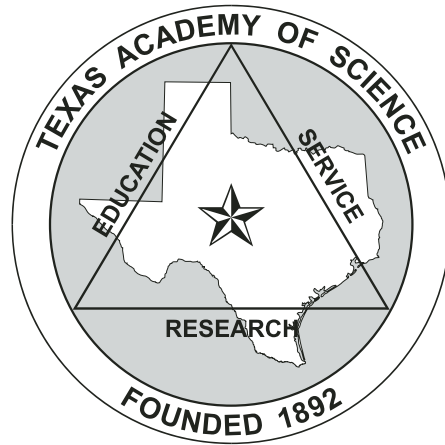


# 111th Annual Meeting of the Texas Academy of Science



## PROGRAM and ABSTRACTS



March 6–8, 2008  
Texas A&M University–Corpus Christi  
Corpus Christi, Texas



2008 PROGRAM CHAIR

**Ray Mathews**

PROGRAM EDITOR

**Bob Murphy**

PROGRAM SPONSOR

**Texas Parks and Wildlife Department**

# SCHEDULE OF EVENTS

## THURSDAY – MARCH 6, 2008

2:00 – 5:00pm	TAS Board Meeting	University Center Bayview Room
3:00 – 6:00 pm	Pre-Conference Check-In/Late Registration	University Center Lone Star Concourse
6:00 – 8:00 pm	Welcome Mixer	University Center Oso Room

## FRIDAY – MARCH 7, 2008

7:30 am – 9:00 am	Conference Check-In/Late Registration	University Center Lone Star Concourse
7:30 am – 9:00 am	Breakfast/Morning Refreshments	University Center Legacy Hall
7:30 am – 7:00 pm	Exhibits – Vendor Displays	University Center Lone Star Concourse
8:00 am – 5:00 pm	Poster Sessions	Faculty Center
8:00 am – 10:00 am	Paper Sessions/Presentations	University Center Center for Instruction Center for the Sciences Harte Research Institute
9:40 am – 10:00 am	Mid-Morning Break (Drop In)	University Center Legacy Hall
11:30 am – 1:00 pm	Lunch	University Center Lone Star Ballroom
1:00 pm – 5:00 pm	Paper Sessions/Presentations	University Center Center for Instruction Center for the Sciences Harte Research Institute
2:00 pm – 2:45 pm	2008 Distinguished Texas Scientist (DTS)	University Center Lone Star Ballroom
2:45 pm – 3:30 pm	DTS Q&A Session – Students Only	University Center Lone Star Ballroom
3:30 pm – 4:00 pm	Mid-Afternoon Break (Drop In)	University Center Legacy Hall
3:00 pm – 4:00 pm	TAS Business Meeting	Center for Instruction Room 138
4:00 pm – 5:00 pm	2008 Outstanding Texas Educator (OTE)	Center for Science Room 101
5:00 pm – 5:30 pm	OTE Q&A Session – Students Only	Center for Science Room 101
5:15 pm – 5:45 pm	All Section Chairs Meeting	Science & Technology Room 101
6:00 pm – 7:00 pm	Banquet Reception	University Center Legacy Hall
7:00 pm – 9:00 pm	Awards Banquet	University Center Lone Star Ballroom

## SATURDAY – MARCH 8, 2007

7:30 am – 9:00 am	Breakfast/Morning Refreshments	Center for Instruction Atrium
8:00 am – 12:00 pm	Paper Sessions/Presentations	Center for Instruction
8:00 am – 12:00 pm	Geology Field Trip	Jelly Fish Parking Lot



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## FUTURE ACADEMY MEETINGS

2009 112th annual meeting .....Texas Tech University Field Station at Junction, Junction, Texas

## ACKNOWLEDGEMENTS FROM THE PROGRAM CHAIR

As any past Program Chair will tell you, the task of putting together the Annual Program for the Texas Academy of Science is daunting. Before I even started on the work, several of the Past-Presidents offered their condolences, which let me know I was going to face a significant challenge. In meeting with those challenges, there are many people that helped me get to the final product.

Dr. Pati Milligan, our webmaster from Baylor University's Computer Information Systems Department, provided custom features in the MyReview software package that we used for just the second time for abstract submissions. Those of you who submitted abstracts did so by uploading them to this software, and it was very helpful for organizing the papers in the various Sections of the Academy by membership type (student or senior member). The papers could then be filtered into different categories for assigning them to sessions, rooms, and times, and alerting judges of those posters or presentations that need to be evaluated for student awards.

Dr. Roy Lehman, Local Host, and Crystal Seehorn, Events and Conference Manager, TAMU-CC were very helpful in determining what rooms in the various campus buildings were available for the Annual Meeting sessions, registration, banquet, symposium, and lectures by the Distinguished Texas Scientist and Outstanding Texas Educator among other activities associated with our program. Crystal went through numerous changes with me in the rooms to accommodate the largest meeting the academy has ever had, with 340 abstracts submitted, and her patience and work on our behalf is greatly appreciated. Dr. Hudson DeYoe was always there to answer questions about how he approached problems with last year's program. Dr. Bill Quinn helped provide information on the awards for the program, and gave me information that was necessary for student presentations to be judged. Joseph Kowalski, Center for Subtropical Studies at The University of Texas-Pan American organized an international symposium entitled "Exploration of estuarine linkages: A symposium on physical, chemical, and biological connections on the coastal fringe." The Academy's Board of Directors; Dr. Larry McKinney, Director of Coastal Resources for the Texas Parks and Wildlife Department; Dr. Bob Ferguson, Director, and Dr. Wes Tunnell, Associate Director of the Harte Research Institute, combined their resources to provide funding for travel expenses to our Mexican colleagues and internationally recognized invited speakers.

The program itself could not be produced without the help of Bob Murphy, Artificial Reef Specialist, and Chris Hunt, Graphic Designer, with the Texas Parks and Wildlife Department. Chris has worked on the graphic design for the Academy's program for eight years, and her expertise is of considerable benefit to those of you who use the program each year to find your way to the various sessions and other activities. Bob Murphy has made a special effort to honor our deceased colleague, Dr. Amir-Moez, Mathematics Professor Emeritus, distinguished colleague, and benefactor to the Academy for many years through development of a poster in his honor.

If it were not for your presentations and posters in numerous scientific disciplines, serving as chairs, vice-chairs, moderators, and judges of the various sessions, the Academy would not function, and I am honored to be of service to such an outstanding group of individuals.

Finally, I would like to thank my colleagues and administrators with my employer, the Texas Water Development Board, for allowing me the time and resources to work on this program on behalf of the Texas Academy of Science.

Ray Mathews

## LETTER OF WELCOME FROM THE TAS PRESIDENT

Greetings fellow scientists! For many of you this may be the first (but hopefully not the last!) scientific meeting you attend. Some of you may be anxious about making your first presentation (I still remember my first time!). Since at least 50% of the papers and posters presented at TAS meetings are student-authored, take solace in that you are not alone! TAS prides itself as being a training ground for aspiring scientists. It is here that you can gain personal insight as to your interest and aptitude in science. Take the time to mingle with fellow students and senior scientists from outside your institution. Science doesn't happen in a vacuum; a big part of science is communicating ideas. You can learn a lot very quickly and have fun at the same time!

At the time I am writing this letter (January), there is a move in Texas to incorporate creationism and intelligent design in the science curricula of Texas schools. We, as scientists, are partly responsible for this situation. I think it is the responsibility of scientists not only to educate each other but to educate the public about science as well. In this case, it means doing what we do best, explaining our positions employing a dispassionate, unbiased look at the evidence. Our goal should not be to espouse one view or another, but to separate the wheat from the chaff and to help the public to sort through the issue. Regardless of your beliefs, as a scientist, our goal should be to use, and promote the use of logic and rational, fact-based reasoning. Towards this end, all scientists have an obligation to be scientist-citizens meaning that besides their other duties scientists should regularly reach out to the public by giving public lectures, getting involved in local government, running for the school board, giving time to your local schools, or writing articles for the popular press. Use your talents as scientists to bring clarity of thought to issues, whatever your personal beliefs may be. But don't be silent.

Have a productive and stimulating meeting,

Hudson R. DeYoe  
President

# Texas A&M University-Corpus Christi

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## WELCOME TO THE ISLAND UNIVERSITY TEXAS A&M UNIVERSITY-CORPUS CHRISTI

February 4, 2008

Dear Members of the Texas Academy of Science,

On behalf of our faculty, staff and students, I welcome you to our campus. My colleagues and I are excited to host the 111<sup>th</sup> meeting of the Texas Academy of Science. It has been over 25 years since we have had the privilege of hosting your society. The Texas Academy of Science is one of the oldest science organizations in the state of Texas with its origins in the 19<sup>th</sup> century. The meeting promises to be the largest meeting to date and has an international connection as scientists and students from Mexico will be presenting and attending.

Our campus is celebrating its 60<sup>th</sup> birthday! Texas A&M University-Corpus Christi is a unique campus that is situated on a coastal island. The campus has pathways throughout the 240 acre campus that are lined with tropical vegetation, a beach along Ocean Drive and is surrounded by natural wetlands. I hope that you will explore our campus beyond the facilities which will be housing your organized events. And don't miss the opportunity to enjoy the City of Corpus Christi and the beautiful Texas Coastal Bend.

Again, I welcome you to the Island University and hope that you have an enjoyable and productive visit.

Sincerely,

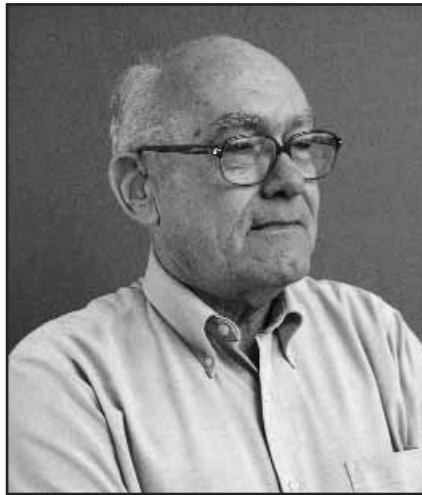


Frank Pezold, Dean  
College of Science and Technology





## 2008 DISTINGUISHED SCIENTIST



### **Dr. Ernest L. Lundelius, Jr.**

Dr. Ernest L. Lundelius, Jr., is descended from a pioneering Central Texas Swedish family. He is a product of Austin public schools, although his mother, a schoolteacher, fostered lifetime learning at home. Fossils and animals have fascinated Dr. Lundelius since his early childhood. He was always interested in finding the origin of things, and he collected his first Cretaceous invertebrate fossil was collected as a young boy. He carried the fifteen-pound *Inoceramus unbonatus* specimen home with some difficulty, and now, over 70 years later, it sits on his hearth. Dr. Lundelius collected Cretaceous invertebrate fossils for many years, but was always more interested in the vertebrates.

Dr. Lundelius earned the Bachelor of Science degree in Geology from the University of Texas in 1950, following military service in the Philippines. The University of Chicago conferred his Ph.D. in Paleozoology in 1954. He mentored several generations of undergraduate and graduate students at the University of Texas at Austin after arriving on its campus as a junior faculty member in 1957. In the intervening half century, he taught in the Geology Department, occupying an endowed chair as the John A. Wilson Professor of Vertebrate Paleontology. Since retiring from active teaching in 1998, he has continued to guide students as the John A. Wilson Emeritus Professor of Vertebrate Paleontology. During the 1980s and 1990s, he was also Director of the Texas Memorial Museum-Vertebrate Paleontology Laboratory, now the Texas Natural Science Center-Vertebrate Paleontology Laboratory. After completing his doctorate, Dr. Lundelius studied Pleistocene and post-Pleistocene faunas in Western Australia. This fieldwork was supported by a Fulbright Fellowship and followed by a post-doctoral fellowship at the California Institute of Technology in 1956-57. Upon arriving at UT-Austin, he pursued research interests centering on Plio-Pleistocene and Holocene mammals in North America (mostly Texas) and Australia, with emphasis on how environmental changes affect faunal changes. Applying quantitative techniques to paleontological problems, he and his students address issues in taxonomy and zoogeography. Dr. Lundelius has participated extensively in the debate on the causes of the Late Pleistocene mammalian extinctions. His strong interest in analyzing nonhuman skeletal material from archaeological sites has made him well known to archaeologists from Texas to the Middle East. His research has contributed to the scientific literature throughout his career and has been published in the United States, Europe, and Australia. It illustrates his long-term collaboration with many researchers in geology and related fields.

Dr. Lundelius has received many grants and awards, including eight National Science Foundation grants that supported his research with his students. The grants also improved management of Quaternary fossil collections and associated data at the Texas Memorial Museum-Vertebrate Paleontology Laboratory and at other institutions in the U.S. Additional awards and grants have come from the Fulbright Foundation (Senior Scholar Award), the Wenner-Gren Foundation, and Earthwatch. He has led scholarly societies at the local, state, and national levels, including the Austin Geological Society (President, 2007), the Texas Academy of Science (President, 1975), and the Society of Vertebrate Paleontology (President, 1981). He is a Fellow of the American Association for the Advancement of Science (1983). Dr. Lundelius is an active member in the Society for the Study of Evolution, the Geological Society of America, the Society of Economic Paleontologists and Mineralogists, Sigma Xi, the National Association of Geology Teachers, the American Society of Naturalists, the American Association for the Advancement of Science, the American Society of Mammalogists, and the Austin Geological Society. As he has been for decades, Dr. Lundelius remains an active member of the Texas Academy of Science.

## 2008 OUTSTANDING TEXAS EDUCATOR



### **Carolyn Kelley Barnes** **Vidor Independent School District**

Carolyn K. Barnes is completing her seventeenth year of service as a teacher in Texas' public schools. Currently, she teaches science to eighth graders at Vidor Junior High School. She has worked for Vidor ISD since 1995. Initially, she began teaching science and Spanish in the Middle School Magnet Program and then transferred to the Junior High where she taught both in regular and inclusion classrooms. She has been active as a UIL Sponsor and in incorporating JASON and Lamar University's Scientists in Schools program into her curriculum. Prior to moving to Vidor, she taught science, mathematics and other subjects at Zavalla Elementary School. While excelling in her teaching, she is working toward a Master of Science degree in Secondary Education with a specialization in Environmental Science at Lamar University in Beaumont. She hopes to complete the Master Science Teacher Specialization as well. Previously, she earned a Bachelor of Science in Elementary Education with a specialization in Biology at East Texas Baptist University in Marshall.

Mrs. Barnes emphasizes the importance of a learning environment where students can explore ideas without fear of criticism. Her goals are to help her students learn to solve problems by thinking critically for themselves, and to help every student reach her/his potential as they discover the world around them. Her colleagues repeatedly cite the strength of her commitment to education in a diverse environment, and she has been particularly successful in developing her students' skills in inclusion classes. Ms. Barnes embraces the opportunities provided by the extraordinary diversity of student skills and aptitudes in those inclusion classes, using that diversity to raise the performance of all of her students. The quality of her teaching not only empowers her students, it inspires and motivates their parents and her colleagues.

## 2008 TAS FELLOW

### **Dr. Alfonso Correa Sandoval** **Instituto Tecnológico de Cd. Victoria**

Dr. Alfonso Correa-Sandoval has been at the Instituto de Cd. Victoria for over twenty years, where he is also the Curator of the Mollusk Collection. He has been awarded numerous grants to support his research on the taxonomy, zoogeography, and ecology of terrestrial, marine and freshwater mollusks of Northeastern Mexico. He has presented his research findings at over fifty professional meetings, and published nearly thirty papers in internationally recognized journals, including the *Texas Journal of Science*. In 2005, he co-edited and published two manuscripts in the inaugural volume of *Biodiversidad Tamaulipeca*, an extensive review of the biological diversity of his home state. He has authored or co-authored a number of presentations at the annual meetings of the Academy, he has served as President of the Sociedad Mexicana de Malacología, and he has been a member of the Sistema Nacional de Investigadores since 1996.

## 2008 OUTSTANDING SERVICE AWARD

### **Dr. Ned Strenth**

After earning degrees in zoology and biology at the University of Texas, Southwest Texas State University and Texas A&M University, Dr. Ned Strenth settled into a productive career of research and teaching at Angelo State University in 1979. He was active in the Texas Academy of Science early in his career, making the first of over fifteen presentations at the annual meeting in 1974. He was named a Fellow of the Academy in 1982. In addition to serving as the President in 1994-95, Dr. Strenth has been a Board Member for well over a decade, and he has served tirelessly as the Managing Editor of the *Texas Journal of Science*. Among his many contributions is his advocacy for student members. He initiated the awards for collegiate and graduate student awards, paying for part of the first series of awards personally. He has also mentored many of our new and long-time members through his wit and wisdom. The Academy is pleased to honor him for his sustained contributions to the success of the Texas Academy of Science.

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## TEXAS ACADEMY OF SCIENCE MEMORIAL TRIBUTES



### DR. ALI REZA AMIR-MOEZ

Dr. Ali Reza Amir-Moez, a mathematician, educator, author, actor, artist, dancer, world traveler, and true humanitarian, passed away August 25, 2007, at his home in Lubbock. Ali was born and raised in Teheran, Persia, April 7, 1919. He was the youngest son of Mohammad and Fatema (Gorgestani) Amir-Moez. Dr. Amir-Moez was nurtured in the Moslem faith, but considered himself as a Universal Theist. He was a man of great faith and great love of all man kind. During World War II, 1936–1938, he served in the Persian Army, as a 2nd Lieutenant, and was decorated Honor Emblem Persian Royal Court.

He earned his BA at the University of Teheran in 1942, and served as a Math Instructor at Teheran Technical College from 1942–1946. Following his immigration to the United States in 1947, his first love was drama and the performing arts, however, he was forced to study math to receive an extension on his visa, and thus he continued his education earning his MA in 1951, and PhD in 1955, both from UCLA, Las Angeles, California. He served as a Professor of Math at the University of Idaho; Queens College, New York City; Purdue University; University of Florida, Gainesville; Clarkson College, Potsdam, New York; and Texas Tech University, Lubbock. Dr. Amir-Moez was dedicated to mathematics research and established scholarships at both Texas Tech University and the University of California at Los Angeles. In 1975, he was awarded the medal of Pro Mundi Beneficio, Academia Brasileira De Ciencias Humanas.

He became Professor Emeritus at Texas Tech University in 1988. Prior to suffering a stroke in 2004, Dr. Amir-Moez was an active member of the Texas Academy of Science; American Mathematical Society; Mathematical Association of America; Sigma Xi; Pi Mu Epsilon; Kappa Mu Epsilon; and New York Academy of Science.

He was the author of several books including *Elements of Linear Space*, *Extreme Properties of Linear Transformations and Geometry in a Unitary Space*, *Classes Residues et Figure ance Ficelli*, and plays including *Kaleeleh and Demneh* and *Three Persian Tales*. His publications include over 150 papers, articles, and books; and he was often featured in *Highlights for Children*. Dr. Amir-Moez was fluent in four languages, including English and Persian, and was able to translate many more.

He was a long time member and benefactor of the Texas Academy of Science, and he founded the Amir-Moez Fund in 2000 with an initial gift of \$5,000 to endow the award for the best student paper in the Mathematics Section. The first award was made at the TAS Annual meeting in San Marcos. He continued to make annual contributions to the endowment, which now has \$17,243. About \$2,400 in Math-related awards have been given out since 2001. No other single benefactor has been so generous to the Academy.



*Tribute by Ray Mathews, President-elect & Program Chair*



## DR. CLARK HUBBS

March 15, 1921 – February 3, 2008

It's with great sadness that we share the news that Dr. Clark Hubbs passed away Sunday, February 3. He died at the age of 86, after a battle with cancer, at home in the care of his wife, Cathy, and three children. The Texas Chapter of the American Fisheries Society offers our condolences to Cathy and their whole family, who have been such wonderful friends and colleagues to the Chapter. Clark was born March 15, 1921 and was the second child of noted naturalists Carl and Laura Hubbs. He developed a love for the science of fisheries biology at an early age. His parents paid Clark and his sister and brother five dollars for collecting a new genus and one dollar for collecting a new species. They also paid them five cents for each species collected. Not surprisingly, Clark became an ichthyologist, a scientist who studied fish and truly loved his chosen profession.

During World War II, he served in the army in the 96th Infantry Division Headquarters, including the invasions of Leyte and Okinawa. After the war, he obtained his PhD from Stanford in 1951 under the GI bill. He met his wife of 58 years, Catherine, while on a field trip with the Stanford Natural History Club.

In 1951, Clark Hubbs became an assistant professor of zoology at the University of Texas and subsequently became an associate and then full professor. From 1974 to 1976, he was chairman of the Biology Department, and from 1978 to 1986 he was chairman of the Zoology Department. He was professor emeritus at the time of his death. During his long career, he published more than 300 articles. He was still collecting field data for his studies in January 2008. He was editor of *Copeia*, the journal of the American Society of Ichthyologists and Herpetologists for more than a decade, and a former president of the Texas Chapter of the American Fisheries Society, American Society of Ichthyologists and Herpetologists, the American Institute of Fisheries Research

Biologists, the Southwestern Association of Naturalists, Texas Organization for Endangered Species, and the Texas Academy of Science. He was Chair Emeritus Science Committee Hubbs-Sea World Research Institute. He was a tireless supporter of the Texas Academy of Science, Edwards Aquifer, and protection of endangered species. Four different species were named after him.



*Clark Hubbs sampling fish on the Rio Grande.*



In addition to Dr. Hubbs many professional accomplishments, he was a great asset to the mission of the Texas Academy of Science. Dr. Hubbs was also a founding member and the only Leader of the Rio Grande Fishes Recovery Team for its 30-year history. Under his leadership, the team was an active force in conservation of fishes in west Texas and southern New Mexico. He was instrumental in furthering fisheries research in Texas and a staunch advocate for preventing extinction of many rare species. He also played a pivotal role as an expert witness in the litigation of the Edwards Aquifer for the protection of spring flows for endangered species. Dr. Clark Hubbs will be greatly missed, but his legacy will live on in his students, his research and his inspiration for the next generation of conservation scientists.

Besides being a brilliant fisheries biologist, it is noteworthy to mention that Dr. Hubbs was a character. As an example, when we were returning from a sampling trip on the Rio Grande, he made me stop at several streams to sample the Western Mosquitofish, one of his favorite fish species for distributional ecology and population structure. I could not determine how he was evaluating what streams he had me stop at, and so I finally asked him. He said he just liked the name of them, such as "Woman Hollering Creek," near San Antonio. He said he just had to sample the fish species in a creek with a name like that. My heart is heavy with sadness, but I also have to smile a little when I remember those times spent with my friend, colleague, and mentor: Dr. Clark Hubbs.

There are many students who have strong feelings about their association with Dr. Clark Hubbs. Here is one of them, from former student Fred Stevens, TAS Executive Secretary: "I owe a great debt to Clark Hubbs. I came to Texas specifically to do graduate work under his direction. During those years in Austin in the 1970s I was a beneficiary of his sharp mind, his integrity, and his absolute commitment to quality scientific work. He always expected the best from his students and would accept nothing less. I will always think of myself as a Hubbs' student. This is one of the deepest and most stable elements of my identity. Hubbs students are not so much members of an academic society as they are members of an extended family. I know that I can never pay back this debt, but I can pay it forward – to the next generation. Service to the Texas Academy of Science is one way for me to accomplish this."

Clark Hubbs was preceded in death by his mother, father, and two sisters, Marjorie Anne Hubbs and Frances Miller. He is survived by his wife, Catherine, his brother Earl, daughters Laura Hubbs: Tait and Ann Hubbs, son John Hubbs and four grandchildren, Aaron and Aiden Tait, Eric Hubbs, and Adam Weissman as well as hundreds of students, colleagues, and friends. In lieu of flowers, the family suggests donations to the Hubbs-Sea World Research Institute ([www.HSWRI.org](http://www.HSWRI.org)) or a charity of your choice. Memorial services were held at the Congregational Church and reportedly will be held at numerous scientific meetings. The Texas Chapter of the American Fisheries Society will also provide tribute to Dr. Hubbs in our next Annual Meeting.



*Tribute by Ray Mathews, President-elect & Program Chair*



## Exploration of Estuarine Linkages:

### A symposium on physical, chemical, and biological connections on the coastal fringe

Estuaries are situated between the expanse of the open ocean and the coastal fringe, increasingly populated and influenced by humans. This symposium highlights research that explores the influences which affect the unique position of the estuary and the ecotones linking the coastal fringe and open ocean. The symposium venue, the Harte Research Institute (HRI) for Gulf of Mexico Studies at Texas A&M University–Corpus Christi, is conveniently located between two estuaries—Corpus Christi Bay and Oso Bay, along the coastal bend of Texas. As a consequence of the meeting locality along the Texas coast, the Center for Subtropical Studies at The University of Texas–Pan American, in conjunction with HRI, Texas Parks and Wildlife Department, Coastal Fisheries Division, and the Texas Academy of Science, organized this symposium to explore how estuaries are affected by two connected, but disparate ecosystems. Symposium planners sought to involve researchers from a wide array of coastal biology disciplines. We are fortunate to have four invited speakers and numerous other researchers from universities and institutions from the State of Texas accept the offer to contribute to the symposium.



Jim Fourqurean, with the Southeast Environmental Research Center at Florida International University, accepted our invitation as plenary symposium speaker. Jim has more than 50 peer-reviewed articles in topics such as biogeochemistry of the coastal ocean, nutrient cycling in the marine environment, primary productivity of aquatic systems, seagrass physiological ecology, and ecosystem modeling.



Brigitta van Tussenbroek, with Instituto de Ciencias del Mar y Limnología (ICML) and Universidad Nacional Autónoma de México (UNAM) in Puerto Morelos, México, focuses her research on the study of marine macrophytes of seagrass beds (principally, the dominant species *Thalassia testudinum*), towards contributing to the general knowledge of seagrasses in reef systems. Her studies are mainly ecological, but also involve histology, demography, photobiology, and population genetics, to name but a few.



Sharon Herzka is an up-and-coming scientist studying recruitment process in the early stages of marine fish and larvae, the ecology of stable isotopes, and estuarine ecology with the Departamento de Oceanografía Biológica, Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE) in Ensenada, Baja California, México.



Jim Kaldy is with the Western Ecology Division of the U.S. Environmental Protection Agency in Newport, Oregon, where his research interests include developing a mechanistic understanding of the factors that regulate marine macrophyte production and the fate of that production. He uses a multidisciplinary, integrative approach that couples field, laboratory and stable isotope studies with modeling. As a result, he addresses both basic and applied research questions at multiple spatial and temporal scales. Of particular interest to Jim are the biogeochemical linkages between aquatic plants, other communities and estuarine and coastal carbon and nitrogen processing.

Finally, we gratefully acknowledge and thank Texas A&M University–Corpus Christi (\$5,000), Larry McKinney with Texas Parks and Wildlife Department Coastal Fisheries Division (\$5,000), and the Texas Academy of Science (\$10,000), for their generous financial support. Logistical support for the symposium was provided by HRI director Bob Furgason and associate director Wes Tunnell, without whose assistance this endeavor would not have been a success.

Joseph L. Kowalski, Symposium Chair  
Center for Subtropical Studies and Department of Biology, The University of Texas–Pan American

# 2008 PROGRAM AGENDA

## Codes indicate the following:

- NS Non-student
  - U Undergraduate Student
  - G Graduate Student
  - P Poster
- \* Indicates presenting author

## ATTENTION UNDERGRADUATE POSTER AUTHORS

All undergraduate students need to be by their posters for the 9:40–10:00 a.m. break, and from 12:15–12:40 p.m. on Friday, March 8, in the Faculty Center in order for judges to ask questions of students about their posters for the student award competition.

## SPANISH PRESENTATIONS

At the time of the printing of the Program, we are finalizing plans to have a Spanish translator for all the FMS presentations in UC-106B.

## GEOLOGY FIELD TRIP NOTICE

Terrace Stratigraphy and Paleontology of the Nueces River Valley  
Leaders: Jon Baskin and Ronny Thomas, Texas A&M University–Kingsville

The field trip will depart TAMU-CC Saturday at 8 AM, last 3-4 hours and people can caravan. Meet in the Jellyfish Parking Lot. The gravel pit we will visit is about 30 miles west of Corpus Christi. Along the way we will be examining the terrace stratigraphy of the lower Nueces River Valley and relate it to sea level changes over the past 120,000 years. At the gravel pits, if there is relatively easy access and we don't have more than about 20 people, we will descend into the pit (possibly by rope) to examine channel, point bar, and overbank deposits. We will then examine piles of unsorted and sorted material excavated from the pit for early Pliocene and late Pleistocene fossils (see Jon Baskin's website for background information <http://users.tamuk.edu/kfjab02/SOTXFAUN.htm>). We will also look at the cobbles (consisting of Miocene petrified wood, Cretaceous cherts from the Hill Country, Paleozoic cherts from the Transpecos, volcanics and metamorphics from Mexico, West Texas and beyond, etc.) to provide an example of cycles of erosion and deposition.

## DISCLAIMER

Despite efforts of the editors, some errors and misspellings may be found in the program. Every attempt was made to correct obvious errors.

**ANTHROPOLOGY**  
**Session I**  
**Friday, March 7 • CS-115**

- 4:00 NS 70 APPROPRIATE SCALES AND BUNNY TALES: USING SMALL HERBIVORES FROM ARCHAEOLOGICAL SITES IN ECOLOGICAL RECONSTRUCTION.  
Leonard Kemp, Cynthia Munoz, Debajyoti Paul, Grzegorz Skrzypek, Robert Hard, Raymond Mauldin\*, University of Texas at San Antonio–Center for Archaeological Research.
- 4:20 NS 304 THE FISH FAUNA FROM ARENOSA SHELTER (41VV99), LOWER PECOS REGION, TEXAS.  
Christopher J. Jurgens, Texas Archeological Research Laboratory, The University of Texas at Austin, and Texas Water Development Board.

**ANTHROPOLOGY POSTERS**

- G 205 A COMPARISON OF ISOLATED TEETH AND INTACT JAWS FOR RECONSTRUCTING PALEOENVIRONMENT.  
Sophia Aguayo, Megan Oadra, and Patrick J. Lewis, Sam Houston State University.

**BOTANY**  
**Session I**  
**Friday, March 7 • UC-307**

- 8:00 NS 42 ANALYTICAL METHODOLOGY FOR RELIABLE IDENTIFICATION OF FIBER PLANTS USED TO MANUFACTURE ARCHAEOLOGICAL ARTIFACTS.  
Sherida G. Tripp, Sul Ross State University, Alpine, TX.
- 8:20 NS 51 *ZANTHOXYLUM PARVUM* (RUTACEAE): A RARE WEST TEXAS ENDEMIC, SAFE AT LAST?  
James C. Zech, Department of Biology, Sul Ross State University, Alpine, TX.
- 8:40 NS 91 BRYOPHYTE COMMUNITIES ACROSS A RANGE OF NATURAL EAST TEXAS ECOLOGICAL TYPES.  
Melia P. Huston and James E. Van Kley\*, Stephen F. Austin State University, Nacogdoches, TX.
- 9:00 G 108 SEED DISPERSAL BY AMERICAN BLACK BEARS (*URSUS AMERICANUS*) IN BIG BEND NATIONAL PARK, TEXAS.  
Justin D. Cenicerros\*, Andrew R. Berezin, and Steven G. Platt, Department of Biology, Sul Ross State University, Alpine, TX.
- 9:40 Break**
- 10:20 NS 164 DISTRIBUTION AND GERMINATION OF COMMON GULF COAST *HELIANTHUS* SPECIES ON TWO SOIL TYPES.  
Sean M. Thompson\*, David J. Gris  and R. Deborah Overath, Department of Life Sciences, Texas A&M - Corpus Christi, Corpus Christi, TX.
- 10:40 U 203 CONTENT MANAGEMENT SYSTEMS IN BIOLOGICAL SURVEYS: AN EXAMPLE FROM A FLORISTIC SURVEY OF RUSH CREEK, TYLER COUNTY, TEXAS.  
Jeffrey G. Pittman\*, Department of Geology and Randall G. Terry, Department of Biology, Lamar University, Beaumont, TX.
- 11:00 NS 233 NOTEWORTHY BRYOLOGICAL COLLECTIONS FROM SOUTH TEXAS.  
Cynthia M. Galloway\* and Arielle McEwin, Department of Biological and Health Sciences, Texas A&M University–Kingsville, Kingsville, TX.

- 12:00**                    **Lunch – UC-142 ABC**
- 2:00**                    **Distinguished Texas Scientist Lecture and 2:45 Q&A (students only) – UC-142 Lone Star Ballroom**
- 3:00**                    **TAS Business Meeting – CI-138**
- 4:00    U        246    COMPARISON OF GERMINATION RATES OF TWO MORPHOTYPES OF SUNFLOWER SEEDS.  
Eric Soto\* and Kirk Cammarata, Texas A&M University–Corpus Christi, Corpus Christi, TX.
- 4:20    NS        261    DETERMINING THE RELATIONSHIP BETWEEN *CYANOSPORA ALBICEDRAE* (ASCOMYCOTA: STICTIDACEAE) AND *JUNIPERUS ASHEI* (MAGNOLIOPHYTA: CUPRESSACEAE).  
Samuel A. Miller\* and David E. Lemke, Department of Biology, Texas State University, San Marcos, TX.
- 4:40    NS        262    DISTRIBUTION OF OSMOPHORES IN THE CARRION FLOWERS (APOCYNACEAE, ASCLEPIADOIDEAE).  
David E. Lemke\* and Kort A. Angerstein, Department of Biology, Texas State University, San Marcos, TX.
- 5:15**                    **All Section Chairs Meeting – S&T-101**

## BOTANY POSTERS

- NS        P139    STOMATAL VARIABILITY AS CORRELATED WITH LEAF MORPHOLOGY IN *SMILAX BONA-NOX* L.  
Yao Wei Lu\* and Herbert D. Grover, Department of Biology, Hardin-Simmons University, Abilene, TX.
- NS        P180    RELATIONSHIPS BETWEEN POLLEN WALL STRUCTURE AND STIGMATIC SURFACES FOR SELECTED TAXA.  
Oksana O. Martyniuk\* and James E. Van Kley, Stephen F. Austin State University, Nacogdoches, TX.
- NS        P186    GERMINATION OF TWO SUNFLOWER SPECIES ACROSS A SALT GRADIENT.  
Hector G. Aguilar\*, Sean M. Thompson, David J. Gris  and R. Deborah Overath, Department of Life Sciences, Texas A&M-Corpus Christi, Corpus Christi, TX.
- NS        P225    COMPARATIVE ULTRASTRUCTURE AND X-RAY ELEMENTAL ANALYSIS OF FRUITS WITHIN FAMILY APIACEAE.  
Fawzia Abdel-Rahman and Mahmoud A. Saleh, Department of Biology, Texas Southern University, Houston, TX.

## CELL AND MOLECULAR BIOLOGY

### Session I

### Friday, March 7 • CI-126

- 8:00    G        158    ALUMINUM INFLUX VIA A CALCIUM CHANNEL IN THE ROOT TIP CELLS OF THE WINTER WHEAT (*TRITICUM AESTIVUM* L.) CULTIVARS AL-TOLERANT ATLAS 66 AND AL-SENSITIVE SCOUT 66.  
Junie A. Leblanc\* and Magaly Rinc n-Zachary, Department of Biology, Midwestern State University, Wichita Falls, TX.
- 8:20    U        140    PUTATIVE ROLE OF CALCINEURIN IN THE REGULATION OF DAF-16 AND ASSOCIATIVE LEARNING IN *CAENORHABDITIS ELEGANS*.  
Harmanpreet Buttar\* and Fidelma A. O’Leary, St. Edward’s University, Austin, TX.
- 8:40    U        5        TEMPORAL VARIATION OF MYOGLOBIN CONCENTRATION IN FLIGHT AND CARDIAC MUSCLE OF THE MEXICAN FREE-TAILED BAT (*TADARIDA BRASILIENSIS*).  
Ashlee R. Stiles\* and David S. Marsh, Department of Biology, Angelo State University, San Angelo, TX.
- 9:00    U        4        THE GENOTOXIC EFFECTS OF ANTHRACYCLINES IN PROKARYOTIC AND EUKARYOTIC CELLS.  
William J. Mackay\*, Edinboro University of Pennsylvania, Edinboro, PA.

- 9:20 G 184 EFFECTS OF EXOGENOUS MELATONIN ON TOBACCO (*NICOTIANA TABACUM* CV. HAVANA) SEED GERMINATION AND SEEDLING DEVELOPMENT.  
Liliane Haden\* and Magaly Rincón-Zachary, Department of Biology, Midwestern State University, Wichita Falls, TX.
- 9:40 Break**
- 10:00 U 188 NUCLEAR IMPORT OF HUMAN IMMUNODEFICIENCY VIRUS TYPE-1 (HIV-1) INTEGRASE IN *SACCHAROMYCES CEREVISIAE*.  
J. David Dominguez\*, Megan Mazour, Miguel Palacios, Kathleen Taylor-Prese, and Peter J. King, St. Edward's University, Austin, TX.
- 10:20 U 247 TARGETING FOXO TRANSCRIPTION FACTORS BY NATURAL DIETARY AGENTS FOR THERAPY OF CANCER.  
Shishir Shishodia, Department of Biology, Texas Southern University, Houston, TX.
- 10:40 U 303 IDENTIFICATION AND CHARACTERIZATION OF *DROSOPHILA* RECEPTOR EXPRESSION ENHANCING PROTEIN (REEP) HOMOLOGS.  
Ravi R.C. Lala\* and Enrique Massa, Texas A&M University–Kingsville, Kingsville, TX.
- 11:00 NS 228 ARE CIS-REGULATORY MUTATIONS A MAJOR CONTRIBUTOR TO PHENOTYPIC CHANGE?  
Lisa M. Goering\*, St. Edward's University, Austin TX, Priscilla Hunt, Cassandra Heighington, and Greg Gibson, North Carolina State University, Raleigh, NC.
- 11:30 Lunch – UC-142 ABC**
- 12:40 U 78 MICROBIAL POPULATION ANALYSIS AS A TOOL FOR ECOLOGICAL CLASSIFICATION.  
Darya Fakhretdinova\*, James E. Van Kley, Armen Nalian, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX.
- 1:00 NS 81 DEVELOPMENT OF REAL-TIME PCR ASSAY FOR QUANTIFICATION OF *EIMERIA TENNELA* AND *ACERVULINA* OOCYSTS IN FECAL SAMPLES.  
Marina Maksimova\*, Armen Nalian, Irina Teplova, Alexandra Martynova VanKley, Stephen F. Austin State University, Nacogdoches, TX.
- 1:20 G 90 URANIUM ACETATE INDUCES OXIDATIVE STRESS AND ACTIVATES APOPTOSIS SIGNALING PATHWAY IN RAT LUNG EPITHELIAL CELLS.  
Adaikkappan Periyakaruppan\*, Prabakaran Ravichandran, Bindu Sadanandan, Govindarajan Ramesh, Bobby L. Wilson and Renard L. Thomas, NASA University Research Center, Texas Southern University, Houston, TX.
- 1:40 G 187 AN INVESTIGATION OF ALUMINUM TOLERANCE MECHANISM IN WHEAT (*TRITICUM AESTIVUM* L.) ROOTS: AL EFFLUX.  
Bikash Adhikari\* and Magaly Rincón-Zachary, Department of Biology, Midwestern State University, Wichita Falls, TX.
- 2:00 Distinguished Texas Scientist Lecture and 2:45 Q&A (students only) – UC-142 Lone Star Ballroom**
- 3:00 TAS Business Meeting – CI-138**
- 4:00 U 112 ENVIRONMENTAL PERTURBATIONS ON GROWTH RATES OF *VIBRIO VULNIFICUS* ISOLATES FROM WATERS OF SOUTH TEXAS BAYS.  
Eileen Quiroz<sup>1</sup>, Justin Villarreal<sup>1</sup>, Gregory Buck<sup>1</sup>, Joanna Mott<sup>1</sup>, Alexis Galvan<sup>1</sup>, Gabriel Ramirez<sup>1</sup>, Amanda Smith<sup>1</sup>, Sabrina Imam<sup>1,2</sup>, Gregory Hild<sup>1</sup>, Dan Cooper<sup>1</sup>. <sup>1</sup>Department of Life Sciences, Texas A&M University–Corpus Christi. <sup>2</sup>Cornell University Endowed Colleges, Ithaca, NY.

- 4:20 NS 137 AN INVESTIGATION OF THE EFFECTS OF ALUMINUM ON THE CONCENTRATION OF FREE CYTOPLASMIC CALCIUM USING THE YELLOW CAMELEON (YC 3.60) IN CONJUNCTION WITH FLUORESCENCE RESONANCE ENERGY TRANSFER (FRET) AND SENSITIZED EMISSION.  
Magaly Rincón-Zachary\*, Department of Biology, Midwestern State University, Wichita Falls, TX, Aline H. Valster, Christy M. Motes, J. Alan Sparks, and Elison B. Blancaflor, Plant Biology Division, The Samuel Roberts Noble Foundation, Ardmore, OK.

**5:15 All Section Chairs Meeting – S&T-101**

## CELL AND MOLECULAR BIOLOGY

### Session II

Friday, March 7 • CI-127

- 8:00 U 26 ANALYSIS OF CARBON PREFERENCE INDICATES ALANINE AS A PREFERRED ENERGY SOURCE FOR *PSEUDOMONAS AERUGINOSA*.  
Aissa Longoria\*, Patricia Baynham and Karla Barrera, St. Edward's University, Austin, TX and Lindsay Aye, Kelli L. Palmer and Marvin Whiteley, University of Texas, Austin, TX.
- 8:20 U 67 THE LEUCINE RESPONSIVE REGULATORY PROTEIN (LRP) REGULATES ALANINE CATABOLISM IN *PSEUDOMONAS AERUGINOSA*.  
Karla Barrera\*, Patricia J. Baynham and Aissa Longoria, St. Edward's University, Austin, TX and Lindsay Aye, Kelli L. Palmer and Marvin Whiteley, University of Texas, Austin, TX.
- 8:40 NS 80 ASSEMBLING CHIMERA FROM TWO DOMAINS: HYPERTHERMOSTABLE BETA-1,4-ENDOGLUCANASE AND BETA-GLUCOSIDASE FROM *PYROCOCCUS HORIKOSHII*.  
Srihari Babu Gogineni\*, Nalian Armen, Dr. Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX.
- 9:00 G 88 NANOTOXICOLOGY OF SINGLE WALLED AND MULTI WALLED CARBON NANOTUBES.  
Prabakaran Ravichandran\*, Adaikkappan Periyakaruppan, Bindu sadanandan, Govindarajan Ramesh, Bobby L. Wilson and Renard L. Thomas, NASA University Research Center, Texas Southern University, Houston, TX.
- 9:20 U 232 IMPRINT OF EVOLUTIONARY CONSERVATION AND PROTEIN STRUCTURE VARIATION ON THE BINDING OF PROTEIN KINASE INHIBITORS.  
Aliya Jamil\* and Charles Hauser, Bioinformatics Program, St. Edward's University, Austin TX.

**9:40 Break**

- 10:00 U 251 ROLE OF P44 IN THE CONTROL OF PROLIFERATION AND DIFFERENTIATION OF PROSTATE EPITHELIAL CELLS.  
Onyeoma Joan Uyanwune and Shishir Shishodia, Department of Biology, Texas Southern University, Houston, TX and Dr. Zhengxin Wang, The University of Texas MD Anderson Cancer Center, Houston, TX.
- 10:20 G 252 CHARACTERIZATION OF BIOTIN OPERON IN *PSEUDOMONAS MUTABILIS* USING SEQUENCING.  
Venkatasanka Pedapudi\*, Dr. Beatrice Clack, Stephen F. Austin State University, Nacogdoches, TX.
- 10:40 NS 17 GENETIC VARIATION IN EASTERN OYSTER (*CRASSOSTREA VIRGINICA*) FROM THREE TEXAS BAYS.  
Jacquelyn Reuther\*, R. Deborah Overath, and Delbert L. Smee, Department of Life Sciences, Texas A&M University–Corpus Christi, Corpus Christi, TX.
- 11:00 G 82 PHYLOGENETIC DIFFERENCES OF AMF INHABITING *CALLICARPA AMERICANA* IN EAST TEXAS.  
Elvira Kurmaeva\*, James Van Kley, Armen Nalian, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX.

**11:30 Lunch – UC-142 ABC**

## CELL AND MOLECULAR BIOLOGY

### Session III

Saturday, March 8 • CI-126

- 8:20 NS 179 BACTERICIDAL EFFECTS OF UNDOPED AND Nd-DOPED TiO<sub>2</sub> ON *ESCHERICHIA COLI* UNDER SIMULATED SOLAR IRRADIATION.  
Ashley Walthall\*, Randall Yoder, Department of Biology, and Daniel Chen, Department of Chemical Engineering, Lamar University, Beaumont, TX.
- 8:40 NS 250 CREATING THE NEW WT p53: AN EVOLUTIONARY CHANGE THROUGH ARTIFICIAL SELECTION.  
Georgette Rolle, Olufisayo A Jejelowo, and Shishir Shishodia, Department of Biology, Texas Southern University, Houston, TX.
- 9:00 NS 218 Pd-MODIFIED TITANIA FOR THE CATALYTIC INACTIVATION OF BACTERIA.  
Leah R. Quisenberry\*, Luke H. Loetscher, and Joel E. Boyd, Department of Chemistry, Wayland Baptist University, Plainview, TX

## CELL AND MOLECULAR BIOLOGY POSTERS

- U P301 IMPACT OF OXIDATIVE STRESS, ANTIOXIDANTS, AND POLYUNSATURATED FATTY ACIDS ON MEDIATORS ASSOCIATED WITH ASTHMA.  
Christopher Stevenson\*, Olufisayo Jejelowo and Mario Hollomon, Department of Biology, Texas Southern University, Houston, TX.
- G P117 SPECIATION IN THE MILLEPORE COMPLEX: WHAT CONSTITUTES A SPECIES?  
Logan Squiers\*, Texas A&M Corpus Christi, Corpus Christi, TX, and Peter Lehr, Pavla Brachova, Bob Black, Craig Tepper, Ben Greenstein, Dana Friend, Cornell College, Mt. Vernon, IA.
- G P79 PHYLOGENETIC DIFFERENCES OF AMF INHABITING *TOXICODENDRON RADICANS* IN EAST TEXAS.  
Charles Adams\*, James Van Kley, Armen Nalian, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX.
- G P341 EXPRESSION OF *JUNIPERUS ASHEII* ALLERGENS IN *NICOTIANA* USING A TOBACCO MOSAIC VIRUS VECTOR.  
Zun Liu\* and Christopher M. Kearney, Department of Biology, Baylor University, Waco, TX.
- NS P89 NUCLEIC ACID AND AMINO ACID SEQUENCE OF HEMOGLOBIN FROM THE BRITTLE STAR *OPHIACTIS SIMPLEX* (ECHINODERMATA, OPHIUROIDEA).  
A.B. Christensen\* and E.F. Christensen, Biology Department, Lamar University, Beaumont, TX.
- NS P235 THE CLONING OF A PHOSPHOGLUCOMUTASE GENE FROM *BRYUM RADICULOSUM*.  
Arielle McEwin and Cynthia M. Galloway. Department of Biological and Health Sciences, Texas A&M University-Kingsville, Kingsville, TX.
- U P237 ASSIGNING PROTEIN FUNCTION BY COMPARATIVE GENOME ANALYSIS: *CHLAMYDOMONAS REINHARDTII*.  
GiNell Elliott, Lauren Riedmueller\* and Charles Hauser, Bioinformatics Program, St. Edward's University, Austin, TX.
- NS P269 CLONING AND EXPRESSION OF *ERWINIA CARATOVARA* CELLULASE IN *ESCHERICHIA COLI*.  
Mitra Motaghi\*, Patrick L. Mills, Kim D. Jones, Kenneth W. Escudero and Jean M. Escudero, Texas A&M-Kingsville, Kingsville, TX.
- NS P293 PHOSPHATASE INVOLVEMENT IN E2F ASSOCIATED APOPTOSIS.  
Joe M. Garza\* and Jonathan H. Lieman, University of Texas-Pan American, Edinburg, TX.



- NS P338 CONTRIBUTION OF COMMON VARIANTS IN MODY GENES TO RISK OF TYPE-2 DIABETES IN MEXICAN AMERICANS. L Morales<sup>1</sup>, JH Lieman<sup>1,2</sup>, RJ Leach<sup>2,3</sup>, M Escamilla<sup>2,4</sup>, R Duggirala<sup>6</sup>, MP Stern<sup>2,5</sup>, and DM Lehman<sup>2,5</sup>  
<sup>1</sup>Dept. of Biology, The Univ. of Texas Pan American, Edinburg, TX, <sup>2</sup>S. Texas Medical Genetics Group Univ. of Texas Health Science Center SA, Edinburg, TX, <sup>3</sup>Depts. of Cellular and Structural Biology and Pediatrics, <sup>4</sup>Psychiatry, <sup>5</sup>Medicine/Clinical Epidemiology, The Univ. of Texas Health Science Center, SA, TX, <sup>6</sup>Dept. of Genetics, Southwest Foundation for Biomedical Research, SA, TX.

## CHEMISTRY AND BIOCHEMISTRY

### Session I

Friday, March 7 • CI-122

- 8:00 U 1 THE BIOEFFECTS OF CARBON NANOTUBES.  
 Edidiong Obot\*, Prathyush Ramesh, Space, Engineering, and Science Internship Program (SESIP), Texas Southern University, Houston, TX, Renard Thomas, NASA University Research Center, Texas Southern University, Houston, TX, Prabakaran Ravichandran, Govindarajan Ramesh, Molecular Neurotoxicology Laboratory, Texas Southern University, Houston, TX, Bobby Wilson, SESIP Program Director, Texas Southern University, Houston, TX.
- 8:20 U 10 COMPARISON OF VARIABLES THAT MAY ALTER ACRYLAMIDE PRODUCTION IN FRENCH FRIES.  
 Shane Guthrie\*, Dr. Nick Flynn, Angelo State University, Department of Chemistry/Biochemistry, San Angelo, TX.
- 8:40 NS 38 PHOTOCHEMISTRY OF ARYLOXIRANES: EVIDENCE FOR DIVERGENT PATHWAYS IN AN INITIALLY FORMED 1,3-DIRADICAL.  
 Rick White\*, Arney Benny, Heiko Ihmels, Milos Trajkovic, Sam Houston State University, Huntsville, TX.
- 9:00 U 134 PREVENTIVE EFFECTS OF CELLULOSE ON UV DEGRADATION OF POLYSTYRENE.  
 Phillip Lang\*, Howard Payne University, Brownwood, TX.
- 9:40 Break**
- 10:00 U 15 A PYRO-ELECTRIC CRYSTAL PARTICLE ACCELERATOR.  
 Chelsea L. Harris\*, Rand Watson, Texas A&M University, College Station, Cyclotron Institute 2007 Summer REU, Texas Southern University.
- 10:20 NS 18 EXAMINATION OF PHOTO-INDUCED RING-OPENING OF ARYLOXIRANES AND SUBSEQUENT BETA-SCISSION IN THE RESULTING 1,3-DIRADICAL.  
 Benny E. Arney, Jr.\*, Department of Chemistry, Sam Houston State University, Huntsville, TX.
- 10:40 U 207 CHEMICAL CHARACTERIZATION AND ANTIOXIDANT ACTIVITY OF SELECT ESSENTIAL OILS FROM THE FAMILY ASTERACEAE.  
 Shavon Clark\* and Mahmoud A. Saleh, Department of Chemistry, Texas Southern University, Houston, TX.
- 11:00 G 213 COMPARATIVE BIOLOGICAL CHEMICAL ANALYSIS OF ESSENTIAL OILS FROM THE APIACEAE FAMILY.  
 Brooke Woodard\*, Wenluo Zhang and Mahmoud Saleh, Texas Southern University, Houston, TX.
- 11:30 Lunch – UC-142 ABC**
- 12:40 G 216 ANTIFUNGAL ACTIVITY OF WHITE ROSE PETALS.  
 WenLuo Zhang\*, Fawzia H. Abdel Rahman, and Mahmoud A. Saleh Department of Chemistry, Texas Southern University, Houston, TX.

- 1:00 U 271 LIPOIC ACID'S CHELATING EFFECTS ON COPPER (CU<sup>2+</sup>) TREATED FRESHWATER GREEN ALGAE.  
Derek A. Hagy\*, Howard Payne University, Department of Physical Science, Brownwood, TX.
- 1:20 U 277 STUDY OF THE PHOTOCATALYZED DEGRADATION OF PHENOL USING TiO<sub>2</sub> NANOPARTICLES  
DOPED WITH Ag.  
J.E. Valladares\*, J. Ruedas, J. Guzman and J. Lien, Chemistry Department, Science and Math Division,  
Midland College, Midland, TX.
- 1:40 U 342 OXYGEN: WHY OR WHY NOT? (*TRICHOMONAS VAGINALIS*).  
Charles A. Lehnhoff\*, Schreiner University, Kerrville, TX. and Donald M. Kurtz, UTSA, San Antonio, TX.

**2:00 Distinguished Texas Scientist Lecture and 2:45 Q&A (students only) – UC-142 Lone Star Ballroom**

**3:00 TAS Business Meeting – CI-138**

**5:15 All Section Chairs Meeting – S&T-101**

## CHEMISTRY AND BIOCHEMISTRY

### Session II

Saturday, March 8 • CI-122

- 8:00 NS 11 A COMPUTATIONAL ROUTE TO SOLVENT SELECTION FOR RECRYSTALLIZATION.  
Karl D. Kuklenz\*, Katie L. Rothlisberger, Derek R. Blaylock, and Darren L. Williams, Chemistry  
Department, Sam Houston State University, Huntsville, TX.
- 8:20 NS 12 A SYSTEMATIC PROCESS FOR SELECTING RECRYSTALLIZATION SOLVENT SYSTEMS.  
Katie L. Rothlisberger\*, Derek R. Blaylock, Karl D. Kuklenz, and Darren L. Williams, Chemistry  
Department, Sam Houston State University, Huntsville, TX.
- 8:40 NS 94 INVESTIGATION OF BORONIC ACIDS AS NOVEL INSECTICIDES.  
G. Scott Weston, Feik School of Pharmacy, University of the Incarnate Word, San Antonio, TX.
- 9:00 NS 98 DESIGN OF RESEARCH AND TEACHING LABORATORIES FOR AN UNDERGRADUATE CHEMISTRY DEPARTMENT.  
Henry Altmiller, Mary Kopecki-Fjetland, Eamonn Healy, and J.D. Lewis\*, Department of Chemistry, St.  
Edward's University, Austin, TX.
- 9:20 NS 99 INFRARED STUDIES OF THE OH STRETCHING BAND AS A TOOL FOR CONFORMATIONAL STUDIES  
OF ALCOHOLS.  
J.D. Lewis, Department of Chemistry, St. Edward's University, Austin, TX.
- 9:40 Break**
- 10:00 NS 13 EXPLORING NON-IDEAL SOLVATION USING THE TYNDALL EFFECT.  
Derek R. Blaylock\*, Karl D. Kuklenz, Katie L. Rothlisberger, and Darren L. Williams, Chemistry  
Department, Sam Houston State University, Huntsville, TX.
- 10:20 NS 37 H-ATOM TRANSFERS AND MIGRATIONS IN PHOTOCHEMICAL SYSTEMS.  
Benny E. Arney, Jr.\*, Rick C White, Michael Towler, Amy Massenburg, Department of Chemistry,  
Sam Houston State University, Huntsville, TX.
- 10:40 NS 223 USE OF ELECTROLYTICALLY GENERATED HYDROGEN FOR NITRATE REDUCTION OVER Pd/Cu ALUMINA  
CATALYSTS.  
Stephanie L. Skiles\* and Joel E. Boyd, Department of Chemistry, Wayland Baptist University, Plainview, TX.

- 11:00 NS 219 PHOTOCATALYTIC OXIDATION OF AMMONIA OVER PLATINIZED TiO<sub>2</sub>.  
Lori A. Pretzer\*, Philip J. Carlson, and Joel E. Boyd, Department of Chemistry, Wayland Baptist University, Plainview, TX.
- 11:20 NS 236 A COMPARISON OF UDPG PYROPHOSPHORYLASE AND PHOSPHOGLUCOMUTASE ACTIVITIES FROM VASCULAR AND NONVASCULAR PLANTS.  
Cynthia M. Galloway, Department of Biological and Health Sciences, Texas A&M University–Kingsville, Kingsville, TX.

## CHEMISTRY AND BIOCHEMISTRY POSTERS

- U P40 DECREASE IN SUNSCREEN SPF WITH TIME.  
Michael M. Looney and Jeanna Stepka\*, Schreiner University, Kerrville, TX.
- U P100 INFRARED STUDIES OF THE OH STRETCHING BAND IN SUBSTITUTED PHENOLS.  
Deepthi Chiluvuri\* and J.D. Lewis, Department of Chemistry, St. Edward's University, Austin, TX.
- U P131 SYNTHESIS OF TWO PHENOLIC, BIOACTIVE COMPOUNDS, (-)-4 & 5, ISOLATED FROM THE ROOTS OF *LINDERA FRUTICOSA*.  
Jack Southard, Billyjack Melchor, Texas A&M University–Corpus Christi, Corpus Christi, TX.
- U P132 TOTAL SYNTHESIS OF HOSTMANIANE (1) A FUNGITOXIC BENZOIC ACID DERIVATIVE ISOLATED FROM PIPER SPECIES.  
Jack Southard\*, Christos Elias, Texas A&M University–Corpus Christi, Corpus Christi, TX.
- U P190 INFRARED STUDIES OF THE CONFORMATIONAL CHANGES IN ALIPHATIC ALCOHOLS IN THE PRESENCE OF ACTONE.  
Amanda Riojas\* and J.D. Lewis, Department of Chemistry, St. Edward's University, Austin, TX.
- U P264 ENCAPSULATION EFFICIENCY AS A FUNCTION OF LIPID COMPOSITION FOR LIPOSOME ENCAPSULATED RHODANASE.  
Jonathan Childress\* and Ilona Petrikovics, Dept. of Chemistry, Sam Houston State University, Huntsville, TX.
- U P268 STUDY OF TRANSITIONAL METAL BASED DETECTOR FOR CARBOHYDRATES.  
An Vo\*, Mian Jiang, and Larry G. Spears, Department of Natural Sciences, University of Houston–Downtown, Houston, TX.
- U P336 TAGGING OF PEPTIDES BY A PROTEOLYTIC ENZYME.  
Tim Tucker\* and Robert Holloway, Schreiner University, Kerrville, TX.
- U P337 TRYPTIC MAPPING OF LEPTIN BY CAPILLARY ELECTROPHORESIS.  
Lindsay Rutkowski\* and Robert Holloway, Schreiner University, Kerrville, TX.
- U P343 MOLECULAR MODELS OF ASYMMETRIC TETRAALKYLPHOSPHONIUM IODIDE SALTS.  
Mathew Monroe\* and Maria Benavides, University of Houston-Downtown, Houston, TX.
- U P344 INFRARED SPECTRA OF PHOSPHONIUM-BASED IONIC LIQUIDS.  
Amita Tailor\*, Mathew Monroe, Nicolle Patterson and Maria Benavides, University of Houston-Downtown, Houston, TX.
- G P249 OPTIMAL LIPOSOMAL COMPOSITION FOR THE ENCAPSULATION OF ORGANOPHOSPHOROUS HYDROLASE (OPH).  
Patricia Chapela\*, Melinda Wales, Marianna Budai, and Ilona Petrikovics, Sam Houston State University.
- NS P61 IDENTIFICATION OF NUTRITIONAL COMPONENTS AND SMALL ORGANIC MOLECULES IN NOPALITOS CACTI, A HOMEOPATHIC REMEDY FOR TYPE II DIABETES.  
Julian M. Davis, Jose Guevara\*, John J. Stankus, Lori Lazaro, Mark Olivares, and David Olivares, Department of Chemistry, University of the Incarnate Word, San Antonio, TX.

- NS P65 ACCUMULATION OF CADMIUM AND LEAD IN *BOUTELOUA CURTIPENDULA* AND *CYNODON DACTYLON*.  
Julian M. Davis, John J. Stankus, Angela E. Roberts\*, Jennifer D. Caraway, Zachery A. Juhl, Patricia P. Gonzalez, University of the Incarnate Word, San Antonio, TX, and Michael Bernard, Alwyn B. Anfone, San Antonio Water System, San Antonio, TX.
- NS P123 FUNCTIONAL ALTERATIONS OF RETINAL Na<sup>+</sup>,K<sup>+</sup>-ATPase CATALYTIC ISOZYMES IN NEONATAL RATS FOLLOWING DEVELOPMENTAL LEAD EXPOSURE.  
Carlos A. Garcia\*, Department of Biological and Health Sciences, Texas A&M University–Kingsville and Donald A. Fox, College of Optometry, University of Houston, TX.
- NS P273 A NEW NEUROTRANSMITTER SENSOR BASED ON SOL-GEL / CARBON COMPOSITE MATERIAL.  
Claudia Moreno\*, Juan P. Tito, Mian Jiang, and Larry G. Spears, Department of Natural Sciences, University of Houston–Downtown, Houston, TX.
- NS P274 ELECTROCHEMICAL DNA ASSAY BY USING NICKEL BASED ELECTRODE.  
Rosa Villagomez\* and Mian Jiang, Department of Natural Sciences, University of Houston–Downtown, Houston, TX.
- NS P275 A SIMPLE PROTOCOL TO STUDY SUGAR METABOLISM.  
An Vo\*, Mian Jiang, Akif J. Uzman and Larry G. Spears, Department of Natural Sciences, University of Houston–Downtown, Houston, TX.

## COMPUTER SCIENCE

### Session I

Friday, March 7 • CS-111

- 1:00 NS 171 NON LINEAR ANALYSIS OF BIOLOGICAL SIGNALS IN HEMORRHAGIC SHOCK USING ENTROPY.  
John A. Ward, Brooke Army Medical Center, Andriy I. Batchinsky, Jose Salinas and Lee C. Cancio, US Army Institute of Surgical Research, Fort Sam Houston, TX.
- 1:20 NS 204 HIGH FIDELITY HEMODYNAMIC WAVEFORM ARCHIVE FOR TEACHING AND RESEARCH.  
James R. Bulgrin\*, Bernard J. Rubal and John A. Ward, Brooke Army Medical Center, Fort Sam Houston, TX.

## CONSERVATION ECOLOGY

### Session I

Friday, March 7 • UC-320

- 8:40 G 6 A GIS PREDICTIVE HABITAT DISTRIBUTION MODEL FOR THE HOUSTON TOAD (*BUFO HOUSTONENSIS*) IN BASTROP AND LEE COUNTIES, TEXAS.  
Daniela Buzo\*, Michael R. J. Forstner, M. Clay Green and Mark A. Fonstad, Texas State University, San Marcos, TX.
- 9:00 U 19 MUSKRAT (*ONDATRA ZIBETHICUS*) HABITAT USE IN A HETEROGENEOUS DRAINAGE SYSTEM IN SOUTHWESTERN OKLAHOMA DURING DROUGHT.  
Brandon McDonald, Department of Biology, Midwestern State University, Wichita Falls, TX.
- 9:20 NS 32 DISTRIBUTION AND MICROHABITAT PREFERENCES OF THE GEORGETOWN SALAMANDER, *EURYCEA NAUFRAGIA*.  
Benjamin A. Pierce\*, Alexis L. Ritzer and Taylor A. Jones, Southwestern University, Georgetown, TX.

9:40

Break

- 10:00 U 47 A COMPARATIVE STUDY OF BIRDS AFTER A WILDFIRE IN CERRO EL POTOSI, GALEANA, NUEVO LEON, MEXICO. Mariam Latofski\*, Armando Contreras and Juan Garcia, Laboratorio de Ornitología Universidad Autonoma de Nuevo Leon.
- 10:20 G 101 ASSESSMENT OF THE IMPACT OF CHLORIDE CONTROL MEASURES IN THE UPPER WICHITA RIVER SYSTEM BY A POPULATION GENETICS STUDY OF THE PLAINS KILLIFISH (*FUNDULUS ZEBRINUS*). Gary F. Burke\* and Jon B. Scales, Department of Biology, Midwestern State University, Wichita Falls, TX.
- 10:40 U 102 SYNTHESIZING FOUR YEARS OF WATER QUALITY AND VEGETATION DATA FROM THE ESTUARINE MARSHES OF THE ARANSAS NATIONAL WILDLIFE REFUGE, TEXAS. Jeffrey Wozniak\* and Stephen Davis, Texas A&M University, College Station, TX.
- 12:00 Lunch – UC-142 ABC**
- 2:00 Distinguished Texas Scientist Lecture and 2:45 Q&A (students only) – UC-142 Lone Star Ballroom**
- 3:00 TAS Business Meeting – CI-138**
- 4:00 NS 135 HORMONAL RESPONSES OF TIMBER RATTLESNAKES (*CROTALUS HORRIDUS*) TO REPRODUCTIVE AND ENVIRONMENTAL STRESSORS. William I. Lutterschmidt\*, Sam Houston State University, Huntsville, TX, Deborah I. Lutterschmidt, Georgia State University, Atlanta, Georgia, Robert T. Mason, Oregon State University, Corvallis, OR, and Howard K. Reinert, The College of New Jersey, Ewing, NJ.
- 4:20 U 152 PARENTAL INVESTMENT BY MALE CAROLINA WRENS (*THRYOTHORUS LUDOVICIANUS*). James C. Cureton II and Diane L. H. Neudorf, Sam Houston State University, Huntsville, TX.
- 4:40 NS 270 PRELIMINARY INVESTIGATIONS OF THE REPRODUCTIVE BIOLOGY OF SOUTH TEXAS AMBROSIA (ASTERACEAE: *AMBROSIA CHEIRANTHIFOLIA*). Robert M. Gonzalez, Christina Martinez\*, Tan Nguyen, Franklin J. Weaver, Alicia D. Yaklin and Alice L. Hempel. Department of Biological and Health Sciences, Texas A&M–Kingsville, Kingsville, TX.
- 5:00 NS 272 SURVIVAL AND GROWTH OF THE ENDANGERED SOUTH TEXAS AMBROSIA (ASTERACEAE: *AMBROSIA CHEIRANTHIFOLIA*) IN A NUECES COUNTY, TEXAS DEMONSTRATION PLANTING. Alice L. Hempel. Department of Biological and Health Sciences, Texas A&M–Kingsville, Kingsville, TX.
- 5:15 All Section Chairs Meeting – S&T-101**

## CONSERVATION ECOLOGY POSTERS

- U P165 THE USE OF GIS AND BIOCLIM TO PREDICT CURRENT AND FUTURE DISTRIBUTIONS OF *SPERMOPHILUS MEXICANUS PARVIDENS*. H. Travis Gallo, Texas A&M University–Corpus Christi College of Science and Technology, Corpus Christi, TX.
- G P118 OVERFISHING AS A STRESSOR TO POPULATION AND COMMUNITY STRUCTURAL CHANGE IN MACRO AND MICRO BENTHIC BIOTA ASSOCIATED WITH REEFS: IMPLICATIONS FOR CORAL DISEASE. Joshua A. Haslun\* and Kevin Strychar, Texas A&M University–Corpus Christi, Corpus Christi, TX.
- G P9 PREDICTING THE POTENTIAL DISTRIBUTION OF *VIOLA GUADALUPENSIS* HABITAT IN THE GUADALUPE MOUNTAINS USING A GIS-BASED HABITAT MODEL: EVIDENCE OF A NEW ISOLATED POPULATION. Timothy C. Mullet, Department of Biology, Sul Ross State University, Alpine, TX, Fred Armstrong\*, Resource Management Office, Guadalupe Mountains NP, Salt Flat, TX, Benjamin Zank, Resource Management and Science, Great Smoky Mountains NP, Gatlinburg, TN, and Christopher M. Ritz, Department of Biology, Sul Ross State University, Alpine, TX.

- NS P22 GENETIC STRUCTURE OF *HALODULE WRIGHTII* POPULATIONS FROM A HYPERSALINE LAGOON REGION IN THE WESTERN GULF OF MEXICO.  
Patrick D. Larkin\*, Krista L. Storey, and Joyce Parker, Department of Physical and Environmental Sciences, Texas A&M University–Corpus Christi, Corpus Christi, TX, and Beau Hardegee, Texas Parks and Wildlife Department, Corpus Christi, TX.

## ENVIRONMENTAL SCIENCE

### Session I

Friday, March 7 • CI-109

- 8:40 U 57 ASSESSMENT OF AQUATIC ENVIRONMENTAL ESTROGENS IN THE LOWER GALVESTON BAY WATERSHED.  
Bita Maki\*, Renard Thomas, PhD, and Bobby Wilson, PhD, Texas Southern University, Houston, TX.
- 9:00 NS 220 PHOTOCATALYTIC ENHANCEMENT OF THE SODIS BOTTLE.  
Jonathan M. Carey\*, Luke H. Loetscher, and Joel E. Boyd, Department of Chemistry, Wayland Baptist University, Plainview, TX.
- 9:20 U 201 THE USE OF SOUTHERN AFRICAN *TATERA* (RODENTIA: GERBILLINAE) IN PALEOENVIRONMENTAL RECONSTRUCTION.  
Timothy L. Campbell\*, J. Kelly Forson, Patrick J. Lewis, Sam Houston State University, Huntsville, TX.
- 9:40 Break**
- 10:00 U 173 MAPPING THE SPATIAL DISTRIBUTION OF BLACK MANGROVE ON SPOIL ISLANDS OF THE LOWER LAGUNA MADRE USING AERIAL COLOR INFRARED PHOTOGRAPHY AND AUTOMATED IMAGE CLASSIFICATIONS.  
Violet Yeager, Kenneth R. Summy, \* Frank W. Judd, Ruben A. Mazariegos, Thomas Whelan III, Michael R. Heep, The University of Texas–Pan American, Edinburg, TX, and James H. Everitt, Agricultural Research Service, U.S. Department of Agriculture, Weslaco, TX.
- 10:20 U 189 CHARACTERIZATION OF RIPARIAN WETLAND IN THE LOWER RIO GRANDE VALLEY.  
Diana C. Del Angel, Clint D. Roberts, Anthony S. Reisinger, Nydia Gutierrez, Anna Hockaday and Jude A. Benavides Ph. D. The University of Texas at Brownsville, Brownsville, TX.
- 10:40 U 149 TAXON-SPECIFIC EFFECTS OF MICROBIAL-MEDIATED LEAF LITTER DECOMPOSITION IN AQUATIC ECOSYSTEMS.  
Pamela A. Vazquez\*, Clay Barton, Anthony Nguyen, Richard Lewis, Chad W. Hargrave, and Todd P. Primm. Department of Biological Sciences, Sam Houston State University, Huntsville, TX.
- 11:00 NS 221 A PHOTOCATALYTIC LED-ILLUMINATED REACTOR FOR THE STERILIZATION OF DRINKING WATER.  
Luke H. Loetscher\*, Leah R. Quisenberry, and Joel E. Boyd, Department of Chemistry, Wayland Baptist University, Plainview, TX.
- 11:30 Lunch – UC-142 ABC**
- 12:40 U 240 ANALYSIS OF PESTICIDES IN HAIR BY COMPREHENSIVE TWO-DIMENSIONAL GAS CHROMATOGRAPHY.  
Charlotte A. Smith-Baker\* and Mahmoud A. Saleh, Texas Southern University, Department of Chemistry, Houston, TX, and J.-M. D. Dimandja, Spelman College, Department of Chemistry, Atlanta, GA.
- 1:00 U 257 POSSIBLE ENVIRONMENTAL IMPACTS FROM THE PROPOSED BORDER WALL IN SOUTH TEXAS – A GIS ANALYSIS.  
Joseph Lemen\*, Anthony S. Reisinger, and Jude A. Benavides, The University of Texas at Brownsville, Brownsville, TX.

- 1:20 U 142 CORRELATION OF MICROBIOLOGICAL ANALYSIS OF FECAL BACTERIA USING FLUORESCENT WHITENING AGENTS AS DETECTORS.  
Mercedes Mata\*, Egon Weber, Texas A&M University–Corpus Christi, Center for Water Supply Studies.
- 2:00 **Distinguished Texas Scientist Lecture and 2:45 Q&A (students only) – UC-142 Lone Star Ballroom**
- 3:00 **TAS Business Meeting – CI-138**
- 5:15 **All Section Chairs Meeting – S&T-101**

## ENVIRONMENTAL SCIENCE POSTERS

- U P3 THE PRELIMINARY CHARACTERIZATION OF ENVIRONMENTAL ESTROGENS IN WASTEWATER EFFLUENTS.  
Reba Scott, Space Engineering & Science Internship Program, Texas Southern University, Houston, TX. Katoria Tatum-Gibbs, Environmental Toxicology PhD. Program, Texas Southern University, Houston, TX, Dr. Tuan Phan, Dr. Renard Thomas and Dr. Bobby Wilson, NASA University Research Center, Texas Southern University, Houston, TX.
- U P178 WATER QUALITY: SURVEILLANCE OF POTENTIAL EXOGENOUS NUTRIENTS IN A WATERSHED BORDERED BY RESIDENTIAL DEVELOPMENT.  
Meredith L. Cohen and William J. Quinn, St. Edward's University, Department of Biology, Austin, TX.
- U P181 EVALUATION OF GAS CHROMATOGRAPHY-DIFFERENTIAL MOBILITY SPECTROMETRY FOR MEASUREMENT OF AIR CONTAMINANTS IN SPACECRAFT.  
Jamail Plumber, Space and Engineering Science Internship Program (SESIP), Texas Southern University, Houston, TX, John Boyd, Senior Scientist in the Toxicology Laboratory, Wyle Lab, Houston, TX, Noreen Khan-Mayberry, Space Toxicologist, Space Life Science Directorate, National Aeronautics and Space Administration, Houston, TX, Thomas Limer, Wyle Laboratories Toxicology Labs Supervisor, Wyle Lab, Houston, TX, and John T. James, Space Toxicologist, Space Life Science Directorate, National Aeronautics and Space Administration, Houston, TX.
- U P195 DUNE RESTORATION PILOT PROJECT FOR SOUTH PADRE ISLAND, TEXAS.  
Jose M. Aguilar Jr., Andres Cardenas, Michelle Clark, Schaune Collins, Diana C. Del Angel, Mara Contreras, William Cortez, Anna Flores, Jonathan Flores, Dr. Elizabeth A. Heise, Jorge Martinez, Luis Reyes, Clint Roberts, Erick Tripp and Tamara Young. The University of Texas at Brownsville, Department of Chemistry and Environmental Sciences, Brownsville, TX.
- U P212 HIGH DENSITIES OF GRAM-POSITIVE BACTERIAL POPULATIONS INHABIT HEMOLYTIC SNAKE VENOM BUT DO NOT DISPLAY COLONY, CELLULAR OR BIOCHEMICAL VARIATION.  
Ibdanelo Cortez\*, Frederic Zaidan III and Kristine L. Lowe, Department of Biology, University of Texas–Pan American, Edinburg, TX.
- G P34 QUANTIFYING INORGANIC CONTAMINANTS IN THE MUNICIPAL DRINKING WATER USING ICP-MS.  
Uchenna Obianagu, Space, Engineering, & Science Internship Program, Texas Southern University, Houston, TX, Andrea Oyewole, Environmental Toxicology Ph.D. Program, Texas Southern University, Houston, TX, Felicia L. Conley, Renard L. Thomas and Bobby L. Wilson, NASA University Research Center, Texas Southern University, Houston, TX.
- NS P281 MONITORING OXIDATIVE STRESS INDUCED BY LOWERED SALINITY AND HEAVY METALS IN TURTLE GRASS (*THALASSIA TESTUDINUM*) IN THE LOWER LAGUNA MADRE TEXAS USA.  
Natali Mejia\*, Fritzie J. Into, Jacqueline D. Bruce, Anna Martinez, Thomas Whelan III, Hudson R. DeYoe and Michael W. Persans, University of Texas–Pan American Edinburg, TX.

- NS P282 USE OF ENZYMATIC ASSAYS FOR SUPEROXIDE DISMUTASE AND CATALASE ACTIVITY TO ASSESS OXIDATIVE STRESS INDUCED BY LOWERED SALINITY AND HEAVY METALS IN TURTLE GRASS (*THALASSIA TESTUDINUM*) IN THE LOWER LAGUNA MADRE TEXAS USA.  
Fritzie J. Into\*, Natali Mejia, Ana Santacruz, Jacqueline D. Bruce, Anna Martinez, Thomas Whelan III, Michael W. Persans and Hudson R. DeYoe, University of Texas–Pan American, Edinburg, TX.
- NS P284 PRIMER DESIGN AND ASSESSMENT OF OXIDATIVE STRESS RESPONSE GENE EXPRESSION IN *THALASSIA TESTUDINUM*.  
Nanbing Li, Sheenaley Legas, Amery Yang, and Michael W Persans, University of Texas–Pan American.
- NS P285 CHARACTERIZATION OF HYPERACCUMULATOR AND NON-ACCUMULATOR BRASSICACEAE PLANT SPECIES IN RESPONSE TO HEAVY METAL TREATMENT.  
Hille Corona\*, Maria Calagui\*, Sharifa Llemit, Lester Cabrera, Jeni Vela, Glee-Ann Llemit, Thomas Whelan III, Kenneth R. Summy and Michael W Persans. University of Texas–Pan American.
- NS P311 IMMUNOTOXIC EFFECTS OF ACRYLONITRILE *in vitro*.  
M. Farooqui, University of Texas–Pan American, Edinburg, TX, A. R. Abd-Allah, Al-Azhar University, Egypt, and A. Ahmed, University of Texas Medical Branch, Galveston, TX.
- NS P313 IMMUNOTOXIC EFFECTS OF ACRYLONITRILE IN VIVO.  
M. Farooqui, University of Texas–Pan American, Edinburg, TX, A. R. Abd-Allah, Al-Azhar University, Egypt, and A. Ahmed, University of Texas Medical Branch, Galveston, TX.

## EXPLORATION OF ESTUARINE LINKAGES

### Session I

Friday, March 7 • HRI-127

**Moderator: Hudson DeYoe**

- 8:00 G 144 GROWTH OF BLACK MANGROVE (*AVICENNIA GERMINANS* (L.) L.) ALONG THE SOUTH TEXAS COAST.  
Mollie K. McIver\*, Kim Withers, and Roy L. Lehman, Center for Coastal Studies, Texas A&M University–Corpus Christi, Corpus Christi, TX.
- 8:20 NS 280 EXPLORING CONNECTIVITY BETWEEN SALT MARSHES AND SUBTIDAL HABITATS.  
Anna R. Armitage\*, Texas A&M University at Galveston.
- 8:40 G 125 RECRUITMENT AND COLONIZATION OF MACROALGAL SPECIES TO THE ROCKY JETTIES OF PACKERY CHANNEL, CORPUS CHRISTI, TEXAS.  
Ryan L. Fikes\* and Roy L. Lehman. College of Science & Technology, Center for Coastal Studies, Texas A&M University–Corpus Christi, Corpus Christi, TX.
- 9:00 NS 307 THE SPATIAL PATTERN OF ELEMENTAL RATIOS AND STABLE ISOTOPES IN THE BENTHOS CAN REVEAL THE NATURE OF THE LINKAGES BETWEEN UPLANDS AND THE COASTAL OCEAN.  
James W. Fourqurean\*, Department of Biology and the Southeast Environmental Research Center, Florida International University, Miami, FL.

**9:40 Break**

**Moderator: Wes Tunnell**

- 10:00 G 267 CHARACTERIZATION OF LAGUNA MADRE IN TERMS OF TROPHIC STATUS AND COMMUNITY STRUCTURE.  
Jacqueline E. Staggs\* and Kim Withers, Center for Coastal Studies, Texas A&M University–Corpus Christi, Corpus Christi, TX.



- 10:20 NS 302 USING STABLE ISOTOPES AND MODELS TO EXPLORE ESTUARINE LINKAGES AT MULTIPLE SCALES.  
James E. Kaldy\*, Cheryl Brown and Peter Eldridge, US EPA – Western Ecology Division, Newport, OR.
- 11:00 NS 296 CHARACTERISTICS OF FRESHWATER INFLOWS TO TEXAS BAYS.  
Ruben S. Solis\*, Ph.D., P.E. Bays and Estuaries Team Leader, Texas Water Development Board.

**11:30 Lunch – UC-142 ABC**

**Moderator: Patrick Larkin**

- 1:00 NS 170 CHANGES IN THE SPECIES COMPOSITION OF FISH IN THE COASTAL PLAINS IN THE STATE OF CHIAPAS.  
CAMBIOS EN COMPOSICIÓN DE ESPECIES DE PECES EN LA PLANICIE COSTERA DEL ESTADO DE CHIAPAS.  
Diana Lizeth Romero-Melchor\*, Ma. de Lourdes Lozano-Vilano y Ma. Elena García-Ramírez, Lab. de Ictiología, Fac. de C. Biológicas, Universidad Autónoma de Nuevo León, Apartado Postal 425, San Nicolás de los Garza, Nuevo León, México 66450.
- 1:20 NS 145 OCEANIC DISPERSAL OF THE SEAGRASS *THALASSIA TESTUDINUM* AND ITS CONSEQUENCES FOR GENETIC STRUCTURING AND DIVERSITY.  
Brigitta Van Tussenbroek\*, Van Dijk, Jent Kornelis, Unidad Académica Puerto Morelos, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México Apdo. Postal 1152, Cancún, Quintana Roo, México.
- 2:00 U 309 PRODUCTION AND BIOMASS DYNAMICS OF THE SEAGRASS, *HALODULE WRIGHTII* IN THE LOWER LAGUNA MADRE, TEXAS.  
Priscilla Requenez\*, Hudson DeYoe and Joseph Kowalski. Center for Subtropical Studies and Biology Dept., University of Texas–Pan American, Edinburg, TX.

**Moderator: George Guillen**

- 3:20 G 276 NUTRIENT LIMITATION AND PRODUCTIVITY OF PHYTOPLANKTON IN THE LOWER LAGUNA MADRE, TEXAS.  
Natasha Pardo and Hudson DeYoe, Center for Subtropical Studies and Biology Dept, University of Texas–Pan American, Edinburg, TX.
- 3:40 NS 25 THE ROLE OF FINE SCALE MOVEMENT PATTERNS AND GROWTH RATE MEASUREMENTS IN IDENTIFYING FISH NURSERY HABITATS IN ESTUARINE SYSTEMS.  
Sharon Z. Herzka\*, Department of Biological Oceanography, Center for Scientific Research and Higher Education of Ensenada (CICESE), Baja California, Mexico.
- 4:20 NS 294 DELINEATING SEAGRASS LANDSCAPE INDICATORS OF DISTURBANCE USING HIGH RESOLUTION DIGITAL AERIAL PHOTOGRAPHY.  
Warren Pulich, Jr.\*, Texas State University, San Marcos, TX, Reginald S. Fletcher, USDA-ARS, Weslaco, TX, Beau Hardegree, USFWS, Corpus Christi, TX.

**4:40 Break**

**Moderator: Anna Armitage**

- 4:55 NS 126 THE EFFECT OF SCARRING INTENSITY ON SEAGRASS GENETIC VARIATION IN A SINGLE BAY SYSTEM.  
Patrick D. Larkin\*, Krista L. Heideman, Dept. of Physical and Environmental Sciences, and Dana D. Burfeind, Gregory W. Stunz. Dept. of Life Sciences, Texas A&M University–Corpus Christi, Corpus Christi, TX.

- 5:15 NS 36 EVALUATION OF REGULATORY PROTECTION OF SEAGRASSES IN THE REDFISH BAY STATE SCIENTIFIC AREA, TEXAS.  
Dennis Pridgen\*, Perry Trial, Faye Grubbs, and Mark Fisher, Rockport Marine Laboratory, Texas Parks and Wildlife Department, Rockport, TX.
- 5:35 G 143 IMPACTS OF INVASIVE FISH SPECIES ON NATIVE FISH COMMUNITIES FOUND IN COASTAL TRIBUTARIES.  
Dianna Ramirez\*, and George Guillen. University of Houston Clear Lake, Environmental Institute of Houston, Houston, TX.

## EXPLORATION OF ESTUARINE LINKAGES

### Session II

Saturday, March 8 • CI-127

**Moderator: Kirk Cammarata**

- 8:00 NS 295 IMAGING, QUANTIFICATION AND COMPARISON OF SEAGRASS EPIPHYTES.  
Kirk Cammarata\*, Department of Life Sciences, Texas A&M–Corpus Christi, Corpus Christi, TX.
- 8:20 NS 297 BENTHIC MAPPING IN THE TEXAS COASTAL BEND TO SUPPORT SEAGRASS MONITORING AND TREND ANALYSIS.  
James Simons\*, Texas Parks and Wildlife Department, Corpus Christi, TX, Mark Finkbeiner, NOAA Coastal Services Center, Charleston, SC, John Wood, Texas A&M University–Corpus Christi, Corpus Christi, TX, Bill Stevenson, NOAA Coastal Services Center, Charleston, SC.
- 8:40 NS 327 MARINE AND COASTAL BIRDS OF THE GULF OF MEXICO: THEIR STATUS AND THREATS.  
AVES MARINAS Y COSTERAS DEL GOLFO DE MÉXICO. ESTATUS Y AMENAZAS.  
Armando J. Contreras-Balderas y Juan A. García-Salas. Laboratorio de Ornitología, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León. San Nicolás de los Garza, Nuevo León. México. Apartado Postal 425. San Nicolás de los Garza, Nuevo León, México. 66450.
- 9:00 NS 283 PRODUCTION AND BIOMASS DYNAMICS OF THE SEAGRASS, *THALASSIA TESTUDINUM* IN THE LOWER LAGUNA MADRE, TEXAS.  
Hudson DeYoe\* and Joseph Kowalski. Center for Subtropical Studies and Biology Dept., University of Texas–Pan American, Edinburg, TX.

## FRESHWATER AND MARINE SCIENCE

### Session I

Friday, March 7 • UC-106A

**Moderator: Bob Edwards**

- 8:00 G 155 DISTRIBUTION OF ADULT BLUE CRABS (*CALLINECTUS SAPIDUS*) ALONG A SALINITY GRADIENT IN THE NUECES ESTUARY, TEXAS.  
D. Matthew Schweitzer\* and Kim Withers, Center for Coastal Studies, TAMU-CC, Corpus Christi, TX.
- 8:20 G 286 FEEDING ECOLOGY OF THE MOLE CRAB (*EMERITA*) ON TEXAS BEACHES.  
Felicia Farquhar\*, David Hicks, and Eric Linder. The University of Texas at Brownsville, Brownsville, TX.

- 8:40 U 253 TOP-DOWN EFFECTS ON THE RECRUITMENT OF EASTERN OYSTERS (*CRASSOSTREA VIRGINICA*) IN ST. CHARLES BAY, NUECES BAY, ARANSAS BAY, AND MESQUITE BAY.  
Keith D. Johnson\* and Delbert L. Smee, Texas A&M University–Corpus Christi, Corpus Christi, TX.
- 9:00 NS 58 FEMALES CONTROL MALE MATING VIA RESISTANCE IN THE WESTERN MOSQUITOFISH, *GAMBUSIA AFFINIS*.  
P. Raelynn Deaton\*, Department of Biological Sciences, Sam Houston State University, Huntsville, TX, Ricky Cothran, Department of Zoology, University of Oklahoma, Norman, OK, and Chad Hargrave, Department of Biological Sciences, Sam Houston State University, Huntsville, TX.
- 9:20 U 183 DOES FEMALE RESISTANCE INTERACT WITH MALE SIZE TO AFFECT MALE MATING SUCCESS IN THE WESTERN MOSQUITOFISH (*GAMBUSIA AFFINIS*)?  
Chris Kroll\*, Wes Farris, and Raelynn Deaton. Department of Biological Sciences, Sam Houston State University, Huntsville, TX.

**9:40 Break**

- 10:00 U 175 EFFECTS OF TEMPERATURE AND BODY SIZE ON MALE MATING BEHAVIOR IN THE WESTERN MOSQUITOFISH, *GAMBUSIA AFFINIS*.  
Jason Randall\* and Raelynn Deaton, Department of Biological Sciences, Sam Houston State University, Huntsville, TX.
- 10:20 NS 29 SEAGRASS INVENTORY FOR CHRISTMAS BAY.  
Leslie Williams, Texas Parks and Wildlife Coastal Fisheries.
- 10:40 U 339 RELATIONSHIP BETWEEN SEX RATIO AND SHELL LENGTH OF OYSTERS IN TEXAS BAYS.  
Elani Morgan\*, Jennifer Beseres Pollack, Paul Montagna; Harte Research Institute for Gulf of Mexico Studies, Texas A&M University, Corpus Christi.
- 11:00 NS 319 HEAVY METALS: Cu AND Zn IN THE PACIFIC OYSTER *CRASSOSTREA GIGAS* IN TWO SUSPENSIÓN CULTURES (LONG LINE) IN LA PITAHAYA, GUASAVE AND LA CURVINA, AHOME, SINALOA ESTUARIES.  
Ana Laura Domínguez Orozco\*, Andrés Martín Góngora Gómez, Genaro Diarte Plata, Ana Luisa Leal Sepúlveda. Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional - IPN - Unidad Sinaloa. Blvd. Juan de Dios Batiz Paredes # 250, Guasave, Sinaloa, México.

**12:00 Lunch – UC-142 ABC**

- 1:00 G 215 ENVIRONMENTAL EFFECTS ON SEAGRASS SUCCESSION.  
Melissa Gutierrez\* and Delbert L. Smee, Texas A&M–Corpus Christi, Corpus Christi, TX.
- 1:20 U 168 HATCHING OF THE FIGHTING CONCH *STROMBUS PUGILIS* (LINNAEUS, 1758) BASED ON EARLY LIFE STUDIES AT DIFFERENT TEMPERATURES.  
Andrés M. Góngora\*, Manuel García and Genaro Diarte, IPN-CIIDIR-SINALOA, Blvd. Juan de Dios Batiz Paredes # 250, Guasave, Sinaloa, Mexico.
- 1:40 U 226 EFFECTS OF OPERATIONAL SEX RATIO AND DENSITY ON FEMALE FORAGING IN THE WESTERN MOSQUITOFISH, *GAMBUSIA AFFINIS*.  
Stacy Stoops\* and Raelynn Deaton, Department of Biological Sciences, Sam Houston State University, Huntsville, TX.

**2:00 Distinguished Texas Scientist Lecture and 2:45 Q&A (students only) – UC-142 Lone Star Ballroom****3:00 TAS Business Meeting – CI-138**

**Moderator: Chad Hargrave**

- 4:00 NS 150 GLOBAL WARMING AFFECTS NUTRIENT DYNAMICS IN SMALL HEADWATER STREAMS.  
Chad W. Hargrave\* and Landis R. Shoemaker, Center for Biological Field Studies and Department of Biological Sciences, Sam Houston State University, Huntsville, TX.
- 4:20 U 136 DIRECT AND INDIRECT EFFECTS OF FISHES ON LEAF LITTER DECOMPOSITION.  
Landis R. Shoemaker\* and Chad W. Hargrave, Center for Biological Field Studies and Department of Biological Sciences, Sam Houston State University, Huntsville, TX.
- 4:40 NS 278 MACROINVERTEBRATE RECOLONIZATION DYNAMICS OF BENTHIC HABITATS IN THE RECENTLY RE-FLOODED BAHIA GRANDE.  
Ruben Trevino\*, Troy McWhorter, Oscar Sosa, Noemi Matos, Anthony Reisinger, and David Hicks. The University of Texas at Brownsville, Brownsville, TX.
- 5:00 NS 227 PRE- AND POST- CHANNEL ION CONCENTRATIONS IN THE LAGUNA LARGA AND THE LITTLE LAGUNA MADRE.  
David A. Carter\*, Steven Barraza, Jeff Masters and Sean Coeckelenbergh. Angelo State University, San Angelo, TX.

**5:15 All Section Chairs Meeting – S&T-101**

**FRESHWATER AND MARINE SCIENCE****Session II**

**Friday, March 7 • UC-106B**

**Moderator: Russ Wilke**

- 8:00 G 53 STOCKING DENSITY IN THE CULTURE OF WHITE SHRIMP *LITOPENAEUS VANNAMEI* (BOONE, 1931) IN FLOATING CAGES AT LOW SALINITY.  
Jesús Enciso González\* and Arcadio Valdés González, Laboratorio de Acuicultura, Departamento de Ecología Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Av. Pedro de Alba s/n San Nicolás de Los Garza, Nuevo León, México.
- 8:20 NS 121 THE FISHING SITUATION IN MEXICAN RESERVOIRS: NORTH PACIFIC REGION.  
Ma. Teresa Gaspar-Dillanes\*, Instituto Nacional de Pesca (INAPESCA) Pitágoras No. 1320, Col. Santa Cruz Atoyac, México, D.F. 03310.  
LA SITUACIÓN PESQUERA EN EMBALSES MEXICANOS: REGIÓN PACIFICO NORTE.
- 8:40 NS 316 OBTAINING OF EGG MASSES OF THE SNAIL, *STROMBUS PUGILIS*, (MESOGASTROPODA: STROMBIDAE) UNDER LABORATORY CONDITIONS.  
Andrés M. Góngora\*, Juan A. Hernández and Ana L. Domínguez, IPN-CIIDIR-SINALOA, Blvd. Juan de Dios Batiz Paredes # 250, Guasave, Sinaloa, México.
- 9:00 NS 322 SPATIAL AND DENSITY PATTERN OF THE SEA COCKROACH *CHITON ARTICULATUS* SOWERBY 1832, ON TWO BEACHES THAT DIFFER IN THEIR DEGREE OF WAVE INTENSITY IN ACAPULCO GUERRERO, MÉXICO.  
Sergio García-Ibáñez\*, R. Flores-Garza, P. Flores-Rodríguez, A. Valdés-González, D. G. Arana-Salvador, L. Galeana-Rebolledo, C. A. Millán-Román, C. Torreblanca-Ramírez and A. Hernández Arroyo. Unidad Académica de Ecología Marina. Universidad Autónoma de Guerrero.  
PATRÓN ESPACIAL Y DENSIDAD DE LA CUCARACHA DE MAR *CHITON ARTICULATUS* SOWERBY 1832, EN DOS PLAYAS QUE DIFIEREN EN EL GRADO DE INTENSIDAD DEL OLEAJE, EN ACAPULCO GUERRERO, MÉXICO.

- 9:20 NS 321 NUTRITION AND REPRODUCTION IN *MEGUPSILON APORUS* (MILLER AND WALTERS, 1972): AN EXTINCT SPECIES IN ITS WILD HABITAT.  
Ma. Elena Angeles-Villela\* and A. Valdés-González. Laboratorio de Acuicultura, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León. San Nicolás de los Garza, Nuevo León. México.  
ALIMENTACIÓN Y REPRODUCCIÓN EN *MEGUPSILON APORUS* (MILLER Y WALTERS, 1972), ESPECIE EXTINTA EN SU HABITAT SILVESTRE.
- 9:40 Break**
- 10:00 NS 166 TOWARDS A SUSTAINABLE EXPLOITATION OF THE CARIBBEAN SPINY LOBSTER.  
Ernesto A. Chávez\*, Centro Interdisciplinario de Ciencias Marinas (CICIMAR-IPN), Instituto Politécnico Nacional, Av. IPN s/n, Col. Sta. Rita, Playa el Conchalito, La Paz, Baja California Sur 23096, México.
- 10:20 U 95 COMPOSITION SPECIES CHANGE IN FISHES OF THE PACIFIC COASTAL PLAIN OF CHIAPAS STATE, MEXICO.  
Diana Lizeth Romero-Melchor, Ma. de Lourdes Lozano-Vilano and Ma. Elena García-Ramírez. Lab. de Ictiología, Fac. de C. Biológicas, Universidad Autónoma de Nuevo León, Apartado Postal 425, San Nicolás de los Garza, Nuevo León, México 66450.
- 10:40 NS 320 TAXONOMIC, DISTRIBUTIONAL AND ECOLOGIC STUDY OF THE FISH IN SELECT AREAS IN THE NORTH-EASTERN ZONE OF CHIAPAS, MEXICO.  
Jesús Maria Leza-Hernández\*, Ma. de Lourdes Lozano-Vilano and Ma. Elena García-Ramírez. Universidad Autónoma de Nuevo León, Facultad de Ciencias Biológicas. Laboratorio de Ictiología, Apartado Postal 425, San Nicolás de los Garza, Nuevo León, México.  
ESTUDIO TAXONÓMICO, DISTRIBUCIONAL Y ECOLÓGICO DE LA ICTIOFAUNA DE AREAS SELECTAS EN LA ZONA NORESTE DEL ESTADO DE CHIAPAS, MEXICO.
- 11:00 NS 317 ANALYSIS OF COMMERCIAL CAPTURE FROM 1985-1998, IN THE FALCON INTERNATIONAL DAM, NUEVA CIUDAD GUERRERO, TAMAULIPAS, MÉXICO.  
Arcadio Valdés González\* and Antonio Leija Tristan. Laboratorio de Acuicultura, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León. San Nicolás de los Garza, Nuevo León. México.  
ANÁLISIS DE LA CAPTURA COMERCIAL DURANTE EL PERÍODO 1985-1998, EN LA PRESA INTERNACIONAL FALCÓN, NUEVA CIUDAD GUERRERO, TAMAULIPAS, MÉXICO.
- 12:00 Lunch – UC-142 ABC**
- Moderator: Romi Burks**
- 1:00 NS 318 PHYSICAL-CHEMICAL QUALITY OF WATER IN SELECT AREAS OF THE LACANTUN RIVER BASIN IN CHIAPAS, MÉXICO.  
M. E. García-Ramírez\*, M. L. Lozano-Vilano, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Apartado Postal 425, San Nicolás de los Garza, Nuevo León, México 66450, FelipeCarrillo Puerto # 54. Col. Villa Coyoacán, Delegación Coyoacán 04000 México, D., and C. Ramírez-Martinez and S. Contreras-Balderas, Bioconservación, A. C. Apartado Postal 405 San Nicolás de los Garza, Nuevo León, México 66450  
CALIDAD FÍSICOQUÍMICA DEL AGUA EN AREAS SELECTAS DE LA CUENCA DEL RÍO LACANTÚN CHIAPAS, MÉXICO.
- 1:20 NS 324 AQUATIC VEGETATION IN NORTHEASTERN MEXICO.  
Alberto Contreras-Arquieta\*, Pronatura Noreste, A. C. Loma Larga No. 235, Col. Loma Larga, 64710 Monterrey, Nuevo Leon, México, Armando J. Contreras-Balderas and Ma. Lourdes Lozano-Vilano, Laboratorio de Ictiología, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León. Apartado Postal 425. San Nicolas de los Garza, N. L., México 66450.  
VEGETACIÓN ACUÁTICA DEL NORESTE DE MÉXICO.

- 1:40 NS 325 INVESTIGATION OF THE DISTRIBUTION OF THE INVASIVE PLANT *ARUNDO DONAX* (GIANT REED) IN THE RÍO BRAVO BASIN.  
Alberto Contreras-Arquieta\*, Pronatura Noreste, A. C. Loma Larga No. 235, Col. Loma Larga, 64710 Monterrey, Nuevo Leon, México, Armando J. Contreras-Balderas, Ma. Lourdes Lozano-Vilano, Laboratorio de Ictiología, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León. Apartado Postal 425. San Nicolas de los Garza, N. L., México 66450, and John Goolsby, USDA ARS. Weslaco, TX.  
INVESTIGACIÓN SOBRE LA DISTRIBUCIÓN DE LA PLANTA INVASORA *ARUNDO DONAX* (CARRIZO GIGANTE) EN LA CUENCA DEL RÍO BRAVO.
- 2:00 Distinguished Texas Scientist Lecture and 2:45 Q&A (students only) – UC-142 Lone Star Ballroom**
- 3:00 TAS Business Meeting – CI-138**
- 4:00 NS 326 RECENT INFORMATION ABOUT THE FRESHWATER FISHES OF THE NORTH OF COAHUILA, MÉXICO.  
Ma. Lourdes Lozano-Vilano\*, Laboratorio de Ictiología, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León. Apartado Postal 425. San Nicolás de los Garza, N. L., México 66450, and Alberto Contreras-Arquieta, Pronatura Noreste, A. C. Loma Larga No. 235, Col. Loma Larga, 64710 Monterrey, Nuevo Leon, México.  
INFORMACION RECIENTE DE LOS PECES DULCEACUÍCOLAS DEL NORTE DE COAHUILA, MÉXICO.
- 4:20 NS 330 AGE AND GROWTH OF TILAPIA (*OREOCHROMIS AUREUS*) IN THE VICENTE GUERRERO DAM IN TAMAULIPAS, MEXICO.  
Jorge H. Rodríguez-Castro\* and A. Valdés-González. Lab de Zoología, Insittuto Tecnológico de Cd. Victoria, Tam. Xenarthra, A.C. Calle de la Hacienda #432, Frac. Lomas de Clamaco, C.P. 87018, Cd. victoria, Tamaulipas. Mexico.  
EDAD Y CRECIMIENTO DE LA TILAPIA (*OREOCHROMIS AUREUS*) EN LA PRESA VICENTE GUERRERO, TAMAULIPAS MÉXICO.
- 4:40 NS 234 SPATIO-TEMPORAL VARIATION OF FISH DISTRIBUTED IN TWO CONTRASTING HABITATS IN TROPICAL SOUTHEAST OF MEXICO.  
Guadalupe Lara de la Cruz\*, R. Florido, División Académica de Ciencias Biológicas, Lab. de Hidrobiología de Humedales, Leticia Huidobro-Campos, Instituto de Biología de la Universidad Nacional Autónoma de México, Ma. de Lourdes Lozano-Vilano, Lab. de Ictiología, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Ap. Postal 425, San Nicolás de los Garza, Nuevo León, 66450, México, y Alberto J. Sánchez, División Académica de Ciencias Biológicas, Lab. De Hidrobiología de Humedales.  
VARIACIÓN ESPACIO-TEMPORAL DE PECES DISTRIBUIDOS EN DOS HÁBITAT CONTRASTANTES EN UN HUMEDAL TROPICAL EN EL SURESTE DE MÉXICO.
- 5:00 NS 323 PERSPECTIVES ON CONSERVATION AND MAINTENANCE OF FISHING RESOURCES OF CURRENT COMMERCIAL IMPORTANCE IN THE LAGUNA MADRE.  
Antónimo Leija-Tristán\* and Arcadio Valdés-González. Laboratorio de Acuicultura, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León. San Nicolás de los Garza, Nuevo León. México.  
PERSPECTIVAS DE CONSERVACIÓN Y SUSTENTABILIDAD DE LOS RECURSOS PESQUEROS DE IMPORTANCIA COMERCIAL ACTUAL, EN LA LAGUNA MADRE.

**5:15 All Section Chairs Meeting – S&T-101**

**FRESHWATER AND MARINE SCIENCE****Session III****Friday, March 7 • UC-106C****Moderators: Tom Arsuffi and Romi Burks**

- 8:00 U 291 EFFECT OF DROUGHT, FLOOD AND SEASON ON A NEW STREAM IN CENTRAL TEXAS.  
D. M. Levine\*, Twin Oaks Biological, Dripping Springs, TX, and T. L. Arsuffi, Llano River Field Station, Texas Tech University at Junction, TX.
- 8:20 NS 44 ECONOMICS, EDUCATION AND ENGAGEMENT AS TOOLS FOR INCREASING PUBLIC LITERACY OF AQUATIC INVASIVE SPECIES AS HAZARDS ON WATER RESOURCES AND ECOSYSTEMS IN TEXAS.  
Tom L. Arsuffi\*, Llano River Field Station, Texas Tech University at Junction, Junction, TX, and Earl Chilton, Texas Parks and Wildlife Department, Austin, TX.
- 8:40 NS 93 TEXAS MUSSEL WATCH: A CITIZEN SCIENCE VOLUNTEER MONITORING PROGRAM.  
Marsha Elizabeth May\* and Lee Ann Linam, Wildlife Diversity Program, Texas Parks and Wildlife Department, Austin, TX.
- 9:00 U 104 SMALL SNAILS GROW UP FAST: FEEDING PREFERENCES, HABITAT CHOICE AND GROWTH OF JUVENILE APPLESNAILS (*POMACEA INSULARUM*) IN THE PRESENCE OF *PROCAMBARUS CLARKII*.  
Sarah Hensley\*, Colin Kyle, James McDonough and Romi Burks, Southwestern University, Biology Department, Georgetown, TX.
- 9:20 U 83 PINK EGGS AND SNAILS: COMPARISON OF FIELD AND LAB OVIPOSITION BEHAVIOR IN *POMACEA INSULARUM*.  
James P. McDonough, Colin H. Kyle and Romi L. Burks, Department of Biology, Southwestern University, Georgetown, TX.
- 9:40 Break**
- 10:00 U 87 LOCATION, LOCATION, LOCATION: LABORATORY EXPERIMENT SHOWS INVASIVE *POMACEA INSULARUM* CHOOSE ELEPHANT EAR AS OVIPOSITION SITES.  
Colin H. Kyle\*, James P. McDonough and Romi L. Burks, Biology Department, Southwestern University, Georgetown, TX.
- 10:20 U 59 SPATIAL AND TEMPORAL VARIABILITY IN OYSTER REEF FOOD WEB STRUCTURE COMPARED TO OTHER ESTUARINE HABITATS.  
Jenny L. Wrast\*, Texas A&M University–Corpus Christi, Corpus Christi, TX., James D. Simons, Texas Parks and Wildlife Department, Corpus Christi, TX., and Gregory W. Stunz, Texas A&M University–Corpus Christi, Corpus Christi, TX .
- 10:40 U 335 WHO CONTROLS WHO? INVESTIGATING FEMALE CONTROL OVER MALE MATING SUCCESS AND HER OWN REPRODUCTIVE FITNESS IN THE WESTERN MOSQUITOFISH.  
Rachel Martin\*, James Cureton, Kevin Hudson, and Raelynn Deaton, Sam Houston State University, Huntsville, TX.
- 11:00 G 333 FACTORS INFLUENCING FEMALE CHOICE IN THE WESTERN MOSQUITOFISH, *GAMBUSIA AFFINIS*.  
Stephanie Morse\*, Kevin Hudson, and Raelynn Deaton, Sam Houston State University, Huntsville, TX.

**12:00 Lunch – UC-142 ABC**

### Moderators: Bryan Brooks and Kirk Cammarata

- 1:00 G 177 DEVELOPING MICROSATILLITE MARKERS FOR ATLANTIC CROAKER (*MICROPOGONIAS UNDULATUS*) FOR FISHERIES MANAGEMENT.  
Kenneth Rainer\*, R. Deborah Overath and Cynthia Morales, Texas A&M University–Corpus Christi, TX, Ivonne Blandon and Robert Vega, Texas Parks and Wildlife CCA/CPL Marine Development Center, Corpus Christi, TX.
- 1:20 U 185 TOWARD CREATION OF ECOLOGICAL ROADMAPS: A PROPOSED TROPHIC DATABASE FOR THE GULF OF MEXICO LARGE MARINE ECOSYSTEM.  
James D. Simons\*, Texas Parks and Wildlife Department, Corpus Christi, TX, Thomas Shirley, Harte Research Institute, Corpus Christi, TX, Nicolas Bailly, The WorldFish Center, Philippines, Jim Ditty, National Marine Fisheries Service, Galveston, TX, Erin Hill, Texas A&M University-Corpus Christi, Long-zhuang Li, Texas A&M University, Corpus Christi, TX. Grace Tolentino-Pablico, The WorldFish Center, Philippines, Tara Schultz, Texas State Aquarium, Corpus Christi, TX, Maria Vega-Cendejas, CINVESTAV-IPN, Unidad Merida, Merida, MX, Kim Withers, Texas A&M University, Corpus Christi, and John Wood, Harte Research Institute, Corpus Christi, TX.
- 1:40 G 138 CHARACTERIZATION OF DNA MICROSATELLITE MARKERS FOR THE SPOTTED SEATROUT, *CYNOSCION NEBULOSUS*.  
Cynthia Morales\* and R. Deborah Overath, Texas A&M University Corpus Christi, Department of Life Sciences, Corpus Christi, TX, Ivonne Blandon and Robert Vega, Texas Parks and Wildlife, CCA/CPL Marine Development Center, Corpus Christi, TX.

**2:00 Distinguished Texas Scientist Lecture and 2:45 Q&A (students only) – UC-142 Lone Star Ballroom**

**3:00 TAS Business Meeting – CI-138**

### Moderator: Lee Smee

- 4:00 G 69 CLIMATE CHANGE AND GLOBAL WARMING: EFFECTS OF HEAT STRESS ON PORIFERANS FROM FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY, GULF OF MEXICO.  
Amber Miller\* and Kevin Strychar, Texas A&M University–Corpus Christi, TX; Thomas Shirley, Harte Research Institute, Texas A&M University–Corpus Christi, TX; and Klaus Rützler, National Museum of Natural History, Smithsonian Institution, Washington, D.C.
- 4:20 U 106 DISTRIBUTION OF NEAR-SHORE CORALS AND EFFECTS OF TURBIDITY ON *LEPTOGORGIA* SP. AT THREE SOUTH TEXAS JETTY SYSTEMS.  
Emily A. Williamson\*, Kevin Strychar, Joe Fox, and Kim Withers. Texas A&M University–Corpus Christi, Corpus Christi, TX.
- 4:40 G 68 EFFECTS OF TOLUENE AND METHYL TERT-BUTYL ETHER ON THE GORGONIAN CORAL, *LEPTOGORGIA VIRGULATA*, IN THE ARANSAS PASS SHIP CHANNEL, TEXAS.  
Michelle White\* and Dr. Kevin Strychar, Texas A&M University, Corpus Christi, TX.

**5:15 All Section Chairs Meeting – S&T-101**



## FRESHWATER AND MARINE SCIENCE

### Session IV

Friday, March 7 • UC-210

**Moderators: Raelynn Deaton and Sandra Arismendez**

- 8:00 U 242 DIRECT EFFECTS OF MALE HARASSMENT ON FEMALE PHYSICAL CONDITION IN THE WESTERN MOSQUITOFISH, *GAMBUSIA AFFINIS*.  
Janalyn West\*, Abigail Marcotte, and Raelynn Deaton, Sam Houston State University, Huntsville, TX.
- 8:20 U 315 EVALUATION OF TEMPERATURE, SALINITY AND GROWTH OF THE JAPANESE OYSTER *CRASSOSTREA GIGAS* (BIVALVIA: OSTREIDAE) IN MACAPULE BAY, GUASAVE, SINALOA, MEXICO.  
Andrés M. Góngora\*, Juan A. Hernández and Ana L. Domínguez, IPN-CIIDIR-SINALOA, Blvd. Juan de Dios Batiz Paredes # 250, Guasave, Sinaloa, México. C.P. 81101.
- 8:40 U 130 PREDATOR-INDUCED PHENOTYPIC PLASTICITY IN THE WESTERN MOSQUITOFISH (*GAMBUSIA AFFINIS*).  
Andres A. Palencia\*, Samir K. Rosado, Raelynn Deaton, and Chad W. Hargrave, Center for Biological Field Studies and Department of Biological Sciences, Sam Houston State University, Huntsville, TX.
- 9:00 U 176 EFFECTS OF PRESSURE ON THE THERMAL TOLERANCE OF PINFISH (*LAGODON RHOMBOIDES*).  
Gabby N. Ahmadi\* and Wayne A. Bennett, University of West Florida, Pensacola, FL.
- 9:20 G 298 CHARACTERIZATION OF EPIPHYTIC BIOFILMS ON *THALASSIA TESTUDINUM* AND *HALODULE WRIGHTII*.  
Justin Medlock\*, Eric Helander, Texas A&M University–Corpus Christi, Department of Life Sciences, Corpus Christi, Ivonne R. Blandon, CCA/CPL Marine Development Center, Texas Parks and Wildlife Department, Corpus Christi, TX, and Kirk Cammarata, Texas A&M University–Corpus Christi, Department of Life Sciences, Corpus Christi, TX.
- 9:40 Break**
- 10:00 G 279 FISH ASSEMBLAGE DYNAMICS IN THE RECENTLY RE-FLOODED BAHIA GRANDE.  
Erika Cornejo\*, Ruben Trevino, Troy McWhorter, Anthony Reisinger, and David Hicks. The University of Texas at Brownsville, Brownsville, TX.
- 10:20 G 224 WHERE DO CATSHARKS LAY EGGS IN DEEP WATER?  
Peter Etnoyer\*, Harte Research Institute, Texas A&M–Corpus Christi, Mary Sue Brancato, Ed Bowlby, NOAA Olympic Coast National Marine Sanctuary, and Jeff Hyland, NOAA Center for Environmental Health and Biomolecular Research.
- 10:40 G 157 DOGWHELKS (*NUCELLA LAPILLUS*) EVALUATE PREDATION RISK USING CHEMICAL CUES FROM PREDATORS AND PREDATOR DIET.  
Scott I. Large\* and Delbert L. Smee, Texas A&M University–Corpus Christi.
- 11:00 NS 263 MINERALIZATION OF THE CRAYFISH CUTICLE.  
Francis Horne, Department of Biology, Texas State University, San Marcos, TX.
- 12:00 Lunch – UC-142 ABC**

**Moderator: Bryan Brooks**

- 1:00 U 141 ELEVATED ATMOSPHERIC CO<sub>2</sub> AFFECTS STREAM ECOSYSTEM PROPERTIES AND FUNCTIONS.  
Samir K. Rosado\*, Kaitlen P. Gary and Chad W. Hargrave, Center for Biological Field Studies and Department of Biological Sciences, Sam Houston State University, Huntsville, TX.
- 1:20 U 116 NEAR SHORE GORGONIAN CORALS AS POTENTIAL LARVAL AND JUVENILE FISH HABITAT.  
Alyssa F. Dailey\*, Kevin Strychar, and David McKee, Texas A&M University–Corpus Christi TAMUCC, Corpus Christi, TX.
- 1:40 G 84 DEFENSIVE COMPOUNDS FROM THE DEEP-SEA BUBBLEGUM CORAL *PARAGORGIA* SP.  
Larissa M. Bright\*, Texas A&M University–Corpus Christi, TX, Thomas Shirley, Harte Research Institute, Texas A&M University–Corpus Christi, TX, Kevin Strychar and Eugene Billiot, Texas A&M University–Corpus Christi, TX.

**2:00 Distinguished Texas Scientist Lecture and 2:45 Q&A (students only) – UC-142 Lone Star Ballroom**

**3:00 TAS Business Meeting – CI-138**

**Moderators: Bryan Brooks and Peter Etnoyer**

- 4:00 U 148 INVESTIGATION OF *VIBRIO VULNIFICUS* BIOTYPES IN ESTUARINE WATERS OF THE COASTAL BEND REGION OF TEXAS.  
Amanda K. Smith\*, Gabriel D. Ramirez, Joanna B. Mott and Gregory W. Buck, Texas A&M University–Corpus Christi, Corpus Christi, TX.
- 4:20 G 198 INCIDENCE AND DISTRIBUTION OF *VIBRIO VULNIFICUS* IN SOUTH TEXAS COASTAL WATERS.  
Gabriel Ramirez\*, Gregory Buck and Joanna Mott, Texas A&M University–Corpus Christi, Corpus Christi, TX.
- 4:40 G 172 CHARACTERIZATION OF EPIPHYTIC BIOFILMS ON *THALASSIA TESTUDINUM*.  
Erik Helander\*, Justin Medlock and Kirk Cammarata, Texas A&M Corpus Christi, TX.
- 5:00 G 287 EVALUATION OF SOUTHERN FLOUNDER (*PARALICHTHYS LETHOSTIGMA*) GENETIC RESOURCES IN THE TEXAS COAST APPLICATIONS FOR A STOCK ENHANCEMENT PROGRAM.  
Ivonne R. Blandon\* and Robert R. Vega, CCA/CPL Marine Development Center, Texas Parks and Wildlife Department, Corpus Christi, TX, Rocky Ward, USGS Northern Appalachian Research Center, Wellsboro, PA, Kirk Cammarata and R. Deborah Overath, Texas A&M University, Corpus Christi.

**5:15 All Section Chairs Meeting – S&T-101**

**FRESHWATER AND MARINE SCIENCE POSTERS**

- U P210 ARSENIC-OXIDIZING AND ARSENIC-REDUCING BACTERIA FROM THE LAGUNA MADRE.  
Marina Martinez\* and Kristine L. Lowe, Department of Biology, University of Texas–Pan American, Edinburg, TX.
- U P300 A METHODOLOGY FOR ASSESSING PHYSICAL DAMAGE TO FEMALE MOSQUITOFISH CAUSED BY MALE COERCIVE MATING USING SCANNING ELECTRON MICROSCOPY.  
Abigail Marcotte\*, Janalyn West, and Raelynn Deaton, Department of Biological Sciences, Sam Houston State University, Huntsville, TX.

- U P310 BAHIA GRANDE RESTORATION: WATER QUALITY, 2005-2007.  
Dori Cedillo\*, Antonio Villarreal, Christian Garcia, Ruben Trevino, Erin Bieberbach, and Hudson DeYoe. Center for Subtropical Studies and Biology Dept., University of Texas–Pan American, Edinburg, TX.
- G P209 EFFECTS OF SALINITY ON MANGANESE REDUCTION RATES BY BACTERIAL CONSORTIA FROM AQUATIC ECOSYSTEMS.  
Omar R. Elizondo\*, Michael W. Persans and Kristine L. Lowe, Department of Biology, University of Texas–Pan American, Edinburg TX.
- NS P63 CHARACTERIZATION OF SEATROUT (*CYNOSCION* SPP.) IN GALVESTON BAY USING MORPHOLOGY, MICROSATELLITES AND MITOCHONDRIAL DNA MARKERS.  
Joel Anderson\*, Dusty McDonald, William Karel and Britt Bumguardner, Texas Parks and Wildlife–Coastal Fisheries, Perry R. Bass MFRS, Palacios, TX.
- NS P64 TEXAS FREEZE SIMULATION AND WINTER MORTALITY FOR COBIA (*RACHYCENTRON CANADUM*).  
Dusty McDonald\*, Britt Bumguardner and Eric Young, Texas Parks and Wildlife–Coastal Fisheries, Perry R. Bass MFRS, Palacios, TX.
- NS P197 AN EXAMINATION OF FISH ASSEMBLAGES IN POHNPEI, FEDERATED STATES OF MICRONESIA.  
Shaun Donovan, Texas A&M University–Corpus Christi.
- NS P199 WHERE HAVE ALL THE BLUE CRABS GONE? EFFECTS OF SALINITY AND PESTICIDES ON BLUE CRABS (*CALLINECTES SAPIDUS*).  
Christina Wendel\* and Delbert Smee, Texas A&M–Corpus Christi.
- NS P167 SPACE-TIME DISTRIBUTION OF FISHES IN THE BIOSPHERE RESERVE OF THE MARSHES OF CENTLA: A WETLAND IN SOUTHEAST MEXICO.  
Guadalupe Lara de la Cruz\*, Rosa Florido-Araujo, Leticia Huidobro-Campos, División Académica de Ciencias Biológicas, Lab. De Hidrobiología de Humedales, Río Teapa 108 Altos, Col. Casa Blanca, Villahermosa, Tabasco, 86060, México, Ma. de Lourdes Lozano-Vilano, Lab. de Ictiología, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Ap. Postal 425, San Nicolás de los Garza, Nuevo León, 66450, México, and Alberto J. Sanchez-Martínez, División Académica de Ciencias Biológicas, Lab. De Hidrobiología de Humedales, Río Teapa 108 Altos, Col. Casa Blanca, Villahermosa, Tabasco, 86060, México.
- DISTRIBUCIÓN ESPACIO-TEMPORAL DE PECES EN LA RESERVA DE LA BIOSFERA PANTANOS DE CENTLA, UN HUMEDAL DEL SURESTE DE MÉXICO.
- NS P169 FISHES ASSOCIATED WITH MARGINAL VEGETATION IN THE TROPICAL MARSHLAND OF SOUTHEASTERN MEXICO: BIOSPHERE RESERVES OF THE RESERVOIR OF CENTLA, TABASCO, MEXICO.  
Adán Alberto Macossay-Cortez\*, Rosa Florido-Araujo, Alberto J. Sánchez-Martínez, División Académica de Ciencias Biológicas. Laboratorio de Hidrobiología de Humedales, Paseo de Tulipan No. 106 Frac. Paseo del Usumacinta, Villahermosa, 86035, México, and Ma. de Lourdes Lozano-Vilano, Lab. de Ictiología, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Ap. Postal 425, San Nicolás de los Garza, Nuevo León, 66450, México.
- PECES ASOCIADOS A VEGETACIÓN MARGINAL EN UN HUMEDAL TROPICAL DEL SURESTE MEXICANO: RESERVA DE LA BIOSFERA PANTANOS DE CENTLA, TABASCO, MEXICO.

**GEOSCIENCES**  
**Session I**  
**Friday, March 7 • CS-114**

- 8:00 NS 113 A LATE CLARENDONIAN AND A LATEST HEMPHILLIAN LOCAL FAUNA FROM THE GOLIAD FORMATION OF SOUTH TEXAS.  
 Jon Baskin\*, Texas A&M Univ.-Kingsville, Kingsville, TX and Richard Hulbert, Florida Museum of Natural History, Gainesville, FL.
- 8:20 NS 156 ORIGIN AND PRESERVABILITY OF PELLETS ON THE ALGAL FLATS OF GALVESTON ISLAND STATE PARK, TEXAS.  
 R. LaRell Nielson\*, Patricia S. Sharp, and Chris A. Barker, Department of Geology, Stephen F. Austin State University, Nacogdoches, TX.
- 8:40 U 194 AN APOMORPHY-BASED IDENTIFICATION OF THE FOSSIL HERPETOFAUNA FROM THE KOANAKA HILLS.  
 Alicia M. Kennedy\*, Sam Houston State University, Huntsville, TX, and Bhart-Anjan S. Bhullar, University of Texas at Austin, Austin, TX.
- 9:00 NS 230 COMPARISON OF DEFORMATION TRENDS IN CRETACEOUS BOQUILLAS STRATA IN ERNST TINAJA AND DOG CANYON, BIG BEND NATIONAL PARK, TX.  
 Chris A. Barker\*, R. LaRell Nielson, Stephen F. Austin State University, Nacogdoches, TX, and Joseph I. Satterfield, Angelo State University, San Angelo, TX.

**GEOSCIENCES POSTERS**

- G P202 AN ANALYSIS OF SPATIAL RELATIONSHIPS OF QUATERNARY CAVE FAUNAS OF TEXAS USING GIS.  
 Darius Bordbar, Alex Hendrex, Ashley Marie Hilliard, Maddie Lionberger, Areen Pitaktong, Tania Tasneem\*, Magnet Program, Kealing Middle School, Austin, TX and Christian O. George, Environmental Sciences Institute, The University of Texas at Austin, Austin, TX.
- G P206 A COMPARISON OF ISOLATED TEETH AND INTACT JAWS FOR RECONSTRUCTING PALEOENVIRONMENT.  
 Sophia Aguayo, Megan Oadra, and Patrick J. Lewis, Sam Houston State University, Huntsville, TX.
- NS P266 GEOLOGY, TRACE-ELEMENT AND RARE-EARTH-ELEMENT (REE) CHARACTERISTICS, AND ORIGIN OF CHIHUAHUA CARBONATITE COMPLEX (CCC), NORTHERN MEXICO.  
 Ravi C. Nandigam\*, Department of Chemistry and Environmental Sciences, University of Texas at Brownsville, Brownsville, TX., Elizabeth Y. Anthony and Kenneth F. Clark, Department of Geological Sciences, University of Texas at El Paso, El Paso, Texas and Oscar Comadurán A., Cumbres de Majalca, 2006 Chihuahua, Chihuahua, Mexico.
- U P306 LIGHT CURVES OF 2005 FY9, PLUTO-SIZED TRANS-NEPTUNIAN OBJECT. Jeffrey W. Davis\*, Honors Program, Hardin-Simmons University, Abilene, TX and J. Patrick Miller, Department of Mathematics, Hardin-Simmons University, Abilene, TX.

**MATHEMATICS**  
**Session I**  
**Friday, March 7 • CS-111**

8:00	NS	30	MEAN STUFF. Elsie M. Campbell*, Department of Mathematics, Angelo State University, San Angelo, TX, and Dionne T. Bailey*, Department of Mathematics, Angelo State University, San Angelo, TX (jointly).
8:20	NS	66	REDUCING BIAS IN NONPARAMETRIC ESTIMATION OF THE DISTRIBUTION FUNCTION OF NONSTANDARD MIXTURES. E. D. McCune*, Department of Mathematics and Statistics, Stephen F. Austin State University, Nacogdoches, TX, and Sandra L. McCune, Department of Elementary Education, Stephen F. Austin State University, Nacogdoches, TX.
8:40	U	314	A PROBABILISTIC ALGORITHM FOR MEASURING COASTLINE LENGTH. Jessica Halley Newman* and Trey Smith, Dept. of Mathematics, Angelo State University, San Angelo, TX.

**SCIENCE EDUCATION**  
**Session I**  
**Friday, March 7 • CS-108**

8:00	G	86	MOTIVATION, SELF-EFFICACY AND LEARNING STRATEGIES OF STUDENTS ENROLLED IN PRINCIPLES OF BIOLOGY AT ANGELO STATE UNIVERSITY. David Ballard, Oklahoma State University, Stillwater, OK, Connie Russell, Angelo State University, San Angelo, TX.
8:20	U	147	A SIMPLE SOLUTION TO A COMPLEX PROBLEM: A HYPOTHESIS-BASED HEIRARCHICAL APPROACH FOR TEACHING GENERAL CONCENPTS IN AN ECOLOGY LAB. Chris D. Felder* and Chad W. Hargrave, Department of Biological Sciences, Sam Houston State University, Huntsville, TX.
8:40	U	31	COMBINING HISTORY WITH CHEMISTRY AND TEXTILES IN A STUDY ABROAD COURSE: A LIBERAL ARTS APPROACH TO A SCIENCE COURSE. Rick White, Janis White, John White, Maria Granic White, Sam Houston State University.
9:00	NS	62	SEQUENCING STOICHIOMETRY IN FIRST-SEMESTER INTRODUCTORY CHEMISTRY. Paul A. Loeffler, Sam Houston State University, Huntsville, TX.
9:20	U	72	USING TEXAS WETLANDS, VIDEO TECHNOLOGY, STUDENTS, AND JASON WETLANDS CURRICULA TO CREATE A HYBRID VEHICLE FOR WETLAND ENVIRONMENTAL EDUCATION. James Westgate, Earth & Space Sciences, Lamar University, D'Ann Douglas*, JASET, Lamar University, Communications, Lamar University, Larry Elliot, Communications, Lamar University, Daniel McLemore, Communications, Lamar University and O'Brien Stanley, Communications, Lamar University.
<b>9:40</b>			<b>Break</b>
10:00	G	191	TWO ENTRY-LEVEL BIOLOGY COURSES ASSESSMENT FOR BIOLOGY MAJORS' AT TEXAS STATE UNIVERSITY – PRELIMINARY RESULTS. Mamta Singh and Sandra West, Texas State University–San Marcos, San Marcos, TX.
10:20	U	133	USING CLEA SOFTWARE IN AN INTRODUCTORY ASTRONOMY CLASS FOR NON-SCIENCE MAJORS. Pamela Bryant* Howard Payne University, Brownwood, TX.

- 10:40 U 308 INTERNATIONAL ASTEROID SEARCH CAMPAIGN.  
Dominic Juliano\*, Hardin-Simmons University, Abilene, TX and J. Patrick Miller, Mathematics Department, Hardin-Simmons University, Abilene, TX.
- 11:00 NS 21 FRESHMAN BIOLOGY LABORATORY CURRICULUM – BYE BYE COOKBOOK AND HELLO RESEARCH!  
Tara Maginnis\*, St. Edward's University and Patricia Mokry, St. Edward's University.
- 11:30 Lunch – UC-142 ABC**
- 12:40 G 345 MATHEMATICAL MODELING IN HIGH SCHOOL SCIENCE SUPPORTED BY COMPUTER SIMULATIONS.  
Andrzej Sokolowski, Graduate Studies in Education, Texas A&M University, Magnolia West High School.
- 1:00 NS 244 CORRELATED SCIENCE AND MATH: A NEW MODEL FOR LINKING TWO DISCIPLINES.  
Sandra West, Texas State University–San Marcos, San Marcos, TX
- 1:20 U 248 A LONGITUDINAL STUDY OF SAFETY IN TEXAS SCHOOL SCIENCE CLASSROOMS.  
Lisa Kennedy\*, Texas State University–San Marcos, San Marcos, TX and Sandra West, Texas State University–San Marcos, San Marcos, TX.
- 1:40 NS 256 EVOLUTION ON TRIAL AGAIN.  
Mike Hemer\*, Texas State University–San Marcos, San Marcos, TX and Sandra West, Texas State University–San Marcos, San Marcos, TX.
- 2:00 Distinguished Texas Scientist Lecture and 2:45 Q&A (students only) – UC-142 Lone Star Ballroom**
- 3:00 TAS Business Meeting – CI-138**
- 4:00 Outstanding Texas Educator Lecture and 5:00 Q&A (students only) –CS-101**
- 4:00 NS 289 AN OVERALL ASSEMENT OF “LOS ARACNIDOS DE TAMAULIPAS”; A ONE WEEK MINI-COURSE CONDUCTED AT THE INSTITUTO TECNOLOGICO DE CD. VICTORIA, TAMAULIPAS, MEXICO IN AUGUST OF 2007.  
Ned E. Strenth\*, Angelo State University, San Angelo, TX, Lynn McCutchen, Kilgore College, Kilgore, TX, and Alfonso Correa-Sandoval, Instituto Tecnológico de Cd. Victoria, Cd. Victoria, Tamaulipas, México.
- 5:15 All Section Chairs Meeting – S&T-101**

## SCIENCE EDUCATION POSTERS

- G P97 THE LAGUNA MADRE LIVING CLASSROOM: AN INTERDISCIPLINARY RESEARCH AND EDUCATION INITIATIVE.  
Suraida Nañez-James\*, John W. Tunnell, Jr., Harte Research Institute for Gulf of Mexico Studies, Texas A&M University–Corpus Christi, Harte Research Institute, Corpus Christi, TX, Tina Dellinger, Innovation Academy for Engineering, Environmental and Marine Science, Corpus Christi Independent School District, Corpus Christi, TX, and Jason T. James, University Preparatory High School, Flour Bluff Independent School District.
- G P192 ASSESSMENT OF A HANDS-ON SCIENCE-BASED EDUCATIONAL EXPERIENCE OF A STEM ACADEMY IN CORPUS CHRISTI, TEXAS.  
Sandra S. Arismendez and Suraida Nanez-James, Harte Research Institute for Gulf of Mexico Studies, Texas A&M University–Corpus Christi, Tina Dellinger, The Innovation Academy for Engineering, Environmental and Marine Science, Corpus Christi Independent School District, and John W. Tunnell, Jr., Harte Research Institute for Gulf of Mexico Studies, Texas A&M University–Corpus Christi.
- NS P33 AN ALTERNATIVE APPROACH TO FRESHMAN CHEMISTRY LAB PRACTICALS.  
Dr. Nick Flynn, Angelo State University, Department of Chemistry/Biochemistry, San Angelo, TX.

## SYSTEMATICS AND EVOLUTIONARY BIOLOGY

### Session I

Friday, March 7 • CI-108

- 8:00 G 24 EGG SIZE VARIATION IN THE NORTH AMERICAN BARN SWALLOW (*HIRUNDO RUSTICA ERYTHROGASTER*).  
Beverly L. Cochran\* and Jeffrey G. Kopachena, Texas A&M University–Commerce, Commerce, TX.
- 8:20 U 27 EMERGENCE, OVIPOSITION, AND GENERAL ACTIVITY OF *EXOPROSOPA ALBICOLLARIS* (DIPTERA: BOMBYLIIDAE) IN A *BEMBECINUS NEGLECTUS* (HYMENOPTERA: CRABRONIDAE) NESTING AGGREGATION.  
Sonia Salinas, Michelle Richardson, St. Edward's University, Austin, TX.
- 8:40 G 28 *ARGIA* SPP. (ODONATA: ZYGOPTERA) AND THEIR GREGARINES (APICOMPLEXA: EUGREGARINIDA) IN SIX BIOGEOGRAPHICAL PROVINCES OF TEXAS.  
Joanna J. Hays\*, Tamara J. Cook, and R. E. Clopton. Department of Biological Sciences, Sam Houston State University, Huntsville, TX, and Department of Natural Science, Peru State College, Peru, NE.
- 9:00 U 35 MALE SIZE AND BEHAVIOR IN RELATION TO MATING STRATEGY AND COLOR VARIATION IN *BEMBECINUS NEGLECTUS* (HYMENOPTERA: CRABRONIDAE: BEMBECINAE).  
Yvette Chenaux, St. Edward's University, Austin, TX.
- 9:20 G 217 SEX RECOGNITION BY PUFFISH: WHO ARE FEMALE MIMICS FOOLING?  
Jennifer M. Gumm, Department of Biological Sciences, Lehigh University, Bethlehem, PA.
- 9:40 Break**
- 10:00 U 241 INCONGRUENCE OF SPECIES DESIGNATIONS AS DETERMINED BY MITOCHONDRIAL AND NUCLEAR DNA: AN EXAMPLE FROM THE CUBAN CROCODILE (*CROCODYLUS RHOMBIFER*).  
Jeremy P. Weaver\*, Texas Tech University, Lubbock, TX, David Rodriguez, Texas Tech University, Lubbock, TX, Miryam Venegas-Anaya, Texas Tech University, Lubbock, TX, José Rogelio Cedeño-Vázquez, El Colegio de la Frontera Sur, Chetumal, Mexico, Michael R. J. Forstner, Texas State University, San Marcos, TX, and Llewellyn D. Densmore III, Texas Tech University, Lubbock, TX.
- 10:20 U 243 POPULATION GENETICS OF THE TEXAS RAT SNAKE (*ELAPHE OBSOLETA LINDHEIMERI*).  
Mike Vandewege\*, Texas Tech University, Lubbock, TX, David Rodriguez, Texas Tech University, Lubbock, TX, Jeremy P. Weaver, Texas Tech University, Lubbock, TX, Michael R. J. Forstner, Texas State University, San Marcos, TX, and Llewellyn D. Densmore III, Texas Tech University, Lubbock, TX.
- 10:40 U 151 DELINEATION OF RETINAL PROJECTIONS IN THE MEXICAN FREE-TAILED BAT (*TADARIDA BRASILIENSIS*) USING HORSE-RADISH PEROXIDASE - WHEAT GERM AGGLUTININ.  
Jessica Halley Newman\* and David S. Marsh, Dept. of Biology, Angelo State University, San Angelo, TX.
- 11:00 G 153 PHYLOGEOGRAPHIC AND TEMPORAL ANALYSIS OF *STIPHODON CF. ELEGANS* AND *STIPHODON CAERULEUS* FROM POHNPEI, FEDERATED STATES OF MICRONESIA (FSM).  
Leslie L. Patterson\* and Frank Pezold, Texas A&M University, Corpus Christi, TX, and Tom Turner, Museum of Southwestern Biology–University of New Mexico, Albuquerque, NM.
- 11:30 Lunch – UC-142 ABC**
- 12:40 G 255 MOLECULAR PHYLOGENETICS OF WEST-CENTRAL AFRICAN SHREWS: AN EMPHASIS ON *PARACROCIDURA*.  
Adam W. Ferguson\*, and Loren K. Ammerman, Department of Biology, Angelo State University, San Angelo, TX.
- 1:00 G 260 PHYLOGEOGRAPHY OF WESTERN SPOTTED SKUNKS BASED ON CYTOCHROME B DNA SEQUENCE.  
Gema I. Guerra\*, Loren K. Ammerman, Robert C. Dowler, Angelo State University, San Angelo, TX.

- 1:20 U 288 A REVIEW OF THE LAND SNAIL GENUS *HOLOSPIRA* (GASTROPODA: UROCOPTIDAE) FROM THE STATE OF COAHUILA IN NORTHERN MEXICO.  
Ned E. Strenth\*, Angelo State University, San Angelo, TX, Alfonso Correa-Sandoval, Instituto Tecnológico de Cd. Victoria, Cd. Victoria, Tamaulipas, México and Lynn McCutchen, Kilgore College, Kilgore, TX.
- 1:40 G 160 INTRASPECIFIC VARIATION WITHIN THE INNER EAR OF A CRETACEOUS EUTHERIAN MAMMAL.  
Eric G. Ekdale, Jackson School of Geosciences, The University of Texas at Austin, Austin, TX
- 2:00 Distinguished Texas Scientist Lecture and 2:45 Q&A (students only) – UC-142 Lone Star Ballroom**
- 3:00 TAS Business Meeting – CI-138**
- 4:00 U 254 MORPHOMETRIC AND MOLECULAR VARIATION OF MOUNTAIN CATFISHES (AMPHILIIDAE, *AMPHILIUS*) IN GUINEA, WEST AFRICA.  
R. Schmidt\* and F. Pezold, Department of Life Sciences, Texas A&M University–Corpus Christi.
- 4:20 G 182 FROM TEXAS TO CALIFORNIA: POPULATION GENETIC AND PHYLOGEOGRAPHIC RESULTS IN THE CAVE MYOTIS.  
Julie A. Parlos\* and Michael R. J. Forstner, Texas State University, San Marcos, TX.
- 4:40 U 193 PRELIMINARY ANALYSIS OF AN AVIFAUNAL ASSEMBLAGE FROM ROLAND SPRINGS RANCH, WEST TEXAS.  
Julie Sculley, Sam Houston State University, Huntsville, TX, Eileen Johnson, Museum of Texas Tech University, Lubbock, TX, and Patrick J. Lewis, Sam Houston State University, Huntsville, TX.
- 5:15 All Section Chairs Meeting – S&T-101**

## SYSTEMATICS AND EVOLUTIONARY BIOLOGY

### Session II

Saturday, March 8 • CI-108

- 8:40 NS 119 APPENDAGE REGENERATION: A FRAMEWORK FOR FUTURE RESEARCH.  
Tara Maginnis, St. Edward's University, Austin, TX.
- 9:00 NS 174 MORPHOLOGICAL VARIATION IN THE BATHYGOBIUS SOPORATOR SPECIES COMPLEX.  
Laura E. George\* and Frank Pezold, Texas A&M University–Corpus Christi.
- 9:20 NS 238 POPULATION GENETICS OF THE CONCHO WATER SNAKE (*NERODIA PAUCIMACULATA*) IN COMPARISON TO HARTER'S WATER SNAKE (*NERODIA HARTERI*) AND THE BLOTCHED WATER SNAKE (*NERODIA ERYTHROGASTER TRANSVERSA*).  
David Rodriguez\*, Texas Tech University, Lubbock, TX, John D. McVay, Louisiana State University, Baton Rouge, LA, Michael R. J. Forstner, Texas State University, San Marcos, TX, and Llewellyn D. Densmore III, Texas Tech University, Lubbock, TX.
- 9:40 Break**
- 10:00 NS 45 HOW GENERAL IS THE PSEUDACTEON MOUND-TRAIL NICHE AXIS DICHOTOMY? AN ARGENTINA PERSPECTIVE.  
Richard J.W. Patrock\*, Section of Integrative Biology and Brackenridge Field Laboratory, University of Texas at Austin; Patricia J. Folgarait, Centro de Estudios e Investigaciones, Universidad Nacional de Quilmes, Buenos Aires, Argentina and Lawrence E. Gilbert, Section of Integrative Biology and Brackenridge Field Laboratory, University of Texas at Austin.
- 10:20 NS 115 UNUSUAL FLEXIBILITY IN THE NESTING BEHAVIOR OF *PALMODES DIMIDIATUS* (HYMENOPTERA: SPHECIDAE).  
Allan Hook\*, Sonia Salinas, St. Edward's University, Austin, TX.



## SYSTEMATICS AND EVOLUTIONARY BIOLOGY POSTERS

- U P85 POPULATION GENETICS AND GENE FLOW OF THE ALASKAN COASTAL SHRIMP *HEPTACARPUS MOSERI* FOUND ON ALASKAN SEAMOUNTS.  
Casandra L. Hernandez\*, Deborah R. Overath, Thomas Shirley, and Kevin Strychar. Department of Life Sciences, Texas A&M University–Corpus Christi; Harte Research Institute, Texas A&M University–Corpus Christi.
- U P114 NOTES ON THE NESTING BEHAVIOR OF TWO SPECIES OF *BICYRITES* (HYMENOPTERA: CRABRONIDAE).  
Julie Le\* and Allan Hook, St. Edward's University, Austin, TX.
- U P124 THE EFFECTS OF SURFACE AND AIR TEMPERATURE ON THE ACTIVITY PATTERNS OF *BEMBECINUS NEGLECTUS* (HYMENOPTERA: CRABRONIDAE: BEMBECINAE).  
Cameron Siddens\* and Rich Patrock, St. Edward's University, Austin, TX.
- G P41 ISOLATION AND CHARACTERIZATION OF MICROSATELLITE LOCI IN TWO BOX TURTLE SPECIES.  
A.B. Buchman\*, Department of Biological Sciences, Sam Houston State University, Huntsville, TX, T. Brummel, Long Island University, Brookville, NY, P.R. Deaton, Department of Biological Sciences, Sam Houston State University, Huntsville, TX, E.D. Wilson, Department of Biological Sciences, Sam Houston State University, Huntsville, TX, and W.I. Lutterschmidt, Department of Biological Sciences, Sam Houston State University, Huntsville, TX.
- G P305 RESOLVING CONFLICTS BETWEEN MORPHOLOGICAL AND MITOCHONDRIAL DNA DATA SETS IN *MYOTIS* BATS.  
Dana Lee\* and Loren Ammerman, Department of Biology, Angelo State University, and Russell Pfau, Tarleton State University.
- NS P211 MORPHOLOGICAL POPULATION VARIATION OF THE SULU GOBY (*ACENTROGOBIUS SULUENSIS*) IN THE WESTERN AND SOUTHERN PACIFIC OCEAN.  
Leiva, Adriana and Pezold, Frank. Dept. of Life Sciences, College of Science & Technology, Texas A&M University–Corpus Christi.

## TERRESTRIAL ECOLOGY AND MANAGEMENT

### Session I

Friday, March 7 • CI-112

- 8:00 G 7 GREEN TREEFROGS (*HYLA CINEREA*) IN BIG BEND NATIONAL PARK, REASON FOR CONCERN?  
Daniel J. Leavitt, Texas A&M University, College Station, TX.
- 8:20 G 20 BIODIVERSITY OF MESOCARNIVORES ALONG RIPARIAN AREAS OF THE BIG BEND NATIONAL PARK.  
Lorna Hernandez-Santin\*, Louis A. Harveson, Bonnie J. Warnock, and Christopher M. Ritzi. Sul Ross State University, Alpine, TX.
- 8:40 G 60 COMPARISON OF NATIVE BEE DIVERSITY BETWEEN A BOTANICAL GARDEN AND ADJACENT GRASSLANDS, CHIHUAHUAN DESERT RESEARCH INSTITUTE, JEFF DAVIS COUNTY, TEXAS.  
Cynthia G. McAlister\* and Christopher M. Ritzi, Department of Biology, Sul Ross State University, Alpine, TX.
- 9:00 U 129 THE EFFECTS OF *JUNIPERUS ASHEI* ON UNDERLYING VEGETATION IN CENTRAL TEXAS.  
Sandra L. Salinas\* and William J. Quinn. St. Edward's University. Austin, TX.
- 9:20 U 122 POPULATION DENSITY AND HABITAT SELECTION OF THE PAINTED BUNTING.  
Stephanie B. Carey\*, Texas A&M University–Corpus Christi, Corpus Christi, TX., Robert Benson Ph.D., Texas A&M University–Corpus Christi, TX.

- 9:40** **Break**
- 10:00 U 146 PREDATION ON ARTIFICIAL NESTS IN URBAN AND NATURAL ENVIRONMENTS.  
Anne-Marie Prouty\* and Diane L. H. Neudorf, Department of Biological Sciences, Sam Houston State University, Huntsville, TX.
- 10:20 U 154 LAND CRABS AND LEAF LITTER IN THE SIAN KA'AN BIOSPHERE RESERVE, QUINTANA ROO, MEXICO.  
Kim Withers\* and Ryan Fikes, Center for Coastal Studies, Texas A&M University–Corpus Christi, Corpus Christi, TX.
- 10:40 G 159 PRELIMINARY RESULTS FROM A POPULATION GENETICS STUDY OF COASTAL PLAIN TOADS.  
(*BUFO NEBULIFER*).  
Diana J. McHenry\*, University of Missouri, Columbia, MO, and Michael R. J. Forstner, Texas State University, San Marcos, TX.
- 11:00 U 162 A STUDY OF THE DEMOGRAPHY OF THE WESTERN COTTONMOUTH MOCCASIN (*AGKISTRODON PISCIVORUS LEUCOSTOMA*) AT THE WESTERN LIMIT OF ITS RANGE.  
Jason L. Strickland\* and J. Kelly McCoy, Dept. of Biology, Angelo State University, San Angelo, TX.
- 11:30** **Lunch – UC-142 ABC**
- 12:40 G 332 SUPPORT HOST SELECTION OF *LONICERA JAPONICA* AND ITS INTERACTION WITH DIFFERENT FACTORS IN CAMERON PARK, WACO, TX.  
Song Gao\* and Susan P. Bratton, Baylor University, Waco, TX.
- 1:00 NS 120 THE DIET OF THE BURROWING OWL (*ATHENE CUNICULARIA HYPUGAEA*) WINTERING IN CENTRAL MEXICO.  
Héctor E. Valdez-Gómez\* and Armando J. Contreras-Balderas. Laboratorio de Ornitología, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León. Ciudad Universitaria CP 66451, A.P. 425 San Nicolas de los Garza, Nuevo León, México, and Geoffrey L. Holroyd and Helen E. Trefry, Canadian Wildlife Service, Environment Canada. Room 200, 4999-98 Ave., Edmonton, AB, T6B 2X3, Canada.
- 1:20 G 200 DOES THE CANOPY HOLD A MISSING PIECE OF THE AMAZON RAINFOREST AMPHIBIAN DIVERSITY? NEW SPECIES FROM A NEW FRONTIER IN YASUNÍ NATIONAL PARK, AMAZONIAN ECUADOR.  
Shawn F. McCracken\* and Michael R. J. Forstner, Department of Biology, Texas State University, San Marcos, TX.
- 1:40 G 340 COMPOSITION OF GYRINID AGGREGATIONS IN THE EAST TEXAS PRIMITIVE BIG THICKET (COLEOPTERA: GYRINIDAE).  
Edward Realzola\*, Jerry L. Cook, Tamara J. Cook, Department of Biological Sciences, Sam Houston State University, Huntsville, TX, and Richard E. Clopton, Department of Natural Science, Peru State College, Peru, NE.
- 2:00** **Distinguished Texas Scientist Lecture and 2:45 Q&A (students only) – UC-142 Lone Star Ballroom**
- 3:00** **TAS Business Meeting – CI-138**

## TERRESTRIAL ECOLOGY AND MANAGEMENT POSTERS

- U P39 THE EFFECTS OF THE RED IMPORTED FIRE ANT ON BIODIVERSITY IN THE BLUNN CREEK PRESERVE.  
Christopher Redmond, St. Edward's University, Austin, TX.
- U P290 AN EXAMINATION OF SHELL DAMAGE IN THE LAND SNAIL *RABDOTUS ALTERNATUS* (GASTROPODA: PULMONATA) FROM THE DESERT ENVIRONMENTS OF WEST TEXAS AND NORTHERN MEXICO.  
Christopher D. Montag\* and Ned E. Strenth, Department of Biology, Angelo State University, San Angelo, TX.
- G 292 DISTRIBUCION HERPETOLOGICA DE TRES TIPOS DE VEGATCION DEL CERRO DEL POTOSÍ, GALEANA, NUEVO LEÓN, MÉXICO.  
Jorge A. Contreras-Lozano\*, David Lazcano-Villarreal, and Armando J. Contreras Balderas. Lab. de Herpetología, Facultad de Ciencias Biologicas, Universidad Autonoma de Nuevo Leon. Apartado Postal 425, San Nicolas de los Garza, N. L., Mexico. 66450.
- NS P23 DEVELOPMENT OF A MICROSATELLITE ASSAY FOR USE WITH THE INVASIVE SPECIES *DICHANTHIUM ANNULATUM*.  
Destiny S. Bean\*, Megan L. Thompson, and Patrick D. Larkin, Dept. of Physical and Environmental Sciences, Texas A&M University–Corpus Christi, Corpus Christi, TX.
- NS P48 MAPPING AND MONITORING BLACK BEARS (*URSUS AMERICANUS EREMICUS*) IN THE STATE OF NUEVO LEON, NE MEXICO.  
Hebert K. Nieto-Pliego, Horacio J. Urbano-Castillo, Armando J. Contreras-Balderas, Juan Antonio García-Salasalan Sergio López-Villarreal, Laboratorio de Ornitología, F. C. B., U. A. N. L. Apartado Postal 425. San Nicolas de los Garza, N. L., Mexico 66450.
- NS P107 ENDO- AND ECTOPARASITES OF SMALL RODENTS FROM BREWSTER COUNTY, TEXAS.  
Traci Guckian, Rosalva Meraz\*, and Christopher Ritzi, Department of Biology Sul Ross State University, Alpine, TX.

# A B S T R A C T S

## ANTHROPOLOGY

- 70 APPROPRIATE SCALES AND BUNNY TALES: USING SMALL HERBIVORES FROM ARCHAEOLOGICAL SITES IN ECOLOGICAL RECONSTRUCTION.

Leonard Kemp, Cynthia Munoz, Debajyoti Paul, Grzegorz Skrzypek, Robert Hard, Raymond Mauldin\*, University of Texas at San Antonio–Center for Archaeological Research.

Archaeologists commonly reconstruct paleoecological conditions using proxy data (e.g., pollen analysis, stable isotopes in paleosols) that reflect long-term, large scale climate patterns. Yet, prehistoric hunter-gatherers adapt to short-term (e.g., seasonal, yearly), local conditions, not multi-century, regional trends. Methods that can monitor local conditions at short temporal scales are underdeveloped. Stable carbon isotope analysis of collagen from jackrabbits (*Lepus californicus*) and cottontails (*Sylvilagus sp.*), both of which are commonly found in many archaeological sites in Texas, can potentially help fill this void. Leporids occupy home ranges that seldom exceed 300 ha in size. In the wild, most leporids are dead before the age of three. The stable carbon isotopic composition present in their bone collagen should reflect local diet during this brief lifetime. Preliminary analysis of collagen extracted from 12 jackrabbits and 6 cottontails from a Central Texas archaeological site (41MM340) occupied between 3,050 and 2,060 BP, demonstrates that both species consume C<sub>3</sub> and C<sub>4</sub> vegetation. Delta <sup>13</sup>C values for jackrabbits in our samples ranged from -10.7‰ to -18.9‰, while cottontail values ranged from -14.5‰ to -21.5‰. While large numbers of samples will be required to confidently assess vegetation structure and changes in that structure, this study demonstrates that stable carbon isotope composition extracted from these species can potentially yield ecological reconstructions at scales that are informative of local conditions. Given the distribution of leporids and their near ubiquity in archaeological sites, this approach may be widely applicable in paleoenvironmental studies.

- 304 THE FISH FAUNA FROM ARENOSA SHELTER (41VV99), LOWER PECOS REGION, TEXAS.

Christopher J. Jurgens, Texas Archeological Research Laboratory, The University of Texas at Austin, and Texas Water Development Board.

Salvage excavations (1965-68) at Arenosa Shelter in the arid Lower Pecos cultural region yielded over 47,000 faunal specimens and 1,000 bone artifacts. This large Pecos River terrace site is near the Rio Grande confluence and international border. Recent research using U. S. National Park Service collections studied the subsistence and bone technology practices of prehistoric residents. Small to large fish remains formed a significant minority of the faunal sample. The remains provided evidence of previously undocumented capture and carcass processing techniques used during the Middle to Terminal Late Archaic. Fish skeletal material also entered the region's bone technology to be used in specific, limited roles as tools.

- P205 A COMPARISON OF ISOLATED TEETH AND INTACT JAWS FOR RECONSTRUCTING PALEOENVIRONMENT.

Sophia Aguayo, Megan Oadra, and Patrick J. Lewis, Sam Houston State University.

Due to their sensitivity to changes in the environment, small mammals are commonly used to rebuild past environments at archaeological and paleontological sites. The depositional environments of these sites vary dramatically, as impacting the preservation of the fossils they contain. Some sites, such as those preserved in caves, often contain small mammal faunas that are nearly intact. In such cases there may be many complete mandibles and maxillae, the principle elements used for species diagnosis. Other localities, such as those deposited by high energy streams, may contain only a few isolated teeth. These differing depositional environments preserve different elements in varying quantities and conditions, all affecting the environmental signature of the small mammal fauna. This study attempts to estimate the bias in assemblages containing only loose teeth when compared to those containing intact jaws. A sample of jaws from a paleontological site in Botswana is compared to the isolated tooth component of that same site to determine if the two assemblages are reflective of each other. Our preliminary results suggest that many smaller taxa are missing from the fauna identified from intact jaws. Likewise, there is an apparent bias against the larger, more robust component of the fauna in the isolated teeth. Our results suggest that both jaws and isolated teeth should be studied to have an accurate assessment of paleoenvironment, and that when one component is absent caution must be taken to avoid overstating the utility of the fauna in rebuilding past environments.

## BOTANY

- 42 ANALYTICAL METHODOLOGY FOR RELIABLE IDENTIFICATION OF FIBER PLANTS USED TO MANUFACTURE ARCHAEOLOGICAL ARTIFACTS.

Sherida G. Tripp, Sul Ross State University, Alpine, TX.

The methodology for identification of the fiber plants used to manufacture a perishable artifact has traditionally been performed using gross morphological characteristics. Fiber plants within the genera *Yucca*, *Agave*, *Nolina*, and *Dasyilirion* were the plants of choice prehistorically for the making of fiber objects, and their similar traits can lead to errors in identification when relying solely on external features. In 1944, Bell and King published a methodology to facilitate identification of fiber plants based on constant anatomical characteristics within the plant's vascular system. The vascular bundle morphology and arrangement between taxa of the genera are unique and discernable in cross section. The use of vascular bundle anatomy and arrangement and their comparison with fiber artifacts have demonstrated a most effective and reliable method of recognition among examples analyzed. Limitations of this analytical method include deterioration of fiber materials, restrictions on sample amounts, and lack of identification as to particular species within the genera.

- 51 *ZANTHOXYLUM PARVUM* (RUTACEAE): A RARE WEST TEXAS ENDEMIC, SAFE AT LAST?

James C. Zech, Department of Biology, Sul Ross State University, Alpine, TX.

Shinners' Tickle Tongue (*Zanthoxylum parvum*, Rutaceae) is a rare endemic species restricted to the Davis Mountains of West Texas. *Zanthoxylum parvum* is dioecious with little known about its reproductive biology. A total of nine locations/populations have been recognized: three exclusively female; one male; one mixture; and four gender undeterminable. Lack of a vestigial gynoeceum in staminate flowers and the general lack of a vestigial androeceum in pistillate flowers may indicate that gynoeceum suppression is relatively recent and that *Z. parvum* may represent floral evolution from hermaphroditic, to gyno-dioecious, to dioecious. So far there is no evidence that sexual reproduction is occurring in this species with growth habit observations suggesting that *Z. parvum* is clonal, reproducing vegetatively by rhizomes.

- 91 BRYOPHYTE COMMUNITIES ACROSS A RANGE OF NATURAL EAST TEXAS ECOLOGICAL TYPES.

Melia P. Huston and James E. Van Kley\*, Stephen F. Austin State University, Nacogdoches, TX.

While including the second largest and most widespread plant group (mosses), bryophytes are often neglected in ecological studies and until now little effort has been made to describe east Texas bryophyte communities. A recently-revised ecological classification system (ECS) describes a range of ecological types based on soils, topography, and vascular plant communities for the Texas Pineywoods. Using ECS as a framework, we revisited a subset of the sample sites that provided the basis for ECS and examined bryophyte diversity and species composition. These sites, from Angelina, Sabine, and SFA Experimental Forests, represented the principal east Texas ecotypes. Eighty-four species (sixty-one mosses, twenty-two liverworts and one hornwort) were collected. Multivariate ordination and classification of species-by-samples data enabled the description of eight bryophyte communities which differed across floodplain, mesic, upland, and dry sandy sites. While the occurrence of these communities was strongly related to the corresponding vascular plant community on a site and responded to similar soil and topographic gradients, bryophyte communities appeared to respond to these factors at a finer spatial scale and were also influenced by the types of substrates available in each site.

- 108 SEED DISPERSAL BY AMERICAN BLACK BEARS (*URSUS AMERICANUS*) IN BIG BEND NATIONAL PARK, TEXAS.

Justin D. Ceniceros\*, Andrew R. Berezin, and Steven G. Platt, Department of Biology, Sul Ross State University, Alpine, TX.

Seed dispersal by carnivores is an important, yet often overlooked and poorly studied plant-animal mutualism. Among carnivores, black bears are potentially important seed dispersers because fruit comprises a major portion of the diet; seeds may be retained in the digestive tract for up to 24 hours (perhaps longer) before being defecated, and bears often move long distances. We conducted a preliminary investigation (May-September 2007) of seed dispersal by black bears in Big Bend National Park, and recovered the seeds of Texas persimmon (*Diospyros texana*), desert olive (*Forestiera angustifolia*), little leaf sumac (*Rhus microphylla*), yucca (*Yucca* spp.), and prickly pear (*Opuntia* spp.) from fresh scats. During the forthcoming field season (2008), we plan to continue scat collections and quantify the viability and germination rates of seeds recovered from bear scats. A control group of seeds that have not been ingested by bears will also be established. These data sets will be compared to determine what effect passage through the digestive tract has on seed viability and germination rates.

164 DISTRIBUTION AND GERMINATION OF COMMON GULF COAST *HELIANTHUS* SPECIES ON TWO SOIL TYPES.

Sean M. Thompson\*, David J. Gris  and R. Deborah Overath, Department of Life Sciences, Texas A&M–Corpus Christi, Corpus Christi, TX.

*Helianthus annuus* and *H. argophyllus* are the most common species of sunflowers in Nueces County, Texas. In a previous study, *H. argophyllus* was restricted to sandy sites, while *H. annuus* was nearly restricted to clay sites. To determine if the germination phase of development plays a role in this distribution, we germinated locally collected seed of *H. annuus* and *H. argophyllus* on sand and clay soils for 30 days. Although each species germinated on both soil types, percent germination on the preferred soil type was significantly higher. The germination and establishment rate across the whole experiment was 22%. Overall, *H. annuus* had significantly higher germination and establishment than *H. argophyllus* (30% vs. 14%;  $\chi^2=15.47$ ,  $df=1$ ,  $P < 0.01$ ). *Helianthus annuus* displayed significantly higher germination and establishment on clay than on sand (41% vs. 20%;  $\chi^2=8.66$ ,  $df=1$ ,  $P < 0.01$ ), and *H. argophyllus* had significantly higher germination and establishment on sand than on clay (20% vs. 9%;  $\chi^2=5.44$ ,  $df=1$ ,  $P < 0.05$ ). This trend is consistent with the field distribution. We are currently repeating this study with appropriate replication to obtain a larger sample size for more powerful statistical analyses.

## 203 CONTENT MANAGEMENT SYSTEMS IN BIOLOGICAL SURVEYS: AN EXAMPLE FROM A FLORISTIC SURVEY OF RUSH CREEK, TYLER COUNTY, TEXAS.

Jeffrey G. Pittman\*, Department of Geology and Randall G. Terry, Department of Biology, Lamar University, Beaumont, TX.

A content management system (CMS) is used to manage information on a web site. We describe the use of Plone, a CMS based on the programming language Python and the object-based web application server Zope, all open source. The full potential of this software suite is reached by combining desktop computer and server programming in Python. Capabilities include management of custom graphics (including images of organisms and features critical for identification), charts, mapping of GPS-generated locality data, and other types of information routinely generated in biological surveys. For our project, field data are first uploaded, stored and processed on desktop computers, followed by bulk uploading to the CMS using custom scripts. Online presentation of data and collaboration capitalizes on features of the CMS, including user authentication and attribution, content versioning, which is important for keeping a history of specimen identifications, and the hierarchical storage system, a natural counterpart to specimen identification in the laboratory and to phylogenetic information. The CMS is queried periodically for status reports, which include color-coded displays for quick assessment of progress and identification of items needing attention.

## 233 NOTEWORTHY BRYOLOGICAL COLLECTIONS FROM SOUTH TEXAS.

Cynthia M. Galloway\* and Arielle McEwin, Department of Biological and Health Sciences, Texas A&M University–Kingsville, Kingsville, TX.

For the past 17 years, collections of mosses have been made from various locations in Texas south of San Antonio. This area has been widely under-collected when compared to areas in the rest of the United States. Since there are many places yet to be explored within the state, new and unexpected species are found on a regular basis by those who care to take the time to look. The records presented here are from collections by students from past Non-Flowering Plants classes, Independent Research projects, faculty within the Biology Department, and students working in my research lab at TAMUK. Several of these collections represent only second time collections of species from the state, while others are range extensions for species within the state. Methods of collection and identification will be presented as well as future plans for the study of bryophytes in Texas.

## 246 COMPARISON OF GERMINATION RATES OF TWO MORPHOTYPES OF SUNFLOWER SEEDS.

Eric Soto\* and Kirk Cammarata, Texas A&M University–Corpus Christi, Corpus Christi, TX.

Studies on sunflowers (*Helianthus argophyllus*) responses to arsenic revealed low germination rates of harvested seeds and that there were two morphological variations of seeds, spotted and solid. It was hypothesized that the larger spotted seeds had higher levels of germination than the solid seeds. To test the hypothesis, 100 wild-collected seeds of each type were incubated on moist filter paper and observed 2-3 times per week for six weeks. Observed germination rates were 43% vs. 1% for spotted vs. solid seeds, respectively. In order to understand why the germination rates differed we measured the fresh and dry weights of the seeds. Spotted seeds had an average weight of  $4.3 \pm 0.9$  mg while the solid seeds

weighed  $1.7 \pm 0.2$  mg and there were corresponding differences in the appearance of dissected seeds. Colorimetric visualization of respiration and peroxidase activities suggested that the solid seeds were non-viable. To determine the ratio in which spotted and solid seeds occur on the plants, we counted each seed type from 5 mL batches of seeds. In three replicate counts, we observed a ratio of  $0.8 \pm 0.13$  spotted to solid seeds. We conclude that the solid morphotype, which represented 56% of total seeds in our sample, is non-viable.

261 DETERMINING THE RELATIONSHIP BETWEEN *CYANOSPORA ALBICEDRAE* (ASCOMYCOTA: STICTIDACEAE) AND *JUNIPERUS ASHEI* (MAGNOLIOPHYTA: CUPRESSACEAE).

Samuel A. Miller\* and David E. Lemke, Department of Biology, Texas State University, San Marcos, TX.

The occurrence of grayish-white blotches caused by a particular fungal species, *Cyanospora albicedrae*, on the stems of *Juniperus ashei* is a characteristic feature of the Ashe juniper in central Texas. To investigate the nature of the relationship between the species, we estimated fungal load and measured tree height and basal trunk diameter for specimens of *J. ashei* growing along the Barton Creek Greenbelt in Austin, Travis Co., Texas in the fall of 2007 and found statistically significant negative correlations between fungal load and tree height and between fungal load and basal trunk diameter. The overall decrease in tree size that corresponds with an increase in fungal load may indicate that *C. albicedrae* is parasitic on *J. ashei*. In thin sections of infected stems stained with trypan blue, hyphal-like structures were found in the innermost (and therefore presumably active) layers of the secondary phloem, providing additional evidence for the parasitic nature of the relationship.

262 DISTRIBUTION OF OSMOPHORES IN THE CARRION FLOWERS (APOCYNACEAE, ASCLEPIADOIDEAE).

David E. Lemke\* and Kort A. Angerstein, Department of Biology, Texas State University, San Marcos, TX.

The fragrance of flowers is commonly produced by volatile substances often originating in specialized glands termed osmophores. Such glands were first described from milkweeds but have since been found in families as diverse as Aristolochiaceae, Solanaceae, Araceae, Iridaceae and Orchidaceae. Osmophores generally consist of glandular tissue several cell layers in thickness with the epidermal layer responsible for accumulation and release of the fragrance and the lower layers responsible for fragrance synthesis. We have found diverse patterns of osmophore distribution within the flowers of the stapeliads, a group of approximately 30 genera and over 600 species of Old World succulents commonly known as "carrion flowers," and are exploring correlations between osmophore distribution, pollination syndromes, and systematic relationships within this group.

P139 STOMATAL VARIABILITY AS CORRELATED WITH LEAF MORPHOLOGY IN *SMILAX BONA-NOX* L.

Yao Wei Lu\* and Herbert D. Grover, Department of Biology, Hardin-Simmons University, Abilene, TX.

Stomatal density in perennial plants is known to vary as a function of species, leaf age, leaf size, moisture availability, and other environmental conditions. Using standard methods for collecting leaf surface impressions, we sampled the underside of leaves collected from *Smilax bona-nox* L. plants from three locations differing in soil conditions (clay-loam to sand) and dominant vegetation (disturbed mesquite shrubland vs. mature oak woodland). For our analysis, leaf specimens were categorized based on shape (reniform to rounded) and presence or absence of prickles on leaf margins and/or mid-veins. Leaf impressions were collected from lower, middle and upper regions of leaves of different morphotypes using clear nail polish as a cast material and clear cellophane tape to remove the cast. Digital images were taken of each impression at 40-power magnification. Images were imported into the Manifold® 8.0 image processing and GIS software package to quantify stomatal density and spatial distribution. Preliminary findings indicate stomatal densities range from approximately 82 stomata per mm<sup>2</sup> for leaves with prickles at the oak woodland location, to approximately 49 stomata per mm<sup>2</sup> for leaves lacking prickles in a nearby oak woodland site. Differences in stomatal density between prickled vs. non-prickled leaves were greatest between leaves collected from the oak woodland locations, with minimal differences between leaf morphotypes collected from the disturbed shrubland location where average stomatal densities of about 70 per mm<sup>2</sup> were obtained. Additional data examining correlations between total leaf area (as an indicator of leaf age), stomatal density, and nearest neighbor distances between stomata will also be discussed.

## P180 RELATIONSHIPS BETWEEN POLLEN WALL STRUCTURE AND STIGMATIC SURFACES FOR SELECTED TAXA.

Oksana O. Martyniuk\* and James E. Van Kley, Stephen F. Austin State University, Nacogdoches, TX.

The significance of the position of pores in depressions of certain pantoporate (multiple rounded apertures) pollen grains is unclear. We used light and scanning electron microscopy to compare pollen surface features with the surface of the corresponding stigma for selected taxa including *Alternanthera*, *Gomphrena*, *Celosia*, *Mollugo*, *Cerastium*, *Stellaria*, *Ulmus*, *Polygonum*, and *Quercus*. The size and structure of papilla tips from the stigmas of several Amaranthaceae species were clearly related to the occurrence of pores in depressions (luminas); pollen depressions fit the papillae exactly. Such configurations provide good contact with the stigma and at the same time inhibit occupation of the stigma by foreign pollen. For pollen grains of other taxa other conditions may dictate their structure. This is true as well for colpate (both an elongated and rounded aperture) pollen grains such as those of *Quercus* (oaks) where the humidity of a plant's habitat may influence the degree of a colpa's opening and pollen surface topography is not necessarily closely related to that of the stigma. For example, the almost plane stigmatic surface of *Quercus* is largely non-selective and there is a high probability that pollen from other taxa will stick; surfaces of east Texas *Quercus* stigmas contained substantial foreign pollen, especially that of *Pinus* (pine) spp.

## P186 GERMINATION OF TWO SUNFLOWER SPECIES ACROSS A SALT GRADIENT.

Hector G. Aguilar\*, Sean M. Thompson, David J. Gris  and R. Deborah Overath, Department of Life Sciences, Texas A&M–Corpus Christi, Corpus Christi, TX.

*Helianthus annuus* and *H. argophyllus* are the two main species of sunflowers in Nueces County, Texas. In general, *Helianthus argophyllus* is found growing on sand and *H. annuus* is found on clay. Because the sandy soils on which *H. argophyllus* is found include dunes near saline environments, this difference in distribution may be due to differences in salt tolerance. To determine if *H. argophyllus* is able to germinate in more saline environments, we compared the percent germination between the two species at different salinities. We monitored percent germination in sand-filled Petri dishes at four salinity levels over a course of 15 days. We used commercial seeds to avoid any dormancy that field-collected seeds may have. Salinity levels were 0% (distilled water), 5%, 10%, and 15% salt. For *H. annuus*, we observed 68% germination in the 0% salt treatment, 69% germination in the 5% salt treatment, 59% germination in the 10% salt treatment, and 56% germination in the 15% salt treatment. For *H. argophyllus*, we observed 69% germination in the 0% salt treatment, 64% germination in the 5% salt treatment, 49% germination in the 10% salt treatment, and 27% germination in the 15% salt treatment. Germination in both species decreased with increasing salinity, but the decrease was more severe in *H. argophyllus*. This result is contrary to our expectations based on field distributions of these species. We are repeating this experiment with field-collected seeds.

## P225 COMPARATIVE ULTRASTRUCTURE AND X-RAY ELEMENTAL ANALYSIS OF FRUITS WITHIN FAMILY APIACEAE.

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Species in the family Apiaceae are usually herbs which are rich in essential oils that are secreted from oil ducts or vittae. Fruits of ten different species of Apiaceae were studied using the Scanning Electron Microscope (SEM). The ultrastructure of the surface of the following fruits were investigated: *Ammi visnaga*, *Anethum graveolens*, *Apium graveolens*, *Carum carvi*, *Coriandrum sativum*, *Cuminum cyminum*, *Daucus carota*, *Foeniculum vulgare*, *Petroselinum crispum*, and *Pimpinella anisum*. In addition the ultrastructure of the cross sections of all mentioned fruits was studied as well. An X-ray detector was utilized to determine the elemental analysis of all studied fruits. Large micromorphological differences with considerable different types of sculpturing were found in the surfaces of different species. Different types of surface structures were distinguished among studied fruits; the surface pattern is very diagnostic and most fruits can be clearly distinguished by their surface characteristics. SEM investigation of the cross sections of different fruit species showed detailed ultrastructures including the secreting ducts, and stored fat and protein. 3-D elemental mapping revealed significant differences among the studied species. Supported by NASA grant # NCC-195-9 and RCMI grant # R003045-17.



## CELL AND MOLECULAR BIOLOGY

- 158 ALUMINUM INFLUX VIA A CALCIUM CHANNEL IN THE ROOT TIP CELLS OF THE WINTER WHEAT (*TRITICUM AESTIVUM* L.) CULTIVARS AL-TOLERANT ATLAS 66 AND AL-SENSITIVE SCOUT 66.

Junie A. Leblanc\* and Magaly Rincón-Zachary, Department of Biology, Midwestern State University, Wichita Falls, TX.

Aluminum (Al) toxicity is linked to changes in Ca<sup>2+</sup> homeostasis and to the blockage of plasma membrane Ca<sup>2+</sup> channels. While Al interferes with the influx of Ca<sup>2+</sup> in root tip cells, extracellular Ca<sup>2+</sup> alleviates Al toxicity. The interaction between the two ions has given direction in efforts to understand Al toxicity, however, little is known about the mechanism of Al transport across the plasma membrane. If Al enters root tip cells via plasma membrane Ca<sup>2+</sup> channels, Al accumulation in root tip cells will be inhibited by Ca<sup>2+</sup> channels blockers. This hypothesis was tested using intact roots of the winter wheat (*Triticum aestivum* L.) cultivars, Al-tolerant Atlas 66 and Al-sensitive Scout 66. Al uptake was monitored with the fluorescent Al-indicator, morin, after a 6 h treatment in a nutrient solution containing 50 μM AlCl<sub>3</sub>, with and without Ca<sup>2+</sup> channel blockers that have previously been shown to inhibit Ca<sup>2+</sup> uptake in wheat roots. Accumulation of Al in the tissue was visualized using epifluorescence microscopy. Images were taken for quantification analysis. Fluorescence images showed that Ca<sup>2+</sup> channel blockers, lanthanum chloride and ruthenium red, inhibited the influx of Al across the plasma membrane of the root tips. In addition, differential accumulation of Al between Scout 66 and Atlas 66 was not significant. The results support the hypothesis that Al uptake via calcium channels occurs in wheat root.

- 140 PUTATIVE ROLE OF CALCINEURIN IN THE REGULATION OF DAF-16 AND ASSOCIATIVE LEARNING IN *CAENORHABDITIS ELEGANS*. Harmanpreet Buttar\* and Fidelma A. O'Leary, St. Edward's University, Austin, TX.

Increasing intracellular free radical levels are associated with aging as free radicals tend to accumulate over time. Numerous studies with *Caenorhabditis elegans* have shown that antioxidants reverse the neuronal damage and learning deficits that are caused by free radical accumulation. In this study, the thermotaxis model for food-temperature associative learning was used as a paradigm to identify the indirect effect of calcineurin, a calcium/calmodulin dependent phosphatase that is translated from the tax-6 gene, on antioxidant protein levels in the neurons of *C. elegans*. Daf-16 is a transcriptional factor that regulates genes needed for the formation of antioxidant proteins. The activity of daf-16 is in turn regulated by components of the insulin-like signaling pathway, including age-1. The learning success rates at various training intervals were measured for tax-6, age-1, and daf-16 mutants, in order to examine if the learning behaviors of tax-6 mutants mirrored those of daf-16 mutants. The observation that after 16 hours of training in fed conditions at 17°C, the percentages of the tax-6 mutant population (33.6%) and daf-16 mutant population (21.3%) that moved towards 17°C were significantly lower than the wild-type population (81%) indicates a positive correlation between the behaviors of these two mutants and suggests the role of calcineurin as a regulator of daf-16 activity in *C. elegans*. These results imply that calcineurin plays an important role in helping to maintain the plasticity of the nervous system.

- 5 TEMPORAL VARIATION OF MYOGLOBIN CONCENTRATION IN FLIGHT AND CARDIAC MUSCLE OF THE MEXICAN FREE-TAILED BAT (*TADARIDA BRASILIENSIS*).

Ashlee R. Stiles\* and David S. Marsh, Department of Biology, Angelo State University, San Angelo, TX.

This study investigated seasonal variation in myoglobin concentration within flight musculature and cardiac musculature of *Tadarida brasiliensis*. Bats were collected at monthly intervals from a nearby roost and samples of pectoralis major and cardiac muscle were extracted. Data collected were analyzed for temporal variations in levels of myoglobin and correlated with the timing of migratory flights. The results were also compared to published myoglobin levels in other non-migratory bat species, non-flying and diving mammals. Reynafarje's simplified method for determination of myoglobin (Reynafaraje, 1963) was employed in this study. Data collected were analyzed for correlation using ANOVA.

- 4 THE GENOTOXIC EFFECTS OF ANTHRACYCLINES IN PROKARYOTIC AND EUKARYOTIC CELLS.

William J. Mackay\*, Edinboro University of Pennsylvania, Edinboro, PA.

Since the early 1960's anthracyclines have represented one of the most commonly used classes of anticancer drugs. However, the clinical usefulness of these compounds is limited due to acute cardiotoxic effects and a dose-related cardiomyopathy. Much effort has been involved in creating less toxic analogues with improved pharmacological properties. It is

known that anthracyclines interact with DNA in a very complex manner. Studies in our lab have shown that anthracyclines (specifically daunomycin, adriamycin, idarubicin and epirubicin) can induce base-substitution and frameshift mutations in the bacterium *Salmonella typhimurium*. In addition, our lab has determined that 3-methyladenine DNA glycosylase (Aag) can recognize and repair anthracycline-induced DNA adducts. More recently, our lab has assessed the recombinogenic potential of anthracyclines in a unicellular eukaryotic organism. In the yeast deletion (DEL) assay, recombination is induced by the formation of DNA strand breaks, which are a substrate for initiation of genetic repair in this organism. Using the DEL assay our lab has examined the role of DNA recombination pathways in the recognition and removal of anthracycline-induced DNA adducts. Specifically, daunomycin (79-fold induction), adriamycin (491-fold induction), idarubicin (52-fold induction), epirubicin (279-fold induction) tested positive in this assay. The results from our lab indicates that anthracyclines can act as mutagens in prokaryotic cells and as genotoxins in a eukaryotic cell.

184 EFFECTS OF EXOGENOUS MELATONIN ON TOBACCO (*NICOTIANA TABACUM* CV. HAVANA) SEED GERMINATION AND SEEDLING DEVELOPMENT.

Liliane Haden\* and Magaly Rincón-Zachary, Department of Biology, Midwestern State University, Wichita Falls, TX.

Melatonin is a hormone secreted by the mammalian pineal gland in response to photoperiod and seasonal changes. In humans, the circadian rhythm of melatonin secretion is under the control of the circadian regulator in the suprachiasmatic nucleus of the hypothalamus. Melatonin is an indoleamine that has been found in many organisms including plants. In plants, melatonin has been detected in flowers, seeds, leaves, stems, and roots. It has been reported that melatonin stimulates hypocotyl and root growth of lupin and Wisconsin Fast plants seedlings. In this study, the effect of exogenous melatonin on the germination and development photodormant tobacco seeds (*Nicotiana tabacum* cv. Havana) was investigated. The results indicate that melatonin breaks photodormancy and accelerates germination rate. Changes during development associated with periodic addition of exogenous melatonin to tobacco plants will be also discussed.

188 NUCLEAR IMPORT OF HUMAN IMMUNODEFICIENCY VIRUS TYPE-1 (HIV-1) INTEGRASE IN *SACCHAROMYCES CEREVISIAE*.  
J. David Dominguez\*, Megan Mazour, Miguel Palacios, Kathleen Taylor-Prese, and Peter J. King, St. Edward's University, Austin, TX.

Human immunodeficiency virus type-1 (HIV-1) replication requires the virally-encoded integrase (IN) which acts in the context of a large multi-protein complex, the pre-integration complex (PIC). Active nuclear import of the HIV-1 PIC is required for infection of non-dividing cells such as macrophages and resting T-lymphocytes; however, the molecular components of the HIV-1 PIC that are recognized by the cellular nuclear import machinery and the specific nuclear import pathway utilized for PIC import remain incompletely defined. HIV-1 IN has been implicated in a central role in the nuclear import process in mammalian cell culture, but the inability to perform reverse genetics in these cells has limited the ability to dissect details involving its import. The objective of our investigation was to evaluate *Saccharomyces cerevisiae* as an experimental model to study nuclear import of HIV IN. We have examined the importance of the N- and C- terminal regions of HIV IN as well as the effect of several yeast mutations on the nuclear import of IN utilizing a green fluorescent protein (GFP) expression system. These results highlight the importance of *S. cerevisiae* in molecular studies of nuclear import, and provide preliminary evidence of domains of HIV IN and cellular factors that may play vital roles in the nuclear import of the HIV-1 PIC.

247 TARGETING FOXO TRANSCRIPTION FACTORS BY NATURAL DIETARY AGENTS FOR THERAPY OF CANCER.

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The FOXO family of Forkhead transcription factors, FKHR (FOXO1), FKHR-L1 (FOXO3a) and AFX (FOXO4) are required for the maintenance of the general metabolic status of the cells. Under resting condition of the cell, the FOXO proteins translocate to the nucleus and up-regulate a series of target genes that control the cell cycle, cell death, cell metabolism and oxidative stress. FOXO transcription factors are regulated by the phosphoinositide-3-kinase-protein-kinase-B (PI3K-PKB/c-Akt) pathway. Akt prevents nuclear localization of FOXO3a by phosphorylation. Carcinogens, cytokines, growth factors, or direct phosphorylation by PKB cause FOXO protein cytoplasmic localization and degradation. Adverse processes activated by FOXO suppression include increased generation of reactive oxygen species. ROS are pivotal for the onset of various common conditions, including hypertension, atherosclerosis, type 2 diabetes, cancer and Alzheimer's disease. Curcumin (diferuloyl-methane), a component of turmeric has been described as a potent antioxidant and anti-inflammatory agent. The suppression of cellular transformation, proliferation, invasion, angiogenesis, and metastasis of tumors by curcumin has been

reported. Work from our laboratory has shown that curcumin can suppress NF- $\kappa$ B activation, STAT3 activation, COX-2 expression, AKT activation, cyclin D1 and TNF expression. Whether curcumin can modulate the expression of FOXO is not understood. We have found that curcumin blocks the cytoplasmic translocation and degradation of FOXO. Our further study aims at determining the mechanism of action of curcumin in suppressing the cytoplasmic translocation of FOXO proteins.

303 IDENTIFICATION AND CHARACTERIZATION OF DROSOPHILA RECEPTOR EXPRESSION ENHANCING PROTEIN (REEP) HOMOLOGS.

Ravi R.C. Lala\* and Enrique Massa, Texas A&M University-Kingsville, Kingsville, TX.

Recent work has revealed the presence of multiple proteins that enhance or facilitate G-protein coupled receptor expression in various tissues. In particular, a set of Receptor Expression Enhancing Proteins (REEPs) have been implicated in the expression and activity of several olfactory and taste G-protein coupled receptors. Mutations in one class of REEP have also been identified in a familial form of spastic paraplegia, a debilitating human neurological condition. Bioinformatic analyses of the *Drosophila melanogaster* genome resulted in the identification of seven distinct REEP homologs. One *Drosophila* REEP was identified as the cognate of human REEP1, which is mutated in one version of hereditary spastic paraplegia. A P-element insertion was identified within the *Drosophila* REEP1 homolog which results in a hypomorphic reduction of REEP expression in these flies. Initial characterization of the fly REEP1 homolog demonstrated that the mutant flies exhibit an abnormal nervous system as denoted by defective and diminished negative geotactic responses in these mutants. The defective geotactic responses also seems to increase with age. The apparent behavioral phenotype of the REEP mutation suggests that the fly REEP exhibits a conserved neuronal function as seen in the human REEP1 gene. Further results on the behavioral characterization of the fly REEP1 homolog mutation will be determined and presented.

228 ARE CIS-REGULATORY MUTATIONS A MAJOR CONTRIBUTOR TO PHENOTYPIC CHANGE?

Lisa M. Goering\*, St. Edward's University, Austin TX, Priscilla Hunt, Cassandra Heighington, and Greg Gibson, North Carolina State University, Raleigh, NC.

An outstanding question in the field of evolutionary developmental biology regards the contribution of cis-regulatory mutations to phenotypic evolution. It has been proposed that certain types of phenotypic changes, notably those involving morphology, may be more likely to occur due to adaptive mutation in cis-regulatory regions, rather than in the protein-coding regions of genes. Two populations of *Drosophila melanogaster* were surveyed for naturally occurring genetic variation in 19 previously defined cis-regulatory modules (CRMs) under the control of the developmental morphogen Bicoid. Only one CRM, the *orthodenticle* early-head enhancer had a pattern of molecular variation that showed a significant departure from neutrality. Specifically, the pattern of variation suggests the past action of balancing selection acting to maintain two distinct haplotypes. Phenotypically, the two haplotypes are associated with differences in the pattern of endogenous *orthodenticle* expression; furthermore, transgenic *Drosophila* expressing *lacZ* under the control of the two *otd* CRM haplotypes show the same results. Studies of this type aid in our understanding of the role cis-regulatory mutations play in the evolution of organismal phenotypes.

78 MICROBIAL POPULATION ANALYSIS AS A TOOL FOR ECOLOGICAL CLASSIFICATION.

Darya Fakhretdinova\*, James E. Van Kley, Armen Nalian, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX.

An ecological classification of natural habitats based on their vegetation, topographic position, soil texture, hydrology, fire frequency, and plant nutrient availability was recently developed as a management tool for east Texas forests. This classification scheme does not take into account such important components of terrestrial ecosystems as microbes, particularly arbuscular mycorrhizal fungi (AMF) and soil bacteria. AMF facilitate plant mineral uptake, enhance pathogen and disease resistance, and influence plant community structure and productivity. Soil bacteria are important decomposers, improve water infiltration and water-holding capacity of the soil, and amend its stability and aeration. In the current work microbial diversity across different natural east Texas habitat types was studied by molecular techniques: PCR amplification of fragments of the small subunit ribosomal RNA (SSU rRNA) gene with subsequent denaturing gradient gel electrophoresis (DGGE) analysis of obtained amplicons. DGGE profiles show the qualitative microbial diversity of each habitat. Analyzing AMF and soil bacterial diversity across different habitat types using DGGE provides a new and additional component for ecological classification of east Texas natural habitat types.

- 81 DEVELOPMENT OF REAL-TIME PCR ASSAY FOR QUANTIFICATION OF *EIMERIA TENNELA* AND *ACERVULINA* OOCYSTS IN FECAL SAMPLES.

Marina Maksimova\*, Armen Nalian, Irina Teplova, Alexandra Martynova VanKley, Stephen F. Austin State University, Nacogdoches, TX.

Avian coccidiosis is a protozoan disease, which is responsible for significant economic losses in poultry production. It is caused by seven species of the genus *Eimeria*. It is important to identify and determine the quantity of oocysts for successful treatment of the disease. A real-time PCR assay based on fluorogenic probes species-specific to the 18S rRNA gene was developed to quantify parasite load in fecal samples. The TaqMan probes for the analysis of *Eimeria* were identified utilizing BLAST, the ClustalW program and custom software developed in our laboratory. The number of oocysts in fecal samples was estimated quantitatively based on a standard curve which was built using plasmid DNA. This technique for quantitative detection of *Eimeria* species can be used in the poultry industry as a tool for monitoring coccidiosis.

- 90 URANIUM ACETATE INDUCES OXIDATIVE STRESS AND ACTIVATES APOPTOSIS SIGNALING PATHWAY IN RAT LUNG EPITHELIAL CELLS.

Adaikkappan Periyakaruppan\*, Prabakaran Ravichandran, Bindu Sadanandan, Govindarajan Ramesh, Bobby L. Wilson and Renard L. Thomas, NASA University Research Center, Texas Southern University, Houston, TX.

Uranium is a natural and commonly occurring radioactive element. It is a highly reactive metal, hence it is not found as free uranium in the environment. Uranium can enter the human body through inhalation, ingestion, or penetration through the skin. Inhalation of depleted uranium dust is the most likely route of exposure. Several reports have shown that uranium or depleted uranium induce oxidative stress causing DNA damage, mutagenic cancer and neurological defects. The present study was undertaken to evaluate the role of oxidative stress in signaling cascade induced by uranium and also to examine the mechanism of toxicity. We used *in-vitro* rat lung epithelial cells (RL-65) as a model system. Uranium was found to induce reactive oxygen species significantly with decrease in viability of rat lung cells by 72 hr. The decreased in cell viability may be due to increased cell death or decreased cell proliferation. Uranium also reduced the levels of glutathione and superoxide dismutase the antioxidant protective mechanism present in LE cells, which further proves the increased oxidative stress. Tunnel assay carried out on the control and uranium treated cells suggested that the decreased in cell number experimental cells was due to apoptosis. Treatment of cells with uranium activates both caspase 3 and caspase 8 significantly compared to control. Caspase 3 inhibitor down regulated the caspase 3 and caspase 8 activity and blocked the apoptosis induced by uranium. The results suggested that oxidative stress induced by uranium activates apoptotic signaling pathway in rat lung epithelial cells.

- 187 AN INVESTIGATION OF ALUMINUM TOLERANCE MECHANISM IN WHEAT (*TRITICUM AESTIVUM* L.) ROOTS: AL EFFLUX. Bikash Adhikari\* and Magaly Rincón-Zachary, Department of Biology, Midwestern State University, Wichita Falls, TX.

Aluminum (Al) toxicity is a global problem that limits crop production in acidic soil. Although, there is considerable variation within and between plant species in their ability to tolerate Al, the cellular and molecular basis for tolerance is still poorly understood. Calcium (Ca<sup>2+</sup>) alleviates Al toxicity in wheat by inhibiting the accumulation of Al in the root tips. The objective of this study was to investigate the effect of Ca<sup>2+</sup> on the efflux of Al from wheat roots. It was hypothesized that an Al tolerant cultivar could have an efflux mechanism controlled by Ca<sup>2+</sup>. Intact roots were incubated in a nutrient solution containing 50 μM Al for 2 h. The roots were then transferred to an Al-free nutrient solution with or without Ca<sup>2+</sup> for 2 and 4 h. Al remaining in the root tissue was assessed using Al-Morin complex and epifluorescence microscopy. Digital images were taken and analyzed using Image J software. Retention of Al in the Al-tolerant wheat roots was higher when Ca<sup>2+</sup> was omitted from the Al-free solution than when Ca was present in the solution. The results suggest that there is an Al efflux mechanism regulated by Ca<sup>2+</sup>.

- 112 ENVIRONMENTAL PERTURBATIONS ON GROWTH RATES OF *VIBRIO VULNIFICUS* ISOLATES FROM WATERS OF SOUTH TEXAS BAYS.

Eileen Quiroz<sup>1</sup>, Justin Villarreal<sup>1</sup>, Gregory Buck<sup>1</sup>, Joanna Mott<sup>1</sup>, Alexis Galvan<sup>1</sup>, Gabriel Ramirez<sup>1</sup>, Amanda Smith<sup>1</sup>, Sabrina Imam<sup>1,2</sup>, Gregory Hild<sup>1</sup>, Dan Cooper<sup>1</sup>. <sup>1</sup>Department of Life Sciences, Texas A&M University–Corpus Christi. <sup>2</sup>Cornell University Endowed Colleges, Ithaca, NY.

*Vibrio vulnificus* has a worldwide distribution in estuarine and marine waters and is the cause of severe and often fatal infection in immuno-compromised individuals. Prior studies involving *Vibrio* strains isolated from the Gulf of Mexico and

bays around the Corpus Christi area have showed varying growth responses when exposed to 880  $\mu\text{M}$   $\text{H}_2\text{O}_2$ , but other environmental factors were not considered. As such, little is known about how salinity affects levels of *Vibrio vulnificus* in south Texas, and this information is important for tourism, fishing, oyster harvesting, and recreation. This study investigates how the effect of step-wise increases of salinity levels may impact the growth patterns of local environmental *Vibrio* isolates in comparison to a clinical ATCC type isolate. Environmental isolates of *V. vulnificus* were taken from water sampled throughout the bay systems around Corpus Christi including Port Aransas and Rockport Beach; ATCC 27562 clinical isolate was used as a comparison. Isolates were grown in Luria-Bertani (LB) broth with various concentrations of NaCl at 37°C from lag phase to early stationary phase, and the growth rates measured at 590 nm. Environmental isolates demonstrated a greater ability to survive at salinities ranging from 25 ppt to 50 ppt than ATCC strains whose optimal growth was seen at salinities of 15 ppt and 25 ppt. This result was unexpected, and suggested that Gulf Coast *Vibrio* isolates may have a higher tolerance to high salinities. Further studies of environmental isolates will determine the genetic basis for high salt tolerance.

- 137 AN INVESTIGATION OF THE EFFECTS OF ALUMINUM ON THE CONCENTRATION OF FREE CYTOPLASMIC CALCIUM USING THE YELLOW CAMELEON (YC 3.60) IN CONJUNCTION WITH FLUORESCENCE RESONANCE ENERGY TRANSFER (FRET) AND SENSITIZED EMISSION.

Magaly Rincón-Zachary\*, Department of Biology, Midwestern State University, Wichita Falls, TX, Aline H. Valster, Christy M. Motes, J. Alan Sparks, and Elison B. Blancaflor, Plant Biology Division, The Samuel Roberts Noble Foundation, Ardmore, OK.

Mutations have been introduced in the green fluorescent protein (GFP) gene to produce proteins that fluoresce at different wavelengths. These proteins are useful tools in visualizing and monitoring cellular processes. YCs are composed of: (1) a cyan fluorescent protein (CFP); (2) the C terminus of calmodulin (CaM); (3) a glycine-glycine linker; (4) the CaM-binding domain of myosin light chain kinase (M13); and (5) a yellow fluorescent protein (YFP). The increased interaction between M13 and CaM upon  $\text{Ca}^{2+}$  binding shortens the distance between CFP and YFP and as a result the efficiency of fluorescence resonance energy transfer (FRET) increases. Transgenic *Arabidopsis thaliana* expressing the synthetic gene YC 3.60 was used to study the effect of aluminum ( $\text{Al}^{3+}$ ) on the concentration of free  $\text{Ca}^{2+}$  in the cytosol ( $[\text{Ca}^{2+}]_{\text{cyt}}$ ) of root cells. The changes in  $[\text{Ca}^{2+}]_{\text{cyt}}$  were monitored by CFP/YFP FRET imaging using confocal microscopy and the sensitized emission method. The addition of  $\text{Al}^{3+}$  (0.1 mM and 1 mM) to root cells increased the  $[\text{Ca}^{2+}]_{\text{cyt}}$  within 30 s. This  $\text{Al}^{3+}$  induced increase of  $[\text{Ca}^{2+}]_{\text{cyt}}$  was observed in root cells from the distal elongation, elongation and mature root zones. The response was not specific to  $\text{Al}^{3+}$ ; other trivalent ions such as  $\text{La}^{3+}$  and  $\text{Gd}^{3+}$  also induced an increase in  $[\text{Ca}^{2+}]_{\text{cyt}}$  within the same time frame as  $\text{Al}^{3+}$ . Since  $\text{Al}^{3+}$ ,  $\text{Gd}^{3+}$ , and  $\text{La}^{3+}$  are  $\text{Ca}^{2+}$  channel blockers, we hypothesize that the observed elevation of  $[\text{Ca}^{2+}]_{\text{cyt}}$  may be due to the release of  $\text{Ca}^{2+}$  from intracellular stores (e.g. vacuole, ER, and mitochondria) into the cytosol.

- 26 ANALYSIS OF CARBON PREFERENCE INDICATES ALANINE AS A PREFERRED ENERGY SOURCE FOR *PSEUDOMONAS AERUGINOSA*.

Aissa Longoria\*, Patricia Baynham, and Karla Barrera, St. Edward's University, Austin, TX, Lindsay Aye, Kelli L. Palmer, and Marvin Whiteley, University of Texas, Austin, TX.

*Pseudomonas aeruginosa* is an environmental bacterium and a potent opportunistic pathogen. It poses a problem for individuals undergoing chemotherapy, burn patients, and individuals with the genetic disease cystic fibrosis (CF). CF is characterized by accumulation of sputum (mucus) within the lungs. CF sputum is a complex mixture of secreted mucus, inflammatory products, eukaryotic and prokaryotic detritus and serves as a reservoir for chronic bacterial infections in the CF lung. The most clinically relevant CF lung infection is caused by *Pseudomonas aeruginosa*. Although there is compelling evidence that *P. aeruginosa* resides and grows in sputum within the CF lung, there is little information regarding CF sputum nutritional components. Understanding the nutritional content of CF sputum is critical, as several aspects of *P. aeruginosa* virulence, including biofilm formation and cell-cell signaling, are impacted by nutritional cues. The objective of this study was to examine *P. aeruginosa* carbon preference during growth in CF sputum to identify critical catabolic pathways important for colonization and persistence in the CF lung. Results from these studies reveal that *P. aeruginosa* preferentially consumes six carbon sources: proline, alanine, arginine, lactate, glutamate, and aspartate. Due to high levels of alanine present in CF sputum, we focused on alanine catabolism. The molecular architecture of the alanine catabolism gene cluster was determined using primer extension, RT-PCR, and Northern blot analysis. Regulation studies reveal that the alanine catabolic operon is positively controlled by the leucine responsive regulatory gene (LRP). Preliminary experiments suggest that alanine analogs may inhibit *P. aeruginosa* growth.

67 THE LEUCINE RESPONSIVE REGULATORY PROTEIN (LRP) REGULATES ALANINE CATABOLISM IN *PSEUDOMONAS AERUGINOSA*.

Karla Barrera\*, Patricia J. Baynham, Aissa Longoria, St. Edward's University, Austin, TX, Lindsay Aye, Kelli L. Palmer, and Marvin Whiteley, University of Texas, Austin, TX.

*Pseudomonas aeruginosa* is a gram-negative bacterium commonly found in soil and water. It is not a problem for healthy individuals but is highly pathogenic in those with some underlying condition. Cystic fibrosis (CF) is a recessive genetic disease characterized by accumulation of sputum within the lungs. CF sputum is a complex mixture of secreted mucus, inflammatory products, eukaryotic and prokaryotic detritus and serves as a reservoir for chronic bacterial infections in the CF lung. The most clinically relevant CF lung infection is caused by the opportunistic pathogen *P. aeruginosa*. Understanding the nutritional content of CF sputum is critical to understanding disease, as several aspects of *P. aeruginosa* virulence, including biofilm formation and cell-cell signaling, are impacted by nutritional cues. The objective of this study was to examine *P. aeruginosa* carbon preference during growth in CF sputum, with the goal of identifying catabolic pathways important for colonization and persistence in the CF lung. The results reveal that *P. aeruginosa* preferentially consumes six carbon sources: proline, alanine, arginine, lactate, glutamate, and aspartate, during growth in CF sputum. Due to high levels of alanine present, we focused on alanine catabolism as an important source of carbon in CF sputum. Using a reporter gene fusion we found that the alanine catabolic operon is positively controlled by the leucine responsive regulatory gene (LRP). Current studies are aimed at understanding the importance of alanine catabolism for growth and competitiveness in CF sputum as well as the potential of this pathway for design of novel therapeutics.

80 ASSEMBLING CHIMERA FROM TWO DOMAINS: HYPERTHERMOSTABLE BETA-1,4-ENDOGLUCANASE AND BETA-GLUCOSIDASE FROM *PYROCOCCUS HORIKOSHII*.

Srihari Babu Gogineni\*, Nalian Armen, Dr. Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX.

Cellulose is the most abundant biopolymer in nature. It is composed of repeating glucose units which are joined by beta-1,4-glycosidic bonds. Cellulases are the class of enzymes responsible for hydrolysis of cellulose. They are multicomponent complexes which include endoglucanases, exoglucanases, and beta-glucosidases. In the current study, beta-1,4-endoglucanase and beta-glucosidases from *Pyrococcus horikoshii* were combined into a chimeric protein to enhance the cellulolytic activity at high temperatures (95 °C) and also to decrease the product inhibition. The enhanced activity of the enzyme was verified by p-nitrophenyl beta-D-glucopyranoside and p-nitrophenyl beta-D-cellobiose.

88 NANOTOXICOLOGY OF SINGLE WALLED AND MULTIWALLED CARBON NANOTUBES.

Prabakaran Ravichandran\*, Adaikkappan Periyakaruppan, Bindu Sadanandan, Govindarajan Ramesh, Bobby L. Wilson and Renard L. Thomas, NASA University Research Center, Texas Southern University, Houston, TX.

Carbon nanotubes (CNTs) are allotropes of carbon, first identified in 1991 by Sumio Iijima of NEC, Japan, and formed from hexagonal arrays of carbon atoms. There are two main types of carbon nanotubes: Single-walled nanotubes (SWNTs) and Multi-walled nanotubes (MWNTs). A SWCNT is a one-atom thick sheet of graphite rolled up to give a tube like structures and MWNT consist of multiple layers of graphite rolled in on themselves to form a tube shape. Carbon Nanotubes possess many unique and remarkable properties, which includes targeted drug delivery, virus detection, better medical implants, artificially created organs, molecular methods for disease diagnosis and molecular imaging. The use of CNTs in various fields, especially in medical applications raises serious concerns about health and safety issues. Only limited toxicological studies have been carried out on activated carbon, graphite, and carbon fibers. Quite often industrial workers suffer from asthma and other respiratory diseases, suggesting that CNTs may pose health and environmental hazards. The widespread use of SWCNT's is hindered by few toxic studies that have been carried out on animal models and cell cultures. Therefore the purpose of this is to compare the level of toxicity in lung epithelial cells when treated with Single and multi-walled carbon nanotubes. The following objectives are being investigated in this work. 1. Treat Rat lung epithelial cell lines with single walled and multi walled nanotubes. 2. Analysis of cellular, molecular and mechanistic bioeffect.

232 IMPRINT OF EVOLUTIONARY CONSERVATION AND PROTEIN STRUCTURE VARIATION ON THE BINDING OF PROTEIN KINASE INHIBITORS.

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Protein kinases are the most abundant single family of signaling molecules in the cell accounting for ca. 2% of the human proteome. Tyrosine kinases (TK) act as important arbiters of signal transduction in eukaryotes and many prokaryotes and control key cellular processes such as the cell cycle, differentiation and proliferation. Mutations and dysregulation of tyrosine kinases therefore result in numerous human neoplastic diseases. Receptor and nonreceptor tyrosine kinases have therefore emerged as clinically important drug target molecules for treating certain types of cancer. Rational drug design has produced several protein kinase inhibitors including STI57 (imatinib mesylate), which cross-inhibits a variety of tyrosine kinases including c-kit, platelet-derived growth factor receptor (PDGFR) and Abl but not the closely related kinase, Src. X-ray co-crystal structures of imatinib - Abl and imatinib - c-kit complex demonstrates that the drug binds to an inactive conformation of both kinases. Interestingly, although the receptor kinases Flt-3, Kdr, Tek and c-Met belong to the same receptor TK family as c-kit and PDGFR they are not inhibited by imatinib. This suggests that although structurally related, these tyrosine kinases have subtle differences in their ATP - binding domains. We used a carefully constructed alignment of the kinase domains of all known human tyrosine kinases present in the SMART database as a basis for studying the structural evolution and ability of drugs such as imatinib to inhibit subsets of these kinases.

251 ROLE OF P44 IN THE CONTROL OF PROLIFERATION AND DIFFERENTIATION OF PROSTATE EPITHELIAL CELLS.

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The androgen pathway describes the signaling route that plays a role in inducing proliferation of prostate cells; differentiating prostate cells in relation to function; survival and maintenance of prostate cells; and in prostate tumorigenesis and prostate cancer progression. The present model of androgen functions in the prostate gland is that androgens increase the proliferation of prostate cells and androgen withdrawal has the potential to inhibit prostate cell growth and induce apoptosis. Various cofactors have been shown to regulate androgen-receptor transactivation but their physiological functions in the AR pathway and prostate tumorigenesis are undefined. p44 is a novel protein that functions as an AR co activator to regulate expression of AR target genes. It is so named because it has a molecular weight of approximately 44 kDa. It may be suggested that p44 in the nucleus of epithelial cells promotes their differentiation, while p44 in the cytoplasm of epithelial cells enhances their proliferation. In order to test this hypothesis an experimental design is set up which involves first the generation of p44 knockout epithelial cells from prostates of male p44<sup>loxp/loxp</sup> mice. Phenotypic analysis p44<sup>-/-</sup> epithelial cells is then carried out by infecting the cells with retrovirus expression NLS-p44 and NES-p44. The growth, proliferation and differentiation of these epithelial cells are used to observe the effects of p44 when it is confined to the nucleus and when it is in the cytoplasm. Although a lot is not known about the role of p44 in prostate epithelial cells, investigating the consequences of p44 sub-cellular localization in Epithelial cell on their proliferation and differentiation will shed more insight into this very important protein.

252 CHARACTERIZATION OF BIOTIN OPERON IN *PSEUDOMONAS MUTABILIS* USING SEQUENCING.

Venkatasanka Pedapudi\*, Dr. Beatrice Clack, Stephen F. Austin State University, Nacogdoches, TX.

Biotin (vitamin H) is an essential nutrient for all organisms. Though biotin operon is present in many bacterial species there is much variation in the organization of the genes involved: In some cases all of the *bio* genes are organized within a single transcription unit (such as *B. subtilis* and *Mesorhizobium loti*), while in other cases the genes are organized in multiple operons, sometimes at different locations in the chromosome. Similar variation is present in the Gram negative and Gram positive bacteria producing biotin. This project is aiming to sequence the biotin operon of *P. mutabilis* and to study the orientation and arrangement of the genes thus increasing our understanding of variations in organization of bio genes in *Pseudomonas*.

17 GENETIC VARIATION IN EASTERN OYSTER (*CRASSOSTREA VIRGINICA*) FROM THREE TEXAS BAYS.

Jacquelyn Reuther\*, R. Deborah Overath, and Delbert L. Smee, Department of Life Sciences, Texas A&M University–Corpus Christi, Corpus Christi, TX.

We studied DNA variation to find whether genetic diversity is high in the eastern oyster (*Crassostrea virginica*) within and among three Texas bays, specifically Copano, Matagorda, and Carancahua. We extracted DNA using a Qiagen DNeasy kit

from 25 oysters from each of the three different bays. We amplified known microsatellite loci using PCR to estimate genetic diversity within and between each bay. Microsatellites loci are locations in the DNA of all organisms in which the nucleotides are repeated in tandem. The number of times the duplicated nucleotides are repeated varies among individuals and between chromosomes within individuals. We have completed the DNA extractions, but have yet to complete the PCR and analysis of the microsatellite loci. We expect to find relatively high genetic diversity among the oysters from these three bays. If we find genetic variation among the bays, we will be able to test the hypotheses that high genetic variation in artificial reefs makes these reefs more resilient to change within the environment and increases larval recruitment to the reefs, as has been found for other marine species.

82 PHYLOGENETIC DIFFERENCES OF AMF INHABITING *CALLICARPA AMERICANA* IN EAST TEXAS.

Elvira Kurmaeva\*, James Van Kley, Armen Nalian, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX.

Arbuscular mycorrhizal fungi (AMF) form a symbiosis with plant roots in more than 80% of terrestrial plant species. AMF enhance plant nutrient absorption, increase soil stability and protect plants against soil pathogens. PCR was used to amplify 550 bp fragments of the 18S rRNA gene isolated from root samples of the common forest grass *Callicarpa americana* taken across a range of east Texas forest habitat types. The rDNA fragments which potentially represent several AMF species per sample were subsequently subject to DGGE in order to separate fragments of differing nucleotide sequence. In the current study, rDNA was obtained from the principal DGGE bands, cloned, and sequenced. Sequences were subjected to phylogenetic analysis which showed relationships among local AMF types produced. Studies of AMF diversity in different natural habitat types of East Texas could lead to the development of tools to improve local forestry and agriculture.

179 BACTERICIDAL EFFECTS OF UNDOPED AND Nd-DOPED TiO<sub>2</sub> ON *ESCHERICHIA COLI* UNDER SIMULATED SOLAR IRRADIATION.

Ashley Walthall\*, Randall Yoder, Department of Biology, and Daniel Chen, Department of Chemical Engineering, Lamar University, Beaumont, TX.

Several experiments were conducted to investigate the bactericidal effects of titanium dioxide (TiO<sub>2</sub>) and Neodymium-doped titanium dioxide (Nd-doped TiO<sub>2</sub>) in the presence of simulated sunlight treatments. Photocatalysts have also been shown to achieve simultaneous destruction of organic chemical pollutants (dissolved herbicides, pesticides, and hydrocarbons) with the outdoor solar spectrum. The goal of this project was to investigate the effectiveness of these photocatalysts as possible alternatives to conventional water treatment methods. *Escherichia coli* were suspended in water with the photocatalyst and exposed to fluorescent light or UV-A light. Nd-doped treatment with UV-A light yielded consistent bactericidal effectiveness between 60 and 75 minutes. Treatment with undoped TiO<sub>2</sub> under UV-A light resulted in bactericidal effectiveness at 75 minutes. Nd-doped TiO<sub>2</sub> and fluorescent light treatment was found to have bactericidal effectiveness post 150 minutes of exposure. TiO<sub>2</sub> and fluorescent treatment resulted in a decrease in *Escherichia coli* colonies, but no total bactericidal effects were achieved.

250 CREATING THE NEW WT p53: AN EVOLUTIONARY CHANGE THROUGH ARTIFICIAL SELECTION.

Georgette Rolle, Olufisayo A Jejelowo, and Shishir Shishodia, Department of Biology, Texas Southern University, Houston, TX.

The p53 gene is a tumor suppressor gene and it is instrumental in controlling the formation of tumors. p53 mutations occur frequently in human tumors. Wild type (Wt) function can be restored to more than fifty percent of the most common p53 cancer mutants by introducing one or more changes in amino acid(s) 235, 239, and 240 of the mutant p53 protein. Data suggests that it is possible that a variety of p53 cancer mutants can be restored to normal function through a common mechanism which is still unknown. Over a period of time the wild type form of a protein etc. can be replaced by a mutant form, which then becomes the new wild type of that protein. Despite efforts to restore the wt p53 function, the occurrence of mutant p53 is still a problem. Instead of trying to restore function to the wt p53 why not make a new wild type, which through artificial selection could become the dominant species in time. My hypothesis is that by creating a new wt p53 through mutations, we can stop the inhibition of cellular stress signals. According to data, the stabilization of endogenous mutant p53 due to the loss of wt functions cannot occur in the presence of the wt p53 allele. Heterozygous mutant/wt cells are rare. Therefore, we will have to use cells that have endogenous p53 and cells that are void of endogenous p53. We will obtain a number of constructs, each of which has mutations in either of the domains on the p53 gene. We will also obtain constructs of p53 mutants which have mutations at amino acid(s) 235, 239, or 240. We can transfect



these mutant p53 constructs individually and in combinations in cells. From the data, we can determine which mutant is the most dominant or the strongest. We can then mutate it in other ways and see if it is still the strongest. Further single mutations can be made to try and achieve a positive effect. That positive mutation can then be incorporated into other cells, and hopefully a new wt sequence will be born. The new wt sequence can then be incorporated into humans using stem cells.

218 Pd-MODIFIED TITANIA FOR THE CATALYTIC INACTIVATION OF BACTERIA.

Leah R. Quisenberry\*, Luke H. Loetscher, and Joel E. Boyd, Department of Chemistry, Wayland Baptist University, Plainview, TX.

Metal modified TiO<sub>2</sub> was investigated as a means of water disinfection using *Escherichia coli* as a model bacteria. Pd modified TiO<sub>2</sub> was found to work many times faster than Pt, V, and Ag/AgBr modified TiO<sub>2</sub>. Pd/TiO<sub>2</sub> was also active in the absence of light; therefore, an alternative mechanism was investigated. It was found that the catalyst does not work more than once, unless exposed to air for a period of time prior to its re-use. Also, sodium thiosulfate was used as a sacrificial electron donor to probe the presence of oxidizing species in the solution. The use of the electron donor drastically inhibited bactericidal activity, indicating the presence of strongly oxidizing species. It is proposed that the reduction of Pd<sup>2+</sup> on the surface of the samples resulted in the formation of Cl<sub>2</sub> in solution. The Cl<sub>2</sub> is postulated to be the source of the bactericidal properties of Pd/TiO<sub>2</sub>.

P301 IMPACT OF OXIDATIVE STRESS, ANTIOXIDANTS, AND POLYUNSATURATED FATTY ACIDS ON MEDIATORS ASSOCIATED WITH ASTHMA.

Christopher Stevenson\*, Olufisayo Jejelowo and Mario Hollomon, Department of Biology, Texas Southern University, Houston, TX.

A number of urban areas are experiencing levels of air pollution that exceed federal regulatory standards. Many health officials believe that air pollution is a contributing factor in a number of the asthma visits to medical emergency rooms. Air pollutants such as ozone and polycyclic aromatic hydrocarbons increase cellular oxidative stress, which is thought to contribute indirectly to symptoms associated with asthma. The mediators of interest in the project are macrophage inflammatory protein-2 (MIP-2), platelet activating factor (PAF) and leukotrienes (LT). MIP-2 is a chemokine that induces the migration of neutrophils to sites of infection or tissue injury. PAF is a lipid mediator associated with inflammation and asthma. Leukotrienes are lipid mediators derived from arachidonic acid which play a significant role in the inflammatory process associated with asthma. The aim of this project is to investigate the response to oxidative stress in a bronchial epithelial cell line as well as determine if this response can be manipulated by antioxidants and PUFAs. This project will provide additional data and understanding on the impact that air pollutants play in generating mediators associated with asthma and how diet may or may not influence this impact. Bronchial epithelial cells will be exposed to various concentrations of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) for varying time points. The cells will be cultured in normal media or media containing various concentrations of antioxidants and polyunsaturated fatty acids, n3 or n6, prior to H<sub>2</sub>O<sub>2</sub> exposure. Following oxidative stress challenge, MIP-2, PAF, and LT levels will be measured.

P117 SPECIATION IN THE MILLEPORA COMPLEX: WHAT CONSTITUTES A SPECIES?

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Fire coral from the genus *Millepora* are ubiquitous in tropical western Atlantic reefs. Two distinct morphologies of *Millepora*, currently classified as separate species, exist off the coast of the Bahamas. After an intermediate morphology was discovered, the question arose as to whether these different morphologies represent different species or whether the differences result from ecophenotypic plasticity. Our reef survey analyses have revealed the appearance of both the branching and blade morphs at the same depth at some reef locations. The absence of continuous variation between these forms of *Millepora* suggests that they possess distinct genetic differences. To test this hypothesis, DNA was collected from all three morphs and the internal transcribed spacer (ITS) regions of rDNA were examined. The rDNA fragment examined included the 3' end of the 18S rDNA gene, ITS-1, the 5.8S rRNA gene, ITS-2, and the 5' end of the 28S rRNA gene. All PCR products of the rDNA region examined showed bands at approximately 825 bp regardless of morph or geographical location. In addition to a few random mutations, DNA sequence analysis showed differences in nucleotide sequence between Milleporid specimens at five identical nucleotide positions for all samples. These single nucleotide polymorphisms (SNPs) fit into two separate patterns, or clades. A phylogram of sequence data separates each clade into two distinct branches that are not

dependent on depth, reef location or morphology. This suggests that Milleporids may be reproductively isolated cryptic species, and that traditional macro- and microskeletal features used for classification cannot distinguish them.

P79 PHYLOGENETIC DIFFERENCES OF AMF INHABITING *TOXICODENDRON RADICANS* IN EAST TEXAS.

Charles Adams\*, James Van Kley, Armen Nalian, Alexandra Martynova-Van Kley, Stephen F. Austin State University, Nacogdoches, TX.

Arbuscular mycorrhizal fungi (AMF), which belong to the phylum Glomeromycota, have symbiotic relationships with the roots of 80% of the 250,000 known plant species. AMF are beneficial to plants in several ways; they aid plants in obtaining minerals from the soil and help plants tolerate high soil salt concentration, drought and resist pathogen infections. In addition, AMF allow plants to overcome the shock created from transplantation. Using the traditional morphological approach to identify species and estimate diversity distribution is both imprecise and difficult. The ideal method of choice for species identification is DNA-based analysis. DNA samples from the roots of plants that occur widely throughout the East Texas region, *Toxicodendron radicans*, were collected from across a range of natural habitats. Using primers specific to Glomeromycota, the 550 bp region of the 18S rDNA was amplified by PCR. Clones from the samples were sequenced and analyzed. As a result, a phylogenetic tree was developed reflecting the relationships between them.

P341 EXPRESSION OF *JUNIPERUS ASHEI* ALLERGENS IN *NICOTIANA* USING A TOBACCO MOSAIC VIRUS VECTOR.

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Mountain cedar (*Juniperus ashei*) pollen causes severe allergies in Texas and the central USA. The two major allergenic proteins in this pollen are Jun a 1 (homologous to pectate lyases) and Jun a 3 (homologous to PR-5 plant pathogenesis related proteins). Neither protein has been successfully expressed in a heterologous system, even though repeated attempts have been made. We inserted each ORF, with its native signal peptide sequence, into a tobacco mosaic virus vector and inoculated *Nicotiana benthamiana* plants. Protein was isolated from vacuum extracted apoplastic fluid. Jun a 3 was produced in good quantity (300 µg/g fresh plant tissue) and at 80% purity in the crude extract. We also expressed Jun a 3 in *Pichia pastoris* for comparison and produced 100 µg/ml of culture with lower purity. Jun a 1 was found to induce severe necrosis within 10 days in vector transcript inoculated plants. Though Jun a 1 was present, apoplastic fluid was dominated by PR proteins due to the necrosis. TMV-expressed banana pectate lyase gave an identical response. Similar difficulties have been reported with this group of proteins in yeast and insect cell expression systems. Thus, expression of cedar allergens is protein and system specific.

P89 NUCLEIC ACID AND AMINO ACID SEQUENCE OF HEMOGLOBIN FROM THE BRITTLE STAR *OPHIACTIS SIMPLEX* (ECHINODERMATA, OPHIUROIDEA).

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*Ophiactis simplex* is a small six-armed brittlestar that produces hemoglobin containing coelomocytes that are circulated in the water vascular system. Using a combination of primers designed for the hemoglobin of a closely related species, *Hemipholis elongata*, and 5' RACE PCR we were able to amplify and sequence one of the hemoglobin genes of *O. simplex*. The cDNA translates into a protein that is 149 amino acids long that shows 47-52% homology with the hemoglobins of *H. elongata*. The 5' noncoding end of the cDNA is 79 nucleotides in length and the 3' noncoding region is 579 nucleotides. Preliminary data on gene structure reveals one of the two introns that are common to most hemoglobins splitting the codon for amino acid 106; the intron is 314 nucleotides in length. Further investigations will examine the position and size of other introns that may be present in the gene.

P235 THE CLONING OF A PHOSPHOGLUCOMUTASE GENE FROM *BRYUM RADICULOSUM*.

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While many genes have been sequenced and cloned from higher plants there are few reports of gene sequences from bryophytes and even fewer from the mosses. In recent years, interest has begun to focus on mosses due to their remarkable ability to withstand desiccation for long periods of time. Studies have been done to locate unique genes for desiccation tolerance with little success, but the same studies have identified genes that are more highly expressed upon desiccation.

One of the genes of interest is phosphoglucomutase and there is no known sequence of this gene in bryophytes. In order to study gene expression or regulation the gene was isolated from the moss *Bryum radiculosum* using a degenerate primer constructed from known sequences of the gene from *Zea*, *Arabidopsis*, and *Populus*. A cDNA library obtained, following desiccation, from the moss *Polytrichum commune* was probed to determine the abundance of the gene. Sequence homology between the gene obtained in this investigation and the published sequences from higher plants was determined.

P237 ASSIGNING PROTEIN FUNCTION BY COMPARATIVE GENOME ANALYSIS: *CHLAMYDOMONAS REINHARDTII*.

GiNell Elliott, Lauren Riedmueller\* and Charles Hauser, Bioinformatics Program, St. Edward's University, Austin, TX.

Determining protein functions from genomic sequences is a central goal of bioinformatics. We adopt a method based on the assumption that proteins that function together in a pathway or structural complex are likely to evolve in a correlated fashion. This property of correlated evolution can be described by characterizing each protein by its phylogenetic profile, a string that encodes the presence or absence of a protein in a set of reference genomes. This study focused on determining the putative functions encoded by the proteome of the unicellular green alga *Chlamydomonas reinhardtii*, a model organism used to study photosynthesis and flagellar structure / function. Phylogenetic profiles were constructed for each of the 15,143 predicted proteins of the *C. reinhardtii* proteome. Every *Chlamydomonas* protein was compared to the proteomes for each of 18 phylogenetically diverse reference organisms using mpiBLAST. Scores corresponding to the best hit (putative homolog) in each reference species were calculated by taking  $-1/\log E$ , where  $E$  is the best scoring Expect value calculated by BLAST. Each resulting phylogenetic profile is a string of 18 real numbers between 0.0 and 1.0, where 0 represents the presence of an exact homolog found in the corresponding reference species, and 1 means no significant match was found. The degree of similarity between all pairs of phylogenetic profiles was assessed by measuring the Mutual Information (MI) between profiles. Pairs of proteins with a high MI index would be considered as putative functional or physical interacting proteins. A comparison of these functional linkages to known pathways is currently being analyzed.

P269 CLONING AND EXPRESSION OF *ERWINIA CARATOVARA* CELLULASE IN *ESCHERICHIA COLI*.

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The conversion of citrus waste into fuel ethanol is an attractive alternative renewable source of energy. The enzymes required for the hydrolysis of polysaccharides in citrus waste are cellulase, pectinase, and  $\beta$ -galacturonase. *Erwinia caratovara* is a wood-rotting bacterium known for its ability to rapidly degrade cellulosic materials using these very enzymes. The long-term goal of our project is to engineer a bacterium that will be able to hydrolyze the waste as well as use the fermentable sugars to produce ethanol. To this end, we have cloned the open reading frame (ORF) encoding the *Erwinia caratovara* cellulase protein and expressed it in the bacterium *Escherichia coli*. PCR primers were designed to amplify the cellulase ORF based on the published sequence. A PCR product of the expected size (1121 bp) was produced and cloned into pGEMT-EASY (Promega). Following sequence confirmation, the cellulase ORF was cloned into the *E. coli* expression vector pTAC MAT (Sigma). The expression of the enzyme has been optimized and conditions for digestion of cellulose examined.

P293 PHOSPHATASE INVOLVEMENT IN E2F ASSOCIATED APOPTOSIS.

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Apoptosis is tightly linked to the cell cycle through the Rb/E2F pathway and serves as a checkpoint to help guard against hyperproliferative cells. Loss of Rb tumor suppressor function results in an apoptotic response through both p53 dependent and independent mechanisms. These checkpoints are disrupted in virtually all tumors, while much is known about the p53 dependent apoptotic pathway relatively little is known about the p53 independent pathway. We have previously established that this pathway is mediated by several phosphatases normally repressed by Rb, which serve to control the activity of Focal Adhesion Kinase (FAK). The loss of FAK activity plays a key role in initiating this apoptotic response. To study this pathway we utilize an inducible cell line (DNE2F-ER) which triggers p53 independent apoptosis by expression of a dominant negative form of E2F lacking a transactivation domain. We use real-time PCR assays to identify phosphatases negatively regulated by the Rb/E2F pathway. RNA isolated from cells undergoing E2F associated apoptosis was collected to determine presence of phosphatases and their relative levels throughout the apoptotic process. To validate targets we utilize chromatin immunoprecipitation assays (ChIP) on putative binding sites.

P338 CONTRIBUTION OF COMMON VARIANTS IN MODY GENES TO RISK OF TYPE-2 DIABETES IN MEXICAN AMERICANS.

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Maturity-onset diabetes of the young (MODY) is an autosomal dominant form of noninsulin-dependent diabetes typically diagnosed before the age of 25 years. To date, mutations in eight genes (HNF4A, GCK, TCF1, IPF1, TCF2, NEUROD1, KLF11, CEL) have been identified to cause MODY. In addition, rare, less penetrant variants within these genes have been associated with typical adult onset type 2 diabetes (T2DM). A recent study performed in a large Finnish cohort sought to determine whether common variants within known MODY genes contributed to T2DM and identified common variants in five genes that demonstrated an association (PGENE value <0.05) with T2DM. Since risk factors may differ between ethnic groups, we aimed to evaluate the contribution of these common variants to risk of T2DM in a Mexican-American population. Three of the five single nucleotide polymorphism (SNP) variants were successfully genotyped in subjects from the San Antonio Family Diabetes/Gallbladder Study (average T2DM onset age  $48.4 \pm 14.0$ ): rs6103716 (HNF4A/MODY1), rs2071190 (TCF1/MODY3), and rs3916026 (NEUROD1/MODY6). Each SNP was tested for association with T2DM using a measured genotype approach applied in SOLAR. Only one showed evidence for association with T2DM (rs6103716,  $p=0.002$ ). In contrast with the Finnish study, association with SNP rs6103716 does not exhibit a stronger association with T2DM than previously tested SNPs in the P2 promoter region (e.g., rs2144908) in this cohort. These data suggest that common variants in the MODY1 gene, but not MODY3 or MODY6 genes, contribute to risk of T2DM in Mexican-Americans. Evaluation of the common variants in the other MODY genes is underway.

## CHEMISTRY AND BIOCHEMISTRY

1 THE BIOEFFECTS OF CARBON NANOTUBES.

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The application of Carbon Nanotubes (CNT's) in various fields, especially in medical applications raises serious concerns about health and safety issues. Currently there are several areas that are looking towards nanotechnology as a new form of enhancement, however because this kind of technology is so new we lack the knowledge of its various effects that could affect our society. In our study we tested the toxicity level of Single Wall, Multi-Wall, and Metallized Carbon Nanotubes in lung epithelial cells as it relates to the possible affects in industrial workers due to inhalation. CNT's could become airborne during the manufacturing process and handling resulting in inhalation and skin exposure. If we test the Metallized Carbon Nanotubes we can see what kind of effect it would have particularly in our pulmonary system. We believe that if there is an attraction between the cells and the Metallic Carbon Nanotubes then it will cause a toxic response in the cell. The research will consist of culturing a cell line of lung epithelial cells, exposing the lung epithelial cells to a Metallic Carbon Nanotube, Muti-Wall Carbon Nanotubes, and Single Wall Nanotube and compare the outcome, checking the toxicity using MTT and live dead cell assays in order to its test the vulnerability or resistance, comparing its Reactive Oxidative Stress (ROS), and using Transmission Electron Microscope (TEM) and Scanning Electron Microscope (SEM) to determine if the nanoparticles entered the cell. Based on our results we were able to determine that Metallized Carbon Nanotubes are more toxic than Single-Wall and Multi-Wall Carbon Nanotubes. Results show there is a direct relationship between the number of cells dying and its Reactive Oxidative Stress.

10 COMPARISON OF VARIABLES THAT MAY ALTER ACRYLAMIDE PRODUCTION IN FRENCH FRIES.

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Acrylamide is a compound found in many fried, starchy foods and is a known carcinogen and neurotoxin. This study evaluated the effect of temperature and the time in which fries were soaked in a distilled water solution on acrylamide production. The fries soaked for 5 minutes had an acrylamide concentration of  $63.61 \pm 8.10$  ug/mL which demonstrated

no statistical difference between the burned fries ( $53.56 \pm 6.14$  ug/mL) and the fries soaked for 15 minutes ( $49.25 \pm 4.10$  ug/mL). These samples however were statistically different from untreated fries ( $29.70 \pm 3.20$  ug/mL) and fries soaked for 30 minutes ( $19.16 \pm 3.44$  ug/mL). This means that with an increase in temperature there was an increase in acrylamide concentration. There is also a question that arises from the high concentrations of acrylamide in the 5 and 15 minute soaks as opposed to the lowest detected acrylamide concentration in the 30 minute soak. Perhaps the availability of free asparagine decreases with an increase in the amount of time the fries are soaked in water. Further analysis between temperature cooked and time soaked between samples will help determine the role of free asparagine in acrylamide production.

- 38 PHOTOCHEMISTRY OF ARYLOXIRANES: EVIDENCE FOR DIVERGENT PATHWAYS IN AN INITIALLY FORMED 1,3-DIRADICAL.  
Rick White\*, Arney Benny, Heiko Ihmels, Milos Trajkovic, Sam Houston State University, Huntsville, TX.

The photochemistry of vicinal diaryl oxiranes has been characterized as proceeding by generation of carbonyl ylids through carbon-carbon bond cleavage. However, the photochemistry of monoaryl oxiranes has been described as proceeding via cleavage of the benzyl carbon-oxygen bond to generate a 1,3-diradical. The photolysis of 1,2-dihydronaphthalene oxide (a monoaryl oxirane) showed that indan was a primary photoproduct, formed through an aldehyde-carbene intermediate, and not a secondary photoproduct as originally believed. In a similar manner, we reexamined the photochemistry of styrene oxide. We found that toluene was a hitherto unreported primary photoproduct of this oxirane. Conical intersection studies predicted that an aldehyde-carbene was again an intermediate in this reaction. The same intermediate was generated from the photochemistry of styrene glycol carbonate through extrusion of carbon dioxide from an initial ring opened diradical, and the same photoproducts were observed. The photochemistry of 2,2-diphenyloxirane also formed diphenylmethane as a primary photoproduct showing this to be a general process in the photochemistry of monoaryl oxiranes.

- 134 PREVENTIVE EFFECTS OF CELLULOSE ON UV DEGRADATION OF POLYSTYRENE.  
Phillip Lang\*, Howard Payne University, Brownwood, TX.

Polystyrene is a common plastic that is used in various ways in the consumer world today. Commercial polystyrene has UV inhibitors in it to prevent UV radiation from degrading it and rendering it ineffective as a container for food products. Therefore, the polystyrene remains in landfills for many years. This experiment will look at the effects of adding cellulose to polystyrene to determine if cellulose is a natural inhibitor or catalyst for UV degradation of polystyrene. Analysis was determined using Oxygen Bomb Calorimetry, and FTIR.

- 15 A PYRO-ELECTRIC CRYSTAL PARTICLE ACCELERATOR.  
Chelsea L. Harris\*, Rand Watson, Texas A&M University, College Station, Cyclotron Institute 2007 Summer REU, Texas Southern University.

Recent investigations have revealed that the electric field produced by heating or cooling a pyro-electric crystal can be utilized to accelerate deuterons to enough energies that will initiate  $d + d$  fusion reactions. Although energies on the order of keV are not high enough to cross the Coulomb barrier,  $d + d$  fusion can be achieved due to a tunneling effect. This discovery suggests the possibility of developing a table-top, pyro-electric crystal-based neutron generator. The purpose of this project was to optimize a constructed pyro-electric crystal particle accelerator by modifying its system to increase the maximum accelerating potentials of the electrons and raise the detected neutron counting rate above background levels. A lithium tantalate pyroelectric crystal was mounted on a conducting copper block to which two heating resistors and a thermocouple were also attached; the block and upper portion of the crystal was coated with a green epoxy insulating varnish to prevent unnecessary discharging of the crystal. Deuterium gas is leaked into the small chamber using an automatic valve system controlled by our electronics system and differential pumping with a turbo molecular pump. Upon heating, positive deuterium ions were accelerated into a target, causing electrons to accelerate from the target to the copper block, producing x-rays and bremsstrahlung radiation. Upon cooling, the charged particles accelerated in the opposite direction due to the crystal's reversed polarity. A pulse-height analyzer and multi-channel scalar are utilized to detect the x-ray counts and the channel of their appearance, which is converted to energies. The bremsstrahlung spectra occurring in the x-ray spectrum are used to determine the maximum energies of the accelerated electrons. A liquid scintillation neutron detector is used with a multi-channel scalar and timer to reveal the detected amounts of neutrons in 10 second intervals. The average accelerating potential was approximately 80 keV; however, there were only three runs where relatively high neutron counts were observed. Further modifications will include adding a more efficient neutron detector, and possibly adding a second crystal to double the electrostatic force.

- 18 EXAMINATION OF PHOTO-INDUCED RING-OPENING OF ARYLOXIRANES AND SUBSEQUENT BETA-SCISSION IN THE RESULTING 1,3-DIRADICAL.

Benny E. Arney, Jr.\*, Department of Chemistry, Sam Houston State University, Huntsville, TX.

The photochemistry of aryl-substituted three-membered rings commonly exhibits complete dissociation of the ring giving a carbene and pi-bond or an alkyl-allyl diradical system. Computational experiments on these structures and their evolution provide agreement with experimental results and gives a novel, but seemingly ubiquitous, model for these bond cleavages. One potential energy surface degeneracy yields highly efficient funnels to the ground state resulting in low quantum yields for the reactive pathways. Another degeneracy provides access to the T1 energy surface where beta-scission is a low barrier process.

- 207 CHEMICAL CHARACTERIZATION AND ANTIOXIDANT ACTIVITY OF SELECT ESSENTIAL OILS FROM THE FAMILY ASTERACEAE.

Shavon Clark\* and Mahmoud A. Saleh, Department of Chemistry, Texas Southern University, Houston, TX.

The family Asteraceae is highly rich in phytochemicals that show promise for further biological investigations. This family is used widely as medicinal sources of antifungal and antibacterial compounds. In this study, essential oils common to the Asteraceae family are investigated for their antioxidant activities. GC-MS analysis was performed to identify the constituents of each oil. The antioxidant activity was investigated using the 1,1-diphenyl-2-picrylhydrazyl (DPPH) scavenging assay and the  $\beta$ -carotene bleaching test. The lipid peroxidation activity was evaluated using thiobarbituric acid (TBA). In the  $\beta$ -carotene bleaching test, the ability of samples to inhibit the linoleic acid oxidation was investigated. Chemical characterization was conducted using TLC, HPLC, UV-VIS and IR spectrophotometers.

- 213 COMPARATIVE BIOLOGICAL CHEMICAL ANALYSIS OF ESSENTIAL OILS FROM THE APIACEAE FAMILY.

Brooke Woodard\*, Wenluo Zhang and Mahmoud Saleh, Texas Southern University, Houston, TX.

A group of commercially available essential oils of the Apiaceae family were collected from three different sources representing different methods of extraction. Though many studies have been performed on natural products from this family, none were found linking biological activity and chemical composition within an entire family. All oils were subjected to a battery of antimicrobial assays carried out on various strains of fungi, gram-negative/gram-positive bacteria to monitor quorum-sensing and biofilm inhibition activities. Oils with common activities were grouped together and subjected to detailed analytical techniques including GC-MS, HPLC, TLC, refractive index, UV-Vis, IR, and  $^{13}\text{C}$  NMR spectroscopy.

- 216 ANTIFUNGAL ACTIVITY OF WHITE ROSE PETALS.

WenLuo Zhang\*, Fawzia H. Abdel Rahman, and Mahmoud A. Saleh, Department of Chemistry, Texas Southern University, Houston, TX.

Based on our field observation of flowers we discovered that insects, bacteria, and fungi only devoured the stem and leaves leaving the petals untouched. Three groups of roses red, yellow and white were analyzed. As a result of our preliminary antimicrobial bioassays, white rose petals were selected to perform a series of testing to determine their antifungal activity. White rose petals were collected and extracted with a 1:1 mixture of methanol /methylene chloride. The crude extract was evaporated to remove all of the solvent using rotary evaporator and then using diethyl ether to extract the crude extract for the liquid fractionation. The ether extract of white roses had the highest antifungal activity against *Penicillium*. Bioassay techniques included the determination of antibacterial/antifungal activities using four gram-positive and four gram-negative bacteria, and five fungi using the diffusion disc bioassay and TLC bio-autography as described by Saleh et al. (2006). The Thin Layer Chromatography (TLC) bioautography was used to find the nature of the active component in the mixture. The Preparative Thin Layer Chromatography (PLC) was utilized to purify the mixture and one of purified products is chemically related to gamma-sitosterol, and other one is chemically related to (Z,Z)-9,12-octadecadienoic acid. All purified products were identified by other analytical techniques including high performance liquid chromatography (HPLC), gas chromatography/mass spectrometer (GC/MS), ultraviolet/visible (UV), infrared (IR), and nuclear magnetic resonance (NMR) spectroscopy.

271 LIPOIC ACID'S CHELATING EFFECTS ON COPPER (Cu<sup>2+</sup>) TREATED FRESHWATER GREEN ALGAE.

Derek A. Hagy\*, Howard Payne University, Department of Physical Science, Brownwood, TX.

Lipoic acid is an antioxidant with powerful chelating and metabolic characteristics. In this study lipoic acid and copper (Cu<sup>2+</sup>) were introduced to a freshwater green algae environment. Lipoic acid was determined to bear a significant positive effect on the photosynthetic and metabolic activity of the algae. Conversely, the introduction of Cu<sup>2+</sup> bore a significant negative effect on the photosynthetic activity of the algae. Lipoic acid was also introduced into a Cu<sup>2+</sup>/freshwater algae environment and was observed not only to arrest the degradation, but also counteract the initial effects and increase the metabolic activity of the algae. Based upon the preliminary findings, a mechanism whereby lipoic acid prevents Cu-protein binding in the algae is proposed.

277 STUDY OF THE PHOTOCATALYZED DEGRADATION OF PHENOL USING TiO<sub>2</sub> NANOPARTICLES DOPED WITH Ag.

J.E. Valladares\*, J. Ruedas, J. Guzman and J. Lien, Chemistry Department, Science and Math Division, Midland College, Midland, TX.

Silver ion doped TiO<sub>2</sub> nanoparticles were used for the photocatalytic degradation of phenol dissolved in water. The silver ion was deposited on TiO<sub>2</sub> surface from a diluted solution of AgNO<sub>3</sub>. The doped nanoparticles were characterized by use of Scanning electron Microscopy –Energy dispersive X-Ray Analysis. Initial results showed that the Ag doped nanoparticles substantially enhance the rate of photodegradation of phenol when compared with the undoped TiO<sub>2</sub>.

342 OXYGEN: WHY OR WHY NOT? (*TRICHOMONAS VAGINALIS*).

Charles A. Lehnhoff\*, Schreiner University, Kerrville, TX. and Donald M. Kurtz, UTSA, San Antonio, TX.

*Trichomonas vaginalis*, a lower eukaryote, is unusual in that a flavin di-iron protein (FDP) alone, rather than the usual ensemble of three enzymes, is employed to catalyze the NO oxidation of NADH. One of the four known FDP isoenzymes is actually able, kinetically, to use O<sub>2</sub> as the oxidant. We have isolated one of the isoforms and hope ultimately to determine whether a single amino acid substitution (histidine at position 38 for aspartate) is responsible for this kinetic difference.

## 11 A COMPUTATIONAL ROUTE TO SOLVENT SELECTION FOR RECRYSTALLIZATION.

Karl D. Kuklenz\*, Katie L. Rothlisberger, Derek R. Blaylock, and Darren L. Williams, Chemistry Department, Sam Houston State University, Huntsville, TX.

Optimized methods of recrystallization require precise control of solvent-solute interactions, and the paint, polymer, and pharmaceutical industries have demonstrated the utility of solubility parameters for selecting solvent blends that meet their needs. Solubility parameters were first calculated by Hildebrand and Scott in 1950, and Hansen and others have compiled extensive tables of the dispersion (D), polar (P), and hydrogen-bonding (H) solubility parameters of solvents. The general principal is this: solvents and solutes that have similar Hansen solubility parameters are miscible. In this work, a quantitative structure activity relationship (QSAR) procedure is used to predict the DPH values. The optimized geometry and vibrational frequencies were computed for >180 molecules using the Gaussian 03 model B3LYP/6-31G(d)//B3LYP/6-31G(d). The total dipole moment in mdyne/Å, the total electronic extent in Å<sup>2</sup>, the mean polarizability in Å<sup>3</sup>, and the maximum charge difference were recorded from the Gaussian output. The model is compared with tabulated values, group additivity values, and experimental results.

## 12 A SYSTEMATIC PROCESS FOR SELECTING RECRYSTALLIZATION SOLVENT SYSTEMS.

Katie L. Rothlisberger\*, Derek R. Blaylock, Karl D. Kuklenz, and Darren L. Williams, Chemistry Department, Sam Houston State University, Huntsville, TX.

Optimized methods of recrystallization require precise control of solvent-solute interactions. The paint, polymer, and pharmaceutical industries have demonstrated the utility of Hansen solubility parameters for selecting solvent blends that meet their needs. The general principal is this: solvents and solutes that have similar Hansen solubility parameters are miscible. In this work, the Hansen solubility parameters for a crystalline explosive and various explosive mimics are determined. These solubility parameters are used to predict solvent blends and non-solvent additives that are useful for controlled recrystallization. Finally, polarized light microscopy and microFTIR spectroscopy are used to illustrate the resulting crystal morphology similarities and differences.

## 94 INVESTIGATION OF BORONIC ACIDS AS NOVEL INSECTICIDES.

G. Scott Weston, Feik School of Pharmacy, University of the Incarnate Word, San Antonio, TX.

There is a continuing need for the discovery and development of novel insecticides that are both environmentally-friendly and non-toxic to mammals at commonly-used concentrations. Several factors contribute to this need: the development of insect strains that are resistant to the chemical compounds commonly used as pesticides; the need for new compounds that are more specific, biodegradable, and environmentally-friendly; the evolving governmental standards that restrict the usage of existing insecticides. Boron-containing compounds, including boric acid, have a long history of use as insecticides. However, boric acid is only a weak insecticide, displaying insecticidal activity only at relatively high concentrations. In addition, neither the mechanism by which boric acid exerts its insecticidal activity, nor the biochemical target on which it acts, is known. Ongoing research regarding the potential utility of boronic acids as novel insecticides will be presented.

## 98 DESIGN OF RESEARCH AND TEACHING LABORATORIES FOR AN UNDERGRADUATE CHEMISTRY DEPARTMENT.

Henry Altmiller, Mary Kopecki-Fjetland, Eamonn Healy, and J.D. Lewis\*, Department of Chemistry, St. Edward's University, Austin, TX.

In 2006 St. Edward's University completed construction of a new facility to house classrooms and laboratories for the Department of Chemistry and the Department of Biology. During the planning process the chemistry faculty made a deliberate decision to design laboratories for undergraduates that used space efficiently while being well suited to supporting both research and teaching activities. This included creating a large chemistry laboratory to house much of the chemical instrumentation and most of the undergraduate research activities of students in the department. This lab was designed to include both experimental space and study areas for undergraduate research students pursuing a variety of undergraduate research projects. Another consideration in the design of this space was to create a greater sense of community among chemistry students. This presentation will describe the design of this and other chemistry laboratories in the John Brooks Williams Natural Sciences Center and our experience thus far in using these labs.

## 99 INFRARED STUDIES OF THE OH STRETCHING BAND AS A TOOL FOR CONFORMATIONAL STUDIES OF ALCOHOLS.

J.D. Lewis, Department of Chemistry, St. Edward's University, Austin, TX.

Since 1993 various students in our group have used infrared spectroscopy as a tool for obtaining structural information about alcohols. During this time we have examined the infrared spectra of the OH stretching region of hundreds of aliphatic and aromatic alcohols in a variety of solvents. We have found cyclohexane to be better suited than carbon tetrachloride as solvent for such studies. The FTIR spectra of dilute alcohol solutions in cyclohexane typically exhibit more distinct absorption bands than in carbon tetrachloride and many other solvents. It is often possible to identify specific hydrogen-bonded and "free" stable conformations of alcohols in cyclohexane solution. This presentation will provide an overview of the results for selected alcohols that have been examined by our group.

## 13 EXPLORING NON-IDEAL SOLVATION USING THE TYNDALL EFFECT.

Derek R. Blaylock\*, Karl D. Kuklenz, Katie L. Rothlisberger, and Darren L. Williams, Chemistry Department, Sam Houston State University, Huntsville, TX.

A simple experiment is presented using the Tyndall effect to determine the temperature-dependent solubility of a crystalline explosive and several explosive mimics. The Flory-Huggins equation is used to determine the non-ideal thermodynamic values of solvation. The results are presented for several solvent systems and comparisons are made to the Hansen solubility model.

## 37 H-ATOM TRANSFERS AND MIGRATIONS IN PHOTOCHEMICAL SYSTEMS.

Benny E. Arney, Jr.\*, Rick C White, Michael Towler, Amy Massenburg, Department of Chemistry, Sam Houston State University, Huntsville, TX.

In many photochemical reactions H-atom movement is an ubiquitous process that is often observed. In many of these systems, it is very difficult to determine the nature of the migration; Is it a radical abstraction?; Is it a sigmatropic shift?; Is the migration occurring on the excited state or ground state surface? The results of an investigation into a relatively simple system, indene oxide, in which three distinct photochemical H-atom migrations are observed will be presented and discussed.



- 223 USE OF ELECTROLYTICALLY GENERATED HYDROGEN FOR NITRATE REDUCTION OVER Pd/Cu ALUMINA CATALYSTS.  
Stephanie L. Skiles\* and Joel E. Boyd, Department of Chemistry, Wayland Baptist University, Plainview, TX.

A Pd/Cu alumina catalyst was prepared by wet impregnation, and subsequently deposited on acrylic (PMMA) and polystyrene support structures via solvent deposition. Two sources of hydrogen gas introduction were studied. Initial tests were conducted using hydrogen introduced externally from a gas cylinder. The in situ generation of hydrogen from the electrolysis of water was utilized as the second hydrogen introduction method. Various electrolytes were studied for optimal electrolytic hydrogen production. The utilization of electrolytically generated hydrogen allows the reduction of aqueous nitrate to nitrogen gas without the need to consume externally provided reducing agents.

- 219 PHOTOCATALYTIC OXIDATION OF AMMONIA OVER PLATINIZED TiO<sub>2</sub>.  
Lori A. Pretzer\*, Philip J. Carlson, and Joel E. Boyd, Department of Chemistry, Wayland Baptist University, Plainview, TX.

Aqueous ammonia was degraded using platinum-modified titanium (IV) oxide (titania) solvent deposited on acrylic (PMMA) support materials. The catalyst was modified with platinum to enhance the selective oxidation of ammonia to nitrogen gas. The optimum platinum concentration and oxidation state for ammonia oxidation was investigated. Initial ammonia concentrations ranged from 42-48 ppm NH<sub>3</sub>-N. Concentrations of NO<sub>3</sub>-N, NO<sub>2</sub>-N, and NH<sub>3</sub>-N in solution were monitored during the course of the reaction. The selectivity to nitrogen gas and oxidation rate of ammonia were probed using a kinetic fit to the experimental data. Maximum selectivity to nitrogen gas was observed in a 5.1 %(w/w) platinum/titania reactor.

- 236 A COMPARISON OF UDPG PYROPHOSPHORYLASE AND PHOSPHOGLUCOMUTASE ACTIVITIES FROM VASCULAR AND NONVASCULAR PLANTS.  
Cynthia M. Galloway. Department of Biological and Health Sciences, Texas A&M University-Kingsville, Kingsville, TX.

The first step in respiration, both aerobic and anaerobic, involves the breakdown of glucose into two molecules of pyruvic acid. In plants a step precedes the breakdown of glucose due to the fact that plants breakdown sucrose to obtain glucose for glycolysis. Sucrose is broken down into either glucose and fructose or UDP-glucose and fructose. UDP-glucose is broken down into UTP and glucose 1-phosphate by UDPG pyrophosphorylase (UDPGppase) and the glucose 1-phosphate is converted to glucose 6-phosphate by the enzyme phosphoglucumutase (PGM). In most higher plants UDPGppase has a much higher activity than PGM, while bryophytes usually have a higher PGM activity when compared to the activity of UDPGppase. This report summarizes these differences and attempts to offer an explanation of these observations.

- P40 DECREASE IN SUNSCREEN SPF WITH TIME.  
Michael M. Looney and Jeanna Stepka\*, Schreiner University, Kerrville, TX.

Sunscreens protect from exposure to harmful Ultraviolet radiation from the sun (specifically, UVA and UVB rays) by absorbing or blocking this radiation. The level of protection is determined by the "sun protection factor", a value that determines how long an individual can be exposed to this radiation before the "minimal erythemal dose" (MED) or "burning" is reached. The ratio of the MED when an individual uses sunscreen to the MED when an individual does not use sunscreen is the SPF. The purpose of this research is to determine the decrease of UV absorption in sunscreen samples over time. In this study, sunscreen with SPF factors of 4, 8, 15, 30 and 45 were tested after one year of storage to determine the percentage decrease in the overall absorption. The results indicate a significant drop of the UV absorbance suggesting, after time, the sunscreen and sunblock samples are not protecting at the SPF level their respective labeling proclaims. Higher SPF levels have a tendency to breakdown to a greater extent due to the chemical combination that is used to give the higher SPF value.

- P100 INFRARED STUDIES OF THE OH STRETCHING BAND IN SUBSTITUTED PHENOLS.  
Deepthi Chiluvuri\* and J.D. Lewis, Department of Chemistry, St. Edward's University, Austin, TX.

We have recently examined the infrared spectra of a series of substituted phenols to examine how substitution in phenols affects the frequency of free and hydrogen-bonded OH stretching bands. In monosubstituted phenols there is evidence that the electron-releasing or withdrawing nature of the substituent group affects the free OH stretching frequency. In ortho substituted phenols there is evidence of hydrogen bonding between the OH and substituent groups with pi electrons

or lone pairs. In 2,6-disubstituted phenols our results suggest that the free OH stretching frequency is influenced by both electronic and steric effects. For the OH stretching bands in 0.02M 2,6-dimethylphenol and 2,6-di-tert-butylphenol in cyclohexane solution, the size of the frequency shift relative to phenol depends of the size of the alkyl group indicating a significant steric effect. Where nonequivalent conformations are possible as in 2,6-diisopropyl phenol, multiple OH stretching bands are observed at frequencies consistent with differing amounts of steric crowding.

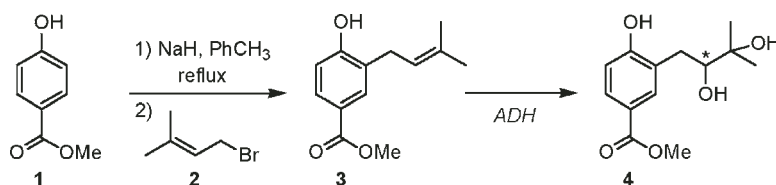
- P131 SYNTHESIS OF TWO PHENOLIC, BIOACTIVE COMPOUNDS, (-)-4 & 5, ISOLATED FROM THE ROOTS OF *LINDERA FRUTICOSA*. Jack Southard, Billyjack Melchor, Texas A&M University–Corpus Christi, Corpus Christi, TX.

From shrubs indigent to Brazil two phenolic compounds (-)-4 and 5 have been isolated from the roots of *Lindera fruticosa*. A stereoselective synthesis of (-)-4 and 5 is underway. Our process involves the protection of commercially-available 3-methoxycatechol followed by a Vielsmeier-Haack formylation to produce aldehyde 3. Addition of Grignard reagent, PhMgBr, results in racemic 4. Dess-Martin periodinane oxidation of 2° alcohol *rac*-4 should provide ketone 5 which is one of the target compounds. Asymmetric reduction of 5 should result in (-)-4. A rigorous spectroscopic analysis (<sup>1</sup>H-NMR, <sup>13</sup>C-NMR, FTIR and MS) of the intermediate(s) and final product will be conducted for all structural assignments. Further reinforcement for stereochemical designations will be based upon Mosher ester analysis of (-)-4. An enantiomeric excess determination will also be made *via* chiral HPLC. This work is supported by AMP (Alliance for Minority Participation).

- P132 TOTAL SYNTHESIS OF HOSTMANIANE (1) A FUNGITOXIC BENZOIC ACID DERIVATIVE ISOLATED FROM PIPER SPECIES. Jack Southard\*, Christos Elias, Texas A&M University–Corpus Christi, Corpus Christi, TX.

Several fungitoxic benzoic acid derivatives have been isolated from *Piper* species. Among this include hostmaniane (1). As shown in Scheme 1, a stereoselective synthesis of 1 is underway. Our process involves isoprenylation of methylparaben (2) followed by a Sharpless asymmetric dihydroxylation (*ADH*) of 3. A preliminary absolute stereochemical assignment of the single center of asymmetry has been based upon an AD-mnemonic. A rigorous spectroscopic analysis (<sup>1</sup>H-NMR, <sup>13</sup>C-NMR, FTIR and MS) of the intermediate(s) and final product will be conducted for all structural assignments. Further reinforcement for stereochemical designations will be based upon Mosher ester analysis. An enantiomeric excess determination will also be made *via* chiral HPLC.

Scheme 1



- P190 INFRARED STUDIES OF THE CONFORMATIONAL CHANGES IN ALIPHATIC ALCOHOLS IN THE PRESENCE OF ACTONE. Amanda Riojas\* and J.D. Lewis, Department of Chemistry, St. Edward's University, Austin, TX.

Our group has studied the competition between the hydrogen-bonded (intramolecular and intermolecular) and free conformations in various alcohols when acetone, at varying concentrations, is added to 0.02M solutions of alcohols in cyclohexane. We have used the infrared spectrum of the OH stretching region of aliphatic alcohols to track the formation and disappearance of the various types of conformations of the OH group (free, intramolecularly hydrogen bonded, and intermolecularly hydrogen bonded) by observing changes in the intensity of the corresponding OH stretching bands. For the C2 and C3 aliphatic alcohols we studied, our results indicate the Type 2 free conformation, in which the OH is pointing away from the remainder of the molecule, has a greater tendency to form an intermolecular hydrogen bond than other monomeric conformations. When acetone is present in the 0.02M solutions of primary alcohols, the resulting broad intermolecularly hydrogen-bonded absorption band appears to be comprised of two broad, overlapping bands.

- P264 ENCAPSULATION EFFICIENCY AS A FUNCTION OF LIPID COMPOSITION FOR LIPOSOME ENCAPSULATED RHODANESE.  
Jonathan Childress\*, and Ilona Petrikovics, Dept. of Chemistry, Sam Houston State University, Huntsville, TX.

One potential antidotal approach is based on the concept of converting cyanide (CN) to the less toxic thiocyanate before it reaches target organs by utilizing sulfurtransferases (e.g. rhodanese) and various sulfur donors (SD) in close proximity by injecting them directly to the blood stream. For making this approach efficient *in vivo* it is crucial to minimize the immunologic reactions by encapsulating the enzyme in an appropriate carrier system. Previous results demonstrated the success of this approach with erythrocyte-encapsulated rhodanese in the presence of various SDs in CN antagonism. Present studies are focusing on the liposomal carrier system: Varying liposomal compositions were formulated with varying levels of cholesterol, dipalmitoylphosphatidylcholine (DPPC), palmitoyloleoylphosphatidylcholine (POPC), and lecithin in order to determine the ideal composition. The encapsulation efficiency as a function of the liposomal composition has been analyzed by determining the formation of thiocyanate spectrophotometrically.

- P268 STUDY OF TRANSITIONAL METAL BASED DETECTOR FOR CARBOHYDRATES.  
An Vo\*, Mian Jiang, and Larry G. Spears, Department of Natural Sciences, University of Houston–Downtown, Houston, TX.

Carbohydrates consist of monosaccharides, oligosaccharides or polysaccharides, and are essential components in life circle. The detection of carbohydrates varies, ranging from the use of assay kit, to sophisticated HPLC or x-ray analysis. In this research we systematically examined transitional metals Co, Ni, Cu, Pd, Au, and their alloys, for their sensing capacity toward carbohydrates. Voltammetry was used for qualitative and quantitative comparison. The results have shown the sensory effect of these metals for carbohydrates can only occur at alkaline media, with monosaccharides showing the highest sensitivity and polysaccharides revealing no response. In addition, nickel based detectors, especially thin nickel layer coated electrodes, exhibit a stable and sensitive voltammetric peak for monosaccharides. This response is based on catalytical oxidation of sugar molecules at around Ni (II/III) moieties and shows linearity depending on the analyte concentration. Following these findings, we developed a new selective detection of simple carbohydrates in the presence of polysaccharides. Aside from this universal "sensing of simple sugars" feature, our protocol can be extended into monitoring the decay/decomposition of polysaccharides such as starches. This offers an alternative means to study metabolism *ex situ* of carbohydrates, with or without enzymes. Because of the fast surface responding process, and the inexpensive use of transitional metals, our presented selective detection of carbohydrates may be developed into a real time monitoring approach for *ex situ/in situ* studying sugar chemistry. This work was supported by UARP from SACP, USARO through UHD–SA, UHD–ORC, and the Welch Foundation.

- P336 TAGGING OF PEPTIDES BY A PROTEOLYTIC ENZYME.  
Tim Tucker\*, Robert Holloway, Schreiner University, Kerrville, TX.

By controlling the position of equilibrium, peptide bonds may be formed rather than broken by proteolytic enzymes. This allows for a novel method of tagging proteolytic digests.

- P337 TRYPTIC MAPPING OF LEPTIN BY CAPILLARY ELECTROPHORESIS.  
Lindsay Rutkowski\*, Robert Holloway, Schreiner University, Kerrville, TX.

The cleavage of the adipose tissue signaling protein leptin by trypsin yields a mixture of peptides which may be displayed by capillary electrophoresis as a "fingerprint" of the protein.

- P343 MOLECULAR MODELS OF ASYMMETRIC TETRAALKYLPHOSPHONIUM IODIDE SALTS.  
Mathew Monroe\* and Maria Benavides, University of Houston-Downtown, Houston, TX.

Optimization of the electrolyte between the photosensitive dye and the conducting band in Grätzel solar cells can increase the conversion ratio between solar and electrical energy. Computer models of tetraalkylphosphonium iodide ionic liquids can demonstrate a relationship between dipole moment and electrochemical thermodynamics. Models created in our research lab have shown that tetraalkylphosphonium iodides exhibit a relationship between large dipole moment values and long bonds lengths between iodine and the phosphonium cation. In addition, theoretical vibrational frequencies are used

to calculate thermodynamic properties such as enthalpy, entropy, and free energy. Our study used the B3LYP DFT method with a Stuttgart/Dresden SDD basis set for geometric optimization and frequency analysis (B3LYP/SDD//RB3LYP/SDD) using Gaussview and Gaussian 03 programs.

P344 INFRARED SPECTRA OF PHOSPHONIUM-BASED IONIC LIQUIDS.

Amita Tailor\*, Mathew Monroe, Nicolle Patterson and Maria Benavides, University of Houston-Downtown, Houston, TX.

Four phosphonium-based ionic liquid compounds were recently designed for potential use as electrolytes in the development of nanocrystalline solar cells. These compounds were prepared and their infrared spectra collected. The IR spectra are being compared to simulated IR spectra obtained by computational chemical calculations using the B3LYP density functional method with a Stuttgart-Dresden (SDD) effective core potential basis set. The IR spectra comparison allows us to assess the validity of the molecular models generated by computational methods.

P249 OPTIMAL LIPOSOMAL COMPOSITION FOR THE ENCAPSULATION OF ORGANOPHOSPHOROUS HYDROLASE (OPH).

Patricia Chapela\*, Melinda Wales, Marianna Budai, and Ilona Petrikovics, Sam Houston State University.

The toxicity of organophosphorous (OP) compounds is attributed to the inhibition of acetylcholinesterase. The current treatment for OP exposure in the USA is the combination of atropine and pralidoxime (2-PAM). Previous research has demonstrated an enhanced antidotal efficiency when encapsulated OPH was combined with the current treatment. The enzyme must be encapsulated in a stealth carrier system to protect OPH from *in vivo* degradation. This study focused on the liposomal encapsulations. The optimal composition of liposomes for the encapsulation of OPH was determined by evaluating the encapsulation efficiency using a spectrophotometric assay. The molar ratios of dipalmitoylphosphatidylcholine (DPPC), palmitoyloleoylphosphatidylcholine (POPC), and cholesterol were varied to determine the effect on encapsulation.

P61 IDENTIFICATION OF NUTRITIONAL COMPONENTS AND SMALL ORGANIC MOLECULES IN NOPALITOS CACTI, A HOMEOPATHIC REMEDY FOR TYPE II DIABETES.

Julian M. Davis, Jose Guevara\*, John J. Stankus, Lori Lazaro, Mark Olivares, and David Olivares, Department of Chemistry, University of the Incarnate Word, San Antonio, TX.

In the United States, it is estimated that over 20 million adults suffer from diabetes, and it has been the sixth leading cause of death nationally from 2002 through 2004. The nopalitos cactus is widely used in Mexico as home remedy for the treatment of type II diabetes. Recent research has shown incorporating leaves of this cactus into the diet of type II diabetics helps regulate blood sugar levels and thereby alleviate symptoms, though little is known about the mechanism. In order to help address this question we are examining components of the cactus (*Opuntia engelmannii*). The consumption of magnesium and calcium helps diabetics retain less glucose in their cells. Levels of these elements in cactus leaves are measured using atomic absorption spectroscopy. In addition, we are using soxhlet extractors to draw out small organic molecules which we are then working to identify using GC-MS.

P65 ACCUMULATION OF CADMIUM AND LEAD IN *BOUTELOUA CURTIPENDULA* AND *CYNODON DACTYLON*.

Julian M. Davis, John J. Stankus, Angela E. Roberts\*, Jennifer D. Caraway, Zachery A. Juhl, Patricia P. Gonzalez, University of the Incarnate Word, San Antonio, TX, and Michael Bernard, Alwyn B. Anfone, San Antonio Water System, San Antonio, TX.

Elevated levels of heavy metals in the soil and water pose an environmental and human health threat. Phytoextraction is a method of removing pollutants, such as heavy metals, from the environment using plants. The principle objective of this research is to determine the degree to which two common Texas grazing grasses, Sideoats Grama (*Bouteloua curtipendula*) and Bermuda (*Cynodon dactylon*), can absorb lead and cadmium ions through the root system and into the blades of grass. Samples of each grass were grown from seed for two months and then given different amounts of lead and cadmium nitrates in their water for another 27 days. The roots, shoots, and soil were analyzed using ICP-OES.

P123 FUNCTIONAL ALTERATIONS OF RETINAL Na<sup>+</sup>,K<sup>+</sup>-ATPase CATALYTIC ISOZYMES IN NEONATAL RATS FOLLOWING DEVELOPMENTAL LEAD EXPOSURE.

Carlos A. Garcia\*, Department of Biological and Health Sciences, Texas A&M University–Kingsville and Donald A. Fox, College of Optometry, University of Houston, TX.

Developmental lead exposure has been linked to deficits in retinal ERG function and apoptotic rod and bipolar cell death. Inhibition of the sodium pump (Na,K-ATPase) may be partially responsible for these neuronal dysfunctions. In the rat retina there are two catalytic alpha isozymes (α1 and α3) of Na<sup>+</sup>,K<sup>+</sup>-ATPase which differ in activity, kinetics and [<sup>3</sup>H]ouabain equilibrium binding characteristics. The enzyme activity of these isozymes was measured in age-matched control and lead-exposed animals at 21 and 90 days of age. Lead exposure decreased the maximum activity of the α1 and α3 isozymes by 16% and 15% respectively, at 21 days of age and by 10% and 28% respectively, at 90 days of age. [<sup>3</sup>H]ouabain binding by the α3 isozyme revealed that the equilibrium binding constant ( $K_d$ ) in the lead-exposed rats decreased 21% in the 21 day old rats but increased 30% in the adult rats. The Scatchard analysis indicated that the  $B_{max}$  of the α3 isozyme in the lead-exposed retina was decreased 37% and 31% in the 21 and 90 day old rats, respectively. The data in the present study clearly show that developmental lead exposure produces a short-term and long-term inhibition of the sodium pump. This inhibition of Na,K-ATPase may contribute to retinal degenerations and other nervous system deficits seen following lead exposure and suggests neurotoxic damage in the developing nervous system persists into adulthood.

P273 A NEW NEUROTRANSMITTER SENSOR BASED ON SOL-GEL / CARBON COMPOSITE MATERIAL.

Claudia Moreno\*, Juan P. Tito, Mian Jiang, and Larry G. Spears, Department of Natural Sciences, University of Houston–Downtown, Houston, TX.

A neurotransmitter is a chemical messenger transported between nerve cells in responding to a particular body chemical reaction. Neurotransmitters control major body functions including movement, emotional response, and the physical ability to experience pleasure and pain. The detection of neurotransmitter has been a major topic in biochemical assay. In this work we report a new sensing protocol for neurotransmitter dopamine. The sol-gel/carbon composite material, as core part of this new sensor, was prepared by hydrolysis and polycondensation of precursor tetramethylorthosilicate (TMOS) in presence of graphite powders. When applying this newly formed sol onto the electrode surface, it gradually develops into a water-insoluble gel and eventually becomes rigid silicon oxide ceramic glass. Our follow-up characterization showed this "ceramic" is conducting, providing wide electrochemical window ( +1.0 ~ -1.0V ) that may offer voltammetric application. The "conductive ceramic/glass" is attributed to the incorporation of graphite powders. Our further test revealed that dopamine can be oxidized on this sol-gel/C composite film, generating very sensitive voltammetric current that also shows concentration dependence. These observations constitute the basis for the construction of a new sensor for neurotransmitter dopamine. Our study then focused on the optimization of different operational conditions, including the composition ratio of sol-gel precursor over graphite, selection of different precursors, coating thickness, medium pH condition, and applied voltage. Our results have offered a promising analytical prospect for *ex situ* determining of the neurotransmitter dopamine. This work was supported by UARP from SACP, USARO through UHD-SA, UHD-ORC, and the Welch Foundation.

P274 ELECTROCHEMICAL DNA ASSAY BY USING NICKEL BASED ELECTRODE.

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Gene therapy is the most sophisticated biochemical process and offers the ultimate solution for treating human disease. DNA sensing and monitoring are the initial and important part of this treatment. There have been a variety of DNA assay protocols, ranging from fluorimetry to radiology for *in situ* or *ex situ* determination. Despite these developments, the need of sophisticated instrumentation, the involvement of radioactive labeling, and cost-ineffectiveness all contribute the limitation of current DNA assay. In this work, a new DNA sensor based on the nickel metal thin film was developed for *ex situ* genetic measurement. Fabrication of the sensing film is facile, *in situ*, thickness-controllable, utilizes the metal electroplating and a subsequent stripping. Chromosomal DNA exhibits voltammetric response on this sensor in alkaline media. We have also studied Ni alloy based sensing, and found binary alloy can enhance the sensitivity and stability of the proposed sensor, especially for the Ni-Cu alloy. Mechanistic study revealed that electrogenerated higher valent Ni(III) in alkaline media oxidize DNA at around the redox potential of Ni(III/II). This electrocatalytic oxidation thus accounts for the much enhanced voltammetric current and for the much reduced overpotentials of these analytes at unmodified electrodes. From an analytical point, since no pretreatment of analytes is needed in the determination, our mixed hydroxide film provides a

simple, cost-effective, and label-free assay alternative in the DNA quantitation. This work was supported by UARP from SACP, USARO through UHD-SA, UHD-ORC, and the Welch Foundation.

P275 A SIMPLE PROTOCOL TO STUDY SUGAR METABOLISM.

An Vo\*, Mian Jiang, Akif J. Uzman and Larry G. Spears, Department of Natural Sciences, University of Houston–Downtown, Houston, TX.

Sugar metabolism includes digestion, assimilation and storage of carbohydrates, which involves enzymatic catalysis, energy release/consumption, breaking of polysaccharides starch, dextrin, and glycogen into 12-carbon sugar such as maltose or end-product 6-carbon glucose. Sugar metabolism maintains the basic life cycle but is subjected to variance because of all of the above factors involved. In this work we developed a nickel-based electrochemical detector to study sugar metabolism. Nickel was found to catalyze the electrochemical oxidation of small carbohydrates in the presence of excess polysaccharides, thus offer the selective determination of mono- or di-saccharides that were metabolite products of macro polysaccharides including starch. Also during this course the degradation speed, the pH effect, and the enzymatic kinetics can all be directly or indirectly correlated from the hydrolysis of polysaccharides. We have compared nickel as well as nickel based alloy with other transitional metals, and they all respond to glucose, maltose, and other simple sugars. Noteworthy, this sensing does not extend to macro-molecular polysaccharides, hence provides the specificity of analyzing a degraded starch mixture. Various kinetic processes, including with and without enzyme during the hydrolysis of starch, have been examined using this new sensing protocol. Preliminary results showed the new proposed protocol can be used for the routine study of sugar metabolism, with potential to be further developed into a fast, real time, cost-effective means in research of fermentation and biomass conversion. This work was supported by UARP from SACP, USARO through UHD-SA, UHD-ORC, and the Welch Foundation.

## COMPUTER SCIENCE

171 NON LINEAR ANALYSIS OF BIOLOGICAL SIGNALS IN HEMORRHAGIC SHOCK USING ENTROPY.

John A. Ward, Brooke Army Medical Center, Andriy I. Batchinsky, Jose Salinas and Lee C. Cancio, US Army Institute of Surgical Research, Fort Sam Houston, TX.

This presentation discusses non-linear statistics as related to biological waveform analysis with an emphasis on complexity measures as defined by approximate entropy and sample entropy in a hemorrhagic shock model. These techniques are based on the probability that one segment of a waveform will match another segment on the next sample. Approximate entropy and sample entropy statistics are used in cardiovascular physiology to characterize the complexity (and non repeatability) of heart rate R to R beats and thereby to distinguish between normal and pathological states. Using matrix symmetry provides an efficient algorithm for calculating entropy. The algorithm is tested against a "gold standard" consisting of an existing method and against known behavior referenced in the literature. Finally, the investigator compares three sets of indices of volume status: hemodynamics, time and frequency domain analysis of heart rate variability, and waveform entropy using experimental data from conscious ovine models of hypovolemia.

204 HIGH FIDELITY HEMODYNAMIC WAVEFORM ARCHIVE FOR TEACHING AND RESEARCH.

James R. Bulgrin\*, Bernard J. Rubal and John A. Ward, Brooke Army Medical Center, Fort Sam Houston, TX.

To date over 1,000 complete analog recordings of high-fidelity hemodynamic catheterization cases obtained during the period 1972 through 1993 in a US Army medical center have been digitized and prepared for distribution to interested researchers world-wide. This collection is the only appreciably-sized collection of such signals in existence, replacing more than one million miles of analog tape (> 1,000 recorded hours). Representing the "gold-standard" for hemodynamic records, each contains simultaneously recorded high-fidelity right and left heart pressures with a voice channel. One-third of the cases also possess an electromagnetic flow velocity, permitting calculation of heart parameters such as pulsatile power and input impedance. An accompanying database has been created, containing over 75 textual fields related to each case. In the past twenty years, echocardiography has largely replaced high-fidelity hemodynamic measurements in clinical practice; however, these waveforms are still of value in the study of certain disease processes and are ideal for the validation of mathematical / computer modeling of the cardiovascular system and other engineering applications. The authors of this project envision making all waveforms available in the public domain (e.g., MIT PhysioBank archive). This would require the non-trivial effort of translation of the files into a standard format. Also desirable would be software tools to allow web-based selection of data-sets, automated review and incorporation of self-paced teaching modules.

## CONSERVATION ECOLOGY

- 6 A GIS PREDICTIVE HABITAT DISTRIBUTION MODEL FOR THE HOUSTON TOAD (*BUFO HOUSTONENSIS*) IN BASTROP AND LEE COUNTIES, TEXAS.

Daniela Buzo\*, Michael R. J. Forstner, M. Clay Green and Mark A. Fonstad, Texas State University, San Marcos, TX.

Identification and characterization of suitable habitat is fundamental for modern conservation biology and wildlife management. Threatened and endangered species are excellent candidates for a landscape level approach to predictive models of habitat suitability. We used soil type, canopy cover, and distance to water source as environmental variables to predict potential habitat for the endemic and highly endangered amphibian *Bufo houstonensis*. The accuracy of the models was evaluated by overlaying species occurrence data onto predictive habitat suitability maps. We used a chi-square goodness of fit test to examine whether the observed frequencies of occurrence in each habitat category were different than would be expected if they occurred in the categories relative to their availability. These categories were: High, Medium, Low, Very Low and None. We found that observed occurrence were in fact different than expected relative to their availability (Bastrop:  $\chi^2 = 1032$ ,  $df = 4$ ,  $P < 0.0001$ ; Lee:  $\chi^2 = 39$ ,  $df = 4$ ,  $P < 0.0001$ ). Overall, model evaluation demonstrated that habitat suitability models performed well when predicting species occurrence in High and Medium suitable habitat categories (89% of Bastrop sites and 78% of Lee sites), and species absence in Very Low and None categories. This study provides important information for the recovery of Houston Toad. It enables the evaluation of historical and current surveys, identifies areas that are not currently documented as occupied but appear to have suitable habitat, and aids in the selection of suitable population augmentation sites.

- 19 MUSKRAT (*ONDATRA ZIBETHICUS*) HABITAT USE IN A HETEROGENEOUS DRAINAGE SYSTEM IN SOUTHWESTERN OKLAHOMA DURING DROUGHT.

Brandon McDonald, Department of Biology, Midwestern State University, Wichita Falls, TX.

Status of the muskrat (*Ondatra zibethicus*) in the southern High Plains and western Rolling Plains has remained uncertain due to a scarcity of records. I examined riparian habitat diversity, frequency of occurrence of habitat types, availability of habitat types, and use by muskrats within an irrigation drainage system in southwestern Oklahoma during prolonged drought. Thirty one kilometers of drainage channels supported a richness of six major habitat types; including in order of descending frequency: cattail emergent, wet prairie-sedge meadow, cattail-forested transition, forested, turf grass, and pioneer mudflat. Sixty percent of drainage system habitats were classified as available for muskrats as defined by the presence of water. Availability differed among habitat types; wet prairie-sedge meadow had the highest availability and cattail emergent was the lowest in terms of availability. Muskrat habitat use differed significantly between habitat types and was driven by availability.

- 32 DISTRIBUTION AND MICROHABITAT PREFERENCES OF THE GEORGETOWN SALAMANDER, *EURYCEA NAUFRAGIA*.

Benjamin A. Pierce\*, Alexis L. Ritzer, and Taylor A. Jones. Southwestern University, Georgetown, TX.

The Georgetown salamander, *Eurycea naufragia*, is a spring and cave-dwelling salamander known from only about a dozen sites in the San Gabriel River drainage of Williamson County, Texas. We are surveying springs in the San Gabriel drainage to better delineate the range of the species and to determine its habitat requirements. Existing locality records and surveys of additional sites indicate that the salamanders are typically found near the heads of larger springs. Populations appear to be small and vulnerable to habitat and water quality degradation. Preliminary data from surface counts of salamanders at one location reveal significant fluctuations in numbers from month to month, but salamanders are consistently clustered at a few locations within the spring run. Analysis of types of cover objects occupied by salamanders demonstrates that salamanders are found under cover objects in proportion to their occurrence within the spring run.

- 47 A COMPARATIVE STUDY OF BIRDS AFTER A WILDFIRE IN CERRO EL POTOSI, GALEANA, NUEVO LEON, MEXICO.

Mariam Latofski\*, Armando Contreras and Juan Garcia, Laboratorio de Ornitología Universidad Autónoma de Nuevo Leon.

El Potosí is the highest peak (3750 meters above sea level) within the mountain chain of the Sierra Madre Oriental. Due to its ecological features, topography and geographic isolation, it generates a wide range of micro-climatic variables, which results in endemisms and the establishment of an alpine vegetation that is unique in the area. The wildfire that occurred in

1998 is the biggest of this region, with an estimate affected area of 2049 hectares. The forest fire took a part of Mt. El Potosí, between the 100° 10' and 100° 16' longitude West and 24° 50' 30" and 24° 56' latitude North in an altitude range of 200 to 2700 meters, disturbing the North, West and Southeast exposure of the Mount, distressing the pine forest, and almost eliminating the *Pinus ayacahuite* communities as the *P. hartwegii* and *P. cembroides*, and the dwarf shrub of *P. culminicola*. During a year (2006-2007) monthly visits to the field were made, with the objective of listing the birds of Mount El Potosí, in order to analyze the changes in species composition generated by the disturbance. Transects (Hilden, 1991) were made in quadrants previously defined, covering altitudinal stations and vegetative communities present in the study area, registering every bird observed. Of the 80 species known for Mt. El Potosí, 48 species were confirmed and 28 different species had established after the fire.

101 ASSESSMENT OF THE IMPACT OF CHLORIDE CONTROL MEASURES IN THE UPPER WICHITA RIVER SYSTEM BY A POPULATION GENETICS STUDY OF THE PLAINS KILLIFISH (*FUNDULUS ZEBRINUS*).

Gary F. Burke\* and Jon B. Scales, Department of Biology, Midwestern State University, Wichita Falls, TX.

Populations of plains killifish (*Fundulus zebrinus*) were collected in the Upper Wichita River basin and examined for genetic variance in relation to implemented chloride control measures on the Wichita River. Microsatellite allele data were compiled. Observed genotypic frequencies within and between sampled sites were compared with expected genotypic frequencies on the assumption of Hardy-Weinberg equilibrium and evaluated using a  $X^2$  analysis. This study did not detect any indication that U.S. Army Corps of Engineers chloride control measures were negatively impacting populations of plains killifish. Detection of the heterozygous FhCA-22 microsatellite allele in plains killifish will be useful for future genetic studies.

102 SYNTHESIZING FOUR YEARS OF WATER QUALITY AND VEGETATION DATA FROM THE ESTUARINE MARSHES OF THE ARANSAS NATIONAL WILDLIFE REFUGE, TEXAS.

Jeffrey Wozniak\* and Stephen Davis, Texas A&M University, College Station, TX.

The estuarine marshes of the Aransas National Wildlife Refuge (ANWR) are heterogeneous in nature and are regulated by a unique balance between freshwater inflows and tidal flushing. The timing and magnitude of riverine inflows is a critical driver of marsh hydrology and salinity patterns and dictates the degree of connectivity between the tidal creek, upland marsh, and isolated pond micro-habitats. In addition, these coastal marshes act as a critical wintering habitat for the endangered Whooping Crane (*Grus americana*), which has led to an expanded interest in understanding marsh function along the ANWR coast. Over the past four years, the San Antonio Guadalupe Estuarine System (SAGES) project has utilized empirically generated data and, more recently, ecological modeling to further our knowledge of the interactions between river inflows, water quality, vegetation dynamics, and Whooping Crane fitness. Here we present the synthesis of both *in situ* and greenhouse vegetation experiments with observational marsh water quality data. Our goal was to determine the phenological response of the Carolina Wolfberry (*Lycium carolinianum*), an important food source for the wintering Whooping Cranes, to seasonal variations in marsh habitat conditions. Our findings show that along the ANWR coast there are site-specific differences in Wolfberry growth and fruit production, which appear to be strongly related to seasonal variability in salinity and inundation patterns. This synthesis allows us to understand the Wolfberry's response to natural and anthropogenic perturbations such as drought and proposed modifications in river inflows, and will contribute to more effective management strategies related to Whooping Cranes.

135 HORMONAL RESPONSES OF TIMBER RATTLESNAKES (*CROTALUS HORRIDUS*) TO REPRODUCTIVE AND ENVIRONMENTAL STRESSORS.

William I. Lutterschmidt\*, Sam Houston State University, Huntsville, TX, Deborah I. Lutterschmidt, Georgia State University, Atlanta, Georgia, Robert T. Mason, Oregon State University, Corvallis, OR, and Howard K. Reinert, The College of New Jersey, Ewing, NJ.

We investigated seasonal variation in the effects of capture stress on corticosterone, testosterone, and estradiol in a population of timber rattlesnakes (*Crotalus horridus*) within the Tiadaghton State Forest of northcentral Pennsylvania. This study was conducted as part of a larger investigation evaluating the influences of timbering practices on the ecology, movement patterns, and mortality of rattlesnakes. In May, July, and September, we collected baseline and post-stress blood samples from 27 of 64 rattlesnakes that were monitored with radio-telemetry. Although both male and female rattlesnakes responded similarly to capture stress treatment with a significant increase in corticosterone, the magnitude of the stress



response varied significantly with season. Capture stress also significantly increased testosterone concentrations of male snakes during the spring. In contrast, neither capture stress nor season significantly influenced plasma estradiol concentrations of female snakes. However, corticosterone responses to capture stress varied significantly with female reproductive condition: gravid snakes had significantly higher baseline corticosterone concentrations and a larger stress-induced increase in corticosterone than female snakes that were non-gravid or post-parturition. Finally, preliminary data suggest there is no relationship between baseline corticosterone levels and the amount of time rattlesnakes were associated with habitats affected by timber harvesting activities.

- 152 PARENTAL INVESTMENT BY MALE CAROLINA WRENS (*THRYOTHORUS LUDOVICIANUS*).  
James C. Cureton II and Diane L. H. Neudorf, Sam Houston State University, Huntsville, TX.

According to parental investment theory, males of a genetically monogamous species should be confident of their paternity and thus, invest highly in nestling care. Carolina Wrens (*Thryothorus ludovicianus*) are a socially and genetically monogamous songbird of the eastern United States. We predicted that male Carolina Wrens should provide care to their offspring at a level at least equal to the female. Parental investment (feeding trips and load size) was measured for one hour during each of four nestling stages (1-3 days, 4-6 days, 7-9 days, and 10-12 days) at 12 wren nests during the 2007 breeding season. In support of the hypothesis, there was no significant difference in number of male and female feeding trips or in load size at any nest stage. Male Carolina Wrens have been observed to sing while approaching the nest with food and after feeding. We tested the hypothesis that males sing to communicate their position to the female. We predicted that males would sing more when the female was not present at the nest. Male singing was monitored 1-minute pre and post feeding during each feeding trip. When the male approached the nest and sang the female was not present 95% of the time. When the male left the nest and sang the female was not present 97% of the time. These findings supported our second hypothesis that males sing to communicate their location to the female.

- 270 PRELIMINARY INVESTIGATIONS OF THE REPRODUCTIVE BIOLOGY OF SOUTH TEXAS AMBROSIA (ASTERACEAE: *AMBROSIA CHEIRANTHIFOLIA*).  
Robert M. Gonzalez, Christina Martinez\*, Tan Nguyen, Franklin J. Weaver, Alicia D. Yaklin and Alice L. Hempel. Department of Biological and Health Sciences, Texas A&M-Kingsville, Kingsville, TX.

South Texas Ambrosia, an herbaceous rhizomatous perennial plant, is only known in the US from a few populations in Nueces and Kleberg counties, though the historic range included Jim Wells and Cameron counties. Loss and alteration of the native short grass prairies through plowing and exotic grass invasion is the primary threat to this species, which was federally listed as endangered in 1994. Observations suggest population recruitment appears to be primarily by asexual production of stems from underground rhizomes, so hundreds of stems may represent a single clonal plant. Nothing is known about the importance of sexual reproduction in this species, nor of the genetic structuring of populations or metapopulations. Weedy *Ambrosia* species produce tremendous numbers of fertile seed, but all known prior attempts to germinate seed of *A. cheiranthifolia* have proven unsuccessful. A recently planted demonstration population in Nueces County provided an opportunity to perform some pollen exclusion and hand pollination tests, seed collection for viability and germination testing and to gather data on other aspects of fecundity. While these are only preliminary investigations, the data currently being gathered will be the first studies of the sexual reproductive biology of this endangered species and will be valuable in highlighting areas for further study.

- 272 SURVIVAL AND GROWTH OF THE ENDANGERED SOUTH TEXAS AMBROSIA (ASTERACEAE: *AMBROSIA CHEIRANTHIFOLIA*) IN A NUECES COUNTY, TEXAS DEMONSTRATION PLANTING.  
Alice L. Hempel. Department of Biological and Health Sciences, Texas A&M-Kingsville, Kingsville, TX.

A cooperative educational project between Nueces County, TPWD, USF&W, USGS, USDA, the San Antonio Botanical Garden, local schools and universities resulted in 200 endangered South Texas Ambrosia plants being transplanted into an artificial Burrowing Owl habitat in the Nueces County park in Robstown, TX. San Antonio Botanical Garden propagated plants from root material collected from a nearby natural population. Students from the fall 2006 Texas A&M-Kingsville Ecology class tagged and measured each plant prior to planting and with Robstown H.S. students transplanted them into randomly assigned locations in 10 experimental plots. Half of the plants in each plot received additional shade protection. Only 71 plants were reported alive in spring 2007. In fall 2007, the TAMUK Ecology class returned and gathered line inter-

cept data on percent coverage of weeds, grass, bare ground, weed control fabric and *A. cheiranthifolia* in both the experimental plots and areas between the plots. Weeds and weedy grass were removed, surviving original plants were measured, and new plants located. Over 300 plants were located, measured and additional stems continued to emerge in cleared areas throughout the fall, resulting over 50% increase in the population from the original transplants. Shade protection was not a significant factor in transplant survival, but other factors that appear to influence new plant recruitment in the population will be discussed.

P165 THE USE OF GIS AND BIOCLIM TO PREDICT CURRENT AND FUTURE DISTRIBUTIONS OF *SPERMOPHILUS MEXICANUS PARVIDENS*.

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As development and habitat loss increase in Texas, specifically South Texas, potentially-suitable habitat for many species needs to be evaluated. New developments in geographical information systems have allowed for further understandings of biodiversity. BIOCLIM summarizes 35 climatic and specifically chosen physical parameters throughout a species' known range, and assesses the suitability of habitat within a chosen area. Species distribution models, using BIOCLIM, were constructed on *Spermophilus mexicanus parvidens*. Although *S. mexicanus parvidens* is not considered an under-studied species in Texas, it can not be called a well-studied species either. *Spermophilus mexicanus* is the most abundant ground squirrel in Texas. Occurrence data was collected from databases GBIF and MaNIS, various museums in Texas and New Mexico, and field collecting in South and Central Texas. Analyses were run using current climatic parameters and specific environmental data layers to predict potential habitat. The current known distribution for *S. mexicanus* matched up with the predictive distribution output of BIOCLIM. Building these maps for *S. mexicanus parvidens* creates baseline data for a future potential need of prioritizing areas for conservation or reintroduction of animals. Building predictive distribution maps, in general, can help identify hotspots, predict biodiversity, and establish suitable areas for reintroduction of endangered and threatened species.

P118 OVERFISHING AS A STRESSOR TO POPULATION AND COMMUNITY STRUCTURAL CHANGE IN MACRO AND MICRO BENTHIC BIOTA ASSOCIATED WITH REEFS: IMPLICATIONS FOR CORAL DISEASE.

Joshua A. Haslun\* and Kevin Strychar, Texas A&M University–Corpus Christi, Corpus Christi, TX.

Coral disease occurrence has continued to become more widespread over the past thirty years with devastating losses reported in many species around the globe. The affects of reef fisheries on the occurrences of coral disease have been studied but only addressing direct comparisons between the coral disease and reef fish diversity and populations, neglecting to take into account the microorganisms associated with interacting populations. This study proposes to examine the effects concerning fish population, reef diversity and coral disease, by focusing on diseased fish as potential vectors causing increased coral diseases being observed on reefs. Three study sites encompassing the Caribbean and three stages of fishing pressure are proposed: San Salvador, Bahamas; Quintana Roo Mexico; and Cayano, Haiti. Each studied site will be surveyed using a three pronged style in which reef fish population and diversity, benthos populations and diversity, and coral disease occurrence will be examined. Underwater photography will be utilized for benthic surveys and visual assessments for reef fish surveys. These data sets will be used to correlate the prevalence of specific populations and diversities amongst reef inhabitants with the exception of invertebrates not including corals, to coral disease. Such data will help predict the organisms most likely to have microbial epibionts or epiphytes associated with different coral diseases due to changing fishing pressure.

P9 PREDICTING THE POTENTIAL DISTRIBUTION OF *VIOLA GUADALUPENSIS* HABITAT IN THE GUADALUPE MOUNTAINS USING A GIS-BASED HABITAT MODEL: EVIDENCE OF A NEW ISOLATED POPULATION.

Timothy C. Mullet, Department of Biology, Sul Ross State University, Alpine, TX, Fred Armstrong\*, Resource Management Office, Guadalupe Mountains NP, Salt Flat, TX, Benjamin Zank, Resource Management and Science, Great Smoky Mountains NP, Gatlinburg, TN, and Christopher M. Ritzi, Department of Biology, Sul Ross State University, Alpine, TX.

*Viola guadalupensis* is a rare endemic of the Guadalupe Mountains range in West Texas. Isolated to a remote limestone, rock face, this species was known only to exist at a single location along the East Rim within Guadalupe Mountains National Park (GMNP). Despite traditional surveys in seemingly suitable habitat, researchers had been unable to locate new populations. Its small population size, genetic isolation, and lack of significant habitat information make this species vulnerable to extinction. Consequently, the Resource Management Office of GMNP has implemented a strategy to introduce laboratory-

germinated plants to new suitable habitats in an attempt to preserve this species' viability. Geographical Information Systems (GIS) have previously been successful at predicting suitable habitats of rare species; therefore, we developed a GIS-based habitat model – generated from the elevation, aspect, and slope specific to the type locality – that displayed a map predicting suitable *V. guadalupensis* habitat throughout the park. We ground truthed 9 of the 14 locations produced by the habitat model. One location accurately predicted the type locality, while a second location revealed a new population of *V. guadalupensis* within a steep, slot-canyon drainage along Frijole Ridge. Three locations were determined to be suitable for *V. guadalupensis* introduction and 4 were considered unsuitable. Considering our model accurately predicted the type locality and discovered a new population, despite traditional survey efforts, the usefulness of GIS-based habitat models for surveying is reaffirmed, providing baseline information for further investigation.

222 GENETIC STRUCTURE OF *HALODULE WRIGHTII* POPULATIONS FROM A HYPERSALINE LAGOON REGION IN THE WESTERN GULF OF MEXICO.

Patrick D. Larkin\*, Krista L. Storey, and Joyce Parker, Department of Physical and Environmental Sciences, Texas A&M University–Corpus Christi, Corpus Christi, TX, and Beau Hardegree, Texas Parks and Wildlife Department, Corpus Christi, TX.

A Random Amplified Polymorphic DNA (RAPD) assay was used to assess genetic variation among three populations of the seagrass *Halodule wrightii* (= *beaudettei*) from the Laguna Madre region in the western Gulf of Mexico, a unique ecosystem that contains one of the world's few hypersaline lagoons. Population zones in this region show significant differences in salinity, freshwater inflow and anthropogenic impact. Results indicate that the highly impacted Redfish Bay population has the greatest amount of genetic diversity. It had the highest values for proportion of polymorphic loci ( $P$ , 100%), mean heterozygosity ( $H_e$ , 0.41), number of unique RAPD "profiles" and clonal diversity. Genetic differentiation ( $F_{ST}$ ) estimates indicate a high degree of historical gene flow between two of the populations ( $F_{ST} = 0.09$ ), while the third remains relatively isolated ( $F_{ST} > 0.3$ ). Differentiation results were very similar to those obtained previously for *Thalassia testudinum*, a co-regional species that shares many life history and mating system characteristics with *Halodule*. A number of biotic and abiotic factors have been identified that may account for these differences.

## ENVIRONMENTAL SCIENCE

57 ASSESSMENT OF AQUATIC ENVIRONMENTAL ESTROGENS IN THE LOWER GALVESTON BAY WATERSHED.

Bitia Maki\*, Renard Thomas, PhD, and Bobby Wilson, PhD, Texas Southern University, Houston, TX.

Traditional chemical analyses are being used to measure the concentrations of selected medical and non-medical Environmental Estrogens (EEs) in the waters of the lower Galveston Bay watershed in order to test the hypothesis that chlorophylls and other algal pigments (carotenoids) characteristic of aquatic phytoplankton may be effective biomarkers for exposure to EEs.

This objective is being investigated through the following specific aims:

Specific Aim 1: Site-specific monitoring to identify and determine the extent of contamination by EEs and related compounds in major tributaries emptying into the Galveston Bay System and the open water of Upper Galveston Bay.

Specific Aim 2: To investigate the effects of EEs on changes in concentration of algal chlorophylls and other algal pigments by using five different estrogens (Estradiol, Estrone and Estriol, B-Estradiol and DES) that are found in the Galveston Watershed are introduced to the grown algae cells. At first, in order to find a threshold amount, each estrogen is being tested separately using three different concentrations, which fall between the actual levels found. The estrogen(s) with the most significant impact on algae growth is (are) selected and further tested with combinations of the estrogens listed. Later, any combination(s) with outmost effect on the algae growth is (are) selected. At this stage the most potent estrogens with needed concentrations that result in significant effects on algae cell count are identified.

220 PHOTOCATALYTIC ENHANCEMENT OF THE SODIS BOTTLE.

Jonathan M. Carey\*, Luke H. Loetscher, and Joel E. Boyd, Department of Chemistry, Wayland Baptist University, Plainview, TX.

Titania was solvent deposited on the interior walls of a polyethylene terephthalate (PET) bottle for the purpose of studying its photocatalytic activity in the sterilization of water containing *E. coli*. A mixture of 60% phenol and 40% trichloroethylene was used to soften the interior of the bottle, allowing for the deposition of the titania. The bactericidal action, under simulated solar illumination, of the titania-modified bottle was assessed in comparison with an unmodified PET bottle. The unmodified PET bottle is representative of the bottles utilized in the SODIS project of the World Health Organization.

- 201 THE USE OF SOUTHERN AFRICAN *TATERA* (RODENTIA: GERBILLINAE) IN PALEOENVIRONMENTAL RECONSTRUCTION.  
Timothy L. Campbell\*, J. Kelly Forson, Patrick J. Lewis, Sam Houston State University, Huntsville, TX.

Small animal faunas are useful in rebuilding past terrestrial environments as they are generally associated with small home range sizes and often have niche specializations. Microfauna, for example, are historically used to estimate environmental parameters such as vegetation cover, substrate, mean annual precipitation and temperature range. The diagnosis of small mammal fossil taxa from the Plio-Pleistocene of southern Africa is generally accomplished through comparative analyses with closely related extant forms. However, modern taxa are often classified based on differences in habitat, behavior, and soft anatomy. As fragmentary maxillae and mandibles are the most common diagnostic elements found in southern African fossil localities, dental traits are heavily weighted in taxonomic assessments. There are four extant species within the genus *Tatera* in southern Africa, each exhibiting varying degrees of ecological tolerance. These same modern species are routinely reported from many of the paleontological and archaeological sites in the region. Our research compares dental characteristics used to separate modern species of *Tatera* with characteristics reported in the literature for diagnosing fossil species in this genus. Differences due to sexual dimorphism, ontogeny and ecophenotypic variation are not well documented. We find that dental characteristics used to diagnose modern species are overlapping and lack definitive apomorphies. Such findings suggest that identifying fossil species based solely on dental remains cannot be accomplished with confidence and may, in fact, lead to distorted paleoenvironmental signatures. The diagnosis of fossil *Tatera* should therefore be limited to higher taxonomic levels unless definitive dental apomorphies can be defined.

- 173 MAPPING THE SPATIAL DISTRIBUTION OF BLACK MANGROVE ON SPOIL ISLANDS OF THE LOWER LAGUNA MADRE USING AERIAL COLOR INFRARED PHOTOGRAPHY AND AUTOMATED IMAGE CLASSIFICATIONS.

Violet Yeager, Kenneth R. Summy, \* Frank W. Judd, Ruben A. Mazariegos, Thomas Whelan III, Michael R. Heep, The University of Texas–Pan American, Edinburg, TX, and James H. Everitt, Agricultural Research Service, U.S. Department of Agriculture, Weslaco, TX.

The spatial distribution of black mangrove, *Avicennia germinans*, on selected dredged-material or “spoil” islands of the Lower Laguna Madre was mapped using large-format (23 x 23-cm) aerial color infrared (CIR) photography acquired during June, 2005. Aerial CIR photographs (1:10,000 scale) and unsupervised image classifications (Isocluster algorithm) suggested a concentration of black mangrove along the western shorelines of most islands evaluated. This distribution was confirmed by ground surveys which revealed highly significant differences in densities of mangrove plants along western vs eastern shorelines, but no significant differences in ratios of small (<1.0 m) trees vs large (>1.0 m) plants along any shoreline. These observations suggest that 1) establishment of black mangrove seedlings along eastern shorelines may be hindered by wave action caused by prevailing southeasterly winds or boat traffic along the Gulf Intracoastal Waterway, and 2) that once established, mangrove plants thrive and reproduce along shorelines regardless of aspect. The latter result is important as it suggests a potential to utilize black mangrove as an effective means by which to mitigate or prevent shoreline erosion, which currently represents a major threat to many of the spoil islands of the Lower Laguna Madre.

- 189 CHARACTERIZATION OF RIPARIAN WETLAND IN THE LOWER RIO GRANDE VALLEY.

Diana C. Del Angel, Clint D. Roberts, Anthony S. Reisinger, Nydia Gutierrez, Anna Hockaday and Jude A. Benavides Ph. D. The University of Texas at Brownsville, Brownsville, TX.

The Lower Rio Grande Valley is located less than 10 meters above sea level and between two bodies of water, the Gulf of Mexico and the Rio Grande River. A mixture of salt tolerant coastal plants and semi-arid plants can be found in this area including *Batis maritime*, *Opuntia engelmannii*, and *Borrchia frutescens*. Historically humans have impacted the natural ecology of this area. An estuarine characterization of the lower Rio Grande River was performed to identify and map vegetation along the river. The documentation of such areas and vegetation established in them can prove beneficial in future studies, in which a comparison may verify a changing environment. The scope of the study had a radius 1.6 km from the river, for the first 40 km from the mouth of the river. ARC-GIS software was used to analyze digital elevation models, NRCS (Natural Resources Conservation Service) soil data, and false color aerial photography. These were used to create vegetation polygons and hydro-geographic features. Vegetation data was collected during field visits with the use of GPS.

- 149 TAXON-SPECIFIC EFFECTS OF MICROBIAL-MEDIATED LEAF LITTER DECOMPOSITION IN AQUATIC ECOSYSTEMS.  
Pamela A. Vazquez\*, Clay Barton, Anthony Nguyen, Richard Lewis, Chad W. Hargrave, and Todd P. Primm. Department of Biological Sciences, Sam Houston State University, Huntsville, TX.

The primary energy source in small headwater streams often is leaf litter input from the riparian zone. Microbes (e.g., bacteria and fungi) play an important role in regulating the decomposition of this detritus, making this allochthonous carbon source available to higher order consumers. For example, research has shown that increased microbial productivity and abundance enhances rates of leaf litter decomposition and positively affects detritivorous invertebrates. However, few studies have tested species-specific effects of microbes on decomposition rates. In this study, we isolated about 16 microbial taxa from decomposing Sycamore, Pine, and Water Oak leaves collected in a small second order stream in Walker Co. Texas. These taxa were identified based on colonial morphology, biochemical tests and 16S ribosomal gene sequencing. Additionally, we classified each taxon's functional characteristics (e.g., nitrogen fixing, cellulose degrading, etc.) that might affect its role in the detrital food web. Using sterile microcosms, we tested each taxon's effect on decomposition rates of Water Oak leaves. To date, we have identified one bacteria taxon that significantly increased rates of leaf litter decomposition. This taxon was strongly hemolytic compared to the other microbial taxa that did not affect leaf decomposition. These data suggest that rates of leaf decomposition may be regulated by functional structure of the microbial community. Thus, factors affecting microbial community composition (e.g., antimicrobial anthropollutants) may have significant impacts on nutrient cycling in aquatic ecosystems.

- 221 A PHOTOCATALYTIC LED-ILLUMINATED REACTOR FOR THE STERILIZATION OF DRINKING WATER.  
Luke H. Loetscher\*, Leah R. Quisenberry, and Joel E. Boyd, Department of Chemistry, Wayland Baptist University, Plainview, TX.

A portable water treatment reactor was developed which utilizes light emitting diodes as the source of illumination for immobilized titanium dioxide photocatalysts. This reactor produces sufficient oxidative species to inactivate the *Escherichia coli* present within the contaminated water. A series of tests was performed to determine the optimum spectral distribution and illumination intensities of the LEDs utilized. The results of these tests were used to design and optimize a low-cost, portable, and durable reactor for the sterilization of drinking water.

- 240 ANALYSIS OF PESTICIDES IN HAIR BY COMPREHENSIVE TWO-DIMENSIONAL GAS CHROMATOGRAPHY.  
Charlotte A. Smith-Baker\* and Mahmoud A. Saleh, Texas Southern University, Department of Chemistry, Houston, TX, and J.-M. D. Dimandja, Spelman College, Department of Chemistry, Atlanta, GA.

The objective of this talk is to describe the development of a new non-invasive method for the analysis of toxicological biomarkers for exposure to pesticides. The method is based on comprehensive two-dimensional gas chromatography (GCxGC), which subjects the analytes to two separation columns through the use of an on-column injector called a modulator. The primary advantage of GCxGC over conventional one-dimensional GC techniques in this particular application is a simplification in the sample preparation procedure, which results a substantial improvement in analytical throughput. The presentation will focus on the development of the GCxGC method and an evaluation of the qualitative and quantitative figures of merit of the technique. This work was funded by RCMI Grant #R003045-17, NASA/TSU-URC Grant #NCC165-9, Association of Minority Health, Morehouse School of Medicine, CDC/ATSDR, and NSF/SEI.

- 257 POSSIBLE ENVIRONMENTAL IMPACTS FROM THE PROPOSED BORDER WALL IN SOUTH TEXAS – A GIS ANALYSIS.  
Joseph Lemen\*, Anthony S. Reisinger, and Jude A. Benavides, The University of Texas at Brownsville, Brownsville, TX.

The 109<sup>th</sup> Congress of the United States has approved a wall to be built on the United States/Mexico border through the Secure Border Act of 2006. The Department of Homeland Security has made available proposed wall locations on their website. The sections of wall for the lower Rio Grande Valley pose potential impacts such as wildlife refuge degradation, tax revenue losses, and other environmental impacts. The proposed wall, also referred to as "tactical infrastructures", will likely have aesthetic impacts as well. ArcGIS was used to geo-reference the published Homeland Security map in an attempt to analyze possible impacts. A variety of different spatial information datasets were used including wildlife refuges, census data, parcel data, and digital elevation models. Various impacts were identified including parcel disruption, loss of private property, habitat fragmentation, and loss of access to fresh water for native wildlife. We also attempt to estimate the portion of the local population that will be able to see the wall and illustrate some of these areas using a viewshed analysis.

142 CORRELATION OF MICROBIOLOGICAL ANALYSIS OF FECAL BACTERIA USING FLUORESCENT WHITENING AGENTS AS DETECTORS.

Mercedes Mata\*, Egon Weber, Texas A&M University–Corpus Christi, Center for Water Supply Studies.

Identifying human fecal contamination in surface waters is often based upon complex, time consuming microbiological enumerations. However, fecal contamination from domestic wastewater (including failed septic systems) is closely associated with fluorescent whitening agents (FWAs) used in clothing detergents, which are not readily biodegradable. The purpose of this study is to determine if FWAs can be detected in surface waters, and are distinct from dissolved organic matter, thus allowing their unambiguous identification. To evaluate this methodology, laboratory-prepared dilutions of common detergents, samples from Oso Creek (an effluent dominated stream in South Texas), and samples rich in dissolved organic matter were analyzed using a Fluorolog-2 fluorometer. Fluorescence emission scans using an excitation wavelength of 350 nm show that detergent FWAs have an emission peak at 430 nm; this contrasts with dissolved organic matter which has a wider emission peak at 445 nm. The emission at 430 nm offers the highest specificity of such FWA detection and minimizes the matrix effect of dissolved organic matter. This methodology can identify the presence of FWAs down to 20 mg detergent/1(ppm); this is within the range of significant sewage contamination as reported in the literature. Samples collected from seven locations along Oso Creek show fluorescence emission peaks centered on 430 nm, and emission levels suggesting detergent contents ranging from 285 ppm in the most upstream sample down to 150 ppm in the most downstream sample. The next phase of this study will correlate the presence of FWAs with microbiological analyses of fecal bacteria.

P3 THE PRELIMINARY CHARACTERIZATION OF ENVIRONMENTAL ESTROGENS IN WASTEWATER EFFLUENTS.

Reba Scott, Space Engineering & Science Internship Program, Texas Southern University, Houston, TX. Katoria Tatum-Gibbs, Environmental Toxicology PhD. Program, Texas Southern University, Houston, TX, Dr. Tuan Phan, Dr. Renard Thomas and Dr. Bobby Wilson, NASA University Research Center, Texas Southern University, Houston, TX.

In this study, the objective is to identify estrogens in sewage effluents. Estrogens are a group of steroid compounds that function as the primary female sex hormone. Estrogens are used as oral contraceptives and estrogen replacement therapy in postmenopausal women. Sewage effluents may contain many different estrogens, including estrogens that are endocrine disrupting compounds (ECDs). ECDs are both natural and man-made and they can interfere with the endocrine glands and their hormones that alter the functioning of the endocrine system. It is important to identify these estrogens to have a better understanding of the effects of these estrogens in the environment. The procedure includes a solid-phase extraction (SPE) of approximately 500 milliliters of water samples. The SPE absorbent used for sample preparation was an octadecyl (C18)-bonded silica sorbent. High Performance Liquid Chromatography with ultraviolet detector (HPLC - UV) was used to characterize the estrogens in the sewage effluents. HPLC - UV was used for its specific detection and potential identification of estrogens in the presence of other chemicals. The preliminary analysis showed the presence of three compounds at levels between .0206 mgL<sup>-1</sup> (estradiol) to .2257(ethinyl estradiol) mgL<sup>-1</sup>. The EPA does not regulate the levels of estrogens that are released into the water but even at low concentration levels the estrogens have been observed harmful on the reproduction, growth, and development of certain species of wildlife [4, 5].

P178 WATER QUALITY: SURVEILLANCE OF POTENTIAL EXOGENOUS NUTRIENTS IN A WATERSHED BORDERED BY RESIDENTIAL DEVELOPMENT.

Meredith L. Cohen and William J. Quinn, St. Edward's University, Department of Biology, Austin, TX.

A baseline water quality study of the Barton Creek watershed in southwest Travis County (Austin, TX) was designed to assess nitrate and reactive phosphorus concentrations in samples collected from major and minor tributaries as well as from mainstem Barton Creek. The watershed site of interest (30°17'43"N, 97°53'25"W) is characterized by contrasting levels of impervious cover (IC%) between the north and south banks. Sampling was performed biweekly for a total of ten days between 11 July 2007 through 16 August 2007. Water samples from Barton Creek and its tributaries on the south bank (residential area) and the north bank (property of The Nature Conservancy) were acquired according to LCRA water quality protocol. [NO<sub>3</sub>] and [P] values were standardized and reported as g/day for each water sample location. Data analysis served to determine if the developmental disparity between each bank was paralleled by a variation in the nutrient levels of focus during this 30 day trial.

P181 EVALUATION OF GAS CHROMATOGRAPHY-DIFFERENTIAL MOBILITY SPECTROMETRY FOR MEASUREMENT OF AIR CONTAMINANTS IN SPACECRAFT.

Jamail Plumber, Space and Engineering Science Internship Program (SESIP), Texas Southern University, Houston, TX, John Boyd, Senior Scientist in the Toxicology Laboratory, Wyle Lab, Houston, TX, Noreen Khan-Mayberry, Space Toxicologist, Space Life Science Directorate, National Aeronautics and Space Administration, Houston, TX, Thomas Limero, Wyle Laboratories Toxicology Labs Supervisor, Wyle Lab, Houston, TX, and John T. James, Space Toxicologist, Space Life Science Directorate, National Aeronautics and Space Administration, Houston, TX.

The main goals of the Gas Chromatography-Differential Mobility Spectrometry (GC-DMS) software evaluation project are to test RFIMS-So2vi program in analyzing the air contaminants of spacecrafts in real time, to determine the optimal settings for the greatest efficiency, and to integrate the software with the GC-DMS. The GC-DMS is the next generation of hardware that will be used on the International Space Station (ISS) to detect specific chemical constituents in the ISS atmosphere. The quality of the spacecraft's air is determined by the quantity of the volatile organic compounds (VOC's). The importance of having the capability to monitor VOC's has been seen in both the ISS and MIR, one past example is multiple Freon leaks that created an unhealthy living environment. In addition to this, there is the constant exhalation of carbon dioxide (CO<sub>2</sub>) gas by the astronauts. This project is being pursued in order to utilize the GC-DMS technology as a replacement for GC-IMS. The GC-DMS has a number of advantages over the GC-IMS, starting with smaller overall hardware size, this is critical to NASA, since space is at a premium in ISS. The GC-DMS also has more independent functional abilities, such as autonomy from ISS's wiring system. The preliminary findings of this project have shown the possible problem VOC will be acetone, because of its adhesive nature it tends to stick to the walls of the tubing and mixing in with the other compounds. It has also shown that certain compounds react to heat and become easily detectable.

P195 DUNE RESTORATION PILOT PROJECT FOR SOUTH PADRE ISLAND, TEXAS.

Jose M. Aguilar Jr., Andres Cardenas, Michelle Clark, Schaune Collins, Diana C. Del Angel, Mara Contreras, William Cortez, Anna Flores, Jonathan Flores, Dr. Elizabeth A. Heise, Jorge Martinez, Luis Reyes, Clint Roberts, Erick Tripp and Tamara Young. The University of Texas at Brownsville Department of Chemistry and Environmental Sciences. Brownsville, TX.

South Padre Island is a beach community on the coast of South Texas. Some areas along the coast have experienced a deterioration of sand dunes due to large storms in the Gulf of Mexico, a loss of vegetation, and the reduction of sand dunes by beach visitors. The purpose of this study was to estimate the amount of work it would take to build a continuous dune line for the town. We mapped the total area of un-vegetated and vegetated dune line on South Padre Island. We revegetated approximately 4000 m<sup>2</sup> of un-vegetated dune line. We calculated the number of man hours per square meter to revegetate the dunes. One team conducted an analysis of vegetation cover using ArcGIS software to compare true color aerial images from 1994, 2005 and 2006. In addition GIS plotted information of anthropogenic paths and current location of walk-over bridges, were included in the maps. A second team, collected native coastal vegetation from an area with excess vegetation. These plants were then taken and potted in the greenhouse located at the University of Texas at Brownsville. The plants were prepared for future transplanting on the bare dunes. After 2 months in the greenhouse the roots had rejuvenated sufficiently for transplanting. The plants were planted in the test area. A third team developed public education materials that included pamphlets, a PowerPoint presentation for a meeting with the Town of SPI and design of an information webpage which provides project information.

P212 HIGH DENSITIES OF GRAM-POSITIVE BACTERIAL POPULATIONS INHABIT HEMOLYTIC SNAKE VENOM BUT DO NOT DISPLAY COLONY, CELLULAR OR BIOCHEMICAL VARIATION.

Ibdanelo Cortez\*, Frederic Zaidan III and Kristine L. Lowe, Department of Biology, University of Texas–Pan American, Edinburg, TX.

The research objective was to isolate, characterize and identify bacteria inhabiting venom of the Western Diamondback rattlesnake (*Crotalus atrox*). Hemolytic venom contains mixtures of toxins and enzymes that break down blood cells making venom an inhospitable environment for most organisms. Bacteria are able to live in harsh environments; thus, we hypothesize that bacteria have adapted to living in rattlesnake venom and may be transferred along with the venom. To test this, venom samples from 12 captive rattlesnakes were collected, diluted and spread onto 5% Sheep's Blood Agar for culturing. Bacterial densities from each venom sample were estimated after 72 hours incubation. Random colonies were Gram-stained and tested with API strips, which are commercially-available biochemical test strip. Results showed that bacteria were pres-

ent in the venom and in high densities. The average population density of bacteria was greater than  $10^6$  colony forming units per ml of venom (cfu ml<sup>-1</sup>). Colonies were typically small with a slight green tint; cells were all Gram-positive rods. API tests resulted in few positive biochemical tests for the 22 tests on the strip; however, 100% of tested isolates (n = 80) could utilize citrate as a carbon substrate and could produce N<sub>2</sub> gas; 25% of tested isolates could utilize glucose as a carbon substrate. These results suggest that the bacteria are the same or similar species despite being isolated from different snakes. We are currently using PCR and DNA sequencing to identify the bacteria compare these results to venom samples collected from wild rattlesnakes.

P34 QUANTIFYING INORGANIC CONTAMINANTS IN THE MUNICIPAL DRINKING WATER USING ICP-MS.

Uchenna Obianagu, Space, Engineering, & Science Internship Program, Texas Southern University, Houston, TX, Andrea Oyewole, Environmental Toxicology Ph.D. Program, Texas Southern University, Houston, TX, Felicia L. Conley, Renard L. Thomas and Bobby L. Wilson, NASA University Research Center, Texas Southern University, Houston, TX.

The municipal district supplies drinking water to a large number of the greater Houston area. A comprehensive study was conducted to identify trace metals, along with their level of abundance, within the water and compare them to EPA maximum contaminant levels. Our major concern was with the primary contaminants, but tests were also conducted for secondary contaminants as well. Trace metal contaminated water samples were collected from eight local fire stations and quantified in accordance to EPA method 200.8 version 5.4. Each fire station was visited twice and 2 samples were collected from each site. During analysis, each sample was run twice to give a total of 32 samples per analysis. For secondary contaminants, the results showed that some fire stations exceeded standards for sodium and iron. For primary contaminants, some fire stations exceeded set levels for copper and lead. Although sodium and aluminum are not primary contaminants, their levels well surpassed the maximum contaminant levels and therefore maybe be a cause for concern. Lead is a primary contaminant and is considered hazardous at any level. Proper measures should be taken to make sure that municipal drinking water in areas tested meet the EPA standard levels.

P281 MONITORING OXIDATIVE STRESS INDUCED BY LOWERED SALINITY AND HEAVY METALS IN TURTLE GRASS (*THALASSIA TESTUDINUM*) IN THE LOWER LAGUNA MADRE TEXAS USA.

Natali Mejia\*, Fritzie J. Into, Jacqueline D. Bruce, Anna Martinez, Thomas Whelan III, Hudson R. DeYoe and Michael W. Persans, University of Texas–Pan American Edinburg, TX.

Turtle grass (*Thalassia testudinum*) is an important seagrass in the Lower Laguna Madre (LLM). Although there are natural and anthropogenic stressors of seagrass, there is little research on quantitating stress in seagrass. Early warning stress indicators could be useful to assess the health of a seagrass population. The goal of this study was to evaluate the utility of non-traditional stress indicators to detect stress in a controlled setting. In order to monitor oxidative stress caused by changes in salinity or heavy metals we have used assays for lipid peroxidation (TBARS) and protein carbonylation (PC) as well as infrared spectroradiometry (NDVI) to assess the levels of oxidative stress induced by these factors. *Thalassia* was harvested from the LLM and placed in six 150 liter tanks with recirculating sea water. The salinity was lowered from 35 ppt to 12 ppt in half the tanks, then seagrass was harvested at 0, 24, 48, 72 and 192 hrs and subjected to the assays above. For treatment with the heavy metals Cu and Mn, the seagrass was placed in 37.5 liter tanks, heavy metals were added and samples were taken at 0, 24, and 72 hrs and assessed using the above assays. With regard to salinity stress, the TBARS and PC assays showed acute stress at both 35 and 12 ppt after 24 and 48 hrs. Heavy metal stress resulted in increased TBARS and PC values after 72 hr. NDVI assays showed no change in the salinity experiment but increased in the heavy metal stress experiment.

P282 USE OF ENZYMATIC ASSAYS FOR SUPEROXIDE DISMUTASE AND CATALASE ACTIVITY TO ASSESS OXIDATIVE STRESS INDUCED BY LOWERED SALINITY AND HEAVY METALS IN TURTLE GRASS (*THALASSIA TESTUDINUM*) IN THE LOWER LAGUNA MADRE TEXAS USA.

Fritzie J. Into\*, Natali Mejia, Ana Santacruz, Jacqueline D. Bruce, Anna Martinez, Thomas Whelan III, Michael W. Persans and Hudson R. DeYoe, University of Texas–Pan American, Edinburg, TX.

There are natural and anthropogenic stressors of seagrass present in the environment and early warning stress indicators could be useful to assess the health of a seagrass population. The seagrass *Thalassia testudinum* (turtle grass), because of its widespread global distribution and local availability, makes it well suited as an indicator species for environmental stress.



The goal of this study was to evaluate the utility of superoxide dismutase (SOD) and catalase (CAT) assays as stress indicators. Turtle grass was harvested from the LLM and placed in six 150 liter tanks with recirculating sea water. In half the tanks, the salinity was lowered from 35 ppt to 12 ppt and the seagrass harvested at 0, 24, 48, 72 and 192 hrs and subjected to the stress assays above. For treatment with the heavy metals Cu and Mn, the seagrass was placed in 37.5 liter tanks, heavy metals were added and samples were taken at 0, 24, and 72 hrs and assessed using the above stress assays. SOD activity did not increase over the time course of the experiment in the 35 ppt salinity control tanks but it did show an increase in the 12 ppt lower salinity tanks at 72 and 192 hrs. CAT activity also showed an increase in the 12 ppt lower salinity tanks but this was only evident at 192 hrs post treatment. Interestingly, heavy metal treatment did not result in an overall increase in SOD activity at any of the time points tested.

- P284 PRIMER DESIGN AND ASSESSMENT OF OXIDATIVE STRESS RESPONSE GENE EXPRESSION IN *THALASSIA TESTUDINUM*. Nanbing Li, Sheenaley Legas, Amery Yang, and Michael W Persans, University of Texas–Pan American.

Turtle grass (*Thalassia testudinum*) is an abundant seagrass in the Lower Laguna Madre (LLM) Texas. Its ubiquitous distribution in the LLM and other parts of the world such as the Gulf of Mexico, Atlantic Ocean and Mediterranean Sea make it an ideal candidate organism to be used as an early warning indicator of environmental stress. Many environmental stressors ultimately cause oxidative stress to an organism. The organism responds by inducing genes that are part of the oxidative stress response (OSR) such as glutathione-S-transferase, superoxide dismutase, catalase, ascorbate peroxidase, glutathione peroxidase, and glutathione reductase. These genes are found in all plants; unfortunately the DNA sequences of these genes are unknown in *Thalassia testudinum* due to the fact that its genome is not sequenced. However, there are other monocot plant species that have extensive data on the sequences of these genes such as rice (*Oryza sativa*), wheat (*Triticum aestivum*) and corn (*Zea mays*). Through alignment of these gene sequences and others present in DNA data-banks, PCR primers were designed to conserved regions of these genes. Genomic DNA and total RNA were successfully isolated from *Thalassia testudinum* and PCR products were obtained for the above genes. Currently work is underway to characterize the PCR products and assess expression levels of these OSR genes in *Thalassia testudinum*.

- P285 CHARACTERIZATION OF HYPERACCUMULATOR AND NON-ACCUMULATOR *BRASSICACEAE* PLANT SPECIES IN RESPONSE TO HEAVY METAL TREATMENT. Hille Corona\*, Maria Calagui\*, Sharifa Llemit, Lester Cabrera, Jeni Vela, Glee-Ann Llemit, Thomas Whelan III, Kenneth R. Summy and Michael W Persans. University of Texas–Pan American.

There are numerous species of plants in the *Brassicaceae* family that are well known hyperaccumulators of the heavy metals Nickel and Zinc. Some of these plants can accumulate between 1-5% of their dry biomass as metal. The physiological and molecular mechanisms behind hyperaccumulation have been studied but much is still unknown about the fine detail of the process. Through the use of remote sensing via infrared spectroradiometry and molecular cloning techniques, further insight into the physiological and molecular processes of metal hyperaccumulation has been elucidated. The use spectroradiometry via the monitoring of NDVI ratios has indicated the both non-accumulators and hyperaccumulators are able to tolerate metal exposure for periods of up to one week, but after 2 or 3 weeks of metal exposure the non-accumulator species show significant changes in NDVI ratios whereas the hyperaccumulators do not. In an effort to understand the physiological processes characterized by the spectroradiometry experiments at the molecular level and effort was launched to isolate CDF genes from hyperaccumulator and non-accumulator *Brassicaceae* plant species. We have successfully cloned several CDF genes from both hyperaccumulator and non-accumulator plants. Efforts are underway to sequence, assess mRNA expression levels and functionally express these CDFs in yeast to determine if they can impart metal tolerance to metal sensitive yeast strains.

- P311 IMMUNOTOXIC EFFECTS OF ACRYLONITRILE *in vitro*. M. Farooqui, University of Texas–Pan American, Edinburg, TX, A. R. Abd-Allah, Al-Azhar University, Egypt, and A. Ahmed, University of Texas Medical Branch, Galveston, TX.

Acrylonitrile (AN) is a known animal carcinogen, mutagen and teratogen. This study describes the immunotoxic potential of AN *in vitro* in human leukocytes and T<sub>84</sub> human colonic epithelial cells. Human buffy coats were used for the separation of different types of human leukocytes. Cells were incubated with various concentrations of AN (5 – 40 umoles) at various time intervals (30-120 minutes). Concentrations of reduced (GSH) and oxidized (GSSG) glutathione were determined as a

function of AN concentration and incubation time. Mitogenic response of human lymphocytes was determined using concanavalin-A (Con-A), phytohemagglutinin (PHA) and lipopolysaccharide (LPS). Apoptosis in human lymphocytes was assayed using Cis-platinum as a positive control. Concentrations of GSH and GSSG significantly decreased in human leukocytes (0 – 60 % of controls) as a function of AN concentration and incubation time. AN (20 umoles) significantly inhibited  $^3\text{H}$ -thymidine uptake as a response to PHA stimulation (86-90 % of controls), Con-A (76-87 % of control) and LPS (56-68 % of controls). AN (5 umoles for 1 h) significantly increased percentage of nonviable cells in lymphocyte cultures. Incubation of lymphocytes with AN (5 umoles for 1 h) also resulted in a significant increase in the percentage of DNA fragmentation. Addition of AN in the incubation medium decreased IL<sub>8</sub> secretion by T<sub>84</sub> human colonic epithelial cell line. These results indicate immunotoxic potential of AN in human leukocytes colonic epithelial cells.

P313 IMMUNOTOXIC EFFECTS OF ACRYLONITRILE IN VIVO.

M. Farooqui, University of Texas–Pan American, Edinburg, TX, A. R. Abd-Allah, Al-Azhar University, Egypt, and A. Ahmed, University of Texas Medical Branch, Galveston, TX.

This study describes the immunotoxic effects of acrylonitrile (AN) in CD-1 mice after acute and subchronic AN exposure. In acute study experimental mice received a single oral dose of 13.5 mg / Kg and animals sacrificed 3-5 days post treatment. Other experimental mice received 6.75 mg AN / Kg once daily for 5 days and animals sacrificed 24 hours after last dose. In subchronic study experimental immunized and non-immunized mice received 3 dose levels of AN 1.35, 2.7 and 5.4 mg / Kg for 14 days. Control mice received distilled water. A positive control immunized group received cyclophosphamide in a single i.p. dose of 225 mg / Kg. Treated mice were sacrificed 24 hours after last treatment. Parameters investigated included, body weight, relative lymphoid organ weights, morphological and histopathological changes of brachial lymph node, intestine and lung, spleen viability and spleen leukocyte, and total and differential counts. In acute study the average body and lymphoid organ weights significantly decreased (6-50% of controls). Similarly all types of leukocyte counts significantly reduced (38-73% of controls). Subchronic study revealed a significant swelling in brachial region due to an abscess formation in 80-92 % of treated mice. In addition significant lung abscess formation, enlargement of Peyer's patches and over 40% mortality rate were observed in mice treated with higher AN doses. These results demonstrate immunotoxic potential of AN in CD-1 mice.

### EXPLORATION OF ESTUARINE LINKAGES

144 GROWTH OF BLACK MANGROVE (*AVICENNIA GERMINANS* (L.) L.) ALONG THE SOUTH TEXAS COAST.

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The black mangrove, *Avicennia germinans* (L.) L., is one of three species of mangrove found along the Gulf of Mexico coast. They protect coastal shorelines, aid in substrate stabilization, filter runoff, and provide habitat to many estuarine organisms. It is the only mangrove species reportedly found in Texas, Louisiana, and Mississippi because of its ability to tolerate cool temperatures. In the past, this species was thought to be ephemeral and with limited distribution in Texas but recent studies have shown increased and apparently more permanent populations along the coast. Extensive research has been conducted on black mangroves around the world, but little attention has been devoted to those along the Texas coast. The purpose of this research was to characterize black mangrove growth along the south Texas coast. Internode growth was measured monthly at nine sites located between Aransas Bay and the Upper Laguna Madre for one year. These sites represent the three general habitat types where mangroves are found in the local area: barrier islands, bay islands, and mainland bayshores. Significant differences were found among habitat types using repeated measures ANOVA. These differences maybe attributed to other factors measured, such as sediment grain size, salinity, and total organic content.

280 EXPLORING CONNECTIVITY BETWEEN SALT MARSHES AND SUBTIDAL HABITATS.

Anna R. Armitage\*, Texas A&M University at Galveston.

In coastal wetlands with regular tidal inundation, water movement closely links tidal salt marshes and subtidal soft-bottom communities as detritus and motile fish and invertebrates move between habitats. Regions with weather-driven tidal patterns can dramatically alter the predicted level of connectivity between habitats within coastal wetlands. My objective was

to quantify the degree of connectivity between marsh and soft-bottom habitats in an estuary subject to extended periods of weather-driven high or low tides, where habitats may be continuously connected, or disconnected, for periods of days to weeks. I installed 30-m long fences (1.2 m tall, 2 mm mesh) and control fences (20 cm tall) along sections of marsh edge habitat in West Galveston Bay in September 2007. The fences allowed water movement but limited faunal movement and organic matter flow between habitats. Over two months I monitored plant, animal, and sediment responses to the fence treatments. Fences reduced *Spartina alterniflora* stem density, suggesting that vascular plant productivity was lower in disconnected habitats. Post-reproductive *Spartina* senescence appeared to occur faster in full fence treatments. Marsh insect density was highly variable, but certain insect groups, including spiders, gnats, and leaf hoppers, were less common in full fence treatments. There was lower sediment organic content in subtidal habitats in full fence treatments, possibly due to reduced detrital flow from the marsh to the subtidal habitat. These preliminary findings, in conjunction with isotopic analyses of plant and animal tissue, suggest that organic matter moving between habitats may supply benthic consumers in both habitats.

125 RECRUITMENT AND COLONIZATION OF MACROALGAL SPECIES TO THE ROCKY JETTIES OF PACKERY CHANNEL, CORPUS CHRISTI, TEXAS.

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Marine macroalgal assemblages on artificial structures may play an important ecological role in coastal and estuarine ecosystems by supplementing nearby natural communities. Variations in abundance and diversity of algae aid in the assessment of habitat function and ecosystem health. Macroalgae found on the rocky jetties of Port Aransas and Mansfield Pass have been previously characterized, but the jetties of Packery Channel, located in between, represent a recent habitat addition. We monitored initial recruitment of macroalgal species during the first year of colonization. Eight sampling sites were established along the offshore portion of the new Packery Channel jetties. Samples were taken bimonthly from along a ten meter transect between September 2006 and July 2007. Quadrats (20 X 30cm) were sampled every meter by harvesting techniques and the use of an airlift. All plant materials were identified to lowest possible taxon and biomass calculated. Data obtained from this study assesses composition and establishes a timeline for algal recruitment. Within the first month after jetty completion, 20 species of macroalgae had become established. At six months species richness had increased to 32 and after one year richness reached 40 species. Biomass significantly differed between both sites and sampling months of study. Primer analyses show strong linkages between rate of recruitment and site location. Sites with the highest level of wave energy tended to have the highest overall biomass and species richness. Though development of this habitat has occurred quite rapidly, it will likely continue over the course of the next several years.

307 THE SPATIAL PATTERN OF ELEMENTAL RATIOS AND STABLE ISOTOPES IN THE BENTHOS CAN REVEAL THE NATURE OF THE LINKAGES BETWEEN UPLANDS AND THE COASTAL OCEAN.

James W. Fourqurean\*, Department of Biology and the Southeast Environmental Research Center, Florida International University, Miami, FL.

Owing to the episodic and spatially variable nature of the input of nutrients to the coastal ocean from terrestrial or marine sources, it is often difficult to detect spatial patterns in nutrient availability via water quality sampling. Benthic organisms continuously sample the water that flows over them; long-lived organisms then have the potential to integrate the variability in nutrient availability. Because of this, the spatial pattern in the elemental and stable isotopic content of benthic organisms can economically provide indicators of the relative importance of different elements in controlling primary production, the location of the sources of nutrients, and the nature of those sources. Further, long-term trends in isotopic and elemental content can be used to track changes in the linkages between land and the coastal ocean. Analysis of the spatial pattern in C, N and P content, as well as stable isotopes of C and N, have provided insight to the sources and processing of nutrients in such varied environments as Tomales Bay, California, Florida Bay, and the Mediterranean Sea. Experiments to test the hypotheses generated by spatial patterns in elemental stoichiometry in south Florida confirm the utility of these indicators. Temporal trends in these indicators are now suggesting large spatial scale, decadal changes in the linkage of nutrient exchange between the uplands of the Florida peninsula to the coastal ocean, before these changes have resulted in a change of the structure of the coastal ocean ecosystem.

- 267 CHARACTERIZATION OF LAGUNA MADRE IN TERMS OF TROPHIC STATUS AND COMMUNITY STRUCTURE.  
Jacqueline E. Staggs\* and Kim Withers, Center for Coastal Studies, Texas A&M University–Corpus Christi, Corpus Christi, TX.

Accounting for only 20% of the bay and estuary systems of Texas, yet supporting nearly 80% of the seagrass meadows found in Texas, the Laguna Madre is a large and highly productive semi-enclosed negative estuary. However, seagrass loss, harmful algal blooms and low dissolved oxygen (DO) suggest eutrophic conditions in the Laguna Madre which, according to the National Estuarine Eutrophication Assessment (1999), are predicted to worsen greatly by 2020. Therefore, understanding factors affecting water quality is necessary for developing long-term adaptive management strategies. In November 2002, The Texas Commission for Environmental Quality (TCEQ) initiated a comprehensive monitoring project in response to depressed DO levels in the Laguna Madre. The present research was part of that TCEQ assessment effort. In addition to the environmental data requested by TCEQ, sediment grain size, total organic matter (OM) and biological samples were collected. Five matched replicate samples of benthic macrophytes and macroinvertebrates were collected monthly (Mar – Oct 2004) at six sites in the Laguna Madre along a north-south gradient. Upper Laguna Madre (ULM) sites were located near Pita Island, Bird Island Basin and Baffin Bay while lower Laguna Madre (LLM) sites were located near the Land Cut, Arroyo Colorado, and Port Isabel. In ULM, preliminary results suggested that sediment grain size increases while faunal density, macrophyte biomass and total OM decreases along the north-south gradient. This pattern, however, was not as clear in LLM. The discussion includes factors contributing to variability among sites and between each region of the lagoon.

- 302 USING STABLE ISOTOPES AND MODELS TO EXPLORE ESTUARINE LINKAGES AT MULTIPLE SCALES.  
James E. Kaldy\*, Cheryl Brown and Peter Eldridge, US EPA- Western Ecology Division, Newport, OR.

Estuarine managers need tools to respond to dynamic stressors that occur in three linked environments – coastal ocean, estuaries and watersheds. Models have been the tool of choice for examining these dynamic systems because they simplify processes and integrate over multiple scales. Similarly, stable isotopes integrate over a variety of biogeochemical processes and provide a sensitive and robust tracer. We use empirical measurements of  $^{15}\text{N}$  in green macroalgae to document switching of the N loading from a watershed source to an oceanic source in estuaries. By incorporating  $^{15}\text{N}$  into a hydrodynamic model, we can quantify the contributions from the various sources in the system. Ocean upwelling supplies N during the summer, while watershed inputs from N fixing red alder trees dominates loading during the winter. We have used these findings to classify estuaries. As another example, we have used a similar empirical/model/isotope approach to evaluate seagrass protective criteria. Using empirical data we have developed a stress response model for *Zostera marina* (eelgrass) including detailed measurements of growth, biomass, carbohydrates, photosynthetic parameters and DOC exudation. Model validation efforts include in-situ stable isotope enrichment experiments, short-term transplanting efforts and mesocosm studies. Using the model we evaluated the potential effectiveness of water clarity criteria on *Zostera marina* and found that values similar to those used in Chesapeake Bay would be protective of eelgrass. These examples demonstrate how simple models coupled with critical empirical data and stable isotope measurements can be a very powerful tool to address linkages across temporal and spatial scales.

- 296 CHARACTERISTICS OF FRESHWATER INFLOWS TO TEXAS BAYS.  
Ruben S. Solis\*, Ph.D., P.E. Bays and Estuaries Team Leader, Texas Water Development Board.

Freshwater inflows to Texas' bays are perhaps the single most significant connection between the upstream watershed and the receiving bay. They provide the bay with nutrients, moderate Gulf of Mexico salinity, and serve to build and maintain habitat crucial to important bay species. The magnitude, frequency and seasonality of freshwater inflows are the basic characteristics that determine their impact on bay ecosystems. This presentation will describe historical freshwater inflows to Texas bays, describe the effects that some upstream influences have had in altering inflows and their characteristics, and look at some interesting recent trends.

## 170 CHANGES IN THE SPECIES COMPOSITION OF FISH IN THE COASTAL PLAINS IN THE STATE OF CHIAPAS.

## CAMBIOS EN COMPOSICIÓN DE ESPECIES DE PECES EN LA PLANICIE COSTERA DEL ESTADO DE CHIAPAS.

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Chiapas is one of the country's states that has the most biological diversity due to its topographic variation, its complex physiography, and its latitudinal situation, since it is the northernmost region of the tropical belt. This work takes into account the changes caused by man, like the unchecked destruction of the forest, use of agricultural chemicals in crops, insecticides, industrial wastes and the discharge of black waters which are the prime causes of the impact in the rivers and the fish population. The fish are important because they serve as biological indicators of contaminants and/or heavy metals. The objective of this work is to detect over the next 20 years the fish composition present in the coastal plains region of Chiapas y its possible causes. Two trips were taken to the coastal plains of the pacific of Chiapas, México; in all of the 24 locations that were sampled determined with anteriority in the years 1981 and 1985. A total of 14,470 samples were obtained, in 451 lots, 60 collections and in 24 locations. 23 species were found divided into 20 geni and 11 families. The fish of the coast of Chiapas was found to have suffered changes in its composition due to the alteration of the area in which it finds itself. These alterations have mainly been anthropogenic, although the surrounding areas have been observed to have been affected by natural causes such as meteorological phenomena.

Chiapas es uno de los estados del país que cuenta con mayor diversidad biológica debido a su variación topográfica, su compleja fisiografía, y su situación latitudinal, ya que es la región más norteña del cinturón tropical. Este trabajo toma en cuenta los cambios ocasionados por el hombre, como la tala inmoderada de la selva, uso de agroquímicos en cultivos, insecticidas, desechos industriales, descargas de aguas negras que son los principales causantes del impacto en los ríos y por ende de la composición íctica, la importancia de los peces recae en que sirven como indicadores biológicos de contaminantes y/o metales pesados. El presente trabajo tiene como objetivo detectar los cambios que se han dado a través de más de 20 años a la fecha en la composición íctica presente en la zona de la Planicie Costera del Estado de Chiapas y sus posibles causas. Se realizaron dos viajes a la Planicie Costera del Pacífico en el Estado de Chiapas, México; en total se muestrearon 24 localidades determinadas con anterioridad y tomadas de coletas realizadas en los años 1981 y 1985. Se obtuvieron un total de 14,470 ejemplares, en 451 lotes de 60 colectas en 24 localidades. Se encontraron 23 especies repartidas en 20 géneros y 11 familias. Se encontró que la ictiofauna de la costa de Chiapas ha sufrido cambios en su composición debido a la alteración del medio en donde se encuentra, estas alteraciones han sido mayormente de tipo antropogénicas, aunque se han visto afectados los entornos por causas naturales como los fenómenos meteorológicos.

145 OCEANIC DISPERSAL OF THE SEAGRASS *THALASSIA TESTUDINUM* AND ITS CONSEQUENCES FOR GENETIC STRUCTURING AND DIVERSITY.

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The fruits of the seagrass *Thalassia testudinum* either open *in situ* when still attached to the mother plant (providing a mechanism of propagule retention) or detach breaking the pedicel and float to the surface, to be transported over long distances by oceanic currents. To describe the seed dispersal curve, > 100 female flowers or young fruits were marked in March and April, in the Puerto Morelos reef lagoon, Mexican Caribbean, and the fruits which dehisced *in situ* (indicated by open pericarp) or became detached (indicated by broken pedicel) were registered. In September and October, mature fruits were collected, placed in mesh cages in the sea, and flotation time was established. Potential displacement of floating fruits was determined by following 50 physical models of the fruits, released at a fixed point in the reef lagoon, and their position was followed during several hours. Displacement of the models was then related to wind regimes and currents which were determined with a neutral floating body. More than 95% of the fruits dehisced within the bed or displaced over short distances (kms), but a small percentage potentially traveled between 852 and 1184 km. Studies of population genetics integrate dispersal potential with fixation of the genes in the population, and present thus an overall picture of long-term population connectivity. Twenty populations (N sample 30 or 36) between 150 and 4296 km apart were collected in the Greater Caribbean and the Gulf of Mexico. Six polymorphic microsatellites loci were screened and AMOVA analysis revealed low overall population differentiation ( $F_{ST}=0.199$ ), indicating a significant but very low genetic structure of this species through-

out its whole distribution area. An isolation by Distance (IBD) test revealed a random relationship between genetic and geographical distance. These results together suggest that populations of this species are highly connected, generated by infrequent seed transport over large distances by currents. Local coastal transport of seeds ensures further homogenization of the populations. Laguna Madre is a special case. The seaward barrier inhibits free gene exchange with the Gulf of Mexico, and most likely populations went through a genetic bottleneck, or the lagoon was relatively recently colonized by few genetic individuals, resulting in an overall genetically poor population, with low allelic richness (2.0-2.9: overall mean value: 4.6). However, clonal diversity was high indicating high rates of seed production and seedling establishment.

- 309 PRODUCTION AND BIOMASS DYNAMICS OF THE SEAGRASS, *HALODULE WRIGHTII* IN THE LOWER LAGUNA MADRE, TEXAS. Priscilla Requenez\*, Hudson DeYoe and Joseph Kowalski. Center for Subtropical Studies and Biology Dept, University of Texas–Pan American, Edinburg, TX.

To assess the health of *Halodule wrightii*, we monitored its biomass and growth in May and September 2007 at four sites in the Lower Laguna Madre that vary in water quality and sediment composition. The site with the highest nutrient levels was Green Island, near the Arroyo Colorado, a eutrophic waterway while the site with the lowest nutrient levels was Franke West. The remaining sites, Bay West and South Bay had intermediate nutrient levels. During each sampling event, core samples were collected for biomass and production (leaf clip method). Total biomass was not significantly different between seasons except for Bay West, but this result was likely an artifact of changing sample sites. Root to shoot ratio (RSR) was higher at Bay West and Franke West in September while at South Bay and Green Island there was not a seasonal difference. RSR was lowest at Green Island (<2) compared to the other locations. Areal shoot production except for South Bay was higher in September than May (0.6 vs 0.3 mg DW m<sup>-2</sup> day<sup>-1</sup>) and shoot production was similar in September at all sites except Franke West. May shoot production was greatest at South Bay. Leaf elongation rates did not differ between seasons (1.84 vs 1.89 mm day<sup>-1</sup>) but were highest in September at Green Island (3.28 mm day<sup>-1</sup>). Overall, the sites were not dramatically different from each other but there was an indication that *Halodule* at Green Island was light-limited, perhaps due to the influence of the Arroyo Colorado.

- 276 NUTRIENT LIMITATION AND PRODUCTIVITY OF PHYTOPLANKTON IN THE LOWER LAGUNA MADRE, TEXAS. Natasha Pardo and Hudson DeYoe, Center for Subtropical Studies and Biology Dept, University of Texas–Pan American, Edinburg, TX.

The Lower Laguna Madre is a relatively pristine subtropical lagoon in south Texas dominated by seagrass. Significant nutrient inputs from the most eutrophic waterway in Texas, the Arroyo Colorado, may be detrimental to this ecosystem. The fate of these nutrients is uncertain but is likely to stimulate productivity of phytoplankton in portions of the lagoon. The goal of this year-long project is to determine which nutrient, nitrogen (N) or phosphorus (P), limit growth at three lagoon sites that differ in nutrient level: high (GI), medium (BW) and low (AB). Field assays were conducted in June and August 2007. At each site, four nutrient treatments (control, N, P, and N+P) were applied to 20-liter carboys of screened lagoon water. After one day of incubation, photosynthetic production (light/dark bottle method) was measured while biomass accrual (chlorophyll a) was measured after one day and 3 or 4 days of incubation. In June, a stimulatory effect of nutrient addition on net primary productivity was seen at BW (P) and GI (N or N+P)(p<0.001, both). In August, a stimulatory effect of nutrient addition on net primary productivity was seen at AB (N) and GI (N)(p<0.05, both). At AB and BW, N+P resulted in higher chlorophyll levels (p<0.05) except in one instance. At GI, there was a stimulatory effect of N in June (p<0.01) but not August. At no location was P considered limiting.

- 25 THE ROLE OF FINE SCALE MOVEMENT PATTERNS AND GROWTH RATE MEASUREMENTS IN IDENTIFYING FISH NURSERY HABITATS IN ESTUARINE SYSTEMS. Sharon Z. Herzka\*, Department of Biological Oceanography, Center for Scientific Research and Higher Education of Ensenada (CICESE), Baja California, Mexico.

Estuaries function as high-quality nursery habitat for many marine fish species. In a review of the assessment of nursery habitats within estuarine systems, Beck et al. (2001) proposed that for management purposes, nursery habitat quality should be evaluated based on their relative contributions to adult populations. Testing the 'nursery habitat hypothesis' requires evaluating abundance, growth and mortality and quantifying recruitment to adult populations. In this context,

habitats with higher juvenile densities, lower mortality rates and/or that can sustain faster growth can potentially provide more recruits to adult populations. However, one important consideration is whether abundance, growth and mortality estimates derived from point measurements truly reflect local patterns of habitat utilization. The latter implies identifying the spatial and temporal scales over which the movement of juveniles occurs, and evaluating the connectivity among habitats within an estuary. Recently, my collaborators and I have applied a suite of techniques to examining movement and patterns of habitat utilization in California halibut (*Paralichthys californicus*). During the juvenile stage, California halibut can inhabit estuarine or coastal habitats, while they are primarily found in coastal waters as adults. Our model system, the Punta Banda Estuary in Baja California, Mexico, is a relatively unmodified estuary located in a seasonally arid region similar in some respects to the Texas coast. During the course of our studies, we reconstructed the movement patterns of individual juveniles over fine spatial and temporal scales using otolith elemental analysis and mark-recapture experiments. In addition, we have measured the recent growth rates of wild-caught and caged juveniles in different areas and environmental conditions using otolith microstructural analysis. Lastly, we have used isotopic analysis (carbon and nitrogen) of soft tissues and otolith growth rates to determine if estuarine residents exhibit higher growth rates than coastal residents. I will present our results within the context of identifying estuarine nursery habitats of marine fishes. This work contributes to the understanding of the relationship between growth rates, environmental conditions, movement and habitat utilization patterns of California halibut and other species that use estuaries during the juvenile stage.

294 DELINEATING SEAGRASS LANDSCAPE INDICATORS OF DISTURBANCE USING HIGH RESOLUTION DIGITAL AERIAL PHOTOGRAPHY.

Warren Pulich\*, Jr., Texas State University, San Marcos, TX, Reginald S. Fletcher, USDA-ARS, Weslaco, TX, Beau Hardegree, USFWS, Corpus Christi, TX.

Management of coastal seagrass habitats requires broad scale monitoring to assess status and trend dynamics of seagrass beds and to detect impacts from human activities and natural disturbance processes. Photointerpretation of 1:24,000 scale, natural color aerial photography has traditionally been used for mapping seagrass beds, but in recent years, mapping problems have been identified which stem from analyst error and the minimum mapping unit resolvable with this mapping technique. In addition, the lack of resolution and cost of most satellite imagery precludes using such sensors. Semi-automated digital analysis techniques are now being developed based on high-resolution color aerial photography (1:9,600 scale) to determine landscape indicators of disturbance in seagrass beds. A recent method relies on RGB to Intensity-Hue-Saturation (IHS) color space transformation to automate the spectral analysis process. Previous work has dealt with developing the basic RGB to IHS technique and its application to delineating unvegetated landscape features (e.g. bare patches) using the saturation and intensity band images. This paper evaluates the spectral analysis and GIS techniques used to quantify bare and vegetated features (seagrass and macroalgae) in typical seagrass beds in Coastal Bend of Texas. Results are presented on pixel thresholding, classification and masking techniques, and raster to vector data conversion used to produce landscape metrics that quantify seagrass disturbances.

126 THE EFFECT OF SCARRING INTENSITY ON SEAGRASS GENETIC VARIATION IN A SINGLE BAY SYSTEM.

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Habitat fragmentation and destruction pose a significant threat to the stability of ecosystems throughout the world. Habitat fragmentation can lead to population isolation, which from a genetic perspective can result in reduced gene flow, increased inbreeding, and lower population viability. This study was undertaken to examine the influence of one form of habitat fragmentation, boat propeller scarring, on seagrass genetic variation in a single bay system. We used an Amplified restriction Fragment Length Polymorphism (AFLP) assay to measure genetic diversity at six replicate sites, representing four distinct scarring intensities: reference (0%), low (5% or less), moderate (5-15%), and severe (>15%). Although we found severely scarred sites to have the lowest mean percentage of polymorphic markers ( $P$ ) and heterozygosity ( $H_e$ ), scarring intensity by itself was not significant for explaining genetic variation within the dataset. A significant proportion of the variation (17%), however, was attributed to differences among sampling sites, an indication of genetic structuring on a relatively small (~30 km<sup>2</sup>) scale.

- 36 EVALUATION OF REGULATORY PROTECTION OF SEAGRASSES IN THE REDFISH BAY STATE SCIENTIFIC AREA, TEXAS.  
Dennis Pridgen\*, Perry Trial, Faye Grubbs, and Mark Fisher, Rockport Marine Laboratory, Texas Parks and Wildlife Department, Rockport, TX.

In the 1990s, it was recognized that propeller scars left by boaters were causing damage to seagrass beds in the Redfish Bay State Scientific Area (RBSSA) located in Aransas and Corpus Christi bays, Texas. Initial efforts to address the problem through education, outreach, and the establishment of voluntary no-prop zones, were largely unsuccessful. In May 2006, a regulation went into effect which prohibits the uprooting of seagrasses by submerged propellers within the RBSSA. As part of an effort to evaluate the efficacy of the new regulation, baseline data were collected along 35 randomly-selected 100 m transects in the RBSSA from August-September in 2005. In 2006, sampling criteria were refined, resulting in 15 of the original transects being dropped from the sampling frame while 15 new transects were added. These 35 transects were sampled from August-October in 2006 and 2007. The total number of propeller scars on each transect was recorded, and qualitative as well as quantitative information was collected on each scar. In 2007, the locations along transects of scars detected in 2006 were re-examined to evaluate scar recovery. Following enactment of the regulation we found a 69% reduction in total scars (highly significant  $P < 0.0001$ ). In addition, prop scars in the area appear to recover at a much more rapid rate than what has been reported in the literature. Of 97 scars observed in 2006, 91 were considered recovered by 2007.

- 143 IMPACTS OF INVASIVE FISH SPECIES ON NATIVE FISH COMMUNITIES FOUND IN COASTAL TRIBUTARIES.  
Dianna Ramirez\* and George Guillen, University of Houston Clear Lake, Environmental Institute of Houston, Houston, TX.

During September 2004 through October 2006 we conducted surveys in selected first and second order tributaries of the Clear Lake watershed in Galveston Bay, Texas. Fish community data were collected using backpack electroshocking gear and seines. The two major objectives of our study were to 1) examine the relationship between water quality and invasive fish species and 2) examine the relationship between invasive fish and native fish by comparing invasive fish abundance & native fish abundance. Our first hypothesis was that invasive fish species are found in higher numbers in degraded versus minimally impacted streams. Our second hypothesis was that native fish communities have been altered in areas containing invasive fish species in comparison to areas without invasive fish. Results of our survey and comparisons with past data suggest that native "exotics" such as the Rio Grande Cichlid, *Cichlasoma cyanoguttatum*, have invaded and extended their range within the watershed, and have become numerically dominant in some waterbodies. Native sunfish diversity has declined in many waterbodies invaded by Rio Grande Cichlids and other exotic species including, tilapia *Oreochromis niloticus* and sucker-mouth catfish *Pterygoplichthys* spp. Our data suggests that the ecologically similar cichlids are having greater effects on centrarchids, in comparison to overall fish community structure. High conductivity seems to be correlated with increased number of invasive cichlids. Possible sources include ongoing introductions by tropical fish hobbyists and downstream invasion through low salinity bay systems. The probability is high for widespread invasion of these species into other portions of southeastern Texas and Louisiana coastal streams, due to their tolerance to low salinity water.

- 295 IMAGING, QUANTIFICATION AND COMPARISON OF SEAGRASS EPIPHYTES.  
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There is concern for the general decline in seagrass stands observed in many coastal areas. Anthropogenic impacts are currently being assessed by numerous researchers. It is generally believed that anthropogenic nutrients may lead to excessive growth of epiphytic biofilms of algae and other organisms on the seagrass blades, ultimately shading the leaf to a degree that photosynthetic productivity declines. However, these biofilms present complex physical and chemical environments, with a high degree of spatiotemporal variation in both the biofilm and the seagrass leaf. A fluorescence-based imaging protocol is being developed to enhance the characterization and quantification of epiphytes. Digital imaging will allow quantification of total leaf area of a seagrass blade or the entire ramet, % coverage by epiphytes, and a comparison of total loads. This technique can distinguish loading differences between younger and older blades, or along the age gradient of a single leaf. This type of data should be useful for modeling epiphyte-seagrass dynamics and, ultimately, a better understanding of the impacts of epiphytic growth.



- 297 BENTHIC MAPPING IN THE TEXAS COASTAL BEND TO SUPPORT SEAGRASS MONITORING AND TREND ANALYSIS.  
James Simons\*, Texas Parks and Wildlife Department, Corpus Christi, TX, Mark Finkbeiner, NOAA Coastal Services Center, Charleston, SC, John Wood, Texas A&M University–Corpus Christi, Corpus Christi, TX, Bill Stevenson, NOAA Coastal Services Center, Charleston, SC.

The Texas Parks and Wildlife Department (TPWD) and Texas A&M University (TAMU) – Corpus Christi, in partnership with the NOAA Coastal Services Center have been using airborne digital multi-spectral imagery to map seagrass, oyster reefs, and other shallow benthic communities in the Texas Coastal Bend (San Antonio Bay to the Lower Laguna Madre). Semi-automated, rule-based processes were used to develop the map, capturing habitat areas as small as 100m<sup>2</sup> with high detail and accuracy. Patchy habitats are specifically identified, and can be used to identify areas where habitat may be expanding or disappearing. These data will support the Texas Seagrass Monitoring Plan, and will both complement and augment a concurrent effort by TAMU - Galveston and TPWD using sidescan sonar and subbottom profiler technology to map oyster reefs and benthic habitats in primary, secondary and tertiary bays of Texas. All of these spatial habitat data sets, together with supplementary research on food webs and community structure, will further our understanding of the inter-connectivity of these important habitats.

- 327 MARINE AND COASTAL BIRDS OF THE GULF OF MEXICO: THEIR STATUS AND THREATS.

AVES MARINAS Y COSTERAS DEL GOLFO DE MÉXICO. ESTATUS Y AMENAZAS.

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Data is presented on the status of protection and diet of the species of aquatic and coastal birds of the Gulf of Mexico. 162 species are reported in 27 families that represent 16% of the birds of the country. Of these species, 10 are feed only on fish that represent 6.1%, one that feeds on insects and one from crustaceans that represent between the two of them 1.2%, while 92.7% use a combination of various items, and also change in diet according to the climatic station. Almost 15% of the species are found under some status of protection under the 4 that are established by the NOM-059-ECOL-2001, such that species in danger of extinction are 7 (4.3%), threatened 6 (3.7%), and under special protection 11 (6.7%). It should be noted that it is possible that many more are in a vulnerable position because of contamination, hunting, and the anthropogenic activities caused by the growth of the human population on the coasts.

Se presenta información sobre el estatus de protección y la dieta de las especies de aves acuáticas y costeras del Golfo de México. Se reportan 162 especies en 27 familias que representan el 16% de las aves del país. De las especies, 10 se alimentan solo de peces que representa el 6.1%, una que se alimenta de insectos y una de crustáceos que representan entre ambas el 1.2%, el 92.7% utiliza una combinación de varios ítems, inclusive existen cambios en la dieta, según la estación climática. Casi la quinta parte (14.8%) de las especies se encuentran bajo algún tipo de estatus de protección dentro de los 4 que establece la NOM-059-ECOL-2001, tal que: especies en Peligro de extinción son 7(4.3%), Amenazadas 6(3.7%), y Protección especial 11(6.7%). Cabe destacar que posiblemente otro tanto este en posición vulnerable por la contaminación, la cacería, y las actividades antropogénicas debido al crecimiento de la población humana en las costas.

- 283 PRODUCTION AND BIOMASS DYNAMICS OF THE SEAGRASS, *THALASSIA TESTUDINUM* IN THE LOWER LAGUNA MADRE, TEXAS.

Hudson DeYoe\* and Joseph Kowalski. Center for Subtropical Studies and Biology Dept, University of Texas–Pan American, Edinburg, TX.

*Thalassia testudinum* is an important component of seagrass communities in the Lower Laguna Madre, a subtropical lagoon along south Texas coast. Water and pore water quality in the lagoon varies spatially due to terrestrial influences, sediment features and geomorphology. It is anticipated that the biomass and performance of *Thalassia* varies in concert with the site characteristics. To evaluate this hypothesis, a 1-year study of *Thalassia* production and biomass dynamics was initiated. During the study, water and sediment quality, *Thalassia* biomass and leaf production were measured at four locations that varied from low to high nutrients (A, B, S, G, respectively). Biomass (esp. rhizomes) was higher at the two locations (A and B) which typically had lower water column nutrients and high water clarity. Shoot density was also higher at these locations.

The site with the lowest shoot density (G) had the highest water column nutrient levels. At site A, the root to shoot ratio (RSR) was high, suggesting that the population relies on sediment nutrients. At site G, RSR was low, suggesting light limitation. Shoot production was highest at the lowest nutrient site (A) and lowest at the high nutrient site (G), but the reverse was true for leaf elongation suggesting light was adequate at site A while limiting at site G. Typically, *Thalassia* biomass and production at all sites were lowest in winter or spring and highest in summer or fall. At site G which is influenced by the Arroyo Colorado, *Thalassia* may be stressed due to light limitation.

## FRESHWATER AND MARINE SCIENCE

- 155 DISTRIBUTION OF ADULT BLUE CRABS (*CALLINECTUS SAPIDUS*) ALONG A SALINITY GRADIENT IN THE NUECES ESTUARY, TEXAS.

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Adult blue crabs (*Callinectes sapidus*) were sampled for one year (November 2006 to November 2007) in the Nueces Estuary, Texas to explore sex ratios, size ranges and abundance of crabs along a salinity gradient. Salinity (psu) ranges of the gradient were 0-3, 4-10, 11-17, 18-24, and 25+. Crabs were caught using commercial crab traps, counted, sexed, measured, and tagged using Visible Implant Elastomere (VIE) tags. There were significant differences in crab sizes with regard to sex, salinity, and month but no significant interactions. In all salinity zones, males outnumbered females, often by a considerable margin. Crab catch numbers were low until significant rainfall (58 cm) in the late July and early August reduced salinity throughout the system. Numbers of crabs caught increased greatly then declined when the salinity gradient re-established itself in late September. Only one recapture occurred. These results suggest that crab sizes, numbers and activity are greater at lower salinities and that the sex ratio in the system is male-dominated.

- 286 FEEDING ECOLOGY OF THE MOLE CRAB (*EMERITA*) ON TEXAS BEACHES.

Felicia Farquhar\*, David Hicks, and Eric Linder. The University of Texas at Brownsville, Brownsville, TX.

Mole crabs of the genus *Emerita* (Hippidae) are a common constituent of beach intertidal swash zone communities worldwide and therefore are often used as bio-indicators for monitoring coastal environments. Mole crabs feed by using their second antennae to capture particulate organic matter suspended in the water column by breaking waves. This study examines the feeding behavior and rate of particle capture by *Emerita* under laboratory conditions when offered six algal diets. Specifically, we examined efficiency of particle removal over a range of particle concentrations and sizes ranging 2-11 $\mu$ m. The results are discussed in relation to intertidal beach community ecology and impact assessment of beach management practices.

- 253 TOP-DOWN EFFECTS ON THE RECRUITMENT OF EASTERN OYSTERS (*CRASSOSTREA VIRGINICA*) IN ST. CHARLES BAY, NUECES BAY, ARANSAS BAY, AND MESQUITE BAY.

Keith D. Johnson\* and Delbert L. Smee, Texas A&M University-Corpus Christi, Corpus Christi, TX.

We investigated the importance of predation in structuring oyster reef communities from May – October 2007 in four Texas Bays. We created artificial oyster reefs by placing 30 live adult oysters in small plastic baskets on top of a layer of oyster shell. We investigated the effects of predators by excluding predators from the baskets via cages. Baskets were deployed in each site in groups of 4: control, a full predator exclusion using vexar mesh, and two partial predator exclusions to control for caging artifacts (side only or top only covering with vexar). After 5 months, we recovered the baskets and counted the number of live oysters, the number of recruited oysters, and the occurrence and diversity of fish and smaller crabs present in each basket. Species richness and abundance were compared between caging treatments. Significantly more juvenile oyster recruits were found in the full predator exclusion cages. Results from mesocosm studies suggest that a trophic cascade occurs on oyster reefs whereby large predators consume small crabs which consume juvenile oysters. Thus, excluding top predators decreased juvenile oyster survival via increasing predation on juvenile oysters by intermediate crab predators. Our findings suggest that complex trophic interactions on oyster reefs, including feeding at multiple trophic levels by some fishes and crabs, may dampen the trophic cascades seen in mesocosms. Furthermore, we detected a significant difference in the associated reef organisms between predator exclusion cages and controls, suggesting that top-down forces play an important role in structuring oyster reef communities.

- 58 FEMALES CONTROL MALE MATING VIA RESISTANCE IN THE WESTERN MOSQUITOFISH, *GAMBUSIA AFFINIS*.  
P. Raelynn Deaton\*, Department of Biological Sciences, Sam Houston State University, Huntsville, TX, Ricky Cothran, Department of Zoology, University of Oklahoma, Norman, OK, and Chad Hargrave, Department of Biological Sciences, Sam Houston State University, Huntsville, TX.

It is becoming increasingly clear that sexual coercion plays an important role in the evolution of mating systems, particularly in the livebearing mosquitofishes. Although some studies have suggested that female mosquitofish exhibit mate choice, the extent to which females are choosy remains unknown. Studies have suggested that females exert mate choice via resistance, rather than overt female choice, suggesting a role for sexual conflict. In this study, we investigated the role of female resistance in mate choice in the western mosquitofish, *Gambusia affinis*. We asked whether females have control over mating, and if so, to what extent? We manipulated female resistance by temporarily sedating females with clove oil, and measured the number of mating attempts by males across three treatments: pre-sedation (day 1), sedation (day 2), and post-sedation (day 3). We manipulated male condition (based on fat stores) by feeding some males on a low quality diet (algae) and some on a high quality diet (commercial flake food) in order to test whether females resist low quality males at higher rates than high quality males. A Two-Way Repeated Measures ANOVA showed that males do increase their mating attempts toward females when females are sedated, but male diet did not affect the number of mating attempts by males. The results supported our prediction that male mating activity is highest in the sedation treatment when female resistance is reduced. These findings support our hypothesis that females to have some level of control in the *Gambusia* mating system via resistance to coercive males.

- 183 DOES FEMALE RESISTANCE INTERACT WITH MALE SIZE TO AFFECT MALE MATING SUCCESS IN THE WESTERN MOSQUITOFISH (*GAMBUSIA AFFINIS*)?  
Chris Kroll\*, Wes Farris, and Raelynn Deaton. Department of Biological Sciences, Sam Houston State University, Huntsville, TX.

Livebearing mosquitofishes are an ideal model system for studies in sexual conflict because males use sexual coercion as their primary means for mating. Recent studies show that females significantly control male mating and that male size is an important factor for male mating success in the western mosquitofish. In two behavioral studies (non-competition and competition), we asked whether female resistance interacts with male body size to affect male mating success. We reduced female resistance by sedating females in clove oil and tested male mating behavior across three treatments (Day 1 = pre-sedation; Day 2 = sedation; and Day 3 = post sedation control). In a non-competition experiment, we tested the prediction that smaller males would increase their mating attempts toward sedated females at higher rates than larger males. When males of varying size compete, however, we predicted that large males would totally out-compete smaller males for mates when females were sedated. In both experiments, we found that males of all sizes increased mating attempts when female resistance was reduced. Smaller males increased their mating attempts at a higher rate than large males when females were sedated, supporting our prediction. In our competition study, however, smaller males mated at equal rates to large males on Days 1 and 2 (pre-sedation and sedation), but significantly more than large males on Day 3 (post-sedation). These results were surprising, but suggest that when female resistance is reduced, female choice via resistance may be a more important predictor of male mating success than male-male competition.

- 175 EFFECTS OF TEMPERATURE AND BODY SIZE ON MALE MATING BEHAVIOR IN THE WESTERN MOSQUITOFISH, *GAMBUSIA AFFINIS*.  
Jason Randall\* and Raelynn Deaton, Department of Biological Sciences, Sam Houston State University, Huntsville, TX.

In fishes exposed to extreme environmental fluctuations (e.g. mosquitofishes), temperature can have direct effects on fitness by reducing or increasing mating behaviors. Wilson (2005) showed that temperature affected mating behavior in a tropical population of the eastern mosquitofish, *Gambusia holbrooki*, and males mated optimally between 22-26°C. In this study, we investigated the effects of varying temperatures (23°, 26°, 29°, 32°, 35°C) on male mating behavior in the western mosquitofish, *Gambusia affinis*, in a Texas population frequently exposed to extreme thermal fluctuations. In addition, we tested whether male size interacts with temperature to affect male mating and/or aggressive behaviors. In two separate experiments (non-competition and competition), we tested whether (1) male mating behavior is highest at mid-range temperatures (approximately 28°C; based on pilot studies); and (2) larger males mate more than smaller males in sub-optimal temperatures (23° and 35°C), possibly because large males have lower mass-specific metabolic rates. In both experiments, males showed no difference in mating behavior across temperature treatments. Relative, but not absolute, male size was an

important predictor of both male mating and male aggressive behaviors, which supports other studies (Hughes, 1985; Deaton, in press). Our results show variation in male mating behaviors across all temperatures tested and we found no interaction between male size and mating across at any temperature tested, suggesting that mosquitofish in our study population may not have been exposed to sub-optimal temperatures. Our results also suggest that mating behavior in relation to temperature in mosquitofishes varies across both species and populations.

29 SEAGRASS INVENTORY FOR CHRISTMAS BAY.

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Seagrass in the Galveston Bay system had almost entirely disappeared by the late 1970s due to anthropogenic activities. We repeated a 1998-1999 study of seagrass coverage in Christmas Bay and Drum Bay in 2005 - 2006 to determine whether any changes in acreage, patchiness, distribution or species composition had occurred over the past six years. Aerial photographs were taken in December 2005 and groundtruthed using ArcGIS in October to December 2006 and then compared to GIS maps from 1998 to determine seagrass trends. Groundtruthing consisted of using the 92 GPS points from the previous study and taking three 4-inch core samples to determine seagrass species present at each site. Total seagrass coverage for Christmas and Drum Bay based on the 2005 aerial photographs was 436.6 and 32.1 acres of mixed shoalgrass and clovergrass beds, respectively. Drum Bay groundtruthing sites in 1999 contained shoalgrass and clovergrass, but only shoalgrass in 2006. However, visual observations determined there was clovergrass present between those sites in 2006. Widgeongrass was not present at any groundtruthing point in 2006 or in the bays. Available water quality data was too limited to determine if seasonal changes were the cause of the absence of widgeongrass in 2006. Turtlegrass patches increased in number and the acreage almost doubled (from 1.6 to 2.8 acres). Compared to the 1998 study there were more turtlegrass patches but they were smaller in size. Seagrass in Christmas and Drum Bay appear to be slightly increasing and healthy.

339 RELATIONSHIP BETWEEN SEX RATIO AND SHELL LENGTH OF OYSTERS IN TEXAS BAYS.

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The purpose of this study was to examine the relationship between sex ratio and shell length for the eastern oyster, *Crassostrea virginica*. Previous research has indicated that *C. virginica* are able to undergo a change of sex from early life to full maturity. The general knowledge is that small oysters are predominantly male, while larger oysters are predominantly female (protandry). In order to examine sex ratios in Texas Bays, oysters were collected monthly starting in October, 2006, from 10 randomly selected stations on known reefs throughout the Mission-Aransas Estuary. Gonadal tissues from 10 large and 10 small oysters per station (20 total) were examined in the laboratory. During the months of November and December, gonadal material was not present in any of the oysters sampled. During the months when gonadal material was present, our preliminary results suggest that although *C. virginica* are able to undergo sex-metamorphosis, the generally predicted sex ratios did not always occur.

319 HEAVY METALS: Cu AND Zn IN THE PACIFIC OYSTER *CRASSOSTREA GIGAS* IN TWO SUSPENSION CULTURES (LONG LINE) IN LA PITAHAYA, GUASAVE AND LA CURVINA, AHOME, SINALOA ESTUARIES.

Ana Laura Domínguez Orozco\*, Andrés Martín Góngora Gómez, Genaro Diarte Plata, Ana Luisa Leal Sepúlveda. Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional - IPN - Unidad Sinaloa. Blvd. Juan de Dios Batiz Paredes # 250, Guasave, Sinaloa, México.

The concentration and variation of copper and zinc was determined during the dry and wet season in La Pitahaya, Guasave and La Curvina, Ahome estuaries, where two suspension cultures (long line) of Japanese Oyster *Crassostrea gigas* were established in the period of November 2004 to August 2005. Thirty organisms were taken to quantify the concentration of heavy metal, copper and zinc, in *C. gigas* during the dry and wet season. Morphometric measures (length, long and width), dissection was performed with a bistouries, the weight with and without the shell was determined, the tissue was dried in an oven at <60 °C, once dried, were grated with a mortar and the digestions were made with HNO<sub>3</sub> acid with Maria bath at 90 °C. Duplicates and targets were made and Standard Reference Material 1566b for oysters was used. The digestion readings were taken with an atomic absorption spectrometer GBC. The average concentrations for the dry season in La Pitahaya estuary and La Curvina were: Zn (217.33 mg/Kg, 184.8 mg/Kg) and Cu (71.12 mg/Kg, 41.77 mg/Kg),

respectively. During the wet season for the La Pitahaya and La Curvina, the average concentrations recorded were: Zn (324.26 mg/Kg, 269.16 mg/Kg) and Cu (130.43, 66.23 mg/Kg) respectively. The results suggest that the heavy metal concentrations appear to depend on the precipitation, runoff from the land occupied carrying fertilizers and the pesticides from the agricultural sector.

215 ENVIRONMENTAL EFFECTS ON SEAGRASS SUCCESSION.

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Seagrass beds follow a linear successional series where shoal grass (*Halodule wrightii*) is replaced by manatee grass (*Syringodium filiforme*) and finally by turtle grass (*Thalassia testudinum*). I investigated two study sites that differ in the expected successional series described above: Corpus Christi Bay (seagrass species make-up remained relatively constant for the past 20 years) and the Laguna Madre (manatee grass is slowly replacing shoal grass) to determine how environmental conditions affect seagrass succession. Early results indicate that abiotic conditions, particularly salinity and turbidity are drastically different between my study sites, with these conditions being significantly higher in the Laguna Madre. Furthermore, abiotic conditions are more static in the Laguna Madre but fluctuate daily in Corpus Christi Bay, which may favor the competitive abilities of manatee grass. Epiphyte loads were also significantly higher in Corpus Christi Bay, which may favor shoal grass as its smaller, shorter blades may not be as susceptible to fouling as the taller and broader stems of manatee grass. Preliminary results suggest that shoal grass growth rates are relatively constant between both study sites, and these values are similar to earlier published works. Manatee grass, however, grew significantly less in Corpus Christi Bay, possibly due to the fluctuating abiotic conditions and higher epiphyte loads, both of which may affect its ability to competitively displace shoal grass in that site. These early results suggest that environmental context can have large impacts on seagrass succession.

168 HATCHING OF THE FIGHTING CONCH *STROMBUS PUGILIS* (LINNAEUS, 1758) BASED ON EARLY LIFE STUDIES AT DIFFERENT TEMPERATURES.

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The fighting conch *Strombus pugilis* (Linnaeus, 1758) is an economically important species in Mexican fisheries because of its use as a direct food source and for fishermen's income revenue. Yet, this species faces a heavy catching pressure as the use of other conch species is presently banned in México. Mariculture has been proposed as productive option that also helps natural recruitment and artificial translocation, and thus protects the species as a future food resource. Mariculture, however, still presents several technical constraints that require further investigation. Increasing *Strombus pugilis* productivity partly depends on identifying important environmental factors that regulate development on its early embryological stages (e.g. temperature). Actually, the initial processes that determine cell lineages have been considered key aspects on future egg development, and thermal variations of water often determine growth and mortality rates as in other invertebrate larvae species growing in benthic environments. The aims of this study were to determine the effects of different water temperatures on the early embryological stages of *S. pugilis* as identified by morphological and behavioral egg changes up to its hatching. This is the first description of the embryonic stage of this species in the Caribbean. The morphological characteristics are similar from those of the trochophore previously described for the same species in the Atlantic.

226 EFFECTS OF OPERATIONAL SEX RATIO AND DENSITY ON FEMALE FORAGING IN THE WESTERN MOSQUITOFISH, *GAMBUISA AFFINIS*.

Stacy Stoops\* and Raelynn Deaton, Department of Biological Sciences, Sam Houston State University, Huntsville, TX

Operational sex ratio (OSR) can influence male-male competition, male-female interactions, and female fitness. However, the mechanisms by which these effects occur are largely unexplored. We investigated the effects of OSR and density on female foraging in the western mosquitofish. We tested whether reductions in female fitness are due to decreased foraging via competition for food. We predicted that intra-sexual competition for food would be greater than inter-sexual competition. In a six-week experiment, we varied both sex ratio [0:1 (female control), 1:1, 1:3, 3:1] and density (4 and 8). After six weeks, we measured female growth rate (changes in female mass and length), female condition (residuals of length-weight regressions) and coefficient of variation in female condition (CV). Female growth rate (mass) varied across density, but not across sex ratio. Female condition varied with sex ratio but not with density. CV in condition was highest in all-female control treatments in the high-density treatment. Following the experiment, we conducted a behavioral study to examine intra-

and inter-sexual competition for food, male mating behavior and male harassment (chasing females) during two feeding intervals (pre- and post-feeding). Female-female aggression (chasing and fighting for food) significantly increased during feeding, but sexual coercion by males was significantly reduced during feeding. Our results support that both sex ratio and density contribute to overall female fitness, and that competition for food is a likely mechanism by which female experience decreased fitness in groups.

150 GLOBAL WARMING AFFECTS NUTRIENT DYNAMICS IN SMALL HEADWATER STREAMS.

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Predicting the effects of global warming on ecosystem functioning is perhaps one of the most important challenges currently facing ecosystem ecologists. This question has been well studied in terrestrial ecosystems. However, the effects of elevated temperature on aquatic ecosystems have received much less attention. Fishes are important consumers in aquatic ecosystems and affect many ecosystem functions (e.g., nutrient dynamics). Because fishes are ectothermic and nutrient excretion rates are a function of metabolic pathways, we predicted that increased water temperatures resulting from global warming could affect the nutrient dynamics of aquatic ecosystems by altering fish-mediated nutrient effects. In this study, we tested this hypothesis by constructing population-level excretion rate models for a fish community in a small headwater stream. Our results suggest that global warming can increase nutrient cycling and nutrient flux in aquatic ecosystems. We believe that this effect will, in part, be mediated by the direct effects of elevated temperature on the physiological processes of fishes. However, the effects of increasing temperature on consumer-mediated nutrient dynamics did not occur proportionately across seasons or years. Rather, our models suggest that the effects of global warming on nutrient dynamics in aquatic ecosystems might be of greatest magnitude during cooler seasons. Thus, because fishes are important consumers in aquatic ecosystems, converting food resources into soluble nutrients available for microbial and autotrophic production, elevated temperatures might indirectly affect primary productivity and decomposition through bottom up pathways. These effects could feedback on ecosystem functioning, causing dynamic ecosystem change in response to elevated temperatures.

136 DIRECT AND INDIRECT EFFECTS OF FISHES ON LEAF LITTER DECOMPOSITION.

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In small headwater stream ecosystems, detrital input from the riparian zone (e.g., leaves) often serves as the primary source of energy driving secondary production. In these ecosystems, rates of detrital decomposition can directly affect consumer abundance and biomass. As a result, ecosystem properties that regulate decomposition (e.g., nutrient availability, detritivore abundance) can have direct or indirect effects on consumer trophic levels. For example, experiments that have increased stream watercolumn nutrients have documented increased rates of microbial respiration and leaf litter decomposition. On the contrary, experiments that reduced detritivore abundance have shown a decrease in rates of leaf litter decomposition. Thus, heterotrophic ecosystem processes and functions (e.g., decomposition) likely are governed by the same top-down and bottom-up processes that regulate autotrophic ecosystems. We tested direct and indirect effects of three fish species from different trophic-functional guilds on leaf litter degradation, benthic chlorophyll-*a*, detritivorous invertebrates and watercolumn nutrients in a 35-day experiment. Each fish species had a positive effect on decomposition despite trophic-functional differences. Our data suggested that the surface and watercolumn insectivorous fishes and the benthic omnivorous fish increased leaf litter decomposition rates via bottom-up and top-down pathways, respectively. Specifically, the surface and watercolumn fishes increased decomposition by stimulating microbial productivity via watercolumn nutrient enrichment. Benthic omnivorous fish caused an increase of detritivorous invertebrates on leaf litter that likely enhanced detritivore consumption of leaf material. This study demonstrated that, much like autotrophic ecosystems, fishes can affect heterotrophic ecosystems via direct and indirect food web interactions.

278 MACROINVERTEBRATE RECOLONIZATION DYNAMICS OF BENTHIC HABITATS IN THE RECENTLY RE-FLOODED BAHIA GRANDE.

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A two-year sampling program was initiated to monitor the development of the benthic community following the July 2005 re-flooding of the Bahia Grande. Benthic habitats were sampled quarterly from 24 randomly selected stations distributed

across the 2,600 hectare basin. Recolonization dynamics of benthic macroinvertebrates were correlated to corresponding variations of salinity over the course of the 24 month survey. During periods of moderate hypersalinity (45-55 ppt), benthic sediments were quickly colonized by nereid, capitellid, and spionid polychaete worms and small benthic crustaceans (corophids, cumaceans, and isopods). However, during periods of extreme hypersalinity (80 to >100 ppt) as a result of prolonged drought, the benthic community becomes dominated by salt tolerant insect larvae (brine fly and midge larvae) and adults (water scavenger beetles). The resultant community after drought reflected similar in composition to the assemblages of wind-tidal flats and coastal evaporative salt ponds. Our findings support the need for future manipulations and enhancement actions for increasing circulation throughout the system, particularly, replacing the 4.5 m wide pilot channel with the proposed 45.7 m wide permanent channel.

- 227 PRE- AND POST- CHANNEL ION CONCENTRATIONS IN THE LAGUNA LARGA AND THE LITTLE LAGUNA MADRE.  
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In June 2007, channels were cut to allow seawater from the Bahia Grande (Cameron Co., TX) to flood the Little Laguna Madre and the Laguna Larga. Water samples were collected from these and related bodies of water in March and July of 2007. Salinities and ion concentrations of these samples provide insight into the nature of these water bodies prior to flooding and initial changes caused by the initial influx of seawater. Total dissolved solids, pH, sodium, chloride, potassium, bromide, magnesium, calcium, sulfate and alkalinity levels were analyzed. Many of the variations in these parameters can be explained by effects of runoff (affected by a number of man made structures) and evaporation. However, the Laguna Larga had substantially greater salinities (>30‰ NaCl) than other locations. Evidence will be presented that suggests that this hypersalinity may be a result of evaporative concentration of brine that is seeping into the Laguna Larga from a gas well blow out crater. The data suggests that the seepage may be enriched in bromide and sulfate and depleted in potassium relative to water samples from the other sources.

- 53 STOCKING DENSITY IN THE CULTURE OF WHITE SHRIMP *LITOPENAEUS VANNAMEI* (BOONE, 1931) IN FLOATING CAGES AT LOW SALINITY.  
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The marine shrimp *Litopenaeus vannamei* (Boone, 1931) was grown in a system of floating cages at low salinity (0.2 ppt), evaluating 4 stocking densities of 100(T1), 150(T2), 200(T3) and 250 (T4) organisms per square meter, with 4 repetitions, over a period of 10 weeks, to determine the optimal density with respect to growth observed in gain weight and survival of the organisms. The average increase in weight was 0.53 g per week and the average survival was 78.6 %. Treatments T1 and T2 obtained greater weight than total mean. There was a significant difference in weight gain in the cages for the different densities ( $F = 35.51$ ), whereas no appreciable difference was seen in survival for the four densities studied ( $F = 2.45$ ). The cultivation of the marine shrimp *L. vannamei* in floating cages, at low salinity, supports high densities (over 100 organisms per square meter) with high survival rates and good growth, which indicates the viability of this type of aquaculture.

- 121 THE FISHING SITUATION IN MEXICAN RESERVOIRS: NORTH PACIFIC REGION.  
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In the reservoirs in Mexico, important fisheries have developed, principally supported by species such as tilapia, catfish, carp, trout and minnows, with a production volume of 13,737 tons in 2003 at a value of 982.5 million pesos (8.55% of the national fishing production and 7.05% of its total value). Besides providing the analysis of the factors involved in fishing activity, a contribution to the knowledge of the situation in the reservoirs of the North Pacific region of Mexico (for the INAPESCA, this region includes the states of Baja California, South Baja California, Sonora, Sinaloa, Nayarit, Chihuahua, Durango and Zacatecas). Reservoirs of great size exist in this region were constructed in the middle of the last century, such as the Presa Novillo, Sonora or the reservoirs of Aguamilpa and Nayarit. This region contributes more than 8% of the continental fishing production registered in Mexico; another relevant activity is the sport fishing of the black trout. In these reservoirs, various problems have been identified that affect the use of these resources, which is why it is considered necessary to implement management plans for each reservoir, that include scientific basis and technicalities and necessary mediums that would aid in the balanced administration and use of the fishing resources.

## LA SITUACIÓN PESQUERA EN EMBALSES MEXICANOS: REGIÓN PACIFICO NORTE.

En los embalses de México se desarrollan importantes pesquerías, sostenidas principalmente por especies como tilapia, bagre, carpa, lobina, trucha y charal, con un volumen de producción para el 2003 de 133,737 t y valor de 982.5 millones de pesos (8.55% de la producción pesquera nacional y 7.05% del su valor total). A partir del análisis de los factores involucrados en la actividad pesquera, se contribuye al conocimiento de su situación en embalses de la Región Pacífico Norte de México (administrativamente para el INAPESCA esta región incluye los Estados de Baja California, Baja California Sur, Sonora, Sinaloa, Nayarit, Chihuahua, Durango y Zacatecas). En la región existen embalses de gran tamaño que fueron construidos a mitad del siglo pasado, como la Presa Novillo, Sonora o recientemente como la presa Aguamilpa, Nayarit. Esta región contribuye con más del 8% de la producción pesquera continental registrada para México; otra actividad relevante es la pesca deportiva de lobina negra. En estos embalses se han identificado diversos problemas que afectan el aprovechamiento de los recursos, por lo que se considera necesario implementar planes de manejo para cada embalse, que incluyan bases científicas y técnicas y las medidas necesarias que posibiliten la administración y aprovechamiento equilibrado de los recursos pesqueros.

### 316 OBTAINING OF EGG MASSES OF THE SNAIL, *STROMBUS PUGILIS*, (MESOGASTROPODA: STROMBIDAE) UNDER LABORATORY CONDITIONS.

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The survival, reproduction and embryonic development of *Strombus pugilis*, were determined during a period of ten months under laboratory conditions. Seven progenitors were collected in Contoy Island, Quintana Roo, Mexico and later transferred to the laboratory, where they were placed in aquarium with 80 liters of seawater and fed with "pellets." A total of 30 egg masses were collected, one in September and the other in April. The estimated total length of one egg mass was 11.24 m; the mean number of embryos obtained per 2 cm was 264, obtaining an estimated total of 157,500 embryos in the egg mass. The means of the physical-chemical parameters during the study were: salinity  $37.6 \pm 0.5$  ‰, pH  $7.5 \pm 0.5$  and temperature  $28 \pm 0.2$  °C. The maintenance and water recirculation system used to sustain the breeding stock is excellent both for reproduction of the organism and for obtaining egg masses under controlled conditions.

### 322 SPATIAL AND DENSITY PATTERN OF THE SEA COCKROACH *CHITON ARTICULATUS* SOWERBY 1832, ON TWO BEACHES THAT DIFFER IN THEIR DEGREE OF WAVE INTENSITY IN ACAPULCO GUERRERO, MÉXICO.

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*Chiton articulatus* were collected on two beaches that differ in their wave intensity with the intent of comparing its pattern of spatial distribution, as was done with the relative densities of said species. To do this, a systematic sampling was carried out on a total of 30 m<sup>2</sup>. The relative density was calculated as the average of the number of organisms per unit area. In the case of spatial distribution the Morisita indices were obtained, Morisita standardized index of middle-variance.

### PATRÓN ESPACIAL Y DENSIDAD DE LA CUCARACHA DE MAR *CHITON ARTICULATUS* SOWERBY 1832, EN DOS PLAYAS QUE DIFIEREN EN EL GRADO DE INTENSIDAD DEL OLEAJE, EN ACAPULCO GUERRERO, MÉXICO.

Se llevó a cabo una colecta de *Chiton articulatus* en dos playas que difieren en la intensidad del oleaje, con la finalidad de comparar su patrón de dispersión espacial así como las densidades relativas de dicha especie. Para ello se llevó a cabo un muestreo sistemático considerando un total de 30 m<sup>2</sup>. La densidad relativa se calculó como el promedio del número de organismos por unidad de área; en el caso de la dispersión espacial se obtuvieron los índices de Morisita, índice estandarizado de Morisita, varianza-media.



321 NUTRITION AND REPRODUCTION IN *MEGUPSILON APORUS* (MILLER AND WALTERS, 1972): AN EXTINCT SPECIES IN ITS WILD HABITAT.

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The interest in studying *Megupsilon aporus* is that it is a species that maintains itself only in captivity and is currently at risk of extinction. It is considered probably extinct in the wild. Its original location was the spring in the El Potosí common land in Galeana, NL. This work is based on a series of experiments having to do with nutrition and reproduction of the *Megupsilon*, with the purpose of testing whether nutrition and temperature have significant effects on the quality of reproduction. The interval of experimentation was a period of one month; the first 15 days were for physiological stimulation and the last 15 days were to observe the effects. In the first experiment, different intervals were used to collect the eggs: 1) daily, 2) every two days and 3) every four days. Observing the female's predation of the eggs, daily collection was established as the most functional. In a second set, several temperatures were tested: 1) 24, 2) 26 and 3) 28°C, and the species demonstrated the most activity at 26°C. For the third group of experiments, different foodstuffs were used: 1) mix prepared with shrimp, 2) Tetramin flakes, 3) larva Culicidae, 4) shredded beef heart and 5) Chironomid larva. The results were that the most eggs were made when the parents were fed Culicidae larva.

ALIMENTACIÓN Y REPRODUCCIÓN EN *MEGUPSILON APORUS* (MILLER Y WALTERS, 1972), ESPECIE EXTINTA EN SU HABITAT SILVESTRE.

El interés de estudiar a *Megupsilon aporus*, es porque es una especie que se mantiene únicamente en cautiverio y que se encuentra en la categoría de riesgo: "Probablemente extinta en el medio silvestre", su localidad de origen era el manantial del ejido El Potosí en Galeana, NL. El presente trabajo se basa en una serie de experimentos en alimentación y reproducción realizados a *Megupsilon*, con la finalidad de comprobar si la alimentación y la temperatura tienen efectos significativos en la calidad de la reproducción. El intervalo de experimentación fue por periodo de un mes, los primeros 15 días fueron para su estimulación fisiológica y los posteriores para observar los efectos. En el primer experimento se utilizó intervalos de colecta de huevecillos: 1) diaria, 2) cada dos y 3) cada cuatro días. Observando depredación de los huevecillos por parte de la hembra, estableciendo un intervalo de colecta a diario como el más funcional. En un segundo set, se probaron las temperaturas 1) 24, 2) 26 y 3) 28°C resultando que la temperatura en que la especie presento mayor actividad reproductora fue a 26°C. Y para el tercer grupo de experimentos se utilizó alimentos como: 1) mezcla preparada con mariscos, 2) hojuela Tetramin, 3) larvas de culícidos, 4) ralladura de corazón de res y 5) larvas de quironómidos, resultando una mayor cantidad de huevecillos cuando se alimenta a los padres con larvas de culícidos.

166 TOWARDS A SUSTAINABLE EXPLOITATION OF THE CARIBBEAN SPINY LOBSTER.

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The spiny lobster (*Panulirus argus*) is the most important fishery for the Caribbean, measuring nearly 40,000 tonnes and valued at 286 Million USD. The industry provides jobs to 32,000 fishers. A biological and socio-economic assessment was made based on catch data extracted from the FAO statistical records. The analysis suggests that fishing pressure has been over exploiting some of these stocks in recent years. A stock assessment was carried-out and optimum harvesting strategies were evaluated to provide the basis for recovery of regional stocks and an improvement of the derived social and economic benefits. Despite the fact that these fisheries are profitable, enhancement of recruitment and restoration of biomass of some stocks is required. In those stocks that were found overexploited, reductions in fishing effort is advised, but it does not imply catch reductions. It was found that maximizing profits would imply an increase of only 0.06 %, but a reduction of 11% in the number of jobs.

95 COMPOSITION SPECIES CHANGE IN FISHES OF THE PACIFIC COASTAL PLAIN OF CHIAPAS STATE, MEXICO.

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Chiapas is one of the states of Mexico with more biological diversity due to the topography, physiographic and geographical situation. The Coast of Chiapas has many environment problems caused mainly by human activities including deforestation,

use of agrochemicals, industrial and human wastes, etc., In addition, Chiapas has been affected by natural disturbances such as hurricanes. Whether natural or not, the fishes can indicate any change in the aquatic environment. The main objective of this research is to detect the ichthyological changes that had been occurred since 1981 to 2006 in the tributary rivers of the Pacific Coast of Chiapas and the possible causes. This study will support future areas of research such as sustainable fisheries, restoration of aquatic environments, protection of the ichthyofauna, etc. To assess species composition, there were done 60 samples in 24 localities, with a total of 14,474 specimens, with 24 species in 21 genera and 12 families. According to zoogeographical origin, there were 17 neotropical species and 1 exotic (*Oreochromis niloticus*). Classified by their ecological affinity, there were 6 primary, 11 secondary and 7 peripheral species. One of this species is on list of La Norma Oficial Mexicana (NOM-059-ECOL-2001) like Pr = In danger (*Rhamdia guatemalensis*).

320 TAXONOMIC, DISTRIBUTIONAL AND ECOLOGIC STUDY OF THE FISH IN SELECT AREAS IN THE NORTHEASTERN ZONE OF CHIAPAS, MEXICO.

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Chiapas is located in the Southeast of the Mexican Republic, in the coordinates 14° 30' and 18° 30' N x 90° 30' and 94° 30' W (75,634 km). Chiapas has a large hydrologic water main system, made up of large rivers and lakes. The study was done in the Northeastern part of the state, in tributary rivers in the Usumacinta basin. Samples were taken from 45 locations, 20 in the Montes Azules Biosphere Reserve. The objective is to create a taxonomic, zoogeographic, and ecological inventory of the fish in the Northeastern region of Chiapas. 4 trips were made, from June 2004 to June 2006, with a total duration of 20 days; 140 samples were taken in 45 locations in the Northeast region of the state. A total of 11,181 samples were analyzed, in which there were 58 species, 23 families and 41 genera. Neotropical species predominate with 32 species, 13 nearctic and 3 exotic because of their zoogeographic origin; because of their ecological affinity 27 secondary species were found, 18 peripheries and 8 primaries. In the Official Mexican Norm, we found 5 species currently under protection.

ESTUDIO TAXONÓMICO, DISTRIBUCIONAL Y ECOLÓGICO DE LA ICTIOFAUNA DE AREAS SELECTAS EN LA ZONA NORESTE DEL ESTADO DE CHIAPAS, MEXICO.

El Estado de Chiapas se localiza al Sureste de la Republica Mexicana, dentro de las coordenadas 14° 30' y 18° 30' N y 90° 30' y 94° 30' W; tiene una extensión de 75,634 km. Chiapas presenta una gran red hidrológica, constituida por grandes lagos y ríos. El estudio se realizo en la región Noreste del Estado, en ríos tributarios de cuenca del Usumacinta. Se colectaron 45 localidades, 20 se encuentran dentro de la Reserva de la Biosfera Montes Azules. El objetivo es Realizar un inventario taxonómico, zoogeográfico y ecológico de la ictiofauna en la región NE del Estado de Chiapas. Se realizaron 4 viajes, de Junio del 2004-Junio del 2006, con una duración de 20 días; se realizaron 140 colectas en 45 localidades en la región Noreste del estado. Se reviso un total de 11,181 ejemplares, dentro de las cuales son 58 especies, en 23 Familias y 41 Géneros. Por su origen Zoogeográfico predominan las especies Neotropicales con 32 especies, 18 Neárticas y 3 exóticas; por su afinidad ecológica se encontraron 27 especies secundarias, 18 periféricas y 8 primarias. Dentro de la Norma Oficial Mexicana encontramos cinco especies bajo un estatus de protección.

317 ANALYSIS OF COMMERCIAL CAPTURE FROM 1985-1998, IN THE FALCON INTERNATIONAL DAM, NUEVA CIUDAD GUERRERO, TAMAULIPAS, MÉXICO.

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Seasonal and annual analysis of the commercial capture of valuable species in Falcon International Dam from 1985-1998 is presented. A broad comparison is presented between the volumes of captures of species relative to the temperature and the pluvial precipitation, reported by the Solidarity Society Cooperative. The species evaluated are: *Ictalurus punctatus* (Rafinesque) (catfish), *Aplodinotus grunniens* (Rafinesque) (sheep's head), *Cyprinus carpio* (Linnaeus) (carp), *Lepisosteus osseus* (Linnaeus) (gar), *Carpiodes carpio* (Meek) (suckers), *Cichlasoma cyanoguttatum* (Baird and Girard) (sunfish), *Morone crisops* (Rafinesque) (white bass), *Sarotherodon aurea* (Steindachner) (tilapia) and *Micropterus salmoides* (Lacépède) (large-mouth). The total capture registered from 1985-1998 was 22,298 tons, with an average capture of per unit effort (CPUE)

of 145 kg/day/fisherman. The carp and the catfish represented the greatest proportions at 49.4% and 18.3%, respectively; similarly, the maximum CPUE with 71.1 kg/day/fisherman and 27.9 kg/day/fisherman, respectively. The annual capture oscillated between 1200 and 2200 tons, with the greatest catch in 1988 (2191 tons). The gar was captured all year, from 1985 to 1990. The capture of suckers was constant in 1995. In commercial capture, the matorra is considered the most important catch in the last six years. The catfish was best represented in summer and fall, the tilapia and the largemouth in fall and winter, and the carp and sheep's head in winter and spring. The captures of catfish, sheep's head and gar are positively correlated with the pluvial precipitation and the sucker, sunfish and largemouth with temperature.

#### ANÁLISIS DE LA CAPTURA COMERCIAL DURANTE EL PERÍODO 1985-1998, EN LA PRESA INTERNACIONAL FALCÓN, NUEVA CIUDAD GUERRERO, TAMAULIPAS, MÉXICO.

Análisis estacional y anual de la captura comercial de las especies valiosas en la pesquería comercial de la Presa Falcón durante 1985-1998. Se ofrece un panorama comparativo entre los volúmenes de captura para dichas especies con respecto a la temperatura y la precipitación pluvial, reportados por la Cooperativa Sociedad Solidaridad. Las especies evaluadas son: *Ictalurus punctatus* (Rafinesque) (bagre, catfish), *Aplodinotus grunniens* (Rafinesque) (besugo, sheep's head), *Cyprinus carpio* (Linnaeus) (carpa, carp), *Lepisosteus osseus* (Linnaeus) (catán, gar), *Carpiodes carpio* (Meek) (matalote, suckers), *Cichlasoma cyanoguttatum* (Baird y Girard) (mojarra, sunfish), *Morone crisops* (Rafinesque) (robalo blanco, white bass), *Sarotherodon aurea* (Steindachner) (tilapia) y *Micropterus salmoides* (Lacépède) (lobina, largemouth). La captura total registrada en el período 1985-1998 fue de 22,298 toneladas, con un rendimiento promedio de captura por unidad de esfuerzo (CPUE) de 145 kg/día/pescador. La carpa y el bagre representaron el mayor volumen con el 49.4% y el 18.3%, respectivamente; asimismo, la máxima CPUE con 71.1 kg/día/pescador y 27.9 kg/día/pescador, en su orden. La captura anual osciló entre 1200 y 2200 toneladas, con el mayor volumen en 1988 (2191 ton). El catán se presentó en las capturas durante todo el año, desde 1985 hasta 1990. El matalote aparece de manera continua a partir de 1995. La mojarra es considerada como de mayor importancia dentro de la captura comercial, en los últimos seis años. El bagre estuvo mejor representado en verano y otoño, la tilapia y el robalo en otoño e invierno, y la carpa y el besugo en invierno y primavera. Las capturas de bagre besugo y catán se correlacionan positivamente con la precipitación pluvial y el matalote, la mojarra y la lobina con las temperaturas.

#### 318 PHYSICAL-CHEMICAL QUALITY OF WATER IN SELECT AREAS OF THE LACANTUN RIVER BASIN IN CHIAPAS, MÉXICO.

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This study was done on the Montes Azules Biosphere reserve (RBMA) which is located in Chiapas which is the most diverse and best preserved in the Mexican tropics. An analysis was done on the physical-chemical quality of the water in 20 locations in the Lacantun River, where its space and time behavior was compared and quantified (2004-2006). The objective is to analyze the physical-chemical quality of the water in select areas and to do a comparison among the different locations. Samples were collected during two seasons of the year, rainy and low water levels in 20 different locations. Eleven parameters were measured: total alkalinity, calcium, chlorines, magnesium, nitrates, sulfates, color, peat bog, dissolved oxygen and temperature. Velasco-Colín (1979) showed that the control of dissolved oxygen, temperature, and concentration of toxic substances is important for the fish. The results of this study show that in the reserve, the dissolved oxygen, sulfates, nitrates and alkalinity values are higher than outside of the reserve. The data shows ecological damage perhaps due to humans that live near the reserve. This work shows us that the contamination of the water is a result of the use of insecticides and the concentration of clays caused by erosion due to change of the use of the ground. If this situation is not controlled, it may threaten the survival of these species.

#### CALIDAD FISICOQUÍMICA DEL AGUA EN AREAS SELECTAS DE LA CUENCA DEL RÍO LACANTÚN CHIAPAS, MÉXICO.

El presente estudio se realizó en la reserva de la Biosfera Montes Azules (RBMA) que se localiza en el estado de Chiapas y es la mejor conservada y con mayor diversidad en el trópico mexicano. Se realizó un análisis de la calidad fisicoquímica del agua en 20 localidades del Río Lacantún, donde se comparo y cuantificado su comportamiento en espacio y tiempo (2004-2006). El objetivo es analizar la calidad fisicoquímica del agua de las áreas seleccionadas y hacer un comparativo entre las diferentes localidades. Para esto se realizaron muestreos en dos temporadas del año, lluvias y estiaje en las 20 localidades.

Se tomaron 11 parámetros: alcalinidad total, calcio, cloruros, magnesio, nitratos, nitritos, sulfatos, color, turbidez, oxígeno disuelto y temperatura. Velasco-Colín (1979) señalo que para los peces es importante el control del oxígeno disuelto, temperatura y la concentración de sustancias tóxicas. Los resultados de éste estudio muestran que en las localidades dentro de la reserva (RBMA) el oxígeno disuelto, sulfatos, nitratos y alcalinidad valores más altos que en las localidades fuera de la reserva. Los datos mostrados detectan daño ecológico debido probablemente a los humanos que habitan cerca de la reserva. Este trabajo nos muestra que la contaminación del agua es el resultado de uso de insecticidas, concentración de arcillas en suspensión producto de la erosión por el cambio de uso de suelo. Si esta situación no se controla puede amenazar la supervivencia de las especies.

#### 324 AQUATIC VEGETATION IN NORTHEASTERN MEXICO.

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The study was done on aquatic plants in northeastern Mexico in the states of Chihuahua, Coahuila and Nuevo León, as a collaborative study of fish and distribution of the giant reed. The diversity at the observation sites was more than 35 species of plants. Of these, it is important to note that for the first time *Proserpinaca palustris* was found, as was the species in extinction *Heteranthera mexicana*. The species of plants found were *Proserpinaca*, *Potamogeton*, *Ceratophyllum*, *Cyperus*, *Hydrilla*, *Najas*, *Nuphar*, *Nymphaea*, *Heteranthera*, *Hydrocotyle*, *Juncos*, *Lobelia*, *Marsilia*, *Sagitaria*, *Utricularia*, *Eleocharis*, *Cabomba*, *Ludwigia*, *Eichornia*, *Echinodorus*, *Typha*, *Arundo*, *Phragmites*, *Zosterella*, and *Wolffia*.

#### VEGETACIÓN ACUÁTICA DEL NORESTE DE MÉXICO.

Se elaboró un estudio de las plantas acuáticas en el noreste de México en los Estados de Chihuahua, Coahuila y Nuevo León, como producto colateral de un estudio ictiológico y distribución del carrizo gigante. Se estima la diversidad encontrada en los sitios de observación más de 35 especies de plantas. De estas, resalta el encontrar por primera vez a *Proserpinaca palustris*, así como especie en riesgo de extinción como *Heteranthera mexicana*. Los géneros de plantas encontrados son *Proserpinaca*, *Potamogeton*, *Ceratophyllum*, *Cyperus*, *Hydrilla*, *Najas*, *Nuphar*, *Nymphaea*, *Heteranthera*, *Hydrocotyle*, *Juncos*, *Lobelia*, *Marsilia*, *Sagitaria*, *Utricularia*, *Eleocharis*, *Cabomba*, *Ludwigia*, *Eichornia*, *Echinodorus*, *Typha*, *Arundo*, *Phragmites*, *Zosterella*, y *Wolffia*.

#### 325 INVESTIGATION OF THE DISTRIBUTION OF THE INVASIVE PLANT *ARUNDO DONAX* (GIANT REED) IN THE RÍO BRAVO BASIN.

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The study took place on the geographic distribution of the giant reed, *Arundo donax*, a species of exotic weed in the Rio Bravo Basin in the northeast of Mexico from May to September of 2007. We took 10 trips to the field to find populations of the giant reed and at each site the coverage and density were recorded when possible. One sample was taken for genetic analysis and two were taken for the herbarium and for digital photography to observe the production of shoots, new stems and flowering, in addition to coordinates taken with a Garmin III GPS. A total of 120 sites with 381 patches and accurate registers, which oscillate between 1 to 30,000 m<sup>2</sup>. A total of 50 potential sites visited did not have *Arundo*, but because of their nearness to the sites with the giant reed, they are susceptible to invasion. Fourteen sites were found with the native reed, *Phragmites australis*. The possibility of hybridizing existed at 2 sites. The total coverages of the *Arundo donax* ascends is greater than 112,254 m<sup>2</sup>. The average density of the giant reed is 43 stalks per square meter. The temperature oscillated between 23.3 to 46.0 °C, the relative humidity was from 20 to 100% and the altitude was from 108 to 2051 m.s.n.m.

#### INVESTIGACIÓN SOBRE LA DISTRIBUCIÓN DE LA PLANTA INVASORA *ARUNDO DONAX* (CARRIZO GIGANTE) EN LA CUENCA DEL RÍO BRAVO.

Se elaboró un diagnóstico sobre la distribución geográfica del carrizo gigante, *Arundo donax*, especie de maleza exótica, en la Cuenca del Río Bravo, Noreste de México, de Mayo 2007 a Septiembre 2007, donde realizamos 10 visitas de campo

para localizar las poblaciones del carrizo gigante y en cada sitio se obtuvo cuando era posible, la cobertura y la densidad, una muestra para el análisis genético, 2 muestras de plantas para herbario y fotografía digital para observar producción de brotes, caña nueva y floración, además de sus coordenadas con un GPS Garmin III. Un total de 120 sitios con 381 registros puntuales o parches, que oscilan entre 1 hasta 30,000 m<sup>2</sup>. Un total de 50 sitios visitados potenciales fueron negativos a la presencia de *Arundo*, pero por la cercanía a sitios con carrizo, puedes ser susceptibles de la invasión. Se encontraron 14 sitios con presencia de carrizo nativo, *Phragmites australis*; en dos sitios existe la posibilidad de hibridación. La cobertura total de *Arundo donax* asciende a más de 112,254 m<sup>2</sup>, es decir 112. Ha de carrizo gigante y una densidad promedio de 43 cañas por metro cuadrado. La temperatura oscila entre 23.3 hasta 46.0 °C, la humedad relativa fue de 20 hasta el 100 %; y la altura encontrada fue desde 108 hasta 2051 m.s.n.m.

### 326 RECENT INFORMATION ABOUT THE FRESHWATER FISHES OF THE NORTH OF COAHUILA, MÉXICO.

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A study was done to find out the actual state of the freshwater fish of the northern region of the state of Coahuila, with an emphasis on the species reported to be at risk, vulnerable, threatened and in danger of extinction in the NOM-059-SEMARNAT-2001. Three field trips were made with a total of 48 locations visited, from which 40 species of the 52 registered were found, distributed among 25 genera and 13 families. With the registers obtained, and the historic registers, and a GIS database was created. The information is extended on the species *Dionda diaboli*, *Percina macrolepida*, *Lepisosteus oculatus*, *Etheostoma grahami*, *Cyprinella venusta*, and *Prietella phreatophila*, and information is reported for the first time on *Heterandria cf. formosa*, *Poecilia latipinna*, and *Micropterus dolomieu*.

### INFORMACION RECIENTE DE LOS PECES DULCEACUÍCOLAS DEL NORTE DE COAHUILA, MÉXICO.

Se realizó un estudio para conocer el estado actual de los peces dulceacuícolas de la región Norte del Estado de Coahuila, con énfasis a las especies reportadas en riesgo, en la NOM-059-SEMARNAT-2001, vulnerables, amenazadas, en peligro de extinción. Se efectuaron 3 salidas de campo con un total de 48 localidades visitadas, de las cuales se reportan 40 especies de las 52 registradas en la zona, repartidos en 25 géneros y 13 familias. Con los registros obtenidos y los registros históricos se elaborará un sistema de información geográfica. Se amplía la distribución de para *Dionda diaboli*, *Percina macrolepida*, *Lepisosteus oculatus*, *Etheostoma grahami*, *Cyprinella venusta*, y *Prietella phreatophila*, y se reporta por primera vez a *Heterandria cf. formosa*, *Poecilia latipinna*, y *Micropterus dolomieu*.

### 330 AGE AND GROWTH OF TILAPIA (*OREOCHROMIS AUREUS*) IN THE VICENTE GUERRERO DAM IN TAMAULIPAS, MEXICO.

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The age structure of the tilapia (*Oreochromis aureus*) in the Vicente Guerrero dam in Tamaulipas, Mexico is presented by indirect methods and the growth curves are presented using the Von Bertalanffy method, during the period from August 2005 to June 2006. The samples were taken monthly, evaluating the commercial capture of the Society Cooperative of Fishing Production "Villa de Padilla," including morphological information of total length and total weight to obtain the length and weight.

### EDAD Y CRECIMIENTO DE LA TILAPIA (*OREOCHROMIS AUREUS*) EN LA PRESA VICENTE GUERRERO, TAMAULIPAS MÉXICO.

Se presenta la estructura de edad obtenida mediante métodos indirectos y las curvas de crecimiento de acuerdo al método de VonBertalanffy, de la tilapia (*Oreochromis aureus*) en la Presa Vicente Guerrero, Tamaulipas Mexico, durante el período Agosto 2005-Junio 2006, mediante muestreos mensuales evaluando la captura comercial de la Sociedad Cooperativa de Producción Pesquera Villa de Padilla, incluyéndose tomas de información en morfometría la longitud total y peso total obteniéndose la elación longitud peso.

## 234 SPATIO-TEMPORAL VARIATION OF FISH DISTRIBUTED IN TWO CONTRASTING HABITATS IN TROPICAL SOUTHEAST OF MEXICO.

## VARIACIÓN ESPACIO-TEMPORAL DE PECES DISTRIBUIDOS EN DOS HÁBITAT CONTRASTANTES EN UN HUMEDAL TROPICAL EN EL SURESTE DE MÉXICO.

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In three localities of the reservoirs of marshes of Centla, the abundance of fish fauna associated with submerged aquatic vegetation (VAS) and soft substratum without, vegetation (SSSV) were compared. A total of 478 specimens were studied, which comprised 20 species, 16 genera and 10 families. The VAS had the greatest abundance (279 specimens) and number of species (18) as compared to SSSV with 199 specimens and 13 species. Seventy-six percent of the registered fish fauna was captured during the season of minimum inundation. The remainder (24%) were captured during the period of maximum inundation. The dominant species with greatest abundance was the pepesca (*Astyanax aeneus*) at 51%. The El Sauzo lagoon locality had the greatest abundance of specimens (253) and species richness (16), followed by San Pedro with 70 specimens and 14 species. The toadfish (boquiblanca - *Opsanus beta*) and the silver mojarra (*Diapterus auratus*) were found in the San Pedrito Lagoon in the SSSV in the period of minimum inundation, while in the El Sauzo lagoon, the sardine maya (*Dorosoma petenense*) and guayacon jarocho (*Heterophallus (cf) rachovii*) were obtained in both seasons. This study highlights the capture of *Rhamdia guatemalensis* in both habitats, which is under special protection in the NOM (Mexican Official Norm), and demonstrates the importance of conservation of variability of habitat to maintain biodiversity of aquatic vertebrates in these tropical wetlands.

En tres localidades de la Reserva de Pantanos de Centla se comparó la abundancia y de la ictiofauna asociada con Vallisneria americana (VAS) y con sustratos suaves sin vegetación (SSSV) adyacentes. Un total de 478 ejemplares fueron revisados, los cuales pertenecieron a 20 especies, 16 géneros y 10 familias. La VAS registró la mayor abundancia (279) y número de especies (18) con respecto a SSSV con 199 ejemplares y 13 especies. El 76% de la ictiofauna registrada se capturó en la temporada de mínima inundación, el 24% restante se obtuvo en la temporada de máxima inundación. La especie dominante y de amplia distribución fue la pepesca (*Astyanax aeneus*) con un 51% de abundancia. La localidad que registró la mayor abundancia (253) y riqueza específica (16) fue la laguna El Sauzo, seguida de San Pedrito con 14 especies y 70 ejemplares. Las especies sapo boquiblanca (*Opsanus beta*) y mojarra plateada (*Diapterus auratus*) se registraron con un ejemplar en la Laguna San Pedrito en los SSSV en la temporada de mínima inundación, en tanto en la localidad El Sauzo, sardina maya (*Dorosoma petenense*) y guayacón jarocho [*Heterophallus (cf) rachovii*] se obtuvo en ambas temporadas. Se destaca la captura de *Rhamdia guatemalensis* en los dos hábitat, la cual se encuentra como Protección especial en la NOM (Norma oficial Mexicana), demostrando la importancia de conservación de la variabilidad de hábitat para mantener la biodiversidad de vertebrados acuáticos en estos humedales tropicales.

## 323 PERSPECTIVES ON CONSERVATION AND MAINTENANCE OF FISHING RESOURCES OF CURRENT COMMERCIAL IMPORTANCE IN THE LAGUNA MADRE.

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Among permanent lagoons on the Mexican coast of the Gulf of Mexico, the Laguna Madre de Tamulipas stands out as being the main site of fishing activity (Britton and Morton, 1989; Leija-Tristán *et al.*, 1995; García, 1996; Leija-Tristán *et al.*, 2000 a, b; Villarreal, 2001; Tunnell and Judd, 2002). The fishing carried out in this ecosystem is 100% artisan, standing out from the authorized arts such as the brass band, the shrimp nets, the gill nets, ties, rings, oyster goggles and lines with fish hooks (Gómez-Soto and Contreras-Balderas, 1988; Alarcón and Arreguín-Sánchez, 1994a,b; Arreguín-Sánchez *et al.*, 1997b; Villarreal, 2001). On the coasts of Tamaulipas, 26 species are commercialized, including crustaceans, mollusks and fish, contributing an average of 40% of the state's fishing resources (Ortiz-Lozano *et al.*, 2000; Gómez-Ortiz *et al.*, 2003); however, the most important population that are exploited in Laguna Madre are the brown shrimp *Farfantepenaeus aztecus*, pink shrimp *F. duorarum* and white shrimp *Litopenaeus setiferus* (33%), the flounder *Paralichthys lethostigma*, the mullet *Mugil cephalus*, the leasing *Mugil curema*, the bream *Archosargus probatecephalus*, the trout *Cynoscion nebulosus* (42%), crabs

*Callinectes sapidus* and *C. rathbunae* (15%) and the oyster *Crassostrea virginica* (10%) (Gómez-Soto, 1988; Biotechnology Studies, 1993, Villarreal, 2001; Gómez-Ortiz *et al.*, 2003). For each resource, the most preponderant biological, ecological and fishing information is emphasized, the actual methods of managing them are described in detail and conservation in short, medium and long time periods are described, just as the interests of fishing exploitation alternates between the available fishing resources.

PERSPECTIVAS DE CONSERVACIÓN Y SUSTENTABILIDAD DE LOS RECURSOS PESQUEROS DE IMPORTANCIA COMERCIAL ACTUAL, EN LA LAGUNA MADRE.

Entre los cuerpos lagunares permanentes que se localizan en las costas mexicanas del Golfo de México, la Laguna Madre de Tamaulipas destaca por ser el principal sitio de actividad pesquera (Britton y Morton, 1989; Leija-Tristán *et al.*, 1995; García, 1996; Leija-Tristán *et al.*, 2000 a, b; Villarreal, 2001; Tunnell y Judd, 2002). La pesca realizada en este ecosistema es 100% de tipo artesanal, destacando entre las artes autorizadas las charangas, las trampas jaiberas, redes agalleras, atarrayas, trasmallos, palangres, cimbras, nazas, aros, gafas ostioneras y líneas de anzuelos (Gómez-Soto y Contreras-Balderas, 1988; Alarcón y Arreguín-Sánchez, 1994a,b; Arreguín-Sánchez *et al.*, 1997b; Villarreal, 2001). En las costas de Tamaulipas se comercializan 26 especies, donde se incluyen crustáceos, moluscos y peces, aportando para el estado, en promedio, el 40% (12,978 t) de los recursos pesqueros (Ortiz-Lozano *et al.*, 2000; Gómez-Ortiz *et al.*, 2003); sin embargo, las poblaciones más importantes, que se explotan en Laguna Madre, son los camarones café *Farfantepenaeus aztecus*, rosado *F. duorarum* y blanco *Litopenaeus setiferus* (33%) el flander *Paralichthys lethostigma*, la lisa *Mugil cephalus*, la lebrancha *Mugil curema*, el sargo *Archosargus probatecephalus*, la trucha *Cynoscion nebulosus*, (42%) las jaibas *Callinectes sapidus* y *C. rathbunae* (15%) y el ostión *Crassostrea virginica* (10%) (Gómez-Soto, 1988; Estudios Biotecnológicos, 1993, Villarreal, 2001; Gómez-Ortiz *et al.*, 2003). Para cada recurso se remarca la información biológica, ecológica y pesquera más preponderante, se detallan las medidas actuales de manejo y conservación a corto, mediano y largo plazo, así como los intereses de explotación pesquera alterna entre los recursos pesqueros disponibles.

291 EFFECT OF DROUGHT, FLOOD AND SEASON ON A NEW STREAM IN CENTRAL TEXAS.

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Heavy rains in the Guadalupe River watershed in the summer of 2002 created a large gorge (max 25-m wide and 20-m deep) and opened numerous small springs to form a permanent new stream. In 2003, we examined colonization of benthic invertebrates and characterized changes in taxonomic composition, abundance and diversity as well as reproductive patterns and functional feeding group dynamics. The colonization process proceeded rapidly and r-strategists, such as chironomids and baetid mayflies with multivoltine reproductive patterns, dominated early on and were later followed by k-strategists such as trichopterans. Mayflies dominated in diversity and abundance and we collected 65 other taxa. In our second phase (March 2006 to February 2007), we found an invertebrate community again overwhelmingly dominated by mayflies. Exceptional drought impacted the central Texas region for most of 2005 and 2006, but this did not inhibit diversity and abundance due to adequate and reliable spring flow. Extreme floods impacted the region in 2007 and totally scoured the streambed. This extreme disturbance depressed invertebrate recolonization in the new stream for only a short duration. In early March 2007, total number of specimens of all taxa collected in 0.1 M at each site was 202. After over 20-cm of rain, 95 specimens were collected in April 2007. The number quickly recovered to 164 later in the study. This pattern repeated itself after each spate. We suggest further study into the effects of streambed shading on the benthic invertebrate community during the winter months to determine if shading inhibits mayfly abundance.

44 ECONOMICS, EDUCATION AND ENGAGEMENT AS TOOLS FOR INCREASING PUBLIC LITERACY OF AQUATIC INVASIVE SPECIES AS HAZARDS ON WATER RESOURCES AND ECOSYSTEMS IN TEXAS.

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Invasions by plants, animals, and pathogens, are regarded by biologists as one of the major threats to biological diversity worldwide and can have major impacts on water resources and economics. Here, we describe basic ecological research on selected aquatic exotic macrophytes in Texas and describe the applied/policy/management implications of that research. The research encompasses spatial and temporal dimensions, population dynamics, trophic studies, tracking and migration,

abiotic tolerances, biodiversity and community structure and ecosystem function and conservation biology. The applied and policy implications involve interbasin water transfers, instream flows, sports fisheries, endangered species, water quality, restoration, lawsuits and public education. Direct and indirect economic impacts associated with scientific findings from the studies translate into millions of dollars per year for Texas. Ecological impacts show dramatic changes in aquatic communities, increased threats to biodiversity and altered ecological structure and function. Water losses due to invasive species cost Texas hundreds of thousands of acre-feet of water per year, water unavailable for instream flows, irrigation and other human uses. Innovative, proactive ecological research and public and policy awareness and education initiatives are instrumental to preventing further invasions and managing existing exotic species impacts in Texas aquatic ecosystems. Water saved by curbing invasive species may be critical to future water planning efforts and coping with projected population growth.

93 TEXAS MUSSEL WATCH: A CITIZEN SCIENCE VOLUNTEER MONITORING PROGRAM.

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In 1998, Texas Mussel Watch (TMW), a Texas Parks and Wildlife Department (TPWD) Texas Nature Trackers Program, first trained a group of 20 volunteers to help TPWD document the presence or absence of freshwater mussel species in the rivers, lakes, streams, and ponds of Texas. Over 200 volunteers have participated in TMW workshops since the inception of the project. These volunteers logged over 1000 volunteer hours, covered over 150 sites in 18 Texas river systems in 53 counties, and recorded the presence 39 unionid species. During TMW workshops, participants are presented with information on the distribution, biology, and identification of unionids in Texas, as well as information on non-native species such as Asian clams (*Corbicula fluminea*) and zebra mussels (*Dreissena polymorpha*). Highlights include the discovery of the rare golden orb (*Quadrula aurea*) in the San Marcos River, Central Texas; the discovery of two species that had not previously been found in Austin County, the Texas lilliput (*Toxolasma texasensis*) and tapered pondhorn (*Unio merus declivis*); and seven live Texas fawnsfoot (*Truncilla macrodon*) in the Brazos River in Washington County. TMW is reaching out to more Texas citizens through partnerships with Texas Master Naturalist Chapters and Nature Centers.

104 SMALL SNAILS GROW UP FAST: FEEDING PREFERENCES, HABITAT CHOICE AND GROWTH OF JUVENILE APPLESNAILS (*POMACEA INSULARUM*) IN THE PRESENCE OF *PROCAMBARUS CLARKII*.

Sarah Hensley\*, Colin Kyle, James McDonough and Romi Burks, Southwestern University, Biology Department, Georgetown, TX.

Snails hold long-standing reputations as pests and problematic exotics. Some species quickly spread over wide geographical areas and become invasive (i.e. EIS). Native to South America, large-sized and armed with high fecundity, *Pomacea insularum*, a channeled applesnail, epitomizes an EIS that warrants concern. Scientists worry about the potential of established reproductive populations to become rice pests or compete with native species. However, we know very little about feeding and habitat preferences of *P. insularum*. To investigate this, we placed a single small (10-mm) or large (23-mm) juvenile snail in one of 48 enclosures with three open compartments, each compartment offering a different plant (*Colocasia sp.* [taro or elephant ear], *Eichhornia crassipes* [water hyacinth] or *Myriophyllum spicatum* [Eurasian water milfoil]). Twenty-four enclosures resided in a filtered pool containing crayfish (*Procambarus clarkii*) and another 24 lacked crayfish. We observed snail growth (i.e. change in operculum), percent plant consumption and habitat preferences in both pools over six weeks. Small juvenile snails grew significantly more than larger snails. Presence of *P. clarkii* did not produce a significant effect on snail growth, plant consumption or behavior. A significant difference existed in percentage of elephant ear consumed between smaller versus larger juveniles. Furthermore, neither size readily consumed *Eichhornia*. Our results suggest juvenile applesnails prefer less structurally and chemically defended plants and do not alter plant consumption when predators occur. These results reinforce the idea that small *P. insularum* consume substantial amounts of plants and should be taken seriously as a new EIS in Texas.

83 PINK EGGS AND SNAILS: COMPARISON OF FIELD AND LAB OVIPOSITION BEHAVIOR IN *POMACEA INSULARUM*.

James P. McDonough, Colin H. Kyle and Romi L. Burks, Department of Biology, Southwestern University, Georgetown, TX.

Invasive exotic species represent a major threat to the world's ecosystems and cause approximately \$120 billion in damage annually in the U.S alone. Mollusk invaders appear particularly destructive due to their small life stages and high reproductive rates. A recently identified invasive species of applesnail in Texas, *Pomacea insularum*, exhibits these alarming charac-



teristics. Native *P. insularum* occur in South America, but this species recently established reproductive populations along the Gulf Coast, ranging from Florida to east Texas. The egg stage, easily identified by its bright pink color, likely represents a bottleneck in survival. Egg removal might serve as effective method of slowing the invasion of *P. insularum* in Texas. To investigate this possibility, we studied *P. insularum* oviposition (i.e. egg laying) behavior. Before we could conduct experimental studies, we needed to determine if the reproductive characteristics of *P. insularum* in the lab mirrored that from the field. We investigated oviposition behavior by comparing clutch dimensions and clutch height above the water line from clutches at Armand Bayou (Houston) with similar observations recorded from lab clutches. Through statistical analysis, we then tested to see if significant differences existed between oviposition behavior from the field and oviposition behavior in the lab. Our results revealed no significant differences in clutch length ( $p>0.982$ ), width ( $p>0.551$ ), depth ( $p>0.388$ ), or clutch height ( $p>0.469$ ) between lab or field data. We concluded that any future studies on *P. insularum* oviposition behavior done in the lab would be comparable to field behavior.

87 LOCATION, LOCATION, LOCATION: LABORATORY EXPERIMENT SHOWS INVASIVE *POMACEA INSULARUM* CHOOSE ELEPHANT EAR AS OVIPOSITION SITES.

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Increasing globalization moves hundreds of organisms from their native habitat to other exotic ecosystems. In extreme cases, introduced organisms establish populations and spread to other areas. Mollusks have a long history of destructive invasions and fecundity best represents a mollusk's invasive potential. Discovered in Houston in 1989, a recently identified species of South American applesnail, *Pomacea insularum*, poses a threat to aquatic and wetland habitats of the Gulf Coast. *P. insularum* represents such a threat due to unsettling traits such as large size, high fecundity, and ravenous whole plant consumption. To understand this new invader and slow its expansion, we studied *P. insularum* behavior and oviposition (i.e. egg laying) preferences. We presented captive breeding females 4 different structures on which to lay eggs (elephant ear, wood, metal, Astroturf) in 2 light conditions (shaded or unshaded). In addition, we recorded the activity of each snail three times a day. We evaluated the results using Chi-Squared analysis tests. We found that females laid almost exclusively on elephant ear and ignored other structures ( $p<0.01$ ), with more clutches produced in unshaded versus shaded environments. From documenting their behavior, the results suggest that the snails spend most of their time feeding or searching banks for potential egg-laying surfaces ( $p<0.001$ ). Because egg number directly translates into population growth, this new knowledge of *P. insularum* behavior and oviposition preferences will improve our ability to slow down invading populations by locating and removing clutches before they can hatch.

59 SPATIAL AND TEMPORAL VARIABILITY IN OYSTER REEF FOOD WEB STRUCTURE COMPARED TO OTHER ESTUARINE HABITATS.

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Food webs exemplify the transfer of material and energy from one organism to another within an ecosystem and are generally analyzed using stomach contents and/or stable isotopes. In the present study, we examined the temporal and spatial aspects of community structure and food webs of subtidal oyster reefs compared to marsh edge habitats and non-vegetated habitats in Matagorda Bay, TX. Samples of fish and macroinvertebrates were collected for community structure, gut content, and stable isotope analyses. Benthic sleds were employed directly over each habitat type, and gill nets were used in collecting transient predators. Samples of vegetation, phytoplankton, zooplankton, benthic algae, macroinvertebrates, and fish tissue were collected for stable C and N isotope analysis. Approximately 600 specimens have been selected for gut content analysis and 455 for stable isotope analysis. The species kept for analysis characterize the range and occurrence of representative species from different trophic levels. The Matagorda Bay system supports a dynamic and complex food web influenced both by spatial and temporal factors. The subtidal oyster reefs of the Matagorda Bay system provide prime habitat for some of the bays most important food resources for upper level consumers including *Bagre marinus*, *Cynoscion arenarius*, and *Carcharhinus limbatus*. These data provide evidence that subtidal oyster reef in Matagorda Bay system compose particularly valuable habitat for fisheries.

- 335 WHO CONTROLS WHO? INVESTIGATING FEMALE CONTROL OVER MALE MATING SUCCESS AND HER OWN REPRODUCTIVE FITNESS IN THE WESTERN MOSQUITOFISH.

Rachel Martin\*, James Cureton, Kevin Hudson, and Raelynn Deaton, Sam Houston State University, Huntsville, TX.

Recent studies have shown that female mosquitofish show signs of mate choice and have some control over male mating via resistance to males. We conducted a two-part study investigating factors that influence female mate choice and female reproductive success. We were interested in the following questions: (1) Do females control their own reproductive success behaviorally, or is male coercion a more important factor in determining the number of fertilized embryos per brood? and (2) To what extent does male behavior and time spent with males affect female reproductive success? In both experiments, we tested the predictions that receptive females have higher reproductive success than resistant females, and that female reproductive success should increase with the number of successful copulation attempts by males. We found a positive correlation between female resistance and number of unsuccessful mating attempts, and female receptivity and the number of successful mating by males, supporting that females have control over male mating success. However, we found no correlation between female receptivity or number of mating attempts by males and the proportion of fertilized embryos. In the second experiment, there was no difference in the proportion of fertilized broods between females exposed to 30-min versus 24-hours. Our results support that females have behavioral control over male mating, but this does not necessarily translate into behavioral control over her reproductive success. Further, our data show that at least partial broods may be fertilized when females are exposed to males for brief periods of time.

- 333 FACTORS INFLUENCING FEMALE CHOICE IN THE WESTERN MOSQUITOFISH, *GAMBUSIA AFFINIS*.

Stephanie Morse\*, Kevin Hudson, and Raelynn Deaton, Sam Houston State University, Huntsville, TX.

Coercive mating (forced copulations) is the most common means of obtaining reproductive success in the livebearing mosquitofishes (genus *Gambusia*). As a result, this system is believed to be largely male driven and most studies on mosquitofish focus on male, rather than female behaviors. Overt female choice is difficult to measure because most females resist copulation attempts by males, presumably to reduce potential fitness costs due to coercive mating, and do not show overt signs of choice for particular male traits. However, some females allow males to copulate and exhibit behaviors that qualify as female choice. Because little is known regarding factors that influence female choice, we asked: (1) Do male coercive behaviors influence female choice? and (2) What female characteristics are important for female choice? We conducted a behavioral experiment where all male and female behaviors, and female responses to male behaviors were recorded, scoring female behaviors as "resistant" or "receptive". We found that, while most females resisted male mating attempts, some did allow males to copulate. We hypothesized that female size and reproductive state are important predictors of female choice, predicting that females with ripe eggs ready for fertilization would be most receptive to males. Multiple regression showed the larger the female and closer she was to parturition (measured as embryo stage), the more resistant she was to matings. However, no female characteristics measured were correlated with female receptivity. While our results clarify factors influencing female resistance, mechanisms by which females allow males to mate remain unclear.

- 177 DEVELOPING MICROSATILLITE MARKERS FOR ATLANTIC CROAKER (*MICROPOGONIAS UNDULATUS*) FOR FISHERIES MANAGEMENT.

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*Micropogonias undulatus*, the Atlantic croaker, is an important commercial and recreational fish, mainly used as a baitfish, found along the North American eastern and southern coastlines. Since 1996, the catch rate of *M. undulatus* in the coastal bend area of Texas has declined. Currently, in Texas, there are no catch limits or restrictions on *M. undulatus* to prevent population decline. Understanding stock structure using molecular markers, such as nuclear microsatellites, would facilitate the development of scientifically-based management policies. However, nuclear microsatellite markers for *M. undulatus* are currently unavailable. Our goal is to develop microsatellite markers for *M. undulatus*. Therefore, we constructed an enriched genomic library and developed microsatellite primers for this species. The markers we develop will be useful for future studies in genetic variation and stock structure of this species and provide necessary information for fisheries management.

185 TOWARD CREATION OF ECOLOGICAL ROADMAPS: A PROPOSED TROPHIC DATABASE FOR THE GULF OF MEXICO LARGE MARINE ECOSYSTEM.

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A new era of large distributed biological databases has evolved in the past 10 to 15 years. Projects such as the Census of Marine Life (CoML), National Biological Information Infrastructure (NBII), ORNIS, MaNIS, HerpNet, FishNET, INCOFish, FishBase, Paleobiology, EOL and others are capturing taxonomic and biological data into spatially explicit databases. While these databases are capturing species distribution data, what is lacking is a catalogue of the ecological interactions between species in an ecosystem that are fundamental to ecology. We report on a proposed project to build a temporally and spatially explicit web-based marine and estuarine trophic database for the Gulf of Mexico. It will include diet data for marine mammals, sea turtles, seabirds and shorebirds, fishes, crustaceans, polychaetes, ctenophores and cnidarians extracted from published and unpublished sources. This database will facilitate the analysis of spatial and temporal trends in the tropho-dynamics of the Gulf of Mexico, provide a rich database for theoretical investigations into food web topology and directed networks, and will be valuable to fisheries and food web modelers using Ecopath and other models. In addition, this project will provide a mechanism to preserve valuable historical data from destruction or discard, and make it more readily accessible to researchers and the public alike. Techniques and tools will be developed to make this data available to the general public through organizations such as the Texas State Aquarium and other education and outreach groups.

138 CHARACTERIZATION OF DNA MICROSATELLITE MARKERS FOR THE SPOTTED SEATROUT, *CYNOSCION NEBULOSUS*.

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*Cynoscion nebulosus*, the spotted seatrout, is a popular recreational fish along the Texas coast. As part of an ongoing salt-water fishery management strategy to reverse declines in spotted seatrout in Texas bays and estuaries, the daily fishing bag and possession limit was lowered recently in the lower Laguna Madre region. In addition, the Texas Parks and Wildlife Department produces juvenile hatchery-reared spotted seatrout for purposes of stock enhancement to supplement 'wild' stocks as a means to counterbalance the effects of fishing, habitat degradation, and natural occurrences. Recent DNA microsatellite studies utilizing interspecies markers have observed little population structure for spotted seatrout along the Texas coast. Genetic surveys using additional, species-specific microsatellite loci have been recommended to provide the information needed to develop scientifically-based policies that take into account stock structure and geographic boundaries of different stocks of spotted seatrout, should they exist, as a responsible approach to assessing stocking impacts and its potential as a fishery management strategy. In this study, an enriched DNA microsatellite library was constructed for *C. nebulosus*. From the library, we characterized DNA microsatellite markers, facilitating future investigations of the genetic variability and population structure of *C. nebulosus*.

69 CLIMATE CHANGE AND GLOBAL WARMING: EFFECTS OF HEAT STRESS ON PORIFERANS FROM FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY, GULF OF MEXICO.

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Temperatures in the Gulf of Mexico appear to be increasing by as much as 0.5°C per decade, causing either complete or partial bleaching of species containing bacterial and/or algal symbionts. Here, we assess the efficacy of using heat stress on Poriferans as a proxy to monitor the overall health and status of the benthos community on these assumed pristine reefs. Poriferans commonly occur on hard substrate in the Gulf of Mexico and are used by many species for food, habitat, and chemical defense against predators. Poriferans compete intensely for space with scleractinian corals; their water filtration ability and unique bacterial endosymbionts make them a suitable model for ecophysiological comparison. Two species, *Xestospongia muta* and *Cliona varians*, are prevalent on the Flower Garden Banks and contain specialized symbiotic bacteria

which can be monitored to assess the effects of heat stress. The results will allow comparison with coral bleaching where photosynthetic symbionts are expelled under heat stress.

- 106 DISTRIBUTION OF NEAR-SHORE CORALS AND EFFECTS OF TURBIDITY ON *LEPTOGORGIA* SP. AT THREE SOUTH TEXAS JETTY SYSTEMS.

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Most coral species are associated with tropical coral reefs. However, there are also some temperate coral species found along the coast of the U.S. that colonize other natural and artificial hard substrates. In Gulf of Mexico, studies on these corals have concentrated on the northeastern coast from Florida to Louisiana. As a result, there is a shortage of data regarding their distribution along the northwestern coast, especially in Texas waters. Preliminary surveys in the Corpus Christi, Texas region have shown that species of the gorgonian coral, *Leptogorgia*, are common and the scleractinian corals *Astrangia poculata* and *Oculina diffusa* are also present. Our study will conduct transect surveys in a north to south gradient (temperate to subtropical) along the south Texas coast at the Brazos-Santiago Pass, Aransas Pass, and Mansfield Pass jetties. One of our objectives will be to determine distribution, abundance, and community composition of coral species present. Corals will be identified to species and the height, number of branches, health, and color of each measured. Associated organisms on and near the colony will be included in these investigations. Surveys will be undertaken in both the winter and summer at the aforementioned locations in order to study seasonal differences in the populations. Samples of *Leptogorgia* sp. will also be subjected to controlled laboratory experimentation on the effect of turbidity/sedimentation on survivorship.

- 68 EFFECTS OF TOLUENE AND METHYL *TERT*-BUTYL ETHER ON THE GORGONIAN CORAL, *LEPTOGORGIA VIRGULATA*, IN THE ARANSAS PASS SHIP CHANNEL, TEXAS.

Michelle White\* and Dr. Kevin Strychar, Texas A&M University, Corpus Christi, TX.

The south jetties in the Aransas Pass ship channel, Texas, are habitat for the gorgonian coral *Leptogorgia virgulata* at ~4-5m in depth. The Aransas ship channel connects the Gulf of Mexico with the Aransas Bay making it a major waterway for ships to travel in and out of the port of Corpus Christi. Because of the water traffic, remnants of gasoline are deposited into the water column including hydrocarbons, toluene, and methyl *tert*-butyl ether (MTBE). Many ahermatypic corals, including *L. virgulata*, are filter feeders, siphoning waste particles in the water column. There are significant concerns that some of the chemicals associated with boating traffic may have a negative effect on benthic biota. For example, both toluene and MTBE have been shown to cause nervous system effects in humans such as dizziness, nausea, and loss of memory. The purpose of this study is to determine what effect, if any, gasoline and/or its constituents have on benthic ahermatypic corals, specifically *L. virgulata*. Preliminary evidence obtained by exposing sampled coral to various concentrations of either toluene or MTBE for 30 hours show that these chemicals, regardless of their concentrations (~2-15%), are harmful to the coral. Effects included cell sloughing, or cell loss, un-protruding polyps, and at an extreme, coral death.

- 242 DIRECT EFFECTS OF MALE HARASSMENT ON FEMALE PHYSICAL CONDITION IN THE WESTERN MOSQUITOFISH, *GAMBUSIA AFFINIS*.

Janalyn West\*, Abigail Marcotte, and Raelynn Deaton, Sam Houston State University, Huntsville, TX.

The western mosquitofish is an ideal study organism for investigating sexual conflict because males exhibit a coercive mating system. Variation in operational sex ratio (OSR) and density are known to contribute to sexual conflict and affect male mating behaviors. Using virgin females, we varied density and OSR to estimate male harassment. We recorded the number of copulation attempts by males (both successful and unsuccessful). We predicted that male harassment would increase with male density and as sex ratios become more male biased. Our results showed that average copulation attempts did not vary with sex ratio or density. But, we recorded total male copulation attempts within each group; therefore, the number of copulation attempts toward individual females may vary. The second component of our study investigates possible decreases in female fitness via actual physical damage by the male intromittent organ (gonopodium), which is sharp and equip with hooks at the end to aid in sperm transfer. It is likely that the gonopodium causes increased tissue damage, which may decrease female fitness via reduced fecundity, decreased offspring fitness, or reduced female lifespan due to increased susceptibility to bacterial infections or sexually transmitted diseases. We use scanning electron microscopy (SEM) to measure actual tissue damage to gonopores of the females from our behavioral experiment. We

predict that tissue damage will increase with male density and as OSR becomes more male-biased. We currently are in the process of completing the SEM work, and results from this component of our study also will be presented.

315 EVALUATION OF TEMPERATURE, SALINITY AND GROWTH OF THE JAPANESE OYSTER *CRASSOSTREA GIGAS* (BIVALVIA: OSTREIDAE) IN MACAPULE BAY, GUASAVE, SINALOA, MEXICO.

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Between November 15<sup>th</sup> of 2004 and May 15<sup>th</sup> of 2005, we evaluated the growth of oysters, temperature and salt content of the water at the culture site of the Japanese Oyster (*Crassostrea gigas*) in Macapule Bay, Guasave, Sinaloa, Mexico. The results indicated that the site and the culture methods (suspension baskets) are very favorable for this species because we recorded a monthly average growth of 1.52 cm, with an increase of 113.13 grams in the total weight. This represents approximately 50 % more than that recorded in the same period from other countries such as Japan and England. Salinities of 36‰ and temperature 25°C do not inhibit the growth of these species at the culture site.

130 PREDATOR-INDUCED PHENOTYPIC PLASTICITY IN THE WESTERN MOSQUITOFISH (*GAMBUSIA AFFINIS*).

Andres A. Palencia\*, Samir K. Rosado, Raelynn Deaton, and Chad W. Hargrave, Center for Biological Field Studies and Department of Biological Sciences, Sam Houston State University, Huntsville, TX

Predator-induced phenotypic plasticity has been well demonstrated in plants, zooplankton and tadpoles. These morphological changes often result in increased fitness due to enhanced predatory avoidance. However, because these morphological changes have some cost, the degree of plasticity often varies with level of predatory threat. For example, when predatory risk is inversely related to prey density, the magnitude of predator-induced plasticity can change as a function of prey density. In a series of laboratory observations, we documented the development of a teardrop (dark pigmentation under the eye) in individual Western Mosquitofish (*Gambusia affinis*) when exposed to a common predator (Redfin Pickerel, *Esox americanus*). In this study, we tested visual and chemical predator cues on phenotypic plasticity (teardrop) across densities (high and low) and populations (with predators and without predators) in the Western Mosquitofish. Visual response to predatory threat caused teardrop formation in all densities and populations of Western Mosquitofish. Thus, in our study the magnitude of phenotypic response was uncoupled from the degree of predatory threat. This suggests that teardrop development may not be costly, and might be characteristic of Western Mosquitofish throughout their range. Test of chemical cues are currently underway and also will be presented.

176 EFFECTS OF PRESSURE ON THE THERMAL TOLERANCE OF PINFISH (*LAGODON RHOMBOIDES*).

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As fishes are exposed to increasing or decreasing temperature within their range of tolerance, physiological processes are altered. If temperatures surpass a fish's thermal limit, metabolic processes collapse and death normally ensues. Many mechanisms have been proposed to explain thermal intolerance of metazoans. Enzymatic dysfunction appears to be a major underlying cause. Extreme temperatures break weak bonds and force enzymes into different tertiary arrangements. Conformation changes may cause failure of one or more key enzymes resulting in physiological disorganization, and ultimately death. The enzymatic breakdown hypothesis implies that fish thermal tolerance limits could be expanded if techniques existed that could stabilize protein configuration. Previous studies indicate that high pressure may ameliorate high temperature effects. My research examines the relationship between pressure and thermal tolerance of pinfish, *Lagodon rhomboides*. High and low temperature tolerance values were estimated for replicate groups of pinfish exposed to increasing pressure of 101.0 (ambient), 1034, 2069, 3103, and 4137 kPa. Critical Thermal Methodology was used to quantify upper (CTMax) and lower (CTMin) thermal tolerance for pinfish in each pressure treatment group. As pressure increased, pinfish heat tolerance increased from 36.9°C to 38.0°C, whereas cold tolerance fell from 10.8°C to 12.7°C. The upward shift of thermal tolerance demonstrates that application of pressure may be stabilizing enzymes at high temperatures and perturbing enzymes at low pressure, indicating that enzymatic dysfunction is a major underlying cause of fish thermal intolerance. In addition, the temperature-pressure relationships may have ecologically relevant implications to fish that live in extreme environments.

- 298 CHARACTERIZATION OF EPIPHYTIC BIOFILMS ON *THALASSIA TESTUDINUM* AND *HALODULE WRIGHTII*. Justin Medlock\*, Eric Helander, Texas A&M University–Corpus Christi, Department of Life Sciences, Corpus Christi, Ivonne R. Blandon, CCA/CPL Marine Development Center, Texas Parks and Wildlife Department, Corpus Christi, TX, and Kirk Cammarata, Texas A&M University–Corpus Christi, Department of Life Sciences, Corpus Christi, TX.

Seagrasses provide critical aquatic habitat for many marine organisms, but are generally in decline in some areas of coastal Texas. Excessive growth of epiphytes (including bacteria, algae, and fungi) has been implicated where there are anthropogenic nutrient impacts, presumably reducing photosynthetic productivity due to attenuation of light. We seek to gain insight into the effects of epiphyte growth on *Thalassia testudinum* and *Halodule wrightii* by characterizing the composition of epiphytic biofilms using 16S/18S rDNA identification technologies. This stage of the study was directed towards optimizing PCR amplification conditions and a preliminary sequence characterization of epiphytic organisms. DNA was extracted from *Thalassia* and *Halodule* epiphytes and the 16S/18S rDNA regions were amplified using the primers for a Universally Amplified Ribosomal Region (495 bp and 508 bp products for 16S/18S rDNA, respectively), as well as algae-specific primers (approx 1000 bp). PCR conditions were optimized and purified amplicons were subsequently cloned using the TOPO-TA® cloning system. Initial cloned rDNA PCR products were bidirectionally sequenced and compared to nucleotide databases using BLAST. Top matches (>95% sequence identity) for these clones included diatoms, red algae, cyanobacteria, proteobacteria, bryozoans, hydrozoans, gastropods, and copepods. We are currently processing additional clones for organism identification. Future efforts will focus on comparing samples from seagrass beds with varying degrees of anthropogenic impact.

- 279 FISH ASSEMBLAGE DYNAMICS IN THE RECENTLY RE-FLOODED BAHIA GRANDE. Erika Cornejo\*, Ruben Trevino, Troy McWhorter, Anthony Reisinger, and David Hicks. The University of Texas at Brownsville, Brownsville, TX.

In July 2005, the 2,600 hectare Bahia Grande was reconnected to the lower Laguna Madre by way of a 4.5 m wide pilot channel extending from the Brownsville Ship Channel. The July 2005 event marked the first permanent flooding of the Bahia Grande in over 70 years. A quarterly sampling program, utilizing bag seines and gill nets, was initiated to monitor species composition and community structure in the re-flooded wetland. A total of 15 and 10 fish species have been captured in bag seine and gill net samples, respectively, in 24 months of survey. Fish assemblage dynamics were correlated to corresponding variations of salinity. During periods of extreme hypersalinity (80 to >100 ppt), fish diversity approaches near zero as sheepshead minnow (*Cyprinodon variegatus*) overwhelmingly dominate the system. During periods of moderate hypersalinity (45-55 ppt) fish diversity quickly recovers. Our findings support the need for future manipulations and enhancement actions for increasing circulation throughout the system, particularly, replacing the pilot channel with the proposed 45.7 m wide permanent channel.

- 224 WHERE DO CATSHARKS LAY EGGS IN DEEP WATER? Peter Etnoyer\*, Harte Research Institute, Texas A&M–Corpus Christi, Mary Sue Brancato, Ed Bowlby, NOAA Olympic Coast National Marine Sanctuary, and Jeff Hyland, NOAA Center for Environmental Health and Biomolecular Research.

Catsharks are a speciose group of small benthic oviparous elasmobranchs [Carcharhiniformes: Scyliorhinidae] that range throughout the deep-sea. Their egg cases are distinctive, with long tendrils, and a bulging fusiform shape. Catshark egg cases have been found attached to soft coral, derelict fishing gear, and hydroids, but to date, the nature and extent of the relationship between catsharks and their choice of nursery habitat remains unclear. A 2003 expedition to the Mississippi Canyon in the Gulf of Mexico documented >1000 individual catshark egg cases in a large monotypic field of deep-sea primnoid gorgonian coral, *Callogorgia americana delta* (Cairns and Bayer 2002) [Gorgonacea: Primnoidae] at 560 m depth. Questions posed by the discovery asked whether the choice of nursery substrate was site specific, substrate specific, or species specific (Etnoyer and Warrenchuk 2007). Three years later, surveys for deep-water corals in the Olympic Coast National Marine Sanctuary on the US Pacific coast also encountered a large field of primnoid gorgonians (*Plumarella* sp.) adorned with scyliorhinid egg cases, helping to reveal tentative answers to each of these questions.

- 157 DOGWHELKS (*NUCELLA LAPILLUS*) EVALUATE PREDATION RISK USING CHEMICAL CUES FROM PREDATORS AND PREDATOR DIET. Scott I. Large\* and Delbert L. Smee, Texas A&M University–Corpus Christi.

Dogwhelks (*Nucella lapillus*) are marine gastropods that are preyed upon by predatory crabs. *Nucella* assess their environment before foraging and reduce foraging time in the presence of predators. This could have important implications on community structure via trait mediated indirect interactions. The purpose of this study is to determine 1) what type of cue *Nucella* use to determine predation risk, 2) how do common predators affect *Nucella* behavior, and 3) how does predator diet affect *Nucella* responses to risk? Using laboratory flumes, we determined that *Nucella* alter their behavior in response to the waste of the predatory European green crabs. *Nucella* move significantly less in the presence of green crab exudates indicating that chemical cues mediated *Nucella* reactions to predators. Because different predators impose varying levels of threat to prey, we investigated *Nucella* behavioral response to Jonah, rock, and green crabs. *Nucella* reacted to green crabs by decreasing their movement, but did not respond to Jonah or rock crabs. Predator diet also influenced *Nucella* responses to green crabs. *Nucella* reacted to green crabs that had eaten conspecifics, mussels and to manually crushed conspecifics, but did not react to starved predators. Because green crabs are generalist predators, the threat posed by green crabs to *Nucella* is unrelated to the crab's diet. Therefore, we should not expect *Nucella* to react different to predators feeding on mussels vs. conspecifics. The response of *Nucella* to manually crushed conspecifics may provide a strategy by which these snails can evaluate predators when predator cues are undetectable.

- 263 MINERALIZATION OF THE CRAYFISH CUTICLE. Francis Horne, Department of Biology, Texas State University, San Marcos, TX.

In soft, neutral pHs of fresh waters, extracellular mineralization of freshwater crayfish, *Procambarus clarkii* (Girard, 1852), cuticles overcome carbonate ion shortage by utilizing carbonic anhydrase (CA) to enhance availability of carbonate ions. Data is presented supporting this hypothesis. Stained cuticle sections treated with <sup>91</sup> antibodies to bovine RBC carbonic anhydrase stained more intensely blue along the matrix fibrils than did the intermatrix spaces. Controls that were not exposed to <sup>91</sup> antibodies to the bovine RBC enzyme CA, but only to the <sup>92</sup> antibodies and to the phosphatase substrate, did not stain significantly. Poorly calcified and flexible ventral abdominal cuticle stained weakly or not at all. The poorly calcified and weakly staining ventral cuticle contained 0.5% calcium or a ratio of CaCO<sub>3</sub>/dry matrix = 0.072, while heavily calcified and strongly staining cuticle from the carapace contained 21% calcium or a ratio of CaCO<sub>3</sub>/dry matrix = 3.27/1.0. The heavily calcified carapace was 45 times as calcified as the weakly calcified ventral membranes. Dot blots illustrate that the proteins extracted from crayfish cuticles respond positively to <sup>91</sup> antibodies to bovine RBC carbonic anhydrase. By comparing color intensity with controls the estimated CA concentration in the cuticle extracts was approximately 8ng/2.3 μg or 0.2%. Data reported here are similar to those reported for marine crustaceans and further support the contention of others that CA is probably critical for calcite formation and that the enzyme is deposited and operating extracellularly as it does in the avian egg.

- 141 ELEVATED ATMOSPHERIC CO<sub>2</sub> AFFECTS STREAM ECOSYSTEM PROPERTIES AND FUNCTIONS. Samir K. Rosado\*, Kaitlen P. Gary and Chad W. Hargrave, Center for Biological Field Studies and Department of Biological Sciences, Sam Houston State University, Huntsville, TX.

The effects of elevated atmospheric CO<sub>2</sub> (eCO<sub>2</sub>) on terrestrial ecosystem properties and functions has been well studied. In general, CO<sub>2</sub> enrichment affects energy, nutrient and community dynamics in grasslands and forests. However, fewer studies have tested the effects of eCO<sub>2</sub> on properties and functions in aquatic ecosystems. This limits broad generalizations about effects of a changing climate across biomes. In this study, we tested effects of eCO<sub>2</sub> (i.e., double ambient) on stream ecosystem properties and functions using large, outdoor, stream mesocosms. We found that increased levels of atmospheric CO<sub>2</sub> decreased pH and increased dissolved CO<sub>2</sub> in the watercolumn. This reduced C-limitation and stimulated primary productivity (PPR) of benthic periphyton. Enhanced periphyton productivity increased rates of C-assimilation relative to nutrient uptake, resulting in poorer periphyton quality in the eCO<sub>2</sub> treatment. Benthic invertebrate density, biomass and average individual size increased in the eCO<sub>2</sub> treatment regardless of poorer periphyton quality, suggesting that total PPR was a more important regulator of secondary production than food quality in this experiment. Decomposition rates of leaf litter were slower in the eCO<sub>2</sub> treatment. We speculate that this effect could have resulted from nutrient competition between microbial decomposers and the more productive periphyton assemblages, but this needs further investigation. This study provides some of the first evidence that eCO<sub>2</sub> can affect a variety of stream ecosystem properties and functions that might transcend trophic levels and affect food web dynamics in these ecosystems.

## 116 NEAR SHORE GORGONIAN CORALS AS POTENTIAL LARVAL AND JUVENILE FISH HABITAT.

Alyssa F. Dailey\*, Kevin Strychar, and David McKee, Texas A&M University–Corpus Christi TAMUCC, Corpus Christi, TX.

Many vertebrate and invertebrate fishery populations along estuarine coastal habitats support important recreational and commercial industries in Texas. The Black Drum (*Pogonias cromis*) is one type of important fish (Sciaenidae). During their two phase life cycle, Black Drum migrate into and out of the bays as conditions permit. Finding appropriate habitat that supports foraging for food as well as refuge from predators is necessary for survival. *Leptogorgia virgulata* (commonly called a sea whip), a colonial gorgonian coral, is found on hard substrates lining passageways into Texas bays and estuaries. The sea whip, as it grows, produces vertical branches that attract an assortment of organisms. These organisms may prey upon the coral or develop a commensal relationship with the gorgonian. Due to the locations in which *Leptogorgia* sp. are found, and the potential food sources that are attracted to the coral, a plethora of anecdotal information suggests such coral may be attracting and/or used by fishery species (e.g. Black Drum) as nursery habitat.

84 DEFENSIVE COMPOUNDS FROM THE DEEP-SEA BUBBLEGUM CORAL *PARAGORGIA* SP.

Larissa M. Bright\*, Texas A&M University-Corpus Christi, TX, Thomas Shirley, Harte Research Institute, Texas A&M University–Corpus Christi, TX, Kevin Strychar and Eugene Billiot, Texas A&M University–Corpus Christi, TX.

Asteroids (sea stars), predators of deep-sea corals, appear to avoid feeding on gorgonian octocorals of the genus *Paragorgia*, but readily feed on many other deep-sea gorgonian corals. Except for sclerites, this immobile genus does not have obvious defenses against predation. The lack of predation on *Paragorgia* and the absence of physical defenses suggest this coral may contain a defensive bioactive compound. Previous studies have isolated four xeniolide diterpenoids from *Paragorgia arborea* (Linnaeus, 1758), but their defensive capabilities have not been examined. These diterpenoids differed between *P. arborea* collected from different regions, and several of them were novel compounds. The goals of this research are to: (1) examine the behavioral responses of goldfish, *Carassius auratus* (Linnaeus, 1758) to chemical extracts from *Paragorgia* sp.; (2) estimate defensive capabilities of any and/or all isolated extracts; and, (3) isolate and characterize the chemicals contained in *Paragorgia* sp.

148 INVESTIGATION OF *VIBRIO VULNIFICUS* BIOTYPES IN ESTUARINE WATERS OF THE COASTAL BEND REGION OF TEXAS.

Amanda K. Smith\*, Gabriel D. Ramirez, Joanna B. Mott and Gregory W. Buck, Texas A&M University–Corpus Christi, Corpus Christi, TX.

*Vibrio vulnificus* is a naturally occurring, ubiquitous bacterium found in estuarine waters. It is a well-documented pathogen with two main clinical presentations, i.e. primary septicemia and wound infection. Currently, this bacterium is sub-classified into three groups designated biotypes 1, 2, and 3. Biotype 1 is more commonly associated with human pathogenicity. From April through July 2007, this study examined the occurrence, levels, and biochemical profiles of *V. vulnificus* at six Coastal Bend beach stations currently monitored for *Enterococcus* through the Texas Beach Watch program. A positive correlation was found between levels of *V. vulnificus* and *Enterococcus*. A subset of *V. vulnificus* isolates, confirmed by colony-blot hybridization using the species specific vva gene probe, were biochemically characterized to determine the biotype of each isolate. Of the 40 isolates, 25 were classified as biotype 1 and 15 did not fit any classification. None of the isolates matched the characteristics of either biotype 2 or 3. No correlation was found between the incidence of biotype 1 and month of collection, site of collection, or water temperature. This preliminary study must be expanded to further explore the spatial and temporal incidence of *V. vulnificus* biotypes in the Coastal Bend area and to assess the diversity of strains in this region.

198 INCIDENCE AND DISTRIBUTION OF *VIBRIO VULNIFICUS* IN SOUTH TEXAS COASTAL WATERS.

Gabriel Ramirez\*, Gregory Buck and Joanna Mott, Texas A&M University–Corpus Christi, Corpus Christi, TX.

Although there have been a number of studies investigating the distribution of *Vibrio vulnificus* in various estuaries around the U.S., there is a lack of information on its prevalence in south Texas coastal waters. *V. vulnificus* in local waters has been linked to several cases of severe illness or death from wound infections. Thus, a one-year study on the distribution of this pathogen in south Texas coastal waters was conducted at six sites using multiple regression analyses to reveal the major environmental factors affecting its distribution. Field sampling was conducted monthly from August 2006 through July 2007, and levels of *V. vulnificus* were examined in relation to the fecal indicator, *Enterococcus* sp. and six abiotic factors. *V. vulnificus* and



*Enterococcus* sp. were enumerated from each water sample using selective media. Isolates of *V. vulnificus* were confirmed using colony hybridization with a species specific gene probe that targets the cytolysin gene, *vwhA*. *V. vulnificus* was isolated from each site for every sampling event. Multiple regression analyses indicated that levels of *V. vulnificus* were influenced by water temperature, salinity, and turbidity (Secchi disk). Water temperature and salinity accounted for 48% of the variability in the concentration of *V. vulnificus* enumerated using *Vibrio vulnificus* Agar, and salinity and turbidity (Secchi disk) accounted for 22% of the variability in the concentration of *V. vulnificus* enumerated using modified Cellobiose Polymixin Colistin Agar. The pathogen, *V. vulnificus*, was ubiquitous in the marine waters sampled in the Coastal Bend region of the Texas coast.

172 CHARACTERIZATION OF EPIPHYTIC BIOFILMS ON *THALASSIA TESTUDINUM*.

Erik Helander\*, Justin Medlock and Kirk Cammarata, Texas A&M Corpus Christi, TX.

Seagrasses provide critical aquatic habitat for many marine organisms, but are generally in decline in some areas of coastal Texas. Excessive growth of epiphytes (including bacteria, algae, and fungi) has been implicated where there are anthropogenic nutrient impacts. We seek to gain insight into the effects of epiphyte growth on *Thalassia testudinum* by characterizing the microbial composition of epiphytic biofilms using 16S rDNA identification technologies. This stage of the study was directed towards optimizing PCR amplification conditions and doing a preliminary sequence characterization of epiphytic bacteria. DNA was extracted from *Thalassia* epiphytes and two regions of 16S rDNA were amplified (566bp and 433bp) using oligonucleotides F341, R907 and F968, R1401. Problems occurred with the initial PCR procedure that included multiple and indistinct banding as well as primer dimers. Primer concentration was reduced to 0.2 $\mu$ M, template DNA quality and concentration were standardized and annealing temperatures were adjusted to improve amplification. PCR product was then gel purified and used for subsequent cloning reactions. An initial batch of 9 cloned 16S rDNA PCR products was sequenced and compared to nucleotide databases using BLAST and RDP II. Top matches (>97% sequence identity) for these clones included *Maritimibacter*, *Rhodobacteraceae*, *Roseobacter*, gamma *Proteobacteria*, *Rhodovulum*, *Phormidium*, and other uncultured bacteria. We are currently processing another 103 clones for bacterial identification. Future efforts will focus on comparing samples from seagrass beds with varying degrees of anthropogenic impact.

287 EVALUATION OF SOUTHERN FLOUNDER (*PARALICHTHYS LETHOSTIGMA*) GENETIC RESOURCES IN THE TEXAS COAST APPLICATIONS FOR A STOCK ENHANCEMENT PROGRAM.

Ivonne R. Blandon\* and Robert R. Vega, CCA/CPL Marine Development Center, Texas Parks and Wildlife Department, Corpus Christi, TX, Rocky Ward, USGS Northern Appalachian Research Center, Wellsboro, PA, Kirk Cammarata and R. Deborah Overath, Texas A&M University, Corpus Christi.

The southern flounder (*Paralichthys lethostigma*), an important commercial and recreational species on the Texas Coast, has recently experienced drastic coastwide declines in population size. In response, Texas Parks & Wildlife Department (TPWD) initiated an effort to hatchery-rear juvenile southern flounder for purposes of stock enhancement. Protocols to spawn captive flounder broodstock and rear juveniles in grow-out ponds are currently being tested at TPWD hatcheries. The primary goal of this effort is to develop hatchery techniques to culture this species on a large-scale basis, allowing a flexible response to changing management needs (e.g., stocking to compensate for year class failures owing to catastrophic events). In preparation for this intensive enhancement effort, collaborative research is ongoing at the TPWD CCA/CPL Marine Development Center and TAMUCC to conduct a preliminary survey of genetic variability among southern flounder collected along the Texas coast. Variation in allele frequencies of nine polymorphic microsatellite loci was determined for 350 southern flounder obtained from 8 Texas bay systems. Samples from northern Mexico and North Carolina were included for comparison. Mean observed heterozygosity ranged from 0.52 to 0.67. Allele frequencies varied among samples with 8 of 9 loci significantly contributing to that discrimination. The information obtained in this study will be used to design comprehensive management strategies (e.g., broodfish collection, and hatchery juvenile releases) focused on the conservation of the genetic resources of this species in Texas waters.

P210 ARSENIC-OXIDIZING AND ARSENIC-REDUCING BACTERIA FROM THE LAGUNA MADRE.

Marina Martinez\* and Kristine L. Lowe, Department of Biology, University of Texas–Pan American, Edinburg, TX.

The Laguna Madre is one of only five hypersaline estuaries in the world. Seagrass beds, which are regions of high primary productivity, serve as nursery grounds for marine and estuarine organisms. Rare, endangered, threatened and migratory animal species feed or nest in the Laguna Madre. Arsenic in the Laguna Madre presents a potential threat to the ecosystem

and may impact its organisms. Some microorganisms may increase the mobility of arsenic by reducing As(V) to As(III) (arsenic-reducing bacteria). However, some microorganisms may lessen the toxicity of arsenic by immobilizing it via oxidation of As(III) to As(V) (arsenic-oxidizing bacteria). The purpose of this study was to determine the presence, densities and fundamental characteristics of potential arsenic-oxidizing and arsenic-reducing microbes from the Laguna Madre. Density was determined using standard plate counts on agar media containing As(III) or As(V). Bacterial isolates from agar media were characterized by observing colony morphology on arsenic media and Gram staining. Preliminary results showed that potential arsenic-oxidizing and arsenic-reducing microbes were present in Laguna Madre sediments and ranged from  $1.0 \times 10^2$  cfu  $g^{-1}$  wet sediment to  $2.8 \times 10^4$  cfu  $g^{-1}$  wet sediment. Typical morphology for isolates on As(III) media was small, round white colonies; cells were typically Gram-positive bacilli or cocci. Typical morphology for isolates on As(V) media was small, round opaque colonies; cells were Gram-positive bacilli. These culture-based experiments will be performed throughout the year to determine if seasonal changes of population size differ. Additionally, populations at sites with varying contamination levels will be compared.

P300 A METHODOLOGY FOR ASSESSING PHYSICAL DAMAGE TO FEMALE MOSQUITOFISH CAUSED BY MALE COERCIVE MATING USING SCANNING ELECTRON MICROSCOPY.

Abigail Marcotte\*, Janalyn West, and Raelynn Deaton, Department of Biological Sciences, Sam Houston State University, Huntsville, TX.

Sexual conflict theory predicts that male harassment may decrease female fitness by increasing susceptibility to bacterial infections and other pathogens. We study sexual conflict in mosquitofish because they exhibit a coercive mating system, where males force copulations on females. Males internally fertilize females with an intromittent organ called a gonopodium, derived from the elongation and modification of the male's anal fin rays. Because of the morphology of the gonopodium (it is equipped with hooks that serve as a holdfast during copulation), and coercive behavior of males, we predict that females may suffer reduced fitness indirectly via increased physical damage to the gonopore tissue. Thus, we predict a positive correlation between male coercion and physical tissue damage to females. We currently are developing a methodology to measure actual physical damage to the female genital region acquired during mating. We use scanning electron microscopy (SEM) to measure tissue damage (tears, folds, inflammations) to the gonopore of females using a grid system that we developed for measurements. We weigh females (g), carefully remove and weigh the gonopore ( $\mu$ g), critically dry tissues, coat tissues in gold, photograph the tissues using SEM, and measure tissue damage from photographs that are standardized for female size. Here, we focus mainly on presenting our methodology for use of SEM to assess tissue damage to females. In addition, we will present comparative photographs of virgins, nonvirgins, and females with varying degrees of tissue damage, and present any correlations between male mating and genital tissue damage for our test females.

P310 BAHIA GRANDE RESTORATION: WATER QUALITY, 2005-2007.

Dori Cedillo\*, Antonio Villarreal, Christian Garcia, Ruben Trevino, Erin Bieberbach, and Hudson DeYoe. Center for Subtropical Studies and Biology Dept., University of Texas–Pan American, Edinburg, TX.

The Bahia Grande is a 6,500-acre basin located within the Laguna Atascosa National Wildlife Refuge in southern Cameron County, Texas. This area is part of the Bahia Grande Restoration Project, which is a US Fish & Wildlife Service effort to restore the Bahia Grande to pre-1930s condition by re-establishing tidal exchange with marine waters of the Brownsville Ship Channel. One objective of our study is to monitor basin water quality changes quarterly during restoration. Field data (temperature, salinity, conductivity, pH, depth) was first collected and sampling occurred in August 2005, one month after the resumption of tidal exchange and quarterly through August 2007. During each trip, water samples were collected at 9 sites in the basin and were analyzed for water column chlorophyll *a*, nitrate-nitrite, soluble phosphate, ammonium and total suspended solids. Sediment samples were collected and analyzed for benthic microalgal chlorophyll *a* levels. Comparing August 2005-2007, average basin salinity was highest in 2006 (>70 ppt) while salinity in 2005 and 2007 was about equal (50 ppt). In 2006-07, water column chlorophyll was generally low (<15  $\mu$ g/L) until August 2007 when it exceeded 70  $\mu$ g/L. Sediment chlorophyll increased through 2006 and early 2007 to peak in March 2007 and subsequently decline through August 2007. Nitrate, ammonium and phosphate although generally low peaked in August 2006 but were not accompanied by an increase in phytoplankton or benthic microalgae. It appears that in 2007 salinities combined with other factors led to the development of the first significant plankton community in the basin.

- P209 EFFECTS OF SALINITY ON MANGANESE REDUCTION RATES BY BACTERIAL CONSORTIA FROM AQUATIC ECOSYSTEMS. Omar R. Elizondo\*, Michael W. Persans and Kristine L. Lowe, Department of Biology, University of Texas–Pan American, Edinburg TX.

Manganese reducing bacteria (MRB) are active in manganese biogeochemical cycling and reduce solid manganese (Mn(IV)) to soluble manganese (Mn(II)) during anaerobic respiration. Experiments were conducted to assess the effects of salinity on manganese reduction rates by sediment bacterial communities from 3 marine and 2 freshwater sites. Sediment from each site was inoculated into tubes of an anaerobic Mn(IV) medium with salinity ranging from 0.0% to 8.0% to grow MRB and estimate the manganese reduction rate at different salinities. In a second experiment, MRB consortia were first grown at salinities that approximated their natural salinity, then transferred to fresh Mn(IV) media that contained other salinities. Manganese reduction rates (mM Mn(IV) reduced per day) were estimated by monitoring media Mn(IV) concentrations using a colorimetric assay to assess the effects of salinity on manganese reduction. Results showed that MRB from freshwater environments displayed the best manganese reduction rates at low salinities (<3.0%); marine MRB displayed the best manganese reduction rates at higher salinities (>3.0%). However, the highest reduction rates were at salinities higher than the environmental salinity measured at collection. Consortia experiments showed that consortia from most sites could reduce manganese at almost any salinity tested at a rate comparable to their normal salinity. Only 1 freshwater consortium was unable to reduce manganese at salinities other than the natural salinity. These results suggest that MRB are able to adapt to changing salinities in their environment. This is especially important in ecosystems, such as the Laguna Madre of Texas, which experience salinity fluctuations.

- P63 CHARACTERIZATION OF SEATROUT (*CYNOSCION* SPP.) IN GALVESTON BAY USING MORPHOLOGY, MICROSATELLITES AND MITOCHONDRIAL DNA MARKERS.

Joel Anderson\*, Dusty McDonald, William Karel and Britt Bumguardner, Texas Parks and Wildlife-Coastal Fisheries, Perry R. Bass MFRS, Palacios, TX.

The evolutionary associations between closely related fish species, both contemporary and historical, are frequently assessed using molecular markers, such as microsatellites. Here, the presence and variability of microsatellite loci in two closely related species of marine fishes (sand seatrout *Cynoscion arenarius* and silver seatrout *C. nothus*) are explored using heterologous primers from red drum *Sciaenops ocellatus*. Data from these loci are used in conjunction with morphological characters and mitochondrial DNA haplotypes to explore the extent of genetic exchange between species in offshore Galveston Bay, TX. Despite seasonal overlap in distribution, low genetic divergence at microsatellite loci and similar life history parameters of *C. arenarius* and *C. nothus*, all three data sets indicated that hybridization between these species does not occur, and that historical admixture in Galveston Bay following divergence between these species was unlikely. The genetic markers employed herein will be useful in future studies in the genus *Cynoscion*.

- P64 TEXAS FREEZE SIMULATION AND WINTER MORTALITY FOR COBIA (*RACHYCENTRON CANADUM*).

Dusty McDonald\*, Britt Bumguardner and Eric Young, Texas Parks and Wildlife-Coastal Fisheries, Perry R. Bass MFRS, Palacios, TX.

Spawning and raising of migratory species for foodfish and stocking purposes has increased in interest. One threat of pond-raising migratory species, which *in situ* have the ability to evade temperature extremes, is a pond freeze. We simulated a potential Texas freeze to determine lethal cold temperatures for pond-raised juvenile cobia *Rachycentron canadum*. After acclimating juveniles to 20.0°C, temperature was decreased 0.33°C per hour, (Texas freeze rates have been reported at 0.25°C). The first fish showing signs of loss of equilibrium occurred at 12.4°C and 50% of experimental individuals lost equilibrium by 12.1 ± 0.35°C. Loss of respiratory movement first occurred at 9.9°C and the median lethal temperature was at 9.6 ± 0.26°C. Results of this study indicate that pond housed cobia juveniles require a temperature >13°C.

- P197 AN EXAMINATION OF FISH ASSEMBLAGES IN POHNPEI, FEDERATED STATES OF MICRONESIA.

Shaun Donovan, Texas A&M University–Corpus Christi.

Collections were conducted on and around the island of Pohnpei in the Federated States of Micronesia (FSM) from 18 April 1999 to 8 June 2007 in order to examine fish assemblages. The collections were analyzed by habitat type of which there were three groups identified: rivers, mangroves and bays. Data were analyzed using principal component analysis, which

reduces the number of variables in a data set to the main or principal components (vectors) of variance. The original variables in the data set were species and the values were the number of individuals captured at a locality. *Stiphodon caeruleus*, an endemic amphidromous freshwater goby, was found to be the most abundant organism in the waters of Pohnpei. The PC values for the observed assemblages drastically increased from freshwater to saltwater indicating a higher degree of variance in the marine environments. This variance was mainly due to high levels of biodiversity and the rarity of some species in the bay habitats observed.

- P199 WHERE HAVE ALL THE BLUE CRABS GONE? EFFECTS OF SALINITY AND PESTICIDES ON BLUE CRABS (*CALLINECTES SAPIDUS*). Christina Wendel\* and Delbert Smee, Texas A&M–Corpus Christi.

Blue crabs (*Callinectes sapidus*) are an ecologically and economically important species, but their populations are declining in part due to increased anthropogenic influences in the environment. Pesticide runoff and freshwater diversion that increase salinity in estuaries are two potential threats to blue crabs. The purpose of this study is to determine how a commonly used pesticide and changes in salinity affect blue crab survival and behavior. We elected to study the effects of Malathion on blue crabs as the organophosphate pesticide is widely used in Coastal Texas for mosquito control. Blue crabs were exposed to low, intermediate, and high concentrations of Malathion and to no-pesticide controls and housed in either a favorable (17-22 psu) or elevated salinity (35-40 psu). We also varied exposure time using chronic (continuous for 5 days) or acute (1 hour) treatments. Additionally, we are beginning an investigation to determine if these stressors affect blue crab behavior, specifically foraging ability, as changes in foraging by these keystone predators may have large impacts on blue crab populations and on estuarine communities in general. This study is in its infancy, but preliminary results suggest that high salinity coupled with pesticides increase crab mortality and diminish their desire or ability to forage. We have also noted that crabs can recover and resume normal activities after acute exposure. This study provides an important first step in investigating these stressors on blue crab mortality and behavior and may provide key insights as to the causes of blue crab population decline.

- 167 SPACE-TIME DISTRIBUTION OF FISHES IN THE BIOSPHERE RESERVE OF THE MARSHES OF CENTLA: A WETLAND IN SOUTHEAST MEXICO.

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Few studies exist concerning the distribution of specific fish in their habitats at the reservoirs of Centla. The space-time distribution was studied of the fishes associated with soft substratum without vegetation (SSSV) and those associated with submerged aquatic vegetation (SAV) in the Biosphere Reserve of the Reservoirs of Centla, located in the coastal zone in the South of the Gulf of Mexico. The design of the sample included the spatial variation between the two constant habitats (SSSV and SAV) in three lagoons (El Sauzo, Larga and San Pedrito) and temporal variation between the seasons of minimum and maximum inundation. The samples were taken monthly during an annual cycle. A total of 437 specimens were revised, divided into 18 species, 9 families and 14 genera. The results were that the families of the Characidae (42%) and Cichlidae (36%) were found in greatest abundance. The lagoon El Sauzo, was where the greatest abundance was found. In the soft substratum without vegetation the Characidae was mostly acquired, and the Cichlidae was found mostly in aquatic, submerged vegetation. The Cichlidae had the most species in the two habitats (SSSV and SAV) with 5 and 9 species, respectively. The capture of *Rhamdia guatemalensis* was prominent in the two habitats, a species which is now under special protection at the NOM (Mexican official Norm), demonstrating the importance of conservation of the variability of habitats to maintain the biodiversity of the aquatic vertebrates in these tropical wetlands.

DISTRIBUCIÓN ESPACIO-TEMPORAL DE PECES EN LA RESERVA DE LA BIOSFERA PANTANOS DE CENTLA, UN HUMEDAL DEL SURESTE DE MÉXICO.

En Pantanos de Centla existen escasos estudios de la ictiofauna específicos a la distribución en hábitats. Se estudió la distribución espacial y temporal de los peces asociados con sustratos suaves sin vegetación (SSSV) y con vegetación acuática

sumergida (SAV) en la Reserva de la Biosfera Pantanos de Centla, ubicada en la zona costera del sur del Golfo de México. El diseño de muestro incluyó la variación espacial entre dos hábitat contrastantes (SSSV y SAV) en tres lagunas (El Sauzo, Larga y San Pedrito) y variación temporal entre las épocas de mínima y máxima inundación. Los muestreos fueron mensuales durante un ciclo anual. Se revisaron un total de 437 ejemplares, repartidos en 18 especies, 9 familias y 14 géneros. Como resultados se presentó la mayor abundancia en las familias Characidae (42%) y Cichlidae (36%). La laguna El Sauzo, fue donde se encontró mayor abundancia. En sustrato suave sin vegetación los carácidos se obtuvieron en mayor número, y los cíclidos se les encontró mayormente en vegetación acuática sumergida. Los cíclidos registraron el mayor número de especies en los dos hábitat (SSSV y VAS) con 5 y 9 especies respectivamente. Se destaca la captura de *Rhamdia guatemalensis* en los dos hábitat, la cual se encuentra como Protección especial en la NOM (Norma oficial Mexicana), demostrando la importancia de conservación de la variabilidad de hábitat para mantener la biodiversidad de vertebrados acuáticos en estos humedales tropicales.

169 FISHES ASSOCIATED WITH MARGINAL VEGETATION IN THE TROPICAL MARSHLAND OF SOUTHEASTERN MEXICO: BIOSPHERE RESERVES OF THE RESERVOIR OF CENTLA, TABASCO, MEXICO.

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Wetlands are important because they account for many different ecological habitats and their complexity provides many means of nutrition, protection against predation and reproduction. These functions make the great diversity of flora and fauna possible. The objective of this work is to determine the composition of the population of fish, to analyze the spatial-temporal variation in the abundance and richness of species and to evaluate the plant associations that are most rich and abundant. 2,285 samples were taken from 32 species, 10 families and 27 genera. From these, 279 were in the larval stage which is why they are only included in the family classification. The family that was best represented was the Cichlidae with 12 species, followed by the Poeciliidae with 9. *Gambusia sexradiata* dominated numerically and distributed itself widely in 23 locations. The species that were found in the least number of locations were *Rhamdia guatemalensis*, *Poecilia petenensis* and *Vieja pearsei* only in one location. *Hyporhamphus mexicanus*, *Xiphophorus maculatus*, *Amphilophus robertsoni*, *Archocentrus octofasciatus*, *Parachromis friedrichsthalii*, *Thorichthys meeki* and *T. passionis* were only found in two of them. The Dren Narváez South and El Sauzo Lagoon had the most abundance with 200 and 156 samples respectively. The capture was greatest in the period of maximum vegetation with a catch of 64.95%. Concerning the distribution between the basin, those from Usumacinta represented 59.72% of the total abundance, followed by the one of the basin of Grijalva at 29.36%.

PECES ASOCIADOS A VEGETACIÓN MARGINAL EN UN HUMEDAL TROPICAL DEL SURESTE MEXICANO: RESERVA DE LA BIOSFERA PANTANOS DE CENTLA, TABASCO, MEXICO.

Los humedales son importantes ya cuentan con diferentes hábitat ecológicos y su complejidad provee sitios de alimentación, protección contra la depredación y reproducción, lo que hace posible la presencia de una gran diversidad de flora y fauna. Los objetivos del presente trabajo es determinar la composición ictica, analizar la variación espacio-temporal de la abundancia y riqueza de especies y evaluar las asociaciones vegetales con mayor abundancia y riqueza. Se obtuvo un total de 2,285 ejemplares representados en 32 especies, 10 familias y 27 géneros; de estos 279 estaban en etapa larval por lo que se incluyen solo a nivel de familia. La familia mejor representada es Cichlidae con 12 especies, seguida de la Poeciliidae con 9. *Gambusia sexradiata* dominó numéricamente y se distribuyó ampliamente en 23 localidades, las especies que se encontraron en menor número de localidades fueron *Rhamdia guatemalensis*, *Poecilia petenensis* y *Vieja pearsei* solo en una; e *Hyporhamphus mexicanus*, *Xiphophorus maculatus*, *Amphilophus robertsoni*, *Archocentrus octofasciatus*, *Parachromis friedrichsthalii*, *Thorichthys meeki* y *T. passionis* en dos de ellas. El Dren Narváez Sur y Laguna El Sauzo obtuvieron mayor abundancia con 200 y 156 ejemplares respectivamente. La captura fue mayor en el periodo de máxima inundación fue con 64.95%; y en cuanto a la distribución entre cuencas, la del Usumacinta representó el 59.72% de la abundancia total, seguido de la cuenca del Grijalva con 29.36%.

## GEOSCIENCES

- 113 A LATE CLARENDONIAN AND A LATEST HEMPHILLIAN LOCAL FAUNA FROM THE GOLIAD FORMATION OF SOUTH TEXAS. Jon Baskin\*, Texas A&M University–Kingsville, Kingsville, TX, and Richard Hulbert, Florida Museum of Natural History, Gainesville, FL.

In addition to the well-known early Clarendonian Lapara Creek Fauna of the Goliad Formation, a late Clarendonian and a latest Hemphillian fauna are both also present. The Dinero Local Fauna in Live Oak County is in a roadcut, higher in the section than the Lapara Creek Fauna, just below the caliche that caps the Goliad. The following taxa are present: *Mylagualus* sp., *Pseudhipparion* cf. *skinneri*, *Callippus* cf. *cerasinus*, and *Cormohipparion* cf. *ingenum*. Their concurrent range zone is the late Clarendonian. The early Pliocene fauna is reworked in a late Pleistocene terrace of the Nueces River and has been transported at least 10 km downstream. Taxa include *Dinohippus* cf. *mexicanus*, *Astrohippus* *stockii*, *Pseudhipparion* *simpsoni*, *Nannippus* cf. *beckensis*, *N. aztecus*, and *Neohipparion* *eurystyle*. Two partial skulls *Nannippus* cf. *beckensis* and an edentulous *Rhyncotherium* palate are filled in with dense caliche. These and a tooth of *Neohipparion* *eurystyle* found on the caliche at Lake Corpus Christi provide support for a latest Hemphillian age for the upper Goliad Formation.

- 156 ORIGIN AND PRESERVABILITY OF PELLETS ON THE ALGAL FLATS OF GALVESTON ISLAND STATE PARK, TEXAS. R. LaRell Nielson\*, Patricia S. Sharp, and Chris A. Barker, Department of Geology, Stephen F. Austin State University, Nacogdoches, TX.

Pellets present on the algal flats of Galveston Island State Park, Texas have different shapes and sizes. The pellets, composed of fine-grained silt and clay-sized clasts, were either bound together by compaction from the digestive tracks of animals living on the algal flats or produced as balls from burrowing action. Pellets have been scattered randomly across the flats and were produced primarily during nighttime hours by organisms venturing onto the flats or by organisms burrowing in the algal flats. These pellets were left exposed to weathering and to drying conditions during daytime hours. Upon drying, many of the pellets disarticulated and were reworked into the algal flats. Shallow pits dug through the algal flats did not encounter any pellets in the upper few centimeters of sediment. This indicated that the pellets were not being preserved in the flats. In the vegetated areas that surrounded the flats, pellets were also found on the surfaces between plants. However, shallow pits revealed that pellets were not preserved in the sediment under the vegetated areas. Following deposition and burial, roots from the vegetation destroyed the pellets. The lack of preservation of the pellets on the algal flats and marsh areas of Galveston Island State Park, would suggest that pellets found in the Tertiary strata of east Texas did not originate on algal flats or in vegetated areas behind barrier beaches but as fecal pellets in lagoon or shallow marine environments.

- 194 AN APOMORPHY-BASED IDENTIFICATION OF THE FOSSIL HERPETOFAUNA FROM THE KOANAKA HILLS. Alicia M. Kennedy\*, Sam Houston State University, Huntsville, TX, and Bhart-Anjan S. Bhullar, University of Texas at Austin, Austin, TX.

Recent excavations in cave deposits of the Koanaka (!Ncumsta) Hills, western Ngamiland, Botswana have produced a diverse fauna conservatively dated to 390,000yrs. BP. A variety of taxa are represented including 53 amphibian and reptile elements making this one of the first reports of a middle Pleistocene herpetofaunal assemblage from Botswana. Using an apomorphy-based approach for taxonomic designations, specimens have thus far been attributed to Anura and the squamate clades Caenophidia, Scincidae, Gekkonidae, Lacertidae, Cordylidae and Agamidae. Gekkonids are the most common taxa in the assemblage, consisting of 22 specimens. We identified several distinct morphotypes of gekkonids in the assemblage. Among these are forms with relatively tall teeth, relatively short teeth and forms with differing cusp morphologies. The facial process of one maxilla is dotted with small pits. Among the non-gekkonid squamates, both cordylid maxillae bear very wide palatal shelves. Two dentaries carrying bicuspid teeth are attributable to Lacertidae, and eight specimens show the distinctive acrodont dentition of Agamidae. A single snake vertebra can be diagnosed to Caenophidia. In addition to the squamates, seven specimens are attributed to Anura, suggesting the past presence of a permanent source of water in a currently arid area. While a lack of extant comparative osteological material from the region currently limits the taxonomic resolution of identification, the broad range of taxa in the sample nevertheless indicates a diverse fauna. This fauna fills important spatial and temporal gaps in the current understanding of African reptile and amphibian phylogenetics, as well as the paleoenvironment of Botswana.

- 230 COMPARISON OF DEFORMATION TRENDS IN CRETACEOUS BOQUILLAS STRATA IN ERNST TINAJA AND DOG CANYON, BIG BEND NATIONAL PARK, TX.  
Chris A. Barker\*, R. LaRell Nielson, Stephen F. Austin State University, Nacogdoches, TX, and Joseph I. Satterfield, Angelo State University, San Angelo, TX

Deformation structures in the Ernst Member of the Cretaceous Boquillas Formation share similar orientations and styles at Ernst Tinaja and at Dog Canyon, 48 km N. At Ernst Tinaja, abundant open to tight, mainly parallel, flexural-slip folds in flaggy bedding in the Boquillas have rounded to chevron hinges. Some layers show slight disharmonic thickening in the hinge due to flowage in thin clayey units. Competent layers thicken only slightly, if at all, in the hinges and are Ramsay class 1b to 1c folds. Just E of the tinaja (a large pothole in the underlying Buda Limestone), folds in the Boquillas trend almost N/S and verge westward (avg. axial plane S&D is N8W, 74NE; avg. axis P&B is 11, S11E). Half-wavelengths of these subhorizontal to gently plunging, steeply inclined folds average 1.4 m. An outcrop-scale thrust fault transported Boquillas strata westward along a 4.5 m ramp before dying out in a knot of breccia. Shear or pseudo(?) shear features form sigmoidal patterns and apparent boudins in some layers. The underlying thick and competent Buda Limestone dips 15°-25° SW; it does not contain outcrop-scale folds at Ernst Tinaja but is deformed in a map-scale anticline 3 km E. Mapping at 1:12,000 scale in Dog Canyon identified similar deformation patterns. While some Boquillas folds are penecontemporaneous structures, the widespread extent of this deformation phase, also present near Muskog Spring and Persimmon Gap, suggests the cause was regional, probably Laramide, tectonism.

- P202 AN ANALYSIS OF SPATIAL RELATIONSHIPS OF QUATERNARY CAVE FAUNAS OF TEXAS USING GIS.  
Darius Bordbar, Alex Hendrex, Ashley Marie Hilliard, Maddie Lionberger, Areen Pitaktong, Tania Tasneem\*, Magnet Program, Kealing Middle School, Austin, TX and Christian O. George, Environmental Sciences Institute, The University of Texas at Austin, Austin, TX.

Caves are widely regarded as an important repository of fossil resources. The first report of a cave fauna from Texas was in 1919. In the nearly 100 years of paleontological investigations of caves in Texas, most of the important caves have been found in the Early Cretaceous rocks of Central Texas. There has been a great deal of work studying the faunas of individual caves and combining results from several of the caves to reconstruct the paleoecology of the Late Quaternary of Texas. Since relatively little work has been done analyzing the spatial relationship between the caves and the geology and geography of Texas, we were interested in exploring the factors that influenced the distribution of caves with fossils across the state. We tested hypotheses of the influence of rock type, faults, and topography on the age distribution of caves, archaeological utilization, and the formation of caves across Texas using a GIS database. Predictably many of the caves were found on the karst-rich Edwards Plateau, but several important caves were located outside of this region. We also found that faults strongly controlled the location of caves with fossils. The relationship between the age distribution of cave faunas and geologic and geographic parameters is more complex and is still being investigated.

- P206 A COMPARISON OF ISOLATED TEETH AND INTACT JAWS FOR RECONSTRUCTING PALEOENVIRONMENT.  
Sophia Aguayo, Megan Oadra, and Patrick J. Lewis, Sam Houston State University, Huntsville, TX.

Due to their sensitivity to changes in the environment, small mammals are commonly used to rebuild past environments at archaeological and paleontological sites. The depositional environments of these sites vary dramatically, impacting the preservation of the fossils they contain. Some sites, such as those preserved in caves, often contain small mammal faunas that are nearly intact. In such cases there may be many complete mandibles and maxillae, the principle elements used for species diagnosis. Other localities, such as those deposited by high energy streams, may contain only a few isolated teeth. These differing depositional environments preserve different elements in varying quantities and conditions, all affecting the environmental signature of the small mammal fauna. This study attempts to estimate the bias in assemblages containing only loose teeth when compared to those containing intact jaws. A sample of jaws from a paleontological site in Botswana is compared to the isolated tooth component of that same site to determine if the two assemblages are reflective of each other. Our preliminary results suggest that many smaller taxa are missing from the fauna identified from intact jaws. Likewise, there is an apparent bias against the larger, more robust component of the fauna in the isolated teeth. Our results suggest that both jaws and isolated teeth should be studied to have an accurate assessment of paleoenvironment, and that when one component is absent caution must be taken to avoid overstating the utility of the fauna in rebuilding past environments.

- P266 GEOLOGY, TRACE-ELEMENT AND RARE-EARTH-ELEMENT (REE) CHARACTERISTICS, AND ORIGIN OF CHIHUAHUA CARBONATITE COMPLEX (CCC), NORTHERN MEXICO. Ravi C. Nandigam\*, Department of Chemistry and Environmental Sciences, University of Texas at Brownsville, Brownsville, TX., Elizabeth Y. Anthony and Kenneth F. Clark, Department of Geological Sciences, University of Texas at El Paso, El Paso, Texas and Oscar Comadurán A., Cumbres de Majalca, 2006 Chihuahua, Chihuahua, Mexico.

The Chihuahua Carbonatite complex (CCC) is located in the southernmost part of the Rio Grande rift and to the west of the Tertiary Eastern Alkalic Belt, Trans-Pecos Magmatic Province (TPMP), Texas. The CCC intruded Cretaceous- and Tertiary volcanic and plutonic igneous rocks as a stock, breccia pipes, and dikes. Carbonatite outcrops show numerous xenoliths and roof pendants of host rocks. Major minerals present in CCC carbonatite include calcite, Fe-rich carbonate, and hematite. Carbonatite metasomatism is characterized by the development of grossular-rich garnet. CCC carbonatites are calcio-, magnesio- and ferrocarnatites based on their major element abundances. U, Th, La, Ce, Y and Nb contents in CCC carbonatites increase with increasing iron oxide. The Sm/Nd ratios show relatively narrow range from 0.07 to 0.1. Th/U ratios are  $\leq 1.0$  for most of the samples. The degree of light-REE enrichment is substantiated by the  $(La/Sm)_N$  ratios (15 to  $> 50$ ) and  $(La/Yb)_N$  ratios (25 to 1338). The REE contents indicate a high degree of differentiation. Middle-REE contents suggest a strong fractionation of apatite. These chemical characteristics suggest a fractional crystallization origin for the CCC carbonatites. Drill cuttings of CCC carbonatite have an average of 0.16 weight % of  $\Sigma$ REE. Hematite is the major host for REE.  $^{40}Ar/^{39}Ar$  dates suggest an emplacement age of about 36 Ma which corresponds with a shift in the stress regime in the study region from Laramide-crustal shortening to extension. Available data for the CCC carbonatites supports a petrogenetic origin in a post-Laramide extensional environment.

- P306 LIGHT CURVES OF 2005 FY<sub>9</sub>, PLUTO-SIZED TRANS-NEPTUNIAN OBJECT. Jeffrey W. Davis\*, Honors Program, Hardin-Simmons University, Abilene, TX and J. Patrick Miller, Department of Mathematics, Hardin-Simmons University, Abilene, TX.

Recent astronomical searches off the ecliptic have revealed a number of Pluto-sized trans-Neptunian objects (TNOs). One such object is 2005 FY<sub>9</sub> with an orbit located 30° off the ecliptic, a semi-major axis of 46 AU, and 0.16 eccentricity. This object has a mean diameter on the order of 2000 km compared to 2600 km for Pluto, making it a candidate for classification as a dwarf planet. Images of 2005 FY<sub>9</sub> were taken 14-17 December 2006 by J.L. Ortiz (Departamento Sistema Solar Instituto de Astrofísica de Andalucía), using the 1.5-m telescope at the Sierra Nevada Observatory (Granada, Spain). Using these images in this study, light curves are produced, presented, and analyzed for this Pluto-sized object.

## MATHEMATICS

- 30 MEAN STUFF. Elsie M. Campbell\*, Angelo State University, San Angelo, TX, and Dionne T. Bailey\*, Angelo State University, San Angelo, TX (jointly).

The arithmetic mean, geometric mean, and harmonic mean are common mathematical concepts which have been known for centuries. The relationship between the three means will be explored analytically, geometrically, and historically.

- 66 REDUCING BIAS IN NONPARAMETRIC ESTIMATION OF THE DISTRIBUTION FUNCTION OF NONSTANDARD MIXTURES. E. D. McCune\*, Department of Mathematics and Statistics, Stephen F. Austin State University, Nacogdoches, TX, and Sandra L. McCune, Department of Elementary Education, Stephen F. Austin State University, Nacogdoches, TX.

Nonstandard mixtures occur when a random variable behaves in a continuous manner except at a countable number of discrete mass points. Polansky (2005) introduced a biased kernel estimator of the distribution function of nonstandard mixtures. In this paper, a new estimator of the distribution function of nonstandard mixtures with less bias than Polansky's (2005) estimator is obtained by applying to Polansky's (2005) estimator a nonparametric data transformation bias-reduction technique introduced by Swanepoel and Van Graan (2005). Statistical properties of the new estimator are determined and presented.



- 314 A PROBABILISTIC ALGORITHM FOR MEASURING COASTLINE LENGTH.  
Jessica Halley Newman\* and Trey Smith, Dept. of Mathematics, Angelo State University, San Angelo, TX.

Mandelbrot recognized that "coastline length turns out to be an elusive notion that slips between the fingers of one who wants to grasp it". In this project, a Monte Carlo method for measuring curve length including coastline length was developed. This project uses randomly selected *grid sizes* and randomly selected *grids* on a map of a coastline to provide an estimate of the coastline length. It demonstrates that a greater number of iterations of the experiment will provide greater accuracy. A similar but much simpler approach has been successfully applied to area problems. It is also well known that random iteration algorithms can be applied to various problems associated to fractals.

## SCIENCE EDUCATION

- 86 MOTIVATION, SELF-EFFICACY AND LEARNING STRATEGIES OF STUDENTS ENROLLED IN PRINCIPLES OF BIOLOGY AT ANGELO STATE UNIVERSITY.  
David Ballard, Oklahoma State University, Stillwater, OK., Connie Russell, Angelo State University, San Angelo, TX.

In 2001, the Angelo State University Biology Department changed its introductory biology class for majors in biology from a non-lab, lecture format to an active learning style of class with a required lab. The purpose of this study was to determine if the changed format had an effect on the students learning biology. The students were given a pre- and post-survey, the Motivated Strategies for Learning Questionnaire, which measures students' motivation and self-efficacy. The questionnaire measured fifteen different components of motivation and self-efficacy, which provide a wide range of interlocking factors to test. Demographic data about the students, including ACT/SAT scores and sex, were also used to see if they could help explain any of the factors. Peer Learning and Critical Thinking mean scores increased, while Self-Efficacy and Learning Strategies mean scores decreased. The decreases were greatest in female students who scored a C or D as a final grade.

- 147 A SIMPLE SOLUTION TO A COMPLEX PROBLEM: A HYPOTHESIS-BASED HEIRARCHICAL APPROACH FOR TEACHING GENERAL CONCENPTS IN AN ECOLOGY LAB.  
Chris D. Felder\* and Chad W. Hargrave, Department of Biological Sciences, Sam Houston State University, Huntsville, TX.

The field of ecology is complex because it is driven largely by quantitative theory that is supported by observational and experimental studies. This complexity makes teaching ecology in a laboratory setting difficult. Thus, students often finish an ecology class with a poor understanding of the practical application of general ecological theory, and the process of collecting quantitative observational and experimental data. In this presentation, we will describe a semester-long, hypothesis-based laboratory exercise that incorporates theoretical, observational and experimental approaches to introduce junior-level students to practical ecological research. Our laboratory exercise is broken into separate but interconnected studies. Each study contributes to a single overlying theoretical question, hypothesis and prediction based upon the ecosystem scale of ecology. In general, we conduct a manipulative experiment at the organismal scale, and observational studies at the population and community scales of ecology to produce data that address the theoretical question. Using fish and a small stream as model systems, we estimate individual excretion and metabolic rates, population size and community level interactions to address theoretical predictions about energy flow and nutrient cycling in small second order streams. Although we use an aquatic model, our laboratory exercise easily can be modified to fit any model system. In this presentation we will discuss the methodology and supporting data from our General Ecology Laboratory, illustrating the integration of all organizational-levels of ecology into a semester-long, hypothesis-based course.

- 31 COMBINING HISTORY WITH CHEMISTRY AND TEXTILES IN A STUDY ABROAD COURSE: A LIBERAL ARTS APPROACH TO A SCIENCE COURSE.  
Rick White, Janis White, John White, Maria Granic White, Sam Houston State University.

In order to meet a demand for an advanced elective course, we developed a two-week out-of-country course for students in which we take them to five cities in Germany and to Paris to discuss monumental scientific advances. We will list the five cities in Germany where famous people (mostly Nobel laureates) worked and discuss a) their lives, b) the historical times in which they worked, c) how those historical times influenced their work, d) what their work was, and e) how their efforts continue to impact us. To do this, we have four pre-trip class meetings in which we discuss a) the class schedule, b) behavior

expectations for the course, c) the need to pack light, d) physical fitness for much walking e) the cultural differences to expect between Americans and Europeans, and f) grade requirements. This presentation will discuss these as well as give a daily schedule for the places we take students and what is discussed in each place.

62 SEQUENCING STOICHIOMETRY IN FIRST-SEMESTER INTRODUCTORY CHEMISTRY.

Paul A. Loeffler, Sam Houston State University, Huntsville, TX.

Modern textbooks associated with introductory chemistry for science majors uniformly present concepts associated with mole relationships among quantities of reactants and products involved in chemical reactions in a similar manner. These calculation-based, problems-oriented approaches which are intended to instill understanding of the conservation laws and of mass transfer often create misconceptions and limiting realities. Perhaps the sequence: formula stoichiometry and empirical equations, calculations based on single substance chemical equations, limiting reagents and theoretical yields, should be reordered. It is proposed that explorations of mass transfer in chemical processes should start with limiting reagent examples. In addition, it is suggested that tabularized, mass action accounting, frequently presented in much later chapters associated with chemical equilibria, should also be introduced very early in our development of these constructs.

72 USING TEXAS WETLANDS, VIDEO TECHNOLOGY, STUDENTS, AND JASON WETLANDS CURRICULA TO CREATE A HYBRID VEHICLE FOR WETLAND ENVIRONMENTAL EDUCATION.

James Westgate, Earth & Space Sciences, Lamar University, D'Ann Douglas\*, JASET, Lamar University, Communications, Lamar University, Larry Elliot, Communications, Lamar University, Daniel McLemore, Communications, Lamar University and O'Brien Stanley, Communications, Lamar University.

In 2006-07, the JASON Alliance for Southeast Texas (JASET) created a video called "Texas Wetlands" which focuses on the community structure and importance of wetland ecosystems in southeast Texas and draws attention to their threatened state. Lamar University Communications majors videoed and edited the wetland experiences of 42 secondary school argonauts on trips hosted by local experts. Science content and video format were overseen by the authors. Students visited freshwater wetlands in the Big Thicket National Preserve, intermediate wetlands at Shangri La Nature Center, saltwater wetlands in Trinity Bay, the Coastal Fisheries Research Station on Pleasure Island, and investigated the role alligators play in wetland ecology at J. D. Murphree WMA. The video supplemented our training of 160+ 4th-8th grade science teachers using the JASON Disappearing Wetlands curriculum and was aired to their 8000+ students as auditorium experiences. Production (\$10K), and reproduction & distribution (\$1.5K) costs totaled \$11.5K. All participating teachers received copies of the "Texas Wetlands" video, JASON wetlands curriculum, training, and access to educational resources on the JASON website. The JASON experience is provided free of charge courtesy of the generosity of our JASET underwriters who donate approximately \$100K annually to support hands-on, discovery-based science education in southeast Texas.

191 TWO ENTRY-LEVEL BIOLOGY COURSES ASSESSMENT FOR BIOLOGY MAJORS' AT TEXAS STATE UNIVERSITY – PRELIMINARY RESULTS.

Mamta Singh and Sandra West, Texas State University–San Marcos, San Marcos, TX.

Texas State University-San Marcos implemented a new curriculum "The Biology 2000 Curriculum" replacing two traditional entry-level biology courses, namely Zoology and Botany for biology majors. The present study is to evaluate the entry-level biology majors' courses which have evolved over the past seven years at the Biology Department. The first phase of the study was conducted in the Fall 2007. All students taking the two entry-level biology courses comprised the convenience sample for this study. There were 16 and 18 laboratory sections in the Functional and Organismal Biology respectively with the total sample of approximately 646 students. The data were collected during the laboratory section of these two entry-level biology classes. The content knowledge pre-and posttests, demographic variables are used to explore the research questions: (1) Did students' scores improve on the content knowledge test from pre to posttests in: Functional Biology & Organismal Biology? (2) Did students correctly answer more questions at three higher levels of Bloom's taxonomy on the content knowledge test from pre to posttests in: Functional Biology & Organismal Biology? A paired t-test will be used to address the above two research questions. It is anticipated that students' scores will improve on the content knowledge test from pre to posttests at the statistical significant level.

## 133 USING CLEA SOFTWARE IN AN INTRODUCTORY ASTRONOMY CLASS FOR NON-SCIENCE MAJORS.

Pamela Bryant\* Howard Payne University, Brownwood, TX.

CLEA (Contemporary Laboratory Experiences in Astronomy) was developed by Lawrence Marschall at Gettysburg College supported by funds from the National Science Foundation. I have been using the CLEA computer-based exercises for laboratory sections of introductory astronomy classes for non-science majors. These exercises reinforce many of the basic techniques introduced in lecture and help students experience how astronomy is really done. There are thirteen different exercises which are used widely at many institutions from middle schools to upper-level astronomy classes. I will describe and demonstrate some of the CLEA materials and talk about the techniques needed to make a few of these labs successful for non-science majors.

## 308 INTERNATIONAL ASTEROID SEARCH CAMPAIGN.

Dominic Juliano\*, Hardin-Simmons University, Abilene, TX and J. Patrick Miller, Mathematics Department, Hardin-Simmons University, Abilene, TX.

The International Asteroid Search Campaign (IASC, fondly nicknamed "Isaac") is an Internet-based program for high schools and colleges. Within hours of acquisition astronomical CCD images are made available via the Internet to participating schools around the world. Under the guidance of their teachers, students analyze the images with free software tools, searching for new asteroids and confirmations of near-Earth objects (NEOs). These discoveries are reported to the Minor Planet Center (MPC; Smithsonian Astrophysical Observatory, Harvard), which gives the students published recognition in its MPC circulars. To date, 71 new main belt asteroids have been found in one year and >400 NEOs confirmed.

## 21 FRESHMAN BIOLOGY LABORATORY CURRICULUM – BYE BYE COOKBOOK AND HELLO RESEARCH!

Tara Maginnis\*, St. Edward's University and Patricia Mokry, St. Edward's University.

Traditionally, many freshman biology laboratories have been run in a "cookbook" format; students follow a set of instructions and write/describe the results. While some of this is appropriate at the freshman level, newer approaches to inquiry and research based thinking have been shown to drastically improve the quality of the undergraduate mind. In this session, we will present a curriculum implemented at St. Edward's University, a small private institution in Austin, Texas. During the first semester, students are introduced to scientific inquiry and hypotheses testing, and these foundations are re-enforced in almost every laboratory activity. In addition, they acquire and/or are exposed to several scientific 'tools' such as basic statistics, presentation and writing practice, library databases, biological equipment, case studies, and experience evaluating scientific experimental designs and manuscripts. In the second semester, students apply these tools when they design, implement, write, and present a small yet high quality group research project. After completing the curriculum, students will have given two conference style presentations, written four scientific manuscripts, learned and applied three statistical tests, and followed the scientific process from beginning to end thirteen times. They will have an outstanding grasp on the process of doing science, writing science, and perhaps most importantly, thinking like a scientist. An instructional guide to implementing this curriculum will be provided.

## 345 MATHEMATICAL MODELING IN HIGH SCHOOL SCIENCE SUPPORTED BY COMPUTER SIMULATIONS.

Andrzej Sokolowski, Graduate Studies in Education, Texas A&M University, Magnolia West High School.

Mathematical modeling is a territory between science and mathematics, where science curricula, focusing on science content, leave it to math, and mathematics, focusing on pure rather than applied topics, leaves it to science. This territory has been abounded by both sides due to tightly defined "standards" in science and math curricula. Fulfilling this gap in a content rich environment where students will be given opportunity to apply mathematical concepts in science seems to be beneficial for enhancing both; science and math and more importantly it will make both subjects more meaningful to students. Computer based science simulations provide a great opportunity for exercising math modeling. They are free from mathematical equations, symbols and coordinate axes. Measuring devices such as rulers and stopwatches are usually embedded in the simulations and can be used to take data or to manipulate on variables. Furthermore, the process of experiment can be played back providing opportunity for multiple observations and taking data. During this presentation, applications of physics simulations to modeling piece-wise and trigonometric functions will be discussed. Utilized simulations are provided by Physics Education Technology project (PhET) at Colorado State University.

## 244 CORRELATED SCIENCE AND MATH: A NEW MODEL FOR LINKING TWO DISCIPLINES.

Sandra West, Texas State University–San Marcos, San Marcos, TX.

Correlated Science and Math (CSM) is a new curriculum model for making linkages between the two disciplines. This model is different from the traditional ways. "Science with math" occurs when science uses math as a tool or uses math to teach science. "Math with science" occurs when math uses science as an application of a math principle or to make math more interesting to students. The CSM model teaches both disciplines in a conceptual manner and equally important teaches the appropriate language of each discipline. There are obvious similarities between the two disciplines with parallel concepts. However, language barriers to developing a CSM curriculum include the use of the same names for different concepts and the use of different names for the same concept. Using CSM curriculum for inservice teacher training significantly improves teacher content expertise and when teachers have more content expertise their students experience higher cognitive gains. A sample lesson will be provided.

## 248 A LONGITUDINAL STUDY OF SAFETY IN TEXAS SCHOOL SCIENCE CLASSROOMS.

Lisa Kennedy\*, Texas State University–San Marcos, San Marcos, TX and Sandra West, Texas State University–San Marcos, San Marcos, TX.

Studies conducted in 1989, 1991, 2001, 2003 and 2007 provide a profile on the conditions of teaching science in Texas secondary science classrooms. Teachers report that they understand the science standards better and now plan lessons that teach only one concept per lesson. For example, in the middle school Texas Essential Knowledge and Skills lists "mixtures and solutions" together and teachers traditionally have taught them together as one lesson. However, after the CSM training the lesson on mixtures is a separate lesson from solutions. Additionally, the lesson on solutions is not taught until the students clearly demonstrate an understanding of the concept of mixtures.

## 256 EVOLUTION ON TRIAL AGAIN.

Mike Hemer\*, Texas State University–San Marcos, San Marcos, TX and Sandra West, Texas State University–San Marcos, San Marcos, TX.

The controversy over Evolution has a long history. More recent legal rulings include the U.S. Supreme Court ruling against 'creation science' in the 1987 Edwards v. Aguillard case and the ruling by a federal judge, US District Judge Frank Darnell, in Pennsylvania dismissed the famous Evolution case which Judge Darnell said was about "whether Larry Caldwell was denied access to speak in various (forums) or participate in certain processes because of his actual or perceived religious beliefs." He specifically stated that the case was not about Evolution or whether Intelligent Design should be taught in school, but about denied access. An explanation of these rulings and implications for the future of science education and in particular biology education will be presented by a board certified attorney who also teaches high school biology.

## 289 AN OVERALL ASSEMENT OF "LOS ARACNIDOS DE TAMAULIPAS"; A ONE WEEK MINI-COURSE CONDUCTED AT THE INSTITUTO TECNOLOGICO DE CD. VICTORIA, TAMAULIPAS, MEXICO IN AUGUST OF 2007.

Ned E. Strenth\*, Angelo State University, San Angelo, TX, Lynn McCutchen, Kilgore College, Kilgore, TX, and Alfonso Correa-Sandoval, Instituto Tecnológico de Cd. Victoria, Cd. Victoria, Tamaulipas, México.

This study reviews the background, planning and teaching of a one week mini-course on the "Arachnids of Tamaulipas" which was conducted in northeastern Mexico at the Instituto Tecnológico in Cd. Victoria during late August of 2007. Course content, format, ancillaries and amount of time devoted to class-room lecture, laboratory exercises and local field trips will be outlined. The demographic makeup of the institution, its biology majors, and the class of 17 students will also be reviewed. Due to time constraints, traditional lecture and laboratory examinations were replaced with a pass-fail assessment by the sponsoring faculty member and a standard one page post-class survey was used to determine the student's overall evaluation of the course. A post-course assessment and "lessons learned" will be given along with a number of changes planned for future offerings of this course. A very similar but expanded two-week course is currently scheduled for the Texas Tech Campus in Junction during late May of 2008 and plans to offer the course again at the Instituto Tecnológico in Cd. Victoria in 2009 or 2010 are under consideration.

- P97 THE LAGUNA MADRE LIVING CLASSROOM: AN INTERDISCIPLINARY RESEARCH AND EDUCATION INITIATIVE. Suraida Nañez-James\*, John W. Tunnell, Jr., Harte Research Institute for Gulf of Mexico Studies, Texas A&M University–Corpus Christi, Harte Research Institute, Corpus Christi, TX, Tina Dellinger, Innovation Academy for Engineering, Environmental and Marine Science, Corpus Christi Independent School District, Corpus Christi, Texas, and Jason T. James, University Preparatory High School, Flour Bluff Independent School District.

The Laguna Madre Field Station (LMFS) Project is an interdisciplinary research and education initiative started fall 2007 through a partnership between Harte Research Institute (HRI) and Corpus Christi Independent School District. The project is currently funded through a grant awarded to CCISD from the Texas Education Agency, Bill and Melinda Gates Foundation, and the Dell Foundation. Educators and students get to experience a 20-minute boat ride to the LMFS located on a dredge reclamation island near the Gulf Intracoastal Waterway, where they spend the night and collect research data. The overall goals of the project are to introduce Moody High School teachers and students to the Upper Laguna Madre, establish a long-term monitoring research and education project, produce an interdisciplinary curriculum guide specific to this location, and increase the number of individuals in Science, Technology, Engineering, and Math careers. Specifically, teachers and students are taught proper sampling procedures, experimental design, data collection protocol, identification techniques for identifying flora and fauna, and the natural and anthropogenic issues affecting the Laguna Madre. A unique aspect of the project is all teachers, not just the science educators, are participating and learning alongside their students. Another important component is secondary school teachers and students are being mentored by scientists. They are all working together and learning how to communicate with one another. The project will continue in spring 2008 with five sampling trips scheduled to the field station. The data collected will be compiled and analyzed by the Moody High School students and teachers.

- P192 ASSESSMENT OF A HANDS-ON SCIENCE-BASED EDUCATIONAL EXPERIENCE OF A STEM ACADEMY IN CORPUS CHRISTI, TEXAS. Sandra S. Arismendez and Suraida Nanez-James, Harte Research Institute for Gulf of Mexico Studies, Texas A&M University–Corpus Christi, Tina Dellinger, The Innovation Academy for Engineering, Environmental and Marine Science, Corpus Christi Independent School District, and John W. Tunnell, Jr., Harte Research Institute for Gulf of Mexico Studies, Texas A&M University–Corpus Christi.

The need for science education improvements in the Corpus Christi Independent School District is imperative since only 69% of 11th grade students met the 2006 Texas Assessment of Knowledge and Skills science standard. Researchers have generally reached consensus that hands-on activities are the most effective learning environments for the sciences. Therefore, the goal of the Innovation Academy for Engineering, Environmental and Marine Science at Moody High School (MHS) and Cunningham Middle School (CMS) is to increase student achievement by engaging students in innovative science and math instruction. In 2006 CCISD was awarded a competitive grant to establish a Science, Technology, Engineering, and Mathematics (STEM) academy at MHS and CMS. Students at these schools comprise a 91% Hispanic enrollment and come from families of low socioeconomic status. The academy is designed to promote education strategies that integrate the teaching of STEM in a way that challenges students to be innovative in environments that model real world contexts. The Harte Research Institute (HRI) has established an educational partnership with CCISD to help facilitate their mission. In the summer 2007, HRI hosted an orientation for the academy students. Pre- and post-tests designed to determine the effectiveness of educational activities were administered to the students; activities included topics in marine ecology, water chemistry, geographic information science, and watershed hydrology. A total of 144 students participated in the study, 69 (48%) improved post-test scores, 56 (39%) revealed no change and 19 (13%) lowered scores. Other variables explored included gender, ethnicity, at-risk and economic status.

- P33 AN ALTERNATIVE APPROACH TO FRESHMAN CHEMISTRY LAB PRACTICALS. Dr. Nick Flynn, Angelo State University, Department of Chemistry/Biochemistry, San Angelo, TX.

Many lab practicals in chemistry laboratory courses focus either on testing selected wet lab skills or the ability of students to perform calculations that they have performed throughout the semester. While these approaches are certainly valid, another method that was employed during our honors freshman chemistry laboratory this semester required students to develop presentations concerning each wet lab that was conducted throughout the semester. Students were required to provide a brief description of the lab. Additionally, they had to include information concerning the chemical principles taught during their assigned lab as well as what they specifically learned during the lab. Students were also required to provide suggested

modifications to the lab that will be used to improve each specific lab from one year to the next. Finally, a brief discussion of each presentation and lab module provided further insights into the lab for both students and the instructor. Student comments concerning this approach, perspectives from former students and advantages/disadvantages of this approach to a lab practical will be presented as well.

## SYSTEMATIC AND EVOLUTIONARY BIOLOGY

- 24 EGG SIZE VARIATION IN THE NORTH AMERICAN BARN SWALLOW (*HIRUNDO RUSTICA ERYTHROGASTER*).  
Beverly L. Cochran\* and Jeffrey G. Kopachena, Texas A&M University–Commerce, Commerce, TX.

Within-clutch variation in egg size is an important maternal effect strategy affecting nestling fitness. Among bird species egg size either increases or decreases with laying order. These hierarchies are often more pronounced when hatching asynchrony occurs. In asynchronous nests laying a smaller or larger “ultimate” egg may either help or hinder the last-hatched chick. Female birds may thus facultatively bias within-clutch egg sizes in response to physical, physiological, or environmental conditions. In this study we investigated egg size in relation to hatching asynchrony and ambient temperature in the North American barn swallow (*Hirundo rustica erythrogaster*). In 1998 and 1999 we collected measurements from 1350 eggs at 349 nests and determined egg volume. Data for hatching order, clutch size, and hatching success were also collected. Daily ambient temperature was measured and monthly average precipitation levels were recorded. Our results showed a significant increase in egg size with laying order resulting in a larger ultimate egg. Egg size increase was more pronounced as clutch size increased and egg size was a reliable indicator of hatching success. However, within-clutch egg size was not found to be correlated with hatching asynchrony, ambient temperature, or precipitation. The results will be discussed within the context of egg size variation and its adaptive significance in other species.

- 27 EMERGENCE, OVIPOSITION, AND GENERAL ACTIVITY OF *EXOPROSOPA ALBICOLLARIS* (DIPTERA: BOMBYLIIDAE) IN A *BEMBEVINUS NEGLECTUS* (HYMENOPTERA: CRABRONIDAE) NESTING AGGREGATION.  
Sonia Salinas, Michelle Richardson, St. Edward’s University, Austin, TX.

*Exoprosopa albicollaris* is known to parasitize the cocoon (prepupal/pupal stage) of the sand wasp, *Bembecinus neglectus*. *Exoprosopa* behavior was studied at a known nesting aggregation of its host from 14 May to 7 June 2007 at Pedernales Falls State Park, Blanco Co., Texas. Data was obtained on time (n=12) and day (n=14) of emergence for *E. albicollaris*. Censuses (counts) of the fly in the wasp nesting area were taken every 30 minutes throughout most of the day to provide information on fly activity in relation to wasp activity. Generally flies became active later than their wasps hosts. *Exoprosopa albicollaris* parasitizes wasp nests by throwing eggs down the nest entrance. Flies use a special abdominal structure, the sand chamber, to collect sand that they use to coat their eggs before tossing them down a nest entrance. Egg throwing behavior often follows bouts of obtaining sand. Flies tossed from one to seven eggs before replenishing their sand chambers, however there was no correlation between the number of eggs thrown and the time taken to replenish the sand chamber. Recently eclosed flies were marked to attempt to obtain information on adult fly longevity.

- 28 *ARGIA* SPP. (ODONATA: ZYGOPTERA) AND THEIR GREGARINES (APICOMPLEXA: EUGREGARINIDA) IN SIX BIOGEOGRAPHICAL PROVINCES OF TEXAS.

Joanna J. Hays\*, Tamara J. Cook, and R. E. Clopton. Department of Biological Sciences, Sam Houston State University, Huntsville, TX, and Department of Natural Science, Peru State College, Peru, NE.

Gregarines (Apicomplexa: Eugregarinida) are ubiquitous parasites of invertebrates, especially insects. Over 20 gregarine species have been described from the insect order Odonata (dragonflies and damselflies) in the Old World, but only 6 species have been described from odonates in the western hemisphere. This survey focused on a single genus, *Argia*, with an exclusively New World distribution. Prior to this survey, only one species in this genus had been reported as a gregarine host. Our study examined gregarine infection in over 1000 *Argia* individuals, representing 7 species, from 9 localities in the 6 biogeographical provinces of Texas. At least two species of *Argia* were collected from each locality. Damselflies were dissected and examined for gregarine infection or curated for identification between June 2006 and September 2007. Sampling in 2006 recovered a previously undescribed gregarine from *Argia sedula* and *Argia translata*, which we subsequently described as *Nubenocephalus secundus*. In the 2007 survey, 6 of the 7 species of *Argia* were infected with

gregarines belonging to the genus *Nubenocephalus*. To date, there are only 3 described species of *Nubenocephalus*, 2 from species of *Argia*. Ongoing morphometric analyses will allow us to determine if the *Nubenocephalus* are one of the 3 previously described species or represent new species. This study will also elucidate biogeographical distributions of these gregarines.

- 35 MALE SIZE AND BEHAVIOR IN RELATION TO MATING STRATEGY AND COLOR VARIATION IN *BEMBECINUS NEGLECTUS* (HYMENOPTERA: CRABRONIDAE: BEMBECINAE).  
Yvette Chenux, St. Edward's University, Austin, TX.

Male size and behavior was studied in *Bembecinus neglectus* at Pedernales Falls State Park in Blanco Co, Texas. Head widths which strongly correlate with body size were measured to test whether there is a size difference between males performing alternative mating strategies in this population. Results were also compared to measurements obtained in previous years at the same site in order to test if male size varies between years. Interestingly, males of *B. neglectus* vary in color from pale to bright yellow, and so further work examined whether this color polymorphism was sized-based, and if color influences male mating strategies. There was no significant difference in size when comparing males performing alternative mating strategies. Males of 2007 were significantly larger than males of previous years. There was no difference found in either male size or behavior comparing pale to yellow males. However, more work is needed in order to more fully understand this male color polymorphism.

- 217 SEX RECOGNITION BY PUPFISH: WHO ARE FEMALE MIMICS FOOLING?  
Jennifer M. Gumm, Department of Biological Sciences, Lehigh University, Bethlehem, PA.

Species, sex and mate-quality recognition are vital to maximizing individual reproductive success. In male Comanche Springs pupfish (*Cyprinodon elegans*), small males have morphological and behavioral characteristics similar to females. Female mimicry may allow them to avoid aggression by larger territorial males and garner matings in a large male's territory. However, selection is predicted to favor large males' ability to discriminate against female mimics as they may usurp fertilizations in a male's territory and potentially eat eggs fertilized by the territory owner. Results of a field study conducted at Balmorhea State Park, Balmorhea, TX show that territorial males behaviorally discriminate based on size and sex. They are more aggressive to large males than to female mimics. Additionally, territorial males discriminate against female mimics, directing more aggressive behaviors to female mimics than similarly sized females. These results suggest that female mimicry may not be an effective tactic for small males. However, as female mimics garner little aggression when a large male intruder is also present, they will potentially gain opportunities to spawn if large males commonly intrude into males' territories. These results imply that complex interactions among males expressing alternative mating tactics may have important evolutionary consequences in fitness for both territorial males and female mimics.

- 241 INCONGRUENCE OF SPECIES DESIGNATIONS AS DETERMINED BY MITOCHONDRIAL AND NUCLEAR DNA: AN EXAMPLE FROM THE CUBAN CROCODILE (*CROCODYLUS RHOMBIFER*).  
Jeremy P. Weaver\*, Texas Tech University, Lubbock, TX, David Rodriguez, Texas Tech University, Lubbock, TX, Miryam Venegas-Anaya, Texas Tech University, Lubbock, TX, José Rogelio Cedeño-Vázquez, El Colegio de la Frontera Sur, Chetumal, Mexico, Michael R. J. Forstner, Texas State University, San Marcos, TX, and Llewellyn D. Densmore III, Texas Tech University, Lubbock, TX.

There is a surprising lack of genetic data for the Cuban crocodile (*Crocodylus rhombifer*), especially given its status as a critically endangered species. We used DNA isolated from blood samples collected from wild caught and captive individuals to genetically characterize this species in comparison to other New World crocodylians and also to identify *C. rhombifer*-like haplotypes found outside of Cuba, in Jamaica, Grand Cayman, Florida, and Mexico. Partial mitochondrial sequence data were generated from *cyt-b* (843 bp) and the tRNA<sup>Pro</sup>-tRNA<sup>Phe</sup>-Dloop region (442 bp). Phylogenetic analyses were performed by generating maximum parsimony, maximum likelihood, and Bayesian based topologies. Also, in an effort to identify species-specific alleles 10 polymorphic microsatellite loci were genotyped. Distance and model-based clustering analyses were performed on microsatellite data, in addition to a model-based assignment of hybrid types. Both mitochondrial and nuclear markers identified two distinct *C. rhombifer* genetic sub-clades, which were incongruent with their present morphological assignments.

- 243 POPULATION GENETICS OF THE TEXAS RAT SNAKE (*ELAPHE OBSOLETA LINDHEIMERI*).  
Mike Vandewege\*, Texas Tech University, Lubbock, TX, David Rodriguez, Texas Tech University, Lubbock, TX, Jeremy P. Weaver, Texas Tech University, Lubbock, TX, Michael R. J. Forstner, Texas State University, San Marcos, TX, and Llewellyn D. Densmore III, Texas Tech University, Lubbock, TX.
- Texas Rat Snakes (*Elaphe obsoleta lindheimeri*) are common throughout the central and eastern part of the state; however, little is known about their population biology in Texas. Nuclear markers (five microsatellite loci) were used to test for possible population structure within the sampled distribution by using distance- and model-based methods. The Great Plains Rat Snake (*E. guttata guttata*) and Baird's Rat Snake (*E. bairdi*) were also sampled in order to estimate their allelic diversity in comparison to *E. o. lindheimeri*. Partial Cytochrome-*b* sequences were also used to build a haplotype network to test for evidence of population structure. Morphologically anomalous individuals considered as hybrids (*E. o. lindheimeri* X *E. bairdi*) were included in these analyses to determine if hybrids could be genetically detected.
- 151 DELINEATION OF RETINAL PROJECTIONS IN THE MEXICAN FREE-TAILED BAT (*TADARIDA BRASILIENSIS*) USING HORSE-RADISH PEROXIDASE - WHEAT GERM AGGLUTININ.  
Jessica Halley Newman\* and David S. Marsh, Dept. of Biology, Angelo State University, San Angelo, TX.
- Investigations of CNS retinal connectivity in echolocating bats are sparse. This study attempted to elucidate the visual pathway in the Mexican free-tailed bat (*Tadarida brasiliensis*; family Molossidae) using HRP-WGA. Specimens of *T. brasiliensis* were injected monocularly with intravitreal injections of 10-30 $\mu$ L aliquots of HRP-WGA. After 2-4 days of post-injection survival, bats were euthanized and perfused with fixative prior to brain removal. Following 24 hours of storage in 10% sugar-formalin, brains were sectioned at 40 $\mu$ m on a freezing microtome. The brain sections were then processed for the TMB reaction product as outlined by Mesalun (1978) and alternate sections were counterstained with cresyl violet or Richardson's stain. Reconstruction of the bat visual pathway was accomplished using comparisons to the rat stereotaxic atlas (Paxino 1986) and mouse brain (LONI, UCLA).
- 153 PHYLOGEOGRAPHIC AND TEMPORAL ANALYSIS OF *STIPHODON CF. ELEGANS* AND *STIPHODON CAERULEUS* FROM POHNPEI, FEDERATED STATES OF MICRONESIA (FSM).  
Leslie L. Patterson\* and Frank Pezold, Texas A&M University, Corpus Christi, TX, and Tom Turner, Museum of Southwestern Biology-University of New Mexico, Albuquerque, NM.
- Sicydiine gobies inhabit fast-moving freshwater river systems on tropical Pacific high islands and are particularly interesting because of their reproductive and dispersal success, amphidromous lifestyle, and species abundance. Typically, *Stiphodon* larvae have a pelagic marine period estimated to be between 60 to 90 days until they metamorphose and migrate upstream in a freshwater habitat. This type of reproduction and distribution mechanism combined with a lack of information on basic life history makes them prime candidates for phylogenetic studies aimed at elucidating spatiotemporal variation in population composition. Approximately 90 *Stiphodon caeruleus* and 60 *Stiphodon cf. elegans* were collected in 2007 from at least three different watersheds at low and high elevations on the island of Pohnpei, FSM. Fish were collected using a variety of techniques, such as seining, shocking, and spearing. Genetic variation among populations was assessed by sequencing and comparing the mitochondrial gene, NADH dehydrogenase subunit 4 (ND4) and subunit 4L (ND4L). Our research suggests that little genetic variation exists between cohorts and among *S. caeruleus* populations inhabiting different rivers of the island. Population samples of *S. cf. elegans* showed greater haplotype diversity, but no sign of insular geographic structuring. These results suggest that a significant pool of recruits would be available to recolonize a river following a major disturbance.
- 255 MOLECULAR PHYLOGENETICS OF WEST-CENTRAL AFRICAN SHREWS: AN EMPHASIS ON *PARACROCIDURA*.  
Adam W. Ferguson\*, and Loren K. Ammerman, Department of Biology, Angelo State University, San Angelo, TX.
- Shrews of the recently elevated order, Soricomorpha, form a complex of hard to identify small mammals whose phylogenetic relationships are often as complicated as their morphological identification. The west-central African countries of Gabon, Cameroon, Democratic Republic of Congo, and the Central African Republic support some unique shrew taxa including all three species of the genus *Paracrocidura*. As part of a larger project comparing phylogenetic and morphological identification of shrews collected in Gabon, Africa, we sought the use of molecular techniques to clarify the confounding relationship of *Paracrocidura* to other west African shrews. A total of 39 individual shrews have been sequenced for a 740 base pair



fragment of the cytochrome-b (cyt-b) gene and analyzed using Maximum Likelihood and Maximum Parsimony. Although some relationships are clear, a majority of them are complicated by potential nuclear mitochondrial translocations (NUMTs) or lack of resolution between taxa. The sister relationship of *Paracrociodura* to other west-African crocidurine shrews is unclear under both cyt-b and 16s rRNA datasets. Our current focus is on employing nuclear markers (b-fibrinogen intron) to help clarify the relationship of *Paracrociodura schoutedeni* and *P. maxima* to crocidurine genera and to continue using various techniques to detect the influence of NUMTs on our phylogenetic assessment of this community of shrews.

260 PHYLOGEOGRAPHY OF WESTERN SPOTTED SKUNKS BASED ON CYTOCHROME B DNA SEQUENCE.

Gema I. Guerra\*, Loren K. Ammerman, Robert C. Dowler, Angelo State University, San Angelo, TX.

Historically, spotted skunks in the United States were recognized as a single species, *Spilogale putorius*. However, Mead in 1968 recognized different reproductive patterns in *Spilogale*, and separated it into two species—the western spotted skunk and the eastern spotted skunk (*Spilogale gracilis* and *Spilogale putorius*). There are seven described subspecies, some of which have been documented to have different karyotypes. Because of its fairly new species level designation, broad geographic range, and lack of detailed genetic analysis, the study of *S. gracilis* genetic variation might reveal patterns that suggest the presence of cryptic species according to the genetic species concept. DNA was extracted and mitochondrial cytochrome *b* gene amplified by PCR for 29 individuals. *S. gracilis* samples were from Texas (11), Arizona (3), New Mexico (2), Baja California Mexico (4), California (4) Sonora Mexico (2), Oregon (1), *S. putorius* (1) from Texas, and *Spilogale pygmaea* from Michoacán Mexico(1). DNA sequences were compared using Neighbor Joining analysis and parsimony. There are three well-supported clades as measured with bootstrap support (BS): a California and Baja California clade (100 BS), an Arizona and Sonora Mexico clade (100 BS), and a Texas and New Mexico clade (94 BS). A basal clade is also present (100 BS) that includes individuals that appear morphologically intermediate between *S. gracilis* and *S. putorius*. This result may suggest that hybridization of the western spotted skunk and eastern spotted skunk is occurring or has occurred in the past.

288 A REVIEW OF THE LAND SNAIL GENUS *HOLOSPIRA* (GASTROPODA: UROCOPTIDAE) FROM THE STATE OF COAHUILA IN NORTHERN MEXICO.

Ned E. Strenth\*, Angelo State University, San Angelo, TX, Alfonso Correa-Sandoval, Instituto Tecnológico de Cd. Victoria, Cd. Victoria, Tamaulipas, México and Lynn McCutchen, Kilgore College, Kilgore, TX.

This study was undertaken in preparation for a general review of the land snail genus *Holospira* in the state of Coahuila in northern Mexico. Between 1865 and 1953 a total of eight species were described from the state. Most of these were described from specimens which had either been donated to major museums by private collectors or those which were obtained in conjunction with museum sponsored expeditions that were conducted as part of general surveys of northern Mexico. Original collection data is often of limited value in determining the exact location of the type localities of several of these species. In addition, morphological differences between several taxa such as *Holospira monclovana* and *H. picta* appear to be very minor. Several species are known only from a very limited number of specimens or in the case of *H. infanta*, just a single specimen. In addition, most of these species are known only from the mountainous regions in the vicinity of Saltillo (*H. dalli*, *H. nelsoni*, *H. infanta* and *H. odontoplax*) and Monclova (*H. monclovana*, *H. picta* and *H. orcutti*) along the southern and eastern border of the state. The remaining areas of the central, western and northern regions of the state were not surveyed during this earlier time period and remain in need of study today. The known history of the genus *Holospira* in Coahuila since 1865 is reviewed in conjunction with the results of more recent field studies in this area of northern Mexico.

160 INTRASPECIFIC VARIATION WITHIN THE INNER EAR OF A CRETACEOUS EUTHERIAN MAMMAL.

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Zalambdalestidae is a group of eutherian mammals known from dental, cranial, and postcranial material recovered from Late Cretaceous deposits in Asia. The external morphology of the petrosal bone, which houses the structures of the inner ear, is well known and described for this taxon. However, only a small amount of information is available for the internal surface of the petrosal, which forms the bony labyrinth of the inner ear. The use of high resolution X-ray computed tomography (CT) provides a more thorough view of the entire bony labyrinth of zalambdalestids. I constructed digital endocasts of the bony labyrinth of several specimens of the zalambdalestid taxon *Kulbeckia kulbecke* (from the Cretaceous of Uzbekistan), and I measured various aspects of the inner ear. The measurements include volumes of the various inner ear

components (such as the cochlea and semicircular canals), the number of turns completed by the cochlea, and spatial relationships among the semicircular canals. The overall morphology of the bony labyrinth of *K. kulbecke* is similar to that of both extinct and extant eutherians. Any functional significance of the inner ear of *K. kulbecke* has yet to be determined, but when compared with the inner ear of other eutherians, the internal auditory structures might be a phylogenetically significant. For example, the degree of coiling (a single coil) likely is the ancestral condition for eutherians, and may separate fossil taxa from extant eutherians (the living placental mammals).

254 MORPHOMETRIC AND MOLECULAR VARIATION OF MOUNTAIN CATFISHES (AMPHILIIDAE, *AMPHILIUS*) IN GUINEA, WEST AFRICA.

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A morphometric and molecular analysis was performed on specimens identified as *Amphilius* species from Guinea, West Africa. Specimens and tissues of *Amphilius platyichir*, *Amphilius rheophilus*, and *Amphilius atesuensis* were collected in the streams of the Fouta Djallon highlands, Zone Forestiere, and coastal drainages during several expeditions in 2003. A geometric morphometric analysis was performed using lateral body profiles, dorsal, and ventral images of the head, recognizing 15, 14, and 7 landmarks respectively. A principal components analysis displays clear separation of three morphotypes. Significant variation was also observed across the various basins sampled. The phylogenetic analysis of partial sequences of the mitochondrial cytochrome-*b* gene revealed two distinct clades with 20% sequence divergence corresponding to *A. platyichir* and *A. rheophilus*. *Amphilius platyichir* specimens collected in the Koumbouya River (Fatale River basin) displayed 10% sequence divergence from specimens in the Konkouré, Gambie, and Senegal River basins. The analysis of *A. rheophilus* and *A. atesuensis* specimens resulted in two distinct clades: one clade comprising Bafing and Thiangeloussi River (Senegal River basin) *A. rheophilus* specimens and another of Senta and Finton rivers (Tominé River basin), Konkouré, specimens. *A. atesuensis* from the Loh River exhibited 13% sequence divergence from *A. rheophilus* specimens from the Senegal River basin, but only 5% sequence divergence with Tominé River basin *A. rheophilus* specimens. There was 10% sequence divergence among *A. rheophilus* specimens between the Tominé River basin and Senegal basin. Intraspecific genetic variation observed within species correlates with significant morphometric variation.

182 FROM TEXAS TO CALIFORNIA: POPULATION GENETIC AND PHYLOGEOGRAPHIC RESULTS IN THE CAVE MYOTIS.

Julie A. Parlos\* and Michael R. J. Forstner, Texas State University, San Marcos, TX.

The cave myotis (*Myotis velifer*) is an insectivorous, cave-dwelling chiropteran, which is recognized as a Texas species of concern due to abandonment of historical roosts. These concerns have brought questions of relatedness, site fidelity, and population genetic structure among remaining occupied roosts. To address these, wing tissue samples were collected to test whether population structure exists. Samples were collected from a total of 20 roosts, three in the Texas Panhandle, 13 in Central and West Texas and four near the California-Arizona border. These samples represent three taxonomic subdivisions which have been observed to vary in morphological and behavioral characteristics. Mitochondrial sequence data (982 base pairs from *Cytochrome b*) yield 53 haplotypes from 102 individuals. While some structure exists between these haplotypes, they do not provide phylogeographic or taxonomic structure. An evaluation of 28 microsatellite loci yielded four suitably polymorphic autosomal loci and one X-linked locus. Results generated from the nuclear data of 192 individuals also indicate a lack of phylogeographic and taxonomic structure from Texas to California. These data indicate very weak, if any, female philopatry as well as a substantial amount of gene flow occurring between these three taxonomic subdivisions. A lack of genetic structure in mitochondrial DNA has rarely been observed in chiropterans; however, this may be attributable to the migratory nature of the cave myotis.

193 PRELIMINARY ANALYSIS OF AN AVIFAUNAL ASSEMBLAGE FROM ROLAND SPRINGS RANCH, WEST TEXAS.

Julie Sculley, Sam Houston State University, Huntsville, TX, Eileen Johnson, Museum of Texas Tech University, Lubbock, TX, and Patrick J. Lewis, Sam Houston State University, Huntsville, TX.

The Plio-Pleistocene is of great interest in regard to avian evolution, as the climatic fluctuations of the Pleistocene impacted avian biodiversity significantly. By the late Pliocene, virtually all modern avian families and genera were present and species diversity had peaked in excess of 20,000. The glaciation events of the Pleistocene reduced this number to fewer than 10,000. As few described North American avifaunal assemblages are available, the overall pattern of avian systematics and biogeography is poorly understood. This research is focused on a systematic and paleoenvironmental analysis of the

avifaunal component of a fossil assemblage from the Roland Springs Ranch of Snyder, Texas. This locality, RSR1, is in the Rolling Plains region of West Texas. Deposition appears to have occurred in a low-energy fluvial environment without apparent taphonomic bias resulting in the preservation of a diverse fauna. Preliminary biostratigraphic dating using non-avian taxa suggests this assemblage represents a transitional period between the Blancan and Irvingtonian North American Land Mammal Ages (ca. 1.8 mya). As such, the RSR1 avifauna should compare well with others from contemporaneous North American sites, and is hypothesized to be similar to those from localities located in the early to middle Blancan-age Rexroad Formation in the High Plains of Kansas. This avifaunal assemblage numbers over 30 specimens and consists of various elements representing at least two orders. The fauna fills an important spatial gap in the avifaunal record and will help to resolve avian systematic and biogeographical issues from the important period just prior to the Pleistocene.

119 APPENDAGE REGENERATION: A FRAMEWORK FOR FUTURE RESEARCH.

Tara Maginnis, St. Edward's University, Austin, TX.

Many organisms have the ability to shed an appendage (autotomy) to escape a predator or fouled molting event. Despite its immediate advantage on survivorship, autotomy can have important consequences for locomotion, foraging, survivorship, and/or reproduction. Thus, regeneration is a way that animals alleviate some of the costs associated with losing an appendage. Like autotomy, however, appendage regeneration can have important consequences for a variety of aspects of fitness; in a wide range of amphibians, reptiles, fish, and arthropods, the allocation of resources to regenerate a lost appendage negatively affects somatic or reproductive growth. Previous research into the costs associated with autotomy and regeneration has provided a strong framework to explore how tradeoffs associated with regeneration may have influenced its evolution, and has all been done from a specific set of comparisons: individuals autotomising and regenerating an appendage compared to individuals that have never lost an appendage. I suggest a shift in the way we approach our studies in order to specifically address why regenerative capacities *themselves* evolve or persist. Future work in this direction promises new insights into how the tradeoffs associated with autotomy and regeneration may be shaping its evolution, as well as how regeneration may be influencing animal form and function.

174 MORPHOLOGICAL VARIATION IN THE *BATHYGOBIUS SOPORATOR* SPECIES COMPLEX.

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The frillfin goby, *Bathygobius soporator* (Teleostei: Gobiidae), has historically been regarded as an amphi-Atlantic species commonly associated with rocky shorelines and intertidal pools. Ginsburg (1947) suggested that despite a generally low degree of distinction, morphological variation associated with geographic distribution in the species was sufficient to recognize four subspecies, *B. s. catulus*, *B. s. soporator*, *B. s. longiceps*, and *B. s. sextaneus*. In a more recent analysis Miller and McK. Smith (1989) discerned no significant morphological difference within the species across its geographic range, other than average values for some counts and measures between W. African and western Atlantic populations. Subsequent molecular studies by Lima et al. (2005) and unpublished studies in our lab suggest the occurrence of several cryptic species within a *Bathygobius soporator* complex. Geometric morphometric analyses of 163 representative specimens from across the species range were conducted using 24 digitized landmarks. Principal components analyses discerned no variation in body form associated with geographic distribution, or consistent with the subspecies hypothesized by Ginsburg. Additionally, traditional morphological and meristic characters were analyzed for 269 individuals representative of the species range. While some structuring of the data by geographic locality was apparent, principal components analyses determined no significant differences to support the hypothesized subspecies. Further study of pigmentation variation is underway.

238 POPULATION GENETICS OF THE CONCHO WATER SNAKE (*NERODIA PAUCIMACULATA*) IN COMPARISON TO HARTER'S WATER SNAKE (*NERODIA HARTERI*) AND THE BLOTCHED WATER SNAKE (*NERODIA ERYTHROGASTER TRANSVERSA*).

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In Texas, *N. paucimaculata* and *N. harteri* are two localized and threatened water snakes; whereas, *N. erythrogaster transversa* is a more common and widespread species. We used mitochondrial DNA (*cyt-b*) sequences and six microsatellite loci to estimate and compare several population genetic parameters. Sequences were used to build a median joining haplotype network and to generate a phylogenetic topology. Measures of microsatellite variation were estimated to determine the

genetic diversity within each species group. Distance and model-based methods were then used to analyze multilocus genotypes to test for population structure and in the case of *N. harteri* and *N. paucimaculata* for the possibility of genetic admixture. Within the same geographic area *N. e. transversa* exhibited higher genetic diversity, in both mitochondrial and nuclear genomes, than *N. paucimaculata* and *N. harteri*.

45 HOW GENERAL IS THE *PSEUDACTEON* MOUND-TRAIL NICHE AXIS DICHOTOMY? AN ARGENTINA PERSPECTIVE.

Richard J.W. Patrock\*, Section of Integrative Biology and Brackenridge Field Laboratory, University of Texas at Austin; Patricia J. Folgarait, Centro de Estudios e Investigaciones, Universidad Nacional de Quilmes, Buenos Aires, Argentina and Lawrence E. Gilbert, Section of Integrative Biology and Brackenridge Field Laboratory, University of Texas at Austin.

Imported fire ants are attacked by parasitoid phorids at their nesting sites and along foraging trails. In Brazil, the finding that species preferentially attacked the host ants at one or the other of these locations led to the categorization of the parasitoid community as falling along a Mound-Trail niche axis. Studies in Argentina have shown variability in this niche axis, however. We explored this geographical variation to determine the extent to which the Mound-Trail axis could be generalized. A comparative analytical study of species propensities towards being found on trails showed that the Mound-Trail categorization was robust across the South American landscape; both Mound and Trail species were generally more likely to be found in their classified locality than the other. Sites in Brazil showed the strongest, whereas those in western Argentina showed the least level of dichotomy along the the Mound-Trail axis. Interestingly, we saw that the contrast in dichotomy across regions followed a similar pattern: mound species were more likely to be found on trails and trail species on mounds as the contrast in the dichotomy decreased. We explored logistical, ecological and evolutionary factors that might have contributed to these patterns of niche variation.

115 UNUSUAL FLEXIBILITY IN THE NESTING BEHAVIOR OF *PALMODES DIMIDIATUS* (HYMENOPTERA: SPHECIDAE).

Allan Hook\*, Sonia Salinas, St. Edward's University, Austin, TX.

The nesting sequence of solitary wasps is generally thought to be highly stereotypical with more ancestral members using a single prey item per offspring for a nest that is excavated after obtaining the prey item. More advanced wasps first construct a nest and then provision cells for rearing offspring. *Palmodes* is unusual in that two species have been reported to hunt for prey and then dig a nest but also to first dig a nest before hunting. Doubt has been raised on these mixed reports as no wasp has shown such behavioral flexibility in the nesting sequence. *Palmodes dimidiatus* has been regularly seen in and about a nesting aggregation of *Bembecinus neglectus* over the past few years at Pedernales Falls State Park, Blanco Co., Texas. Females have occasionally been seen transporting paralyzed prey of the tettigioniid, *Neobarrettia spinosa* to sites where females then proceeded to excavate their nests. This past summer a few nests were observed that were constructed before prey hunting. This appears to be the first documentation of a conditional strategy involving the nesting sequence of a solitary wasp. Variation in prey size may influence such behavioral flexibility in this wasp.

P85 POPULATION GENETICS AND GENE FLOW OF THE ALASKAN COASTAL SHRIMP *HEPTACARPUS MOSERI* FOUND ON ALASKAN SEAMOUNTS.

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In an expedition conducted by the National Oceanic Atmospheric Administration several scientists conducted research on seamounts located off the Gulf of Alaska. During this expedition the submersible Alvin was used to gather specimens from deepwater seamounts. We conducted research on two questions regarding shrimp collected during the 2004 Gulf of Alaska Seamount Expedition. First, are unidentified shrimp collected on several different seamounts located in the Gulf of Alaska *Heptacarpus moseri*? Second, are two shrimp populations collected from different, isolated seamounts, genetically different, indicating little gene flow between seamounts, or are they genetically similar, indicating significant gene flow between seamounts? To identify these shrimp we took pictures, weights and carapace measurements of every individual. Based on the presence of epipods on the maxillipeds and on the first feet, shrimp from both seamounts were identified as *Heptacarpus moseri*. To estimate genetic differentiation of these populations we used the standard procedures from Qiagen's DNeasy kit to extract DNA. We removed 25mg of soft tissue from the cardiac regions of each ethanol-preserved specimen for all extractions. PCR was used to copy mitochondrial genes, which will then be sequenced to estimate any genetic differences. The two seamounts are isolated by distance and oceanographic currents, which could hinder gene flow

between shrimp populations, therefore we hypothesize that the populations might have significant genetic differentiation. It is important to note that genetic analysis is not yet finished, but will be completed by fall.

P114 NOTES ON THE NESTING BEHAVIOR OF TWO SPECIES OF *BICYRTE* (HYMENOPTERA: CRABRONIDAE).

Julie Le\* and Allan Hook, St. Edward's University, Austin, TX.

*Bicyrtes* includes 27 species restricted to the Western Hemisphere with eight species recorded in North America. These wasps generally nest in sandy substrate and mass provision their ground nests with immature Heteroptera, primarily Pentatomidae (stink bugs) and Coreidae (leaf-footed bugs). Data on the nesting biology of two species (*B. quadrifasciatus* and *B. ventralis*) were obtained this past summer at Pedernales Falls State Park, Blanco Co., Texas. Pedernales Falls State Park is an excellent site to study the comparative biology of members of this genus as we have collected six of the eight species found in North America at this locality. Results will be presented on nest architecture, prey records, and rates of provisioning for these two species.

P124 THE EFFECTS OF SURFACE AND AIR TEMPERATURE ON THE ACTIVITY PATTERNS OF *BEMBEVINUS NEGLECTUS* (HYMENOPTERA: CRABRONIDAE: BEMBEVINAE).

Cameron Siddens\* and Rich Patrock, St. Edward's University, Austin, TX.

Male *Bembecinus neglectus* exhibit scramble competition polygyny, whereby males emerge before females and patrol the emergence area, characteristically landing and crawling over the surface so as to intercept females as they just emerge. This ground patrolling behavior takes place mainly in the morning hours, tending to cease as surface temperatures increased, beginning at temperatures around 23°C and stopping at temperatures up to 54°C. This research investigated whether air temperature, surface temperature or time of day influences male mating behavior, specifically in the emergence area. Nonlinear analyses showed significant regressions for both surface and air temperatures influencing male mate searching activity. Time of day and male activity was not significant.

P41 ISOLATION AND CHARACTERIZATION OF MICROSATELLITE LOCI IN TWO BOX TURTLE SPECIES.

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Ornate (*Terrapene ornata ornata*) and Three-toed (*Terrapene carolina triunguis*) box turtles have different habitat preferences within overlapping ranges in Texas and Oklahoma. In such sympatric distributions, individuals may display characteristics of both species. Hybridization events, between two closely related species, often occur within interspersed habitats with reduced reproductive barriers. Morphometric analyses indicated that putative hybrids have carapace morphology more similar to *T. c. triunguis* than *T. o. ornata*. However, additional molecular data is needed to investigate the incidence and extent of hybridization. Microsatellite markers have been effectively used in numerous population studies, and have been particularly useful in kinship and parentage analyses and in examining hybridization between sympatric species. A molecular analysis (using microsatellite primers developed by Hauswaldt and Glenn (2003) for *Malaclemys terrapin*) of putative *T. o. ornata* – *T. c. triunguis* hybrids yielded limited results, largely because specific microsatellite primers are not likely applicable across taxa. Because microsatellite primers for *Terrapene* have not yet been developed, we are currently developing species-specific microsatellite primers for *T. o. ornata* and *T. c. triunguis* with a refined hybridization capture procedure outlined by Glenn and Schable (2005). After primer development, microsatellite genotypic data will be analyzed with GENEPOP 3.1 to assess genetic structure among *Terrapene* populations. Development of primers for this previously uncharacterized genus will allow for detailed molecular analysis of the putative hybrids and will contribute to the microsatellite library for reptiles.

P305 RESOLVING CONFLICTS BETWEEN MORPHOLOGICAL AND MITOCHONDRIAL DNA DATA SETS IN *MYOTIS* BATS.

Dana Lee\* and Loren Ammerman, Department of Biology, Angelo State University and Russell Pfau, Tarleton State University.

The California myotis (*Myotis californicus*) and the Western small-footed myotis (*Myotis ciliolabrum*) are largely sympatric in the western United States, and they are so morphologically similar that subtle features of their skull must be used to distinguish between them. Previous analysis of mitochondrial DNA (mtDNA) sequence data (*cytochrome b*) demonstrated that these two species are paraphyletic. The objective of this study was to use a DNA fingerprinting technique, amplified frag-

ment length polymorphism (AFLP) analysis to resolve the conflicting morphological and mtDNA data sets. There is currently data for 16 individuals of both species, and a few additional individuals from closely related *Myotis* species (*M. leibii*, *M. yumanensis*, and *M. volans*). These data were used to generate a principle coordinate analysis and create a neighbor-joining tree. Preliminary results show a clear separation of *M. ciliolabrum* and *M. californicus*. An interesting outcome was *M. leibii*, from the eastern United States, clustered within *M. ciliolabrum*.

P211 MORPHOLOGICAL POPULATION VARIATION OF THE SULU GOBY (*ACENTROGOBIUS SULUENSIS*) IN THE WESTERN AND SOUTHERN PACIFIC OCEAN.

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The Sulu Goby, *Acentrogobius suluensis*, is a small fish common in estuaries of the western Pacific Ocean. Specimens recently collected in Pohnpei, Federated States of Micronesia are characterized by a distinctive black spot on the second dorsal fin not observed in the species original description by Herre (1927). An examination of morphological and pigmentary variation in populations of *Acentrogobius suluensis* from the central and southwestern Pacific Ocean suggests that this distinctive pigmentation is limited to populations in the Caroline Islands and Fiji. Principal Components Analysis not only shows morphological features but also meristic features that contribute to sample distinction between the different populations.

## TERRESTRIAL ECOLOGY AND MANAGEMENT

7 GREEN TREEFROGS (*HYLA CINEREA*) IN BIG BEND NATIONAL PARK, REASON FOR CONCERN?

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Invasive species are among the greatest concerns in regards to preserving biological diversity. However, not all introduced species are invasive species since many will not persist in the new habitat. One of the most effective means used to determine potential invasiveness is by assessing potential niche overlap and negative interaction. In the late spring and early summer of 2007, 105 individual Green Treefrogs were hand captured in a newly invaded location. Here I will describe habitat use and some characteristics of the sample collected from Rio Grande Village in Big Bend National Park. Also, based upon dietary data and a literature review, assessments for potential overlap and interaction with the native fish and amphibian species will be examined.

20 BIODIVERSITY OF MESOCARNIVORES ALONG RIPARIAN AREAS OF THE BIG BEND NATIONAL PARK.

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Most of Big Bend National Park's (BBNP) data for presence and distribution are based on tourist and employee observations. The objective of this study was to document and describe mesocarnivore biodiversity and relative periods of activity, based on presence and absence data; and, to conduct habitat analysis of the different sites within BBNP and compare them. We selected 6 camera trap-lines of 6 km each (using 3 cameras per trap-line); and 9 cameras, which were shifted between sites. Species accumulation curves were created using EstimateS, and we compared the sites using the Normalized Difference Vegetation Index (NDVI) to maximize the visual quality of the vegetation density. Relative periods of activity were recorded as being night, day, or crepuscular hours. A total of 126 days were sampled between fall 2006 and spring 2007. During this time, 149 pictures were taken; with 44% represented by medium-sized carnivores (n = 65). Six mesocarnivore species were documented: grey fox (43% of the mesocarnivore pictures), coyote (21%), bobcat (19%), western hog-nosed skunk (8.5%), striped skunk (4.3%), and ringtail (4.3%). The species accumulation curve reached the asymptote for the study area. Of the 65 pictures taken, 58 were taken during the night, 2 at crepuscular hours, and 5 during the day. BBNP has low vegetation density, giving negative NDVI values in almost all the camera points, and all the sites. A detailed analysis of mesocarnivores by trapping location and NDVI will be presented.

60 COMPARISON OF NATIVE BEE DIVERSITY BETWEEN A BOTANICAL GARDEN AND ADJACENT GRASSLANDS, CHIHUAHUA DESERT RESEARCH INSTITUTE, JEFF DAVIS COUNTY, TEXAS.

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Over 90% of angiosperms are pollinated by animals, particularly insects. Of these, native bees have been considered the most important pollinators of wild vegetation. Over 30,000 species of bees have been described worldwide with more than

500 species in Texas. It has been documented that bees reach their peak taxonomic diversity in xeric regions of the world, including North America's desert southwest. While a decline in bee diversity has been documented in Britain and the Netherlands, lack of baseline data in North America has made population trends here difficult to assess. To address this issue, a survey of native bee fauna was undertaken at the Chihuahuan Desert Research Institute's Botanical Gardens. This 8 ha patch exhibits floral abundance and diversity, and is believed to attract a representative sample of the bees in the region. To assess bee diversity in the Botanical Gardens and compare it to that found in surrounding grasslands, a preliminary pan trap survey was conducted. Yellow pan traps were set out for one 8 hour day every two weeks. Traps were arranged in two equivalent 1 ha grids; one grid in the Botanical Gardens, the other in the grasslands. Traps were placed 25 meters apart for a total of 25 traps per sample site. Sampling took place during the usual rainy season, June through August 2007. It is hypothesized that the enhanced floral diversity of the Botanical Gardens will attract greater bee diversity than will the surrounding unmanaged grasslands. Results will be presented comparing diversity of taxa recovered.

129 THE EFFECTS OF *JUNIPERUS ASHEI* ON UNDERLYING VEGETATION IN CENTRAL TEXAS.

Sandra L. Salinas\* and William J. Quinn. St. Edward's University. Austin, TX.

In a study conducted in the summer of 2007, the effects of *Juniperus ashei* on vegetation growing under its canopy were evaluated. Fifty mature *J. ashei* trees were identified in a mixed grassland-juniper community in western Travis County, Texas. The area under each tree's canopy was subdivided into sections representing the inner and outer halves. Soil moisture, litter depth and light level were measured in each section, as were the number and cover of forbs, grasses and woody species. Results indicate a higher light level, a reduced depth of litter, and higher cover and numbers of grasses and forbs in the outer sections when compared to the inner sections. Regression analyses indicate that the most reliable predictor of vegetative growth under the canopy was reduction in litter depth; interestingly, there was no apparent effect of soil moisture on competing vegetation. There are many potential explanations for these findings, including a possible allelopathic effect of juniper litter on competing vegetation. Indirect effects of litter, light and moisture availability (though not seen in this study) are also possible.

122 POPULATION DENSITY AND HABITAT SELECTION OF THE PAINTED BUNTING.

Stephanie B. Carey\*, Texas A&M University–Corpus Christi, Corpus Christi, TX., Robert Benson Ph.D., Texas A&M University–Corpus Christi, TX.

The Texas Painted Bunting population (*Passerina ciris pallidior*) experienced a 3.4% annual decline from 1966-1995. The primary goal of this study is to better understand the general habitat requirements of the western subspecies of Painted Bunting. Point count surveys and the stocked quadrat method were used to determine population density. The surveys were extended into various habitat types across the study site to increase habitat sampling diversity. Population densities ranged from 0.33122 males/ha in preferred habitat to 0.06305 males/ha in less preferred habitat with an average of 0.16085 males/ha  $\pm$  0.04021 for the study site. In future research, a Painted Bunting habitat preference index will be compiled by measuring the vegetation structure within each quadrat of the study site. Multivariate techniques will be used to explore the relationships between painted bunting densities and vegetation structure variables such as species frequencies. This research will serve as a baseline for a recovery plan design if the historical decline of the species continues.

146 PREDATION ON ARTIFICIAL NESTS IN URBAN AND NATURAL ENVIRONMENTS.

Anne-Marie Prouty\* and Diane L. H. Neudorf, Department of Biological Sciences, Sam Houston State University, Huntsville, TX.

Nest predation is the leading cause of reproductive failure in songbird species. Habitat changes, such as urbanization, may result in higher nest predation due to the loss of nesting habitat, as well as an increase in urban-adapted predators. We studied nest predation on artificial nests in two habitats in east Texas using time-lapse infrared video camera systems. One habitat was a residential neighborhood consisting of large yards with many older trees and shrubs in the city of Huntsville, Walker County, Texas. The other was a 100 ha tract of pines and hardwood forest adjacent to the Sam Houston National Forest. We hypothesized that predator species would differ in the two habitat types and that depredation would occur at a higher rate in the urban area than in the natural area. We found a significantly higher predation rate in the urban habitat as predicted. Via video surveillance, four species of nest predators were identified visiting depredated nests. Knowledge of how nest predation varies according to region and habitat is important to the conservation of songbird species.

- 154 LAND CRABS AND LEAF LITTER IN THE SIAN KA'AN BIOSPHERE RESERVE, QUINTANA ROO, MEXICO.  
Kim Withers\* and Ryan Fikes, Center for Coastal Studies, Texas A&M University–Corpus Christi, Corpus Christi, TX.

In coastal tropical areas, earthworms are typically absent from soils and land crabs (e.g., *Cardisoma guanhumi*, *Gecarcinus lateralis*, *Ucides cordatus*) recycle the majority of leaf litter. We determined tree density, litterfall, leaf litter accumulation and burrow density of land crabs in low humid jungle on the narrow coastal peninsula within the northern Sian Ka'an Biosphere Reserve during May 2007. Chit palm (*Thrinax radiata*) dominated; coco palm (*Cocos nucifera*) and chechem (*Metopium brownei*) were also abundant as was red mangrove (*Rhizophora mangle*) near the lagoon shore. Leaf litter accumulation ranged from 35 g/m<sup>2</sup> to nearly 6,000 g/m<sup>2</sup>. Litterfall was very low, ranging from 0 g/day to 7.3 g/day. Crab burrow density was negatively correlated with leaf litter distribution suggesting that crabs were clearing litter from areas around their burrows.

- 159 PRELIMINARY RESULTS FROM A POPULATION GENETICS STUDY OF COASTAL PLAIN TOADS (*BUFO NEBULIFER*).  
Diana J. McHenry\*, University of Missouri-Columbia, MO, and Michael R. J. Forstner, Texas State University-San Marcos, TX.

The Coastal Plain toad, *Bufo (Ollotis) nebulifer*, is common throughout its range from Veracruz, Mexico north into Texas and east into Louisiana. Although many aspects of its biology have been examined, including home range, hybridization, and orientation ability, no population genetics studies exist. We report on preliminary findings of a landscape-wide microsatellite study of Coastal Plain toads across central and southeast Texas. Additionally, we discuss finer-scale genetic variation and structuring within Bastrop County, Texas. These data might elucidate gene flow patterns which may be generalized for use in conservation management of rarer anuran taxa.

- 162 A STUDY OF THE DEMOGRAPHY OF THE WESTERN COTTONMOUTH MOCCASIN (*AGKISTRODON PISCIVORUS LEUCOSTOMA*) AT THE WESTERN LIMIT OF ITS RANGE.

Jason L. Strickland\* and J. Kelly McCoy, Dept. of Biology, Angelo State University, San Angelo, TX.

The western cottonmouth (*Agkistrodon piscivorus leucostoma*) is a semiaquatic pitviper with a known range from western Georgia to central Texas and from the southern coast as far north as the southern tip of Illinois. The population in this study is at the westernmost limit of the range with only a few smaller isolated populations slightly farther west. A mark-recapture study was used in two distinct areas on approximately 2.4 km (1.5 miles) of the South Concho River System (Tom Green County, Texas). The Schnabel method was used to determine population size of this species. During the study demographic data was also collected on the population to determine the sex ratio, average size, and distance traveled between recaptures. These data were compared to other known populations more central to its range. Comparisons between the two separate collecting areas were also made to try to detect differences within the population. Twenty-seven snakes were collected with fourteen individuals from one collecting area and thirteen from the other. Fifteen females and eight males were collected for a sex ratio of 1.875. All recaptures came from the same collecting area for a total number of captures of thirty-eight and an average number of captures per snake of 1.407.

- 332 SUPPORT HOST SELECTION OF *LONICERA JAPONICA* AND ITS INTERACTION WITH DIFFERENT FACTORS IN CAMERON PARK, WACO, TX.

Song Gao\* and Susan P. Bratton, Baylor University, Waco, TX.

Japanese honeysuckle (*Lonicera japonica*), an exotic woody vine species, has naturalized in riparian forests in central Texas. The objective of this study was to quantify its existence pattern associated with different environmental and biotic factors in Cameron Park. We tested the hypothesis that *L. japonica* occurrence and its invasive success are differentially associated with aspect, canopy closure, native vine coverage, and soil water holding capacity. We also assumed that climbing of *L. japonica* is promoted by both support host availability and a specified range of diameter and height of carriers. Eighty-eight 8 by 4 meter plots were established along twelve trails (pre-surveyed for *L. japonica*) in the area during spring 2007 and ten treatment methods (based on height class of support host as well as involvement of native vines) were randomly applied to each plot in May 2007. After-treatment measurements were taken two months after the treatment was applied. Through multiple ordinal regression analysis, we found that cover of *L. japonica* was only significantly related to native vine cover and only the treatment of clearing both native and exotic vines showed a significant effect. However, when it comes to the number of support host used by *L. japonica*, only the treatments of clearing vines on carriers of low to medium height class made significant impacts. These results suggested that biotic factors play a more important role in its invasion and support hosts with low to medium height contribute to its spread from understory to canopy layer of the forest.



- 120 THE DIET OF THE BURROWING OWL (*ATHENE CUNICULARIA HYPUGAEA*) WINTERING IN CENTRAL MEXICO. Héctor E. Valdez-Gómez\* and Armando J. Contreras-Balderas. Laboratorio de Ornitología, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León. Ciudad Universitaria CP 66451, A.P. 425 San Nicolas de los Garza, Nuevo León, México, and Geoffrey L. Holroyd and Helen E. Trefry, Canadian Wildlife Service, Environment Canada. Room 200, 4999-98 Ave., Edmonton, AB, T6B 2X3, Canada.

The burrowing owl has a wide distribution in Mexico; however, very little information is available on the winter ecology of this species. Determining the diet is central to understanding the burrowing owl habitat requirements. A total of 723 pellets were analyzed over four winters (99-00, 00-01, 01-02, 02-03) in Irapuato, Guanajuato. Additionally 315 pellets were analyzed from two winters (01-02; 02-03) in Zapopan, Jalisco. Burrowing owls in Central Mexico preyed upon a wide variety of invertebrates, small mammals, birds, and reptiles. Invertebrates generated the highest frequencies in the diet in Irapuato ( $\pm$  SD); (97.8 %  $\pm$  0.46) as well as in Zapopan (98.6%  $\pm$  0.12); however, small mammals on average represent 28.34% of the ingested biomass consumed in Irapuato, and 20.06% in Zapopan. The proportion of the prey were different among winters in Irapuato for mammals ( $X^2 = 8.950$ ;  $df = 3$ ;  $P = 0.030$ ) and invertebrates ( $X^2 = 8.487$ ;  $df = 3$ ;  $P = 0.037$ ). Among insects, Lepidoptera represents 26.7% of the ingested biomass in Zapopan, contrasting with 62.6% for Orthoptera in Irapuato. The overall mean prey size among winters was similar among winters (9.57 g) in Zapopan and (9.45g) in Irapuato. Prey diversity differed between sites ( $H'_{zap} = 3.32$ ;  $H'_{irap} = 1.67$ ) but showing similar moderate evenness ( $J'_{zap} = 0.86$ ;  $J'_{irap} = 0.43$ ) indicating that *Athene cunicularia hypugea* in central Mexico, consumes a relative diverse array of prey species in relative even proportions.

- 200 DOES THE CANOPY HOLD A MISSING PIECE OF THE AMAZON RAINFOREST AMPHIBIAN DIVERSITY? NEW SPECIES FROM A NEW FRONTIER IN YASUNÍ NATIONAL PARK, AMAZONIAN ECUADOR. Shawn F. McCracken\* and Michael R. J. Forstner, Department of Biology, Texas State University, San Marcos, TX.

The Upper Amazon Basin represents the pinnacle of known amphibian diversity, with 107 species having been documented at the Tiputini Biodiversity Station (TBS) in Yasuní National Park, Amazonian Ecuador. Terrestrial amphibian surveys are the historical method of sampling (e.g. visual encounter surveys), which encompass only a small microcosm (~ 2 m vertical height) of rainforest diversity. The vertical strata, reaching 50+ m height, of Amazonian rainforests are estimated to possess 70% of total biomass within the ecosystem. Canopy amphibian fauna have historically only been represented by a few surveys of felled trees conducted during forest clearing operations. Annual canopy surveys conducted from 1998 to 2002 along a 100 m-long system of canopy bridges at TBS and sporadic canopy surveys conducted during one week in May 2002 at the Yasuní Research Station resulted in 14 species collected. In summer 2004 and 2006, I employed a modified patch sampling method using single-rope climbing technique to collect a large tank-bromeliad species, *Aechmea zebrina*, from 16 trees to analyze for herpetofauna presence. Thirty-four adults, 10 juveniles, 15 larvae, and 17 eggs representing at least four species of anurans were collected during the two survey periods. Two of these species are now described as new species of the genus *Eleutherodactylus* (*Pristimantis*). The 15 known species collected in all canopy surveys have rarely or never been collected during typical terrestrial surveys. It is hypothesized that accounts of diversity, community structure, and abundance of amphibians within this multifaceted rainforest system are biased towards the terrestrial strata.

- 340 COMPOSITION OF GYRINID AGGREGATIONS IN THE EAST TEXAS PRIMITIVE BIG THICKET (COLEOPTERA: GYRINIDAE). Edward Realzola\*, Jerry L. Cook, Tamara J. Cook, Department of Biological Sciences, Sam Houston State University, Huntsville, TX, and Richard E. Clopton, Department of Natural Science, Peru State College, Peru, NE.

Gyrinids were collected from lotic and lentic sites in the Texas Big Thicket, where species frequently exhibited aggregation. Aggregations consisted of two or more species, and some aggregations had species representing up to three genera: *Dineutus* MacLeay, *Gyretes* Brullé and *Gyrinus* Müller. The composition of these aggregations is described along with habitat preferences. In the Big Thicket region of east Texas, gyrinids are most commonly found in species aggregations and were rarely collected in as single species groups. As a result of this research a new species of *Gyrinus* was discovered and is being described.

- P39 THE EFFECTS OF THE RED IMPORTED FIRE ANT ON BIODIVERSITY IN THE BLUNN CREEK PRESERVE. Christopher Redmond, St. Edward's University, Austin, TX.

The Red imported fire ant, *Solenopsis invicta* Buren has posed an enormous threat to the biodiversity and ecology of the southern United States for the past 75 years. This invasive species has negatively impacted agriculture, invaded urban areas,

and has perhaps caused irreparable ecological damage. Feeding on foliage and fauna alike, arthropod diversity has been shown to plummet when *S. invicta* is present. I conducted a pitfall study of arthropod diversity at the Blunn Creek Preserve in Austin, for comparison with two well known experiments previously performed at the University of Texas' Brackenridge Field Laboratory (BFL). Blunn Creek can be compared to the BFL in general topography. Pitfall results compared favorably with the first BFL study (done during the initial invasion), but less favorably with a follow-up study after the invasion was complete. At least for the Blunn Creek Preserve, the impact of *S. invicta* on arthropod diversity appears to be either in an early infestation phase or has had a more permanent effect on the local fauna.

- P290 AN EXAMINATION OF SHELL DAMAGE IN THE LAND SNAIL *RABDOTUS ALTERNATUS* (GASTROPODA: PULMONATA) FROM THE DESERT ENVIRONMENTS OF WEST TEXAS AND NORTHERN MEXICO.

Christopher D. Montag\* and Ned E. Strenth, Department of Biology, Angelo State University, San Angelo, TX.

This study examined external shell damage in naturally occurring populations of the land snail *Rabdotus alternatus* from several desert environments of west Texas and southeastern Coahuila in northern Mexico during 2006 and 2007. Six sites near La Linda in Brewster County, two sites near Pandale in Val Verde County and populations near Paredon, La Esmeralda and General Cepeda in southern Coahuila were examined during this study. Two basic types of damage were commonly observed at the study sites; complete shell destruction and small entry holes in the larger whorls near the aperture. The study site in the Zona del Silencio near La Esmeralda was characterized by the presence of numerous pack rat burrows and contained multiple remains of completely destroyed shells. Shells from the six locations in Brewster County were found to exhibit both single and multiple entry holes in 21 percent of the shells examined. Thirty-two percent of the specimens from Val Verde County exhibited shell damage. An analysis of shell damage as to whorl number and differing characteristics of the entry holes will be given from both sites in west Texas. One site in Val Verde County exhibited characteristics of an anvil stone feeding site which is supportive of an avian predator. While initial field observations appear to support the presence of more than a single predator, additional field studies will be required to determine the specific nature of the causative factors involved in the observed damage of shells of *Rabdotus alternatus* in the desert environments of both Texas and Coahuila.

- P292 DISTRIBUCION HERPETOLOGICA DE TRES TIPOS DE VEGACION DEL CERRO DEL POTOSÍ, GALEANA, NUEVO LEÓN, MÉXICO. Jorge A. Contreras-Lozano\*, David Lazcano-Villarreal, and Armando J. Contreras Balderas. Lab. de Herpetología, Facultad de Ciencias Biologicas, Universidad Autonoma de Nuevo Leon. Apartado Postal 425, San Nicolas de los Garza, N. L., Mexico. 66450.

El presente estudio herpetofaunístico, se realizó en el Cerro del Potosí en el municipio de Galeana, Nuevo León, México. Este será el primer trabajo herpetofaunístico extenso que se realiza en el área. Lo que lo convierte en una importante contribución que nos permite incrementar el conocimiento de la herpetofauna de esta montaña, considerada como Área Natural Protegida a nivel estatal y con ello, aportar información que permita establecer mejores estrategias de manejo y conservación de este importante grupo de vertebrados. El Cerro cuenta con un gradiente altitudinal que va desde los 2000 hasta los 3750 msnm, el cual es enriquecen por las comunidades vegetales presentes. Los objetivos del trabajo son: Determinar la posición taxonomica de las especies, así como determinar sus preferencias de sustrato, la distribución en los diferentes rangos altitudinales y comunidades vegetales. Los muestreos se realizaron mediante transectos, siguiendo el método de inventario y muestreo de Campbell y Christman (1982). Con base a los muestreos realizados, se capturaron 188 individuos distribuidos en 7 especies. Las especies encontradas entre estos gradientes altitudianles (2800 a 3750msnm) son: para los anuros una especie, para los urodelos una especie, para los saurios cuatro especies y para serpientes una especie que se encuentra en la NOM-059-2001 con la categoría Pr (Protección especial).

- P23 DEVELOPMENT OF A MICROSATELLITE ASSAY FOR USE WITH THE INVASIVE SPECIES *DICHANTHIUM ANNULATUM*.

Destiny S. Bean\*, Megan L. Thompson, and Patrick D. Larkin, Dept. of Physical and Environmental Sciences, Texas A&M University–Corpus Christi, Corpus Christi, TX.

Invasive species are non-native organisms that become introduced into ecosystems and interfere with normal physiological or ecological functions. *Dichanthium annulatum* (Kleberg Bluestem), a perennial plant of the Poaceae (grass) family, is an invasive species that is found throughout South Texas. The aim of this study was to develop a DNA microsatellite assay to examine genetic diversity among *Dichanthium annulatum* populations. Such information could be useful for determining

the source and number of genotypes that have colonized the region. Microsatellite sequences were identified using plant material from rural Nueces County, TX. They were used to design fluorescent, oligonucleotide primers for DNA amplification and analysis using the Polymerase Chain Reaction (PCR) and capillary electrophoresis. Two methods were tested: a two-primer method and a three-primer method that used a fluorescently tagged M13 universal primer. The three-primer method failed to generate strong or reproducible signals. Though amplification conditions (DNA/primer/DNA polymerase concentration, thermal cycling conditions) were modified several times, results were sporadic and inconsistent. Use of a two-primer method dramatically improved results in terms of signal strength, consistency and reproducibility.

- P48 MAPPING AND MONITORING BLACK BEARS (*URSUS AMERICANUS EREMICUS*) IN THE STATE OF NUEVO LEON, NE MEXICO. Hebert K. Nieto-Pliego, Horacio J. Urbano-Castillo, Armando J. Contreras-Balderas, Juan Antonio García-Salasalan Sergio López-Villarreal, Laboratorio de Ornitología, F. C. B., U. A. N. L. Apartado Postal 425. San Nicolas de los Garza, N. L., Mexico 66450.

Over the past 50 years in Mexico, the habitat of the black bear (*Ursus americanus*) has a serious deterioration, in accordance with the NOM-059-SEMARNAT-2001 for endangered species, given that at present barely reaches 20% of the population estimated in 1981, now only found in the northern regions of Mexico. In the State of Nuevo Leon, studies on black bears are scarce, mainly of diet, but there's a great feasibility for recovery and management of the species, while creating an effect of indirect protection, which will allow the conservation of other species and their various habitats. As for Serranias del Burro, in the State of Coahuila, Mexico, where the bear population has recovered. The main objective of this study is the monitoring and distribution, and to development a plan of conservation and recovery their habits in the state of Nuevo Leon. For it requires the organization and implementation of necessary actions for their recovery and protection. To achieve the objective it is necessary to conduct a researches of the black bear major areas of influx, in order to do that, it is important to take into account the experience of people in the field, since they are the ones who are in contact with the wildlife in our state. During about 4 months we have visited at least 28 of the 51 municipalities. On each visit we set up meetings with ranchers, farmers and ejido members, as well as municipal government representatives. Surveys were implemented to collect sites data, customs and / or conflicts in the interaction of people with the black bear or other animal wildlife; it was also done the location of sites where we have knowledge of the presence and activity of this kind. Data Collected in the different municipalities visited allow us to produce a map of the most recent sites visited by Black Bear in the state. This information made also possible to show the main areas of sampling for the census population in the second phase of this study; and the identification of potential biological corridors between Mexico and the United States.

- P107 ENDO- AND ECTOPARASITES OF SMALL RODENTS FROM BREWSTER COUNTY, TEXAS. Traci Guckian, Rosalva Meraz\*, and Christopher Ritzi, Department of Biology Sul Ross State University, Alpine, TX.

Information regarding the endo and ectoparasites associated with small rodents is poorly known, particularly in the southwestern United States. In the Trans-Pecos region, few studies have been conducted to examine the parasitic communities associated with small rodent populations. The goal of this study is to gain a better understanding of the rodent parasitic community associated with a grazed habitat over the course of the year. The study area selected is the Sul Ross State Ranch in Alpine, Brewster County, Texas. This area represents a typical grazed habitat in the Trans-Pecos region, and is home to a variety of small rodents, such as *Peromyscus leucopus* and *Peromyscus maniculatus*. We propose to collect rodent specimens through the use of Museum Special snap-traps, baited with either oats or peanut butter. Trap lines will be set out every other week for a year, beginning in September 2007. Transects consist of 20 traps each, set at a distance of three paces for an overall length of 20 meters. Traps will be set in the evening and checked the following morning for three consecutive days each trapping session. Four trapping sessions will be conducted at each locality, and then transects will be relocated to another area of the property to minimize the impact on the rodent community. Collected specimens will be washed for ectoparasites, using the technique outlined by Whitaker. Following washes, rodent GI tracts will be excised and visually examined for endoparasites. Preliminary results of this study will be presented.

# MAPS

Texas A&M University–Corpus Christi  
and  
Corpus Christi Area





**Corpus Christi**  
 PADRE AND MUSTANG ISLANDS  
 Convention & Visitors Bureau  
**BAY AREA MAP**  
 Convention & Visitors Bureau  
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