

The Trochus Resource in New Caledonia*

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Introduction

New Caledonia, which is surrounded by one of the largest lagoons in the world, is a good reservoir of the Pacific species of trochus (*Trochus niloticus*). The shell of this large marine gastropod yields one of the thickest, most beautiful mother-of-pearls available on the world market.

Fig. 1 shows fluctuations in trochus shell exports since 1907. The curve reflects the vulnerability of this stock, which is relatively easy to harvest. A trochus stock assessment was implemented in 1982 by the Fisheries Service.

Field Sampling Plan

The trochus biotope, reef flats with dead coral heads, is very common in the lagoon. Therefore, the area to be inventoried was very extensive, about

Some semi-finished products made from trochus shells (center).

2,000 km². A random sampling plan was marked out in the survey area, with the number of sites depending on the size of the reefs. On each site, a 2-m wide transect across the reef was sampled with a flowmeter measuring the distance

covered. A small area was thoroughly explored to assess the proportion of trochus shells hidden under coral blocks.

The total area suitable for trochus was estimated by planimetry and, on a trial basis, by LANDSAT images processing. With the trochus density calculated on each site, it was possible to compute the trochus numbers and biomasses for

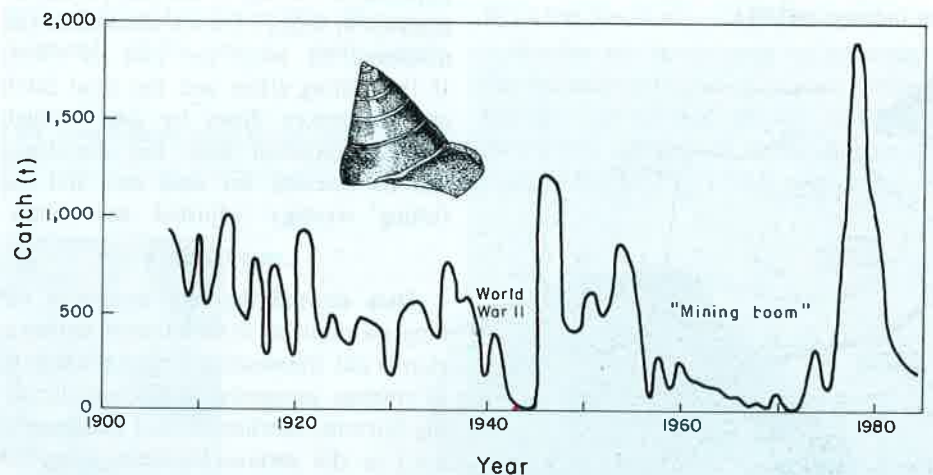


Fig. 1. Fluctuations in trochus shell exports since 1907.

*This text is a digest of a working paper presented at the Seventeenth Regional Technical Meeting on Fisheries of the South Pacific Commission. The original in French was translated by SPC.

the total population and for the exploitable stock by main lagoon zones. A complete biomass assessment remaining on the reefs was achieved in 1984. The size-frequency distributions from this survey and a previous study on growth and natural mortality allowed calculation of an analytical population dynamics model: cohort analysis.

Cohort Analysis

The cohort concept reflects a factual situation in New Caledonia since the spawning season takes place from November to April, thereby creating a new generation each year. The cohort analysis model using back calculation allowed estimations of catch, fishing mortality and numbers of trochus for seven years (1978 to 1984) and for nine age classes. The results are presented in Fig. 2.

Size Regulation

A new size regulation for the trochus fishery was established in 1983; only shells with base diameter between 9 and 12 cm were permitted to be fished. Before 1983, only a lower size regulation of 8 cm occurred. The effect of this new regulation can be observed on Fig. 2, especially on the mean fishing mortality curve which, in that period, came close to the optimum value of 0.10. The mean biomass, which had been halved by the intensive exploitation that occurred in 1978, stabilized from 1981 around 2,000 t because of a considerable decline in actual catches. The sharp drop of fishing mortality since 1983 had a favorable effect on the biomass which showed an increase in 1984.



Trochus shells yield one of the thickest, most beautiful mother-of-pearls available on the world market.

This stabilization, followed by the regeneration of the mean exploitable biomass, is encouraging for an attempt to boost stocks to their 1978 level, i.e., about 4,000 t, through appropriate management. With such a biomass, the optimum sustainable catch would be 400 t. This figure should therefore be regarded as a target in the first instance, and then as a level to be maintained, by a quota system for example, to ensure sustained and regular production, which is a prime consideration for any export resource. About five years, with a catch quota ranging progressively from 100 to 300 t, would be necessary to regain the high level biomass.

Regular monitoring of the level of the exploitable biomass is essential; it can be assessed in terms of stock abundance and measured by catch per unit of effort. If the fishing effort and the total catch can be broken down by area through reliable statistical data, the abundance can be assessed for each area and the fishing strategy adjusted accordingly.

Local Industry

Data showed that the decline in the biomass resulting from intensive exploitation is not irreversible. The establishment of trochus processing units (manufacturing buttons, mother-of-pearl handicrafts, etc.) in the various localities along the New Caledonia coast could be a good way of ensuring that catches are kept to the

recommended level. Besides generating new jobs, processing of this valuable natural resource by a small local industry would offer opportunities for exportation of finished or semi-finished products typical of the South Pacific Islands.

Clarification—Aquaculture Research Libraries

The October 1986 Naga contained lists of important literature on tropical fisheries and aquaculture (p. 30-36). The aquaculture entries were grouped into two sections, the first dealing with research areas and the second with selected fish commodities. The entries for research areas were selected because they contain important information on research *methods*. Therefore the list includes some journal articles as well as books. The entries for fish commodities were selected because they contain important collected information, in other words they are synopses, reviews and other reference sources.

These lists represent ICLARM's first attempt to suggest key texts on methods and reference sources suitable for research libraries in tropical developing countries that may lack the resources of large institutional libraries. ICLARM is keen to amend and supplement these lists and invites comments from Naga readers for this purpose.

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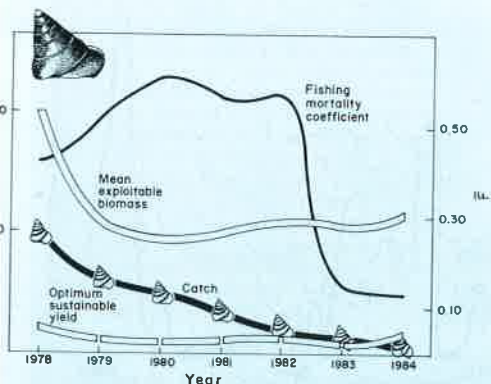


Fig. 2. Fluctuation of the main data to be taken into account for management of the trochus fishery. F = fishing mortality coefficient.