Family Chanidae

Milkfish

The milkfish is a living representative of an ancient fish group (Gonorynchiformes or Anotophysi) related to Otophysi fishes, such as Characiformes, Citharinifomes, Cypriniformes, Gymnotiformes, and Siluriformes. Beside the milkfish, Gonorynchiformes only include Gonorynchidae and Kneridae. The milkfish is easily identified by its compressed and oblong body, small, toothless, terminal mouth, deeply forked caudal, complete lateral line, and small cycloid scales. Milkfishes have lateral pouches on the posterior part of the branchial chamber, forming an epibranchial organ, which allows them to breathe air. West Asia is the distribution border of the milkfish, where it occurs in the Persian Gulf.

The milkfish is one of the most important aquaculture species in the world. It is a primary consumer of plants and detritus, so it can be produced with much less energy input than most other aquaculture species. Milkfish aquaculture first began around the 12th century in the Philippines. Larvae are collected from rivers and grown in ponds into juveniles, which are marketed fresh, smoked, canned, and frozen. Since the 1980s, broodstocks have been raised and spawned in captivity to produce larvae in hatcheries. No milkfish is kept in aquaculture in West Asia, likely due to low winter temperatures. In Indonesia, Taiwan, and the Philippines, more than a quarter of a million tonnes of milkfish are harvested annually in brackish ponds, contributing roughly 60 % of the total fish production from Southeast Asian aquaculture. **Further reading.** Juario et al. 1984, Lee et al. 1986 (aquaculture); Carpenter et al. 1997 (identification, distribution); Nelson et al. 2016 (phylogenetic position).

Chanos chanos; Nha Trang, Vietnam; about 200 mm SL.

Chanos chanos

Common name. Milkfish.

Diagnosis. Distinguished from superficially similar Clupeids by having four branchiostegal rays (vs. 6–7 in Clupeiformes) and no scutes along the belly (vs. present). Size up to 1850 mm SL and 18.6 kg, usually less than 1500 mm SL and 14 kg.

Distribution. West Asia: Red Sea, Persian Gulf, and Gulf of Oman and along coasts of Arabian Peninsula. May be only a summer visitor in northern Red Sea and Persian Gulf. Widespread in tropical Indo-Pacific but absent from areas affected by cold currents. Distribution coincides with coral reef areas where water is warm (>20°C), clear and shallow. Migrates up to 100 km inland from Shatt al Arab/Arvand. Also reported from Baghu near Bandar-e Abbas, lower Mand, and Shour-Shirin or Tiyab estuaries. Likely to be found at least occasionally in all major estuaries in Persian Gulf basin.

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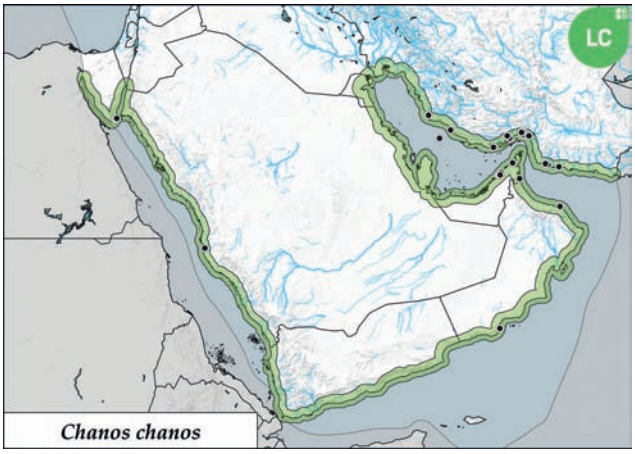
Habitat. Marine. Juveniles enter estuaries and lower parts of rivers. Can acclimatise to freshwater. Adults occur near coasts or around islands where reefs are well developed. Spawns in marine waters in sheltered sandy bays less than 30 km from shore.

Biology. Age unknown in wild due to lack of aging method. Lives up to 12 years in ponds, but large wild adults are thought to be much older. Mature at 3–9 years in ponds. A warm water species, preferring water temperatures above 20°C, can survive up to 41°C. Dies at about 12°C. Euryhaline, can survive in fresh, marine, hypersaline waters (0–158 ‰). Very resistant to low dissolved oxygen, high ammonia, nitrite concentrations, crowding, and starvation. Spawning season long near equator becomes progressively shorter with a single peak at higher latitudes. Spawning thought to be triggered by rising spring temperatures (25–30°C) and high tides. Adults migrate offshore from coastal waters after spawning. High fecundity with very small eggs, 0.3–1.0 million eggs per kg body weight, 1.1–1.2 mm in diameter when fertilised. Hatching varies from 20 to 25 hours after fertilization at 26–32°C and 29–34 ‰ salinity. Eggs and ribbon-like larvae, pelagic up to 2–3 weeks. Eggs sink at salinities below 30 ‰. Larvae metamorphose and, at 10–17 mm TL, migrate ashore and settle in coastal wetlands (mangroves, estuaries). After about 4 weeks, most juveniles leave coastal waters. Some remain in estuaries for up to 4 years before returning to sea. Occasionally enters freshwater during juvenile stage. Grows to 200–430 mm TL in a year in wild. Larvae and small juveniles feed on copepods and diatoms. Larger juveniles are mainly herbivorous, feeding on cyanobacteria, algae, detritus, and small invertebrates grazed from substrate. Adults are opportunistic feeders, filtering, grazing, or snatching small prey and taking larger quantities of zooplankton and small fish.

Conservation status. LC; conservation status of wild populations is poorly known. Research is strongly focused on aquaculture aspects.

Further reading. Juario et al. 1984, Lee et al. 1986 (biology).



Chanos chanos at Maui, Hawaii. © A. Koharu Uyeoka.

Microbialites in the world's largest saline soda lake, Lake Van © S. Dura