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A NEW SPECIES OF PRIMITIVE *ANOLIS* (SAURIA: IGUANIDAE) FROM THE SIERRA DE BAORUCO, HISPANIOLA

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ABSTRACT. A new species of primitive anole is described from the Sierra de Baoruco in the República Dominicana. The species is compared with its relatives *occultus* (Puerto Rico) and *darlingtoni* and *insolitus* (Hispaniola). Data on the ecology of the new species, in relation to *A. insolitus* and *A. occultus,* are presented.

On the Antillean islands of Puerto Rico and Hispaniola occurs a small group of anoles which has been known from only three species, two of which were only very recently discovered and named. The earliest discovery of a member of this trio of lizards was that of *Anolis darlingtoni* Cochran, of which the holotype and still only known specimen was taken by P. J. Darlington in 1934 at Roche Croix on the northern slopes of the Haitian Massif de la Hotte on the Tiburon Peninsula at an elevation of about 5000 feet (1525 meters). Cochran (1935) named this species *Xiphocercus darlingtoni* in recognition of its resemblances to *X. valencienni* Duméril and Bibron from Jamaica. The genus *Xiphocercus* is now in the synonymy of *Anolis;* the two species are very similar in general habitus and habits but are not closely related. Etheridge (1960: 92) stated that although these two species were externally similar, they differed in critical osteological details (caudal vertebrae, number of attached and floating chevrons, and presence of autonomic septa). *X. valencienni* was like other Jamaican anoles in osteological characteristics and *X. darlingtoni* like several Haitian species. It seemed obvious that these two species were erroneously associated at the generic

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level, and that they represented a convergence between representatives of two anoline stocks of Jamaica and Hispaniola.

The second member of this complex of anoles was discovered on Puerto Rico in 1963 by Juan A. Rivero in the Cordillera Central near Cerro de Punta at an elevation of 1338 meters. *Anolis occultus* was described by Williams and Rivero (1965) from a suite of specimens from various upland Puerto Rican localities and at the same time Thomas (1965) summarized the ecological data and field observations that he had accumulated while collecting the majority of the type-series. Later, Webster (1969) presented further information on the ecology of this forest-dwelling species.

The third member of the trio was first secured by Clayton E. Ray and Robert R. Allen in 1963 at La Palma, La Vega Province, República Dominicana, at an elevation of 3500 feet (1068 meters) in the Dominican Cordillera Central. *Anolis insolitus* was described by Williams and Rand (1969) from six specimens taken at the type-locality. These authors also made extensive comparisons between *darlingtoni, occultus,* and *insolitus,* which form a small complex of primitive anoles. That they are distinct species is unquestioned. But Williams and Rand (1969: 10) noted that "Certainly the most plausible assumption based on current evidence is that *darlingtoni* and *insolitus* are geographic representatives . . . of one stock. This assumption, however, leaves the extreme size disparity of these allopatric species without easy explanation." At the time this statement was written, the largest known *insolitus* had a snout–vent length of 34 mm and the holotype of *darlingtoni* has a snout–vent length of 72 mm. The allusion of Williams and Rand to these two species as "geographic representatives" is due to the fact that one (*darlingtoni*) occurs on the Hispaniolan south island whereas the other (*insolitus*) occurs on the Hispaniolan north island. These two terms have come into common usage among herpetologists who deal with Hispaniolan amphibians and reptiles, since they apply to two island masses, formerly separated, but now joined by the low-lying Cul de Sac-Valle de Neiba plain. These two islands have, to a large extent, distinctive faunas; there has naturally been some invasion and interchange of species, but this has been primarily of lowland forms. The montane faunas of these two paleoislands remain remarkably distinct today, and it is only reasonable to assume that these montane faunas, despite a common origin in many cases, have been completely discontinuous for a very long period.

Williams and Rand (1969: 10) also pointed out that of the 21 Hispaniolan species of *Anolis,* seven had been described within the last ten years; they also stated that they felt that the list of species presented in their summary was incomplete and that "the fund of new information and of new taxa is not nearly exhausted, and the need for further collection and study is abundantly clear."

Under the sponsorship of two National Science Foundation grants (G-7977 and B-023603) between 1968 and 1972, I collected in the República Dominicana; comparable collections were made by Richard Thomas in Haiti. In the former country, we were successful in securing specimens of two new species of *Anolis.* The description of one of these (Schwartz, 1973) has already been completed. Although this species, from the Cordillera Central, is a large and exceptionally handsome lizard, it does not add materially to our knowledge of the Antillean history of the genus *Anolis.* It is a species living in deciduous forest of the Central uplands at elevations above 5400 feet (1647 meters), and as far as present evidence indicates, it is an endemic Cordillera Central species of the *monticola* complex.

The second species is far more interesting and intriguing. This anole is an inhabitant of hardwood forests in the Sierra de Baoruco, the easternmost massif of the chain of three montane masses on the Hispaniolan south island. It is in the Massif de la Hotte, the westernmost of this chain of three ranges, that *A. darlingtoni* occurs. Thus, we now know of two species of this group of anoles from the Hispaniolan south island. The doubts expressed by Williams and Rand concerning the geographical equivalence of *darlingtoni* and *insolitus* have been shown to have a sound basis, since there is little question that this new species is the south island analogue of the north island *insolitus,* and that the larger *darlingtoni* stands alone among other members of the group as a much larger lizard. Details of the relationships between all four species will be presented by Williams and Etheridge in a separate publication; it is my aim herein to describe the new species, give details of its variation, and compare it with the three remaining species, as well as to present field observations made during 1971.

The first specimen of this new taxon was observed by myself on the night of 29 August 1971, as it slept on a dry hanging vine under a low vine canopy shelter adjacent to the road in the Sierra de Baoruco. Its sleeping posture and general configuration, despite the fact that it was some ten feet (3.1 meters) above

me, attested that it was a species related to *A. insolitus* and *A. occultus*. Because of the peculiar situation where the lizard slept, I was reluctant to make the attempt to secure it. This reluctance was due to the fact that I and my companions have spent many nights and days collecting in the Sierra de Baoruco since 1963 without seeing a lizard of this sort. Bruce R. Sheplan was invited to make the attempt at retrieving the lizard, and he very carefully ascended the muddy road cut, crawled gingerly beneath the vine canopy without disturbing the vegetation, and handily secured the lizard. We later learned that there was no need for such care in dealing with this *Anolis,* since, like *insolitus* and *occultus,* it is extremely tolerant of any sort of nocturnal disturbance and determinedly clings to its perch despite disturbances. A second specimen was secured later the same evening from a similar sleeping situation only 15 feet (4.6 meters) from the first individual. Two more visits to the same general area yielded a total of 16 lizards; it is obvious that at least locally this new species is not rare, but on the other hand its ecological requirements (and these can be deduced only from its sleeping sites) may be extremely rigid. The locality itself is not difficult of access and to my eye is little different from many other regions in the Sierra de Baoruco uplands, areas such as the Las Auyamas-Valle de Polo region which have been extensively collected. Still, the new species is known only from one fairly circumscribed area. In honor of Mr. Sheplan, whose care and interest not only were responsible for the first two specimens but also for most of the subsequent material, I propose that the new species be named

Anolis sheplani new species

Holotype. National Museum of Natural History (USNM) 194015, an adult male, from 13.0 mi. (20.8 km) SE Cabral, 3200 feet (976 meters), Barahona Province, República Dominicana, taken by Bruce R. Sheplan on 29 August 1971. Original number Albert Schwartz Field Series (ASFS) V30309.

Paratypes. ASFS V30310, same data as holotype; Carnegie Museum (CM) 52300, same locality as holotype, 30 August 1971, D. C. Fowler; ASFS V30326, USNM 194016–17, CM 54140–41, American Museum of Natural History (AMNH) 108822, Museum of Comparative Zoology (MCZ) 125641–42, 12.3 mi. (19.7 km) SE Cabral, 3300 feet (1007 meters), Barahona Province, República Dominicana, 30 August 1971, D. C. Fowler, A. Schwartz, B. R. Sheplan; MCZ 125691, ASFS

V30824–26, 12.3 mi. (19.7 km) SE Cabral, 3300 feet (1007 meters), Barahona Province, República Dominicana, 9 September 1971, A. Schwartz, B. R. Sheplan.

Diagnosis. A species of the *darlingtoni-occultus-insolitus* group of anoles, distinguished from all other species by the combination of: 1) small size (males to 41 mm, females to 40 mm snout–vent length) and strong lateral compression; 2) modally 2 rows of loreal scales (modally 3 or 4 in other species); 3) supraorbital semicircles modally separated by 1 row of scales (3 rows in *occultus,* 1 row in *darlingtoni* and *insolitus*); 4) supraocular semicircles separated from interparietal scale by 1 scale on each side (4 scales in *occultus,* 1 scale in *darlingtoni* and *insolitus*); 5) modally 1 enlarged scale in supraorbital disk (no enlarged scales in *occultus,* 2 in *insolitus,* 5 in *darlingtoni*); 6) rostral scale in contact posteriorly with 5 small scales (9 scales in *occultus,* 5 scales in *insolitus,* 6 scales in *darlingtoni*); 7) 4 distinct canthal scales (10 indistinct small canthal scales in *occultus,* 4 distinct canthals in *insolitus,* 5 in *darlingtoni*); 8) supralabials to center of eye 8 (10 in *occultus,* 7 in *insolitus,* 7 or 8 in *darlingtoni*); 9) 4–6 scales (mode 5) between second canthal scales (9–14 in *occultus,* 2–6 in *insolitus* with a mode of 4, 5 in *darlingtoni*); 10) a distinct supraciliary row of scales but no scale enlarged (no differentiated supraciliaries in *occultus*); 11) no postorbital, supratemporal, or occipital spines (present in *insolitus*); 12) no distinct supratemporal line of enlarged scales (present and the series enlarged and terminating in a spine in *insolitus*); 13) interparietal scale ovoid, much larger than external auditory meatus (equal in *occultus*); 14) canthal ridge strong (weak in *occultus*); 15) middorsal scales small, smooth, subequal, with a longitudinal series of isolated spine-like scales separated by about 6 to 8 small flat scales, no specialized spine-like scales on neck (no modified middorsal scales in *occultus;* nape scales slightly smaller than middorsals and no specialized spine-like scales in *darlingtoni;* nape scales forming a low nuchal crest as far posteriorly as about insertion of forelimbs, followed by low rounded and isolated bosses, composed of about 8 small rounded scales, the bosses separated by about 5 or 6 small dorsal scales in *insolitus*); 16) ventral scales smooth and distinctly larger than dorsal scales (about equal in *darlingtoni*), juxtaposed, in often poorly defined transverse rows; 17) dewlap large, slotted (= inset), in both sexes, pale peach in males, brown with a cream border in females (pinkish gray in both sexes of *occultus;* rich mustard, brown, orange or orange-ocher in both sexes of

insolitus; color unknown and dewlap not slotted in *darlingtoni*); 18) limb scales smooth, those on anterior face of thigh as large as ventrals (smaller than ventrals in *occultus,* weakly carinate in *darlingtoni*); 19) supradigital scales smooth (multicarinate in *darlingtoni*); 20) tail round with a continuation of the evenly spaced middorsal spines, dorsal caudal scales larger than ventrals, smooth to weakly unicarinate, ventral caudal scales much larger, strongly unicarinate (no dorsal caudal scale modification in *occultus,* dorsal scales very small, granular, ventral caudal scales larger, smooth, and smaller than ventrals; dorsal caudal scales modified into a series of irregularly spaced large triangular scales in *insolitus,* dorsal and ventral caudal scales unicarinate and ventral caudals larger than ventral scales); 21) a pair of enlarged postanal scales in males (none in *occultus*); 22) general coloration very pale (almost white) but capable of pale tan to dark brown phases, or lichenate blotching of these two colors with a row of tiny dark brown dots down middorsal line, these dots the enlarged median dorsal spinose scales; a small black to dark brown nuchal dot and a broad dark sacral U in the pale phase; two black radiating lines from the eye onto the temporal region and a ventral radiating line from the eye which, ventrally, forms one of a maximum series of five incomplete transverse dark brown to black lines crossing the throat, the most posterior at the anterior end of the slotted dewlap; venter white.

Description of holotype. An adult male with the following measurements and scale counts: snout–vent length 40 mm, tail length 43 mm; 4 canthal scales; 5 snout scales at level of second canthal scales; 3 vertical rows of loreals; supraorbital semicircles separated by 1 row of scales; 1 scale on each side between the interparietal and the supraorbital semicircles; subocular scales and supralabial scales in contact; 1 large scale in the supraocular disk; 2 postmental scales; 6 small scales in contact with the rostral scale posteriorly; 8 supralabials to center of eye; 14 subdigital lamellae on phalanges II and III of fourth toe. Coloration of holotype. When collected at night, very pale tan (almost white), but capable of limited metachrosis to pale tan at one extreme and dark brown at the other; often assuming a lichenate blotched pattern of pale tan and dark brown, with a row of tiny dark brown dots down the dorsal midline, these dots corresponding to the individual enlarged and spaced spinose middorsal scales; in the pale phase, a black to dark brown nuchal dot and a dark broad sacral U; tail banded red-brown and tan, the red-brown bands narrow, five in number including the tail tip,

and separated by tan interband areas that are twice the width of the dark bands; a pair of fine black lines radiating onto the temples from the eye on each side, and a fine black line extending ventrally from the eye across the supralabials onto the throat where it forms the central of five incomplete dark crossbands across the throat, the most posterior of which is at the angle of the jaws; dewlap large, slotted, very pale peach, venter very pale tan laterally, white centrally.

Variation. The series of *A. sheplani* consists of 16 specimens of which one (MCZ 125691) has been skeletonized and upon which no external counts or measurements were taken. Of the remaining 15 lizards, nine are males and six are females. The largest male has a snout–vent length of 41 mm (MCZ 125641) and the largest female 40 mm (ASFS V30310). Both sexes thus seem to reach about the same adult size; males are easily distinguished at any age by the presence of a pair of enlarged postanal scales. The series includes four young lizards with snout–vent lengths between 20 mm and 25 mm. The canthal scales are large and clearly delimited and always 4. There are between 4 and 6 scales across the snout at the level of the second canthals (mode 5). The loreal rows are either 2 or 3 (mode 2). The supraocular semicircles are either in contact or separated by 1 or 2 rows of scales (mode 1). The scales between the interparietal and the supraocular semicircles are almost always 1 bilaterally, although two specimens have 2 scales in this position unilaterally. The subocular scales are always in contact with the supralabial scales, of which there are between 7 and 10 (mode 8) to the center of the eye. There is modally only 1 enlarged scale in the supraorbital disk, but three lizards have 2 scales (the second enlarged but much smaller than its companion) in the disk. The postmental scales vary between 2 and 5 (mode 4) and there are 4 to 8 small scales (mode 5) in posterior contact with the rostral scale. In further discussion of scutellar characters, I follow the schema established by Williams and Rand (1969) for this group of anoles.

Head: Narrow, elongate. Head scales large, smooth, smallest anteriorly. Nostril circular, nasal scale separated from rostral by 3 small oval scales. Rostral scale wide, low, in contact with 4 to 8 small scales posteriorly.

Supraorbital semicircles large, weakly convex, the scales slightly boss-like, either in contact or separated by 1 or 2 rows of smaller scales. A much less distinct row of many small oval scales along the supraciliary margin on each side, no elongate

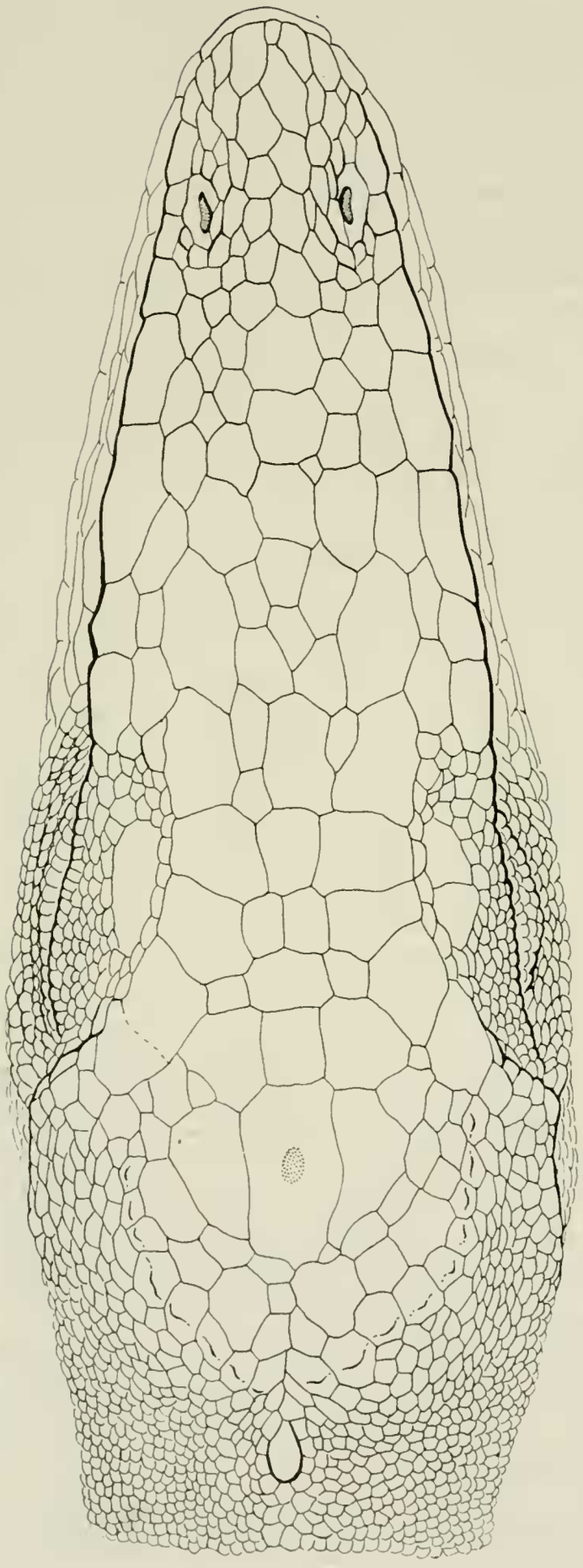

Figure 1. *Anolis sheplani* Holotype. Dorsal view of head. Illustrations funded by NSF grant GB-37731X to Ernest E. Williams.

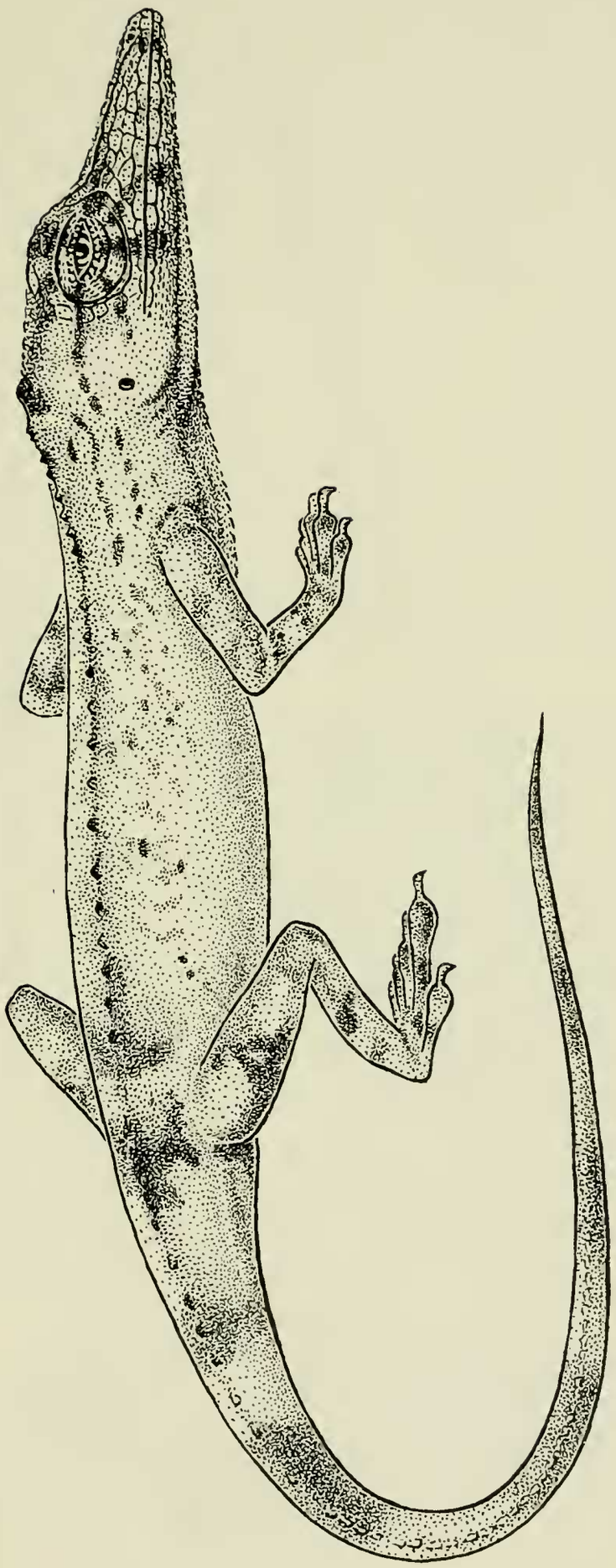

Figure 2. *Anolis sheplani* Holotype. Lateral view of head.

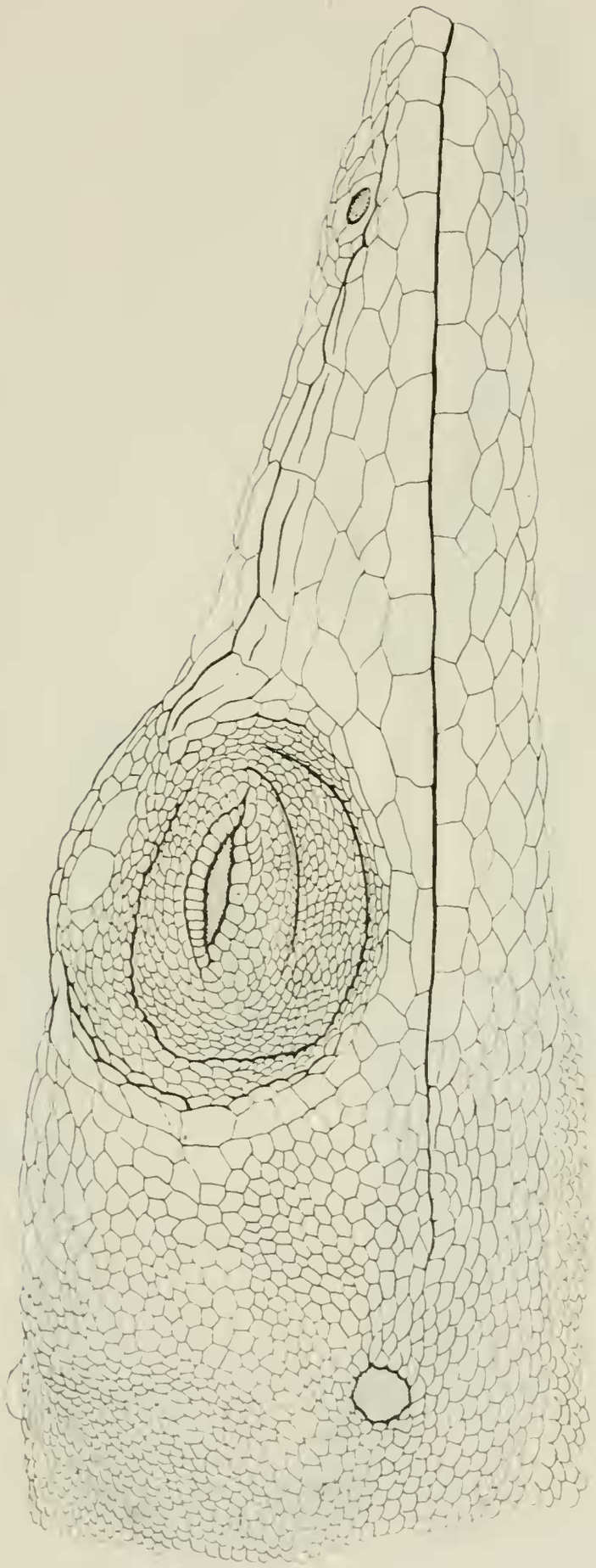

Figure 3. *Anolis sheplani* Holotype. Lateral view.

supraciliary scale. Posterior and interior to the supraciliary row, 3 or 4 rows of small scales or granules of which the most interior are largest, surrounding the single (occasionally two) enlarged scale in the supraorbital disk. Canthal ridge of 4 scales well defined, second canthal longest, diminishing in size anteriorly, anteriormost posterior to nostril and separated from it by the posterior portion of the nasal scale. Loreal rows 2 or 3, the scales varying in shape between elongate rectangular and quadrangular. No distinct supratemporal line or row of scales. Temporal scales small, flat, about 14 between the enlarged postocular scales and the external auditory meatus. Supratemporal scales flat and gradually larger than temporals, not forming a U-shaped crest behind the interparietal region. Interparietal ovoid, very much larger than tiny external auditory meatus, separated on each side usually by 1 (occasionally 2) scale from the supraocular semicircles. Scales surrounding interparietal flat, without prominent tubercles or spines. External auditory meatus very tiny, elliptical, placed far ventrally, just dorsal to the comissure of the mouth.

Suboculars directly in contact with supralabials, anteriorly grading into loreals, posteriorly continuous with the enlarged postoculars. Seven to 10 supralabials to center of eye.

Mental large, semidivided, wider than deep, in contact with 2 to 5 small granular postmental scales; 1 infralabial and 1 sublabial in contact with mental on each side. Throat scales smooth. elongate anteriorly, becoming more granular and ovoid posteriorly, gradually merging with the ventral scales.

Trunk: Dorsal scales small, smooth, slightly larger on flanks. and merging with the ventral scales; a middorsal series of individual spinose crest scales, separated by about 6 to 8 unmodified dorsal scales, this middorsal series of spinose scales continued onto the dorsal caudal midline. Ventrals larger than dorsals. smooth, rounded, and in transverse rows that may be slightly irregular.

Dewlap: Large; present in both sexes, slotted (= inset), pale peach in males, brown with a cream border in females, scales large and arranged in rows, larger than throat scales and about the same size as ventrals; marginal dewlap scales crowded and about the same size as throat scales adjacent to dewlap.

Limbs and digits: Limbs short, tibial length about equal to distance from tip of snout to center of eye. Thirteen to 17 lamellae under phalanges II and III of fourth toe. Scales of limbs

smooth, those of anterior surface of thigh slightly smaller than ventrals. Supradigital scales smooth.

Tail: Round non-verticillate, with a median series of widely spaced spinose scales, their apices directed posteriorly, separated from each other by about 3 to 5 smaller, smooth to weakly unicarinate dorsal caudal scales. A pair of enlarged postanal scales in males. Scales behind vent and around base of tail smooth. Four to 6 ventral rows of much enlarged unicarinate caudal scales.

Color in life: The coloration and pattern of *A. sheplani* have been given both in the diagnosis of the species and in the description of the holotype and need not be repeated in detail. The lizards are capable of limited metachrosis (they have no green phase) between very pale tan (almost white) while sleeping and brown when disturbed or active. In the pale phase there is a brown nuchal dot, a broad dark sacral U, and a median dorsal series of dark brown to black dots. An intermediate pigmental condition involves a lichenate tan-and-brown phase. The dewlap is pale peach in males, dark brown with a cream border in females; although the dewlap is well developed in both sexes, it is slightly larger in males than in females.

Comparisons. The diagnosis gives details of comparisons between *sheplani* and the three remaining species of the group (*darlingtoni, occultus, insolitus*), and these need not be repeated. However, there are some salient differences that I wish to emphasize. Of the four species, *sheplani* most closely resembles *occultus* in snout–vent length; females of both species reach a snout–vent length of 40 mm, whereas the largest male *occultus* (ASFS V5489) I have examined has a snout–length of only 35 mm; Williams and Rand (1969: 13) noted maximally sized *occultus* at 34 mm snout–vent length (sex not stated), but Williams and Rivero (1965: 7) gave 42 mm as the size of the largest *occultus* (sex not stated) examined by them. *A. sheplani* is smaller than *A. insolitus* (maximally sized male 47 mm — ASFS V22502; female 44 mm — ASFS V31614), and much smaller than *A. darlingtoni* (holotype male, 72 mm). Of the four species, only *occultus* males lack enlarged postanal scales. The spinose or tuberculate head scales, and the supratemporal line of enlarged scales which terminates in a spine, are absent in *sheplani,* as well as *occultus* and *darlingtoni;* these features are distinctive of *insolitus.* Scales between the second canthals are very numerous in *occultus* (9–14) and very many less in the other species, with *insolitus* having 2–6 (mode 4) and *sheplani*

4–6 (mode 5). *A. darlingtoni* has 5 scales between the second canthals. Loreal rows are modally 2 in *sheplani,* 3 in *darlingtoni* and in *insolitus,* and 4 in *occultus.* The supraorbital semicircles are modally separated by 3 scales (2–5) in *occultus,* by 1 row of large scales in *insolitus,* by 1 row of small scales (0–2) in *sheplani,* and by 1 row of small scales in *darlingtoni.* Scales between the interparietal and the supraorbital semicircles are modally bilaterally 4 in *occultus* (range 2–6), and 1 scale in the other species (range 0–2 in *insolitus,* 1–2 in *sheplani,* 1 in *darlingtoni*). The supraocular disks in *occultus* have no enlarged scales, whereas in *sheplani* there is 1 (occasionally 2) enlarged scale in this area, in *insolitus* 1 to 6 (mode 2), and 5 in *darlingtoni.* Scales posteriorly in contact with the rostral are 6–10 in *occultus* (mode 9), 4–7 in *insolitus* (mode 5), 4–8 in *sheplani* (mode 5), and 6 in *darlingtoni.* The canthal scales are poorly defined and very numerous (7–12; mode 10) in *occultus,* whereas all *sheplani* have 4 distinct canthals, *insolitus* modally has 4 distinct canthals (range 3–6), and *darlingtoni* has 5. There are 9–11 supralabials to the eye center in *occultus* (mode 10), 6–8 (mode 7) in *insolitus,* 7–10 (mode 8) in *sheplani,* and 7 or 8 in *darlingtoni.*

The dewlap color in *occultus* is pinkish gray, whereas that of *insolitus* varies between rich mustard, brown, orange or orange-ocher; in neither of these species is the dewlap color sexually dichromatic, whereas the dewlap is strongly sexually dichromatic in *sheplani.*

Thomas (1965: 15–16) gave a résumé of the color repertory of *occultus;* the pattern of this species consists of a dark cephalic figure or interocular trangle; dark radiating eye lines; four zones of transverse body banding (scapular, dorsal, lumbar, sacral); a single or paired lumbar spot; and a fine reticulum of dark lines which frequently appears as small ocelli. The ground color of *occultus* varies through shades of gray through olive-brown, olive, yellow-green to dirty orange, to a lichenate off-white or very light gray and black or very dark gray. In *insolitus,* the dorsum is grayish green or grayish brown, irregularly marbled, with a distinctive pale green supra-axillary crescent, a white subocular spot, and a black postorbital spot. In life, the supra-axillary crescent is extremely clear, and it, plus the black post-orbital spot, are ready recognition features of the species. At night while asleep, *insolitus* may often be a very pale tan or white, very much in the fashion of *sheplani.* The coloration of *darlingtoni* in life is unknown, but Williams and Rand (1969:

11) have an excellent figure showing the basic design of the holotype. Conspicuous details of the pattern are a large dark postocular blotch and a generally transversely banded (about five fragmented bands) dorsal pattern.

One structural feature is interesting. *A. occultus* has the median dorsal scales unmodified into any sort of spines or crest scales. In *sheplani,* there are isolated spinose scales along the dorsal midline, the scales separated widely by small dorsal scales. In *insolitus,* there are low raised bosses that are covered by "rosettes" of scales, slightly larger than their surrounding scales, the bosses separated by unspecialized dorsal scales. These raised "bosses" with the rosettes of scales become slightly less conspicuous posteriorly, and on the tail are replaced by laterally compressed and spaced individual triangular scales as part of the same dorsal series. *A. darlingtoni* lacks specialized middorsal scales.

Field observations. All specimens of *A. sheplani* were taken in a very circumscribed area between 3200 and 3300 feet (976 and 1007 meters) in the Sierra de Baoruco. The immediate area where the lizards were secured is high mesic deciduous forest, somewhat modified by the cultivation of coffee and cacao. The high original forest trees have been retained as shade cover for the cultivated plants. The general aspect is rich, wet, and very well wooded. A newly constructed highway ascends the northern slope of the Sierra de Baoruco between Cabral in the Valle de Neiba and the settlements of Las Auyamas and Polo in the Baoruco uplands. At a distance of 10.4 miles (16.6 km) south of Cabral, an unpaved but quite good road takes off to the southeast of the main highway and terminates abruptly at the settlement of La Lanza. The road apparently formerly went from La Lanza to the coastal town of Paraíso, but this section is no longer passable. At a distance of between 1.9 and 2.6 miles (3.0 and 4.2 km) from the intersection, the road has been cut into a gradually sloping mountain side. Below the road there are high-canopied *cafetales* and *cacaotales;* above the road, and separated from it by a road-cut bank that varies from 2 to 10 feet (0.6 to 3.1 meters) in height, is an area of second-growth trees, saplings, shrubs, and weed and grass patches, the arborescent vegetation heavily interlaced with living and dead vines, primarily those of a purple-flowered member of the Convolvulaceae. In many places along this limited stretch of road, there are dense mats and curtains of vines; it was within and under these mats that *A. sheplani* was encountered. The species is far

outnumbered by *Anolis hendersoni* Cochran, which sleeps in precisely the same situations, and one *Anolis singularis* Williams was also found sleeping syntopically with *A. sheplani.*

Sleeping sites of *A. sheplani* are bare twigs and vines within and beneath the curtains and mats of vines. The lizards sleep exposed and are easily seen since they are very pale. They are not easily disturbed by movement of the collector, jostling of the vines, or flashlight. On those rare occasions when an individual was disturbed, it opened its eyes, clutched the twig or vine more tightly, and, if pressed, moved unhurriedly away from the source of disturbance. We never saw *A. sheplani* either scurry away or drop to the ground in the fashion of other anoles when disturbed at night. Rather, their reaction to complete disturbance (for instance, touching the lizard or breaking the twig or vine to collect it) only caused the lizard to cling more tightly to its substrate. The lowest lizard was taken at a height of 3 feet, the highest 14 feet, above the ground; this gives a sleeping range of 3 to 14 feet (0.9 to 4.3 meters). It is probable that *A. sheplani* sleeps even higher on vines in the canopy, but at this location the trees in general are fairly low (perhaps 20 feet — 6.1 meters — average height) and thus the vines are low. It is significant that we never encountered *A. sheplani* below the road in this same area, despite suitable vine mats and curtains; on the lower side of the road the forest is much less disturbed and the canopy is much higher. In neighboring situations, even within a few meters, *A. cybotes, A. coelestinus* and *A. distichus* were also found sleeping.

It is instructive to compare the sleeping sites and general behavior of *A. sheplani* with that of *A. insolitus* and *A. occultus.* I have the impression that *insolitus* is an inhabitant of much less disturbed situations than *sheplani.* The known localities for *insolitus,* which now number seven, are invariably gallery forest along rivers or streams. At some localities for *insolitus,* the forest has been slightly disturbed by planting of coffee and cacao, but in general the canopy is high and dense, and vines and lianas are abundant and conspicuous (but often quite high). Consequently, sleeping sites of *insolitus* are not restricted to sheltered spots beneath vine mats or curtains. Regularly, specimens of *insolitus* have been taken completely exposed on the tips of twigs, vines, and branchlets, at heights above the ground between 2 and 25 feet (0.6 and 7.6 meters). On occasion, *A. insolitus* have been taken sleeping on green leafy shrubs rather than on bare twigs and vines. At the type locality, however, during a

very heavy and continuous rain, most *insolitus* were secured in sheltered situations under vine mats or curtains, and two individuals were found sleeping on top of each other on a pendant vine. In summary, the sleeping sites of *A. insolitus* are regularly much more exposed than are those of *A. sheplani.*

Thomas (1965) and Webster (1969) have both commented upon the habits of *A. occultus* in Puerto Rico. Northeast of Guayama, Thomas reported *occultus* "sleeping at night in tangles of dead (or leafless) vines and twigs along both sides of the path, four to ten feet above the ground" on a forested hillside, and north of Sabana Grande Thomas recorded this species sleeping at heights of 4 to 15 feet (1.2 to 4.6 meters) on dead vines. Finally, south-southeast of Villa Pérez, *A. insolitus* was encountered asleep in the same sorts of situations 5 to 12 feet (1.5 to 3.7 meters) above the ground. Webster reported sleeping sites of seven *A. occultus* at a locality south of Palmer as "long, exposed twigs, . . . twigs near leaves, . . . and the upper surface of a broad, stiff leaf." Webster also located six additional *A. occultus* sleeping on living twigs near leaves, one on a long dead twig, and at the tip of a very long descending branch, and a juvenile on a dead fern. Both Thomas and Webster commented on the habit of *occultus* of clinging tightly to twigs when disturbed; this habit is shared with *A. sheplani* as noted above. The same is true of *A. insolitus;* on one occasion, we cut from the tree the small branch upon which an *insolitus* slept, and the lizard remained clinging to the branchlet during the entire operation. On another occasion, a pendant vine upon which an *insolitus* slept was deliberately broken above and below the lizard and then accidentally dropped onto the ground in leaf litter and herbaceous growth. When the vine was located, the now wide-awake *insolitus* was seen to be still clinging tightly to the vine!

Remarks. I have little doubt that *A. sheplani* is more closely related to *A. insolitus* than to *A. darlingtoni,* despite the fact that the latter species occurs on the south island along with *sheplani* (although the sole *darlingtoni* locality is removed some 310 kilometers to the west of those for *sheplani*). It is truly puzzling, considering the intensive (albeit local) collecting activity on the Hispaniolan south island in Haiti, most especially in the mountains above Port-au-Prince (Montagne Noire, Morne l'Hôpital) and in the Massif de la Hotte (Les Platons, Castillon) that no further specimens of *A. darlingtoni* have been encountered. I suspect that the habits of this species will be found to be very like those of the remaining members of the complex; if

so, then nocturnal collecting with emphasis on dead vines, branches, twigs, etc., in sheltered locales may well be the secret of securing more *A. darlingtoni.* Considering the apparently very narrow ecological situations that *A. sheplani* favors, and the fact that the uplands of the Sierra de Baoruco in the Las Auyamas-Polo region have presumably been well collected since the 1920's, there is always the possibility that *A. darlingtoni* has equally stringent ecological requirements that have been overlooked or that may be very restricted in the Massif de la Hotte. Likewise, I have little doubt that *A. sheplani* will be encountered elsewhere in the Sierra de Baoruco and (or a related form) in the Massif de la Selle and its associated ranges.

The knowledge that the *darlingtoni* group of anoles occurs on both the north and south Hispaniolan islands should spur interest in ascertaining the presence of similar species of this small group in other Hispaniolan ranges. Most pertinent is the Sierra de Neiba, that range which borders the Valle de Neiba on its northern side, just as the Sierra de Baoruco borders the low-lying valley on its southern side. If *insolitus* and *sheplani* are more closely related to each other than either is to *darlingtoni,* it would seem likely that some member of this group of anoles occurs in the uplands of the intervening Sierra de Neiba. On this premise, we visited that range both during the day and at night during 1971, but to no avail. The forests are mesic and viney, altogether suitable situations for members of this group of lizards. The canopy is generally high, however, and this may make it more difficult to secure related anoles if they occur in this range. However, in similar high-canopied forests south of El Río in the Cordillera Central, *A. insolitus* was easily observed. It may well be that there is no member of the *darlingtoni* group in the Sierra de Neiba, but this range is so poorly known herpetologically that one cannot with certainty dismiss the absence of a related species there.

The elevational distributions of the four members of the *darlingtoni* complex are interesting. *A. occultus* in Puerto Rico is known to occur between elevations of 2300 and about 4389 feet (702 and 1338 meters), whereas the known altitudinal ranges of the other species are: *darlingtoni,* 5000 feet (1525 meters); *sheplani,* 3200–3300 feet (976–1007 meters); and *insolitus,* 3500–5800 feet (1068–1769 meters). Although the data on *darlingtoni* and *sheplani* are limited, *insolitus* seems to reach higher elevations in the Cordillera Central than any species does elsewhere. This may at least in part be due to the fact that no

mountains in Puerto Rico or the Sierra de Baoruco reach such high elevations as do the mountains within the area known to be inhabited by *insolitus*.

Williams and Rand (1969: 9) noted that "It would be a possible argument against the close affinity of the two species that *darlingtoni* (72 mm) is approximately twice the snout–vent length of *insolitus* (33 mm). Differences in size between closely related species, particularly if they are sympatric, are not unusual, but as far as known, these two species are widely allopatric, and the size difference is extreme." More recently collected and larger numbers of *A. insolitus* show that the supposed extreme difference in size (= snout–vent length) between *darlingtoni* and *insolitus* is not so striking as Williams and Rand supposed. In fact, *insolitus,* which reaches a maximum known snout–vent length of 47 mm (not 33 mm) but which is nonetheless still smaller than *darlingtoni,* rather bridges the size gap between smaller *occultus* and *sheplani* and larger *darlingtoni.* The size discrepancy for members of the complex, which Williams and Rand felt might argue against relationships among these lizards, is not so striking as they supposed.

Specimens examined. Anolis occultus: PUERTO RICO, 20.9 km NNE Guayama, 2300 feet (702 meters) (ASFS V4891–92, V4901, V5017–18); 13.7 km N Sabana Grande, 2800 feet (854 meters) (ASFS V5489–91, V5494); 13.7 km S Palmer (ASFS V6662–65); 10.6 km SSE Villa Pérez, 3400 feet (1037 meters) (ASFS V6196–97).

Anolis insolitus: REPUBLICA DOMINICANA, *La Vega Province,* La Palma, 14 km E El Río, 3500 feet (1068 meters) (ASFS V18739, V18917–19, V22546–53, V31705–10); 1.9 mi. (3.0 km) SW El Río, 3900 feet (1190 meters) (ASFS V31656–63); 16 km SE Constanza, 5250 feet (1601 meters) (ASFS V22502–05); 16.4 km SE Constanza, 5500 feet (1678 meters) (ASFS V31614); 18 km SE Constanza, 5800 feet (1769 meters) (ASFS V19096); 18.5 km SE Constanza, 5800 feet (1769 meters) (ASFS V31581–82). *Peravia Province,* 6.5 mi. (10.4 km) NW La Horma, 5400 feet (1647 meters) (ASFS V31933–37, V31973–74); 8.1 mi. (13.0 km) NW La Horma, 5800 feet (1769 meters) (ASFS V31927–28).

Anolis darlingtoni: HAITI, *Dépt. du Sud,* Roche Croix, Massif de la Hotte, ca. 5000 feet (1525 meters) (MCZ 38251).

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