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# TWO NEW SPECIES OF *SPHAERODACTYLUS* FROM EASTERN CUBA (SQUAMATA: GEKKONIDAE)

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ABSTRACT: Two new species of *Sphaerodactylus* are described from eastern Cuba: *S. schwartzi* is from low elevation xeric habitats in western Guantánamo Province, and *S. cricoderus* is from moderate elevations on the north and south slopes of the Sierra Maestra in Santiago de Cuba Province. The two new taxa appear to be sister species and allied to *S. ramsdeni*, also endemic to eastern Cuba. Together, these three species form the *ramsdeni* group, which is characterized by dark, short-snouted species with very small dorsal scales, more than one internasal, and lack of marked sexual dichromatism. Convergence in the genus *Sphaerodactylus* is discussed, and two ecomorphs are proposed (mesic forest and xeric forest).

*Key words:* Reptilia; Systematics; Caribbean; West Indies; Cuba; Ecomorph

THE *Sphaerodactylus* of Cuba (14 species) fall into seven morphologically definable entities (Schwartz and Garrido, 1985; Thomas, 1975; Thomas and Schwartz, 1966): (1) the *nigropunctatus* complex which includes *S. nigropunctatus* Gray and *S. torrei* Barbour—these are large species with granular scales, banded patterns, and

strong sexual dichromatism; (2) *S. elegans* MacLeay, which is similar to species in the *nigropunctatus* complex but lacks strong sexual dichromatism; (3) the *intermedius* complex, including *S. armasi* Schwartz and Garrido, *S. docimus* Schwartz and Garrido, *S. intermedius* Barbour and Ramsden, and *S. ruibali* Grant, which have imbricating scales and weakly developed banding patterns; (4) the *S. scaber* group, including *S. oliveri* Grant and *S. scaber* Barbour and Ramsden, which are moderate-sized with large, keeled, boss-like scales and a zone of middorsal granules; (5) the *S. notatus* group, including *S. bromeliarum* Peters and Schwartz, *S. celicara* Schwartz and Garrido, and *S. notatus* Baird (and a large number of Hispaniolan species), consists of moderate-sized species with flattened, keeled, imbricate scales, and a suite of pattern similarities; (6) *S. ramsdeni* Ruibal, a moderate-sized, short-snouted species with small, weakly imbricate or granular scales and a dark, lineate, not strongly sexually dichromatic pattern; and (7) *S. argus* Gosse, a moderate-sized species with small imbricate scales and a distinctive ocellate and/or vermiculate pattern. *Sphaerodactylus argus* is a Jamaican species with Jamaican and Cayman Islands relatives, is peripherally and irregularly distributed in Cuba, and may be introduced.

Recently, a revised classification of West Indian *Sphaerodactylus* was proposed based on phylogenetic analyses of slow-evolving protein loci and albumin immunological data (Hass, 1991). Because only six of the 14 Cuban species were included in that study, those seven morphological groupings could not be tested. However, at least five separate dispersal events were hypothesized to explain the origin of the Cuban species.

In the summers of 1989 and 1990 during expeditions to eastern Cuba, we collected dark, small-scaled sphaerodactyls having a pale band across the neck at several localities. Although they share some features with *Sphaerodactylus ramsdeni* and, with that species, constitute a group, they are distinct and themselves represent two new species.

## Materials and Methods

The following abbreviations are used: MNHNCU (Museo Nacional de Historia Natural, Cuba (Havana), SVL (snout–vent length), and USNM (United States National Museum). Head scale counts are given as left/right; upper labial counts are given as the number of scales between the rostral and a point just below the middle of the eye. Dorsal and ventral scale counts were made to one side of midline and to one side of midventer (respectively), along a line connecting axilla to groin. Escutcheon counts are reported as (1) the maximum number of scales from anterior to posterior and (2) the maximum number transversely across the patch (including extensions onto thighs). Sex was determined by gonadal examination or by the presence of an escutcheon in males.

For the first of these geckos, in honor of Albert Schwartz and his extensive contributions to the knowledge of this exquisite genus, we propose the name

### *Sphaerodactylus* ***schwartzi*** sp. nov.

Fig. 1A

*Holotype.*—MNHNCU 3438, an adult male, from Loma Redonda, 5 km NW Hatibonico, Guantánamo Prov., Cuba, 100 m, collected by S. Blair Hedges and Richard Thomas on 18 June 1990. Original number USNM Field Series 190957.

*Paratypes.*—USNM 309764 (male), same locality as holotype, 14 June 1990, R. Thomas; 309765 (female), 309766 (male), MNHNCU 3439 (female), and MNHNCU 3440 (male), same locality as holotype, 18 June 1990, S. Blair Hedges and Richard Thomas; USNM 309767 (female), 8.9 km SW Hatibonico, 50 m, Guantánamo Prov., Cuba, 14 June 1990, Richard Thomas.

*Diagnosis.*—A dwarf *Sphaerodactylus* (adults 18–20 mm SVL), the smallest known Cuban species, having small, nearly granular dorsal scales, rostral with a semicircular flat plate delimited by a ridge, two prominently enlarged internasals, one postnasal, two enlarged postmentals, and a head pattern of two pale postocular stripes

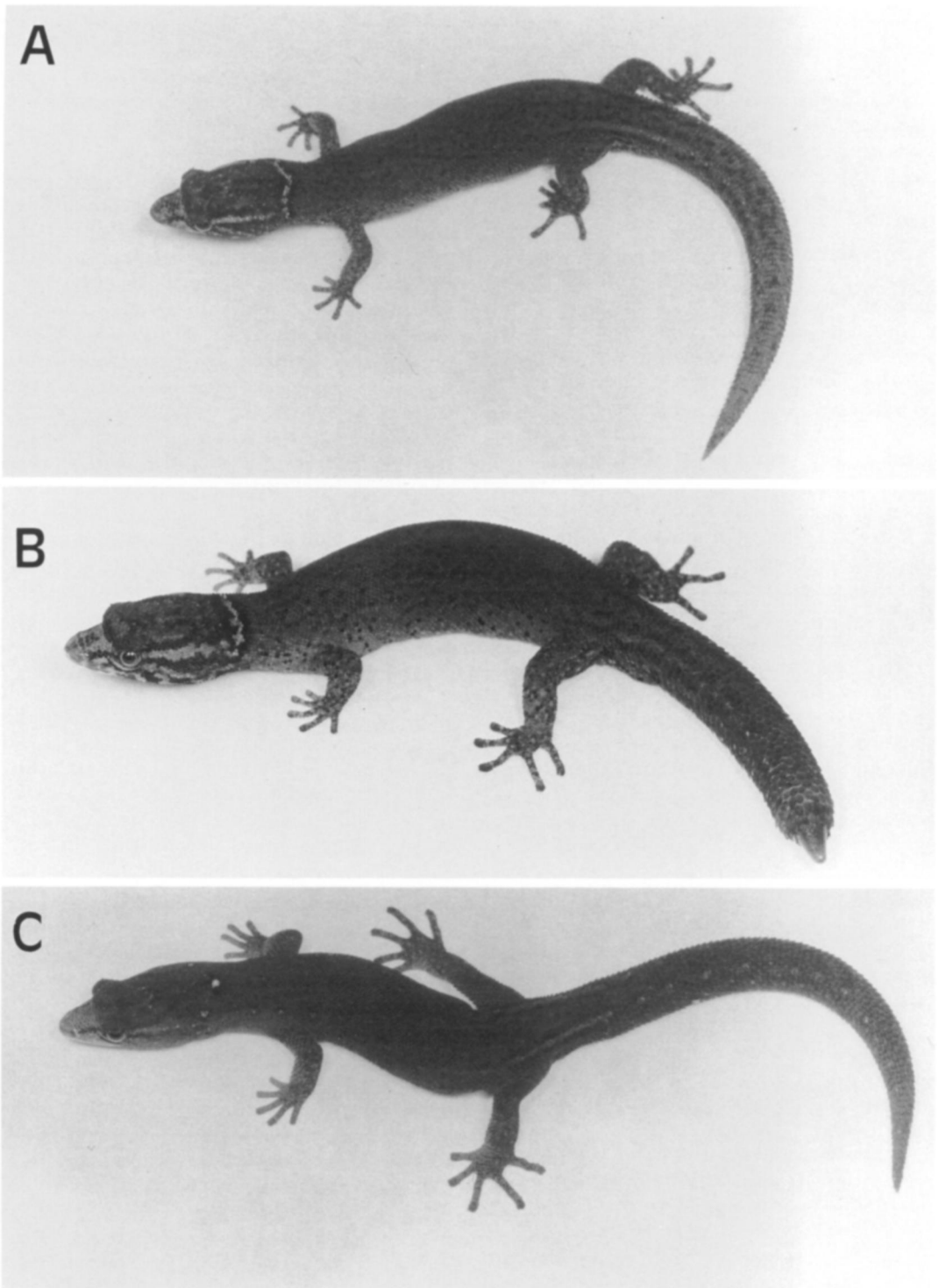


FIG. 1.—(A) *Sphaerodactylus schwartzi* (MNHNCU 3438, male, 19 mm), (B) *S. cricoderus* (USNM 309768, male, 25 mm), (C) *S. ramsdeni* (USNM 309774, male, 24 mm).

being confluent with, abutting or approximating a fine, pale, transverse neck band (forming a pale U-shaped figure); weak sexual dichromatism present in throat pattern and head stripes.

The presence of more than one internasal and very small (nearly granular) dorsal scales distinguishes *S. schwartzi* from other *Sphaerodactylus* except two presumably close relatives occurring in eastern Cuba, *S. ramsdeni* and a second new species described below. *S. schwartzi* can be easily separated from both of those species by its two large internasals (versus 3–5 small internasals) and very small body size [20 mm maximum SVL versus 25 mm (new species) and 33 mm (*ramsdeni*)]. The small body size is also noteworthy in that *S. schwartzi* is the second smallest species in the genus (*S. parthenopion* of Virgin Gorda is 18 mm maximum SVL) and thus is one of the smallest known lizards. Additional comparisons with *S. ramsdeni* and the new species are given below.

*Description.*—Size small, adults 18–20 mm SVL. Snout short, rostral broadly rounded; sloping, depressed flat area of rostral set off by almost perfectly semicircular ridge; median cleft extending to ridge; two large, usually subpentagonal internasals flanked by supranasals. First upper labial squarish, somewhat higher posteriorly; 3/3 upper labials to mid-eye. Eyelid spine varying from reduced but evident to almost indistinguishable. Pupils round to oval with narrow pale edge. Mental semicircular with two large postmentals, followed by flat, cobblelike (broad, rounded, and raised) gulars becoming smaller, more granular, weakly keeled and imbricate on throat (gulars between ear openings 35–41, $\bar{x}$ = 37.4, $n$ = 7). First lower labial subrectangular, not tapering posteriorly; naris bordered posteriorly by point contact of triangular dorsal spur of first supralabial and upper postnasal. Snout covered by cobblelike, weakly keeled and slightly imbricate scales; posteriad on head, scales becoming very narrow, erected and keeled in interocular region, more rounded and cobblelike on top of head, more conical on neck, and on trunk becoming swollen (to subconical), angled to rounded, keeled, slightly or not imbricate (more erected on flanks) and smaller middorsally (but no zone of granules); dorsal scales axilla to groin 52–58 ($\bar{x}$ = 55.1, $n$ = 7). Pectoral and ventral scales smooth, flat, cycloid; ventrals axilla to groin 32–37 ($\bar{x}$ = 34.1, $n$ = 7); scales around midbody 58–66 ($\bar{x}$ = 63.0, $n$ = 7). Unregenerated dorsal scales of tail acute, keeled, slightly swollen, flat-lying imbricate, and verticallate; ventral caudals larger, more rounded on posterior edge, smooth, flat-lying, with midventral row enlarged. Escutcheons of four males with small centers and thin (one scale row) extensions onto legs (3–6 × 20–25; total scales 37–53). Toe pads hardly expanded, not wider than distal phalangeal segments. One or two (mode) single-hair bearing scale organs on the posterior tips of dorsal scales.

*Coloration.*—Dorsal trunk dark brown to gray brown with a relatively uniform stipple of darker scales; stippling varies in intensity from fairly dense to sparse; some with evidence of pattern on trunk; pair of pale, dark-edged sacral lines extending posteriorly onto base of tail and anteriorly just onto presacral region; faint, irregular traces of longitudinal lines seen on three individuals; others with no trace of longitudinal patterning. Head with bold, pale, dark-edged postocular stripes connecting with a transverse pale collar band, forming in most a U-shaped figure (more heavily dark-edged in males); connection not present in two specimens and faint in another; two specimens with a faint secondary transverse band anterior to the main one passing just across the occiput and connecting with the postocular stripes at both ends; most specimens with dark pigmentation in center of U-shaped head figure, irregular in appearance and not forming a distinct marking; most with indications of a pale occipital spot that may be prominent and elongate. Approximately 7–8 radiating pale and dark stripes proceeding ventrad from eye, thence curving posteriad on sides of throat and fading out on neck; dark throat stripes darker and more prominent in males; venters unpatterned, pale, to faintly stippled or darkly flecked. In life (USNM 309767 and MNHNCU

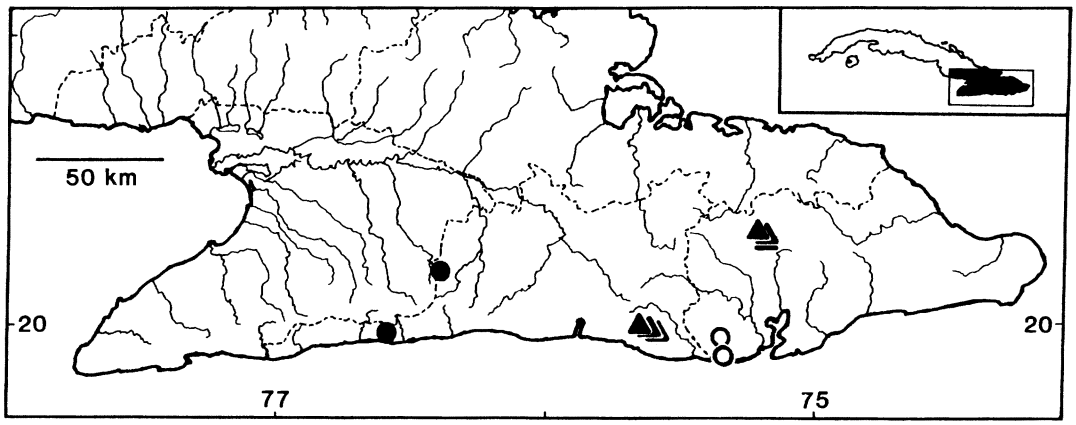


FIG. 2.—Distributions of species in the *ramsdeni* group of *Sphaerodactylus*: *S. ramsdeni* (triangles), *S. schwartzi* (open circles), and *S. cricoderus* (closed circles).

3439), medium brown or dark brown ground color with dark brown spots (USNM 309767 only); throat white with dark markings; venter grayish brown; postocular stripe white and orange cream; neck band cream and orange cream; eye color dark brown, pupil black.

*Data on holotype.*—An adult male, 19 mm SVL; two internasals, 1/1 postnasals; two postmentals; labials to mid-eye 3/3; gulars between ear openings 35; dorsal scales axilla to groin 55; ventrals axilla to groin 35; scales around midbody 65; fourth toe lamellae of left pes nine; escutcheon 3 × 25 (44 total scales).

*Distribution.*—Known only from the xeric region of southwestern Guantańamo Province (Fig. 2), presumably inhabiting xeric woods in at least the southern part of the Sierra Larga and possibly extending west into Santiago de Cuba Province in appropriate habitats. However, we did not find this species around nearby Laguna Baconao (Santiago de Cuba Prov.) where *S. notatus* occurs in canopied leaf-litter, nor in apparently suitable areas in Guantánamo Bay Naval Station only 10 km to the east of one locality for *S. schwartzi* (8.9 km SW Hatibonico).

*Natural history.*—The type series of *S. schwartzi* was collected in xeric woods in leaf litter, rotten wood, and fallen *Tillandsia* (Bromeliaceae). At the Loma Redonda site, the xeric woods had been cut back, and in the pasture below the woods we found empty shells of unhatched eggs, presumably of *S. schwartzi*, in deep litter around the bases of fan palms, but no living animals—a testament to rapid ecological change. Loma Redonda is part of the Monitongas, an isolated low ridge of volcanic hills, whereas the other locality for *S. schwartzi* (8.9 km SW Hatibonico) is on more typical limestone rock.

For the second of the new geckos, we propose the name

*Sphaerodactylus* ***cricoderus*** sp. nov.

Fig. 1B

*Holotype.*—MNHNCU 238, an adult male from 2.8 km N Uvero, Santiago de Cuba Prov., Cuba, 136 m, collected 13 August 1989 by Emilio Alfaro.

*Paratypes.*—USNM 309768 (adult male), 1.5 km WSW La Tabla, 465 m, Santiago de Cuba Province, Cuba, 15 August 1989, S. Blair Hedges; USNM 309769 (subadult female), same locality as preceding, 4 July 1990, S. Blair Hedges.

*Diagnosis.*—A moderate-sized *Sphaerodactylus* (both adults 25 mm SVL) having small, nearly granular dorsal scales, rostral with a semicircular flat plate delimited by a ridge, three internasals, one postnasal, 3–4 postmentals, and a head pattern of broad pale postocular stripes that fail to meet (or abut) a pale transverse neck band and therefore do not form a continuous

TABLE 1.—Comparison of three species of Cuban *Sphaerodactylus.**

| | *S. ramsdeni* | *S. cricoderus* | *S. schwartzi* |
|---|---|---|---|
| Dorsal scales | 55–63 (59.3, 6)<br>41–57 (48.1 11)** | 59–61 (59.7, 3) | 52–58 (55.1, 7) |
| Ventral scales | 33–36 (34.3, 6)<br>20–37 (26.8, 11)** | 29–32 (30.0, 3) | 32–35 (34.1, 7) |
| Midbody scales | 62–68 (64.5, 6)<br>50–65 (56.7, 11)** | 63–66 (64.7, 3) | 58–66 (63.0, 7) |
| Rostral plate | V-shaped | semicircular | semicircular |
| Internasals | 2–4 | 3 | 2 (large) |
| 4th toe lamellae | 9–11 | 7–9 | 8–9 |
| Postnasals | 0/0 | 1/1 | 1/1 |
| Postmentals | 2 large | 3–4, one large | 2 large |
| 1st Infralabial | rectangular | triangular | rectangular |
| Adult SVL (range) | 24–33 | 25 | 18–20 |
| Gulars | 43–49 | 38–41 | 36–41 |
| Dorsal scales | weakly swollen | moderately swollen | greatly swollen |

* Mean and sample size in parentheses.
** Data from Schwartz and Garrido (1985), which may have contained two species, are listed separately.

U-shaped figure; weak sexual dichromatism present in throat pattern and head stripes.

The presence of more than one internasal and very small dorsal scales readily separates *S. cricoderus* from other *Sphaerodactylus* except for *S. ramsdeni* and *S. schwartzi*. Those three species can be separated by a variety of characters (Table 1; Fig. 3). From *S. ramsdeni*, *S. cricoderus* differs in being smaller (25 mm SVL versus 33 mm SVL), having a semicircular rostral plate (not V-shaped), one postnasal (no postnasal), 3–4 postmentals (two), fewer gular scales (38–41 versus 43–49), and moderately swollen dorsal scales (weakly swollen). From *S. schwartzi* it differs in being larger (25 mm SVL versus 20 mm SVL), having more dorsal scales (59–61 versus 52–58), fewer ventrals (29–32 versus 32–35), three internasals—isomorphic with snout scales (versus two large and squarish internasals), 3–4 postmentals (two), moderately swollen dorsal scales (greatly swollen), and a triangular first infralabial (rectangular). Also, the head patterns of the two species differ in that none of the specimens of *S. cricoderus* have the postocular stripes and transverse head stripe confluent and forming a single U-shaped figure, which is the modal condition in *S. schwartzi*. The neck stripes of the two adult *S. cricoderus* (both males) are more prominent (more heavily dark-edged) than those of the male *S. schwartzi*. In *S. ramsdeni* (Fig. 3C), the nasal is greatly expanded laterally (presumably by fusion with the upper postnasal) and contacts the spur of the first upper labial. In all three species of this group, a dorsal spur of the first labial blocks contact of other scales with the naris, so that *ramsdeni* has no true postnasals.

*Description.*—Size moderate, both adults 25 mm SVL. Snout short, rostral broadly rounded; depressed flat area set off by almost perfectly semicircular ridge rising to curved peripheral declivity; median cleft extending to step; three internasals (one internasal fused with supranasal in USNM 309769) flanked by transversely expanded supranasals. Eyelid spine reduced, virtually indistinguishable. Pupils round to oval with narrow pale edge. First supralabial squarish, higher posteriorly, 3/3 supralabials to mid-eye; mental semicircular with 3–4 postmentals (1–2 enlarged), followed by flat, cobblelike gulars becoming smaller, more granular, weakly keeled and imbricate on throat (gulars between ear openings 38–41, $\bar{x} = 39.6$, $n = 3$). First lower labial rectangular, not tapering posteriorly; naris bordered posteriorly by point contact of triangular dorsal spur of first labial and postnasal. Snout covered by cobblelike, weakly keeled and slightly imbricate scales; scales becoming very narrow posteriad on head, erected

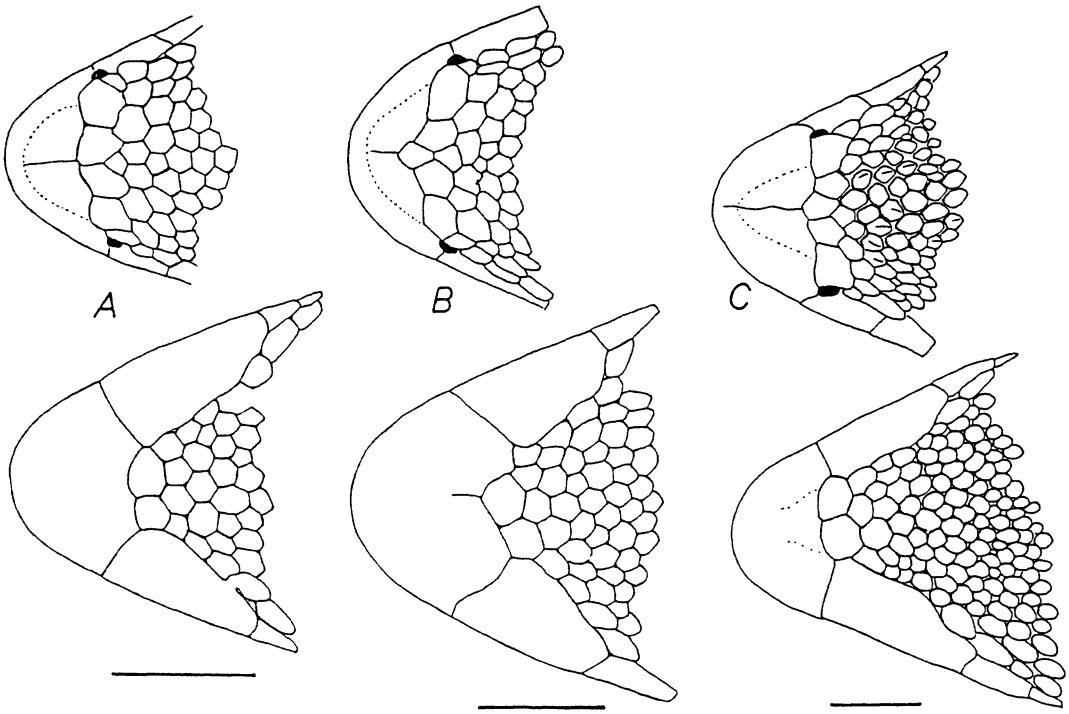


FIG. 3.—Comparison of dorsal snout scalation (upper figure) and chin scalation (lower figure) of (A) *Sphaerodactylus schwartzi* (MNHNCU 3438, male), (B) *S. cricoderus* (MNHNCU 238, male), and (C) *S. ramsdeni* (USNM 309770, female).

and keeled in interocular region, more rounded and cobblelike on top of head, more conical on neck, and on trunk becoming swollen (to subconical), angled to rounded, keeled, slightly or not imbricate (more erected on flanks) and smaller middorsally (but no abruptly smaller zone of granules); dorsals axilla to groin 59–61 ($\bar{x}$ = 59.7, $n$ = 3). Pectoral and ventral scales smooth, flat, cycloid; ventrals axilla to groin 29–32 ($\bar{x}$ = 30.0, $n$ = 3); scales around midbody 63–66 ($\bar{x}$ = 64.7). Dorsal scales of unregenerated tails acute, keeled, slightly swollen, flat-lying imbricate, and verticillate; ventral caudals enlarged, more rounded on posterior edge, smooth, flat-lying, median row enlarged. Escutcheons of two males with moderate central areas and thin extensions onto legs (4–5 × 13–22; total scales 46–52). Toe pads hardly expanded, not wider than distal phalangeal segments. Two scale organs bearing single hairs on posterior tip of each dorsal scale.

*Coloration.*—Dorsal trunk dark brown to gray brown with light to moderate stippling of darker scales; no evidence of pattern on trunk; a pair of pale, dark-edged dorsolateral sacral lines extending posteriorly onto base of tail. Head with hazy, pale, postocular stripes that either do not meet or abut a narrow, dark-edged, transverse pale stripe, across nape of neck; connection not present in two specimens and faint in another; two specimens with a faint secondary transverse stripe anterior to the main one and passing just across the occiput and connecting with the postocular stripes at both ends; dark pigmentation on dorsum of head much lightened or eroded in appearance. Approximately seven alternating dark and pale radiating stripes proceeding ventrad from eyes across mandible, then curving posteriad on sides of throat and fading out; throat stripes darker and more prominent in males, the neck stripes also more prominent in males; venters unpatterned, pale, to darkly and uniformly stippled. Escutcheon compact with or without thin extensions well onto thighs.

The color pattern of *S. ramsdeni* is one of dorsolateral lines from postocular to sacrum, but fainter or absent on the body. The head pattern consists of three pale, dark-edged ocelli on the neck, the central one being farther posterior than the lateral ones; all are connected by very faint pale lines, which if more prominent would form U-shaped head figures. Schwartz and Garrido (1985) reported a specimen of *S. ramsdeni* (IZAC 4727) with a U-shaped head figure from the Meseta del Guaso. The ocelli-and-line neck pattern is strikingly similar (although differing in detail) to the pattern seen in *S. armstrongi hypsinephes*, a Hispaniolan species occurring in similar habitat to *S. cricoderus* and *S. ramsdeni* (Thomas and Schwartz, 1983).

*Data on holotype.*—An adult male, 25 mm SVL; three internasals; 1/1 postnasals; four postmentals; labials to mid-eye 3/3; gulars between ear openings 41; dorsal scales axilla to groin 61; ventrals axilla to groin 32; scales around midbody 63; fourth toe lamellae of left pes nine; escutcheon 5 × 13 (52 scales total).

*Etymology.*—From the Greek; *krikos*, ring; *dere*, neck; in allusion to the distinctive pale band across the neck of this species.

*Distribution.*—Known only from the northern foothills and southern slopes of the central part of the Sierra Maestra range (Fig. 2); the two localities are approximately 30 km airline distance from one another.

*Natural history.*—All specimens were captured in leaf litter in mesic woods, including coffee groves. The locality near La Tabla is in a restricted karst region on the northern foothills of the Sierra Maestra, SSW of Baire and near the headwaters of the Río Cautillo. Both specimens from this locality were captured in leaf litter on limestone rock near the base of a small, well-shaded sinkhole. The Uvero locality is along a stream flowing directly from the high crest of the Sierra Maestra (Pico Martí area).

## Discussion

*Sphaerodactylus ramsdeni* is known from the eastern extreme of the Sierra Maestra, in the Sierra de la Gran Piedra, which is an eastern outlier of the larger range (Fig. 2). These populations are separated from those in the Meseta del Guaso by approximately 40 km of generally xeric lowlands. The nearest locality for *S. cricoderus* (La Tabla) is approximately 80 km to the northwest of Gran Piedra. Otherwise, sphaerodactyls of this group are unknown from the Sierra Maestra. It is likely that *S. cricoderus* or related species will be found more extensively in the Sierra Maestra and perhaps other highlands of eastern Cuba. The known range of *S. schwartzi* lies approximately 30 km to the southeast of Gran Piedra in xeric lowlands.

Our scale counts for *S. ramsdeni* (Table 1) differ from those of Schwartz and Garrido (1985). Both data sets include specimens of this species from the west (Gran Piedra) and the east (Meseta del Guaso), and it seemed possible that the differences were due to intraspecific or undetected interspecific variation. However, when we combine the data sets and compare the two regions, there are no obvious differences; also Schwartz and Garrido (1985) did not remark on the possibility of there being two taxa.

The similarities of these three species of *Sphaerodactylus* suggest that they belong to one evolutionary lineage, which may be called the *ramsdeni* group. Members of this group are distinguished from other species of *Sphaerodactylus* by the following combination of presumably derived traits: dark coloration, short snouts, very small dorsal scales, presence of more than one internasal, and lack of marked sexual dichromatism. The relationships of the *ramsdeni* group to other groups of *Sphaerodactylus* remains unclear (Hass, 1991; Schwartz and Garrido, 1985). However, within this group, *S. schwartzi* and *S. cricoderus* appear to be sister species based on several presumably derived traits that they share: a neck band, a semicircular plate on the rostral scale, and moderately to greatly swollen dorsal scales. The primitive traits (absence of a neck band, V-shaped rostral plate, and weakly swollen dorsal scales, respectively) are found in *S. ramsdeni* (Table 1).

The concept of ecomorph, or ecologically and morphologically convergent spe-

cies, has been applied to the other large genera of West Indian vertebrates, *Anolis* (Williams, 1972, 1983) and *Eleutherodactylus* (Hedges, 1989), but not to *Sphaerodactylus*. This may be due to the tendency of species in this genus to be less specialized and have stronger inter-island affinities due to dispersal (Hass, 1991). Nonetheless, some patterns of convergence are evident among species of *Sphaerodactylus*.

As noted by Schwartz and Garrido (1985), the forest-dwelling species of *Sphaerodactylus* tend to be dark, cryptic, and often have a lineate pattern. This could be referred to as the **forest ecomorph**, which in turn can be subdivided into a **xeric forest** ecomorph and a **mesic forest** ecomorph.

The xeric forest ecomorph is characterized by very small, dark or drab species that occur in leaf litter or xeric forests (often coastal), and are not strongly sexually dichromatic. These include *S. schwartzi* (Cuba), S. sp. nov. 1 (Jamaica; R. Thomas, unpublished), *S. cryphius* Thomas and Schwartz, *S. nycteropus* Thomas and Schwartz, *S. omoglaux* Thomas, *S. perissodactylius* Thomas and Hedges, *S. streptophorus* Thomas and Schwartz, and S. sp. nov. 2 (Thomas and Hedges, unpublished) (Hispaniola), *S. micropithecus* Schwartz (Isla Monito), and *S. nicholsi* Grant, *S. parthenopion* Thomas, and *S. townsendi* Grant (Puerto Rico Bank).

The mesic forest ecomorph is characterized by moderate-sized, very dark species with short snouts that occur in mesic forest (often upland) and usually are not sexually dichromatic. These include *S. cricoderus* and *S. ramsdeni* (Cuba), *S. goniorhynchus* Cope (Jamaica), *S. armstrongi* Noble and Hassler, *S. darlingtoni* Shreve, *S. elasmorhynchus* Thomas (Hispaniola), and *S. gaigeae* Grant, and *S. klauberi* Grant (Puerto Rico Bank).

Details of scalation and molecular data (Hass, 1991) indicate that, at the inter-island level, these two ecomorphs are composed of convergent species rather than species that have simply retained a primitive pattern, although members of the same ecomorph on the same island tend to be related. For example, molecular data suggest that *S. goniorhynchus* is more closely related to other Jamaican species, *S. darlingtoni* is more closely related to other Hispaniolan species, and that *S. gaigae* and *S. klauberi* are sister species that are not close to either *S. goniorhynchus* or *S. darlingtoni* (Hass, 1991). Although it is true that independent derivation does not rule out the possibility that these two ecomorphs represent the retention of primitive traits in independent lineages, details of their relationships (Hass, 1991), although not completely resolved, argue more strongly for convergence. Other patterns of convergence may be present in *Sphaerodactylus*, but the recognition of additional, less obvious, ecomorphs must await detailed phylogenetic and ecological studies on this fascinating group of diminutive lizards.

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## APPENDIX I

*Specimens Examined*

*Sphaerodactylus ramsdeni*.—Cuba: Santiago de Cuba Prov., La Isabelica, Sierra de la Gran Piedra, USNM 309770–72; 21 km E Santiago de Cuba on W slope of La Gran Piedra, 600 m, USNM 309773; Guantánamo Prov., 5.4 km SW La Tagua, 720 m, USNM 309774.

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