RED TIDE AND SHELLFISH POISONING

By J.L. Maclean

At certain times of year, shellfish around the coasts of PNG become poisonous. The poison may kill the person who eats the shellfish, or it may just make him sick.

The poison is caused by a certain kind of microscopic floating organism—a plant so tiny that most of them can be seen only with a microscope.

Normally, there are only small numbers of these organisms in the sea, and they cannot be seen, but occasionally there is a sudden increase in numbers of these organisms.

When this happens, they form a visible patch on the surface of the sea, which is usually a reddish colour, and is called "Red Tide". These patches may be up to a kilometre long and 100 metres wide.

The picture on the cover of this issue of *Harvest* shows a patch of Red Tide near Port Moresby.

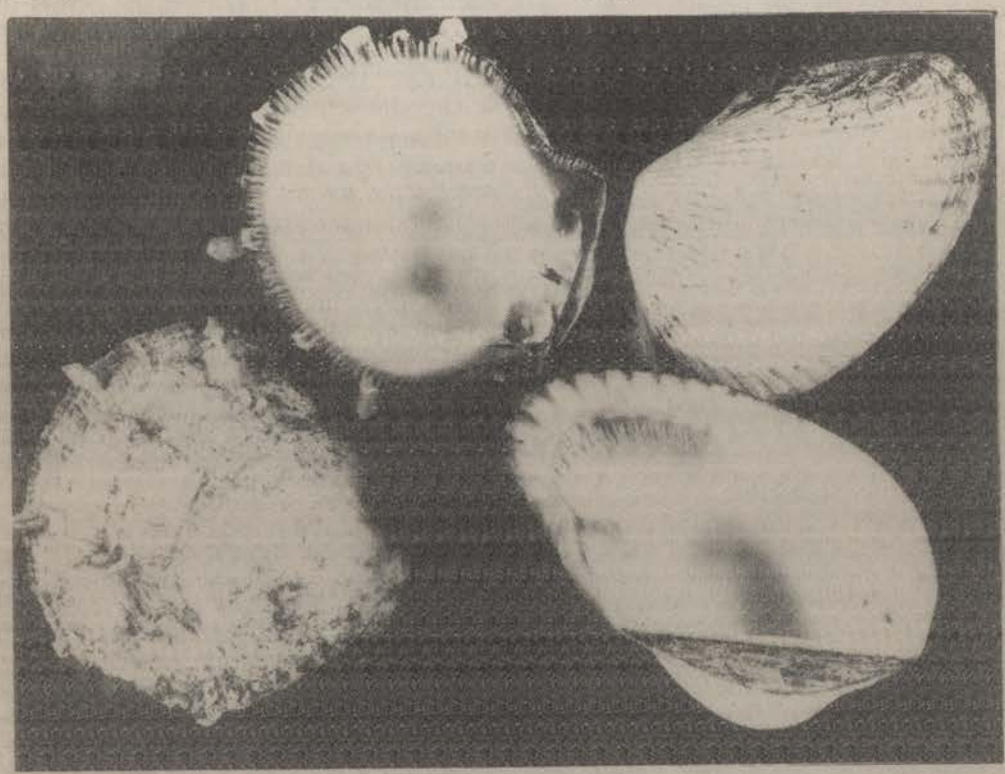
Not all the types of Red Tide are poisonous. Indeed some are quite harmless. But some Red Tides are made by poisonous species.

People never eat the Red Tide organisms directly, but some shellfish feed on the Red Tide, and then people eat the shellfish. So the poison is transferred from the Red Tide to the shellfish and from the shellfish to the person who eats it.

Only the shellfish that have two shells eat Red Tide and become poisonous. Shellfish that have two shells are known as "bivalves"; examples are oysters, mussels and clams.

Below is a list of some bivalves which are not safe to eat during Red Tide—

English name	*Motu name*
oysters	siro, batata
mussels	dihu dihu, gogodiro
jewelbox shells	sisihu
thorny oyster	sisihu
cockles	kwadi



Some of the shellfish which are harmful at the time of a poisonous Red Tide. The two shells on the left are jewelbox shells, which are called in Motu "sisihu", and on the right are cockles, called "kwadi" in Motu.

There are two factors which make these bivalves so dangerous to eat.

- Cooking the shellfish does not get rid of the poison.
- The poison stays in the shellfish for several weeks after the Red Tide has finished. It is not possible to give a definite time limit for this, but it could be as long as three months.

Symptoms of poisoning

Symptoms of poisoning appear very quickly after eating these bivalves. Within 30 minutes there is a tingling or burning of the lips, gums, tongue and face. Later this spreads to the neck, arms, fingers, legs and toes.

These parts of the body gradually become numb and later in severe cases the patient cannot move his arms or legs at all, and finally the patient may die.

A patient with these symptoms should be taken to hospital straight away. The sooner he gets to hospital, the more chance he has of getting better.

Shellfish which are safe to eat

Two types of bivalves have been found, however, which seem to be safe to eat any time. Their Motu names are "minikore" and "bogani".

Shells which have only one shell, not two, are also safe to eat. These shells are called univalves. Ordinary fish are not made poisonous by Red Tide either. The English and Motu names of some univalves are given below—

English name	*Motu name*
spider shell	raga raga
conch shell	kibi
cowrie shell	nc ne none
olive shell	digoa
volute shell	koko

Looking out for Red Tide

Airline pilots, fishermen and other people keep a lookout for Red Tide. Over the last few years, Red Tide has been reported from the Papuan coast between Port Moresby and Kapakapa and also as far east as Milne Bay.

It has been seen in the Huon Gulf near Lae, and in the Trobriand Islands, the Admiralty Islands, and West New Britain.

When Red Tides are reported, samples of the water are studied by biologists to see whether the Red Tide is poisonous. On some occasions, Red Tides have been found to be caused by harmless organisms. When a poisonous Red Tide is discovered, people in the area are warned not to eat the bivalve shellfish until the time when studies show the danger is passed.

Time of year

It now seems that poisonous Red Tides occur every year in Port Moresby harbour and eastwards along the coast during the rainy season, December to May.

On the Morobe coast, east of Lae, the Red Tide is said to be virtually an annual event in November. It is looked forward to by local villagers, who are not shellfish eaters, because the Red Tide kills large numbers of fish in many bays, and these are cooked and eaten.

But the fact that there have been few deaths in recent years means that the Red Tide may not be as poisonous in some years as in others. We don't yet know why.

Recently Red Tides have been in the news again. On 9th December, 1975, an Air Niugini pilot reported a massive outbreak in the Madang province, "stretching from the southern edge of Karkar Island across the Vitiaz Straits to Cape Croisilles and eastward to, encircling Bagabag Island". The next day it was east of Madang, covering some 180 square kilometres.

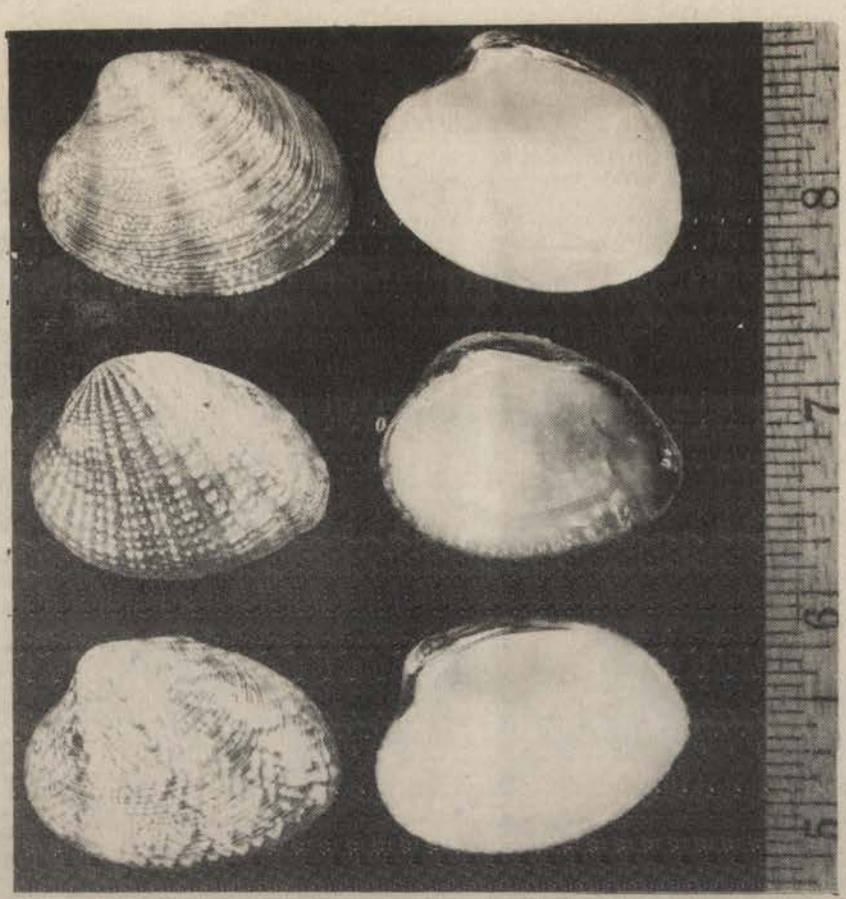
A sample was sent to me in Canberra. It proved to be a harmless Red Tide, common in open ocean waters.

However, a week earlier two people in the Talasea area were said to have been killed by eating fish which were affected by Red Tide there. Thirty other persons were treated for poisoning at the time. Deaths from eating bivalve shellfish have occurred near Talasea before—three persons in 1961 and one in 1963. It is not known whether the deaths in December, 1975 were from fish or shellfish, but it seems more probable that bivalve shellfish were the culprits.

Notifying Red Tide sightings

Since there is no easy way to distinguish between poisonous Red Tides and harmless ones, it is desirable that all Red Tides be investigated. Officers from the Department of Primary Industry will be glad to come and take samples of any Red Tide they hear about.

Marine biologists will make a microscopic examination of the water and will then be able to advise whether it is poisonous or not. All appearances of Red Tide should therefore be



As far as we know, these are the only bivalves which are safe to eat, at a time of poisonous Red Tide. The two shells in the centre are called in Motu "minikore" while those at the top and bottom are called "bogani".

reported to—

Officer-in-charge
Kanudi Fisheries Research Station
Department of Primary Industry
P.O. Box 2417
Konedobu
Telephone Port Moresby 259522 or 259995

Is Red Tide spreading?

The poisonous Red Tide which is now found in Papua New Guinea was previously never known to occur in this part of the Pacific Ocean, only on the eastern shores of the Pacific in the tropical American continent.

In March and April, 1976, an outbreak of this Red Tide was reported for the first time in Malaysia and there are reports of deaths from eating bivalve shellfish.

Is it possible this Red Tide is spreading?

Further information

Maclean, J.L. (1973). Red tides and paralytic shellfish poisoning in Papua New Guinea. *Papua New Guin. agric. J.*, 24(4):131-138.

Maclean, J.L. (1974). Shellfish poisoning in the South Pacific. *SPC Information Circular*, No. 54.

Maclean, J.L. (1975). Red tide in the Morobe District of Papua New Guinea. *Pacif. Sci.*, 29(1): 7-13.

Maclean, J.L. (1975). Paralytic shellfish poison in various bivalves, Port Moresby, 1973. *Pacif. Sci.*, 29(4): 349-352.

Maclean, J.L. (in press). Observations on *Pyrodinium bahamense* Plate, a toxic dinoflagellate in Papua New Guinea. *Limnol. Oceanogr.*, in press.

Worth, G.K., Maclean, J.L. and Price, M.J. (1975). Paralytic shellfish poisoning in Papua New Guinea. *Pacif. Sci.*, 29(1):1-7.

Mr Maclean was formerly a fisheries biologist at Kanudi Fisheries Research Station. He is now with the Fisheries Division of the Department of Primary Industry, Canberra, Australia.