Lutjanus argentimaculatus (Forsskål, 1775)

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IDENTIFICATION

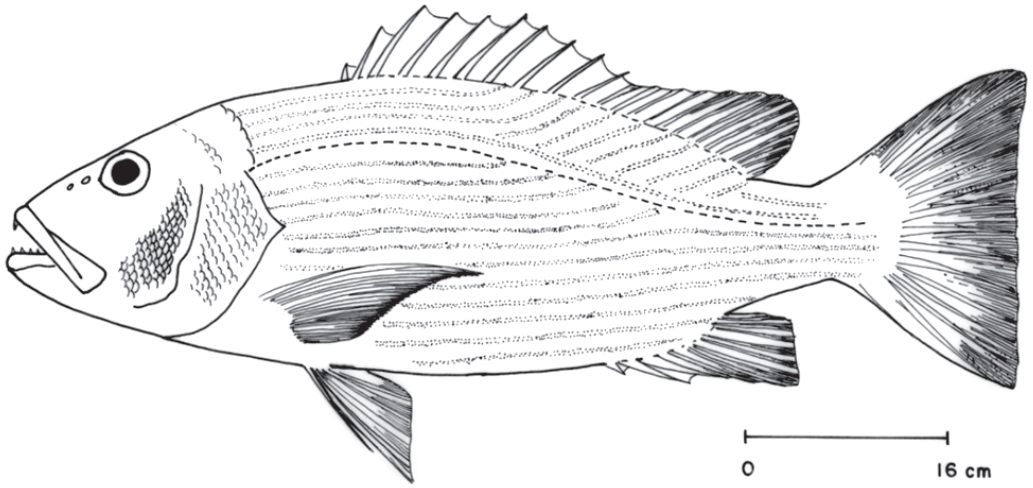
Order	:	**Perciformes**
Family	:	**Lutjanidae**
Common/FAO Name (English)	:	**Mangrove red snapper**

Local names: Ratado (**Gujarati**); Chawari tamb, Tambusa (**Marathi**); Tambus (**Konkani**); Tamboos, Chembali (**Kannada**); Murumeen, Pahari, Chempalli, Chemkalava (**Malayalam**); Chenganni, Cheppili, Karuvalai, Karva, Nethiprion, Paruthivala meen, Paruthikanni, Patani-keeli, Tokkal, Vekkattai (**Tamil**); Kaliviyya, Rangu, Rangoo, Thundava (**Telugu**); Dhala-chandi (**Oriya**)

MORPHOLOGICAL DESCRIPTION

The body of *Lutjanus argentimaculatus* is moderately deep (maximum depth 2.5 to 3.1 times in standard length), snout is slightly pointed, pre-orbital bone is relatively broad and is wider than eye diameter. The pre-opercular notch and knob are poorly developed, vomerine tooth patch is crescent-shaped without a medial posterior extension and the tongue has a patch of granular teeth. The first gill arch has 16-20 gill rakers with the lower limb having 9-12 (including rudiments). The dorsal fin has 10 spines and 13-14 soft rays, the anal fin has 3 spines and 8 soft rays and the posterior profile of dorsal and anal fins is rounded. The pectoral fins have 16-17 rays and the caudal fin shape ranges from emarginate to nearly truncate. The scale rows on the back are roughly parallel to the lateral line, or parallel below the spinous part of dorsal fin and sometimes rise obliquely posteriorly, or rarely with entirely oblique rows.

Source of image : RC of CMFRI, Visakhapatnam



The back and sides of the fish range from greenish-brown to reddish colour; belly silvery or whitish with specimens from deep water frequently being fully reddish. Juvenile fish have series of about eight whitish bars crossing the sides, and 1 or 2 blue lines across their cheek.

PROFILE

GEOGRAPHICAL DISTRIBUTION

Lutjanus argentimaculatus is distributed in the Indian Ocean and Pacific Ocean, from Africa eastwards to Samoa and from the Ryukyus in the north to Australia in the south. It has also been recorded from the coast of Lebanon in the Mediterranean Sea though it is not established in the Mediterranean Sea. In India, it has been reported from both the east and west coasts with more landings from the southern states.

HABITAT AND BIOLOGY

Lutjanus argentimaculatus is a euryhaline species. It has a complex life history with distinct inshore and offshore phases. Juveniles are primarily found in estuaries, rivers, coastal wetlands and tidal creeks. Adults are often found in groups around coral reefs and sometimes they migrate to offshore, deeper reef areas, even penetrating to depths beyond 100 m. This species is a nocturnal feeder and feeds mostly on fishes and crustaceans. Maximum recorded size is 104 cm length and 14.50 kg weight. Maximum reported age is 37 year.

It is a gonochoristic fish i.e. male and female gonads are present in separate individuals. In Australia, the length at 50 % maturity was found to be 512 mm for females and 449 mm for males. During spawning, distinct courtship behaviour is noticed. They are highly fecund and batch spawners with an average fecundity of 5,26,000 eggs/kg body weight of female fish. The species is also known to aggregate for spawning purposes in Palau. Larvae are planktonic.

PRODUCTION SYSTEMS

BREEDING IN CAPTIVE CONDITIONS

The broodstock development of mangrove snapper was carried out in cages at Southeast Asian Fisheries Development Center, Tigbauan, Iloila, Philippines. The adult or sub-adult fish were either collected from wild or reared from hatchery produced fry and stocked in floating net cage of 6 m diameter and 3 m depth with mesh size 12-22 mm for broodstock development. The cage was stocked with 12 to 14 females and 14 to 15 males. Fish were fed low value fish at the rate of 5 % of their total body weight every other day. The annual salinity and temperature ranged from 25 to 36 g/l and from 25 to 32 °C respectively. The cage reared mangrove red snapper spawned between midnight and early morning hours from March to November.

In China, broodstock were raised from wild collected juveniles reared for 7 years in captivity. Thirty mature fish (14 females and 16 males) were selected from them and stocked in a concrete pond of 3,000 t capacity having 3 m water depth with a salinity of 30-33 g/l and temperature of 22.8-25.5 °C to acclimatized them prior to spawning. The female and male weights were 6.92-8.36 and 6.48-7.42 kg respectively. Water was continuously changed at the rate of 40 % per day. The fishes were fed with low value fish such as carangid, *Scombrid* spp. and squid at the rate of 3 % body weight per day. The broodstock spawned naturally five months after stocking. Spawning usually occurred between 23:00 hrs and midnight. The hatching rate varied from 34.8 to 99.5 %. Fertilized eggs were transparent, spherical and pelagic in nature, measuring 0.74-0.81 mm in diameter with a single oil globule (0.14-0.16 mm diameter) at the vegetal pole. The eggs hatched out after 16-22 h at 25.8-28.7 °C.

LARVAL REARING

Newly hatched out larvae measured 1.62-1.94 mm in total length. The larvae had yolk sacs, which got fully reabsorbed after 66-90 h after hatching. The mouth opened after 2 days of hatching. The larvae were reared in 4 t circular FRP tank. The larvae were stocked at a density of 5-16.4 nos./l. Rotifers were fed to larvae at the rate 10-20 nos./ml from starting till 40 days of rearing. *Nannochloropsis* sp. was added in tank at the rate of 3-5 x 10^6 cells/ml from 0 day to 40 days. *Artemia* nauplii were fed at the rate of 1-2 nos./ml from 20th days onwards. In addition copepod was added from 25th day at the rate of 5 nos./ml. Artificial feed was given from 30 dph onwards. The

salinity during larval rearing was 30±2 g/l and water temperature ranged from 24-30 °C. Water was maintained static till 10 dph with mild aeration. Water was exchanged at 10 % daily from 10 dph and 33 % daily from 20 dph. Flow through at the rate of 15-20 l/min. was maintained from 30 dph onwards. Metamorphosis occurred at 10.5-17.2 mm size. The juveniles reached a mean total length of 49.4±4.3 mm after 50 days of rearing with average survival of 21.1 %.

NURSERY REARING

Fry from wild or hatchery was reared for 3 month for nursery rearing. Nursery rearing was carried out either in pond or cages inside the pond.

GROW-OUT

The mangrove red snapper is mainly cultured in south-east Asian countries such as Malaysia, Hong Kong, Singapore, Thailand, Philippines and Taiwan. This species in primarily raised in cage culture system. In Thailand, juveniles were cultured in relatively small cages (3 x 2 m) and fed with trash fish. Good growth and survival has been reported when juveniles were stocked at 60-90 fish/ m^3. Juveniles of mangrove red snapper (20 g) were stocked at the rate of 90 nos./m^3 in 3 m diameter floating cages in Thailand. They were fed with chopped carangids, *Selaroides* spp. till satiation twice daily. The environmental parameters such as water temperature, salinity and dissolved oxygen during the culture was 28.9 °C, 31 g/l and 7.8 mg/l respectively. The fish attained a size of 806 g with feed efficiency 15.6 % and survival 83 % after 10 months of culture. The recommended juvenile size for grow out is about 20-100 g average weight in Indonesia. The stocking density followed in pond is 5000 nos./ ha or 5 nos./m^3 when stocked in cages inside the pond.

FOOD AND FEEDING

Lutjanus argentimaculatus is carnivorous in nature. In culture systems, it feeds well on low value fish such as *Selaroides* spp., sardine, *Decapterus* sp. and artificial diets. The optimal requirement of protein in fingerlings diet is 42.8 %. In Indonesia, reported dietary protein requirement is about 48-50 %.

GROWTH RATE

Juveniles cultured in tank grew from 8.0 g to 110 g in 90 days in Pakistan. In another experiment, they attained a size of 806 g from 20 g and 963 g from 34 g after 10 months and 2.3 kg after 22 months of culture in cage. The growth was better at a stocking density of 50 nos./m^2 than with 110 or 152 nos./m^2. Fish stocked at 100 nos./m^2 fed once per day grew from 20 to 500 g in 9-10 months. In India, the fish attained a size of 750-900 g from 15-20 g after 8 months and 1.1 to 1.3 kg after 13 months of culture period.

DISEASES AND CONTROL MEASURES

The bacterial infection *Vibrio harveyi* has been reported from cage culture of mangrove red snapper from Karwar, Karnataka, India. In addition, around 21 species of endoparasite; six trematode, eight nematode, three acanthocephalan, one cestode and three trypanorhyncha species has been reported from wild along Karachi coast, Pakistan.

PRODUCTION, MARKET AND TRADE

PRODUCTION

The fish is cultured in pond as well as cages. The global production of mangrove red snapper was 4,683 t and 4,620 t reported in 2006 and 2007 respectively.

MARKET AND TRADE

This is an excellent food fish because it does not get rancid easily when frozen. It commands a good export market price with no limit on body size. The fish is marketed fresh, frozen, dried or salted. Approximate price for the fish in local market in India is ₹ 280/kg. The average weekly price in live market of Hong Kong is US $ 5-6/kg.

CHALLENGES TO MARICULTURE

Though the broodstock development, breeding and seed production is standardized by many countries, India is yet to standardize these technologies. Thus in India the main researchable issues, which have to be sorted out for this species are (i) Healthy broodstock development protocol (ii) Larval rearing protocol: standardization of larval rearing by environmental and nutritional manipulation (iii) Disease and feed management and (iv) Culture practices.

FUTURE PROSPECTS

Mangrove red snapper is a fast growing, high-value fish which has good domestic demand and commands good price. Development of seed production and hatchery technology will lead to its widespread farming in cages and coastal ponds enhancing the supply without affecting the natural population.

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