Okeechobee, Florida 34974, USA, and **DENNIS N. DAVID**, Florida Game and Fresh Water Fish Commission, 4005 South Main Street, Gainesville, Florida 32601, USA.

TESTUDINES

CHRYSEMYS PICTA PICTA (Eastern Painted Turtle). **PREDATION.** Previous accounts of predation by invertebrates on reptiles and amphibians focused primarily on lizards and frogs (Bauer 1990. Herpetol. Rev. 21:83-87; Hinshaw and Sullivan 1990. J. Herpetol. 24:196-197; McCormick and Polis 1982. Biol. Rev.57:29-58), but crabs regularly prey on sea turtle hatchlings (Stancyk 1982, *In* K. Bjorndal (ed.) Biology and Conservation of Sea Turtles, pp. 139-152). Here I report predation by invertebrates on juvenile freshwater turtles. Two hatchling and one small juvenile *Chrysemys picta* (CL 20-30 mm) were observed being attacked by large (40-50 mm) giant water bugs (Hemiptera: Belostomatidae) on three different occasions during early summer 1990. These attacks occurred along the vegetated margins of a shallow pond (3 ha) at the Patuxent Wildlife Research Center, Prince Georges Co., Maryland. In all three cases, the water bugs firmly grasped the turtles' carapace from the top with their legs and inserted their proboscis at the base of the turtles' necks beneath the anterior rim of the carapace. Only one of the turtles appeared alive when discovered, and it was not actively resisting or attempting to escape. About 30 min later, the water bug was on the now dead turtle and still had its proboscis inserted. Although hatchling turtles are vulnerable to many predators, most studies have focused on vertebrates. My observations suggest that large aquatic invertebrates also may be an important factor in juvenile turtle mortality.

Submitted by **STEVE W. GOTTE,** U. S. Fish and Wildlife Service, National Museum of Natural History, Washington, D.C. 20560, USA.

SERPENTES

COLUBER CONSTRICTOR (Black Racer). **PREDATION.** Annual mortality of adult *Coluber constrictor* is known to vary from 21-46% among three populations (Brown and Parker 1984. *In* R. A. Seigel, L. A. Hunt, J. L. Knight, L. Malaret, and N. L. Zuschlag (eds.), Vertebrate Ecology and Systematics, a Tribute to Henry S. Fitch. Univ. Kansas Mus. Nat. Hist. Special Publ. No. 10, pp. 13-40; Fitch 1963. Univ. Kansas Publ. Mus. Nat. Hist. 15:351-468; Rosen 1991. Copeia 1991:897-909), but the specific sources of adult mortality are poorly known. During the period 20 July - 18 October 1989, we radiotracked ten adult *C. constrictor* on the Savannah River Site near Aiken, South Carolina. Two snakes (20%) suffered predation in this period. One snake (male, 83 cm SVL, 140 g) was released on 28 July and monitored daily as it moved around and through a Carolina bay. On 3 August, it was eaten by a 112 cm, 420 g female *Lampropeltis getulus*. A second *C. constrictor* (female, 90 cm, 164 g), was released on 28 July. Over the next nine days it moved >1.2 km from the original point of capture. On 6 August, the snake was tracked to a mixed pine/hardwood forest where it was found in a pre-shedding opaque condition coiled in an abandoned bird nest 6 m up in a pine tree. When the nest was checked the following morning, the snake's head and anterior part of its body were missing.

Mortality in our approximate 90-day study was similar to that in Fitch and Shirer's (1971. Copeia 1971:118-128) radiotelemetric study of *C. constrictor* in which two of 12 (17%) snakes predation over a period of <102 days. If the 90-day morta study is adjusted up to an annual rate (Krebs 1989. E Methodology. Harper & Row, New York, 654 pp.), obtained (60%) is greater than annual mortality observe natural populations. The calculation of annual morta mortality observed in a restricted part of the year ass mortality is constant over the entire year, an assumpti may not be true in *C. constrictor* (Brown and Parker 198 However, the calculation strongly suggests that the 20% observed over 90 days was, in fact, high.

Although these data are limited, they suggest that s mortality of adult *C. constrictor* may result from predatio these snakes being relatively large, fast-moving, alert, sionally aggressive (Fitch 1963. op. cit.).

Small snakes with implanted transmitters may suffer of predation in the short term perhaps as a result of the mass burden of the transmitter (Plummer 1990. J. Herpet 328). In this study, the ratio of transmitter mass/body less than 5%.

We thank J. Haskins for assisting in radiotracking. was supported by contract DE-AC09-76SROO-819 be U.S. Department of Energy and the University of Georgi nah River Ecology Laboratory.

Submitted by **MICHAEL V. PLUMMER** and **JU CONGDON**, Savannah River Ecology Laboratory, Aiken, South Carolina 29801, USA. Present address (M partment of Biology, Harding University, Searcy, Arkan USA.

LAMPROPELTIS PYROMELANA (Sonoran Mount snake). **PREDATION.** As part of a continuing study o spotted owl (*Strix occidentalis lucida*) diet in Arizona Mexico, I identified the skeletal and epidermal remain brate and invertebrate prey items, primarily from re pellets. Mexican spotted owls feed on a variety of mamm reptiles, and arthropods, although mammals make up t their diet (>90% biomass; Duncan and Sidner 1990. G Nat. 50:197-200; Ganey 1988. M.S. thesis, Northern Ariz Flagstaff; E. D. Forsman, pers. comm., 1990; R. B. Du study and unpubl. data). Snakes are considered a rare pr spotted owls (Ross 1989. Wisconsin Endangered Species 59). Ross (op. cit.) compiled published accounts of spotte containing reptiles and amphibians, in which only one western terrestrial garter snake (*Thamnophis elegans*), mented.

In this study of spotted owl prey, reptiles accounted of the total number of prey items (N = 2557) and < biomass. Among the catalogued reptiles, only one sna lizards were identified (Duncan, unpubl. data). The mountain kingsnake was identified from a pellet sampl regurgitated in July 1989 in the Huachuca Mountains, Co Arizona beneath a roost in a steep canyon (elev. 1737-2 montane riparian woodland bordered by montane con and Madrean Evergreen Woodland (Brown 1982. Des 4:1-342). The specimen has been deposited at the USFS, S Regional Office, Albuquerque, New Mexico, as part of a tive collection of Mexican spotted owl prey items.

This manuscript benefited from the editorial commen Reichenbacher and J. D. Taiz, and was written while t was supported by a professional services contract from

study of *C. constrictor* in which two of 12 (17%) snakes suffered predation over a period of <102 days. If the 90-day mortality in our study is adjusted up to an annual rate (Krebs 1989. Ecological Methodology. Harper & Row, New York, 654 pp.), the value obtained (60%) is greater than annual mortality observed in three natural populations. The calculation of annual mortality from mortality observed in a restricted part of the year assumes that mortality is constant over the entire year, an assumption which may not be true in *C. constrictor* (Brown and Parker 1984. op. cit.). However, the calculation strongly suggests that the 20% mortality observed over 90 days was, in fact, high.

Although these data are limited, they suggest that significant mortality of adult *C. constrictor* may result from predation, despite these snakes being relatively large, fast-moving, alert, and occasionally aggressive (Fitch 1963. op. cit.).

Small snakes with implanted transmitters may suffer high rates of predation in the short term perhaps as a result of the increased mass burden of the transmitter (Plummer 1990. J. Herpetol. 24:327-328). In this study, the ratio of transmitter mass/body mass was less than 5%.

We thank J. Haskins for assisting in radiotracking. This work was supported by contract DE-AC09-76SROO-819 between the U.S. Department of Energy and the University of Georgia's Savannah River Ecology Laboratory.

Submitted by **MICHAEL V. PLUMMER** and **JUSTIN D. CONGDON**, Savannah River Ecology Laboratory, Drawer E, Aiken, South Carolina 29801, USA. Present address (MVP): Department of Biology, Harding University, Searcy, Arkansas 72143, USA.

LAMPROPELTIS PYROMELANA (Sonoran Mountain Kingsnake). **PREDATION.** As part of a continuing study of Mexican spotted owl (*Strix occidentalis lucida*) diet in Arizona and New Mexico, I identified the skeletal and epidermal remains of vertebrate and invertebrate prey items, primarily from regurgitated pellets. Mexican spotted owls feed on a variety of mammals, birds, reptiles, and arthropods, although mammals make up the bulk of their diet (>90% biomass; Duncan and Sidner 1990. Great Basin Nat. 50:197-200; Ganey 1988. M.S. thesis, Northern Arizona Univ., Flagstaff; E. D. Forsman, pers. comm., 1990; R. B. Duncan, this study and unpubl. data). Snakes are considered a rare prey item of spotted owls (Ross 1989. Wisconsin Endangered Species Res. Rep. 59). Ross (op. cit.) compiled published accounts of spotted owl diet containing reptiles and amphibians, in which only one snake, the western terrestrial garter snake (*Thamnophis elegans*), was documented.

In this study of spotted owl prey, reptiles accounted for <0.5% of the total number of prey items (N = 2557) and <0.2% total biomass. Among the catalogued reptiles, only one snake and 12 lizards were identified (Duncan, unpubl. data). The Sonoran mountain kingsnake was identified from a pellet sample that was regurgitated in July 1989 in the Huachuca Mountains, Cochise Co., Arizona beneath a roost in a steep canyon (elev. 1737-2134 m) in montane riparian woodland bordered by montane conifer forest and Madrean Evergreen Woodland (Brown 1982. Desert Plants 4:1-342). The specimen has been deposited at the USFS, Southwest Regional Office, Albuquerque, New Mexico, as part of a comparative collection of Mexican spotted owl prey items.

This manuscript benefited from the editorial comments of F. W. Reichenbacher and J. D. Taiz, and was written while the author was supported by a professional services contract from the U. S. Forest Service (USFS), Southwest Region.

Submitted by **RUSSELL B. DUNCAN** Biologists, Tucson, Arizona, USA; Address 607 N. 6th Ave., Tucson, Arizona 85705, U

MASTICODRYAS PLEII. (NCN). **ANTI IOR**. During field work in the northweste sula de Paraguaná, north-midwestern Ve *Mastigodryas pleii* crawling slowly on the patch of vegetation. When disturbed, th escape by crawling rapidly to a grou (Cactaceae), where it stopped under one t slowly to climb the spines of the cactu uppermost pad (ca. 1.3 m above groun mained immobile but alert for 1-2 min be

In another instance, near Cabo San Ro treme of the Peninsula de Paraguaná), an similar behavior. The second snake was lizard (*Ameiva bifrontata*) under an *O. went* escape from the collector by climbing into cactus and it also then stayed quiet but al

We infer that this behavior could refle response to medium- to large-sized terres The *O. wentiana* pads detach very easily. T skin readily, are very difficult to remove,

Submitted by **ABRAHAM MIJARES-U ARENDS R. CIEZA-UNEFM**, Apartado 7 ezuela.

OPHRYACUS UNDULATUS (Horned P **DISTURBANCE**. *Ophryacus undulatus* is distributed in the Sierra Madre del Sur o west-central Veracruz, the Mixteca regio and Lamar 1989. The Venomous Rept Comstock Publ. Assoc., Cornell Univ. Pres pp.), and Hidalgo (O. Flores, pers. comm

An adult male *O. undulatus*, SVL = 536 m collected on 14 July 1990 at El Portrero, Ten This snake had an intestinal obstipatio vealed to be a skull of the Mexican vole (*M* of the skull, especially the broken zygomat the wall of the large intestine, obstructin Scales and bones of one *Sceloporus gram* that was ingested in captivity were also f

A detailed external macroscopic exam area revealed strong swelling of the intes the wounds caused by the pieces of the healed over, they still contained the whol

Information regarding this kind of pert from captive animals (e.g., *Boa constrict* terrestrial chelonians (Frye 1981. Biomedi of Captive Reptile Husbandry. Veterina Our observation suggests that misdigeste conditions may have potentially lethal co

We thank Arturo González, Adolfo Na M. Smith, and Jack Sites, Jr. for their comm Mario Mancilla for help in the field, and Pérez for identifying the mouse. Financia by the Direccion General de Apoyo a (DGAPA) project IN201789.