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**BIO-SYSTEMATIC STUDIES ON *PROTEOCEPHALUS GRANULARIS* SP. NOV.
(CESTODA: PROTEOCEPHALIDAE⁸) OF FRESHWATER FISH *MYSTUS SEENGHALA*¹¹**

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ABSTRACT

The present study deals with description of a new species of cestode genus *Proteocephalus*, collected from intestine of freshwater fish, *Mystus seenghala*¹¹ at Kandhar, Dist. Nanded (M.S.) India. *Proteocephalus granularis* sp.nov. comes closer to all the known species of genus *Proteocephalus* in general topography of organ but differs due to broad scolex, suckers five in number, large, neck absent, mature Proglottids slightly broader than long, cirrus pouch pyriform, genital pore marginal, testes 55-60 in numbers, ovary bilobed, ootype oval and vitellaria granular.

Figures : 03

References : 14

Table : 00

KEY WORDS : Bio-Systematic, Cestode, *Mystus seenghala*, *Proteocephalus granularis* sp. nov.

Introduction

Genus *Proteocephalus* with type species *P. filicollis* in *Gasterosteus aculeatus* and *G. pungitius* from Europe was reported. Three species *P. exiguus*, *P. dubius* and *P. neglectus* from white fish, Perches and Trout respectively were added. Worker¹ described *P. thymalli* from Graylings. Two species to this genus *P. fluviatilis* were added from *Micropterus dolonieu* and *P. osburni* from small mouth bass². *P. vitellaris* was reported from *Bagarius yarrelli*¹³. Dogiel and Bykhovskii, described *P. gobiorum* from *Gobies*. *P. parallactius* was added from *Cristivomer namaycush* to this genus⁹. Cestodologist⁵ recorded *P. primaverus* from *Salmo clarkia*. Another researcher⁷ added *P. sandoni* from *H. niloticus*. *P. longicollis* from *Cottus gobio*⁴ and *P.*

raosahebae from *M. armatus*³ were reported.

Materials and Methods

During the survey of Piscean Helminths, 16 out of 214 freshwater fish *Mystus seenghala*¹¹ from Kandhar, Dist. Nanded (M.S.) India were found infected with 28 cestode parasites during February, 2011 to January, 2013. These cestodes were preserved in 4% hot formalin, stained with Harris haematoxylin and Borax carmine, dehydrated through various alcoholic grades, cleared in xylene, mounted in D.P.X. and drawings are made with the aid of Camera Lucida. All measurements were recorded in millimeters unless otherwise stated. Identification was done by standard methods^{6,10,12,14}.

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Results

(Based on Seven Specimens)

Cestodes medium, creamy-whitish, having scolex, neck, immature and mature proglottids. Scolex unarmed, large, triangular, narrow anteriorly and broad posteriorly, measures 0.421 (0.393-0.449) in length and 0.354 (0.225-0.483) in breadth. It bears five muscular suckers, oval to rounded in shape and measures 0.157 (0.146-0.168) in length and 0.140 (0.135-0.146) in breadth. Fifth sucker larger than other suckers and measures 0.163 (0.157-0.168) in length and 0.174 (0.168-0.180) in breadth. Neck absent. Mature proglottids slightly broader than long and measures 3.456 (3.382-3.529) in length and 4.706 (4.588-4.823) in breadth. Testes 55-60 in numbers, oval to rounded, scattered throughout proglottids, pre-ovarian and measures 0.250 (0.235-0.265) in length and 0.206 (0.176-0.235) in breadth. Cirrus pouch mediam, pyriform and measures 0.765 (0.735-0.794) in length and 0.397 (0.382-0.412) in breadth. Cirrus thin coiled tube, within cirrus pouch and measures 0.559 (0.529-0.588) in length and 0.044 (0.029-0.059) in breadth. Vas deferens thin, long, curved tube and measures 0.912 (0.882-0.941) in length and 0.073 (0.059-0.088) in breadth. Vagina and cirrus pouch opens through common genital pore which is small, oval, marginal and measures 0.279 (0.265-0.294) in length and 0.0117 (0.088-0.147) in breadth. Vagina starts from common genital pore, posterior to cirrus pouch, elongated thin tube, runs transversely, forms seminal receptaculum and measures 2.500 (2.470-2.529) in length and 0.059 (0.029-0.088) in breadth. Seminal receptaculum, runs transversely, reaches and opens to ootype, measures 0.765 (0.735-0.794) in length and 0.073 (0.059-0.088) in breadth. Ootype rounded, medium, measures 0.323 in diameter. Ovary large, distinctly bilobed, transversely placed towards posterior margin of proglottids and measures 1.985 (1.912-2.059) in length and 0.456 (0.323-0.588) in breadth. Uterus tubular, elongated, originates from ootype, reaches medially towards anterior side, filled with eggs and measures 2.382 (2.353-2.412) in length and 0.338 (0.235-0.441) in breadth. Egg oval to rounded and measures 0.206 (0.176-0.235) in length and 0.103 (0.088-0.117) in breadth. Excretory canal long, running across the proglottid longitudinally on both sides of proglottid and measures 3.265 (3.235-3.294) in length and 0.044 (0.029-0.089) in width. Vitellaria granular, arranged in two rows.

Discussion

Genus *Proteocephalus* was established with type species *P. filicollis* from *Gastrosteus aculetus*. The present form differs in having broader scolex, suckers five, large, neck absent, mature proglottids slightly broader than long, cirrus pouch pyriform, genital pore marginal, testes 55-60, ovary bilobed, ootype oval and vitellaria granular. Present worm comes closer to reported species of the genus *Proteocephalus* in general topography of organs but differs from *P. filicollis* in having scolex rounded, testes 75-90 in numbers, vitellaria follicular and collected from Sticklebacks. It differs from *P. exiguus*⁸, in having small scolex; mature proglottids longer than broad, testes 35-55 in numbers, uterus with 4-5 lateral branches on each side, vitellaria follicular and collected from White fish. The new species differs from *P. dubius*⁸, in having small scolex, mature proglottids longer than broad, testes 50-60 in numbers, uterus with 7-14 lateral ramifications, vitellaria follicular and collected from *Perches*. The observed species differs from *P. neglectus*⁸, in having testes 75 in numbers and uterus with 7-9 lateral branches, vitellaria follicular and collected from *Trout*. *Proteocephalus granularis* Sp.Nov. differs from *P. thymalli*¹, in having Scolex almost rounded, mature segments longer than broad, testes 50-60 in numbers, vagina anterior to cirrus pouch and uterus with 5-6 branches on each side. It differs from *P. fluviatilis*², in having scolex small, testes 73-98 in numbers, vagina anterior to cirrus pouch, uterus large with lateral out pockets, vitellaria follicular and collected from *Micropterus dolomieu*. Newer worms differs from *P. osburni*², in having testes 50-60 in numbers, vagina anterior to cirrus pouch, ovary large, irregular in outline, uterus small and straight, vitellaria follicular and collected from *Small mouth bass*. The observed specimen differs from *P. vitellaris*¹³, in having scolex large, cylindrical with circular flattened apex, testes 257 in numbers, vagina anterior to cirrus pouch and collected from *Bagarius yeralli*. New form differs from *P. gobiorum* in having testes 25-35 in numbers, vagina anterior to cirrus pouch, uterus with 3-5 lateral branches, vitellaria follicular and collected from *Gobies*. *Proteocephalus granularis* Sp.Nov. differs from *P. parallactius*⁹, in having Scolex triangular or dome shaped, mature segments longer than broad, testes 42-90 in numbers, vagina posterior to cirrus pouch, ovary 'W' shaped and collected from *Cristivomer namaycush*. It differs from *P. primaverus*⁵ in having scolex unarmed, testes



Fig. 1 : Collection Site and Fish Host

57-89 in numbers, cirrus pouch extends across to $1/3^{\text{rd}}$ to $1/2$ of proglottids, uterus with 13-15 lateral pouches. The new form differs from *P.sandoni*⁷ in having scolex without metascolex, testes 45-70 in numbers, cirrus pouch elongated narrow to distal, uterus medulary, rounded. It differs from *P. longicollis*⁴ in having testes 54-67 in numbers, cirrus pouch transversly placed. *Proteocephalus granularis* Sp.Nov. differs from *P.raosahebae*³ in having Scolex large, conical, testes 20-22, cirrus pouch protrusible, uterus long tube like.

From the above discussion it is clear that the species under discussion is new to science and differs from known valid species of *genus Proteocephalus* Weinland, 1858 in respect to major

taxonomic characteristics. Considering all significant differentiating features of newer worms, authors are inclined to raise a new species *Proteocephalus granularis* Sp.Nov. The present species is named on account of having granular vitellaria.

Taxonomic Summary

Type species: *Proteocephalus granularis* Sp.Nov.

Host : *Mystus seenghala*¹¹

Habitat : Intestine

Locality : Kandhar, District Nanded (M.S.), India.

Prevalence : Twenty eight mature tapeworms collected from Sixteen infected host out of Two Hundred Fourteen examined.



Scolex

Mature Proglottids

Fig. 2 : Microphotoplate of *Proteocephalus ganularis* Sp. Nov.

Period of collection: February, 2011 to January, 2013.

No. of Specimen: 28

Accession number: PGDZ/YMN/1-07/ February, 2011 to January, 2013

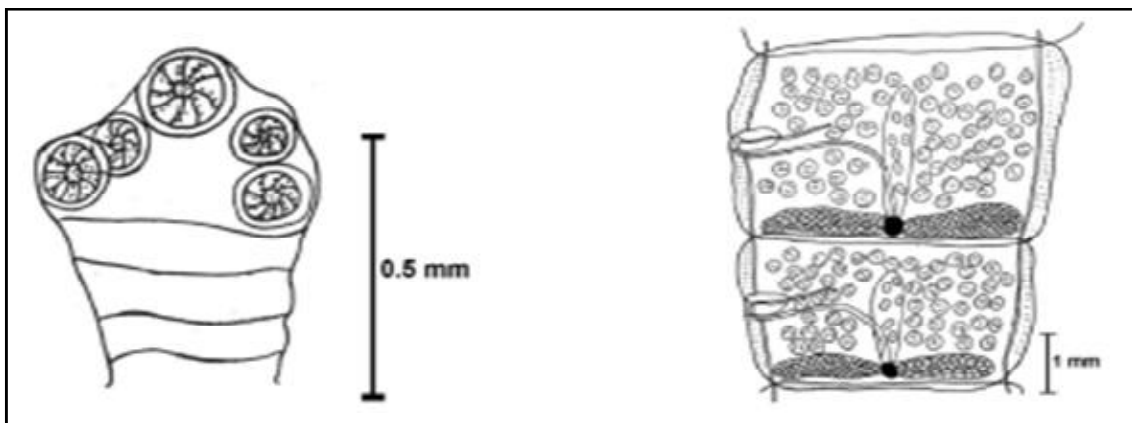
Deposition : Research and PG Department of Zoology, Yeshwant Mahavidyalaya, Nanded.

Etymology : The species is named on account of having granular vitellaria.

A Revised Key to the Species of the genus *Proteocephalus* Weinland

Vitellaria follicular	-	1
Vitellaria granular	-	2

- | | |
|--|---|
| 1) Mature segment longer than broad- | 3 |
| Mature segment broader than long- | 4 |
| 2) Testes below 100 in numbers - | 5 |
| Testes above 100 in numbers - <i>P. vitellaris</i> ¹³ | |
| 3) Vagina anterior to cirrus pouch - | 6 |
| Vagina posterior to cirrus pouch- | 7 |
| 4) Scolex triangular in shape - <i>P. fluviatilis</i> ² | |
| Scolex rounded in shape - <i>P. filicollis</i> , Rud | |
| Scolex conical anteriorly and broad | |
| Posteriorly - <i>P. osburni</i> ² . | |
| 5) Suckers four in numbers - <i>P. longicollis</i> ⁴ | |
| Suckers five in numbers - | 8 |



Scolex

Mature Proglottids

Fig. 3 : Camera Lucida diagramme of *Proteocephalus ganularis* Sp. Nov.

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6) Suckers four in numbers	- <i>P. gobiorum</i>	9) Scolex rounded	- <i>P. thymalli</i> ¹
Suckers five in numbers	-8	Scolex triangular	- <i>P. granularis</i> Sp. Nov
7) Testes below 60 in numbers	- <i>P. exiguns</i> ⁸	Scolex unarmed	- <i>P. primaverus</i> ⁵
Testes above 60 in numbers	- <i>P. neglectus</i> ⁸	Scolex conical	- <i>P. raosahebae</i> ³
8) Scolex rounded in shape	- <i>P. dupius</i> ⁸	Scolex without metascolex	- <i>P. sandoni</i> ⁷
Scolex dome shaped	- <i>P. parallactius</i> ⁹		

References

- ANNENKVA- KHLOPINA, N. P. (1919) Two new species of the genus *Caryophyllaeus* parasitic in cyprinidae. *Bulletin de L'Academie des Science de russic* 97-110
- BANGHAM, R. V. (1925) A study of the cestode parasites of the black bass in Ohio, with special reference to their Life History and Distribution. *Ohio J. Sci.* **25**(6): 255-270.
- DANDWATE, R.R. AND PAWAR R.G. (2013) *Proteocephalus raosahebae* n.sp. from *Mastacembelus armatus* (Lecepede, 1800) from Godavari River at Kopargaon Dist. Ahmednagar, India. *Deccan Current Science India.* **9**(01): 188-192.
- FRANTICS, MORAVEC (2001) Common Sculpin Cottus gobin asa natural paratenic host of *Proteocephalus longicilic* of Salmonids in Europe. *J. Disease of Aquit. Organic Organism* **45**:155-158
- KENNETH, A. NEILAND (1940) A new species of *Proteocephalus* Weinland, 1858, (cestoda), with notes on its life history. *The Journal of Parasitology.* 540-545.
- KHALIL, L.F, JONES, A. AND BRAY, R.A, (1994) *Keys to the cestodes parasites of vertebrates.* CAB International Pub. U.K. pp.1-751.
- LYNSDALE J.A. (1960) On *Proteocephalus sandoni* n.sp. from the Sudan. *Journal of helminthology* **84**: 114 -124.
- LA RUE, G.R. (1911). A revision of the cestode family *Proteocephalidae*. *Zool. Anz.* **38**, 473-482.
- MACLULICH, D.A. (1943) *Proteocephalus parallacticus* a new species of tapeworm from Lake Trout, *Cristivomer namaycush*, Canada. *J. Res. Sect. D. Zool. Sc.* **21**:145-149.
- SCHMIDT, GERALD D. (1934) *Handbook of Tapeworm Identification.* CRC Press, Inc. Boca Raton, Florida. pp 1-675.
- SYKES, W. H. (1839) An account of the fishes of the Dukben. *In Proceedings of learned societies. Zoological Society. Ann. Mag. Nat. Hist. (N.S.)* **4**: 54-62.
- WARDLE, R.A., MCLEOD, J.A. AND RADINOVSKY (1974). *Advances in the Zoology of tapeworm 1950-1970*, University of Minnesotar Press, Minneapolis 1-780.
- VARMA, S. C. (1928) On new Proteocephalid cestode from an Indian freshwater fish. *Allahabad University Stud.* **2** : 353-362.
- YAMAGUTI, S. (1959) *Systema Helminthum. II. The Cestodes of Vertebrates.* Intescience Publishers Inc. N.Y., pp 860.