



Two additional new species of *Sphaerodactylus* (Reptilia, Squamata, Gekkonoidea, Sphaerodactylidae) from the Honduran Bay Islands

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Abstract

Recently, we described two new species of geckos of the genus *Sphaerodactylus* from the Bay Islands of Honduras. After further collections, and morphological and molecular analyses, we describe two additional species here. One of the new species belongs to the *S. millepunctatus* species group, which is centered in Middle America. The other new species belongs to the *S. copei* species group, which is centered in the Greater Antilles.

Key words: Bay Islands, Honduras, *Sphaerodactylus poindexteri* sp. nov., *Sphaerodactylus alphus* sp. nov., morphology, mtDNA, 12S, cytochrome b

Introduction

We (McCranie & Hedges 2012) recently provided a review of the *Sphaerodactylus millepunctatus* complex in Honduras based on combined morphological and molecular data. Those authors also relied heavily on the thorough systematic review by Harris & Kluge (1984) of the *S. millepunctatus* complex in Mexico and Central America. McCranie & Hedges (2012) described new species of that complex from Roatán (*S. leonardovaldesi*) and Guanaja (*S. guanajae*) islands in the Honduran Bay Islands. Molecular data were not available for the Utila Island population of the *S. millepunctatus* complex, which at time was known only from four specimens in the SMF collection. Consequently, the morphology of that population also had not been thoroughly studied.

Parker (1940) described *Sphaerodactylus rosaurae* based on one adult male “collected on Helene Island [= Santa Elena, Roatán Island], Bay Islands, Honduras.” Santa Elena is not actually an island, but represents the eastern end of Roatán Island that is separated from the remaining portion of Roatán by mangrove swamps and a channel. Parker (1940: 264) considered his new species to be allied with Antillean geckos he called the “*anthracinus*, *fantasticus* group of species.” Wilson & Hahn (1973) reported *S. rosaurae* from Guanaja Island (based on two specimens), a few additional specimens from Roatán, and two specimens from Utila Island. Unfortunately, all specimens placed in the LSUZ collections by those two authors were destroyed when the alcohol in their container evaporated (McCranie personal observation January 2009).

Wilson & Hahn (1973) described the history of the study of the *Sphaerodactylus anthracinus* and *S. fantasticus* groups and noted color pattern differences of a single adult female *S. rosaurae* from Guanaja Island compared to those from Roatán and Utila islands. Wilson & Hahn (1973) concluded that *S. rosaurae* closely resembles *S. copei* Steindachner of the West Indies and mentioned the possibility that *S. rosaurae* was conspecific with *S. copei*. Schwartz (1975) and Schwartz & Garrido (1981) studied the *Sphaerodactylus* species allied with *S. copei* and concluded that *S. rosaurae* was a species distinct from *S. copei*, but was a member of the *S. copei* species group.

During September 2012, McCranie visited Utila Island and collected three additional adults of the *Sphaerodactylus millepunctatus* species group and two adults and a single juvenile of *S. rosaurae*. Also, during November 2011 and September 2012, McCranie collected additional specimens of *S. rosaurae* from Guanaja and

Roatán Islands. Tissues of all populations were collected. Study of these new materials revealed that the Utila population of the *S. millepunctatus* group (identified as *S. continentalis* Werner by McCranie & Hedges 2012) and the Guanaja population of *S. rosaurae* represent undescribed species, herein described.

Methods

The description of the holotypes of the two new species generally follows the format for the description of the neotype of *Sphaerodactylus millepunctatus* Hallowell in Harris & Kluge (1984). Color codes and names used herein follow those of Smithe (1975–1981) and museum acronyms follow those of Leviton *et al.* (1985). We use the WGS84 geodetic datum system herein.

DNA sequence analyses of the recently collected tissue samples by SBH show substantial genetic divergence between the Utila *Sphaerodactylus continentalis* and those of the *S. millepunctatus* species group populations studied by McCranie & Hedges (2012) as well as the Guanaja *S. rosaurae* population compared to those from Utila and Roatán. Together with the morphological evidence, these molecular data indicate that the Utila *S. continentalis* and the Guanaja *S. rosaurae* are best treated as distinct evolutionary species (Fig. 1).

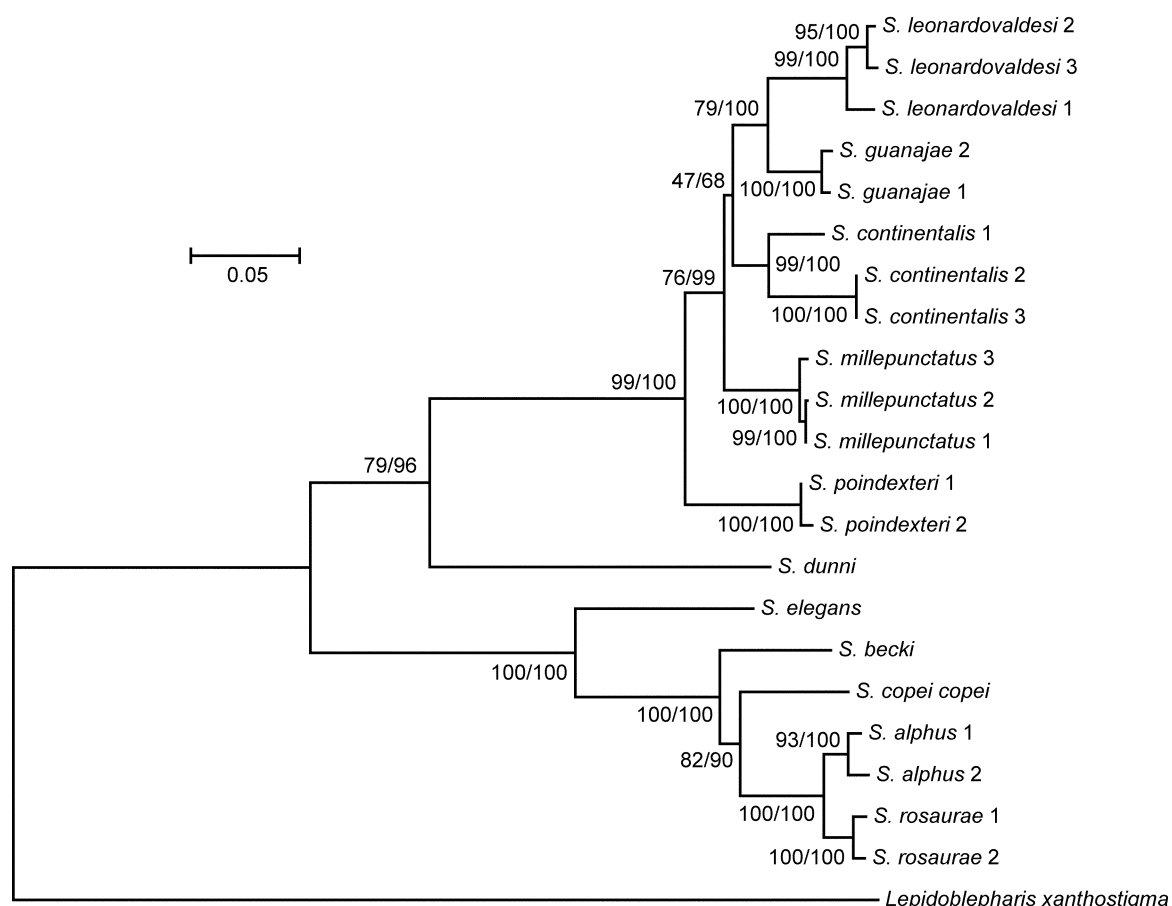


FIGURE 1. Phylogenetic tree of 11 species of *Sphaerodactylus* from a maximum-likelihood analysis of DNA sequences of two mitochondrial genes (12S rRNA and cytochrome b). A scale bar is indicated. The numbers at nodes are bootstrap (left) and Bayesian (right) support values.

The molecular data set comprised one outgroup species (*Lepidoblepharis xanthostigma* [Noble]) and 21 individuals in two related groups of species (see accounts for the two new species and Appendix 1) and 1311 total aligned nucleotide sites from two mitochondrial genes: 12S ribosomal RNA (rRNA) and cytochrome b (cyt b). Methods used for the collection of the new DNA sequences are detailed elsewhere (Heinicke *et al.* 2007; Hedges *et al.* 2008; Hedges & Conn 2012). Localities, Genbank accession numbers, and museum numbers for all sequences used are in the accounts for the two new species and Appendix 1. For the Utila Island new species, we included a

more distantly related species in Middle America, *Sphaerodactylus dunni* Schmidt, which also occurs in Honduras and is a member of the same species group. For the Guanaja Island new species, we included the more distantly related Antillean species, *S. becki* Schmidt, *S. copei*, and *S. elegans* MacLeay, for comparison. For the combined analysis, we chose *Lepidoblepharis xanthostigma*, a sphaerodactylid gecko, as outgroup. Alignments (MUSCLE) and best-fit model selection were performed in MEGA 5.0 (Tamura *et al.* 2011). A maximum likelihood (ML) analysis was performed using RAxML 7.28 (Stamatakis 2006), unpartitioned, using the evolutionary model GTRGAMMA, the maximized available option (the best-fitting evolutionary model under the Bayesian Information Criterion, GTR + Γ + I is not recommended in RAxML). Gaps were treated as missing data. All parameters for the ML analyses were estimated by the program during the run. Ten ML searches were performed to find the best tree. Branch support in the trees was provided by standard bootstrap analysis (2,000 replicates). A Bayesian phylogenetic analysis using MrBayes 3.2.1 (Ronquist *et al.*, 2012) also was performed, also using the GTR + Γ model. The Bayesian analysis was set to two parallel runs for five million generations, sampled every 100 generations, each run employed three heated and one cold chain, with a temperature parameter of 0.10. The first 10% of samples were discarded as burn-in. Convergence was assessed by the standard deviation of split frequencies (< 0.01 in all cases).

Systematics

Sphaerodactylus poindexter sp. nov.

(Fig. 2)

Sphaerodactylus millepunctatus—Köhler, 1996:25.

Sphaerodactylus millepunctatus—Köhler, 1998:141.

Sphaerodactylus millepunctatus—McCranie *et al.*, 2005:80 (part).

Sphaerodactylus continentalis—McCranie & Hedges, 2012:72 (part).

Holotype. FMNH 283685 (genetic sample 1, KF017641), an adult female from near Trade Winds on the east coast of Isla de Utila, 16.102567°, -86.883117°, Islas de la Bahía, Honduras, 3 m elev., collected 25 September 2012 by James R. McCranie and Leonardo Valdés Orellana.

Paratypes (2). FMNH 283682, 283684 (genetic sample 2, KF017642, KF017631), both adult females, same data as holotype.

Geographic distribution. *Sphaerodactylus poindexter* is known to occur only at low elevations on Isla de Utila in the Islas de la Bahía, Honduras (Fig. 3).

Diagnosis. *Sphaerodactylus poindexter* has a slightly longer head (HL/SVL 0.272–0.273) than do the other species in the *S. millepunctatus* species group (versus 0.221–0.248 in seven female *S. continentalis*, 0.220–0.261 in 10 female *S. guanajae*, 0.210–0.260 in 10 female *S. leonardovaldesi*, and 0.214–0.247 in 10 female *S. millepunctatus*). *Sphaerodactylus poindexter* also lacks the short, narrow, pale longitudinal line located above each pelvic area as seen in the other Bay Island species of this group (*S. guanajae*, *S. leonardovaldesi*). *Sphaerodactylus poindexter* differs further from *S. millepunctatus* in having smaller and more numerous dorsal scales (63–72, $x = 68.0 \pm 4.6$ dorsal scales between levels of axilla and groin in *S. poindexter* versus 42–57, $x = 51.7 \pm 4.8$ in 18 *S. millepunctatus*). *Sphaerodactylus poindexter* also appears to have fewer dorsal scales around the midbody than does *S. continentalis* (55–63 in two *S. poindexter* versus 64–80 in 21 *S. continentalis*). *Sphaerodactylus poindexter* also differs from *S. continentalis* and *S. millepunctatus* in having a more muted dorsal pattern (dark dorsal spots, when present, usually confined to one scale in *S. poindexter* versus dark dorsal spots usually larger, usually occupying more than one scale in size *S. continentalis* and *S. millepunctatus*). *Sphaerodactylus poindexter* occurs sympatrically with one other species of *Sphaerodactylus*, *S. rosaurae* Parker, but is easily distinguished from that species in having all dorsal body scales of a similar size (versus middorsal zone of granular scales that are sharply and distinctly differentiated from the much larger surrounding dorsal scales in *S. rosaurae*). *Sphaerodactylus poindexter* also differs from other *S. millepunctatus* species group members in amount of model-corrected cytochrome b sequence divergence (17 %; Fig. 1).

Description of holotype. A moderate-sized *Sphaerodactylus* with a snout-vent length (SVL) of 23.9 mm; snout-ear length (head length) 6.5 mm; head width 2.6 mm; head depth 2.0 mm; snout length 2.8 mm, snout length/eye-ear length 1.04; tail broken at base.

Rostral with long median cleft and short posterior notch occupied by a single small scale; supranasals two, anterior one largest, rounded, dorsally confined, in contact with nasal opening, separated from first supralabial by posterior supranasal and two small postnasals, anterior supranasal contacting rostral above nasal opening; internasal single, occupying space narrower than greatest width of anterior supranasal; snout scales swollen, weakly keeled, juxtaposed, 11 along midline from anterior level of orbits to rostral, four per interorbital width (IOW); scales between eyes narrower than snout scales; parietal surfaces and nape covered with swollen, weakly keeled granules, about 5–6 per IOW; superciliary spine short, located at level anterior to mideye; fourth supralabial lies below anterior half of eye, shorter fifth supralabial lies below center and posterior portion of eye; third infralabial lies below anterior half of eye, fourth infralabial lies below center and posterior half of eye, first infralabial largest, its length equals nearly 2.0 times IOW; mental large, about as long as wide, with oblique sutures between infralabials; postmentals two, polygonal, not elongated; gular scales smooth, granular, juxtaposed, five per IOW.

Dorsal scales of trunk oval, flattened, keeled, slightly imbricate, about four per IOW, 69 along midline between levels of axilla and groin; lateral scales similar to dorsals; ventrals smooth, flat, about three per IOW, 41 along midline between levels of axilla and groin; scales around midbody not countable because of tissue removal and damaged skin; proximal supracaudal scales rhomboid, flat, imbricate, keeled; proximal subcaudal scales smooth, larger than supracaudals; no pair of distinctly swollen granules at each corner of vent; subdigital lamellae smooth, nine present on each fourth toe, seven present on each fourth finger, 32 total subdigital lamellae on combined fourth digits.

Color in life (Fig. 2): dorsal ground color of body Ground Cinnamon (239) with scattered Vandyke Brown (221) small spots; dorsal surface of head Ground Cinnamon with Vandyke Brown postorbital stripe and scattered spots; Vandyke Brown occipital spot present; paired Vandyke Brown nuchal blotches present, blotches outlined by Tawny Olive (223D); dorsal surfaces of limbs Ground Cinnamon with golden brown spot on knee and band on shank; dorsal surface of basal part of tail (note that when color in life was recorded and the specimen was photographed, the tail was complete for about two-thirds of its original length; tail currently broken and lost at base) Ground Cinnamon with Vandyke Brown mottling, remainder of dorsal surface of tail to broken point Vinaceous Pink (221C); venter of head and body pale brown with scattered brown flecking; subcaudal surface Vinaceous Pink distal to pale brown base; iris with golden yellow ring around Vandyke Brown pupil.



FIGURE 2. Adult female holotype (FMNH 283685) of *Sphaerodactylus poindexterii* **sp. nov.** from east end of Utila Island near Trade Winds, (SVL 23.9 mm). Photograph by J.R. McCranie.

Color in alcohol: dorsal surfaces brown without scattered darker brown scales on body; snout medium brown with indistinct brown postnasal stripe extending nearly to orbit; supraocular scales dark brown, top of head posterior to that point medium brown with indistinct reticulated pattern of brown lines; postocular stripe dark brown; paired dark brown nuchal blotches present, separated medially by five pale brown scales; dorsal surfaces of limbs similar to that of dorsal surface of body, but with distinct pale brown dorsal spot on knee and pale brown dorsal band on shank; supralabials pale brown with dark brown flecking; mental and infralabials pale brown,

without distinct markings; gular region pale brown with brown flecking; belly cream with brown flecking on scale edges; no pale pelvic line evident.

Variation. Three adult females in the type series have SVL's of 22.0–29.6 (25.2 ± 4.0) mm, 63–72 (68.0 ± 4.6) dorsal scales, 34–44 (39.7 ± 5.1) ventral scales, 58–63 (60.5 ± 3.5 , $n = 2$) scales around midbody, 10–11 (10.3 ± 0.6) snout scales, 9–11 (9.5 ± 0.8) subdigital lamellae on fourth toe, 7–8 (7.2 ± 0.4) subdigital lamellae on fourth finger, 32–37 (33.7 ± 2.9) combined subdigital lamellae on the fourth digits, and all lack pale lines above the pelvic region in preservative. One paratype (FMNH 283682) has dark brown blotches on the nape, but they are smaller than those in the holotype, whereas dark nape blotches are absent in the other paratype (FMNH 283684). One paratype (FMNH 283684) has widely separated dark brown dorsal spots, most of which are confined to one scale; also, that specimen has distinct dark brown lines on the posterior end of the head and in the nuchal region. One paratype (FMNH 283684) has a complete tail with a TAL/SVL of 0.895, with the medial series of subcaudal scales enlarged and aligned in a row.

Habitat. Individuals were uncovered while raking through leaf litter during the morning and afternoon. Specimens were collected at two adjacent sites, one consisting of a zone of Sea Grape (*Cocoloba uvifera*) trees located behind the beach and a zone of uplifted coral rock. The second site consisted of hardwood tree leaf litter. The former site is at 3 m elevation, whereas the second site is at 10 m elevation. Because of the fragile skin of this species, most museum specimens have some damage to their skin.

Etymology. The specific name *poindexteri* is a patronym honoring James A. Poindexter of the USNM Support Center in Suitland, MD. James has been extremely helpful to the first author (JRM) over the years in providing copies of much needed literature for his continuing work on the amphibians and reptiles of Honduras.

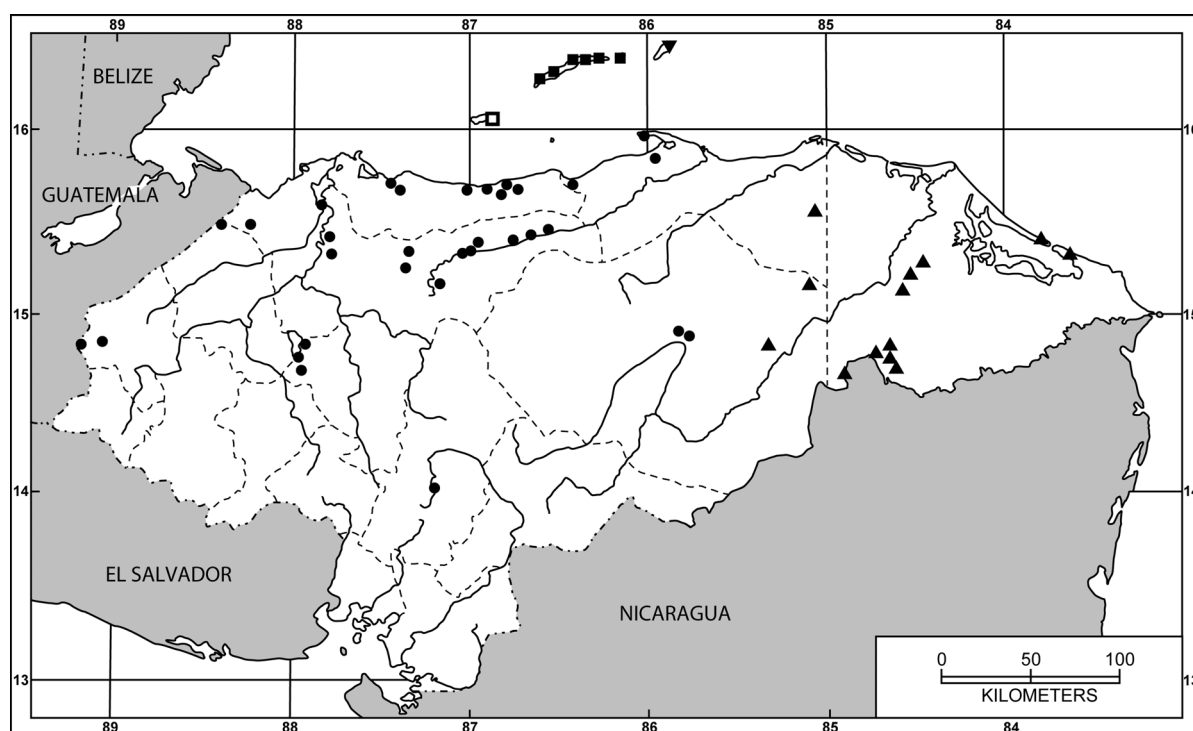


FIGURE 3. Map of Honduras showing localities for specimens examined of *Sphaerodactylus continentalis* (circles), *S. guanajae* (inverted triangle), *S. leonardovaldesi* (squares), *S. millepunctatus* (triangles), and *S. poindexteri* sp. nov. (open square). These five species represent a closely related group of cryptic species in the *S. millepunctatus* species group.

Sphaerodactylus alphus sp. nov.

(Figs. 4–5)

Sphaerodactylus rosaurae—Wilson & Hahn, 1973:106 (part).

Sphaerodactylus rosaurae—Schwartz, 1975:17 (part).

Sphaerodactylus rosaurae—Schwartz & Garrido, 1981:20 (part).

Sphaerodactylus rosaurae—McCranie *et al.*, 2005:82 (part).

Holotype. FMNH 283672 (genetic sample 1, KF017633, KF017624), an adult female from Savannah Bight, 16.29078°, -85.50300°, Isla de Guanaja, Islas de la Bahía, Honduras, 15 m elev., collected 20 September 2012 by James R. McCranie and Leonardo Valdés Orellana.

Paratypes (7). FMNH 283666, adult female, same data as holotype; FMNH 283663, 283674, adult males, and FMNH 283668, juvenile, from East End, 16.486°, -85.832°, collected 19 September 2012 by McCranie and Valdés Orellana; FMNH 283671, 283673 (genetic sample 2, KF017634, KF017625), adult females from East End, collected 17 November 2011 by McCranie; FMNH 283664, adult male from the Hotel Posada del Sol ruins, 16.462117°, -85.853867°, collected 21 September 2012 by McCranie and Valdés Orellana.

Geographic distribution. *Sphaerodactylus alphus* is known to occur at low elevations on Isla de Guanaja in the Islas de la Bahía, Honduras (Fig. 6).

Diagnosis. *Sphaerodactylus alphus* can be distinguished from *S. rosaurae* by its larger size (41.2 mm SVL in two of the seven adults versus maximum known SVL 38.5 mm in 26 adult *S. rosaurae*; mean SVL 38.6 mm in seven adults larger than largest known female [38.5 mm] of *S. rosaurae*). *Sphaerodactylus alphus* also differs from *S. rosaurae* in having a white spot enclosed in a dark brown occipital blotch that is especially distinct in adult females and juveniles, dark brown occipital blotch confluent with a narrow dark brown crossband in adult females and juveniles, and conspicuous dark, medially broken, crossbands in adult females (versus no white occipital spot, no dark brown occipital blotch confluent with narrow dark brown crossband, and dorsal pattern of adult females reduced to dark spots in *S. rosaurae*). *Sphaerodactylus alphus* also averages more dorsal scales in males (29–35, $x = 31.3 \pm 3.2$, $n = 3$) than do male *S. rosaurae* (21–29, $x = 26.0 \pm 2.3$, $n = 12$). *Sphaerodactylus alphus* occurs sympatrically with one other species of *Sphaerodactylus*, *S. guanajae* of the *S. millepunctatus* species group (McCranie & Hedges 2012), but is easily distinguished from that species in having 2–3 middorsal rows of granular scales that are sharply and distinctly differentiated from the much larger surrounding dorsal scales (versus all dorsal body scales of a similar size in *S. guanajae*). *Sphaerodactylus alphus* also differs from other *S. copei* species group members in amount of model-corrected cytochrome b sequence divergence (6 %; Fig. 1).

Description of holotype. A large *Sphaerodactylus* with a snout-vent length (SVL) of 38.5 mm; snout-ear length (head length) 9.0 mm; head width 4.2 mm; head depth 3.6 mm; snout length 4.1 mm, snout length/eye-ear length 1.11; tail broken at estimated point of about anterior third of original tail.

Rostral with long median cleft and short posterior notch occupied by a single small scale; supranasals 1–1, dorsally confined, anterior and lateral edges straight, rounded posteriorly, in contact with nasal opening, separated from first supralabial by upper postnasal, contacting rostral above nasal opening; internasal single, occupying space equal to about half width of each supranasal; snout scales mostly flat, keeled, most juxtaposed, 11 along midline from between level of anterior edge of orbit to rostral, four per interorbital width (IOW); scales between eyes narrower than snout scales; parietal surfaces and nape covered with swollen, conical granules, about five per IOW; superciliary spine short, located at level slightly anterior to mideye; fourth supralabial lies below anterior half of eye, fifth supralabial small, lying below center portion of eye; third infralabial lies below anterior half of eye, fourth infralabial lies below center of eye, first infralabial largest, its length slightly less than 2.0 times IOW; mental large, about as long as wide, with oblique sutures between infralabials; postmental single; gular scales smooth, granular, juxtaposed, seven per IOW.

Dorsal scales of trunk diamond-shaped, most with raised posterior ends, keeled, juxtaposed, about two per IOW, 33 along midline between levels of axilla and groin; middorsal zone of 2–3 rows of small granular scales that are sharply demarcated from remaining dorsals; lateral scales similar to dorsals; ventrals smooth, flat, about two per IOW, 32 along midline between levels of axilla and groin; scales around midbody 40 plus 2 rows of mid-granules; basal supracaudal scales oblong, flat, imbricate, keeled, about one per IOW; basal subcaudal scales oblong for first six rows, median series becoming rectangular for four rows until broken point, median series smooth, larger than supracaudals, rectangular median series aligned into single row; no pair of distinctly swollen granules at each corner of vent; subdigital lamellae smooth, 12 per side present on fourth toes, 9–10 present on fourth fingers, 43 total combined subdigital lamellae on fourth digits.

Color in life (Fig. 4): dorsum with Hair Brown (119A) vertical lines and mottling separating Pale Horn Color (92) bands; nuchal crossbands alternating Hair Brown-dirty white-Hair Brown-Pale Horn Color; top of head yellowish brown with dark brown longitudinal lines to level of eyes, head posterior to eyes yellowish brown with dark brown mottling; occipital region with large Hair Brown blotch with brilliant white spot in posterior portion; lateral surface of head pale brown with dark brown vertical spots; dorsal surface of tail Pale Horn Color with Hair

Brown crosslines and spots; dorsal surfaces of limbs similar to that of top of head anterior to eyes; chin and throat brown with purple tinge; belly yellowish gray; subcaudal surface and ventral surfaces of limbs brownish yellow with dark brown spots; iris Army Brown (219B) with golden brown ring around pupil.



FIGURE 4. Adult female holotype (FMNH 283672) of *Sphaerodactylus alphus* sp. nov. (SVL 38.5 mm) from Savannah Bight, Isla de Guanaja, Islas de la Bahía, Honduras. Photograph by J.R. McCranie.



FIGURE 5. Adult male paratype (FMNH 283663) of *Sphaerodactylus alphus* sp. nov. (SVL 39.9 mm) from East End, Isla de Guanaja, Islas de la Bahía, Honduras. Photograph by J.R. McCranie. Note the sexual dichromatic differences between males and females (compare with Fig. 4) of this species.

Color in alcohol: dorsal surface of head pale brown, with medium brown lines; occipital blotch dark brown with dirty white spot located near posterior end; occipital dark blotch confluent medially with narrow (4–5 scale rows long) dark brown nuchal crossband, dark crossband followed by complete (3 scale rows long) dirty white crossband, that pale crossband followed by complete (4 scale rows long) dark brown nuchal crossband, that dark brown crossband followed by incomplete medially, brown crossband (2 scale rows long dorsolaterally), that brown crossband followed by complete dark brown (3 rows long) crossband, that dark crossband followed by complete dirty white (3 rows long) crossband, that pale crossband bordered posteriorly by complete dark brown (2 rows long) crossband that passes just anterior to forelimb insertion; dorsal surface of body with alternating brown, dark brown, pale brown, dark brown, brown, pale brown, dark brown, pale brown, and dark brown crossbands; dorsal surfaces of limbs pale brown with dark brown spots, dark brown blotches and narrow crossbands also present on hind limbs; dorsal surface of base of tail pale brown with reticulated dark brown crossbands; ventral surfaces of head, chest, and body pale brown, without markings except for dark brown spots along lateral edges of belly; basal subcaudal surface pale brown with dark brown posterior edges in rectangular-shaped medial scales.

Variation. The seven adults in the type series have SVL's of 33.2–41.2 (38.6 ± 2.7) mm, 26–35 (30.3 ± 3.0) dorsal scales, 31–32 (31.6 ± 0.5) ventral scales, 40–50 (45.6 ± 3.7) scales around midbody, 8–11 (9.6 ± 1.1) snout scales, 10–13 (12.1 ± 0.9) subdigital lamellae on the fourth toe, 8–11 (9.6 ± 1.0) subdigital lamellae on the fourth finger, 41–47 (43.4 ± 2.3) combined subdigital lamellae on fourth digits.

Color in life of an adult male paratype (FMNH 283663; Fig. 5): top of head Mars Brown (223A) with small white spot in posterior occipital region; dorsum of body Mars Brown with large scales greenish gray with Mars Brown edges; top of tail pale brown with extensive Mars Brown mottling and spotting; dorsal surfaces of limbs Mars Brown with dark brown spots; chin and throat Army Brown (219B); belly dark brown with some greenish gray scales; subcaudal surface grayish brown on original portion, dark grayish brown on regenerated portion; iris Mars Brown.

The adult female paratypes agree well in color in alcohol with that described for the holotype, except one (FMNH 283666) has the dorsal crossbands broken into dark brown spots forming incomplete crossbands. The adult male paratypes show distinct sexual dichromatic patterns as follows: dorsal surface of head brown without markings except for poorly-defined dark brown occipital blotch that surrounds pale brown occipital spot; dorsal surface of body brown with widely scattered dark brown spots; dorsal surfaces of limbs brown with indistinct darker brown spots; ventral surfaces of head, chest, and body pale to medium brown, without darker markings; subcaudal surface pale brown with darker brown outlining most scales. A juvenile (FMNH 283668) agrees well in color with the female holotype except the contrast between the dark and pale colors is more distinct, with the pale color being immaculate white.

Habitat. Specimens were found by raking through Sea Grape (*Cocoloba uvifera*) leaf litter and debris below coconut palms. Individuals usually tried to rapidly retreat to nearby cover when first exposed. Thus, they are somewhat difficult to capture while at the same time the collector trying not to be too aggressive because of the fragile skin of this species. Because of that fragile skin, many museum specimens of *Sphaerodactylus alphus* have some damage to their skin.

Etymology. The specific name *alphus* is a Latin masculine, singular noun meaning “a white spot on the skin.” The name alludes to the distinctive white occipital spot found in this species.

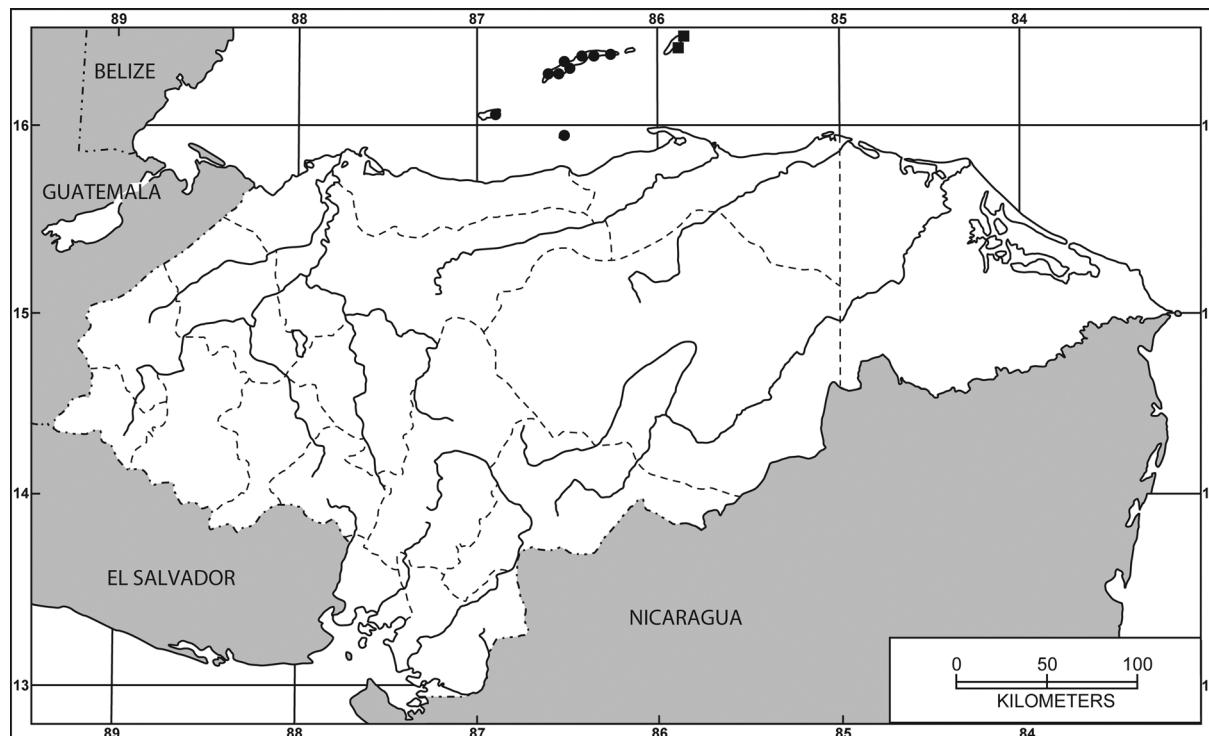


FIGURE 6. Map of Honduras showing localities for specimens examined of *Sphaerodactylus rosaurae* (circles) and *S. alphus* sp. nov. (squares).

Discussion

Specimens of the two new *Sphaerodactylus* species described herein are poorly represented in museum collections. In addition to the type series of three adults of *S. poindexteri* sp. nov., only four specimens are in museum collections (SMF 77118–19, 77997–98). Those specimens were casually examined by McCranie several years ago and were included as *S. continentalis* in the McCranie & Hedges (2012) study before tissues became available. Also, the type series of *S. alphus* are the only specimens that remain today in museum collections. The two specimens in the LSUMZ collection listed for Guanaja by Wilson & Hahn (1973) were lost along with all other LSUMZ specimens of *S. rosaurae* listed by those authors when the alcohol in their jar evaporated sometime prior to 2009. *Sphaerodactylus rosaurae* is known from Utila Island based only on two adults and one juvenile collected by McCranie during 2012 and on one neonate in a broken egg (SMF 81207). Frazier *et al.* (2011) also reported *S. rosaurae* from Cayo Cochino Pequeño in the Cayos Cochinos, but both specimens were placed in the UNAH collection without examination by JRM. With the completion of this study, all *Sphaerodactylus* populations known from the three main Honduran Bay Islands (Guanaja, Roatán, and Utila) have now been sampled molecularly.

With the discovery that the Utila Island population of the *Sphaerodactylus millepunctatus* species group represents a distinct genetic lineage makes it even more likely that the Cozumel Island, Mexican population of this species group represents an undescribed species (see Harris & Kluge 1984, McCranie & Hedges 2012). Likewise, Fig. 1 indicates that *S. continentalis* on the Honduran mainland might represent more than one species.

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APPENDIX I. Comparative specimens examined. Genbank accession numbers are listed (in parentheses) for the genetic samples (12S rRNA, cytochrome b).

Lepidoblepharis xanthostigma: Panama: no specific locality, SBH 267845 (KF017643, KF017632).

Sphaerodactylus millepunctatus species group

Sphaerodactylus continentalis: Honduras: ATLÁNTIDA-Barra Salado, MCZ R-191113, 191119–20; Estación Forestal CURLA, USNM 570164–68; 7.4 km SE of La Ceiba, USNM 570163; La Ceiba, USNM 55245; 11.3 km W of La Ceiba, TCWC 21966; Lancetilla, ANSP 25869, 33108–10, FMNH 21832, MCZ R-32200, 39711; Tela, FMNH 13183, LSUMZ 24599, USNM 64173 (on bananas in Baltimore, USA), 69863, 70460–61 (all three on bananas in New Orleans, USA). COLÓN-Balfate, AMNH 58621; Puerto Castilla, USNM 64932 (collected on bananas); 0.5 km S of Trujillo, LACM 47809. COMAYAGUA-about 8 km S of La Misión, MCZ R-49975; 1.6 km S of Pito Solo, LSUMZ 28528–29; Pito Solo, CM 64526. COPÁN-Copán, USNM 570169; Rancho El Jaral, LACM 45391. CORTÉS-Laguna Ticamaya, FMNH 5032–35, 5226; Los Pinos, UF 166397–400, USNM 573096 (genetic sample 1, JX073108, JX073119), USNM 573097–98; Río Santa Ana, FMNH 5029. FRANCISCO MORAZÁN-Tegucigalpa, USNM 570170 (specimen found on floor of a gymnasium and likely transported there from a more northerly location). OLANCHO-4.5 km SE of Catacamas, LACM 47777; Catacamas, LACM 45137–39; Piedra Blanca, USNM 579972–73. SANTA BÁRBARA-tributary of Río Listón, USNM 573884. YORO-0.5 km N of Coyoles, LACM 47779–80, LSUMZ 21441; Coyoles, LACM 47783, 47785–808, LSUMZ 21442–74; El Progreso, UMMZ 58380; Los Indios, MCZ R-38796; 21 km WSW of Olanchito, UF 90207–08; 41 km WSW of Olanchito, UF 90209–10; Rancho San Lorenzo, LACM 47781–82; San Francisco, MVZ 52401, USNM 579974; near San Lorenzo Abajo, USNM 570193, 579975, 579976 (genetic sample 2, JX073106, JX073118), 579977 (genetic sample 3, JX073107, sequence not obtained), 579978; 5.5 km SSE of San Lorenzo Arriba, USNM 579979–82; 4.7 km ESE of San Lorenzo Arriba, USNM 565402–06, 570194–95; vicinity of San Lorenzo Arriba, USNM 579983–84; Subirana Valley, MCZ R-38795; Yoro, KU 203087. “HONDURAS”-USNM 71733, 79951, 82573–74, 86862, 95866–67, 98909.

Sphaerodactylus dunni: Honduras: Yoro; Vicinity of San Patricio, USNM 579605 (JX073114, JX073125).

Sphaerodactylus guanajae: Honduras: ISLAS DE LA BAHIA-Isla de Guanaja, East End, FMNH 283678–79, 283681, 283686, USNM 579994–95, 579996 (genetic sample 1, JX073112, JX073123), 579997 (genetic sample 2, JX073113, JX073124), 579998–580000; Posada del Sol Hotel ruins, FMNH 283676, 283680; 2 km W of Savannah Bight, LACM 47778; Savannah Bight, FMNH 282334, 283675, USNM 520269.

Sphaerodactylus leonardovaldesi: Honduras: ISLAS DE LA BAHIA-Isla de Roatán, Camp Bay, FMNH 282791 (genetic sample 3, JX073109, JX073120), USNM 579990–93; near Coxen Hole, FMNH 34541; near Diamond Rock, USNM 570180; about 3.2 km W of French Harbor, LSUMZ 22390, 22392; near French Harbor, CM 64525; Gibson Bight, LSUMZ 33796–97; near Oak Ridge, UTA R-10723–32; Palmetto Bay, FMNH 281531, 282785–88, USNM 579987–89; 1 km E of Pollytilly Bight, FMNH 282789 (genetic sample 1, JX073110, JX073121), 282790 (genetic sample 2, JX073111, JX073122); Port Royal, USNM 578832–36; near Port Royal Harbor, LSUMZ 33801, 33806–08, MCZ R-150935, TCWC

52427–28; 3.2 km W of Roatán, CM 64527; Roatán, LSUMZ 22338–40, UF 28489; Rocky Point, USNM 570181–82; near Sandy Bay, KU 203127, 203132–33; West End, USNM 578832; West End Point, USNM 570183–88; West End Town, USNM 570189; “no other data,” USNM 570190.

Sphaerodactylus millepunctatus: Honduras: COLÓN-near Barranco, UMMZ 58408. GRACIAS A DIOS-Awasbila, USNM 570171; Bachi Kiamp, FMNH 282792, USNM 579985–86; Bodega de Río Tapalwás, USNM 570172–73; Caño Awalwás, UF 140810, 150310–11; Cauquira, UF 150304; Dos Bocas, FMNH 282793 (genetic sample 1, JX073104, JX073115), 282794 (genetic sample 2, JX073105, JX073116), 282795 (genetic sample 3, KF017640, JX073117), 282796; Leimus (Río Warunta), USNM 573094; Rus Rus, UF 150302, USNM 570174–76; San San Hil Kiamp, USNM 570177–78; Tapalwás, USNM 570179; Yahurabila, USNM 573095. OLANCHO: Matamoros, SMF 79852–53, USNM 570191; confluence of Ríos Sausa and Wampú, USNM 570192.

Sphaerodactylus copei species group

Sphaerodactylus becki U.S.: Navassa Island, north of lighthouse, SBH 194962 (KF017635, KF017626).

Sphaerodactylus copei copei: Haiti: DEPT. DE L'OUEST-4.2 km E of Carisse, SBH 191659 (KF017635, KF017626).

Sphaerodactylus elegans U.S.: Florida Keys, no specific locality, SBH 172243 (KF017637, KF017628).

Sphaerodactylus rosaurae: Honduras: ISLAS DE LA BAHÍA-Isla Barbareta, near southwest shore, USNM 520258–62; Isla de Roatán, Coxen Hole, FMNH 34542; Isla de Roatán, near Diamond Rock, USNM 570196–97; Isla de Roatán, Flowers Bay, USNM 570198; Isla de Roatán, between Flowers Bay and West End Point, USNM 570199; Isla de Roatán, about 3.2 km W of French Harbor, UF 28558–59; Isla de Roatán, 2.5 km N of, 3 km E of Oak Ridge, UF 91320; Isla de Roatán, E of Oak Ridge, MCZ R-150938–42; Isla de Roatán, near Oak Ridge, TCWC 52422–25, UTA R-10700–06; Isla de Roatán, Palmetto Bay, FMNH 283665, 283667, 283669–70; Isla de Roatán, 1 km E of Pollytilly Bight, FMNH 282674 (genetic sample 1, KF017638, KF017629), 282675–77; Isla de Roatán, Port Royal, USNM 578838; Isla de Roatán, about 4.8 km W of Roatán, UF 28536; Isla de Roatán, about 3.2 km W of Roatán, CM 57184; Isla de Roatán, near Roatán, CM 64523, UF 28488, 28496; Isla de Roatán, Rocky Point, USNM 570200; Isla de Roatán, near Sandy Bay, USNM 570201–02; Isla de Roatán, Sandy Bay, KU 203128–31; Isla de Roatán, W of Santa Elena, MCZ R-150936–37; Isla de Roatán, near Santa Elena, TCWC 52426; Isla de Roatán, Santa Elena, BMNH 1938.10.4.1, UMMZ 142648 (2), UTA R-10699; Isla de Roatán, 6.6 km E of West End Point, MVZ 263859; Isla de Roatán, West End Point, USNM 570203–10; Isla de Roatán, West End Town, USNM 570211–13; “Isla de Roatán,” UF 149595, USNM 570214, UTA R-55247–51; Isla de Utila, east coast near Trade Winds, FMNH 283662, 283667 (genetic sample 2, KF017639, KF017630), 283683; Isla de Utila, 2 km N of Utila, SMF 81207 (neonate).