



## Original Research Article

# Mode of attachment and Pathogenicity of *Lytocestus indicus* in fresh water Murels

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## ABSTRACT

### Keywords

*Lytocestus indicus*;  
*Channa punctatus*;  
*Channa striatus*,

*Lytocestus indicus*, a caryophyllaeid tape worm infects the freshwater murels, *Channa punctatus* and *Channa striatus*. Histopathological changes have been noticed in the stomach of fishes due to infection with *Lytocestus indicus*. Histopathological changes include shortening and destruction of villi, Damage of mucous and submucous membranes. Complete damage of lamina propria, Vacuolation and necrosis of gastric glands. At the site of scolex attachment in the stomach shows mechanical damage.

## Introduction

Many scientists have worked out on the host-parasite relationship. The cestode parasites were attached mostly in the stomach and duodenal mucosa. Heavy infection with this cestode parasites caused inflammation, congestion (Khadap, 2009). *Lytocestus indicus* is a caryophyllaeid cestode of fresh water fishes. During the present study on the helminth parasites of the fresh water fishes of Warangal, *C.punctatus* and *C.striatus* both are found to be frequently and mainly parasitized by the caryophyllaeids, *Lytocestus indicus* in the stomach. However, in earlier reports this parasite was found to be infected in the intestine (Chakravarthy & Tandon, 1989). The occurrence of cestodes, caryophyllaeid in particular was reported in the piscine hosts by Amlacher

(1961), Musselius and Strelkov (1963). Akhmetova (1966). Mackiewicz et al (1972), Bauer et al (1973). Hayunga (1979), Kadav and Agarwal (1982, 1983). An attempt has been made on the mode of attachment and also assess the pathogenicity of parasite, *Lytocestus indicus* in fresh water fishes *C.punctatus* and *C.striatus*.

## Materials and Methods

Pieces of the infected and uninfected stomach of fresh water murels, *C.punctatus* and *C.striatus* were fixed in Bouin's, Susa, Carnoy and Zenker's fluid for the histopathological and histochemical studies (Pearse, 1968;

Bancroft, 1975). They were dehydrated by graded alcohol, cleared and embedded in paraffin wax. A battery of histochemical tests were applied on the microtome cut sections of stomach gives exact localization of the parasite, the damage caused at a particular site of the tissue and the change in the chemical nature of the tissue of the organ affected.

## **Results and Discussion**

The body of cestode, *Lytocestus indicus* is elongated, tapering anteriorly and rounded posteriorly. The scolex is not well differentiated and the body is not divided into segments. The presence of *Lytocestus indicus* in the stomach wall of *C.punctatus* and *C.striatus* disrupted the basic structural organization of the stomach in the host. This species penetrates deep into the muscularis layer. At the site of scolex attachment to the stomach wall, mechanical displacement and compression of tissue layers, such as mucosa, submucosa and muscularis were noticed. Due to excess pressure exerted by the scolex, at some places the submucosa became hyperplastic. At some places a thin mucoïd interfere between the host tissue and the scolex was also observed. These histopathological changes within the hosts tissue, stomach shows a definite habitat preference. However, the effects on the host depends upon the mode of attachment. This deep penetration of parasite caused serious damage to the host's stomach (Fig. 1, 2, 3 & 4)

The observations made in the present study are in conformity with those of Mackiewicz et al(1972) and Bauer et.al(1973), particularly mode of attachment. Borvelnska & Caira(1993) explain the mode of all attachment and pathogenecity of

tapeworm infecting the spiral intestine of the nurse shark.. Shinde et al.(1984) studies interrelationship between cestode parasites with their host *Caracharias acutus*. Similar observations were made by Satpute and Agarwal(1974), Ahmed and sanaullah (1979), Bose and Sinha (1981) and Niyogi and Agarwal(1985). The pronounced tissue reaction expressed as hyperplasticity of the submucosal layer may probably be attributed to the secretion of gland cells of the parasite. The highly developed musculature in the parasite may be also responsible for exertion of pressure in the tissue layers of host leading to their compression. However the mechanical obstruction is caused due to occurrence of parasites (Chakravarthy and Tandon,1989). In the present study it is observed that the stomach is highly effected due to *lytocestus* infestations which resulted to a major disruption of the structural organization of the organ which might have profound influence on the nutrition and digestion process of the fish.

The parasite brought about severe histopathological changes in the stomach of infected fish that includes shortening of villi, thickening of the muscle layer, destruction of the villi, hold fast penetration of the mucosa and the damage of both mucous and submucous membranes. Flattening of the surface epithelium, complete damage of lamina propria and oedema of submucous columnar cells present in it are completely degenerated necrosis and the raising of secondary folds of the muscularis layer is also evidenced.

The muscularis layer which is distinctly marked as longitudinal and circular muscle layer in the infected fish has shown vacuolation and clumping of tissue at many places and the necrosis of their

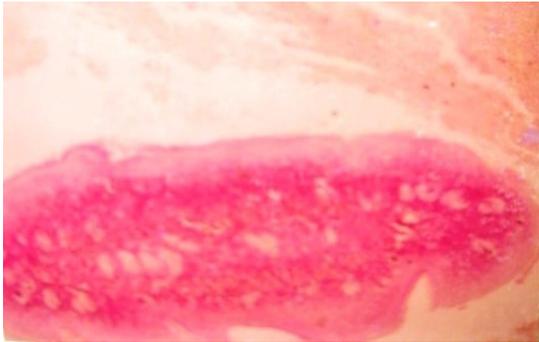


Fig.1. T.S of infected intestine of Channa striatus punctatus with enlarged parasite

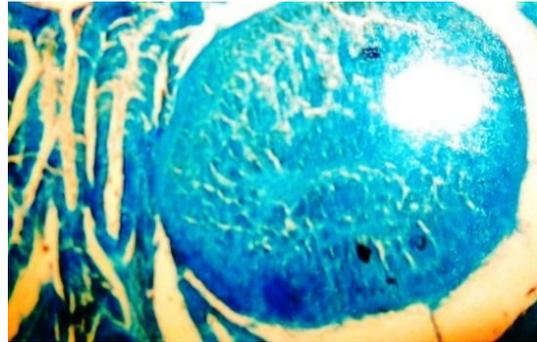


Fig.2. T.S of infected intestine of Channa striatus punctatus with attachment of parasite

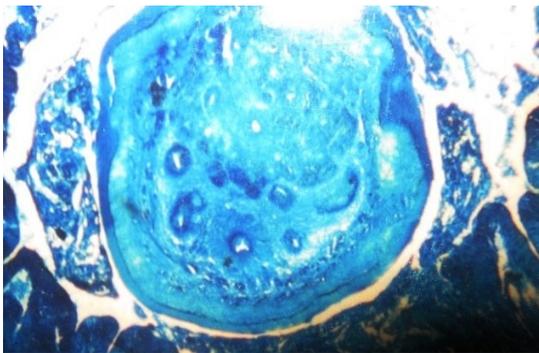


Fig.3. T.S of infected intestine of Channa striatus punctatus with degenerated villi



Fig.4. T.S of infected intestine of Channa striatus punctatus with enlarged parasite

gastric glands is clearly seen. The pathological lesions, the presence of cysts in different regions of the stomach results in the damage of tissue of the stomach was clearly evidenced in the present study. The blood vessels have undergone marked dialation and the submucosa slugging into the mucosa layer. These histopathological changes with in the hosts tissue, stomach shows a definite habitat preference. However, the effects on the host depends upon the mode of attachment. This deep penetration of parasite caused serious damage to the host's stomach(Fig-1&2)Nanware et al.(2005)also studied histopathology cestodes of Capra -hircus and a marine fish. Hayunga

(1977)explained relation ship of pathology and site secretion in host intestine of caryophyllaeid tape worm.

Parasites of marine fishes when cause histopathological conditions in a tissue the main changes occurs in the infected tissue are increase or decrease in a particular regions of the tissue (Khadap,2009). The pathological conditions due to Lytocestus indicus infections cause changes in the physiological functioning of the effected organs.

Rees(1967)observed inflammation fibrosis associated with hyperplasia and metaplasia in cestode infection.The epithelial necrosis was clearly noticed. The shallow ulcers are

formed due to *Lytocestus indicus* after prolong and chronic infections (Ahmammad and Muhammad,1979). Heavy infection with cestode parasites cause inflammation, congestion and haemorrhagia. The stomach infections also interfere with the food digestion causing metabolic disorders.

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### References

- Ahmad,A.T. and Muhammad,S.1979.Fish pathol.,1-14.
- Ahmad,A.T. and Sanaullah,M.1979.Pathological observations of the intestinal lesions induced by Caryophyllid cestodes in *Clarias batrachus* Linnaeus *Siluriformes:Claridae*.Fish path.,141:1-7.
- Akhmetova,B.1966.Epizotiology of karioza of carp on the Alma-Ata fish farms, scientific production conference on the control of diseases of fish in Kazakhstan and Republics of Central Asia.ALMA-Ata March 15-19.
- Amlacher,E.1961.Die Wirkung des Malachitgrüns auf Fische,Fisch Parasiten *Ichthyophthirius*,*Trichodina*.*Kleinkrebs* und wasser pflanzenThe action of malachite green on fish,fish parasites *Ichthyophthirius*,*Trichodina*,small crustaceans and water plants.*Dt.Fischerei-Ztg*,8:12-15.
- Bauer,O.M.,Musselius,V.A. and Strelkov,Yu A.1973.Diseases pond fishes.Jerusalem Isred ss Programme for Scientific translations.
- Bancroft. J.D.1975. Histochemical techniques Butterworths, London and Boston.
- Benarjee.G. and Laxma Reddy.B.2006. Histopathological and Histophysiological changes in the duodenum due to infestation with *Djombangia indica*. *J.of Curr.Sci*.92:647-654.
- Borvenska and Cairra.1993 Mode of attachment and pathogenicity of tapeworm infecting the spiral intestine of the nurse shark,Marathwada Uni.*J.Sci*.25:162-165.
- Bose,K.C. and Sinha, A.K.1983. Histopathology of *Clarias* attributable to the intestinal cestode *Lytocetus indicus*. *Proc. Natl.Acad.Sci.India.Sec.B.Biol.Sci*.53: 226-230.
- Chakravarthy ,R.and Veena.1989. Caryophylliasis in the cat fish,*Clarias batrachus* L.,: some histopathological observations. *Proc.Indian Acad.Sci.Anima Sci*. 98:127-132.
- Chakravarthy .R. and Tandon, V.1989. Histochemical studies on *Lytocestus indicus* and *Djombangia penetrans*, Caryophyllidean cestode parasites *Clarias batrachus* L.*Helminthologia* British.26 :259-274.
- dap,R.A.,2009.Histopathology of the cestode parasites,*Gensus Cotugia Diamare*,1893from *Galus domesticus*.*U.P.J.Zoo*.293:423-426.
- Hayunga,E.G.1977.Scolices of three caryophyllid tape worm relationship of pathology and site of secretion in host intestine. *Diss,Abs.Int*.pp.38-39.
- Hayunga,E.G.1979.Observations on the intestinal pathology caused by 3 caryophyllaeid tape worms of the White sucker *Catostomus commersoni* Lacepede.*J.Fish.Dis*.2:239-248.
- Kadav,M. and Agarwal,S.M.1982.Amino acid piture qualitative and quantitative

- of host serum of uninfected and infected clarias batrachus parasitized with Caryophyllaeids. *Indian J. Helminthology*, 33:78-96.
- Kadav, M. and Agarwal, S.M. 1983. Parasitic effects on haematology of Clarias batrachus infected with Caryophyllaeid. *Indian J. Helminthol.* 33:137-143.
- Kh. adap, R.A., 2009. Histopathology of the cestode parasites, *Gensus Cotugia Diamare*, 1893 from *Galus domesticus*. *U.P.J. Zoo.* 293:423-426.
- Kanth, L.k. and Srivastava, L.P. 1984. Host-parasite relations in monozoic tape worm, *Lytocestoides fossilis* infection of fresh water fish, *Heteropneustes fossilis* Bloch. *Current science*. 53: 11-22.
- Lyngdoh R.D. 1995. Some caryophyllidean cestodes parasitizing edible cat fishes: a morphological, histological and histochemical approach to the host parasite relationship. North Eastern Hill Uni, Shillang.
- Lyngdoh, R.D. and Tandon, V. 1996. Surface topographical and ultrastructural studies on a caryophyllaeid cestode, *Lytocestus indicus* Lytocestidae. *J. Parasitol. App; Animal Biol.* 5:67-74.
- Laxma Reddy .B. and Benarjee .G. 2006. Histopathological changes in the stomach of *Clarias batrachus* due to *Lytocestus indicus*. *J. Agric. Biol. Res.* 231:251-257.
- Mackiewicz, J.S., Cosgroove, G.E. and Gude, W.D. 1972. Relation ship of pathology of Scolex morphology among caryophyllaeid cestode. *Z. Parasitenkd.* 39:233-246.
- Musselius, V.A. and Strelkov, J.A. 1963. Diseases and control measures for fishes of Far East complex in farms of the USSR, *Bull. Off. int. Epizooties*, 699, 10; 1603-1611.
- Nanware, S.S., Jadhav, B.V. & Kalyakar, S.N. 2005. Histopathological changes in intestine of marine fish, *Carcharias acutus* parasitized by *Phorelo bothrium* sp. *Natl J. Life Sciences*. 21 and 2: 127-128.
- Pearse, A. G.E. 1968. Histochemistry. Theoretical and applied 2<sup>nd</sup> Edition, Little Brown and Company., Boston, MSS. Rees, G. 1967. *Helminthos Abstr.* 36, 1.
- Satpute L.R. and Agarwal, S.M. 1974 a. Seasonal infection of *Clarias batrachus* Lby *Lytocestus indicus* Moghe, 1931 and parasitic effects on its haematology and histopathology. *Ind. J. Exp. Biol.* 12:584-586.
- Satpute, L.R. and Agarwal, S.M. 1974 b. Diverticulosis of the fish duodenum infected with cestodes. *Ind. J. Exp. Biol.* 12; 584-586.
- Shinde, G.B., Jadhav, B.V. and Mohekar, A.D. 1984. *Phoreiobothrium arebiansin* sp. cestoda: Onchorhynchidae from *Carcharias acutus*, Indian *J. Parasitol.* 82:317-318.