

• Nicaragua

First report of PSP on Pacific coast of Nicaragua associated with *Pyrodinium bahamense*

Studies of marine phytoplankton and harmful algae on Nicaraguan coasts are very scarce. As historical antecedents, there were red tide alerts on the Pacific coasts of Guatemala and El Salvador in December 2000 and of Costa Rica in September 2001. During those events, the Nicaraguan health ministry (MINSA) detected neither red tides nor shellfish toxicity.

In early November 2005, reddish patches were seen off the north Pacific coast of Nicaragua, due to a bloom dominated by *Pyrodinium bahamense*. This event was associated with 50 cases of PSP toxicity, including one death, following consumption of mangrove cockles (*Anadara tuberculosa*).

This event had a strong economic impact in six municipalities (Corinto, El Realejo, Chinandega, El Norte Viejo, Posoltega and León) whose main sources of income are the harvesting and commercialization of molluscs. The health authorities sought help from the Nicaraguan Aquatic Resources Research Centre of the National Autonomous University in Managua (CIRA/UNAN), to identify the

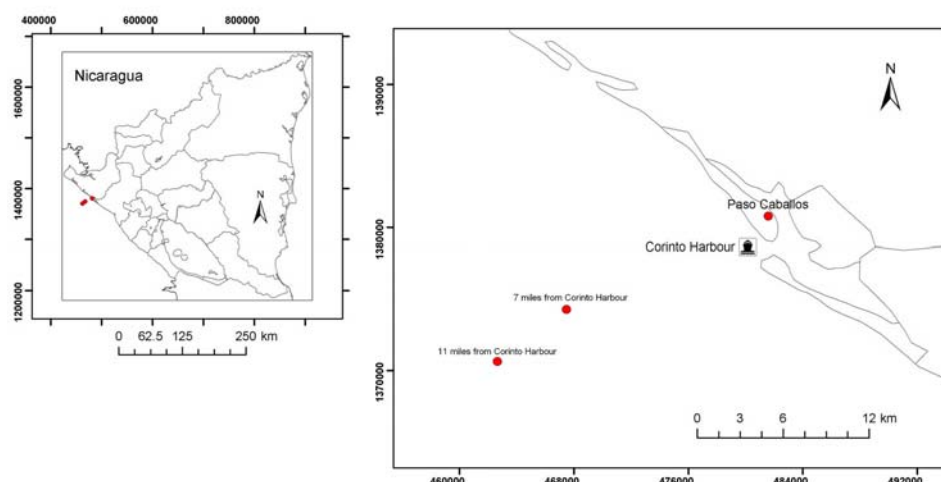


Fig. 1. Sampling stations on Pacific coast of Nicaragua

phytoplankton species potentially responsible for the toxic outbreak.

Water samples for phytoplankton analysis were taken on 11 and 15 November 2005 at three coastal stations off Corinto (Chinandega) selected by MINSA (Fig. 1), at Paso Caballos (11 November) where the cases of poisoning occurred, and from two stations 7 and 11 miles from Corinto (15 November), where reddish patches had been seen the previous day during overflights. Oblique hauls for qualitative

analysis were taken with a 10 μm mesh net and transported to the laboratory live, quantitative samples with a 2.5 L van Dorn at 0.5 m depth, and fixed with Lugol's iodine. Counts were made with an Olympus CH40 inverted microscope following the Utermöhl method.

Both diatoms and dinoflagellates were common at the Paso Caballos and 11 mile stations, but the patch detected from the air the previous day was a practically monospecific bloom of *Pyrodinium*

bahamense (Fig. 1), which reached concentrations of $17.3 \times 10^6 \text{ cell L}^{-1}$, compared with $72 \times 10^3 \text{ cell L}^{-1}$ and $14 \times 10^3 \text{ cell L}^{-1}$ at Paso Caballos and the 11 mile station respectively.

Epidemiological results are summarized in Fig. 2 and 3. Symptoms were muscular weakness (76%), oral numbness (56%), and vomiting (50%). Mouse bioassay indicated a maximum saxitoxin concentration of $1265 \mu\text{g STX eq } 100 \text{ g}^{-1}$ of meat; toxicity was undetectable one month later.

Pyrodinium bahamense var. *compressum* (Fig. 4) is presently considered a harmful species in the tropics due to its high toxicity, and has been associated with intense episodes of PSP on the Pacific coast of Mexico and Central America which have included fatalities. In November 1989, 99 people were poisoned (three fatally) in the Gulf of Tehuantepec, Mexico [1]; 187 people (26 fatalities) were affected in July 1987 in Guatemala [2]. In El Salvador, between August 2001 and January 2002, there were 41 cases [3], and in Costa Rica, in 1999 and 2000, there were about 70 cases [4].

This is the first report of a PSP event in Nicaragua, accompanied by observations of plankton patches and standard methods of toxin analysis, identification of the suspect species, and a parallel epidemiological study coordinated by MINSA. This event indicates the need for a phytoplankton

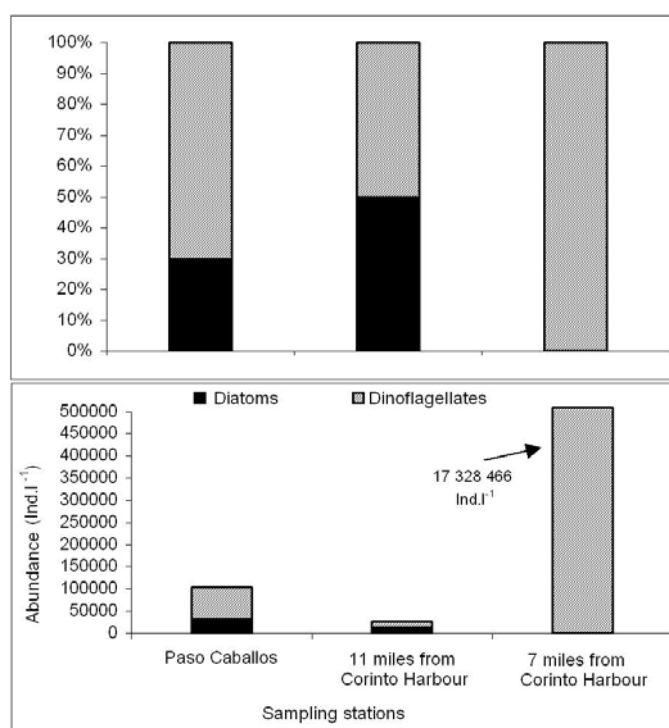


Fig. 2. Percentage contributions and numerical abundance of phytoplankton groups at the three stations

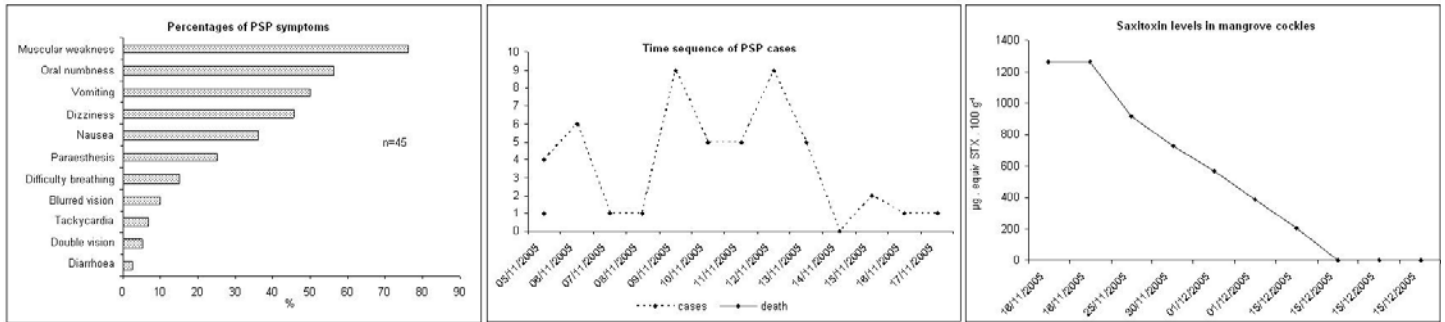


Fig. 3. Percentages of different symptoms in people poisoned, temporal distribution of cases and saxitoxin levels ($\mu\text{g equiv. STX} \cdot 100 \text{ g}^{-1}$ of meat) estimated by mouse bioassay in *Anadara tuberculosa* during toxic event on Pacific coast Nicaragua, November 2005. (Data of SILAIS, Sistema Local de Atención Integral de Salud).

monitoring program on the Pacific coast of Nicaragua, and for testing toxicity in shellfish destined for human consumption. This type of program would prevent the occurrence of human poisoning, identify periods and zones at risk, and mitigate economic losses to the mariculture industry.

There is also a need to establish links for technical cooperation and information exchange among Central American countries, especially those which share common *P. bahamense* events. It is possible that blooms of *P. bahamense* reflect mesoscale events over a wide zone of Pacific Central America, and that a communication network between countries affected would improve prediction of the development of these events, and improve the analytical capacity of national laboratories responsible for toxin detection and phytoplankton taxonomy.

Finally, it is of great importance that consumers be informed of the risks associated with shellfish consumption

exposed to these toxins by the state institutions (INETER; ADPESCA) to deal with the problem in a coordinated manner.

References:

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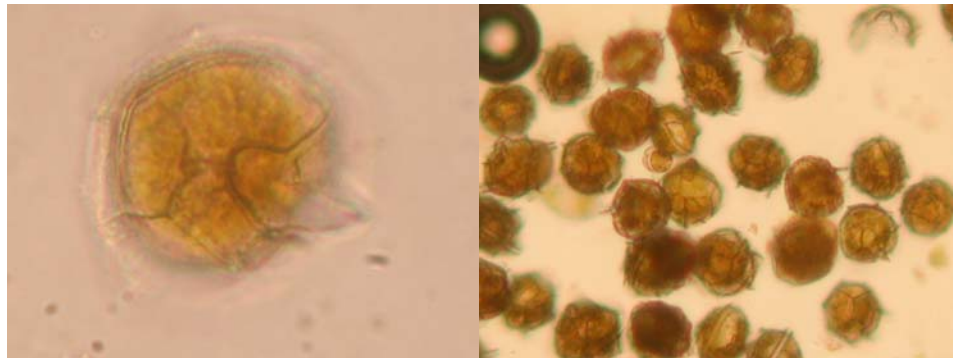


Fig. 4. Photograph of *Pyrodinium bahamense* (40x and 10x).

