

# Fish and Shellfish Diseases in Culture Systems

## V. Prophylaxis and Disease check up

C. Thankappan Pillai

Central Marine Fisheries Research Institute, Cochin - 18.

The importance of aquaculture of cultivable finfishes and shellfishes has already been mentioned in the preceding series of this article. In all living beings diseases can occur at unpredictable intervals, but by adopting proper management and timely prophylactic measures, to a large extent diseases can be prevented.

It is essential that finfishes and shellfishes are safeguarded against diseases as they damage the resou-

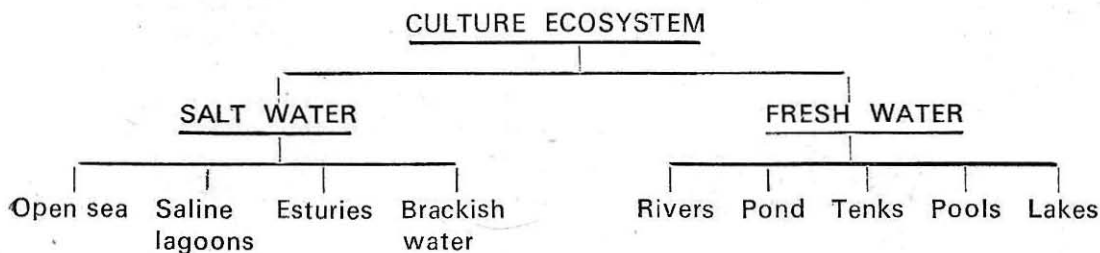
the management of the resources.

It is often believed that incidence of diseases in the vast culture system is unavoidable. This need not be the rule, for many of the diseases can be prevented by following certain measures of prophylaxis.

For convenience, let us classify culture ecosystems as in table 1.

Each system has its own ecological and biological characteristic.

TABLE—1



ources in the natural and culture systems, which result in loss of weight and bodily damages resulting in non-marketability. Above all, the possibility of certain types of infections being transmitted through aquaculture products to man cannot be ruled out. Further, the occurrence of diseases in cultivable organisms pose serious problems to

As the nature of the culture ecosystem differs, the applicability of the under-mentioned guidelines may also vary. In the enclosed water culture ecosystem, disease prevention is relatively easier than that of the open sea culture ecosystems in cages and pens wherein control over the ecosystem can be only minimal or practically nil.

Methods of prophylaxis are:

### 1. SELECTION OF CERTIFIED DISEASE FREE SEEDS FOR CULTURE

As in agricultural crops, a practice of certification and issue of disease free finfish and shellfish seeds would be highly useful. This is in practice in some foreign countries such as U. S. A. and Canada and could be adopted in India.

### 2. DEVELOPMENT OF DISEASE RESISTANT SEEDS

This can be carried out by selective breeding of hardy species. This method has been found quite successful by investigators in Germany in developing disease resistant species (carps) against hemorrhagic septicaemia. Genetic selection with desirable traits is thus very important.

### 3. SUITABLE SITE SELECTION

Site for culture should have all the required congenial conditions. For example, the culture site should not be contaminated by pollutants and there should be adequate supply of good quality water. The culture system should be monitored for pathogenic organisms.

### 4. DISINFECTION OF CULTURE SITE

It will be desirable to drain off the culture ponds and treat the ponds with any one of the disinfectants (say, quick lime / calcium cyanamide etc.) using permissible levels of contamination. When chemical treatment is made, stocking should be done only after a period of time to allow for biodegradation and flushing. The pH and other parameters will have to be carefully checked for stocking.

### 5. DISINFECTION OF SEEDS

If the seeds are not certified ones, and if contamination is suspected on examination, every consignment of seeds before releasing them in the culture system, may be suitably treated with an effective antimicrobial agent (eg. Terramycin at a rate of 15-50 mg. per litre of water.

### 6. INSTALLATION OF PROPER BUND AND SLUICE

This is applicable in the case of enclosed water culture system. Suitable bunds which are seepage free are essential. Sluices should be installed in the bunds to control the inflow and outflow of water and permit good circulation. The mesh size of the screens of the sluices should be suitable to retain the stocked animals and at the same time prevent the entry of the free swimming larval parasites and predators from outside. Care should be taken for the proper maintenance of the screens and sluices.

### 7. STOCK DENSITY

The field should be stocked only with optimum number of seeds in consideration of the characteristics of the species selected for culture and the nature of the site as overcrowding can at times lead to disease outbreaks. So, a preferable stock density limit may be fixed according to the size of the site and nature of seeds.

### 8. CARE ON ENVIRONMENTAL STRESS

Any sudden change in the environmental factors can impose severe stress to the stocked animals. For example, presence of excess of decaying organic matter may result in drastic decrease

in the dissolved oxygen content of the water body. Here, the oxygen deficiency acts as a stress factor to the standing stock. Every effort should be taken to minimise or avoid any kind of stress to the animals.

#### 9. KNOWLEDGE OF LIFE HISTORY OF THE PATHOGENIC PARASITES

A knowledge of the life history of the pathogens in relation to different ecological parameters will help to save the population at the right time. This will also be helpful to adopt suitable prophylactic measures and treatment where necessary.

#### 10. STANDARD FOOD FOR FEEDING

Supply of well balanced diet should be maintained. Artificial food may be made sterile and supplied. In the case of natural food such as phytoplankton and zooplankton, they may be treated with ultraviolet radiation and or deep frozen over 24 hours in clean water for stock.

#### 11. QUALITY OF FOOD

Periodical check up to ensure that the food items are free from pathogens and microbial toxin(s), is essential to avoid their entry into the culture system. For example, aflatoxin produced by a mould, *Aspergillus flavus* can cause hepatoma disease.

#### 12. MAINTAINANCE OF GENERAL CLEANLINESS

Hygiene is very important in culture practices. Utensils, nets and other instruments should be properly and suitably cleaned and sterilised by UV radiation or using chemicals. In the absence of sufficient facilities' the hatchery instruments may be properly cleaned in clean water and sun dried

well before using or reusing. This will help to eliminate contamination and cross infection.

#### 13. AVOIDANCE OF PATHOGENS IN CIRCULATING WATER

Water may contain pathogens harmful to the stocked animals. Hence in recycling systems, it will be desirable that the water be suitably filtered and treated with ultraviolet light to kill the pathogens and reduce the high bacterial load.

#### 14. LIMITATION OF FREQUENT HANDLING

Avoid frequent handling of the animals, especially by inexperienced hands. Moreover, handling should be as gentle as possible as any stress or any injury can cause epizootics and other problems.

#### 15. SEGREGATION OF ANIMALS AND BIRDS

As far as possible, no chances should be given for animals and birds to get into the culture systems as quite often they serve as disease vectors by transmitting various viral, bacterial and fungal pathogens. Bird and animal dropping could also contaminate the water;

#### 16. SEED IMMUNISATION

As vaccination is effective and possible to prevent certain types of diseases, suitable and timely vaccination may be given promptly. Mass immunisation is successful against vibriosis by immersion method in the concerned vaccine. Oral vaccine introduced through feed is also effective.

Adequate care may be taken right from the egg stage in order to remove the infected from among the non-

infected as the infected ones will rapidly spread the infection and lead to mass mortality.

#### 18. SCREENING OF FREQUENT SEED INTRODUCTION

In a culture system, frequent introduction of seeds, at different intervals without proper quarantine period and conditioning in the ecosystem in which the seeds are to be introduced, is not desirable, because, as a result of frequent introduction, pathogens may be introduced in the culture system along with the seeds. This will save the standing stock and the introduced animals. Moreover, the microbial flora of the newly introduced

seed may serve as pathogens to the standing stock and also the microbial flora of the culture system may in turn become pathogenic to the newly introduced seed due to lack of the conditioning of the animals to the flora and the flora to the animals.

#### 19. DISEASE CHECK UP

Disease check up of the standing stock at frequent intervals is quite essential to estimate the general health of the animals to forecast the occurrence of diseases and to take necessary measures for safeguarding. Along with the disease check up, water analysis is also useful to determine the hydrological and biological conditions.

