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Anguid Lizards of the Genus *Diploglossus* in Panama, with the Description of a New Species

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ABSTRACT

Three species of *Diploglossus* occur in Panama. *Diploglossus montisilvestris* is described from cloud forest of the Serranía de Pirre, Darién Province. The new species differs from most other mainland *Diploglossus* (*Celestus* included) in having the nasal scale separated from the rostral, and from most Antillean and some mainland species in having an unguis (claw) sheath. It is superficially similar to *D. bilobatus* but differs significantly in characteristics of the nasal region, in the unguis sheath, and in other characters; it is possibly arboreal, whereas *D. bilobatus* is terrestrial.

Diploglossus bilobatus is reported from Panama for the first time, and a photograph from life is presented. Although not abundant, the large, orange-bellied *Diploglossus monotropis* is well known in Panama, being called *escorpión coral* in the west and by the Colombian names *madre de culebra* and *madre coral* in the east. Each of the three species is defined and diagnosed and the coloration described from life. A key is given to the three genera and five species of Anguidae in Panama.

INTRODUCTION

Three genera of skinklike lizards of the family Anguidae occur in the Republic of Panama. The northern *Gerrhonotus* (*Barisia, auctorum*) is found at the limit of its range in a few volcanic craters in Chiriquí Province, western Panama. The monotypic *Coloptychon* also is supposed to live in "Chiriquí"; this enigmatical genus is known to science only from a single

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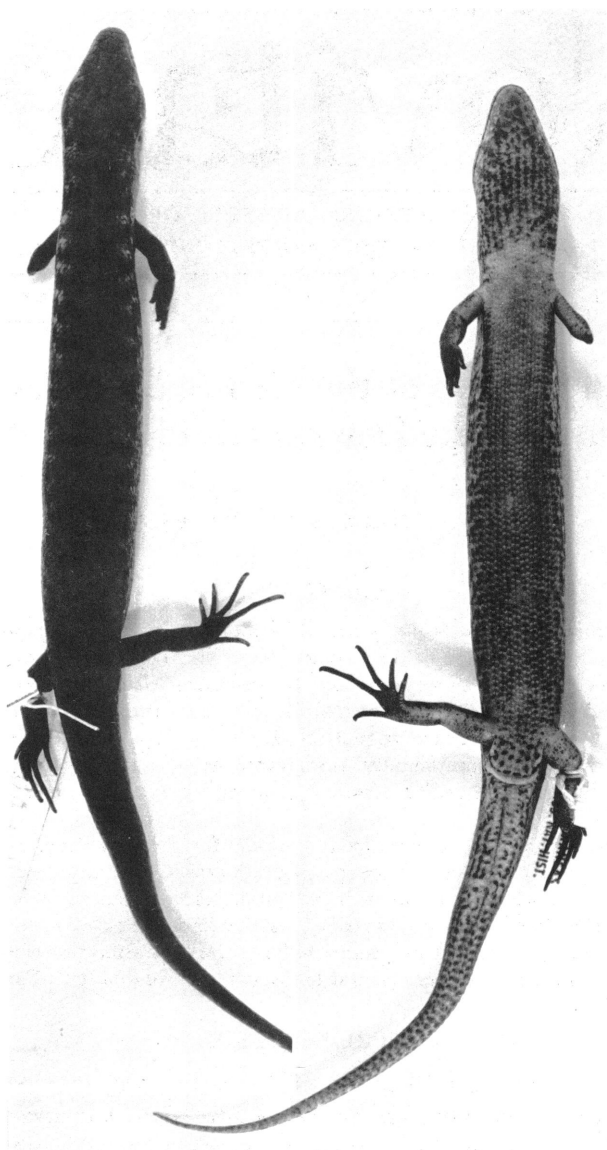


FIG. 1. Holotype of *Diploglossus montisilvestris*, new species. $\times 0.9$.

specimen and presumably awaits rediscovery in western Panama and adjacent Costa Rica. *Diploglossus*, although uncommon, is widespread in the country and is the subject of the present report, which was drawn up primarily in recognition of the following novelty:

***Diploglossus montisilvestris*, NEW SPECIES**

Figures 1–3B

HOLOTYPE: KU¹ 113660 (field no. CWM 4995), an adult female caught by Charles W. Myers and Tomás Quintero on May 25, 1965, in cloud forest on the southeastern slope of Cerro Pirre, 1440 meters elevation, Serranía de Pirre, Province of Darién, Republic of Panama (fig. 5).

ETYMOLOGY: The specific epithet means “of mountain forest,” and is derived from the Latin prefix *monti-* (from *mons*, mountain) plus the adjective *silvestris* (belonging to forest).

DEFINITION AND DIAGNOSIS: A small *Diploglossus* with sheathed claws; a single large prefrontal (no separate frontonasal²); nasal not in contact with rostral; nostril situated near middle of nasal; a single postnasal; dorsal and lateral scales striated, lacking distinct median keel. Not brightly colored—dorsum brown with darker crosslines, sides indistinctly mottled, venter yellow-green (turning gray, not white, in preservative).

This species differs from most other mainland *Diploglossus* (including *Celestus*) in the separation of nasal from rostral, and is distinguishable from the majority of Antillean and some mainland species by the presence of the unguis sheath. *Diploglossus montisilvestris* is most likely to be confused with the geographically closest anguid that is small and brown and has sheathed claws—namely *D. bilobatus* of Costa Rica and Western Panama. *Diploglossus montisilvestris* differs significantly in: 1) the nasal-rostral separation; 2) one postnasal (two in *bilobatus* and all mainland “*Celestus*”); 3) superolateral scale of unguis sheath overlapped by upper edge of the inferior scale, as in figure 3B (the reverse situation in *bilobatus*, as in fig. 3C). Other differences between the two species are listed under Comparisons.

¹ Museum abbreviations used in this paper are: AMNH, the American Museum of Natural History; BMNH, British Museum (Natural History); FMNH, the Field Museum of Natural History, Chicago; KU, the University of Kansas Museum of Natural History, Lawrence; MCZ, the Museum of Comparative Zoology, Harvard University; UMMZ, University of Michigan Museum of Zoology, Ann Arbor.

² The terminology follows that of Smith (1946, figs. 131–133), Tihen (1949b, fig. 1), Bogert and Porter (1967, fig. 5), and Meszoely (1970, fig. 1). The term “frontonasals” sometimes is applied to the posterior internasals, for example, by Stejneger (1904) and Underwood (1959, 1964); the “frontonasal” of Smith (*loc. cit.*) and others, when present, then becomes a “median prefrontal.” No attempt is made in the present paper to trace the homologies of these scales.

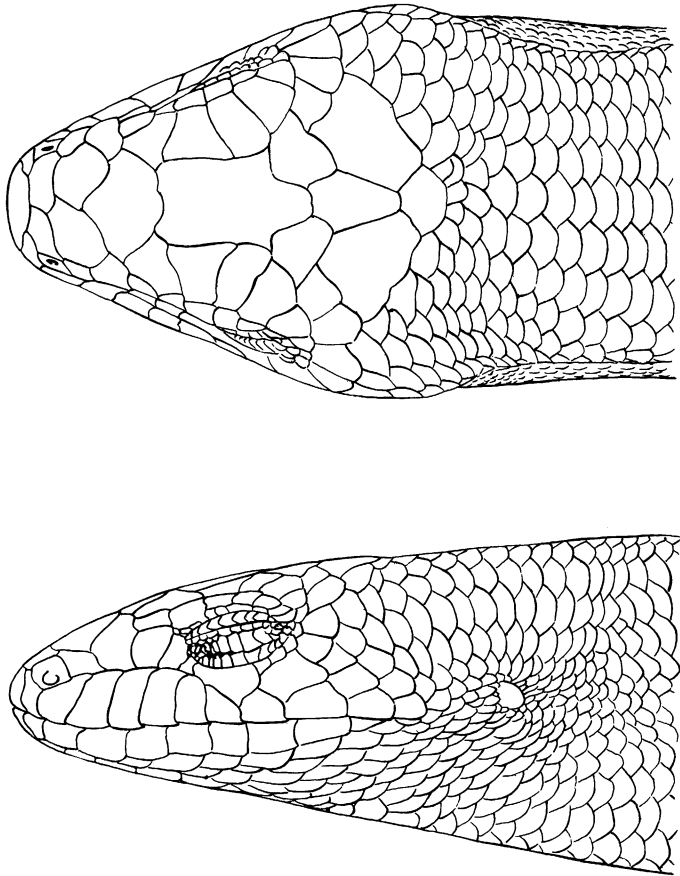


FIG. 2. Holotype of *Diploglossus montisilvestris*, new species. Dorsal and lateral views of head, $\times 4$.

DESCRIPTION OF HOLOTYPE: Specimen a female, adult (containing ova about 2 mm. in diameter). Snout to vent length 100 mm., total length (tail regenerated) 187 mm., axilla to groin 60 mm., forelimb (from axilla) 17 mm., hind limb (from groin) 26 mm., head length to rear of ear opening 18 mm., greatest width of head (behind corners of mouth) 12 mm., head height 9 mm., length of palpebral aperture 3 mm., diameter of ear opening about 1 mm. Body subquadrangular; tail somewhat laterally compressed, evidently regenerated (see Remarks). Left arm missing below elbow.

In life, brown above, with about 16 irregular blackish bars across top

of neck and trunk—each transverse marking about two or three scales wide, but poorly defined, lacking sharply demarcated edges. Brown interspaces about as wide as transverse bars, darkest on middorsum and becoming pale dorsolaterally. Sides of neck, trunk, and tail indistinctly mottled blackish on pale brown (in preservative, dark brown on gray); a rather sharp demarcation between mottled sides and crossbarred dorsum. Underside of head dirty white with dense black markings; chest, belly, and underside of tail yellow-green (gray in preservative), with small black spots on belly and under tail. Palm and soles black. Iris brown.

Rostral plate twice as wide as high, separated from nasal by first supralabial. Pair of anterior internasals (supranasals) in contact with rostral, first supralabial, nasal, postnasal, and posterior internasals. Pair of posterior internasals, narrowly excluded from nasal by postnasal, posteriorly in contact with first loreal and the single large prefrontal (no separate frontonasal). Frontal the largest plate on head, 1.3 times longer than its greatest width, anteriorly concave, posteriorly blunt. Paired frontoparietals and parietals separated from their fellows by interparietal. Pineal eye poorly defined, situated near posterior end of interparietal. A relatively small occipital, rounded in back. Five medial supraoculars, first three in contact with frontal, fifth the smallest. Six small lateral supraoculars, the anteriormost (which also might be interpreted as a canthal) of this series situated between second loreal and first medial supraocular. A broken row of about eight tiny scales partly separating lateral supraoculars from upper ciliaries. Five vertically quadrangular, translucent scales covering eye when lower eyelid is raised. Canthus rostralis rounded, no canthal scales (unless first lateral supraocular be so construed), side of snout slightly concave. First supralabial in contact with anterior internasal. Nasal scale longer than high, left one semidivided with horizontal suture from anterior edge to naris. Nostril pierced slightly posterior of center of nasal. Four large scales between nasal and eye, as follows: one postnasal; first loreal tall, in contact with prefrontal atop head; second loreal lower, situated below first lateral supraocular; one preocular. Eight scales in subocular-postocular series, undifferentiated except for an enlarged angular subocular, none reaching lip. Temporal scales little differentiated. Supralabials 11 (left)/10 (right), with 7/6 anterior labials to center of eye. Mental small, little larger than adjacent labials. Infralabials 9/9, first two touching postmental and second also touching first chinshield. Postmental larger than mental and followed by four pairs of chinshields, first two pairs in contact mesially.

About 96 dorsal scales from occipital to base of tail, 105 ventral scales between mental and vent, 37 scales around middle of body. Dorsal and

lateral scales of body and tail, and scales on top and underneath limbs, with multiple striations; about 10-15 striae on most body scales, in excess of 20 on some large caudal scales. Ventral scales smooth. Limbs short, separated by length of the forelimb when appressed. Pentadactylous; laterally compressed digits with slightly rounded subdigital lamellae, palm and sole with non-contiguous, conical scales. Third finger slightly longer than fourth; toes relatively long and slender, fourth conspicuously longest; third and fourth fingers with 11 lamellae each, third toe with 14 lamellae, fourth toe with 17 (left) or 16 (right) lamellae. Each digit ending in a claw largely concealed in a sheath (fig. 3B).

Scale organs (minute tubercles) distributed over all surfaces of head, becoming dense on anterior sides of trunk, upper arms, and hind limbs; inconspicuous and less abundant on dorsal and ventral surfaces of trunk and tail.

Middorsal osteoderms (fig. 3A) with broadly obtuse medial convexity in gliding surface; basal section of osteoderm with more or less transverse canals, distal section with radiating network of canals.

COMPARISONS: *Diploglossus montisilvestris* is almost unique among main-

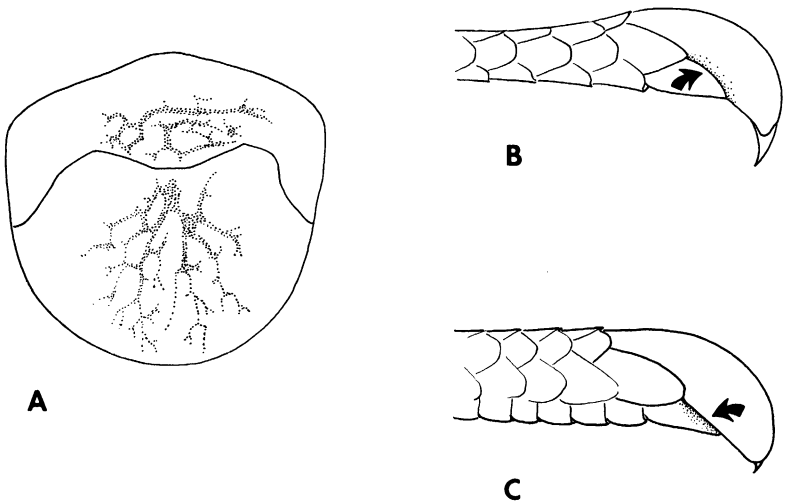


FIG. 3. A. Middorsal osteoderm from holotype of *Diploglossus montisilvestris*, $\times 25$. The medial convexity of the gliding surface is diagnostic of the subfamily Diploglossinae, *sensu* Meszoely (1970). B. Left fourth toe of *Diploglossus montisilvestris*, holotype, $\times 11$ (arrow denotes inferior unguis-sheath scale overlapping superolateral scale). C. Same for *D. bilobatus*, KU 67433, $\times 22$ (superolateral unguis-sheath scale overlapping inferior scale).

land *Diploglossus* (*Celestus* included) in having the nasal scale separated from the rostral by the first supralabial, which makes dorsal contact with an anterior internasal (supranasal). Underwood (1959, p. 7) stated that, "Contact between nasal and rostral scales is shown by all the mainland forms . . ." This statement holds true in the material that I have examined, except for two Brazilian specimens (AMNH 19440, 27637) of *D. fasciatus*, in which the condition is variable. The nasal-rostral contact also obtains in descriptions or illustrations of the following mainland species not seen by me nor listed in Underwood's table: *Diploglossus bivittatus* Boulenger, *Celestus atitlanensis* Smith, *C. montanus* Schmidt, and *C. rozellae* Smith.

Despite a general similarity between *Diploglossus montisilvestris* and adult specimens of *D. bilobatus*, there is no reason to suspect that the two might be conspecific. Although perhaps related, they clearly are distinct species as indicated by the following differences:

<i>Diploglossus montisilvestris</i>	<i>Diploglossus bilobatus</i>
Nasal and rostral separated	In contact
Naris near middle of nasal scale	In posterior end
One large postnasal scale	Two small postnasals
One high first loreal, reaching prefrontal	Usually two superposed first loreals, or, if only one, not reaching prefrontal
Trunk scales lacking median keel	Often a weak keel
Broadly obtuse medial convexity in gliding surface of osteoderm (fig. 3A)	Medial convexity troughlike
Upper edge of inferior unguis-sheath overlaps superolateral scale; sheath less extensive (fig. 3B)	Superolateral scale overlaps inferior scale; sheath more extensive (fig. 3C)
Digits of hind foot more slender, first toe distinct, fourth toe decidedly longer than third (fig. 1)	Digits shorter, first toe almost stublike, fourth toe only slightly longer than third
Dorsum with vague dark crossbands; sides indistinctly mottled	Dorsum more checkered or reticulated, or nearly uniform; sides darker, often with pale ocelli or dark bars
Belly yellow-green, turning gray in preservative	Belly gray in juvenile, pink in adult, both turning whitish in preservative
Longer snout to vent (100 mm. in holotype)	Shorter (92 mm. in largest of 14 specimens)
Arboreal? (see Remarks)	Terrestrial

It must be remembered that the preceding comparisons are based on a small sample (one *montisilvestris*, 14 *bilobatus*). Although some of the more

fundamental differences (e.g., in length of toes and condition of ungual sheath) are doubtless constant, variational overlap will be expected in some characters. For example, the differences in osteoderms might not hold true if there is much intraspecific variation. This possibility is suggested by published illustrations of middorsal osteoderms of *Diploglossus monotropis*; Hoffstetter (1962, p. 154, fig. 2) shows a deep, troughlike medial convexity in the gliding surface, whereas Meszoely (1970, p. 101, fig. 6A) shows a shallow, broadly obtuse convexity. Meszoely's illustration is suggestive of the condition here pictured for *montisilvestris* (fig. 3A), whereas the drawing in Hoffstetter resembles osteoderms that I have examined from *bilobatus*.

REMARKS: The tail of the holotype is evidently regenerated, because there is a very slight constriction and change in coloration about 15 mm. posterior to the vent (see fig. 1, ventral aspect), and also because it is unusually short (87 percent of snout-vent length) for a *Diploglossus*. Nonetheless, the tail appears complete at first glance. The regenerated scales are well formed, and the dorsal caudal scales are striated until near the end of the tail; there is a perfect, terminal spinelike scale. Some anguids have possibly perfected regeneration to an unusual degree. Taylor (1956, p. 208) described the close correspondence between original and new scales on a specimen of *Celestus* (= *Diploglossus*) *cyanochloris*; as Taylor observed, the regenerated scales of lizards are generally unlike the original scales.

The holotype and only known specimen of *Diploglossus montisilvestris* was caught in the cloud forest that covers the top of the Serranía de Pirre, an isolated montane ridge in extreme eastern Panama (Myers, 1969, pp. 19-24). The type locality is the same as for the snake *Coniophanes joanae*, and the location and habitat are discussed elsewhere (Myers, 1966). The lizard was in a spot of sunlight on the side of a tree, about three-quarters of a meter above ground. This observation, together with the relatively long toes and reduced claw sheath, suggests that *Diploglossus montisilvestris* is an arboreal or partly arboreal species. Arboreal habits are the exception in *Diploglossus*, having previously been reported only for a Jamaican species (Schwartz, 1971).

Diploglossus bilobatus (O'Shaughnessy)

Figures 3C, 4

Celestus bilobatus O'SHAUGHNESSY, 1874, pp. 257, 258 (holotype in BMNH, from Costa Rica).

DEFINITION AND DIAGNOSIS: A small *Diploglossus* with sheathed claws;

a single large prefrontal, no frontonasal; nasal in contact with rostral; nostril pierced in rear of nasal; two postnasals; dorsal and lateral scales striated (smooth in juveniles), sometimes with a weak median keel. Dorsum brown (juveniles may be mostly black), often vaguely checkered or reticulated with black; middorsum usually demarcated abruptly from lighter sides by thin dorsolateral dark line that may be emphasized by pale dashes or light upper edge; sides of neck and/or body usually with pale ocelli, sometimes set in vertical black bars; venter whitish in preservative, varying in life from gray (juvenile) to pink (adult).

The well-developed claw sheath will quickly distinguish *D. bilobatus* from other small brown anguids (*D. cyanochloris*) and skinks (*Mabuya*, *Scincella*) within its range. See above for comparison with the somewhat similar *D. montisilvestris*.

DISTRIBUTION: Atlantic versant of Costa Rica and extreme western Panama, from near sea level to above 1000 meters elevation. A presumably disjunct population on Pacific drainage in southern Costa Rica (record in Taylor, 1956, p. 204).

REMARKS: *Diploglossus bilobatus* has not previously been reported from Panama. There are three specimens from the Province of Bocas del Toro, northwestern Panama (fig. 5): The Harold Trapido Collection at the Field Museum contains a specimen (FMNH 152064) from the vicinity of Almirante, and I obtained two specimens (AMNH 107411, KU 113658) about 5 kilometers west of Almirante. It does not seem common—my two specimens were taken six years apart. Both were in leaf litter in lowland rain forest.

Coloration is variable and probably subject to ontogenetic change. The specimen illustrated (fig. 4) is a juvenile only 27.5 mm. snout to vent. In life, its head was greenish gold above and the body was mostly black (dark brown in preservative), broken by a dorsolateral line of orange dashes (along upper edge of dorsolateral dark line which is barely visible on preserved specimen). The light markings seen (fig. 4) on the lower side of the black head and neck were vivid, pale green, with just a few specks of this color on the sides of the trunk. The venter was gray, turning bluish gray under the tail, the tip of which was black.

My larger specimen (KU 113658), a female of 62 mm. snout to vent, had a light brown snout, and a brown middorsum checkered with black. There was a dorsolateral line of golden dashes and a few small golden spots on the brownish sides; spots on the side of the neck were conspicuous light green. The chin and throat were white, the belly pink, and the underside of the tail gray.

The third Panamanian specimen (FMNH 152064) is a large, heavy-

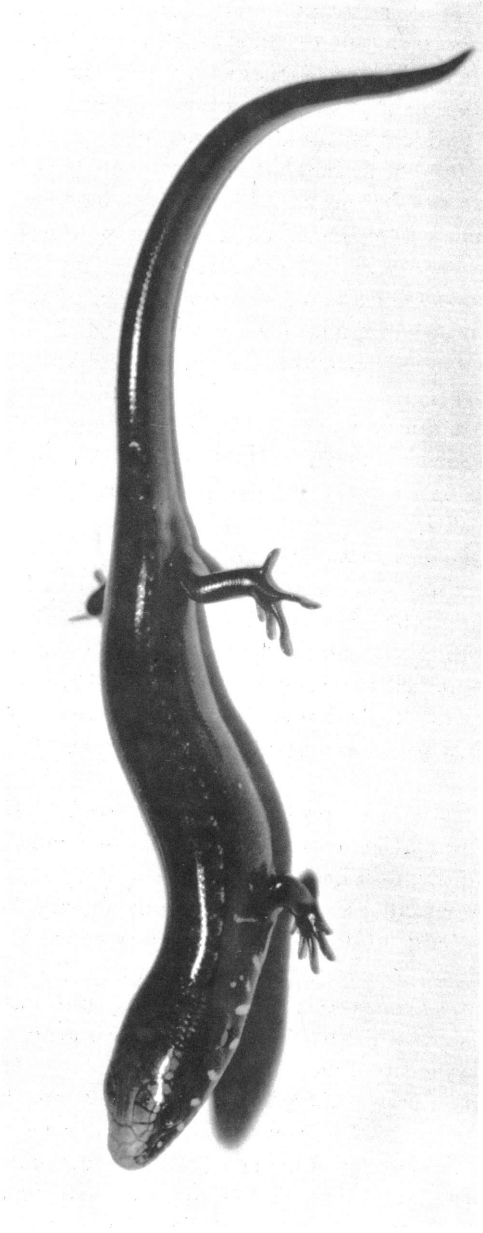


FIG. 4. *Diploglossus bilobatus*, AMNH 107411, a juvenile specimen from western Panama. Approximately $\times 3.5$.

bodied male of 92 mm. snout to vent. It is nearly uniform brown in preservative, with only a hint of dark checkering but with a distinct dorsolateral dark line. The lighter sides are boldly marked with a half-dozen large black bars, which contain only a few pale, tiny spots. The black lateral bars and heavy body give this animal a different aspect from any other specimen of the species that I have seen.

In addition to the preceding three specimens, I also examined a series of *bilobatus* from Cartago Province, Costa Rica (KU 67424–67434). Most of these have vague checkering on the dorsum, a dorsolateral dark line, and small but fairly evident ocelli on the sides. See Taylor (1956) for notes on additional Costa Rican material.

Diploglossus bilobatus varies in several aspects of scutellation, but the diagnostic nasal contacts and the single prefrontal seem constant. Usually there are two superposed first loreals, with the upper touching the prefrontal, but occasionally there is only one first loreal (KU 67428 [right side] and 113658). In the latter, however, the single first loreal makes dorsal contact with the posterior internasal rather than with the prefrontal and so is not comparable with the single loreal-prefrontal contact in the type specimen of *D. montisilvestris*. Taylor (1956, p. 202) commented on the variability in keeling of the body scales. Of the three Panamanian specimens reported above, the juvenile has smooth scales, the female has striated scales with a weak median keel, and the large male has strongly striated scales, of which only the lateral ones are weakly keeled. The male specimen also shows a tendency toward keeling of the ventral scales.

MATERIAL EXAMINED: *Costa Rica: Cartago:* Moravia de Turrialba, 1200 m., KU 67424–67434. *Panama: Bocas del Toro:* Almirante, FMNH 152064; ca. 4.8 km. W Almirante, 50–100 m., KU 113658; ca. 5 km. W Almirante, 30–40 m., AMNH 107411.

Diploglossus monotropis (Kuhl)

Scincus monotropis KÜHL, 1820, pt. 1, pp. 128, 129 ("Im Britischen Museum," type locality unknown).

DEFINITION AND DIAGNOSIS: A large *Diploglossus* with sheathed claws; a frontonasal and paired prefrontals; nasal in contact with rostral; large nostril in extreme posterior part of nasal; positioning of postnasal scales somewhat variable, usually two postnasals, or one postnasal and a small posterior supranasal (= upper postnasal); striated dorsal and lateral scales with a distinct median keel. Brilliantly colored in life: Head olive or yellowish olive; middorsum mostly olive-brown, brown, or blackish, with about a dozen black-edged white, gray, or olive-green crosslines (vivid in young, less conspicuous or even obscure in adults); tail with brown or

blackish dorsal bands separated by narrower interspaces of white, gray, or olive-green; chin yellowish, turning bright orange on venter¹ and sides of body, this color broken on flanks by dark vertical bars; underside of tail orange like venter or else changing to yellowish green; iris orange or brown.

This handsome species should be confused with no other in its range, being immediately identifiable by its characteristic dorsal pattern (see fig. in Taylor, 1956, p. 196) and, in life, by its bright orange venter and flanks. It closely resembles the West Indian *D. montisserrati*, the only known specimen of which differs most noticeably from *monotropis* in having a plain brown dorsum (ventral color in life unknown) according to Underwood (1964).² The geographically nearest relative of *monotropis* is *D. millepunctatus* O'Shaughnessy, which is confined to the Pacific island of Malpelo, Colombia; large size and similarities of head scutellation (especially in nasal and prefrontal region) indicate a close relationship between the two species. *Diploglossus millepunctatus* is a larger animal, growing to at least 250 mm. snout to vent (AMNH 63979); it is well differentiated from *monotropis* by its big limbs, smooth scales, and different color pattern (many small, pale spots on a dark ground).

DISTRIBUTION: Southern Nicaragua (Villa, 1971) and Atlantic drainage of Costa Rica and western Panama, throughout eastern Panama, and the Pacific lowlands of western Colombia and Ecuador. The species also seems to occur on the western flank of the Cordillera Oriental, in the Río Magdalena drainage of northern Colombia (according to localities given in Burt, 1932, and Medem, "1968" [1969], p. 177). It is not known whether these populations are relict or part of a presently continuous distribution around the northern end of the Colombian Andes.

Most locality records are in the lowlands; the uppermost elevational record in Panama is 500 meters. But one locality in northern Colombia (Muzo, Depto. Boyacá) is about 800 meters elevation, and a Costa Rican specimen might have been taken well above 2000 meters (see Taylor, 1956, p. 199). Probably it is safe to assume that the elevational range extends from sea level to at least 1000 meters.

REMARKS: The preceding, abbreviated color description of *Diploglossus*

¹ There may be an ontogenetic change in ventral coloration, from yellowish to orange. See Remarks.

² Presence or absence of a dark temporal streak is not a constant difference between *monotropis* and *montisserrati* as suggested in Underwood (*op. cit.*, p. 7); this marking is lacking in some *monotropis*, for example KU 80218, 96927, 108286. Underwood's figure of *montisserrati* shows the nostril to be centrally placed in the nasal scale, possibly a significant difference from *monotropis*, in which the nostril opens at the rear edge of the nasal.

monotropis is abstracted from my field notes on four Panamanian specimens (KU 96226–96228, 113659). Breder (1946, p. 429) noted that another specimen (AMNH 37560) had the ventral surface “a brilliant vermilion with a slight orange tint.” This is close to my “bright orange,” but Barbour (1923, p. 3) described a juvenile (MCZ 17182) as having a *yellowish* belly and carmine sides. There is no reason to doubt Barbour’s description, particularly since one of my specimens, KU 113659—also a juvenile, of 117 mm. snout to vent—had a light orange venter followed by a yellowish green subcaudal surface. In larger specimens, the underside of the tail was orange like the belly. On the basis of these few data, I believe that there is probably an ontogenetic color change, with juveniles having yellowish venters that turn orange first on the belly and then on the tail. Possibly there is also a change in color of the iris, inasmuch as the afore-said juvenile was the only specimen having brown eyes, which were orange in the larger individuals.

Diploglossus monotropis occurs in regions of rain forest and monsoon rain forest, within which it seems to be found in disturbed or “edge” situations more often than in heavy forest. Taylor (1956) reported one from the edge of a lake, and I have taken a specimen each in a cacao grove, on a trail through dense second growth, and in a tangled oceanside clearing on an island. It is strictly diurnal and terrestrial so far as known. The species is rare in Central Panama, where it seems to occur only on the wetter Atlantic side of the isthmus.

Individuals of this species grow to a length of at least 215 mm. snout to vent (AMNH 17667 from Ecuador), and the osteoderms of a large specimen can sometimes even deflect .22-caliber dustshot. The largest Panamanian specimen that I have measured is 202 mm. snout to vent (KU 108286). There may be geographic variation in the dorsal color pattern. A few somewhat faded specimens (AMNH 17666, 17667) and the illustration in Günther [1885 (1885-1902), pl. 23] seem to indicate that *monotropis* in Ecuador is characterized by a more uniform and perhaps lighter dorsal ground color than in Central America, and with the pale crosslines becoming ontogenetically less obscure (see also remarks in Taylor, 1956, and compare his fig. 51 with that in Günther, *loc. cit.*).

People in northwestern Panama know *Diploglossus monotropis* by the name *escorpión coral*. The names used by Colombian Negroes living in eastern Panama are *madre de culebra* and *madre [de] coral*. Medem (“1968” [1969]) also recorded the last two names, for Colombia. This “mother of coral snakes” is naturally believed to be poisonous and something to be feared.

MATERIAL EXAMINED: The following list includes only the Panamanian specimens of *Diploglossus monotropis* that I have examined, in documentation

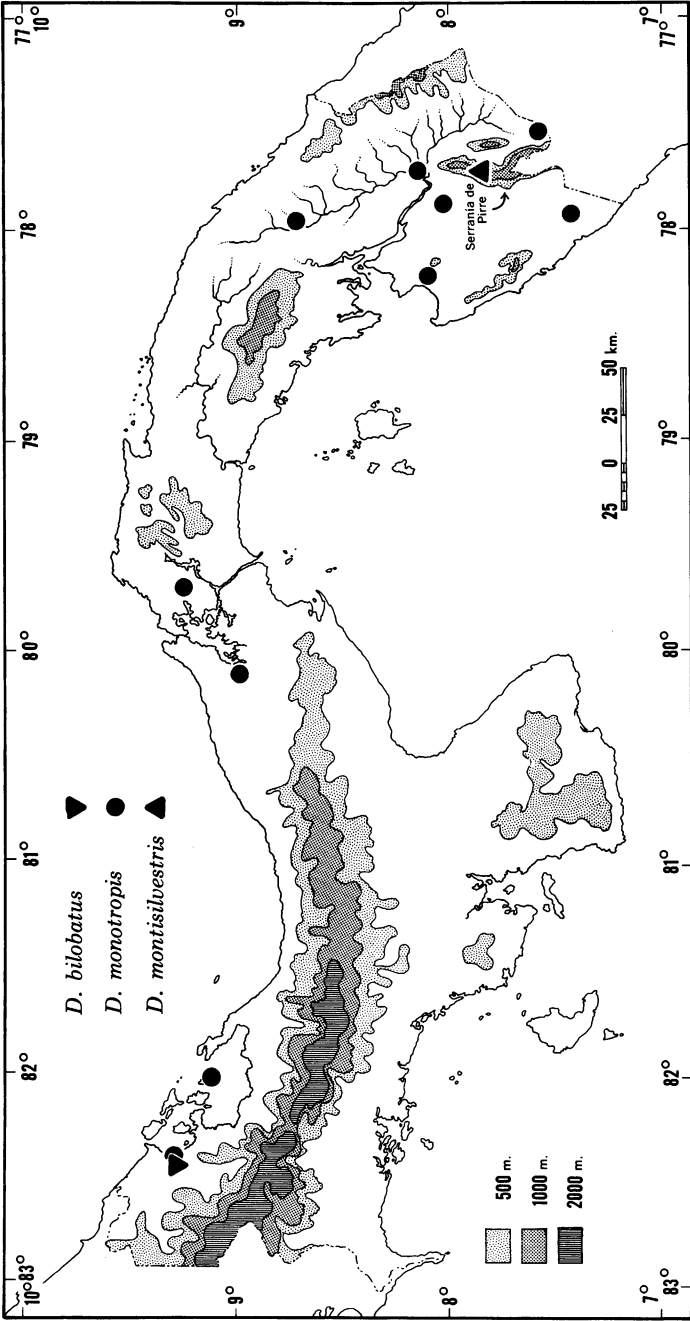


FIG. 5. Locality records for the species of *Diploglossus* in Panama.

of the locality records in figure 5. *Bocas del Toro*: Almirante, KU 80218, UMMZ 128415; ca. 4.8 km. W Almirante, 40 m., KU 96926; south end Cayo de Agua, 0–5 m., KU 96927. [*Canal Zone*]: Goodyear Rubber Farm, headwaters Lagarto and Siricito rivers, west of Gatun, MCZ 42734. *Colón*: Quebrada Bonita near Buena Vista, 40 m., KU 108286. *Darién*: north slope Cerro Quia, 500 m., KU 96928; Río Esnápe (trib. Río Taimatí), MCZ 17182; Río Jaque, 1.5 km. above Río Imamadó, 50 m., KU 113659; Río Pihuila (trib. Río Balsas [= Río Tucutí], lower Tuirá drainage), MCZ 37129; Río Subcutí (“Sucubti” in Breder, 1946; trib. Río Chucunaque), AMNH 37560; Yavisa, MCZ 37139, 39783.

DISCUSSION

Some authors recognize two genera of diploglossines in Middle America, one in which the claws are concealed in a large compressed sheath (*Diploglossus*, *sensu stricto*) and another in which the claws are naked (*Celestus*). There is no consensus in the literature, and no good summary of the matter either. Briefly, the history is as follows: Boulenger (1885, p. 284) maintained *Celestus* Gray as a synonym of *Diploglossus*, which he divided in two major sections based on presence or absence of the unguis sheath, which character was supposedly associated with the claws being retractile or not. Stejneger (1904, pp. 621, 622), without explaining his reasons, revived *Celestus* for a Puerto Rican species, stating that the genus “is confined to the Greater Antilles and Central America . . .” Barbour (1910, p. 297) expressly stated that lack of the unguis sheath separated *Celestus* from *Diploglossus*. Burt and Burt (1931, pp. 241, 242) overlooked Barbour’s 1910 paper and claimed that, “apparently no one has specified the basis of its [*Celestus*] separation from the genus *Diploglossus*.” The Burts then attempted to “set a standard for the identification of the two groups”; like Barbour, they chose the claw characters used by Boulenger for separating his groups I and II (group II = *Celestus*, *sensu* Barbour, Burt and Burt). Dunn (1939, p. 3) argued that *Celestus* should be dropped; Dunn’s argument gave equal weight to the condition of the claws and the number of “prefrontals,” although the latter was considered of secondary importance by Boulenger, and Burt and Burt. Brongersma (1946) briefly reviewed the above nomenclatural history but did not mention the arguments of Dunn. Underwood (1959, pp. 2, 6) seemed to blame Burt and Burt for the recognition of *Celestus*, ignoring the fact that these authors were following established usage. It would be fair, or at least generous, to accept that earlier authors had reasonably assumed that the claw characters were fundamental differences between two “natural” groups, whether the groups were considered congeneric (as in Boulenger’s scheme) or not

congeneric (e.g., Barbour, Burt and Burt). But Underwood (1959, p. 6) charged that Burt and Burt's "discussion begs the question as to whether or not there are two natural groups which might properly be regarded as genera; they seek only a formal basis for their discrimination." Underwood tabulated interspecific variation in several characters and rejected *Celestus* as not comprising a monophyletic group; he concluded (p. 10) that the unguis sheath has probably been lost several times in *Diploglossus*.

Underwood is the only author who has considered the problem of *Diploglossus* versus *Celestus* in any depth, and his conclusions have been followed by subsequent students of West Indian and fossil anguils (e.g., Schwartz, 1964; Meszoly, 1970). However, authors concerned with Recent mainland anguils (e.g., Smith and Taylor, 1950; Taylor, 1956; Stuart, 1963; Peters and Donoso-Barros, 1970) have fairly consistently recognized *Celestus* in accordance with the older views of Stejneger, Barbour, and Burt and Burt. I am inclined to favor Underwood's interpretation, but the problem is of no great significance in the generic assignment of the three Panamanian species, all of which have an unguis sheath and thus belong to *Diploglossus* in the strict sense. In any case, it will be of considerable interest to learn the functional significance of the unguis sheath. Most authors, apparently following Boulenger (1885, p. 284), have inferred a degree of claw retractility in association with the sheath, but this is questioned by Underwood (1959, p. 6). Observations on living specimens would be useful.

I agree with Underwood (1959, p. 10) that, in general, species-group relationships are obscure in the *Diploglossus* complex. Anguils seem to be a declining group, compared, for example, with the Scincidae, and large morphological gaps between living species are not unexpected. The new *Diploglossus montisilvestris* does not seem particularly close to any other named species; I have compared the holotype directly with specimens of all species having an unguis sheath except the Brazilian *D. lessonae* (which, in many respects, is the best known species owing to Vanzolini's [1958] thoughtful study). Of these species, *D. bilobatus* seems to be the closest relative of *montisilvestris*, although characteristics of the unguis sheath and nasal region seem fundamentally different. The possibility of a closer relationship with some mainland or West Indian species of "*Celestus*" cannot be precluded at this time, considering that *montisilvestris* does have a somewhat reduced unguis sheath (fig. 3) and also has the nasal scale separated from the rostral—the latter condition being characteristic of most of the Antillean species but seemingly of no other mainland species. Following Underwood's analysis of evolutionary trends, *D. montisilvestris* would be primitive in retaining scale organs on the trunk, but advanced in

the nasal-rostral separation, the single prefrontal, and in the slight reduction of the unguis sheath. *Diploglossus montisilvestris* is one of several reptiles and amphibians that may be endemic to the isolated cloud forest atop the Serranía de Pirre (Myers, 1969, p. 47). Additional descriptions of new species from the Pirre cloud forest are in preparation.

The following key will facilitate identification of Panamanian anguids. Reference can be made to Tihen (1949a, 1949b, 1954, p. 11) for additional data on the Panamanian species of *Gerrhonotus* (under the name *Barisia*) and *Coloptychon*. For other mainland areas, the reader may refer to the keys in Smith and Taylor (1950) and in Peters and Donoso-Barros (1970).¹

KEY TO ANGUID LIZARDS IN PANAMA

- 1. Lateral "expansion" groove along side of body (gerrhonotines) 2
 No lateral groove separating dorsal and ventral armor (diploglossines) 3
- 2. Ventral scales in 12 longitudinal rows at midbody; subocular scales differentiated from postocular series; sides of neck finely granular
 *Gerrhonotus monticola* Cope
 Ventral scales in 10 longitudinal rows; subocular and postocular series not well differentiated; sides of neck nearly agranular
 *Coloptychon rhombifer* (Peters)
- 3. A pair of prefrontals and a medial frontonasal present; dorsal body scales with a pronounced median keel (in addition to being striated); size large (to ca. 200 mm. snout to vent) *Diploglossus monotropis* (Kuhl)
 A single large prefrontal (as in fig. 2); dorsal body scales strongly striated but median keel absent or weak; size small (to ca. 100 mm. snout to vent) 4
- 4. Nasal scale anteriorly in contact with rostral plate and posteriorly bordered by two postnasals *Diploglossus bilobatus* (O'Shaughnessy)
 Nasal separated from rostral by contact between first supralabial and anterior internasal; nasal posteriorly bordered by a single large postnasal
 *Diploglossus montisilvestris* Myers

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¹ A correction made in the keys, and the addition of an overlooked species, will facilitate using the invaluable *Catalogue* of Peters and Donoso-Barros. In their key to *Diploglossus (sensu stricto)*, on p. 108, reverse the numerals 2 and 4 in couplet 1. To their section on *Celestus*, p. 90, add *Diploglossus bivittatus* Boulenger ("1894" [1895]); see Villa (1971) for the location and corrected spelling of the type locality.

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