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Protozoan Parasites of Cold Water Fishes of Jammu and Kashmir

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ABSTRACT

Jammu and kashmir is bestowed with water resources of about 40,000 ha comprising of lakes, streams, rivers, sars, spring etc. suitable for fish culture. The entire water area of Jammu and kashmir supports potential fish farming of the UT. Aquaculture is one of the most economical sectors of country. Fishes are one of the most beneficial and nutritional resources of human beings.Parasites present in water damages our stock and water quality which imbalance our ecosystem.

Keywords: *Aquaculture, Fish farming, Parasite, Protozoa*

INTRODUCTION

Jammu & Kashmir, lying between six mountain ranges and covering an area of 2, 22, 236 sq. kms. is located between 32° 17' and 36° 58' North latitude, and between 37° 26' and 80° 30' East longitude. The state commonly referred to as Kashmir is delimited in the north by Afghanistan and China, in the east by China, in the south by the state of Himachal Pradesh and also the state of geographic area in India, and in the west by the North-West Frontier Province and the Punjab Province of Pakistan. Jammu and Kashmir geographically incorporates of 3 regions: the foothill plains of Jammu; the lakes and blue valleys of Kashmir growing to alpine passes, the excessive altitude plains and starkly lovely mountains of Ladakh which lies past slender passes. Kashmir is rightly stated to be the nature's grand finale of beauty. In this masterpiece of earth's introduction seasons in sturdy individuality vary with each other in placing up extraordinary styles of allur e and loveliness.

This state holds the glorious history of the valiant kings, the placid lakes, the greenery of the forests and the amazing rivers. The sunny gardens, romantic house boats and Lakes add to the beauty of the region. The state of J&K measures about 425 kms from north to south and extends over 520 kms from east to west. The entire water area of Jammu and Kashmir supports potential fish farming of the UT. Aquaculture is one of the most economical sectors of country. Fishes are one of the most beneficial and nutritional resources of human beings. Parasites present in water damages our stock and water quality which imbalance our ecosystem.

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Cold water fishes of Jammu and Kashmir

- ✓ *Shizothorax curviforns* (satter gaed)
- ✓ *S.plagiostomus* (khont)
- ✓ *S.labiatus* (chush)
- ✓ *S.niger* (ale gaed)
- ✓ *S.esocinus* (chhuru)
- ✓ *Bangana dioplostoma* (Raput)
- ✓ *Cyprinus carpio* (Punjaeb gaed)
- ✓ *Carsssius carssius* (Gang gaed)
- ✓ *Triplophyta kashmeriensis* (Ara gurun)
- ✓ *Glyptothorax kashmirensis* (Nayid)
- ✓ *Botia biridi* (Ram gurun)

Parasite

Parasite is an organism that lives on or in a host organism and gets its food from or at the expense of its host. Parasitic diseases are one of the most seroius problems in fishes and causes heavy mortality in wild.

Three main classes of parasite are:

- Protozoa
- Helminths
- Ectoparasite

Protozoan parasite

Protozoa are microscopic, one-celled organism that can be free living or parasitic in nature. Protozoan parasites are either external or internal parasites present in large on fish skin, gills or in the internal organs of fish. They have direct life cycle and hence build up to very high numbers in short time especially when fishes are overcrowded.

Different protozoan parasites of cold water fishes of Jammu and Kashmir

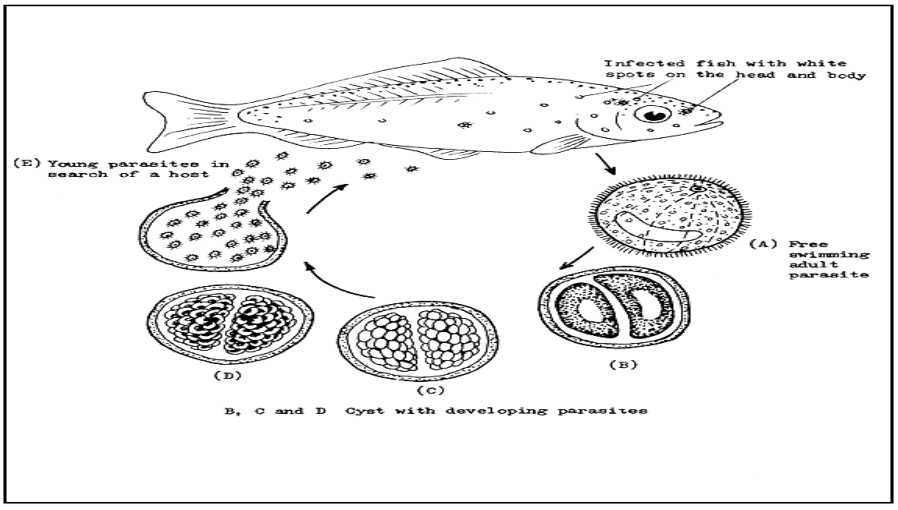
- ✓ Ichthyophthirius multifilis
- ✓ *Trichodina*
- ✓ *Trypanosoma*

Icthyophthirius multifilis

It causes *icthyophthiriasis*, also known as 'Itch' or 'white spot' and is probably the most significant protozoan disease which affects the early stages of all freshwater food fishes. They are up to 1 mm in size characterised by its large horse-shoe shaped nucleus. I. multiifilis obtained from gills of S. niger in Dal Lake during a parasitological survey (October 2013 & March 2015).

Life Cycle

The life cycle of this parasite is direct, however is spent, in part, off of the host. The trophont is at intervals the cuticle of the host, till it leaves the fish, encysts and divides to provide several host-seeking tomites. The tomites penetrate the skin and gills of the fish to finish the life cycle. The life cycle is temperature dependent with a shorter life cycle occurring at hotter water temperatures. Fish with a cutaneous infection will "flash", i.e., turn over and expose their white underside, whereas fish with a gill infection will "pipe", i.e., come to the surface of the water and "breathe" through their mouth. Gill lesions include epithelial hyperplasia with the presence of mature trophonts within the gills. Cutaneous lesions also exhibit focal epidermal hyperplasia, with parasites being located beneath the hyperplastic epidermis.



Life cycle of *I. multiflis*

Symptoms

Symptoms include skin, and gill irritation displayed by flashing, rubbing and rapid breathing. Infected fish show tiny white spots on the fins and skin when infection has reached the mature stage, increased mucus production; fish often rub against submerged objects. Ichthyophthiriasis is fatal to fish of all sizes. Chronic infection will cause serious damage to the skin, fin and gills; corneal infection impairs vision.

Prevention and control

An elevation of water temperature to 30oC for 6 hr. daily for 3-5days. 0.05% salinity shock. 100 ppm formalin for 1 hr for 2-3 days. 25 ppm formalin and 0.1 ppm malachite green. Transfer of infected stock in previously dry parasite free tanks for 2-3 times at 3 day interval.

Trichodina

One of the most common ciliates found on the skin and gills of pond reared fish. They mainly live on gills, skin with rings of chitinous teeth and spiral cilia around cytostome. *Trichodina* has a circular body 100 (microns)/u diameter with cilia around the perimeter. *Trichodina heterodenta* obtained from gills of S. niger in Dal Lake during a parasitological survey (October 2013 & March 2015). The infection sets in when there is high level of organic matter in the water or poor water exchange. Low numbers are not harmful, but overcrowding or deterioration of water quality facilitates rapid multiplication and serious damage besides susceptibility to opportunistic bacterial infections.

Symptoms

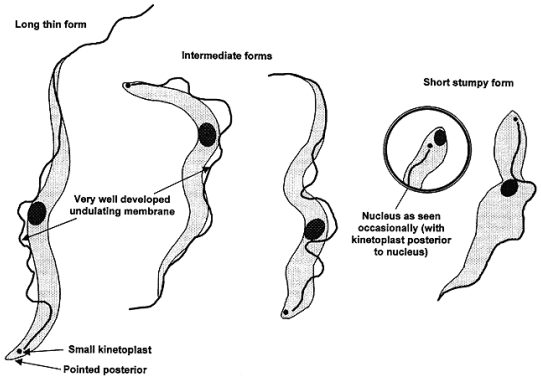
It infects mainly gills, body surface and fins and causes excessive mucus production on gills and body surface with frayed fins. Clinically fish has pale gills with irritation of body and hence they rub body against objects. Fish becomes weak during heavy infection and there can be high mortality among young fish.

Prevention and control

Easy to treat but the correction of the environmental problem is of prime importance. Salinity shock using 2-3% salt solution for 2-5 min. for 3-4 days Freshwater bath for 1 hour for 3 days Short bath with 200-ppm formalin for 30-60 min. for 3 days.

Trypanosoma

Trypanosoma is a monophyletic group of unicellular parasitic flagellate protozoa. Trypanosoma could be a monophyletic culture of living thing parasitic flagellate protozoa. All trypanosomes are heteroxenous (requiring quite one obligatory host to finish life cycle) and most are transmitted *via* a vector. The majority of species are transmitted by blood feeding invertebrates, however there are completely different mechanisms among the variable species. In an invertebrate host they're usually found within the intestine, but usually occupy the blood or an animate thing surroundings in the vertebrate host. aquatic vertebrate haemoflagellates swim freely in the blood. Members of the genus *Trypanosoma* are spindle shaped, 25–95 µm long, one flagellum originating from a usually top kinetoplast is connected long ways to the trypanosome. The nucleus is typically single, except within the course of division and centrally positioned. Natural infection with *trypanosomes* may be very common, particularly where the leech vector is also common.



Symptoms

Fish often come to the water surface or gather near the zone of aeration. Pale gills and darkening of the body surface are also noticed. Destroy gills and skin, high or mass mortality, if not treated. Sick fishes are dark in colour and extremely thin.

Prevention and control

Most of the infections are easy to control. Copper sulphate bath (0.5 ppm) for 3-5 days with good aeration and a daily replenishment of water. Short bath treatment with 200 ppm formalin for 1 hr with good aeration is also recommended.

REFERENCES

APHA, (1998). Standard methods for examination of water and wastewater. 20th Edition. American Public Health Association, Washington, D.C.

Cable, R. M. (1977). An illustrated laboratory manual of parasitology. Burgess Publishing Company. pp 165.

Chishti, M. Z., & Peerzada, M. Y. (1998). Host and seasonal occurrence of acanthocephala in fishes of Wullar Lake. *Oriental Science*. pp 31-38.

Eure, H. E., & Esch, G. W. (1974). Effects of thermal effluent on the population of helminth parasites in largemouth bass, in thermal ecology. U.S. AEC Symp. Ser. pp 32.

Feroz, A. S., Chisti, M. Z., & Fayaz A. (2005). Immune response of carp (Cyprinus carpio) to infection with Acanthocephala (Pomphorhyncus kashmerensis). *Journal of Parasitic Diseases*, *24*(1), 41-46.

Golterman, H. I., & Clyno, R. S. (1969). Methods of physical and chemical analysis of fresh water. IBP Handbook No. 8, Blackwell Scientific Publications, Oxford. Hynes H B N. 1988. Biogeography and origins of the North American stoneflies (Plecoptera). *Mem Entomological Society of Canada, 144*, 31-37.

Kennedy, C. R., & Watt, R. J. (1994). The decline and natural recovery of an unmanaged coarse fishery in relation to changes in land use and attendant eutrophication. (Eds) Cowx I. G. Rehabilitation of Freshwater Fisheries. Blackwell Scientific, Oxford. pp 366-375. Parasitic Bioload in Schizothoracine Fishes of Kashmir Valley 368.

Khan, M. Y., Shabeer, A. M., Raja, I. A., & Wani, N. A. (2012). Physico-chemical analysis of river Jhelum (Kashmir). *Global Journal of Science Frontier Research Interdiciplinary*, *12*(1), 1-3.

Khurshid, I., & Fayaz, A. (2014). Parasitic burden of some fresh water fishes of River Sindh in Kashmir in relation to season. *International Journal of Innovative Research in Science, Engineering and Technology*, *3*(8), 15688-15690.

Khurshid, I., Ahmad, F., & Ahmad T. (2013). Parasitic distribution in relation to gender, season and length of fish hosts in Shallabugh wetland. *International Journal of Scientific and Engineering Research*, *4*(4), 1083-1091.

Khurshid, I., Fayaz, A., & Sofi, T. A. (2013). A comparative study of parasites infecting some fishes of Shallabugh wetland, Kashmir. *New York Science Journal 6*(1), 68-72.