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A NEW WHIPTAIL LIZARD, GENUS *CNEMIDOPHORUS*,
FROM MEXICO

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As presently understood, the genus *Cnemidophorus* in Mexico consists of four distinct species groups. One of these, *hyperythrus*, is restricted to Baja California and the adjacent islands. The other groups are more or less widespread on the Mexican mainland, two of them also extending into the United States and Baja California. The most widespread is the *sexlineatus* group, which extends from southeastern United States and the Great Plains to Honduras and El Salvador. This group includes *burti*, *gigas*, *neomexicanus*, *inornatus*, *labialis*, *sacki*, *sexlineatus*, and *gadovi*; the last is of doubtful validity (Savage, 1954: 329). All of these have four supraoculars, more or less enlarged mesoptychials, and a pattern of longitudinal light lines at least in the young. Of the species comprising this group, *C. sacki* is the most variable and widespread; 12 races are currently recognized. The new species described herein is closely related to *C. sacki* as indicated by the presence of markedly enlarged postantibrachials and three or four enlarged preanal scales, in addition to the characters mentioned above.

Cnemidophorus calidipes, new species

HOLOTYPE.—UMMZ 112672 from Capirio (1200 feet) on the Río Tepalcatepec, Michoacán, Mexico, collected by William E. Duellman, July 3, 1955. Original number WED 7218.

PARATYPES.—All from Michoacán. UMMZ 112671: Capirio; UMMZ 112673–85: 2.6 miles north of Capirio; UMMZ 112686–88: 7.7 miles south of Apatzingan.

DIAGNOSIS.—A small *Cnemidophorus* (74 mm. maximum snout-vent length), closely related to *C. sacki*, with complete or nearly complete

supraorbital semicircle series separating the anterior supraocular from the rest of the series, three enlarged preanals, 17–23 femoral pores, and an ontogenetic change in color pattern from yellowish longitudinal stripes on a dark brown ground color in young to a pale brown ground color with pale blue vertical bars on the sides in adults; males with a pink throat and a black belly.

DESCRIPTION OF HOLOTYPE.—Adult male, snout-vent length 71 mm.; tail length (complete) 157 mm.; length of right hind limb to base of fourth claw 53 mm.

Scutellation typical of the *sacki* complex: enlarged mesoptychials and postantebrachials, three enlarged preanals with a slightly enlarged scale in the apex of the hind limbs, nasal in contact with first upper labial, postnasal in contact with upper labials 1 and 2, loreal nearly as long as high and in contact with upper labials 2 and 3; a large pre-subocular in contact with upper labials 3 and 4, followed by three enlarged suboculars; four supraoculars, the fourth reduced in size, and the first nearly separated from the second by the anterior extension of the supraorbital semicircle series (Fig. 1).

COLORATION IN LIFE.—The dorsum, including the top of the head, back, and upper surfaces of the limbs and tail is a light cocoa brown, approaching Vinaceous-Buff (Ridgway, 1912: Pl. XL). The ground color becomes darker brown on the flanks. On the sides are 17 pale bluish gray vertical bars that break down dorsally into irregular spots. The bars originate on the lateral row of ventral scutes. Bluish gray spots are scattered over the dorsal surfaces of the hind limbs and on the base of the tail, but not in the middorsal region of the back. The upper half of the posterior surface of the hind limb is black; this color continues as a mid-lateral stripe on the tail for about one-fourth its length. The undersurfaces of the limbs and tail are light blue. The brown of the head fades into cream on the sides of the head, including the upper labials. The lower labials, chin, throat, and anterior third of the belly are pale rose-pink. The pink suffuses the light brown on the sides of the neck behind the ear opening. The posterior two-thirds of the belly and the proximal undersurfaces of the hind limbs are jet black.

VARIATION.—The following account of variation is based upon the type series of 18 specimens. The femoral pores vary from 17 to 23. In snout-vent length the specimens range from 59 to 74 mm., and from 193 to 242 mm. in total length. All individuals have four supraoculars; the first of these scales is separated from those that follow in 13 (72 per cent) of the specimens by the anterior extension of the

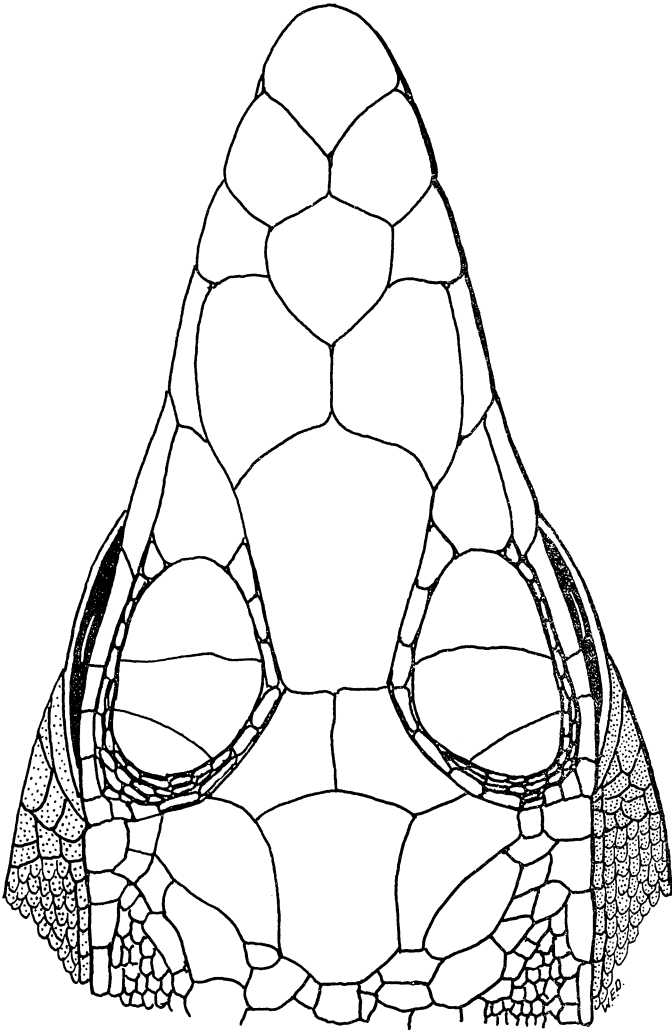


FIG. 1. Dorsal view of the head of the type specimen of *Cnemidophorus calidipes* (UMMZ 112672).

supraorbital semicircle series. In the other five specimens the semicircle series extends anteriorly to the anterior border of the second supraocular (1), to the middle of the second supraocular (2), to the posterior edge of the second supraocular (1), or to the middle of the third supraocular (1). All have three enlarged preanals; some individuals have a single enlarged scale in the apex of the hind limbs, others have two to four small scales.

SEXUAL DIMORPHISM.—The most striking difference between the sexes is the absence of the black belly color in the females. Also, the pink throat color is absent in females, the entire undersurfaces being cream. Only three females are available; it is possible that a larger series may show that the pink develops in the gular region in large females. The black ventral color, however, is found in the smallest available males (59 mm. snout-vent), and it is quite likely that this color is present in the juvenile pattern in males but not in females. There may be a significant sexual difference in the number of femoral pores, although at present the sample is not of sufficient size to determine this. In 15 males the average number on a side is 20.2 (18–23); in three females, 18.8 (17–21).

ONTOGENETIC CHANGE IN COLOR PATTERN.—The sample of 18 specimens includes adults and subadults, but no juveniles. In the smallest specimens, however, there remains enough of the juvenile color pattern to permit an analysis of the development of the adult color pattern. In the following discussion I have used only males, since that sex is better represented in the sample.

On the body of the small specimens (59–64 mm.) there are seven longitudinal light cream stripes on a dark brown ground color. The lateral line is the brightest; it begins below the eye and passes above the ear opening onto the anterior surface of the hind limb; the dorso-lateral stripe originates on the posterior superciliaries and ends on the base of the tail just above the insertion of the hind limb; the paravertebral stripes begin on the parietals or on the posterolateral corners of the interparietal and end on the base of the tail. The vertebral stripe, which is diffuse and often indistinct, begins on the granules posterior to the interparietal. The stripe is widest at mid-body; in some individuals it gives the appearance of being double, since there may be a dark area in the middle. Posteriorly, the vertebral stripe fades out anterior to the insertion of the hind limbs. At mid-body the vertebral stripe is wider than the dark area between the vertebral and paravertebral stripes. This dark area is narrower than that between the paravertebral and dorsolateral stripes, which, in turn, is narrower than that between the dorsolateral and lateral stripes (Fig. 2A). In the dark fields between the stripes develop cream spots, aligned in single rows. One row of spots is present below the lateral light stripe, and spots may be present on the dorsal surfaces of the hind limbs and on the base of the tail (Fig. 2B). The posterior two-thirds of the belly is black; the undersurfaces of the hind limbs are pale blue. The throat and chest are pale bluish cream with a slight pinkish cast.

The development of a pattern of vertical bars from one of longitudinal lines is accomplished through the fragmentation of the longitudinal lines into spots, which subsequently fuse with the spots in the dark fields above and below. In this way a pattern of longitudinal lines and alternating longitudinal rows of spots becomes vertical bars. The

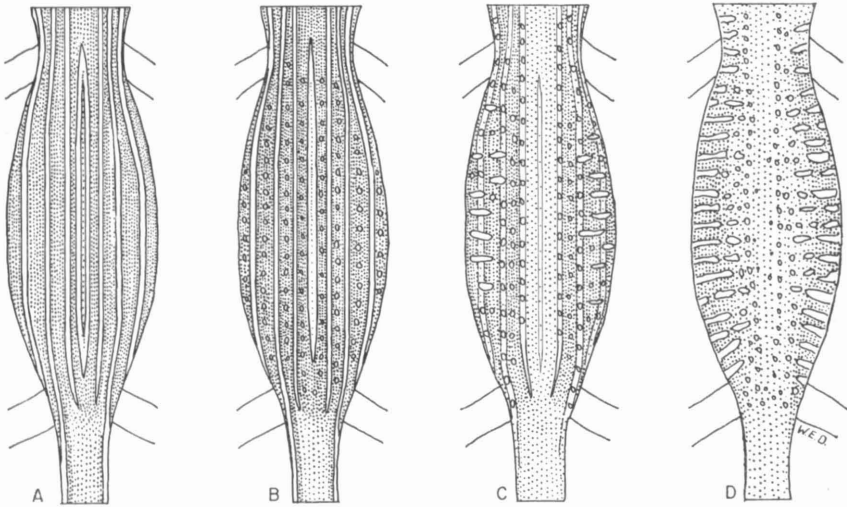


FIG. 2. Ontogenetic change in dorsal body pattern in *Cnemidophorus calidipes* from young (A) to adult male (D).

reduction of the stripes begins with the lateral, then continues to the dorsolateral. The vertebral stripe fades into the lighter ground color and is likewise followed by the paravertebrals (Fig. 2C-D). During this change from stripes to vertical bars the light areas change from cream to pale blue. Also, the throat and chest become pink. The blue on the underside of the hind limbs becomes intensified, and a pale blue develops on the underside of the tail. The posterior two-thirds of the belly remains a jet black.

COMPARISONS AND RELATIONSHIPS.—The scale characters of *Cnemidophorus calidipes* immediately place the species in the *sacki* complex, characterized by enlarged mesoptychials and postantebrachials, three preanals, and four supraoculars. From all other members of this group, *calidipes* differs in having complete or nearly complete supraorbital semicircle series and in having an adult color pattern of vertical blue bars on the flanks.

In southern Michoacán *C. sacki copei* is the most common and widespread species of *Cnemidophorus* (Duellman, 1954: 12-15). It differs from *calidipes* in being nearly twice as large (to 130 mm. snout-vent length and to 400 mm. in total length) and in having a greenish ground color with yellow spots in adults. The throat is pink.

The sympatric occurrence of *C. calidipes* and *C. sacki copei* in the Tepalcatepec Valley parallels the situation in Morelos, where a large species, *C. gigas*, and a small one, *C. s. sacki*, inhabit the same area (Davis and Smith, 1952: 97-99).

The immature color pattern of *C. calidipes* resembles that of *C. s. sacki* more closely than that of *C. sacki copei*, suggesting that it may have originated from a stock like *C. s. sacki* in the lower Balsas Basin. On the other hand, if the large size and greenish olive coloration of *C. gigas* and *C. sacki copei* are indicative of a close relationship, *C. gigas*, a form that occurs in the upper Balsas Basin in Morelos and Puebla, may prove to be subspecifically related to *C. sacki copei* of the lower Balsas Basin and the coastal regions of Michoacán and Colima. Intergradation between *copei* and *sacki communis* to the north and west has not been definitely demonstrated.

DISTRIBUTION AND ECOLOGY.—*Cnemidophorus calidipes* has been collected at three localities in the Tepalcatepec Valley—Capirio, 2.6 miles north of Capirio, and 7.7 miles south of Apatzingan. It has also been observed at Nueva Italia. The localities at which it has been collected lie between an elevation of 1200 and 1400 feet and are characterized by an arid scrub vegetation with paloverde (*Cercidium* sp.) predominating.

In comparison with its sympatric species, *C. sacki copei* and *C. deppei lineatissimus*, *C. calidipes* appears to be ecologically restricted to the paloverde-acacia association. At all three localities at which *calidipes* was collected, *sacki* was abundant. The latter also inhabits open acacia flats, dense scrub forests, and riparian situations. *C. deppei lineatissimus* was found with *C. calidipes* only at the locality south of Apatzingan. Ecologically, *deppei* appears to be less tolerant than *sacki*, being restricted to more mesic areas. In the Tepalcatepec Valley *deppei* is most frequently encountered in riparian situations in barrancas. Furthermore, it has not been found at elevations exceeding 2600 feet, whereas *sacki* is abundant in many areas to an elevation of about 3500 feet. Both are present at sea level.

REMARKS.—The valley of the Río Tepalcatepec is hot and arid. *Cnemidophorus calidipes* was active when the temperature of the sandy soil was above the 120° F. maximum of our thermometers. The specific

name, suggested by Dr. Charles F. Walker, alludes to the heat of the substrate as well as to the speed of the lizard.

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