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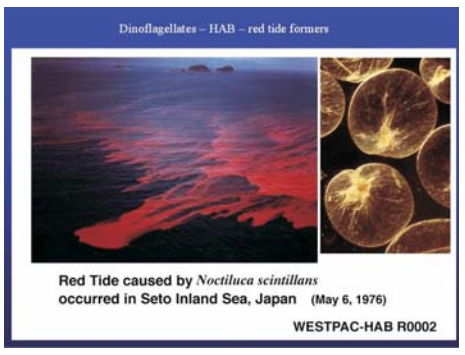
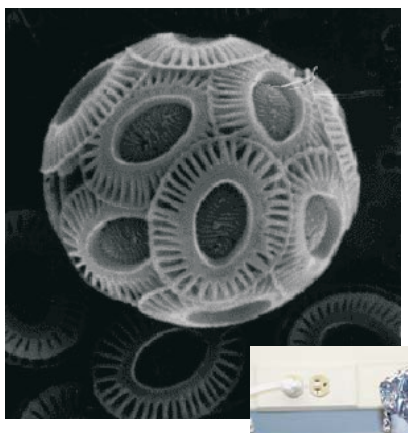
PHYCOLOGIST

Dr. Carmelo Tomas



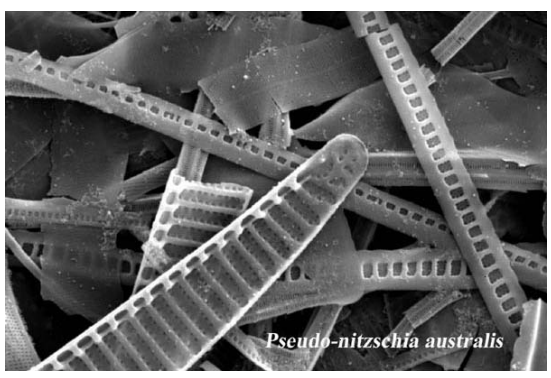
My name is Dr. Carmelo Tomas and I am a **phycologist**. A phycologist studies the structure, life-cycles, and ecological impact of different species of algae. My work focuses on algal blooms, which are rapid increases in the number of algal cells such that they outnumber other organisms in the planktonic community. I study what determines how well toxic algal species compete with non-toxic species and what role nutrients play in stimulating and supporting blooms and toxin production. Toxins impact organisms in a variety of ways that range from cell and tissue damage to organism death.



Culturing Phytoplankton

Algae blooms can be caused by high nutrient levels in the water, or when algae get more sunlight than usual. You may not be aware, but some algal blooms produce toxins and cause the animals that eat the algae to become sick and sometimes die. These blooms are called **HABs** or **Harmful Algal Blooms** and they can be very damaging to the aquatic ecosystem. HABs can negatively impact organisms in a variety of ways that range from cell and tissue damage to organism death. The toxins in the algae move through the food web and build up in animals through a process called **bioaccumulation**.

When studying HABs, we are often faced with dead fish or sick birds as with the penguins in the Newport Kentucky Zoo. These birds were being fed two types of fish when suddenly they began showing symptoms of illness. The penguins were vomiting and showing signs of physical discomfort. Eventually some of them died. We examined the food being given to the penguins and it turned out that of the two types of fish being eaten the Herring were fine and had no toxins but that the Anchovy had stomach filled with diatom shells. The stomach content was cleaned and showed a large number of diatom (shells) that allowed us to identify a toxic species of diatom called Pseudo-nitzschia australis. This diatom species was originally found in Canada and off the California coasts. The penguins being fed the smaller anchovy were being poisoned by the toxic diatoms in their stomachs. Quickly changing the food allowed the remaining penguins to recover. This is an example of how a food chain containing a harmful diatom can be in danger without the help of phycologists who work hard to solve the problem.



Toxic Diatom making the penguins sick in Kentucky