

Morphological Characters, Life Cycle and Breeding Techniques of *Pangasius hypophthalmus* – An Overview

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SUMMARY

Pangasius hypophthalmus mainly inhabits large river area and estuaries; but can also be seen in irrigation canals, beels, natural depressions and even ponds especially during the monsoon period. *P. hypophthalmus* like all Pangasiid species, it migrates widely over hundreds of kilometers (*potamodromous*) between habitats for spawning and refuge upstream and feeding and nursery habitats downstream. *P. hypophthalmus* eats a wide range of foods, including fish in larger specimens, fruit, crustaceans, insects, higher plants, and zooplankton. The spawning habitat is made up of rapids, sandbanks, and deep rocky channels and pools.

INTRODUCTION

Pangasius hypophthalmus (Hamilton, 1822) is a catfish species in the Pangasiidae family of the Siluriformes order. It forms a valuable fishery and is used to fetch a high market price as a food fish due to its delicious taste and high protein, mineral, and fat content in its flesh. It is well-liked as a game fish as well. It recently entered the ornamental fish market, and it has also been confirmed that India exports it as an indigenous ornamental fish. *Pangasius hypophthalmus* is widely distributed in India, Bangladesh, Pakistan, Myanmar, Malayapeninsula, Indonesia, Vietnam, Java and Thailand, but in India mainly present in Andhra Pradesh, West Bengal, Chattishgarh. *Pangasius hypophthalmus* mainly inhabits large river area and estuaries; but can also be seen in irrigation canals, beels, natural depressions and even ponds especially during the monsoon period.

Morphological characters of *Pangasius hypophthalmus*

There are no scales on the body, which is elongated and laterally compressed. The tail is constricted but slightly extended before the caudal peduncle; the head and abdomen are flat. Behind the adipose fin, the tail is confined. The basal bone of the dorsal fin is reached via the occipital process, and the snout is fairly conspicuous. A little granulation is present on top of the head. On the lower surface of the head, in the frontal half, the eyes are partially visible. The upper jaw is longer than the lower jaw, and the mouth gape is moderately sized. Reaching opposite the center of the front edge of the eye is done using the cleft of the mouth. The palatine teeth are arranged in a crescent row on the palate, and the vomarine patches are either separate from the palate teeth or almost so. The palate has four groups of teeth. There are two sets of barbels; the mandibular pair is only halfway as long as the head while the maxillary pair extends to the bottom of the pectoral fin. First dorsal fin has a moderately strong spine that is finely serrated on the outside and strongly serrated on the inside. The spine of the pectoral fin is long, sturdy, and serrated. The anal fin is broad and developed. Upper lobe of caudal fin has a deep fork, and it is a bit wider. Silvery body with purple gloss on sides and darker along the back; golden cheeks and underside of the head; bright yellow caudal fin.

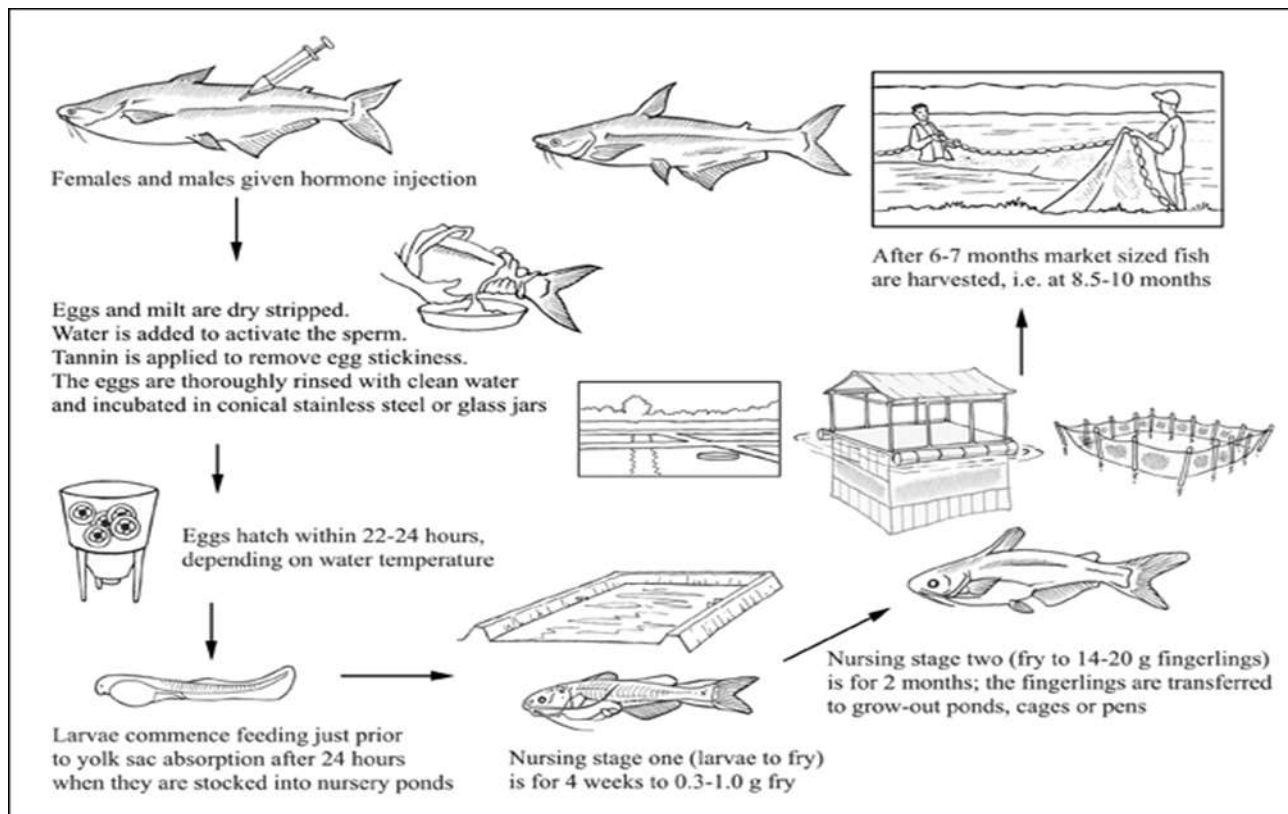
Habitat and biology

The Mekong River, the Chaopraya River, and possibly the Mekong basins in Cambodia, Lao People's Democratic Republic, Thailand, and Viet Nam, as well as the Ayeyawady basin in Myanmar are the only places where this riverine freshwater species, also known as *Pangasius sutchii* or *Pangasius hypophthalmus*, is found. These locations are all between 19°N and 8°N. There are numerous common English names for the species, including striped catfish, sutchi catfish, and iridescent shark-catfish. *P. hypophthalmus* like all Pangasiid species, it migrates widely over hundreds of kilometers (*potamodromous*) between habitats for spawning and refuge upstream and feeding and nursery habitats downstream. *P. hypophthalmus* eats a wide range of foods, including fish in larger specimens, fruit, crustaceans, insects, higher plants, and zooplankton. The maximum standard total length and weight for fish are 130 cm and 44 kg, respectively. This benthopelagic species prefers a pH range of 6.5 to 7.5 and temperatures between 22 and 26 °C. In the wild, it takes roughly the same amount of time for males to reach sexual maturity in their second year. In captivity, females typically take three years or more to reach

sexual maturity (being over 3 kg in weight at that point). An adult female weighing 10 kg is capable of producing over one million eggs. Two clutches of eggs are typically laid by wild broodstock each year, but in cages in Vietnam, a second spawning has been seen 6 to 17 weeks after the first.

Life cycle of *P. hypophthalmus*

It is closely correlated with the annual monsoon flood cycle, with spawning taking place in May or June at the start of the monsoon season. During the dry season, this and other species congregate and seek protection in the deeper refuge areas. The spawning habitat is made up of rapids, sandbanks, and deep rocky channels and pools. The exposed root systems of *Gimenila asiatica* and other rheophilic tree species are where the sticky eggs are laid.



Life-cycle and production of *Pangasius hypophthalmus*

Reproductive biology

All Pangasiid species is a highly migratory riverine fish species that makes long-distance migrations over several hundred kilometers (Potamodromous) between upstream refuge and spawning habitats and downstream feeding and nursery habitats. *Pangasius spp* is omnivorous, feeding on algae, higher plants, zooplankton, and insects, while larger specimens also take fruit, crustaceans and fish. Mature fish can reach a maximum standard total length of 130 cm and up to 44 kg in weight. Females take at least three years to reach sexual maturity in captivity (over 3 kg in weight), while males often mature in their second year, probably taking about the same time in the wild. A female (10 kg) can spawn over one million eggs. Wild brood stock typically spawns twice annually but in cages in Viet Nam has been recorded as spawning a second time 6 to 17 weeks after the first spawning.



Induced breeding

HCG or HCG combined with pituitary gland extract can be used to coax *P. hypophthalmus* into reproducing. Males only receive a single injection of hormone when the female is receiving her dose, whereas females receive 2-4 injections. Typically dry stripped, broodstock are spawned in single pairs or in larger numbers. The incubation of the eggs takes place in conical jars made of glass or stainless steel that have an up-welling water flow to keep the eggs suspended. Within 22 to 24 hours, the eggs will hatch. Absorption of yolk-sac takes 24 hours. The larvae are moved from the hatchery just before the yolk-sac absorption is finished.



Nursery Rearing

To reduce stocking density, nursing is performed in 2 different stages. Typically 1 000–5 000 m² in size, earthen nursery ponds are pre-prepared by being dried (1-3 days, depending on the season), limed (1 t/ha), filled, and stocked with *Moina* (20–30 kg/ha). To keep predators out of nursery ponds, water is filtered through a fine mesh of cloth. Larvae are stocked at 400–500/m² during the first nursing phase, just before the yolk sac is absorbed, to ensure that natural feeds are available and that the larvae have enough room to prevent cannibalism. During the nursery phase, water is only topped off and not exchanged unless clearly deteriorating water quality is stressing the animals. For the first two weeks, boiled egg yolk and soybean meal are combined into an emulsion and fed five to six times per day. Commercial pellets are then fed. After 4 weeks, following a 24 hour starvation period the nursery ponds are partially (about 1/3 depth) gravity drained and then pumped dry, and the 0.3-1 g fry are harvested by seine net and transferred and stocked at 150-200/m² in another pre-prepared pond without *Moina*. Typical larvae to fry survival rate during the first nursing stage is 40-50 per cent. In the second nursing stage, from fry to 14-20 g fingerlings, survival rates over the 2 month nursing period are typically 60-70 per cent.

Harvesting techniques

After partial tidal gravity drainage and pumping, striped catfish are caught from ponds using a netting technique. Hand lifting the cage netting is used to harvest cages. For processing plants to meet their high volume demands, it is typical to harvest an entire pond or cage at once. At low tides in the spring, net pens are harvested using seine netting.

CONCLUSION

Typically, the caught fish are transported by river in well boats without aeration to processing facilities. The majority of striped catfish is exported as frozen fillets via sea in freezer containers (between 2.7 and 3.3 kg of fish are needed to make 1 kg of fillet). Live whole fish are transported either in well boats without aeration or in tanks on trucks with aeration and sold in the domestic market.

REFERENCES

- Job, T. J., David, A., & Das, K. N. (2016). Fish and fisheries of the Mahanadi in relation to the Hirakud Dam.
 David, A. (1963). Fishery and biology of the Schilbeid catfish, *Pangasius pangasius* (Ham.) and utility and propagation in culture ponds. *Indian Journal of Fisheries*, 10(2), 521-600.

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Khanh, P. V. (1996). Induced spawning of river catfish *Pangasius hypophthalmus* in the Mekong Delta of Vietnam. University of Fisheries, Nha Trang, Viet Nam.(Ph. D. thesis).

Gustiano, R. (2003). Taxonomy and phylogeny of Pangasiidae catfishes from Asia (Ostariophysi, Siluriformes). PhD Thesis. Katholieke Universiteit Leuven..

Phillips, M. J., Penh, P., & Mekong River Commission. (2002). Freshwater aquaculture in the lower Mekong Basin.

ICAR E-course , finfish breeding hatchery and management.