S. S. College, Jehanabad

Department: Zoology

Class: M.Sc. Semester IV

Subject: Zoology

Topic: Composite Fish Culture & Polyculture

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8) Composite fish culture or Polyculture:

Introduction :— Stocking of cultivable fishes of different species which differ in feeding habits in same pond is called composite fish culture or polyculture or mixed fish farming. In other word, combined or mixed farming of compatible fish species is called polyculture or composite fish culture.

In 1971, ICAR initiated All Indian Co-ordinate research project (AICRP) on composite fish culture of Indian and exotic fishes under different Agro-Climatic condition in the country.

Principle :—

When several species belonging to different ecological niches of a pond are cultivated together, the available food in the pond is utilized most efficiently leading to maximum production of fishes. The stocking is done in such a way that towards the end of vegetative period, marketable fishes of all the species are obtained. objectives of composite fish culture.

1) All available niches are fully utilized.
2) Composite fish species do not harm each other.
3) No competition among different species is found.
4) The entire type of food supply is utilized.
5) Production increases five to eight times than monoculture.
6) Fishes may have beneficial effect on each other.

Composite Fish culture in India :—

A full fledged co-ordinate

research Project of I.C.A.R (CIFRI) on composite fish culture was started in (1971) with one centre in six major engaged in fish culture. These centers are in:—

(i) Andhra Pradesh
(ii) Haryana
(iii) Maharashtra
(iv) Tamilnadu
(v) U.P
vi) West Bengal.

The location of these centers in these states is given below.

(1) Sunkesula fish farm (A.P).
(2) Saidpura fish farm, Karnyal (Haryana).
(3) Hadapsar fish farm. Pune (Maharashtra).
(4) Bhawani Sagar fish farm (Tamilnadu).
(5) Vijayatala fish farm, Jaunpur (U.P).
(6) Kulia fish farm (W.B).

Now-a-days in India Polyculture is Progressing well in large Ponds on commercial scale. In west Bengal at Anjana fish farm, 4000 kg/hectare/year Production of fish has been recorded with Rohu, Catla, and Mrigal.

Various combinations selected for composite experimentation chiefly include:—

(i) Grass carp, Silver carp, Scale carp and mirror carp in ratio of 5:3:8:2.
(2) Grass carp, Silver carp, Rohu Scale carp and mirror carp in ratio of 5:3:6:8:2

<3> Grass carp, Silver carp, Catla, Rohu, Scale carp and Mirror carp in ratio of 5:3:3:6:8:2.

<4> Grass carp, Silver carp, Catla, Rohu, Scale carp, Mirror carp and Tilapia in ratio of 5:3:3:6:8:2:3.

Indigenous major carps :-

<1> Catla catla (Catla or Bhakur). It is a surface feeder consuming zooplanktons.

<2> Labeo rohita (Rohu). It is a column feeder consuming algal forms, decaying plants and macrophytes.

<3> Cirrhinus mrigala (Mrigal or Nain). It is a bottom feeder consuming decaying plants and detritus.

Exotic carps :-

<1> Cyprinus carpio (Common carp). Omnivorous and scavenger, feeding on both animals and plants.

<2> Ctenopharyngodon idella (Grass carp). It feeds on coarse macro-vegetation, viz. Spirodela, Lemna, Azolla, Hydrilla, Ceratophyllum etc.

<3> Hypophthalmichthys molitrix (Silver carp). A surface feeder on Phytoplankton.

Stocking density :-

In India with improvement in management practices, the stocking density of six species of carps had been gradually increased from 5000-6000 fingerling/hectare (Low input technology) to 8000 fingerlings/hectare

(intermediate input technology) to 10000 fingerlings /hectare (high input technology). A higher stocking density (15000 - 25000) of fingerling/hectare through rational culture is being experimented out at CIFA, Kausalyaganj. The result are encouraging and promising.

Indigenous			Exotic.			
catla :	Rohu :	Mrigal :	Common carp :	Grass carp :	Grass carp :	Silver carp.
1 :	1 :	1 :	2.5 :	2.5 :	2.5 :	2
1 :	1 :	1 :	2.5 :	2.5 :	1.5 :	3
1.5 :	3 :	1 :	2.5 :	2.5 :	1.5 :	3.5

The factors which are considered useful for the purpose of complete utilization of natural/supplementary food and higher productivity is give below:-

1) selection of suitable combinations with respect to food and feeding habits and their tolerance limit to various physico chemical and biological factors.
2) stocking densities of fingerlings stocked per hectare area of the pond.
3) Initial total weight of fingerlings being released in the pond.
4) Rate, kind and frequency of artifical fertilization of pond.
5) Rate, kind and frequency of artificial food being supplied.
6) The biotic and biotic characteristics of the pond.
7) The cost of production based on expenditure.

Production:

The results of experiment on mixed farming of the aforementioned three indigenous and three exotic species have opened in a new

line in aquaculture in India. It was found that the average yield of indigenous major carp in intensive fixed farming is about 1000 kg/hectare/year whereas and the average yield of indigenous and exotic species cultured together is 2000 kg. Hectare. year (Jhingran 1974). Further raise I the Polyculture have been done and a production of over 11000 kg. Hectare/year has been reported in recent years.

Additional fish Polyculture

In USSR and in a number of east European countries, the trenches are stocked additionally with the carps. These fishes feed on submerged vegetations and the invertebrates from the peripheral zone of Plant canopy, occupying the bottom of the pond. They also feed on residue falling down to the bottom, thereby preventing decomposition and improving sanitation of the pond.

In India, among the other fish species which can be reared with major carps, supplementary feed in the form of larvae of insects, chopped flesh, worms etc. may be provided to feed these fishes. Addition of cat fishes to commonly cultivated stocks of carp will not only restore the depleted stock of catfishes in inland water resources but also conserve the meat of high food value.

statistics of growth rate of main six species used in composite fish culture programming: —→

Growth Potential of different carps under composite fish culture has been studied in different agro climatic conditions in India. However, the average monthly growth rate of Grass carp and common carp is higher in comparison to silver carp, Catla, Mrigal and Rohu.

1) Grass carp — 96.6 – 112.5
2) Common carp — 83.0 – 92.0
3) Silver carp — 65.6 – 92.0
4) Catla — 43.0 – 64.2
5) Mrigal — 42.2 – 53.5
6) Rohu — 38.0 – 46.6.