

PLANKTON NEWS

THE NEWSLETTER OF THE VOLUNTEER PHYTOPLANKTON MONITORING NETWORK

Volume 7 Issue 1

The White Princess

Join the PMN as we follow the journey of Mike and Dawn Dorsett as they prepare to leave Trinidad and Tobago for a cross Pacific adventure aboard their sailing yacht, the "White Princess." Mike, born in Nigeria, and Dawn, born in the U.K., met while diving in a flooded quarry in England in 2002. They got married later that year, built a boat, and just completed a world circumnavigation this past October when they returned to Barbados.

Both Mike and Dawn are avid scuba divers with a passionate interest in the marine environment. On reaching the Mediterranean in 2002 they were shocked at the deterioration they found, and learned that the causes were a combination of over fishing and pollution. As they sailed the Pacific, many of the shallow reefs were bleached, including much of the Great Barrier Reef. On their second Atlantic crossing they noticed a distinct lack of mature fish and plankton-eating species.

This led us to want to do something about it, and not having a lot of funds, we were looking for an organisation that could use volunteers and utilize our skills and facilities. It was in Barbados that a marine biologist put us in contact (with) NOAA and the PMN.

Our intentions are to cross the Pacific collecting specimens and monitoring phytoplankton and passing our results back to the PMN. We also hope to contact schools on the islands as we travel around, and give talks to the children to advise them of what we are doing. Many of the islanders have been introduced to western technology but know nothing of its hazards and the damage it can do to the environment, so education here is important. We hope that this way we can give back a little to the Island people in the Pacific and help them to understand their environment better.



The White Princess

The PMN looks forward to following the White Princess's journey across the Pacific. Keep an eye out for upcoming web blogs and newsletter updates on what kind of phytoplankton Mike and Dawn have found and the outreach they have been doing along their journey. If you have any questions for Mike and Dawn as they make their trek across the Pacific, please send them to Jeff Paternoster at jeff.paternoster@noaa.gov.

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Dominican Bound: Spirit of SC Collects Offshore Samples for the PMN

As 18 students from Porter Gaud, an independent school in Charleston, SC, sail towards the Dominican Republic this winter, they will be collecting offshore phytoplankton samples for the PMN. This group of students is traveling to the Dominican Republic where they will assist Charleston-based, non-profit Water Missions International (WMI) with the installation of a water purification system in the village of Mosovi. While onboard the Spirit of SC the students will be learning about human ecology through the study of water quality and its global impact. The collection of phytoplankton will serve as one part of this curriculum. Thanks go to the crew of the Spirit of SC and the students of Porter Gaud for their assistance in collecting samples.

From The Desk Of Dr. Morton

It has been another exciting time at the PMN office since the last Plankton News. The program is approaching an important milestone with the 150th sample site. It is hard to believe the growth of this program in the last 8 years! Thanks again for all your support to keep this program alive and going.

Since the last newsletter, I had the opportunity to present an oral research paper at the [13th International Meeting on Harmful Algae](#) which took



Dr. Morton presenting the oral research paper

place in Hong Kong. My presentation was on the blooms of *Ceratium furca* occurring in American Samoa and the linkage with nutrient input and land usage. This work was highlighted in past issues of the Plankton News. Hong Kong was an outstanding venue for this meeting; approximately 400 scientists from around the world attended with meeting. A presentation of note was by Dr. Rita Horner. Dr. Horner presented data on the volunteer monitoring effort in Washington and how this effort interfaces with the PMN. During the meeting I had a chance to meet with Dr. Anbiah Rajan of the United Arab Emirates to discuss a greater collaboration between his program and NOAA. I am currently working with Dr. Rajan on monitoring HABs in the Arabian Gulf.

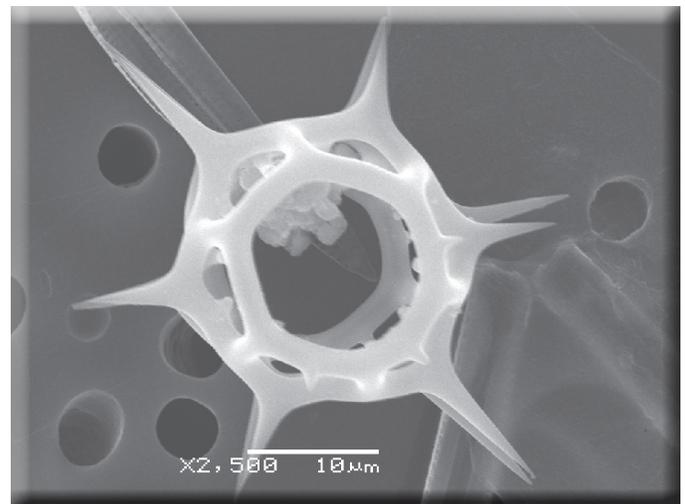


Dr. Morton in Hong Kong

During December through January, a large bloom of *Gymnodinium catenatum* was observed throughout most of the southern Arabian Gulf. *G. catenatum* is known to produce saxitotoxin and related congeners which causes Paralytic Shellfish Poisoning (PSP). This bloom was followed by a larger bloom of *Cochlodinium*. I am currently working with Drs. Don Andersen and Mindy Richlen of [Woods Hole Oceanographic Institute](#) on the taxonomy and systematic of this *Cochlodinium* bloom.

Dictyocha Bloom on the Alaskan High Seas

It was a sunny day in August with flat calm water as Cindy Wyatt and her two children, Morgan and April, towed the phytoplankton net through the sparkling green ocean. They were boating on the east side of Cape Bartolome near the Prince of Wales Island in Alaska. On this warm Alaskan day, the children were on the back of the boat having water wars, something which Cindy says “does not happen often during our southeast summers.” During the fishing season, the Wyatt family lives on the boat for weeks at a time, so they preserve each sample with Lugol’s. Upon their return home and further investigation of the August 21 sample, they found 200+ *Dictyocha* spp. cells on the gridded slide. The PMN Staff requested that a sample be sent for further analysis, and after observing in the Scanning Electron Microscope it was determined that the Wyatt family had found a *Dictyocha* bloom. *Dictyocha* is a silicoflagellate that is often considered a living fossil. This genus does not produce toxins, however fish kills have been associated with blooms due to anoxic conditions. This unique organism is most frequently observed during the life stage that produces a siliceous skeleton (as seen in the photograph). Good work Wyatt family, and thank you for all of your offshore efforts!



Dictyocha spp.

Visit the [Resources](#) page on the PMN website to see an archive of past phytoplankton in the spotlight.

Feel free to suggest a phytoplankton for spotlight.

This newsletter is published by the Volunteer Phytoplankton Monitoring Network

For more information or to submit an article, contact Jeff Paternoster at 843-762-8657 or jeff.paternoster@noaa.gov

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Basic Observation Buoy Workshop

The brain child of Dr. Doug Levin, BOBs (Basic Observation Buoys) were born out of his passion for sharing real-world science with students and teachers. After a conversation with Dr. Steve Morton about ways to collect higher resolution water quality data, Doug was interested in filling



Participants viewing the sample BOB

the gaps by developing a low-cost observation system that could be built and launched by students. It was from this idea that the Director of the Center for Ocean Sciences Education Excellence (COSEE) SouthEast, Dr. Lundie Spence, decided to bring together experts in the field to fine-tune the BOB design. On January 29 and 30 this workshop was held in partnership with Skidaway Institute of Oceanography (SKIO), COSEE – SouthEast and the National Oceanic and Atmospheric Administration (NOAA). Twenty-one participants included the University of North Carolina – Wilmington’s Marine Quest program, University of North Florida, Kennesaw State University, Grays Reef National Marine Sanctuary, Jacksonville University, Beaufort High School, University of Florida, SKIO, NOAA, Savannah State University, DownEast Instruments, and the Southeast Coastal Ocean Observing Regional Association (SECOORA).

The group was challenged with building a buoy in one evening and then launching it the next day. Nine buoys were built and six were outfitted with Pasco sensors. It was through collaborating and sharing ideas that this design has been improved. Working out of the NOAA Chesapeake Bay Office, it is Doug’s hope that this program will soon be available to schools in the Chesapeake Bay region so that data can be collected from the shallow, protected areas of the estuary. The plan is for the data collected to be uploaded to a publically accessible URL. Stay tuned for more information on BOBs!



UNC-W Marine Quest deploying their BOB

To view volunteer reported blooms and where other phytoplankton are being reported, visit the PMN Arc IMS maps at

<http://www.ncddc.noaa.gov/website/SEPMN/viewer.htm>

Wonders of Phytoplankton on the Web

After a stroll on the beach where she encountered Lettered Olives and Eastern Augers, Sharon Mooney’s love for marine life began. “I realized at that moment the wonder of the natural ecosystems around us,” which led Sharon on a mission to expand her knowledge about ocean life. After attending Westwood College of Technology for multimedia, this Holden Beach, North Carolina resident applied her skills in photography and online publishing by developing an online blog about her aquatic experiences. In 2003 she became fascinated with microscopy and in 2007 Sharon tapped into a fantastic resource for information on marine species, Terri Kirby-Hathaway. Terri, a Marine Education Specialist with N.C. Sea Grant, suggested to Sharon that the Phytoplankton Monitoring Network was the perfect outlet for her curiosity. It was then that Sharon was formally introduced to the world of diatoms and dinoflagellates and her blogging adventure began.

Sharon enthusiastically talks about her website and the “twenty to thirty blogs focusing on individual dinoflagellates, diatoms, aquaculture and the sea shells of N.C.” With several hundred video clips stored on her computer, Sharon is eager to transfer them to the web where they might be of use to students and educators. Producing media that is educational is her top goal so that resources can be provided for her “favorite target audience: young curious minds interested in marine science.” One video clip can take several hours to edit so Sharon has her hands full!

As Sharon fine tunes her skills, she looks for the “rare opportunities to capture an organism on the move, leaving no question as to what the organism looks like from all possible angles.” She enjoys learning and understanding more about her own complex physical composition by understanding a single cell. When asked what her favorite phytoplankton are and why, she chooses a fairly common group. “*Coscinodiscus* remains my favorite phytoplankton due to its beauty and diversity. On occasion I’ve captured the diatom as it was pulled in a light water current, flipping along revealing its three dimensional shape. At other times, when the light is right, *Coscinodiscus*’ delicate beauty comes through.” It is with this appreciation and eye for beauty that provides us with Sharon’s magical images.

Sharon’s blog can be found at <http://coscinodiscus.blogspot.com>. She would like to give special thanks to Edward Babinski (Furman University) and Dr. R Norman (University Michigan-Dearborn (emeritus)) for their support.

South Carolina PMN Volunteer Groups Working as a Team

As the Phytoplankton Monitoring Network expands across the coastal United States, multiple volunteer groups are found in close proximity to one another. This occurrence provides the perfect opportunity for collaboration and team work between already established groups and those just getting off the ground. This type of alliance has been very beneficial for two PMN groups on Pawleys Island, South Carolina. A seven year veteran of the PMN, Cathy Smith has become an authority at phytoplankton monitoring and identification. She represents the [Grand Strand Master Gardeners Association](#) and leads her volunteer group of five in the bi-weekly sampling of three sites: North Pawleys Island, South Pawleys Island and Hog Inlet.

It is with Cathy's dedication and experience that she was asked to mentor the [Pawleys Island Montessori](#) school group in their participation in the PMN. Sarah Wilson, the Montessori teacher supervising her students' participation in the network, cherishes the support that Cathy provides. "Cathy has been instrumental in the students learning how to search the slide, identify the plankton and record the information they find." Grace Miller, a fourth grader, says "Ms. Cathy is very nice because she comes in every Tuesday to help us. She is very good at identifying plankton. She's a natural!" Sometimes the students get stuck on an unfamiliar phytoplankter... "Ms. Cathy is good help when we see a plankton not on our list. She can identify what we can't," says fifth grader Wil Riley. It is during her Tuesday visits that Cathy's enthusiasm provides these students with the support and encouragement they need to stick with it.

The students are not the only ones who have gained from this partnership. Cathy explains "it has given me a greater appreciation for what we volunteers do and how we fit into this larger network of monitoring. Not only am I able to monitor phytoplankton myself, but I'm able to pass that knowledge along to a new generation. It keeps me on my toes since I'm the "expert" in the classroom." And this transfer of knowledge has provided the students with a greater enthusiasm for how they play a role in monitoring the health of the ocean. Sarah Wilson hopes that this will instill civic responsibility that could last throughout their lives.

Other areas of enrichment for the students include having a better understanding of genus and species, improving their vocabulary and appreciating the size of microscopic animals and plants. "They are fascinated with the concept of such small organisms living in the water in such large numbers," states Sarah Wilson. Fourth grader Justin Busby says "I've learned that it takes patience to look in the microscope and you won't see everything you want to see." Cathy Smith has been the key to helping the students understand that it takes practice to learn and record what is found in the water sample.

Cathy comments on how winter is a good time for the students to start observing phytoplankton in small quantities and it has helped them to recognize species much faster. "I keep telling them 'just wait until warm weather, you'll wish you were back in winter weather.'" These low numbers have helped the students focus on species individual characteristics. "I really like finding the plankton that move or have crazy spines. I especially like finding the *Bacillaria* which moves like an accordion." It is with these young eyes and eager minds that Cathy can share her love for phytoplankton and passion for protecting the oceans. Her impact will encourage continued curiosity and stewardship for years to come.

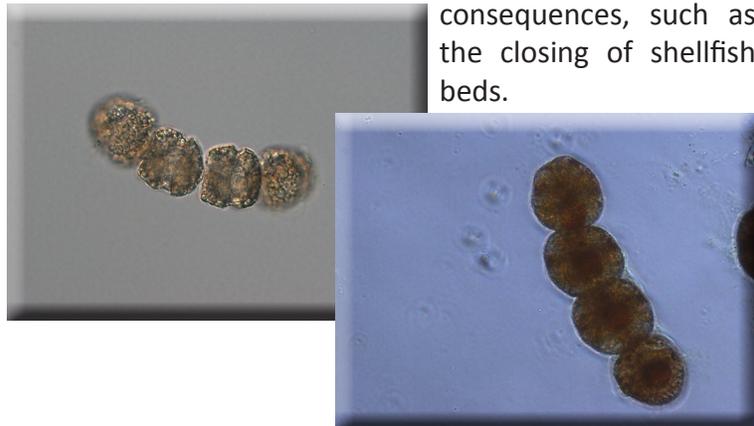


Species Spotlight: *Gymnodinium catenatum*

Belonging to the genus *Gymnodinium*, *Gymnodinium catenatum* is a green-brown, bloom forming dinoflagellate found in temperate waters worldwide in North America, Europe, Australia, Japan and most recently Abu Dhabi, United Arab Emirates. Sometimes confused with *Gyrodinium impudicum*, *G. catenatum* has morphological variability due to its ability to be solitary, in a vegetative state (cyst cell), or chain-forming. Small-celled and forming up to 64 cells per chain, the chain-forming cells vary in appearance from solitary cells in that the cells are attached anteriorly, resulting in a compression of the cells.

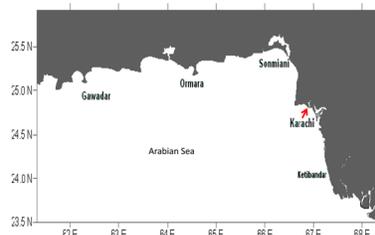
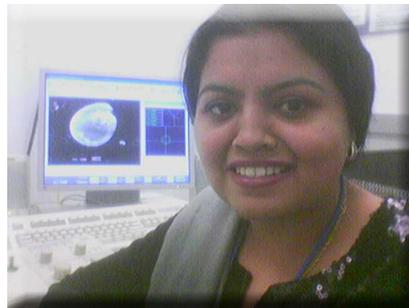
When viewed solitary *G. catenatum* ranges in size from 38-53 μm long and 33-45 μm wide. *G. catenatum*'s hypotheca is larger than its rounded or conical epitheca. It has an apical groove that runs counterclockwise just above the mid-region of the cell and ends in the sulcal region. In addition, *G. catenatum* is observed with a quilted reticulation, has a large central nucleus, and contains chloroplasts.

Interestingly, *G. catenatum* is the only known unarmored dinoflagellate to produce toxins (saxitoxins and gonyautoxins) responsible for causing Paralytic Shellfish Poisoning (PSP). These toxins are released into the food chain when *G. catenatum* is consumed by shellfish such as scallops, mussels, and oysters. These shellfish then become poisonous to humans that consume them. Consequently, victims may experience respiratory difficulties, muscular paralysis, and in extreme cases even death. Other associated events suspected to be a result of PSP are animal mortalities/diseases, ecological impacts, and economic consequences, such as the closing of shellfish beds.



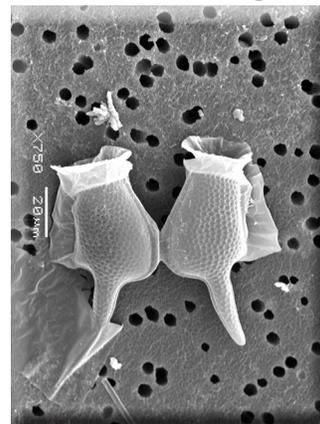
Researcher from Pakistan visits Marine Biotoxins Program

Ms. Sonia Munir from the [University of Karachi](#), started a training internship with the PMN and taxonomy group of the NOAA Marine Biotoxins Program. Sonia is a Ph.D. from the Centre of Excellence in Marine Biology, University of Karachi, Pakistan.

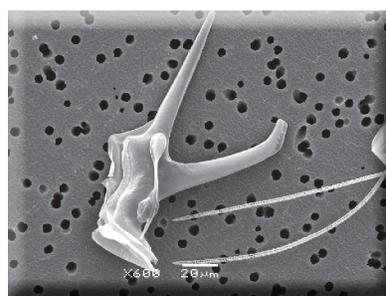


Sonia received a Higher Education Commission grant from the Pakistani governments to study under the guidance of Dr. Morton. At the Marine Biotoxins Program,

Sonia will learn advanced microscopy techniques such as scanning electron microscopy required for the identification of dinoflagellates. Sonia's research is focused on the ecology and taxonomy of dinoflagellates from the Northern Arabian Sea. The Arabian Sea is well known for upwelling and a distinct monsoonal season. Sonia's study will be the first comprehensive examination of dinoflagellates from this location.



Dinophysis caudata



Dinophysis miles

in her samples, a number of dinoflagellate has been identified for the first time in the Indian Ocean; some of these are species restricted to tropical waters such as the unusual *Dinophysis miles*.

Schedule a PMN Training

Please check the on-line [PMN training calendar](#) for available dates and email your state's contact person to reserve the day and time which works best for you.

Please be patient with PMN as Jeff's transition to Program Coordinator and the hiring of an outreach specialist takes place.

From the Field: Amanda Dewey, Teacher at West Hawaii Explorations Academy

We were out on the dock at the harbor pulling the net through the water and ended up seeing 2 Hawaiian Green Sea Turtles swim right up to us, they were very curious about the net. This is pretty common, but the next part isn't! So we're checking out the turtles and one of the students yells, "what is that thing swimming under the dock?" We all looked and it was a 7 foot Hawaiian Monk Seal! We all ran along the side of the dock to watch it and it popped it's head above water and took a long stare at us from about 5 feet away! I have been snorkeling and diving here for 9 years and have never seen one, it was amazing and the students were speech-less! Unfortunately, we didn't get a picture of the Monk seal but the memory is burned into our hearts and minds!



PMN volunteers from West Hawaii Explorations Academy

We're having wonderful plankton trips and it gets the kids even more excited about this project!

What Does The Phytoplankton Monitoring Network Mean To Allison Sill?



"I immediately think of you, the eager volunteer. This program exists only because of your hard work and dedication to learning more about the health of the ocean. Thank you for your curiosity and willingness to discover more about this important microscopic world. My past two years with the program have been very rewarding as I have traveled from coast to coast and watched you sample, identify and proudly submit your findings. You asked challenging questions and offered up ideas on how we can improve. Thank you for all that you have done and all that you continue to do! In mid-April I will be leaving as Program Coordinator for the PMN. As my spring trainings come to an end I must say it will be tough to leave a group of citizen scientists that work tirelessly to make this research project so successful. I am off on an Alaskan adventure for three months and upon my return to Charleston this fall, I will teach 5th/6th Grade Science at Ashley Hall. I really look forward to sharing my passion and enthusiasm for the marine environment with students and colleagues. And yes, I do plan to put them to work for the Phytoplankton Monitoring Network!"

The PMN thanks Allison for all her hard work and wishes her much success in her future endeavors.

Submitting Images to PMN

If you have identified or unknown phytoplankton images, PMN would love to see them! Please include a proper cite for the image(s) in your email to Jeff Paternoster (jeff.paternoster@noaa.gov).

PMN Image Use

If there are any PMN images you would like to use, please contact Dr. Steve Morton at 843-762-8857 or steve.morton@noaa.gov for the proper procedures for image use.

Please feel free to contact PMN staff regarding any questions about the Phytoplankton Monitoring Network.

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