

THIS MONTH'S GUEST SPEAKER

Hans-Werner Herrmann

School of Natural Resources
and
Geomic Analysis and Technology Core
University of Arizona
Tucson, Arizona

Phong Nha - Ke Bang: A Nature Conservation Program in Vietnam

7:15 PM

Tuesday, 16th August

Arizona Game and Fish Department Office
555 North Greasewood Road

(between Speedway and Anklam, west of Pima Community College)



August speaker Hans-Werner Herrmann, in the field in Vietnam.

Hans-Werner Herrmann received his Ph.D in 1995 from Philipps University in Marburg, Germany. His dissertation was on the molecular systematics of African vipers. He was the curator of amphibians, reptiles, fishes and invertebrates at Cologne Zoo, Germany's premiere zoological garden, for seven years. During this term he established zoo-based *in situ* nature conservation projects in Cameroon and Vietnam. At Philipps University Hans-Werner was a lecturer in herpetology and desert ecology and instructed student field classes in Morocco and Namibia. In 2002 he accepted a Zoological Society of San Diego Millennium Fellowship on the "Conservation biology of Goliath Frogs in Cameroon", where he spent three years.

Hans-Werner arrived in Tucson this year and is currently a Research Associate at the University of Arizona where he works on the conservation genetics and molecular systematics of species such as the Goliath frog and the endangered Kanab ambersnail. His presentation is subtitled "The discovery and re-discovery of two snake species or, what's luck gotta do with it?" The talk will highlight the initial stages of a nature conservation project in Vietnam, demonstrate how to get lucky with finding new species of herpetofauna, and touch on the biodiversity and status of the herpetofauna and other animals of central Vietnam's karst mountains.



NEXT MONTH'S GUEST SPEAKER

Dale DeNardo

Gila Monsters: Surviving in the Desert without Air-conditioning, Plumbing, and Supermarkets

Tuesday, 20th September

Tucson Herpetological Society meetings are open to the public and are held on the third Tuesday of each month starting at 7:15 PM



Figure 1.
John Lawrence LeConte
(1825 – 1883).
From Mallis (1971).

XII *Rhinocheilus lecontei* Baird and Girard, 1853 – Long-nosed Snake

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A late afternoon visit to Bianchi's Pizza on THS meeting night might give one the impression that herpetologists are a beer-swilling, casual-dressing group whose topics of interest all revolve around cold-blooded beasts with slimy or at best scaly skin. It has been the goal of this series to bring culture to this brutish lot. With this in mind, this Patronym article begins with a quote from Shakespeare (or at least a partial quote from Shakespeare): "What is in a name?" Forget the rose stuff; this quote provides the desired lead-in to discuss the scientific name of *Rhinocheilus lecontei*.

Scientific names can be a treasure chest of information, carrying valuable clues to identification,

along with information on the scientific history and the animal's discoverer. *Rhinocheilus lecontei* is such a name. Both the genus and the species names were created in 1853 by Spencer Baird and his sidekick at the Smithsonian, Charles Girard, in their Catalogue of Reptiles, Pt. 1. – Serpentes. Apparently, their ambitious goal to provide a series of catalogues for all of the herps proved too ambitious, making the first part the last part as well...but I digress.

Traditional practices of nomenclature dictate that generic names are capitalized and derived from Greek stems. In the case of the Long-nosed Snake, two such stems were used; *rhinos* meaning nose and *cheilos* meaning lip or brim. *Rhinocheilus* thus refers to the

snout's extended appearance due to the snake's counter sunk lower jaw and pointed rostral scale. This also explains the common name, "Long-nosed Snake." The specific epithet is a patronym honoring a man named LeConte. In patronymics, the genitive is formed by adding to the honoree's full name an *i*, *ii*, or *iana* if a man, or *ae* or *iae* if a woman. In zoology the specific epithet begins with a lower case letter. Thus, the name became *lecontei*. Here in this well-crafted scientific name, the reader is given both a description of the snake and the name of the person that collected the first specimen. The name also has a nicer ring to it than another LeConte patronym, *Philonotus lecontei*, a beetle species whose name can be loosely translated as LeConte's dung lover.

Before proceeding with the identity of the patronym, here is a brief look at the snake that carries his name. Long-nosed Snakes are nocturnal species found in xeric habitats of western United States and northern Mexico. The most thorough study of the genus *Rhinocheilus* is a 1940 paper by Lawrence Klauber, an electrical engineer and amateur herpetologist who also dabbled some with rattlesnakes. The most recent review of the genus is that of Medica (1975). The short account the follows is drawn from these sources, my own observations, and a scattering of recent information. *Rhinocheilus* was long a monotypic genus with a single species, *lecontei*. The number of subspecies has varied but, at the time of Medica's review, only two were recognized in the United States: *lecontei* in California, Arizona, Nevada, Utah, S. W. New Mexico and northern Mexico, and *tesselatus* in the rest of New Mexico, Texas, Colorado, Oklahoma, and a hefty portion of northern Mexico. A third subspecies, *antoni*, occurs along the west coast of Mexico. In 1990, Lee Grismer described a fourth subspecies, *R. l. etheridgei*, an endemic form from the island of Cerralvo in the Sea of Cortez, naming it in honor of Dr. Richard E. Etheridge, a distinguished herpetologist at San Diego State University. In a subsequent paper, Grismer (1999) elevated *R. etheridgei* (Isle Cerralvo Long-nosed Snake) to the status of a species, thus disqualifying *Rhinocheilus* for monotypic status.

Long-nosed Snakes supposedly attain a length of 5 feet (1.5 m), but the largest ones that I have encountered are between 2 to 3 feet (0.61- 0.91 m). They are unusual among colubrids by having undivided subcaudal scales. Among their close relatives are the *Cemophora* (scarlet snakes) and like this Eastern genus, they resemble coralsnakes and are burrowing predators that seek out squamates and their eggs. The counter sunk lower jaw and pointed rostral scale facilitates digging for such prey. The most thorough study of their diet to date (Rodríguez-Robles and Greene 1999) found that lizards (chiefly whiptails) comprised 66% of the diet, mammals 26%, and reptile eggs 7%. Mexican *Rhinocheilus* tend to be larger and consume a somewhat greater number of mammals. *R. etheridgei* appears to

have retained the traditional *Rhinocheilus* gastronomy, as one of the paratypes contained an *Aspidocelisceralbensis* (Isle Cerralvo Whiptail) and a *Dipsosaurus dorsalis* (Desert Iguana).

Rhinocheilus are known to display an elaborate defensive behavior consisting of head hiding, rapid body coiling, tail elevation and vibration, helical coiling, and anal gland discharge accompanied by autohemorrhage (particularly in females). A good review of this behavior and its significance can be found in McCoy and Gehlbach (1967). Autohemorrhaging (expelling blood) is not widely reported but is perhaps best known in certain horned lizards (*Phrynosoma*) that rupture vessels in the nictitating membrane of the eye to spray blood onto predators (especially canids). In the case of *Rhinocheilus*, the blood is expelled from the cloaca along with feces and anal gland secretions. Whether this blood might be a deterrent to canid predators as is that of horned lizards remains to be demonstrated.

Here in Tucson, I tend to see more dead than living Long-nosed Snakes. This is no doubt due to the nocturnal habits of this slender, attractive snake. By the time I have had my coffee and read the newspaper, most members of this species have retired to their burrows. The coloration is somewhat variable but a typical pattern consists of black saddles bordered with white and interspersed by bands of red or cream. The black saddles are flecked with white and the interspaces are flecked with black. Other than the somewhat similar colors, to me Long-nosed Snakes are poor mimics of coralsnakes which are smaller, have a blunt nose, and solid-color bands that continue onto the belly. Nevertheless, many of these inoffensive little snakes are killed because someone thought they looked too much like a coralsnake. Interestingly, Gary Nabhan reports that even the Seri people, a group closely in tune with nature, call this snake "*cofti caacoj*" or large coralsnake.

My first encounter with a Long-nosed Snake came about shortly after my wife and I moved to Tucson in 2000. A female friend called me one morning to frantically report that she had found a snake in her office and wondered if I wanted it. As I was just getting acquainted with the Western herpetofauna, I was anxious to identify and photograph herps at any opportunity. Her office was only a few blocks away, so I told her that I would be right there. There was a slight pause on the phone, and then she told me that I had better hurry, as she had called the fire department before thinking of me.

Upon arriving at her office, a huge fire truck was already parked in front and as I approached the door, a generously proportioned fireman emerged closely followed by two others. The big man was daintily holding a 4 to 5 inch (102 - 127 mm) *Rhinocheilus* between his thumb and forefinger. The first thought

The name also has a nicer ring to it than another LeConte patronym, *Philonotus lecontei*, a beetle species whose name can be loosely translated as LeConte's dung lover.

that crossed my mind was: “This is our tax dollars at work?” The firemen were only too happy to surrender the snake to me rather than have to move it to some remote locality. So I was able to take my photographs and then watch as the little fellow slithered off— hopefully to grow up in this less-than-ideal urban environment.

Since that time I have encountered only a few live *Rhinocheilus* in the wild. One early morning encounter (read 0800 h) at Tohono Chul Park was particularly interesting. I saw one moving slowly along a trail, stopping occasionally to stick its head into burrows. At one burrow, over half of the snake’s body disappeared down the opening. I expected it to emerge with prey in its jaws but, when the snake reappeared, there was no indication that it had captured anything.



Figure 2.
A Long-nosed Snake
(*Rhinocheilus lecontei*)
from Tucson. Photo by
Tom McDonald.

Later, I read an account by Harry Greene stating that these snakes extract sleeping lizards from holes which may explain these observations.

Presumably, Baird and Girard named this snake after the celebrated entomologist, John Lawrence LeConte, who collected the holotype near San Diego. However, as was often the case with their patronyms, they failed to mention for whom the animal was being named. In many cases there would be no question who was the honoree, but in this case there were a whole passel of LeContes who had become distinguished scientists of the time and perhaps deserving of a patronym. Among these LeContes was Louis (1782-1838), a botanist; John, Louis’ son who became a doctor, chemist, physicist, and the first professor at University of California, Berkeley (UCB); Joseph, another son of Louis, who became a noted geologist and Sierra Club officer; Joseph N., a son of Joseph, who became an engineering professor at UCB and another Sierra Club officer; John Eatton (1784 – 1860), a brother of Louis, was a well-known naturalist in his own right; and finally, John Lawrence (1825-1883), John Eatton’s son, who arguably became the most

important American entomologist of the 19th century. Interestingly, the LeContes were shirt-tail relatives with the co-describer of *Rhinocheilus*, Spencer Baird.

The LeContes, a wealthy and prominent family of Huguenot ancestry living in France, fled to America around 1700 in order to escape the intolerance of Louis XIV and the revocation of the Edict of Nantes. Initially they settled in New York. John L’s father, Major John Eatton LeConte, served for awhile in the United States Army but devoted most of his life to studies of plants, insects, and reptiles. In the hereptological arena, the Major described two large river turtles of the Southeast, River Cooter (*Pseudemys concinna*) and Coastal Plain Cooter (*P. floridana*). John L’s mother died shortly after his birth and henceforth he and his father were constantly together. The Major taught him the skills of a naturalist, including collecting, identifying, and drawing specimens.

John L. attended Mount St. Mary’s College in Maryland where he showed a natural aptitude for mathematics and language. He had an exceptionally retentive memory and progressed quickly through school receiving his degree in 1842. From St. Mary’s he entered the College of Physicians and Surgeons in New York where he received a medical degree in 1846. How he ever got this degree could be one of the great mysteries of the time. John L. is known to have made a journey to the far West in 1843 where he collected a thrasher near Yuma, Arizona, which today bears his name (*Toxostoma lecontei*). In 1844, he visited Lake Superior, working his way along the entire South Shore and eventually cross country to the source of the Mississippi River. In 1845, he followed the Platte River to Fort Laramie and the foot of the Rocky Mountains. He then trekked the Santa Fe trail to New Mexico. So when did he have time to study medicine? Presumably there were lots of skipped classes. One can only assume that he had a friend that took good notes.

Over the subsequent decade, LeConte traveled throughout the country pursuing his passion, collecting beetles. He worked with Louis Agassiz around Lake Superior. He collected in Florida, New York, Nova Scotia, and then returned to the West, spending considerable time in California. Things often did not go well. He lost over 20,000 specimens in the great San Francisco fire of 1852. Indians stole his horses near the Gila River and he had to walk over thirty miles of desert to find help. However, nothing deterred him from his quest to amass the greatest collection of beetles of the day. Beetles were not his only pursuit, however. The Major had instilled within him an interest in all nature and he collected a wide range of species, many of which ended up in the Philadelphia Academy of Sciences and

the Smithsonian. During this period, John L. not only collected the type specimen of *Rhinocheilus lecontei* in the San Diego area but he picked up a tiny, slug-eating serpent with a pointed tail near San Jose and was rewarded with still another patronym as Baird and Girard named *Contia tenuis* (Sharp-tailed Snake) in his honor. For his own part LeConte collected a mud turtle in Tucson which he described as *Kinosternon sonoriense* in an 1853 Philadelphia Academy of Science publication.

In 1861, shortly before his father died, LeConte married Helen C. Grier and they had one son. They lived in Philadelphia where John L. and the Major had established residence since 1852. With the onset of the Civil War, LeConte finally had an opportunity to practice the medical profession as the surgeon for the Philadelphia Volunteers. Following the War, John L. returned to his travels, working for a time on a railroad survey in Kansas and New Mexico. He went on to explore parts of Colorado and New Mexico. From 1869 through 1872, LeConte took his family to Europe, where they traveled while he examined important entomological collections.

Finally, in the last decade of his life, LeConte did less traveling, while he worked on publications and began to reap honors from his respectful colleagues. John L. was a founder (1859) and subsequent president of the American Entomological Society. He was elected President of the American Association for the Advancement of Science in 1873. Finally, in 1878, he even succumbed to taking a 9 to 5 job as Assistant Director of the U.S. Mint in Philadelphia. For the last few years of his life, LeConte suffered from ill health and died on November 15, 1883. His great collection of beetles was bequeathed to Harvard presumably because of his long friendship with Louis and Alexander Agassiz.

John L. Leconte's 180 plus publications spanned over 40 years and included the fields of geology, fossil mammals, herpetology, ethnology and, of course, beetles. Over his career, he described between 5000 to 6000 species of Coleoptera. His major works included editing the two volume *The Complete Writings of Thomas Say on the Entomology of North America*, which appeared in 1859, and coauthoring with his pupil, George Horn, the monumental *Classification of the Coleoptera of North America*. Entomologists recognize LeConte as one of the greatest entomologists of his day and certainly the greatest coleopterist. However, to the beer-swilling, casual-dressing crowd at Bianchi's, the LeConte name will be forever associated, not with creatures having six-jointed legs and iron elytra, but with a long-nosed, coralsnake mimicking, lizard-eating, serpent of the desert.

Acknowledgements

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Tucson Herpetological Society Photo Contest

Herp photographers, it's time to dust off your lenses, power up your batteries, buy some film or test your compact flash cards, and get out into the field with cameras ready for action. The Tucson Herpetological Society is planning a PHOTO CONTEST! Details are being worked out, but the contest will include both film and digital media, involve photos of herps within our 100 mile circle area, and is open to both professional and amateurs as long they are members of THS.

Winners will be featured in a THS calendar for 2006 and possibly on our website in conjunction with the 100 mile circle. So get out now, take advantage of our monsoon season, and start getting those great shots. More details to follow in future issues of the Sonoran Herpetologist, in Roger Repp's emails, and at the THS monthly membership meetings. This should be lots of fun for us all, and don't forget to get your kids involved.

For more information contact Young Cage, THS President, at ydcage@aol.com.

Snake Avoidance Training with Dogs: Making Informed Choices

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As temperatures rise in the springtime in Arizona, humans and other creatures increase their outdoor activities. Sightings of wildlife increase with an associated worry on the part of the humans about close encounters with the more dangerous types, for example Arizona's rattlesnakes. Arizona is well-endowed with rattlesnakes—at least a dozen species, of which some are common (e.g., Western Diamond-backed Rattlesnake [*Crotalus atrox*]) and some are rare (e.g., Arizona Ridge-nosed Rattlesnake [*C. willardi willardi*], our State Reptile, by the way). All are protected or restricted under laws of the Arizona Game and Fish Department and U.S. Fish and Wildlife Service.

Dog owners in particular share concerns about keeping their canine companions safe when venturing into the desert and mountains for hiking, hunting, and other activities. Homeowners who live close to the desert and whose yards are exposed are also concerned about keeping their dogs safe.

A service provided by a number of individuals that appears to be growing in popularity is called snake avoidance training. Some call it other things: snake proofing (a very misleading term), de-snaking (inaccurate at best), or just snake training (which sounds like it would take a very long time as snakes don't seem to learn as quickly as other animals). The basic strategy involves a snake, an electronic shock collar, and the dog. The purpose is to present the snake to the dog, usually several times under different conditions so that the dog is exposed to the sound, smell and look of the snake. When the dog approaches the snake, a "trainer" administers the shock, usually at one of the highest settings. The hope is that through rapid aversive conditioning, the dog will learn to associate pain and/or fear with the snake and, therefore, will avoid snakes in the future. It sounds simple, but this is actually a very complex situation that deserves careful attention.

The purpose of the remainder of this article is to help dog owners make informed choices about snake avoidance training. In addition to notes about the training itself, humane treatment of all the animals involved is also emphasized. The end of the article is summarized with a series of questions dog owners should ask (and get answers from) any potential trainer. My main point of this article is that this is a choice for the owner to make, and I want to encourage the most informed choice possible. It is NOT my intention to

say whether one should even attempt this training. That is entirely up to the individual dog owner.

As a native Arizonan, I believe that the ideal training for snake avoidance should occur throughout the dog's life. Ranch dogs, full-time companion dogs of field researchers and others who spend a great deal of time out-of-doors don't usually need special training—they learn from other dogs, from near-misses and from their humans that snakes are things to leave alone. Granted, this is easier with some breeds than for others. If you have a Jack Russell or other high drive terrier, sometimes there's nothing you can do to get them to leave snakes alone. Snake avoidance training is not for every dog. Also, snake avoidance training doesn't always help dogs that, when working, might accidentally step on a snake while concentrating on their job.

In any event, the reality of life in Arizona these days is that most people don't spend that much time outdoors but value the weekend or early morning walks and want to do what they can to prevent a possibly life threatening experience for their dogs. This is not to mention the expense of the treatment and soul-wrenching decision-making that the owners might have to go through. If you were told it would take \$3000¹ worth of antivenin and treatment to maybe save your dog's life, what would you do? As a staff member of a local poison and drug information center says, "Is this a dog, or is this THE dog?" Fortunately, most dogs that get bitten don't need this level of treatment.

Snake avoidance training is most often recommended for people whose dogs are frequently in the field.² People who are active out-of-doors or who live near the desert/suburb interface are also motivated to get the training. The costs range from \$40-\$80 or more and sometimes include a "free" follow-up session to make sure that the learning sticks.

The trainings are frequently offered in a clinic format, with a number of people bringing their dogs to one location over a day or weekend. All trainers seem to note that this process is not guaranteed to work 100%. Many trainers attempt to conduct the training in as safe a manner as possible: safe for the human, safe for the dog. As mentioned above, the usual "presentation" of the stimulus (i.e., snake) is done in several ways where the dog is exposed separately to the sight, sound, or smell so that the dog hopefully will "get it" that this is a snake, and bad things happen to you when you approach a snake. Some trainers prefer that a "neutral" person walk the dog towards the snake ("...so that the dog won't inadvertently lose trust in its owner..." or so that the "dog won't get distracted by the owner") while

others merely want the shock to be administered by another person. The snake is usually a rattlesnake, and is either caged in some way, free but defanged in some way, or muzzled to ensure the safety of the dog. One might also ask about the safety of the snake through all this, and that will be discussed later. Ideally, the dog is shocked only once and figures out that snakes are to be avoided. Unfortunately, some dogs don't seem to get it this quickly (or some trainers don't know what they're doing) and multiple shocks are administered. If the timing of the trainer is off by even a millisecond, the dog will not only be in pain but totally confused. Lindsay (2000, p. 321) notes that "a punisher that does not work in 3 to 5 trials should be re-evaluated and possibly abandoned." Additionally, as noted by Dr. Dog, a San Diego behaviorist and radio personality, "...the training is not a lot of fun for the snake either."

The key points here are that it takes a tremendous amount of knowledge about operant conditioning and the temperaments of different kinds of dogs, vast experience and extensive background about snakes, and exquisite timing to administer the right amount of pain at the precise moment to make all of this work properly. Despite what you may read on some outdoor magazine websites, this is definitely NOT a do-it-yourself operation. I've read on the web about hunting clubs that get together as a group with some snakes and some shock collars (and I hope no alcohol to enhance the party atmosphere) to "de-snake" their dogs. As they say on Fear Factor, do NOT try this at home. Lindsay (2000, p. 316) points out, "There is considerable risk for abuse when such collars are placed in naïve and inexperienced hands." This is not to mention the risk to humans of getting bitten by the snake. Some of the potential long-term effects on the dog occur when the training is done improperly, and can range from avoidance of anything remotely resembling a snake (including shadows and other innocuous things) to attacking all snakes. For some dogs, their fear becomes so great that it may interfere with their normal activities. Let the buyer beware.

One of the questions that I have always had about these trainings relates to the treatment of the snake

throughout this process. As a member of the Tucson Herpetological Society and having been active in the Speaker's Bureau, I'm more aware than most people, I suppose, of the misinformation and misperceptions about reptiles that exist in the general population of humans. I think that snakes, as living creatures, deserve care and consideration as well as the dog. Even for snake phobic humans, *humane* treatment should not be a difficult concept.

Examples of horror stories abound. Cases of snakes being attacked by dogs during aversive conditioning have been documented.³ Some "trainers" remove snake fangs by yanking them out with pliers⁴ and others make them "safe" by sewing their mouths shut. Neither of these are medically or ethically acceptable.

Other concerns include whether the trainers keep the snake from overheating when training; and, if the trainers capture a wild snake, do they use it to earn money for a few weeks and then return it to the wild? Although this sounds as though it might not be such a bad thing, it's actually against Arizona law (e.g., §A.R.S. 17-306; Arizona Game and Fish R12-4-428).

Also, do the trainers capture a wild snake and move it to a bunch of different locations? Again, this is environmentally and ecologically bad as it can spread disease among wild populations. Furthermore, relocation usually results in the death of the relocated animal (Hare and McNally 1997).

What else should you do?

- Know your dog. Dogs are predators. Some have more prey drive than others. You should keep your dog on leash and not let it nose around in the bushes and holes. Your dog is not supposed to be off-leash in Pima County anyway. Dogs can bother other wildlife besides rattlesnakes. Have you ever seen the result of a dog/javalina encounter? Do you know how many desert tortoises are brought to veterinarians after being mauled by domestic dogs? Practice calling your dog to you under many conditions, every day.



Figure 1. The author's dog Caledonia in Greasewood Park, Tucson, on 11 February, 2005. Photo by Allison Titcomb.

- Alter your behavior. Avoid hiking with your dog during peak activity seasons (e.g., April and September) or on trails with lots of weedy cover. Educate yourself about snakes and snake behavior. Most snakes will stay quiet and hidden unless provoked (see above about keeping your dog on leash). Keep nighttime walks to a minimum, especially as summer temperatures rise and snakes become more nocturnal. If you do go out at night, bring a flashlight, use it, pay attention, and walk around the snakes.
- Knowledge is power. Learn as much as you can. Ask lots of questions.

Questions to ask a potential trainer

- What is your experience, training and education about the following: dogs and dog behavior, snakes and snake behavior, operant conditioning? (*Check for excellent knowledge and experience...not just "OK." Do you want some yahoo administering multiple electric shocks to your dog?*)
- What kind of snake is it? Where did you obtain the snake? How long have you had it? What happens to the snake once all the training is over? How many dogs are used with the one snake? How do you keep the snake on-site when you're not training a dog? (*Check for humane treatment and evidence for compliance with Arizona law about reintroduction after captivity and moving snakes in the wild (that's a no-no). Also, the trainer better know exactly species it is...and so should you. If it's a rare or other protected species of rattlesnake, you should report the trainer to Operation Game Thief at 1-800-352-0700.*)
- How will the snake be presented to the dog? If de-fanged, exactly what procedure was used for that process? (*If you hear the word "pliers", run.*)

The bottom line is that snake avoidance training is not for every dog. If you decide to pay for someone's services, choose your trainer carefully and wisely. Finally, keep in mind that there are larger issues to consider, both for your dog and for the other creatures involved.

References/Resources

- Arizona Game & Fish Department Web Site: <http://www.gf.state.az.us/>. This site includes links to laws and regulations regarding Arizona wildlife.
- Arizona PARC Web Site: <http://reptilesfaz.com>.
- Arizona Poison and Drug Information Center Web Site: <http://www.pharmacy.arizona.edu/centers/apdic/apdic.shtml>.
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- Tucson Herpetological Society Web Site: <http://tucsonherpsociety.org>. This site includes downloadable brochures on Living with Venomous Reptiles and others.

Questions or comments can be directed to Allison Titcomb via email: allisont@juno.com.

Endnotes

- ¹ One vet estimates that most rattlesnake bite cases cost between \$500 and \$1200 when Ft. Dodge equine serum antivenin is used. Crofab antivenin increases the cost dramatically.
- ² Another "new" item marketed to dog owners is a so-called "rattlesnake venom vaccination." Several veterinarians have questioned the effectiveness of this vaccine and, if it works at all, how long it will last. It also was developed for only one species of rattlesnake. It is most likely a complete waste of money for the average dog owner. See redrocksbiologic.com for the limited study the company cites.
- ³ The dog attacking the snake might also be an example of how the conditioning can go wrong. Lindsay (2000, p. 320) states that "... fear and anger may become motivationally linked together as a conditioned response to pain or threat of pain." Do you want your dog to learn to attack snakes rather than avoid them? This is more reason to be very careful as you choose a trainer.
- ⁴ If you want to read more about medical procedures for venom duct ligation/resection and venom gland removal, see the veterinary research articles cited in the references.

Timing of Hatching in Beaded Lizards (*Heloderma horridum*)

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Among the limited reports on reproduction on free-ranging helodermatid lizards (genus *Heloderma*; Gila Monsters and Beaded lizards) there are reports that hatching and emergence from nest cavities of Beaded Lizards, *Heloderma horridum*, occurs coincident with the onset of summer monsoon rains (Beck 2005). *H. horridum* is restricted to the tropical deciduous forests of western México and Guatemala, and foraging and movements appear to be synchronized with seasonal precipitation (Beck and Lowe 1991). Hatching season has not been reported previously for Sonoran or Sinaloan *H. horridum*, and neonatal lizards hatching at this time would presumably emerge to increased food abundance after the four-to-six month dry season that precedes the monsoons in western México.

We encountered three Beaded Lizard neonates in southern Sonora, México between 18 July and 06 August 2004 during the Sonoran monsoon season. We measured, photographed (Figure 1), and released the animals where they were captured. We also measured neonate specimens from museums (Table 1). We were not able to determine sex

of individuals. This species does not have noticeable secondary sexual characteristics, and gonads (dissected specimens) are often indistinguishable in neonates and small juveniles.

The neonatal lizards that we measured were slightly larger than those in a report for six lizards captured earlier in the summer in Jalisco, México during the coastal summer monsoons in July (mass = 23-27g [0.81-0.95 oz], and SVL = 115-127mm [4.5-5.0 in]; Ramírez-Bautista 1994).

Hatchling Beaded Lizards incubated in the lab reportedly ranged from 21.4 to 42.2g (0.75-1.50 oz; mean = 37.0 g [1.3 oz]), and hatched after 146-162 days of incubation at 29.0 C (84.2 F; mean = 152 days; Gonzalez-Ruiz et al. 1996). Because these hatchlings were similar in size to those we encountered, it seems likely that the lizards we encountered were indeed hatchlings, and not older juveniles. In addition, all three live individuals we encountered still had evidence of umbilical tissue emerging from the abdomen.

Breeding activity in *H. horridum* is known to occur in the Fall. Spermiogenesis reportedly occurs in Fall in *H. horridum* in southern Sonora (Goldberg and Beck 2001), and male-male combat (a behavior typically associated with breeding activity) also occurs during fall (Beck and Ramírez-Bautista 1991). It remains unknown when conception and oviposition occurs, but if *H. horridum* deposits eggs in the fall, and hatchlings emerge at the beginning of the summer monsoon season, then eggs could incubate for up to six months (the entire dry season in tropical deciduous forests), which is equivalent in duration only to that reported for the largest varanid

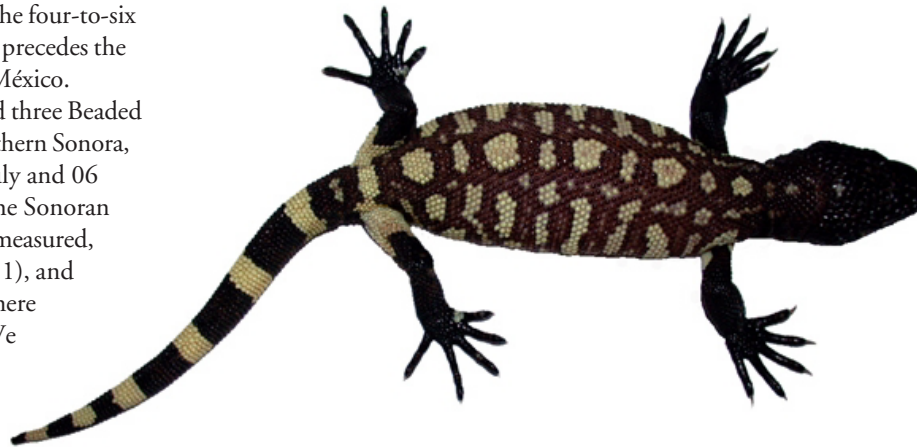


Figure 1. Neonate Rio Fuertes Beaded Lizard (*H. horridum exasperatum*). Specimen 942 observed from southern Sonora, Mexico.

lizards (Thompson and Pianka 2001), to which *Heloderma* are closely related. Incubation periods for varanids and iguanians that are similar in size to *H. horridum* are typically only 3-4 months (Birchard and Marcellini 1996), and in many species the eggs hatch in the same season in which they are deposited.

The accumulated data support the possibility that, throughout its range, *H. horridum* hatches and emerges from nests at a time coincident with the onset of the summer monsoons.

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Table 1. Snout-to-vent length (SVL, in mm), tail length (TL, in mm), body mass (g), and collection data for hatchling *H. horridum* from México.

<u>Specimen</u> (Locality)	<u>SVL</u> (Date)	<u>TL</u>	<u>Mass</u>
931 (southern Sonora)	133 (18 Jul 2004)	92	28
942 (southern Sonora)	141 (2 Aug 2004)	90	30
948 (southern Sonora)	140 (6 Aug 2004)	90	32
CAS 134061 (southern Sonora)	138 (17 Jul 1971)	100	N/A
LACM 6597 (northern Sinaloa)	130 (3 Jul 1964)	89	N/A
CAS 204135 (southern Sinaloa)	123 (Jul 1984)	90	N/A
MVZ 16434 (México)	132 (1 Jul 1933)	90	N/A

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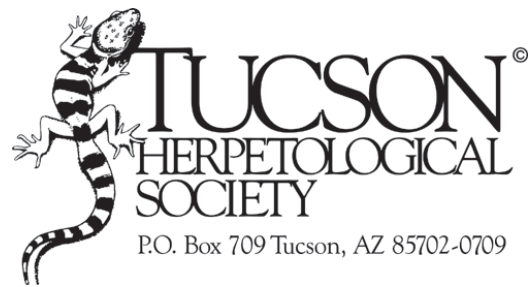
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