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PATHOGENIC *CRYPTOBIA CATARACTAE* (REDESCRIBED) OF FRESH WATER FISHES FROM MASOOLI RESERVOIR, PARBHANI (M.S.)

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INTRODUCTION

Genus *Cryptobia* belongs to the family Cryptobiidae. The genus *Cryptobia* includes 52 species that infect the body surface, gills, bloodstream or the digestive tract of many species of marine and freshwater fishes. Of these, 47 species are endoparasites that live either in blood or the digestive tract. And 5 species are ectoparasites that attached to the fish skin and specially gill. Accorrding to Woo and Poynton, 1995 out of 52 species of *Cryptobia*, forty species of these parasites are haemoflegellate which are found in the bloodstream. Some of these parasites are known to cause disease and are responsible for killing commercially important fish species such as *Cryptobia salmositica* which causes disease and mortality in all *Onchorhynchus* spp. in North

Chalachnikow (1888) was the first to record this parasite in the blood of fishes. Woo and Wehnert (1983) and Bower and Margolis (1983) reported that *Trypanoplasma* and *Cryptobia* of many species of fish can be acquired directly via water. Bower aud Margolis (1984) and Woo (1987) also considered *Trypanoplasma* a synonym of *cryptobia.*

Among ectoparasitic *cryptobia*, the most widely spread species is *cryptobia branchialis.*It has been recorded in Europe, Asia, North America and the Philipines as a parasite of cultured fresh water fish (Chen-1956; Bauer et.al 1969; Lom 1980; Nativided et.al 1986; Alveraz-pellitero et.al 1993.Woo and Poynton, 1995; Plumb1997). The effect of this parasite on aquaculture is very harmful and *Cryptobia branchialis* had been implicated in mortality of carp, *goldfish* and catfish in many parts of the world (Chen 1956; Bauer et.al 1969; Naumova 1969; Hoffman 1978).

Woo 1987, 1991, 1994*Cryptobia* species are reported on the gills, body surface, digestive tract, and blood of freshwater and marine fishes. Although a few species are pathogenic to fish, many are not known to cause disease. Infected fish develop anaemia, anorexia, exophthalmia, abdominal distension with ascites, general edema, and splenomegaly (Woo 1979, Li and Woo 1991).The clinical signs of the disease include lethargy, anaemia, abdominal distension with ascites, and splenomegaly (Burreson 1982a, b).

The *Cryptobia* species found in the gills shows a direct life cycle. In heavy infections, the parasites produce gill hyperplasia and epithelial destruction, with subsequent respiratory impairment. External signs are anorexia and skin darkness. The infection can produce trickling but persistent mortalities, so loses can reach 10% after several weeks. Diagnosis is based on microscopic fresh and histological examination.

MATERIALS AND METHOD

For Flagellates Protozoan parasites Blood smear were prepare a thin film of blood by placing small drop of blood near one end of clean microscopic slide and carrying that drop across.The moving slide should be held at about 40^0 angles. The blood smear is left to dry and this air dried blood smear slides were placed in absolute methyl alcohol for about 10 minutes removed and dried the slide and stained with the Geimsa stain for 20 to 60 minutes.(Used a dilute solution of Geimsa stain 1 drop of stain to 1 ml of distilled water). Washed the slide in distilled water to remove excess stain, and then allow the smear to dry and mount in Canada balsam.

Description (Based on Photo and Line-diagram)

For study of *Cryptobia* protozoan parasite isolated from live or freshly killed catfish *clarius batrachus* were collected from Masooli reservoir of Parbhani Didtrict (M.S) India from January 2010-2012. The total 38 fishes examined for isolation of present parasite. Out of which 06 fishes found infected with *Cryptobia* parasite.

As per references available on internet, author thinks that present*Cryptobia* protozoan parasitemight be reported for the first time in Marathwada region M.S India. So far there is very little work done on *Cryptobia* in India.

The study is based on entirely on light microscopic observation. These unfortunately donot reveled details of some important structure that can be seen in electron microscope. Neverthless techniques for staining and impregnation bring out through details to make slides preparation useful for comparision species with previously described species.

Present *Cryptobia* protozoan parasite is very small in size, elongate, both ends are somewhat pointed. The anterior part is somewhat broader than the posterior one and slightly curves down. The overall shape looks somewhat like a sickle cell and it measures 30.8µm in length and 4.8µm in width. The body of *Cryptobia* is armed with two unequal flagella, one at anterior end and the other is at the posterior end.

Anterior flagellum is shorter than the posterior one and it measures 13.2µm while the posterior flagella is long, rather coiled and measures 16.8µm in length. It is thicker at the flagellar pocket and goes thinner towards the reaching end.

The nucleus is oval and located at the anterior side of the body. The entire nucleus stained darker with Giemsa stain therefore nucleolus not clearly visible. It measures 6.0µm in length and 2.8µm in width.

The kinetoplast as stained darker with Giemsa stain, it is not clearly visible and situated towards the anterior end. The nucleus and kinetoplast are situated at anteriorly but opposite to each other. The kinetoplast is somewhat oval in shape and measures 3.6µm in length and 2.0µm in width.

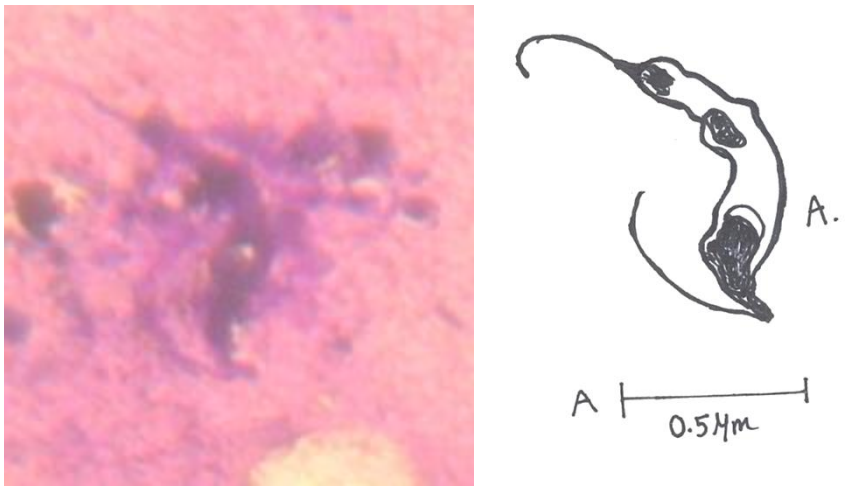

Photo and Line-diagram of *Cryptobia cataractae*(Redescribed)

Discussion (Based on Table No.1)

Living specimens from a single host cannot be characterized by much more than size, shape and proportionate length of the flagella. In stained and impregnated preparations, the position and appearance of nucleus and kinetoplast may be the only helpful features.

By comparing the body length of the present parasite with the other previously described species, it is found that it is 30.8µm in present *Cryptobia* species, which is completely different from other described species i.e it is 17 (14.7-18.9)µm in *Cryptobia cataractae* (Robert E. Putz, 1972), 14.9 (6.0-25.0µm)in *Cryptobia salmositica* (Katz,1951), 10.5 (7.5-11.6µm) in *Cryptobia branchialis* (Chen, 1956) and 21-24µm in *Cryptobia acipenseris* (Lwoff et al, 1926).

After comparing the body width of the present species with other previously described species, it is found that it is 4.8µm, which shows somewhat resembelence with *Cryptobia branchialis* (Chen, 1956) in

which it is 4.1 (2.8-4.6µm) and it is different in other described species it is 2 (1.54-2.2µm) in *Cryptobia cataractae* (Robert E. Putz, 1972), 2.5 (1.3-4.0µm) in*Cryptobia salmositica* (Katz,1951) and 3.1-3.9µm in case of *Cryptobia acipenseris* (Lwoff et al, 1926).

When we compae the length of anterior flagella, it was observed that the length of anterior flagella of present parasite is 13.2µm which shows somewhat resembelence with *Cryptobia cataractae* (Robert E. Putz, 1972)in which it is 11 (9.6-13.2µm) and it is different in other previously described species as it is 16.1 (6.5-27.0µm) in *Cryptobia salmositica* (Katz,1951), 8.7 (6.1-10.2µm) in case of*Cryptobia branchialis* (Chen, 1956) and the author Lwoff et al, 1926 not mentioned it in *Cryptobia acipenseris.*

By comparing the length of posterior flagella of present species with previously described species, it is found that it is 16.8µm in present species which shows some similarities with *Cryptobia cataractae* (Robert E. Putz, 1972), in which it is 14 (11-16.4µm) and it is different in other described species as 9.0 (4.0-17.0µm) in *Cryptobia salmositica* (Katz, 1951), 19.5 (13.8-28.2µm) in *Cryptobia branchialis* (Chen, 1956) and it is not mentioned in *Cryptobia acipenseris* by the author Lwoff et al.

By comparing the nucleus of the present parasite, oval in shape and measures 6.0µm in lengthand 2.8µm in width which is completely different in other previously described species as it is rounded and the diameter is given in all species.

By comparing the length of kinetoplast, it was found that the length of the kinetoplast of the present parasite is 3.6µm which is somewhat similar to *Cryptobia cataractae* (Robert E. Putz, 1972) in which it is 2.6-3.1µm and it is different in *Cryptobia salmositica* (Katz, 1951)in which it is 2.0-9.0µm and it is not given in the remaining described species of *Cryptobia.*

After going through the comparative study, it was found that the present species of genus *Cryptobia*found somewhat close to*C. cataractae* with all characters except the shape and size of nucleus. Therefore it is redescribed as *Cryptobia cataractae* (Robert E. Putz, 1972).

Type species *Cryptobia cataractae*
Habitate *Clarius batrachus*
Locality Skin
Date of collection 22 November, 2012

Table No. 1Comparative chart showing different species of genus *Cryptobia*

Characters/ Genus	Host	Body length	Body width	Length of anterior flagella	Length of posterior flagella	Nucleus	Length of Kinetoplast
Cryptobia cataractae (Robert E. Putz, 1972)	*C. virginicus*	17 (14.7-18.9)µm	2 (1.54-2.2)µm	11 (9.6-13.2)	14 (11-16.4)	1-1.5	2.6-3.1
Cryptobia salmositica Katz, 1951	*P. salmositica*	14.9(6.0-25.0)µm	2.5(1.3-4.0)µm	16.1(6.5-27.0)µm	9.0(4.0-17.0)µm	1.5-3.5	2.0-9.0
Cryptobia branchialis (Chen, 1956)	*Tilapia*	10.5 (7.5-11.6)µm	4.1 (2.8-4.6)µm	8.7(6.1-10.2)µm	19.5(13.8-28.2)µm	Not given	Not given
Cryptobia acipenseris Lwoff et al, 1926	----------	21-24µm	3.1-9.3µm	----------	----------	----------	----------
Cryptobia cataractae (Redescribed)	*Clarius batrachus*	30.8µm	4.8µm	13.2µm	16.8µm	6.0µm	3.6µm

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REFERENCES

1. Lom, J. 1970. Protozoa Causing Diseases in Marine Fishes. Institute of Parasitology, Czech Academy of Sciences, Prague. pp. 101-123.
2. Lom, J. and Dykova, I. 1992. Protozoan Parasites of Fishes. Elsevier, Amsterdam, London, New York, Tokyo. 315pp.
3. Lom J. (1979) Biology of the trypanosomes and trypanoplasms of fish. In: Biology of Kinetoplastida, Vol. 2 (ed. by W. H. R. Lumsden & D. A. Evans), pp. 269±337. Academic Press, London.
4. Woo, P. T. K. 1994. Flagellate Parasites of Fishes. In: "Parasitic Protozoa", 2nd edn, Vol. VIII. (Ed.) Kreier, J. P. Academic Press, London. pp.1-80.
5. Woo, P. T. K. 1995. Fish Diseases and Disorders, Vol. 1, Protozoan and Metazoan Infections. CAB International, Wallingford, Oxford, UK.
6. Woo P.T.K. 2003 Crytobia (Trypanoplasma) salmositica and salmonid cryptobiosis. Journal of Fish Diseases 26, 627-646.
7. Katz, M. 1951. Two new hemoflagellates (genus Cryptobia) from some western Washington teleosts. J. Parasit. 32: 245-250.
8. J. C. Woodey, C. D. Becker, P. T. K. Woo, and J. R. Adams. 1966. Records of Cnjptobia salmositica from sockeye salmon from the Fraser River drainage and from the State of Washington. J. Fish. Res. Bd. Can. 23: 1965-1966.
9. Becker, C. D., and M. Katz. 1965a. Transmission of the hemoflagellate, Cryptobia salmositica Katz, 1951, by a Rhynchobdellid vector. J. Parasit. 51: 95-99.
10. Woo P. T. K., Wehnert S. D. (1983) Direct transmission of a hemoflagellate, Cryptobia salmositica (Kinetoplastida: Bodonina) between rainbow trout under laboratory conditions. J. Protozool. 30: 334-337.
11. **Nohynkova, E., 1984: A new pathogenic Cryptobia from freshwater fishes a light and electron microscopic study. Protistologica, 202: 181-195**
12. Noga J.E., 2000, Fish disease. Diagnosis and Treatment. pp. 27-29. Iowa State Press. Iowa.
13. Becker C.D. & Katz M. (1965a) Infections of the haemoflagellate Cryptobia salmositica Katz 1951, in freshwater teleosts of the Pacific coast. Transactions of the American Fisheries Society 94, 327–333.
14. Becker C.D. & Katz M. (1965b) Transmission of the haemoflagellate Cryptobia salmositica Katz 1951, by the rhynchobdellid leech vector. Journal of Parasitology 51, 95–99.
15. Becker C.D. & Katz M. (1966) Host relationships of Cryptobia salmositica (Protozoa, Mastigophora) in a Washington hatchery stream. Transactions of the American Fisheries Society 95, 196–202.