

First report of *Alexandrium globosum* on the Pacific coast of Central America

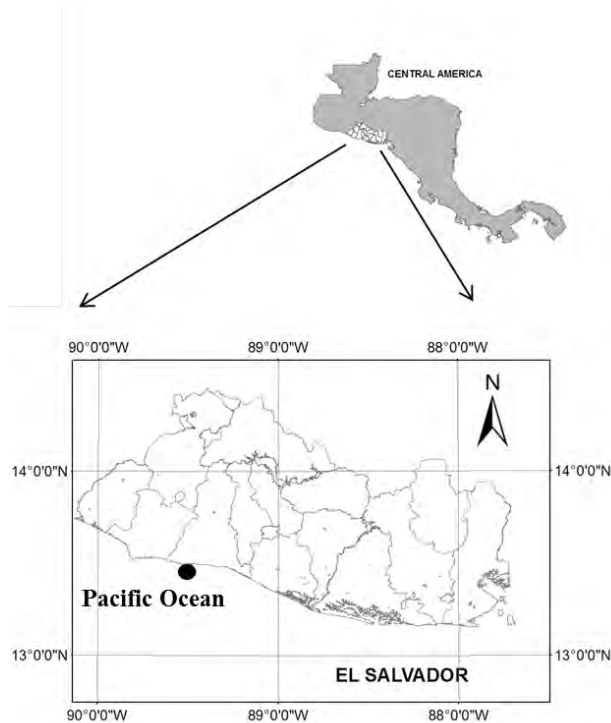


Fig. 1. Sampling area at department of La Libertad, El Salvador.

Harmful algal blooms of the dinoflagellate *Alexandrium* can have considerable socio-economic impacts. Amongst the 30 species described for this genus, more than half are known to be toxic. *Alexandrium* species are unique on their capacity to produce at least three different kinds of toxins: saxitoxins, spirolides and goniodomines [1]. Little is known about the impact of *Alexandrium* in Central America.

Between August and September 2014, an intense bloom of *Cochlodinium* cf. *polykrikoides* developed which lasted 21 days and mainly affected the central and western coasts of El Salvador (Eastern Pacific). The observation of reddish-brown patches was associated with fish kills along the rocky shores of La Libertad. In addition, putrid smells from decaying algae affected the tourist

industry. Cells of an unidentified *Alexandrium* species co-occurred with this bloom.

Plankton net (20- μ m mesh) hauls and 10-L Niskin bottles samples were collected on 2 September 2014 off Puerto de La Libertad (13°29'11.6" N; 89°19'12.6" W), fixed with Lugol's solution and taken to LABTOX-UES for analyses. Samples were stained with Calcofluor, observed under the epifluorescence microscope (Zeiss Axio Imager) and cellular density estimated from Sedgewick Rafter chamber counts with an inverted microscope (Zeiss 40CF). *Alexandrium* spp. reached densities over 49×10^3 cells L⁻¹.

The genus *Alexandrium* is characterized by the Kofoidian plate tabulation formula: Po, 4', 6'', 6c, 10s, 5''', 2'''. Some important features for morpho-

logical classification of this genus are cell shape, size, chain-forming capacity, thecal ornamentation and shape of the cingulum, sulcus, cingular displacement and shape of the apical pore complex (APC), plates 1', 6' and some sulcal plates [2]. Plate tabulation of the cells in this work was Po, 4', 6'', 5''', 1''', 1sp. The epithecal plate 1' was wide and asymmetrical with no direct connection with the APC (Fig. 2a); a characteristic ventral pore between plates 1' and 4' was present, plate 6' was rectangular and no connecting pores were observed either on the epitheca or the hypotheca (Fig. 2b). Morphology of the *Alexandrium* specimens corresponded to that of *Alexandrium globosum* as described by Larsen & Nguyen [3].

Fish kills were attributed to *Cochlodinium* cf. *polykrikoides*. Nevertheless, we cannot rule out that *Alexandrium* cf. *globosum* contributed to the fish kills, because other species of *Alexandrium* have been described as producers of PSP and/or hemolytic toxins devastating fish farms [1].

Acknowledgements

We thank Jacob Larsen for confirmation of the species identity and CENDE-PESCA (La Libertad) for sampling help. This work was supported by the International Atomic Energy Agency (IAEA) projects RLA/7020 and ELS/7007.

References

1. Anderson DM et al 2012. *Harmful Algae* 14: 10–35
2. Balech E 1995. *Sherkin Island Marine Station*, 151 pp.
3. Larsen J and Nguyen N. 2004. *Opera Botanica* 140.

Authors

Yaneth Alvarado, Rebeca Quintanilla & Oscar Amaya, Marine Toxins Laboratory, University of El Salvador (LABTOX-UES), Faculty of Natural Sciences and Mathematics, University City, 25 North End Avenue, San Salvador, El Salvador

Email: alvaradocallejas2001@gmail.com

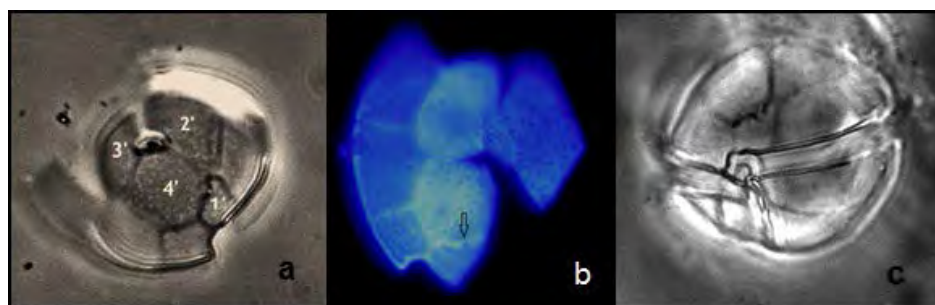


Fig. 2. Micrographs of *Alexandrium globosum* a) Epitheca and tabulation of the apical plates; b) Stained cells showing the ventral pore; c) Ventral view. Samples from La Libertad, El Salvador, 2 September 2014.