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Short Communication

# Description of *Mononchus oryzae* n.sp. with Observation on *Coomansus parvus* (De Man, 1880) Jairajpuri and Khan, 1977, (Mononchida: Mononchidae) from Pakistan

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**Authors' Contribution**
**UI performed survey and sampling. EI processed the samples and identified specimen. NK prepared the manuscript. SD supervised the research work.**

**Key words**
***Mononchus oryzae* n.sp., *Coomansus parvus*, Taxonomy, Morphometrics**

## ABSTRACT

During a survey for predatory soil nematodes of the order Mononchida, a new species of the genus *Mononchus* Bastian, 1865 was collected from rice (*Oryza sativa* L.) field in Nawabshah, Sindh, Pakistan, which has been described and illustrated. *Mononchus oryzae* n.sp., is characterized by its body, 1.508-1.528 mm long, lip region 23-24 µm wide, buccal cavity 34-36 x 16-17 µm with tooth apex located at 20-22% of stoma length and 3.9-4.2 anal body diameter long tail. *M.oryzae* n.sp. comes close to *M. nudus* Gagarin, 1991 and *M. labiatus* Shah and Hussain, 2016. It differs from former in smaller body length, in the values of b and c, vulva located more posteriorly and in shorter tail length. From *M. labiatus* it differs in having higher values of indices, in shorter tail length, in anteriorly located nerve ring and caudal glands arranged in tandem. The genus *Coomansus* Jairajpuri and Khan 1977, and its species *Coomansus parvus* (de Man. 1880) Jairajpuri and Khan, 1977 has been reported for the first time from Pakistan.

Predatory nematodes belong to the order Mononchida Jairajpuri (1969) feed exclusively by predation and hence this group is considered of agricultural importance in controlling other soil-inhabiting microorganisms including little proportion of plant parasitic nematodes. During the research studies random surveys were conducted by collecting soil samples from different localities of Pakistan. The genus *Mononchus* (Bastian, 1865), is predator and can be found in both terrestrial and aquatic environment (Ahmed and Jairajpuri, 2010). From Pakistan two species of *Mononchus* has been reported so far. *Mononchus papillatus* was first reported by Akhtar and Hussain (1968) from soil around the roots of citrus from Lyallpur, Punjab, Pakistan. Later this species was also reported from decaying matter of Peshawar, Khyber Pakhtoon Khwa (Gul and Saifullah, 1991) and from tobacco nurseries of Mansehra, Pakistan (Saeed *et al*., 1986). Mussarat *et al*. (2008) reported *M. aquaticus* (Coetzee, 1968) from rice field of Sindh, Pakistan. Later on, many scientists reported *Mononchus* spp. from various locations of the country (Shahina *et al*., 2019; Maqbool and Shahina, 2001; Zarina and Shahina, 2012). The genus *Coomansus* Jairajpuri and Khan (1977) and its species *C. parvus* (de Man, 1880) Jairajpuri and Khan (1977) has been reported for the first time from Pakistan.

### *Materials and methods*

During the present research study, the samples were collected from soils around the roots of rice (*Oryza sativa* L) from Nawabshah, Sindh Pakistan. The collected soil samples were processed and extracted for nematodes by Cobbs's wet sieving and decanting technique (Cobb, 1918) followed by modified Baermann funnel method (Baermann, 1917). The encountered nematodes recovered were heat killed and fixed in triethanol-amine formaldehyde (TAF) containing 8% formalin and 2% triethanol-amine in distilled water. The later were then processed through the dehydrated pure glycerin by Seinhorst's method (Seinhorst,

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1959) and mounted on permanent glass slides. De Mans's formula was used for denoting the dimensions of the nematodes. The best-preserved specimens were observed, measured, figures were drawn by using camera lucida and for photo micrography Nikon DS L2 camera was used.

***Mononchus oryzae*** *n.sp*
(Fig. 1, Table I)

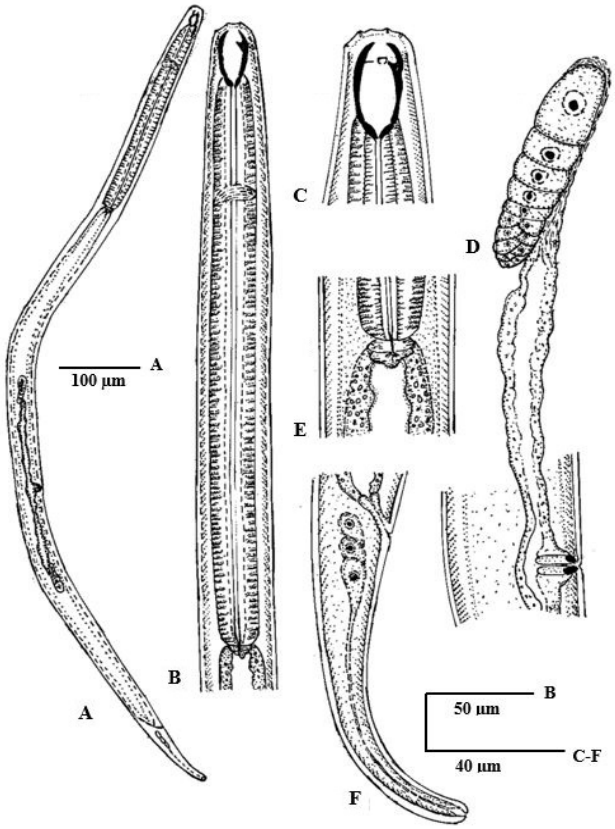


Fig. 1. *Mononchus oryzae* n.sp. Female: A, Whole body; B, Oesophageal region; C, Anterior region; D, Female gonad; E, Oesophago-intestinal junction; F, Tail region.

*Description*

*Female*: Body almost straight when heat relaxed, with the distal part of tail curved, 48-53 µm wide at mid body. Lip region continuous with adjoining body 23-24 µm wide or 2.4-2.8 times as wide as high, papillae distinct. Amphid aperture cup shaped 3 µm across, located at 11-12 µm from anterior end, just above dorsal tooth. Cuticle finely striated 2-3µm wide at mid-body. Lateral chord 40-44% of corresponding body width. Buccal cavity strongly sclerotized with conspicuous arched near tooth. Buccal cavity narrow barrel shaped 2.1-2.2 times as long as wide. Wall about 2-3µm thick. Dorsal tooth medium sized and situated in anterior half of the stoma, its apex 26-29µm or 76-80% from the base of buccal cavity and 7-8µm or 19-20% from anterior end of buccal cavity. Stoma 1/11–1/12 of oesophagus length. A short longitudinal ridge on the anterior third of ventral wall. Transverse subventral ribs fine, slightly posterior to dorsal tooth apex. Body at posterior end of oesophagus twice as wide as head. Oesophagus strongly muscular. Nerve ring distinct located at 24-28% of neck length. Oesophago-intestinal junction non-tuberculate, cardia conoid surrounded by intestinal tissue. Excretory pore not observed. Female reproductive system didelphic-amphidelphic with reflexed ovaries, each 3.4-4.2 times as long as body diameter. Distance between vulva and anus 4.9-5.2 times as long as tail. Vulva transverse, vulval lips strongly sclerotized, Vagina 16-18µm long about one third of body width. Sphincter muscle present between uterus and oviduct, but difficult to observe. Ovaries well developed with numerous oocytes. No eggs or sperms present. Tail elongate cylindrical and curved ventrally 3.9-4.2 anal body width long, ending in a rounded terminus. Caudal glands well developed arranged in tandem and ending in an ampulla through a common duct. Rectum 0.55-0.73 times anal body width.

*Male:* Not found.

*Type habitat and locality*

Specimens were collected from soil around roots of rice (*Oryza sativa* L.) from Nawabshah, Sindh Pakistan.

*Type specimen*

Holotype and paratype females have been deposited in the Nematodes Collection of National Nematological Research Centre, University of Karachi, Karachi, Pakistan.

*Differential diagnosis*

According to the key provided by Ahmad and Jairajpuri (2010) the new species *Mononchus oryzae;* n.sp., comes close to *M. nudus* (Gagarin, 1991) but differs from it in smaller body (1.50-1.52 vs. 1.62-2.1) mm, small b value (3.6-3.9 vs. 3.9-4.6), greater c value (12.3-13 vs. 9-12), the vulva situated more posteriorly (59.4-60.6 vs. 49-57) in shorter tail (117-122 vs. 176 µm mean length), and in percentage of dorsal tooth apex from anterior end of buccal cavity (30-35 vs. 22-24%). The new species also resembles *M. labiatus* (Shah and Hussain, 2016) but differs from it in having higher and lower value for indices, respectively (C=12.3-13.9 vs 7-8; c'=3.9-4.2 vs 6-7), shorter tail length (116-134 vs 193-231) µm, anterior nerve ring (100-110 vs 125-134) µm; dorsal tooth situated at (76.4-80.5 vs 65-73%) of the length of buccal cavity from its base, and caudal glands arranged in tandem vs in group.

**Table I. Morphometric data of *Mononchus oryzae* n.sp and *Coomansus parvus* (De-Man, 1880; Jairajpuri and Khan, 1977). All measurements are in µm except L and in the form Mean ± SD (range).**

| Character | Holotype female | Females (n=10) | | Females (n=15) | |
|---|---|---|---|---|---|
| | | Mean ± SD | Range | Mean ± SD | Range |
| L | 1.526 | 1.52 ± 8.67 | 1.508-1.528 | 1429.3 ± 101.08 | 1.27-1.52 |
| a | 31.7 | 30.28 ± 1.34 | 28.4-31.7 | 23.86 ± 1.25 | 21.3-25.1 |
| b | 3.9 | 3.76 ± 0.127 | 3.6-3.9 | 3.66 ± 0.11 | 3.5-3.8 |
| c | 12.9 | 12.7 ± 0.3 | 12.3-13.0 | 16.8 + - 1.64 | 14.5-18.9 |
| c' | 3.9 | 1.03 ± 0.124 | 3.9-4.2 | 2.42 ± 0.213 | 2.1-2.8 |
| V % | 60.6 | 29.9 ± 0.45 | 59.5-60.6 | 68.4 ± 1.84 | 67.3-71.1 |
| $G_1$ | 12.5 | 14.15 ± 1.14 | 12.5-16.4 | 129.3 ± 14.4 | 110-150 |
| $G_2$ | 11.2 | 13.3 ± 1.4 | 11.2-15.3 | 132.6 ± 13.64 | 112-150 |
| Lip region width | 24 | 23.5 ± 0.5 | 23-24 | 30.5 ± 0.76 | 30-34 |
| Buccal cavity length | 36 | 35.16 ± 0.89 | 34-36 | 31.5 ± 1.38 | 30-34 |
| Buccal cavity width | 16 | 16.33 ± 0.47 | 16-17 | 32.1 ± 2.96 | 26-35 |
| Dorsal tooth apex (%) | 33 | 33.6 ± 1.58 | 30-35 | 63 ± 3.41 | 58-68 |
| Nerve ring from anterior end | 100 | 104.16 ± 4.48 | 100-110 | 109 ± 6.40 | 8.6-9.8 |
| Oesophageal length | 390 | 394.6 ± 7.99 | 387-410 | 385 ± 20.74 | 8.8-9.8 |
| Body diameter at neck base | 47 | 47.5 ± 0.5 | 47-48 | 55 ± 4.3 | 50-62 |
| Body diameter at mid-body | 48 | 49.5 ± 1.7 | 48-53 | 60 ± 6.13 | 52-71 |
| Body diameter at anus | 30 | 29.5 ± 0.44 | 29-30 | 34.6 ± 1.5 | 32-37 |
| Rectum length | 22 | 19.3 ± 2.49 | 16-22 | 28.8 ± 2.19 | 26-32 |
| Tail length | 118 | 118.6 ± 1.79 | 117-122 | 85.16 ± 4.33 | 80-90 |
| Tail length as % of total body length | 7.6 | 7.75 ± 0.138 | 7.6-8.0 | 8.32 ± 0.458 | 8.0-8.5 |

*Coomansus parvus* (De-Man, 1880; Jairajpuri and Khan, 1977)
(Fig. 2, Table I)

*Description*

*Female*: Body small to medium sized 1.2-1.5mm long and 52-71 µm wide at mid-body; habitus curved ventrad upon fixation, especially in posterior body region. Cuticle finely annulated 7.5-8.5 µm thick at mid body and 5-5.5 µm at tail. Lip region 30-31 µm wide, as wide as or somewhat wider than adjoining body. Lips separated and rounded with low papillae, about 2.5-3 times as wide as high. Body at proximal end of pharynx 1.6-2.0 times as wide as lip region. Amphidial aperture 4-5 µm wide located at the anterior end of buccal cavity 10-14 µm from anterior end. Buccal cavity barrel shaped, tapering at base 30-34 µm long and 16-18 µm broad, 1.8 times as long as broad, 1-1.2 times as long as lip region width and occupying 8.0-8.3% of total neck length; entrance of capsule 6-8 µm wide; buccal walls well sclerotized, 1.0-2.0 µm thick, dorsal tooth strong, 5-6 µm from base to apex, forward directed, and with its apex located at 10-12 µm from entrance of capsule or at 22-24% of buccal length (measured from anterior end of buccal cavity) and at 12-13 µm from opposite wall; ventral longitudinal ridge weak, gradually beginning on anterior end of buccal cavity. Pharynx 360-420 µm long, heavily muscular, 38-40 µm wide at proximal end of buccal cavity. Excretory pore inconspicuous in all specimens examined. Cardia discoidal, pharyngo-intestinal junction non-tuberculated. Intestine wide-lumened simple. Rectum 0.81-0.86 anal body width long. Distance between posterior end of pharynx and vulva 2.4-2.8 times as long as pharynx. Female genital system amphidelphic, relatively short uterus anterior branch 2.1-3.5 body width long or occupying 8.8-11.8% of body length, posterior branch 1.6-2.0 body width long or occupying 7.8-8.5%, body length; ovaries short, oocytes few in numbers; uterus consisting of a short distal part joining to proximal chamber of oviduct; vagina 14-16 µm long; and vulva a transverse slit with sclerotized pieces, no sphincter between uterus and oviduct. Distance between vulva and anus equal to 4.0-4.8 tail lengths. Tail elongate-conoid, curved ventrad, 80-90 µm long, occupying 5.9-6.2% of entire length of body. Caudal glands and spinneret absent.

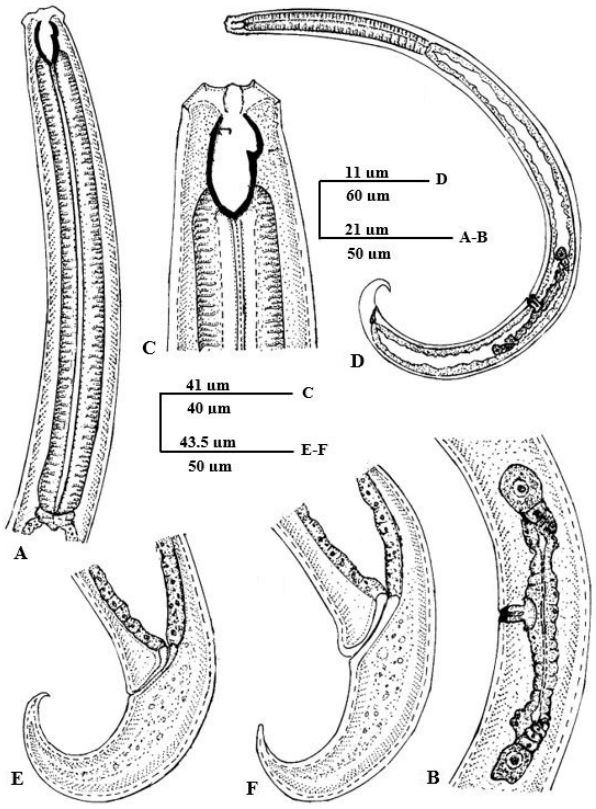


Fig. 2. *Coomansus parvus* (de Man, 1880) Jairajpuri and Khan, 1977. Female: A, Oesophageal region; B, Female reproductive system; C, Anterior region; D, Whole body; E, F, Tail region.

*Male:* Not found.

*Remarks*

The specimen of *Coomansus parvus* were collected from soil around the roots of rice (*Oryza sativa* L.) from Nawabshah, Sind Pakistan. Our population morphometrics and general morphology agree well with the original description but for a rather longer body in female (0.74-1.1mm in *Coomansus parvus*), wider lip region (19-25 µm in *Coomansus parvus*) and longer buccal cavity (21-26x10-16 µm in *Coomansus parvus*). The present description of *Coomansus parvus* adds new data and extends its intraspecific variability.

*Statement of conflict of interest*

The authors have declared no conflict of interest.

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