



CLARIUS GARIEPINUS: AFRICAN CATFISH EXOTIC SPECIES ENDANGERING NATIVE AQUATIC BIODIVERSITY OF INDIA

Sudhir V. Bhandarkar

Department of Zoology, M.B. Patel College Deori, Dist. Gondia MH

Corresponding Email ID: Sudhirsense@gmail.com

Abstract: An African Catfish or Thai Magur (*Clarius gariepinus*), is widely distributed across the nation, having been brought from all over the world and being cultivated with Indian Major Carps in freshwater bodies. Farmers began monoculture owing to its rapid growth and omnivorous eating behavior, however it was later discovered that the aforementioned fish was detrimental to the health of biodiversity. That is why the Indian government banned this species in 1999, despite the fact that farmers were found to be using monoculture tactics to generate money since this fish grows quickly without the necessary cultural management measures. The fish is extremely durable under adverse environmental conditions. The challenges to biodiversity posed by this species' overpopulation in India's freshwater bodies are explored in this article.

Keywords: African Catfish, overpopulation, Threaten, Biodiversity, Conservation

Introduction: Exotic species may have detrimental effects on local ecosystems, such as the introduction of parasites and biological competition with native species, resulting in a loss of biodiversity. Many vulnerable or endangered species are deemed endangered largely due to competition and predation by non-indigenous species (Wilcove et al., 1998). Around 50 exotic fin fish species are being farmed in Asia (de Silva et al., 2006). In recent years, the introduction and illegal production of various new foreign species has been observed in 'India'-the world's second largest aquaculture producer (FAO 2008-2009). *Clarias gariepinus*, often known as the African mud catfish, several nations cite negative environmental effects following its adoption. lives in the wild but is also widely farmed in ponds, cages, and pens for commercial purposes. This fish is omnivorous but prefers a planktonic diet. The ravenous predator feeds on both living and dead animal stuff, including as fish and crustaceans, and has been known to attack small birds. It has an advantage over other local species due to its

capacity to remain in shallow muck for extended periods of time, high tolerance for poorly oxygenated water, and rapid mating. In India it was first noticed in Andhra Pradesh (Middendorp, 1998). Since then, it has colonized several major rivers, marshes, and other bodies of water across the country. It was introduced to India from Bangladesh (Thakur, 1998) and was originally farmed in the two north-eastern provinces of West Bengal and Assam, as well as the southern state of Andhra Pradesh, alongside indigenous Indian Major Carps (Baruah et al., 1999). Because to the considerable losses in carp production in such mixed culture ponds with Indian Major carps, farmers eventually favored the monoculture of *C. gariepinus* due to its rapid growth rate and economic benefits (Middendorp, 1998; Thakur, 1998; Baruah et al., 1999). The species, also known as African Mushi, was imported throughout the world in 1980 for aquaculture and in India without official permission. The fish can survive in shallow muck for long periods of time and has a strong tolerance for low oxygenated water. The government has prohibited the production of African catfish, an invasive species that is flourishing in water bodies across the country and poses a danger to local aquatic species. The National Green Tribunal, in its ruling no 435/2018 dated January 22, 2019, prohibited the species' raising because it was endangering many local types of fish and contaminating water sources. Because of the possible harm to human health and aquatic biodiversity, India's Ministry of Agriculture banned the culture, breeding, transportation, and import of *Clarias gariepinus* in 1997. (Gopi and Radhakrishnan, 2002).

Global distribution: The African catfish (*Clarias gariepinus*), native in much of Africa and Asia Minor, is also introduced for aquaculture in different parts of the world (Khan and Pannikar, 2009; Eagle and Valderrama, 2001; Bruton, 1979). The fish is distributed in Africa: almost Pan-African, with the exception of the Maghreb, Upper and Lower Guinea, the Cape Province, and maybe Nigal province. Asia includes Jordan, Israel, Lebanon, Syria, and southern Turkey. Other regions of Africa, Europe, and Asia have been widely imported.

Biology of a species: Adults prefer shallow and marshy places with a soft muddy substrate and calmer water, and can be found in tranquil ponds, lakes, and pools. They can also occur in fast-flowing rivers and rapids. Rice fields are recorded as having been or being cultivated. Water turbidity and substrate type appear to correspond with the two recognized colour types. Water parameters appear to be of modest importance. Because this species has an extra breathing organ, it can breathe air even when it is exceedingly active or in very dry conditions. They live on muddy pond substrates and occasionally inhale air via their mouths. Can exit the water at night, utilizing its powerful pectoral fins and spines, in pursuit of land-based food, or go into breeding sites via extremely shallow passageways. It is bottom feeders that occasionally eat above the surface. At night, they feed on a broad range of food, including insects, plankton, crustaceans, and fish, but they also eat young birds, decomposing meat, and plants. To spawn, they migrate to rivers and temporary streams. During intra-specific hostile contacts, this species was seen to emit monophasic, head-positive electric organ discharges lasting 5-260 ms. In aquaculture, it is known as sharptooth catfish, and it is a popular food fish in Africa. (Teugels, 1986)

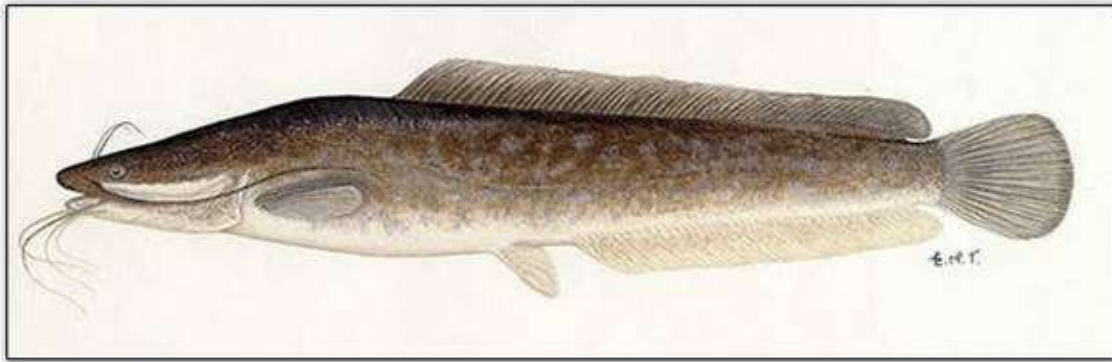


Fig. 1 *Clarias gariepinus* (Courtesy of South African Institute for Aquatic Biodiversity)

Environmental Impact: The United States' Invasive Species Advisory Committee (ISAC) defines "ecological harm" as biologically significant decreases in native species populations, changes to plant and animal communities, or changes to ecological processes on which native species and other desirable plants, animals, and humans rely for survival (ISAC, 2006). The African catfish is a widespread invasive fish species that is thought to pose a significant danger to native fish fauna. (Casal, 2006; de Silva et al., 2009). *Clarias gariepinus* has a far higher fertility than the native Indian catfish (*Clarias batrachus*), which varies between 7,000 and 15,000 eggs. The breeding input cost is also quite low when compared to native catfish (Krishnakumar et al., 2011) and has a flexible form, grows quickly, has diverse habitat preferences, is adaptable of a broad range of water conditions, can live on a wide variety of food, and can hybridize with nonspecific (Bruton, 1986). These features allow the fish to destabilize local fish and aquatic invertebrate species, which is why several Asian nations, such as India, restrict its usage in aquaculture (Dhawan and Kaur, 2001). Like many catfish, it is a nocturnal fish. It feeds on both live and dead animal materials. It can swallow pretty large prey whole due to its enormous jaws. Most river systems in the Western Ghats are thought to be dominated by the African catfish. *C. gariepinus* importation and cultivation have had a severe influence on the native fish species of Manalur in Kerala (Gopi & Radhakrishnan, 2002). *C. gariepinus* has also been found in numerous Indian interior river systems, including the Ganga, Yamuna, Sutlej, Godavari, and Periyar, as well as lakes such as Vembanad (Krishnakumar et al., 2011; Singh et al., 2014). According to de Moor and Bruton (1988), this species also consumes tiny reptiles, amphibians, and birds, disrupting the natural balance of water bodies and reducing the food basis for aquatic birds. It has been observed capturing huge water birds such as common moorhens (Anoop et al., 2009). It can also crawl on dry ground to get away from drying ponds. Furthermore, it can persist for extended periods of time in shallow muck between wet seasons. *Clarias gariepinus* has a significant environmental impact, mostly through benthic feeding behavior (Vilizzi and Tarkan, 2015; Kadye, 2011; Krishnakumar et al., 2011), habitat change (Koekemoer and Steyn, 2002; Kadye, 2011), predation, and aggressiveness (Vitule et al., 2008).

Clarias gariepinus may harbour a variety of digeneans, as well as other endo- and ectoparasites such as *Costia* sp., *Chilodonella* sp., *Trichodina maritinkae*, and *Henneguya* sp. (Protozoans); *Cysticerca* sp. (Nematodes);

Gactylogyrus sp. and Gyrodactilus (Sudhan and Moulitharan, 2017). In captivity, the fish is fed decaying meat and spinach, which pollutes the water. Because of its better tolerance to harsh aquaculture conditions and comfort in living in unsanitary and polluted environments, this fish has a high proportion of lead and iron, which has several public health consequences. The African catfish has also been documented to have an impact on aquatic plants such as phytoplankton, periphyton, and macrophytes (Tapia and Zambrano, 2003; Badiou et al., 2011; Kadye, 2011). African catfish thrive in water temperatures ranging from 8 to 35 degrees Celsius and salinities ranging from 7 to 15 parts per thousand (Britz and Hecht, 1989). Due to the aforementioned reasons, it's illegal culture and sale have not completely stopped in India. The state fisheries agency conducted an effort to dismantle its cultivation centre. The state government has destroyed 32 tonnes of Thai magur in Sakoli (Bhandara), 8 tonnes in Indapur, and 6 tonnes in Shikarpur (Pune). Thousands of tonnes of forbidden catfish were unlawfully produced in over 125 artificial ponds in rural Thane by Maharashtra officials. In addition, the Uttarakhand State Government has detained several fish farmers for illegally producing Thai Magur till September 2020. A truck carrying 15 tonnes of Thai Mangur fry (baby fish) from West Bengal to Hapur in western Uttar Pradesh was apprehended in Varanashi. New and effective means of capture and control must be implemented. *Clarias batrachus*, often known as Magur, has fallen dramatically from its native habitats in India during the previous decade. This fish is popular among Indian customers and has a strong market demand. As a result, dealers in India frequently replace *C. batrachus* for a morphologically similar but allegedly prohibited exotic catfish, *C. gariepinus*. This study examines the amount of replacement of *C. batrachus* by *C. gariepinus* in India using rigorous morphological comparisons corroborated by DNA barcode analysis (Khedkar et al., 2014), According to the findings, up to 99 percent (in several situations) of market samples advertised as Magur or *C. batrachus* were actually *C. gariepinus*. Proper management measures should be implemented, including the strict enforcement of current regulations and raising awareness of this invasive alien species among scientists, farmers, politicians, and the general public (Gul et al., 2020).

Conclusion: *Clarias gariepinus* is an unusual fish that is found in all types of water in India. It possesses a range of qualities that allow it to survive in poor environmental or unfavorable condition. It competes with indigenous fish species in many ways, causing their population to increase in all bodies of water while causing the extinction of other indigenous fish and other important biota for long-term existence. *Clarius gariepinus* in wild rivers or streams could be managed, and endemic species should be conserved in order to preserve India's natural and national richness for future generations.

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