

Short Note

Phoresia of *Nigolaimoides borborophilus* (Nematoda: Dorylaimida) by scatobiotic dipterans

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Phoretic relationships between nematodes and different animals have been reported for both free-living and parasitic forms. Several phoretic relationships are obligatory as the dispersal stages of some nematode species are transported only by specific species of insects, and this specificity usually occurs when both nematode and its dispersal species occupy the same habitat. The transport of the aphelenchid nematode *Bursaphelenchus xylophilus* by the cerambycid beetles of the genus *Monochamus* is an example of this type of relationship. The transportation of aphelenchids and tylenchids, associated with woodland and forest plants, has been documented (Siddiqi, 1986; Hunt, 1993), e.g. *Sychnotylenchus nematodes* (Tylenchida) are frequently found under the elitrae of the bark beetle *Scolytus intricatus* (Rühm, 1956). Numerous neotylenchid juveniles have been observed under elitrae, inside wing folds and between tergites of beetles of the family Cucujidae, and also some carabid and silphid beetles (unpublished results). All of these beetles occur beneath the bark of fallen trees.

Nematodes of the family Rhabditidae are also characterized by phoretic relationships with bark beetles, and transportation of rhabditid juveniles by beetles belonging to the genera *Ips*, *Hylesinus*, *Dendroctonus*, *Polygraphus* and *Scolytus* has been reported (Blinova, 1982). Coprophilous species of rhabditids and diplogasterids are transported by scarabid beetles belonging to the subfamily Geotrupinae, and can frequently be found on the surface of these insects. An unusual phoretic relationship with drosophilid flies and rhabditids, inhabiting rotten organic debris, was reported in which juvenile nematodes were found only on the distal part of fly legs (Poinar, 1975).

In the reported cases of phoretic relationships between insects and nematodes only comparatively short nematode juveniles (< 1 mm) were transported. Here we describe a phoretic relationship between

larger nematodes (body length= 1.9 mm) and insects.

Nematode specimens were found on the surface of scatobiotic flies of five species belonging to the families Sphaeroceridae (*Leptocera limosa*, *L. humida*, *Coproica ferruginata*, *C. vagans*) and Sepsidae (*Sepsis punctum*). The flies were collected over cow dung in pastures at the Moscow and Jaroslavl regions with an entomological net. The flies were rinsed under tap water, which was collected and filtered through nylon mesh. The residue with nematodes was fixed with TAF and examined under the dissecting microscope. Twenty four *Nigolaimoides borborophilus* (De Man, 1876) Meyl, 1960 females were identified but males and juveniles were never observed. Both mature (containing fully formed eggs) and premature females (only oocytes present in the gonades) were present and the nematodes were recovered from samples collected throughout the vegetation season i.e. from the start of grazing in early May until the first frosts in September. Only 0.5% of flies were found to have nematodes attached to them and each fly had only one nematode.

The *N. borborophilus* females (n=24) had the following morphometrics: L = 1.51-2.38 (1.91) mm; a = 16.5-34.3 (23.8); b = 4.7-8.8 (6.1); c = 57.1-97.5 (72.3); c' = 0.5-0.8 (0.7); V = 46-56 (50)%, spear 12-14 μ m. The nematodes were characterised as having: body ventrally curved, sometimes C-shaped, tapering to the anterior end. Maximum body diameter 59-105 (80) μ m. Cuticle with fine longitudinal striation 3-4 μ m wide in mid-body, but up to 6 μ m in tail region. Cephalic end rounded, not offset, 17-22 (20) μ m dia. Short spear, with prominent lumen and obliquely cut distal end. Amphids stirrup-shaped. Guiding ring simple, 3-5 μ m from anterior end. Oesophagus 270-366 (300) μ m long. Basal swelling of oesophagus starting from its middle 117-167 (140) μ m long, and 33-44 (38) μ m wide. Cardium present. Paired gonads, vulvar lips not protruding, vagina slightly sclerotized, short. Antidromous ova-

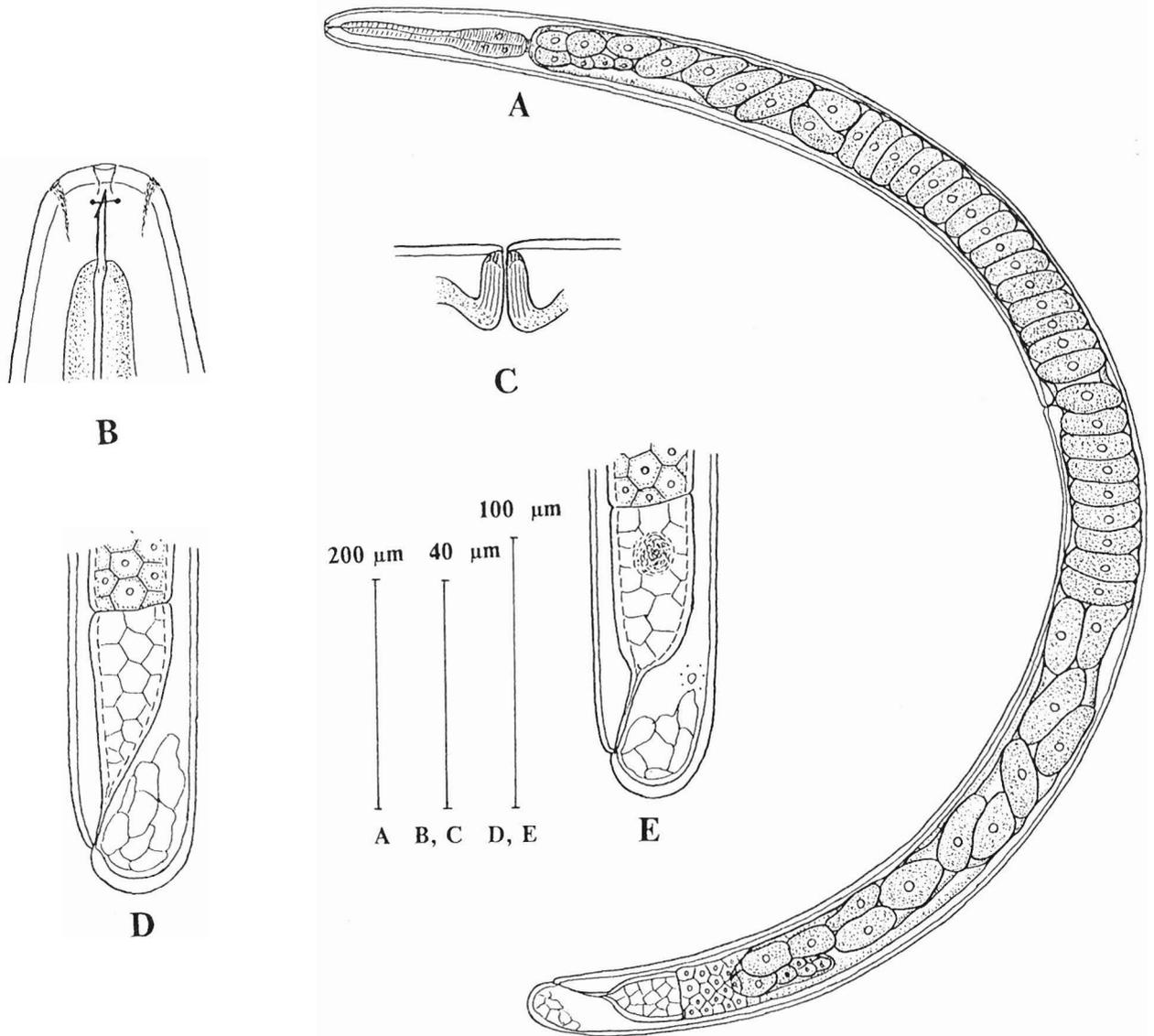


Fig. 1. *Nigolaimoides borborophilus*. A: Mature female; B: Head; C: Vulva region; D, E: Tail.

ries, with tip cells in the region of vulva. Anterior gonad reflected close to oesophagus middle, posterior - close to rectum. Up to 47 fully formed eggs were observed in the anterior end of mature females, up to 40 in the posterior end. Egg size 78-100 (89) x 35-50 (38) μm . Size of sickle-shaped spermatozoa in uteri 5-6 μm . Prerectum comparatively short, 54-81 (65) μm . Rectum 25-40 (33) μm long. Anal diameter 33-44 (38) μm . Tail end rounded, 17-30 (25) μm long (Fig.1).

Specimens mounted on slides deposited in the nematode collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg.

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