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## HERPETOCULTURE NOTES

### TESTUDINES — TURTLES

**CUORA GALBINIFRONS GALBINIFRONS (Indochinese Box Turtle). POST-COPULATORY SNIFFING BEHAVIOR.** With the exception of a few species that are commonly kept and bred in captivity, relatively little is known about the breeding biology and reproductive behaviors of geomydid turtles belonging to the genus *Cuora*. In this note we describe an unusual post-copulatory behavior observed and video-recorded in an adult sexual pair of *C. galbinifrons galbinifrons* that had been introduced for breeding purposes at the Wildlife Conservation Society, Bronx Zoo.

The Bronx Zoo acquired an adult male *Cuora galbinifrons galbinifrons* from a dealer in November 1985 and an adult female in July 1986, which have been housed together for the majority of their time at the zoo. Copulation and egg laying by this pair has occurred in the past, but all eggs received to date have been non-viable. Since September 2010, the pair has been housed separately in plastic enclosures measuring 1.2 x 0.4 x 0.6 m (l x w x h). Beginning 5 November 2010, in an attempt to stimulate reproductive cycling, the pair was brumated inside their enclosures with a 25-cm deep mixture of coconut fiber and peat moss covered with leaf litter. Cork bark hides and a large water bowl were also provided.

Following a five-month-long period, during which temperatures dropped as low as 15°C, the pair was brought out of brumation on 4 April 2011, and first reintroduced in the female's enclosure for 15 minutes on 18 April. Although the male repeatedly attempted to mount the female during initial introductions, copulation was not observed until their sixth introduction on 22 May. After 16 min of unsuccessful mounting attempts by the male, the female emerged from her shell and became receptive to the male's advances. At this time, the female moved about the enclosure while manipulating her tail to reveal the cloaca. The male proceeded to mount the female, grasping the underside of the female's carapace with his hind limbs and wrapping his tail around the tail of the female. Copulation lasted for ca. 8 min.

Following copulation, the male spent several minutes adjusting and retracting his penis, and the female turned to face the male. As the male turned away, the female approached the male's post-vertebral marginal scutes, lowered her head towards the male's cloacal region, and appeared to sniff the area for approximately eight seconds. Shortly thereafter, both turtles reversed their positioning and the male lowered his head and sniffed the cloacal region of the female for five seconds before turning away to charge at the observer.

Although limited to just a single observation, this account adds new information to what has been reported on the reproduction and behaviors of *C. galbinifrons* (e.g., Fiebig and Lehr 2000. Salamandra 36[3]:147–156; Fritzsche and Fritzsche 2005. Radiata 14[2]:48–49; Hiller 2005. Radiata 14[2]:44–47), and may be useful to other zoos and institutions seeking to reproduce this species in captivity. Moreover, this behavior may also provide further insight on the role of olfaction in turtles.

Cloacal sniffing has been observed in many chelonians as a precursor to copulation (see e.g., Mason 1992. In Gans and Crews [eds.], Biology of the Reptilia: Physiology E, pp. 114–228. University of Chicago Press, Chicago, Illinois; Halpern 1992. In Gans and Crews, *op. cit.*, pp. 424–532), and is currently thought to play important roles in species and gender discrimination as well as provide information on the reproductive status of females (Galeotti et al. 2007. Copeia 2007:980–985; Liu et al. 2009. Amphibia-Reptilia 29:185–195). The behavioral interactions described here for *C. galbinifrons* differ from earlier reports of sniffing behavior in that they took place after copulation had occurred, and sniffing was initiated by the female and then reciprocated by the male. Thus, this behavior in *C. galbinifrons* probably cannot be explained by previous explanations of sniffing behavior in turtles (e.g., Galeotti et al., *op. cit.*; Liu et al., *op. cit.*), but further observations are needed to understand its purpose as well as its importance in the reproduction of this species.

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### SQUAMATA — SNAKES

**AGKISTRODON CONTORTRIX CONTORTRIX (Southern Copperhead). MAXIMUM CAPTIVE LENGTH.** The current maximum documented total body length (TL) for any wild-caught form of *Agkistrodon contortrix* is 53 in. (134.62 cm) based on a specimen from White Plains, New York, USA, and reported by Ditmars (1931. *Snakes of the World*. MacMillan Co., New York. 207 pp.). Cagle (1968. *In* Blair et al. [eds.], *Vertebrates of the United States*, pp. 273–358. MacGraw Hill, New York) reported a specimen of *A. contortrix* with a total length of 57 in. (144.78 cm), although the subspecies was not indicated and a voucher specimen was not referenced.

Largest of the documented specimens of the southern form of *A. contortrix* include two Louisiana individuals, one 52 in. (132.1 cm) TL individual cited in Conant (1975. *A Field Guide to the Reptiles and Amphibians of Eastern and Central North America*, 2<sup>nd</sup> ed. Houghton Mifflin Co., Boston, Massachusetts. 429 pp.) and a 50.125 in. (127.3 cm) TL male measured by Douglas A. Rossman and cited in Gloyd and Conant (1990. *Snakes of the Agkistrodon Complex: a Monographic Review*. SSAR Contributions to Herpetology 6, vi + 614 pp.).

Captive specimens can clearly reach dimensions normally not obtained in wild populations; however, the following report suggests the possible body length that can occur in southern forms of *A. contortrix*. On 21 April 2001, an unsexed *A. contortrix* was captured by EC just west of CR 269, approximately 2 miles N of I-10, in Gadsden Co., Florida, USA (30.645°N, 84.820°W). No measurements were taken at the time of capture, although the snake likely was born in the fall of 2000. The specimen remained in captivity from initial capture until death, which occurred on 18 April 2012. Immediately following death, the specimen was measured by EC using a steel rule, and showed a total body length of 147.32 cm (58 in.) (Fig. 1). Sex was not determined. The specimen is believed to represent the largest documented wild-caught or captive *A. contortrix*, a voucher photograph of which has been deposited in the collection of the South Carolina State Museum, Columbia, South Carolina.



FIG. 1. Record length *Agkistrodon c. contortrix* being measured following its death.

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**NERODIA SIPEDON (Northern Watersnake). CAPTIVE LONGEVITY.** *Nerodia sipedon* is a common water snake of the northern and southeastern United States. The natural lifespan of this species is currently unknown but a longevity record of 9 years, 7 months, 24 days for a captive *Nerodia sipedon pleuralis* has been published (Slavens and Slavens 1999. *Reptiles and Amphibians in Captivity: Breeding, Longevity, and Inventory*. Slaveware, Seattle, Washington; Snider and Bowler 1992. *Longevity of Reptiles and Amphibians in North American Collections*. SSAR Herpetol. Circ. 21, 40 pp.). Here we report a *Nerodia sipedon sipedon* that attained a minimum known age of 21 years.

This snake had reportedly been captured near Traverse City, Michigan, USA in the fall of 1991 and donated to an elementary school for a class pet by the student who caught it. The student reportedly had kept the snake for some time (two or more years) before it was donated to the school, but confirming details on this point are unavailable. The snake was estimated to have been at least 45–50 cm in total length in 1993 when it came to the attention of the junior author (KR), but exact measurements were never taken. KR was given possession of the snake in 1995.

The sex of the specimen was unconfirmed but it was presumed to have been male, an assumption supported by its small relative size, as males are smaller than females in this species (Ernst and Ernst 2003. *Snakes of the United States and Canada*. Smithsonian Books, Washington, DC. 668 pp.). Since 1995 it had been maintained in a screen-topped cage measuring 76 x 30.5 cm in horizontal dimensions, heated with a “hot rock,” with bark bedding and two water dishes, and positioned near a south-facing window. It was typically fed about 12 small goldfish once per week, except during the winter months, when it would sometimes refuse food for several weeks at a time.

On 23 January 2012, after a prolonged fast, the snake was observed to have a swollen area near the tail, and was taken to a veterinarian and determined to have a “rectal prolapse” and possible septicemia. It died later that day. Although exact measurements were not made, the snake was approximately 68 cm in total length at death. It seems reasonable to assume that this Northern Watersnake was at least one year old in fall of 1991; thus its minimum attained age would be 21 years and perhaps 4–5 months (given that parturition in this species typically occurs from late July through early September in northern Michigan).

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