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PTERIGODERMATITES (PAUCIPECTINES) SPINICAUDATIS N. SP. (NEMATODA: RICTULARIDAE) FROM *DROMICIOPS AUSTRALIS* (MARSUPIALIA: MICROBIOTHERIIDAE) IN BARILOCHE, RIO NEGRO, ARGENTINA. BIOGEOGRAPHICAL DISTRIBUTION AND HOST-PARASITE RELATIONSHIPS

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Pterigodermatites (P.) spinicaudatis *sp. n. from* Dromiciops australis *is proposed and described. The simple morphology of the ovijector and the presence of a well developed spine between the two cuticular projections at the caudal extremity of the female distinguish the studied nematode from the remainder species of the genus parasitizing South American Edentata, marsupials and cricetid rodents. The distribution area of the hosts of the different species of* P. (P.) *are given. The studied genus does not parasitize any Australian marsupials. It was found in the endemic South American Microbiotheriidae. This fact suggests from a parasitological point of view that* D. australis *is not related to the Australian marsupials but to the South American ones.*

Key words: parasites – helminths – Nematoda – Rictularidae – relationship

The genus *Pterigodermatites* Wedd, 1861 comprises five subgenera: *Pterigodermatites* Wedd, 1861; *Paucipectines* Quentin, 1969; *Neopaucipectines* Quentin, 1969; *Mesopectines* Quentin, 1969 and *Multipectines* Quentin, 1969. The geographic origin of *Paucipectines* is the area represented by Canada and Siberia. The genus groups the archaic species that parasitize rodents (sciurids, microtids and cricetids of the Palearctic, Nearctic and Neotropical regions) (Quentin, 1969). In South America, the subgenus is represented in Edentata by *P. (P.) chaetophracti* (Navone & Lombardero, 1980; Navone, 1987) in marsupials by *P. (P.) jagerskioldi* (Lent & Freitas, 1935), *P. (P.) kozeki* (Chabaud & Bain, 1981; Navone, 1989) and in cricetids by *P. (P.) massoiai* (Sutton, 1979), *P. (P.) azarai* (Sutton, 1980).

Dromiciops australis is the last living representative of the superfamily Microbiotheroidea. It inhabits Chile and adjacent areas of Argentina and is endemic to South America. From the gut of this marsupial, a nematode, whose anatomical characters correspond to those of the genus *Pterigodermatites (Paucipectines)* was collected.

The present work has the following objectives: (1) to describe the species found and to compare it with the remaining species of the subgenus from the Neotropical region; (2) to analyze the distribution of these species in relation to the distribution of their hosts; (3) to comment about the possible origin and evolution of the subgenus in South America.

MATERIALS AND METHODS

The intestinal tracts of four specimens of *D. australis* captured in Bariloche, Rio Negro were examined. Twenty nematodes (5 males and 15 females) were collected from these hosts. The worms were fixed in 70 hot alcohol (70 °C) and cleared with lactophenol. The parasites were studied under a Wild M20 microscope and the drawings were made with the aid of a Wild drawing tube. The measurements are given in mm; the means are followed by the range enclosed in parentheses.

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RESULTS

Pterigodermatites (P.) spinicaudatis sp. n.

General description – Length: male, 4.80 (4.50-5.50); female, 29.05 (26.14-32.17). Wide: male (in the middle region of the body), 0.17 (0.15-0.22); female (in the anterior portion that reaches the vulva), 0.46 (0.40-0.49), (at the level of the uterus), 1.34 (1.22-1.55). The mouth is surrounded by 11-12 teeth-like structures of similar size and shape. Buccal capsule present. Two dental plates (one dorsal and one ventral) and three oesophageal teeth (one dorsal and two latero-ventral) are present in the base of the buccal capsule. A dorsal cuticular ala reaches the nerve ring. The cuticular projections (spines) are arranged in pairs in two subventral rows. Oesophagus total length: male, 1.25 (1.20-1.28); female, 4.20 (3.70-4.90). Nerve ring: male, 0.22 (0.20-0.28); female, 0.40 (0.29-0.45) from the anterior end respectively. The excretory pore was not observed. One pair of deirids are present.

Male – It posseses 43 pairs of spines and 4 unpaired precloacal spines; two unequal spicules, the larger one 0.12 (0.10-0.18) long and 0.006 wide; the smaller one 0.05 (0.06-0.07) long and 0.004 wide; cloaca 0.11 from the caudal extremity. The odd spines 0.03-0.07 diameter; the size of the spines increases from the anterior to the posterior end.

Female – Buccal capsule 0.04 (0.03-0.06) in depth and 0.05 (0.04-0.08) in maximum diameter. Ventral wall of the capsule 0.05 high and the dorsal wall 0.04 (0.03-0.05). It posseses 68 to 69 pairs of spines of which 36 (35-37) pairs are prevulvar and a caudal spine. The deirids are asymmetrical, the right one placed at the level of the sixth pair of spines and the left one between the sixth and the seventh pairs, 0.68 (0.52-0.81) from anterior end. Vulva opens at the level of spine pair number 35 (36-38) at the oesophago-intestinal junction or immediately posterior to it, 4.68 (3.90-5.80) from anterior end. Simple ovijector with an expanded zone covered with fine transverse striations. The uterus is divided into two branches posteriorly to the vulva and contains eggs with a thick shell, morulated in the distal region and embryonated in the proximal region. Eggs 40 (30-50) µm long x 30 (20-40) µm wide. Anus opens 0.24 (0.16-0.33) from the caudal extremity. The posterior end bears a caudal spine 0.07 long; a pair of spines is inserted laterally.

Host: Dromiciops australis

Locality: Bariloche, Rio Negro, Argentina

Location in the host: small intestine

Specimens studied: 5 males and 15 females

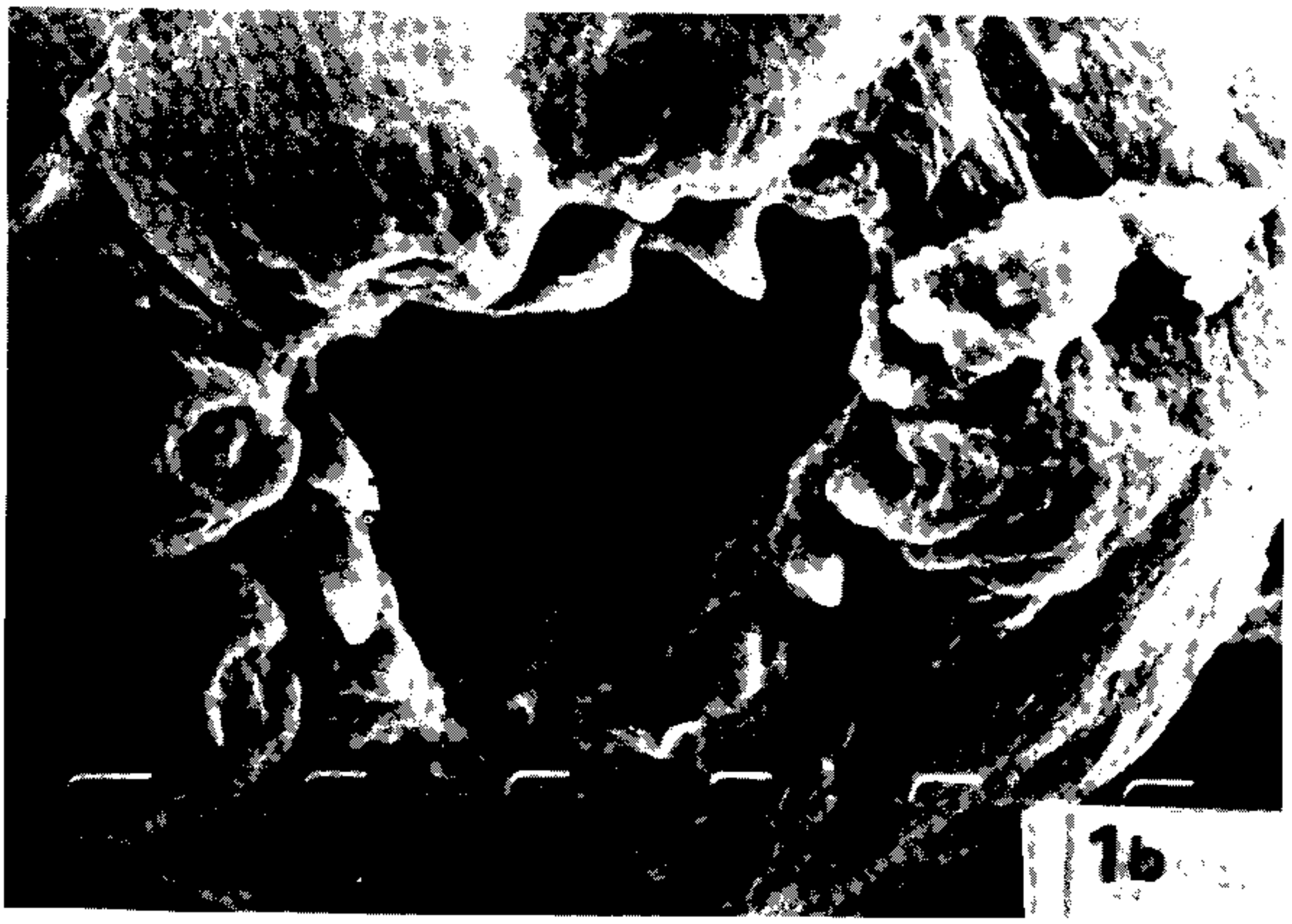
Holotype: deposited in Argentine Museum of Natural Sciences Bernardino Rivadavia. Helminthological Collection No 363.

Host: Voucher specimens are preserved in the Municipal Museum of Natural Sciences of Mar del Plata, Argentina.

DISCUSSION

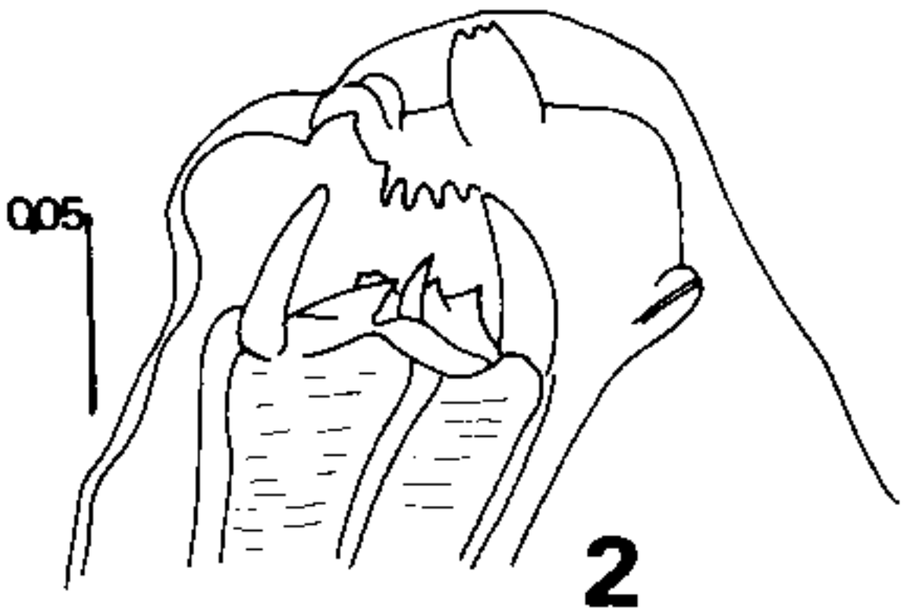
The features that characterize *Pterigodermatites (Paucipectines)* are: apical oral opening; first, fourth and eighth pair of cloacal papillae laterally situtated; 29 to 39 pairs of prevulvar cuticular projections. These anatomical characters determine this subgenus to be the most primitive (Quentin, 1969). The total number of spines present in both male and female of the nematode described here links it with *P. (P.) chaetophracti, P. (P.) azarai* and *P. (P.) kozeki.* The reduction of the dorsal ala to anterior to the nerve ring level differentiates it from *P. (P.) kozeki* which posseses a weakly developed dorsal ala and from *P. (P.) chaetophracti* and *P. (P.) azarai;* in both of which lack the dorsal ala. Furthermore, in the nematode studied here, the vulva opens at the level of the oesophago-intestinal junction and, in the other species mentioned above, the vulva opens posterior to this junction. This determines the differences in the number of prevulvar cuticular projections. The male has two spicules of different length and no gubernaculum: this character resembles *P. (P.) chaetophracti,* but it differs in the number of cuticular projections. Moreover, the absence of a gubernaculum separates it from *P. (P.) kozeki,* which also exhibits two spicules of different lengths. The simple morphology of the ovijector and the presence of a well-developed spine between the two cuticular projections at the caudal extremity of the female distinguish this nematode from the remainder of the species of the genus. For these reasons, this nematode is considered to represent a new species, namely *Pterigodermatites (Paucipectines) spinicaudatis* n. sp.

In South America *Pterigodermatites (Paucipectines)* spp. parasitize Edentata, marsupials and cricetids. In fact, *Dasypus hibridus,*



Pterigodermatites (Paucipectines) spinicaudatis. Fig. 1a: anterior end, apical view (female) (750 X). Fig. 1b: oral opening (female) (1500 X).

Chaetophractus villosus and *Tolypeutes matacus* are the hosts of *P. (P.) chaetophracti.* They are distributed in an area that comprises Brazil (the southern part and Mato Grosso State), the eastern part of Bolivia, Paraguay (Chaco Paraguayo), Uruguay and Argentina (North and Central parts of the country, from Cordoba and Mendoza down to the Rio Negro). *P. (P.) jaegerskioldi* is found in *Caluromys phillander,* whose distribution ranges from southern Mexico to northern Argentina. *P. (P.) kozeki* parasitizes *Thylamys pusillus, Didelphis*



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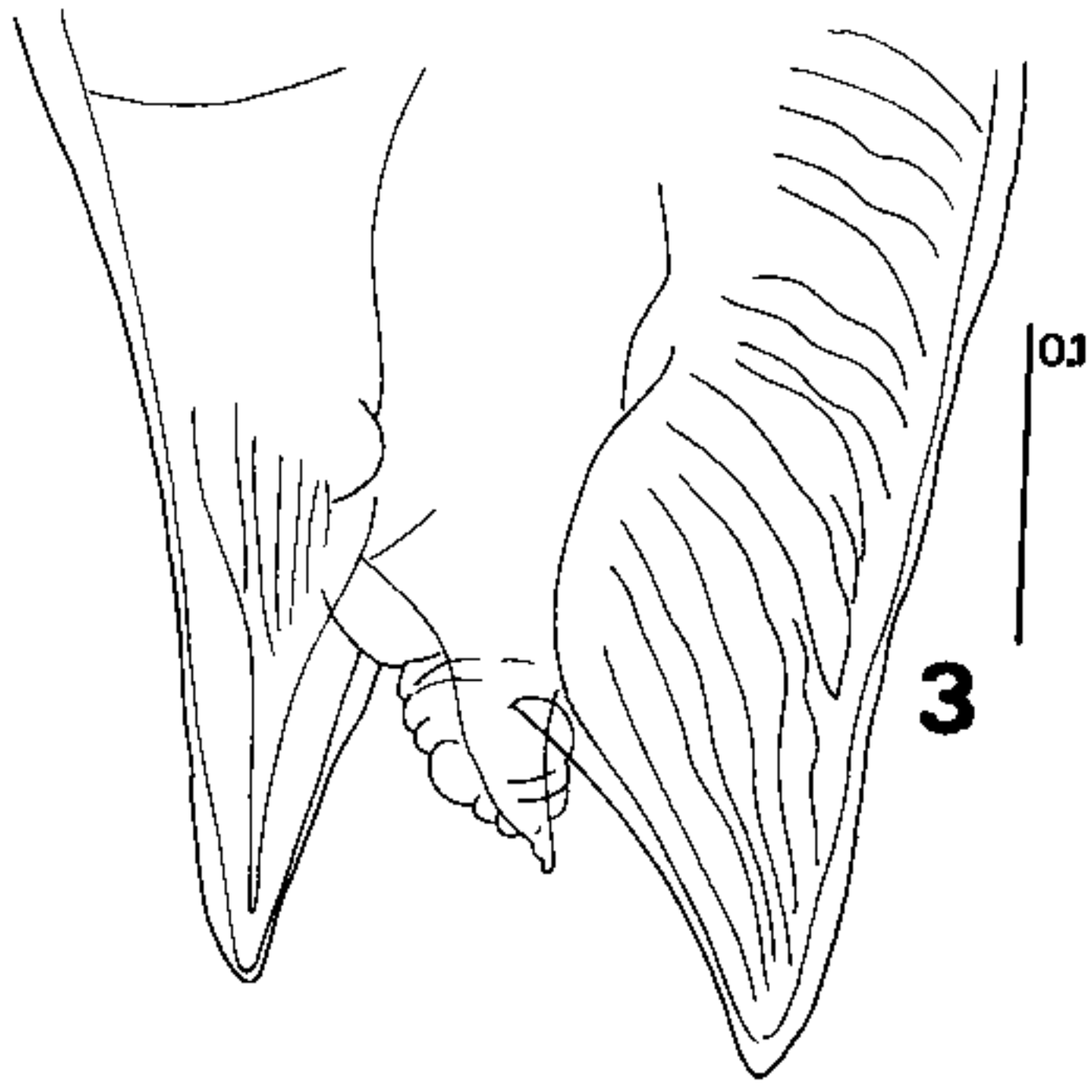

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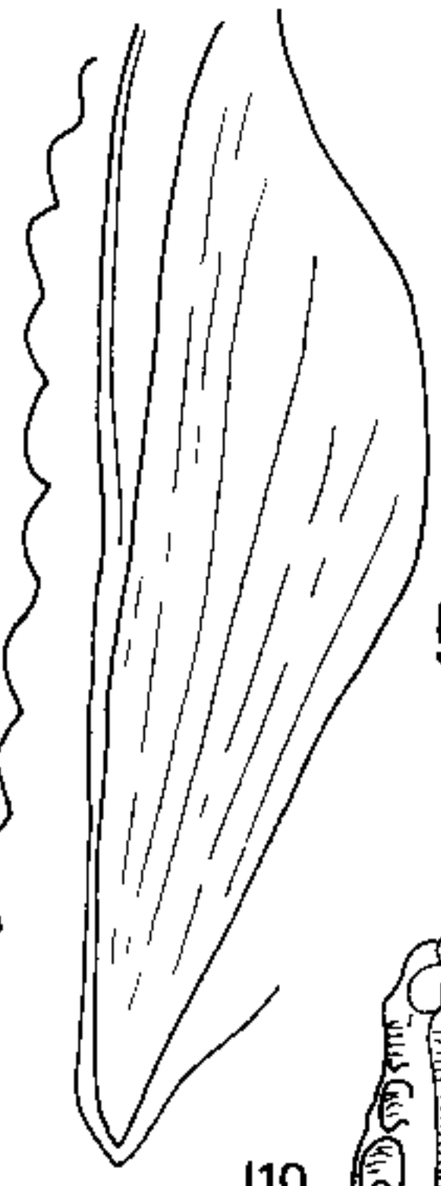

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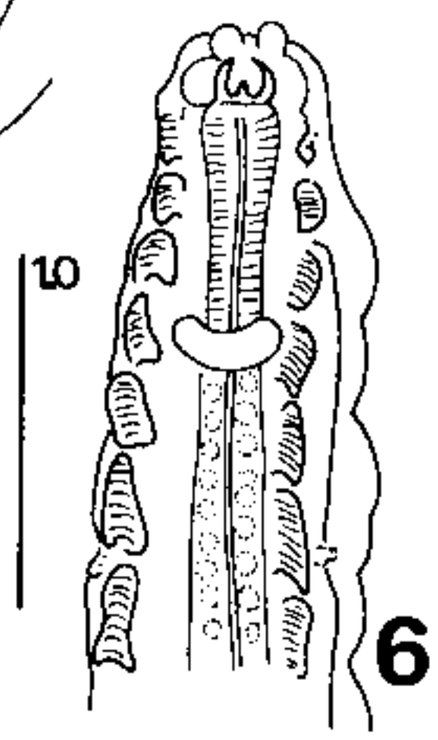

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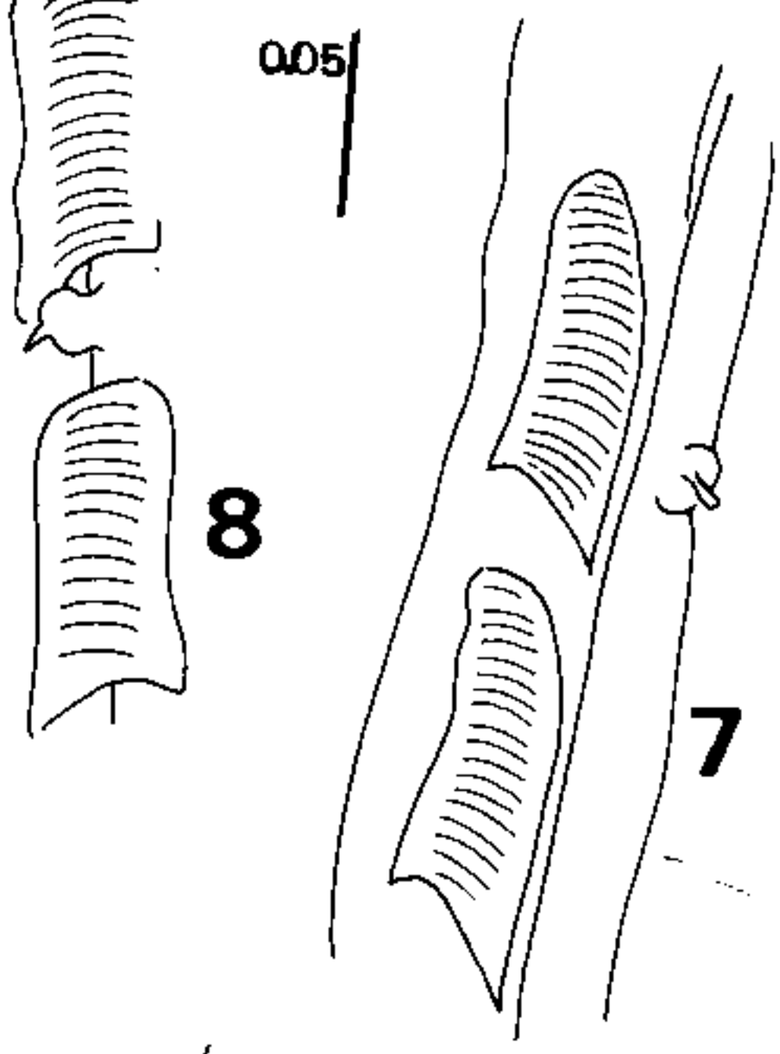

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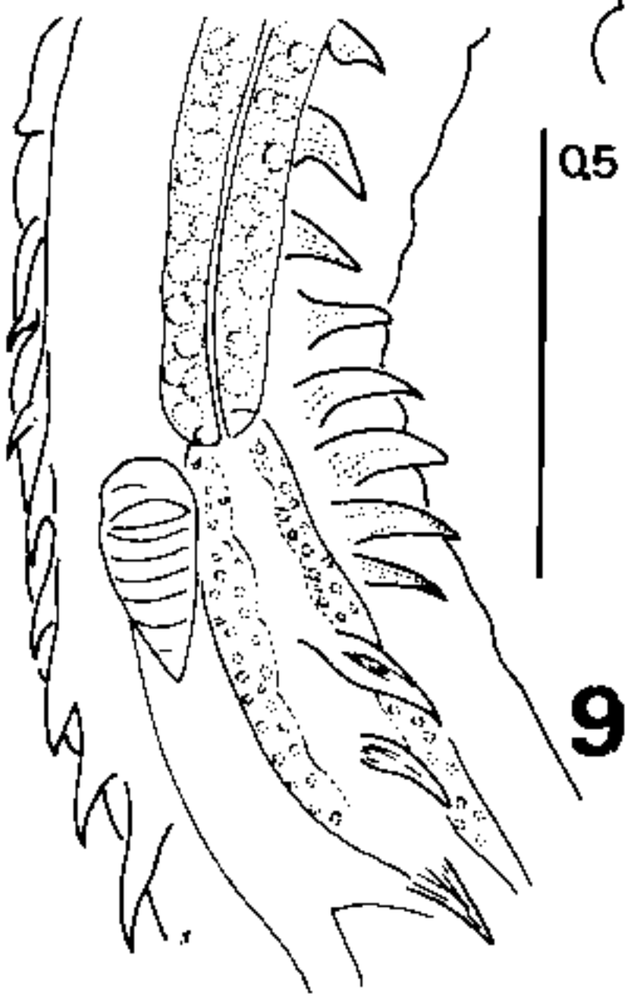

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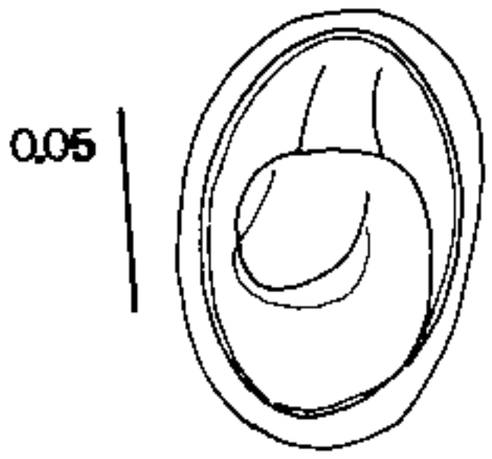

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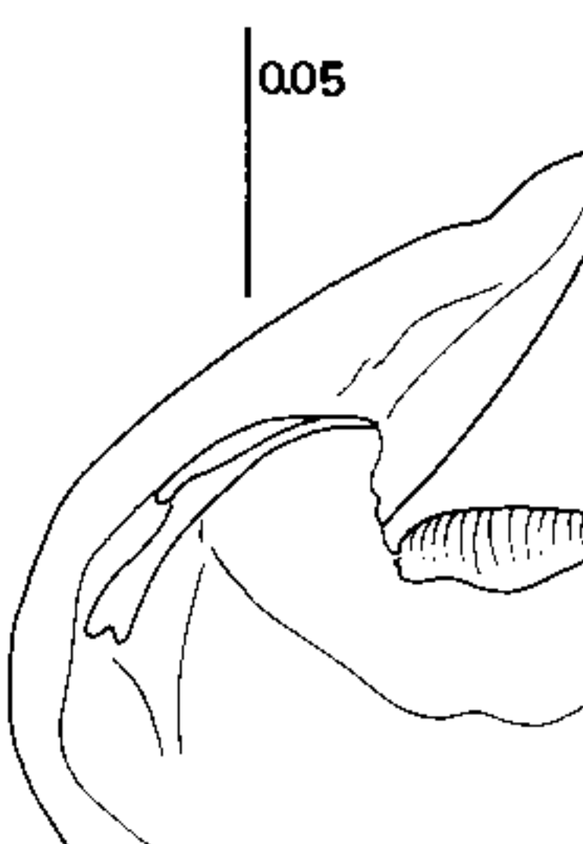

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Pterigodermatites (Paucipectines) spinicaudatis. Fig. 2: anterior end, ventral view. Fig. 3: caudal end (female). Fig. 4: prevulvar spines. fig. 5: postvulvar spines. fig. 6: anterior end showing nerve ring and-deirids. Fig. 7: Left deirid. Fig. 8: right deirid. Fig. 9: vulvar region, ventral view. Fig. 10: egg. Fig. 11: caudal end (male). (Scales in mm).

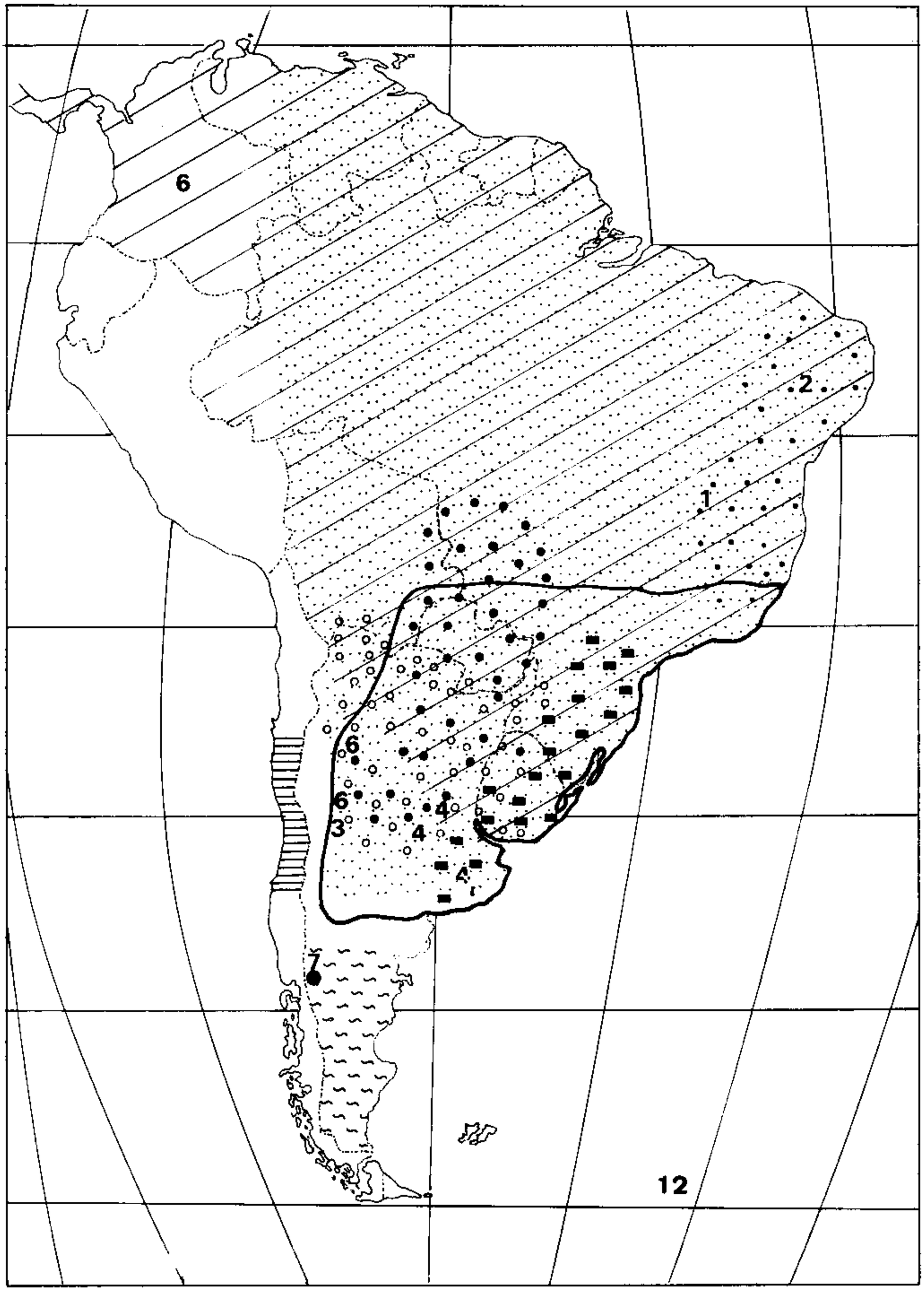

Fig. 12: distribution area of the South American hosts and parasites of the genus *Pterigodermatites (Paucipectines).* ⚃ *T. pusillus.*, ◪ *C. phillander*, ◙ *D. albiventris*, ◓ *L. halli*, ◳ *Z. lasiurus*, ◒ *A. azarae*, ▤ *P. grisoflavus*, ◒ *D. hibridus* and *Ch. villosus*, ◘ *T. matacus*, ● *D. australis*. 1. *P. (P). jagerskioldi*, 2. *zygodontomys*, 3. *massoiai*, 4. *chaetophracti*, 5. *azarai*, 6. *kozeki*, 7. *spinicaudatis.*

albiventris and *Lestodelphis halli* that live in the North of Venezuela, Argentina (Northern and Central Patagonia) and Brazil (from the East to the inter Andes mountains region of the West). *Bolomys lasiurus (= Zygodontomys lasiurus), Graomys grisoflavus (= Phyllotys grisoflavus) and Akodon azarae are the hosts of P. (P.) zygodontomys, P. (P.) massoiai* and *P.*

(P.) azarai. These cricetids occupy an area that includes Chile (between Bahía Salada and Santiago de Chile), Argentina (between Mendoza and Sierra de la Ventana) and Brazil (South and East). This indicates that the distribution of the hosts of the different species of *Pterigodermatites (Paucipectines)* with the exception of *D. australis* (Fig. 12) totally or partially overlap. This suggests that it is very improbable that *P. (P.) spinicaudatis* was transmitted to that marsupial (because of the heteroxenic character of the cycle) via its intermediate hosts. In fact, the distribution of *D. australis* is restricted to the austral region of Argentina and Chile. For this reason, *D. australis* could not be the secondary host of *P. (P.) spinicaudatis.* From a parasitological point of view, this conclusion is relevant to the controversy concerning the hypotheses postulated by Szalwy (1982) and Reig et al. (1987). The first author related *Dromiciops* with the Australian marsupials but not with the South American ones, while Reig et al. support the concept that *Dromiciops* is without doubt a didelphomorph which is well differentiated on the basis of certain anatomical characters (cranial and dental) and biochemical studies. This marsupial represents the most derived taxon in the linege of the didelphomorphs from the most primitive to the most recent ones. The fact that the genus has not previously been found in any Australian marsupial and parasitizes an endemic South American microbiotherid indicates, from a parasitological point of view, that the hypothesis of Reig et al. seems more plausible.

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REFERENCES

CHABAUD, A. G. & BAIN, O., 1981. *Quantius kozaki* n. g. n. sp. nematode Rictulaire parasite d'un marsupial americain. *Ann. de Parasit.* (Paris), *56:* 173-178.

LENT, H. & TEIXEIRA DE FREITAS, J. P., 1935. Sobre dois novos nematodeos parasitos de quica: *Caluromys phillander* (L). *Mem. Inst. Oswaldo Cruz, 30:* 535-542.

NAVONE, G. T., 1987. Descripción del macho de *Pterigodermatites (Paucipectines) chaetophracti* (Navone & Lombardero, 1980) Sutton, 1984 (Nematoda: Rictularidae), *Neotrópica, 33:* 45-49.

NAVONE, G. T., 1989. *Pterigodermatites (Paucipectines) kozeki* (Chabaud et Bain, 1981) n. comb. parásito de *Lestodelphis halli* Tate, 1934, *Didelphis albiventris* y *Thylamys pusilla* (Desmarest) de la República Argentina. Anatomia y posición sistemática. *Rev. Iber. Parasit. 49:* 219-226.

NAVONE, G. T. & LOMBARDERO, O., 1980. Estudios parasitológicos en edentados argentinos. I. *Neotrópica, 26:* 65-70.

QUENTIN, JU. C., 1969. Essai de classification des nematodes Rictulaires. Mem Museum Nat. d'Histoire Naturelle Ser A, Liv 1-115.

REIG, O. A.; KIRSCH, J. A. W. & MARSHALL, L. G., 1987. Systematic relationship of living and the neocenozoic América "opossum-like" marsupials (Suborder Didelphomorphia) with comments on the classification of these and the Creteus and Paleocene New World and European Metaterians. p. 11-89. In M. Archer, *Possum and Opossum studies in evolution.* Surrey Beaty and Sons Pty Limited and Royal Zoological Society of New South Wales, Chipping Norton, N S W, Australia.

SUTTON, C. A., 1979. *Rictularia massoiai* sp. n. y *Enterobius yagoi* sp. n. (Nematoda). *Acta Zoológica Lilloana, 35:* 29-37.

SUTTON, C. A., 1980. Contribución al conocimiento de lafauna parasitológica argentina XIII. Nuevos nematodes de la familia Rictularidae. *Neotrópica, 30:* 141-152.

SZALAY, F., 1982. A new appraisal of marsupial phylogeny and classification, p. 621-640. In M. Archer, *Carnivorous marsupials.* Sydney Royal Society of New South Wales.