

**RED SNAPPER – *Lutjanus spp.***

Depending on language and location, the name Red Snapper applies to a number of fish species across the globe within the Lutjanidae family, and refers to those snappers that exhibit a red coloration as adults. Species falling under the title “red snapper” include:

- *Lutjanus campechanus* (Northern red snapper; found in the Western Atlantic from the Gulf of Mexico and southeastern USA to the northern coast of South America)
- *Lutjanus argentimaculatus* (Mangrove red snapper; found in the Indo-West Pacific from East Africa to Southeast Asia and south to the northern coasts of Australia)
- *Lutjanus purpureus* (Southern red snapper; found in the Caribbean Sea to the northeast coast of South America)
- *Lutjanus buccanella* (Blackfin snapper; found in the Western Atlantic from the Gulf of Mexico and southeastern USA to the northern coast of South America)
- *Lutjanus bohar* (Two-spot red snapper; found in the Indo-Pacific from East Africa to the Pacific islands south to Australia.
- *Lutjanus erinaceus* (Crimson red snapper; found in the Western Pacific and Indian Oceans, from the Gulf of Oman to Japan and northern Australia)
- *Lutjanus malabaricus* (Malabar blood snapper; found in the Western Pacific, where it is found east to Fiji and Japan, and Indian Ocean, where it occurs west to the Persian Gulf and Arabian Sea).

Snappers are an extremely important fishery resource in the geographies where they are found, contributing to production for both local consumption as well as export markets. Red snappers are one of the most valuable and widely recognized members among the Lutjanidae, although the common name “red snapper” pertains to, and are sometimes used indistinctively for, several distinct species.

The vast majority of the world’s snapper production comes from capture fisheries, with Asia contributing most of the global supply (69%). Indonesia is the single largest Lutjanid-producing country (45% of global supply), followed by Malaysia (10%), Brazil (7%), the Philippines (7%) and Mexico (5%) (Cawthorn and Mariani, 2017). However, fisheries management is still developing in many of these countries, and there is concern for the health of snapper stocks considering overfishing and habitat loss.

Red snapper is recognized as a promising fish for aquaculture, including both species *Lutjanus argentimaculatus* (in southeast Asia) and *Lutjanus campechanus* (in North America). Significant research on closing the hatchery production loop for *Lutjanus campechanus* has been underway for decades in the United States, but large-scale production has yet to be achieved. *Lutjanus argentimaculatus* is currently cultured in Southeast Asia, utilizing a mix of hatchery spawned juveniles and wild caught juveniles raised in grow-out ponds. Much of this snapper aquaculture production is on a small scale for subsistence, with some larger companies growing snapper in marine net pens for regional or export markets. Although the industry is growing, “approximately 97% of the aggregate supply was derived from capture fisheries, whereas only 3% came from aquaculture,” (Cawthorn and Mariani, 2017).

According to the FAO, only two countries are presently engaged in snapper aquaculture: Malaysia and the Philippines. While Mexico had some production in the early 2000s, there has been no recorded output since 2010. It is known that Hong Kong and Singapore have some red
snapper aquaculture as well, although the production volume is unclear. Important to note here is that these numbers correspond to aquaculture production of all species falling under the Lutjanus genus, categorized as “Snappers nei.” Distinguishing among red snapper species is challenging considering the variety of appearances between juveniles and adults, the number of species in the Lutjanidae family, and the similar morphologies between different species. Fishermen often have trouble correctly identifying a snapper species, so the majority of records and trade data are not species specific. Moreover, those snapper farms that do have websites simply refer to their fish as snapper or red snapper, without specifying species name.

Malaysia

Marine finfish pen culture began in Malaysia in the 1970s and expanded in the 1980s; aquaculture largely takes place “in the west coast of Peninsular Malaysia where the shoreline is less exposed to strong wave and current” (Ali and Ali, 1994). Asian seabass (barramundi), groupers, and snappers are the most commonly cultured marine species, namely the mangrove red snapper *Lutjanus argentimaculatus* and John’s snapper *Lutjanus johnii*. While aquaculture is not a major contributor to the country’s overall fisheries production, Malaysia is one of the world’s largest producers of farmed snapper. According to the FAO, Malaysia produced 98 tonnes of snapper (*Lutjanus spp*) through aquaculture in 2016.

Red snappers are grown in both small scale and large-scale operations in Malaysia, with culture systems ranging from brackish water ponds for subsistence or local markets to marine net pens for commercial production. Hatchery technology has been achieved and artificial production of fry has been conducted since 1990. However, fry are still caught in local waters and imported from nearby countries for aquaculture production.

As the industry continues to develop, the government is working to create regulations to ensure sustainable growth.

Risk Assessment

- Farm Siting: Medium Risk
  - Planning laws in place although these don’t completely mitigate all risks concerned with farm siting/only partially effective.
  - “Pursuant to the 1990 Fisheries Regulations, marine aquaculture is subject to a double authorization system: a permit to set up the facilities, and a licence for their operation,” (FAO 2005-2020).
Application must include: type of marine culture system, proposed aquaculture site, plan of chosen site.
  - No specific provisions for sea ranching
  - “Land-based aquaculture projects implying the clearing of mangrove swamp forests, and covering an area of 50 hectares or more, are subject to the EIA.
  - Considering 50 ha provision, many small-scale aquaculture projects are not required to provide EIA.

- Nutrient Pollution: Medium Risk
  - There is some monitoring of water quality and feed use, though not to any prescribed standard; monitoring records are incomplete.
  - No further information found

- Feed Source: High Risk
  - The source of feed is undocumented or shown to come from an unsustainable fishery.
  - A commercial feed (i.e. pelleted diet) has been developed for red snapper aquaculture, though it is not readily available.
  - Trash fish is still a common source of feed in red snapper aquaculture: farmers use otherwise undesirable wild caught fish, deemed unfit for human consumption, to feed their snapper; some believe it produces better quality fish.

- Disease, medicine, chemicals: Medium Risk
  - The farm can evidence that medicines and chemicals are legal, though records incomplete.
  - All aquaculture farms supplying raw material for export must register with Department of Fisheries and participate in sampling program (Tan et al., 2015):
    - Aquaculture Residue Monitoring Plan: analysis done for a number of chemicals, snappers are species involved
    - Sanitary Phytosanitary Aquaculture Program: focuses on farms not involved in ARMP; samples taken randomly from registered farms and tests for veterinary drug residue, antibiotics, microbiology, heavy metal, pesticide
    - Feedmill monitoring program: assesses shrimp and fish feed manufacturers in the country, looks for drugs or chemicals; samples taken twice a year
  - “Notification of disease is a mandatory system which allows for co-ordination and monitoring if there are any reasons to suspect the presence of disease in a country,” though the FAO notes there are no provisions for fish disease control.
  - As production increases, disease is becoming a problem, leading to mass mortality linked to water quality and oxygen depletion.

- Introductions/Genetics: Low Risk
  - The farm operation does not pose a risk to native populations as the species is already native to the country and farmed species genetics unlikely to establish in the wild.
  - Red snapper farmed in Malaysia are either the product of hatchery broodstock (locally caught) or caught as juveniles and grown out to market size; considering
the use of native species for aquaculture and the minimal genetic differences created by the hatchery (if any), escapees are not a major concern.

- **Wild Seed: Medium Risk**
  - Some seed likely to come from second-generation broodstock in closed loop hatchery production, though not all.
  - Seed supply is recognized as a constraint to Malaysia’s marine finfish aquaculture industry; though hatcheries exist, fry (and eggs) still has to be imported from neighboring countries such as Indonesia, Thailand, Singapore (Othman, 2008).
    - Most seed production centers too small to supply demand.
  - While hatchery technology exists for red snapper aquaculture in Malaysia (which utilizes wild caught spawners), not all farms rely on hatchery-raised fry.

- **Fish Welfare: Medium Risk**
  - Aspects of animal husbandry not properly controlled (e.g. stocking densities not recorded/managed); there is no veterinary care plan.
  - There are no regulations regarding stocking densities.
  - Fish are transported to market live.

### Philippines

Aquaculture in the Philippines began in the 1970s with cultivation of milkfish in brackish water ponds. Milkfish remains the primary aquaculture product, followed by tilapia and shrimp. While other species, including snappers, are cultivated in the Philippines, production is not at industrial level. Red snapper is recognized as a valuable culture species with significant potential in the region, however most production in the Philippines is research based or on a small scale for subsistence.

It was announced in 2016 that scientists at the National Integrated Fisheries Technology Development Center successfully bred red snapper in captivity and were producing small amounts of fry to sell to farmers for grow-out (Towers, 2016). According to the FAO, the country produced 112 tonnes of snapper (Lutjanus spp.) in 2017, however data is not species specific. Further, no snapper species are listed in the Production of Major Aquaculture Species section of the 2016-2018 Fisheries Statistics of the Philippines report (p. 105, Philippines Statistics Authority).

Red snapper aquaculture in the Philippines is a small subsection of the nation’s fishery and aquaculture industry, with minimal, if any, product making it to the export market.

### Hong Kong

A small but organized aquaculture industry exists in Hong Kong. According to the Agriculture, Fisheries and Conservation Department, 3284 tonnes were produced by the aquaculture sector in 2019. Of that, 889 tonnes came from marine finfish culture, which utilizes floating cages in sheltered coves along the coast to produce species including grouper, seabream, mangrove snapper (Lutjanus argentimaculatus), Russell’s snapper (L. russellii), and star snapper (L. stellatus). Fry for marine finfish aquaculture come from China, Taiwan, Thailand, Philippines, or Indonesia. Trash fish was the traditional feeding method, though pellet feed is becoming common with efforts by the government to promote its use to improve habitat and fish quality.

All aquaculture operations in Hong Kong must have a license and be located within designated Fish Culture Zones. Apart from conducting regular water quality monitoring at all fish
culture zones, AFCD has set up real time water quality monitoring systems at 13 fish culture zones to monitor the water quality continuously for early detection of abnormality and issuance of alerts to mariculturists. Marine finfish farms are small-scale and product serves a small portion of local demand for live fish.

A voluntary “Accredited Fish Farm Scheme” also exists in Hong Kong to assist local producers in promoting their sustainable products and competing in the marketplace. Accredited fish products are sold bearing the AFFS logo and an AFFS traceable quick response (QR) code fish tag. By scanning the QR code with a mobile device, consumers can easily obtain information of the fishery product – such as the origin of the fishery product, its safety test results (such as ruling out the presence of malachite green, exceedances of drug residue limits and unsafe levels of heavy metals) and the contact number for the fish farm that supplied it.

Ambulatory veterinarian services supported by AFCD’s Sustainable Fisheries Development Fund are available to local fish farmers, with a view to improve the sustainability of local aquaculture industry through effective fish disease control and prevention.

**Singapore**

Though not identified by the FAO as an aquaculture producer of snapper, Singapore hosts several farms raising red snapper. As aquaculture technology continues to develop and Singapore aims to become more self-sufficient, fish farming is an expanding part of the country’s food system. According to a recent article, 112 coastal fish farms are in operation in Singapore, producing mainly Asia seabass, groupers, snappers, and pompano (Elangovan, 2019).
References


Cawthorn, D., Mariani, S. 2017. Global trade statistics lack granularity to inform traceability and management of diverse and high-value fishes. Sci Rep 7, 12852. https://doi.org/10.1038/s41598-017-12301-x


