Redescription of some species of the genus *Filenchus* Andrássy, 1954 (Nematoda, Tylenchidae)

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Redescription of some species of the genus Filenchus *Andrássy, 1954 (Nematoda, Tylenchidae).*– Examination of several species of *Filenchus* showed continuous sequences of morphometric data leading to extensive synonymization: *F. pseudoorbus* with *F. andrassyi; F. cylindricollis* and *F. plattensis* with *F. butteus; F. ditissimus, F. clarki, F. microdorus, F. magnus, F. zaphari, F. sheri, F. annulatus, F. crassus, F. parvissimus, F. neominimus* and *F. amaritus* with *F. misellus; F. aquilonius* with *F. orbus; F. cerealis* with *F. sandneri; F. cylindricus, F. cylindricaudatus, F. hageneri, F. japonicus*, and *F. filipjevi* with *F. thornei;* and *F. mirus, F. cynodontus, F. ruatus, F. angusticephalus, Basiroides paraobliquus, F. conicephalus and F. brevis* with *F. vulgaris.*

Key words: *Filenchus*, Tylenchidae, Tylenchina, Taxonomy, Description.

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Introduction

The genus *Filenchus* was defined and reviewed by Raski & Geraert (1987). Since, some new species have been described. However, the limits of variability of most species remains unknown.

The aim of this paper was to revise various species of *Filenchus* and to study their variability and limits.

Material and methods

The majority of nematodes were observed mounted in glycerine on permanent slides. Killing, fixation and processing varied and is unknown for most specimens.

Data are presented for females, as males do not usually show additional diagnostic features. Measurements were taken with an ocular micrometer at magnification

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1000x. All measurements are given in µm.

The measurements studied are: body length (L), stylet length (st), distance from anterior body end to excretory pore (ep), length of pharynx (phar), length of tail (tail), distance from anterior body end to anus (L'), ratio of body length to body width at spermatheca level (a), ratio of body length to pharynx length (b), distance from anterior body end to centre of valve plates in median bulb expressed as percentage of pharynx length (MB), ratio of body length to tail length (c), ratio of tail length to anal/cloacal width (c'), ratio of tail length to distance between vulva and anus (T/VA), distance from anterior end to vulva expressed as percentage of L' (V').

Descriptions

Filenchus acutus (Siddiqi, 1979) Raski & Geraert, 1987 (fig. 1 A-D)

Mean of means ± SD [range of means] (range of extremes) of two populations examined, including data of Siddiqi (1979): L = 483±50.1 [447-540] (401-660), st = 6.5 [6.5] (6-7), ep = 74±4.9 [71-80] (65-85), phar = 108±4.4 [105-113] (94-125), tail = 88±10.8 [80-100] (73-122), L' = 373±5.7 [369-377] (329-408), a = 37.5±3.6 [34.9-41.7] (27-46), b = 4.5±0.3 [4.2-4.8] (4.0-5.3), MB = 41.0±1.5 [39.9-42.7] (37-45), c = 5.6±0.06 [5.5-5.6] (5.0-6.2), c' = 10.1±1.6 [9.2-12.0] (8.0-14.6), T/VA = 1.2±0.1 [1.1-1.3] (1.0-1.4), V = 67.0±1.4 [65.4-67.8] (65-71), V' = 82.4±0.4 [82.1-82.7] (81-85).

Relaxed body straight. Annulation distinct, annuli rounded, 0.8-1.0 µm wide, striae deep. Subcuticular annulation similar to the outer annulation. Lateral field a protruding ridge with refractive border lines, in most females examined a third central line visible at reproductive system level. Lateral field expands laterally at excretory pore level to include deirid. Head rounded, often slightly narrower than adjacent body. Head annulation described by Siddiqi (1979), but not detected in present nematodes. Head diameter 4-5 µm. Stylet very delicate, cone short, knobs rounded. Median bulb fusiform, apparently devoid of valve plates. Thin isthmus gradually expands into elongated basal bulb. Spermatheca offset, unilobed, uterine sac short, refractive, vagina anteriorly directed, postvulval sac absent, although in some females uterine sac may expands slightly beyond vulva level. Tail elongated conical, never filamentous, ends with a sharply pointed terminus. Male spicules 12-13 µm, gubernaculum about 2 µm long. Bursa narrow.

The examined specimens are shorter than those described by Siddiqi (1979), but otherwise fit the original description very well (L = 0.48-0.66 mm in types). The central line in the lateral field has not been mentioned.

Two populations of *F. acutus* were collected in a deciduous litter of the Białowieża primeval forest, Poland. The species was previously reported from Nigeria only.

Filenchus andrassyi (Szczygieł, 1969) Andrássy, 1979 (fig. 2 A-C)
F. pseudoorbus Mukhina, 1981, n. syn.

Mean of means ± SD [range of means] (range of extremes) of five populations examined, including data of Szczygieł (1969): L = 805±25.9 [768-835] (624-930), st = 8±0.7 [7.4-9.0] (7-10), ep = 107±9.3 [99-122] (84-128), phar = 131±10.4 [122-149] (100-169), tail = 121±3.5 [116-126] (95-150), a = 31.8±2.9 [28.0-34.6] (24-37), b = 6.2±0.4 [5.4-6.5] (5.1-6.9), MB = 39.1±0.6 [38.5-40.1] (36-44), c = 6.6±0.2 [6.4-6.9] (5.0-7.6), c' = 7.8±0.6 [6.7-8.4] (5.9-9.4), T/VA = 0.86±.05 [0.8-0.9] (0.7-1.2), V = 67.7±1.1 [66.2-69.3] (63-71), V' = 79.7±1.1 [78.1-81.0] (77-83).

Relaxed nematodes arcuate ventrad to straight. Lateral field with four lines. Cuticle about 1.5-2 µm thick, annulation distinct, annuli 1.2-1.5 µm wide. Head continuous, trapezoid, 6-8 µm wide at base. Stylet thin, conus about one-third of stylet length, knobs very small. Median bulb more or less elongated, with small convex thickenings. Isthmus gradually expands into short basal bulb. Spermatheca an offset pouch filled with sperm of 2-3 µm in diameter, vagina perpendicular to body, about half of body width long, postvulval sac up to a body width long. Tail ends with a sharp terminus, short filamentous ending occasionally observed. Male spicules about 17-20 µm long, manubrium indistinctly separated.

The description of *F. pseudoorbus* differentiates this species from *F. andrassyi* in the index a, thickness of cuticle and spicule length (a = 46-47, cuticle about 0.5 µm, spicules 12-13 µm). However, the drawings show thicker cuticle and spicule about 40 µm. The text mentions postvulval uterine sac 36 µm long, which is 'about vulval body width' (Mukhina, 1981). Thus, dividing the length of body by postvulval sac length (840-940: 36) gives the index a = 23-26. Despite these discrepancies, taking into account the overall similarities (st = 7-8, c = 5.7-7.8, V = 66-70), *F. pseudoorbus* is considered conspecific with *F. andrassyi*.

This species is seldom. The Polish specimens examined correspond well to the original description of Szczygieł (1969).

Filenchus baloghi (Andrássy, 1958) Siddiqi, 1986 (fig. 1 E-G)

Mean of means ± SD [range of means] (range of extremes) from eight populations examined, including data of Andrássy (1958), Wasilewska (1965b), Szczygieł (1974) and Torres & Geraert (1996): L = 472±48.1 [426-548] (345-588), st = 7.4±0.9 [6.7-8.5] (6.5-10), ep = (59-79), phar = 86.8±6.4 [81-95] (77-98), tail = 69.7±6.4 [61-76] (49-81), L' = (294-423), a = 34.6±2.1 [32.8-37.8] (29-49), b = 5.4±0.5 [5.1-6.2] (4.6-6.6), MB = 43.1±1.2 [41.5-44.4] (40-48), c = 6.1±1.0 [4.6-7.2] (4.2-8.3), c' = 8.6±0.8 [7.6-9.5] (5.4-13), T/VA = 0.8±0.07 [0.7-0.9] (0.6-0.9), V = 63.4±1.3 [61.5-64.7] (55.5-66), V' = 75.7±1.3 [74.4-77.3] (72-78).

Body straight, slightly arcuate or bent ventrad at vulva or cloaca. Annulation very prominent, annulus width 1.5-1.9 µm. Lateral field composed of two ridges, in lateral view appearing as three lines. Head low, anteriorly flattened, 5-6 µm wide at base. Stylet thin, knobs elongated obliquely posteriad. Median bulb elongated fusiform, plates very small. Glandular bulb short. Spermatheca bilobed, offset pouches on both sides of genital tract. Epiptygma shown on SEM micrograph of Torres & Geraert (1996), but not seen under light microscope. Postvulval sac shorter than body width. Tail usually rounded at tip, although in single population examined all females with pointed terminus.

This is one of the easiest species to recognize because of its prominent annulation, small body size, structure of lateral field, short stylet and unique bilobed spermatheca.

F. baloghi was examined from several localities in Poland. It occurs in sandy or organic, well aerated soils. Density is generally low.

Filenchus butteus (Thorne & Malek, 1968) Raski & Geraert, 1987 (fig. 3)
F. cylindricollis (Thorne & Malek, 1968), n. syn.
F. plattensis (Thorne & Malek, 1968), n. syn.

Paratype females of *Tylenchus butteus*, Rugby, ND (n = 3): L = 480 (460-503), st = 9.8 (9.5-10), ep = 81.3 (80-84), phar = 97 (94-99), tail = 70.3 (70-71), L' = 409 (390-432), a = 29.3 (24-35), b = 5.0 (4.7-5.1), MB = 37.8 (36.5-38.5), c = 6.8 (6.6-7.1), c' = 7.2 (6.8-7.6), T/VA = 0.8-0.9, V = 67.9 (67-68), V' = 79.6 (79-80).

Paratype females of *Tylenchus plattensis* (n = 2): L = 507, 575, stylet invisible, phar = 99, 103, tail = 69, 79, L' = 438, 476, a = 33, 41, b = 5.1, 5.4, MB = 37, 38, c = 7.0, 7.3, c' = 7.4, 9.1, T/VA = 0.9, 1.0, V = 69, 73, V' = 81, 84.

Paratype females of *Tylenchus cylindricollis* from Medicine Butte (n = 2): L = 423, 528, st = 9, phar = 82, 102, tail = 64, 77, L' = 359, 451, a = 32,39, b = 5.1, 5.1, MB = 38, 41, c = 6.6, 6.8, c' = 6.2, 7.5, T/VA = 0.9, V = 68, 70, V' = 81, 82.

Paratype females of *Tylenchus cylindricollis* from Montana Rt. 12 (n = 2): L = 459, 545, st = 9, 10, phar = 85, 97, tail = 58, 84, L' = 402, 460, a = 34, 35, b = 4.7, 6.4, MB = 36, 41, c = 6.5, 8.0, c' = 5.6, 8.2, T/VA = 0.7, 0.9, V = 67, 69, V' = 78, 80.

Body curved ventrad. Cuticle thin, annulus width 0.8-1.4 µm. Lateral field with four incisures. Head anteriorly broad and flattened, 6-7µm wide. Stylet delicate, knobs small, rounded to slightly sloping backward. Stylet in *F. plattensis* paratypes could not be seen. Median bulb oval, valve plates small and not distinct, isthmus expands into rather elongated basal bulb. Tail thick, straight, rounded at the tip.

The paratypes examined are flattened, cuticle is distended, many details not visible, cephalic framework is often divided into 'finger-like sclerotized structures' as termed by Wu (1968). The measurements,

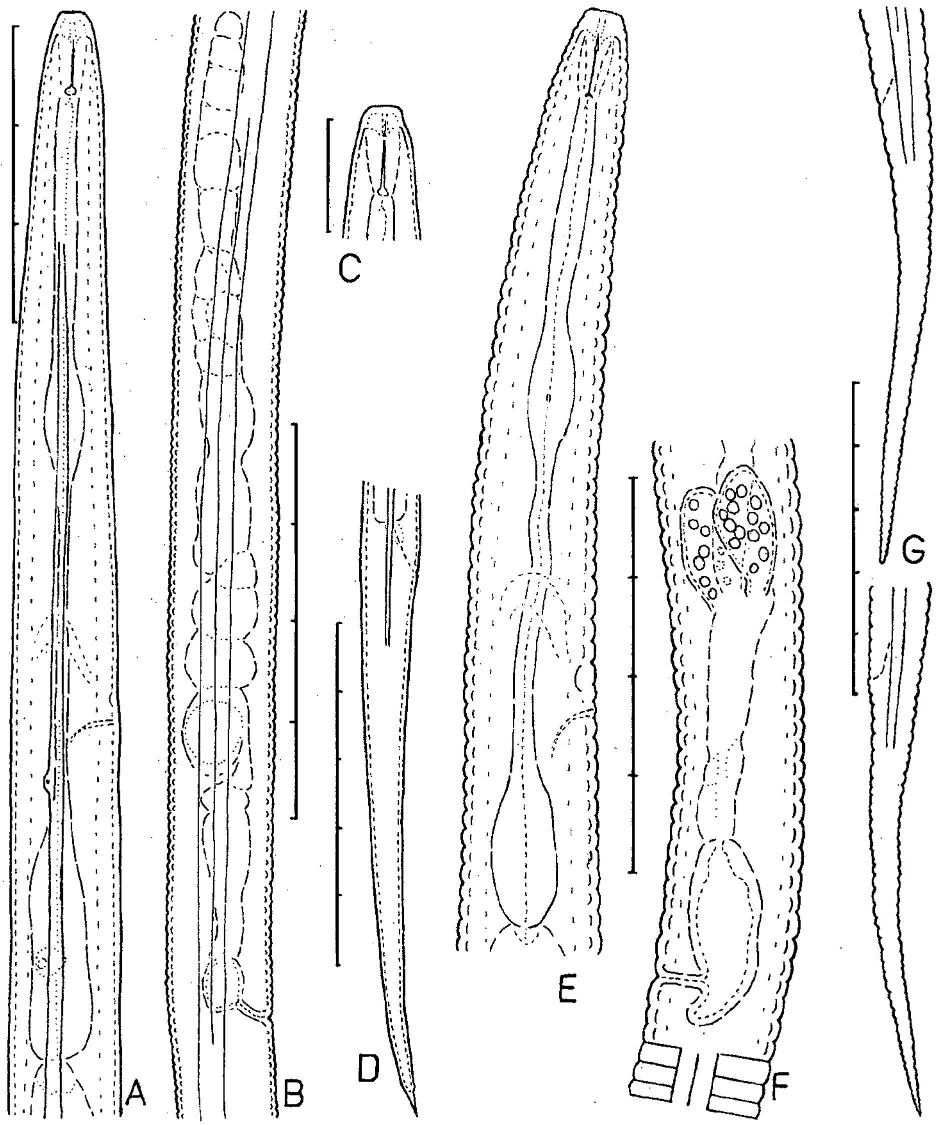


Fig. 1. A-D. *Filenchus acutus*: A. Pharyngeal region; B . Part of female body showing genital tract and lateral field; C. Head; D. Tail. E-G. *Filenchus baloghi*: E. Pharyngeal region; F. Part of female genital tract; G. Tail. (Smallest unit of scale bar = 10 µm.)

A-D. Filenchus acutus: *A. Región faríngea; B. Parte del cuerpo femenino mostrando conducto genital y zona lateral; C. Cabeza; D. Cola. E-G.* Filenchus baloghi: *E. Región faríngea; F. Parte del tracto genital masculino; G. Cola. (Unidad más pequeña de medida = 10 µm.)*

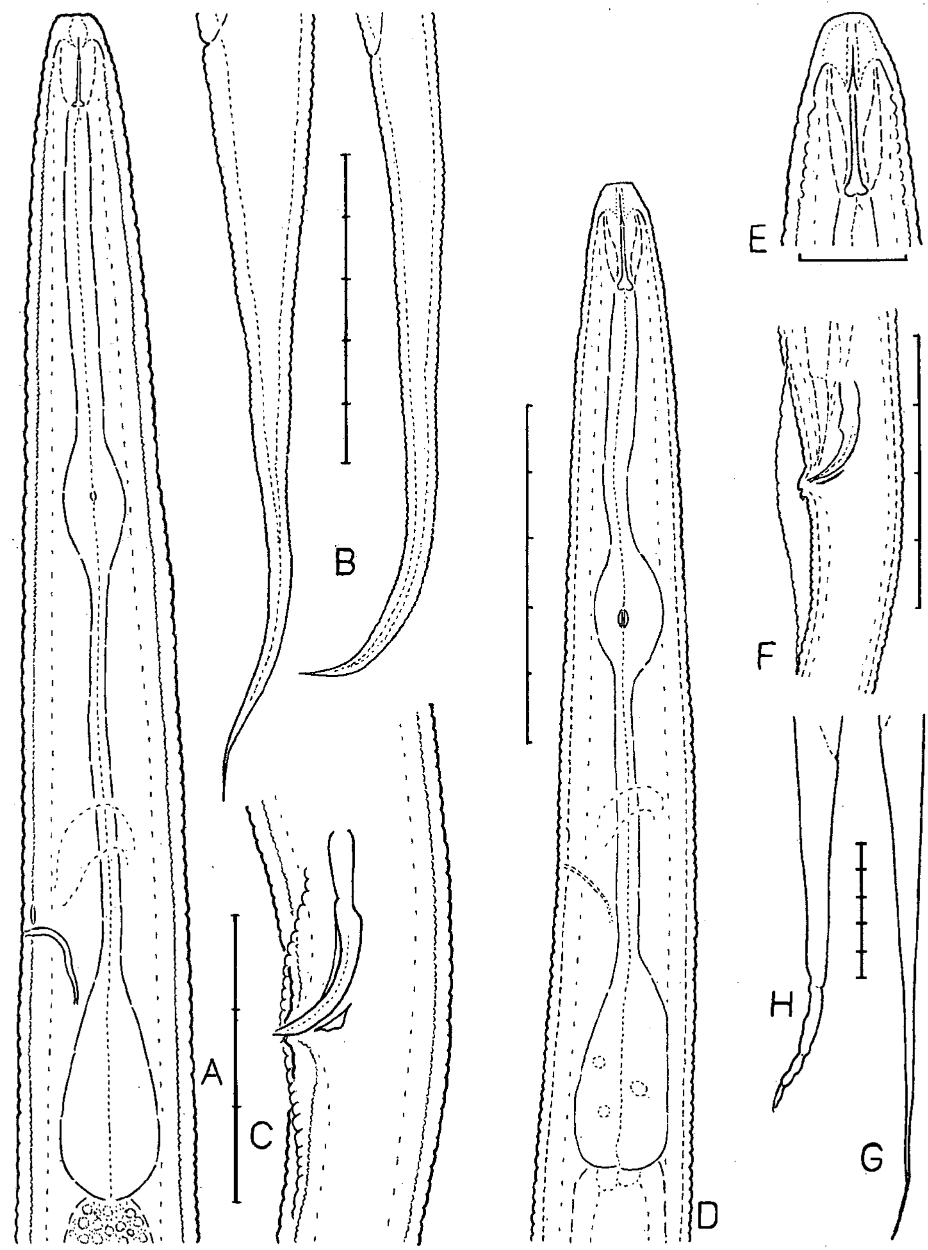


Fig. 2. A-C. *Filenchus andrassyi:* A. Pharyngeal region; B. Tail; C. Cloacal region. D-H. *Filenchus hazensis:* D. Pharyngeal region; E. Head; F. Cloacal region; G. Tail; H. Tail broken and then healed. (Smallest unit of scale bar = 10 µm.)

A-C. Filenchus andrassyi*: A. Región faríngea; B. Cola; C. Región cloacal. D-H.* Filenchus hazensis: *D. Región faríngea; E. Cabeza; F. Región cloacal; G. Cola; H. Cola rota y posteriormente sanada. (Unidad más pequeña de medida = 10 µm.)*

text and drawings in the descriptions do not always agree.

Description of *T. butteus* gives stylet length 12 µm but it was found 9-10 µm, V was given 64 and calculations from measurements indicate vulva-anus distance 69 µm, tail length 111 µm and T/VA = 1.6. The text states 'vulva-anus distance slightly less than tail length', measurements of fig. 2F of THORNE & MALEK (1968) show vulva to anus distance about 83 µm and tail length about 89 µm, calculated T/VA is 1.07. Thus the drawing agrees with the written text and observations of paratypes but not with the measurements in the description.

Description of *T. cylindricollis* says 'striae about 2.5 µm apart', but it was measured about 1-1.3 µm. It is not known if the holotype had mean annulus width 2.5 µm, or is this an error. However, as slides in this collection do not bear indications of the status ('holotype' or 'paratype' is not written on the labels), it is preferable to accept what has actually been seen as proper values for this species.

Neither descriptions nor observations of specimens show differences that would justify differentiation of species. Consequently these species are synonymized. *F. butteus* has page priority.

F. butteus is similar to *F. sandneri* but vulva in *F. butteus* is slightly more anterior (both V and V') and the tail is straight as opposed to always ventrally curved of *F. sandneri*.

Filenchus crassacuticulus (Wu, 1968) Siddiqi, 1986

Paratype females (n = 2): L = 1078, 1070, st = ?, 9, phar = 164, 161, tail = 137, 141, L' = 941, 929, a = 39, 37, b = 6.6, 6.7, MB = 43, c = 7.9, 7.6, c' = 8.3, T/VA = 0.8, V = 71, V' = 81, 82.

The species was described on the basis of two females and two males. Type specimens mounted on one slide were examined. There are three females (one with broken end of tail) and one male. The measurements of WU (1968) are close to those taken, except for stylet length and index a. The stylet was described as 'about 14 µm long' but 'faintly shown' (WU, 1968). Indeed, the basal portion of stylets is not clear and stylet could be measure in one paratype female only. The difference in index a perhaps resulted from measuring the body width together with the swollen cuticle by Wu, while the swollen cuticle is excluded here. Otherwise, the description correctly reports morphology of the species.

F. crassacuticulus is similar to *F. vulgaris*. The main differences are in body length and V', both are just outside the limit known for other species of *F. vulgaris* group. Until more collections are studied, it is preferable to leave the two species separate.

Only the two paratype females were examined.

Filenchus discrepans (Andrássy, 1954) Raski & Geraert, 1986

*F. helenae (*Szczygieł, 1969), n. syn.

F. longicaudatulus Zell, 1988, n. syn.

Mean of means ± SD [range of means] (range of extremes) of 11 populations examined, including data of ANDRÁSSY (1954, 1958), SZCZYGIEŁ (1969), BRZESKI (1982), MIZUKUBO & MINAGAWA (1986), ZELL (1988) and MIZUKUBO (1993): L = 428±64.3 [342-562] (314-597), st = 6.6±0.4 [6.0-7.2] (6-8), ep = 58.8±7.7 [48.8-72.7] (42-80), phar = 79.8±8.7 [68-94] (59-99), tail = 121±16.3 [96-154] (77-176), L' = 312±59.2 [246-409] (219-439), a = 35.7±4.5 [30.0-45.1] (25-48), b = 5.4±0.4 [4.9-6.3] (4.4-7.4), MB = 40.0±1.7 [37.4-43.1] (35-46), c = 3.6±0.4 [3.0-4.6] (2.6-5.3), c' = 15.7±2.2 [13.1-19.1] (9.0-26.9), T/VA = 2.1±0.3 [1.5-2.8] (1.5-3.1), V = 58.1±2.3 [54.6-64.0] (49-65), V' = 80.9±0.8 [79.4-82.2] (77-84).

This species has been well described and illustrated by ANDRÁSSY (1954), SZCZYGIEŁ (1969), BRZESKI (1982), MIZUKUBO & MINAGAWA (1986), ZELL (1988) and MIZUKUBO (1993), and only summarized measurements are presented herein.

F. helenae is synonymized with *F. discrepans*, as already suggested by MIZUKUBO (1993). GERAERT (1991) mentioned presence of males and position of vulva as differentiating characters, and this was discussed by MIZUKUBO (1993). The differences in V are within limits of variation observed for other species of the genus. Presence or absence of males and sperm in spermatheca is not accepted as a specific character, unless it is proved that the genes do not flow between populations or until other constant differences are demonstrated.

ZELL (1988) mentioned the cuticular annulation, the head diameter and T/VA as the differences between *F. longicaudatulus* and *F. discrepans*. The annuli of both species are very small, head diameter of *F. discrepans* is 3.5-5.5 μm (MIZUKUBO, 1993), while in *F. longicaudatulus* it is 3.5-4.5 μm (ZELL, 1988), T/VA is 1.6-2.6 in Japanese nematodes, 1.6-3.1 in Polish specimens, and it is not significantly different from 2.8-3.7 (ZELL, 1988). The lengths of filiform tails are very variable as the posterior part may be invisibly broken off not influencing nematode activities. Consequently both species are synonymised.

F. ranunculaceus (Sumenkova, 1987) is differentiated from *F. helenae* (= *F. discrepans*) by 'vagina length about half of vulval body width, thick walled, thickness 3.2-5.2 μm' (SUMENKOVA, 1987). The drawings show the most internal part of vaginal walls strongly thickened. This is an unusual character, but if observed in all 19 females studied it supports Sumenkova's conclusion about the two species being different. Another difference may be the stylet length 8-9 μm, which is beyond the limits for *F. discrepans*.

F. discrepans has been examined from many populations from Poland, as well as from Germany, Switzerland, Russia (Karelia), Mexico and USA (Utah).

Filenchus hamatus (Thorne & Malek, 1968) Raski & Geraert, 1987 (fig. 4)

Paratype females of *T. hamatus* (n = 3): L = 574 (544-609), st = 8 (n = 1), ep = 80 (n = 1), phar = 107 (103-113), tail = 84 (78-90), a = 31 (30-32), b = 5.4 (5.0-5.9), MB = 41.7 (40-44), c = 6.6 (6.0-6.9), c' = 7.2 (6.7-7.6), T/VA = 0.8 -0.9, V = 67.7 (67-69), V' = 79 (78-80).

Mean ± SD of means [range of means] (range of extremes) of two populations and paratypes examined: L = 477±91.5 [392-574] (365-609), st = 8.0 +0.9 [7-8.9] (7-10), ep = 70±12.4 [56-74] (52-81), phar = 90±18.0 [71-107] (69-113), tail = 76±9.1 [66-84] (57-90), L' = 402±82.7 [326-490] (303-519), a = 28.3±3.4 [24.5-31.0] (22-34), b = 5.3±0.2 [5.1-5.5] (4.7-6.0), MB = 44.3±2.2 [41.7-45.8] (40-48), c = 6.2±0.3 [6.0-6.6] (5.3-6.9), c' = 7.3±0.2 [7.2-7.5] (6.1-8.4), T/VA = 0.9±0.1 [0.85-1.0] (0.8-1.3), V = 66.7±1.0 [65.6-67.7] (64-69), V' = 79.3±1.0 [78.5-80.4] (77-82).

The paratypes of *T. hamatus* are flattened, the cuticle is distended, many details not visible, cephalic framework is divided into 'finger-like sclerotized structures' as termed by WU (1968). Calculations from the measurements (THORNE & MALEK, 1968) gives V' about 80, and T/VA about 0.7. The text says 'vulva-anus distance 2.5 times tail length'. Therefore, the following description is based on new collections.

Body of relaxed nematodes straight to slightly arcuate, except for the postvulval part which is arcuate ventrad in all examined specimens. Lateral field with four lines. Annulation fine, annulus width about 0.8-1.2 μm. Subcuticular annulation similar to the cuticular. Cephalic region trapezoid, about 4-5 μm wide at base, lateral slits of amphidial openings not visible. Stylet delicate, cone about one-third of stylet length, knobs small directed obliquely posterior. Dorsal pharyngeal gland orifice about 1-2 μm posterior to knobs. Median bulb oval, plates very small. Vagina about half of body width long. Spermatheca short, details not clearly seen. Sperm in spermatheca about 1 μm in diameter. Body narrows posterior to vulva. Anus small and indistinct, tail bent ventrad, narrows to rounded terminus. Sometimes tail end hooked either ventrally or laterally. Male not found.

F. hamatus is most similar to *F. sandneri*, the differences are in broader head and thicker tail of the latter.

Three paratype females and collections from Pfadiheim, Switzerland, Krzymów, Poland, were examined.

Filenchus hazenensis (Wu, 1969) Siddiqi, 1986 (fig. 2 D-H)
Dactylotylenchus filiformis Wu, 1968

Holotype female of *Dactylotylenchus filiformis*: L = 1095, st = 14, phar = 156, tail = 231, a = 40.9 when distended cuticle is taken into account and 44.3 when body without the cuticle is measured, b = 7.0, MB = 39.7,

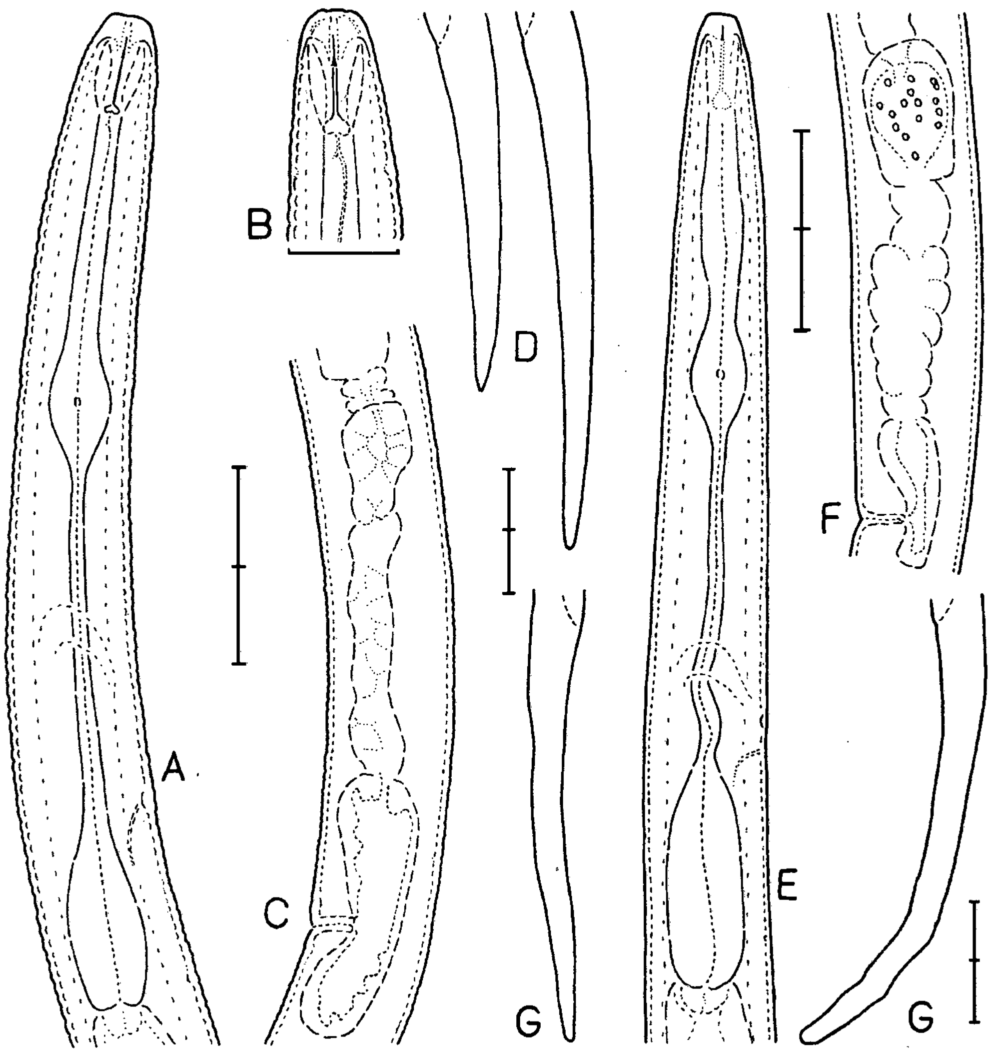


Fig. 3. A-D. Paratypes of *Tylenchus butteus:* A. Pharyngeal region; B. Head; C. Part of female reproductive system; D. Tail. E-G. Paratypes of *Tylenchus plattensis*: E. Pharyngeal region; F. Part of female reproductive system; G. Tail. (Smallest unit of scale bar = 10 µm.)

A-D. Paratipos de Tylenchus butteus: *A. Región faríngea; B. Cabeza; C. Parte del sistema reproductor femenino; D. Cola. E-G. Paratipos de* Tylenchus plattensis: *E. Región faríngea; F. Parte del sistema reproductor femenino; G. Cola. (Unidad más pequeña de medida = 10 µm.)*

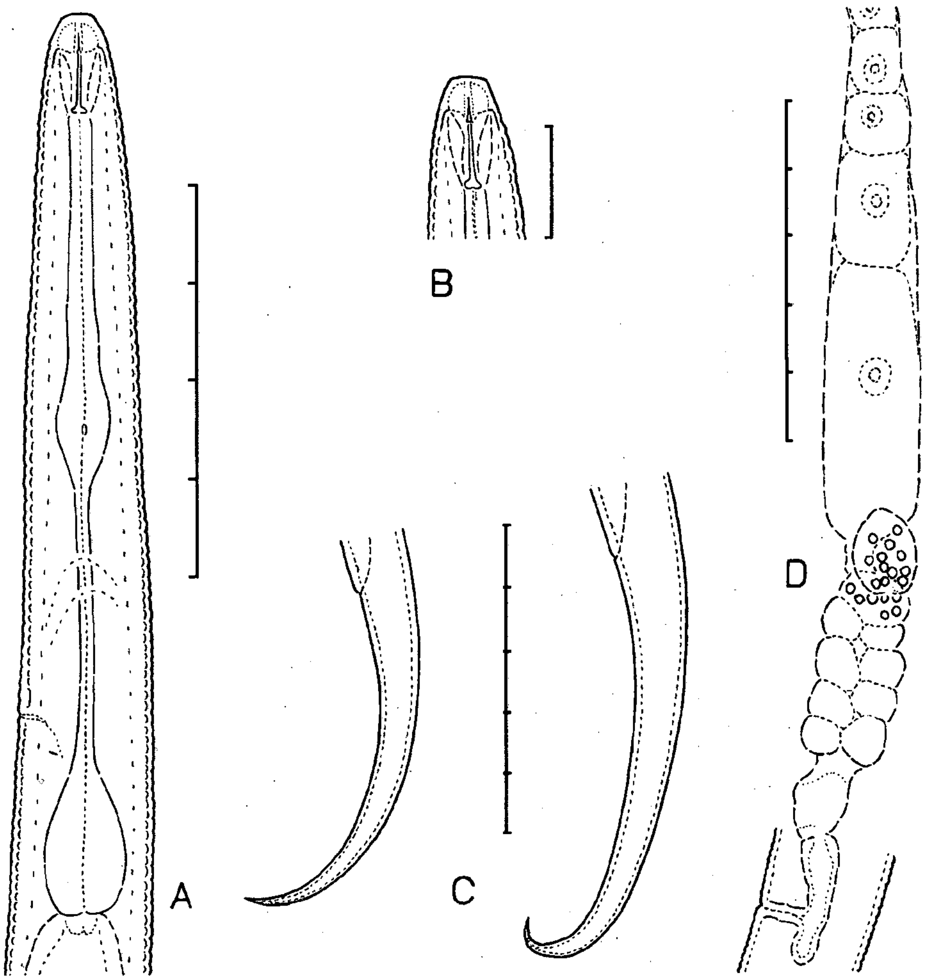


Fig. 4. *Filenchus hamatus*: A. Pharyngeal region; B. Head; C. Tail; D. Part of female reproductive system. (Smallest unit of scale bar = 10 µm.)

Filenchus hamatus: *A. Región faríngea; B. Cabeza; C. Cola; D. Parte del sistema reproductor femenino. (Unidad más pequeña de medida = 10 µm.)*

c = 4.7, c' = 14.0 with and 20.4 without outer cuticle, T/VA = 1.1, V = 60, V' = 76.

Paratypes of *Dactylotylenchus filiformis* (n = 2): L = 1064, 1066, st = 14, phar = 149, 164, tail = 239, 241, a = 43, 37 with or 41 without outer cuticle, b = 7.1, 6.5, MB = 42, 40, c = 4.6, 4.4, c' = 15.5, 13.8 with or 18.0 without outer cuticle, T/VA = 1.3, 1.25, V = 60.5, 59, V' = 78, 77.

Poland, Bolimowski Landscape Park, wet sandy soil in young pine stand (n = 5): L = 930±59.3 (877-1003), st = 14.5±0.4 (14-15), ep = 109±5.2 (102-116), phar = 143±6.9 (134-152), tail = 189±31.3 (138-219), L' = 741±38.4 (701-784), a = 36.2±2.6 (33-39), b = 6.5±0.5 (6.1-7.4), MB = 43.6±1.6 (42-45), c = 5.0±0.7 (4.6-6.3), c' = 11.5±1.9 (8.4-13.3), T/VA = 1.1±0.2 (0.8-1.2), V = 61.1±1.5 (57-60), V' = 76.7±0.7 (76-77.5).

Relaxed body straight. Lateral field with four incisures, but only two seen in some specimens. Cuticle about 1 µm thick, annuli 1.2-1.5 µm wide. Head trapezoid, continuous, 8-9 µm at base. Amphidial apertures appear to be in form of longitudinal slits on lateral sides of head as observed under light microscope. Stylet delicate, knobs about 2-2.5 µm in diameter. Median bulb ovoid, valve plates relatively large, convex, about 2 µm long. Excretory duct refractive, narrow. Spermatheca offset, filled with sperm of about 2-3 µm in diameter. Postvulval sac shorter than body width. Spicule 18 µm long in the only male found, manubrium not differentiated. Tail tapers evenly to needle-like terminus, in some specimens broken and the wound evidently healed.

Dactylotylenchus filiformis was synonymized with *F. hazenensis* by Raski & Geraert (1987). After inspection of the type specimens of the former their decision is cocurred with.

F. hazenensis belongs to *F. vulgaris* group and the stylet length differentiate this species from others. It appears most similar to *F. thornei,* but the stylet of *F. hazensis* is slightly longer and weaker and lumen thickenings in median bulb are more convex.

Filenchus misellus (Andrássy, 1958) Raski & Geraert, 1987

F. ditissimus (Brzeski, 1963), n. syn.

F. clarki (Egunjobi, 1968), n. syn.

F. microdorus (Chawla, Prasad, Khan & Nand, 1969), n. syn.

F. magnus (Husain & Khan, 1975), n. syn.

F. zaphari (Mavljanov, 1976), n. syn.

F. sheri (Khan & Khan, 1978), n. syn.

F. annulatus (Siddiqui & Khan, 1983),n. syn.

F. crassus (Siddiqui & Khan, 1983), n. syn.

F. parvissimus (Thorne & Malek, 1968), n. syn.

F. neominimus (Savkina, 1986), n. syn.

F. amaritus Zell, 1988, n. syn.

Mean of means ± SD [range of means] (range of extremes) of 22 populations examined, including data of Andrássy (1958), Brzeski (1963), Chawla et al. (1969), Szczygieł (1974), Husain & Khan (1975), Mavljanov (1976), Zeidan & Geraert (1991), and Torres & Geraert (1996): L = 320±53.7 [264-371] (238-500), st = 6.8±0.8 [6.0-7.5] (5-8), ep = 53.5±7.2 [47-61] (44-65), phar = 77.9±9.7 [72-89] (65-93), tail = 54.3±15.8 [36-66] (28-71), L' = 269±41.0 [228-310] (204-322), a = 28.6±3.7 [24.6-32] (19-49), b = 4.1±0.4 [3.7-4.5] (3.3-6.0), MB = 44.6±0.5 [44-45] (40-48.5), c = 6.1±1.2 [4.9-7.3] (4.2-9.6), c' = 7.5±2.4 [5.2-10.0] (3.9-11.0), T/VA = 1.2±0.2 [1.0-1.4] (0.7-1.6), V = 69.0±4.0 [65-73] (63-74.5), V' = 82.6±1.8 [81-84.4] (80-85.5).

Body straight or slightly arcuate ventrad. Annuli about 0.8-1.3 µm wide. Lateral field indistinct, four lines traced in some specimens while two lines seen in others. Head 4-5 µm wide at base (3 µm in the smallest nematodes), mostly trapezoid in outline, sometimes head very slightly narrower than adjacent body. Stylet thin, knobs rounded or obliquely elongated. Excretory pore opposite isthmus, excretory canal narrow. Hemizonion opposite basal bulb or junction of bulb and isthmus. Median bulb fusiform, muscular, with thickenings less than 1 µm long. Female reproductive system short, spermatheca offset, empty if males absent or filled with sperm, uterine sac very short, postvulval sac may extend for few µm posterior to vulva. Vaginal walls not thickened, vagina about 1/4 to 1/3 of body width long. Body narrows more or less evenly posterior to vulva. Anus inconspicuous. Male spicules 10-12 µm long, bursa small adcloacal. Tail conical, never filiform, tip sharply pointed to minutely rounded.

The synonymy of 13 species proposed herein is caused by the lack of differences and continuous sequences of all measurements. These species could be separated when only few populations were known, but now all measurements overlap considerably and no morphological species limits can be detected.

Some populations are without males, in some the ratio of females to males is high, while in others approximately the same number of specimens of both sexes can be found. It is not considered as a specific character because nothing is known on the possibility of the flow of genes or on the possible effect of environmental conditions on the appearance of males.

Number of lateral lines in these nematodes vary and two or four can be seen. This is also of no importance for species differentiation because of limited visibility, known variability, and stretchability of lateral fields leading to disappearance of central lines.

F. neonanus is very similar to *F. misellus* as defined above, and the only difference is visible under SEM. This is the shape of amphidial openings, which are laterally directed in *F. neonanus* and rounded, oval to ventrolaterally oriented slits in examined populations of *F. misellus*. The variability of amphidial openings within *F. misellus* remains unknown and this may not be a specific difference.

F. recisus Grewal, 1991 is differentiated from *F. misellus* by structure of lateral field only (GREWAL, 1991). In the former, two lines separate very narrow lateral field, while in the latter the lateral field has either two or four lines (light microscope observation) but is not as narrow.

Filenchus orbus Andrássy, 1954 (fig. 5)
F. aquilonius (Wu, 1969), n. syn.

Paratypes of *Tylenchus aquilonius* (n = 2): L = 701, 759; st = ?, 10; phar = 137, 145; tail = 99, 110; L' = 602, 649; a = 34; b = 5.1, 5.2; MB = 38, 40; c = 7.1, 6.9; c' = 6.4, 7.1; T/VA = 0.9, 0.8; V = 70, 68; V' = 82, 80.

Mean of means ± SD [range of means] (range of extremes) of seven populations examined, including data of ANDRÁSSY (1954), WU (1968) and SAKWE & GERAERT (1994): L = 641±52.3 [542-710] (488-950), st = 10.7±0.6 [9.7-11.4] (9-12), ep = 90.8±5.7 [84.6-101.6] (79-117), phar = 112±6.7 [103-124] (100-153), tail = 116±12.3 [103-124] (99-153), L' = 520±42.8 [442-578] (400-649), a = 30.4±2.5 [26.3-35.1] (23.5-38), b = 5.7±0.5 [5.1-6.9] (4.7-7.3), MB = 42.3±1.2 [39.9-44.0] (38-48), c = 5.7±0.2 [5.4-6.0] (4.0-7.4), c' = 8.9±0.6 [8.1-10.0] (6.3-11.9), T/VA = 1.0±0.05 [1.0-1.1] (0.8-1.3), V = 64.4±1.3 [62.0-66.4] (61-70), V' = 78.7±0.8 [77.5-79.9] (77-82).

Relaxed nematodes straight or slightly arcuate ventrad. Lateral field with four lines. Annulation in most specimens examined indistinct due to flattened annuli and shallow striae, sometimes, annulation more prominent and annuli rounded. Annulus width 1.3-2.0 [1.5] µm. Cephalic region not separated, rounded, 5.5-9 [7] µm wide. Stylet variable, from medium built to strong, knobs variable in size, mostly sloping obliquely, sometimes more rounded. Median bulb oval, thickenings of lumen walls distinct, isthmus thin, glandular bulb short in all nematodes examined. Spermatheca an axial chamber and offset pouch separated by narrowing. Sperm diameter 2-2.5 µm. Intrauterine egg 52-76 x 15-19 µm or 2.4-3.3 [2.7] of body widths long. Vagina perpendicular to body axis. Postvulval uterine sac usually shorter than body width. Tail tapers evenly, tip pointed or minutely rounded. Male spicules sickle shaped, manubrium only slightly differentiated, spicule length 16-19 [17.4] µm.

F. orbus and *F. aquilonius* were differentiated by the head diameter and stylet strongly built in the former while much weaker in the latter (RASKI & GERAERT, 1987). However, study of specimens from several populations from various geographical areas showed the difference in head structure is valid for some but not all populations. It is not always easy to classify the intermediate nematodes. The head of examined females is 7 µm wide at base, the average value given by RASKI & GERAERT (1987). Moreover, the narrowing separating the offset pouch of spermatheca and the short tail are the same regardless of head width. Other measurements are also similar. On the basis of these observations both species are synonymized.

F. orbus is most similar to *F. vulgaris* group, but is distinguished mainly because of the structure of spermatheca. The relatively short tail adds to the differentiation of this species, although the tail is variable in this group of nematodes.

The male described by WU (1969) was seen and found to be a species of *Aglenchus* and not *Filenchus*.

Two paratype females of *Tylenchus aquilonius* from Hanzen Lake area, Canada, and some populations from Poland, Sweden, the Netherlands and Russia (Karelia) were examined.

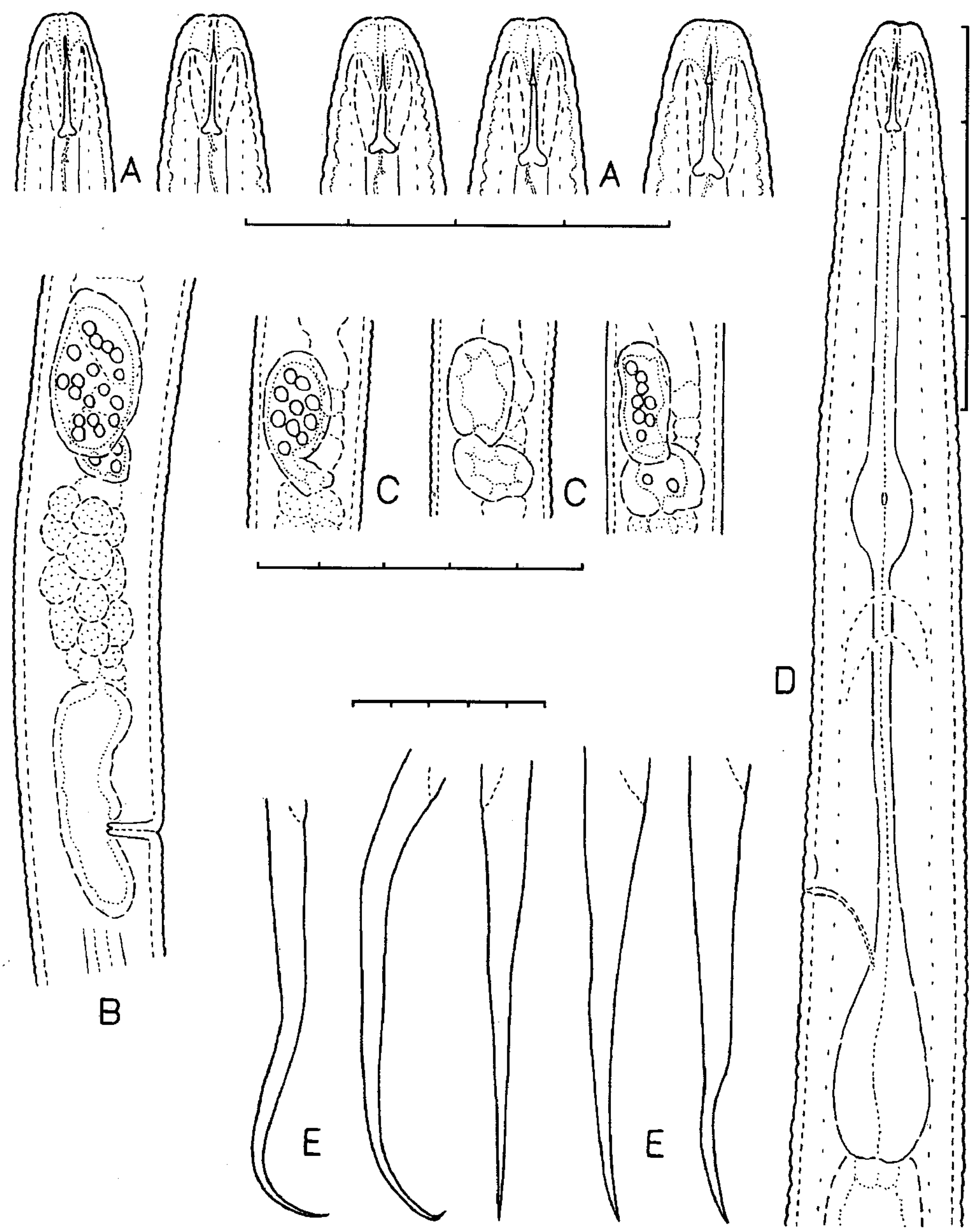


Fig. 5. *Filenchus orbus:* A. Variation of head; B. Part of female reproductive system; C. Variation of spermatheca; D. Pharyngeal region; E . Tail. (Smallest unit of scale bar = 10 µm.)

Filenchus orbus: *A. Variación de la cabeza; B. Parte del sistema reproductor femenino; C. Variación de la espermateca; D. Región faríngea; E . Cola. (Unidad más pequeña de medida = 10 µm.)*

Filenchus sandneri (Wasilewska, 1965) Raski & Geraert, 1987
F. cerealis (Kheiri, 1970), n. syn.

Mean of means ± SD [range of means] (range of extremes) of 10 populations examined, including data of WASILEWSKA (1965a), KHEIRI (1970) and RAHAMAN et al. (1994): L = 437±34.4 [381-472] (342-590), st = 7.9±0.5 [7.0-8.5] (7-11), ep = 66.3±4.5 [60.5-71.7] (57-82), phar = 89.2±6.5 [80.1-95.5] (76-106), tail = 45.6±10.7 [35.2-70.3] (27-77), L' = 388±28.1 [346-427] (308-513), a = 31.7±3.4 [26.3-35.8] (24-42), b = 4.9±0.4 [4.4-5.8] (4.0-6.2), MB = 39.7±0.8 [38.3-40.7] (34-45), c = 9.8±1.7 [7.5-12.2] (6.9-13.4), c' = 5.0±0.9 [3.8-6.6] (3.0-7.5), T/VA = 0.7±0.1 [0.6-1.0] (0.5-1.1), V = 74.7±1.1 [73.0-76.0] (72-78.5), V' = 83.6±0.4 [83.1-84.2] (82-85).

Body bent ventrad. Lateral field with four lines. Cuticular annulation fine, annulus width 0.7-1 µm. Subcuticular annulation similar to the cuticular. Head about 5-6 µm wide at base and 1.5-2.5 µm high, continuous with body contour, flattened anteriorly. Stylet delicate, knobs small. Median bulb ovate in outline, isthmus gradually expands into short glandular bulb. Vagina with thin walls, postvulval sac shorter than body width. Spicules 11-14 µm, bursa short adcloacal. Tail thick, always bent ventrad, tip rounded.

F. cerealis is synonymized with *F. sandneri* because the differences mentioned by KHEIRI (1970) were considered specific when no more populations were known. Now these differences are bridged by measurements of other populations, although stylet length needs discussion. The stylet of *F. sandneri* was described as 7.7-8.2 µm and for *T. cerealis* 8.5-10 µm, respectively. The stylet of all measured nematodes varied between 7-10 µm (one female 11 µm), often stylet lengths that fit both descriptions were found in one population, the ratio Max: Min being 1.57. This is similar to the variability found among other species. Thus, the stylet length is not different enough to separate species and both are considered conspecific.

The identity of *F. sandneri* and *F. butteus* is possible, but because of small differences in position of vulva and straight tail of examined paratypes of the latter these two are left separate.

F. sandneri has been examined from several locations in Poland, always from loamy or similar soils, and from Syria.

Filenchus thornei (Andrássy, 1954) Andrássy, 1963 (fig. 6)
F cylindricus (Thorne & Malek, 1968)
F cylindricaudus (Wu. 1969), n. syn.
F. hageneri (Elmiligy, 1971)
F. japonicus Mizukubo & Minagawa, 1986, n. syn.
F. filipjevi Andrássy, 1988, n. syn.

Paratype of *Tylenchus cylindricaudus* (n = 1): L = 859, st = 12, phar = 126, tail = 145, L' = 714, a = 42, b = 6.8, MB = 43, c = 5.9, c' = 11.8, T/VA = 0.9, V = 65, V' = 78.

Paratypes of *Tylenchus hageneri* (n = 2): L = 847, 932, st = 12, 11, phar = 139, 136, tail = 105, 167, L' = 742, 768, a = 37, 41, b = 6.1, 6.9, MB = 44, 41, c = 8.1, 5.6, c' = 7.3, 11.6, T/VA = 0.6, 0.9, V = 66, 63, V' = 75, 76 (the shorter female measured could have tail end broken off).

Paratypes of *Tylenchus cylindricus* (n = 4): L = 971±14.4 (966-992), st = 13.3±0.6 (13-14), phar = 148±2.0 (147-151), tail = 148±13.4 (132-164), L' = 822±22.0 (802-847), a = 35.7±2.5 (33-39), b = 6.5±0.1 (6.4-6.7), MB = 37.5±1.3 (36-39), c = 6.6±0.6 (5.9-7.3), c' = 9.9±1.7 (8.0-12.2), T/VA = 0.82±0.05 (0.8-0.9), V = 66.2±2.6 (64-70), V' = 78.2±2.1 (76-81).

Mean of means ± SD [range of means] (range of extremes) of eight populations examined, including data of ANDRÁSSY (1954, 1988), WU (1969), ELMILIGY (1971), MIZUKUBO & MINAGAWA (1986) and RASKI & GERAERT (1987): L = 955±111 [749-1162] (644-1530), st = 12.1±0.5 [11.2-13.0] (10-14), ep = 111.8±11.2 [90.8-126.3] (83-149), phar = 136.9±12.7 [118-158] (111-175), tail = 202±20.5 [172-236] (146-280), L' = 753±100.6 [575-925] (494-1250), a = 39.3±3.8 [31.6-45.9] (28-54), b = 6.9±0.5 [6.1-7.6] (5.3-8.8), MB = 42.0±1.3 [39.8-44.1] (37-49), c = 4.7±0.3 [4.3-5.2] (3.9-7.0), c' = 14.1±1.7 [11.2-16.2] (9.8-18.6), T/VA = 1.1±0.1 [1.0-1.3] (0.8-1.4), V = 59.4±1.4 [56.6-61.5] (55-67), V' = 75.6±1.7 [73.3-78.0] (70-79).

Relaxed body straight. Cuticular annuli 1.2-1.8 µm wide, flat, striae shallow, cuticle about 1-1.5 µm thick. Lateral field of young specimens with four equally spaced lines, but in mature ones the central band becomes wider and the inner lines less prominent. Eventually, in old females, the lateral field becomes indistinct and difficult to observe while the inner lines disappear as seen with the high magnification of the light microscope. Head annulation visible in most specimens. Head continuous with the body contour in shorter specimens, may be slightly narrower than the adjacent body in the longer samples. Diameter of head 7-9 µm, height about 4 µm. Stylet usually between 12-13 µm long, medium sized, knobs small. Posterior cephalids appear slightly more posterior than in related species. Median bulb elongated fusiform, posterior bulb small. Excretory duct with refractive walls and wide lumen. Spermatheca offset, sperm diameter 2-4 µm. Vagina perpendicular to body. Postvulval uterine sac spacious, usually shorter than body width. Tail end pointed or minutely rounded, sometimes short posterior part filamentous. Spicule sickle shaped, 19-28 µm long, manubrium well differentiated. Body narrows near cloaca, cloacal lips distinct, bursa small.

ANDRÁSSY (1954) described *F. thornei* as large species with stylet 10.5-14 µm. Later, SZCZYGIEŁ (1974) described another species which he considered *F. thornei*, and his specimens were examined by Andrássy who supported this identification. This was discussed by RASKI & GERAERT (1987), and their opinion is accepted herein as *F. thornei* representation and not subsequent identification. The population identified by RASKI & GERAERT (1987) as *F. thornei* from Colorado may be rather *F. vulgaris* because the stylet is only 9.6 (9-11) µm. This population is not included in the mean dimensions of *F. thornei* given above. Stylet of *F. vulgaris* is shorter than that of *F. thornei*, although the values slightly overlap.

RASKI & GERAERT (1987) already synonymized *F. cylindricus* and *F. hageneri*. Examination of paratypes of both species supported their conclusion. Comparison of paratypes of *F. cylindricaudus* and other populations identified as *F. thornei* did not show specific differences. The very detailed description of *F. filipjevi* is based on single male and single female (ANDRÁSSY, 1988). It differs only from examined *F. thornei* in body length: 1.53 mm for female and 1.32 mm for male. All other characters agree well with those observed in *F. thornei*. The holotype (female) of *F. filipjevi* is just 14% longer than the longest female examined, and it is not considered sufficient for species differentiation. In effect *F. filipjevi* is synonymized with *F. thornei*.

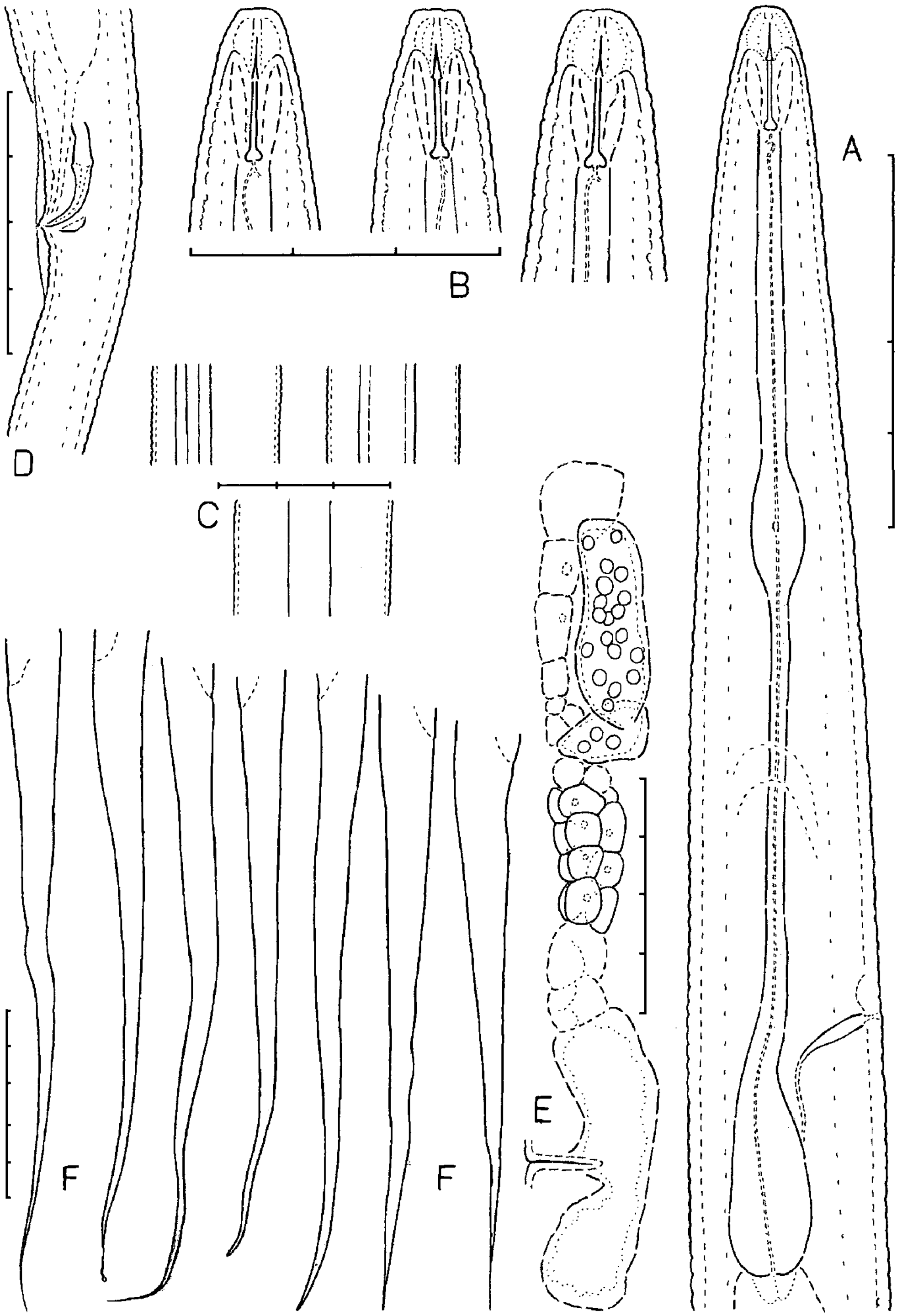
F. japonicus was described as differing from *F. vulgaris* only by number of lateral lines (two against four). However, Dr. Mizukubo kindly informed me in a letter that SEM micrographs of *F. japonicus* showed four lines. As all other characters, including stylet length, agree with the present redescription of *F. thornei*, both are considered conspecific.

F. thornei is most similar to *F. vulgaris* and the differences are mainly in wider head and broader stylet knobs of the former. The body and stylet of *F. thornei* are longer, but the actual values overlap. These differences are judged at a specific level, although difficulties may arise in identification of some females. In Poland *F. thornei* usually occurs in more humid soils than those where *F. vulgaris* is found, although in a few samples both species coexisted.

Paratypes of *F. cylindricus* (four females), *F. hageneri* (two females), *F. cylindricaudus* (female) and specimens from Poland and from Iowa (USA) were studied.

Fig. 6. *Filenchus thornei:* A. Pharyngeal region; B. Variation of head; C. Variation of lateral field as seen with light microscope; D. Cloacal region; E. Part of female reproductive system; F. Tail. (Smallest unit of scale bar = 10 µm.)

Filenchus thornei: *A. Región faríngea; B. Variación de la cabeza; C. Variación de la parte lateral tal como se ve con el microscopio óptico; D. Región cloacal; E. Parte del sistema reproductor femenino; F. Cola. (Unidad más pequeña de medida = 10 µm.)*


A
B
C
D
E
F
F

Filenchus vulgaris (Brzeski, 1963) Raski & Geraert, 1987 (fig. 7)
F. mirus (Husain & Khan, 1967), n. syn.
F. cynodontus (Husain & Khan, 1967), n. syn.
F. ruatus (Egunjobi, 1967), n. syn.
F. angusticephalus (Thorne & Malek, 1968), n. syn.
T. thornei sensu Szczygieł, 1974
Basiroides paraobliquus Kazachenko, 1975, n. syn.
T. thornei sensu Brzeski & Sauer, 1982
F. conicephalus Siddiqui & Khan, 1983
F. brevis Lal & Khan, 1987, n. syn.

Paratype female of *Tylenchus angusticephalus* (n = 1): L = 743, st = 10, phar = 103. tail =180, L' = 562, a = 45, b = 7.2, MB = 45, c = 4.1, c' = 17.5, T/VA = 1.2, V = 55, V' = 73.

Paratypes of *Tylenchus vulgaris* (n = 6): L = 752±49.3 (680-820), st = 10.4±0.4 (10-11), ep = 95.5±6.3 (89-106), phar = 122±5.2 (114-127), tail = 154±9.8 (140-164), L' = 599±44.4 (540-656), a = 39.6±2.6 (38-44), b = 6.2±0.4 (5.6-6.5), MB = 42.4±1.3 (41-43), c = 4.9±0.3 (4.6-5.4), c' = 13.9±1.3 (12.2-15.6), T/VA = 1.0±0.1 (0.9-1.1), V = 59.6±1.1 (58-61), V' = 75.0± 0.7 (74-76).

Mean of means ± SD [range of means] (range of extremes) of 34 populations examined: L = 655±95 [524-947] (467-981), st = 9.8±0.6 [8.7-11.6] (8-12), ep = 84.2±8.9 [70-104] (65-111), phar = 110±11.0 [95-138] (83-142), tail = 146±18.0 [118-197] (94-275), L' = 509±84.5 [388-750](358-790), a = 33.2±2.8 [26.8-39.6] (25-54), b = 6.0±0.4 [5.2-6.9] (4.5-7.5), MB = 42.9±1.3 [39.9-46.1] (38.5-49.5), c = 4.5±0.4 [3.7-5.0] (3.0-6.0), c' = 12.9±1.2 [11.1-16.8] (8.9-21.1), T/VA = 1.3±0.2 [1.0-1.8] (0.9-2.9), V = 59.4±1.5 [56.6-62.7] (50-65), V' = 77.0±0.9 [74.8-79.2] (66.5-83).

Body straight or arcuate ventrad. Lateral field 4-6 µm wide, with four lines, although sometimes only outer border lines visible. Cuticular annuli rounded in younger specimens, flattened and wider in older specimens, striae shallow. Annulus width 1.25 [1.1-1.3] (0.9-2.2). Amphidial openings as longitudinal slits on lateral sides of lip region. Cephalic region 5-9 µm wide and 2-4 µm high, mostly trapezoid in outline, sometimes more rounded. Stylet thin and delicate, cone less than 40% of total stylet length. Knobs variable in shape, small to medium sized, anterior surface sloping obliquely backward. Total stylet length varies 8-12 µm, but only nine of over 300 females measured have stylet 8 µm and only two females 12 µm respectively. Median bulb ovoid, isthmus gradually expands into short basal bulb. Excretory duct refractive and comparatively wide. Vulva a transverse slit about a quarter of body circumference. Vagina perpendicular to body axis, postvulval sac spacious, between 0.5-1 body width long. Spermatheca as central chamber with offset pouch. Length of pouch depends on the degree to which it is packed and stretched by sperm. Sperm inside spermatheca 2-3 µm in diameter. Intrauterine egg 61-68 µm or 2.4-3.0 [2.7] body widths long. Anus a distinct crescent slit. Cuticle usually slightly swollen and annuli slightly wider in short distance anterior and posterior to anus. Tail tapers gradually to very thin filamentous posterior part or the filamentous part broken off. Sometimes irregularities and narrowings visible on posterior part of tail suggesting this may be broken. Single female had almost entire tail broken and body end healed (fig 7D). Spicules 21 (17-24) µm long, manubrium slightly differentiated.

F. angusticephalus was differentiated from other species because of the 'abruptly narrowed lip region' (Thorne & Malek, 1968). Raski & Geraert (1987) stated 'this difference is probably unimportant' and synonymized *F. angusticephalus* with *F. thornei* because of similar tail length. Paratype female of *F. angusticephalus* from Avon, SD, has been examined and found that this species does not differ from *F. vulgaris*. Variation of the cephalic region shape was already discussed by Szczygieł (1974), and some examined nematodes also had narrowed and slightly concave lip region but shorter tail. In conclusion *F. angusticephalus* is considered synonymous with *F. vulgaris*.

The identity of *F. ruatus*, *F. vulgaris* and *F. thornei* was already suspected by Bello & Geraert, (1972). Later, Raski & Geraert (1987) used number of lines in the lateral field (two in *F. ruatus* and four in two other species) as differentiating character in their key. However, the number of lateral lines is not always clearly visible (Brzeski, in press). The lateral field with two lines only is usually narrower than that illustrated for *F. ruatus* and more refractive as it is formed by elevated ridge. As Bello & Geraert (1972) said

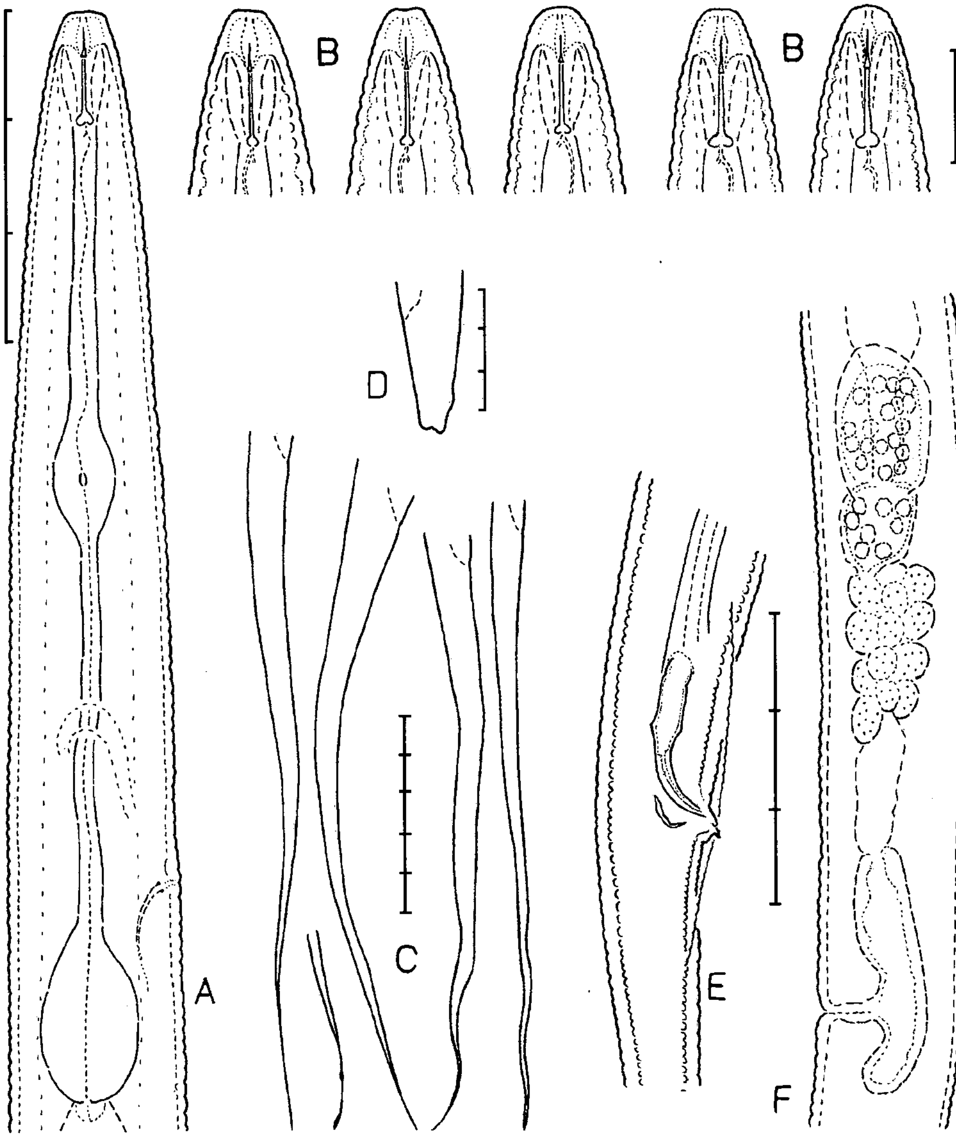


Fig. 7. *Filenchus vulgaris:* A. Pharyngeal region; B. Variation of head and stylet knobs; C. Tail; D. Tail of aberrant female; E. Cloacal region; F. Part of female reproductive system. (Smallest unit of scale bar = 10 µm.)

Filenchus vulgaris: *A. Región faríngea; B. Variedad de cabeza y de la protuberancia del estilete; C. Cola; D. Cola de una hembra aberrante; E. Región cloacal; F. Parte del sistema reproductor femenino. (Unidad más pequeña de medida = 10 µm.)*

'lateral field a plain band; sometimes two minute incisures could be detected' and all other characters are within limits observed. The species is synonymized with *F. vulgaris*.

Szczygieł (1974) differentiated *F. vulgaris* and *F. thornei* sensu Szczygieł, 1974 because the form of cuticular annulation and size of style knobs. These are variable characters and all forms were observed within the same population, providing that enough specimens were examined. In some populations either shape of stylet knobs may prevail, but continuous variation was observed in large material examined. The measurements of both forms differentiated by Szczygieł (1974) do not differ and these are considered conspecific. Thorne (1961) and Thorne & Malek (1968) described species identified as *Tylenchus exiguus*, but this seems not different from *F. vulgaris*.

Dr. I. P. Kazachenko kindly made specimens from three populations available for examination. These were collected from the area where *Basiroides paraobliquus* was originally found and identified by her as this species. These specimens are mounted in glycerine-jelly, transparent and flattened. However, the cuticular annulation, stylet length and knobs shape, postvulval sac and tail length agree with those found in *F. vulgaris*. Amphidial openings are probably in form of the longitudinal slits, but this could not be ascertained. Position of vulva (V = 65-71) as given by Kazachenko (1975) is probably a printing error. Consequently *Basiroides paraobliquus* is transferred to *Filenchus* as *F. paraobliquus* (Kazachenko, 1975) n. comb. and is synonymized with *F. vulgaris*.

Raski & Geraert (1987) differentiated *F. thornei* from *F. vulgaris* on the base of tail length: over 170 µm in the former and shorter in the latter. Among populations measured three show mean tail length more than 170 µm, while in some others the maximum tail length exceeds 170 µm. Tail length cannot be accepted as the specific character because posterior filamentous part may easily break off. Apparently long tail is an ancestral character and is not needed for a nematode to live, as an aberrant female with very short tail (fig. 9D), identified as *F. vulgaris*, was observed living and moving in water. *F. thornei*, as described by Andrássy (1954), is considered a distinct species because stylet is longer (10.5-14 µm), knobs are larger and head is broader.

F. brevis, as described by Lal & Khan (1987), does not differ from *F. vulgaris* in any of the morphological details and is synonymized with this species.

F. mirus and *F. cynodontus* are insufficiently described, but the information available shows all morphological details within limits of *F. vulgaris*. For this reasons it is concluded that both are synonyms of *F. vulgaris* in contrast with the findings of Raski & Geraert (1987) who considered *F. cynodontus* conspecific with *F. quartus*. Two paratypes of *F. quartus* and some other collections of Szczygieł (1974) had stylet 8 µm and were identified as *F. misellus*. On the other hand, holotype stylet is 12 µm. Nematodes identified as *F. quartus* were studied from few places in Poland and these differ from *F. vulgaris* by having strong knobs sloping posteriorly. Slit of amphidial apertures is not seen on lateral side of head suggesting amphids openings on labial plate, but this feature has to be proved by SEM studies.

This species has been examined from many populations from Poland, Germany, Bulgaria, the Netherlands, Switzerland, Italy (Sicilia), Greece, Syria, Russia (far East), USA, Mexico and Australia. Paratypes of *F. angusticephalus*, *F. vulgaris* and nematodes identified as *Basiroides paraobliquus* by Dr. I. P. Kazachenko were also examined.

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Resumen

Redescripción de algunas especies del género Filenchus *Andrássy, 1954 (Nematoda, Tylenchidae)*

El examen de varias especies de *Filenchus* muestra secuencias continuas de datos morfométricos que conducen a una extensa sinonimización: *F. pseudoorbus* con *F. andrassyi; F. cylindricollis y F. plattensis* con *F. butteus; F. ditissimus, F. clarki, F. microdorus, F. magnus, F. zaphari, F. sheri, F. annulatus, F. crassus, F. parvissimus, F. neominimus* y *F. amaritus* con *F. misellus; F. aquilonius* con *F. orbus; F. cerealis* con *F. sandneri; F. cylindricus, F. cylindricaudatus, F. hageneri, F. japonicus,* y *F. filipjevi* con *F. thornei;* y *F. mirus, F. cynodontus, F. ruatus, F. angusticephalus, Basiroides paraobliquus, F. conicephalus* y *F. brevis* con *F. vulgaris.*

References

ANDRÁSSY, I., 1954. Revision der Gattung *Tylenchus* Bastian, 1865. *Acta Zool. Acad. Sci. Hung.*, 1: 5-42.

- 1958. Erd- und Süsswassernematoden aus Bulgarien. *Acta Zool. Acad. Sci. Hung.*, 4: 1-88.

- 1988. [*Filenchus filipjevi* sp. n. (Tylenchidae) a new soil inhabiting nematode species]. *Trudy Zool. Inst.*, 180: 25-29 [in Russian].

BELLO, A. & GERAERT, E., 1972. Redescription of eighth species belonging to the superfamily Tylenchoidea (Nematoda: Tylenchida). *Nematologica*, 18: 190-200.

BRZESKI, M. W., 1963. *Tylenchus ditissimus* sp. n., a new nematode from Poland (Nematoda, Tylenchidae). *Bull. Acad. Polon. Sci., Classe 2*, 11: 537-540.

- 1982. Taxonomy of *Ottolenchus* Husain & Khan, and description of *Coslenchus polonicus* sp. n. (Nematoda: Tylenchidae). *Rev. Nematol.*, 5: 71-77.

- (in press). Descriptions of *Filenchus angustatus* sp. n. and *F. dorsalis* sp. n. and comments on the genera *Ottolenchus* Husain & Khan, 1967 and *Paramalenchus* Sumenkova, 1988 (Nematoda: Tylenchidae). *Fund. Appl. Nematol.*

CHAWLA, M. L., PRASAD, S. K., KHAN, E., & NAND, S., 1969. Two new species of the genus *Tylenchus* Bastian, 1865 (Nematoda: Tylenchidae) from Uttar Pradesh, India. *Labdev J. Sci. Technol.*, 7-B: 291-295.

ELMILIGY, I. A., 1971. Two new species of Tylenchidae, *Basiroides nortoni* n. sp. and *Tylenchus hageneri* n. sp. (Nematoda: Tylenchida). *J. Nematol.*, 3: 108-112.

GERAERT., E., 1991. Tylenchidae in agricultural soils. In: *Manual of agricultural nematology*: 795-825 (W. R. Nickle, Ed.). Marcel Dekker Inc., New York.

GREWAL, P. S., 1991. Description of *Filenchus recisus* sp. n. and observations on *F. thornei* 'England population' and *F. ditissimus* (Nematoda: Tylenchidae) from mushroom casing material. *Nematologica*, 37: 243-251.

HUSAIN, S. I. & KHAN, A. M., 1975. Four new tylenchid nematodes from north India. *Indian J. Nematol.*, 5: 49-55.

KAZACHENKO, I. P., 1975. [New nematode species of the family Tylenchidae from the litter of coniferous forests.] *Trudy Biol.-Pochv. Instit., Novaja Serija, (Vladivostok)*, 26: 178-186 [in Russian].

KHEIRI, A., 1970. Two new species in the family Tylenchidae (Nematoda) from Iran, with a key to *Psilenchus* de Man, 1921. *Nematologica*, 16: 359-368.

LAL, A., & KHAN, E., 1987. New species of *Coslenchus* Siddiqi, 1978 and *Filenchus* Andrássy, 1954 (Tylenchidae: Nematoda) associated with forest trees in northern India. *Indian J. Nematol.*, 17: 254-260.

MAVLJANOV, O. M., 1976. [*Parasitic and soil nematodes of the technical plants of Uzbekhistan*]. Fan, Tashkent [in Russian].

MIZUKUBO, T., 1993. Description of *Filenchus* discolabialis sp. n. and additional records of *F. helenae* (Szczygieł, 1969) Raski & Geraert, 1987 (Nematoda: Tylenchidae). *Nematologica*, 39: 466-475.

MIZUKUBO, T. & MINAGAWA, N., 1986. Description of *Filenchus japonicus* n. sp. and *Ottolenchus helenae* (Szczygieł, 1969) Brzeski, 1982 from Japan (Tylenchida: Tylenchidae). *Japanese J. Nematol.*, 16: 1-9.

MUKHINA, T. I., 1981. [Nematode fauna of *Echinopanax elatum* in the Primorsk Territory]. In: *Svobodnozhivushchyje i fitopatogennye nematody fauny Dal'nego Vostoka*: 41-62, 99-156 (A. S. Eroshenko & O. I. Belogurov, Eds.). Dal'nevostochnyj nauchn. Tcentr Akad. Nauk SSR, Vladivostok [in Russian].

RAHAMAN, P. F., AHMAD, I., & JAIRAJPURI, M. S., 1994. One new and two known species of the family Tylenchidae. *Indian J. Nematol.*, 24: 62-68.

RASKI, D. J. & GERAERT, E., 1987. Review of the genus *Filenchus* Andrássy, 1954 and description of six new species (Nemata: Tylenchidae). *Nematologica*, 32 (1986): 265-311.

SAKWE, P. N. & GERAERT, E., 1994. The genera *Basiria* Siddiqi, 1959, *Neopsilenchus* Thorne & Malek, 1968 and *Filenchus* Andrássy, 1954 (Nematoda: Tylenchidae) from Cameroon, with a description of *Basiria paratumida* n. sp. *Nematologica*, 40: 214-229.

SIDDIQI, M. R., 1979. Seven new species in a new nematode subfamily Duosulciinae (Tylenchidae), with proposals for *Duosulcius* gen. n., *Zanenchus* gen n. and *Neomalenchus* gen. n. *Nematologica*, 25: 215-236.

SUMENKOVA, N. I., 1987. [Taxonomy of phytonematodes of the genus *Ottolenchus* (Nematoda, Tylenchidae) and a description of two new species of the genus.] Zool. Zhurn., 66: 1805-1811 [in Russian].

SZCZYGIEŁ, A., 1969. A new genus and four new species of the subfamily Tylenchinae de Man, 1876 (Nematoda: Tylenchidae) from Poland. *Opusc. zool. Budapest*, 9: 159-170.

- 1974. Plant-parasitic nematodes associated with strawberry plantations in Poland. *Zesz. probl. Post. Nauk Roln.*, 154: 9-132.

THORNE, G., 1961. *Principles of nematology.* McGraw-Hill Book Company, New York.

THORNE, G. & MALEK, R. B., 1968. Nematodes of the northern Great Plains. Part I. Tylenchida (Nemata: Secernantea). *South Dakota State Univ. Agric. Exp. Station Tech. Bull.*, 31: 1-111.

TORRES, M. S. & GERAERT, E., 1996. Tylenchidae from Buenos Aires, Argentina. *Nematologica*, 42: 42-61.

WASILEWSKA, L., 1965a. *Tylenchus sandneri* sp. n. a new nematode from Poland (Nematoda, Tylenchidae). *Bull. Acad. Polon. Sci., Classe 2*, 13: 87-89.

- 1965b. *Tylenchus (Tylenchus) baloghi* Andrássy, 1958 in Poland (Nematoda, Tylenchidae). *Bull. Acad. Polon. Sci., Classe 2*, 13: 163-165.

WU, L.-Y., 1968. *Dactylotylenchus crassacuticulus*, a new genus and new species (Tylenchinae: Nematoda). *Can. J. Zool.*, 46: 831-834.

- 1969. Five new species of *Tylenchus* Bastian, 1865 (Nematoda: Tylenchidae) from the Canadian high Arctic. *Can. J. Zool.*, 47: 1005-1010.

ZEIDAN, A. B. & GERAERT, E., 1991. The genera *Filenchus* Andrássy, 1954, *Sakia* Khan, 1964, *Boleodorus* Thorne, 1941 and *Basiria* Siddiqi, 1959 (Nemata: Tylenchida) from Sudan. *Nematologica*, 37: 185-212.

ZELL, H., 1988. Nematode eines Buchen wald bodens 10. Die Tylenchen (Nematoda, Tylenchoidea). *Carolinea*, 46: 75-98.