UNIVERSITE DE NEUCHATEL (Suisse)
FACULTE DES SCIENCES — INSTITUT DE ZOOLOGIE
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CONTRIBUTIONS TO THE HELMINTH FAUNA OF TROPICAL AFRICA

TAPEWORMS FROM THE BELGIAN CONGO

Thèse présentée
à la Faculté des Sciences de l'Université de Neuchâtel
pour l'obtention du grade de Docteur ès Sciences

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La Faculté des sciences de l'Université de Neuchâtel, sur le rapport de MM. les professeurs J. BAER, C. FAVARGER et R. CHABLE, *autorise l'impression de la présente thèse intitulée* : « Contributions to the Helminth fauna of tropical Africa. Tapeworms from the Belgian Congo », *sans exprimer d'opinion sur les propositions qui y sont contenues.*

Neuchâtel, le 7 juillet 1953.

Le Doyen,
E. GUYOT.

PREFACE

This valuable collection of Cestodes belonging to the « Musée Royal du Congo belge » was entrusted to Professor J.G. BAER, University of Neuchâtel, and it was our privilege to work on this varied and interesting material, under his supervision, with the kind permission of the Trustees of above mentionned Museum.

The helminth fauna of the Belgian Congo has been little studied. As far as we know, the only papers published on this subject are by BAER (1925, 1925a, 1950), BAER and FAIN (1951), BAYLIS (1939, 1940), FAIN (1947, 1948, 1950, 1952), FAIN and RAMÉE (1949), SANDGROUND (1930), SOUTHWELL and LAKE (1939) and BAYLIS (1939). In his monumental work on Tetrarhynques from the Paris Museum, R. Ph. DOLLFUS mentioned some specimens collected in the mouth of the Congo River (pp. 254, 269, 1942) but in Portuguese territory. The knowledge about the Cestodes of the Belgian Congo has been summarised in the *Encyclopédie du Congo Belge* by Dr. Edm. DARTEVELLE.

Many of the tapeworms in the present collection are reported from the Belgian Congo for the first time. The collection includes worms from all the classes of Vertebrates, and is especially rich in avian Cestodes. There are five new species from birds and three from mammals, including one new genus. The cestodes found are listed in systematic order. Under the name of each worm is found its host, and in brackets follows the group to which the host belongs. Then comes the locality in which the material was collected, the collection number of the specimens, the collector, and the date, when they are known. All the drawings were made with the aid of a camera lucida unless otherwise stated. The bird specific names used in the text, whether taken from the literature or from the Congo and laboratory material, have been revised according to J. L. PETERS' « Check-List of Birds of the World » vols. 1-7, Harvard University Press, 1931-1951, and the works of Dr. H. SCROUTEDEN « Vogels van Belgisch Congo en van Ruanda Urundi » (Les Oiseaux du Congo Belge et du Ruanda-Urundi) *Annales du Musée Royal du Congo Belge*, in 4°, C., Zool., S. IV, vol. II, f. 1-5, 1948-1953. As regards Mammals, the names used conform to those mentioned in « Faune du Congo Belge et du Ruanda Urundi. 1. Mammifères », by the same author (*Ann. Mus. Congo Belge*, Tervuren, série in 8°, Sc. zoologique, vol. I, 1948).

We would like to express here our most sincere thanks to Professor J. G. BAER for his unstinted help and friendly advice during our sojourn at the Institut de Zoologie. The study of tapeworms has proved to be most fascinating, and the profound knowledge and enthusiasm of Professor BAER has made working with him a stimulating and invaluable experience.

Our thanks go also the Trustees of the « Musée Royal du Congo Belge »; to Dr. H. SCHOUTEDEN, Honorary Director, to Prof. F. M. OLBRECHTS, present Director, and to Dr. E. DARTEVELLE, Keeper of Invertebrates, whose material, collected by himself during his journeys in the Congo, constitutes the major part of the collection and who has been kind enough to read through our manuscript.

We thank also the Conseil d'Etat du Canton de Neuchâtel for having awarded us a Scholarship for Foreign Students, thus enabling us to study at the Université de Neuchâtel, and for having graciously renewed the grant for a second year.

Besides Dr. Edm. DARTEVELLE, the others collectors of the considerable material of the « Musée Royal du Congo Belge » are:

Dr. M. BEQUAERT (Elisabethville), Dr. BERVOETS (Banana), Dr. BOUVIER (Luputu-Lomami), Prof. BRIEN during his journey in the Congo, Dr. COLBACK (Ruanda), Director of Veterinary Services of Belgian Congo, MM. A. COLLART (Stanleyville), J. J. DEHEYN, Direction de l'enseignement Agricole, Dr. DÉOM (Kisenyi), M. DE WITTE (Lukula), Dr. DRION (Lomami), M. G. DU SOLEIL (Kilo), Dr. FAIN (Kwango, Lake Albert region, and Ruanda), Prof. GÉRARD, during his journey in the Katanga, MM. L. GHENNE (Lisala and Kirambo), J. GHESQUIÈRE, Dr. GILLAIN (Nioka), R. P. HULSTAERT (Baudouinville), Révérend Frère HUTSEBAUT (Ibembo), R. P. HUYPERS (Boende), MM. LEFÈVRE (Ituri), LEGROS (Elisabethville), LESTRADE (Urundi), N'GWE, native of Bolobo, RANDORN (Geti), C. ROSSIGNOL (Kindu), Dr. RODHAIN, from the Institut de Medecine Tropicale Prince LEOPOLD, Dr. SCHWETZ, from the Université de Bruxelles, Dr. SCHOUTEDEN, Honorary Director of the Museum, Dr. TOBACCO (Elisabethville), Dr. VALDONIO (Elisabethville), M. VAN CANNEYT (Ituri), Dr. L. VAN DEN BERGHE (Director of Irsac), Dr. VAN DEN BRANDEN (Leopoldville), M. VER EYKEN (Nioka), Rev. VICCARS (Bolobo).

Institutes such as Ineac and the Zoological Gardens (Antwerp) have also sent their collections to the Musée Royal du Congo belge.

Neuchâtel, July 1953.

SYSTEMATIC PART

LIST OF SPECIES DESCRIBED :

PSEUDOPHYLLIDEA :

DIPHYLLOBOTHRIIDAE — DIPHYLLOBOTHRIINAE :

1. — *Bothridium ovatum* DIESING, 1850.
2. — *Duthiersia fimbriata* (DIESING, 1854).

Ligulinae :

3. — *Ligula intestinalis* (LINN., 1758).

ICHTHYOTAENIDEA :

ICHTHYOTAENIIDAE :

*. — *Ophiotaenia* sp.

CYCLOPHYLLIDEA :

DAVAINEIDAE — OPHRYOCOTYLINAE :

4. — *Ophryocotyle herodiae* FUHRMANN, 1909.

— DAVAINEINAE :

5. — *Cotugnia crassa* FUHRMANN, 1909.
6. — *C. pluriuncinata* BAER, 1925.
7. — *Raillietina* (*Raillietina*) *baeri* MEGGITT and SUBRAMANIAN, 1927.
8. — *R.* (*R.*) *bycanistis* (BAYLIS, 1919).
9. — *R.* (*R.*) *calcaria* (FUHRMANN, 1908).
10. — *R.* (*R.*) *dartevellei* n. sp.
11. — *R.* (*R.*) *fuhrmanni intermedia* FUHRMANN and BAER, 1943.
12. — *R.* (*R.*) *macrocirrosa* FUHRMANN, 1909.
13. — *R.* (*R.*) *pintneri* (KLAPTOCZ, 1906).
14. — *R.* (*R.*) *tetragona* (MOLIN, 1858).
15. — *R.* (*R.*) *werneri* (KLAPTOCZ, 1908).
— *R.* (*R.*) sp.
16. — *R.* (*Fuhrmannetta*) *crassula* (RUDOLPHI, 1819).
17. — *R.* (*F.*) *pluriuncinata* (CRETY, 1890).
18. — *R.* (*Paroniella*) *bargetzii* n. sp.
19. — *R.* (*P.*) *numida* (FUHRMANN, 1912).
20. — *R.* (*P.*) *perreti* n. sp.
21. — *R.* (*P.*) *reynoldsiae* MEGGITT.

* — Tapeworm recorded for the first time from the Belgian Congo.

— IDIOGENINAE :

22. — *Idiogenes flagellum* (GOEZE, 1782).
* — *I. furtiva* MEGGITT, 1933.
* — *I. otidis* KRABBE, 1867.
* — *I. kori* ORTLEPP, 1938.
* — *I. pseudotidis* n. sp.
* — *I. nana* FUHRMANN, 1925.
23. — *I. kolbei* ORTLEPP, 1938.
* — *I. grandiporus* CHOLODKOWSKY, 1905.
* — *I. bucorvi* JOYEUX, BAER et MARTIN, 1936.
— *Schistometra* sp.

ANOPLOCEPHALIDAE — ANOPLOCEPHALINAE :

24. — *Anoplocephala rhodesiensis* (YORKE and SOUTHWELL, 1921).
25. — *A. spatula* (v. LINSTOW, 1901).
26. — *Bertiella studeri* (BLANCHARD, 1891).
27. — *Catenotaenia lobata* BAER, 1925.
28. — *Cittotaenia pectinata* (GOEZE, 1782).
29. — *Crossotaenia baeri* n. g., n. sp.
30. — *Moniezia expansa* (RUDOLPHI, 1810).
31. — *M. mettami* BAYLIS, 1934.
32. — *Paranoplocephala isomydis* (SETTI, 1892).

— LINSTOWIINAE :

33. — *Inermicapsifer hyracis* (RUDOLPHI, 1810).
34. — *I. arviconthidis* (KOFEND, 1917).
35. — *I. congolensis* n. sp.
36. — *I. guineensis* (GRAHAM, 1908).
37. — *I. interpositus* JANICKI, 1910.
38. — *I. pagenstecheri* (SETTI, 1897).
— *I. schoutedeni* EZZAT.
— *I.* sp.
39. — *Oochoristica khalili* HAMID, 1932.
40. — *O. zonuri* BAYLIS, 1919.

— THYSANOSOMINAE :

41. — *Avitellina centripunctata* (RIVOLTA, 1874).
42. — *Stilesia globipunctata* (RIVOLTA, 1874).
43. — *St. hepatica* (WOLLFHÜGEL, 1903).

MESOCESTOIDIDAE :

44. — *Mesocestoides dissimilis* BAER, 1933.
— *Mesocestoides* sp.

DILEPIDIDAE — DILEPIDINAE :

45. — *Cyclorchida omalancristrota* (WEDL, 1855).
46. — *Dilepis bycanistis* n. sp.
47. — *D. macrosphincter* FUHRMANN, 1909.
48. — *Echinorhynchotaenia tritesticulata* FUHRMANN, 1909.
49. — *Poricterotaenia coronata* (CREPLIN, 1829).

— DIPYLIDIINAE :

50. — *Choanotaenia corvi* JOYEUX, BAER and MARTIN, 1937.
51. — *Ch. polyorchis* (KLAPTOCZ, 1908).
52. — *Ch. riccii* FUHRMANN and BAER, 1943.
53. — *Ch. ululae* n. sp.
54. — *Dipylidium caninum* (LINN., 1758).

— PARUTERININAE :

55. — *Octopetalum numida* (FUHRMANN, 1909).

HYMENOLEPIDIDAE — HYMENOLEPIDINAE :

56. — *Hymenolepis aelleni* n. sp.
57. — *H. carioca* (MAGALHAES, 1898).
58. — *H. farciminosa* (GOEZE, 1782).
59. — *H. microstoma* (DUJARDIN, 1845).
60. — *H. multiformis* (CREPLIN, 1929).
— *H.* sp.

TAENIIDAE :

61. — *Taenia acinomyxi* ORTLEPP, 1938.
62. — *T. brauni* SETTI, 1897.
63. — *T. parva* BAER, 1924.
64. — *T. pisiformis* BLOCH, 1780.
65. — *T. regis* BAER, 1923.
66. — *T. saginata* GOEZE, 1782.

ACOLEIDAE — ACOLEINAE :

67. — *Gyrocoelia kiewietti* ORTLEPP, 1937.
— Undeterminable fragments.

LARVAL CESTODES :

68. — *Bothridium pithonis* BLAINVILLE, 1824.
69. — *Ligula intestinalis* (LINN., 1758).
70. — *Taenia brauni* SETTI, 1897.
71. — *T. hydatigena* PALLAS, 1756.
72. — *T. parva* BAER, 1924 (polycephalic larva).
73. — *T. solium* LINN., 1758.
74. — *T. taeniaeformis* (BATSCH, 1896) = « *Cysticercus fasciolaris* ».
75. — *Sparganum.*

NEW GENUS AND NEW SPECIES DESCRIBED :

Crossotaenia nov. gen.
génotype : *C. baeri* n. sp.

Raillietina (*Raillietina*) *dartevellei* n. sp. (host : *Gypohierax angolensis*; type locality: Boma).
R. (*Paroniella*) *bargetzii* n. sp. (host: *Gymnobucco bonapartei*; type locality: Luebo).
R. (*P.*) *perreti* n. sp. (host: *Pycnonotus barbatus tricolor*; type locality: Manzadi).
Idiogenes pseudotidis n. sp. (type host: *Otis* sp.; type locality: Angola - other record: host: *Eupodotis senegalensis*; locality: « West-Africa »).

Crossotaenia baeri n. sp. (type host: *Cephalophus sylvicultor*; type locality: Kwamouth - other record: host: *Cephalophus* sp.; locality: Manzadi).

Inermicapsifer congolensis n. sp. (type host: *Cricetomys dissimilis*; type locality: Djugu - other record: host: *Dasymys bentleyae*; locality: Djugu).

Dilepis bycanistis n. sp. (host: *Bycanistes sharpei sharpei*; type locality: Mpozo).

Choanotaenia ululae n. sp. (host: *Bubo africanus*; type locality: Kahalo).

Hymenolepis aelleni n. sp. (host: *Epomophorus wahlbergi haldemanni*; type locality: Boma).

With exception of *Idiogenes pseudotidis* all the types are in the helminthological section of the Musée Royal du Congo Belge, at Tervueren.

EXPLANATION OF ABBREVIATIONS USED IN ALL TABLES

Length :	Length of longest specimen
Breadth :	Maximum breadth
Scolex :	Diameter of scolex, measured across the suckers
Sucker spines :	Length of sucker spines
Rostellum :	Diameter of rostellum, unless indicated otherwise
No. of hooks :	Number of rostellar hooks
Hook length / Hook lgth :	Length of rostellar hooks
Testes :	Number of testes per segment
Diam. of testes :	Diameter of testes
Cirrus pouch / Cirrus pch :	Maximum length and maximum diameter of cirrus pouch
Eggs :	Diameter of eggs
Embryo :	Diameter of embryo
Embryonic hooks :	Length of embryonic hooks
No. :	Number

ABBREVIATIONS USED IN FIGURES

C	Cirrus
Cem	Cells of embryophore
Dev	Dorsal excretory vessel
Divd	Dilation of vas deferens
E	Egg
Em	Embryo
Esh	Egg shell
Esv	External seminal vesicle
Ev	Ecretory vessel
Ga	Genital atrium
Isv	Internal seminal vesicle
M	Muscle
Mg	Mehlis' gland
N	Nerve
Ov	Ovary
Ovd	Oviduct
Rh	Rostellar hooks
Rs	Receptaculum seminis
T	Testis
Tev	Transverse excretory vessel
Ut	Uterus
Utw	Wall of uterus
V	Vagina
Vd	Vas deferens
Vev	Ventral excretory vessel

ORDER PSEUDOPHYLLIDEA CARUS, 1863.

DIPHYLLOBOTHRIIDAE LÜHE, 1910.

DIPHYLLOBOTHRIINAE LÜHE, 1910.

1. **Bothridium ovatum** DIESING, 1850.

Host: *Python sebae* (GM.) (= « Python ») (Ophidia) : Ile de Mateba (19184) ; Dr. E. DARTEVELLE, IV-1937 (1).
: Zoo. Gdns. Antwerp (27987), died on 22-II-1948.
: » » » (28011).
: » » » (28014-38) died on 2-V-1948.
: » » » (28039-49) died on 22-VIII-1948.
: » » » (28051) died on 8-VII-1948.
: Eala (18153-59) ; J. GHESQUIÈRE, XI-1936.

2. **Duthiersia fimbriata** (DIESING, 1854).

Host: *Varanus niloticus* (L.) (Lacertilia) : . . . . Eala (18375) ; J. GHESQUIÈRE, XI-1936.
» » : Zoo Gdns., Antwerp (28050, 28222).
» » : Fetish ROCK (18893) ; Dr. E. DARTEVELLE, IV-1937.

This species is a parasite of *Varanus* spp. of Africa and Southern Asia. A re-description is given by BAER (1927a.) with a discussion of the synonomy.

SOUTHWELL and LAKE report this species from the same host from the Belgian Congo, under the synonym of *D. elegans* (Rec. Dr. J. SCHWETZ).

LIGULINAE LÜHE, 1899.

3. **Ligula intestinalis** (LIN., 1758).

Host: *Treron* (= *Vinago calva* (L.) (?) (Columbidae) : Kanda-Kanda, Lomami (2263-66; 2267 2269) ; Dr. DRION, (1935).

ICHTHYOTAENIDEA EUZET, 1953.

ICHTHYOTAENIIDAE ARIOLA, 1899.

Ophiotaenia sp.

Host: *Rattus rattus* L. (Rodentia) : . . . . . Matadi (19949), Dr. E. DARTEVELLE, II-1937.

It was not possible to make a specific determination of this material, which is very contracted.

It should be noted that *Ophiotaenia* is not a parasite of rodents, and its occurrence in the rat may be explained by the rat's having ingested a snake just before death.

Ophiotaenia sp.

Host: *Causus rhombeatus* (LICHT.). (Ophidia) : . . Eala (18044, 18507) ; J. GHESQUIÈRE ; 2-VII-1936 et IV-1936.
« Serpent » . . . . . : Eala (18260, 18259) ; id. ; XI-1936.
Causus sp. (*lichtensteini* JAN?) . . . . . : Eala (16588) ; Dr. H. SCHOUTEDEN, 10-II-1921.
« Serpent » (*Causus* sp.?) . . . . . : Leopoldville (9790) ; Dr. VANDENBRANDEN.
Hôte inconnu . . . . . : Kilo Mines (1444) ; G. DU SOLEIL, 1935.

It was not possible to make a specific determination.

(1) All numbers refer to the catalogue of the Royal Belgian Congo Museum.

CYCLOPHYLLIDEA Braun, 1900.

DAVAINEIDAE Fuhrmann, 1907.

OPHRYOCOTYLINAE Fuhrmann, 1907.

4. **Ophryocotyle herodiae** Fuhrmann, 1909 (figs. 1-5).

Host: *Hagedashia hagedash* (Lath.) (Ciconiidae): . . Ibembo (27266); R. F. Hutsebaut, 21-XII-1949.

The longest specimen measures 320 mm. in length and has a maximum breadth of 2,25 mm. The material is very contracted.

The scolex (fig. 1) has a diameter of 488 to 712μ, with the rostellum withdrawn, and is provided with four, slightly oval suckers measuring 280 by 200μ. The suckers are armed with rose-thorn shaped spines from 9,2 to 21,6μ in length. The armed rostellum is strongly developed. It is encircled by numerous small hooks, situated in a wavy band. The hooks are of two sizes and are arranged in a double crown, small and

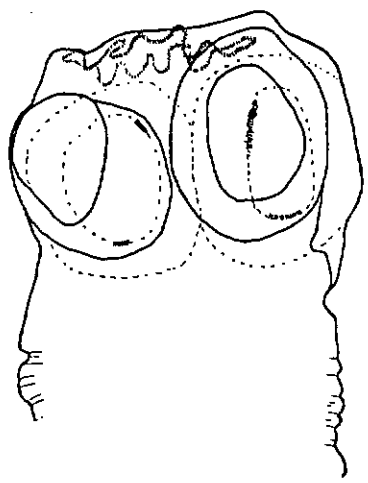


Fig. 1. — *Ophryocotyle herodiae* Fuhrm. from *Hagedashia hagedash* (Lath.); scolex.

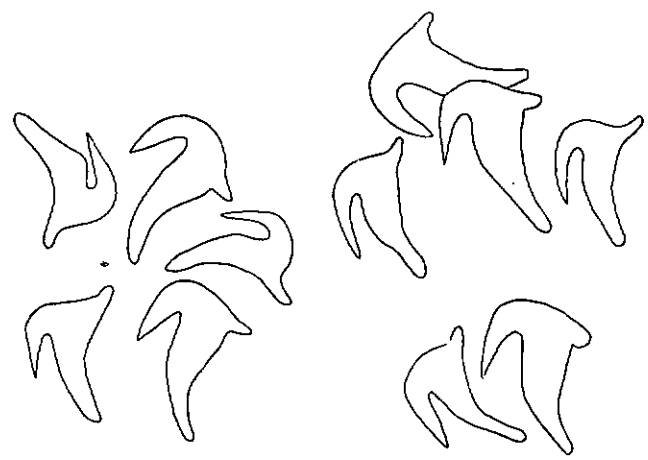


Fig. 2. — *Ophryocotyle herodiae* Fuhrm. from *Hagedashia hagedash* (Lath.); rostellar hooks, drawn in profile.

large hooks alternating (fig. 2). The hooks, mounted in Berlese, measure 11,2 by 12,6μ in profile, and as seen from the back the large ones have a length of 12,6μ and the small ones 11,2μ.

Segmentation is evident immediately behind the scolex. The segments are all wider than long, being very short at first but becoming comparatively longer in the gravid segments. The latter are about three times as broad as they are long. The genital pores are irregularly alternating.

The cortical musculature is composed of two, clearly marked layers of longitudinal muscles. The inner layer is much the stronger and is composed of about 46 bundles, each bundle containing about 30 and up to 40 fibres. The weaker outer layer is composed of a larger number, about 100, of small bundles each containing about 7 up to 10 fibres.

The cortex is marked off from the medulla by transverse muscle fibres. Calcareous bodies are fairly numerous in the parenchyma.

The excretory system is composed of two pairs of longitudinal canals, the ventral canals wider than the dorsal. Each pair of canals is joined in each segment by a posterior transverse commissure.

The nervous system consists of a pair of well marked longitudinal nerves, situated laterally to the excretory vessels.

The male genital organs are the first to develop. The testes are 25 to 30 in number and have a diameter of 65μ. They are first seen as small bodies arranged in two to three antero-posterior rows, situated dorsally and posteriorly in the segment. Later, however, the testes increase considerably in size, and owing to the contraction of the material, they tend to lose their arrangment in rows and come to lie close together in a single row. The testes are normally situated between the excretory canals, but where the material is very contracted they may extend laterally beyond the canals (fig. 3).

The vas deferens is highly convoluted and leads directly to the cirrus pouch without forming an external seminal vesicle.

The cirrus pouch is thick walled, and extends inwards to the poral excretory vessels (fig. 4). It measures 240 to 320μ by 88 to 112μ and contains a small internal seminal vesicle and the coiled cirrus, which is armed along its length with small spines. The cirrus is provided with protractor muscle fibres which are inserted in the distal part of the cirrus pouch. The latter is provided with a retractor muscle and with two distal sphincter muscles: it opens into the genital atrium (fig. 5). The genital atrium of this species is well developed, somewhat spherical in form and with very muscular walls.

The thick walled vagina opens from the genital atrium ventral to the cirrus pouch, and passes somewhat obliquely into a dorsally situated, elongated, spindle-shaped receptaculum seminis.

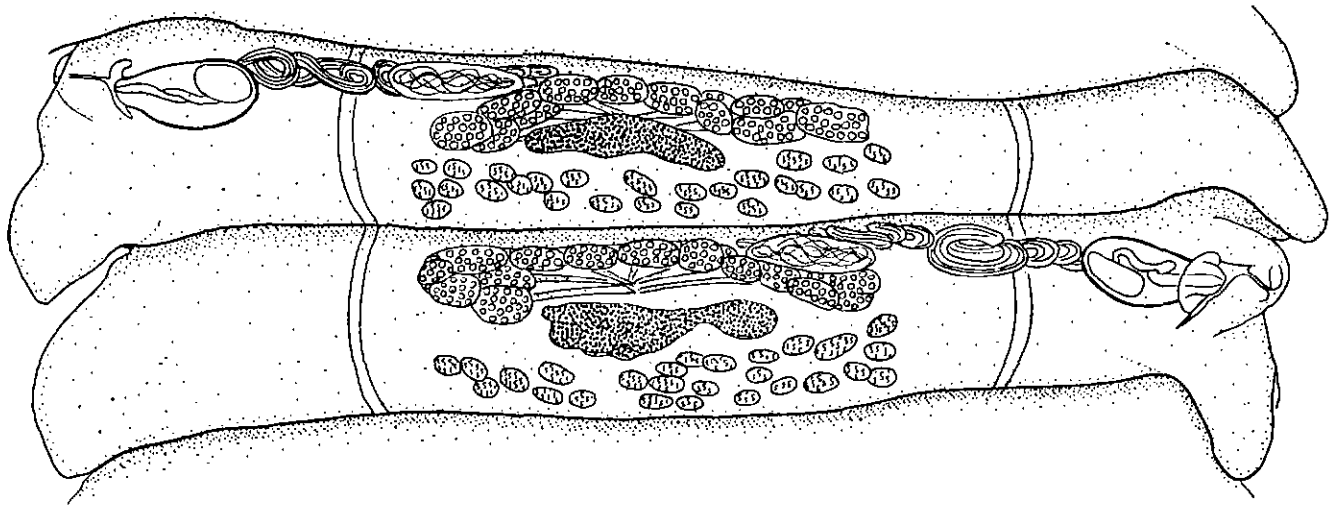


Fig. 3. — *Ophryocotyle herodiae* FUHRM. from *Hagedashia hagedash* (LATH.); dorsal view of whole mount of mature segments.

The ovary, situated dorsally and anteriorly, is digitate at first, the terminations of the processes being slightly expanded. The vitelline gland is more posteriorly placed. Mehlis' gland surrounds the oviduct and receives the vitelloduct and a duct from the receptaculum seminis. From it passes a canal which empties into the uterus.

The uterus appears first as a transverse tube with branched extremities. Later each branch expands, increasing considerably in size. Finally the uterus expands completely, losing its lobed appearance, and becomes filled with eggs. At this stage the uterus occupies most of the segment.

The eggs are oval in shape and measure 30 by 36μ. The egg shell is very thick and its surface is seen to be finely sculptured. The ripest eggs each contain an hexacanth embryo measuring 30 by 24μ.

The type material of *Ophryocotyle herodiae* was examined and the Belgian Congo material was seen to correspond with it in all respects.

Other species of the genus *Ophryocotyle* were examined and a table of comparative measurements was drawn up. (See Table below). It was noted that the most reliable specific characters are: the number of testes; the number of bundles, and number of fibres per bundle of the longitudinal musculature; the size of the eggs; the size of the cirrus pouch. The cirrus pouch was measured in whole mounts, as sections were seen to give a false impression of the length due to the sudden curvature of the aporal end of the pouch. On comparing the structures, it was borne in mind that the dimensions of the soft structures are considerably affected by the state of contraction or maceration of the material.

Measurements of the type material of *Ophryocotyle herodiae* were made. On comparing these with those given by FUHRMANN (1909), there was seen to be a discrepancy in the number of testes. In his description, FUHRMANN gives the number of testes as 50, whereas on examination of the type material there were seen to be 25 to 30.

The type material of *O. bucki* JOYEUX and BAER, 1939 was examined and measured, and a comparison made with the original description. This material is from *Lophotibis cristata* (BODD.). It was noted that the material is extremely macerated, as evidenced by the transparency of the whole mounts, and by the dis-

organised condition of the fibres of the longitudinal musculature. On comparing the measurements of *O. bucki* with those of *O. herodiae* (see table below) it is seen that these correspond. The number of testes for *O. bucki* is 20 to 25 and that for *O. herodiae* is 25 to 30. The measurements of the cirrus pouch for *O. bucki* (240-368 : 168-136μ) are admittedly larger than those for *O. herodiae* (108-137 : 70-60μ), but this difference can be accounted for by the extreme state of maceration of the former material, as mentioned above. We propose that *Ophryocotyle bucki* JOYEUX and BAER, 1939 become a synonym of *Ophryocotyle herodiae* FUHRMANN, 1909.

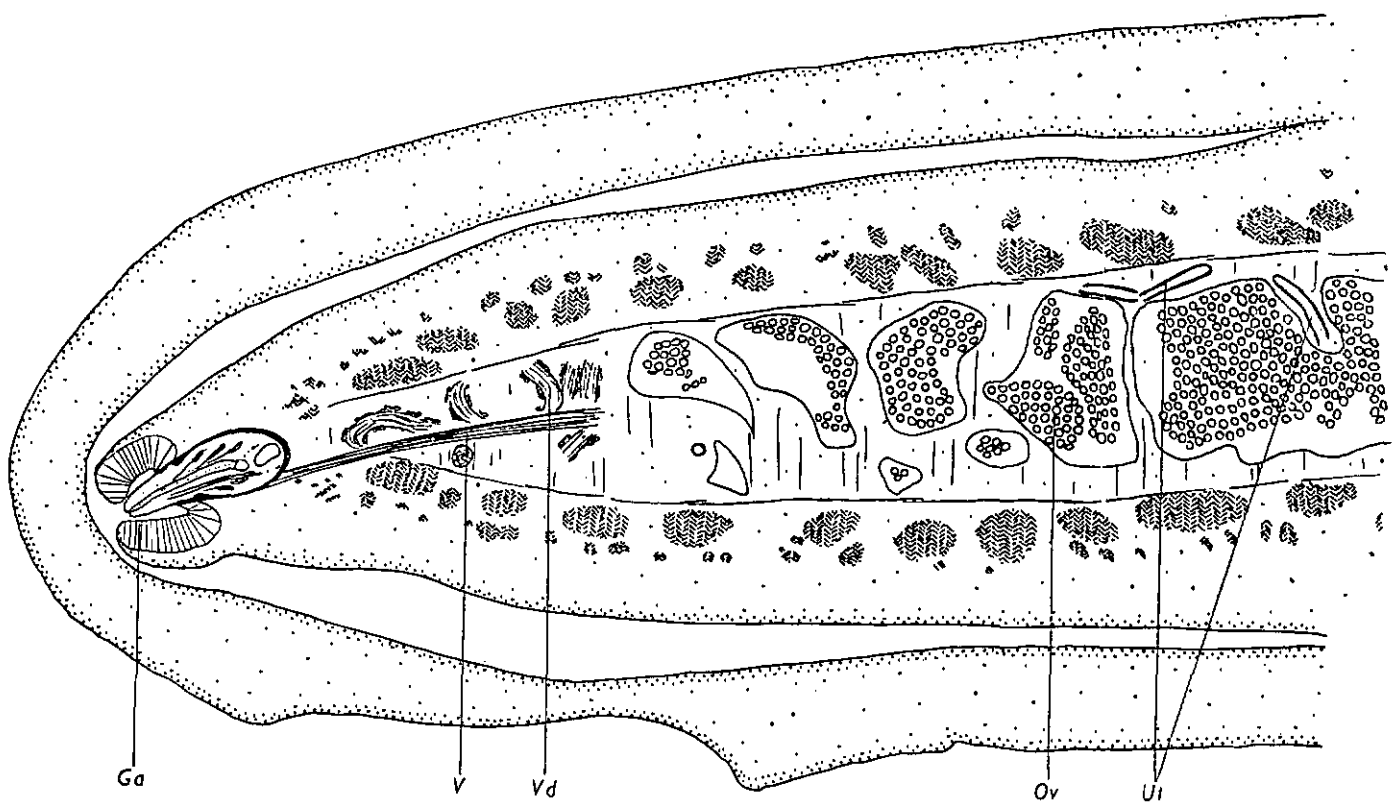


Fig. 4. — *Ophryocotyle herodiae* FUHRM. from *Hagedashia hagedash* (LATH.); poral half of transverse section of mature segment.

Measurements of the type material of *O. insignis* LÖNNBERG, 1890 were made and compared with those given by FUHRMANN (1909) in his redescription of this species. There is seen to be a discrepancy in the number of testes, (see Table below) FUHRMANN giving 100, and the re-examination showing a maximum of 40. Unfortunately it was not possible to measure the cirrus pouch in a whole mount.

WEBSTER (1949), in his description of an *Ophryocotyle* from *Haematopus ostralegus bachmani* AUDUBON, from Alaska, remarks that his worm *O. alaskensis* is closely related to *O. insignis*, differing from the latter in the number of waves in the crown of rostellar hooks, the smaller number of testes and the slightly larger cirrus pouch. On comparing the data given by WEBSTER for *O. alaskensis* with those obtained from a re-examination of *O. insignis* (see table) the disparity in the number of testes noted by WEBSTER disappears and the difference in the size of the cirrus pouch is not sufficiently large to be unaccounted for by the dissimilar fixation of the two worms. We propose that *Ophryocotyle alaskensis* WEBSTER, 1949 become a synonym of *Ophryocotyle insignis* LÖNNBERG, 1890.

O. zeylanica VON LINSTOW, 1906, redescribed by CLAUSEN (1915), is distinguished by the small number of testes *viz.* 18, and by the much smaller eggs (10 : 12μ). It is interesting to note that in this species the genital ducts pass between the dorsal and ventral excretory vessels, contrary to the arrangement in the other species of the genus in which the genital ducts lie dorsal to the two excretory vessels.

The type specics of the genus, *O. proteus*, FRIIS, 1870 was redescribed by LINTON in 1927. The type material was not examined, but from LINTON's description this species is clearly distinguished by the small number of testes, *viz.* 9, and the size of the eggs (20μ).

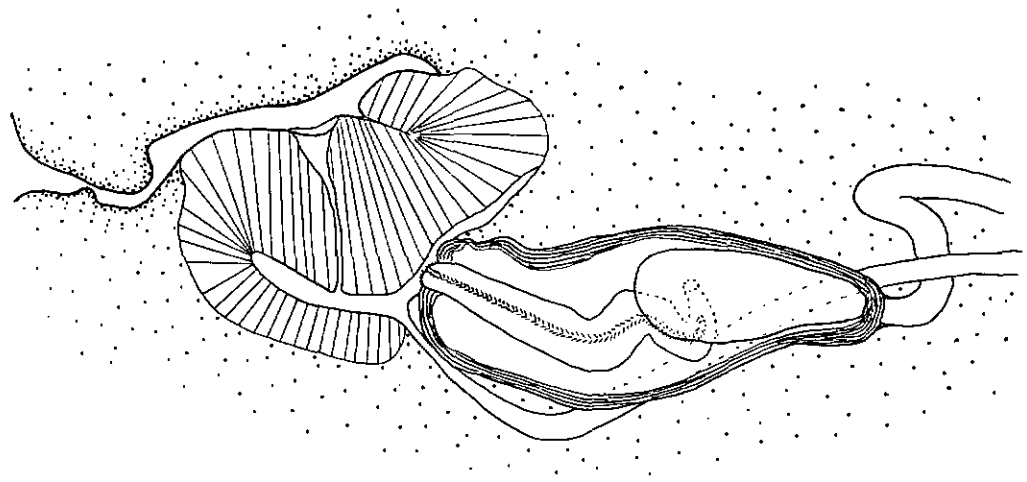


Fig. 5a.

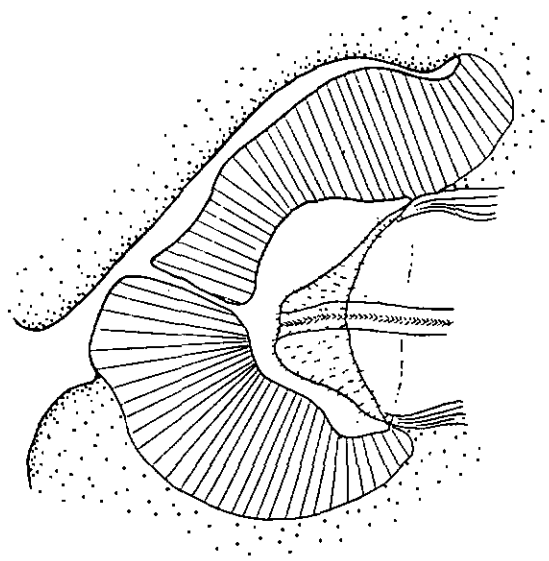


Fig. 5b.

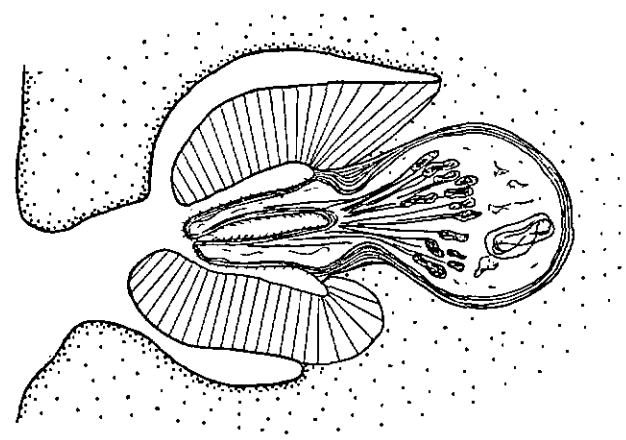


Fig. 5c.

Fig. 5. — *Ophryocotyle herodiae* FUHRM. from *Hagedashia hagedash* (LATH.); cirrus pouch and genital atrium (a) whole mount, cirrus withdrawn (b) whole mount. cirrus partly evaginated (c) longitudinal section, cirrus evaginated.

The original description of *O. turdina* CHOLODKOSKY, 1913 is insufficient to serve as a basis of comparison with other species.

A larval *Ophryocotyle*, not ascribed to a species, has been reported by CREWE (1951) from British limpets. He records that the cyst measures 0,4 by 0,4 to 0,6 mm. and that the hooks measure 10μ in length.

Genus *Ophryocotyle*

Species	*O. proteus*	*Ophryocotyle herodiae*			*Ophryocotyle bucki*		*Ophryocotyle insignis*		*O. alaskensis*	*Ophryocotyle zeylanica*	
Author	Friis, 1869	Fuhrm., 1909			Joyeux & Baer, 1939		Lönnberg, 1890		Webster, 1949	v. Linstow, 1906	
Described by	Linton, 1927	Fuhrm., 1909	Personal measurements of type	Belgian Congo material	Joyeux & Baer, 1939	Personal measurements of type	Fuhrm., 1909	Personal measurements of type	Werster, 1949	Clausen, 1915	Personal measurements of type
Length	100 mm.	30 mm.	--	32 mm.	155 mm.	—	—	--	26-41 mm.	50-60 mm.	--
Breadth	3,7 mm.	2,5 mm.	2 mm.	2,25 mm.	2,5 mm.	2,25 mm.	—	--	—	0.6 mm.	--
Scolex	280µ	310µ	317µ	488-712µ	400-600 µ	416-560 µ	—	320 µ	—	250 µ	288 µ
Suckers	80µ	100µ	108µ	280 × 200µ	90-125 µ	144 µ	140 × 100 µ	--	122-149 µ	120 × 100 µ	115 × 100 µ
Sucker spines	8µ	—	--	9,2-21,6µ	—	10,5 µ	7-8 µ	—	7-9 µ	—	—
Rostellum length	160µ	150µ	162µ	--	360 µ	328-480 µ	440 µ	—	277-302 µ	470 µ	—
« Loops » in crown of hooks	--	–	14	12	--	12	—	24-26	14-15	10	—
Hook length	4µ	9µ	10u	11,6-12,6µ	8-9 u	8,4 µ	10 µ	7 u	8,6 µ	10 µ	11,2 µ
Testes	9	50	25-30	25-30	20-25	20-25	100	max. 40	37-40	18	—
Diam. of testes	—	—	65-72µ	65µ	30-40 µ	50 µ	30 µ	54 × 93 µ	71-73 µ	28-42 × 19-23 µ	—
Cirrus pouch	150µ (from Webster)	120µ	108-137 × 70-60µ	240-320 × 88-112µ	330-400 × 100-155 µ	240-368 × 168-136 µ	140-160 µ	—	187-197 µ	140 × 47 µ	—
Eggs	--	—	—	30 × 36µ	35-40 × 30-34 µ	40 × 29 µ	—	42 × 38 µ	49-51 × 36-38 µ	10 × 12 µ	--
Embryo	20µ	—	—	30 × 24µ	27-29 × 18-20 µ	29 × 18 µ	—	--	—	—	—
Embryonic hooks	—	—	—	--	18 µ	--	—	14 µ	—	--	—
No. muscle bundles in inner layer	—	—	44	46	--	--	—	36	46	--	--
fibres per bundle	--	—	—	30-40	--	--	100-120	70	—	13-17	--
No. muscle bundles in outer layer	--	--	100	100	—	--	—	120	numerous	—	--
fibres per bundle	--	--	--	6-10	--	—	30-50	30	—	7-8	—
Host	*Larus atricilla* L. *L. argentatus smithsonianus* Coues.	*Hagedashia hagedash* (Lath.)			*Lophotibis cristata* (Bodd.)		Charadriiform		*Haematopus ostralegus bachmani* Audubon	*Ncophron pernopterus gingianus* (Lath.)	
Locality	N. America	White Nile	White Nile	Belgian Congo	Madagascar		West coast of Norway		Alaska	Ceylon	

For explanation of abbreviations see p. 147.

DAVAINEINAE BRAUN, 1900.

5. **Cotugnia crassa** FUHRMANN, 1909.

Host: *Numida meleagris marchei* OUSTALET (Numididae): . . . . . Manzadi (22750, 22751); Dr. E. DARTEVELLE, VI-1937).
» » » . . . . . : Vista (22744); Dr. E. DARTEVELLE, II-1938.
» » » . . . . . : Tshela Fuka, N-W Boma (19122-24); Dr. E. DARTEVELLE, V-1937.

It was difficult to make measurements of this material and the scolex was missing.

The genital organs are double except for the testes, which are arranged in a single group across the segment, and the single uterus which breaks up into egg capsules each containing one egg.

There are two other species of *Cotugnia* described from *Numida* species, *Cotugnia pluriuncinata* BAER, 1925, and *Cotugnia meleagridis* JOYEUX, BAER and MARTIN, 1936. The former is discussed below. The latter is recorded from a « pintade » from North Somaliland.

6. **Cotugnia pluriuncinata** BAER, 1925.

Hosts: *Numida meleagris* (L.) (Numididae): . . . Zoo. Gdns., Antwerp (28012).
Numida meleagris galeata PALL. . . . . : » » » (28013).

An entire specimen was present. The material was contracted. The worm measures about 40 mm in length, and has a maximum breadth of 1,6 mm.

The scolex, mounted in Canada balsam, has a diameter of 760μ. The round, unarmed suckers are 240μ wide, and the rostellum measures 240μ across. The rostellar hooks have fallen out.

The genital organs are double. The numerous testes stretch across the segment in a single, dorsal field; it was not possible to estimate the number. The cirrus pouch measures 180 to 216μ in length, rather longer than the dimensions given by BAER (1925 d.) i.e. 150 to 160μ.

The uterus breaks up into capsules, each containing one egg. The capsules vary in size from 54 to 70μ, by 70μ. The egg has a diameter of 29μ.

This species was described by BAER (1925 d.) together with two species of *Raillietina* (*Raillietina*), parasites typical of the Galliformes, but which were reported to have come from an *Herpestes* (Carnivora). The assumption was that the mongoose had acquired an accidental infection from eating a Guinea fowl just before being killed.

7. **Raillietina (Raillietina) baeri** MEGGITT and SUBRAMANIAN, 1927.

Hosts: *Mastomys coucha ugandae* WINT. (Rodentia): Ituri, Djugu (8505); VAN CANNEYT, 1930.
Mastomys coucha fuscus BOC. . . . . : Luluabourg St-Joseph (23534), J. J. DEHEYN, I-V-1939.
« Souris » . . . . . : Pweto (28713), Dr. GÉRARD, 1926.

Several scoleces were present, and fragments of strobila.

The scolex is 342 to 456μ wide. The unarmed suckers measure 126 to 160μ in diameter. The rostellum, 72 to 76μ wide, is armed with 60 hooks 14 to 15μ long.

There are about 35 to 40 testes. The cirrus pouch measures 94 to 108μ by 54 to 65μ. It is small and does not reach the poral excretory vessels. The number of egg capsules per segment is variable. There are about 30 to 40, each enclosing about 9 eggs. The genital pores are unilateral.

The dimensions given by JOYEUX and BAER (1936) are as follows: 60 to 65 rostellar hooks, 12 to 16μ long; testes c. 35; cirrus pouch 80 by 42μ; egg capsules per segment, 23; eggs per capsule 3 to 5.

R. (*R.*) *baeri* is already reported from the Belgian Congo by BAYLIS (1939) from *Mastomys coucha* SMITH from the River Kwango Valley.

8. **Raillietina (Raillietina) bycanistis** (BAYLIS, 1919) (fig. 6).

Hosts: *Ceratogymna atrata* (TEMM.) (Bucerotidae) : . Kionzo, près Matadi (19850, 21142) ; Dr. E. DARTEVELLE, II-1937.

Tropicranus (= *Berenicornis*) *albocristatus* (CASSIN.) . . . . . : Kudiboma, N-W. Boma (22755) ; Dr. E. DARTEVELLE, V-1937.

An almost entire strobila, complete with scolex, was present in the material from host. n°. 19850, and the measurements are taken from this material.

This species is described by BAYLIS (1919) from *Bycanistis subcylindricus subquadratus* CAB. from Uganda. As his description is not a very full one we take this opportunity to re-describe the species.

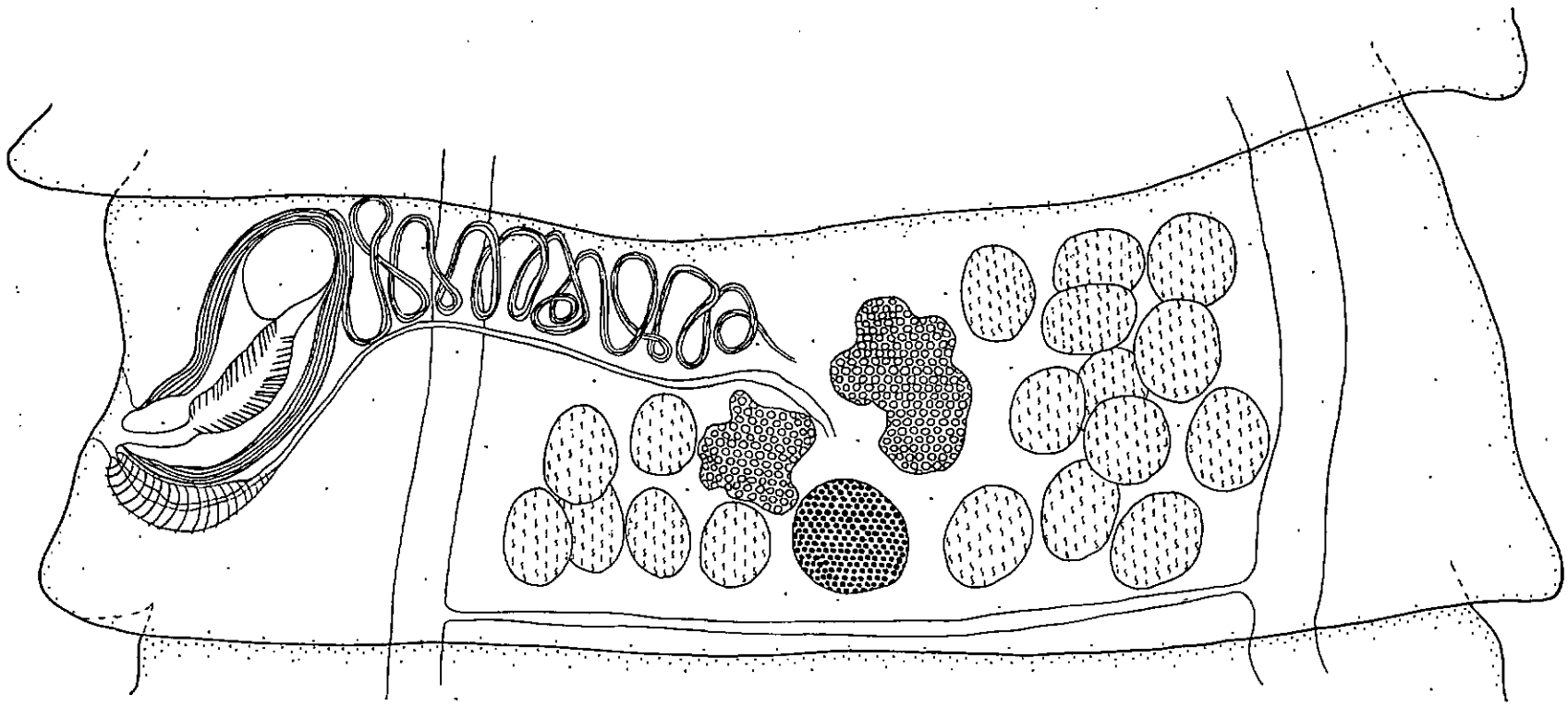


Fig. 6. — *Raillietina* (*Raillietina*) *bycanistis* (BAYLIS) from *Tropicranus* (= *Berenicornis*) *albocristatus* (CASSIN) ; whole mount of mature segment.

The worm is about 80 mm. long and has a maximum width of 2,3 mm.

The scolex, mounted in Berlese, has a diameter of 456 µ. The suckers are oval in shape — 240 by 192 µ — and are armed with several rows of small spines. The rostellum is 160 µ wide. The typical, hammer-shaped rostellar hooks number about 320 and are arranged in a double crown. They measure 15 to 16 µ in length.

The genital pores are unilateral and open at the middle of the lateral border of the segment.

The ventral pair of longitudinal excretory vessels is clearly visible, and the canals are seen to be connected by a posterior commissure in each segment. The dorsal canals are not distinguishable.

There are 17 to 21 testes arranged in two groups either side of the female organs. There are from 5 to 8 testes in the poral group, and 11 to 14 in the aporal one. The testes extend laterally almost to the excretory vessels on each side (fig. 6). The vas deferens is highly convoluted and enters the cirrus pouch without forming an external seminal vesicle. The cirrus pouch has thick, muscular walls and contains the cirrus and an internal seminal vesicle. It measures 180 to 216 µ by 79 to 90 µ. The cirrus has a rather special appearance. In its middle portion it is very wide and provided with stout spines (fig. 6). These spines are visible only in certain segments of the preparation, having probably been lost in the rest. The genital atrium is wide and shallow.

The vagina opens from the genital atrium behind the cirrus pouch. The distal part is thick-walled and provided with strong, circular muscles. The rest of the vagina is narrow and thin walled. As the dorsal

excretory vessel is not visible and as the testes do not overlie the female glands, one cannot say in which position the genital ducts lie in relation to the excretory canals. A receptaculum seminis was not observed, and if present is very small. The median ovary is bifid and slightly lobed. The poral lobe is rather smaller than the aporal one. The vitelline gland lies somewhat behind the ovary and between its two wings. The Mehlis' gland was not seen.

The uterus appears as a lobed sac filled with eggs. As it develops it breaks up into thin-walled capsules each containing one egg, and fills the segment between the excretory canals. Later, parenchymatous capsules appear enclosing 6 to 9 eggs.

The unilateral arrangement of the genital pores and the presence of several eggs in parenchymatous capsules, place this species in the sub-genus *Raillietina* STILES and ORLEMAN, 1926.

The measurements given by BAYLIS (1919) are:- length 140 mm., maximum breadth 2 mm., diameter of scolex 270 µ and of the suckers 88 µ, width of rostellum 150 µ. Length or rostellar hooks 15 µ, number of testes 12 to 14, dimensions of cirrus pouch 200 µ by 62 µ, number of eggs per capsule 4 to 5.

Three species of *Raillietina* have been described from bucerotiforms, *R.* (*R.*) *emperus* (SKRJABIN, 1915), *R.* (*R.*) *bycanistis* (BAYLIS, 1919) and *R.* (*R.*) *flabralis* MEGGITT, 1927.

R. (*R.*) *bycanistis* is distinguishable from *R.* (*R.*) *emperus* - recorded from *Buceros ceratoginina* (= *Ceratogymna elata* TEMM.) from the Cameroons - by the absence of a strong sphincter muscle surrounding the genital atrium, a feature characteristic of the latter species. It is not possible to compare the scoleces, as that of *R.* (*R.*) *emperus* is unknown. The number of testes in *R.* (*R.*) *bycanistis* is slightly less - 17 to 21 - than for *R.* (*R.*) *emperus*, c.25. The cirrus pouch of the latter is, however, considerably larger, 230 µ by 67 µ as compared with 180 to 216 µ by 79 to 90 µ.

R. (*R.*) *flabralis* is described from *Dichoceros bicornis* (= *Buceros bicornis* LIN.), which is distributed throughout Indochina and Sumatra. The number of testes is small, 4 to 5, and the rostellar hooks, 350 in number, measure only 6 µ.

9. **Raillietina (Raillietina) calcaria** (FUHRMANN, 1908).

Hosts: *Corythaeola cristata* (VIEILL.) (Musophagidae): Lisala (20214); L. GHENNE.
» » . . . . . : Kirambo (28727); L. GHENNE, 2-X-1917.
« Oiseau » (?) . . . . . : Kinshasa-Leopoldville (28730); Dr. TOBACCO, X-1927.

The presence of *R.* (*R.*) *calcaria* in the material labelled « Oiseau » indicates that the host is a species of *Corythaeola*.

The discussion on this species is to be found under *R.* (*R.*) *macrocirrosa*, p. 159.

10. **Ralllietina (Raillietina) dartevellei** n. sp. (fig. 7).

Host: *Gypohierax angolensis* (GMEL.) (Vulturidae): Boma (18894, 19145); Dr. E. DARTEVELLE, II-1937.

An entire specimen with scolex, and several fragments were obtained from the host n°. 19145. Portions of gravid strobila were found in host n°. 18894. The material is very macerated.

The worm is about 80 mm. long; its maximum breadth is 2 mm.

The scolex, mounted in Berlese, has a diameter of 560 µ. The suckers are armed, although most of the spines have been lost. The rostellum, 208 µ wide, is armed with a double crown of typical, hammer-shaped hooks, 80 to 90 in number and measuring 34 to 36 µ in length.

The genital pores are unilateral and open anteriorly to the middle of the lateral border of the segment. The mature segments are wider than long, the gravid ones becoming square and tending to a barrel shape.

The excretory system is not easy to see, but would seem to be of normal type.

The testes, 25 to 35 in number, are large and occupy most of the width of the segment (fig. 7) extending dorsally across the female glands. The vas deferens describes wide loops before entering the cirrus pouch. There is no external seminal vesicle. The muscular cirrus pouch is relatively large, measuring 136 to 168 µ by 79 to 88 µ. Its proximal end extends past the poral excretory vessels. It contains an internal seminal vesicle provided with circular muscles, and the unarmed cirrus. The genital atrium is shallow.

The vagina opens from the genital atrium behind the cirrus pouch. Its distal portion is somewhat dil-

ated (fig. 7) and is provided with circular muscles. This muscular wall is not visible in all segments. A receptaculum seminis was not obsarved. The ovary, median or slightly poral in position, appears to be bifid. Behind it lies the vitelline gland. The Mehlis' gland was not observed.

It was not possible to follow in detail the development of the uterus, but the eggs, after filling the segment, are enclosed in numerous parenchymatous capsules, each containing about 3 to 4 eggs.

The unilateral genital pores and the egg capsules each containing one egg, place this species in the sub-genus *Raillietina* STILES and ORLEMAN, 1926.

Two species of the genus *Raillietina* FUHRMANN, 1920 are recorded from accipitrine birds, *R.* (sens. lat.) *sphaeroides* (CLERC, 1903) from *Buteo vulpinus menetriesi* BOGD. from the Urals, and *R.* (*R.*) *vagandae* (BAYLIS, 1919 a.) from *Haliaetus vocifer vocifer* (DAUD.), from Uganda.

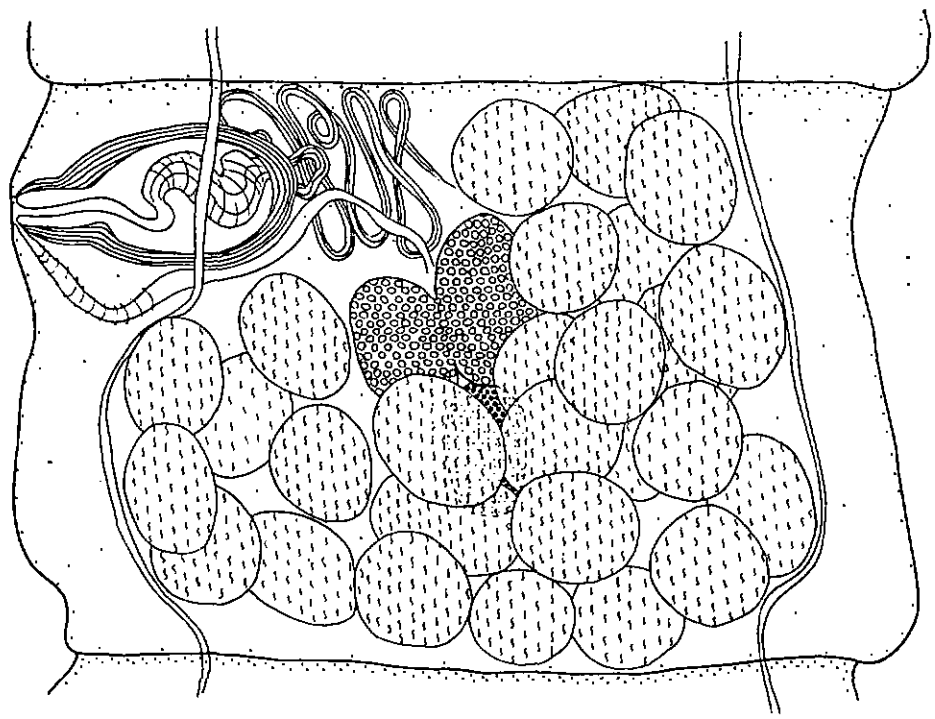


Fig. 7. — *Raillietina* (*Raillietina*) *dartevellei* n. sp. from *Gypohierax angolensis* (GM.); whole mount of mature segment.

R. (*R.*) *dartevellei* n. sp. is distinguishable by the length of the rostellar hooks and the number of testes. BAYLIS (1919 a) gives the hook length as 25 µ and the number of testes as 6 to 8. CLERC (1903) gives 7 µ and 10 µ respectively. The cirrus pouch in *R.* (*R.*) *vagandae* is also smaller i.e. 100 by 60 µ.

On looking at the drawing of a mature segment given by CLERC (1903, pl. III, fig. 81), one is struck by the enormous size of the cirrus pouch, which, as CLERC mentions in his description (p. 360), occupies about two-thirds of the width of the proglottis. Unfortunately there were no segments containing eggs present in CLERC's material and thus he could not follow the development of the uterus. The enormous size of the cirrus pouch is very reminiscent of the genus *Idiogenes* (see p. 168). The representative of the genus *Idiogenes* in accipitrines is *I. flagellum*, and it is interesting to note that the measurements given by CLERC (1903) correspond with those for *I. flagellum*. CLERC's measurements are:- diameter of scolex 150 µ, hook length 7 µ. He does not give the length of the cirrus pouch, but its length in a mature segment would be two-thirds of the width of the segment, i.e. about 200 µ; number of testes 10. CLERC (p. 360) describes the vagina as being long and narrow forming several acute undulations before entering the receptaculum seminis in the centre of the proglottis. The measurements for *I. flagellum* are: scolex 100 to 252 µ, hook length 7 to 12,5 µ, cirrus pouch 240 to 700 µ (i.e. 240 µ in a mature segment) testes 8 to 20. There is, however, a discrepancy in the number of rostellar hooks, 330 for *R. spheroides* and 150 to 186 for *I. flagellum*. It not being possible to examine the type material of *R. spheroides* one cannot, of course, say whether the latter is an *Idiogenes* or not, and it will only be possible to do so when material is found from *Buteo vulpinus menetriesi* BOGD. which corresponds with CLERC's description.

It is with great pleasure that we name this species after Dr. E. DARTEVELLE, Keeper of Invertebrates, Musée Royal du Congo Belge, on whose material this species is based.

11. **Raillietina (Raillietina) fuhrmanni intermedia** FUHRMANN and BAER, 1943.

Hosts: *Turtur chalcospilos* (WAGL.) (Columbidae) : . Kitombe, near Banane (22684) ; Dr. E. DARTEVELLE, II-1938.
Treron (= *Vinago*) *calva* . . . . . : Boma (19177) ; Dr. E. DARTEVELLE, IV-1937.
« Pigeon » . . . . . : Usumbura (16628-29, 17305-06) ; Dr. COLBACK, 12-III-1936.

The scolex has a diameter of 400 µ and the suckers measure 160 by 96 µ. The rostellum is 120 µ wide. The latter is armed with numerous hammer-shaped hooks, about 140 in number and 11 to 14 µ in length.

It is rather difficult to distinguish the number of testes, but there are about 12 to 14. The cirrus pouch is 144 µ long and 65 µ wide. The unilateral genital pores and the egg capsules containing several eggs, place this species in the subgenus *Raillietina* STILES and ORLEMAN, 1926.

FUHRMANN and BAER (1943) divide the species *R.* (*R.*) *fuhrmanni* into three sub-species, based on the size of the rostellar hooks viz. *R.* (*R.*) *fuhrmanni fuhrmanni* (SOUTHWELL, 1922) hooks 25 to 30 µ long; *R.* (*R.*) *fuhrmanni intermedia* FUHRMANN and BAER, 1943, hooks 12 to 14 µ long; *R.* (*R.*) *fuhrmanni idiogenoides* (BAER, 1933) syn. *R.* (*R.*) *idiogenoides* BAER, 1933, hooks 5 to 8 µ long. FUHRMANN and BAER report *R.* (*R.*) *fuhrmanni intermedia* from *Oena capensis capensis* (*L.*) from Ethiopia.

The anatomy of the Congo specimens corresponds with the description by BAER (1933), who gives the following dimensions:- scolex diameter 250 to 260 µ; suckers 80 to 100 µ; testes, 10 to 12; cirrus pouch 130 to 150 µ by 80 µ. As seen above, the length of the hooks corresponds with the sub-species *intermedia.*

12. **Raillietina (Raillietina) macrocirrosa** (FUHRM. 1909).

Host: *Centropus senegalensis* (*L.*) (Cuculidae) : Boma (19187) ; Dr. E. DARTEVELLE, V-1937.

The longest specimen measures 50 mm. and has a maximum breadth of 2 mm. No scolex was present.

There are 23 to 27 testes and the cirrus pouch measures 108 by 86 µ. The genital atrium is surrounded by a large sphincter muscle, characteristic of this species. The genital pores are unilateral and the egg-capsules each contain several eggs, these properties placing the species in the sub-genus *Raillietina.*

This species was described by FUHRMANN (1909) under the name of *Davainea macrocirrosa*, from a Cuculiform from the Cameroons. He gives the number of testes as 30 and the length of the cirrus pouch as 100 µ.

There are three species of the sub-genus *Raillietina* reported from the Cuculiformes, *R.* (*R.*) *macrocirrosa*, *R.* (*R.*) *calcaria* (FUHRMANN, 1909) and *R.* (*R.*) *undulata* (FUHRMANN, 1909), the latter two both from *Corythaeola cristata* (VIEILL.) from the Cameroons. The dimensions given by FUHRMANN (1909) for *R.* (*R.*) *calcaria* are 300 rostellar hooks, 14 to 16 µ in length, 14 testes and length of cirrus pouch 140 µ. *R.* (*R.*) *undulata* was reported by BAER (1933) from *Gallirex porphyreolophus* (VIGORS), and *Chrysococcyx caprius* (BODD.) from East Africa. It was re-described by HILMY (1936) from *Corythaeola cristata cristata* (VIEILL.) from Liberia, and by SOUTHWELL and LAKE (1939) from the latter host from the Belgian Congo. The measurements given by FUHRMANN, BAER, HILMY and SOUTHWELL and LAKE respectively are; 150-200 hooks, 25 to 28 µ long; 200 hooks, 22 to 26 µ long; 190 hooks, 30,4 µ long and 180 hooks, 20 to 26 µ long. BAER and HILMY both give 20 as the number of testes, and SOUTHWELL and LAKE give 10 to 12. For the dimensions of the cirrus pouch, BAER gives 110 to 150 µ by 50 µ and HILMY gives 315 µ by 100 µ. Neither of these two species possesses the strongly developed atrial sphincter muscle.

JOHRI (1934) reports *R.* (*R.*) *macrocirrosa* from a galliform - but this observation seems open to doubt.

R. (R.) MACROCIRROSA AND R. (R.) EMPERUS.

R. (*R.*) *macrocirrosa* was described by FUHRMANN (1909) from a Cuculiform from the Cameroons. SKRJABIN (1915) in the discussion of his new species *Davainea emperus* from *Ceratogymna elata* TEMM. (Bucerotiformes), also from the Cameroons, notes the following distinguishing differences; number of testes

25 and length of cirrus pouch 230 µ for his new species, as compared with 30 testes and cirrus pouch length 100 µ for *R.* (*R.*) *macrocirrosa*.

JOYEUX and BAER in JOYEUX, GENDRE and BAER (1928) describe the scolex of *R.* (*R.*) *macrocirrosa* for the first time, and comment on the close relationship of the latter species with the *R.* (*R.*) *emperus*. Bearing in mind the fact that both worms were found in the Cameroons, and the affinity between the Coccygiformes (= Cuculiformes) and the Coraciiformes (p. p. = Bucerotiformes), they wonder if in fact the two worms are not identical.

HILMY (1936) goes further and after describing in detail *R.* (*R.*) *macrocirrosa* from *Centropus senegalensis senegalensis* (LIN.) (Cuculiformes), makes *R.* (*R.*) *emperus* a synonym of *R.* (*R.*) *macrocirrosa*.

The measurements for *R.* (*R.*) *emperus* given by SKRJABIN (1915), those for *R.* (*R.*) *macrocirrosa* taken from FUHRMANN (1909), those for the scolex from JOYEUX and BAER, together with those from HILMY (1936) and the present Belgian Congo material are given in the table below.

Species	*R.* (*R.*) *emperus* (SKRJABIN, 1915)	*R.* (*R.*) *macrocirrosa* (FUHRM., 1909)		
Reported by	SKRJABIN, 1915	FUHRM., 1909)	HILMY, 1936	Belgian Congo material no. 19187
Length	110 mm.	--	130 mm.	50 mm.
Breadth	2 mm.	2.5 mm.	2.43 mm.	2 mm.
Scolex	--	240-250 µ	--	—
Suckers	--	100-112 × 45-70 µ	--	—
Hook no.	--	275-300	--	—
Hook length	—	13-14 µ	--	—
Testes	c. 25	30	c. 32	23-27
Cirrus pch	230 × 67 µ	100 µ	120 × 60 µ	108 × 86 µ
Host	*Ceratogymna elata* TEMM.	*Tauraco persa buffoni* (VIEILL.)	*Centropus senegalensis* (L.)	*Centropus senegalensis* (L.)
Locality	Cameroons	Cameroons	West Africa	Belgian Congo

For explanation of abbreviations see p. 147.

The type materials of *R.* (*R.*) *emperus* and *R.* (*R.*) *macrocirrosa* were then examined. The dimensions correspond with those in the original descriptions. Both materials show the characteristic, stout sphincter muscle surrounding the genital atrium. It is not possible to compare the scoleces as that for *R.* (*R.*) *emperus* is not yet described. As seen from the table, the number of testes agrees, but there is a considerable difference in the size of the cirrus pouch. Other things being equal, difference in size of the cirrus pouch seems little basis on which to separate the two species, but it would seem that it is not possible to state that these species are identical until the scolex of *R.* (*R.*) *emperus* has been found. On the other hand, it is to be noted that *R.* (*R.*) *emperus* was described from museum material, and there is a possibility of there being a mistake in the host label.

13. **Raillietina (Raillietina) pinteri** (KLAPTOCZ, 1906).

Syn.: *Raillietina* (*R.*) *pintneri* var. *polyorchis* BAER, 1925.
Raillietina (*R.*) *steinhardti* BAER, 1925.
Raillietina (*R.*) *africona* BAER, 1925.

Hosts: *Numida meleagris marchei* OUSTALET (Numididae) : . . . . . Tshela Fuka, N.W. Boma (19122-24); Dr. E. DARTEVELLE, V-1937.
» » » » . . . . : Boma (19186); Dr. E. DARTEVELLE, IV-1937.

Hosts: *Numida meleagris marchei* OUSTALET (Numidae) : . . . . . Kitombe, near Banane (22747), Dr. E. DARTEVELLE, II-1938.

» » » » . . . : Manzadi (22750, 22751); Dr. E. DARTEVELLE, VI-1937.

» » » » . . . : Moanda (27179, 27180, 27181, 27183, 27184); Dr. E. DARTEVELLE, IX-1947.

Pintade . . . . . : Kindu (8264); C. ROSSIGNOL, 1935.

The material was fairly abundant and it was possible to gain some idea of the extent of the individual variation for each character.

The worms show the characters of the sub-genus *Raillietina*, viz, unilateral genital pores and egg capsules each containing several eggs.

The longest specimen measures 70 mm. in length; the maximum breadth is 1,5 mm. The scolex of specimens from host n°. 22747, mounted in Canada balsam, has a diameter of 272 µ. The figures given by JOYEUX and BAER (1936) are 150 to 220 µ. The rostellum, diameter 80 µ, is armed with a double crown of 115 to 120 hooks which are 7 to 8 µ long. The dimensions given by JOYEUX and BAER are, rostellum diameter 150 µ, number of hooks 150 to 200, length of hooks 7 to 8 µ.

The development of the genital organs is slow and consequently there is a large number of segments at any one particular stage. The number of testes varies considerably, both within and between individual worms, and forms a series, the limits of which are 15 to 29. The individual terms are 15 to 20, (host n°. 19186); 16 to 23 (host n°. 22750); 17 to 21 (19122); 20 to 25 (22744); 22 to 29 (22747).

The cirrus pouch is small and does not extend past the poral excretory vessels. In the classical descriptions (JOYEUX and BAER (1936)), the cirrus pouch is described as having a muscular, globular part and an elongated portion which opens into the genital atrium. On examining the Congo material, special attention was paid to the structure of the cirrus pouch and we are not able to agree with its having any unusual structure. It is indeed very muscular, but is of the normal shape. Neither does FUHRMANN (1909 a, fig. 6) show two parts to the cirrus pouch in his drawing. The cirrus pouch of the present material measures 122 to 162 µ by 58 to 79 µ. This is larger than the dimensions given by JOYEUX and BAER (1936) i.e. 100 µ by 70 µ. Near the distal end of the cirrus is a small diverticulum known as the *pars accessoria*, drawn by FUHRMANN (1909 a, fig. 6).

The vagina opens from the genital atrium behind the cirrus pouch, and together with the vas deferens passes between the excretory vessels. The distal part of the vagina is muscular; it has a wide lumen and is provided with thick, cuticular spines. A short distance from its opening into the genital atrium there is a small expansion. The rest of the female organs show no peculiarities.

The number of egg capsules per segment is very variable. The average number of eggs per capsule is from 9 to 12. It was not possible to measure ripe eggs.

There are many species of *Raillietina* reported from the Galliformes. Those reported from Guinea fowls, *Numida* sp., interest us more particularly viz:-

R. (*R.*) *pintneri* (KLAPTOCZ, 1906).
R. (*R.*) *tetragona* (MOLIN, 1858).
R. (*R.*) *tetragonoides* (BAER, 1925).
R. (*R.*) *echinobothrida* (MEGNIN, 1880).
R. (*R.*) *pintneri* var. *polyorchis* BAER, 1925.
R. (*R.*) *steinhardti* BAER, 1925.
R. (*R.*) *africana* BAER, 1925.

The species *R.* (*R.*) *steinhardti* from German South-West Africa was described by BAER (1925b.) together with a new variety *R.* (*R.*) *pintneri* KLAPTOCZ, (1906) var. *polyorchis*. As forseen by BAER, now that further data is available on the limits of variation of *R.* (*R.*) *pintneri*, the variety *polyorchis* falls within the limits of the former species, the differences between *R.* (*R.*) *pintneri* and the variety *polyorchis* lie in the length of the rostellar hooks (7 to 8 µ for the former and 9,6 to 11,2 µ for the latter); in the number of testes (18 to 20 for the former and 25 to 30 for the latter). In all other respects the species correspond. As can be seen from the measurements of the Congo material, 25 to 30 testes falls within the range for *R.*

(*R.*) *pintneri*. Bearing in mind the variation within the species of this group, a difference of 7 to 8 µ and 9,6 to 11,2 µ for the hook length would not seem sufficiently great to exclude these two worms from the same species.

As seen from the table, the figures given for *R.* (*R.*) *steinhardti* agree with those given for *R.* (*R.*) *pintneri* by BAER (1936) eleven years later, with the exception of the cirrus pouch, which measures 150 to 170 µ by 60 µ in *R.* (*R.*) *steinhardti* and 100 µ by 70 µ in *R.* (*R.*) *pintneri*. This measurement does however come within the dimensions for the Belgian Congo material.

Species	*R.* (*R.*) *steinhardti* BAER, 1925	*R.* (*R.*) *pintneri* from JOYEUX and BAER, 1936	*R.* (*R.*) *africana* BAER, 1925
Length	45 mm.	50-72 mm.	45 mm.
Breadth	1.7 mm.	1.4 mm.	—
Scolex	230 µ	150-220 µ	250
Suckers	95 × 75 µ	100 µ	100 µ
Rostellum	76 µ	150 µ	80 µ
No. of hooks	160	120-200	250-260
Hook length	6-7 µ	6,4-8 µ	7-8 µ
Testes	20	18-20	20-30
Cirrus pch	150-170 × 60 µ	100 × 70 µ	190 × 90 µ

For explanation of abbreviations see p. 147.

A third species *R.* (*R.*) *africana* BAER, 1925 was described from a group of Galliform parasites found in the intestine of an *Herpestes*, a mongoose, the latter animal presumably having recently eaten a Guinea-fowl. As seen from the table, *R.* (*R.*) *africana* differs from *R.* (*R.*) *pintneri* in the number of hooks (250 to 260 for the former and 120 to 200 for the latter), and the slightly larger cirrus pouch (190 µ by 90 µ and 122 to 162 µ by 58 to 79 µ). However, the form of the vagina and cirrus pouch of *R.* (*R.*) *africana* as drawn by BAER (1925 d, pl. III, figs. 7-7), and the presence of a diverticulum on the cirrus (1925 d p. 57) is, as this author remarks, reminiscent of the arrangement in *R.* (*R.*) *pintneri* described by FUHRMANN (1909 a). We consider this peculiar structure of the cirrus to be a more reliable specific character for this group than the number of rostellar hooks and a slight difference in size of the cirrus pouch.

We propose, therefore, that *Raillietina* (*Raillietina*) *pintneri* (KLAPTOCZ, 1906) var. *palyarchis* BAER, 1925 *Raillietina* (*R.*) *steinhardti* BAER, 1925 and *Raillietina* (*Raillietina*) *africana* BAER, 1925 become synonyms of *Raillietina* (*Raillietina*) *pintneri* (KLAPTOCZ, 1906).

14. **Raillietina (Raillietina) tetragona** (MOLIN, 1858).

Host: *Gallus gallus domesticus* (« poule indigène »)
(Gallidae): . . . . . N'Sengi (18620-38, 19180); Dr. E. DARTEVELLE, IV-1937.
» » » . . . . . : Vista (22749); Dr. E. DARTEVELLE, II-1938.
» » » . . . . . : Mpozo, near Matadi (19948); Dr. E. DARTEVELLE, II-1937.

This material corresponds in all respects with the description of JOYEUX and BAER (1936). For the sake of completeness these measurements are given. Maximum length 250 mm; maximum breadth 1,4 mm; diameter of scolex 175 to 350 µ; diameter of suckers 70 to 140 µ number of hooks 100; length of hooks 6 to 8 µ; cirrus pouch 75 to 100 µ by 50 µ; egg capsules per segment 60 to 100; eggs per capsule 6 to 12; diameter of egg 20 to 53 µ; diameter of embryo, 10 to 15 µ.

This species has a cosmopolitan distribution.

15. **Raillietina (Ralllietina) werneri** (KLAPTOCZ, 1908).

syn. *Davainea w.* KLAPTOCZ, 1908.
R. (Ransomia) w. FUHRMANN, 1920.
Kotlania w. LOPEZ-NEYRA, 1931.

Host: *Colius striatus nigricollis* VIEILL. (Coliidae) : Matadi (21143); Dr. E. DARTEVELLE, II-1937.
» » » . . . . . : Manzadi (21588-92, 21908-09); Dr. E. DARTEVELLE, VI-1937.

This is the only species of the sub-genus recorded from the Coliidae. It was described by KLAPTOCZ (1908) from *Colius striatus affinis* SHELL. from East Africa, but the head was missing. The measurements for the scolex are given by BAER (1933), his material being from *Colius striatus* GM., from Rhodesia.

The present material has 240 to 260 hooks, 11 to 14 µ in length (BAER gives 180 to 200 hooks, 10 to 11 µ long). There are 12 to 15 testes, and the cirrus pouch measures 144 µ by 72 µ (KLAPTOCZ describes the number of testes as 15 to 25, and the dimensions of the cirrus pouch as 100 µ by 46 to 58 µ). These slight differences may well be attributed to individual variation.

Raillietina (Raillietina) sp.

Host: *Coliuspasser albonotatus* GMEL. (Ploceidae): . Boma (19165-19174; 22121; Dr. E. DARTEVELLE, IV-1937.

There were several scoleces present together with fragments of strobila, which are too contracted to permit of a detailed study of the anatomy. It is, however, possible to see that the genital pores are arranged unilaterally, and that the egg capsules contain several eggs, and thus to assign the worm to the sub-genus *Raillietina* FUHRMANN, 1920.

16. **Ralllietina (Fuhrmannetta) crassula** (RUDOLPHI, 1819).

Hosts: « Pigeon domestique » (Columbidae): . . . Boma (22746); Dr. E. DARTEVELLE, IV-1937.
Turtur chalcospilos (WAGL.). . . . . : Kitombe near Banane (22684); Dr. E. DARTEVELLE, II-1938.
» » . . . . . : Vista (22013); Dr. E. DARTEVELLE, II-1938.

The irregularly alternating genital pores and the parenchymatous egg capsules, each containing several eggs, place this worm in the sub-genus *Fuhrmannetta* STILES and ORLEMAN, 1926.

This is the only species of the sub-genus recorded from the Columbiformes. The limits of variation for the characters of *R. (F.) crassula* are not well known. JOYEUX and BAER (1936) give the number of rostellar hooks as 60 to 70, whereas in the Congo material there are 130-146. This discrepancy is perhaps due to the falling out of the hooks in the former case. The number of testes in the present material is 52 to 57, as compared with 30 to 40 given by JOYEUX and BAER (1936). The cirrus pouch measures 115 to 144 µ by 64 µ, as compared with 100 µ.

17. **Raillietina (Fuhrmannetta) pluriuncinata** (CRETY, 1890).

Host: *Coturnix coturnix africana* TEMM.-SCHLEG. (Phasianidae): . . . . . Baudouinville (25694); R. P. HULSTAERT, 12-V-1948.

The species is a typical parasite of Galliforms. This is the first record for the Belgian Congo.

18. **Raillletina (Paroniella) bargetzii** n. sp.

Host: *Gymnobucco bonapartei* HARTLAUB. (Capitonidae) : . . . . . Luebo (9799); Dr. H. SCHOUTEDEN, 16-VIII-1921.

Three specimens were found. The material was rather contracted.

The longest worm measured about 20 mm in length with a maximum width of 2,6 mm.

The scolex measures 457 µ in diameter, and is provided with four oval suckers measuring 114 µ by 68 µ. The suckers are armed with several rows of spines 8 to 10 µ in length. The rostellum has a diameter of 136 µ and is armed with a double crown of about 250 typical hammer-shaped, davaineid hooks, 17 to 19 µ in length.

The unsegmented neck region is very short. The genital pores are unilateral. Calcareous bodies are numerous and concentrated mainly in the cortex.

The muscular system is feebly developed. The longitudinal, cortical musculature is composed of two layers; the inner consisting of widely spaced bundles containing 5 to 10, and up to 15 fibres; the outer layer is composed of fibres more or less isolated, or in small groups extending almost to the subcuticular region. The medulla is marked off from the cortex by transverse fibres, and throughout the medulla are scattered dorso-ventral fibres.

The excretory system is of the normal type. A pair of narrow dorsal vessels situated above a pair of wider ventral vessels joined in each segment by a transverse, ventral, posterior commissure.

The nervous system is composed of two longitudinal fibres, clearly defined and rather wide, situated laterally to the excretory vessels.

The testes are 15 to 25 in number and are arranged in two dorso-ventral layers, and three antero-posterior rows. They extend laterally to the excretory vessels.

The vas deferens is convoluted and leads directly to the cirrus pouch without forming an external seminal vesicle. The genital ducts pass between the dorsal and ventral excretory vessels, and dorsal to the nerve. The cirrus pouch extends about half way to the poral excretory vessels and measures 104 µ in length and 36 µ at its maximum width. It contains a coiled, unarmed cirrus and no internal seminal vesicle. It empties into a small genital atrium which opens on the anterior part of the lateral border of the segment.

The vagina, lined with setae, opens dorsally to the cirrus pouch and then follows a straight course posterior to the latter. Once past the excretory vessels it dilates to form a long sinuous, rather narrow seminal receptacle, which, on approaching the ovary, terminates in a wider, globular portion.

The ovary is dorsal in position, and is lobed. The vitelline gland is compact, posterior to the ovary, and granular in appearance. The Mehlis' gland is small. The female organs are more or less median.

The uterus appears as a small sac between the ovary and the vitelline gland. It rapidly extends laterally, becomes lobed and later fills the segment. Each egg becomes enclosed singly in a portion of the uterine membrane; thus each egg is enclosed in a capsule measuring 32 µ in diameter, and the uterus delimiting a single uterine cavity ceases to exist. The embryo measures 21 by 16 µ.

There are two other species of the sub-genus *Paroniella* recorded from the Capitoniformes from Africa: *R. (P.) bucerotidarum* JOYEUX and BAER, 1928, found in a *Lybius bidentatus aequatorialus* (SHELL.) from Labé, French Equatorial Africa, the type material of which was examined. The other is *R. (P.) bomensis* SOUTHWELL and LAKE, 1939 from *Lybius bidentatus friedmanni* (BANNERMAN) from the Belgian Congo.

Our specimens are easily distinguished from *R. bucerotidarum* by the hooks, i.e. 240 hooks of length 17 to 19 µ for the new species as compared with 170 hooks 30 to 32 µ in length for *R. bucerotidarum*. As seen from the table below the suckers, rostellum and cirrus pouch are all larger in *R. bucerotidarum*. *R. (R.) bargetzii* is distinguished from *R. (P.) bomensis* by the number and size of the rostellar hooks, i.e. 250 hooks, 17 to 19 µ long for the former, and 200 hooks, 27 to 30 µ long for the latter. *R. (R.) siamensis* SCHMELZ, 1941 is the only other species of the sub-genus recorded from the Capitoniformes reported from *Megalaima zeylanica lineata* (VIEILL.) and *M. faiostricta* (TEMM.) from Siam. Once again, *R. (P.) bargetzii* n. sp. is distinguished from *R. (P.) siamensis* on comparing a length of 20 and 24 µ for the hooks of the latter, with 17 to 19 µ for *R. (P.) bargetzii* n. sp. As seen from the table, *R. (P.) siamensis* also possesses a larger number of testes.

In his discussion, SCHMELZ (1941) mentions that *R. (P.) sphecotheridis* JOHNSTON, 1914 is sometimes erroneously placed among the Cestodes of the Capitoniformes. JOHNSTON (1914) describes his *R. (P.) sphecotheridis* from *Sphecotheres maxillaris* (LATH.), a Passeriform, from Queensland. BAYLIS (1928) refers *Davainia spherotheridis* JOHNSTON, 1914 to the genus *Houttuynia* FUHRMANN, 1920, and in the same paper records, « Specimens probably referable to this species » (i.e. *H. sphecotheridis* JOHNSTON, 1914) were obtained from four species of birds belonging to four genera and three families, viz:

Megalaima chrysopogon chrysopsis GOFF. (Capitonidae) loc. Mt. Penrissen.
Megalaima pulcherrima (SHARPE) (Capitonidae) » Mt. Murdu.
Picus mentalis humii (HARGITT) (Picidae) » Mt. Penrissen.
Buchanga stigmatops (SHARPE) (Dicruridae) » Mt. Penrissen.

As the Capitoniformes are an Old World group of birds it seems unlikely that BAYLIS' specimens were in fact *R.* (*P.*) *sphecotheridis*, originally described from a passerine from Queensland.

This species is dedicated to Mr. J. P. BARGETZI, Assistant at the Institut de Zoologie, Neuchâtel.

Species	*R.* (*P.*) *bucerotidarum* J. & B., 1928	*R.* (*P.*) *siamensis* SCHMELZ, 1941.	*R.* (*P.*) *bomensis* S. & L., 1939	*R.* (*P.*) *bargetzii* n. sp.
Length	30 mm.	45 mm.	20 mm.	
Breadth	1,5 mm.	4,9 mm.	2-3 mm.	2,6 mm.
Scolex	450 µ	400-440 µ	—	457 µ
Suckers	160 × 120 µ	200 µ	—	114 × 68 µ
Rostellum	160 µ	130-150 µ	—	136 µ
Hook no.	170	240	200	250
Hook length	30-32 µ	20-24 µ	27-30 µ	17-19 µ
Testes	c. 25	50-60	27	15-25
Cirrus pch	120 × 50 µ			104- × 36 µ
Host	*Lybius bidentatus acquatorialis* (SHELL)	*Megalaima zeylanica lineata* (VIEILL.)	*Lybius bidentatus friedmanni* (BANNERMAN)	*Gymnobucco* sp.
Locality	W. Africa	Siam	Belgian Congo	Belgian Congo

For explanation of abbreviations see p. 147.

19. **Raillietina (Paroniella) numida** (FUHRMANN, 1912)

Hosts: *Numida meleagris marchei* OUSTALET (Numididae) : . . . . . Kitombe near Banane (22747); Dr. E. DARTEVELLE, II-1938.
» » *intermedia* NEUMANN . : Gatsibu, Ruanda (8263); Dr. COLBACH, 4-II-1934.
pintade . . . . . : Ozegura, Nizi (28731); A. COLLART, 4-III-1929.

The scolex was missing, and the material was very macerated.

The unilateral arrangement of the genital pores and the egg capsules each containing one egg, place this species in the sub-genus *Paroniella* FUHRMANN, 1920.

There are 6 to 8 testes. The cirrus pouch measures 234 to 270µ by 50µ. The genital atrium is very large, and it and the base of the vagina are lined with very stout setae. The dimensions given by JOYEUX and BAER (1936) are testes, 7 to 10; the cirrus pouch, 160µ by 40 to 50µ. The eggs have a diameter of 50µ.

There are only two species of this sub-genus reported from *Numida* species, viz. *R.* (*P.*) *numida* FUHRMANN, 1913 syn. *R.* (*P.*) *magninumida* JONES, 1930, HUDSON (1934), and *R.* (*P.*) *woodlandi* BAYLIS, 1934. The dimensions for *R.* (*P.*) *woodlandi* taken from the original description by BAYLIS (1934) are testes 100 to 150 — which differentiates it clearly from *R.* (*P.*) *numida* — and cirrus pouch 200 to 240µ.

20. **Raillietina (Paroniella) perreti** n. sp. (fig. 8).

Host: *Pycnonotus barbatus tricolor* RCHW. (Pycnonotidae): . . . . . Manzadi, Zadi-Kakongo (22108) Dr. E. DARTEVELLE, VI-1937.

Two entire worms with scoleces and several fragments of strobila were present. The material was macerated.

The longest worm is about 55 mm. in the length and has a maximum breadth of 1 mm.

The scolex, mounted in Canada balsam, has a diameter of 234μ. The oval suckers meaasure 79μ by 68μ, and the rostellum is 50μ wide. The rostellar hooks, mounted in Berlese, are c. 240 in number and are 8 to 9μ long. They are of the typical hammer-shape.

The genital pores are unilateral and open at about the middle of the lateral border of the segment. The mature segments are wider than long, but the gravid ones become twice as long as wide.

The testes number 22 to 29, are grouped to either side of the female glands, a single row behind the vitelline gland connecting the two groups (fig. 8). The vas deferens is convoluted, becoming increasingly so

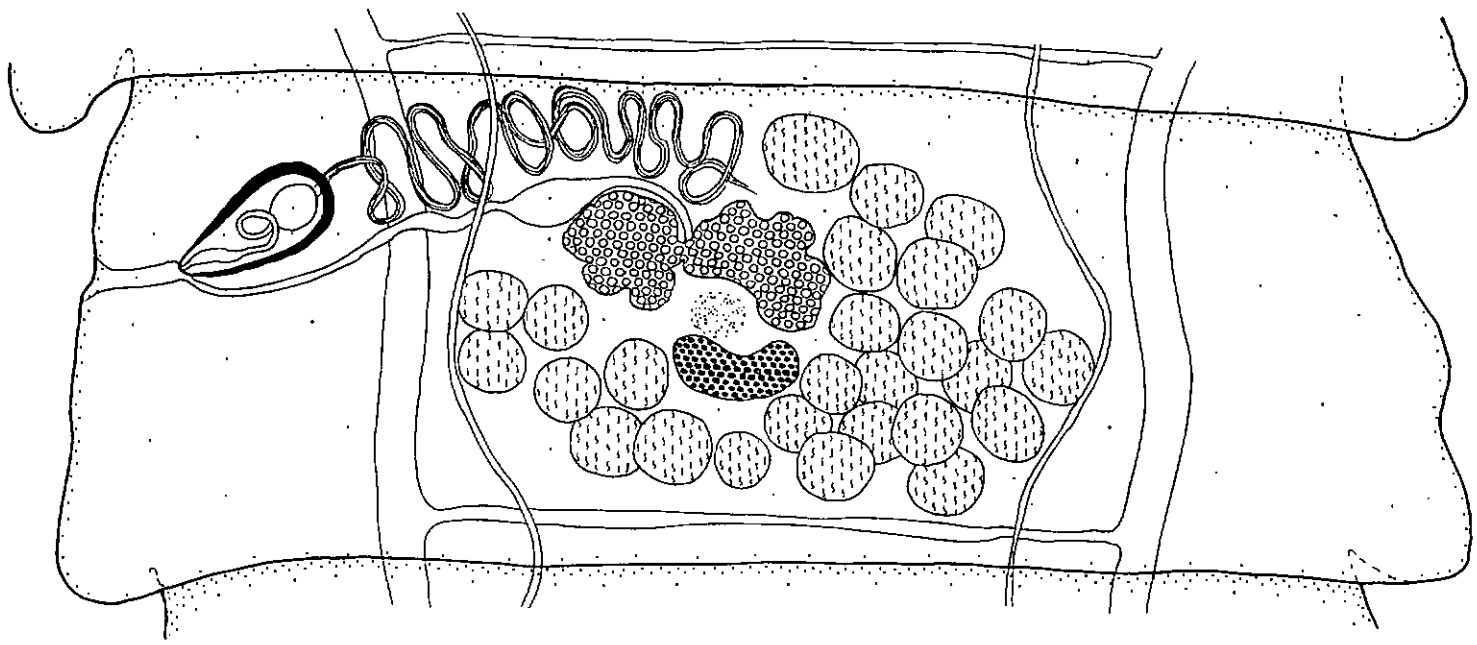


Fig. 8. — *Raillietina (Paroniella) perreti* n. sp.
from *Pycnonotus barbatus tricolor*;
dorsal view of whole mount of mature segment.

before passing between the excretory vessels, to enter the cirrus pouch. There is no external seminal vesicle. The cirrus pouch measures 90 to 126μ by 50 to 54μ and extends almost to the poral excretory vessels. It contains a small, spherical internal seminal vesicle at its proximal end, and the unarmed cirrus. The genital atrium is small.

The vagina opens behind the cirrus pouch, and its proximal portion widens to form a receptaculum seminis. The genital ducts pass between the excretory vessels. The ovary is bifid and median. Behind it, and between its two wings, is the vitelline gland (fig. 8). It was not possible to see the Mehlis' gland.

The form and position of the uterus is indicated by the appearance of the eggs more or less on the site of the ovary. It is difficult to see the wall of the uterus. The latter becomes lobed and eventually the eggs fill the segments. In the gravid segments the eggs are seen to be enclosed each in a capsule. There is no formation of parenchymatous capsules containing several eggs. In the ripest segments present the oval eggs measure 35 μ by 26μ and the embryo is 17 μ in diameter.

The unilateral genital pores and the egg capsules containing only one egg, place this species in the sub-genus *Paroniella* FUHRMANN, 1920.

Two other species of this sub-genus are described from *Pycnonotus* species - *R. (P.) balbularum* TUBANGUI and MASILUGNAN, 1937 from *Pycnonotus goiavier* SCOP. from the Philippines, and *R. (P.) pycnonoti* YAMAGUTI and MITUNAGA, 1943 from *Pycnonotus sinensis formosa* HARTERT from FORMOSA. The measurements, taken from the original descriptions, together with those for *R. (P.) perreti* n. sp. are given in the table below.

As can be seen from the table *R. (P.) perreti* n. sp. is clearly distinguished by the number and size of its rostellar hooks.

We dedicate this species to our friend, JEAN-LUC PERRET.

Species	*R. (P.) perreti* n. sp.	*R. (P.) pycnonoti* Y. & M. 1943	*R. (P.) bulbularum* T. & M. 1937
Length	c. 55 mm.	75 mm.	70 mm.
Breadth	1 mm.	1,9-4 mm.	1,5 mm.
Scolex	234 µ	—	500 µ
Suckers	79 × 68 µ	110-150 µ	110-130 × 90-110 µ
Rostellum	50 µ	80-100 µ	70-80 µ
No. of hooks	240	105-115	120-130
Hook length	8-9 µ	15-22 µ	20-23 µ
Testes	22-29	14-30	26-30
Cirrus pouch	90-126 × 50-54 µ	90-150 × 60-75 µ	130-150 × 60-70 µ
Host	*Pycnonotus barbatus tricolor* RCHW.	*P. sinensis formosa* HARTERT	*P. goiavier* SCOP.
Locality	Belgian Congo	Formosa	Philippines

For explanation of abbreviations see p. 147.

21. **Raillietina (Paroniella) reynoldsiae** MEGGITT, 1926.

Host: *Corvus albus* MÜLL. (Corvidae): . . . . . Zoo. Gdns. Antwerp (27989); died on, 4-II-1948.
» » » . . . . . : Kisenyi-Ruanda (28919); Dr. J. DEOM, 16-IX-1951.
» » » . . . . . : Yangambi (25691); INEAC, 5-I-1948.

The scoleces were mounted in Berlese. The fragments of strobila were rather contracted.

The rostellar hooks are 240 to 280 in number, and 17 to 22 µ long.

There are 25 to 30 testes, and the cirrus pouch measures 115 to 176 µ by 68 to 79 µ. The eggs have a diameter of 32 to 36 µ. The genital pores are unilateral, and the egg capsules each enclose a single egg.

The anatomy agrees with that described by MEGGITT (1926) for *R. (P.) reynoldsiae* from *Corvus splendens insolens* HUME, from Rangoon. The dimensions he gives are:- 250 rostellar hooks, 11 to 17 µ in length; 33 to 38 testes; cirrus pouch 130 to 212 µ long. The number of rostellar hooks and the size of the cirrus pouch of the Congo specimens agree with MEGGITT's figures; the difference in the number of testes falls well within the order of variation encountered in the genus *Raillietina*. We realise that the discrepancy in the hook length is rather large, but it is not impossible that this too falls within the limits of individual variation.

The only other species of the sub-genus *Paroniella* FUHRMANN, 1920 recorded from *Corvus* sp. is *R. (P.) corvina* (FUHRMANN, 1905). The measurements given by FUHRMANN (1905) are: 100 to 140 rostellar hooks, 16 to 18 µ in length; 26 testes cirrus pouch 100 by 40 µ. FUHRMANN reports his species from *Corvus culminatus* SYK. from Siam and *Corvus macrorhynchus* WAGL. from Ceylon.

To date there are thirteen species of this sub-genus reported from the Passeriformes (including the *Pycnonotus* spp.). There are three recorded from Australasia, *R. (P.) paradisea* (FUHRMANN, 1909) from *Manucodia chalybeata* (PENN.) from New Guinea has 100 rostellar hooks, 23 µ in length. There are 100 testes and the cirrus pouch is 100 µ long. *R. (P.) conopophilae* (JOHNSTON, 1911) from *Conopophila albigularis* (GOULD) and *R. (P.) sphecotheridis* (JOHNSTON, 1914) are both recorded from Australia. The former has hooks 18 µ long, 30 to 36 testes, and cirrus pouch 90 to 100 µ by 45 to 60 µ. The hooks of the latter are 15 to 20 µ in length. There are 30 testes and he cirrus pouch measures 100 µ by 40 µ. *R. (P.) compacta* (CLERC, 1906) is descibed from *Oriolus galbula* L. from the Urals. Three species are found in the Philippines, *R. (P.) coronea* TUBANGUI and MASILUGNAN, 1937 from *Corvus philippina* BONAPARTE has 200 hooks, 15,3 to 17,3 µ in length. The testes are 44 to 46 in number and the cirrus pouch measures 130 to 140 µ by 50 to 60 µ. *R. (P.) culiauana* TUBANGUI and MASILUGNAN, 1937, from *Oriolus macrorhynchus*

WAGL. has 300 hooks, 15 to 18 µ long. There are 30 to 33 testes and the dimensions of the cirrus pouch are 130 to 160 µ by 80 to 90 µ. The third species is *R. (P.) bulbularum* TUBANGUI and MASILUGNAN, 1937 from *Pycnonatus goiavier* SCOP. which has 120 to 130 hooks 20 to 23 µ long. There are 26 to 30 testes and the cirrus pouch measures 130 to 150 µ by 60 to 70 µ. Two species reported from India are *R. (P.) molpastina* MOGHE and INAMDAR, 1934 and *R. (P.) duosyntesticulata* MOGHE and INAMDAR, 1934 from *Molpastes haemorrhous* (GM.) and *Xantholaema haematocephala* (MÜLLER) respectively. The figures for the former are 180 hooks, 15 µ long, 19 testes and cirrus pouch 140 µ by 40 µ. For the latter the dimensions are 234 hooks, 17 µ long, 32 to 37 testes and cirrus pouch 96 µ by 47 µ. The figures for *R. (P.) reynaldsiae* and *R. (P.) corvina* from Rangoon and Ceylon respectively have already been given. Another form from a *Pycnonotus* is *R. (P.) pycnonoti* YAMAGUTI and MITUNAGA, 1943 from *P. sinensis formosa* HARTERT, from Formosa. There are 105 to 115 hooks, 15 to 22 µ in length. The testes number 14 to 30 and the cirrus pouch measures 90 to 150 µ by 60 to 75 µ. The only African form so far reported is *R. (P.) perreti* n. sp. (see p. 165).

It was not found possible to make a key to these species of *Raillietina (Paroniella)* from Passeriformes. The characters on which such a key may be based are number and size of rostellar hooks, number of testes and size of the cirrus pouch. The species fall into groups in which the various dimensions closely overlap. As one might expect *R. (P.) paradisea*, a parasite of birds with a very localised distribution, stands out from the rest, but even so only in one character, i.e. the large number of testes (100). The hook lengths of all the species intergrade between 11 and 25 µ, with the exception of *R. (P.) perreti* n. sp. in which the hooks are 8 to 9 µ long, a not very large difference. Taking the number of testes as a character, *R. (P.) paradisea* stands out, as already mentioned. The number of testes for all the rest intergrade between 14 and 30, except for *R. (P.) coronea*, which has 44 to 46. With regard to the number of hooks, (not given for *R. (P.) conopophilae* and *R. (P.) sphecotheridis*) the three species *R. (P.) pycnonoti*, *R. (P.) bulbularum* and *R. (P.) molpastina* form a group with 100 to 180 hooks. They also have similar lengths of cirrus pouch, i.e. 90 to 150 µ, 130 to 150 µ, and 140 µ respectively. *R. (P.) duosyntesticulata* and *R. (P.) reynoldsiae* have 234 to 250 hooks and a similar number of testes. The cirrus pouch of the former is rather smaller. *R. (P.) culiauana* and *R. (P.) compacta* have 300 and 400 hooks respectively. The former has a slightly larger number of testes; the length of the cirrus pouch of the latter is not given.

On analysing the dimensions given for these worms, one had the impression of overlapping and composite species. These questions cannot, however, be tackled until abundant material, allowing of a thorough study of the individual variation, is available.

IDIOGENINAE FUHRMANN, 1907.

22. **Idiogenes flagellum** (GOEZE, 1782) (fig. 9, 17).

Host: *Milvus migrans tenebrosus* GRANT and PRAED
(Aquilidae = Accipitridae): . . . . . Gabu, Nioka (22022, 22025, 28377); VER EYKEN, 4-II-1948.

Two entire specimens and several fragments of this worm were present. *Choanotaenia polyorchis* (KLAPTOCZ, 1908) was also found in host no. 28377.

The longest worm measures 20 mm. in length, and has a maximum breadth of 0,52 mm. The heads were mounted in Berlese and the other preparations in Canada balsam. The scolex, diameter 252 µ, is provided with four suckers, each armed with small spines arranged in several rows around its border. The rostellum is armed with typical davaineid, hammer-shaped hooks arranged in a double crown. The base of the rostellum is seen to be covered with minute spines. The diameter of the suckers is 54 to 58 µ, and that of the rostellum 144 µ. The rostellar hooks are 160 in number and measure 9 to 12,5 µ in length.

The anatomy is typical of *Idiogenes*, as shown in fig. 17. There are 10 to 14 testes situated posteriorly in the segment. The large cirrus pouch measures 376 to 440 µ in length and 120 µ at its maximum width. The vagina (fig. 9)* is long with a rather narrow lumen, and is provided with small setae along its length. The distal portion of the vagina is wavy, the proximal part becoming convoluted before entering the seminal receptacle.

(*) The figures 9-16 are all drawn to the same scale.

Species	*Idiogenes otidis* KRABBE, 1867		*Idiogenes nana* FUHRM., 1925		*Idiogenes kolbei* ORTLEPP, 1938		*Idiogenes kori* ORTLEPP, 1938		*I. grandiporus* CHOLODKOWSKY, 1905
	ZSCHOKKE, 1885-86 (a.)	(b.)	FUHRMANN. 1925 (a.)	(b.)	ORTLEPP, 1938 (a.)	(b.)	ORTLEPP, 1938 (a.)	(b.)	CHOLODKOWSKY, 1906 (a.)
Length	25 mm.	28 mm.	7 mm.	6 mm.	32 mm.	13 mm.	60 mm.	40 mm.	70 mm.
Breadth	0,3 mm.	1 mm.	—	0,44 mm.	0,54 mm.	1 mm.	0,72 mm.	0,97 mm.	1 mm.
Scolex	—	—	120-130 μ	—	220-270 μ	—	240-300 μ	—	380-450 μ
Suckers	—	—	36-45 μ	—	60-78 μ	—	90-102 μ	—	180-200 μ
Rostellum	—	—	36 μ	—	120-160 μ	—	174-210 μ	—	—
Hook no.	—	—	75-80	—	120-140	—	44-50	—	104
Hook length.	—	—	7,2-9 μ	—	12-16 μ	—	36-48 μ	—	28-34 μ
Testes	10-15	15-20	9-12	10-12	6-8	4-6	12-15	10-15	24 (from drawing)
Cirrus pch.	250-330 × 50-85 μ	370-496 × 100-120 μ	—	256-336 × 96-104 μ	190-210 × 66 μ	180-234 × 43-47 μ	270-300 × 70-78 μ	360-450 × 88-96 μ	250-330 × 51-85 μ (from CLAUSEN)
Host	*Otis tarda* L.	*Otis* sp.	*Choriotis arabs* (L.)	*Choriotis arabs* (L.)	*Choriotis kori* (BURCH.)	*Lophotis ruficrista gindiana* (OUST.)	*Choriotis kori* (BURCH.)	*Otis* sp.	*Tetrax tetrax* (L.)
Locality	Europe	Angola	Algeria	Algeria	Transvaal	Abyssinia	Transvaal	Angola	Russia

For explanation of abbreviations see p. 147.

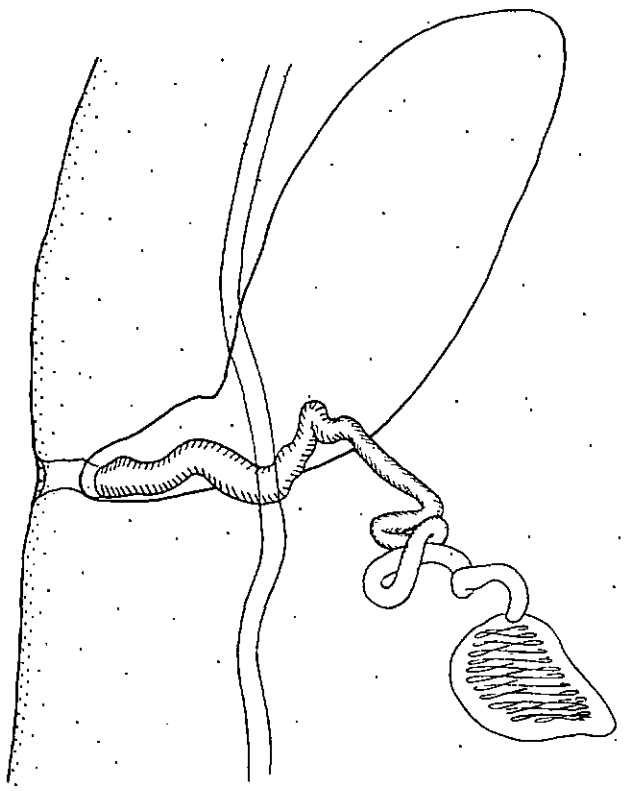


Fig. 9. — *Idiogenes flagellum* (GOEZE) from *Milvus migrans tenebrosos* GRANT and PRAED; ventral view of vagina.

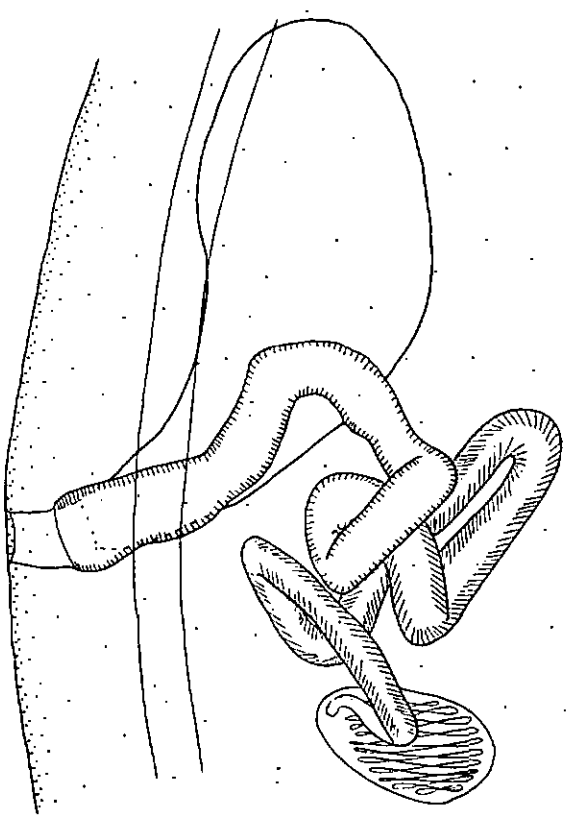


Fig. 12. — *Idiogenes bucorvi* JOYEUX, BAER and MARTIN from *Bucorvus abyssinicus* (BOD.); ventral view of vagina.

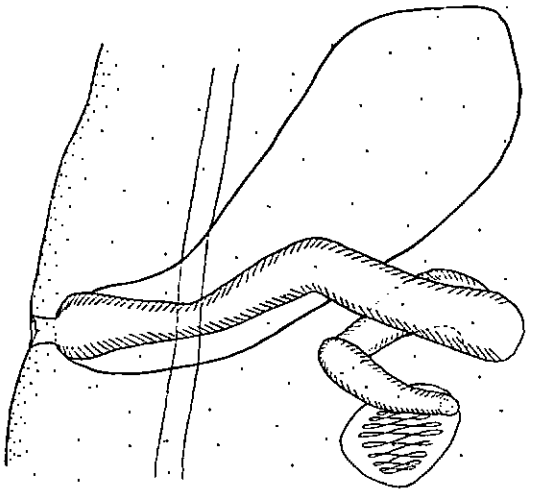


Fig. 10. — *Idiogenes nana* FUHRM. from *Choriotis arabs* (L.); ventral view of vagina.

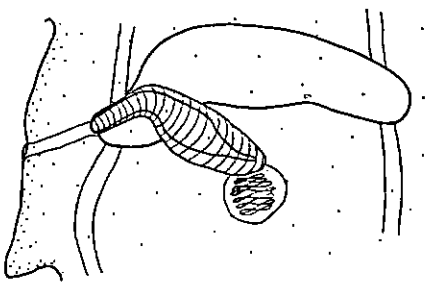


Fig. 13. — *Idiogenes kolbei* ORTLEPP from *Lophotis ruficrista giudiana* (OUST.); ventral view of vagina.

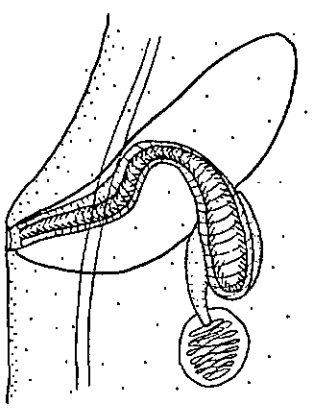


Fig. 11. — *Idiogenes horridus* FUHRM. from *Cariama cristata* (L.); ventral view of vagina.

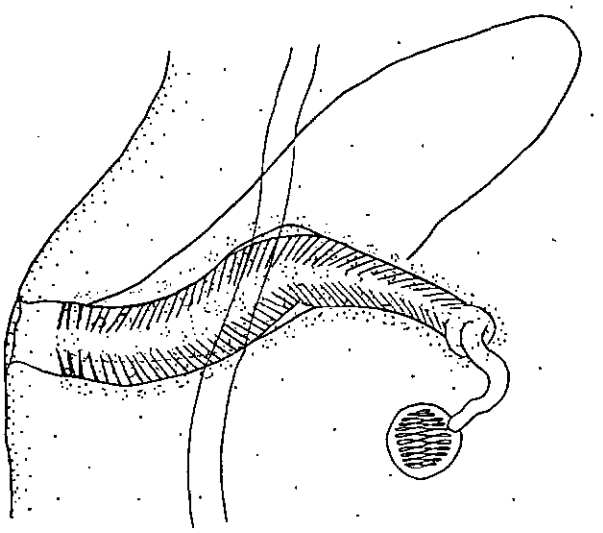


Fig. 14. — *Idiogenes kori* ORTLEPP from *Otis* sp.; ventral view of vagina.

The ripe segments show the typical horse-shoe-shaped uterus, but in none was the paruterine organ filled with eggs.

On reading the literature with a view to identifying *Idiogenes flagellum*, the differences between the species did not stand out clearly. In order to clarify the characters of specific value in the genus *Idiogenes* KRABBE, 1869 it was decided to compare certain measurements given for the various species. The species of a single host group were first compared in order that differences in physiology and host specificy should not enter into consideration. The host group from which the most species of *Idiogenes* is reported is the Otidiformes. The following species are described:

I. otidis KRABBE, 1867.
I. grandiporus CHOLODKOWSKY, 1905.
I. kolbei ORTLEPP, 1938.
I. kori ORTLEPP, 1938.
I. nana FUHRMANN, 1925.

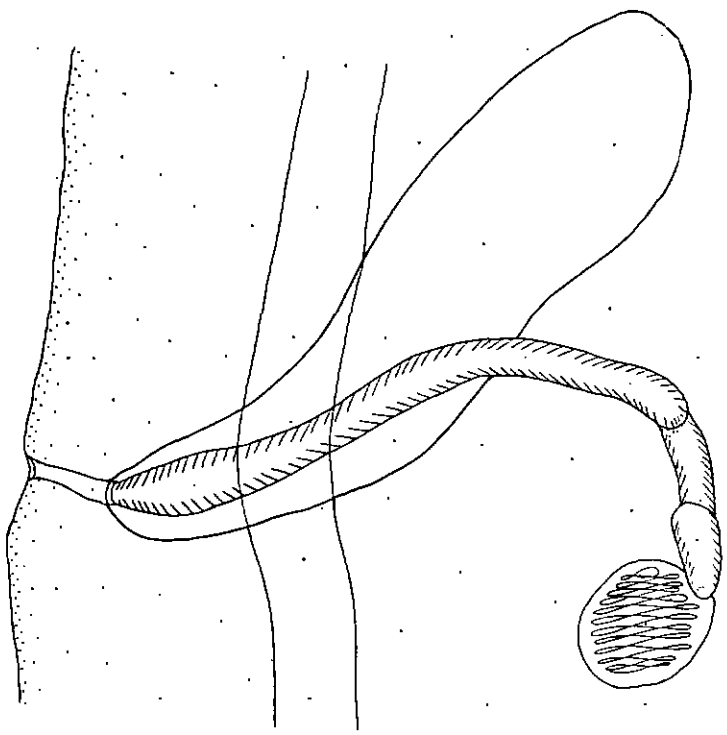


Fig. 15. — *Idiogenes pseudotidis* n. sp.
from *Eupodotis senegalensis* (VIEILL.); ventral view of vagina.

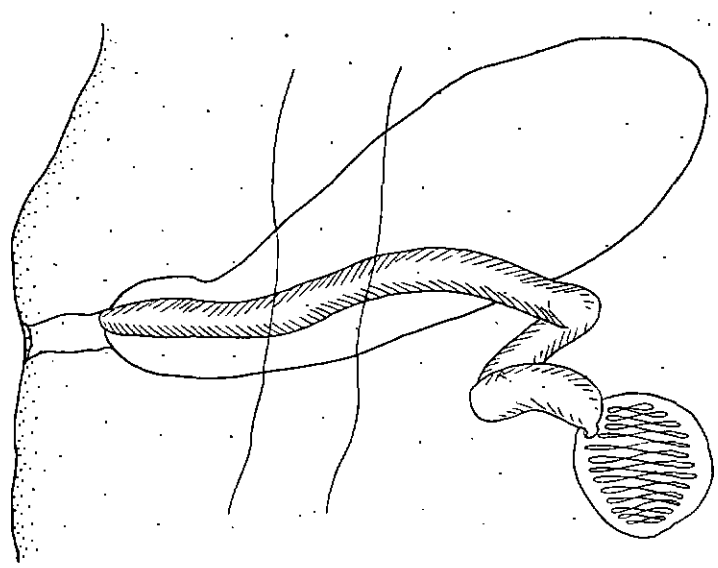


Fig. 16. — *Idiogenes otidis* KRABBE
from *Chlamydotis undulata* (JACQ.); ventral view of vagina.

I. otidis is the types species of the genus.

The characters chosen for comparison were the number and size of the hooks, the number of testes and the size of the cirrus pouch.

The first record of a scolex for *I. otidis* is that of JOYEUX, and BAER in JOYEUX, GENDRE and BAER (1928). However, for the reasons given later, it was decided not to include these measurements at this point. MEGGITT (1927) gives the measurements 24 to 26 µ for the length of the rostellar hooks of *I. otidis*, which he cites from KRABBE, (1869, p. 304). On referring to this paper, one finds that KRABBE gives this measurement for rostellar hooks which are 14 in number and which are arranged in a single crown. KRABBE's description refers to a *Hymenolepis villosa* (BLOCH. 1782) and not to an *Idiogenes* species, there being a confusion of nomenclature in KRABBE's paper, as remarked by JOYEUX and BAER (1928). Therefore these hook measurements are not given in the table.

The figures in colum (a) in the table below p. 169 are those taken from the original descriptions, except for *I. otidis*, which are recorded by ZSCHOKKE (1885-86).

An examination was made of the type material of *I. nana* and of subsequent collection material of *I. kolbei*, *I. kori* and *I. otidis*. The resulting measurements are given in the colum (b).

As seen from this table such characters as number of hooks, size of hooks, number of testes and size of cirrus pouch form a more or less continuous series, the terms of which may in some cases overlap.

It would seem then, that the value of these characters in a specific determination is not absolute, and that small variations in such characters are of specific value only when they confirm other differences.

It was then neccessary to see if there was any fixed character of specific importance, and one was led to the conclusion that the form of the vagina is characteristic for each species. The vagina has four variable properties; the extent of convolution, the degree of spininess, diameter and muscularity. Diagrams of the vagina of each species are given in figures 9-15.

The vagina of the remaining species of *Idiogenes* from other host groups was examined, viz. *I. flagellum* from Accipitriformes, *I. horridus* FUHRMANN, 1908 from Cariamiformes and *I. bucorvi* JOYEUX, BAER and MARTIN, 1936 from Bucerotiformes. In each species the form of the vagina is constant and characteristic, (figs. 9, 11, 12). The vagina can thus be used as a diagnostic feature.

The generic characters of *Idiogenes* are : scolex often replaced by pseudoscolex; uterus horse-shoe shaped; parnterine organ elongated; genital pores unilateral; cirrus pouch very large. A complete list of *Idiogenes* species, arranged according to host group is given below, and is followed by a description of each worm.

Accipitriformes.

I. buteonis SCHULTZ, 1939.
I. flagellum (GOEZE, 1782).
I. furtiva MEGGITT, 1933.
I. travassosi ORTLEPP, 1938.

Bucerotiformes.

I. bucorvi JOYEUX, BAER and MARTIN, 1936.

Cariamiformes.

I. horridus FUHRMANN, 1908.

Otidiformes.

I. otidis KRABBE, 1867.
I. grandiporus CHOLODKOWSKY, 1905.
I. kolbei ORTLEPP, 1938.
I. kori ORTLEPP, 1938.
I. nana FUHRMANN, 1925.

Accipitriformes.

To date, four *Idiogenes* species are recorded from this group; *I. flagellum, I. furtiva, I. travassosi* and *I. buteonis :*

Idiogenes flagellum GOEZE, 1782 (fig. 9, 17).

syn. *Taenia flagellum* GOEZE, 1782.
I. mastigophora KRABBE, 1879.
Davainia (Chapmania) longicirrosa FUHRMANN, 1906.
I. longicirrosa (FUHRMANN, 1906), KLAPTOCZ, 1908.
I. horridus (FUHR.) var. *africanus* HUNGERBÜHLER, 1910.

Full descriptions are given by FUHRMANN (1906) and HILMY (1936).

Species	*Idiogenes flagellum* (Goeze, 1782)						*Idiogenes travassosi* Ortlepp, 1938	*Idiogenes buteonis* Schultz, 1939
Measurements from	Fuhrmann, 1906	Hilmy, 1936	Vienna Mus. material	Congo material		Limits of variation	Ortlepp, 1938	Schultz, 1939
Length	20 mm.	41 mm.	—	20 mm.		20-100 mm.	50 mm.	100 mm.
Breadth	0,4 mm.	0,436 mm.	0,4 mm.	0,52 mm.		0,4-1 mm.	0,6 mm.	1 mm.
Scolex	100 µ	180 µ	--	252 µ	194-242 µ	100-252 µ	230 µ	150-200 µ
Suckers	--	--	--	54-58 µ	54 µ	35-60 µ	35-40 µ	40-60 µ
Rostellum	50 µ	82 µ	--	144 µ	101-119 µ	50-144 µ	100 µ	50-70 µ
No. hooks	150 (?)	186	--	160	140-160	150 (?)-186	160	160
Hook length.	10 µ	10 µ	--	9-12, 5 µ	8-12,6 µ	7-12,5 µ	9-11 µ	7-8 µ
Testes	10-12	8-16	10-11	10-14		8-20	15-20	12-18
Cirrus pch.	240 µ	--	320 × 96 µ	376-440 × 120 µ		240-700 × 73-116 µ	300 × 73 µ	520-700 × 112-116 µ
Host	*Milvus migrans* (Bodd.)	*M. migrans parasiticus* (Dand.)	*M. migrans govinda* Sykes	*Milvus migrans* (Bodd.) Host no. 28377	*Milvus migrans tenebrosus* Grand & Praed Host no. 22025		*Milvus migrans* (Bodd.)	*Buteo swainsoni* Bonaparte
Locality	Africa	Liberia		Belgian Congo			Transvaal	North America

For explanation of abbreviations see p. 147.

In the table below p. 173 are the measurements given by FUHRMANN and HILMY, together with those based on collection material from the Vienna Museum and the material from the Belgian Congo.

The scolex is armed with a double crown of davaineid, hammer- shaped hooks. The suckers are armed with minute spines.

The anatomy of a mature segment is seen in fig. 17. As seen from the table the number of testes and the size of the cirrus pouch is variable. The vagina (fig. 9) is long and of a rather narrow lumen. The distal part is wavy and provided with setae. The proximal portion is convoluted before passing into the seminal receptacle. In no segments is the paruterine organ seen filled with eggs.

ORTLEPP (1938) describes a new species, *I. travassosi* from *Milvus migrans* (BODD.) from the Transvaal. His measurements are given below.

These figures agree with those for *I. flagellum*, except for the slightly larger number of testes in ORTLEPP's material which, as will be shown later, is hardly of specific importance. In the discussion of the affinities of his new species, ORTLEPP (1938, p. 357) says, « It differs from GOEZE's species in that the latter is much smaller (2 cm.) and has only 10 to 13 testes, and in addition also has chalk bodies. ». HILMY's specimens, however, attain a length of 41 mm., and the absence of chalk bodies is not a character of specific importance.

Writing of *I. horridus* (FUHR.) var. *africanus* HUNGERBÜHLER, ORTLEPP (1938, p. 357) says, « Unfortunately a description of this African variety is not available, but the writer's materials differ from FUHRMANN's species in that the latter has only 7 to 9 testes. » We agree with HILMY (1936) that *I. horridus* var. *africanus* is a synonym of *I. flagellum*, and would point out that *I. horridus* FUHRMANN, 1908 is a parasite from the bird group Cariamiformes.

In view if the above remarks, we consider that *I. travassosi* ORTLEPP, 1938 must be regarded as a synonym of *I. flagellum* (GOEZE, 1782).

SCHULTZ (1939) describes a new species, *I. buteonis* from the hawk *Buteo swainsoni* BONAPARTE from North America. As SCHULTZ remarks, the only other representative of the genus *Idiogenes* reported from the New World is *I. horridus* FUHRMANN, 1908 from *Cariama cristata* (LINN.) from Brazil. His measurements are given in the folded table I.

As can be seen from this table, the differences lie in the smaller hooks and the larger cirrus pouch of *I. buteonis*.

In his discussion, SCHULTZ enumerates the species of the genus *Idiogenes*. He says (1939, p. 451), « of these, *I. flagellum* and *I. furtiva* were taken from hawks and *I. horridus africanus* from a « Raubvogel ». The other species were taken from nonraptorial birds. » He then goes on to discuss the differences between his new species and *I. bucorvi* — a form from an African Bucerotiform — which he considers to be the nearest relative of the new species, and does not discuss further the relations with these other examples of *Idiogenes* from the same host group.

We realise that the *Idiogenes* sp. so far reported from the Accipitriformes are all African forms. If, however, one bears in mind the distribution of bird genus *Buteo* — found in North, South and Central America, Europe, Asia and Africa — a close affinity between the parasites of an American and an African *Buteo* would be expected. A comparison of the measurements given in the tables would indicate that such an affinity exists between *I. flagellum* and *I. buteonis*.

There is no apparent marked anatomical difference between *I. buteonis* and *I. flagellum*. As seen from the table, there is a difference in the size of hooks and in the size of the cirrus pouch; *I. flagellum* is from Africa, while *I. buteonis* is from America. Bearing in mind the remarks about the value of such differences in a specific determination, we feel that such differences do not justify the separation of the two worms as distinct species. Moreover, the form of the vagina in *I. buteonis*, as seen from SCHULTZ's drawing (1939, p. 449, fig. 1), is typical of *I. flagellum*. We propose, therefore, that *Idiogenes buteonis* SCHULTZ, 1939 become a synonym of *Idiogenes flagellum* (GOEZE, 1782).

SCHULTZ (1939, p. 451) also says, « *I. buteonis* is apparently the first species of this genus described as having armed suckers. » HILMY (1936) describes his specimen of *I. flagellum* as having suckers armed with about six rows of very minute spines. He mentions that KLAPTOCZ (1908) notes the presence of spines on the suckers of *I. flagellum*.

ORTLEPP (1938), in his description of *I. travassosi*, records that, although most of the sucker hooks have been lost, sufficient remain to be able to say that they are arranged in from 6 to 8 rows.

HILMY suggests that the suckers of *I. flagellum* are armed in distinction to the species reported from other groups of birds. This hypothesis would seem to be borne out by the fact that *I. grandiporus*, *I. kolbei*, *I. kori* and *I. nana* are all stated to be unarmed; *I. bucorvi* has no scolex; in the description of *I. horridus* the presence or absence of spines is not mentioned, but the examination of the type material did not reveal any.

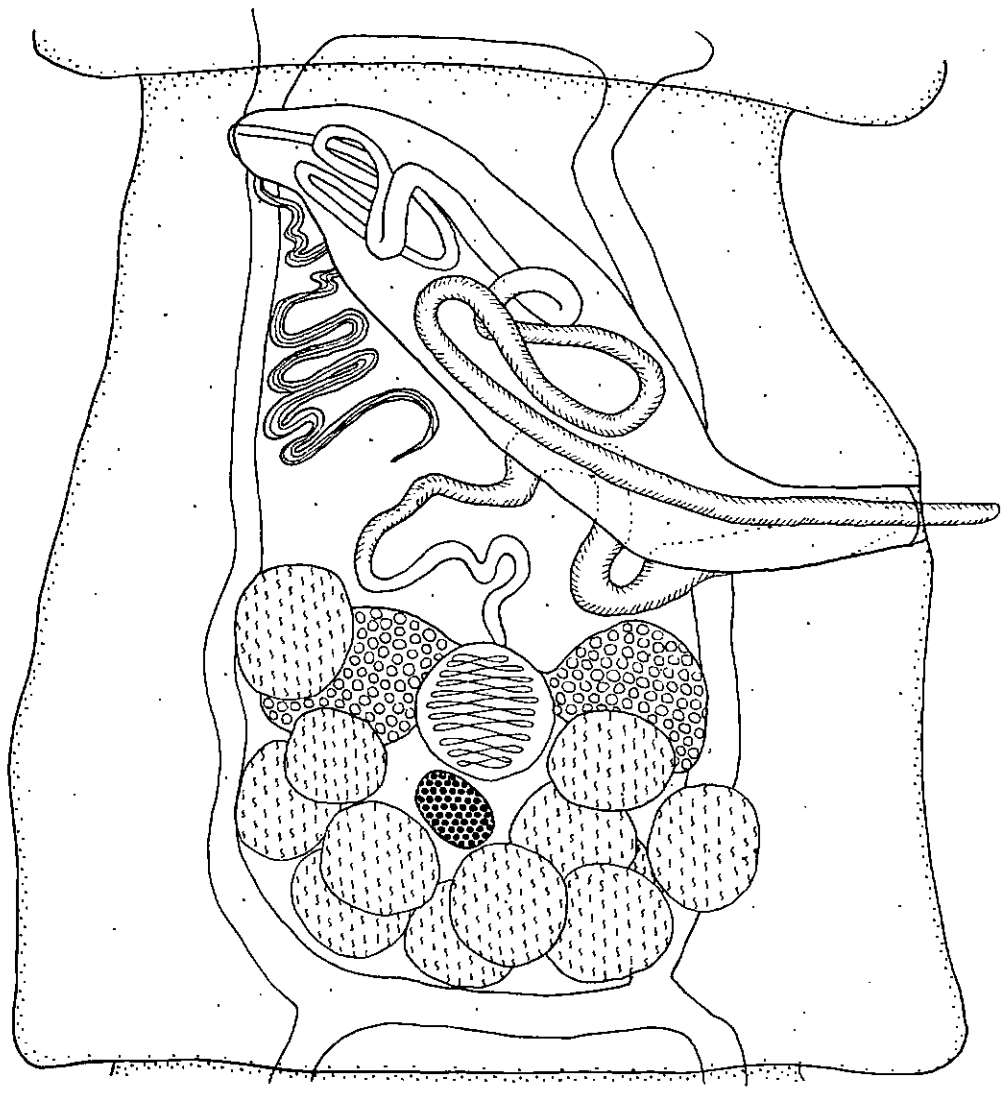


Fig. 17. — *Idiogenes flagellum* (GOEZE) from *Milvus migrans tenebrosus* GRANT and PRAED; dorsal view of whole mount of mature segment.

The table below p. 173 shows the limits of variation for the characters of *I. flagellum*, these limits including all the dimensions from the descriptions mentioned above.

I. flagellum has been reported from the following hosts and localities:-

Hosts:	Locality:	Author:
Milvus migrans (BODD.)	Africa	FUHRMANN (1906); ORTLEPP (1938)
« Raubvogel »	South Africa	HUNGERBÜHLER (1910)
Milvus milvus (L.); *Milvus lineatus* (GRAY); *M. migrans govinda* SYKES; *Circus cinereus* VIEILL.	Europe; Asia	SKRJABIN (1914)
Milvus migrans parasiticus (DAUD.)	Africa	HILMY (1936)
Buteo swainsoni BONAPARTE	N. America	SCHULTZ (1939)
Milvus migrans tenebrosus GRANT and PRAED.	Belgian Congo	Host no. 22022, 22025, 28377.

Idiogenes furtiva MEGGITT 1933.

MEGGITT (1933) describes a new species *I. furtiva* from *Falco peregrinus peregrinus* TUNSTALL (Accipitritormes-Falconidae), from the Zoological Gardens, Calcutta. He writes that the description is based on a few fragments of strohila and that the scolex is absent; that the genital pores are irregularly alternating; that the cirrus pouch extends past the excretory vessels one-third across the proglottis, and that the egg capsules are not fully developed. He gives diagrams of a mature proglottis and a gravid one.

The characters cited above from MEGGITT's description do not correspond with those of the genus *Idiogenes*, in which the genital pores are unilateral, the cirrus pouch large — stretching right across the segment — and in which the uterus is persistant and horse-shoe shaped, emptying into a paruterine organ without the formation of egg capsules. The mature proglottis drawn by MEGGITT might he a macerated *Choanotaenia*, hut the gravid segment, if indeed it belongs to the same worm, apparently contains a paruterine organ, which would exclude it from the genus *Choanotaenia*. All that can he said is that MEGGITT's species does not fall within the genus *Idiogenes* and that it should he left as sp. inquir.

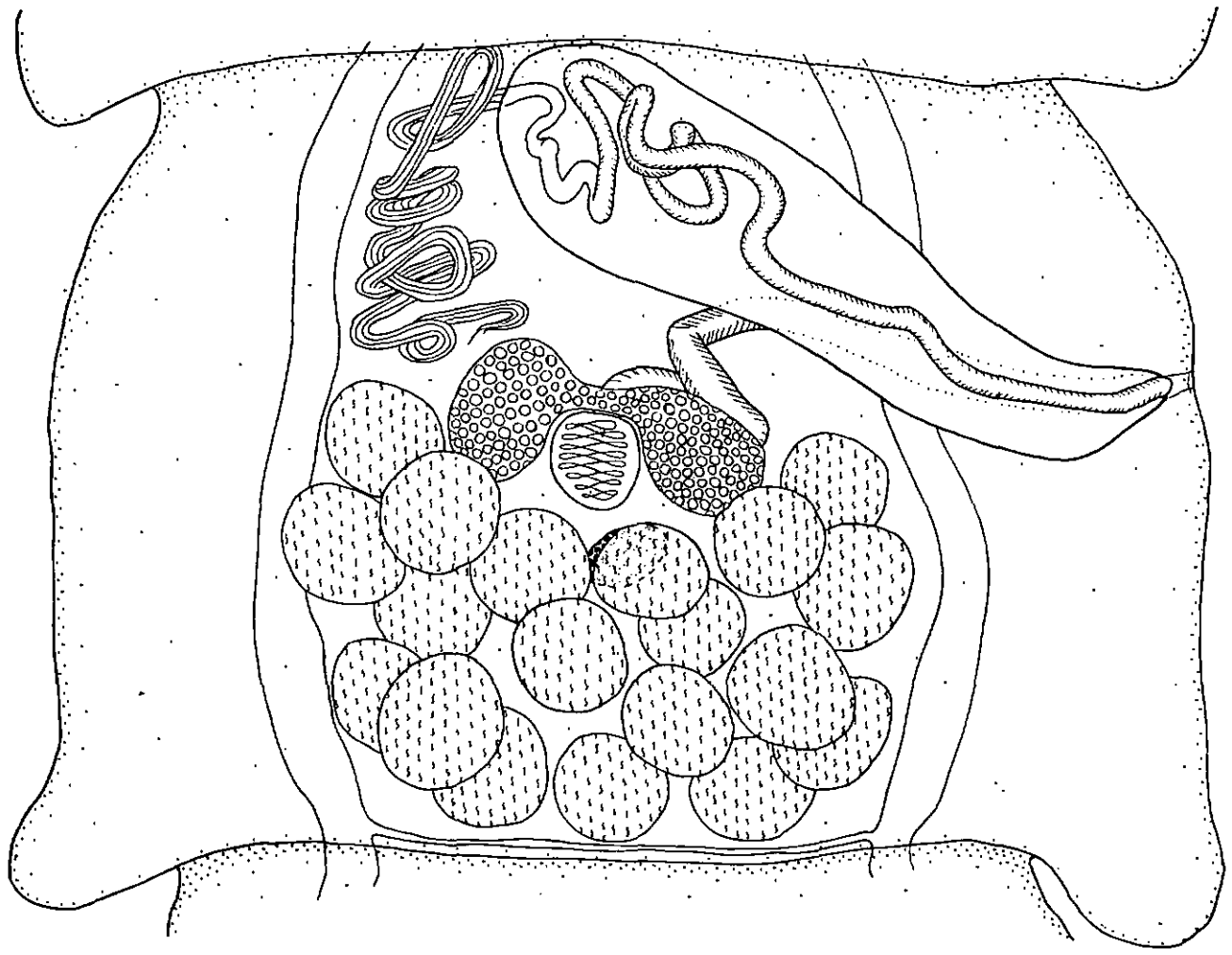


Fig. 18. — *Idiogenes otidis* KRABBE from *Chlamydotis undulata* JACQ.: dorsal view of whole mount of mature segment.

Thus the only representative of the genus in Accipitriformes is *Idiogenes flagellum* (GOEZE, 1782), with the following synonyms:-

Taenia flagellum, GOEZE, 1782.
Idiogenes mastigophora KRABBE, 1879.
Davainea (*Chapmania*) *longicirrosa* FUHRMANN, 1906.
I. longicirrosa KLAPTOCZ, 1908.
I. horridus (FUHR.) var. *africanus* HUNGERBÜHLER, 1910.
I. travassosi ORTLEPP, 1938.
I. buteonis SCHULTZ, 1939.

Otidiformes.

To date, five species of *Idiogenes* have been described from this group of birds; *I. otidis*, *I. grandiporus*, *I. kolbei*, *I. kori* and *I. nana*.

The type material of *I. grandiporus* and *I. nana*, together with collection material of *I. otidis*, *I. kolbei* and *I. kori* were examined; also a worm, the head of which was described by JOYEUX and BAER *in* JOYEUX, GENDRE and BAER (1928) as the scolex of *I. otidis*.

It is interesting to note that in the collection material there was frequently a mixture of *I. otidis*, *I. kori* and a third species not yet described. The anatomy of the worm used by JOYEUX and BAER for their description of the scolex, corresponds with that of this new species. As a result, there exists no description of the scolex of *I. otidis* at present.

Idiogenes otidis KRABBE, 1867 (fig. 16, 18).

A full description of this worm is given by ZSCHOKKE (1885-86) and by CLAUSEN (1914).

Collection material was examined; the measurements, together with those of ZSCHOKKE and CLAUSEN are given in the folded table 1. The last column shows the limiting figures for each character.

So far, only pseudoscoleces are known for *I. otidis*. The anatomy of a mature proglottis is shown in fig. 18. The testes, situated posteriorly, vary somewhat in number, as does also the size of the cirrus pouch. The vagina (fig. 16) has a straight, distal portion which passes just posterior to the cirrus pouch; the proximal part has a characteristic double loop before entering the seminal receptacle.

The gravid segments contain the horse-shoe shaped uterus, and although the collection material possessed no segments sufficiently gravid, both ZSCHOKKE and CLAUSEN have seen the eggs pass from the uterus into the paruterine organ.

The hosts and localities from which *I. otidis* has so far been recorded are:

Otis tarda L.	Europe	ZSCHOKKE (1885-86).
Tetrax tetrax L.	Europe	SKRJABIN (1914).
Chlamydotis undulata (JACQ.)	North Africa	SKRJABIN (1914).

Idiogenes kori ORTLEPP, 1938 (fig. 14, 19).

This species was described by ORTLEPP (1938) from *Choriotis kori* (BURCH.) from the Transvaal. The folded table 1 is a table of his measurements and those made on collection material. The last column gives the limiting figures for each character.

It should be pointed out that ORTLEPP bases his description on worms possessing pseudoscoleces, and he tentatively refers six small, strobila-carrying scoleces to *I. kori*, and it is the measurements from these that are given in the table. These scoleces are provided with a rostellum armed with a double crown of hooks; the shapes of the hooks from the anterior and posterior crowns are somewhat different. The base of the rostellum is covered with minute spines; the suckers are unarmed. No scoleces were present in the collection material.

The anatomy of a mature segment is shown in fig. 19. The vagina (fig. 14) is wide, straight and heavily lined with seta which readily take up the stain. ORTLEPP records that in no segments were any eggs seen inside the paruterine organ. Neither were any seen in the collection material.

The hosts so far reported for *I. kori* are:

Choriotis kori (BURCH.)	Transvaal	ORTLEPP (1938)
Lophotis ruficrista gindiana (OUST.)	Abyssinia	Collection material.
Otis sp.	Angola	Collection material.

Idiogenes pseudotidis n. sp (figs. 15, 20, 21).

Syn.: *I. otidis* JOYEUX et BAER, 1928 *nec* KRABBE, 1867.

This species was present in collection material from *Otis sp.* from Angola and from *Eupodotis senegalensis* (VIEILL.) from West Africa.

The description is based on one entire specimen from *Eupodotis senegalensis* (VIEILL.) and on fragments of strobila from the other collection material. It should be noted that this entire specimen is the one which was used by JOYEUX and BAER (1928) for their description of the head of *I. otidis*.

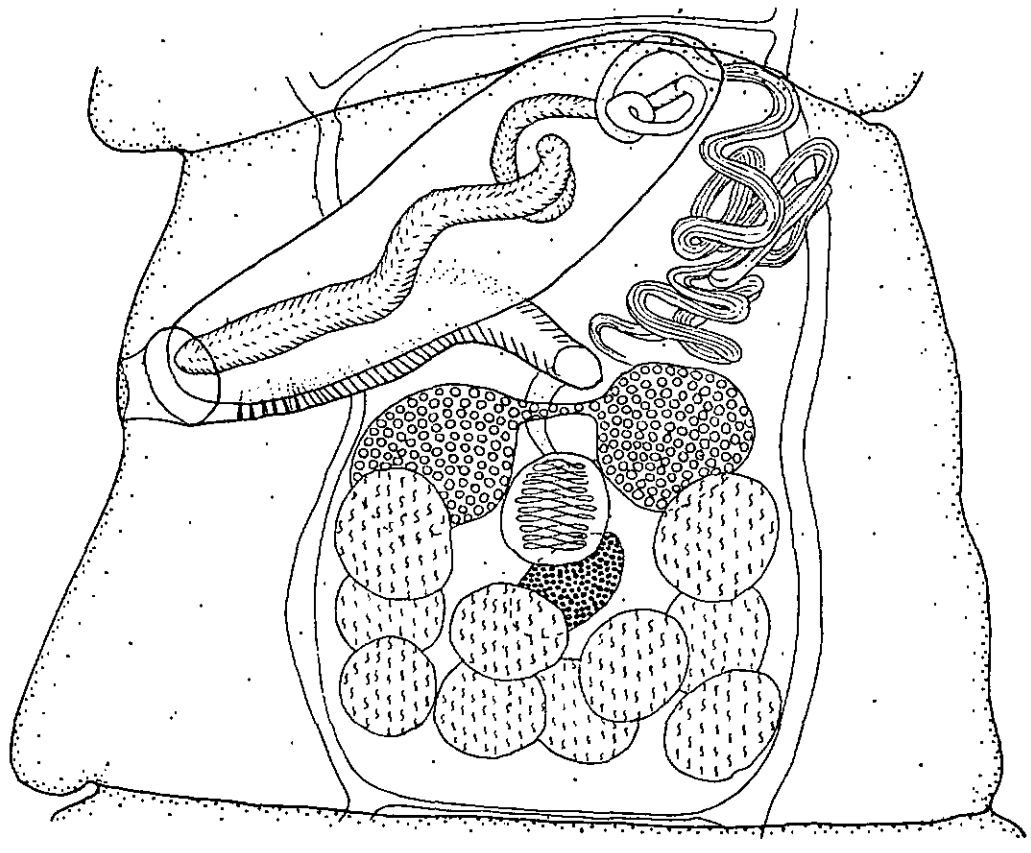


Fig. 19. — *Idiogenes kori* ORTLEPP from *Otis* sp.; dorsal view of whole mount of mature segment.

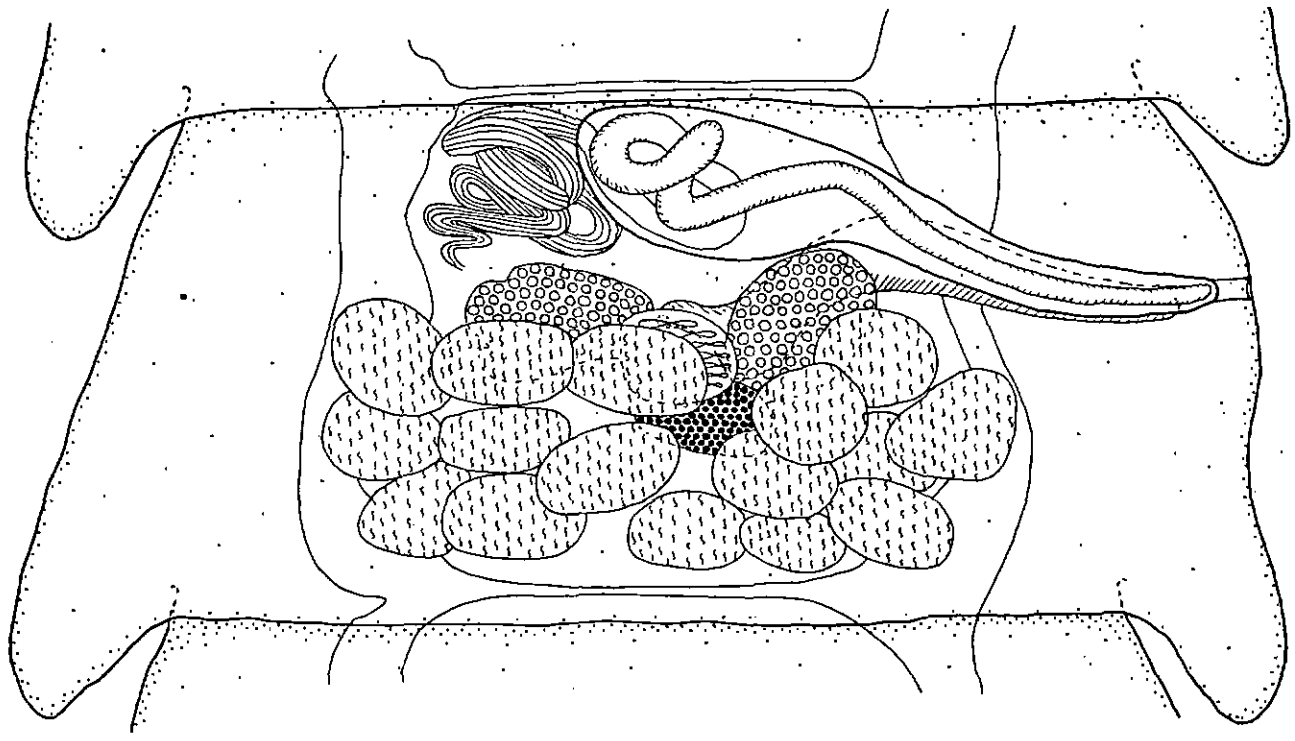


Fig. 20. — *Idiogenes pseudotidis* n. sp. from *Eupodotis senegalensis* (VIEILL.); dorsal view of whole mount of mature segment.

The scolex, mounted in Canada balsam, has a diameter of 130 μ and is provided with four, unarmed suckers, 47 to 50 μ wide. The rostellum, diameter 54 μ, is armed with a double crown of hooks, 50 in number and of the typical hammer shape. They measure 12 to 13 μ in length. It is realised that these measurements do not correspond with those given by JOYEUX and BAER (1928), but they were carefully checked on the material that served for their description.

The anatomy, as seen in whole mounts, is typical of *Idiogenes,* as shown in fig. 20. There are 15 to 20 testes, situated posteriorly. The vas deferens is highly convoluted before entering the cirrus pouch. No external seminal vesicle is present. The cirrus pouch, which measures 400 to 480 μ by 80 to 120 μ, is large and extends right across the segment almost to the excretory canals on the poral side. The cirrus is highly coiled and armed with small spines. There is no internal seminal vesicle.

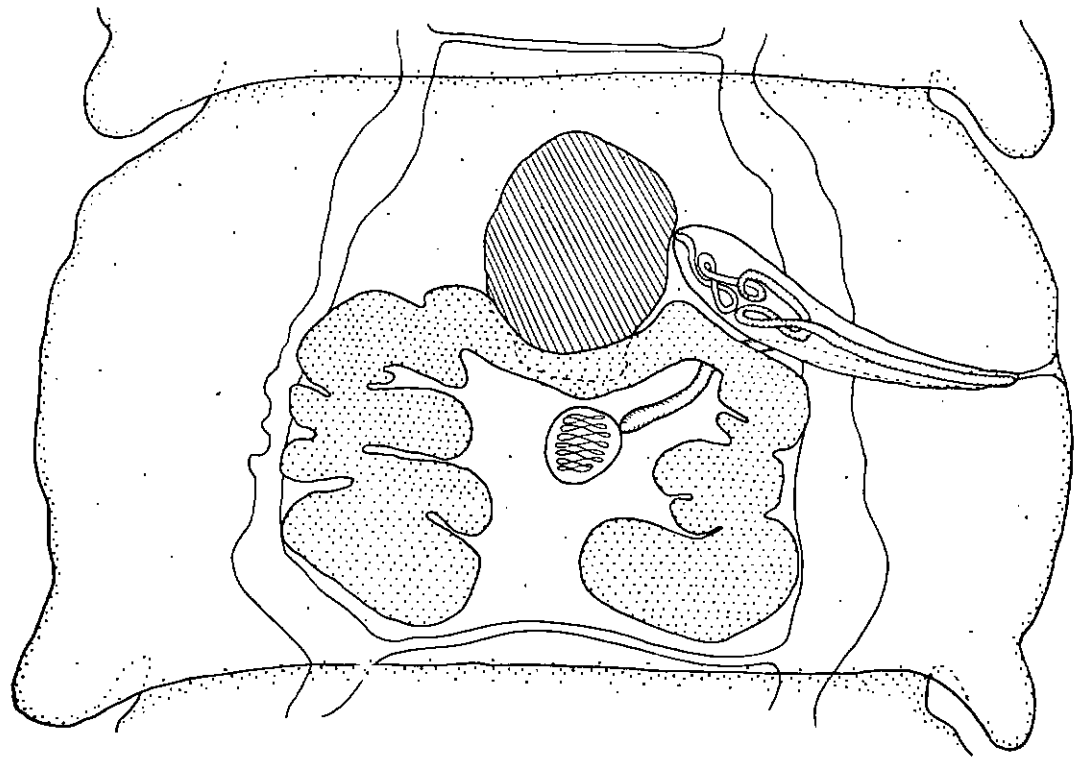


Fig. 21. — *Idiogenes pseudotidis* n. sp. from *Eupodotis senegalensis* (VIEILL.); dorsal view of whole mount of gravid segment.

The genital pores are unilateral; the genital atrium is small.

The vagina (fig. 15) is intermediate in form between that of *I. otidis* and *I. kori.* It is straight, except for a short portion that bends backwards in order to enter the receptaculum seminis. The lumen is narrower than in *I. kori,* and it is less heavily spined.

The seminal receptacle varies somewhat in size, and is placed almost centrally in the segment. The ovary is bilobed, and just posterior to it is the compact, rather small vitelline gland.

The uterus appears just anterior to the ovary and sends out two lobes, one on either side, to form the characteristic horse-shoe shaped organ. The uterus is slightly lobed. The paruterine organ appears as a solid mass of tissue in front of the uterus (fig. 21). As it increases in size it displaces the cirrus pouch towards the poral side of the segment. In no segments were there seen to be eggs in the paruterine organ.

I. pseudotidis shows obvious affinities with *I. otidis* and *I. kori,* and often occurs with these two in the same host. The distinguishing feature is the form of the vagina. The scolex, when compared with those attributed to *I. kori,* shows a marked difference in the size of the hooks, i.e. 12 to 13 μ for *I. pseudotidis* as against 36 to 48 μ for *I. kori.*

The folded table I gives the measurements for *I. otidis, I. kori* and *I. pseudotidis.*

Idiogenes nana FUHRMANN, 1925 (figs. 10, 22).
Syn.: *I. otidis* var. *nana* FUHRMANN 1925.

This species was first described by FUHRMANN (1925) from *Choriotis arabs* (L.) from Algeria. FUHRMANN considered his specimens to belong to a variety of *I. otidis* because of the smaller total length, the smaller number of segments and the smaller number of testes, as compared with *I. otidis* described by ZSCHOKKE (1885-86) and CLAUSEN (1914). He suggests that these differences were perhaps due to the specimens coming not from the normal host *Otis tarda* L., but from *Choriotis arabs* (L.).

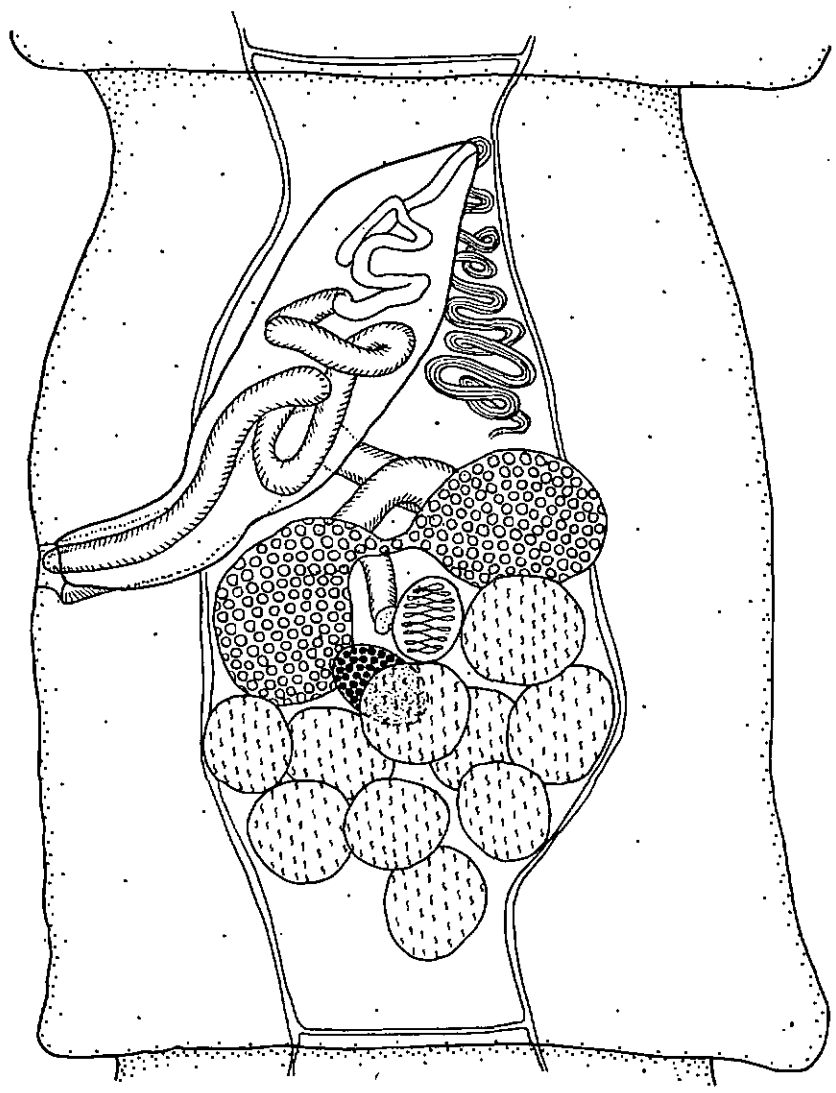


Fig. 22. — *Idiogenes nana* FUHRM. from *Choriotis arabs* (L.); dorsal view of whole mount of mature segment.

JOYEUX and BAER (1928) raised FUHRMANN's variety to the rank of species, having as they thought, found the scolex of *I. otidis*, the measurements of which did not correspond with those of *I. nana*. MEGGITT (1927) also considered *I. nana* as a distinct species on comparing the size of the rostellar hooks, 7,2 to 9 µ for *I. nana* as against 24 to 26 µ for *I. otidis*, given by KRABBE (1869). But, as already mentioned, the figure given by KRABBE refers to an *Hymenolepis* and not to *I. otidis*.

The type material of *I. nana* was examined. This material is in fact considered to be a distinct species, because of the form of the vagina (fig. 10) and the differences in measurements. The table p. 169 shows the measurements of *I. nana*, taken form the original description, and those of *I. otidis*.

The anatomy of *I. nana* is seen in fig. 22.

The hosts so far recorded for *I. nana* are:-

Choriotis arabs (L.)	Algeria	FUHRMANN (1925)
Chlamydotis undulata (JACQ.)	Egypt	MEGGITT (1927)

Species :	*Idiogenes otidis* Krabbe, 1867.				*I. pseudotidis* n. sp.	*I. nana* Fuhrm., 1925	*Idiogenes kori* Ortlepp, 1938.			*I. grandiporus* Cholodkowsky, 1906	*Idiogenes kolbei* Ortlepp, 1938			*I. horridus* Fuhrm. 1908	*I. bucorvi* Joyeux, Martin and Baer, 1936
Described by :	Zschokke, 1885-86	Clausen, 1914	Collection material	Limits of variation	Collection material	Fuhrmann, 1925	Ortlepp, 1938.	Collection material	Limits of variation	Cholodkowsky, 1906	Ortlepp, 1938	Collection material	Limits of variation	Fuhrmann, 1908	Joyeux, Martin and Baer, 1936
Length	25 mm.	—	28 mm.	25-28 mm.	32 mm.	7 mm.	60 mm.	40 mm.	40-60 mm.	70 mm.	32 mm.	13 mm.	13-32 mm.	30 mm.	23 mm.
Breadth	0,3 mm.	—	1 mm.	0,3-1 mm.	1 mm.	—	0,72 mm.	0,97 mm.	0,72-0,97 mm.	1 mm.	0,54 mm.	1 mm.	0,54-1 mm.	0,3 mm.	0,6 mm.
Scolex	—	Not yet described		—	130 µ	120-130 µ	240-300 µ	—	240-300 µ	380-450 µ	220-270 µ	—	220-270 µ	160 µ	—
Suckers	—	—	—	—	47-50 µ	36-45 µ	90-102 µ	—	90-102 µ	180-200 µ	60-78 µ	—	60-78 µ	—	—
Rostellum	—	—	—	—	54 µ	36 µ	174-210 µ	—	174-210 µ	—	120-160 µ	—	120-160 µ	70-80 µ	—
No. of hooks	—	—	—	—	50	75-80	44-50	—	44-50	104	120-140	—	120-140	160	—
Hook length.	—	—	—	—	12-13 µ	7,2-9 µ	36-48 µ	—	36-48 µ	28-30	12-16 µ	—	12-16 µ	10 µ	—
Testes	10-15	20	15-25	15-25	15-20	9-12	12-15	10-15	10-15	24-30	6-8	4-6	4-8	7-9	12
Cirrus pouch.	—	250-330 × 50-85 µ	370-496 × 100-120 µ	250-496 × 51-120 µ	400-480 × 80-120 µ	256-336 × 96-104 µ (personal measurements)	270-300 × 70-78 µ	360-450 × 88-96 µ	270-450 × 70-96 µ	250-330 × 51-85 µ	190-210 × 66 µ	180-234 × 43-47 µ	180-234 × 43-66 µ	200 µ	350 × 140 µ
Host	*Otis tarda* L.	—	*Otis sp.*		*Eupodotis senegalensis* (Vieill.) *Otis sp.*	*Choriotis arabs* (L.)	*Choriotis kori* (Burch.)	*Otis sp.*		*Tetrax tetrax* (L.)	*Choriotis kori* (Burch)	*Lophotis*		*Cariama cristata* (L.)	*Bucorvus abyssinicus* (Bod.)
Locality	Europe		Angola		Africa	Algeria	Transval	Angola		Turkestan	Transval	Abyssinia		South America	North Somaliland

For explanation of abbreviations see p. 147.

23. **Idiogenes kolbei** ORTLEPP 1938 (figs. 13, 23, 24).

Host: *Neotis cafra* (LICHT.) (Otididae) : Kanzi, Bas-Fleuve (21555-21564) Dr. E. DARTEVELLE, VII-1937.

This species was described by ORTLEPP (1938) from *Choriotis kori* (BURCH.) from the Transvaal.

Collection material from *Lophotis ruficrista gindiana* (OUST.) from Ethiopia and *Otis* sp. from Angola was examined, and the measurements together with those from ORTLEPP's original description, are given in the folded table I. The last column gives the limiting figures for each character.

I. kolbei has a very characteristic anatomy (fig. 23). The testes are large and few in number. The cirrus pouch is very large, and tends to bulge into the preceeding segment. The vagina (fig. 13) is not wavy, but after leaving the genital atrium, it curves through a right angle before entering the seminal receptacle. The

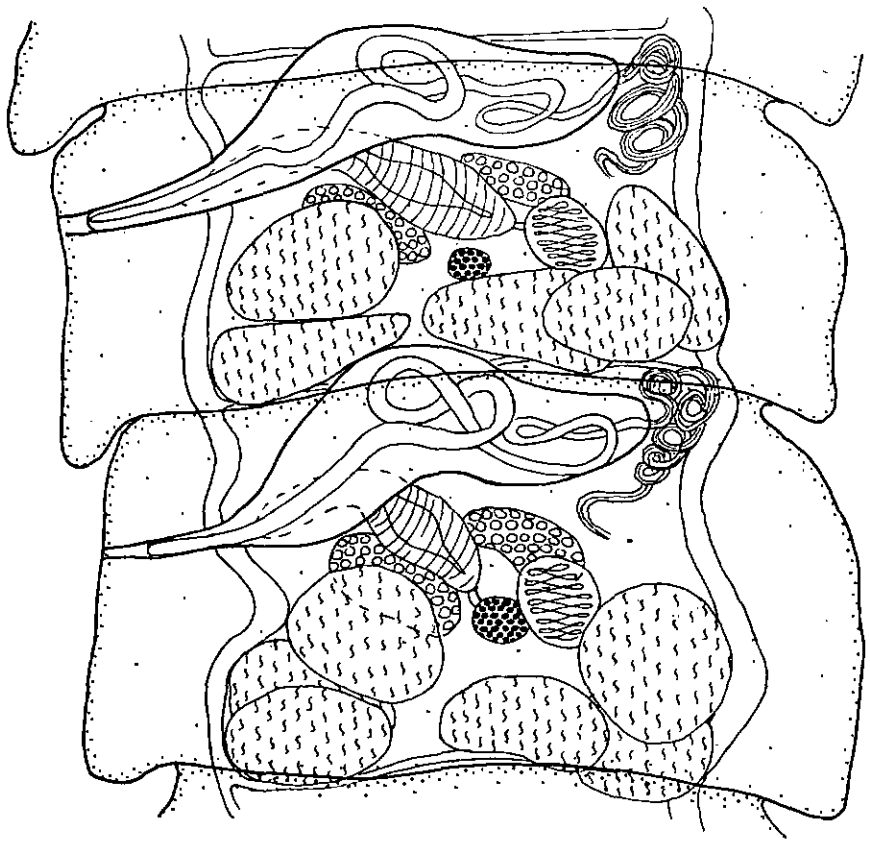


Fig. 23. — *Idiogenes kolbei* ORTLEPP from *Lophotis ruficrista gindiana* (OUST.): dorsal view of whole mount of mature segment.

distal portion is thin walled and lined with small setae. In some segments this part is seen to be dilated. The proximal portion has a thick, muscular wall, which continues up to the receptaculum seminis. In some segments this muscular part is contracted and forms an almost spherical vesicle. A gravid segment is seen in fig. 24.

The hosts recorded for *I. kolbei* are:-

Lophotis ruficrista gindiana (OUST.)	Ethiopia	FUHRMANN and BAER (1943).
Otis sp.	Angola	Collection material.
Choriotis kori (BURCH.)	Transvaal	ORTLEPP (1938).
Neotis cafra (LICHT.)	Belgian Congo	host no. 21555.

Idiogenes grandiporus CHOLODKOWSKY 1905.

This species was reported by CHOLODKOWSKY in 1905 from *Tetrax tetrax* (L.) from Russia and the next year was fully described by him. CLAUSEN (1924) redrescribed the type material. Both these authors emphasise the large size of the genital atrium, which they consider to be a distinguishing feature of the species. It was recorded by CLERC in 1906.

Longitudinal and transverse sections of the type material were examined, but from these it was difficult to make out the structure of the genital atrium.

We thought that what had been considered the genital atrium might in fact have been the large, spiny vagina of *I. kori*. The measurements of *I. grandiporus* and *I. kori* are given in the table p. 59.

As it was not possible to gain a clear idea of the structure of the vagina from the sections, we do not feel justified in considering *I. grandiporus* a synonym of *I. kori*.

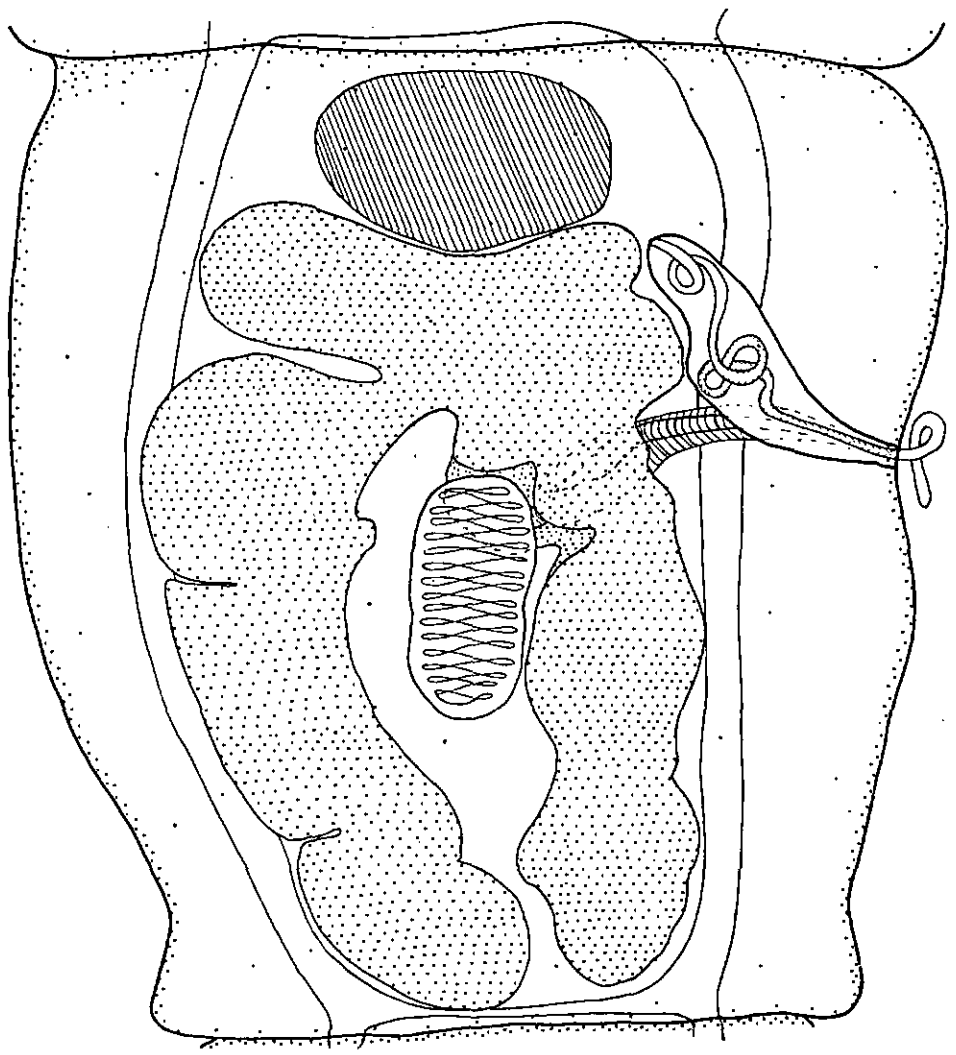


Fig. 24. — *Idiogenes kolbei* ORTLEPP from *Lophotis ruficrista gindiana* (OUST.); dorsal view of whole mount of gravid segment.

Cariamiformes.

Only one species of *Idiogenes* has been described from this group of birds.

Idiogenes horridus FUHRMANN, 1908 (figs. 11, 25).

This species was described from *Cariama cristata* (L.) from Brazil.

The type material was examined, and the measurements correspond with those of the type description, which are given in the folded table 1.

The anatomy of a mature segment is seen in fig. 25. The distal part of the vagina (fig. 11) is straight and lined with setae. Its lumen is narrow. The proximal portion is somewhat wider and curves backwards. Before entering the seminal receptacle, the vagina describes a single loop.

The only host reported is that in the original description.

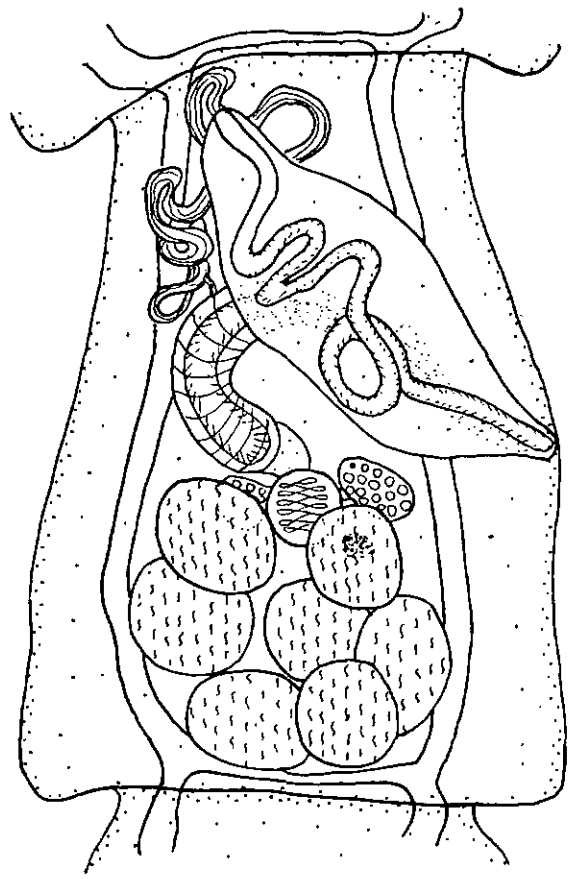


Fig. 25. — *Idiogenes horridus* FUHRM. from *Cariama cristata* (L.): dorsal view of whole mount of mature segment.

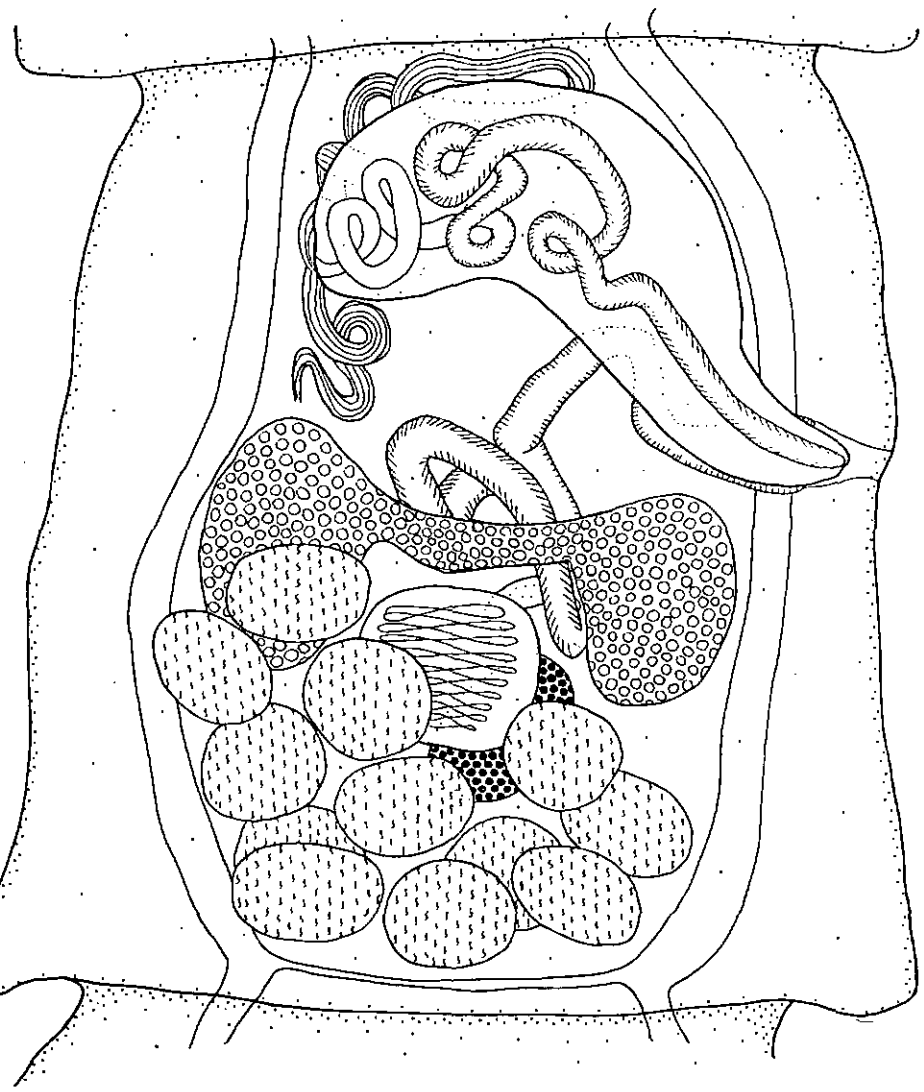


Fig. 26. — *Idiogenes bucorvi* JOYEUX, BAER and MARTIN from *Bucorvus abyssinicus* (BOD.); dorsal view of whole mount of mature segment.

Bucerotiformes.

Idiogenes bucorvi JOYEUX, BAER and MARTIN, 1936 (figs. 12, 26).

This species is recorded from *Bucorvus abyssinicus* (BOD.) from North Somaliland, and is the only one reported for the Bucerotiformes.

The type material was examined, and the measurements correspond with those from the original description given in the folded table I.

Only pseudoscoleces have been recorded for this species. The anatomy of a mature segment is seen in fig. 26. The vagina (fig. 12) has a narrow lumen, and in its distal part is lined with small spines. The distal part is straight but the proximal portion is convoluted before entering the seminal receptacle. In gravid segments, the eggs have not been seen passing into the paruterine organ.

The only host reported is that in the original description.

The complete list of *Idiogenes* species after this revision, will be as follows :

ACCIPITRIFORMES.

I. flagellum (GOEZE, 1782).

BUCEROTIFORMES.

I. bucorvi JOYEUX, BAER and MARTIN, 1936.

CARIAMIFORMES.

I. horridus FUHRMANN, 1908.

OTIDIFORMES.

I. otidis KRABBE, 1867.
I. grandiporus, CHOLODKOWSKY, 1905.
I. kolbei ORTLEPP, 1938.
I. korvi ORTLEPP, 1938.
I. nana FUHRMANN, 1925.
I. pseudotidis n. sp.

Schistometra sp.

Host: *Neotis cafra* (LICHT.) (Otididae) : Kanzi, Bas-Fleuve (21555) ; Dr. E. DARTEVELLE, VII-1937.

There was a single strobila, very long (80 mm.), but possessing neither scolex nor gravid segments. A specific determination was not possible.

ANOPLOCEPHALIDAE Fuhrmann, 1907.

ANOPLOCEPHALINAE Fuhrmann, 1907.

24. **Anoplocephala rhodesiensis** Yorke and Southwell, 1921.

Hosts: *Equus (Hippotigris) burchelli böhmi* Matsch. (Ungulata) : . . . . . Ruanda, Nyakatare (8461, 8462, 8463, 23949); Dr. Colback, 12-XII-1931.

Equus burchelli grandi de Winton . . . : Zoo Gdns, Antwerp (27990/27997); died on 26-VII-1948.

Although a frequent parasite of zebras, this worm has not previously been reported from the Belgian Congo.

25. **Anoplocephala spatula** (Linstow, 1901).

Hosts: « Daman » *Dendrohyrax arboreus adolfi-friederici* Brauer « rat de lave » (Procavidae) : . Gabu-Nioka (28405, 28556, 28557) Ver Eyken, 2-III-1949.

Heterohyrax chapini Hatt. . : Matadi (14878); Dr. E. Dartevelle, II-1937.

The scolex is very large, 1,2 mm. to 1,6 mm. in diameter, and is provided with four suckers, measuring 360 to 400 µ. The dimensions given by Baer (1927) for the scolex are 0,9 mm. to 1,0 mm., and for the suckers 300 to 400 µ. The anatomy conforms to this author's description.

The genital pores are unilateral. The testes are numerous, about 200; the cirrus pouch is very large. i.e. 700 to 1000 µ by 150 µ, and is provided with a stout retractor muscle.

This species appears to be the only one of the genus found in Procavids, and to be restriced to this latter group of hosts.

26. **Bertiella studeri** (Blanchard, 1891).

Hosts: *Cercopithecus aethiops cynosurus* Scop. (Simia) : Mpozo, near Matadi, Bas Congo (19736); Dr. E. Dartevelle, II-1937.

» » » : Angola, Pweto (18583); IV-1937.

» *aethiops* L. . . . . : Zoo. Gdns. Antwerp (28008, 28009); died on 7-VI-1948.

» *ascanius ascanius* Aud. . . . : Kwamouth (28704); Dr. H. Schouteden, III-1921.

» *ascanius schmidti* Matschie . : Rutshuru forêt of Makwera (22220, 22221); J. Ghesquière, V-1938.

Papio cynocephalus L. . . . . : Zoo. Gdns. Antwerp (27988); died on 18-VII-1948.

This worm is a parasite of Primates exclusively, being found in both man and monkeys of Africa and the Near East. Baer (1927), using an abundant material, was able to make a comparative study of this species.

Southwell and Lake (1939) have reported this worm from *Cercopithecus neglectus* Schleg. from the Belgian Congo.

Baer and Fain (1941) record another species, viz *Bertiella congolensis* from *Colobus polykomos angolensis* Sclat. and *C. polykomos adolfi-friederici* Matschie from the same region.

27. **Catenotaenla lobata** Baer, 1925.

Host : *Mastomys coucha ugandae* Wint. (Rodentia) : Ituri, Djugu (28724); Van Canneyt, 1930.

Three worms were found, all with scoleees. The longest specimen has a length of 41 mm., and a maximum breadth of 2,2 mm.

The scolex, which is not provided with a rostellum, is 440 to 616 µ wide, and the round suekers have a diameter of 128 to 152 µ.

The genital pores are irregularly alternating. The cirrus pouch is small, measuring 144 to 200 µ by 34 µ. The ovary is deeply lobed and occupies most of the anterior part of the segment. The vitelline gland, poral in position, is also lobed.

This species was described by BAER (1925 a) from a rat « Tshakoja » from the Belgian Congo. The dimensions given in the original description are: scolex diameter 700 µ, suckers 200 µ, number of testes 200, size of cirrus pouch 150 µ by 60 µ; the anatomy of a mature segment (1925 a. fig. 7) is also shown.

28. **Cittotaenia pectinata** (GOEZE, 1782).

Host: « Carnassier » (Mistake in host?) : Rutshuru (22371); J. GHESQUIÈRE, IV-1937.

This material, which is well preserved, corresponds with the description given by JOYEUX and BAER (1936). The cirrus pouch is somewhat larger, 600 to 1100 µ, as against 400 to 900 µ.

The double genitalia, numerous testes (120 to 150) arranged in a single dorsal field, the very long cirrus pouch, and a persistent, sacciform uterus are characteristic of this species. The excretory system is ramified, and there is neither internal nor external seminal vesicles. The vagina is wide, with a muscular wall, and leads into a well developed receptaculum seminis.

There were no gravid segments.

The occurrence of this species in an African carnivore is surprising because *Cittotaeniia pectinata* is a characteristic parasite of rabbits, The parasite was presumably introduced on to the continent with its host, and its presence in a carnivore may be explained by the latter's having eaten a rabbit just before death, or by there being a mistake in the host label.

29. **Crossotaenia baeri** n. g., n. sp. (figs. 27-34).

Hosts: *Cephalophus sylvicultor* AFZEL (Ungulata) : . Kwamouth (28706, 28709); Dr. H. SCHOUTEDEN, III-1921.

» sp. . . . . : Manzadi, Zadi-Kakongo (21566, 22748); Dr. E. DARTEVELLE, VI-1937.

Unfortunately none of the specimens possessed a scolex.

The longest worm has a length of 230 mm., and a maximum breadth of 5 mm. All the segments are broader than long; the posterior border of each segment is indented and frilly, and overhangs the succeeding segment. The frilliness increases as the progottids mature. The genital pores are regularly alternating; very occasiionally two consecutive segments are seen to have the genital pore on the same side. In section, the cuticle is seen to be spiny.

The muscular system is not very strongly developed. The inner, cortical band of longitudinal muscles is composed of numerous bundles of 4 to 14 fibres, The outer layer consists of smaller bundles with 2 to 5 fibres, and frequent isolated fibres (fig. 28).

The excretory system is composed of two pairs of longitudinal canals of about equal diameter. There is a posterior ventral commissure in each segment.

The nervous system is composed of two, well developed nerves, situated considerably laterally to the excretory vessels.

The testes are 40 to 55 in number, situated posteriorly in the segments in a more or less single, transverse row, composed of two dorso-ventral layers. As seen in a whole mount, they measure 72 to 88 µ by 47 to 54 µ.

The vasa efferentia arise from the posterior limit of the testes and join to form the vas deferens, which, on passing the ovary and the poral excretory vessels, becomes highly convoluted. On passing into the cirrus pouch it forms neither internal nor external seminal vesicle.

The cirrus pouch is small and not very muscular, extending about one half of the way to the poral excretory vessels. It is lightly convoluted at its poral end. The length was measured along a straight line from its opening into the genital atrium, to the farthest edge of the proximal end. Two other measurements made were the maximum diameter and the diameter of the poral portion. The dimensions are 288 to 480 µ, 54 to 96 µ, 36 µ. The coiled cirrus is unarmed, and the genital atrium is small.

The thin-walled, undulating, unarmed vagina passes, together with the vas deferens, between the poral excretory vessels. It opens into a dorsal receptaculum seminis. The ovary, slightly anterior in position, is

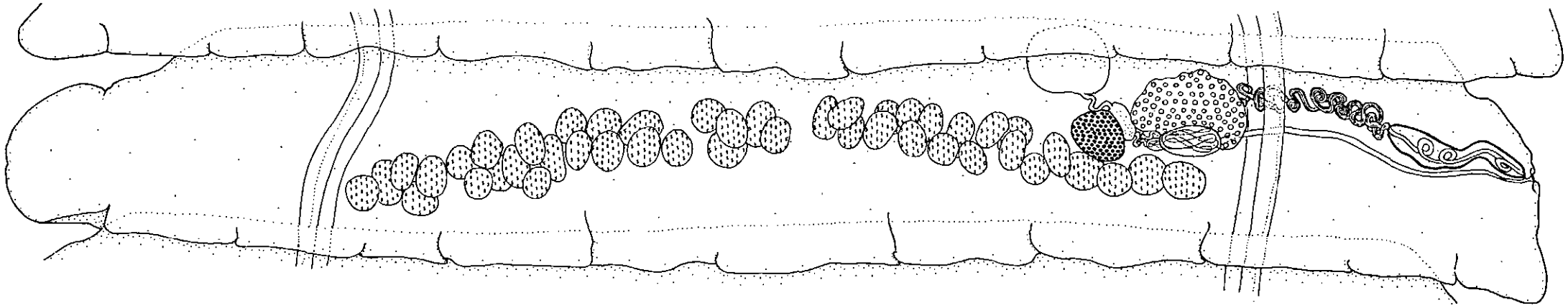


Fig. 27. — *Crossotaenia baeri* n. g., n. sp. from *Cephalophus sylvicultor* AFZEL; dorsal view of whole mount of mature segment.

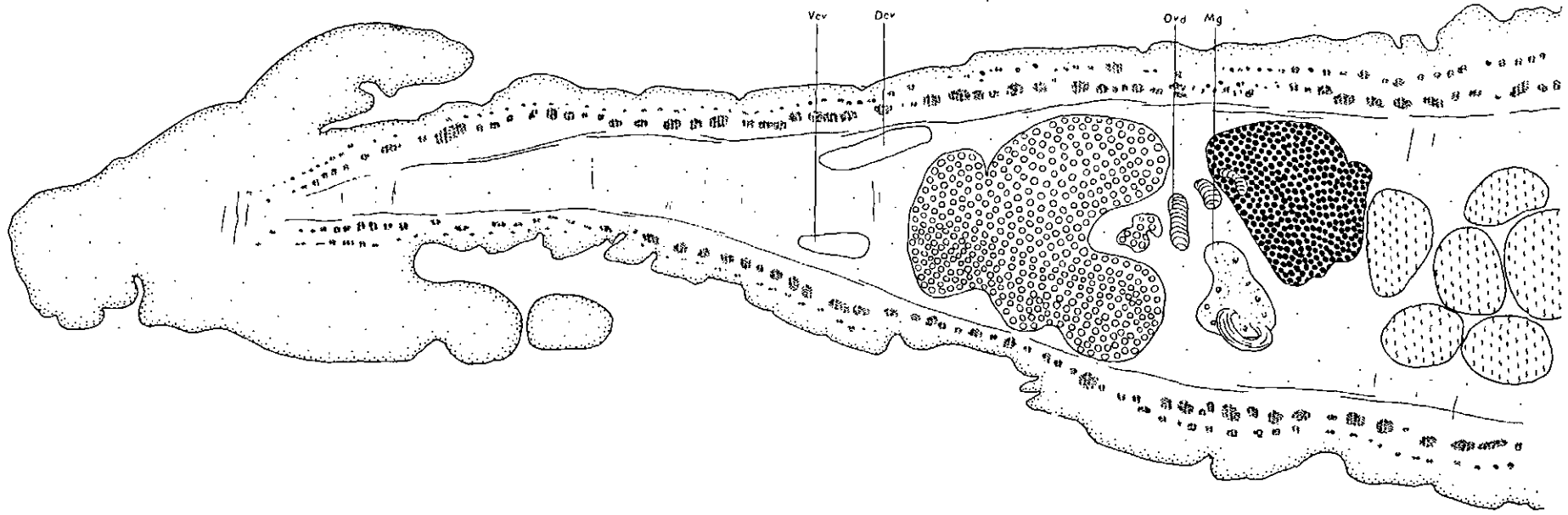


Fig. 28. — *Crossotaenia baeri* n. g. n. sp. from *Cephalophus sylvicultor* AFZEL; transverse section of mature segment.

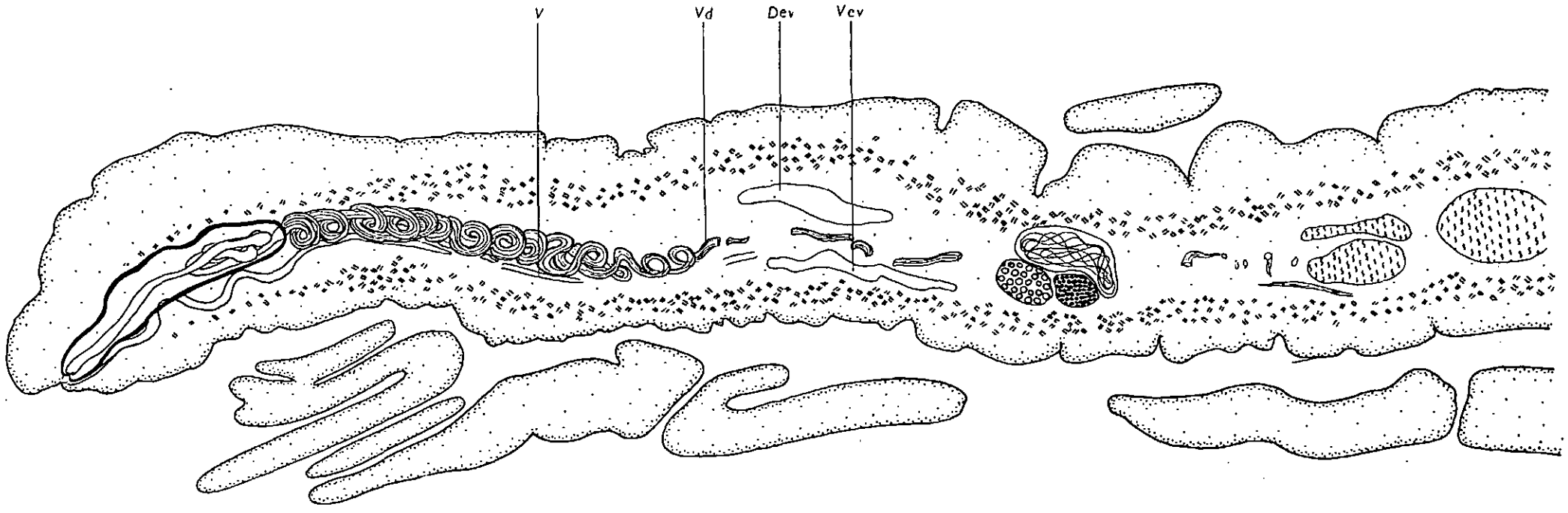


Fig. 29. — *Crossotaenia baeri* n. g. n. sp. from *Cephalophus sylvicultor* AFZEL; transverse section of mature segment. The material is macerated, and the muscle fibres tend to lose their two-layered arrangement.

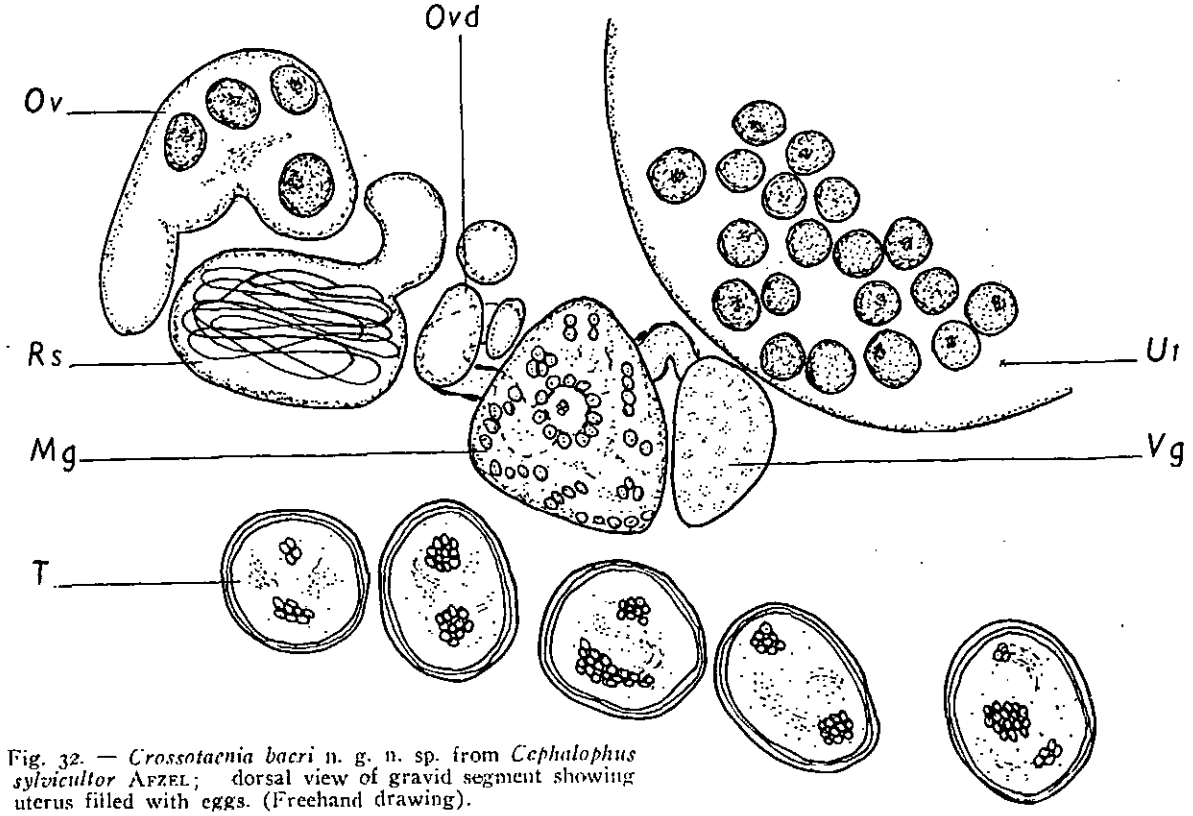


Fig. 32. — *Crossotaenia baeri* n. g. n. sp. from *Cephalophus sylvicultor* AFZEL; dorsal view of gravid segment showing uterus filled with eggs. (Freehand drawing).

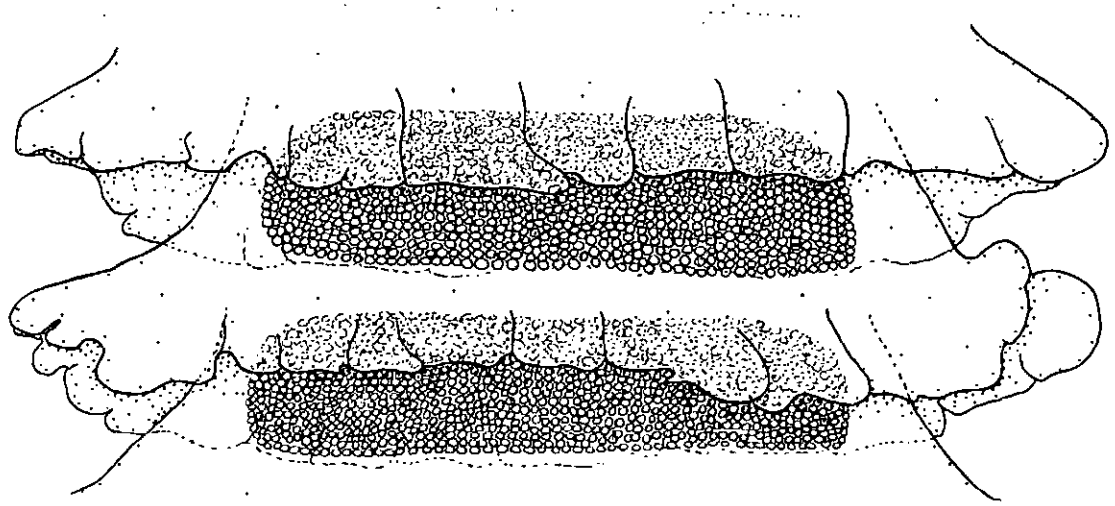


Fig. 30. — *Crossotaenia baeri* n. g. n. sp. from *Cephalophus sylvicultor* AFZEL; transverse section across female organs in a mature segment.

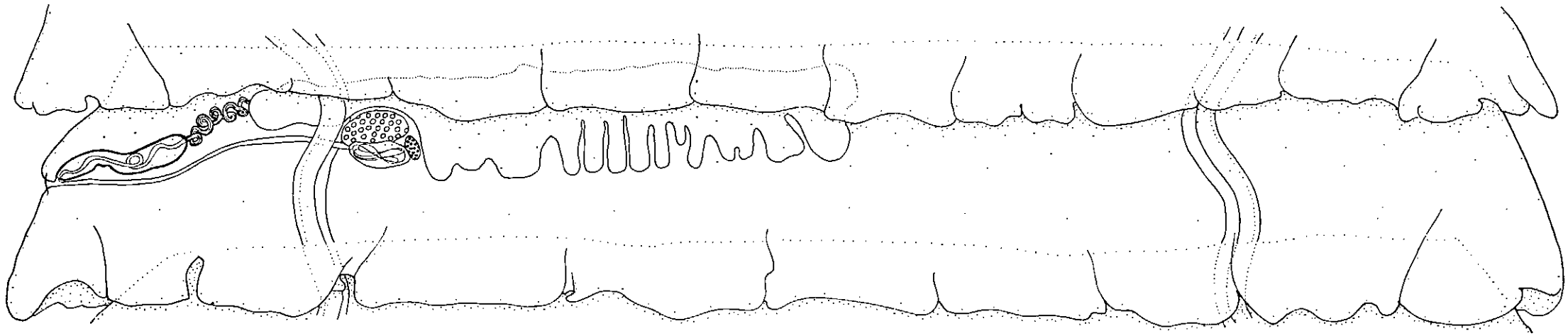


Fig. 31. — *Crossotaenia bacri* n. g. n. sp. from *Cephalophus sylvicultor* AFZEL; dorsal view showing the shape of the young uterus.

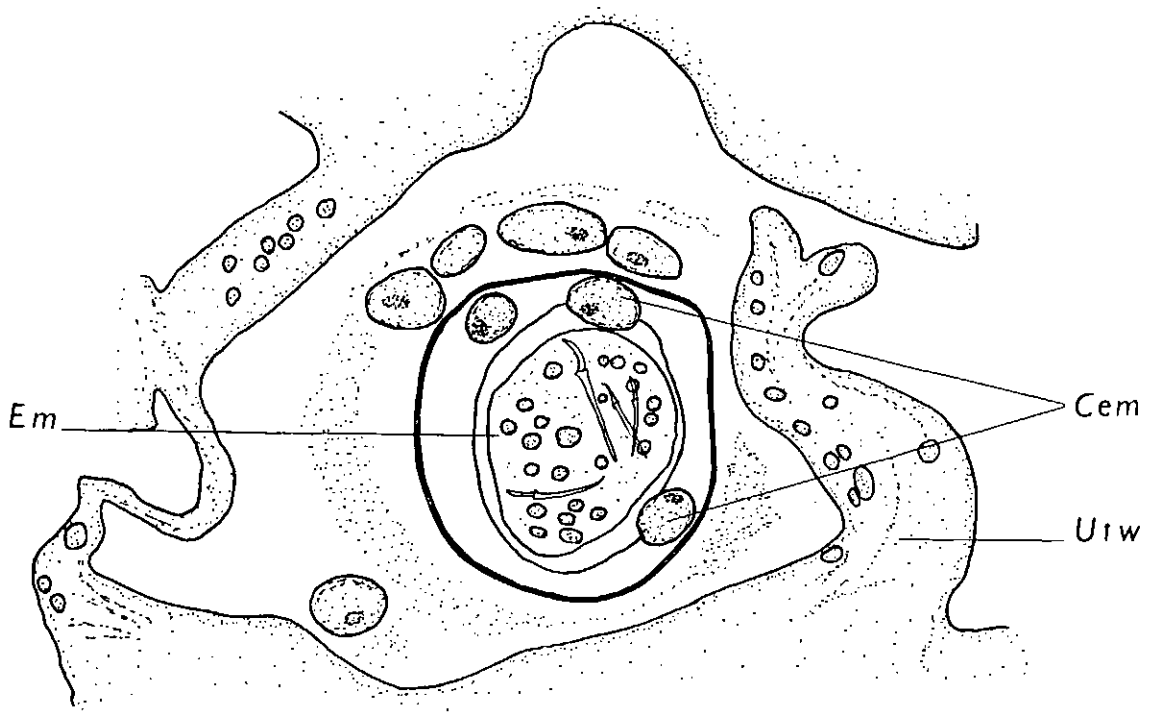


Fig. 33. — *Crossotaenia bacri* n. g. n. sp. from *Cephalophus sylvicultor* AFZEL; transverse section of ripening segment showing developing egg and embryophore.

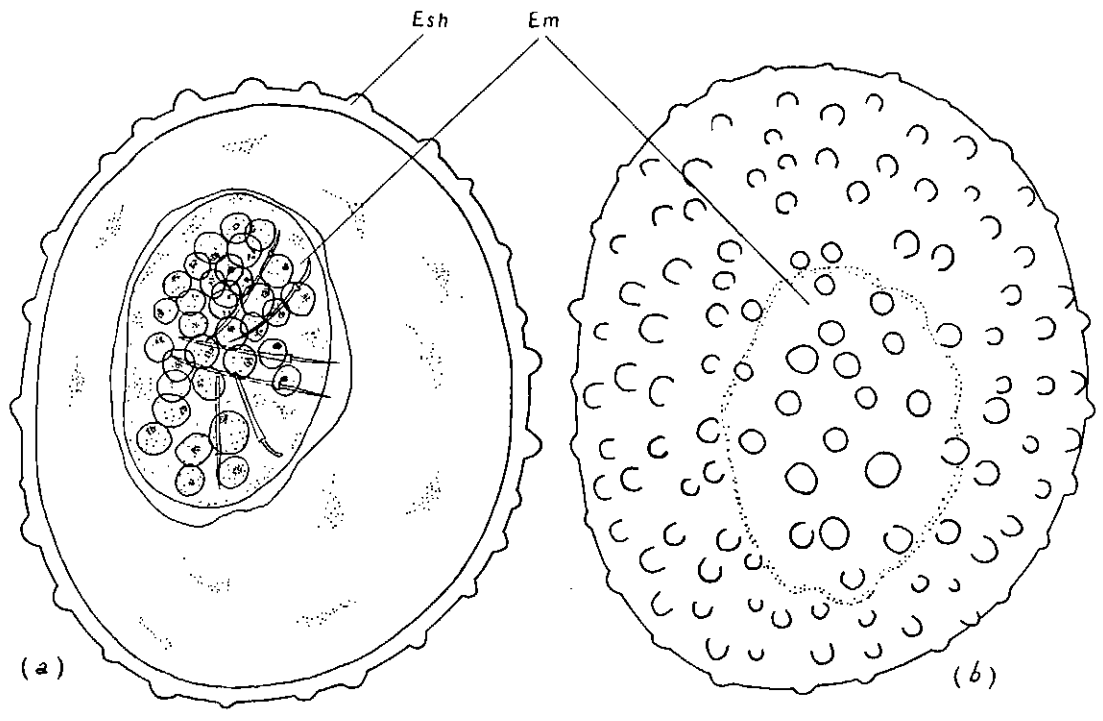


Fig. 34. — *Crossotaenia bacri* n. g. n. sp. from *Cephalophus sylvicultor* AFZEL; ripe egg (a) seen in optical section, (b) seen in surface view.

situated close to the poral excretory vessels. It is composed of large cells and is kidney-shaped. The vitelline gland is small and composed of lightly granulated cells, A Mehlis' gland is present. It has a diffuse appearance and consists of granulated cells grouped around the uteroduct. The disposition of these organs is seen in fig. 27.

The uterus appears as a spherical sac, anterior to the vitelline gland (fig. 27). The uterus receives eggs almost immediately after its appearance, and as development continues, it extends laterally, sending out lobes which occupy the anterior half of the segment (fig. 31). Finally the uterus fills the entire segment, passing between the excretory vessels (fig. 32). It remains lobed and contains large eggs.

The eggs have an interesting structure. They are oval in shape and thick shelled. In the unripe uterus, the egg is surrounded by an embryophore, the cells of which can be seen lying against the shell (fig. 33). As the egg becomes ripe, the outer layer of the shell is raised in more or less hemispherical bumps (fig. 34). The ripe eggs measure 90 to 97 μ, and contain hexacanth embryos. There is no formation of egg capsules, nor of paruterine organs.

The diagnosis of *Crossotaenia* n. g. is the following:- *Anoplocephalinae* with segments broader than long. The posterior border of the segment is indented and frilly. No interproglottid glands present. Genital pores regularly alternating, the genital ducts pass between the excretory vessels. Cirrus pouch not well developed; no internal nor external seminal vesicle present. Vitelline and Mehlis' gland present; female organs situated in the poral half of the segment. Uterus appears as a round sac which, becoming lobed, extends laterally between the excretory canals. Adults in bile ducts of ruminants. Type species *Crossotaenia baeri* n. sp.

This genus enters into the family *Anoplocephalidae* because of the arrangement of the female organs, the segments which are wider than long, and the numerous testes; and into the sub-family *Anoplocephalinae*, characterised by a persistant uterus.

Crossotaenia is, however, quite distinct from the other genera of the *Anoplocephalinae* by the following features: the frilly posterior borders of the segments, the absence of internal and external seminal vesicles, and more particularaly by the position of the genital ducts relative to the excretory canals and the evolution of the uterus. In *Crossotaenia* the genital ducts pass between the excretory vessels, whereas in the other genera they pass dorsal to the excretory canals, except in *Triuterina* otherwise quite distinct from *Crossotaenia*, being a parrot parasite in which the uterus shows three diverticula. The uterus of *Crossotaenia* is distinctive, that of the other genera appearing as a transverse tube or as a network.

The only other Anoplocephaline found in ruminants is *Moniezia*, in which the genital organs are double and the uterus a network.

The genus *Crossotaenia* however, shows many similarities to *Thysanosoma* and *Wyominia*, more especially the latter. These two genera are members of the sub-family *Thysanosominae*, characterised by the formation of a paruterine organ. The members of this sub-family are all parasites of ruminants, and show varying degrees of reduction of the vitelline gland, excepting *Wyominia*. This genus and *Thysanosoma* are both American forms, found in the bile-ducts of their hosts, and both double-pored. All the other genera are Old World forms, found in the intestines of their hosts and all single-pored.

Crossotaenia and the American genera have in common the frilly border of the segments: with *Wyominia* in particular, it has certain anatomical features in common, viz. the genital ducts passing between the excretory vessels, absence of internal and external seminal vesicles, cirrus pouch long and narrow slightly convoluted at its distal end, no testes to poral side of ovary, longitudinal muscles weakly developed arranged in two layers, dorsal and ventral excretory vessels of approximately the same diameter. On the other hand, in contrast to *Crassotaenia*, in *Wyominia* the vagina opens independantly from the cirrus pouch and male atrium, on to the dorsal surface of the worm on one side and on the ventral surface on the other. The uterus appears as a transverse tube, and the eggs are enclosed by paruterine organs.

Thus *Crassotaenia*, although falling into the *Anoplacephalinae*, shows certain affinities with members of the *Thysanosominae*. It is perhaps significant that the three genera *Crassotaenia*, *Thysanasoma* and *Wyominia* are all found in the same rather special habitat, i.e. the bile-ducts of ruminants, and the morphological similarities may be considered as adaptive characters. If, however, these similarities are indicative of a close relationship, it would imply that the presence or absence of a paruterine organ, although important in sytstematics, is not a criterion of phylogenetic relationsbip.

As a mark of esteem and gratitude, this species i dedicated to our teacher, Professor J.G. BAER.

30. **Moniezia expansa** (RUDOLPHI, 1810).

Hosts: *Damaliscus korrigum* OGLIB.; « Topi » (Ungulata) : . . . . . Nyakatare (28703) ; Dr. COLBACK, 3-X-1931.
Tragelaphus scriptus PALL. . . . . : Nioka (20063) ; Dr. GILLAIN.
« Bœuf » . . . . . : Elisabethville (28702) ; Dr. VALDONIO, 12-II-1911.
« Mouton » . . . . . : Buta (28701) ; R. F. HUTSEBAUT, 1929.
« Mouton » . . . . . : Nioka (20103) ; Dr. GILLAIN.

The scolex has a diameter of 712 µ and the round suckers are 280 to 204 µ wide.

The genital pores are double. Interproglottid glands in the form of a rosette are present, and the numerous testes occupy a single, continuous, dorsal field; these feature are characteristic of the species *Moniezia expansa*.

This species has already been reported from bovines from the Belgian Congo by FAIN and RAMÉE (1949).

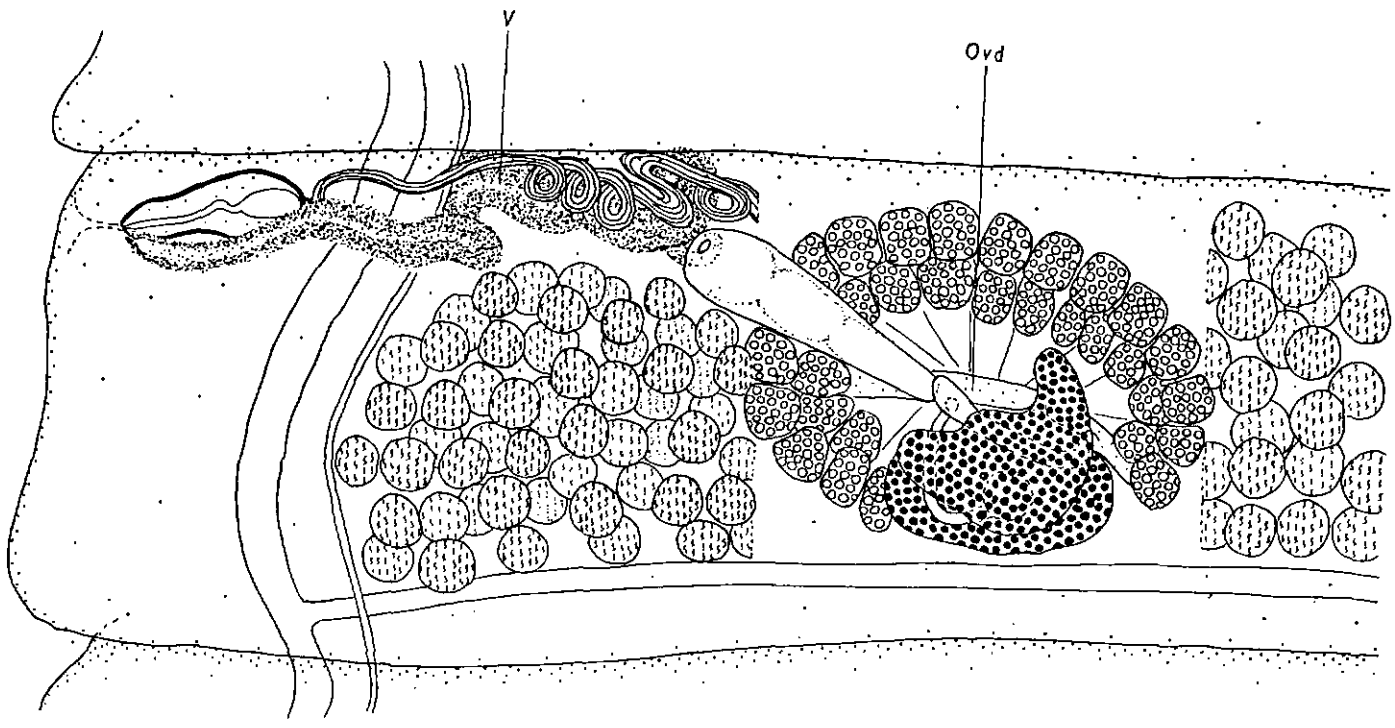


Fig. 35. — *Moniezia mettami* BAYLIS from *Phacochoerus aethiopicus* PALL.; dorsal view of poral half of mature segment, with testes removed in order to show the female organs.

31. **Moniezia mettami** BAYLIS, 1934 (fig. 35).

Host: *Phacochoerus aethiopicus* PALL. (Ungulata) : . Gabu-Nioka (28378, 28399) ; VER EYKEN, 24-IV-1950 et 12-II-1950.

This worm is described by BAYLIS (1934) from the warthog, *Phacochoerus aethiopicus* PALL, from Uganda.

The specimen from the Congo is 600 mm. in length, BAYLIS' measurement being 220 mm. Our specimen has a larger scolex - 1,04 mm. measured in Canada balsam, as against BAYLIS' 0,85 mm., measured in creosote. All other measurements correspond, and BAYLIS' measurements are given here for the sake of completeness.

Maximum width — measured in formalin — 11 mm.; suckers, measured in creosote, 300 µ; cirrus pouch 250 to 270 µ in length and 80 to 90 µ maximum width; genital atrium 100 to 150 µ in depth. Number of testes estimated at about 400 per segment; thin-shelled eggs 66 to 80 µ in diameter; that of the onchosphere 20 to 22 µ.

Each segment is provided with two genital pores, and two sets of genital organs. The most striking feature of this worm is the highly glandular, convoluted vagina, shown in fig. 35.

32. **Paranoplocephala isomydis** (SETTI, 1892) (fig. 36).

Host: *Oenomys hypoxanthus* PUCH. (Rodentia) : Djugu, Ituri. (8514, 8515, 28720) ; VAN CANNEYT, 1931.

This worm was redescribed by BAER (1949), but unfortunately the type material was macerated and the scolex contracted, so we take this opportunity to redescribe the species, basing the measurements on well preserved specimens.

Of the three examples, the longest measures 35 mm. in length and has a maximum breadth of 7 mm.

The scolex, measured in Canada balsam, has a diameter of 500 µ, and the oval suckers measure 200 µ by 160 µ. These dimensions are much larger than BAER's, and agree with his remark that the scolex would be found to be larger.

Segmentation becomes apparent immediately behind the scolex and there is no narrowed neck region. The segments are all wider than long. The genital pores are irregularly alternating, and open slightly anterior to the middle of the lateral border of the segment.

The musculatur system is well developed. The inner layer of cortical longitudinal muscles consists of rather widely spaced bundles. The number of fibres per bundle varies from 5 to 8 in one part of the worm to 12 to 15 in another. This variation results from the branching of the longitudinal muscles and the unequal contraction of the worm along its length. The outer layer is composed of dorso-ventrally elongated bundles containing from 20 to 25 up to 30 to 40 fibres per bundle.

The excretory system is of the normal type with a pair of narrow dorsal canals and a pair of wider ventral canals connected by a transverse commissure.

As noted by BAER, the nervous system shows the usual two longitudinal trunks situated laterally to the excretory canals, each accompanied by two smaller longitudinal nerves.

Calcareous bodies are numerous, and are mainly situated in the cortex .

The testes number from 75 to 100, as estimated from transverse and longitudinal sections, and are situated dorsally in the segment, the majority being aporal. The vas deferens dilates into a pronounced external seminal vesicle, which enters the cirrus pouch by a short, narrow portion. The cirrus pouch measures from 300 to 360 µ in length, as seen in longitudinal sections, and has a maximum width of 88 to 96 µ. Its proximal end does not quite reach the poral nerve; it contains an internal seminal vesicle. The cirrus is straight and unarmed. The genital atrium is small and not very muscular.

The vagina opens from the genital atrium behind the cirrus pouch and together with the vas deferens passes dorsally to the excretory vessels and the nerve trunks. A large receptaculum seminis is present. The female organs are situated in the poral third of the segment. The ovary is deeply lobed and spread out laterally. Dorsal to the latter is the small, darker staining vitelline gland, situated somewhat posteriorly. The Mehlis' gland is present, large, lightly staining, but well defined.

The uterus appears as a narrow, dorsal, transverse tube which extends laterally to the excretory vessels on either side. The terminations of the tube become swollen and filled with eggs. The eggs have a diameter of 41 to 43 µ, and the embryo, which is provided with a pyriform apparatus, has a diameter of 17 to 18 µ.

On examining the Erythrean material on which the description by BAER is based, we are convinced that, despite the discrepancies between certain of the dimensions, BAER's material and these Belgian Congo specimens are in fact the same species, and that the disparities can be accounted for by the difference in the state of maceration, fixation and preservation of the two materials.

LINSTOWIINAE FUHRMANN, 1907.

33. **Inermicapsifer hyracis** (RUDOLPHI, 1810).

Host: « Daman » *Dendrohyrax arboreus adolfi-friederici* BRAUER, « Rat de lave », (Procavidae): Gabu-Nioka (28405, 28556, 28557); VER EYKEN, 2-II-1949 (*).

This species is redescribed by JANICKI (1910) from a *Procavia* sp. and is the longest worm of the genus. JANICKI and also BAER (1925) give 350 mm. for their longest measurements. Of the two specimens from the Congo, the longest reaches a length of 105 mm. with a maximum width of 5 mm.

There is some variation in the size of the scoleces, 560 µ and 820 µ, as compared with 590 µ given by JANICKI. In the Congo specimens the number of testes, per segment varies from 75 to 116, and as seen in whole mounts, each testis measures 90 to 100 µ by 83 to 90 µ; the non-muscular cirrus pouch measures 180 to 227 µ by 61 to 94 µ; the genital pore is in the middle of the lateral border of the mature segments, and just posterior to the middle in gravid segments.

The table below shows the measurements given by JANICKI and BAER and those of the Congo material.

	JANICKI, 1910	BAER, 1925	*Congo material*
Length	350 mm.	350 mm.	105 mm.
Breadth	3-5 mm.	4-5 mm.	5 mm.
Scolex	590 µ		560-820 µ
Suckers	200 µ		200-264 µ
No. of testes	110-120	90-140	75-116
Cirrus pouch	230 µ	—	180-227 × 61-94 µ
Eggs/capsule	4-5	7-12	
Capsules/segment	—	8-300	

For explanation of abbreviations see p. 147.

34. **Inermicapsifer arvicanthidis** (KOFEND, 1917).

Hosts: *Arvicanthis abyssinicus* RÜPP., « tsere-tsere » (Rodentia) : . . . . . Ituri, Djugu (28718, 28721); VAN CANNEYT, 1931.
Cricetomys dissimilis ROCHEBR. . . . . : Ituri, Djugu (8473); VAN CANNEYT, 1929.
Dasymys bentleya THOM. . . . . : Ituri, Djugu (8518, 8521, 8522); VAN CANNEYT, 1930.
Mastomys coucha ugandae WINT. . . . . : Ituri (8499, 8502, 8508, 28715); VAN CANNEYT, 1930.
« Rat » . . . . . : Gabu-Nioka (28282); VER EYKEN, 24-VIII-1948.

As several specimens of this worm are available, it is perhaps interesting to give their measurements in order to indicate the degree of variation for certain characters.

I. arvicanthidis was redescribed by BAYLIS (1949), the description being based on specimens from man and rodents from Kenya.

In the table below are given the measurements of BAYLIS and KOFEND; those made on collection material, from rats and a mouse, and those from the Congo material.

(*) The identity of the host was given by the collector. It seems however very doubtful, since the same species of tapeworm has been collected from *Procavia johnstoni lopesi* captured in the same locality, by Dr. J. DEOM (*vide* EZZAT, 1954). The Museum possesses the *Procavia* received from Dr. DEOM but there is no trace of the *Dendrohyrax* sent by M. VER EYKEN. It appears therefore likely that there has arisen a confusion in host names.

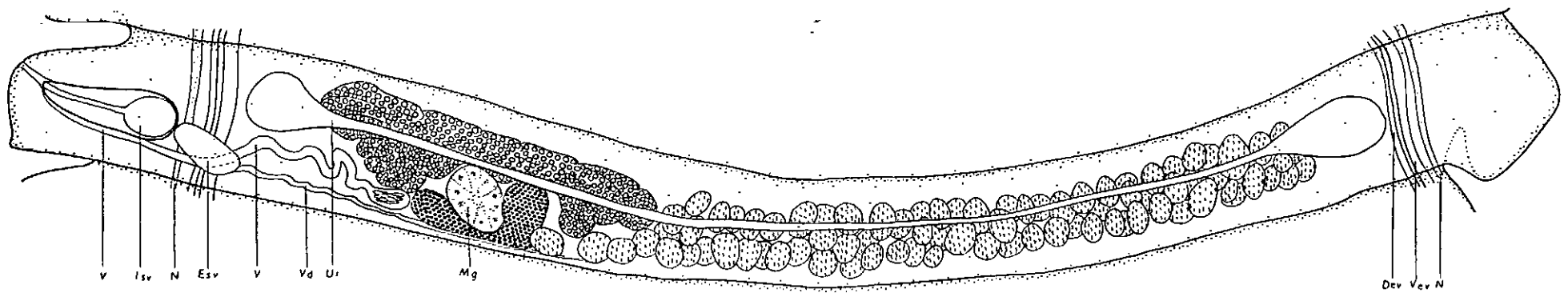


Fig. 36. — *Paranoplocephala isomydis* (SETTI) from *Oenomys hypoxanthus* PUCH.; dorsal view of mature segment.

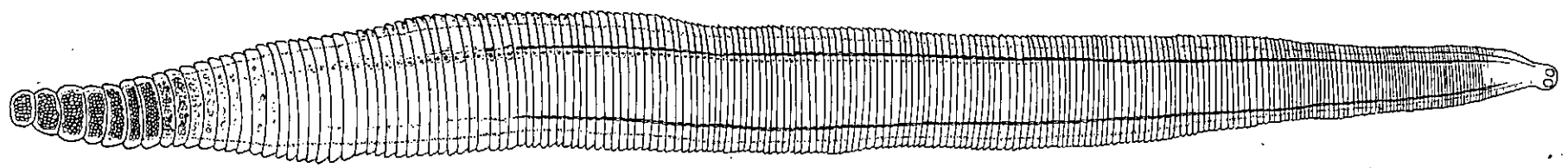


Fig. 37. — *Inermicapsifer congolensis* n. sp. from *Cricetomys dissimilis* ROCHEBR.; dorsal view of entire specimen.

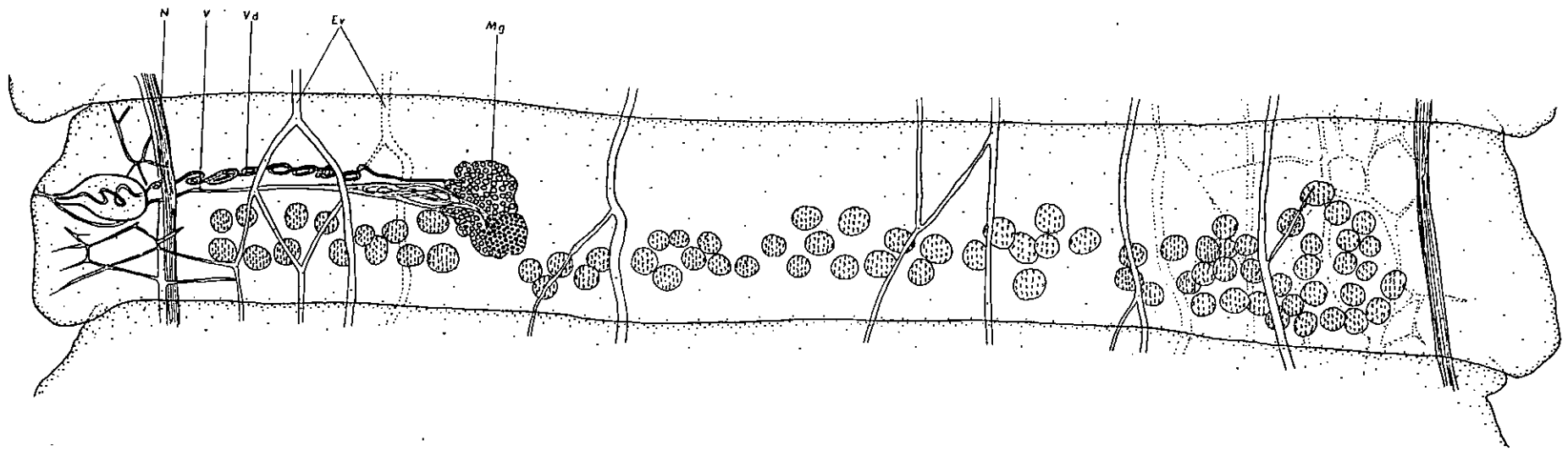


Fig. 38. — *Inermicapsifer congolensis* n. sp. from *Cricetomys dissimilis* ROCHEBR.; dorsal view of mature segment.

	BAYLIS & KOFEND	*Coll. material*	*Congo mat.*
Length	185 mm.	20-90 mm.	62,5-132 mm.
Breadth	3 mm.	1-2,5 mm.	3.5 mm.-6,25
Scolex	450-550 µ	376-440 µ	440-576 µ
Suckers	190 µ	140-160 µ	160-224 µ
No. testes	48-55	20-78	53-87
Diam. testes	60 µ	61-72 × 50-65 µ	54-72 µ × 40-65
Cirrus pouch	100-120 × 60 µ (KOFEND, 140-150 µ)	126-158 × 47-61 µ	90-180 µ × 58 µ
Eggs/capsule	12-15 (KOFEND, 11-13)	9-12	9-12

For explanation of abbreviations see p. 147.

35. **Inermicapsifer congolensis** n. sp. (figs. 37-38).

Hosts: *Cricetomys dissimilis* ROCHEBR. (Rodentia) : Ituri, Djugu (8466, 8488, 9828, 9838, 28719, 28723, 28716); VAN CANNEYT, 1929.

Dasymys bentleyae THOM. . . . . : Ituri, Djugu (8516, 8517, 8519, 8520); VAN CANNEYT, 1930.

The worm is lancet-shaped (fig. 37), 53 mm. to 90 mm. in length, with a maximum width of 5 mm. to 6,5 mm.

The scolex measures 664 µ to 880 µ in diameter and is provided with four, nearly circular suckers, diameter 200-336 µ, but entirely lacks a rostellum and consequently bears no hooks. The segments become defined almost immediately behind the scolex. The segments, with entire margins, are always much wider than long, but tend to a square form in the most gravid proglottids.

The genital pores are unilateral, and situated in the middle or slightly anterior to the middle of the lateral border of the segment.

The muscular system is not strongly developed. The cortical longitudinal muscles form two hardly distinguishable layers, the inner layer composed of a single row of groups of 2 to 5 fibres, and the outer layer, which is wider, is composed of single and groups of 2 to 4 fibres. The sub-cuticular muscles are comparatively well developed. The medulla is marked off from the cortex by transverse muscle fibres. Transverse fibres are also seen between the inner and outer layer of cortical longitudinal muscles. The medulla is crossed by dorso-ventral fibres which extend into the cortex to the outer band of longitudinal muscles.

The excretory system consists of anastomosing dorsal and ventral longitudinal canals. As seen in transverse sections the number of vessels varies from 16 to 25. A comparatively constant position is assumed by two pairs of longitudinal canals which are found in a normal position, dorsally and ventrally lateral to the nerves.

The lateral longitudinal nerves are broad and well defined.

The male and female organs appear simultaneously.

The testes vary considerably in number, both from one individual worm to another, and in different segments of the same worm. The testes are situated either side of the ovary and extend laterally to the nerves. They are situated posteriorly in the segment, except in the extreme aporal region where they spread anteriorly. The poral testes are all posterior to the genital ducts (fig. 38). The two fields of testes are united by a continuous row behind the ovary. The poral testes number 6 to 20 and those in the aporal group number 47 to 88. The total number varies from 62 to 103. As seen in a whole mount the testes are oval in form and the maximum measurements are 76 µ to 100 µ by 65 µ to 43 µ.

The convoluted vas deferens enters the cirrus pouch without forming an external seminal vesicle. Neither is an internal seminal vesicle present.

The cirrus pouch is relatively small and non-muscular 144-226 × 86-108 µ. It occupies 1/22 to 1/29 of the width of the segment. It is globular in form and contains an unarmed, slightly coiled cirrus. The pouch opens into a small, non-muscular genital atrium. In mature segments the cirrus may be seen either everted through the genital atrium or recurved immediately posteriorly into the vagina.

The vagina, which opens from the genital atrium posteriorly to the cirrus pouch, follows a straight path ventral to the vas deferens, and together with the latter passes between the excretory vessels and ventral to the nerve. On nearing the female glands, its lumen widens to form a spindle-shaped receptaculum seminis. The vagina is seen to stain heavily, and appears to be lined with setae.

The ovary, at first small, compact and spherical in shape, is situated at the limit of the poral 1/3 to 1/4 of the segment, i.e. the distance from the centre of the ovary to the poral border is 1/3 to 1/4 of the segment. As development continues the ovary increases in size, sending out lateral lobes.

The vitelline gland, situated dorsally, aporally and somewhat laterally to the ovary, is smaller than the latter, roughly spherical in shape, and granular in appearance. Mehlis' gland is present, small but with a distinct outline.

The fertilised eggs are distributed throughout the segment. Each egg is surrounded by a membrane derived from the uterus. Later several eggs, each with its uterine membrane, are enclosed within a capsule of parenchymatous origin. The number of eggs per capsule varies from 10 to 14; the number of capsules per segment is very variable.

The genus *Inermicapsifer* is a very unstable group of cestodes, and the specific characters are very ill-defined. As already remarked the individual variation is very great, as well as the variation between the segments of an individual. For any one character the limits of variation of one species approach those of a neighbouring species and may even overlap. A specific determination, then, has to depend upon the general appearance of the worm and the ensemble of its characters.

In order to find a relatively fixed or constant character, various proportions between the dimensions of segments and or other organs were estimated, e.g. the proportion of the diameter of the scolex to that of the suckers; of the maximum width of the segment to the length of the cirrus pouch; of the width of the segment to the distance from the centre of the ovary to the lateral border of the segment. These proportions were calculated for the new species and also for other species of the genus, and the results are tabulated below, in the folded sheet II. No one of these proportions is very constant, but together with the dimensions normally given, help to establish a picture of the species.

Two groups of mammals, the Rodentia and the *Procavidae* harbour species of the genus *Inermicapsifer*. The species found in each group are specific to that order of mammals. The nearest relative of *Inermicapsifer congolensis* n. sp., a parasite of rodents, would appear to be *I. hyracis* RUDOLPHI, 1810, recorded from hyraxes. Being fortunate to have the type material, a re-examination was made, and the measurements, together with those given by JANICKI (1910) and those of two specimens from the Belgian Congo, are given in the table below, p.

I. congolensis n. sp. can also be distinguished from *I. hyracis* by the form of the entire worm, *I. hyracis* being the longest of the genus and having the normal, progressively widening shape.

36. **Inermicapsifer guineensis** (GRAHAM, 1908) (1).

Host: *Pelomys campanae* HUET. (Rodentia): . . . Luluabourg St Joseph (23533); J. J. DEHEYN, I-V-1939.

There were only fragments of strobila present, and the material was very contracted. For the sake of completeness other *I. guineensis* material was examined, viz, specimens from *Cricetomys gambianus* WATERH. from the Paris Museum from the Belgian Congo.

Their measurements are given in columns (a) and (b) respectively, in the table below.

(1) Under the name *Zschokkeella guineensis* SOUTHWELL and LAKE referred this species from a bird *Centropus superciliosus loandae*. but they add that these worms are doubtfully refereed to this species; there is also the possibility of a mistake in the host label.

Species	*Inermicapsifer congolensis* n. sp.	*Inermicapsifer arvicanthidis* (KOPEND, 1904)			*I. guineensis* (GRAHAM, 1908)	*Inermicapsifer hyracis* (RUDOLPHI, 1810)		*Inermicapsifer interpositus* JANICKI, 1910		*I. pagenstecheri* (SETTI, 1897)	*Inermicapsifer schoutedeni* EZZAT, 1954
Measurements taken from	Belgian Congo material	Belgian Congo material	Collection material	BAYLIS, 1949	Collection material	Belgian Congo material	JANICKI, 1910	Belgian Congo material	JANICKI, 1910	Belgian Congo material	EZZAT, 1954
Length	53-90 mm.	62,5-132 mm.	20-90 mm.	185 mm.	46 mm.	105 mm.	350 µ mm.	47 mm.	17-30 mm.	13,5-35 mm.	35-300 mm.
Breadth	5-6,5 mm.	3,5-6,25 mm.	1-2,5 mm.	3 mm.	3 mm.	5 mm.	3,5 mm.	2,5-3 mm.	3-3,5 mm.	2-2,5 mm.	1,5 mm.
Scolex	664-880 µ	440-576 µ	376-440 µ	450-550 µ	640-656 µ	560-820 µ	590 µ	1060-1480 µ	850-1000 µ	528-744	700 µ
Suckers	200-336 µ	160-224 µ	140-160 µ	190 µ	224-248 µ	200-264 µ	200 µ	344-400 µ	360 µ	208-248 µ	290 µ
Testes	62-103	53-87	20-78	48-55	47-89	75-116	110-120	42-61	80	84-142	84-109 (in two groups)
Diam. of testes	76-100 × 65-43 µ	54-72 µ × 40-65 µ	61-72 µ × 50-65 µ	60 µ	50-72 × 50-72 µ	72-100 × 65-90 µ	—	90-180 × 76 µ	—	108-126 × 94-115 µ	—
Cirrus pouch	144-226 × 86-108 µ	90-180 × 58 µ	126-158 × 47-61 µ	100-120 × 60 µ	144-180 × 36-43 µ	180-227 × 61-94 µ	230 µ	154-234 × 54-68	150 µ	288-350 × 108-133 µ	120 µ
Segment/scolex	5,8-8,4	5,8-11,4	2,8-6,7		4,6	6,1-7,5		2-2,4		3.2	—
Scolex/suckers	2,6-3,4	2,5-3,3	2,5-3,6		2,8	2,7-3,3		2,9-3,3		2,8	2,04
Seg/scolex/sucker	1,4-2,4	1-2,4	0,3-1		1	1,6-1,7		0,9		0,7	—
Seg/cirrus pouch	22-29	22-46	10-17		17	19-23		13-14		7	—
Seg/ovary axis	3,3-4,1	2-3	2-2,7		4	3					
Host:	Rodents.	Rodents	Rodents	Man and Rodents.	Rodents.	Hyrax		Hyrax		Hyrax	Hyrax

For explanation of abbreviations see p. 147.

	(*a*)	(*b*)
Length	45 mm.	40 mm.
Breadth	3 mm.	3 mm.
Scolex	—	640-656 µ
Suckers	—	224-248 µ
Testes		
poral	8-14	9-17
aporal	48-66	37-73
total	60-75	47-89
Diam. testes	90 × 58 µ	50-72 × 50-72 µ
Cirrus pouch	144-176 × 50-54 µ	144-180 × 36-43 µ
Host	*Cricetomys gambianus* WATERH.	*Cricetomys gambianus* WATERH.

For explanation of abbreviations see p. 147.

37. **Inermicapsifer interpositus** JANICKI, 1910.

Host.: « Daman »: *Dendrohyrax arboreus adolfi-friederici* BRAUER, « Rat de lave » (Procavidae) : Gabu-Nioka (28556, 28557); VER EYKEN, 2-III-1949 (*).

This species is characterized by a large scolex, 1,06 mm. and 1,08 mm. in our specimens, and 0,850-1,0 mm. given by JANICKI (1910). The worm is not very long, 47 mm. (JANICKI, 33 mm.) with a maximum width of 3 mm. (JANICKI, 3-3,5 mm.).

The number of testes is few compared with the other members of the genus. There are 42-61 in our specimens and 80 in those of JANICKI.

The cirrus pouch measures 154-234 µ × 54-68 µ. JANICKI's measurements are somewhat smaller, i.e. 150 µ.

	JANICKI, 1910	*Congo material*
Length	17-33 mm.	47 mm.
Breadth	3-3.5 mm.	2,5 mm.-3 mm.
Scolex	850-1000 µ	1060-1480 µ
Suckers	360 µ	344-400 µ
No. testes	80	42-61
Diam. testes	—	90-180 × 76 µ
Cirrus pouch	150 µ	154-234 × 54-68 µ
Eggs/capsule	5-7	

For explanation of abbreviations see p. 147.

(*) See footnote p. 193 on host of *Inermicapsifer hyracis*.

38. **Inermicapsifer pagenstecheri** (SETTI, 1897).

Host: « Daman »: *Dendrohyrax arboreus adolfi-friederici* BRAUER « Rat de lave » (Procavidae): . Gabu-Nioka (28405, 28556); VER EYKEN, 2-III-1949.

The characteristics of this species are the disposition of the testes and the position of the genital pore. The testes extend in one field right across the segment; the genital pore opens posteriorly on the lateral border of the segment.

The measurements for the Congo material, which includes a number of young worms, are as follows:-

Length	13.5-35 mm.
Breadth	2-2,5 mm
Scolex	528-744 µ
Suckers	208-248 µ
No. of testes	84-142
Diam. testes	108-126 × 94-115 µ
Cirrus pouch	288-350 108-133 µ

For explanation of abbreviations see p. 147.

Inermicapsifer schoutedeni EZZAT, 1954.

Host: « Daman » *Dendrohyrax arboreus adolfi-friederici* BRAUER (Procavidae): . . . . . Kisenyi (Ruanda); Dr. J. DEOM, 6-XII-51.

This species that appears to be very closely related to *I. settii* JANICKI, has been described recently by EZZAT (1954), from the above host. Since we have not seen the original specimens, the measurements given in the table have been taken from the original description.

Inermicapsifer sp.

Hosts: *Hystrix galeata* THOM. « Porc-épic » (Rodentia). Nioka (20017); Dr. GILLAIN.
Mastomys coucha SMITH. . . . . : Lulnabourg (23534); J. J. DEHEYN, 1-V-1939.
Hystrix galeata THOM. « Porc-épic » . . . : Gabu-Nioka (28554); VER EYKEN, 14-I-1951.

A specific determination was not possible.

39. **Oochoristica khalili** HAMID, 1932 (fig. 39).

Host: *Philothamnus* (= *Chlorophis*) *heterodermus carinatus* (ANDERSON) (Ophidia): . . . . . Eala (18261); J. GHESQUIÈRE, XI-1936.

There is no scolex in this material, which is contracted.

The mature segments are wider than long, but the gravid ones are almost square. The genital pores are irregularly alternating and open anteriorly on the lateral border of the segment. The cuticle is thick and wrinkled.

The excretory system consists of two pairs of canals, a dorsal pair and a slightly wider, ventral pair. No trace of a transverse, posterior ventral commissure was seen.

The testes number 42 to 58 and are situated to both sides and behind the female glands (fig. 39). The vas deferens is slightly convoluted and leads to the cirrus pouch without forming an external seminal vesicle. Nor is an internal seminal vesicle present. The cirrus pouch is relatively small, 216 µ by 54 µ, and extends to the poral excretory vessels. The genital atrium is deep and narrow.

The vagina opens into the genital atrium behind the cirrus pouch. It follows a straight course, and together with the male genital duct, passes between the poral excretory vessels. As seen most clearly in gravid segments, the vagina empties into a small, spindle-shaped receptaculum seminis. The ovary, almost median in position, is bifid and lobed. Behind it, and between its two wings, is the darker staining, slightly lobed vitelline gland. The shell gland is seen as a group of darkly staining cells between the ovary and the vitelline gland. The development of the uterus is rapid and its appearance was not observed. The segment becomes filled with uterine capsules, each surrounding a single egg containing an hexacanth embryo. The

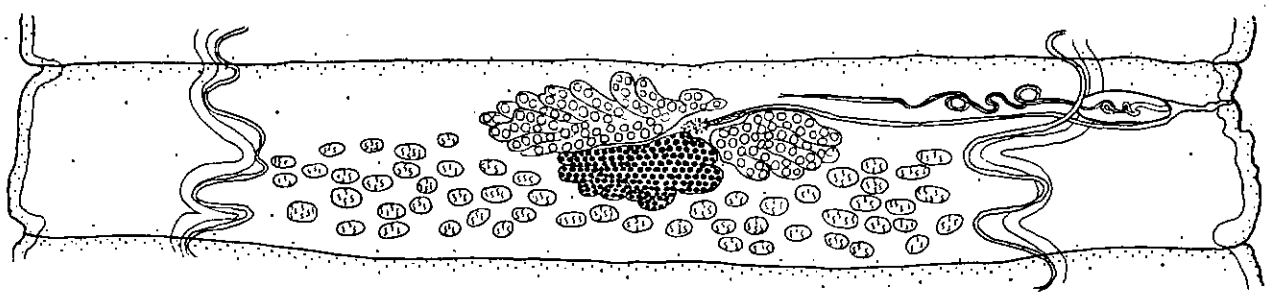


Fig. 39. — *Oochoristica khalili* HAMID from *Philotamnus* (= *Chlorophis*) *heterodermus carinatus* (ANDERSON). dorsal view of mature segment.

capsules extend laterally past the excretory vessels. The diameter of the egg is 43 µ by 36 µ and that of the embryo 21 to 25 µ.

The above features come closest to those given by HAMID (1932) in his description of O. *khalili* from a snake *Psammophis schokari* from the Zoological Gardens, Giza. He gives 44 to 61 as the number of testes, and 286 to 318µ as the lengh of the cirrus pouch. As shown both in his figure 3 and in the text, HAMID has confused the cirrus pouch with the genital atrium. He says: « Vagina, a thin tube opening into the cirrus pouch at its posterior end... ». He also mentions that the shell gland and seminal receptacle were not found.

40. **Oochoristica zonuri** BAYLIS, 1919 (fig. 40).

Host: *Mabuia* [*maculilabris* (GRAY) ?] (Lacertilia): Boma (8452); Dr. RODHAIN.

The total length is 100 mm. and the maximum width is 2 mm.

The scolex, provided with four round suckers, and lacking a rostellum, has a diameter of 680 to 700µ. The suckers have a diameter of 280 to 304µ.

The strobila narrows behind the scolex and segmentation appears almost immediately.

The borders of the segments are entire, and the posterior border does not overlap the succeeding segment. The genital pores are unilateral, and open on the anterior part of the lateral border of the segment.

The testes are 60 to 70 in number (fig. 40) and are disposed in a single field behind the female organs. Laterally, the testes do not extend to the excretory vessels. The vas deferens is coiled; neither external nor internal seminal vesicle is present. The cirrus pouch, measuring 180 to 200µ by 100µ contains the coiled, unarmed cirrus. At its distal end the cirrus pouch extends just past the poral excretory vessels. It opens into a narrow, nonmuscular genital atrium.

The vagina opens posteriorly and just ventrally to the cirrus pouch. The genital ducts pass between the excretory vessels. The vagina leads to a dorsal seminal receptacle situated posteriorly to the ovary. The latter is bifid and compact. Behind it, and between its two wings is the vitelline gland.

The uterus appears rapidly, and almost immediately breaks up into capsules each enclosing one egg. The capsules finally fill the entire segment, extending past the excretory vessels. The eggs are thin shelled, diameter 65 to 68µ by 61 to 65µ, and contain an hexacanth embryo, diameter 50µ by 36µ.

This worm agrees most nearly with *Oochoristica zonuri* BAYLIS, 1919, described from *Zonurus tropidosternum* from Portugese East Africa.

One other species has, to date, been described from the genus *Mabuia*, viz. *O. excelsa* TUBANGUI and MATSILUGÑAN, 1936, from *Mabuia multifasciata* from the Philippines. *O. excelsa* is distinct from the Congo material by its small dimensions and by the locality in which its host was found. The dimensions of

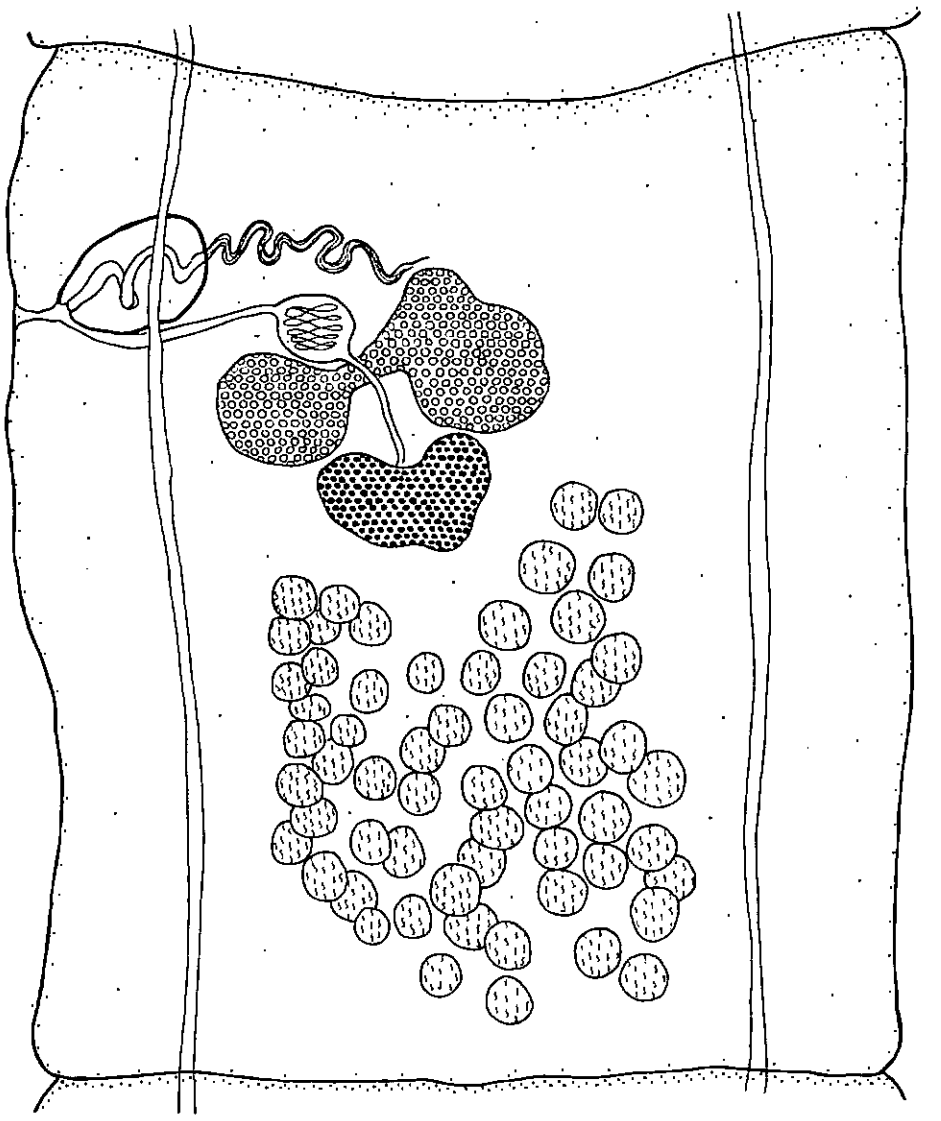


Fig. 40. — *Oochoristica zonuri* BAYLIS from *Mabuia* sp.; whole mount of mature segment.

O. excelsa are as follows:- Maximum length 26 mm., maximum width 1,1 mm. Diameter of scolex 250 µ. Cirrus pouch, 107 to 123 µ by 46 to 57 µ. Number of testes 29. Diameter of onchosphere, 38 to 46 µ by 30 to 34 µ.

THYSANOSOMINAE FUHRMANN, 1907.

41. Avitellina centripunctata (RIVOLTA, 1874).

Hosts: *Cephalophus nigrifrons* GRAY (Ungulata): . . Zoo. Gdns. Antwerp (28221); died on 11-VI-1928.
Damaliscus korrigum ugandae BLAINE «Topi»: Nyakatare (28707); Dr. COLBACK, 3-X-1933.
Syncerus caffer SPARRM., « Buffle noir » . : Nioka (28406); VER EYKEN, 19-V-1949.
« Veau » . . . . . : Nioka (20091); Dr. GILLAIN.

This species, typical of the African fauna (BAER, 1925), has not previously been reported from the Belgian Congo. It is described by JOYEUX and BAER (1936).

42. **Stilesia globipunctata** (RIVOLTA, 1874).

Host: *Cephalophus nigrifrons* GRAY (Ungulata): . . Zoo. Gdns. Antwerp (28010); died on 11-VI-1948.

This worm occurs frequently in Artiodactyls.

43. **Stilesia hepatica** (WOLLFHÜGEL, 1903).

Hosts: « Bœuf » (Ungulata): . . . . . Elisabethville (8465); Dr. VALDONIO, 16-XI-1911.
« Mouton » . . . . . : Elisabethville (28710); LEGROS, II-1912.

This worm is found in large numbers in the biliary canals in sheep, especially in South Africa. This is the first record for the Belgian Congo. For a description of this species see BAER (1927).

MESOCESTOIDIDAE FUHRMANN, 1907.

44. **Mesocestoides dissimilis** BAER, 1933.

Host: *Genetta tigrina* SCHREB. « Genette » (Carnivora): Gabu-Nioka (28312); VER EYKEN, 17-VIII-1948.

This species was described by BAER (1933) from *Myonax sanguineus proteus* (THOMAS), Tanganyika Territory.

The measurements given by BAER are, length 60 mm. maximum breadth, 0,6 mm. Scolex, diameter 220 to 230 µ, suckers oval, measuring 130 to 150 µ by 90 to 100 µ. The cirrus pouch is 80 µ long and 50 µ wide. The testes number about 37.

The characteristic features of this worm are the median genital pore, which opens in the anterior half of the segment, the testes arranged in two lateral fields outside the excretory vessels, the bilobed ovary and vitelline gland, and a single paruterine organ. This author also draws the scolex, a mature segment and a gravid one (1933, fig. 12-14).

Mesocestoides sp.

Host: *Thos adustus* SUND. « Chacal » (Carnivora): . Gabu-Nioka (28283); VER EYKEN, 4-II-1948.

It was not possible to make a specifie determination.

DILEPIDIDAE FUHRMANN, 1907.

DILEPIDINAE STILES, 1896.

45. **Cyclorchida omalancristota** (WEDL, 1855).

Host: « Spatule » *Platalea alba* SCOP. (Plataleidae): Banane (25924); Dr. BERVOETS, 1947.

The rostellar hooks, arranged in a double crown, have a very characteristic shape (JOYEUX and BAER 1936, fig. 306). The base of the hook is very large, and is surmounted by a small, curved blade.

This is the only species of the genus.

46. **Dilepis bycanistis** n. sp. (fig. 41-42).

Host: *Bycanistes sharpei sharpei* (ELLIOT) (Bucerotidae): Mpozo, near Matadi (19966); Dr. E. DARTEVELLE, II-1937.

There were several specimens of this worm. The material was for the most part very contracted.

The scolex of one contracted worm measures 648 µ in diameter, mounted in Canada balsam. The largest scolex has a diameter of 715 µ. The four unarmed, circular suckers have a diameter of 200 to 274 µ. The rostellum, evaginated in all the specimens, is cone-shaped and measures 700 µ in length — the base of the cone, diameter 208 µ, forms the distal end which bears a double crown of hooks. The rostellar sac, which extends backwards behind the scolex into the segmented region, has a maximum diameter of

Fig. 41. — *Dilepis bycanistis* n. sp. from *Bycanistes sharpei* (ELLIOT): rostellar hooks.

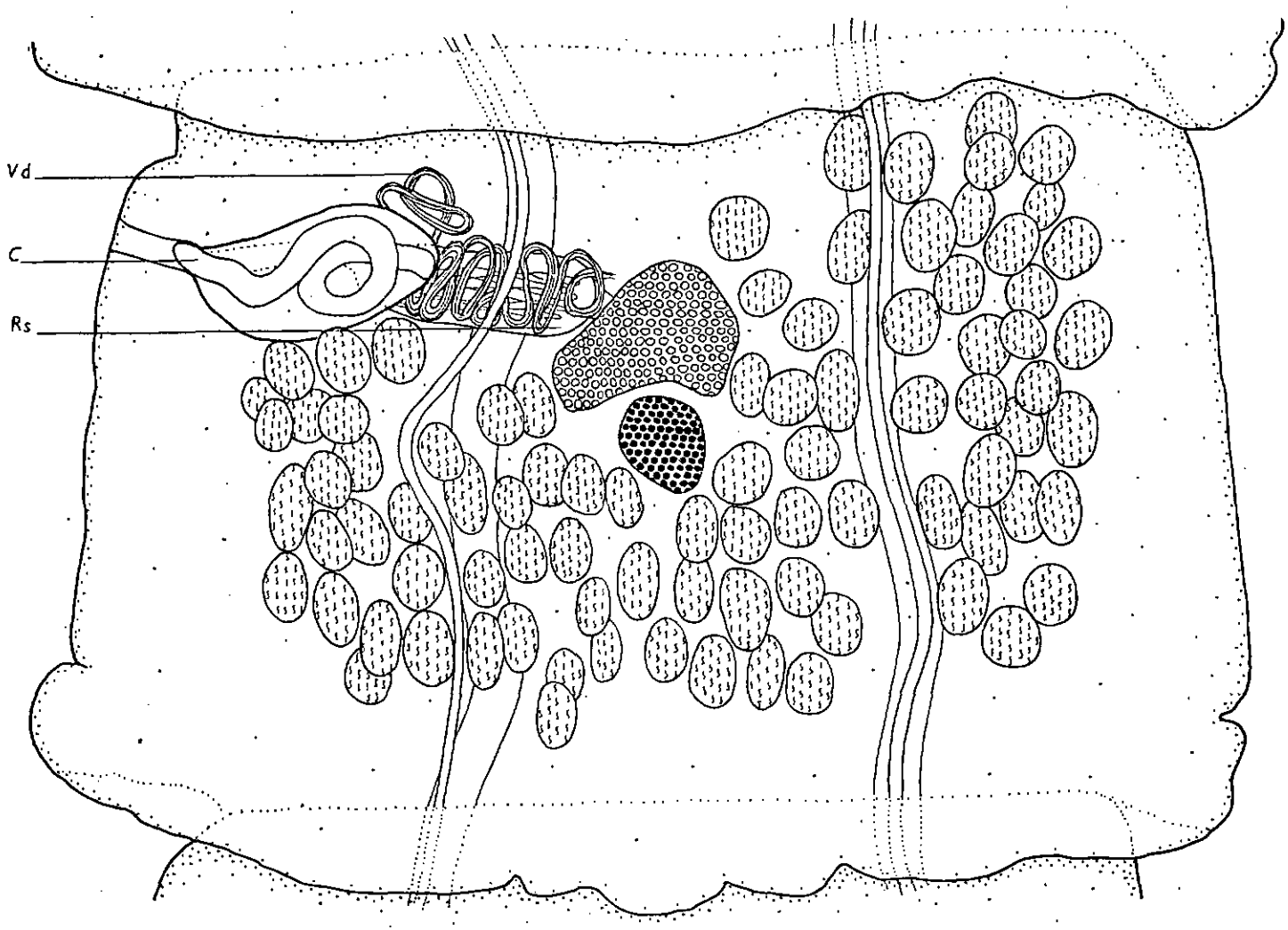


Fig. 42. — *Dilepis bycanistis* n. sp. from *Bycanistes sharpei* (ELLIOT): dorsal view of mature segment.

400 µ. There are 24 to 26 rostellar hooks. Those of the anterior crown, mounted in Berlese, measure 158 to 176 µ by 90 to 97 µ, and those of the posterior crown 187 to 189 µ by 112 to 115 µ. The form of the hooks is seen in fig. 41.

Segmentation beings immediately behind the scolex. The genital pores are unilateral and open in the anterior part of the lateral horder of the segment.

The excretory system is of the usual type; a pair of narrow, dorsal vessels and a pair of wider, ventral vessels.

The dorsally situated testes are numerous, 70 to 90, and occupy most of the segment, extending laterally beyond the excretory vessels and surrounding the female glands on three sides. The vas deferens is convoluted and enters the cirrus pouch without forming an external seminal vesicle. Neither is an internal seminal vesicle present. The relatively small cirrus pouch is rounded in form, particularly in the contracted segments. It attains a length of 126 to 180 µ and a maximum width of 79 to 104 µ and extends almost to the poral excretory vessels. The cirrus pouch contains the coiled cirrus which appears to be unarmed.

The female organs reach maturity after the male organs, but develop very quickly. The vagina passes ventrally to the cirrus pouch, and together with the vas deferens passes between the excretory vessels. In fully mature segments the lumen of the vagina becomes enormously dilated and filled with spermatozoa. The vitelline gland, situated ventrally to the proximal end of the dilated vagina, is compact and granular in appearance. Surrounding it is the ovary (fig. 42). The persistant uterus developps very rapidly — it is at first saclike and then it becomes lobed. No completely gravid segments are present and so dimensions of the eggs are not given.

The characters which refer this species to the genus *Dilepis* WEINLAND, 1858, are: scolex bearing two crowns of rostellar hooks, unilateral genital pores, genital ducts passing between the excretory vessels, numerous testes and persistant uterus.

To date no member of the genus *Dilepis* has been recorded from the Bucerotiformes.

47. **Dilepis macrosphincter** FUHRMANN, 1909 (fig. 43).

Host: *Pyrrherodia* (= *Ardea*) *purpurea purpurea* L. (Ardeidae) : . . . . . : Ile de Mateba (18598) ; Dr. E. DARTEVELLE, IV-1937.
Pyrrherodia » » » : Shinkakasa (18895) ; Dr. E. DARTEVELLE, V-1937.

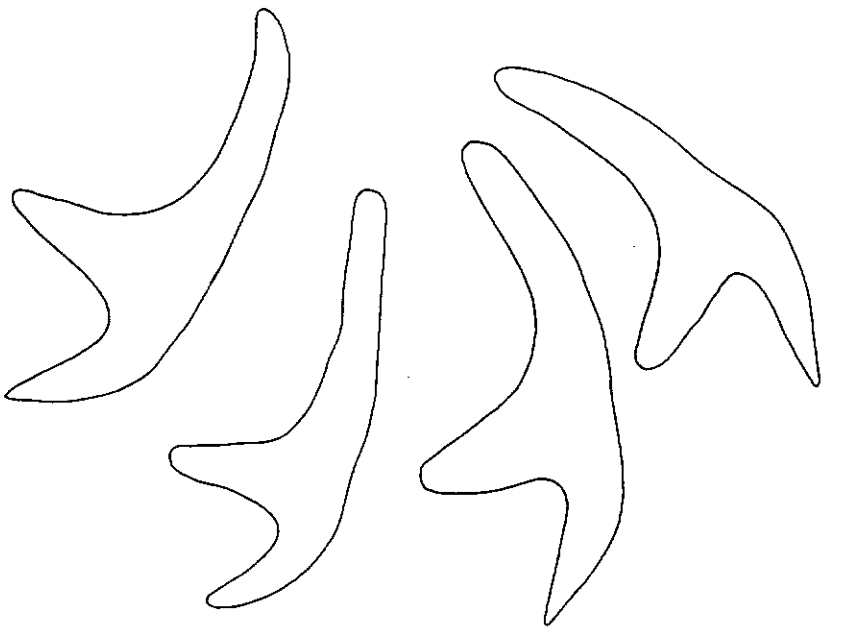


Fig. 43. — *Dilepis macrosphincter* FUHRM. from *Ardea purpurea purpurea* L.; rostellar hooks seen in profile.

This species is recognised by the shape (fig. 43), number and size of the hooks i.e. 20 hooks, 42 to 49 µ in length, and also by the large sphincter surrounding the genital atrium, drawn by FUHRMANN (1909 a, fig. 21).

48. **Echinorhynchotaenia tritesticulata** FUHRMANN, 1909 (fig. 44-52).

Hosts: *Anhinga rufa rufa* (DAUD.) (Anhingidae): . . Ile des Princes (18878); Dr. E. DARTEVELLE, III-1937.
» » » » . . . . . : Leopoldville-Kalina (25692); Dr. E. DARTEVELLE, 1947.
Oedicnemus sp. (Burhinidae-Oedicnemidae)
(Mistake in host label?): . . . . . Ile de Mateba (18639); Dr. E. DARTEVELLE, IV-1937.

This parasite is specific to *Anhinga* species, for which reason we supose that tube n°. 18639 has been incorrectly labelled. As *Anhinga rufa rufa* is the only species of the genus found in tropical Africa the material labelled « Unknown » must in fact have come from this host.

Echinorhynchotaenia tritesticulata has already been reported from *Anhinga rufa rufa* from the Belgian Congo by SOUTHWELL and LAKE (1939).

The description which follows is based on material from *Anhinga rufa rufa* (DAUD.) from the Cameroons.

The worm measures 90 mm. in length, and has a maximum width of 2 mm.

The scolex (fig. 44), 367 µ in diameter, is provided with four, unarmed, more or less circular suckers, each 160 µ in diameter. The rostellum is long, measuring 560 µ in length and 56 µ in breadth, and when withdrawn is coiled within the muscular rostellar sac, (fig. 45). The armature of the rostellum consists of a double crown of hooks and numerous rose-thorn shaped spines running the length of the rostellum.

The hooks (fig. 46b), 24 in number, are arranged in two crowns, the hooks of one crown differing in size from those of the other. The large hooks measure 13,5 µ by 9 µ, and the small ones 11,2 µ by 8,4 µ.

The spines (fig. 46a) are arranged in straight lines along the length of the rostellum. In the invaginated rostellum the spines lying immediately in front of the hooks measure 7 µ with a base of 5,6 µ. These spines are the smallest and the size gradually increases towards the most distal end where the spines measure 12,6 µ by 11,2 µ.

The segmented region follows almost immediately behind the scolex. All the proglottids are broader than long, but become relatively narrower as they mature.

The muscular system is well developed (fig. 47). Transverse muscle fibres separate the cortex from the medulla, which is supplied with single, dorso-ventral fibres.

The cortical muscles are grouped in two strongly marked layers. The inner layer consists of about 50 to 60 bundles of fibres, and the outer layer consists of about 100 to 110 smaller bundles.

The excretory system is composed of a pair of narrow dorsal vessels, a pair of wider, thin-walled, ventral vessels, and a segmental, ventral, transverse commissure.

The genital ducts pass between the dorsal and ventral excretory vessels.

The nervous system consists of a pair of longitudinal fibres passing laterally to the excretory vessels.

The genital pores are unilateral and open into a genital atrium. From the three testes the vasa efferentia collect into the vas deferens, which, only slightly convoluted, leads into a well developed, muscular cirrus pouch, which at its maximum size measures 480 µ by 160 µ. After entering the cirrus pouch the vas deferens expands into a vesicle (fig. 48). From this vesicle a narrow duct, leading backwards joins a small muscular pouch, the seminal vesicle proper, which thus lies beside the expansion of the vas deferens. From the seminal vesicle leads the non-convoluted cirrus, which is armed with spines measuring 7 µ in length. The musculature of the cirrus pouch is described by FUHRMANN (1909a). His description notes the presence of a cirrus pouch retractor muscle, and of protractor muscles inserted along the lateral border of the segment. The muscular cirrus is also provided with a rectractor inserted at the distal end of the cirrus pouch. In the poral portion of the cirrus pouch, FUHRMANN describes numerous fibres inserted along its walls, to which also are ascribed the function of its retraction.

No external seminal vesicle is present. The testes are three in number, and as seen in transverse sections, attain the maximum size of 160 µ by 80 µ. The position of the testes is variable, as seen by FUHRMANN's account (loc. cit.).

The vagina opens from the genital atrium ventral to the cirrus pouch. It then follows a straight course posterior to the cirrus pouch, and opens into a well formed receptaculum seminis. The ovary is bilobed, each lobe being subdivided. The yolk gland is compact and situated posterior to the ovary. The Mehlis' gland is well developed.

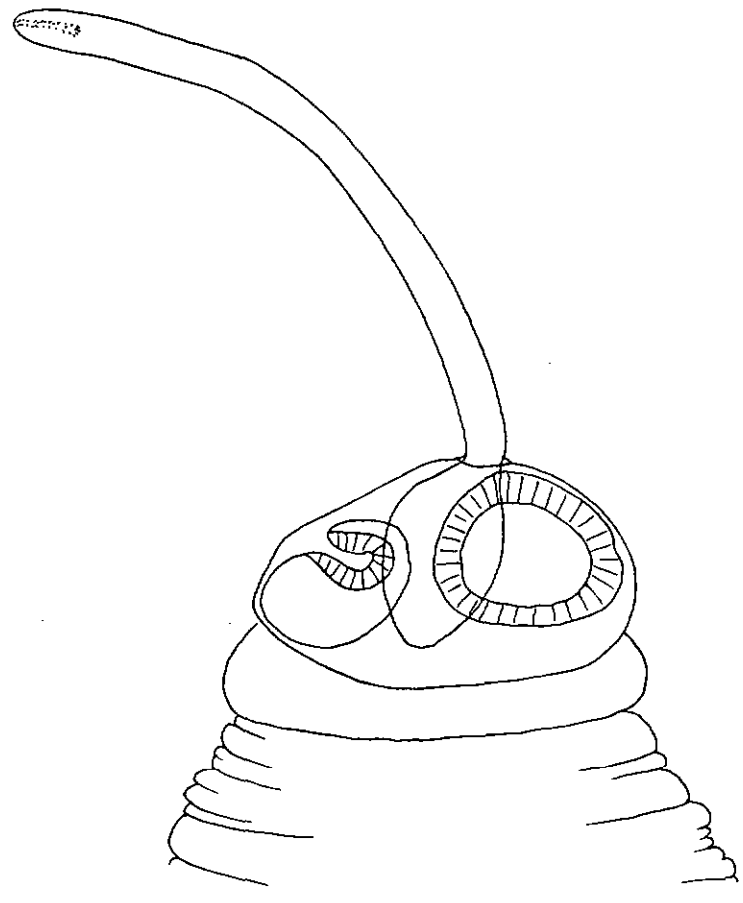


Fig. 44. — *Echinorhynchotaenia tritesticulata* FUHRM. from *Anhinga rufa rufa* (DAUD.); scolex with rostellum evaginated.

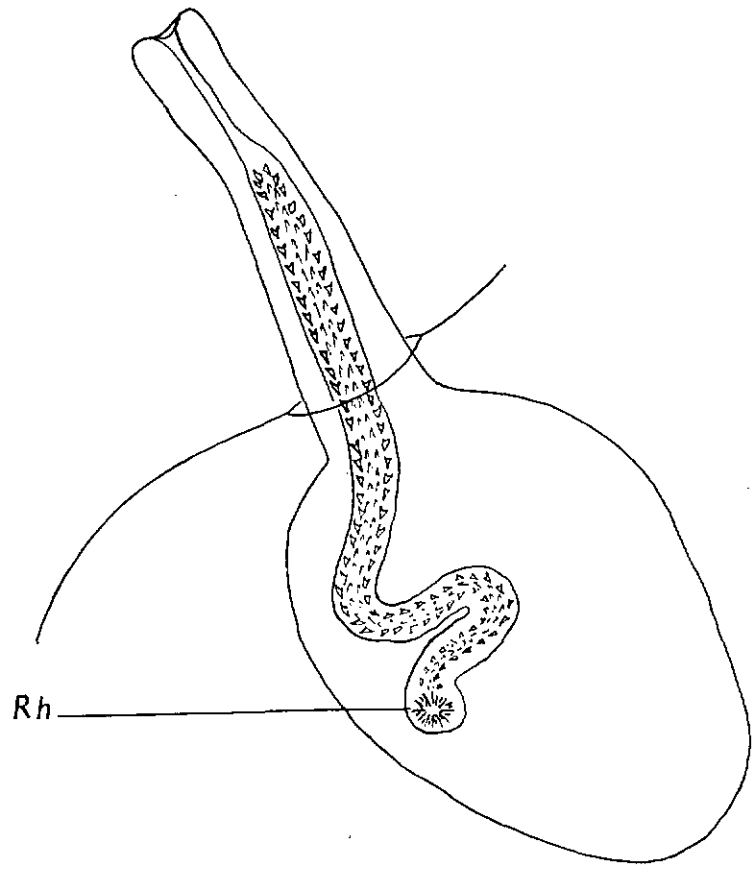


Fig. 45. — *Echinorhynchotaenia tritesticulata* FUHRM. from *Anhinga rufa rufa* (DAUD.); rostellar sac with rostellum almost entirely withdrawn.

The uterus first appears as a small sac (fig. 49a) between the ovary and the yolk gland. This sac then assumes a dumb-bell form, (fig. 49b) and finally extends dorsally past the excretory vessels, to occupy the entire segment (fig. 50). The uterus is persistant, and remains lobed.

Other material was then examined, comparative measurements were made, and the table below drawn up. This material consisted of the type material from the White Nile, preparations of material from Dahomey, a specimen from an *Anhinga* from Mamwe, Belgian Congo, and also material from the Celebes described by DAVIS (1945) under the name *Hymenolepis furcouterina.*

On comparing the scolex and the internal anatomy of these specimens no doubt is left as to their similarity to the type and thus to their identity.

As the specimens from the Cameroons and the Belgian Congo were entire it was possible to examine minutely the structure of the scolex. This examination revealed the presence of a double crown of hooks,

Fig. 46. — *Echinorhynchotaenia tritesticulata* FUHRM. from *Anhinga rufa rufa* (DAUD.);
(a) rostellar spines, (b) rostellar hooks.

as described above, in addition to the numerous rose-thorn shaped spines which cover the length of the rostellum.

In the original description FUHRMANN (1909a.) does not mention the double crown of rostellar hooks, although he describes the spines. However, on examination of the type material the crown of hooks was seen and measurements were made (fig. 51). SOUTHWELL and LAKE (1939) also omit a description of the hooks.

JOYEUX and BAER (1928) and JOYEUX and GAUD (1945) were the first to draw attention to the hooks, in a description of a scolex with an evaginated rostellum.

DAVIS (1945) describes a tapeworm from *Anhinga melanogaster* PENNANT, collected from Lake Lindu, Celebes, the specimen being without a scolex. She places it in the genus *Hymenolepis*, calling it *Hymenolepis furcouterina.*

However, on examination of this material - U. S. National Museum No. 36928 - the anatomy of the strobila was found to agree in all respects with *Echinorhynchotaenia tritesticulata.* Thus *Hymenolepis furcouterina* DAVIS, 1945 becomes a synonym of *Echinorhyncotaenia tritesticulata* FUHRMANN, 1909.

FUHRMANN (loc. cit.) in his description remarks that the structure of the reproductive organs of *E. tritesticulata* strongly recalls that of the hymenolepids. Both FUHRMANN (loc. cit.) SOUTHWELL and LAKE (loc. cit.) and DAVIS (loc. cit.) describe an external seminal vesicle. However, on careful examination of the material no true external seminal vesicle was observed. SOUTHWELL and LAKE also comment, (1939) « No receptaculum seminis was observed on the vagina in our section, which were made from slightly immature segments (figure 7a) ». However in figure 7a — a transverse section — a receptaculum seminis is drawn and labelled.

The absence of an external seminal vesicle, the arrangement of the longitudinal muscles and the presence of a double crown of rostellar hooks are features which contrast with the characters of the hymenolepids.

As diagnostic features of the genus *Echinorhynchotaenia*, FUHRMANN gives: « *Dilepininae* avec un rostre en forme de massue, qui est fortement recouvert de crochets sur toute sa longueur. Les pores génitaux sont unilatéraux. Les conduits sexuels passent entre les deux vaisseaux excréteurs. Testicules peu nombreux. L'utérus sacciforme et lobé ». To these features it is necessary to add: A double crown of rostellar hooks; absence of external seminal vesicle.

The only other species of the genus *Echinorhynchotaenia* at present reported is *E. biuncinata* JOYEUX and BAER, 1942, a cysticercoïd found in an Ephemerid-larva in Morocco. This form possesses a single crown of 10 hooks (fig. 52). It therefore becomes necessary to remove this species from the genus *Echinorhynchotaenia* and to assign it to another genus when the adult has been found. It is to be noted that the bird genus *Anhinga* does not occur in Morocco.

The distribution of this worm is interesting. As far as has yet been reported, it is found only in birds of the genus *Anhinga* BOISSON, in which it appears to be the only tapeworm parasite. The species of the genus *Anhinga*, the « darters » or « snake-birds » are determined geographically, and have representatives in Palestine, West and South Africa, Madagascar, India and Ceylon to the Celebes, Australia and New Guinea, and the New World from Texas to the North Argentine. The worm has so far only been reported form the African and the Celebes species, but its presence is to be expected in the others.

49. **Paricterotaenia coronata** (CREPLIN, 1829) (fig. 53-54).

Syn.: *Taenia coronata* CREPLIN, 1829.
Choanotaenia coronata (CREPLIN) FUHRM., 1908.
Icterotaenia c. (CREPLIN) BAER, 1925.
Paricterotaenia c. (CREPLIN) FUHRM., 1932.
Icterotaenia delachauxi BAER, 1925.
Paricterotaenia delachauxi (BAER) FUHRM., 1932.
Icterotaenia delachauxi mesacantha LOPEZ-NEYRA, 1935.
Choanotaenia megistacantha FUHRM., 1909.
(?) *Ch. magnihamata* BURT., 1940.

Host: *Tringa* (= *Totanus*) *nebularia* (GUNN.) (Charadriidae) : . . . . . Banane (22120), Dr. E. DARTEVELLE, I-1938.
Pternistis afer cranchii (LEACH) (Phasianidae): Kitomhe, near Banane (22119), Dr. E. DARTEVELLE, (mistake in host?)

Two strobila, both with scoleces, and one with gravid segments, together with several other scoleces and fragments were present.

The scolex, mounted in Canada balsam, is 860 to 1000 µ wide. The unarmed suckers measure 206 to 300 µ by 137 to 180 µ. The rostellum has a diameter of 300 to 550 µ. There are 24 to 28 rostellar hooks (fig. 53) arranged in what appears to be a single crown. The hooks are large and measure 360 to 388 µ from tip of blade to tip of handle and 164 to 184 µ across the base.

The genital pores are irregularly alternating. The excretory system is of the normal type with a pair of narrow, dorsal longitudinal canals, and a pair of wider ventral vessels united in each segment by a posterior, transverse commissure.

There are 12 to 25 testes, arranged in a single field stretching dorsally across and behind the female glands, and extending to the excretory vessels on each side. The vas deferens is highly convoluted and enters the cirrus pouch without forming an external seminal vesicle. Neither is an internal seminal vesicle present. The cirrus pouch, 320 to 400 µ by 40 to 48 µ, opens somewhat posteriorly to the middle of the lateral border of the segment, and is directed obliquely forwards. It is long and thin and not very muscular, and it contains a looped, unarmed cirrus. The genital atrium is small. There does not appear to be a bunch of setae at the base of the cirrus.

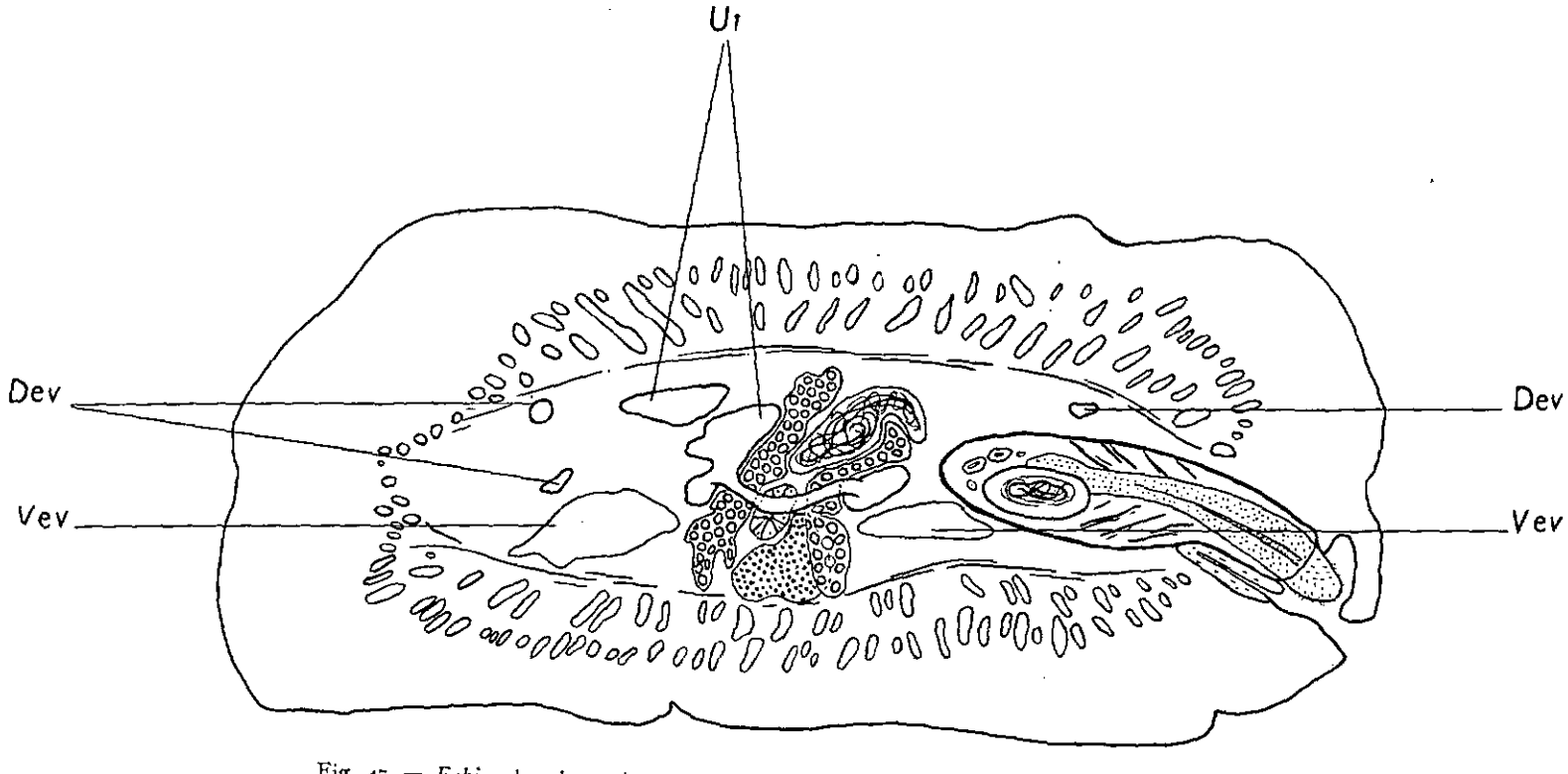


Fig. 47. — *Echinorhynchotaenia tritesticulata* FUHRM. from *Anhinga rufa rufa* (DAUD.); transverse section of mature segment.

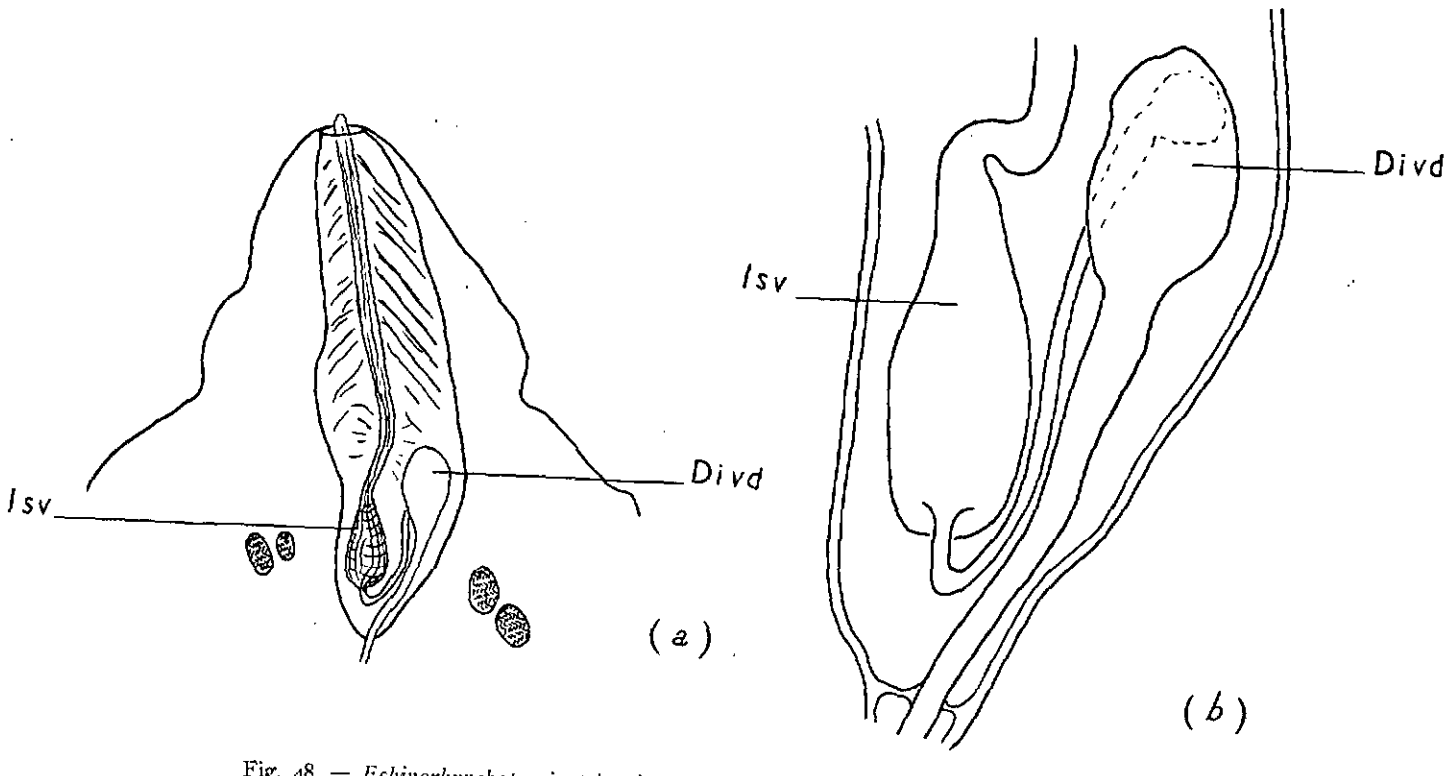


Fig. 48. — *Echinorhynchotaenia tritesticulata* FUHRM. from *Anhinga rufa rufa* (DAUD.); (a) diagram of cirrus pouch (b) detail of cirrus pouch showing internal seminal vesicle and the dilation of the vas deferens.

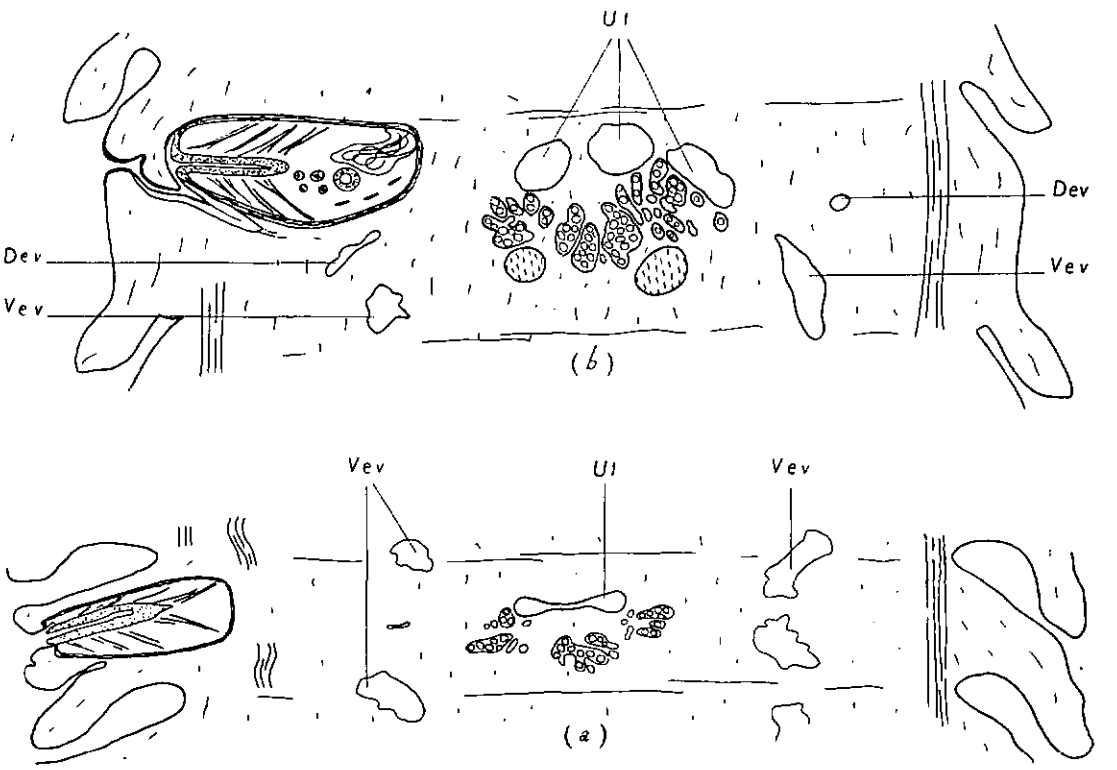


Fig. 49. — *Echinorhynchotaenia tritesticulata* FUHRM. from *Anhinga rufa rufa* (DAUD.); longitudinal section (a) showing apparition of the uterus (b) showing developing uterus.

Fig. 51. — *Echinorhynchotaenia tritesticulata* FUHRM.; from *Anhinga rufa rufa* (DAUD.); rostellar hooks of type material.

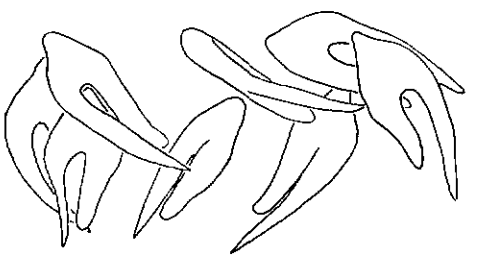
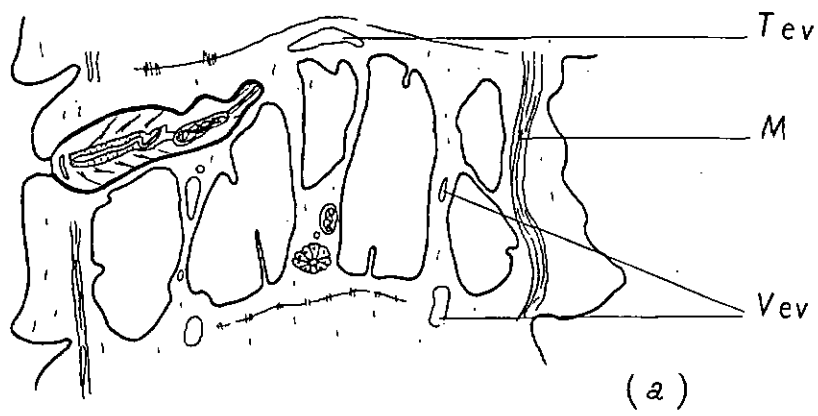
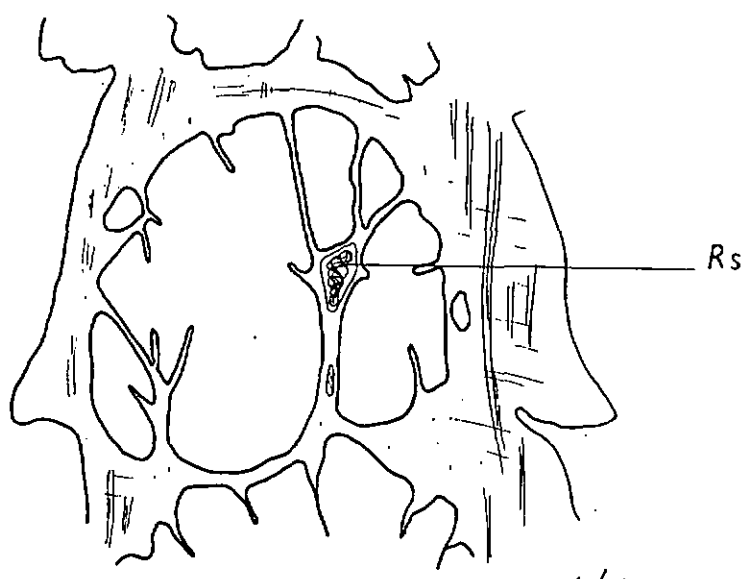


Fig. 52. — *Echinorhynchotaenia bimcinata* JOYEUX et BAER; from Ephemerid larva — rostellar hooks of cysticercoid.





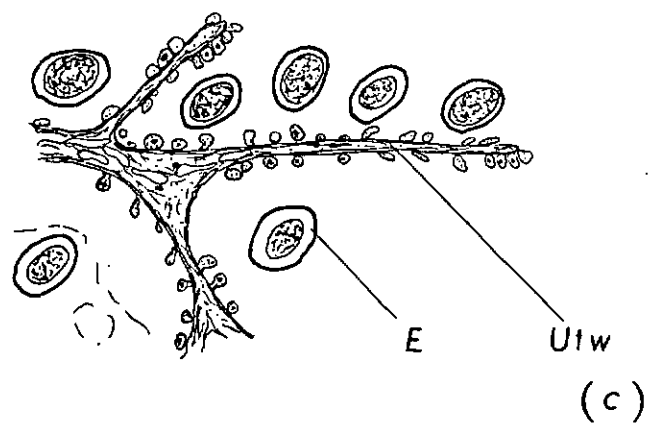


Fig. 50. — *Echinorhynchotaenia tritesticulata* FUHRM. from *Anhinga rufa rufa* (DAUD.); longitudinal section showing (a) and (b) uterus expanding to fill segment (c) detail of uterine wall and eggs.

Echinorhynchotaenia tritesticulata FUHRMANN, 1909.

Measurements given by	FUHRM. 1909	Personal measurements of type	Personal measurements	Personal measurements	Personal measurements	DAVIS, 1945	Personal measurements of DAVIS' material	SOUTHWELL & LAKE 1939
Length	300 mm.	—	45 mm.	90 mm.	125 mm.	303 mm.	—	70-80 mm.
Breadth	4-5 mm.	4.5 mm.	5 mm.	2 mm.	3 mm.	3,12 mm.	—	6 mm.
Scolex	300 µ	—	360 µ	376 µ	368 µ	—	—	—
Suckers	120 µ	—	136 µ	160 µ	160 µ	—	—	370 µ
Rost. sac.	240 × 140 µ	—	160 × 100 µ	—	160 × 120 µ	—	—	—
Rostellum	400 × 40 µ	—	980 × 40 µ	560 × 56 µ	720 × 45 µ	—	—	560 × 40 µ
Rost. spines	—	7 × 6 — 13 × 11,2µ	—	7 × 5,6 — 12,6 × 11,2 µ	7 × 5.6 µ	—	—	7,4 µ
No. of hooks	—	—	—	24	24	—	—	—
Large hook	—	14 × 9.8 µ	—	13.5 × 9 µ	14 × 9 µ	—	—	—
Small hook	—	11,2 × 8,4 µ	—	11,2 × 8,4 µ	10,5 × 8.4 µ	—	—	—
Bundles in inner muscle layer	—	50	50-60	50-60	—	—	50-60	50
Bundles in outer muscle layer	—	100	100-110	100-110	—	—	100-110	100
Testes	3	3	3	3	3	3	3	3
Diam. in T. S.	—	144 × 65 µ	155 × 90 µ	160 × 80 µ	—	—	—	—
Cirrus pouch	—	580 × 140 µ	500 × 140 µ	480 × 160 µ	400 × 184 µ	555-561 × 150-168	480 × 140 µ	—
Host	*Anhinga rufa rufa* (DAUDIN)		*A. rufa rufa* (DAUD.)	*A. rufa rufa* (DAUD.)	*A. rufa rufa* (DAUD.)	*Anhinga melanogaster* PENN.		*A. rufa rufa* (DAUD.)
Locality	White Nile		Dahomey	Cameroons	Belgian Congo	Celebes		Belgian Congo

For explanation of abbreviations see p. 147.

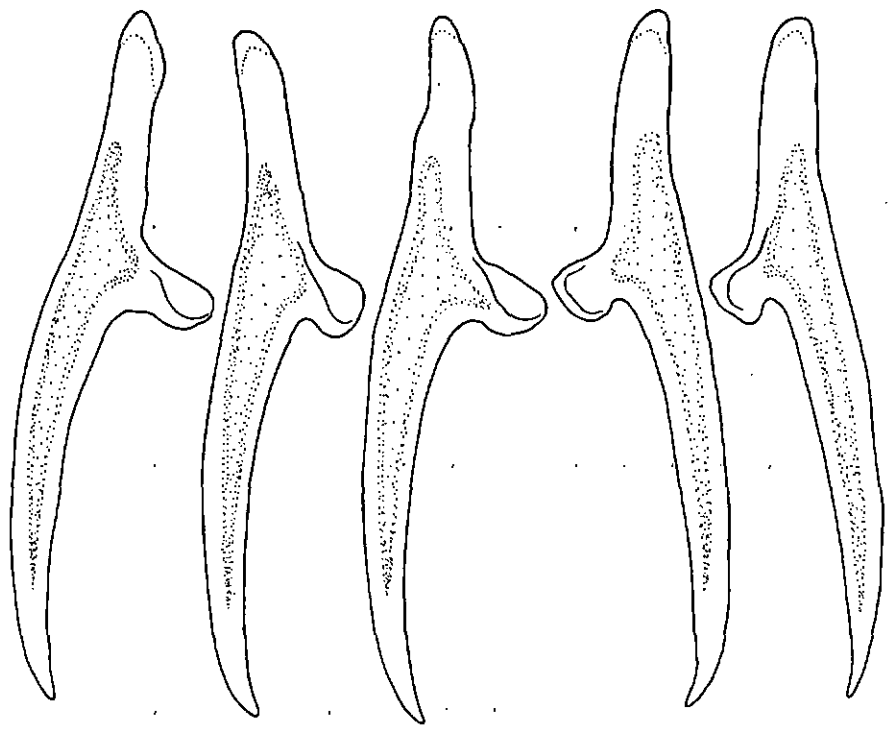


Fig. 53. — *Paricterotaenia coronata* (CREPLIN) from *Charadriiform* (host n° 22119); rostellar hooks seen in profile.

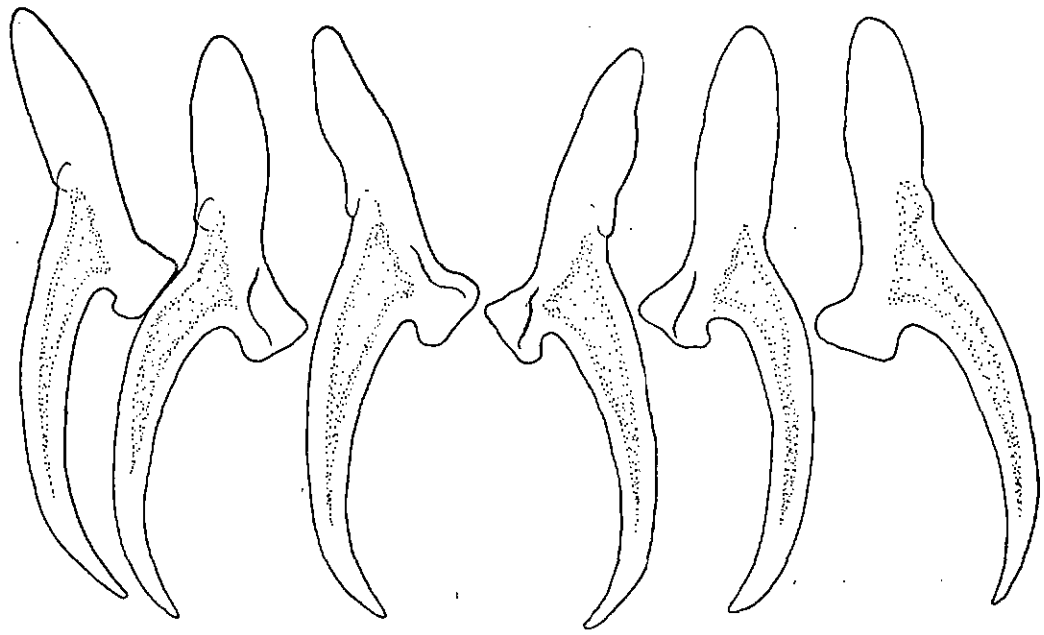


Fig. 54. — *Paricterotaenia coronata* (CREPLIN); rostellar hooks of CREPLIN's type material.

The vagina opens from the genital atrium behind the cirrus pouch, and lies close to the latter, directed obliquely forwards. In its proximal part it dilates to form a receptaculum seminis. The ovary is bifid, the aporal lobe being more or less median in position; behind it lies the vitelline gland. The Mehlis' gland was not observed. Although no completely ripe segments were present, the uterus appears to be persistant.

FUHRMANN and BAER (1943), having re-examined the scolex of CREPLIN's type material, established the following synonymy:- *P. coronata* (CREPLIN, 1829) syn. *P. delachauxi* (BAER, 1925), *P. delachauxi mesacantha* (LOPEZ-NEYRA, 1935). They also establish that what has previously been described under the name *P. coronata* is in fact *P. arquata* i.e. *P. arquata* (CLERC, 1906) syn. *P. coronata*, auct. They give the length of the rostellar hooks of *P. coronata* (measured from the type material) as 300 to 320 µ, and that for *P. arquata*, measured from material from North Somaliland as 126 to 133 µ.

The type material of CREPLIN was re-examined (fig. 54) and following measurements found:- 21 hooks, 308 to 320 µ long i.e. dimensions which agree exactly with those found by FUHRMANN and BAER (1943).

KRABBE (1896) redescribes *Taenia coronata*. He gives the number of hooks as 9, 110 to 120 µ in length. KRABBE was mistaken in ascribing this worm to the species *Taenia coronata*, and it was at this point that the confusion in the measurements for this species arose.

CLERC, (1906) describes a worm from *Numenius arquata* (L.), from the Urals. Using KRABBE's description as a basis of comparason, he creates a new species, viz. *Choanotaenia arquata*, giving 18 to 20 as the number of hooks, with the same length as those recorded by KRABBE, i. e, 110 to 120 µ. It would seem that despite the discrepancy in the number of hooks, the worm described by KRABBE was in fact the same as *P. arquata*, later described by CLERC.

BURT (1940) redescribes as *P. coronata* a worm from *Burhinus oedicnemus indicus* (SALVAD.), from Ceylon. He gives the number of hooks as 10, and their length as 116 to 120 µ. This worm is actually *P. arquata*. In the same paper, BURT describes a new species, *Choanotaenia magnihamata*, from the same host. This species has 22 hooks, 300 µ long and BURT mentions that the uterus breaks up into egg capsules. The shape of the hooks (BURT, 1949, fig. 15) and their measurements correspond with *P. coronata*. The distinction, however, between the genera *Paricterotaenia* and *Choanotaenia* is that in the former the uterus is persistant and sacciform, whereas in the latter it breaks up into capsules, each containing one egg. BURT's species must therefore rest in the genus *Choanotaenia*. It should be noted that the full development of the uterus of *Paritcterotaenia coronata* is not yet known. FUHRMANN (1932, p. 109) says, « Il n'y a pas de capsules utérines, mais l'utérus semble être très fortement lobé ». There is, however, no bunch of setae at the base of the cirrus, a character which seems to be characteristic of the genus *Choanotaenia*.

LOPEZ-NEYRA (1952) abolishes the genus *Paricterotaenia* FUHRMANN, 1932 and places *Taenia coronata* in the genus *Choanotoenio* with the following synonyms (LOPEZ-NEYRA 1952, p. 41):- *Taenia coronata* CREPLIN, 1829, *Icterotoenia coronata* (CREPLIN) BAER, 1925 *Paricterotaenia coronata* (CREPLIN) FUHRMANN, 1932. For *P. coronata* LOPEZ-NEYRA gives 10 hooks, 110 to 128 µ long, but these measurements do not refer to *P. coronata* as we have just shown.

DIPYLIDIINAE STILES, 1896.

50. **Choanotaenia corvi** JOYEUX, BAER and MARTIN, 1937.

Host: *Corvus albus* MÜLL. (Corvidae): . . . . . Kisenyi. Ruanda (28919); Dr. J. DEOM, 16-IX-1951.
» » . . . . . : Boma (19205); Dr. E. DARTEVELLE, V-1937.
» » . . . . . : Manzadi, Zadi-Kakongo (21682-84); Dr. E. DARTEVELLE, VI-1937.

No scolex was present.

The bunch of setae at the base of the cirrus, the irregularly alternating genital pores and the egg capsules each containing one egg are characteristic of the genus *Choanotaenia*.

The measurements correspond with those given by JOYEUX, BAER and MARTIN (1937) for *Ch.* corvi which they found in *Corvus rhipidurus* HARTERT from North Somaliland. The measurements of the Congo material and those for *Ch. corvi* are given in the table below.

	Ch. corvi	*Congo material*
Max. breadth	4 mm.	3 mm.
No. testes	32-35	50-55
Cirrus pouch	140 × 50 µ	90-108 × 50 µ
Size of egg	50-53 µ	49 × 38 µ
Size of embryo	33-37 µ	28 × 21 µ
Length of embryonic hooks	17 µ	17 µ

For explanation of abbreviations see p. 147.

51. **Choanotaenia polyorchis** (KLAPTOCZ, 1908) (fig. 55).

Host: « Milan » *Milvus migrans tenebrosus* GRANT and PRAED (Aquilidae = Accipitridae) : . . . Gabu-Nioka (28377); VER EYKEN, 4-II-1948.

This worm occurred together with *Idiogenes flagellum* (GOEZE, 1782) in the intestine of a « Milan ».

The specimens consisted of an entire worm, and a strobila without a head. The material was contracted. Gravid segments were present.

The scolex has a diameter of 366 µ and is provided with four suckers of diameter 137 to 169 µ, armed with several rows of small spines around the border. The rostellum, diameter 59 µ, is armed with 20 hooks

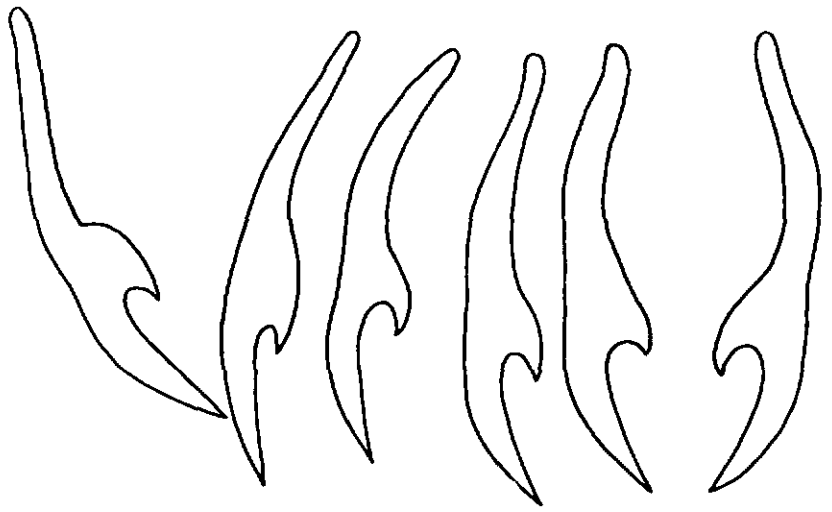


Fig. 55. — *Choanotaenia polyorchis* (KLAPTOCZ) from *Milvus migrans tenebrosus* GRANT and PRAED; rostellar hooks.

which appear to be arranged in a single crown. The hooks have a characteristic shape (fig. 55) and measure (in Berlese) 27-29 µ from the tip of the guard to the tip of the blade, and 18-21 µ from the tip of the guard to the tip of the handle.

The entire worm has a length of 35 mm. and a maximum breadth of 1 mm. Segmentation begins immediately behind the head. The genital pores are irregularly alternating.

The testes number 20 to 30; the cirrus pouch is typical of the genus. It is retort shaped, and beyond its narrow distal portion is a male atrium lined with long, fine setae, which surround the cirrus. The cirrus pouch measures 108 to 148 µ in length and in one segment reaches a length of 162 µ. The maximum width is 97 to 100 µ. The bundle of setae is 70 µ in length.

The eggs, containing hexacanth embryos, are thickshelled and each is surrounded by a very fine, closely adhering egg capsule. The oval eggs, measured in Canada balsam measure 61 µ by 54 µ. The embryos measure 40 µ by 33 µ.

To date two species of *Choanotaenia* RAILLIET, 1896 are reported from accipitriform birds, *Ch. polyorchis* (KLAPTOCZ, 1908) and *Ch. fuhrmanni* SKRJABIN, 1915.

Choanotaenia polyorchis (KLAPTOCZ, 1908) BAER, 1925 syn. *Monopylidium infundibuliformis* var. *polyorchis* KLAPTOCZ, 1908, was described by KLAPTÖCZ from *Milvus migrans tenebrosus* GRANT and PRAED from Africa. KLAPTOCZ' measurements are given in the table below.

In 1915 SKRJABIN described *Choanotoenia fuhrmanni* from *Polyborus* sp. from Paraguay. The measurements he found are also given in the table. In neither of these two sets of material were gravid segments present. FUHRMANN and BAER (1943) report *Ch. fuhrmanni* from *Milvus migrans* (BODD.) from Ethiopia and suggest the possibility that KLAPTOCZ' variety *polyorchis* and SKRJABIN's *Ch. fuhrmanni* are one and the same species. The material described by FUHRMANN and BAER (1943) was examined, and is seen to correspond with the Belgian Congo material.

On comparing the descriptions of KLAPTOCZ and SKRJABIN one is struck by the similarity of the measurements and of the drawings. There is a discrepancy in the number of testes, 35-40 for *Ch. polyorchis* and 20 to 25 for *Ch. fuhrmanni*. The Ethiopian material, however, possesses an intermediate number, 24 to 26, It would seem that this character is subject to individual variation. We are of the opinion that these two worms belong to the same species and propose that *Choanotaenia fuhrmanni* SKRJABIN, 1915 become a synonym of *Choanotaenia polyorchis* (KLAPTOCZ, 1908) BAER, 1925.

ORTLEPP (1938) described a new species, *Unciunia travassosi* from *Milvus migrans* (BODD.) from the Transvaal. The genus *Unciunia* is characterized by the small glandular rostellum devoid of hooks. The type species is *Unciunia trichocirrosa* SKRJABIN, 1915 from *Polyborus* sp. from the Paraguay. The material was examined and the anatomy is seen to correspond with that of *Choanotaenia*. Bearing in mind the genera *Taenia* and *Hymenolepis*, in which both armed and unarmed species are present, we propose that the genus *Unciunia* be assimilated to the genus *Choanotaenia*. The synonyms of *Choanotaenia* RAILLIET, 1896 then are *Monopylidium* FUHRMANN, 1899, *Prochoanotaenia* MEGGITT, 1920, *Multitesticulata* MEGGITT, 1929, *Viscoia* MOLA, 1929, *Unciunia* SKRJABIN, 1915.

The specimens of this genus which were examined, and the drawing in the literature, all show the presence of a tuft of setae at the base of the cirrus. As not all the species of this genus have been examined one should not be categoric, but we suggest that this feature is in fact a generic character of *Choanotaenia*. The generic characters then are as follows :-

Dipylidiines with rostellum unarmed, or armed with one or two crowns of hooks. Genital pores irregularly alternating. Genital ducts pass between the two excretory vessels. No semninal vesicles. Tuft of setae at base of cirrus (?) Testes numerous, situated behind the female organs, but also on either side of the latter. Uterus at first sac-like or highly lobed, then breaking up into uterine capsules which generally contain a single egg. Parasites of birds. Type species *Choanotaenia infundibulum* (BLOCH 1779).

Of *Unciunia travassosi*, ORTLEPP (1938) says, « The rostellum is small and carries no hooks, although what appears to be scars were seen on its anterior end ». It is interesting that this worm should be found in a *Milvus migrans* (BODD.), together with *Idiogenes flagellum*, and the description of the anatomy corresponds with that of *Choanotaenia polyorchis*. ORTLEPP's measurements are given in the table below. We propose that *Unciunia travassosi* ORTLEPP, 1938 become a synonym of *Choanotaenia polyorchis* (KLAPTOCZ, 1908) BAER, 1925.

HILMY (1936) reports a *Choanotaenia* from *Milvus migrans parasiticus* (DAUD.) from Liberia. He proposes that *Ch. polyorchis* become a synonym of *Ch. infundibulum* (BLOCH, 1779) COHN, 1899. We do not agree at all with this proposition. Firstly, there is a difference in the shape of the hooks of the two species and secondly *Ch. infundibulum* is a common species found in galliform birds, whereas *Ch. polyorchis* occurs in the Accipitriformes.

A point of interest, recorded by KLAPTOCZ (1908), by HILMY (1936), by ORTLEPP (1938), and which recurs in the Belgian Congo material, is the occurrence of *Ch. polyorchis* and *Idiogenes flagellum* together in the same host. This would suggest that the two worms have the same or similar intermediates hosts : that of *Choanotaenia* is known to be an Arthropod.

The list of synonyms of *Choanotaenia polyorchis* (KLAPTOCZ, 1908) BAER, 1925 is as follows :-
Monopylidium infundibuliformis var. *polyorchis* KLAPTOCZ, 1908.
Choanotaenia fuhrmanni SKRJABIN, 1915.
Paricterotaenia fuhrmanni (SKRJABIN, 1914) FUHRMANN, 1932.
Unciunia travassosi ORTLEPP, 1938.
Choanotaenia infundibulum HILMY, 1936 *nec.* (BLOCH, 1779), COHN, 1899.

Measurements taken from	SKRJABIN 1915	KLAPTOCZ 1908	ORTLEPP 1938	Belgian Congo material no. 28377
Length	25-30 mm.	10 mm.	—	35 mm.
Breadth	1,3-1,5 mm.	—	—	1 mm.
Scolex	230 µ	250-350 µ	370 µ	366 µ
Suckers	110-130 µ	160 × 145 µ	145-160 × 130-145 µ	137-169 µ
Rostellum	70 µ	40-45 µ	45 µ	59 µ
Hook no.	16-18	18	—	20
Hook lgth.	24 µ	20 µ	—	27-29 µ
Testes	20-25	35-40	30-50	20-30
Cirrus pch.	136-170 × 90-100	100 µ (— 200 µ, from drawing)	110-120 × 67 µ	108-148 × 97 — 100 µ
Host	*Polyborus* sp.	*Milvus migrans aegyptius* (GM.)	*Milvus migrans* (BODD.)	*M. migrans tenebrosus* GRANT and PRAED
Locality	Paraguay	Sudan & N. Uganda	Transvaal	Belgian Congo

For explanation of abbreviations see p. 147.

52. **Choanotaenia riccii** FUHRMANN and BAER, 1943. (fig. 56).

Host: *Sphenorhynchus abdimii* (LICHT.) Ciconiidae : Boma (19183), Dr. E. DARTEVELLE, IV-1937.

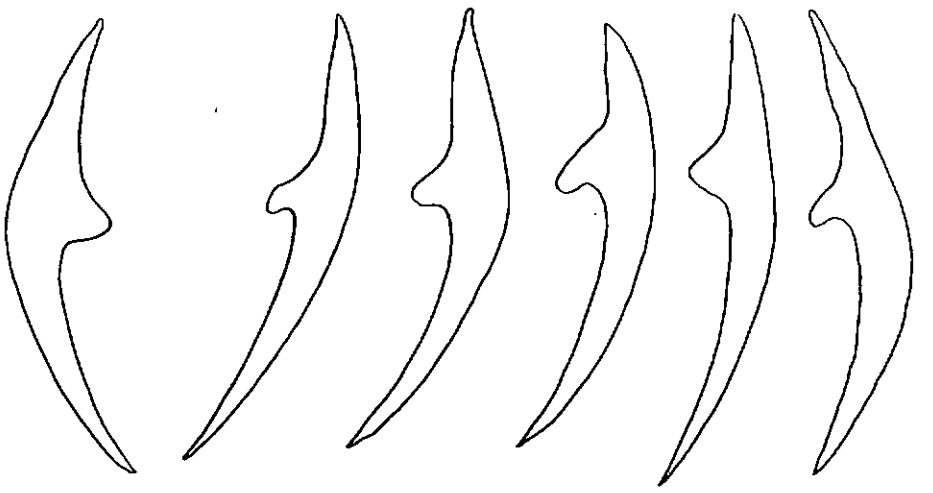


Fig. 56. — *Choanotaenia riccii* FUHRM. and BAER from *Sphenorhynchus abdimii* (LICHT.): rostellar hooks.

Several fragments and an entire specimen were found. The measurements correspond with those given by FUHRMANN and BAER (1943), with the exception of the hooks. The scolex of the Congo material possesses 18 rostellar hooks which measure from 72 µ to 83 µ in length Fig. 56 shows the hooks seen from different angles. In the original description the number of hooks is given as 24, and the length 90 to 106 µ. As the Congo material is macerated and the rostellum evaginated, it is possible that some of the books have fallen out.

As mentioned by FUHRMANN and BAER, the characteristic tuft of setae is present at the base of the cirrus.

The only other species so far recorded from the Ciconiiformes is *Choanotaenia discoidea* (VAN BENEDEN, 1868), redescribed by JOYEUX and GAUD (1945) from the white stork, *Ciconia ciconia* (L.) from Morocco. This species is easily distinguished by its cirrus pouch, 175 to 215 µ by 50 µ, which is larger than that of *Ch. riccii*, the shape and size of its hooks, which measure 33 to 37 µ, and which are 22 in number.

LOPEZ-NEYRA (1952) makes *Ch. riccii* a synonym of *Anomotaenia aurita* (RUDOLPHI). RUDOLPHI's type material, from a blue heron, *Florida coerulea* (L.), was examined. The hooks measure 266 to 284 µ. These dimensions do not at all agree with those for *Choanotaenia riccii*, and so we are not in agreement with LOPEZ-NEYRA's conclusions.

53. **Choanotaenia ululae** n. sp. (fig. 57-58).

Host: *Bubo africanus* TEMM. « Hibou » (Strigidae) . Kabalo (28728); Dr. H. SCHOUTEDEN, I-1926.

Two specimens were present; the material is rather contracted.

The longest specimen measures 30 mm in length and has a maximum breadth of 1,3 mm.

The scolex has a diameter of 274 to 297 µ and is provided with four oval, unarmed suckers measuring 90 to 137 µ by 76 to 105 µ. The invaginated rostellum is well defined. It is cone shaped and extends well behind the scolex. It has a maximum width of 69 to 90 µ, and a length of 297 to 324 µ. The rostellum is armed with 26 hooks arranged in a double crown. The hooks, mounted in Berlese, vary in length from 65,8 to 77 µ when seen in profile, and 70 to 78,4 µ when viewed dorsally. The shape of the hook is seen in fig. 57. A thin, transparent disc can sometimes be seen attached to the extremity of the short, stumpy guard.

The neck is short and of the same diameter as the scolex. The margins of the segments are entire. The genital pores are irregularly alternating and open slightly anterior to the middle of the lateral border of the segment, there being one set of genitalia per segment. In sections, the cuticle is seen to be partly covered with small spines, which presumably cover the entire surface of the living worm. The segments are wider than long except the most gravid ones, which have a width two-thirds of the length. There are numerous chalk bodies, mostly seen in the cortex.

The excretory system is of the normal type, a pair of narrow dorsal canals and a pair of wider ventral canals, with a posterior ventral commissure in each segment.

The nervous system shows two longitudinal nerve trunks situated laterally to the excretory vessels.

The testes number 15 to 20 and extend laterally to the excretory vessels (fig. 58). The vas deferens is highly convoluted and leads directly to the cirrus pouch, without forming an external seminal vesicle.

The cirrus pouch is small and globular, measuring 72 to 90 µ in length with a maximum breadth of 36 µ. It reaches not quite half way to the excretory vessels. It contains a coiled, unarmed cirrus and no internal seminal vesicle. In section, long fine setae may be seen on either side of the cirrus at its base. The genital atrium is small and non-muscular.

The vagina opens from the genital atrium behind the cirrus pouch, and follows a straight course into the receptaculum seminis. The genital ducts pass between the excretory vessels. The ovary is dorsal and lobed, and extends almost to the excretory vessels. The vitelline gland is large, somewhat dorsal and behind the ovary. The Mehlis' gland is small but well defined.

The uterus is not well marked, but its position is indicated by the eggs. These are seen to appear dorsal to the ovary and then to extend laterally, and rapidly occupy most of the segment. The uterus breaks up to form uterine capsules, since each egg is seen to be contained singly in a very thin membrane or capsule, having a diameter of 63 to 70 µ. There is no formation of parenchymatous capsules or paruterine organs. The egg is thick shelled, with a diameter of 46 µ. The hexacanth embryo has a diameter of 34 µ, with hooks about 14 µ long.

Only two other species of *Choanotaenia* have been described from Strigiformes. *Ch. strigium*, JOYEUX and TIMON-DAVID, 1934 from an *Otus scops* (L.) from the region of Marseille, species is armed with a single crown of 12 hooks of a different shape which measure 52 to 54 µ in length, and is thus easily distinguishable from *Choanotoenia ululae*, as is also *Ch. speotytonis* RAUSCH, 1948, with a single crown of 18 hooks measuring 46-56 µ.

Fig. 57. — *Choanotaenia ululae* n. sp. from *Bubo africanus* TEMM. (« Hibou »): rostellar hooks.

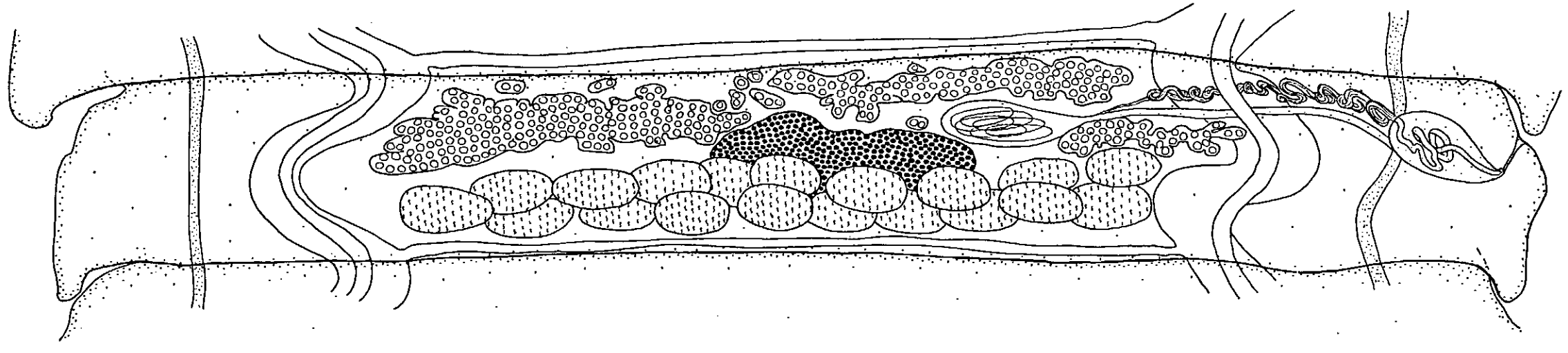


Fig. 58. — *Choanotaenia ululae* n. sp. from *Bubo africanus* TEMM. (« Hibou »): dorsal view of mature segment.

54. **Dipylidium caninum** (LINN., 1785).

Host: *Canis familiaris* L. « Chien indigène » (Carnivora): . . . . . Luputu Lomami (18418, 18419), Dr. BOUVIER, 1933.

Although a common parasite, this species has not previously been reported from the Belgian Congo.

PARUTERININAE FUHRMANN, 1907.

55. **Octopetalum numida** (FUHRMANN, 1909).

Syn.: *Rhabdometra numida* FUHRMANN, 1909.
Octopetalum longicirrosa BAER, 1925.
Unciunia sudanea WOODLAND, 1928.

Hosts: *Numida meleagris* (L.) (Numididae): . . . Zoo. Gdns, Antwerp (28012); died on 24-X-1949.
Numida meleagris galeata PALL. . . . . : » » » (28013); died on 15-VI-1949.
Numida meleagris intermedia NEUMAN . . : Ruanda (8263); Dr. COLBACK, 4-11-1934.

A strobila with scolex was present, but there were no completely gravid segments. The longest worm has a length of 43 mm. and maximum breadth of 1 mm.

The scolex, mounted in Canada balsam, has a diameter of 488 µ, and the suckers measure 200 to 224 µ in width. The scolex has no rostellum, and consequently is unarmed.

There are about 35 testes, and the cirrus pouch measures 440 to 520 µ by 40 to 48 µ. The genital pore is irregularly alternating and opens in the posterior third of the margin of the segment. The genital ducts pass between the excretory vessels. A parutine organ is present in the the hindermost segments, but in this material it contains no eggs.

This species was described by FUHRMANN, (1909 a) as *Rhabdometra numida*, from *Numida meleagris* (L.) from North Africa. The dimensions given by FUHRMANN are: length, 50 mm; breadth 1,5 mm; scolex diameter 570 µ; suckers measure 200 by 160 µ; testes number 60 to 70; cirrus pouch, 790 µ long and 30 µ wide.

FUHRMANN and BAER (1943) establish the synonymy indicated above. *Octopetalum longcirrosa* was described by BAER (1925 c) from *Numida meleagris* (L.), from South West Africa, and in the same paper this author places the genus *Octopetalum* in the sub-family *Paruterininae*, removing it from its provisional position in the *Tetrabothriidae*.

The only other species of *Octopetalum* recorded from the Galliformes is *O. gutterae* BAYLIS, 1914, the type species, described from *Guttera edouardi* (HARTL.) from Nyasaland. In this species the cirrus pouch is smaller (BAYLIS 1914, pl. XVII, fig. 2) than in *O. numida*; the testes are more numerous and are found in front of the cirrus pouch, which is not the case in the latter species.

HYMENOLEPIDIDAE FUHRMANN, 1907.

HYMENOLEPIDINAE PERRIER, 1897.

56. **Hymenolepis aelleni** n. sp. (fig. 59).

Host: *Epomophorus wahlbergi haldemanni* HOLB.
(Chiroptera): . . . . . Boma (1674); Dr. RODHAIN, IX-1933.

An entire specimen with scolex was found.

The worm is 17 mm. long and has a maximum breadth of 0,8 mm.

The scolex, mounted in Canada balsam, has a diameter of 320 to 343 µ. The suckers measure 90 to 103 µ. The rostellum, 100 to 159 µ wide, is armed with 40 hooks (fig. 59), arranged in a single crown. The hooks are 26-30 µ long.

As in all hymenolepids, the genital pores are unilateral. The cirrus pouch, which stretches well past the poral excretory vessels, measures 137 to 173 µ by 40 to 43 µ. The external seminal vesicle is large. The three testes are at first arranged in a triangle, but as they increase in size, they appear to lie in a straight line. The eggs measure 40 to 43 µ.

To date there are ten species of *Hymenolepis* reported from bats.

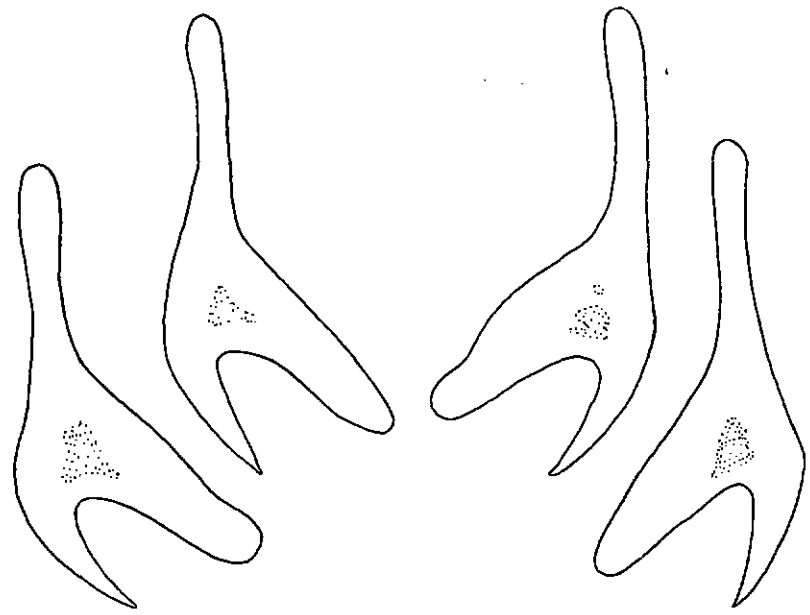


Fig. 59. — *Hymenolepis aelleni* n. sp. from *Epomophorus wahlbergi haldemanni* HOLB.; rostellar hooks seen in profile.

Species :	No. of hooks:	Size of hooks:	Locality:
H. acuta (RUDOLPHI, 1819)	38-40	40 µ	Europe
H. decipiens (DIESING, 1850)	44-46	23-27 µ	S. America
H. gertschi MOEY, 1947	35-41		N. America
H. grisea (VAN BENEDEN, 1873)	unarmed		Europe
H. moniezi PARONA, 1893	unarmed		
H. christensoni MACY, 1931	35-41	33-38 µ	N. America
H. balsaci JOYEUX and BAER, 1934	30	20-22 µ	Europe
H. kerivoulae HUBSCHER, 1937	20-22	22-23 µ	Java
H. sandgroundi BAER, 1938	16-18	24 µ	Africa
H. chiropterophila VIGUERAS, 1941	32-33		S. America
H. roudabushi MACY and RAUSCH, 1946 . . .	41-48	38-43 µ	N. America

H. moniezi and *H. grisea* are unarmed. HUBSCHER (1937) gives a key to the species recorded at that time.

The Congo material is the first to be reported from an *Epomophorus* sp., and as can be seen it is quite distinct from the species already described, by the number and size of its rostellar hooks. We propose to call this new species *Hymenolepis aelleni* n. sp. after Dr. W. AELLEN, one time Assistant at the Institut de Zoologie, Neuchâtel.

57. **Hymenolepis carioca** (MAGALHAES, 1898).

Host: *Gallus gallus domesticus* L. « poule indigène »
(Gallidae): . . . . . Manzadi, Zadi-Kakongo (22116); Dr. Edm. DARTEVELLE, VI-1937.
» » » . . . . . : Vista (22752); Dr. Edm. DARTEVELLE, II-1938.
» » » . . . . . : N'Sengi (19180); Dr. Edm. DARTEVELLE, IV-1937.

There was no scolex and the material was rather contracted.

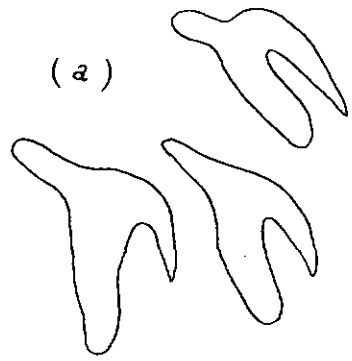
58. **Hymenolepis farciminosa** (GOEZE, 1782).

Host: *Corvus albus* MÜLL. (Corvidae): . . . . . Yangambi (25691); INEAC, 5-I-1948.

There are 10 rostellar hooks, 22 μ in length. These figures correspond with those given by JOYEUX and BAER (1936).

59. **Hymenolepis microstoma** (DUJARDIN, 1845) BLANCHARD, 1891 (fig. 60-61).

Hosts: *Arvicanthis abyssinicus* RÜPP. (Rodentia): . . Ituri, Djugu (28721, 28725); VAN CANNEYT, 1930.
Mastomys coucha ugandae WINT.. . . . Ituri, Djugu 8500-01, 8503-8505, 8509 28722); VAN CANNEYT, 1930); (9826, 9827); VAN CANNEYT, 1929).



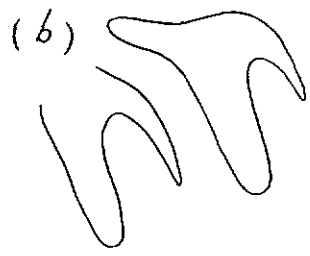


Fig. 60. — *Hymenolepis microstoma* (DUJARDIN); rostellar hooks of (a) specimen from *Arvicanthis abyssinicus* (RÜPP.) and from *Mastomys coucha ugandae* WINT. (b) specimen from *Meriones shawi* ROZET.

Fig. 61. — (a) *Hymenolepis microstoma* (DUJARDIN after JOYEUX and BAER, 1936); (b) *H. evaginata*; (c) *H. globirostris*; (d) *H. straminea*; (e) *H. uncinispinosa*.

The longest worm measures 90 mm. in length, and has a maximum breadth of 2 mm.

The scolex, 274 to 328 μ in diameter, is provided with four suckers, which measure 59 to 68 μ. The rostellum is armed with a single crown of 18 to 25 hooks, which are 11 to 15 μ long.

The cirrus pouch measures 144 to 180 μ by 54 to 58 μ. The thin-shelled eggs have a diameter of 61 to 72 μ and contain an embryo, 36 to 40 μ.

Collection material from white mice, from *Mus musculus* L. and from *Meriones shawi* ROZET was examined. The dimensions are:- diameter of scolex, 187 to 288 μ; diameter of suckers, 86 to 108 μ; diameter of rostellum, 58 to 79 μ; 19 to 24 hooks, 10 to 14 μ in length; cirrus pouch, 100 to 198 μ by 40 to 65 μ; eggs, 48 μ, and embryo, 31 to 43 μ.

The dimensions given by JOYEUX and BAER (1936) are:- length 80 mm., maximum breath, 2 mm., diameter of scolex, 200 μ and that of the suckers 60 μ. There are 27 hooks, 15 μ in length, The cirrus pouch measures 135 μ by 50 μ, and the eggs 90 by 80 μ.

The armed hymenolepids from Rodents listed to date (taken partly from HUGHES, 1941) are:-

H. myoxi-sciurina CHOLODKOWSKY, 1913.

H. evaginata BAKER and ANDREWS, 1915.

H. muris-sylvatici (RUDOLPHI, 1819), BAER, 1930.
H. globirostris BAER, 1925.
H. microstoma (DUJARDIN, 1845), BLANCHARD, 1891.
H. muris-variegati JANICKI, 1904.
H. straminea (GOEZE, 1782), KOWALEWSKY, 1904.
H. assymetrica JANICKI, 1904.
H. fraterna STILES, 1906.
H. myoxi (RUDOLPHI, 1819), JANICKI, 1904.
H. uncinispinosa JOYEUX and BAER, 1930.
H. sinensis OLDHAM, 1929.
H. pearsi JOYEUX and BAER, 1930.
H. suricattae ORTLEPP, 1938.
H. octocoronata (LINSTOW, 1879), FUHRMANN, 1924.
H. oregonensis NYLAND and SEUGER, 1952.
H. ondatrae RIDER and MACY, 1947.
H. johnsoni SCHILLER, 1952.

Of these the following are seen to have a similar shape of hook as *H. microstoma.*

Species :	No. of hooks:	Size of Hook:
H. microstoma	18-27	10-15 µ
H. evaginata	10	20-22 µ
H. globirostris	12-14	18-24 µ
H. straminea	20-24	14-16 µ
H. uncinispinosa	12	34-37 µ

Fig. 60a shows the hooks of *H. microstoma* from the Congo material and fig. 60 b those from the collection material from *Meriones shawi* ROZET. Fig. 61, (after JOYEUX and BAER, 1936) shows the hooks of the members of this group of hymenolepids.

Hymenolepids from rodents, already reported from the Congo are *H. microstoma* from *Mastomys coucha* SMITH by BAYLIS (1939); *H. fraterna*, from *Rattus rattus* L. reported by SOUTHWELL and LAKE (1939) and *H. globirostris*, from the rat « Houmba », by BAER (1925 a).

60. **Hymenolepis multiformis** (CREPLIN, 1829).

Syn.: *H. filirostris* (WEDL., 1856) (fig. 62).

Host: « Cigogne » (Ciconiidae): . . . . . Lukula (28733); DE WITTE.

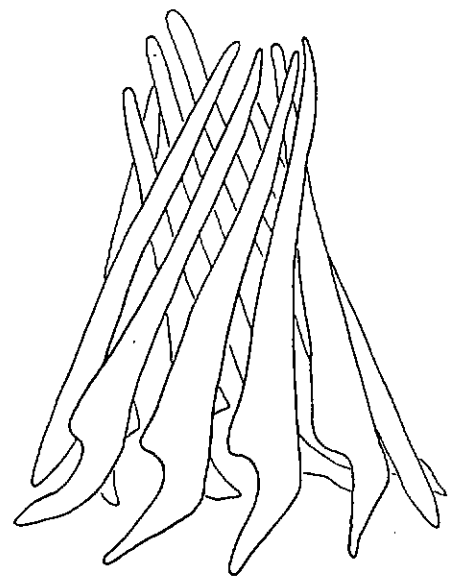


Fig. 62. — *Hymenolepis multiformis* (CREPLIN) from « Cigogne »; rostellar hooks.

FUHRMANN and BAER (1943) redescribed this species, but for the scolex which was missing. The anatomy of the Congo specimens agrees in all respects with FUHRMANN and BAER's account. Fortunately several scoleces were present, ant thus it is possible to supplement their description.

The scolex, mounted in Berlese, has a diameter of 144 to 180 µ, the suckers measure 72 µ by 58 µ and the rostellum is 34 to 40 µ wide. The rostellar hooks are 10 in number, and are 34 to 38 µ long.

FUHRMANN and BAER suggest that it is more than likely that *H. filirostris* (WEDL, 1856) is identical with *H. multiformis*. The number and the length of the hooks of the Congo material coincide with WEDL's (1856) description, i. e. 10 hooks, 38 µ in length (fig. 62).

We can thus confirm that *Hymenolepis filirostris* (WEDL, 1856) is a synonym of *Hymenolepis multiformis* (CREPLIN, 1829).

The table below shows the measurements given by JOYEUX and BAER (1936), FUHRMANN and BAER (1943), WEDL (1856), and those for the Congo material.

Measurements taken from	WEDL (1856)	JOYEUX & BAER (1936)	FUHRMANN and BAER (1943)	*Congo material* host no. 28733
Length	230 mm.	230 mm.	—	—
Breadth	0,5 mm.	0,501 mm.	—	—
Scolex	170 µ	—	—	144-180 µ
Suckers	120 µ	—	—	72 × 58 µ
Rostellum	—	—	—	34-40 µ
No. hooks	10	10	—	10
Length of hooks	38 µ	36-38 µ	—	34-38 µ
Cirrus pouch	—	—	280-320 µ × 36-29 µ	280-320 µ × 40 µ
Size of eggs	48 µ	48 µ	—	—

For explanation of abbreviations see p. 147.

Hymenolepis sp.

Hosts: *Rattus rattus* LINNÉ (Rodentia) . . . . . : Ituri-Djugu (28717); VAN CANNEYT, 1930.
» » . . . . . : Boma (19119, 28712); Dr. H. SCHOUTEDEN, 17-VIII-1920.
Mastomys coucha ugandae WINT. . . . . : Soyo near Matadi (19875, 19876, 19905-19907); Dr. E. DARTEVELLE, II-1937.
« Chiroptère » (Chiroptera) . . . . . : Stanleyville (28714); A. COLLART, I-III-1928.
Pternistis afer cranchii (LEACH) (Phasianidae): Kitombe near Banana (19185); Dr. E. DARTEVELLE, II-1938.
Pycnonotus barbatus tricolor RCHW. (Pycnonotidae): . . . . . Zambi (18581); Dr. E. DARTEVELLE, V-1937.

It was not possible to make a specific determination of this material.

TAENIIDAE LUDWIG, 1886.

61. **Taenia acinomyxi** ORTLEPP, 1938 (fig. 63).

Host: *Felis (Panthera) pardus* LINNÉ « Léopard » (Carnivore): . . . . . Nyangwé (1711, 23705); J. GHESQUIÈRE, 5-X-1917.

There are 34 to 42 hooks arranged in a double crown. The large hooks are 216 to 232 µ long, with a base of 130 to 151 µ. The small hooks have a length of 133 to 148 µ and a base of 83 to 86 µ. The uterus shows about 6 main lateral lobes.

There are several species of *Taenia* described from carnivores for which the hook number and measurements correspond, viz. *T. pisiformis* (BLOCH, 1780), hooks 225 to 294 µ and 132 to 177 µ; *T. hyaenae* BAER, 1924, hooks 196 to 223 µ and 124 to 156 µ; *T. lyncis* SKINKER, 1935, hooks 220 to 258 µ and 159 to 208 µ; *T. bubesei* ORTLEPP, 1938, hooks 235 to 273 µ and 136 to 180 µ; *T. acinomyxi* ORTLEPP, 1938, hooks 218 to 227 µ and 128 to 136 µ; and *T. jakhalsi* ORTLEPP, 1938, hooks 195 to 220 µ and 131 to 142 µ.

On comparing a camera lucida drawing of the hooks (fig. 63) with the drawings given in the original

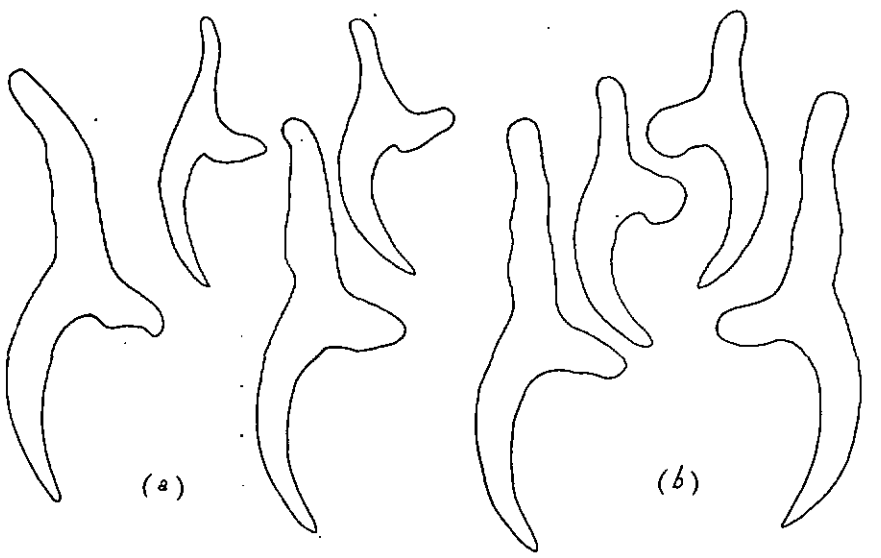


Fig. 63. — *Taenia acinomyxi* ORLEPP; from *Felis (Panthera) pardus* L. « Léopard »; rostellar hooks: (*a*) host no. 23705; (*b*) host no. 1711.

descriptions (with the exception of *T. pisiformis*, which was taken from JOYEUX and BAER, 1936), *T. hyaenae*, *T. lyncis*, *T. bubesei* and *T. jakhalsi* are eliminated because of their differently shaped hooks. The uterus of *T. pisiformis*, as figured by JOYEUX and BAER (1936, fig. 489E) shows 8 to 14 main lateral branches. The drawing of a gravid segment of *T. acinomyxi* by ORTLEPP (1938 a, fig. 15) is much more representative of the condition in the Congo material. *T. acinomyxi* is described from a *Acinomyx jubatus jubatus* (ERXL.) a « cheetah » from South West Africa.

62. **Taenia brauni** SETTI, 1897.

Host: *Lycaon pictus* TEMM. « Chien sauvage » (Carnivore): . . . . . Gabu-Nioka (28288); VER EYKEN, 4-II-1948.

The scolex was mounted in Berlese. There are 22 hooks, arranged in two crowns. The large hooks have a length of 151 to 162 µ, with a base of 97 µ. The small hooks are 100 to 108 µ long, on a base of 68 to 72 µ.

The shape of the hooks, their number and size correspond with those from *Taenia brauni*, as described by ORTLEPP (1938), and by FAIN (1952)). The figures given by FAIN for the adult are, 26 to 30 hooks, large hooks 140 to 153 µ with a base of 80 to 100 µ, and the small ones 90 to 110 µ by 54 to 70 µ.

Working in the Belgian Congo, FAIN (1952) was able to establish the life-cycle of this *Taenia*. The larva is found in the rodent *Lemniscomys*, and may show either the typical coenurus form, with internal scoleces, or alternatively a polycephalic form with external scoleces. Occasionally a mixed type of larva was found with both internal and external scoleces. The adult occurs frequently in dogs and jackals in the region of Ituri, Belgian Congo. This parasite is found only in canines, and appears to be the only species of *Taenia* harboured by the latter.

63. **Taenia parva** BAER, 1924 (fig. 64-69).

Host: *Genetta tigrina* « Genette » (Carnivore): . . Katanga (28700); Dr. GERARD.
» » » . : Nyanarongo (27277); Dr. A. FAIN, 1949.

The hooks (fig. 64) of these specimens are of the characteristic shape for the *taeniaeformis-laticollis-parva* group of *Taenia*. There are 42 to 46 hooks arranged in a double crown. The large hooks have a length of 392 to 424 µ with a base of 192 to 200 µ. The small hooks are 240-264 µ long, and have a base of 144 to 152 µ. As will be shown later, there is no means of distinguishing between these three species, basing the diagnosis merely on the hooks.

The absence of a vaginal sphincter muscle, the arrangement of the lateral longitudinal muscles, and the position of the genital ducts, which lie ventral to the excretory canals, distinguish this Congo material as *Taenia parva*.

The type material of *T. parva* was examined and the following measurements found for the hooks (fig. 65) ; large hooks, 344 to 376 µ and the small ones, 232 to 248 µ. The dimensions given in the original description are 361 µ and 228 µ respectively.

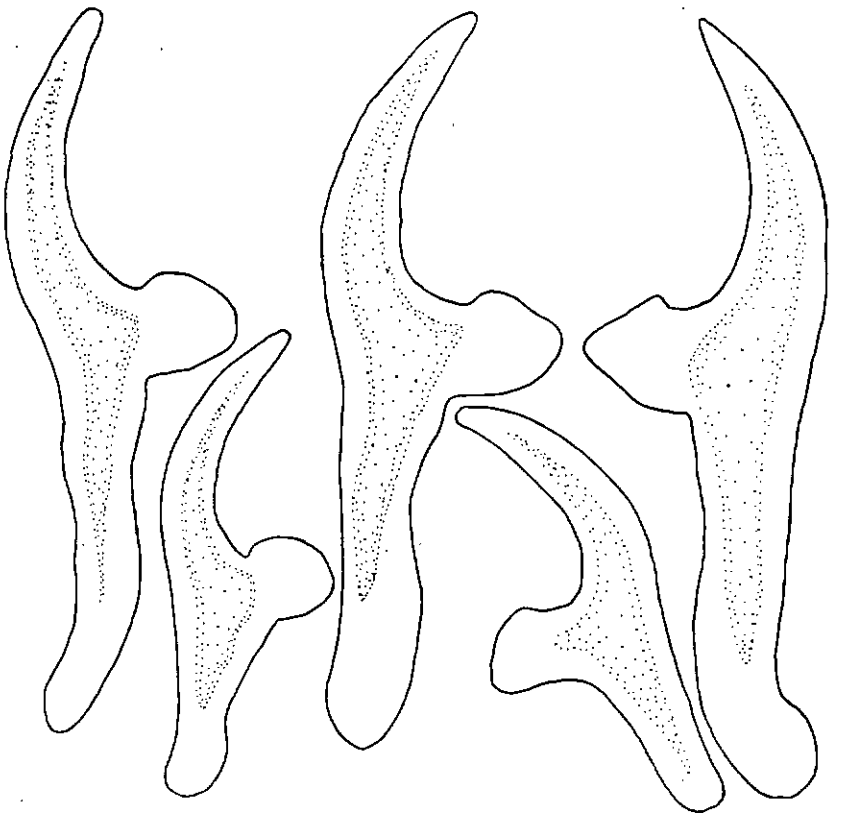


Fig. 64. — *Taenia parva* BAER from *Genetta tigrina* SCHREB. « Genette » from Belgian Congo ; rostellar hooks.

Taenia parva, BAER, 1924 is described from *Genetta ludia* from South Africa, In the discussion which follows the description, BAER (1925) demonstrates the specific independance of *T. laticollis* RUDOLPHI, 1819, and *T. taeniaformis* (BATSCH, 1786). The latter has a vaginal sphincter muscle, which is absent in the former.

SKINKER (1935) redescribes *T. laticollis* from lynxes from North America. She says (p. 217), « In several respects this species is similar to *T. taeniaeformis*, and the two species have undoubtedly been confused; ..... Nevertheless, the two species are readily separated ..... on the basis of the difference in the shape of the large hooks and the striking difference in the size of the strobila in mature specimens; the guard of the hooks of *T. taeniaeformis* is much more prominent than the guard of the large hooks of *T. laticollis*:... ».

The lengths of the hooks of these two species are very similar. For *T. laticollis*, SKINKER (1935) gives the following dimensions: large hooks, 390 to 415 µ and the small ones 214 to 238 µ. For *T. taeniaeformis* she gives: large hooks 380 to 430 µ in length, and small hooks 238 to 260 µ in length.

After an historical introduction to these two species, JOYEUX and BAER (1935) analyse the data from material from eight sources, including both adult and larval worms with reference to certain characters which might be of use in a specific determination they conclude the following: Number of hooks, size of hooks and

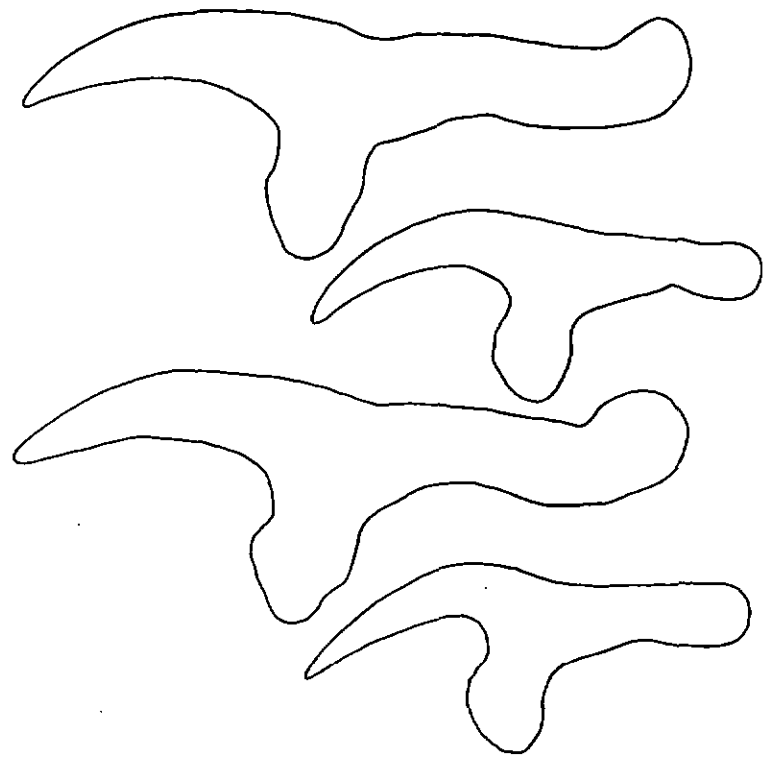


Fig. 65. — *Taenia parva* BAER from *Genetta ludia*; hooks of type material.

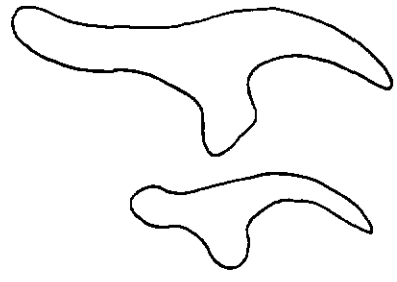


Fig. 66. — *Taenia taeniaeformis* (BATSCH) from a cat; rostellar hooks (after DOLLFUS, 1938).

Fig. 67. — *Taenia laticollis* RUDOLPHI from « Lynx »; rostellar hooks (after SKINKER, 1935).

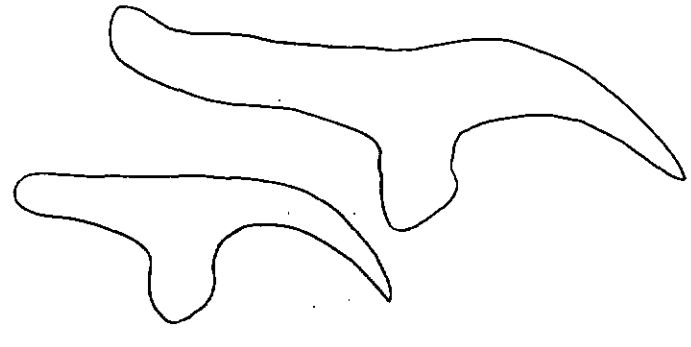


Fig. 68. — *Taenia laticollis* RUDOLPHI from « Genette » from France; rostellar hooks.

shape of hooks, difficult to base a diagnosis on these features. Vaginal sphincter; a good systematic character — present in *T. taeniaeformis* and absent in *T. laticollis*. Number of testes; the differences are not very large, and are covered by the variation normally found in the genus *Taenia*. Length of cirrus pouch; not an absolute character. Number of main uterine branches; uterus of the same type in the two species. Size of egg; slightly larger in *T. taeniaeformis*, i. e. 29 to 35 μ by 23 to 29 μ as against 25 to 27 by 21 to 24 μ for *T. laticollis*. Host; both species harboured by viverrids and felines. Thus these two authors are of the opinion that although *T. taeniaeformis* and *T. laticollis* are very closely related, they are, nevertheless, two distinct species.

DOLLFUS (1938) gives as the measurements for the hooks of *T. taeniaeformis*, large hook 400 μ and small hook 245 to 248 μ in length. DOLLFUS' (1938, p. 139, fig. 5) drawing of the hooks of *T. taeniaeformis*

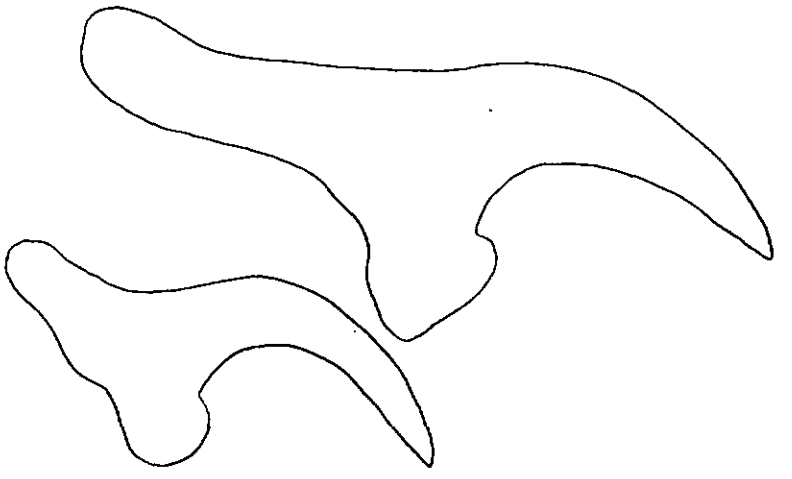


Fig. 69. — *Taenia taeniaeformis* (BATSCH) from « Cat »; rostellar hooks.

from experimental material from a cat are reproduced here (fig. 66) together with SKINKER's (1935, pl. 19. fig. 8) drawing of those of *T. laticollis* (fig. 67).

Drawings were then made of hooks from collection material of *T. laticollis* (fig. 68) from a genette from France, and *T. taeniaeformis* (fig. 69) from a cat from France.

The hook measurements for the former species are: large hook, 311 to 343 μ long and small hook, 206 to 224 μ long. Those for the latter species are 416 to 430 μ for the large hook, and 234 to 271 μ for the small one. The hooks of the type material of *T. parva*, for which the measurements are given above, are also shown (fig. 65).

JOYEUX (1945 a) records *T. laticollis* from *Felis macrura* from Brazil, differentiating it from *T. taeniaeformis* by the absence of a vaginal sphincter. He describes the genital ducts as passing between the excretory vessels. As seen in the photomicrographs of sections of *T. parva* given by BAER (1925, p. 77, fig. 37-38), the genital ducts in this species pass ventral to the excretory canals.

In the paper by JOYEUX and BAER (1935) already cited, the affinity between *T. parva* and *T. laticollis* is discussed. They say (p. 489) that these two species have in common the number, shape and size of the rostellar hooks; the size of the cirrus pouch and the eggs, and the absence of the vaginal sphincter. However *T. parva* may be distinguished by the special development of the longitudinal musculature, especially in the lateral part of the segment. The number of main uterine branches also seems to be smaller in *T. parva*. They wonder if these characters are sufficient to distinguish the two species, and if it is not rather a question geographic variation of *T. laticollis*. However, they retain *T. parva* as a distinct species, until a more abundant material is available for study.

As there are not sufficient specimens in the Congo material, we prefer to leave this question open, and to refer the present specimens to *T. parva* until such time as the latter becomes a synonym of *T. laticollis*.

64. **Taenia pisiformis** (BLOCH, 1780).

Host: *Python sebae* (mistake in host?): . . . . . Zoo. Gdns. Antwerp (28007).

This, *Taenia* is a common parasite of the Canidae and is also occasionally found in felines.

There is a double crown of 28 hooks; the large hooks measure 227 to 230 µ, by 144 to 151 µ, and the small ones 133 to 151 µ by 83 to 94 µ. The measurements given by BAER (1925) are 225 to 294 µ and 132 to 177 µ respectively.

65. **Taenia regis** BAER, 1923.

Host: *Felis leo azandicus* ALL. « lion » (Carnivore): Kasenyi (29528); Dr. A. FAIN, VII-1951.

The rostellar hooks are arranged in a double crown of 26 in all. The large hooks measure 288 µ by 192 to 200 µ, and the small ones 176 to 199 µ by 120 to 136 µ. The measurements given by BAER (1925) are 290 µ and 190 µ respectively.

66. **Taenia saginata** (GOEZE, 1782).

Host: *Homo sapiens* L.: . . . . . Elisabethville (3198); Dr. M. BEQUAERT, 1925.
» (8525, 8528, 8529, 8530, 8531); Dr. L. VAN DEN BERGHE, 1933.

The larval form of this species is found in bovines. The adult has already been reported from the Belgian Congo.

ACOLEIDAE sens. lat. FUHRMANN, 1907.

ACOLEINAE FUHRMANN, 1907.

67. **Gyrocoelia kiewietti** ORTLEPP, 1937 (?)

Hosts: *Actophilornis africana* (GM.) (Parridae = Jacanidae): . . . . . Mateba (19125); Dr. E. DARTEVELLE, IV-1937.
Tringa (= *Totanus*) *nebularia* (GUNN.) (Charadriidae): . . . . . Mateba (22754); Dr. E. DARTEVELLE, IV-1937.
id. . . . . : Banane (22120); Dr. E. DARTEVELLE, I-1938.
Hemiparra crassirostris (HARTL.) . . . . : (riv. Nyobugoyo naar Kigali) Ruanda (28958); A. LESTRADE, 29-XI-1951.

This material is very contracted. The two scoleces recovered were present in the *Actophilornis* material; they were mounted in Berlese. In the *Hemiparra* material most of a strobila was present, including ripe segments, and from the *Tringa* only fragments were recovered.

The diameter of the scolex is 416 to 440 µ and that of the slightly oval suckers 232 by 200 µ. The hooks are arranged in 6 double, longitudinal rows of 6, i. e. 72 hooks in all. They are 33 to 36 µ long.

The strobila appears to be protandrous, but it was not possible to determine the number of testes. The cirrus pouch is large, measuring 650 to 748 µ in length and 200 to 325 µ at its maximum breadth. The genital pores are irregularly alternating.

The more posterior segments contain the mature female organs. The ovary extends laterally almost to the excretory vessels, and behind it lies the vitelline gland. As one would expect in this family, the vagina was not observed in the riper segments.

The hindermost segments of the strobila are filled with eggs measuring 61 to 72 µ by 41 to 43 µ.

The characters of specific importance for this genus appear to be, the number of hooks, the size of the hooks and of the cirrus pouch.

There are seven species recorded for this genus, and these are discussed by BAER (1940). *G. crassa* FUHRM., 1900, syn. *G. brevis* (FUHRM., 1900) has 40 hooks, 33 to 36 µ long. *G. fausti* TSENG-SHEN, 1933 has 60 hooks 21 to 48 µ long, *G. milligani* LINTON, 1927 has 40 hooks 32 to 35 µ long, and *G. paradoxa* (V. LINSTOW, 1906) has 78 hooks 29 µ long. The scoleces of *G. perverse* FUHRM., 1899 and *G. australiensis* are not described. Thus the only hook measurements similar to those of the Congo material are those for *G. paradoxa*, but this species has a cirrus pouch very much smaller i, e, 320 to 400 µ.

Regarding the size of the cirrus pouch, this material corresponds with *G. perversa* and *G. kiewietti*, for both of which 750 μ is given as the length. The number of testes for the former species is 20 to 30. In *G. kiewietti* there are 78 to 84 hooks, 29 μ in length. The present material does not correspond exactly with these figures, but it is possible that the differences fall within the limits of variation for the species. One cannot be sure of this because of the lack of data. The number of testes for *G. kiewietti* is not given. *G. perversa* is reported from Europe and *G. kiewietti* from Africa.

We then tentatively refer this Congo material to the species *G. kiewietti* (ORTLEPP, 1937) recognising the possibility of its being identical with *G. perverse* FUHRM., 1899.

UNDETERMINABLE FRAGMENTS :

Hagedashia hagedash LATH. (Plataleidae) : . . . . Kwamouth (28729) ; Dr. H. SCHOUTEDEN, 3-VI-1921.
« Canard sauvage » (?) - (Anatidae) : . . . . . Kasolo-Malenga, Katanga (9424) ; Dr. SCHWETZ, 10-X-1925.
Gallus gallus domesticus L. « poule indigène » (Gallidae) : . . . . . Boma (18853) ; Dr. E. DARTEVELLE, IV-1937.
Actitis hypoleucos (L.) (Charadriidae) : . . . . . Mateba (18603, 18604) ; Dr. E. DARTEVELLE, IV-1937.
Streptopelia semitorquata (RÜPP.) (Columbidae) : . . Bakede, N.-W. Boma (22753) ; Dr. E. DARTEVELLE, V-1937.
Centropus sp. (Cuculidae) : . . . . . ? (250) ; Dr. H. SCHOUTEDEN.
Poicephalus robustus suahelicus (RCHW.) Perroquet vert » (Psittacidae) : . . . . . Forêt de Rugege, Astrida (25690) ; A. LESTRADE.
Andropadus (= *Eureillas*) *virens* (CASSIN) (Pycnonotidae) : . . . . . Kangu (22745) ; Dr. E. DARTEVELLE, IX-1937.
Riparia congica RCHW. (Hirundinidae) : . . . . . Matadi (19960-19961) ; id., II-1937.
Oriolus sp. (Oriolidae) : . . . . . ? (28734) ; Dr. H. SCHOUTEDEN.
Hypochaera funerea Tar. (Ploceidae) : . . . . . Baudouinville (25855) ; R. F. HUTSEBAUT, I-VIII-1948.
Textor collaris VIEILLOT (id.) : . . . . . Manzadi, Zadi-Kakongo (22118) ; Dr. E. DARTEVELLE, VI-1937.

Crossarchus alexandri THOM. et WROUGHT. (Carnivora) : Ibembo (27641) ; R. F. HUTSEBAUT, 28-5-1950.
Bétail (Ungulata) : . . . . . Geti (23590) ; RANDOUR, 1939.

LARVAL CESTODES

68. Larva (?) of **Bothridium ovatum** DIESING, 1850.

Hosts: *Bufo regularis* REUSS. (Amphibia) : . . . . Boende (25689) ; R. P. HUYPENS, 1948.
« Poisson » (?) (Pisces) . . . . . : Bolobo (27447) ; N'GWE, Rev. VICCARS, 1950.

The adult is a parasite of Pythons and has been recorded from *Python sebae* from the Belgian Congo by SOUTHWELL and LAKE (1939).

69. Larva of **Ligula intestinalis** (LIN., 1758).

Hosts: *Barbus kamolondoensis* L. DAVID et M. POLL (Pisces) : . . . . . riv. Kandulu, Sakania (23323) ; Prof. BRIEN, 1937.
Barbus lukusiensis L. DAVID et M. POLL. . : riv. Kandulu, Sakania (23327) ; Prof. BRIEN, 1937.
Barbus microbarbus L. DAVID et M. POLL. . : Ruanda, Terr. Ruhenzori, Lac Luhondo (18506) ; Dr. COLBACK, II-1934.
« Cyprinidé »(?= *Barbus pellegrini* M. POLL) : Bukama swamps between Bukama et Lualaba (23321, 23322) ; Prof. BRIEN, 19-VI-1937.
« Poisson » ? . . . . . : Bolobo (27446) ; N'GWE, Rév. VICCARS, 1950.

« Poisson » (=*Barbus komolondoensis* L. DAVID et M. POLL). . . . . : Riv. N'Gesi s/affl. Ituri (22222); P. C. LEFÈVRE, 1937.

Crocodilia cataphractus CUVIER (Crocodilia): . Irumu, Ituri (2270); G. DU SOLEIL, IV-1935.

The larva is found commonly in the body cavity of freshwater fish, where it reaches an advanced stage of development. It already shows adult characters, and the sexual organs are almost mature. The adults, found in water and diving birds, reach sexual maturity in two to three days, and are then expelled from the bird.

70. Larva of **Taenia brauni** SETTI, 1897.

Host: *Mastomys coucha ugandae* WINT. (Rodentia) . Ituri-Djugu (8506, 8507, 8512); VAN CANNEYT, 1930.

« rat » . . . . . : Kasenyi (29529); Dr. A. FAIN, 1952.

« souris » . . . . . : Kasenyi (29530); Dr. A. FAIN, 1952.

The infection in the latter host was an experimental one, the mouse having been fed the eggs of a tapeworm from a cat or from a dog.

71. Larva of **Taenia hydatigena** (PALLAS, 1756).

Host: *Cephalophus* (= *Sylvicapra*) *grimmi coronotus* GRAY (Ungulata): . . . . . Zoo. Gdns. Antwerp (28224); died on II-VI-1948.

The larval form, *Cysticercus tenuicollis* RUD., is reported from the Belgian Congo by FAIN and RAMÉE (1949). The adult is harboured by members of the canine family, but has not yet been found in this region.

72. Polycephalic larva of **Taenia parva** BAER, 1924 (?) (fig. 70-74).

Host: « Souris » *Mus musculus* L. (Rodentia): . . . Pweto (28713); Dr. GERARD, 1926.

This polycephalic larva has external buds, and not internal ones as in the coenurus of the usual type. There is a small central bladder (fig. 70), diameter 7 to 8 mm., and from it radiate 12 flattened, capitate peduncles, These false strobila are externally annulated, and are 11 to 13 mm. in length. The maximum width is attained at the head end, which has a diameter of 3 mm.

A head was mounted and crushed in Berlese. There are 40 hooks (fig. 71) arranged in a double crown. The large hooks measure 408 to 416 μ from the tip of the blade to the tip of the handle, and 256 to 272 μ from the tip of the handle to the tip of the guard. The small hooks measure 256 μ by 144 to 152 μ. A pair of abnormal hooks was found, one measuring 340 μ and the other 210 μ by 140 μ.

Polycephalic larvae of a similar type i. e. with external scoleces, have been described by the following authors:- von LINSTOW (1902), who ascribes his specimen to *Taenia brauni*. SOUTHWELL and KIRSHNER (1937) describe a larva from *Mastomys erythroleucos* (TEMM.), from Sierra Leone, which they call *Cysticercus fasciolaris* (i.e. the larval form of *Taenia taeniaeformis*). DOLLFUS (1938) reports such a larva from a white mouse, from the Cameroons, which he considers as a teratological *Cysticercus fasciolaris*. CAMPANA-ROUGET (1950) describes a polycephalic larva from *Apodemus sylvaticus* (L.) from the South of France, which she attaches to *Taenia taeniaeformis*. DOLLFUS (1951) found such a larva in *Gerbillus pyramidus hirtipes* LATAST. from North Africa, but refrains from placing it in a known species of *Taenia*. FAIN (1952) describes the larva of *T. brauni* from *Lemniscomys striatus* (L.) from the Belgian Congo, and he finds that this larva may equally well present a normal coenurus or a polycephalic cyst with external scoleces, the former, however, being more frequent. He sometimes observed a larva of a mixed type i. e. showing both internal and external scoleces at the same time.

The measurements these authors find for the larvae ascribed to *T. taeniaeformis* are shown in the table below. Their drawings of the hooks are seen in fig. 72, 73, 74.

This type of cyst, with several external scoleces, was at first considered to be a teratological cysticercus, viz. of *T. taeniaeformis*. It would seem that its occurrence is too frequent for it to be considered as a monster. FAIN's work (1952) would indicate that the polycephalic larva is a variation of the coenurus form, and not of a cysticercus. That this form of larva is not constant in a given species is also illustrated by FAIN's findings.

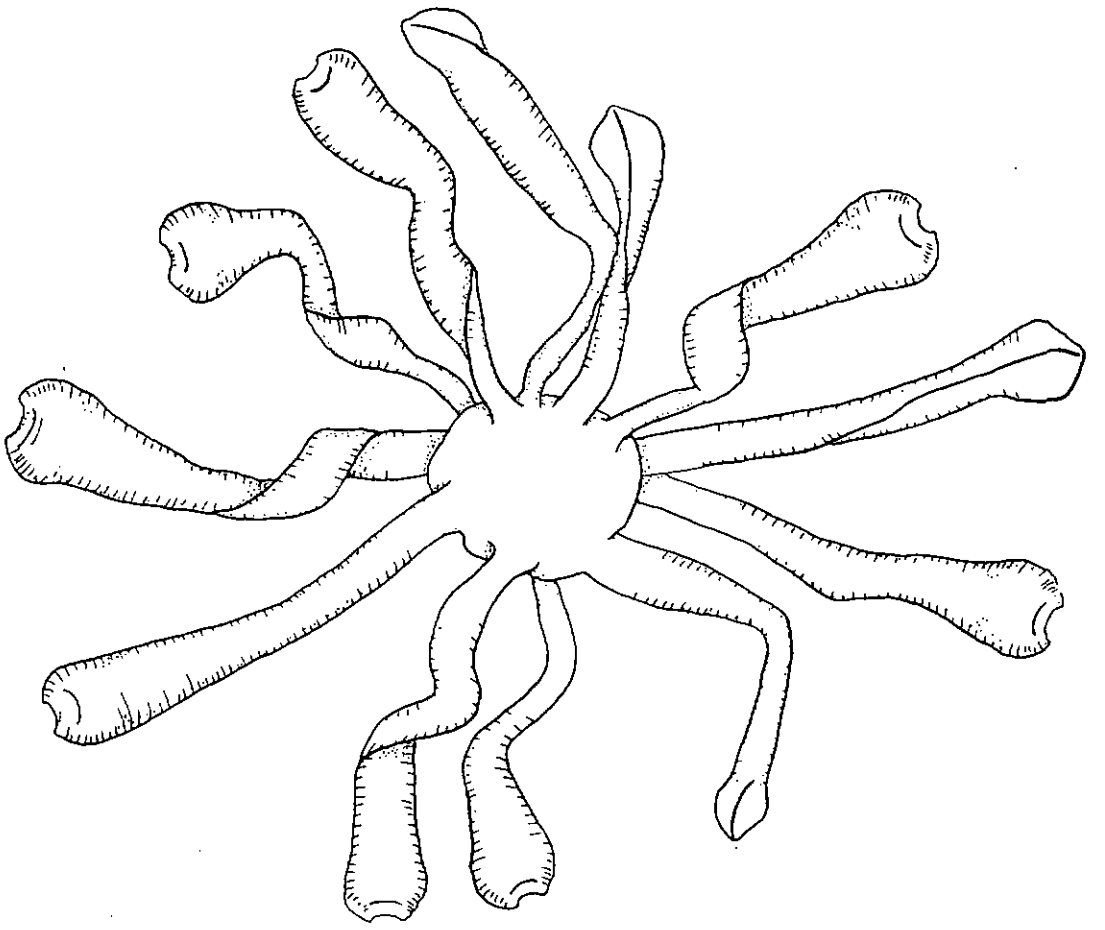


Fig. 70. — Polycephalic larva from mouse (28713): free-hand drawing of entire larva.

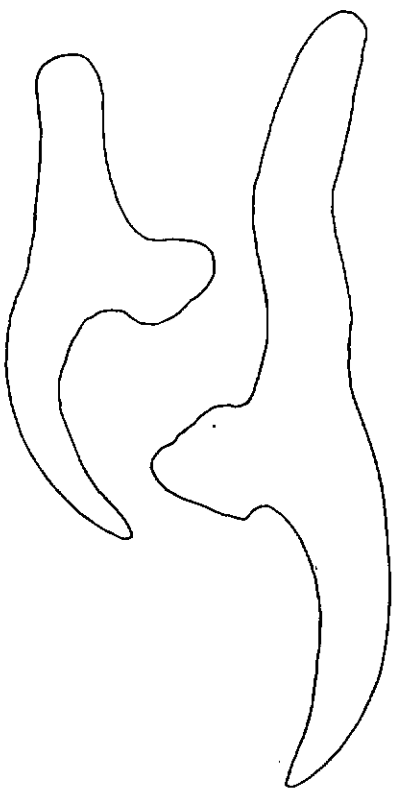


Fig. 71. — Polycephalic larva from mouse (28713); rostellar hooks.

Fig. 72. — Polycephalic larva from *Mastomys erythroleucos*; rostellar hooks (after SOUTHWELL and KIRSHNER, 1937).

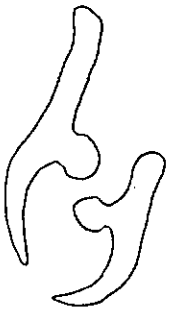


Fig. 74. — Polycephalic larva from *Apodemus sylvaticus*; rostellar hooks (after CAMPANA-ROUGET, 1950).

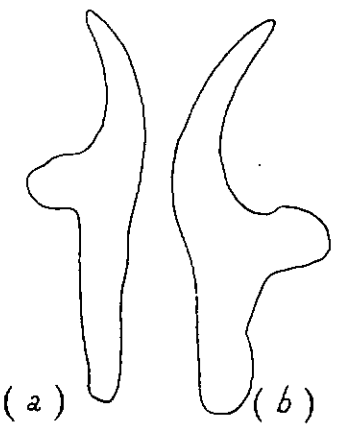


Fig. 73. — Polycephalic larva from « White Mouse »; rostellar hooks (after DOLLFUS 1938) (a) large hook, (b) small hook: drawn to different scales.

Until recently — as remarked by CAMPANA-ROUGET (1950) — all the polycephalic larvae with external scoleces, with the exception of that of VON LINSTOW, have been referred, sometimes tentatively, to the species *T. taeniaeformis*, the normal larva of which is a cysticercus.

The question whether one can distinguish the larvae of the three species, *T. taeniaeformis*, *T. laticollis* and *T. parva* — a diagnosis necessarily based on the hooks — now arises. As already seen in the discussion of this group of *Taenia* sp. (see p. 135), one is forced to admit that it is not possible. The life cycle of *T. taeniaeformis*, the larval form being *Cysticercus fasciolaris*, has been established, but that of the other two species is not yet known.

Measurements taken from	SOUTHWELL & KIRSHNER 1937	DOLLFUS 1938	CAMPANA-ROUGET 1950
Diam. of vesicle	10 mm.	13 × 7 mm.	12 × 10 mm.
No. of buds	12	6	16
Peduncle length.	20-22 mm.	10-12 µ mm.	29-36 mm.
Diam. of head	2,2-2,5 mm.	4-5 mm.	3.5 mm.
No. of hooks	44	46	42
Large hook	380-400 µ	295-399 µ	340-370
Small hook	220-240 µ	244-255 µ	227-250 µ
Host	*Mastomys erythroleucos* (TEMM.)	« Souris blanche »	*Apodemus sylvaticus* (L.)
Locality	Sierra Leone	Cameroons	South of France

For explanation of abbreviations see p. 147.

The following arguments should, however, be borne in mind. As already mentioned, there is now no reason to regard the polycephalic larvae with external scoleces as monstrous forms of a cysticercus, but rather as a variant of the normal coenurus type. If this is the case, the polycephalic cysts with external scoleces are not the larvae of *T. taeniaeformis*. Also *T. taeniaeformis* adult is found as a parasite of Eurasian felines, and has not yet been reported from wild felines from Africa south of the Sahara. The larval form, however, has been found in rodents captured near towns (see p. 233).

With regard to *T. laticollis* and *T. parva* — the eventual independance of which is open to doubt (see p. 224) — it is observed that the adults of *T. parva* always occur in large numbers in the intestines of their hosts, which admits of the possibility of infection with a polycephalic larva. Also, polycephalic cysts of the type with external scoleces have been reported from Africa and the South of France, where genettes harbouring *T. parva* have been found.

For these reasons we refer the polycephalic larva from the mouse (28713) from the Belgian Congo, to the species, *T. parva*.

The same arguments apply to the larvae reported by SOUTHWELL and KIRSHNER (1937), DOLLFUS (1938) and CAMPANA-ROUGET (1950), and we would like to indicate the possibility of these larvae belonging, in fact, to the species *T. parva*, or eventually *T. laticollis*. It is not possible to be categoric, and the question will not be settled until experimental work on the life cycles of these worms has been done.

73. Cysticercus of **Taenia solium** LIN., 1758.

Host: « Porc » (Ungulate): . . . . . Elisabethville (28708, 28711); Dr. VALDONIO, 1912.

The scolex was mounted in Berlese. There are 24 hooks arranged in a double crown. The large hooks are 155 to 180 µ in length, with a base of 108 µ. The small ones are 122 to 144 µ long, with a base of 83 to 90 µ.

The dimensions given by JOYEUX and BAER (1936) are :- 26 to 32 hooks, the large ones 160 to 180 µ in length, and the small ones 110 to 140 µ long.

74. Larva of **Taenia taeniaeformis** (BATSCH, 1896).

Hosts: *Rattus rattus* L. (Rodentia): . . . . . Matadi (21144); Dr. E. DARTEVELLE, II-1937.
Rattus rottus frugivorus (RAFIN.) . . . . : Matadi (22764); Dr. E. DARTEVELLE, II-1937.

The larval form, *Cysticercus fasciolaris* (BLOCH, 1780) is commonly found in the liver of rodents; the adults are harboured by felines.

SOUTHWELL and LAKE (1939) report the presence of this larva in *Rottus rattus* L. from the Belgian Congo.

75. **Sparganum** sp.

Hosts: *Homo sapiens* L.: . . . . . Bagata (25921); Dr. A. FAIN, 1946.
Felis servol SCHREB. (Carnivora): . . . . Bagata (25922, 25923); Dr. A. FAIN, 1946.

The name *Sporganum* is a collective one given to the plerocercoid larvae of the genus *Diphyllobothrium* and related genera. The adult worms are found in carnivores and in man.

REMARKS ON DISTRIBUTION.

The fauna of a country may be considered to comprise three groups: those animals which are found distributed throughout, but not outside, the zoogeographical region in which the country is situated; those which are common to other regions, and those which are restricted to a sub-region including or included by the country in question. The distribution of Cestodes is of course dependant on that of the host, It also depends on the specificity evinced by the parasite, shown to the most marked extent by the tapeworms of birds.

Avitellina centripunctota may be considered as a tapeworm typical of the African fauna, and is expected to be found where Artiodactyls occur. *Hymenolepis microstoma*, *Dipylidium caninum* and *Taenia pisiformis*, each occurring in more than one genus of host, are examples of tapeworms found also outside the Ethiopian region. *Echinorhynchotaenia tritesticuloto* is a species found exclusively in birds of the genus *Anhingo*. Although as yet it has only been reported from Africa and the Celebes, its occurrence is to be expected in other areas in which *Anhinga* species are found.

The rewarding results obtained from the study of this collection add interesting data to the knowledge of the Congolese fauna, and provide an incentive to any helminthologist who has the opportunity to collect further material from the little studied helminth-fauna of this country.

The host list which follows is to our knowledge, a complete one for Cestodes found so far in the Belgian Congo. The worms marked with an asterisk are reported from this country for the first time. The classification followed is that used in the vertebrate section of the Congo Museum.

HOST LIST

List of Hosts, showing the parasites found in each.

HOST	*PARASITE*
Class PISCES	
Barbus kamolondoensis L. DAVID et M. POLL.	* *Ligula intestinalis* (LIN., 1758) : larva.
Barbus lukusiensis L. DAVID et M. POLL.	» »
Barbus microbarbus L. DAVID et M. POLL.	» »
« Cyprinid » (? = *B. pellegrini* M. POLL).	» »
Parectadus sp.	? *Lytocestaides* sp.
Clarias sp.	*Lytocestus adhaerens* COHN, 1908.
Chrysichthys brachynema BOULENGER.	*Prateacephalus beauchampi* FUHRM. and BAER, 1925.
Chrysichthys sp.	*Proteocephalus sulcatus* KLAP., 1906.
Sphyrna lewini (GRIFFITH) (= *Zygaena malleus* LAC., see SOUTHWELL and LAKE).	*Lecanicephalum peltatum* LINTON, 1890.
Class AMPHIBIA	
Bufo regularis REUSS.	* larva of *Bothridium avatum* DIESING, 1850.
Class REPTILIA	
OPHIDIA	
Causus rhombeatus (LICHTST.).	*Ophiotaenia punica* (CHOLODKOWSY, 1908).
Causus sp. (= *lichtensteini* JAN?).	*Ophiataenia* sp.
Causus sp.	*Ophiataenia* sp.
Psammaphis brevirostris (PETERS)	*Oacharistica agamae* BAYLIS, 1919.
Psammaphis sibilans (L.).	*Oachoristica agamae* BAYLIS, 1919.
Philathamnus (= *Chloraphis*) *heteradermus carinatus* (ANDERSSON).	* *Oacharistica khalili* HAMID, 1932.
Baaedan lineatus (DUM. et BIB.).	*Ophiataenia cangolense* SOUTHWELL and LAKE, 1939.
Baaedon olivaceus (DUM.).	» » » »
Python sebae GM.	*Bothridium ovatum* DIESING, 1850.
Python sp.	» »
LACERTILIA	
Mabuia [= *maculilabris* (GRAY) ?].	* *Oachoristica zanuri* BAYLIS, 1919.
Gerrhasaurus nigralineatus nigralineatus (HALL).	» »
Varanus niloticus (L.).	*Duthiersia fimbriata* (DIESING, 1854).
Chamaeleo etiennei SCHMIDT.	*Oacharistica agamae* BAYLIS, 1919.
CROCODILIA	
Crocadilus cataphractus (GM.).	* *Ligula intestinalis* (LIN., 1758) larva.

(*) Tapeworm recorded for the first time from the Belgian Congo.

Class AVES

Order PELECANIFORMES

Anhinga rufa rufa (LACEP. et DAUB.).

Echinorhynchotaenia tritesticulata FUHRMANN, 1909.

Order CICONIIFORMES

Butorides striatus atricapillus (AFZEL.).
Pyrrherodia (= *Ardea*) *purpurea purpurea* L.
° *Ibis ibis* (L.).

Sphenorhynchus abdimii (LICHT.).
« Cigogne »
Hagedashia hagedash (LATH.).

Platalea alba SCOP.

Hymenolepis unilateralis (RUDOLPHI, 1819).
* *Dilepis macrosphincter* FUHRM. 1909.
(?) *Hymenolepis varicanthos* SOUTHWELL and LAKE, 1939.
* *Choanotaenia riccii* FUHRMANN and BAER, 1943.
* *Hymenolepis multiformis* (CREPLIN, 1929).
* *Ophryocotyle herodiae* FUHRM., 1909.
* *Hymenolepis* sp.
* *Cyclarchida omalancristrota* (WEDL, 1855).

Order FALCONIFORMES (= ACCIPITRIFORMES)

Gypohierax angolensis (GMEL.).
Milvus migrans (= *aegyptius*) *tenebrosus* GRANT and PRAED.

* *Raillietina* (*Raillietina*) *dartevellei* n. sp.

* *Choanotaenia polyorchis* (KLAPTOCZ, 1908).
Idiogenes flagellum (GOEZE, 1782).

Order GALLIFORMES

Guttera eduardi (HARTL.).
Numida meleagris (L.).

Numida meleagris galeata PALL.

Numida meleagris marchei OUSTALET.

Numida meleagris intermedia NEUMANN.
Numida sp.

« Pintade »

Coturnix coturnix africana TEMM. and SCHLEG.

Pternistis afer cranchii (LEACH).
Gallus gallus domesticus (L.).

Galliform sp.

Metroliasthes lucida RANSOM, 1900.
* *Cotugnia pluriuncinata* BAER, 1925.
* *Octapetalum numida* (FUHRM., 1909).
* *Cotugnia pluriuncinata* BAER, 1925.
* *Octopetalum numida* (FUHRM., 1909).
* *Cotugnia crassa* FUHRM., 1909.
* *Raillietina* (*Raillietina*) *pintneri* (KLAPTOCZ, 1906).
* *Raillietina* (*Paroniella*) *numida* (FUHRM., 1912).
* *Rallietina* (*Paroniella*) *numida* (FUHRM., 1912).
* *Octopetalum numida* (FUHRM., 1909).
Metroliasthes lucida RANSOM, 1900.
Raillietina (*Raillietina*) *echinobothrida* (MÉGNIN, 1880).
* *Raillietina* (*Raillietina*) *pintneri* (KLAPTOCZ, 1906).
Raillietina (*Raillietina*) sp.
* *Raillietina* (*Fuhrmannetta*) *plurincinata* (CRETY, 1890).
Hymenolepis sp.
Raillietina (*Raillietina*) *tetragona* (MOLIN, 1858).
* *Hymenolepis carioca* (MAGALHAES, 1898).
Raillietina (*Raillietina*) *tetragona* (MOLIN, 1858).
Hymenolepis sp.

(o) SOUTHWELL & LAKE describe this species as having a double crown of hooks, drawn in fig. 4 A. From the arrangement and shape of the hooks it cannot be a species of *Hymenolepis*. Is it perhaps *Dilepis urceus* ?
(*) Tapeworm recorded for the first time from the Belgian Congo.

Order GRUIFORMES

Lissotis melanagaster (RÜPP.).
Neotis cafra (LICHT.).

Actophilornis (= *Parra*) *africana* (GM.).

Idiogenes atidis KRABBE, 1868.
* *Idiogenes kalbei* ORTLEPP, 1938.
* *Schistometra* sp.
* *Gyrocoelia kiewietti* ORTLEPP, 1937 (?).

Order CHARADRIIFORMES

Rostratula benghalensis (L.).

Hemipnrra crassirostris (HARTL.).
Actitis hypoleucos (L.).
Tringa (= *Totanus*) *nebularia* (GUNN.).

Glnreola (= *Galachrysia*) *nuchalis nuchnlis* GRAY.

Dilepis irregularis SOUTHWELL and LAKE, 1939.
Hymenolepis spinosa v. LINSTOW, 1906.
* *Gyrocoelia kiewietti* ORTLEPP, 1937 (?).
undeterminable fragments.
* *Gyrocoelia kiewietti* ORTLEPP, 1937 (?)
* *Paricterotaenia coronata* (CREPLIN, 1829).
Haploparaxis crassirostris (KRABBE, 1809).
Oligorchis kwangensis SOUTHWELL and LAKE, 1939.

Order COLUMBIFORMES

Turtur chalcospilos (WAGL.).

Streptopelia semitorquata (RÜPP.).
Columbia livia L. (= pigeon domestique ?)

« Pigeon »
« Pigeon domestique »

Treron (= *Vinago*) *calva calva* (TEMM.).

* *Raillietina* (*Raillietinn*) *fuhrmanni intermedia* FUHRMANN and BAER, 1943.
* *Rnillietina* (*Fuhrmannetta*) *crassula* (RUDOLPHI, 1819).
undeterminable fragments.
Raillietina (*Fuhrmannetta*) *korkei* JOYEUX and HOUDEMER, 1927.
* *Raillietina* (*Raillietina*) *fuhrmanni intermedia* FUHRMANN and BAER, 1943.
» »

Ligula intestinalis (LIN., 1758).
Hymenolepis sp.

Order CUCULIFORMES

Clnmator (= *Coccystes*) « Tshawaka »
Centropus senegalensis (L.).

Centropus « Diwaka ».
« Coucou »
Tauraco persa buffoni (VIEILL.).

Corythaeoln cristata (VIEILL.).

« Oiseau »

Raillietina (*Raillietina*) *calcaria* (FUHRM., 1908).
Raillietina (*Raillietinn*) *macrocirrosa* (FUHRM., 1909).
Raillietina (*Raillietina*) *calcaria* (FUHRM., 1908).
» »
Raillietina (*Raillietina*) *macrocirrosa* (FUHRM., 1909).
Rnillietina (*Raillietina*) *calcnria* (FUHRM., 1908).
Raillietina (*Raillietinn*) *undulata* (FUHRM., 1908).
Raillietina (*Raillietina*) *calcaria* (FUHRM., 1908).

Order PSITTACIFORMES

Psittacus erithacus L.

Poicephalus robustus suahelicus REICHW « Perroquet vert ».

Raillietina (*Fuhrmannetta*) *vandenbrandeni* BAYLIS, 1940.

undeterminable fragments.

(*) Tapeworm recorded for the first time from the Belgian Congo.

Order CORACIIFORMES

Merops nubicoides DES MURS and PUCHERON.

Tropicranus (= *Berenicornis*) *albocristratus* (CASSIN).
Bycanistes sharpei sharpei (ELLIOT).
Bycanistes sp.
Ceratogymna atrata (TEMM.).

Biuterina meropina (KRABBE, 1869) *macrancristrota* FUHRM., 1908.
* *Raillietina* (*Raillietina*) *bycanistis* BAYLIS, 1919.
* *Dilepis bycanistis* n. sp.
Ophryocotyloides pinguis (FUHRM., 1904).
Raillietina (*Raillietina*) *bycanistis* BAYLIS, 1919.
Raillietina (*Raillietina*) *emperus* (SKRJABIN, 1915).

Order STRIGIFORMES

Bubo africanus TEMM.
Ciccaba (= *Syrnium*) *woodfordi nuchalis* (SHARPE).

* *Choanotaenia ululae* n. sp.
Biuterina sp.

Order CAPRIMULGIFORMES

Scotornis fossii welwitschi BOC.

Biuterina sp. (?)

Order COLIIFORMES

Colius striatus GMEL.
Colius striatus nigricollis VIEILL.

* *Raillietina* (*Raillietina*) *werneri* (KLAPTOCZ, 1908).
» »

Order PICIFORMES

Gymnobucco bonapartei HARTLAUB.
Pogonornis (= *Melanobacco*) *bidentatus friedmanni* (BANNERMAN).
Pogonornis (= *Melanobucco*) *minor intercedens* NEUMANN.
Indicator indicator (SPARRMAN).
Campethera caroli caroli (MALHERTE).
Campethera permista permista (REICHW.).

* *Raillietina* (*Paroniella*) *bargetzii* n. sp.
Raillietina (*Paroniella*) *bomensis* SOUTHWELL and LAKE, 1939.
Hymenolepis sp.
Hymenolepis stylosa (RUDOLPHI, 1810).
Raillietina sp.
Raillietina (*Raillietina*) *pernista* SOUTHWELL and LAKE, 1939.

Order PASSERIFORMES

Chlorocichla (= *Astimastillas*) *falkensteini* (RCHW.).
Pycnonotus barbatus tricolor (HARTL.).

Nicator vireo CABANIS.
Dryoscopus angolensis angolensis (HARTLB.).

Tschagra senegala rufofusca (NEUM.).
Dicrurus adsimilis (= *modestus*) *coracinus* (VERREAUX).
Corvus albus MÜLL.

Corbeau « Eshikololo »

Biuterina cylindrica FUHRM., 1908.
* *Raillietina* (*Paroniella*) *perreti* n. sp.
Hymenolepis sp.
Biuterina sp.
Paronia corrinoi (DIAMARE, 1900).
Raillietina sp.
Biuterina meropina (KRABBE, 1869) var. *macrancristrota* FUHRM., 1908.
Anonchotoenia bobica CLERC, 1903.
Hymenolepis fringillarum (RUD., 1809).

* *Choanotaenia corvi* JOYEUX, BAER and MARTIN, 1937.
* *Raillietina* (*Paroniella*) *reynoldsiae* MEGGITT, 1926.
* *Hymenolepis farciminosa* (GOEZE, 1782).
Cotugnia parva BAER, 1925.

(*) Tapeworm recorded for the first time from the Belgian Congo.

Coliuspasser albonatatus (CASSIN).	*Raillietina* (*R.*) sp.
Spermaphaga (= *Spermaspiza*) *haematina pustulata* (VOIGT).	*Echinocotyle rosseteri* R. BLANCHARD, 1891.

Order unknown

« Kdornischen » (?)	*Rnillietina* (*Skrjabinia*) *cryptocotyle* BAER, 1925.
	Taenia (? *Anomataenia*) sp.

Class MAMMALIA

Order PRIMATES

Hama sapiens L.	*Sparganum* sp.
	Inermicapsifer arvicanthidis (KOFEND, 1917).
	Taenia saginata (GOEZE, 1782).
	T. solium L.
	Taenia (*Coenurus*) sp.
Garilla garilla beringei MATSCHIE.	*Anoplocephala garillae* NYBELIN, 1927.
Colobus polykomos adolfi-friederici MATSCHIE	*Bertiella congolensis* BAER and FAIN, 1951.
Colobus polykomos angolensis SCLAT.	» »
Cercopithecus aethiops L.	*Bertiella studeri* (R. BLANCHARD, 1891).
Cercopithecus aethiops cynosurus SCOP.	» »
Cercopithecus ascanius ascanius AUD.	» »
Cercopithecus ascanius schmidti MATSCHIE	» »
Cercopithecus neglectus SCHLEGEL.	» »
Papia cynocephalus L.	» »

Order CHIROPTERA

Epomopharus wahlbergi haldemanni HOLL.	* *Hymenolepis aelleni* n. sp.
« Chiroptère »	* *Hymenolepis* sp.

Order INSECTIVORA

Crocidura accidentalis kivu OSGOOD.	*Hymenolepis dodecacantha* BAER, 1925.
« Musaraigne »	» »
« Musaraigne d'Afrique »	*Hymenolepis furcata* (STIEDA).

Order CARNIVORA

Felis leo nzandicus ALL. (« Lion »).	* *Taenia regis* BAER, 1923.
Felis (*Panthera*) *pardus* L. (« Léopard »).	* *Taenia acinonyxi* ORTLEPP, 1938.
Felis (*deptailurus*) *serval* SCHREBER.	*Sparganum* sp.
« Genette », probably *Genetta tigrina* SCHREB.	* *Taenia parva* BAER, 1925.
	* *Mesocestaides dissimilis* BAER, 1933.
Thos adustus SUND. (= « Chacal »).	** *Diphyllobothrium parvum*
	* *Mesocestaides* sp.
Lycaon pictus TEMM. (« Chien sauvage »).	*Taenia brauni* SETTI, 1897.
« Chien indigène ».	* *Dipylidium caninum* (L., 1758).
Poecilogale albinucha GRAY.	*Taenia brachyacantha* BAER and FAIN, 1951.
Carnivore.	* *Taenia pisiformis* (BLOCH, 1780).

(*) Tapeworm recorded for the first time from the Belgian Congo.

(**) *D. parvum* CHOLODKOWSKY is a synonym of *D. latum* (LIN., 1758), not yet reported from Africa. This parasite from the jackal is probably *D. theileri* BAER, 1925 or *D. pretoriensis* (BAER, 1925).

Order HYRACOIDEA

Heterohyrax chapini HATT.	* *Anoplocephala spatula* (LINSTOW, 1901).
Procavia johnstoni lopesi THOM.	*Inermicapsifer interpositus* JANICKI, 1910.
Dendrohyrax arboreus adolfi-friederici BRAUER (***)	*Anoplocephale spatula* (LINSTOW, 1901).
	* *Inermicapsifer hyracis* (RUDOLPHI, 1810).
	* *Inermicapsifer interpositus* JANICKI, 1910.
	* *Inermicapsifer pagenstecheri* (SETTI, 1897).
	Inermicapsifer schoutedeni M.A.E. EZZAT, 1954.

Order UNGULATA

Equus (Hippotigris) burchelli böhmi MATSCH. (Zèbre)	* *Anoplocephala rhodesiensis* (YORKE and SOUTHWELL, 1921).
Phacochoerus aethiopicus PALL.	* *Moniezia mettami* BAYLIS, 1934.
« Porc »	* *Taenia solium* LIN., 1758, larval form.
Syncerus coffer SPARRM. (« Buffle noir »).	* *Avitellina centripunctata* (RIVOLTA, 1874).
« Bovidés »	*Moniezia expansa* (RUDOLPHI, 1810).
	Taenia saginata (GOEZE, 1768) larva (= *Cysticercus bovis*)
Bétail (« Bœuf », « Veau »...).	* *Avitellina centripunctata* (RIVOLTA, 1874).
	Moniezia expansa (RUDOLPHI, 1810).
« Mouton »	*Moniezia expansa* (RUDOLPHI, 1810).
	* *Stilesia hepatica* (WOLLFHÜGEL, 1903).
Damaliscus korrigum ugondae BLAINE (« Topi »).	* *Avitellina centripunctata* (RIVOLTA, 1874).
	Moniezia expansa RUDOLPHI, 1810.
Cephalophus (= Sylvicapra) grimmi coronntus GRAY.	*Taenia hydatigena* PALL., 1756, larva.
Cephalophus nigrifrons GRAY.	* *Avitellina centripunctata* (RIVOLTA, 1874).
	* *Stilesia globipunctata* (RIVOLTA, 1874).
Cephalophus sylvicultor AFZEL.	* *Crossotaenia baeri* n. g., n. sp.
Cephalophus sp.	» »
Tragelaphus scriptus PALL.	*Moniezia expansa* (RUDOLPHI, 1810).
Okapia johnstoni SCLATER.	*Sporganum okapiae* FAIN, 1948.
	Stilesia globipunctata var. *okapi* (LEIPER, 1935).
	** *Moniezia expansa* (RUDOLPHI, 1810).
Ungulate	*Taenia hydatigena* PALL., 1756, larval form = *Cysticercus tenuicollis*.

Order RODENTIA

Thrionomys swinderianus TEMM.	*Raillietina (Raillietina) gracilis* JANICKI, 1904.
Hystrix galeata THOM. (« porc épic »).	* *Inermicapsifer* sp.
Funisciurus congicus KÜHL.	*Catenotaenia lobata* BAER, 1925.
« Ecureuil »	*Hymenolepis* sp.
Oenomys hypoxanthus PUCH.	* *Paranoplocephala isomydis* (SETTI, 1892).
Dasymys bentleyae THOM.	*Inermicapsifer arviconthidis* (KOFEND, 1917).
	* *Inermicapsifer congolensis* n. sp.
Arvicanthis abyssinicus RÜPP.	*Hymenolepis microstoma* (DUJARDIN, 1845).
	Inermicapsifer arvicnnthidis (KOFEND, 1917).
	Raillietina (Raillietina) trapezoides JANICKI, 1904.

(*) Tapeworm recorded for the first time from the Belgian Congo.
(**) One specimen of this species has recently been recovered from an Okapi that died at Epulu 16-III-1954 (30008). [J. G. BAER det.].
(***) On the identity of this host see p. 193, footnote.

Pelonys camponae HUET.	* *Inermicapsifer guineensis* (GRAHAM, 1908).
Pelomys frater THOM.	*Hymenolepis diminuta* (RUD., 1819).
Rattus rattus L.	*Hymenolepis diminuta* (RUD., 1819).
	Hymenolepis fraterna STILES, 1906.
	Hymenolepis sp.
	Inermicapsifer arvicanthidis (KOFEND, 1917).
	Taenia brauni SETTI, 1897. - Larva.
	Taenia taeniaeformis (BATSCH, 1986).
	Larva = *Cysticercus fasciolaris*.
Rattus rattus frugivorus (RAFIN.)	» » »
Rattus sp.	*Hymenolepis* sp.
	Tania taeniaeformis (BATSCH, 1986).
	Larva = *Cysticercus fasciolaris*.
? Rat « Houmba »	*Hymenolepis globirostris* BAER, 1925.
	Inermicapsifer arvicanthidis (KOFEND, 1917).
? Rat « Timmun »	» » »
? Rat « Tshakoja »	*Catenotaenia lobata* BAER, 1925.
	Inermicapsifer arvicanthidis (KOFEND, 1917).
Mastomys coucha SMITH.	*Catenotaenia pusilla* (GOEZE, 1782).
	Hymenolepis microstoma (DUJARDIN, 1845).
	Inermicapsifer arvicanthidis (KOFEND, 1917).
	* *Inermicapsifer* sp.
Mastomys coucha fuscus BOC.	*Raillietina* (*Raillietina*) *baeri* MEGGITT and SUBRAMANIAN, 1927.
	Raillietina (*Raillietina*) *madagascariensis* (DAV., 1870).
Mastomys coucha ugandae WINT.	*Catenotaenia lobata* BAER, 1925.
	Hymenolepis microstoma (DUJARDIN, 1845).
	Hymenolepis sp.
	Inermicapsifer arvicanthidis (KOFEND, 1917).
	Raillietina (*Raillietina*) *baeri* MEGGITT and SUBRAMANIAN, 1927.
« Souris » (? *Mus musculus* L.).	*Taenia brauni* SETTI, 1897. Larva.
	Raillietina (*Raillietina*) *baeri* MEGGITT and SUBRAMANIAN, 1927.
	Taenia brauni SETTI, 1897. Larva.
Lophuromys sp. (= *sikapusi* TEMM.).	* *Taenia parva* BAER, 1925. Polycephalic larva.
Cricetomys dissimilis ROCHEBR.	*Hymenolepis* sp.
	Inermicapsifer arvicanthidis (KOFEND, 1917).
Steatomys pratensis PETERS.	* *Inermicapsifer congolensis* n. sp.
Rodent (?)	*Hymenolepis diminuta* (RUD., 1819).
	* *Cittotaenia pectinata* (GOEZE, 1782).
	(See remarks p. 186).

(*) Tapeworm recorded for the first time from the Belgian Congo.

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— (1925)

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11th. 12th. Rep. Dir. Vet. Res. Pretoria, pp. 63-136, 43 figs.

— (1925 a.)

Sur quelques Cestodes du Congo belge.
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(*) Species not forming part of the present Belgian Congo Collection.

ERRATA

p. 160, 13 *Raillietina* (*Raillietina*) *pinteri* (KLAPTOCZ, 1906) should read *pintneri*.

p. 170, Fig. 9. — *Milvus migrans tenebrosos* should read *tenebrosus*.

pp. 181, 182, Figs 23, 24. — *Lophotis ruficristata gindiama* should read *gindiana*.

p. 188, for Fig. 32 read Fig. 30 and for Fig. 30 read Fig. 32.

p. 224, Fig. 63. — *Taenia acinomyxi* ORLEPP should read ORTLEPP.

p. 237, *Raillietina* (*Raillietina*) *pernista* SHOUTHWELL and LAKE, 1939 should read *permista*.

p. 243, CLEZC, W. (1903) should read CLERC, W. (1903).

p. 245, FUHRMANN, O. et BAER, J.G. (1943). — Mission biologique Sangan-Omo, should read Sagan-Omo.