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Some common plant parasitic nematodes of Citrus plants from Manipur

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Abstract : The present investigation deals with a systematic survey of plant nematodes of citrus plants collected from different localities of Manipur. Some of the collected nematodes belonging to Tylenchida are *Helicotylenchus* sp., *Tylenchorhynchus* sp., *Scutellonema* sp. and *Psilenchus* sp. Their detail descriptions of morphology, dimension, host range etc. are provided.

Key words : *Citrus*, Nematodes and Manipur.

INTRODUCTION

A survey of plant parasitic nematodes of citrus plants was carried out for a period of 2 years i.e. from March 2010- February 2012. During investigation some of parasitic Tylenchida belonging to different species were collected from the rhizosphere of different citrus plants. These plant parasitic nematodes are very minute, diversified, colourless and triplobastic lower invertebrates. Nematodes constitute one of the most important groups of organisms inhabiting the soil, water, plants and animals. Nematodes are one of the most abundant groups of the soil and litter fauna and they play an important role in regulating microbial communities (Krivtsov *et al;* 2006; Krivtsov et al; 2007)[7].

MATERIALS AND METHODS:

Various soil samples were collected from the rhizosphere of different citrus plants, properly labelled and brought to the laboratory for further processing. The samples were processed for the extraction of nematodes by Cobb's (1918)[3] sieving and decanting method followed by modified Baermann's funnel technique. The extracted nematodes were dehydrated by Seinhorst's (1959)[11]rapid glycerine method and mounted permanently on slides using dehydrated glycerine as mountant. Camera lucida sketches were made and photomicrographs were taken using digital Olympus camera. All measurements were in µm unless otherwise stated.

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RESULT AND DISCUSSION:

5 (five) Nematodes have been found from different localities of Manipur. Their descriptions are given below:

1. *Helicotylenchus digonicus* Perry, 1959**. (Fig. 1)**

Male : Not found.

Female: L= 0.52 - 0.74; a = 21-31; b = 52 - 69; c = 4.2 - 61; c' = 6.5 – 10.6

Stylet = 26 - 29; v = 0.56 – 0.70

Body are usually spiral in shape. Lip region are not demarcated from general shape of the body, anterior blunt with circular rings. Internal frameworks of lip region were well developed. Duct of dorsal oesophageal gland opens into oesophageal lumen behind the base of the stylet. Metacarpus is ovoid with distinct valvular apparatus. Nerve ring is in equatorial and encircles isthmus. Oesophageal

gland varies in shape usually overlapped to intestine from ventral side. Vulva is in the form of transverse slit, with small lateral membrane. Spermatheca is situated dorsal from junction of ovary and oviduct. Spermatozoa are not found. Phasmid is three circular ring posterior and 2 to 5 anterior to anus. Tail is more arced dorsally than ventrally with 4 circular rings on ventral sides. Tip of tail are variables in shapes.

Host locality: Collected from around the rhizosphere of *Citrus maxima* from Langmeidong,Thoubal District, Manipur.

Remark: The morphological characters and dimensions of the present specimen are in resemblance with those of the original descriptions and dimensions provided by Perry, 1959**.**

2.*Helicotylenchus gulabi* Jain *et.al.* (2000) **(Fig. 2)**

Male : Not found.

Female: L= 0.49 - 0.69; a = 20.92 – 26.13; b = 3.51 – 4.28; c = 22.3 – 48.2; Stylet =20 - 26; o = 30 – 49; v = 60.95 – 67.10

Body is cylindrical and assumes spiral in shape. Cuticles are marked with striations. Lip region is demarcated, tapering anteriorly bearing inconspicuous annules. Lateral field are 4 incisures fused posteriorly, stylet 20-26 and long with well developed rounded basal knobs. Dorsal oesophageal gland is located at 10 -13 from the stylet base. Procorpus is cylindrical in shape, bearing a slight constriction at its base. Median bulb is spheroid in shape. Oesophageal gland overlaps the intestine ventrally. Nerve ring encircles the isthmus about 90- 100 from anterior end of body. Excretory pore is distinct, 2-3 striae posterior to hemigonid.

Vulva transverse depressed slit, located at 60.93 – 67.10 from the head end. Ovaries are paired and opposite to each other. Spermatheca are oval and elongated filled with sperms. Tail is smooth, covoid and bluntly rounded terminus. Phasmid is inconspicuous and situated almost at the level of anus.

Locality of hosts: Collected from around the rhizosphere of *Citrus maxima* from Sagolband Tera, Imphal West, Manipur.

Remark: The present specimen fit well in morphological characters and measurements with those described by Jain, *et.al.* (2000).

3. *Scutellonema commune* ,Van den Berg and Heyns, 1973. **(Fig. 3)**

Male : Not found

Female: L= 0.8 - 1.90; a = 29 – 35; b = 7.8 – 9.2; c = 21 – 56; c'= 2.84 – 3.42;

Stylet = 25 - 26; O = 0.2 – 0.6; v = 0.7 – 0.9; T= 0.028 – 0.048

Body curves toward ventral sides forming a circle. Lip region is semi - spherical slightly and demarcated from general shape of body. Stylet knobs are rounded. Metenchium is shorter than telenchium. Excretory pore is at the level of posterior glandular part of oesophagus, 0.16 – 0.18. Epiptygma are paired. Vulval glands are large and elongated. The Intestine overlaps the rectum. Width of scutellum is 3.1- 5.2 and situated posterior to anus. Lateral field is one-eighth of body diameter, hypodermis is as highly annulated as outer cuticle, however annulations commencing from level of base of lip region and continuing to anal region do not reach end of the body.

Locality of hosts: Collected from around the rhizosphere of *Citrus maxima* from Yumnam Huidrom, Imphal West, Manipur.

Remark: The present specimens agree generally with *S. commune* , Van den Berg and Heyns, 1973, described earlier by various authors excepting some minor variations in the measurements.

4.*Psilcuchus hilarulus* De man,1921 **(Fig. 4)**

Male : Not found.

Female: L= 0.68 - 1.49; a = 30 – 48; b = 6.5 – 9.9; c = 6.1 – 9.8; c'=6.5 – 10.6;

Stylet -11 - 19; v = 43 – 52

Body is long and cylindrical, cuticle finely striated. Lateral fields are marked by four incisures, outer slightly crenate. Deirids vary in position below the nerve rings. Phasmid is prominient on tails, 1-2 anal body width below anus. Lip region are elevated, smooth and continuous. Spear is long and slender. Dorsal oesophageal gland orifice situated behind stylet base. Median bulb is pyriform. Cardia is conoid. Excretory pore varies from near base of isthmus to middle of basal bulb. Spermatheca is oblong 12 X 43. Ovaries are paired.Tail is elongated tapering to the terminus which varies from cylindrical to clavate.

Locality of hosts: Collected from rhizosphere of *Citrus maxima* of Sagang, Wangoo, Bisnupur District, Manipur.

Remark: The present specimen fit well in morphological characters and measurements with those described by De man, 1921.

5. *Tylenchorhynchus* Siddiqi and Basir, 1959 **(Fig. 5)**

Female: L= 1.35-1.86; a =31–53; b = 4.9 – 7.8; c = 10.43 – 14.43; c'= 56 – 69; V = 0.69 – 0.81; T= 0.10 – 0.13

Male: L=1.12 -1.18; a = 46.70–67.79; b =5.07–9.15;c =13.50 – 22.90; c'=4.17–5.92; Spicules= 0.02; T= 0.07 – 0.08

Female: Body is very long and cylindrical in shape. Cuticle is with distinct transverse annulations and lateral field with four incisures. Lip region is continuous with or offset from body and annulated. Oesophageal is 0.15 – 0.27 from posterior to spear knobs. Procorpus is cylindrical, median bulb oval in shape. Isthmus is slender expanding to an elongate cylindrical shape and cardia prominent and clavate. Nerve ring is located at about 0.06 – 0.08 from anterior end. Excretory pore is slightly posterior to the nerve ring. Vulva is equatorial and a depressed transverse slit, spermatheca rounded and ovaries are paired. Tail is cylindrical, narrowing gradually and ending into a bluntly rounded unstriated terminus. Phasmid is in anterior half of tail.

Male: Body is shorter than female. Bursa crenate arises one and half cloacal body width anterior to cloaca, enveloping the tail incompletely. Spicule is cephalated and distally flanged and pointed. Gubernaculums are well developed simple and rod like in structure. Tail tapers sharply ending with an acute terminus.

Locality of hosts: Collected from around the rhizosphere of *Citrus maxima* from Jiribam, Imphal East, Manipur.

Remark: The morphological characters and dimensions of the present specimen are in resemblance with those of the original description and dimension provided by Siddiqi and Basir, 1959.

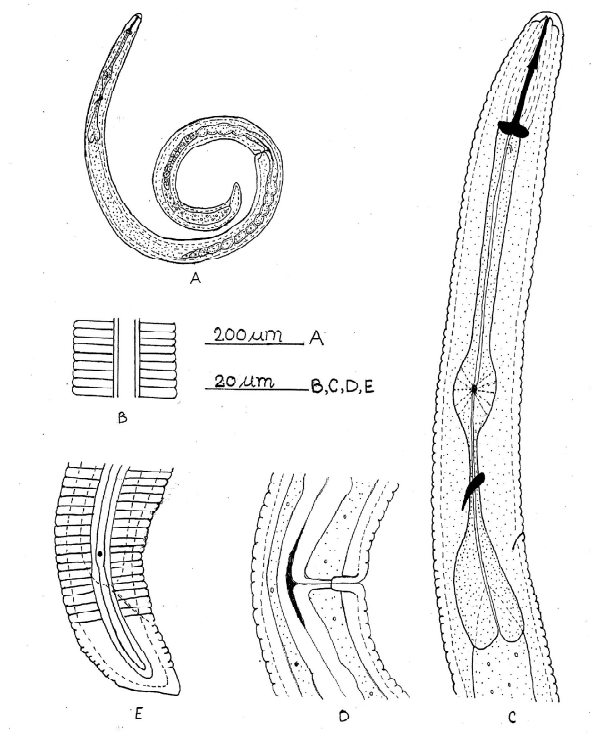

Fig.1 *Helicotylenchus digonicus* Perry, 1959. A. Female entire, B. Female lateral field, C. Anterior end, D. Valval region and E. Posterior end.

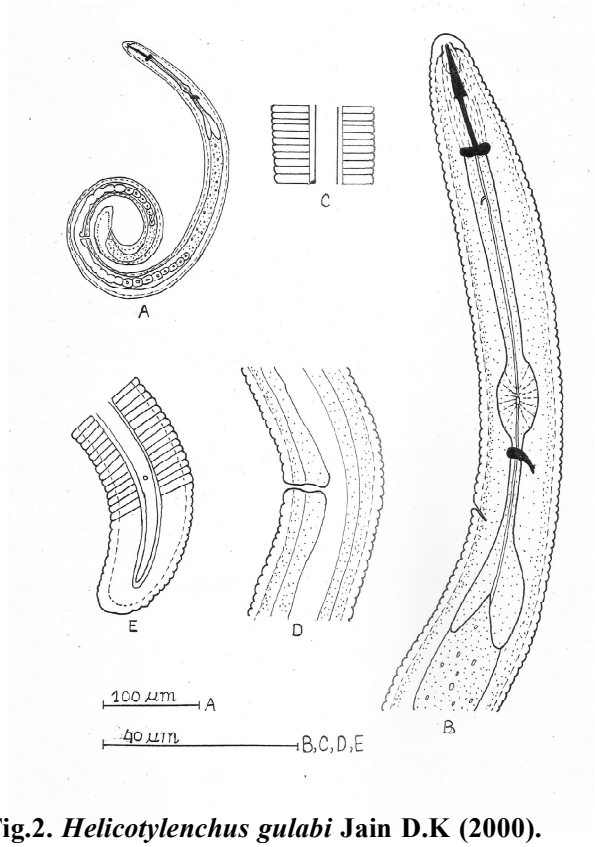

Fig.2. *Helicotylenchus gulabi* Jain D.K (2000). A. Female entire, B. Anterior end, C. Female lateral field, D. Valval region and E. Posterior end.

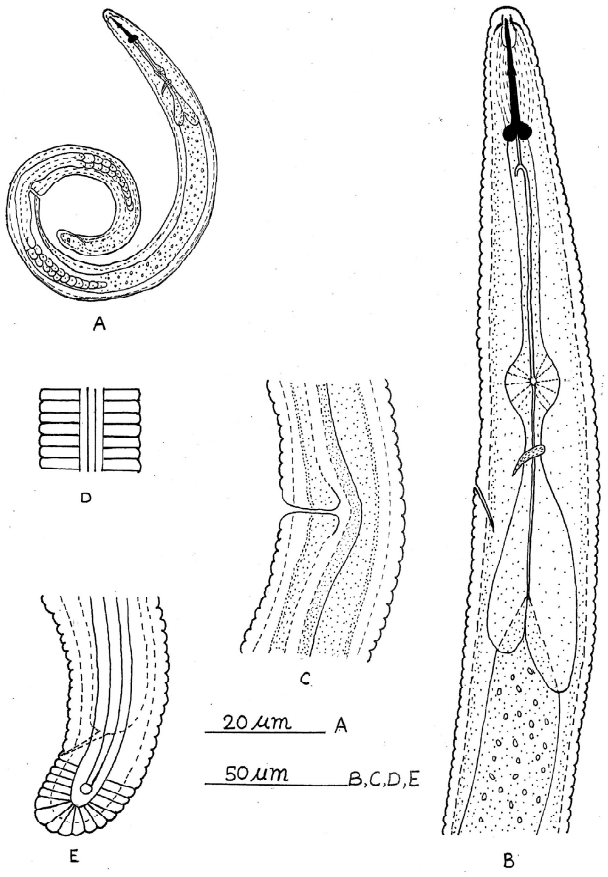

Fig. 3. *Scutellonema commune* ,Van den Berg and Heyns, 1973.
A. Female entire, B. Anterior end, C. Valval region, D. Female lateral field and E. Posterior end.

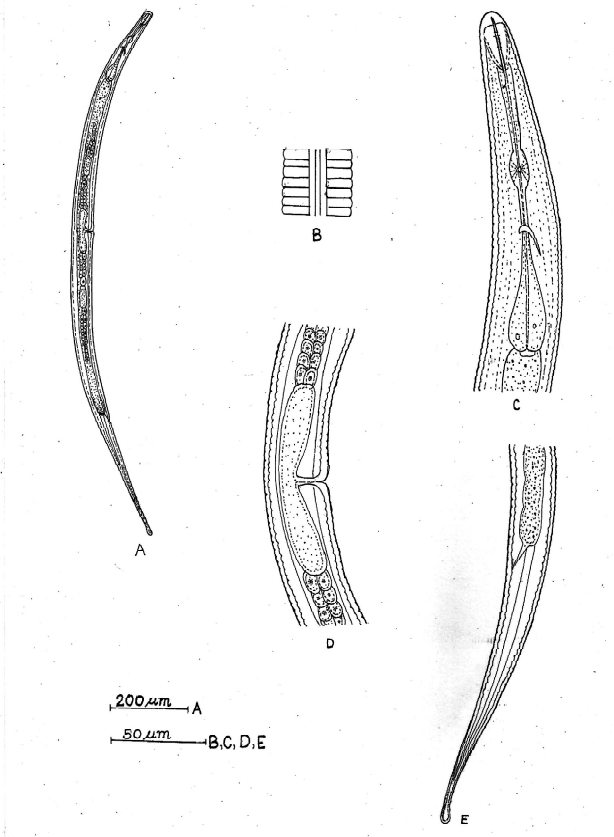

Fig. 4. *Psilcuchus hilarulus* De man, 1921.
A. Female entire, B. Female lateral field, C. Anterior end D. Valval region, and E. Posterior end.

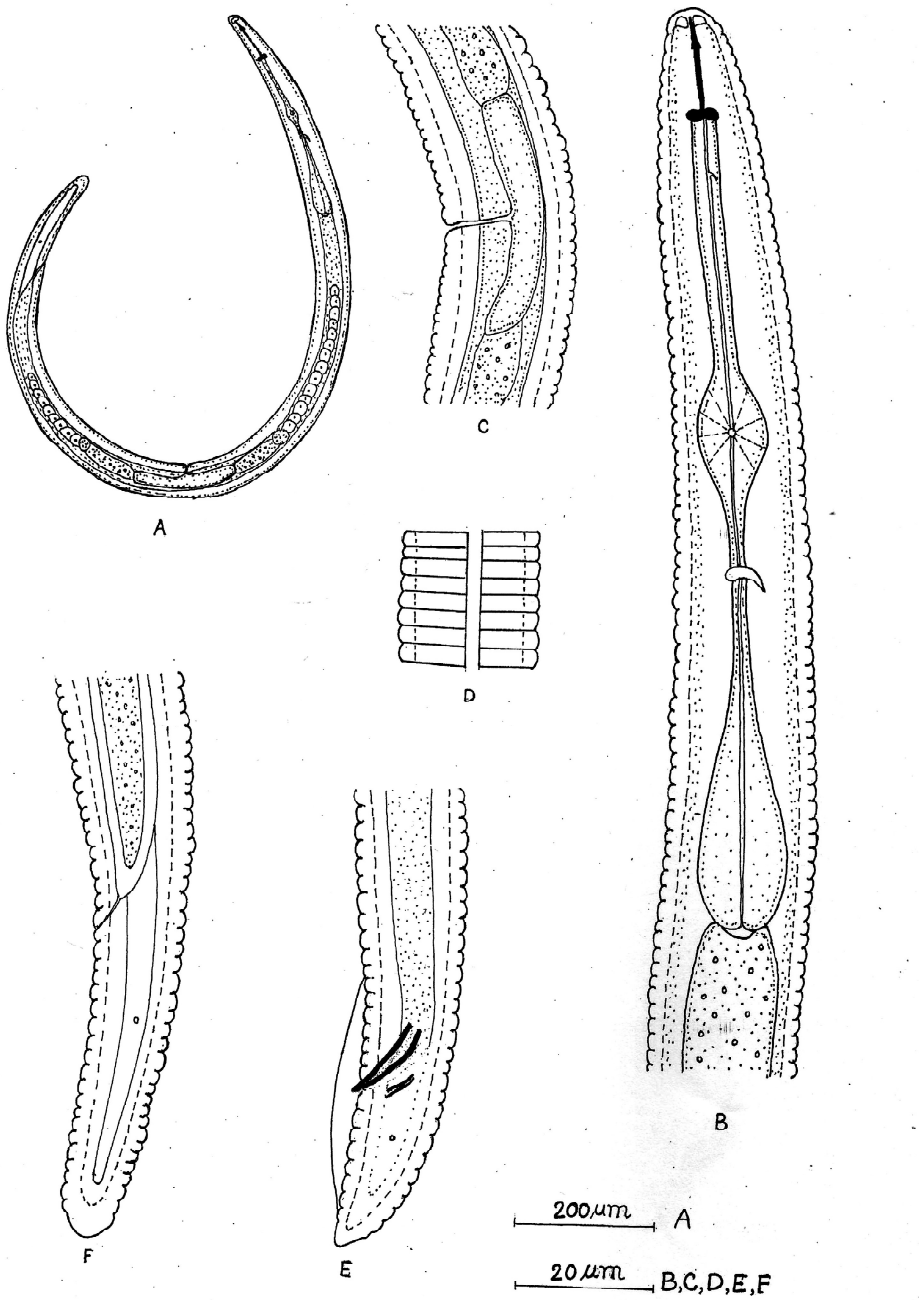

Fig. 5. ***Tylenchorhynchus*** **Siddiqi and Basir,1959**
A. Female entire, B. Anterior end of female, C. Valval region D. Female lateral field, E. Posterior end of male and F. Posterior end of female.

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