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CNEMIDOPHORUS ALPINUS: A NEW SPECIES OF TEIID LIZARD FROM PUEBLA, MEXICO

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In August, 1964, the University of Colorado Museum Expedition to Mexico collected 15 specimens of a medium sized whiptailed lizard from the southeastern edge of the Mexican Plateau in Puebla, Mexico. In one character or another, this taxon resembles *Cnemidophorus scalaris, C. gularis,* and *C. mexicanus* but is equally distinct from each of these. We therefore recognize this form as a species and because of its habitat designate it as:

Cnemidophorus alpinus
sp. nov.
(Figure 1)

Holotype: University of Colorado Museum 27076. Secured at Lago Alchichica (elevation *ca.* 8000 feet), 14 miles northeast of Zacatepec, Puebla,

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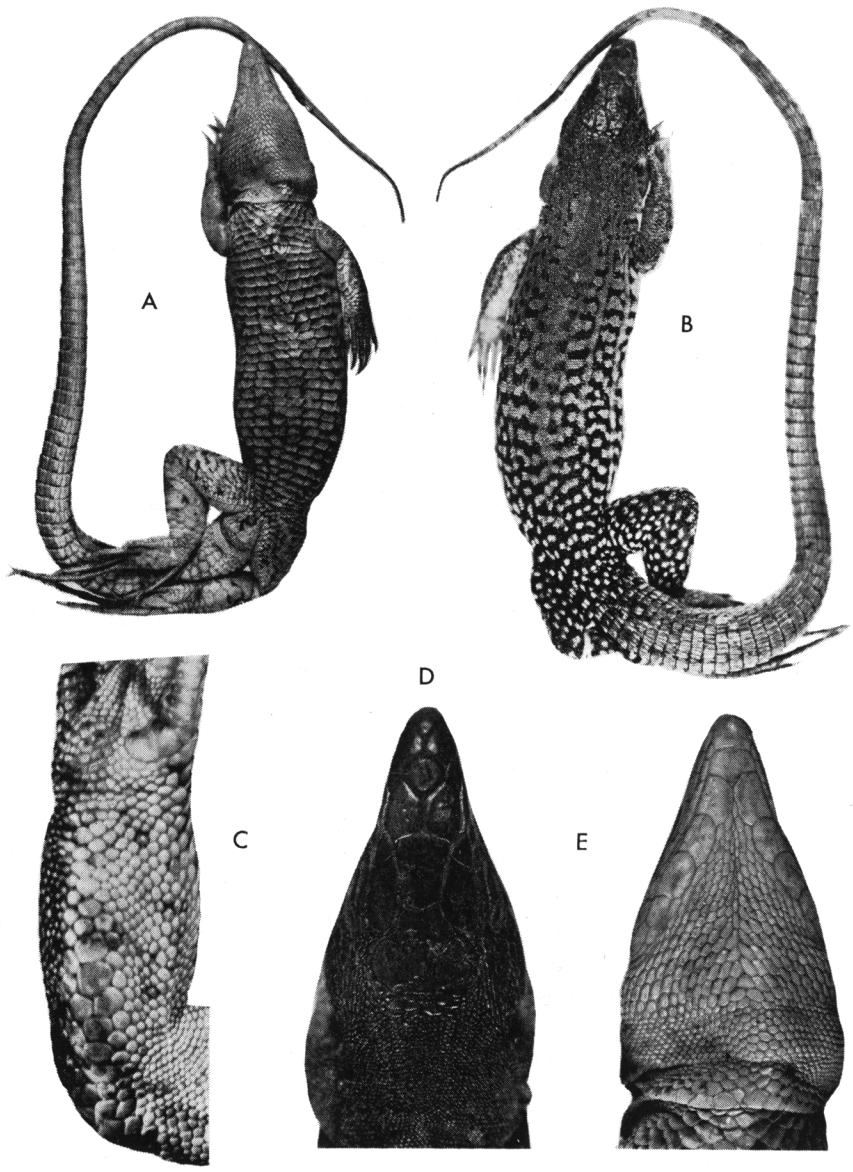

FIGURE 1. (A) ventral view, (B) dorsal view, (C) postantebrachial scales, (D) head scutellation, and (E) mesoptychial scales of *Cnemidophorus alpinus*.

Mexico, by T. Paul Maslin, Garry N. Knopf, and C. J. McCoy, Jr. on August 27, 1964.

Topoparatypes: UCM 27074-27075, 27077-27088.

Diagnostic characters: A species of the sexlineatus group of the genus *Cnemidophorus* distinguished from other forms by a combination of the following characters: medium size (maximum snout to vent length *ca.* 90.0 mm.), low number of granules around midbody (79.1 ± S. E. 1.2), granules separating the paravertebral stripes 12.8 ± 0.8; PV/GAB ratio x 10, 1.59 ± 0.08, low number of femoral pores (32.7 ± 0.5), supraorbital semicircle series extending anteriorly to the middle of the third supraoculars, contact of the preoculars with the supralabials, slightly to moderately enlarged postantebrachials which are irregularly disposed, and scales at the edge of the gular fold (mesoptychials) abruptly differentiated from those of the fold. The dorsal ground color of juveniles is black with six primary stripes and a wide tan or brown vertebral stripe. The color pattern of adults consists of a black dorsum with a wide brown or tan vertebral band which obscures all stripes on the nape and the paravertebrals posteriorly, suggestions of vertical gray or tan bars on the flanks, small gray and/or tan spots on the rump, an unspotted brown tail, a pink chin with a light bluish suffusion, scales from the gular fold to the postaxillary region with pink, chest scales posterior to the postaxillary region, and belly scales light purplish-blue edged with darker pigment in both sexes, and undersurfaces of the fore limbs pink.

Description of holotype: The holotype of *Cnemidophorus alpinus* is an adult male with a complete tail and a snout to vent length of 90.0 mm. Details of scutellation are: 77 granules around midbody, 192 granules from the interparietal scale to the base of the tail, 14 left and 15 right femoral pores, 30 left and 31 right subdigital lamellae, preocular scales in contact with the supralabials; supraorbital semicircles extending anteriorly to the middle of the third supraoculars, abruptly enlarged mesoptychial scales (Figure 1 E), and moderately enlarged postantebrachial scales (Figure 1 C). The head scutellation of the type specimen is variable with the frontal scale partially fused with the left third supraocular and the right third supraocular is divided into several small irregular scales (Figure 1 D).

Aspects of the color pattern are: chin pink with a light bluish suffusion; scales of chest (excluding a small pink area immediately posterior to the gular fold), belly and ventral surfaces of the thighs margined with dark purplish-blue and suffused centrally with light purplish-blue; and ventral surfaces of the fore limbs pink with minute purplish spots (Figure 1 A).

Dorsally, a pair of tan dorsolateral stripes are visible from the nape to midbody where they become disrupted into spots posteriorly, and a pair of gray laterals are visible from the temporal region to the groin. A wide tan vertebral band partially obscures the stripes on the nape and the paravertebrals posteriorly. There are small gray and tan spots on the rump, indica-

tions of small gray and tan vertical bars along the flanks, and the tail is brown above (Figure 1 B).

VARIATION

Size: The type series of *Cnemidophorus alpinus* comprises 7 males and 8 females. Sex was determined by an examination of the gonads and associated ducts, and by the presence or absence of hemipenes. Males range in snout to vent length (SVL) from 70 mm. to 90 mm. with an average SVL of 81.9 mm. Females range in SVL from 64 mm. to 82 mm. with an average SVL of 74.6 mm. The four largest males have heavily pitted and eroded head scales, hence we regard these individuals as fully mature adults.

Scutellation: Scutellation data for *Cnemidophorus alpinus* are: 72-87 (79.1 ± 1.2, $N = 15$) granules around midbody, 174-204 (190.4 ± 2.3, $N = 14$) granules from the interparietal scale to the base of the tail, 29-35 (32.6 ± 0.5, $N = 15$) combined femoral pores, 29-34 (31.6 ± 0.4, $N = 15$) subdigital lamallae on the longest toe of the left pes. In 14 of 15 specimens the preocular scales contact the supralabials, and in 14 of 15 specimens the supraorbital semicircles extend anteriorly to the middle of the third supraoculars. Asymmetrical variations in head scutellation is a characteristic of all except two specimens of *alpinus*. Scales involved most often are the supraoculars, the parietals, and the frontoparietals, all of which may be subdivided. An important diagnostic character of *alpinus* is the size and shape of the postantebrachial scales. The postantebrachials of the holotype (Figures 1 C and 2 A) are the largest of the type series and they still fall below the lower size limits of such forms as *C. scalaris* and *C. gularis* (Figure 2 B).

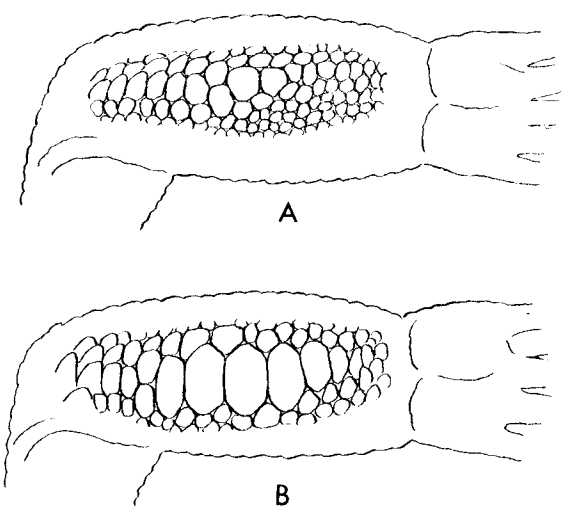

FIGURE 2. Comparison of (A) postantebrachial scales of *C. alpinus* and (B) postantebrachial scales of *C. scalaris*.

Color pattern: Males and females of *Cnemidophorus alpinus* follow a similar series of ontogenetic pattern changes. The smallest of our specimens is a female with a SVL of 64 mm. On the basis of the pattern of this individual we think it probable that hatchlings would have a black ground color with six primary stripes and a wide tan or brown vertebral band. Individuals of both sexes with SVLs of 64 mm. to 79 mm. conform to the following basic pattern. There is a pair of cream lateral stripes which originate under the eye and terminate on the anterior surface of the thighs, a pair of tan dorsolaterals which originate on the superciliaries and terminate on the basal third of the tail, and a pair of tan paravertebrals which originate posterior to the parietal scales but are obscured from midbody posteriorly by a wide tan or brown vertebral band. Individuals of this size class have also developed brown, tan, or gray spots in the flank, dorsolateral, and paravertebral fields, which seldom touch the stripes. The color of these fields are flank grayish anteriorly and black posteriorly, dorsolateral black, and paravertebral black.

In larger males and females (SVL from 80 mm. to 90 mm.), all of the stripes have become obscured anteriorly (although still discernable) by the tan or brown color of the nape and the paravertebrals posteriorly by the vertebral band. The laterals, dorsolaterals, and often the paravertebrals remain distinct on the anterior two-thirds of the body, but the dorsolaterals and paravertebrals are disrupted into small gray or tan spots posteriorly. The flank and dorsolateral fields have vertical spots (bars) which may touch the adjacent stripes but do not traverse them. These spots differ slightly in color to that of the stripes. The rump is finely spotted with gray and tan pigments and the hind limbs are spotted with gray. The dorsal spotting of *alpinus* is never as conspicuous as that of *C. scalaris scalaris.* The tail of *alpinus* is never spotted as in *C. scalaris scalaris,* being brown dorsally, striped laterally, and white beneath.

Discernable on the venter of both males and females (excluding a female with a SVL of 64 mm.) are the following color pigments: chin pink with a light bluish suffusion, scales from the gular fold to the postaxillary region pink with little bluish, scales from the postaxillary region to the apex of the femora a light purplish-blue centrally with dark purple anterior and lateral margins, fore limbs pink with minute purplish punctations, and thighs a light purplish-blue.

In summary, metamorphosis of color pattern involves the following basic changes: (1) the expansion of the vertebral band on the nape and down the midline of the dorsum, (2) the appearance of spots in the dark fields, (3) disruption of the paravertebrals and dorsolaterals posteriorly into small spots, (4) the appearance of small spots on the rump, and (5) the appearance of bluish pigments from the postaxillary region to the apex of the femora.

COMPARISONS

Cnemidophorus alpinus is morphologically similar to *C. gularis, C. mexicanus,* and *C. scalaris.* The most conspicuous differences between *alpinus* and these forms are in color pattern and pattern metamorphosis. Juveniles of *C. gularis* usually have two vertebral stripes which are not wide and diffuse. Adults retain seven or eight stripes, develop white spots and some times short vertical bars in the dark fields, develop a dark bluish-black suffusion from the gular fold to the apex of the femora, and have a laterally checkered belly produced by alternating dark and light scales. Juveniles of *C. mexicanus* have a dark brown dorsum with a clearly discernable vertebral stripe and minute white or cream spots in the dark fields. Adults have an olive-brown dorsum with very small light spots, dorsolateral and paravertebral stripes which persist only on the nape, and a blackish suffusion from the gular fold to the apex of the femora. Juveniles of *C. scalaris scalaris* have a black dorsum with six primary stripes and, sometimes, a narrow vertebral of the same intensity of the other stripes. Adults usually lose all stripes, except occasionally the laterals; have large black and gray bars along the flanks; large gray spots on the rump and mid-dorsal area; a boldly spotted black tail proximally; and a bluish-black suffusion from the gular fold to the apex of the femora. The chin of *C. scalaris scalaris* never develops a faint bluish suffusion. An unnamed form of a *scalaris*-like lizard in San Luis Potosi is distinguished by its dorsal pattern of a bluish-black ground color with small spots and a solid black venter from the gular fold to the apex of the femora. Even more striking differences exist between *alpinus* and other forms of *scalaris* (see Duellman and Zweifel, 1962).

Scutellation data for *C. alpinus, C. gularis, C. mexicanus,* and *C. scalaris* are compared on Table 1. Duellman and Zweifel (1962) made no distinction in the size of the postantebrachials of such forms as *C. mexicanus* and *C. scalaris.* Actually marked differences exist, but they are difficult to describe. *C. alpinus* has slightly to moderately enlarged postantebrachial scales as does *C. mexicanus,* whereas *C. scalaris* and *C. gularis* have large plate-like scales (Figure 1).

ECOLOGICAL NOTES

The type locality of *Cnemidophorus alpinus* is situated along Federal Highway 140 which follows a northeasterly course from Zacatepec, Puebla, across a high arid plain interrupted at intervals by extinct volcanos. At the eastern edge of the state of Puebla, 14 miles northeast of Zacatepec, Highway 140 passes through a broad open crater. At the bottom of the crater is Lake Alchichica. The road then courses around the southeastern edge of this lake through a rocky impoverished area planted in agave. It is in this area that

TABLE 1. Comparison and size and scutellation data for *Cnemidophorus alpinus, C. scalaris, C. mexicanus,* and *C. gularis.* Abbreviations: MSVL = maximum snout to vent length; GAB = granules around midbody; FP = femoral pores; PO = preoculars (in contact with supralabials); PAB = postantebrachials.

Taxon	GAB	FP	PO	PAB	MSVL
alpinus	79.1 ± 1.2	32.6 ± 0.5	yes (14 of 15)	Type A	90.0 mm.
	72-89 (15)	29-34 (15)			
s. scalaris[1]	84.1 ± 0.6	33.2 ± 0.6	no (43 of 53)	Type B	107.0 mm.
	72-95 (52)	29-39 (52)			
s. pallidus[2]	85.0 ± 0.9	38.4 ± 0.5	no (19 of 20)	Type B	95.7 mm.
	77-91 (20)	36-43 (19)			
s. septemvittatus[3]	85.4 ± 1.1	38.2 ± 0.5	no (29 of 29)	Type B	94.0 mm.
	79-107 (29)	34-43 (29)			
gularis[4]	88.3 ± 1.7	35.0 ± 1.1	variable	Type B	97.0 mm.[6]
	82-98 (10)	30-42 (11)			
mexicanus[5]	79.4 ± 1.0	33.2 ± 0.9	variable	Type A	87.0 mm.
	74-86 (10)	30-39 (10)			

[1]Five miles S Durango, Durango, Mexico
[2]Cuatro Cienegas Basin, Coahuila, Mexico
[3]Big Bend National Park, Texas
[4]San Luis Potosi, Mexico
[5]Oaxaca, Mexico
[6]Denton County, Texas

Cnemidophorus alpinus were collected as they foraged in the debris that accumulates close to the agaves, opuntia thickets, and other low xerophylic plants. Other lizards found in this habitat include *Sceloporus pictus* on the agave leaves and *Sceloporus spinosus spinosus* in the agave and opuntia thickets.

REMARKS

Cnemidophorus alpinus is apparently allopatric to all other species of the *sexlineatus* group. The nearest records given by Duellman and Zweifel (1962) for similar species are *C. gularis* central San Luis Potosi and northern Veracruz, *C. mexicanus* central Oaxaca, and *C. scalaris* Districto Federal and northwestern Oaxaca. In appearance and scutellation, *C. alpinus* resembles *C. scalaris scalaris,* but ranging between *alpinus* and this form in San Luis Potosi and perhaps adjacent areas is a large finely-spotted *Cnemidophorus (scalaris?).* On the basis of what is now known of the distribution of *Cnemidophorus* in southern-central Mexico, we believe that it would be unwise to assign *Cnemidophorus alpinus* as a subspecies of any currently recognized form.

ACKNOWLEDGMENTS

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