Extension Folder No. 69
2014

Grass Carp - - 1.5
Common Carp - 2.0

Feeding groups  Group Species Species % Ratio
Surface feeder 40 Catla Silver carp 15 25 1.5 2.5
Column feeder 20 Rohu 20 2.0
Bottom feeder 30 Mrigal Common carp 15 15 1.5 1.5
Macro-vegetation feeder 10 Grass carp 10 1.0

C. Post stocking:

1) Supplementary feeding
Fishes need much more food than what is available naturally in the pond. Fishes can be fed with a mixture of rice bran and oilcakes in the ratio 4:1. Due to the high cost of Ground nut Oil Cake (GOC) alternate sources like Cotton seed oil cake which is comparatively cheaper than GOC. GOC and cotton seed oil cake can be mixed in equal proportions and fed to the fish and is reported to give almost the same growth rate as that of GOC. The feed should be placed on a feeding tray or in feeding bags and lowered to the pond bottom or it can be dispersed at the corners of the pond. After some time the fishes will get used to this type of feeding and aggregate at the same place at particular time for regular feeding thereby reducing the feed losses. The recommended feeding rate is 5 - 6 % of the body weight upto 500gm size of fish and then reduce to 3.5% of body weight from 500-1000gm size. The feeding is supplementary in nature.

2) Manuring
i) Organic manuring may be done in monthly instalments @ 1000 kg/ha. ii) Inorganic fertilisation may be done at monthly intervals alternating with organic manuring. However, the monthly rate of fertilisation will depend on pond productivity and the growth of the fishes. It should be ensured that excess fertilisation does not take place which may result in eutrophication.

D) Harvesting
Harvesting is generally done at the end of first year, when the fishes attain average weight of 800 gm to 1.25 kg. With Proper management a production of 4 to 5 tons/ha can be obtained in a year. Harvesting is done by partial dewatering and repeated netting. In some cases complete dewatering of ponds is resorted to. Some farmers resort to partial harvesting also depending on the season and demand for fish.

Favourable ranges in water quality parameters for fresh water composite fish culture

Parameters Safe limit for culture
Turbidity 30-45cm
Salinity Less than 0.5ppt
Dissolved oxygen 5ppm
Un ionized Ammonia Less than 0.05 ppm
Nitrite Less than 0.1ppm
Nitrate 50-150ppm
Introduction

The technology developed for fish culture in which compatible and non-competing fishes are cultured simultaneously through the utilization of different feeding zones (all the natural niches) is called Composite Fish Culture and it is the most popular culture technique in the country.

Steps in Composite Fish Culture

1. Site selection:
   Factors to be considered are
   A) Ecological factors- depends on location, topography, soil suitability, water quality and quantity, hydrological and meteorological factors.
   B) Biological factors includes species selection, predator and disease control.
   C) Economical and social factors includes type of facility, marketing, safety and security, social considerations etc.
      i. Pond area: 0.5-2 ha ideal, but even 0.02 ha ponds can be used.
      ii. Ideal depth is 1.5-2m
      iii. pH: 7.5-8.5
      iv. DO >5ppm
      v. Salinity <2ppt
      vi. Clayey loam soil is ideal for as it has low permeability & high fertility. Clayey loam contains textural components like sand: 20-45%, silt: 15-23% & clay: 27-40%.
      vii. Desilting of existing ponds
      viii. Deepening of shallow ponds.
      ix. Excavation of new ponds
      x. Impoundment of marginal areas of water bodies.
      xi. Construction / repairs of embankments.
      xii. Construction of Inlets / Outlets.
      xiii. Any other item like civil structures, watchmen sheds, pump sets water supply arrangements /electricity supply arrangements etc. depending on requirements of the project based on its size etc.

2. Pond Management

Pond Management plays a very important role in fish farming before and after the stocking of fish seed.

A) Prestocking:
   New ponds, pre stocking operations starts with liming and filling of the pond with water. The first step for existing pond requiring development deals with clearing the unwanted weeds and fishes either by manual, mechanical or chemical means from the pond. Different methods are employed for this.
   i) Removal of weeds by Manual/Mechanical, Chemical or biological means.
   Chemical means- herbicides like 2,4-D (2,4-dichlorophenoxy acetic acid), Paraquat or aqueous ammonia and Diuron/Karmex, Biological means- introduction of Grass carp, Tilapia, Common carp, Pearl spot, Gaint gouramy
   ii) Removal of unwanted and predatory fishes and other animals by repeated netting or using mahua cake with a dose of 15ppm in salinity less than 15ppt, tamarind seed powder with a dose of 175-200ppm
   iii) Liming - The soils/ tanks which are acidic in nature are less productive than alkaline ponds. Lime is used to bring the pH to the desired level. In addition lime also has the following effects -
      a) Increases the pH.
      b) Acts as buffer and avoids fluctuations of pH.
      c) It increases the resistance of soil to parasites.
      d) Its toxic effect kills the parasites; and
   e) It hastens organic decomposition.
   The normal doses of the lime desired ranges from 200 to 250 Kg/ha. However, the actual dose has to be calculated based on pH of the soil and water as follows:

<table>
<thead>
<tr>
<th>Soil pH</th>
<th>Nature</th>
<th>Lime (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0-4.5</td>
<td>Highly acidic</td>
<td>1000</td>
</tr>
<tr>
<td>4.5-5.5</td>
<td>Medium acidic</td>
<td>700</td>
</tr>
<tr>
<td>5.5-6.5</td>
<td>Slightly acidic</td>
<td>500</td>
</tr>
<tr>
<td>6.5-7.5</td>
<td>Near acidic</td>
<td>200</td>
</tr>
<tr>
<td>7.5-8.5</td>
<td>Alkaline</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Liming materials- calcium carbonate, calcium oxide, calcium hydroxide etc

iv) Fertilisation/ Manuring- Fertilisation of the pond is an important means for intensifying fish culture by increasing the natural productivity of the pond. The fertilisation schedule has to be prepared after studying the quality of the pond soil. A combination of both Organic and Inorganic fertilisers also be used. The fertiliser programme has to be suitably modified depending on the growth of the fish, available food reserve in the pond, physico chemical conditions of the pond and climatic conditions.

1) Organic
   Farm yard manure(FYM)- Cowdung @ 5000 kg/ha, Poultry, sheep manure
   Crop byproducts- cotton seed meal, mustard oil cake

2) Inorganic
   Inorganic fertilisation to be undertaken after 15 days of application of fertilisers. Fish fingerlings of 50-100 gm size (approx) should be stocked @ 5000-8000 nos. per hectare. Depending on availability of seed and market condition, stocking can be of 3, 4 or 6 species combination in the following ratio.

Fish species involved in composite fish culture

Depending on the compatibility and type of feeding habits of the fishes, Indian as well as Exotic varieties have been identified and recommended for culture in the composite fish culture technology Species feeding habits and feeding zone

1.1. Indian Major Carp

<table>
<thead>
<tr>
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<th>3-species</th>
<th>4-species</th>
<th>6-species</th>
</tr>
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<tbody>
<tr>
<td>Catla</td>
<td>4.0</td>
<td>3.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Rohu</td>
<td>3.0</td>
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<td>2.0</td>
</tr>
<tr>
<td>Mirgal</td>
<td>3.0</td>
<td>2.0</td>
<td>1.5</td>
</tr>
</tbody>
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1.2. Exotic carps

<table>
<thead>
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<th>6-species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver carp</td>
<td>Phytoplankton feeder</td>
<td>Surface feeder</td>
<td></td>
</tr>
<tr>
<td>Grass carp</td>
<td>Herbivorous</td>
<td>Surface, column and marginal areas</td>
<td></td>
</tr>
<tr>
<td>Common carp</td>
<td>Detritivorous/Omnivorous</td>
<td>Bottom feeder</td>
<td></td>
</tr>
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Species combination (ratio)

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