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Analysis of fish productivity of Govindgarh Lake, Rewa (M.P.)

Minakshi Shukla[1], Dr. Umesh Pandey[2]
[1] Research scholar Zoology, Govt. Science College, Rewa, Madhya Pradesh, India
[2] Professor of Zoology, Govt. Science College, Rewa, Madhya Pradesh, India

Abstract
Govindgarh lake is a big water body rich in flora and fauna. The lake is also used for fish culture under the control of department of fisheries Government of M.P. The production of stored fish depends mainly on the suitability of the cultivated species and the condition of the lake where the cultivation is done. With the maintenance and improvement of the lake, the right choice of fish, artificial food and stocking rate can be controlled and enhanced. Mixed species cultivation will produce more than single species cultivation. It is clear that no species can use the farm's available food. A combination of many compatible species with supplementary food habits will make better use of the pond's food resources. The number composition of fishes were Local Major showed highest production in number followed by Rohu, Catla, Common Carp, Mrigal and Local Minor having 2116, 2019, 1766, 471, 437 and 47 in which number composition were 31%, 29%, 26%, 7%, 6% and 0.68% respectively during the study period.

Keywords: fish, productivity, Govindgarh Lake, Rewa

1. Introduction
The fresh water bodies are spread over diverse geo-climatic condition and receial drainage from different types of catchment areas. The major problems of fresh water bodies is eutrophication due to drainage and unwanted growth of aquatic vegetation. The fish culture in these fresh water bodies is affected by severs factors. Several researches like Ganapti (1956a, 1956b), Sreenivasan (1984) [6], Jhingran & Ghosh (1978) [5], Chaudhari *et al.* (1975), Gupta (1976), Tilak *et al.*(2001) [7] etc. have pointed out the importance of edaphic physical chemical and biological factors in the fish production. But the history of fish production and catch composition was yet not fully traced.

2. Materials and Methods
2.1 Study area and location
The Govindgarh lake is one of the unique water body in M.P. and located in south of Rewa district at a distance of 20 km. with a longitude 81°15'0" and latitude 24°20'25". It comes under the Rewa district and in Huzur tehsil. The lake is connected with Rewa-Shahdol and Satna-Sidhi road. The lake was formed by impounding of small nalla originating from Kaimore hill. With a view to storing rain water, the Maharaja of Rewa at that time built a bandh across the nalla to form a tank in 1958.
Various species of fishes were bred in this lake and feed of gram and small pills of wheat flour was given to them twice a day from the budget sanctioned by Rewa state. Fishing in the lake was totally prohibited. This practice continued till it was handed over to the M.P. Government. Now fisheries department looks after it and exports fishes worth several thousand rupees every years.

The main features of Govindgarh lake Rewa are as follows
- Maximum water level (F.T.L.) - 30.48 meter (100.00)
- Area of submergence - 759 Acres/307 Hect.
- Total water holding capacity - 422.45 Mc.Ft. at (F.T.L.)
- Minimum water level - 27.21 meter (89.30 ft.) Bed level - 70'
- Catchment area - 25.24 sq. km. (9.75 sq. miles)
- Lands use of catchment area - Hilly forest
- Source use of catchment area - Hilly forest
- Source of water - Rain water and
- Surface run off from the C.A.
- Activities permitted in the lake - Irrigation nistar, fisheries, boating, drinking and bathing purpose.

2.2 Fish production
Fish fauna and fish culture is evaluated by attending the commercial catches, species composition, their minimum and maximum length and weight and total weight of the catches of this lake. Based on the commercial catches, mean weight per catchment was estimated for the lake and these figures were used to estimate annual fish production considering all operations excluding closed period and off season.
Fishes were collected by small mesh sized gill net, cast net and drag net with the help of local fisherman. The collected different species of fishes were preserved in 5% formalin and brought to laboratory for further investigation. Fishes were identified up to species with the help of "The fishes of India" by (F. Day, 1889, Reproduced in 1958).
In order to obtain high production per hectare of water body, fast growing compatible species of fish of different feeding habits were stocked in the pond so that all its ecological niches are occupied by fishes. The stocked fishes should not harm each other and should have a beneficial influence on growth and production of the other.

3. Results and Discussion
The choice of a suitable fish is very important in increasing production in a dam under established ecological conditions. Fish with small food chain (herbivorous, plankton-feeder,

detritus-feeder) etc. would give larger yields of a quantitative nature, whereas those with long food chain (such as voracious fish) are good for higher economic production.

The principle requirements of the different species in supplementary are the following

1. They have supplementary feeding habits.
2. They occupy different ecological niches.
3. They attain adult marketable size at the same time.
4. They should tolerate each other.
5. They should all be non predatory.

For increasing fish production, the management and improvement of water body is necessary. This can be done by means of control of unwanted vegetation (weeds), for the better productivity regular monitoring of physico-chemical factors of lake should be done. Cultured fishes must be examined pathologically at regular intervals and artificial food.

Carps generally use natural food at least to the extent of 50% of feeding and artificial food alone does not serve the purpose. This is because carps are unable to digest the common artificial food given to them in the absence of natural food. Use of fertilizers which increases natural production of food. Natural food along has all the constituents of a complete and balanced diet. The natural foods are plankton, animal organisms, detritus, worms, insects, mollusks etc.

There the 6856 number and 27928.30 kg of fish species were recorded during study period from November 2014 to October 2015, in which 1766 number and 8897.20 kg of Catla, 2019 number and 5799.10 kg Rohu, 437 number and 1634.50 kg of Mrigal, 471 number and 2183.50 kg of common carp, 2116 number and 9281 kg of local major and 47 number and 133 kg of local minor fishes were compiled during study period. The maximum number were recorded of local major followed by Rohu, Catla, Common Carp, Mrigal and local minor and maximum weight of fishes were recorded as Local Major, Catla, Rohu, Common Carp, Mrigal and Local minor (Table 1 and Graph 1).

The weight composition of fishes in Govindgarh lake out of 6880.50 kg Local Major showed highest weight composition of Local Major 33.23% followed by Catla 31.86%, Rohu 20.76%, Common Carp 7.82%, Mrigal 5.85% and Local Minor 0.48% having the weight of 9281.00 kg, 8897.19 kg, 5799.11 kg, 2183.50 kg, 1634.50 kg and 133.00 kg respectively were recorded during the research work (Table 2 and Graph 2).

The number composition of fishes were Local Major showed highest production in number followed by Rohu, Catla, Common Carp, Mrigal and Local Minor having 2116, 2019, 1766, 471, 437 and 47 in which number composition were 31%, 29%, 26%, 7%, 6% and 0.68% respectively during the study period (Table 3 and Graph 3).

Table 1: Production of fishes in Numbers and Kilograms at Govindgarh Lake of Rewa District (M.P.) from November 2014 to October 2015.

Months' Name	Catla		Rohu		Mrigal		Common carp		Local major		Local minor		Total	
	No.	Weight in (Kg.)	No.	Weight in (Kg.)	No.	Weight in (Kg.)	No.	Weight in (Kg.)	No.	Weight in (Kg.)	No.	Weight in (Kg.)	No.	Weight in (Kg.)
Nov-14	203	1193	242	833	186	822	145	658.5	776	3306	23	68	1575	6880.5
Dec-14	21	0.126	12	0.042	12	30	9	37	54	235	12	27	120	329.168
Jan-15	10	0.06	20	0.065	14	40	12	50	56	215	0	0	112	305.125
Feb-15	363	2078.5	337	1265	225	742.5	305	1438	1230	5525	12	38	2472	11087
Mar-15	597	3457.5	611	2205	0	0	0	0	0	0	0	0	1208	5662.5
Apr-15	425	1084	622	657	0	0	0	0	0	0	0	0	1047	1741
May-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-15	147	1084	175	839	0	0	0	0	0	0	0	0	322	1923
Oct-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0

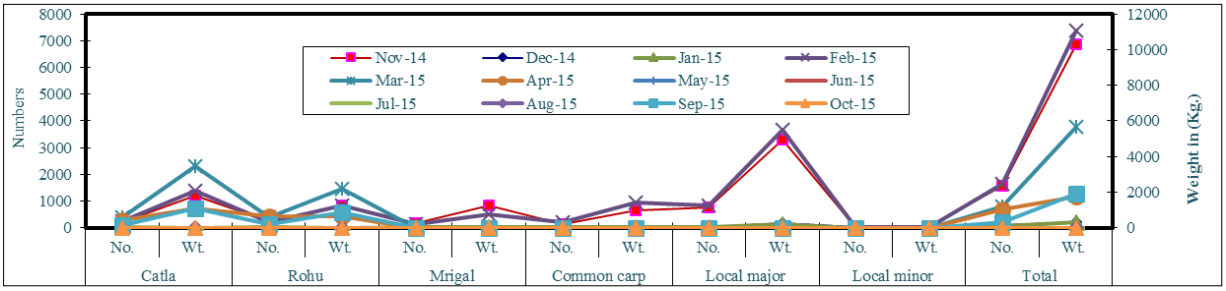

Fig 1: Production of fishes in Numbers and Kilograms at Govindgarh Lake of Rewa District (M.P.) from November 2014 to October 2015.

Table 2: Number composition of fishes in experimental at Govindgarh Lake of Rewa District (M.P.) from November 2014 to October 2015

Months' Name	Total number of species	Catla		Rohu		Mrigal		Common carp		Local major		Local minor	
		Weight	Weight%	Weight	Weight%	Weight	Weight%	Weight	Weight%	Weight	Weight%	Weight	Weight%
Nov-14	1575	203.00	12.89	242.00	15.37	186.00	11.81	145.00	9.21	776.00	49.27	23.00	1.46
Dec-14	120	21.00	17.50	12.00	10.00	12.00	10.00	9.00	7.50	54.00	0.45	12.00	10.00
Jan-15	112	10.00	8.93	20.00	17.86	14.00	12.50	12.00	10.71	56.00	0.50	0.00	0.00
Feb-15	2472	363.00	14.68	337.00	13.63	225.00	9.10	305.00	12.34	1230.00	0.50	12.00	0.49
Mar-15	1208	597.00	49.42	611.00	50.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Apr-15	1047	425.00	40.59	622.00	59.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-15	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jun-15	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jul-15	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-15	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sep-15	322	147.00	45.65	175.00	54.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oct-15	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

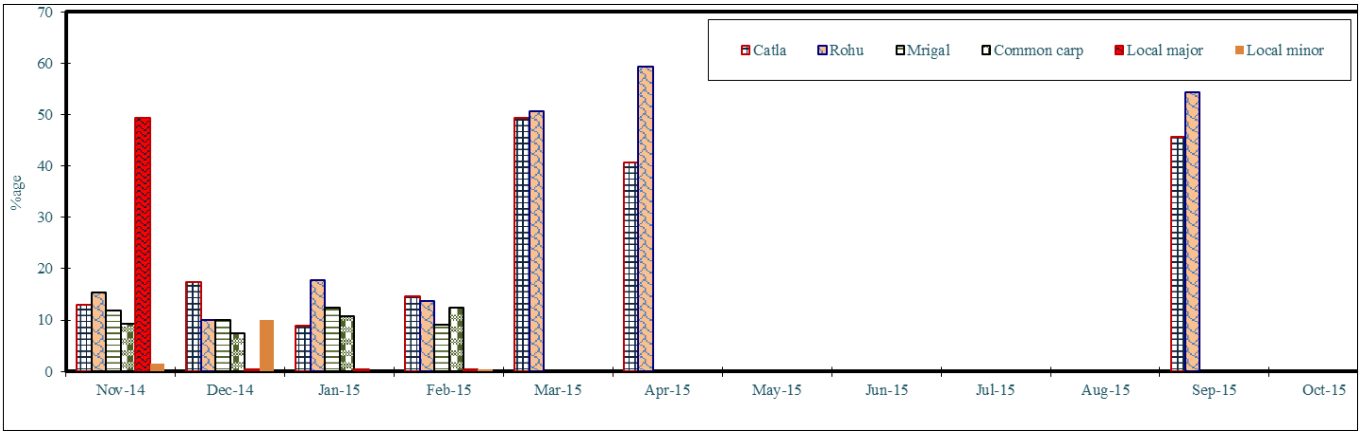

Fig 2: Percentage composition of fishes in experimental at Govindgarh Lake of Rewa District (M.P.) from November 2014 to October 2015

Table 3: Weight composition of fishes in experimental at Govindgarh Lake of Rewa District (M.P.) from November 2014 to October 2015

Months' Name	Total weight of species	Catla		Rohu		Mrigal		Common carp		Local major		Local minor	
		Weight	Weight%	Weight	Weight%	Weight	Weight%	Weight	Weight%	Weight	Weight%	Weight	Weight%
Nov-14	6880.5	1193.0	17.34	833.00	12.11	822.00	11.95	658.50	9.57	3306.0	48.05	68.00	0.99
Dec-14	329.17	0.13	0.04	0.04	0.01	30.00	9.11	37.00	11.24	235.00	71.39	27.00	8.20
Jan-15	305.13	0.06	0.02	0.07	0.02	40.00	13.11	50.00	16.39	215.00	70.46	0.00	0.00
Feb-15	11087	2078.5	18.75	1265.00	11.41	742.5	6.70	1438.00	12.97	5525.0	49.83	38.00	0.34
Mar-15	5662.5	3457.5	61.06	2205.00	38.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Apr-15	1741.0	1084.0	62.26	657.00	37.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jun-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jul-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sep-15	1923.0	1084.0	56.37	839.00	43.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oct-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

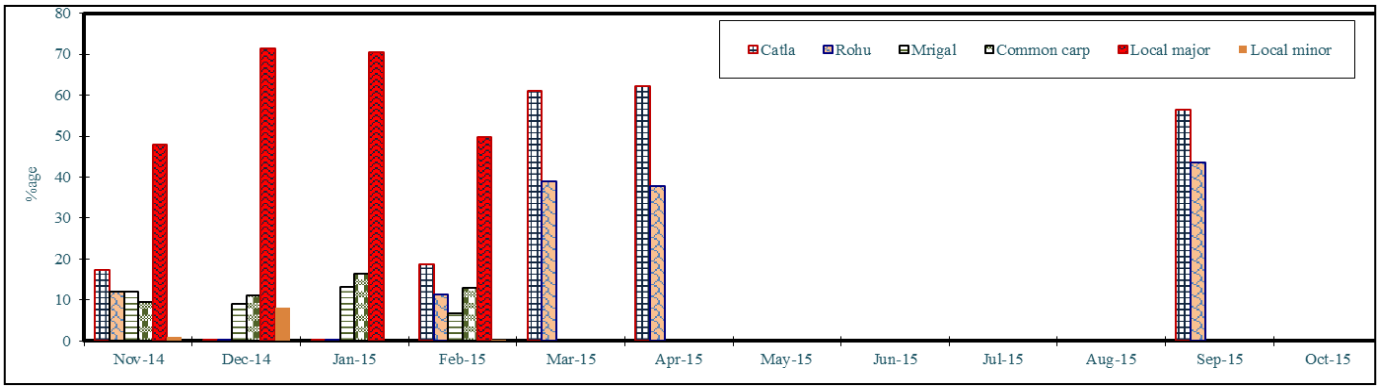

Fig 3: Weight percentage composition of fishes in experimental at Govindgarh Lake of Rewa District (M.P.) from November 2014 to October 2015

4. Conclusion

The lake can be an artificially produced or natural mass of water. Govindgarh Lake is a big pond which spreads in 15.40 hectare area. The essential feature of 'pond' is that it should be manageable for controlled farming. Govindgarh Lake is a deep pond and its depth is up to 15 meters in the rainy season. Very deep water is problem of drainage problems as well as different temperature levels, which is harmful to productivity.

The initial size of the fingerring was between 10 to 15 cm. Supplementary feed contains rice husk walnut nut cake, soybean meal and mineral mixture (45: 35: 15: 5), with 2-3% to 35% raw protein level at 2-3% rate in Govindgarh Lake Fish is provided during the period of fish biomass culture in the Govindgarh Lake, a total of 2147.875 kg / ha was produced. Catla, Rohu and Common carp showed better production during the study period.

5. Acknowledgement

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