

**TEXAS STATE VITAE 2015**  
**(1-21-2016)**

**I. ACADEMIC/PROFESSIONAL BACKGROUND**

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Francis R. Horne, Ph.D.                      Professor, Biology

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Texas Tech University, Lubbock, Texas	B.A.	1962	(Zoology/Botany)
University of Wyoming, Laramie, Wyoming	M.S.	1964	(Physiology)
University of Wyoming, Laramie, Wyoming	Ph. D.	1966	(Physiol./Biochemistry)

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*University of Oklahoma Lake Texoma Laboratory, NSF Summer Fellow 1961*

*Duke University Marine Laboratory Beaufort, North Carolina NSF Summer Fellow 1964*

**RESEARCH & PROFESSIONAL EXPERIENCE:**

Ongoing

1967-2001      Professor, Biology, Department of Biology, TSU, San Marcos, TX.

Previous:

1966-67	University of Miami Marine Institute	Postdoctoral Fellow
1965-66	University of Wyoming	Teaching Assistant
1964	Texas Technological College	Research Assistant
1963	Grand Teton National Park	Ranger Naturalist
1962-65	University of Wyoming	NDEA Fellow
1960-62	Texas Technological College	Laboratory Instructor
1961	University of Oklahoma Biol. Stat.	NSF summer Award
1959-62	Texas Technological College	Research Assistant

**HONORS:**

NSF Summer award University of Oklahoma. 1961

NDEA Fellowship University of Wyoming 1962-1966

NSF Summer award Duke University Marine Lab 1964

NSF-National Science Foundation grant (Univ. Oklahoma, 1961).

NSF-National Science Foundation grant (Duke Univ., 1964).

NIH Postdoctoral Fellow Marine Laboratory University of Miami, Florida. 1966-67

NIH-National Institutes of Health grant (Univ. Miami: 1966-1967)

NSF Research Grant funded for 1969-1971

NSF-National Science Foundation (1972). Grant approved for funding but not close enough to the cut-off point for full funding. Could have accepted 25% funding, but chose to take a chance for full funding. Gambled and lost; in hind sight, half of a loaf would have been better than none.

NIH-National Institutes of Health (1973). Grant approved for funding. NIH sent an evaluation crew to evaluate SWTSU's Biology Department to ascertain if SWTSU had the space, equipment and teaching load for such a project. Since we had to share equipment with the Chemistry Department, the conclusion was obvious.

IBP – International Biological Program. Grant approved for funding (1973), but Congress failed to refund the program in 1974 after having funded it for 10 years previously.

NSF Research Grant funded for 1992-1994

Dean of Science Assessment Award, \$1000.

Faculty Senate, six years. 1992-1997.

**II. TEACHING**

1) Have taught large sections of both botany and zoology for majors. Taught large undergraduate sections of Biol. 1320 for non-majors & Biol. 3421 (Vertebrate Physiology) for both majors and non-majors. Taught Biol. 4450 (Physiol. Ecol.). **With large enrollments these are the courses that make the money for the**

- department funding of faculty with low teaching loads so they can conduct research.** I was, and am, along with other faculty pulling the wagon, not riding in it.
- 2) Have had many graduate students and undergraduate students doing research.
- 3) Alphi Chi Teaching award-1995 and 1997. Students in advanced courses rate me as an excellent teacher.

### III. SCHOLARLY ACTIVITY

#### A. Works Not in Print yet

- Horne, F. R. and K.L. Lavalli. Aspects of mineralization of the freshwater mussel, *Quadrula*. Crustaceana (In preparation, 2012).
- Horne, F. R. 2012. Influence of strontium on growth and shell formation in the freshwater snail, *Heliosoma*, shell.
- Horne, F. R. 2012. Strontium uptake in the freshwater playa lake ostracod shells.

#### B. PUBLICATIONS (37 in 18 Different National and International Journals): **THAT'S DIVERSITY**

- \_\_\_\_\_. F. R. Horne. 2011. Comal County in The Civil War as reported in the Neu Braunfels Zeitung. Cotton Publishers, Lubbock, Texas. 2011. 200p.
- \_\_\_\_\_. F. R. Horne, 2009. Aspects of mineralization of the cuticle of the crayfish, *Procambarus clarki*. Crustaceana 82(8):1057-1065.
- \_\_\_\_\_. F. R. and S. Tarsitano, 2007. The mineralization and biomechanics of the exoskeleton. Chapter 8: In: Crustacean Issues: The Biology and Fisheries of Slipper Lobsters, pp. 183-198.
- \_\_\_\_\_. F. R. and N. Strenth, 2007. Identification key for the common ostracods of the playa lakes of the Llano estacado. **Texas Journal of Science**. 59(4):291-300.
- \_\_\_\_\_, F. R. 2007. Ask The Experts, **SCIENTIFIC AMERICAN**, InterNet posting, December 6. Hard copy, Scientific American, 1-07.
- \_\_\_\_\_. F. R. , with E. Spanier, Tarsitano, S.F., K.L. Lavalli. 2006. The constructional properties of the exoskeleton of homarid, scyllarid, and palinurid lobsters. **Hydrobiologia**, 557:9-20.
- \_\_\_\_\_. F. R. Horne, S. Tarsitano, and K. Lavalli, 2002. Carbonic anhydrase in freshwater crayfish cuticle mineralization. **Crustaceana** 75(9): 1067-1081.
- \_\_\_\_\_. F. R. with Tarsitano, S., A. R. Russell, C. Plummer, and K. Millerchip. 2000. On the evolution of feathery from an aerodynamic and constructional view point. **American Zoologist**, 40:676-686.
- \_\_\_\_\_. F. R. and Ari Kahn. 2000. Water loss and viability in *Zizania* (Poaceae) seeds during short term desiccation. **American J. Botany**, 87(11): 1707-1711.
- \_\_\_\_\_. F. R. and Ari Kahn. 1997. Phylogeny of wild rice, a theory. **The Southwestern Naturalist**. 44:423-434.
- \_\_\_\_\_. F. R. 1996. Ostracods of the playa lakes of the Llano Estacado of Texas. **The Southwestern Naturalist**. 4(2); 375-381.
- \_\_\_\_\_. F. R. 1993. Survival strategy to escape desiccation in a freshwater ostracod, **Crustaceana** 65(1):53-61.
- \_\_\_\_\_. F. R. et al. 1992. Recent Introduction and potential impact of the giant rams-horn snail into the Comal Springs ecosystem. **The Southwestern Naturalist**, 37: 194-196.
- \_\_\_\_\_. 1980. Comparative aspects of estivating metabolism in the aquatic gastropod, *Marisa*. **Comp. Biochem. Physiol.** 64A:309-311.
- \_\_\_\_\_. 1979. Purine production during fasting in slugs. **J. Experimental Zool.** 209:309-316.
- \_\_\_\_\_. 1979. Factors influencing distribution of mussels in the Blanco River of Central Texas. **Nautilus** 94:119-133.
- \_\_\_\_\_. 1977. Ureotelism in the slug, *Limax flavus* Linne. **J. Experimental Zoology**, 119:227-232.
- \_\_\_\_\_. 1977. Aspects of fasting metabolism in the desert tortoise, *Gopherus berlandieri*. **Comp. Biochem. Physiol.** 58B: 21-26.
- \_\_\_\_\_. 1977. The distribution of river shrimp in the Guadalupe and San Marcos Rivers of Central Texas. **Crustaceana**, 33:56-60.
- \_\_\_\_\_. 1976. Regulation of urea biosynthesis in the slug, *Limax flavus* Linne. **Comparative Biochem. and Physiol.** 56:63-69.
- \_\_\_\_\_. 1975. The utilization of foodstuffs and urea production by a land snail during estivation. **Biol. Bull.**

144:321-335.

\_\_\_\_\_. **1974.** Phyllopods of some southern high plains saline playas. **Southwestern**

**Nat.**19:465-484.

\_\_\_\_\_. **1973.** Urea metabolism in an estivating terrestrial snail, *Bulimulus dealbatus*. **Amer. J. Physiol.** 224:781-787.

\_\_\_\_\_. **1973.** Physiochemical features of hemoglobin in the crustacean, *Triops longicaudatus*. **Arch. Biochem. Biophysics**, 161:369-374.

\_\_\_\_\_. **1973.** The utilization of foodstuffs and urea production by a land snail during estivation. **Biol. Bull.**

\_\_\_\_\_. **1971.** Some effects of temperature and oxygen concentration on phyllopodecology. **Ecology**. 52:343-347.

\_\_\_\_\_. **1971.** Accumulation of urea by a pulmonate snail during aestivation. **Comparative Biochemistry and Physiology**, 220:1875-1881.

\_\_\_\_\_. **1971.** Physiological properties of hemoglobin in the branchiopod crustacean *Triops*. **Amer. J. Physiol.** 220:1875-1881.

\_\_\_\_\_, F. R. and Viroj Boonkoom. **1970.** The distribution of the ornithine cycle enzymes in thirteen gastropods. **Comparative Biochemistry and Physiology**, 88:141-153.

\_\_\_\_\_, F. R. and G. Barnes. **1970.** Reevaluation of urea biosynthesis in prosobranch and pulmonate snails. **Zeitschrift für Vergleichende Physiologie**, 69:452-457.

\_\_\_\_\_, F. R. and W. Baze. **1970.** Ureogenesis in chelonia. **Comparative Biochemistry and Physiology**, 34:91-100.

\_\_\_\_\_, F. R. **1969.** Purine excretion in five scorpions, a uropygid and a centipede. **Biological Bulletin**, 127:155-160.

\_\_\_\_\_, F. R. **1968.** Quantification of sodium uptake in the alpine fairy shrimp, *Chirocephalopsis bundyi*. **Crustaceana**, 14:271-274.

\_\_\_\_\_, F. R. **1968.** Survival and ionic regulation in the notostracan, *Triops longicaudatus*, in various salinities. **Physiological Zoology**, 41:180-144:321-330.

186.

\_\_\_\_\_, F. R. **1968.** Quantification of sodium uptake in the alpine fairy shrimp, *Chirocephalopsis bundyi*. **Crustaceana**, 14:271-274.

\_\_\_\_\_, F. R. **1968.** Survival and ionic regulation in the notostracan, *Triops longicaudatus*, in various salinities. **Physiological Zoology**, 41:180-186.

\_\_\_\_\_, F. R. **1968.** Nitrogen excretion in crustacea - I. The herbivorous land crab, *Cardisoma guanhumi* latreille. **Comparative Biochemistry and Physiology**, 26:637-645. Nitrogen excretion in crustacea - I. The herbivorous land crab, *Cardisoma guanhumi* latreille. **Comparative Biochemistry and Physiology**, 26:637-645.

\_\_\_\_\_, F. R. **1967.** Effects of physiological-chemical factors on the distribution and occurrence of some Southeastern Wyoming phyllopods. **Ecology** 48: 472-477.

\_\_\_\_\_, F.R. **1966.** The effects of digestive enzymes on the hatchability of *Artemia salina* eggs. **Transactions of the American Microscopical Society**, 75:271-274.

\_\_\_\_\_, F. R. **1966.** Some aspects of ionic regulation in the tadpole shrimp, *Triops longicaudatus*. **Comparative Biochemistry and Physiology**, 14:313-316.

## **B. Works Not in Print yet**

Horne, F. R. and K.L. Lavalli. Aspects of mineralization of the freshwater mussel, *Quadrula*. *Crustaceana* (In preparation, 2012).

Horne, F. R 2015. Influence of strontium on growth and shell formation in the freshwater snail, *Heliosoma*, shell.

Horne, F. R 2015. Strontium uptake in the freshwater playa lake ostracod shells.

## **Abstracts and Presentations:**

**Presentations and abstracts (Published and Unpublished) presented at Regional and National Scientific Meetings by myself and students: 1997 to 2015 only. 1967-1996 not included.**

- Horne, F.R. and K. Souther. 1997. Phylogeny of the crustaceans, *Triops* (tadpole shrimp) and *Cyzicus* (clam shrimp). American Association for the Advancement of Science (AAAS), Texas A&M University, College Station, Texas.
- Horne, F.R. 1997. Use of scientific equipment in undergraduate science teaching. American Association for the Advancement of Science (AAAS), Texas A&M University, College Station, Texas.
- Horne, F.R. and A. Kahn. 1997. Phylogeny of North American wild rices based on nuclear rDNA Sequences. American Association for the Advancement of Science (AAAS), Texas A&M , College Station, Texas.
- Horne, Francis. 1997. Comparison of isozymes in three North American wild rices. Southwest and Rocky Mountain division of American Association for the Advancement of Science 68<sup>th</sup> Annual Meeting, University of Arizona.
- Horne, Francis. 1997. Phylogeny of North American wild rices. Southwestern Association of Naturalists, 45<sup>th</sup> Annual Meeting, University of Arkansas.
- Kahn, Ari and Francis Horne. 1998. Phylogeny of North American wild rices based on nuclear rDNA sequences. Southwestern Association of Naturalists, 45<sup>th</sup> Annual Meeting, University of New Mexico.
- Horne, F. R. and Jacob Oder. 1998. Phylogeny of some phyllopod crustaceans. Texas Academy of Science, March 6, 1998, Tyler, Texas.
- Horne, F. R. and Anissa Reyes, 1998. Effects of drying on germination of wild rice seeds. Texas Academy of Science , March 6, 1998, Tyler, Texas.
- Horne, F. R. 1998. Strontium and calcium deposition in shells. Texas Academy of Science , March 6, 1998, Tyler, Texas.
- Horne, F. R. 1998. Effects of drought on wild rice phylogeny. American Association of Scientists (SWRAAAS) Meetings, May, 1998, Grand Junction, Colo.
- Horne, F. R. and Ari Kahn. 1998. Phylogeny of *Zizania* using DNA sequences. American Association of Scientists (SWRAAAS) Meetings, May, 1998, Grand Junction, Colorado.
- Horne, Francis. 1998. Effects of desiccation on survival and germination of wild rice seeds. . Southwestern Association of Naturalists, 45<sup>th</sup> Annual Meeting, University of New Mexico.
- Caldwell, Sara, **Francis Horne** and Samuel Taristano. 1999. Mechanism for shell deposition in the marine oyster *Crassostrea*. Texas Academy of Sciences, 102<sup>h</sup> Annual Meeting, Southwest Texas State University.
- Oder, Jak., **Francis Horne** and Samuel Taristano. 1999. Mechanism for shell deposition in the freshwater snail, *Marisa*. Texas Academy of Sciences, 102<sup>h</sup> Annual Meeting, Southwest Texas University.
- Horne, Francis, Sam Tarsitano, Kari Lavalli, and Julie Pevehouse. 2000. Mineral deposition in shells. Texas Academy of Sciences, 102<sup>h</sup> Annual Meeting, Texas A&M University, Kingsville.
- Horne, Francis, S. Tarsitano and K. Lavalli. 2000. The vinegaroon and life in the desert. Southwestern Association of Naturalists, 47<sup>th</sup> Annual Meeting, Fort Hays University.
- Horne, Francis, S. Tarsitano, C. Plummer and David Rodriguez. 2000. Role of carbonic anhydrase in the mineralization of the lobster exoskeleton. 6<sup>th</sup> International conference and Workshop on Lobster Biology and Management., Key West, Florida. P.90.
- Tarsitano, S, F. Horne, K. Millerchip, and David Rodriguez. 2000. New light on the evolution of feathers. 5<sup>h</sup> European Workshop on Vertebrate Palaeontology, Karlsruhe, Germany. Pp. 82.
- Horne, F. R. 2000. Nitrogen excretion in the vinegaroon. American Association for the Advancement of Science, Southwest and Rocky Mountain Division, New Mexico State University, Las Cruces.
- Horne, Francis, S. Tarsitano, C. Plummer, and David Rodriguez. 2000. The mineralization of the animal skeleton. 5<sup>h</sup> European Workshop on Vertebrate Palaeontology, Karlsruhe, Germany. Pp. 36.
- Plummer, Chris, **Francis Horne**, Samuel Tarsitano, and David Rodriguez. 2001. Insights

- into the mineralization of bone. Texas Academy of Sciences, 104<sup>h</sup> Annual Meeting, Southwest Texas State University.
- Plummer, Chris, **Francis Horne**, and Samuel Tarsitano,. 2001. Calcium carbonate deposition in the spiny lobster. Texas Academy of Sciences, 104<sup>h</sup> Annual Meeting, Southwest Texas State University.
- Talbert, Kiersten, **Francis Horne**, and Samuel Taristano. 2001, Mechanism for calcium carbonate deposition in the avian egg. Texas Academy of Sciences, 104<sup>h</sup> Annual Meeting, Southwest Texas State University.
- Horne, Francis. 2002. Mineralization de la concha de invertbrados – un mecanismo. Southwestern Association of Naturalists, 45<sup>th</sup> Annual Meeting, University of Morales, Cuernavaca, Morales, Mexico.
- Tarsitano, S., K.L. Lavalli, **F. Horne**, and D. Rodriguez. 2002. Spiny lobsters: A model for horn development in ceratopsian dinosaurs. 31<sup>h</sup> Annual Benthic Ecology Meeting, Florida State University, March 2002.
- Tarsitano, S., K.L. Lavalli, **F. Horne**, and E. Spanier. 2002. Biomechanical aspects of the lobster carapace. 8<sup>h</sup> Colloquium Crustacea Decapoda Mediterranea, Ionian University, Corfu Island, Greece.
- Horne, Francis, Kim Crystal, Mary Gentry, and S. Tarsitano. 2003. Shell formation in two freshwater mussels. Texas Academy of Sciences, 106<sup>th</sup> Annual Meeting, Stephen F. Austin University, Nacogdoches. P. 37.
- Horne, Francis, and S. Tarsitano. 2003. Amniote egg shell formation. Texas Academy of Sciences, 106<sup>th</sup> Annual Meeting, Stephen F. Austin University, Nacogdoches. P. 37.
- Tarsitano, Samuel, Cassie Malcom, Chris. Plummer, and **Francis Horne**. 2003. Texas Academy of Sciences, 106<sup>th</sup> Annual Meeting, Stephen F. Austin University, Nacogdoches. P. 39.
- Horne, Francis. 2003. Egg shell formation in the American alligator. .Southwestern Association Naturalists, 46<sup>th</sup> Annual Meeting, University of Oklahoma, Norman. P. 39.
- Lavalli, K. L., W. F. Hernkind, M. Childress, A. Evans, and F. Horne. 2003. Attack by piscine predators, *Balistes capricus*. Texas Academy of Sciences, 106<sup>th</sup> Annual Meeting, Stephen F. Austin University, Nacogdoches.PP. 41-42.
- Horne, Francis R. 2004. Comparative Biomineralization of eggshells in birds and alligators. Southwestern Association of Naturalists, 51<sup>th</sup> Annual Meeting, San Antonio, Texas. P. 94-95.
- Horne, Francis R. 2004. Aspects of Eggshell formation in Birds and Crocodilia, Texas Academy of Sciences, 107<sup>th</sup> Annual Meeting, Schreiner . University, Kerrville. P. 16 & 23.
- \*Horne, Francis R. 2004. Carbonic anhydrase in the alligator eggshell. Society of Integrative and Comparative Biology, 2004 Annual Meeting, New Orleans, La. P. 107.
- Horne, Francis R. 2004. Biomineralization of egg shells in the American alligator. Texas Academy of Sciences, 107<sup>th</sup> Annual Meeting, Schreiner University, Kerrville. P. 17.
- Horne, Francis R. 2005. Carbonic Anhydrase in the Decapod cuticle presented at the Annual Meeting of Texas Academy of Science, University of Texas at Edinberg. P. 49.
- Horne, Francis R. 2005. Carbonic Anhydrase in the Decapod cuticle presented at the Annual Meeting of Texas Academy of Science, University of Texas at Edinberg. P. 49.
- Horne, F. R. 2005. Cuticle Mineralization in Aquatic Crustaceans, presented at the Annual meeting of Southwestern Association of Naturalists, Sam Houston State University, Huntsville. P. 94.
- \*Horne, F. 2005. Localization of Carbonic Anhydrase in the crustacean cuticle, presented at Annual meeting of Society of Integrative and Comparative Biology, San Diego, California. p. 107.
- \*Horne, F. 2005. Carbonic anhydrase in the molting slipper lobster, *Scyllariides latus*, cuticle, presented at Annual Meeting of Society of Integrative and Comparative Biology, Orlando, Florida. p. 88.

- Horne, F. and K.L. Lavalli. 2006. Aspects of mineralization of the crayfish cuticle. Crustaceana (In preparation, 2007).
- Horne, F. 2006. Carbonic anhydrase in molting cuticles of slipper lobsters, *SCYLLARIDES LATUS*, Texas Academy of Science 109<sup>th</sup> Annual Meeting, Lamar Univ., Beaumont, p. 47.
- Horne, F. 2006. Southwestern Association of Naturalists annual Meeting University of Colima, Colima, Mexico.
- Horne, F. 2006. Carbonic anhydrase in the freshwater clam, *Quadrula apiculata*. presented at Annual Meeting of Society of Integrative and Comparative Biology, Phoenix, Arizona. p. 96.
- Horne, F. 2007. Carbonic anhydrase in the freshwater clam, *Quadrula apiculata*. presented at Annual Meeting of Society of Integrative and Comparative Biology, Phoenix, Arizona. p. 96.
- Horne, F. 2007. Shell formation in freshwater mussels. Texas Academy of Science 110<sup>th</sup> Annual Meeting, Baylor University, Waco, Texas, p. 82.
- Horne, F. 2008. Freshwater crayfish cuticle mineralization. Texas Academy of Science 111<sup>th</sup> Annual Meeting, Texas A&M University, Corpus Christi, p. 47.
- Horne, F. 2009. Carbonic anhydrase in a concho river freshwater mussel, *Quadrula*. Southwestern Association of Naturalists 56<sup>th</sup> Annual Meeting, University of Monterey, Mexico, p.47.
- Horne, F. 2009. Laboratory exercise using crustacean amylase. Texas Academy of Science 112<sup>th</sup> Annual meeting, Texas Tech University, Junction, p. 37.
- Horne, Francisco. 2010. Estroncio y magnesio en la mineralización de shell. universidad del estado de Texas, San Marcos, Texas. Southwestern Association of Naturalists 57<sup>th</sup> Annual Meeting, Texas Tech University, Junction p.51.
- Horne, F. 2010. Playa lakes: environmental factors influencing survival success of several phyllopods and ostracods. Texas Academy of Science 113<sup>th</sup> Annual Meeting, Tarleton State University, Stephenville, p. 35.
- Horne, F. 2011. Survival success of playa lake ostracods in an unstable environment. Texas Academy of Science 114<sup>th</sup> Annual Meeting, Saint Edwards University, Austin, p. 35.
- Horne, F. 2009. Carbonic anhydrase in a concho river freshwater mussel, *Quadrula*. Southwestern Association of Naturalists 56<sup>th</sup> Annual Meeting, University of Monterey, Mexico, p.47.
- Horne, F. 2009. Laboratory exercise using crustacean amylase. Texas Academy of Science 112<sup>th</sup> Annual meeting, Texas Tech University, Junction, p. 37.
- Horne, Francisco. 2010. Estroncio y magnesio en la mineralización de shell. universidad del estado de Texas, San Marcos, Texas. Southwestern Association of Naturalists 57<sup>th</sup> Annual Meeting, Texas Tech University, Junction p.51.
- Horne, F. 2010. Playa lakes: environmental factors influencing survival success of several phyllopods and ostracods. Texas Academy of Science 113<sup>th</sup> Annual Meeting, Tarleton State University, Stephenville, p. 35.
- Horne, F. 2011. Supervivencia éxito de ostrácodos playa del lago en un entorno inestable. Texas Academy of Science 114<sup>th</sup> Annual Meeting, Saint Edwards University, Austin, p. 35.
- Horne, F. 2011. Playa lagos: parámetros físicos que influyen en la supervivencia y presencia de varios phyllopods. Southwestern Association of Naturalists 58<sup>th</sup> Annual Meeting, University Texas at Tyler, Tyler. p.51.
- Horne, F. 2012. Mineral deposition in a freshwater snail, *Planorbella trivolvis*. Texas Academy of Science 115<sup>th</sup> Annual Meeting, Sul Ross State University, Alpine, p. 9.
- Horne, F. 2013. Phylogeny of Texas wild rice, *Zizania texana*. Southwestern Association of Naturalists 60<sup>th</sup> Annual Meeting, University McNeese State University, Lake Charles, Louisiana.
- Horne, F. 2014. Notas sobre la biología de Texas wild rice/ the story of texas wild rice. Texas Academy of Science 117<sup>th</sup> Annual Meeting, Texas A & M University, Galveston, p. 11.
- Horne, F. 2015 Life in the desert: vinegaroon. Christmas Mountains Symposium, 3<sup>rd</sup>. Big Bend.

### C. GRANTS AND CONTRACTS

- NSF - National Science Foundation grant funded (Univ. Oklahoma, 1961).
- NDEA – National Defense Education Act grant funded (Univ. Miami, 1962-1966).

NSF - National Science Foundation grant (Duke Univ., 1964).

NIH-National Institutes of Health grant funded (Univ. Miami: 1966-1967).

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NSF- National Science Foundation Research Grant (1972). Grant approved for funding but not close enough to the cut-off point for full funding. Could have accepted 25% funding, but chose to take a chance for full funding. Gambled and lost.

NIH - National Institutes of Health (1973). Grant approved for funding. NIH sent an evaluation crew to evaluate SWTSU's Biology Department to ascertain if SWTSU had the space, equipment and low teaching loads for such a project. Since we had to share equipment with the Chemistry Department and had to teach four courses, the conclusion was obvious.

IBP – International Biological Program. Grant approved for funding (1973), but Congress failed to refund the entire program in 1974 after having funded it for 10 years previously.

NSF- National Science Foundation Research Grant funded for 1992-94.

Several National Science Foundation Research Grants applied for but not funded in 1990s

### **Current Research Activity:**

Currently, my research is limited since I gave up my lab 7 years ago, but my research interests are in the area of calcareous skeletal formation and the role of carbonic anhydrase in calcium carbonate deposition. The exoskeletons of 1) arthropods and molluscs and 2) avian egg shell formation are the focus of my most recent research, 3) biology of wild rices. We are attempting to explain the control of calcium carbonate deposition in highly calcified tissues. Specifically, how is carbonate made available in large quantities for site specific calcification. It is presumed that carbonic anhydrase plays a major role in most if all calcifying system. Students are working on the role of carbonic anhydrase in hard coral exoskeletal formation, emu shell calcification, lobster and crab cuticle calcification, and shell formation in mollusc shell formation.