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CNEMIDOPHORUS TIGRIS PUNCTATUS: A NEW WHIPTAILED LIZARD FROM NORTHWESTERN SONORA, MEXICO

J. MARTIN WALKER AND T. PAUL MASLIN

The whiptailed lizard *Cnemidophorus tigris tigris* ranges through a large portion of the interior of Southwestern North America and within this area exhibits considerable variation. Stebbins (1954), for instance, reported that this form is probably a composite of more than one subspecies as, "Populations of the Colorado Desert differ from those of the Mojave Desert and regions to the north." From March 1963 to March 1965, the University of Colorado Museum secured a large number of specimens of a distinctive variant of *Cnemidophorus tigris* from the vicinity of Puerto Peñasco, Sonora, Mexico. These specimens, along with a large series from the Carnegie Museum, are readily distinguished from more northerly populations of *Cnemidophorus tigris tigris* in possessing a dorsal pattern consisting of a gray dorsum with small black and large white spots. In allusion to this spotted pattern of adults, and usually juveniles, we designate this form as:

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Figure 1. Left to right: ventral, dorsal, and lateral views of the holotype (UCM 29200) of *Cnemidophorus tigris punctatus*.
Cnemidophorus nemidophorus ligris punctatus subsp. nov.
Desert Spotted Whiptail
(Figure 1)

Holotype: University of Colorado Museum 29200 (formerly C. J. McCoy, Jr. field number 5795), collected by C. J. McCoy, Jr., from Cholla Bay, ca. 4 miles northwest Puerto Peñasco, Sonora, Mexico, on April 1, 1965.


Paratypes: University of Colorado Museum 13205 from El Puerto, 13206 from 21 miles E San Luis, 19245-19247 from 30.6 miles SW Sonoyta, 19107-19113, 20504 from Puerto Peñasco, 29218-29220 from 5 miles W Puerto Peñasco. Carnegie Museum 40214-40219 from 15.5 miles NE Puerto Peñasco, 40426-40429 from Pelican Point 8 miles NW Puerto Peñasco (all paratypes from Sonora, Mexico).

Diagnosis: A subspecies of Cnemidophorus tigris distinguished from other forms by a combination of the following characters: (1) light gray dorsal ground color, (2) four dorsal stripes of juveniles replaced by a linear pattern of black and white spots early in ontogeny (3) dorsal pattern of adults consisting of small black and white spots mid-dorsally and small black and large white spots on the flanks; (4) head light brown or grayish-brown dorsally and spotted with black laterally; (5) chin gray or white with a pink suffusion and usually minute black spots; (6) chest scales light gray or white often narrowly edged with black; (7) belly scales completely white or with a very narrow black anterior edge, never checkered; (8) ventral surface of the tail white; (9) about 75 granules around midbody; (10) about 167 granules from the interparietal scale to the base of the tail; (11) and about 41 femoral pores.

Description of the holotype: The holotype is a male (UCM 29200) with a perfect tail and a snout to vent length of 82 mm. Features of scutellation are: 2 frontoparietals; 3 parietals; 4-4 supraoculars; 5-5 supralabials; 15-15 lateral supraocular granules; the supraorbital semicircles extend anteriorly to the middle of the third supraoculars; small scales at the edge of the gular fold (mesoptychiads); granular postantebrachials; 71 granules around midbody; 154 granules from the interparietal scale to the base of the tail; 22-23 femoral pores; and 34-35 subdigital lamellae on the longest toes of the pes.

Features of the color pattern are: head grayish-brown dorsally, black-spotted laterally; dorsum light gray with nine linear series of black spots between which are eleven linear series of white spots; hind limbs gray with small black and large white spots; chin gray (suffused with pink in life) with minute black spots; chest grayish with some scales edged with black; belly white; and ventral surface of the tail white.
VARIATION

Size: Available for study are 93 specimens of which 44 are females and 49 are males. The largest specimen is a male with a snout to vent length (SVL) of 93 mm. The largest female has a SVL of 88 mm., and the smallest individual is a male with a SVL of 49 mm. The SVL frequencies of our series are depicted in Table 1.

Color pattern: Juveniles of Cnemidophorus tigris punctatus (SVLs of ca. 49 mm. to ca. 70 mm.) may have four dorsal stripes which are only a little lighter than the grayish ground color of the dorsum. There is a pair of paravertebrals which originate near the posterior edge of the parietals and terminate at the base of the tail, and a pair of dorsolaterals which originate near the superciliaries and terminate near the base of the tail. In some juveniles of punctatus, however, the stripes have been disrupted by the encroachment of pigments from the intervening spaces. All juveniles available to us have large white spots along the flanks (sometimes vertical white bars are present) and on the sides of the head. The ventral pattern consists of a white chin with faint gray marbling, a white chest, and a white belly with a grayish or blackish suffusion on the outer edges of the lateral belly scales.

Larger individuals of punctatus (SVLs of ca. 71 mm. to ca. 80 mm.) have a light gray dorsum (usually with little if any evidence of the dorsal stripes), linear series of small black and white spots are present in the mid-dorsal region, small dark and larger white spots along the flanks and on the dorsal surface of the hind legs, a gray or white chin with a suffusion of pink and, often, small black spots, a white or light gray chest, a white belly with some of the scales edged anteriorly with blackish pigments, and a tail which is predominantly white ventrally.

The largest specimens of punctatus available to us (SVLs of ca. 81 mm. to 93 mm.) show the following variations in the dorsal pattern—mid-dorsal region is gray with no spots, with scattered spots, or with a linear series of spots. Seldom is there any evidence of the dorsal stripes in specimens of this size class. The flanks may have small black and/or large white spots or have scattered and irregularly disposed black spots. The head is heavily mottled and spotted with black laterally. The chin may be either gray or white with a pink suffusion and may or may not have minute black spots. The chest scales may be predominantly gray or white with narrow black edges and the belly is usually white, although occasionally very light gray, never achieving the checkered appearance of C. tigris tigris from Nevada, Utah, and California. The dorsal surface of the tail is usually yellowish brown with minute black spots proximally, blackish-brown distally, and white beneath.

In summary, the metamorphosis of color pattern in both sexes of
Table 1. Snout to vent length frequencies of 49 males and 41 females of *Cnemidophorus tigris punctatus*.

|   | 49 | 53 | 55 | 56 | 60 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 91 | 92 | 93 |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| ♂ | 1  | 3  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 2  | 4  | 1  | 2  | 1  | 3  | 3  | 7  | 2  | 2  | 3  | 3  | 3  | 3  | 1  | 3  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  |
| ♀ | 1  | 2  | 2  | 1  | 2  | 2  | 1  | 1  | 4  | 5  | 2  | 6  | 2  | 4  | 3  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  |
Cnemidophorus tigris punctatus involves four basic steps: (1) the disruption of the stripes by the encroachment of pigment from the intervening spaces, (2) the appearance of black spots on the dorsum, (3) the appearance of gray, pink, and often black pigment on the chin, and (4) the appearance of blackish pigment on the anterior edges of the chest scales.

The parallel development of color pattern in both sexes results in no apparent sexual dimorphism in adults.

Scutellation: Data for Cnemidophorus tigris punctatus are: 66-93 (75.4 ± S.E. 0.7, N = 64) granules around midbody, 150-179 (163.6 ± 1.8, N = 25) granules from the interparietal scale to the base of the tail, 14-50 (42 ± 0.4, N = 61) combined femoral pores on both hind legs, 29-39 (33.3 ± 0.3, N = 46) subdigital lamellae on the longest toe of the left pes. Typical of all members of the tigris complex, punctatus has small scales at the edge of the gular fold (mesoptychials), granular postantebraчials, and the usual number of 2 frontoparietals, 3 parietals, and 4-4 supraoculars. Considerable variation is evident in the anterior extension of the supraorbital semicircles. Thirty specimens have semicircle series which extend to the middle of the third supraoculars, 16 to the posterior edge of the frontal, 10 to the second supraorbital sutures, 3 to the middle of the second supraoculars, and 4 have a complete series. Definitions of the above characters of scutellation may be found in Duellman and Zweifel (1962).

COMPARISONS

To the northeast, east, and south of Cnemidophorus tigris punctatus is found C. tigris gracilis and to the north, northwest, and west is found the nominal subspecies C. tigris tigris. No character or combination of characters of scutellation serves to distinguish these three forms; only color and pattern serve as important diagnostic features.

Pattern characteristics of gracilis which distinguish it from punctatus are: (1) juveniles have six dorsal stripes which are often evident in adults, (2) the chin, chest, and belly of adults are black, (3) gracilis has a ventral black tail band two scales wide.

Cnemidophorus tigris punctatus appears to be most closely related to C. tigris tigris but this form is readily distinguished from punctatus by the following characteristics: (1) adults retain four clearly defined light dorsal stripes separated by black interspaces, (2) postaxillary region and part of flank extensively suffused with blackish pigment, (3) fore limbs boldly marbled with black, (4) blackish pigment of the flanks interrupted by
white vertical bars, (5) belly and chest extensively checkered with black pigment, (6) tail has a ventral black band two scales wide.

RANGE

As now understood, the range of *Cnemidophorus tigris punctatus* encompasses a small region of the Sonoran Desert in northwestern Sonora, Mexico, from the vicinity of Puerto Peñasco on the coast, inland to the northeast to at least 30.6 miles south southwest of Sonoyta and northwest to the vicinity of the Colorado River and San Luis, Sonora. Four specimens from Yuma County, Arizona have the blackish ventral suffusion of *gracilis* and UCM specimens from San Bernardino County, California are referrable to the nominal subspecies. Thus we assume that both of these forms are replaced by *punctatus* in northwestern Sonora a short distance south of the international border.

REMARKS

The relationship between the forms now allocated to *Cnemidophorus tigris*, and among its close relatives on the islands in the Gulf of California, represent one of the most complex problems in the genus *Cnemidophorus*. Of special interest are the zones of contact between mainland subspecies. These zones, from all available evidence, are very narrow with an abrupt replacement of one form by another. In one such zone along the Arizona-New Mexico border, Zweifel (1962), found not only intermediate individuals between *C. tigris gracilis* and *C. tigris marmoratus*, but also both parental types. In some ways the population of such zones resemble hybrid swarms rather than typical subspecific intergradations. This interpretation is in keeping with the electrophoretic plasma protein patterns studied by Dessauer, Fox, and Pough (1962) of the same population studied morphologically by Zweifel (1962). These studies serve to illustrate that the subspecies of *Cnemidophorus tigris* do not represent an array of forms smoothly intergrading with each other through a series of step clines, but rather a number of distinct fairly homogenous variants each representing the phenetic expression of an adaptive peak. Such population patterns further suggest that each of these forms has been isolated from the others for some time and in those instances where contact between races is known to occur it appears that this contact has only recently been reestablished.

The recognition of *punctatus* brings the number of subspecies of *tigris* to 14. There are, however, a number of distinctive insular races which also should be recognized or revived. While these forms obviously cannot interbreed, they, nevertheless, demonstrate the ease with which distinctive races can evolve within this widespread and adaptable species.
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LITERATURE CITED


