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Effect of Stocking Density on Growth Performance of *Tilapia Chatraladareared* in Cemented Cisterns University of Sindh, Jamshoro

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Abstract: Present study was undertaken on the effect of stocking density on growth and survival of Tilapia chatraladareared in cemented cisterns University of Sindh, Jamshoro. Thirteen cemented cisterns (size was 1.25 m^2 each) were maintained and designs as 10, 15, 20 and 25 fish/m^2 replicated thrice with control. It was noted that the highest weight gain was observed in low stocking density in 10 fish/ m^2 (40.68g) followed by 15 fish/ m^2 (30.46g) and lowest in 25 fish/ m^2 (22.91g). The highest production (0.30 kg/m^2) and specific growth rate (1.28%/day) was observed in low density. The high feed conversation ratio (5.0) was recorded highest at high density. Physicochemical parameter like Temperature, Dissolved Oxygen, Power of Hydrogen Concentration and Total Dissolved Solids were monitored fortnightly. All the physicochemical parameters were found to be in suitable ranges. It was concluded that the low density is best for culture of Tilapia chatralada in cemented cisterns.

Keywords: Density**,** Tilapia chatralada, cemented cistern, Physiochemical parameters

1. INTRODUCTION

Tilapia chatralada is dominant species in freshwater cultures system (Maclean, 1984).It is mainly lucrative fish which are well-adapted to enclosed water and fast growing, resistant to disease and handling, easy to produce in captivity and are able to tolerate wide range of environmental conditions. However, the people of third world countries are still suffering from malnutrition and animal protein deficiency (Narejo, 2003). In this subcontinent lot of tilapia species are available which have good taste, market value and high protein contents that could be utilized by culturing of these fast growing species. In Pakistan this fish introduced in fish hatchery Chilya Thatta in (2011) imported from Thailand (Arain *et al*., 2015).

In fish culture operations density plays an important role in various growth parameters possesses straight influence on the fish production and survival rates (Narejo *et al*., 2005). Voluminous work on this aspect is available on growth and survival rate of different fish species like Hassan e*t al*., (1982) on *Sarotherodonniloticus* Sardar and Mollah (1991) on *Pangasiuspangasius*, Narejo *et al*., (2002) on *Monopteruscuchia* and Narejo *et al*., (2005) on *Heteropneustesfossilis*, Narejo *et al*., (2010) on *Labeorohita* and Arain et *al* (2015) *Tilapia nilotica*. No literature in available on density of *T. chatralada*the present paper will help to rear this fish with suitable density.

2. MATERIALS AND METHODS

The present investigation on stocking density was carried out during May to July 2015 in cemented cisterns department of fresh water biology and fisheries university of Sindh Jamshoro, thirteen rectangular cemented cisterns (1.25 m^2 each). Cisterns were covered with green net shed to protect fish from predation. The live specimens of *Tilapia chitralada* body weight of 3.32g were collected from the stock maintained in the cemented cisterns. Four different densities 10, 15, 20 and 25 fish/m^2 were applied and designated as treatments replicated thrice. The experimental fish were acclimatized for seven days in cemented cisterns. Feed were supplied at the rate of 5-8% body weight, twice a day once at 9:00 AM and evening 4:00 PM. Soybean feed was used for the experimental fish as suggested by (Yasmin *et. al*., 1998). Sampling was done once in a month and weight was measured by using electronic balance after successful sampling feed ratio was maintained according to the weight gain of the experimental fish. The water quality parameters such as Temperature (^{0}C), Dissolved Oxygen (DO), Power of Hydrogen Concentration (pH) and Total Dissolved Solids (TDS) was measured fortnightly during the study period with the help of electrochemical analyzer model number C-6020.Tthe water of the cisterns was exchanged fortnightly to prevent accumulation of growth inhibitory ammonia as suggested by (Seymour, 1980).

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3. RESULTS

Growth performance of *Tilapia chitralada*under different stocking densities in terms of initial weight, final weight, means weight gain, % weight gain, Specific growth rate (%per day), survival rate, production (Kg/m^2)throughout study period. It was noted that the highest weight gain was observed in low stocking density in 10 fish/ m^2 (40.68g) followed by 15 fish/ m^2 (30.46g) and lowest in 25 fish/ m^2 (22.91g). The highest production (0.30 kg/m^2) and specific growth rate (1.28%/day) was observed in low density.

The high feed conversation ratio (5.0) was recorded highest at high density **(Table-1)**. Physicochemical parameter like Temperature, Dissolved Oxygen, Power of Hydrogen Concentration and Total Dissolved Solids were monitored fortnightly. All the physicochemical parameters were found to be in suitable ranges. It was concluded that the low density is best for culture of *Tilapia chatralada*in cemented cisterns **(Table-2)**.

Table 1. Growth Parameters of *Tilapia Chatralada*from Cemented Cisterns

Parameters	TI	TII	TIII	TIV
Initial Weight (g)	3.3 ± 0.7	3.3 ± 0.7	3.3 ± 0.7	3.3 ± 0.7
Final weight (g)	44.0 ± 1.0	337.8±1.2	26.2± 0.8	28.5±0.5
Weight gain (g)	40.6 ± 0.4	30.4 ± 0.6	25.2 ± 0.8	22.9±0.1
% Weight gain	4068	3046	2291	2525
SGR	1.28	1.16	1.14	1.12
Survival	100%	100%	100%	100%
FCR	5.0	6.4	6.9	6.4
production/kg/ m2	0.30	0.23	0.18	0.19

Table 2. Month-wise Changes In Physico-Chemical Parameters From Cemented Cisterns

Months	Parameters				
	Temperature (ºC)	pH	TDS (mg/l	Salinity g/l	DO mg/l
May	27.9	8.3	433.7	0.3	3.6
June	27.6	8.1	392.3	0.3	3.4
July	27.6	8.6	352.2	0.3	3.4

4. DISCUSSION

The present study was conducted on the effect of stocking density of *Tilapia chatralada* from cemented cisterns department of Freshwater Biology and fisheries. The results of growth performance of *Tilapia chitralada* through out the study period were recorded. In term of Initial weight, final weight, weight gain means weight gain, %, Specific growth rate (%per day), survival rate, production ($Kg/m^{2)}$ were noted. Maximum growth was recorded from Treatment I (10 fish 40.68 ± 1.2g), is trailed by treatment II (15 fish) (30.46 ± 0.4) and lowest was observed in treatment IV (25 fish) (22.91 ± 1.0). Many researchers supported the present study like Mollah, (1991) conducted research on effect of stocking density of catfish, *Clariasbatrachus* He observed that the lower the stocking density the larger was the larval size. Narejo *et al* (2005) worked on density of *Heteropneustesfossilis*, their observations were in accord with the above results. Yakubu *et al*., (2012) Rehana *et al*., (2014) worked on stocking density and finding of above researchers are in accord with the present study. The temperature of water in the present study varied from 27.1-28.4^{0}C which was influenced by the variation in temperature during morning and evening. The various authors like Kadiri 2000; Atoma 2004; Julian *et al* 2008 Ask *et al* 2009) given the temperature values and ranges that are similar to the present study. Oxygen regulates the most of the vital process of plant and animals; it is the most important factor in both in aquatic and terrestrial environment (Rehman, 1992). Range of DO in current study was 2.9-4.0 Dastagir *et al*., (2014) Boyd and Tucker, (1998) describes the content of oxygen in the ponds, stream and lakes is mainly due to various reasons such as temperature, movement in water, pollution and supply of fresh water. The findings of the Boyd and Tucker (1998) and Dastagir *et al*., (2014) are in agreement with the present study. Salinity was recorded 0.3 ppt throughout the study period. It is one of the vital units that used to control many aquatic organisms directly or vice versa.

The range and tolerance differ from species to species. Kubly, (1982) and Kumar *et al* (2002) suggested the range of salinity of freshwater habitats 0.25- 0.65ppt. These ranges are similar to those obtained from the cemented cistern in the present study. pH is expressed as power of hydrogen ion concentration in the present findings the values of pH ranged between 7.7-8.9. Various workers like Satpathy *et al.,* 2007; Dastagir *et al*., 2014) reported pH values for fish culture operations ranged between 6.5-8.5. The above mentioned ranges are in agreement with present findings. In the present study Total Dissolved Solids were recorded 328- 446 mg/lit. According to WHO (1989) TDS (1000mg/l) is suitable for drinking and Fish Culture Purposes.

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