

FLOW: Amigos de Bolsa Chica Citizen Science Program

Plankton Collection and Identification Report

Date: 06/07/13 Time: 2:27 PM

Collectors: Sandy M., Nicki B., Brian W., Carolyn D., Karl S.; Joana T.

Tide: ebb (going out)

Secchi: N/A

Temp.: 20°C

Salinity: 37 ppt

pH: 8.2

Nitrates: 0 ppm

Phosphates: 0.1 ppm

Ammonia: 0 ppm

Weather/ wind: Sunny and clear; onshore wind

Summary:

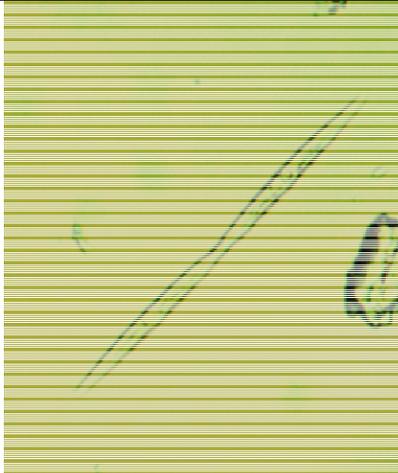
We collected plankton at the Tidal Inlet this afternoon following our usual procedures. Back at the Visitor Center, we measured nutrients and pH and observed samples under the microscope: Carolyn, Sandy and Joana were in charge of microscopy; others were in charge of measuring and recording the chemical parameters.

Today's sample was exceptionally different from last week's. We observed great quantities and variety of plankton organisms. There were many active and "healthy-looking" dinoflagellates and diatoms of various groups and shapes (see complete list at the end of the report).

Nutrients and pH were within expected ranges, and lower than what we measured in the past 2 weeks.

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).

 <p data-bbox="237 516 448 541"><i>Prorocentrum micans</i></p>	<p data-bbox="659 222 1427 365"><i>P. micans</i> is a marine bloom-forming dinoflagellate. This is a cosmopolitan species in cold temperate to tropical waters. Although <i>P. micans</i> 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.</p> <p data-bbox="659 401 1386 453">The concentration of <i>P. micans</i> observed in today's sample was medium to high.</p>
 <p data-bbox="237 1083 610 1108"><i>Ceratium divaricatum</i> var. <i>balechii</i></p>	<p data-bbox="659 575 1427 1020">Distribution of <i>Ceratium divaricatum</i> 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: <i>Ceratium divaricatum</i> var. <i>balechii</i>. <i>C. divaricatum</i> var. <i>balechii</i> may be relatively abundant, even producing non-toxic red tides, in various spots along coasts of the Pacific Ocean (Canada to Mexico). It appears to be a neritic form, with high sensibility to changes in water temperature, and presumably associated to upwelling areas. <i>Ceratium divaricatum</i> was reported as "common to abundant between San Mateo and Sonoma counties by the end of the month of September of 2011.</p> <p data-bbox="659 1056 1386 1108">The abundance of <i>C. divaricatum</i> in today's sample was medium to high.</p>
	<p data-bbox="659 1142 1427 1285"><i>Dinophysis caudata</i> is an armored, marine, planktonic dinoflagellate species. It is a bloom-forming species associated with massive fish kills. It is commonly found world-wide in subtropical and tropical neritic waters. <i>D. caudata</i> is a cosmopolitan planktonic species. <i>D. caudata</i> is common in temperate to tropical neritic waters.</p> <p data-bbox="659 1291 1427 1344">Red tides associated with mass mortality of fish has been reported in the Gulf of Thailand and Seto Inland Sea in Japan.</p> <p data-bbox="659 1379 1321 1411">The abundance of <i>D. caudata</i> in today's sample was low to medium.</p>

 <p><i>Pseudo-nitzschia</i> spp.</p>	<p>The genus <i>Pseudo-nitzschia</i> 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.</p> <p>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 <i>Pseudo-nitzschia</i> are now known to produce DA. In California, <i>Pseudo-nitzschia australis</i> and <i>Pseudo-nitzschia multiseriata</i> 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.</p> <p>The abundance of <i>Pseudo-nitzschia</i> in the sample analyzed today was low to medium.</p>
 <p><i>Dictyocha</i> sp.</p>	<p>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. Silicoflagellates 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.</p>
 <p><i>Protoperidinium</i> sp.</p>	<p><i>Protoperidinium</i> is a type of marine armored dinoflagellate. Although often listed as a type of phytoplankton (mainly due to the fact that they are dinoflagellates), most species within this genus lack chloroplasts and therefore are heterotrophic (i.e. they graze on diatoms and other planktonic organisms). The genus has several species, but none associated with potentially harmful effects or toxins; the genus is cosmopolitan (i.e. widespread throughout the world).</p> <p>The abundance of <i>Protoperidinium</i> observed in today's sample was low to medium</p>



Radiolaria (Phylum)

ZOOPLANKTON.

The Radiolaria are amoeboid protozoa (diameter 0.1–0.2 mm) that produce intricate mineral skeletons, typically with a central capsule dividing the cell into inner and outer portions. They are found as zooplankton throughout the ocean, and their skeletal remains cover large portions of the ocean bottom as radiolarian ooze. Radiolarian species are non-motile; they drift along water currents. Radiolaria appear to be most abundant in warm waters of the equatorial zone. Besides water temperature and salinity, there is evidence that maximum concentrations of radiolarian below the surface are associated with maximum concentrations of chlorophyll. Potential sources of food can influence Radiolaria behavior.

Observations show that Radiolaria have their greatest density and diversity in the eutrophic, nutrient rich, waters of the California Current, with decreasing densities in the Gulf Stream and Gulf of Mexico.



This photo illustrates the great variety and abundance of phytoplankton organisms observed in today's sample.

Plankton ID	
	06/31/13 Conc/ Rel. Abundance
<i>Pseudo-nitzschia</i> spp.	Low-medium
<i>Chaetoceros</i> spp.	Medium-high
<i>Bacteriastrum</i> sp.	Medium
<i>Nitzschia</i> spp.	Medium
<i>Coscinodiscus</i> spp.	Low-medium
<i>Navicula</i> spp.	Low
<i>Eucampia</i> sp.	Low
<i>Pleurosigma</i> spp.	Low-Medium
Cf. <i>Scripsiella</i> sp.	High
<i>Ceratium furca</i>	Medium-High
<i>Ceratium divaricatum</i> var. <i>balechii</i>	Medium-High
<i>Prorocentrum micans</i>	Medium
<i>Protoperidinium</i> spp.	Low-medium
<i>Dinophysis caudata</i>	Medium
<i>Dictyocha</i> spp.	Low
Radiolaria (zooplankton)	Low

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>

If you are interested in learning more about eutrophication and the chemical cycles of Nitrogen and Phosphorus (which we measure through our Phosphates, Nitrates and Ammonia tests), read the materials available on the following sites:

<http://cfpub.epa.gov/watertrain/pdf/issue1.pdf>

<http://pubs.usgs.gov/circ/circ1136/>

http://www.coastalwiki.org/wiki/eutrophication_in_coastal_environments

<http://en.wikipedia.org/wiki/Nitrification>