First report of *Meloidogyne* species infecting *Turnera subulata* J. E. Smith from Chhattisgarh, India

Harvinder Kumar Singh[1*], Gaurav Sharma[2], K. P. Verma[3]

[*1]Department of Plant Pathology, College of Agriculture, Indira Gandhi Krishi Vishwavidyala Raipur, 492012, Chhattisgarh
[2]Department of Floriculture and Landscaping, Rani Lakshmi Bai Central Agricultural University, Jhansi, Uttar-Pradesh
[3]College of Agriculture and Research Station Bemetra, Indira Gandhi Krishi Vishwavidyala Raipur, 492012, Chhattisgarh
*Corresponding Author

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Abstract— *Gall symptoms were observed on the roots of Turnera subulata a flowering shrub of medicinal importance. Rhizosphere soil and infected root samples of T. subulata were collected from Jora, Krishaknagar, IGKV campus Raipur, Chhattisgarh. Second-stage juveniles (J2) of root knot nematode were isolated from diseased roots showing excessive gall formations on primary as well as secondary roots. Morphological and morphometrical findings after examination of the species conformed with descriptions of Genus Meloidogyne. This is the first report of Meloidogyne species infecting T. subulata in India as per the available literature scan.*

Keywords— Turnera subulata, Gall symptoms, Root Knot nematode.

I. INTRODUCTION

Turnera subulata belonging to the Turneraceae family is one of the most extensively distributed perennial flowering weed in the tropical and subtropical regions of Asia and Africa. *T. subulata* is infact a polymorphic polyploid complex of perennial weeds commonly called 'Butter cup, sulphur alder and white alder'. Plants are compact, thick herb with dark green foliage and light yellow or white flower having a dark base (Saravanan *et al*., 5). It is most widely adopted as an ornamental garden plant and important medicinal herb used in alternative traditional folk medicine for treatment of several types of chronic diseases. It has been reported as a fast naturalizing weed in Indian subcontinent (Kumar *et al*.,3)

Nematodes account for an estimated 14% of all worldwide plant losses and among them root-knot nematodes are the most common and destructive nematode pathogens. Most root-knot nematodes have a very wide host range (Mitkowski & Abawi,4). In India, the distribution of nematodes in different states has been documented in nematode distribution atlas by All India Coordinated Research Project (Nematodes) and published by Directorate of Information and Publications of Agriculture, Indian Council of Agricultural Research, New Delhi, India during 2010.

Stunting and leaf wilting symptoms were observed in few plants of *Turnera subulata*, (Figure 1a & b) grown as hedges in the Indira Gandhi Krishi Vishwavidyalaya Campus, Raipur. The plants when uprooted revealed the presence of galls on primary as well as on secondary roots (Figure 1c & d). Rhizospheric soil and infected root samples of *T. subulata* were collected from University campus. Around 20 percent of total plants were found to be associated with multiple galling on roots

1 (a)

1 (b)

1 (c)

1 (d)

FIGURE 1: Excessive galling/Multiple gall formation on *Tunera subulata*

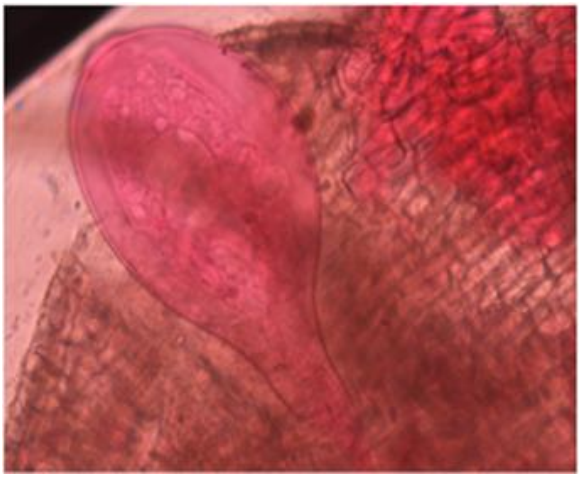

FIGURE 2: Mature root-knot females *Meloidogyne* species endoparasitically infecting the root tissue was observed.

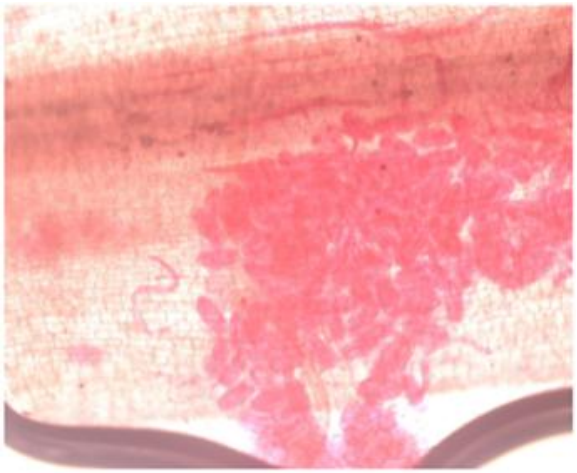

FIGURE 3: Second-stage juveniles (j2) of *Meloidogyne* species, the infective stage and vermiform in shape.

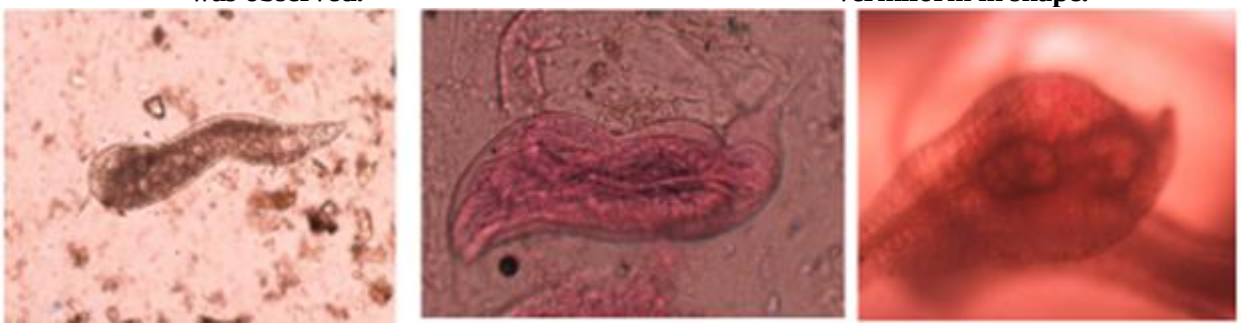

FIGURE 4: J4 stage of *Meloidogyne* species depicting the progression from juvenile to globose adult females

II. RESULTS

The infected roots (vegetative propagules) was boiled in acid fuschin lactophenol solution for few minutes and destained in clear lactophenol. Different stages of Meloidogyne retained the red stain deeper than the plant tissue (Coyne *et al.*,1). Mature root-knot females endoparasitically infecting the root tissue was observed (Fig 2). The females of root-knot nematode had a globose body, with a short "neck," containing the stylet. Second-stage juveniles (J2), the infective stage and vermiform in shapes along with males were also observed (Figure 3).

The J4 stage, depicting the progression from juvenile to globose adult females or to vermiform adult males was also clearly visible (Figure 4).

III. CONCLUSION

The morphological and morphometrical findings after examination of different stages of *Meloidogyne* species in *Turnera subulata* conformed with descriptions and measurements provided by Whitehead (6) and Hunt & Handoo (2).

To our knowledge and literature scan, this is the first report of *Meloidogyne* species infecting *Turnera subulata* in India.

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