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PLANNING A FISH HEALTH PROGRAM FOR HATCHERY OPERATIONS

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As is true of most endeavors, planning, whether it is highly structured or quite informal, is the basis upon which sound fish health management programs are developed. The absence of planning can lead to indecision, hesitation, false starts and untimely changes in direction which may seriously affect the outcome and effectiveness of disease control measures.

Planning, in its broadest context, is the selection of courses of future action from a number of alternatives, and is the procedure by which a manager determines what goals are to be achieved. Planning must involve, in some form, the hands-on fish culturist as well as the fishery administrator. Elements that are generally involved in planning are summarized in Fig. 1.

Planning, as an activity, means many things to many people. It can be all-consuming from a mechanical process standpoint but this undoubtedly should be avoided. In general, it is advisable to keep the complexity of the planning process appropriate to the scope of the problem. As a general rule, planning a fish health program should not be considered an overly complex exercise. The primary objective of fish health management in any fish culture operation should be reduction of the risk of exposure of fish stocks to disease. This objective can best

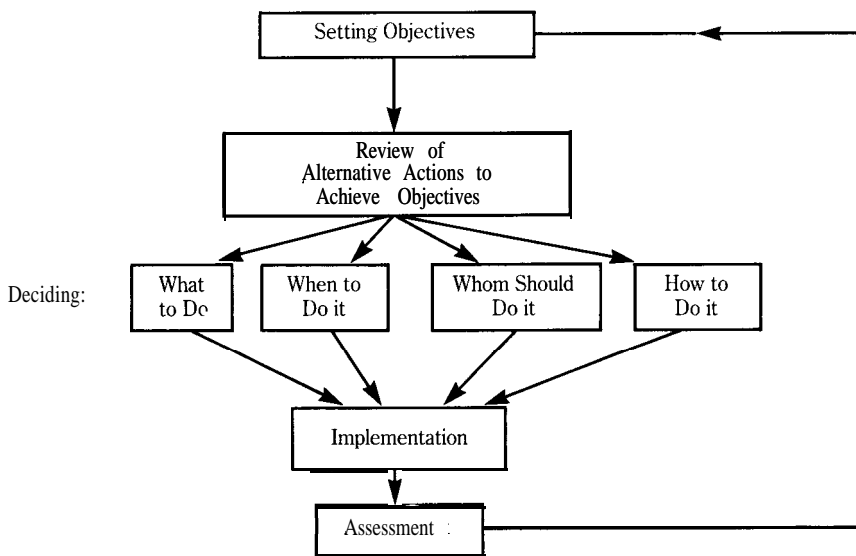


FIG. 1 General sequence of actions in planning and implementing a fish health program.

be accomplished by using a combination of strategies and by selecting those alternatives which are most effective and for which costs do not exceed financial resources available.

Maximum flexibility for fish health planning is available during the design phase for a new fish culture facility. Alternatives can be reviewed and decisions made regarding whether to use groundwater, as opposed to surface water, as the source of supply; whether water treatment facilities are required; whether quarantine facilities are needed if disease-free sources of stock are not available; or whether separate facilities should be constructed for broodstock rearing to eliminate the necessity for bringing in new stock each year. Generally, it has always proved to be less costly to incorporate disease control measures into new facilities during initial construction than after a rearing facility has been completed. Needham (1977) recommended that a fish pathologist be involved in all phases of culture operational planning, including site selection, hatchery design, selection of brood stocks, harvest methods, and quality control. Fish health considerations should be an integral part in the planning of all these activities.

For an existing fish production system, the same fish health objective applies but the approaches to be used may differ. Routine procedures and facilities already in place may have to be changed in order to reduce or eliminate potential disease risks. If diseases are already present and causing problems, plans should be developed for phased elimination of the diseases and for a reduction of further exposure to disease organisms.

The potential actions available to fish health planners can be categorized as disease prevention, control and eradication:

1. Disease Prevention Techniques —These techniques are designed to maximize the ability of cultured fish to withstand disease as well as to minimize the risks of exposure to pathogens and/or outbreaks of disease. They are used

primarily before diseases are detected and after a disease has been eradicated. In order to maximize the ability of fish to withstand disease, maintenance of optimal environmental conditions is of utmost importance, as are the proper selection of genetic strains, diets, etc. Fish that are in poor physiological condition due to one or more undesirable factors are normally more susceptible to disease. In fact, avoidance of stress is probably the single most important way to prevent disease (Avault 1981).

In order to minimize the risk of exposure to pathogens or outbreaks of a disease, the water supply can be treated to kill pathogens (disease organisms) or infected fish that may be present, facilities can be disinfected between crops or year classes, fish stocks can be vaccinated, and introduced fish placed in quarantine until it can be demonstrated that they are free of diseases of concern. It should also be noted that continuing disease prevention techniques are important in order to control the spread of diseases to new areas and other facilities after outbreaks have occurred.

2. Control Measures — These measures are employed to alleviate the impact of pathogens after a disease problem has been detected. Techniques used can be either direct in their effects on pathogens in the fish (e.g. use of bactericides and antibiotics), or indirect in that they reduce the density of pathogens available to infect fish (e.g. partial water treatment).

3. Eradication of a Disease — Eradication includes all actions required to eliminate specific pathogens from a facility, and to prevent further opportunity for expression of the disease. It is strongly recommended that fish culture program managers develop the outline of an eradication plan prior to a disease outbreak. It is far more difficult to be objective in preparing such a plan when fish may be dying in large numbers.

After considering all disease control alternatives that could be applied in a given situation, decisions must be made on the actions that should be taken, when, how and by whom. Important considerations at this stage include the formulation of contingency plans, incentives for the staff, and the full range of other management issues.

A plan or course of action is no more than an abstract exercise unless the needed resources are available and steps are taken to make it operational. Too often, procedures for fish disease control are clearly laid out but not followed. Workers may become careless if not regularly reminded, and errors made in the space of a few seconds may negate years of work in fish disease control. Implementation of a fish health plan at the operational level is therefore as important as the planning exercise itself. At higher organizational levels, planning activity should be translated directly into budgets that will support future fish health management activities.

Finally, regular assessment of the progress that has been made in implementing the plan will provide essential feedback to determine if objectives are being achieved. Objectives may have to be modified or fine-tuned based on the effectiveness and costs of different actions.

A simplified, theoretical fish health program describes the measures that can be implemented to reduce the risk of exposure to diseases at each stage of a fish cultural operation. Fish health programs will vary considerably among facilities in detail and complexity, depending on the objectives set and resources

available. It is for this reason that it is important that planning be undertaken separately for each field installation.

REFERENCES

- Avault, J. W. 1981. Prevention of fish diseases: Some basics reviewed. Part two. *Aquaculture* 7(6): 4.
- Needham, E.S. 1977. The salmonid pathologist in 1977, p. 8-15. In *Proc. Int. Symp. Cult. Salmon*. Tavolek, Inc., Seattle, WA. 189 p.