



FIG. 2. Adult (presumably male and female) Indiana *Coluber constrictor* in a tangle of Oriental Bittersweet 4.1 m above ground. Note the head of the presumed male above that of the presumed female, and the partially everted left hemipenis of the male in the upper left.

On 6 May 2016, at 0940 h (air temp ca. 15°C, sunny, calm winds), in a middle-growth woodlot located 3.7 km SE of Centerville, Wayne County, Indiana, USA, I observed two racers moving along tree branches (*Liriodendron tulipifera*) among Oriental Bittersweet (*Celastrus orbiculatus*) vines at heights of 4.1 and 4.7 m above ground (Fig. 1). I immediately left the site so as not to further disturb them. I returned briefly at 0957 h and the higher snake (presumably male) had descended to the level (4.1 m) of the lower (presumably female) snake in a thick tangle of Bittersweet, and appeared to be courting her (bodies aligned, male rubbing/writhing against the female, head above hers, but no biting observed). When I returned at 1123 h they were in the same approximate location and positions, and appeared to be copulating (Fig. 2), but by ca. 1230 h, when I again returned, they were not in the area. This date is well within the normal reported mating season of the species (e.g., Fitch, *op. cit.*), but this is the first record of arboreal courtship and copulation for *C. constrictor*.

JOHN B. IVERSON, Department of Biology, Earlham College, Richmond, Indiana 47374 USA; e-mail: johni@earlham.edu.

CROTALUS OREGANUS HELLERI (Southern Pacific Rattlesnake). LOSS OF RATTLE STYLE AND MATRIX. The loss of the rattle and style/matrix has been previously reported for *Crotalus atrox* (Western Diamond-backed Rattlesnake) and *C. ruber* (Red Diamond Rattlesnake) (Schuett et al. 2012 Herpetol. Rev. 341–342). Here we report apparent rattle loss in a wild-caught *C. o. helleri* from within the same field site (Rancho Jamul Ecological Reserve, California, USA) as the *C. ruber* reported by Schuett et al. (*op. cit.*).

On 04 Oct 2014 an adult male *C. o. helleri* (SVL = 902 mm, tail length = 68 mm; 540 g) was captured coiled at the base of a large rock outcrop (32.68613°N, 116.85632°W, WGS 84). No rattle was noted (Fig. 1), nor was any injury or scarring that would indicate the loss of rattle due to trauma; upon handling defensive responses included posturing and attempted rattling (i.e., tail shaking). Radiographs were taken to compare morphology of the



FIG. 1. Coiled posture of rattlesnake *Crotalus oreganus helleri* prior to radiographs.

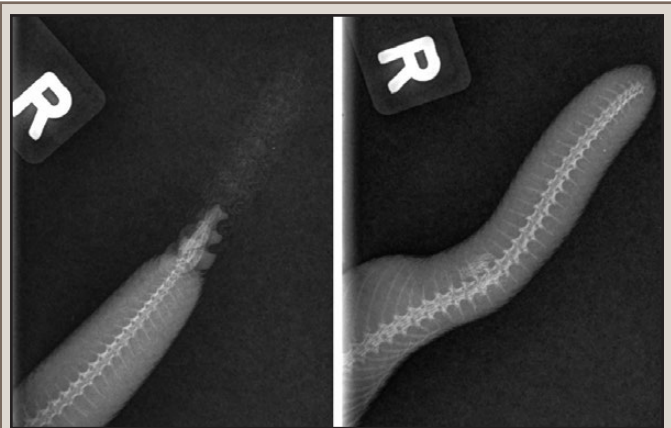


FIG. 2. Radiographs of rattled (left) and rattlesnake (right) adult male *Crotalus oreganus helleri*.

rattlesnake *C. o. helleri* to a rattled adult male *C. o. helleri* (Fig. 2). Radiographs were taken by Thomas Boyer, DVM, that confirmed the lack of an underlying rattle matrix.

Since 2011, we have captured 26 *C. o. helleri* from within Rancho Jamul Ecological Reserve and 19 *C. o. helleri* from the neighboring protected area of Hollenbeck Wildlife Canyon, suggesting the occurrence of rattlesnake is rare within this population. The loss of the rattle from injury as a neonate cannot be eliminated; however, the absence the style and matrix as indicated by radiographs suggests a congenital loss of rattle style and matrix. As Schuett et al. (*op. cit.*), we favor a non-injury hypothesis that this phenotypic change is genetic in nature either as direct mutation to structural (e.g., Hox) genes or through the action of transposable elements.

Although rare, rattlesnake individuals appear able to survive to adulthood without the use of the rattle as a defensive mechanism. Additional research into phenotype frequency, heritability, and fitness effects would contribute to understanding the evolutionary and ecological aspects of rattle loss and a deeper understanding of the genetic mechanisms involved.

STEPHEN RICE (e-mail: stephen-rice@hotmail.com), **BREANNA PUTMAN, HANNES SCHRAFT,** and **RULON CLARK,** San Diego State University, 5500 Campanile Drive, Department of Biology, San Diego, California 92182, USA.