

Collaborative *Pinctada margaritifera* research programme proposed

by Garry Preston,
South Pacific Commission,
Noumea, New Caledonia

SPC Senior Inshore Fisheries Scientist Garry Preston has been working with Australian and Pacific Island marine scientists in the development of a major three-year research programme aimed at investigating specific research questions on the biology and culture of the black-lipped pearl oyster *Pinctada margaritifera*. The Pacific Island Pearl Oyster Resource Development Project is expected to form Phase 1 of a two-part activity, the second phase of which will focus on extension of research results to Pacific Island countries. The Phase 1 project is to be submitted for funding consideration to the Australian Centre for International Agricultural Research (ACIAR).

The project is still under development, but at present Phase 1 consists of four components, to be carried out by three different Australian institutions working in collaboration with interested Pacific Island governments and agencies. Collaborating institutions are: James Cook University, Townsville (coordinating organisation); the Australian Institute of Marine Science, Townsville; the Queensland Department of Primary Industries; the South Pacific Commission; the Ministry of Marine Resources, Cook Islands; and the Ministry of Natural Resource Development, Kiribati. Other countries are likely to join in as the project develops.

The overall aims of the project are:

- to support Pacific Island countries' attempts to develop and increase fisheries and aquaculture activities based on pearl oysters;
- to investigate methods of restocking, hatchery production and husbandry of these organisms suited to application in the Pacific Islands;
- to improve understanding of the population biology, genetics, pathology and histology of these animals in support of this work.

Specific research targets are:

- *Develop a simple, low-technology method for increasing settlement and survival of pearl oyster larvae in locations where resources are impoverished*

This component will be carried out by James Cook University, under the direction of Dr John Lucas, and will involve developing and testing a simple, low-cost larval and juvenile rearing system for improving pearl oyster spat-falls. If this can be

done successfully, it is likely that a substantial part of the extension phase (Phase 2) of the project will involve applying the system in selected Pacific Island locations to assist pearl oyster replenishment in those islands.

Other activities will include the evaluation of simple hatchery culture techniques, the study of aspects of reproductive biology and early life history of pearl oysters, and investigation of the biological and technical characteristics of low-key culture technologies that may be applicable to pearl oysters.

- *Identify and describe common pathogens, diseases and parasites present in pearl oysters and recommend practices to minimise disease outbreaks*

Using samples collected by a variety of means, including pearl oyster surveys carried out by SPC and national fisheries agencies, Drs John Norton and Ian Anderson of the Oonoonba Veterinary Laboratory of QDPI will conduct pathological and veterinary examination of pearl oyster populations. Specific aims are to document the occurrence and distribution of parasites and pathogens within and between atolls, to estimate the likely potential for introduction of pathogens and diseases when translocating pearl oysters from one location to another, and to recommend action that might be taken to minimise deleterious consequences of such translocations.

- *Develop more productive methods of seeding cultured pearls using improved surgical techniques, and assess the feasibility of tissue culture as a means of improving pearl-sac and pearl quality*

This component, to be carried out by the Queensland Department of Primary Industries, will involve surgical and histological studies of pearl seeding techniques and of the pearl formation process, in order to identify means of increasing the proportion of gem-quality pearls produced by seeding operations. Specific areas of investigation will be: possible improvements in surgical techniques used during innucleation (stress reduction, anaesthetics, sterile technique, etc.) that will lead to fewer rejected nuclei and deformed pearls; to examine the histological process of pearl formation and identify characters of the pearl-sac responsible for variations in quality; and to develop mantle tissue culture lines that could ultimately be used as a superior alternative to donor oyster mantle tissue as a basis for pearl-sac formation.

—Describe the population structure of pearl oyster resources in the Pacific, and monitor the effects of translocation and stock enhancement programmes on genetic resources

Samples collected at the same time as those used in the pathological/ histological studies (above) will be analysed by the Australian Institute for Marine Sciences using allozyme electrophoresis techniques, to determine variations in the genetic makeup of pearl oyster populations from different Pacific locations.

This work, to be supervised by Dr John Benzie, will enable documentation of the degree of genetic differentiation occurring within and between locations; estimation of the degree of genetic interchange occurring; and elucidation of the likely consequences, in terms of loss of genetic material, of translocating pearl oysters among atolls of the region. Monitoring of the genetic effects of translocation and resource enhancement programmes through repeat analyses in selected locations will also be undertaken. By the end of the three-year research phase, it should be possible to acquire a broad picture of the pearl oyster population genetic structure across the region, and to recommend action that might be taken to

minimise deleterious consequences of translocations.

The activities to be undertaken during the extension phase will be developed in response to the results observed as Phase one proceeds. Likely activities during the extension phase, which should commence in 1995 (or perhaps earlier) are: extension to Pacific Island countries of low-technology methods for enhancing pearl oyster reproductive success and spatfalls; field trials of improvements to surgical methods used in pearl seeding to improve pearl quality; and dissemination of Phase one research results through a technical workshop on pearl oyster resource development.

In March 1992, the draft project outline will be discussed by representatives of the Australian agencies and Pacific Island countries that have so far been collaborating in its development. This will permit finalisation of the project document in time for the ACIAR board of management meeting at the end of March. In the meantime, SPC will be financing the genetic analysis by AIMS of pearl oyster samples collected from the Cook Islands (Penrhyn, Manihiki and Suvarrow) and Kiribati (Abaiang and Butaritari) during the first few months of 1992.

This article was originally published in the SPC Fisheries Newsletter No. 60 (January–March 1992), pp. 3–5.

Black Pearls, Inc. begins *P. margaritifera* hatchery research and development in Kona, Hawaii

by Neil Sims,
Black Pearls, Inc.,
Kona, Hawaii

Mr Neil Sims, Research Director for Black Pearls, Inc. in Kona, Hawaii (and also your editor) provides a personal note:

The development of hatchery culture methods for *Pinctada margaritifera*, the Hawaiian variety of the black-lip pearl oyster, is the focus of initial research by a newly-formed company based in Kona, on the big island of Hawaii. Dr Dale Sarver, President of Black Pearls, Inc. said that the company will look at using the hatchery technology to supply spat to farms both in Hawaii and throughout the South Pacific. Initial hatchery trials will be on a small experimental scale using laboratory facilities at the Natural Energy Laboratory (OTEC) site in Kona.

The company can be contacted through:

Black Pearls, Inc.
P.O. Box 525, Holualoa,
Kona, Hawaii, HI 96725, USA.
Phone / Fax: (1) (808) 325 6516

