Gnathanodon speciosus (Forsskål, 1775)

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IDENTIFICATION

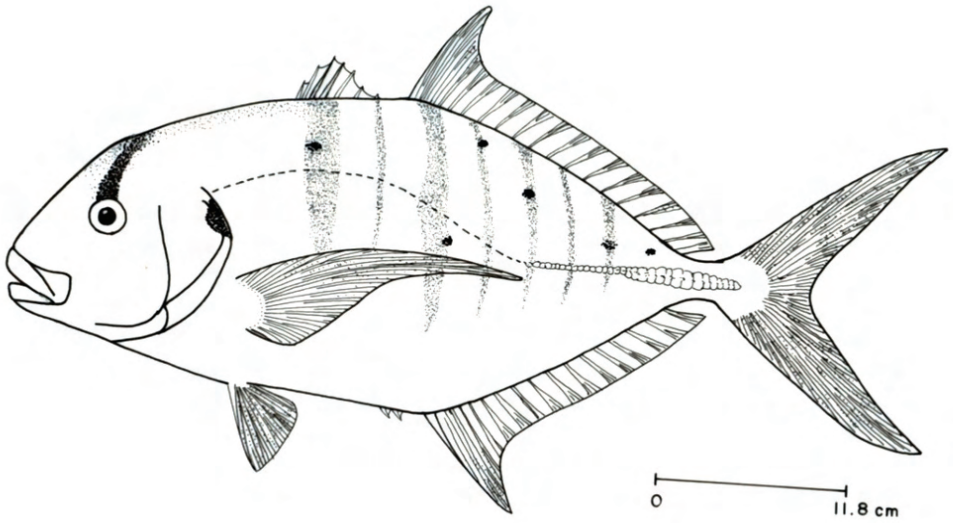
Order	:	**Perciformes**
Family	:	**Carangidae**
Common/FAO Name (English)	:	**Golden trevally**

Local names: Gondlu (**Kannada**); Para (**Malayalam**); Komara parai, Parai, Pulli parai, Sema parai, Thenga parai, Vennai parai (**Tamil**); Manjal parai, Pulli parai (**Telugu**)

MORPHOLOGICAL DESCRIPTION

Body is compressed and oblong; lips noticeably papillose and upper jaw strongly protractile. Eye diameter smaller than snout length; upper jaw without teeth; lower jaw with a few feeble teeth in young (smaller than 10 cm fork length) and absent in adults. Gill rakers (including rudiments) present are 7 to 9 upper, 19 to 22 lower and 27 to 30 on first gill arch. Two separate dorsal fins, the first with 7 spines, the second with 1 spine and 18-20 soft rays; anal fin with 2 detached spines followed by 1 spine and 15-17 soft rays; lobe of second dorsal fin shorter than head length. Lateral line anteriorly with a moderate regular arch, with junction of curved and straight parts below second dorsal fin between 9th to 14th soft rays; straight part of lateral line with 17-24 scales followed by 17-26 scutes. Breast completely scaled. There are 10 +14 vertebrae. The species is characterized by the presence of black vertical bands on the body, which fade as the fish grows, to become black patches or spots. The fish is yellowish green dorsally and pale yellow ventrally. Juveniles are silvery to yellow in colour with 7-11 black vertical bands.

Source of image : CMFRI, Kochi



PROFILE

GEOGRAPHICAL DISTRIBUTION

Golden trevally is widely distributed throughout the tropical and sub-tropical waters of the Indian and Pacific Oceans. In the Indian Ocean, the species is distributed from South Africa along the east African coastline, including the Red Sea and the Persian Gulf, extending east towards along the Indian and south-east Asian countries, and south up to Indonesia and northern Australia. In the Pacific Ocean, the species is spread throughout the south east Asian region and Indonesian archipelago, north to mainland China and Japan and south to eastern Australia and New Zealand. Golden trevally has been recorded from many central Pacific Islands, including Hawaii, with their distribution extending to Central America. In America, its range extends from the Gulf of California in the north to Columbia in the south. In India, this species is distributed all along the Indian coast from Gujarat to West Bengal including Andaman and Nicobar Islands.

HABITAT AND BIOLOGY

The golden trevally predominantly occupies the inshore waters of varying substrates and deeper continental shelf reefs. In coastal areas, the species inhabits rocky and coral reefs as well as open sand flats where it forages for food. Golden trevally feeds mainly on crustaceans such as shrimps, crabs, amphipods and other fossorial invertebrates. They also feed on small fishes. It has a highly protractile mouth which is used to form a tube to suck prey out of both reef and algae-dominated habitats as well as for filtering organisms out of sandy substrate.

The sexes of golden trevally are separate. The fishes mature at a length of 32.5 cm. Spawning period in the Pacific Ocean is late February to early October with a peak from late April to early

September. Distinct spawning peaks are correlated to the first and third quarters of the moon. In the Indian Ocean, spawning occurred in April and May. Generally, spawning occurs from early evening upto night. Males and females are almost equally distributed in wild populations. Eggs and early larvae are pelagic. The fish has a maximum reported age of 15 years and maximum size of 15 kg.

PRODUCTION SYSTEMS

BREEDING IN CAPTIVE CONDITIONS

At Research Institute for Mariculture, Gondal, Bali, Indonesia, spawners (0.5-2.5 kg) were reared and acclimatized in 30-50 m^3 round-concrete tanks with water exchange of 200-300 % per day. The fishes were fed twice a day at 3-5 % of body weight. Air stones (4-6 nos.) were provided in the tanks for maintaining dissolved oxygen levels. Twenty brooders (in ratio of 1 male: 3-4 females) had spawned 68 times in tanks producing 68,80,000 fertilized eggs. Generally, the fishes spawned between 17:00 to 19:00 hrs. The fertilized eggs were buoyant and semi-transparent. The eggs had an average diameter of 910±60 µm. The fertilized eggs contained a single oil globule measuring 260±10 µm in diameter. Hatching time varied from 18-22 h, depending upon water temperature. The salinity requirement during the hatching period was 32-33 g/l.

In another study in Florida, USA, golden trevally brooders of average size 2.4 kg were stocked in 4.5 t Recirculatory Aquaculture Systems (RAS) at 26 °C at 33.92 g/l salinity. The fish were fed with frozen capelin, squid and krill to satiation levels twice daily. The fish were anesthetized and depending on maturity levels, were administered with 75 µg of Ovaplant (Western Chemical) pellet. Three spawning events were reported, each at 48 h, 72 h and 96 h after administration of Ovaplant at an average production of 15,900 eggs/kg of female body weight. Hatching occurred within 6 h of collection of eggs.

LARVAL REARING

In Indonesia, larval rearing was conducted using 1-10 m^3 concrete FRP tanks. Tanks were cleaned and dried before use and were filled up to 75 cm depth with filtered sea water. The newly hatched larvae (2.73±0.10 mm total length) were stocked in tanks at 10-30 nos./l, within 3-4 h after hatching. Water exchange in larval tanks commenced from day 10 with 10-20 % of the total volume and was increased up to 50-80 %. The 30 days post-hatch (dph) fry were maintained in a flow-through system. Bottom siphoning was started from day 12 and was thereafter done on every alternate day. Larval rearing was completed within 35 days, by which time the larvae attained a size of 3-4 cm. Survival rate was 10-20 % during larval rearing.

In the Florida study, the larvae were stocked in 104 l cyclindrical tanks with black walls and white bottom. Two stocking densities were used @ 136 and 173 larvae/l. Water exchange was to the tune

of 200 % upto 2nd dph and photoperiod was maintained at 12 h (08:00-20:00 hrs). Larvae were fed a mixture of copepod nauplii *Parvocalanus* sp., rotifer *Brachionus plicatilis*, Instar I *Artemia* nauplii (INVE Aquaculture, Thailand), dry diet (Otohime B1, Japan) or a combination of these components from 2nd dph onwards. Once feeding commenced, water was exchanged during 20:00 hrs at the rate of 200-400 % to remove unwanted feed and other wastes. Larvae grew up to 46 mm in 45 days of larval rearing. Metamorphosis was completed by 30 dph and the survival during 45 days of larval rearing was 4.27 %.

NURSERY REARING

Golden trevally fingerlings of 3-4 cm size were used for nursery rearing in Indonesia. Juveniles (110.70±25.02 mm) attained the banded pattern and colour similar to that of adult fish after 100 days of culture. Feeding trials of golden trevally have been conducted in Indonesia in floating net cages. Juveniles of 40 g each were stocked at 40 nos. per 1m x 1m x 1.5 m cages with artificial feeding. The fish grew to 100 g in two months with survival of 87 %. Juveniles of more than 10 cm size are used for cage culture in south-east Asian countries mainly in Singapore, Taiwan, Malaysia and Indonesia.

FOOD AND FEEDING

Golden trevally is carnivorous, feeding mainly on fishes, crustaceans, bivalves, etc. In culture systems, they are grown on fish, krill, squid and artificial pellets.

GROWTH RATE

Though information on growth rate is limited, studies in UAE have shown that the species shows seasonal differences in growth. It was found to grow fastest during summer months of April to August and slowest in the winter months of September to March.

DISEASES AND CONTROL MEASURES

The parasitic nematode *Metobronema magnum* has been reported from the species. Another digenean parasite *Stephanostomum talakitok* has been reported in the species from Australia.

PRODUCTION, MARKET AND TRADE

PRODUCTION

The species is often caught using hooks and lines, gill nets and other artisanal fish trapping methods. It forms a regular part of the fisheries for UAE, Qatar and Bahrain and to a much lesser extent for Australia and Singapore. The global golden trevally catch has increased from 1,187 t in 2000 to 3,475 t in 2010. It is farmed in cages in Singapore, Taiwan, Malaysia and Indonesia.

MARKET AND TRADE

The major suppliers of golden trevally are Indonesia, Singapore, Taiwan and Malaysia. The wholesale price of market-sized golden trevally was about US $ 6-8/kg in 2008 in Hong Kong and other south-east Asian countries. In addition, it has also been marketed as ornamental fish in international markets because of its golden-yellowish color and vertical black stripes on its body. Golden trevally is often marketed as pilot fish in the aquarium trade and juveniles may retail over US $ 50. The price of golden trevally in the Indian market is around ₹ 200/kg.

CHALLENGES TO MARICULTURE

The main researchable issues, which have to be addressed for this species in India are (i) Broodstock development protocol (ii) Breeding and larval rearing protocol with environmental and nutritional interference (iii) Standardization of techniques for nursery rearing and grow out and (iv) Feed and disease management.

FUTURE PROSPECTS

Golden trevally is an ideal candidate species for aquaculture diversification, particularly in the Asia-Pacific region, because of consumer demand, desirable taste, hardiness in a crowded environment, fast growth and efficient feed conversion. It fetches a good price in international markets (Hong Kong and other south-east Asian countries) as well as in domestic markets of India also. Additionally, it has also been marketed as ornamental fish in international markets. Thus this species can be a good candidate for culture in abandoned shrimp ponds and floating cages.

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