

ON *THELAZIA ANOLABIATA* (MOLIN, 1860) RAILLIET & HENRY, 1910 (NEMATODA, THELAZIOIDEA) – A NEW HOST RECORD AND SYSTEMATIC CONSIDERATIONS

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Thelazia anolabiata (Molin, 1860) Railliet & Henry, 1910, parasite of eyes of birds, is reported in a new host, *Ortalis canicolis pantanalensis* Cher & Reich from Salobra, Mato Grosso do Sul State; *T. digitata* Travassos, 1918 and *T. lutzi* Travassos, 1918 are considered its synonyms.

Key words: *Thelazia anolabiata* – *Ortalis canicolis pantanalensis* – new host record – synonymy

The genus *Thelazia* Bosc, 1819 contains a large number of species parasites of eyes of birds and mammals. In Brazil, 19 species were referred.

The taxonomy of this group of nematodes is very difficult, mainly because the species very often have no host specificity, besides the great variability of characters used for specific differentiation and many species were described based either on the study of a few specimens or on female specimens only.

As part of the study of this genus we tried to identify nematodes of eyes of *Ortalis canicolis pantanalensis* Cher & Reich and *Crax fasciolata* Spix, birds Cracidae. Morphological approaches between *Thelazia anolabiata* (Molin, 1860) Railliet & Henry, 1910 *T. lutzi* Travassos, 1918 and *T. digitata* Travassos, 1918 were considered herein.

In the present paper a comparative study on these three species is presented.

MATERIALS AND METHODS

Seven samples of preserved wet material (Railliet & Henry's solution) from eyes of *O. c. pantanalensis* from Salobra, Mato Grosso do Sul State three samples of material of *C. fasciolata* from Barranco Alto, Aquidauana River, MS, also preserved in Railliet & Henry's solution and specimens identified as *T. anolabiata*, *T. lutzi* and *T. digitata* preserved in

balsam deposited in the Instituto Oswaldo Cruz Helminthological Collection, (CHIOC) were studied.

The material of *O. c. pantanalensis* was cleared in glacial acetic acid and beechwood creosote and mounted in Canada balsam; the material of *C. fasciolata* was cleared in glacial acetic acid and beechwood creosote and replaced in Railliet & Henry's solution.

Drawings were made with a Carl Zeiss camera lucida. Measurements are in millimeters. Voucher specimens were deposited in CHIOC.

RESULTS

The comparison between samples from *O. c. pantanalensis* and *C. fasciolata*, the study of the material deposited in CHIOC and data concerning to *T. anolabiata*, *T. lutzi* and *T. digitata* after several authors, show that we are dealing with single species. Working with many specimens from some different necropsies we can obtain a great variation of relative values during measurements, reinforcing the hypothesis of synonymy (Tables I and II).

After the amplification of data the new diagnosis for the species is as follows:

Thelazia anolabiata (Molin, 1860) Railliet & Henry, 1910

Synonymy – *Spiroptera anolabiata* Molin, 1860; *Filaria anolabiata* Stossich, 1897; *Oxyspirura anolabiata* Ramson, 1904; *Thelazia anolabiata* Railliet & Henry, 1910; *Thelazia* (*T.*)

TABLE I

Comparative data on species identified to *Thelazia anolabiata* (Molin, 1860)

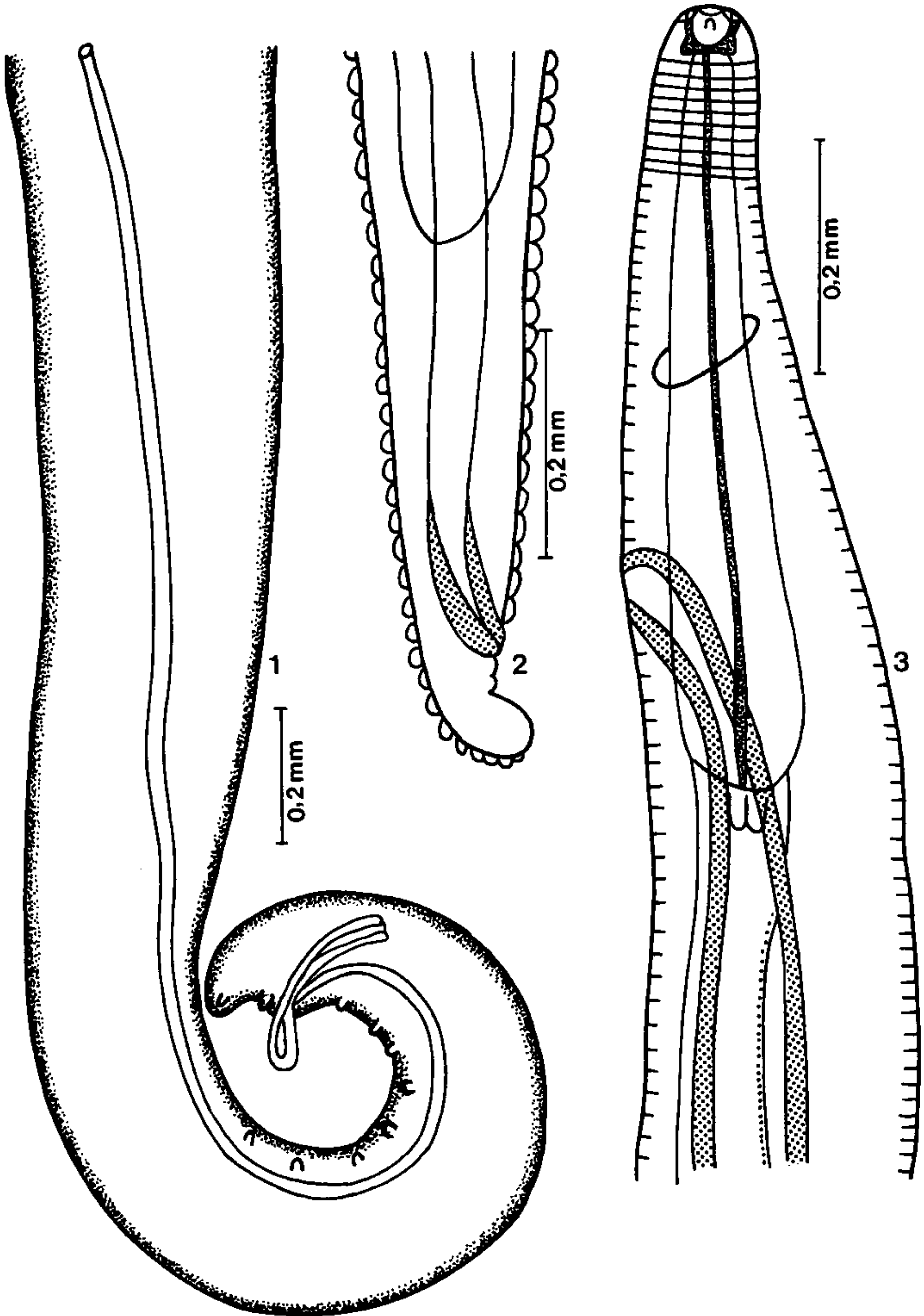
| Species | <i>Spiroptera anolabiata</i> (Molin, 1860) | <i>Thelazia lutzi</i> Travassos, 1918 | | <i>Thelazia digitata</i> Travassos, 1918 | <i>Thelazia anadorhynchi</i> Strachan, 1957 | | <i>Thelazia anadorhynchi</i> Strachan, 1957 | | <i>Thelazia anolabiata</i> (Molin, 1860) | <i>Thelazia anolabiata</i> (Molin, 1860) | | <i>Thelazia digitata</i> Travassos, 1918 | |
|--|---|---|---------------------------|---|---|---------------------------------|---|-------------|--|---|---------------------------------|--|---------------------------|
| Autor | Molin, 1860 | Travassos, 1918 | | Travassos, 1918 | Strachan, 1957 | | Anderson & Diaz Ungria, 1959 | | Anderson & Diaz Ungria, 1959 | Anderson & Diaz Ungria, 1959 | | Anderson & Diaz Ungria, 1959 | |
| Sex | Female | Male | Female | Female | Male | Female | Male | Female | Female | Male | Female | Male | Female |
| Lenght | 8-17 | 22-24 | 25-27 | 18 | 13,0-15,5 | 19,5-23,4 | 14 | 16-17 | 12,5 | 9-13 | 12-16 | 12-13 | 15-16 |
| Width | 0,400 | 0,400-0,500 | 0,500-0,800 | 0,500 | 0,47-0,57 | 0,57-0,67 | | | | 0,41-0,50 | 0,54-0,59 | 0,41-0,46 | 0,46-0,51 |
| Buccal cavity (L x W) | | | 0,035-0,049 x 0,028 | 0,021 x 0,028 | 0,041-0,045 x 0,049-0,054 | 0,039-0,047 x 0,042-0,052 | | | | 0,026-0,036 x 0,034-0,039 | 0,036-0,043 x 0,040-0,046 | 0,023-0,026 x 0,034-0,036 | 0,030 x 0,036-0,038 |
| Oesophagus (Lenght) | | | 0,67-0,74 | 0,85 | 0,76-0,84 | 0,9-0,93 | 0,67 | 0,60-0,72 | 0,83 | 0,70-0,84 | 0,82-0,88 | 0,65-0,71 | 0,69-0,79 |
| First striation from anterior end | | | | | | | 0,046 | 0,060-0,068 | 0,10 | 0,12 | 0,10-0,13 | 0,049-0,058 | |
| Number complete striations | | | | | | | 24 | 27 | 23 | 21 | 19-23 | 16-26 | |
| Cervical papillae from anterior end | | | | | | | 0,46 | 0,33-0,43 | 0,51 | 0,39-0,54 | 0,45-0,54 | 0,38-0,44 | 0,38-0,40 |
| Nerve ring | | | 0,26-0,28 | 0,32 | 0,24-0,31 | 0,23-0,36 | 0,28 | 0,23-0,29 | 0,36 | 0,32-0,38 | 0,35-0,41 | 0,28-0,30 | 0,28-0,32 |
| Long spicule | | 0,74 ^a | | | 0,396-0,591 ^b | | 0,097 ^b | | | 1,3-1,6 | | 1,5-1,7 | |
| Short spicule | | 0,19 | | | 0,085-0,153 | | 0,18 | | | 0,17-0,18 | | 0,18 | |
| Vulva from anterior end | | | 0,53 | 0,60 | | | | 0,42-0,56 | 0,63 | | 0,60-0,68 | | 0,52-0,57 |
| Anus to posterior end | | 0,085 | 0,10 | 0,12 | 0,112-0,269 | 0,15-0,20 | 0,097 | 0,08-0,12 | 0,12 | 0,089-0,099 | 0,092-0,13 | 0,079-0,099 | 0,097-0,11 |
| Eggs (L x W) | | | | | | 0,030-0,043 x 0,021-0,025 | | | | | | | |
| Number of caudal papillae | | 10 p. preanal 1 isol. preanal 2 p. postanal | | | 8 p. preanal 3 p. postanal | | 9-10 p. pre- anal 1 p. postanal | | | 10 p. preanal 2 p. postanal | | 7-10 p. pré-anal 1 isol. preanal 1 p. postanal | |
| Host | <i>Crax fasciolata</i> Spix | <i>Penelope</i> sp. | | <i>Ramphastus</i> sp. | <i>Anadorhynchus</i> <i>hyacinthinus</i> Lathan | | <i>Anadorhynchus</i> <i>hyacinthinus</i> Lathan | | <i>Penelope</i> <i>purpurascens</i> <i>aequatorialis</i> Salvatori & Festa | <i>Crax alector</i> (L.) | | <i>Ramphastus v. vitellinus</i> Lichtenstein | |
| Locality | Brazil | Brazil | | Brazil | Central Brazil | | Central Brasil | | Venezuela | Caura River, Bolivar, Venezuela | | Caura River, Bolivar, Venezuela | |

^a: Mistake in the original measure.^b: anomalous spicules after Anderson & Diaz Ungria who studied the type of *T. anadorhynchi*

TABLE II

Comparative data on species identified to *Thelazia anolabiata* (Molin, 1860)

| Species | <i>Thelazia digitata</i> Travassos, 1918 | | <i>Thelazia digitata</i> Travassos, 1918 | | <i>Thelazia digitata</i> Travassos, 1918 | | <i>Thelazia digitata</i> Travassos, 1918 | | <i>Thelazia digitata</i> Travassos, 1918 | | <i>Thelazia lutzi</i> Travassos, 1918 | | <i>Thelazia anolabiata</i> (Molin, 1860) | | <i>Thelazia anolabiata</i> (Molin, 1860) | |
|--|---|--|---|-------------|---|-------------|---|-------------|---|---------------------------|--|---------------------------|---|---------------------|---|---------------------------------|
| | Anderson & Diaz Ungria, 1959 | | Anderson & Diaz Ungria, 1959 | | Anderson & Diaz Ungria, 1959 | | Anderson & Diaz Ungria, 1959 | | Rodrigues & Vicente, 1969 | | Rodrigues & Rodrigues, 1970 | | Rodrigues & Rodrigues, 1970 | | This work | |
| Sex | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female |
| Length | 11-14 | 13-18 | 9,5 | 12-14 | 9-12 | 13-15 | 12-14 | 15-18 | 12,26-16,52 | 19,19-21,32 | 11,90-15,30 | 17,59 | 13,81 | 19,99 | 13,33-17,06 | 13,22-20,26 |
| Width | | | | | | | | | 0,45-0,55 | 0,53-0,58 | 0,43-0,47 | 0,516 | 0,49 | 0,59 | 0,266-0,479 | 0,239-0,479 |
| Buccal cavity (L x W) | | | | | | | | | 0,028-0,037 x 0,020-0,036 | | 0,033-0,043 x 0,036-0,040 | | 0,048 x 0,055 | 0,048 x 0,066 | 0,019-0,033 x 0,039-0,046 | 0,013-0,046 x 0,033-0,059 |
| Oesophagus (Length) | 0,63-0,85 | 0,62-1,00 | 0,55 | 0,60-0,67 | 0,60-0,70 | 0,70-0,80 | 0,63-0,66 | 0,61-0,73 | 0,73-0,74 | 0,80-0,84 | 0,67-0,70 | 0,73 | 0,69 | 0,69 | 0,666-0,749 | 0,699-0,866 |
| First striation from anterior end | 0,044-0,069 | 0,037-0,056 | 0,046 | 0,040-0,056 | 0,043-0,059 | 0,040-0,060 | 0,046-0,068 | 0,040-0,060 | 0,052 | 0,048-0,063 | 0,079-0,099 | | 0,111 | 0,113 | 0,053-0,099 | 0,055-0,115 |
| Number of complete Striations | 19-27 | 23-26 | 20 | 20-24 | 22-23 | 19 | 21-27 | 22-27 | | | | | | | | |
| Cervical papillae from anterior end | 0,34-0,48 | 0,38-0,53 | 0,36 | 0,32-0,40 | 0,34-0,44 | 0,33-0,43 | 0,35-0,43 | 0,35-0,41 | | | | | | | | |
| Nerve ring | 0,25-0,31 | 0,26-0,35 | 0,25 | 0,25-0,26 | 0,25-0,32 | 0,24-0,32 | 0,26-0,29 | 0,25-0,28 | 0,23-0,24 | 0,33-0,35 | 0,29-0,31 | | 0,39 | 0,39 | 0,166-0,319 | 0,266-0,366 |
| Long spicule | 1,4-1,9 | | 1,5 | | 1,4-1,8 | | 1,6-2,0 | | 1,91-1,99 | | 2,16-2,27 | | 1,749 | | 1,915-2,264 | |
| Short spicule | 0,17-0,20 | | 0,16 | | 0,17-0,19 | | 0,17-0,19 | | 0,20-0,24 | | 0,18-0,19 | | 0,199 | | 0,233-0,299 | |
| Vulva from anterior end | | 0,40-0,61 | | 0,41-0,46 | | 0,39-0,55 | | 0,44-0,54 | | 0,63-0,68 | | 0,53 | | 0,749 | | 0,533-0,666 |
| Anus to posterior end | 0,073-0,12 | 0,09-0,12 | 0,08 | 0,08-0,10 | 0,08-0,09 | 0,085-0,10 | 0,07-0,09 | 0,09-0,11 | | 0,09-0,11 | | 0,10 | | 0,084 | 0,066-0,106 | 0,079-0,116 |
| Eggs (L x W) | | | | | | | | | | 0,029-0,033 x 0,018 | | 0,033 x 0,018-0,022 | | 0,066 x 0,018 | | 0,024-0,060 x 0,011-0,018 |
| Number of caudal papillae | 8-10 p. preanal 2-5 isolate postanal | 9-10 p. preanal 2 p. postanal 1 isolate postanal | | | 8-11 p. preanal 2-4 p. postanal | | 8-10 p. preanal 4-5 isolate postanal | | 10 p. preanal 2 p. postanal | | 9-11 p. preanal 1 p. postanal | | 8 p. preanal 1 p. postanal | | 7-8 p. preanal 2-3 p. postanal | |
| Host | <i>Ramphastus t. tucanus</i> L. | <i>Cyanocorax v. violaceus</i> Du Bus | | | <i>Phloeocastus m. melanoleucus</i> Gmelin | | <i>Ara macao</i> (L.) | | <i>Pteroglossus aracari</i> (L.) | | <i>Penelope</i> sp. | | <i>Crax fasciolata</i> Spix | | <i>Ortalis canicollis pantanalensis</i> Cher & Reich | |
| Locality | Caura River, Bolivar, Venezuela | Caura River, Bolivar, Venezuela | | | Caura River, Bolivar, Venezuela | | Caura River, Bolivar, Venezuela | | Belém-Brasília Road, Belém PA, Brazil | | Jacutinga, SP, Brasil | | Barranco Alto, Aquidauana River, MT, Brazil | | Salobra, MS, Brasil | |



Thelazia anolabiata (Molin, 1860) from *Ortalis c. pantanalensis* Cher & Reich – Fig. 1: male, posterior extremity, lateral view (32,739 b). Fig. 2: female, posterior extremity, lateral view (32,739 j). Fig. 3: female, anterior extremity, lateral view (32,739 j).

lutzi Travassos, 1918; *Thelazia* (?) *digitata* Travassos, 1918; *Thelazia anadorhynchi* Strachan, 1957.

Diagnosis – Length – male: 9-24; female: 8-27. Width – male: 0,26-0,57; female: 0,23-0,80.

Slender nematodes. Body attenuated at both ends, anterior end abruptly attenuated with rounded apex, posterior end rounded. Cuticula with distinct transverse striations. First striation 0,043-0,12 from anterior end in the males and 0,037-0,13 in the females. There are 20-27 complete striations around anterior end in the males and 16-27 in the females. Mouth without lips but provided with 6 papillae. Buccal cavity short, widened posteriorly, with 0,019-0,049 long by 0,020-0,055 wide in the males and 0,013-0,048 long by 0,028-0,066 wide in the females. Oesophagus without clear division into two parts, with 0,55-0,85 long in the males and 0,60-1,00 long in the females. Excretory pore little evident 0,49 in one male and 0,33 and 0,39, respectively, in two females from anterior end. Nerve ring 0,23-0,39 from anterior end in the males and in the females. Cervical papillae 0,34-0,54 from anterior end in the male and 0,32-0,54 in the female. Male with two unequal and dissimilar spicules. The long spicule is delicate, slender and withy fine transverse striations; is 1,30-2,27 long. The short spicule is boatshaped, broad, with blunt point; is 0,16-0,29 long by 0,019-0,033 width. Gubernaculum little evident. Tail curved ventrally. Six to eleven pairs of precloacal and one to three pairs of postcloacal papillae. In some species there are isolated papillae, principally postcloacal, from two to five in number. Cloacal aperture 0,066 to 0,269 from tip of tail.

Female didelphic, opisthodelphic, viviparous. Vulva in the oesophageal region, anterior to the posterior end of the oesophagus 0,39-0,74 from anterior end. The vagina is large and muscular and connects with two uteri directed posteriorly. The mature females contain both embryonated and unembryonated eggs. The eggs are 0,024-0,066 by 0,011-0,025. Embryos hatch in uterus. The tail is short, blunt and round. The anus is 0,084-0,200 from tip of the tail. At the end of intestine there is a rectum 0,099-0,166 long.

Hosts (birds) – *Anadorhynchus hyacinthinus* Lathan, *Ara macao* (L.), *Crax alector* (L.),

Crax fasciolata Spix, *Cyanocorax v. violaceus* Du Bus, *O. c. pantanalensis* Cher & Reich, *Penelope purpurascens* Spix, *Penelope purpurascens aequatorialis* Salvatori & Festa, *Penelope superciliaris superciliaris* Temminck, *Penelope* sp., *Phloeoceastes m. melanoleucus* (Gm.), *Pteroglossus aracari* (L.), *Ramphastus t. tucanus* L., *Ramphastus v. vitellinus* Licht., *Ramphastus* sp., *Trogon massena* Gm.

Distribution: Jacutinga, SP, Salobra, MS, Barranco Alto, Aquidauana River, MS, Central Brazil, Belém-Brasília Road, PA, Manaus-Itacoatiara Road, AM, in Brazil; Caura River, Bolivar State, in Venezuela and Nicaragua.

Specimens are deposited in CHIOC under the nos. 14,556, 15,535 and 15,598 (parasites of *Crax fasciolata* Spix), in Railliet & Henry liquid and 30,464 a-f (parasites of *Pteroglossus aracari* (L.)), 30,499 a-b (parasites of *Crax fasciolata* Spix), 30,532 a-f (parasites of *Penelope* sp.), 32,031 (parasite of *Ramphastus tucanus* L.), 32,735 a-d, 32,736 a-b, 32,737 a-b, 32,738 a-i, 32,739 a-j, 32,740 a-b and 32,741 a-c (parasites of *O. c. pantanalensis* Cher & Reich.), in balsam.

REMARKS

Molin (1860) described *Spiroptera anolabiata* on basis on the study of four females recovered from eyes of *C. fasciolata* Spix by Natterer in Brazil. These specimens were reviewed by Drasche (1883).

A single female worm was the basis for the proposition of *T. digitata* from the eyes of a Brazilian *Ramphastus* sp. by Travassos (1918) that in the same year described *T. lutzi* from the eyes of *Penelope* sp. from Jacutinga, SP.

Strachan (1957) referred *T. lutzi* in *P. superciliaris* Temminck from Central Brazil.

Anderson & Diaz Ungria (1959) redescribed *T. digitata* from *Ramphastus v. vitellinus* Licht., 1823, *Ramphastus t. tucanus* L., 1758, *Cyanocorax v. violaceus* Du Bus, 1847, *Phloeoceastes m. melanoleucus* (Gm., 1788), *Ara macao* (L., 1758) from Caura River, Bolivar State, Venezuela; they also considered *Thelazia anadorhynchi* Strachan, 1957 from *Anadorhynchus hyacinthinus* (Laastes m. melanoleucus (Gm., 1788), *Ara macao* (L., 1758) from Caura River, Bolivar State, Venezuela; they also considered *Thelazia anadorhynchi* Strachan, 1957 from

Anadorhynchus hyacinthinus (Lathan, 1790) from Central Brazil identical to *T. digitata*. In this work they studied *T. anolabiata* on basis on specimens of *C. alector* (L.) from Venezuela and also studied a female worm from *Penelope purpurascens aequatorialis* Salvatori & Festa, considering it alike the specimens of *C. alector* (L.) and concluding that *T. lutzi* Travassos, 1918 parasite of *Penelope* sp. was synonym of *T. anolabiata*.

Rodrigues & Vicente (1969) identified *T. digitata* recovered from eyes of *Pteroglossus aracari* (L.) from Belém-Brasília Road, Pará State, Brazil.

Rodrigues & Rodrigues (1970 a) restudied *T. amolabiata* (Molin, 1860) from *C. fasciolata* Spix from Barranco Alto, Aquidauana River, MS and at the same year (Rodrigues & Rodrigues, 1970 b) revalidated *T. lutzi* Travassos, 1918 after the review of specimens studied by Travassos.

Schmidt & Neiland (1973) referred *T. digitata* in *Trogon massena* from Nicaragua.

Pinto & Gomes (1985) reported *T. digitata* in *Ramphastus tucanus* L. from Manaus-Itacoatiara Road, Amazonas State, Brazil.

Ortalis canicolis pantanalensis Cher & Reich is a new host record and Salobra, MS is a new locality record of *Thelazia anolabiata* (Molin, 1860) Railliet & Henry, 1910.

REFERENCES

- ANDERSON, R. C. & DIAZ UNGRIA, C., 1959. Revisión preliminar de las especies de *Thelazia* Bosc (Spiruroidea, Thelaziidae) parasitas de aves. *Mem. Soc. Ciencias Nat. La Salle*, 19: 37-75.
- DRASCHE, R., 1883. Revision der in der Nametoden. Sammlung des k.k. Zoologischen Hofcabinetes befindlichen. Original Exemplare Diesing's und Molin's. *Verhandl. d. k. k. Zool. Bot. Gesellsch.*, 33: 107-118.
- MOLIN, R., 1860. Una monografía del género Spiroptera. *Sitz. Akad. Wiss. Wien. mat. natur.*, 28: 911-1005.
- PINTO, R. M. & GOMES, D. C., 1985. Nematodes of amazonian birds, with a description of *Hoazinsstrongylus amazonensis* n. gen. n. sp. (Trichostrongylidae, Libyostrongylinae). *Mem. Inst. Oswaldo Cruz*, 80: 213-217.
- RODRIGUES, H. O. & RODRIGUES, S. S., 1970 a. Redescricao de *Thelazia anolabiata* (Molin, 1860) (Nematoda, Spiruroidea). *Atas Soc. Biol. Rio de Janeiro*, 12 (Supl.): 29-31.
- RODRIGUES, H. O. & RODRIGUES, S. S., 1970 b. Nota sobre *Thelazia lutzi* Travassos, 1918 (Nematoda, Spiruroidea). *Atas Soc. Biol. Rio de Janeiro*, 13: 191-193.
- RODRIGUES, H. O. & VICENTE, J. J., 1969. Redescricao de *Thelazia digitata* Travassos, 1918 (Nematoda, Spiruroidea). *Atas Soc. Biol. Rio de Janeiro*, 12: 295-297.
- SCHMIDT, G. D. & NEILAND, K. A., 1973. Helminth fauna of Nicaragua V. *Cardiofilaria sthepheni* sp. n. (Onchocercidae) and other nematodes of birds. *Proc. Helm. Soc. Washington*, 40: 285-288.
- STRACHAN, A. A., 1957. Eye worms of the family Thelaziidae from brazilian birds. *Can. J. Zool.*, 35: 179-187.
- TRAVASSOS, L., 1918. Contribuição para o conhecimento da fauna helmintologica brasileira. VII. Espécies brasileiras do gênero *Thelazia* Bosc, 1819. *Rev. Mus. Paul.*, 10: 217-230.