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LIZARDS OF THE GENUS *RIAMA* (SQUAMATA: GYMNOPHTHALMIDAE): THE DIVERSITY IN SOUTHERN ECUADOR REVISITED

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ABSTRACT. Following examination of recently collected and older specimens of *Riama* from southern Ecuador, we report morphological variation in *R. vespertina* and modify the species diagnosis and description accordingly; furthermore, we describe two new species, comment on additional diversity of the genus in this region and discuss some character-states, specially dorsal scale relief (specifically striated and keeled conditions). We provide an identification key to the species of *Riama* occurring in southern Ecuador.

KEY-WORDS. Andes; Microteiid lizards; *Riama aurea* sp. n., *Riama kiziriani* sp. n., and *Riama vespertina*; South America; Taxonomy.

INTRODUCTION

Southern Ecuador contains some of the least known gymnophthalmid species in the genus *Riama*. As a conclusion of his comprehensive monograph on Ecuadorian *Riama* (then *Proctoporus*), Kizirian (1996: 148) stated "The greatest void in the knowledge of *Proctoporus* distribution occurs in southern Ecuador." One would expect that since then a myriad of *Riama* specimens from southern Ecuador, including the Andean provinces of Azuay, Cañar, El Oro, Loja, Zamora-Chinchipec, and the southern half of Morona-Santiago, would have reached natural history collections; but this is not the case. Besides the scarce material reported by Kizirian (1996), we have been able to locate only 29 additional specimens from this vast region. The secretive nature of these lizards and the lack of interest in collecting them would explain such a scenario. Despite the limited material we have gathered, a review of it is pivotal if we are to better understand the high diversity of *Riama* in the Ecuadorian Andes, especially to facilitate phylogenetic studies of the genus; it is important to test microevolutionary hypotheses (e.g., species identities) before pursuing macroevolutionary studies. To this end, we maximize the available evidence by analyzing traditional external morphological characters used in *Riama* systematics along with molecular data. Our investigation results in the description of two new species and the redescription of *R. vespertina*, a species described by Kizirian (1996) on the basis of a single male, followed by comments on additional *Riama* diversity in southern Ecuador, and a discussion of some character-states.

MATERIAL AND METHODS

To facilitate species determination, *Riama vespertina* and the new species are diagnosed from each other as well as all other 27 currently recognized species of *Riama* from Ecuador, Colombia, Venezuela, Peru and Trinidad & Tobago. For this purpose, we examined specimens from all the species known to occur in Ecuadorian territory plus eight species from Colombia, Venezuela and Trinidad & Tobago (see Appendix). Data for *R. inanis*, *R. laudahnae*, and *R. rhodogaster* were taken from the literature (Doan and Schargel, 2003; Köhler and Lehr, 2004; Rivas *et al.*, 2005). Measurements (snout-vent length [SVL] and tail length) were taken to 0.1 mm with digital calipers. Sex was determined by noting the presence of everted hemipenes in males and/or secondary sex characters. Characters and head-scale terminology follow Kizirian (1996). Bilateral variation is reported as left/right.

Except for DHMECN (División de Herpetología, Museo Ecuatoriano de Ciencias Naturales, Quito, Ecuador), EPNH (Escuela Politécnica Nacional, Colección Herpetología, Quito, Ecuador), FHGO (Fundación Herpetológica Gustavo Orcés, Quito, Ecuador), MHNCSJ (Museo de Historia Natural, Colegio San José, Medellín, Colombia), MHNUC (Museo de Historia Natural, Universidad de Caldas, Manizales, Colombia), PSO-CZ (Museo de Historia Natural de la Universidad de Nariño, Pasto, Colombia), QCAZ (Museo de Zoología, Pontificia Universidad Católica del Ecuador, Quito, Ecuador), and UV-C (Museo de Vertebrados, Universidad del Valle, Cali, Colombia), institutional abbreviations are those of Sabaj Pérez (2012).

SYSTEMATICS

Riama aurea, new species

Figures 1 and 2

Proctoporus oculatus (O'Shaughnessy, 1879): Burt and Burt, 1931: 369 [part (for AMNH 18310)].

Proctoporus striatus (Peters, 1862): Uzzell, 1958: 7 [part (for AMNH 18310)].

Proctoporus hypostictus Boulenger, 1902: Kizirian, 1996: 112 [part (for AMNH 18310)].

Riama sp.: Sánchez-Pacheco *et al.*, 2011: 11 [part (for AMNH 18310)].

Holotype – QCAZ 07886 (Figs. 1, 2), an adult male collected on December 5, 2006 by Silvia Aldás-Alarcón at Guanazán, Provincia El Oro, Ecuador, 2789 m; 03°26'29"S; 79°29'39"W.

Paratypes – QCAZ 09649-50, a male and a female, respectively, collected on August 22, 2009 by Silvia Aldás-Alarcón at El Panecillo, Provincia El Oro, Ecuador, 2775 m; 03°28'3"S; 79°28'59"W; EPNH 06196, a female collected on March 25, 1995 by A. Almendariz and Pedro Chicai at Guishaguiña, Zaruma, Provincia El Oro, Ecuador.

Referred material – AMNH 18310, a specimen (anterior portion only) collected on August 3, 1920 by H. E. Anthony at El Chiral, Provincia El Oro, Ecuador.

Etymology – The specific epithet, to be treated as an indeclinable word, is an adjective derived from the Latin word *aurum*, meaning gold, and refers to the provenance of the species, El Oro Province.

Diagnosis – Among the other five species of *Riama* currently known to occur in southern Ecuador, *R. aurea* differs from *R. anatoloros* in having two post-parietals (three in *R. anatoloros*), 19-20 longitudinal dorsal scale rows in males (22-27), 34-35 transverse dorsal scale rows (36-44) and four femoral pores per hind limb in males (7-11). It differs from *R. stigmatoral* in having four femoral pores per hind limb in males (9-11 in *R. stigmatoral*) and eight scales between medialmost femoral pores in males (0-2). It can be distinguished from *R. petrorum* by the superciliary arrangement, 1+1, 1+2 or 2+2 (one, the anteriormost, in *R. petrorum*), by the second or second and fourth supraoculars contacting the ciliaries (second, third and fourth, or first, second and third in contact with ciliaries) and by the ventral coloration,

cream with brown smears in scale centers gradually becoming more distinct ventrolaterally and on tail, forming nearly continuous longitudinal lines (venter unicolored olive or dark brown with cream along scale sutures); it further differs from *R. petrorum* in

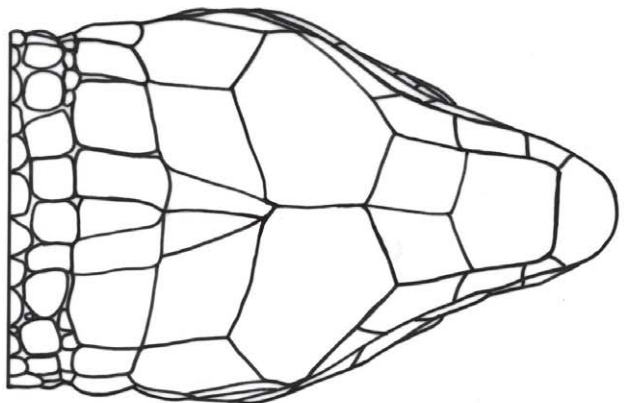
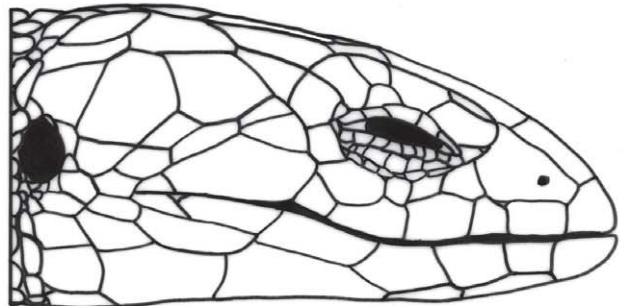
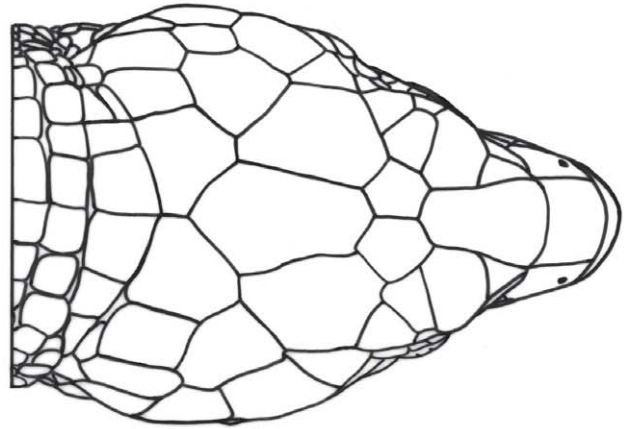


FIGURE 1. *Riama aurea*, new species. Dorsal, lateral, and ventral views of head of holotype (QCAZ 07886, 57.4 mm SVL).

adult body size (maximum known SVL in *R. aurea* is about 57 mm for males and 52 mm for females, versus 72 mm and 76 mm for males and females, respectively, of *R. petrorum*). From *R. vespertina*, *R. aurea* differs in having four supraoculars (three in *R. vespertina*) and 1+1, 1+2 or 2+2 superciliaries (2+1). From *R. kiziriani* it differs in having four supraoculars (three in *R. kiziriani*), 1+1, 1+2 or 2+2 superciliaries (2+1), four femoral pores per hind limb in males (seven) and venter cream with brown smears in scale centers gradually becoming more distinct ventrolaterally and on tail, forming nearly continuous longitudinal lines (venter dark brown to black with longitudinally arranged white stripes or spots on the scale sutures).

Riama aurea can be distinguished from the remaining Ecuadorian species, as well as Colombian, Venezuelan, Peruvian and Trinidadian congeners by the

number of scales between medialmost femoral pores in males (eight in *R. aurea* versus six or fewer in the other species).

Description – *Riama aurea* possesses the following characteristics: (1) Maximum SVL in males 57.4 mm ($n = 3$), in females 52 mm ($n = 2$); (2) frontonasal distinctly shorter than frontal; (3) prefrontals absent; (4) nasoloreal suture absent [= loreal absent]; (5) supraoculars four, second in contact with ciliaries (one specimen with second and fourth in contact with ciliaries); (6) superciliary series incomplete, 1+1, 1+2 or 2+2; (7) supralabial-subocular fusion usually absent; (8) postoculars two; (9) postparietals two; (10) supratympanic temporals three; (11) genials two pairs; (12) dorsal scales rectangular, juxtaposed, striated; (13) nuchal scales smooth; (14) longitudinal dorsal scale rows in males 19-20, in females 19-22; (15) transverse dorsal scale rows 34-35; (16) ventral



FIGURE 2. *Riama aurea*, new species. Dorsal and ventral views of holotype (QCAZ 07886, 57.4 mm SVL). Photos courtesy: Pedro H. Bernardo.

scales smooth, in 21 transverse rows; (17) lateral scale rows two or three; (18) femoral pores per hind limb in males four, in females absent or four; (19) scales between medialmost femoral pores eight; (20) subdigital scales on toe I four or five; (21) anterior cloacal plate scales paired; (22) dorsum brown with or without dark brown to black spots, pale dorsolateral stripe present; longitudinal row of ocelli on flanks of adult males present; venter cream, with brown smears in scale centers gradually becoming more distinct ventrolaterally and on tail, forming nearly continuous longitudinal lines.

Description of holotype – Male (Figs. 1, 2), SVL 57.4 mm, tail (incomplete) length 46.7 mm; head scales smooth, glossy; rostral scale wider than long, higher than adjacent supralabials, in contact with frontonasal, nasals, and anteriormost supralabials posteriorly; frontonasal roughly quadrangular, widest posteriorly, much shorter than frontal, in contact with nasals laterally, and frontal posteriorly; prefrontals absent; frontal longer than wide, widest anteriorly, anterior suture slightly convex, lateral sutures slightly concave, posterior suture angular with point directed posteriorly, not in contact with anteriormost superciliary anterolaterally on the left side, in contact with first and second supraoculars laterally, frontoparietals posteriorly; frontoparietals pentagonal, in contact with second and third supraoculars anterolaterally, parietals and interparietal posteriorly; interparietal hexagonal, longer than wide, in contact with parietals laterally, postparietals posteriorly; parietals in contact with third and fourth supraoculars anterolaterally, dorsalmost temporal scale laterally, and postparietals posteriorly, not in contact with dorsalmost postocular; postparietals two, in broad contact; supraoculars four, second and fourth in contact with ciliaries. Nasoloreal suture absent (= loreal absent), nasal roughly pentagonal; superciliaries one anteriorly, one posteriorly, separated from each other by second supraocular; anteriormost superciliary lies between nasal, frontal (right side only), first and second supraoculars, and anteriormost ciliaries, barely extending onto dorsal surface of head; palpebral disc divided into three large and several small scales, anteriormost scales unpigmented, posteriormost pigmented; frenocular roughly pentagonal, in contact with nasal anteriorly; circumorbital scales between posteriormost supraocular and frenocular five; postoculars two; temporals smooth, glossy, polygonal; supratympanic temporals three; supralabials six; infralabials five. Mental wider than long, in

contact with anteriormost infralabials and postmental posteriorly; postmental roughly pentagonal, posterior suture angular, point directed posteriorly, in contact with first and second infralabials laterally; genials in two pairs, anteriormost pair roughly quadrangular, in contact with second and third infralabials; posterior pair polygonal, in contact with third and fourth infralabials on the right side, third, fourth and fifth infralabials on the left side; scale rows between genials and collar fold (along midventral line) eight; medialmost scales of posteriormost scale row distinctly enlarged, smooth; posteriormost gular row enfolded posteriorly, concealing two small scale rows; lateral neck scales squarish or rounded, smooth.

Dorsal scales rectangular, longer than wide, juxtaposed, striated, in 34 transverse rows (one of them incomplete); longitudinal dorsal scale rows at fifth transverse ventral scale row 18, at 10th transverse ventral scale row 19, at 15th transverse ventral scale row 19; lateral scale rows at fifth transverse ventral scale row 4/5, at 10th transverse ventral scale row two, at 15th transverse ventral scale row three; lateral scales on body near insertion of forelimb small to granular; ventral scales smooth; complete transverse ventral scale rows 21; longitudinal ventral scale rows at midbody 10; anterior cloacal plate scales two; posterior cloacal plate scales five, medial scale in contact with anterior cloacal plate; scales on tail rectangular and juxtaposed; midventral subcaudals smooth, wider than adjacent scales, nearly square. Femoral pores per hind limb four; scales between medialmost femoral pores eight. In general, limb squamation as described for congeners (*e.g.*, Kizirian, 1996).

Coloration of holotype (Fig. 2) – In preservative (70% ethanol), dorsal ground color brown with dark brown to black spots, and fine dark brown mottling visible microscopically; dorsolateral dark-bordered pale stripe extending posteriorly from temporal region onto body, disappearing posterior to hind limb. Well-defined ocelli laterally from neck to anterior portion of tail becoming less distinct posteriorly on tail (tail incomplete); labial scales dark brown with cream sutures. Venter cream, with brown smears in scale centers gradually becoming more concentrated and distinct ventrolaterally and on tail, forming nearly continuous longitudinal lines.

Variation – The paratypes consist of a male (SVL = 48.6 mm) and two females (SVLs = 52 and 51.9 mm). Head shape, which tends to be more robust in sexually mature males, suggests that the referred

specimen (anterior portion only) is presumably a male. The paratypes and the referred specimen are similar to the holotype with the following noteworthy exceptions. Frontal divided horizontally in QCAZ 9650; second supraocular in contact with ciliaries in all paratypes and the referred specimen (second and fourth in the holotype); superciliaries 2+2 (EPNH 06196, QCAZ 09650 and AMNH 18310) or 1+2 (QCAZ 09649), 1+1 in the holotype; supralabial-subocular fusion present in QCAZ 09650. Females with pale dorsolateral stripe (not dark-bordered), without ocelli laterally, EPNH 06196 with some tiny cream spots on flanks.

Natural history – One specimen (QCAZ 07886) was found on a branch 10 cm above the ground next to an unpaved road. To our knowledge, this is the first report of arboreality in *Riama*. Two specimens (QCAZ 09649 and 09650) were found under ground material near cultivated fields in an herbaceous paramo forest and dry montane scrub.

Distribution – *Riama aurea* is known from four localities in northeastern El Oro Province (Fig. 7). It occurs at elevations between 2775 and 2789 m.

Remarks – Peters (1967), Kizirian (1996) and Sánchez-Pacheco *et al.* (2011) briefly discussed the identity of AMNH 18310 (anterior portion only) and agreed that it may represent an undescribed species, but that additional specimens were required to allow specific recognition. AMNH 18310 is conspecific with the new material from El Oro as evidenced by color pattern and cephalic squamation.

We found that sequences of 12S and 16S mtDNA are 5.5–6.8% and 3.3–4.4%, respectively, divergent (uncorrected pairwise distance) between the samples of *Riama aurea* and *R. kiziriani*, and 4.4% and 3.4–3.6% between the samples of *R. aurea* and *R. vespertina*, whereas the sequences are identical and nearly identical (0% and 0–0.2%) between the samples of *R. aurea* (unpubl. data derived from an ongoing phylogenetic analysis).

Riama kiziriani, new species

Figures 3 and 4

Holotype – QCAZ 9667 (Figs. 3, 4), an adult male collected on August 20, 2009 by Elicio Tapia at San Antonio, Provincia de Azuay, Ecuador, 1900 m; 02°53'42"S; 79°24'19"W.

Paratype – QCAZ 9607, a male collected on July 20, 2009 by Paola Mafla-Endara and Amaranta Carvajal-Campos at El Chorro de Girón, Girón, Provincia de Azuay, Ecuador, 2546 m; 03°7'48"S; 79°9'57"W.

Etymology – The specific epithet is a noun in the genitive case and a patronym for David A. Kizirian, our friend and colleague, in recognition of his contribution to the knowledge of *Riama* diversity.

Diagnosis – *Riama kiziriani* can be distinguished from its congeners, except *R. vespertina*, by the presence of two anteriorly and one posteriorly positioned superciliary scales. It can be distinguished from

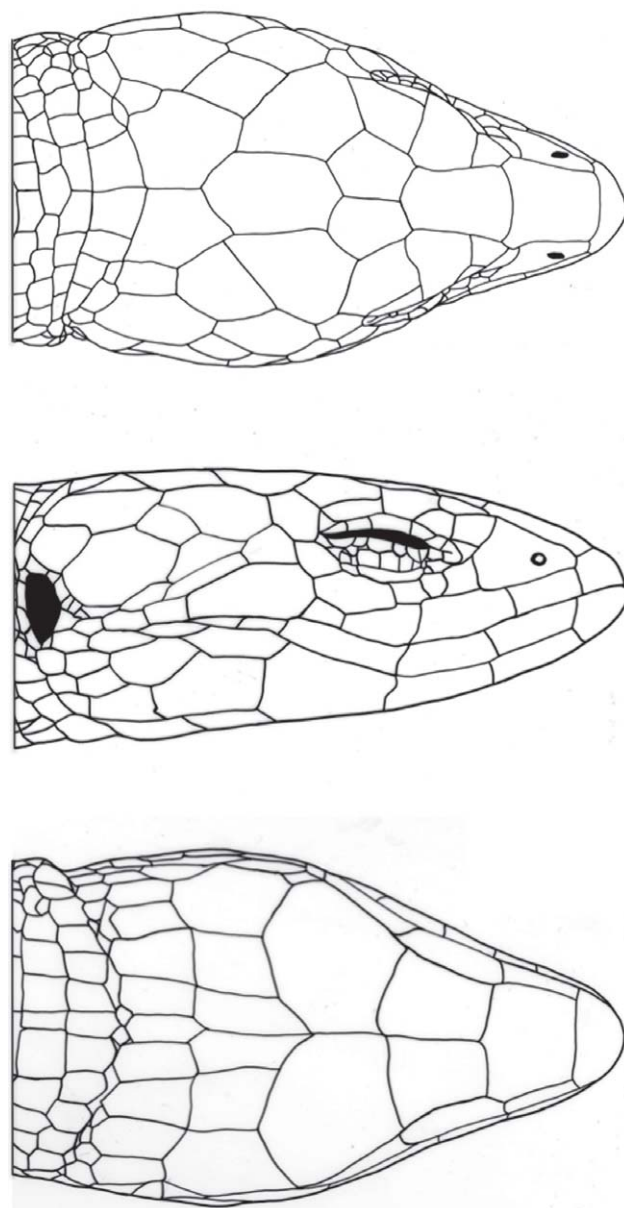


FIGURE 3. *Riama kiziriani*, new species. Dorsal, lateral, and ventral views of head of holotype (QCAZ 9667, 61.0 mm SVL).

R. vespertina by the following characteristics (condition for *R. vespertina* in parentheses): femoral pores per hind limb in males seven (4-5); and venter dark brown to black with small white spots or narrow lines on longitudinal sutures (ventral coloration in males cream – yellowish in life – with faint brown spots on central portion of scales).

In addition, among the other four species of *Riama* currently known to occur in southern Ecuador, *R. kiziriani* differs from *R. anatoros* in having two postparietals (three in *R. anatoros*), 20 longitudinal dorsal scale rows in males (22-27), and 32-34 transverse dorsal scale rows in males (36-42). It differs from *R. stigmatoral* in having three supraoculars

(four in *R. stigmatoral*), seven femoral pores per hind limb in males (9-11), and six scales between medialmost femoral pores in males (0-2). It can be distinguished from *R. petrorum* by the second supraocular contacting the ciliaries (second, third and fourth, or first, second and third in contact with ciliaries in *R. petrorum*), by the number of femoral pores per hind limb in males, seven (4-5), and by the number of scales between medialmost femoral pores, six (eight); it further differs from *R. petrorum* in adult body size (maximum known SVL in *R. kiziriani* is about 61 mm for males, versus 72 mm in *R. petrorum*). From *R. aurea* it differs in having three supraoculars (four in *R. aurea*), seven femoral pores per hind limb in males



FIGURE 4. *Riama kiziriani*, new species. Dorsal and ventral views of holotype (QCAZ 9667, 61.0 mm SVL) in life. Photos: Omar Torres-Carvajal.

(four) and venter dark brown to black with longitudinally arranged white stripes or spots on the scale sutures (venter cream with brown smears in scale centers gradually becoming more distinct ventrolaterally and on tail, forming nearly continuous longitudinal lines).

Description – *Riama kiziriani* possesses the following characteristics: (1) Maximum SVL in males 61.0 mm (n = 2), females unknown; (2) frontonasal shorter than frontal; (3) prefrontals absent; (4) nasoloreal suture absent [= loreal absent]; (5) supraoculars three, second in contact with ciliaries; (6) superciliary series incomplete, two anteriorly, one posteriorly; (7) supralabial-subocular fusion absent; (8) postoculars two; (9) postparietals two; (10) supratympanic temporals three; (11) genials two pairs; (12) dorsal scales rectangular, juxtaposed, striated; (13) nuchal scales smooth; (14) longitudinal dorsal scale rows 20; (15) transverse dorsal scale rows 32-34; (16) ventral scales smooth, in 19-21 transverse rows; (17) lateral scale rows three; (18) femoral pores per hind limb seven; (19) scales between medialmost femoral pores six; (20) subdigital scales on toe I four; (21) anterior cloacal plate scales paired; (22) dorsum dark brown, distinct dorsolateral stripe present; venter dark brown with longitudinally arranged white stripes or spots on the scale sutures.

Description of holotype – Male (Figs. 3, 4), SVL 61.0 mm, tail (regenerated) length 33.9 mm; head scales smooth, glossy; rostral scale wider than long, higher than adjacent supralabials, in contact with frontonasal, nasals, and anteriormost supralabials posteriorly; frontonasal longer than wide, widest posteriorly, shorter than frontal, in contact with nasals laterally, anteriormost superciliary and first supraocular posterolaterally, and frontal posteriorly; prefrontals absent; frontal longer than wide, widest anteriorly, anterior suture slightly convex, lateral sutures slightly concave, posterior suture angular with point directed posteriorly, not in contact with anteriormost superciliary anterolaterally, in contact with first and second supraoculars laterally, frontoparietals posteriorly; frontoparietals pentagonal, in contact with second and third supraoculars anterolaterally, parietals and interparietal posteriorly; interparietal roughly hexagonal, longer than wide, in contact with parietals laterally, postparietals posteriorly; parietals in contact with third supraocular anterolaterally, dorsalmost temporal scales and postocular laterally, and postparietals posteriorly; postparietals two, in broad

contact; supraoculars three, second in contact with ciliaries. Nasoloreal suture absent (= loreal absent), nasal roughly pentagonal; anterior superciliaries two, posterior superciliary one, separated by second supraocular; anteriormost superciliary lies between nasal, frontonasal, first supraocular, second superciliary and anteriormost ciliaries, barely extending onto dorsal surface of head; palpebral disc divided into three large and several small unpigmented scales; frenocular quadrangular, in contact with nasal anteriorly; circumorbital scales between posteriormost supraocular and frenocular five; postoculars two; temporals smooth, glossy, polygonal; supratympanic temporals three; supralabials six; infralabials five. Mental wider than long, in contact with anteriormost infralabials and postmental posteriorly; postmental roughly pentagonal, posterior suture angular, point directed posteriorly, in contact with first and second infralabials laterally; genials in two pairs, anteriormost pair roughly quadrangular, in contact with second infralabials; posterior pair polygonal, in contact with second and third infralabials; scale rows between genials and collar fold (along midventral line) eight; medialmost scales of posteriormost scale row distinctly enlarged, smooth; posteriormost gular row enfolded posteriorly, concealing small scales; lateral neck scales squarish or rounded, smooth.

Dorsal scales rectangular, longer than wide, juxtaposed, striated, in 34 transverse rows; longitudinal dorsal scale rows at fifth transverse ventral scale row 16, at 10th transverse ventral scale row 20, at 15th transverse ventral scale row 21; lateral scale rows at fifth transverse ventral scale row six, at 10th transverse ventral scale row three, at 15th transverse ventral scale row two; lateral scales on body near insertion of forelimb small to granular; ventral scales smooth; complete transverse ventral scale rows 21; longitudinal ventral scale rows at midbody 11; anterior cloacal plate scales two; posterior cloacal plate scales five, medial scale in contact with anterior cloacal plate; scales on tail rectangular and juxtaposed; midventral subcaudals smooth, wider than adjacent scales, nearly square. Femoral pores per hind limb seven; scales between medialmost femoral pores six. In general, limb squamation as described for congeners (*e.g.*, Kizirian, 1996).

Coloration of holotype (Fig. 4) – In life, dorsal ground color dark brown, dorsal surface of head with randomly arranged concentrations of light brown pigment; dorsolateral dark-bordered pale stripe present on neck, disappearing posterior to forelimb, appearing

again on tail; ocelli laterally; ventral surface of head brown, center of postmental and genials with cream pigmentation; ventral aspect of neck, body and tail dark brown to black with small white spots or narrow lines on longitudinal sutures.

Variation in paratype – The paratype (SVL 43.1 mm) is similar to the holotype with the following noteworthy exceptions: frontonasal not in contact with first supraocular posterolaterally; dorsum mottled; white longitudinal lines along ventral scale sutures more distinctive than in the holotype.

Natural history – The holotype (QCAZ 9667) was found under a 30 × 40 cm rock next to a pasture in a dry highland forest. Paratype QCAZ 9607 was found on rocks next to a trail in a dry area covered with *Marchantia* (Marchantiophyta: Marchantiaceae).

Distribution – *Riama kiziriani* is known only from two localities in Azuay province, southern Ecuador, at elevations between 1900 and 2546 m (Fig. 7).

Remarks – We found that sequences of 12S and 16S mtDNA are 5.5-6.8% and 3.3-4.4%, respectively,

divergent (uncorrected pairwise distance) between the samples of *Riama kiziriani* and *R. aurea*, and 6-7.8% and 4-4.6% between the samples of *R. kiziriani* and *R. vespertina*, whereas the divergence is only 0-2.1% and 0-1.3% between the samples of *R. kiziriani* (unpubl. data derived from an ongoing phylogenetic analysis).

Riama vespertina (Kizirian, 1996)

Figures 5 and 6

Proctoporus vespertinus Kizirian, 1996: 142-145.

Original description. Holotype, male (AMNH 22130) from [Pampa] Chitoqué, 6000 ft [Loja], Ecuador.

Riama vespertina (Kizirian, 1996): Doan and Castoe, 2005: 409 [first use of combination]; Reyes-Puig *et al.*, 2008: 368 [for DHMECN 4113-14 from Reserva Biológica Utuana, 48.3 km southeast to the type locality].

New Referred Material – QCAZ 10283, 10286, 10288, 10306-13, a series collected on February 25, 2010 by Silvia Aldás-Alarcón and Freddy Velásquez



FIGURE 5. *Riama vespertina*. Dorsal and ventral views of holotype (AMNH 22130, 40 mm SVL). Photos courtesy: David A. Kizirian.

Alomoto at Guachaurco, Loja, Ecuador, between 2824-2958 m; 04°2'33"S; 79°51'46"W.

Additional Examined Specimens – AMNH 22130 (Holotype, Fig. 5) and DHMECN 4113-14.

Etymology – The specific epithet is a Latin adjective meaning “of the west” and alludes to the fact that *Riama vespertina* is the westernmost species of *Riama* (Kizirian, 1996).

Diagnosis – *Riama vespertina* can be distinguished from its congeners, except *R. kiziriani*, by the presence of two anteriorly and one posteriorly positioned

superciliary scales. It can be distinguished from *R. kiziriani* by the following characteristics (condition for *R. kiziriani* in parentheses): femoral pores per hind limb in males 4-5 (seven); and venter cream – yellowish in life – with faint brown spots on central portion of scales (ventral coloration in males dark brown to black with small white spots or narrow lines on longitudinal sutures).

In addition, among the other four species of *Riama* currently known to occur in southern Ecuador, *R. vespertina* differs from *R. anatoloros* in having two postparietals (three in *R. anatoloros*) and 4-5 femoral pores per hind limb in males (7-11). It differs from *R. stigmatoral* in having three supraoculars

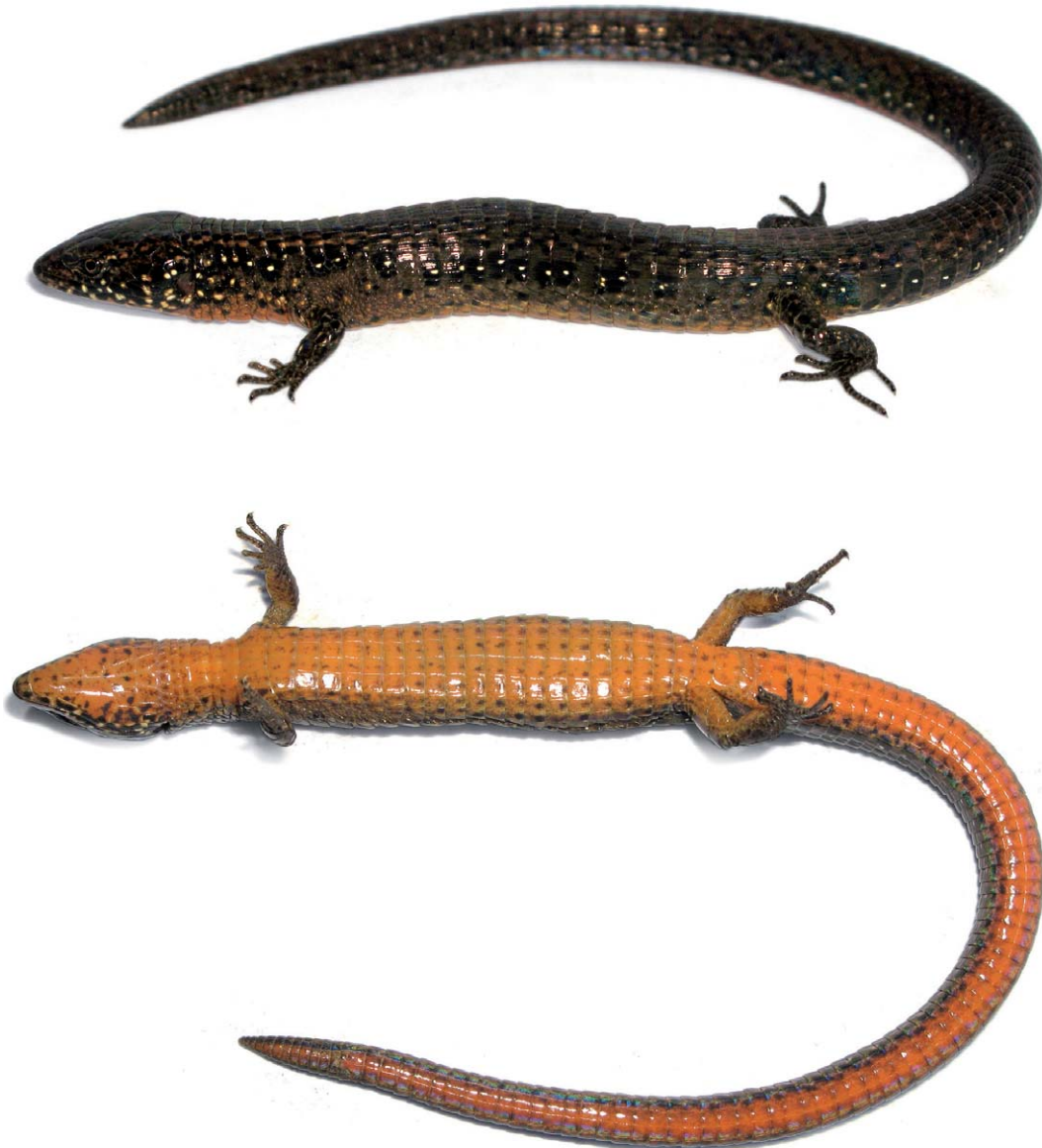


FIGURE 6. *Riama vespertina*. Dorsolateral and ventral views of the adult male in life QCAZ 10283 (56.0 mm SVL). Photos courtesy: Silvia Aldás-Alarcón.

(four in *R. stigmatoral*), 4-5 femoral pores per hind limb in males (9-11) and 6-10 scales between medialmost femoral pores in males (0-2). It can be distinguished from *R. petrorum* by the second supraocular contacting the ciliaries (second, third and fourth, or first, second and third in contact with ciliaries in *R. petrorum*) and by the number of transverse dorsal scale rows in males, 34-35 (33) and in females, 34-36 (31-33); it further differs from *R. petrorum* in adult body size (maximum known SVL in *R. vespertina* is about 66 mm for males and 68 mm for females, versus 72 mm and 76 mm for males and females, respectively, of *R. petrorum*). From *R. aurea*, *R. vespertina* differs in having three supraoculars (four in *R. aurea*).

Description – *Riama vespertina* possesses the following characteristics: (1) Maximum SVL in males 65.8 mm (n = 5), in females 68.6 mm (n = 9); (2) frontonasal usually shorter than frontal; (3) prefrontals absent; (4) nasoloreal suture absent [= loreal absent]; (5) supraoculars three (two specimens with four on the right side), second in contact with ciliaries; (6) superciliary series incomplete, two anteriorly, one posteriorly; (7) supralabial-subocular fusion absent; (8) postoculars usually two; (9) postparietals two; (10) supratympanic temporals usually three; (11) genials two pairs; (12) dorsal scales rectangular, juxtaposed, striated; (13) anterior nuchal scales smooth, posterior nuchal scales slightly striated; (14) longitudinal dorsal scale rows in males 19-23, in females 19-26; (15) transverse dorsal scale rows in males 34-35, in females 34-36; (16) ventral scales smooth, in 19-22 transverse rows in males, 21-24 in females; (17) lateral scale rows 1-3; (18) femoral pores per hind limb in males 4-5, in females absent or four, usually absent; (19) scales between medialmost femoral pores 6-10; (20) subdigital scales on toe I 4-6; (21) anterior cloacal plate scales paired; (22) dorsum dark brown, pale dorsolateral stripe usually present in both sexes; ocelli laterally in males, absent in females; venter cream (yellowish in life) with faint brown spots on central portion of scales in males, distinctive brown markings ventrolaterally in females.

Description of holotype – Kizirian (1996) provided a detailed description of the holotype of *Riama vespertina*.

Coloration in life (Fig. 6) – Reyes-Puig *et al.* (2008) provided photographs and color description of DHMECN 4113-14 in life.

Coloration in preservative (70% ethanol) – Dorsum in males dark brown (light brown in the holotype likely because of long preservation time), with fine darker brown mottling in the holotype and QCAZ 10283; indistinct pale dorsolateral stripe present on neck (also on the temporal region in the holotype and QCAZ 10313), conspicuous in QCAZ 10313 and DHMECN 4113, disappearing posterior to forelimb, appearing again above hind limbs and on anterior portion of tail in DHMECN 4113. Flanks with white spots surrounded by black blotches to form ocelli longitudinally arranged from neck to anterior portion of tail. Venter cream with faint concentrations of dark brown pigment on central portion of scales (distinctive brown markings in DHMECN 4113), becoming more concentrated on ventral surface of head. Dorsum in females dark brown; pale dorsolateral stripe present on neck, absent in QCAZ 10310. Lateral ocelli absent. Venter cream with distinctive brown markings on central portion of scales, especially on ventral surface of head, ventrolaterally on the body, and subcaudally.

Variation – Noteworthy variations among referred specimens include: frontonasal equal in length to frontal in QCAZ 10313; postoculars three in QCAZ 10286; supratympanic temporals two in QCAZ 10283; femoral pores absent in all but one female (DHMECN 4114, four femoral pores per hind limb). DHMECN 4114 and QCAZ 10286 appear to have four supraoculars on the right side because the third supraocular is divided. Femoral pore number is the most evident sexually dimorphic character, with males having from 4-5 pores per hind limb and females usually lacking them.

Previous authors have mentioned that *Riama vespertina* has keeled or striated dorsal scales (Kizirian, 1996; Reyes-Puig *et al.*, 2008). However, in all but one of the specimens examined by us, scales are striated, or slightly striated (DHMECN 4113). The exception is QCAZ 10309, a juvenile female (SVL 31.7 mm) with smooth or slightly keeled dorsal scales (but see section on dorsal scale relief in Discussion below).

Natural history – Ecological data of DHMECN 4113-14 can be found in Reyes-Puig *et al.* (2008). The specimens listed under “New Referred Material” above were found under rocks next to a secondary road in a high Andean forest, as well as a pine forest. Two females (QCAZ 10310 and 10312) contained two eggs each. One specimen (QCAZ 10313) was

collected next to a communal nest with six eggs. All specimens were collected between 9am-2pm.

Distribution – *Riama vespertina* has only been collected in southern Loja Province in extreme southwestern Ecuador, at elevations between 2600 m and 2958 m (Fig. 7).

Remarks – It should be noted that Kizirian (1996: 142) was not very precise when reporting the type locality of *Riama vespertina* as “[Pampa] Chitoqúe, 6000 ft [Loja], Ecuador”. However, in the same paper he

clarifies that the type locality is “4.5 km south of Vicentino [79°55’54”W, 03°59’55”S]”, Cordillera de Celica, in extreme southwestern Ecuador (Kizirian, 1996: 144). The AMNH catalog further states that this locality lies “between San Bartolo & Piñas (San Bartolo 8 mi NE of Alamor, Piñas 8 mi N of Alamor), Chitoque [Loja], Ecuador”.

Based on the difference in elevational ranges and femoral pore counts between the holotype of *Riama vespertina* and the specimens that Reyes-Puig *et al.* (2008) reported (DHMECN 4113-14), the latter concluded that the new material may correspond to an

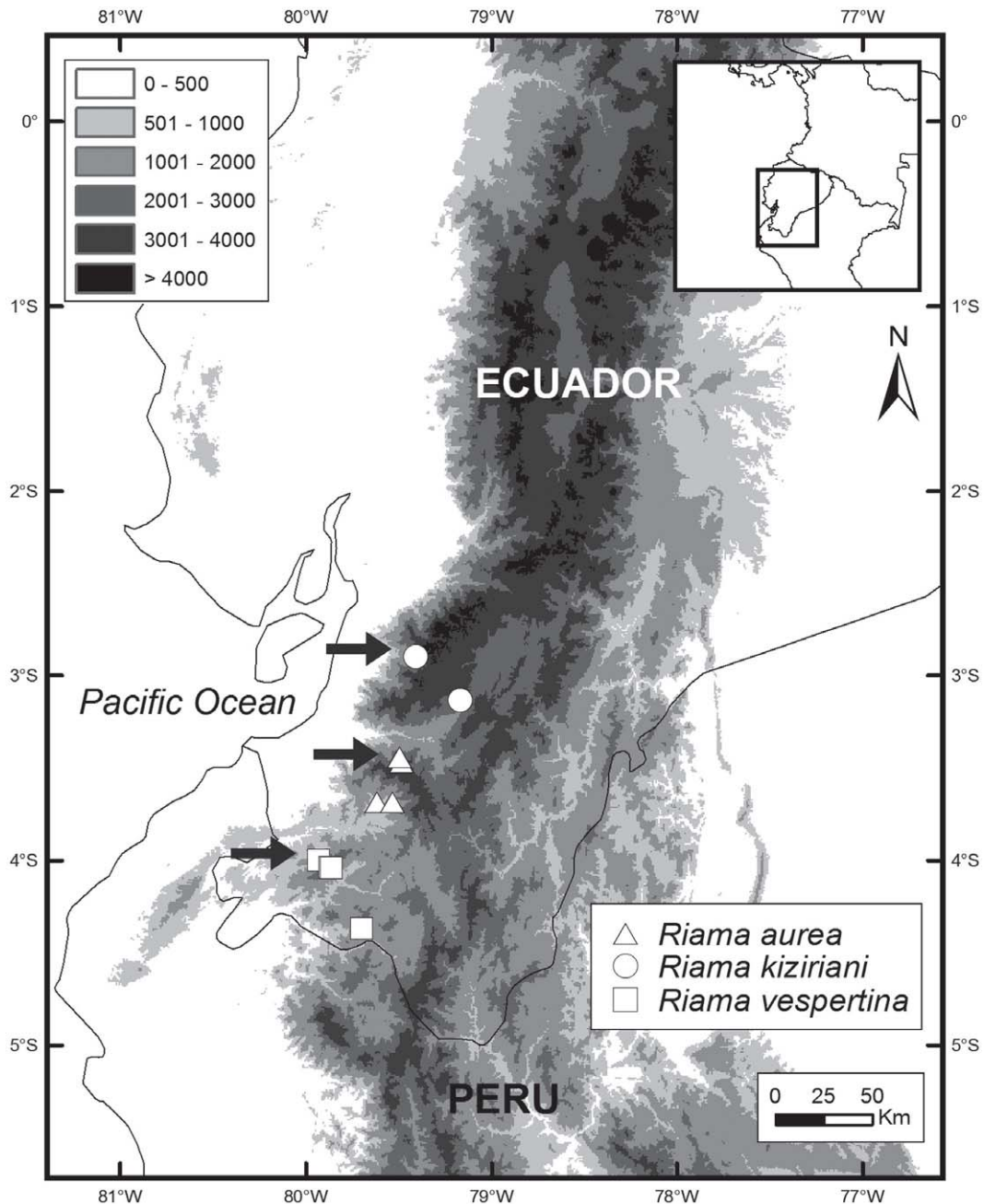


FIGURE 7. Distribution of *Riama aurea*, *R. kiziriani* and *R. vespertina* in southern Ecuador. Arrows indicate type localities.

undescribed species. However, we examined those specimens and conclude that they are indeed conspecific with *R. vespertina*. The variation Reyes-Puig *et al.* observed in femoral pore counts is due to a methodological misunderstanding. Kizirian (1996) reported the number of femoral pores on the left leg (= per hind limb), which was defined in his characters section, whereas Reyes-Puig *et al.* reported the total number of femoral pores (= including both hind limbs). Thus, the 10 femoral pores reported by Reyes-Puig *et al.* for the male DHMECN 4113 match Kizirian's description of the holotype (five femoral pores on the left leg). DHMECN 4114 is the only female with femoral pores, which supports Reyes-Puig *et al.*'s claim; nevertheless, because in all other aspects both specimens fall well within the variation observed in *R. vespertina*, we consider this variation as individual. Similar intraspecific variation in presence (four) or absence of femoral pores in females has been documented for other species of *Riama* such as *R. petrorum* (Kizirian, 1996) and *R. aurea* (this study). We attribute the difference between the elevational ranges to an imprecise record of the holotype's provenance.

We found that sequences of 12S and 16S mtDNA are 4.4% and 3.4-3.6%, respectively, divergent (uncorrected pairwise distance) between the samples of *Riama vespertina* and *R. aurea*, and 6-7.8% and 4-4.6% between the samples of *R. vespertina* and *R. kiziriani*, whereas the sequences are identical (0%) between the samples of *R. vespertina* (unpubl. data derived from an ongoing phylogenetic analysis).

Comments on Additional *Riama* Diversity in Southern Ecuador

Four specimens from Cordillera del Cóndor, Zamora-Chinchipec province, (QCAZ 9169, FHGO 2405 and 8617, and EPNH 12689) are tentatively assigned to *Riama anatoloros*. One of them, FHGO 2405, appears to correspond to the southern variation reported by Kizirian (1996): a complete nasolateral suture, an incomplete superciliary series, and a high number of femoral pores per hind limb (11). The identity of the remaining specimens is enigmatic as they have only the anteriormost superciliary scale and exhibit supralabial-subocular fusion, two features that have not previously been recorded in this species. Moreover, these specimens have a single pair of genials, a trait formerly reported in only one specimen of *R. anatoloros* (Kizirian, 1996) and extremely atypical

in *Riama*. In the absence of a thorough morphological and molecular analysis involving the entire geographic range of *R. anatoloros*, which is beyond the scope of this paper, we refrain from recognizing these specimens as a different species.

The other two species of *Riama* occurring in southern Ecuador, *R. petrorum* and *R. stigmatoral*, remain rare in collections. This is especially true for *R. petrorum*, a species described on the basis of two type and one non-type specimens from Morona-Santiago province (Kizirian, 1996). In spite of our collection searching and the targeted field work carried out by VA and OTC, we were unable to find new material of this rare species. Similarly, *R. stigmatoral* was only known from the 10 specimens used in its original description (Kizirian, 1996), but unlike *R. petrorum* we have reviewed an additional series of males (QCAZ 7374, 7884, 6657, 9946 and 11414) collected in Cañar and Azuay provinces. These five new specimens do not significantly alter the diagnosis and description of the species. However, femoral pore per hind limb count of QCAZ 9946 is eight, one less than the range (9-11) reported by Kizirian (1996). Likewise, the number of transverse ventral scale rows in QCAZ 9946 (25) is one more (21-24), and the number of transverse dorsal scale rows in QCAZ 7374 (42) and QCAZ 6657 (43) is one and two more (36-41), respectively.

Riama anatoloros, *R. petrorum* and *R. stigmatoral* occur sympatrically in Cordillera Zapote Naida, Morona-Santiago (Kizirian, 1996). No other case of sympatry between congeners in southern Ecuador was detected by us, but possible interspecific contact zones may be discovered as collections in unexplored areas increase.

DISCUSSION

All six species of *Riama* in southern Ecuador have striated dorsal scales – also keeled in *R. stigmatoral* (see below for a detailed discussion on dorsal scale relief) – and all but one of them (*R. stigmatoral*) have a high number of scales (four or more) between the medialmost femoral pores in males. Furthermore, these taxa exhibit an incomplete series of superciliaries, though superciliary arrangement varies considerably among them (from one superciliary, the anteriormost, in *R. petrorum* and some specimens of *R. anatoloros*, to 2+2 in two specimens of *R. aurea*). *Riama vespertina*, *R. aurea*, *R. kiziriani* and *R. petrorum* share at least two additional character-states:

frontonasal shorter than frontal and nasoloreal suture absent. Insofar as these states have been observed throughout *Riama*, their phylogenetic significance cannot yet be inferred. In contrast, the presence of two anteriorly and one posteriorly positioned superciliary scales is a rare condition in *Riama* that all known specimens of *R. vespertina* and *R. kiziriani* exhibit. Kizirian (1996) and Sánchez-Pacheco (2010a) documented (exceptional) specimens of *R. unicolor* and *R. columbiana*, respectively, with the same feature (two of 132 *R. unicolor* and on one side in two of 16 *R. columbiana*).

Dorsal scale relief varies considerably among the species of *Riama*. Smooth scales are easily identified as well as the rugose condition – somewhat unclear when initially described and implemented by Kizirian (1996) but later clarified by Sánchez-Pacheco (2010b). Both states are uncommon in the genus; the former occurs in four species (*R. afrania*, *R. laevis*, *R. meleagris* and *R. simotera*)¹ whereas the latter in only two taxa (*R. stellae* and *R. vieta*). In contrast, as pointed out by Kizirian (1996: 91), differentiating between keeled and striated relief of dorsal scales can be confusing. According to Kizirian, the striated condition “refers to scale relief characterized by two centrally positioned, parallel and longitudinal furrows” and the keeled condition “refers to a rounded, narrow, central keel in the middle of the scale. This rounded keel can be flanked by striations varying in depth such that the distinction between the keeled and striated conditions becomes unclear”. Further, in keeled species of *Riama* the keel is typically low, which confuses relief identification. Thus, in some species descriptions Kizirian (1996) reported dorsal scale relief as “striated/keeled” (among them *R. anatoloros*, *R. petrorum*, *R. stigmatoral* and *R. vespertina*). Nonetheless, we believe that by treating these character-states independently, the differences become unambiguous. Much of the confusion is attributable to perception; when striations occur, the central portion of the scale between them appears to be raised, and may be interpreted as a keel. When a low, rounded keel is present, it is not flanked by striations. Hence, when striations are present, the scale relief condition must be described as striated, even if the central portion of the scale resembles a keel, and, when striations are absent but a keel is evident, the condition is to be described as keeled. Difficulties in recognizing both states can be minimized if the

ethanol is permitted to evaporate from the scales and the angle of light is adjusted. All adult specimens of *R. anatoloros*, *R. petrorum* and *R. vespertina* that we have examined are actually striated. Adults of *R. stigmatoral* can be either striated or keeled. Dorsal scale ornamentation is well developed and conspicuous in adults, less developed in juveniles.

Artificial Key to the Southern Ecuadorian Species of *Riama*

The following key does not reflect phylogenetic relationships, and is largely based on adult male morphology.

1. Femoral pores per hind limb in males four or five2
 Femoral pores per hind limb in males seven or more4
2. Transverse dorsal scale rows 31-33; superciliary series incomplete, one (anteriormost); second, third and fourth, or first, second and third supraoculars contacting the ciliaries; venter unicolored olive, or dark brown with cream along scale sutures *R. petrorum*
 Transverse dorsal scale rows 34-35; superciliary series incomplete, two or more; only the second supraocular contacting ciliaries; venter cream with faint brown spots on central portion of scales3
3. Superciliary series 2+1; supraoculars three
 *R. vespertina*
 Superciliary series 1+1, 1+2 or 2+2; supraoculars four *R. aurea*
4. Frontonasal shorter than frontal; transverse dorsal scale rows 32-34; longitudinal dorsal scale rows 20 *R. kiziriani*
 Frontonasal longer than or equal to frontal; transverse dorsal scale rows 36-44; longitudinal dorsal scale rows 21-285
5. Scales between the medialmost femoral pores in males 0-2 *R. stigmatoral*
 Scales between the medialmost femoral pores in males four or more *R. anatoloros*

RESUMEN

Tras la examinación de especímenes recientemente colectados y material anteriormente conocido de *Riama* del sur de Ecuador, reportamos variación

¹ Dorsal scales on posterior part of body and on tail often with a low rounded keel in *Riama meleagris* and *R. simotera*.

morfológica en *R. vespertina* y por lo tanto modificamos la diagnosis y descripción de la especie; además, describimos dos especies nuevas, comentamos sobre la diversidad adicional del género en esta región y discutimos algunos estados de carácter, especialmente la textura de las escamas dorsales (específicamente las condiciones estriada y quillada). Proveemos una clave de identificación para las especies de *Riama* presentes en el sur de Ecuador.

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APPENDIX

Material Examined

Riama achlyens: VENEZUELA: Aragua: Rancho Grande (AMNH 137260, 137267-69, 137271-76, 137278-82, 137297).

Riama afrania: Antioquia: Municipio de Urrao, 13 km northeast on Urrao-Caicedo Road, Valle Real, 2350 m (MHNCSJ 1048 holotype, MHNCSJ 801-03, 1044, 1051-52, IAvH-R 3957, 3959-60 paratypes), vereda El Chuscal, quebrada Las Juntas, 2430-2490 m (ICN 9513 paratype).

Riama anatoloros: ECUADOR: Napo: La Bonita (USNM 229706-45); Napo-Pastaza [= Napo]: Abitagua (AMNH 38821-22) Zamora-Chinchipe: Cuenca del rio Jamboe, Romerillos, Parque Nacional Podocarpus, 1700 m (FHGO 2405).

Riama cf. anatoloros: Zamora-Chinchipe: Las Orquídeas, Tepuy, 4 km desde el rio Namgaritza (Gabarra) hacia el Tepuy (QCAZ 9169); Yanzatza, parroquia Los Encuentros, localidad Colibrí (FHGO 8617); Yanzatza, Los Encuentros (EPNH 12689).

Riama aurea: ECUADOR: El Oro: Guanazán, 2789 m (QCAZ 07886 holotype); El Panecillo, 2775 m (QCAZ 09649-50 paratypes); Guishaguíña, Zaruma (EPNH 06196 paratype); El Chiral (AMNH 18310).

Riama cashcaensis: ECUADOR: Bolivar: Guaranda, 2640 m (KU 135019-21 paratypes); 4.0 km E Guanujo, 2870 m (QCAZ 877 paratype).

Riama colomaromani: ECUADOR: Pichincha: 19.8 km W Chillogallo, ca Quito-Chiriboga rd (KU 221737 paratype); Carchi: 26.9-27.3 km from Maldonado on Road to Tulcan (KU 217209); 58 km E Tulcán, 2900 m (QCAZ 4250, 4252).

Riama columbiana: COLOMBIA: Probably Antioquia: municipio de Sonsón (NRM 1631 Lectotype, NRM 1633, 1634, 6168 paralectotypes); Caldas: municipio de Villa María, vereda Montaña, 2450 m (MHNUC 0088), predio La Mesa, Bosques de la CHEC, 2640 m (ICN 11295-98), 2600 m (ICN 11299-01); municipio de Neira, vereda La Cristalina, finca La Cristalina, 2300 m (ICN 11302); Quindío: between the haciendas El Brillante and San Julian, vereda San Julian, municipio de Calarcá, 2100 m (ICN 6479); Risaralda: Santuario de Fauna y Flora Otún Quimbaya (IAvH-R 4941); Parque Municipal Campo Alegre, municipio de Santa Rosa de Cabal (IAvH-R 5194).

Riama crypta: ECUADOR: Cotopaxi: Pilaló, 2700 m (KU 121153, 121154 paratypes); 2500 m (KU 135100-02 paratypes, 135103 holotype, 135104-15 paratypes); 2400 m (KU 179455-65 paratypes); 2320 m (KU 196386-89 paratypes); 3 km W Pilaló on Quevedo-Latacunga Road (USNM 229638-39 paratypes).

Riama hyposticta: COLOMBIA: Nariño: municipio de Barbacoas, corregimiento Altaquer, Vereda El Barro, Reserva Natural Rio Nambí (PSO-CZ 085).

Riama kiziriani: ECUADOR: Azuay: San Antonio, 1900 m (QCAZ 9667, holotype); El Chorro de Girón, Girón, 2546 m (QCAZ 9607, paratype).

Riama laevis: COLOMBIA: Valle del Cauca: municipio Cumbre, 2000 m (IAvH 4916), vereda Chicoral (UV-C 11266); 15 km al oeste del Cairo, base cerro del Ingles, ca. 2000 m (UV-C 10103).

Riama luctuosa: VENEZUELA: Aragua: Rancho Grande (AMNH 137270, 137277, MCZ 100410, USNM 196336), Parque Nacional Henry Pittier, Rancho Grande (USNM 259170).

Riama meleagris: ECUADOR: [Tungurahua]: Baños (FMNH 28037-42, 28049 [six specimens]). In error: El Oro: Machala (USNM 196264-65).

Riama oculata: ECUADOR: Pichincha: Nanegal (USNM 229640), 3 km E of Nanegal Chico (USNM 229642). Cotopaxi: San Francisco de las Pampas (UMMZ 188630).

Riama orcesi: ECUADOR: Napo: 12 km W (via road) Baeza (AMNH 124044 paratype); 31 km N Jondachi, 2190 m (QCAZ 2829, 2835); vertiente del volcán Sumaco, 2200 m (QCAZ 931-40).

Riama petrorum: ECUADOR: Morona-Santiago: trail between Sevilla de Oro and Mendez on E slopes of the mountains between Cerro Negro and Pailas (tambos) (USNM 196266 paratype), San Vicente, slightly S of W of Limon and 35 km E Gualeceo by road (USNM 196268).

Riama raneyi: ECUADOR: Napo: 3.3 km ESE Cuyuja, 170 m (KU 142903 paratype); Sucumbios: near Santa Barbara (MCZ 175160-62); Napo [= Sucumbios]: immediate environs of Santa Barbara (USNM 229750); 2 km E of Santa Barbara (USNM 229749); 3 km SW Santa Barbara at bridge (covered) over river (USNM 229748). Sucumbios: 32 km E Julio Andrade on road to Santa Barbara, 2610 m (QCAZ 2827). Carchi: Santa Bárbara, Santa Bárbara-Guanderal, 2980 m (QCAZ 1379).

Riama shrevei: TRINIDAD & TOBAGO: Horne Tucuche (MCZ 62506-07); El Teluche [in error, probably Tucuche] (MCZ 100466-68); Mt. Tucuche (MCZ 160065-66).

Riama simotera: ECUADOR: Carchi: 14.6 km NW El Carmelo, 3130 m (KU 179478); km 13 carretera a El Carmelo, 3300 m (ICN 9823-34); km 16 Tulcán-Tufino, 3130-3160 m (ICN 9835-36); 15.3 km W Tulcán on road to Tufino, 3080 m (QCAZ 915, 918); km 13 desvío carretera Panamericana, El Ángel (ICN 9837). COLOMBIA: Nariño: municipio de Pupiales (IAvH [formerly IND-R] 1553); municipio de Túquerres, km 10 carretera Túquerres-Guachucal, hacienda Alsacia, 3140 m (ICN 9817); municipio de Cumbal, km 4 Cumbal – volcán Cumbal, 3260 m (ICN 9818-22).

Riama stellae: COLOMBIA: Nariño: municipio de Barbacoas, corregimiento de Ricaurte, Reserva La Planada (PSO-CZ 102 holotype; PSO-CZ 103 and 109, ICN 12068 [formerly PSO-CZ 108] paratypes).

Riama stigmatoral: ECUADOR: Azuay: Sevilla de Oro (USNM 229644 paratype); San Vicente, camino a las antenas (QCAZ 11414); Morona-Santiago: Pailas, a tambo on trail between Sevilla de Oro and Mendez, on E or NE facing slope (USNM 229648 paratype); between tambos called Cerro Negro and Pailas on trail Sevilla de Oro and Mendez (USNM 229643 paratype); between Pailas and Mirador, on trail between Sevilla de Oro and Mendez (USNM 229645 paratype), Pailas, a tambo on trail between Sevilla de oro and Mendez, on E or NE facing slope (USNM 229647 paratype); San Juan Bosco, a posada on trail between Limon (General Plaza) and Gualeceo, slightly S of W of Limon (USNM 229649); El Cruzado, a posada on trail between Limon (General Plaza) and Gualeceo, slightly S of W of Limon (ca. 0.5 hour up trail from San Juan Bosco) (USNM 229650). No other data (AMNH 32778). San Jose (AMNH 38820); Cañar: Mazar, Reserva Mazar (QCAZ 7374, 7884, 6657); Biblian, Iglesia de Biblian (QCAZ 9946).

Riama striata: COLOMBIA: Boyacá: Municipio de Villa de Leyva, sector rural vereda el Roble (IAvH 4895); Pesca (IAvH [formerly IND-R] 0665-66); municipio de Turmequé, vereda Joyagua (MUJ 816); Toquilla, Vadohondo, km 71 carretera Sogamoso-Pajarito (ICN 2800). Cundinamarca: Bogotá (CAS-SUR 8280, MCZ 14166-67, 16979-80, 16982-83, 17129, 110415-16, USNM 75969, 153974-82, 194744, ICN 2181); Bogotá, salón de clases de la Pontificia Universidad Javeriana (MUJ 229); Bogotá, instalaciones del laboratorio de fauna “Venado de Oro,” vivero Inderena (IAvH [formerly IND-R] 1100-01, 1499, 1602, 3006); Bogotá, laboratorio de fauna Unifem Inderena (IAvH [formerly IND-R] 3130-31, 3934, 4163, 4262); Bogotá, ladera del cerro Guadalupe (IAvH [formerly IND-R] 3503, ICN 2436, 2535, 2537, 2541, 2543-44, 2546); Mt. Guadalupe (FMNH 177075-81, 177243-47); Salto del Tequendama (IAvH [formerly IND-R] 3985); municipio de San Francisco, vereda Sabaneta

(ICN 5991), cerro Cueva Grande, 2590 m (ICN 5737), finca La Quebrada, quebrada El Vino, 2540-2560 m (ICN 9759-65); Páramo Cruz Verde, 3100 m (ICN 675-76); municipio de Fómeque (ICN 2232); between Alban and Sasaima, 50 NW Bogotá, D.C. (MVZ 191880); 6 km S Alban on road to Bogotá D.C. (MVZ 191878); represa del Hato, south of Usme, ca 2800 m (FMNH 165800-03, ICN 2371, 2373, 2375); Municipio de Suesca, vereda El Hatillo, microcuenca Santa Helena, 2950 m (MUJ 644-48), 3 km al sur de la laguna Suesca, 2860 m (ICN 7276); no other data (UMMZ 56448, 56760 [11 specimens], 89417 [seven specimens], 123315, 203767-70, ICN 2362); PNN Chingaza, 3300 m (IAvH [formerly IND-R] 4241-42), sitio Monteredondo, 3030 m (MUJ 906-09), sector de Chuza (IAvH [formerly IND-R] 3891-94), embalse cerca del Casino (MUJ 228). Santander: SFF Guanenta, alto Rio Fonce, 2650 m (MUJ 910); municipio de Virolin, Cañaverales km 72 carretera a Charalá, rio Cañaverales, 1830 m (ICN 9783). Not located: Tanques de Vitelma (IAvH [formerly IND-R] 0649).

Riama unicolor: ECUADOR: Carchi: Montufar Atal-Vinculo, 2700 m (UMMZ 105895-97). Imbabura: Lago de Cuicocha (MCZ 154515-16, 154628). Pichincha: Quito (MCZ 22154, 164616, 164662, 164665-68, 164670); Paschoa Volcano Forest, 40 km SE Quito, 2800-2880 m (175052-53); Machachi (QCAZ 758). Not located: Chillo (MCZ 21070). Not located (QCAZ 6122).

Riama vespertina: ECUADOR: Loja: [Pampa] Chitoque, between San Bartolo and Piñas (AMNH 22130 holotype); Reserva Biológica Utuana, 48.3 km southeast to the type locality, 2600 m (DHMECN 4113-14); Guachaurco, 2824-2958 m (QCAZ 10283, 10286, 10288, 10306-13).

Riama vieta: ECUADOR: Guayas: km 85 on Durán-Tambo road (USNM 142601).