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Indian Journal of Helminthology, Vol. XXII, No. 1, March, 1970 pp. 46—52

**HELICOTYLENCHUS INDICUS SIDDIQI, 1963 WITH CERTAIN
REMARKS ON THE GENUS *HELICOTYLENCHUS* STEINER,
1945 AND SOME OF ITS SPECIES***

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Three adult and seven juvenile specimens of the genus *Helicotylenchus* Steiner, 1945 were recovered from the rhizosphere of pearl millet collected from the village Bassi. These forms very closely resemble *Helicotylenchus indicus* Siddiqi, 1963. However, some variations have been observed which are being discussed here.

***HELICOTYLENCHUS INDICUS* SIDDIQI, 1963**

(Fig. 1 A—D)

MEASUREMENTS

Juveniles (seven) : L = 0.32-0.39 mm ; a = 17-20 ;
b = 3.9-4.2 ; b' = 3-3.66 ;
c = 28-38 ; c' = 0.8-1.0 ; m=40-45 ;
O = 38-45 ; stylet = 19-21 μ .

Male - unknown.

Females (three) : L = 0.44-0.59 mm ; a = 23-25.3 ;
b = 4.4-5.5 ; b' = 4-4.8 ; c = 40-50 ;
c' = 1-1.8 ; m=45-50 ; O = 43-50 ;
V = 60-65 ; stylet = 20-22 μ .

Body small, stout, assuming spiral shape on thermal death. Tail about 10-13 μ long, bearing 9-12 annules ; more curved dorsally with hemispherical terminus, sometimes with suggestion of slight ventral

*This research has been financed in part by a grant made by the United States Department of Agriculture under P. L. 480.

projection. Tip unstriated in some forms. Cuticle with coarse transverse striations, the striae being interrupted by lateral fields that occupy $1/8$ body width ending short of tail tip, marked by 4 incisures, the outer ones of which being faintly crenate. Inner incisures either sepa-

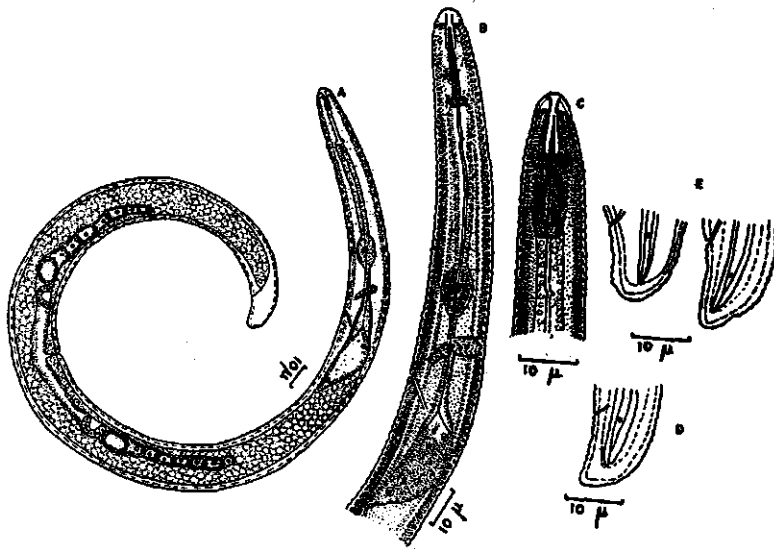


Fig. 1. A. Entire B. Anterior end C. Head region enlarged D-E. Tail ends showing variation in shape, lateral lines and position of phasmid.

rate until end of lateral field or may fuse in posterior-third of the tail. Phasmids pore-like, varying from the level of anus to 2-3 annules anterior or 3-5 annules posterior to the level of anus. Lip region continuous with body contour, conoid-rounded with 4 or 5 indistinct annules. Cephalic frame work well developed. Stylet with rounded to flattened basal knobs. The orifice of dorsal oesophageal gland 10μ behind the base of stylet knobs. Oesophagus comprises a narrow procorpus $35-40 \mu$ long and a median bulb $11-14 \mu \times 7-9 \mu$, being longer than broad occupying $1/2$ body width at that region, with crescentic valves. Lobe-like glandular region of oesophagus overlaps intestine

dorsally, laterally and ventrally, the longest overlap being ventral. Rectum 5-7 μ long, about 1/2 anal-body-diameter. Nerve ring 74-80 μ from anterior end. Excretory pore slightly posterior to nerve ring; about 82-90 μ from anterior end. Hemizonid (discernible in some forms only) just anterior to excretory pore. Ovaries paired, outstretched in the opposite directions. Oocytes arranged in a single file. Uterus muscular, with spermagonium towards its distal end. Vagina at right angle to the body extending 1/4 body-width at that region. Vulva post equatorial.

Habitat : Rhizosphere of *Pennisetum typhoides* (Stapf & Hubbard)

Locality : Bassi (40 miles north-east of Jaipur)

Date of collection : August 20, 1966.

Slide Nos. : NMB 13 & 14/P. L. 480.

DISCUSSION

Although genus *Helicotylenchus* Steiner, 1945 as emended by SHER (1966) is clearly defined, the characters delineating species are vague and subjective and hence too trivial and confusing to identify readily one species from the other. Intraspecific variability is great, the morphological diversity not being very conspicuous. SHER (1966) has rendered valuable service by revising the genus and settling the chaos to a considerable extent. However, he has not assessed the relative merits of the specific characters and there are some discrepancies. The main features used in identification are : shape of lip region, presence or absence of annules on the lip, shape of stylet knobs, size of stylet, shape of tail, number of tail annules and position of phasmids in relation to anus. Majority of the characters, however, are highly variable and hence unreliable. The situation is all the more confusing, especially when one encounters intermediary forms. Generally head is described as either hemispherical or truncate. Many workers (SIDDIQI and BROWN, 1964 ; SIDDIQI and HUSAIN, 1964 ; Prasad *et al.*, 1965 ; GUPTA and GUPTA, 1966 and SWARUP and SETHI 1968) have described the head to be conoid-rounded which falls in between hemispherical and truncate categories.

In the case of *H. cavenessi* Sher, 1966 the lip region is usually hemispherical. SHER (1966) has at the same time stated that lip region sometimes appears to be almost flattened anteriorly. He has synonymised *H. broadbalkiensis* Yuen, 1964 with *H. digonicus* Perry, 1959 with the remark, "Although there appears to be a slight difference in lip region shape (not as truncated), this is not considered sufficient at present to separate it as a distinct species". However, in the diagnosis of *H. egyptiensis* Tarjan, 1964 he states, "*H. egyptiensis* can be distinguished from the closely related *H. pseudorobustus* (Steiner, 1914) Golden, 1956 by the truncate lip region", without giving any other supplementary characters.

Tail shape and shape of stylet knobs are highly variable within the species—rounded to flattened or slightly indented anteriorly as for example, in *H. lobus* Sher, 1966 and *H. exallus* Sher, 1966. Even otherwise, shape of stylet knobs needs to be handled with caution, specially while studying fixed and mounted specimens.

The forms redescribed here, fit too well with the descriptions of *H. indicus* Siddiqi, 1963 in possessing a short stylet (19-22 μ long), in the variable position of phasmids (from the level of anus to 3-5 annules pre- or post-anal) and in the variation in the tail tip i.e., from hemispherical to slight ventral projection bearing 9-12 annules. According to SIDDIQI'S (1963) original description, stylet knobs are rounded or spherical, position of phasmids is at anal latitude and tail dorsally convex-conoid with a blunt terminus; no mention being made as to whether head is truncate, hemispherical or conoid-rounded. SHER (1966) after examining topotypes described lip region to be truncate, stylet knobs with sloping anterior surfaces, phasmids four annules posterior to four annules anterior to level of anus and tail more curved dorsally, terminus hemispherical to slight ventral projection. However, the present authors could observe certain variations in the forms recovered: in the shape of head (conoid-rounded), stylet knobs (rounded or flattened), tail tip (striated or unstriated), lateral lines (separate until end or fused).

The fusion of inner lines of lateral field, or being separate until end of lateral field is not uncommon, since similar condition is met with *H. microcephalus*, Sher, 1966. The variation in the tail shape is exhibited intraspecifically in *H. varicaudatus* Yuen, 1964, *H. tunisiensis* Siddiqi, 1963, *H. clarkei* Sher, 1966 and *H. indicus*. The present forms resemble *H. rotundicauda* Sher, 1966 in having rounded stylet knobs and in having irregularly hemispherical tail with 9 annules and being unstriated ventrally. But the shape of stylet-knobs and tail is not constant in the former. Although the forms described combine characters of many species, it would be logical and a matter of expediency to accommodate them with *H. indicus* rather than erecting a new species simply based on minor differences enumerated above.

PRASAD, KHAN & CHAWLA (1965) described two species, *H. microdorus* and *H. impar* which have not been reviewed by SHER (1966). *H. microdorus* is very similar to and probably a synonym of *H. indicus*. The authors emphasize shapes of stylet knobs and tail, and longer body size as diagnostic characters to separate *H. microdorus* from *H. indicus*. The tail of the former described as 'bluntly rounded terminus with slightly flattened ventrally' comes near to the hemispherical with slight ventral projection of *H. indicus*. The spear length, 'V' and 'c' values fairly come in the range of *H. indicus*. The difference in the stylet knob shape has already been stated as unsound. GUPTA and GUPTA (1966) have redescribed *H. indicus* (from various localities of Uttar Pradesh and also from Punjab). Their illustration of stylet knobs exactly resembles that of *H. microdorus*. Thus the only difference left is in length which is highly variable especially in the coiled and spiralled specimens of *Helicotylenchus*. (*H. microdorus* : 0.65-0.74, *H. indicus* : 0.45-0.63 (after Siddiqi) 0.57-0.67 (after Sher).

GUPTA and CHHABRA (1966) have described a new species, *H. thornei* (also from Punjab). According to these authors, the presence of an 'additional pore' above the phasmid in the tail region, number of annules in the tail and shape of tail are the distinguishing characters of *H. thornei* to separate it from its closest ally, *H. insignis* Khan and Basir, 1964. It is pertinent to note that SHER (1966) has synonymised

H. insignis with *H. indicus*. *H. thornei* also appears to be a synonym of *H. indicus* because of the following reasons : 1) the various measurements of *H. thornei* fairly come within the range of *H. indicus*, 2) the rounded tail bearing 10-11 annules fit in the range given for *H. indicus* and 3) the presence of 'additional pore' above the phasmids is doubtful. Nowhere in the tylenchid taxonomy such a structure has been described by any worker. TARJAN (1964) has described subcuticular refractive dots or punctations in the case of *H. egyptiensis* which SHER considered to be artifacts possibly due to impurities in the fixative or glycerine. He further suggested that similar refractive dots or punctations have been seen in other specimens in the Hoplolaiminae. More information on the existence and significance of 'additional pore' is required before assigning it a diagnostic status. Above all, virtually there is no distinction between GUPTA and GUPTA's (1966) redescribed *H. indicus* and GUPTA and CHHABRA's (1966) *H. thornei* except for the so called 'additional pore'.

Khera's (1968) proposition of *H. impar* Prasad, Khan & Chawla, 1965 to be a probable synonym of *H. retusus* Siddiqi & Brown, is substantiated because in features like the shape and number of annules of both head and tail, location of phasmids, shape of stylet knobs and length of stylet, *H. impar* fairly resembles *H. retusus*. Recently SWARUP and SETHI (1968) have described two species, *H. punicae* and *H. pisi*. The authors discussed the relationship of *H. punicae* with *H. serenus* Siddiqi, 1963. Actually it comes close to Siddiqi original description of *H. retusus* in the following features : 1) over all measurements, 2) the position of dorsal oesophageal gland opening, 3) position of phasmids, shape of head and stylet knobs, 5) stylet length and number of tail annules and 6) outer margins of lateral field being faintly crenate.

Thorough examination of the slides and assessment of disputable and variable characters would be desirable before any conclusion is arrived at regarding the synonymy of *H. microdorus* and *H. thornei* with *H. indicus* as well as *H. impar* and *H. punicae* with *H. retusus*. However, these synonyms are distinct possibilities.

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