Indian J. Fish., **54**(4) : 423-425, 2007

Note

Preliminary observations on rearing of the hill stream fish, *Naziritor chelynoides* (Mc Clelland) under pond environment

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ABSTRACT

The present study was conducted to observe the general adaptability, growth and survival of a hill stream fish, *Naziritor chelynoides*, in the pond environment. The experimental fishes were caught from the rivulet Ladhiya in district Champawat (Uttaranchal), transported and reared in the experimental fish farm at Chhirapani, Champawat from April 1998 to March 1999. A total of 45 fishes with body length ranging between 170-185 mm and corresponding weight of 39.5-46.0 g (average weight 43.5 g) were stocked in 2 cement ponds at a stocking density of 1.5 fish m^{-2}. The stock was fed with a laboratory formulated wet diet @ 1-3% of body weight. On completion of the experiment, the fish attained 195-230 mm body length with corresponding weight between 71.0-89.5 g (77.66 g) with an overall growth rate of 0.09 g day^{-1}. The survival rate was 95.5%, in the ambient water temperature range between 4.5 - 24.3°C.

Naziritor chelynoides, formerly known as *Tor chelynoides* and popular as ''dark mahseer'' is a rare coldwater fish distributed in Pakistan, North East Baluchistan, North West frontier province and in Himalayan region up to Assam and also in the river Ganga (Talwar and Jhingran, 1991; Jayaram, 1999). In Kumaon Himalayas, *N. chelynoides* is reported from the rivers Kali, Gori, Saryu, east and west Ramganga, Kosi, Gaula, Gagas, Ladhiya, Gharhakiya and Lohawati (Joshi, 1999). Though the fish has good food and sport value, its contribution in the upland fishery is insignificant due to very sparse distribution. Joshi *et al*. (2003) have reported marginal population (1.22 %) of *N. chelynoides* from rivulet Ladhiya in Kumaon hills. Owing to various anthropogenic perturbations to the Himalayan environment coupled with rapid overexploitation and wanton destruction, the fishery resources in general and commercially important species of the Himalayas in particular are under severe depletion (Das and Joshi, 1993; Sehgal, 1999; Joshi, 1999; 2003; 2004). As a result, the species having marginal population are on the risk of extermination. *N. chelynoides* has been categorized as 'rare' fish species in the riverine resources of Kumaon hills (Joshi, 1999). Hence there is a need to explore the possibility of domestication and conservation of this species. Therefore, the present study has been conducted to observe the general adaptability of this wild hill stream fish to the pond environment; its ability to take compounded feed, annual growth rate and survivability in the system.

The domestication and rearing experiments were conducted at experimental fish farm Chhirapani, Champawat (Uttaranchal) located at an altitude of 1620 m. asl. in central Himalaya (Long. 80° 07' N; Lat. 29° 30' E) from April 1998 to March 1999. The fishes were caught by repeated netting from rivulet Ladhiya in district Champawat, transported in live condition to Chhirapani fish farm and acclimatised for a week after proper disinfections with 5% potassium permanganate

solution and recording of the body size and weight. Later, *N. chelynoides* were stocked in cemented ponds measuring 10 × 3 × 1.25 m. The bottom of the rearing cement pond was filled with 3 cm soil layer, to provide semi-natural bottom conditions.

A total of 45 fishes ranging between 170-185 mm in total length and corresponding weight of 39.5-46.0 g (average weight 43.5 g) were stocked in the experimental pond. Stocking density and total biomass was 1.5 fish m^{-2} and 1.93 kg, respectively. The stock was fed on a laboratory compounded wet diet comprising 32% crude protein @ 1-3% of body weight and regulated as per temperature variation and feeding intensity of the fishes. The fish did not accept feed during extreme cold conditions when water temperature was below 10.0°C. The ingredients used for feed formulation were - soya flour (38.0 %), groundnut oil cake (20.0 %), rice polish (20.0%), fishmeal (20.0%) and Supplevit-M (2.0 %) (Bhanja *et al*., 2001). The finely powdered dry feed was soaked in water to make small dough balls, which were kept on feeding trays at pond bottom, twice a day. The frys were regularly sampled for observation of gain in body length, weight and survival. The water flow in the ponds was maintained at the rate of 10-20 lpm (litre per minute) to provide a flow-through-system. The feeding schedule was maintained according to the ambient water temperature. The water quality parameters were recorded at regular intervals as per standard methods (APHA, 1990).

The water temperature, pH, dissolved oxygen, free carbon-di-oxide, total alkalinity, total dissolved solids and specific conductance in the rearing pond during the experimental period varied from 4.5 – 24.3°C, 7.8 – 8.2, 7.0 – 12.2 $mg1^{-1}$, 0.00 – 2.4 mg 1^{-1}, 12.0 – 32.0 $mg1^{-1}$, 12.4 – 33.8 $mg1^{-1}$ and 25.0 – 67.0 µmhos, respectively.

The stocked *N. chelynoides* attained 195-230 mm body length with corresponding weight of 71.0-89.5 g (average weight 77.66 g), on completion of the experiment. The stock grew @ 0.09 g day^{-1} with optimum growth rate of 0.16 g day^{-1} recorded during April-June when ambient water temperature ranged between 13.2-24.3°C (Table 1). Like other cold water fishes cultivated in the similar temperature regime, *N. chelynoides* also attained markedly low growth (0.003 g) in extreme cold regime (4.5-10.0°C) (Tyagi and Behl, 1998; Chauhan, 2000; Joshi and Tyagi, 2002). Almost similar growth pattern has also been recorded by Joshi *et al*. (2005 a) in another slow-growing cold water cyprinid, *Schizothorax richardsonii* (5 year old stock) reared in the same farm. Such a slow growth rate could be attributed to the poor feed utilization by the fish at low water temperature and shift from natural habitat of the fish. Further, Joshi *et al*. (2005 b) registered remarkably higher annual growth (95-715 g $year^{-1}$) in the fast growing strain of exotic rainbow trout reared in the same farm. The overall survival during the experimental period was remarkably high (95.5%) and marginal mortality was noticed only during extreme cold conditions.

The present study, though preliminary in nature revealed that *N. chelynoides* thrives well in pond environment of central Himalaya. The

TABLE 1: *Growth and survival of* N. chelynoides *reared in pond during April 1998 to March 1999*

Prameters	Rearing Period				
	April-June (Summer)	July-September (Monsoon)	October-December (Post-monsoon)	January-March (Winter)	April 98-March 99
No. of days	91	92	92	90	365
Water temp. (°C)	13.2-24.3	17.4-23.6.0	6.0-20.5	4.5-15.3	4.5-24.3
Growth (g day^{-1})	0.16	0.15	0.05	0.00	0.09
Survival (%)	100.0	100.0	100.0	95.5	95.5

fish feeds on formulated compound diet with high survival rate. The finding of the present study would pave way for further attempts on aquaculture, domestication and conservation of this rare upland fish.

Acknowledgements

The author is grateful to Dr. K.K. Vass, former Director, National Research Centre on Coldwater Fisheries (NRCCWF), Bhimtal for the encouragement and facilities provided. Author is also thankful to Mr. Ravinder Kumar and Mr. Hansa Datt, NRCCWF, Champawat, for their active help in rearing of the stock.

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Date of Receipt : 18-03-06
Date of Acceptance : 13-11-07