Hexamermis glossinae sp.nov. (Nematoda: Mermithidae), a parasite of tse-tse flies in West Africa

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Received October 15, 1980

POINAR, G. O., JR., B. MONDET, J. P. GOUTEUX, and C. LAVEISSIERE. 1981. ***Hexamermis glossinae*** sp.nov. (Nematoda: Mermithidae), a parasite of tse-tse flies in West Africa. Can. J. Zool. **59**: 858–861.

A new mermithid, ***Hexamermis glossinae*** sp.n., is described as a parasite of tse-tse flies in West Africa. Nematode parasites were reared from adults of *Glossina palpalis*, *G. p. pallicera*, and *G. n. nigrofusca* from the region of Vavoua in the Ivory Coast. This is the first description of mermithids from these important hosts.

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Hexamermis glossinae n.sp., dont la description apparaît ici, parasite les mouches tsé-tsé en Afrique Occidentale. Les parasites ont été obtenus par élevage d'adultes de *Glossina palpalis*, *G. p. pallicera* et *G. n. nigrofusca* de la région de Vavoua en Côte d'Ivoire. C'est la première description de mermithidiens chez ces hôtes de grande importance.

[Traduit par le journal]

Introduction

Over the past decades, several workers recovered parasitic mermithid nematodes from adults and puparia of tse-tse flies. All attempts to identify or describe the worms have been unsuccessful due to the absence of adult stages (Poinar 1975) (Briggs et al. 1977).

Thanks to the persistence of the junior authors, who maintained postparasitic stages of mermithid parasites of tse-tse flies until they molted, adult material was available for study. The mermithids collected in rearings from several *Glossina* species in the Ivory Coast, West Africa, were discovered to represent a new species and are described here. Information regarding other aspects of parasitism will be presented elsewhere (Gouteux et al., manuscript in preparation[1]).

Materials and methods

During an ecology study of *Glossina* species in a forested region in the Ivory Coast (Vavoua), adult flies captured by nets and traps were discovered to harbor nematodes. After dissections, the nematodes were placed in soil for several weeks, then were killed and fixed after the method described by Poinar (1975). They were subsequently processed to glycerin for taxonomic studies.

Results

The nematodes, which were found to represent a new species of *Hexamermis*, are described below. In the quantitative portion of the description, all measurements are given in micrometeres unless otherwise specified. The value given after the character represents the average and the numbers in parentheses, the range of that character.

Hexamermis glossinae sp.nov.

Description

Mermithidae Braun, 1883. *Hexamermis* Steiner, 1924 as redefined by Rubsov (1978). Fairly long nematodes; the body usually narrowing in the head region; criss-cross fibers present in the adult cuticle; six hypodermal cords at midbody; six head papillae arranged in one plane; amphids small, situated in the lateral head papillae, usually opening slightly behind or adjacent to the lateral head papillary nerve endings; mouth terminal; vagina horn shaped, curved only slightly at the distal portion where it meets the branches of the uterii; spicules paired, separate, equal or subequal, slightly curved, approximately equal or slightly longer than the body width at the cloaca; genital papillae arranged in three double rows; female with a vestigial

[1]Gouteux, J. P., C. Laveissiere, B. Mondet, and G. O. Poinar, Jr. Observations sur le parasitisme de *Glossina palpalis* s.l., *G. pallicera* et *G. nigrofusca nigrofusca* par des *Hexamermis glossinae* (Nematoda: Mermithidae) en Côte d'Ivoire.

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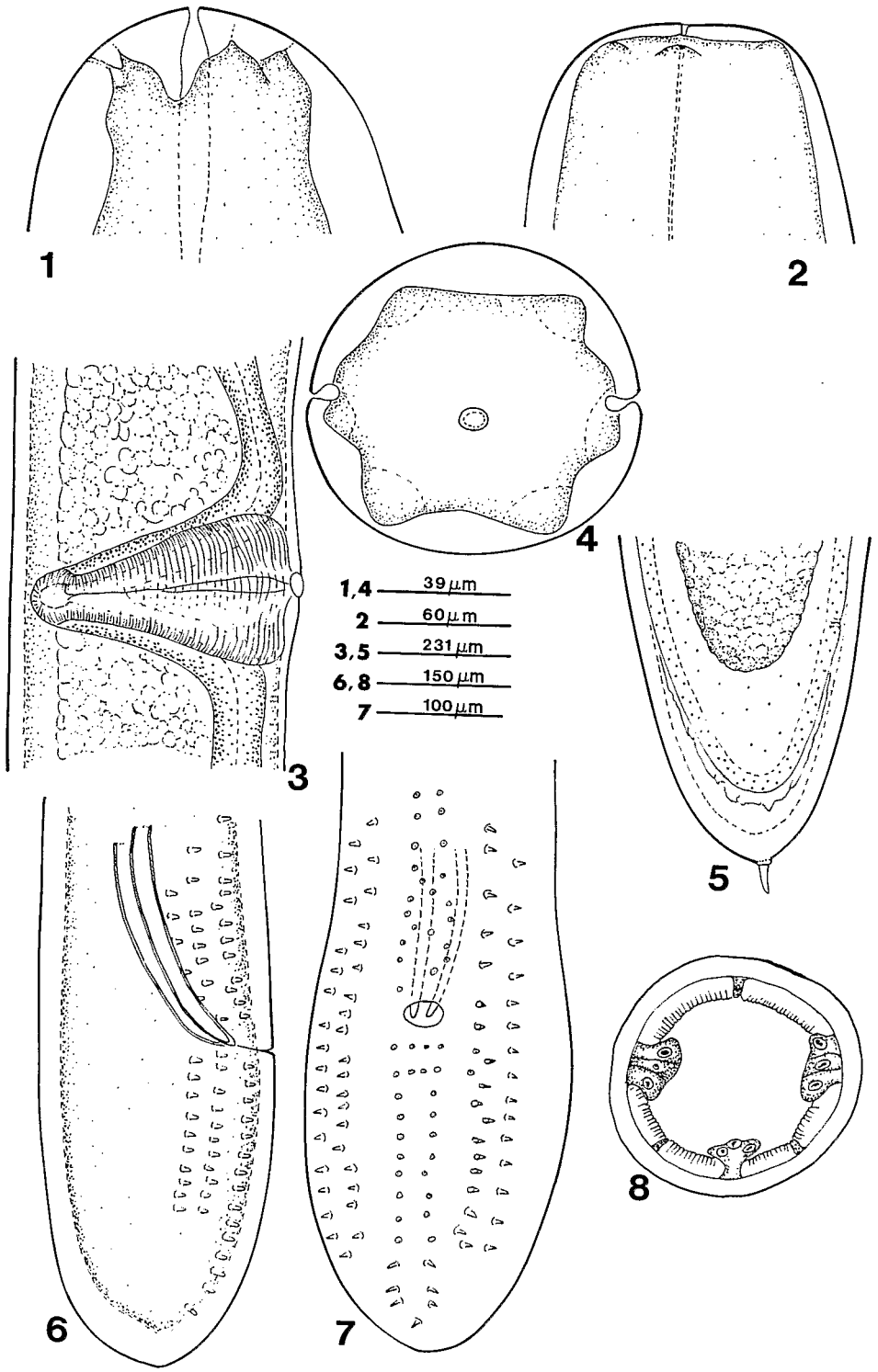

FIGS. 1–8. *Hexamermis glossinae* sp.nov. Fig. 1. Dorsal view of female head. Fig. 2. Dorsal view of postparasitic juvenile head. Fig. 3. Lateral view of vulva. Fig. 4. "En face" view of female. Fig. 5. Lateral view of tail of molting female. Fig. 6. Lateral view of male tail. Fig. 7. Ventral view of male tail. Fig. 8. Cross section of female.

FIG. 9. Adult *Glossina palpalis* infected with *Hexamermis glossinae* sp.nov.

anal opening; three to four rows of cells in the lateral hypodermal cords.

Female (N = 3) (Figs. 1, 3, 4, 5, 8)

Length 8.2 (6.0–10.0) cm; greatest width 493 (450–520); distance of head from nerve ring 431 (385–500); length of vagina 420 (385–462); vulva 43 (42–46%); distance from vestigial anus to tip of tail 295 (269–331); vulva opening circular, between 30 and 50 in diameter; vulvar lips reduced or absent.

Male (N = 2) (Figs. 6, 7)

Length 8.7 (8.0–10.0) cm; greatest width 310 (300–320); length of tail 335 (310–347); length of spicules 223 (192–300); body width at cloaca 200 (169–275); distance from head to nerve ring 404 (385–423); six rows of genital papillae; 9–11 preanal genital papillae in each row; 11–14 postanal genital papillae in each row.

Postparasitic juveniles (N = 5) (Figs. 2, 5)

Length 9.2 (4.0–11.0) cm; molts twice after leaving host to become adult; contains a tail appendage with a length of 30–60; head papillae indistinct.

Diagnosis

The present species is placed in the genus *Hexamermis* as characterized by Rubsov (1978). His classification restricts the genus to forms that possess a horn-shaped, rather than an S-shaped vagina. The present species could also be placed in the genus *Ovomermis* Rubsov (1976) on the basis of the position of the amphids. However since one of the basic characters of the latter genus is the size of the eggs, which are absent in the present material, it was decided to place the new species in *Hexamermis*. *Hexamermis glossinae* differs from all other previously described species of *Hexamermis* and *Ovomermis* as recognized by Rubsov (1978) in the following characters: small amphids located on the lateral head papillae; spicules slightly curved, roughly equal in length to the body diameter at the cloaca, male with six rows of genital papillae (or three double rows); vagina straight, only with a slight bend where the distal portion joins the branches of the uteri.

The only described mermithid from West Africa similar to *H. glossinae* is *Mermis tamalensis* Baylis (1933). Although the male of this species resembles *H. glossinae* in the shape of the spicule and arrangement of genital papillae, the spiral amphids clearly separate the two species.

Type host

Glossina palpalis Rob.-Desu. (Diptera: Muscidae). Other hosts are *G. n. nigrofusca* Newstead and *G. p. pallicera* Bigot.

Type locality

Vavoua, Ivory Coast, West Africa.

Type specimens

Holotype (female) and allotype (male) deposited in the Nematology Collection, University of California, Davis, California. Paratypes are in the author's (G.O.P. Jr.) collection.

Biological Observations

The rates of infection varied seasonally; in March–April 1979, the rate of infection for *G. n. nigrofusca* was 7.7% ($N = 2$), for *G. p. pallicera*, 2.4% ($N = 13$), and for *G. palpalis* s.l., 4.5% ($N = 58$) (Fig. 9). Both sexes of adult flies were parasitized and up to three

nematodes were found in a single host. The parasitized tse-tse flies were localized and the infestation occurred during the rainy season. More detailed observations on the parastic relationship are presented by Gouteux et al. (1981).

Members of the genus *Hexamermis* are known to parasitize a wide variety of soil insects, as well as terrestrial molluscs (snails and slugs). As in the present case, they usually kill their hosts upon emergence. The rest of their life is completed in the soil. This includes molting to the adult stage, mating, and oviposition.

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Reprinted from

Canadian Journal of Zoology

Réimpression du

Journal canadien de zoologie

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Volume 59 • Number 5 • 1981

Pages 858–861

National Research Council Canada / Conseil national de recherches Canada