SYNOPSIS

Fishes are cold-blooded vertebrates that breathe by means of gills and live in water. They comprise about 30,000 to 40,000 species differing widely from each other in shape, size, habits and habitats. They live in all the seas, river, lakes, canals, dams and in almost every place where there is water.

The fishes are the major component of an aquatic ecosystem and they constitute economically a very important group of animals. They provide the highly nutritious and delicious food for mankind. The fishes are not only providing protein rich, cheap food but they also provide several highly precious by products which are used by the man for various purposes. The fish also play an important role in keeping the ecosystem in balance and also enhances the beauty of the nature by various ways.

Fishes also form one of the most important groups of vertebrates for man, influencing his life in various ways. Millions of human beings suffer due to hunger and malnutrition, and fishes form a rich source of food and provide a means to tide over the nutritional difficulties of man.

In particular siluridae family of the fishes are carnivorous and some are air-breathing form an economically important group e.g. *Clarias batrachus* (Magur), *Heteropneustes fossilis* (singhi) *Wallago attu* (Gangori) and *Mystus cavasius* (Catarana). Some are marketed alive and are therefore called live fishes. They breathe through gills as well as by means of accessory respiratory organs. These species comprise about 15% of the total marketable surplus of inland fishes. Air breathing carnivorous fishes is in great demand due to their higher protein and iron content, low fat as compared to the carps.

Parasitism is a very successful way of life, all of the major groups of animals have parasitic members and 50% of all known species are parasitic at some stage of their life cycle. No one definition of parasitism is totally satisfactory, but that of Crofton is a good starting point.

i) Parasitism is an ecological relationship between two different organisms; one designated the parasite, the other as host.

ii) The parasite is physiologically or metabolically dependent upon its host.

iii) Heavily infected hosts will be killed by their parasites.

iv) The reproductive potential of parasites exceeds that of their host.
v) There is an over dispersed frequency distribution of parasites within the host population.

Parasites are animal, which spend part of their lives living on or at the expense of another animal, in this case the catfishes, which is then known as the host. Parasites may be found in all tissues of the host, but they are particularly common on the skin and gills because these external surfaces are easily invaded. The parasites of the catfishes may have a common host, but the range of parasite types is very wide. In the world, although catfishes have many parasites, they are usually found in small numbers and rarely cause any serious injury. In the fish farm, however, they can build up to serious levels very quickly and results can be very serious. Normally a healthy fish and its parasites maintain an even balance, but where mishandling, or water or nutritional problems stress then parasite burden can build up very quickly. Although parasites can vary tremendously in shape and size they are usually divided up into two groups, the protozoa or single celled parasites and the metazoa or multi-cellular parasites.

The fishes are voracious feeders and will consume most types of food. However, as fry, even in the presence of adequate food, there may be difficulty if they do not have an optimal bacterial flora in their intestine. This is probably a function of the provision of high levels of vitamins by bacteria rather that any digestive function of these bacteria, but certainly catfishes fry reared in particularly clean conditions rarely survive even on an ideal diet.

Many fishes from different water resources are attacked by helminth parasites and they create the general health problems causing ill effects on growth rate, reproduction, general metabolism etc.

The helminth causes many health hazards and diseases among human and animal population. This leads to major problem and high economic loss to nation. There are many methods for combating human and animal helminthiasis but total eradication and control of their diseases is a major problem and is not so easy. In recent year mass dehelminthization among hosts is relatively providing good mean to eradicate helminthoses to certain extent and it is proved effective too. But there are many chances of reinvasion / reinfection as the environment is not free from contamination. The environment should not get contaminated with discharged helminths through faecal matter.

There are different types infection found in fishes and are caused by bacteria or protozoa, besides the fungi, helminth worms and parasites copepods also infect various species of fishes. The cestode parasites cause many dangerous and serious diseases to the host, which reduce
the food value and increase the mortality of the host. In turn they also disturb the ecological balance, since the man consumes fishes as food, the diseases caused by the cestode parasites are carried from fishes into the human population.

Many other cestode parasites may cause different health hazards to human also many teleosts and elasmobranches carry cestode infection.

Taxonomy of helminth parasites of fishes has been at its realm during 18th and 19th centuries. Parasitologists have their preference of studying helminth parasites group wise, such as trematodes, cestodes, and nematodes. But recent studies are some what different and particularly for an ecologist, to give community diversity of parasite burden of a particular host, its infra population have to be studied. Such studies will give a comprehensive idea about the infra population of a particular host as well as its host parasite relationship.

In Parasitology, study of parasites and their relationship to the host requires a multidimensional approach in order to understand the nature of parasitism and the pathological effect on the host, such studies includes, phylogenetic relationship, taxonomical accepts, physiological and biochemical accepts of parasitic relationship.

The thesis entitled “Studies on the cestode parasites of fishes from Siluridae family” includes six chapters, which also includes, preface and references.

I) Taxonomic studies of cestode parasites
II) Population studies and seasonal variation of cestode parasites
III) Biochemical studies of cestode parasites
IV) Histochemical studies of cestode parasites
V) Nervous system and neurosecretory cells of the cestode parasites
VI) Histopathological study

The first chapter deals with the taxonomical studies of the cestode parasites collected from two-piscian hosts, *Clarias batrachus*, Linnaeus (1758) and *Wallago attu*, Bleeker (1851).

The parasitocoenosis of the host *Clarias batrachus*, Linnaeus (1758) includes *Lytocestus vyasaei* n.sp. and *Lytocestus purnensis* n.sp. The *Wallago attu*, Bleeker (1851) include *Gangesia (Gangesia) ramkaei* n.sp. belonging from the following orders and families.
The second chapter deals with the population studies and seasonal variation in the infection of cestode parasites *Lytocestus vyasaei* to host *Clarias batrachus*, Linnaeus (1758) and *Gangesia (Gangesia) ramkaei* to the host *Wallago attu*, Bleeker (1851) from various places of Marathwada region, during the two annual cycle (Dec. 2003 to Nov. 2004 and Dec. 2004 to Nov. 2005).

In the present study, the total 389 *Clarias batrachus* and 313 *Wallago attu* were examined for the present study during the said period from all districts of Marathwada region. The calculated values for the population and seasonal variation on the basis of incidence (prevalence) of infection are given in the table. The result indicates that the season plays a significant role in the prevalence of infection. The infection values in *Lytocestus vyasaei* n.sp are high in winter season, low in summer season and totally absent in rainy season. In case of *Gangesia (Gangesia) ramkaei* n.sp infection values are high in rainy, moderate in winter and low in summer season from the study area.

The third chapter deals with the Biochemical estimations, like glycogen, protein and lipid of the cestode parasites, *Lytocestus vyasaei* n.sp and *Gangesia (Gangesia) ramkaei* n.sp from respective host, with infected and non-infected intestinal tissue of the host. The dry tissues were grounded to powder and utilized for estimation, glycogen was estimated by using Anthrone reagent as given by DeZwaan and Zandee (1972), using glucose as standard. Total lipids were estimated by using Vanillin reagent and Cholesterol as a standard as given by Barnes and Blackstock (1973) and the total amount of protein was estimated by Lowry’s method (Lowry’s et al., 1951) by using Folin and Ciocalteus phenol reagent and Bovine serum albumin as a standard.

The result indicate that the glycogen and protein content in infected intestinal tissue as compared to that of control host tissue (healthy host) was decreased in both host and in the
Lytocestus vyasaei n.sp and Gangesia (Gangesia) ramkaei n.sp it was found increased. The lipid content of the host Clarias batrachus infected intestinal tissue as compared to that of control was decreased and in the Lytocestus vyasaei n.sp was found increased, whereas in the host of Wallago attu infected intestinal tissue and Gangesia (Gangesia) ramkaei n.sp as compared to that of control it was seen decreased. The results are given in the table with percent changes over control (non-infected) and results of statistical test.

The fourth chapter deals with the histochemical analysis of glycogen, protein, lipid, alkaline phosphatase and acid phosphatase of the Lytocestus vyasaei n.sp and Gangesia (Gangesia) ramkaei n.sp collected from the freshwater catfishes, Clarias batrachus and Wallago attu respectively.

In the present study, a result indicates that it is observed that the worms contains large amount of glycogen, protein and lipid in tegument at region showing deep staining reaction, parenchyma, muscle of suckers, reproductive organs and vitelline follicles. From the observations it is clear that the worm could able to acquire the glycogen, protein and lipid from the respective host i.e. from the microenvironment in which they live.

The histochemical observation of longitudinal sections of scolex, mature and gravid segments of Lytocestus vyasaei n.sp and Gangesia (Gangesia) ramkaei n.sp for the alkaline and acid phosphatase enzyme activity shows that present, in enzyme activity is some of the part of worms i.e. reproductive organs and vitellaria it was high and in the anterior part of the worms i.e. in immature zone it was less. The photo plates of respective parasites to show the staining reaction for glycogen, protein, lipid, alkaline phosphatase and acid phosphatase are presented in this chapter.

The fifth chapter deals with the nervous system and neurosecretory cells of the Lytocestus vyasaei n.sp and Gangesia (Gangesia) ramkaei n.sp. The results indicate that the worm Lytocestus vyasaei n.sp, nervous system is clearly visible. The central nervous system consists of cephalic ganglionic mass and the lateral longitudinal nerve cords. The cephalic ganglionic mass consists of a number of apolar cells, unipolar cells, bipolar cells and few multipolar cells, which are darkly stained. The apolar cells with or without axons, the bipolar cells are spindle shaped with two axons, unipolar cells are rounded with single axon and multipolar cells are with many axons. The longitudinal nerve cords are running posteriorly,
these cords are thick and contain bundles of nerve fibers and neurosecretory cells. In the middle region of the worm, neurosecretory cells are located in the longitudinal nerve cord and peripheral region and three types of cells are present, like, unipolar, bipolar and multipolar. The worm *Gangesia (Gangesia) ramkaei* n.sp, longitudinal sections of the mature segments nervous system was observed that the cephalic mass consist of apolar cells, more unipolar cells, moderate bipolar cells and few multipolar cells, all with neurosecretory material. The photo plates of respective parasites to show nervous system and neurosecretory cells are presented in this chapter.

The sixth chapter deals with the histopathological studies of the infected and non-infected intestinal tissue of the respective host with the *Lytocestus vayasie* n.sp and *Gangesia (Gangesia) ramkaei* n.sp. The results indicates that the transverse sections of the intestine it has been observed that, the worm *Lytocestus vayasie* n.sp is having penetrative type of scolex and there is no doubt that they cause heavy mechanical tissue damage to their host intestine. The worm *Gangesia (Gangesia) ramkaei* n.sp is having penetrative type of scolex, invades through it and cause damage to villi, epithelium. The photo plates of respective histopathological changes are presented in this chapter.

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