



## Procedures for Start-up of Warm Water Aquaculture Ponds <sup>1</sup>

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### Introduction

Basic procedures for pond preparation and start-up are similar for a wide variety of species. Aquaculturists may find this information useful in establishing or evaluating their pond start-up procedures for producing small fish or fingerlings.

### Pre-Filling

#### New Ponds

Newly constructed ponds should have clean smooth bottoms which slope towards the drain or to one end of the pond if the pond must be pumped out for harvest. Average depths of aquaculture ponds are 3 to 5 feet. New ponds requiring liming should receive 1,000-2,000 lbs/acre at this time.

#### Drained Ponds

Ponds which have been drained and are to be refilled should be allowed to dry if possible for 1 to 2 weeks. This allows aeration of bottom sediments and kills many disease organisms and aquatic animals which remain in the pond after draining. To disinfect a pond after draining, hydrated lime ( $\text{Ca}(\text{OH})_2$ ) at 1,000-2,000 lbs/acre may be applied. Chlorine at 5

mg/l is also useful to ensure sterilization of ponds or tanks, particularly where pools of standing water remain.

### Water Supply

#### Surface Water

If water from a stream or reservoir is used to fill the pond, the water should be screened or filtered. A series of screened boxes or a gravel filter bed are useful at the intake source. Unfiltered water at the pond inlet should run through a fine mesh screen box or saran filter sock. The primary purpose of the screens and filters is to prevent undesirable wild fish, fish eggs, and predaceous invertebrates from entering the pond.

#### Ground Water

Water pumped from wells is often low in oxygen and may contain high levels of undesirable gasses such as hydrogen sulfide and carbon dioxide. It is beneficial to aerate this water prior to its entering a pond or tank, especially if the in-flowing water rapidly replaces the pond or tank water. A splash board or other device which splashes, sprays or agitates the water as it enters the pond is normally used.

1. This document is FA-5, one of a series of the Department of Fisheries and Aquatic Sciences, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Reviewed March 2000. Please visit the EDIS Web site at <http://edis.ifas.ufl.edu>.

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## Filling Ponds

Ponds should be filled as rapidly as possible prior to stocking, and proper management should begin immediately. Allowing filled ponds to sit unattended invites weeds and filamentous algae problems. If small fish are to be stocked, it may not be necessary to fill the pond completely prior to stocking as the small fish will occupy very little of the pond volume. Filling should be completed shortly after stocking, however, as even young fish can rapidly deplete the natural food supply.

## Pond Fertilization

Ponds stocked with fish eggs, fish fry or fingerlings benefit from fertilization. The nutrients provided stimulate the productivity of the natural food chain which results in abundant zooplankton, the preferred natural food of most young fish. A mix of organic and inorganic fertilizers are used most often. Quantities of organic fertilizers used are dependent on quality and nutrient content. Cottonseed meal or chicken manure at 300 to 500 lbs/acre will help promote development of the zooplankton bloom. Phytoplankton growth is stimulated by adding 8 to 10 lbs/acre of phosphorus in a liquid or granular fertilizer mix. The most commonly used inorganic fertilizers are ammonium phosphate or liquid poly-phosphates. When using a liquid fertilizer, application rates are usually about 1 to 1.5 gallons per acre. Natural fertility of the water determines the need for fertilization in any case. Older ponds with nutrient rich sediments may respond without fertilization. Fertilization should take place when or shortly after the pond is filled. At the time the fish are fed a prepared diet, the need for fertilization is eliminated.

## Aquatic Insect Control

The larvae and adults of many insects are predacious on small fish, particularly their eggs and fry. Insects are attracted to newly filled ponds as sites for egg-laying. As a result, ponds newly prepared for stocking young fish are also growing a crop of predacious insects. These insects can greatly reduce survival of fish to larger sizes. Insects and their larvae can be eliminated by applying chemicals to the water which are specifically approved for this use. Contact

the Florida Department of Agriculture for a list of legal chemicals. Care must be taken when selecting a chemical for use in fish ponds. It not only must be labeled for use in ponds, but must be labeled specifically for the type of fish that is being grown (such as foodfish, baitfish, or goldfish). Chemicals which are toxic to insects may also be toxic to some fish. Treatments are generally more effective at pH below 9 and water temperatures between 65 and 85°F. Once the appropriate chemical is chosen, it should be mixed with water and sprayed or otherwise well dispersed around the pond edge. The product label contains a great deal of information about the product and should be read thoroughly and carefully before each use.

A major drawback of using such chemicals is that many are also toxic to desirable zooplankton which are an important food for young fish. As a result, to derive benefits of both insect control and zooplankton production, timing of application is critical. Ponds should be treated for insect control 5-7 days prior to stocking fish fry. If eggs are stocked, application should occur 5-7 days before eggs are expected to hatch. This treatment will control insects, but allow zooplankton to develop, because their recovery time is shorter. Following initial control, applications should not be repeated until approximately three weeks following the initial treatment or until fish have depleted the zooplankton supply and are feeding on prepared diets. In ponds used for producing small fish or fingerlings, regular control of insects at 2 to 3-week intervals will enhance survival if ponds are receiving supplementary feeding to compensate for depletion of zooplankton populations. Once fish grow beyond one inch in length they are much less susceptible to predation by insects.

In food fish ponds where these chemicals cannot be used, a mixture of 4 gallons of diesel fuel and 1 quart of motor oil per surface acre can be applied to kill air-breathing predaceous insects. This treatment clogs the breathing tubes of the insects when they rise to the surface for air. To minimize damage to zooplankton populations, the diesel fuel should be aerated for 24 hours prior to application and is approved for use on food fish.

## Aquatic Vegetation Control

Proper preparation, filling, and fertilizing of ponds should prevent aquatic weed problems. A pre-filling application of herbicide such as Simazine can prevent weed and algae growth. It also reduces phytoplankton bloom development. A phytoplankton bloom established in a pond will out-compete aquatic weeds. If weeds become established, they will prevent development of a satisfactory bloom. For small weed infestations, manual removal is best. Once weeds are removed, development of the phytoplankton bloom will prevent their reestablishment. If extreme weed problems develop, aquatic herbicides may be required and the advice of a weed specialist should be considered as to the type and amount of herbicide to use. In aquaculture, the grass carp is often used for biological weed control at densities dependent upon the extent of weed infestation. For rapid control, grass carp of about 8 to 12 inches in length should be stocked at about 100 per acre. Larger carp can be stocked at lower densities. As the grass carp control the weeds, they should be removed as they will compete with other fish for feed added to the pond. The grass carp are not a threat to small fish in the pond, although at harvest time, due to their large size, they can physically damage small fish if confined in the same net. A large mesh seine to remove the grass carp fish solves this problem. Grass carp can be used at densities as low as 1 to 2 per acre for maintenance after weed control has been achieved. In states where grass carp are legal, triploid (sterile) grass carp may be required. The triploid grass carp can be used in Florida with proper permits. Dealers who sell the fish can usually supply you with a permit application, which must be sent to the Florida Game and Fresh Water Fish Commission.