

RECOMMENDATIONS FOR IMPLEMENTATION OF MOLLUSCAN
AQUACULTURE PROJECTS IN THE SPIFPA AREA

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GENERAL RECOMMENDATIONS

The Trust Territory of the Pacific Islands offers considerable potential for oyster culture. It is understood that plans are in preparation for implementation of some of the consultant's recommendations. Arrangements have been made for the consultant to conduct a follow-up survey of Palau, Truk and Ponape in November 1971 while en route Tokyo to Seattle. This survey will provide a better basis for planning specific aquaculture experiments to be established during the following few months.

Experiments were begun in Fiji Islands March-June 1971 and are being continued by Fisheries Division personnel. At some time it would seem worthwhile for the consultant to review progress and results of these experiments and to recommend additional projects which will lead to development of commercial aquaculture.

Similarly, experimental plantings of Japanese oysters in New Caledonia were observed by the consultant, and several experiments were recommended for completion by M. Georges Guerlain. Also, the survey of June 1971 did not permit observation of the Pam area which is reported to have considerable potential for oyster culture. A return visit to New Caledonia by the consultant would permit a review of progress of experiments at Boulouparis and a survey of the Pam area. A stopover at Tahiti would permit further observation of the troublesome Tatutu Bay area, where extensive oyster mortalities have been recorded, and a chance to obtain live samples for additional study by U.S. shellfish pathologists if desired.

Specific recommendations by areas are as follows:

PALAU

The Trust Territory Marine Resources Division should continue efforts to collect seed of both native species of oysters, but especially those of giant black-rimmed Crassostrea echinata. This species is more abundant in Palau than in the other islands surveyed in the South Pacific, except New Caledonia.

If these efforts are successful, oyster culture at Palau should concentrate on this species, utilizing seed collected from natural reproduction. If seed collecting is not successful, the alternatives are (1) artificial propagation of C. echinata to produce seed in a hatchery, or (2) introduction of an exotic species such as Crassostrea gigas.

Alternative (1) will require hatchery facilities and a period of research to test the applicability of known methods of inducing spawning and rearing larvae or the development of new methods suitable for this species.

If a university-sponsored marine research laboratory is built in Palau, this research could be done there by visiting investigators or permanent staff. Such a laboratory should qualify for Sea Grant or Foundation funds. This research project would require one to three years after facilities became available.

Alternative (2) could be accomplished readily by shipping seed oysters to Palau from Japan during January-March 1972 and planting this seed in several locations, using various methods. This experiment could be completed in one to one and one-half years and would show whether C. gigas is suitable for this environment.

It would be preferable to utilize a large local oyster C. echinata since it is already acclimated to the environment of Palau and since this would eliminate the risk of accidental introduction of unwanted species.

It would be appropriate to utilize OEO or Trust Territory funds for this project. A SPIFDA project in Micronesia to complement aquacultural experiments in Fiji would be justified, but it would appear more appropriate to establish this at Ponape.

YAP

No immediate program is recommended for Yap. Instead, it is recommended that the results of research and development conducted at Palau be applied at Yap if they are successful. This would mean a delay in aquacultural experiments in Yap of about two or three years.

GUAM

It is recommended that Guam Fish and Game keep in close contact with research conducted by Marine Resources Division at Palau which is directed toward developing a system for collecting seed of a large species of oysters C. echinata. When and if seed oysters are available from Palau, test plantings should be made at representative locations in Guam to determine growth rate and survival. It appears that C. echinata which is adapted to temperature and salinity ranges at Palau should be the species best suited for aquaculture in Guam.

In addition, it is recommended that small quantities of Crassostrea gigas seed be obtained from Japan and planted in representative locations by Guam Fish and Game. Test plantings should be made using the raft culture methods commonly employed in Japan, or the rack culture method which is adaptable to shallow estuarine areas.

It is especially important to establish adequate inspection procedures to prevent accidental introduction of pests or predators with seed oysters from Japan.

TRUK ISLANDS

No immediate oyster culture experiments are recommended for Truk Islands. Although there are several protected bays which appear suitable for raft culture of oysters, the local mangrove oyster Crassostrea glomerata is generally too small for commercial harvest, and the large, black-rimmed oyster Crassostrea echinata is too scarce to provide a good opportunity for collecting seed.

While introduction of the Japanese Crassostrea gigas should eventually be tried in Truk Islands, it appears more appropriate to conduct the initial experiments on the Island of Ponape. If these experiments are successful, similar methods could then be used in Truk Islands.

PONAPE

Matalanim Harbor on the east side of Ponape Island appears to have excellent potential for culture of the Japanese oyster Crassostrea gigas. Salinity in this area is considerably less than oceanic levels and the large Ratao River brings nutrients which should insure adequate growth and fattening of oysters. Furthermore, the location of the Ponape Agricultural Technical School on this bay provides an opportunity for combining oyster culture experiments with a teaching program if this can be arranged with Father Costigan.

It is recommended that an oyster aquaculture expert be brought to Ponape for about six months to establish oyster culture experiments, using seed oysters from Japan or from a commercial hatchery in California. If the Marine Resources Division of the Trust Territory in the Pacific Islands employs a resident Fisheries Biologist at Ponape, he and his staff should continue scientific observations after completion of the assignment of the visiting oyster culture specialist in cooperation with the Ponape Agricultural Technical School.

It would be appropriate to use OIO or similar funds for this project since it seems likely that it would be successful and would lead to local aquaculture projects which would provide food for local use and a product which would be attractive to tourists and available in the future for export to Guam or Honolulu. It would also be appropriate for SPIFDA to provide funds and perhaps personnel for an oyster experiment using Crassostrea gigas that would be parallel to that conducted in the Fiji Islands, but under a different environment.

Ideally this project should be initiated promptly so that seed oysters could be obtained from Japan in January-March. If the project could not be started that quickly, it would be necessary to obtain "cultchless" or "unattached" seed oysters Crassostrea gigas from a commercial hatchery in California.

ELLICE ISLANDS

No immediate aquaculture projects are recommended for Funafuti since there appears to be a low potential for mollusc culture in these islands. If aquaculture methods can be perfected for the pink oyster Crassostrea mordax, it might be possible to grow this species in Funafuti and other atoll locations. This research and development would require perhaps one to four years and probably could be conducted best in the Fiji Islands.

There remains the possibility of growing pearl oysters Pinctada margaritifera for shells or pearls at Funafuti and at similar atolls. If this is contemplated, it would be advisable to arrange for a survey by Mr William Reed from French Polynesia.

AMERICAN SAMOA

Native mangrove oysters Crassostrea glomerata from Pago Pago Harbour were planted at various depths in two enclosed pools adjacent to the airport runway during the survey by the Consultant. If those oysters have survived and grown, additional plantings of this seed attached to rocks would be warranted.

If test plantings of seed oysters on rocks from Pago Pago Harbour were made in Pala Lagoon as recommended, information should be available to indicate whether these oysters will reach usable size in a suitable environment. If not, these experiments should be conducted promptly by personnel of Marine Resources Division.

In addition, seed oysters Crassostrea glomerata from New Zealand should be obtained and planted in Pala Lagoon following the methods used commercially in New Zealand and Australia.

The potential for culture of the clam Gafrarium tumidum in Pala Lagoon warrants establishment of a research program to determine information on life history needed for development of commercial aquaculture.

COOK ISLANDS

Only limited areas suitable for oyster culture were found during surveys of Rarotonga and Aitutaki Islands. No local species of oysters were found with potential for aquaculture. Therefore, it is recommended that small test plantings of Crassostrea gigas seed of "cultchless" or "unattached" type from California be made at Rarotonga and Aitutaki. It is also recommended

that small quantities of seed oysters Crassostrea glomerata be obtained from New Zealand and planted in Rarotonga and Aitutaki. In about one year these experimental plantings should indicate whether either or both of these species of oysters have potential for aquaculture in the Cook Islands. These experiments should be relatively inexpensive and should be conducted by the Fisheries staff of the Cook Islands.

FIJI ISLANDS

Test plantings of Crassostrea gigas from two different sources were made in the Fiji Islands during March and April and monitored by the consultant until June. During this initial period these oysters grew rapidly and survived well. The Fisheries Division of the Fiji Department of Agriculture was to continue observations of these plantings until they reached a marketable size, hopefully within one year. On the basis of the initial success of this experiment, it was planned that Division of Fisheries would purchase additional seed oysters from California of the "cultchless" or "unattached" type to expand the oyster planting program to several additional areas. The Fisheries Division of the Department of Agriculture has a well defined and funded oyster development program and it is important that government continue to provide support throughout the initial five-year period. Because of the indicated success of oyster culture in the Fiji Islands, it would be appropriate to supplement Fiji government funds with UNDP funds if needed.

The native mangrove oyster of Fiji Crassostrea glomerata usually does not reach commercially usable size, except in specialized locations. Experiments were outlined by the consultant for collecting seed of this species and planting it under various conditions to determine if it would produce oysters of usable size within a reasonable period of time. If so, oyster culture could be expanded using the local species.

In addition, the pink oyster Crassostrea mordax is abundant on exposed rocky areas of high salinity, but usually is so firmly attached to the substrate that it is difficult to remove it for shipment to market. An initial period of research, which would require one to four years, would be needed to learn enough about the life history of the species to perfect methods of aquaculture. It is recommended that this kind of research be done by the University of South Pacific or by visiting investigators or resident scientists at the Reef and Lagoon Institute, if one is established on Fiji, or by the Fisheries Division of the Department of Agriculture. If aquaculture methods can be developed, the pink oyster could probably be grown in many atolls in the South Pacific where the salinity is at oceanic levels, thus providing a food supply and income source for Island residents.

Details, suggestions and instructions for continuation of oyster experiments in the Fiji Islands were provided by the consultant and should be followed by the Fisheries Division if they have been successful in recruiting a shellfish biologist.

NEW CALEDONIA

Two native species of oysters in New Caledonia have considerable potential for aquaculture. Both the mangrove oyster Crassostrea glomerata and the giant black-rimmed oyster Crassostrea echinata are grown commercially at Boulouparis, and experimentally at Pam at the northern end of the island. The Government of New Caledonia should encourage expansion of oyster culture by allocating additional intertidal and subtidal areas to private oyster farmers.

Japanese seed oysters were brought in during the spring of 1971 and planted at Boulouparis and were growing satisfactorily when observed by the consultant. If growth and survival has remained good through the following period, it would be worthwhile to try plantings of "cultchless" or "unattached" seed oysters from a commercial hatchery in California. These oysters can be shipped to New Caledonia at a much lower cost than the seed from Japan which is attached to oyster or scallop shells. After arrival, the "unattached" seed can be cemented to a suitable material and suspended below rafts or hung from fences or racks. It appears likely that Crassostrea gigas seed will reach marketable size much more rapidly than either native species of oysters and, if so, the additional cost of seed importation would be economically justified.

FRENCH POLYNESIA

French Polynesia already has an on-going research and development program which is progressing satisfactorily. A number of small oyster concessions have been established on Raiatea and Tahaa, and the first crop should reach market size within the next few months. If these small concessions continue to be successful, it is probable that oyster culture will become well established as a part-time occupation for many fishermen and copra plantation workers in outlying mountainous islands.

Results of initial oyster farming experiments at Tatutu Bay on Tahiti have been discouraging because of extensive mortalities when the oysters are in their second year. Commercial oyster farming on Tahiti will await development of practical methods of reducing mortality.

The cause of the mass mortality of oysters in Tahiti is unknown. Samples taken to United States by the consultant were checked by specialists of the National Marine Fisheries Service for pesticides and for micropathogens, but results were negative. An intensive research program would be required to determine the cause of this mortality.

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