On the identity of *Tylencholaimus nagauriensis* Baqri & Bohra, 2001
(Dorylaimida: Tylencholaimidae)

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The genus *Tylencholaimus* de Man, 1876 is a diversified and widely distributed nematode taxon, hitherto including 56 valid species. During the last decade, more than a dozen species have been added to the inventory but, unfortunately, these new taxa were not always well characterised. As a consequence, the taxonomy of the genus has become more intricate and species identification more difficult. Baqri and Bohra (2001) described *T. nagauriensis* from India and characterised it as having, among other features, the perioral area of the lip region differentiated into a disc-like structure. The study of a population recently collected from Pakistan, as well as the re-examination of one paratype, revealed that such differentiation does not exist and further studies have been undertaken to clarify the status of the species in the light of new evidence.

One female paratype of *T. nagauriensis* deposited in the University of Jaén nematode collection, as well as 18 females collected from the rhizosphere of wheat in Pakistan, have been studied. Moreover, several specimens of other similar species were also examined for comparative purposes, viz., one female paratype of *T. notrus* Khan, Jairajpuri & Ahmad, 1990, one female of *T. dora* Kruger, 1965 (syn. of *T. obscurus* Jairajpuri, 1965), and type material of *T. terrestris* Peña-Santiago & Coomans, 1996. All of these specimens were from the University of Jaén nematode collection.

Nematodes were photographed with a Nikon Eclipse 80i microscope and a Nikon DS digital camera. SEM studies were made on specimens dehydrated in a graded ethanol series, critical point dried, coated with gold and observed with a Jeol JSM-5800 microscope.

*Tylencholaimus nagauriensis*, based on the new population from Pakistan, is described as follows: females (n = 18) moderately slender: *L* = 0.76 ± 0.05 (0.60-0.83) mm; *a* = 27.7 ± 2.0 (24.8-30.6). Body cylindrical, tapering gradually from neck base to anterior end. Habitus slightly curved ventrad when relaxed. Outer cuticle layer smooth under LM, but bearing very fine transverse striations under SEM, inner layer with irregular outline along entire body and separated from outer layer; radial refractive elements and fixation folds not especially distinct. Lateral chords 7-8 μm wide or one-fourth to one-third of mid-body diam., with irregular margins. Lateral pores obscure in specimens examined. Lip region cap-like, 9-10.5 μm broad, marked off from adjacent body by deep constriction, ca twice as broad as high and one-third of body diam. at neck base. Lips mostly amalga-mated, their inner portion elevated and weakly differentiated from outer portion, perioral disc absent. Labial papillae button-like, well developed but not protruding. Amphid fovea cup-shaped, opening at level of cephalic constriction; its aperture a transverse slit, measuring 4-5 μm or two-fifths to one-half of lip region diam. Cheilostom a truncate cone, 6 μm long; its walls slender, but with anterior end differentiated into small circumoral thickenings. Odontostyle moderately strong, 6.5-8.5 μm long, ca seven times as long as broad, shorter (0.8 times) than lip region diam.; aperture ca one-fourth of total length. Guiding ring simple. Odontophore 10-12 μm long or 1.3-1.5 odontostyle lengths, with small, poorly developed basal knobs. Neck 176-203 μm long. Anterior part of pharynx slender but muscular, enlarging gradually; pharyngeal expansion cylindrical, 72-100 μm long or ca two-fifths (38-41%) of total neck length, 5.2-5.8 times as long as broad and...
2.8-3.2 times corresponding body diam., \( b = 4.0 \pm 0.27 \) (3.3-4.4). Pharyngeal gland nuclei and their outlets situated as follows: outlet of dorsal gland at 3.5-4.0 \( \mu \text{m} \) from expanded part of pharynx; dorsal nucleus at 8.0-9.5 \( \mu \text{m} \) from expanded part; distance from dorsal outlet to dorsal nucleus = 5.0-5.5 \( \mu \text{m} \); nuclei of anterior pair of ventrosublateral glands at 34-36 \( \mu \text{m} \); nuclei of posterior pair of ventrosublateral glands at 56-60 \( \mu \text{m} \). Nerve ring situated at 68-115 \( \mu \text{m} \) from anterior end. Cardia conoid, 10-12 \( \mu \text{m} \) long, surrounded by intestinal tissue. Genital system mono-prodelphic. Anterior genital branch 112-188 \( \mu \text{m} \) long (\( G_1 = 19.4 \pm 4.5 \) (14.5-25.6)). Ovary reflexed up to half distance from vulva, moderately developed, oocytes initially in two rows, then in single row. Genital tract poorly differentiated, 3.3-3.7 corresponding body diam. long; oviduct joining ovary subterminally; sphincter, if present, very weak; uterus relatively thin, equal in length to oviduct. Posterior genital branch absent. Vagina extending inwards 10-13.5 \( \mu \text{m} \) or \( ca \) one-half of body diam.; \( pars proximalis \) as long as wide (8 \( \times \) 8 \( \mu \text{m} \)), pear-shaped, surrounded by weak musculature; \( pars refringens \) not distinctly differentiated. Vulva a post-equatorial (\( V = 66.5 \pm 2.5 \) (66.0-70.0)) transverse slit. Anal body diam. 17-22 \( \mu \text{m} \). Prerectum (n = 5) 45-70 \( \mu \text{m} \) long or 2.1-3.7 anal body diam. Rectum 14-18 \( \mu \text{m} \) long, barely shorter than anal body diam. Tail convex conoid to rounded, 18-25 \( \mu \text{m} \) long, \( c = 35.3 \pm 2.9 \) (31.0-41.3), \( c' = 1.0 \pm 0.1 \) (0.9-1.3), with very irregular inner cuticle layer outline; two pairs of caudal pores in mid-region of tail, one subdorsal, one lateral. Male unknown.

*Tylencholaimus nagauriensis* is distinguished by its body length of 0.60-0.83 mm, lip region cap-like and 8-10.5 \( \mu \text{m} \) broad, perioral disc absent, odontostyle 6.5-8.5 \( \mu \text{m} \) long, odontophore bearing small thickenings at its base, neck 176-203 \( \mu \text{m} \) long, pharyngeal expansion 72-100 \( \mu \text{m} \) long or \( ca \) two-fifths (38-41%) of total neck length, female genital system mono-prodelphic, no post-vulval uterine sac, vulva a post-equatorial (\( V = 64-70 \)) transverse slit, tail convex conoid to rounded (18-25 \( \mu \text{m} \), \( c = 31-41, c' = 0.9-1.3 \)), and males unknown.

The population from Pakistan is morphologically and morphometrically almost identical to the type population from India, with the exception of its more slender body (\( a = 25-31 \) vs 19-22). However, the paratype examined by the authors is distinctly flattened (\( a = 21.8 \)), indicating that Indian specimens were also more slender before mounting. Baqri and Bohra (2001) characterised *T. nagauriensis* as having, among other features, the perioral area of lips “forming a marked perioral disc”. Neither the re-examination of the paratype nor the SEM pictures obtained from two specimens from Pakistan confirms the existence of such differentiation. Although the SEM pictures are not of good quality they show that the inner perioral region appears elevated and weakly differentiated from the rest of the lip region, never forming a marked, disc-like structure.

In having a relatively large lip region lacking a perioral disc, relatively long odontostyle, anterior pharyngeal region distinctly muscular and enlarging gradually, mono-prodelphic female genital system and lacking a post-vulval uterine sac, *T. nagauriensis* belongs to a group of similar species: *T. americanus* Peña-Santiago & Coomans, 1996, *T. notrus*, *T. obscurus* (= *T. dora*), *T. proximus* Thorne, 1939 and *T. terrestris*. It differs from *T. americanus* by its longer odontostyle (vs 5.5-6 \( \mu \text{m} \)), longer pharyngeal expansion (vs 59-68 \( \mu \text{m} \)), and female tail convex conoid to rounded vs conical and shorter (vs \( c = 20-24, c' = 1.2-1.6 \)); from *T. notrus*, a very similar species also from India, in its shorter neck (vs 205-226 \( \mu \text{m} \), \( n = 10 \)), comparatively shorter pharyngeal expansion (vs 42-47% of total neck length) and more posterior vulva (vs \( V = 60-65 \)); from *T. obscurus*, a very similar species also originally described from India, by the cuticle lacking radial refractive elements vs present and distinct, odontophore bearing small thickenings at its base vs base not differentiated, female genital system very poorly vs more differentiated (cf., Van Reenen & Heyns, 1986), and males absent vs present; from *T. proximus* in its longer odontostyle (vs 5.0-7.0 \( \mu \text{m} \) or \( ca \) two-thirds of lip region diam.), and female tail more rounded vs more conoid and shorter (vs \( c = 22-34 \)); and from *T. terrestris* in its cuticle lacking radial refractive elements vs abundant and distinct along the entire body, shorter odontostyle (vs 6.0-7.0 \( \mu \text{m} \)), and shorter, less conoid, tail (vs 26-30 \( \mu \text{m} \), \( c = 26-29, c' = 1.4-1.7 \)).

*Tylencholaimus nagauriensis*, *T. notrus* and *T. obscurus* form a group of species whose boundaries are very difficult to establish. Peña-Santiago and Coomans (1986) noted that *T. notrus* and *T. obscurus* were very similar. Baqri and Bohra (2001) mentioned that *T. nagauriensis* was close to *T. notrus* and *T. obscurus*, but they distinguished their (new) species “in having perioral disc” (vs no perioral disc); however, as mentioned above, this difference cannot be confirmed, thereby raising the question of its status. The comparison of the three species presented above is based on the study of one paratype of each species and the new material of *T. nagauriensis* from Pakistan. The differences between the three species are

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