

Herpetology 2006

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

THE YELLOW MUD TURTLE IN ILLINOIS

M. W. Tuma [2006, *Chelonian Conservation and Biology* 5(1): 108-120] notes that the yellow mud turtle (*Kinosternon flavescens*) is a xerothermic relict partially distributed among several disjunct populations on sand prairies along the former Prairie Peninsula in Illinois, Iowa, and Missouri. In Illinois, where the species is listed as endangered, the largest known population occurs at the northeastern extent of the species' range in Henry County. A major portion of the site is in private ownership, and the Illinois Department of Natural Resources seeks to acquire additional mud turtle habitat to supplement a 1998 acquisition that was designated as a preserve. To determine additional preserve acquisition area, identify critical habitat, and recommend management techniques, data regarding the range, habitat use, and seasonal activity of turtles at this location were collected through radiotelemetry, aquatic trapping, and drift fence captures. Eleven adult mud turtles (6 males, 5 females) were fitted with radio transmitters and tracked between 12 May 1992 and 6 June 1993. Radiotagged turtles occupied ephemeral ponds between mid-April and late May, and estivated in sand dunes in June and July. Some emerged for a second aquatic activity period in the ponds in July and August. Hibernation occurred in sand dunes from September through mid-April. Aquatic trapping and drift fence captures of adults and juveniles confirmed similar schedules of activity, estivation, and hibernation observed in the telemetered individuals. Drift fence captures of hatchlings indicated emergence from nest locations from early May through June. A lack of hatchling captures in midsummer suggests that hatchlings remained in ponds or dried pond beds through the summer. Important aquatic habitat identified during the study included shallow ponds with soft, muddy substrates and dense emergent vegetation; important terrestrial habitat included sand dunes with an elevation of at least 15 feet above the ponds. Telemetered adult mud turtles burrowed into sand dunes at locations of up to 90 m from pond edges. Females oviposited at nest locations up to 70 m from pond edges. Nest predators included coyotes (*Canis latrans*), striped skunk, (*Mephitis mephitis*), and western hognose snake (*Heterodon nasicus*). The recommended area for the preserve addition includes a buffer of terrestrial habitat to a distance of 90 m from maximum pond level edges. Additional preserve design recommendations include constructing a bridge or culvert under a road that bisects the site so that turtles can move between aquatic and terrestrial habitats on each side of the road, and encouraging native shortgrass prairie vegetation in acquired areas. Other recommendations include periodic introductions of hatchling mud turtles from a nearby, appropriately identified population, predator management techniques that encourage hatchling recruitment, and conducting habitat management activities with the potential to disturb soils between November and March.

NEW PERUVIAN HARLEQUIN FROG

S. Lötters et al. [2004, *Revista Española de Herpetología* 18: 101-109] explain that several undescribed species of harlequin frogs, genus *Atelopus*, are known from the Amazonian slopes of the Andes in Peru. Most of these have restricted distributions. This paper describes one such species, known from a single site in the eastern Andes of northern Peru, and names it *Atelopus epikeisthos*. The new species is similar to *A. angelito*, *A. bomolochos*, *A. dimorphus*, *A. eusebianus*, *A. exiguus*, *A. muisca*, and *A. peruensis* by having a uniform green dorsum. The new species can be distinguished from the above on the basis of adult size and dorsal skin texture. The male holotype of the new species has a snout-vent length of 38.2 mm and warts on the dorsum. Applying IUCN Red List criteria, the authors categorize the new species as critically endangered. The specific name is a Greek adjective meaning "threatened through adverse circumstances" and refers to its conservation status.

MOST PRIMITIVE SNAKE FOSSIL

S. Apestegui a and H. Zaher [2006, *Nature* 440:1037-1040] note that it has commonly been thought that snakes underwent progressive loss of their limbs by gradual diminution of their use. However, recent developmental and palaeontological discoveries suggest a more complex scenario of limb reduction, still poorly documented in the fossil record. Here we report a fossil snake with a sacrum supporting a pelvic girdle and robust, functional legs outside the ribcage. The new fossil, from the Upper Cretaceous period of Patagonia, fills an important gap in the evolutionary progression towards limblessness because other known fossil snakes with developed hindlimbs, the marine *Haasiophis*, *Pachyrhachis* and *Eupodophis*, lack a sacral region. Phylogenetic analysis shows that the new fossil is the most primitive (basal) snake known and that all other limbed fossil snakes are closer to the more advanced macrostomatan snakes, a group including boas, pythons and colubroids. The new fossil retains several features associated with a subterranean or surface dwelling life that are also present in primitive extant snake lineages, supporting the hypothesis of a terrestrial rather than marine origin of snakes.

REVIEW OF THE SHIELD COBRAS

D. G. Broadley and A. S. Baldwin [2006, *Herpetological Natural History* 9(2):163-176] note that the southern African elapid genus *Aspidelaps* remains poorly understood in most aspects of its biology. The available information is sparse and often only published via anecdotal notes in obscure journals or out-of-print books. The review presented here is not comprehensive in respect to many historical herpetological surveys of the southern African region, but provides a compilation of updated taxonomic, ecological, behavioral, zoogeographical and toxicological information, including notes on captive husbandry.

ISLAND VERSUS MAINLAND BOA CONSTRICTORS

S. M. Boback [2006, *Copeia* 2006(2):261-267] reports that relative to mainland *Boa constrictor*, boas from islands off the coast of Belize have been described as being smaller, having longer tails, more elongate snouts, and proportionately larger eyes. However, no systematic confirmation of these patterns has been made. A morphometric study was initiated to investigate the body size and head shape variation between island and mainland boas in Belize. One hundred twenty-nine boas from five islands and the mainland were caught and measured. Univariate and multivariate analyses indicated that, in general, previous descriptions are accurate. Island boas are about half the length and one-fifth the mass of mainland boas. In contrast to mainland boas, no sexual size dimorphism is evident in island boas. The head shape of island boas differs from that of mainland boas but this divergence is not consistent among populations. Some island boas have more attenuate snouts compared to mainland boas whereas other island boas have larger eyes and narrower heads. Male island boas have longer tails compared to males from the mainland, but such a difference is not found in females from the two localities. The morphology of island boas is consistent with an arboreal habit and reduced prey size. Because these changes have occurred over an extremely short time interval, this may be another example of the speed and magnitude of adaptation that is possible in squamates.

CONSERVATION STATUS OF THE NEGEV TORTOISE

J. Perälä [2006, *Chelonian Conservation and Biology* 5(1): 57-66] notes that the Negev tortoise, *Testudo weneri*, is one of the smallest tortoise species in the Mediterranean region, with a historical distribution in northeastern Egypt, Sinai, and parts of the Negev desert in Israel. Populations in Egypt are already practically extinct due to anthropogenic factors affecting the habitat and collection for the pet trade. Currently, *T. weneri* has a national Israel Red List status of Endangered (EN, A2cd, B). The species' primary habitat, desert sands, is degrading rapidly because of a multitude of human induced factors. Other threats include unnatural predators attracted by human settlements, and collecting for food and pet trade. According to present estimates, the global population has declined by around 95% in less than three generations. The remaining *T. weneri* population is essentially restricted to an area of around 700 km² or less in northwestern Negev, Israel. Ten individuals are known from Zaranik in northern Sinai of Egypt. The present population size is estimated at between 2520 and 3150 individuals depending on parameters used, of which around 1890 to 2360 tortoises would be adults. True figures may be considerably less, however. *Testudo weneri* is clearly threatened by extinction, potentially within decades, but more data are needed for an accurate estimate. The establishment of new nature reserves in the sands of northwestern Negev in conjunction with effective management would enhance the survival prospects of the species, assuming that most of the known threat factors can be addressed. *Testudo weneri* qualifies globally for listing as Critically Endangered (CR, A2abcde+3de) under current IUCN Red List Criteria; this was recommended and accepted by the IUCN in 2003.

MASSASAUGA HIBERNATION SITES

D. S. Harvey and P. J. Weatherhead [2006, *J. Herpetology* 40(1):66-73] note that hibernation sites at higher latitudes must protect snakes from colder conditions for longer periods of time. Because fewer locations are likely to be suitable, hibernation site availability may restrict the northern distribution of snakes. The authors considered overwinter mortality, hibernation site fidelity, and the abundance of suitable hibernation sites based on surface features to assess whether massasauga rattlesnakes, *Sistrurus c. catenatus*, are likely to be limited by hibernation site availability on the Bruce Peninsula, Ontario, Canada. Three years of radiotelemetry were used to locate 46 hibernation sites of 32 individual snakes. Snakes hibernated individually in old root systems, rodent burrows, and rock crevices in forested areas. Hibernation sites could be differentiated from forested areas generally available to snakes but not from locations with holes and crevices in the immediate vicinity of hibernation sites. Few snakes hibernated in the same location in consecutive years, although most (> 70%) hibernated within 100 m of their previous location. Overwinter mortality over three years (23%) was similar to mortality during the active season (21%). These results suggest that massasauga rattlesnakes may be limited by the availability of suitable hibernation sites, but sites of similar quality to those used by overwintering snakes are locally abundant. The location of hibernation sites within forests could not be predicted reliably based on surface features. Therefore, efforts to conserve habitat for this threatened species should consider all forested areas on the Bruce Peninsula as potential hibernation habitat.

LEOPARD TORTOISE THERMOREGULATION

M. K. McMaster and C. T. Downs [2006, *Herpetologica* 62(1):37-46] note that behavioral thermoregulation is used by tortoises (Family Testudinidae) to moderate the effects of daily and seasonal fluctuations in ambient temperature on their body temperature. Extensive use is made of refuges to facilitate this behavioral thermoregulation. The Nama-Karoo in South Africa experiences wide temperature fluctuations both daily and seasonally. The authors investigated the seasonal use of refuges by the leopard tortoise (*Geochelone pardalis*) and the orientation of the tortoises within the refuges. Tortoises used a wide variety of refuges, with *Lycium* spp., *Eberlanzia ferox*, *Opuntia ficus*, and grass clumps being preferred. Seasonal variation in the use of these refuges depended on whether the refuges were used as forms or shelters. Tortoises in spring and winter often remained in the same refuge for the entire season or returned to the same refuge on consecutive nights. Seasonal and behavioral variation was found in (a) the orientation of the tortoises within a refuge, and (b) the portion of the shell of each leopard tortoise within a refuge that was exposed to solar radiation. Tortoises in winter and spring maximized the amount of solar radiation received on their shells, while tortoises in summer and autumn minimized the solar radiation received. Consequently, using a combination of refuge type and body orientation, leopard tortoises appear to passively thermoregulate and thus control for temperature fluctuations experienced in an extreme environment.

BURN REGIMES AND HERPETOFAUNA

D. J. Wilgers and E. A. Horne [2006, *J. Herpetology* 40(1): 73-84] report that the Flint Hills region of Kansas is the largest contiguous area of tallgrass prairie remaining today. Historically, the tallgrass prairie burned every 2-3 yr on average, but current land managers have altered burn regimes, resulting in a range of habitats from annually burned to long-term unburned. The authors used drift fence/funnel trap arrays and coverboards to estimate species richness, evenness, and diversity of herpetofauna within three different burn regimes: annual, 4-yr, and long-term unburned at Konza Prairie Biological Station, Riley County, Kansas. During the spring and fall of 2003-2004, 315 individuals from 20 species were captured across all burn regimes. Herpetofaunal species richness, evenness, and diversity estimates were not different between the three burn treatments. However, because of species-specific responses to individual burn regimes, community composition was significantly different between the habitats ($\chi^2 = 158.19$, $df = 20$, $P < 0.001$). Four species exhibited preferences among burn regimes, which differed significantly from independent assortment, with *Eumeces obsoletus* and *Phrynosoma cornutum* preferring annual burn treatments, *Scincella lateralis* preferring 4-yr burn treatments, and *Diadophis punctatus* preferring long-term unburned treatments. Species-specific responses were likely because of changes in vegetation structure and microhabitat (temperature and moisture content) created through different frequencies of fire disturbances. Maximizing large-scale herpetofaunal diversity across the Flint Hills' rangelands could be accomplished by creating a large number of small scale habitat types through a mosaic style burning plan.

ALLIGATOR SNAPPING TURTLES IN LOUISIANA

J. Boundy and C. Kennedy [2006, *Chelonian Conservation and Biology* 5(1):3-9] trapped 200 alligator snapping turtles at an average rate of 0.057 turtles per trap-night in all but 1 of 33 sites in southeastern Louisiana. Trap rate varied between sites, by harvest pressure levels at sites, and by season, but not by hydrology. Perceived trap rate differences under different harvest regimes appeared to be a function of seasonal differences in trap rate. No differences in sex ratio or percentage of immature turtles were detected among sites, harvest regimes, seasons, or water-body types. Turtle weight varied among harvest regimes and hydrology. Weight and length for turtles were highly correlated and their relationship was similar between sexes, except that males continued to grow to larger sizes than females (males averaged 150% female weight and 118% female carapace length). Sex ratio was 1:1, and immature turtles made up 48% of the total. Average sizes of turtles were very similar between Louisiana and turtles from surveys in several other states. Population structure differed between surveys, with Louisiana having a higher percentage of immature turtles and lower trap rate than elsewhere. Population differences could not entirely be explained by differences in harvest regimes between states. Large-scale turtle butchering operations in southern Louisiana have closed, as has commercial harvest. Anecdotal reports that alligator snappers were nearly extirpated from a heavily harvested site proved erroneous. Resurvey of sites to determine current population trends is recommended.

CRICKET FROG DECLINES

R. M. Lehtinen and A. A. Skinner [2006, *Copeia* 2006(2):159-167] note that Blanchard's cricket frogs (*Acris crepitans blanchardi*) are geographically widespread and historically common, yet are in decline throughout much of the northern part of their range. One proposed mechanism for this decline is the negative effects of acidified precipitation on this acid-sensitive species. To test the predictions of this hypothesis, the authors sampled 570 randomly-selected sites along three transects in Ohio using chorusing surveys during 2004. Along these transects, pH and acid neutralizing capacity (alkalinity) were assessed, as well as terrestrial and aquatic vegetation cover. The surveys detected 53 extant cricket frog populations (9.3% of surveyed sites) in ponds, lakes, and streams. These sites were exclusively located in western Ohio, indicating a substantial (120 km) range contraction, compared to its historic distribution in the state. A multiple logistic regression model found no significant relationship between cricket frog occurrence and either pH or acid neutralizing capacity ($P > 0.50$). Acid neutralizing capacity and pH were also not significantly different in extant and extinct areas of the cricket frog's range in Ohio ($P > 0.05$). Cricket frogs were found to occur significantly more frequently than expected by chance in lakes and at sites with low canopy cover ($P < 0.001$). While synergistic interactions with other factors cannot be ruled out, these results suggest that habitat acidification is likely not responsible for cricket frog declines in Ohio. Unlike other declining amphibians, where likely causal mechanism(s) have been identified, causes of cricket frog declines remain enigmatic.

CHORUS FROG COURTSHIP CALLS

P. C. Owen and J. K. Tucker [2006, *Copeia* 2006(1):137-144] studied the courtship behavior of two species of chorus frogs, *Pseudacris illinoensis* and *P. triseriata*, in western Illinois. The authors report observations of courtship behavior and describe courtship calls for each species. These calls were given in response to both male and female conspecifics entering the calling spaces of resident males. Courtship calls given in response to an intruder were never followed by aggressive behaviors from the resident or the intruder, and courtship calls were never given in response to playbacks of conspecific advertisement calls. Thus, these calls do not appear to be used in an aggressive context. Courtship calls of *P. illinoensis* are longer in duration than advertisement calls. Courtship calls in *P. triseriata* consist of multiple notes compared to single note advertisement calls. These courtship calls have higher pulse rates and lower dominant frequencies, and they are given at faster calling rates than advertisement calls. Courtship calls of both species are more variable in structure within males than advertisement calls. Like two other species of chorus frogs for which courtship calls have been reported, courtship calls in *P. illinoensis* and *P. triseriata* are modifications of the advertisement call. Courtship calls in the genus that have been described so far do not appear to share a common structure. The recognition of courtship calls in a chorus may play a useful role in long-term monitoring of anuran breeding activity, especially in remotely determining the presence of gravid females.

SLIMY SALAMANDER NESTING BEHAVIOR

S. E. Trauth et al. [2006, *Herpetological Natural History* 9(2): 141-149] examined brooding postures and nest site fidelity in a nesting aggregation of western slimy salamanders (*Plethodon albagula*) from an abandoned mine shaft located in the Ouachita National Forest of southwestern Arkansas. From November 1999 through December 2001, the authors collected a photographic record of brooding and nesting behavior. Females oviposit a free-hanging, grape-like egg cluster within relatively dry nest perches along the walls of the mine shaft. Six female brooding postures were recorded from 101 observations involving 101 egg clutches. The most common brooding posture (34.6% of the time) was one in which the female positioned her shoulder region next to or in contact with her egg clutch. Body coiling around the egg clutch occurred 20.8% of the time and at about the same frequency as brooding postures involving eggs touching the head (17.8%) or trunk (22.8%). Six females (6.3%) exhibited nest site fidelity; one female returned to the same nesting site in each of three nesting seasons, but successfully brooded a clutch during the first season only. Egg predation by a ring-necked snake was observed during the 2001 nesting season. These results suggest that brooding postures may function as a predator defense mechanism and may also serve as an antimicrobial defense. The autumn/winter nesting season appears to serve as an antipredator strategy in this species.

AMPHIBIANS OF THE GAMBIA

C. Emms et al. [2005, *The Herpetological Bulletin* 94:6-16] present an up-to-date checklist of the amphibian fauna of The Gambia, the smallest country in continental Africa. The authors have collated data from the existing literature, including unpublished material, and from their own surveys. The resulting list comprises 35 frog species, six of which (*Bufo maculatus*, *B. pentoni*, *Phrynobatrachus* cf. *calcaratus*, *Pyxicephalus edulis*, *Arthroleptis* cf. *pocilonotus* and *Leptopelis bufonides*) are new to The Gambian checklist. The report includes color photographs of seven species.

EFFECTS OF TAIL LOSS

R. M. Goodman [2006, *J. Herpetology* 40(1):99-102] notes that tail autotomy serves as an aid to escape predators in many lizards, but potential costs include loss of fat stores, impaired locomotion, loss of social status, and reduced growth and reproductive output. Two potential costs of tail loss were examined in juvenile skinks, *Eumeces fasciatus*, through manipulation in a laboratory study. Changes in growth and sprint speed were compared among full autotomy, partial autotomy, and control groups of lizards after these treatments at three weeks of age and up to four weeks later. Full tail autotomy was associated with increased growth in mass during the two weeks posttreatment and increased growth of the tail between two and four weeks post-treatment. No other measures of growth were affected by partial or full tail loss. Immediately following treatments, fully autotomized lizards became significantly slower, with respect to maximum sprint speed, relative to both other groups. However, this effect was gone by four weeks after tail loss.

REPRODUCTIVE BEHAVIOR IN COMMON LIZARDS

S. Hofmann and K. Henle [2006, *J. Herpetology* 40(1):1-6] note that the common lizard (*Lacerta vivipara*) is a small, nonterritorial, live-bearing lacertid that is sexually dimorphic in several morphological traits (e.g., tail length, snout-vent length, head size). The authors used microsatellites to examine paternity in a wild population and investigated whether sexual dimorphism could be the result of intra- or intersexual selection. Multiple paternity was found in 65.4% of 26 clutches. There was no evidence of assortative mating. Successfully reproducing males were larger and heavier and had longer tail regenerates or intact tails compared to those that did not reproduce. Tail length and body condition of males were related to the number of offspring sired. However, no evidence was found that head width was related to male reproductive success. The authors conclude that (1) males with higher body condition index might be more successful in male-male interactions or might be able to search more effectively for females, (2) sex divergence in relative tail length in common lizards reflects the action of sexual selection for male reproductive success, and (3) intersexual dietary divergence could be an alternative hypothesis for head size difference between sexes rather than intrasexual selection.

POPULATION DENSITIES OF THE COQUI

L. L. Woolbright et al. [2006, *J. Herpetology* 40(1):122-126] note that *Eleutherodactylus coqui*, accidentally introduced to east Hawaii Island in the late 1980s, has since become established as scattered populations across the island. Mark-recapture study plots indicate that population size remains small for the first year after initial colonization. Plots in heavily forested areas where the coquí has become well-established yield population estimates of frog density three times the estimates reported from native populations in Puerto Rico. Surveys of the Hilo area using sound pressure level meters found many loud chorusing populations producing sound pressure levels up to 73 dB suggesting that this frog will achieve high densities through broad areas of Hawaiian forest and towns. The authors suggest that the apparent lack of native or exotic predators in Hawaii and abundance of suitable retreat sites contribute to achievement of unusually high population densities of *E. coqui* in Hawaii compared with Puerto Rico.

AMPHIBIANS OF MAURITANIA

J. M. Padial and I. De la Riva [2004, *Revista Española de Herpetología* 18:89-99] present the first distributional checklist with commentaries of amphibians of Mauritania. This country contains 11 anuran species belonging to three families: Bufonidae (three species), Hyperoliidae (one species), and Ranidae (seven species). New distribution information includes the first record of *Ptychadena* aff. *mascareniensis* and the second record of *Pyxicephalus edulis* in Mauritania. Two species have been removed from the list (*Bufo mauritanicus* and *Hildebrandtia ornata*). Most species are Afrotropical and inhabit the Sahel savannas of the south, while some occur in wet areas of the Sahara. There are believed to be at least 19 other unreported species in the country.