Five Species of Plant Parasitic Nematodes (Order: Tylenchidae) Affecting Vegetable Crops of Nepal

Arvind K. Keshari¹, Ranjana Gupta²

¹Department of Zoology, Patan M. Campus, Patan, Lalitpur, Nepal.
²Head, Central Department of Zoology, Tribhuvan University, Kirtipur, Nepal.

ABSTRACT

During a survey for plant parasitic nematodes affecting various vegetable crops grown in three hilly districts surrounding Kathmandu Valley, Nepal, five species of order Tylenchidae are reported for the first time from Nepal. The nematode species are *Hoplolaimus indicus*, *Tylenchorhynchus mashhoodi*, *Helicotylenchus incisus*, *Microposthonia paraxestis* and *Hemicriconemoides cocophilus*. All the species are illustrated with line diagrams and described with their morphometric data along with localities and host plants.

Key words: Plant parasitic nematodes; tylenchidae; taxonomy; species; new records

INTRODUCTION

A nematological literature available so far reveals that very little taxonomic work is done in Nepal. The first survey work on generic level was done by Amatya and Shrestha (1968) reporting 34 genera of plant parasitic nematodes from Nepal. Besides some fragmentary works, no significant progress is done. The present taxonomic work is an attempt to identify the nematodes up to the species level.

The present paper is based on the collection of soil samples from ten vegetable crops of three hilly districts-Bhaktapur, Kavre and Dhadhing surrounding the Kathmandu Valley, Nepal. The analysis of samples yielded varieties of plant parasitic nematodes. Among them, five species of order Tylenchidae are reported for the first time from Nepal. Brief descriptions, illustrations and information on host, locality of these species are provided here.

RESULTS AND DISCUSSION

Descriptions and illustrations of *Hoplolaimus indicus*, *Tylenchorhynchus mashhoodi*, *Helicotylenchus incisus*, *Microposthonia paraxestis* and *Hemicriconemoides cocophilus* are provided herewith.

**Hoplolaimus indicus** Sher 1963

(Fig. 1; A–D)

Measurements:

Females: $L = 1.04–1.26$ mm; $a = 31.4–36.9$; $b = 8.7–10.6$; $b' = 7.0–8.5$; $c = 63.3–76.7$; $c' = 0.55–0.76$; $V = 52.8–57.3$;

MATERIALS AND METHODS

An nematological survey was carried out during 2012-2013 from three major vegetable producing districts of Nepal-Bhaktapur, Kavre and Dhadhing at altitudes of 1319 m, 1439 m and 1518 m, respectively. Nematodes isolated by modified by Cobb's (1918) sieving and decantation and modified Baermann's (1917) funnel techniques were killed and fixed in hot FA (4:1) for 24 hours (Seinhorst 1962). After fixation, the nematodes were transferred to glycerine–alcohol (5 parts glycerine and 30% alcohol) and kept in a desiccator for slow dehydration. Permanent mounts were made in anhydrous glycerine by using wax ring technique. Measurements, morphological observations were made using an Olympus microscope while drawing with camera lucida. The specimens on slides are deposited in Central Department of Zoology, Tribhuvan University, Kirtipur, Kathmandu, Nepal.

*Corresponding author Email address: arvind.k.keshari@hotmail.com*
**Description:**


**Males:** Similar to females but slightly smaller in length. Spicules strong, 33–40 µm long, arcuate, gubernaculum simple. Bursa striated, enveloping tail.

**Host and locality:** Soil around the roots of cauliflower (Brassica oleracea) and brinjal (Solanum melagena) from Kavre, Nepal.

**Remarks:** *H. indicus* is most widely distributed species (Khan and Chawla 1975). Since Sher (1963) described this species from India, many workers (Hussain and Rashid 1969) and Khan and Chawla 1975 have studied variations in species. Anderson (1983) reported this species from Canada. The measurements and description of the present species agree well with previous descriptions.

**Tylenchorhynchus mashhoodi** Siddiqi and Basir 1959 (Fig. 1; E–H)

**Measurements:**

**Females:** L = 0.62–0.74 mm; a = 33.2–35.2; b = 5.2–5.8; c = 12.2–15.0; c' = 3.2–4.0; V = 47.3–56.5; stylet = 18.3–19.4 µm; conus = 7.5–9.0 µm; oesophagus = 115–128 µm; excretory pore = 96.0–106.5 µm; tail = 45–56 µm.

**Males:** L = 0.63–0.70 mm; a = 31.2–36.0; b = 5.0–5.5; c = 13.2–14.7; c' = 3.0–3.7; stylet = 18.0–19.4 µm; conus = 8.6 µm; oesophagus = 116–129 µm; excretory pore = 100.0–107.5 µm; spicules = 22–27 µm; gubernaculum = 16.5–18.3 µm; bursa = 64–80 µm; tail = 41.5–52.5 µm.

**Descriptions:**


**Helicotylenchus incisis** Darker and Khan 1978 (Fig. 2; A–D)

**Measurements:**

**Females:** L = 0.65–0.93 mm; a = 33.5–44.3; b = 6.3–7.6; b' = 5.6–6.4; c = 39.8–56.0; c' = 0.91–1.11; v = 59.3–65.0; stylet = 22.5–27.0 µm; conus = 12.0 µm; oesophagus = 114–156 µm; excretory pore = 87–129 µm; tail = 15–18 µm.

**Descriptions:**

Female: Body C-shaped to spirally coiled. Cuticle finely transversely striated, each striae about 1.5 µm apart at midbody. Lateral fields with four incises. Lip region continuous, smooth, truncated. Lip annules absent. Cephalic framework strongly sclerotized. Stylet well developed, conus conoid, 48–53% of stylet length with basal knobs spherical. Dorsal oesophageal gland opening 7.5–9.0 µm behind spear base. Oesophagus with tubular

**Host and locality:** Soil around the roots of tomato (*Lycopersicon esculentum*) and cucumber (*Cucumis sativus*) from Bhaktapur, Nepal.
Fig 1. *Hoplolaimus indicus*. A. Female oesophageal region, B. Female head end, C. Male tail end, D. Female tail end. *Tylenchorhynchus mashhoodi* E. Female oesophageal region, F. Female head end, G. Male tail end. H. Female tail end.
Fig 2. *Macroposthonia paraxestis*. A. Entire female, B Female oesophageal region, C. Female head end, D. Female tail end. *Helicotylenchus incisus*. E. Female oesophageal region, F. Female head end, G. Female tail end.


Remarks: Dimensions and morphological characters of the present specimens conform to those descriptions given by Dhanachand and Renubala 1991. It is the genus reported for the first time from Nepal.

Hemicriconemoides cocophilus (Loos 1949)
Chitwood and Birchfield 1957
(Fig. 3; A–E)

Measurements:

Females: L = 0.33–0.38 mm; a = 14–17; b = 4.0–4.5; c = 15–23; V = 92.0–93.9; stylet = 45–51 μm; conus = 37.5–43.5 μm; tail = 20.0–27.5 μm; R = 122–138; Rst = 16–18; Roes = 25–32; Rex = 21–31; Rv = 8–10; Rvan = 1–2; Ran = 7–9; VL/VB = 1.0–1.4; St%L = 13.5–16.4.

Description:

Females: Body stout, ventrally arcuate upon fixation narrowing towards extremities. Outer cuticular sheath tightly enclosing body and well separated on tail. Lip region slightly set off with two distinct lip annules, first annule 10.5 μm wide, second 13.5 μm wide. Labial disc more or less round, oral disc circular, raised, with a fine rim like collar. Cephalic framework moderately sclerotized, stylet well developed, metenchium 82–85% of stylet length, telenchium 7.5–9.0 μm long. Basal knobs massive, long, anchor shaped stylet knobs. Dorsal oesophageal gland opening 3 μm behind base of stylet. Oesophagus 78–87 μm long. Excretory pore 81–90 μm and nerve ring 67.5–75.0 μm from anterior end.

Reproductive system mono-prodelphic, ovary outstretched. Vulva an open transverse slit, vulval flaps two annules long. Vagina anteriorly directed, 10.5–13.5 μm long. Anus small, porelike, located adjacent to vulva. Tail conoid and tail tip finely rounded.

Male: Not found.

Host and locality: Soil around the roots of cauliflower (Brassica oleracea) from Bhaktapur, Nepal.

Remarks: It is the widely distributed species. Loos 1949 first described this species from Sri Lanka. Later Siddiqi 1961, Edward and Mishra 1963 and Decraemer and Geraert 1992 redescribed this species. The measurements of this specimens closely agree with previous descriptions and measurements given by Loos 1949.

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Fig 3. *Hemicriconemoides cocophius*. A. Entire female, B. Female head end, C. Oesophageal region, D. Female gonad, E. Female posterior end.
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