Three new species of the genus _Belondira_ Thorne, 1939 from Manipur, India

Maqsood Ahmad, Ch. Dhanachand and M. Shamim Jairajpuri *

Section of Nematology, Department of Zoology, Aligarh Muslim University, Aligarh-202001, India.

SUMMARY

Three new species belonging to the genus _Belondira_ Thorne, 1939 have been described and figured from Manipur, India. _Belondira microdora_ n. sp. collected from around the roots of wild plants from Imphal comes close to _B. caudata_ Thorne, 1939 and _B. tenuidens_ Thorne, 1964 but differs from both of them in having a narrower body, longer anterior uterine sac, smaller tail and in the presence of males. _Belondira tenuidora_ n. sp. collected from around the roots of grasses from Imphal is also very similar to _B. caudata_ and _B. tenuidens_. From the former it differs in having posteriorly located vulva, smaller prerectum and longer tail and from the latter in having a smaller body, longer oesophagus and tail. _Belondira affinis_ n. sp. collected from around the roots of _Musa paradisiaca_ L. from Waithou hills comes close to _B. syedi_ Suryawanshi, 1972 and _B. goldeni_ Suryawanshi, 1972 but differs from both of them in having heavily sclerotized cephalic framework and in the length and shape of odontostyle and odontophore. A key to the species of the genus _Belondira_ has also been provided.

RéSUMÉ


A survey of plant-parasitic and soil-inhabiting nematodes from Manipur during February, 1977 yielded three new species of the genus _Belondira_ Thorne, 1939. These species are named as _B. microdora_ n. sp., _B. tenuidora_ n. sp. and _B. affinis_ n. sp., which are described and illustrated. A key to the species of the genus _Belondira_ Thorne, 1939 is also provided.

Measurements were taken and observations made on specimens mounted in glycerine after being killed in hot 4% formalin and dehydrated by the slow method.

_Belondira microdora_ n. sp. (Fig. 1)

**DIMENSIONS**

Paratype females (4) : L = 0.96-1.11 (1.08) mm; a = 42-48 (45); b = 4.9-5.5 (5.1); c = 64-69 (65); c’ = 1.00-1.17 (1.07); V = 34-36 (36); G1 = 7-9 (7); G2 = 17-25 (20); odontostyle = 6-7 (6) μm; odontophore = 10-11 (10) μm; expanded part of oesophagus = 78-83 (80) μm; tail = 15-17 (16) μm.

* Present address: Commonwealth Institute of Parasitology, St. Albans, Herts., England.

Fig. 1. Belondira microdora n. sp.; A: Entire female; B: Entire male; C: Expanded part of oesophagus; D: Anterior end; E: Female gonad; F: Male posterior region; G: Female posterior region.
Holotype female: L = 1.30 mm; a = 54; b = 6.2; c = 76; c’ = 1; V = 36; G_1 = 9; G_2 = 13; odontostyle = 7 μm; odontophore = 10 μm; expanded part of oesophagus = 83 μm; tail = 17 μm.

Paratype males (4): L = 1.03-1.24 (1.10) mm; a = 43-52 (48); b = 4.8-5.7 (5.2); c = 60-67 (63); c’ = 1.00-1.11 (1.00); T = 40-45 (42); odontostyle = 6-8 (7) μm; odontophore = 9-10 (9) μm; expanded part of oesophagus = 85-90 (87) μm; spicules = 27-30 (28) μm; ventro-median supplements = 2; tail = 17-20 (18) μm.

DESCRIPTION

Female: Body almost straight upon fixation, tapering gradually anterior to base of oesophagus. Cuticle 2 μm thick at midbody and 3-4 μm on tail. Lateral chords narrow, about one-third of body diameter at midbody.

Lip region rounded and continuous with body contour; lips amalgamated. Amphids stirrup-shaped, apertures occupying about two-thirds of corresponding body diameter. Odontostyle small, narrow, 6-8 μm or about one lip-width long. Odontophore rod-like, about twice the odontostyle length. Guiding ring obscure, about one lip-width from anterior end. Nerve ring at 72-80 μm from anterior end. Basal expanded part of oesophagus occupying about 35-40% of oesophageal length, surrounded by thick sheath of spiral muscles. Cardia hemispherical, 8-10 μm long.

Vulva transverse, vagina about half vulval body diameter long. Female reproductive tracts monopistodrilic. Anterior uterine sac 80-115 μm or about 3.5-5.0 corresponding body diameters. Posterior gonad well developed with a small uterus. A distinct sphincter present at oviduct-uterus junction. Ovary long with 10-15 oocytes arranged in a single row. Prerectum 100-120 μm or about 6-7 anal body diameters long. Rectum 29-32 μm or about two anal body diameters long. Tail short, hemispherical slightly clavate, 15-17 μm with two caudal pores on each side.

Male: Body slightly ventrally curved in posterior half. Supplements consist of an adanal pair and two widely spaced ventromedians; the first one at 40-42 μm from the anus and second at 55-60 μm from the first. Spicules arcuate, 27-30 μm or slightly less than two anal body diameters along median axis. Lateral guiding pieces small, tongue-like, 7 μm long. Tail ventrally curved, bluntly rounded.

TYPE HABITAT AND LOCALITY

Soil around roots of wild plants from Lamphel, Imphal, Manipur state, India; collected in February, 1977.

TYPE SPECIMENS

Holotype female on slide Belondira microdora n. sp./1; paratype females and males on slides Belondira microdora n. sp./2-4; deposited in the nematode collection of Zoology Department, Aligarh Muslim University, Aligarh. A female paratype and a male paratype deposited at Muséum national d’Histoire naturelle, Laboratoire des Vers, Paris, France.

DIFFERENTIAL DIAGNOSIS

Belondira microdora n. sp. comes close to B. caudata Thorne, 1939 and B. tenuidens Thorne, 1964 because of the absence of swollen cuticle on tail and the oesophagus which is enlarged posterior to its middle. It, however, differs from both these species in having a narrower body, longer anterior uterine sac, shorter tail and in the presence of males. It further differs from B. caudata in having a longer odontophore and prerectum (a = 41; c = 42; anterior uterine sac one body diameter long and prerectum 4-5 anal body diameter long in B. caudata). It can be further differentiated from B. tenuidens in having a shorter body, odontostyle with a distinct aperture and a shorter oesophagus (L = 1.4 mm; a = 36; b = 6.5; c = 59; anterior uterine sac one body diameter long in B. tenuidens).
Fig. 2. *Belondira tenuidora* n. sp.; A: Entire male; B: Entire female; C: Oesophageal region; D: Anterior end; E: Anterior end showing amphid; F: Female gonad; G: Female posterior end; H: Female posterior region; I: Male posterior region; J: Spicule and lateral guiding piece.
Belondira tenuidora n. sp.
(Fig. 2)

Dimensions

Paratype females (5) : L = 1.06-1.24 (1.19) mm; a = 39-50 (43); b = 5.4-5.9 (5.6); c = 32-35 (34); c' = 1.5-1.7 (1.6); V = 37-40 (39); G₁ = 2-4 (3); G₂ = 10-23 (20); odontostyle = 8-9 (8) μm; odontophore = 9-10 (9) μm; expanded part of oesophagus = 72-98 (87) μm; tail = 33-38 (35) μm.

Holotype female : L = 1.23 mm; a = 41; b = 5.6; c = 35; c' = 1.5; V = 39; G₁ = 3; G₂ = 23; odontostyle = 8 μm; odontophore = 9 μm; expanded part of oesophagus = 98 μm; tail = 35 μm.

Paratype males (5) : L = 1.16-1.28 (1.21) mm; a = 41-53 (47); b = 5.6-6.3 (5.9); c = 27-32 (30); c' = 1.8-1.9 (1.8); T = 25-36 (31); odontostyle = 8-9 (8) μm; odontophore = 9-10 (9) μm; expanded part of oesophagus = 79-90 (83) μm; spicules = 33-36 (34) μm; ventromedian supplement = 1; tail = 38-40 (39) μm.

Description

Female : Body almost straight upon fixation, tapering gradually anterior to base of oesophagus. Cuticle finely transversely striated, 3 μm thick at midbody and 4-6 μm on tail. Lateral chords narrow, about one-third of body diameter at midbody.


Vulva transverse, vagina about half vulval body diameter long. Female reproductive tracts mono-opisthodelphic. Anterior uterine sac 25-45 μm or slightly more than one body diameter long. Posterior gonad normally developed, 120-

285 μm long. A distinct sphincter present at oviduct-uterus junction. Ovary with 10-13 oocytes. Prerectum 43-75 μm or 2-4 anal body diameters long. Rectum 29-30 μm or about one and a half anal body diameters long. Tail slightly tapering posteriorly, with rounded terminus, about as long as rectum with two caudal pores on each side.

Male : Body slightly ventrally curved in posterior half. Supplements an adanal pair and one ventromedian, the latter at 105-110 μm from the anus. Spicules only slightly arcuate, 33-36 μm or about one and a half anal body diameters along median axis. Lateral guiding pieces small, tongue-like, 8-10 μm long. Tail 38-40 μm with two caudal pores on each side.

Type habitat and locality

Soil around roots of grasses from Sangolban lane, Imphal; Manipur state, India; collected in February, 1977.

Type specimens

Holotype on slide Belondira tenuidora n. sp./1; paratype females and males on slides Belondira tenuidora n. sp./2-5; deposited in the nematode collection of the Zoology Department, Aligarh Muslim University, Aligarh. One paratype female and a paratype male deposited at Muséum national d'Histoire naturelle, Laboratoire des Vers, Paris, France.

Differential diagnosis

Belondira tenuidora n. sp. comes close to B. caudata Thorne, 1939; B. tenuidens Thorne, 1964 and B. microdora n. sp. From the former it differs in having a posterior vulva, shorter prerectum, longer tail and in the presence of males (c = 42; V = 36; prerectum three body diameters long in B. caudata). It differs from B. tenuidens in having shorter body, longer oesophagus, shorter prerectum, longer tail and in the presence of males (L = 1.4 mm; b = 6.5; c = 59; prerectum = 5-6 anal body diameters long in B. tenuidens). From B. micro-
Fig. 3. Belondira affinis n. sp.; A: Entire female; B: Entire male; C: Oesophageal region; D: Anterior region; E: Anterior end (lateral); F: Anterior end (dorsoventral); G: Oesophageal constriction; H: Oesophago-intestinal junction; I: Female gonad; J: Female posterior region; K: Female posterior end; L: Male posterior region; M: Male posterior end; N: Spicule and lateral guiding piece.
dora n. sp. it can be differentiated in having a shorter anterior uterine sac and prerectum, longer tail and longer and differently shaped spicules (anterior uterine sac = 3.5-5.0 body diameters; prerectum 6-7 anal body diameters; c = 64-69; spicules = 27-30 μm in B. microdora).

**Belondira affinis** n. sp.

(Fig. 3)

**Dimensions**

*Paratype females* (4) : $L = 1.43-1.55$ (1.51) mm; $a = 31-35$ (33); $b = 3.9-4.1$ (4.0); $c = 70-79$ (75); $c' = 0.82-0.92$ (0.87); $V = 35-39$ (37); $G_1 = 2-3$ (2); $G_2 = 12-15$ (14); odontostyle = 8-9 (8) μm; odontophore = 11-12 (11) μm; expanded part of oesophagus = 218-233 (226) μm; tail = 18-22 (19) μm.

*Holotype female* : $L = 1.44$ mm; $a = 32$; $b = 3.9$; $c = 80$; $c' = 0.86$; $V = 39$; $G_1 = 2$; $G_2 = 13$; odontostyle = 9 μm; odontophore = 11 μm; expanded part of oesophagus = 220 μm; tail = 18 μm.

*Paratype males* (5) : $L = 1.22-1.51$ (1.36) mm; $a = 37-39$ (38); $b = 4.0-4.9$ (4.2); $c = 61-75$ (69); $c' = 0.81-0.90$ (0.83); $V = 53-54$ (53); odontostyle = 8-9 (8) μm; odontophore = 13-15 (13) μm; expanded part of oesophagus = 160-173 (165) μm; spicules = 33-35 (34) μm; ventromedian supplement = 1; tail = 18-20 (18) μm.

**Description**

*Female* : Body almost straight upon fixation, tapering gradually anterior to base of oesophagus. Cuticle finely transversely striated, 2 μm thick at midbody and 6-4 μm on tail. Lateral chords narrow, about one-third of body diameter at midbody.

Lip region continuous with body contour, one-fourth of body diameter at base of oesophagus; lips rounded and labial papillae obscure. Cephalic framework strongly sclerotized. Amphidial apertures slit-like, almost as wide as lip-width. Odontostyle fusiform, about one lip-width long. Odontophore rod-like, about two times of odontostyle length. Guiding ring obscure, about one odontostyle length. Anterior slender part of oesophagus has a fusiform swelling just anterior to the odontophore. Basal expanded part of oesophagus occupying about 54-65% of oesophageal length, surrounded by a sheath of spiral muscles. Nerve ring at 90-95 μm from anterior end. Dorsal oesophageal gland nucleus located at 15-17 μm from the anterior expanded part of oesophagus. Cardia hemispherical, 11-15 μm long.

Vulva transverse, vagina about half vulval body diameter long. Female reproductive tracts mono-opisthodelphic. Anterior uterine sac 23-25 μm or less than one body diameter long. Posterior gonad normally developed, 180-240 μm long. A distinct sphincter present at oviduct-uterus junction. Ovary with 8-11 oocytes. Prerectum 90-113 μm or 3-4 anal body diameters long. Rectum 18-22 μm or about one anal body diameter long. Tail short, hemispherical, slightly swollen, 18-22 μm or about as long as rectum, with two caudal pores on each side.

*Male* : Body slightly ventrally curved in posterior half. Supplements consist of an adanal pair and one ventromedian, the latter at 60-65 μm from the anus. Spicules arcuate, 33-35 μm or about one and a half anal body diameters along median axis. Lateral guiding pieces small, tongue-like, 10-11 μm long. Tail ventrally curved, bluntly rounded, 18-20 μm.

**Type habitat and locality**


**Type specimens**

Holotype female on slide *Belondira affinis* n. sp./1; paratype females and males on slides *Belondira affinis* n. sp./2.5; deposited in the nematode collection of Zoology Department, Aligarh Muslim University, Aligarh. One paratype female and a paratype male deposited at Muséum national d'Histoire naturelle, Laboratoire des Vers, Paris, France.
Differential diagnosis

Belondira affinis n. sp. comes close to B. syedi Suryawanshi, 1972 and B. goldeni Suryawanshi, 1972 but differs from both these species in having prominently sclerotized cephalic framework, and in the length and shape of odontostyle and odontophore. It further differs from B. syedi in having a shorter oesophagus, anteriorly located vulva, shorter anterior uterine sac and a longer tail (b = 3.5-3.9; c = 87-94; V = 40-42; anterior uterine sac more than one body diameter in B. syedi). From B. goldeni it also differs in having a longer oesophagus, shorter spicules and in the number of ventromedian supplements (b = 4.3-4.6; spicules = 36-48 μm; ventromedian supplements = 2 in B. goldeni).

Key to species of Belondira Thorne, 1939
(Modified after Suryawanshi, 1972)

1. Cuticle at tail terminus not conspicuously swollen, tail usually not clavate ........................................ 2
   Cuticle at tail terminus conspicuously swollen, tail usually clavate .................................................. 13
2. Body length about 2 mm ........................................ 3
   Body length less than 1.8 mm .................................... 4
3. Oesophageal bulb 60% of total oesophagus length ........................................ capitica Thorne, 1939
   Oesophageal bulb 50% of total oesophagus length ....................... porta Thorne, 1964
4. Oesophageal bulb less than 50% of total oesophagus length .................. 5
   Oesophageal bulb equal or superior to 50% of total oesophagus length ........................................ 8
5. Odontostyle slender ........................................ 6
   Odontostyle fusiform ........................................ 23
6. Body length 1.4 mm; males not known ........................................ tenuidens Thorne, 1964
   Body length less than 1.3 mm; males present ........................................ 7
7. Anterior uterine sac 3.5-5.0 body diameters long; spicules 27-30 μm long ........................................ microdora n. sp.
   Anterior uterine sac about one body diameter long; spicules 33-36 μm long ........................................ tenuidora n. sp.
8. Oesophageal bulb 50% of total oesophageal length; V = 33 ........................ cylindrica Thorne, 1964
   Oesophageal bulb superior to 50% of total oesophagus length; V = 35 ........................................ 9
9. Vulva at 40-42%; c = 87-94 ........................................ syedi Suryawanshi, 1972
   Vulva at 35-39%; c = 48-50 ........................................ 10
10. Anterior uterine sac twice the body diameter long; ortha Thorne, 1939
    Anterior uterine sac less than one body diameter long ........................................ 11
11. Body length 1.17 mm; b = 3.4 ........................................ 12
    Body length 1.22-1.67 mm; b = 3.8-4.6 ........................................ 13
12. Cephalic framework strongly sclerotized; tail 18-22 μm; affinis n. sp.
    Cephalic framework not sclerotized; tail 25-31 μm ........................................ goldeni Suryawanshi, 1972
13. Post-rectal sac present ........................................ 14
    Post-rectal sac absent ........................................ 15
14. Body length 1.0-1.3 mm ............................... moladrica Nesterov, 1976
    Body length less than 3 mm ........................................ 15
15. Oesophageal bulb less than 50% of total oesophagus length ........................................ 16
    Oesophageal bulb 50% of total oesophagus length ........................................ 21
16. Anterior uterine sac smaller than body diameter ........................................ clava Thorne, 1939
    Anterior uterine sac longer than body diameter ........................................ 17
17. Vulva at 32-35%; repalensis Siddiqi, 1964
    Vulva at more than 36% ........................................ 18
18. Odontostyle slender, aperture obscure ........................................ thornei Suryawanshi, 1972
    Odontostyle fusiform, aperture distinct ........................................ 19
19. Anterior uterine sac 2.3-3.0 body diameters long ........................................ murtazai Siddiqi, 1968
    Anterior uterine sac slightly more than one body diameter long ........................................ 20
20. Body length 1.0-1.3 mm; males present ........................................ paraclava Jairajpuri, 1964
    Body length 0.9-1.0 mm; males not known ........................................ tunicauda Coomans & Baqri, 1972
21. Body length less than 1.0 mm (0.7-0.9 mm) ........................................ 22
    Body length more than 1.1 mm (1.18-1.30 mm) ........................................ 25
22. Anterior uterine sac not more than one body diameter long ........................................ 23
    Anterior uterine sac 1.5 or more body diameters long ........................................ 24
23. Odontostyle slender; odontophore in two parts ........................................ clavicaudata (Williams, 1958) Andrassy, 1963
    Odontostyle fusiform; odontophore in two parts ........................................ 25
24. Vulva at 37-40%; tail 15-19 μm ........................................ 25
    Vulva at 43%; tail 22-38 μm ........................................ 26
25. Anterior uterine sac slightly more than one body diameter long; sacchari Suryawanshi, 1972
    Anterior uterine sac about two body diameters long ........................................ 26
26. Oesophagus 200 μm long; tail 2.3-2.6 anal body diameters long ........................................ 27
    Oesophagus 231 μm long; tail 1.8 anal body diameters ........................................ 28

Not included in the key:

*Belondira gracilis* Razzhivin & Mil'an, 1978 because of lack of information on this species. However, it differs from *B. bulbosa* in the shape of tail and in the presence of caudal papillae in females. It also differs from *B. caudata* and *B. porta* in the shape of tail and in the number of genital papillae of the males and of the caudal papillae in the females.

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**References**


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