

On two new species of *Pseudogonatodes* Ruthven, 1915 (Reptilia: Squamata: Gekkonidae), with remarks on the distribution of some other sphaerodactyl lizards

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Two new species of *Pseudogonatodes* Ruthven, 1915, are described, one from the Rio Juruá Basin, in the state of Acre, Brazil (Amazonian rainforest), the other from Rancho Grande, in the state Aragua, Venezuela (cloud forest). Both have granular dorsals and relatively numerous fourth toe lamellae, of which the third (from tip to base of toe) is not distinctly larger than the two distal ones. The species from the Rio Juruá is small, with dark belly, and recognised, among other characteristics, by its tall, conical to flat-conical dorsals. That from Rancho Grande is relatively large, with low number of ventrals, and mental with a straight or convex posterior segment medially, among other distinctive characteristics. Some remarks on the geographic distribution of sphaerodactyl lizards in South America are presented, including a new record for *Coleodactylus meridionalis*.

Resumo.— Duas novas espécies de *Pseudogonatodes* Ruthven, 1915 são descritas, uma procedente da bacia do rio Juruá, estado do Acre, Brasil (floresta amazônica), a outra de Rancho Grande, estado Aragua, Venezuela (floresta nublada). Ambas as espécies possuem escamas dorsais granulares e lamelas do quarto artelho relativamente numerosas, entre as quais a terceira lamela (a partir da extremidade distal do artelho) não é especialmente aumentada em relação às duas distais. A espécie do Rio Juruá é pequena, com ventre escuro, e reconhecível, entre outros caracteres, pelas escamas dorsais altas e cônicas a cônico-achatadas. A espécie de Rancho Grande é relativamente grande, com um baixo número de escamas ventrais, e margem posterior da mental com um segmento mediano formando uma linha transversal reta ou convexa, entre outros caracteres distintivos. São apresentadas também algumas observações sobre a distribuição geográfica de lagartos Sphaerodactylidae na América do Sul, incluindo um novo registro para *Coleodactylus meridionalis*.

Introduction

While studying the lizards collected by C. Gascon during an expedition to the Rio Juruá (1991-92), in the southwestern part of Brazilian Amazonia, we found three specimens of *Pseudogonatodes*. Two of these were *P. guianensis* Parker, 1935, but the third one was quite distinct — it was darker, both dorsally and ventrally, and had a higher number of toe lamellae, but the most remarkable feature were the tall, conical scales covering most of the animal. A more extensive comparative study was then performed, during which most of the types described in the genus were examined. During this study, among others we examined some material from Venezuela, which also turned out to belong to a new species. Both species are described here.

Huey & Dixon (1970) recognised six species in the genus *Pseudogonatodes* (*P. amazonicus* Vanzolini, 1967, *P. barbouri* (Noble, 1921), *P. furvus* Ruthven, 1915, *P. guianensis* Parker, 1935, *P. lunulatus* (Roux, 1927), *P. peruvianus* Huey & Dixon, 1970). Hoog-

moed (1973) considered *P. amazonicus* a synonym of *P. guianensis*, a possibility which had already been hinted at by Huey & Dixon (1970), and in this was followed by several other authors (see Avila-Pires, 1995). Kluge (1995) referred to *P. amazonicus* as a subspecies of *P. guianensis*, but Avila-Pires (1995) demonstrated that, at our present state of knowledge, it is best to consider these two names as synonyms. Huey & Dixon (1970) moreover doubted the validity of *P. lunulatus*, but Dixon & Soini (1975, 1986) considered it a valid species (however, see under 'Discussion'). Therefore, with the two new species here described, the genus *Pseudogonatodes* now presents a total of seven recognised species.

Material and Methods

The following material was used for comparison:

- Pseudogonatodes barbouri*: BM 1946.8.26.29-30 (paratypes), NW Peru: Cajamarca: Perico (near Jaén); MCZ 14373, 14375, 14379 (paratypes), NW Peru: Cajamarca: Bellavista; LACM 49371, 49378, 49382, 49384, 49387, 49389, 49393, Peru: Cajamarca: 0.5 km E Bellavista, 1 km W Marañon River.
- Pseudogonatodes furvus*: UMMZ 47782 (holotype), Colombia: Magdalena: Santa Marta Mountains, San Lorenzo, 5000 ft; MCZ 29700, Colombia: Magdalena (state assumed; not in original data): Rio Frio.
- Pseudogonatodes guianensis*: MPEG 17951, Brazil: Amazonas: Rio Juruá (left bank), Condor (6°45'S 70°51'W); INPA 516, Brazil: Amazonas: Rio Juruá (left bank), Lago Jaiu (6°28'S 68°46'W); MPEG 15910, 15926, 15952, 15989, RMNH 25876, 25879-81, Brazil: Amazonas: Rio Solimões, Benjamin Constant; USNM 298932, Peru: Madre de Dios: vicinity Cocha Cashu, c. 70 km (airline) NW mouth Rio Manu, on Rio Manu; USNM 316685, Peru: Amazonas: Rio Cenepa, c. 0.5 mi N Huampami; USNM 316686, Peru: Amazonas: Rio Cenepa, vicinity Huampami; USNM 316687, Peru: Amazonas: Rio Cenepa, vicinity San Antonio; USNM 343190, Peru: Amazonas: Rio Caterpiza (tributary Rio Santiago), vicinity Caterpiza; USNM 343191, Peru: Amazonas: Rio Yutupis (tributary Rio Santiago), vicinity Shiringa. KU 121947, 146646, Ecuador: Napo: Santa Cecilia, 340 m; KU 121953, Ecuador: Napo: Rio Araguaico, Puerto Libre, 570 m; KU 189245, Ecuador: Napo: Limoncocha.
- Pseudogonatodes lunulatus*: NMB 9338 (holotype), Venezuela: Falcón: Acosta District, El Mene; UMMZ 56516, Venezuela: Táchira: San Felix, 364 m; MCZ 154440, 154443, Colombia: Meta: La Reforma, an orchid farm off the road from Villavicencio to Bogotá; MCZ 154756, Colombia: Meta: Quebrada Colorado, c. 10 km from Villavicencio. RMNH 26495-97, Venezuela: Aragua: Parque Nacional Henri Pittier, La Trilla.
- Pseudogonatodes peruvianus*: MVZ 82136 (holotype), 82139 (paratype), Peru: Amazonas: Rio Utcubamba: Tingo, 30 km S and 41 km E Bagua Grande (5°53'S 78°12'W), 1000 m; LSUMNS 21255-6 (paratypes), Peru: Cajamarca: 7 km N Ingenio, 1150 m.
- Pseudogonatodes* sp.: MIZA 15-185, Venezuela: Estado Táchira: Represa Uribante Caparo, Sector Las Cuevas.

The specimens studied were measured with a common ruler, except for head dimensions, which were measured with an electronic calliper. Snout-vent length

(SVL) is the linear distance from the tip of the snout to the cloaca. Loreals were counted between the postnasals and the orbit; ventrals along a midventral row between the anterior level of fore- and hind limbs, and between anterior level of fore limbs and border of cloaca (excluding the distinctly smaller scales bordering the cloaca). Subdigital lamellae were counted on both sides; the number per side is given. Third lamellae under fourth toe refers to the third lamellae counted from the tip of the toe toward the foot's sole. Drawings were made with a drawing mirror.

For an explanation of acronyms see the Acknowledgements.

Taxonomic part

Pseudogonatodes gasconi spec. nov.
(figs 1, 2, 5)

Material — Holotype MPEG 17950, ♀, Brazil: Acre: left margin of Rio Juruá near Porongaba (72°46'W 8°40'S), 27.ii.1992, at night, on small tree in dry varzea forest, leg. Claude Gascon.

Diagnosis.— A relatively small species of *Pseudogonatodes* with tall, conical to flat-conical dorsals; 37 ventrals (in the only specimen known) between the anterior level of fore limbs and that of hind limbs; rostral without posterior medial cleft and bordered by five postrostrals; seven loreals in a straight line between postnasals and orbit; six postmentals; lamellae under fourth finger seven, under fourth toe eight; third lamellae under fourth toe not distinctly enlarged.

Description.— Only known from the holotype. SVL 24 mm, tail 21 mm (0.88 times SVL). Head 4.9 mm (0.21 times SVL), 1.43 times as long as wide, 1.36 times as wide as high. Fore limb 6.0 mm (0.25 times SVL), hind limb 8.0 mm (0.33 times SVL). The presence of an egg in the abdomen, visible from the outside, indicates that the specimen is an adult female (fig. 1).

Rostral large, well visible from above, posterior margin indented by medial postrostral; no posterior medial cleft. Five postrostrals, laterals (supranasals) distinctly wider than long, three medial postrostrals roundish; the lateral postrostrals much larger than adjacent scales on snout, the medial postrostrals only slightly larger. Nostril bordered by rostral, lateral postrostral (supranasal), two postnasals, and first supralabial. Postnasals slightly larger than adjacent posterior loreal scales. Scales on snout and loreal region roundish, anteriorly flat and juxtaposed, posteriorly subimbricate and those on loreal region tending to be conical. Seven scales on loreal region, in a straight line between postnasals and orbit. Scales on supraocular region, top of head and temporal region relatively small, conical, juxtaposed. Most of anterior and upper margin of eyes forming a supraciliary flap, with two enlarged scales on anterior border. Four supralabials, the fourth below centre of eye. Ear-opening small, round to oval (figs 2a, c).

Mental large, posterior margin V-shaped, with a short medial cleft. Six postmentals, about as large as adjacent scales on chin. Scales on chin mostly small, granular, juxtaposed; posteriorly, toward the sides, scales higher (flat-conical), subimbricate. Some of the scales adjacent to infralabials slightly larger, flat and elongate. Infralabials five, first largest but not reaching anterior margin of eye, fourth below centre of

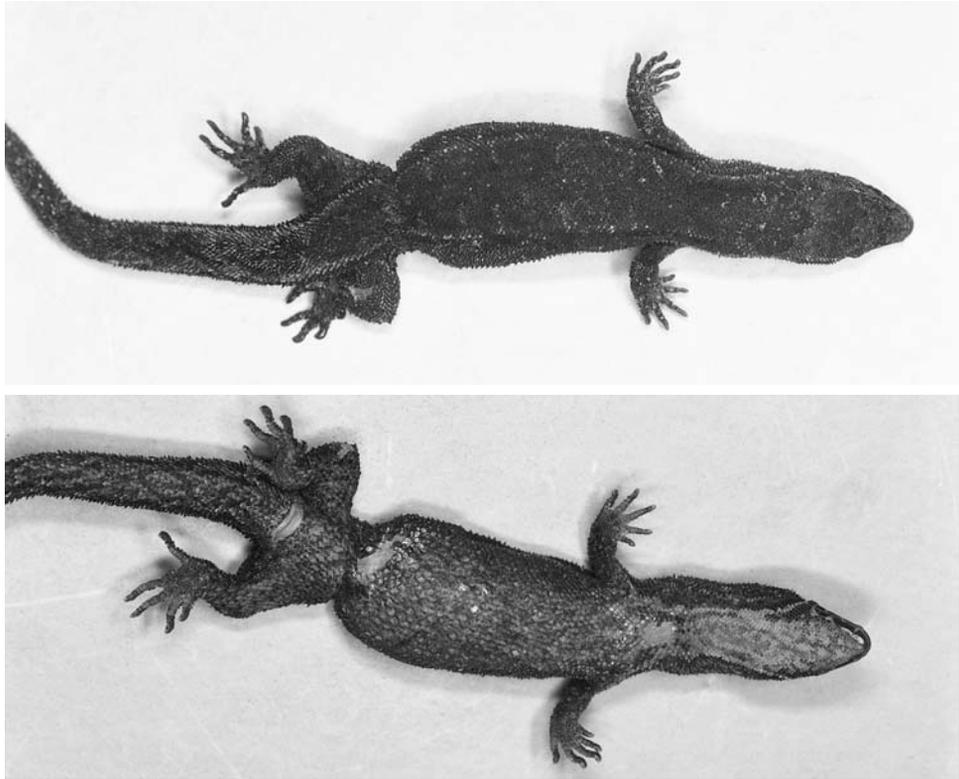


Fig. 1. Dorsal and ventral views of *Pseudogonatodes gasconi* spec. nov., holotype, MPEG 17950. SVL 24 mm.

eye (fig. 2b, c). Scales on dorsal surface of neck conical. Those on sides of neck similar, except for the presence of some higher, more prominent scales scattered among the others. Throat with anterior scales granular to conical, posterior scales flat, smooth, imbricate, with a short transition between these two areas.

Dorsals relatively tall, conical to flat-conical, slightly inclined posteriorly; flanks with a few, scattered scales higher than the others. Ventrals distinctly larger, smooth, flat, imbricate, in approximate longitudinal and oblique rows; 37 scales along a mid-ventral row between anterior level or fore- and hind limbs, 43 until border of cloaca. A narrow transitional zone between dorsals and ventrals. Scales around midbody 88. Scales on preanal plate similar to ventrals, except for the scales along the border of the cloaca, which are distinctly smaller.

Scales on dorsal surface and sides of tail flat-conical, pointed, inclined posteriorly. On ventral surface of tail, scales flat, smooth, imbricate, as ventrals, but narrower and more pointed than those. No midventral row of enlarged scales (fig. 2g).

Scales on fore limbs conical. On hind limbs conical to flat-conical on anterior and dorsal aspects, and posterior aspect of lower legs; flat, smooth, imbricate on ventral aspect; and granular on posterior aspect of thighs. Sole of foot with heterogeneous squamation. Lamellae under fourth finger seven, under fourth toe eight. No distinctly

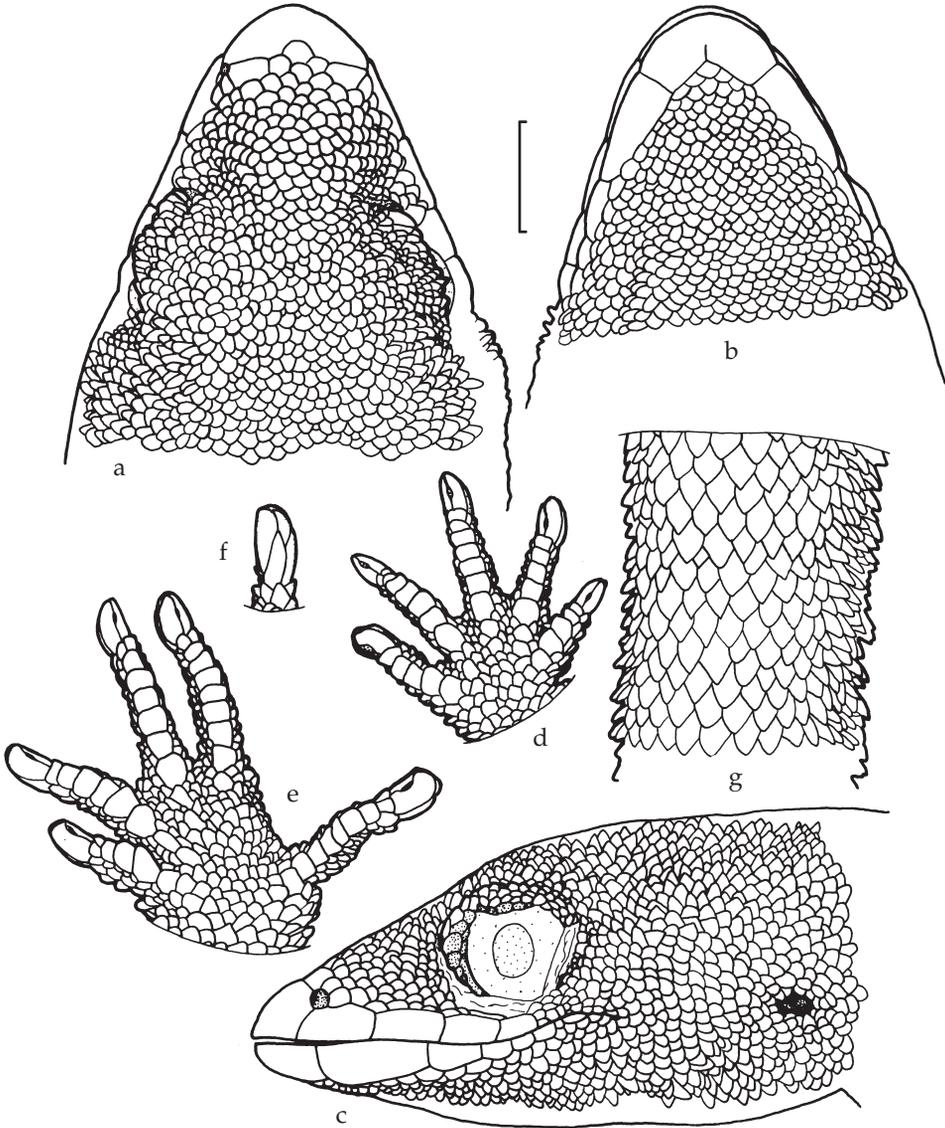


Fig. 2. *Pseudogonatodes gasconi* spec. nov., holotype, MPEG 17950: a, b, c: dorsal, ventral and lateral views of head; d, e: ventral views of right hand and left foot; f: unguis sheath of left 4th toe; g: ventral view of proximal part of tail. The bar represents 1 mm.

enlarged subdigital lamellae. Claws enclosed in an unguis sheath composed of five scales, as characteristic for the genus (figs 2d-f).

In preservative, general colour dark brown. A W-shaped light spot on top of the head, starting on the posterior border of each eye. A faint light dorsolateral stripe, at each side, from the W-shaped spot to the proximal part of the tail, with short, trans-

verse stripes toward the vertebral area, but not reaching it. On the tail the dorsolateral stripes show irregular expansions toward the middorsal area. Ventral surface of head cream with irregular brown spots medially, dark brown on the sides. Labials mostly brown, with some cream spots. A cream stripe, bordered by brown, from below each eye to the zone of transition between conical and flat scales on the throat. Chest and belly brown variegated with lighter areas. Underside of tail dark brown variegated with white.

Etymology.— The species is named after Claude Gascon, presently Deputy Director of the center for Applied Biodiversity Science at Conservation International, who collected the holotype and sent it to us for further study.

Distribution.— Only known from the type locality (fig. 5).

Remarks.— Gascon (1996) and Gascon et al. (1996) presented some general data about the Rio Juruá and the expedition during which this species was collected.

Pseudogonatodes manessi spec. nov.
(figs 3-5)

Pseudogonatodes lumulatus: Test et al., 1966: 11 (part); Manzanilla Puppo et al., 1996: 5 (part).

Material.— Holotype RMNH 26965, ♀, Venezuela: Aragua: Rancho Grande, Parque Nacional Henri Pittier, 12 km NW of Maracay, 06.xi.1976, 13:45 h, in leaf litter on ground between buttresses, transitional cloud forest, 1150 m, leg. M.S. Hoogmoed (MSH 2046).

Paratypes.— KU 182740, Venezuela: Aragua: Rancho Grande; UMMZ 124313, Venezuela: Estado Aragua: Rancho Grande (in cloud forest); CM 30118, Venezuela, Miranda, Los Canales, Planta Eléctrica Naguayata, 720 m.

Diagnosis.— A moderately large species of *Pseudogonatodes*, with granular dorsals; 31-35 ventrals in a longitudinal row between anterior level of fore limbs and that of hind limbs; rostral with a posterior medial cleft, bordered by three postrostrals; 7-8 loreals in a straight line between postnasals and orbit; 6-9 postmentals, three of which form a straight or convex suture with the mental; lamellae under fourth finger 8-9, under fourth toe ten; third lamellae under fourth toe not distinctly enlarged.

Description.— The holotype is the largest specimen, with 38 mm SVL. In the only specimen with a complete tail, UMMZ 124313 (28.5 mm SVL), its length is 0.79 times SVL. Head 0.21-0.22 times SVL, 1.4-1.5 times as long as wide, 1.3 times as wide as high. Fore limb 0.21-0.27 times SVL, hind limb 0.30-0.35 times (fig.3).

Rostral large, well visible from above, with a shallow posterior medial cleft. Three postrostrals, medial about as wide as long, laterals (supranasals) at least twice as wide. All three, or at least supranasals, distinctly larger than adjacent scales on snout. Nostril bordered by rostral, lateral postrostral (supranasal), two postnasals, and first infralabial. Postnasals larger than adjacent loreal scales. Scales on snout and loreal region polygonal, convex, smooth, subimbricate, gradually changing into juxtaposed granules on top of head. Loreal scales 7-8 in a longitudinal line between postnasals and orbit. Scales on supraocular region granular, similar to contiguous scales on middorsal area. Most of anterior and upper margin of eye forming a supraciliary flap, with two enlarged scales on anterior border, upper one the largest (in holotype, upper one at least twice as high as lower one). Supralabials four, suture between third

and fourth, or the fourth supralabial, below the centre of the eye. Temporal scales similar to those on top of head (small, granular, juxtaposed). Ear-opening small, round, elongate or sub-triangular (figs 4a, c).

Mental large, with or without two small posterior clefts. Six to nine postmentals, three of which form a straight or convex, transverse suture with the mental. The remaining postmentals occupy a lateral position, forming two divergent lines. At least the three medial postmentals slightly larger than adjacent scales on chin. Scales on chin mostly granular; some close to the mouth may be flatter and elongate. Infralabials four to six, the first much larger and reaching (or almost so) the anterior level of the orbit, suture between third and fourth infralabials below centre of eye (figs 4b, c). Scales on upper part and sides of neck granular, similar to dorsals. Throat with scales anteriorly granular, posteriorly smooth, flat, imbricate; with a short transition between the two areas.

Dorsals granular, slightly larger than scales on top of head. Part of the granules may appear slightly flattened and inclined posteriorly, part conical and erect. Ventrals distinctly larger, smooth, flat, imbricate, in approximate longitudinal and oblique rows; 31-35 scales in a midventral row between anterior levels of fore- and hind limbs, 37-40 until border of cloaca. A narrow transitional zone between dorsals and ventrals. Scales around midbody 85-100. Scales on preanal plate similar to ven-

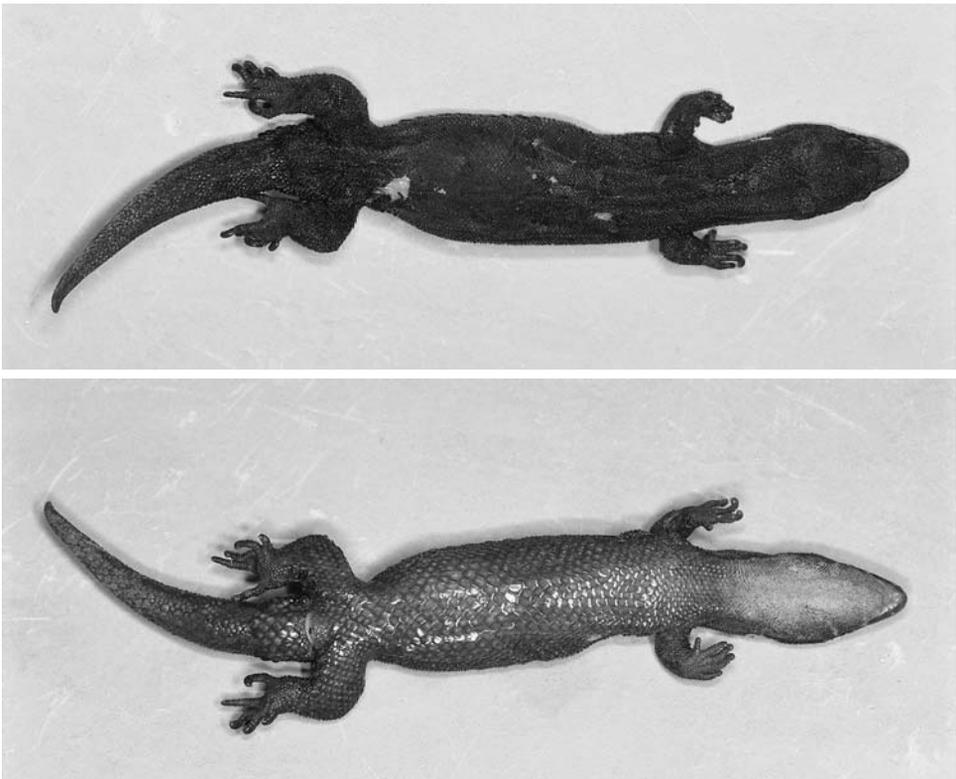


Fig. 3. Dorsal and ventral views of *Pseudogonatodes manessi* spec. nov., holotype, RMNH 26965. SVL 38 mm.

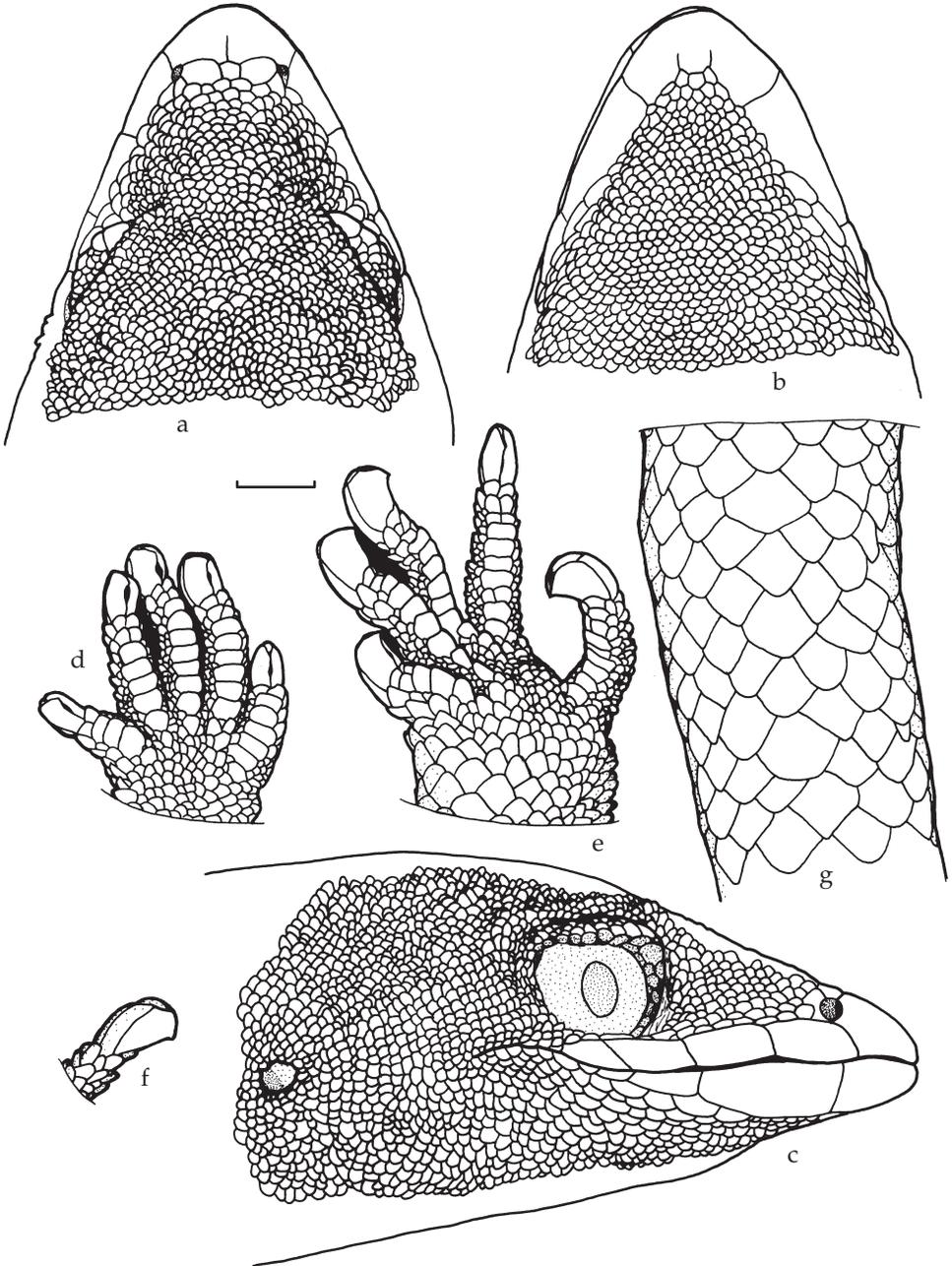


Fig. 4. *Pseudogonatodes manessi* spec. nov., holotype, RMNH 26965: a, b, c: dorsal, ventral and lateral views of head; d, e: ventral views of left hand and left foot; f: unguis sheath of 4th toe in lateral view; g: ventral view of proximal part of tail. The bar represents 1 mm.

trals, except for the scales on the border of the cloaca, which are distinctly smaller.

Scales on dorsal surface and sides of tail flat-conical, imbricate. On ventral surface of tail, scales flat, smooth and imbricate; a midventral row of slightly enlarged scales starts a short distance from the base of the tail (not in regenerated segments), alternately in contact latero-posteriorly with one or two scales (fig. 4g).

Scales on upper and anterior aspects of fore limbs, on anterior aspect of thighs, and on ventral aspect of hind limbs flat, smooth, imbricate; elsewhere on limbs scales granular. Sole of foot with heterogeneous squamation, except in CM 30118 where the scales on the sole are rather homogeneous. Lamellae under fourth finger 8-9, under fourth toe 10. Third lamellae under fourth toe not distinctly enlarged. Basal lamellae, especially those of first finger and first toe, may be slightly enlarged in relation to distal lamellae. Claws enclosed in an unguis sheath composed of five scales, as characteristic for the genus (figs 4d-f).

RMNH 26965, in life, with back dark brown, belly transparent dark grey. A lighter occipital band and dorsolateral stripes in sacral area just indicated. Iris dark gold colour with reddish-brown rim around pupil (MSH, field notes).

In preservative, specimens light to dark brown both dorsally and ventrally, chin paler in RMNH 26965 and KU 182740. U-shaped arc on top of head, starting at posterior border of eyes, only faintly indicated. Back and flanks in RMNH 26965 and UMMZ 124313, and ventral region in all specimens, uniformly coloured. KU 182740 and CM 30118 with a faint pattern of a dorsolateral light stripe at each side, at least anteriorly, each in contact laterally with a number of irregular dark spots. In CM 30118 the dorsolateral stripes are also connected to each other by transverse light stripes, separated by irregular darker areas. A pair of dorsolateral light stripes at level of hind limbs, continuing into tail at least proximally. Another pale light stripe may be present from posterior aspect of thigh to base of tail. Middorsally on tail and bordering ventrally both stripes, irregular, dark brown stripes.

Meristic data of holotype.—SVL 38.0 mm, tail length 3.5 + 17.5 mm (original and regenerated parts respectively), head length 7.8 mm, head width 5.2 mm, head height 4.0 mm, fore limb length 8.0 mm, hind limb length 11.5 mm. Scales around midbody 97. Ventrals in a longitudinal row 35 between anterior margin of fore limbs and that of hind limbs, 40 until border of cloaca. Lamellae under fourth finger 8-9, under fourth toe 10. Scutellation as depicted in fig. 4.

Etymology.—Named in honour of the American biologist Scott J. Maness, who was a pleasant field companion for M.S. Hoogmoed while collecting in Rancho Grande, and who tragically died fighting a forest fire in Florida, a few years after the joint field work, much too young.

Distribution.—Known only from Estados Aragua and Miranda, Venezuela (fig. 5).

Remarks.—Test et al. (1966) identified three specimens (UMMZ 124312, 124313 and 56516) as *P. lunulatus*. The first of these at present is cleared and stained, and we did not examine it, because external characters no longer can be used. UMMZ 124313 is here included in the type series of *P. manessi*, while UMMZ 56516 was also examined by us and it is indeed *P. lunulatus*. The reference by Manzanilla Puppo et al. (1996) of *P. lunulatus* in the cloud forest of Rancho Grande (their table 2) was based on Test et al. (1966), and refers to *P. manessi*. On the other hand we examined three specimens (RMNH 26495-97) collected by Manzanilla Puppo also in the Parque Nacional

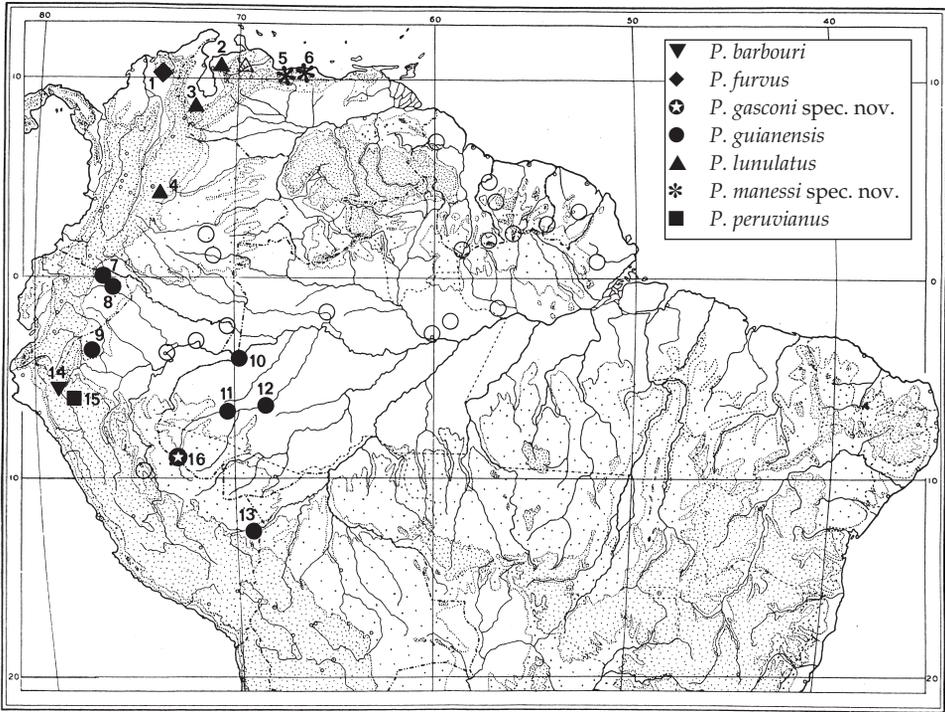


Fig. 5. Map of northern South America, showing the approximate distribution of the species of *Pseudogonatodes*: *P. barbouri* (triangle with tip pointing down), *P. furvus* (rhomboid), *P. gasconi* spec. nov. (circle with a star), *P. guianensis* (circles; open circles are literature data, according to Avila-Pires, 1995), *P. lunulatus* (triangles with tip pointing up, plus locality 5, where the species is sympatric with *P. manessi*; open triangle according to Shreve, 1947), *P. manessi* spec. nov. (asterisks), *P. peruvianus* (square). Localities of material studied here are indicated with the following numbers (for more details on localities see text): 1. Santa Marta Mountains and Rio Frio, Magdalena, Colombia; 2. El Mene, Falcón, Venezuela; 3. San Felix, Táchira, Venezuela; 4. La Reforma and Quebrada Colorado, Meta, Colombia; 5. Parque Nacional Henri Pittier, Aragua, Venezuela; 6. Naiguata, Miranda, Venezuela; 7. Puerto Libre, Napo, Ecuador; 8. Limoncocha, Napo, Ecuador; 9. localities on and between Rio Cenepa and Rio Santiago, Amazonas, Peru; 10. Benjamin Constant, Amazonas, Brazil; 11. Condor, Amazonas, Brazil; 12. Lago Jainu, Amazonas, Brazil; 13. Cocha Cashu, Madre de Diós, Peru; 14. Perico and Bellavista, Cajamarca, Peru; 15. Tingo, Amazonas, Peru; 16. Porongaba, Acre, Brazil.

Henri Pittier (locality 'La Trilla'), and they were *P. lunulatus*, indicating that both species occur in the park, although maybe in different habitats. See Test et al. (1966), Beebe & Crane (1947) and Manzanilla Puppo et al. (1996) for data on the ecology and on the herpetofauna of the area of Rancho Grande.

Among the material we examined, one specimen, MIZA 15-185, from Estado Táchira, Venezuela, could not be identified with certainty. The specimen has a SVL of 22.5 mm, and without dissection we cannot completely rule out the possibility that it is a juvenile of *P. manessi*, although it gives the impression to be an adult specimen (in which case it would certainly represent a distinct species). Besides, it differs from *P. manessi* in having 29 ventrals between the anterior levels of fore- and hind limbs; in

having six loreals in a straight line between postnasals and orbit; in having seven lamellae under the fourth finger, and nine under the fourth toe. The mental has a U-shaped (with divergent sides) posterior margin, with three small, non-symmetrical clefts present (possibly indicating partially fused postmentals), and it is bordered by six postmentals. A pair of dorsolateral light stripes (one per side) runs along the body and base of tail, and a light stripe (broken in three segments), with dark borders, extends obliquely and posteriorly from below each eye toward the throat, and from there ventrolaterally to the arm insertion.

Discussion

Huey & Dixon (1970) tentatively recognised three species groupings within *Pseudogonatodes*. Both new species present characteristics of the third grouping recognised by them and composed of *P. furvus* and *P. peruvianus*: third lamellae under fourth toe not expanded, number of fourth toe lamellae relatively high, and presence of granular dorsals. *Pseudogonatodes guianensis* and *P. lunulatus*, which form the first grouping, in contrast have the third lamella of fourth toe expanded, and five to seven lamellae under the fourth toe. *P. barbouri*, the only member of the second grouping, has the same characteristics as the first grouping and in addition has scale-like and imbricate dorsals. The numerical characteristics that separate the four species now composing the third species grouping of Huey & Dixon (1970) are shown in table 1. Moreover, *P. gasconi* differs from the other three species in having taller, conical to flat-conical scales covering most of dorsal surfaces; rostral without a posterior medial cleft; and no enlarged subcaudals. *Pseudogonatodes manessi* differs also from *P. gasconi* and *P. lunulatus* by the shape of the mental: V-shaped in these two latter species, with a posterior medial cleft; with a straight or convex medial segment on the posterior margin, and none or two small clefts, in *P. manessi*.

Although not considered in detail here, at least some specimens of each species of *Pseudogonatodes* have been examined, including *P. lunulatus*, *P. guianensis* and *P. barbouri*. It is clear that the two former species are closely related, and a detailed analysis of geographic variation including both taxa is necessary to clarify their status and, in case the analysis supports their validity, the taxonomic delimitation between them. Such an analysis would be beyond the objectives of the present paper. Avila-Pires

Table 1. Comparative tabulation (based on material examined) of some morphometric data for the four species of *Pseudogonatodes* with granular dorsals and relatively high number of fourth toe lamellae, of which the third lamellae is not distinctly expanded (third species grouping of Huey & Dixon, 1970).

	<i>P. gasconi</i>	<i>P. manessi</i>	<i>P. furvus</i>	<i>P. peruvianus</i>
maximum SVL	24 mm	38 mm	45 mm	32 mm
ventrals	37 (43)	31-35 (37-40)	37-39 (44-46)	36-40 (45-46)
postrostrals	5	3	3	3-4
lorealis	7	7-8	9-10	5
postmentals	6	6-8	2	3-6
lamellae 4th finger	7	8-9	11	6-7
lamellae 4th toe	8	10	14-15	8-9

(1995) already pointed out the geographic variation within *P. guianensis* and the necessity of more studies on this species. If we consider, therefore, that the species in the first species grouping of Huey & Dixon (1970) are closely related, we may hypothesise that the low number of lamellae under the fourth toe, with the third lamellae expanded, is a derived character uniting (*P. lunulatus* + *P. guianensis*) + *P. barbouri*. In that case, the characteristics of the third species grouping would represent the primitive state, and would not indicate relationship between the species. Out-group comparison with other sphaerodactyl geckos (e.g., based on Kluge, 1995) also indicates that presence of subequal lamellae under the fourth toe is the primitive character state, although it does not permit a conclusion on the direction of evolution regarding the number of lamellae under the fourth toe.

Key to species of *Pseudogonatodes* (adapted from Huey & Dixon, 1970)

- 1. Dorsal squamation of conical or flattened granules 2
- Dorsal squamation of flat, imbricate scales *P. barbouri*
- 2. Lamellae under fourth toe seven or less; third lamellae under fourth toe expanded *P. guianensis* + *P. lunulatus*
- Lamellae under fourth toe eight or more; third lamellae under fourth toe not expanded 3
- 3. Lamellae under fourth toe 14 or more; 9-10 loreals between postnasals and orbit; maximum SVL 45 mm *P. furvus*
- Lamellae under fourth toe 10 or less; eight or less loreals between postnasals and orbit; maximum SVL less than 40 mm 4
- 4. Ventrals between anterior level of fore- and hind limbs 31-35; mental with a straight or convex transverse medial segment on posterior margin, with none or two small clefts; lamellae under fourth finger 8-9, under fourth toe 10 *P. manessi*
- Ventrals 36 or more; mental V-shaped, with one cleft on posterior margin; lamellae under fourth finger seven or less, under fourth toe nine or less 5
- 5. Dorsals tall, conical to flat-conical; rostral with no posterior medial cleft, bordered by five postrostrals; seven loreals; no enlarged subcaudals *P. gasconi*
- Dorsals granular, not as tall as in above species; 3-4 postrostrals, not indenting the rostral; five loreals; subcaudals slightly enlarged medially *P. peruvianus*

Notes on the distribution of some other sphaerodactyl lizards

1. While doing field work in Paragominas, Pará, Brazil (02°57'37"S 47°23'04"W; fig. 6), in 1994, we collected two specimens of *Coleodactylus meridionalis* (Boulenger, 1888) (MPEG 19030, RMNH 26964). The species occurred in sympatry with *C. amazonicus* (Andersson, 1918) (of which several specimens were seen and/or collected), in a relatively small and disturbed patch of forest (due to deforestation in the last decades). It is not known whether *C. meridionalis* already occurred in the area before the deforestation process started, but our record at least seems to indicate that the original distribution of the species bordered (if it not entered) the Amazonian region.

2. Avila-Pires (1995) registered the easternmost locality of *Gonatodes hasemani* Griffin, 1917 as Maués, in the state of Amazonas, Brazil. Vitt et al. (1997: 41), however,

reported the species near Cachoeira Juruá, left bank of Rio Xingu (east of Altamira), state of Pará (03°22'S 51°51'W), about 650 km further east (see fig. 6 for this and the other localities mentioned below). We examined a photo of one of the specimens, which leaves no doubt about the correctness of the identification (specimens are deposited in the Museu de Zoologia da Universidade de São Paulo, Brasil). The absence of the species in other collections from between the Tapajós and Xingu rivers is not easy to explain, since the species, where it is known to occur, is not very rare; neither are its habits very secretive. For example, the senior author (Avila-Pires) participated, together with L.J. Vitt and other researchers, in three-month expeditions to the states of Acre (5 Km N of Porto Walter, Rio Juruá), Amazonas (Rio Ituxi, affluent of the Rio Purus, 157 km SSW [229°] of Lábrea) and Rondônia (Parque Estadual Guajará-Mirim, Município de Nova Mamoré), and during each of these expeditions from nine to more than 50 specimens were observed. In the Rio Xingu expedition of Vitt, 21 specimens were collected (also during a period of almost three months). On the other hand, in a similar expedition to a locality 100 km S and 18 km E of Santarém, in Pará, the species was not found, and closer to the Rio Amazonas several other localities in this area have been studied to some extent. Therefore, the absence of *G. hasemani* in the lower Tapajós-Xingu interfluvial area appears to be real. However, we still do not

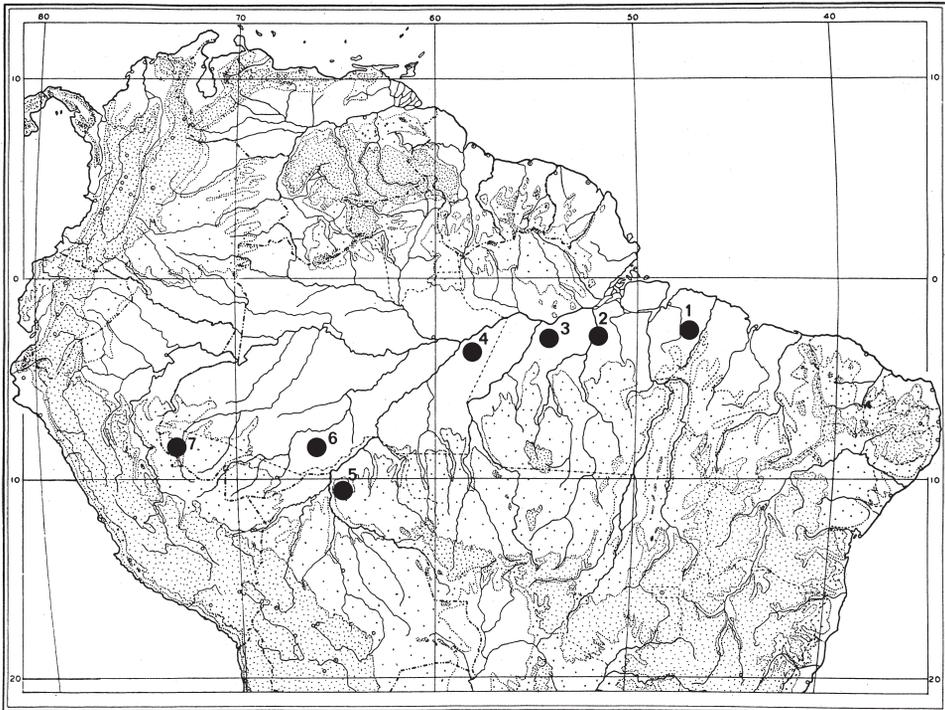


Fig. 6. Map of northern South America showing several Brazilian localities mentioned in the text: 1 – Paragominas, Pará; 2 – Cachoeira Juruá, Rio Xingu, Pará; 3 – locality 100 km S and 18 km E of Santarém, Pará; 4 – Maués, Amazonas; 5 – Parque Estadual Guajará-Mirim, Rondônia; 6 – locality on Rio Ituxi, affluent of Rio Purus, Amazonas; 7 – Porto Walter, Rio Juruá, Acre.

know enough about more southern areas in the interfluvial, which possibly might harbour the species.

3. Kluge (1995) discussed the cladistic relationships of sphaerodactyl lizards, and in that context presented distribution maps of the genera involved. This seems to be the appropriate place to point out that these maps do not reflect the actual state of knowledge about the distribution of most of these genera. Kluge (1995) could not take into account the data provided by Avila-Pires (1995). From Avila-Pires (1995: figs 90, 95, 99) it is clear that the isolates within South America shown in Kluge's distribution maps of *Gonatodes* Fitzinger, 1843, *Lepidoblepharis* Peracca, 1897, and *Pseudogonatodes* (his figures 2,3 4) are due to lack of data; these genera have a continuous distribution throughout the Amazon basin. In the case of *G. humeralis* (Guichenot, 1855), its presence in what seems to be the area of cerrado vegetation in Central Brazil can be explained by the expansion of the forest along the rivers (gallery forests). As regards *Coleodactylus* Parker, 1926, the geographic distribution shown in Kluge (1995, fig. 1) is incomplete, since *C. amazonicus* occurs westward at least to Tefé, in the state of Amazonas, Brazil. As pointed out above, *C. meridionalis* also seems to have a wider distribution than shown by Kluge (1995).

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