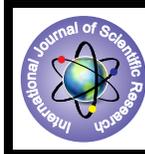


Digenic Trematodes of Lutjanus Species from Visakhapatnam coast, Andhra Pradesh



Zoology

KEYWORDS : Lutjanus, Stephanostomum casum, Plagioporus indicus, Hamacreadium mutabile, Helicometrina nimia, Paracryptogonimus hirastrictus and Neometadina lutiani.

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ABSTRACT

Six different species of Digenic trematodes were obtained during a survey of 2008-2009 from snappers, Lutjanus (Pisces: Lutjanidae) of Visakhapatnam coast, India. They are *Stephanostomum casum* (Linton,1910), McFarlane, 1934; *Plagioporus indicus* Gupta et sehgal,1967; *Hamacreadium mutabile* Linton,1910; *Helicometrina nimia* Linton,1910; *Paracryptogonimus hirastrictus* Manter,1963 and *Neometadina lutiani* Hafeezullah & Siddiqi,1970.

INTRODUCTION:

Lutjanus are commonly known as Snappers and belong to the family Lutjanidae. These are rocky fish and abundantly occur throughout the Indian coast. These fishes are commercially known for their delicacy as food fish and have good quality of proteins and other nutrients. The species available at Visakhapatnam coast are *Lutjanus johni* (Bloch, 1792) and *L.fulviflamma* Forskal. These fishes are usually parasitized by Digeneans of the family, Acanthocolpidae Luhe, 1909; Opecoelidae Ozaki, 1925 and Cryptogonimidae (Ward, 1917) Cirurea, 1933. In the present study six different species of parasites have been collected. They are *Stephanostomum casum* (Linton,1910), McFarlane, 1934; *Plagioporus indicus* Gupta et sehgal,1967; *Hamacreadium mutabile* Linton,1910; *Helicometrina nimia* Linton,1910; *Paracryptogonimus hirastrictus* Manter,1963 and *Neometadina lutiani* Hafeezullah & Siddiqi,1970.

MATERIAL AND METHODS:

100 Fishes of *Lutjanus* sp. were collected from harbour and local fish markets of Visakhapatnam during 2008 to 2009. Fishes of all sizes ranging from 10.5-30 cm were brought to the laboratory for the examination of parasites. Before dissecting the fish

, its length and weight were noted. Fish was cut open with a mid-ventral incision for search of endoparasites. Intestine and stomach were kept in petridishes separately filled with saline and were dissected with a longitudinal incision. Gut contents were dissipated and were decanted many times to remove the mucus and observed under microscope. Digeneans were fixed in FAA solution. Later these parasites were washed thoroughly and stained with Alum carmine. After proper dehydration in graded alcohols the specimens were cleared in carbol xylol and mounted in Canada balsam. All diagrams were drawn with camera lucida for which scale is given. All measurements are given in millimeters unless otherwise mentioned. Parasites were stored in the Museum of Zoology Department, Andhra University, Visakhapatnam (ZDAU).

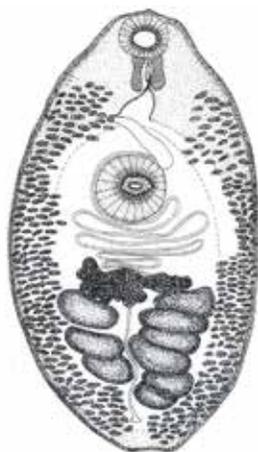
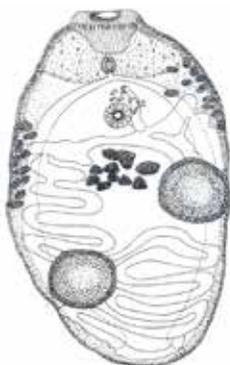
RESULTS:

Six Digenean species namely, *Stephanostomum casum* (Linton,1910), McFarlane, 1934(Family Acanthocolpidae); *Plagioporus indicus* Gupta et sehgal,1967; *Hamacreadium mutabile* Linton,1910; *Helicometrina nimia* Linton,1910(Family Opecoelidae); *Paracryptogonimus hirastrictus* Manter,1963 ;*Neometadina lutiani* Hafeezullah & Siddiqi,1970(Family Cryptogonimidae) were obtained and described.

A COMPARATIVE DESCRIPTION OF DIGENEAN PARASITES OF LUTJANUS SPECIES

S.no	Characters	<i>Stephanostomum casum</i>	<i>Plagioporus indicus</i>	<i>Hamacreadium mutabile</i>	<i>Helicometrina nimia</i>	<i>Paracryptogonimus hirastrictus</i>	<i>Neometadina lutiani</i>
1.	Body	Elongate, 1.89X0.37 at the level of ventral sucker. Cuticle spinose.	Elongate & flat. 0.78X0.36 across the middle region of the body.	Elongate & oval. 0.84-2.57X0.78-1.20	Elongate & white in colour. 1.42-2.49X0.23-1.20. Cuticle smooth.	Wide, flate and round posteriorly. 0.92-0.99X0.44-0.47. Cuticle thick. Anterior part of the body thick forming a cushion like structure filled with cells.	Wide, round in the anterior and posterior extremities. Worms measure 0.10-1.57X0.34-0.89s
2.	Oral sucker	0.11X0.13 long, with 18 perioral spines, alternating in two rows.	Round and 0.07X0.08	Circular and in 0.15-0.30 diameter.	Spherical, 0.06-0.21 in diameter.	Oral sucker terminal. Spines present on the oral sucker in 3-4 rows and oral sucker measures 0.10-0.11X0.12-0.13.	Oral sucker terminal, sub spherical, measuring 0.10-0.23X0.10-0.24.
3.	Ventral sucker	0.23X0.23	Acetabulum large and measures 0.16X0.15, it is in the anterior one third of the body.	Ventral sucker larger than oral sucker, spherical, in the anterior one third of the body and measures 0.26-0.52 in diameter.	Large and measures 0.09-0.25X0.08-0.26.	Acetabulum spherical, smaller in the anterior one third of the body, measuring 0.07X0.08 in diameter.	Acetabulum spherical, 0.14-0.22X0.14-0.24, located near the anterior one third of the body.
4.	Pre pharynx	Long, measuring 0.32X0.30	-	-	absent	-	-
5.	Pharynx	0.17X0.16	Muscular and measures 0.04 in diameters.	0.07-0.12X0.11-0.15, oval, muscular and elongate.	Slightly large and elongate, measuring 0.05-0.11X0.05-0.12	Pharynx distinct	Pharynx long, measuring 0.05-0.15X0.05-0.21.

6.	Oesophagus	Wider	-	short	-	distinct	short
7.	Testes	Two, tandem, oval. Anterior testes 0.15X0.10 and posterior 0.15X0.80 separated by a few vitelline follicles.	Two in number, are transversely elongated, tandem and are in the posterior half of the body. Anterior testes measures 0.10 X 0.20, where as posterior testes is 0.07X0.13	Two, lobed, diagonal, measuring 0.15-0.21X0.21-0.25 in posterior half of the body.	Nine in number, oval to irregular in shape, measuring 0.04-0.15X0.03-0.23. Testes are in two longitudinally parallel rows of three and six.	Round, diagonal, distinctly separated from one another, anterior testes measure 0.18-0.20X0.17-0.20 and posterior testes 0.19-0.20X0.15-0.20. Anterior testes post acetabular in the posterior half of the body where as the second testes is near the posterior one fourth of the body.	Testes round, post acetabular measure 0.11-0.25 in diameter, located slightly diagonally in the posterior half of the body.
8.	Cirrus sac	Thick walled, long and measures 0.40X0.05 and extends from the base of acetabulum encircling it and extending to the anterior region.	Elongated and measures 0.20X0.04	Long and measures 0.20-0.45X0.06-0.13, anterior to acetabulum, containing seminal vesicle.	Elongate in central region of bifurcation and acetabulum, measuring 0.10-0.31X0.02-0.20.	Cirrus sac opens anterior to acetabulum.	Cirrus sac opens anterior to acetabulum. Seminal vesicle coiled and posterior to acetabulum
9.	Genital pore	Pre acetabular	Lies on the right of the median line, just below the intestinal bifurcation	-	Genital opening just lateral to the bifurcation of the caeca.	-	-
10.	Ovary	Globular, measuring 0.12X0.15	Ovary transversely elongated in the middle of the body, in front of the anterior testes and measures 0.06X0.10	Ovary deeply multy lobed, 0.14-0.15X0.23-0.29, pre testicular, obscured partly by uterus. Seminal receptacle conspicuous antero-dorsal to ovary.	Ovary lobed, pre testicular and slightly overlapping the anterior testes. Ovary measures 0.01-0.37X0.01-0.41.	Ovary in the form of large acini, median, parallel to anterior testes. Ovary measures 0.10-0.20X0.13-0.2.	Ovary trilobed, median, pre testicular, lying some distance from acetabulum rosette and in shape.
11.	Uterus	With a few coils, pre ovarian and joins the male duct.	Pre ovarian with few coils and metraterm joins cirrus sac.	Uterus restricted to area between the ovary and pharynx.	Uterus coiled and restricted in between the acetabulum and ovary.	Uterus voluminous, between acetabulum and posterior end.	Uterus extensive occupies entire post testicular space except lateral edges of body and a few follicles overlap the caeca. Seminal receptacle anterior to ovary.
12.	Vitellaria	Extend from the posterior level of ventral sucker to posterior end of body.	Follicular, follicles larger in size and extend from the pharyngeal region to the posterior region of the body. They are marginal upto testicular region but occupy entire posterior region of the body.	Follicular, from the level of caecal bifurcation to the terminal region of the body. Vitellaria measure 0.04-0.05X0.01-0.02.	Follicular, extend from the level of intestinal bifurcation to the posterior end of the body and almost confluent in the post testicular space.	Follicular, limited in limited fields at the anterior level of acetabulum and anterior testes.	Follicular in lateral fields from posterior level of acetabulum to posterior region.
13.	Eggs	Measure 0.03-0.04X0.01-0.03.	Large and measure 0.03X0.02	Measure 0.03-0.05 in diameter.	Measure 0.02-0.04X0.02-0.05.	Measure 0.02X0.01, numerous and thick shelled.	Thick shelled and measure 0.01X0.01.

Fig: 1- *Stephanostomum casum*Fig: 2- *Plagioporus indicus*Fig: 3- *Hamacreadium mutabile*Fig: 4- *Helicometrina nimia*Fig: 5- *Paracryptogonimus hirastrictus*Fig: 6- *Neometadina lutiani*

DISCUSSION:

Digenetic trematodes are important group of parasites in fishes. The following works are worth mentioned- Linton, 1898; Odhner, 1902; Stafford, 1904; Linton, 1907 & 1910; Yamaguti, 1934; Manter, 1940 & 1947; Bravo-Hollis & Manter, 1957; Winter, 1958; Manter & Pitchard, 1960; Velasquez, 1961; Nagaty and Abdul Aal,

1962; Manter, 1963; Lamothe-Argumedo, 1965; Gupta et Sehgal, 1967; Travassos et al, 1967; Durio & Manter, 1968 & 1969; Lamothe-Argumedo, 1970; Hafeezullah, 1971; Nahas & Powell, 1971; Nasir, 1973; Bashirullah, 1974; Madhavi, 1974 & 1975; Bilquees, 1976; Mulay, 1977; Gupta & Ahmad, 1979; Ramadan, 1983; Gu-changdong & Shen Jiwei, 1984; Gupta & Haregovind, 1984; Shen, 1985; Ahmad, 1986; Ramadan, 1987; Gupta & Gupta, 1988; Tak-Seng & See-young, 1989 and Sanjay Chaubey et al., 2006.

Stephanostomum Loss, 1899 comes under family Acanthocolpidae. *S.cesticillus* (Molin, 1958) Loss, 1899 is the type species described from *Lophius piscatorius*. There are a number of species reported under this genus from all over the world. However there is report of *S.casum* (Linton, 1910) McFarlane, 1934 from *Lutjanus*. This was reported from various species of *Lutjanus* from all over the world including India. Manter, 1947; Durio & Manter, 1969; and Madhavi, 1976 reported these parasites. Present parasite is considered as *Stephanostomum casum* (Linton, 1910) McFarlane, 1934.

The genus *Plagioporus* was erected by Stafford, 1904, *P.serotinus* as the type species from *Moxosoma macrolepidotum* from Canada. Later there are a number of species reported under this genus. *P.indicus* was reported by Gupta and Sehgal, 1967 from India from *L.fulviflamma*. The present parasite resembles this species in all characters and so is considered as *Plagioporus indicus* Gupta et Sehgal, 1967.

The genus *Hamacreadium* was erected by Linton, 1910, *H.mutable* as type species from *Lutjanus* species. Later some more species were described from different marine fishes from different parts of the world. Present parasite resemble *H.mutable* described by Linton, 1910. Hafeezullah, 1971 also reported these parasites from various species of *Lutjanus* from India. Present parasites are considered as *Hamacreadium mutabile* Linton, 1910.

The genus *Helicometrina* was erected by Linton, 1910 with *H.nimia* as the type species. There are many species reported under this genus. Many of these erections are based on the number of testes since the parasite shows varying number of testes in different hosts. Hafeezullah, 1971 synonymized a number of species under *H.nimia* justifying that the number and arrangement of testes is a morphological variation. From these synonymisation Bhuta & Khan, 1975 considered *H.orientalis* and *H.septorchis* as distinct species. Later Bray, 1987 synonymized *H.hexorchis*, *H.otolithi*, *H.delicatulus*, *H.chilomyteri* and *H.karachiensis* under *H.nimia*. In the present study all the parasites exhibited more or less same organization except for some variation in testes arrangement. Considering this as morphological variation all these parasites are considered as *H.nimia*. Hafeezullah, 1971 reported *H.nimia* with varying number of testes from different species of *Lutjanus*. However in the present parasites 9 testes is a constant feature. These are considered as *Helicometrina nimia* Linton, 1910.

The genus *Paracryptogonimus* was erected by Yamaguti, 1934 and the type species is *P.acanthostomum* from *Lutjanus vittae* and *Therapon oxyrhynchin*. Later there are many reports of different species, from different species of *Lutjanus* from all over the world. *P.hirastrictus* was reported by Manter, 1963 from *Lutjanid* fishes. Madhavi, 1976 and Hafeezullah & Siddiqi, 1970 reported this species from India from the same host. In the present survey these parasites were obtained from *L.fulviflamma* and are considered as *Paracryptogonimus hirastrictus* Manter, 1963.

The genus and the type species *Neometadina lutiani* was erected by Hafeezullah and Siddiqi, 1970 from *Lutjanus johni* and *L.fulviflamma* from Karwar. In the present study 10 parasites

were obtained from the same hosts and are considered as *Neometadena lutiani* Hafeezullah and Siddiqi, 1970.

ACKNOWLEDGEMENTS:

One of the authors Sowjanya Pilla is grateful to the authorities of Andhra University for providing the facilities during the course of study.

REFERENCE

- Ahmad, J. 1986. Studies on digenetic trematodes of marine fishes from the Arabian sea, of the Panjim Coast, Goa, India. Part 50. on two new haploporid trematodes. (Digenea: Haploporidae) Revista Iberica de Parasitologia., 46(1): 27-33. | Bashirullah,A.K.M. 1974. Seasonal fluctuation of Paracryptogonimus and Metadena (Trematoda) in Parga, Lujanus griseus(Linn) of Cubagua Island, Venezuela. In third International congress of Parasitology. Munich, August 25-31. Proceedings, Vol. 1. Vienna, Austria; Facta Publication., 340-341. | Bilquees,F.M. 1976. Olivacreadium n.gen. (Trematoda: Opecoelidae) based on two new species from the fishes of the Karachi Coast. Norwegian Journal of Zoology., 24(1) 33-36(En). | Bravo-Hollis, M.& Manter, H.W. 1957. Trematodes of marine fishes of Mexican waters. Thirteen Digenea, including nine new sps and two new genera, from the Pacific Coast. Proceedings of the Helminthological Society of Washington., 24(1), 35-48. | Gu Changdong; Shen Jiwei. 1984. Digenetic trematodes of fishes from the xisha llands, Guangdong Province, China.I | Gupta, P.C.; Gupta, V.C. 1988. On three Opecoelid trematodes (Digenea) from marine fishes, Bay of Bengal, India. Proceedings of Parasitology., No.6, 59-68(En, 34 ref). | Gupta, P.C.; Hare Govind., 1984. On three new species of the genus Plagioporus Stafford,1904(Fam: Opecoelidae Ozaki, 1925) from fishes of Orissa. Kanpur University Research Journal(science) (publ.1987) 5,1-6(En, 4 ref). | Gupta, V.; Ahmad,J. 1979. Digenetic trematodes of marine fishes. On five new digenetic trematodes from marine fishes of Bay of Bengal, Puri, Orissa. Helminthologia., 16(3) 161-171. | Hafeezullah,M. 1971. On some new and known digenetic trematodes from marine fishes of India. J. Helminth., 45: 73-78. | Lamothe-Argumedo, R.,1965. Trematodes de Peces(II). Presencia de los trematodes Bianium pttictium(Linton,1928) Stunkard,1931; Lecithochirium microstomum Chandler,1935, en peces del pacifico Mexicano. An. Inst. Biol. Univ Mex., 36(1/2): 147-157. | Linton, E. 1889. Notes on metazoan of marine fishes of New England, eith description of several new species. Rep. U.S. Fish Comm., 14: 453-511. | Linton, E. 1910. Helminth fauna of the dry Tortugas. II Trematodes. Carn. Inst. Wash. Publ., no. 133: 98 pp. | Linton,E. 1907. Notes on parasites of Bermuda fishes. Proc. U. S. Nat. Mus., 33: 85-126. | Madhavi, R. 1974. Digenetic trematodes from marine fishes of Waltair coast, Bay of Bengal. Family: Monorchhiidae. Rivista di Parasitologia., 35(2): 87-98. | Madhavi, R. 1975. Digenetic trematodes from marine fishes of Waltair coast, Bay of Bengal. Family: Opecoelidae. Rivista di Parasitologia., 36(2/3): 153-164. | Manter, H.W. 1940. Digenetic trematodes of fishes from the Galapagos Islands and the neighbouring pacific. Rep. Allan Hancock Pacific exped. (1932-1939) 2: 325-497. | Manter, H.W. 1940. Digenetic trematodes of fishes from the Galapagos Islands and the neighbouring pacific. Rep. Allan Hancock Pacific exped. (1932-1939) 2: 325-497. | Manter, H.W. 1963a. Studies on digenetic trematodes of fishes of Fiji, III. Families: Acanthocolpidae, Fellostomatidae and Cryptogonimidae. J. Parasit., 49: 443-450. | Manter, H.W. 1963b. Studies on digenetic trematodes of fishes of Fiji, IV. Families: Haploporidae, Angiodictyidae, Monorchhiidae and Bucephalidae. Poo. Helminth. Soc. Wash., 30(20): 224-232. | Manter,H.W., And Prichard, M.D. 1960. Some hemiurid trematodes from Hawaiian fishes. Proc. Helm. Soc. Wash. 27(1): 87-102. | Mulay,V.B. 1977. Mehrailla srivastavi n.sp. (Trematoda: Cryptogonimidae Ward, 1917) from the intestine of the fish Lutianus lineolaus (Bloch) in India. Marathwada University of journal of Science (Natural sciences) 16(sci.No.9): 189-190. | Nagaty, H.F. And Abdel Aalo, T.M., 1962. Idem XVI. On three new species of Hamacreadium (Allocreadiidae) J. Arab Vet. Med. Ass., 22(4): 301-305. | Nahhas, F.M.; Powell, E.C. 1971. Digenetic trematodes of marine fishes from the Floridian northern Gulf of Mexico. Tulane studies in Zoology and Botony., 17(1): 1-9. | Nasir,P. 1973. Monotypic study of Prosogonotrema perez Viguera, 1940(Trematoda: Digenea). Rivista di Parasitologia., 34(4): 271-276. | Odhner,T. 1902. Mitteilung Zur Kenntniss der Distomen. Centralbl. Bakt. I., 31:58-68. | Odhner,T. 1902. Trematoden aus Reptilien nebst allgemeinen systematischen Bemerkungen. Ofvers. K. Vetensk-Akad. Forth. Stockholm., 59(1): 19-45. | Ramadan, M.M. 1983. A review of the genus Stephanostomum Loss, 1899(Trematoda: Acanthocolpidae) with description of two new species from Red Sea fishes. Journal of the Faculty of Education, Ain Shams University., No. 6: 385-397. | Ramadan, M.M. 1987. Trematodes of the genus Acsnthocipus Luhe,1906(Acanthocolpidae) with description of Acanthocolpus agyptiacus n.sp. from Red sea fishes. Rivista di Parasitologia., 4(48) (3): 309-313. | Sanjay Chaubey., Singh, H.S., Jaisawal, D. K. 2006. Lutianotrema kanyakumariae sp.nov. (Trematoda:Lepocreadiidae) from a marine water fish Lutianus quinquelineatus from Bay of Bengal, Kanyakumari, India. Journal of Experimental Zoology., 9(2): 417-419. | Shen, J.W.1985. Digenetic trematodes of fishes from the Xisha Islands, II. Studia Marina Sinica., No. 24: 167-180. | Stafford, J. 1904. Zool. Anz., 27, 481. | Tak-Seng, L.; See-Young,W. 1989. Parasites of wild and cultured golden Snapper, Lutjanus johni (Bloch), in Malaysia. Tropical Biomedicine., 6(2): 73-76. | Velasquez, C.C., 1961. "Cryptogonimidae (Digenea:Trematoda) from Philippine food fishes." Journal of Parasitology., 47(6): 914-918. | Winter,H.A. 1958. Trematodes de peces marinos de agues mexicanas. XIII. Cuatro digeneos de peces del Oceano Pacifico, dos de ellos nuevos especies de la familia Cryptogonimidae Ciurea, 1933. An. Inst. Boil. Univ. Nac. Mexico., 28(1-2) : 75-194. | Yamaguti,S. 1934a. Studies on the helminth fauna of Japan. Part2 trematodes of fishes I. Japanese Journal of Zoology., 5: 249-541. |