

# Diversity of Exotic Fishes and their Ecological Importance in Southwestern Part of Bangladesh

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## Abstract

Survey was conducted in different water bodies of Jhenidah district situated in south western part of Bangladesh. 15 species of exotic fishes were identified during the study period from 2012 May to June 2013 *Oreochromis mossambicus*, *Hypothelminx molitrix* and *Pangasius* were the most dominance species among all exotic fishes. Attempts were made to estimate the diversity of exotic fishes and their role in the ecology of the water bodies as a means of successful aquaculture practices.

**Keywords: Exotic fish diversity, abundance, ecology, Jhenidah. Bangladesh**

## I. INTRODUCTION

Aquaculture is the rapidly growing sectors of the world. Fish farmers are trying to grow more production of fish yields to earn more profit by introducing different kinds of exotic fishes. Exotic fishes are those which are not native to our country. The idea of introducing fishes is to fill up the vacant niches of the water body, to obtain more production and control of weeds and insect pests. 92 species of exotic fishes were cultured in Bangladesh in aquaculture practices. In India, 300 exotic fishes were introduced of which 29 reported as food fishes { Biju kumar, 2000, Lakra and sing, 2007, NBFGR, 2009, Sing and Lakra, 2011 }. But exotic fishes cause harm to the food web and cause huge loss to the indigenous species (Nyman 1991).

Water is the basic element of life and immense importance in Bangladesh. The rivers, lakes, haor (depression), baor (oxbow lakes), canals, ponds are the open water sources estimated as 1160 billion m<sup>3</sup>. Bangladesh fisheries sector is very rich in South Asian countries and ranked third after China and India. Fish contribute 65% protein intake in Bangladesh diet (World Bank 2006). Besides these, employment opportunities in the field covers 9% of the country and contribute about 6% of the total GDP (Chowdhury, 2010, World Bank, 2006).

Fish is the principal component of diet in Bangladesh and without rice and fish, it is impossible to complete launch. Fish provide protein and nutrition to mankind and play significant role in the economy of Bangladesh (Ahmed and Ali, 1996). Bangladesh is a low riparian country blessed with numerous natural water bodies with large number of indigenous variety of species. Water bodies are proclaimed with pollutants aggravating the health of the water causing for elimination of species or fish kills.

Aquaculture is profitable business to the fish farmers by adopting scientific and economic strategies not only in Bangladesh but also all over the world. With the intensity of the growth of the population, there is a growing need to enhance the total production of fishes to meet the domestic and international demands. In order to mitigate this problem, aquaculture practices is the suitable area for cultivation of commercial species. Successful aquaculture depends on successful maintenance of water quality, selection of species to maximum utilization of food chain. Exotic species are fast growing non local species which were incorporated in Bangladesh and other adjacent countries in order to fill up vacant niche of the aquatic environment, improved more production, increase the number of sporting fishes and narrow the gap between demand and supply.

Attempts were made to identify the exotic fishes of Jhenidah district to construct base line information and their ecological significant. For this reason, an attempt was made to construct the diversity of freshwater exotic food fish species available in Jhenidah district in Bangladesh.

## II. MATERIALS AND METHODS

The study was carried out for the abundance of exotic fish species in Jhenidah district in Bangladesh during 2012-2013. Different rivers, wetlands, ponds were selected for investigations. The specimens were collected during harvesting of fish with the help of fishermen by traditional gears and crafts. Collected fish samples were preserved in 10% Formalin for detail examination and identified following Talwar and Jhingran (1991), Rahman (2005) Jayaram (1981, 1999), and [www.fishbase.org](http://www.fishbase.org). Besides these, information were collected from local fish market visits and consult with age old fishermen was also considered.

### III. RESULTS AND DISCUSSION

The aquaculture practices is increasing with the exponential growth of human population to meet the challenges of protein supply in developing countries .As a result , there is a need to introduced exotic fishes to boost up fish production in order to solve the problems. Exotic fishes can

With the pace of national scenario fish introductions in Jhenidah district in Bangladesh have been increasing considerably during last thre or four decades due to relations with other changes in our society .due to the high demand of protein ,farmers are showing their thirst to grow more production of fishes within a shortest period of time. As a result 15 exotic fish species under 8 families were identified in the district during study. The scientific, common and scientific name of the species, together with their systematic position, purp, present utility status were described in Table 1.

Table 1. identified exotic fishes during survey period from 2012 to 2013

Serial no	Common name	Scientific name	Systematic position	Feeding habit	status
01	Tilapia	<i>Oreochromis mossambicus</i>	Cichlidae	Omnivorous	Food fish
02	Silver carp	<i>Hypophthalmichthys molitrix</i>	cyprinidae	plankyonivorous	Food fish
03	Pangas	<i>Pangasius hypothalmus</i>	Pangasiidae	Omnivorous	Food fish
04	Nilotica	<i>Oreochomis niloticus</i>	Cichlidae	Omnivorous	Food fish
05	Thai puti	<i>Barbonymus gonionotus</i>	cyprinidae	planktonivorous	Ornamental and food fish
06	Thai koi	<i>Anabus testudineus</i>	Anabantidae	Omnivorous	Food fish
07	Bighead	<i>Aristichthys nobilis</i>	cyprinidae	planktonivorous	Food fish
08	Common carp	<i>Cyprinus carpio var communis</i>	cyprinidae	omnivorous	Food fish
09	Grass carp	<i>Ctenopharyngodon idella</i>	cyprinidae	herbivorous	Control of weeds and food fish
10	African catfish	<i>Clarius garipinus</i>	claridae	carnivorous	Food fish
11	Mud carp	<i>Cirrhinus molitorella</i>	cyprinidae	omnivorous	Food fish
12	Black carp	<i>Mylopharyngodon piceus</i>	cyprinidae	omnivorous	Food fish
13	Pangas african	<i>Pangasius sutichi</i>	Pangasiidae	Omnivorous	Food and ornamental fish
14	Java puti	<i>Puntius javanicus</i>	cyprinidae	planktonivorous	Food fish
15	Golden carp	<i>Cerassius cavassius</i>	cyprinidae	omnivorous	Food fish +ornamental

15 species of exotic species were recorded in the district, . Among the exotic fish species 5 species (Grass carp, Common carp, Black carp, Mossambique tilapia and Nilotica tilapia) are cultivated for the purpose of biological control in natural water bodies beside being cultivated as food fish .and 2 fishes (thai puti and African pangas) have effective ornamental values and used as aquarium trade in the district. Majority of exotic fish species namely pangas, tilapia,Silver carp, Big head carp, Mud carp, thai koi,( Climbing perch) and African magur,thai swar puti are exclusively food fish for their rapid growth (Table 1).

Most popular exotic fishes used as food fishes were tilapia>silver carp>Pangas>thai puti>common carp>nilotica>thai koi(climbing perch) etc.Among the exotic fish species in the district, silver carp and common carp thai puti were introduced in the fish poly culture system to enhance yields through proper utilization of unoccupied trophic niches. Grass carp was also an significant species used in aquaculture to control weeds in aquatic bodies simultaneously the productivity was also increasing.monosex culture of tilapia is now very much popular in aquaculture in the district. Among the catfishes, the African magur was introduced particularly in this border district namely Jessore possibly during 1994 (Singh and Lakra, 2011). This type of voracious fishes was largely cultured in the district mainly in small ponds, abandoned ditches and cemented vat but now its abundance is very low. The government of Bangladesh and the ministry of fisheries have ordered the farmers and concerned authorities to restrict the culture of African cat fishes because the species is harmful to indigenou species,birds,ducks cattle even human. Hybrid technology was used to make a cross between *C. gariepinus* and *C. macrocephalus* as a result new variety of new variety of fast growing catfish is being used in aquaculture practices.are a fast growing variety and its seed is being produced in aquaculture practices ( Khan et al. 2000). Similarly an exotic species of thai koi( climbing perch) *A. testudineous* having large in size and rapid growth rate (Hasan et al., 2010), has been introduced in the pond culture in the district of Bangladesh..

Introduction of exotic species cause severe problems in the aquatic environment for food, shelter and habitat. some carnivorous fishes eat valuable indigenou species or attack them and ultimately lead to the loss of biodiversity. Every species is essential for successful maintenance of the ecosystems. Species of the same kind and the species of the different kinds are equally important for the balance of prey predator relationships, tropic levels and food chain. Some exotic fishes are very hady in nature, can tolerate high degree of pollution, adjusting them with the changing environment but the local fishes can not competing with the non native fishes as well as the rapid changes of the water bodies due to habitat degradation, siltation , waste materials of domestic and industrial sources(Bhakta and Bandyopadhyay, 2007). Thus it is prime importance for successful and accountable fishery, information about the environment and biological aspects of the introduced fish mainly on their food and feeding habit is indispensable.

#### IV. CONCLUSION

By introducing exotic fishes ,native fishes were lost as an alarming rate. It is necessary to adapt species specific plan for successful management of aquaculture. The aquatic species was taken into consideration as priority basis in the present global context

#### REFERENCES

- [1] Ahmed, A.T.A .and Ali, M.L..Fisheries resources potential in Bangladesh and Manpower Development for fisheries activities in population dimension of fisheries Development and Management Policies of Bangladesh, Dhaka,Bangladesh1996.
- [2] Bhakta, J.N. and Bandyopadhyay, P.K.Exotic fish biodiversity in Churni River of West Bengal, India. Electronic J. Biol., 3(1),2007, 13-17.
- [3] Bhuiyan,, A.L. Fishes of Dacca. Asiatic Society of Pakistan, Dacca, 1964, pp148.
- [4] Chowdhury, N.T..Water management in Bangladesh: an analytical review, *Water alus*) in Assam. Indian a of Fisheries 46 (3), 2010, 265–272.
- [5] Biju Kumar, AExotic fishes and freshwater fishdiversity. *Zoos' Print Journal*, 15(11), 2000, 363-367. .
- [6] Hasan, M., Ahammad, A.K.S. and Khan, M.M.R. A preliminary investigation into the production of Thai Koi (*Anabas testudineous*) reared in nylon hapas in Bangladesh. *Bangladesh Research Publications Journal*, 4(1),2010 ,15-23.
- [7] Jayaram, K.C. Freshwater fishes of India handbook. Zoological Survey of India, Calcutta, India1981..
- [8] Jayaram, K.C. The freshwater fishes of the Indian region. Narendra Publishing House, New Delhi, India.,1999.
- [9] Khan, R.M., Mollah, A.M.F., Ahmad, U.G). Mass production of hybrid magur and its culture production in Bangladesh. *Aquaculture Research*, 31 (5):2000, 467–472.
- [10] Lakra, W.S. and Singh, A.K.Fish introduction in Indian waters. *Fishing Chimes*, 27(1):2007, 30-34.
- [11] Lakra, W.S., Singh, A.K. and Ayyappan, S.Fish Introduction. in India: Status, Potential and Challenges. Narendra Publishers, New Delhi.2008.
- [12] NBFGR Ecological impacts of exotic fish species in India. Singh, A.K. and Lakra, W.S. (Ed.). National Bureau of Fish Genetic Resources, Lucknow, India,2009, pp 14.
- [13] Nyman, L. Conservation of freshwater fish. Protection of biodiversity and genetic variability in aquatic ecosystem. Fisheries Development Series 56, Swedmar & WWF, Sweden, 1991, 38.
- [14] Rahman ,A. K. A. Fresh water fishes of Bangladesh.2<sup>nd</sup> edition. The Zoological society of Bangladesh, Department of Zoology, University of Dhaka, Dhaka-1000, 2005, pp394
- [15] Singh, A.K. and Lakra, W.S. Risk and benefit assessment of alien fish species of the aquaculture and aquarium trade into India. *Reviews in Aquaculture*, 3,2011, 3-18.
- [16] Talwar, P.K. and Jhingran, A.G. Inland fishes of India and adjacent countries. Oxford & IBH Publishing Co., New Delhi, India. 1991.
- [17] World Bank: Bangladesh country water Resource Assistant Strategy report no 32312, BD,Environment and social unit, Agriculture and rural development unit, Energy and infrastructure unit south Asia region, document of the world Bank. 2006.