



FIGURE 4. *Tantilla wilcoxi* (Chihuahuan Black-headed Snake) from the Huachuca Mountains, Cochise Co. with typical ventral coloration. Photo by Andrew T. Holycross.

elevations of the Huachuca, Patagonia, and Santa Rita mountains. These sites are mostly characterized by rocky canyons or slopes, often with a riparian canyon-bottom component (Rorabaugh 2013a). Lowe (1964) reported that *T. wilcoxi* extends downslope into Semidesert Grassland, and in Coahuila, México, it occurs in "both oak-pine forests and rocky, semiarid habitats" (Lemos Espinal and Smith 2007b). However, in AZ, all verified and vouchered localities are from montane woodlands. Specimens from Mowry in the Patagonia Mountains and the entrance to Carr Canyon in the Huachuca Mountains were from the oak woodland-grassland ecotone. Within these montane woodland communities, *T. wilcoxi* is typically found under rocks or other surface debris such as logs and dead agaves, yuccas, and *Dasilyrion* (Lowe 1964; Fowlie 1965).

■ **DIET AND FORAGING BIOLOGY.** Diet is poorly known, but *T. wilcoxi* reportedly feeds on centipedes, insect larvae, millipedes, scorpions, and spiders (Fowlie 1965; Behler and King 1979; Stebbins 2003; Lemos Espinal and Smith 2007b). Based on diets of other *Tantilla* in AZ, it likely feeds on a variety of other invertebrates.

■ **PREDATORS AND PARASITES.** A variety of vertebrates and invertebrates prey on *T. wilcoxi*. Van Denburgh and Slevin (1913) removed a *T. wilcoxi* from the stomach of a *Diadophis punctatus*

from Ramsey Canyon, Huachuca Mountains. Liner (1983) noted that a *T. wilcoxi* was consumed by a *Hypsiglena jani* when both were in a collecting bag. Parasites of *T. wilcoxi* have not been studied.

■ **BEHAVIOR.** Presumably fossorial and nocturnal, this species forages for invertebrates in loose soil and leaf litter and under surface debris. Although most are found under surface objects during the day, the sole specimen from the Peloncillo Mountains, NM was collected crossing a road mid-day on 30 September 2018 (Hansen and Tremper 2018). Collections in AZ have occurred from 7 March to 22 September, and in every intervening month except June. All but four of the 23 collections occurred during the summer monsoon season (collection dates of 19 July–20 August).

■ **REPRODUCTION.** Wright and Wright (1957) reported that mature males and females measure 214–270 mm and 175–215 mm (presumably TL), respectively. Eight males examined from the University of Arizona collection (four from AZ, four from México) were all undergoing spermiogenesis, including two collected in July, five in August, and one in September. The smallest male producing sperm was 168 mm SVL (Goldberg 2004f). Although egg production is poorly studied in this species, 1–3 eggs are reportedly laid in spring or summer (Behler and King 1979; Lemos Espinal and Smith 2007a). Goldberg (2004f) found a single oviductal egg measuring 27 x 8 mm in a female collected 22 September from Santa Cruz Co. Another female collected 22 August from Sonora, México, was not undergoing yolk deposition. Hatchlings resemble small adults and likely measure 90–140 mm TL (Rorabaugh and Lemos Espinal 2016).

■ **REMARKS.** *Tantilla wilcoxi* was most recently reviewed by Liner (1983) and Rorabaugh (2013a).

■ **ACKNOWLEDGMENTS.** I thank Trevor Persons for a review of this account.

## *Tantilla yaquia* YAQUI BLACK-HEADED SNAKE

James C. Rorabaugh

■ **TAXONOMY.** *Tantilla yaquia* was described by Hobart M. Smith (1942a) based on an adult female (MCZ 43274) collected at Guasaremos on the Río Mayo, Chihuahua, México, by Howard S. Gentry in August 1936. Norman E. Hartweg (1944) described *Tantilla bogerti* based on two specimens from Acaponeta, Nayarit, and noted its close relationship to *T. yaquia*. Smith and Van Gelder (1955) reported a *T. yaquia* from central Sinaloa and considered *T. yaquia* distinct from *T. bogerti*; however, Zweifel and Norris (1955) collected a specimen at Mirasol, about 112 km south of Guasaremos in the mountains of southeastern Sonora, that shared characters with *T. bogerti* from Nayarit and Smith's *T. yaquia* from Guasaremos. They referred the Mirasol specimen to *T. yaquia yaquia*, the first use of that combination; considered *T. yaquia* and *T. bogerti* to be sub-specifically related; and noted clinal variation in these snakes along the western coast of México. McCoy (1964), reporting on the addition of *T. yaquia* to the herpetofauna of AZ and the United States, found evidence that *T. yaquia* and *T. bogerti* should be considered conspecific. Noting a clinal variation in color patterns among *T. planiceps*, *T. eiseni*, *T. utahensis*, and *T. yaquia*, Tanner (1966) placed both *yaquia* and *bogerti* as subspecies of *T. planiceps*. However, that arrangement was rejected by McDiarmid (1968) based on a detailed analysis of characters used by Tanner (1966). McDiarmid (1968) also noted north-to-south clinal variation in *T. yaquia* and *T. bogerti* and concluded these taxa represent within-species variation along that clinal gradient. McDiarmid (1968) and Hardy and McDiarmid (1969) also concluded that *T. yaquia* was distinct from *T. planiceps*, although Cole and Hardy (1981) considered them sister taxa. Wilson (1999) placed *T. yaquia* in the *planiceps* species group of *Tantilla*. Crother (2017) listed no subspecies of *T. yaquia*.



FIGURE 1. *Tantilla yaquia* (Yaqui Black-headed Snake) from the Santa Rita Mountains, Pima Co. Photo by Timothy A. Cota.

**ETYMOLOGY.** The generic name *Tantilla* (L. *tantillus*, a small thing) refers to the diminutive size of snakes in this genus. The term is feminine in gender (Wilson 1982). The specific name *yaquia* refers to the Yaqui (Yoeme) Tribe, a cultural group centered on the lower Río Yaqui of Sonora (Wilson and Mata-Silva 2014).

■ **DESCRIPTION.** *Tantilla yaquia* is a small (maximum 325 mm TL), slender, fossorial, and secretive species similar to other *Tantilla* in AZ. The head is not distinctly differentiated in shape from the neck (Fig. 1; Fig. 3 in the *Tantilla hobartsmithi* account). Tail length is 21.2–27.4% and 17.2–28.5% of TL in males and females, respectively, with the highest percentages in northern (AZ and Sonora) populations (McDiarmid 1968, 1977; Wilson and Mata-Silva 2014). The two enlarged, grooved teeth in the rear of the upper jaw are presumably capable of delivering toxins from the Duvernoy's glands to prey. The hemipenis is semi-capitate with two very large, curved spines near the simple *sulcus spermaticus* near the base. There are no spinules below the basal spine, but there are 37–58 spines in two to four rows around the midsection (Cole and Hardy 1981). Detailed descriptions and illustrations of the hemipenes of seven *Tantilla* species are provided in Cole and Hardy (1981).

**COLORATION AND PATTERN.** This is a brown, grayish-brown, or tan snake (Fig. 2) with a dark gray, dark brown, or black cap atop the head that extends two to slightly more than four scales behind the posterior end of the furrow or suture between the parietal scales, and usually extends 0.5–3 scales below the angle of the mouth (Fig. 1; Fig. 3 in the *T. hobartsmithi* account). The posterior edge of the cap is usually not pointed. The supralabials are mostly white to cream (100% white to cream on supralabials 5 and 6), as is the lower one-half to one-third of the anterior temporal scale (Cole and Hardy 1981), creating a large and distinctive light cheek patch posterior to the eye and a light lip stripe below and anterior to the eye. The snout is often light-colored, as well. Posterior to the black cap is a light nuchal collar 1.0–1.5 scales wide that is not bordered by a dark band and does not contact the parietals. The small dark spots or maculations prevalent across the dorsal scales of *T. hobartsmithi* and *T. wilcoxi* are absent, or minute and few, in this species. In southern populations, dorsal scales posterior to the nuchal collar may exhibit a dark spot, and where these scales overlap, the color is also darker or there may be concentrations of small spots on the scale margins, which can give the impression of a dark stripe down the center of the scale rows (McDiarmid 1968). Some AZ specimens also exhibit these characters. A faint and thin, dark middorsal stripe is present in some specimens, and faint lateral dark stripes may be present as well. These are small, dark blood vessels showing through the translucent skin of the snake. Ventral coloration in life is cream grading to light pink or orange posteriorly (Smith 1942a; McDiarmid 1977; Degenhardt *et al.* 1996; Ernst and Ernst 2003; Lemos Espinal and Smith 2007a,b). In preserved specimens, the ventral coloration fades to light tan, light gray, or gray.

**SCUTELLATION.** Laterally on each side of the head are 1 preocular, 2 postoculars, no loreals,

a divided nasal, 6–8 (usually 7) supralabials, 6–7 (usually 6) infralabials, and 1+1 temporals. The nasal and preocular scales are in contact. The mental scale is usually separated from the anterior chin shields by the first infralabials in AZ specimens (McDiarmid 1968; Hardy and McDiarmid 1969). As in other AZ *Tantilla*, dorsal scale rows number 15 along the length of the body and the scales are smooth and not pitted. The cloacal scute and subcaudals are divided (Wilson 1982; Ernst and Ernst 2003). Throughout the species' range, males and females have 134–157 and 145–165 ventral scales and 50–73 and 46–75 subcaudal scales, respectively; however, in AZ, ventral counts are 145–157 (males) and 155–165 (females), and subcaudals are 50–73 (males) and 46–75 (females; McDiarmid 1968; Wilson and Mata-Silva 2014).

**SIMILAR SPECIES.** *Tantilla yaquia* resembles the other three *Tantilla* occurring in AZ (see Fig. 3 in the *T. hobartsmithi* account). It is distinguished from them by its bold, light nuchal collar, which is not in contact with the parietals and has no posterior dark border. As well, it has a light, postocular cheek patch that is particularly large and distinct (supralabials 5 and 6 are completely white or cream and the cheek patch extends upward onto the lower one-half to one-third of the anterior temporal). Within its range in AZ, the only other snake that might be confused with *T. yaquia* is *Diadophis punctatus*, which has a loreal (it may be missing on one side) and dark spots on the ventral scales.

■ **DISTRIBUTION AND ABUNDANCE.** Range-wide, *Tantilla yaquia* occurs from southeastern AZ and southwestern NM south through eastern and southern Sonora, western Chihuahua, and Sinaloa to the Río Santiago Valley in Nayarit (McDiarmid 1977; Ernst and Ernst 2003; Wilson and Mata-Silva 2014; Rorabaugh and Lemos Espinal 2016). It was reported only relatively recently from NM (Painter *et al.*



FIGURE 2. *Tantilla yaquia* (Yaqui Black-headed Snake) from the Pajarito Mountains, Santa Cruz Co. Photo by Randall D. Babb.

1992). These snakes occur from near sea level in Sinaloa (LACM 7001, Teacapán) to 1,830 m ASL in AZ. The lower-elevation collection and observation sites (<200 m) occur on the southwestern coast of Sonora, south through the coastal plain to Nayarit. *Tantilla yaquia* has been found near the AZ border in Sonora at L. Zapeta Ranch, ca. 24 km SE of Sasabe, and at Rancho Esmeralda, about 20 km SW of Nogales (R.D. Babb, pers. comm.). Another specimen was collected at 2.7 km SW of Aribabi, Sonora, which is ca. 155 km SSE of Douglas, and one was recently (2015) photo-documented in the Sierra El Tigre, 134 km SSE of Douglas. On the NM side of the Peloncillo Mountains, *T. yaquia* has recently been collected from multiple locations, including Antelope Pass (Wilcox *et al.* 2000), Skeleton Canyon (Painter *et al.* 1992), and Guadalupe Canyon.

The species was first reported in AZ and the United States by McCoy (1964) based on a re-examination of UCM 875 (originally identified as a *T. nigriceps nigriceps*) collected by Dr. C.L. Edmonson in 1907 at Bisbee (in the Mule Mountains), as well as a second Bisbee specimen (AMNH 4194) with incomplete collection data. Unfortunately, UCM 875 is now missing (R. Humphrey, pers. comm.). In AZ, *T. yaquia*

has been found in Cochise, Pima, and Santa Cruz counties (Map 30). In Cochise Co., vouchers record it from the Chiricahua, Mule, Peloncillo, and Swisshelm mountains. However, only one specimen (MSB 54920) has been collected on the AZ side of the Peloncillo Mountains, and it was collected “at Arizona/New Mexico line” in Guadalupe Canyon; it is regarded as an AZ specimen herein. Other Cochise Co. records include three specimens collected on SR 80 near Silver Creek between the Pedregosa and Perilla mountains (AMNH 128239, CAS 190319-20) and one from Fort Bowie between the Chiricahua and Dos Cabezas mountains (UAZ 42881; Lowe and Johnson 1976). In Santa Cruz Co., numerous specimens have been collected in the Atascosa-Pajarito mountain range complex and other vouchers document it from scattered localities, including: Big Casa Blanca Canyon, Santa Rita Mountains (UAZ 45886); near Papago Springs in the Canelo Hills (UAZ 50382); “Los Encinos” near Sonoita (UAZ 50646); a site just south of the Santa Cruz River ca. 8 km north of Nogales (UMMZ 225398); and from near Harshaw Townsite, Patagonia Mountains (ASU HP00109; Rorabaugh and Schmidt 2015). In Pima Co., *T. yaquia* has been vouchered from the “Santa Rita Experimental Station HQ” at

the mouth of Florida Canyon, Santa Rita Mountains (YPM 347), from Box Canyon, Santa Rita Mountains (ASU HP00399), and recently from Brown Canyon, Baboquivari Mountains (ASU HP00108). The paucity of records in and near the Canelo Hills and Santa Rita Mountains is curious, given the extensive collecting that has occurred in those areas. No specimens or observations are known from the Huachuca Mountains, which is also surprising. Turner (2007) noted *T. yaquia* in the Sonoita Creek State Natural Area on the Santa Rita Mountains bajada, which also supports *T. hobartsmithi*. Elevations of AZ localities range from 1,083 to 1,830 m ASL.

**QUESTIONABLE LOCALITIES.** A specimen (MVZ 43701) associated with the locality "Tombstone" but lacking any other associated data (*e.g.*, collector or collection date) is not mapped herein. The town of Tombstone is on a rolling bajada in Chihuahuan Desertscrub that is unlikely to support the species; however, this species might conceivably occur in the nearby Tombstone Hills or Dragoon Mountains. Given its presence in the Baboquivari Mountains, the species likely occurs in the Quinlan Mountains, but the only "*T. yaquia*" specimen from that area (Kitt Peak; UAZ 45527) is a misidentified *T. hobartsmithi*.

**STATUS AND TRENDS.** I am aware of only 44 museum specimens from AZ and believe that on any one day, collectors rarely take more than one *T. yaquia* per locality. Although no information exists to determine abundance, this secretive snake is likely more abundant than the relatively few AZ specimens suggest. Commenting on the relative abundance of *T. yaquia* at Fort Bowie National Historic Site, Lowe and Johnson (1976) noted that while *Tantilla* are secretive and difficult to locate, populations of most species are likely relatively dense where they occur. During 2000–2011 seven *T. yaquia* were captured in pitfall traps in Leslie Canyon in the Swisshelm Mountains (W.R. Radke, pers.

comm). During the same period, the same array of pitfall traps yielded 15 *T. hobartsmithi*. Population trends are unknown, but habitats where *T. yaquia* occur are currently relatively intact. Habitat is threatened by climate change, spread of non-native plants, and increased frequency of catastrophic wildfire that may reduce and alter the woodland habitats in which the species is often found (Rorabaugh 2013b). Hard-rock mining for copper and other minerals results in destruction of habitat in some areas.

■ **HABITAT.** *Tantilla yaquia* occurs in woodlands of mesquite, oak, and/or juniper; Semidesert Grassland; Foothill and Coastal thornscrub; tropical deciduous forest; and marginally into Chihuahuan Desertscrub and pine-oak woodlands (Hardy and McDiarmid 1969; Ernst and Ernst 2003; Rorabaugh and Lemos Espinal 2016). Disjunct collections from north of San Carlos, Sonora, are in rich Sonoran Desertscrub, and a photo-documented specimen from 47 m ASL at Loma de Bäum, Sonora, is in a Sonoran Desertscrub–Coastal Thornscrub transition (Rorabaugh and Schmidt 2015). In AZ, the species is most often associated with rolling terrain, montane foothills, and rocky canyons characterized by open Madrean Evergreen Woodland. *Tantilla yaquia* is also found sparingly into Semidesert Grassland and Chihuahuan Desertscrub in Cochise Co. near and east of Portal, as well as in the malpais lava fields at the southern base of the Pedregosa Mountains in an area also dominated by Semidesert Grassland. Specimen records are not uncommon along riparian corridors and rocky arroyos within these broader community types. At the Fort Bowie National Historic Site, Lowe and Johnson (1976) found a single *T. yaquia* in the riparian habitat of lower Siphon Canyon, just up-canyon from Tevis Rocks. The snake was found in the sandy wash bottom, damp from recent rains, and the canyon walls were steep and rocky. In stark contrast to its habitat in the United States and northern Sonora, most of the species' southern localities are on

the coastal plain of southern Sonora, Sinaloa, and Nayarit, at relatively low elevation (<200 m ASL) and often in relatively featureless, flat areas devoid of rocks.

■ **DIET AND FORAGING BIOLOGY.** The diet of this species is poorly known; however, similar to other southwestern *Tantilla*, it likely feeds on a variety of larval and adult invertebrates, particularly elongated species such as caterpillars and centipedes (Degenhardt *et al.* 1996; Stebbins 2003). Holm (2008) found four beetle larvae, two centipedes, one spider or solpugid, and one unidentified invertebrate in *T. yaquia* stomachs he examined. In the Pajarito Mountains, Santa Cruz Co., R.D. Babb (pers. comm.) observed a geophilomorph centipede moving rapidly across a talus slope while being pursued by a *T. yaquia*. Goldberg and Bursey (2004a) found oligacanthorhynchid cystacanths in a *T. yaquia* specimen from Santa Cruz Co. The life cycle of acanthocephalan parasites begins with ingestion of an egg by an arthropod. Hence, the *T. yaquia* examined by Goldberg and Bursey likely fed on an arthropod that was an acanthocephalan host.

■ **PREDATORS AND PARASITES.** Similar to other AZ *Tantilla*, this species is likely prey of a variety of vertebrate and invertebrate predators. The only documented predator is *Rana tarahumarae* (Tarahumara Frog). McDiarmid (1968) noted a *T. yaquia* in the stomach of one of these frogs collected from Alamo Canyon in Santa Cruz Co. Oligacanthorhynchid cystacanths reported from a *T. yaquia* by Goldberg and Bursey (2004a) manifested as two oblong, whitish bodies, *ca.* 1 x 3 mm in the coelom of the snake. The *T. yaquia* probably served as a paratenic (transport) host for this acanthocephalan, which is typically a parasite of mammals and birds (Goldberg and Bursey 2004a).

■ **BEHAVIOR.** *Tantilla yaquia* is secretive and primarily fossorial, and most individuals are

found under rocks, logs, and other surface debris. They can also be captured in pitfall traps (Degenhardt *et al.* 1996; W.R. Radke, pers. comm.). McDiarmid (1968) suggested the species is nocturnal; individuals are sometimes found on roads after dark (Degenhardt *et al.* 1996). Moist conditions or recent rainfall may encourage surface activity especially in or near streams. Robert Bezy collected UAZ 23547 as it was swimming just before dark in Sycamore Canyon, Santa Cruz Co. (McDiarmid 1968). On 6 July 1990, I also observed a *T. yaquia* surface-active at dusk in Sycamore Canyon. Based on specimens with collection dates, *T. yaquia* is active in AZ from 23 March to 11 October. Numbers of AZ specimens by month are as follows: March (2), April (10), May (1), June (5), July (5), August (10), September (5), and October (1). Ernst and Ernst (2003) noted collections from December, January, and February outside of AZ, and collection dates suggest it is active nearly year-round in southern Sonora (Rorabaugh and Lemos Espinal 2016). Upon capture, *T. yaquia* may release a small amount of musk and feces (Degenhardt *et al.* 1996).

■ **REPRODUCTION.** The reproductive biology of this species has not been investigated. Stebbins (2003) suggested 1–4 eggs are probably laid in late spring and summer. Two recently hatched snakes with umbilical scars measured 104 mm (from southern Sonora) and 140 mm (undetermined locality) TL and otherwise resembled small adults (McDiarmid 1968).

■ **REMARKS.** The species was most recently reviewed by McDiarmid (1977), Rorabaugh (2013b), and Wilson and Mata-Silva (2014, 2015).

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