Trichostrongylina (Nematoda, Heligmosomoidea) coparasites in *Dasyprocta fuliginosa* Wagler (Rodentia, Dasyproctidae) from Brazil, with the re-establishment of the genus *Avellaria* Freitas & Lent and the description of two new species

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ABSTRACT. Two new tichostrongylid nematodes of the family Viannaiidae Durette-Desset & Chabaud, 1981 coparasites in *Dasyprocta fuliginosa* Wagler, 1832 from the State of Amazonas, Brazil, are described: *Viannella trichospicula* **sp. nov.** is differentiated from the other species of the genus by the extreme slenderness of its spicules. *Avellaria intermedia* **sp. nov.** is distinguished from the single type species *Avellaria avellari* Freitas & Lent, 1934, by a smaller number of cuticular ridges (17 versus 27), a higher ratio of spicule length / body length (8% versus 5.6%) and spicules with a single tip. This genus, synonymized with the genus *Viannella* Travassos, 1918, by Durette-Desset (1968) is re-established, the female being didelphic. It is the first record of a nematode of the family Viannaiidae in a host of the family Dasyproctidae Bonaparte, 1838.
KEY WORDS. *Avellaria intermedia* **sp. nov.**; Brazil, Caviomorpha; nematodes; rodents; Viannaiidae; *Viannella trichospicula* **sp. nov.**

RESUMO. **Trichostrongylina (Nematoda, Heligmosomoidea) co-parasitos em *Dasyprocta fuliginosa* Wagler (Rodentia, Dasyproctidae) do Brasil, com o restabelecimento do gênero *Avellaria* Freitas & Lent e a descrição de duas novas espécies.** Dois novos nematóides tricostrongilídeos da família Viannaiidae Durette-Desset & Chabaud, 1981 co-parasitos em um espécime de *Dasyprocta fuliginosa* Wagler, 1832 do Estado do Amazonas, Brasil, são descritos: *Viannella trichospicula* **sp. nov.** distingue-se das espécies do gênero, pelos espículos extremamente delgados. *Avellaria intermedia* **sp. nov.** diferencia-se da espécie tipo e única do gênero *Avellaria avellari* Freitas & Lent, 1934, pelo menor número de arestas cuticulares (17 comparado a 27), pela maior relação entre o tamanho do espículo e o comprimento do corpo (8% comparado a 5,6%) e espículos com extremidade única. Este gênero, que havia sido considerado sinônimo de *Viannella* Travassos, 1918, por Durette-Desset (1968), é restabelecido; as fêmeas são didelfas. Este é o primeiro registro de um nematóide da família Viannaiidae em um hospedeiro da família Dasyproctidae Bonaparte, 1838.
PALAVRAS-CHAVE. *Avellaria intermedia* **sp. nov.**; Brasil; Caviomorpha; nematóides; roedores; Viannaiidae; *Viannella trichospicula* **sp. nov.**

The agoutis have been investigated mainly for the role they play in the spreading of severe sylvatic zoonoses (Ribeiro & Barretto 1977, Rebollar-Telles *et al*. 1996, Sherlock 1996, Lainson 1997, Rodrigues-Silva *et al*. 2002).

Presently, 12 species of Pudicinae (Heligmonellidae) distributed in four genera (*Durettestrongylus* Guerrero, 1982, *Fuellebornema* Travassos & Darriba, 1929, *Heligmostrongylus* Travassos, 1917 and *Pudica* Travassos & Darriba, 1929) have been described on the basis of nematodes recovered from specimens of the genus *Dasyprocta* Illiger, 1811 from Brazil, Colombia, Venezuela and Paraguay. Seven species are parasitic in *Dasyprocta leporina* (Linnaeus, 1758): *Fuellebornema agoutii* (Neiva, Cunha & Travassos, 1914) Travassos & Darriba, 1929, *Fuellebornema neivai* Cassone & Durette-Desset, 1991 (= *F. agoutii sensu* Travassos, 1937 *nec* Neiva, Cunha & Travassos, 1914), *Fuellebornema minor* Travassos, 1937, *Fuellebornema almeidai*

Travassos, 1937, *Heligmostrongylus sedecimradiatus* (Travassos, 1917) and *Pudica pudica* (Travassos, 1921) from Brazil and *Durettestrongylus ojastii* Guerrero, 1982 from Venezuela; three species in *D. fuliginosa* Wagler, 1832: *Fuellebornema granulosa* Durette-Desset, 1970, *Fuellebornema bocqueti* Durette-Desset, 1970 and *P. pudica* from Colombia; and five species in *Dasyprocta azarae* Lichtenstein, 1823: *F. granulosa*, *Fuellebornema demarsae* Cassone & Durette-Desset, 1991, *P. pudica*, *Pudica gonosoma* Cassone & Durette-Desset, 1991 and *Durettestrongylus baudi* Cassone & Durette-Desset, 1991 from Paraguay (Neiva *et al.* 1914, Travassos 1917, 1921, 1937, Travassos & Darriba 1929, Durette-Desset 1970a, Guerrero 1982, Cassone & Durette-Desset 1991).

Several examples of the occurrence, in a single individual-host, of coparasite species (congeneric or belonging to the same sub-family) have already been revealed in caviomorph rodents. Cases have been reported from *Proechimys* **spp**. (Durette-Desset 1970b, R'kha & Durette-Desset 1990, Durette-Desset *et al*. 2001), *D. fuliginosa* (Durette-Desset 1970a) and from *D. azarae* (Cassone & Durette-Desset 1991).

This paper is related to trichostrongylid nematodes recovered from an agouti, with the description of two new species, one in the genus *Viannella* Travassos, 1918 and another in the genus *Avellaria* Freitas & Lent, 1934, which is re-established here.

Moreover, this is the first record of a nematode of the family Viannaiidae Durette-Desset & Chabaud, 1981 in a host of the family Dasyproctidae Bonaparte, 1838, taking into account that representants of this group were previously found infected only with trichostrongylids of the family Pudicinae Durette-Desset, 1971.

MATERIAL AND METHODS

Capture and necropsy of the host specimen were authorized by the IBAMA (Instituto Brasileiro de Meio Ambiente e Recursos Renováveis), Brazil, process no. 02001.002659/97-02, permits no. 056/2000 – DIFAS/DIREC and no. 021/2002 – COEFA. Nematodes were recovered from the small intestine of one specimen of *Dasyprocta fuliginosa* in the middle and high Negro river microregion, State of Amazonas, Brazil. The animal was captured in piassaba palm trees (*Leopoldinia piassaba* Wallace, 1853) plantations, maintained in the waterways of the Aracá river, left-side tributary of Negro river, Barcelos municipality. Worms, briefly kept in a 0.85% NaCl solution, were fixed with steaming A.F.A (70º GL ethanol, 93%; formaldehyde, 5%; glacial acetic acid, 2%) and stored as wet material in the same solution; some were further dehydrated in an ethanol series, clarified in glacial acetic acid, phenol and preserved as whole mounts in beechwood creosote and Canada balsam. Type material is deposited in the Coleção Helmintológica do Instituto Oswaldo Cruz (CHIOC). The synlophe was studied according to the Durette-Desset (1985), Durette-Desset & Digiani (2005) methods. The cuticular ridges are numbered from left to right for the dorsal and for the ventral sides, the sides being delimited by the lateral fields. The nomenclature used for the study of the caudal bursa follows Durette-Desset & Chabaud (1981). Classification of the host is in accordance with Woods (1993). Figures were made with the aid of a drawing tube connected to a bright-field microscope. Measurements are in micrometers (µm) unless otherwise indicated.

RESULTS

Viannaiidae Durette-Desset & Chabaud, 1981
Viannaiinae Neveu-Lemaire, 1934
Viannella trichospicula **sp. nov.**

Figs 1-14

Type material. Holotype male and allotype female CHIOC no. 35419 (wet material), male paratypes no. 35420 (wet material), female paratypes no. 35421 (wet material), male and female paratypes CHIOC no. 34857 (wet material) and 35052 a-k (whole mounts).

Type host. *Dasyprocta fuliginosa* Wagler, 1832 (Dasyproctidae). Necropsy CHIOC no. 26465.

Site of infection. Small intestine.

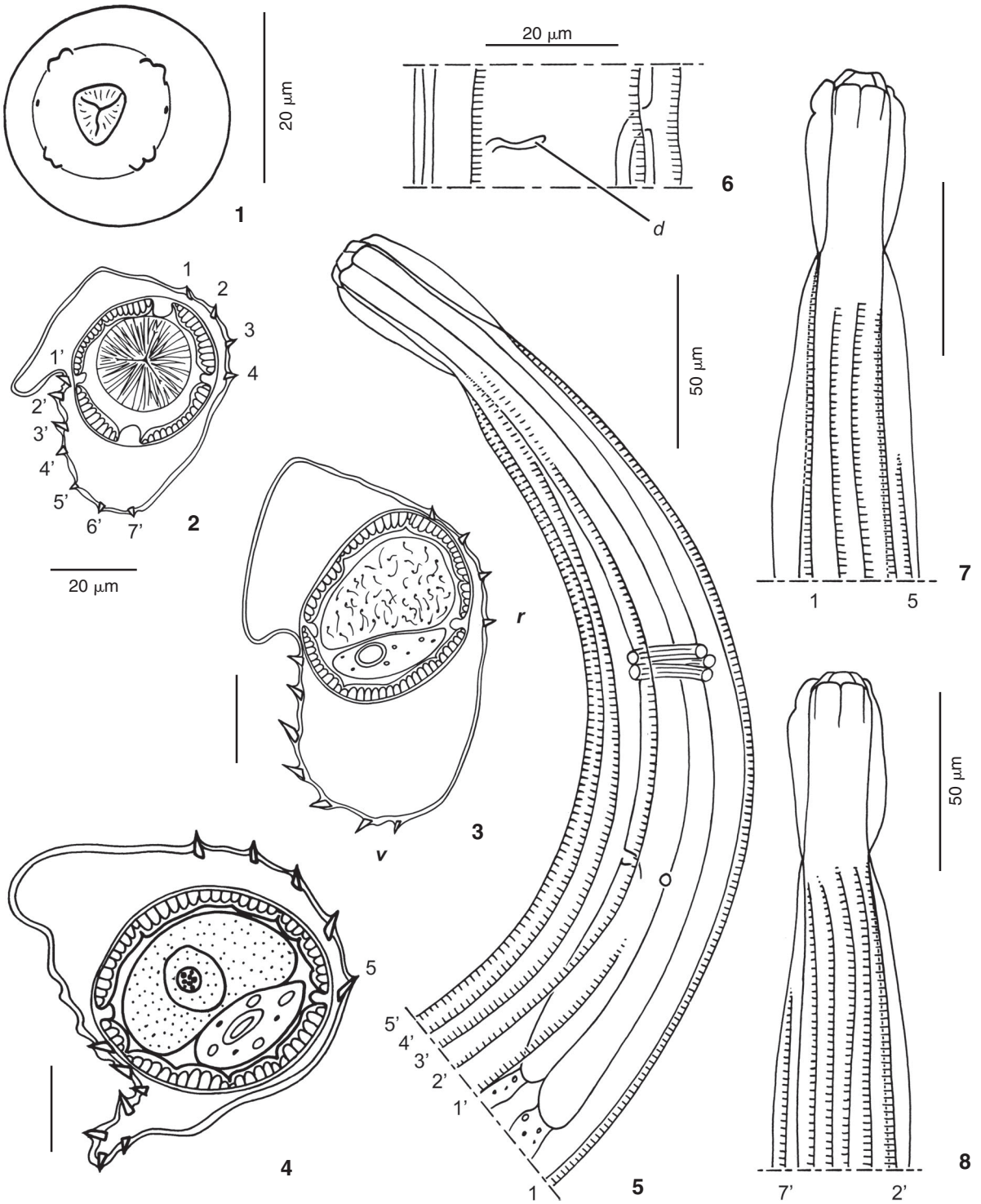
Type locality. Três Barracas settlement, Jauari waterway, left margin of the Aracá river, Barcelos municipality (0º58'29"S, 62º55'27"W), State of Amazonas, Brazil.

Collector/date. A.Q. Gonçalves, February 06, 2002.

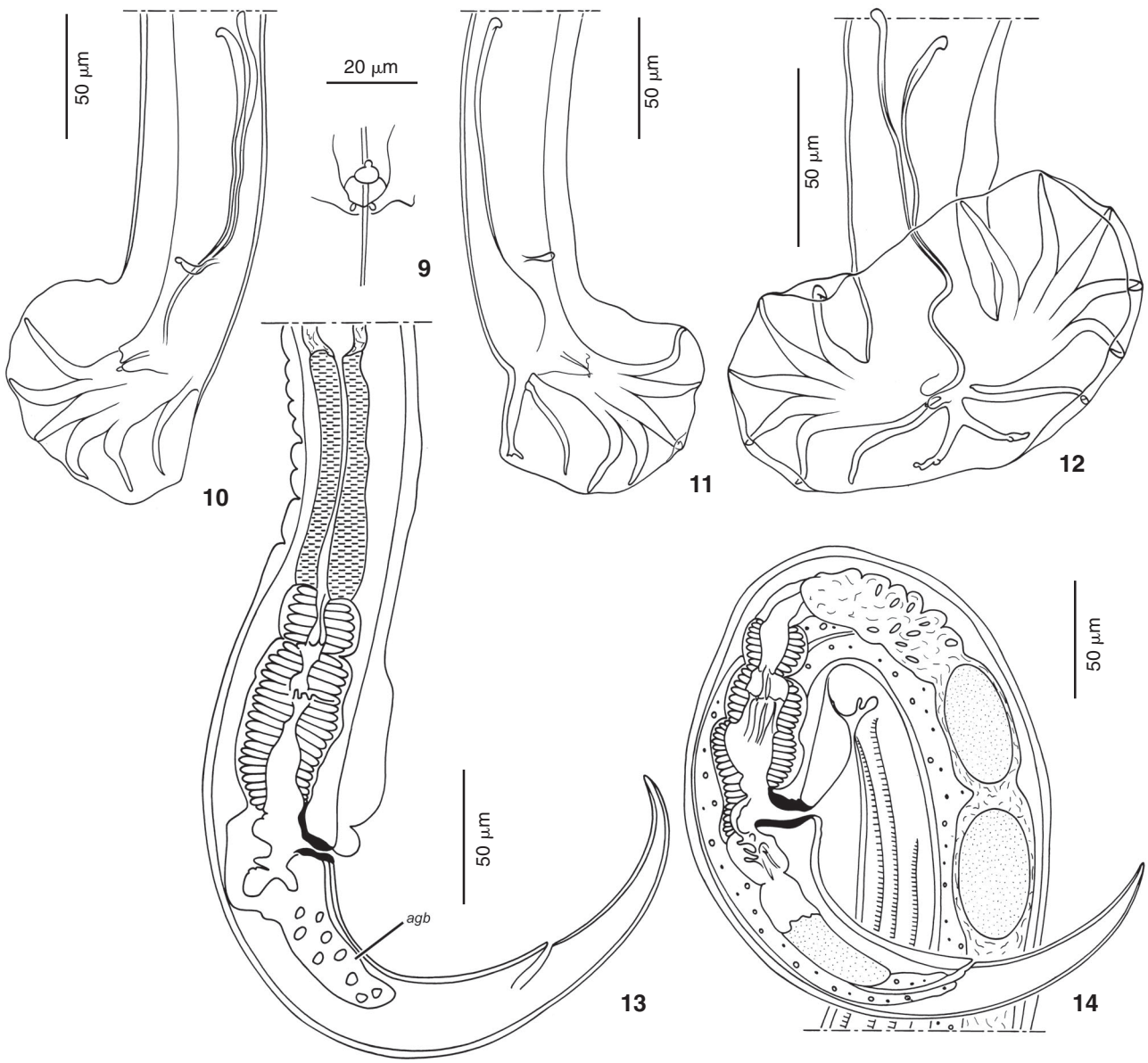
General. Small and fragile nematodes coiled along ventral side following two to three spirals in male, three in female. Cuticle strongly dilated on right ventral and left dorsal quadrant. Nerve ring difficult to observe; often, only nervous cells are visible. Excretory pore situated within proximal third of oesophagus in males, within third quarter in females. Deirids well developed, tongue-shaped (Fig. 6), situated at same level as excretory pore, slightly anterior or posterior to it. Oesophagus less than 13 % of body length in males, 14 % in females. In males, papillae 1 are very long (Figs 10, 11). In females, infundibulum rectilinear (Fig. 13) or twisted (Fig. 14) and in this case, not measurable, posterior genital branch present but atrophied (Figs 13, 14). Uterus between 9% and 15 % of body length.

Head. Cephalic vesicle present. In apical view triangular mouth opening surrounded by two amphids, four externo-labial papillae and four cephalic papillae (Fig. 1).

Synlophe. (studied in one male, one female paratype). In both sexes cuticle bears uninterrupted longitudinal cuticular ridges. Ridges appear posterior to cephalic vesicle except dorsal ridge no. 5, ventral ridge no. 7' both arising between cephalic vesicle and nerve ring (Figs 7, 8) and ridge no. 1' arising posterior to excretory pore (Fig. 5). In male, dorsal ridges disappear about 300 anterior to caudal bursa and ventral ridges about 100. In female, ventral ridges disappear 50-60 anterior to vulva and dorsal ridges at vulvar level. Right ventral quadrant and left dorsal quadrant without ridges. Number of ridges along the body except for the extremities: 11 (4 dorsal, 7 ventral) in male (Figs 3, 4), 12 (5 dorsal, 7 ventral) in female (Fig. 2). Gradient of size present on ventral side and decreasing from



Figures 1-8. *Viannella trichospicula* **sp. nov.**: (1) female, head, apical view; (2-4) transverse sections of body (2) female 3.5 mm long, at mid-body (1.2 mm from apex); (3-4) male 2. 3 mm long: (3) at 30 µm anterior to oesophago-intestinal junction; (4) at mid-body (1.2 mm from apex); (5) female, anterior extremity, left lateral view; (6) female, detail of the excretory pore and the right deirid, right lateral view; (7- 8) female, arising of the cuticular ridges; (7) dorsal view; (8) ventral view. (d) deirid, (v) ventral side, (r) right side.



Figures 9-14. *Viannella trichospicula* **sp. nov.**. (9-12) Male: (9) genital cone, ventral view; (10-12) caudal bursa; (10) left lateral view; (11) right lateral view; (12) another male, ventral view; (13-14) Female: (13) posterior extremity, right lateral view; (14) another female, posterior extremity, right lateral view. (agb) Atrophied genital branch.

left to ventral side. Dorsal ridges of equivalent size. At mid-body, axis of orientation directed from right ventral quadrant to left dorsal quadrant and inclined at about 40° to sagittal axis in male, 45° in female.

Holotype male. 2. 3 mm long, 70 wide, cuticular dilatation included. Cephalic vesicle 50 long and 25 wide. Nerve ring, excretory pore and deirids situated at 140, 205 and 210 from apex, respectively. Oesophagus 320 long. Caudal bursa slightly asymmetrical with larger left lobe and pattern of type 1-4 with tendency 1-3-1, with ray 2 diverging first from common trunk, then rays 6 (Figs 10-12). Papillae 1 about 12 µm long. Rays 3 to 5 separated at same level from their common trunk. Rays 3 most developed. Dorsal lobe poorly developed with long rays 8 arising at base of dorsal ray. Dorsal ray divided within its median third into two branches forming an open "V". Each branch divided into two small branches, rays 9 (external branches) and rays 10 reduced to a button (internal branches). Extremely thin spicules, 150 long with handle about 1/4 of spicule length. Each

spicule ending in one tip (Figs 10-12). Ratio spicule length/ body length 6. 5%. Rectangular genital cone, 20 long, 10 wide on ventral view with 2 small rounded papillae 7 on ventral lip (Fig. 9). Papilla zero not observed. Gubernaculum absent.

Main measurements (average and range) of 8 paratypes. 2.4 (2.1-2.7) mm long, 71 (60-85) wide; cephalic vesicle 53 (50-58) long and 23 (20-26) wide; nerve ring (n = 7), excretory pore (n = 7) and deirids (n = 7) situated at 138 (120-170), 213 (175-230), 216 (175-238) from apex, respectively; oesophagus 295 (270-310) long; spicules 144 (135-160) long. Ratio spicule length/body length 5.9% (5-4 -7.1) %

Allotype female. 2. 9 mm long, 75 wide, cuticular dilatation included. Cephalic vesicle 75 long, 25 wide. Nerve ring, excretory pore and deirids at 180, 225 and 230 from apex, respectively. Oesophagus 310 long (Fig. 5). Monodelphic. Vulva situated at 220 from caudal extremity; vagina vera 22 long, ovejector very short, 105 long with vestibule 50 long, 30 wide, sphincter 20 long, 30 wide, infundibulum 45 long (Fig. 13). Uterus 440 long with 7 eggs, 8 to 16 blastula stage, 50 long, 25 wide; ratio uterus length/ body length: 15.2%. Atrophied posterior genital branch, 60 long (Figs 13, 14). Very thin tail, with sharp tip, 80 long (Figs 13, 14).

Main measurements (range and average) of 8 paratypes. 3.2 (2.8-3.5) long, 71 (60-80) wide; cephalic vesicle 51 (50-55) long, 27 (23-32) wide; nerve ring (n = 5), excretory pore and deirids situated at 173 (160-200), 217.5 (190-255) and 216 (200-235) from apex, respectively; oesophagus 341 (300-400) long; vulva situated at 219 (200-230) from caudal extremity; vestibule 40 (36-60) long; sphincter (n = 6) 27 (20-30) long, 34 (30-36) wide, infundibulum (n = 3) 70 (60-80); uterus long; eggs 5 (4-7), 55 (50-60) long, 30 (25-36) wide; atrophied posterior uterine branch 90 (65-115) long; tail 83 (70-90) long.

Diagnosis. The specimens described above, belong to the genus *Viannella* Travassos, 1918 (Viannaiidae, Viannaiinae) which is mainly characterized by a monodelphic female and a synlophe without ridges on the right ventral and left dorsal sides, the pattern of the caudal bursa being variable. Seven species are described in the genus, all in the Neotropical region, six in Caviomorpha rodents (one in the Hydrochoeridae Gray, 1825, one in the Agoutidae Gray, 1821, one in the Chinchillidae Bennet, 1833 and three in the Caviidae Gray, 1821) and one in Primates.

The parasites from specimens of *Dasyprocta* Illiger, 1811, are differentiated from the other species of the genus by the extreme slenderness of the spicules. They therefore belong to the new species described here *Viannella trichospicula* **sp. nov.**, taking into account this character.

Remarks. On what concerns other morphological features, two species, *V. brevispicula* Lent & Freitas, 1936 (Lent & Freitas 1936) a parasite of *Agouti paca* (Linnaeus, 1756) from Brazil and *V. dubia* (Travassos, 1921) (Travassos 1921) a parasite of Cebidae spp. from South America are close to *V. trichospicula* **sp. nov.**

In the original description of *V. brevispicula*, the spicules are untwisted and relatively thick. On what refers to the synlophe, Durette-Desset (1968) figured a section at mid-body of a voucher male parasite of *Agouti paca* from Brazil; nevertheless, there was no information about the spicules and the caudal bursa. The pattern of the synlophe is similar to that of the male of *V. trichospicula* **sp. nov.** (4 dorsal cuticular ridges of equivalent size, 7 ventral with a decreasing gradient of size from left to right). There is a strong probability that the male drawn by Durette-Desset (1968) belongs to the species *V. trichospicula* **sp. nov.**

The closest related species is *Viannella dubia* described as *Heligmosomum dubium* Travassos, 1921 in *Alouatta caraya* (Humboldt, 1812) from Brazil (Travassos 1937, Vicente *et al*. 1997). The species was recorded in two other South American Cebidae, *Saimiri sciureus* (Linnaeus, 1758) by Cameron (1923) and *Callithrix jacchus* (Linnaeus, 1758) by Mawson (1964), but the precise geographic locality of these hosts is unknown, since they were kept in zoological gardens. The number of cuticular ridges is about the same (5 dorsal, 7 ventral in male, unknown in female). The caudal bursa is also of type 1-4, the spicules are straight and untwisted and the distance anus-vulva is twice as great as the length of the tail. Finally, it is the only other species in the genus to possess an atrophied posterior genital branch. Therefore, the presence of the genus *Viannella* Travassos, 1918 in primates is interpreted as a "capture" from a species close to *Viannella trichospicula* **sp. nov.**

Avellaria intermedia sp. nov.

Figs 15-36

Type material. Holotype male and allotype female CHIOC no. 35416 (wet material), male paratypes no. 35417 (wet material), female paratypes no. 35418 (wet material), male and female paratypes CHIOC no. 34883 (wet material) and 35072 a-g (whole mounts).

Type host. *Dasyprocta fuliginosa*. Necropsy CHIOC no. 26465.

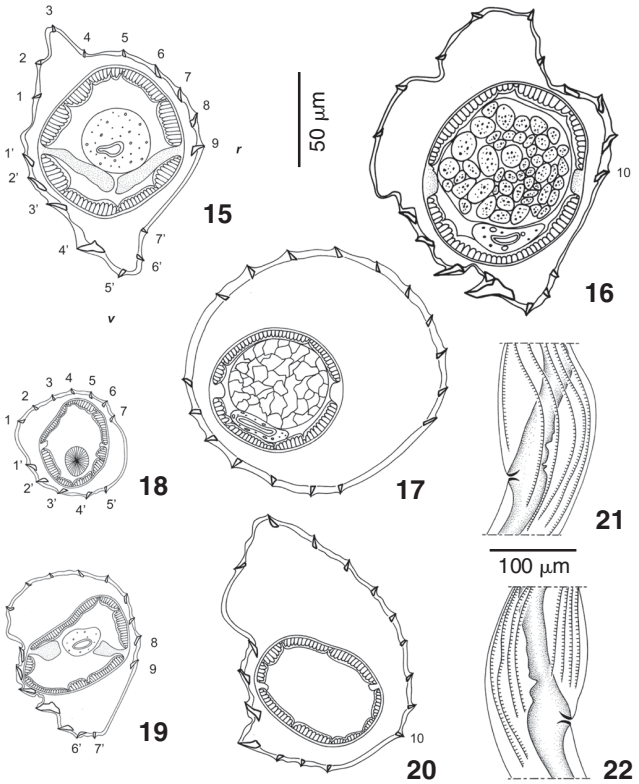
Site of infection. Small intestine.

Type locality. Três Barracas settlement, Jauari waterway, left margin of the Aracá river, Barcelos municipality (0º58'29"S, 62º55'27"W), State of Amazonas, Brazil.

Collector/date: A. Q. Gonçalves/ February 06, 2002.

Description:

General. Small nematodes coiled along ventral side forming two spirals in both sexes. In females, only the anterior part of the body is coiled up to level of the vulva; the posterior part is straight, producing a very peculiar silhouette (Fig. 25). Just anterior to vulva, body widens and forms a "bubble" of 280 long, 330 wide on average (Figs 25, 26). In males, body widens progressively to the level of caudal bursa (Fig. 31). Excretory pore within median third of oesophagus in female, distal third in male. Rounded deirids, posterior to excretory pore (Fig. 24). Oesophagus length less than 12% of body length. In males, papillae 1 well-developed (Fig. 30B). In females, vulva situated between third and posterior quarter of body; each sphincter divided into two triangular parts by a median constriction,



Figures 15-22. *Avellaria intermedia* **sp. nov.**: (15-20) transverse sections of the body; (15-17) male 4.5 long; (15) at oesophago-intestinal junction; (16) at mid-body (1.9 mm from apex); (17) at posterior third of body (3.0 mm from apex); (18-20) female 4.4 mm long; (18) just posterior to cephalic vesicle; (19) at oesophago-intestinal junction; (20) at mid-body (2 mm from apex); (21, 22) other female, disappearance of the ridges at vulvar level; (21) left lateral view; (22) right lateral view. (v) Ventral side, (r) right side. Bars: (15-20) 50 µm; (21-22) 100 µm.

named part 1 for infundibulum side and part 2 for vestibule side. Ratio uterine branches length/body length between 16.2% and 26% for the anterior branch, 12.7 % and 18% for the posterior. In some paratype females, the presence of a vulvar "cork" was observed (Fig. 26).

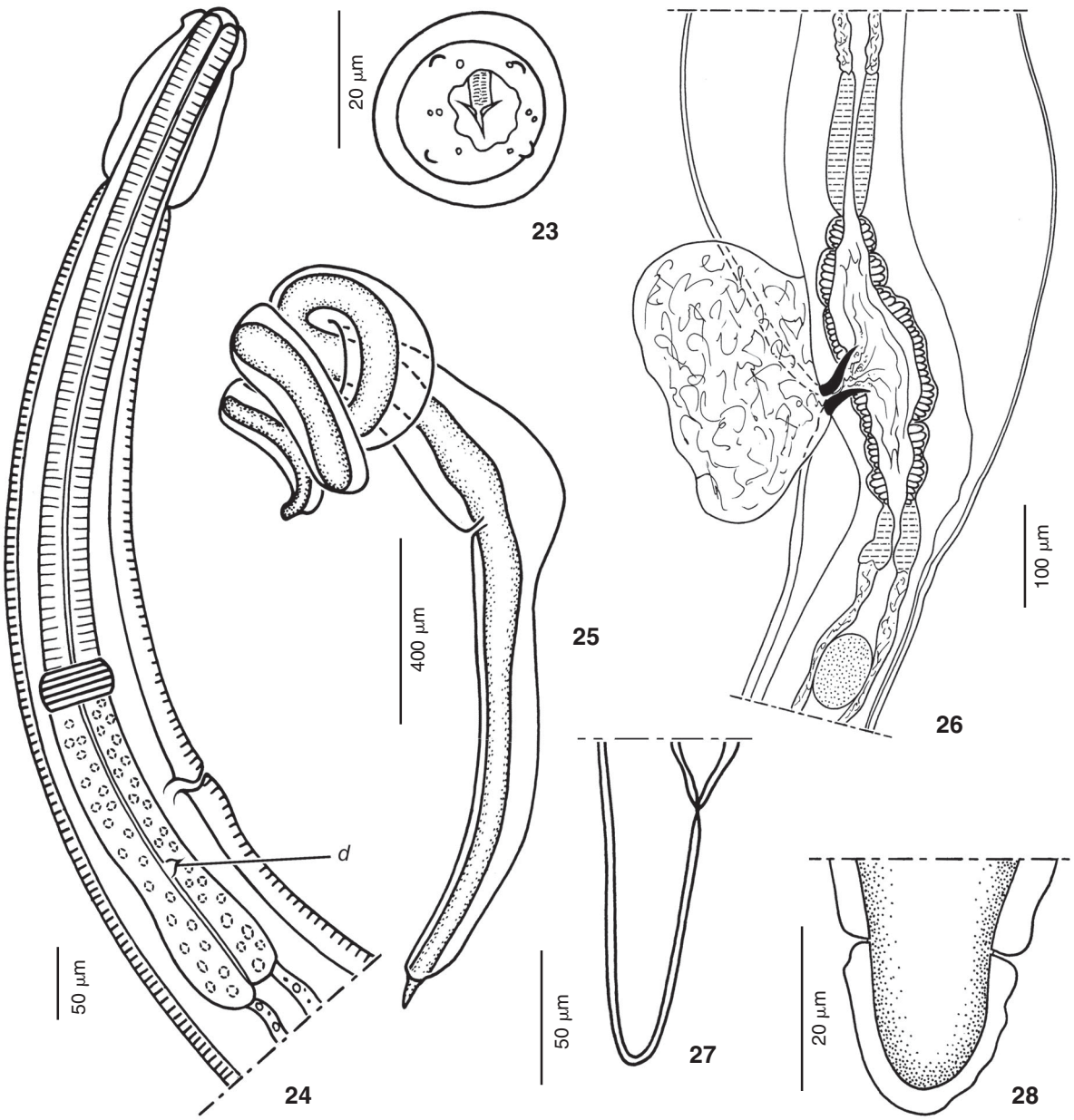
Head. Cephalic vesicle present. In apical view, presence of six small lips surrounded by two amphids, six externo-labial papillae and four cephalic papillae (Fig. 23).

Synlophe. (studied in one male and one female paratype) (Figs 15-22). In both sexes, cuticle with longitudinally uninterrupted ridges. Ridges appearing posterior to cephalic vesicle and at different levels, opposite right lateral field, up to anterior third of body. Ridges disappearing between 250 to 300 anterior to caudal bursa in male. In female, ventral ridges disappearing just anterior to vulva, dorsal ridges just posterior to the vulvar aperture (Figs 21, 22). No ridges on the right region of the right ventral side and on part of left region of the left dorsal side. Number of ridges. In both sexes, just posterior to cephalic vesicle, 12 (7 dorsal, 5 ventral) (Fig. 18), at level of oesophago-intestinal junction, 16 (9 dorsal, 7 ventral) (Figs 15, 19); at anterior third of body and mid-body 17 (10 dorsal, 7 ventral) (Figs 16, 20). This number remains the same until the ridges disappear (Fig. 17). In anterior part of body, ridges of unequal size, dorsal ridges being smaller than ventral ones. On left ventral side, size of ridges decrease from both ventral to left and right sides. In posterior part of body, size of ridges decreases from the level of posterior quarter of body in males and from the level of vulva in females where ridges are of equivalent size (Fig. 17). All along body, tips of ridges are directed from right ventral to left dorsal side. At mid-body, axis of orientation inclined at about 55° to sagittal axis for both sexes on right axis (Figs 16, 20), not calculable on the left side.

Holotype male. 3.9 mm long, 150 wide at mid-body, 185 anterior to caudal bursa; cephalic vesicle 90 long, 40 wide; nerve ring, excretory pore and deirids situated at 250, 350 and 370 from apex, respectively; oesophagus 425 long (Fig. 24). Caudal bursa with pattern of type 1-3-1 (rays 2 and 6 separating first from common trunk of rays 2 to 6 (Figs 29-32). Papillae 1, 70 long. Rays 2 and 3 totally separated up to base. Rays 4 longest, very thick, rounded at extremity. Rays 8 arising just anterior to division of dorsal ray. Dorsal ray divided into two branches forming at base an angle of 90°. Each branch ending in one round tip, rays 9 (external branches) and rays 10 (internal branches) confused. Spicules 270 long; ratio of spicules length to body length 6.9% (Figs 33-35). Each spicule with a small curved handle 48 long and blade ending in one tip, slightly longer in left spicule. Tips encircled by a membrane. In one paratype, the genital cone 15 long and 30 wide at base with papilla zero on ventral lip and long papillae 7 on dorsal lip (Fig. 36). Gubernaculum absent.

Main measurements (average and range) of 9 paratypes: 4 (3. 5–4.3) mm long; 135 (110 -150) wide at mid-body and 180 (160-200) anterior to caudal bursa; nerve ring (n = 5), excretory pore (n = 6) and deirids (n = 4) situated at 276 (175-280), 325 (280 -360), 330 (310-365) from apex, respectively; oesophagus: 420 (410-450) long; spicules: 296 (270-310) long. Ratio of spicules length to body length 8% (6.7-8.9%).

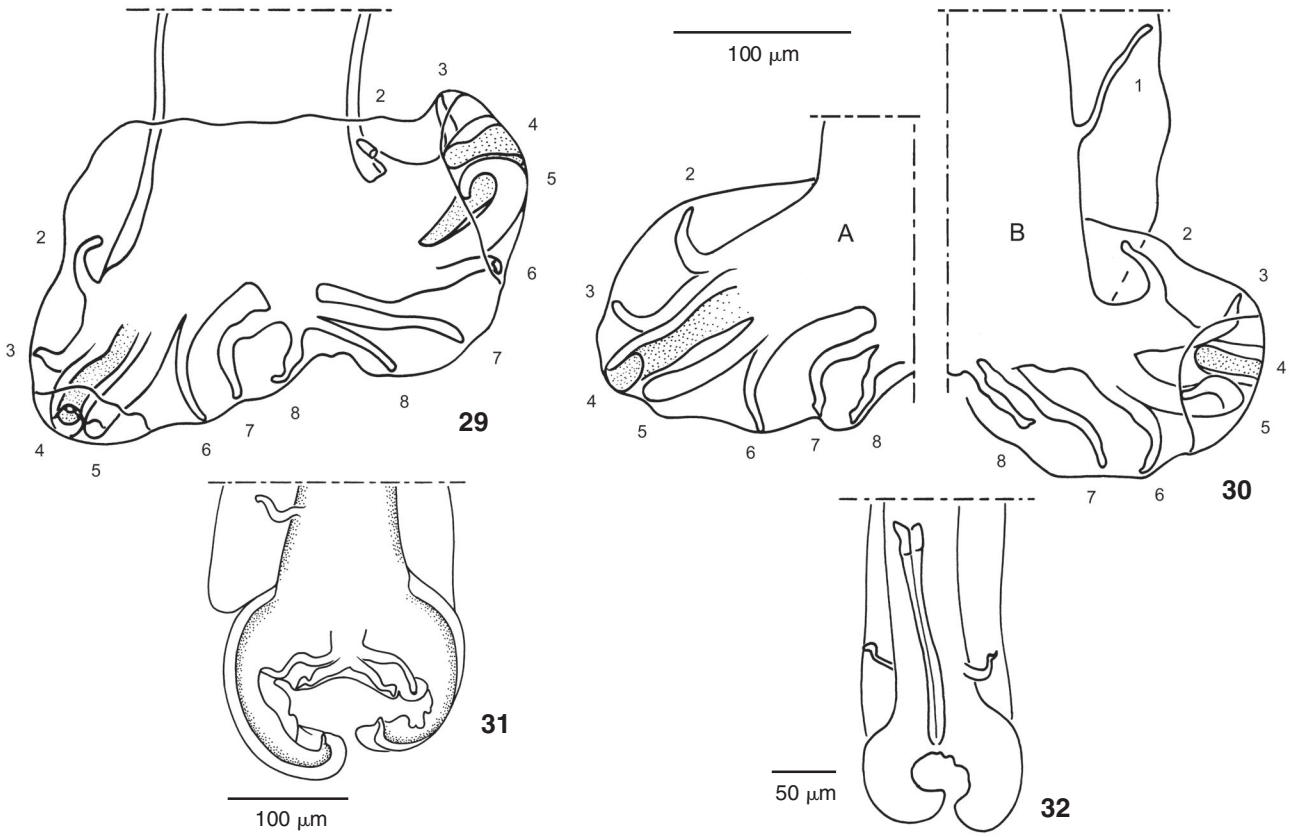
Allotype female. 5.9 mm long and 150 wide at mid-body, 200 anterior to vulva, 100 posterior to vulva. Cephalic vesicle 75 long, 40 wide; nerve ring, excretory pore and deirids situated at 200, 290 and 310 from apex, respectively; oesophagus 525 long. Didelphic: vulva at 1.3 mm from caudal extremity, 27.8 % of body length. *Vagina vera* 28 long. Ovejector 362 long, vestibule 80 long with very small distal part, anterior sphincter 50 long with part 1 measuring 20 long, 32 wide and part 2, 30 long, 42 wide, anterior infundibulum 80 long. Posterior sphincter 75 long with part 1 measuring 20 long, 30 wide and part 2, 30 long, 45 wide, posterior infundibulum 60 long (Fig. 26). Anterior uterine branch 1.2 mm with 14 eggs, posterior



Figures 23-28. *Avellaria intermedia* **sp. nov.**: (23) female, head, apical view; (24) male, anterior extremity, right lateral view; (25) female, silhouette showing the coiled anterior part of the body, the swelling of the cuticle at the level of the vulva and the straight posterior part of the body, left lateral view; (26) female, ovejector and vulvar "cork", left lateral view; (27) female, tail, right lateral view; (28) female, rounded caudal extremity with the phasmids. (d) Deirids.

uterine branch 750 long with 19 eggs, 50 long, 30-35 wide. Ratio of anterior uterine branch to body length: 20.8 %, posterior 12.5 %. Tail 60 long, 35 wide at base with rounded extremity (Figs 27-28).

Main measurements (average and range) of 9 paratypes. Length 4.9 (4.0-5.4) mm; width at mid-body, 136 (110-160), anterior to vulva 278 (250-350), posterior to vulva 138 (125-150), cephalic vesicle 69 (62-80); nerve ring, excretory pore and deirids (n = 7) situated at 206 (180-250), 286 (235-325), 292 (255-343) from apex, respectively; oesophagus 486 (445-520) long; vulva at 1.4 (1.1-1.5) from caudal extremity; ovejector with vestibule 73 (60-82) long; anterior sphincter (n = 7) 48



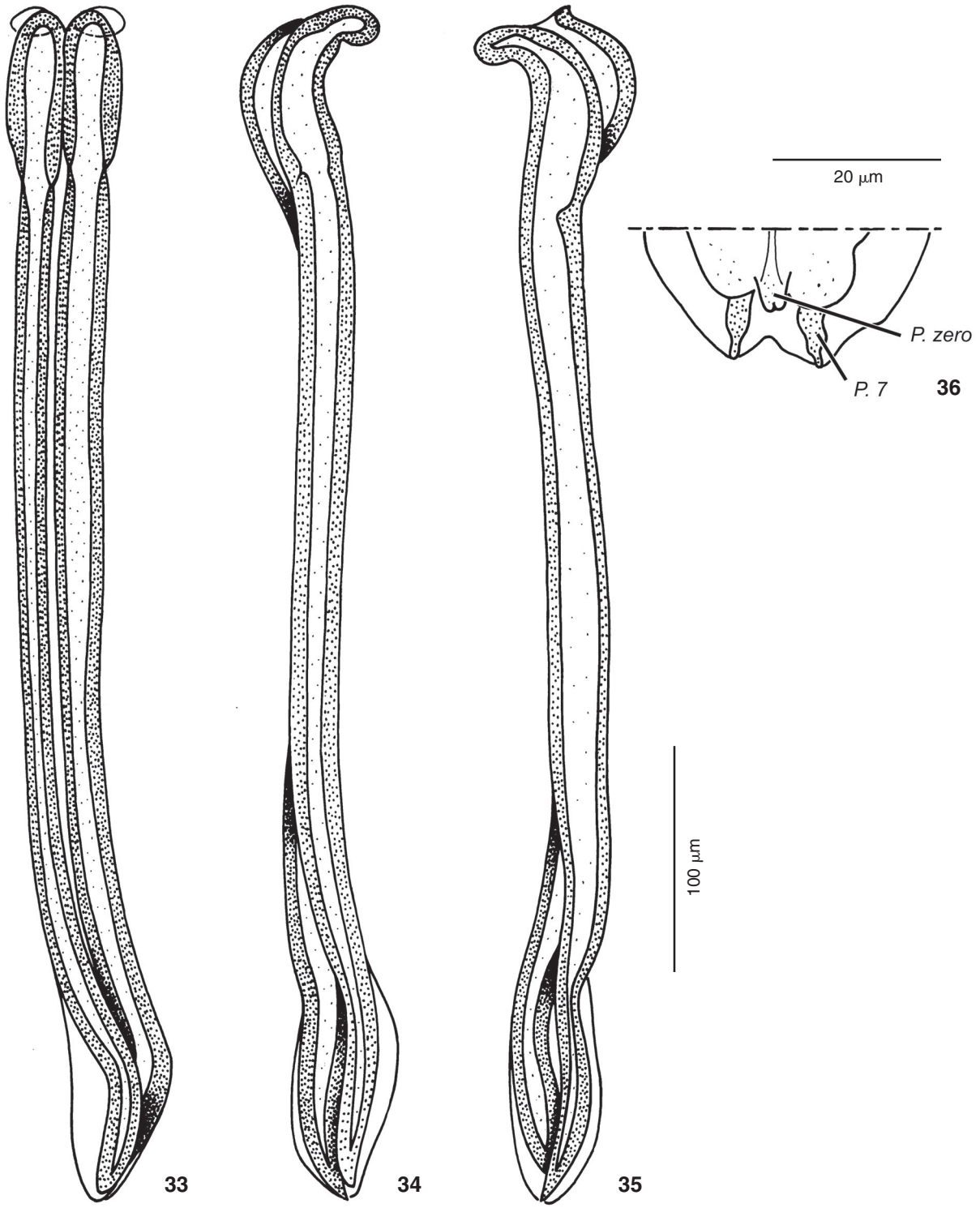
Figures 29-32. *Avellaria intermedia* **sp. nov.**: (29) male caudal bursa, ventral view; (30 A) right lobe, ventral view; (30 B) left lobe, ventral view; (31-32) other male; (31) dorsal view showing dorsal lobe; (32) silhouette of posterior part showing papillae 1.

(42-50) long with part 1 measuring 21 (20-27) long, 35 (28-45) wide, part 2, measuring 27 (22-30) long, 46 (35-56) wide; anterior infundibulum 65 (50-85) long; posterior sphincter (n = 8) 45 (39-52) long with part 1 measuring 20 (17-22) long, 32 (26-50) wide and part 2, 25 (22-33) long, 45 (38-50) wide for part 2; posterior infundibulum (n = 5) 57 (48-75) long. Anterior uterine branch (n = 7) 1.020 (730-1300) long with 4 (0-14) eggs, posterior uterine branch (n = 8) 800 (640-1100) long with 8 (0-22) eggs 48 (40-55) long, 28 (20-35) wide; tail 91 (82-115) long, 37 (30-45) wide at base; Ratio of anterior uterine branch to body length (n = 7) 18.4 (16.2-26.3)%; Ratio of posterior uterine branch to body length (n = 7) 15.6 (12.7-18.2)%. Tail 91 (82-115) long, 37 (30-45) at base. Phasmids visible (Fig. 28).

Diagnosis. The specimens described above belong to the super-family Heligmosomoidea, considering that the body is coiled in a sinistral spiral and the synlophe is not symmetrically bilateral (Durette-Desset & Chabaud 1993). They present the same features as the Viannaiidae, mainly parasites of Neotropical marsupials, Cavioidea and Chinchilloidea rodents (one species in a primate). The Viannaiidae parasites of marsupials are characterized by a synlophe with three left ventral ridges or ridges with a subfrontal axis of orientation and didelphic females. The Viannaiidae parasites of rodents are characterized by a synlophe with an oblique axis of orientation in relation to the sagittal axis and monodelphic females. The nematodes recovered from specimens of *Dasyprocta* present didelphic females like the Viannaiidae parasites of marsupials and a synlophe similar to that of the parasites of rodents. It would, therefore, seem necessary to include these specimens in another genus.

Freitas & Lent (1934) described a new genus *Avellaria* for a species parasite of *Agouti paca* from Brazil named *A. avellari*. The description of the male of this species is similar to that of the specimens described above: caudal bursa with stout rays 4 of which the extremities are wide and rounded, dorsal ray and rays 8 of similar shape, spicules relatively long and straight, opposite to the twisted spicules of the genus *Viannella*. Therefore, the male parasite of *A. paca* and those described above are different from the species of the genus *Viannella* and belong to another genus.

The female parasite of *A. paca* described by Freitas & Lent (1934) as *A. avellari* is monodelphic and therefore does not belong to same genus as the male. It is relatively frequent in



Figures 33-36. *Avellaria intermedia* **sp. nov.** (33-35) Dissected spicules of male: (33) dorsal view with left spicule on right hand side; (34) right lateral view with left spicule behind right spicule; (35) left lateral view with left spicule above right spicule; (36) genital cone, ventral view. (P. zero) Papilla zero, (P.7) papilla 7.

the Heligmosomoidea and particularly in the Pudicinae that several congeneric species or genera belonging to the same evolutive line share the same infection site (small intestine). (Durette-Desset 1970a, b, R'kha & Durette-Desset 1990, Cassone & Durette-Desset 1991). In this case, only the features of the synlophe allow us to match up the two sexes. The female described as *A. avellari* has a particular ovejector not described in the other monodelphic Viannaiidae and without the knowledge of the synlophe it is dificult to classify it. However, two features are close to the genus *Viannella* Travassos, 1918: firstly, the female presents an atrophied genital posterior branch as *V. dubia* Travassos, 1937 and *V. trichospicula* **sp. nov.** Secondly, the section of a female made at two-thirds of the body by Durette-Desset (1968) is similar to the synlophe of the genus *Viannella* and we think that it is possible to allocate this female in the genus *Viannella*.

The re-establishment of the genus *Avellaria* that was put in synonymy with *Viannella* by Durette-Desset (1968) is proposed. The nematodes found in the specimen of *Dasyprocta* are differentiated from the male of *A. avellari* by a smaller number of cuticular ridges (17 versus 27), a higher ratio of spicules length/body length (8% versus 5.6%) and spicules with a single tip.

Thus, some of the nematode specimens parasitizing the agouti investigated here are considered representatives of the new species described, *Avellaria intermedia* **sp. nov.**, considering the intermediary position of the genus between the Viannaiidae parasites of marsupials and those which are parasites of rodents. The emendation of the definition of the genus *Avellaria* is: Viannaiidae, Viannaiinae with didelphic female; synlophe with ventral ridges strongly developed in anterior part of body, caudal bursa of type 1-3-1 with huge rays 4, straight spicules with small and marked handle. Parasites of Neotropical Agoutidae and Dasyproctidae.

Type species. *Avellaria avellari* Freitas and Lent, 1934. Other species: *Avellaria intermedia* **sp. nov.**

Remarks. It is the first report of a Viannaiinae in the genus *Dasyprocta*, only parasitized up to now by the Pudicinae (Heligmonellidae). According to Durette-Desset (1971), the Viannaiinae parasites of caviomorph rodents may have derived from the Viannaiinae parasites of marsupials and the diagnosis of genus *Avellaria* supports this hypothesis. The female is didelphic like the parasites of marsupials but the synlophe is similar to the observed in species of the genus *Viannella* with the presence of an oblique axis and the absence of cuticular ridges at least *pro parte* on the ventral-right and dorsal left sides.

ACKNOWLEDGEMENTS

To José R. Coura and Angela C.V. Junqueira, from the Laboratory of Parasite Diseases, Department of Tropical Medicine, Oswaldo Cruz Institute, Rio de Janeiro, Brazil for the invitation to collect the samples for this study. To the National Health Foundation; to Cibele R. Bonvicino and Gilson E. Iack-Ximenes from the National Cancer Institute, Rio de Janeiro, Brazil, and Zoology Museum of São Paulo University, respectively, for the identification of the rodent host; to Dely Noronha, Curator of the Helminthological Collection of the Oswaldo Cruz Institute (CHIOC), Rio de Janeiro, Brazil, for the loan of some helminthes specimens for study.

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Received in 17.VIII.2005; accepted in 16.V.2006.