



FIGURE 1. Arraial do Cabo aerial view (South-western Brazil coast)

SEA URCHINS KILLED BY TOXIC ALGAE



FIGURE 2. *Echinometra lucunter* zones of the shallow areas of local rocky shores.

Scientists around the world are very concerned about the effects of natural and anthropogenic disturbances in the sea. Overexploitation, pollution, global warming, physical alteration and exotic species introductions are considered the main impacts driving the decline of species diversity.

A lot of concern has been devoted to reef systems, especially coral reefs, as they are considered hotspots of biodiversity.

Arraial do Cabo is located in the southeastern Brazilian coast (23°S, 42°W) (Figure 1) and is considered a marginal reef site as

it does not sustain true coral reefs. However, the region is the limit of distribution of many tropical organisms southward and to subtropical organisms northward, thus the diversity of species is high, including tropical as well as subtropical components.

In 1998 while the author was studying the relationship of reef herbivores consumption and primary production of epilithic algae, their main food source, a dinoflagellate bloom occurred. This caused a huge die-off of the sea urchin species *Echinometra lucunter*. This sea urchin species dominates the calm and



FIGURE 3. Microscopic view of *Ostreopsis ovata* (50x).

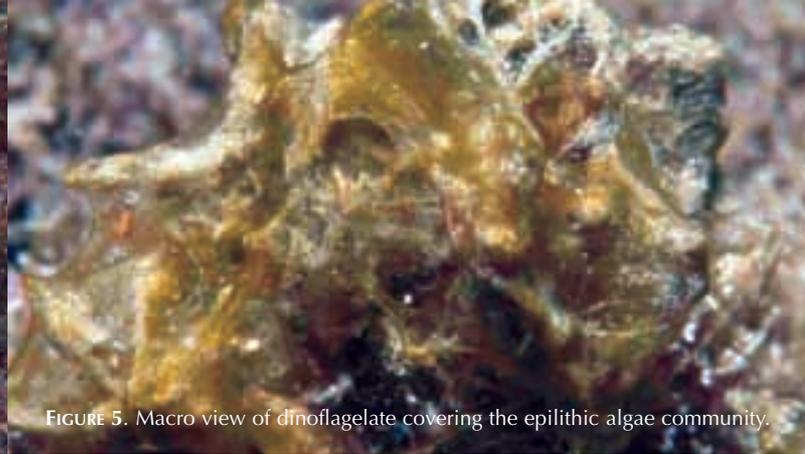
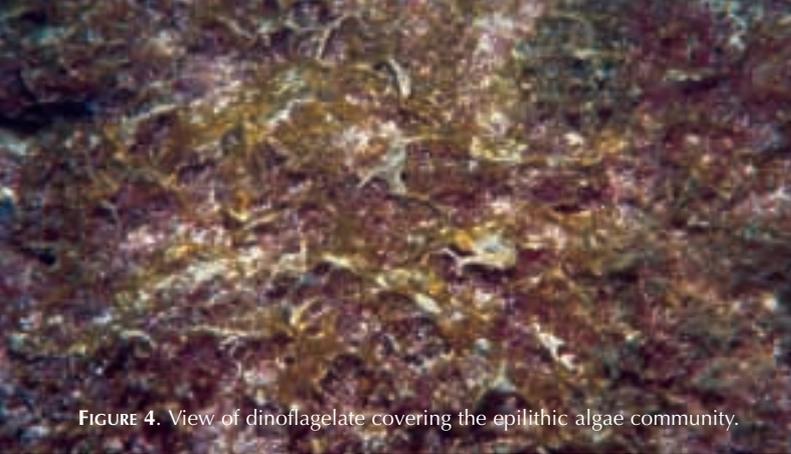


FIGURE 4. View of dinoflagellate covering the epilithic algae community.

FIGURE 5. Macro view of dinoflagellate covering the epilithic algae community.

tropical shallow waters of the rocky shores in an extensive area of the southeastern Brazilian coast. Where they occur in high densities only extended bare substratum dominated by incrusting calcareous algae, could be maintained (Figure 2). However, where densities vary, a thick, 'carpet' of algae, called epilithic algae matrix, flourish and sustain most of the reef herbivores.

The dinoflagellate, *Ostreopsis ovata* (Figure 3), appeared like a brown film covering great extensions of the epilithic algae community in November of 1998 (Figure 4 & 5). Probably by ingestion, urchins started to loose spines (Figure 6) and later appeared completed denuded (Figure 7). Some individuals showed serious necrosis leaving their carapace exposed (Figure 8). The density of urchins in the shallow zones dropped from 50(±5) to 15 (±2) individuals/ m² in a one month period. The 'ovatoxin' produced by the dinoflagellate is a potent neurotoxin

chemically similar to 'palytoxin'.

The event was also detected 400 km north of Arraial do Cabo coast, near Vitória City. In some bays, a complete die off of urchins occurred. Scubadivers reported the death of herbivorous parrotfishes in some near coastal islands while local hospitals reported deaths due to ingestion of seafood. The only abnormal climate condition detected was a week of rain, but scientists are still trying to figure out what conditions triggered the toxic bloom. The dinoflagellates are still present in the region but no similar die off event was ever detected again. Five years after the event the density of urchins in some places has not recovered to former numbers.

Also Published in JMBA

Tuya, F., Martin, J. A., Reuss, G. M. & Luque, A., 2001. Feeding preferences of the sea urchin *Diadema antillarum* in Gran Canaria Island (Central-East Atlantic Ocean). *JMBA*, **81**, 1-5.



FIGURE 6. Urchins losing spines.

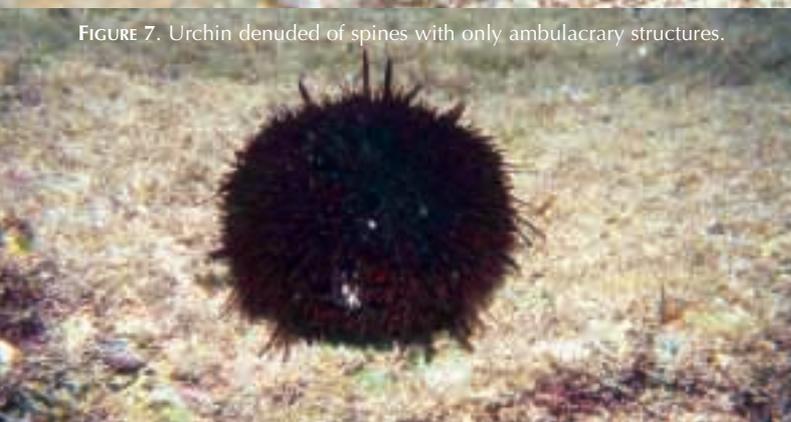


FIGURE 7. Urchin denuded of spines with only ambulatory structures.



FIGURE 8. Urchin with necrosis.