

REVIEW ON *CLUPISOMA GARUA* (HAMILTON, 1822), AN INHABITANT SPECIES IN INLAND OPEN WATERS OF INDIA

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ABSTRACT

Clupisoma garua (Hamilton, 1822) commonly known as 'garuabachcha' under the order Siluriformes and family Schilbeidae, a potamodromous species, demersal habitat and found both fresh as well as brackish water. The species is mainly distributed in Asian countries like Bangladesh, India, Pakistan and Nepal and found mainly large freshwater bodies. The species are categorized as Least Concern (LC) by IUCN but kept as Vulnerable (Vu) category by the CAMP and CAFF reports. It is an omnivorous species and feeds on insects, molluscs, crustaceans and small fishes in wild conditions. The species have both food and ornamental values and the medium-size individual also treated as game fish in India. Through the species is said to be widely distributed but threatened in some localities like southern West Bengal, due to overfishing and anthropogenic activities. In the present review, we have tried to give detail information of 'garuabachcha', which will be useful to know the species, its potential importance and suitable conservation measures may carry out accordingly.

INTRODUCTION

Clupisoma garua (Hamilton, 1822) commonly known as 'garuabachcha' under the order Siluriformes and family Schilbeidae well distributed in Indian rivers and reservoirs and have potential aquaculture importance. The catfish family Schilbeidae native to Africa and Asia comprises of 66 species in 14 genera (Eschmeyer and Fong, 2016). Approximately half (32 species) is known from Asian countries comprising of 5 genera including *Clupisoma*, *Ailia*, *Horabagrus*, *Lalides* and *Pseudeutropius* (Wang *et al.*, 2016). The genus *Clupisoma* are having of five species of which four are reported from Indian region namely *C. garua*, *C. bastari*, *C. naziri* and *C. montana* (Hora, 1937). As per IUCN Red List Status, the species categorized under Least Concern (LC), according to CAMP (1998) and CAFF (2006) report the species declared as Vulnerable (Vu) category due to the reduction of populations in natural habitats. In the neighboring country, Bangladesh the species is recently kept under critically endangered (Hanif *et al.*, 2015; IUCN, 2015) of limited geographical distribution in that region over the decades for the increase of anthropogenic and natural hazards (Siddik *et al.*, 2017). *Clupisoma garua* is said to be commercially important freshwater fish species and a potential candidate species for aquaculture system (Saraswat *et al.*, 2014) and its demand is exceeding its supply in the market (Verma and Serajuddin, 2017). The 'garuabachcha' a very important capture fishery resources and well distributed in Indian rivers and reservoirs and have potential aquaculture importance (Figure 1). Being boneless, it is mostly preferred as food

fish (Talwar and Jhingran 1991). The fish is consumed by all groups of consumers but mostly favoured by poor people due to their high nutritional value with protein content of 18.40%, fat 5.2% and water 74.2% (Bhuiyan, 1964; Memon *et al.*, 2010), availability (Galib *et al.*, 2009) and good taste (Siddik *et al.*, 2017; Verma and Serajuddin, 2017). The fish also has an ornamental value hence, promotes livelihood alternative for coastal communities (Gupta *et al.*, 2016). Through the species is said to be widely distributed but threatened in some localities like southern West Bengal, due to overfishing activities (Verma *et al.*, 2014) and a moderate decline of this species from natural water bodies of Bengal also reported by Patra *et al.* (2005) and Mishra *et al.* (2009). This is a migratory species and used to travel for a long distance for feeding as well as to searching for suitable breeding grounds.

Common names: Garua Bachcha, Guarchcha (English).

Bangladesh: Ghaira, Gang ghaira, Ghaura and river catfish (Galib, 2008; Rahman, 1989).

India: Neria (Assam); Garua, Gharwya, Kocha, Puttoshi, Gaurcha, Ghero (West Bengal); Bachawa, Gharuwa (Bihar); Buchua (Uttar Pradesh); Chellee, Buchua (Punjab); Punia-cathua, Gajri (Orissa) (Talwar and Jhingran, 1991).

Finland: Sillimonni (Finnish) (FishBase.org.in)

Distinguishing characters

Morphological characters are well documented by Jayaram, 1977; Talwar and Jhingran, 1991; Sarma *et al.*, 2009; Das *et al.*, 2012; Gupta and Banerjee, 2016; Hadiuzzaman *et al.*, 2017; Singh *et al.*, 2018.

Fin formula: D.1/6; A 3/28; P. 1/11; V. 1/5; C. 17-20.

Clupisoma garua is herring-shaped fish, tapering very gradually toward both ends and abdominal edge partly keeled between pelvic fins and vent (Jayaram, 1977). The body is elongated and laterally compressed with a silvery body and yellowish-green back. Head is oval, blunt and of moderate size with a golden gloss (Talwar and Jhingran, 1991). Eyes are large with circular adipose eyelids. The mouth is wide and sub-terminal. Teeth villiform on jaws and palate. Upper jaw is longer. Barbels 4 pairs, 2 pairs of mandibular and one each of maxillary and nasal. Maxillary reaching the middle or to the base of pelvic fin. Mandibular barbels extending to the base of pectoral fins in adults.

Nasal barbel not reaching the anterior edge of the eye. Pectoral fin serrated internally and not extending pelvic fin. Dorsal spine is slender. The adipose dorsal fin is absent in adults. Anal fin with 29 to 36 branched rays. Caudal fin deeply forked, lower lobe longer than upper. Dorsal, pectoral and caudal are black edged.

Colour: Body color is silvery grey on the back and lighter on the sides and abdomen; fins are tinted grey in color with dorsal, pectoral and caudal fin are black edged. The species name *garua* probably derived from *gerua* (yellowish orange) color fins.

Maximum length: 60.9 cm of SL (Shrestha, 1990) and 100 cm of TL (Talwar and Jhingran, 1999).



Fig. 1. A fully matured *C. garua* collected from a large reservoir resources

Distribution

Global distribution

Clupisoma garua has a wide distribution, Indus plain and adjacent hilly areas, Pakistan, in the large reservoir of northern India, Bangladesh and Nepal (Talwar and Jhingran, 1991).

Local distribution

In India, its distributions are to north India including Bihar, West Bengal, Odisha, Madhya Pradesh, Assam (Brahmaputra and Barak drainage).

Habit and habitat

It is mainly found in lacustrine habitat in normally at larger rivers and reservoirs and also in stagnant impoundments. Generally inhabitant in freshwater body, brackish water abundance also reported and a bottom dweller species. They are generally moved in shoals in canals, rivers, streams, lakes, reservoirs and swamplands of both freshwater and brackish-water bodies (Verma and Serajuddin, 2017). Potamodromous, migrating within streams, rivers and travels a long distance (more than 100 km) for feeding or for locating suitable breeding grounds in new water bodies to avoid stress conditions of existing habitat (Froese and Pauly, 2013 and Saraswat *et al.*, 2014).

Food and feeding habits

It is an Omni-carnivore fish feeding mostly along the bottom and along margins of the river. Being non-selective

feeder they subsist on anything and everything available in the habitat. As per the classification of Nikolsky (1963), *Clupisoma garua* falls in the category of euryphagous fish. Nath, 1994 reported this fish as highly carnivorous and predacious in nature. Afsar (1990) studied on food and feeding habits of *Clupisoma garua* and found continuous in its feeding and reported its high feeding intensity during September to October. *Garuabachcha* feeds actively in April to June and September to December (Chondar, 1999). Surface feeding is during the rainy season and bottom feeding during winters (Krishna Murti *et al.*, 1991). In river Brahmaputra, this fish is caught by using goat liver mixed with fats of Ganges river dolphin, *Platynista gangetica* (Roxburgh, 1801) as bait by Fishers of Bin community, Assam (Ahmed *et al.*, 2018). A comparative food and feeding habits of *C. garua* worked on different workers provided in Table 1.

Clupisoma garua relies largely on smell, taste and touch and on lateral line sense organ to locate and catch the prey. They wait till animal passes by and then dart out to grasp it (Talwar and Jhingran 1991). The fishes have better developed olfactory organ compared to vision (Ghosh, 2018). There is mixed opinion regarding the feeding behavior of *C. garua*. Several workers reported it is an omnivorous in feeding habits (Tandon *et al.*, 1977; Agarwal and Tyagi, 1969) and few of them also described the

species as carnivorous (Khan, 1934; Molur and Walker, 1998).

Table 1. Comparative food and feeding habits of *C. garua* by different researchers

Author	Feeding habits
Khan, 1934	Insects and their larvae, crustaceans and small fishes
Hora, 1937	Preys on crabs, shrimps, fish, insects etc., and vegetable matter
Karamchandani, 1957	Carp fry and insects
Motwani and Karamchandani, 1958	Insects of both aquatic and terrestrial, fish, animal flesh, molluscs, crustacean, algae fragments of higher plants, debris and mucus
Agarwal and Tyagi, 1969	Omnivorous feeding on small fishes, crustacean and pieces of plants. Bottom and marginal feeder. Smaller size groups are omnivorous, with an increase in size becomes insectivorous and piscivorous
Tandon <i>et al.</i> , 1977	Bottom and marginal feeder. Smaller size groups are omnivorous, with an increase in size becomes insectivorous and piscivorous
Talwar and Jhingran, 1991	Molluscs, insects, small fishes and decaying matter

Reproduction

Clupisoma garua is bisexual in nature and the male and female individuals could be easily identified once they matured with the secondary sexual characters developed during spawning season. The pectoral fin spine is found longer in male compared to the female during the breeding season. The species become sexually matured at the end of first year and male matured earlier than that of female (Chondar, 1999). It is reported to move in shoals during breeding period and breeds in shallow water during the month of March-August. The breeding also reported in monsoon floods between May to August at Gangetic Brahmaputra system (Chondar, 1999). Bhuiyan (1964) have reported the suitable spawning temperature of this species is between 15.6-20°C at Bangladesh water bodies. It is an oviparous species, fertilization is external in open water and eggs are remained unguarded by the parents (Das *et al.*, 2012).

Conservation status

As per IUCN Red List Status, the species is categorized as Least Concern, but it is kept as critically endangered in Bangladesh (IUCN, 2000) and Vulnerable in India (Lakra *et al.*, 2010, CAMP Report, 1998). In several parts of the country, the species population is reported to be in decline from natural water resources. The causes for declining of the species could be over exploitation, loss of habitat, human interference, climate change, pollution, siltation and trade but the primary reason was found to be overfishing (Biswas *et al.*, 2018). Knowledge of certain biological aspects of this commercially important species will be useful to conserve this species in natural habitats and food

and feeding behaviors along with reproductive traits will help while aquaculture practices.

Conflict of interest

There are no conflicts of interest and the authors are responsible for the content and of the writing of the manuscript.

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