Sarputi, *Puntius sarana sarana* (Hamilton): a promising candidate species for introduction into the grow-out carp polyculture system of Tripura

Abstract:-

Puntius sarana sarana (Hamilton, 1822) is a tropical freshwater fish belonging to the *Puntius* genus of minnow family. This species is commonly called as Sarputi / olive barb which can be used both as food fish as well as ornamental fish. The generic status of the fish is still unclear and keeps flipping between Barbodes and Puntius. The study was aimed to find out the ability of survival of specific type of carp and its spawning frequency at different aquatic zones. Survival of sarputi was recorded 60% (T_3) to 85 %(T_1) during the study period. Average body weight recorded after 5 months in sarputi was 0.15±0.05 kg. Average production of sarputi was 230 kg/ha where as the total production was 2200kg/ha. It is a medium sized carp species and reported to have moderate growth rate compared to the major carps which attains a length of 31 cm. However, the species needs to be thoroughly studied before a re-evaluation could be done. The present study concluded that, this specific fish is a widespread species without any known major vulnerability. Knowledge of gonad development and the spawning season of a species allow subsequent studies on spawning frequency of its population, might be a significant importance for its sustainable management.

Introduction:

Puntius sarana sarana (Hamilton, 1822) is a tropical freshwater fish belonging to the *Puntius* genus of minnow family. This species is commonly called as Sarputi / olive barb which can be used both as food fish and ornamental fish. The generic status of the fish is still unclear and keeps flipping between Barbodes and Puntius. Moderately compressed deep body, elevated dorsal profile, anterior half of the head with large eyes, round snout, silvery back, golden opercula, yellowish white abdomen are few of the identifying characteristics (Rahman, 1989; Rahman, 2005; Rahman and Chowdhury, 2007). This barb is very widely distributed all over India in rivers and tanks. Once distributed widely in the natural waters in the South East Asian countries, the poor seed survival (Chondar, 1999) and over-exploitation over the years have reduced its natural population to the extent of placing it under vulnerable group (Mahanta *et al.*, 1994, Mukherjee *et al.*, 2002 and Chakraborty *et al.*, 2003). In India this species is widespread (except peninsular India - South of Krishna River), and is also found in Nepal, Bangladesh, Bhutan, Afghanistan and Pakistan (Talwar and Jhingran, 1991). It attains the sexual maturity in the first year of its life and prefers shallow water of floodplain areas for the breeding (Chakraborty *et al.*, 2006). It breeds during monsoon in running waters amongst submerged boulders and vegetation (Talwar and Jhingran 1991). Spawning occurs in two stages, once between May to mid September but prominent in June and the second spawning time in the months of August and September (Chakraborty *et al.* 2007). The technique of induced breeding using synthetic inducing agents like Ovaprim and mass scale seed rearing of the species has already been standardized (Anon., 2007). Histological study helps in detecting the breeding season and in establishing phenotype characters of fully mature breeders for a successful artificial propagation. Hence, it is very important to assess the yearly breeding cycle of *P. sarana* to assure success in culture practice. According to Mookerjee *et al.* (1946), food of *P. sarana* is 27% algae, 45% higher plants, 20% protozoan, 8% mud and sand. It can live in sandy bed mixed with mud and in fairly swift current. It normally forms groups of four or five to several dozen. Photoperiod plays a major role in controlling the reproductive activity of this fish. It is very widely distributed in all the northern and north-eastern rivers of India including Tripura.

Materials & methodology

Research Study by Krishi Vigyan Kendra, Dhalai in collaboration with College of Fisheries, Tripura:

Experimental design and observations are outlined here: On Farm Trial on Assessment on performance of potential high value native fish sarputi, *Puntius sarana* rearing in inland aquaculture was undertaken by Krishi Vigyan Kendra, Dhalai with KVK fund, ICAR at Kamalpur and Salema. Total farmers covered 10. Total water area under OFT was 0.80 ha. Combined stocking density was 7500 fingerlings/ha. Initial size of sarputi was 3.5±0.5 gm. Fed with mixture of rice bran and groundnut oil cake in a 1:1 ratio (w/w) at 5% of biomass/day during 1st month, 3%: 2nd and 3rd months, 2%: 4th - 6th month.

T_1: catla, silver carp, rohu and sarputi at 0.5:0.5:1:1,

T_2: catla, silver carp, mrigal and sarputi at 0.5:0.5:1:1,

T_3: catla, rohu, mrigal and sarputi at 0.5:0.5:1:1

Control: farmer's practice: catla, silver carp, rohu and mrigal at 0.5:0.5:1:1;

Sampling of Sarputi in On farm Trial plot by KVK Dhalai after 6 months culture duration

Resource persons from College of Fisheries, Tripura delivering lecture on Sarputi culture

Result & Discussion:

Survival of sarputi was found 60% (T_3) to 85 %(T_1). Average body weight recorded after 5 months in sarputi 0.15±0.05 kg. Average production of sarputi was 230 kg/ha with total production 2200kg/ha. It is a medium sized carp species and reported to have moderate growth rate compared to the major carps. It attains a length of 31 cm. It is a hardy fish. The species is omnivorous and feeds on aquatic insects, fish, algae and small prawns. Studying the compatibility of sarputi during fingerling rearing, Jena *et al.* (2007) reported its average body weight attainment to be lower when reared in combination with rohu than that with mrigal (*Cirrhinus mrigala* Hamilton).

However, they found higher biomass production in olive barb–rohu (*Labeo rohita* Hamilton) combination than that of olive barb–mrigal and rohu–mrigal combinations, and inferred the species to be compatible with both mrigal and rohu. In a grow-out study in Bangladesh, Chakraborty *et al.* (2005) reported production of 4,200–4,819 kg ha^{-1} from polyculture using sarputi @30–35% of the stocked density of 9,980 fingerling ha^{-1} with four other major carps. However, compatibility of the species with the carps could not be established from their study since olive barb was incorporated with all the carps, *viz.*, silver carp (*Hypophthalmichthys molitrix* Valenciennes), catla (*Catla catla* Hamilton), rohu and mrigal in all treatments. Successful farming of sarputi in grow-out polyculture system necessitates study on

its compatibility with other carps in the conventional culture system. The high consumer preference, even at smaller size of 100—200 gm, makes sarputi a suitable candidate for diversifying the carp culture (Gopakumar *et al.*, 1999 and Chakraborty *et al.*, 2003) and also for short-term culture in seasonal water bodies. Cost of cultivation was Rs. 1.50 lakh/ha and farmer's income was Rs. 3.20 lakh/per ha. Benefit Cost Ratio was calculated 2.13:1. Sarputi market price was found to be higher (Rs. 250/kg) as compared to other bottom feeder (Rs. 150/kg). Average added income of Rs. 0.60 lakh/ha was observed only due to introduction of Sarputi. Though it is with inter-muscular bones, yet it is highly esteemed as food Flesh contains 17.50% crude protein, 2.00% fat and 74.00% water. Digestibility and biological value of flesh is very high (Bhuiyan, 1964). In one year it can grow up to 450-500 gm and fetches around Rs. 150-250 kg^{-1}. It can also be used as an ornamental species due to its attractive silver-coloured body and hardy nature. This species is considered as the "biological control" in aqua cultural practices, since it can be used for eradication of aquatic weeds (*Lemna* species) from the water bodies like ponds and tanks.

Conclusion:

Very little works has been done in such direction. However, the species needs to be thoroughly studied before a re-evaluation is done. It is a widespread species with no known major widespread threats. Knowledge of gonad development and the spawning season of a species allow subsequent studies on spawning frequency of its population, which is very important for its management. There is a need to conduct in-depth studies on ecology and biology of this species and enact strict conservation strategies for its protection. No data is available to confirm the belief that this species is declining. Currently, based on its wide distribution and apparent lack of threats it is assessed as Least Concern. However, limited studies on development of artificial breeding and rearing of the species have been conducted by several researchers and educational institutions in Bangladesh and India (Mujkherjee *et al.*, 2002; Chakraborty *et al.,* 2006).

Since the species possesses culture potential, its introduction into the carp polyculture system would not only help in diversification of culture practices, but also can serve for its conservation. It can be successfully introduced in carp polyculture system to increase the fish production. So, immediate attention from researchers and educational institutions is required in this regard.

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