

Redescription of *Ditylenchus angustus* (Butler, 1913) Filipjev, 1936

Debanand Das and Harish K. Bajaj*

Krishi Vigyan Kendra, A.A.U, Boisa Garumuria, North Lakhimpur 787 001

*Department of Nematology, CCS Haryana Agricultural University, Hisar - 125 004, India

ABSTRACT

Ditylenchus angustus was redescribed from the materials collected from deep water rice from Assam. *D. angustus* was morphologically distinct from previously described specimens having different head shape, narrow and slender isthmus, crustaformeria with 4-5 cells in each row, longer post vulval uterine sac and short conoid tail with a mucro.

Key words: *Ditylenchus angustus*, *Oryza sativa*.

Butler (1913) described a new nematode species, *Tylenchus angustus* from Noakhali of East Bengal (now in Bangladesh). In 1936, Filipjev erected a new genus *Ditylenchus* and transferred the species to this new genus. Seshadri and Dasgupta (1975) gave a detailed account of this species on specimens collected from Joydevpur, Bangladesh. Examination of freshly collected specimens of *Ditylenchus angustus* from Assam (Das & Sharma, 1995), India from the deep water rice (var. Amona bao) showed that the reported descriptions of this species need some amendments. Therefore, *D. angustus* is redescribed hereunder.

Materials and Methods

Aerial plant parts of rice showing typical disease symptoms of 'Ufra' caused by *D. angustus* were collected. Plant parts were chopped into small pieces on a single layer tissue paper to collect nematodes by modified Baermann's funnel technique. They were killed and simultaneously fixed by pouring equal amount of hot 8% formalin. Fixed nematodes were processed by Seinhorst's slow method and mounted in dehydrated glycerin. Measurements were taken with the help of an ocular micrometer and drawings were made with the help of a camera

lucida. For denoting the dimensions of the nematode De Man's formulae were used.

DITYLENCHUS ANGUSTUS (BUTLER, 1913)
FILIPJEV, 1936 (Fig. 1, A-H and Fig. 2, A-P)

Females (n=15): L= 1.09 ± 0.06 (0.99 - 1.25) mm; a= 60.9 ± 2.4 (56.3 - 63.7); b= 6.5 ± 0.6 (5.47.2); c= 20.7 ± 0.7 (19.7 - 21.7); c'= 3.9 ± 0.3 (3.8 - 4.2); MB= 34.4 ± 1.3 (32.6 - 35.8); V= 79.7 ± 1.83 (79.4 - 81.7); spear= 11.07 ± 1.0 (10 - 12) µm; excretory pore= 113.8 ± 7.0 (105 - 129) µm; hemizonid= 109.1 ± 7.8 (101 - 125) µm.

Males (n=15): L=1.03 ± 0.03 (0.99 - 1.05) mm; a= 50.0 ± 5.5 (42.5 - 57.9); b= 6.7 ± 0.4 (6.0 7.0); c= 18.9 ± 6.2 (10.4 - 22.5); c'= 4.2 ± 0.5 (3.7 - 5.1); MB= 34.2 ± 2.5 (31.9 - 35.0); spear= 10.0 ± 1.0 (9 - 11) µm; excretory pore= 106.8 ± 5.3 (93 - 109) µm; spicule= 17.0 ± 1.0 (16 - 18) µm; gubernaculum= 6 µm.

Second stage juvenile (n=2): L= 0.44 - 0.45 mm; a= 33.6 - 35.7; b= 3.8 - 4.1; c= 11.9 - 13.2; c'= 3.5 - 3.8; MB= 34.4 - 37.8; spear= 7 µm; hemizonid= 71 - 75 µm.

Third stage female juvenile (n=6): L= 0.62 ± 0.03 (0.59 - 0.67) mm; a= 48.6 ± 2.2 (46.1 - 52.0); b= 4.8 ± 0.3 (4.3 - 5.2); c= 16.0 ± 0.3 (15.8 - 16.4);

$c' = 4.2 \pm 0.1$ (4.0 - 4.4); MB= 34.7 ± 2.3 (32.0 - 38.0); spear= 8.6 ± 1.2 (7 - 11) μm ; excretory pore= 86.6 ± 2.1 (82 - 89) μm ; hemizonid= 84.9 ± 3.3 (81 - 87) μm .

Third stage male juvenile (n=9): L= 0.70 ± 0.10 (0.58 - 0.84) mm; a= 51.8 ± 5.3 (47.0 - 59.4); b= 5.1 ± 1.1 (4.1 - 7.1); c= 16.0 ± 1.4 (14.4 - 17.8); $c' = 3.8 \pm 0.7$ (3.0 - 4.7); MB= 34.2 ± 3.3 (29.239.3); spear= 8.9 ± 1.0 (7 - 11) μm ; excretory pore= 90.3 ± 4.4 (86 - 94) μm ; hemizonid= 88.1 ± 4.5 (82 - 93) μm .

Fourth stage male juvenile (n=3): L= 0.71 ± 0.07 (0.66 - 0.76) mm; a= 50.4 ± 1.9 (49.1 - 51.8); b= 5.2 ± 0.9 (4.5 - 5.8); c= 16.6 ± 0.3 (16.4 - 16.8); $c' = 3.5 \pm 0.3$ (3.3 - 3.7); MB= 36.4 ± 4.0 (33.6 - 39.3); spear= 11 μm ; excretory pore= 91 μm ; hemizonid= 87.3 ± 1.7 (86 - 89) μm .

Description

Female: Body slender, straight to slightly ventrally curved when relaxed. Cuticle finely annulated, annuli about 1 μm wide at mid body. Lateral fields with 4 incisures, non areolated. Lip region continuous with the body, low, unstriated, 2.5 times wider than high at the base. Cephalic framework moderately sclerotized. Cephalids distinct, near the base of the spear knobs. Spear with small, slightly posteriorly slopping knobs; conus about 50 % of the spear length. Orifice of dorsal oesophageal gland 2.5 μm behind spear base. Procorpus narrow, cylindrical, joining median bulb with a constriction; median bulb oval with distinct valvular apparatus; isthmus slender and narrow; basal bulb 39 - 52 x 7 - 9 μm in size, slightly overlapping intestine ventrally, with three nuclei. Nerve ring encircles isthmus. Hemizonid located at 101 - 125 μm from anterior end. Excretory pore 4 - 5 annuli posterior to hemizonid.

Vulva at 79 - 82 % of body length from anterior end. Vagina a transverse slit; ovary outstretched; oocytes arranged in a single row. Spermatheca elongated oval, 52 - 62 μm long, filled with sperm. Sperm elongated-rounded, arranged at tandem. Crustaformeria with 4 - 5 cells in each row. Post vulval uterine sac 105 - 129 μm or about 5 times vulval body diameter long, without sperm. Tail

elongated conoid, tail tip short conoid with a small, terminal mucro.

Male: Straight to slightly ventrally curved when relaxed. Testis outstretched. Spicules curved ventrally, 16 - 18 μm long. Gubernaculum simple, 6 μm long. Bursa low, enveloping the entire tail. Tail tip similar to female.

Second stage juvenile: Body almost straight upon fixation. Cuticle finely annulated. Lip region continuous with body. Spear 7 μm long with rounded knobs. Procorpus slender, swollen posteriorly to join median bulb with a constriction; median bulb fusiform with distinct valvular plates; isthmus slender; basal bulb elongated, 29-35 x 6 - 9 μm in size, with three distinct gland nuclei, one large germinal nucleus at middle and two epithelial nuclei at the ends; located at 56 - 58 per cent of body from the anterior end. Tail similar to female.

Third stage female juvenile: Body almost straight to slightly ventrally curved upon fixation. Cuticle finely annulated. Lateral fields marked with four incisures. Lip region continuous with body. Spear small, with small rounded, posteriorly slopping knobs. Procorpus cylindrical, slightly swollen posteriorly to join median bulb with a constriction; basal bulb elongated, 28 - 45 x 6 - 8 μm in size, slightly overlapping intestine ventrally. Genital primordium 30 - 57 μm long, located at 68 - 73 % of body from anterior end. Genital primordium consists of anteriorly located cap cell, 4 - 6 germinal nuclei, followed by 2 - 3 rows of epithelial nuclei. Tail similar to female, 37 - 47 μm long.

Third-stage male juvenile: Body similar to the third stage female juvenile. Genital primordium 50- 55 μm long, located at 49 - 62 % of body from anterior end. Genital primordium consists of cluster of epithelial nuclei followed by 4 - 6 germinal nuclei and a cap cell nucleus.

Fourth stage male juvenile: Body slightly ventrally curved upon fixation and similar to that of female. Basal bulb 43 - 44 x 9 μm in size. Genital primordium 155 - 166 μm long with 7 - 11 germinal nuclei and rows of epithelial nuclei. Spicular primordium prominent.

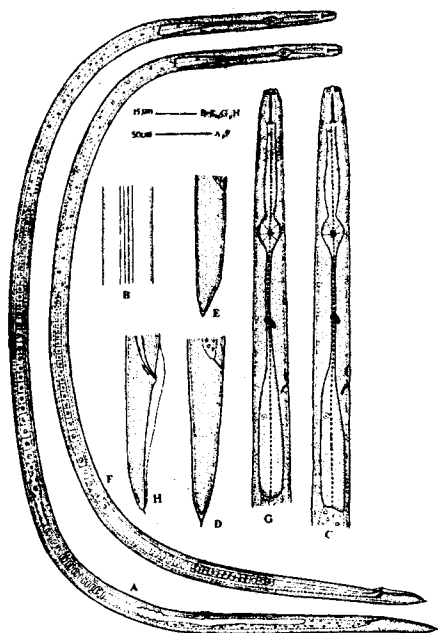


Fig. 1. *Ditylenchus angustus*: A-E Adult female. A- Entire, B- Lateral field, C- Oesophageal region, D-E- Tails; F-H Adult male. F- Entire, G- Oesophageal region, H- Tail.

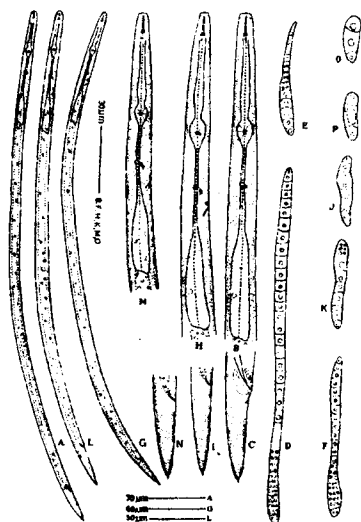


Fig. 1. *Ditylenchus angustus*: A-F Fourth stage male juvenile. A- Entire, B- Oesophageal region, C- Tail, D-F- Genital primordia; G-J Third stage female juvenile. G- Entire, H- Oesophageal region, I- Tail, J- Genital primordia; K Third stage male juvenile- Genital primordia; L-O Second stage juvenile. L- Entire, M- Oesophageal region, N- Tail, O- Genital primordia; P- Second moult- Genital primordia.

Host and Locality: Collected from the inside panicles of deep water paddy (*Oryza sativa* L. var. Amona bao), North Lakhimpur, Assam.

Discussion

Butler (1913) described *D. angustus* as *Tylenchus angustus* Filipjev (1936) to *Ditylenchus*. The present specimens agree with the descriptions given by Seshadri and Dasgupta (1975) for Joydevpur, Bangladesh population. However, differed from the earlier descriptions in having different head shape, narrow and slender isthmus, crustaformeria with 4 - 5 cells in each row, longer post vulval uterine sac and short conoid tail ending in a mucro (head rectangular, isthmus broad, crustaformeria with 4 cells in each row, post vulval uterine sac 2.0 - 2.5 times of VBD and a long conoid tail in descriptions and illustrations given by Seshadri and Dasgupta (1975). Butler (1913) reported post vulval uterine sac covering two-third of the vulva-anus distance, and tail tip pointed without a mucro. In India, this nematode was reported from the states of Assam, Maharashtra, Orissa, Uttar Pradesh and West Bengal. Das and Saikia (2005) also reported the distribution and integrated management approach of *D. angustus*.

References

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