

Size and number of *Trochus niloticus* produced (1992 – Feb. 1994)

Size (mm)	Number	Age
1–5	23,000	< 4 months
5–20	6,000	< 8 months
20–40	5,500	< 1 year
40–70	105	< 2 years

Field observations and basic biological studies must be completed to obtain the required information. It is essential to have information on the predators, feeding habitat, movement and growth of the natural juveniles before starting re-seeding programmes in Kosrae.

4.2 Seed production, reseedling and conservation (Phase 3)

Seed production and re-seeding should be continued to enhance and preserve the topshell resources in Kosrae. The techniques developed in phases one and two of the project will be useful for seed production and re-seeding.

The ultimate aim of this project is to enhance the topshell fishery for all Kosraeans. Impartially, not just those people who own fishing apparatus (for example diving gears or vessels). To conserve the topshell resources and equalise income among the people of Kosrae, regulations governing topshell, including limits on the number and size of trochus to be harvested, location, and harvesting methods should be considered.

References

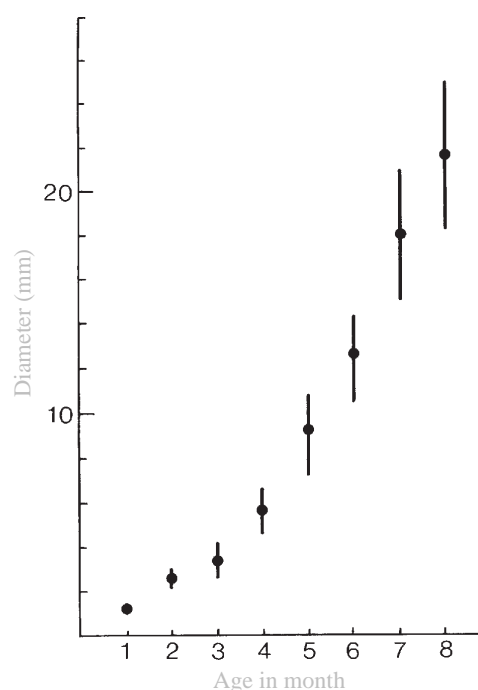
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Growth of *Trochus niloticus* juveniles in the rearing tanks at NAC, Kosrae. (Vertical bars indicate standard deviation)

Transplantation of trochus shell, *Trochus niloticus*, to the Kingdom of Tonga

by Naita Manu, Shigeaki Sone
& Kazuo Udagawa,
Ministry of Fisheries, Nuku'Alofa, Tonga

Introduction

Transplantation of trochus is one of the schemes planned under the Aquaculture Research and Development Project started in October 1991. The aim of the scheme is to establish trochus resources in the unused space (niche) of the inshore reef zone and thus to earn foreign exchange in the future for Tonga.

Preparation for the transplantation began with a preliminary site selection survey (Sone, 1992), which was followed by an intensive release site survey (Kikutani et al., 1993).

Fiji was identified as the most suitable trochus source country because of the frequent flight schedule and the abundant resource. During the enquiry period, we learnt that an FAO-UNDP-funded

trochus transplantation to Tonga had been carried out in August 1992 (Gillett 1992). The release site was the Vava'u island group, some 300 km NNE of Tongatapu, and the number of trochus transplanted was 250.

The location of the release in Vava'u was not disclosed to the public to avoid poaching. Thirty-five trochus retained at Sopo Mariculture Centre, Nuku'alofa, had been used later for the land-based experiments such as spawning inducement. A release-recapture trial had been also carried out, using animals released at Vaini Liku beach on Tongatapu island.

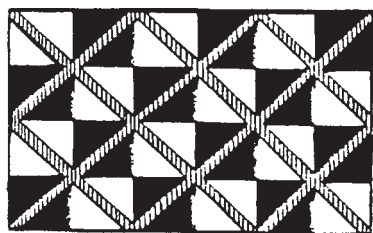
In our project, we have taken a different approach. We announced the release of trochus to the public through the mass media (radio, TV and newspapers), although we did not disclose the exact release points. We believe that the transplantation of the trochus shell is similar to an afforestation project, in which the future management of the resource will be uncertain without the people's cooperation and understanding.

We requested His Royal Highness Prince Lavaka to lead the trochus release ceremony, so that the people of the Kingdom will be aware of the importance of the project, and do not disturb the released stock until it is well established. This approach will also help to raise people's awareness of conservation of nature, including the marine environment.

Trochus transplantation procedures

Collection and transportation

Following a contract agreement, a consultant, Mr R. Gillett, did the preparatory work, which included obtaining export permission from the Fiji Government and contacting traditional Lau leaders on Lakeba Island, 300 km east of Viti Levu Island, Fiji. Approximately 100 villagers collected 1,119 trochus in 4 days (from 3 to 6 May 1994). A tentative minimum purchase size of 5 cm was set by the consultant, as very small trochus were brought by the villagers.



The trochus were removed from water at 9.30 a.m. (Fiji local time) on 6 May at Lakeba, and sent to Nausori by a chartered flight. They were then transported to Nadi by road, to catch an early morning flight to Tonga. The trochus arrived in Tonga at 9.30 a.m. (Tonga local time) on 7 May, and were placed in the sea-water tank at Sopo Mariculture Centre. They were out of water for a total of 24 hours, of which they spent 19 hours in airtight plastic containers (Gillett 1994).

Mortality during transportation

Upon arrival at Sopo Mariculture Centre, we removed dead shells from the container and put live ones in a sea-water tank, keeping them in mesh bags. Counting and further inspection of the trochus was done at 3 p.m. on the same day. We found 22 dead shells and 1,070 alive.

During the following two days, 24 more shells were found dead, which reduced the number of live trochus to 1,046. No further mortality occurred before release of the trochus into the ocean. The mortality rate was therefore 4.1 per cent. Besides this, 27 trochus were lost during transportation for unknown reasons. It is suspected that small individuals dropped through the mesh of the bag while kept in the sea in Fiji.

Measuring and tagging

Shell diameter was measured for all of the 1,046 live trochus. Then a small hole (4 mm in diameter) was drilled on the outer lip of the shell as a mark to distinguish between the first-generation trochus and their offspring. We constructed the size distribution for the whole consignment and then selected for tagging 100 trochus whose size distribution represented that of the whole. We attached individually numbered 'Dymo tape' to the shells, using quick-dry polyethylene filler. Weights were also recorded. The shells were 42 mm to 150 mm in diameter.

One hundred and forty-six juvenile trochus, whose shell diameters were less than or equal to 60 mm, were omitted from the release in case they should be mis-identified as the second generation. These small trochus were kept in the sea-water tanks at Sopo Mariculture Centre for future release and study. Therefore, a total of 900 trochus was released in May 1994.

The release

The date of the release ceremony was uncertain until 10 May 1994. We decided to release 800 trochus

before the ceremony at the selected release site recommended by Kikutani et al. (1993) to avoid mortality of the trochus in the tanks due to disease or lack of food. The fishing vessel *Albacore*, which belongs to the Ministry of Fisheries, was used to transport the trochus for release. On 11 May 1994, the 800 un-tagged trochus were placed in 20 plastic containers with fresh algae and taken on board. Four hundred trochus were released on the reef of Fukave Island and the others on the reef of Euaiki Island.

Release ceremony

With his Royal Highness Prince Lavaka's attendance, the release ceremony of trochus took place on 30 May 1994. The Ministry of Foreign Affairs and Defence approved the use its patrol boat *Neiafu* for the ceremony. One hundred tagged trochus were released at the Fukave site.

Future direction

To make the transplantation successful, a regulation that bans the taking of trochus shell should be established. Follow-up surveys on the settlement and reproduction of the trochus should be conducted regularly.

To date, despite the numerous attempts to transplant trochus, there have been no records of adverse environmental, ecological or economic consequences (Nash 1993). However, in our trochus transplantation, the effects on the environment must be monitored carefully. It is also necessary to let the public know of the activities of the Ministry of Fisheries through various campaigns.

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Notes on trochus (Lola) shell production in South Sulawesi Province, Indonesia

by Dr Rick Braley & Ir. Aspari Rachman,
Marine Science Education Project,
Ujung Pandang, Indonesia

In the last issue (Bulletin #2) the production of trochus shell was presented for Maluku Province, Indonesia for the years 1987–1991.

Here, we present data from annual statistics for South Sulawesi Province obtained from the Provincial Fisheries Department (Dinas Perikanan, Ujung Pandang).

The figure on page 16 is based upon those records. Comparison with the Maluku records show a very similar pattern, with peak production in 1989 and a major plummet in 1990 and 1991.

The table is modified slightly from the Dinas Perikanan annual statistics to show the percentage

increase or drop in total shell weight from the previous year, and the annual value per tonne.

Records of trochus shell production for South Sulawesi Province

Year	% increase/decrease in total shell weight from previous years	U.S.\$/ tonne
1988	—	3,830
1989	-85.2	7,764
1990	-73.0	9,890
1991	-3.7	6,690