

Review of the genus *Ditylenchus* Filipjev, 1936 (Nematoda : Anguinidae)

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SUMMARY

The genus *Ditylenchus* Filipjev, 1936 is reviewed and 80 valid species are listed. Following species, originally described in *Nothotylenchus*, are transferred to *Ditylenchus*: *D. drymocolus* (Rühm, 1956) n. comb., *D. major* (Thorne & Malek, 1968) n. comb., *D. montanus* (Kiknadze & Eliashvili, 1988) n. comb., *D. websteri* (Kumar, 1983) n. comb. Following new synonyms are proposed: *D. paramonovi* (Gagarin, 1974), *D. srinagarensis* (Fotedar & Mahajan, 1974), *D. saxenai* Fortuner & Maggenti, 1987 and *D. alliphilus* Fortuner & Maggenti, 1987 are synonymised with *D. acutus* (Khan, 1965); *D. elongatus* (Husain & Khan, 1974) with *D. cylindricus* Khan & Siddiqi, 1968; *D. galeopsidis* Paramonov, 1970 with *D. dipsaci* (Kühn, 1857); *D. sibiricus* German, 1969 with *D. equalis* Heyns, 1964; *D. silvestris* (Kazachenko, 1970) and *D. protensus* Brzeski, 1984 with *D. ferepolitor* (Kazachenko, 1970). *D. maleki* Fortuner & Maggenti, 1987 is considered junior objective synonym of *D. major* (Thorne & Malek, 1968). Eight species previously listed as valid are considered *species inquirendae*. Tabular characteristic for valid species of the genus is provided. Five new species are described. *D. acutatus* sp. n. is characterised by six incisures, stylet = 7-8 µm, muscular median bulb and offset posterior bulb, V = 77-81, long PUS, spicule = 19 µm and thick tail with more or less pointed terminus. *D. apus* sp. n. has six incisures, stylet = 8 µm, median bulb muscular, oesophageal glands form a long lobe overlapping intestine, V = 75-76, PUS less than half of vulval body width, thick tail with rounded tip. *D. filenchulus* sp. n. is diagnosed as having six incisures, stylet = 7-8 µm, muscular median bulb and offset basal bulb, V = 67-72, PUS about a third of vulva-anus distance, spicule = 13-16 µm, tail long and cylindrical in posterior part, tip rounded, wedge shaped or pointed. *D. silvaticus* sp. n. is characterised by six incisures, stylet = 7-8 µm, muscular oesophagus with offset basal bulb, V = 78-81, PUS about a third of vulva-anus distance, body posterior to vulva tapers evenly to thick and variable tail terminus. *D. terricolus* sp. n. has four incisures, muscular median bulb, posterior bulb overlapping intestine for few µm, V = 71-77, PUS about a third of vulva-anus distance, spicule = 13-14 µm and thick tail mostly with rounded tip with small mucro. Twenty known species of *Ditylenchus* are redescribed.

RÉSUMÉ

Révision du genre Ditylenchus Filipjev, 1936 (Nematoda : Anguinidae)

Le genre *Ditylenchus* Filipjev, 1936 est révisé, et une liste des 80 espèces valides est donnée. Les espèces suivantes, placées à l'origine dans le genre *Nothotylenchus*, sont transférées au genre *Ditylenchus*: *D. drymocolus* (Rühm, 1956) n. comb., *D. major* (Thorne & Malek, 1968) n. comb., *D. montanus* (Kiknadze & Eliashvili, 1988) n. comb., *D. websteri* (Kumar, 1983) n. comb. Les synonymies nouvelles suivantes sont proposées: *D. paramonovi* (Gagarin, 1974), *D. srinagarensis* (Fotedar & Mahajan, 1974), *D. saxenai* Fortuner & Maggenti, 1987 et *D. alliphilus* Fortuner & Maggenti, 1987 sont synonymisés à *D. acutus* (Khan, 1965); *D. elongatus* (Husain & Khan, 1974) à *D. cylindricus* (Khan & Siddiqi, 1968); *D. galeopsidis* Paramonov, 1970 à *D. dipsaci* (Kühn, 1857); *D. sibiricus* German, 1969 à *D. equalis* Heyns, 1964; *D. silvestris* (Kazachenko, 1970) et *D. protensus* Brzeski, 1984 à *D. ferepolitor* (Kazachenko, 1970). *D. maleki* Fortuner & Maggenti, 1987 est considéré comme un synonyme mineur objectif de *D. major* (Thorne & Malek, 1968). Huit espèces classées jusque-là comme valides sont placées dans les *species inquirendae*. Une table des caractères concernant les espèces valides est donnée. Cinq nouvelles espèces sont décrites: *D. acutatus* sp. n. a les caractéristiques suivantes: six incisures, stylet = 7-8 µm, bulbe médian musculaire et bulbe postérieur bien en relief, V = 77-81, sac postutérin (SPU) long, spicule = 19 µm, queue épaisse à terminus plus ou moins pointu; *D. apus* sp. n.: six incisures, stylet = 8 µm, bulbe médian musculaire, glandes oesophagiennes recouvrant longuement l'intestin, V = 75-76, SPU long de moins d'un diamètre au niveau de la vulve, queue épaisse, à extrémité arrondie; *D. filenchulus* sp. n.: six incisures, stylet = 7-8 µm, bulbe médian musculaire et bulbe postérieur en relief, V = 67-72, SPU = un tiers de la distance vulve-anus, spicule = 13-16 µm, queue longue, cylindrique, à extrémité arrondie, en forme de coin ou pointue. *D. silvaticus* sp. n.: six incisures, stylet = 7-8 µm, oesophage musculaire avec bulbe postérieur en relief, V = 78-81, SPU = un tiers de la distance vulve-anus, corps s'amincissant postérieurement à la vulve, extrémité de la queue épaisse, de forme variable. *D. terricolus* sp. n.: quatre incisures, bulbe médian musculaire, bulbe postérieur recouvrant l'intestin sur quelques µm, V = 71-77, SPU = un tiers de la distance vulve-anus, spicule = 13-14 µm, queue épaisse, généralement arrondie et mucronée à son extrémité. Vingt espèces déjà connues sont redécrites.

Number of described *Ditylenchus* species increased despite very small differences between species and unknown limits of specific variability. Perhaps Zjubin (1974) made the first attempt to provide a polytomial key for species identification. Later Sumenkova (1975, 1982) prepared compendia of what was known as the separate genera *Nothotylenchus* Thorne, 1941 and *Ditylenchus*. The same year brought also revisionary work of Fortuner (1982), who established what are the most stable characters of *D. myceliophagus* Goodey, 1958. Both Sumenkova (1975, 1982) and Fortuner (1982) divided the genus into species groups to facilitate identification. These groups do not reflect evolution within genus, although some evolutionary trends within genus are shown by Fortuner and Maggenti (1987). The latter authors made an important step in synonymising five genera with *Ditylenchus* and listed 91 valid species. Some of these species need discussion. Therefore, I tried to reconsider those available to me, still leaving much room for further investigations.

Materials and methods

The nematodes were examined in glycerine mounts. The killing, fixation and processing methods vary for various collections. Measurements were taken at magnification of 1 000 × with an ocular micrometer, and all dimensions in this paper are expressed in micrometers. Specimens from various populations were measured, and means and ranges for all specimens are given. Drawings were made with a drawing tube attached to a microscope.

The following symbols are used throughout of the paper in order to avoid unnecessary repetitions :

- ABD = anal body diameter,
- ex. p. = excretory pore,
- oes. = oesophagus length,
- st. = stylet length,
- PUS = post-vulval uterine sac,
- VA = vulva-anus distance,
- VBD = vulval body diameter.

Tail terminus shape is described in various publications with different terms. Fortuner (1982) found it is a stable and important character and differentiated between pointed and rounded tail tips. However, examination of many specimens and descriptions showed it is variable in some species and terms pointed, dull (intermediate) or rounded are used to describe tail termini.

Ditylenchus Filipjev, 1936

- = *Anguillulina* (*Ditylenchus*) Filipjev, 1936
- = *Nothotylenchus* Thorne, 1941
- = *Boleodoroides* Mathur, Khan & Prasad, 1966
- = *Diptenchenus* Khan, Chawla & Seshadri, 1969
- = *Safianema* Siddiqi, 1980
- = *Orrina* Brzeski, 1981

DIAGNOSIS (Fortuner & Maggenti, 1987)

Anguinidae. Median bulb with or without valve; isthmus not separated from glandular bulb by a constriction; glandular bulb short or long, when long may overlap the intestine for a short or long distance. Ovary short or long, sometimes reaching oesophageal region and/or flexed; oocytes in one/two rows; columned uterus with four rows of four cells; post-uterine sac present or absent. Testes usually without flexures; caudal alae leptoderan, short adanal or long, but never reaching tail end. Mature female not or slightly swollen. Mycetophagous or parasites of higher plants, found in soil or above ground.

TYPE SPECIES

- D. dipsaci* (Kühn, 1857) Filipjev, 1936.
- = *Anguillula dipsaci* Kühn, 1857.
- = *Aguillulina dipsaci* (Kühn, 1857) Gervais & Van Beneden, 1859.
- = *Tylenchus dipsaci* (Kühn, 1857) Bastian, 1965.
- = *Anguillulina dipsaci* var. *allocatus* Steiner, 1934.
- = *D. allocatus* (Steiner, 1934) Filipjev & Schuurmans Stekhoven, 1941.
- = *Anguillulina dipsaci* var. *communis* Steiner & Scott, 1935.
- = *D. dipsaci* var. *narcissi* de Bruyn Ouboter, 1930.
- = *Anguillula devastatrix* Kühn, 1869.
- = *Tylenchus devastatrix* (Kühn, 1869) Örley, 1880.
- = *Anguillulina devastatrix* (Kühn, 1869) Neveu-Lemaire, 1913.
- = *D. devastatrix* (Kühn, 1869) Tarjan, 1960 (wrongly attributed to Filipjev & Schuurmans Stekhoven, 1941 by Tarjan, 1960).
- = *Anguillula secalis* Nitschke, 1869.
- = *Anguillulina secalis* (Nitschke, 1869) Goodey, 1932.
- = *D. secalis* (Nitschke, 1869) Siddiqi, 1986.
- = *Tylenchus allii* Beijerinck, 1883.
- = *D. allii* (Beijerinck, 1883) Tarjan, 1960 (wrongly attributed to Filipjev & Schuurmans Stekhoven, 1941 by Tarjan, 1960).
- = *Tylenchus havensteinii* Kühn, 1881.
- = *Anguillulina hyacinthi* (Prillieux, 1881) Goodey, 1932.
- = *D. havensteinii* (Kühn, 1881) Siddiqi, 1986.
- = *Tylenchus hyacinthi* Prillieux, 1881.
- = *Anguillulina hyacinthi* (Prillieux, 1881) Goodey, 1932.
- = *D. dipsaci* var. *hyacinthi* (Prillieux, 1881) Filipjev & Schuurmans Stekhoven, 1941.
- = *Tylenchus putrefaciens* Kühn, 1879.
- = *D. putrefaciens* (Kühn, 1879) Tarjan, 1967 (wrongly attributed to Filipjev & Schuurmans Stekhoven, 1941 by Tarjan, 1967).
- = *Tylenchus tobaensis* Schneider, 1937.

- = *D. tobaensis* (Schneider, 1937) Kirjanova, 1951.
- = *D. phloxidis* Kirjanova, 1951.
- = *D. fragariae* Kirjanova, 1951.
- = *D. galeopsidis* Paramonov, 1970 (see remark 14).
- = *D. sonchophilus* Paramonov, 1970.
- = *D. dipsaci falcariae* Poghosyan, 1967.

VALID SPECIES

- D. acuminatus* Fortuner & Maggenti, 1987.
- = *Pseudhalenchus acutus* Khan & Nanjappa, 1972.
- = *D. acutus* (Khan & Nanjappa, 1972) Fortuner, 1982 nec *Nothotylenchus acutus* Khan, 1965.
- D. acutatus* sp. n.
- D. acutus* (Khan, 1965) Fortuner & Maggenti, 1987.
- = *Nothotylenchus acutus* Khan, 1965.
- = *Nothotylenchus allii* Khan & Siddiqi, 1968 nec *D. allii* (Beijerinck, 1883) Filipjev & Schuurmans Stekhoven, 1941, syn. n.
- = *Nothotylenchus indicus* Saxena, Chhabra & Joshi, 1973 nec *D. indicus* (Sethi & Swarup, 1967) Fortuner, 1982, syn. n.
- = *Nothotylenchus paramonovi* Gagarin, 1974, syn. n.
- = *D. paramonovi* (Gagarin, 1974) Fortuner & Maggenti, 1987, syn. n.
- = *Nothotylenchus srinagarensis* Fotedar & Mahajan, 1974, syn. n.
- = *D. srinagarensis* (Fotedar & Mahajan, 1974) Fortuner & Maggenti, 1987, syn. n.
- = *D. saxenai* Fortuner & Maggenti, 1987, syn. n.
- = *D. alliphilus* Fortuner & Maggenti, 1987, syn. n.
- D. adasi* (Sykes, 1980) Fortuner & Maggenti, 1980.
- = *Nothotylenchus adasi* Sykes, 1980.
- D. affinis* (Thorne, 1941) Fortuner & Maggenti, 1987.
- = *Nothotylenchus affinis* Thorne, 1941.
- D. anchilispomus* (Tarjan, 1958) Fortuner, 1982.
- = *Pseudhalenchus anchilispomus* Tarjan, 1958.
- = *Safianema anchilispomum* (Tarjan, 1958) Siddiqi, 1980.
- D. angustus* (Butler, 1913) Filipjev, 1936.
- = *Tylenchus angustus* Butler, 1913.
- = *Anguillulina angusta* (Butler, 1913) Goodey, 1932.
- D. antricolus* (Andrássy, 1961) Fortuner & Maggenti, 1987.
- = *Nothotylenchus antricolus* Andrássy, 1961.
- D. apus* sp. n.
- D. attenuatus* (Mulvey, 1969) Fortuner & Maggenti, 1987.
- = *Nothotylenchus attenuatus* Mulvey, 1969.
- D. ausafi* Husain & Khan, 1967.
- D. australiae* Brzeski, 1984.
- D. basiri* (Khan, 1965) Fortuner & Maggenti, 1987.
- = *Nothotylenchus basiri* Khan, 1965.
- D. bhatnagari* (Tikyani & Khera, 1969) Fortuner & Maggenti, 1987.
- = *Nothotylenchus bhatnagari* Tikyani & Khera, 1969.
- D. buckleyi* (Das, 1960) Fortuner & Maggenti, 1987.
- = *Nothotylenchus buckleyi* Das, 1960.
- D. caudatus* Thorne & Malek, 1968.
- D. citri* (Varaprasad, Khan & Lal, 1980) Fortuner & Maggenti, 1987.
- = *Paurodontus citri* Varaprasad, Khan & Lal, 1980.
- = *Nothotylenchus citri* (Varaprasad, Khan & Lal, 1980) Siddiqi, 1986.
- D. clarus* Thorne & Malek, 1968.
- D. convallariae* Sturhan & Friedman, 1965.
- D. cylindricollis* (Thorne, 1941) Fortuner & Maggenti, 1987.
- = *Nothotylenchus cylindricollis* Thorne, 1941.
- D. cylindricus* (Khan & Siddiqi, 1968) Fortuner & Maggenti, 1987.
- = *Nothotylenchus cylindricus* Khan & Siddiqi, 1968.
- = *Nothotylenchus elongatus* Husain & Khan, 1974, syn. n. (see remark 1).
- = *D. elongatus* (Husain & Khan, 1974) Fortuner & Maggenti, 1987, syn. n.
- D. cyperi* Husain & Khan, 1967.
- D. danubialis* (Andrássy, 1960) Fortuner & Maggenti, 1987.
- = *Nothotylenchus danubialis* Andrássy, 1960.
- D. deiridis* Thorne & Malek, 1968.
- D. dipsacoideus* (Andrássy, 1952) Andrássy, 1956.
- = *Anguillulina (Ditylenchus) dipsacoideus* Andrássy, 1952.
- D. drepanocercus* Goodey, 1953.
- D. dryadis* Anderson & Mulvey, 1980.
- D. drymocolus* (Rühm, 1956) comb. n.
- = *Nothotylenchus drymocolus* Rühm, 1956.
- D. elegans* Zell, 1988.
- D. emus* Khan, Chawla & Prasad, 1969.
- D. equalis* Heyns, 1964.
- = *D. sibiricus* German, 1969, syn. n.
- D. exilis* Brzeski, 1984.
- D. ferepolitor* (Kazachenko, 1980) Fortuner & Maggenti, 1987.
- = *Nothotylenchus ferepolitor* Kazachenko, 1980.
- = *Nothotylenchus silvestris* Kazachenko, 1980 syn. n.
- = *D. silvestris* (Kazachenko, 1980) Fortuner & Maggenti, 1987 syn. n.
- = *D. protensus* Brzeski, 1984 syn. n.
- D. filenchulus* sp. n.
- D. filimus* Anderson, 1983.
- D. fotedari* (Mahajan, 1977) Fortuner & Maggenti, 1987.
- = *Nothotylenchus fotedari* Mahajan, 1977.
- D. geraerti* (Paramonov, 1970) Bello & Geraert, 1972.

- = *Tylenchus geraerti* Paramonov, 1970.
- D. goldeni* (Maqbool, 1982) Fortuner & Maggenti, 1987.
= *Nothotylenchus goldeni* Maqbool, 1982.
- D. hexaglyphus* (Khan & Siddiqi, 1968) Fortuner & Maggenti, 1987.
= *Nothotylenchus hexaglyphus* Khan & Siddiqi, 1968.
- D. indicus* (Sethi & Swarup, 1967) Fortuner, 1982.
= *Pseudhalenchus indicus* Sethi & Swarup, 1967.
= *Safianema indicum* (Sethi & Swarup, 1967) Siddiqi, 1986.
- D. khani* Fortuner, 1982.
= *Diptenchus indicus* Khan, Chawla & Seshadri, 1969 nec *Ditylenchus indicus* (Sethi & Swarup, 1967) Fortuner, 1982.
- D. kheirii* Fortuner & Maggenti, 1987.
= *Nothotylenchus geraerti* Kheiri, 1971 nec *D. geraerti* (Paramonov, 1970) Bello & Geraert, 1972.
- D. loksai* (Andrássy, 1959) Fortuner & Maggenti, 1987.
= *Nothotylenchus loksai* Andrássy, 1959.
- D. longicauda* Choi & Geraert, 1988.
- D. longimatrixalis* (Kazachenko, 1975) Brzeski, 1984.
= *Basiroides longimatrixalis* Kazachenko, 1975.
= *Basiria leptolongimatrixalis* Bajaj & Bhatti, 1979 (a wrong spelling for *longimatrixalis*).
- D. lutionensis* (Siddiqi, 1980) Fortuner, 1982.
= *Safianema lutionensis* Siddiqi, 1980.
= *Pseudhalenchus lutionensis* (Siddiqi, 1980) Ryss & Krall, 1981.
- D. major* (Thorne & Malek, 1968) comb. n. nec *D. major* (Fuchs, 1915) Filipjev, 1936 = *Sychnotylenchus major* (Fuchs, 1915) Fortuner & Maggenti, 1987 (see remark 2).
= *Nothotylenchus major* Thorne & Malek, 1968.
= *D. maleki* Fortuner & Maggenti, 1987.
- D. medians* (Thorne & Malek, 1968) Fortuner & Maggenti, 1987.
= *Nothotylenchus medians* Thorne & Malek, 1968.
- D. medicaginis* Wasilewska, 1965.
- D. mirus* Siddiqi, 1963.
- D. montanus* (Kiknadze & Eliashvili, 1988) comb. n.
= *Nothotylenchus montanus* Kiknadze & Eliashvili, 1988.
- D. myceliophagus* Goodey, 1958.
- D. nanus* Siddiqi, 1963.
- D. nortoni* (Elmiligy, 1971) Bello & Geraert, 1972.
= *Basiroides nortoni* Elmiligy, 1971 nec *Basiroides nortoni* (Thorne & Malek, 1968) Fotedar & Mahajan, 1973.
= *Basiria nortoni* Thorne & Malek, 1968.
- D. obesus* Thorne & Malek, 1968.
- D. oryzae* (Mathur, Khan & Prasad, 1966) Fortuner & Maggenti, 1987 = *Basiroides oryzae* Mathur, Khan & Prasad, 1966.
= *Paurodontus oryzae* (Mathur, Khan & Prasad, 1966) Sumenkova, 1975.
= *Nothotylenchus oryzae* (Mathur, Khan & Prasad, 1966) Siddiqi, 1986.
- D. parasimilis* (Massey, 1974) Fortuner & Maggenti, 1987.
= *Nothotylenchus parasimilis* Massey, 1974.
- D. parvus* Zell, 1988.
- D. petilus* (Massey, 1974) Fortuner & Maggenti, 1987.
= *Nothotylenchus petilus* Massey, 1974.
- D. phyllobius* (Thorne, 1934) Filipjev, 1936.
= *Anguillulina phyllobia* Thorne, 1934.
= *Nothanguina phyllobia* (Thorne, 1934) Thorne, 1961.
= *Orrina phyllobia* (Thorne, 1934) Brzeski, 1981.
- D. silvaticus* sp. n.
- D. similis* (Thorne & Malek, 1968) Fortuner & Maggenti, 1987.
= *Nothotylenchus similis* Thorne & Malek, 1968.
- D. singhi* (Das & Shivaswamy, 1980) Fortuner & Maggenti, 1987.
= *Nothotylenchus singhi* Das & Shivaswamy, 1980.
- D. solani* Husain & Khan, 1976.
- D. sorghii* Verma, 1966.
- D. taylori* (Husain & Khan, 1974) Fortuner & Maggenti, 1987.
= *Nothotylenchus taylori* Husain & Khan, 1974.
- D. tenuidens* Gritzenko, 1971.
- D. terricolus* sp. n.
- D. thornei* (Andrássy, 1958) Fortuner & Maggenti, 1987.
= *Nothotylenchus thornei* Andrássy, 1958.
- D. triformis* Hirschmann & Sasser, 1955.
- D. truncatus* (Eliashvili & Vatcheishvili, 1980) Fortuner & Maggenti, 1987.
= *Nothotylenchus truncatus* Eliashvili & Vatcheishvili, 1980.
- D. tuberosus* (Kheiri, 1971) Fortuner & Maggenti, 1987.
= *Nothotylenchus tuberosus* Kheiri, 1971.
- D. turfus* (Yokoo, 1968) Fortuner & Maggenti, 1987.
= *Neotylenchus turfus* Yokoo, 1968.
= *Nothotylenchus turfus* (Yokoo, 1968) Siddiqi, 1986.
- D. uniformis* (Truskova & Eroshenko, 1977) Fortuner & Maggenti, 1987.
= *Nothotylenchus uniformis* Truskova & Eroshenko, 1977.
- D. utschini* (Gagarin, 1974) Fortuner & Maggenti, 1987.
= *Nothotylenchus utschini* Gagarin, 1974.
- D. valveus* Thorne & Malek, 1968.
- D. varaprasadi* Fortuner & Maggenti, 1968.

- = *Paurodontus solani* Varaprasad, Khan & Lal, 1981.
- = *Nothotylenchus solani* (Varaprasad, Khan & Lal, 1981) Siddiqi, 1986 nec *Ditylenchus solani* Husain & Khan, 1976.
- D. virtudesae* Tobar-Jimenez, 1974.
- D. websteri* (Kumar, 1983) comb. n.
- = *Nothotylenchus websteri* Kumar, 1983.

SPECIES INQUIRENDAE

- D. acris* (Thorne, 1941) Fortuner & Maggenti, 1987 (see remark 3).
- = *Nothotylenchus acris* Thorne, 1941.
- D. atypicus* (Khera & Chaturvedi, 1977) Fortuner & Maggenti, 1987 (see remark 4).
- = *Boleodorus atypicus* Khera & Chaturvedi, 1977.
- = *Nothotylenchus atypicus* (Khera & Chaturvedi, 1977) Siddiqi, 1986.
- D. bacillifer* (Micoletzky, 1922) Filipjev, 1936.
- = *Tylenchus bacillifer* Micoletzky, 1922.
- = *Anguillulina bacillifer* (Micoletzky, 1922) Goodey, 1932.
- D. beljaevae* Karimova, 1967.
- D. boevii* (Izatullaeva, 1967) Tarjan & Hopper, 1974 (wrongly attributed to Sher, 1970 by Tarjan & Hopper, 1974).
- = *Chitinotylenchus boevii* Izatullaeva, 1967.
- D. brevicauda* (Micoletzky, 1925) Filipjev, 1936.
- = *Tylenchus brevicauda* Micoletzky, 1925.
- = *Anguillulina brevicauda* (Micoletzky, 1925) Goodey, 1932.
- D. cafeicola* (Schuurmans Stekhoven, 1951) Siddiqi, 1986.
- = *Tylenchus cafeicola* Schuurmans Stekhoven, 1951.
- D. compactus* (Massey, 1974) Fortuner & Maggenti, 1987 (see remark 5).
- = *Nothotylenchus compactus* Massey, 1974.
- D. damnatus* (Massey, 1966) Fortuner, 1982 (see remark 6).
- = *Pseudhalenchus damnatus* Massey, 1966.
- = *Safianema damnatum* (Massey, 1966) Siddiqi, 1980.
- D. darbouxii* (Cotte, 1912) Filipjev, 1936.
- = *Tylenchus darbouxii* Cotte, 1912.
- = *Anguillulina darbouxii* (Cotte, 1912) Goodey, 1932.
- D. eurycephalus* (de Man, 1921) Filipjev, 1936.
- = *Tylenchus eurycephalus* de Man, 1921.
- = *Anguillulina eurycephala* (de Man, 1921) Goodey, 1932.
- D. exiguus* (Andrássy, 1958) Fortuner & Maggenti, 1987 (see remark 7).
- = *Nothotylenchus exiguus* Andrássy, 1958.
- D. humuli* Skarbilovich, 1972.
- D. incognatus* (Van der Linde, 1938) Tarjan & Hopper, 1974 (wrongly attributed to Sher, 1970 by Tarjan & Hopper, 1974).
- = *Anguillulina incognata* Van der Linde, 1938.
- = *Chitinotylenchus incognatus* (Van der Linde, 1938) Loof, 1956.
- D. inobservabilis* (Kirjanova, 1938) Kirjanova, 1961.
- = *Anguillulina inobservabilis* Kirjanova, 1938.
- D. intermedius* (de Man, 1880) Filipjev, 1936.
- = *Tylenchus intermedius* de Man, 1880.
- = *Anguillulina intermedia* (de Man, 1880) Goodey, 1932.
- D. istatae* Samibaeva, 1966.
- D. karakalpakensis* Erzhanova, 1964.
- D. longistylus* (Khera & Chaturvedi, 1977) Fortuner & Maggenti, 1987 (see remark 8).
- = *Boleodorus longistylus* Khera & Chaturvedi, 1977.
- = *Nothotylenchus longistylus* (Khera & Chaturvedi, 1977) Siddiqi, 1986.
- D. melongena* Bhatnagar & Kadyan, 1969 (see remark 9).
- D. microdens* Thorne & Malek, 1968 (see remark 10).
- D. minutus* Husain & Khan, 1967 (see remark 11).
- D. paragracilis* (Micoletzky, 1922) Sher, 1970.
- = *Tylenchus paragracilis* Micoletzky, 1922.
- = *Anguillulina paragracilis* (Micoletzky, 1922) Goodey, 1932.
- = *Chitinotylenchus paragracilis* (Micoletzky, 1922) Filipjev, 1936.
- D. procerus* (Bally & Reydon, 1931) Filipjev, 1936.
- = *Tylenchus procerus* Bally & Reydon, 1931.
- = *Anguillulina procera* (Bally & Reydon, 1931) Goodey, 1932.
- D. pumilus* Karimova, 1957.
- D. sapari* Atakhanov, 1958.
- D. sedatus* (Kirjanova, 1951) Tarjan & Hopper, 1974 (wrongly attributed to Sher, 1970 by Tarjan & Hopper, 1974).
- = *Chitinotylenchus sedatus* Kirjanova, 1951.
- D. sycobius* (Cotte, 1920) Filipjev, 1936.
- = *Tylenchus sycobius* Cotte, 1920.
- = *Anguillulina sycobia* (Cotte, 1920) Goodey, 1932.
- D. taleolus* (Kirjanova, 1938) Kirjanova, 1961.
- = *Anguillulina taleola* Kirjanova, 1938.
- D. tausaghysatus* (Kirjanova, 1938) Kirjanova, 1961.
- = *Anguillulina tausaghysata* Kirjanova, 1938.
- D. tenuis* (Kischke, 1956) comb. n. (see remark 12).
- = *Tylenchus davaini* var. *tenuis* Kischke, 1956 nec *Tylenchus tenuis* Micoletzky, 1922 = *tytus* generis of *Tetylenchus* Filipjev, 1936 *genus dubium*.
- = *Tylenchus kishkeae* Meyl, 1961.
- D. kiskyleae* (Meyl, 1961) Loof, 1985.
- D. tulaganovi* Karimova, 1957.

SPECIES INCERTAE SEDIS

- D. pustulicola* (Thorne, 1934) Filipjev & Schuurmans Stekhoven, 1941.
= *Anguillulina pustulicola* Thorne, 1934.
= *Anguina pustulicola* (Thorne, 1934) Goodey, 1951.
- D. valkanovi* (Andrássy, 1958) Zell, 1988 *sensu* Zell, 1988 *nec* Andrássy, 1958 (see remark 13).

NOMINA NUDA

- D. callidus* (Izatullaeva, 1967) Fortuner & Maggenti, 1987.
= *Nothotylenchus callidus* Izatullaeva, 1967.
- D. sonchophilus* Kirjanova, 1958.

UNAVAILABLE NAMES

- D. galeopsidis* Teploukhova, 1968 (see remark 14).
Nothotylenchus strictus Kapoor, 1983.

REMARKS ON SOME JUNIOR SYNONYMS, SPECIES INQUIRENDAE ET INCERTAE SEDIS AND UNAVAILABLE NAMES

Remark 1

D. cylindricus and *D. elongatus* are synonymised because detailed descriptions do not show any differences.

Remark 2

Fortuner and Maggenti (1987) transferred *Nothotylenchus major* Thorne & Malek, 1968 to *Ditylenchus* and proposed the new name *D. maleki* because they consider the specific name *major* as preoccupied by *D. major* (Fuchs, 1915). However, the latter belongs now to the genus *Sychnotylenchus*, and according article 59 (c) of ICZN the original name is restored. *D. maleki* became junior objective synonym of *D. major*.

Remark 3

Description of *Nothotylenchus acris* does not inform about stylet and spicule length and do not allow to differentiate this species from related forms. Considered as *species inquirenda*.

Remark 4

Description shows offset, pouch-like spermatheca filled with small sperm, and this excludes the species from *Ditylenchus*. Statement in the description "stylet with basal part about 1/3 of total stylet length" casts doubts on this species as a member of *Boleodorus*, the genus where it was originally placed. The description and dimensions of oesophagus parts given in the text disagree with Fig. 2 A (Khera & Chaturvedi, 1977). Therefore the species should be first redescribed and then its taxonomic position could be determined.

Remark 5

Few morphological details are given in the description, information is lacking on number of lateral lines and cephalic skeleton structure. Male is not known. Thus, the available data are not sufficient for identification and *D. compactus* is considered *species inquirenda*.

Remark 6

Description does not inform about stylet and spicule length, and says "lateral incisures absent". Fortuner (1982) restudied paratypes and said "stylet length in female (not indicated in original description) was 12 µm, lateral incisures were not absent as mentioned, but very difficult to observe. Three lines were seen on tail. The number of lines on the body could not be determined. The tail was more pointed than originally described". The species clearly needs redescription, and until it is published it remains unidentifiable. Consequently it is treated as *species inquirenda*.

Remark 7

Stylet is described as "Mundstachel klein, sehr schwach chitinisiert, mit kleinen Knöpfen", but no stylet length is given. Spermatheca is drawn as small and short (Orig. Fig. 14 F). Male is unknown. As lack of these data do not allow proper identification of the species, I consider it as *species inquirenda*.

Remark 8

Small pouch-like spermatheca filled with small sperm shown on Fig. 1 B (Khera & Chaturvedi, 1977) excludes this species from *Ditylenchus*. The discrepancies between description and drawings cause that it is treated *species inquirenda*.

Remark 9

The description of *D. melongena* contains only dimensions: body length, stylet length, a, b, c, V, and no other morphological information. Drawing shows thick stylet with large knobs and head high offset by constriction, both not found in other species of the family. The differential diagnosis says only: "It differs from allied species by an anteriorly placed vulva (V = 65.5)". Since this is not sufficient for identification it must be considered *species inquirenda*.

Remark 10

The description of *D. microdens* does not allow to differentiate this species from *D. equalis*, although spicule length is not given for *D. microdens* preventing synonymisation of both species. *D. microdens* is treated *species inquirenda* until redescription will clarify its status.

Remark 11

Measurements of 15 females of *D. minutus* lack mean values, especially important in vulva position: V = 72 — 80. This range is wide enough to suggest at least

one female with aberrant vulva-anus distance. It is not known if this was exceptionally long or short. Moreover, description says "bursa crenate, enveloping less than 1/3 of tail length", while Fig. 3 B shows bursa extending along about 63 % of tail. In the relationships *D. minutus* is compared only with *D. misellus*, now known as species of *Filenchus*, family Tylenchidae. In conclusion — uncertainty of these two points do not allow correct identification of this species. Consequently *D. minutus* is declared *species inquirenda* until new description of type specimens.

Remark 12

Kischke (1956) described *Tylenchus davaini* var. *tenuis*, and Meyl (1961) elevated it to the full specific rank. At the same time he proposed new name *T. kischkeae* as *T. tenuis* was preoccupied by the type species of the genus *Tetylenchus*. The taxonomic position of *Tetylenchus tenuis* remains unknown, but it is not considered identical with *Ditylenchus*. Later Loof (1985) showed the animals described by Kischke belong to *Ditylenchus*, proposed the name *D. kischkeae*, and placed it in *species inquirenda* category. However, in agreement with the article 59 (c) of ICZN the original name has to be restored and consequently *D. tenuis* is proposed.

Remark 13

The description of *Tylenchus (Filenchus) valkanovi*, based on two males, is insufficient for identification, and it was declared *species inquirenda*. Zell (1988) described nine females and one male of what he considered identical with Andrassy's species and transferred it to *Ditylenchus*. Examination of three females kindly supplied by Dr. H. Zell did not allow to see many details because specimens were poorly fixed and mounted, although offset spermatheca filled with small sperm and cardiac cells were observed. These characters exclude Zell's animals from Anguinidae. The exact position of Zell's species could not be determined. Therefore, *T. (F.) valkanovi* Andrassy remains *species indeterminata*, while the position of *D. valkanovi sensu* Zell, 1988 is unknown.

Remark 14

D. galeopsidis was described in doctoral thesis only and has not been published. First published description of this species was by Paramonov (1970), who copied it from Teploukhova's thesis. Consequently the name became available only after Paramonov's publication. Examination of Teploukhova's type material showed no differences with *D. dipsaci* and the two species are synonymised.

SPECIES IDENTIFICATION

Species of *Ditylenchus* are rather uniform and do not show many characters helpful for identification. In effect identification is difficult and preparation of

workable key almost impossible. Therefore, the tabular presentation of species characteristics serves only for selection of a group of similar species. The descriptions of these species must always be consulted for final determination of an unknown population.

D. sorghii is not included in Table 1 because the description was not available.

DESCRIPTIONS OF SOME SPECIES

Ditylenchus acutatus sp. n.

(Fig. 1)

MEASUREMENTS

Females

Paratypes (n = 2). L = 846, 953*; oes = 143, 156; ex. p. = 109; tail = 59, 63; a = 34, 37; b = 5.9, 6.1; MB = 40, 36; c = 15.2; c' = 4.2, 4.1; VA/T = 2.4, 2.5; V' = 83, 82; V = 78, 77; st = 7.5, 7.

Poland, Puszcza Białowiecka (n = 3). L = 891 (852-915); oes. = 152 (144-157); ex. p. = 108 (101-119); tail = 58 (53-62); a = 49 (44-55); b = 5.8-5.9; MB = 36-37; c = 15.4 (14.7-16.2); c' = 5.3 (4.8-5.7); VA/T = 2.3 (2.0-2.5); V' = 85 (82-87); V = 79 (77-81); st. = 7.0-7.5.

Males

Paratype (n = 1). L = 873; oes. = 145; ex. p. = 110; tail = 66; a = 57; b = 6.0; MB = 35; c = 13.2; c' = 5.3; gubernaculum = 7; spicule = 19; st. = 7.

Poland, Puszcza Białowiecka (n = 1). L = 957; oes. = 157; ex. p. = 113; tail = 54; a = 52; b = 6.1; MB = 37; c = 17.9; c' = 4.0; gubernaculum = 5.5; spicule = 19; st. = 8.

Holotype (female). L = 983; oes. = 149; ex. p. = 116; tail = 63; a = 53; b = 6.6; MB = 38; c = 15.6; c' = 5.5; VA/T = 2.4; V' = 84; V = 78; st. = 7.

DESCRIPTION

Female : Relatively large nematodes, body thin, straight when relaxed. Cuticular annulation distinct. Lateral field with six incisures, although sometimes, on certain body parts, four incisures are distinct and two others appear very faint. Head 5-6 μm wide, striation indistinct. Cephalic skeleton weak. Stylet delicate, cone about one-third of total stylet length, knobs small and rounded. Median bulb muscular, with very small thickenings of lumen walls. Basal bulb offset from intestine or overlap intestine up to 5 μm . Excretory pore opposite

* All measurements are given in μm .

Table 1

Some diagnostic features of *Ditylenchus* species

MB = median bulb with (+) or without (—) thickenings of lumen walls, PUS = length of post-vulval part of uterine sac expressed in relation to VBD (*) or as percentage of vulva anus distance (**) — Tail tip : P = pointed, D = dull, R = rounded, m = (sometimes) mucronate — > = slightly more than, < = slightly less than, [] = figure obtained from measured drawing and not given in description, ? = no information available

Species	MB	Incis.	Stylet (μm)	V	Spicule (μm)	PUS	Tail tip	c	c'	Bursa (% of tail)
<i>D. longimatrixalis</i>	+	+	5.5-7.5	60-73	12-15	1.8-5.1* 23-73**	P	5.3-10.3	5.9-10.2	9-33
<i>D. acuminatus</i>	+	4	5-7	79-84	?	0.7-1*	P, ? D	9-11.9	5	?
<i>D. exilis</i>	+	4	6-8	77-80	15-17	0.6-1*	R	8.9-10.7	6.5-9	29-35
<i>D. terricolus</i>	+	4	7-7.5	71-77	13-14	2.1-3.2* 35-39**	R, D, m	9.1-12.1	4.5-7.1	26-39
<i>D. parvus</i>	+	4	6.5-9	71-77	12-18	2-4* 28-51**	P	8.6-15	3.6-8.1	17-50
<i>D. equalis</i>	+	4	7-8	77-82	14-15	0.9-1.7* 22-50**	P, D	9-13	4-6	29-35
<i>D. emus</i>	+	4	7-9	79-81	15-16	2-2.2* 37-39**	R	12-15	5-5.3	24-33
<i>D. nortoni</i>	+	4	7-8.5	79-86	21-25	about 1*	P	9-11.6	5.4-7.6	up to 60
<i>D. filimus</i>	+	4	7-9	81-85	29	0.5-1.1*	P	9-11	4.3-6.5	61
<i>D. deiridus</i>	+	4	8	87 ?	?	absent	P, D	18	[3.9]	?
<i>D. solani</i>	+	4	8-11	80-83	18-20	> 2* > 50**	D	10-16	6-7	< 20
<i>D. ausafi</i>	+	4	10-11	72-75	12-15	> 1*	D	9-16	[5.7]	< 33
<i>D. angustus</i>	+	4	10-11	78-80	16-21	2-2.5* 33-67**	P, m	18-24	5.2-5.4	almost 100
<i>D. dipsaci</i>	+	4	10-12	76-86	23-28	40-70**	P	11-20	3-6	40-70
<i>D. indicus</i>	+	4	11-12	80-84	14	< 2*	R	10-14	< 5	< 33
<i>D. cyperi</i>	+	5	10-11	75-83	15-18	50**	D	17-18	[3.1]	almost 100
<i>D. geraerti</i>	+	6	6	80	?	> 50**	R	10-13.8	[3.5]	?
<i>D. ferepolitor</i>	+	6	6-7.8	68-75	9-14	1.1-3.5* 13-45**	P	7-10.6	6-9	14-35
<i>D. filenchulus</i>	+	6	7-8	68-72	13-16	2.1-4.5* 30-45**	R, P	6.1-9.8	7-14	11-15
<i>D. elegans</i>	+	6	7-9	71-77	16-18	[3.2]	P	7.6-10.9	7.2-12.3	[14]
<i>D. apus</i>	+	6	8	75-76	?	0.2-0.4* 4-9**	R	9.6-10.9	4.1-5.3	?
<i>D. silvaticus</i>	+	6	7-8	78-81	?	0.8-1.4* 27-45**	P, m	9.2-14.2	3.6-6.3	?
<i>D. acutatus</i>	+	6	7-8	77-81	19	2.8-4.1* 45-59**	P	14.7-16.2	4.1-5.7	23-57
<i>D. tenuidens</i>	+	6	7-9	76-82	15-18	0.9-1.8* 18-37**	P	9-12.9	4.1-6.8	24-50
<i>D. medicaginis</i>	+	6	7-9	75-84	15-22	1.2-2.2* 30-40**	D, R, P	8.4-13.6	4-8.6	20-44
<i>D. valveus</i>	+	6	7-9	76-82	16-23	0.8-2.9* 21-50**	R, m	8.4-14.1	5-8.8	23-47
<i>D. myceliophagus</i>	+	6	6.5-8.5	77-86	15-20	1.5-2.8* 30-69**	R	8.2-17	3-7	20-55
<i>D. virtudesae</i>	+	6	7.3-8.2	80-82	11	40-60**	R, D	17.3-20.9	[2.8]	100
<i>D. nanus</i>	+	6	7-8	81-85	13-15	52-71**	R	15.1-19	2.9-3.6	55-almost 100
<i>D. triformis</i>	+	6	7.5-9.5	75-82	13-15	25-33**	R, D	9.6-11.9	[4.4-5.1]	33-50
<i>D. lutonensis</i>	+	6	8-9.4	70-74	15-17	2.6-3.3*	P, D	7.2-8.5	8-11	17-20
<i>D. longicauda</i>	+	6	8-10	75-81	16-23	1.2-2.1*	R, P	6.5-11.7	6.7-12	17-23
<i>D. anchilispomus</i>	+	6	7.6-10.8	78-83	17-20	1.5-2.5*	R, D	11.1-13.3	[3.9-5.1]	50-67

<i>D. khani</i>	+	6	8-9	82-90	22	absent	P, D, R	12-18.5	2.9-5	< 67
<i>D. caudatus</i>	+	6	10	75	[22]	1*	R	10	[4.6]	33
<i>D. australiae</i>	+	6	9-10	80-82	18-19	0.5-1.2*	D	10.2-12.7	4-6	23-36
<i>D. clarus</i>	+	6	9-10	78-83	19	1.3-2.3*	R	12.8-15.4	4-5	49-54
<i>D. tatricus</i>	+	6	10-11	76-80	21-24	2.2-3.1*	P	13-17.4	5.1-6.3	38-40
						23-41**				
<i>D. dryadis</i>	+	6-8	10-11	80-83	23-31	61-86**	P	17-24	3.4-4.8	64-76
<i>D. destructor</i>	+	6	10-13	77-84	24-27	53-90**	R	14-20	3-5	50-70
<i>D. convallariae</i>	+	6	11-13.5	74-79	20-26	25-47**	P	12-15	4.5-6	50-66
<i>D. dipsacoides</i>	+	?	8.3-9	72-79	16	[1.5]*	R	12.3-17	[2.8]	75
<i>D. drepanocercus</i>	+	?	8-9	75-80	10	1*	sickle, m	16.2-18	[3.1]	50
<i>D. mirus</i>	+	?	8-9	83-85	17	50**	R	17-20	[2.4]	almost 100
<i>D. obesus</i>	+	?	10	79	?	> 1*	D	12.5	[4.3]	?
<i>D. petilus</i>	-	2	7.5	76	14	> 1*	P, ? D	18	[3.1]	88
<i>D. basiri</i>	-	4	6-7	73-75	13-15	2.3	R	8.8-10.4	5	< 50
<i>D. thornei</i>	-	4	6.4	76	?	< 1*	R, m	10	9	?
<i>D. antricolus</i>	-	4	6.6-7	71-72	?	< 1*	P, D	6.7-6.9	9.6-10	?
<i>D. loksai</i>	-	4	7.8	67	14	> 0.5*	R	6.3	8	[12]
<i>D. damubialis</i>	-	4	7.7	72-73	15-16	3.4-5.7*	P	9.3-10.4	6-8	17
<i>D. turfus</i>	-	4	7.5	71-85	19	1.5*	P	8.8-16	[3.8-5.8]	almost 100
<i>D. parasimilis</i>	-	4	7.5	81	[16] > 1*	P	16	[3]	67	
<i>D. cylindricollis</i>	-	4	7	90	20	1*	P	17	[4.1]	50
<i>D. acutus</i>	-	4	7-9	70-80	14-20	1.3-3*	P, D	5.6-12	4-9.2	12-40
						25-50**				
<i>D. cylindricus</i>	-	4	7-8	75-82	14	1.5-2*	R	7-11.4	4.8-6	29-30
						30-50**				
<i>D. paramonovi</i>	-	4	8-10	72-79	16-19	1.7-3.8*	P	7.9-12.1	5.9-8	29-41
						34-44**				
<i>D. oryzae</i>	-	4	8-9	74-76	19-21	1.5*	R	9	5.5	[40]
<i>D. attenuatus</i>	-	4	9-10	74-77	?	> 2*	P	13-16	[7.5]	?
<i>D. singhi</i>	-	4	9	77	13-15	> 1.5*, 50**	R	8.3	6-7	33
<i>D. websteri</i>	-	4	8-9	80-82	11-13	1.5*	P	10.5-13.7	4	20
<i>D. bhātnagari</i>	-	4	9-10	80-82	17-19	< 1*	R	11.2-17.5	[4.2]	> 50
<i>D. phyllobius</i>	-	4	9-10	78-84	18-22	1.6-2.4*	R	11.4-17.6	2.9-4.5	52-77
						45-77**				
<i>D. truncatus</i>	-	4	11.2-12.5	57-66	?	1.2*, 14-20**	D	6.3-7.4	7-7.5	?
<i>D. adasi</i>	-	4	11-13	68-76	22-24	1.2-2.3*	R, D	8.7-10.1	5.1-7.5	31-43
						16-34**				
<i>D. utschini</i>	-	4	12-13.5	75-79	13-15	2*	P, ? D	9.8-11.2	6.7	up to 50
<i>D. drymocolus</i>	-	5	11-12	81-85	18-21	[< 1]*	P	9.7-11.8	[4.9]	[31]
<i>D. varaprasadi</i>	-	6	6-8	79-80	18-21	> 1*	R	13	4-5	50
<i>D. medians</i>	-	6	6.5-8	79-84	15-18	1.3-2.6*	R	10.9-14	3.7-4.6	27-84
						39-65**				
<i>D. hexaglyphus</i>	-	6	7-8.5	82-84	21-22	0.5-1*	R	11.5-14.5	3.6-5.1	38-46
						18-21**				
<i>D. taylori</i>	-	6	8-9	75-77	20	2-3*	R	10-11	6-7	> 50
<i>D. affinis</i>	-	6	8-9	76-80	15-17	1.1-1.3*	R	9.2-11.7	4.7-7.3	50
<i>D. uniformis</i>	-	6	8.4	80	?	1.2-1.4*	P	12.5	[4.6]	?
<i>D. citri</i>	-	6	8-10	78-80	20-22	2*	P, D	12-15	4-6	75
<i>D. kheirii</i>	-	6	8-9	78-83	16	1.5-2.6*	R	10-14.3	3.4-6	33
<i>D. tuberosus</i>	-	6	9	81-82	?	2-2.4*	R	13-15	4-5.2	?
						50**				
<i>D. fotedari</i>	-	6	9	84-86	17	> 1*	P, ? D, ? R	14-16	4	?
<i>D. major</i>	-	6	10	82	[17]	33-50**	R, D	14	[3.2]	50
<i>D. similis</i>	-	6	10	84	22	1*	D	17	[2.9]	< 75
<i>D. buckleyi</i>	-	6	11	71	15	> 50**	P	11.2	[4.8]	33
<i>D. goldeni</i>	-	6	11-12	82-83	20-21	0.5*	P, D, R	12-14	3.3-3.8	> 50
<i>D. montanus</i>	-	6	12-14	80-83	?	50**	P	12-13	/	?

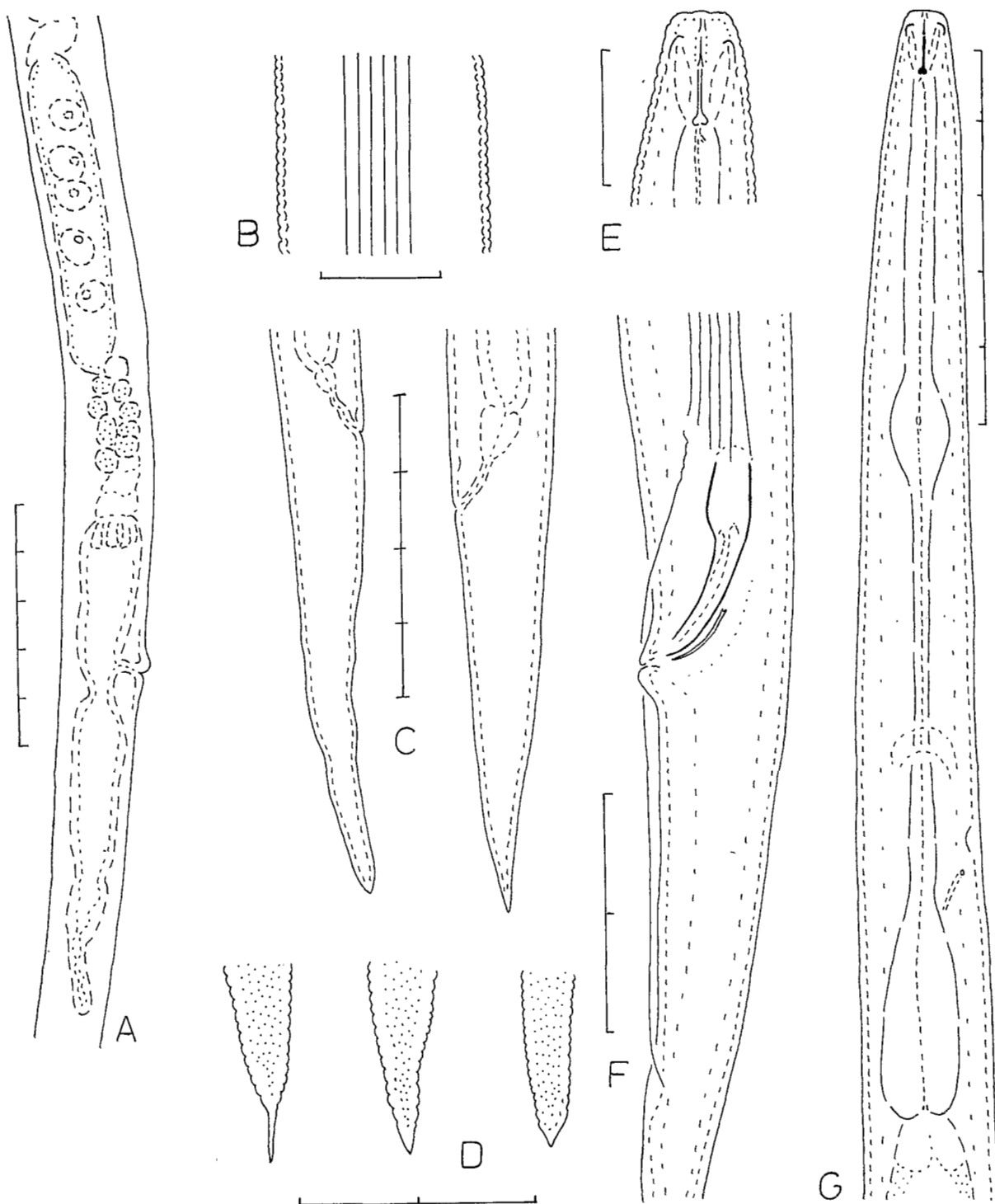


Fig. 1. *Ditylenchus acutatus* sp. n. — A : Part of female reproductive system; B : Lateral field; C : Female tail; D : Tail terminus; E : Head; F : Male cloacal region; G : Oesophageal region. (Smallest unit of scale bar = 10 μ m.)

posterior part of isthmus or junction of isthmus and basal bulb. Vulval lips sometimes protruding, vagina thin walled. PUS length equals 3.5 (2.8-4.1) VBD, or 52 (45-59) % VA. Post-vulval part of body 16.4 (13.9-18.9) ABD long. Body width at vulva 1.6-1.8 of the anal diameter. Tail tapers evenly to more or less pointed terminus.

Male : Similar to females except for genital tract. Spicules only slightly bent. Bursa narrow, 2.2-4.2 ABD long, reaching 23-57 % of tail length.

HABITATS AND LOCALITIES

Type locality : Poland, Puszcza Biata, found in moss in a pine forest. Also collected in Poland, Puszcza Białowieska, in sandy soil around roots of grasses.

TYPE SPECIMENS

Holotype female and *paratypes* (two females and one male) deposited in nematode collection of the Instytut Zoologii PAN, ul. Wilcza 64, Warszawa, Poland.

DIAGNOSIS AND RELATIONSHIPS

D. acutatus sp. n. is distinctive because of six incisures, short stylet with small knobs, muscular oesophageal bulb, position of vulva, long PUS and tail evenly tapering to a pointed tip.

D. acutatus sp. n. resembles *D. tenuidens*, from which it differs by having longer PUS, shorter and thicker tail, more delicate stylet with smaller knobs and more posterior position of excretory pore. The new species may also be compared with *D. valveus*, which has shorter PUS, smaller c value and differently shaped tail.

REMARK

The specific name *acutatus* refers to pointed tail tip.

***Ditylenchus acutus* (Khan, 1965)
Fortuner & Maggenti, 1987
(Fig. 2)**

MEASUREMENTS

Females

Poland, Tarnów (n = 5). L = 653 (620-710); oes. = 127 (114-133); ex. p. = 93 (89-101); tail = 73 (69-77); a = 30 (26-33); b = 5.1 (4.7-5.7); MB = 44 (43-46); c = 9.0 (8.1-9.8); c' = 6.0 (5.4-6.7); VA/T = 1.3-1.5; V' = 82 (81-84); V = 73 (71-75); st. = 8-10.

Poland, Radom (n = 1). L = 687; oes. = 134; ex. p. = 95; tail = 69; a = 33; b = 5.1; MB = 38; c = 10.0; c' = 6.1; VA/T = 1.5; V' = 83; V = 75; st. = 8.5.

Poland, Kucharki (n = 5). L = 726 (679-766); oes. = 123 (108-131); ex. p. = 96-99; tail = 76

(70-82); a = 31 (27-38); b = 6.0 (5.2-7.1); MB = 45 (43-48); c = 9.2-9.8; c' = 5.1-6.8; VA/T = 1.6 (1.4-1.7); V' = 82 (81-84); V = 73 (72-75); st. = 7.5-8.0.

Poland, Potaniec (n = 1). L = 840; oes. = 148; ex. p. = 111; tail = 92; a = 37; b = 5.7; MB = 44; c = 9.2; c' = 6.4; VA/T = 1.4; V' = 83; V = 74; st. = 8.

Poland, Teodorów (n = 1). L = 646; oes. = 121; ex. p. = 95; tail = 71; a = 31; b = 5.4; MB = 44; c = 9.1; c' = 5.8; VA/T = 1.3; V' = 84; V = 75; st. = 9.

Poland, Kodrąb (n = 3). L = 769 (695-845); oes. = 135 (129-144); ex. p. = 110 (99-126); tail = 79 (74-87); a = 33 (29-37); b = 5.4-5.9; MB = 44 (42-46); c = 9.4-9.9; c' = 5.0-6.0; VA/T = 1.4-1.5; V' = 84 (82-85); V = 75 (73-76); st. = 9.

Poland, Morgi (n = 1). L = 726; oes. = 131; ex. p. = 101; tail = 78; a = 37; b = 5.6; MB = 43; c = 9.3; c' = 6.3; VA/T = 1.4; V' = 83; V = 74; st. = 9.

Poland, Ruszkowice (n = 1). L = 767; oes. = 147; ex. p. = 104; tail = 83; a = 31; b = 5.2; MB = 41; c = 9.2; c' = 5.4; VA/T = 1.5; V' = 82; V = 73; st. = 7.5.

Poland, Puszcza Białowieska (n = 3). L = 651 (559-798); oes. = 128 (108-165); ex. p. = 93 (83-114); tail = 69 (63-82); a = 32-36; b = 4.8-5.4; MB = 40 (36-43); c = 8.9-9.7; c' = 5.5-6.2; VA/T = 1.4; V' = 83-84; V = 73-75; st. = 8-9.

Poland, Btonie (n = 3). L = 743 (624-881); oes. = 122 (110-130); ex. p. = 96 (84-103); tail = 79 (72-83); a = 35 (32-40); b = 5.6-6.2; MB = 44 (41-47); c = 8.8-9.3; c' = 6.2 (5.7-7.0); VA/T = 1.2-1.3; V' = 82-84; V = 73-75; st. = 7.5-8.

Poland, Gościcino (n = 1). L = 636; oes. = 117; ex. p. = 96; tail = 69; a = 36; b = 5.4; MB = 41; c = 9.2; c' = 6.1; VA/T = 1.4; V' = 83; V = 74; st. = 8.5.

Poland, Dulcza (n = 2). L = 591, 606; oes. = 111, 114; ex. p. = 80, 85; tail = 56, 74; a = 29; b = 5.3; MB = 44, 46; c = 8.2, 10.6; c' = 4.5, 6.0; VA/T = 1.4, 1.5; V' = 80, 84; V = 70, 76; st. = 7.5, 8.

Poland, Kochów (n = 3). L = 839 (808-877); oes. = 140 (131-145); ex. p. = 103-104; tail = 86 (81-95); a = 45 (43-47); b = 6.0 (5.6-6.7); MB = 39-41; c = 9.7 (8.8-10.5); c' = 7.7 (6.8-9.2); VA/T = 1.5 (1.3-1.7); V' = 82-84; V = 74-76; st. = 9.

Poland, Puszcza Bolimowska (n = 2). L = 852, 995; oes. = 147, 149; ex. p. = 105, 112; tail = 96, 97; a = 34, 44; b = 5.7, 6.8; MB = 37, 38; c = 8.9, 10.4; c' = 6.6, 6.7; VA/T = 1.4; V' = 82, 85; V = 72, 77; st. = 9.5, 10.

Poland, Hrubieszów (n = 1). L = 808; oes. = 141; ex. p. = 112; tail = 84; a = 52; b = 5.7; MB = 37; c = 9.6; c' = 9.1; VA/T = 1.5; V' = 83; V = 74; st. = 8.

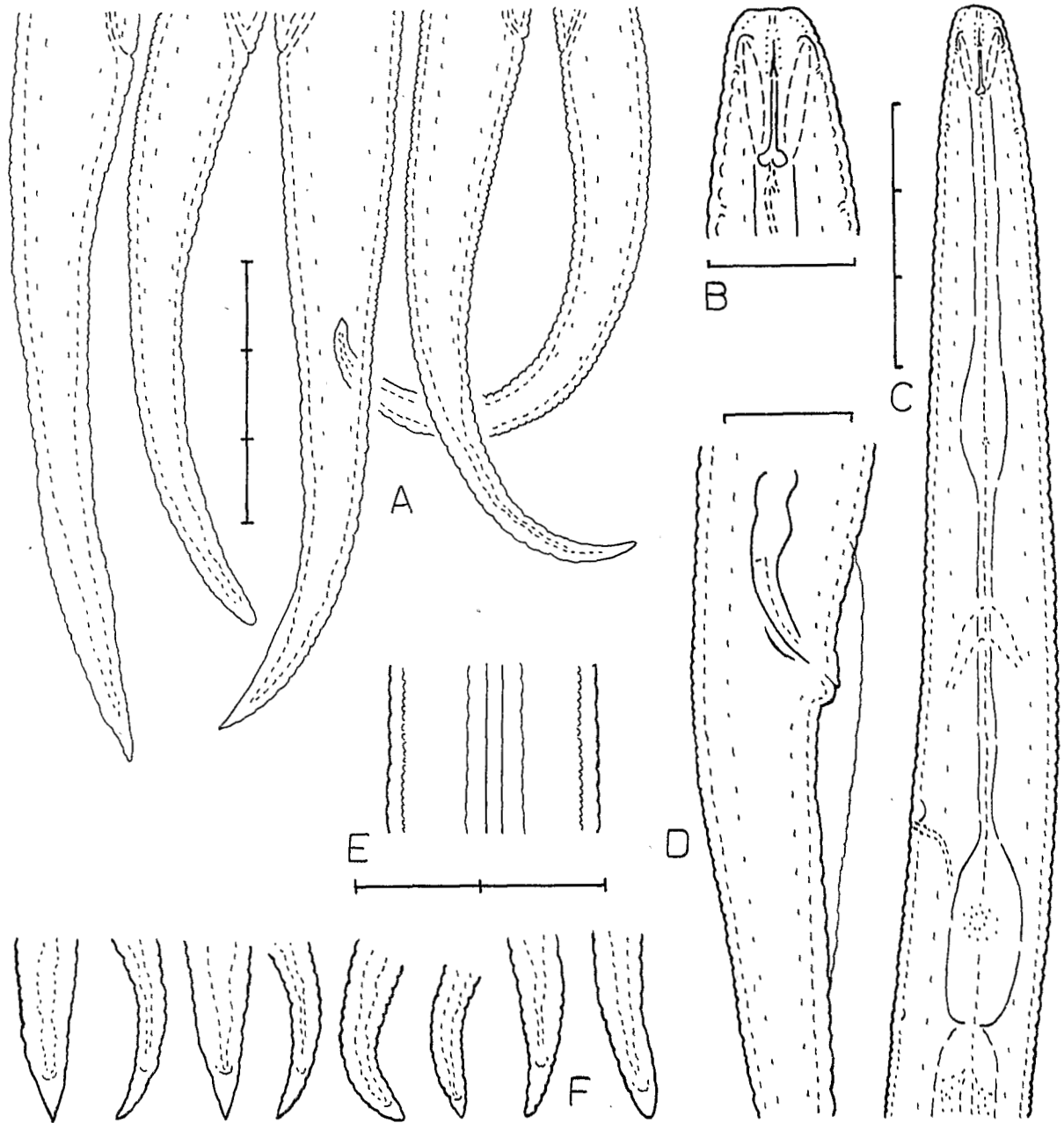


Fig. 2. *Ditylenchus acutus*. — A : Posterior part of female; B : Head; C : Oesophageal region; D : Male cloacal region; E : Lateral field; F : Tail terminus. (Smallest unit of scale bar = 10 μ m.)

Poland, Studzienna (n = 5). L = 1 000 (896-1 099);
oes. = 137 (135-140); ex. p. = 110 (105-114); tail = 88
(78-98); a = 43 (38-45); b = 7.3 (6.6-8.1); MB = 41
(39-44); c = 11.3 (10.6-12.1); c' = 6.5 (5.1-7.6);

VA/T = 1.7 (1.4-2.0); V' = 84 (81-87); V = 76
(73-79); st. = 9-9.5.

Switzerland, Thalwil (n = 2). L = 785, 905;
oes. = 134, 143; ex. p. = 95, 102; tail = 82, 69;

a = 33; b = 5.1, 5.5; MB = 38, 43; c = 9.5, 10.0; c' = 6.1, 6.2; VA/T = 1.3, 1.5; V' = 83, 85; V = 75, 76; st. = 8.5.

Males

Poland, Tarnów (n = 1). L = 655; oes. = 137; ex. p. = 93; tail = 87; a = 40; b = 4.8; MB = 41; c = 7.6; c' = 6.5; spicule = 17.5; st. = 7.5.

Poland, Kucharki (n = 2). L = 604, 659; oes. = 118, 124; ex. p. = 84, 97; tail = 70, 80; a = 32, 36; b = 5.1, 5.3; MB = 42, 46; c = 8.2, 8.6; c' = 6.0, 6.2; spicule = 16; st. = 7.5-8.

Poland, Puszczka Białowieska (n = 1). L = 544; oes. = 112; ex. p. = 82; tail = 73; a = 35; b = 4.8; MB = 40; c = 7.4; c' = 6.5; spicule = 17; st. = 8.

Poland, Btonie (n = 4). L = 590 (526-692); oes. = 110 (105-115); ex. p. = 84 (79-94); tail = 72 (67-80); a = 34-36; b = 5.4 (4.8-6.0); MB = 42-43; c = 8.2 (7.9-8.6); c' = 6.0 (5.2-6.8); spicule = 17 (15-20); st. = 7-8.

Poland, Kochów (n = 4). L = 771 (719-844); oes. = 144 (140-149); ex. p. = 99 (95-105); tail = 86 (81-94); a = 48-51; b = 5.0-5.6; MB = 39-40; c = 8.8-9.0; c' = 7.5 (7.2-7.8); spicule = 17.5 (16-19); st. = 8.

Poland, Puszczka Bolimowska (n = 1). L = 982; oes. = 160; tail = 81; a = 50; b = 6.1; MB = 35; c = 12.1; c' = 6.1; spicule = 18; st. = 8.

Switzerland, Thalwil (n = 2). L = 694, 744; oes. = 129, 140; ex. p. = 104, 105; tail = 81, 89; a = 37, 38; b = 5.3, 5.4; MB = 41, 46; c = 7.9, 9.1; c' = 5.6, 6.1; spicule = 19; st. = 9.

DESCRIPTION

Female : Body slightly ventrally arcuate to almost straight when relaxed, more curved in posterior part. Lateral field with four incisures, occasionally two additional faint lines could be observed at spermatheca level. Cuticular annuli at mid-body about 1.2-1.6 μm wide. Head low, with one or two annuli usually 6-7 μm wide. Stylet cone about one-third of stylet length, size of knobs somewhat variable as the longer specimens have larger knobs. Median bulb without lumen wall thickenings, mostly elongated, fusiform, occasionally slightly wider than illustrated. Basal bulb elongated, offset from intestine. Excretory pore opposite posterior part of isthmus, 78 (67-87) % of oesophagus length from anterior end. Vulva mostly within limits V = 73-77. PUS length equals 2.1 (1.3-3.0) VBD or 36 (25-51) % VA. Post-vulval part of body 14.9 (11.1-22.1) ABD long (71 % of females within 13-17). Body width at vulva 1.5 (1.3-1.8) ABD (68 % of females within 1.5-1.6). Tail elongated conical, tip pointed, dull or rounded.

Male : Similar to female. Gubernaculum 4-5 μm . Caudal alae length 2.4 (1.7-3.2) ABD; exceptional male

with bursa 4.2 ABD long. Alae extends along 25 (12-41) % of tail length, mostly 18-30 %.

HABITATS AND LOCALITIES

Most *D. acutus* examined were collected in cultivated sandy soils. One population came from sand of the bottom of temporarily drying ditch. *D. acutus* was described from India; many collections from Poland and one from Switzerland were examined.

VOUCHER SPECIMENS

Specimens are deposited at the nematode collection of the Instytut Zoologii PAN, Warszawa, Poland, and in author's collection.

DIAGNOSIS AND RELATIONSHIPS

The species is distinct because of four incisures, low head, stylet mostly 7.5-9 μm , non-muscular fusiform median bulb, position of vulva (V mostly 73-77), PUS length (25-51 % VA) and conical tail mostly 5-9 of ABD long. Medium sized bursa and spicules 15-20 μm long further contribute to species characterization.

The measurements of *D. acutus* are similar to that of *D. oryzae* and *D. attenuatus* (Table 1). The former needs to be restudied as indicated by Sumenkova (1975), but is drawn with distinctly clavate tail. The latter differs from *D. acutus* mainly by having very long basal bulb of about one-third of total oesophagus length, probably thinner body (a = 53-59) and much longer vulva-anus distance in relation to tail length.

REMARKS

Six species are herein synonymised, *D. acutus* having priority. Diagnostic characteristics given in descriptions of these species are presented in Table 2. Most of these characteristics strongly overlap or are bridged by other species. Two of these, namely tail tip and position of vulva, require discussion.

Tail terminus of examined specimens is essentially pointed. However, the very short terminal part of tail, some 1-2 μm or less, can be easily broken resulting in rounded tip. As most of the discussed species are based on few specimens, this character cannot be considered as having taxonomic value.

V varies from 70 to 82, a rather large variation. However, the variations for *D. acutus* and *D. elongatus*, species with extreme values, remain unknown as no means were calculated. Both these species have at least some specimens with V very close to the mean for all populations. Although V is very stable, specimens with unusually long or short body parts (mostly vulva-anus) are known for many species. This results in smaller or greater V values. As all other characteristics of the species named in the Table 2 agree, these species are considered as being conspecific.

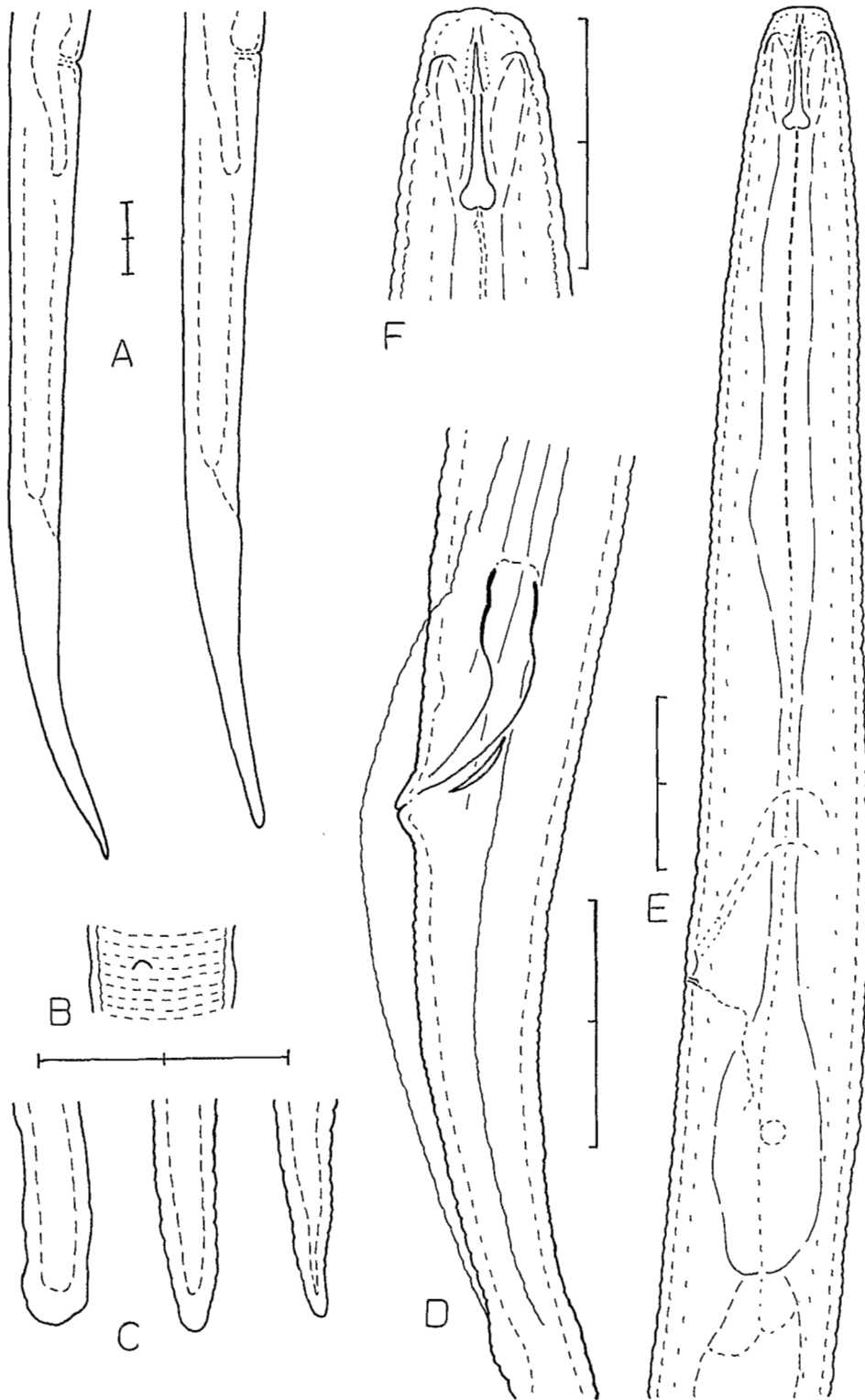


Fig. 3. *Ditylenchus adasi*. — A : Posterior part of female; B : Anus, ventral; C : Tail terminus; D : D : Male cloacal region; E : Oesophageal region; F : Head. (Smallest unit of scale bar = 10 μ m.)

Table 2
 Characteristics of species synonymised with *Ditylenchus acutus*

Species and number of specimens	Body length mm	c	c'	V	Stylet	Spicule	PUS	Tail tip	Tail shape description	Bursa in relation to tail	VA/T
<i>D. acutus</i> (1) 6 ♀, 4 ♂	0.39-0.57	8-11	6	70-76	7-9	12-15	> 1.5* < 1/3**	P	ventrally arcuate	1/3	1.06
<i>D. alliphilus</i> (1) 1 ♀, 2 ♂	0.50	10	4.4	75	7	15-16	1.4* ab 1/3**	R	bent	2/5	1.5
<i>D. cylindricus</i> (1) 4 ♀, 2 ♂	0.54-0.57	10-11.4	4.8	78-81	7-8	14	1.5* 1/2**	R	slightly arcuate	< 1/3	< 1
<i>D. elongatus</i> (1) 6 ♀, 2 ♂	0.58-0.64	7-10	5-6	75-82	6-9	13-15	1.75-2* < 1/3**	R	drawn arcuate	2/7	Over 1
<i>D. paramonovi</i> (1) 3 ♀, 2 ♂	0.66-0.67	7.9-8.0	7-8	71.7-72.6	8-8.5	16-16.5	2*	P (? D)	drawn straight	1/3	1.2-1.3
<i>D. saxenai</i> 4 ♀	0.58 (2) 0.5-0.64	6.6 (2) 6.5-7	6	75 (2) 74-76	8-9	?	present	P	ventrally arcuate	?	?
<i>D. srinagarensis</i> (1) 3 ♀	0.6-0.65	9-11	4	79-81	8	?	> 1*	P	drawn arcuate	?	?

(1) no mean values are given; (2) mean; * PUS length in relation to ABD; ** PUS length in % of VA; > : slightly more than; < : slightly less than; ? : no information available.

***Ditylenchus adasi* (Sykes, 1980)
 Fortuner & Maggenti, 1987
 (Fig. 3)**

MEASUREMENTS

Females

Poland, Steżyca (n = 16). L = 838 (785-869); oes. = 156 (147-171); ex. p. = 113 (106-118); tail = 89 (84-96); a = 36 (33-39); b = 5.4 (5.0-5.9); MB = 44 (39-46); c = 9.5 (8.8-10.2); c' = 6.1 (5.1-6.7); VA/T = 1.6 (1.4-1.8); V' = 81 (79-83); V = 72 (71-74); st. = 12.2 (12-13).

Poland, Płońsk (n = 7). L = 869 (725-967); oes. = 165 (151-183); ex. p. = 128 (117-136); tail = 92 (82-100); a = 40 (35-47); b = 5.3 (4.6-6.3); MB = 42 (40-44); c = 9.4 (8.7-10.1); c' = 6.3 (5.8-6.9); VA/T = 1.4 (1.2-1.6); V' = 83 (81-84); V = 74 (72-76); st. = 11.5 (10.5-12).

Poland, Kamienica Szlachecka (n = 2). L = 845, 889; oes. = 153; ex. p. = 109, 114; tail = 90, 96; a = 39, 40; b = 5.5, 5.8; MB = 43, 44; c = 9.3, 9.4; c' = 6.6, 6.7; VA/T = 1.5; V' = 81, 82; V = 73; st. = 12.

Poland, Gdynia-Cisowa (n = 2). L = 859, 874; oes. = 154, 164; ex. p. = 118, 122; tail = 88, 92; a = 40, 44; b = 5.3, 5.6; MB = 41, 45; c = 9.5, 9.8; c' = 6.4, 7.1; VA/T = 1.4, 1.5; V' = 83, 84; V = 74, 75; st. = 12, 13.

Poland, Wojciechów (n = 2). L = 845, 865; oes. = 150, 153; ex. p. = 115, 116; tail = 124, 136;

a = 43, 44; b = 5.5, 5.8; MB = 45; c = 9.0, 9.3; c' = 6.9, 7.0; VA/T = 1.3, 1.5; V' = 82, 84; V = 73, 75; st. = 11.

Poland, Ruszkowice (n = 1). L = 907; oes. = 165; ex. p. = 124; tail = 96; a = 42; b = 5.5; MB = 42; c = 9.5; c' = 5.2; VA/T = 1.5; V' = 83; V = 74; st. = 11.

Males

Poland, Steżyca (n = 5). L = 738 (705-775); oes. = 148 (144-156); ex. p. = 103 (99-106); tail = 85 (83-88); a = 40 (37-42); b = 5.0 (4.8-5.1); MB = 42 (40-45); c = 8.6 (8.4-8.8); c' = 5.9 (5.5-6.3); spicule = 23 (22-24); st. = 11-11.5.

DESCRIPTION

Female : Body slightly ventrally arcuate or straight. Cuticular annuli 1.2-1.8 µm wide. Lateral field with four distinct incisures. Head with two or three annuli, 8-9 µm wide. Stylet robust, cone about one-third of stylet length, knobs large, rounded to slightly sloping posteriorly. Stylet length of majority of females 11-12 µm long, only one female with st. = 10.5 and three other st. = 13 were seen out of 31 females measured. Median oesophageal bulb indistinct, fusiform, without thickenings of lumen walls. Basal bulb always offset from intestine. Excretory pore opposite junction of isthmus and basal bulb. In most females V = 72-75, but a single female was found with abnormally long vulva anus

distance resulting in $V = 65$, $V' = 73$ and postvulval body part 18.8 ABD long. PUS length 1.6 (1.2-2.3) VBD, or 24 (16-34) % of vulva anus distance. Postvulval part of body 15.9 (12.7-17.9) ABD long. Tail tapers evenly, annulation often indistinct or disappears near tail end, tip rounded to dull.

Male : Similar to female. Spicules slightly bent, gubernaculum 5-7 μm long. Bursa length = 4.9 (3.7-6.6) ABD, extending along 38 (31-43) % of tail length.

HABITATS AND LOCALITIES

This species has been described from England from loamy sand soil, and then found again in few localities in Poland, always in wet sandy or low peat soil.

VOUCHER SPECIMENS

Examined specimens are deposited in the nematode collection of the Instytut Zoologii PAN, Warszawa, Poland, and in the author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. adasi is distinctive because of four incisures, robust stylet with large knobs, indistinct non-muscular median bulb, position of vulva (mostly $V = 72-75$), thick tail with rounded tip and long spicules (22-24 μm).

Having four incisures, non-muscular median bulb and long stylet *D. adasi* is close to *D. utschini* and *D. truncatus*. It differs from the former in cephalic skeleton structure, longer spicules, slightly more anterior vulva and tail tip (in *D. utschini* basal plate of cephalic skeleton is described as strongly refractive, spicule = 13-15 μm , $V = 75-78.6$, tail tip described as pointed but drawn dull). *D. adasi* differs from *D. truncatus* by position of vulva, shape of head, PUS length and tail shape (in *D. truncatus* $V = 56.7-66.4$, head is described and drawn as high and trapezoid, PUS length equals 1.21-1.23 VBD, tail tapers in anterior part and then is thin, cylindrical). The head shape, anterior vulva and thin tail may suggest *D. truncatus* belongs to *Boleodorus*. However, it is not removed from *Ditylenchus* because specimens were not examined.

Ditylenchus apus sp. n.

(Fig. 4 A-C)

MEASUREMENTS

Females

Paratypes (n = 2). L = 473, 543; oes. = 100, 102; oes. to end of glandular lobe = 149, 159; ex. p. = 74, 80; tail = 43, 50; a = 31; b = 4.6, 5.4; b' = 3.2, 3.4; c = 10.8, 10.9; c' = 4.1, 4.2; VA/T = 1.6, 1.8; V' = 82, 84; V = 75, 76; st. = 8.

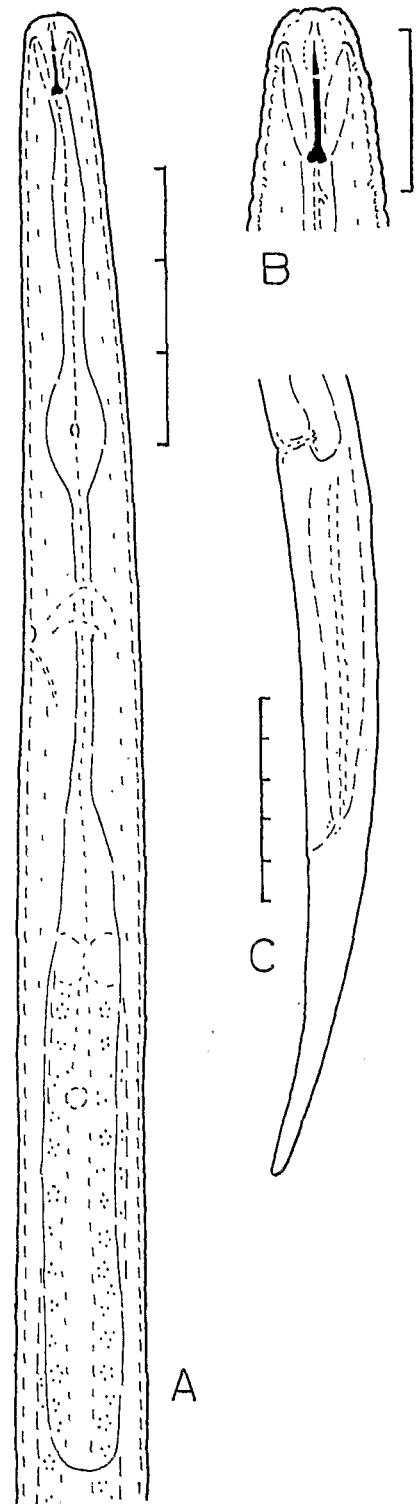


Fig. 4. *Ditylenchus apus* sp. n. — A : Oesophageal region; B : Head; C : Posterior part of female. (Smallest unit of scale bar = 10 μm .)

Poland, Kochów (n = 1). L = 572; oes. = 110; oes. to end of glandular lobe = 167; ex. p. = 82; tail = 60; a = 37; b = 5.2; b' = 3.4; c = 9.6; c' = 5.3; VA/T = 1.4; V' = 83; V = 75; st. = 8.

Holotype. L = 515; oes. = 73; dist. heart to end oes. lobe = 167; ex. p. = 73; tail = 52; a = 33; b = 4.9; b' = 3.1; c = 10.0; c' = 5.0; VA/T = 1.5; V' = 83; V = 75; st. = 8.

DESCRIPTION

Female: Body of relaxed specimens straight. Cuticle less than 1 μm thick, annuli fine and indistinct. Lateral field with six incisures. Head finely striated, 5-6 μm wide. Stylet thin, cone shorter than shaft, knobs small, rounded to slightly sloping posteriorly. Metacorporal bulb oval in outline, muscular, with small thickenings of lumen walls. Oesophageal glands form long lobe overhanging intestine. No sperm seen in any of the four examined females. PUS 3-7 μm long or 0.2-0.4 VBD, or 4-9% VA. Post-vulval part of body 10.5-12.8 ABD long. Body width at vulva level 1.3-1.4 of that at anus level. Tail conical, thick, almost cylindrical in posterior half, tip rounded.

Male: not found.

HABITATS AND LOCALITIES

Type specimens found in Poland, Ożarów Mazowiecki, in loamy soil around celeriac roots on Mr. Barszczewski's farm. Also found in Poland, Kochów, in cultivated field soil.

TYPE SPECIMENS

Holotype and paratypes kept in nematode collection of the Instytut Zoologii PAN, Warszawa, Poland. One female from Kochów in author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. apus is very distinctive because of short stylet, long oesophageal lobe, very short PUS and rather thick tail with rounded tip.

Among species with long oesophageal lobe *D. apus* may be immediately recognised by very short PUS.

Ditylenchus emus Khan, Chawla & Prasad, 1969 (Fig. 5)

MEASUREMENTS

Female

Poland, Niegostawice (n = 2). L = 802, 983;

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oes. = 140, 141; ex. p. = 108, 119; tail = 67, 74; a = 38, 39; b = 5.7, 7.0; MB = 45, 47; c = 12.0, 13.2; c' = 5.0, 5.3; VA/T = 1.6; V' = 86, 87; V = 79, 80; st. = 8.

Male

Poland, Niegostawice (n = 5). L = 610 (517-710); oes. = 122 (117-130); ex. p. = 90 (80-99); tail = 58 (48-70); a = 35 (31-38); b = 5.0 (4.3-5.5); MB = 45 (40-49); c = 10.7 (9.6-12.3); c' = 4.4 (3.9-4.9); spicule = 15-16; st. = 8 (7-9).

DESCRIPTION

Female: Lateral field with four incisures, the outer weakly crenated. Head width 5-6 μm . Stylet weak, cone about one-third of stylet length, knobs rounded. Posterior blades of cephalic framework appear to extend slightly more than in other species of the genus. Median bulb muscular with very small thickenings of lumen walls. Posterior bulb short and offset from intestine. Excretory pore opposite posterior part of isthmus. PUS length equals 2.0-2.2 VBD or 37-39% VA. VBD equals 1.4-1.6 ABD. Post-vulval body part equals 12.8-13.9 ABD. Tail conical, more or less ventrally arcuate, with rounded tip.

Male: Similar to female. Bursa 2.2 (1.9-3.1) ABD long, reaching to 27 (24-30)% of tail length.

HABITAT AND LOCALITY

D. emus was described from India, and found again in Poland, Niegostawice, in soil around parsley roots.

VOUCHER SPECIMENS

Examined specimens are deposited in the nematode collection of the Instytut Zoologii PAN, Warszawa, Poland.

DIAGNOSIS AND RELATIONSHIPS

D. emus is characterised by four incisures, medium sized stylet with distinctly rounded knobs, muscular median bulb, posterior position of vulva, PUS reaching about one-third of vulva-anus distance and rounded tail tip.

Because of the similar measurements and some other features (Table 1) *D. emus* appears close to *D. equalis* and *D. terricolus*. It differs from the former by having rounded tail tip and longer PUS. *D. emus* differs from *D. terricolus* by having more posterior vulva, shape of stylet knobs and possibly also slightly shorter spicules.

REMARKS

Description of this species contain some errors. Body length of holotype female is given 0.8 mm, V = 65 and

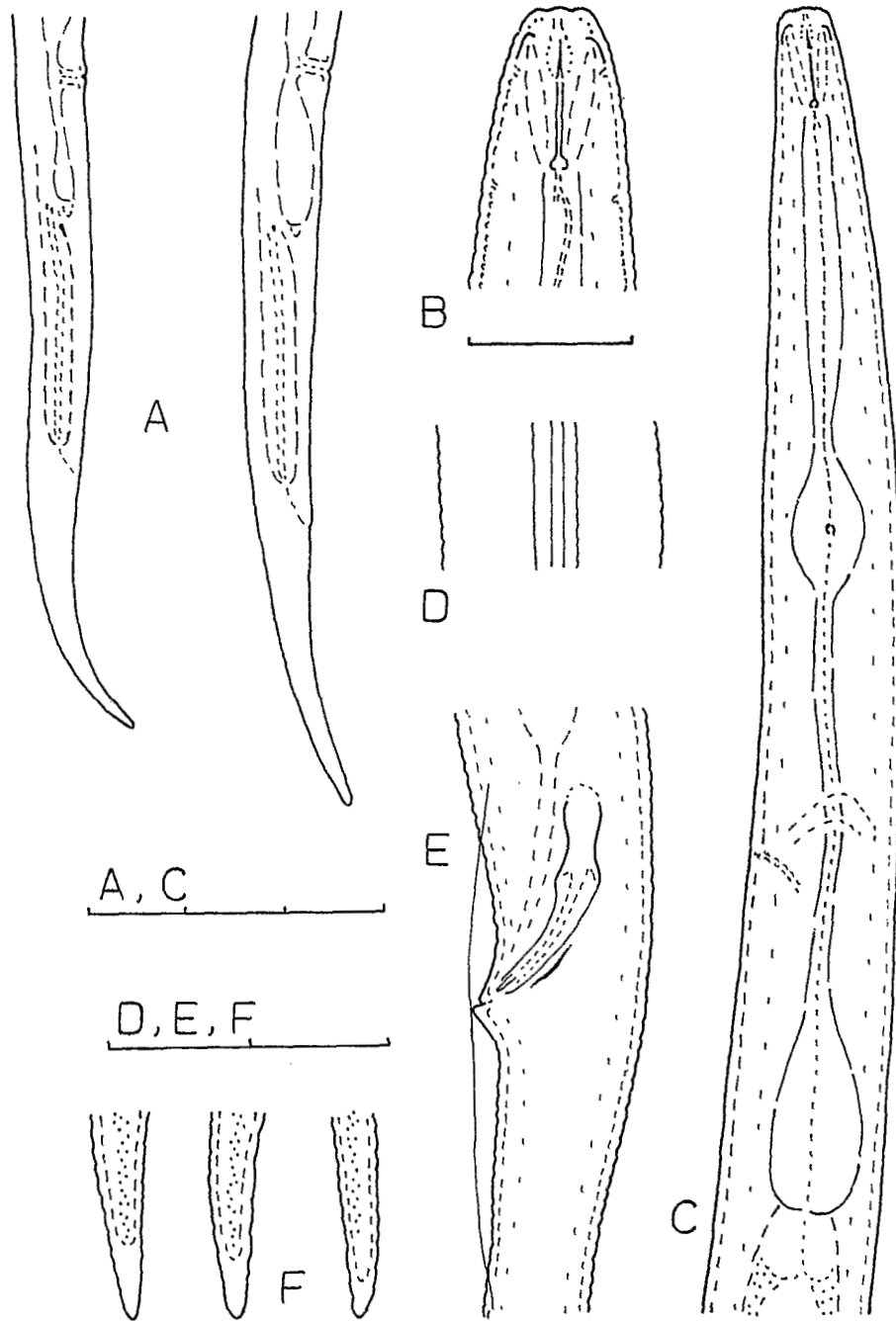


Fig. 5. *Ditylenchus emus*. — A : Posterior part of female; B : Head; C : Oesophageal region; D : Lateral field; E : Male cloacal region; F : Tail terminus. (Smallest unit of scale bar = 10 μ m.)

$c = 14$. From this data the distance from head to vulva can be calculated as 520 μ m, vulva to anus 223 μ m, and tail 57 μ m. Thus $VA/T = 3.9$, a value unusually high among *Ditylenchus* species. However, Fig. E of the description shows vulva-anus distance 92 μ m, tail length

on Fig. E equals 58 μ m and on Fig. B 62 μ m respectively. Accepting the drawings are correct, the distance from head to vulva should be corrected to 648 μ m, and then $V = 81$, $V' = 88$ and $VA/T = 1.5$. These data correspond to described population from Poland.

***Ditylenchus equalis* Heyns, 1964**

MEASUREMENTS

Females

Paratypes (n = 5). L = 858 (822-885); oes. = 125 (114-134); ex. p. (n = 4) = 96 (92-102); tail = 83-84; a = 38 (34-40); b = 6.9 (6.6-7.3); MB = 43 (40-50); c = 10.2 (9.8-10.6); c' = 6.0 (5.9-6.2); VA/T = 0.9-1.0; V' = 90 (89-91); V = 81-82; st. = 8.

Poland, Nowa Wieś (n = 7). L = 884 (695-1008); oes. = 137 (125-150); ex. p. (n = 6) = 103 (98-108); tail = 89 (61-104); a = 37 (29-42); b = 6.4 (5.2-7.0); MB = 39-40; c = 10.0 (9.2-11.4); c' = 6.3 (4.5-7.1); VA/T (n = 5) = 1.0 (0.9-1.2); V' (n = 5) = 88-89; V (n = 5) = 79 (78-81); st. = 7-8.

Poland, Puszcza Białowieska (n = 10). L = 546 (485-670); oes. = 112 (101-125); ex. p. = 88 (85-98); tail = 50 (42-63); a = 29 (26-32); b = 4.9 (4.3-5.5); MB = 42 (40-44); c = 10.9 (9.1-13.1); c' = 4.5 (3.9-5.1); VA/T = 1.3 (0.9-1.5); V' = 88 (85-90); V = 80 (77-82); st. = 7.2 (6.5-8.0).

Poland, Borki (n = 3). L = 688 (650-744); oes. = 118-119; ex. p. = 98 (94-105); tail = 66-69; a = 36 (33-40); b = 5.8 (5.5-6.2); MB = 42-44; c = 10.2 (9.6-10.8); c' = 5.4 (4.9-5.8); VA/T = 0.9-1.1; V' = 89-90; V = 80-81; st. = 8.

Males

Poland, Nowa Wieś (n = 1). L = 663; oes. = 126; ex. p. = 85; tail = 82; a = 37; b = 5.3; MB = 39; c = 8.0; c' = 6.7; spicule = 17; st. = 7.

Poland, Puszcza Białowieska (n = 2). L = 476, 478; oes. = 103, 111; ex. p. = 79, 81; tail = 50, 54; a = 31, 39; b = 4.3, 4.6; MB = 45; c = 8.9, 9.5; c' = 5.0, 5.2; spicule = 14; st. = 6.5, 7.

Poland, Borki (n = 2). L = 554, 646; oes. = 116, 118; ex. p. = 93, 97; tail = 60, 72; a = 36, 42; b = 4.7, 5.5; MB = 43, 44; c = 9.0, 9.3; c' = 5.3, 6.4; spicule = 14, 15.5; st. = 8.

DESCRIPTION

Female : Body of relaxed specimens usually bent ventrally near vulva. Lateral field with four incisures. Head striation not seen, head width 5-6 μm . Stylet delicate, cone shorter than shaft, knobs small and rounded. Median oesophageal bulb muscular, with small thickenings of lumen walls. Basal bulb always offset from intestine. Vulva position mostly V = 77-82 and V' = 88-91, although two females with V = 75-76 and V' = 83-84 were found in population from Puszcza Białowieska (these are not included in the measurements). PUS length in most females 0.9-1.1 of VBD or

15-27 % of vulva anus distance. Specimens from Borki had PUS = 1.4-1.7 VBD or 38-46 % VA, and one female from Puszcza Białowieska PUS = 2.1 VBD or 58 % VA. VBD equals 1.4-1.7 ABD. Post-vulval part of body 10.0 (8.0-12.1) ABD long in three populations, but 13.8 (10.1-16.9) in population from Nowa Wieś. Tail terminus pointed to dull.

Male : Similar to female. Bursa length 3.1 (2.7-3.4) ABD, extends along 31 (28-34) % of tail length. Gubernaculum length 4-5 μm .

HABITATS AND LOCALITIES

This species has been first described from a field in Transvaal, Republic of South Africa, and then described again as *D. sibiricus* from barley field in Tomsk province, USSR. Present specimens were collected in dry moss of a pine forest (Puszcza Białowieska), wet *Sphagnum* moss (Borki), and in loamy field soil (Nowa Wieś).

VOUCHER SPECIMENS

Examined specimens are deposited in the nematode collection of the Instytut Zoologii PAN, Warszawa, Poland and in the author's collection.

DIAGNOSIS AND RELATIONSHIP

D. equalis is characterised by having muscular median bulb with small thickenings, four incisures, short stylet (7-8 μm), posterior vulva (V mostly 77-82), short PUS, medium sized bursa, short spicules 14-17 μm and pointed to dull tail tip.

As characterised in Table 1, *D. equalis* resembles *D. nortoni*, *D. microdens* and *D. minutus*. It differs from *D. nortoni* in spicule length : 14-17 μm in the former and 21-25 μm in the latter. Tail tip of *D. nortoni* appears more pointed than that of *D. equalis*. These differences are considered big enough to treat both as distinct species. *D. microdens* and *D. minutus* are considered *species inquirenda*.

REMARKS

D. sibiricus is synonymised with *D. equalis* because detailed description of the former inform about muscular median bulb with lumen walls thickenings, four lines on lateral field, stylet length 8.6 μm in female and 8.1 μm in male, V = 82, PUS length described as "not more than VBD", spicule = 13.5 μm , tail of similar shape and relative length (c = 9.3 in female and 8.3 in male) tail terminus described as pointed and figured dull. All these features do not differ from *D. equalis* examined in this work and both species are considered conspecific.

***Ditylenchus ferepolitor* (Kazachenko, 1980)
Fortuner & Maggenti, 1987**

MEASUREMENTS

Female

Poland, Rawka (n = 5). L = 837 (754-977); oes. = 117 (111-123); ex. p. = 88 (84-92); tail = 100 (88-113); a = 53 (50-63); b = 7.5 (6.4-8.3); MB = 36 (34-39); c = 8.4 (7.8-8.9); c' = 9.0 (8.5-10.1); VA/T = 1.4 (1.3-1.5); PUS = 3.1 (2.7-3.5) of VBD and 33 (29-36) % of vulva-anus distance; V' = 80-81; V = 71-72; st. = 6-6.5.

Male

Poland, Rawka (n = 4). L = 666 (641-710); oes. = 114 (113-116); ex. p. = 81 (78-84); tail = 84 (78-91); bursa extends along 12-16 % of tail; a = 54 (49-59); b = 5.8 (5.6-6.2); MB = 36-39; c = 7.9 (7.7-8.2); c' = 8.5 (7.6-9.2); spicule = 11-13; st. = 5.5-6.

DESCRIPTION

Detailed description of this species was recently published by Kazachenko (1980) and Brzeski (1984) and it is not repeated here. New measurements supplement previous data and increase known variation of this species.

HABITATS AND LOCALITIES

D. ferepolitor is characterised by straight and thin the Far Eastern part of USSR, cultivated soils in Poland and sandy soil near grass roots in Karelia, USSR. Measured specimens were collected in light sandy soil of a meadow in Rawka, Poland.

VOUCHER SPECIMENS

Specimens from Rawka are kept in author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. ferepolitor is characterised by straight and thin body, elongated muscular median bulb with small thickenings, six incisures, short stylet with cone about one-third of stylet length, anterior position of vulva, PUS short to medium sized, elongated conical tail with very pointed tip, short spicules and adcloacal short caudal alae.

Having straight and thin body, short stylet, muscular median bulb, anterior vulva and pointed tail tip *D. ferepolitor* should be compared with *D. longimatricalis* and *D. parvus*. However, both have four incisures, the former has also longer PUS, while the latter has usually ventrally bent tail.

REMARKS

Kazachenko (1980) described *D. ferepolitor* and *D. silvestris* as members of *Nothotylenchus*, although both descriptions state: "Metacorporal bulb oval, with slightly developed valvae, or valvae absent". The two species were differentiated by body length only: 0.43-0.44 mm for *N. ferepolitor* and 0.60-0.86 mm for *N. silvestris*. All other characters and ratios are the same. The difference in body length is bridged by *D. protensus*. In original description *D. protensus* has not been compared neither with *N. silvestris* nor with *N. ferepolitor* because at that time these two species were placed in another genus. As no differences are reported in detailed descriptions and examined specimens agree well with published information, the discussed species are synonymised. *N. ferepolitor* has page priority over *N. silvestris*.

***Ditylenchus filenchulus* sp. n.**

(Fig. 6)

MEASUREMENTS

Female

Paratypes (n = 15). L = 749 (582-916); oes. = 118 (108-125); ex. p. = 84 (77-94); tail = 107 (94-119); a = 51 (40-58); b = 6.3 (5.4-7.7); MB = 41 (39-43); c = 7.0 (6.1-8.9); c' = 11.4 (8.3-14.0); VA/T = 1.2 (1.0-1.7); V' = 80 (79-81); V = 68 (67-70); st. = 7.

Poland, Puszcza Białowieska I (n = 4). L = 685 (660-728); oes. = 96 (93-99); ex. p. = 80 (77-82); tail = 72 (69-74); a = 44 (40-47); b = 7.2 (6.9-7.6); MB = 41-42; c = 9.5 (9.0-9.8); c' = 8.0 (7.4-8.5); VA/T = 1.8 (1.6-1.9); V' = 80 (78-81); V = 71 (70-72); st. = 8.

Poland, Puszcza Białowieska II (n = 1). L = 775; oes. = 130; ex. p. = 95; tail = 98; a = 42; b = 6.0; MB = 43; c = 7.9; c' = 8.6; VA/T = 1.5; V' = 78; V = 68; st. = 8.

Poland, Warszawa (n = 2). L = 781, 956; oes. = 118, 123; ex. p. (n = 1) = 96; tail = 112-116; a = 44, 54; b = 6.6-7.8; MB = 40, 41; c = 7.0, 8.2; c' = 11.3, 12.1; VA/T = 1.2, 1.4; V' = 80; V = 68, 70; st. = 7.

Males

Paratypes (n = 8): L = 636 (570-707); oes. = 115 (106-122); ex. p. = 84 (78-91); tail = 102 (84-115); a = 49 (43-57); b = 5.5 (4.9-6.1); MB = 42 (39-45); c = 6.3 (5.9-6.8); c' = 10.5 (9.0-11.4); spicule = 14.3 (13-16); st. = 7.

Holotype: L = 823; oes. = 126; ex. p. = 95; tail = 117; a = 53; b = 6.5; MB = 41; c = 7.0; c' = 11.4; VA/T = 1.1; V' = 81; V = 69; st. = 7.

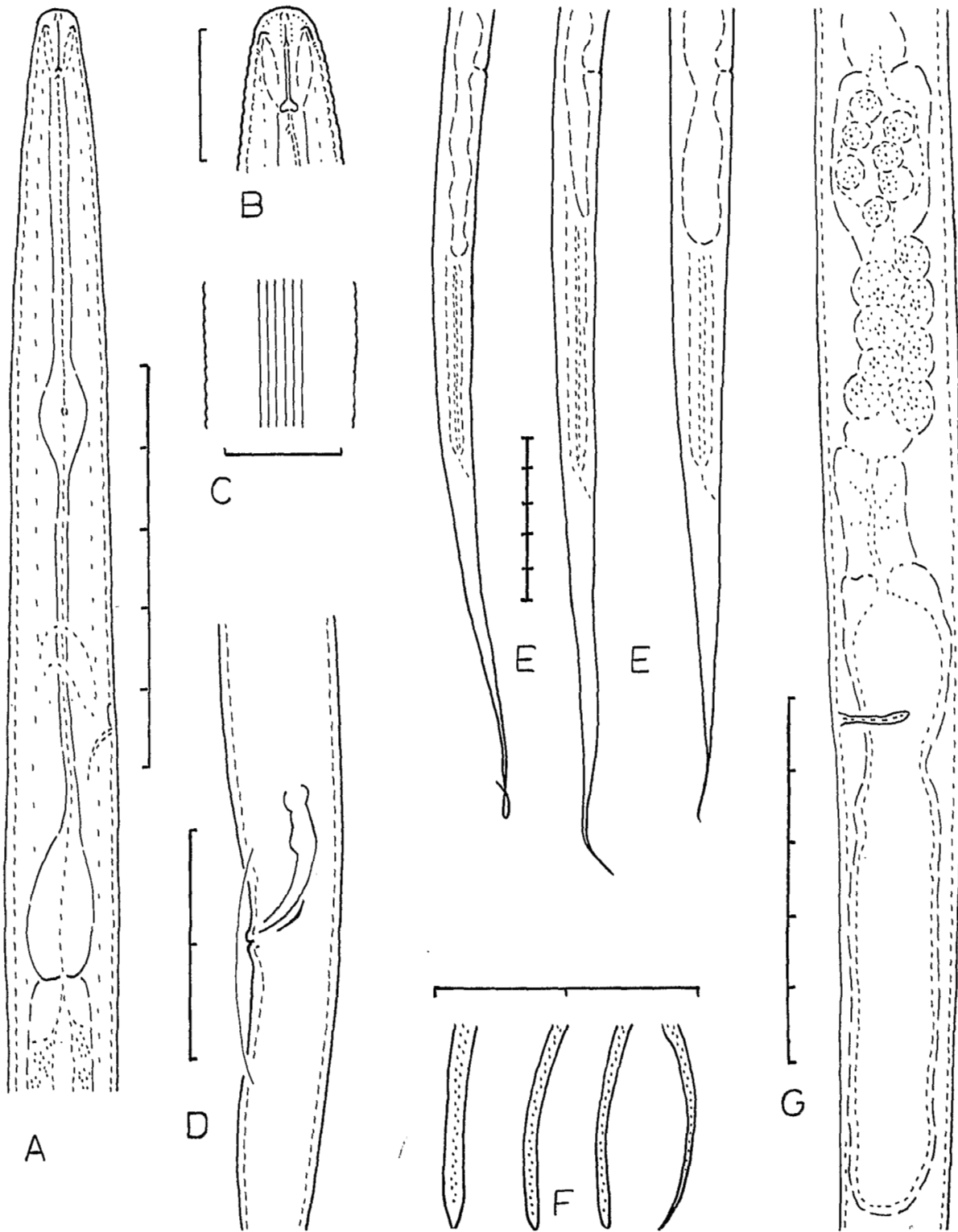


Fig. 6. *Ditylenchus filenchulus* sp. n. — A : Oesophageal region; B : Head; C : Lateral field; D : Male cloacal region; E : Posterior part of female; F : Tail terminus; G : Part of female reproductive system. (Smallest unit of scale bar = 10 μ m.)

Description

Female: Relaxed specimens straight. Cuticle less than 1 µm thick, lateral field with six incisures. Head striation not seen, head width 4-5 µm. Stylet delicate, cone about one third of stylet length, knobs small and rounded to slightly sloping posteriorly. Median bulb oval in outline, muscular, lumen walls thickenings about 1.5-2 µm long. Isthmus very thin, expands into small and offset glandular bulb. Excretory pore opposite posterior half of isthmus, i.e. 72 (68-77) % of oesophagus length from anterior body end. Spermatheca mostly empty, when filled with sperm then 1.5 (1.2-1.9) VBD long. Vagina 0.2-0.5 VBD long. PUS length 3.4 (2.1-4.5) VBD or 37 (30-45) % VA. Anus a short and straight slit perpendicular to body axis. Post-vulval part of body 24.7 (18.6-28.5) ABD long. Tail anteriorly narrowing, then thin and cylindrical, tip rounded, wedge shaped or pointed.

Male: Similar to female. Caudal alae 2.3 (2.0-2.7) ABD long, extends along 13 (11-15) % of tail length. Spicules thin and bent. Gubernaculum 4 µm long.

HABITATS AND LOCALITIES

Type population found in Poland, Podkowa Leśna near Warszawa, B. Hryniewiecki Nature Reserve, among fallen oak leaves. Also found in Poland, Puszcza Białowieska, in *Sphagnum* moss, and in Warszawa, Sobieski Parc, in oak litter.

TYPE SPECIMENS

Holotype and paratypes deposited in nematode collection of the Instytut Zoologii PAN, Warszawa, Poland. Remaining specimens are kept in author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. filenchulus sp. n. is very characteristic because of thin and straight body and long tail with cylindrical posterior part. In addition lateral field is marked by six incisures, head is rounded and 4-5 µm wide, stylet 7-8 µm with short cone, vulva anterior (V = 68-72), PUS medium sized, spicules small (13-16 µm), and bursa very short, adcloacal.

Having tail long and cylindrical in posterior part *D. filenchulus* sp. n. resembles *D. longicauda* and *D. luto-nensis*. It differs from the former by more anterior position of vulva, shorter stylet, smaller head, shorter spicules and probably somewhat longer PUS. *D. filenchulus* sp. n. differs from *D. luto-nensis* by structure of posterior part of oesophagus which in the latter form lobe overlapping intestine for 45-59 µm, somewhat shorter stylet and probably more anterior position of vulva (in *D. luto-nensis* st. = 8-9.4; V = 70-74).

Ditylenchus filimus Anderson, 1983

MEASUREMENTS

Female

Poland, Śniadków (n = 3). L = 660 (585-774); oes. = 108 (103-118); ex. p. = 91 (84-96); tail = 67-71; a = 38 (34-42); b = 6.0 (5.6-6.5); MB = 41-42; c = 9.5 (8.7-10.2); c' = 6.2 (5.8-6.5); VA/T = 0.8 (0.6-1.1); V' = 89-92; V = 81; st. = 7.5-8.

DESCRIPTION

Female: Relaxed females ventrally arcuate, cuticular annuli rounded, striae distinct, mean annulus width 1 µm. Head rounded and finely striated, 5.5-6 µm wide. Lateral field with four incisures. Stylet cone about one-third of stylet length, knobs rounded. Metacorporal bulb oval, muscular, with small thickenings of lumen walls. Glandular bulb offset from intestine. Excretory pore opposite basal bulb, excretory canal refractive. Vaginal lips not very prominent, PUS equals to 0.8-1.1 VBD, or 26-33 % VA. Tail conoid, its posterior part thin, tip pointed but without a filament as described by Anderson (1983).

Male: Not found.

HABITATS AND LOCALITIES

D. filimus was described from mushroom compost in Manitoba, Canada. Present specimens were collected in heavy soil under celeriac roots in Śniadków, Poland.

VOUCHER SPECIMENS

Two females deposited in nematode collection of the Instytut Zoologii PAN, Warszawa, Poland, and one female with the author.

DIAGNOSIS AND RELATIONSHIPS

D. filimus is characterised by four incisures, head low and striated, stylet 7-9 µm, median bulb muscular, glandular bulb offset, posterior vulva (V = 81-85), PUS = 0.5-1.1 VBD, tail conical with very sharply pointed terminus, spicules = 29 µm, crenated bursa extends along 61 % of tail. This diagnosis includes information given by Anderson (1983) as well as data of present specimens.

D. filimus appears most closely related to *D. nortoni* and the two species differ by thinner posterior part of tail and more posterior position of excretory pore in the former. Examination of specimens from various populations may demonstrate these differences are not specific. *D. filimus* can also be compared with *D. exilis*, from which it differs by tail shape, slightly longer stylet and spicule length (the latter has thicker tail with rounded tip, stylet 6-8 µm as opposed to 7-9 µm in the former,

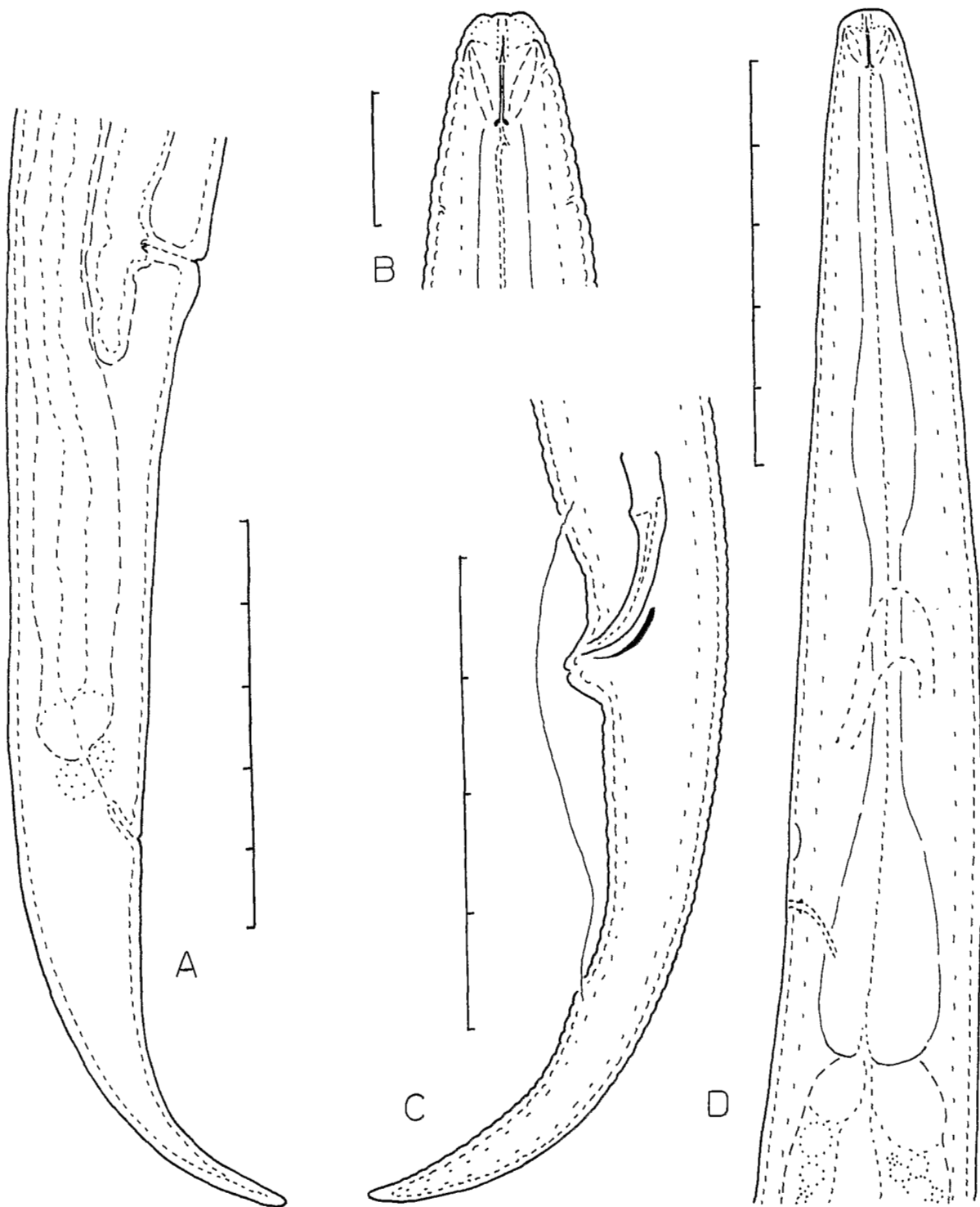


Fig. 7. *Ditylenchus hexaglyphus*. — A : Posterior part of female; B : Head; C : Male tail; D : Oesophageal region. (Smallest unit of scale bar = 10 μ m.)

spicule 15-17 μm as compared with 29 μm in a single male described by Anderson). *D. filimus* can also be compared with *D. equalis*, although the latter has thicker tail, shorter spicules and bursa, more anterior position of excretory pore.

***Ditylenchus hexaglyphus* (Khan & Siddiqi, 1968)
Fortuner & Maggenti, 1987
(Fig. 7)**

MEASUREMENTS

Female

Mexico, Cuernavaca (n = 2). L = 654, 916; oes. = 115, 131; ex. p. = 93, 112; tail = 49, 63; a = 26, 29; b = 5.7, 7.0; MB = 44, 45; c = 13.2, 14.5; c' = 3.6, 3.7; VA/T = 1.2, 1.3; V' = 90, 91; V = 83, 84; st. = 7.0, 7.5.

Male

Mexico, Cuernavaca (n = 2). L = 661, 732; oes. = 119, 123; ex. p. = 100, 106; tail = 58; a = 36, 38; b = 5.5, 6.0; MB = 41, 46; c = 11.5, 12.7; c' = 3.7, 4.0; spicule = 21, 22; st. = 8.

DESCRIPTION

Female : Lateral field with six incisures. Head low, unstriated, 6-6.5 μm wide. Stylet delicate, cone shorter than shaft, knobs unusually minute and elongated. Median bulb without thickenings of lumen walls. Posterior bulb large, offset from intestine. Excretory pore opposite basal bulb. Post-vulval part 8.1-8.2 ABD long. PUS length 0.5-0.7 VBD or 18-21 % VA. Tail ventrally curved, terminus rounded.

Male : Similar to female. Cloacal alae 2.4-2.5 ABD long, extending along 38-46 % of tail length. Tail ventrally curved, tip rounded. Gubernaculum length 6-7 μm .

HABITATS AND LOCALITIES

This species has been described from a potato field in Uttar Pradesh, India. Present specimens were collected from soil near water canal at Cuernavaca, State of Mexico, Mexico.

VOUCHER SPECIMENS

Described specimens are kept in author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. hexaglyphus is characterised by six lines in lateral field, low head, short stylet with very minute knobs, non-muscular median bulb, posterior position of excre-

tory pore, posterior vulva (V = 82-84), very short PUS, ventrally curved tail with rounded tip, spicules 20-21 μm and rather long bursa.

Having non-muscular median bulb, six incisures, short stylet and posterior vulva *D. hexaglyphus* resembles *D. medians*, *D. taylora*, *D. affinis*, *D. kheirii* and *D. tuberosus*. However, none of these species has such small stylet knobs, and all but *D. affinis* have longer PUS than that observed in *D. hexaglyphus*. In addition *D. medians* has shorter spicules (15-18 vs 20-21); *D. taylora* has more anterior vulva (V = 75-77 vs 82-84), bursa extends well over half of tail length and tail appears to be thinner (c' = 6-7 vs 3.6-5.1); *D. affinis* has more anterior vulva (V = 76-80 vs 82-84) and shorter spicules (17 vs 20-21); finally *D. kheirii* can also be differentiated by spicule length (16 vs 20-21).

***Ditylenchus khani* Fortuner, 1982
(Fig. 8, A-D)**

MEASUREMENTS

Female

Poland, Góry Świętokrzyskie (n = 6). L = 1 139 (1 086-1 205); oes. (n = 3) = 143 (128-150); ex. p. = 146 (138-161); tail = 66 (60-70); a = 35 (30-41); b (n = 3) = 7.9 (7.3-9.1); MB (n = 3) = 38 (37-40); c = 17.2 (15.7-18.2); c' = 3.9 (3.2-4.4); VA/T = 1.15 (1.0-1.2); V' = 93; V = 87-88; st. = 8.4 (8-9).

Switzerland, Pfadiheim (n = 2). L = 1 026, 1 113; oes. = 131, 141; ex. p. = 136; tail = 65, 69; a = 36, 37; b = 7.8, 7.9; MB = 37, 38; c = 15.8, 16.1; c' = 4.2, 4.5; VA/T = 0.9, 1.1; V' = 92, 94; V = 87, 88; st. = 9.

Mexico, Zacatecas (n = 2). L = 806, 1 008; oes. = 136, 138; ex. p. = 125, 138; tail = 50, 55; a = 28, 31; b = 6.5, 7.3; MB = 35, 44; c = 16.0, 18.5; c' = 2.9, 3.3; VA/T = 0.9, 1.2; V' = 93, 94; V = 88; st. = 8.

DESCRIPTION

Female : Body ventrally arcuate. Cuticular annulation distinct, annuli width 1.2-2 μm . Lateral field with six incisures in mid body region, four incisures on anterior and posterior body parts. Head low, with single stria separating two head annuli, head width 6.5-8 μm . Stylet very delicate, cone shorter than shaft, knobs small and rounded. Median bulb elongated, muscular, with very small thickenings of lumen walls. Excretory pore near oesophago-intestinal junction, sometimes opposite anterior part of intestine. Ovary may reach anteriorly to the middle of isthmus. Spermatheca filled with sperm, although male not found. Vagina anteriorly bent, no PUS. Tail end pointed, dull or rounded with or without micro.

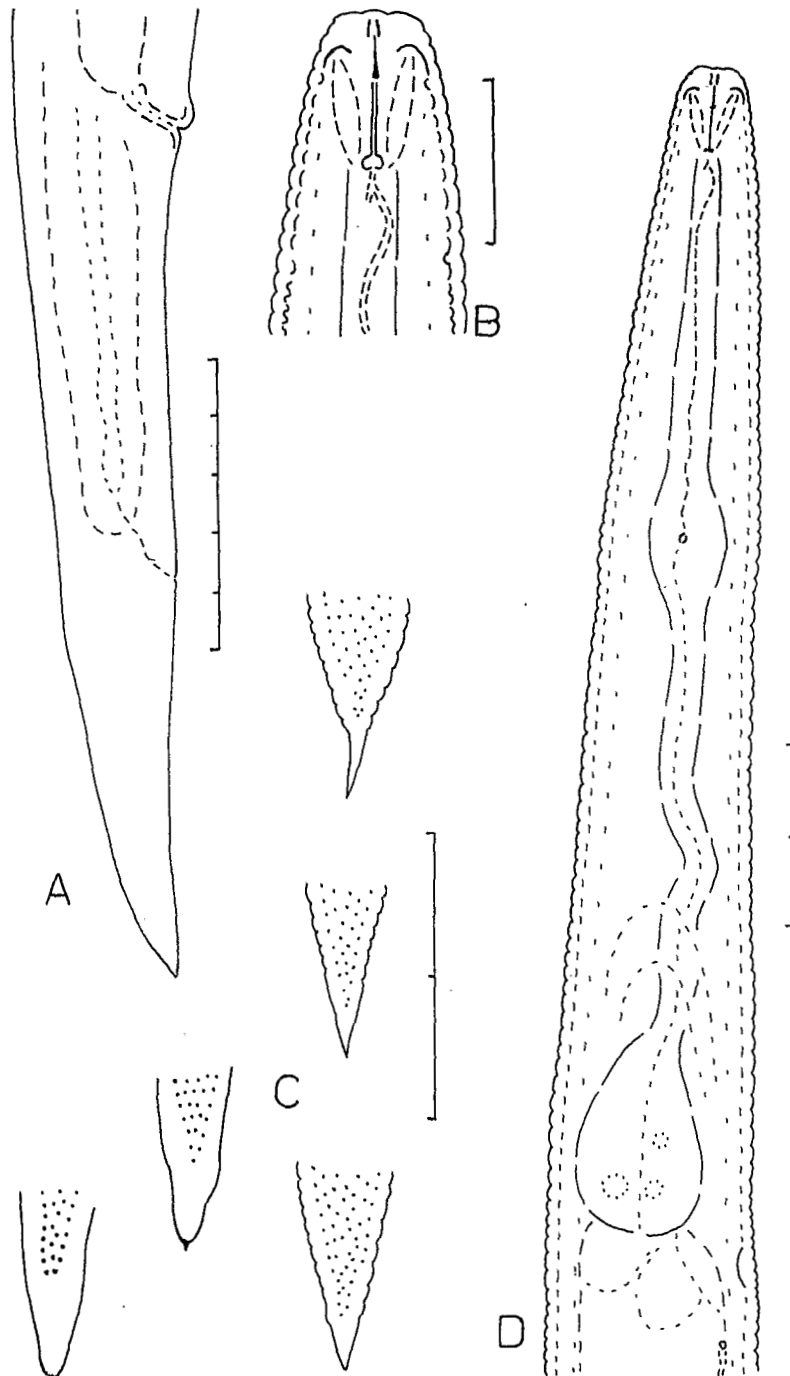


Fig. 8. *Ditylenchus khani*. — A : Posterior part of female; B : Head; C : Tail terminus; D : Oesophageal region. (Smallest unit of scale bar = 10 μ m.)

Male : Not found.

HABITATS AND LOCALITIES

Two collections of *D. khani* from moss from Poland and Switzerland and one collection from semiarid soil near Zacatecas, Mexico, are the first records of this species since its description from New Delhi, India.

VOUCHER SPECIMENS

Specimens from Góry Świętokrzyskie, Poland, are deposited in the Instytut Zoologii PAN, Warszawa, Poland. Remaining specimens are kept in author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. khani is most distinctive because of lack of PUS. In addition it is characterised by low head, six incisures, very posterior vulva and short tail.

D. khani is almost identical with *D. deiridus*, and these species appear to differ only in number of lateral incisures.

REMARKS

Collection from Mexico contained a third female with abnormally short tail, not included in the measurements of species. This female is characterised by : L = 747; oes. = 136; ex. p. = 92; tail = 25; a = 21; b = 5.5; MB = 45; c = 30.2; c' = 1.3; VA/T = 1.9; V' = 93; V = 90; st. = 8.

Ditylenchus kheirii Fortuner & Maggenti, 1987 (Fig. 9)

MEASUREMENTS

Female

Poland, Błonie (n = 5). L = 587 (564-643); oes. = 116 (112-123); ex. p. = 85 (76-89); tail = 59 (50-69); a = 37 (33-40); b = 4.9 (4.6-5.1); MB = 39 (38-40); c = 10.1 (8.4-11.2); c' = 5.7 (4.9-6.7); VA/T = 1.2 (0.9-1.4); V' = 87 (86-87); V = 78 (77-79); st. = 7-8.

Poland, Hrubieszów (n = 2). L = 541, 655; oes. = 111, 116; ex. p. = 83, 95; tail = 58, 62; a = 33, 38; b = 4.9, 5.6; MB = 41, 43; c = 9.4, 10.6; c' = 5.5, 6.2; VA/T = 1.3; V' = 85-87; V = 76, 79; st. = 7.5, 8.

Poland, Chetmiec (n = 1). L = 903; oes. = 157; ex. p. = 110; tail = 74; a = 49; b = 5.8; c = 12.2; c' = 6.0; VA/T = 1.5; V' = 87; V = 80; st. = 7.

Syria, Alhasseka I (n = 6). L = 588 (533-681); oes. = 106 (101-112); ex. p. = 86 (78-93); tail = 53 (46-60); a = 38 (32-44); b = 4.6 (5.2-6.2); MB = 39 (34-42); c = 11.2 (9.8-13.0); c' = 5.0 (4.5-5.3);

VA/T = 1.3 (1.1-1.5); V' = 87 (86-89); V = 80 (78-82); st. = 7-8.

Syria, Alhasseka II (n = 7). L = 579 (496-646); oes. = 111 (107-118); ex. p. = 85 (78-93); tail = 52 (41-59); a = 34 (30-43); b = 5.2 (4.7-5.9); MB = 39 (36-43); c = 11.3 (9.8-12.9); c' = 4.6 (4.0-5.2); VA/T = 1.3 (1.2-1.5); V' = 87 (84-89); V = 79 (76-82); st. = 7-8.

Male

Poland, Błonie (n = 4). L = 542 (510-581); oes. = 114 (103-119); ex. p. = 82 (78-85); tail = 58 (52-65); a = 40 (37-44); b = 4.8 (4.6-5.0); MB = 40 (39-43); c = 9.6 (8.5-10.6); c' = 5.5 (5.0-6.1); spicule = 16.5-17.5; st. = 7-8.

Poland, Hrubieszów (n = 2). L = 656, 665; oes. = 109, 127; ex. p. = 75, 85; tail = 52, 69; a = 42, 50; b = 5.2, 6.1; MB = 37; c = 9.5, 12.9; c' = 5.0, 6.1; spicule = 14, 15.5; st. = 7.

Syria, Alhasseka I (n = 3). L = 525 (513-540); oes. = 107 (104-112); ex. p. = 83 (79-91); tail = 50-52; a = 32-33; b = 4.9 (4.7-5.1); MB = 38-41; c = 10.3 (10.0-10.7); c' = 4.4 (4.1-4.5); spicule = 15.5-16.5; st. = 7-8.

Syria, Alhasseka II (n = 2). L = 484, 507; oes. = 103, 107; ex. p. = 76, 80; tail = 46, 57; a = 34, 35; b = 4.7; MB = 40, 42; c = 8.9, 9.4; c' = 4.3, 5.5; spicule = 15.5; st. = 7, 8.

DESCRIPTION

Female : Relaxed specimens ventrally arcuate. Cuticular annulation indistinct, annuli width 0.9-1.1 μ m. Lateral field with six incisures. Head high, striation not seen, 4.5-5.5 μ m wide. Stylet thin, cone shorter than shaft, knobs rounded and slightly sloping backward. Metacorporal bulb elongated, without thickenings of lumen walls. Posterior bulb small, offset or with small overlap over intestine. Excretory pore opposite posterior part of isthmus or anterior part of basal bulb. PUS spacious or collapsed, 1.8 (0.6-2.5) VBD long, or 40 (14-52) % VA. Postvulval part of body 11.8 (8.9-14.9) ABD long. Tail tip usually minutely rounded, sometimes posterior part of tail thicker and then tip more distinctly rounded, seldom dull to almost pointed.

Male : Similar to female. Bursa 2.4 (1.8-3.2) ABD long, extends along 28 (20-36) % of tail. Gubernaculum length 4-5 μ m.

HABITATS AND LOCALITIES

This species has been originally described from Iran, and examined specimens were collected in loamy and clay soils in various localities of Poland and in Alhasseka, Syria.

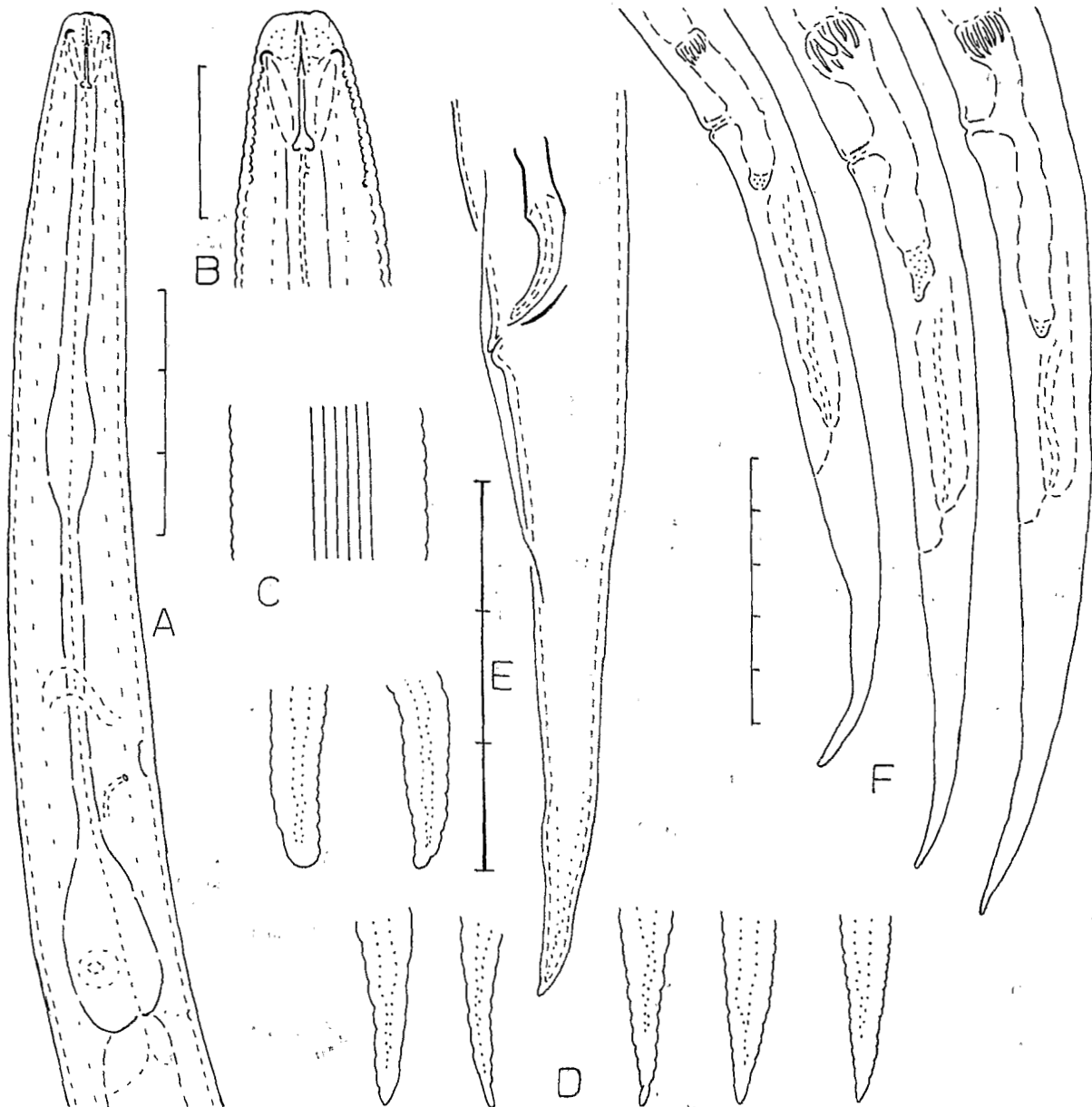


Fig. 9. *Ditylenchus kheirii*. — A : Oesophageal region; B : Head; C : Lateral field; D : Tail terminus; E : Male tail; F : Posterior part of female. (Smallest unit of scale bar = 10 μ m.)

VOUCHER SPECIMENS

Examined specimens are deposited in the nematode collection of the Instytut Zoologii PAN, Warszawa, Poland, and in author's collection.

REMARKS

D. kheirii is very close to *D. medians*, but differing by head structure (see drawings in this paper) and shape of

stylet knobs. *D. kheirii* is also close to, if not identical with, *D. tuberosus*. Kheiri (1970) compared these two species and found the main differences in asymmetrical oesophageal glands and "comparatively long uterus" of *D. tuberosus*. The variability of oesophageal glands, within described limits, are not considered specific (Brzeski, 1967; Fortuner, 1982). Additional studies are necessary to differentiate these species.

This description corresponds well to description of

type population of *Nothotylenchus geraerti* (= *D. kheirii*), except for stylet length which is reported 8-9 μm . Such a difference is well known range of variation. The stylet length of *D. kheirii* is 7-9 μm .

***Ditylenchus longicauda* Geraert & Choi, 1988**

(Fig. 10)

MEASUREMENTS

Female

Poland, Pszczyna (n = 6). L = 870 (786-971); oes. (n = 2) = 132, 134; ex. p. = 90 (83-103); tail = 119 (108-149); a = 46 (40-51); b (n = 2) = 6.2-6.4; MB (n = 2) = 41; c = 7.3 (6.5-7.9); c' = 9.9 (8.2-12.1); VA/T = 0.9 (0.8-1.0); V' (n = 4) = 86-88; V (n = 4) = 75-76; st. = 8.0-8.5.

Poland, Umiastów (n = 3). L = 784 (737-830); oes. = 113-114; ex. p. = 98 (95-100); tail = 88-92; a = 42-45; b = 6.9 (6.5-7.3); MB = 42; c = 8.8 (8.4-9.1); c' = 6.9 (6.7-7.1); VA/T = 0.8-1.0; V' = 87-89; V = 77-79; st. = 8.

Male

Poland, Pszczyna (n = 6). L = 748 (708-828); oes (n = 3) = 118 (115-123); ex. p. = 87 (80-96); tail = 110 (95-122); a = 48 (41-54); b (n = 3) = 6.4 (5.8-7.2); MB (n = 3) = 44-45; c = 6.8 (6.2-7.6); c' = 9.3 (7.1-11.0); spicule = 16-18; st. = 8.

Poland, Umiastów (n = 1). L = 787; oes. = 119; ex. p. = 94; tail = 96; a = 40; b = 6.6; MB = 42; c = 8.2; c' = 6.6; spicule = 19.5; st. = 8.

DESCRIPTION

Female : Body straight or slightly ventrally curved, more so in the posterior part. Lateral field with six incisures. Head not annulated, 5-6 μm wide. Posterior blades of cephalic skeleton not very refractive, extend about two annuli posterior to basal plate. Stylet delicate, cone about a third of stylet length, knobs rounded to somewhat sloping posteriorly. Median bulb muscular, oval in outline, with small thickenings of lumen walls. Isthmus thin, posterior bulb small and offset from intestine. Vulva position in the studied females mostly V = 75-79, although two females from Pszczyna had V = 73 and 71 and V' = 84 and 86. PUS length 1.9 (1.8-2.1) of VBD in specimens from Pszczyna and 1.4 (1.2-1.6) in those from Umiastów, but 30 (24-34) % of vulva-anus distance in both populations. Post-vulval body part 15.4 (12.7-18.2) of ABD long, but in the two females with more anterior position of vulva it equals 22.4 and 20.3. Tail elongated, cylindrical in posterior part, tip rounded or dull in nematodes from Umiastów, while dull to pointed in those from Pszczyna.

Male : Similar to female. Caudal alae adcloacal, 3.0 (2.5-3.5) of ABD long, extends along 19 (17-23) % of tail. Gubernaculum 5-6 μm long.

HABITATS AND LOCALITIES

D. longicauda was collected in Poland in a meadow soil at Pszczyna and in cultivated soil near parsley roots at Umiastów. It is the second record of this species since its description from Korea.

VOUCHER SPECIMENS

Described specimens are kept in the author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. longicauda is distinctive because of the long tail with cylindrical posterior part. It is also characterised by lateral field with six incisures, stylet 8-10 μm , oesophagus with muscular median bulb and offset glandular bulb, vulva position (V = 75-80; V' = 86-90), PUS about 30 % VA, rather long spicules (16-23 μm) and adcloacal bursa.

Having long tail cylindrical in posterior part *D. longicauda* resembles *D. filenchulus* and *D. lutonensis*. The comparison with the former is discussed under that species. The latter has a long oesophageal lobe overlapping intestine, somewhat more anterior vulva (V = 70-74), PUS length about 2.6-3.3 VBD.

REMARKS

Polish specimens of *D. longicauda* differ from Korean ones by being shorter and having shorter stylet (in type population L = 1.0-1.4 mm, st. = 9-10). However, as no other significant differences were found they are regarded conspecific.

Ditylenchus longimatricalis
(Kazachenko, 1975) Brzeski, 1984

(Fig. 11)

MEASUREMENTS

Female

Poland, Bory Tucholskie (n = 25). L = 520 (470-558); oes. = 107 (96-114); ex. p. = 74 (67-82); tail = 64 (56-73); a = 38 (32-51); b = 4.9 (4.2-6.1); MB = 39 (35-45); c = 8.2 (7.5-9.1); c' = 6.9 (6.0-8.9); VA/T = 1.4 (1.2-1.6); V' = 80 (78-81); V = 70 (69-73); st. = 6.0 (5.5-6.5).

Poland, Puszcza Biała, coniferous litter (n = 15). L = 504 (466-559); oes. = 100 (95-103); ex. p. = 72 (67-76); tail = 57 (48-64); a = 41 (33-46); b = 5.1 (4.6-5.5); MB = 38 (37-40); c = 8.8 (7.9-9.6); c' = 7.1

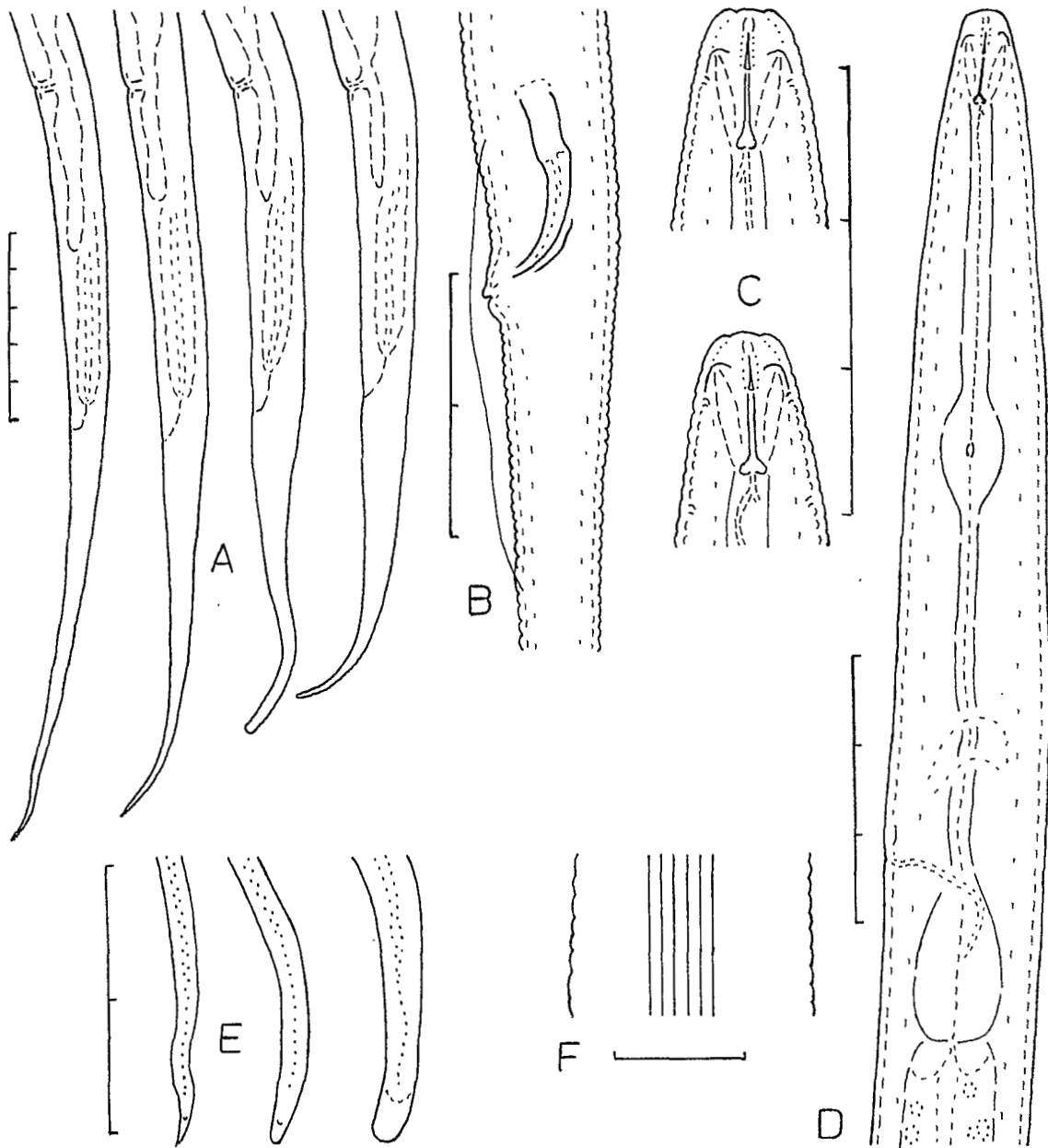


Fig. 10. *Ditylenchus longicauda*. — A : Posterior part of female; B : Male cloacal region; C : Head; D : Oesophageal region; E : Tail terminus; F : Lateral field. (Smallest unit of scale bar = 10 μ m.)

(5.9-8.7); VA/T = 1.6 (1.3-1.8); V' = 80 (76-81); V = 71 (67-72), st. = 6.0-6.5.

Poland, Puszcza Białą, soil (n = 7). L = 527 (441-561); oes. = 102 (93-110); ex. p. = 73 (68-77); tail = 64 (54-71); a = 39 (35-45); b = 5.2 (4.8-5.6); MB = 40 (38-41); c = 8.3 (7.8-8.9); c' = 7.0 (6.5-8.6); VA/T = 1.4 (1.3-1.5); V' = 80 (79-82); V = 71 (69-73); st. = 5.5-6.0.

Poland, Puszcza Białowieska, moss (n = 6). L = 640 (507-744); oes. = 106 (87-125); ex. p. = 75 (67-82); tail = 71 (62-78); a = 43 (37-48); b = 6.1 (5.5-7.6); MB = 37-39; c = 9.0 (8.2-10.3); c' = 7.8 (6.3-8.6); VA/T = 1.7 (1.5-2.0); V' = 79 (76-81); V = 70 (66-72); st. = 6.0-6.5.

Poland, Puszcza Białowieska, soil (n = 3). L = 625 (578-663); oes. = 107 (103-110); ex. p. = 79 (74-84);

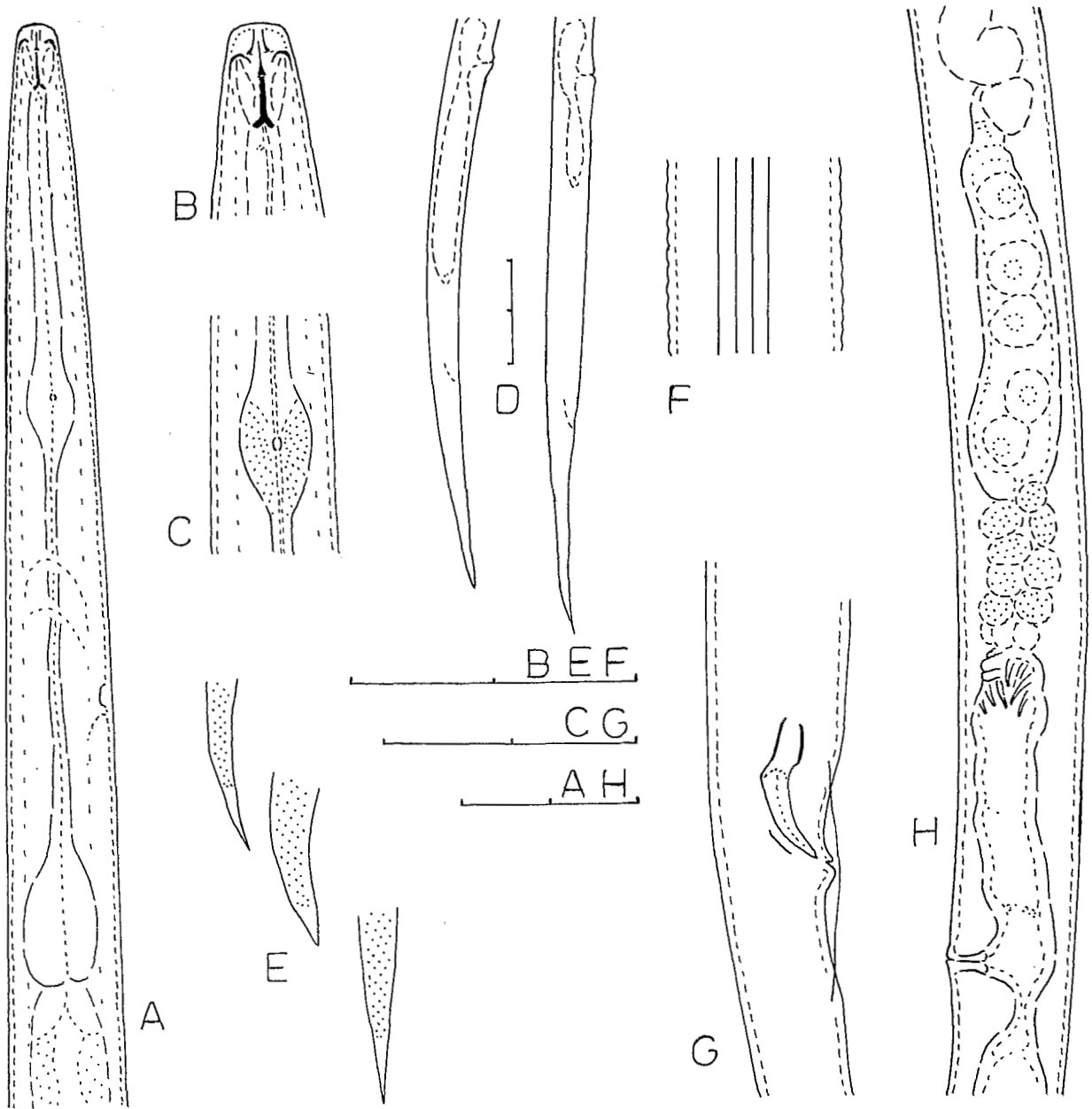


Fig. 11. *Ditylenchus longimatrix*. — A : Oesophageal region; B : Head; C : Metacorporal bulb; D : Posterior part of female; E : Tail terminus; F : Lateral field; G : Male cloacal region; H : Part of female reproductive system. (Smallest unit of scale bar = 10 μ m.)

tail = 93-95; a = 42 (37-46); b = 5.8 (5.3-6.2); MB = 37-38; c = 7.0 (6.7-7.2); c' = 9.8 (9.5-10.2); VA/T = 1.3 (1.1-1.5); V' = 78 (76-81); V = 69 (66-71); st. = 7.

Poland, Rewa (n = 3). L = 654 (614-694); oes. = 107 (103-114); ex. p. (n = 2) = 74; tail = 74-76; a

= 52 (46-56); b = 6.1 (5.7-6.7); MB = 40; c = 8.4 (8.1-9.4); c' = 8.4 (8.1-9.0); VA/T = 1.6 (1.4-1.8); V' = 79-81; V = 70-71; st. = 5.0-6.0.

Poland, Puszcza Kampinoska (n = 4). L = 506 (479-537); oes. = 93-98; ex. p. = 64-68; tail = 63-67; a = 36-39; b = 5.2-5.5; MB = 39-41; c = 7.6-8.0;

$c' = 7.3$ (6.8-8.1); VA/T = 1.3-1.4; $V' = 79-81$; $V = 68-71$; st. = 6.0.

Sweden, Uppsala (n = 4). L = 614 (572-652); oes. = 121 (108-131); ex. p. = 77 (74-82); tail = 72 (65-78); a = 43 (37-49); b = 4.8-5.4; MB = 35-39; c = 8.5 (8.2-9.0); $c' = 7.4-7.9$; VA/T = 1.4-1.6; $V' = 79-81$; $V = 70-71$; st. = 6.5-7.0.

Holland, Universiteit Twente (n = 3). L = 498 (478-515); oes. = 99-100; ex. p. = 72-75; tail = 51 (46-54); a = 39 (36-44); b = 5.0 (4.8-5.2); MB = 38 (36-40); c = 9.9 (9.3-10.3); $c' = 6.7$ (6.2-7.4); VA/T = 1.7-1.9; $V' = 80-81$; $V = 71-73$; st. = 6.0.

Male

Poland, Bory Tucholskie (n = 20). L = 480 (431-549); oes. = 107 (98-119); ex. p. = 73 (68-82); tail = 62 (51-70); a = 38 (33-45); b = 4.5 (4.0-4.9); MB = 39 (37-41); c = 7.8 (6.7-9.0); $c' = 6.4$ (5.4-7.6); spicule = 13 (12-14); st. = 5.5-6.0.

Poland, Puszcza Biąta, coniferous litter (n = 5). L = 511 (470-542); oes. = 96 (93-98); ex. p. = 72 (69-78); tail = 60 (55-67); a = 43 (41-44); b = 5.3 (4.8-5.7); MB = 39 (37-41); c = 8.6 (8.0-9.1); $c' = 6.3$ (6.0-6.8); spicule = 13 (12-14); st. = 6.0.

Poland, Puszcza Biąta, soil (n = 1). L = 557; oes. = 109; ex. p. = 74; tail = 63; a = 39; b = 5.1; MB = 40; c = 8.9; $c' = 6.8$; spicule = 12; st. = 6.0.

Poland, Puszcza Białowieska, moss (n = 6). L = 583 (551-618); oes. = 110 (107-116); ex. p. = 74 (67-81); tail = 69 (64-76); a = 45 (41-52); b = 5.3 (4.7-5.6); MB = 36-39; c = 8.4 (7.8-9.0); $c' = 6.9$ (6.2-7.4); spicule = 13 (12-14); st. = 6.0-6.5.

Poland, Rewa (n = 1). L = 607; oes. = 107; ex. p. = 77; tail = 65; a = 54; b = 5.7; MB = 37; c = 9.3; $c' = 7.0$; spicule = 12; st. = 6.0.

Sweden Uppsala (n = 3). L = 537 (496-558); oes. = 107 (97-113); ex. p. = 72 (65-77); tail = 63 (57-69); a = 39-45; b = 4.9-5.1; MB = 36-39; c = 8.1-8.8; $c' = 6.1-6.9$; spicule = 12-13; st. = 6.0-7.0.

Holland, Universiteit Twente (n = 4). L = 534 (467-620); oes. = 105 (101-113); ex. p. = 75 (73-77); tail = 61 (54-82); a = 44 (37-54); b = 5.0 (4.6-5.4); MB = 39 (36-42); c = 8.9 (7.5-10.0); $c' = 6.4$ (5.2-8.9); spicule = 14-15; st. = 6.0.

DESCRIPTION

Female: Body of relaxed specimens straight, sometimes slightly ventrally arcuate. Annuli indistinct due to shallow striae, mean annuli width about 1 μm . Head width 4-5 μm . Body at oesophago-intestinal junction about 2-3 times wider than head width, then almost cylindrical to vulva, and then tapers evenly to sharply pointed tail terminus. VBD equals 1.3-1.6 of ABD. Cephalic skeleton slightly more refractive than in most

species of the genus. Stylet delicate, cone about one third of stylet length, knobs sloping posteriorly. Median bulb oval in outline, with small thickenings of lumen walls. Isthmus very thin, gradually expands into pyriform basal bulb. The latter never overlaps intestine. Excretory pore opposite isthmus somewhere between its middle and basal bulb. Spermatheca filled with sperm 5-6 μm in diameter. Vagina about a quarter of VBD. Vulval lips may be protruded in older females. PUS mostly spacious, sometimes collapsed, its length equals 3.8 (1.8-5.1) VBD or 53 (27-73) % VA. Length of post-vulval part of body equals 18.0 (15.3-23.6) of ABD.

Male: Usually shorter than female. Caudal alae small, its length 16 (12-20) μm or 1.7 (1.3-2.2) ABD, extending along 18 (11-33) μm of tail.

HABITATS AND LOCALITIES

This species was described from coniferous litter in forests of the Far-Eastern region of USSR, subsequently found widespread in moss and litter of pine forests in Poland. Also collected in the Netherlands, in moss on Twente Universiteit campus and in Sweden near Uppsala, also in moss. In Poland only occasionally found in meadow soils but not in cultivated soils.

VOUCHER SPECIMENS

Examined specimens are deposited in the nematode collection of the Instytut Zoologii PAN, Warszawa, Poland, and in the author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. longimatrixalis is characterised by small body size, four incisures, short stylet (5.5-7.0 μm), muscular oesophagus, position of vulva ($V = 66-73$), usually spacious PUS and short spicules and bursa.

Having short stylet, muscular oesophagus, anterior vulva and pointed tail tip, *D. longimatrixalis* should be compared with *D. parvus* and *D. equalis*. The former differs from *D. longimatrixalis* by longer body, longer stylet, slightly more posterior vulva, and annulated head. *D. equalis* can be differentiated from *D. longimatrixalis* by longer body, longer stylet, posterior vulva, shorter PUS and less pointed tail tip.

Ditylenchus medians (Thorne & Malek, 1968) Fortuner & Maggenti, 1987

(Fig. 12)

MEASUREMENTS

Female

Poland, Dziekanów Leśny (n = 13). L = 734 (660-803); oes. = 131 (111-144); ex. p. = 99 (88-105);

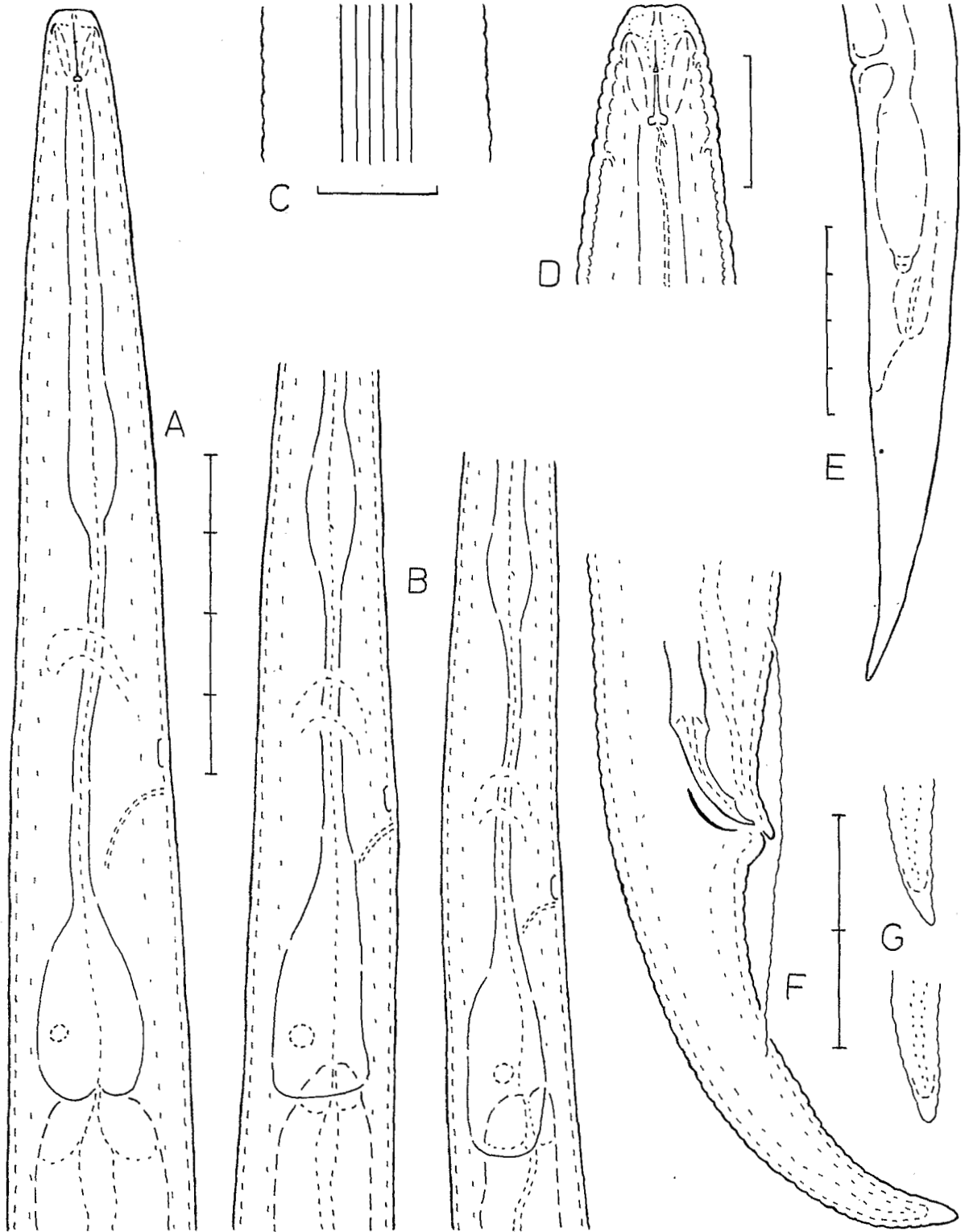


Fig. 12. *Ditylenchus medians*. — A : Oesophageal region; B : Posterior part of oesophagus; C : Lateral field; D : Head; E : Posterior part of female; G : Tail terminus. (Smallest unit of scale bar = 10 μ m.)

tail = 59 (52-63); a = 31 (25-36); b = 5.6 (5.0-6.0); MB = 39 (35-42); c = 12.5 (11.4-13.2); c' = 4.1 (3.7-4.6); VA/T = 1.3 (1.2-1.5); V' = 89 (86-90); V = 82 (79-83); st = 7.3 (6.5-8.0).

Syria, Alhasseka (n = 3). L = 680 (620-731); oes. = 128 (117-136); ex. p. = 94-99; tail = 54-57; a = 30-32; b = 5.2-5.4; MB = 36-39; c = 12.4 (10.9-13.7); c' = 4.0 (3.7-4.6); VA/T = 1.2-1.4; V' = 88-90; V = 80-83; st. = 7.0.

Male

Poland, Dziekanów Leśny (n = 6). L = 643 (613-695); oes. = 130 (124-134); ex. p. = 95 (91-98); tail = 55 (53-58); a = 33 (31-35); b = 5.0 (4.7-5.2); MB = 40 (36-42); c = 11.8 (10.9-13.2); c' = 4.4 (3.9-5.1); spicule = 16-18; st. = 7.0-7.5.

Syria, Alhasseka (n = 3). L = 612-624; oes. = 124 (119-130); ex. p. = 91-96; tail = 42-49; a = 30-32; b = 4.7-5.2; MB = 38-42; c = 13.8 (12.6-14.5); c' = 3.2-3.5; spicule = 15-17; st. = 6.8 (6.0-7.5).

DESCRIPTION

Female : Body slightly ventrally arcuate. Cuticular annulation indistinct due to flattened annuli and shallow striae, except for short distance between anterior and posterior cephalids where it is pronounced. Lateral field with six incisures, best visible on younger specimens and disappearing on older and thicker ones. Head low, rounded, striation faint, 6-7 μm wide. Stylet cone shorter than shaft, knobs rounded. Metacorporal bulb more or less fusiform, without thickenings of lumen walls. Posterior bulb either offset or overlaps intestine up to 15 μm . This overlap found in two specimens from Poland and in all Syrian ones. Ovary of old female long, may reach almost to metacorporal bulb. Some females had eggs in uteri, up to three eggs in one female were seen. Egg dimensions 55 \times 23 (47-62 \times 21-25) μm , length of egg equals 2.3 (1.8-2.9) VBD. PUS 1.9 (1.3-2.6) VBD long or 54 (39-65) % VA. Post-vulval part of body 9.4 (8.4-11.2) ABD long. Tail tapers evenly to rounded terminus.

Male : Similar to female. Caudal alae 2.7 (1.8-4.7) ABD long, extending along 43 (27-84) % of tail.

HABITATS AND LOCALITIES

D. medians has been found in Poland and Syria, and this is the second record of this species originally described from South Dakota, USA.

VOUCHER SPECIMENS

Specimens from Dziekanów Leśny are deposited in the nematode collection of the Instytut Zoologii PAN, Warszawa, Poland, while those from Syria are kept in the author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. medians is differentiated by stout body, six incisures, short stylet (7-8 μm), non-muscular oesophagus, posterior vulva (V = 79-83), long PUS and short, conical tail with rounded tip. Medium sized spicules (mostly 17-18 μm) and bursa reaching to one-third or half of tail length further add to the species characterisation.

D. medians is most similar to *D. myceliophagus*, from which it differs mainly by oesophagus and cephalic skeleton structure.

REMARKS

Described nematodes agree well with the original description except for position of vulva. Thorne and Malek (1968) give V = 76, which has to be treated as printer's error. Calculations from the dimensions indicate head to vulva distance 502 μm and vulva to terminus 158 μm . Tail length can be calculated from body length and coefficient c, and it makes 47 μm . Thus, the distance from vulva to anus would be 158 - 47 = 111 μm , resulting with VA/T almost 2.4. However, Fig. 35 F of Thorne and Malek (1968) shows VA/T = 1.3. Assuming the figure is correct, the vulva-anus distance can be calculated as 1.3 \times 47 = 61 μm . Now the post-vulval body part measures 61 + 47 = 108 μm , and pre-vulval part 660 - 108 = 552 μm . These corrections make V = 83.6, nearer to what have been observed in examined females.

Among females from Dziekanów Leśny, a single specimen with two excretory pores was seen. These were 96 and 105 μm from anterior end.

Ditylenchus medicaginis Wasilewska, 1965

(Fig. 13)

MEASUREMENTS

Female

Poland, type locality, Dziekanów Leśny (n = 9). L = 868 (767-1130); oes. = 134 (118-163); ex. p. = 100 (90-108); tail = 89 (74-99); a = 43 (40-48); b = 5.7 (5.5-7.0); MB = 39 (36-41); c = 9.8 (8.4-12.6); c' = 7.4 (5.8-8.6); VA/T = 0.9 (0.7-1.1); V' = 90 (89-91); V = 80 (78-84); st. = 7.0-7.5.

Poland, Rewa (n = 11). L = 726 (574-965); oes. = 123 (107-153); ex. p. = 101 (84-115); tail = 70 (62-77); a = 40 (29-49); b = 5.9 (5.1-6.9); MB = 44 (40-49); c = 10.3 (8.8-13.6); c' = 6.2 (5.5-6.8); VA/T = 1.2 (0.8-1.6); V' = 87 (82-91); V = 79 (73-82); st. = 7.7 (7-8).

Poland, Kolonia Kiersnowek (n = 7). L = 750 (678-829); oes. = 122 (113-129); ex. p. = 101 (93-105); tail = 75 (71-78); a = 50 (41-57); b = 6.2 (5.6-6.7); MB = 41 (39-42); c = 10.0 (9.3-10.7); c' = 7.2

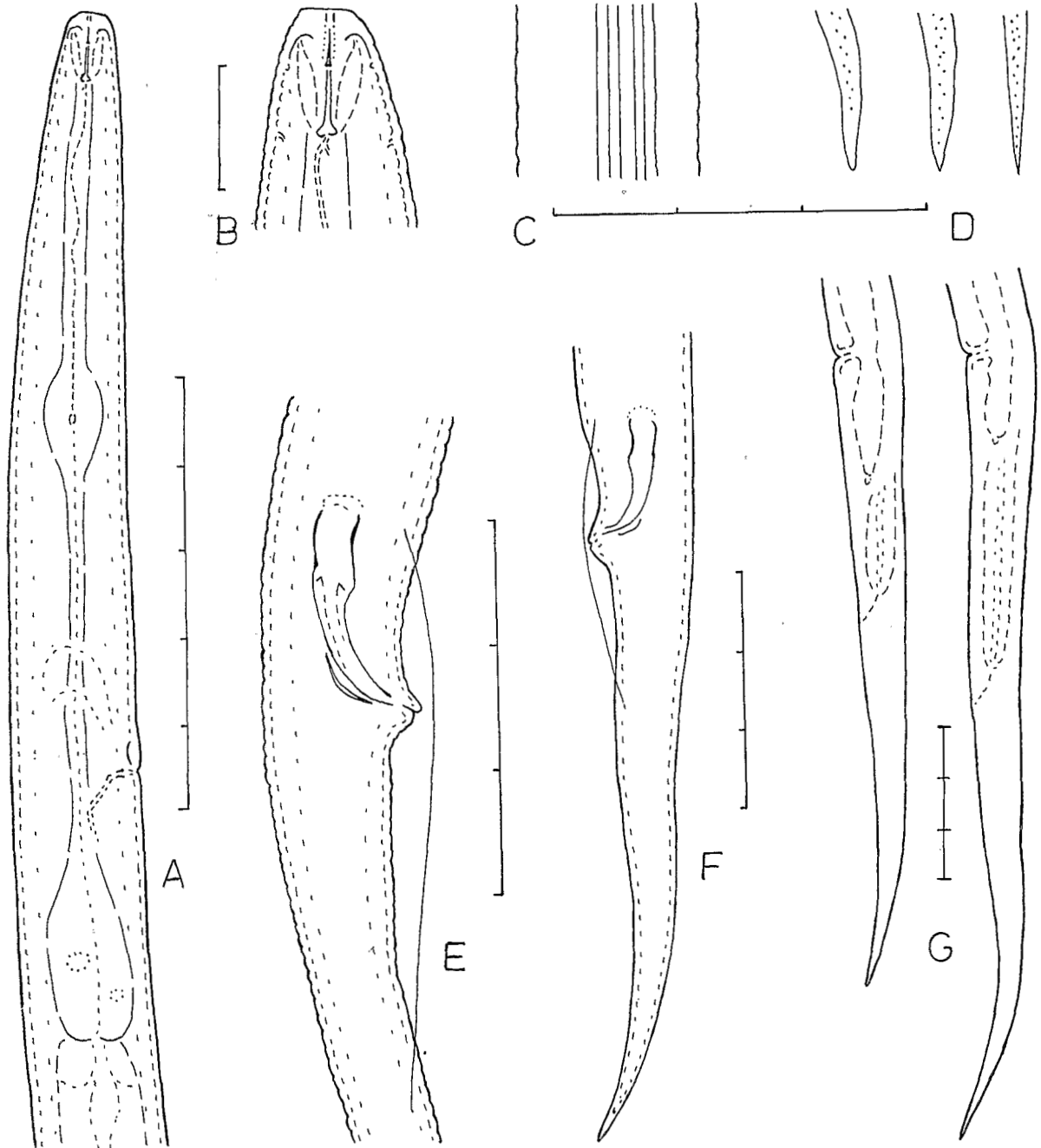


Fig. 13. *Ditylenchus medicaginis*. — A : Oesophageal region; B : Head; C : Lateral field; D : Tail terminus; E : Male cloacal region; F : Male tail; G : Posterior part of female. (Smallest unit of scale bar = 10 μ m.).

(5.8-8.3); VA/T = 1.5 (1.3-1.7); V' = 83 (82-85); V = 75 (74-76); st. = 7.4 (7-8).

Poland, Komorów (n = 6). L = 790 (593-939); oes. = 126 (112-141); tail = 76 (56-92); a = 40 (32-43); b = 6.3 (5.3-7.3); MB = 40 (37-43); c = 10.5

(8.6-13.2); c' = 6.0 (4.9-7.4); VA/T = 1.2 (0.9-1.4); V' = 87 (81-91); V = 79 (72-82); st. = 7.8 (7-8).

Poland, Perlino (n = 5). L = 729 (626-804); oes. = 131 (121-139); ex. p. = 93 (87-97); tail = 68 (61-76); a = 46 (38-49); b = 5.6 (5.2-6.1); MB = 39 (38-40);

c = 10.7 (9.9-11.6); c' = 6.0 (5.2-7.4); VA/T = 1.5 (1.4-1.7); V' = 84 (82-86); V = 76 (75-78); st. = 7.

Poland, Rawa Mazowiecka (n = 4). L = 951 (883-1 048); oes. (n = 2) = 140, 148; ex. p. = 105 (94-126); tail = 93 (87-99); a = 38 (34-43); b (n = 2) = 6.3, 7.1; MB (n = 2) = 41; c = 10.3 (10.0-10.6); c' = 5.3 (5.2-5.5); VA/T = 1.0-1.1; V' = 88-89; V = 79-80; st. = 7.5 (7-8).

Poland, Faliszewo (n = 5). L = 727 (619-857); oes. = 121 (114-134); ex. p. = 96 (92-102); tail = 67 (50-84); a = 41 (36-52); b = 6.0 (5.2-7.5); MB = 40 (35-41); c = 11.0 (10.1-12.3); c' = 6.1 (4.5-8.2); VA/T = 1.0-1.1; V' = 89-90; V = 82 (81-83); st. = 7.4 (7.0-8.5).

Poland, Hrubieszów (n = 2). L = 633, 712; oes. = 115, 124; ex. p. = 91, 101; tail = 69, 72; a = 44, 46; b = 5.5, 5.8; MB = 41, 44; c = 8.8, 10.3; c' = 6.7, 7.0; VA/T = 1.1, 1.5; V' = 84, 86; V = 76; st. = 7.

Poland, Wizna (n = 1). L = 740; oes. = 126; ex. p. = 108; tail = 70; a = 42; b = 5.9; MB = 43; c = 10.6; c' = 5.7; VA/T = 1.3; V' = 86; V = 78; st. = 7.

Poland, Lowicz (n = 2). L = 797, 806; oes. = 135, 144; ex. p. = 96, 101; tail = 85, 92; a = 39; b = 5.5, 6.0; MB = 40, 43; c = 8.8, 9.3; c' = 6.9, 7.4; VA/T = 1.0, 1.1; V' = 86, 88; V = 77, 79; st. = 7, 8.

Poland, Urbanie (n = 2). L = 575, 579; oes. = 103, 106; ex. p. = 82, 84; tail = 57, 65; a = 37, 40; b = 5.5, 5.6; MB = 45, 46; c = 8.9, 10.2; c' = 5.5, 7.4; VA/T = 1.3, 1.5; V' = 83, 84; V = 75; st. = 7.5, 8.0.

Poland, Kucharki (n = 2). L = 754, 767; oes. = 117, 144; ex. p. = 92, 94; tail = 82, 83; a = 37, 39; b = 5.3, 6.4; MB = 39, 40; c = 9.0, 9.3; c' = 6.2, 7.4; VA/T = 1.0, 1.4; V' = 83, 87; V = 74, 77; st. = 7, 8.

Bulgaria, Varna (n = 1). L = 864; oes. = 126; ex. p. = 100; tail = 81; a = 38; b = 6.9; MB = 39; c = 10.6; c' = 6.1; VA/T = 1.1; V' = 89; V = 80; st. = 7.

Syria, Alhasseka (n = 2). L = 542, 575; oes. = 109, 112; ex. p. = 82; tail = 49; a = 37, 39; b = 4.1, 5.0; MB = 37, 38; c = 11.0, 11.6; c' = 4.8; VA/T = 1.0, 1.2; V' = 89, 90; V = 81; st. = 7.

Mexico, soil (n = 3). L = 646 (610-675); oes. = 104-118; ex. p. = 93 (82-100); tail = 61-69; a = 40-44; b = 5.5-6.4; MB = 43-45; c = 9.8-10.1; c' = 6.3-6.7; VA/T = 1.3-1.4; V' = 84-86; V = 76-77; st. = 7.

Male

Poland, type locality, Dziekanów Leśny (n = 6). L = 745 (660-872); oes. = 134 (125-142); ex. p. = 96 (88-103); tail = 83 (76-95); a = 45 (39-52); b = 5.6 (5.2-6.2); MB = 38 (37-42); c = 8.9 (8.4-9.3); c' = 7.2 (6.4-8.4); spicule = 17.3 (15-20); st. = 7.0-7.5.

Poland, Rewa (n = 6). L = 680 (561-880); oes. = 128 (109-153); ex. p. = 100 (81-112); tail = 74 (62-109); a = 38 (32-43); b = 5.3 (5.0-5.7); MB = 45 (41-49); c = 9.9 (8.7-12.0); c' = 5.4 (5.0-5.8); spicule = 16.5 (15-20); st. = 7.0-7.5.

Poland, Kolonia Kiersnówek (n = 5). L = 696

(592-755); oes. = 118 (116-126); ex. p. = 97 (89-101); tail = 68 (63-72); a = 48 (44-54); b = 5.9 (5.0-6.4); MB = 40 (37-42); c = 10.2 (9.4-10.6); c' = 6.4 (5.8-6.9); spicule = 16.2 (15-17); st. = 7.0-7.5.

Poland, Komorów (n = 2). L = 685, 779; oes. = 114, 122; tail = 69, 80; a = 42, 44; b = 6.0, 6.4; MB = 37, 44; c = 9.7, 9.9; spicule = 18.5, 19.5; st. = 7.

Poland, Perlino (n = 4). L = 659 (589-699); oes. = 125 (119-133); ex. p. = 92 (85-95); tail = 68 (66-70); a = 40 (38-45); b = 5.3 (4.8-5.5); MB = 39-41; c = 9.7 (8.8-10.4); c' = 5.4 (5.1-5.9); spicule = 16-17; st. = 7.

Poland, Rawa Mazowiecka (n = 2). L = 801, 870; oes. = 127; ex. p. = 103, 110; tail = 92, 94; a = 35, 37; b = 6.3, 6.9; MB = 40, 41; c = 8.5, 9.5; c' = 5.4, 5.7; spicule = 22; st. = 7.0, 7.5.

Poland, Faliszewo (n = 2). L = 608, 655; oes. = 116, 124; ex. p. (n = 1) = 91; tail = 60, 66; a = 39, 53; b = 5.2, 5.3; MB = 36, 47; c = 9.2, 11.0; spicule = 17, 18.5; st. = 7.0, 7.5.

Poland, Urbanie (n = 1). L = 533; oes. = 119; ex. p. = 75; tail = 55; a = 40; b = 4.5; MB = 34; c = 9.9; c' = 5.8; spicule = 15; st. = 7.

DESCRIPTION

Female : Body straight or slightly ventrally arcuate. Lateral field with six incisures. Head finely annulated, 5-6 µm wide. Cephalic skeleton extending about two annuli posterior to basal plate. Stylet delicate, cone shorter than shaft, knobs small and rounded. Median bulb oval in outline, muscular, with small thickenings of lumen walls. Basal bulb offset from intestine, short. Excretory pore mostly opposite posterior part of isthmus. Vulva position more variable than in other species of the genus, V = 72-84 was observed in total material measured; however, 62 % of specimens showed V within limit 78-82, and 85 % within V = 75-82. Length of PUS equals 1.8 (0.8-3.5) VBD or 20-56 % VA, although one female with PUS 14 % VA and another one with 74 % VA were observed. Post-vulval part of body 13.3 (9.5-18.0) of ABD long. Tail elongated conical, terminus mostly pointed or dull, sometimes rounded.

Male : Similar to female. Bursa 2.7 (1.9-4.1) of ABD long, extending along 30 (20-44) % of tail length.

HABITATS AND LOCALITIES

In Poland *D. medicaginis* is a common soil nematode, occasionally found within plant tissues. It is most often found in medium textured soils.

VOUCHER SPECIMENS

Studied specimens are deposited at the nematode collection of the Instytut Zoologii PAN, Warszawa, Poland and in the author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. medicaginis is characterised by six incisures, muscular median bulb and offset glandular bulb, stylet 7-8 μm , cephalic skeleton not more refractive than in most species of *Ditylenchus* extending posteriorly for about two annuli, vulva mostly at 75-82 % of body length, tail elongated conical with narrow posterior part and pointed or dull terminus. Occasionally tail end wider and then terminus rounded. Medium sized spicules (usually 15-20 μm) and bursa reaching about one-third of tail length also contribute to species diagnosis.

D. medicaginis differs from *D. myceliophagus* mainly by cephalic skeleton structure. Tail tip of the former is narrower than that of the latter.

***Ditylenchus myceliophagus* Goodey, 1958**

(Fig. 14)

MEASUREMENTS

Female

Specimens from original Cairns culture (type population; n = 8). L = 878 (801-921); oes. = 114 (104-118); dist. head-end oes. lobe = 128 (115-137); ex. p. = 103 (93-111); tail = 56 (50-62); a = 33 (30-35); b = 7.7 (7.1-8.9); b' = 6.9 (6.5-8.0); MB = 41 (36-50); c = 15.6 (14.4-17.0); c' = 3.6 (3.1-4.0); VA/T = 1.5 (1.2-1.9); V' = 90 (88-91); V = 84 (82-86); st. = 7.0 (6.5-7.5).

Poland, Jawczyce (n = 4). L = 722 (545-918); oes. = 104 (93-112); dist. head-end oes. lobe = 149 (133-160); ex. p. = 88 (77-100); tail = 57 (50-68); a = 37 (29-45); b = 6.8 (5.3-8.4); b' = 4.8 (3.8-5.7); MB = 43 (41-46); c = 12.5 (10.8-14.3); c' = 5.2 (4.8-5.4); VA/T = 1.2-1.3; V' = 88-90; V = 82 (80-84); st. = 8.

Poland, Kolonia Kiersnówek (n = 1). L = 662; oes. = 113; dist. head-end oes. lobe = 166; ex. p. = 99; tail = 56; a = 43; b = 5.8; b' = 4.0; MB = 43; c = 11.9; c' = 5.4; VA/T = 1.2; V' = 89; V = 82; st. = 7.5.

Poland, Dulcza Wielka (n = 4). L = 668 (618-740); oes. = 116 (100-127); dist. head-end oes. lobe = 164 (131-196); ex. p. = 94 (78-101); tail = 54 (50-59); a = 40 (38-41); b = 5.8 (5.0-6.2); b' = 4.2 (3.5-4.7); MB = 43 (37-48); c = 12.4 (11.7-13.2); c' = 4.9-5.6; VA/T = 1.3 (1.1-1.4); V' = 88-89; V = 81-82; st. = 7.7 (7-8).

Poland, Maszkowice (n = 3). L = 723 (696-767); oes. = 112 (106-118); dist. head-end oes. lobe = 166 (156-176); ex. p. = 93-94; tail = 54-58; a = 34-37; b = 6.4 (6.0-7.2); b' = 4.4 (4.0-4.9); MB = 44-46; c = 12.5-13.3; c' = 4.2-4.7; VA/T = 1.2-1.4; V' = 88-90; V = 81-83; st. = 7.5.

Poland, Ożarów (n = 2). L = 643, 665; oes. = 106, 108; dist. head-end oes. lobe = 146, 153; ex. p. = 84, 90; tail = 49, 57; a = 39, 43; b = 5.9, 6.3; b' = 4.2, 4.5; MB = 40, 45; c = 11.7, 13.0; c' = 4.8, 5.5; VA/T = 1.1, 1.4; V' = 89, 90; V = 82; st. = 7.5, 8.0.

Poland, Koldrab (n = 1). L = 716; oes. = 118; dist. head-end oes. lobe = 165; ex. p. = 93; tail = 57; a = 37; b = 6.0; b' = 4.3; MB = 42; c = 12.6; c' = 4.6; VA/T = 1.3; V' = 89; V = 82; st. = 8.

Poland, Skrzyszowice (n = 1). L = 595; oes. = 106; dist. head-end oes. lobe = 116; ex. p. = 90; tail = 52; a = 34; b = 5.6; b' = 5.1; MB = 38; c = 11.6; c' = 4.8; VA/T = 1.4; V' = 87; V = 79; st. = 7.

Poland, Dziekanów Leśny (n = 1). L = 864; oes. = 136; dist. head-end oes. lobe = 162; ex. p. = 111; tail = 64; a = 35; b = 6.4; b' = 5.3; MB = 39; c = 13.5; c' = 4.8; VA/T = 1.8; V' = 86; V = 79; st. = 8.

Poland, Blonie (n = 4). L = 655 (600-680); oes. = 122 (112-139); dist. head-end oes. lobe = 155 (146-164); ex. p. = 87-89; tail = 56 (38-69); a = 42 (36-47); b = 5.4 (4.8-5.9); b' = 4.0-4.6; MB = 40-44; c = 12.3 (9.8-15.8); c' = 5.2 (4.1-6.7); VA/T = 1.2 (0.9-1.5); V' = 88-90; V = 82 (81-84); st. = 7.6 (7.0-8.5).

Poland, Kamienna Szlachecka (n = 5). L = 757 (676-877); oes. = 121 (106-137); dist. head-end oes. lobe = 162 (146-172); ex. p. = 93-102; tail = 60 (53-72); a = 42 (36-50); b = 6.3 (5.7-7.3); b' = 4.7 (4.3-5.3); MB = 35-40; c = 12.9 (9.9-15.9); c' = 5.0 (4.0-6.4); VA/T = 1.2 (1.0-1.5); V' = 87-91; V = 82 (79-85); st. = 7.

Poland, Kucharki (n = 1). L = 605; oes. = 110; dist. head-end oes. lobe = 159; ex. p. = 92; tail = 61; a = 35; b = 5.5; b' = 3.8; MB = 44; c = 9.9; c' = 5.9; VA/T = 1.1; V' = 88; V = 79; st. = 7.

Poland, Samszyce (n = 1). L = 767; oes. = 122; dist. head-end oes. lobe = 157; ex. p. = 95; tail = 58; a = 37; b = 6.3; b' = 4.9; MB = 38; c = 13.3; c' = 4.0; VA/T = 1.5; V' = 88; V = 81; st. = 7.

Poland, Umiasztów (n = 5). L = 684 (596-783); oes. = 112-124; dist. head-end oes. lobe (n = 3) = 135 (115-147); ex. p. = 91 (87-97); tail = 57 (53-62); a = 36 (34-40); b = 5.6-6.3; b' (n = 3) = 5.3 (4.7-5.8); MB = 38-44; c = 10.2-13.6; c' = 4.6 (3.9-5.2); VA/T = 1.1-1.3; V' = 88-90; V = 82 (80-83); st. = 7.0-7.5

Poland, Dybówka (n = 2). L = 576, 577; oes. = 103, 110; dist. head-end oes. lobe = 114, 129; ex. p. = 80, 83; tail = 44, 52; a = 31, 35; b = 5.2, 5.6; b' = 4.5, 5.0; MB = 40, 42; c = 11.2, 13.0; c' = 3.9, 5.0; VA/T = 1.5, 1.7; V' = 85; V = 78, 79; st. = 7.0, 7.5.

Syria, Alhasseka (n = 9). L = 636 (544-708); oes. = 114 (95-125); dist. head-end oes. lobe (n = 1) = 111; ex. p. = 92 (84-103); tail = 52 (49-59); a = 38 (30-42); b = 5.6 (4.8-7.0); b' (n = 1) = 5.9; MB = 38-42; c = 10.6-13.7; c' = 4.5 (4.0-5.2); VA/T = 1.3 (1.1-1.5); V' = 89 (86-90); V = 81 (78-83); st. = 7.3 (7-8).

Male

Specimens from original Cairns culture (type population; n = 4). L = 729 (691-752); oes. = 115

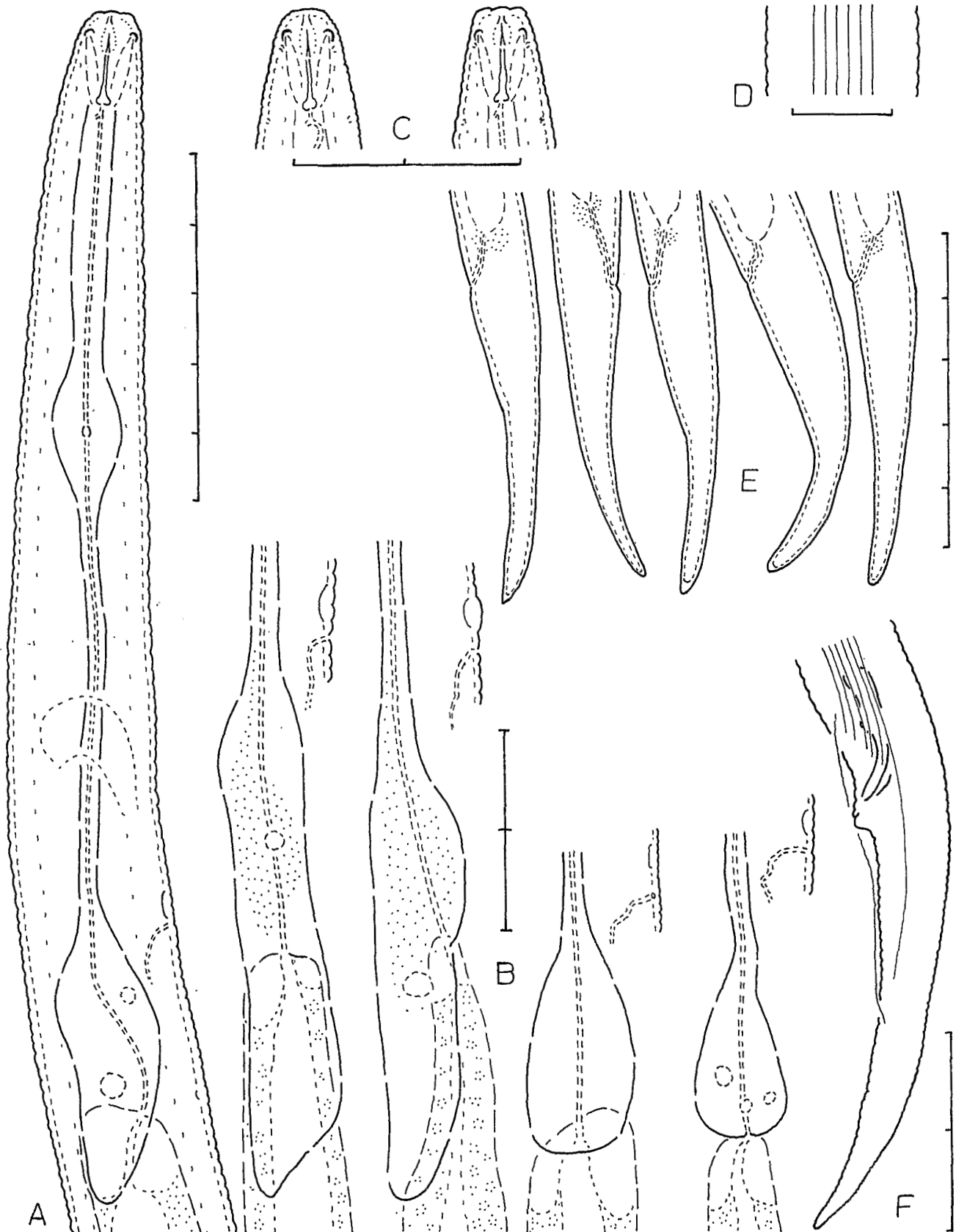


Fig. 14. *Ditylenchus myceliophagus*. — A : Oesophageal region; B : Posterior part of oesophagus; C : Head; D : Lateral field; E : Female tail; F : Male tail. (Smallest unit of scale bar = 10 μ m.).

(108-124); dist. head - end oes. lobe = 124 (117-127); ex. p. = 88-97; tail = 52-57; a = 34-36; b = 6.5 (6.0-7.2); b' = 6.0 (5.5-6.4); MB = 38; c = 13.7 (13.2-14.3); c' = 3.9-4.2; spicule = 20-23; st. = 7.

Poland, Jawczyce (n = 4). L = 562 (512-626); oes. = 105 (98-116); dist. head - end oes. lobe = 133 (125-142); ex. p. = 80 (75-88); tail = 50 (43-55); a = 34-36; b = 5.1-6.0; b' = 4.0-4.6; MB = 40-42; c = 10.4-12.0; c' = 4.2-4.8; spicule = 15-17; st. = 7-8. Poland, Maszkowice (n = 1). L = 632; oes. = 121; ex. p. = 96; tail = 76; a = 36; b = 5.2; MB = 41; c = 8.3; c' = 6.2; spicule = 16; st. = 7.

Poland, Kołdrąb (n = 1). L = 881; oes. = 133; dist. head - end oes. lobe = 195; ex. p. = 116; tail = 73; a = 45; b = 6.6; b' = 4.5; MB = 43; c = 12.0; c' = 5.1; spicule = 19; st. = 8.5.

Poland, Dziekanów Leśny (n = 4). L = 595 (542-649); oes. = 110 (101-116); dist. head - end oes. lobe = 144 (129-158); ex. p. = 93 (88-98); tail = 51 (44-57); a = 37 (33-42); b = 5.4 (4.7-6.1); b' = 4.2 (3.5-4.8); MB = 40-44; c = 11.9 (9.6-14.7); c' = 4.4 (3.9-5.0); spicule = 15-17; st. = 7-8.

Poland, Błonie (n = 1). L = 563; oes. = 117; ex. p. = 81; tail = 57; a = 39; b = 4.8; MB = 42; c = 9.9; c' = 5.5; spicule = 16; st. = 8.

Poland, Kamienica Szlachecka (n = 4). L = 644 (628-689); oes. = 116 (112-126); dist. head - end oes. lobe = 143 (139-148); ex. p. = 84 (79-89); tail = 54-60; a = 40 (36-45); b = 5.5-5.6; b' = 4.3-4.8; MB = 37-39; c = 11.6 (10.5-12.6); c' = 4.6-5.2; spicule = 16-18; st. = 7.0-7.5.

Poland, Umiałów (n = 2). L = 564, 576; oes. = 111, 122; ex. p. = 74, 80; tail = 47, 50; a = 37; b = 4.7, 5.1; MB = 42, 43; c = 11.4, 11.9; c' = 4.2, 4.5; spicule = 15; st. = 7.0, 7.5.

Poland, Dybówka (n = 2). L = 501, 552; oes. = 108-112; dist. head - end oes. lobe (n = 1) = 111; ex. p. = 77, 83; tail = 42, 44; a = 35, 43; b = 4.5, 5.1; b' (n = 1) = 5.0; MB = 39, 40; c = 11.9, 12.5; c' = 4.1, 4.3; spicule = 16, 16.5; st. = 7.0, 7.5.

Syria, Alhasseka (n = 6). L = 578 (533-644); oes. = 110 (105-113); ex. p. = 88 (84-92); tail = 50 (45-59); a = 39 (34-46); b = 5.2 (4.8-5.8); MB = 36-42; c = 11.6 (10.8-12.5); c' = 4.0-4.8; spicule = 16-20; st. = 7.

DESCRIPTION

Female : Lateral field with six incisures. Cuticle thin, annulation variable even on the same specimen. Head continuous with body contour, with fine often indistinct annuli, head diameter 5-6 μm . Stylet thin and delicate, cone about one third of stylet length, knobs rounded. Outer margins of basal plate of cephalic skeleton short and crescentic, more refractive than in other species of

the genus. Metacorporal bulb oval in outline, muscular, with small thickenings of lumen walls. Oesophageal glands overlap intestine in 83 % of examined females and 72 % of examined males. This overlap sometimes only few μm or up to 70 μm long. PUS equals 2.1 (1.0-2.8) VBD or 47 (18-69 % VA) (out of 53 females, only four had PUS shorter than 30 % VA). Post-vulval part of body 10.9 (8.1-13.3) ABD long. Tail rather thick, mostly ventrally bent, tip rounded, cuticle not swollen at the terminus.

Male : Usually shorter than female. Caudal alae 2.6 (1.8-3.9) of ABD long, reaches 35 (20-55) % of tail length.

HABITATS AND LOCALITIES

D. myceliophagus has been examined from soils of many localities in Poland, and also from Bulgaria and Syria. It does not appear to occur in sandy soils.

VOUCHER SPECIMENS

Specimens used in this study are deposited in the nematode collection of the Instytut Zoologii PAN, Warszawa, Poland, and in author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. myceliophagus is characterised by rather stout body, six incisures, stylet 7-8 μm long with short cone, crescentic and refractive margins of cephalic skeleton, Oesophagus muscular, mostly overlapping intestine, sometimes offset. Vulva very posterior, PUS long. Male bursa usually extending along less than half of the tail length. Tail terminus in both sexes rounded.

Having six incisures, short stylet and posterior vulva *D. myceliophagus* is similar to *D. triformis*, *D. anchilisposomus*, *D. medians* and *D. medicaginis*. However, *D. triformis* is described as having shorter spicules (13.4-14.9 μm), shorter PUS (25-33 % VA), three annuli on slightly offset head, and number of incisures on male cloacal region reduced to four. *D. anchilisposomus* has long lobe of oesophageal glands and female stylet 8.8 (6.2-9.9) μm long. Both mentioned species are not described as having short, crescentic and refractive margins of cephalic skeleton, and this appears the main difference allowing to differentiate females of *D. anchilisposomus* with stylet up to and including 9 μm from females of *D. myceliophagus* with longer oesophageal lobe. *D. medians* differs from *D. myceliophagus* by structure of oesophagus and cephalic skeleton. Cephalic skeleton structure appears to be also the main differentiating feature between *D. myceliophagus* on one side, and *D. medicaginis* and *D. geraerti* on another side.

***Ditylenchus nanus* Siddiqi, 1963**

MEASUREMENTS

Female

Australia, Dareton (n = 6). L = 746 (683-852); oes. = 127 (112-150); ex. p. = 100 (96-107); tail = 46 (42-48); a = 32 (28-40); b = 5.9 (4.9-7.3); MB = 40 (36-45); c = 16.4 (15.1-18.8); c' = 3.2 (2.9-3.6); VA/T = 1.7 (1.5-2.0); V' = 89 (87-90); V = 83 (81-84); st. = 7-8.

Male

Australia, Dareton (n = 7). L = 687 (623-764); oes. = 132 (123-140); ex. p. = 97 (89-107); tail = 48 (43-54); a = 36 (33-39); b = 5.2 (4.8-5.8); MB = 39 (35-42); c = 14.4 (12.9-15.1); c' = 3.7 (3.5-4.0); spicule = 13-15; st. = 7-8.

DESCRIPTION

Female : Lateral field with six incisures. Cuticle less than 1 μm thick, annulation indistinct. Stylet thin, cone shorter than shaft, knobs sloping backward. Median bulb muscular, oval in outline, thickenings of lumen walls about 2 μm long. Glandular bulb offset from intestine. PUS length equals 2.2 (1.8-2.6) VBD or 58 (52-67) % VA. Post-vulval part of body 8.7 (7.2-10.3) ABD long. Tail short and thick, often ventrally curved, with distinctly rounded terminus.

Male : Similar to female but shorter. Caudal alae 3.4 (2.8-3.7) ABD long, extending along 64 (55-69) % of tail length. Gubernaculum 5-6 μm long.

HABITATS AND LOCALITIES

D. nanus was collected in soil near *Eucalyptus* sp. tree growing on the bank of Murray river near Dareton, Victoria. It is the second record of this species after its description from India.

VOUCHER SPECIMENS

Examined specimens are kept in the author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. nanus is characterised by six incisures, muscular oesophagus offset from intestine, stylet 7-8 μm with short cone and sloping knobs, posterior vulva (V = 81-85) and PUS length about 50-70 % VA. Short spicules, long bursa and rounded tail terminus of both sexes are further features of this species.

D. nanus appears most similar to *D. mirus*. However, the latter is drawn with more rounded stylet knobs, and with thicker and straight tail.

***Ditylenchus nortoni* (Elmiligy, 1971)
Bello & Geraert, 1972**

MEASUREMENTS

Female

Poland, Skala (n = 1). L = 943; oes. = 141, ex. p. = 107; tail = 102; a = 42; b = 6.7; MB = 38; c = 9.3; c' = 7.6; VA/T = 0.8; V' = 90; V = 81; st. = 8.

Male

Poland, Skala (n = 2). L = 845, 943; oes. = 158, 160; ex. p. = 112, 132; tail = 71, 79; a = 44, 48; b = 5.3, 6.0; MB = 39, 40; c = 1.9; c' = 5.3, 5.5; spicule = 22, 23; st. = 9.

DESCRIPTION

This species is well described by Elmiligy (1971) and Bello and Geraert (1972), so only main characteristic features are mentioned below.

HABITAT AND LOCALITY

Three specimens of *D. nortoni* were collected in Skala, Poland, in loamy soil under pea.

VOUCHER SPECIMENS

These specimens are kept in author's collection.

DIAGNOSIS AND RELATIONSHIPS

Lateral field with four incisures. Head unstriated. Stylet 7-9 μm long, cone shorter than shaft, knobs rounded. Median bulb muscular, posterior bulb offset. PUS equal to or slightly longer than VBD. Vulva posterior V = 80-85. Spicule 21-25 μm long, bursa extending 45-62 % of tail length. Tail tip of both sexes pointed.

Because of four incisures, stylet length and position of vulva, *D. nortoni* resembles *D. equalis*. For comparison see under the latter.

***Ditylenchus parvus* Zell, 1988
(Fig. 15)**

MEASUREMENTS

Female

Poland, Podkowa Leśna (n = 21). L = 665 (561-817); oes. = 128 (118-141); ex. p. = 82 (74-92); tail = 69 (61-82); a = 39 (32-47); b = 5.2 (4.5-5.9); MB = 35 (33-38); c = 9.7 (8.6-11.6); c' = 6.3 (5.2-7.7); VA/T = 1.6 (1.1-1.9); V' = 81 (80-85); V = 73 (71-76); st. = 7.5 (7.0-8.0).

Poland, Hamernia (n = 14), L = 716 (640-899);

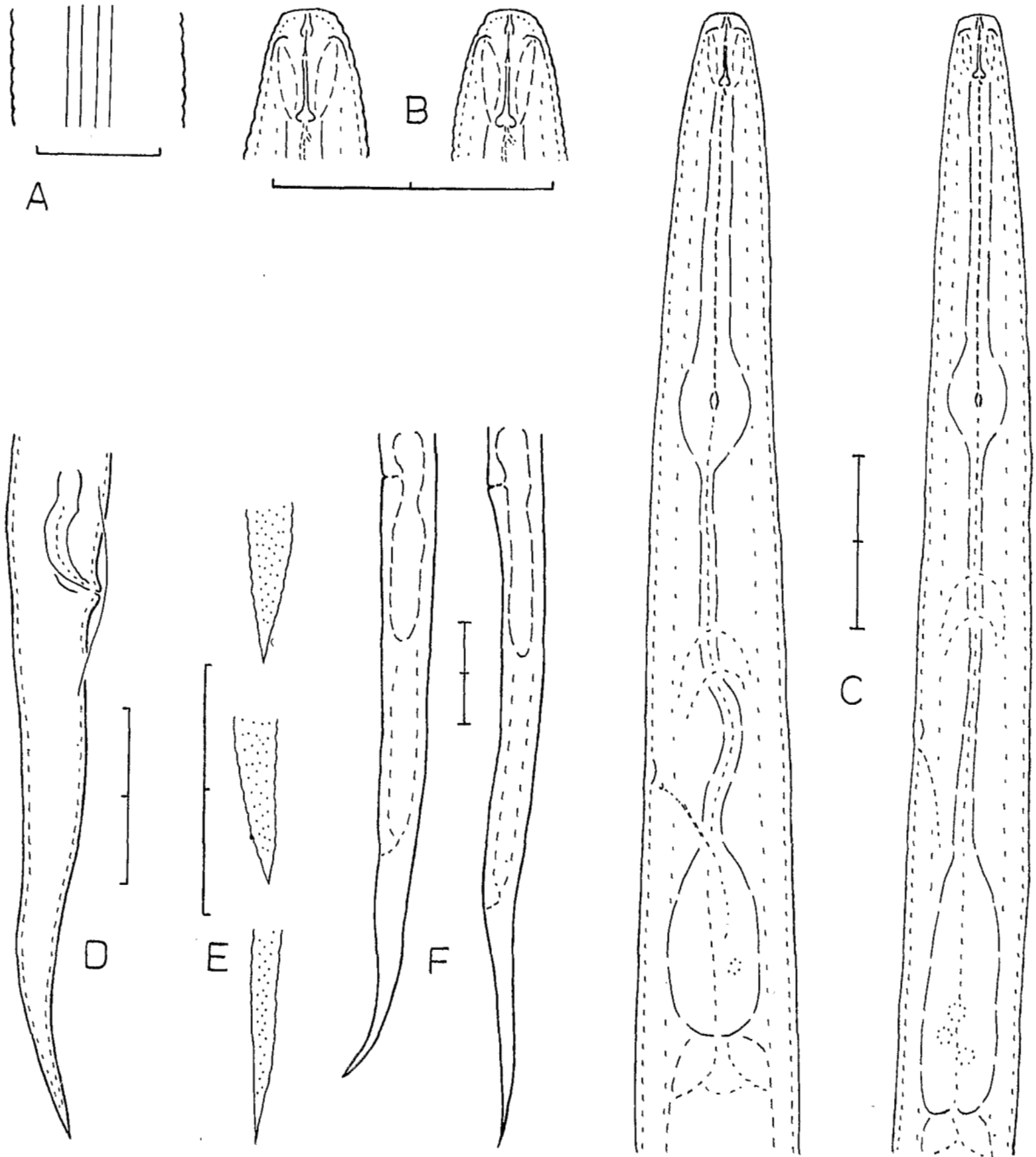


Fig. 15. *Ditylenchus parvus*. — A : Lateral field; B : Head; C : Oesophageal region; D : Male tail; E : Tail terminus; F : Posterior part of female. (Smallest unit of scale bar = 10 μ m.)

oes. = 130 (116-140); ex. p. = 85 (80-93); tail = 72 (67-78); a = 41 (35-52); b = 5.5 (4.9-6.7); MB = 36 (32-39); c = 9.9 (9.1-11.5); c' = 6.4 (5.1-8.1); VA/T = 1.7 (1.4-2.3); V' = 81 (78-83); V = 73 (71-75); st. = 7.6 (7.0-8.0).

Poland, Nowa Wola (n = 3). L = 614 (572-655); oes. = 118-121; ex. p. = 76-80; tail = 56-63; a = 41-45; b = 4.8-5.4; MB = 38 (35-43); c = 10.3-10.5; c' = 6.3-6.4; VA/T = 1.6-1.7; V' = 82-83; V = 74-75; st. = 6.5-7.0.

Male

Poland, Podkowa Leśna (n = 16). L = 640 (538-733); oes. = 120 (110-132); ex. p. = 80 (69-91); tail = 73 (63-85); a = 41 (36-47); b = 5.3 (4.6-6.3); MB = 37 (34-41); c = 9.0 (7.9-9.9); c' = 5.9 (5.4-6.4); spicule = 15.3 (14.5-17.5); st. = 7.1 (6.5-8.0).

Poland, Hamernia (n = 3). L = 670 (646-696). oes. = 126-128; ex. p. = 80-81; tail = 68-72; a = 42-46; b = 5.1-5.5; MB = 35-37; c = 9.3-9.7; c' = 6.0-6.4; spicule = 15-16; st. = 7.5-8.0.

DESCRIPTION

Female : Relaxed specimens straight, sometimes slightly ventrally arcuate. Annuli 1-1.3 μm wide. Lateral field with four incisures, occasionally two faint incisures could be seen for short distance at uterus level. Head with one, seldom two, indistinct striae. Head width 4.5-5 μm . Stylet delicate, cone about one-third of stylet length, knobs rounded and somewhat variable in size but not in shape. Median bulb large, oval, muscular, with small thickenings of lumen walls. Basal bulb usually elongated, always offset from intestine. Excretory pore opposite to posterior part of isthmus. PUS often collapsed, measuring 2.7 (1.8-4.3) VBD (only one female over 4, two others under 2) or 38 (28-51) % VA. Tail mostly slightly ventrally arcuate, tip always pointed.

Male : Similar to female. Caudal alae 2.3 (1.8-2.9) ABD long, extends along 22 (17-33) % of tail. Gubernaculum 4-6 μm long.

HABITATS AND LOCALITIES

In Poland this species occurs in litter and organic soil of deciduous forest, sometimes in wet moss, seldom in soil.

VOUCHER SPECIMENS

Examined specimens are deposited in the nematode collection of the Instytut Zoologii PAN, Warszawa, Poland, and in the collection of author.

DIAGNOSIS AND RELATIONSHIPS

D. parvus is characterised by four incisures, stylet mostly 7-8 μm , muscular median bulb with small thickenings, rather long posterior bulb, position of vulva (V = 71-77), PUS about a third of vulva-anus distance and pointed tail terminus. Spicule 12-18 μm and short bursa further add to the species characterization.

Having four incisures, stylet 7-8 μm and V = 71-77, *D. parvus* resembles *D. terricolus* and *D. equalis*. The former has more elongated median bulb, posterior bulb overlaps intestine for a short distance, thicker tail, and tail tip not so distinctly pointed. *D. equalis* has more posterior vulva (V = 77-82), PUS about equal to VBD and less pointed tail.

Present specimens were compared with holotype and some paratypes of *D. parvus* kindly lent by Dr. H Zell. No differences were seen, and the stylet length of type specimens was found 7-8 μm .

***Ditylenchus phyllobius* (Thorne, 1934)
Filipjev, 1936**

MEASUREMENTS

Female

Texas, Lubbock (n = 10). L = 684 (592-838); oes. = 80 (72-93); dist. head - end oes. lobe = 126 (110-144); ex. p. = 88 (72-99); tail = 48 (36-58); a = 25 (20-32); b = 8.6 (7.4-10.5); b' = 5.5 (4.1-6.5); c = 14.6 (11.4-17.6); c' = 3.7 (2.9-4.5); VA/T = 1.8 (1.3-2.2); V' = 87 (85-89); V = 81 (78-84); st. = 9-10.

Male

Texas, Lubbock (n = 10). L = 750 (672-799); oes. = 89 (77-105); dist. head - end oes. lobe = 132 (103-156); ex. p. = 99 (74-113); tail = 41 (39-46); a = 29 (27-34); b = 8.5 (7.0-9.7); b' = 5.8 (4.7-7.5); c = 18.1 (16.3-19.2); c' = 2.8 (2.5-3.1); spicule = 20.5 (19-22); st. = 9-10.

DESCRIPTION

Female : Cuticle very finely and indistinctly striated, subcuticular annulation also fine but more distinct. Lateral field about 2 μm wide, apparently with four lines. Head unstriated, 7-9 μm wide. Cephalic skeleton not very refractive, extending posterior to basal plate for a short distance. Stylet cone about 40 % of stylet length, knobs large and elongated, perpendicular to stylet. Oesophagus usually devoid of median bulb, although small swelling near orifice of subventral glands sometimes present. Glandular part of oesophagus forming a long lobe overlapping intestine. Excretory pore near level of oesophago-intestinal junction. Gonad sometimes reaching up to stylet knobs. PUS length 2.1 (1.6-2.4) VBD or 65 (45-77) % VA. Post-vulval body part 10.2 (8.4-12.3) ABD long. Tail conical, tip rounded.

Male : Longer than female. Caudal alae reaches 68 (52-77) % of tail length. Gubernaculum 7-8 μm long. Tail with distinct projection, usually 5-7 μm long, tip rounded.

HABITAT AND LOCALITY

Studied specimens were collected from leaf galls of *Solanum eleagnifolium* Cav. grown in Lubbock, Texas, USA. This is monophagous obligatory parasite known from Arizona and Texas.

VOUCHER SPECIMENS

Examined specimens are deposited in the nematode collection of the Instytut Zoologii PAN, Warszawa, Poland, and in the collection of author.

DIAGNOSIS AND RELATIONSHIPS

D. phyllobius is distinctive because of very narrow lateral field with four incisures, rather long stylet (9-10 μm) with large knobs, oesophagus structure, posterior vulva, sexual dimorphism in tail end, rounded tail tip and long bursa. Obligatory parasitism and formation of galls on host leaves add to the species characterisation.

REMARK

The structure of oesophagus and stylet place this species apart from other *Ditylenchus* species.

Presented description agrees with that of Thorne (1961). However, Sivakumar and Mahanasundaram (1982) presented description of specimens from the vicinity of Coimbatore, India, from leaf galls of the same host. According to these authors the Indian specimens differ from North American ones in having areolated lateral field with seven incisures, stylet 11.5 (10.4-12.0) μm long, slightly more posterior excretory pore and pointed tail tip. These differences are usually considered specific. However, otherwise the Indian specimens show many characters in common with those observed. This discrepancy is noted without conclusion because the Indian nematodes have not been examined by the author.

Ditylenchus silvaticus sp. n.

(Fig. 16)

MEASUREMENTS

Female

Paratypes (n = 4). L = 602 (560-660); oes. = 104 (96-108); ex. p. = 90 (82-97); tail = 57 (52-67); a = 24-25; b = 5.8 (5.3-6.5); MB = 38 (36-39); c = 10.6 (9.2-12.6); c' = 5.0 (4.2-6.3); VA/T = 1.2 (0.9-1.4); V' = 88 (86-89); V = 79 (78-81); st. = 7.

Poland, Puszcza Bolimowska (n = 2). L = 572, 643; oes. = 106, 111; ex. p. = 98, 101; tail = 45, 50; a = 24, 27; b = 5.1, 6.1; MB = 39, 41; c = 12.6, 12.7; c' = 3.7, 4.1; VA/T = 1.6; V' = 86; V = 79; st. = 7.

Poland, Roztocze, moss (n = 2). L = 625, 626; oes. = 110, 111; ex. p. = 97, 104; tail = 48, 49; a = 25; b = 5.6, 5.7; MB = 42; c = 12.6, 12.9; c' = 3.6, 3.8; VA/T = 1.4, 1.5; V' = 87, 88; V = 81; st. = 7, 8.

Poland, Roztocze, coniferous litter (n = 1). L = 675; oes. = 112; ex. p. = 95; tail = 43; a = 25; b = 5.5; MB = 43; c = 14.2; c' = 3.8; VA/T = 1.6; V' = 88; V = 81; st. = 7.

Poland, Puszcza Kampinoska (n = 1). L = 508; oes. = 103; ex. p. = 88; tail = 44; a = 31; b = 5.0; MB = 39; c = 11.5; c' = 4.8; VA/T = 1.4; V' = 87; V = 79; st. = 8.

Holotype. L = 628; oes. = 109; ex. p. = 92; tail = 59; a = 25; b = 5.8; MB = 40; c = 10.5; c' = 4.8; VA/T = 1.1; V' = 88; V = 80; st. = 7.

DESCRIPTION

Female : Body plump, slightly ventrally arcuate. Lateral field narrow, with six incisures. Cuticular annulation extremely fine, indistinct, annular width less than 1 μm but could not be measured. Head width 6-7 μm , striation not seen. Stylet delicate, cone about a third of stylet length, knobs small. Median bulb large, muscular, with small thickenings of lumen walls. Isthmus long and thin, expanding into a short basal bulb offset from intestine. Excretory pore near junction of isthmus and basal bulb, somewhat more posterior than in most species of the genus. Intestine densely granulated in all specimens, obscuring observation of intestinal lumen and genital tract. Ovary reaching the middle of isthmus. Spermatheca empty. PUS length equals 1.2 (0.8-1.4) VBD or 36 (27-45) % of vulva-anus distance. Post-vulval part of body tapers evenly to tail tip, 10.3 (8.8-11.9) ABD long. Tail terminus variable, pointed or dull with mucro in type population, wider or even clavate with mucro in some other populations.

Male : Not found.

HABITATS AND LOCALITIES

Type population collected in Poland, Hamernia, in deciduous leaf litter. Other populations found in moss of the Roztocze National Parc and Kampinoski National Parc, in coniferous litter in Roztocze National Parc and in deciduous leaf litter in Puszcza Bolimowska.

TYPE SPECIMENS

Holotype female and all paratypes are deposited in nematode collection of the Instytut Zoologii PAN, Warszawa, Poland. Specimens from other localities kept in author's collection.

DIAGNOSIS AND RELATIONSHIPS

Rather small and plump nematodes characterised by very fine cuticular annulation, six incisures, stylet 7-8 μm long, muscular median bulb and small offset glandular bulb, posterior vulva (V = 78-81), post-vulval part of body short and tapering evenly, PUS about one third of vulva-anus distance, thick tail with pointed or dull terminus, sometimes with mucro.

Because of six incisures, short stylet, oesophagus structure and posterior vulva, *D. silvaticus* sp. n. should

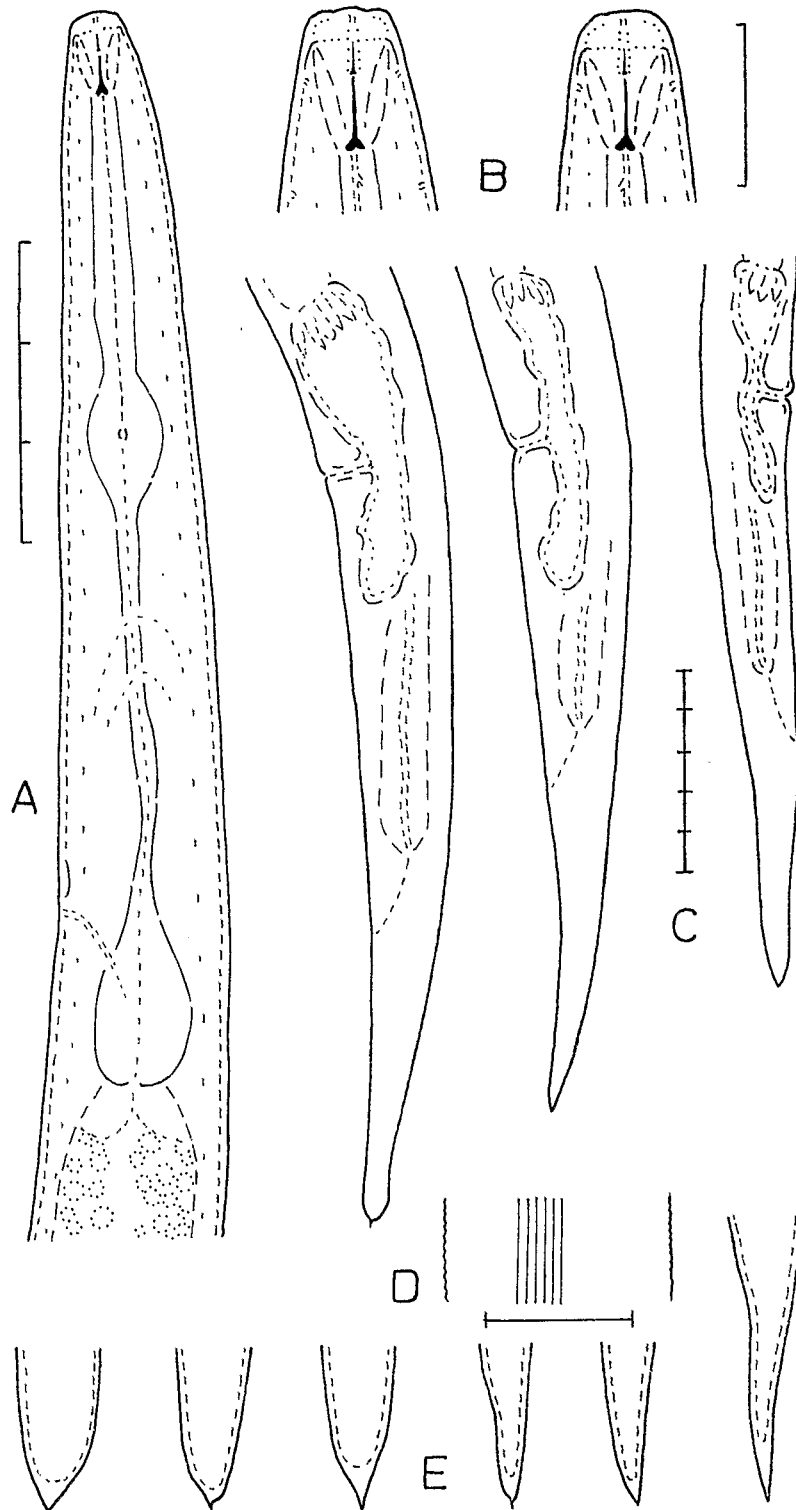


Fig. 16. *Ditylenchus silvaticus* n. sp. — A : Oesophageal region; B : Head; C : Posterior part of female; D : Lateral field; E : Tail terminus. (Smallest unit of scale bar = 10 μ m.)

be compared with *D. acutatus*, *D. tenuidens*, *D. medicaginis* and *D. myceliophagus*. It differs from all these species by having much finer cuticular annulation and body tapering evenly from vulva to tail terminus. The thick tail of *D. silvaticus* sp. n. further differentiates this species from all but *D. acutatus*. However, the latter has longer PUS and longer post-vulval part of body in relation to ABD, and also different shape of stylet knobs.

***Ditylenchus tenuidens* Gritzenko, 1971**

(Fig. 17)

MEASUREMENTS

Female

Poland, Puszcza Bialowieska (n = 8). L = 646 (591-677); oes. = 134 (128-141); ex. p. = 93 (87-97); tail = 64 (53-69); a = 35 (29-40); b = 4.6-5.0; MB = 36-41; c = 10.3 (9.5-12.7); c' = 5.5 (4.4-6.0); VA/T = 1.2 (1.1-1.8); V' = 85-88; V = 77-79; st. = 8.

Poland, Puszcza Biata, humus (n = 4). L = 654 (587-697); oes. = 130 (123-140); ex. p. = 87-91; tail = 62 (53-70); a = 34 (31-40); b = 5.1 (4.8-5.4); MB = 38-40; c = 9.8-12.3; c' = 5.1 (4.1-5.9); VA/T = 1.2-1.4; V' = 85-88; V = 78 (76-81); st. = 8 (7.5-8.5).

Poland, Puszcza Biata, coniferous litter I (n = 6). L = 723 (550-853); oes. = 125 (111-135); ex. p. = 92 (81-103); tail = 74 (47-95); a = 38 (34-44); b = 5.8 (4.8-6.6); MB = 38-42; c = 11.4 (10.9-11.6); c' = 5.5 (4.9-6.0); VA/T = 1.3 (1.1-1.4); V' = 85-89; V = 79 (77-82); st. = 7.8 (7.0-8.0).

Poland, Puszcza Biata, coniferous litter II (n = 4). L = 663 (614-775); oes. = 124-133; ex. p. = 92 (89-98); tail = 62 (56-72); a = 36 (31-42); b = 5.2 (4.6-5.9); MB = 39; c = 10.7 (10.1-11.5); c' = 5.3 (4.6-5.8); VA/T = 1.4-1.5; V' = 85 (83-87); V = 75-79; st. = 8.0-8.5.

Poland, Puszcza Biata, moss (n = 4). L = 665 (625-732); oes. = 136 (129-145); ex. p. = 91-101; tail = 63 (56-73); a = 37 (32-42); b = 4.9 (4.6-5.1); MB = 39-41; c = 10.7 (10.0-11.2); c' = 5.8 (5.2-6.8); VA/T = 1.3-1.5; V' = 85-86; V = 77-79; st. = 8.

Poland, Roztocze (n = 2). L = 656, 691; oes. = 129, 131; ex. p. = 87, 90; tail = 66, 68; a = 32, 37; b = 5.0, 5.4; MB = 36, 38; c = 9.7, 10.5; c' = 5.3, 5.5; VA/T = 1.2, 1.8; V' = 83, 86; V = 74, 77; st. = 8.

Poland, Puszcza Bolimowska (n = 5). L = 642 (586-670); oes. = 135-140; ex. p. = 84-94; tail = 64-70; a = 36-41; b = 4.3-4.8; MB = 36-39; c = 9.7 (9.0-10.5); c' = 5.6 (5.2-6.3); VA/T = 1.2-1.4; V' = 85-86; V = 76-77; st. = 7.0-7.5.

Sweden, Uppsala, moss I (n = 6). L = 645 (552-711); oes. = 126-134; ex. p. = 85-87; tail = 62 (47-68); a = 34-40; b = 4.9 (4.4-5.3); MB = 36-39;

c = 10.5 (9.7-11.7); c' = 5.5 (4.8-6.2); VA/T = 1.2-1.4; V' = 85-87; V = 77-79; st. = 8.

Sweden, Uppsala, moss II (n = 3). L = 724 (687-770); oes. = 142-146; ex. p. = 90-97; tail = 66-73; a = 34-42; b = 4.8-5.3; c = 10.4-10.6; c' = 5.3-6.1; VA/T = 1.3-1.5; V' = 84-86; V = 76-78; st. = 7.5-8.5.

Sweden, Uppsala, moss III (n = 2). L = 651, 751; oes. = 134, 138; ex. p. = 85-93; tail = 54, 72; a = 36, 37; b = 4.9, 5.4; MB = 36, 38; c = 10.4, 12.2; c' = 4.7, 5.6; VA/T = 1.4, 1.5; V' = 85, 87; V = 77, 79; st. = 8, 9.

Male

Poland, Puszcza Biata, humus (n = 1). L = 723; oes. = 137; ex. p. = 95; tail = 78; a = 41; b = 5.3; MB = 38; c = 9.2; c' = 5.4; spicule = 18.5; st. = 7.5.

Poland, Puszcza Biata, coniferous litter I (n = 3). L = 665 (570-752); oes. = 125-126; ex. p. = 90-98; tail = 58-65; a = 43 (37-49); b = 5.3 (4.5-6.0); MB = 40-42; c = 9.9-12.0; c' = 4.7-5.5; spicule = 15.5-18.5; st. = 7.5-8.0.

Poland, Puszcza Biata (n = 2). L = 592, 643; oes. = 128, 137; ex. p. = 86, 93; tail = 62, 63; a = 36, 42; b = 4.6, 4.7; MB = 38, 40; c = 9.4, 10.4; c' = 4.9, 5.2; spicule = 15.5, 16.5; st. = 8.0, 8.5.

Poland, Roztocze (n = 1). L = 716; oes. = 131; ex. p. = 95; tail = 69; a = 43; b = 5.5; MB = 39; c = 10.4; c' = 5.4; spicule = 18; st. = 8.

Poland, Puszcza Bolimowska (n = 2). L = 544, 599; oes. = 129, 148; ex. p. = 88, 92; tail = 60, 68; a = 38, 45; b = 4.1, 4.2; MB = 39, 42; c = 8.8, 9.1; c' = 5.5, 6.6; spicule = 15, 16; st. = 7.0, 7.5.

Sweden, Uppsala, moss II (n = 3). L = 610 (544-715); oes. = 122-134; ex. p. = 86 (80-95); tail = 57-66; a = 37-41; b = 4.5-5.3; MB = 36-39; c = 9.5-10.8; c' = 4.6-5.3; spicule = 16-18; st. = 8.

Sweden, Uppsala, moss III (n = 1). L = 667; oes. = 139; ex. p. = 89; tail = 71; a = 38; b = 4.8; MB = 39; c = 9.4; c' = 5.8; spicule = 17.5; st. = 9.

DESCRIPTION

Female : Relaxed specimens straight. Lateral field with six incisures. Head width 5-6 μ m, striation not seen. Stylet moderate, cone about a third of stylet length, knobs rounded. Metacorpal bulb rather large and oval, muscular, with small thickenings of lumen walls. Isthmus thin, gradually expanding into elongated basal bulb. The latter always offset from intestine. Excretory pore at the level of middle of isthmus. Vulva usually 77-79 % of body length from anterior end (only two out of 45 females lower V; two other with higher V). PUS measuring 1.3 (0.9-1.8) VBD or 26 (18-37) % VA. Post-vulval part of body 12.9 (9.4-14.8) ABD long, although 17.1 in one female. Tail conical, tip sharply pointed.

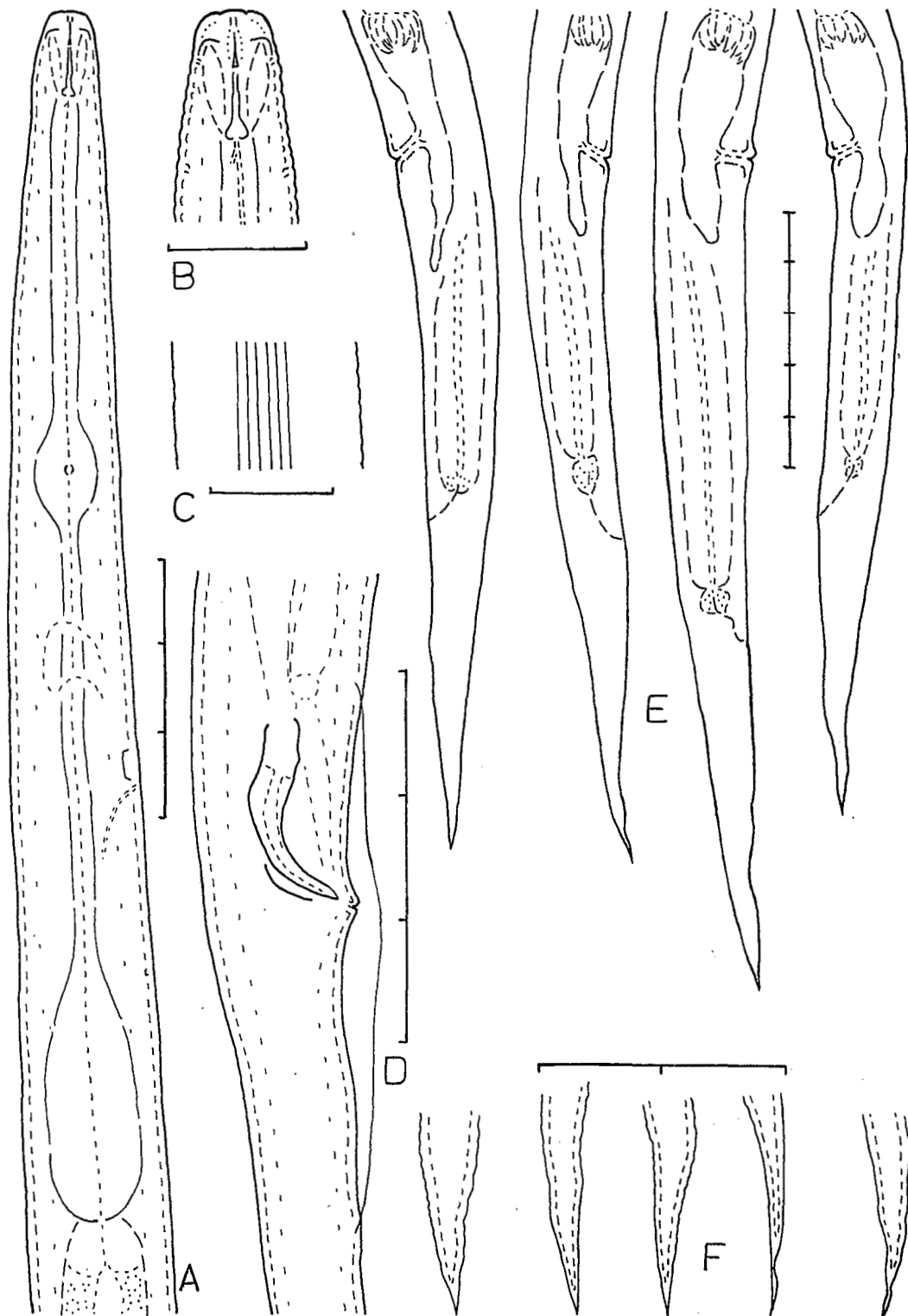


Fig. 17. *Ditylenchus tenuidens*. — A : Oesophageal region; B : Head; C : Lateral field; D : Male cloacal region; E : Posterior part of female; F : Tail terminus. (Smallest unit of scale bar = 10 μ m.)

Male : Similar to female. Caudal alae 2.5 (1.9-3.8) ABD long, reaching 30 (24-43) % of tail length. Gubernaculum 7-9 μm .

HABITAT AND LOCALITIES

In Poland *D. tenuidens* commonly occurs in leaf litter, forest organic soil and in rather wet moss habitats. It was also found in all three moss samples collected near Uppsala, Sweden, by Prof. B. Sohlenius. Occasionally it also occurs in cultivated and uncultivated soils. This species has been described from Kirghizia, and then recorded from California.

VOUCHER SPECIMENS

Examined specimens are distributed in collections of nematodes of the Instytut Zoologii PAN, Warszawa, Poland, and in author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. tenuidens is characterised by six incisures, unstriated head, moderately developed stylet 7-8.5 μm long with short cone, muscular oesophagus with elongated basal bulb, vulva posterior (V mostly 77-79), tail conical with sharply pointed terminus, spicules 15-18 μm long and bursa reaching about one third of tail length.

Having six incisures, short stylet and posterior vulva *D. tenuidens* resembles *D. medicaginis*. However, it can be differentiated by usually dull tail tip, more delicate stylet, annulated head of the latter. *D. tenuidens* could be also compared with *D. acutatus*, *D. silvaticus* and *D. valveus*, but these species differ immediately by much thicker tail.

Ditylenchus terricolus sp. n.

(Fig. 18)

MEASUREMENTS

Females

Paratypes (n = 23). L = 692 (629-772); oes. = 121 (113-131); ex. p. = 91 (83-96); tail = 65 (59-73); a = 38 (33-42); b = 5.7 (5.1-6.3); MB = 37 (35-39); c = 10.7 (9.1-12.1); c' = 5.6 (4.5-7.1); VA/T = 1.7 (1.4-2.1); V' = 82 (79-84); V = 75 (71-77); st. = 7.0-7.5.

Male

Paratypes (n = 6). L = 665 (631-705); oes. = 118 (108-131); ex. p. = 90 (83-100); tail = 62 (58-66); a = 40 (34-44); b = 5.7 (5.4-6.0); MB = 37 (36-40); c = 10.8 (9.8-12.2); c' = 5.4 (4.9-5.9); spicule = 13-14; st. = 6.5-7.0.

Holotype. L = 722; oes. = 114; ex. p. = 95; tail = 60; a = 33; b = 6.3; MB = 36; c = 12.1; c' = 4.8; VA/T = 1.9; V' = 83; V = 76; st. = 7.

DESCRIPTION

Female : Relaxed nematodes slightly ventrally arcuate. Lateral field with four incisures, the outer crenate. Head 5-6 μm wide, striation not seen, Cephalic skeleton not refractive, extends backward for about two annuli. Stylet very delicate and thin, cone shorter than shaft, knobs somewhat sloping posteriorly. Median bulb oval in outline, muscular, with small thickenings of lumen walls. Posterior bulb elongated, overlapping intestine on dorsal side for 2-4 μm . Spermatheca filled with sperm; PUS length equals 2.6 (2.1-3.2) VBD, or 37 (35-39) % VA. VBD equals 1.5 (1.3-1.6) ABD. Post-vulval part of body 15.1 (12.5-17.8) ABD long. Tail thick, terminus mostly rounded with small mucro, sometimes rounded to almost pointed, devoid of mucronate tip.

Male : Similar to female. Caudal alae length 3.0 (2.5-3.8) ABD, reaching 33 (26-39) % of tail length. Gubernaculum 4 μm long.

HABITAT AND LOCALITY

Described specimens were found in loamy soil around celeriac roots, Mr. Barszczewski's farm, Ożarów Mazowiecki, Poland.

TYPE SPECIMENS

Holotype and paratypes deposited in the nematode collection of the Instytut Zoologii PAN, Warszawa, Poland. Two paratype females and one male also kept in author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. terricolus sp. n. is characterised by : four incisures, stylet 6.5-7.5 μm with short cone knobs sloping backward, muscular oesophagus with small thickenings of lumen walls and posterior bulb overlapping intestine for a short distance. Vulva at 71-75, PUS about 0.3 VA, rather long post-vulval body part (12.5-17.8) ABD, thick tail, short spicules (13-14 μm), bursa extending along about a third of tail length also contribute to species characterisation.

Because of four incisures, short stylet and vulva position *D. terricolus* sp. n. should be compared with *D. acuminatus*, *D. parvus*, *D. longimatrixalis* and *D. emus*. However, *D. acuminatus* has more posterior vulva (V = 78.7-83.5), PUS about VBD long, oesophageal overlapping longer, posterior part of tail not so thick. *D. parvus* differs from *D. terricolus* sp. n. in having relatively more robust stylet, offset glandular bulb, and

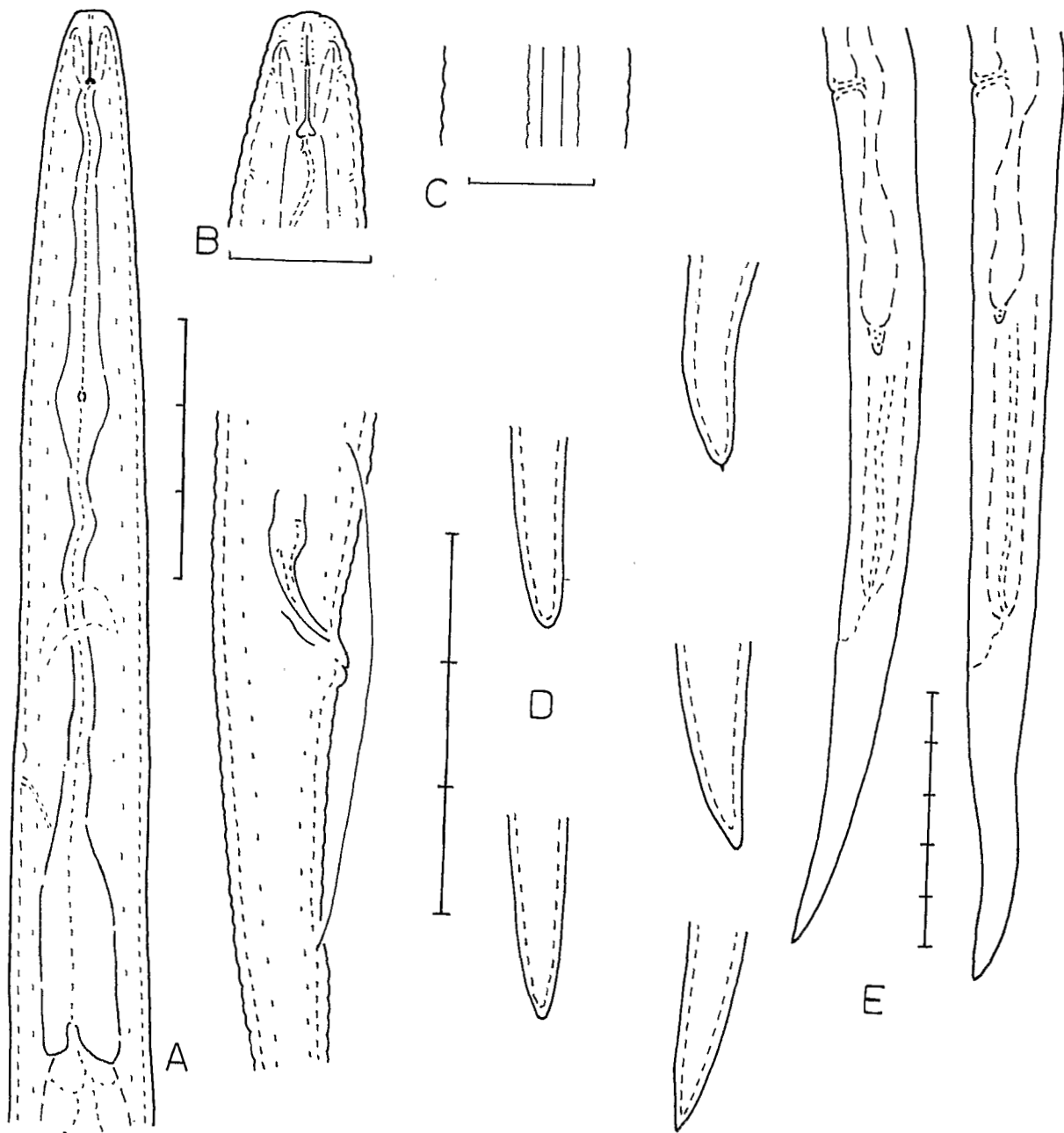


Fig. 18. *Ditylenchus terricolus* sp. n. — A : Oesophageal region; B : Head; C : Lateral field; D : Tail terminus; E : Posterior part of female. (Smallest unit of scale bar = 10 μ m.)

different tail shape. *D. longimatricalis* is different because of shorter stylet, more anterior vulva, longer PUS and different tail shape. Finally, *D. emus* differs from *D.*

terricolus because of more posterior vulva, probably slightly shorter stylet with different shape of knobs, posterior oesophageal bulb and tail shape.

***Ditylenchus valveus* Thorne & Malek, 1968**
(Fig. 19)

MEASUREMENTS

Female

Poland, Ołtarzew (n = 7). L = 910 (831-998); oes. = 135 (128-144); ex. p. = 106 (101-111); tail = 92 (80-99); a = 42 (35-52); b = 6.8 (6.0-7.8); MB = 37 (35-38); c = 9.9 (9.6-10.3); c' = 7.0 (6.8-7.2); VA/T = 0.7-0.9; V' = 90-92; V = 80-82; st. = 7.0-7.5.

Poland, Poświętne (n = 2). L = 889, 900; oes. = 130, 135; ex. p. = 98, 101; tail = 84, 93; a = 42, 43; b = 6.6, 6.9; MB = 37, 39; c = 9.6, 10.7; c' = 7.5; VA/T = 1.0, 1.1; V' = 89; V = 79-80; st. = 7.5, 8.0.

Poland, Grzebienisko (n = 1). L = 843; oes. = 130; ex. p. = 103; tail = 87; a = 43; b = 6.5; MB = 38; c = 9.7; c' = 7.0; VA/T = 0.9; V' = 90; V = 81; st. = 7.

Poland, Puszcza Białowieska (n = 1). L = 921; oes. = 139; ex. p. = 111; tail = 94; a = 53; b = 6.6; MB = 39; c = 9.8; c' = 8.3; VA/T = 0.9; V' = 90; V = 81; st. = 7.5.

Bulgaria, Varna (n = 5). L = 677 (621-725); oes. = 122 (118-131); ex. p. = 90 (83-100); tail = 60 (52-69); a = 41 (35-46); b = 5.5 (5.0-5.8); MB = 35-38; c = 11.4 (10.2-14.1); c' = 5.7 (5.0-6.3); VA/T (n = 3) = 1.2 (0.9-1.5); V' (n = 3) = 88-90; V (n = 3) = 79-82; st. = 7.5 (7-8).

Male

Poland, Ołtarzew (n = 1). L = 756; oes. = 133; ex. p. = 89; tail = 79; a = 46; b = 5.7; MB = 39; c = 9.5; c' = 5.9; spicule = 20; st. = 7.

Bulgaria, Varna (n = 6). L = 661 (586-731); oes. = 126 (117-134); ex. p. = 94 (89-100); tail = 59 (48-81); a = 39 (35-44); b = 5.3 (4.7-6.2); MB = 38 (35-42); c = 11.3 (8.9-12.2); c' = 4.8 (3.9-5.7); spicule = 18.5 (16-23); st. = 7.9 (7.0-8.5).

DESCRIPTION

Female : Lateral field with six incisures. Head annulated, 5-6.5 µm wide, mostly 2-3 annuli seen. Cephalic skeleton extending posteriorly from basal plate for about two annuli. Cone of stylet shorter than shaft, knobs rounded. Median bulb muscular, with small thickenings of lumen walls. Excretory pore usually opposite to junction of isthmus and basal bulb. The latter offset or overlapping intestine up to 4 µm. Vulva posterior (V = 79-82), except in two females from Varna where V = 74 and 76 resulted from elongation of vulva-anus distance. PUS 1.2 (0.9-1.7) VBD long in population from Ołtarzew and 2.1 (0.8-2.9) in population from Varna; PUS 32 (21-50) % VA (over 40 % in only two out

of sixteen females). Post-vulval part of body 13.7 (11.3-17.0) ABD long. Tail terminus rounded, mucronate or dull (tail tip pointed in one female).

Male : Similar to female. Bursa 2.9 (2.7-3.7) ABD long, extends along 37 (23-47) % of tail length. Gubernaculum 5-7 µm long.

HABITATS AND LOCALITIES

D. valveus was collected from cultivated loamy soil in Ołtarzew, Poland, and from soil near unidentified bush grown on the bank of small stream in Varna, Bulgaria.

VOUCHER SPECIMENS

Examined specimens are deposited in nematode collection of the Instytut Zoologii PAN, Warszawa, Poland, and in author's collection.

DIAGNOSIS AND RELATIONSHIPS

D. valveus is characterised by six incisures, annulated head, stylet 7-8.5 µm with short cone and small rounded knobs, muscular median bulb with small thickenings, posterior bulb offset or with very short overlapping over intestine, posterior vulva (V = 79-82; V' = 88-91), PUS about a third of vulva-anus distance and mostly rounded tail terminus; spicules 16-23 µm, bursa extending along approximately one-third of tail length.

Because of six incisures, short stylet, vulva position, oesophagus structure and tail shape, *D. valveus* resembles *D. myceliophagus* and *D. medicaginis*. It differs from the former by the shape of cephalic skeleton, thinner tail and generally offset oesophagus. *D. valveus* differs from *D. medicaginis* mainly by tail shape and also by slightly more posterior vulva position.

REFERENCES

- ANDERSON, R. V. (1983). An emended description of *Ditylenchus valveus* Thorne & Malek, 1968 and description of *D. filimus* n. sp. (Nematoda : Tylenchidae) from mushroom compost in Canada. *Can. J. Zool.*, 61 : 2319-2323.
- ANDERSON, R. V. & MULVEY, R. H. (1980). Description, relationships, and host symptoms of *Ditylenchus dryadis* n. sp. (Nematoda : Tylenchidae) from the Canadian High Arctic, a transitional species of gall-forming parasite attacking *Dryas integrifolia* M. Vahl. *Can. J. Zool.*, 58 : 363-368.
- ANDRÁSSY, I. (1952). Freilebende Nematoden aus dem Bükk-Gebirge. *Annls hist.-nat. Mus. natn. hung.*, 2 : 13-26.
- ANDRÁSSY, I. (1958). Erd- und Süßwassernematoden aus Bulgarien. *Acta zool. hung.*, 4 : 1-88.
- ANDRÁSSY, I. (1959). Freilebende Nematoden aus Rumänien. *Annls. Univ. Scient. bdpest. Sec. Biol.*, 2 : 3-27.
- ANDRÁSSY, I. (1960). Nematoden aus dem Periphyton der Landungsmolen der Donau zwischen Budapest und Mohacs. *Annls Univ. Scient. bdpest., Sect. Biol.*, 3 : 3-21.

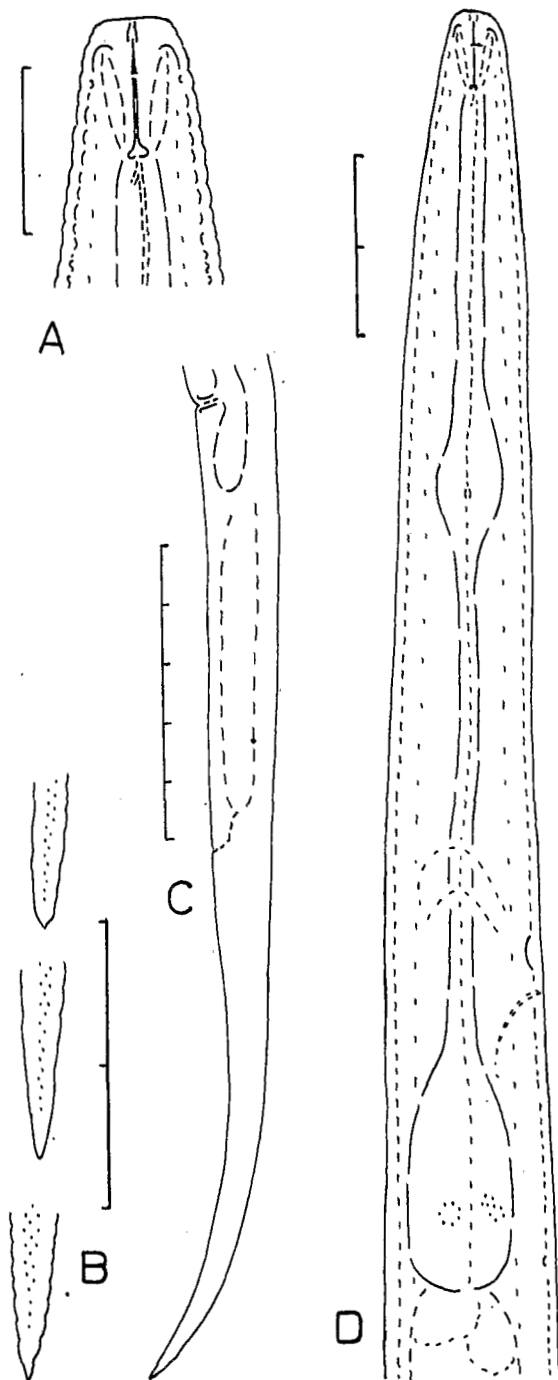


Fig. 19. *Ditylenchus valveus*. — A : Head; B : Tail terminus; C : Posterior part of female; D : Oesophageal region. (Smallest unit of scale bar = 10 μ m.)

- ANDRÁSSY, I. (1961). Zur Taxonomie des Neotylenchiden. *Nematologica*, 6 : 25-36.
- BELLO, A. & GERAERT, E. (1972). Redescription of eight species belonging to the superfamily Tylenchoidea (Nematoda : Tylenchida). *Nematologica*, 18 : 190-200.
- BHATNAGAR, R. D. S. & KADYAN, A. S. (1969). A preliminary survey of the plant-parasitic nematodes of brinjal from the Punjab. *J. Res. Punjab Agric. Univ.*, 6 : 281-289.
- BRZESKI, M. W. (1967). The effect of host on morphology and population increase of *Ditylenchus myceliophagus* Goodey (Nematoda : Tylenchinae). *Bull. Acad. pol. Sci., Cl. II*, 15 : 147-149.
- BRZESKI, M. W. (1983). Three new species of *Ditylenchus* Filipjev, 1936, and comments on *Basiroides longimatricalis* Kazachenko, 1975 (Nematoda : Anguinidae). *Nematologica*, 29 : 380-389.
- DAS, V. M. (1960). Studies on the nematode parasites of plants in Hyderabad (Andhra Pradesh, India). *Z. ParasitKde*, 19 : 553-605.
- DAS, V. M. & SHIVASWAMY, V. (1980). *Paurodontus brassicae* n. sp. and *Nothotylenchus singhi* n. sp. from south India. *Proc. Indian Acad. Parasit.*, 1 : 62-65.
- ELIASHVILI, T. S. & VATCHEISHVILI, L. A. (1980). [New nematode species *Nothotylenchus truncatus* sp. nov. (Nematoda : Tylenchida from eastern Georgia)]. *Bull. Acad. Sci. Georgian SSR*, 98 : 177-178.
- 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.
- FILIPJEV, I. N. & SCHUURMANS STEKHOVEN, J. H. (1941). *A manual of agricultural helminthology*. Leiden, E. J. Brill : 878 p.
- FORTUNER, R. (1982). On the genus *Ditylenchus* Filipjev, 1936 (Nematoda : Tylenchida). *Revue Nématol.*, 5 : 17-38.
- FORTUNER, R. & MAGGENTI, A. R. (1987). A reappraisal of Tylenchina (Nemata). 4. The family Anguinidae Nicoll, 1935 (1926). *Revue Nématol.*, 10 : 163-176.
- FOTEDAR, D. N. & MAHAJAN, R. (1974). Two new nematode species (Nothotylenchidae) from Kashmir. *Indian J. Nematol.*, 2 (1972) : 169-172.
- GAGARIN, V. G. (1974). [Two new species of the genus *Nothotylenchus* (Nothotylenchidae : Nematoda) and descriptions of males of *Tylocephalus auriculatus* and *Chronogaster typicus*]. *Trudy GELAN*, 24 : 30-35.
- GERMAN, E. V. (1969). [New species of stem nematodes]. *Vestnik s.-kh. Nauki Kazakhstana*, 1 : 83-85.
- GOODEY, T. (1953). On two new species of nematodes associated with leaf-blotch in *Evodia roxburghiana* an Indian evergreen tree. *Thapar Commem. Vol.*, 95-102.
- GRITZENKO, V. P. (1971). [*Ditylenchus tenuidens* sp. n. and *Aphelenchoides curiolis* sp. n. (Nematoda, Tylenchidae, Aphelenchoididae) from Kirghizia]. *Zool. Zh.*, 50 : 1402-1405.

- HEYNS, J. (1964). *Aphelenchoides helicus* n. sp. and *Ditylenchus equalis* n. sp., two new soil-inhabiting nematodes. *S. Afr. J. agric. Sci.*, 7 : 147-150.
- HIRSCHMANN, H. & SASSER, J. N. (1955). On the occurrence of an intersexual form in *Ditylenchus trififormis* n. sp. (Nematoda, Tylenchida). *Proc. helminth. Soc. Wash.*, 22 : 115-123.
- HUSAIN, S. I. & KHAN, A. M. (1967). A new subfamily and eight new species of nematodes from India belonging to superfamily Tylenchoidea. *Proc. helminth. Soc. Wash.*, 34 : 175-186.
- HUSAIN, S. I. & KHAN, A. M. (1974). Three new species of neotylenchid nematodes from north India. *Indian J. Nematol.*, 4 : 81-87.
- HUSAIN, S. I. & KHAN, A. M. (1976). Four new tylenchid nematodes from North India. *Indian J. Nematol.*, 5 (1975) : 49-55.
- KAZACHENKO, I. P. (1980). [New species of nematodes (Tylenchida) and description of male of *Teratocephalus sigillarius* (Rhabditida) from forests of the Far East]. *Zool. Zh.*, 59 : 810-817.
- KHAN, A. M. & SIDDIQI, M. R. (1968). Three new species of *Nothotylenchus* (Nematoda : Neotylenchidae) from North India. *Nematologica*, 14 : 369-376.
- KHAN, E., CHAWLA, M. L. & PRASAD, S. K. (1969). *Tylenchus (Aglenchus) indicus* n. sp. and *Ditylenchus emus* n. sp. (Nematoda : Tylenchidae) from India. *Labdev J. Sci. Technol.*, 7-B : 311-314.
- KHAN, E., CHAWLA, M. L. & SESHADRI, A. R. (1969). *Dipten-chus indicus* n. gen., n. sp. (Nematoda : Tylenchidae) from soil around roots of grapevine from Delhi, India. *Nematologica*, 15 : 337-340.
- KHAN, E. & NANJAPPA, C. K. (1971). *Pseudhalenchus acutus*, sp. nov. and *Tylenchorhynchus aerolatus*, sp. nov. (Nematoda : Tylenchida) from India. *Bull. Ent.*, 12 : 55-58.
- KHAN, S. H. (1965). *Nothotylenchus acutus* n. sp. and *N. basiri* n. sp. (Nematoda : Nothotylenchinae) from North India. *Proc. helminth. Soc. Wash.*, 32 : 90-93.
- KHEIRI, A. (1971). Two new species of *Nothotylenchus* Thorne, 1941 from Iran and a redescription of *N. affinis* Thorne, 1941 (Nematoda, Neotylenchidae) with a key to the species of the genus. *Nematologica*, 16 (1970) : 591-600.
- KHERA, S. & CHATURVEDI, Y. (1977). Nematodes from tea plantations of Dhera Dun, India. *Rec. zool. Surv. India*, 72 : 125-152.
- KIKNADZE, G. A. & ELIASHVILI, T. S. (1988). [New nematode species *Nothotylenchus montanus* sp. n. (Nematoda : Tylenchida) from subalpine zone]. *Bull. Acad. Sci. Georgian SSR*, 132 : 161-163.
- KUMAR, P. (1983). *Nothotylenchus websteri* n. sp. (Nematoda : Neotylenchoidea) from Lucknow. *Indian J. Parasit.*, 7 : 105-107.
- LOOF, P. A. A. (1985). The taxonomic position of *Tylenchus davainei* var. *tenuis* Kischke, 1956 (Nematoda : Tylenchinae). *Nematologica*, 31 : 478-479.
- MAHAJAN, R. (1977). *Scutellonema petersi* n. sp. and *Nothotylenchus fotedari* n. sp., two new nematodes from India. *Riv. Parasit.*, 38 : 334-337.
- MAQBOOL, M. A. (1982). Three new species of the superfamily Neotylenchoidea (Nematoda : Tylenchida) from Pakistan. *J. Nematol.*, 14 : 317-323.
- MASSEY, C. L. (1966). The nematode parasites and associates of *Dendroctonus adjunctus* (Coleoptera : Scolytidae) in New Mexico. *Ann. ent. Soc. Am.*, 59 : 424-440.
- MASSEY, C. L. (1974). *Biology and taxonomy of nematode parasites and associates of bark beetles in the United States*. Washington D. C., Agric. Handbook no. 446, USDA Forest Service, v + 233 p.
- MULVEY, R. H. (1969). Nematodes of the family Neotylenchidae (Tylenchida : Nematode) from Canadian high Arctic. *Can. J. Zool.*, 47 : 1261-1268.
- PARAMONOV, A. A. (1970). [Principles of phytohelminthology. Vol. III. Taxonomy of nematode superfamily Tylenchoidea]. Moskva, Nauka, 253 p.
- SAXENA, P. K., CHHABRA, H. K. & JOSHI, R. (1973). *Nothotylenchus indicus* n. sp. (Nematoda : Nothotylenchinae) from rhizosphere of peach trees in the Punjab (India). *Zool. Anz.*, 190 : 140-142.
- SETHI, C. L. & SWARUP, G. (1967). *Pseudhalenchus indicus*, a new nematode species from India (Tylenchinae : Nematoda). *Indian Phytopathol.*, 20 : 26-28.
- SIDDIQI, M. R. (1963). Four new species in the sub-family Tylenchinae (Nematoda) from North India. *Z. ParasitKde*, 23 : 397-404.
- SIDDIQI, M. R. (1980). Two new nematode genera, *Safianema* (Anguinidae) and *Discotylenchus* (Tylenchidae), with description of three new species. *Proc. helminth. Soc. Wash.*, 47 : 85-94.
- SIDDIQI, M. R. (1986). *Tylenchida parasites of plants and insects*. Slough, U.K., Commonwealth Agric. Bureaux, x + 645 p.
- SIVAKUMAR, C. V. & MOHANASUNDARAM, M. (1982). Occurrence of *Orrina phyllobia* (Thorne, 1934) Brzeski, 1981 (Anguinidae : Nematoda) in Tamil Nadu, India. *Indian J. Nematol.*, 12 : 416-418.
- STURHAN, D. & FRIEDMAN, W. (1965). *Ditylenchus convallariae* n. sp. (Nematoda : Tylenchida). *Nematologica*, 11 : 219-223.
- SUMENKOVA, N. I. (1975). [Nematodes of plant and soil. Neotylenchoidea]. Moskva, Nauka, 198 p.
- SUMENKOVA, N. I. (1982). [Taxonomic review of the genus *Ditylenchus*]. In : Gubina, V. G. (Ed.). [Nematodes of plants and soil. Genus *Ditylenchus*]. Moskva, Nauka : 5-69.
- SYKES, G. B. (1980). A new species of *Nothotylenchus* (Nematoda : Neotylenchoidea) from England. *Syst. Parasit.*, 1 : 237-239.
- TARJAN, A. C. (1958). A new genus, *Pseudhalenchus* (Tylenchinae : Nematoda), with descriptions of two new species. *Proc. helminth. Soc. Wash.*, 25 : 20-25.

- TARJAN, A. C. & HOPPER, B. E. (1974). *Nomenclatorial compilation of plant and soil nematodes*. DeLeon Springs, Florida, Society of Nematologists, 419 p.
- THORNE, G. (1941). Some nematodes of the family Tylenchidae which do not possess a valvular median oesophageal bulb. *Gt Basin Nat.*, 2 : 37-85.
- THORNE, G. (1945). *Ditylenchus destructor* n. sp., the potato rot nematode, and *Ditylenchus dipsaci* (Kühn, 1857) Filipjev, 1936, the teasel nematode (Nematoda : Tylenchidae). *Proc. helminth. Soc. Wash.*, 12 : 27-33.
- THORNE, G. & MALEK, R. B. (1968). *Nematodes of the Northern Great Plains. Part I. Tylenchida Nemata : Secernentea*. Brookings, S. Dakota, Agric. Exp. Statn, Bull. 31, 111 p.
- TIKYANI, M. G. & KHERA, S. (1969). *Nothotylenchus bhatnagari* n. sp. from the rhizosphere of great millet (*Sorghum vulgare* Pers). *Zool. Anz.*, 182 : 87-91.
- TOBAR JIMÉNEZ, A. (1964). *Ditylenchus virtudesae* n. sp. (Nematoda : Tylenchidae) habitante de los suelos granadinos. *Revta iber. Parasit.*, 24 : 51-56.
- VARAPRASAD, K. S., KHAN, E. & LAL, M. (1980). *Paurodontus solani* sp. n. and *P. citri* sp. n. (Nematoda : Neotylenchoidea) with a key to the species of *Paurodontus* Thorne, 1941. *Indian J. Nematol.*, 10 : 182-188.
- WASILEWSKA, L. (1965). *Ditylenchus medicaginis* sp. n., a new parasitic nematode from Poland (Nematoda, Tylenchidae). *Bull. Acad. pol. Sci., Cl. II*, 13 : 167-170.
- YOKOO, T. (1968). Nematological studies on the yellow patch of green grass of the Golf Link. II. On the nemic-fauna in the green grass of International Golf Link of Isahaya, Nagasaki Prefecture, with description on new species of *Neotylenchus* (Nematoda : Neotylenchidae). *Agric. Bull. Saga Univ.*, 26 : 9-19.
- ZELL, H. (1988). Nematoden eines Buchenwaldbodens 11. Die Anguiniden (Nematoda, Anguinoidea). *Carolinea*, 46 : 99-114.
- ZJUBIN, B. N. (1974). [Identification of the nematode species of the genus *Ditylenchus* with the aid of numerical and punch-card methods]. In : Tokobaev, M. M. (Ed. [*Fauna of helminths of animals and plants of Kirghizia*], Frunze, Ilim : 90-98.

Accepté pour publication le 6 janvier 1990.