FLOW: Amigos de Bolsa Chica Citizen Science Program

Plankton Collection and Identification Report

Date: 05/17/13 Time: 10:34 AM
Collectors: Dennis P., Nicole G. and Kevin J. (Fullerton College); Tan N. (Golden West College); Joana T.
Tide: ebb (going out)
Secchi: N/A
Temp.: 22°C/71.6F
Salinity: 37 ppt
pH: 8.2
Nitrates: 0 ppm
Phosphates: 0 ppm
Ammonia: 0.3 ppm
Weather/ wind: Sunny and clear; gentle onshore breeze (W-SW)

Summary:

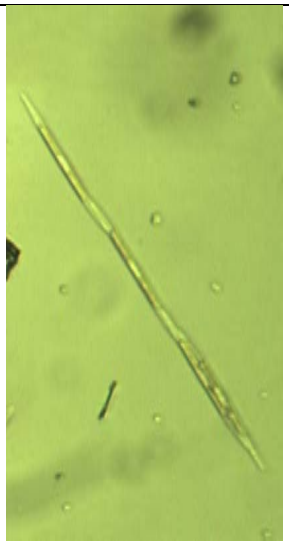
We collected plankton at the Tidal Inlet this morning following our usual procedures. Back at the Visitor Center, we measured nutrients and pH and observed samples under the microscope: Nicole and Kevin were in charge of microscopy, but everyone participated in identifying the phytoplankton on the TV; Dennis and Tran were in charge of measuring chemical parameters.

Today's sample was significantly different from last week's. There were very few phytoplankton organisms in the water (in contrast to the high abundance of *Bacteriastrum* spp. and *Prorocentrum micans* observed last week). There were a few scant dinoflagellates and diatoms including a few chains of the potentially harmful genus of diatom *Pseudo-nitzschia* spp. (see complete list at the end of the report).

Nutrients and pH were within expected ranges (this water was collected when the tide is going out so it makes sense that salinity was higher than ocean's average and that ammonia and phosphates are a bit above 0 ppm).

Here are a few species and genera of plankton that we observed, identified and photographed under the microscope today. (See complete list of organisms observed at the end).

 *Dinophysis acuminata*	*Dinophysis acuminata* is marine, planktonic dinoflagellate species. It is a potentially toxic species that may produce ocadaic acid and blooms of this species have been associated with diarrhetic shellfish poisoning (DSP) events. It is commonly found in coastal waters of the northern Atlantic and Pacific Oceans. The most extensive blooms have been reported from the summer and fall months in many parts of the world. The concentration of *Dinophysis* acuminata in today's sample was very low (lower than last week's).
 *Prorocentrum micans*	*P. micans* is a marine bloom-forming dinoflagellate. This is a cosmopolitan species in cold temperate to tropical waters. Although *P. micans* is capable of forming extensive blooms, it is usually considered harmless. It may excrete substances that inhibit diatom growth, but apparently these substances do not enter the food chain or affect organisms at higher trophic levels. The concentration of *P. micans* observed in today's sample was much lower than the high abundance that we've observed in the past 2-3 weeks, which leads us to believe that this species is currently experiencing the decline of its bloom.
 *Ceratium divaricatum* var. *balechii*	Distribution of *Ceratium divaricatum* is wider than previously documented (mainly because of previous misidentifications): the North Pacific Ocean, from British Columbia in Canada to temperate or subtropical waters of Mexico, and then is interrupted to reappear again in coasts of Peru and Chile, and also in coasts of the Benguela area, the South-west Atlantic Ocean. In tropical and equatorial areas of the Pacific Ocean, a more delicate form occurs: *Ceratium divaricatum* var. *balechii*. *C. divaricatum* var. *balechii* may be relatively abundant, even producing non-toxic red tides, in various spots along coasts of the Pacific Ocean (Canada to Mexico). I t appears to be a neritic form, with high sensibility to changes in water temperature, and presumably associated to upwelling areas. *Ceratium divaricatum* was reported as "common to abundant between San Mateo and Sonoma counties by the end of the month of September of 2011. The abundance of *C. divaricatum* in today's sample was low.

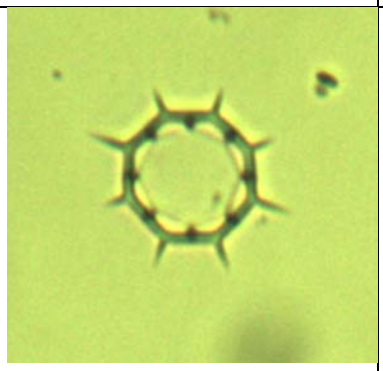


Pseudo-nitzschia spp.

The genus ***Pseudo-nitzschia*** includes several species of marine diatoms known to produce the neurotoxin called domoic acid; this toxin is responsible for the illness called amnesic shellfish poisoning, which affects higher consumers, such as sea lions, sea birds, humans and mammals in general that have consumed contaminated shellfish.

This genus of phytoplankton is known to form harmful algal blooms in coastal waters of Canada, California, Oregon, Washington state, Europe, Asia, Australia, New Zealand, Central America, and South America. At least nine species within the marine diatom genus *Pseudo-nitzschia* are now known to produce DA. In California, *Pseudo-nitzschia australis* and *Pseudo-nitzschia multiseries* are the main toxin producers. The correct identification of these species is very difficult without the use of electronic microscopy. Blooms of these diatoms in CA often occur during the spring and summer causing the intoxication and death of hundreds of marine mammals and birds.

The abundance of *Pseudo-nitzschia* in the sample analyzed today was low, but a bit higher that last week's concentration. Over the past 6-7 weeks, we observed the development and decline of this genus' bloom at Bolsa Chica. Today's slightly higher abundance may indicate that their populations' abundance is coming back.



Dictyocha sp.

Dictyocha is a genus of silicoflagellates- unicellular heterokont marine algae. Dictyocha spp. have a silica test with one or more "windows", and when alive (not the case in this photo) they also have one or many gold or yellow chloroplasts, and one winged flagellum. The cell body wraps around the test. Sillicoflagellates are most common in inshore waters, though can be present in temperate, polar, coastal and oceanic regions. Silicoflagellates are a poorly understood group of phytoplankters that are difficult to study due to their small size. They secrete silicon dioxide either in the form of a framework (as shown above) or in the form of multiple scales. The marine forms commonly have the framework type secretion. The cell body wraps around the siliceous framework - like cotton candy around a stick. They have two flagellae, one is long and very efficient at moving the cell through the water. The other flagellum is very small and nearly impossible to see. Like other phytoplankters, they can produce blooms which can block sunlight from reaching underlying parts of the ocean - including blocking light from understory marine plants.

Plankton ID	
05/17/13	Conc/ Rel. Abundance
Pseudo-nitzschia spp.	Low
Chaetoceros spp.	Low
Bacteriastrum sp.	Low-medium
Eucampia sp.	Low
Nitzschia spp.	Low
Coscinodiscus spp.	Low-medium
Thalassionema sp.	Low
Ceratium furca	Low
Ceratium divaricatum var. balechii	Low
Prorocentrum micans	Low
Dinophysis acuminata	Low
Gonyaulax spp.	Low
Protoperidinium spp.	Low
Dictyocha spp.	Low
Tintinnids (zooplankton)	Medium

For those of you interested in reading and learning more about phytoplankton taxonomy and ecology, here are some interesting sites that I'd recommend you to visit and study when you get a chance:

http://oceandatacenter.ucsc.edu/PhytoGallery/index.html
http://www.mbari.org/staff/conn/botany/phytoplankton/DEFAULT.HTM
http://botany.si.edu/references/dinoflag/intro.htm