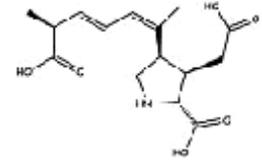
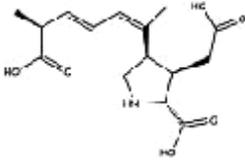


Pseudo nitzschia: Tiny Creatures Can Have a Big Impact

Jose Jimenez (1,2), Alicia Reyes (1,2),
Diego Gonzalez (1,2), Elisabet Moya (1,2)



1. Pajaro Valley High School, Watsonville, CA
2. WATCH (Watsonville Area Teens Conserving Habitats) Program, Monterey Bay Aquarium

Introduction

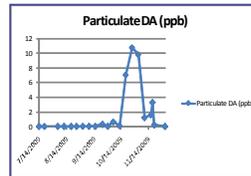
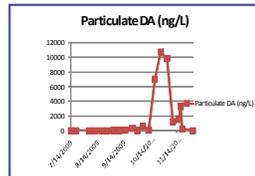
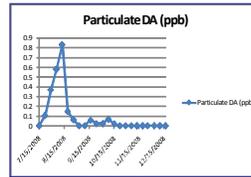
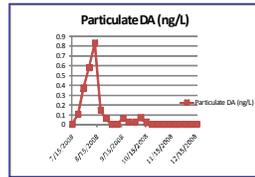
Most people generally know little about plankton, and do not know of the potential harmful effects of certain algal blooms like *Pseudo nitzschia*. *Pseudo nitzschia* is a type of phytoplankton that contains a neurotoxin called domoic acid. Although scientists have researched *Pseudo nitzschia* for many years they still are not able to predict individual *Pseudo nitzschia* blooms. When a *Pseudo nitzschia* bloom occurs, one of the affects is the biomagnification of domoic acid in certain types of filter feeding shellfish that the public consumes year round. If the presence of domoic acid reaches 20 ppm in shellfish tissue, it can pose a hazard to people consuming shellfish. Additionally, we want to show people how their actions, such as the use of fertilizers can create a *Pseudo nitzschia* bloom and how it can negatively affect marine mammals. Educating the community about how fertilizers in this agricultural community can have huge impact on increasing harmful algal blooms is one of our main goals.

Conclusion

The purpose of our project was to learn about *Pseudo nitzschia* blooms and the harmful affects of domoic acid. We took water samples at the Santa Cruz Wharf and were able to test them at UCSC. Of the six tests we performed, only the December test was positive for *Pseudo nitzschia*. In addition to our tests, we received test results taken over previous years from the Kudela Lab at UCSC. We used this information from the Kudela Lab to make comparisons with our data. We graphed the information and the data that UCSC sent us from previous years to make comparisons. After analyzing all of our data, we concluded that the time of year we sampled was a big factor towards our data. It normally occurs during the months of June through October. We tested in December through February, that is why the presence of *Pseudo nitzschia* was not evident in our data.



UCSC Research Data:



Material and Methods

In order to check for the presence of *Pseudo nitzschia* in the Monterey Bay, we took samples at the Santa Cruz Wharf and performed two different types of tests each time. First, we performed two vertical plankton tows with 20µ plankton net. We took these samples back to school to observe them under the microscope. Next, we measured the net with a measuring tape to determine how deep the net was submerged in the water. Then, we filtered 240 ml of ocean water with a syringe filter into a glass filter to obtain samples to test at the Kudela Lab at UCSC.

•Through the dates of 7/15/08-10/15/08 and 9/14/09-11/14/09 the Kudela laboratory in UCSC found there to be *Pseudo nitzschia* bloom.



Santa Cruz Wharf Research Data:

Date	ELISA [extract] (ppb)	ELISA [env] (ppb)	ELISA [env] (ng/L)	LCMS [extract] (ppb)	LCMS [env] (ppb)	LCMS [env] (ng/L)
WATCH						
12/23/2009	0	0	0	2.79	0.06975	69.75
1/7/2010	0	0	0	0	0	0
1/11/2010	0	0	0	0	0	0
1/15/2010	0	0	0	0	0	0
2/5/2010	0	0	0	0	0	0

Field Work

Materials

- 20µ plankton net
- Sample container
- Rope
- Measuring tape
- Syringe
- Glass filters
- Sharpies

After our field work was completed, we took the plankton filtered samples to the Kudela Lab at UCSC to perform a DAP extraction test. There, we processed our filters by doing the following: first, we added 3ml of 10% Methanol to each round-bottom tube second, we placed each filter in an assigned tube third, we cleaned the sonicator tip using a Milli-Q fourth, we started the sonicator at 0. We then submerged the sonication probe into the 10% Methanol with the filter and put the sonication at level 4 for 30 seconds until we had a milkshake-like substance. We repeated steps three, four, and five. Next, we placed a 0.2µm syringe filter to a 5mL syringe. Finally, we poured the milkshake-like substance filter into the syringe barrel where we processed the sample and stored it in a DAP extract at -80°C.

Laboratory Analysis Materials

- 5ml Polystyrene round bottom-tube
- 5ml Cryovial
- Methanol
- Sonicator
- 5ml syringe
- 0.2µm syringe filter

Results

We gathered data collected from water samples at the Santa Cruz Wharf. We ran our samples through Enzyme-Linked Immunosorbent Assay (ELISA) and got all negative results. Addition to that we also ran our samples through a Liquid Chromatograph-Mass Spectrometry (LCMS). Our results varied. The result for December 23rd tested positive for *Pseudo nitzschia*. The LCMS [extract] results indicated a level of 2.79 ppb. The LCMS [env] resulted indicated a level of 0.06975 ppb and the LCMS [env] resulted indicated a level of 69.75 ng/L. The other days we collected data had a result of 0. The table displays our data taken from the samples from the Santa Cruz wharf. In addition to our data, we present data collected in previous years by the Kudela Lab at UCSC.

Acknowledgements

Monterey Bay Aquarium Staff:

Amy Gunzelman
Kim Swan

UCSC Ocean Science Department:

Raphael Kudela
Kendra Hayashi

MBARI:

George Matsumoto

Pajaro Valley High School Advisors:

Gary Martindale

Special Acknowledgement to our

Main Advisor:
David Benham



Literature Cited

Central & Northern California Ocean Observing System.
CeNCOOS. 25 Jan 2010
<<http://www.cencoos.org/sections/classroom/index.html>>

Channel Islands Marine and Wildlife Institute. 2006 CIMWI. 20 Dec 2009
<http://www.cimwi.org/stranded_domoic.html>