Pratinema sepsis gen. n., sp. n. (Tylenchida: Allantonematidae), a parasite of coprophilous flies of the genus *Sepsis* (Diptera: Sepsidae)

Vladimir N. Chizhov* and Dieter Sturhan**

***Prospect Mira 184-1, 53, Moscow, 129301, Russia,**
****Biologische Bundesanstalt, Institut für Nematologie und Wirbeltierkunde, Toppheideweg 88, D-48161, Münster, Germany.**

Accepted for publication 3 September 1997

Summary. *Pratinema sepsis* gen. n., sp. n. is described from coprophilous flies of the family Sepsidae (*Sepsis punctum* and *Sepsis* sp.). This species can be distinguished from those in the related genus *Contortylenchus* by its ventrally curved female body, prominent cuticularization of the excretory pore and the duct in invasive females, and by the absence of bursa and a gubernaculum in free-living males. *Contortylenchus* species are parasites of bark beetles. The life cycle of *Pratinema sepsis* gen. n., sp. n. consists of a single gamogenetic population with copulation outside of host.
Key words: Allantonematidae, Diptera, *Pratinema sepsis* gen. n., sp. n., Russia, taxonomy, Tylenchida.

Dissection of coprophilous flies of the genus *Sepsis* collected in the Jaroslavl region of Russia revealed the presence of parasitic nematodes. A description of these nematodes, which were identified as representing a new species and a new genus of entomoparasitic tylenchids, is presented here.

MATERIALS AND METHODS

Coprophilous flies were collected by using an entomological net from over cow-dung in grass pastures every 20-30 days during two summer seasons. Gamogenetic females of undescribed entomoparasitic tylenchids were dissected from infected flies in water and rapidly fixed in hot TAF. Juveniles of the same tylenchids which were found simultaneously were transferred to a moist chamber to obtain free-living stages. Invasive females and free-living males were also fixed with TAF. Fixed nematodes were processed and mounted in anhydrous glycerin.

DESCRIPTION

Pratinema sepsis gen. n., sp. n. (Fig. 1)

Measurements: Table 1.

Invasive female. Body almost straight. Cuticle finely annulated. Lateral field around 3 μm wide, with six incisures, inner incisures mostly indistinct. Cephalic capsule hemispherical with small circumoral protrusion (5-7 μm wide and 2 μm high), continuous with body contour. Armature of head capsule absent. Stylet well developed, with prominent lumen and basal thickenings up to 3 μm wide and mostly asymmetrical; conus measuring about one fourth of total stylet length. Oesophagus narrow, without sclerotization of lumen walls. Two prominent oesophageal glands. Dorsal oesophageal gland orifice 6-8 μm from stylet base; orifice of subventral gland 36-40 μm behind stylet base. Posterior end of the dorsal oesophageal gland close to mid-body. Excretory pore wide; walls of excretory duct close to pore strongly sclerotized. Excretory gland with large nucleus at the level of oesophagus base. Hemizonid 8-11 μm anterior to excretory pore. Distinct deirids in the center of lateral fields at level of excretory pore. Apical cell of gonad 155-220 μm behind anterior end. Genital primordium with 6-12 cells, 50-60 μm long. Postvulvar sac sometimes present. Vulvar lips equal, not protruding, vagina walls slightly cuticularized. Anus obscure. Tail conically-elongated with slender pointed terminus.

Parasitic female. Body obese, coiled ventrally in tight spiral. Hypodermis 3-6 μm thick, without annulation. Cephalic end hemispherical or slightly flattened anteriorly, usually with circumoral 7-18 μm wide intrusion. Stylet well defined, with thin walls and visible lumen, almost no swelling at base. Dorsal oesophageal gland orifice 6-15 μm behind stylet base. Structures of cephalic capsule and oesophagus re-

Table 1. Morphometrics of *Pratinema sepsis* gen. n., sp. n. (measurements are given in μm).

Characters	Invasive females		Free-living males	Parasitic females
	Holotype	Paratypes (n=22)	Paratypes (n=23)	Paratypes (n=21)
Length	557	554±49 (456-652)	427±26 (374-476)	2319±298 (1721-2913)
a	34.8	32±5.6 (24-42)	31±3.3 (24-37)	18±4.5 (12-26)
b	6.7	6.4±0.9 (5.5-8.1)	–	–
c	7.6	8.4±1.8 (5.3-10.6)	9.7±0.7 (8.3-11.2)	34.8±10.1 (19-50)
c'	8.3	10.6±1.8 (6.0-13.3)	4.1±0.3 (3.4-4.7)	–
Stylet	13	12±1.1 (9-15)	4.5±0.1 (4-5)	20±4.2 (11-28)
V	82	81±3.7 (73-84)	–	92±1.2 (89-94)
Spicules	–	–	13±0.5 (11-15)	–
Excretory pore to anterior end	97	92±10.1 (77-111)	68±3.0 (62-74)	–
Body width	16	19±3.0 (14-26)	15±1.3 (13-18)	122±22.3 (91-158)
Vulva - anus	31	32±4.2 (24-41)	–	102±17.3 (70-122)
Tail length	73	73±18.0 (52-106)	45±3.5 (38-52)	66±13.0 (50-89)

duced, only in few specimens short and distorted oesophagus lumen visible. Thick chord-like intestine without lumen filled with granules. Ovary with numerous nuclei, usually protruded, rarely with short loop in the middle, with apical cell close to stylet base. Oviduct narrow and long, usually filled with synchronous eggs measuring 66-76 (72) x 28-38 (31) μm. Vulva opening slit-like, about half of corresponding body diameter. Vaginal walls thickened and slightly sclerotized. Tail terminus rounded or with digitiform terminus of variable length (up to 40 μm). Young parasitic females are oviparous, aged females viviparous.

Free-living male. Cuticle finely annulated. Cephalic capsule flatly rounded, 5-6 μm wide, non-sclerotized. Stylet small and delicate with prominent differentiation: conical part slightly longer than cylindrical; minute basal knobs present. Oesophagus structures inconspicuous. Orifice of dorsal oesophageal gland 5-10 μm from stylet base. Deirids at level of excretory pore. Testis 196-270 μm long, with cap cell 148-157 μm behind anterior end. Spicules narrow, slightly broadening to proximal end. Gubernaculum and bursa absent. Cloacal opening slightly protruded. Tail conically-elongated with slightly rounded terminus, often curved dorsally.

Biology. The life cycle of *Pratinema sepsis* gen. n., sp. n. consists of a single gamogenetic generation with copulation occurring outside the host. The nematode is localized in the abdominal part of its insect host and an infected *Sepsis* fly harbors, generally, one parasitic female of *P. sepsis* gen. n., sp. n., numerous eggs and juveniles of different stages. It appears that the last-stage juveniles migrate from the host through the gonad openings to the environment (cow-dung), where they moult to become invasive males and females. About 10-14 days are required for last-stage juveniles to develop into invasive females and free-living males. After copulation the invasive female penetrates the host larvae and oviposition by the mature parasitic females starts when the imago flies leave the cow-dung. Infected female flies are not completely sterile and can still produce small quantities of fully developed eggs. Infection of male flies appears to be lethal for the parasite.

Specimens of *Pratinema sepsis* gen. n., sp. n. nematodes were recorded in flies during the entire summer season (end of May to early September). The highest prevalence of nematode infection (2%) was observed in flies inhabiting cow-dung in woodland pastures. This observation may be explained by higher humidity in the air retarding desiccation of the cow-dung at such sites. At least two generations of the parasite per year were observed in the Jaroslavl region.

Type host. *Pratinema sepsis* gen. n., sp. n. was found in two species of coprophilous flies: *Sepsis punctum* F. (type host) and *Sepsis* sp., Diptera: Sepsidae.

Type locality. *Pratinema sepsis* gen. n., sp. n. was found in the vicinity of Borok, at the campus of the Institute of Inner Waters Biology, Nekouz district of the Jaroslavl region, in woodland and lawns close to the river Sunoshka. It was also recorded in the Khimki district, Moscow region (close to a dairy farm).

Type material. The holotype and paratypes (parasitic and invasive females, free-living males) are deposited in the collection of the Institute of Parasitology, the Russian Academy of Sciences (Moscow).

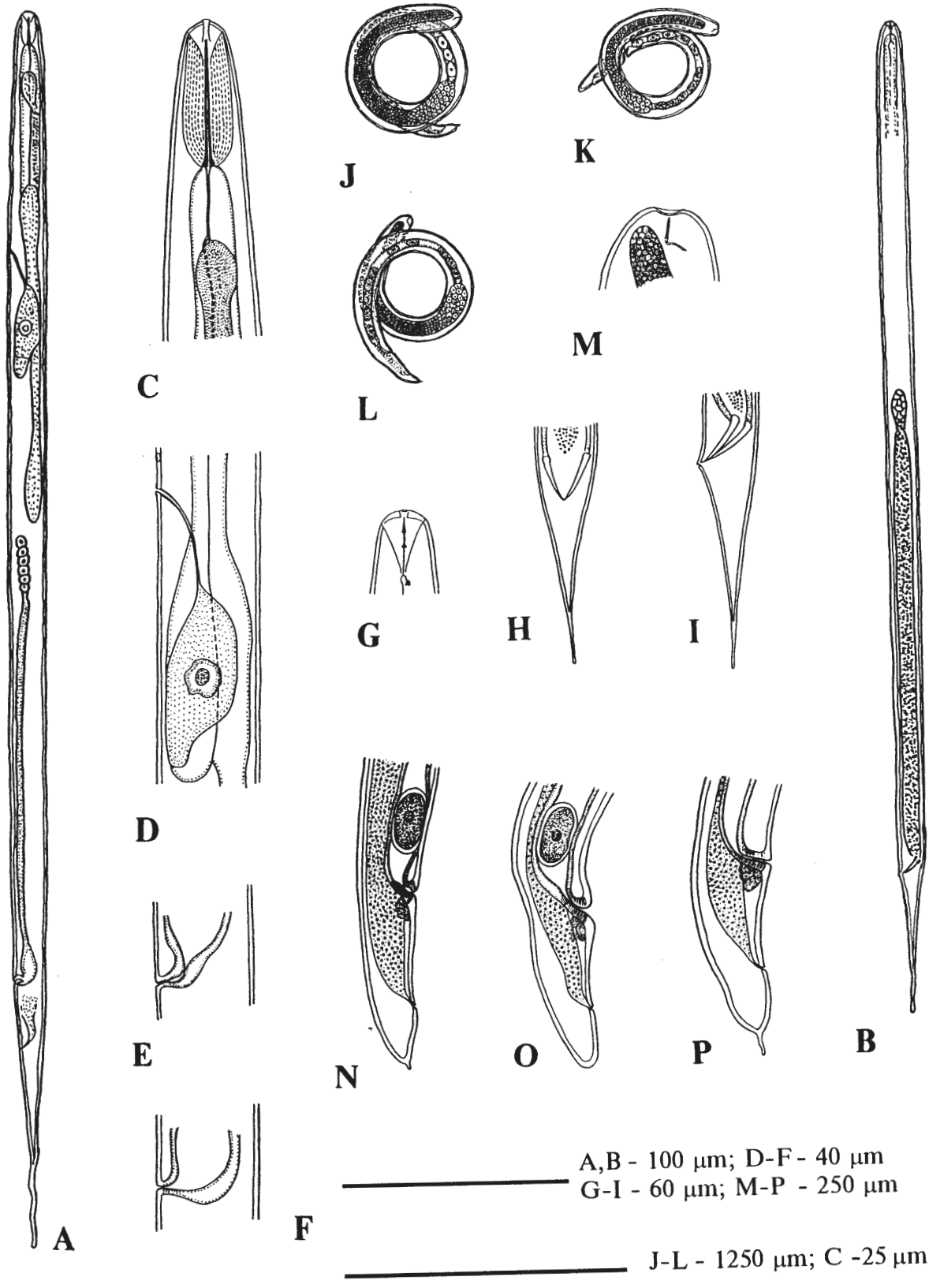

Fig. 1. *Pratinema sepsis* gen. n., sp. n. A: Invasive female; B: Free-living male; C: Anterior end of invasive female; D: Renetta region; E, F: Vulva region of invasive females; G: Anterior end of male; H, I: Tails of male; J-L: Body habitus of parasitic females; M: Anterior end of parasitic female; N-P: Posterior ends of parasitic females.

Slides with additional invasive and parasitic female and free-living male paratypes are deposited in the German Nematode Collection, Biologische Bundesanstalt, Institut für Nematologie und Wirbeltierkunde, Münster, Germany (slide numbers DNST 196/1/1-10).

Etymology. The generic name is proposed after the Latin "*pratum*"- lawn, meadow, and the specific name after the generic name of the host insect.

Differential diagnosis. *Pratinema sepsis* gen. n., sp. n. can be distinguished from those in the related genus *Contortylenchus* by the shape of the body of the parasitic female (spirally curved in *Pratinema* gen. n. *vs.* curved dorsally in *Contortylenchus*). *Pratinema* gen. n. is also characterized by a strong cuticularization of the excretory duct, while no such cuticularization is reported for *Contortylenchus*. Bursa and gubernaculum are absent in *Pratinema* gen. n. males but are present in *Contortylenchus*. Members of the genus *Contortylenchus* parasitize bark beetles, whereas *Pratinema sepsis* gen. n., sp. n. is reported from dipteran hosts.

Pratinema gen. n.

Diagnosis. Allantonematidae. Parasitic female ventrally curved. Vulva opening slit-like, vagina near half of vulval diameter. Free-living males with thin stylet bearing minute basal knobs. Single gamogenetic generation with copulation occurring outside the host.

Type species: *Pratinema sepsis* gen. n., sp. n.

DISCUSSION

The features which characterise *Pratinema sepsis* gen. n., sp. n. are its simple tylenchoid spicules, absence of an everted uterus and presence of a single gamogenetic generation; these are indicative that the new genus should be included in the family Allantonematidae (Pereira, 1931) Chitwood & Chitwood, 1937. This taxon consists of the two subfamilies Allantonematinae Pereira, 1931 and Contortylenchinae Rühm, 1956 (Siddiqi, 1986; Remillet & Laumond, 1991). The only important feature distinguishing these subfamilies is the vulva structure in parasitic females. While representatives of Allantonematinae are characterized by having a short and narrow, closed vulva, with equal or protruding lips, the representatives of Contortylenchinae have a wide and long, open slit-like vulva, with oblique lip margins. It is proposed that *Pratinema sepsis* gen. n., sp. n. be included in Contortylenchinae, although it has some features in common with *Howardula* Cobb, 1921 in the Allantonematinae *viz.* body shape of parasitic females, general morphology of free-living males, hosts (flies of the family Sepsidae were reported as the hosts of *Howardula* species by Yatham & Narayan Rao, 1980). Nevertheless, the newly described nematodes cannot be included in the genus *Howardula* because of the presence of a stylet in the males and an open vulva in the females. The description of many Allantonematidae genera are not sufficiently detailed and several of the characteristics described here for *Pratinema sepsis* gen. n., sp. n. also occur in different genera of the family. However, it appears preferable and justified to erect a new genus for the nematodes recovered from two *Sepsis* species, as a result of the uncertain position of the species and genus within the Allantonematidae.

ACKNOWLEDGEMENTS

The authors are grateful to Drs. E.P. Narchuk and A.Yu. Ryss (Zoological Institute, the Russian Academy of Sciences, St. Petersburg) for their help in identification of the material, and to Dr. S.E. Spiridonov, Institute of Parasitology, the Russian Academy of Sciences, Moscow, for his constructive comments on the manuscript.

REFERENCES

Remillet, M. & Laumond, Ch. 1991. Sphaerularioid nematodes of importance in agriculture. In: *Manual of Agricultural Nematology* (W.R. Nickle, Ed.). pp 967-1024. New York, Marcel Dekker.

Siddiqi, M.R. 1986. *Tylenchida Parasites of Plants and Insects.* Commonwealth Institute of Parasitology, Farnham Royal, UK. 645 pp.

Yatham, N.R. & Narayan Rao, P. 1980. Description and biology of *Howardula albopunctata* sp. n. from two species of *Sepsis* (Sepsidae: Diptera). *Proceedings of the Indian Academy of Parasitology* 1: 42-46.

Чижов В. Н., Штурхан Д. *Pratinema sepsis* gen. n., sp. n. (Tylenchida: Allantonematidae) - паразит копрофильных мух рода *Sepsis* (Diptera: Sepsidae).

Резюме. Описывается новый вид нового рода энтомопаразитической нематоды - *Pratinema sepsis* gen. n., sp. n. из мух рода *Sepsis*. Новый вид отличается от видов близкого рода *Contortylenchus* вентральной изогнутостью паразитических самок, заметной склеротизацией экскреторного протока у инвазионных самок, отсутствием бурсы и рулька у свободноживущих самцов и паразитированием в других видах насекомых. Жизненный цикл нового вида состоит из одной гамогенетической генерации с копуляцией во внешней среде.