Tectus niloticus (Linnaeus, 1767)

Jasmin F.

IDENTIFICATION

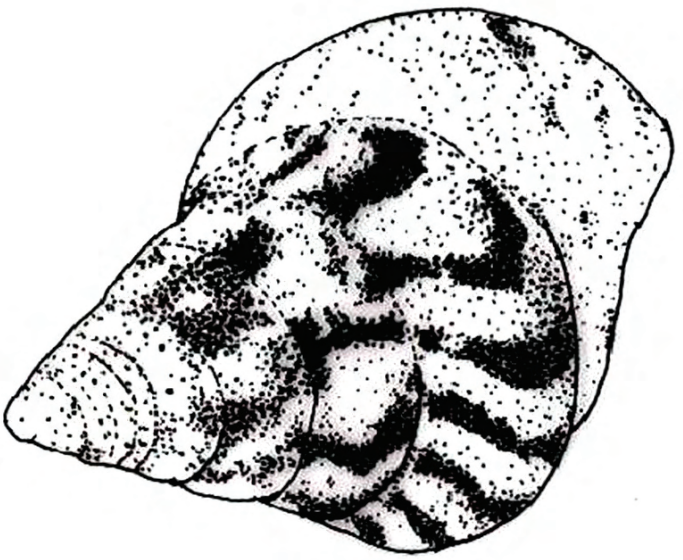
Order	:	-
Family	:	**Tegulidae**
Common/FAO Name (English)	:	**Commercial top shell**

Local names: Not available

MORPHOLOGICAL DESCRIPTION

It is a marine gastropod having a conical shaped large shell. The base of the shell is spotted or radially streaked with crimson, violet or reddish brown colour. The spire is conical in shape and has an acute apex, usually eroded in most shells. The shells have 8-10 whorls. The outer shell is sub-perforate, have a thick layer of nacre; the first two are smooth; the last whorl is concave with bulging and projecting ends. The base of the shell is convex. The aperture is extended across and slanting. The columella is diagonal, terminating in a tooth below with a strong fold above, which is inserted into the axis. The operculum is thin, round, orange-brown in colour, and has about 10 whorls. Breadth of the shell is more than the height.

Source of image : RC of CMFRI, Tuticorin



PROFILE

GEOGRAPHICAL DISTRIBUTION

T. occurs in the Indo-Pacific region. In India it is distributed in the Andaman and Nicobar Islands and Gulf of Mannar. It has been successfully introduced in tropical oceanic islands, as far east as French Polynesia.

HABITAT AND BIOLOGY

Tectus niloticus inhabits shallow waters of coral and rocky reefs. It feeds on filamentous algae and generally avoids bottoms of sand and living corals. Population density decreases in deeper areas, while the mean sizes of individuals increase. It breeds during spring tides. Fertilization is external and shows nocturnal spawning. The presence of sperm induces females to spawn. Length of shell ranges from 50-165 mm and diameter from 100-120 mm.

BREEDING IN CAPTIVE CONDITIONS

Attempts on rearing *Tectus niloticus* in captivity has been undertaken at several locations viz., Palau, north Queensland in Australia, New Caledonia, India, Vanuatu and Okinawa in Japan with varying success.

Tectus niloticus spawning was often observed within a few days of new moon i.e. it spawned with lunar periodicity. Spawning was induced by thermal shock usually. Spawning generally happened in the early evening hours. Females spawned half a million to two million eggs in a 5-15 min spawning period; mostly about one million eggs per period. Spawning was always initiated by males, but females did not always spawn in response to the male spawning; females usually spawned about half as frequently as males. Some behavioural changes occurred shortly before spawning, like spending time at the waterline, cessation of feeding, and holding their heads partially inserted in shells. The right siphon, through which the eggs or sperm were released, was extended more than usual, and closed at the tip. Spawning lasted from about 5 to 15 min in females, and from about 10 min to an hour in males. The chances of spawning in well-fed specimens were more.

Breeding in captive conditions for stock enhancement was carried out in Australia, Indonesia and Vanuatu. More than 30 adults were collected for each spawning to ensure a good level of genetic variability. Spawning was induced by thermal shock in Australia and by strong aeration in Indonesia. The brooders were fed with brown and green algae growing on rocks and coral masses. About 100 specimens at a time were needed for the production of 5,00,000 seed shells of 3-4 mm in size.

Several artificial inductions are known to stimulate spawning such as drying, increase in temperature, hydrogen peroxide or a suspension of reproductive organs. *Tectus* spawned in activated sea water by ultra-violet (UV) rays, after they had been kept in static water for 24 h. When the UV activated sea water failed, the sea water temperature was increased by about 5 °C. Fully-matured *Tectus* also *spawned* naturally without any stimulation.

Parent shells were removed from the tank and held as males and females separately after spawning. The eggs of *T. niloticus* are covered with a thick layer of gelatinous material; which can be spoiled in warm water. The eggs should be kept at a low density or washed often by water exchange for the normal growth of eggs to veliger larvae. The 100 l polycarbonate hatching tank fitted with a plastic basket and covered with netting of 60-70 µm mesh were used to hatch the eggs. Egg density in larval rearing tank was 4-5/ml.

LARVAL REARING

Veliger larvae come up to the water surface after 20-24 h in hatching tank. They were collected and transferred to FRP tanks of 2.75 m^3 or 4 m^3 in volume where diatoms have been cultured in

corrugated plates. The larvae fed on these cultured sessile diatoms. The sessile diatom medium was used in its culture, so seawater exchange was done only when the water quality was very poor, and only siphoning was done daily. The water in the tank used for algal culture was aerated finely to wash out the excess nutrients before larval culture. The duration of larval rearing was 2-3 months depending on the density. Seed was removed from the corrugated algal plates by hand or by immersing the plates in fresh water.

FOOD AND FEEDING

Larvae feed on benthic diatoms (*Nitzschia* sp. and *Navicula* sp.). Seaweeds and filamentous algae, other benthic algae and detritus are the main food of juveniles.

GROWTH RATE

Growth depends on the density of juveniles in the cages and the consequent competition for food and space. For density of 100/m^2, a basal diameter of 10-20 mm was achieved. On reduction of density to 50/m^2, yield increased to 25-40 mm basal diameter in 1.5 to 3 months. Reef-based cages yielded faster shell growth with an average of 2.6 mm/month in Vanuatu Island.

DISEASES AND CONTROL MEASURES

Boring sponges, bivalves (*Lithophaga* sp.) and gastropods (*Saptadanta nasika* and *Patella sp.*) bore into the periostracal and nacreous layers of the shell and damage it.

PRODUCTION, MARKET AND TRADE

PRODUCTION

It is one of the most economically important gastropod species especially in the Pacific Islands. Production of *Tectus* in the Thailand was 1,955 kg in 1994-1995; then decreased to 450 kg in 1995-1996 and increased again to 4,382 kg in 1996-1997.

MARKET AND TRADE

Shells are commercially exploited to make ornaments like pearl buttons, pendants, ear rings, necklaces, bangles etc. It is sold as decorative items, and is used in floor tiles, metallic paints and shampoo. Top shell is primarily targeted for its shell, which is processed into blank buttons and exported to China and Hong Kong for the fashion industry. The main top shell exporters are Indonesia, Philippines and Thailand and they export to Japan, Hong Kong, Europe, etc. In 2004, processed *T. niloticus* exported from Vanuatu Island was 35 t.

CHALLENGES TO MARICULTURE

Culture worldwide is on an experimental scale, and hence mass scale development of production systems, including breeding and larval and nursery rearing in confined environment has to be developed. Predation by fishes and ciliate infestation of larvae and boring by sponges, bivalves and gastropods are potential mariculture problems and need to be addressed urgently.

FUTURE PROSPECTS

It is a highly sought after resource both for food and other products from it, in the Pacific and Indo-Pacific regions. This has resulted in the species being over-harvested and the stocks becoming depleted. Currently, in India, the species is conserved under Schedule IV of Wild Life Protection Act, 1972. Releasing hatchery-reared juveniles is an option to replenish the reduced wild stocks. Similarly standardizing and popularizing the hatchery operations can lead to enhanced exports from India.

SUGGESTED READING

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