Pakistan J. Zool., vol. 51(6), pp 1-3, 2019. **DOI**: http://dx.doi.org/10.17582/journal.pjz/2019.51.6.sc8

Short Communication

Rearing of Catfish, *Rita rita* with Live and Prepared Feeds in Cemented Cisterns

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Article Information
Received 05 June 2018
Revised 23 August 2018
Accepted 27 March 2019
Available online 26 August 2019

Authors' Contributions
SJ performed experimental work and this paper is part of his Ph.D thesis. NTN peresented the idea and supervised the research. PK collected the samples and analysed the data.

Key words
Growth performance, Feed regime, Cemented cistern, *Rita rita*, Live feed

ABSTRACT

The rearing of catfish, *Rita rita* with live and prepared feeds in cemented cisterns was initiated for 90 days. The juveniles of experimental fish with mean initial body weight 6.40 ± 1.6 g were procure from local fishing community of River Indus near Jamshoro. Feed regime like live small fish (tilapia), tubifex laryae, chopped chicken viscera and dead small fish (tilapia) were used as live and prepared feed with control. It was observed that the experimental fish fed with chopped chicken viscera exhibited significantly better growth (129.10 ± 2.90 g weight gain) followed by chopped small fish (103.90 ± 1.10g) as prepared feed while live small fish resulted 3rd preference (81.89 ± 1.11 g). Significantly lower growth and survival was obtained fed with Tubifex larvae (73.85 ± 1.15 g). Water quality parameter like pH, temperature, dissolved oxygen; ammonia nitrate and alkalinity were monitored fortnightly and found within the suitable ranges. Finally decided that chopped chicken viscera found to be ideal food for better growth and survival of catfish *Rita rita* reared in cemented cisterns.

The catfish, *Rita rita* (Hamilton) is commercially as well as aquaculturally important species in Asian countries like Pakistan, India and Bangladesh (Jalbani *et al*., 2016). It is locally known as "Khagga" very popular fish with high market demand, even sometimes having double market value than the carps. Since this species has a high market value, its rearing technology can augment its production and make it more available to the consumers, having no hazardous effect on the environment and can be cultured in cisterns, mini ponds, tanks ditches and other derelict water bodies with indigenous carps (Narejo *et al*., 2003). This fish is suitable candidate for artificial culture and propagation. For culture of any fish species selection of best food is pre-requisite for ideal growth and survival rate. For enhancement of aquaculture production it is essential to introduce a new potential aquaculture species in the existing system (Narejo *et al*., 2005). If the fishery of *R. rita* could be developed, Pakistan would be able to earn a lot of foreign exchange by exporting this fish in future. No published information is available at the moment on the rearing of this commercially important fish from Pakistan.

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0030-9923/2019/0006-0001 $ 9.00/0

Materials and methods

To determine the suitability of live and prepared feed on growth and survival rate of indigenous catfish *R. rita*, 13 cemented cisterns of 1.25m^2 each were randomly selected for the four different food regimes were replicated thrice with control (on natural food only).

Live small fish (tilapia) were designated as Feed I (live); Tubifex larvae Feed II (live); Chopped chicken viscera Feed III (prepared); Dead small fish (tilapia) were assigned as Feed IV (prepared) and Control with natural food control

The growth performance of catfish *Rita rita* reared in cemented cisterns with live and prepared feed was initiated for 90 days trial starting from March- May 2016. Ten experimental fish with mean initial body weight of 6.4 ± 1.6 g were stocked in each cistern. Growth parameters like mean initial weight, mean final weight, weight gain, percentage weight gain, survival rate, feed conversion ratio (FCR), specific growth rate (SGR) and production was recorded. Water quality parameters like pH, temperature, dissolved oxygen, alkalinity, and ammonia nitrate were monitored fortnightly with the help of analyzer number C-6020 throughout the study period. The chicken viscera were procured from local market while dead and live small fish (tilapia) was obtained from the stock maintained.

Live small fish and tubifex larvae were supplied at

rate of 5% of the body weight while 5.0 g of chopped chicken viscera and dead small fish (tilapia) was given every morning at 8.00 AM. The amount of feed increased with the increase of fish weight as reported by Narejo *et al*. (2005). Sampling was done after a month by measuring weight of fish. The fish were weighed on an electronic balance with help of small plastic bucket.

Duncan's Multiple Range Test (DMRT) was used to identify significant difference between means. This statistical analysis was performed with the aid of the computer software SPSS program.

Results and discussion

The growth performance of catfish, *Rita rita* was recorded during March-May 2016. The significantly ($P<0.05$) highest weight gain and survival was recorded in feed III (129.10 ± 2.90 g) fed with chopped chicken viscera, followed by feed IV (103.0 ± 1.10 g) fed with dead small fish. Significantly ($P<0.05$) lowest growth was noticed from feed I and II (81.89 ±1.11g and73.85± 1.15g) fed with live small fish and tubifex larvae respectively. The mean initial weight of 6.4 ± 1.6g reached to the final weight of 135.50 ± 2.50 g in feed III with 100% survival rate (Table 1). It indicated that the experimental fish *Rita rita* prefers prepared feed (dead) instead of live feed.

Amin *et al*. (2012) from Bangladesh reared *Rita rita* with three food items namely small prawn, chicken viscera and formulated feed. They observed highest growth feed with chicken viscera and small prawn, which is in agreement with the present findings. Numerous workers performed same experiment in different fish species and obtained results which support present study like Sanaullah *et al*. (1986) in *Clarias batrachus*, Yasmin *et al*. (1998) in *Clarias batrachus* reported highest weight gain (793.1g) fed with feed with chopped tubifex worms. Lowest growth with pellet feed. Nahar *et al*. (2000) in *Clarias gariepinus* fed with chopped shrimps showed highest growth. Narejo *et al*. (2002) in *Pisodonophis boro* reared in cemented cisterns with different food items. The significantly highest growth rate was observed in treatment I (dead small shrimps) followed by treatment II (dead small fish) and the lowest was observed in treatment III (Pellet feed). Narejo *et al*. (2003b) reported dead small prawn and fish for the better growth, survival and production for the rearing of *Mastacembelus armatus* in cemented cisterns. Narejo *et al*. (2003a) reared *Monopterus cuchia* with live and prepared feed and found that highest growth in dead small fish. It is inferred that the catfish prefers animal-based feed (dead) rather than live feed. Hence all above researchers are in agreement with the present findings. Finally concluded that chicken viscera was found to be the suitable food for the rearing of *R. rita* in cemented cisterns. It was also observed that the 100% survival rate was noticed from prepared food items (dead) and lowest 80-85% survival in live feeds. Similar observation has been reported by number of researchers Nahar *et al*. (2002) in *Clarias gariepinus*; Narejo *et al*. (2002) in *Pisodonophis boro* and Narejo *et al*. (2003b) in *Mastacembelus armatus*. Naeem and Zulqurnanin (2018) reported growth performance of *Oreochromis niloticus* under semi-intensive culture system.

Table II shows physicochemical analysis of water parameters that these all were in the ranges of fish culture operations. These parameters are not different from the ones reported by other authors earlier (Kadiri, 2000; Atoma, 2004; Julian *et al*., 2008; Jenny-Ask *et al*., 2009; Chandrashekhar *et al*., 2003; Satpathy *et al*., 2007; Dastagir *et al*., 2014; Boyd and Tucker, 1998).

Table I.- Data on growth and survival rate of catfish, *Rita rita* (Hamilton) fed with live and prepared feed in cemented cisterns.

Parameters	Feed I Live small fish	Feed II Tubifex larvae	Feed III Chopped chicken viscera	Feed IV Dead small fish	*Control Without feed
Rearing period (days)	90	90	90	90	90
Mean initial eeight (g)	$6.4^{a} \pm 1.6$	$6.4^{a} \pm 1.6$	$6.4^{a} \pm 1.6$	$6.4^{a} \pm 1.6$	$6.4^{a} \pm 1.6$
Mean final weight (g)	$88.29^{c} \pm 2.3$	$80.25^{d} \pm 1.5$	$135.50^{a} \pm 2.50$	$110.30^{b} \pm 1.4$	$20.0^{e} \pm 1.66$
Weight gain (g)	$81.89^{c} \pm 1.11$	$73.85^{d} \pm 1.15$	$129.10^{a} \pm 2.90$	$103.90^{b} \pm 1.10$	$13.60^{e} \pm 1.40^{2}$
(%) Weight gain	1379^{c}	1253^{d}	2117^{a}	1723^{b}	33.33^{e}
SGR (% per day)	1.46^{c}	1.40^{d}	1.69^{a}	1.58^{b}	0.12^{e}
FCR	4.50^{a}	4.40^{b}	3.80^{d}	3.90^{c}	----
Survival (%)	80^{c}	85^{b}	100^{a}	100^{a}	10^{e}
Production (Kg/m^2/90 days)	5.886^{c}	5.350^{d}	9.033^{a}	7.353^{b}	0.236^{e}

*Control without feed, only with natural food. Figures in the same row having same superscripts are not significantly ($p<0.05$) different when compared on the basis of Duncan's New Multiple Range Test.

Table II.- Month-wise variation in water quality parameters of cemented cisterns throughout the study period.

Parameters	Months						
	March	April	May	Minimum	Maximum	Mean ± Sd.	(WHO 2000)
Temperature (ºC)	26.8	27.5	28.4	26.8	28.4	27.56 ± 1.04	18.5-30.0
pH	7.35	7.30	7.33	7.30	7.35	7.32± 0.3	6.5-8.5
D.O. (mg/l)	4.6	4.8	4.8	4.6	4.8	4.7 ±1.0	4.0-9.0
Alkalinity (mg/l)	149	152	180	149	180	160 ±10.5	100-200
Ammonia (mg/l)	0.35	0.54	0.48	0.35	0.54	0.45 ± 0.15	0. 5- 1.0
Nitrite (mg/l)	0.168	0.170	0.171	0.168	0.171	0.169 ±0.2	0.1-0.2

Conclusion

It was concluded that the chopped chicken viscera were found to be suitable food for the rearing of *R. rita* in cemented cisterns.

Statement of conflict of interest

The authors declare no conflict of interest.

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