

**FILARIOPSIS BARRETOI (TRAVASSOS, 1921) (NEMATODA: METASTRONGYLOIDEA) LUNG PARASITE OF PRIMATES FROM SOUTH AMERICA – TAXONOMY, SYNONYMS AND PATHOLOGY**

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*Nematodes and fragments of lungs from Cebus spp., Callithrix jacchus (L.) and Saimiri sciureus (L.) were studied. The worms from Cebus and Callithrix must be called Filariopsis barretoii (Travassos, 1921). The names Filariopsis arator Chandler, 1931 and Filaroides cebi Gebauer, 1933 are synonymized to F. barretoii. The status of Filariopsis gordius (Travassos, 1921) remains uncertain.*

*The pathology is described. The parasites are located in the pulmonary paranchyma, near the pleural surface, constituting nodules.*

Key words: *Filariopsis barretoii* – Nematoda – pathology – primates

Specimens of nematodes and fragments of lungs from primates, deposited in the Helminthological Collection of Oswaldo Cruz Institute (IOC) were examined. The nematodes belong to *Filariopsis*, a Metastrongylide genus with atrophied copulatory bursa. Due to doubts in the classification of these parasites, which occur in non-human primates, we made a brief historic of these species.

Travassos (1921) described the species *Oslerus barretoii* from *Callithrix jacchus* and *Oslerus gordius* from *Saimiri sciureus*, respectively from Rio de Janeiro and Pará States. Travassos did not figure the species, he gave only short descriptions.

Chandler (1931) described *Filariopsis arator* from *Cebus* spp. from Chicago Zoo, USA. These species were compared with *F. asper* Van Thiel, 1926, which is mostly characterized by the large size of the spicules, twice bigger than these of *F. arator*.

Gebauer (1933) described *Filaroides cebi* from *Cebus macrocephalus* and *Cebus* sp. from Vienna Zoo, Austria. He discussed the paper of Travassos (1921), but he did not know the Chandler's report (1931). Notwithstanding that his description is excellent.

Wehr (1935) redescribed *Filariopsis arator* Chandler, 1931, by using type specimens; he emphasized the description of the cephalic papillae. Wehr concluded that these nematodes belong to *Filariopsis* in the Metastrongyloidea.

Dougherty, 1943 (as mentioned by Webster [1978]), proposed *F. cebi* Gebauer, 1933 as a synonym of *F. arator* Chandler, 1931.

Liu (1965) described *Filariopsis cebuellae* from *Cebuella pygmaea* from Colombia and compared with the other species from South America.

Rego (1974) described the males and females nematodes collected from lungs of a *Callithrix jacchus* from Rio de Janeiro. These worms were classified as *Filariopsis barretoii* (Travassos, 1921). Rego was the first author to propose this taxonomic combination. The lesions observed in the lungs were briefly described.

Webster (1978) redefined and proposed the resurrection of the genus *Filariopsis* for the species found in this site. He redescribed the species *F. asper* Van Thiel, 1926, *F. arator* Chandler, 1931, *F. cebuellae* Liu, 1965 and *F. gordius* (Travassos, 1921). He did not give a description of *F. barretoii* but only mentioned Travassos paper (1921). Webster did not refer to Rego's study either. Data on these species were tabulated and compared. Apparently the author accepted these five species as valid.

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TABLE  
*Filariopsis barretoi* (Travassos, 1921) synonymies  
 Comparative measurements

Hosts	<i>Cebus</i> spp.			<i>Callithrix jacchus</i>			
Names	<i>Filariopsis arator</i>	<i>Filaroides cebi</i>	<i>Filariopsis arator</i>	–	<i>Filariopsis barretoi</i>	<i>Filariopsis barretoi</i>	–
Authors	Chandler, 1931	Gebauer, 1933	Webster, 1978	present study	Travassos, 1921	Rego, 1974	present study
Males							
Size	50-60	50	–	43,5	65	40	–
Width	0,210	0,230-0,250	0,125-0,200	0,165	0,280	0,170	0,150
Cloaca	0,030-0,035	–	–	0,027	0,046	0,031	0,026
Spicules	0,150	0,110-0,132	0,135-0,165	0,110-0,159	0,100	0,078	0,125
Gubernaculum	–	0,033-0,038	0,028-0,038	0,030-0,040	0,049	–	0,034-0,045
Females							
Size	80-90	63-95	–	–	90-140	120	–
Width	0,260	0,280-0,320	0,200-0,275	0,360	0,300	0,280	0,225
Vulva	0,130-0,150	0,080-0,168	0,060-0,125	–	0,140-0,170	0,115	0,133-0,152
Anus	0,050	0,030-0,041	0,065	–	0,035-0,049	0,028	0,041

Coppo et al. (1979) referred in Argentina, *Filariopsis arator*, found in 4 of 16 *Cebus apella* examined.

In this work we studied samples of *Filariopsis* collected respectively from *Cebus* spp., *Callithrix jacchus* and *Saimiri sciureus*. We performed its taxonomic and morphological study and it was completed with a description of the lung pathogenicity produced in these primates.

#### MATERIAL AND METHODS

Lung fragments and worms were preserved in Railliet & Henry solution and kept at the Helminthological Collection in the IOC. The worms were clarified in Amman's Lactophenol for study. To dissociate the spicules, males extremities were macerated in Sodium Hypochlorite (50% [ClO]<sub>2</sub> Ca + 50% H<sub>2</sub>O). Sections of the lung with 5 μ were stained by Hematoxylin-Eosin and Trichromic. Drawings were performed with the aid of a camera lucida. All measurements are in mm.

#### RESULTS

##### TAXONOMY

*Specimens from marmoset, Callithrix jacchus* (L.) – Samples and slides deposited at the Helminthological Collection of IOC, numbers, 3.143, 31.038-a-e, 31.039-a-c.

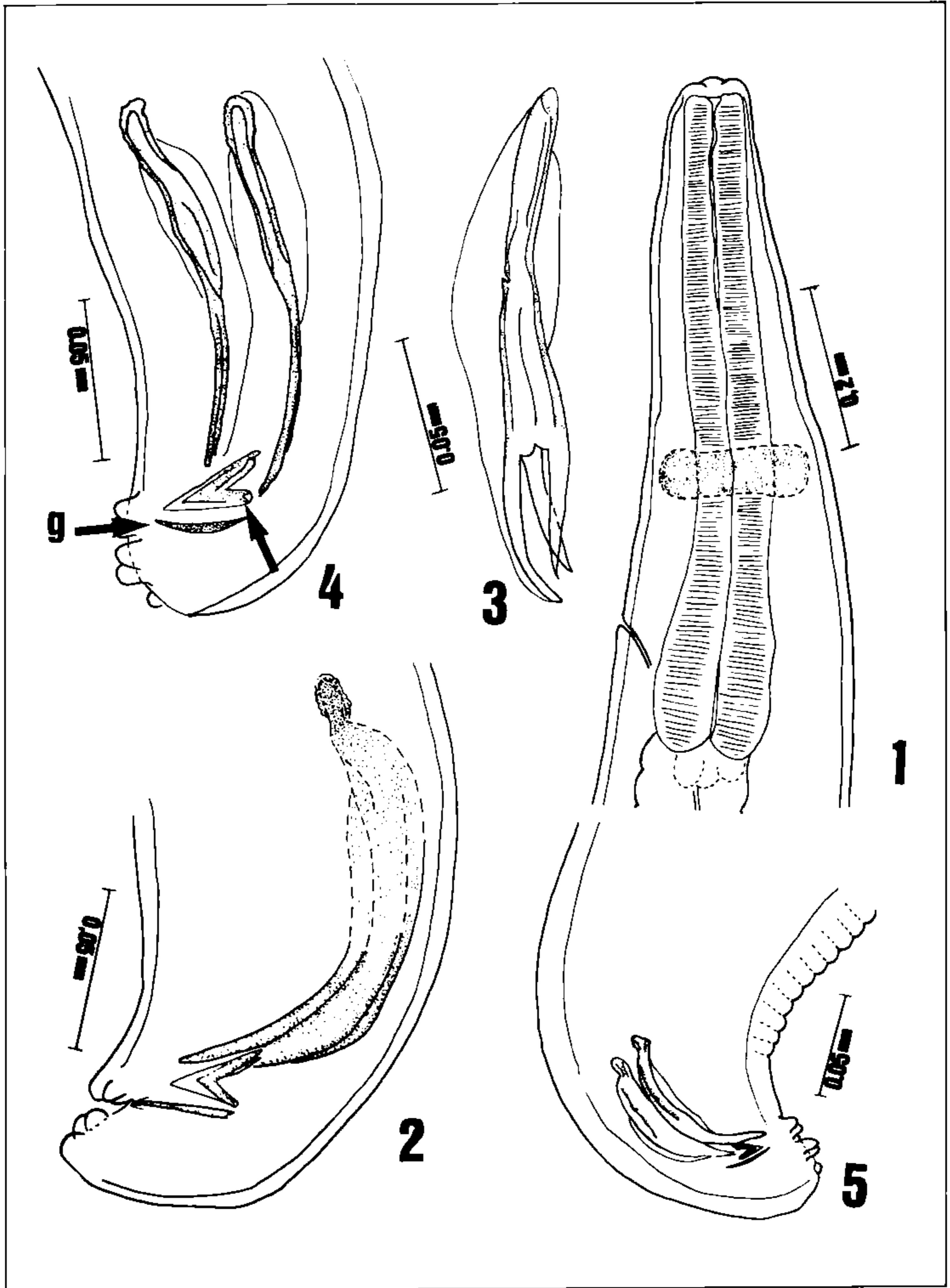
The morphology is in accordance to Rego (1974), except that in this study the dissected spicules could be better observed; the larger ones measures 0,125 (Rego referred only 0,078).

*Specimens from capuchin monkeys, Cebus capucinus* (L.) and *Cebus apella* (L.) – Slides and samples deposited at the Helminthological Collection, numbers, 6.158, 6.169, 8.585, 10.307, 11.199, 11.453, 11.456, 16.909, 32.415-a-c, 32.416.

The spicules are morphologically similar to the ones from *Callithrix*, but a little larger, 0,110-0,159. The gubernaculum measured, 0,030-0,040. The spicules have distal extremity clearly trifurcate (Fig. 3). The gubernaculum is plate shaped and close to this organ there is a V shaped cuticularized structure (Fig. 4).

*Specimens from squirrel monkey, Saimiri sciureus* (L.) – Slides deposited at the Helminthological Collection numbers, 3.144, 3.147, 3.292, 3.391, 3.392, 3.403, 3.410.

The specimens from *Saimiri* are poorly known, since the superficial description by Travassos (1921), there is only a description of males obtained from *Saimiri sciureus* and *Tamarinus nigricollis* (Webster, 1978). We examined the material kept in our collection and it is constituted by specimens in slides (balsam) and in bad conditions of conserva-



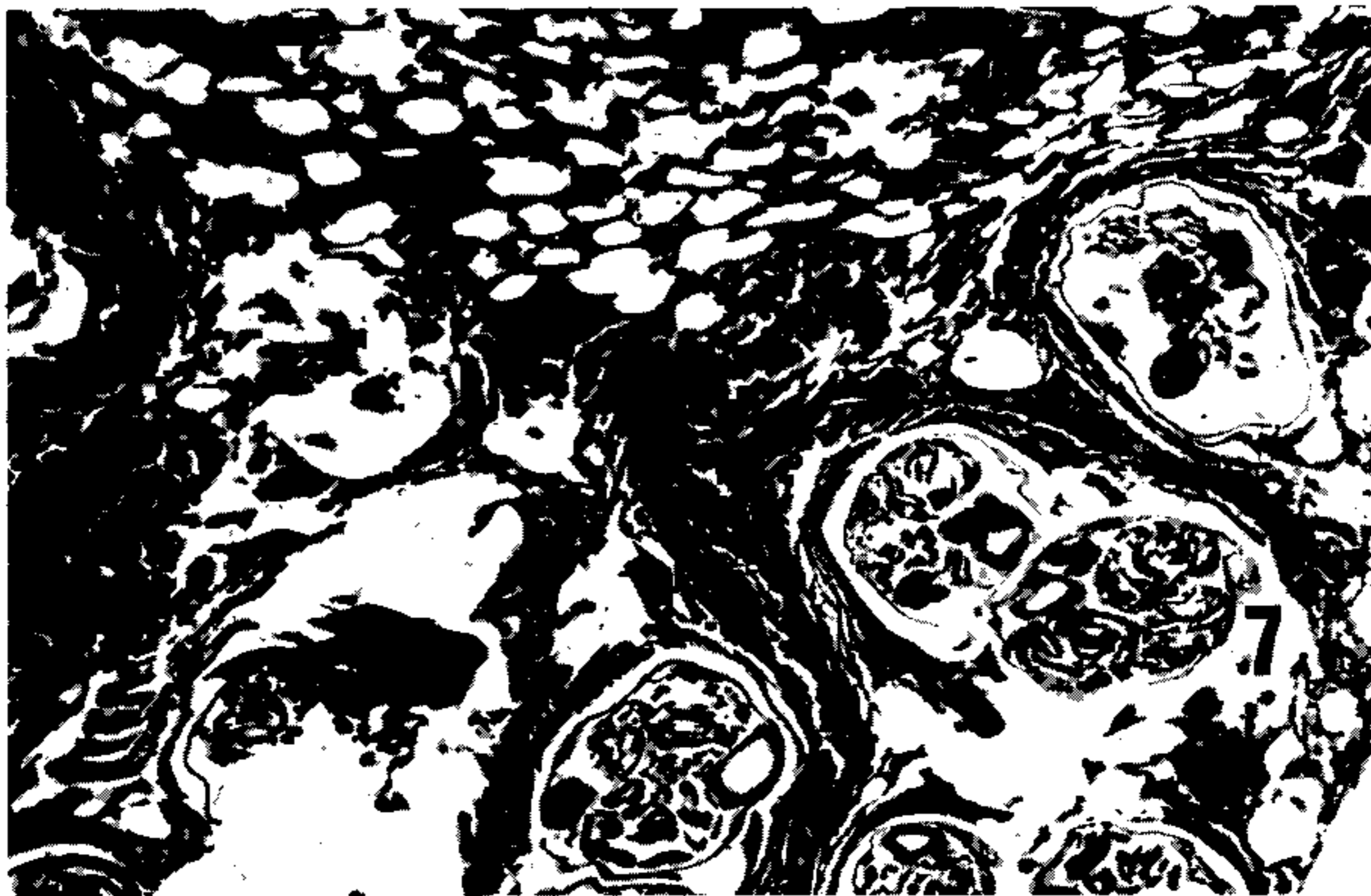
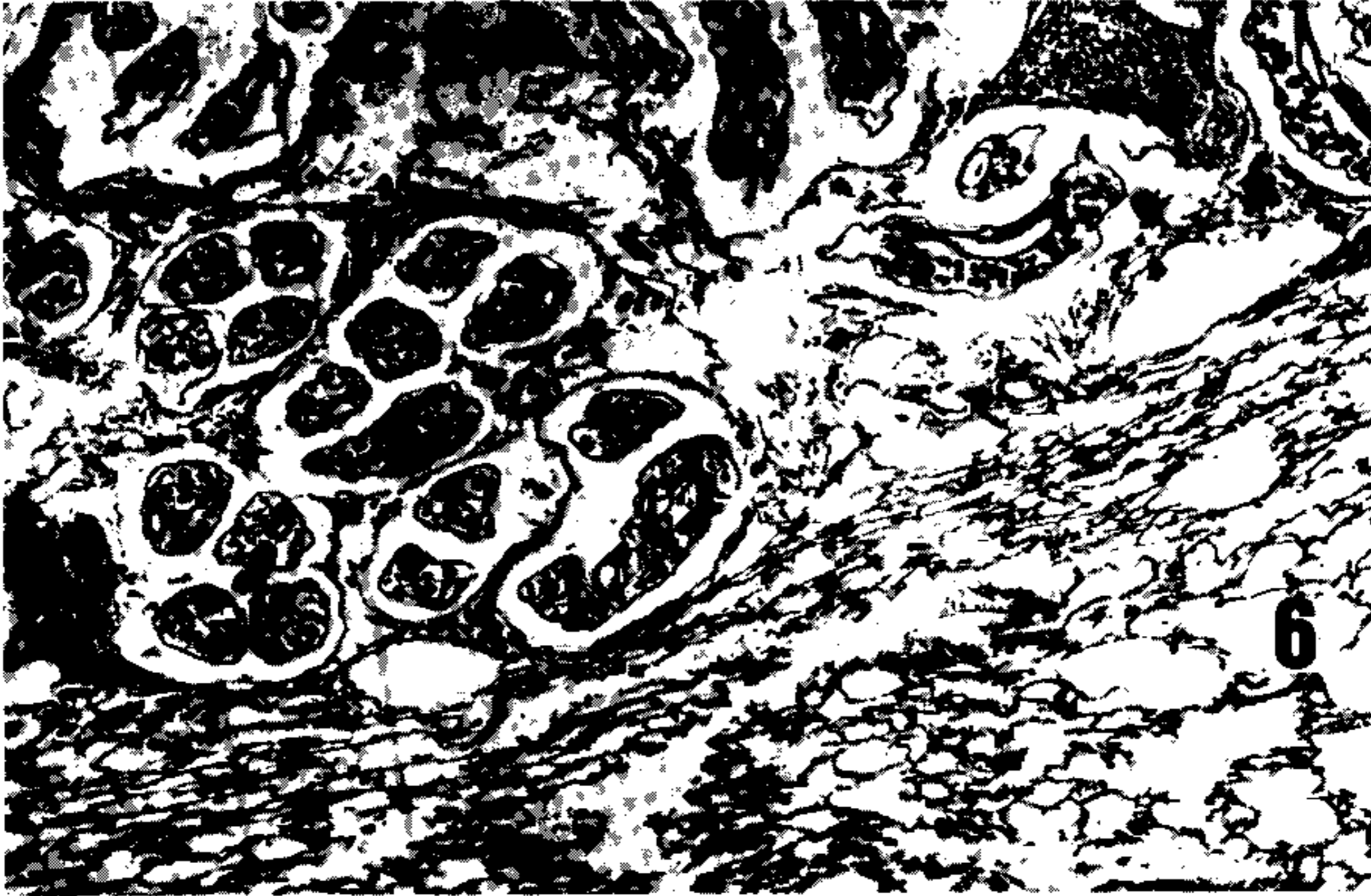
*Filariopsis barretoei* (Travassos, 1921). Fig. 1: Anterior part of male. Fig. 2: Male tail, lateral view, from *Cebus apella*. Fig. 3: Dissected spicule, from *Cebus apella*. Note the distal points. Fig. 4: Male tail, from *Cebus apella*. Alate spicules. Note the gubernaculum (g) and appendix (arrow).

*Filariopsis gordius* (Travassos, 1921). Fig. 5: Male tail, lateral view, from *Saimiri sciureus*.

tion. We tried to dissect the worms from fixed lungs but they became fragmented, unsuitable for study.

Only males were obtained; they measured  $20 \times 0,150$ . Cloaca, from terminal end,  $0,022-0,034$ . The general morphology is in accord-

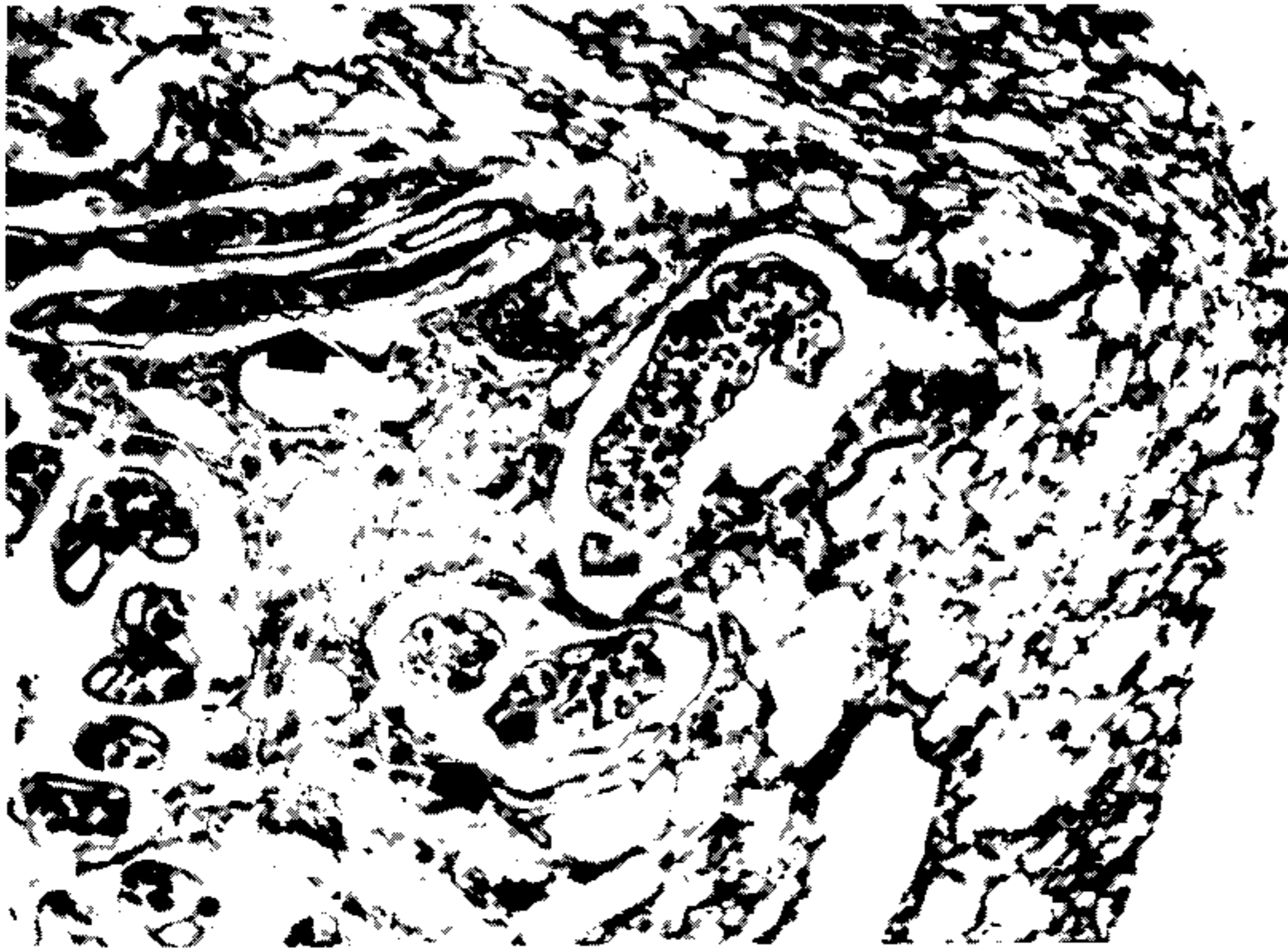
ance to Travassos and Webster descriptions. Unfortunately as it was not possible to dissect the spicules they had to be studied through the worms body; they measured  $0,076-0,083$  and the gubernaculum  $0,026$  (Webster referred  $0,085-0,090$  for the spicules and  $0,027-0,032$  for the gubernaculum).



*Filariopsis barretoii* (Travassos, 1921). Fig. 6: Lung section from *Cebus*, parasites inside the alveoli, that are dilated, broken, with nodular-like aspect. 40X. Fig. 7: Lung section from *Callithrix*, sectioned parasites inside the alveoli. The septa's interstice (arrow) thickened due to the accumulation of overflowing erythrocytes. 40X.



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*Filariopsis barretoii* (Travassos, 1921). Fig. 8: Surface area of *Callithrix* lung, parasites inside broken alveoli; note the accumulation of erythrocytes in the septa (arrow). 40X. Fig. 9: Surface area of *Cebus* lung. Parasites in transverse and longitudinal sections, inside the alveoli. 40X.

*Discussion* — The worms from the lungs of *Cebus* spp., and *Callithrix jacchus* were examined, and showed to have a great similitude, so it would be better to consider them as the same species. However we could admit as a different species the worms from *Saimiri*; they have smaller body and the spicules are shorter and more delicate. Notwithstanding, the species *F. gor-*

*dus* needs a redescription from new samples to clarify its taxonomic status. To summarize, the species from these monkeys that we accept as valids are: *Filariopsis barretoii* (Travassos, 1921), *F. gordius* (Travassos, 1921), *F. asper* Van Thiel, 1926 and *F. cebuella* Liu, 1965. We synonymized with *F. barretoii* the following names: *Filariopsis arator* Chandler, 1931;

*Filaroides cebi* Gebauer, 1933; *Filariopsis barreto* sensu Rego, 1974 and *Filariopsis arator* sensu Webster, 1978.

In the Table we compared the main data on these nematodes. Some variations in the measurements can be attributed to the host's variations and to the unequal observations of the authors. *F. cebuella* from *Cebuella pygmaea* from Colombia is a closer species to *F. barreto*. About *F. asper* Van Thiel from *Alouatta seniculus*, this species is well differentiated from *F. barreto* in the size of worms and spicules.

#### PATHOLOGY

The material examined consisted in some fragments of lungs of two *Cebus capucinus* from Mato Grosso State and a *Callithrix jacchus* from Rio de Janeiro. The degenerative changes are similar in both species.

The worms are delicate and elongated, located in pulmonary parenchyma, near the pleural surface (Figs. 8-9). Macroscopically the infected organs seem normal, except for little points, brown or yellowish, that emphasized on the lungs surface. These points, examined in stereoscopic microscope, disclosed groups of worms contained in fibrous nodules, under the pleura. The area around the nodules sometimes showed dark pigmentation due to the blood outflow.

Microscopically, the parasites are within the respiratory bronchioles, alveolar ducts and dilated alveoli, constituting nodules (Fig. 6). In the nodules the bronchioles show hypertrophy of the smooth musculature, with the covering epithelium exfoliated.

The alveoli have the epithelium hyperplasia, sometimes replaced by a thin fibrous and hyaline lamina which is similar to the parasite cuticle and the septa's interstice enlarged, mainly because of the increase of lymphocytes, plasmocytes and histiocytes.

We did not find parasites in the lumen of blood vessels; however they are dilated and

congested, what is specially observed in the capillaries around the nodules. When the parasited alveoli are broken and connected, it causes a formation of a real cystic cavity.

The lesions observed are small and it seem to be not very pathogenic for the host, unless a great area become affected.

#### RESUMO

*Filariopsis barreto* (Travassos, 1921), (Nematoda: Metastrongyloidea), parasita de pulmão de primatas da América do Sul – Foram estudados os nematóides e fragmentos do pulmão, coletados de *Cebus* spp., *Callithrix jacchus* (L.) e *Saimiri sciureus* (L.). O estudo morfológico, principalmente dos espículos de *Cebus* spp. e de *Callithrix jacchus*, mostrou tratar-se de uma só espécie, *Filariopsis barreto* (Travassos, 1921); os nomes *F. arator* e *F. cebi* são sinônimos. É dada uma descrição pormenorizada das lesões provocadas por estes vermes no parênquima pulmonar dos macacos.

Palavras-chave: *Filariopsis barreto* – Nematóide – patologia – primatas

#### REFERENCES

- CHANDLER, A. A., 1931. New genera and species of nematode worms. *Proc. U. S. Nat. Mus.*, 78 (2866): 1-11.
- COPPO, J. A.; MERIONA, R. A. & LOMBARDERO, O. J., 1979. El parasitismo en los primatas del Caprin. *Acta Zool. Lilloana*, 35 (1): 9-12.
- GEBAUER, O., 1933. Beitrage zur kenntnis on Nematoden aus affenlungen. *Z. Parasitenk.*, 5: 724-734.
- LIU, S., 1965. *Filaroides cebuella* sp. n. (Nematoda: Metastrongyloidea) from the lung of a pygmy marmoset *Cebuella pygmaea* (Spix, 1823). *J. Helminth.*, XXXIX (2-3): 225-228.
- REGO, A. A., 1974. *Filariopsis barreto* (Travassos, 1921) comb. n. parasito de mico estrela, ocorrência e patogenia. *Mem. Inst. Oswaldo Cruz*, 72 (3-4): 181-185.
- TRAVASSOS, L., 1921. Nematódeos novos. I. *Brazil-méd.*, XXXV, 2º vol.: 367-368.
- WEBSTER, W. A., 1978. The resurrection of *Filariopsis* Van Thiel, 1926 (Metastrongyloidea: Filariodidae) for lung-worms from from primates. *Canad. J. Zool.*, 56 (3): 369-373.
- WEHR, E. E., 1935. A restudy of *Filariopsis arator* Chandler, 1931, with a discussion of the systematic position of the genus *Filariopsis* Van Thiel, 1926. *J. Wash. Acad. Sci.*, 25 (8): 415-418.