

Fish and Shellfish Diseases in Culture Systems

IV. Bacterial diseases

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"Disease may ensure immunity but not life"

All living beings, in their natural surroundings, become susceptible to diseases one time or the other in their life. Fishes and shellfishes are also no exception. Even in the natural conditions, a few of fishes and shellfishes become diseased and most of the cases pass unnoticed possibility due to lack of interest and and/or observation. Occurrence of diseases in these organisms either in their natural environments or in culture system adversely affect the population. So, a thorough study of the diseases is absolutely essential, especially in the present context of a global awareness to enhance the food production through aquaculture of fishes and shellfishes in order to meet the requirements of animal protein for the increasing population.

Considerable work has been carried out in several countries in this field and substantial literature is available (Conroy and Herman, 1970; Sliedermann, 1970 and 1977, Snieszko, 1970; Bullock, 1971; Bullock; Conroy and Snieszko 1971; Mawdesley - Thomas, 1972; Reichenback - Klinke, 1973; van

Duijn, 1973, Roberts and Shepherd, 1974; Ribelin and Mijaki, 1975; Dulin, 1976; Hoffman, 1977; and Roberts, 1978). However, few investigations have been undertaken in this discipline in our country and it is imperative that concerted efforts should be made to study and understand the various important fish and shellfish diseases affecting our resources.

Some important bacterial diseases, which cause heavy loss to cultivable species of fish and shellfishes are:

1. Hemorrhagic septicaemia
2. Vibriosis
3. Furunculosis
4. Eye disease
5. Fin / tail rot
6. Ulcer
7. Skin lesion
8. Myxobacteriosis
9. Kidney disease
10. Gill rot
11. Tuberculosis
12. Enteric bacteriosis

Fish and shellfishes being mute and living in a dynamic environment,

detection and disease diagnosis in these cultivable species are rather difficult as compared to that of human diseases.

The symptoms of a disease are of considerable help to provisionally diagnose the case. But, detection of the aetiological agent of the disease will be of definite help to confirm the case and makes it easier to treat the disease as well as to adopt proper prophylactic measures against its outbreak.

Nevertheless, symptomatic treatment shall be followed as any delay in treatment results in heavy mortality of the afflicted population. Considering the needs, a provisional key, for the diagnosis of cases and treatment, is formulated and presented in table 1.

Bacterial diseases predominate among fishes and shell-fishes. But, it may be surprising to note that these organisms are not necessarily essential to be the cent percent cause(s) always for an outbreak of disease. Because, in any community, it has been detected that normal individuals / hosts also sometimes harbour or carry potentially pathogenic microbes without showing any apparent disease symptoms or falling sick. For example, species of *Aeromonas* and *Pseudomonas* which are the normal bacteria of the aquatic environments cause diseases to the fishes and shellfishes when they are under stress. Any sort of stress (eg. dense population) explicates the chances of invading organisms to make the host more susceptible and provokes diseases. And, this happens due to failure of the host's defense mechanism in the struggle against the invading

agent. Here, it is better to realise that stress always lowers the resistance of animals and enhances susceptibility to disease. 'Stress' is a state of condition, caused by intrinsic or extrinsic factors, which upsets the adaptive responses of the animals and reduce the chances of their survival. Stress can be short term or chronic. In the case of short term stress (eg. cold shock) the animals return to normalcy within a few (4-8) hours. But chronic stress cause severe damage as a result of increased susceptibility to infections probably because of reasons such as decreasing inflammatory responses (basic protective responses to tissue damage), decreasing amount of circulating lymphocytes (white blood cells responsible for immune responses), impairing of gamma-globulins (plasma protein concerned with antibody production against infections) production and depressing interferon (important defensive factor against virus infection) production etc.

Thus it is essential to maintain the natural equilibrium to a reasonably possible level among the host, parasite and environment to minimise diseases. Outbreak of a disease is usually the result of abnormal alteration in the adjustment of the interrelationship of the host: parasite and environment and the severity of the disease depends on the intensity of the alteration. Hence, enough care has to be taken in selecting disease-free and immunised seed, observing hygienic measures, maintaining congenial water and other sanitary conditions, and supplying suitable balanced diet for having healthy and quality fishes and shellfishes.

TABLE-1

Sl. No.	Disease	Clinical symptoms	Drug(s)	Administration
1.	Hemorrhagic septicaemia	Body reddening, skin lesion with pus and/or blood, swollen belly, protruding scales, sunken or protruded eyes inflamed anus, bloody discharge from the vent, discolouration and degeneration of the liver, swollen spleen, inflamed swim bladder, anaemia.	Chloromycetin Terramycin	Short bath in suitable water* having any one of the drugs at a rate of 25 - 75 mg. per liter of water OR intraperitoneal injection of any one of the drugs at a level 0.02 mg. per gram body weight of the fish or any one of the drugs may be given along with feed, at a rate of 1 mg. per 10 gram body weight of the fish, once daily for 7 - 21 days.
2.	Vibriosis	Erythema or hyperemia of the skin and fins, petechiae in the mouth, swimming with uneasiness near water surface, body darkening, abdominal distension, corneal opacity, anorexia, pale gills, enlargement or liquefaction of the spleen and kidney myocardial infection.	- do -	- do -
3.	Furunculosis	Boils may be present, skin lesion with pus/or blood, pale gills, sluggish movements, fraying of the fins, inflamed intestine, myocardial necrosis, liquefaction of the kidney and spleen, bleeding from the gills.	Terramycin	Along with feed, the drug may be administered at a rate of 5 - 10 mg. per 100 gram body weight of the fish once daily for 7 - 21 days OR intraperitoneal injection of the drug at a dose of 0.02 mg. per gram body weight of the fish.

T A B L E - 1 (Continued)

Sl. No.	Disease	Clinical Symptoms	Drug(s)	Administration
4.	Eye disease	Eye opacity with tissue proliferation, weak movements, pale gills, anorexia.	Brilliant green Chloromycetin	One mg. of chloromycetin may be given in feed per 10 gram body weight of the fish, once daily for 21 days. Swabbing with brilliant green solution (0.1%) at the area with or without surgical removal of the infected tissue.
5.	Fin / tail rot	Loss of natural colour beginning from the out margin of fin / tail,, fraying of the fin / tail, progressive disintegration of the fin / tail tissue, weak movements, swimming near water surface. Ecchymosis may be noticed.	Acriflavine	Dip in 1 - 5 ppm acriflavine suitable water or surgical removal of the infected tissue and application of the drug (0.1%) in solution in the operated area.
6.	Ulceer	Shallow open sores mostly with white rim, presence of pus and / or blood, eroded fins and mouth.	Acriflavine Chloromycetin	One mg. of chloromycetin may be given in feed per 10 gram body weight of the fish once daily for 7 - 21 days. Swabbing with acriflavine (0.1%) solution at the site of infection.
7.	Skin lesion	Skin lesion clearly visible in water, pus and / or blood in the lesion, sluggishness, anorexia,	Acriflavine Brilliant green Chloromycetin	Swabbing either with acriflavine or brilliant green (0.1%) solution at the site of infection OR short bath thrice daily in suitable water having the

T A B L E - 1 (Continued)

Sl. No.	Disease	Clinical Symptoms	Drug(s)	Administration
				antibiotic at a rate of 25-75 mg, per litre of water for 3 - 10 days.
8.	Myxo-bacterious	Grayish white spots or patches in the body and fins with pus and / or blood, swollen lips, anorexia, sluggishness, damaged gill tissue.	Terramycin	One mg. of the drug in feed, per 10 gram body weight of the fish, once daily for 7-21 days OR short bath having the drug in suitable water at a dose of 25 - 75 mg. per liter of water for 7 - 21 days.
9.	Kidney disease	Body lesion, bilateral exophthalmia, swollen abdomen, balanceless swimming, body darkening, swollen kidney, swollen spleen, infected liver, pericarditis, false membrane over kidney, liver and spleen may be noticed.	Erythromycin	- do -
10.	Gill rot	Isolated movements, anorexia, restlessness, surface floating, orientation against the current, weakness, gill tissue decay or proliferation.	Copper Sulphate Erythromycin	One mg. of the drug (erythromycin) in feed, per 10 gram body weight of the fish, once daily for 7 - 21 days OR dip treatment (for few seconds) in copper sulphate in suitable water at a rate of 1 - 2 mg. per liter of water.

T A B L E - 1 (Continued)

Sl No.	Disease	Clinical symptoms	Drug(s)	Administration
11.	Tuberculosis	Progressive body weakening, damaged or folded fins, swelling of abdomen, anorexia, colour fading, deformities in the skeletal system, sluggish movements, opacity in the cornea, scale defects listlessness, presence of tubercles.	Kanamycin	One mg. of the drug in feed, per 10 gram body weight of the fish, once daily for 7-21 days OR intraperitoneal injection of the drug at a rate of 0.02 mg. per gram body weight of the fish.
12.	Enteric bacteriosis	Enteritis, sluggish movements, body lesions, body discolouration, reddening of the anus, cyclic movements, swimming near water surface. Kidney may be infected.	Sulphadiazine Sulphisoxazole	One mg. of sulphisoxazole in feed, per 10 gram body weight of the fish, once daily for 7-10 days OR short bath, having sulphadiazine in suitable water at a rate of 25-75 mg. per liter of water, for 3-14 days.

* Habitat water or water similar in quality to that of habitat water should be used.