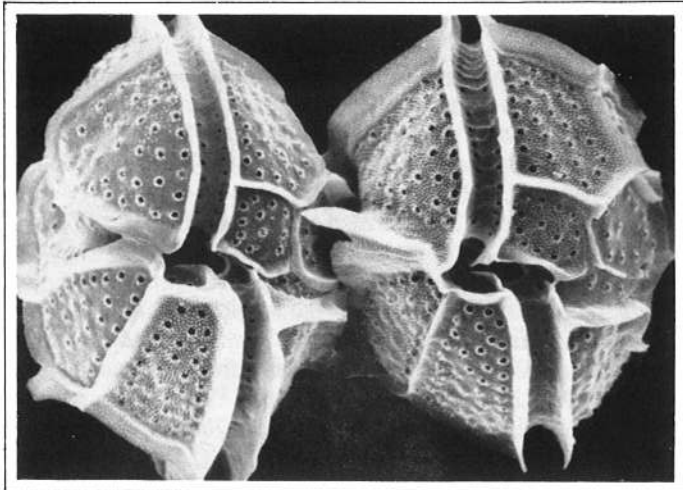


RED TIDES

of the dinoflagellate *Pyrodinium* cause paralytic shellfish poisoning on both sides of the tropical Pacific



Electron micrograph of two cells of *Pyrodinium bahamense* var. *compressum*. Actual size of each is about 40 μm . (photo courtesy of Dr. Gustaaf Hallegraeff, CSIRO, Australia)

OVER 40 RESEARCHERS FROM THE SIX ASEAN countries, and from Australia, Canada, Japan, Papua New Guinea, Central America and the USA, participated in a Management and Training Workshop on *Pyrodinium* Red Tides, held 23-30 May 1989 in Brunei Darussalam, to discuss the biological, economic, management, medical and training issues of *Pyrodinium* red tides.

Pyrodinium bahamense var. *compressum* is a causative organism of paralytic shellfish poisoning (PSP) and represents the major red tide danger in many tropical countries. They produce a number of similar poisons (neurotoxins) which are collectively known as paralytic shellfish toxins.

Eaten by bivalve shellfish - mussels, oysters, scallops and cockles - the dinoflagellates break up and the released poisons are stored in the digestive gland of the shellfish which may then be eaten by humans.

Small fish, such as sardines and anchovies also eat the dinoflagellates but the fish can be eaten safely by humans if the viscera are removed carefully.

The *compressum* variety of *Pyrodinium* first came to the attention of researchers following PSP deaths caused by this dinoflagellate in Papua New

Guinea in 1972. Four years later it struck the west coast of Borneo for the first time, causing deaths and many illnesses. The next area to be affected was the central Philippines where the first outbreak occurred in 1983, claiming over 20 lives with 200 reported illnesses.

In 1984, we reported that red tide seemed to be a growing problem in the Indo-Pacific (ICLARM Newsletter, October 1984, p. 20). This prediction has unfortunately proven to be true as PSP cases have occurred almost every year since in Sabah, while more extensive outbreaks have taken place in the Philippines from 1987 up to the time of writing.

Also in 1987, this dinoflagellate was found responsible for PSP on the Pacific coast of Guatemala and shellfish have been found to be toxic there in the succeeding years.

At the Brunei Darussalam meeting, management papers from the various countries highlighted the differences in approaches needed in different geographical situations and the problems associated with information dissemination.

A great deal of data on the epidemiology of Philippine PSP was presented, suggesting differences in the toxin and/or

susceptibility from those of other red tide species.

On economics, the large losses accompanying *Pyrodinium* and other red tide outbreaks in the past were described. Economic alternatives are major considerations in managing *Pyrodinium* red tides. Thus, economists are needed in red tide research teams.

There were many research recommendations dealing with field studies on bloom distribution; hydrographic studies; investigation of the close association with mangrove areas; life history of *Pyrodinium*; cyst biology and germination requirements; cyst mapping; analysis of the variability in toxin composition; dynamics of accumulation of PSP toxin and depuration; development of toxin detection methods; and taxonomic relations of the two varieties of *Pyrodinium*.

A manual of field and laboratory methods and a proceedings volume will be published later this year by the Brunei Darussalam Government and ICLARM.

Major supporters of the workshop were the Brunei Darussalam Government which also hosted the workshop, the ASEAN/US Coastal Resources Management Project, and the Australian International Development Assistance Bureau (AIDAB). Other supporters included the United Nations Environment Programme (UNEP), Intergovernmental Oceanographic Commission (IOC/WESTPAC), the National Academy of Sciences, USA, ICLARM, International Development Research Centre (IDRC) of Canada, and the United States Agency for International Development (USAID).
J.L. Maclean



Field sampling during the Brunei Darussalam workshop. Dr. Webber Booth holds a core sample inspected by Dr. Ranjith De Silva (right, both from Brunei Darussalam) and Dr. Willy Pastor (far left Philippines). Dr. Yasuwo Fukuyo (Japan) is reassembling the coring device watched by Dr. Joe Castro (background, Philippines).