

NATURAL HISTORY NOTES

Pseudocopulation in the Gila Spotted Whiptail, *Cnemidophorus flagellicaudus*

Robert L. Bezy

Herpetology,

Natural History Museum of Los Angeles County
Los Angeles, CA, 90007

Erik F. Anderson

3234 E. Patricia St. Tucson, AZ, 85716

Six species of unisexual whiptails were included in the list of amphibians and reptiles of Arizona that appeared in the June issue of *Sonoran Herpetologist* (Arizona Game and Fish Department 2002). These all-female lizards reproduce by a process known as parthenogenesis in which their eggs develop without fertilization. Research indicates that unisexual whiptails originated as a result of hybridization (cross-breeding between species; summary in Wright 1993). These all-female lizards appear to be reproductively self-sufficient, able to establish and continue their lineages without the need of males, copulation, or fertilization. At least, this is the predominant view of unisexual reptiles in both the popular and technical literature.

Surprisingly, there is another viewpoint on the role of “sexual” behavior in all-female whiptails that was first presented nearly a quarter of a century ago and has been supported by data from diverse sources (summary in Crews and Moore 1993). In 1978 David Crews at Harvard University and Kevin Fitzgerald at the University of Colorado independently observed behavior in captive all-female whiptails that was remarkably similar to copulation in sexually reproducing species. This behavior in unisexuals is termed pseudocopulation and involves one female mounting another, biting her on the back of the neck, and swinging the tail beneath the mounted individual. The mounting lizard then shifts her grasping jaws from the neck to the pelvic region, with the cloacal openings of the two individuals in close contact. In this position the mounting lizard forms a “doughnut” shaped figure around the posterior region of the mounted female (Crews and Moore 1993).

Studying captive lizards of three all-female species of whiptails (*Cnemidophorus uniparens*, *C. velox*, and *C. tessellatus*), Crews and Fitzgerald (1980) found a relationship

between pseudocopulation and reproductive condition and they hypothesized that this behavior might be an important factor in their reproductive cycles. Several subsequent studies of the Desert Grassland Whiptail (*C. uniparens*) have supported the relationship between pseudocopulation and reproductive condition (Crews and Moore 1993; Crews et al. 1986; Grassman and Crews 1986).

Is pseudocopulation just some aberrant artifact of captivity, or does it occur in nature and thus potentially may play an important role in natural populations of unisexual lizards? Indirect evidence of this behavior in nature was reported by Crews and Young (1991) who examined 137 Desert Grassland Whiptails (*Cnemidophorus uniparens*) captured in 1990 near the Arizona - New Mexico border and found V-shaped scars present on the side of the body of 45% of the lizards. These scars were not found in juveniles and appeared to be identical to those produced by pseudocopulation in captivity.

Pseudocopulation was photographed and reported by Werner (1980) between unisexual Mourning Geckos (*Lepidodactylus lugubris* complex) living inside a house on Kahaluu, Oahu, Hawaii. He interpreted the behavior as a manifestation of social rank. The behavior also has been observed in nature between two Desert Grassland Whiptails by J. Myatt and was reported by Crews and Young (1991). Clearly, additional documentation is needed to confirm that pseudocopulation occurs in natural populations of unisexual lizards and thus may potentially play a role in their reproductive biology.

We observed and photographed (Fig. 1) two Gila Spotted Whiptails (*Cnemidophorus flagellicaudus*, unisexual) in apparent pseudocopulation at ca 1000h. on 6 June 2001 near Cherry Creek, 11.6 miles (by road) north of the Coon Creek bridge, southeastern flank of the Sierra Ancha, Gila County, Arizona. When first observed the mounting lizard was encircling the mounted female in the doughnut position, grasping her on the posterior side of the body, and the cloacal regions of the two appeared to be closely juxtaposed. After we photographed the pair they dismounted. We attempted to noose the two lizards involved, but succeed only in capturing the mounted lizard. Two additional *C. flagellicaudus* were noosed in the immediate area but comparisons of the specimens with the photographs taken of the pair in pseudocopulation do not indicate that either is the mounting lizard. No other species of whiptails were observed at this locality and the three individuals captured were found to be female.

We thank John W. Wright for identifying the three specimens of whiptails that were captured.



Fig. 1. Gila Spotted Whiptails (*Cnemidophorus flagellicaudus*) observed in pseudocopulation near the Sierra Ancha, Gila County, Arizona (Photo by Erik F. Anderson).

Literature Cited

- Arizona Game and Fish Department. 2002. Current list of amphibians and reptiles in Arizona and their status. *Sonoran Herpetologist* 15:62-66.
- Crews, D., and K. T. Fitzgerald. 1980. Sexual behavior in parthenogenetic lizards. *Proc. Natl. Acad. Sci. USA* 77:499-502.
- Crews, D., and M. C. Moore. 1993. Psychobiology of reproduction of unisexual whiptail lizards. In J. W. Wright and L. J. Vitt (eds.), *Biology of Whiptail Lizards (genus Cnemidophorus)*, pp. 257-282, Oklahoma Museum of Natural History, Norman.
- Crews, D., and L. J. Young. 1991. Pseudocopulation in nature in unisexual whiptail lizards. *Anim. Behav.* 42:512-514.
- Crews, D., M. Grassman, J. Lindzey. 1986. Behavioral facilitation of reproduction in gonochoristic and parthenogenetic *Cnemidophorus* lizards. *Proc. Natl. Acad. Sci. USA* 83:9547-9550.
- Grassman, M., and D. Crews. 1986. Progesterone induction of male-like pseudosexual behavior and stimulus-response complementarity in an all-female lizard species. *Hor. Behav.* 20:327-335.
- Werner, Y. L. 1980. Apparent homosexual behavior in an all-female population of a lizard, *Lepidodactylus lugubris* and its probable interpretation. *Z. Tierpsychol.* 54:144-150.
- Wright, J. W. 1993. Evolution of the lizards of the genus *Cnemidophorus*. In J. W. Wright and L. J. Vitt (eds.), *Biology of Whiptail Lizards (genus Cnemidophorus)*, pp. 27-81, Oklahoma Museum of Natural History, Norman.