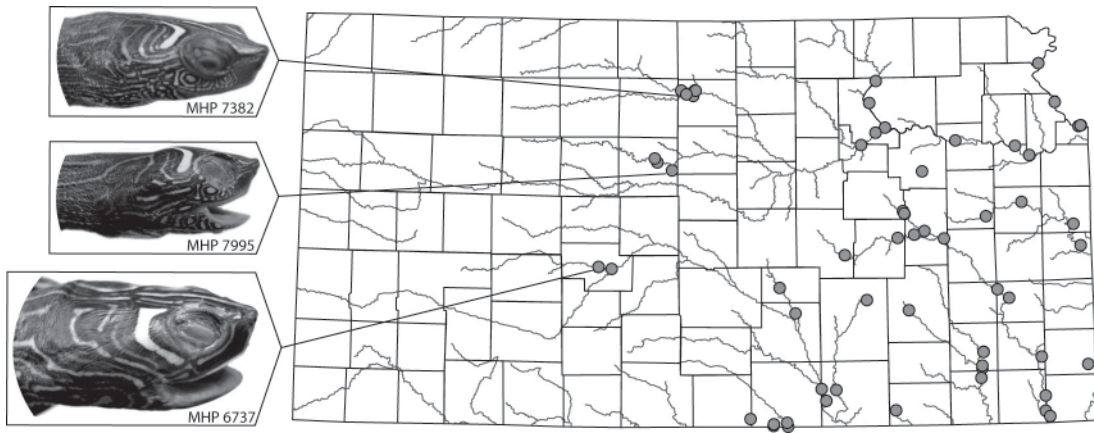


# *JOURNAL OF* KANSAS HERPETOLOGY

NUMBER 12 DECEMBER 2004



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Front Cover: A map of the state of Kansas, showing the exact localities (dark circles) for members of the turtle complex *Graptemys pseudogeographica*. Head patterns of individuals from the three westernmost drainages in which they occur are shown at left of the map. Prepared by Travis W. Taggart, Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas 67601.

# *Journal of Kansas Herpetology*

NUMBER 12 — DECEMBER 2004

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## REPORT ON THE KANSAS HERPETOLOGICAL SOCIETY 31st ANNUAL MEETING

The *Kansas Herpetological Society* held its 31st Annual Meeting at Ackert Hall, Kansas State University, in Manhattan, Kansas, on 6–7 November 2004. Approximately 110 participants (Figure 1) attended scientific paper sessions to listen to 28 talks on amphibians, reptiles, and turtles by scientists and students from across the nation.

During its business meeting, the KHS voted Curtis J. Schmidt (Sternberg Museum of Natural History, Fort Hays State University) as president-elect (Figures 2 & 5), Eric Kessler (Blue Valley North High School) as treasurer, and Mary Kate Baldwin (Topeka Collegiate School) as secretary. David Oldham (Labette Community College) currently is president-elect and takes office as president on 1 January 2005. Eva Horne (Kansas State University) served as president during 2004, and hosted the meeting this year.

During the Society business meeting, Daniel D. Fogell (KHS Awards Committee) announced that Daphne Jones of Emporia State University was this year's recipient of the *Howard K. Gloyd-Edward H. Taylor Scholarship* (Figure 3). The scholarship of \$100.00 honors the memory of two great

herpetologists (and KHS Distinguished Life Members) with strong ties to Kansas. Gloyd was born in Ottawa, Kansas, and attended both Kansas State University and the University of Kansas, and Taylor graduated from Garnett (Kansas) High School and was a faculty member for decades at the University of Kansas. Next, Fogell awarded the *Alan H. Kamb Grant for Research on Kansas Snakes* to Erik Bartholomew, Fort Hays State University (Figure 4). The \$100.00 grant honors the memory of longtime KHS member Al Kamb of Lawrence.

At the start of the Saturday night KHS auction, Dwight R. Platt, Bethel College, North Newton, Kansas (Figure 6), was chosen as the seventh recipient of *The Suzanne L. and Joseph T. Collins Award for Excellence in Kansas Herpetology*. Dwight was selected for this honor by the KHS Awards Committee, which judged his 2003 paper, *Lizards and Snakes (Order Squamata) of Harvey County, Kansas* (published during 2003 in *Journal of Kansas Herpetology* 6) to be the best publication on a Kansas amphibian, turtle, or reptile during the period 2002–2003. For his research of excel-



Figure 1. Participants attending the 31st annual meeting of the Kansas Herpetological Society at Kansas State University, Manhattan, Kansas, on 6–7 November 2004. Photograph by Larry L. Miller.

lence, Dwight Platt was given a commemorative plaque and a check for \$1,000.00 by KHS president Eva A. Horne and Walter E. Meshaka, Jr., board member of *The Center for North American Herpetology*, which co-sponsors the award. *The Collins Award* is the largest biological award given annually in the state of Kansas, and the largest annual presentation made nationally for research (even-numbered years) or photography (odd-numbered years) of amphibians, reptiles, and turtles. Judges for *The Collins Award* during 2002–2003 were William Busby (Kansas Biological Survey, Lawrence), Robert Powell (Avila University, Kansas City, Missouri), and Travis W. Taggart (Sternberg Museum of Natural History, Fort Hays State University, Hays).

Featured speaker at the two-day event was Alicia Mathis (Southwest Missouri State University, Springfield). Alicia spoke about social behavior and conservation of salamanders. Her talk was well received and generated much interest about these amphibians, some of which are found in southeastern Kansas.

Other speakers for the scientific paper sessions on Saturday included (in order of presentation): Daphne Jones, Lynett Bontrager & Lynnette Sievert (Emporia State University, Emporia, Kansas) on transit rate and

gastric digestion in Corn Snakes; Lynett Bontrager, Daphne Jones & Lynnette Sievert (Emporia State University, Emporia, Kansas) on meal size and temperature in Corn Snakes; Ryan L. Rehmeier (Kansas State University, Manhattan) & Raymond S. Matlack (West Texas A&M University, Canyon) on reptiles in an agricultural landscape; Sean Daly (Sam Houston State University, Huntsville, Texas) on erythrocyte osmotic fragilities in Gray Treefrogs; Dustin J. Wilgers & Eva A. Horne (Kansas State University, Manhattan) on communication in *Crotaphytus*; Travis W. Taggart, Curtis J. Schmidt & Richard Hayes (Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas) on a year-one summary of the Kansas Herpetofaunal Survey; Curtis J. Schmidt, Travis W. Taggart & Richard Hayes (Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas) on amphibians and turtles of the Kansas Herpetofaunal Survey; Richard Hayes, Travis W. Taggart & Curtis J. Schmidt (Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas) on the reptiles of the Kansas Herpetofaunal Survey; George R. Pisani & Henry S. Fitch (University of Kansas, Lawrence) on mass and SVL in Kansas Timber Rattlesnakes; Henry S. Fitch (University of Kansas, Lawrence) & Alice F. Echelle (Oklahoma State University, Stillwater) on differences in food habits of Kansas snakes; Erik Bartholomew & William Stark (Fort Hays State University) on effects of burning on snakes; and Bruce Eichhorst & Christie Coleman (University of Nebraska, Kearney) on comparison of species composition and abundance between riparian woodland and clear-cut areas in Nebraska.



Figure 2. Current and newly-elected officers of the Kansas Herpetological Society. Front row (L–R): Travis W. Taggart (editor) and Eric Kessler (treasurer). Middle row (L–R) Curtis J. Schmidt (president-elect for 2005), Suzanne L. Collins (historian) and David Oldham (president for 2005). Back row (L–R): Eva Horne (current president) and Mary Kate Baldwin (secretary). Photograph by Larry L. Miller.



Figure 3. Daphne Jones was the 2004 recipient of the KHS Gloyd-Taylor Scholarship. Here she receives a commemorative certificate and a check for \$100.00 from KHS Awards Committee Chairperson Daniel D. Fogell. Photograph by Larry L. Miller.



Figure 4. At the Society Business Meeting on Saturday, 6 November, Erik Bartholomew received the 2004 Alan H. Kamb Grant for Research on Kansas Snakes for his research while a student at Fort Hays State University. Photograph by Suzanne L. Collins.

Speakers for the scientific paper sessions on Sunday included: Robert Powell (Avila University, Kansas City, Missouri) on reptiles in the Dutch Leeward Islands; Jason T. Moore (Topeka Zoological Park, Topeka, Kansas) on Panamanian Golden Frog conservation at the zoo; James D. Ray (BWXT Pantex), Michelle D. Stachowicz & Richard T. Kazmaier (West Texas A&M University, Canyon) on ecology of Prairie Rattlesnakes; Richard T. Kazmaier & Todd Y. Montandon (West Texas A&M University, Canyon) & Donald C. Ruthven (Texas Parks & Wildlife Department) on radiotelemetry of Western Diamondback Rattlesnakes; Meagan Hall (South Dakota State University, Brookings) on Black Hills Redbelly Snakes; Walter E. Meshaka, Jr. (State Museum of Pennsylvania, Harrisburg) on snake assemblages in western Pennsylvania; Tracy J. Patten, Daniel D. Fogell & James D. Fawcett (University of Nebraska, Omaha) on ecology and demography of the Massasauga; Jeremy S. Lane & Richard T. Kazmaier (West Texas A&M University, Canyon) & Donald C. Ruthven

(Texas Parks & Wildlife Department) on effects of controlled burnings on Texas Horned Lizards; Mark M. Peyton (Central Nebraska Public Power & Irrigation District) & Jim Jennings (Nebraska Public Power District) on wetlands and amphibian colonization in the Platte River valley, Nebraska; Todd Y. Montandon & Richard T. Kazmaier (West Texas A&M University, Canyon) & Donald C. Ruthven (Texas Parks & Wildlife Department) on natural history of Texas Indigo Snakes; Calvin Cink (Baker University, Baldwin City, Kansas) on density and emergence of Smallmouth Salamanders in Baker Wetlands; Jay C. Reed & J. C. Mullican (Washburn University, Topeka) & M. S. Mills (Missouri Valley College, Marshall) on genetic fingerprints of the Brown Water Snake; Chad Whitney (Johnson County Community College, Olathe) on destruction of Timber Rattlesnake dens in Kansas; Bethany Harris (University of Kansas, Lawrence) & Douglas Eifler (Haskell Indian Nations University, Lawrence) on behavior of the Desert Grassland Whiptail; and Michael Morales (Emporia State University) on the origin of turtles.

Abstracts for many of these talks appear elsewhere in this issue of the *Journal of Kansas Herpetology*.

The Saturday evening KHS auction (Figures 7–15) garnered \$1,760.00 for the Society treasury, spurred in part by the extraordinary offering of original artwork by Eva Horne and Ted Leonard, excellent donations of herpetological publications by Suzanne L. Collins (CNAH) and herpetological color photographs by Larry L. Miller



Figure 5. Keith Coleman (left, Johnson County Community College) and Curtis J. Schmidt (Sternberg Museum of Natural History, Fort Hays State University) were both nominated for the position of KHS president-elect. Curtis won, but Keith has the big smile—he doesn't have to conduct the entire annual meeting in 2006. Photograph by Suzanne L. Collins.

(Kansas Heritage Photography), and also by the hard work of auction assistants Ginny Weatherman, Laura Acuff, and Grace Ann Johnson, who so ably assisted KHS auctioneer Joe Collins.

Meeting Chairperson and KHS President Eva Horne deserves the thanks and appreciation of the entire KHS membership for putting together a great meeting. Eva was aided in her task by a local committee consisting of Dustin Wilgers, Ryan Rehmeier, Karl Kosciuch, and Jackie Nooker. To them all we owe our enthusiastic cheers. And, of course, we must recognize the stalwart and sterling efforts of Mary Kate Baldwin (KHS Secretary) and Eric Kessler (KHS Treasurer); both kept us financially frugal and fulfilled through their fiscal work (Figure 7). Finally, our thanks to all the meeting participants—attendance was bolstered at the meeting when folks from Avila University, Baker University, Bethel College, Blue Valley North High School, Haskell Indian Nations University, Johnson County Community College, Emporia State University, Fort Hays State University, Kansas Department of Wildlife & Parks, Kansas State University, Labette Community College, Missouri

Valley College, Northern Hills Junior High School, Oklahoma State University, Pittsburg State University, Sam Houston State University, South Dakota State University, Southwest Missouri State University, State Museum of Pennsylvania, Topeka Collegiate School, Topeka Zoo, University of Kansas, University of Nebraska at Kearney, University of Nebraska at Omaha, Washburn University, West Texas A&M University, Texas Department of Wildlife & Parks, and ZooBooks were in attendance. Hopefully, these and other such entities in Kansas and neighboring states will continue to make such a showing at future meetings.

In 2005, the Society will meet in Pittsburg (talks and coffee, free beer and auction) under the auspices of David Oldham, who will serve as KHS President during that year. For more precise information on the 32nd Annual Meeting of the KHS in November 2005, bookmark and regularly check the KHS meeting web site (updated constantly as new information becomes available) at

<http://www.ku.edu/~khs/AnnualMeetingInfo.html>



Figure 6. Dwight R. Platt (L) was the seventh recipient of *The Suzanne L. & Joseph T. Collins Award for Excellence in Kansas Herpetology* for his published research, judged the best of 2002–2003 at the 31st annual meeting of the Kansas Herpetological Society at Kansas State University, Manhattan, Kansas, on 6 November 2004. Here, Dwight accepts his commemorative plaque and a check for \$1000.00 from KHS President Eva A. Horne and Walter E. Meshaka, Jr., a member of the CNAH Board of Directors, which co-sponsors the award. Photograph by Suzanne L. Collins.



Figure 7. Without the efforts of KHS Secretary Mary Kate Baldwin and KHS Treasurer Eric Kessler, the Society would not operate as smoothly as it does today. Here, they greet the first arrivals at the KHS 31st annual meeting. Photograph by Suzanne L. Collins.



Figure 8. KHS President-elect David Oldham explains his plans for the Society's 32nd Annual Meeting at Pittsburg State University in November 2005. Photograph by Larry L. Miller.

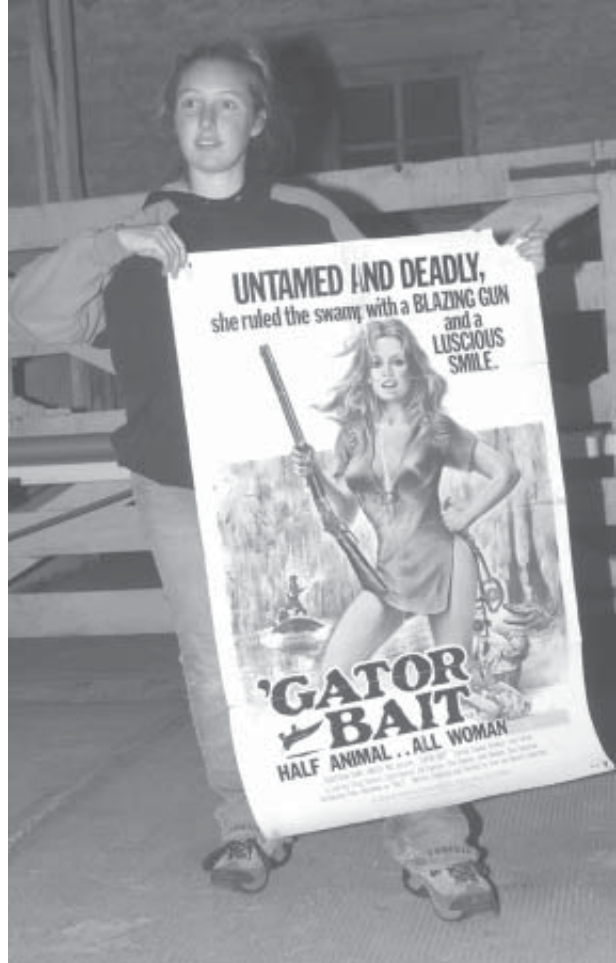


Figure 9. KU student Ginny "Gator Bait" Weatherman skillfully drained much money from the auction crowd with her poise and this pose. Photograph by Larry L. Miller.

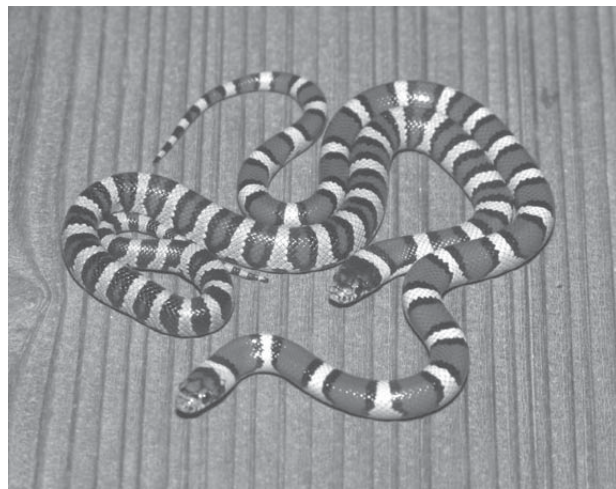


Figure 10. The weather was so warm during the meeting that some participants snuck away into rural Geary County, Kansas, and caught these young Milk Snakes. Photograph by Larry L. Miller.





Figure 11. Tag Oldham and Robin Oldham couldn't resist an opportunity to fondle the Milk Snake. As usual, the KHS live exhibit was a popular venue for meeting participants. Photograph by Larry L. Miller.



Figure 12. During a break in the paper sessions, Chad Whitney has a moment of indecision. Should he go back to the talks? Or go herping for Milk Snakes? Photograph by Suzanne L. Collins.



Figure 13. During a break, Brandon and Judy Low check out the *Arkansas Snake Guide* that was gratis to the first 100 registrants. Photograph by Suzanne L. Collins.



Figure 14. Walter Meshaka (L) and KHS Distinguished Life Member Henry Fitch swap snake stories about who caught the longest and the most. Photograph by Suzanne L. Collins.



Figure 15. KHS members Dan Murrow (L) and Derek Schmidt handled the large Western Rat Snake at the KHS live exhibit. Photograph by Larry L. Miller.

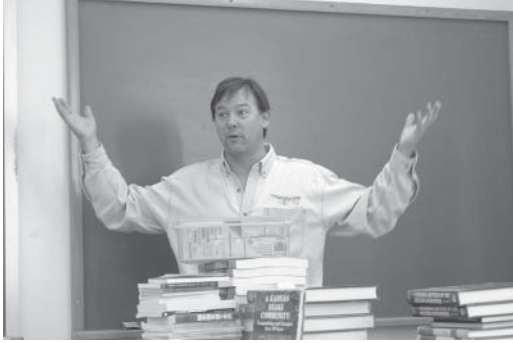


Figure 16. Eric Thiss of ZooBooks was enthusiastic about the future of books; his company donated many fine tomes to the KHS auction. Photograph by Suzanne L. Collins.

#### KHS 2005 SPRING FIELD TRIP

The KHS 2005 spring field trip will be to Shawnee County State Lake. For information as it is posted, be sure to check the KHS web site regularly at:

<http://www.ku.edu/~khs/FieldTripSpringInfo.html>

For immediate information, contact:

Mark Ellis or Larry L. Miller  
*KHS Field Trip Chairpersons*  
 (see inside front cover of this issue)



Figure 17. KHS members Joe Collins (L) and Larry Miller discussed possible sites for future KHS field trips. Photograph by Suzanne L. Collins.

#### PAY YOUR 2005 DUES

If you have not already done so, send your calendar 2005 dues (\$15.00 regular, \$20.00 contributing) to:

Mary Kate Baldwin  
*KHS Secretary*  
 5438 SW 12th Terrace Apt. 4  
 Topeka, Kansas 66604

Your attention to this matter will ensure that delivery of the *Journal of Kansas Herpetology* will be uninterrupted.



Figure 18. KHS member Ken Brunson explained Kansas Department of Wildlife & Parks initiatives to the KHS gathering. Photograph by Larry L. Miller.

#### *Donors*

Few tributes are so lasting or honor individuals so well as donations. The *Kansas Herpetological Society* is privileged to carry on the aims and goals of the Society through its awards, grants, and scholarships. This list recognizes donations received through 1 November 2004.

#### *The Alan H. Kamb Grant for Research on Kansas Snakes*

Mary Kate Baldwin  
 Calvin L. Cink  
 Suzanne L. & Joseph T. Collins  
 Gus B. Huey  
 Lisa K. & Kelly J. Irwin  
 George W. Roycroft, Jr.

#### *The Howard K. Gloyd-Edward H. Taylor Scholarship*

Mary Kate Baldwin  
 Gus B. Huey  
 Walter E. Meshaka, Jr.  
 George W. Roycroft, Jr.

ABSTRACTS OF PAPERS PRESENTED AT THE 31ST ANNUAL MEETING OF THE  
KANSAS HERPETOLOGICAL SOCIETY, 6–7 NOVEMBER 2004,  
ACKERT HALL, KANSAS STATE UNIVERSITY

Effects of Prescribed Burning on Snakes at Quivira National Wildlife Refuge\*\*

Erik M. Bartholomew and Bill J. Stark

Fort Hays State University, Hays, Kansas

Contemporary investigations have reported both benefits and negative effects of prescribed burning on snake abundances. We wanted to investigate these themes within the management framework at Quivira National Wildlife Refuge (QNWR). Currently, QNWR personnel plan to establish a three-year burning cycle on approximately 22,000 acres of public land by burning patches equivalent to one-third of the refuge each year. In order to evaluate the management strategy on resident snake populations we developed a replicated experiment to evaluate snake abundances on sites that were burned in 1) the current year, 2) three years ago, and 3) 10–12 years ago. We found that total snake captures were lower in zero-year burns and that three-year and long-term treatments did not differ significantly. Accordingly, a burning cycle at three-year intervals might be very reasonable to maintain snake populations. In addition, species composition and species diversity did not differ significantly among treatments indicating no effect of the burning cycle on these community parameters. Data analysis of changes in vegetation structure as a correlate to snake relative abundance will be discussed.

Influence of Meal Size on Temperature Selection in Corn Snakes

Lynett Bontrager, Daphne Jones, and Lynnette Sievert  
Emporia State University, Emporia, Kansas

In post-feeding thermophily, snakes presumably select temperatures based on maximizing digestive functions. We were interested in determining if meal size influences thermophily. To test this, individual snakes (*Pantherophis guttatus*) were placed into a linear thermal gradient with floor temperatures ranging from 10°C. After a 24 hour habituation period, substrate temperatures were taken underneath the snake 1/3 of the way down the length of the snake, at three-hour intervals from 0900 to 1800 hours. Each snake was tested three times, once in a fasted state, once after ingesting a 5% body mass meal and once after ingesting a meal equal to 10% of its body mass. The size of the meal had a significant effect ( $P = 0.035$ ) on selected substrate temperatures.

Population Densities and Patterns of Emergence of *Ambystoma texanum* at the Baker Wetlands\*\*

Calvin L. Cink

Baker University, Baldwin City, Kansas

Although the Baker Wetlands floodplain in Douglas County, Kansas has been perceived as a place where *Ambystoma texanum* migrate to breed in early spring, captures of adults throughout most of the year suggest a permanent population. Preliminary estimates based on digging for 300 m of drift fence suggested a density of 16 salamanders/100 m<sup>2</sup>. To confirm this density, three randomly placed 100 m<sup>2</sup> enclosures were constructed during early winter for five consecutive years and monitored for salamanders. Mean density was 6 /100 m<sup>2</sup> (SE = 1.91, range 2–12); much lower than the previous estimate. The peak of abundance (monitored by traps on the drift fence) coincided with the spring mating season in March or April. However, evidence of emergence for a significant portion of the population occurred for nearly any month in which rainfall exceeded 2.5 cm for a two day period.

Herpetofaunal Species Composition and Relative Abundance between Riparian Woodland and Clear-cut Areas at Jeffrey Island Habitat Area, Dawson County, Nebraska

Bruce Eichhorst and Christie Coleman

University of Nebraska, Kearney

The Central Nebraska Public Power and Irrigation District (Central) is managing the Jeffrey Island Habitat Area in Dawson County, Nebraska for wildlife. This 1,700 ha parcel is located on the Platte River between Lexington and Overton. The primary goal of Central's activities is to create and manage habitat for several migratory bird species that are of conservation concern. In 2001 and 2002, Central clear-cut 97.5 ha of riparian woodland and constructed 4,155 linear meters of wetlands. From 17 May to 30 July 2004 we collected baseline data to assess possible effects of woodland deforestation on herpetofauna. A drift fence system with pitfall buckets and funnel traps was placed at each of two wooded sites and two clear-cut sites. A total of 2,772 trap-nights of effort resulted in the capture of 80 amphibians and 158 reptiles at the wooded sites, and 122 amphibians and 75 reptiles at the cleared sites. Amphibians included *Bufo woodhousii*, *Spea bombifrons*, *Rana blairi*, *Rana pipiens*, and *Ambystoma mavortium*. There was a

significant difference in the total number of leopard frogs captured at the cleared sites ( $n = 73$ ) versus the wooded sites ( $n = 49$ ,  $P < 0.05$ ). Reptiles included *Cnemidophorus sexlineatus*, *Thamnophis sirtalis*, *Pituophis catenifer*, and *Coluber constrictor*. There was a significant difference in the number of racerunners captured at the cleared sites ( $n = 70$ ) versus the wooded sites ( $n = 153$ ,  $P < 0.0001$ ). Funnel traps were more effective at capturing racerunners (average of 22.2 captures/100 trap-nights) than the pitfall buckets (2.37 captures/100 trap-nights). Herpetofaunal species diversity was higher at the cleared sites than at the wooded sites.

#### Sexual and Ontogenetic Differences in Food Habits of Some Snakes on the Fitch Natural History Reservation in Northeastern Kansas\*\*

Henry S. Fitch

*University of Kansas, Lawrence*

Alice F. Echelle

*Oklahoma State University, Stillwater*

In a food habits study, 1028 items from eight species of snakes were recorded on the Fitch Natural History Reservation in northeastern Kansas. Size is critical in deciding what will be eaten by a snake. In four of the species (Copperhead, Prairie Kingsnake, Eastern Rat Snake, and Timber Rattlesnake), males were larger than females by 7% to 13%. In the other four species (Ringneck Snake, Eastern Racer, Brown Snake, and Common Garter Snake), females are larger by 9% to 23.5%. Hatchlings of all species average from 23.5 to 42.5% of adult length. The Ringneck Snake is almost exclusively an earthworm feeder. In the Eastern Rat Snake, food differs between males, females, and immatures mainly in the proportion of each kind. In Eastern Racers, change from an 80% orthopteran insect diet in hatchling snakes to 69% small mammal diet in large adults occurs. The Copperhead's food preference is mostly voles and shrews in adult males compared to shrews and reptiles in smaller individuals and young. The Timber Rattlesnake shows the most distinct separation: relatively bulky items (rabbits, squirrels, and rodents) in adult male snakes, compared to rats and voles in adult females, and voles, mice, and shrews in immature serpents.

#### Preliminary data on the Black Hills Redbelly Snake (*Storeria occipitomaculata pahasapae*)

Meagan A. Hall

*South Dakota State University, Brookings*

The subspecies *Storeria occipitomaculata pahasapae* is the only endemic reptile to the Black

Hills of South Dakota. The ecology of the Black Hills Redbelly Snake was studied during the summer of 2004. Sampling sites consisted of mesic habitats, based on prior location data. Black Hills Redbelly Snakes were captured using hand collection. After capturing snakes, snout-vent length, total length, sex, and age (adult or juvenile) was recorded. GPS readings taken at each capture or sighting provide general habitat associations. Tail clippings and shed skins of 49 snakes were collected for DNA analysis. Released snakes were marked by a ventral scale clip. Vouchers were collected to examine stomach contents, to analyze taxonomic features, and to record species occurrence at a particular location. Feeding trials of forty snakes were used to determine food preferences. In the summer of 2005, to determine abundance of food relative to food selection, land invertebrates (e.g., snails, slugs, and earthworms) will be collected using hand collecting and soil sieving techniques. The information gathered will be used by biologists to better manage the population of Redbelly Snakes in South Dakota.

#### Effects of Predation Risk on the Behavior of the Desert Grassland Whiptail (*Aspidoscelis uniparens*)

Bethany Harris

*University of Kansas, Lawrence*  
Doug Eifler

*Haskell Indian Nations University, Lawrence*

We examined the influence of predator presence on the habitat use, activity patterns, and foraging behavior of the Desert Grassland Whiptail. Large outdoor enclosures were used to compare the behavior of Whiptails in the presence and absence of Longnose Leopard Lizards (*Gambelia wislizenii*). In the presence of predators, Whiptails 1) spent more time in vegetation, 2) shortened their activity periods and exhibited a tendency for activity to peak earlier in the morning, and 3) exhibited decreased foraging search rate and efficiency.

#### A Kansas Herpetofaunal Survey: The Reptiles

Richard Hayes, Travis W. Taggart and Curtis J. Schmidt  
*Fort Hays State University, Hays, Kansas*

We collected thirteen species of lizards from 305 localities in the state, representing 135 voucher specimens and an additional 376 observations. Thirty-six species of snakes were observed from 1,015 localities, representing 612 voucher specimens and 1,301 additional observations. Notable observations will be discussed.

Transit Rate versus Gastric Digestion in Corn Snakes  
(*Pantherophis guttatus*)

Daphne Jones, Lynett Bontrager, and Lynnette Sievert  
*Emporia State University*

In the first experiment, we were interested in the transit rate of a frequent-feeding snake, *Pantherophis guttatus*, at different temperatures. We recorded the time from ingestion to defecation at two different temperatures in twelve juvenile Corn Snakes (mean mass 0.89 g). The snakes were fed a meal of 5% of their body mass every other day. Temperature had a significant effect ( $P = 0.005$ ) on transit rate. At 22°C the snakes were unable to consistently eat and often regurgitated their meal while at 32°C they were able to consume the meal and had a faster transit rate. During the study, ecdysis became an important factor in the snakes willingness to defecate, lengthening transit rate up to three times the rate at 22°C ( $P = 0.017$ ). We next fed a meal containing a magnetic stir bar to each snake and monitored the position of the stir bar within the snake's body with a compass. This enabled us to record how much time the meal spent in each area of the digestive tract. We monitored six snakes at 25°C and at 31°C. The meal left the stomach and entered the intestine significantly faster at 31°C ( $P = 0.002$ ).

Snake Assemblages of Allegheny Grasslands in  
Western Pennsylvania

Walter E. Meshaka, Jr.

*State Museum of Pennsylvania, Harrisburg*

Using corrugated tin cover to attract snakes, seven snake species were individually marked during 2002–2004 from three grassland habitats in the Alleghenies of western Pennsylvania. In all sites combined, the Eastern Garter Snake (*Thamnophis sirtalis sirtalis*) was the most abundant species having comprised 68.9% of all captures. Likewise, each of the three sites was unevenly dominated by the eastern garter snake with two, four, or five other species present. In only one site was the second most abundant species, the Northern Ringneck Snake (*Diadophis punctatus edwardsii*), slightly more than one-half as abundant as the Garter Snake. In all other sites, the six other species were marginal in presence. These data form the basis to ask the next question—Why are these assemblages structured this way?

Current Ideas on the Origin of Turtles, and their  
Implications for the Classification of Turtles with other  
Tetrapods

Michael Morales

*Emporia State University, Emporia, Kansas*

Several different ideas concerning the origin of

turtles and their phylogenetic relationship to other tetrapods have been developed or elaborated during the past 15 years. The earliest turtles lived near the end of the Triassic Period (208–200 million). One view of their ancestry is that turtles, which have anapsid skulls without temporal openings, are descendants of early anapsid reptiles that lived during the Permian Period (299–251 million years). Recently, Gauthier et al. and later Gaffney concluded that turtles came from captorhinid anapsids, but Ivakhnenko and later Laurin & Reisz had turtles stemming from procolophonid anapsids, and Lee decided that pareiasaurian anapsids were turtle ancestors. Kordivoka recently concluded that turtles arose from pareiasaurians by the process of paedomorphosis, in which adults of the descendant group resemble the juvenile stages of the ancestral group. In striking contrast, DeBraga & Rieppel allied turtles with early diapsid reptiles, specifically sauropterygians (e.g., nothosaurs, placodonts, plesiosaurs), and stated that the whole assemblage was within the lepidosauromorph branch (including lizards and snakes) of the diapsids. Merck subsequently indicated that sauropterygians are more closely related to the archosauromorph branch (including crocodylians and dinosaurs) of diapsids. Several recent molecular analyses all concluded that turtles are diapsids, with most of the molecular data pointing to a closer relationship of turtles with archosauromorphs rather than with lepidosauromorphs. If true, turtles must have secondarily closed their original diapsid temporal openings early in their history, i.e., before the earliest known fossil forms. Whether turtles came from anapsids (captorhinids or procolophonids or pareiasaurians) or from early diapsids (sauropterygians or early archosauromorphs or early lepidosauromorphs), they are still members of the Reptilia in the modern cladistic sense, i.e., the reptilian branch (anapsids + diapsids) of the Amniota, which is the sister group to the synapsid branch (pelycosaur + therapsids + mammals), both branches having stemmed from basal amniote stock. An additional controversy about turtles is the nature of their original environment and habits. Rieppel & Reisz have proposed that from their beginning turtles have been aquatic, based on their presumed close relationship to sauropterygians, all of which are amphibious or aquatic. However, just this year Joyce & Gauthier argued convincingly that, based on morphological and environmental indications of terrestriality and aquaticity in modern turtles and on comparisons with the earliest fossil forms, turtles were originally terrestrial and became aquatic secondarily.

Preliminary Observations of the Ecology and Demography of the Massasauga (*Sistrurus catenatus*) in Southeast Nebraska

Tracy J. Patten

University of Nebraska, Omaha

The Massasauga, *Sistrurus catenatus*, is classified as a threatened species in Nebraska. It survives in only a few severely fragmented populations where mesic to hydric tallgrass prairie communities still remain relatively unaltered. In March 2004, an ecological study was launched to investigate the conservation needs of the Massasauga in Nebraska. Mark-recapture techniques were employed to estimate population size, define population structure, and monitor seasonal growth. Additionally, seasonal activity, spatial ecology, and habitat use were investigated using radiotelemetry at two state-controlled wildlife management areas. As of October 2004, eleven Massasaugas were still being radiotracked and spatial data have not yet been analyzed; however, sufficient demographic data have been collected to present a preliminary description of the population structure. Mean SVL for all snakes except neonates and young-of-year was 528.0 mm  $\pm$  15.4 SE ( $n = 47$ ). There was no significant difference in SVL between males and females. The sex ratio was 1.6:1 ( $n = 47$ ), which is slightly in favor of males; however, the sex ratio for all snakes with either a single rattle segment or a button was 0.94:1 ( $n = 31$ ) and is much closer to unity. Massasaugas use crayfish burrows for hibernation in Nebraska, and emergence was observed as early as 25 March. Reproductive behavior was observed immediately post-emergence during early spring as well as during mid-summer and early fall. Gravid females experience parturition in August, and the mean litter size observed was 7.6 ( $n = 3$ ). Mean SVL for neonate and young-of-year Massasaugas (single rattle segment or button only) was 232.2  $\pm$  6.0 SE ( $n = 31$ ). Results presented here are preliminary. Data acquisition is still ongoing and will continue throughout the 2005 season.

Constructed Wetlands and Amphibian Colonization in the Central Platte River Valley, Nebraska: Design and Costs

Mark M. Peyton

Central Nebraska Public Power and Irrigation District  
Jim Jennings

Nebraska Public Power District

The Central Nebraska Public Power and Irrigation District along with the Nebraska Public Power District, as mitigation for their five hydroelectric power plants, have purchased two properties located along the Platte River in Nebraska. These two properties,

totaling over 3,000-hectars, are to be developed so as to improve migratory habitat for whooping cranes, sandhill cranes, ducks and geese. In the past three years, as a part of that development, the Districts have developed over ten kilometers of linear sloughs, several potholes, and a large 15-hectare pond/wetland. To date there has been extensive ducks, geese, and shorebird activity on these wetlands with a fair amount of sandhill crane use and one probable sighting of a whooping crane. In addition, amphibians have colonized the shallow, fishless waters in amazing numbers. Nighttime calling and daytime search surveys as well as drift fences and pitfall traps have identified eight amphibian species in and near the wetlands with five documented as reproducing. Most numerous in the survey to date are Plains Leopard Frogs (*Rana blairi*). Also common are Western Chorus Frogs (*Pseudacris triseriata*), Bullfrogs (*Rana catesbeiana*), Woodhouse's Toads (*Bufo woodhousii*) and Plains Spadefoots (*Spea bombifrons*). Identified at the areas, but not yet documented as reproducing in the reconstructed wetlands were Northern Leopard Frogs (*Rana pipiens*), Cope's Gray Treefrogs (*Hyla chrysoscelis*), and Barred Tiger Salamanders (*Ambystoma mavortium*). An additional seven kilometers of linear slough development is planned for the two properties and annual monitoring of amphibian populations will continue. A review of the construction and cost for the development of the wetlands will be given.

The Development and Examination of *Nerodia taxispilota* Genetic Fingerprints via RAPD Analysis

J. C. Reed and J. C. Mullican

Washburn University, Topeka, Kansas

M. S. Mills

Missouri Valley College, Marshall

In an effort to better understand the biology the Brown Water Snake, *Nerodia taxispilota*, 129 blood and 147 tissue samples were collected from wild and captive-born snakes for molecular analysis. Gravid females were captured in or near the Savannah River Ecology Laboratory in Aiken, South Carolina and taken to the laboratory to give birth. Samples were collected from the mother and all living offspring. Genomic DNA from these samples was extracted, purified and analyzed for quality and relative quantity by agarose gel electrophoresis. Several DNA samples from known clutches were then subjected to random amplified polymorphic DNA (RAPD) PCR using short 10-base random oligonucleotides to produce genetic profiles. Here the development of this procedure is outlined and the initial characterization of samples using several oligo sets is presented. RAPD PCR will be performed using up to forty different oligos, used

either individually or in combination with others, until we produce genetic profiles that are easy to assign genotype. These genetic profiles will be useful in a variety of studies. Profiles from the mothers and their offspring will permit the inference of a paternal genetic profile and could be used to determine if multiple paternity occurs in this species. Furthermore, profiles of individuals known to be related will be compared to the profiles of unrelated individuals to identify kin-specific markers unique to each clutch. Furthermore, these profiles could be used to determine the relationship between populations of *N. taxispilota* and estimate genetic drift and migration. In addition, the procedures developed in this study would not be limited to snakes but could be applied to many other organisms as well.

Reptiles in an agricultural landscape: Use of GIS and road-survey data\*\*

Ryan L. Rehmeier

*Kansas State University, Manhattan*

Raymond S. Matlack

*West Texas A&M University, Canyon*

Much of the land suitable for cultivation in the Midwest has been converted to row-crop agriculture. However, little is known about the use of agricultural land by reptiles. We examined use of an agricultural landscape by reptiles by investigating the relationship between locations of reptiles, derived from road surveys, and habitat surrounding a road by using geographic information systems (GIS). The landscape included agriculture (44%), riparian and other woodlands (42%), developed lands (10%), river course (3%) and tallgrass prairie (1%). Intensive surveys were conducted along a 10-km stretch of road through this agricultural mosaic from May 2000 to June 2001. We observed 67 individuals of sixteen species of reptiles during 2370 km of road surveying. We found a negative relationship between species richness and the proportion of cropland within 25 m of the road ( $R^2 = 0.61$ ,  $P < 0.05$ ). Richness and total abundance was positively related to the proportion of woodland within 25 m of the road (richness:  $R^2 = 0.71$ ,  $P < 0.01$ ; abundance:  $R^2 = 0.80$ ,  $P < 0.01$ ). Riparian and other woodlands are important habitats for reptiles in this agricultural landscape. Additionally, these habitats likely serve as travel corridors between hibernation sites and summer habitats.

A Kansas Herpetofaunal Survey: Amphibians and Turtles

Curtis J. Schmidt, Travis W. Taggart and Richard Hayes  
*Fort Hays State University, Hays, Kansas*

We collected seven species of salamanders from 31 localities, representing 33 voucher specimens and

41 additional vouchers. Twenty-one species of frogs were observed from 637 localities, representing 431 voucher specimens and 1,124 additional observations. Eleven species of turtles were found from 478 localities throughout the state, representing 117 voucher specimens and an additional 619 observations. Notable observations will be discussed.

A Kansas Herpetofaunal Survey: Year One

Travis W. Taggart, Curtis J. Schmidt and Richard Hayes  
*Fort Hays State University, Hays, Kansas*

Over the past fifteen years, scientists have become increasingly alarmed over the disappearance of amphibians, reptiles, and turtles from regions in their range where they were formally abundant. And although there has been little evidence presented to suggest that Kansas' herps are declining, the need exists to collect additional information and evaluate current populations. In late 2003, we were awarded a state wildlife grant to do just that. Specifically, we wanted to acquire baseline data on these species so that future evaluations concerning their well-being in the state could be more suitably addressed. We have visited and made observations, at 2,233 localities in Kansas. At those sites we documented 3,461 occurrences of 88 species in the past year. Tissues were taken from 824 different sites, of 1,328 specimens representing 86 species. Results are available online at <http://www.smoky-hills.com/kansas>.

Destruction of Timber Rattlesnake Dens in Northeastern Kansas

Chad Whitney

*Johnson County Community College, Olathe, Kansas*

Over the past few years, northeastern Kansas has seen much growth in human population and consequent encroachment on Timber Rattlesnake habitat. Some of the areas impacted are den sites of Timber Rattlesnakes, considered by the Kansas Department of Wildlife and Parks as a Species In Need of Conservation. A brief overview and description of this destruction and is given, including photographs of impacted dens.

Chemical Communication in Eastern Collared Lizards\*\*

Dustin Wilgers and Eva Horne

*Kansas State University, Manhattan*

*Crotaphytus collaris* is a territorial iguanid lizard living in open rocky habitats. Many lizards rely on a few different types of communication, such as visual, tactile, possibly auditory and chemical communication. Rocky habitats are an ideal place for the devel-

opment of chemical communication. For this study, we hypothesized Eastern Collared Lizards place faecal pellets on open rock faces as a form of chemical communication. We noosed 26 lizards (13 males, 13 females) at two different sites (Tuttle Creek Dam and Konza Prairie Biological Station). Individuals were subjected to five different treatments of chemical stimuli: water control, pungency control (cologne), another female faecal pellet, another male faecal pellet, and their own faecal pellet. Differences in number of tongue-flicks, delay to first tongue-flick, as well as a new behavior observed, number of swallows and delay to first swallow were observed. The swallow behavior was observed when the nose of the lizard was directed toward the chemical stimuli; the lizard fills the throat region with air, and swallows the air. The delay to first swallow behavior (mean = 66.2 sec) was significantly lower than the delay to first tongue-flick (mean = 223.3 sec)( $p < 0.0001$ ). Eastern Collared Lizards were able to differentiate chemical stimuli from water through tongue-flicking ( $\chi^2 = 12.69$ ,  $p = 0.019$ ). When separating the sexes, males ( $\chi^2 = 10.32$ ,  $p = 0.035$ ) were able to differentiate between the chemical stimuli through tongue-flicking, while females ( $\chi^2 = 4.63$ ,  $p = 0.328$ ) were not. When combining both sexes, the overall Friedman's test was unable to detect a significant difference in response to different chemical stimuli through swallows ( $\chi^2 = 7.56$ ,  $p = 0.109$ ). However, when separating the sexes, females were only marginally non-significant ( $\chi^2 = 9.22$ ,  $p = 0.056$ ). This signifies a possible dichotomy of how the different sexes of Eastern Collared Lizards detect and differentiate chemical stimuli. Pairwise comparisons indicated male lizards may be able to differentiate between faecal pellets ( $p = 0.0938$ ), however, more work will need to be done to obtain significance. The possibility of male's ability to differentiate between faecal pellets is very interesting and brings up future work to determine whether it is a territorial or reproductive behavior.

KHS EXECUTIVE COUNCIL MINUTES  
2 October 2004 (noon to 1:00 pm)  
Stockton, Kansas

Officers attending: Eva Horne (presiding), Mary Kate Baldwin, Eric Kessler, David Oldham, and Travis W. Taggart. Committee Chairperson attending: Joseph T. Collins (Nominating). Others: Suzanne L. Collins (interim Recording Secretary)

Annual Meeting

Discussion of the details for the annual meeting to be held in Manhattan. KHS President Eva Horne will

pre-pay Konza Prairie \$125.00 for rental of the barn. Konza Prairie will deliver and set up 100 chairs. She will submit receipts to KHS Treasurer for reimbursement. Joe Collins will download the KHS meeting program from the web site and send it to David Oldham and Eva Horne for final preparation of the programs to be distributed at the meeting. KHS annual meeting program information will remain available on the KHS web site. Joe Collins will prepare commemorative certificates for the recipients of the Gloyd-Taylor Scholarship and Kamb Grant. Tables will be set up for Mary Kate Baldwin and Eric Kessler in Ackert Hall, where the talks are to be given, and also at the Konza Prairie barn for the auction.

New Business

With the support of the KHS Executive Council, President Eva Horne appointed Mark Ellis and Larry Miller as co-chairpersons of KHS field trips. They will select sites for the two annual KHS field trips and provide the Society editors with information to be published in the *Journal of Kansas Herpetology* and on the KHS web site. Eva will charge the new co-chairpersons and send Jay Kirk a letter thanking him for his past service.

Old Business

It was moved (Oldham) and seconded (Baldwin) to appoint Suzanne L. Collins as the KHS Historian. The motion passed unanimously. Suzanne will work with the KU Archivist to preserve the history of KHS from its inception, including copies of past *Newsletters* and *Journals* as well as photographs, news articles, etc. Eva will send a letter to John E. Simmons thanking him for his past service to the Society and asking that he forward any KHS materials he currently holds to Suzanne.

There was discussion of preparing a list of KHS members willing to give talks to groups. A separate link from the KHS web site could be developed that would list them so groups could contact possible speakers directly. Robin Oldham was suggested as a possible coordinator for this project.

Meeting was adjourned at 1:15 pm.



## RESULTS OF THE KHS 2004 FALL FIELD TRIP

In early October 2004, KHS members traveled to Rooks County, Kansas, to search for amphibians, reptiles, and turtles found in the northcentral portion of the state as part of the annual Society Fall Field Trip. Many participants gathered at Webster Reservoir on Friday night, and at 9:00 am on Saturday morning, over 70 individuals were present for the first herpetofaunal count.

Led by Mark Ellis and Larry L. Miller, the group spent the morning chasing amphibians, turtles, and reptiles around the state lake; during the afternoon, the assembled participants spread out through much of the rest of the county. The group had a great weekend, collecting and observing numerous herpetological species throughout the county (Figures 1–4; page 16). The complete count for 2–3 October 2004 is listed below.

Participants were: Ted Abel, Cathy Acuff, Laura Acuff, Rob Acuff, Robin Bailey, Mary Kate Baldwin, Dan Carpenter, Joseph T. Collins, Suzanne L. Collins, Jeremy Conyac, Matthew Conyac, Karen DeDonder, Guntram Deichsel, Andy Durbin, Chris Eberle, Kathy Ellis, Mark Ellis, Bobby Eggers, Tanna Eggers, Mariah Florence, Wes Garrison, James Gubanyi, Julian Gubanyi, Marla Gubanyi, Cheryl Hall, Jenny Hall, Lacey Hamblet, Lindsey Hamblet, Brenda Hanna, Michael Hogan, David Humenczuh, Jennifer Johnson, Eric Kessler, Maura Kessler, Rebecca Kessler, Brandon Low, Judy Low, Loreen McMillan, Ross McNeary, Dustin McPhail, Chris Messier, Allan Miller, Larry Miller, Matt Miller, Suzanne Miller, Dan Murrow, David Oldham, Jackson Oldham, Robin Oldham, Tag Oldham, Erica Peterson, Matt Renk, Michael Rochford, Derek Schmidt, Zach Simson, Steven Skare, Linda Spaulding, Nelson Spaulding, Gaylan Stanley, Travis W. Taggart, Ginny Weatherman, Eric Wenzl, Jessica Wenzl, Karen Wenzl, Kristina Wenzl, Rich Wenzl, Roy Wenzl, Chad Whitney, Garrett Wilkinson, Victor Wilkinson & Bobby Willingham.

The count was as follows:

<u>2 October 2004 at Webster Lake &amp; vicinity</u> (9:00 am to 5:00 pm)	<u>3 October 2004 at Conyac Ranch S of Stockton</u> (9:00 am to noon)
Woodhouse's Toad ..... 1	Barred Tiger Salamander ..... 1
Plains Leopard Frog ..... ±30	Woodhouse's Toad ..... 3
	Great Plains Narrowmouth Toad ..... 1
Common Snapping Turtle ..... 1	
Northern Painted Turtle ..... 2	Yellow Mud Turtle ..... 1
Ornate Box Turtle ..... 12	Northern Painted Turtle ..... 1
	Ornate Box Turtle ..... 1
Prairie Lizard ..... 40	
Six-lined Racerunner ..... 8	Western Slender Glass Lizard ..... 1
Ringneck Snake ..... 32	Ringneck Snake ..... 44
Western Hognose Snake ..... 3	Eastern Racer ..... 2
Eastern Racer ..... 10	Milk Snake ..... 1
Milk Snake ..... 4	Great Plains Rat Snake ..... 3
Coachwhip ..... 3	
Great Plains Rat Snake ..... 10	Total
Gopher Snake ..... 7	
Plains Garter Snake ..... 2	11 species ..... 59 specimens
Lined Snake ..... 1	
Prairie Rattlesnake ..... 1	
Total	
17 species ..... 167 specimens	
 GRAND TOTAL	
21 species ..... 226 specimens	

All verified by Mark Ellis, Larry L. Miller, Travis W. Taggart and Joseph T. Collins



Figure 1. A young Milk Snake was one of the prize discoveries during the 2004 KHS Fall Field Trip to Rooks County, Kansas. Photograph by Suzanne L. Collins.



Figure 2. Jenny Hall displays a Common Garter Snake found during the 2004 KHS Fall Field Trip to Rooks County, Kansas. Photograph by Larry L. Miller.



Figure 3. Victor Wilkinson holds a handful of Ringneck Snakes that were found during the 2004 KHS Fall Field Trip to Rooks County, Kansas. Photograph by Suzanne L. Collins.



Figure 4. Over 70 individuals attended the 2004 KHS Fall Field Trip to Rooks County, Kansas. Shown above are some of the group, holding a wide variety of snakes. Photograph by Larry L. Miller.

## GEOGRAPHIC DISTRIBUTION

**CHELYDRA SERPENTINA** (Common Snapping Turtle). KANSAS: JEWELL Co: Sec. 23, T3S, R7W. 8 July 2004. Marla Gubanyi. Verified by Joseph T. Collins and James Gubanyi. MHP Color Slide 9463, taken by Larry L. Miller. New county record (Collins & Collins. 1993 Amphibians and Reptiles in Kansas. Third Edition. University Press of Kansas, Lawrence. xx + 397 pp.).

Submitted by **MARLA A. GUBANYI**, 1091 North 190th Street, Minneapolis, Kansas 67467.

**STORERIA DEKAYI** (Brown Snake). KANSAS: OSBORNE Co: Sec. 7, T9S, R14W, N39.16.903, W98.48.632. 3 October 2004. Joseph T. Collins & Suzanne L. Collins. Verified by Curtis J. Schmidt. MHP 9598. New county record (Collins & Collins. 1993 Amphibians and Reptiles in Kansas. Third Edition. University Press of Kansas, Lawrence. xx + 397 pp.).

Submitted by **JOSEPH T. COLLINS**, Kansas Biological Survey, University of Kansas, Lawrence, Kansas 66047.

## LIFE HISTORY NOTES

**RANA BLAIRI** (Plains Leopard Frog). NEW STATE MAXIMUM LENGTH. KANSAS: MONTGOMERY Co: 2.75 mi W & 0.25 mi N Coffeyville. 15 April 1966. L. S. Oborny. MHP 3131. Verified by Richard Hayes. SVL = 107 mm (4 1/4 inches). Exceeds previous record length of 100 mm as reported by Collins & Collins (1993. Amphibians and Reptiles in Kansas. Third Edition. University Press of Kansas, Lawrence. xx + 397 pp.).

Submitted by **CURTIS J. SCHMIDT** and **TRAVIS W. TAGGART**, Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas 67601.

**KINOSTERNON FLAVESCENS** (Yellow Mud Turtle). NEW STATE MAXIMUM LENGTH. KANSAS: ROOKS Co: along Robbers Roost Creek, 4.3 mi S Stockton, 39.37635°N, 99.2727821°W. 3 October 2004. Chad Whitney. MHP 9661. Verified by Joseph T. Collins. Shell length = 146 mm (5 3/4 inches). Exceeds previous record length of 135 mm as reported by Collins & Collins (1993. Amphibians and Reptiles in Kansas. Third Edition. Univ. Press Kansas, Lawrence. xx + 397 pp.).

Submitted by **CHAD WHITNEY**, 12260 Walnut, Olathe, Kansas 66061, and **TRAVIS W. TAGGART** and **CURTIS J. SCHMIDT**, Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas 67601.

**LAMPROPELTIS TRIANGULUM** (Milk Snake) **REPRODUCTION**. During April 2003, I observed the posterior portion of two adult Milk Snakes that were mating in the wild (Figure 1). Neither of the snakes were collected. The serpents were found under a rock in Shawnee County, Kansas. Both reptiles crawled on down the hole soon after being

photographed. I estimate that they were between 60 and 70 cm in length.

Submitted by **LARRY L. MILLER**, Northern Hills Junior High School, 5620 NW Topeka Boulevard, Topeka, Kansas 66617.



Figure 1. Two adult Milk Snakes photographed while mating in Shawnee County, Kansas. Photograph by Larry L. Miller.

**STORERIA DEKAYI** (Brown Snake). REPRODUCTION. KANSAS: LEAVENWORTH Co.: Sec. 8, T9S, R22E (N°38.85556, W°94.79901). 5 August 2004. Suzanne L. Collins & Joseph T. Collins. Female. MHP 9310 (SVL 243 mm; total length 302 mm). Verified by Travis W. Taggart. On 12 August 2004, the female gave birth to sixteen young. Collins (1993 Amphibians and Reptiles in Kansas. Third Edition. Univ. Press Kansas, Lawrence. xx + 397 pp.) reported an average litter size of twelve. Total lengths (SVL + tail) for the neonates ranged from 89 mm to 100 mm (mean 95.3 mm; SD 3.46 mm).

Submitted by **SUZANNE L. COLLINS**, The Center for North American Herpetology, 1502 Medinah Circle, Lawrence, Kansas 66047 and **JOSEPH T. COLLINS**, Kansas Biological Survey, University of Kansas, Lawrence, Kansas 66047.

**CROTALUS VIRIDIS** (Prairie Rattlesnake). NEW MAXIMUM SIZE FOR ENTIRE RANGE. KANSAS: HAMILTON Co.: 3 mi N Kendall, Sec. 12, T24S, R39W (N°37.97990, W°101.54400). 28 April 2004. Dick Grusing. MHP 8564. Identification verified by Joseph T. Collins. Male. SVL = 52 3/8 inches; total length = 57 1/8 inches (1454 mm) when measured relaxed prior to preservation. New record length for entire range, exceeding the previous record of 57 inches (1448 mm) as reported in Conant and Collins (1998 Peterson Field Guide to Reptiles and Amphibians of Eastern and Central North America. Third Edition Expanded. Houghton Mifflin Co., Boston. xviii + 616 pp.).

Submitted by **TRAVIS W. TAGGART** and **CURTIS J. SCHMIDT**, Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas 67601.

**CROTALUS VIRIDIS** (Prairie Rattlesnake). BEHAVIOR. KANSAS: KEARNY Co.: 5.5 mi W Lakin, ca. 60 feet north of the Arkansas River. August–September 1987. Rick Bennett. First photographs of combat dance behavior in this species in Kansas (Figures 1-3).

Submitted by **RICK BENNETT**, Southern Star Pipeline Corporation, 1501 Davis Street, Alva, Oklahoma 73717.



Figures 1–3. Prairie Rattlesnakes (*Crotalus viridis*) engaged in combat dance behavior at a site in Kearny County, Kansas. Photographs by Rick Bennett.

## NOTES

### OBSERVATIONS ON RINGNECK SNAKES (*DIADOPHIS PUNCTATUS*)

Henry S. Fitch  
*Fitch Natural History Reservation*  
2060 1600 Road  
Lawrence, Kansas 66044

I was fifteen years old when I saw my first Ringneck Snake (*Diadophis punctatus*). This was on the “back forty” of my father’s pear orchard. He owned about 65 ha approximately six miles south of Medford in the Rogue River Valley of southwestern Oregon. This part of the property was unimproved rolling land at the north base of the Siskiyou Range. The snake was associated with natural vegetation, chaparral (*Ceanothus cuneatus*), Gary Oak (*Quercus garryana*) and ripgut brome (*Bromus rigidus*). The Ringneck Snake was a new species for me, and I handled it cautiously in case it might be venomous. I was already familiar with a dozen reptile species that were more common on or near our land, and knew each by its common and scientific name.

Twelve years later I had captured several more Ringneck Snakes on extensive collecting trips to various areas on the West Coast and was familiar with it as an attractive, rare, and secretive species. Little did I suspect then that I was destined to capture more than 30,000 of these serpents, their numbers greatly exceeding all other kinds of reptiles combined in my herpetological career.

In July 1948, I came to Kansas to take charge of the newly dedicated University of Kansas Natural History Reservation. I was gratified to learn that several kinds of snakes, including Ringneck Snakes, occurred in the area and would be available for study. However, my early field trips were discouraging. I saw few snakes of any kind and no Ringnecks. My new friend, Wilmer W. Tanner of Utah, then a graduate student at the University of Kansas, reassured me of the abundance of this serpent on the Reservation, and told me where to search—on the wooded hillside south of the old limestone quarry and north of the present location of my residence. Encouraged, I searched there assiduously, but still no snakes. It must have been some time in late August that I finally got Wilmer to come to the Reservation to show me where the snakes were. I well remember his puzzlement and frustration after

a half-hour of rigorous rock turning with no captures in the habitat where they had been abundant in spring. At that time, both of us were unaware that this change in behavior was typical of local Ringnecks; in hot dry weather in late summer they withdraw into deep underground shelters and cannot be found above ground.

In general, Ringneck Snake behavior is much influenced by season. Activity is greatest in the spring and adult males are nearly three times as abundant as females in collections made at that time; in early summer, male activity wanes and females (nearly all gravid) constitute the bulk of the catch and they, in turn, dwindle as the summer progresses. In fall, there is a resurgence of activity, depending on the weather. Hatchlings appear in September, and until hibernation, males are mostly less than 146 mm SVL and females less than 160 (Fitch 1999). Second-year young males are mostly 147–214 mm, females 160 to 223. Third-year adolescents are mostly 214 to 233 mm (males) and 223 to 256 (females). Older adults mostly exceed 233 mm SVL (males) and 256 mm (females).

In my book on snakes of the Reservation (Fitch, 1999), I presented 39 samples of Ringneck Snakes, with an average of 65 males and 46.3 females in each annual sample. Males averaged 253.7 mm SVL ( $237.4 \pm 8.8$  to  $258.9 \pm 3.8$  mm) and females averaged 262.0  $\pm$  2.0 mm SVL ( $258.90 \pm 3.8$  to  $291.1 \pm 5$  mm). Comparable small differences in SVL were found between averages of snakes from different habitats: from brome grass pastures of hilltops and lowlands, and regenerated prairie.

#### Literature Cited

- Fitch, Henry S. 1999. *A Kansas Snake Community: Composition and Changes over 50 Years*. Krieger Publishing Company, Malabar, Florida. x + 165 pp.

## ARTICLES

### OBSERVATIONS ON OSAGE COPPERHEADS IN NORTHEASTERN KANSAS

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In the Copperhead, as in some other pit vipers, there is a tendency for gravid females to aggregate in small groups during late pregnancy. There is little opportunity for feeding at the communal dens, and in fact the gravid females are not much interested in capturing prey, but their embryos are nourished mainly from stored fat. At the Fitch Natural History Reservation, many gravid female Osage Copperheads (*Agkistrodon contortrix phaeogaster*) were captured and kept until the birth of their litters, especially in the early years of field work (i.e., 1950s). After several years, it was realized that the captive-born young were stunted. They were consistently smaller than field captured neonates from natural births, and the degree of stunting seemed to be proportional to the length of time that the female had been a captive. Normal litters sometimes have one or more runts, which are severely handicapped, because some of the prey species normally eaten by neonates are too large for them to swallow. The young born to captive females are smaller, but appear to be no more variable in size than those of normal litters. Stunting is somehow caused by the stresses of captivity, which prevent a female from providing her embryos with their normal sustenance.

Figure 1 is based on the many litters of Copperheads born in captivity in the year 1950, and seems to show that the longer the female was kept the smaller the young that she eventually produced. Also, it seems that the longer the female was kept, the later the birth of her young. No attempt was made to duplicate the temperature characteristics of the natural dens used by the females, but probably the temperatures of captive snakes averaged at least as high as in those of the dens.

Young Copperheads born in captivity were kept until they absorbed their abdominal yolk, and were then force-fed a piece of raw meat before release. No doubt this improved their chances of survival. Some were recaptured long after birth, even after they had matured.

Pregnant Copperheads are notably docile, and offer little resistance to handling, in contrast with male counterparts. On 1 July 2004, I became aware of a hitherto unanticipated hazard in handling them. I was

processing a gravid female following my usual procedures (Fitch, 1987) and had stretched her out along a tape measure when she suddenly made biting movements and released a spray of venom, and droplets struck my left eye. Within three seconds pain was intense. I promptly returned the snake to her container, ran to the kitchen sink, and held my face beneath the stream to wash out the venom. There was some swelling and discomfort for several hours, but by morning it was mostly gone. I have handled many hundreds of copperheads, but it was the only occasion when I was squirted in the eye with venom. However, I have often been squirted with musk from the tail glands, and experienced no ill effects.

#### LITERATURE CITED

Fitch, Henry S. 1987. Collecting and life history techniques. Pp. 143–164 in *Snakes: Ecology and Evolutionary Biology*. Richard A. Seigel, Joseph T. Collins, and Susan S. Novak (Editors). Macmillan Publishing Company, New York. xiv + 529 pp.

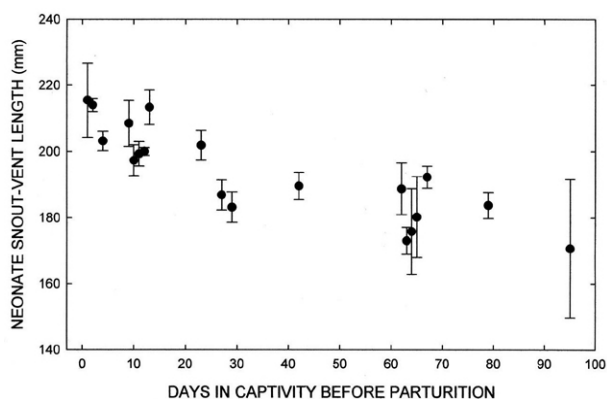


Figure 1. Graph showing negative correlation between time spent in captivity by gravid female Copperheads and mean lengths of their neonates, based entirely on records from 1950.

# The Kansas Herpetological Society

The *Kansas Herpetological Society* is a non-profit organization established in 1974 and designed to encourage education and dissemination of scientific information through the facilities of the Society; to encourage conservation of wildlife in general and of amphibians, turtles and reptiles in Kansas in particular; and to achieve closer cooperation and understanding between herpetologists, so that they may work together in common cause.

## Membership

All interested persons are invited to become members in the Society. Membership dues per calendar year are \$15.00 (U.S., Regular), \$20.00 (*outside* North America, Regular), and \$20.00 (Contributing) payable to the KHS. Send all dues to: KHS Treasurer (see inside front cover). All members are entitled to participate in Society functions, have voting privileges, and are eligible for Society grants and scholarships. They receive copies of the *Journal of Kansas Herpetology*, as well as other publications co-sponsored by the Society, either gratis or at a discount.

## Editorial Policy

The *Journal of Kansas Herpetology*, issued quarterly, publishes peer-reviewed manuscripts and notes dealing with the biology of amphibians, turtles and reptiles. Manuscripts should be submitted to the Editor no later than the 10th of the month prior to the month of issuance. All manuscripts become the sole possession of the Society, and will not be returned unless arrangements are made with the Editor. Pen and ink illustrations and photographs are also welcomed. Illustrations and photographs will be returned to the author only upon request. The *Journal of Kansas Herpetology* uses the common names standardized nationwide by Collins & Taggart (2002).

## The Howard K. Gloyd-Edward H. Taylor Scholarship

The Gloyd-Taylor Scholarship is presented annually by the Kansas Herpetological Society to an outstanding herpetology student. Nominations for this award are open to any KHS member enrolled in an accredited educational institution in Kansas or any KHS member enrolled in any accredited educational institution outside of Kansas. The scholarship is \$100.00 and is awarded on the basis of potential for contributing to the science of herpetology. Students from grade school through university are eligible.

Nominations should include typewritten details of the nominee's qualifications, plus name and address of the nominee and nominator. Self-nomination is encouraged. If self-nominated, a letter of reference from an academician is required.

Nominations should include, but are not limited to, academic record, herpetological activities, and future plans in herpetology. Academic record should address schools attended and an indication of academic performance in each (e.g., grade point average, teacher evaluations, courses completed). Herpetological activities should include a brief narrative that details experiences and activities that demonstrate a long-term interest in herpetology, and documents accomplishments in herpetological study. Future plans in herpetology should include a statement, not to exceed one-page, written by the student about his/her future interests and plans.

Applicants may include an optional appendix with photographs, awards, newspaper articles, reports written by the student, or other documents relevant to herpetological activities.

Nominations should be sent to the KHS Awards Committee Chair, and must be postmarked by 15 September. The scholarship winner will be announced at the annual meeting in November. New applications will be accepted after 1 January of the following year.

## The Alan H. Kamb Grant for Research on Kansas Snakes

KHS members only are eligible to apply for The Alan H. Kamb Grant for Research on Kansas Snakes. The recipient of the grant (minimally \$100.00) will be selected by the KHS Awards Committee. If no qualified proposals are submitted, no award will be made for that year.

The KHS Awards Committee will entertain proposals for research on Kansas snakes. The proposal must be limited to ten typed pages, and should include, but not be limited to the following: title, name of researcher, contact information, abstract, introduction and justification, objectives or hypotheses, materials and methods, significance of research and possible results, literature cited, timetable, and proposed budget. The research must be conducted on one or more native Kansas snake species. Additionally, a majority of the field work or observations must be proposed to occur in Kansas, or the data must be proposed to be collected, at least in part, on Kansas specimens.

Proposals should be sent to the KHS Awards Committee Chair, and must be postmarked by 15 September. The grant recipient will be announced at the annual meeting in November. New applications will be accepted after 1 January of the following year.

## The Suzanne L. & Joseph T. Collins Award for Excellence in Kansas Herpetology

Conditions and Stipulations: The Award shall be known, presented, and portrayed as the *Suzanne L. & Joseph T. Collins Award for Excellence in Kansas Herpetology* and may not be changed for any reason, nor added to or merged with any other award, prize, or gift. The Award is established in recognition of the scientific and photographic achievements of Suzanne L. Collins and Joseph T. Collins, whose life-long study and conservation of the native amphibians, turtles, and reptiles of Kansas is amply demonstrated in their extensive and excellent writings and photography, both academic and popular, about these animals.

*The Collins Award* shall be presented no more than once each year. The Award may not be divided, but must be presented in full to a single individual. The Award consists of a trust-in-perpetuity, owned and invested by the *The Center for North American Herpetology*, and part of the interest from the trust is annually forwarded to the *Kansas Herpetological Society*, should they choose to make an award in that year.

Recipients of *The Collins Award* are chosen by the *Kansas Herpetological Society Awards Committee*.

*In even-numbered years*, the Award is bestowed upon an individual who, in the *preceding* two calendar years, had published a paper of academic excellence on the systematics, ecology, or conservation of a native species of Kansas amphibian, turtle, and/or reptile in the *Journal of Kansas Herpetology*, *Transactions of the Kansas Academy of Science*, *Herpetological Review*, or the *Journal of Herpetology*, and/or presented a lecture of excellence on the systematics, ecology, or conservation of a native species of Kansas amphibian, turtle, and/or reptile at the KHS Annual Meeting. To qualify for the Award, a portion of the field work or observations must have occurred in Kansas, or the systematic data must have been based in part on Kansas specimens. *In odd-numbered years*, the Award is bestowed upon an individual who was chosen the best in a juried competition featuring the art of photography in portraying amphibians, turtles, and/or reptiles, said competition to take place under the auspices and on the occasion of the annual meeting of the *Kansas Herpetological Society*. To qualify for the Award, the art work must portray a species native to Kansas.

*The Collins Award* is minimally \$1000.00, and is neither a grant nor a scholarship. No nominations or applications can be made for it.

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