



An overview of Cerro La Picucha and the ridge leading to it (center and toward right), which is the type locality of a new species of *Rhadinella* being described. Three of the five specimens representing the new taxon were collected along that ridge at elevations between 2,050 and 2,290 m. The photograph was taken on 12 August 1998 at an elevation of about 1,200 m, from an opening in the forests covering the Sierra de Agalta. 📷 © James R. McCranie



A new species of *Rhadinella* (Serpentes: Dipsadidae) from the Sierra de Agalta, Honduras

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ABSTRACT: I describe a new species of dipsadine snake of the genus *Rhadinella* from an isolated mountain range in east-central Honduras. This population previously was identified as *R. lachrymans*. Based on morphological similarities, the closest relative of the new species apparently is *R. lachrymans*. The new species differs from *R. lachrymans* by the presence of a distinct, complete, white line that borders the upper edge of a dark brown lateral stripe, a dark brown postorbital bar or spot that is separated from the orbit, in reaching a longer adult male size, and the presence of fewer subcaudal scales in males. All known localities for *R. lachrymans* are from pine-oak forest on or near the Pacific versant of Guatemala and Chiapas, Mexico. Conversely, the new species occurs in broadleaf rainforest, including elfin forest, on the Atlantic versant of Honduras. In addition, the nearest known locality for *R. lachrymans* is approximately 500 km to the west from that of the new species, and thus geographical distribution and ecological requirements support the representation of two species.

KEY WORDS: Atlantic versant, Babilonia Mountain, Department of Olancho, external morphology, *Rhadinaea godmani* group

RESUMEN: Describo una nueva especie de la serpiente dipsadina del género *Rhadinella* de una cadena montañosa aislada en el este-centro de Honduras. Esta población previamente fue identificada como *R. lachrymans*. Basándose en similitudes morfológicas, el pariente más cercano de la nueva especie aparentemente es *R. lachrymans*. La nueva especie se difiere de *R. lachrymans* por la presencia de una línea blanca distinta y completa que bordea el borde superior de la franja lateral de color café oscuro, una barra postorbital de color café oscuro que está separada de la órbita, en alcanzar un mayor tamaño en los varones adultos, y en tener menos escamas subcaudales en los machos. Todas las localidades conocidas para *R. lachrymans* son de bosque de pino-encino en o cerca de la vertiente del Pacífico de Guatemala y Chiapas, México. Al contrario, la nueva especie ocurre en la selva tropical de hoja ancha, incluyendo el bosque enano, en la vertiente del Atlántico de Honduras. Además, la localidad más cercana conocida para *R. lachrymans* está aproximadamente a 500 km al oeste de la nueva especie, y por lo tanto la distribución geográfica y los requisitos ecológicos apoyan la representación de dos especies.

PALABRAS CLAVES: Departamento de Olancho, grupo de *Rhadinaea godmani*, Montaña de Babilonia, morfología externa, vertiente del Atlántico

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INTRODUCTION

In a seminal study of the genus *Rhadinaea* Cope, Myers (1974), conducted a systematic revision of a group of small to medium-sized snakes with a broad distribution that extends from North Carolina, United States, to east-central Argentina. Subsequently, the genus *Rhadinaea* has been divided into four genera, which in addition to *Rhadinaea* Cope, currently includes *Rhadinella* Smith, *Taeniophallus* Cope, and *Urotheca* Bibron.

Myers (1974) included the group of snakes studied herein in the *Rhadinaea godmani* species group. Previously, Smith (1941: 7) had described the genus *Rhadinella* to accommodate a single species he proposed as new, *R. schistosa*. Myers (1974), however, placed *R. schistosa* (and the *R. godmani* species group) in *Rhadinaea*. Subsequently, Myers (2011) resurrected the genus *Rhadinella* from the synonymy of *Rhadinaea*. With the description of the new species described herein, the genus *Rhadinella* now consists of 18 described species.

McCranie and Wilson (2001) reported *Rhadinella lachrymans* (Cope) from Honduras (as *Rhadinaea*) based on a single specimen from an isolated montane locality on the Atlantic (= Caribbean) versant of the Sierra de Agalta. After four additional specimens from this population became available, McCranie (2011) reported on their morphological variation (three adult males, two adult females; as *Rhadinaea lachrymans*), noting that this population likely represented an undescribed species (also see McCranie, 2015). Herein, I describe the population from the Sierra de Agalta, Honduras, previously assigned to *R. lachrymans*, as a new species.

MATERIALS AND METHODS

I made all measurements in millimeters (mm), with the snout–vent (SVL) and tail length (TAL) measurements to the nearest mm alongside a ruler, and the other measurements to the nearest 0.1 mm with dial calipers under a dissecting microscope. I made the eye and bilateral head scale measurements on the right side, and examined the lateral stripe conditions on the left side. The other abbreviations are as follows: EL (eye length), HL (head length; from tip of snout to oral rictus), HW (greatest width of head), and TOL (total length). I used the scale and morphometric data for *Rhadinella lachrymans* presented in Myers (1974) for 18 males from Mexico (most of them) and Guatemala, and from 15 males I examined from Guatemala. The lateral stripe conditions include data from Myers (1974), as well as from the specimens I examined (see systematic section of the new species and Appendix 1). The color names and numeric codes in life descriptions refer to those provided by Smithe (1975–1981). A recent color guide (Köhler, 2012), largely a reprint of the Smithe guide, contains some new color names and codes, and is useful for visualizing these colors. I followed the style of the hemipenial description used by Myers (1974), including his terminology, as well as the modified terminology suggested by Savage (1997) and Myers and Cadle (2003). Because of the similarity in spelling of *Rhadinaea* and *Rhadinella*, I use the abbreviation *R.* for the latter genus, but spell out *Rhadinaea*.

I also follow Myers (1974) in using the external morphological characters presented in his extensive study on the systematics of this group of small dipsadine snakes related to *Rhadinaea*. Based on his knowledge of the group, Myers (1974) concluded that color and color pattern, maxillary dentition, hemipenial morphology, total length, relative tail length and the number of subcaudals, the number of dorsal scale rows, and the number of ventral scales were of significant value in describing species, understanding the species limits, and/or the species groups of these small snakes. Therefore, in investigating the population I am describing as a new species, and in comparing that population to other populations and species of *Rhadinella*, especially *R. lachrymans*, I relied heavily on those characters. Conversely, Myers (1974: 36) wrote, “Proportions of the various head shields are of very limited taxonomic usefulness.” Consequently, I did not use the proportions of each of the 9-plate head shields in comparing the new species with *R. lachrymans*, unlike Campbell (2015), who used some head shield proportions in diagnosing a new species.

SYSTEMATICS

Rhadinella lisyae sp. nov.

Figs. 1–3

Rhadinaea lachrymans: McCranie and Wilson, 2001: 113; Köhler, 2003: 251; Köhler, 2008: 267; McCranie, 2011: 383.

Rhadinella lachrymans: Myers, 2011: 28 (in part).

Holotype: National Museum of Natural History (USNM) 535870 (Fig. 1), an adult male (hemipenis everted), collected at Cerro La Picucha (14°58'N, 85°55'W; WGS 84); elevation 2,050 m asl, Montaña de Babilonia, Sierra de Agalta, Departamento de Olancho, Honduras, collected by James R. McCranie on 4 August 1997.

Paratypes (2 adult males, 2 adult females): USNM 565821 (Fig. 2), adult male, same data as holotype, except collected at an elevation of 2,290 m on 2 July 2010 by Alexander Gutsche and James R. McCranie; USNM 565592, adult male, same data as holotype, except collected at an elevation of 2,285 m on 25 May 2006 by Franklin E. Castañeda; USNM 565593, adult female, collected at Piedra Blanca (14°53'N, 85°54'W; WGS 84), Montaña Peña Blanca, Sierra de Agalta, at an elevation of 1,300 m in March of 2006 by Franklin E. Castañeda; and USNM 565594, adult female, collected at La Florida (14°57'N, 85°53'W; WGS 84), along the Río Seco, Sierra de Agalta, at an elevation of 1,400 m on 24 May 2006 by Franklin E. Castañeda.

Diagnosis: *Rhadinella lisyae*, with 17 dorsal scale rows, broad lateral and ventrolateral dark stripes, and a relatively large size (see Myers, 1974), apparently is most closely related to *R. lachrymans* from Guatemala and south-eastern Chiapas, Mexico. *Rhadinella lisyae* is distinguished from *R. lachrymans* by the presence of a dark brown postorbital bar or spot that is separated from the orbit (Figs. 1, 3) by pale pigment (vs. dark postorbital bar bordering the orbit in *R. lachrymans*; Fig. 4); by a distinct, complete, white (in life and in alcohol) lateral line that borders the upper edge (Figs. 1, 2) of the dark brown lateral stripe (vs. pale lateral line immediately above dark brown lateral stripe, pale brown to rust color in life, incomplete anteriorly, reduced to dashes or largely absent posteriorly in *R. lachrymans*; see Fig. 4); fewer subcaudals in males (69–78; $\bar{x} = 74.0 \pm 4.6$ (vs. 79–87 subcaudals in males; $\bar{x} = 80.9 \pm 2.4$ in 13 Guatemalan *R. lachrymans* I examined; a range of 75–89 ($\bar{x} = 82.8 \pm 0.8$) in 18 mostly Mexican *R. lachrymans* examined by Myers); a shorter tail with a TAL/TOL of 25.6–27.5% (vs. a TAL/TOL 27.9–31.2% in 13 Guatemalan *R. lachrymans* I examined; values of 26.5–30.7% in 18 mostly Mexican *R. lachrymans* examined by Myers); and a maximum TOL of 487 mm in males, in only three specimens (vs. a maximum TOL 470 mm in males, in 13 Guatemalan specimens I examined, and 454 mm in 18 mostly Mexican *R. lachrymans* examined by Myers).

The 17-17-17 dorsal scale rows in *Rhadinella lisyae* will distinguish it from the four species of *Rhadinella* with 19-19-19 and three species with 21-21-21 dorsal scale rows; 17-17-17 dorsal scale rows are present in the remaining 10 species of *Rhadinella*, but broad lateral and ventrolateral stripes are present only in *R. lachrymans*; see Myers, 1974: 141), which are similar to those in *R. lisyae*. In addition, *R. lisyae* and *R. lachrymans* are the only two “large species” (Myers, 1974: 120) of *Rhadinella* with 17 dorsal scale rows.

Description of the holotype: Adult male; HL 10.5 mm; HL/SVL 3.5%; HW 6.6 mm; HW/SVL 2.2%; SVL 302 mm; TAL 112 mm; TOL 414 mm; TAL/TOL 27.1%; EL 2.0 mm; EL/HL 19.0%; naris to anterior edge of eye distance 1.8 mm; head scales arranged in nine plates with paired internasals, paired prefrontals, paired supraoculars, a single large frontal, and elongate paired parietals; the broad rostral does not extend posteriorly between the internasals; internasal suture 0.7 mm, 41.2% length of the prefrontal suture; frontal length 3.7 mm, 74.0% length of the parietals, 115.6% longer than length of prefrontal suture; interocular distance 3.9 mm, 105.4% longer than frontal; frontal longer than wide, its length 148.0% longer than wide; nasal divided, postnasal about equal to size of prenasal; loreal single, slightly longer than high; preocular single; subpreocular absent; postoculars 2, upper larger than lower; temporals 1 + 2; supralabials 8, 4th and 5th bordering the orbit; infralabials 8, first 4 contacting the anterior chinshields; 1st infralabial in contact with counterpart on the other side posterior to mental; mental broad, 1.6 mm wide × 1.3 mm long; mental groove present; and two pairs of chinshields, anterior pair about the same length as posterior pair, posterior pair separated for posterior two-thirds of its length by 1–2 gular scales. Dorsal scales smooth, without apical pits or anal ridges, in 17–17–17 rows; ventrals 166; subcaudals 78, divided; ventrals + subcaudals 244; cloacal plate divided; and pupil circular.

The dentition of the holotype is as follows: right maxilla with 18 teeth, posterior-most 3 (middle tooth missing, but socket visible) noticeably enlarged and heavier than the others, but in line with the others (not offset); a short diastema is present anterior to the 3rd enlarged tooth (counted from ultimate tooth forward).



Fig. 1. The adult male holotype (USNM 535870) of *Rhadinella lisyae* sp. nov. in life (TOL 414 mm). Note the white line bordering the dark brown lateral stripe, and the dark brown postorbital bar separated from the orbit by white pigment. © James R. McCranie



Fig. 2. An adult male paratype (USNM 565821) of *Rhadinella lisyae* sp. nov. in life (TOL 351 mm) showing the same characters as the holotype in Fig. 1. © James R. McCranie

The color in life of the holotype was as follows: dorsal ground color Hair Brown (119A); dorsal scale rows 1 through lower half of row 3 Drab (27), with substantial Russet (34) flecking; upper half of scale row 3 and lower half of row 4 Sepia (119); upper edge of scale row 4 and lower half of row 5 with complete white line, not interrupted with brown flecking or spotting, and extending the length of the body (Fig. 1); upper half of scale row 5 through row 8 Hair Brown, with the base of scales of row 6 Sepia; vertebral row Hair Brown with an incomplete Sepia stripe coursing down the center of the row; top of head Natal Brown (219A); no large pale blotches on the frontal; postorbital bar white, contacting the orbit (Figs. 1, 3), followed by a Sepia bar on the supralabials below the white postorbital bar, and separated from the orbit by a ventral extension of the white postorbital bar (Figs. 1, 3); supralabials white with Sepia markings; chin yellow, remainder of the venter Orange Yellow (18) with Sepia lateral ventral edges; and iris rust brown. In addition, the spines on the hemipenes were white in life.

The hemipenial morphology of the holotype is as follows: everted organ 11 subcaudal scales long, slightly bilobed, and unicapitate; sulcus spermaticus centrolineal, bifurcate, bifurcating just below the capitulum, with each branch extending nearly to the tip of each lobe; pedicel spinulate; truncus spinulate basally, with numerous enlarged and nearly straight spines covering most of the distal one-third of the truncus, with the spines becoming tiny near the sulcus; a small naked pocket is present on the asulcate side of the truncus, just below the capitulum; and on the apical region spinulate calyces are present around the base of capitulum, papillate calyces above that point on the sulcate side, and spinulate calyces on the asulcate side.

Variation: The entire *Rhadinella lisyae* series consists of three adult males (USNM 535870, 565592, 565821) and two adult females (USNM 565593–94) that show the following range in meristic and morphometric characters: TOL 351–487 ($\bar{x} = 417.3 \pm 68.1$) mm in males, 310–412 (361) mm in females; SVL 261–353 ($\bar{x} = 305.3 \pm 46.1$)





Fig. 3. Lateral view of the head (HL 10.5 mm) of the holotype of *Rhadinella lisyae* sp. nov. (USNM 535870) in preservative, showing a closer view of the dark brown postorbital bar separated from the orbit by white pigmentation.  © James R. McCranie



Fig. 4. An adult male (UTA R-28480) *Rhadinella lachrymans* (TOL 444 mm) in life, showing the incomplete pale lateral line bordering the upper edge of the dark brown lateral stripe anteriorly, and its reduction to dashes posteriorly, and the dark brown postorbital bar bordering the orbit. Specimen from Jalapa, Guatemala.  © Jonathan A. Campbell

mm in males, 229–308 (268.5) mm in females; TAL/TOL 25.6–27.5% in males, 25.2–26.1% in females; ventrals 158–166 ($\bar{x} = 162.7 \pm 4.2$) in males, 164–167 (165.5) in females; subcaudals 69–78 ($\bar{x} = 74.0 \pm 4.6$) in males, 65–66 (65.5) in females; ventrals + subcaudals 227–244 ($\bar{x} = 236.7 \pm 8.7$) in males, 229–233 (231.0) in females.

A dark brown lateral stripe is present in all specimens, which at midbody covers the upper half to two-thirds of scale row 3 and the lower half to only the lower tips of scale row 4; a white lateral line borders the upper edge of the dark lateral stripe, and crosses down to the upper edge of scale row 4 and the lower edge of row 5; the white lateral line remains thin, not wider than one-half of a scale row; a dark vertebral stripe is incomplete, and covers from about two thirds to the entire width of the vertebral row. The ventral and subcaudal surfaces in both specimens I saw alive (USNM 535870, 565821) were bright orange yellow, and the subcaudal surfaces showed a series of dark brown dashes that formed an incomplete stripe.

Distribution and habitat: *Rhadinella lisyae* is known from broadleaf rainforest and elfin forest (Premontane Wet Forest and Lower Montane Wet Forest formations; Holdridge, 1967) at elevations from 1,300 m to 2,290 m, and only from the Sierra de Agalta in east-central Honduras (Fig. 5). The holotype (USNM 535870) was found at ca. 1400 h, coiled on top of a moss matt in direct sunlight on a wind-swept ridge in elfin forest at an elevation of 2,050 m (Fig. 6). Specimen (USNM 565821) was found above cover during a brief period of sunlight at midday, at an elevation of 2,290 m, but quickly crawled under the roots of an elfin tree from where it was dug out. Another specimen (USNM 565594) was found being consumed by the coralsnake *Micrurus nigrocinctus* (Girard) (UNAH 5553) in closed canopy rainforest at an elevation of 1,400 m (F. Castañeda, pers. comm.). The available microhabitat data for the remaining two paratypes shows that one was collected in elfin forest at an elevation of 2,285 m, and the other was encountered in broadleaf rainforest at an elevation of 1,300 m. Two of the four paratypes were taken on the same ridge as the holotype. The ridge generally is exposed to windy and cloudy conditions and dramatic temperature changes, and these small snakes apparently surface only during brief periods of sunlight. The months of collection for the entire series were March, May, July, and August.

Etymology: The specific name *lisyae* is a matronym for my daughter Lisy, who has never shown fear of small non-venomous snakes and enjoys holding them.

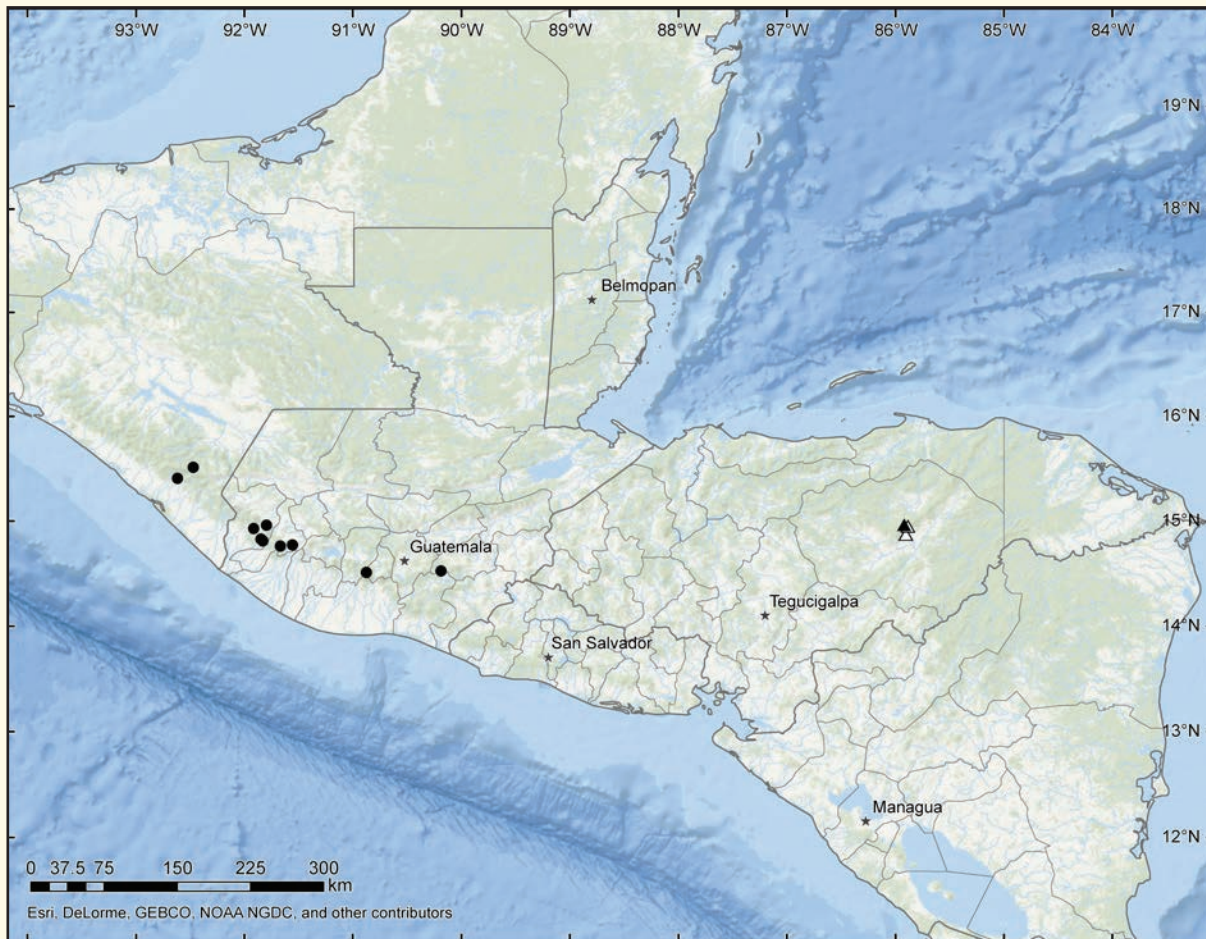


Fig. 5. Known localities for *Rhadinella lisyae* (closed triangle for holotype, open triangles for other specimens) and for the specimens of *Rhadinella lachrymans* (closed circles) examined. Map prepared by Sarah Hanson of the S. Blair Hedges Laboratory, Temple University.

DISCUSSION

Rhadinella lisyae apparently is confined to the isolated Sierra de Agalta, in the department of Olancho in east-central Honduras. This mountain range is located on the Atlantic versant about 500 km to the east from the nearest known locality of its apparent closest relative, *R. lachrymans*, close to or on the Pacific versant in Jalapa, Guatemala. *Rhadinella lisyae* occurs in broadleaf rainforest and broadleaf elfin forest well inland on the Atlantic versant (ca. 120 km from the nearest headwaters on the Pacific versant), whereas according to Myers (1974), all of the known localities for *R. lachrymans* at that time were on the Pacific versant (also see Acevedo, 2006: 523) and in “the pine-oak zone” of Guatemala and Chiapas, Mexico. Thus, in addition to the significant geographical gap that separates *R. lisyae* from *R. lachrymans*, these two nominal forms are isolated by extensive lowlands, of which some are subhumid, and thus lack suitable ecological requirements for the occurrence of these small snakes. The known elevational range for *R. lachrymans* is from 895 m to 2,635 m, compared to 1,300 m to 2,290 m for *R. lisyae*.

In one of the best taxonomic and systematic reviews of any group of snakes in the Western Hemisphere, Myers (1974) indicated that specimens of *Rhadinella lachrymans* showed a geographical trend in the width of the dark brown lateral stripe. The specimens from Guatemala showed a broader lateral stripe than those from Chiapas, Mexico. In the Mexican populations “the lateral stripe usually covers the upper part of scale row 3 and the lower

half or three-quarters of row 4” (Myers 1974: 143). In Guatemalan specimens, the stripe “usually extends from the middle or top of row 2 to the lower half or three-quarters of row 4” (Myers 1974: 143). Of the 15 specimens of *R. lachrymans* from Guatemala I examined, the “narrower” dark lateral stripe condition noted by Myers for the Mexican populations was evident in only two; these specimens, however, were not available to Myers. Thus, when comparing the character of the dark brown lateral stripe, *R. lisyae* more closely resembles the “narrower dark lateral striped” specimens of *R. lachrymans* from Chiapas, Mexico, than those from the geographically nearer Guatemala (compare Figs. 1, 2 with Fig. 4).



Fig. 6. Elfin forest on the ridge leading to Cerro La Picucha (the peak off the right side on the image), the type locality for *Rhadinella lisyae* sp. nov. The photograph was taken at an elevation of 2,200 m, and the holotype was collected on the same ridge at an elevation of 2,050 m.

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Appendix 1. I used the UMMZ specimens of *Rhadinella lachrymans* listed below in McCranie and Wilson (2001), and examined the remaining specimens of *R. lachrymans* for this study. I benefitted by previously having examined all of the known specimens of *Rhadinella* from Honduras, of which all of the pertinent information is listed in McCranie (2011). The specimens of the new species I examined are listed in the systematic account.

Rhadinella lachrymans ($n = 24$; all adult males). **GUATEMALA:** JALAPA: 11.1 km ENE of Mataquesuintla (UTA R-28480–81); QUEZALTENANGO: Finca El Faro, S slope of Volcán Santa María (UTA R-21724, 21727); Finca Lorena (UMMZ 107325); SACATEPÉQUEZ: slope of Volcán Acatenango (UTA R-37084); SAN MARCOS: 2 km NW of Casa Grande (UMMZ 107326); Finca America El Vergel, San Rafael Pie de La Cuesta (UTA R-42339, 42343); Finca La Esperanza, Aldea La Fraternidad (UTA R-38940–42, 38961, 38963, 39496, 39501, 39503); 2 km NW of La Reforma (UMMZ 98306). **MEXICO:** CHIAPAS: Letrero, Ciltepec (UMMZ 94606); Mt. Ovando, Soconusco (UMMZ 87699, USNM 110367–69); Saxchanal (UMMZ 94608).





James R. McCranie is a self-taught herpetologist with a passion for fieldwork, who specializes on the taxonomy and systematics of the Latin American herpetofauna. His main area of interest is Honduras, where he has been conducting fieldwork since 1976. During his career, McCranie has authored or co-authored five books (a sixth book is in press) and nearly 300 peer-reviewed scientific publications, including the descriptions of about 95 new taxa, mostly from Honduras. In 2015, he retired from fieldwork in Honduras because of the unavailability of scientific collecting permits. During his countless trips to Honduras, Randy witnessed a time when extensive forests dominated the landscape; sadly, as a result of deforestation and fragmentation, many of these habitats no longer remain. Because of the lack of governmental effort to curb these practices, he believes that the country has reached the point of no return regarding the conservation of many of its once magnificent natural habitats.