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STUDY OF FISH CULTURE IN KIRHAI DAM OF AMARPATAN, SATNA (M.P.)

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ABSTRACT:

The present study deals with fish culture ofKirhai dam. Kirhai damis made on KirhaiNalla. It is situated between 24°15'25" N latitude and 81°10' E longitude. It is located on Amarpatan-Ramnagar road, 9 km from N.H.-7 Aamarpatan Bus stand. The catchment area of the dam was 0.715 sq. mile (1.852 sq. km). It is an important water body of this area.The results of present investigation reveal the occurrence of 06 fish species belonging to one orders, one families and 06 genera namely; Catlacatla,Cirrhinusmrigala, Labeorohita, Cyprinuscarpio, Hypthalmichthys molitrix, Ptenopharyngodonidellus. Fish productions obtained by combined culture of Indian major carps viz. rohu, catla, mrigal and exotic carps viz. silver carp, grass carp and common carp are represented in table below. During culture period (July 2019 to June 2020) a total of 4156.03 kg/ha/yr production of fish was obtained. Catla and Silver carp showed better production during present study. Harvesting of stock dam was done by drag netting. Fishes attaining the marketable size are harvesting to reduce the pressure of density on the dam and thereby provided efficient space for the growth of other fishes.

KEYWORDS: *Fish culture, fish production and Kirhai dam.*

1.INTRODUCTION

The number of dams, reservoirs, tanks etc. has significantly developed in last few years. The development of fisheries in these fresh water resources needs to be increased through the scientific development. The quality of water should be checked at regular intervals to prevent deterioration of water quality and to maintain aquatic biota.

Fish production in India has been growing steadily over the years and at present India ranks third in fish production in the world. Reservoirs contribute to the inland fish production of India which has been estimated at 93,000 tonnes (Anon, 2006). In spite of this fact, reservoir fish production has been treated as a byproduct, giving it less importance as a fish production system. For this reason, reservoir fisheries have not made significant progress in the country and do not contribute to inland fish production of the country to the extent they could. However, subsequently, the managers of majority of the water and power projects in the country have realized that fisheries need to be given its due importance in overall reservoir management. Vass (2007) reported that fish yield optimization through effective management.

Vass and Sugunan (2007) reported that in Madhya Pradesh about 460,384 reservoirs are present, of which 172,575 are small, 149,259 medium and 138, 550 large sized. In reservoirs, the

annual fish yields were reported in the range of 15 kg/ha to 72kg/ha. Mathew (1969) reported that in Govindgarh reservoir (307 ha) there was sharp variation in yield varying from 0.4 to 26.4 kg/ha (average 15.9/ha).

Fish culture methods are highly variable from region to region as well as investment capabilities of the farmers. It involves the production of fish in a water body for above the level that is naturally obtaining. The fish production can inhance by not only controlling the feeding, growth and breeding of fish but also controlling the characterstics of the water mass.

FISH CULTURE PRACTICES IN INDIA:

Fish culture practices may be classified into three different kinds on economic and commercial consideration, depending upon the motive of farming: extensive, intensive and semi- intensive.

(i) Extensive fish culture is the last managed fish farming. A modest yield raised on the natural food, nothing more than the natural production is obtained.

(ii) Intensive fish culture on the other hand in which an all-out attempt is made to achieve maximum production of fish. It is best managed form of fish farming in which fish are fed on artificial food.

(iii) Semi-intensive fish culture is anything between the first two kinds.

Fish culture may also be classified into monoculture, monosex culture and polyculture.

POLYCULTURE OR COMPOSITE CULTURE:

In principle, the methodololgy of composite fish culture remains the same all over with minor modifications to suit the local needs.

CHARACTERISTIC OF CULTIVABLE FISH SPECIES:

The selection of the fish species in combination must be made according to the type of water body, climatic conditions, artificial food resources and market requirements. The principal characteristic of cultivable fish species should be:

1. They should be fast growing species.
2. They occupy different ecological niches.
3. They have complementary feeding habits.
4. They should tolerate each other.
5. They should all be non-predatory.
6. They should be hardy and resistant to disease.
7. They should be able to use natural foods as well as artificial food.
8. They should be herbivorous in habit.
9. They should be resistant to ecological variation.
10. Their flesh should be tasteful.

STUDY AREA-

The above facts related with damming effect on the ecological condition of the reservoir have inspired the present investigation. The present water body namely Kirhai dam is situated in village Kirhai of tehsil Amarpatan, district Satna (M.P.) on the south side of Amarapatan-Ramnagar road, just below the Kamore hills. It was constructed in 1981. Kirhai dam is situated in village, Kirhai, tehsil Amarpatan, district Satna (M.P.). Amarpatan is located at 24°32'N latitude and 80°98' E longitude. It lies on National Highway No. 7 and connects Rewa to Maihar. Amarpatan is 36 km from district headquarters, nearest Railway station, is Maihar which is 24 km. It has an average elevation of 358 meters (117.4 feet). Kirhai dam is made on KirhaiNalla. It is situated between 24°15'25" N latitude and 81°10' E longitude. It is located on Amarpatan-Ramnagar road, 9 km from N.H.-7 Aamarpatan Bus stand. The catchment area of the dam was 0.715 sq. mile (1.852 sq. km).

It is an important water body of this area.

AIMS AND OBJECTIVE OF STUDY:-

The aims and objectives of the present study are following:

- To Conservate the topography of dam.
- To improve the fish culture and water quality of dam.

REVIEW OF LITERTURE:-

Fish growing practices are almost common in the dam. The fishes constitute an economically important group of animals. Fishes of fresh or inland water bodies of the Indian subcontinents have been a subject of study since last century. Hamilton Buchnan (1822), Day (1878), Talwar and Jhingran (1991), Ghate and Wagh(1995),Dutta et.al.(2003).

The importance of fresh water resources in inland fishery, number of studies had been conducted involving various aspects of dam and reservoir fisheries such as on Chilka lake (Ray and Parida, 1966), Stanely Reservoir (Sreenivasan, 1966), SardarSagar (Sreenivasan, 1979), Kandhar tank (Kanwate and Kulkarni, 2006) and KasarSai dam (Bhalerao, 2012).

METHODOLOGY:-

During present study, semi-intensive fish culture method is used for the production of fish in Kirhai dam during July 2019 to June 2020. The aim of composite fish culture is to achieve maximum production by the culture of fast growing, compatible fish species with complementary feeding habits occupying different ecological niches in the dam. In principle, the methodology of composite fish culture remains the same all over with little modifications to suit the local needs.

The methodology of composite fish culture consists of the following steps:

1. STOCKING OPERATIONS:

A. Selection of species:

Selection of fish species is important as it decides the ultimate fish production. During present study, fingerlings of Rohu (*Labeorohita*), Catla (*Catlacatla*), Mrigala (*Cirrhinusmrigala*), Grass carp (*Ctenopharyngodonidella*), Common carp (*Cyprinuscarpio*) and Silver carp (*Hypophthalmichthysmolitrix*) were stocking in a ration 2 catla: 2 rohu: 1.5 mrigal: 2 silver carp: 1 grass carp: 1.5 common carp at the rate of 7000 fingerlings per ha. In the present study, transportation of fingerlings was done in the early morning hours with oxygen packing from Pondi fish farm, Maihar, Satna (M.P.). Acclimatization of the fingerlings was also done by putting the oxygen packed polythene bags in dam water for 30 minutes followed by addition of excess water in the same bag and releasing the fingerlings slowly in the dam for reducing the stress related to temperature fluctuation.

Catla and Silver carp are surface feeder. Catla is a zooplankton feeder and silver carp predominantly feeds on phytoplankton. Rohu is a column dweller and feeds on decaying macrovegetation and filamentous algae. Mrigal is a bottom feeder and feeds on filamental algae and detritus. Common carp is omnivorous and feeds on a wide variety of food items of both animal and plant origin. Grass carp feeds on macrovegetation. An association of the above six carps, therefore, ensures proper exploitation of the food niches in the dam.

B. Stocking density:

The fish production and productivity directly depend on the density of fish seed stocking. There is an inverse relationship between the area brought under fish culture and stocking density of fish seeds. Agarwal (1990) recommended for stocking the fish seeds in reservoirs in India.

RESULT & DISCUSSION:-

Identification and feeding habits of important cultivable fish species:

In recent period, 3 indigenous major carps and 3 exotic carps are generally cultured in mixed farming pased on ecological considerations of trophic potentials over the last few decades.

Indigenous Species:

(i) **Catla [*Catlacatla (Ham)*]:** A surface feeder consuming zooplankton.
(ii) **Rohu [*Labeorohita (Ham)*]:** A column feeder consuming decaying plant.
(iii) **Mrigal [*Cirrhinusmrigala (Ham)*]:** A bottom feeder consuming decaying plants and detritus.

Exotic Species:

(iv) **Common carp [*Cyprinuscarpio (Linn)*]:** An omnivore and scavenger on both animals and plants.
(v) **Grass carp [*Ctenopharyngodonidella (Val.)*]:** A feeder on coarse macrovegetation.
(vi) **Silver cap [*Hypophthalmichthysmolitrix (Val.)*]:** A surface feeder on phytoplankton.

The main characteristic of above 3 indigenous major carps and 3 exotic carps are given below:

Table-1. Fish Culture of Kirhai Dam, Amarpatan, Satna (M.P.) during July 2019 to June 2020.

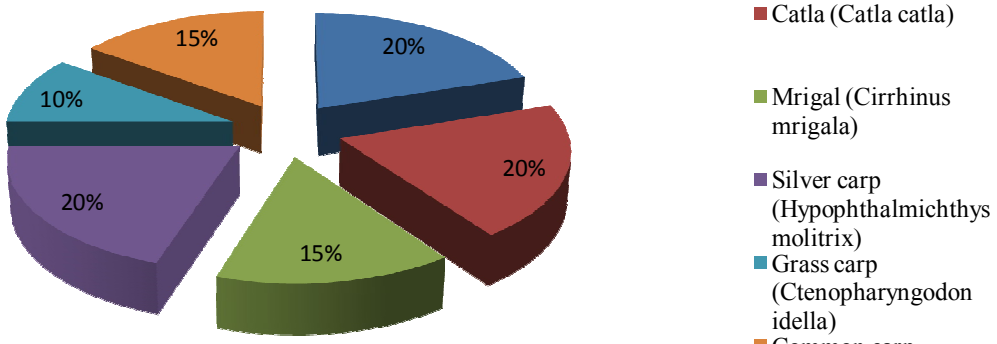
S. No.	Order	Family	Genus	Species	Local Name
1.	Cyperiniformes	Cyprinidae	*Catla*	*catla*	Catla
2.			*Cirrhinus*	*mrigala*	Mrigal
3			*Labeo*	*rohita*	Rohu
4.			*Cyprinus*	*carpio*	Gowri
5.			*Hypthalmichthys*	*molitrix*	Belli Gende
6.			*Ptenopharyngodon*	*idellus*	Hullugende menu

During present study, the stocking rate of the Kirhai dam is more than the above recommended values.Stocking on volume instead of an area basis would be more meaningful. A combination of 6 varieties of carps (3 Indian major carps and 3 exotic carps) were introduced at the rate of 7000 fingerlings per hectare in the ratio 2 rohu: 2 catla: 1.5 mrigal: 2 silver carp:1 grass carp: 1.5 common carp as represented below:

Table.2 Species wise number of fingerlings introduced in Kirhai Dam, Amarpatan, Satna (M.P.) during July 2019 to June 2020.

S.No.	Name of Species	Number of fingerlings/ha	Percentage
1	Rohu *(Labeorohita)*	1400	20%
2	Catla *(Catlacatla)*	1400	20%
3	Mrigal *(Cirrhinusmrigala)*	1050	15%
4	Silver carp *(Hypophthalmichthysmolitrix)*	1400	20%
5	Grass carp *(Ctenopharyngodonidella)*	700	10%
6	Common carp *(Cyprinuscarpio)*	1050	15%
	Total	**7000**	**100%**

Graph No. 2. Species wise number of fingerlings % introduced in Kirhai Dam, Amarpatan, Satna (M.P.) during July 2019 to June 2020



2. POST-STOCKING OPERATION:

A. Supplementary feeding:

The natural fish food is produced in a limited way and cannot supply the energy required for proper growth of fish thus the need for supplementing the food arises. Artificial feeding enhances fish production (Sinha, 1979) to make the artificial feed balanced and complete, it is necessary to understand the basic requirements of the food at the different stages of carps. Supplementary feed comprising mixtures of rice bran, groundnut, oil cake, soyabeen meal and mineral mixture (45:35:15:5) with crude protien level of 30 to 35% are provided to fish in the dam at 2-3% of fish biomass. Singh and Sinha (1981) reported the level of 45 percent protein and 26 percent carbohydrate in test diets resulted in the optimum growth of spawn, fry and fingerlings of rohu and common carp. Lakshmanan et al. (1967) reported that as a substitute of oil cake of mustard (28-30 percent protein) with oilcake of groundnut (35-45 percent protein) was more acceptable and superior in quality.

According to Huct (1975), the total amount of food to be provided is calculated by the following formula:

$$\text{Amount of food to distribute/ha} = \text{Growth per hectare due to artificial feeding} \times \text{feed conversion rate}$$

The average conversion rate of the feed mixture of rice polish and oilcake of groundnut is observed to be 2:1. Sen et al. (1982) observed that higher rates of feeding above the level equivalent to 5 percent of the initial body weight may not be useful in rohu and mrigal fingerlings.

FARTC have formulated several feeds using locally available ingredients and their efficacies have been ascertained on fry and fingerlings of carps. Of these three feeds one with GOC (78.4%), rice bran (9.8%), sal seeds cake (9.8%), fortified with minerals, trace minerals and vitamins, the second with GOC (24.5%), sesamoilckae (24.5%), rice bran (49.0 %) also fortified with minerals, trace minerals and vitamins and the third with GOC (40.0 %), fish meal (20.0%) wheat bran (35.0%) with yeast have shown promising trends in so far as growth and digestibility are concerned. Grass carp are fed with preferred aquatic vegetation kept in enclosures made of bamboos in selected corners of the dam.

Tripathi (1984) reported that provision of desirable aquatic vegetation to grass carp helps other fishes both directly and indirectly thereby increasing production.

Under the management practices followed in composite fish culture, with average survival of over 75% fishes are observed to grow the desired marketable size of one kilo and above in stock dam.

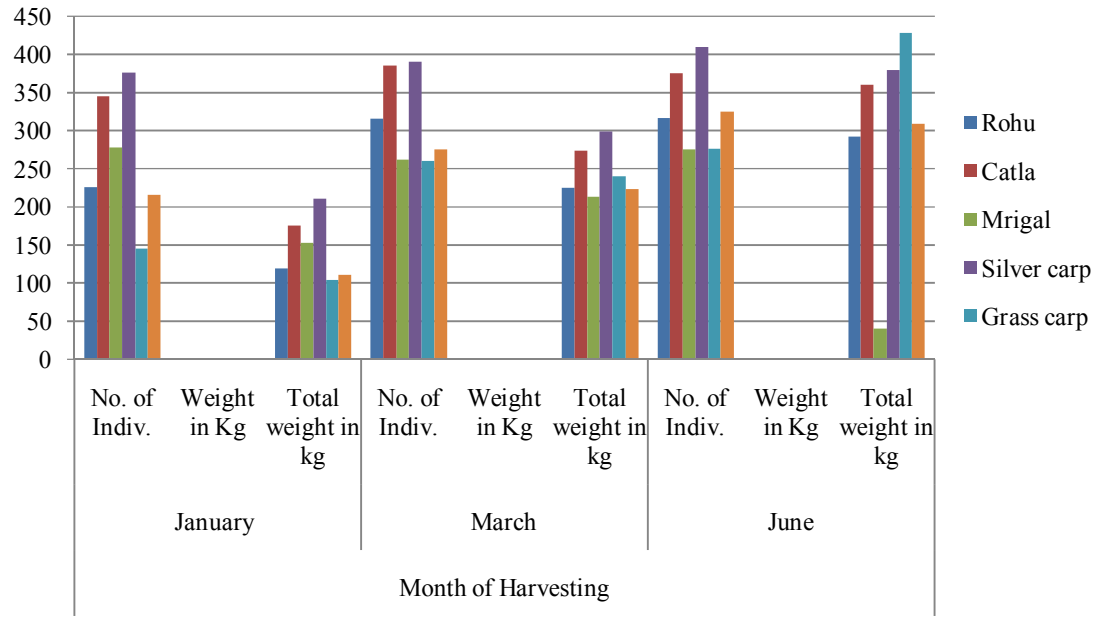
B. Fish production and harvesting:

Fish productions obtained by combined culture of Indian major carps viz. rohu, catla, mrigal and exotic carps viz. silver carp, grass carp and common carp are represented in table below. During culture period (July 2019 to June 2020) a total of 4156.03 kg/ha/yr production of fish was obtained. Catla and Silver carp showed better production during present study. Harvesting of stock dam was done by drag netting. Fishes attaining the marketable size are harvesting to reduce the pressure of density on the dam and thereby provided efficient space for the growth of other fishes.

Table 03. Fish Productivity data of Kirhai Dam, Amarpatan, Satna (M.P.) in Kg/ ha/yr. during (July 2019 to June 2020).

S.No.	Name of species	Month of Harvesting									Total Indiv. Carps	Total weight in Kg
		January			March			June				
		No. of Indiv.	Weight in Kg	Total weight in kg	No. of Indiv.	Weight in Kg	Total weight in kg	No. of Indiv.	Weight in Kg	Total weight in kg		
1	*Rohu*	226.00	0.53	118.65	315.00	0.72	225.23	316.00	0.93	292.30	857	636.18
2	*Catla*	345.00	0.51	175.95	385.00	0.71	273.35	375.00	0.96	360.00	1105	809.30
3	*Mrigal*	278.00	0.55	152.90	262.00	0.82	213.53	275.00	0.15	41.25	815	407.68
4	*Silver carp*	376.00	0.56	210.56	390.00	0.77	298.35	410.00	0.93	379.25	1176	888.16
5	*Grass carp*	145.00	0.72	103.68	260.00	0.93	240.50	276.00	1.55	427.80	681	771.98
6	*Common carp*	216.00	0.52	111.24	275.00	0.81	222.75	325.00	0.95	308.75	816	642.74
	Total	**1586**	**3.375**	**872.98**	**1887**	**4.740**	**1473.71**	**1977**	**5.460**	**1809.35**	**5450**	**4156.03**

Graph No. 3 Fish Productivity data of Kirhai Dam, Amarpatan, Satna (M.P.) in Kg/ ha/yr. during (July 2019 to June 2020)



CONCLUSION:-

In the present investigation, it was concluded that the Kirhai dam is a healthy water body providing a habitat for fresh water fishes of diverse type. However, there is constant threat to fish population due to eutrophication and illegal fishing activities. The illegal fishing activities should be banned to prevent depletion of fresh water fish resources and further studies should be conducted to generate more details regarding seasonal production and ecology of fishes. In the light of present study of Kirhai dam, it is time to make proper policies and take necessary steps to implement so that the future generation can get the fishes lively on earth.

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