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Pangasius pangasius (Hamilton, 1822), A Threatened Fish of Indian Subcontinent

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Abstract

Pangasius pangasius is a catfish species which is widely distributed in India, Bangladesh, Pakistan, Myanmar, Malaya-peninsula, Indonesia, Vietnam, Java and Thailand. It is a popular food fish as having good taste with high protein, mineral and fat content in its flesh. It is also a popular game fish and recently has got its entry in ornamental fish markets too. *Pangasius pangasius* is very hardy in nature; has high tolerance for temperature, salinity and turbidity; but due to over exploitation, habitat degradation, water pollution, destruction of the breeding grounds etc. natural populations of this fish species are facing the threat of extinction and its now high time to take proper measures on serious note to conserve its natural population. The present report has been prepared with the aim to sum up the available information on different aspects of *Pangasius pangasius* along with noting down the possible measures that should be taken into consideration for its conservation.

Keywords: *Pangasius pangasius*; Catfish; Threatened; Conservation

Species Introduction

Pangasius pangasius (Hamilton, 1822) is a catfish species of the family Pangasiidae under the order Siluriformes. It forms a good fishery of considerable value and is used to fetch high market price as a food fish due to its good taste and deliciousness [1] with high protein, mineral and fat content in its flesh [2,3]. It is also popular as a game fish [1]. Recently it has made its entry into ornamental fish markets [4,5] and has also been documented to be exported from India as indigenous ornamental fish [6].

Common Name

Pangas/Pungus/Pangash in India [1,7]; Pangus in Bangladesh [1,7]; Nga-dam, Nga-tan in Myanmar [7]; Pla-sawai in Thailand [7].

Conservation Status

Critically endangered, both in India [8] and Bangladesh [9].

Morphological Characters

Body is elongated and laterally compressed, without any scale. Head and abdomen are flat; tail is constricted behind the adipose fin but a bit extended before the caudal peduncle. Head is slightly granulated above; occipital process is used to reach to basal bone of dorsal fin; snout is fairly prominent. Eyes are in the anterior half of the head, partly on the lower surface of head. Mouth is sub-terminal; upper jaw is longer than the lower jaw; mouth gape is of moderate size. Cleft of mouth is used to reach opposite the centre of front edge of the eye. Four groups of teeth are present on the palate; palatine teeth are in a crescent row, vomarine patches are separate from or nearly confluent with those on palate. Barbels are two pairs; the maxillary pair reaches the base of pectoral fin and the mandibular pair is half as long as the head in length. First dorsal fin is with a moderately strong spine which is strongly serrated on its inner edge but finely serrated on its outer edge. Adipose dorsal fin is short, posteriorly free, and originates almost opposite to the middle of the anal fin. Pectoral fin spine is serrated, strong and as long as dorsal spine. Anal fin is large and well developed. Caudal fin is deeply forked; upper lobe is slightly the longer. Body color is silvery, darkest along the back and glossed with purple on sides; cheeks and the under surface of head is golden; caudal fin is bright yellow [1,10].

Distribution

Pangasius pangasius is widely distributed in India, Bangladesh, Pakistan, Myanmar, Malaya-peninsula, Indonesia, Vietnam, Java and Thailand [1,7,10-15].

Habitat

Pangasius pangasius mainly inhabits large rivers and estuaries; but can also be seen in irrigation canals, haors, baors, beels, natural depressions and even ponds especially during the monsoon period [1,16]

Feeding Habit

Adult of *Pangasius pangasius* is bottom feeding, carnivorous in habit; mainly prefer molluscs [13,16-21]. Apart from molluscs, fishes, insects, crustaceans etc have also been documented from the gut content of adult pangas [18,19]. Ghosh and Saigal [22] and Ali et al. [23] on the other hand have reported adult pangas as an omnivorous fish. Larval and post-larval stages of this fish species live mainly upon the planktonic food and small insects [7]; the fry is having selective feeding on small insects, like caddis fly cocoons (Trichoptera), small ant remains, scaly insect (moths), *Haliplus* larvae, amphipods and copepods while juveniles mainly consume various types of both animal (crustacean, molluscs, insects, fish etc) and plant organisms [13].

Reproductive Biology

David [13] has reported that *Pangasius pangasius* used to attain maturity at about 54 cm size at the end of the third year age or it would

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take a year more to become fully ripe while Rahman [24] on the other side has reported that it attains maturity in the fourth year of its life. *Pangasius pangasius* is a seasonal spawner; David [13] has reported that it breeds between June and August while Rahman [24] has reported its breeding season in between July and October. There are diversified views regarding the spawning location of pangas; according to Pantulu [25], this species used to spend their adult life in the rivers and migrate to estuaries for spawning whereas David [13] has documented that pangas attains maturity in the estuary, then migrates and breeds in the freshwater and the young ones drift into the tidal stretch of the river where they grow and attain maturity. David [13] has reported *Pangasius pangasius* as a highly fecund fish with fecundity range of 8,85,400-58,07,560 while Ramakrishniah [20] has documented a range of 73,000-154,000 for the same.

Threats

Drastic decline of the natural populations of *Pangasius pangasius* has been reported [26] and numbers of factors like over exploitation, habitat degradation, water pollution, destruction of the breeding grounds and lack of proper management have been put reasonable behind this situation. Habitat loss through divergence of streams for irrigation is probably the most important factor that has threatened the species in its wide geographical range [27]. Jhingran [28] has stated that dams located in the lower reaches obstruct the runs of *Pangasius* also is adversely affecting its stocks.

Conservation Measures

Reduction of pressure on the natural populations of any fish species under threat is the first and foremost measure to conserve the particular fish species and in this regard, captive culture of that particular fish species has been suggested by the experts as the most logical step. *Pangasius pangasius* has already been documented as a suitable candidate species for both mono and poly-culture with carps either in ponds or in net cages [13,24,29,30] but unavailability of fry is the main constraint towards the culture of this fish species [26]. This problem can be solved by production of the fry in captivity following induced breeding. So far few works [15,26,31-33] have been done on induced breeding of *Pangasius pangasius*. Success of induced breeding in the sense of achieving maximum fry survivability depends on proper knowledge on the feeding habit and reproductive biology of that particular fish species. Till date, notable information has been documented on these two aspects of *Pangasius pangasius* by earlier workers [7,13,16-25].

Recommendations for Conservation

Pangasius pangasius is a very hardy fish in nature; it can withstand long ranged temperature and salinity and high turbidity. It can also thrive well in low dissolved oxygen condition [7]. But due to over exploitation, habitat degradation, destruction of breeding ground etc., population of this fish species is declining rapidly and is now facing the threat of extinction in nature. The problem of over exploitation can be solved by two measures: (i) by complete banning of fishing during the breeding season to provide protection to the brooders and (ii) by demarking size specific catch to save the juveniles and the existing stock. The factors which are causing habitat degradation and destruction of breeding ground must be identified and proper measures must be taken up to eradicate these problems. But before making all these measures in action, the present status of the populations of this fish species in nature to be analyzed properly as the earlier documented status was analyzed almost a decade ago. A proper survey work must be carried out following providing protection to the existing populations where in nature till they are present in numbers.

Ample information is available on feeding habit of adult *Pangasius pangasius*, but the same is really scarce for the larva, fry and juvenile stages. So, further study should be made to gather proper knowledge on this particular aspect; this will support proper rearing of these stages in artificial propagation and enhance survivability finally. Information available on its reproductive biology is also not much satisfactory; further study on this part will also be helpful for its artificial propagation. Last but not the least, general people should be made aware about this problem and using their support and willingness conservation programs can be arranged to get the ultimate goal.

References

1. Talwar PK, Jhingran AG (1991) Inland fishes of India and adjacent countries. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi, Bombay and Calcutta, India.
2. Islam R, Paul DK, Rahman A, Parvin T, Islam D, et al. (2012) Comparative characterization of lipids and nutrient contents of *Pangasius pangasius* and *Pangasius sutchi* available in Bangladesh. Journal of Nutrition and Food Science.
3. Monalisa K, Islam MZ, Khan TA, Abdullah ATM, Hoque MM (2013) Comparative study on nutrient contents of native and hybrid Koi (*Anabas testudineus*) and Pangas (*Pangasius pangasius*, *Pangasius hypophthalmus*) fish in Bangladesh. International Food Research Journal 20: 791-797.
4. Gupta S, Banerjee S (2012a) Indigenous ornamental fish: a new boon in ornamental fish trade of West Bengal. Fishing Chimes 32: 130-134.
5. Gupta S, Banerjee S (2012b) Present status of Galiff street market, the wholesale ornamental fish market of Kolkata. Fishing Chimes 32: 34-35, 39-42.
6. Gupta S, Banerjee S (2014) Indigenous ornamental fish trade of West Bengal, Narendra Publishing House, New Delhi, India.
7. Chondar SL (1999) Biology of Finfish and Shellfish. SCSC Publishers, India.
8. CAMP (1998) Conservation assessment and management plan for freshwater fishes of India. Workshop Report. Molur S, Walker S (eds.). Zoo Outreach Organization, Coimbatore/CBGS and NBFGR, Lucknow, India.
9. IUCN Bangladesh (2000) Red book of threatened fishes of Bangladesh, IUCN-the World Conservation Union, Bangladesh.
10. Day F (1878) The fishes of India being a natural history of the fishes known to inhabit the seas and fresh waters of India, Burma and Ceylon. William Dowson and Sons, London.
11. Job TJ, David A, Das KN (1955) Fish and fisheries of the Mahanadi in relation to the Hirakund dam. Indian Journal of Fisheries 2: 1-40.
12. Misra KS (1959) An aid to the identification of the common commercial fishes of India and Pakistan. Records of Indian Museum 57: 1-320.
13. David A (1963) Fishery biology of the Schilbeid cat-fish, *Pangasius pangasius* (Hamilton) and its utility and propagation in culture ponds. Indian Journal of Fisheries 10: 521-600.
14. Roberts TR, Vidthayanon C (1991) Systematic revision of the Asian catfish family Pangasiidae, with biological observations and descriptions of three new species. Proceedings of the Academy of Natural Sciences of Philadelphia 143: 97-144.
15. Tripathi SD (1996) Present status of breeding and culture of catfishes in south Asia. In: Legendre M, Proteau JP (eds). The biology and culture of catfishes. Aquatic Living Resources 9: 219-228.
16. Rahman AKA (2005) Freshwater fishes of Bangladesh. Zoological Society of Bangladesh, Dhaka, Bangladesh.
17. Hora SL (1952) Control of molluscan fauna through the culture of *Pangasius pangasius* (Hamilton). Current Science 21: 164-165.
18. Alikunhi KH (1957) Fish culture in India. Farmers Bulletin of Indian Council of Agricultural Research.
19. Menon MD, Chacko PI (1958) The food and feeding habits of some freshwater fishes of Madras State. Journal of Bombay Natural History Society 55: 117-124.

20. Ramakrishniah N (1986) Studies on the fishery and biology of *Pangasius pangasius* (Hamilton) of the Nagarjunasagar reservoir in Andhra Pradesh. Indian Journal Fisheries 33: 320-335.

21. Sengupta S, Homechaudhuri S (2011) Comparison of trophic niche and digestive enzymes of four species of catfishes of the Punarbhaba River in India. Indian Journal of Fisheries 58: 79-85.

22. Ghosh A, Saigal BN (1981) Observations on the digestive enzymes in the catfish Pangasius pangasius (Ham.) in relation to its food habits. Journal of Inland Fisheries Society of India 13: 91-92.

23. Ali MM, Day PC, Islam A, Hanif MA (1985) Food and feeding habits of *Pangasius pangasius* (Ham.) of the river Bishkhali, Patuakhali. Bangladesh Journal of Zoology 13: 1-6.

24. Rahman MK (1992) Aquaculture of *Pangasius pangasius*. Annual Report (1989-91). Fisheries Research Institute, Riverine Station, Chandpur, Bangladesh.

25. Pantulu VR (1962) On the use of pectoral spine for the determination of age and growth of *Pangasius pangasius* (Hamilton-Buch). J. Cons. Int. Explor. Mer. 27: 192-216.

26. Khan MHK, Mollah MFA (2004) Further trials on induced breeding of *Pangasius pangasius* (Hamilton) in Bangladesh. Asian Fisheries Science 17: 135-146.

27. Alam MA, Siddik MAB, Nahar A, Mahmud S, Parvez I (2014) Genetic divergence in natural populations of yellowtail catfish *Pangasius pangasius* (Hamilton-Buchanan, 1822) using allozyme marker. World Applied Sciences Journal 29: 926-932.

28. Jhingran VG (1975) Fish and fisheries of India. Hindustan Publishing Corporation, New Delhi.

29. Hannan AM, Alam AKMN, Mazid MA, Humayun NM (1988) Preliminary study on the culture of *Pangasius pangasius* (Ham.). Bangladesh Journal of Fisheries 11: 19-22.

30. Sarder MRI, Mollah MFA (1991) Effects of feed on growth and production of pangas (*Pangasius pangasius*) in the ponds. Progressive Agriculture 2: 83-87.

31. Gupta SD, Reddy PVGK, Rath SC, Das Gupta S, Sahoo SK, Sar UK (1998) A note on artificial propagation of a teleosts, *Pangasius pangasius* (Ham). J Aqua 6: 23-26.

32. Molla MFA, Khan MHK (1999) Observations on induced breeding of *Pangasius pangasius* (Hamilton). Bangladesh Journal of Fisheries 22: 125-128.

33. Ferose Khan S, Sahoo SK, Giri SS, Saha A, Paramanik M (2015) Embryonic and larval development of yellow tail catfish, *Pangasius pangasius*. Journal of Aquaculture Research and Development 6: 343.