Initial funding for the project has been provided by the United States Department of Agriculture under the College of Micronesia Land Grant program and by the Marshall Islands Marine Resources Authority.

The new Marshall Island Science Station (MISS) is located in Arrak, about 35 kilometres west of Majuro Atoll's airport — and 50 kilometres from its commercial centre.

Despite its modest size, the station promises to be very functional. The aquaculture facilities already include outdoor concrete tanks for keeping the brood stock and growing the juveniles, concrete tables fit for smaller experimental designs, a nursery with PVC tanks and an algae room. All tanks can be provided with running seawater in a flow through system or maintained in a close-circulatory fashion, using a series of mechanical, biological and UV filters. Air is also distributed throughout the set up. The adjoining wet and dry labs give access to technical and scientific material such as microscopes, cameras, aquariums, an autoclave and a laminar flow bench.

Aside from the hatchery, outdoor tanks and laboratories, the 10 acres of land harbour lodging facilities, a kitchen/cafeteria, and offices equipped with computers and Internet access. The station will soon host installations for agricultural research as well.

The Marshall Islands are almost entirely composed of atoll formations, often so narrow that the road is the only barrier between the lagoon and the open ocean. The majority of the islands have an average elevation of 30 cm. In fact, land represents less than 0.1% of the country's total surface area, and is scattered across nearly 2 000 000 km^2 of ocean. With such figures, the importance of ocean studies and marine resources management becomes obvious. The population of about 60 000 depends chiefly on the sea for their economic development as well as for their survival. Restocking, stock enhancement, sustainable fisheries and coral reef preservation are key issues that the nation needs to address very seriously.

This is why the CMI has undertaken to educate the young generation, train the local entrepreneurs and lead them in the new millennium with a fresh way of dealing with their surrounding ocean. We are glad to be a part of this venture and can only hope that the new research station will receive a growing number of scientists and marine life enthusiasts. Hopefully, the program will encourage young and aspiring Marshall Islanders to become marine biologists and resource-conservation scientists. As for the sea cucumber project, it is scheduled to be fully operational in August 2001.

Kommol tata!

Sea cucumbers: farming, production and development of value added products

Andrew Morgan[1]

In May 2000 the New Zealand government, through the Foundation for Research Science and Technology Top Achiever Doctoral Scholarship scheme, awarded funding to investigate the farming, production and development of value-added sea cucumber products.

The aim of this project is to provide an integrated approach to the study of the life history of the sea cucumber *Stichopus mollis* and its application to industry. One of the primary objectives is to develop hatchery techniques to produce enough larvae and juveniles to study characteristics of this animal's life history in the larval period, post settlement and pre-recruitment period. These are areas that are well developed in theory but little understood in practice and limited to very few publications.

The next major objective is to ascertain the role of habitat and its relationship with distribution and abundance. Apart from research on the association of tropical reef habitats with sea cucumbers, little information exists on the demographics of temperate species. The idea is to create a habitat landscape to model the distribution and abundance of *S. mollis*.

1. University of Auckland Leigh Marine Laboratory, PO Box 349 Warkworth, New Zealand. Ph 649 422 6111, fax 649 422 6113, e-mail: a.morgan@auckland.ac.nz

Few publications exist on *in situ* growth of natural populations of sea cucumbers, and these are mostly about tropical species. The objective is to quantify growth parameters from size frequency distributions through time. Estimates of growth and mortality rates (using a deterministic model) will assist in further understanding of the life history of this animal and echinoderms in general.

A life table could be constructed for this animal, provided enough information can be gained from hatchery and *in situ* research.

Project status

Spawning

Preliminary spawning trials in the second half of last summer, January to February 2000, have been positive. Collected broodstock were induced to spawn in small numbers up to one month in captivity. Further, animals spawned naturally in the holding tanks during this period. From November 2000 to February 2001 animals were induced to spawn in a number of trials and larvae reared to late stages of development. The spawning season was interrupted by unusual weather patterns and animals often spawned non-viable gametes. More extensive trials and analysis of spawning behaviour will be conducted in the coming summer. A biopsy of gonad will be used to try and correlate reproductive behaviour and gonad state with readiness to spawn.

Hatchery production of larvae and seed

The hatchery building was refurbished to accommodate this project. Hatching and larval rearing tanks have been set up; an algae culture unit is in place; and a paddle stirrer is being put together to use in replicated experiments to study larval developmental plasticity in response to food availability.

Polyculture

The nutritional value of marine farm effluent as a source of food for the sea cucumber *S. mollis* is being ascertained. Consumption and assimilation of protein and organic matter in polyculture with paua, mussels and sea urchins is being compared to *in situ* populations.

Growth in situ

A population is being monitored *in situ* for 12 to 18 months to determine growth parameters for this animal. Size frequency data is being used to create a deterministic model of growth and mortality rates over time.

Distribution and abundance

The nature of this animal's habitat is being quantified by surveying different reef types using transects and quadrats. This information will be used to create a model for habitat landscape and the corresponding variation in abundance of *S. mollis*.

This project will be designed and implemented to develop and refine technologies for farming the sea cucumber *Stichopus mollis*. The project will benefit the sea cucumber industry in the South Pacific in four ways:

1) developing techniques to harvest the gut of wild caught adults of the sea cucumber *S. mollis* in a non-destructive, renewable manner;

2) developing hatchery techniques to produce large numbers of juveniles;

3) developing value added products from the gut and body wall. A market exists for exporting the whole animal soaked in brine or dried. Further, there is a market for pharmacologically active substances, namely anti-inflammatory compounds extracted from the animal and encapsulated and sold as a food supplement; and

4) initiating pilot scale commercial production of sea cucumbers to supply the industry as an alternative to harvesting wild populations.