UTTAR PRADESH JOURNAL OF ZOOLOGY

43(3): 52-56, 2022
ISSN: 0256-971X (P)

ON A NEW SPECIES OF THE GENUS *Dorylaimus* (NEMATODA: DORYLAIMIDAE) FROM JALNA DISTRICT (MS) INDIA

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.56557/UPJOZ/2022/v43i32918

Editor(s):
(1) Dr. Ana Cláudia Correia Coelho, University of Trás-os-Montes and Alto Douro, Portugal.
Reviewers:
(1) Konstantin Butenko, Lomonosov Moscow State University, Russia.
(2) Edjane Oliveira de Lucena, Federal University of Paraiba, Brazil.

Received: 10 January 2022
Accepted: 14 February 2022
Published: 25 February 2022

Original Research Article

ABSTRACT

A Specimen of the genus *Dorylaimus* was found in soil around the root of the soybean crop in Jalna district (M.S) India. The species is characterized by the body being circular. The body is ventrally curved upon fixation tapering toward both sides, cuticle thick at mid-body. Lip is separated angular, lateral chord about 1/4th to 1/3rd of the body. Guiding is ring single, pharynx odontostylet, length is long. The female genital system is amphidelphic, both the sexual branches are equally developed. Oviduct was joined ovary sub terminally, sphincter present in oviduct uterus junction. The tail is straight and long.

Keywords: *Dorylaimus;* jalna; nematode.

1. INTRODUCTION

The nematodes population was affected economically by agriculture. The plant-parasitic nematodes were found in soybean crops. The Soybean cyst nematode can cause yield loss of up to 30% without showing any visible symptoms in the soybeans. Yield loss can go up to 75% in the heavily infested fields Wang et al. [1]. Nematode constitutes the largest and the most ubiquitous group of the animal kingdom. In India, about 10 to 20% of crops losses occurred due to the plant nematode. Nematodes were doing cause considerable crop losses Mujeebur Rahman khan [2]. The nematode is infecting different crops such as Sugarcane, Maize, Wheat, Rice, Soybean, Cotton, etc. Soybean was occupied 42% of India's total oilseeds and 25% of edible oil production soybean crops economically important in India A.N. Sharma and G.K. Gupta [3]. After that, many scientists worked on this genus worldwide like Andrassy [4] also included this species under *Dorylaimus* in his review of the family *Dorylaimidae*. *Dorylaimus bengalensis* added new species *Dorylaimus proximus* reported new

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species by Vladimir A. Gusakov and Vladimir G. Gagarin [5].

2. MATERIALS AND METHODS

2.1 Sample Collection

The present investigation was carried out on the occurrence of plant-parasitic nematode species associated with soybean crops up to the depth of 0-15 cm. the samples were mixed to make a composite sample from the composite soil sample 250 gm of soil was taken for further processing.

2.2 Plant Nematodes Collection

Extracting the nematodes by Cobb's sieving and decanting method, Cobb [6]. Followed by Bearmann's funnel technique, Schindler [7]. Extracted sample was observed under a stereoscopic binocular microscope for collection and Syracuse counting disc. Isolated nematodes were killed in hot water and fixed in FAA (formalin acetic acid) solution. Based on morphological characteristics of adult and juvenile forms the nematodes were identified up to generic level. Mai and Lyon [8].

2.3 Description

105 Specimens of The plant nematode were collected from the soil around the sugarcane crops, at Partur, Dist. Jalna, (M.S). India. Collected specimens were observed and identified.

Collected plant nematodes are preserved in hot (90^0C - 100^0C), diluted FA solution. Mounted in glycerine, drawings are made with the aid of camera lucida. All measurements are in 'µm' except 'L' in mm.

Nematodes body is elongate, spindle-shaped, tapering towered both bodies end. The buccal cavity lies between the mouth and pharynx. The stylet is spear-like, the pharynx is muscular. The intestine is complete mouth to anus. Sexes are separate.

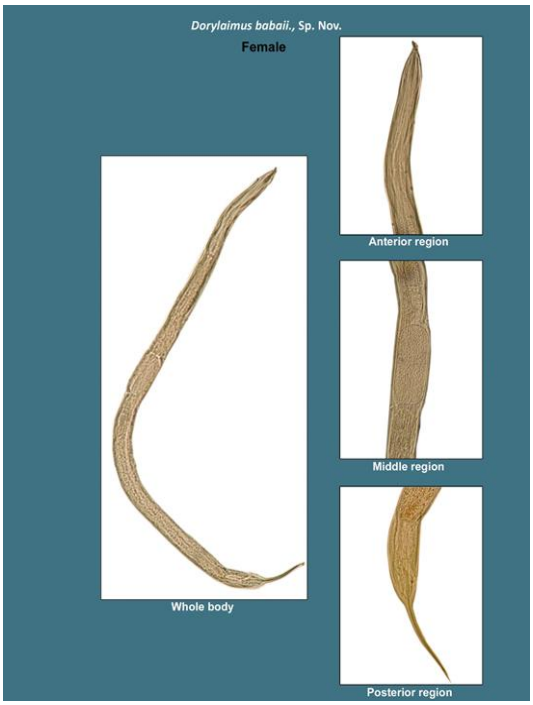
Male – Not found.

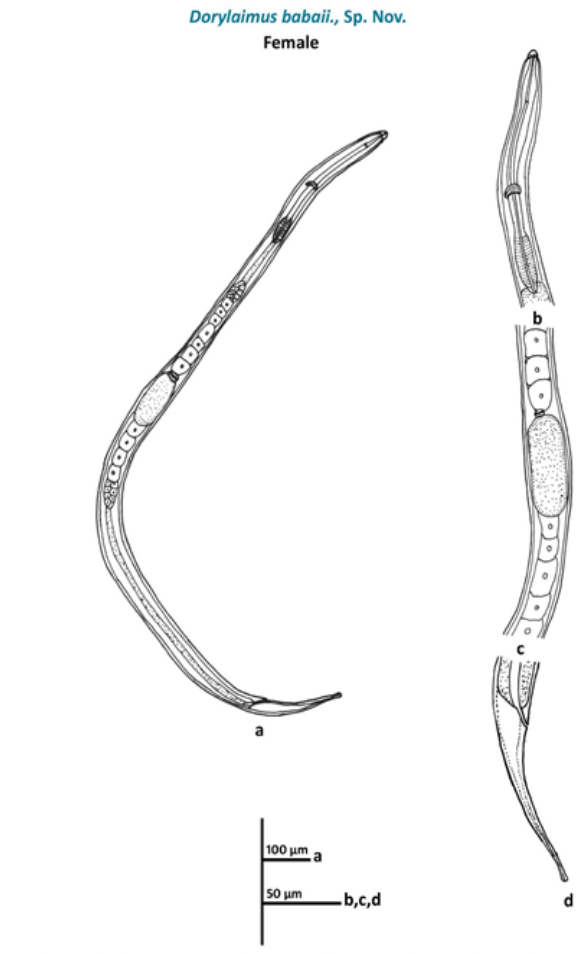
Females – The body is ventrally curved upon fixation, tapering regularly towards extremities. The inner layer was a cuticle with fine longitudinal ridges. The thickness of the cuticle is 6.13 µm at the anterior end at the level of odontostyle. Body pores are numerous and distinct. The Lip region is slightly set off by depression, the lip region hemispherical, Amphids is stirrup-shaped. Odontostyle is 221µm lip region – width long, nerve ring is located 520 µm of pharyngeal length from anterior end. The expanded portion of the pharynx is 3.56 times the neck base width or 53.84 % of the pharyngeal length. The very thin cardiac disc is present, cardia elongate conoid, 26µm long. Pharyngeal gland nuclei are inconspicuous and cannot be located.

Vulva is transverse, pre- equatorial. A vulval region is without any papillae, Reproductive system is amphidelphic, ovaries reflexed, prerectum 5.10 µm, rectum 1.07µm anal body widths long. Tail is attenuated and elongate–conoid with finely rounded terminus 224 µm long.

Table 1. Morphometric data of female – *Dorylaimus babaii Sp. Nov.*, All measurements are in 'µm' except 'L' in mm)

Body Part	Measurements
L	4.57mm
A	35.16
B	5.02
C	10.05
V %	41.21
Width of Head region	39
Width of mid-region	130
Cuticle thickness	6.13
Osophagus length	910
Odontostylet length	221
Cardia length	26
Egg length	910
Egg width	390
Osophagus length	221
Nerve ring from the anterior end	52
Tail length	224





a. Whole body, b. Anterior region, c. Middle region, d. Posterior region

3. DISCUSSION

The worm under discussion has some special characteristics like the vulval region without any papillae.

The worm under discussion came closer to *Dorylaimus gigas* Kleynhans [9]; *Dorylaimus thornei* Andrassy, [10], in some characters but after detailed examination, it shows the following differences.

The present worm was differing from *Dorylaimus gigas* Kleynhans, [9]; in body, length is about 6.5-7.5mm against 4.57mm. the lip is amalgamated against lip hemispherical. Tail is conoid and short, against tail is straight, long.

It also differs from *Dorylaimus tepidus* Andrassy [11] in body length is about 5mm against 4.57mm and the value of 'a' = 22.70µm against the value of 'a'= 35.16 and cuticle unusually thick against cuticle thin.

It differs from *Dorylaimus thornei* Andrassy [10] in body length about 5.8mm against 4.57mm and head distinctly set off; longitudinal ridges 32 against lip region slightly set of by depression.

Given the above distinguishing differences, it is regarded as a new species and it is named *Dorylaimus babaii, Sp. Nov.* This species is named in the honor of well-known helminthology, Late Prof. B. V. Jadhav.

4. CONCLUSION

From the above observation, it is concluded that the various villages of Jalna have a heavy infection of various species of plant nematodes. Their occurrence may cause serious threats to affect the Soybean, crops. As India is an agricultural country, there is need to check and control, growth of nematodes.

Key to the species of the Genus *Dorylaimus,* Dujardin, 1845 [12]

(Modified after Andrassy, 1988)

1. Number of longitudinal ridges ranges between 50-60…..……..……..……..…….....2
- Number of longitudinal ridges less than 45.....4
2. Cuticle unusually thick, 14 - 18µm on mid-body; spear 60 - 63 µm Long……..…*D. pachys* Andrassy l970
- Cuticle much thinner, mostly 5 µm on mid-body; spear 50 µm or shorter……..…….....3
3. Female tail conoid, 4 anal body-widths long.....*D. alaeus* Thome, 1939
- Female tail attenuated, 6-7 anal body-widths long.....*D. stenus* Andrassy, 1970
4. Female tail conoid and short, 2-3 anal diameter.....*D. conicus* Andrassy, 1970
- Female tail attenuated to filiform, not less than 4 anal body-widths long.....5
5. Body exceptionally slender (a = 60 or more)..... 6
- Body much stout (a < 60) 7
6. The longest species of the genus (L = 6.5 - 7.5mm); spicules 130 µm Long……...*D. gigas* Kleynhans, 1970
- Body around 5 mm long; spicules 100µm long.....*D. tepidus* Andrassy, 1959
7. Spear shorter, 35 - 46.5 µm long..... 8
- Spear longer, 50 - 60 µm.....16
8. Vulval region with 4-5 ventral papillae..... 9
-Vulval region without any papillae..... ***D. babaii* Sp. Nov.**
9. Head distinctly set off; Longitudinal ridges 32.....*D. thornei* Andrassy, 1969
- Head not at all set-off or slightly set off; longitudinal ridges 38 - 42.....*D. lineatus* Altherr *et al.*, 1972
10. Spear three lip region-widths long; spicules 50µm…….....*D. siddiqil Ahmad et.al.*, 1982
- Spear less than three lip region-widths long; spicules 73.5 - 90 µm long.....11
11. Body about 2 mm; supplements 55..... *D. carinatus* Thorne & Swanger, 1936
- Body length 2.67 - 4.2 mm; supplements fewer.....12
12.Supplements 35 -46.....13
- Supplements less in number than above..... 14
13. Supplements 46; Body length 3.6 -4.2mm.....*D.fodori* Andrassy, 1988
- Supplements 35 - 38; Body length 2.8 - 3.5..... *D. geraerti* Baqri & Jana, 1986
14. Supplements 32 - 36; Body length 2.67 - 3.54mm……..*D. chatterjeei* De babrata Sen 2010
- Supplements 22 - 27; minimum body length above 3.1mm..... 15
15. Vulva pre-equatorial, at 36 -39% of body length.....*D. numidicus* Andrassy, 1988
- Vulva towards the equatorial region, at 44 - 49% of body.....*D, popus* Gagarin, 1981
16. Cuticle very thick, 12-14 µm on mid-body; spicules 140µ..... *D. crassus* de Man, 1884
- Cuticle much thinner, 8-10 µm; spicules at most 120 µm long..... 17
17. Lips well separate, angular, head deeply offset.....*D. stephani* Andrassy, 1970

- Lips not separate, rounded, head not offset.....18
18. Supplements 55- 62; spicules around 120µm long ……*D. stekhoveni* Baqri and Coomans, 1973
- Supplements 25 - 35; spicules around 80 µm.....*D. montanus* Stefanski, 1923
19. Spear three times as long as labial width..... 20
- Spear not more than two and half times as long as labial width.....21
20. Longitudinal ridges 28 - 29, unequally spaced (on both sides of the body more densely arranged); V = 37 - 38%.....*D. unicus* Andrassy, 1970
- Longitudinal ridges 32-35, equally spaced; V = 46%..... *D. helveticus* Steiner, 1919
21. Spear 57 - 60µm long; a small papilla presents on both sides of vulva……
……..…*D.macroproctus* Altherr, 1963
- Spear shorter, 46 - 53 µm long; papillae absent at vulva..... 22
22. Aperture occupying half of the spear length; spear with a dorsal fissure; supplements 28…….
…….....*D. asymphydorus* Andrassy, 1969
- Aperture occupying one-third of the spear length; spear without dorsal fissure; supplements 36-52…….23
23.Spear conspicuously thicker than cuticle at the same level; vulva at 37 - 39% of the body; supplement 52…...
…….....*D. afghanicus* Andrassy, 1960
-Spear as thick as or thinner than cuticle at the same level, vulva at 42 - 47% of the body; supplements 36-45
.....*D. stagnalis,* Dujardin, 1885

ACKNOWLEDGMENT

The author is thankful to the Head, Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad for providing the laboratory facilities during this research work.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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