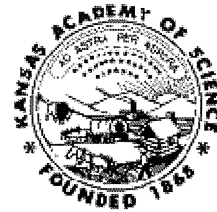


# KAS BULLETIN



## NEWSLETTER OF THE KANSAS ACADEMY OF SCIENCE

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August, 2014

## Kansas Academy of Science 146th Annual Meeting at Emporia State University

The 146<sup>th</sup> annual meeting of the Kansas Academy of Science was held jointly with the Kansas Entomological Society annual meeting at Emporia State University on April 4-5, 2014. Activities began with a Friday afternoon field trip to the famous Hamilton Quarry fossil location in Greenwood County. Through the years, this site has yielded a bonanza of terrestrial, aquatic and brackish water fossils of late Pennsylvanian age (300 million years ago), including fenestrate bryozoans, mollusks, polychaete worms, a variety of arthropods (myriapods, scorpions, tailed whipscorpions, eurypterids, insects and ostracods), cartilaginous and bony fishes, amphibians, reptiles, and a variety of plants. The mudstones with interbedded limey conglomerates which contain these fossils are believed to be channel deposits from a river which flowed into an estuary at the eastern edge of the inland sea.

We spent a pleasant afternoon finding bits of fish spines and crinoids in the rocks, as well as skeleton material of a recently deceased young deer and an armadillo. Turning the rocks also revealed several scorpions (*Centruroides vittatus*) clustered on their undersides and a pale orange reduviid bug with a dark central stripe. The presence of pirate spiders of the genus *Ero* was revealed by the discovery of the characteristic pear-shaped eggsac on a long, silk stalk attached to the underside of a rock.

Friday evening was spent in the student union banquet hall consuming a wonderfully prepared meal and meeting colleagues and students.

Saturday morning began with coffee followed by five concurrent sessions of oral presentations. In addition to two sessions on ecology and organismal biology, there was one on the physical sciences, a paleontology symposium, and a symposium on ecohydrology and climate change. With all these options, it was sometimes difficult to choose which one to attend. Topics ran the gamut from assessing stress in captive snakes, examining genetic diversity of Platte thistle across its entire range, discovering new tardigrades (water bears) in Kansas, alternative mating tactics of wolf spiders, Kansas natural areas and their importance in measuring climate change and water resources, to assessing energy drinks and caffeine consumption by young adults.

A notable presentation by Z.I. Quick, of Wichita State University, examined seed dispersal of sericea (*Lespedeza cuneata*), which is an aggressive invader of native grasslands. Although the seeds are not equipped with structures such as spines which would readily adhere to mammals' fur, sericea seeds readily become trapped in the fur of raccoons and coyotes (less so in deer pelts), especially under wet conditions. Wind was

also discovered to be a significant factor in local seed dispersal.

In addition to the lectures, there were a large number of poster presentations, again covering a wide variety of topics. One poster presented additional effects of DDT. Besides leading to the near extinction of many bird species in the late 1960s, DDT inhibits apoptosis and increases the invasive ability of human malignant melanoma cells. Tardigrades, which are known to withstand very extreme temperatures, pressures and desiccation in the cryptobiotic stage, have recently endured the rigors of outer space, and returned to earth where they resumed life functions, including successful reproduction. Since they can remain in the dormant state for 125 years, it is theoretically possible for tardigrades to travel from distant star systems, for example Alpha Centauri, which is **only** 4.37 light years away!

At noon, we returned to the dining hall for a superbly prepared lunch, followed by an inspirational wakeup call on the loss of biodiversity by Dr. Quentin Wheeler, president of SUNY-College of Environmental Science and Forestry. We are presently experiencing/causing a biodiversity loss of cosmic proportions. Society seems to be more interested in discovering earth-like planets than discovering more about life on earth. Concern about this loss should translate into describing and learning about individual species that live around us. However, the rate of discovery of new species has been constant (18,000-20,000 per year) for many years.

Several interesting presentations were given by members of the Kansas Entomological Society in the afternoon. KU professor Caroline Chaboo inspired us with two lectures on her field work discovering new beetle species in Peru and Namibia, and how the native San people of Africa use toxins from beetles to poison their arrowheads. Orley "Chip" Taylor of KU told us of the plight of monarch butterfly populations which have been drastically reduced in recent years, mainly due to the rise of the biofuel industry

and the subsequent conversion of more land to cropland and the eradication of milkweed in corn and soybean fields because of increased herbicide use. The overwintering populations of monarchs in Mexico have plummeted by more than 50% in recent years. Massive efforts to replace the lost habitat and associated resources are being undertaken. Individual initiatives, such as butterfly gardens and governmental actions need to be pursued very quickly if we are to prevent the loss of this magnificent biological heritage.

Kansas Academy of Science student awards were given for the best oral and poster presentations by undergraduates, masters, and PhD students.

## **Sustain What? Avoiding Biodiversity Losses of Cosmic Proportion**

Excerpts of keynote speaker, Dr. Quentin Wheeler

Why is taxonomy a neglected scientific discipline, when it is actually the "cosmology of the life sciences?" Instead, it is often regarded as 18<sup>th</sup> century stamp collecting and not actually science since it is not experimental in nature. Advances in genetics have uncovered the mechanisms leading to the diversity of life as explained by Darwin's theory of evolution. Phylogenetics has increased our understanding of the relationships of members of the tree of life. However, the basic activity of describing species, which are the end products of evolution, is being woefully neglected. There have been recent efforts to digitize collections, making information that is already known more available, but the expertise of taxonomists is often ignored. Instead of asking how many species are there on earth, the real question is, "what species are there on earth."

Although molecular work is a valuable tool used in understanding the tree of life at different levels, it does not take the place of morphological, ie. traditional, taxonomic methods. For example, we can analyze chips of paint taken from Leonardo da Vinci's

masterpieces and maybe determine when they were painted and other useful information, but this tells us nothing of the complexity, beauty, and form of each work of art.

E.O. Wilson proposed that asking the right questions is more important than getting the right answers. So what is the importance of taxonomy? Taxonomy provides the basic building blocks of biodiversity. A deep appreciation of biodiversity is essential for:

- 1) Establishing a biodiversity baseline which is needed to be able to detect future changes. At the current rate, we will have lost 75% of species in 300 years.
- 2) Increasing the use of biomimicry. The invention of velcro depended on examining plant parts. The passive cooling of some African buildings was based on termite mound structure. These examples are the "low hanging fruit."
- 3) Preserving the aesthetics and quality of life which are being diminished by species loss. One example is the migration of the monarch butterfly.
- 4) Sustaining ecological services. Even engineers now realize that wetlands are the kidneys of the environment.
- 5) Igniting curiosity. Astronomers have advanced our understanding of cosmology, ie. the early formation of the universe. Advances in human evolution are happening at a great rate, but the most interesting period (sweet spot) is the 3.5 billion years in between when the great biodiversity evolved. Taxonomy is the equivalent of cosmology in exploring this life on earth.

How much do we need to know? Ecologists would like to know every species in their study site, while taxonomists need to know every species in existence. There is no shortcut. What would it take to achieve this task? Funding 2000 taxonomic experts, each with 3 support staff people, working in full time positions would make great advances. Universities do not provide adequate taxonomic training, since most of the funding is not available for this basic work. European

and American institutions of learning are lagging behind Brazil. Therefore, most current taxonomy is done by amateurs. Yes, you can practice taxonomy without a license!

How can we increase funding by getting the public to take notice and get interested in taxonomy? One answer is, "shameless self-promotion." Some species that were named after famous people attracted media attention. For instance, beetles were named after George Bush, Cheney etc. Instead of giving extensive facts and figures, mention the 10 new species of the year and why they are interesting. As a scientific community, taxonomists must learn to speak with one voice.

## **KAS Fall Field Trip to Konza Prairie**

Saturday, October 11<sup>th</sup> 1:00pm  
Headquarters Tour & Butterfly Hill Hike  
Cost \$12

Konza Prairie is located in the Flint Hills region of northeastern Kansas, approximately 10 km south of Kansas State University and the city of Manhattan.

<http://kpbs.konza.ksu.edu/index.html>



### **New Home for KAS Library**

Past issues of the Transactions as well as historical information are now being housed in Stoffer Hall's Chemistry Storage room at Washburn University.

While we believe that most of the records have been compiled into one location, if anyone has additional past history that should be included, please contact Shaun Schmidt or Sam Leung:

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**Sam Leung**

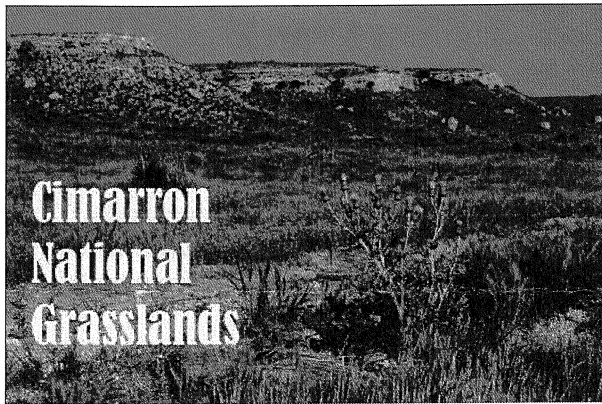
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## Cimarron National Grasslands

Hank Guarisco, KAS Bulletin Editor

In the extreme southwestern corner of Kansas lies a large tract of land (108,000 acres) that was destroyed during the Dust Bowl. It was subsequently purchased by the USDA in the 1930s, and is now managed by Forest Service. The Cimarron National Grasslands (CNG) is a semi-arid region, with an average annual rainfall of 16.6 inches. It is part of the Southern High Plains and the vegetation communities are shortgrass prairie, sagebrush-yucca prairie, and riparian. There is a cottonwood forest along the dry riverbed, and marsh vegetation along the edges of the ponds.



This large region is the home of the black-tailed prairie dog and the lesser prairie-chicken, both species with dwindling populations in the state. Major uses of the CNG involve hunting, camping, limited cattle grazing, birding, photography, and other forms of nature appreciation. There have been surveys of the rare plants, amphibians and reptiles, birds, butterflies, and most recently, spiders. Many southwestern species reach their northwestern limit on the CNG.

Since the CNG comprises approximately one-third of all public land in Kansas, there is room for recreationists to get away from other people, and appreciate its natural beauty unhindered by the trappings of civilization. After spring rains, the prairie comes alive with a rainbow of wildflower colors, and a number of interesting snakes. At this time, large gopher snakes, the beautiful Texas longnose

snake, the plains hognose snake with an almost completely black underside, and prairie rattlers which often have to be prodded off the roads, may be observed. Tarantulas, scorpions, and sun spiders (solpugids) also add to the excitement. So if you want to experience the Southwest in Kansas, come down and camp on the Cimarron National Grasslands for a few days.



The Lesser Prairie Chicken

## A Hungry Little Squatter

Excerpts from The New York Times Aug. 4, 2014

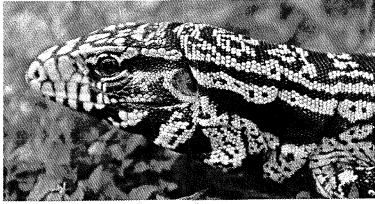
By Rachel Nuwer

Tegus (usually pronounced TAY-goos) originally came here from South America through the pet trade. Although Dr. Mazzotti prefers cats, he can understand why people like them: They are smart, attractive animals, patterned like an abstract Moroccan rug. They have a nasty bite, but with enough handling, they grow docile. "They'll crawl on you — the reptile version of interacting," Dr. Mazzotti said.

But like pythons and other invasive species first brought here as pets, tegus eventually found their way into the natural environment. Once they were unleashed in Florida's wetlands, the warm weather, bountiful food and absence of natural predators allowed them to thrive.

Wild tegus were first spotted in 2008, scuttling around a trailer park in Florida City, south of Miami. But their range quickly expanded, spilling into the nearby Everglades, where they took advantage of a smorgasbord of native wildlife. The lizards have a taste for eggs — both reptile and bird — but they will

also eat small mammals, insects and fruit. “Everything they get their jaws around, plant or animal, they seem to swallow,” Dr. Mazzotti said.



The Invasive Tegu, photo by Rachel Nuwer

Of all the invaders, tegus worry Dr. Mazzotti the most. They are more tolerant of cold than many reptiles, meaning they have a larger potential habitat range. Rare freezes in southern Florida kill nine out of 10 pythons, but tegus have successfully overwintered as far north as Panama City, on the Florida Panhandle. (The Florida Fish and Wildlife Conservation Commission managed to wipe out that population before it could expand.) The invasion has two centers, Florida City and Riverview, southeast of Tampa. Some of the lizards escaped from captivity or were set free by owners who no longer wanted them; scientists and officials suspect many were released by reptile breeders on the theory that harvesting them in the wild is cheaper than breeding them in captivity.

“We know in those two areas they’re reproducing,” said Kristen Sommers, the head of exotic species at the Florida wildlife agency. “We’re trying to get a better handle on what’s going on in those areas, and we’ve really been increasing our trapping efforts.”

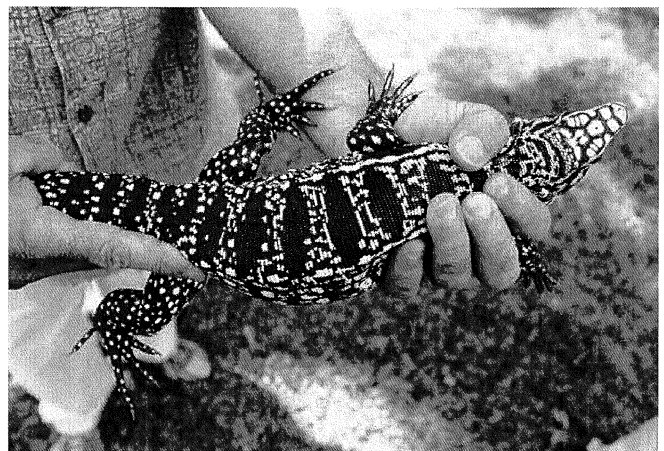
Dr. Mazzotti is reluctant to cite specific population figures, but he notes that the number of tegus trapped around Florida City has risen to 400 a year, from just 13 in 2009 and 21 in 2010; he thinks that represents less than 10 percent of the total population. A time-lapse map he created to track the invasion — yellow dots for traps, red for those that catch a tegu — resembles the progression of a disease outbreak.

Dr. Mazzotti and his colleagues take turns hitting the field each day, checking about 30 live traps that they bait with chicken eggs.

They have also fitted several tegus with small transmitters to track their movements, and set up cameras to monitor the species’ colonization patterns. While the biologists focus on the invasion’s front lines, they have also recruited private trappers to capture the lizards in well-established core areas, nicknamed “trailer park” and “rock pit.”

Tegu populations are creeping east toward Turkey Point Nuclear Generating Station, where threatened American crocodiles nest; west into Everglades National Park, populated by protected Liguus tree snails and endangered Cape Sable seaside sparrows; and south to Crocodile Lake National Wildlife Refuge, the home of the endangered Key Largo wood rat and cotton mouse, and more crocodiles. These rare animals or their eggs are potential prey for tegus, Dr. Mazzotti said, adding, “We cannot wait until an invasive species demonstrates negative impacts to act, because then it’s too late.”

Despite the threats to native wildlife, he said, efforts to tackle the tegu problem are lagging. Attention is still primarily focused on pythons, even though that species is already so well established that there is little hope of eliminating it. “I get weary not so much of fighting the battle to protect our resources,” he said, “but of our seeming inability to learn from past mistakes.”



Wildlife biologists like Frank Mazzotti, holding a captured tegu, are trying to trap the lizards before they can spread throughout Florida and risk impacting local wildlife. Credit Rachel Nuwer