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MORHOLOGICAL AND TAXONOMICAL DESCRIPTION OF A NEW SPECIES *Procamallanus (Procamallanus) lucknowensis* sp.nov. (Nematoda: Camallanidae) FROM *Heteropneustes fossilis* (Bloch) FROM LUCKNOW, U.P. WITH A KEY TO SUBGENERA OF THE GENUS *Procamallanus* BAYLIS 1923

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ABSTRACT

Our earth is endowed with abundant aquatic resources including fishes which constitute one of the best supplements of food item in India. Despite its importance for human consumption, a majority of fishes carry heavy infection of nematode parasites, which causes deterioration in the food value of fish and may even result in their mortality. Thus it become essential to know the type of parasite causing dreadful damages to the fishes and then the steps of controlling them can be started. Present study is one step toward this direction decoding the presence of new species of *Procamallanus.* The present taxa has been described as a new species on the basis of salient morphological observations which include as presence of 9 pairs of caudal papillae, well developed caudal alae, muscle bands at the posterior region of body and having preequatorial vulva.

KEYWORDS: *Heteropneustes fossilis*, *Procamallanus*, Nematode, Parasite

Body small, slender, delicate. Buccal capsule smooth ,chitinoid, barrel shaped, basal part of it thickened to form a rim articulating with anterior end of oesophagus. Gubernaculum present. Spicules unequal. Cuticle striated. Striations 0.01-0.02 and 0.02-0.03 apart in males and in females respectively.

Male

Body 3.26 - 4.36 long, 0.10 - 0.12 wide. Buccal capsule 0.04 - 0.05 long, 0.03 - 0.04 wide. Oesophagus divided into two parts, anterior muscular oesophagus 0.20 0.23 long and 0.03 0.05 wide, posterior glandular oesophagus 0.39 0.43 long and 0.04 - 0.05 wide. Entire oesophagus 0.59 - 0.66 long. Nerve ring 0. 13 and excretory pore 0.18 from anterior end. Tail ventrally curved, blunt 0.06 0.08 long with well developed caudal alae. Spicules tubular, unequal. Right spicule chitinoid 0.28 - 0.31 long. Left spicule feebly chitinized 0.08 - 0.10 long. Caudal papillae 9 pairs, 6 pairs preanal and 3 pairs postanal. Gubernaculum 0.06 0.07 in length.

Female

Body 6.32 - 7.51 long, 0.17 -0.20 wide with lateral alae not uniformly developed. Buccal capsule 0.07-0.08 long 0.04-0.05 wide Muscular Oesophagus 0.28-0.34 long, 0.06-0.07 wide. Glandular oesophagus 0.54-0.58 long, 0.04-0.05wide. Entire oesophagus 0.82-0.92 long. Nerve ring 0.19 and excretory pore 0.24 from anterior extremity .Vulva markedly elevated on the body, prequatorial, 2.92-3.52 from anterior end. Tail 0.06-0.10 long pointed and bifid at the tip.

Host - *Heteropneustes fossilis* (Bloch)

Location - Small intestine

Locality - Lucknow.

Prevalence - 40 male and 12 female specimens from 10 hosts out of 138 examined.

MATERIALS AND METHODS

Fishes procured for present investigation were collected from fishing sites caught by nets. The fishes examined for the parasitic infection and all the internal organs were examined, from where forty males and twelve females specimens of *Procamallanus* were recovered. They were washed vigorously in normal saline to free the worms from mucus and debris. The living worms were directly placed in hot 70% alcohol for fixation (Baylis, 1936) and were preserved in !0% glycerine alcohol.

The nematodes then transferred from preservative to lactohenol or creosote (beech wood) for microscopic studies. The specimens were manipulated by rolling them in the clearing agent under the cover glass, occasionally small broken cover glass were found useful in this process. For the study of end on view the worms were cut with a sharp microscalpal and rolled in desired position under the cover glass with the broken coverglasses and microneedle. For mounting

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permanently, specimens were transferred from preservative to glycerine jelly. The diagrams were made with the aid of camera lucida and measurements were taken through stage micrometer. All measurements are in millimetres. Specimens were also examined with JEOL JSM – T330 for more micro details.

DISCUSSION

Baylis (1923) erected the genus *Procamallanus* with *P.laeviconchus* (Wedl., 1862) as its type species. Numerous species were added to the genus *Procamallanus* from fresh water and marine fishes by different authors. Olsen (1952) erected another genus *Spirocamallanus* to accomodate the species having spiral ridges in their buccal capsules. Soota(1983) followed Olsen in considering *Spirocamallanus* as a distinct genus and did not agree with Khera (1955), Ali (1957-1960), Chakravarty and Majumdar (1960), Chakravarty *et al.* (1961), Yamaguti (1961), Agrawal (1966), Sood (1967), Bilquees and Khanum (1971), Akram (1975), Ashraf *et al.* (1977) and Rehana and Bilquees (1979) who considered Procamallanus and Spirocamallanus as one and the same genus. Soota (1983) followed Petter (1979) and considered *Onchocamallanus* as a distinct genus due to the presence of transverse buccal thickenings. Sood (1988) in his text book "Fish nematodes from South Asia" did not agree with Soota (1983) and others and accomodated all the species with buccal capsule having oblique ridges. uansverse ridges or without ridges in genus *Procamallanus*. It appears that Sood (1988) has not consulted the paper of Moravec and Sey (1988) who recognized three subgenera within the genus *Procamallanuus* viz. *Procamallanus (Procamallanus)* Baylis, 1923 *Procamallanuus (Spirocamallanus)* Olsen, 1952 (Syn.*Onchocamallanus* Petters, 979) and *Procamallanus (Spirocamallanoides*) Moravec and Sey, 1988, on the basis of the presence or absence of spiral thickenings on the buccal capsule. Buccal capsule of *Procamallanus* is smooth wthout any thickenings, *Spirocamallanus* with spiral thickenings, while in *Spirocamallanoides* buccal capsule is smooth in males and with spiral thickenings in females. Moravec Camallanidae and Scholz (1991) erected another subgenus *Procamallanus (Punctocamallanus)* to accomodate the forms having buccal capsule providcd with fine but distinct sculpture with numerous punctations. Moravec and Thatcher (1996) further added another new subgenus *Procamallanus (Denticamallanus*) to accomodate the forms bearing dentine like structure in buccal capsule.

The author is in agreement with Moravec and Sey (1988), Moravec and Scholz (1991) and Moravec and Thatcher (1996) in considering *Procamallaus (Spirocamallanus*), *Procamallanus (Procamallanus*), *Procamallanus (Punctocamallanus), Procamallanus (Denticamallanusjand Procamallanus (Spirocamallanoides)* as the subgenera of the genus *Procamallanus.* Present species described here belong to subgenera *Procamallanus (Procamallanus*) including forms with smooth buccal and Procamallanus (Spirocamallanus) including forms having buccal capsule provided with oblique spiral ridges.

Key to Subgenera of the Genus *Procamallanus* Baylis, 1923.

Buccal capsule provided with spiral thickenings - 2

Buccal capsule without spiral thickenings - 3

Buccal capsule with ornamentation - 4

Spiral thickenings present in both males and females……. ***Procamallanus (Spirocamallanus*)** Olsen, 1952.

Spiral thickenings present only in females; buccal capsule of male smooth..... ***Procamallanus (Spirocamallanoides***) Moravec et Say, 1988.

Buccal capsule without spiral thickenings…… ***Procamallanus (Procamallanus)*** Baylis, 1923

Internal surface of buccal capsule ornamented with punctations ……***Procamallanus (Punctocamallanus***) Moravec and Scholz, 1991.

Internal surface of buccal capsule ornamented with dentine like structure……. ***Procamallanus*** (***Denticamallanus)*** Moravec and Thatcher 1996.

The new taxa differ from all the known species of the genus except *Procamallanus (Procamallanus) spiculogubernaculus*, Agarwal, 1958 in the presence of gubernaculum imperfectly fused with smaller spicule. The present specimens differ from *P. (P) spiculogubernaculus* in having 9 pairs caudal papillae instead of 7 pairs, in the presence of a well developed caudal alae and muscle bands at the posterior region of the body and in having vulva preequatorial instead of postequatorial. All these differences are sufficient to create a new species with specific name *P. (P.) lucknowensis* sp. nov. Present species is named after its locality (Figure 1).

A comparative chart of two species of the genus Procomallanus Baylis, 1923

	***Procamallanus (P.) spiculogubernaculus* Agarwal, 1950**	***Procamallanus (P.) lucknowensis* sp.nov.**
Body length		
(Male)	3.53mm	3.26-4.36 mm
(Female)	10.46mm	6.32-7.51mm
Body width		
(Male)	0.08mm	0.10-0.12mm
(Female)	0.146mm	0.17-0.20mm
Buccal capsule		
(Male)	0.05x0.02mm	0.04x0.03-0.04mm
(Female)	0.07x0.04mm	0.07-0.08x0.04-0.05mm
Oesophagus length		
(Female)	0.91mm	0.82-0.92mm
ant. mus.	0.35 mm	0.28 - 0.34 mm
Post. gland.	0.56 mm	0.54 -0.58 mm
Oesophagus length		
(Male)	0.60 mm	0.59 - 0.66 mm
Ant. mus.	0.27 mm	0.20 -0.23 mm
Post. gland.	0.33 mm	0.39 - 0.43 mm
Nerve ring		
from ant. end		
(Male)	0.14mm	0.13mm
(Female)	0.17mm	0.19mm
Excretory pore		
(Male)	-	0.18mm
(Female)	-	0.24mm
Mail tail	Blunt and rounded	Blunt, rounded and ventrally curved
Length	-	0.06-0.08mm
Spicule length		
Right	0.41mm	0.28-0.31mm
Left	0.05mm	0.08-0.10mm
Caudal papillae	7 pairs	9 pairs
Preanal	4 pairs	6 pairs
Postanal	3 pairs	3 pairs
Caudal alae	Absent	Present
Muscle bands	Absent	Present
Gubernaculum	0.03mm	0.06-0.07mm
Vulva from ant. end	5.4mm	2.92-3.52mm
	Postequatorial	Preequatorial
Host	*Heteropneustes fossilis* (Bloch)	*Hetropneustes fossilis* (Bloch)

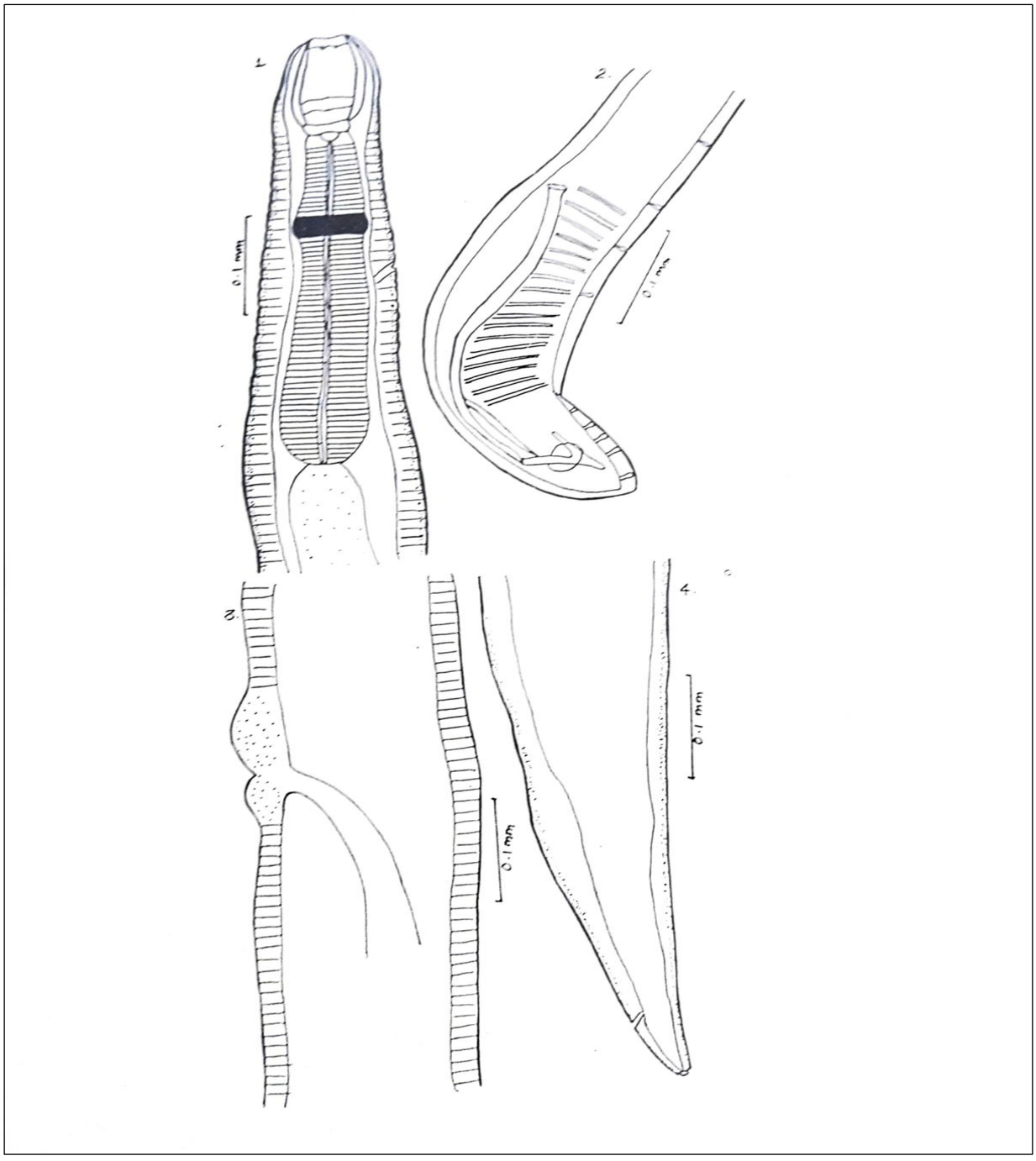

Figure 1: Procamallanus (P.) lucknowensis sp. nov. a) Anterior end of body. Lateral view; b) Posterior end of male. Lateral view; c) Vulvar region. Lateral view; d) Posterior end of female. Lateral view

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