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Technology Development and Standardization of Captive Breeding, Seed Production and Culture of Snakehead Fish for Conservation and Sustainable Aquaculture

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Abstract: *Channa Striatus* or striped snake head is a carnivorous air breather fish is a valuable fish for food. Which have a commercial scale importance in seed production and grow out farming .Air breathing fish have sustainable advantage for aquaculture because they can survive in harsh environment with low level of dissolved O_2 and high ammonia content . It is one of the excellent table size fish .It fetches high prices in the market due to their strong demand, higher nutritional and pharmaceutical values. *Channa Striatus* is serve as a delicious food and can also be sold alive. However in recent years, the natural stock of the fish are decreasing severely due to increased human activity, habitat alteration and unstrained harvesting. As a result, the natural breeding and feeding grounds of this high valued fish species have been destroyed. Presently, *C. Striatus* is considered as a threatened fish species in Bangladesh. Due to the non-availability of quality seeds and difficulty in induced breeding of this fish not much could be achieved toward commercialization of the species or conservation. In the present investigation, advancement of the controlled breeding, seed production and culture protocols have been described.

Keywords: snakehead, *Channa striatus*, breeding seed production, Grow out culture, conservation.

1. INTRODUCTION

Channa striatus belonging to the family channidae. The snakehead is a fresh water fish of tropical Asia and Africa [1]. It is one of the main food fishes in Thailand, Indochina and Malaysia [2, 3]. It is an air breather fish and served as food in Asia because of its delicious taste and theurapatic action. The flesh of this fish is firm, white, boneless and has a good flavour. The skin of snakehead is good for soup. The presence of fatty acid like prostaglandin and thromboxane contribute to hasten the recovery of wound and internal injuries. Polyunsaturated fatty acid can regulate prostaglandin synthesis and can influence the immune system. Other pharmacological activities include antimicrobial, anti inflamation, cell proliferation and induction of platelet aggregation. Hence snakehead is commonly consumed for medicinal purpose in Asian markets. Snakehead is commercially cultivated in Thailand, Philippines, Vietnam, Combodia, India and Pakistan [2, 3, 4, 5]. *Channa striatus* fish have advantages for aquaculture, because they can survive in harsh environment with low level of dissolved O_2 and high ammonia content [1, 6]. *Channa striatus* possesses a pair of suprabranchial cavities for respiration due to this reason it is very hardy and can remain alive for longer time outside water, if kept moist [7]. Air breathing fish often cultured in grow out ponds at densities of 40-80 fish m^2 with annual yields ranging from 7 to 156 mt/ha [4, 8]. On the roof of the pharynx of *Channa striatus* a pair of cavities are present which have higher blood supply. These accessory respiratory organs enable fish to survive out of water. They are therefore called “live fishes”. There are around 33 snakehead fish species native to Asia, and among them 11 species are commercially important for aquaculture production and biodiversity conservation.

Channa micropeltes ***Channa bleheri***

Channa stewartii

Fig.1: Commercially important snakehead fish species endemic to Asian country

II. BREEDING AND LARVAL REARING

Channa striatus usually breeds during the onset of monsoon in ditches, ponds and flooded paddy field. *Channa striatus* build nests before the onset of spawning season to breed in their natural habitat. The fecundity of fish varies from 16,330 to 56,467 in the size range of 34.2-51.50 cm. *Channa striatus* which were collected from the irrigated rice fields of Malaysia observed having six developmental stages of oocytes around the year. Gonadal development and spawning of *C.striatus* occurs all through the year. An experiment is conducted to breed *C.striatus* in a controlled laboratory condition. The broodstock of snakehead were injected with ovaprim hormone with a dosage of 0.5 ml/kg body weight and spawning starts within 24-26 hr. after injecting the hormone. The fertilized egg remains floating, become non adhesive, yellowish in colour and have a diameter 1.20 to 1.40 mm. The incubation period is 23-24 hr at the temp. of 29 ± 1^0 C with the hatching rate of 80-85 %. After the two days of hatching, fry starts to swim vertically. The larva after metamorphosis changes into young juveniles within 20 days post hatching in the rearing system.

III. SEED PRODUCTION AND CULTURE

Captive breeding and larval rearing of snakehead is accomplished experimentally but are not done on commercial scale [2, 6]. Snakehead larvae rearing is a difficult task because of its carnivorous, piscivorous and cannibalistic nature. During early post larval stage, it is better to feed with small planktons like rotifers. Successful snakehead culture require better feed and feeding method. The life cycle of any species of fish from hatchling to fry/fingerling stage have high mortality. Lakshmanan et al. [9] stated that besides supplementary feed, among other factors, stocking density play a vital role influencing growth and survival of fry and fingerlings in nursery ponds. Rahman et al, [5] reared *C.striatus* at different stocking densities of fry 150,000/ha, 200,000/ha and 250,000/ha in T_1,T_2 and T_3 respectively for eight weeks in earthen nursery ponds. A supplementary feed also provided including fish meal (50%) and mustard oil cake (50) at the rate of 5.8% of the estimated body weight. They obtained the highest growth and survival of fingerlings from the treatment (T_1) when stocking density of fry was 150,000/ha then these produced in higher densities. Diana et al. [10] reared snakehead juveniles at different stocking density from 40-80 fingerlings/m^2 and obtained survival rate 13 to 15 % after a rearing period of 9-11 months. Rahman et al.[3] conducted a grow out culture at different stocking densities of 5000, 6250 and 7500 fingerling/ha for 10 months and concluded that 5000 fingerlings/ha was the suitable densities for culture of *C.striatus* for better survival, growth and production.

CONCLUSION

The demands for *C.striatus* in Asian market have been increasing day by day due to its delicious taste quality and white boneless flesh for easy consumption. It is also well known for its therapeutic effect in wound healing and pain reduction due to osteoarthritis. It also has higher nutritional value .Due to over exploitation , environmental degradation and various anthropogenic activity in the aquatic ecosystem, *C.striatus* may became extinct from the natural habitat. Sufficient information and proper knowledge on breeding, larval rearing , seed production and culture protocol of *C.striatus* helps farmer to develop suitable aquaculture technologies for higher production with minimum cost . Due to over exploitation and various ecological changes in the aquatic ecosystem. *C.striatus* may become extinct from their natural habitat in near future. considering the prevailing situation, the finding obtained as well as information from this analysis greatly helpful towards the better understanding of snake head reproduction , larval rearing and culture, which will helpful for better production and conservation of this high valued fish species. If *Channa striatus* could be spawned continuously throughout the year especially in the captive environment to ensure no shortage of fry production in the market.

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