



# PARSITIC DISEASES IN FISHES



**Dr . G. B. CHAND**

Associate Professor

Department of Zoology

Aquatic Toxicology laboratory

Patna University, Patna

Email : [gbchand@rediffmail.com](mailto:gbchand@rediffmail.com)



# PARASITIC DISEASES IN FISHES

and blades

Trichodin

a) The denticles have well developed thorns

b) The thorns slanted so form sharp teeth

or platelets

Trichodinella

a) The blades are attached to the central part almost perpendicularly and the denticles are interlocked only by their central parts

Paratrichodina

b) blades extend from the central part obliquely backwards or denticles are interlocked by

central parts and by anterior projection of

blades fitting into corresponding notches in

the blades of preceding denticles

Impatiella

## Morphology

(i) The shape of body is grossly hemispherical varying from a flat disc to bell shaped. It attaches to host surface by means of the adhesive disc.

(ii) The disc consists of a ring of denticles which has a central part and centrifugal and centripetal projection called blades and thorn respectively.

(iii) The denticles are held to one another by inserted conical parts and subtended by a ring of fine skeletal rods called radial pins.

(iv) The disc is encircled by a movable border

membrane reinforced by fine skeletal rods, which seals off attachment disc.

(v) The ring of denticles and radial pins located above the aboral, petiolar surface provide rigidity to the cells allowing elevation of the centre of the attachment disc via a complex system of myofibrils.

Life cycle: The uniciliated ciliates reproduce by binary fission. The adhesive disc separates in two semicircles which then close to form two smaller disc in daughter individuals.

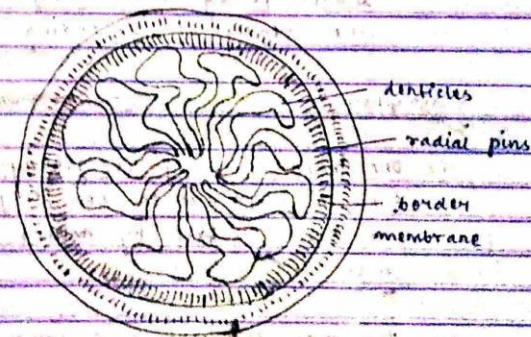


fig: Morphology of trichodine species.

Treatment:

Prophylactic:

- (i) water quality should be improved
- (ii) stocking density should not be high (since the presence of such ciliates in water indicates deteriorating water quality)



# PARASITIC DISEASES IN FISHES

Therapeutic :-

- (i) Sodium chloride bath treatment @ 2-3% till the fishes are stressed
- (ii)  $KMnO_4$  treatment @ 4mg/L in pond
- (iii) Formalin treatment @ 45 mg/L in pond
- (iv) Formalin bath treatment @ 100 mg/L with proper aeration

V. Handwritten mark

## Ichthyophthiriasis

Species affected :- Ray and fingerlings of C. catla, K. rohita, L. bata and C. mrigala in nursery and rearing ponds.

V. Handwritten mark

Affected organ :- skin, fins, gills

Causative agent :- G Ichthyophthirius multifiliis

Etiology :-

External symptoms :- Minute, nodular white spots on skin, fins and gills.

Affected fishes show irritation, erratic movement and restlessness with tendency to rub on the sides (Bhopalkrishnan 1964, Srivastava 1975)

Effect on host :- The epidermal tissue area where parasites lodge leads to severe epithelial ulceration.

## Morphology & Life history

1. The mature trophonts body is circular to ovoid (60-80  $\mu$ m size). It is covered

with 86 to 48 meridional rows of cilia

2. The mouth or cytostome is present anteriorly at the bottom of a vestibular depression.

3. Macronucleus present in large and horse shoe shaped.

Life cycle :-

1. The infective stage of the host is the migratory theront, which infects the fish skin or gills.

Once inside, it starts feeding and growing and such stage is called trophont.

2. The trophont on reaching the size of 1mm escapes from the host and encysts on a convenient substrate or tomont.

3. Within the cyst, the tomont divides by a series of 10-11 division to produce tomites, which breakthrough the cyst wall to become theronts again.

4. The theront is a bit elongated, 8.5  $\times$  10  $\times$  12-22  $\mu$ m in size and covered by 86-48 meridional cilia. They remain infective for 4 days and once theront become lodged into skin, the life cycle is completed.

The life cycle and mode of infection can be schematically represented as :-



# PARASITIC DISEASES IN FISHES

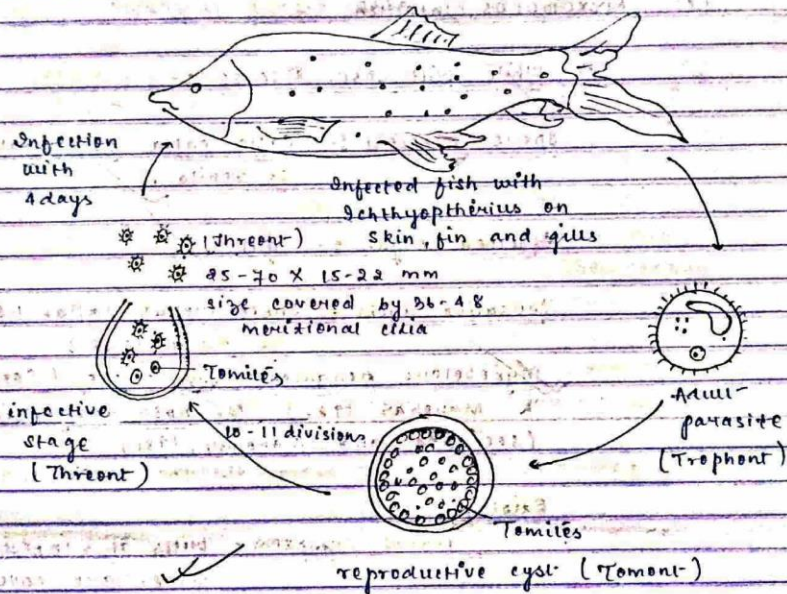


fig. Diagrammatic representation of life cycle of *Ichthyophthirius*

## Treatment

Prophylactic:- The control of this infestation is based on those life stages which are restricted to outside dermal tissues of host.

## Therapeutic

- (i) Hourly bath in 1:5,000 formalin solution for 4 days.
- (ii) Bath in 2% NaCl solution for 7 days or more (Gopalakrishnan 1968)

## (c) MYXOBOLUS infection

### (a) White Mill Spot Disease :-

Species affected :- *Catla catla*, *C. mrigala* and *L. rohita*

Affected organ :- gill

Causative agent :- *Thelohanellus catlae* (Chakrabarti & Basu 1948)

*Myxobolus bengalensis*, *M. catlae* (Seenappa & Manohar 1981), *M. hosa durgensis* (Seenappa and Manohar, 1981)

## Etiology

External symptom:- Gills of infested fishes are covered with whitish cyst of different sizes ranging between 1mm to 4mm or more. In acute infection some of the cysts assumes cauliflower shape, blocking the entire respiratory surface and excessive secretion of mucus results.

Effect on host:- The absorptive surface of gill is reduced hindering normal respiration. In many infestation, hyperplasia of gill lamellae occur and the fishes are under  $O_2$  deficient condition (M.K. Das 1945)

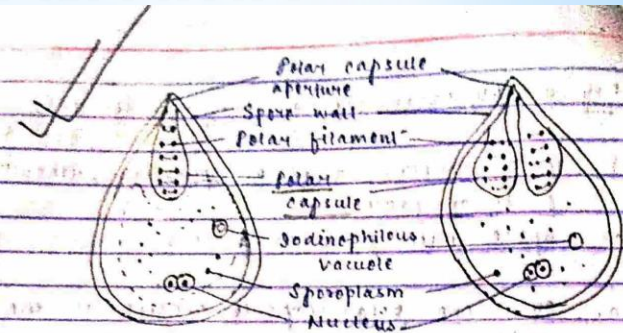
# PARASITIC DISEASES IN FISHES

## Key to Myxozoan genera affecting fish :-

1. a) Spore pyriform, ovoid, or spherical without any posterior process ..... 2
- b) Spore with posterior process ..... 3
2. a. Only one polar capsule present at the anterior end parallel to longitudinal axis of spore ..... Thelohanellus
- b. One polar capsule present at the anterior end perpendicular to longitudinal axis of spore ..... Neothelohanellus
- c. Two polar capsule present ..... Myxobolus
3. Two polar capsule present ..... Henneguya
4. Four polar capsule present ..... Kudoa

## General morphology of Myxozoan :-

1. The infective stages of myxozoan disease is the mature myxozoan spore. The structure of the spores forms the basis for identification of different species of myxozoan parasites.
2. The spore wall is formed as two valves. The polar capsules open outside by an aperture separated by intercapsular structure.
3. Spiney called polar filament is present which gets ejected out under specific stimuli. The posterior part of the spore contains the sporoplasm with two nuclei.



(A) Thelohanellus spore

(B) Myxobolus Spore

## Life cycle

1. The mature spore is ingested by the fish from water body. On entering the fish, the polar filament is ejected and serves as anchor.
2. The infective sporoplasm of the spores comes out as a small amoebula and penetrate the gut wall.
3. The amoebulae then somehow, possibly through the blood stream reaches the infective place or tissue of host fish (Mitchell, 1977) and assumes the shape of trophozoites.
4. The trophozoites increase in size with repeated nuclear division and cytoplasmic growth, to form a large cyst.
5. Sporogenic differentiation begins with the differentiation of sporont sporonts from the syncytial mass. The nucleus of each sporont divides several times to form the sporoblasts and from the sporoblast, mature spores develop.



# PARASITIC DISEASES IN FISHES

Treatment :-

Prophylactic :- Decrease the density of fish in pond.

Therapeutic :-

(i) Treat the pond with malachite green oil cake and lime by which the infective spores are destroyed to a greater extent.

(ii) Wet bath treatment @ 0.5-5% destroy the spores and other developing stages, if present, but not the cyst.

(b) White Scale Spot disease

Species affected :- C. mrigala, L. rohita

Affected organ :- Scales, skin

Causative agent :-

1. Myxobolus mrigala (Chakravarty 1939) in C. mrigala
2. M. sphericum (Jaispathi 1952)
3. Myxobolus rohita (Haldar, Das & Sharma 1983) in L. rohita

Etiology :-

External symptom :- The scales and the body surface are covered with whitish spot (cysts). In C. mrigala the cysts are superficially located on the body surface and scale but in L. rohita, the cysts are situated superficially as well as inside the scales. Affected fishes are lethargic.

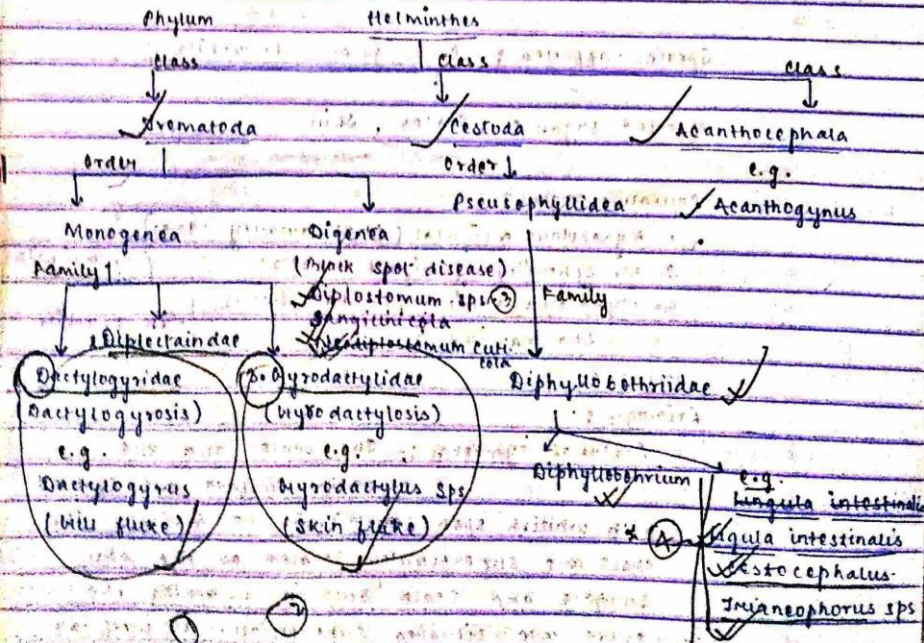
Affect on host :- As the disease advances, the

Scales become loose and perforated in many cases and fall off. A characteristic feature is the presence of ulcer.

Treatment :- Same as that of white gill spot disease

Diseases Caused by Helminthes

Helminthes constitute one of the major group responsible for various fish diseases. The major groups can be summarized as :-



Lymphocystis (cystitis)



# PARASITIC DISEASES IN FISHES

## X Key to the classes of helminthes :-

1. Body dorsoventrally flattened, The attachment organ, the haptor located at the posterior end with varying number of median and marginal hooks -

Exoparasite ..... Monogenea  
Endoparasite ..... 2

2. Body slender, ribbon like segmented. Attachment organ situated anteriorly. Digestive canal absent ..... Cestoda

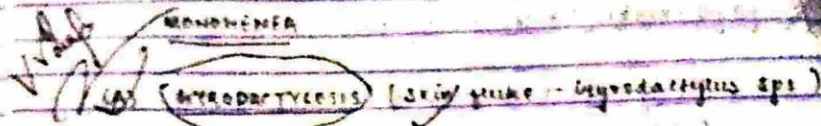
3. Body unsegmented, dorsoventrally flattened. Two attachment organ, one situated near the tip of anterior end and the other between middle and posterior tip. Digestive canal present. Trematoda (Dipnea)

## X Monogenetic trematode diseases :-

Typical monogeneans are dorsoventrally flattened and bilaterally symmetrical. The haptor is characteristic shallow concave organ at posterior extremity equipped with armed structure, marginal hooks for attachment.

### Key to families of Monogenea

1. Haptor with 14 marginal hooks - Squamodisc  
absent ..... Dactylogyridae
2. Haptor with 14 marginal hooks - Squamodisc  
present ..... Diplostelidae
3. Haptor with 16 marginal hooks ..... Gyrodactylidae



Species affected :- Mostly fry and fingerlings of *C. latipinna*, *C. striata* and *C. murraini*  
in St. as nursery and rearing ponds (Tripathi 1953, Stern and Pflanz, 1963; Das and Pal, 1967)

Affected organ :- skin ✓

Causative agent :- Gyrodactylus spp ✓

### Etiology :-

#### External symptoms :-

- (i) Colour of the infected fish begins to fade
- (ii) On heavy infection, dull bluish film develop on the body of fish ✓
- (iii) Excessive mucus secretion and dropping of scales. ✓

#### Effect on host's

- (i) Skin of Gyrodactylosis become more slimy and shows small blood spot ✓

### Morphology of the parasites

Body elongated, small with bifid anterior apisthaptor with 14 marginal hooks and pair of anchor connected by one dorsal and one ventral bar usually with membranous posterior outgrowth.

Eye (6) absent, very short





# PARASITIC DISEASES IN FISHES

oesophagus and intestinal caeca end blindly. Genital pore sub-medial, posterior to pharynx. Vagina absent. Uterus contain single embryo which in turn contains embryo of the following generations.

## Life history :-

Dactylogyx have a direct life cycle involving a single host. Dactylogyx species is viviparous and liberates live young worms which attach to a new host. Unborn young worms can be seen within the living adult.

## Treatment :-

### Therapeutic :-

- (i) Bath in 5% NaCl for 5 min to kill the worm on fish.
- (ii) Formalin bath treatment @ 100 mg l<sup>-1</sup> kills the worm.
- (iii) Formalin treatment in pond @ 25 mg l<sup>-1</sup> is effective in controlling the worm.
- (iv) KMnO<sub>4</sub> treatment in pond @ 4 mg l<sup>-1</sup> is effective in controlling the worm.

## (A) DACTYLOGYXIS (Gill fluke - Dactylogyx sps.)

Species affected :- Mostly fry and fingerlings of *C. catla*, *L. rohita*, *C. mrigata* in nursery and rearing ponds.

Affected organ :- gill

Causative agent :- Dactylogyx sps.

## Etiology

### External symptom :-

- (i) Colour of gills of infected fish fades.
- (ii) Excessive mucus secretion.
- (iii) On heavy infection, gill covering stretched wide open while the gills are expanded and very pale. (Das & Pal, 1989)

### Effect on host :-

- (i) Hypertrophy of gill epithelium and gill tissue eversion.
- (ii) Dactylogyx destroys the gill tissues and cause the fish to suffocate, death is ensured due to asphyxia.

## Morphology :-

- (i) The body of Dactylogyx is bilaterally symmetrical and dorsoventrally flattened.
- (ii) The anterior end is rounded and provided with sucker through mouth open, and provides attachment device.
- (iii) The anterior end is provided with two eye spots.
- (iv) The posterior end is armed with opisthaptor having chitinous marginal hooks.
- (v) St is provided with 14 marginal hooks and one pair of median hooks.
- (vi) St has four head lobes, intestinal caeca fused posteriorly.

## Life history :-

Dactylogyx has a direct life cycle involving one host. St is viviparous laying eggs which are swept away from the branchial chambers.



# PARASITIC DISEASES IN FISHES

On hatching the eggs liberate a ciliated larva swimming larva on locating a new host it becomes attached and metamorphose into a mature worm few eggs also remain attached to the gut epithelium where they hatch and parasitize the fish.

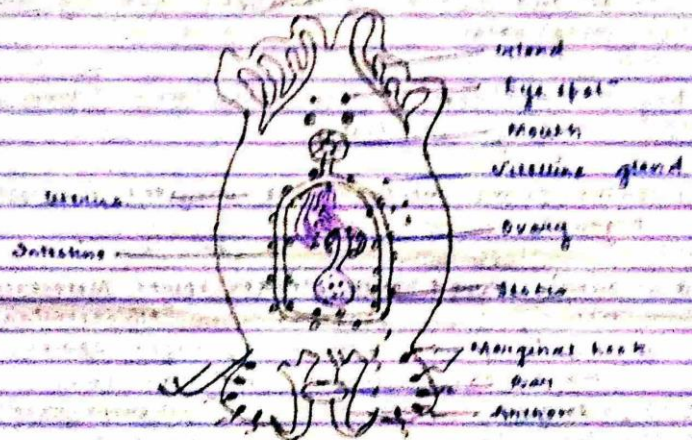


Fig. Morphology of adult Digenea

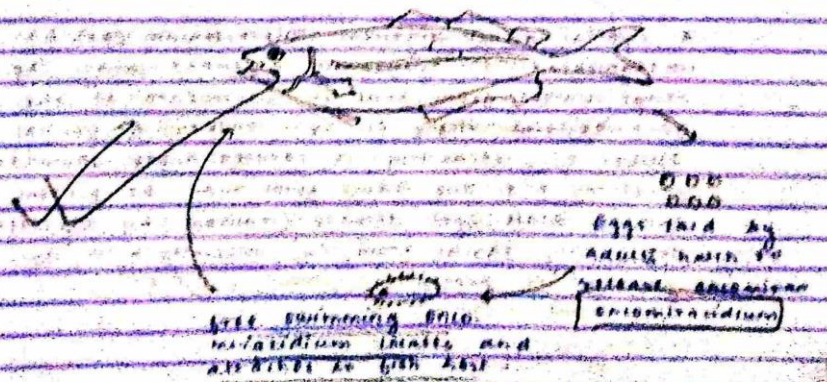


Fig. Schematic representation of life cycle of Digenea

Treatment :- As that of hydrotaetiosis

## 2. Digentic Trematodes disease :-

Digentic trematodes have complex life cycle with several successive larval stages alternating sexual and asexual generations involving two or more hosts.

### Key to families of Trematoda with Larval Stage in Fish

1. Larva forms metacercarial encysted in different organs.
  - a. Cuticle armed with slender spines. Metacercaria usually 2 mm long. . . . . Clinostomidae
  - b. Cuticle armed with scale shaped spines, metacercaria usually less than 1 mm long. . . . . Heterophyidae

### Morphology :-

A typical adult digenean (Diplostomum sps) has an unsegmented dorsoventrally flattened body. The shape varies from oval to lanceolate. At the anterior end there is oval sucker. A ventral sucker or acetabulum is located more towards posterior end. The adult form may be present but in black spot disease (caused by Diplostomum sps.) only larval form i.e metacercariae are parasitic is present.



# PARASITIC DISEASES IN FISHES

miracidia

## Structure of Metacercaria of Diplostomum

1. A typical metacercaria is bilobed more or less bilaterally, symmetrical.
2. The oral sucker is anteriorly located.
3. The digestive tract consists of an elongated pharynx, a slender oesophagus and intestinal area extending towards the posterior end.
4. Accessory suckers are located laterally.
5. The acetabulum is situated at the area of bifurcation of oesophagus and a holdfast organ is placed behind acetabulum.
6. The rudiments of genital organ, ovary and testicles are placed on the portion of the body. The anterior and posterior portion of body is demarcated by constriction.

## Life cycle

1. The digenans (*Diplostomum* sp) are oviparous and release eggs into water and hatch into free swimming miracidium.
2. Miracidium penetrates the skin of molluscs, the first intermediate host inside it changed into sporocyst → radia and finally into cercaria by asexual mode of reproduction.
3. The cercaria is equipped with the locomotory organ, the tail, by which it escapes from snail host and freely swims
  - a. finds a suitable host secondary host usually arthropoda within 48 hours.

they penetrate the host body and encyst the life cycle is completed when the infected invertebrates (chiefly arthropods) is eaten by a suitable fish which acts as a final host.

- a. Cercaria locate a suitable fish species penetrate into it and mature directly into adult.
- b. Cercaria penetrates fish skin and encysts within the fish and metacercaria survival stages, permanently seen as black spot on body surface and life cycle is completed when final host bird eats the infected fish.

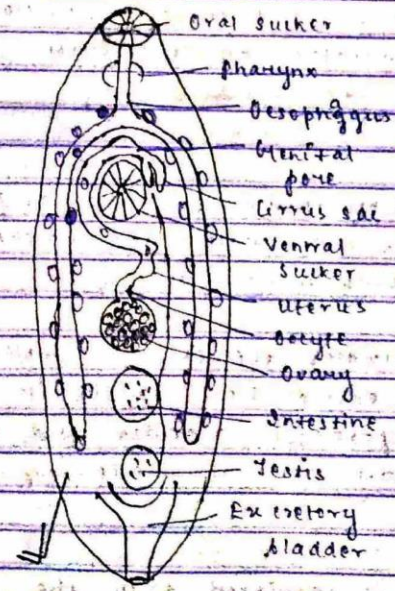


Fig. An adult Digenea

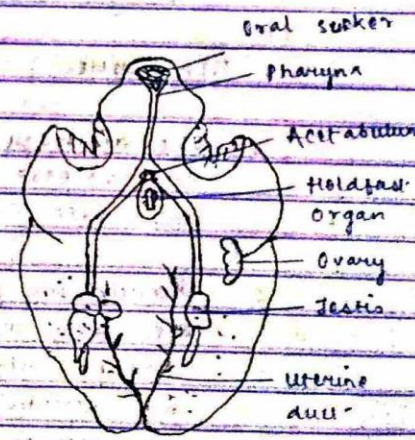


Fig. Morphology of a metacercaria of Diplostomum sp.





# PARASITIC DISEASES IN FISHES

Species affected :- *C. calla*, *L. zohila*, *L. calbasu* in  
the reservoir and lakes in India  
(Bhattacharya, 1987).

Affected organs :- abdomen body cavity

Causative agent :- *Ligula intestinalis*

## Etiology

External symptom :- Affected fishes are dark coloured  
and anaemic, emaciation

erratic swimming, the abdomen is distended  
because of the presence of a large number  
of plerocercoid larvae.

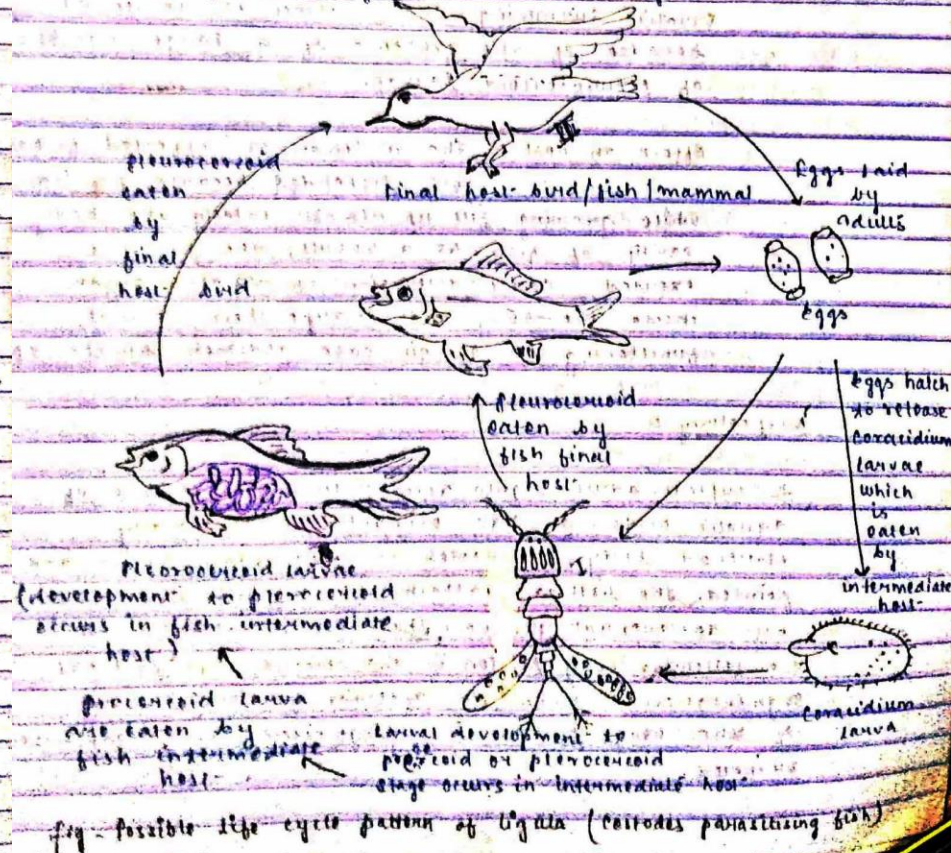
Effect on host :- The abdomen of affected fishes  
gets distended because ligulids  
while growing fill up almost totally the body  
cavity of fish. As a result, the pressure  
exerted cause distortion of various organ  
inside the body and disrupt their normal  
functioning. In certain case abdomen swists open.

## Morphology :-

A typical adult ligula resides in the intestine of  
aquatic birds. It has elongated dorsoventrally  
flattened body. The scolex is triangular, small and  
pointed, the bothria (attachment organ) is represented  
by dorsoventral groove. The neck is absent and  
the following body portion is the strobile with external  
segmentation confined to anterior portion. The rest  
of the body portion is unsegmented and transversely  
wrinkled.

## Life cycle

With the excretion of bird the eggs of ligula  
are passed out into the water and they hatch  
out in free swimming miracidia larvae which are  
swallowed by cyclopoid copepods (cyclops). Here they  
are transformed into trophocercoid larvae. These copepods  
when eaten by fish the larvae transformed into  
the infective larval form the plerocercoids. The life  
cycle is then completed when eaten by a bird  
*Aninga melanogaster* in India (Bopalkrishnan, 1964).





# PARASITIC DISEASES IN FISHES

Treatment :- Control methods of regulation is limited to extermination of definitive host.

## (B) ACANTHOCEPHALAN DISEASE :-

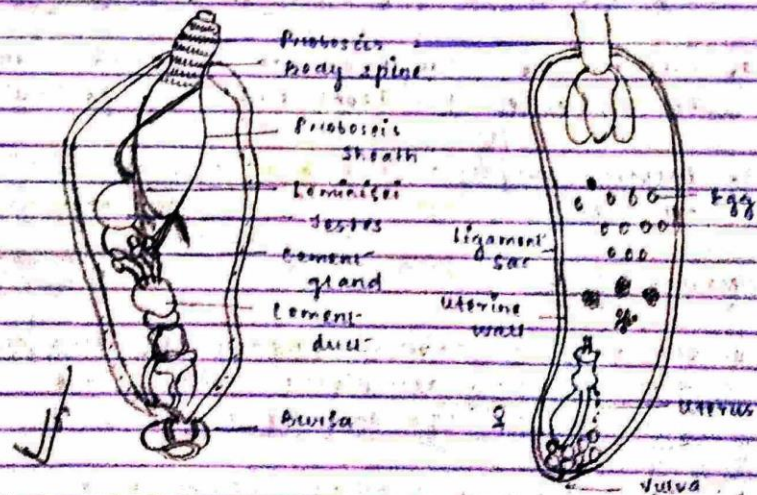
Key to genera of Acanthocephala commonly afflicting fishes in India :-

1. Proboscis short, cylindrical to subglobular with 3 transverse rows of 6 hooks each ... Acanthosentis
2. Proboscis short, subglobular to cylindrical with 8-10 spiral of 4-6 hooks each ... Palliseria
3. Proboscis subglobular with 6 spiral rows of 3 hooks each ... Acanthogyrus

### Morphology :-

1. The body of adult acanthocephalan worms shows three externally recognizable regions, the proboscis, the neck and the trunk.
2. The proboscis is a hollow, subglobular or cylindrical structure always armed with a set of posteriorly pointing hooks, whose number, size and arrangement are of great taxonomic importance. The proboscis functions to anchor the worm in place more or less permanently by penetrating the host intestinal wall.
3. The short neck is retractable. It is delimited from the trunk by a circular ring.

4. The trunk is a sac like structure, straight or curving, sub-cylindrical or bilaterally flattened, usually with many transverse wrinkles or pseudosegmentation. It wall has a synctial membrane structure and contain scattered nuclei. Trunk wall is transverse by a system of ducts, the lacunar canals. The trunk may contain various hooks.



(A) Adult ♂ Acanthocephalan (B) Adult ♀ Acanthocephalan worm

Life cycle :- Eggs passed in the faeces of final host containing an acaenothous larva. The eggs are eaten by suitable host (arthropods) where the acaenothous larvae hatch out and penetrate into the host body cavity where it develops to form a syncanth, which if eaten by suitable host develops into adult.



# PARASITIC DISEASES IN FISHES

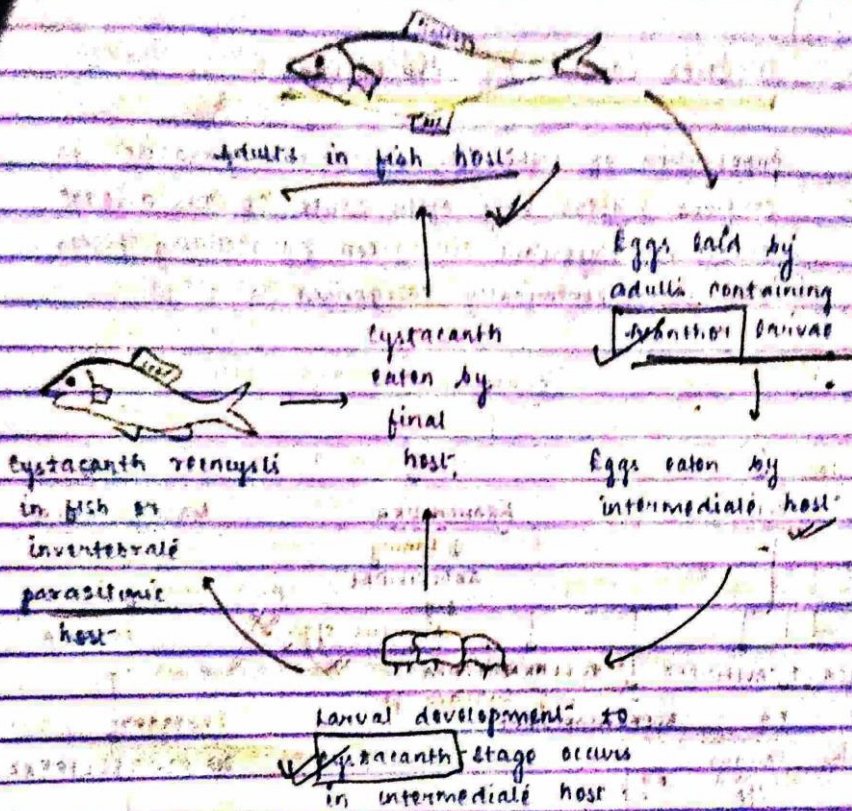
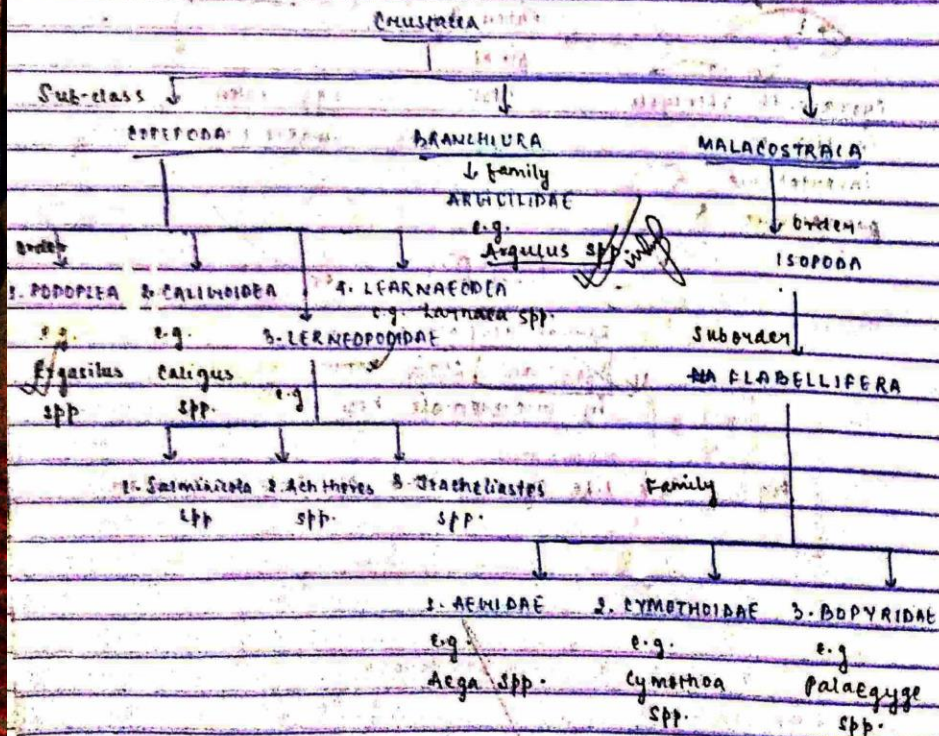


Fig. possible life cycle pattern of Acanthocephalan

## Diseases Caused by Crustaceans:

Infestation of fishes by crustacean parasites in confined waters very often cause serious disease outbreaks. Important crustacean parasitizing fishes can be taxonomically categorized as:





# PARASITIC DISEASES IN FISHES

## taxonomy of crustacean parasites affecting fish and finfish

1. Body built by rigid, rounded segmentation, body anteriorly provided with dorsal shield or cephalothoracic paraplegia, a pair of compound eyes, suckers (attachment organ) being modified first maxillae, brood pouch absent. Amnichiura (Argulus spp.)
2. Body elongate, dorsal surface of body segmented, attached to external surface, buccal or branchial cavity of fish, a pair of compound eyes present brood pouch absent. Isopoda (Palaeogyge spp.)
3. Compound eyes absent, body of vaulted shape, parasite attach to the surface of fish, occasionally moving egg sac present. Copepoda (Lernaea sp., Caligus sp., Ergasilus sp.)

### COPEPODS:

#### ✓✓✓ EQUASITIOSIS ✓✓✓

Species affected: L. rohita, C. mullgai, B. catla,  
H. moolitoris, C. idella, S. fuscus  
(Das 1980)

Affected organ: gills, branchial cavity, operculum, skin

Causative agent: Ergasilus sp. and Mugilicola sp.

### Pathology:

External symptom: Infestation occur in gills, branchial cavity.

operculum and fins take while seen of swim. Sometimes infestation may be as high as 150 per sq. cm characterized by surfaring, lethargy and restlessness. Infestation increases with the size of fish (M.R. Das 1983)

Effect on host: Heavy infestation, cause damage to the gill tissue leading to respiratory dysfunction and growth retardation.

## Key identification of genera of Parasitic copepod affecting fishes in India

1. Female body unsegmented, large holdfast organ with digitate processes in anterior part by which it is embedded in host tissue sessile. Lernaea
2. Slight segmentation body dorsoventrally compressed, cephalic cephalothorax covered dorsally by shield like suckers, movable. Caligus
3. Body pyriform, segmented; cephalothoracic shield absent. Cephalothorax cover nearly half of the body length, second antennae modified into a prominent hook type antenna, eggs contained in egg sacs in longitudinal rows. Ergasilus

### Morphology

The morphology of ergasilids largely resembles that of free swimming copepods. They are





# PARASITIC DISEASES IN FISHES

distinctly segmented, slightly flattened and possess few pairs of natatorial limbs. The length varies from 1 to 2 mm. The head and first thoracic segments fused to form broad cephalothorax. The thorax consists of six segments, fifth being small or absent. The sixth is the genital segment and the egg sacs hang out from this segment. The first four pairs of thoracic segments bear a pair of biramous swimming legs.

The small narrow abdomen has 3 pairs of segments with the posterior most having a pair of anal projection.

The head has two pairs of antennae and the end pair of antennae are modified into large grasping hooks with sickle shaped terminal claws serving as 'clasper organ' when pierced within the tissue (gills) of host. Sexual dimorphism is less distinct in contrast to female, shorter male leads free swimming non-parasitic life having maxillipeds (which is absent in female).

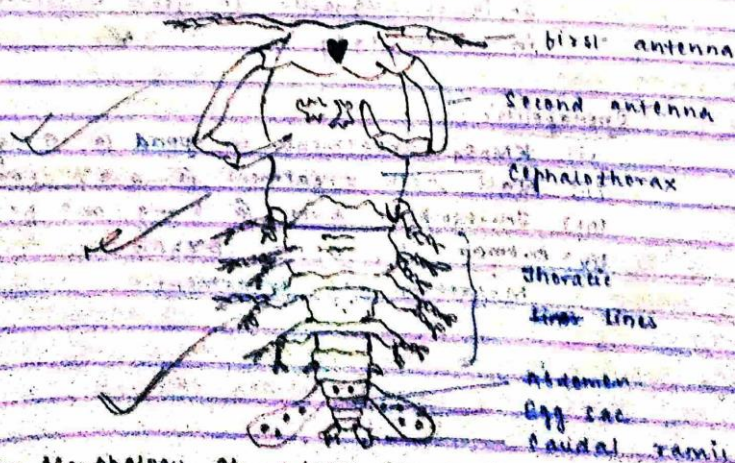


fig: Morphology of adult female Ergasilus sp.

Life cycle: After mating in water, both male and female gets attached to the host and starts parasitic life. The egg formation and maturation in ovary begins in late summer or winter and approx. 200 eggs are produced in egg sac of mother depending upon ambient temperature. Theogenesis progresses during the embryonal development in the egg pouches. Before hatching, the nauplius larvae have a conspicuous blue colour. The nauplius takes 8-10 weeks to grow to a sexually mature stage and copulate. Up to this stage both sexes are non-parasitic and free swimming and after that female turns to be parasitic.

Treatment:

Prophylactic:

- (i) The entry of parasites by introducing fish or by sitting in water containing larvae must be avoided. ✓
- (ii) The infestation in open water bodies is more severe than in zone of vegetation. So, it is suggested to grow vegetation in water body. ✓

Therapeutic:

- (i)  $KMnO_4$  treatment in pond @  $4 mg/l$
- (ii) Salt bath treatment @ 2-3% for 15 min
- (iii) Trichlorophen bath @  $5 mg/m^3$  for 10 min
- (iv) Isoniazid, DDPT, DYLIX, Malathion etc. treatment.



# PARASITIC DISEASES IN FISHES

## LERNAEOSIS :-

Species affected :- *L. callosa*, *L. idella*, *L. variata*  
(Sreenappa et al 1980, Pal &

Ghosh 1985)

Affected organ :- scales ✓

Causative agent :- *Lernaea chaokoensis* (Gnanamuthu, 1951)  
✓ *L. bengalensis* (It appears in small ponds, outdoor tanks and (Anchor worm) even in aquaria on goldfish)

## Etiology :-

External symptom :- On light infestation fishes are restless and rub against the sides and bottom of pond (irritational swimming). Heavily infested fishes become emaciated moribund with erratic movement and emaciation (Bispathkrishnan 1966)

Affect on host :- At the area of parasitic penetration, the overlying scale slough off and ulceration occurs. These ulcerations ulcerated area become prime to secondary infestation by another pathogen.

## Morphology :-

The adult female Lernaea sps. is parasitic, grows to a length of 5-22 mm. Maximum length recorded in *L. idella* as 162 mm by Nandeesh et al in 1985. The males are very much smaller in size. The female changes their shape completely

by a rapid, markedly allometric growth of trunk in the favour of cephalothorax and appendages as well as by loss of segmentation.

The adult form is seen protruding from nostrils, body surface and fins with the head buried deep into host tissue. The head is modified into two pairs of horn shaped cephalic appendages situated at right angle to the body, serve to anchor the worm firmly in host tissues. The body is elongated with atrophied swimming legs. The bifurcated abdomen ends in two short protuberances (egg sac).

Life cycle :- The life cycle of a Lernaea species starts with 0.25 mm long nauplii, with two pairs of antennae and a pair of mandibles hatch from 0.01-0.1 mm long, oblong greenish eggs within 24 hrs at 27-28°C. They survive for 4-5 days on their yolk and then moult to become metanauplii which moult 5 times through successive copepodid stage (1-5). After 5th moulting the cyclopid stage is obtained. In the copepodid stage, they are temporarily transition to parasitism. Mating usually takes place in 4th copepodid stage. Both male dies while female penetrates the skin of host with the help of anterior conical mouth and developing horn like cephalic appendages enter into deep musculature and then sac like body protrudes between the scales directed to sea. Since they are warm water parasite but even affect trout. It does not survive in water bodies having pH value < 7 (less than) and are infrequent in water with salinity



# PARASITIC DISEASES IN FISHES

above 1.8%. They are highly infectious during summer season.

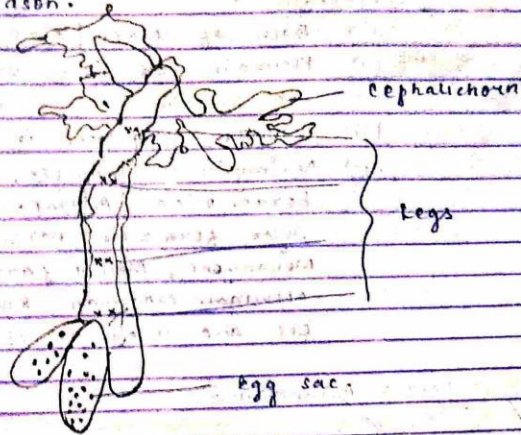
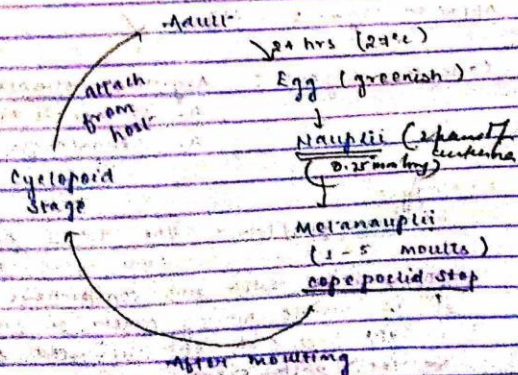


Fig. Morphology of an adult female *Dornaea* sp.

Life cycle of *Dornaea* species can be diagrammatically represented as:



Treatment :-

Therapeutic :-

- (i) Bath of NaCl (8-11 parts/1000) @
- (ii) Formalin (250 ppm) treatment for 30-60 min.
- (iii)  $KMnO_4$  treatment in pond @ 1mg/l
- (iv) Antimycin A, Baygon, Baytex, Benzene hexachloride, Bromox-50, calcium chloride, Dylor, fumigation formalin, Kerlan, Menazone, Methyl parathion, Metox, Neuvigan Noquvan,  $KMnO_4$ , NaCl, Zectran etc are used as therapeutic measures.

Subclass *Astianchuria*

(c) ARGULOSIS: It is most dangerous ectoparasites of freshwater and marine fish.

Species affected: - *L. rohita*; *A. mrigala*; *C. catla*

Affected organ: - Skin ✓

Causative agents: - *Argulus foliaceus* (Linn) ✓  
*A. siamensis* (Wilson 1926) ✓  
*A. bengalensis* (Ramakrishnan 1952)

Etiology :-

External Symptom :- The adult parasite is oval, flat, transparent to whitish with two conspicuous black spots. It is visible moving freely on the surface of the host fish. The affected fishes are restless with erratic swimming behaviour and loss of appetite. Attachment sites



# PARASITIC DISEASES IN FISHES

show sign of ulceration.

Affect on host :- Argulids damage the host directly by extracting hemolymph and tissue fluids and indirectly as path makers for several secondary infestations. Ulcerated areas turn black towards periphery.

Morphology :-

i) the dorsoventrally flattened body consists of cephalothorax, thorax and abdomen.

ii) The head fuses with first thoracic segment while 5th and 6th thoracic segments fused completely with abdomen to form caudal fin.

iii) The cephalothorax is covered by broad carapace extending posteriorly into two broad lobes.

iv) The first antenna is modified into attachment organs and terminates into curved hooks.

v) The second antenna is uniramous. The mandibles are in the cavity of short suctorial proboscis.

vi) The maxillae are modified as a powerful suctorial organ clearly visible on ventral surface.

vii) Four pairs of biramous swimming legs are present.

viii) The movable spine in the median line of body within hollow tube. The poison produced in the gland is sprayed into the wound caused in the host.

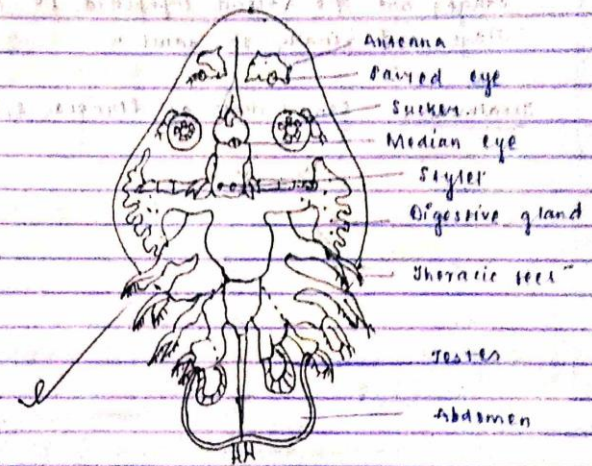


Fig - Morphology of an adult - Argulus sp

Life cycle :-

i) After copulation the female leaves the host. The female bear sac like asymmetrical ovary.

ii) Two circular, dark receptacula spermatozoa in the impregnated individuals.

iii) When eggs are laid they pass the spermatozoa or papillae which are situated below the genital orifice and are connected with spermatheca through the duct. At the papilla the eggs are inseminated often.



# PARASITIC DISEASES IN FISHES

being pierced by sharp points of papillae.  
iv) The sticky eggs are laid on the aquatic plants, stone, roots and aquarium glass.

The embryonic and post embryonic development by way of naupliar stage to metanauplius takes place inside the egg. Other developmental stages are the second copepodid to 5th copepodid stage and finally to adult.



# PARASITIC DISEASES IN FISHES : PROPHYLACTIC AND THERAPEUTIC MEASURES

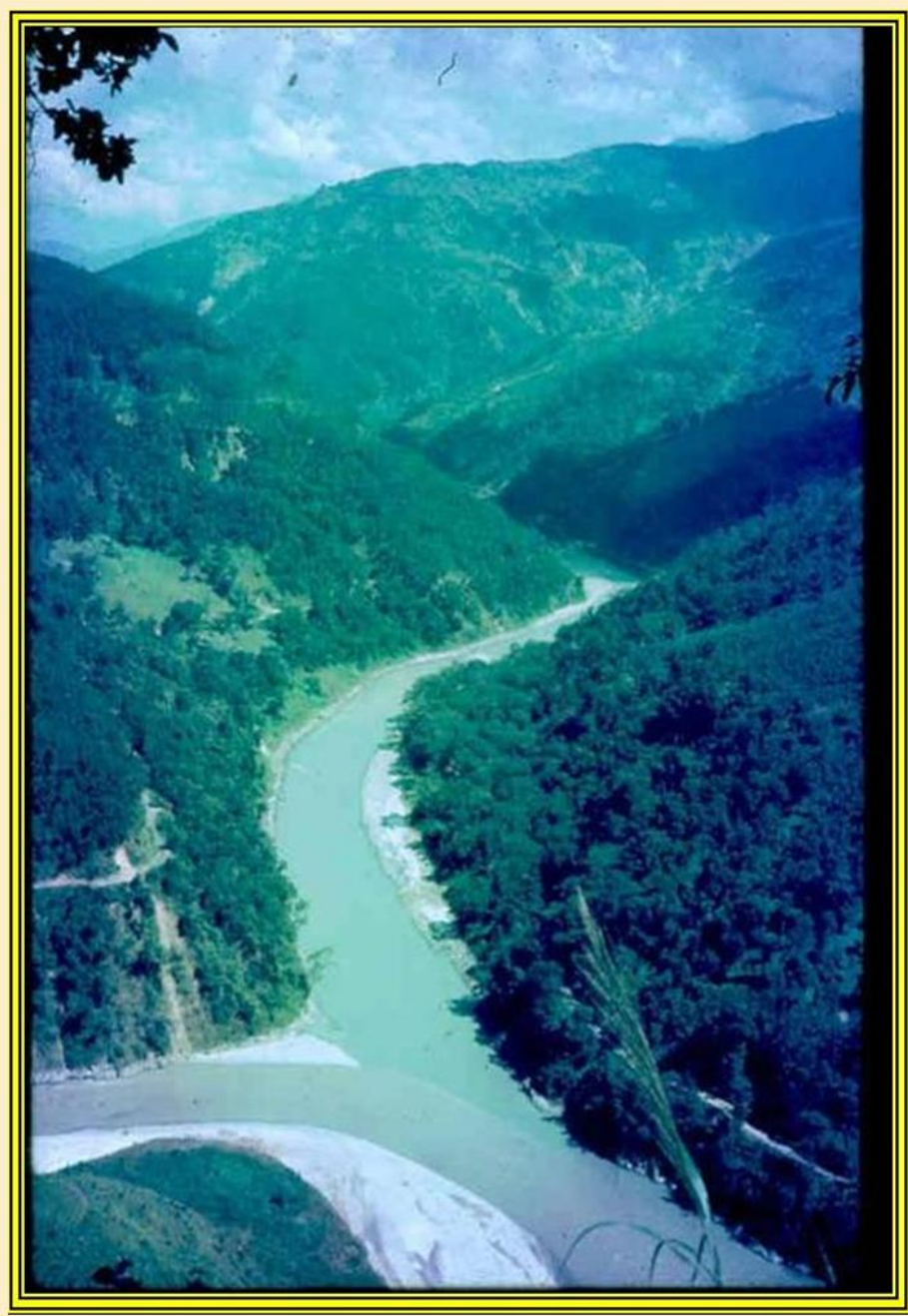
## Strategy for Conservation

For prevention and control of fish diseases the following points are to be considered followed:-

- i) Keeping the environmental parameters within limits
- ii) Maintain good nutritional quality. Avoid over feeding or over manuring.
- iii) Avoid over-crowding. If there is over-crowding reduce the standing crops, increase water volume, increase aeration exchange freshwater and limit the quantity of food.
- iv) Protect through segregation Infected fishes must be segregated from the whole stock. Fishes may be segregated and cultured species wise.
- v) Youngs of a species are more susceptible to diseases, older and wild fishes suffer less but may be carriers. So, at least young fishes should be cultured separately.
- vi) Stock your farm from a disease-free farm. Brooders are potentially free of any infection, so, maintain maximum hygiene in the selection of brooder.
- vii) If possible freshwater should be exchanged ~~at~~ periodically.
- viii) There should not be unauthorized unauthorised entry of adult and wild fishes from other water areas.
- ix) Fishing appliances should be regularly disinfected and dried ~~at~~ before use.

- x) Fishes should be given bath treatment of disinfectants before stocking. Avoid rough handling should be avoided.
- xi) There should be facilities for early disease diagnosis.
- xii) Where vaccine is available against particular disease vaccination schedule should be followed.
- xiii) In case of outbreak use chemicals, disinfectants or antibiotics as recommended
  - a) Generally, waterbody is treated with  $1.5 \text{ mg l}^{-1}$  potassium permanganate or bleaching powder.
  - b) Calcium oxide is used @  $50 - 100 \text{ kg/ha}$ .
  - c) Fishes may be treated by bath treatment with  $\text{KMnO}_4$  @  $500 \text{ mg/l}$ , formalin @  $1000 - 1500 \text{ ml/litre}$ ,  $\text{H}_2\text{O}_2$  @  $500 - 1000 \text{ ml/lit}$  or common salt @  $30,000 \text{ mg/lit}$  for 15 min - <sup>one</sup>every ~~one~~ or two day alternate.
  - d) Chemotherapeutics and antibiotics such as oxytetracycline, sulfur drugs, tricaine methansulphonate may be used with freed but with legislative care.
- xiv) There should be facilities and legislative measures for quarantine and certification atleast for exotic breeds of fishes.

hours



**THANK YOU**