

Studies on the species of the South American lizard genus *Arthrosaura* Boulenger (Reptilia: Sauria: Teiidae), with the resurrection of two species

M. S. Hoogmoed & T. C. S. Avila-Pires

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Key words: *Arthrosaura kockii*; *Arthrosaura reticulata*; *Arthrosaura tyleri*; *Arthrosaura versteegii*; South America; cis-Andean; Brazil; Guianas; Venezuela; Ecuador; Amazon basin; distribution; morphology.

Arthrosaura versteegii and *Pantodactylus tyleri* are resurrected from the synonymy of *A. reticulata*. Detailed descriptions of the three species are provided, a key to the species of the genus is presented, differences are pointed out and synonymy and distribution of the known species are given. Two of the species occur sympatrically in several areas, whereas in one area three species are sympatric. The distribution of *A. kockii* mainly is limited to the eastern part of the Guianas, but also encompasses eastern Pará; that of *A. reticulata* extends from the Amazonian lowlands of Ecuador to the mouth of the Amazon and also includes the Guianas, that of *A. versteegii* seems to be restricted to the Guianas, whereas *A. tyleri* is only known from a high altitude on Mount Duida in Venezuelan Guiana.

Marinus S. Hoogmoed, Nationaal Natuurhistorisch Museum, Postbus 9517, 2300 RA Leiden, The Netherlands.

Teresa C. S. de Avila-Pires, Museu Paraense Emilio Goeldi, DZO, Caixa postal 399, Belém, Pará, CEP 66017-970, Brazil.

Introduction

During a study of the lizards of Amazonian Brasil, the junior author (TCSAP) examined a number of specimens of *Arthrosaura reticulata* (O'Shaughnessy, 1881) from French Guiana, Suriname and Venezuela. From more detailed studies it emerged that *A. versteegii* Van Lidth de Jeude, 1904 and *Pantodactylus tyleri* Burt & Burt, 1931, formerly sunk into the synonymy of *A. reticulata*, represented perfectly valid taxa that could be separated on the basis of morphological and colour characters. The aim of this paper is to present a detailed description of each species and to analyse the present knowledge of the genus. Apart from the three species mentioned above, the genus comprises only one more species, *A. kockii* (Van Lidth de Jeude, 1904), easily distinguished from its congeners by the presence of four instead of three supraoculars. For completeness' sake we include it in the present study as well. However, we only incorporate it in the key, present an updated synonymy and give a short diagnosis, but do not give a detailed description.

Historical review

The genus *Arthrosaura*, though only comprising a small number of species, has shown a rather tumultuous history. Boulenger (1885: 389) described this genus on the

basis of the type specimen of *Cercosaura (Pantodactylus) reticulata* O'Shaughnessy, 1881 from Canelos, Ecuador. Van Lidth de Jeude (1904) described *Arthrosaura Versteegii* and *Prionodactylus Kockii* from "Suriname". Müller (1923) described *A. dorsistriata* from Pará, Brasil, but Brongersma (1928) showed that it was identical to *Prionodactylus kockii* Van Lidth de Jeude, which species he transferred to the genus *Arthrosaura*.

Burt & Burt (1931: 313) described *Arthrosaura tatei* from Mount Duida, Venezuela. As was correctly stated by Brongersma (1932: 80), this species was very different from any other placed in the genus, but as he could not examine the holotype he refrained from changing its status. In 1935 he repeated his opinion in even stronger words: "*Arthrosaura tatei* Burt & Burt differs so much from the other members of the genus, that I am convinced that it must belong to a separate genus", however, without giving an indication as where to place it. Finally Uzzell (1966:285) examined the holotype and concluded that *A. tatei* was a species of *Neusticurus*, a conclusion we can wholeheartedly support after we also examined the holotype.

Burt & Burt (1931: 362) also described *Pantodactylus tyleri* from the top of Mount Duida, Venezuela. Ruibal (1952: 512) noted that it actually was a species of *Arthrosaura* related to *A. kockii*, but did not expand on this remark. Cunha (1967) considered it a synonym of *A. reticulata*.

Burt & Burt (1931: 313) doubted whether the species *A. kockii*, *A. reticulata* and *A. versteegii* really were distinct, but made no formal synonymisations because of lack of material. Brongersma (1932) demonstrated that *A. versteegii* and *A. kockii* indeed showed constant differences and formed two different taxa. In his study he had to base himself on very scarce material, resp. one and three specimens. In 1935 he (Brongersma, 1935) compared the holotypes of *A. reticulata* and *A. versteegii* and came to the conclusion that they were so similar that they should be considered as different subspecies of one species: *A. reticulata*.

Cunha (1967) made a revision of the genus in Amazonia as it was then known. He described a new species, *A. amapaense*, based on several specimens from Amapá, Brasil. Furthermore he considered *A. kockii*, *A. reticulata* and *A. versteegii* as separate taxa, and *A. tyleri* as a synonym of *A. reticulata*.

Cunha's taxonomy was adopted by Peters & Donoso-Barros (1970: 75), but Hoogmoed (1973: 248) returned to the position taken by Brongersma (1935) and again considered *A. versteegii* a subspecies of *A. reticulata*, at the same time synonymising *A. amapaense* with it. Gasc (1977), upon the examination of specimens from both Colombia and French Guiana, also expressed the opinion that *reticulata* and *versteegii* should be considered as distinct subspecies. Vanzolini (1986) followed Hoogmoed (1973).

Hoogmoed (1973: 248) showed that the type locality of *A. versteegii* actually was in French Guiana and not in Suriname as stated in the original description.

Many of the differences in interpretation of the species discussed above can be attributed to the fact that of most of these species only one, or at the most a few specimens were available to the authors dealing with them. Accordingly nobody seemed to have sound ideas about variation within these species and differences between them. Consequently species were lumped based on wrong assumptions, whereas others were described on presumed differences which actually fell within the intraspecific variation.

Results

For the present study we had at our disposal a relatively large number of specimens from several localities in Amazonia, both south and north of the Amazon, and from western (Ecuador, Peru, Brasil) and eastern (Brasil, Guianas) localities. Most of these were collected by the authors. Moreover, we could examine all the types in the genus. The analysis showed that *A. versteegii* is a species different from *A. reticulata*, both species occurring in the Guianas, *A. versteegii* apparently being less common. What was named *A. (reticulata) versteegii* by most recent authors (including Cunha, 1967, and Hoogmoed, 1973) is indeed either *A. reticulata*, or a mixture of both species. The examination of the types of *A. tyleri* showed that they differ from any of the other species, and represent a valid species. No other specimens of *A. tyleri* were found among the material studied, and since the types came from a high altitude on a Venezuelan tepui, it may be assumed that it has a restricted distribution.

During our present study we were especially interested in the taxonomy of the species with three supraoculars only, as problems were cropping up in that group. The only species with four supraoculars (*Arthrosaura kockii*) seems to be a clear-cut case that does not need any further study in this framework, and it has been adequately dealt with in the past. Therefore, we do not provide an extensive description, but only include it in the key and present new data on its distribution and an updated synonymy.

Diagnosis of the genus.— Small lizards with a cylindrical body, a tail that is round in cross section, and well developed legs of variable relative length. Tongue lanceolate without posterior emargination, covered with rhomboidal, scale-like, imbricate papillae in oblique rows; tip bifid, smooth. Anterior teeth conical, the others bicuspid or tricuspid, laterally compressed. Dorsals hexagonal, keeled, mucronate, arranged in transverse rows only; ventrals rectangular, smooth, rounded and imbricate posteriorly; laterals gradually diminishing in size ventrally; ventrals distinctly separated from the laterals, not forming continuous rows; enlarged gulars in pairs. Frontonasal separating the nasals; no supranasals; prefrontals forming a median suture (though we are aware that the description of a new species which lacks prefrontals will soon be published by Donnelly, McDiarmid and Myers); three or four supraoculars; large interparietal as long as parietals; no postparietals. Temporals 15-48, smooth, largest in posterodorsal corner above ear. Four pairs of chinshields, the anterior two in contact (but again, the new species to be described by Donnelly, McDiarmid and Myers is aberrant in this respect). Preanal plate with three to seven scales, rather variable. Preanal and femoral pores present in males, absent or present in females.

The genus is restricted to the Amazon basin, with one species spanning the entire region, being sympatric with two other species in the Guianan region, and one species restricted to a tepui in southern Venezuela (and the new one still to be described by Donnelly, McDiarmid and Myers restricted to intermediate levels in Venezuela).

Key to the species

1. Supraoculars four; distance between forelimbs and hindlimbs at most 1.5 times the length of a forelimb; supralabials 7-9, generally 8; a white vertebral stripe *Arthrosaura kockii*
- Supraoculars three; distance between forelimbs and hindlimbs 1.5-2.5 times the length of a forelimb; supralabials 6-7; no vertebral stripe 2
2. Seven large supralabials; 22-48 temporal scales on each side; scales around midbody 35-53; no dorsolateral stripe *Arthrosaura reticulata*
- Six large supralabials; 15-26 temporal scales on each side; scales around midbody 31-38. When temporal scales ≥ 20 a dorsolateral stripe or a series of spots present, if < 20 dorsolateral stripe present or not 3
3. Temporals large, 15-18; three large scales bordering the parietals laterally; scales around midbody 31-34; limbs relatively long; no dorsolateral stripe; ventral parts with many black spots dispersed over the entire ventral surface *Arthrosaura tyleri*
- Temporals large, 18-26; mostly four or five, rarely three, large scales bordering the parietals laterally; scales around midbody 31-38; limbs relatively short; a distinct dorsolateral stripe or series of spots; ventral parts with a few black spots only, restricted to the lateral part of the belly and throat .. *Arthrosaura versteegii*

Species accounts

Arthrosaura kockii (Van Lidth de Jeude, 1904)

(figs. 1-3)

Prionodactylus Kockii Van Lidth de Jeude, 1904: 91.*Arthrosaura dorsistriata* Müller, 1923: 147.*Arthrosaura kockii*; Brongersma, 1928: 333; Amaral, 1937b: 186.*Arthrosaura kockii*; Burt & Burt, 1931: 312, 313; Brongersma, 1932: 76, 77, 81, 82, 83, 84, 85, 87; Burt & Burt, 1933: 55; Brongersma, 1935: 264; Amaral, 1937a: 1739; Cunha, 1961: 141; Cunha, 1967: 155; Hoogmoed, 1968: 612; Peters & Donoso-Barros, 1970: 75; Hoogmoed, 1973: 236; Hoogmoed, 1975: 146; Hoogmoed & Lescure, 1975: 154; Gasc, 1977: 27; Gorzula, 1978: 19; Gasc, 1981: 307; Duellman, 1987: 492; Duellman, 1989: 81; Gasc, 1990: 21, 48, 49, 71, 75; Mittermeier et al., 1990: 29; Hoogmoed & Avila-Pires, 1991: 79.*Arthrosaura kochii* (sic!); Amaral, 1948: 111.*Arthrosaura kochii* (sic!); Crump, 1971: 20.

Diagnosis.— A small microteiid lizard with cylindrical body, a tail that is round in cross section, and relatively long limbs. Distance between forelimbs and hindlimbs (measured between the axil and the groin) 1.5 times the length of a forelimb. Four supraoculars. Supralabials 7-9, mostly 8. A wide, very evident, light vertebral stripe from the tip of the snout to the tip of the tail.

Description.— There is no need to repeat the extensive description of this species that has been published by Hoogmoed (1973). Moreover, an updated version, including details about new localities in Brasil, will be published shortly by Avila-Pires (1993, in prep.).

Distribution.— Known from many localities in Suriname and French Guiana,

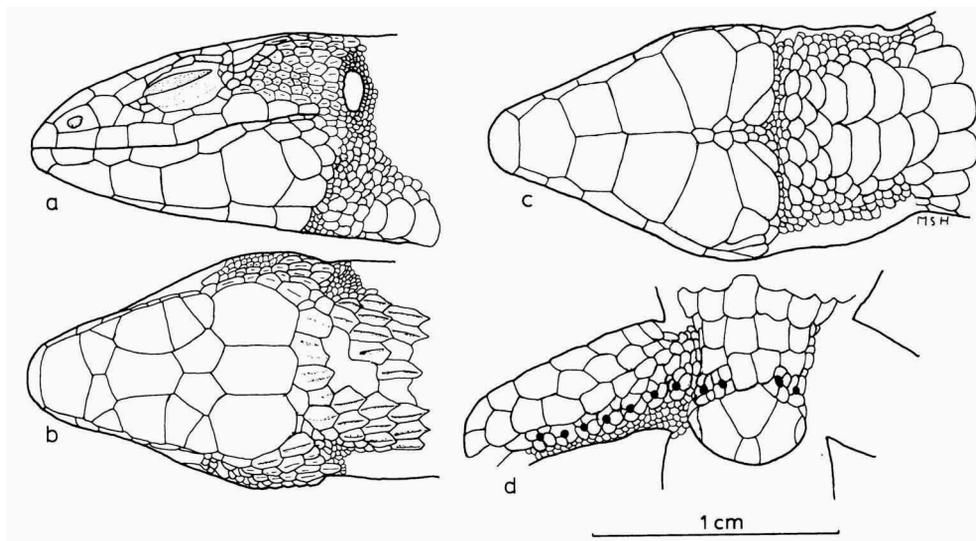


Fig. 1. *Arthrosaura kockii* (Van Lidth de Jeude), head and anal region of ♂, RMNH 15210 c, Voltz Mountain Reserve. From Hoogmoed (1973).

and from some localities in Amapá and eastern Pará, Brasil (fig. 2). So far, the species has not yet been reported from Guyana and northern Pará, though it has been collected in Suriname close to the common border. It probably will turn out to have a (slightly) larger distribution than presently known. A single specimen in the collection of the museum in São Paulo (MZUSP 13965) was collected on the Rio Ampiyacu in Peru (fig. 3), well beyond the range as known until now (fig. 2). Considering the collector (B. Malkin) there is little doubt about the locality, and besides, its occurrence in that area is not as unlikely as it may seem, because several other species (a.o. *Uranoscodon superciliosa* (L.)) originally thought to be restricted to the Guiana shield, recently turned out to have a much wider distribution, also encompassing easternmost Peru.

In most of its range *A. kockii* is sympatric with *A. reticulata*, and in Suriname also with *A. versteegii*. In at least one locality (Sipaliwini, Suriname), the three species occur together (figs. 2, 3 and 9).

Arthrosaura reticulata (O'Shaughnessy, 1881) (figs. 3-8, 11)

Cercosaura (Pantodactylus) reticulata O'Shaughnessy, 1881: 230.

Arthrosaura reticulata; Boulenger, 1885: 389; Burt & Burt 1931: 312, 313; Brongersma, 1932: 78, 79; Burt & Burt, 1933: 55; Cunha, 1967: 147, 153; Medem, 1969: 173; Peters & Donoso-Barros, 1970: 75; Dixon & Soini, 1975: 40; Duellman, 1978: 213; Gorzula, 1978: 19; Miyata, 1982: 14; Ayala, 1986: 572; Dixon & Soini, 1986: 45; Vanzolini, 1986: 14, 17, 18, 20; Almendariz, 1987: 122; Duellman, 1987: 492; Duellman, 1989: 81; Gasc, 1990: 23, 71, 75; Duellman, 1990: 498; Mittermeier et al., 1990: 29(partly); Zimmerman & Rodrigues, 1990: 449, 452.

Leposoma reticulatum; Cope, 1885: 98.

Arthrosaura reticulata reticulata; Brongersma, 1935: 262; Cunha, 1961: 140, 141; Peters, 1967: 18; Gasc, 1977: 271.

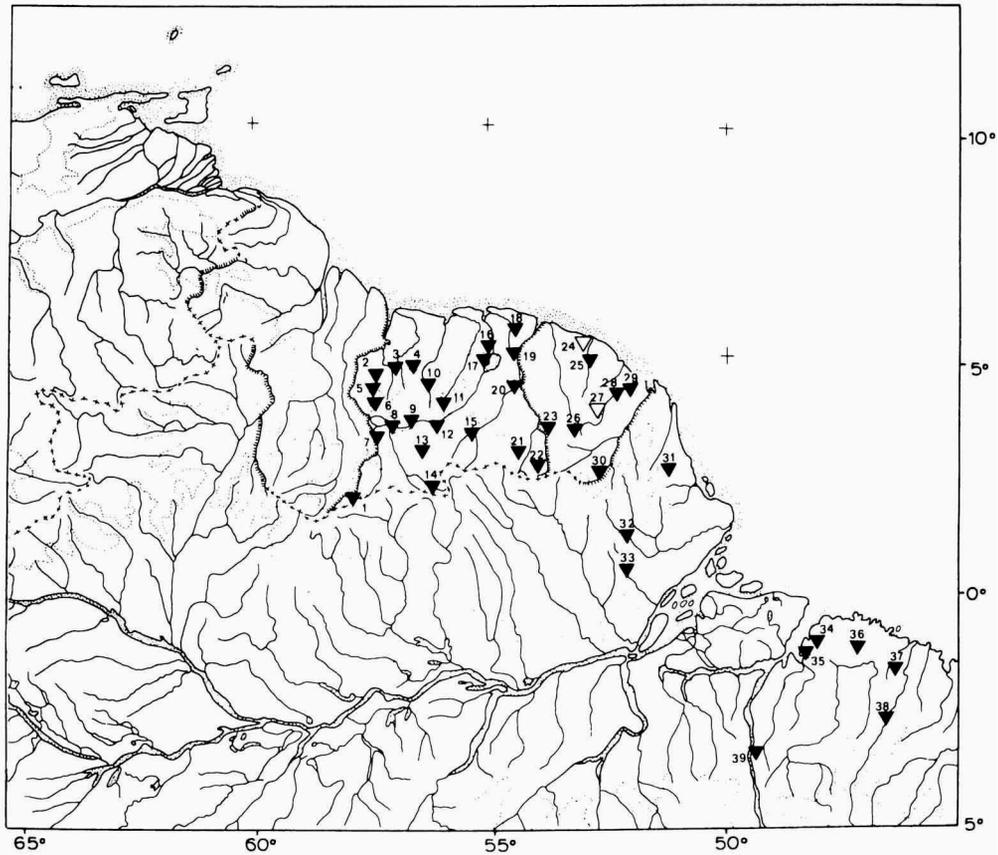


Fig. 2. Distribution of *Arthrosaura kockii* in northeastern South America. **Suriname:** 1. Itabu Creek Head, 2. Kabalebo, road to Amotopo km 67, 3. Paris Jacob Creek, 4. Mozes Creek, 5. Kabalebo, road to Amotopo km 109, 6. Kabalebo, road to Amotopo km 212, 7. Tigri Encampment, New River, 8. Lucie River, 10 km NE airstrip Coeroeni, 9. N. Lucie River, 10. Voltzberg, 11. Tafelberg, 12. Suriname River, Bivouac 5 (type locality), 13. Airstrip Kayser Mountains, 14. Airstrip Sipaliwini, 15. Airstrip Paloemeu, 16. Donderberg, railway km 91.5, 17. Brownsberg, 18. Patamacca, 19. Nassau Mountains, 20. Lely Mountains, 21. Loë Creek, 22. Massif du Mitaraca. **French Guiana:** 23. Maripasoula, 24. Piste de St. Elie, 25. Petit Saut, 26. Montagne Galbao + Saut Maïs, 27. Saut Pararé, 28. Saut Tortue, 29. Lower Mataroni River, near Régina, 30. Village Zidok + Montagne Saint-Marcel. **Brazil:** 31. Igarapé Lunier, 32. Serra do Navio, 33. Alto Rio Maraca + Rio Camaipi, 34. Road Belém-Mosqueiro between Santa Barbara and Benevides, 35. Belém + Tracuateua, 36. Peixe-Boi (type locality of *A. dorsistriata*), 37. Bela Vista, Viseu, 38. Aldeia Coraci, 39. Rio Tocantins (present area of Tucuruí reservoir).

Based on material examined by the authors, most of which either is in the collections of RMNH or MPEG. Also data from the more recent literature (open symbols), especially about French Guiana, have been taken into account.

Arthrosaura reticulata versteegii; Cunha, 1961: 140, 143; Hoogmoed, 1973: 242 (partly); Hoogmoed, 1975: 146; Hoogmoed & Lescure, 1975: 155 (partly); Gasc, 1981: 305; Vanzolini, 1986: 6 (partly); Hoogmoed & Avila Pires, 1990: 168-170.

Arthrosaura amapaense Cunha, 1967: 151; Peters & Donoso-Barros, 1970: 75.

Arthrosaura versteegii; Cunha, 1967: 147, 150; Peters & Donoso-Barros, 1970: 75 (partly); Peters & Donoso Barros, 1970: 75 (partly); Gorzula, 1978: 19.

Arthrosaura reticulata verstegei (sic!); Gasc, 1990: 48, 49.

Material.— **Ecuador.** NAPO. Santa Cecilia: 1 ♀, 1♂, KU 109823-4; 1 ♀, KU 112198; 1 ♂, KU 122170; 1 ♀, 1♂, 1 juv., KU 148190-2; 1 ♀, KU 175338. Rio Misahualli, Alto Napo: 1 ♂, USNM 196069, v.1952, leg. G. Orces-V. Loreto: 1 ♂, USNM 196071, v.1955, leg. G. Orces-V. PASTAZA. Canelos: 1 ♀, BMNH 1946.9.1.5, leg. Buckley (holotype). Montalvo: 1 ♀, USNM 196068, xii.1949, leg. G. Orces-V.— **Peru.** LORETO. Mishana: 1 ♂, TCWC 38116; 1 ♀, TCWC 41361. Centro Union, Rio Aucayo: 1 ♀, TCWC 41884; 1 ♀, 1 juv., TCWC 42753-4; 1 ex., TCWC C&S 413. Yanamono: 1 ♀, TCWC 40415. Moropon: 3 ♀♀, TCWC 40416, 41759, 41885; 1 ♂, TCWC 42752 (cleared & stained).— **Brasil.** AMAZONAS. W of Benjamin Constant: 1 ♂, RMNH 25276, 1 ♀, 1 ♂, MPEG 15939-40, 12.xii.1989, 2 ♂♂, RMNH 25274-5, 1 ♀, MPEG 15916, 10.xii.1089, 1 ♂, RMNH 25277, 14.xii.1989, all leg. M. S. Hoogmoed & T. C. S. Avila Pires; 1 ♀, MPEG 15969, 15.xii.1989, leg. local children, through M. S. Hoogmoed & T. C. S. Avila Pires. Estirao do Equador, Rio Javari: 1 ♂, MPEG 875, 1959, 1 ♂, MPEG 909, 1961, both leg. J. Hidasi. E. of Porto Uruçu, near Petrobras RUC-2: 1 ♂, MPEG 15868, 29.xi.1989, leg. M. S. Hoogmoed & T. C. S. Avila Pires. ZF-2, 60 km N Manaus: 1 ♂, RMNH 25273, 13.vii.1989, leg. M. S. Hoogmoed. Reserva Ducke, 25 km N Manaus: 1 ♂, MPEG 15807, 10.vii.1989, leg. M. S. Hoogmoed & T. C. S. Avila Pires; 1 ♂, MPEG 14406, 8.xi.1985, leg. M. S. Hoogmoed & M. Hero; 1 ♂, INPA 264, iii.1988, leg. G. Moreira. Balbina, Rio Uatumã, Presidente Figueiredo: 1 ♀, 2 ♂♂, MPEG 14892-4, 6.ii.1988, 1 ♂, MPEG 14919, 22.iii.1988, all leg. equipe de resgate; 1 ♀, MPEG 15399, 30.xii.1987, leg. R. Moraes & equipe de resgate; 1 ♂, INPA 064, 5 km SW Rio Pitinga, near Igarapé do Nazaré, 7.ix.1985, leg. J. Marinho; 1 ♀, INPA 259. Balbina, Rio Uatumã, Igarapé Caititu, Presidente Figueiredo: 1 ♀, INPA 120, 4.xii.1986, 2 ♂♂, INPA 144-5, 24.iv.1987, 1 ♂, INPA 152, 1 ♀, INPA 173, 24-30.iv.1987, 1 ♀, INPA 184, 1 ♂, INPA 190, 1 ♀, 1 ♂, INPA 200-1, 27-31.vii.1987, all leg. M. Martins; 1 ♀, INPA 220, 16.ix.1986, leg. A. Queiroz; 1 ♀, 1 ♂, MNRJ 4436-7. SW: 1 ♀, MNRJ 2562. RONDONIA. Cachoeira Samuel, Rio Jamari, E. Porto Velho: 1 ♀, 1 ♂, UCG 014, 30.xii.1988/31.i.1989, leg. N. J. Silva Jr. PARA'. Road Céu Estrelado - Cruz Alta, between Rio Nhamunda and Rio Trombetas, Igarapé Jamari, Faro: 1 ♀, MPEG 15335, 5.xii.1991, 1 ♀, RMNH 25271, 12.xii.1988, 1 ♂, RMNH 25272, 1 ♀, 1 ♂, MPEG 15428-9, 14.xii.1988, all leg. M. S. Hoogmoed, T. C. S. Avila Pires & R. Rocha. Cruz Alta, 6-8 km S Rio Trombetas, Oriximiná: 1 ♀, RMNH 25270, 6.xii.1988, 1 ♂, MPEG 15354, 7.xii.1988, 1 ♀, MPEG 15380, 9.xii.1988, all leg. M. S. Hoogmoed, T. C. S. Avila Pires & R. Rocha. Porto Trombetas, Rio Trombetas, Igarapé do Pau-Pelado, Oriximiná: 1 ex., MPEG 14399, 21.v.1986, leg. F. P. Nascimento & J. M. Rosa. Cachoeira Porteira, Rio Trombetas: 1 ♀, INPA 080, 1 ♀, INPA 084, 67 km NNE of mouth Rio Mapuera, 7-9.viii.1985, both leg. R. C. Best; 1 ♂, INPA 122, mouth of Igarapé Tramalhetinho, 7.xi.1985, leg. A. L. Queiroz. Tucuruí, Chiqueirão, right bank of Rio Tocantins: 1 ♂, MPEG 13391, 7.iv.1984, leg. R. Moraes. Cacoal, Augusto Corrêa: 1 ex., MPEG 12898, 26.x.1973. leg. O. Cunha & F. Nascimento. Km 74 of BR-316 (road Pará-Maranhão): 1 ♂, MPEG 5306, 12.iv.1972, leg. O. R. Cunha & F. P. Nascimento. AMAPA'. Alto Rio Maracá: 1 ♂, MPEG 800 (holotype of *Arthrosaura amapaense*), 2 ♂♂, 2 juvs., MPEG 802-5 (paratypes of *A. amapaense*), 1959, all leg. M. Moreira. Serra do Navio: 1 ♂, RMNH 25269, 20.xi.1988, 1 ♀, MPEG 15059, 8.xi.1988, both leg. M. S. Hoogmoed & T. C. S. Avila Pires. MARANHÃO. Nova Vida, 25 km from Rio Gurupi on BR-316: 1 ex., MPEG 12895, 23.ii.1976, leg. O. R. Cunha & F. P. Nascimento.— **Suriname.** Distr. SIPALIWINI (formerly NICKERIE). Avanavero falls, Kabalebo river: 1 ♀, 1♂, RMNH 25266-7, 23.vii.1975, leg. M. S. Hoogmoed & W. N. Polder. Geological Survey Camp on Lucie river, 10 km NE airstrip Coeroeni: 1 ♂, RMNH 25265, 16.ii.1975, leg. M. S. Hoogmoed. Tafelberg, 3rd camp, topplateau 600 m: 1 ♀, RMNH 25268, 3/4.vii.1979, leg. M. S. Hoogmoed & W. N. Polder. Airstrip Kayser Mountains, 1♀, 1♂, FMNH 128979-80, 1.ii.1961, leg. H. A. Beatty. 4 km NW airstrip Sipaliwini: 1 ♀, 3 ♂♂, RMNH 16374, 10.ii.1970, leg. M. S. Hoogmoed & J. J. P. Paats. PARA. 65 km SSE Paramaribo, Afobaka road: 1♀, 1♂, AMNH 108772, 108774, 12/13.ii.1972, leg. C. W. Myers & J. Daly. CORONIE. Coronie road, km 0.8: 1 ♂, RMNH 13445, 19.xii.1948, leg. Suriname Expedition 1948-49.— **Guyana.** RUPUNUNI. Isherton: 1 ♀, AMNH 70623, 5.xi.1937, leg. R. Snedigar. Kuyuwini landing: 1 ♀, AMNH 57454, leg. R. Snedigar.

Literature data.— **Colombia.** AMAZONAS, PUTUMAYO, VAUPES (Ayala, 1986). PUTUMAYO: Puerto Asís (Medem, 1969). VAUPES: Rio Cananari; Alto Apaporis (Medem, 1969).— **Ecuador.** PASTAZA: Misión and Chuintza (Almendariz, 1987).

Diagnosis.— A small microteiid lizard with cylindrical body, tail round in cross section, and with relatively short limbs. Distance between forelimbs and hindlimbs 1.5-2.5 times as long as a forelimb. Three supraoculars, the last one followed by four or five large scales bordering the parietal laterally. Seven supralabials, second small,

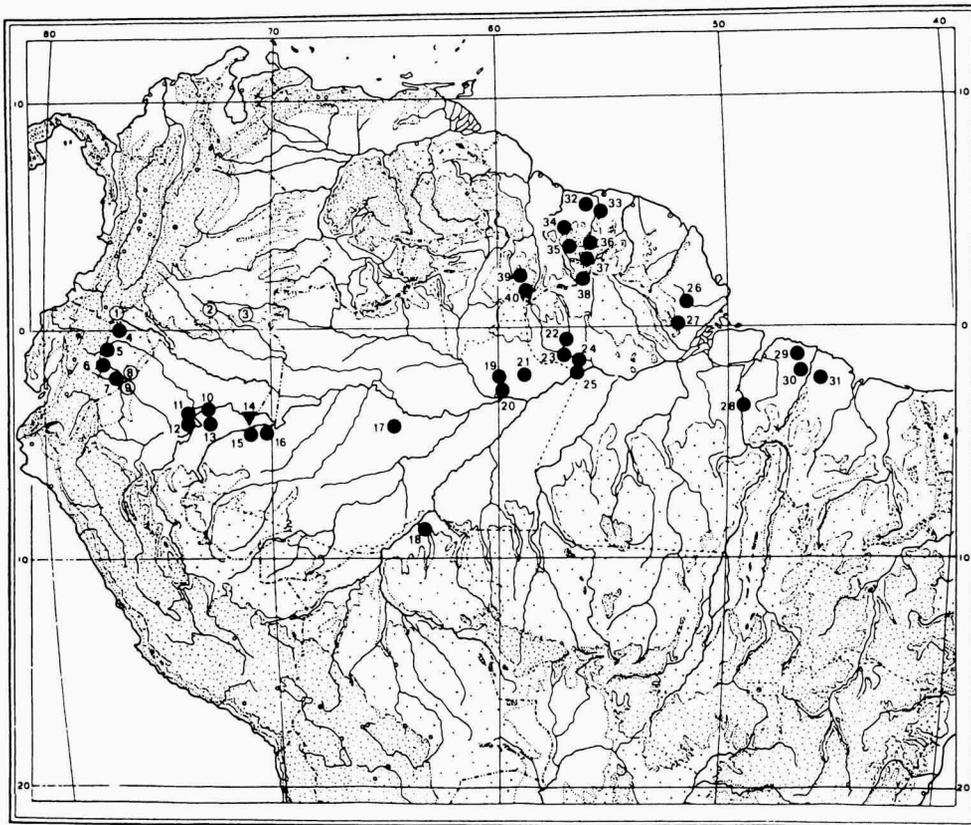


Fig. 3. Distribution of *Arthrosaura reticulata* (dots and numbers in circles) and *A. kockii* (inverted triangle; only one "outlying" locality in Peru). Colombia: 1. Puerto Assis, 2. Alto Rio Apaporis, 3. Rio Cananari. Ecuador: 4. Santa Cecilia, 5. Misahualli, 6. Canelos (type locality of *A. reticulata*), 7. Montalvo, 8. Chuintza, 9. Misión. Peru: 10. Yanamono, 11. Moropon, 12. Mishana, 13. Centro Union, 14. Rio Ampiyacu (outlying locality for *A. kockii*). Brazil: 15. Estirão do Ecuador, 16. Benjamin Constant, 17. E. of Porto Urucu, 18. Cachoeira Samuel, 19. ZF-2, 60 km N Manaus, 20. Reserva Ducke, 21. Balbina, 22. Trombetas, 67 km NNE mouth Rio Mapuera, 23. Cachoeira Porteira, 24. Cruz Alta + porto Trombetas, 25. Igarapé Jamari, Faro, 26. Serra do Navio, 27. Alto Rio Maracá (type locality of *A. amapaense*), 28. Tucurui, 29. Cacoal, 30. km 74 of BR 316, 31. Nova Vida. Suriname: 32. Coronie road, 33. 65 km SSE Paramaribo, 34. Avanavero falls, 35. 10 km NE airstrip Coeroeni, 36. Tafelberg, 37. Airstrip Kayser Mountains, 38. Airstrip Sipaliwini. Guyana: 39. Isherton, 40. Kuyuwini landing. Open symbols refer to literature data.

sixth highest and largest, border between second and third under the loreal or under the anterior part of the frenocular, that between fourth and fifth under the middle of the eye. High number (22-48) of temporals. Number of scales around midbody 35-52. Back uniformly brown, brown with one vertebral dark line or brown with two paravertebral dark lines. Underside immaculate cream, except for the labials, sides of chinshields and gulars, which may have irregular dark spots.

Description.— A microteiid lizard with a maximum snout-vent length in males of 71 mm (Hoogmoed, 1973), in females of 70 mm (Duellman, 1978). Headlength

(distance tip of snout - anterior edge of ear) 0.20-0.27 (0.22 ± 0.01 , $n=96$)* times the snout-vent length (mostly around 0.24 in the smaller specimens, 0.20-0.22 in the larger), head 1.2-1.7 (1.49 ± 0.07 , $n=96$) times as long as wide, and 1.1-1.6 (1.36 ± 0.10 , $n=96$) times as wide as high. Snout blunt, rising gently posteriad. Neck as wide as the head and anterior part of the body. Body cylindrical, slightly depressed. Tail 1.0-2.1 (1.71 ± 0.18 , $n=53$) times the snout-vent length (mostly between 1.4-1.6 in the smaller specimens, 1.8-1.9 in the largest specimens); round to squarish (at base) in cross section, tapering toward the tip. Limbs well developed, forelimbs 0.22-0.30 (0.26 ± 0.02 , $n=84$) times the snout-vent length, hindlimbs 0.36-0.50 (0.41 ± 0.03 , $n=83$) times. Distance between forelimbs and hindlimbs 1.5-2.5 times the length of a forelimb.

Tongue lanceolate, covered with imbricate, scale-like papillae, with a smooth, bifid tip. Anterior teeth conical, more posteriad bicuspid and tricuspid.

Rostral rectangular to hexagonal, 2.5-3 times as wide as high, visible from above, in broad contact with the frontonasal. Frontonasal single, pentagonal, laterally in contact with the nasal and the loreal. Prefrontals irregularly pentagonal, slightly wider than long or slightly longer than wide, with a short to relatively long medial suture; laterally in contact with the loreal and first supraocular, occasionally touching the second supraocular. Frontal hexagonal, one and a half to two times as long as wide, slightly wider anteriorly; laterally concave, in contact with the second supraoculars over their entire length, usually a short border with the first, and occasionally with the third supraoculars. Frontoparietals irregularly pentagonal, about as long as wide, with the medial suture short to relatively long, each one in contact with the frontal, the third (and occasionally the second) supraoculars, one parietal, and the interparietal. Interparietal elongate, irregularly pentagonal, with the sides parallel, diverging or converging posteriorly; as long as, but distinctly narrower than the parietals; posteriorly the three scales form a relatively straight margin, anteriorly each is obtusely angulate; in MPEG 14893 the parietals are transversely divided posteriorly. Occipitals forming a row of four to seven roughly squarish (occasionally elongate or transversely enlarged), smooth scales. Three supraoculars, first smallest, second and third subequal. Four or five, rarely six, supraciliaries, the first distinctly larger; usually the first and last one elongate and the median ones short. Nasal undivided, nostril approximately at the centre, directed lateroposteriorly. Loreal usually approximately rectangular, in contact with the nasal, the second (and sometimes the third) supralabial, the frenocular, a small preocular, the first supraciliary, the first supraocular, one prefrontal, and the frontonasal; sometimes about quadrangular, separated from the supralabials by the frenocular being in contact with the nasal. Frenocular quadrangular to trapezoid, mostly distinctly smaller than the loreal, rarely subequal; followed by three to six, usually four or five, suboculars. A row of three, occasionally four, postoculars, increasing in size dorsally. Lower eyelid with a semi-transparent disc of two to four, exceptionally five, palpebrals. Seven supralabials, the border between the fourth and the fifth below the middle of the eye; the second supralabial

*The numbers between brackets are the mean and the standard deviation; n refers either to the number of specimens or to the number of counts obtained in characters that could be measured on left and right side of a specimen.

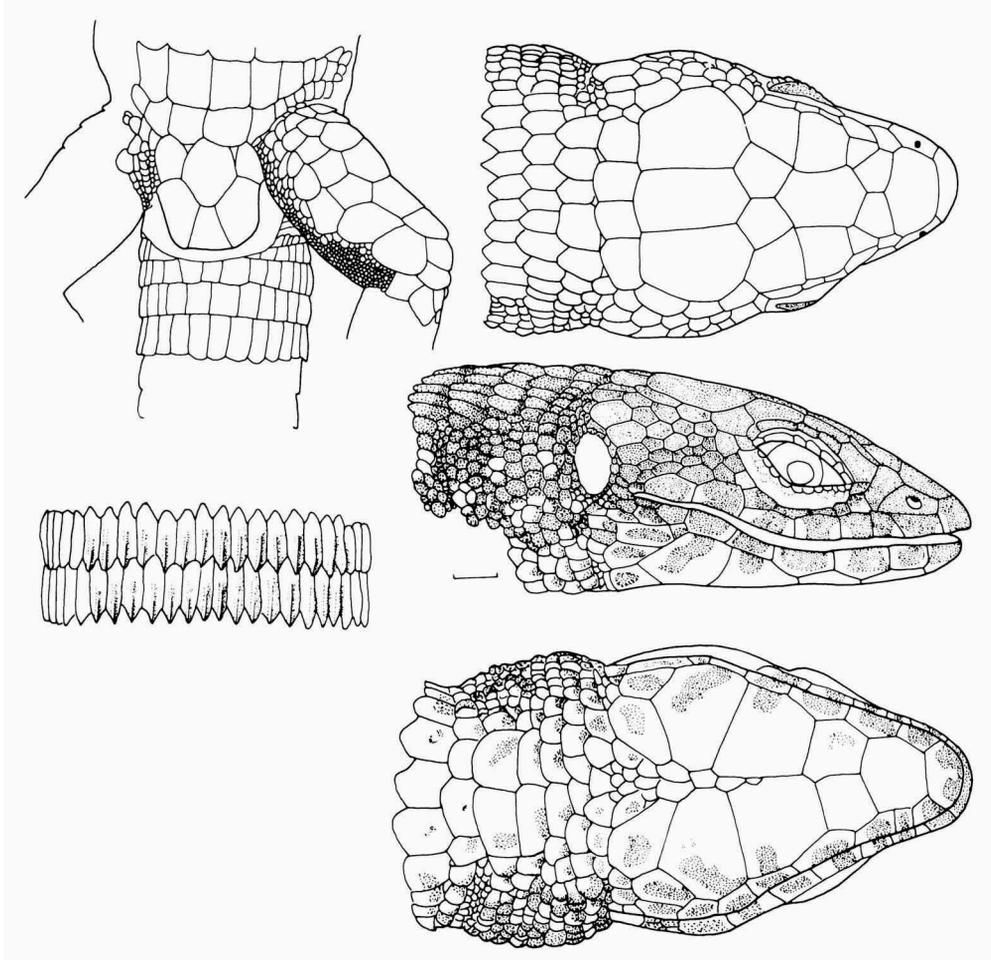


Fig. 4. *Arthrosaura reticulata* (O'Shaughnessy), ♀, RMNH 25268, dorsal, lateral and ventral view of head, anal region and detail of dorsals. The line represents 1 mm.

small, generally with a rather oblique anterior border, causing it to be (much) narrower at the top than at the base (not in specimens from Ecuador and western Brazil); sixth supralabial highest and largest; suture between second and third supralabial under the loreal or under the anterior part of the frenocular. Temporal scales 22-48 (31.8 ± 4.7 , $n=102$), variably polygonal, tending to be hexagonal toward the centre, slightly convex, juxtaposed, smooth; larger posteriorly, either gradually increasing in size, or with one or two vertical rows of larger scales. Four or five (rarely three) scales bordering the parietals. Ear-opening relatively large, semicircular to oval, surrounded by small scales, anteriorly forming a slightly undulating margin, posteriorly smooth; tympanum recessed into a short auditory meatus.

Mental trapezoid or semicircular, followed by a large, heptagonal postmental.

Four pairs of chinshields, the first two pairs in contact with the infralabials and forming medial sutures; medial suture of the second pair of chinshields (much) longer (1.2-2.6 times) than that of the first pair; the third pair in contact with the infralabials, the members of the pair usually separated medially by one small scale, rarely in medial contact; fourth pair widely separated from the infralabials, and medially the members of this pair are separated by one to several scales; in MPEG 14893 there is a fifth pair of chinshields. Scales on the chin sometimes separated from the gulars by a(n) (incomplete) row of small scales. Gulars imbricate, smooth, quadrangular with rounded posterior margin, larger posteriorly; in six or seven, occasionally four or five, transverse rows, of which two to four with a median pair of enlarged scales. Collar with five to eleven scales, forming a lobed posterior margin; median scales subequal, decreasing in size laterally. Gular fold distinct.

Dorsal and lateral head scales with a row of small pits along their margin, sometimes with pits scattered over the scales. Ventral head scales may also have pits. Dorsal scales of body and tail with few small pits along the posterior part of the lateral margins.

Scales on the nape longer than wide, imbricate, in transverse rows, anteriorly smooth to broadly keeled, the posterior margin rounded to bluntly pointed; posteriorly grading into the dorsals. Sides of the neck with distinctly smaller, squarish to sub-oval or round scales, juxtaposed to subimbricate. Dorsals hexagonal, elongate, distinctly keeled, mucronate, in 25-31 (28.2 ± 1.4 , $n=96$) transverse rows between the interparietal and the posterior level of the hindlimbs (including the occipitals and the scales on the nape). Flanks with scales similar to the dorsals, except near the border with the ventrals, where they decrease in size and become less acutely pointed; closer to the limb insertions some intercalated vertical rows of smaller scales appear between the wedge-shaped rows of laterals. Ventrals imbricate, in 15-20 (17.3 ± 1.0 , $n=96$) transverse rows; 10-14 ventrals in a transverse row at midbody, of which six form continuous longitudinal rows between the pectoral area and the preanal plate, the two median ones with rectangular smooth scales, the lateral ones distinctly narrower, bluntly pointed; the scales at the lateral end of each transverse row distinctly smaller. Ventrals and laterals sharply demarcated by a zone of small scales. Scales around midbody 35-52 (42.0 ± 3.4 , $n=96$). Preanal plate either with one anterior and three posterior scales, laterals larger; one anterior and five posterior scales, central scales larger; or three elongate scales; in USNM 196068 both the anterior and the median posterior scales are divided, resulting in 2+6 scales. Males mostly with two preanal pores (1-1 and 1-2 in the two males (USNM 196069, 196071) studied from Ecuador), and four to seven femoral pores, at each side; in females, none or one small preanal pore per side is present, and none or one small femoral pore, located either proximally or distally on the thigh. Pores between three or four scales.

Scales on the tail dorsally and laterally hexagonal, keeled, imbricate, mucronate, in transverse rows, smaller than the dorsals; similar, but smooth and blunt, on the underside.

Scales on the upper side of the upper arms and most of the forearms variably polygonal, smooth, imbricate, larger on the anterior aspect; on the underside of the upper arms and along a narrow band on the inner side of the forearms, scales small, roundish. Thighs with a row of large, trapezoid scales on their anterior aspect, bor-

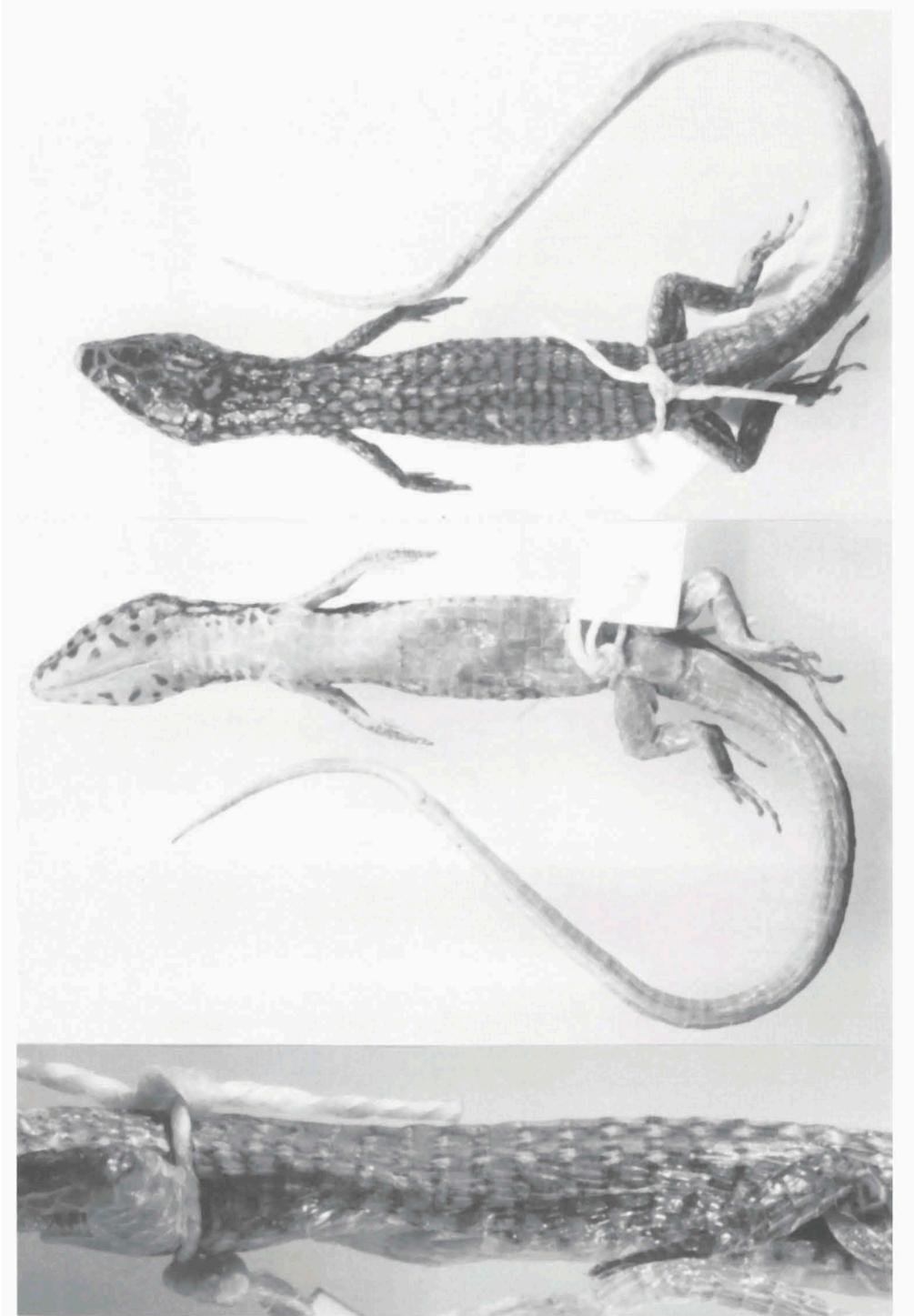


Fig. 5. Dorsal and ventral view, and detail of right flank of the holotype of *Arthrosaura reticulata* (O'Shaugnessy), ♀, BMNH 1946.9.1.5, s-vl 43 mm.

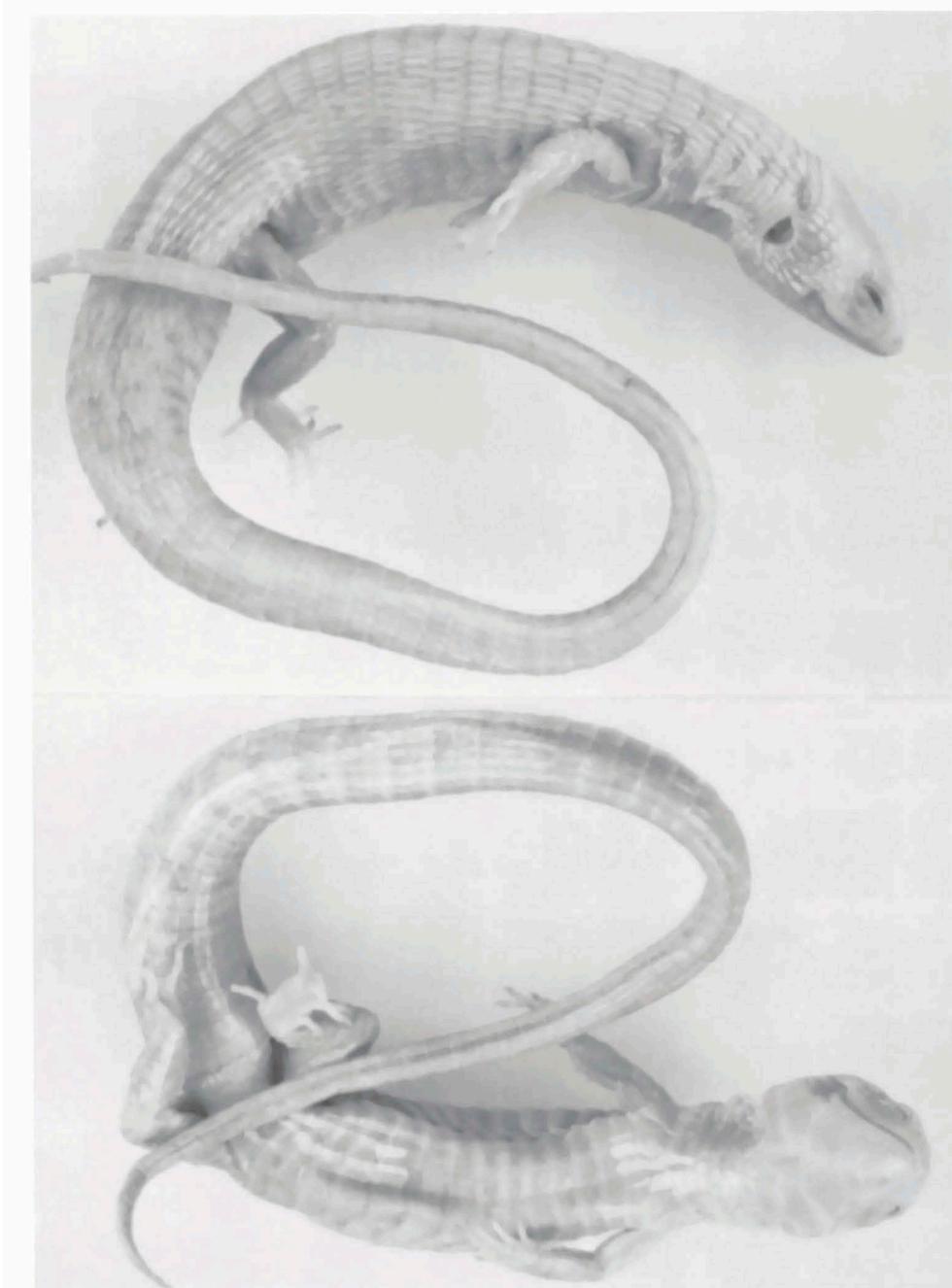


Fig. 6. Laterodorsal and ventral view of the holotype of *Arthrosaura amapaense* Cunha, ♂, MPEG 800, s-
vl 56 mm.

dered at both sides by two to three rows of relatively large, polygonal scales, which ventrally are smooth, in regular rows, and reach the line of pores (or the equivalent area in females); dorsally the scales are slightly keeled, grading over a short distance into small, granular, juxtaposed scales, which cover part of the dorsal, and the posterior aspects of the thighs. Underside of the lower legs with relatively large, rhomboid or hexagonal, smooth, imbricate scales; on the upper side the scales are smaller and slightly keeled, from the anterior toward the posterior aspects decreasing steadily in size and becoming juxtaposed. Subdigital lamellae medially divided, except distally; 12-19 (14.2 ± 1.3 , $n=185$) under the fourth finger, 16-25 (20.2 ± 2.0 , $n=182$) under the fourth toe.

Of several specimens the colour in life was noted in the field and colour slides of several other specimens are available. The top of the head and the back are brown, the back with or without paravertebral rows of black spots; a dorsolateral row of black spots, alternating with yellow brown spots may be present; side of neck with round yellow-white spots; flanks partly brown, partly sepia with buff yellow spots or with horizontal and vertical rows of yellow-brown spots; tail above brown with paravertebral rows of black spots and dorsolateral rows of yellow-brown spots, side of tail black with longitudinal rows of round yellow-brown spots or above and at the sides orange-red or simply orange; chin white, flesh colour or pink with brown spots, throat white or orange, belly yellow-white to orange-yellow, orange or chrome-orange, underside of tail orange-red, orange or salmon; underside of hindlimbs as belly; iris brown, brown with an orange rim, or golden; tongue anteriorly blue-grey, posteriorly pink-white. Adult males may have brightly orange undersides, possibly related to breeding condition.

In preservative, head dorsally uniformly brown, back either uniformly brown, brown with one vertebral band, or brown with two paravertebral dark greyish-brown bands, which are either dashed or with round light spots enclosed, or brown with irregular dark greyish-brown lines along the borders of the anterior margin of the transverse rows of scales; on the nape, pale light spots, surrounded by a dark line, may be present. Sides of the head and flanks usually dark greyish-brown with longitudinal rows of rounded light spots along the neck and anterior part of the body, posteriorly changing into irregular light spots. In specimens from Benjamin Constant, at each side there are a dorsolateral dark greyish-brown band, with enclosed light spots, starting at the posterior corner of the eye, and a lateral row of larger light spots surrounded by a dark line starting at the posterior margin of the ear-opening, both rows tending to become indistinct on the posterior part of the body; on the neck the lateral light spots may be bordered ventrally by even slightly larger, sometimes incomplete, light, dark bordered, spots. Limbs brown, usually irregularly spotted. Tail frequently with a dorsolateral series of light spots, irregularly margined by dark brown, and another series of smaller spots ventrolaterally; an intermediate series of less bright light spots may also be present; sides of tail usually darker than the dorsal area, sometimes of same colour. Ventral region mostly uniformly cream, except for the labials, sides of the chinshields, and the gulars, which may have irregular, dark greyish-brown spots (variably among specimens, some with only the labials spotted).

Distribution.— Known from the eastern slopes of the Andes in Ecuador to the mouth of the Amazon (eastern Pará and Maranhão), north to Vaupés, Colombia

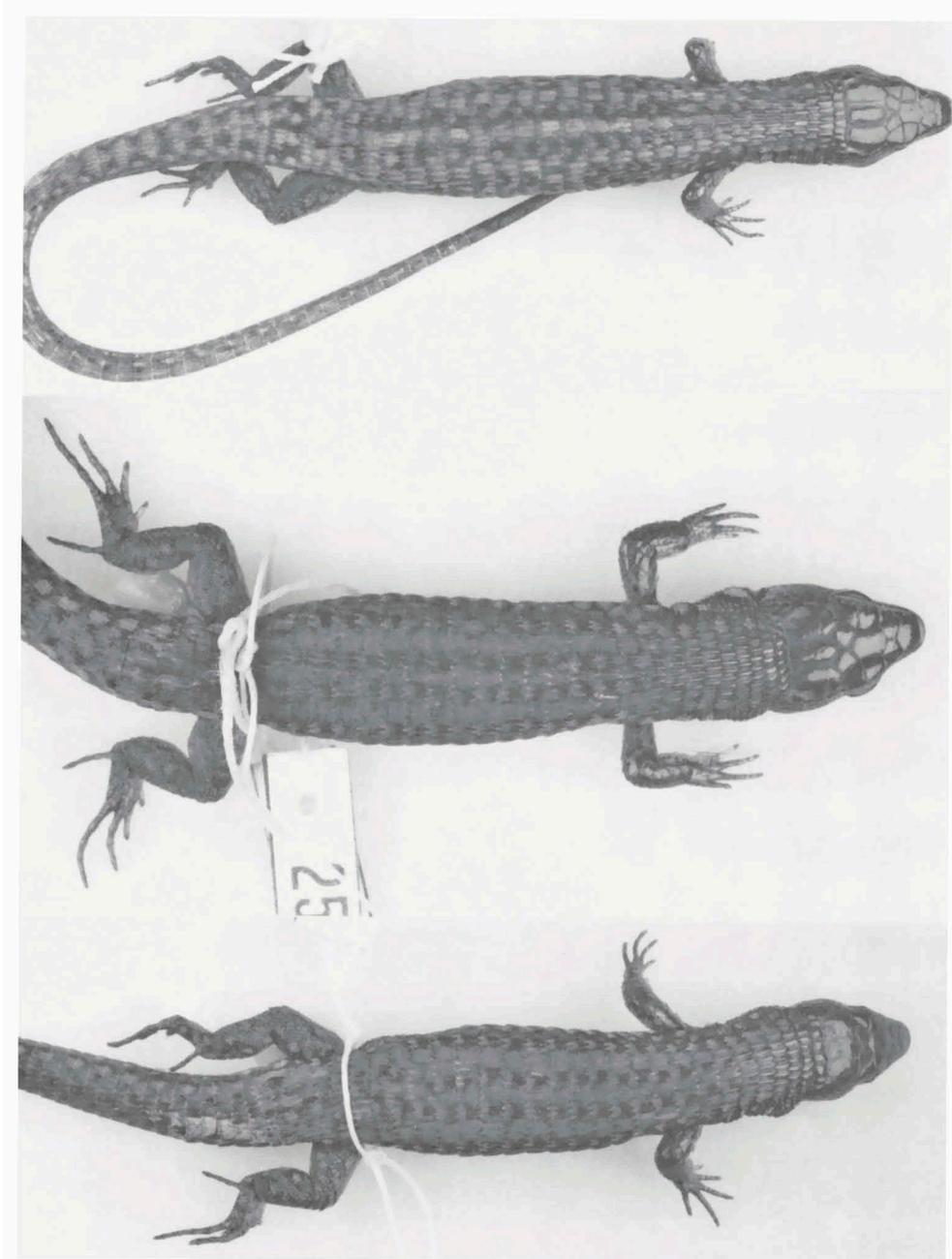


Fig. 7. Specimens of *Arthrosaura reticulata* (O'Shaugnessy), showing variation in dorsal pattern. From top to bottom: ♀, KU 109823, s-vl 70 mm; ♂, RMNH 25276, s-vl 56 mm; ♂, RMNH 25265, s-vl 51 mm.

(Ayala, 1986: 572) and northern Suriname, south to the Iquitos region, Peru (Dixon & Soini, 1986: 45), and to Urucu, Cachoeira Samuel and Tucurui, Brazil (present paper), with localities known in Colombia, Peru, Brazil (Amazonas, Pará, Maranhão, Rondonia, Amapá), Guyana, Suriname, French Guiana. Sympatric (even syntopic) with *A. versteegii* in at least one locality in Suriname (Sipaliwini), and in the Guianas and the eastern part of Pará with *A. kockii*. In the western part of its range (west of Suriname) it is the only species present in lowland localities (fig. 3). The species is known from altitudes between 30 and 600 m.

Habitat.— All specimens for which habitat data are available were collected in forest, either primary terra firme forest or secondary forest, always in leaf litter on the ground, or on the ground under objects. Often specimens were associated with water, either with riverbanks, creeks, dry creek beds, swampy areas in forest or small puddles in jeep trails.

Natural history.— All specimens with more detailed collecting data were collected in daytime between 9.00 and 16.30 h. There is one exception to this rule, RMNH 25269 was collected fully active between 22.00 and 23.00 h during a night with nearly full moon. At the same time many more species of active 'diurnal' lizards were collected. This matter has been dealt with more extensively by Hoogmoed & Avila-Pires (1990).

Remarks.— The literature data seemed to indicate that two subspecies existed in *A. reticulata*, one occupying the western part of the range of the species, the other the eastern part. Actually, most specimens mentioned in the literature as *A. r. versteegii* turned out to be *A. reticulata* as here understood, whereas only few really were different and here are considered as a different taxon, *A. versteegii*. However, although some geographical variation can be observed in *A. reticulata*, it is not possible to separate the material into two internally homogeneous groups, or two extreme groups separated by an area with intermediate or mixed characters, as would be expected if two subspecies existed. The following variation has been observed: (1) four supraciliaries predominate in specimens from Suriname and Manaus, while five is more common in all other localities in Brazil; rarely the number of supraciliaries may be three or six; (2) among the material examined, a few specimens have a short suture between the third pair of chinshields, while in the majority of specimens it is separated by one to a few scales (the second pair in most cases is completely in contact, but in some specimens the posterior half is separated by one scale); (3) as already shown by Hoogmoed (1973), the number of scales on the preanal plate is variable; three preanal scales were found in three specimens each from Suriname and Balbina, in two from eastern Pará, in one from Cruz Alta; 1+3 were found in seven specimens from Suriname, in five from Faro, in two each from Cruz Alta, Trombetas and Rondônia, in four from Balbina and in 1 from Ducke; 1+5 were present in five specimens from Suriname, in two from Amapá, in one each from Trombetas, Urucu and southwestern Amazonia, in ten from Balbina, in two from near Manaus, in eight from Benjamin Constant, in two from Estirão do Equador, in one from Venezuela, in eight from Peru and in ten from Ecuador; 1+6 in one specimen each from Venezuela, Peru and Ecuador; 3+5 in one from Peru and 2+6 in one from Ecuador; (4) all specimens from Suriname, the only two observed from eastern Pará, and most of the specimens from Balbina and Manaus, have ten ventrals in a transverse row at midbody, while most of the specimens from Faro and Cruz Alta have twelve, and those from

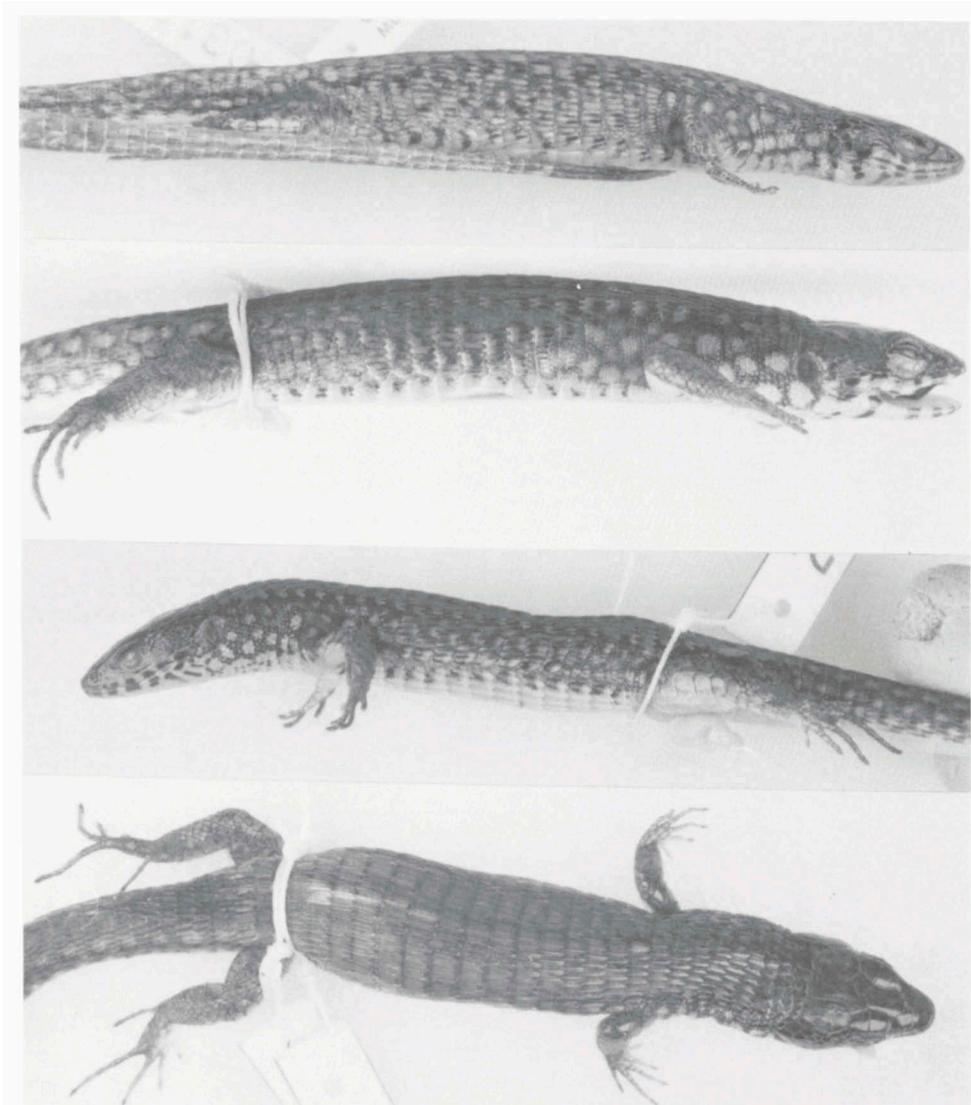


Fig. 8. Specimens of *Arthrosaura reticulata* (O'Shaugnessy), showing variation in pattern of flanks and of dorsum. Same specimens as in fig. 6, except lowermost specimen is ♀, RMNH 25270, s-vl 53 mm.

Benjamin Constant, and one from Urucu, have mainly twelve or fourteen (however, all specimens agree in having only six continuous longitudinal rows of ventrals, the additional scales lateral of them are smaller and not in contact); (5) most specimens observed have two or three, occasionally four, palpebrals, but the specimens from Faro and Cruz Alta have mostly four, occasionally three or five; (6) similarly, most specimens have seven transverse rows of gulars, occasionally eight, while all specimens from Benjamin Constant have eight; (7) the three females studied from Benjamin Constant show a small, indistinct, distal femoral pore, not observed in specimens from other localities; (8) specimens from Ecuador and western Brazil have

seven supralabials, separated from each other by vertical sutures, whereas in the remainder of the range the number of supralabials also is seven, but the border between the first and second supralabial is obliquely sloping backwards (fig. 4). Some variation in colour pattern, linked to populations, may also be observed.

In conclusion, *A. reticulata* does show some degree of geographical variation, but there is no readily recognizable pattern which would allow a division into subspecies.

***Arthrosaura versteegii* Van Lidth de Jeude, 1904**
(figs. 9-13)

Arthrosaura Versteegii Van Lidth de Jeude, 1904: 89.

Arthrosaura versteegii; Burt & Burt, 1931: 312, 313; Brongersma, 1932: 77, 78, 79, 81, 82, 83, 84, 85, 86; Burt & Burt, 1933: 56; Peters & Donoso-Barros, 1970: 75 (partly).

Arthrosaura reticulata versteegii; Brongersma, 1935: 264; Hoogmoed, 1973: 242 (partly); Hoogmoed & Lescure, 1975: 155 (partly); Gasc, 1976: 28; Vanzolini, 1986: 6 (partly); Gasc, 1981: 306 (partly).

Arthrosaura reticulata; Gasc, 1990 (partly): 23, 71, 75; Mittermeier et al., 1990: 29 (partly).

Material.— **Venezuela.** BOLIVAR. 24 km NE Kavanayen, along road to Fuerte Cagramasu: 2 hgr. ♀, RMNH 25261-2, 17.v.1978, leg. M. S. Hoogmoed & P. Gibbs.— **Suriname.** Distr. SIPALIWINI (formerly NICKERIE). Kabalebo area, road to Amotopo km 117, 4 km S Baruba creek: 1 hgr. ♀, RMNH 25263, 18.ix.1980, 1 juv., RMNH 25264, 27.ix.1980, both leg. M. S. Hoogmoed & J. J. P. Paats. Airstrip Sipaliwini: 1 hgr. ♀, RMNH 13443, ii.1961, leg. D. C. Geijskes. (formerly distr. MAROWIJNE). Nassau Mountains, km 9.1: 1 juv., RMNH 13444, 10.iii.1949, leg. Suriname Expedition 1948-49. Lely Mountains, Camp IV: 1 juv., RMNH 25260, 30.ix.1974, leg. M. S. Hoogmoed. Koulimapopane: 1 ♂, MNHNP 1975-2438, leg. J. P. Gasc.— **French Guiana.** Cottica Mountains: 1 ♂, RMNH 4469, 1903, leg. G. M. Versteeg (Gonini Expedition) (holotype).

Diagnosis.— A small microteiid lizard with cylindrical body and tail and relatively short limbs. Distance between forelimbs and hindlimbs 2.3-2.6 times as long as a forelimb. Three supraoculars, the last one followed by three or four large scales bordering the parietal laterally; six supralabials, fourth under the eye, fifth highest and largest, suture between second and third under posterior part frenocular or beyond. Low number (18-26) of temporals. Number of scales around midbody 31-38. Dorsum brown, with a light dorsolateral stripe or series of spots on the posterior part of the head, the neck and the anterior part of the body. Underside immaculate, except outermost lateral area that may show indistinct small dark spots.

Description.— A microteiid lizard with a maximum snout-vent length in males of 49 mm, in females of 47 mm. Headlength (distance snouttip - anterior edge of ear) 0.18-0.24 (0.20 ± 0.02 , $n=9$) times the snout-vent length, head 1.43-1.66 (1.53 ± 0.08 , $n=9$) times as long as wide, and 1.15-1.47 (1.35 ± 0.09 , $n=9$) times as wide as high. Temporal region in males distinctly swollen. Snout blunt, rising gently posteriad. Neck as wide as the head and anterior part of the body. Body cylindrical, slightly depressed. Tail 1.4-1.9 (1.6 ± 0.2 , $n=5$) times the snout-vent length; round to squarish (at base) in cross section, tapering toward the tip. Limbs well developed, relatively short, forelimbs 0.22-0.25 (0.22 ± 0.02 , $n=8$) times the snout-vent length, hindlimbs 0.30-0.42 (0.35 ± 0.05 , $n=8$) times. Distance between forelimbs and hindlimbs 2.3-2.6 times the length of a forelimb.

Rostral rectangular to hexagonal, 2-2.5 times as wide as high, visible from above,

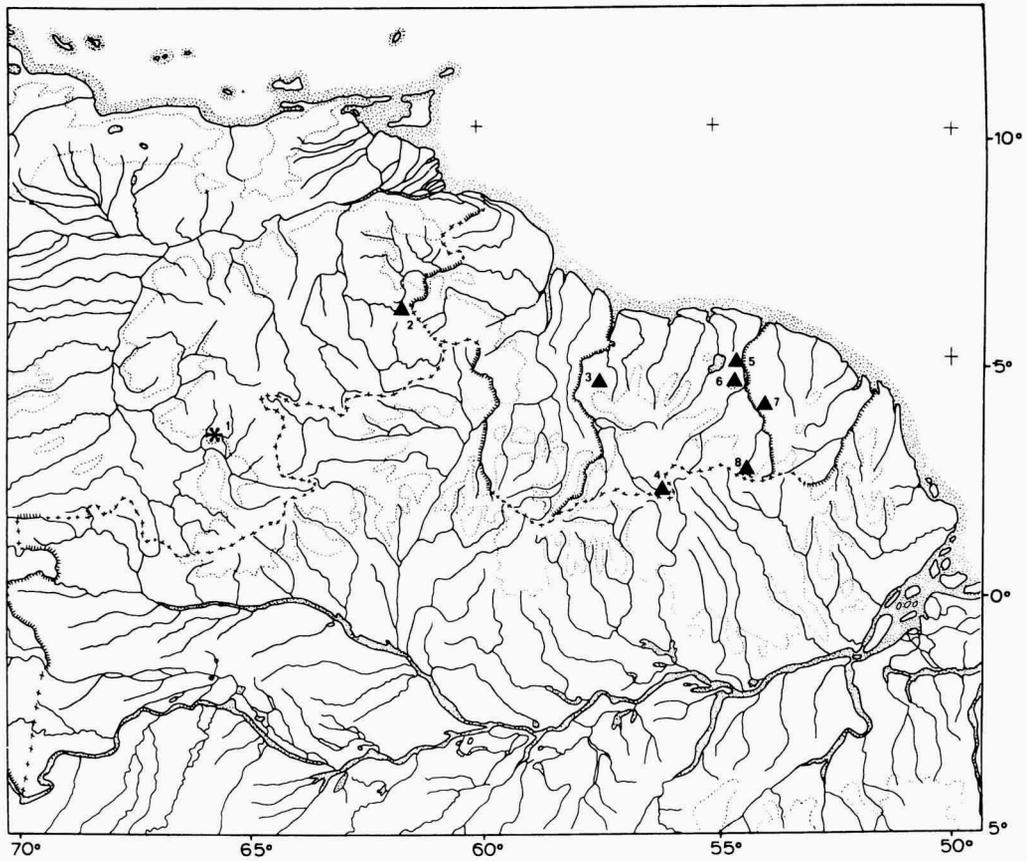


Fig. 9. Distribution of *Arthrosaura tyleri* and *versteegii*. Venezuela: 1. Mount Duida (type locality of *A. tyleri*), 2. 24 km NE Kavanayen. Suriname: 3. Kabalebo, road to Amotopo km 117, 4. Airstrip Sipaliwini, 5. Nassau Mountains, 6. Lely Mountains, 8. Koulimapopane. French Guiana: 7. Cottica Mountains (type locality of *A. versteegii*).

in broad contact with the frontonasal. Frontonasal single, roughly pentagonal, laterally in contact with the nasal and the loreal or only just touching the loreal. Pre-frontals irregularly pentagonal, wider than long or as long as wide, with a short to relatively long medial suture; laterally in contact with the loreal and first supraocular, occasionally also touching the second supraocular, or only in contact with the first supraocular. Frontal hexagonal, one and a half to two times as long as wide, as wide anteriorly as posteriorly; laterally concave, in contact with the second supraoculars over nearly their entire length, usually a short border with the first, and occasionally with the third supraoculars. Frontoparietals irregularly pentagonal, slightly longer than wide, with a short medial suture, each one in contact with the frontal, the third (and often the second) supraoculars, one parietal, and the interparietal. Interparietal elongate, irregularly pentagonal, with the sides more or less parallel, often concave; as long as, but distinctly narrower than the parietals; posteriorly the three scales form a relatively straight margin, anteriorly each is obtusely angulate. Occipitals forming a row of six (sometimes five) roughly squarish, smooth scales.

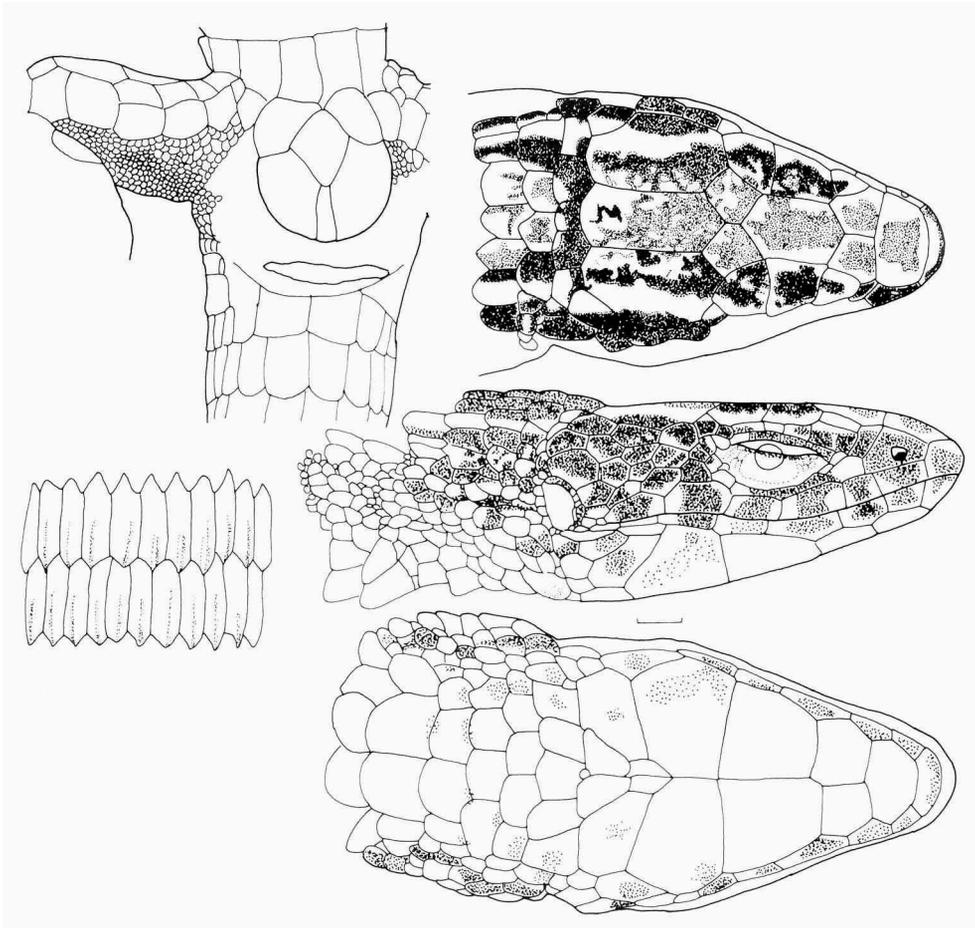


Fig. 10. *Arthrosaura versteegii* Van Lidth de Jeude, ♀, RMNH 25263, dorsal, lateral and ventral view of head, anal region, and detail of dorsals. The line represents 1 mm.

Three supraoculars, first smallest, second and third subequal. Four, sometimes five or six, supraciliaries, the first largest; usually the last one elongate and the median ones short. Nasal undivided, nostril approximately at its base near the supralabials, directed lateroposteriorly. Loreal usually approximately rectangular, in contact with the nasal, the frenocular, a small preocular, the first supraciliary, the first supraocular, one prefrontal, and the frontonasal; always separated from the supralabials by the frenocular being in contact with the nasal. Frenocular trapezoid to pentagonal, about as large as the loreal. Followed by four suboculars. A row of three postoculars, increasing in size dorsally. Lower eyelid with a semitransparent disc of two or three palpebrals. Six supralabials, the fourth below the middle of the eye; fifth supralabial highest and largest; suture between second and third supralabials either under the posterior part of the frenocular or beyond. Temporal scales relatively large, 18-26 (21.2 ± 2.5 , $n=18$), variably polygonal, tending to be hexagonal toward the centre, slightly convex, juxtaposed, smooth; larger posteriorly, gradually increasing in size,

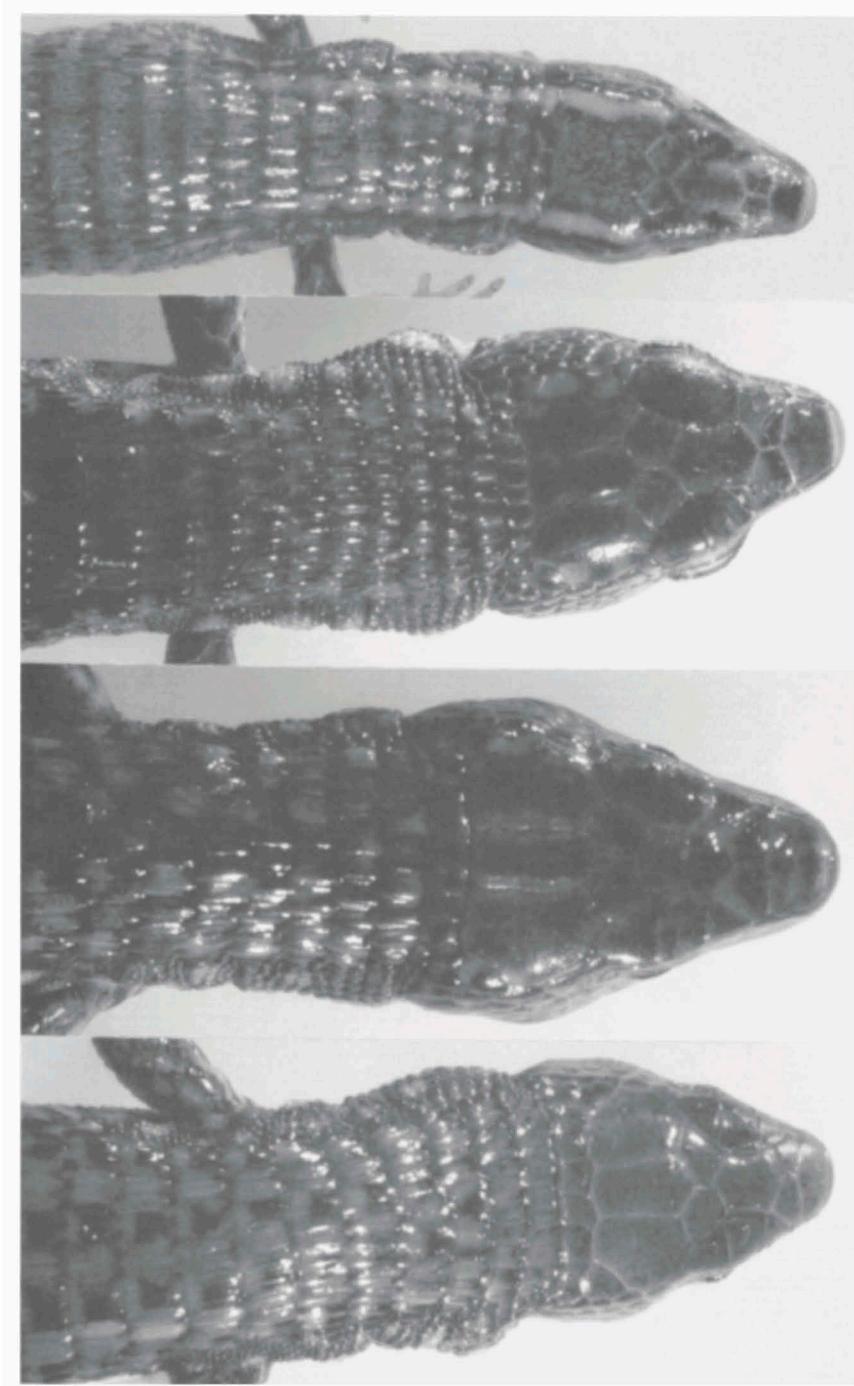


Fig. 11. Dorsal head and neck pattern in (from top to bottom) *Arthrosaura versteegii* Van Lidth de Jeude (♀, RMNH 25263, headlength including ear 9.6 mm) and *A. reticulata* (O'Shaugnessy) (♂, RMNH 25276, headlength including ear 12.8 mm; ♀, KU 109823, headlength including ear 15 mm; ♂, RMNH 25265, headlength including ear 11.7 mm).

with a very large scale just in front of the ear. Ear-opening relatively large, oval, surrounded by small scales, anteriorly forming a slightly undulating margin, posteriorly smooth; tympanum recessed into a short auditory meatus.

Mental more or less trapezoid with a semicircular (anterior) base, followed by a large, heptagonal postmental. Four pairs of chinshields, the first two pairs in contact with the infralabials and forming medial sutures; medial suture of the second pair of chinshields (much) longer (1.4-3.0 times) than that of the first pair; the third pair in contact with the infralabials, the members of the pair either separated medially by one small scale, or forming a medial suture (e.g. in the holotype); fourth pair widely separated from the infralabials, medially the members of this pair are separated by several scales. Gulars imbricate, smooth, quadrangular with rounded posterior margin, posterior ones larger, in five or six, rarely seven, transverse rows, of which three or four with a median pair of enlarged scales. Collar with seven or nine scales, forming a lobed posterior margin; median scales largest, scales decreasing in size laterad. Gular fold distinct.

Dorsal and lateral head scales with a row of small pits along their margin, sometimes with pits scattered over the scales. Some scattered pits on part of the ventral head scales. Dorsal scales of body and tail with few small pits along the posterior part of the lateral margins.

Scales on the nape longer than wide, imbricate, in transverse rows, anteriorly smooth, the posterior margin rounded to bluntly pointed; posteriad grading into the dorsals. Sides of the neck with distinctly smaller, rectangular to oval, juxtaposed scales, forming vertical rows, near the insertion of the forelimbs with intercalated areas of granules. Dorsals hexagonal, elongate, from nearly smooth (Suriname) to distinctly keeled (Suriname and Venezuela), mucronate, in 26-33 (27.9 ± 2.9 , $n=9$) transverse rows between the interparietal and the posterior level of the hindlimbs (including the occipitals and the scales on the nape). Flanks with scales similar to the dorsals, except near the border with the ventrals, where they decrease in size and become less acutely pointed; closer to the limb insertions appear some intercalated vertical rows of smaller scales between the wedge-shaped rows of laterals. Around the insertion of the forelimb there is a large, asymmetrically positioned oval zone with small granular scales, in the groin the scales in front of the hindlimb are square, smaller than the scales on the flanks. Ventrals imbricate, in 15-20 (17.6 ± 1.4 , $n=9$) transverse rows; ten ventrals in a transverse row at midbody, of which six form continuous longitudinal rows between the pectoral area and the preanal plate, the median ones with rectangular, smooth scales, the lateral ones with distinctly narrower, bluntly pointed, smooth scales; the scales at the lateral end of each transverse row distinctly smaller. Ventrals and laterals sharply demarcated by a zone of small scales. Scales around midbody 31-38 (34.1 ± 2.2 , $n=9$). Preanal plate in the holotype consisting of three elongate scales, in the other specimens one large anterior central and three (most) or five (one specimen only) posterior scales, central scales larger, lateral ones small; anterior scale flanked by two small scales. Males with two preanal pores and four or five femoral pores at each side; in females, none or one indistinct small preanal pore per side is present, and no femoral pores. Pores between three or four scales.

Scales on the tail dorsally and laterally hexagonal, keeled, imbricate, mucronate, in transverse rows, shorter than the dorsals; similar, but always smooth and blunt, in

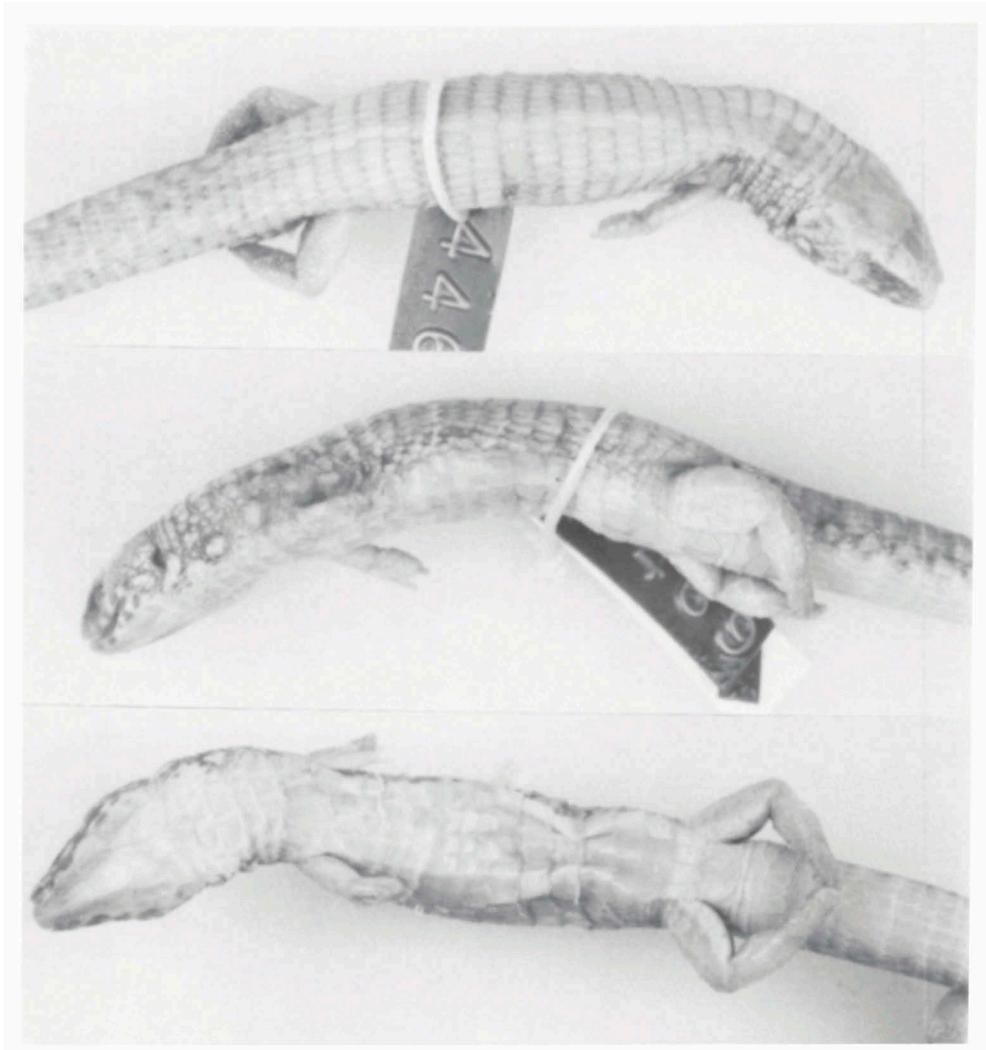


Fig. 12. Dorsal, ventral and lateral view of the holotype of *Arthrosaura versteegii* Van Lidth de Jeude, ♂, RMNH 4469, s-vl 49 mm.

six longitudinal rows on the underside.

Scales on the upper side of the upper arms and most of the forearms variably polygonal, smooth, imbricate, larger on the anterior aspect; on the underside of the upper arms and along a band on the inner side of the forearms, scales small, roundish. Thighs with a row of large, trapezoid scales on their anterior aspect, bordered ventrally by one to two rows of relatively large, smooth, polygonal scales, reaching the line of pores (or the equivalent area in females); bordered dorsally by one row of smooth to slightly keeled scales, grading into small, granular, juxtaposed scales, which cover part of the dorsal, and the posterior aspects of the thighs. Underside of the lower legs with relatively large, rhomboid or hexagonal, smooth, imbricate scales; on the upper side the scales are smaller, smooth or slightly keeled,

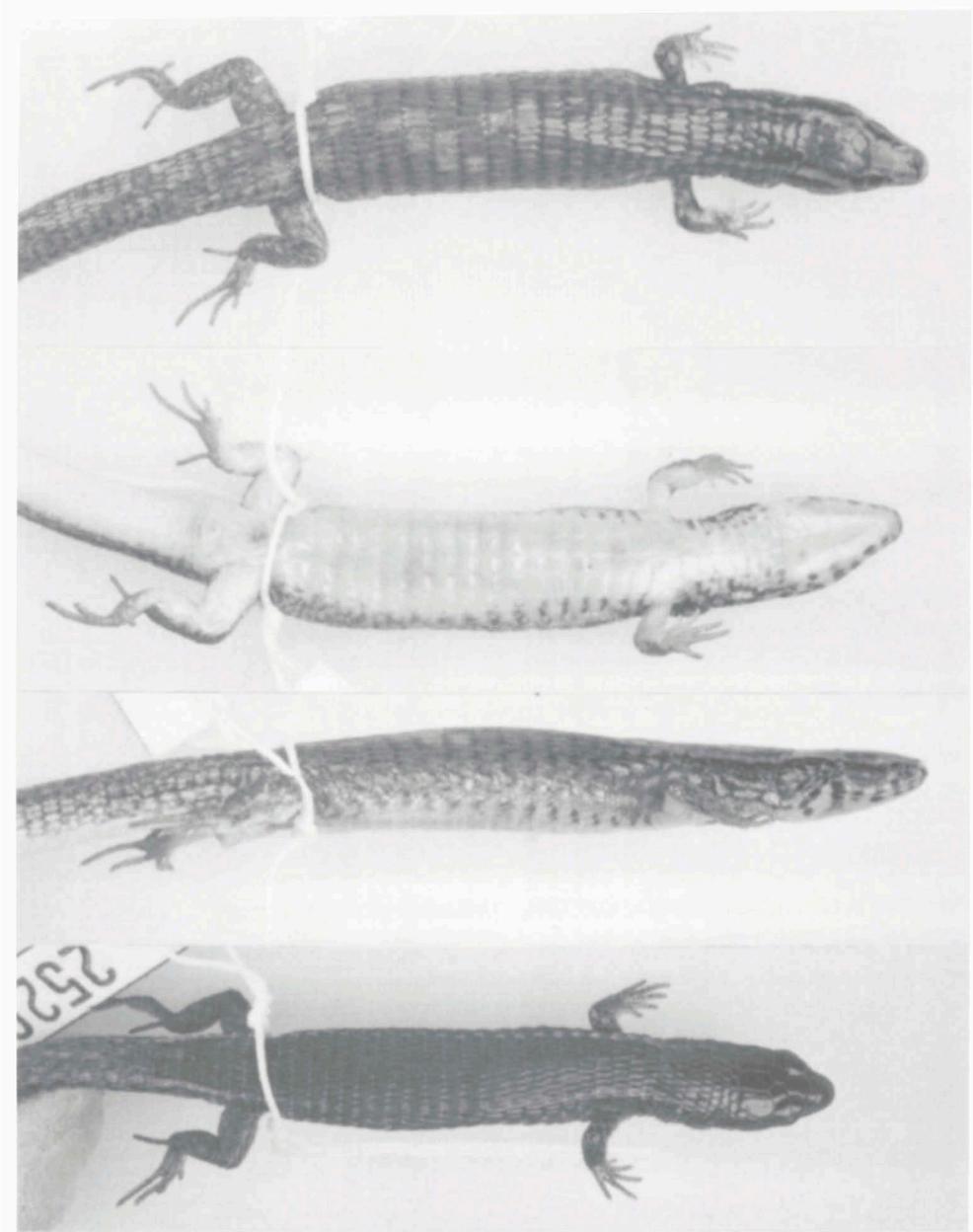


Fig. 13. *Arthrosaura versteegii* Van Lidth de Jeude. From top to bottom respectively dorsal, ventral and lateral view of ♀, RMNH 25263 (s-vl 45 mm), and dorsal view of ♀, RMNH 25262 (s-vl 40 mm). Note different expression of dorsolateral line throughout its length in both specimens.

large and imbricate on the anterior aspect, decreasing in size posteriad, in oblique rows. Subdigital lamellae medially divided, except distally; 9-12 (11.1 ± 0.9 , $n=14$) under the fourth finger, 15-20 (16.9 ± 1.6 , $n=16$) under the fourth toe.

Unfortunately in the field this species was not distinguished from *A. reticulata* and consequently no colour slides and only two not very extensive descriptions of colour in life are available. In life the back is dark brown with black dots; a light brown, anterior dorsolateral stripe that continues as a row of spots, in some specimens continued as a stripe over the sacrum and on the anterior part of the tail. Chin white, throat white or pink, belly white or pale orange. Underside of tail vivid orange, dorsally the tail is orange with a dark brown pattern. Upper and lower lip spotted black and white. Iris red.

In preservative, upper parts brown, with a distinct light dorsolateral stripe from the posterior corner of the eye to just beyond the insertion of the forelimbs, where it disappears; in its posterior part it may be broken up into spots; the light line may be enclosed by a darker brown zone. A light dorsolateral stripe in the sacral area, continued onto the base of the tail, or continued far onto the tail as a stripe (proximally only) or as a series of light spots (further down the tail). On the ventrolateral part of the tail a row of light spots is present, starting at the insertion of the hindlimbs. Dorsal head scales brown (Venezuela), or with a brown centre and light edges (Suriname). Lateral head scales dark brown, with hardly any light edges. Side of neck in its lower part with large white spots (specimens from Suriname) or with indistinct lighter areas (Venezuelan specimens). Only outermost two or three rows of ventrals with dark specks; rest of ventrals and subcaudals immaculate, light. Supra- and infralabials with dark brown spots. Only some indistinct brown infuscations on the lateral part of the chinshields.

Distribution.— Only known from a limited area in the Guianas (Eastern Venezuela, Suriname and western French Guiana), where in the east it is at least sympatric with two other species of *Arthrosaura* (see under *A. reticulata*) (fig. 9). Altitudes where it has been taken vary from 100 m in western Suriname to 630 m in eastern Suriname and to 1400 m in eastern Venezuela.

Habitat.— All specimens of which detailed collecting data are available were collected between leaf litter on the forest floor: RMNH 25261-2 in a small island of low forest in an open grassy savanna area (Gran Sabana), RMNH 25263-4 at the edge of a savanna forest near an open slab of granite ('laja') with sparse vegetation, RMNH 25260 in a shadowed drilling line in high primary forest.

Natural history.— All specimens of which detailed collecting data are available were collected in daytime, between 11.00 and 15.00 h.

Remarks.— *A. versteegii* can be distinguished from *A. reticulata* by its lower number of temporals (18-23 versus 22-48), its lower number of supralabials (six versus seven), its lower number of scales around midbody (31-38 versus 35-52), and the presence of distinct dorsolateral stripes anteriorly.

***Arthrosaura tyleri* (Burt & Burt, 1931)**
(figs. 9, 14, 15)

Pantodactylus tyleri Burt & Burt, 1931: 362.

Arthrosaura tyleri; Ruibal, 1952: 512; Donoso-Barros, 1968: 117.

Arthrosaura reticulata; Cunha, 1967: 153 (partly); Peters & Donoso-Barros, 1970: 75 (partly).

Material.— Venezuela. AMAZONAS. Summit of Mount Duida: 3 ♀♀, AMNH 36645 (holotype), AMNH 36643-44 (paratypes).

Diagnosis.— A small microteiid lizard with cylindrical body and tail and relatively short limbs. Distance between forelimbs and hindlimbs 1.8 times as long as a forelimb. Three supraoculars, the last one followed by one large postocular and two large supratemporals, all three bordering the parietal laterally; six supralabials, fourth under the eye. Scales on dorsal part of tail strongly keeled and mucronate. Few (12-18) temporals. Dorsum dark without a distinct pattern. Ventral and gular scales each with a dark spot.

Description.— A microteiid lizard with a maximum snout-vent length in females of 47 mm; males unknown. Headlength (distance snouttip - anterior edge of ear) 0.19-0.21 times the snout-vent length, head 1.4 times as long as wide, and 1.2-2.0 times as wide as high. Snout blunt, rising gently posteriad. Neck slightly wider than head and anterior part of the body. Body cylindrical, slightly depressed. All specimens have regenerated tails. Tail round in cross section, tapering toward the tip. Limbs well developed, forelimbs 0.23-0.26 times the snout-vent length, hindlimbs 0.36-0.39 times. Distance between forelimbs and hindlimbs 1.7-2.0 times the length of a forelimb.

Rostral hexagonal, 2.5-3 times as wide as high, visible from above, in broad contact with the frontonasal. Frontonasal single, heptagonal, laterally in contact with the nasal and the loreal. Prefrontals irregularly trapezoid, distinctly wider than long, with a short medial suture; laterally in contact with the first supraocular, just separated from the loreal. Frontal hexagonal, 1.6 times as long as wide, slightly wider anteriorly; laterally concave, in contact with the second supraoculars over their entire length, usually a short border with the first, and separated from the third supraoculars. Frontoparietals irregularly hexagonal, slightly longer than wide, medial suture short; each one in contact with the frontal, the second and the third supraoculars, one parietal, and the interparietal. Interparietal elongate, irregularly pentagonal, with the sides slightly converging posteriorly; as long as the parietals, but distinctly narrower; posteriorly the three scales form a relatively straight margin, but anteriorly each is obtusely angulate. Parietals laterally bordered by a large postocular and two large supratemporals. Two rows of occipitals, the first with three transversely enlarged, smooth scales, the second with four. Three supraoculars, first smallest, second and third subequal. Four supraciliaries, the first distinctly larger; the third one elongate and the last one very small. Nasal undivided, nostril large, situated in the lower part near the supralabials, directed laterally. Loreal irregularly hexagonal, in contact with the nasal, the second supralabial, the frenocular, a small preocular, the first supraciliary, the first supraocular, one prefrontal, and the frontonasal. Frenocular trapezoid, distinctly smaller than the loreal; followed by a row of three to six (mostly five) suboculars, that posteriorly is followed by a large postocular; the postocular also is the first large scale bordering the parietals laterally. Lower eyelid with a semitransparent disc of two palpebrals. Six supralabials, the fourth below the middle of the eye; the second supralabial small, square; fifth supralabial highest and largest. Temporal scales (including the supratemporals) 12-18 (14.7 ± 1.8 , $n=6$), irregularly shaped, tending to be hexagonal toward the centre, slightly convex, juxtaposed, smooth; larger posteriorly, with two oblique rows of larger scales in front of the ear-opening; uppermost scales of these rows bordering on the parietals

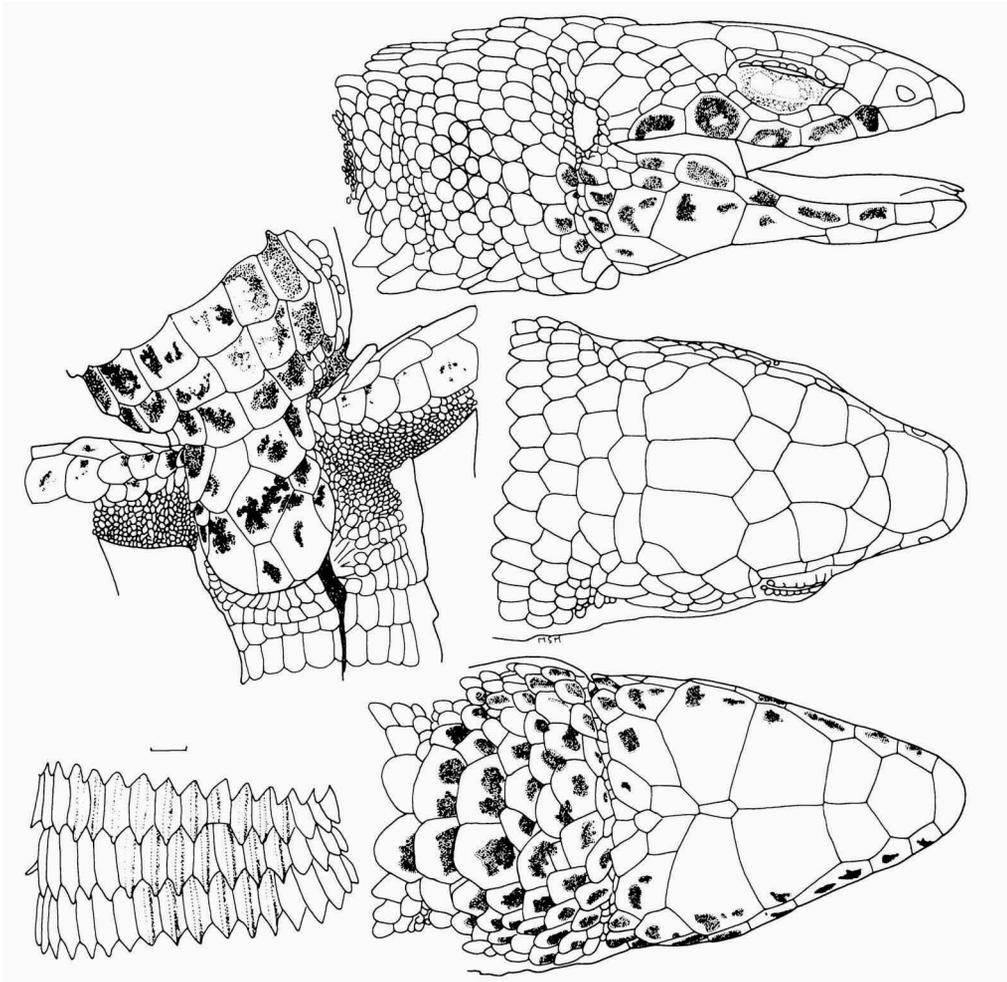


Fig. 14. *Arthrosaura tyleri* (Burt & Burt), ♀, AMNH 36645, dorsal, lateral and ventral view of head, anal region and detail of dorsals. The line represents 1 mm.

("supratemporals"). Ear-opening large, oval, surrounded by small scales, forming a slightly undulating margin; tympanum recessed into a short auditory meatus.

Mental more or less trapezoid, followed by a large, heptagonal postmental. Four pairs of chinshields, the first two pairs in contact with the infralabials and forming medial sutures; medial suture of the second pair of chinshields 2.5 times as long as that of the first pair; the third pair in contact with the infralabials, the members of the pair separated medially by one small scale; fourth pair widely separated from the infralabials, and medially the members of this pair are separated by two to four scales. Scales on the chin partly separated from the gulars by an incomplete row of small scales. Gulars imbricate, smooth, quadrangular with rounded posterior margin, larger posteriorly; laterally in eight transverse rows, medially in seven rows, of

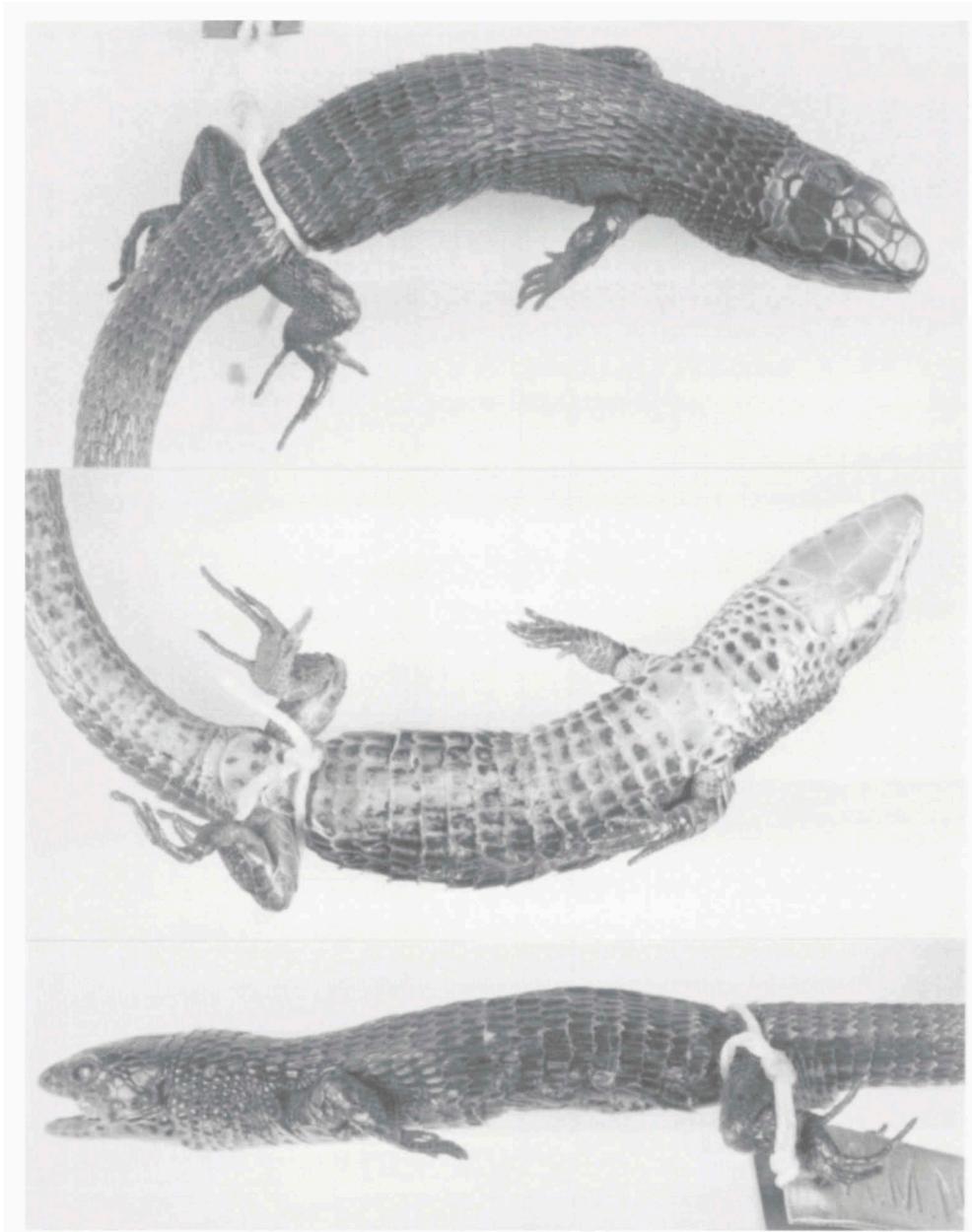


Fig. 15. Dorsal, ventral and lateral view of the holotype of *Arthrosaura tyleri* (Burt & Burt), ♀, AMNH 36645, s-vl 47 mm.

which the posterior three have a median pair of enlarged scales. Collar with seven scales, forming a lobed posterior margin; median scales largest, more lateral scales decreasing in size. Gular fold distinct. Dorsal, lateral, and part of the ventral head scales with small pits scattered over the scales. Dorsal scales of body and tail with few small pits along the posterior part of the lateral margins.

Scales on the nape longer than wide, imbricate, in transverse rows, anteriorly smooth, posteriad broadly keeled, the posterior margin rounded to bluntly pointed; posteriad grading into the dorsals. Sides of the neck with distinctly smaller, rounded, juxtaposed scales. Dorsals hexagonal, elongate, distinctly keeled, mucronate, in 29-31 transverse rows between the interparietal and the posterior level of the hindlimbs (including the occipitals and the scales on the nape). Flanks with scales similar to the dorsals, except near the border with the ventrals, where they decrease in size and become less acutely pointed; around the insertion of the forelimb there is an area with small, granular scales, mostly behind it, only a small area in front of it; around the insertion of the hindlimbs there is no such area with small granules. Ventrals imbricate, in 17-18 transverse rows, with six ventrals per row forming continuous longitudinal rows, the median two with rectangular, the lateral ones with distinctly narrower, bluntly pointed, smooth scales. Ventrals and laterals indistinctly demarcated by an interrupted row of small scales. Scales around midbody 31-34. Preanal plate with one anterior, three posterior and two small lateral scales. Females, without preanal or femoral pores; males not known.

Scales on the tail dorsally and laterally hexagonal, keeled, imbricate, mucronate, in transverse rows, shorter than the dorsals; on the underside the scales are similar but smooth, the two central rows with round posterior margin, flanked by two rows of pointed scales, which in turn are flanked by scales with broad keels.

Scales on the upper side of the upper arms and most of the forearms variably polygonal, smooth, imbricate, larger on the anterior aspect; on the underside of the upper arms and along a narrow band on the inner side of the forearms, scales small, rounded. Thighs with a row of large, trapezoid scales on their anterior aspect, bordered at both sides by one to two rows of relatively large, polygonal scales, the ventral rows regular, with smooth scales, that reach the line of pores (or the equivalent area in females); the dorsal rows with slightly keeled scales, grading into small, granular, juxtaposed scales, which cover part of the dorsal, and the posterior aspects of the thighs. Underside of the lower legs with relatively large, rhomboidal, smooth, imbricate scales; on the anterior and upper aspect the scales are smaller and slightly keeled, from anteriorly to posteriorly steadily decreasing in size and becoming juxtaposed. Subdigital lamellae medially divided, except distally; 12-14 (13.0 ± 0.6 , $n=6$) under the fourth finger, 17-22 (19.2 ± 1.8 , $n=6$) under the fourth toe.

Colour in life unknown.

In preservative, dorsally brown, with edges of the scales lighter. A wide (6-7 scales) dark brown band on the flanks from ear to groin, continued on the tail, where proximally there is a light stripe ventrally of it. Underside creamish with large brown spots on all scales, except in the median part of the throat, on the median rows of ventrals and scales on chest, that only show small spots. Supralabials creamish with large brown spots. Temporals completely dark brown. Underside of tail as belly, more distally becoming completely dark brown.

Distribution.— Only known from the type locality, Mount Duida in southern Venezuela (fig. 9).

Habitat.— The type series has been collected at the summit of Mount Duida at an altitude of 7100 feet.

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