CHAPTER XIII

Helicotylenchus jenkinsis n.sp.
**HELICOTYLENCHUS** Steiner, 1945

The genus *Helicotylenchus* was erected by Steiner in 1945 for *H. nannus* as a type species. The genus contains the most common, abundant and widely distributed spiral nematodes. These are either ectoparasitic, semiendoparasitic or endoparasitic (Parry et al. 1959, Ruchle, 1975; Jones, 1978). Many species damage the cortex of host roots causing necrosis. Golden (1956) revised the genus *Helicotylenchus*. Steiner (1945) separated the genus *Helicotylenchus* from *Rotylenchus* on the basis of type of basal esophageal bulb and the position of the phasmid which is anterior in *Helicotylenchus* and posterior in *Rotylenchus* to the level of the anal opening.

Golden separated the two genera on the basis of position of the phasmid and dorsal gland outlet. He concluded that if the phasmids were pre-anal and the dorsal gland outlet more than one third the length of the stylet posterior to the stylet knobs, then the specimens belonged in *Helicotylenchus*.

Andrassy (1958) revised the genera of subfamily. Hoplolaiminae and separated into two groups:
the first with phasmids small pore like - Rotylenchus and the second with phasmids large, scutellum like - Hoplolaimus. In the first group he placed Helicotylenchus with six species. Then Helicotylenchus was separated on the basis of the distance between the spear knobs and dorsal gland outlet being more than one third the length of the stylet. He placed two species R.melancholicus Lordello, 1955 and R.iperoiguensis Carvalho, 1956 in Helicotylechus with this distance less than one third the stylet length. Perry et al. (1959) described four new species of spiral nematodes and synonymized Gottholdsteineria with Helicotylenchus and recognized twelve species of Helicotylenchus.

Rotylenchus can easily be separated from Helicotylenchus on characters of the lip region. The lip regions of Helicotylenchus are continuous with body contour and cupolate. The species of Helicotylenchus can be also separated on the degree to which they from spiral shape and significant difference in musculature.

Sher (1966) considered that the genus Helicotylenchus is quite different from the genera Hoplolaimus, Aerolaimus Scutellonema, Peltamigratus and Rotylenchus because of unique morphological structure of oesophageal glands, which is in this genus often seen as three lobes overlapping the intestine dorsally,
laterally and ventrally with the longest development usually on the ventral side. He pointed out that Rotylenchoides was most closely related to Helicotylenchus on the basis of structure of oesophageal glands and other similarities in general morphology. Overlapping oesophagus is a common character in different species of Helicotylenchus.

Goodey (1951) synonymized Helicotylenchus with Rotylenchus without any comment. But again due to the position of dorsal oesophageal gland orifice he included three species in this genus. In 1966 the genus was revised by Sher. He established the criteria upon which the taxa within this group are recognised. In the genus Helicotylenchus Sher (1966) listed thirtyxis new species and redescribed eighteen known and valip species. Ten new species of Helicotylenchus proposed by Roman (1965) were not included in Sher's revision.

Siddiqi (1972) listed sixynine new species in this genus and described a key of fortynine species, based on female and male characters. Anderson (1978) recommended the formula of Siddiqi for the description of new species. The frequency with which new species have been reported from every continent of the world, indicates the world wide distribution of this genus.
Helicotylenchus sp. are most probably very commonly found as plant parasitic nematodes. In India the first species of Helicotylenchus was described by Das (1960) as H.crenatus. Later on Siddiqi (1972) reported sixty-nine species and Jain et al. (1986) described two new species H.saccharumi and H.sheri from the soil around the roots of sugarcane and bryophyllum respectively from Uttar Pradesh. After this several species of this genus have been added from different parts of India.
Helicotylenchus jenkinsis n.sp.

(Plate 25 Fig.53; Plate 26 Fig.54; Plate 27 Fig.55,56)

**Thirteen Females (Paratype)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>0.639 (0.563-0.74) mm</td>
<td>a = 24.91 (18.81-29.21)</td>
</tr>
<tr>
<td>b₁</td>
<td>11.12 (7.53-19.15)</td>
<td>b = 5.99 (4.23-8.13)</td>
</tr>
<tr>
<td>b'</td>
<td>5.59 (4.59-8.13)</td>
<td>B = 0.82 (0.63-1.08)</td>
</tr>
<tr>
<td>G₁</td>
<td>35.70 (28.70-3.75)</td>
<td>G₂ = 15.81 (3.21-22.51)</td>
</tr>
<tr>
<td>C</td>
<td>1.85 (26.85-56.76)</td>
<td>C' = 1.06 (0.81-1.88)</td>
</tr>
<tr>
<td>V</td>
<td>63.54 (55.60-69.30)</td>
<td>V' = 66.30 (63.50-68.10)</td>
</tr>
<tr>
<td>VL/VB</td>
<td>7.68 (5.83-9.23)</td>
<td>m = 46.10 (35.00-53.60)</td>
</tr>
<tr>
<td>O</td>
<td>19.00 (14.55-25.00)</td>
<td>Spear = 24.00 (20.00-27.00) μm</td>
</tr>
</tbody>
</table>

**Female (Holotype)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>0.654 mm</td>
</tr>
<tr>
<td>b₁</td>
<td>9.88</td>
</tr>
<tr>
<td>b'</td>
<td>6.46</td>
</tr>
<tr>
<td>G₁</td>
<td>44.25</td>
</tr>
<tr>
<td>C</td>
<td>44.40</td>
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<tr>
<td>V</td>
<td>54.20</td>
</tr>
<tr>
<td>VL/VB</td>
<td>9.14</td>
</tr>
<tr>
<td>O</td>
<td>19.20</td>
</tr>
</tbody>
</table>

; a = 28.35
; b = 6.93
; B = 0.65
; G₂ = 17.32
; C' = 1.00
; V' = 66.07
; m = 50.00
; Spear = 26.004 μm.
FEMALE CHARACTERS

(Plate 25 Fig. 53 Plate 26 Fig. 54 Plate 27 Fig. 55, 56)

The body shape of female worms usually forming an open spiral or more or less spindle shape. The cuticle is transversly striated. Lateral fields marks by four incisures, which usually units at the posterior half of tail regions.

Lip region annulated, having four to six annules, which are not prominent enough, hemispharical and continuous. They are 5-10 μm wide and 3-5 μm high. The cephalic frame work is well sclerotized, and appears as conspicuous arch in lateral view. The stylets are strong and long with rounded basal knobs. It measures 20-26 μm in length.

The position of orifice of dorsal oesophageal gland is conspicuous and it is situated 3.45 (2.00-5.00) μm from the spear base. The median oesophageal bulb typically spheroid. The procorpus is cylindrical and measures 33.3 (24.00-53.00) μm in length. The oesophageal gland lobes overlap the intestine from dorsal and ventral side and measures 50(4-60) μm in length.

The excretory pore situated anterior to the oesophageo-intestinal junction. The nerve ring is placed 75.5 (40.00-112.00) μm from the anterior end.
The genital tract is didelphic. The posterior branch is slightly shorter than anterior one. The valva is a transverse slit like. The ovaries are two and outstretched. The oocytes in a single file. Uterus contains one egg and two larvae. The spermatheca is spherical and have sperms in it. The vagina measures 13.15 (9.00-18.00) μm in length.

The tail dorsally convex conoid and measuring about 15.40 (14.00-19.00) μm in length, with 6-12 annules near the tip. The phasmids are distinct and have 5-10 annules anterior to the anal level.

MALE : Not found.

Habitat:

*Helicotylenchus* was first collected from the roots of Doop grass (*Cynodon dactylon* Pers). Later on it was found associated with the roots of number of different species of plants.

Locality : Chirahula Colony, Rewa.
DISCUSSION

About twelve species of genus *Helicotylenchus* e.g. *H.nannus* Steiner, 1945; *H.degonicus* Perry, 1959; *H.platycerus* Perry, 1959; *H.microlobus*, Perry, 1959; *H.pumilus* Perry, 1959; *H.buvelphilus* Golden, 1956; *H.multicinctus*; *H.erythrinae*; *H.melancholius*; *H.quarta*; *H.goodegi*; *H.iperoiguensis* has been reported from various places of world.


It differs from *H.bradyas* in having shorter length of spear. The length of spear of new species is 26.00 μm. Where as *H.bradyas*, it is 29-33 μm. It also have shorter dorsal oesophageal gland out-let behind the knobs. In the case of *H.bradyas* dorsal oesophageal gland out-let measures 9 μm. The closer examination shows that these two species are also somewhat differs in presence of number of sperms.

In the comparison of new species with *H.macronatus*, these species are quite similar in many respects but it differs from *H.macronatus* in the length of body and spear. The length of body in *H.macronatus* is
0.51-0.59 mm. Whereas the new species measures 0.652 mm. in length and the spear 20-22 μm in *H. macronatus* and in this species it is 26.00 μm.

The value of "o" distance from stylet knobs to dorsal gland opening is quite valuable in separating species of *Helicotylenchus*. The value of "b" is also one of the most important factors for identification of the species of this genus. Here in these two factors, both the species differs allot. This new species differ in having higher value of "b" and lower value of "o". In *H. macronatus* the value of "b" is 5.7-6.3; "o" is 40-47 and dorsal oesophageal gland outlet 8-10 μm.

From *H. exallus* it differs in having lower value of "a" and "o" and higher value of "v" and "b". It has shorter oesophageal gland outlet behind spear. In the case of *H. exallus* the value of a = 26-32; b = 4.5-5.4; o = 32-44 and v = 59-63.

It is, therefore, concluded that the species described above is new to science. It is proposed *Helicotylenchus jenkinsis* in the honour of Professor W.R. Jenkins, Department of Entomology, Rutgers, The State University, New Brunswick, New Jersey.
PLATE 25

Explanation of figure

*Helicotylenchus jenkinsis* n.sp.

*Fig. 53* Entire body of female.
PLATE 26

Explanation of figure

*Helicotylenchus jenkinsis* n.sp.

**Fig. 54** Entire body of female showing larval forms in the uterus.
PLATE 27

Explanation of figures

*Helicotylenchus jenkinsis* n.sp.

**Fig. 55** Anterior region of female.

**Fig. 56** Tail region of female.