

Our purpose is to document and publicize the values and conservation needs of horned lizards, to promote horned lizard conservation projects, and to assist with horned lizard management initiatives throughout their ranges.

Volume 19, Issue No. 1

FEBRUARY 2014

# The Effects of a Catastrophic Wildfire on the Genetic Structures of a Texas Horned Lizard Population (*Phrynosoma cornutum*): a pre- and post-fire Analysis

by Jared Ansley Fuller

(Jared Ansley Fuller was a grant recipient in 2012 and this article is his research results since receiving the grant.)

My research project focused on how a single population of Texas horned lizards genetically responded to a wildfire, which had led to substantial population declines. My study site was the Chaparral Wildlife Management Area

(WMA), which is located in South Texas and is currently managed by Texas Parks and Wildlife as a research and demonstration site. In March of 2008, a catastrophic wildfire burned for three days within the site, encompassing 95% of the property. The effects of the fire were exacerbated by heavy rainfall the prior year in conjunction with suspended grazing, which led to an increase in exotic grasses including Lehmann lovegrass (*Eragrostis lehmanniana*) and buffelgrass (*Pennisetum ciliare*). This wet year was followed by an extreme drought, which left a substantial fire fuel load; perfect conditions for a devastating fire.



A "happy" adult Texas horned lizard at the Chaparral WMA. Photo by James Fuller.

Since the early 1900s, population monitoring through mark and recapture techniques have been conducted on the Chaparral WMA, from which researchers had the foresight to save genetic material from individuals. The monitoring program resumed post-fire, and observed Texas horned lizard

abundance had declined dramatically. This fire thus provided a unique opportunity to examine the effects of a catastrophic wildfire on the genetic diversity of a heavily studied population of Texas horned lizards.

When population size is suddenly reduced, average heterozygosity per locus is expected to decline as well. This is referred to as a genetic bottleneck. If population size increases back to its original numbers following a bottleneck, only a small portion of genetic variability may be left within the population. The genetic variation re-

Continued on page 3

# National Board of Directors

## President

Bill Brooks  
108 Cactus Cove  
Paige, Texas 78659  
512-581-0377  
b.brooks@utexas.edu

## Secretary

Reilly Dibner  
rdibner@uwyo.edu

## Member Services

Katie Talbott  
katie.talbott@state.mn.us

## President-Elect

Tim Tristan  
exoticvet@yahoo.com

## Treasurer

Carolyn Todd  
512-868-0811

## Director At Large

Megan Lahti  
megan.lahti@gmail.com

---

*on the web at — [www.hornedlizards.org](http://www.hornedlizards.org)*

---

## Colorado Contact

Danny Martin  
Natural Resource Ecology Lab  
Colorado State University  
1499 Campus Delivery,  
Fort Collins, CO 80523  
dannym77@lamar.colostate.edu

## Texas Contact

Bill Brooks  
108 Cactus Cove  
Paige, Texas 78659  
512-581-0377  
b.brooks@utexas.edu

## Mexico Contact

Wade Sherbrooke  
wcs@amnh.org

## New Mexico Contact

Tom McCain  
PO Box 53095  
Albuquerque, NM 87112  
tom@httom.com



## *Phrynosomatics* Copy Editor

Leslie Nossaman  
poppies14@comcast.net

## *Phrynosomatics* Design Editor

Fannie Messec  
fmessec@me.com

## California Contact

Bruce Edley  
bruceedley@msn.com

**Please Send Membership  
Applications or Requests  
for Information to:**

**HLCS  
P.O. Box 122  
Austin, TX 78767**

**[info@hornedlizards.org](mailto:info@hornedlizards.org)**

tained after a bottleneck is dependent on the rate of population recovery and the genetic characteristics of survivors.

To begin my research, I hypothesized that (1) genetic variation in the population would be constant prior to the wildfire, and (2) the sudden reduction in population numbers would result in a genetic bottleneck, effectively reducing the genetic variation in the horned lizard population at the Chaparral WMA. I used common conservation and landscape genetic approaches to answer these questions. This was accomplished by optimizing our laboratory protocols with the assistance of a research grant from the HLCS.

Capture rates of horned lizards within the Chaparral WMA declined severely after the wildfire, however, they quickly returned to pre-fire numbers. I detected no significant changes in allelic frequencies, or loss of alleles, in my research analyses. Severe population bottlenecks usually result in the loss of alleles, especially rare ones, as well as reduced genetic diversity and random changes in allele frequencies; none of which were observed in the Chaparral horned lizard populations post-fire. The lack of evidence of a genetic bottleneck effect on the population suggests that the horned lizards responded genetically neutrally to the wildfire, at least in the short term. A single-generation bottleneck is far less deleterious to the loss of genetic diversity compared to sustained reductions in population size. Although there was no noticeable effect of a population bottleneck, it has been shown that high levels of genetic variability can pass through a bottleneck in a highly

heterozygous population.

Future studies should continue the trend of genetically monitoring the population for delayed effects of the fire as well as other natural disturbances such as major droughts and anthropogenic activities. For instance, pending natural gas drilling on the Chaparral WMA has the potential for mass disturbances and habitat fragmentation, which would be interesting to examine genetically.

My findings provide support that populations which have experienced short-term declines can respond neutrally to fire. This information is not only beneficial for the management of Texas horned Lizards, but also for biologists and land managers who are using prescribed fire as a management tool for control over invasive species of woody vegetation or exotic grasses in thornscrub ecosystems.



Jared Fuller & a Texas Horned Lizard: Post-Fire Sampling at the Chaparral WMA. 2011.

**Please renew your annual HLCS membership!!!**  
**HLCS depends on its membership for its conservation and educational presence in the community.**

Categories for *annual* memberships include:

- Regular ..... \$25
- Student or Senior ..... \$10
- Family ..... \$25      Each additional family member ..... \$10
- Contributing ..... \$50
- Corporate ..... \$250
- Lifetime* membership ..... \$300

The HLCS welcomes contributions in any amount you wish to submit and is a 501(c)3 nonprofit organization.

# Visiting the Mexican Plateau Horned Lizard (*Phrynosoma orbiculare*) at El Parque Ecoturístico “El Camaleón,” Hidalgo, México: with Historical and Ethnobiological Commentary.

By Biol. Tania Vianney Gutiérrez Santillán  
Centro de Investigaciones Biológicas (UAEH)  
Universidad Autónoma del Estado de Hidalgo,  
Pachuca, México and Wade C. Sherbrooke,  
Ph.D. Director Emeritus, Southwestern Research  
Station, American Museum of Natural History,  
Portal, Arizona, USA

Of the currently recognized sixteen (until recently it was seventeen) species of horned lizards (Montanucci 2004; Leaché and McGuire 2006; Mulcahy *et al.* 2006; Leaché *et al.* 2009), eight are found living in both the United States and Mexico (*Phrynosoma blainvillii*, *cornutum*, *goodei*, *hernandesi*, *mcallii*, *modestum*, *platyrhinus*, *solare*), seven are found only in Mexico (*P. asio*, *braconnieri*, *cerroense*, *coronatum*, *ditmarsii*, *orbiculare*, *taurus*), and one occurs only in the United States (*P. douglasii*). Mexico is rich in horned lizard species, fifteen, compared to the United States with only nine.

Probably the first Mexican species recorded by Europeans during the Spanish conquests of the peoples in southern North America was a species currently called the Mexican Plateau Horned Lizard, *Phrynosoma orbiculare*. It was well known to local inhabitants at the time and to pre-Columbian peoples as well, as recorded in early documents treating the flora and fauna of *Nueva España* (Alzate y Ramírez 1791; Sessé y Lacasta 1794; Ximenes 1888; Sahagún 1985; Hernández 1959; Manaster 2002). In the native Náhuatl language, Seler (2004) notes various names for lizards, *cuetzpall*, *cuetzpalin*, *topilt* or *topitzin*. He notes a specific lizard in the prehispanic codices, a strange figure of a horned lizard, “*camaleón*” in Spanish (*Phrynosoma orbiculare*). Nevertheless in these drawings lizards completely lack dorsal spines. Using original documents we present a

review of the deep knowledge that ethnic groups had and the interest that was expressed in them by the earliest naturalist writers in Mexico and current beliefs.

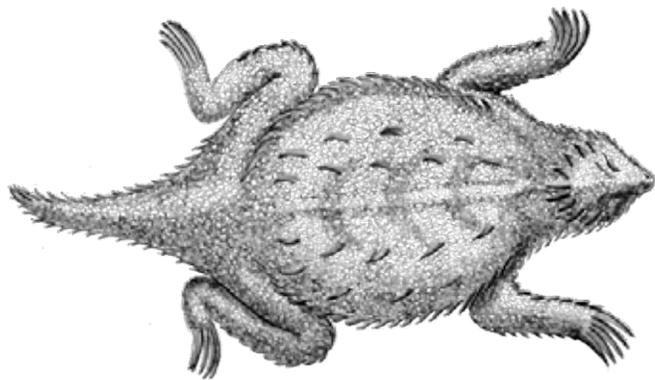
In the Náhuatl language *Phrynosoma orbiculare* is *tapayaxin* (Seller 2004). Their name in Spanish (*camaleón*) apparently resulted from some confusion by early colonists with real Old World chameleons (genus *Chamaeleo*). Historic documents such as Sahagún (1985) mention the *camaleón* in various natural history descriptions including a drawing that does not closely resemble our vision of the species but certainly is thought to be this horned lizard due to its circular form and spines down the back (Figure 1).



**Figure 1.** Drawing of “tapayaxin” in el código Florentino. We need to remember in interpreting such preColumbian illustrations that they were done by specialized artists, *los tlaloque* (Náhuatl name of these recorders of records in the codices). As such they were not drawn from life but are only ethnological interpretations of the organism represented. Illustration taken from Sahagún (1985).

In 1651 Hernandez published the first detailed description with an illustration (Figure 2) of a horned lizard, noting its ability to squirt blood (Hernandez 1959; Manaster 2002). Such early reports from Mexico may have led to, or come from, reports that it was known to “weep” tears

of blood (Sherbrooke 2003). Hernandez's description was used for an 1888 illustration by Ximenes (1888). These authors not only included biological information but also reports on their understanding and traditional knowledge of these lizards by local indigenous peoples. Both Don Antonio de León y Gama (1782) and la de García de la Vega (1782) mention that the *camaleón* is used to cure syphilis, as had Hernández (Manaster 2002). The Linnean name *Lacerta orbicularis* Linnaeus (1789) appears in early documents such as Martin de Sessé y Lacasta (1794) but the taxonomic complexity has grown to six named species, now subspecies of *P. orbiculare* (Baur and Montanucci 1998), which today is utilized throughout its rather extensive range in the Sierra Madre Occidental, Central Mexican Plateau, Mexican Transvolcanic Belt, and both southern and northern portions of the Sierra Madre Oriental (Sherbrooke 2003; Bryson et al. 2012; Hernandez-Ríos 2012).



**Figure 2.** Redrawn from the original illustration of a *camaleón* in Hernandez (1959); drawing by Joel Patricio.

More recently Salinas-Pedraza (1983) focusing on the “*camaleón*” (*P. orbiculare*), has documented the ethnographic record of beliefs of the Otomí people particularly with respect to their curative uses. Also he notes the extinction of the species in regions of the Valle de Mezquital (part of Central México) due to human urbanization. For example he mentions that the *camaleón* is used to cure “*tos ferina*” (whooping cough) and “*la tos*” (cough), covering the patient's chest with blood and mucus-like material (Pérez-Escandón et al. 1992; Santos-Fita et al. 2006; Gutiérrez-Santillán

2010). Salinas-Pedraza also mentions that the *camaleón* calms the nerves, alleviates stomach and kidney pain, and is also used as a good luck charm and is able to cure sicknesses that are of a cultural nature. It is also used during spiritual cleansing of cultural afflictions, passing an animal over all of the patient's body and thus allowing the *camaleón* to take on the wound or evil that inflicted the person (Gutiérrez-Santillán 2010).

The Mexican Plateau Horned Lizard is a medium sized species with rather uniform horns extending across the rear of the head (no mid-dorsal notch), a single row of lateral fringe scales along the sides of the body, a normal length tail (in contrast to the short tails of *P. braconnieri*, *ditmarsii*, and *taurus*), and a variably cryptic color-pattern of cross-body darkened and interrupted bandings (Sherbrooke 2003). As is the case with all horned lizards, females are larger than males (Zamudio 1998). Ants, termites and other insects and invertebrates are important in the diets of Mexican horned lizards (Lemos-Espinal et al. 2004; Gonzáles-Alvarado and Granados-Calixto 2011). In contrast to the common egg laying mode of horned lizards (ten species), *P. orbiculare* gives birth to live young (as is the case with its closest relatives, *P. douglasii*, *ditmarsii*, and *hernandesii*). This reproductive mode is also known in some more distantly related horned lizards, *P. braconnieri* and *P. taurus* (Hodges 2004; Beltrán-Sánchez et al. 2005; Leache and McGuire 2006), suggesting a multiple evolutionary origin of this character within the genus *Phrynosoma*.

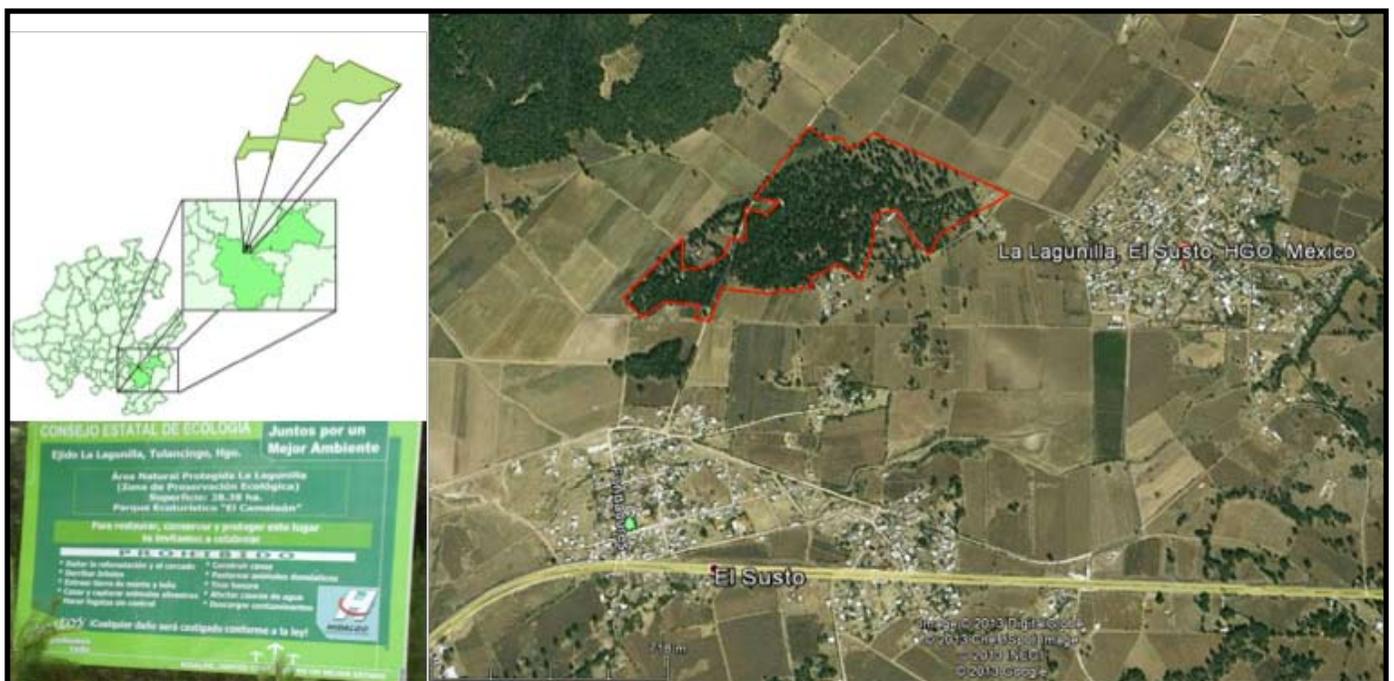
*Phrynosoma orbiculare* is the only species of horned lizard found in the state of Hidalgo, to the northeast of Mexico City (Ramírez-Bautista et al. 2009; Ramírez-Bautista et al. 2010). It has been the subject of recent studies of its ethnocultural and cosmic significance to two distinct native cultures in Hidalgo, Náhuatl and Otomí (Gutiérrez-Santillán et al. 2010). The annual activity and reproductive cycle of *P. orbiculare* living amongst Náhuatl people of Santa Ana Tzaquala has been linked by them to rain cycles

*Continued on next page*

and their agricultural practices for the cultivation of corn. These horned lizards are seen by the community as a positive force in the universe: “*amigos del hombre*,” friends of people; “*el que cuida la milpa*,” the one that guards the field crops; “*el que atrae la buena suerte*,” the one that brings good fortune; “*el que cura algunas enfermedades*,” the one that cures some diseases; “*el protector de los niños*,” the one that protects children. Earlier they served as an offering supplement to the children who were being sacrificed to the god of rain, Dios Tlaloc. With the arrival of the Spanish these sacrificial rites were condemned and abolished but rituals for other uses of *camaleones* continue today (Gutiérrez-Santillán et. al 2010).

*Phrynosoma orbiculare* is not only important to ethnic groups in México, but also is accepted by and is important to people living in large cities. Many appreciate their resemblance to dinosaurs in miniature and they continue to believe that horned lizards are able to bring good luck, “*buenas suerte*.” Because of this they are favorably seen by humans. Nevertheless many are removed from natural habitats for commercial sale in cities and this threatens their existence.

Recently we had the opportunity to encounter the Mexican Plateau Horned Lizard in the field in the state of Hidalgo at a location where it is protected and valued, El Parque Ecoturístico El Camaleón (Figure 3), on toll-free highway Mexico 132 (Pachuca-Tulancingo) about 14 miles (29.3 km) east of Pachuca. We set out in early afternoon on June 22, 2012, the two of us plus two students, Jorge Valencia Herverth and Carlos Maciel Mata, from the Universidad Autónoma del Estado de Hidalgo in Pachuca. The day was not ideal for hunting horned lizards as a rainy-season period continued its activities and clouds dominated the skies. We encountered a light rain at various moments in the field that finally cut our visit short, probably under two hours. Nevertheless we were successful in finding three horned lizards (Figure 4), a large adult female, an adult male and a sub-adult male (missing a forefoot, presumably from an earlier, but healed, injury). All were released on site after being photographed. Their presence was testimony to the importance of this natural reserve. We had discussions with a gentleman from the local community who is responsible for overseeing the activities of tourists and ensuring the goals of the reserve. In the future we hope to revisit the site



**Figure 3.** Left: location within the state of Hidalgo of the Park in, Ejido de La Lagunilla, Municipio de Singuilucan, and Right: its location (red outline) of the Área Natural Protegida La Lagunilla, Zona de Preservación Ecológica, Parque Ecoturístico “El Camaleón”. Map adapted by Jorge Valencia Herverth.



**Figure 4.** Two examples of the Mexican Plateau Horned Lizard, *Phrynosoma orbiculare*, found in the ecotourist park “El Camaleón.” Photograph by Tania Vianney Gutiérrez Santillán.

and community to look for ways of enhancing the environmental education and conservation goals of the natural reserve.

This population of horned lizards is relatively safe within the confines of this park “La Lagunilla,” part of a system of Protected Natural Areas of the state of Hidalgo. Its features have been inventoried by the Centro de Investigaciones Forestales de la Universidad Autónoma del Estado de Hidalgo y el Consejo Estatal de Ecología. The Park was established in November 2003

with a major concern for the conservation of its horned lizards, in part at the urging of our friend and renowned teacher and herpetologist Fernando Mendoza-Quijano, who unfortunately died soon afterwards in an automobile crash (Sherbrooke and Lazcano 2009). The protected area is not large, 28.38 hectares and is divided into two zones, one for public use and one for restoration. The dominant trees are oaks and pines, with lots of open shrub and grass areas. This natural area conserves *Phrynosoma orbiculare* in a central part of Mexico, where it is threatened, and where it has a long and important cultural significance to the people of Mexico.



**Figure 5.** Entrance sign at the Parque Ecoturístico El Camaleón. Note that in the word camaleón the letter O is substituted with an image of a horned lizard’s head. Pictured from left to right, Jorge Valencia Herveth, Tania Vianney Gutiérrez Santillán, and Wade C. Sherbrooke.

Recent articles in *Phrynosomatics* (Hernández-Ríos 2012; Lopez-Damián and Beltrán-Sánchez 2012) have brought Mexican species of horned lizards, their conservation needs, and the activities of Mexican scientists and students to the attention of *Phrynosomatics* readers and members of the Horned Lizard Conservation Society. Given the significance of the biodiversity of horned lizards in Mexico and the threats due to human population increases and exploitative activities, we hope that the Society will continue to expand knowledge about and interest in conservation programs of the wonderful “camaleones” of Mexico (Lazcano-Villareal and Sherbrooke 1999).

*Continued on next page*

*Acknowledgements:*

Jorge Valencia Herverth adapted the map, and he and Carlos Maciel Mata assisted with locating lizards in the field.

*Citations:*

**Alzate y Ramírez, J. 1791.** Utilidad de los camaleones de Nueva España. La naturaleza, tomo VI (1882-1884), Apéndice, pág. 195 (tomada de la Gaceta de Literatura de 22 de marzo y 5 de abril de 1791).

**Baur, B. and R.R. Montanucci. 1998.** Krötenechsen. Offenbach, Germany. Herpeton, Verlag Elke Köhler.

**Beltrán-Sánchez, E., F. Mendoza-Quijano, and W.C. Sherbrooke. 2005.** Aspectos reproductivos del camaleón vivíparo *Phrynosoma taurus* (Sauria: Phrynosomatidae) de Zumpango del Río, Guerrero. Boletín Sociedad Herpetológica de México 13:35-39.

**Bryson, R.W., U.O. García-Vázquez, and B.R. Riddle. 2012.** Diversification in the Mexican horned lizard *Phrynosoma orbiculare* across a dynamic landscape. Molecular Phylogenetics and Evolution 62:87-96.

**Consejo Estatal de Ecología.** Programa de manejo del área natural protegida “La lagunilla.” Consejo Estatal de Ecología: Hidalgo, Centro de Investigaciones Forestales, Universidad Autónoma del Estado de Hidalgo. 63 pp.

**García de la Vega, J.V. 1782.** Discurso crítico que sobre el uso de las lagartijas, como contra muchas enfermedades produjo. *In:* Achim, M. 2008. Lagartijas Medicinales, Remedios Americanos y Debates Científicos en la Ilustración. Consejo Nacional Para la Cultura y las Artes. México.

**González-Alvarado, P.P. and Y. Granados-Calixto. 2011.** Composición de la dieta de *Phrynosoma asio* en el Cerro del Tepetlayo, Zumpango del Río, Municipio de Eduardo Neri, Guerrero, México. Tesis, Universidad Autónoma de Guerrero, Chilpancingo. 63 pp.

**Gutiérrez-Santillán, T.V., A. Moreno-Fuentes, and I.G. Mayer-Goyeneches. 2010.** Cosmos, corpus y praxis: estudio comparativo entre Nahuas y Otomíes del estado de Hidalgo, México: El caso del “camaleón.” Pp. 81-94, *In, Sistemas Biocognitivos Tradicionales: Paradigmas en la Conservación Biológica y el Fortalecimiento Cultural*, Edited by A. Morenos Fuentes, M. T. Pulido Silva, R. Mariaca Méndez, R. Valadez Azúa, P. Mejía Correa, and T. V. Gutiérrez Santillán. pp. 486.

**Hernández, F. 1959.** “Historia Natural de la Nueva España”. vol. II. Obras Completas (México, UNAM).

**Hernández-Ríos, A. and S.F. Arias-Balderas. 2012.** Summary of ecological aspects of a population of *Phrynosoma orbiculare* in Central México. *Phrynosomatics* 17(1):8-10.

**Hodges, W.L. 2004.** Evolution of viviparity in horned lizards (*Phrynosoma*): testing the cold-climate hypothesis. *Journal of Evolutionary Biology* 17:1230-1237.

**Lazcano-Villareal, D. and W.C. Sherbrooke. 1999.** Los camaleones de México. *México Desconocido* 271:50-57.

**Leaché, A.D., M.S. Koo, C.L. Spencer, T.J. Papenfuss, R.N. Fisher, and J.A. McGuire. 2009.** Quantifying ecological, morphological, and genetic variation to delimit species in the coast horned lizard species complex (*Phrynosoma*). *Proceeding of the National Academy of Sciences* 106:12418-12423.

**Leaché, A.D. and J.A. McGuire. 2006.** Phylogenetic relationships of horned lizards (*Phrynosoma*) based on nuclear and mitochondrial data: evidence for a misleading mitochondrial gene tree. *Molecular Phylogenetics and Evolution* 39:628-644.

**León y Gama, A. 1782.** Instrucción Sobre el Remedio de las Lagartijas: Nuevamente descubierto para la curación del cancro y otras enfermedades, Que para su seguro uso. *En:* Achim,

M. 2008. Lagartijas Medicinales, remedios americanos y debates científicos en la ilustración. Consejo Nacional Para la Cultura y las Artes. México.

**Lemos-Espinal, J.A., G.R. Smith, and R.E. Ballinger. 2004.** Diets of four species of horned lizards (genus *Phrynosoma*) from Mexico. *Herpetological Review* 35:131-134.

**López-Damián, L.J. and E. Beltrán-Sánchez. 2012.** Conservation of the horned lizard in Guerrero, Mexico. *Phrynosomatics* 17(2):1,3-4.

**Manaster, J. 2002.** Horned Lizards. 2nd edition. Texas Tech University Press, Lubbock, Texas. Pp. 84.

**Montanucci, R.R. 2004.** Geographic variation in *Phrynosoma coronatum* (Lacertilia, Phrynosomatidae): further evidence for a peninsular archipelago. *Herpetologica* 60:117-139.

**Mulcahy, D.G., A.W. Spaulding, J.R. Mendelson III, and E.D. Brodie Jr. 2006.** Phylogeography of the flat-tailed horned lizard (*Phrynosoma mcallii*) and systematics of the *P. mcallii*—*platyrhinos* mtDNA complex. *Molecular Ecology* 15:1807-1926.

**Ramírez-Bautista, A., U. Hernández-Salinas, U. O. García-Vazquez, A. Leyte-Manrique, and L. Canseco-Márquez. 2009.** *Herpetofauna del Valle de México: Diversidad y Conservación*. Universidad Autónoma del Estado de Hidalgo. Comisión Nacional para el Conocimiento y Uso de la Bioversidad. pp. 213.

**Ramírez Bastista, A., U. Hernández-Salinas, F. Mendoza-Quijano, R. Cruz-Elizalde, B. P. Stephenson, V.D. Vite-Silva, and A. Leyte-**

**Manrique. 2010.** *Lista de los Anfibios y Reptiles del Estado de Hidalgo, México*. Universidad Autónoma del Estado de Hidalgo. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. pp. 104.

**Sahagún, Fr. B..1985.** *Historia General de las cosas de la Nueva España*. Editorial Porrúa, México, D.F.

**Salinas-Pedraza, J.. 1983.** *Etnografía del Otomí*. Instituto Nacional Indigenista. México. D.F.

**Seler, E. 2004.** *Las Imágenes de Animales en los Manuscritos Mexicanos y Mayas*. Casa Juan Pablos, México.

**Sessé y Lacasta, M. 1794.** *Catálogo de animals y plantas Mexicanos Vol I*, 223 pp. Fotocopia de Robert Bye (Jardín Botánico, Instituto de Biología) UNAM, 2007.

**Sherbrooke, W.C. 2003.** *Introduction to Horned Lizards of North America*. University of California Press, Berkeley. Pp. 178.

**Sherbrooke, W.C. and D. Lazcano. 2009.** Fernando Mendoza Quijano (1957-2008). *Herpetological Review* 40:133-134.

**Ximenes, Francisco. 1888.** *In: Cuatro Libros de la Naturaleza y Virtudes de las Plantas y Animales, de Uso Medicinal en la Nueva España*. Biblioteca Mexicana de la Fundación Miguel Alemán, A.C. México, D.F.

**Zamudio, K.R. 1998.** The evolution of female-biased sexual size dimorphism: a population-level comparative study in horned lizards (*Phrynosoma*). *Evolution* 52:284-305.



**JOIN US and Help Protect the Texas**



**State Reptile**

[www.hornedlizards.org](http://www.hornedlizards.org)

**HORNED  
LIZARD  
CONSERVATION SOCIETY**

# Member Highlight—Jared Ansley Fuller

By Jared Ansley Fuller



Jared Fuller with A Regal Horned Lizard (*Phrynosoma solare*). Pima County, Arizona. Photo by: Jared Fuller

Although I grew up in the south Texas countryside, I unfortunately did not encounter a horned lizard until I was twenty-one years old. I have always found these little creatures fascinating, but I became even more awestruck by them upon finally seeing one in the wild; a feeling I'm sure most people experience when they meet their first horned lizard. This happenstance has led me to a borderline unhealthy obsession with horned lizards.

I recently concluded my Master of Science degree in biology at West Texas A&M University where I examined the effects of a large-scale wildfire on the genetic diversity of a population of Texas horned lizards in South Texas. I also conducted a research project through which I compared two populations of Texas horned lizards, one that was heavily fragmented and one that was mostly unperturbed, within the Texas panhandle. This comparison allowed us to delineate the effects of habitat fragmentation on genetic structure.

I am currently a PhD student at the University

of Nevada – Reno, where I am in the process of designing my dissertation research. My primary interests are conservation genetics and landscape genetics. Within these interests, I am able to identify evolutionary significant units (ESU), which are vital in managing for genetic diversity. I am also able to identify geological features or anthropogenic impacts, such as habitat fragmentation, which can result in a loss of genetic diversity, increased inbreeding, accumulation of deleterious alleles in smaller fragments, and elevated extinction risks. Applying these methods to horned lizard conservation allows for proper management of these unique creatures. I am also interested in the effects of natural selection and how diverse environmental conditions shape the different horned lizard genomes.

In the upcoming summer of 2014, I will be collecting genetic samples from multiple species of horned lizards throughout the southwest. I am currently looking for access to private property in order to expand my sampling range, which would allow for a higher-powered analysis. If you own property and are willing to allow non-invasive genetic sampling of your local horned lizard populations, then please contact me at [jfuller@unr.edu](mailto:jfuller@unr.edu). In addition, if you are a researcher and are interested in adding a genetic component to your project, please contact me as I am always open to collaborate with like-minded individuals!

Recently, I have begun collaborating with Ernesto Raya García, a fellow horned lizard fanatic from Michoacán, México. We are currently working on a genetic analysis of the giant horned lizard (*Phrynosoma asio*). Through a combination of phylogeographic and landscape genetics analyses, we will be able to 1) delineate the genetic structure and diversity within the giant horned lizard across its range 2) identify geological features or habitat associations that result in divergence of genetic structure 3) identify evolutionary significant units and 4) examine the effects of habitat fragmentation in

structuring of genetic variation and maintenance of gene diversity. This information will be vital in the implementation of a conservation strategy for this at risk species.

I strongly believe that it is only through methodical research, monitoring efforts, and education can scientists and the general public work together to ensure the persistence of horned lizards. As members of the Horned Lizard Conservation Society, I'm sure this concept is what we all strive for.

I am looking forward to seeing where else my obsession with these phenomenal animals will take me and the interesting characters I will meet along the way.



Regal Horned Lizard (*Phrynosoma solare*). Pima County, Arizona. Photo by: Jared Fuller



## President's Message

*By Bill Brooks*

I hope you all had a wonderful holiday season. We are now approaching the unofficial end of winter. I am anxiously waiting for the trees to leaf out, the wildflowers to start blooming, and for our little horned lizards to poke their heads above ground and start thinking about filling their bellies. I am looking forward to a season of surveys. Stay tuned. We have some good trips in the works and I hope you will be joining us.

I would also like for all of us in Texas to put our citizen scientist caps on and record our reptile sightings on the Texas Natural Diversity Database or on the iNaturalist site, Herps of Texas.

The Texas Natural Diversity Database or TX-NDD is a collection of range data on rare species, both plants and animals, in order to better conserve these populations through "the design and implementation of ecologically sound development projects." Please see their website for more information on how to record your sightings. [http://www.tpwd.state.tx.us/huntwild/wild/wildlife\\_diversity/txnodd/](http://www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/txnodd/)

Another place to record your sightings is on the Herps of Texas database: <http://www.inaturalist.org/projects/herps-of-texas>

You can record your sightings on line or with an iPhone app. Researchers are mainly interested in Species of Greatest Conservation Need (SGCN), however they are interested in the distribution or all reptile and amphibian species. Please support these worthwhile projects.

If you are not in Texas, you can do a computer search or ask area naturalists for programs like these in your area. If you send me information on these programs, I will make a list and pass on the information to other interested members.

To borrow a phrase from the Texas Parks and Wildlife Department, "Life Really Is Better Outside". See you in the field.



# Prairie Heritage Festival

*By Leslie Nossaman and Fannie Messec*

Leslie Nossaman, Fannie Messec, and Wade Phelps spent a wonderful day at the Seabourne Creek Nature Park in Seabourne, Texas working a booth at the second annual Prairie Heritage Festival on November 2, 2013. The festival was hosted by the Coastal Prairie Chapter of the Texas Master Naturalists.

The weather was great with mild temperatures and clear skies except it was very windy all day. Fannie and Leslie drove down from Houston and Wade drove several hours from Kenedy. The attendance was around 400 people at the festival this year.

There were presentation programs on vultures, rainwater



*Our HLCS booth. Photo by Fannie Messec.*

harvesting, and bees. There were also demonstrations of cowboy roping and leather working by the Cowboy Action Shootist Association. This group also brought several display cases of antique

firearms. Clydesdale horse-drawn wagons took tours of the wetlands and there were golf cart tours of the prairie restoration area.

Twenty exhibitors and booths were in attendance with a lot of live animals for viewing. Some of the animals included: ferrets, bees, baby alligators, corn snakes, bull snakes, transpecos ratsnakes, box turtles, butterflies, monitor lizard, tarantula, eastern hog-nose snake, African tortoise, prairie dog, and lots of other animals that we could not get to. The Attwater National Wildlife Refuge was there again. The mayor of Rosenberg and the Fort Bend County Commissioner gave the welcome speeches.

There was also face paint-



*Children coloring horned lizards masks. Photo by Fannie Messec.*



Wade Phelps instructing and helping children make horned lizard kites. Photo by Fannie Messec.

ing and kids' crafts with puppet making, bug and butterfly origami, and making an edible bee hive.

A few animals including a bullfrog were released with some fanfare into the wetlands after being rehabilitated. Lots of ducks were making their presence known around the lake where the booths were near.

The HLCS booth also had a kid's craft on kite making that Wade had developed. This was a big hit with the kids especially since there was so much wind to fly the kites that day. He helped build around 60-70 kites with the kids. They were horned lizard kites and had information about the horned lizard on the kite.

Our booth had lots of handouts and our horned lizard terrarium that Leslie had built with fake horned lizards. We also had

t-shirts, books, and jewelry to sell. Fannie had made a stand-up trifold poster with horned lizard information on it. We had so many items that it took up two six foot tables, a card table, and a smaller table for the kite making. We gave away most of the masks we had and the maze color sheet and the horned lizard environment sheet to the kids. Many of the kids colored the items at our table.

We did talk to lots of people about the horned lizard and why they were not seen on the prairie or this part of the coastal plain anymore. It was great to hear their stories about seeing the horned lizard in the past. Many of them told us about seeing the horned lizard when they were growing up in the Houston area.

The terrarium was again a big hit since there were so many live animals in most of the booths. People thought they were real at first which gave us a chance to talk to them about how hard they are to keep in captivity and why we could not bring any real ones.

It was a great festival and if you are in the area next year it happens in early November each year. Here is the website: <http://txmn.org/coastal/signature/prairie-heritage-festival/> or you can call 281-633-7042 or go to [www.coastalprairie.org](http://www.coastalprairie.org).



Leslie Nossaman, Wade Phelps, and Fannie Messec manning the HLCS booth. Photo by Fannie Messec.

# Another Movie Showing in Temple, Texas

By Bill Brooks

The Horned Lizard Conservation Society owes a huge "thank you" to the Central Texas Master Naturalists (CTMN). On September 17th, Zoe Rasco along with CTMN president Lynn Fleming planned a showing of the movie, "What Happened to the Horny Toad?" in Temple, Texas. That Tuesday we gathered at the Temple downtown library for the movie. CTMN charged \$5.00 at the door to attend the showing

and raffled off a James Avery horny toad charm. They even got Temple's Horny Toad Harley to donate the showing fee. Carolyn Todd and I represented the HLCS that evening.

We took our displays and handouts. Carolyn talked about her horny lizard masks and I introduced the movie. After the presentation we both stuck around for a little Q&A session. Since the group is just north of Austin we were surrounded with lots of

dear friends. Like always, everyone loved the show and there weren't very many questions because the movie does such a wonderful job of explaining the plight of the horned lizard. The whole evening was designed to be a fundraiser for the HLCS and at the end of the night, Zoe gave a check for over \$500- to the society and we gained 7 new members. We are very grateful to nature groups like the CTMN who support the film and the cause of the HLCS.



Temple showing panorama

**HAYWIRE**

by M. Hawley



"...NOW, WHERE DID THOSE KIDS GET TO?"

# The 2013 Old Rip Festival in Eastland, Texas

By Bill Brooks

October 5, 2013 members of the HLCS were in Eastland to pay homage to Old Rip, the most famous horny toad in the world. The first Saturday in October is when Eastland presents the Old Rip Festival. The HLCS has been there for many years and member Bill Brock always reserves us booth space. This year Jim and Bette Armstrong, Jane Burdick and I

(Bill Brooks) spread our conservation message, explained our exhibits, and sold more than a few t-shirts and pieces of horned lizard jewelry. This booth is extremely important to the HLCS because it is always our largest outreach event of the year.

Once again we had a great time with the parade, the yummy food, and reuniting with won-

derful old friends. I encourage everyone to visit Eastland and check out Old Rip on display in his coffin on the side of the courthouse. The yearly Old Rip Festival is the perfect time to plan a visit.



Jim and Bette Armstrong (on the right) talk to interested horned lizard conservationists, Eldora and Don Brown.



Bette and Jim Armstrong (to the left), Jane Burdick (in the middle), and Bill Brooks (on the right) were clever enough to find a photo booth for their group photo.

## Desert Tortoise Council Annual Meeting

By Josh Corona-Bennett

This year's 39th Annual Meeting and Symposium of the Desert Tortoise Council will be held from February 21 through 23, 2014 at the Double Tree Hotel in Ontario, California. The detailed information and the registration form can be found on the Desert Tortoise Council's website (<http://www.deserttortoise.org/symposium/index.html>).

The Symposium will honor Dr.

Robert C. Stebbins, a famous herpetologist in western North America and author of a *Field Guide to Western Reptiles and Amphibians*, *Field Guide to Amphibians and Reptiles of California (California Natural History Guides)*, *Connecting with Nature: A Naturalist's Perspective*, *A Natural History of Amphibians*, *The Lives of Animals in Joshua Tree National Monument*, and many other books and scientific and educational papers. Dr. Stebbins passed away two months ago at the

age of 98. He was a frequent guest at Desert Tortoise Council symposia and a very popular author and artist.

**SYMPOSIUM FIELD TRIP:** This year's field trip will be held on February 20, 2014 at the Desert Tortoise Research Natural Area near California City. It will be hosted by Mary Logan, the Preserve Manager and Peter Woodman of Kiva Biological Consulting.





Post Office Box 122, Austin, Texas 78767

Return Service Requested

---

PLEASE JOIN US! Students/Seniors: \$10; Regular: \$25; Contributing: \$50; Corporate: \$250; Lifetime: \$300  
Families: \$25 for the first person and \$10 for each additional member  
HLCS is a 501(c)(3) non-profit organization. Contributions are deductible to the extent allowable by law.

---

*Printed on Recycled Paper*

### Table of Contents

The Effects of a Catastrophoic Wildfire on The Genetic Structures of a Texas Horned Lizard Population ( <i>Phrynosoma cornutum</i> ): a pre- and post-fire Analysis . . . . .	pages 1 & 3
Jared Ansley Fuller	
Visiting the Mexican Plateau Horned Lizard ( <i>Phrynosoma orbiculare</i> ) at El Parque Ecoturístico “El Camaleón,” Hildalgo, México: with Historical ad Ethnobiological Commentary . . . . .	pages 4 - 9
Tania Vianney Gutiérrez Santillán and Wade C. Sherbrooke	
Member Highlight—Jared Ansley Fuller . . . . .	pages 10 - 11
Jared Ansley Fuller	
President’s Message . . . . .	page 11
Bill Brooks	
Prairie Heritage Festival . . . . .	pages 12 - 13
Leslie Nossaman and Fannie Messec	
Another Movie Showing in Temple, Texas . . . . .	page 14
Bill Brooks	
The 2013 Old Rip Festival in Eastland, Texas. . . . .	page 15
Bill Brooks	
Desert Tortoise Council Annual Meeting. . . . .	page 15
Josh Corona-Bennett	

***Phrynosomatics* is now sent electronically.**

To receive the electronic copy and be taken off the newsletter print list, please contact Katie Talbott at [Katie.Talbott@state.mn.us](mailto:Katie.Talbott@state.mn.us).