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A New *Pseudogonatodes* from Peru with Remarks on Other Species of the Genus

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Pseudogonatodes peruvianus n. sp. is described from the Rio Utcubamba Valley on the eastern slope of the Andes, Department of Cajamarca, northwestern Peru. It is most closely related to *P. furvus* of Colombia by having relatively long digits, lacking an expanded lamella and being scansorial in behavior. It is also related to *P. amazonicus* of Brazil in coloration, body size and having granular dorsals.

INTRODUCTION

THE South American gekkonid genus *Pseudogonatodes* was proposed for a single species described by Ruthven in 1915. In a recent, comprehensive review of the genus, Vanzolini (1967) recognized five species. Mechler (1968) discussed but did not formally describe a sixth species from Colom-

bia. These uniformly tiny geckos are known presently from the highlands of Colombia (*P. furvus* and *P. sp.*), from sea level to approximately 1100 m in northern Venezuela (*P. lunulatus*), the river valleys of northern Guayana (*P. guianensis*), upper Amazon Basin of Brazil (*P. amazonicus*), and the semi-arid valleys of the interandean basins of northwestern Peru (*P. barbouri*).



FIG. 1. Holotype of *Pseudogonatodes peruvianus*, adult female, MVZ 82136, dorsal view. Scale in mm.

Two recent collections of geckos made by the authors and John W. Wright in northern Peru contained a number of *P. barbouri*, described by Noble (1921) from Perico, Peru. Three other specimens of *Pseudogonatodes* plus two more obtained by Richard Thomas are not referable to *P. barbouri*. Comparison with the remaining species indicates the distinctness of these specimens which we here describe as:

Pseudogonatodes peruvianus n. sp.
(Fig. 1)

Holotype.—Adult female, Museum of Vertebrate Zoology (MVZ) 82136, collected by Raymond B. Huey, 24 August 1967. Taken from a rock pile in a banana plantation at Tingo, 5° 53' S, 78° 12' W, 1000 m, Rio Utcubamba; 30 km S, 41 km E Bagua Grande, Department of Amazonas, Peru.

Paratypes.—Four specimens, two adult males from the type-locality, MVZ 82137, 82139; two adult females from 7 km N Ingenio, 1150 m, Department of Cajamarca, Peru, LSUMZ 21255–56.

Diagnosis.—An average sized *Pseudogonatodes* with a maximum snout-vent length of 31 mm; nine lamellae beneath fourth toe; toes lacking enlargement of third distal

lamella; granular dorsum; 79–90 granules and scales around midbody; 55–59 transverse belly scales from gular granules to anus.

Comparisons.—*P. peruvianus* differs from *P. furvus* by a maximum snout-vent length of 31 mm, nine lamellae beneath fourth toe, and 79–90 granules and scales around midbody rather than a maximum snout-vent length of 45 mm, 14 or more fourth toe lamellae, and 100 or more granules around midbody; from *P. barbouri* by having 79 or more granules and scales around midbody and dorsal squamation of tiny granules, rather than 60 or less scales around midbody and dorsal squamation of large flat, imbricate scales; from *P. amazonicus*, *P. guianensis*, and *P. lunulatus* by having nine fourth toe lamellae of which the third distal one (counted from the nail sheath) is not enlarged nor thickened, and no enlarged basal lamella on first toe; rather than six fourth toe lamellae, of which the third distal one is enlarged and thickened, and presence of much enlarged basal lamella on first toe.

Description of holotype.—Rostral rectangular, about twice as wide as high, its dorsal edge with a short median vertical groove; three internasals, somewhat rectangular, median one about one-third size of others; nostril surrounded by rostral, labial, inter-

nasal, and two postnasals; first supralabial in broad contact with ventral edge of nostril; 10 scales bordering posterior edge of internasals from labial to labial; no depression between internasals or frontal region; six scales between nostril and eye; scales of posterior loreal region about equal in size to interorbital scales; 24 midorbital scales; eye small, its diameter contained in snout length 2.5 times; eye brille with two rows of granules and one larger outer row of scales; ear opening tiny, greatest diameter of ear contained in eye diameter 3.3 times; scales on anterior and posterior borders of ear rounded, subequal; four supralabials and four infralabials; posterior edge of first infralabial almost reaches anterior level of eye; mental somewhat bell-shaped, its posterior margin U-shaped with open end facing posteriorly; posterior edge of mental bordered by three granules and first infralabial of each side, followed by second row of six smaller granules.

Dorsum with small, somewhat flattened granules: 79 scales and granules around midbody; belly with 23 longitudinal rows of scales; 59 transverse rows of large imbricate scales from throat to vent, 42 from arm to anus; dorsal surface of arm with flat, imbricate scales; posteroventral surface of forearm with small granules; dorsal surface of thigh with flat, imbricate scales; dorsal surface of lower leg with small granules; lamellar formula for hand 3-5-7-7-5, foot 4-5-7-9-8; nail sheath composed of five scales; tail with flat imbricate scales, those of ventral surface slightly larger than those on dorsal surface.

Measurements in mm: Snout-vent length 31.0, axilla to groin length 15.5, leg length 9.2, arm length 7.2, head length 6.1, greatest head width 3.8, greatest head height 2.7, snout length 2.7, diameter of eye 1.0, diameter of ear 0.3, eye to ear distance 2.2.

Color in alcohol: Dorsum tan brown, with darker brown spots along sides of body; dorsolateral whitish line beginning just anterior to hind leg insertion and continuing onto tail, bordered above and below by black line of about equal length; limbs brownish with faint spots of darker brown; whitish nuchal loop beginning behind eye and crossing head just posterior to parietal area; labials brownish, infralabials darker than supralabials; diagonal, dark brown line runs from corner of mouth to edge of throat, bordered on each side by whitish throat color; dark brown line from below ear to

shoulder; belly pale light brown, lighter than dorsum.

Variation.—Based on five individuals (MVZ 82136–37, 82139; LSUMZ 21255–56), the number of longitudinal ventral scales vary from 20 to 23; transverse ventral scales from throat to vent vary from 55 to 59, 43–50 from arm to vent; number of scales between nostril and eye 6, fourth toe lamellae 9, in all; scales bordering internasals from labial to labial vary from 10 to 11; internasals vary from 3 to 4; granules bordering posterior edge of mental vary from 3 to 6; infralabials 4 and supralabials 4 on both sides in all; granules and scales around midbody vary from 79 to 90; granules across midorbital region vary from 23 to 25.

The smallest individual (24 mm) varies slightly in color pattern in having its dorso-lateral light stripes broken into a few spots at midbody. The general coloration is also darker than that of larger specimens.

Habitat.—Tingo, Peru, where three of the *P. peruvianus* were taken, is in the humid subtropical forest life zone of Tosi (1960). This locality is a steep-sided river valley with large bromeliad-laden trees on the slopes and dense second-growth vegetation mixed with coffee trees covering the valley floor. The *P. peruvianus* and four *Gonatodes atricucularis* were collected on an overcast afternoon beneath small rocks resting on boulders in a dimly lit banana plantation. Thomas' specimens were taken from beneath rocks in a coffee grove, about 7 km N Ingenio, 1150 m; approximately 30 km SE of the Tingo locality. We noted no activities of either species collected.

DISCUSSION

On the basis of sub-digital and dorsal squamation, we tentatively recognize three species groupings within the genus *Pseudogonatodes*. One group has an expanded third lamella on the fourth toe (see Fig. 2), few fourth toe lamellae, and granular dorsals and includes *P. lunulatus*, *P. guianensis*, and *P. amazonicus*; a second group has an expanded third lamella, few toe lamellae, and large imbricate dorsals and includes *P. barbouri*; while the third group lacks expanded lamellae, has many toe lamellae and granular dorsals and includes *P. furvus* and *P. peruvianus*.

Parker (1935) suggested possible conspecificity of *P. furvus* and *P. lunulatus*. Test *et al.*

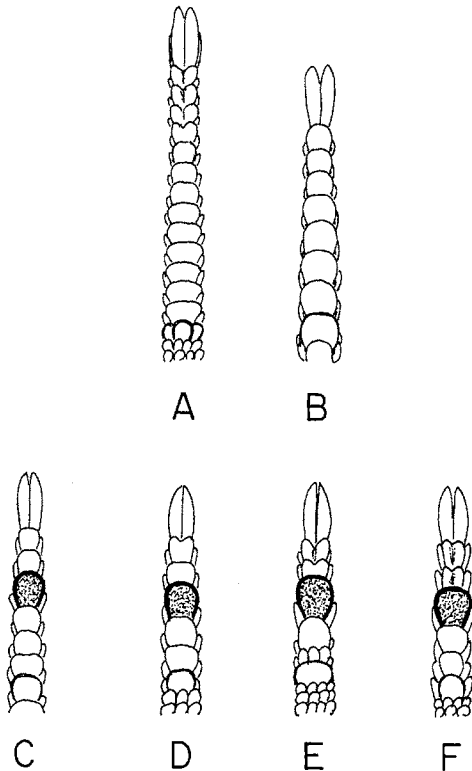


FIG. 2. Ventral view of the fourth toe of species of the neotropical gekkonid genus *Pseudogonatodes*: (A) *P. furvus*, MCZ 29700; (B) *P. peruvianus*, MVZ 82136; (C) *P. barbouri*, TCWC 28366; (D) *P. lunulatus*, MCZ 48894; (E) *P. amazonicus*, MCZ 93581; (F) *P. guianensis*, AMNH 61433. Note stippled lamella (C-F), third from the proximal end of claw sheath. This lamella is larger than others of the fourth toe, and is not evident in *P. furvus* and *P. peruvianus* (A and B).

(1966) disagreed, but indicated that additional collecting might show conspecificity of *P. lunulatus* and *P. guianensis*. In his description of *P. amazonicus*, Vanzolini (1967) proposed that *P. furvus*, *P. lunulatus*, *P. guianensis* and *P. amazonicus* all might be races of a single species. On the basis of subdigital lamellae and other characters, we agree with Test *et al.* (1966) and consider *P. furvus* distinct from *P. lunulatus*, *P. guianensis*, and *P. amazonicus*. Further, we agree in part with Vanzolini (1967) that the latter three species may prove conspecific when more material becomes available.

Because of the two different toe forms in *Pseudogonatodes*, their possible functional differences must be examined. Specifically, are the two toe forms related to different

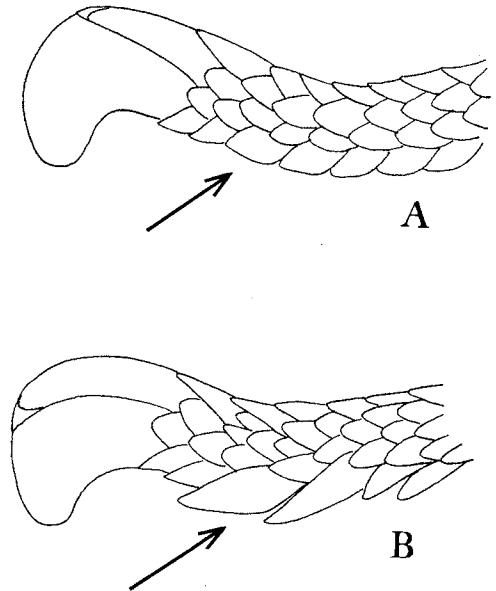


FIG. 3. Lateral view of the fourth toe of (A) *Pseudogonatodes peruvianus* MVZ 82137, and (B) *P. amazonicus*, MCZ 93581. Arrow points to third lamella from proximal end of claw sheath; note enlargement of lamella of *P. amazonicus*.

foraging modes (*i.e.*, terrestrial versus scansorial foraging). Collette (1961) and Dixon and Huey (1970) have previously shown associations between toe form and foraging in *Anolis* and *Phyllodactylus*, respectively.

In *Pseudogonatodes* the claw sheath probably renders the claw of little functional use. Preserved specimens reflect this in having the distal portion of the toes raised (in lateral view). The number of toe lamella in contact with the substrate might show a relationship to the foraging mode.

We surmise that species of *Pseudogonatodes* with high toe lamellae counts are primarily scansorial (*P. furvus* and *P. peruvianus*) as is the case in *Anolis* (Collette, 1961) and that species with low lamellar counts are primarily terrestrial (*P. lunulatus*, *P. guianensis*, *P. amazonicus*, and *P. barbouri*). It is probable that the expanded third lamella on the fourth toe of the latter species (Fig. 3) may be directly related to terrestrial foraging by serving as a new point of weight deposition, while the tip of the toe and adjacent claw no longer function in

this regard. The raised, sheathed claw would thus not hinder locomotion.

The limited available information on foraging of *Pseudogonatodes* supports this hypothesis. Ruthven (1915) found one *P. furvus* inside a decaying log and a second in the stomach of the arboreal snake, *Dryadophis*

boddaerti. Our *P. peruvianus* were found under rocks on boulders. Probably both species are at least partially scansorial.

Information on foraging in species with few subdigital lamellae is available only for *P. barbouri*. All our specimens were collected while they were foraging in leaf litter.

KEY TO SPECIES OF *Pseudogonatodes*

- 1a. Dorsal squamation of small conical or flattened granules 2
 1b. Dorsal squamation of large flat, imbricate scales *barbouri*
 2a. Lamellae of fourth toe nine or more, no enlarged basal lamella on first toe 3
 2b. Lamellae of fourth toe seven or less, enlarged basal lamella present on first toe 4
 3a. Lamellae of fourth toe 9, sole of foot with heterogeneous squamation, maximum snout-vent length 31 mm, granules and scales around midbody 79 to 90 ... *peruvianus*
 3b. Lamellae of fourth toe 14 or more, sole of foot with homogeneous squamation, maximum snout-vent length 45 mm, scales and granules around midbody 100 or more *furvus*
 4a. Scales and granules around midbody 95 or more, sole of foot with heterogeneous squamation 5
 4b. Scales and granules around midbody 88 or less, sole of foot with homogeneous squamation *lunulatus*
 5a. Scales bordering posterior edge of internasals and postnasals from labial to labial 7 to 9, transverse rows of ventral scales from arm to vent 40 to 41, granules bordering mental 7 to 8 *amazonicus*
 5b. Scales bordering posterior edge of internasals and postnasals from labial to labial 11 to 12, transverse rows of ventral scales from arm to vent 35 to 37, granules bordering mental 4 to 5 *guianensis*

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