

Reviving the Giant Featherback (*Chitala lopis*) in Indonesia

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In Indonesia, the giant featherback (*Chitala lopis*) is an economically important freshwater fish. However, this fish has been overfished due to its high demand. For the sustainability of the fishery resource, the Government of Indonesia issued the Decree of MMAF No. 1/2021 declaring this fish species fully protected. Currently, the Research Institute for Inland Fisheries and Extension (RIIFE) with support from the PT Kilang Pertamina Internasional Refinery Unit III Plaju is carrying out experiments on the culture of the giant featherback to revive the population of the giant featherback in the country.

The family Notopteridae includes 10 species of osteoglossiform (bony-tongued) fishes, namely: the reticulated knifefish (*Papyrocranus afer* (Günther, 1868)); African knifefish (*Papyrocranus congoensis* (Nichols & La Monte, 1932), *Xenomystus nigri* (Günther, 1868)); royal knifefish or Indochina featherback (*Chitala blanci* (d'Aubenton, 1965)); Indonesian featherback (*Chitala borneensis* (Bleeker, 1851)); Indian featherback (*Chitala chitala* (Hamilton, 1822)); giant featherback or clown knifefish (*Chitala hypselonotus* (Bleeker, 1852), *Chitala lopis* (Bleeker, 1851), *Chitala ornata* (Gray, 1831)); and the bronze featherback (*Notopterus notopterus* (Pallas, 1769)).

Focusing on *Chitala lopis* or giant featherback, this fish species is found in the Mekong Basin and several Southeast Asian countries, particularly Cambodia, Indonesia, Malaysia, and Thailand (Kottelat *et al.*, 1993) (Figure 1). It is called “trekrai” or “trekrai” in Cambodia, “ikan belida” in Perak, Malaysia, or “pla satu” in Thailand. In Indonesia, this fish is distributed in Riau, Jambi, South Sumatra, Bengkulu,



Figure 1. Distribution of giant featherback in Southeast Asia

Lampung, Java, and Kalimantan, and it is locally called “belida” or “belido” in Palembang or “pipih” in Kalimantan.

The giant featherback usually inhabits the lowland river mainstems and tributaries with rocky and sunken wood bottoms and forest-covered streams. The timbers and logs are refuge areas for small fishes, shrimps, and aquatic insects which are the food source for the giant featherback mostly at night. Besides, the woods or logs serve as substrates for laying their fertilized eggs. During the dry season, they live in the river; and as the water level decreases, they swim to swamps and rice fields for spawning and feeding during the rainy season (Makmur *et al.*, 2008).



Figure 2. Giant featherback (*Chitala lopis*) (Photo: RIIFE)

As shown in Figure 2, the jaw of *C. lopis* increases in length throughout its life, extending far beyond the posterior margin of the eye in large specimens. The small juvenile has slightly oblique bars on its body and anal fin; while in larger juveniles and adults, the body is plain and silvery to bronze overall in their life (Kottelat, 2001).

The giant featherback is a popular freshwater fish and has a high economic value in Indonesia. This fish is a symbol of culture in Sumatra and Kalimantan where it is considered as a prestigious food fish for its high protein and vitamin A content. Its flesh has a smooth texture with distinctive taste and it is also widely consumed as fish cake or “pempek” and fish crackers or “kemplang.” This fish is also a favorite species for ornamental fish collectors because of its peculiar body shape.

Figure 3 shows the production trend between 2010 and 2017 in the provinces where *C. lopis* is found. During the eight-year period, the average production was 2,985 t with highest in 2014 (4,414 t) and lowest in 2016 (1,380 t). A significant decrease in production was observed from 2015 (2,408 t) to 2016 (1,380 t), although there was a slight increase in 2017 (1,632 t). Among the provinces, the three highest average production were in West Kalimantan (807 t), Central Kalimantan (803 t), and South Kalimantan (538 t).

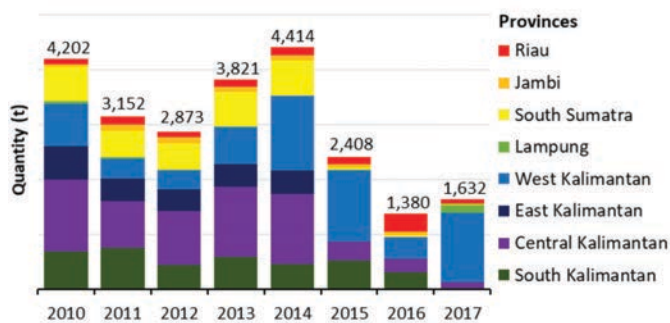


Figure 3. Giant featherback production (t) in 2010-2018 (KKP, 2022)

Conservation Efforts

Unfortunately, the production of *C. lopis* was only from the wild. The population of this species had decreased due to overfishing to supply the high demand, use of unfriendly fishing gear, and destruction of habitat. The International Union for Conservation of Nature (IUCN) listed *C. lopis* as extinct in 2019 (Ng, 2019). Therefore, the need to develop sustainable fish farming is crucial for the optimal production of *C. lopis*.

In order to conserve the giant featherback fishery resource, this fish was protected through Government Rule No. 7/1999 while the Conservation Assessment and Management Plan (CAMP) categorized *Chitala* spp., especially *C. lopis*, as a rare species (Sarkar *et al.*, 2008). Moreover, through the Ministry of Environment and Forestry, Indonesia applied a new rule in 2018 to protect the four species, namely: *C. borneensis*, *C. hypselonotus*, *C. lopis*, and *Notopterus notopterus*. Strengthening the previous Decree, the Decree of Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia (MMAF) No. 1/2021 was issued to declare the four

fish species as fully protected and the capture and utilization of this fish is limited.

In Palembang, the capital city of South Sumatra Province, the giant featherback has served as a mascot. As an effort to raise the awareness of the people of the scarcity of giant featherback in the Musi River, the Palembang City government constructed in 2017 a 12 m × 22 m giant featherback monument in the Kuto Besak Fort Plaza of Palembang with the head of the fish pointing to the Musi River (Figure 4). The Mayor of Palembang emphasized that this monument would remind the residents of Palembang that the giant featherback is a native fish in the Musi River. The Indonesian World Records Museum acknowledged the attempt of RIIFE and PT Kilang Pertamina Internasional Refinery Unit III Plaju to promote the conservation the giant featherback. In December 2021, RIIFE bagged the 2nd Best Award for the Innovative Researcher Category from the Governor of South Sumatra Province during the 26th National Technology Awakening Day with the theme “Sustainability of Giant Featherback (*Belida Lanjut Lestari or Belari*).”

In order to reach a wider audience, especially the young people, the South Sumatra Provincial Government through the Regional Research and Development Agency under its program “Podcast One Day, One Innovation” used social media platforms to circulate various innovations to disseminate the information on the giant featherback. Under the Program, RIIFE also conveyed the results of experimental activities on the culture of the giant featherback.

Exploring the Aquaculture Potential

Several studies had been carried out on the giant featherback such as those on resources management (Wibowo *et al.*, 2010), seedling technology (Sukendi *et al.*, 2019), and



Figure 4. Giant featherback monument in the Kuto Besak Fort Plaza of Palembang City pointing to the Musi River (Photo: Diana Luspa)

management strategy for sustainability (Nugroho *et al.*, 2020). However, scientific literatures on its culture in captivity are still limited, especially that the cultivation technology on the giant featherback is still complicated, even if its aquaculture plays an important role in maintaining the sustainability of the fishery resource.

Aquaculture technology is one way of bridging the acceleration of conserving the fish stocks in nature. The role of fish farmers is crucial in improving the production of any fishery resource which is one of the keys to optimal utilization and preservation of sustainable resources (Nugroho *et al.*, 2020). Currently, the giant featherback is not yet considered an aquaculture commodity, however, attempts to domesticate the fish had been initiated since the early 1980s. Nonetheless, the culture of the giant featherback is still in its development stage and the spawning technology was not yet developed (Sukendi *et al.*, 2019).

As the culture of the giant featherback is still at an experimental stage, it is predicted that the farming of this fish is economically unprofitable because of low seed yield. To produce enough seeds in one hatchery run, a number of broodstock would be needed and this is expensive as the price of a broodstock is high. Moreover, as the growth is also sluggish, rearing of the fish would require more feeds. Being carnivorous, farming of the giant featherback has several obstacles that include slow growth, predatory behavior (aggressive), and the need for specific habitat environmental conditions (Sukendi *et al.*, 2019; Nugroho *et al.*, 2020).

The oil and petrochemical refinery company in Indonesia, PT Kilang Pertamina Internasional Refinery Unit III Plaju, is concerned with community empowerment-based biodiversity programs (Pertamina, 2022). Through its Corporate Social Responsibility (CSR) Program, the Company collaborated with the Research Institute for Inland Fisheries and Extension (RIIFE) to preserve the germplasm of the giant featherback and other native fish species in South Sumatra. The short-term objectives of the two-year (July 2021–July 2023) collaboration include preservation of the germplasm of the giant featherback and selected native fish species in South Sumatra; training and mentoring of community groups for germplasm conservation; and research support through technology dissemination. Meanwhile, the long-term goal is to create a Giant Featherback Farming Village in the Mariana Region, South Sumatra Province.

In the first year of the collaboration, RIIFE has developed several broodstock ponds and hatcheries for the hatchery/nursery of eggs, maintenance of broodstock and larvae, and domestication of *Hemibagrus nemurus* (Asian redbtail

catfish), *Helostoma temminckii* (kissing gourami), and *Anabas testudineus* (climbing perch). In September 2021, the natural spawning of 66 giant featherback in the ponds was a success; and the effort of RIIFE and PT Kilang Pertamina Internasional Refinery Unit III Plaju was acknowledged with an award from the Indonesian World Records Museum. Furthermore, training on the cultivation of giant featherback and Asian redbtail catfish was also organized in 2021 for several groups with assistance from PT Kilang Pertamina Internasional Refinery Unit III Plaju. In early 2022, RIIFE resumed the activities of domesticating the giant featherback, developing of the nursery and semi-artificial spawning technology, and conducting a series of training and mentoring of community groups.

Currently, the domestication process is being carried out to enable the fish to adjust to its new habitat as well as the basic information on the suitability of the habitat and performance of the fish in aquaculture or conservation efforts is being obtained. During the culture trials, the broodstock of giant featherback was fed with snakeskin gourami (*Trichopodus pectoralis*) and small shrimps (Figure 5), while the juveniles were fed with artemia, Tubifex, shrimps, and vitamin E. The juveniles were placed in the aquarium with a cylindrical shelter arranged like a pyramid to protect the pups of the seeds as they grow.



Figure 5. Snakeskin gourami (top) and small shrimp (bottom) as feed for the giant featherback

Aside from addressing the challenges on the conservation of the giant featherback, the relevant community groups would be trained to enhance their knowledge of the cultivation of snakehead (*Channa striata*) and snakeskin gourami which could serve as natural food for the giant featherback. The training would enable the community groups to farm native fish species and reduce feed costs.

Way Forward

Although the Decree of MMAF No. 1/2021 was enacted to limit the capture giant featherback, the Decree of MMAF No. 61/2018 allowed the utilization of the fish for experimental purposes. RIIFE and PT Kilang Pertamina Internasional Refinery Unit III Plaju strive to maintain the public awareness of preserving local fish species by publishing of the results of the experiments on the culture of the giant featherback in various platforms such as scientific journals, popular magazines, newspapers, and others to reach relevant stakeholders. At this juncture, great effort is still necessary to develop the technology of producing giant featherback seeds and keeping them to reach adult stage. Through research, the development of technology on broodstock rearing, spawning, and hatching of giant featherback eggs should be sustained.

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