

Periodic Research

Effect of Artificial Feed & Fertilizers on the Growth of Fishes (Carps) in Ponds



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Abstract

Present studies were conducted to find out the effect of artificial feed and cow dung manure in the form of cattle visit on the growth of fishes (carps). Five ponds viz. 1 to 5 in Akhnoor block were selected. Pond 1 served as control and was kept as such. Pond 2 did not receive any supplementary feed but only received cow dung. Pond 3 again was not given any supplementary feed but only received fertilizers (RCD) were given @ 100kg/kanal/year. Pond 4 received both fertilizers @100kg/kanal/year and supplementary feed @ 2% of the body weight of the fish & in Pond 5 both fertilizers @ 100kg/kanal/year and supplementary feed @ 5% of the body weight of the fish was given. All the five ponds were treated separately for 9 months. Monthly readings of Physico-chemical parameters and weight of fishes were recorded and compared. Fishes of Pond 5 observed significantly with higher weight gain compared to other four ponds. And the growth of fishes in different ponds observed in the order 5>4>3>2>1.

Keywords: Artificial feed, Organic manure, Growth parameters, Carp.

Introduction

Despite a lot of development in agriculture sector, starvation and malnutrition are still the big challenges to be dealt with. More than 70% mouths are still starved. A research into the problem of nutrition reveals that many people in the developing countries of the world are undernourished. Fish offers an important substitute because of its high nutritive quality. Fish is a cheapest, highly proteinacious and easily digestible food for the malnourished and starved people. Globally total average intake of animal protein in the form of fish recorded in 1998 is about 16% (FAO-1990).

Although fish farmers are growing fishes but we require quality fish and for that quality food should be given to the fishes. With the quality feed, we can not only increase the fish production but also the quality of fish. For this, fisherman needs to be guided. It is on record that application of organic and inorganic fertilizers in fish ponds leads to higher production of fishes. (Green, 1992). Use of both organic manure and supplementary feed together influences the pond sediment and can increase 3 to 4 time's pound of fish a pond will support. (Chatterjee and Saha, 2000). It has also been observed that addition of supplementary feed showed higher growth rate in fertilized pond rather than the non fertilized ones. (Azim et al, 2002). Traditionally also, cattle manure was used in semi intensive systems for improving the fish production as well as fish growth. (Nwachukwu, 1997). So, it is the supplementary feed which is required to increase the fish yield in fertilized pond. (Li and Yakupitiyage, 2003). With this objective an attempt has been made to make the fish farmers aware about various feed practices by which they can get maximum fish yield as well as quality fish.

Materials and Methods

Present experiments were conducted in Akhnoor Block of Jammu district. 5 Ponds were selected in the same block & were given different feed frequency and fertilizers. The studies were conducted for 270 days from July 2013 to April 2014.

Stocking of Fish

Each Pond was stocked in the month of July with 1000 fingerlings of approx. 45g of weight. Different species of carp such as Labeo rohita (Rohu), Catla catla, Cirihinus mrigla (Mrigal), Cyprinus carpio (Common Carp), Ctenopharyngodon idella (Grass carp), Hypophthalmichthys molitrix (Silver carp). Pond 1 served as control and was kept as such. Pond 2 a village pond, did not received any supplementary feed but was added with cow dung. Pond 3 again was not given any supplementary feed but was given fertilizers (RCD) @ 100 kg /kanal/ year. Pond 4 received both

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fertilizers @100kg/kanal/year and feed @2 % body weight of the fish and in Pond 5, fertilizers @ 100 kg/kanal/ year and feed @5% of the body weight of the fish was given.

Observations Recorded

The waters from all the five ponds were analyzed at monthly intervals for physico-chemical parameters viz., Air temperature, Water temperature, pH, Dissolved Oxygen, Free carbon dioxide, Carbonates, Bi-carbonates, Phosphate & Sulphate. Fish Sampling was also done at monthly intervals. Cultured fish species were captured randomly by using dragnet from each pond and released back into their respective ponds after recording the growth. Percent weight gain, total weight gain(TWG) and specific growth rate(SGR), were calculated by using following formulae:-

Percent weight gain =

$$\frac{\text{Final body weight} - \text{Initial body weight}}{\text{Initial body weight}} \times 100$$

SGR% =

$$\frac{(\log \text{ of Final weight} - \log \text{ of Initial weight})}{\text{Number of days of Experiment}} \times 100$$

Annual production and economics of various ponds were calculated based on the above observations.

Results

Growth Parameters

Growth Parameters such as final weight, gain in weight, percent weight gain, SGR%, annual production and economics of all the five ponds showed significant differences . Percent total weight gain & SGR was highest in pond 5 followed by pond 4, pond 3, pond 2 and lowest in control pond. Annual production of various ponds was calculated considering a survival rate of 90%. It was found that the annual production of pond 5 was significantly higher with 720kg/kanal/year followed by pond 4 with 360kg/kanal/year followed by pond 3 with 234kg/kanal/year followed by pond 2 with 162kg/kanal/year & lowest in control pond (P-I) with 81kg/kanal/year. Also economics of various ponds showed significant increase in pond 5 with Rs 108,000/year followed by pond 4 with Rs 54,000/year followed by pond 3 with Rs 35,100/year followed by pond 2 with 24,300/year & lowest in control pond with Rs 12,150/-(Table-I). Annual production of various ponds in kg/kanal/year and economics of various ponds in rupees is shown in Figure I and Figure II.

Table -I

Parameters	Pond I(c)	Pond 2	Pond 3	Pond 4	Pond 5
Initial wt. (g)	45	45	45	45	45
Final wt. (g)	90.4	179.8	260	400.2	800.1
Gain in wt. (g)	45.4	134.8	215	355.2	755.1
Percent wt. gain(%)	2.0089	399.56	577.78	889.33	1778
TWG	1.009	2.895	4.778	7.893	16.78
SGR%	184.98	611.39	240.89	259.59	289.69
Annual Prod.(kg/kanal/yr)	81	162	234	360	720
Economics of Ponds in Rupees (@Rs.150kg)	12150.00	24300.00	35100.00	54000.00	108000.00

Table Showing Growth Parameters of fishes in different Ponds.

Figure I

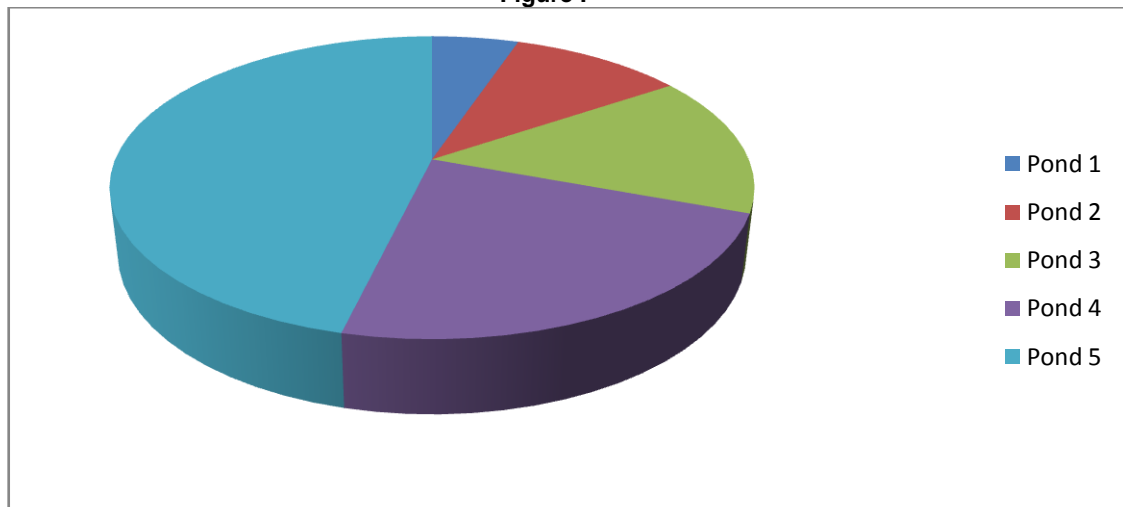


Figure-I Showing annual Production in different Ponds.

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Figure-II

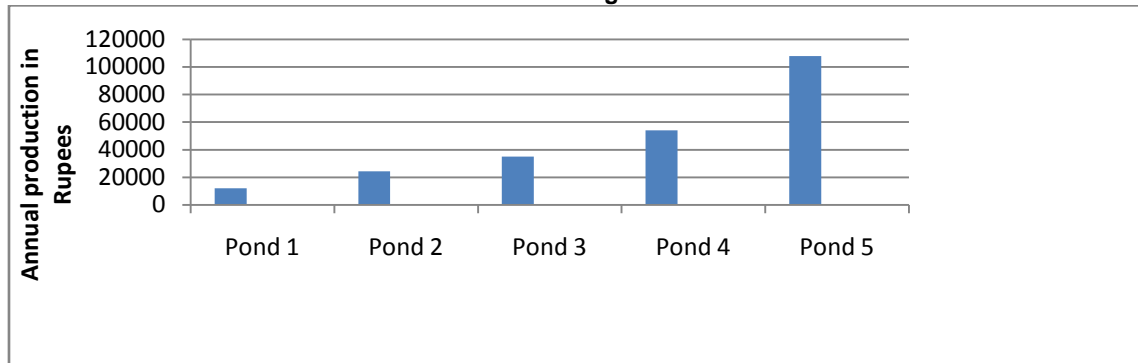


Figure-II showing economics of various Ponds in Rupees

Table-II

Months	pH	Atm.temp	Water temp.	D.o	F.Co2	Co3-	Hco3-	Ca++	Mg++	P	S
July 13	7.0-7.7	32.0-32.5	28.0-29.5	3.5-4.5	5.8-6.2	--	397-405	29-32	23-26.0	0.08 to 0.15	29.0 to 34.0
Aug 13	7.9-8.4	31.0-32.0	25.5-28.5	4.0-4.5	--	3.0-3.7	420-500	40-45	28.32.5	0.12 to 0.19	32-34.5
Sept 13	8.0-8.3	28-29.5	23.0-25.0	3.0-3.9	5.0-5.9	--	400-420	40-41.5	28-29.1	0.08 to 0.12	32-25
Oct 13	7.3-8.0	23-24.5	22.0-22.5	3.0-3.2	5.0-5.8	--	355-372	42.5-44.5	30-34.0	0.06 to 0.09	32-34
Nov 13	7.0-7.5	17-18	17.0-18.0	2.8-3.0	6.0-6.5	--	338-355	41.0-42.5	31-32.5	0.06 to 0.08	32-33.5
Dec 13	6.0-7.3	13-15	12-13	3.3-4.0	5.4-5.8	--	395-411	32-39-	39-40	--	--
Jan 14	5.8-7.4	12-14	13-15	3.6-4.0	3.8-4.0	--	400-412	27-30	30-37.5	0.05 to 0.07	20-28
Feb 14	5.9-7.5	16-18.5	17-20.0	4.0-4.2	4.0-4.2	--	399-410	30-34	32-37.5	0.06 to 0.09	20.0 to 28.5
March14	6.5-7.6	25.0-28	20-25	3.8-4.0	3.8-4.0	--	402-410	30-33	32-36	0.06 to 0.09	20.5 to 29.0
April 14	7.3-7.6	33-33.8	39.5-30.5	3.0-30.5	5.0-5.5	--	380-390	27.5-29.5	22.5 to 24.5	0.07 to 0.09	20.8 to 25.7

Minimum and Maximum values of Physico- chemical parameters of water in different treatment from July 2013 to April 2014.)

Physico-chemical Parameters:

There were no significant differences in the Physico-Chemical Parameters of various Ponds under study except for Phosphate & Sulphates which are Slightly higher in Ponds 3,4 and 5 may be because of addition of fertilizers.

During 9 months of study water temperature ranged from 12^oc to 29^oc, ph varied from 5.8 to 8.4, D.O ranged from 2.8 to 4.5 mg l⁻¹. Fco₂ ranged from 5.0 to 6.5 mg l⁻¹, whereas HCO₃ ranges from 5.0 to 6.5 mg l⁻¹. Ca⁺⁺ ranged from 27-44.5 mg l⁻¹, Mg⁺⁺ ranged from 23 to 40 mg l⁻¹. Phosphate ranged from 0.05 to 0.19 mg l⁻¹ & Sulphate ranged from 20-35 mg l⁻¹.

The differences in the above physico-chemical parameters of various ponds were not very significant. All the Parameters were in acceptable range. Minimum & Maximum values of Physico-chemical Parameters are shown in the table-II

Discussion

The result of the studies conducted showed that the average gain in body weight of the fish species together was significantly higher in Pond 5 which was treated with both fertilizers & supplementary feed @ 5% of the body weight as compared to control and all other 3 Ponds. Zhu ,et al (1990.) also reported that fertilization frequency has great impact on pond productivity and fish production. The Combination of both supplementary feed and fertilizers caused a

significant increase in fish yield. The net fish production of Pond 5 was found to be 720 kg/kanal/year which was significantly higher than all other Ponds, which clearly shows that feed and fertilizers when given together to pond, fishes can really increase fish yield leading to high annual production and of course leads to a very good economics. Abd-El-All et al.(2004) also reported that supplementary feed along with organic fertilizer leads to higher fish yield than chemical fertilization or organic fertilization alone. Edmonson (1955), Ryther and Yentsch (1958) also showed a positive co-relation between fish biomass, pond productivity and fish production. Apart from feed and fertilizers, fish growth and fish production also depends on quality of pond which is further determined by various physico-chemical parameters. During the study period, physico-chemical parameters were within the acceptable range for carps (Hassan et al, 1997, Boyd 1998, Kamal et al, 2008). No significant differences were observed for various physico-chemical parameters such as Air temperature, Water temperature, pH. Dissolved Oxygen, Free carbon dioxide, Carbonates, Bi-carbonates, Phosphate & Sulphate.

Conclusions

It is concluded on the basis of the present study that supplementary feed @ 5% of the body weight of

the fish along with the fertilizers @ 100kg/kanal/year in polyculture resulted in good growth which could fetch a good income of the fish farmers and thereby raises the socio-economic status of fish farmers. To sum up it can be stated that manuring substantiated by artificial feed in polyculture can definitely lead to high fish yield

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