Helminths of Mammals and Birds from Israel. II.  
Sinaiotaenia witenbergi gen. et sp. n. (Cestoda:  
Anoplocephalidae) from Desert Rodents¹

Guta Wertheim and Z. Greenberg  
Department of Parasitology, The Hebrew University—  
Hadassah Medical School, Jerusalem, Israel

ABSTRACT: A cestode first recovered from Gerbillus dasyurus in Israel, found also in gerbilline rodents  
from the Sinai Peninsula, is described as Sinaiotaenia witenbergi gen. et sp. n. As a result of experimental  
exposure of two species of tenebrionid beetles and an unidentified oribatid mite to the tapeworm eggs,  
cysticercoids developed in adults of Tribolium confusum. The unarmored scolex, the character of the gravid  
proglottids with eggs scattered singly in the parenchyma, and the use of an insect as intermediate host,  
point to the tapeworm as belonging to the Linstowiinae subfamily of the Anoplocephalidae. It differs from  
other genera of this subfamily by the position of the female genitalia in the posterior part of the proglottid,  
the localization of the numerous testes anterior to these organs, and the particularly elongated gravid  
proglottids.

When examining rodents from the southern region of Israel for helminths, a cestode which  
could not be assigned to any of the known genera was recovered from Gerbillus dasyurus.  
The description of this cestode, Sinaiotaenia witenbergi gen. et sp. n., is based upon additional  
material laterally recovered from Gerbillus dasyurus, G. gerbillus, Sekeetamys calurus, and  
Meriones crassus caught in the Sinai Peninsula.

Materials and Methods

Living worms, allowed to relax in tap water,  
were fixed in hot alcohol-formalin-acetic acid  
and stained with Semichon's carmine. Transversal  
and sagittal sections 8 μ thick were prepared from proglottids fixed in Bouin's fluid  
and stained in Ehrlich's hematoxylin and eosin.  

For life history studies, gravid proglottids were teased on pieces of wet filter paper and  
offered to larvae and adults of laboratory-reared arthropods (Tenebrio molitor, Tribolium  
confusum, and an oribatid mite) which were examined 18 days post-infection.  

Drawings were prepared with the aid of a  
Reichert viso-pan.  

All measurements are in microns unless  
otherwise indicated.

Sinaiotaenia gen. n.

DIAGNOSIS: Anoplocephalidae, Linstowiinae. Medium-sized tapeworms with proglottid length  
increasing posteriad. Two excretory stems on  
each side of the strobila. Testes numerous, in  
medullary parenchyma, anterior to female genitalia. Seminal vesicle absent. Ovary and  
vitelline gland close to posterior margin of proglottid. Seminal receptacle present. Genital  
ducts passing between longitudinal excretory stems. Genital pores in middle third of proglottid margin, alternating irregularly. Egg capsules, each with a single egg, scattered in  
medullary parenchyma of gravid proglottid. Parasitic in rodents.

The name Sinaiotaenia refers to the Sinai  
Peninsula, where the parasite was found in considerable numbers.

Type species: Sinaiotaenia witenbergi sp. n.

Sinaiotaenia witenbergi sp. n.

DIAGNOSIS: In the following description of fixed and stained material measurements of the type specimen are supplemented by data  
on paratypes (range given in parentheses). The description is based on 10 specimens (type  
and 9 paratypes), each without the original terminal proglottid. The strobila is 145 (87—222) mm long with a maximum width of 2.1  
(1.7—2.8) mm. The unarmored scolex is 434 (385—528) in transverse diameter and not  
sharply separated from the neck region which is 1.18 (0.90—1.72) mm long (Fig. 1). Suckers  
183 (164—220) in diameter. Concentrations of deeply staining nuclei indicating the primordia  
of internal organs appear in proglottids 6 or 7, measuring 868 (714—1,000) in width and 284

¹This study represents part of a survey on "Parasite Fauna of Israel," supported by N.I.H. Grant No. E-1315.

(142–460) in length. Maturity is attained in proglottids 22–24 which measure 1.7 (1.4–2.5) mm in length and 1.41 (1.2–1.8) mm in width and are almost rectangular. In proglottids 35–37 the sexual organs begin to recede and narrow strands of eggs, forming an irregular network, appear in the parenchyma. Proglottids 37–54 measure 11.3 (8.2–16.8) mm in length and 2.0 (1.3–3.4) mm in width. Length to width ratio is 3:1 to 10:1 (Fig. 3). Genital pores in the middle third of the proglottid margin, alternating irregularly.

Testes in medullar parenchyma, between excretory stems, spherical, 110 to 150 in number, 56 to 97 in diameter, in front of female genital glands, occasionally lateral to ovary.

Cirrus pouch elongated oval or in some proglottids bottle-shaped, covered with thick fibrous coat, 243 (214–282) long, 89 (86–97) wide. Vas deferens strongly coiled, not widening into seminal vesicles. Ejaculatory duct coiled inside cirrus pouch. Cirrus unarmed.

Female organs median, close to posterior margin of proglottid. Vitelline gland posterior to ovary, elongated parallel to transverse axis of proglottid, slightly lobed, 452 (413–460) in width. Ovary formed by two lobed parts united by a broad bridge, 340 (320–430) in transversal axis.

Vagina narrow, covered with fibrous coat. Seminal receptacle large, spherical or irregularly oval, 180 (142–215) in diameter, close to ovary, persisting in gravid proglottids.

Genital atrium shallow, semicircular, not muscular. Genital ducts pass between excretory stems and open into the atrium with the vaginal pore posterior to the cirrus (Fig. 2).

Thirty egg capsules from the type and paratypes had the following measurements: egg capsule 130–170 in diameter, oncosphere 45–
49, embryonic hooks 25–28 long (Fig. 4). Egg capsules not covered with fibrous coat, scattered singly in medullary parenchyma of gravid proglottids (Fig. 3).

Two excretory stems on each side of the strobila, the ventral one branching off into short irregular anastomoses, which may reunite with the main stem (Fig. 2).

Localization: Small intestine.

Hosts: Gerbillus gerbillus Olivier, 1801; G. dasyurus Wagner, 1842; Sekeetamys calurus Thomas, 1892; Meriones crassus Sundevall, 1842 (Rodentia, Gerbillidae).


Type (whole mount) (Number S-384) and 9 paratypes deposited in the helminthological collection at the Department of Parasitology, The Hebrew University—Hadassah Medical School, Jerusalem.

Note on life history: Adults and larvae of Tribolium confusum, Tenebrio molitor, and an unidentified oribatid mite were exposed to eggs in teased gravid proglottids. After 18 days, several cysticercoids were recovered from adult T. confusum. A detailed description of the cysticercoids and data on experimental infection of rodent hosts will be published in a separate paper.

Discussion

The cestode Sinaiotaenia witenbergi was recovered from gerbilline rodents caught in arid areas of southern Israel and of the Sinai Peninsula (Wertheim and Greenberg, 1970). Following the classification in Yamaguti (1959), it was assigned to the family Anoplocephalidae Cholodkovsky, 1902, taking into consideration the marginal genital pores, absence of rostellum and hooks in the scolex, and the arrangement of the egg capsules, which are scattered singly in the parenchyma. The taxonomy of the Anoplocephalidae, especially the division into subfamilies, was lately discussed by Stunkard (1961, 1965, 1969). Using as criteria mainly morphological features and bionomics Stunkard recognized in the Anoplocephalidae the following four subfamilies: (1) Anoplocephalinae Blanchard, 1891, transmitted by oribatid mites; (2) Catenotaeniinae Spassky, 1949, transmitted by tyroglyphid mites; (3) Linstowiinae Fuhrmann, 1907, transmitted by coleopterous and
lepidopterous insects; and (4) Thysanosomatinae Führmann, 1907, transmitted by psocopterous insects.

Accepting this approach Sinaiotaenia gen. n. was classified as belonging to the subfamily Linstowiinae. It differs, however, from other genera in this subfamily, Linstowia Zschokke, 1899, Atriotaenia Sandground, 1926, Panceriella (Führmann, 1899) emend. Stunkard, 1969, and Cycloskrjabinia Spassky, 1951, by the position of the female genitalia in the posterior part of the proglottid, the localization of the numerous testes in front of the ovary, and the especially elongated gravid proglottids. (See discussion in Stunkard, 1961, Mettrick, 1965, and Wertheim, 1970.) These differences appeared sufficient to justify the establishment of a new genus, with a new species, named in honor of Professor G. Witenberg.

Acknowledgments

The authors wish to express their gratitude to Drs. E. L. Schiller and R. L. Rausch for examining the specimens and confirming the validity of the new genus.

Thanks are due to Mr. J. Ghattas for the preparation of the slides and drawings.

Literature Cited


Stunkard, H. W. 1961. Cycloskrjabinia taboresis (Loewen, 1934) a cestode from the red bat Lasiurus borealis (Müller, 1776) and a review of the family Anoplocephalidae. J. Parasit. 47: 847-856.


Intestinal Helminths of *Rattus rattus* from Urban and Rural Areas in the Punjab Region of West Pakistan

Henry N. Buscher¹ and A. James Haley²

Division of Parasitology, Pakistan Medical Research Center, Lahore, West Pakistan

Abstract: Eleven species of helminths including 6 genera and 6 species of Nematoda, 3 genera and 4 species of Cestoda, and one genus and one species of Acanthocephala were found in the alimentary tracts of 480 *Rattus rattus*. Urban rats harbored a greater variety of helminths than rural rats and also had a higher incidence of infection. In addition, urban rats had a larger average parasite load (25.5 helminths in 2.8 species) than did rural rats (9.7 helminths in 1.5 species). The results of this study indicate that rats are undoubtedly the reservoir hosts for *H. diminuta* infections occasionally seen in man but appear to be of little or no importance in the epidemiology of *H. nana* in human infections.

Studies on the parasites of *Rattus rattus* have been done in most countries of the world and the literature on the subject is voluminous. In developing countries this information is of particular importance because of the role which

---

¹ Present address: Department of Biology, Austin College, Sherman, Texas.
² Present address: Department of Zoology, University of Maryland, College Park, Maryland.