APHELENCHOIDES GRAMINIS SP. N.(NEMATODA, APHELENCHOIDIDAE)

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Species of the genus Aphelenchoides Fischer, 1894, are widely distributed and are encountered in different biotopes. Several of them are ecto- and endoparasites of insects. The majority are associated with plants. A significant portion of these species belongs to an ecological group of ectoparasitic myconematodes, capable of sucking out the contents of the hyphae of the mycelium of fungi. Another portion of the species belongs to the phytohelminths of unspecified pathogenic effect, capable of co-existing with saprobic nematodes in the tissues of necrotic plants. Some species are phytohelminths of a specific pathogenic effect (Paramonov, 1962).

In recent years the number of species of the genus has significantly increased. At the present time, the genus Aphelenchoides Fischer, 1894, numbers over 40 species (Baker, 1962; Baranovskaya et al., 1965; Sanwal, 1965).

A description of a new species, which has been observed in the root system, stalks, and leaves of winter rye (Secale cereale L.) and winter wheat (Triticum vulgare Vill.), is given below.

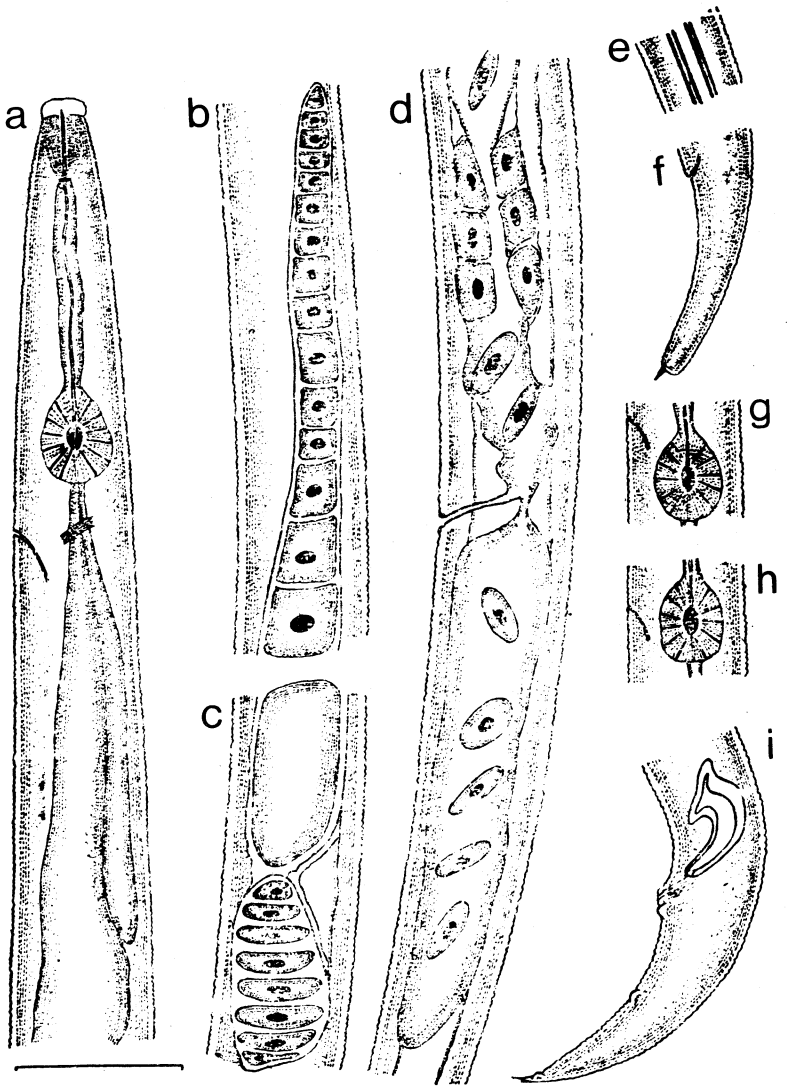
APHELENCHOIDES GRAMINIS BARANOVSKAYA & KHAK SP. N.

Holotype: female. L = 0.510 mm; a = 26.5; b = 9.6; c = 17.0; V = 69.4%; stylet = 12 μm.

Allotype: male. L = 0.466 mm; a = 23.6; b = 8.5; c = 16; V = 62.9%; stylet = 10.44 μm; spicules = 15.08 μm.

Paratypes: females (n = 25). L = 0.3886 - 0.5628 mm (0.471 mm); a = 21.4 - 29 (25.06); b = 7.1 - 10 (8.63); c = 13.4 - 20 (16.61); V = 67.6 - 74% (70.45%); stylet = 10.8 - 12.76 μm (11.24 μm). Males (n = 7); L = 0.4332 - 0.552 mm (0.4927 mm); a = 23.6 - 33 (29.37); b = 7.8 - 9.6 (8.81); c = 14.3 - 18 (16.47); V = 53 - 65% (60.98%); stylet = 10.44 - 10.8 μm (10.74 μm); spicules = 15.08 - 19.2 μm (16.42 μm).

Female body shape cylindroid, tapering toward both ends. Body diameter: at the base of the stylet 8.4 μm, at the metacorpal bulb 15.6 μm, at the nerve ring 16.8 μm, at the excretory pore 16.8 μm, at the beginning of the ovary 18 μm, at the vulva 19.2 μm, and at the anus 8.4 μm.



Aphelenchoides graminis sp. n.

a - front end of female body; b - ovary; c - egg and spermatheca; d - preuterine gland, vulva and posterior uterus; e - lateral field; f - tail of the female laterally; g, h - position of the excretory pore; i - tail of the male laterally.

Cuticle with fine annulations, annule width about 0.6 µm. Cephalic capsule smooth, with rounded shape, clearly separated from the body, and bearing a weakly developed head skeleton. Width of cephalic capsule amounts to almost three times its length.

Stylet thin, with well marked basal knobs, and reaching a length of 12 µm. Protractors well developed and parallel to the stylet axis. Procorpus of esophagus cylindroid, and somewhat tapering toward the metacorpal bulb. Metacorpal bulb round-oval in shape, 12 µm long and 9.6 µm wide, with a sclerotized bulbar cavity [=valve] (see Figure a).

Nerve ring situated somewhat behind the metacorpal bulb. Execretory pore located either at the middle or toward the front, but in the majority of cases toward the rear, of the metacorpal bulb (See Figure, g and h). Esophageal glands reach 61.2 /um in length (See Figure a).

Ovary short, straight, with oocytes arranged in a single row; it stops at a distance from the metacorpal bulb equal to approximately four vulva body diameters (see Figure b). Spermatheca tubular, short, 28.2 /um in length; its measurements vary from 25.5 to 40.8 /um, and it contains large spermatozoids located in a kind of longitudinal row of cells (6 - 8) (see Figure c). Preuterine gland well developed and consisting of three rows of cells (see Figure d).

Posterior uterus long, often containing spermatozoids, equal to 3.8 diameters of the body in the area of the vulva (See Figure d). Egg 46.8 /um long, 16.8 /um wide (see Figure c).

Tail conical, tapering toward the end, with a blunt tip bearing a long mucro which is slightly displaced ventrally (see Figure f).

Lateral field with four lines (see Figure e).

Male body shape cylindrical, tapering toward both ends. Body diameter: at the base of the style 6.96 /um, at the metacorpal bulb 15.08 /um, at the excretory pore 15.08 /um, at the nerve ring 15.08 /um, at the beginning of the testis 18.56 /um, and at the anus 11.6 /um.

Cuticle with fine annulations, annule width about 0.58 /um. Cephalic capsule smooth with rounded shape and clearly separated from the body. The height of the cephalic capsule is 2.4 /um, the width 6 /um.

Stylet small - 10.44 /um, with well marked basal knobs. Protractors situated parallel to the stylet axis.

Procorpus of esophagus cylindroid. Metacorpal bulb round-oval, 11.4 /um long and 9.5 /um wide, with a clearly sclerotized bulbar cavity [=valve].

The nerve ring is, at a distance [equal to] the length of the metacorpal bulb from the metacorpal bulb. Excretory pore situated somewhat in front of the nerve ring. Esophageal glands reach 50.4 /um in length. Testis oligopropagatory. Germinal zone arranged in a single row of spermatocytes with large nuclei. Distance testis to metacorpal bulb equal to 3.4 body diameters [as measured] in the area of the beginning of the testis.

Spicules slender, typically aphelenchoid, and reaching 15.08 /um in length (see Figure i).

Tail gradually tapering, with a sharp mucro slightly bent ventrally. In fixed individuals, the tail is bent ventrally. Three pairs of postanal papillae present (see Figure i).

Lateral field with four lines.

The nematodes (females and males) were observed in the root system, the stalks and the leaves of winter rye (Secale cereale L.) on the experimental fields of the K. A. Timiryazev Agricultural Academy, and in the root system, stalks, and leaves of winter wheat (Triticum vulgare Vill.) on the experimental fields of the Scientific Grain Farming Research Institute of the nonblack earth zone (Nemchinovka Station of the Moscow region).

The holotype, allotype, and paratypes are kept with the authors and in the collection of the Helminthological Laboratory of the USSR Academy of Sciences.

Differential diagnosis: According to the morphological characters, Aphelenchoides graminis sp. n. is closest to the following species: (1) Aphelenchoides subtenuis (Cobb, 1926) Steiner & Buhrer, 1932; (2) A. composticola Franklin, 1957; (3) A. saprophilus Franklin, 1957; (4) A. trivialis Franklin & Siddiqi, 1963; (5) A. sacchari Hooper, 1958.

Their differences are examined in an identification key:

IDENTIFICATION KEY OF SIX SPECIES OF THE GENUS APHELENCHOIDES FISCHER, 1894

1(a). Cuticle finly annulated. Annule width about 0.6 /um. Mucro more or less displaced ventrally 2

(b). Cuticle coarsely annulated. Annule width 0.7 - 1.0 /um. Mucro arranged in the usual manner 3

2(a). There is a spermatheca; spermatozoids compactly arranged in a kind of row of longitudinal cells (6 - 8). Lateral fields with four lines . . . . . Aphelenchoides graminis sp. n.

(b). A spermatheca is lacking. Lateral field with four lines . . . . . Aphelenchoides subtenuis

3(a). Lateral field with four lines . . . . Aphelenchoides saprophilus

(b). Lateral field with three lines 4

4(a). There is a spermatheca; spermatozoids compactly arranged in a kind of row of longitudinal cells (14) . . Aphelenchoides composticola

(b). Spermatheca lacking 5

5(a). Posterior uterus short, shorter than vulva body diameter . . . . . Aphelenchoides trivialis

(b). Posterior uterus long, almost 3.5 vulva body diameters long . . . . . Aphelenchoides sacchari

LITERATURE

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APHELENCHOIDES GRAMINIS A NEW SPECIES (NEMATODA, APHELENCHOIDIDAE)

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Summary

Aphelenchoides graminis sp. n. has been recorded from the cereal crops (winter rye and winter wheat) in the Moscow district.

The new species differs in having very fine cuticle, thin stylet measuring about 10,80—12,76 μ in females and 10,44—10,80 μ in males with slightly developed basal knobs, short ovary, spermatheca and long posterior uterine branch equal to 3,8 body diameter in the vulval region and lateral field with four incisures. Female tail short, conical with a blunt end having a fine mucro which is situated slightly ventrally. Male tail ventrally curved bearing three pairs of papillae. Spicules measure about 15,08—19,20 μ in length. The species under description is closely related by its morphological characteristics to Aphelenchoides subtenius (Cobb, 1926) Steiner et Buhrer, 1932, Aphelenchoides saprophilus Franklin, 1957, Aphelenchoides composticola Franklin, 1957, Aphelenchoides trivialis Franklin et Siddiqi, 1963, and Aphelenchoides sacchari Hooper, 1958. An identification key for the above mentioned species is provided.