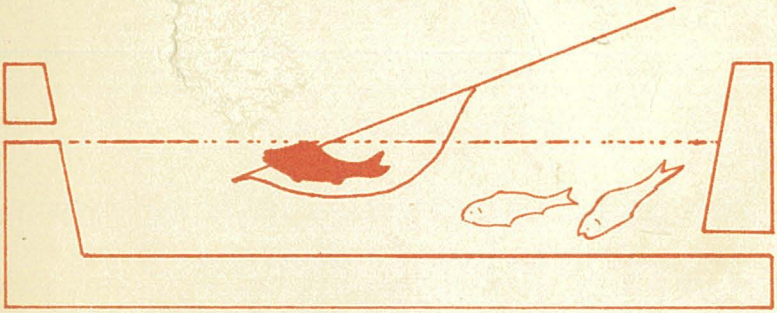
Southeast Asian Fisheries Development Center
in cooperation with the
International Development Research Centre

SAFIS Extension Manual Series No. 32, 1986

FISH DISEASE PREVENTION IN FRESHWATER AQUACULTURE MANAGEMENT



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SEC/SM/32 SAFIS Manual No.32

FISH DISEASE PREVENTION IN FRESHWATER AQUACULTURE MANAGEMENT

by

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The Secretariat
Southeast Asian Fisheries Development Center
March 1986

"Fish Disease Prevention in Freshwater Aquaculture Management" was originally written in Bahasa Indonesia by Drs. Santosa Koesoemadinata. Entitled Pedoman Cara-Cara Pencegahan Timbulnya Wabah Penyakit Bakterial dan Parasiter dalam Usaha Budidaya Ikan Air Tawar, it was published by the Directorate General of Fisheries (DGF) in Jakarta, Indonesia, in 1981. This is an English translation prepared by Mr. Suharyadi Salim, affiliated with DGF for the SAFIS project.

This manual has been adapted and edited by the SEAFDEC Secretariat.

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I. INTRODUCTION

Preventive measures against fish diseases should be taken promptly in accordance with the guidelines for freshwater aquaculture management.

These measures will prevent the spread of disease and will minimize the loss of fish caused by diseases.

Prevention should be practised at all stages of aquaculture production, i.e., from pond preparation to post-harvest activities such as transport, marketing, and storage.

Hygiene is the most important, and applies to the fishes, pond, equipment and personnel engaged in aquaculture.

This manual describes the methods for ensuring hygiene, to prevent red disease caused by bacteria in common carp. This manual indicates the guidelines for prevention and hygiene measures, which were published in Freshwater Fisheries Research Institute (LPPD) Special Issue No. 1, 1980, (October 27, 1980), with reference to "First Efforts to Prevent Bacterial Disease in Common Carp".

II. OBSERVATION OF FISH

1. Frequency

The condition of the fish should be monitored daily so that preventive or curative action can be taken promptly. Individual and group behavior of fish, especially their feeding and swimming behaviour, should be observed. Attention should be given to any signs of injury or sickness, such as gill discoloration.

2. First signs of disease

The first signs of disease in fish are:

- Swimming close to the water surface, away from the main body of fish or far from the pond inlet.

- Loss of appetite. This can be observed during feeding time. If a self-feeder is used, it is easy to see whether any feed is left over from the normal daily ration.

3. Action to be taken

Fish showing signs of disease must be caught immediately and given appropriate treatment. The pond water and the fish must be treated with disinfectant consisting of 3 g of Kalium permanganate per one cubic metre of water until the signs of sickness described above have disappeared.

III. TREATMENT/DISINFECTION OF POND

1. Pond drying

After harvesting, the pond must be allowed to dry for one or two weeks before the fertilizer is applied and a new supply of water is let in.

2. Pond liming

Liming is used in freshwater aquaculture to increase pond productivity and as a precaution against disease. Generally the dosage is 200 g of lime per square metre or two tons per hectare (see Fig. 1).

The procedure to be followed is:

- allow the pond to dry out;
- estimate the quantity of lime needed for the pond area;
- spread out the lime evenly over the whole area;
- let the water into the pond to a depth of about 10 cm;
- maintain the water at this depth for 7 to 10 days;
- lastly, let in more water to reach the normal depth of 30 to 60 m.

The pond is then ready for use.

3. Disinfection with Kalium permanganate

Disinfection with Kalium permanganate destroys fish bacteria and parasites.

The dosage needed to disinfect ponds without fish ranges from 10 to 20 g per one cubic metre of water and should be left for at least one hour. A dosage of 3 g of Kalium permanganate per one cubic metre of water is used for ponds with fish. The disinfectant may be left for a period of 12 to 24 hours after application.

The procedure for applying Kalium permanganate is as follows:

- drain off the water to a depth of 20 cm;
- estimate water volume and pond area;
- calculate the quantity of Kalium permanganate required;
- close the inlet and outlet of the pond;
- spread Kalium permanganate evenly over the water surface (dissolve it in ponds with fish);
- leave it as is for at least one hour and then allow a fresh supply of water into the pond to a depth of 30 to 60 cm;
- after one hour, open the outlet and inlet of the pond until the water regains its normal colour, and is ready for use.

4. Maintenance of water quality

As environmental conditions and water quality play a major role in fish health, periodic observation is necessary.

Since the quality of the water is closely related to oxygen concentration (pH) and affected by toxic elements, special attention should be given to these two factors.

Sufficient oxygen concentration should be maintained through good drainage canals, the use of mechanical aeration (aerator, blower, etc.), and by changing the water.

IV. DISINFECTION OF FRY

1. Isolation of unhealthy fry

If abnormal behaviour is observed in fry, they should be isolated in a quarantine tank instead of being released directly into the fish pond.

2. Disinfection with Kalium permanganate

To prevent bacterial disease, fry must be treated with a Kalium permanganated solution. They should be kept for half an hour in a treatment tank with a solution of 20 g per one cubic metre of water (see Fig. 2).

The table below lists the chemicals used for disinfection in freshwater aquaculture:

TABLE

CHEMICALS USED FOR DISINFECTION IN FRESHWATER AQUACULTURE

Item	Purpose	Available at
1. Kalium permanganate	Disinfection of fish, pond, tools	Drugstore
2. Formalin	Fish disinfection	Drugstore
3. Malachite	Fish disinfection	Drugstore
4. Chlorine	Pond disinfection	Drugstore
5. Densol and Lizol	Disinfection of hands, feet, tools	Drugstore
6. Lime	Pond disinfection	Supplier of construction materials
7. Ovadine	Disinfection of fish eggs	Drugstore
8. Betadine solution	Disinfection of fish eggs	Drugstore

3. Disinfection with formalin and malachite

Fish should be kept for 10 to 15 minutes in a treatment tank containing one cubic centimetre of formalin per 10 litres of water plus 40 mg of malachite per 10 litres of water to prevent parasite infection and fungi (see Fig. 2).

V. HYGIENE REQUIRED OF PERSONNEL AND DISINFECTION OF EQUIPMENT

1. Equipment/tools

The equipment and tools used must always be in a germ-free condition. It should be immersed for 30 to 60 minutes in a solution of 20 g of Kalium permanganate per one cubic metre of water or a chlorine solution with a concentration of 0.5 g per one cubic metre of water (see Fig. 3).

2. Personnel

Personnel as well as visitors must follow the hygiene regulations applying in the pond area, by washing hands and feet with a disinfectant. Densol and Lizol should always be available. Personnel who have just handled fishes must wash their hands with soap and disinfectant (see Fig. 4).

VI. SANITARY MEASURES IN CONNECTION WITH SPAWNING OPERATIONS

1. Health of broodstock

Broodstock that is to be used for spawning must be in a healthy condition and without any injury or signs of sickness. Broodstock showing abnormal behaviour should be isolated and given appropriate treatment.

2. Disinfection of broodstock

Before spawning, broodstock must be disinfected with 20 g of Kalium permanganate per one cubic metre of water, and formalin and malachite at a concentration of 100 cubic centimetres by one cubic metre of water and 4 g by one cubic metre of water respectively.

3. Disinfection of spawning pond and equipment/tools

Spawning ponds must be properly disinfected as described above (Section III), and equipment and tools used in spawning operations must also be disinfected as outlined in Section V.

4. Disinfection of fish eggs

Under controlled spawning, eggs should be disinfected, i.e., soaked for 10 minutes in a solution of 10 cubic centimetres of Ovadine or Betadine per one litre of water.

VII. SANITARY MEASURES IN CONNECTION WITH THE TRANSPORT OF FISH

1. Observation of condition of fish

Prior to transport, fish should be kept under observation for at least one week.

Injured fish or fish showing any abnormality should be removed immediately from other fish for dispatch.

2. Handling before transport

About one week before transport, fish should be handled with special care. All tools used should be disinfected as described in Section V.

If fish are transported in plastic bags, adequated oxygen should be provided. Lack of oxygen causes disease.

VIII. FEED

1. Quality

To improve resistance to disease, fish must be given nutritious feed containing sufficient calories.

The quality of the feed must always be of the same standard. Inferior quality or spoilt feed and feed contaminated by toxic substances must be avoided.

2. Vitamins and minerals

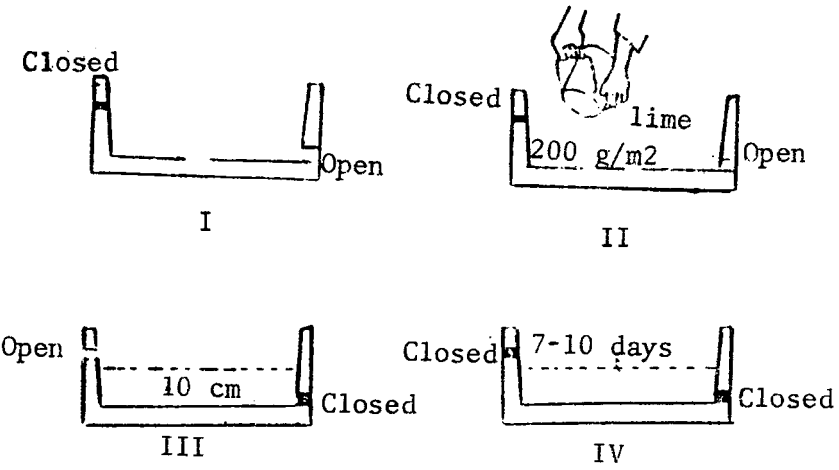
The resistance of fish to disease can be improved by adding vitamins and minerals to their diet.

The doses of vitamins and minerals designed specially for animals are as follows: for vitamins 15 g per kilogram of fish feed, and for minerals 5 g kilogram of fish feed.

IX. CONCLUSION

Prevention is the most effective action that can be taken against fish disease. Curative measures are often difficult to carry out for practical and economic reasons. Moreover, there is no certainty that the treatment of unhealthy fish will be completely successful and that financial loss in fish production can be avoided. Preventive action should therefore form part of the day-to-day operations of freshwater aquaculture, and be carried out with proper care.

1. Liming



2. Releasing Fish

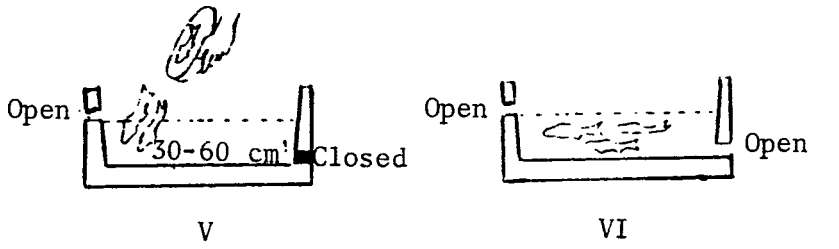


Fig. 1. Method of treating a fish pond

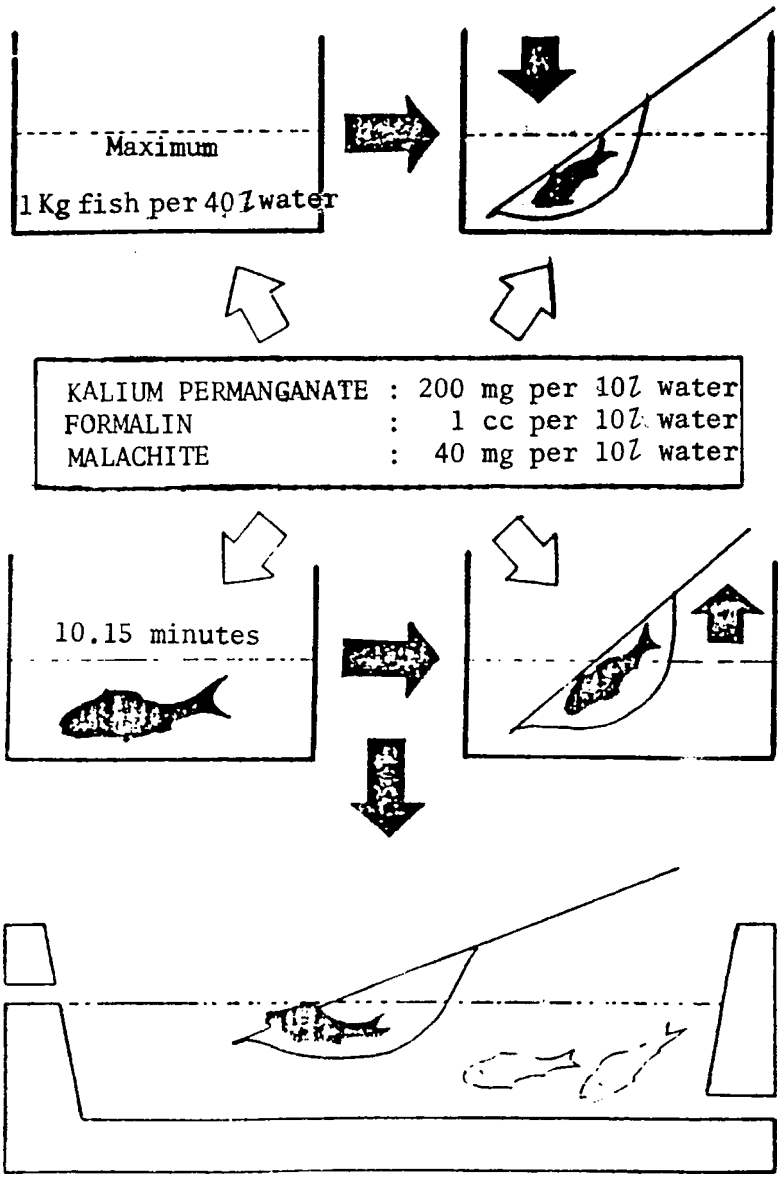


Fig. 2. Disinfection of fish

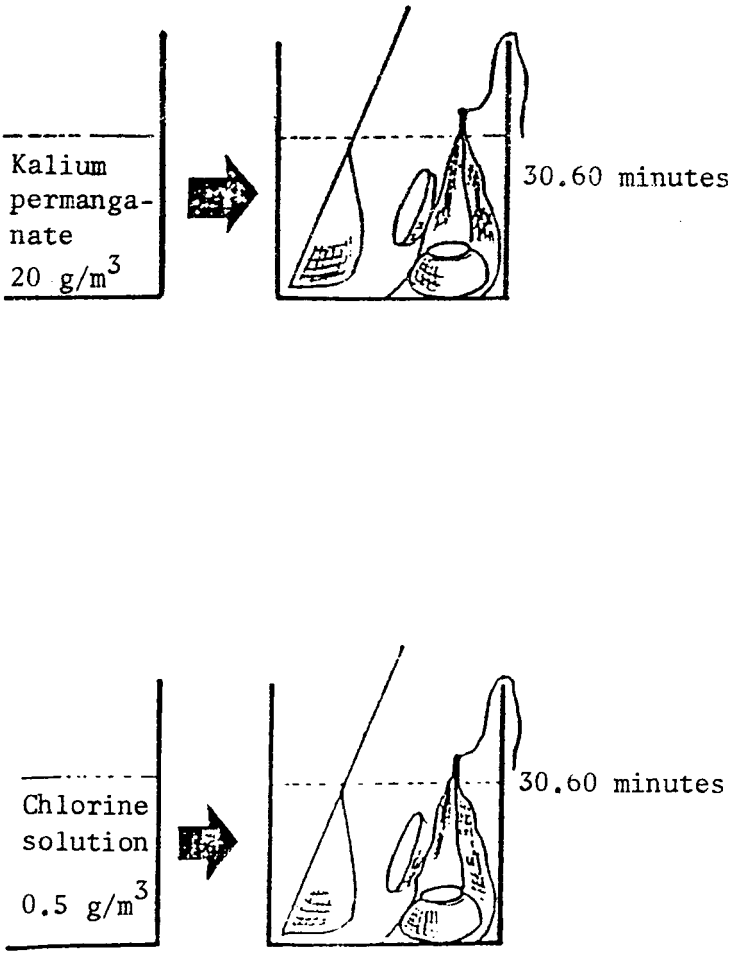


Fig. 3. Disinfection of equipment tools

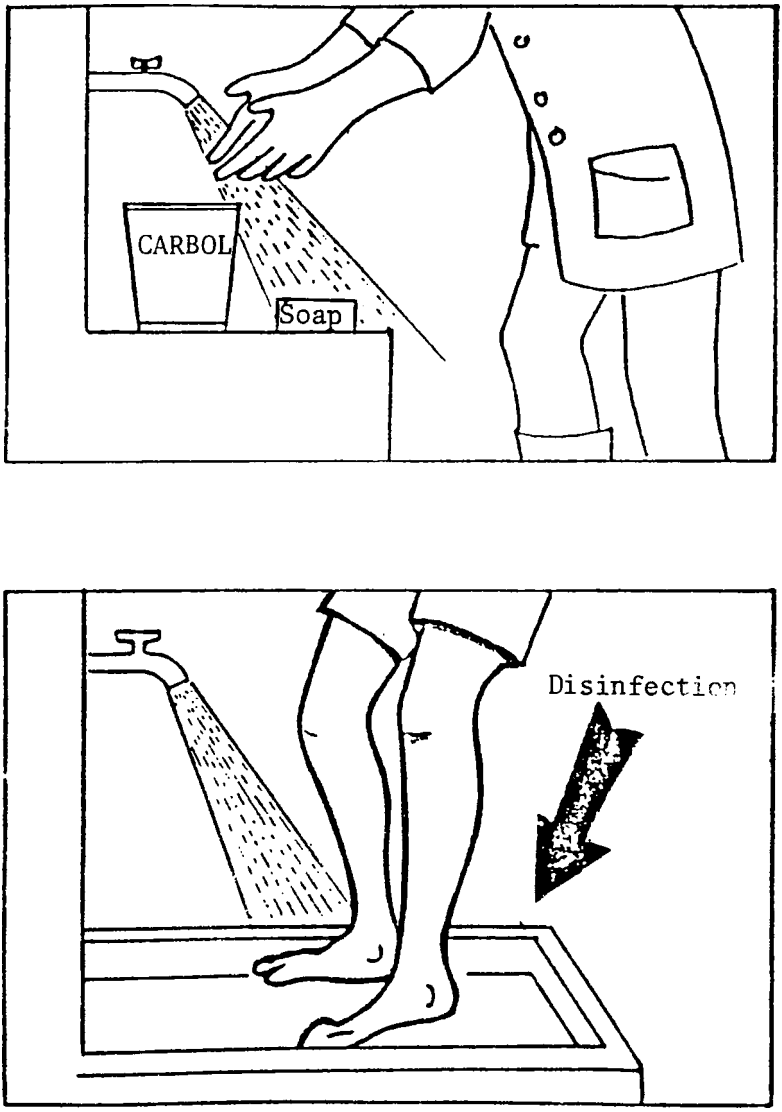


Fig. 4. Disinfection measures applying to pond personnel

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SAFIS

o What is SAFIS?

SAFIS is the Southeast Asian Fisheries Information Service. It is a project of the SEAFDEC Secretariat set up to provide extension materials for small-scale fishermen and fish farmers in the region.

o What are its objectives?

The immediate objectives are to collect and compile fisheries extension manuals, brochures, pamphlets and related aids for small-scale fisheries development, and to translate selected literature into local languages for distribution to fisheries extension workers in Southeast Asia.

o What services will SAFIS provide?

SAFIS will attempt to provide information and publications such as:

- lists of available texts in fisheries extension services,
- translation of suitable manuals,
- manuals of appropriate technologies,
- photocopies of appropriate fisheries extension literature,
- a current awareness service of regional fisheries.

o How much will these services cost?

A nominal cost of US $0.15 per page will be charged for photocopying, handling, and surface mail. Airmail costs will be extra. The publication cost per manual will vary according to the book.

SAFIS is grateful for financial support received from the International Development Research Centre (IDRC) of Canada.

SAFIS is the Southeast Asian Fisheries Information Service. It is a project of the SEAFDEC Secretariat set up to provide extension materials for small - scale fishermen and fish farmers in the region. For additional information, contact the Project Leader of SAFIS

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