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TENTH REGIONAL TECHNICAL MEETING ON FISHERIES

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PROGRESS REPORT ON THE SPC FISH POISONING PROJECT

prepared by the Secretariat

1. Recognizing that the various types of fish poisoning have considerable impact on the health and economy of South Pacific Islanders, the Thirteenth South Pacific Conference (Guam, 1973) resolved that the South Pacific Commission would initiate a research project dealing with the problem of fish poisoning in the region. This project was to be carried out in collaboration with three independent, but co-operating groups: University of Hawaii Institute of Marine Biology, University of Tokyo Laboratory of Marine Biology and the Institute of Medical Research Louis Malardé in French Polynesia.
2. The SPC sponsored an Expert Meeting on Ciguatera Fish Poisoning in February 1977 to discuss the recent advances and future plans for research into fish poisoning within the region. At the meeting the information presented by the collaborators in the project demonstrated that several important advances in ciguatera fish poisoning have been accomplished. One of the probable causes of this form of fish poisoning has been identified as a small one-celled organism known as a dinoflagellate (Diplopsalis sp.). These organisms have recently been grown in pure culture on a small scale in the laboratory. From the culture of these organisms and refined extraction methods the toxin responsible for ciguatera fish poisoning, ciguatoxin, has been purified. As the laboratory culture techniques are improved, the dinoflagellates will be able to be grown in mass culture to produce large quantities of toxin for chemical analysis and to study its physiologic properties. This advance will now allow the detailed study of: (1) more specific detection methods for toxic fish, (2) possible effective ways of treating disease due to ciguatera and (3) understanding the growth requirements of the dinoflagellates.
3. The availability of small quantities of pure toxin has already allowed the development of a relatively sensitive test (radio-immunoassay) for the detection of toxic fish. An independent programme was initiated in Hawaii to examine Amber Jack (Seriola dumerili) by this new detection technique. Sale of this fish is currently banned in Hawaii because of its possible toxicity.

4. The effects of ciguatera fish poisoning in humans were also closely examined. Clinical information on over 3,000 cases of ciguatera fish poisoning occurring in the Pacific were analyzed by a computer. The results of this study will not be available until early 1978. However, this information will provide considerable data on the signs, symptoms, seasonality, types of poisonous fish and laboratory findings on patients with fish poisoning.

5. The immune response of patients with ciguatera is also being investigated. Patients experiencing ciguatera fish poisoning a number of times are suspected of eventually developing the signs and symptoms of ciguatera whether the fish they have eaten is poisonous or not. This has serious implications for some areas of the Pacific where fish is a dietary staple. Understanding the mechanisms involved in developing this type of reaction to fish will provide clues to better methods of treatment and control.

6. The ecological influences on the development of toxic fish is an important aspect of this research project. Efforts are being directed at determining what circumstances occur in the environment which cause the increase in the toxin-producing dinoflagellates. The growth of the dinoflagellates appears to be influenced by sudden natural or man made changes in the reef environment. Such things as a new channel through a reef, a new wharf or dredging in an area where only small quantities of this micro-organism exist frequently can be followed by a great upsurge in their numbers. This will eventually result in an increase in the number of toxic fish. Generally the smaller fish feed on the dinoflagellates and the toxin becomes incorporated into their flesh. These small fish are eaten by larger, more predacious fish (barracudas, groupers, eels, etc.) which tend to concentrate the toxin in larger amounts. Therefore the toxin produced by these dinoflagellates gradually moves up the ocean food chain eventually to reach a concentration in larger fish which makes them toxic to man. By studying the ecological requirements of this dinoflagellate it might be possible to predict when an increase in this micro-organism will occur to outline the toxic areas and therefore possibly control outbreaks.

7. Although major breakthroughs have been made possible by the SPC fish poisoning project, a number of other important aspects need to be examined before adequate control and preventive measures can be effectively implemented.

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