Year of the Lizard News

No. 6 November 2012

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www.YearoftheLizard.org

The Year of the Lizard: A Year in Review

A quizzical Green Iguana (Iguana iguana)*, by Sarah Goldman, YoL Photo Contest.*

When the Year of the Lizard was initiated in 2011, a group of individuals from across the United States joined PARC to form the Year of the Lizard Planning Team. Representatives from federal and state agencies, zoos, academic institutions, and non-governmental organizations were part of this team. Their ongoing efforts have shaped the 2012 Year of the Lizard campaign.

Several landmark achievements and products have resulted from this year. Before the year began, the logo and photo contests were initiated. **Over 150 photo entries have been submitted** to date, representing species from across the United States and North America as well as locations in Kenya, Thailand, Mexico, Peru, the Galapagos, Tobago, Anguilla, Brazil, Grand Cayman, Costa Rica, the French Lesser Antilles, the UK, and Oman. The State of the Lizard report launched on January 1st, and French, Spanish, and German translations are in the works at this time. **Ten collaborating partners** have joined the campaign – each has been providing valuable assistance to reach the public on the important issues surrounding lizards and their conservation. These partners have been instrumental in helping make the Year of the Lizard a success, both across North America and the world. In total, five international partners have joined the Year of the Lizard collaborating partners, representing Slovenia, Hong Kong, Bangladesh, and the UK.

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Inside:

Coming Soon:

2013 - Year of the Snake

Too hot for some?

Climate change in the land of lizards

By Chris Dickman, University of Sydney, Sydney, Australia

The extraordinary diversity of Australia's desert lizards had long been appreciated by the local Aboriginal people, but it was not until the pioneering work of Eric Pianka in the 1960s that this wonderfully rich fauna was brought to wider attention. Curiously, it is the vast and sprawling hummock grasslands that have turned out to have the highest species densities. Dominated by needle-leaved species of Triodia, or spinifex, these grasslands appear to

*A Central Netted Dragon (*Ctenophorus nuchalis*) from the Simpson Desert, central Australia. Photo by Aaron Greenville.*

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"Precisely the least, the softest, lightest, a lizard's rustling, a breath, a flash, a moment - a little makes the way of the best happiness."

Friedrich Nietzsche (German classical scholar, philosopher and critic of culture, 1844-1900)

Get Your November Photo Contest Calendar

Pinocchio? No, it's a Leaf-nosed Anole, native to the Amazon forest of Mato Grosso, Brazil, captured in pixils by November winner Vinicius de Avelar São Pedro. Zoom in and see more, plus our curious chameleon runner-up, when you download your monthly calendar from **http://parcplace.org/images/stories/YOL/YearoftheLizardCalendarNovember.pdf**.

One last call for lizard photos for the December calendar! Go to **http://www.parcplace.org/images/stories/YOT/YOLphotocontest.pdf** for details. And now is the time to begin to submit photos for Year of the Snake! (See page x.)

Did you miss the October calendar? Download it anyway, so you can meet Spyro, the Veiled Chameleon, who sat for his portrait by winner Jacob Henry Camps.

This San Esteban Spiny-tailed Iguana (*Ctenosaura conspicuosa*) was certainly conspicuous the day October runner-up photographer Jim Pinter found it on an island in the Sea of Cortez.

Why Conserve Lizards?

A Moment - A Photo - A Lifetime Memory

As he was scouting for antelope after waiting 14 years to draw a tag, movement on the ground caught his eye.

"I was amazed at the size of this little horned lizard, [it was] relatively easy to catch, and docile while in the hand. I basically connect with any form of wildlife and this guy just begged to have his picture taken. I saw several of these in my walks across the desert. The conditions were very hot that week - usually in the mid to upper 90s, and visible wildlife activity was severely limited to dawn and dusk."

Although he was there for another goal, his outdoor and wildlife experience during that trip was seasoned by many things, with lizards adding an element of aesthetic spice to the menu.

Photo and quote by Jim Greer; photo taken 20 miles NE of Paisley, Oregon.

A Year in Review

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Bi-monthly newsletters and monthly calendar pages have connected our readers to the many conservation, research, and educational efforts that are ongoing or needed in North America and abroad. The Year of the Lizard News has featured stories on research, outreach, interviews with lizard biologists, and ways the public can become involved in lizard conservation efforts. As planning commenced for the Year of the Lizard in 2011, the planning team was very eager to enlist the help of prominent lizard biologists in the academic, state, federal, and private sectors, as well as conservation organizations in developing a newsletter and free downloadable educational materials for both the professional and public audience. However, we could not have expected the amount of materials that were also contributed by, to name a few sources, local nature centers, citizen scientists, and the general public. From newsletter stories on A Field Ecology Tool for Everyone (May) to the outreach by Cool Springs Environmental Center (July) and a beautiful poster of four lizards from North Italy (September), the Year of the Lizard campaign has reached a broader audience across the world due to these contributions. In fact, this month we present another contribution from one of our readers

A Brown Basilisk, Basiliscus basiliscus, *by Patrick Moldowan, YoL Photo Contest.*

(*Why Conserve Lizards?: A Moment - A Photo - A Lifetime Memory*) that again aims to help us understand the question "Why lizards and why now?" As a campaign that was started with the goal of "raising awareness of the issues surrounding lizards", this could not have been done without the assistance of each of you who have downloaded the monthly newsletter, submitted photos for the monthly calendar photo contest, and contacted the Year of the Lizard Team with questions, suggestions, and contributions to this important effort.

Although it is difficult to document the impact that our campaign is having, we can tally the number of times that the website, **www.yearofthelizard.org**, is opened and files are downloaded. These numbers alone show that we have successfully had a broad reach. Tracking of Year of the Lizard web statistics began in January 2012. From January to October 2012, **the various files at the lizard page have been 'hit' over 88,000 times** in total, although certainly this includes some double-hits by the same person. The newsletters have averaged 18,000 hits each, the calendar pages have averaged ~1,000 hits, and, the State of the Lizard report was hit upon 4,200 times. In addition, 10% of visitors to the central PARC website were directed there via the Year of the Lizard webpage and there were over 14,000 unique visitors to Year of the Lizard webpages via the PARC website entry point. Furthermore, close to 150 individual Facebook members have "liked" the Year of the Lizard on the social media network.

An independent effort to raise funds for lizard conservation, research, and education was initiated by the sale of various items (mugs, t-shirts) at Café Press, an online vendor: **www.cafepress.com/parcstore**. Monies from sales are managed by PARC's allied non-profit organization, ARC, Amphibian and Reptile Conservancy. A decision on the use of those funds is pending the close of the year. Also, ARC recently updated their website with a handy 'Donate' button, which they hope will increase fundraising for lizards and herpetofauna programs. See: **www.amphibiansreptiles.org**

As we close the 2012 Year of the Lizard campaign and aim to continue this awareness into 2013 and beyond, it is our hope that you feel the same, too.

A gorgeous Galliwasp, Diploglossus monotropis, *native to Central and northern South America, by Terry Hibbitts.*

Too Hot for Some?

continued from p. 1

be structurally quite simple, yet may sustain 50 or more lizard species per km2. In our work in the hummock grasslands of the Simpson Desert, we have recorded 54 species of skinks, 19 species of geckoes, 15 species of dragons, 8 species of varanids, and 5 pygopodids in regular surveys since 1990. Many more species would be added to the list if we included adjacent shrubland, woodland, and riparian habitats. Truly, this is the land of lizards!

A Knob-tailed Gecko, Nephrurus levis. Photo by Jan van Ekris.

What makes the hummock grasslands so rich? The early work by Pianka showed that coexisting lizards usually use key food and habitat resources in different ways, and also that species differ in their times of activity and preferred operating temperatures. Some of these differences are exquisitely subtle. For example, the beautiful Jewelled Gecko (*Strophurus elderi*) feeds largely on termites that it hunts within hummocks of spinifex, whereas the similar-sized Sandplain Gecko (*Diplodactylus stenodactylus*) prefers bugs and spiders that it plucks from the margins of hummocks or the sand just beyond. But resource partitioning is only part of the story: Australia's central deserts are very dynamic. In most years they experience local storms that create small areas of high but transient productivity, and these in turn favor some lizards in the regional species pool. These species move in at the expense of others. More occasionally, flood rains fall and drive large increases in plant growth. As this growth dies and dries it provides the fuel for wildfires that burn large and small areas of spinifex, and these in turn create habitats of varied complexity that are used by different lizard species. The Military Dragon (*Ctenophorus isolepis*) and the Central Netted Dragon (*C. nuchalis*) provide good examples of this. The former species prefers areas of long-unburnt spinifex and disappears after fire, whereas the latter species is a fire specialist and moves rapidly into recently-burnt sites.

Simpson Desert field trip crew, July 2010 (author at back, third from left).

*Military Dragon (*Ctenophorus isolepsis*). Photo by Bobby Tamayo.*

Paradoxically, fire – indirectly – may also be the greatest threat to Australia's desert lizards. The spread of introduced Red Foxes (*Vulpes vulpes*) and Feral Cats (*Felis catus*) into arid regions now means that lizards have reduced shelter from these predators post-fire, and our research shows that lizards increase 2- to 4-fold in the predators' diets at these times. Cats and foxes also raid lizards in patches of unburnt spinifex in the wake of wildfires, moving across burnt country to access them. Climate predictions indicate that Australia's central deserts will become hotter, perhaps by 2°C, by mid century, and also that long droughts will be punctuated by increasingly heavy flood rains. These in turn will exacerbate the region's boom and bust cycles, lead to more-intense and broad-scale wildfires, and potentially allow hyper-predation on populations of susceptible lizard species. Mitigation strategies such as prescribed burning and predator control will likely be needed to ensure that central Australia remains the land of lizards in future.

Sand Goanna, Varanus gouldii. *Photo by Bobby Tamaya.*

Panther Skink, Ctenotus pantherinus, *photo by Aaron Greenville.*

I am indebted to my colleagues in the Desert Ecology Research Group, especially Chin-Liang Beh, Aaron Greenville, Bobby Tamayo, and Glenda Wardle, for their help and camaraderie over many years, to my many graduate students and the >1000 volunteers who have worked in the desert, and the Australian Research Council for funding. For more information, see: **http://sydney.edu.au/science/biology/sites/dickmanlab/research.shtml.** For a video clip of a research trip to the Simpson Desert trip, see: **http://iconiclandscapes.wordpress.com/2010/02/09/a-simpson-seqence-on-the-road-over-the-dunes-and-into-the-red-sand/**

Lizards in the News

An international team of researchers has found that female **Komodo Dragons** live half as long as males on average, seemingly due to their physically demanding "housework". Read more at: **http://www.sciencealert.com.au/news/20121810-23806.html?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+sciencealert-latestnews+%28ScienceAlert-Latest+Stories%29**

An Australian lizard, the **Eastern Water Skink**, has dispelled a long held myth that reptiles are slow learners. Find out more from: **http://phys.org/news/2012-10-lizards-fast-learners.html**

A brief exposé on **Komodo Dragons**. Read about the experience at: **http://www.thehindu.com/life-and-style/metroplus/lizards-of-horror/article3968419.ece**

They may be known for changing appearance, but four **chameleon** stowaways on board a ship in Cardiff's dock could not escape the attention of customs officers. Find the article at: **http://www.bbc.co.uk/news/uk-wales-19902620**

Tokay Geckos turning India citizens into millionaires. Read the full article at: **http://daily.bhaskar.com/article/NAT-TOP-ne-rears-reptile-that-can-turn-them-into-millionaires-3890810-NOR.html**. Think twice before you jump at this trend: Tokay Geckos make very poor pets, because they're aggressive, bad-tempered, and possess a painful bite.

When the **Dunes Sagebrush Lizard** crept off the endangered species list this summer, it gave new hope to landowners who would like to avoid endangered species regulations for other rare critters on their property. Find out more from: **http://www.eenews.net/public/Greenwire/2012/10/05/1?page_type=print**

An unlikely friendship has blossomed between **a lizard and a pig** at the Jungle Zoo in Cleethorpes, England. Read more at: **http://www.thisisgrimsby.co.uk/Lizard-pig-best-buddies-chance-meeting-Jungle-Zoo/story-16955567-detail/story.html**

Trade in **monitor lizard skin** reaches its height, the lizard is on the verge of extinction, and a solution is suggested. Find the full article at: **http://articles.timesofindia.indiatimes.com/2012-09-03/goa/33562712_1_lizard-ghumat-skin**

What lizard species has been wiped out in its natural habitat and now depends on three females breeding in captivity for its long-term survival? Find the answer at: **http://blogs.scientificamerican.com/extinction-countdown/2012/08/24/lizard-species-3-remaining-females/**

Follow all of the Year of the Lizard news and happenings on Facebook (http://www.facebook.com/yearofthelizard2012) and Twitter (http://twitter.com/YearOfTheLizard).

White bellies are aggressive, too!

By Patrick Cain, Indiana State University, Terre Haute, Indiana

Male Sceloporus siniferus *on tree branch. Photo by Patrick Cain.*

Lizards, which are the focus of research in the Hews lab at Indiana State, use several types of signals, including color, chemicals, and motion, to convey information to conspecifics. Diana Hews (Indiana State University) and Emília Martins (Indiana University) and Mexican colleagues J. Jaime Zúñiga-Vega (Universidad Nacional Autónoma de México) and Cuauhcihuatl Vital (Universidad Autónoma de Ciudad Juárez) are involved in a multi-year project to detail physiological mechanisms underlying correlated traits, and how "sets of traits" may or may not be "pulled apart" evolutionarily. We are studying twelve closely-related lizard species in the genus *Sceloporus* (fence lizards) in Mexico and the Southwest United States. *Sceloporus* is a great lizard group to study when asking questions about communication because of the variety of color patches expressed in this genus. For example, within this genus, we can find a species where males have blue color patches and females can either also have blue or white patches, or we see species where both sexes have white patches. Our goal for this research is to see how communication tactics might change with the differences in such color traits.

This summer, Hews and a team of graduate and undergraduate students, joined by our Mexican colleagues, went to Huatulco, Oaxaca, Mexico, to study *Sceloporus siniferus*. We worked at the Parque Nacional Huatulco on the Pacific coast of Mexico, about 150 km west of Salina Cruz. Our team conducted field tests on males to determine overall aggression levels and display rates, as well as behavioral responses to conspecific chemical secretions excreted from femoral glands. For the aggression tests, we introduced tethered "intruder" conspecific males to free-ranging males and measured their responses. Using these results, we will compare background aggressive signaling of this species to that for other *Sceloporus*. For the conspecific chemical tests, we rubbed "cue papers" on the femoral pores and cloaca of males and introduced those papers to free-ranging males, and then recorded behavioral responses to the exposure to "cue" papers or control (clean) papers. The goal of this experiment is to compare display rates in responses to chemical cues,

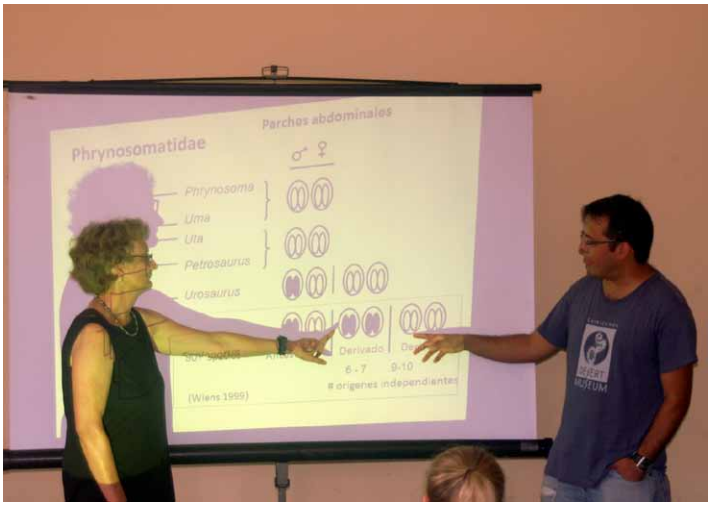
Male Sceloporus siniferus *showing a "full-show" display, extending his dewlap and showing white belly. Photo by Patrick Cain.*

Male Sceloporus siniferus *during a chemical trial with cue paper on the end of a noose pole to the right of animal. Photo by Patrick Cain.*

The Mexico lizard crew: (Left to right) Patrick Cain, Diana Hews, Jake Pruett, Jose Oyola, Ali Ossip-Klein, J. Jaime Zúñiga-Vega. Photo by Patrick Cain.

instead of those elicited by visually seeing another male.

Our results for *S. siniferus* are surprising so far, especially for the chemical cue trials, because males of this species, which is "white" (no blue belly patches), show higher display rates towards control cue papers versus chemical cues. Based on previous results from the only other "white" species studied, *S. virgatus*, we predicted *siniferus* would be less concerned with visual cues (because it lacks abdominal blue color) and relatively more responsive to chemical cues. Perhaps a white patch may be as effective as a blue patch because of the contrast to the particular substrate at this location, but many other hypotheses will be tested as well.



Diana Hews and J. Jaime Zúñiga-Vega giving a talk for Parque Nacional Huatulco staff. Photo by Patrick Cain.

Upcoming Meetings & Events

Kansas Herpetological Society Annual Meeting, 2-4 November, sponsored by Fort Hays State University and the Sternberg Museum of Natural History, Hays, Kansas

Submit Your Snake Art, Stories, and Poetry

Submit photos of your snake art (jpg, tiff, or pdf files) and copies of your stories and poems via email to **parcyearofthesnake@gmail.com**. Please include your name, location, and any comments about the submission in your email message. We will select several submissions to include in the upcoming newsletter.

2012 is coming to a close…
Last chance to get your Year of the Lizard gear!

There's still time to go online to the PARCStore (**http://www.cafepress.com/parcstore**).

Proceeds from sales go to the Amphibian and Reptile Conservancy, a not-for-profit organization that helps support PARC activities, such as public education, publications, and research.

Announcing: 2013 Year of the Snake Photo Contest!

PARC is seeking close-up, digital photos of snakes, preferably in their natural habitats or within an educational or conservation context. One winner will be selected each month to be the featured photo as part of the Year-of-the-Snake online (printable) calendar. Runner-up photos also will be included in the calendar. Additionally, all submitted images will be considered for use in the Year of the Snake monthly newsletter and website as well as other PARC-related conservation, outreach, and educational efforts.

Give us your best shot!

Photos will be judged on quality (resolution, lighting, composition) as well as the general appeal of the subject of the photo. The snake(s) should be the focus of submitted photos. Photos also should capture the coloration, markings, and overall "personality" of the snake(s). Multiple photos may be submitted.

Photos selected for a given month of the calendar will be selected by the 20th of the previous month (i.e., the winning photo for January will be selected on December 20th, and so on each month); however, photos will be accepted on a rolling basis and will be considered for future months. Winners will be notified of their photo's selection via email and will be asked to provide a brief personal biography.

NOTE: By submitting an entry, the contestant grants PARC the right to publish and crop their photo(s) as necessary (see Terms of Use below). Appropriate acknowledgement to photographers will be given for photos when used in the Year-of-the-Snake calendar, newsletter, website, or other PARC-related venues.

REQUIREMENTS:

Resolution: Photos should be at least 300 dpi in resolution (to be suitable for an 8" x 10" page) and in JPG or TIFF format.

File name: File names of submitted images should be titled using the photographer's full name, species name

Snakes are, too, beautiful! Redbelly Snake, Storeria occipitomaculata*, by J.D. Willson.*

(scientific or common, if known), and image numbered consecutively (e.g. JaneSmithRoughGreenSnake01.jpg, JaneSmithRoughGreenSnake02.jpg; JaneSmithOpheodrys_ aestivus01.jpg).

Conservation Message: Please include a short caption related to the photo that highlights a conservation issue for the snake(s) or its/their habitat. If you are unsure as to the conservation status in your area seek local expertise and use the web. The caption should be a maximum of 50 words.

To submit: To submit photos for the contest, please send your photo(s) and supporting material (as described above) along with entry form information (below) to PARCphotocontest@gmail.com. With the subject line "photo contest"

More information and details on the Year of the Snake will soon be posted to **http://parcplace.org/news-a-events/2013-year-of-the-snake.html** – please bookmark this address and keep checking back!

Additional questions: Please email them to **PARCphotocontest@gmail.com**.

Thank you for your participation!

Ask the Experts! (about snakes)

Submit your questions about snakes via email (**parcyearofthesnake@gmail.com**) to our panel of snake experts, and we will select questions to answer in upcoming newsletters. Please include your name and location in your email message.

Submit Your Citizen Science Projects

A compilation of snake-related citizen science (volunteer) inventory and monitoring projects has begun. These will be featured in our monthly newsletters. Send any information on these types of projects to **parcyearofthesnake@gmail.com**.

An Interview with Dr. Jonathan Losos

By Denim Jochimsen, University of Idaho

Dr. Losos out noosing lizards.

Dr. Jonathan B. Losos is an esteemed professor and scientist, employed since 2006 in the department of Organismic and Evolutionary Biology and as the curator in Herpetology at the Museum of Comparative Zoology at Harvard University. His life-long love for reptiles and penchant for exploration and field research have generated an abundance of knowledge that has advanced our understanding of evolution and ecology. Dr. Losos was fortunate to take courses from and work alongside a number of renowned scientists; each of these individuals contributed to his development as a researcher through inspiration and guidance. He received his Ph.D. from the University of California at Berkeley. His dissertation research focused on the *Anolis* lizards of the West Indies and was driven by the desire to understand the factors that contribute to the rich biodiversity of this group. In particular, he was interested in explaining the convergent evolution of similar ecomorphs (species that are similar in form, ecology, and habitat preference that are not closely related) that occur on different islands. Dr. Losos and his numerous students and collaborators have continued to study this group of lizards for over 20 years. These research endeavors have resulted in the publication of countless manuscripts in scientific journals and an entire book on these unique lizards. The vast wealth of information that the scientific community has gleaned from the years of research conducted by Dr. Losos is truly impressive.

I was particularly excited to interview Dr. Losos for our final Year of the Lizard newsletter because his work has inspired me, and he is my academic grandfather! My mentor at the University of Idaho is Dr. Luke Harmon. He completed his dissertation work under the guidance of Dr. Losos when he was at Washington University in St. Louis. I first met Dr. Losos when the University of Idaho hosted the Evolution meetings in 2009. He took the time to talk with me about my research and give me insight into conducting fieldwork on islands. Since then, I have attended his presentations and talked with him at two different scientific conferences. I have left each time with a renewed feeling of motivation and a deeper love for the ecology and natural history of lizards. He has a wonderful personality and is excited by any tidbit related to my own research on lizards that I feel like sharing with him. It is quite evident that Dr. Losos has a deep-seated interest in these animals, their ecology and their evolution. In my opinion, this passion is what has contributed to his success and influence in a number of scientific disciplines. If you are interested in learning more about the ongoing research in the Losos Laboratory, visit **http://www.oeb.harvard.edu/faculty/losos/index.html**. For up-to-date, fascinating facts about anoles, visit **http://www.anoleannals.org/**, and check out the most comprehensive discussion on this group of lizards in *Lizards in an Evolutionary Tree: Ecology and Adaptive Radiation of Anoles*.

The beautiful Anolis grahami *of the West Indies.*

1. How did you become interested in lizards, and at what age?

It all started with dinosaurs, when I was five. Then, at age ten I convinced my mother to let me have spectacled caimans as pets (they were commonly sold in pet stores back then), and after

**The views and opinions of interviewees are not necessarily shared by all members of PARC or other Year of the Lizard Partners*


Anolis pulchellus

that I started keeping lizards, too.

2.Please describe a defining moment or favorite memory of working with lizards.

Again about 10, I remember looking for Green Anoles (*Anolis carolinensis*) in the neighborhood of my great aunt, who lived in Coral Gables. All of a sudden, there was a very loud crashing noise, and I looked around the tree and was face to face with a Cuban Knight Anole (*Anolis equestris*). I had no idea such a thing existed, and was terrified! Later, I discovered my wallet was missing, but that's another story.

3. What is your current role in lizard research and conservation?

I study the evolution and ecology of Anolis lizards and have a lab full of great students and postdoctoral researchers who do the same.

4. Do you have a favorite lizard or group of lizards? Why do you find them particularly interesting?

Duh—anoles! Their diversity is what is so great about them, but they are also very interesting animals to observe. I also like geckos, monitor lizards, and many others.

5. Of all the places that you have visited in search of lizards, which is your favorite and why?

Well, that would have to be Australia just because of the great diversity of all kinds of wildlife, including the greatest animal of all time, acing out even anoles, that honorary reptile itself, the duck-billed platypus.

6. What do you believe is the biggest threat facing lizards in the 21st century?

Well, it varies. Climate change is of course a big one, but so is habitat destruction, and the two factors combined are particularly a challenge.

7. What are some of the ways that the public can help with the conservation of lizards?

Preserve habitats and do what we can to minimize climate change.

8. What guidance would you give to natural resource managers and policy-makers regarding lizard conservation?

Far and away the easiest way to conserve lizards is to conserve their habitat. It is much easier and cheaper than trying to take remedial action after the fact.

9. What advice would you give to young people (or adults) who love lizards and want to work with them?

Learn as much about them as you can, volunteer at zoos, universities, wildlife centers or wherever you can get experience.

10. Which of the following is your favorite way to share the knowledge you have gleaned from your studies on lizards and why… teaching in a classroom? Public outreach events? Scientific meetings? Publishing scientific manuscripts? Writing books?

Well, I like them all and they all can be effective and serve different purposes.

11. Share a funny moment that occurred while conducting field research on lizards.

It is common that the animal with a brain half the size of a pea outwits me and makes me look stupid in my efforts to catch it.

12. Is there anything else that you would like to share with our readers?

As anyone who has tried to noose


Anolis cybotes

lizards knows, one of the most annoying things is when the lizards bite at the noose, because it is impossible to get it around their neck when it is in their mouth, plus the biting can collapse the noose. They do this, presumably, because they are trying to eat the noose. Sometimes the lizards are so hungry that they will even jump at the noose. Once I was battling with a very obstreperous Brown Anole (*Anolis sagrei*), which kept on biting the noose, foiling my efforts. I was getting aggravated. Then the lizard jumped at the noose and landed in it, noosing itself! For a moment, I couldn't believe my eyes. It was as if the heavens opened up and trumpets blared forth—all is well in the world.


Anolis angusticeps

Now Available: *The State of the Lizard*...in Spanish!

The *State of the Lisard* is now also *Estado de los Lagartos.* Thanks to volunteer translators Carlos Velasquez of Medellin, Colombia, and Elena Velasquez of Boise, Idaho, this important document is now available on our Website, **www.yearofthelizard.org**. French and German translations are coming soon, so check back before the end of the year.


Galapagos Marine Iguana, Amblyrhynchus cristatus*, by James Brantley, Year of the Lizard Photo Contest.*

Are You an Educator or Interpretive Naturalist?

We are working to create resources for teachers and naturalists! If you are willing to share, please send your unit materials, educational program information, or PowerPoint presentations to **parcyearofthesnake@gmail.com**. Please include your name, the name of your school/nature center or organization, and location. If you did not create them, please be sure to tell us where you found the materials.

Featured Lizard Families

By Lawrence L. C. Jones (Larry the Lizard Guy)

Each of the six issues of Year of the Lizard News showcases two of the twelve lizard families native to the United States of America. In this issue I discuss the only two families that are not native to my own native haunts, the Southwestern United States. Perhaps that is why I saved them for last. But as we all know, being last doesn't mean you are in any way inferior. These are decidedly interesting lizards, and although they are not well-represented in the United States, they are elsewhere.

Family Polychrotidae, Anoles

Turquoise Anole, Anolis grahami. *Photo by Kristiina Ovaska, YoL Photo Contest.*

Anole: Anole (Victor Borkowski) is a fictional mutant superhero in the Marvel Universe. He was created by Christina Weir and Nunzio DeFilippis and first appeared in issue #2 of *New Mutants* vol. 2 (August 2003). Anole is a student at the Xavier Institute and junior member of the X-Men. His reptilian mutation grants him superhuman abilities including wallcrawling, a prehensile tongue, and adaptive camouflage. (hyperlinks inactive [ed.])

Wikipedia isn't always the best source of information on lizards, but it does show that lizards are the stuff of superheroes! Maybe Victor Borkowski doesn't have the exact same characteristics as real anoles, but he tries. Perhaps a better reference on anoles is the treatise by Jonathan B. Losos (2009, *Lizards in an Evolutionary Tree: Ecology and Adaptive Radiation of Anoles*, University of California Press, 507 p.). This fabulous book could have an alternate title of "*Everything You Always Wanted to Know About Anoles * but were afraid to ask*." Be sure to read the interview with Dr. Losos in this issue.

As with numerous saurian families in my Year of the Lizard series, many herpetologists consider representatives of my so-called "families" to be contained within the family Iguanidae, but I like breaking the groups into more functional units, if not for taxonomic reasons, then for discussion purposes. Otherwise, anoles would be lost in megafamily Iguanidae. I will let the taxonomists wrestle over relationships and names, and I'll focus on the critters themselves. But speaking of taxonomy and nomenclature, the number of genera ranges from 1 to about 16 (usually 1-4) depending on who you talk to. If recognizing one genus with several clades (common practice), the single genus is *Anolis*. Most authorities recognize up to about 400 species, though new species are being described or taxonomically revised. They are distributed from southeastern USA to northern South America. While diversity is highest on the mainland, there are a large number of species in the West Indies, and some on Pacific islands.

I think my very first memory of a lizard is that of an anole. When I was but a tiny larva, I remember being at the circus with my parents and they bought me a "chameleon" (actually *Anolis carolinensis*) on a string, attached to my shirt with a safety pin. It probably wasn't the best environment for a lizard, but it did leave an impression on my tiny reptilian brainstem that added to my fascination for all things reptilian. Fortunately, I don't remember what became of said anole, but I bet it didn't live a long, full life. By the way, Losos' book (page 10, footnote 12) answered to my satisfaction the age-old question on how to pronounce "anole" (and the possible origins of the word). Suffice to say, you can pronounce it however you want, as long as you spell it correctly…like scientific names.

Green Anole, Anolis carolinensis*, smaller than a persimmon. Photo by Steven P. Christman, YoL Photo Contest.*

Anolis conspersus, *Grand Cayman Anole, displaying its dewlap. Photo by Jim Harding, YoL Photo Contest.*

Anoles are really interesting animals and well known for certain characters. In particular, nearly all species possess dewlaps, and many have the ability to change color. Dewlaps are large flaps of loose skin on the throat (often extending well onto the ventral torso) that can be extended by the hyoid apparatus (bones and soft tissue) in the throat. These amazing features are used for communication, such as territorial displays. Males (except two species) always have dewlaps and females of many species also have dewlaps. These can be extremely showy features, often colored brightly (anoles have excellent color vision) and vividly patterned. The ability to change color is present, to some degree, in most anoles. While some species just get lighter or darker, many others can switch from brown to vibrant green or blue; hence, the use of the term "chameleon" by laypersons. Two other interesting features are the toe pads, which are not unlike geckos', in that they can climb smooth surfaces using van der Waals forces (see September *Year of the Lizard News* issue on geckos). Another feature is that anoles lay a single egg at a time, but the eggs are laid in intervals during the reproductively active period (which is typically longer in tropical areas than temperate).

Anolis woodi, *Wood's Anole, native to Costa Rica and Panama. Photo by Mason Ryan, YoL Photo Contest.*

To me, however, the most interesting features are the ecological attributes of anoles, and this is one place where Losos' book shines. As mentioned earlier, there is a high diversity of anoles in the West Indies. There they exhibit specific ecomorphs (body forms that reflect their adaptations to environmental situations). In the case of anoles in the West Indies (the textbook examples of ecomorphs), there is a body form for various species that live in: grasses and bushes, trunk of trees near the ground, trunk, upper trunk and low crown (canopy), upper crown, and twig. As an example of the different morphologies, the grass-bush ecomorphs are small, long, and slender, with long limbs, while the upper-crown species are much larger and stockier, having short legs. What makes this so fascinating is that different island groups have the same ecomorphs, but the species are completely different, having evolved into their niches and body forms independently.

Green Anole displaying the typical reddish dewlap. Photo by Bill Parker, YoL Photo Contest.

In the United States, we only have one to two native species, the Green Anole (*A. carolinensis*) and possibly the Bark Anole (*A. distichus*). The former is one of the more familiar lizards to people in the Southeast and beyond, since they are the famous "chameleon" circus "pets." They range from eastern Texas to South Carolina, including ten states. Green Anoles can change from green to brown and back again, but they do not always match the background. They are very common in some parts of the Southeast. They usually have a reddish dewlap. The Bark Anole is either native (i.e., arrived in Florida from Hispaniola and/or Bahamas via natural dispersal) or introduced by humans. In the USA, it is found from southern Florida to the Keys.

It is somewhat surprising, given the high diversity in the West Indies, that the near-tropical climate of Florida doesn't have more species…but now it does. Crother (2012. *SSAR Herpetological Circular 39*) recognizes ten

species as non-natives that are now established in Florida. Gibbons et al. (2009, *Lizards and Crocodilians of the Southeast*, University of Georgia Press, 235 p.) have nice accounts of eight of these species. They range from little brown jobs, such as the Brown Anole (*A. sagrei*) to big hurkin' upper-crown species, such as the Knight Anole (*A. equestris*), which can reach a whopping 18 inches! The former is also established in several Southeast states, while the latter is also established in Hawaii.

The cryptically colored Bighead Anole, Anolis capito*, is native to Central America. Photo by Laurie J. Vitt.*

Amphisbaenidae (worm lizards)

The worm lizards (or wormlizards or amphisbaenians) are certainly among the most unusual squamates (belonging to Order Squamata). Traditionally, squamates have been considered to be composed of three groups (suborders) of organisms: snakes, lizards, and worm lizards. Of course, nothing in biology is never as simple as it should be. The relationship of the higher taxonomic levels of Squamata has been the topic of many professional studies. In a nutshell, all are related and where one "draws the line" with regard to taxonomic relationships and nomenclature is an argument for someone other than me. Modern geneticists tend to consider worm lizards monophyletic (common origin) within the "lizards," rather than considering them distinct, in the Suborder Amphisbaenia. Of course, this is itself an oversimplification, but this stuff can drive you crazy (or make you giddy if you like that kind of thing), so for our purposes I will consider Amphisbaenidae a family of lizards. Given this, there would be four or five subfamilies (no standardized names of these groups, by the way) of amphisbaenids, including Amphisbaeninae (New World or tropical worm lizards), Bipedinae (ajolotes or two-legged worm lizards), Rhineurinae (Florida or North American worm lizards), Trogonophinae (Palearctic worm lizards), and sometimes Blaninae (Mediterranean worm lizards). However you classify them, they are weird little critters!

In the western hemisphere, worm lizards are found from North America (Florida, Baja California, and points south) to South America, including the West Indies (Rhineurinae, Amphisbaeninae, and Bipedinae). The other subfamilies are found in the eastern hemisphere in Africa (including the Arabian Peninsula and Madagascar) and the Mediterranean (Spain, Portugal, and Morocco). There are somewhere between 150-200 species in about 25 genera. A good source of general information is the website **www.wormlizard.org**.

Worm lizards are typically small, slender, cylindrical animals that, as you might expect from the name, resemble earthworms. Of course, being reptiles, they also have scales. They have thick skulls of fused bones. Their tails are short and blunt and may resemble a second head, and in some areas they are erroneously called "two-headed snakes." The body has scales that are arranged in parallel rows perpendicular to the axis, with gaps between the rows, forming annuli. All of the worm lizard subfamilies, except one, are legless, a condition that evolved independently from snakes and other legless lizards. Worm lizards are burrowers and rarely found on the surface. Because of this, their eyes are not well developed and may be vestigial. Their thickset skulls aid in burrowing. Worm lizards are fossorial, usually found within loose soils, under leaf litter, or under cover objects, such as logs.

One species, the White Worm Lizard, *Ambisbaenea alba*, is known to have a symbiotic relationship with leaf-cutter ants. It is found within the galleries of the ant nests where it feeds on beetles that feed on the waste.

The pinkish, large-scaled, creature is a worm lizard.

The only species native to the United States is the Florida Wormlizard, *Rhineura floridana*, which is found in Florida and extreme south-central Georgia. It is small and pink. The tail has large scales (as does the head) and can be used to plug entrances of burrows as an antipredator tactic. They are usually found in areas of sandy or loamy soils within hardwood or pine forests. Florida Wormlizards are rarely seen on the surface—they are more often seen when their sandy soils are disturbed. This is only species in the subfamily Rhineurinae, although genetic evidence suggests that northern and southern populations may be distinct species.

The next-closest things to native species are the *ajolotes* of northwestern Mexico. They are also known as two-legged worm lizards because they do indeed have just two legs. The legs are far forward on the body. There are three species, one of which has 5 toes per foot, one has 4, and one has three. The Five-toed Worm Lizard (*Bipes biporus*) is another little pink job found in the Viscaíno Desert and Magdalena Plains of southern Baja California, Mexico. The other two lizards are found to the south on the mainland in the states of Guerrero and Michoacán. These are definitely contenders for strangest lizards, if not strangest animals, on the planet. As might be expected, folklore about such odd animals is rampant. In his treatise on the herpetofauana of Baja California, Grismer (2002, *Amphibians and Reptiles of Baja California*, University of California Press, 398 p.) states that (p. 255), "In my experience, no reptile strikes more fear in the hearts of local inhabitants than this *ajolote*. Almost anyone with knowledge of this animal will tell you that its suppository-shaped head facilitates its penetration into the human anus (other animals are sometimes believed to be attacked as well, but usually it's humans). Its long claws grip the walls of the rectum and serve to anchor it within the intestinal tract. The short limbs are used to locomote deeper into the body."

I should leave it at that, but as an aside, I should mention that worm lizards are the dry ecological counterparts of caecilians. Caecilians are actually worm-like amphibians. They are superficially similar, except, of course, they are slimy and lack scales. I mention this not only for the educational value to herp aficionados, but because I have to wonder if there will be a Year of the Caecilian!

And the winner is...

The Planning Team voted on 9 entries in the Year of the Snake Logo Contest. Ann Hirschfeld's design will become the offical logo for PARC's 2013 - Year of the Snake campaign. Congratulations, Ann! And thanks to all the artists who submitted designs.

Located some Lizards?

Collection of lizard location data (and snake and turtle data, as well) will continue through 2013 and beyond. You can download data forms and find instructions on our Lizard Mapping Project page, at **http://www.parcplace.org/news-a-events/year-of-the-lizard/268.html**

Get a head start!

Submit your Articles for Consideration in *The Year of the Snake News*

We would like to hear about your research projects (local, national), citizen science efforts, school projects, folklore, natural area conservation proposals, snake luminaries (people or animals that have been shining stars in your life), or other topics related to snakes.

Please include these components:

1) Title
2) Author name, affiliation, location
3) Text: ~400 words will fill one page, a nice size to consider. Shorter and longer articles are fine. It is an electronic newsletter, after all!
4) 1-2 photographs or graphics (with captions and photographer recognition) per page: 300+ dpi resolution, jpg or tiff.

Themes of the upcoming newsletters include a state-focused issue, a federal-focused issue, and a pets/invasives/trade issue (but please do not feel limited).

Submit your potential articles or any questions pertaining to contributing via email to parcyearofthesnake@gmail.com.