

CESTODES FROM RODENTS IN THE REPUBLIC OF SOUTH AFRICA*

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ABSTRACT

H. MARIA COLLINS. Cestodes from rodents in the Republic of South Africa. *Onderstepoort J. vet. Res.*, 39 (1), 25-50 (1972).

The cestodes recovered from various Muridae and Cricetidae in the Republic of South Africa are recorded.

The following species are redescribed: *Paranoplocephala omphalodes* (Hermann, 1783) Lühe, 1910; *Inermicapsifer congolensis* Mahon, 1954; *Inermicapsifer madagascariensis* (Davaine, 1870) Baer, 1956; *Catenotaenia compacta* Ortlepp, 1962; *Catenotaenia lobata* Baer, 1925; *Catenotaenia lucida* Ortlepp, 1962; *Raillietina* (*Raillietina*) *thryonomysi* Ortlepp, 1938; *Raillietina* (*Raillietina*) *trapezoides* (Janicki, 1904) Fuhrmann, 1924; *Hymenolepis diminuta* (Rudolphi, 1819); *Hymenolepis straminea* (Goeze, 1782); *Hymenolepis nana* (von Siebold, 1852).

Three new species are described: *Paranoplocephala otomys* from *Otomys irroratus*; *Hymenolepis microcantba* and *Hymenolepis taterae* from *Tatera* (*Tatera*) *brantsi*. *Paranoplocephala acanthocirrosa* Baer, 1924 is considered a synonym of *P. omphalodes*; *Catenotaenia capensis* Ortlepp, 1940 of *C. lobata*; and *Raillietina* (*Raillietina*) *namaquensis* Mettrick, 1962 of *R. (R.) trapezoides*.

Cestodes recovered from the Myomorpha in the Ethiopian Region are summarized and a host-parasite list is included.

INTRODUCTION

This investigation is the first systematic survey of the cestodes of some Muridae and Cricetidae in the Republic of South Africa. Previous records of these parasites in the Ethiopian Region appear in reports on the helminth faunas of various countries. The cestodes that have been recorded from Myomorpha in the Ethiopian Region are summarized in Table 1.

Some of the cestodes recovered in this survey have been recorded from many species of rodents in various parts of the world. It is neither possible nor relevant to include all these records. However, definitive hosts listed in the text only include those recorded in this survey. The following authors were consulted to verify the correct names of the host animals: Allen (1939), Cabrera (1960), Davis (1968 a, b), De Graaff (1968), Ellenman & Morrison-Scott (1951), Misonne (1968) and Troughton (1941).

In the text the current names of African states are used throughout; in some cases these differ from those used in the literature, as follows:

- Congo Kinshasa - Belgian Congo
- Rhodesia - Southern Rhodesia
- Somalia - Italian Somaliland and British Somaliland
- Tanzania - Tanganyika and Zanzibar
- Zambia - Northern Rhodesia
- Republic of South Africa - Union of South Africa

In listing the localities in the Republic of South Africa the various provinces are abbreviated as follows:

- E.P. - Eastern Province (Cape Province)
- W.P. - Western Province (Cape Province)
- N.W.P. - North Western Cape (Cape Province)
- Ntl. - Natal
- O.F.S. - Orange Free State
- Tvl. - Transvaal

The following abbreviations are used in the figures:

- C = Cirrus
- Cm = Circular muscles
- Cp = Cirrus pouch

- Esv = External seminal vesicle
- Ev = Excretory vessels
- Glc = Glandular cells
- Isv = Internal seminal vesicle
- Ov = Ovary
- Sr = Seminal receptacle
- T = Testes
- V = Vagina
- Vd = Vas deferens
- Vit = Vitellarium
- Vs = Vaginal sphincter

PARANOPLOCEPHALA LÜHE, 1910

Paranoplocephala omphalodes (Hermann, 1783) Lühe, 1910
Synonym: *Paranoplocephala acanthocirrosa* Baer, 1924

Material

- (1) Paratype of *P. acanthocirrosa* (Onderstepoort Helminthological Collection No. T. 1010, Onderstepoort)
- (2) Three adults and fragments of adults from *O. irroratus*, Albany (E.P.) and Pretoria (Tvl.)
- (3) Fragments of adults from *O. unisulcatus*, Uitenhage (E.P.) and Zoutpansberg (Tvl.)

Redescription

Strobila

The total length varies from 61 to 74 mm and the maximum width from 5.0 to 7.0 mm. The scolex is 760 to 800 μ and the suckers 200 to 240 μ by 176 to 216 μ in diameter. The genital pores alternate irregularly and the genital ducts pass dorsal to the excretory vessels to cross from the medulla into the cortex.

Male genitalia

There are 90 to 120 testes in two to three layers; they are in a single group aporal to the female genitalia (Fig. 1). The vas deferens, which has thick walls, runs parallel to the vagina; its lumen widens in the vicinity of the seminal receptacle. The muscular cirrus pouch is elongated or pyriform; 440 to 700 μ by 120 to 180 μ wide. The cirrus is densely covered with very small spines.

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TABLE 1 Summary of Cestodes recorded from Myomorpha in the Ethiopian Region

Cestode	Host	Locality	Reference
<i>Paramplocephala omphalodes</i> (Hermann, 1783) Syn. <i>Paramplocephala acanthocirrota</i> Baer, 1924	<i>Otomys irroratus</i> (Brants, 1827) <i>Otomys unisulcatus</i> Cuvier, 1829	Republic of South Africa Republic of South Africa Rhodesia Republic of South Africa	This paper Baer (1924; 1926) Baer (1933) This paper
<i>Paramplocephala isomydis</i> (Setti, 1892)	<i>Oenomys hypoxanthus</i> (Pucheran, 1855)	Congo Kinshasa	Mahon (1954)
<i>Paramplocephala otomyos</i> sp. n.	<i>O. irroratus</i>	Republic of South Africa	This paper
<i>Inermicapsifer congolensis</i> Mahon, 1954	<i>Cricetomys gambianus</i> Rochebrune, 1885	Central African Republic Congo Kinshasa Congo Kinshasa Rhodesia Republic of South Africa Republic of South Africa Republic of South Africa Republic of South Africa Republic of South Africa Republic of South Africa Republic of South Africa Republic of South Africa	Quentin (1964) Mahon (1954) Baer & Fain (1955) Mettrick (1962) This paper This paper This paper This paper This paper This paper This paper This paper
<i>Inermicapsifer aberratus</i> Baer, 1924	<i>Thalonomys paedulus</i> (Sundevall, 1846)	Republic of South Africa	Baer (1924; 1926)
<i>Inermicapsifer guineensis</i> (Graham, 1908) Syn. <i>Inermicapsifer zanzibarensis</i> Meggitt, 1921	<i>Arvicanthus niloticus</i> (Desmarest, 1822) <i>Cricetomys bimbabanani</i> Thomas & Hinton, 1921 <i>C. gambianus</i>	Nigeria Nigeria Congo Kinshasa Tanzania Tanzania Republic of South Africa Congo Kinshasa Republic of South Africa Ghana Rhodesia Republic of South Africa	Joyeux & Baer (1930) Joyeux & Baer (1930) Baer & Fain (1955) Baylis (1934) Meggitt (1921) Baer (1926) Mahon (1954) Baer (1926) Baylis (1915) Baer (1933) Baer (1926)
<i>Inermicapsifer madagascariensis</i> (Davaine, 1870) Syn. <i>Inermicapsifer arvicantibidis</i> (Kofend, 1917)	<i>Pelomys campaneae</i> (Huet, 1888) <i>R. rattus</i> <i>R. pumilio</i> <i>T. paedulus</i> <i>Aelbomys (Aelbomys) chrysocephalus</i> (de Winton, 1897) <i>Aelbomys heiseri medicatus</i> (Wroughton, 1909) <i>Aelbomys (Micaelamys) namaquensis</i> (A. Smith, 1834) <i>Arvicanthus abyssinicus</i> (Rüppell, 1842) <i>A. niloticus</i> <i>C. gambianus</i> <i>Cryptomys mechowi</i> (Peters, 1881) <i>D. incomtus</i> <i>Heliophobius argenteocinerus</i> Noack, 1894 <i>Hybomys umittatus</i> Peters, 1876 <i>L. griselda</i> <i>Lemniscomys striatus</i> (Linnaeus, 1758) <i>Mus musculus</i> Linnaeus, 1758 <i>O. hypoxanthus</i> <i>O. irroratus</i>	Republic of South Africa Republic of South Africa Congo Brazzaville Republic of South Africa Congo Kinshasa Congo Kinshasa Dahome Sudan Congo Kinshasa Congo Kinshasa Congo Kinshasa Kenya Central African Republic Nigeria Republic of South Africa Nigeria Dahome Dahome Republic of South Africa	Ortlepp (1961) This paper Quentin (1964) This paper Mahon (1954) Baer (1959) Quentin (1964) Joyeux & Baer (1927) Kofend (1917) Mahon (1954) Baer & Fain (1955) Mahon (1954) Baylis (1949) Quentin (1964) Joyeux & Baer (1930) Ortlepp (1961) Joyeux & Baer (1930) Joyeux & Baer (1927) Joyeux & Baer (1927) Baer (1926)

<i>P. campomae</i>					Congo Brazzaville	
<i>P. (M.) natalensis</i>					Guinea Congo Kinshasa Congo Kinshasa Congo Kinshasa Nigeria Republic of South Africa Republic of South Africa Tanzania Republic of South Africa Ruanda-Urundi Republic of South Africa Republic of South Africa Republic of South Africa Republic of South Africa Nigeria Republic of South Africa Central African Republic Kenya Republic of South Africa Republic of South Africa Ruanda-Urundi Tanzania	Quentin (1964) Joyeux & Baer (1927) Mahon (1954) Southwell & Lake (1939) Baylis (1939) Joyeux & Baer (1930) Ortlepp (1961) This paper Baylis (1934) Ortlepp (1961) Fain (1950) This paper Ortlepp (1961) This paper Ortlepp (1961) Baer (1933) Joyeux & Baer (1930) Baer (1926) Quentin (1964) Baylis (1949) Ortlepp (1961) This paper Fain (1950) Baer (1955)
<i>Rattus paadulcus</i> (Sundevall, 1846)					Rhodesia	Lynsdale (1953)
<i>R. rattus</i>						
<i>R. pumilio</i>						
<i>Sacostomys campestris</i> Peters, 1846						
<i>Stenomys pratensis</i> Peters, 1846						
<i>Tatera valida kempi</i> Wroughton, 1906						
<i>T. paadulcus</i>						
<i>Thomomys rutilans</i> (Peters, 1876) Man						
Rat						
<i>A. (A.) chrysophilus</i>					Republic of South Africa Republic of South Africa	Ortlepp (1962) This paper
<i>C. gambianus</i>					Nigeria	Hockley (1961)
<i>Mastomys</i> sp. (with 32 chromosomes)					Central African Republic	Quentin (1964)
<i>Heltophobius marungensis</i> Noack, 1887					Dahome	Joyeux & Baer (1927)
<i>P. (M.) natalensis</i>					Nigeria Republic of South Africa	Pearse (1930) [Cited by Dollfus (1953)] This paper
					Nigeria Rhodesia	Joyeux & Baer (1930) Metrick (1962)
<i>R. pumilio</i>					Tanzania	Baylis (1934)
<i>T. valida kempi</i>					Republic of South Africa Republic of South Africa Nigeria Nigeria	Ortlepp (1962) This paper Pearse (1930) [Cited by Dollfus (1953)] Joyeux & Baer (1930)
<i>A. (A.) chrysophilus</i>					Republic of South Africa	Ortlepp (1962)
<i>A. (M.) namaquensis</i>					Republic of South Africa Congo Brazzaville	This paper Quentin (1964)
<i>Mastomys</i> sp. (with 32 chromosomes)					Central African Republic	Quentin (1965)
<i>Stochomys longicaudatus</i> (Tullberg, 1855)						
<i>Aethomys walambae pedester</i> (Thomas, 1911)					Congo Kinshasa	Baer (1959)
<i>Dasyurus bentleyae</i> (Thomas, 1892)					Congo Kinshasa	Baer (1959)
<i>Malcomys longipes</i> Rochebrune, 1885					Dahome	Joyeux & Baer (1930)
<i>Mastomys</i> sp. (with 32 chromosomes)					Central African Republic	Quentin (1964)
<i>P. (M.) natalensis</i>					Nigeria	Joyeux & Baer (1930)
<i>Praomys (Praomys) jacksoni</i> (de Winton, 1897)					Central African Republic	Quentin (1964)
<i>R. rattus</i>					Congo Kinshasa Dahome	Baylis (1939) Meggett & Subramanian (1927)

TABLE 1 - continued

Cestode	Host	Locality	Reference
<i>Raillietina (Raillietina) mabonae</i> Baer & Fain, 1955	<i>Otomys kempfi</i> Dollman, 1915 <i>Ibryonomys swinderianus</i> (Temminck, 1827)	Congo Kinshasa Congo Kinshasa Congo Kinshasa	Baer (1959) Baer & Fain (1955) Southwell & Lake (1939)
<i>Raillietina (Raillietina) thryonomysi</i> Ortlepp, 1938	<i>T. swinderianus</i> <i>O. irroratus</i>	Republic of South Africa Republic of South Africa	Ortlepp (1938) This paper
<i>Raillietina (Raillietina) trapezoides</i> (Janicki, 1904) Syn. <i>Raillietina (Raillietina) namaquensis</i> Mettrick, 1962	<i>A. (M.) namaquensis</i> <i>A. nilotius</i> <i>L. striatus</i> <i>R. panilio</i> <i>Parotomys brantsi</i> (Smith, 1840) <i>Tatera (Tatera) brantsi</i> (A. Smith, 1834) <i>T. valida kempfi</i> <i>T. swinderianus</i>	Rhodesia Nigeria Nigeria Congo Brazzaville Nigeria Republic of South Africa Republic of South Africa Republic of South Africa Nigeria Congo Kinshasa Congo Kinshasa	Mettrick (1962) Joyeux & Baer (1930) Southwell & Lake (1939) Quentin (1964) Joyeux & Baer (1930) Ortlepp (1940) This paper Ortlepp (1940) This paper Joyeux & Baer (1930) Baer & Fain (1955) Southwell & Lake (1939)
<i>Anomotaenia beimi</i> Quentin, 1964	<i>Lophuromys siekapsi</i> (Temminck, 1853)	Central African Republic	Quentin (1964)
<i>Dilepis dollfusii</i> Quentin, 1964	<i>Mastomys</i> sp. (with 32 chromosomes)	Congo Kinshasa	Quentin (1964)
<i>Hymenolepis diminuta</i> (Rudolphi, 1819)	<i>Thomomys surdaster</i> Thomas & Wroughton, 1908 <i>Mastomys</i> sp. (with 32 chromosomes) <i>M. musculus</i> <i>Pelomys fallax</i> (Peters, 1852) <i>P. (M.) natalensis</i> <i>P. (P.) jacksoni</i> <i>R. rattus</i>	Tanzania Central African Republic Somalia Republic of South Africa Congo Kinshasa Rhodesia Republic of South Africa Tanzania Toukoulou Tanzania Rhodesia Republic of South Africa Republic of South Africa Central African Republic Congo Kinshasa Congo Kinshasa	Baylis (1934) Quentin (1964) Joyeux, Baer & Martin (1936) This paper Southwell & Lake (1939) Baer (1933) This paper Baylis (1934) Quentin (1964) Baylis (1934) Baer (1933) Baer (1933) This paper Quentin (1964) Southwell & Lake (1939) Southwell & Lake (1939)
<i>Hymenolepis globirostris</i> Baer, 1925	Rat	Congo Kinshasa	Baer (1925)
<i>Hymenolepis microstoma</i> (Dujardin, 1845)	<i>A. alysiinictis</i> <i>Dendromys insignis</i> (Thomas, 1903) <i>Leggoda minutoides</i> (A. Smith, 1834) <i>Mastomys</i> sp. (with 32 chromosomes) <i>M. musculus</i> <i>P. (M.) natalensis</i>	Congo Kinshasa Tanzania Rhodesia Republic of South Africa Congo Brazzaville Somalia Republic of South Africa Congo Kinshasa Congo Kinshasa Republic of South Africa Tanzania	Mahon (1954) Baylis (1934) Baer (1933) This paper Quentin (1964) Joyeux, Baer & Martin (1936) This paper Mahon (1954) Baylis (1939) This paper Baylis (1934)

<i>Hymenolepis microcantha</i> sp. n.	<i>P. (P.) jackeoni</i> <i>R. panillo</i>	Tanzania Republic of South Africa	Baylis (1934) This paper
<i>Hymenolepis nana</i> (von Siebold, 1852)	<i>T. (T.) brantsi</i>	Republic of South Africa	This paper
<i>Hymenolepis pearsi</i> Joyeux & Baer, 1930	<i>M. musculus</i>	Somalia Republic of South Africa	Joyeux, Baer & Martin (1936) This paper
<i>Hymenolepis petteri</i> Quentin, 1964	<i>H. univittatus</i>	Nigeria	Joyeux & Baer (1930)
<i>Hymenolepis taterae</i> sp. n.	<i>L. sikapusi</i>	Central African Republic	Quentin (1964)
<i>Hymenolepis unispinosa</i> Joyeux & Baer, 1930	<i>T. (T.) brantsi</i>	Republic of South Africa	This paper
	<i>H. univittatus</i> <i>P. (M.) natalensis</i>	Nigeria Nigeria	Joyeux & Baer (1930) Joyeux & Baer (1930)

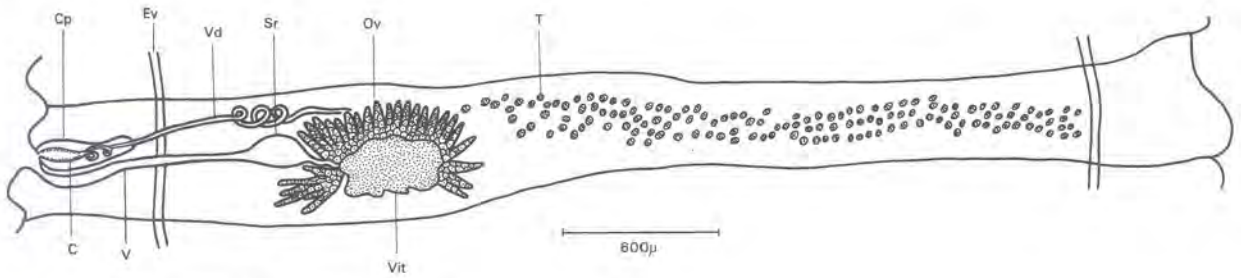


FIG. 1 Sexually mature proglottid of *P. omphalode*

Female genitalia

The fan-shaped ovary and the lobed vitellarium are situated porally. The vagina is thick-walled; it forms a round or oval seminal receptacle which is poral to the ovary. The uterus is a transverse tube with lateral evaginations.

Discussion

In his original description of *Paranoplocephala acanthocirrosa* Baer (1924) records the length of the cirrus pouch as 800 μ. In 1959, Baer described the subspecies *Paranoplocephala acanthocirrosa kivuensis* from *Otomys kempi* Dollman, 1915 in the Congo Kinshasa and redescribed the nominate subspecies. In this publication he states that the cirrus pouch of the latter is 366 to 686 μ long and that of *P. acanthocirrosa kivuensis* 215 to 267 μ.

The cirrus of the nominate subspecies is covered with spines while that of *P. acanthocirrosa kivuensis* has fine hairs. The dissimilarity in the lengths of the cirrus pouches and the fact that the cirrus is spiny in one subspecies and hairy in the other are the only differences noted between the subspecies.

In this investigation, however, it was found that the cirrus pouch in the paratype of *P. acanthocirrosa* varies from 378 to 483 μ and in the additional material described here from 400 to 700 μ. It is thus clear that the length of the cirrus pouch has a wide range of variation and cannot be considered as a reliable criterion for the erection of a subspecies.

Spasskii (1951) questions the validity of *P. acanthocirrosa* but retains it as a distinct species as the cirrus pouch is stated to be longer (800 μ) than that of *P. omphalodes* (200 to 500 μ). However, as is shown above, this structure may vary from 215 to 800 μ in *P. acanthocirrosa* and it must be considered a synonym of *P. omphalodes*.

Paranoplocephala otomyos sp. n.

Definitive host: *Otomys irroratus*
 Type locality: Golden Gate (O.F.S.)

Material

- (1) Holotype from *O. irroratus*, Golden Gate (O.F.S.) (Onderstepoort Helminthological Collection, No. T. 1062, Onderstepoort)
- (2) Fragments of another specimen from the same host species and locality as holotype

Description

Strobila

The total length is 73,5 mm and the maximum width 6,0 mm. The scolex is 580 μ and the spherical suckers 200 μ in diameter. The excretory system consists of one pair of longitudinal ventral and one pair of longitudinal

dorsal vessels; a transverse vessel connects the ventral vessels in the posterior part of each proglottid. The genital pores alternate irregularly and are situated in the middle of the proglottid margin. The genital ducts pass dorsal to the excretory vessels to cross from the medulla into the cortex.

Male genitalia

There are 75 to 95 testes in two layers situated in a single group aporal to the female genitalia (Fig. 2).

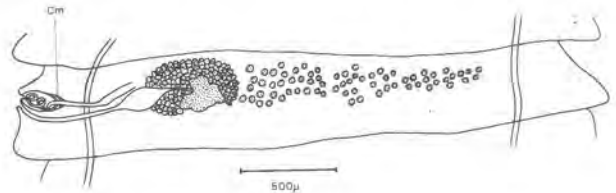


FIG. 2 Sexually mature proglottid of *P. otomyos* sp. n.

The cirrus pouch is oval or pyriform, 144 to 280 μ long by 120 to 160 μ wide. The cirrus is unarmed, 72 to 80 μ in diameter. Before entering the cirrus pouch, the vas deferens becomes narrow and straight and is surrounded by well developed circular muscles, 120 to 152 μ long and 40 to 80 μ wide. The thick-walled vas deferens has a wide lumen.

Female genitalia

The fan-shaped ovary and the lobed vitellarium are situated porally. The walls of the vagina are thickened. The seminal receptacle is oval or round; 136 to 336 μ long by 64 to 136 μ wide. The uterus is a transverse tube with 20 to 24 saccular lateral evaginations. The ova are 44 to 40 μ and the embryo 14 μ in diameter.

Discussion

This species differs from all the others in this genus in the structure of the cirrus pouch (Fig. 3a, b, and c).

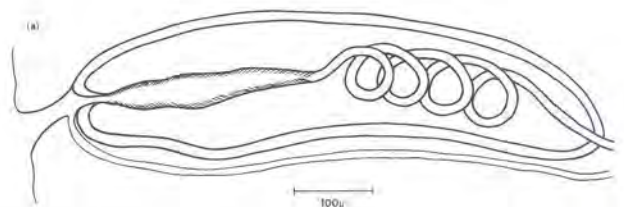


FIG. 3a Cirrus pouch of *P. omphalodes*

TABLE 2 Comparison of *P. omphalodes* according to various authors

Synonym	Author	Length (mm)	Width (mm)	Scolex (μ)	Suckers (μ)	No. of testes	Cirrus pouch (μ)		Eggs (μ)	Hosts
							Length	Width		
<i>P. omphalodes</i> . . .	Lühe (1910)	120-215	3,4-5,0	150-250	350	—	210	—	30	<i>Arvicola terrestris</i> (Linnaeus, 1758) <i>Microtus arvalis</i> (Pallas, 1779)
	Baer (1927)	100-215	5,0	150-200	400	50	200-400	—	40-60	<i>Microtus agrestis</i> (Linnaeus, 1758) <i>A. terrestris</i> <i>Lagidium peruanum</i> (Meyen, 1953)
	Spasskii (1951)	40-280	2,0-5,0	700-2 000	370-400	50	200-500	—	40-70	Various rodents
	Murai (1970)	110	2,5	—	—	50	200-260	62-85	42-47	<i>Cricetus cricetus</i> Linnaeus, 1758
<i>P.a. acanthocirrosa</i> . . . <i>P.a. kinuensis</i> . . . <i>P. blanchardi</i> . . .	This paper	—	—	—	—	100	378-483	147-210	—	<i>O. irroratus</i>
	Baer (1924; 1926) Baer (1959)	61-74	5,0-7,0	760-800	200-240	90-120	400-700	120-180	—	<i>O. irroratus</i> <i>O. unisulcatus</i>
	Baer (1927)	45-60 50	5,0 5,0	500-1 000 585	200 192	40-50 60-65	800 215-367	200 45-123	50 45	<i>O. irroratus</i> <i>O. kempi</i>
	Baer (1927)	20-40	2,5-4,0	700	—	50	500	—	40-50	<i>M. agrestis</i> <i>M. arvalis</i> <i>Microtus nivalis</i> (Martins, 1842)

TABLE 3 Comparison of *I. congolensis* described by various authors

Author	Length (mm)	Width (mm)	Scolex (μ)	Suckers (μ)	No. of testes	Cirrus pouch (μ)		No. of egg capsules	No. of eggs per capsule	Hosts
						Length	Width			
Mahon (1954)	53-90	5,0-6,5	664-880	200-336	53-108	144-226	86-108	—	10-14	<i>C. gambianus</i> <i>D. inornatus</i>
Mettrick (1962)	—	—	680-770	240-270	82-108	220-240	50-60	73-85	4-9	<i>C. gambianus</i>
Quentin (1964)	100-120	—	700-730	250-300	70	140	—	—	—	<i>C. gambianus</i>
This paper	48,5-93,0	2,5-4,5	440-520	160-200	40-68	64-168	40-96	59-110	5-15	Various rodents

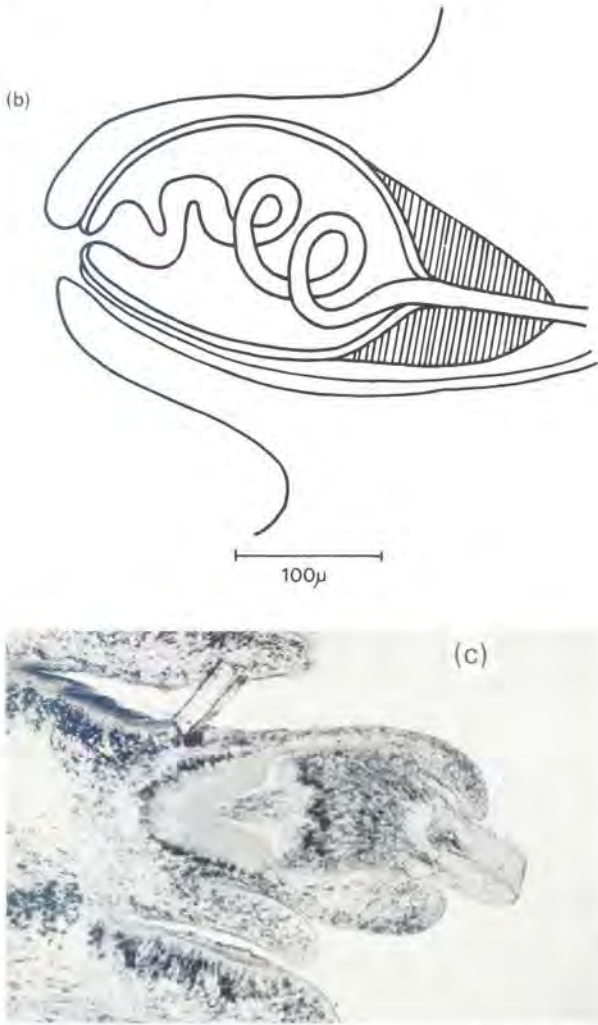


FIG. 3b and c Cirrus pouch of *P. otomys* sp. n. b. Camera lucida drawing c. Microphotograph

It also differs from *Paranoplocephala omphalodes* in that the cirrus pouch is smaller and the cirrus unarmed; from *Paranoplocephala isomydis* in the size of the strobila, and in the absence of an external seminal vesicle (Baer, 1949; Mahon, 1954), and from *Paranoplocephala brevis* Kirschenblatt, 1938 in the size of the strobila (Zarnowski, 1955; Wahl, 1967).

INERMICAPSIFER JANICKI, 1910

Inermicapsifer congolensis Mahon, 1954

- Definitive hosts: *Cricetomys gambianus*
Dasyms incomtus
Lemniscomys griselda
Otomys irroratus
O. unisulcatus
Praomys (Mastomys) natalensis
Rattus rattus
Rhabdomys pumilio

Material

- (1) Ten intact adults from *L. griselda*, Zululand (Ntl.); *P. (M.) natalensis*, Albany and Uitenhage (E.P.) and Pretoria (Tvl.)
- (2) Fragments of adults from *C. gambianus*, Zoutpansberg (Tvl.); *D. incomtus*, Lower Albany (E.P.); *O. irroratus*, Pretoria and Johannesburg (Tvl.); *O. unisulcatus*, Uitenhage (E.P.); *R. rattus*, Pretoria

(Tvl.); *R. pumilio*, Albany and Uitenhage (E.P.) and Pretoria (Tvl.)

Redescription

Strobila

The total length varies from 48,5 to 93,0 mm and the maximum width from 2,5 to 4,5 mm. The scolex is 440 to 520 µ and the suckers 160 to 200 µ in diameter. The genital pores are unilateral; in the specimens from *L. griselda* the genital pores are on the right side in more than 100 consecutive proglottids and on the left side of the remaining proglottids. The genital ducts pass between the excretory vessels to cross from the medulla into the cortex.

Male genitalia

There are 40 to 68 testes arranged in two groups, 11 to 25 poral and 27 to 45 aporal (Fig. 4). The area



FIG. 4 Sexually mature proglottid of *I. congolensis*

anterior to the female genitalia is usually free of testes but two or three may occur here. The cirrus pouch does not reach the excretory vessels; it is oval, 64 to 168 µ long by 40 to 96 µ wide.

Female genitalia

The lobed ovary is situated porally. The vagina is thick-walled and in the cortex it is surrounded by glandular cells. There are 59 to 110 egg capsules per proglottid; each contains 5 to 15 eggs.

Discussion

In the original description of this species Mahon (1954) states: "the vagina is seen to stain heavily, and appears to be lined with setae", but she does not mention the glandular cells which surround it.

Inermicapsifer madagascariensis (Davaine, 1870) Baer, 1956

Definitive hosts:

- Aethomys (Aethomys) chrysophilus*
- Aethomys (Micaelamys) namaquensis*
- Praomys (Mastomys) natalensis*
- Rattus rattus*
- Rhabdomys pumilio*
- Man

Material

- (1) Eighteen intact adults from *A. (A.) chrysophilus*, North Eastern Transvaal; *A. (M.) namaquensis*, *P. (M.) natalensis*, Kruger National Park, (Tvl.); *R. pumilio* and *R. rattus*, Pretoria (Tvl.)
- (2) Fragments of adults from *R. pumilio*, Albany (E.P.) and Zoutpansberg (Tvl.)
- (3) Fragments of an adult from a child, Pretoria (Tvl.)

Redescription

Strobila

The total length varies from 41 to 175 mm and the maximum width from 1,0 to 2,5 mm. The scolex is 240 to 800 µ and the suckers 88 to 280 µ by 136 to 280 µ in diameter. The genital pores are unilateral; in one

specimen from *R. rattus* they are on the right side in the anterior third of the worm and on the left in the remaining two-thirds. The genital ducts pass between the excretory vessels to cross from the medulla into the cortex.

Male genitalia

There are 20 to 64 testes in two groups, 7 to 17 poral and 13 to 47 aporal in position; in some specimens there are a number of testes posterior to the female genitalia which unite the two groups (Fig. 5a, b).

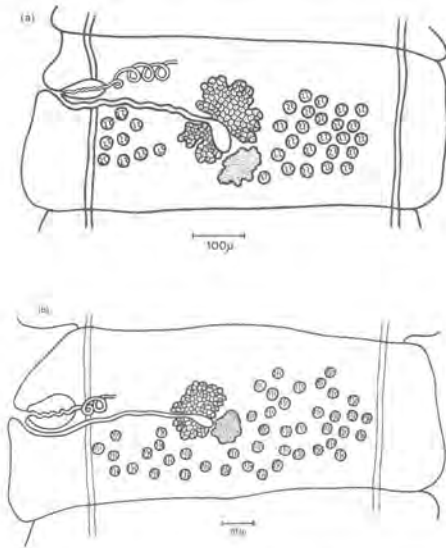


FIG. 5 Sexually mature proglottid of *I. madagascariensis*. a. Testes in two groups b. Testes confluent posterior to the female genitalia

The cirrus pouch extends to the longitudinal excretory vessels and in some instances into the medulla; it is oval, 48 to 176 μ long by 24 to 56 μ wide.

Female genitalia

The fan-shaped ovary is slightly off-centre and the lobed vitellarium somewhat aporal to it. A small seminal receptacle is present. There are 16 to 99 egg capsules per proglottid; they contain 5 to 13 eggs.

Discussion

Fain (1950) showed that *I. cubensis* is a synonym of *I. arvicanthidis*. Baer (1956) reviewed the literature dealing with this taxon and concludes that *I. madagascariensis* has priority over other names (Table 4).

CATENOTAENIA JANICKI, 1904

The status of the genus *Catenotaenia* as well as that of its species has been in dispute for many years. At various times it has been placed in the families Taeniidae, Dilepididae, Anoplocephalidae and finally in the Catenotaeniidae. According to Spasskii (1951), Akhymyan (1946) divided it into three genera, *Catenotaenia*, *Mathevoaenia* and *Skrjabinoaenia*, using the distribution of the testes and structure of the uterus as criteria. Spasskii (1951) separates *Catenotaenia* from *Skrjabinoaenia* on testes distribution and places *Catenotaenia oranensis* Joyeux & Foley, 1930 and *C. lobata* in *Skrjabinoaenia*, which he defines as having the testes in two groups. In the present study, however, it was found that the testes of *C. lobata* are not always in two dis-

tinct groups; furthermore the uterus is like that of the other species but unlike that of *C. oranensis*. It is, therefore, clear that the criteria used for the erection of these genera and subgenera are invalid. Tenora (1959) recognized *Catenotaenia* and *Skrjabinoaenia*; in the former the main trunk of the uterus reaches the end of the proglottid; in the latter the uterus has a short trunk with branches arising only at the base and leading laterally and posteriorly. Tenora further creates three subgenera, i.e. *Catenotaenia*, *Spasjkella* and *Meggittina*, using the distribution of the testes as a criterion. However, Ortlepp (1962) and Wolfgang (1956) are of the opinion that the distribution of the testes is not a valid criterion for the creation of subgenera. The data presented below also show that this character is variable, e.g. in *Catenotaenia lobata* Baer, 1925 it is dependent on the state of contraction of the worm.

Ortlepp (1962) states "a subdivision of the genus into subgenera, if necessary, would be more valid when based on the branched or unbranched nature of the excretory system and not on the spatial arrangement of the testes". If this suggestion is followed the two subgenera would be:

- (1) Species in which the excretory system consists of one pair of ventral and one pair of dorsal longitudinal vessels. This would include *Catenotaenia pusilla* (Goeze, 1782) Janicki, 1904; *Catenotaenia aegyptiaca* Wolfgang, 1956; *Catenotaenia californica* Dowell, 1953; *Catenotaenia chabaudi* Dollfus, 1953; *Catenotaenia cricetorum* (Kirschenblatt, 1949); *Catenotaenia dendritica* (Goeze, 1782); *Catenotaenia geosciuri* Ortlepp, 1938; *Catenotaenia linsdalei* McIntosh, 1941; *Catenotaenia reggiae* Rausch, 1951; *Catenotaenia rhombomydis* Schulz & Landa, 1935 and *C. oranensis*.
- (2) Species in which the excretory system consists of more than one pair of ventral and more than one pair of dorsal longitudinal vessels. These are: *Catenotaenia compacta* Ortlepp, 1962; *Catenotaenia gerbilli* (Wertheim, 1954); *Catenotaenia lucida* Ortlepp, 1962; *C. lobata* and *Catenotaenia pauciproglottis* (Quentin, 1965).

The excretory system of *Catenotaenia baeri* (Lynsdale, 1953), however, is unknown.

To avoid further confusion it is considered inadvisable to subdivide the genus until a comparative study of all the species has been made.

Catenotaenia compacta Ortlepp, 1962.

Definitive hosts: *Aethomys* (*Aethomys*) *chrysophilus*
Aethomys (*Micaelamys*) *namaquensis*

Material

- (1) Syntypes from *A. (A.) chrysophilus*, Kaapmuiden (Tvl.) (Onderstepoort Helminthological Collection, No. T. 1047, Onderstepoort).
- (2) Twenty-two adults from *A. (M.) namaquensis*, Kruger National Park, (Tvl.).

Redescription

Strobila

The strobila consists of three to six proglottids of which at least one is immature, one mature and one gravid. The total length varies from 2,5 to 11,5 mm and the maximum width from 0,7 to 2,5 mm. The scolex is 392 to 920 μ and the suckers 168 to 264 μ in diameter. The excretory system consists of several longitudinal ventral and dorsal vessels which anastomose. The genital pores alternate regularly.

TABLE 4 Comparison of *I. madagascariensis* described by various authors

Synonym	Author	Length (mm)	Width (mm)	Scolex (μ)	Suckers (μ)	No. of testes	Cirrus pouch (μ)		Eggs				Hosts	
							Length	Width	No. of capsules	No. of eggs per capsule	Size of eggs (μ)	Embryo (μ)		Hooks (μ)
<i>I. madagascariensis</i>	Kouri & Rappaport (1940)	27-42	1,0-2,0	610-630	150-185	49-34	150	75	48-175	6-11	55x49	22x19	6	Man
	Baer (1956)	145-190	2,6	595	183	45-53	91-114	20-57	130-150	6-10	34	—	—	Man
	Ortlepp (1961)	—	—	750	190	30-40	120	60	120	5-10	—	—	—	Man Various rodents
	This paper	41-175	1,0-2,5	240-800	88-280	20-64	48-176	24-56	16-19	5-13	—	—	—	Various rodents
		141	1,5	—	—	34-52	72-96	48-64	50-91	6-8	—	—	—	Man
<i>I. arvicantidisi</i>	Baer (1926)	43	—	—	—	30-40	—	—	10-40	8-12	—	—	—	<i>T. paedulus</i> <i>O. irroratus</i>
	Baer (1927)	70-100	2,0	500	500	30-50	140-150	—	10-15	11-13	—	—	—	Various rodents
<i>I. cabensis</i>	Meggitt & Subramanian (1927)	70-100	2,0	500	—	30-50	140-150	—	10-50	11-13	—	—	—	Various rodents
	Baylis (1949)	179-250	3,0	450	190	48-55	100-120	60	80-125	12-15	—	12-16	6	<i>H. argenticincterens</i> <i>P. (M.) natalensis</i> Man
	Mahon (1954)	20-132	1,0-6,3	376-576	140-224	20-87	90-180	47-61	—	9-12	—	—	—	Man Various rodents
	Baer et al. (1949)	50-315	1,5-2,3	320-560	150-190	28-32	92-126	36-65	126-180	4-10	36	11	—	Man
<i>R. (R.) loechesalavezji</i>	Baylis (1949)	270-420	2,1	610	185	33-49	150	75	45-175	6-11	—	22x19	6	Man
	Fain (1950)	170	1,8	440	180	48-55	92-138	50-58	95-120	4-10	—	—	—	Rat
	Dollfus (1940)	191	—	350	148	30-35	106-136	48-55	75-80	3-6	23-26	—	—	Man

TABLE 5 Comparison of *C. compacta* by various authors

Authors	No. of prog-lottids	Length (mm)	Width (mm)	Scolex (μ)	Suckers (μ)	No. of testes	Cirrus pouch (μ)		Seminal receptacle (μ)	Vaginal Vesicle (μ)	Uterine branches	Embryo (μ)	Hosts
							Length	Width					
Ortlepp (1962)	6-13	21	1,8	—	200-300	100-180	270-300	60-80	120	300-360 x 180-280	12-20	15-18 x 10-12	<i>A. (A.) chrysophilus</i>
This paper	5-6	9-11,5	2,0-2,5	720-900	220-264	100-180	120-336	40-80	136-240 x 160	96-400 x 80-296	15-18	12-16 x 9-12	<i>A. (A.) chrysophilus</i>
Other material	3-5	2,5-6,0	0,7-1,3	392-920	168-192	82-134	120-304	32-72	68-144 x 54-104	22-184 x 45-136	10-19	—	<i>A. (M.) namaquensis</i>

The genital ducts pass between the excretory vessels when crossing from the medulla into the cortex.

Male genitalia

There are 82 to 180 testes in two to three layers which surround the female genitalia completely (Fig. 6).

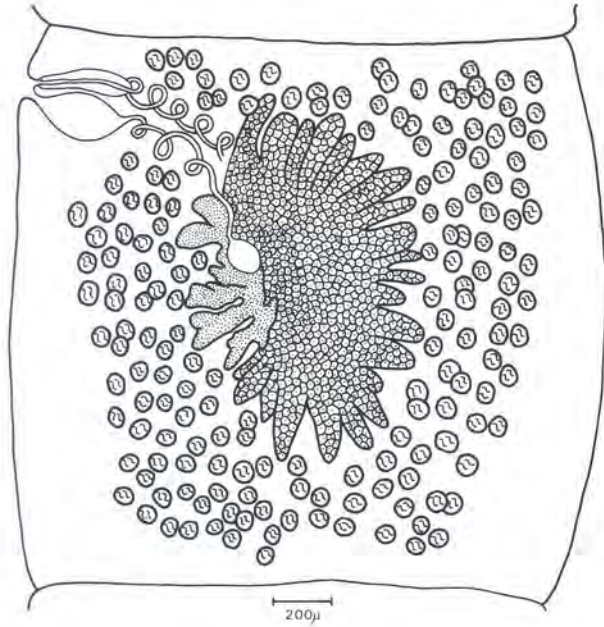


FIG. 6 Sexually mature proglottid of *C. compacta*

The cirrus pouch is oval, 120 to 336 μ long by 32 to 80 μ wide.

Female genitalia

The strongly lobed ovary is situated in the centre of the proglottid while the lobed vitellarium is situated porally. The seminal receptacle is round or oval, 68 to 240 μ by 54 to 160 μ in diameter. The vagina, which is thick-walled, loops dorsoventrally as well as antero-posteriorly and dilates to form a large vesicle before opening in the genital atrium; this vesicle is 22 to 400 μ by 45 to 296 μ in diameter. The uterus consists of a longitudinal stem with 10 to 19 lateral branches which redivide.

Discussion

This species resembles *C. lobata*, *C. lucida* and *C. pauciproglottis* in that the longitudinal excretory system forms a branching network. *C. compacta* is the only species in which the genital pores are always regularly alternating; this may also occur in *C. aegyptiaca* but is not constant in all the type specimens.

Catenotaenia lobata Baer, 1925

Synonym: *Catenotaenia capensis* Ortlepp, 1940

Definitive hosts: *Praomys (Mastomys) natalensis*, *Rhabdomys pumilio*

Material

(1) Holotype of *C. capensis* from *R. pumilio*, Stilbaai-strand (E.P.). (Onderstepoort Helminthological Collection, No. T. 1046, Onderstepoort)

(2) Fragments from *P. (M.) natalensis*, Albany (E.P.), Brits (Tvl.); *R. pumilio*, Cradock (E.P.)

Redescription

Strobila

The total length is 25.0 mm and the maximum width 1.0 to 2.0 mm. The scolex is 240 to 400 μ and the spherical suckers 104 to 120 μ in diameter. The excretory system consists of several longitudinal ventral and dorsal vessels which anastomose. The genital pores alternate irregularly and are situated near the anterior margin of the proglottid. The genital ducts pass between the excretory vessels to cross from the medulla into the cortex.

Male genitalia

There are 100 to 180 testes which are mainly lateral to the female genitalia but some testes unite the two groups posterior to the ovary (Fig. 7). They are 104 to

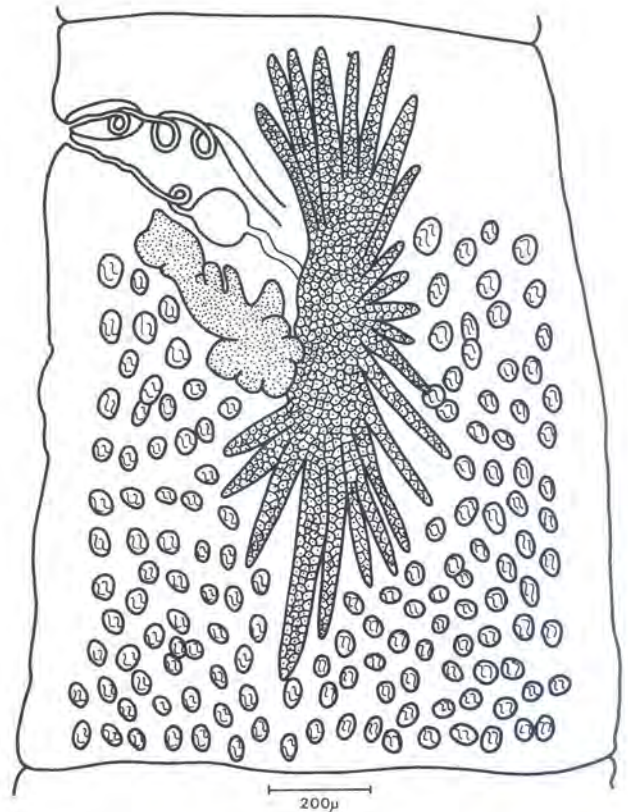


FIG. 7 Sexually mature proglottid of *C. lobata*

128 by 88 to 104 μ in diameter. The vas deferens forms a few coils before entering the cirrus pouch which is pyriform, 136 to 280 μ long by 40 to 96 μ wide; it extends to the ventral excretory vessels or slightly beyond it to the median wall of the most laterally situated ventral vessel.

Female genitalia

The ovary has long slender lobes and is situated on the midline of the proglottid approximately one third of the length of the proglottid from the anterior margin. The lobed vitellarium is situated porally. The

TABLE 6 Comparison of *C. lobata* described by various authors

Synonym	Author	Length (mm)	Width (mm)	Scolex (μ)	Suckers (μ)	No. of testes	Cirrus pouch (μ)		Uterine branches	Hosts
							Length	Width		
<i>C. lobata</i>	Baer (1925)	28	0,7-1,5	700	200	200	150	60	—	Rat
	Meggitt & Subramanian (1927)	144	2,5	700	—	200	150	60	20	<i>Apodemus sylvaticus</i> (Linnaeus, 1758) <i>H. namuensis</i>
	Joyeux & Baer (1945)	12-140	1,0-2,0	300-700	120-200	200	150-170	60	10-15	Various rodents
	Mahon (1954)	—	—	—	—	200	144-200	34	—	<i>P. (M.) natalensis</i>
	Mettrick (1962)	—	—	250-290	90-100	150-170	160	40	11-17	<i>P. (M.) natalensis</i>
	Quentin (1964)	60-110	2,8	350-600	110-200	250	—	—	17-20	<i>Mastomys</i> sp.
<i>C. capensis</i>	Wahl (1967)	15-80	2,5	432	133	200	160-165	45-55	10-15	<i>Apodemus</i> spp.
	This paper	25,0	1,0-2,0	240-400	104-120	100-180	136-280	40-96	14-20	<i>R. pomilio</i> <i>P. (M.) natalensis</i>
	Ortlepp (1940)	23	2,0	410	180	200-250	150	50	10-13	<i>R. pomilio</i>
<i>S. lobata</i>	Akhumyan (1946) [cited by Spasskii (1951)]	50-70	2,5	310-600	122-155	200-229	139-160	—	19-14	Various rodents

TABLE 7 Comparison of *C. lucida* described by various authors

Author	No. of proglottids	Length (mm)	Width (mm)	Scolex (μ)	Suckers (μ)	No. of testes	Cirrus pouch (μ)		Seminal receptacle (μ)		Uterine branches	Hosts
							Length	Width	Length	Width		
Ortlepp (1962)	18	45	1,3	—	120-140	90-200	270-300	50-70	120-160	—	19-22	<i>A. (A.) chrysophilus</i>
Quentin (1964)	26	17	11	330	120	150	175	45	—	—	14-15	<i>Mastomys</i> sp.
This paper	Type specimens	13-16	1,2-1,5	500-600	160-184 \times 152-160	117-144	152-336	56-80	96-168	64-144	15-21	<i>A. (A.) chrysophilus</i>
	Other material	37	1,0	880	120 \times 120	132-139	120-168	40-48	64-128	48-120	17	<i>A. (A.) chrysophilus</i> <i>A. (M.) namaquensis</i>

vagina forms one or two coils before it opens into the round or oval seminal receptacle. The uterus has 14 to 20 branches.

Discussion

The type specimens of *C. capensis* are severely contracted and stain badly but it could be verified that the testes are not confluent along the posterior margin. Ortlepp (1940) used the latter character as a criterion for differentiating this species from *C. lobata* but this is probably caused by the severe contraction of the material. Moreover, the testes distribution in the material described above forms a transition between those described by Baer (1925) and by Ortlepp (1940). Quentin (1964) describes *C. lobata* with the testes in two groups lateral to the ovary joined by two to five rows of testes behind the female genitalia. According to Spasskii (1951) Akhmyan (1946) considers these two species to be identical but places them in a new genus, *Skrjabinotaenia*, which is differentiated from *Catenotaenia* on the testes distribution. As this criterion is, however, influenced by the degree of contraction it cannot be used for the erection of a genus.

In *C. lobata* the two groups of testes are united by a few testes along the posterior margin of the proglottid. In the other species the testes are mainly posterior to the female genitalia.

Catenotaenia lucida Ortlepp, 1962

Definitive hosts: *Aethomys* (*Aethomys*) *chrysophilus*
Aethomys (*Micaelamys*) *namaquensis*

Material

- (1) Syntypes from *A. (A.) chrysophilus*, Kaapmuiden (Tvl.). (Onderstepoort Helminthological Collection, No. T. 1048, Onderstepoort)
- (2) Fragments from *A. (A.) chrysophilus* and *A. (M.) namaquensis*, unknown localities

Redescription

Strobila

The strobila consists of 13 to 37 proglottids. The total length is 16,5 to 52,0 mm; the maximum width 1,0 to 1,5 mm. The scolex is 500 to 880 μ and the suckers 120 to 184 by 120 to 160 μ in diameter. The excretory system consists of several ventral and dorsal vessels which anastomose. The genital pores alternate irregularly. The genital ducts pass between the excretory vessels to cross from the medulla into the cortex.

Male genitalia

There are 117 to 144 testes; 66 to 70 μ by 63 to 96 μ in diameter. They are situated in a single layer laterally and posteriorly to the female genitalia (Fig. 8). The cirrus pouch is elongate, 120 to 336 μ long by 40 to 80 μ wide.

Female genitalia

The ovary consists of long lobes and is situated in the anterior part of the proglottid. The vitellarium is lobed and poral in position. The seminal receptacle is 64 to 168 μ by 48 to 144 μ in diameter. The uterus has 15 to 21 lateral branches which may redivide.

Discussion

In *C. lucida* the majority of the testes are posterior to the female genitalia with a few lateral; in *C. lobata* they are mainly lateral with only a few posterior; in *C. compacta* they surround the female genitalia while in *C. pusilla* all of them are posterior.

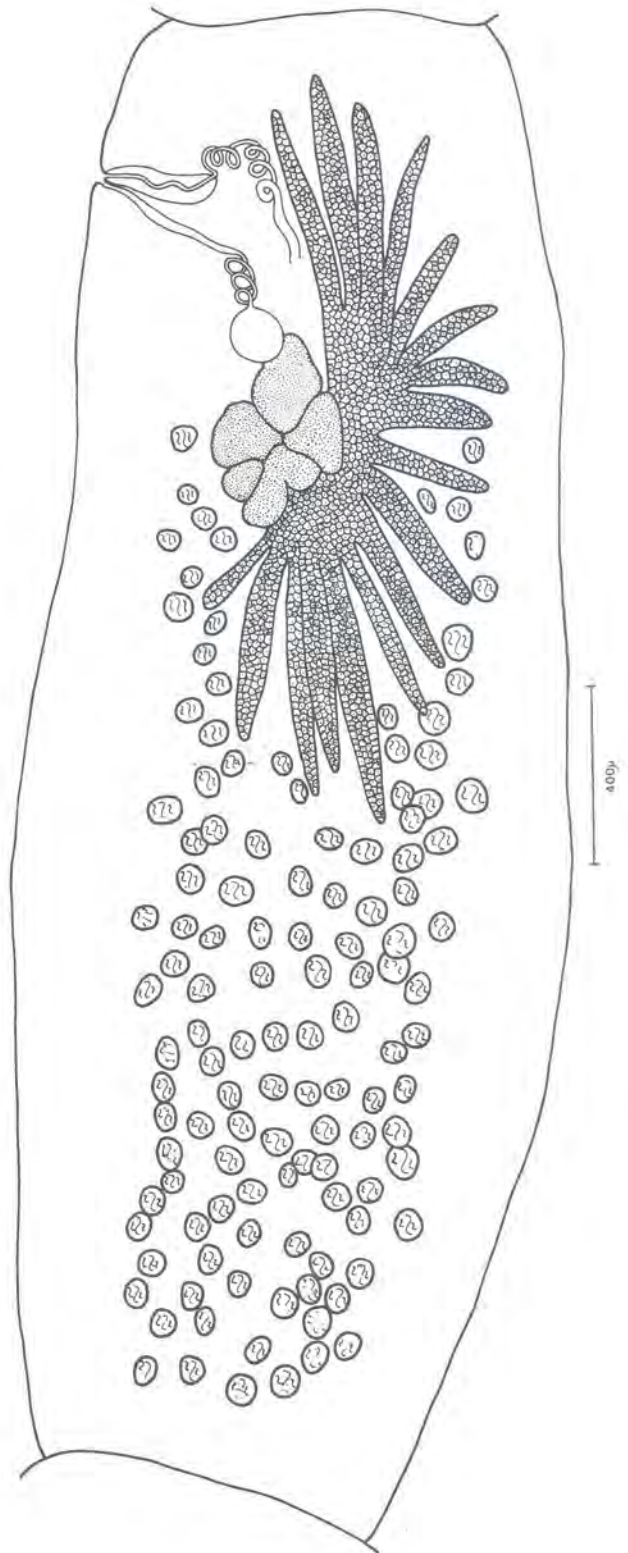


FIG. 8 Sexually mature proglottid of *C. lucida*

TABLE 8 Comparison of *R. (R.) thryonomysi* described by various authors

Synonym	Author	Length (mm)	Width (mm)	Scolex (μ)	Suckers (μ)	Rostellar hooks		No. of testes		Cirrus pouch (μ)		Hosts
						No.	Size (μ)	Length	Width	Length	Width	
<i>R. (R.) thryonomysi</i>	Ortlepp (1938)	9,5-16,0	0,5-0,6	420-480	115-120	100	36-40	50-60	120	66	<i>T. swinderianus</i>	
	This paper	9,5-16,0	0,5	—	—	100-106	35,8-44,5	30-32	—	—	<i>T. swinderianus</i> <i>O. irroratus</i>	

TABLE 9 Comparison of *R. (R.) trapezoides* described by various authors

Synonym	Author	Length (mm)	Width (mm)	Scolex (μ)	Suckers (μ)	Hooks		No. of testes		Cirrus pouch (μ)		Capsules	Eggs	Hosts	
						No.	Size (μ)	Length	Width	Length	Width				
<i>R. (R.) trapezoides</i>	Von Janicki (1904)	40	1,0	182	—	160	8	12-15	—	—	—	40-50	4-5	<i>A. niloticus</i>	
	Meggitt & Subramanian (1927)	40	1,0	67-182	—	160	8	12-15	105-132	52-75	—	40-50	4-5	<i>A. niloticus</i> <i>Mus</i> spp.	
	Southwell & Lake (1939)	50-60	1,2	—	—	140	9	15	—	—	—	—	12	<i>T. swinderianus</i>	
	Ortlepp (1940)	—	—	—	—	200-220 160	7-9 6,0-7,5	10-15 11-14	120-162 120	60-84 60	60-80 60	60-80 60	5-9 5-8	5-9 5-8	<i>R. punilio</i> <i>T. (T.) brantsi</i>
	Quentin (1964)	—	—	280	40-50	170-190	7,5-9,0	10-12	120-170	75-80	100-120	100-120	5-8	5-8	<i>L. striatus</i>
	This paper	15-150	0,5-2,0	264	86 x 40	160-250	7,8-11,1	8-16	64-160	40-80	14-87	14-87	6-12	6-12	<i>T. (T.) brantsi</i> <i>P. brantsi</i>
<i>R. (R.) kerdofanensis</i>	Meggitt & Subramanian (1927)	40-100	1,0	—	—	—	6,7	10-12	140	—	—	—	4-5	<i>A. niloticus</i>	
<i>R. (R.) namaquensis</i>	Mettrick (1962)	110	1,3	180-240	60-70	190-220	6,0-8,0	8-11	140-150	70	48-67	48-67	7-10	<i>A. (M.) namaquensis</i>	

RAILLIETINA FUHRMANN, 1920

Raillietina (Raillietina) thryonomysi Ortlepp, 1938
 Synonym: *Raillietina (S.L.) thryonomysi* Ortlepp, 1938
 Definitive hosts: *Thryonomys swinderianus*
Otomys irroratus

Material

- (1) Holotype and paratypes from *T. swinderianus*, Zululand (Ntl.). (Onderstepoort Helminthological Collection, No. T. 1055, Onderstepoort)
- (2) Fragments of adults from *O. irroratus*, Albany (E.P.)

Redescription

Strobila

The total length of the type specimens varies from 9,5 to 16,0 mm, the maximum width is 0,5 mm. The rostellum is armed with 100 to 106 hooks 35,8 to 44,5 μ long (Fig. 9). The genital pores are unilateral and situated in the anterior part of the proglottid margin.

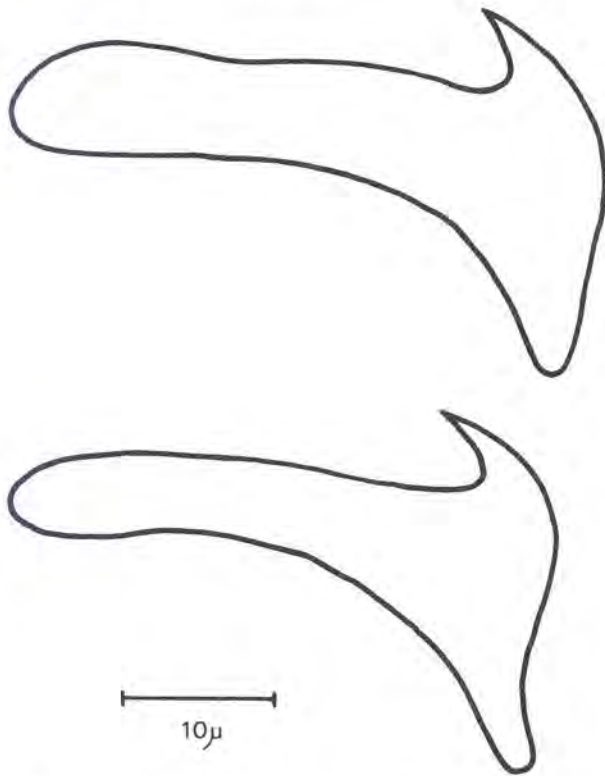


FIG. 9 Rostellar hooks of *R. (R.) thryonomysi*

Male genitalia

As the specimens are macerated very little of the internal morphology could be determined. There are from 30 to 32 testes, 8 to 11 poral and 21 to 22 aporal to the female genitalia.

Female genitalia

The vagina is surrounded by a small sphincter. There are several egg capsules per proglottid; these contain four to seven eggs each.

Discussion

The fragments from *O. irroratus* have rostellar hooks of the same size and shape as those of the holotype. The latter is immature and Ortlepp (1938) could not place it in a subgenus. As there is more than one egg per

capsule in the material from *O. irroratus* this species is placed in the nominate subgenus *Raillietina*. *Raillietina (Raillietina) mabonae* Baer & Fain, 1955 differs from this species in having more rostellar hooks (110 to 130 vs. 100 to 106) which are slightly smaller (26 to 35 μ vs. 36 to 45 μ) (Table 8). These two species may be identical but they are kept separate here until more material is available. Baer & Fain (1955) think that the specimens from the Congo Kinshasa which Southwell & Lake (1939) assigned to *Raillietina (Raillietina) gracilis* (Janicki, 1904) are identical with *R. (R.) mabonae*, which they differentiate from the latter on the shape and size of the cirrus pouch.

Raillietina (Raillietina) trapezoides (Janicki, 1904) Fuhrmann, 1924

Definitive hosts: *Tatera (Tatera) brantsi*
Parotomys brantsi

Material

- (1) Fragments of adults from *T. (T.) brantsi*, Johannesburg, Roodepoort, Luipaardsvlei, Randfontein (Tvl.)
- (2) Four adults and fragments from *P. brantsi*, Port Nolloth (N.W.P.)

Redescription

Strobila

The total length varies from 15 to 150 mm and the maximum width from 0,5 to 2,0 mm. The scolex is 264 μ in diameter; the rostellum bears 160 to 250 hooks, 7,8 to 11,1 μ long (Fig. 10). The suckers are 86

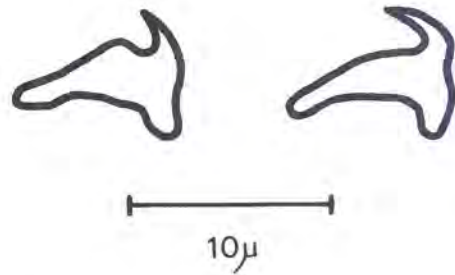


FIG. 10 Rostellar hooks of *R. (R.) trapezoides*

by 40 μ in diameter and are armed with several rows of spines. The genital pores are unilateral; the genital ducts pass between the excretory vessels to cross from the medulla into the cortex.

Male genitalia

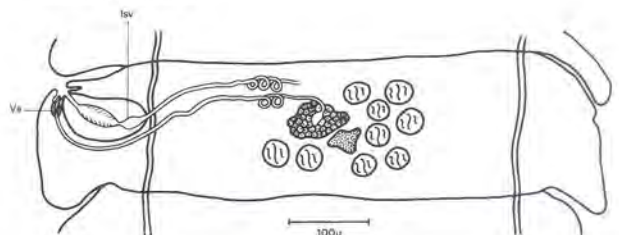


FIG. 11 Sexually mature proglottid of *R. (R.) trapezoides*



FIG. 12 Sexually mature proglottid of *H. diminuta*

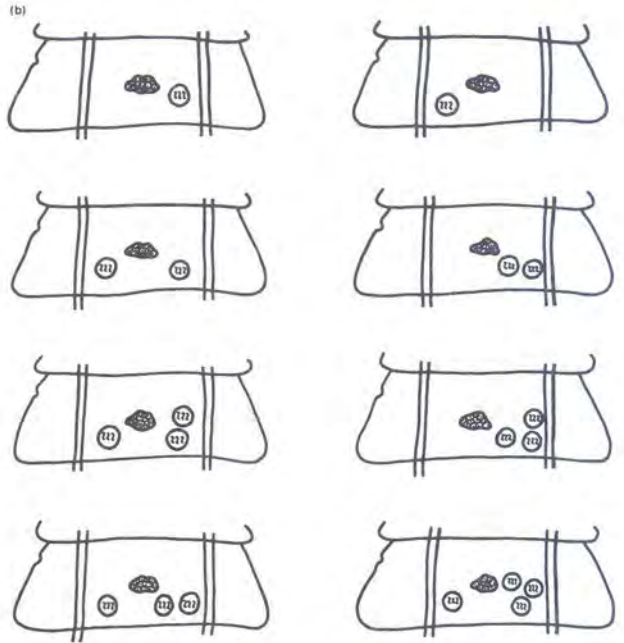
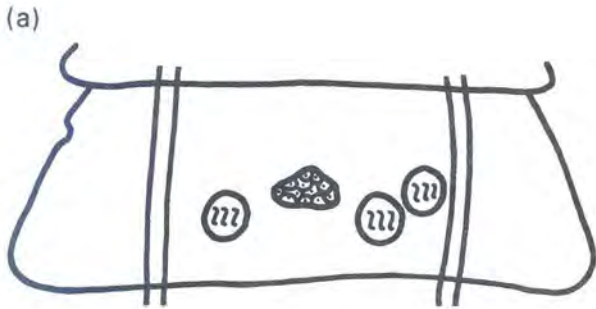


FIG. 13a and b Sexually mature proglottids of *H. diminuta* showing variations in the number and arrangement of the testes in two individuals

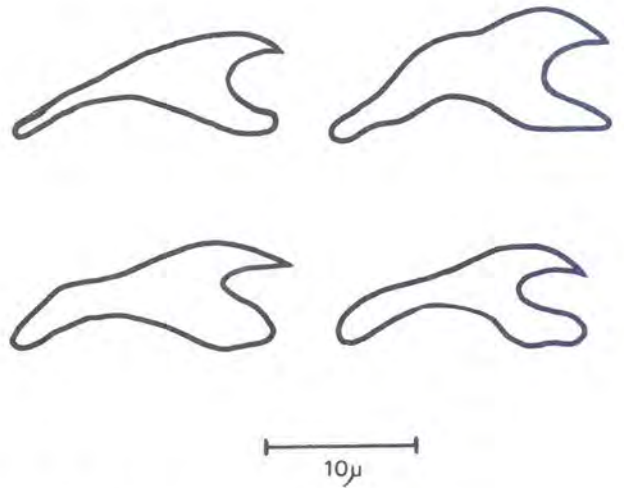
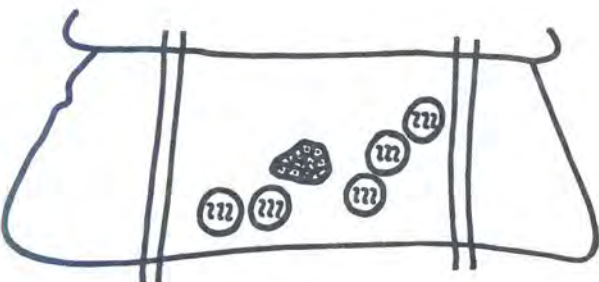
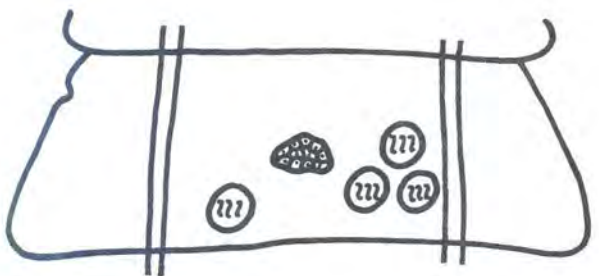
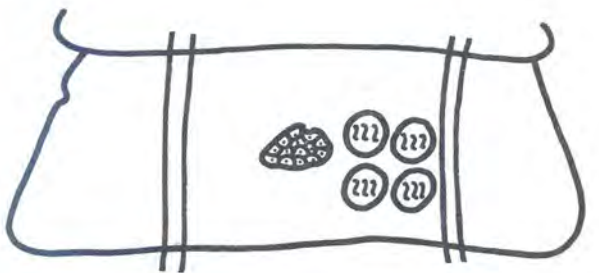


FIG. 14 Rostellar hooks of *H. nana*

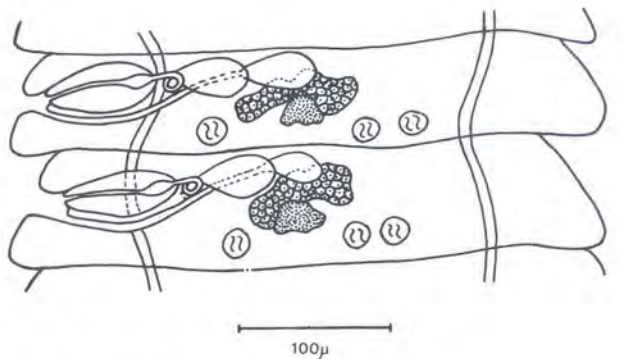


FIG. 15 Sexually mature proglottid of *H. nana*

There are from 8 to 16 testes; they are in two groups which are united by 2 to 3 testes posterior to the female genitalia (Fig. 11). The oval cirrus pouch extends to the longitudinal excretory vessels; it is 64 to 160 μ long by 40 to 80 μ wide. An internal seminal vesicle is present.

Female genitalia

The lobed ovary and the vitellarium are situated in the centre of the proglottid. The seminal receptacle is small. The vagina is surrounded by a well developed sphincter muscle 20 μ from its opening into the genital pore; it is 20 μ in diameter, and 30 μ long. There are 14 to 87 egg capsules per proglottid; each contains 6 to 12 eggs.

Discussion

It differs from the other two species parasitizing rodents in that its rostellar hooks are smaller (7 to 11 μ) than those of either *R. (R.) gracilis* which according to Southwell & Lake (1939) are 40 μ , *R. (R.) thryonomysi* Ortlepp, 1938 which are 36 to 45 μ long (Table 9). Mettrick (1962) differentiated *R. (R.) namaquensis* from *R. (R.) trapezoides* on the basis of a slightly larger cirrus pouch (140 to 150 μ by 70 μ) and fewer testes (8 to 11). Mettrick's material, however, falls within the range of variation described above and must, therefore, be considered a synonym of *R. (R.) trapezoides*.

HYMENOLEPIS WEINLAND, 1858

The genus *Hymenolepis* comprises more than 300 species parasitic in birds and mammals (Hughes, 1941). Recently Spasskii (1954) and Yamaguti (1959) have each described four new genera and Zarnowski (1955) one to accommodate the species which parasitize rodents. The genera *Hymenolepis* and *Insectivorelepis* Zarnowski, 1955 contain those species which have an unarmed rostellum, while the other eight genera are differentiated from one another on the number, size and shape of the rostellar hooks, the distribution of the testes and the development of the uterus. However, these differences are not always clear and it is sometimes difficult to distinguish between the genera. *Hymenolepis* and *Insectivorelepis*, which are both unarmed, must be differentiated on the uterus only: in the former it is saccular and lobed but in the latter an ovoid median sac. While a single difference may be a valid criterion for specific differentiation it is insufficient for the erection of a genus. In the present paper all these genera are, therefore, regarded as synonyms of *Hymenolepis*.

Hymenolepis diminuta (Rudolphi, 1819)

Definitive hosts: *Mus musculus*
Praomys (Mastomys) natalensis
Rattus rattus

Material

- (1) Four adults from *R. rattus*, Pretoria (Tvl.)
- (2) Fragments from *M. musculus*, Pretoria (Tvl.); *P. (M.) natalensis*, Johannesburg (Tvl.); *R. rattus*, Albany (E.P.), Wynberg (W.P.), Durban (Ntl.), Ficksburg (O.F.S.)

Redescription

Strobila

The total length varies from 150 to 170 mm and the maximum width from 0,5 to 4,0 mm. The scolex is 168 to 336 μ and the suckers 80 to 120 μ in diameter. The rostellum is rudimentary and unarmed. The genital

pores are situated in the middle of the proglottid margin; they are usually unilateral. The genital ducts pass dorsal to the longitudinal excretory vessels when crossing from the medulla into the cortex.

Male genitalia

There are from one to five, usually three, testes [type III of Skrjabin & Matiewossian (1945) cited by Zarnowski (1955)]; they are 88 to 184 μ by 72 to 152 μ in diameter (Fig. 12). The cirrus pouch, which is elongated, extends into the medulla; it is 120 to 440 μ long by 32 to 72 μ wide. A large external seminal vesicle is present.

Female genitalia

The lobed ovary and the vitellarium are situated in the centre of the proglottid. The seminal receptacle lies anterior to the ovary. The outer membrane of the ovum is 64 to 72 μ by 64 to 66 μ ; the inner membrane 30 to 34 μ by 28 to 30 μ ; the embryo 26 to 30 μ by 22 to 26 μ with embryonic hooks 16,4 to 19,4 μ long.

Discussion

H. diminuta shows greater variation in the number and the distribution of the testes than the other species of the genus. They vary in number from one to five per proglottid and their spatial arrangement shows marked variation even in a single individual (Fig. 13a, b). The shape of the cirrus pouch is also variable: in the early sexually mature proglottid it is elongated but in some fully mature and gravid proglottids it is pyriform.

Hymenolepis nana (von Siebold, 1852)

Material

Three intact adults from *R. pumilio*, Pretoria (Tvl.)

Redescription

Strobila

The total length varies from 15 to 30 mm; the maximum width is 0,5 mm. The scolex is 136 to 176 μ and the suckers 54 to 73 μ in diameter. The rostellum bears a single crown of 24 to 28 hooks, 16,3 to 20,6 μ long (Fig. 14). The genital pores are unilaterally situated in the anterior half of the proglottid margin. The genital ducts pass dorsal to the excretory vessels to cross from the medulla into the cortex.

Male genitalia

There are two to three testes arranged in a straight line, [type VII of Skrjabin & Matiewossian (1945) cited by Zarnowski (1955)] (Fig. 15). The cirrus pouch is small and pyriform, 52 to 104 μ long by 16 to 32 μ wide. It usually reaches the excretory vessels but in some proglottids these vessels are deflected medially or laterally so that the cirrus pouch may not extend to them or may extend into the medulla.

Female genitalia

The lobed ovary is in the centre of the proglottid; the seminal receptacle is anterior to it. The ova have polar filaments; the outer membrane is 46 to 62 μ by 36 to 46 μ and the inner membrane 24 to 30 μ by 18 to 28 μ in diameter; the embryo is 18 to 24 μ by 18 to 20 μ with embryonic hooks 11,5 to 14,4 μ long.

Discussion

This worm resembles *Hymenolepis straminea* (Goeze, 1782) in the size of the rostellar hooks but may be differentiated from it in the shape of these hooks and in the size of the cirrus pouch. (Table 11).

TABLE 10 Comparison of *H. diminuta* described by various authors

Author	Length (mm)	Width (mm)	Scolex (μ)	Suckers (μ)	Cirrus pouch (μ)		Ova (μ)				Hosts	
					Length	Width	Outer membrane	Inner membrane	Embryo	Embryonic hooks		
Lühe (1910)	200-600	2,5-4,0	250-500	80-160	—	—	60-80	—	—	—	14-16	<i>Rattus norvegicus</i> (Berkenhout, 1769) other rodents, man
Sluiter <i>et al.</i> (1921)	160	3,5	—	—	—	—	70-86	36 x 28	—	—	11	Various rodents
Brumpt (1927)	120-160	3,5	—	—	—	—	60-86	36 x 18	—	—	11	Rats and mice <i>Cercopithecus schmidii</i> (Linnaeus, 1766)
Meggitt (1927)	—	—	290-430	—	170-400	20-60	—	—	—	—	—	Various rodents
Meggitt & Subramanian (1927) . .	120-160	4,0	250-500	—	170-400	20-60	54-86	—	—	—	—	Various rodents (Murinae)
Hegner <i>et al.</i> (1929)	120-160	3,5	—	—	—	—	54-86	24-40 x 36	—	—	—	Rats, mice and man
Joyeux & Foley (1930)	120-160	3-4	—	—	170-400	20-60	—	—	—	—	—	<i>C. schmidii</i>
	—	—	—	—	200-280	—	60-70 x 86	—	—	—	—	Rodents
Tubanguï (1931)	100-160	2,5-4,0	200-600	80-160	170-300	20-40	54-86	24-40 x 20-35	—	—	—	<i>R. norvegicus</i>
This paper	150-180	0,5-4,0	168-336	80-120	120-440	32-72	64-72 x 64-66	30-34 x 28-30	26-30 x 22-26	—	16,4-19,4	Various rodents

TABLE 11 Comparison of *H. nana* according to various authors

Synonym	Author	Length (mm)	Width (mm)	Scolex (μ)	Suckers (μ)	Rostellar Hooks		Cirrus pouch (μ)		Eggs (μ)				Hosts
						No.	Size (μ)	Length	Width	Outer membrane	Inner membrane	Oncosphere	Hooks	
<i>H. nana</i>	Brumpt (1927)	10-25	0,55-0,70	320	80	24-30	14-18	—	—	40-50	—	—	10-14	Man, rats, mice
	Hegner <i>et al.</i> (1929)	10-45	0,5-0,7	250	—	24-30	14-18	—	—	40-60	20-34	—	—	Man, rats, mice
	Hughes (1941)	7-80	0,27-0,65	130-400	50-93	20-26	16-20	—	—	48-60 × 36-48	—	24-35 × 21-27	—	Man
	Meggitt & Subramanian (1927)	5-40	0,5-0,9	210-480	—	20-30	14-18	—	—	30-60	—	—	—	Man, various rodents
	Sluiter <i>et al.</i> (1921)	60	0,9	250-350	100-130	24-28	15-18	—	—	36-44 × 44-52	—	18	—	Man
	Tubangui (1931)	5-90	0,2-0,9	130-480	70-150	20-30	14-18	65-72	18-21	30-60	16-34	—	10-14	<i>R. norvegicus</i>
	Wardle & McLeod (1951)	50-60	0,5-1,0	300-400	—	20-27	16-18	50-70	20-25	50-53 × 37-41	—	24-25 × 21-27	—	Man, rats, mice
	Lühe (1910)	4-45	0,5-0,9	250-320	70-90	20-30	14-18	—	—	36-56 × 32-42	18-24 × 20-32	16-19	9-14	Man, various rodents
	This paper	15-30	0,5	136-176	54-72	24-28	16,3-20,6	52-104	16-32	46-62 × 36-46	24-30 × 18-28	18-24 × 18-26	11,5-14,4	<i>R. pomilio</i>
	<i>H. fraternus</i>	Baer & Tenora (1970)	28-59	0,6-1,0	260-330	90-120	20-30	14-18	60-73	—	39-58	—	29-31	12-16
<i>H. longior</i>	Baylis (1922)	45	0,42-0,53	210-260	75-93	21-22	19-20	—	—	49-60 × 42-48	28,5-35,3 × 22,5-28,5	24-35 × 21-27	10,5-15	<i>R. rattus</i> <i>R. norvegicus</i>
<i>H. nana-fraternus</i>	Baylis (1922)	20	0,27-0,51	160-230	50-70	22-26	16-18	—	—	67,5-90 × 66-87	40,5-51 × 36-43,5	36-45 × 31,5-40,5	15	Various rodents
<i>Taenia nana</i>	Leuckart (1886)	12-20	0,5	300	100	22-28	18	—	—	40	—	23	—	Man
<i>Taenia murina</i>	Dujardin (1845)	25	0,55	320	80	20-24	15-17	—	—	65	50	29-30	15-16	<i>R. norvegicus</i> <i>R. pomilio</i> <i>Eliomys quercinus</i> (Linnaeus, 1766)

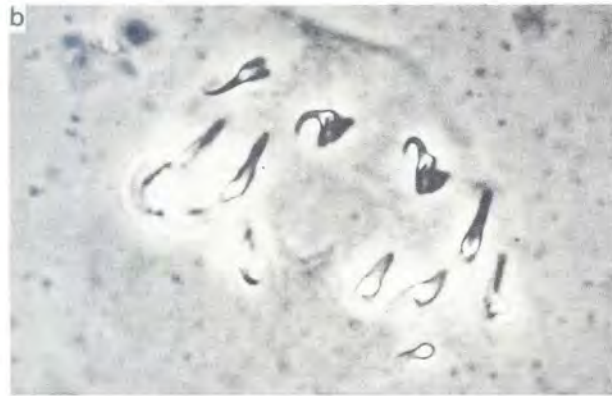
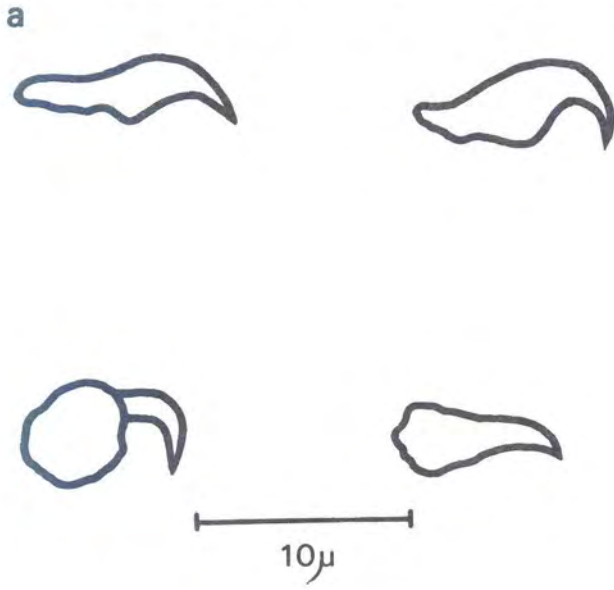


FIG. 16 Rostellar hooks of *H. microcantba* sp. n. a. Camera lucida drawing b. and c. Microphotograph $\times 500$

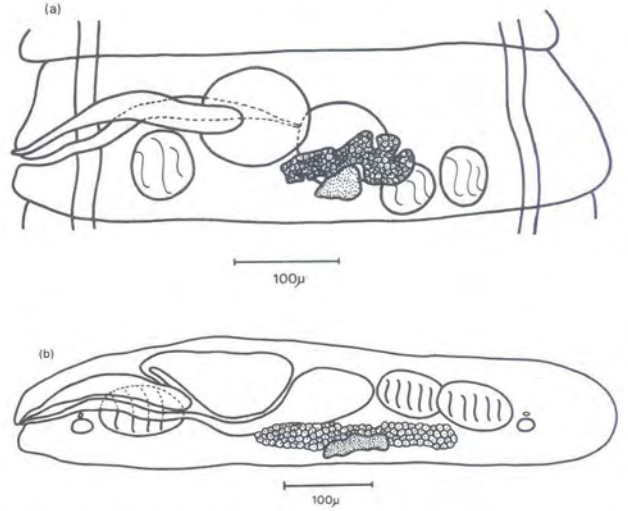


FIG. 17 Sexually mature proglottid of *H. microcantba* sp. n. a. Whole mount b. Transverse section

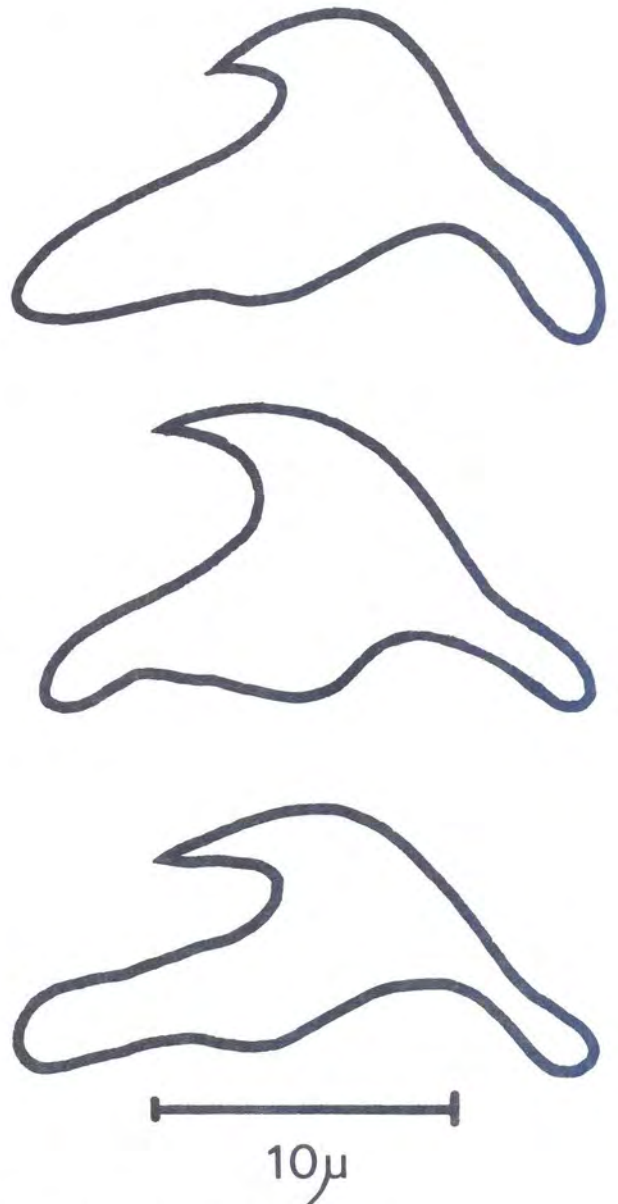


FIG. 18 Rostellar hooks of *H. straminea*

As pointed out by Baer & Tenora (1970), there is a difference of opinion among workers regarding the specific distinctness of *H. nana* of man and *Hymenolepis fraterna* (Stiles, 1906) of rodents. In their publication it is stated that Baer considers both species to be valid while Tenora considers them identical.

Hymenolepis microcantha sp. n.

Definitive host: *Tatera (Tatera) brantsi*
Intermediate host: Unknown
Type Locality: Johannesburg (Tvl.)
Distribution: Republic of South Africa

Material

Holotype from the small intestine of *T. (T.) brantsi*, Johannesburg (Tvl.). (Onderstepoort Helminthological Collection, No. T. 1063, Onderstepoort)

Description

Strobila

The total length including the scolex is 57,0 mm and the maximum width is 1,0 mm. The strobila consists of about 600 proglottids which are all much broader than long; thus the terminal proglottid is 1,0 mm broad but only 96 μ long. The scolex is 248 μ and the suckers 120 μ in diameter. The rostellum bears a crown of 87 hooks, 8,2 to 11,5 μ long (Fig. 16a, b, c). The ventral excretory vessels, 16 μ in diameter, are united by a transverse vessel in the posterior part of each proglottid; the dorsal excretory vessels are 2 μ in diameter. The genital pores are unilateral and situated in the middle of the proglottid margin. The genital ducts pass dorsal to the excretory vessels when crossing from the medulla into the cortex. The transverse muscles are weakly developed.

Male genitalia

The three testes are in a straight line, two aporal and one poral [type VII of Skrjabin and Matiewossian (1945) cited by Zarnowski (1955)]; they are oval in shape, 47 to 90 μ by 31 to 67 μ in diameter (Fig. 17a, b). The vas deferens is short and forms a large external seminal vesicle which may partially overlay the cirrus pouch. The latter is long and narrow and extends well into the medulla; in mature proglottids it is 129 to 162 μ long and 24 μ wide; in gravid proglottids it is 160 to 224 μ by 24 μ .

Female genitalia

The ovary is slightly lobed and transversely elongated. In whole mounts both the ovary and the vitellarium are overlaid by the seminal receptacle and the testes. The pyriform seminal receptacle is situated in the middle of the proglottid anterior to the ovary. On leaving the seminal receptacle the vagina crosses the cirrus pouch and runs anteriorly to it; in the cortex it again crosses the cirrus pouch and opens posteriorly to it in the genital atrium. The lumen of the vagina is wide, about 16 μ in diameter throughout most of its length, but on recrossing the cirrus pouch it narrows gradually to 4 μ at its opening in the genital atrium. There are 24 to 32 oval ova per gravid proglottid; the outer membrane is 67 to 90 μ by 45 to 74 μ and the inner membrane 31 to 38 μ by 29 to 34 μ in diameter; the embryo is 27 to 34 μ by 27 to 31 μ with embryonic hooks 13 to 18 μ long.

Discussion

This species resembles *Hymenolepis petteri* Quentin, 1964 in the size of both the rostellar hooks and the

cirrus pouch. It differs from the latter, however, in that it has fewer rostellar hooks (87 vs. 128), the cirrus is unarmed, there is no sphincter in the cirrus pouch and the outer membrane of the ovum is not covered in protrusions. *H. microcantha* is therefore considered distinct from *H. petteri*.

H. microcantha is readily differentiated from the other armed hymenolepids occurring in rodents. According to Hughes (1941), *Hymenolepis crassa* Janicki, 1904 has rostellar hooks 13 μ in length but it has only 24. Mahon (1954) records the length of the rostellar hooks of *H. straminea* as being 10 to 15 μ , but this species also has only 18 to 30 hooks. The rostellar hooks of *H. microcantha* are slightly larger (8,2 to 11,5 μ) than those recorded by Baer & Della Santa (1960) for *Hymenolepis prolifer* (Villot, 1880) Stammer, 1955, (5,5 to 6,4 μ). However, the latter has 160 to 180 hooks as well as a smaller cirrus pouch and it has been recorded only from *Sorex* spp.

Hymenolepis straminea (Goeze, 1782).

Definitive hosts: *Leggaga minutoides*
Mus musculus
Pracomys (Mastomys) natalensis
Rhabdomys pumilio

Material

- (1) Three intact adults from the liver of *R. pumilio*, Pretoria (Tvl.) and five intact adults from the small intestine of *P. (M.) natalensis*, Brits (Tvl.)
- (2) Fragments from the small intestine of *P. (M.) natalensis* and *M. musculus*, Pretoria (Tvl.); *L. minutoides*, Albany (E.P.)

Strobila

The total length varies from 30 to 145 mm and the width from 0,17 to 2,0 mm. The scolex is 216 to 336 μ and the suckers 72 to 140 μ in diameter. The rostellum bears a single crown of 22 to 30 hooks, 12,1 to 18,6 μ long (Fig. 18). The genital pores are unilateral, situated in the anterior half of the proglottid margin. The genital ducts pass dorsal to the longitudinal excretory vessels when crossing from the medulla into the cortex.

Male genitalia

There are two to three testes either in a straight line [type VII of Skrjabin & Matiewossian (1945) cited by Zarnowski (1955)] or in a triangle [type III of Skrjabin & Matiewossian (1945) cited by Zarnowski (1955)]; they are 41 to 120 μ by 22 to 96 μ in diameter (Fig. 19). The cirrus pouch is pyriform, extends to the longitudinal

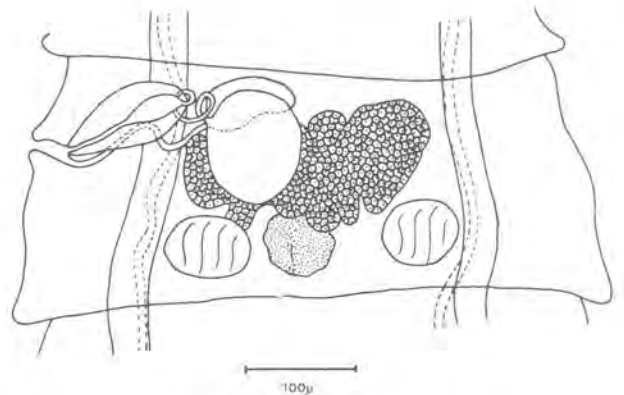


FIG. 19 Sexually mature proglottid of *H. straminea*

TABLE 12 Comparison of *H. straminea* described by various authors

Synonyms	Author	Length (mm)	Width (mm)	Scolex (μ)	Suckers (μ)	Rostellar hooks		Cirrus pouch (μ)		Ova (μ)				Hosts
						No.	Size (μ)	Length	Width	Outer membrane	Inner membrane	Embryo	Embryonic hooks	
<i>H. straminea</i> .	Baer & Tenora (1970)	35-105	1,5-2,8	200-300	70-90	19-28	11-15	120-160	—	48-82	—	25-29	15-19	Various rodents <i>C. ericetus</i>
	Tenora & Murai (1970)	70-110	1,8-2,0	150	52-54	21-24	12-13	65-164	—	55-76 × 40-55	—	29-31	15-18	
<i>H. microstoma</i>	Lüthe (1910)	162	2,1	450	100	30	11	—	—	82-90	77	32	18	<i>M. musculus</i> <i>R. rattus</i> <i>R. norvegicus</i> <i>M. musculus</i> <i>R. norvegicus</i> <i>R. rattus</i>
	Meggitt & Subramanian (1927)	162	2,1	450	—	30	11	—	—	82-90	—	—	—	
	Joyeux & Kobozieff (1928)	80	2,0	200	60	27	15	135	50	90×80	40	30	17-20	Rats and white mice
	Joyeux & Baer (1936) [cited by Mahon (1954)]	80	2,0	200	60	27	15	135	50	90×80	—	—	—	<i>Meriones shawi</i> (Duvernoy, 1842)
	Mahon (1954)	90	2,0	187-328	59-108	18-25	10-15	100-198	40-65	48-72	36-40	—	—	White mice <i>M. musculus</i> <i>M. shawi</i> <i>P. (M.) natalensis</i>
	Dvorak, <i>et al.</i> (1961)	80-350	2,0	200	—	23-28	15	130	50	80-90	30	—	17-20	<i>M. musculus</i> <i>Mesoerictetus auratus</i> (Waterhouse, 1839)
	Wahl (1967)	140-150	3,0	170-270	60-80	28-32	11,5-12,0	115-135	35-45	47-55 × 38-41	30×33	—	13,7-20,2	<i>Apodemus</i> spp.
	This paper	30-145	0,17-2,0	216-336	72-140	22-30	12,1-18,6	72-200	32-64	64-90 × 42-56	28-34 × 24-28	24-32 × 16-24	15,1-19,2	<i>R. pumilio</i> <i>M. musculus</i> <i>L. minutoides</i> <i>P. (M.) natalensis</i>

excretory vessels and may extend into the medulla; it is 72 to 200 μ long by 32 to 64 μ wide. The external seminal vesicle is large in both the mature and early gravid proglottids.

Female genitalia

The lobed ovary and the vitellarium are situated in the centre of the proglottid. The seminal receptacle is large. The outer membrane of the ovum is 64 to 90 by 42 to 56 μ ; the inner membrane 28 to 34 by 24 to 28 μ ; the embryo 24 to 32 by 16 to 24 μ with embryonic hooks 15,1 to 19,2 μ long.

Discussion

Baer & Tenora (1970) conclude that *H. straminea* has priority over *Hymenolepis microstoma* (Dujardin, 1845).

The rostellar hooks of this species resemble those of *H. nana* but they have a well developed guard and short handle while those of *H. nana* have a smaller guard and a longer handle (Table 12).

Hymenolepis taterae sp. n.

Definitive host: *Tatera (Tatera) brantsi*

Intermediate host: Unknown

Type locality: Witwatersrand (Tvl.)

Distribution: Republic of South Africa

Material

Syntypes from *T. (T.) brantsi*, Johannesburg, Roodepoort, Krugersdorp and Randfontein (Tvl.) (Onderstepoort Helminthological Collection, No. T. 1064, Onderstepoort)

Description

Strobila

The total length varies from 12 to 60 mm; the maximum width is 1,0 mm. The strobila consists of about 650 proglottids which are much wider than long; thus the terminal proglottids are 1,0 mm broad but only 104 μ long. The scolex is 152 to 264 μ and the suckers 80 to 144 μ in diameter. The retractable rostellum bears a crown of 24 to 35 hooks 20,9 to 28,1 μ long (Fig. 20).

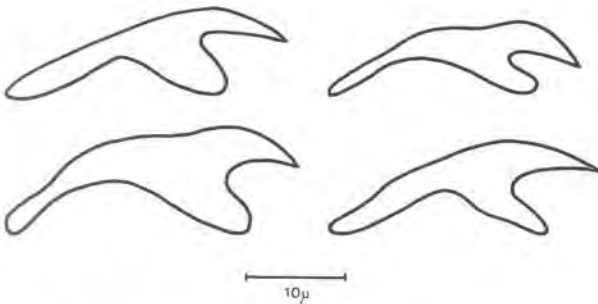


FIG. 20 Rostellar hooks of *H. taterae* sp. n.

The ventral excretory vessels, 16 μ in diameter, are united by a transverse vessel in the posterior part of each proglottid; the dorsal excretory vessels are 2 μ in diameter. The genital pores are unilateral and situated in the middle of the proglottid margin. The genital ducts pass dorsal to the excretory vessels when crossing from the medulla into the cortex.

Male genitalia

The three oval testes are almost in a straight line, two aporal and one poral [type VII of Skrjabin & Matiewossian (1945) cited by Zarnowski (1955)] (Fig. 21 a, b, c). They are 36 to 90 μ by 25 to 72 μ in

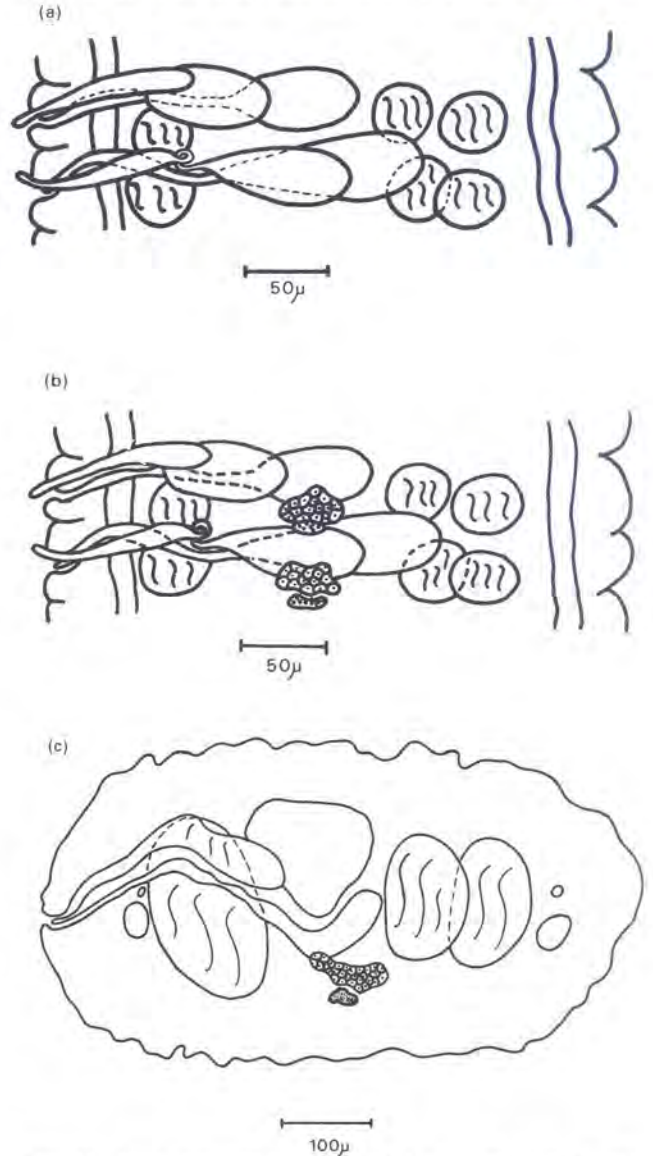


FIG. 21 Sexually mature proglottid of *H. taterae* sp. n. a. Dorsal view b. Ventral view c. Transverse section

diameter. The vas deferens is short and forms a large external seminal vesicle which may partially overlay the cirrus pouch. The latter is long and narrow; extends well into the medulla and is 64 to 248 μ long by 16 to 40 μ wide.

Female genitalia

The lobed ovary and the vitellarium are situated in the centre of the proglottid; in whole mounts they are usually overlaid by the testes and the seminal receptacle. On leaving the seminal receptacle the vagina runs anteriorly to the cirrus pouch but in the region of the excretory vessels it crosses the cirrus pouch to open posteriorly to it in the genital atrium. The lumen of the vagina is 16 μ in diameter throughout most of its length but it gradually narrows to 4 μ before entering

the genital atrium. The outer membrane of the ovum is 50 to 74 μ by 38 to 56 μ and the inner membrane 28 to 38 μ by 24 to 34 μ in diameter; the embryo is 24 to 34 μ by 18 to 32 μ with embryonic hooks 14 to 16 μ long. Polar filaments are present.

Discussion

H. taterae resembles *Hymenolepis sinensis* Oldham, 1929 in the number and size of the rostellar hooks but those of *H. taterae* differ in having long, pointed handles which curve downwards. The strobila of *H. sinensis* has 2,000 or more proglottids but *H. taterae* has only 650. In *H. sinensis* the cirrus pouch is 100 μ long and pyriform while that of *H. taterae* is 64 to 248 μ in length and long and narrow in shape (Fig. 21). The ovary of *H. sinensis* is large, occupying a quarter of the width of the proglottid; in *H. taterae* it occupies about a fifth. In view of these differences, and the fact that *H. sinensis* originates from China, these species are considered distinct from one another.

H. taterae resembles *H. straminea* and *H. nana* in the number of rostellar hooks but those of *H. taterae* are different in shape and somewhat larger than those in the other two species. The shape of the rostellar hook of *H. taterae* also differentiates it from *Hymenolepis australensis* Sandars, 1957. According to Baer (1932), *Hymenolepis myoxi* (Rudolphi, 1819) has spines on the suckers; these are unarmed in *H. taterae*. Baer (1932) in redescribing *Hymenolepis asymmetrica* Janicki, 1904 records 20 to 22 rostellar hooks which are 19 μ long. In *H. asymmetrica* the vitellarium is always aporal in relation to the ovary; in *H. taterae* it is poral in position.

H. nana is the only other species in which polar filaments have been recorded. While examining the eggs of this species it was found that the membranes surrounding them become opaque once they are freed from the gravid proglottid and that the polar filaments are visible for a few minutes only. It is, therefore, possible that these structures are also present in other species of the genus, but have not yet been described.

HOST-PARASITE LIST OF MYOMORPHA
IN THE ETHIOPIAN REGION

- Aethomys (Aethomys) chrysohilus*
- Catenotaenia compacta*
- Catenotaenia lucida*
- Inermicapsifer madagascariensis*
- Aethomys (Micaelamys) namaquensis*
- Catenotaenia lucida*
- Inermicapsifer madagascariensis*
- Raillietina (Raillietina) trapezoides*
- Arvicanthis abyssinicus*
- Hymenolepis microstoma*
- Inermicapsifer madagascariensis*
- Arvicanthis niloticus*
- Inermicapsifer guineensis*
- Inermicapsifer madagascariensis*
- Raillietina (Raillietina) trapezoides*
- Cricetomys buchanani*
- Inermicapsifer guineensis*
- Cricetomys gambianus*
- Catenotaenia cricetomydis*
- Inermicapsifer congolensis*
- Inermicapsifer guineensis*
- Inermicapsifer madagascariensis*
- Cryptomys mechowii*
- Inermicapsifer madagascariensis*
- Dasyurus incomtus*
- Inermicapsifer congolensis*
- Inermicapsifer madagascariensis*
- Dendromys insignis*
- Hymenolepis microstoma*
- Heliophobius marungensis*
- Catenotaenia lobata*
- Heliophobius argenteocinereus*
- Inermicapsifer madagascariensis*
- Hybomys univittatus*
- Hymenolepis pearsi*
- Hymenolepis uncispinosa*
- Inermicapsifer madagascariensis*
- Lemniscomys griselda*
- Inermicapsifer congolensis*
- Inermicapsifer madagascariensis*
- Lemniscomys striatus*
- Inermicapsifer madagascariensis*
- Raillietina (Raillietina) trapezoides*
- Malacomys longipes*
- Raillietina (Raillietina) baeri*
- Leggada minutoides*
- Hymenolepis microstoma*
- Mus musculus*
- Hymenolepis diminuta*
- Hymenolepis microstoma*
- Hymenolepis nana*
- Inermicapsifer madagascariensis*
- Oenomys hypoxanthus*
- Inermicapsifer madagascariensis*
- Paranoplocephala omphalodes*
- Otomys irroratus*
- Inermicapsifer congolensis*
- Inermicapsifer madagascariensis*
- Paranoplocephala omphalodes*
- Paranoplocephala otomyos* sp. n.
- Raillietina (Raillietina) thryonomysi*
- Otomys unisulcatus*
- Inermicapsifer congolensis*
- Paranoplocephala omphalodes*
- Parotomys brantsi*
- Raillietina (Raillietina) trapezoides*
- Praomys (Mastomys) natalensis*
- Catenotaenia lobata*
- Hymenolepis diminuta*
- Hymenolepis microstoma*
- Hymenolepis uncispinosa*
- Inermicapsifer congolensis*
- Inermicapsifer madagascariensis*
- Raillietina (Raillietina) baeri*
- Raillietina (Raillietina) madagascariensis*
- Praomys (Praomys) jacksoni*
- Hymenolepis diminuta*
- Hymenolepis microstoma*
- Pelomys campanae*
- Inermicapsifer guineensis*
- Inermicapsifer madagascariensis*
- Pelomys fallax*
- Hymenolepis diminuta*
- Rattus paedulus*
- Inermicapsifer madagascariensis*
- Rattus rattus*
- Hymenolepis diminuta*
- Inermicapsifer congolensis*
- Inermicapsifer guineensis*

Inermicapsifer madagascariensis
Raillietina (Raillietina) baeri
Rhabdomys pumilio
Catenotaenia lobata
Hymenolepis microstoma
Inermicapsifer congolensis
Inermicapsifer guineensis
Inermicapsifer madagascariensis
Raillietina (Raillietina) trapezoides
Saccostomys campestris
Inermicapsifer madagascariensis
Steatomys pratensis
Hymenolepis diminuta
Inermicapsifer madagascariensis
Tatera valida kempii
Catenotaenia lobata
Inermicapsifer madagascariensis
Raillietina (Raillietina) trapezoides
Tatera (Tatera) brantsii
Hymenolepis microcantha sp. n.
Hymenolepis taterae sp. n.
Raillietina (Raillietina) trapezoides
Thallomys paedulus
Inermicapsifer aberratus
Inermicapsifer guineensis
Inermicapsifer madagascariensis
Thamnomys surdaster
Hymenolepis diminuta
Thryonomys swinderianus
Raillietina (Raillietina) mahonae
Raillietina (Raillietina) thryonomysi
Raillietina (Raillietina) trapezoides

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