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EFFECT OF POULTRY MANURE LEVELS ON GROWTH PERFORMANCE OF GROWTH SILVER CARP

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Abstract

In order to study the effect of poultry manure level on silver carp, a study was conducted at Abbassa, Central Laboratory For Aquaqulture, Agricultural Research Centre. Three levels of poultry manure (500, 750 and 1000 kg/hectar pond) applied biweekly as organic fertilzer were tested monthly from July to October. Results obtained can be summarized as follows

1-Averages of body weight (g) at the experimental period for the three levels of poultry manure were 20.21, 50.84 and 57.21g, respectively.

2-Averages of body length (cm) for the treatment were 12.35, 16.99 and 17.37, respectively.

3- Increasing poultry manure levels increased significantly ($P < 0.001$) growth performance of silver carp in the form of body weight and body lenght.

4- Gain in live weight could be determined by gain in body lenght.

Keywords: Fish, silver carp, growth, poultry manure.

INTRODUCTION

Silver carp (Hypophthalmichthys molitrix) naturally occurs in the river systems, Yangtze, West River Kwangsi and Kwangtang in south and cental China and in the Amur Rasin in USSR.The species has been introduced into many countries in recent years for aquaculture (Jhingran and Pullin 1985). In Egypt it has been introduced to be used in artificial hatcheries and in aquaculture. Silver carp can live between 4 and 38° C(Horvath 1984). The optimum growth temperature for growth of silver carp is 30-31°C (Jhingran and Pullin 1958), while growth is poor below 20°C and feeding stops at 10°C to 15° C. They added that, the optimum water temperature to induce spawning and hatching for carp ranged from 24 to 31° C. Bardach et al. (1973) reported that carps are fresh water fish that can easly tolerate salinity up to 20%.

Tang (1970) classified silver carp as phyto and microzooplankton feeder. Bardach et al. (1973) reported that silver carp feed on phytoplankton in midwater, and are the most commonly stocked phytoplankton feeders. They added that, silver carp can also accept artificial feeds such as bean meal, rice bran and flour, and are known to consume some higher plants. Cremer and Smitherman (1980) observed that the intestinal contents of silver carp are almost phytoplankton with zooplankton. They noted that the size of feed particles filtered was from 8-100mm. Hepher and Pruginin(1981) determined that, silver carp feed mainly on phytoplankton as small as 30-40mm. Wellner (1980) reported that, zooplankton was greatly reduced in the presence of silver carp. Horvath(1984) started that silver carp is herbivorous similar to grass carp, but the main protein of its diet consists of unicellular algae.It has a delicate filtering organ to collect unicellular plants, bacteria and organic detritus from water.

According to Woynarovich (1975), silver carp fish of 250g body weight can strain 32 liters of water/day through their gills. It is quite common for a fish of 500-600 g to grow10g/day or more. Jhingran and Pullin (1985) reported that under culture conditions, the growth rate of silver carp fry is extremely high in the first 10 days; the fish doubling its weight every second day and becoming about 19 mm in length and 0.09g in weight. They observed that, absolute weight increased by 0.001-0.02 g/day in the first 10 days and 402 g/day during the fingerlings stage.Silver carp attained the highest growth rate in the second year of life , and

maximum growth rate in the third year. They added that, growth in both length and weight declined sharply after the third year, the fish may weigh as 2780g gaining weight at rate of 6.3 g/day.

Alikunhi and Parameswaran (1963) evaluated the fecundity of silver carp weighing 3.18 to 8.51 kg as 145000 to 2044000 ova, respectively. they added that the number of eggs was 171 per gramme body weight, and 292 per gramme ovary weight. Jhingran and Pullin (1985) reported that, fish breed during monsoon months in the flowig waters of its natural habitat, rivers, but does not spawn naturally in the static waters of ponds and tanks. The same authors also noted that males have remarkable highly developed testes, some have abdomen bulging as conspicuous as in the gravid females, and weight of testes in some males may be as high as a 20 to 30% of the total body weight.

Cremer and Smitherman (1980) found that , the mean growth was approximately 2.7 g/day for 159 days. They added that, growth was similar in both fertilised ponds and ponds recceiving feed. Dave and Smitherman (1977) noted that, catfish production was slightly higher in the presence of silver carp, which did not compete with catfish for pelleted ration. Hepher and Pruginin (1981) noted that, organic matter is added in order to stimulate heterotrophs and to bypass the light limitation on photosynthesis. At the same time, however, organic matter also releases large amounts of mineral nutrients through its decomposition by bacteria.

The present study aimed to evaluate the effect of different levels of poultry manure as a potential organic fertilizer for growth of silver carp.

MATERIALS AND METHODS

This experiment was conducted from July to October at Abbassa Farm, Abou-Hammad, Sharkia Governorate. The farm belongs to the Central Laboratory for Aqua culture , Agricultural Research Centre. Three rectangle earthen ponds were used for this experiment. Each fresh water pond area was one hectare (2.5Feddan). The amount of natural food in the ponds was established by applying poultry manure. Three treatments, 500, 750 and 1000 kg per feddan per growing period were applied for Aquaculture , Agriculture Research Centre. Three rectangle earthen ponds were used for this experiment. Each fresh water pond area was one hectare (2.5Feddan). The amount of natural food in the ponds was established by applying poultry manure. Three treatments, 500, 750 and 1000 kg per feddan per growing

period was applied to the ponds. Frequency of applications were normaly done every two weeks at a rate of 1250, 1870 and 2500kg. Fish used in this study were silver carp (*Hypophthalmichthys* molitrix). Number of fry stocked in each pond were 10,000 fry per pond . Averages body weight and length at the start of the experiment are presented in Table 1. Random samples (100-140fish) from each pond were taken every month starting from July till the end of the growing season (October). Fish were kept in fiberglass tanks filled with fresh water from the same pond to avoid fish stress. All fish from the samples were returned to their ponds after recording the measures of individual body weight and length.

The statistical analysis of the fish data of the present work was carried out by applying the computer programme described by Harvey (1987). Data of body weight and body length of fish at different growth stages of the study were analysed by adopting the fixed model :

$Yij = M + Si + eij$

Where

Yij = observation on the ij fish;

M = overall mean, common element to all observation;

Si = fixed effect of i th poultry manure rate;

eij = a random deviation of k th fish, this item assumed to be independently randomly distributed $(0,0\text{-}^2)$ it includes all other effects not specified in the model.

RESULTS AND DISCUSSION

The means, standard deviation for body weight and body length at different stages of growth when based on the data collected during the growing period are given in Table 1. Means of initial and final body weight and length show that , silver carp fingerlings gained an average 39.36g and 10.81cm from July till October, respectively.

Results presented in Tables 2 and 3 and Figures 1and 2 revealed that, averag-

es body weight and length increased in a successive manner during all periods with each increase of poultry manure. The statistical evaluation of results indicate that, differances in body weight and body length among the treatment groups were significant ($P<0.001$) (Tables 4 and 5). This would indicate the favour of higher levels of poultry manure (1000kg/feddan). These results are in accordance with those reported by Cremer and Smitherman (1980) and Hepher and Pruginin (1981), who showed that organic fertilization increases pond productivity and natural food of silver carp. They added that, according to analysis of the intestines of silver carp, it is able to convert the primarily productivity phyto-and zooplankton into biomass.

Data presented in Tables 2 and 3 indicate that body weight of silver carp fish of the study varied with the levels of poultry manure rate; the differences were significant ($P<0.001$) in most stages (Tables 4 and 5). Differences in body weigth of silver carp due to poultry manure rate were generally in favour of the highest rate from July to the end of the experiment (October). These results agree with those of Hepher and Pruginin (1981) who reported that, organic matter is added in order to stimulate heterotrophs and to bypass the light limitation on photosynthesis. They added that, organic matter also releases large amounts of mineral nutrients through its decomposition by bacteria. They noted that, increase of manure led to increase in growth as a result of increasing pond productivity in the pond systems. These findings may lead to conclude that poultry manure rate was an important factor that influenced silver carp growth in the form of body weight and length. It could also be concluded that, increasing poultry manure increases growth performance of silver carp growth in the form of body weight and length.

Table 1. Actual means (g), standard deviations (S.D.) for body weight and body length of silver carp at different growth stages.

Growth stage	N	Body weight		Body length	
		mean	S.D.	mean	S.D.
July	341	0.79	0.21	4.39	0.51
August	341	18.10	7.25	11.99	1.56
September	341	27.18	11.21	13.39	2.94
October	341	40.15	21.29	15.20	3.80

Table 2. Least-squares means (g) for factors affecting body weight of silver carp

Independent Variable	No	July wt. mean ± SE	August wt. mean ± SE	September wt. mean ± SE	October wt. mean ± SE
Treatments					
500 kg./hectare	140	0.78±0.02	13.45±0.5	20.99±0.5	20.21±1.1
750 kg./hectare	100	0.79± 0.02	20.59± 0.6	30.15± 0.9	50.84± 1.3
1000 kg./hectare	101	0.79± 0.02	22.09± 0.6	32.83± 0.9	57.21± 1.3

Wt. Body Weight

Table 3. Least-squares means (g) for factors affecting body weight of silver carp.

Independent Variable	No	July wt. mean ± SE	August wt. mean ± SE	September wt. mean ± SE	October wt. mean ± SE
Treatments					
500 kg./hectare	140	4.36±0.04	10.96±0.14	12.02±0.22	12.35±0.26
750 kg./hectare	100	4.36± 0.05	12.34±0.16	14.13±0.27	16.99±0.29
1000 kg./hectare	101	4.46± 0.05	13.06±0.16	14.55±0.27	17.37±0.29

Table 4. Least-squares analysis of variance for body weight of silver carp.

Source of variation	DF	July wt.		August wt.		September wt.		October wt.	
		MS	F.ratio	MS	F.ratio	MS	F.ratio	MS	F.ratio
Total reductin	3	0.01	ns 0.2	1748.3	*** 46.8	3154.5	*** 32.0	32167.8	*** 188.3
MU-YM	1	0.0	ns 0.01	3.3	ns 3.3	216.5	ns 2.2	2253.5	*** 13.2
Treatment	2	0.01	ns 0.2	2622.5	*** 70.3	4713.7	*** 48.0	48251.7	*** 282.5
Remainder	338	0.04		37.3		98.4		170.8	

*** P<0.001, ** P>0.01, * P<0.05 and ns P>0.05.

Table 5. Least-squares analysis of variance for body length of silver carp.

Source of variation	DF	July wt.		August wt.		September wt.		October wt.	
		MS	F.ratio	MS	F.ratio	MS	F.ratio	MS	F.ratio
Total reductin	3	0.24	ns 0.9	91.7	*** 34.2	151.9	*** 20.6	642.6	*** 72.6
MU-YM	1	0.0	ns 0.02	5.9	ns 2.2	10.6	ns 1.4	46.0	*** 5.2
Treatment	2	0.36	ns 1.4	137.6	*** 51.3	227.7	*** 30.9	963.9	*** 108.9
Remainder	338	0.26		2.7		7.4		8.8	

*** P<0.001, ** P>0.01, * P<0.05 and ns P>0.05.

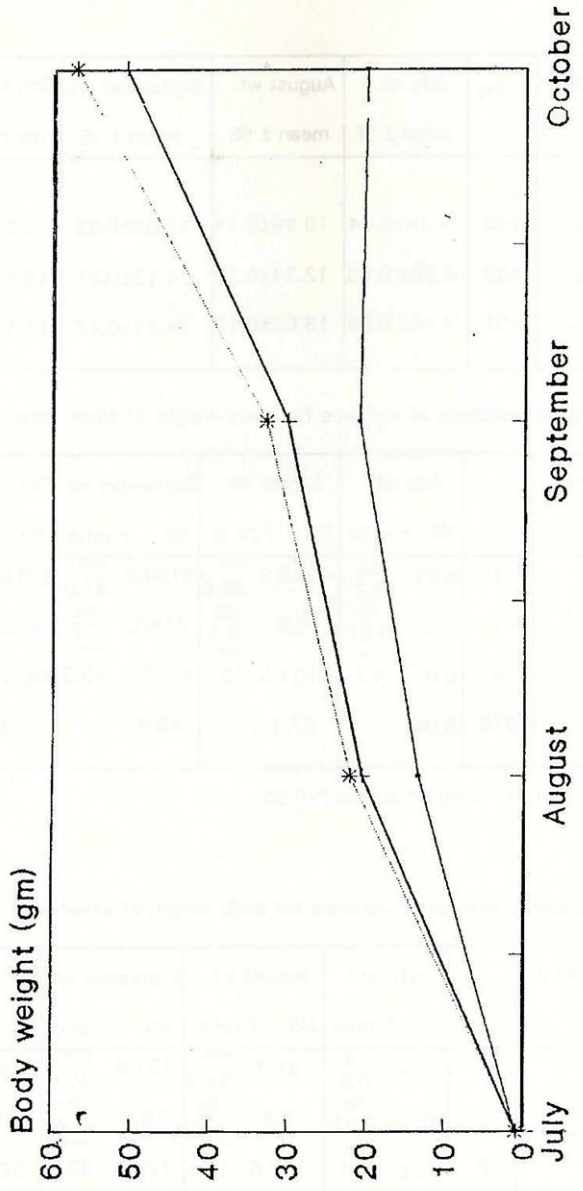

Figure 1. Effect of poultry manure on body weight of silver carp.

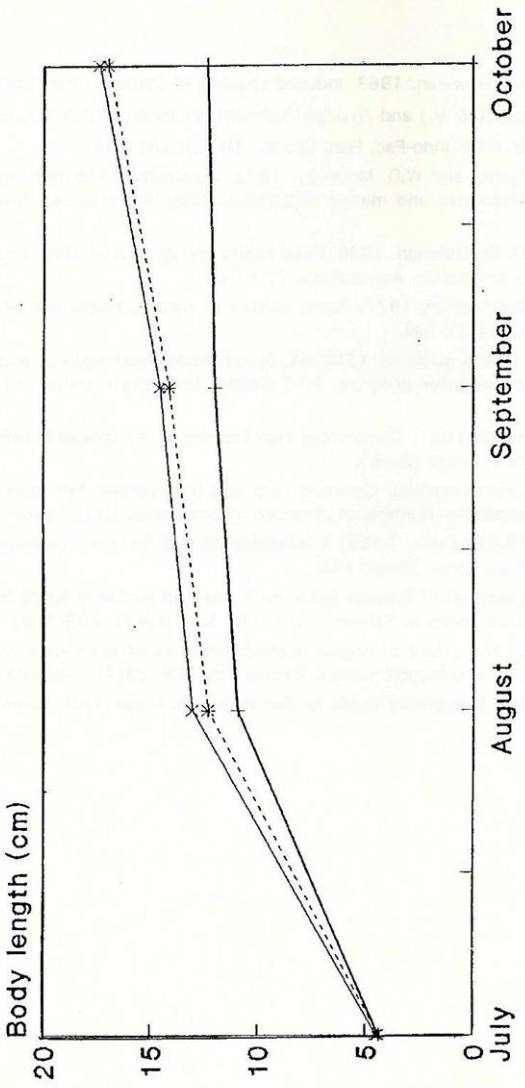

Figure 2 . Effect of poultry manure on body length of silver carp.

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تأثير إستخدام زرق الدواجن على نمو زريعة المبروك الفضى

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أجريت تجربة بأحواض مساحة هكتار بمزرعة المعمل المركزى لبحوث الأسماك بالعباسة التابع لمركز البحوث الزراعية لإختبارتأثير معدلات التسميد العضوى المتمثل فى زرق الدواجن على نمو زريعة أسماك المبروك الفضى. إستخدمت ثلاث معدلات هى:

٥٠٠، ٧٥٠، ١٠٠٠ كجم زرق دواجن طوال فترة التحضين قسمت بمعدل كل أسبوعين وقد أسفرت النتائج على الآ تى:

١- متوسطات أوزان الأصبعيات بالجرام فى نهاية التجربة كانت ٢١,٢٠، ٨٤,٥٠، ٢١,٥٧ على التوالى.

٢- متوسطات أطوال الأسماك بالسنتيمتر فى نهاية التجربة وجدت ١٢,٣٥، ١٦,٩٩، ١٧,٣٧ .

٣- إزدياد معدلات النمو بإزدياد معدلات التسميد المتمثلة فى وزن وطول أسماك المبروك الفضى.