GREEN TURBO (*TURBO MARMORATUS* LINNAEUS), AN ENDANGERED SPECIES IN THAILAND

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ABSTRACT

Green turbo is heavily exploited because of the high price (about 80 US dollars per kg). The snails are widely distributed in the Andaman Sea, and some islands in the Gulf of Thailand. But population sizes are small in spite of the establishment of marine national parks, and prohibition of shell export since 1989 when the CITES International Co-operation legislation was endorsed by Thailand. The biology, development, and hatchery studies of green turbo snail should be encouraged in Thailand in order to conserve the species.

INTRODUCTION

Green turbo (*Turbo marmoratus*), locally called "Hoy mook fi" meaning burnish pearl, because of its shiny texture when polished. It is the biggest turban shell within the family Turbinidae; the shell can reach 200 mm in height. It is characterized by a heavy and solid green shell with bands of alternating red or brown spots; body whorl with 3 distinct heavily nodular keels; aperture large, silvery white and pearly inside (Springsteen & Leobrera 1986; Cernohorsky 1972). The operculum is large and heavy with a dull white colour, circular to ovate in shape. Green turbo is utilized for food and shell products.

This study was carried out because of an obvious over-exploitation of the species. I have interviewed shell shop owners, shell product factories, and local fishermen along the coastline of southern Thailand, with a view to evaluate the occurrence of green turbo in the Andaman Sea.

DISTRIBUTION AND HABITAT

Green turbo occurs, *e.g.*, at Surin Island, Similan Island, Phi-phi Island, Rok Island, and Tarutao Island in the Andaman Sea, and some islands in the Gulf of Thailand (Prachuab Khirikhan, Chumpon, and Surat Thani Provinces). They are most abundant at off shore islands with high salinity and transparency.

Yamaguchi & Kikatani (1989) found green turbo on the coral reef crests and outer reef-flats down to >10 m depth. Juveniles and small adults would usually hide under rocks and in crevices. *Trochus niloticus* and *Tectus pyramis* may co-exist with green turbo.

In Thailand, green turbo mainly lives in rocky areas with clear water, strong current, heavy wave action, and algae covering the surface. Green turbo grazes the algae. Juveniles and smaller adults can be found in coral reef areas, hiding under dead corals. Fully grown adults are rare among live corals. They prefer dead corals if they live in reef areas.

UTILIZATION

The price of green turbo was only 3-5 baht per kg shell in 1959. The amount sold at that time was about one ton per month (pers. comm. Mr. Somneuk, shell dealer in Phuket).

Because of a high demand and low supply of green turbo, the fishermen now receive up to 2,000 baht per kg of empty shells (depending on size and condition of shells). The price of one cleaned and polished shell is 1,500-2,000 bath for the medium to large size when sold in souvenir shops. Most shells will be processed into pieces to make ornaments for inlay works. Substitution with other species, *e.g.*, other turbans, top shells, and mother of pearl is possible but they are less favoured as compared to the green turbo.

AQUACULTURE AND TRANSPLANTATION POSSIBILITIES

Green turbo grows well under laboratory conditions. Komatsu, 1992 studied the reproductive biology in Japan. The sexes are separate, maturity is reached after 3-4 years at *ca.* 13 cm shell width, and one female can produce 1.2-7 million eggs. Breeding was successful

in captivity at the Ryukyus in 1986. The fertilized eggs hatched within 22 hrs at 25 °C, and the pelagic stage was about 4 days (Yamaguchi 1993).

Transplantation of *Trochus niloticus* was successful in Micronesia in 1959 (Yamaguchi & Kikutani 1989). About 30 years after transplantation of seed stock, it was abundant at many islands in Micronesian. About a hundred ton was harvested per year in 1988. About 300 adult green turbo were transplanted to Tahiti in 1967, and in 1979 they were successfully adapted to the reefs (Yen 1990).

There are many coral reefs and rocky areas in the Andaman Sea, Thailand, suitable for transplantation of green turbo, but the broodstock is hard to find. Marine national parks should be ideal areas to study conservation biology because there still may be live snails, and it is possible to prevent harvesting of the brood stock.

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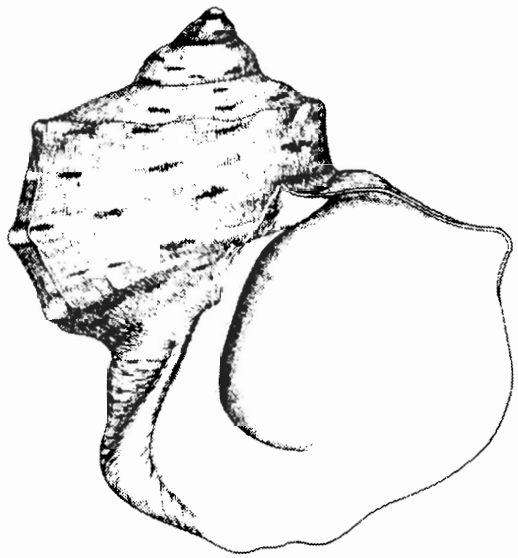

Turbo marmoratus L., 1758. PMBC 1840. 0.5x.
Drawing by Patairat Singdam