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National Shellfisheries Association Quarterly Newsletter

2016 (4)

President's Message



As 2016 winds to a close I've come to the full realization that I am a 'science' junkie and a 'news' junkie. So that really makes me a 'science news junkie'. My addiction to science news is currently fueled (or excused?) by the introductory

biology courses that I teach to our Biology majors here at the University of Dayton. I am always in search of new and different ways to engage my students in the topic so that they don't just think of our discipline, or any discipline, as a static effort that is limited to the pages of a textbook. There are many, many exciting things going on in the shellfish scientific world that are novel and exciting. I want to share some of the shellfish science news stories that have made me think outside my disciplinary box – if want more details just send me an email (Karolyn.Hansen@udayton.edu). In no particular order, here are some journal articles that caught my attention:

-The shell of the window-pane oyster is tough, fracture resistant and transparent. While the basic biology is really cool, the potential for development of tough armor and photonic materials is the exciting aspect (*Nature Materials*).

-Disco clams live in crevices and small caves on Indo-Pacific coral reefs. They are called disco clams since they flash light when predator and/or prey are nearby – but how? They have a layer of silica spheres localized in the mantle that renders it reflective and adsorptive and they can modulate the flashing by curling of the mantle tissue. This is a form of structural coloration rather than pigment coloration. Moreover, they can control the rate of flashing, hence the disco name – how cool is that? (*Journal of the Royal Society Interface*).

-Detecting potential *Vibrio parahaemolyticus* contamination in shellfish product is essential. Researchers are now patenting a rapid multiplexed PCR assay to easily identify Sequence Type 36 (ST 36) *V. parahaemolyticus* in shellfish. This technology will help protect both consumers and growers on essentially a real-time basis (*Journal of Clinical Microbiology*).

-Many of you are familiar with the decades-old Mussel Watch Program for monitoring water contamination. How about a millennium-spanning clam study that traces the chemical composition of the North Atlantic ocean? Using the long-lived quahog as a proxy for ocean chemistry researchers have identified a disruption around 1800 A.D. – while solar activity and volcanic eruptions were drivers of ocean chemistry (and hence climate) pre-1800, they postulate that the industrial revolution became

the driver of ocean chemistry. Instrumental recordings only date back approximately 100 years – the sturdy quahog has that beat by an additional 900 years (*Nature Communications*).

-Spiny oysters eat lucinid clams as part of the diet. But what makes lucinid clams unique – they have symbiotic chemosynthetic bacteria--in the photic zone where most organisms are photosynthetic. Using isotopic analysis, researchers estimate that chemosynthetic bacteria comprise approximately 20% of the spiny lobster diet. Which mean that chemosynthesis contributes to a \$450M fishery. But the most interesting aspect of this story is that the discovery was serendipitous. A Bahamian marine researcher was getting married in the UK and had various shells flown in for some home-town décor at the wedding as well as spiny lobster for the dinner. A scientist attending the wedding remarked about the lucinid clam-chemosynthetic bacteria symbiosis. The groom followed up with a research project that elucidated the clam/bacteria as a spiny lobster dietary component. Now that is really doing what you love (*Current Biology*).

-OK, just one more – and I saved the wildest one for last. It is well-documented that molluscan shell is composed of mineral and organic matrix. In a brilliant application of bio-inspiration, researchers used molluscan organic matrix as a conductive scaffold for building supercapacitor electrodes for energy storage (*ACS Applied Materials and Interfaces*). Wow!

Maybe now you better understand the extent of my science news addiction. The stories mentioned here represent just the tip of the iceberg regarding the impact of shellfish in our world, ranging from basic biology to applied technology. I didn't mention ecosystem services, functional ecology, commercial fisheries, or many other areas where shellfish play a critical role. Fortunately we have an excellent opportunity to explore a wide variety of shellfish research at the upcoming 109th NSA Annual Meeting to be held March 26-30, 2017 in Knoxville, Tennessee (see info in this *Newsletter*). Please join us and explore the wide variety of topics that are on the schedule – I'll be the science omnivore hopping between sessions and trying to take it all in. Hope to see you there.

Karolyn Hansen, President

In this issue:

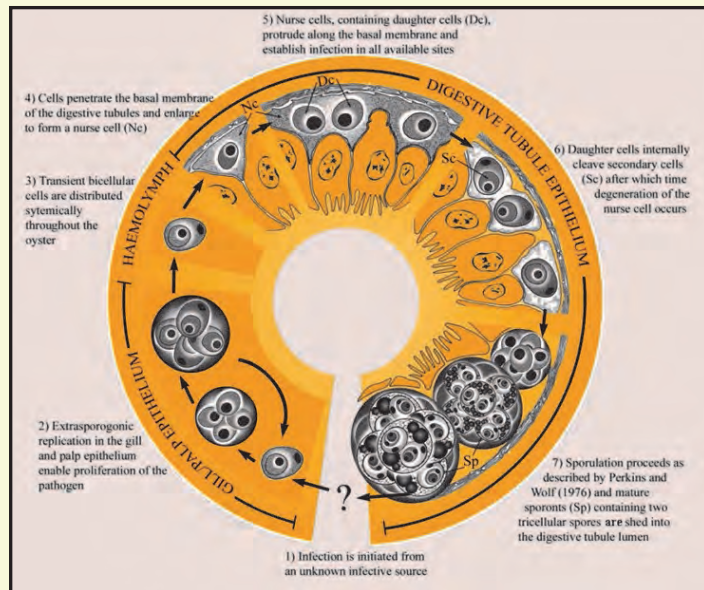
- ***A Shellfish Disease Database Over 20 years in the Making***
- ***18th International Conference on Shellfish Restoration***

A Shellfish Disease Database Over 20 years in the Making

The shellfish aquaculture industry continues to grow to sustain food supply at both local and global levels. One of the realities of the industry expansion is the need to understand the diseases and parasites that affect shellfish. As a scientist, an industry member, an educator, or a policy maker, it is important to have access to a database on shellfish disease. Luckily, such a resource exists.

The Canadian Department of Fisheries and Oceans (DFO) is the platform for the website, *Synopsis of Infection Diseases and Parasites of Commercially Exploited Shellfish*, which is currently the most extensive and easily accessible guide to shellfish disease of the world.

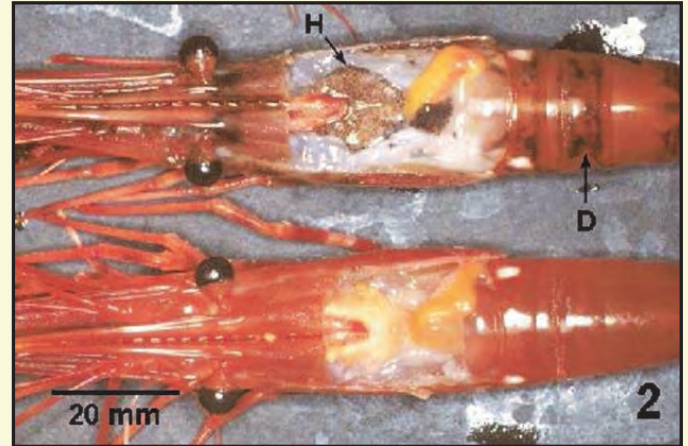
From the remote reaches of British Columbia in a small coastal community, Kyuquot, Dr. Bower continues to update the website 20+ years after it was first posted online in 1996. Dr. Bower started her graduate work in blood parasites in fish and conducted her Ph.D. research on haemoflagellates in bats. After a post-doc studying haemoflagellates in salmon at the Pacific Biological station (DFO) in Nanaimo, BC, she obtained a position at that institute researching shellfish diseases in the west coast of Canada. There was little known about the subject there and Canada had begun updating its shellfish health regulations and they needed scientists to researching the diseases.



At a conference in the early 1990s, Dr. Bower met Dr. Sharon McGladderly (on the east coast of Canada) and Iola Price (at DFO headquarters in Ottawa, Ontario) to create a synopsis of all the shellfish diseases they knew of and published it in the *Annual Review of Fish Diseases* in 1994. To keep up with the global increase in knowledge on shellfish diseases, the Canadian government decided to update and post the information in an electronic format on the world wide web. The updating process has been Dr. Bower's side project ever since and was eventually translated into French in compliance with the Canadian commitment to bilingualism.

Some particularly fascinating organisms in the data base include the Mikrocytos, intracellular protozoans found all around the world in various shellfish species. One of the most captivating questions left to answer is how they are transferred from host to

host, as they have no observable spore stage. This is a fundamental question to understand how the disease spreads. Protozoa in the genus *Perkinsus*, which some readers may know from the eastern oyster (*Crassostrea virginica*), includes several different species, though it is unclear whether they are all different species or simply strains. A critical question regarding *Perkinsus* on the west coast of Canada is with regard to the original source of their introduction and whether they have a reservoir during times of low abundance in shellfish.



Dorsal view of two fresh *Pandalus platyceros* with the cuticle removed exposing the internal organs of the cephalothorax. The upper specimen is infected with stained prawn disease showing a black pepper-like stippling on the surface of the hepatopancreas (H) and the dark discoloration (D) along the cuticular segments of the abdomen, in comparison to the bottom specimen which is healthy.

One of the most impressive aspects of this database is that so much of it is original work by Dr. Bower. She only uploads photos on the database that she has taken in the lab or were provided by colleagues. Collaborators are very welcome, she says, and if someone wants to create a lead page, they would obviously be properly credited as the author of that page. One area that the website really needs updates in are viruses, especially crustacean viruses. They have been put on the backburner because the farming of crustacea is currently not a viable industry in Canada. The more knowledge the website can compile, the greater help it can be to anyone who wants or needs to learn more about shellfish diseases.

If you have something to contribute to the website, feel free to email Susan at susan.bower@dfo-mpo.gc.ca

Synopsis of Infection Diseases and Parasites of Commercially Exploited Shellfish: <http://www.dfo-mpo.gc.ca/science/aah-saa/diseases-maladies/index-eng.html>

Skylar Bayer



NSA Pacific Coast Section News

Greetings from the Pacific Coast!

The 70th annual meeting of the Pacific Coast Section of the National Shellfisheries Association (NSA-PCS) was held in Chehalis, Washington, in October in conjunction with the Pacific Coast Shellfish Growers Association (PCSGA). The venue provided a beautiful (though cold) backdrop for academics, industry, government agencies, tribal representatives, and environmental organizations to share knowledge and experience. The NSA-PCS sincerely thanks the shellfish industry and the Conference Planning Committee (especially Margaret Barrette, Connie Smith, Becky Mabardy, and CJ Phipps) for making this annual joint conference a great success. Over 300 people registered for the conference, of which about 20% were NSA members!

Sean McDonald opened the conference with a fun and educational talk about how to use Twitter. The keynote speaker was Julie Qui, a social media blogger with a passion for oysters. Julie impressed us all with her blog statistics, including over one million views of an oyster shucking video. She also highlighted the importance of quality over quantity in social media posts. Bill Mook (Mook Sea Farms, Maine) was the second participant in the John Lentz Profiles in Innovation Speaker Series. Bill spoke about his experiences on the Damariscotta River, running a hatchery, and growing oysters. He has seen first-hand the effects of ocean acidification and issued a call to action for climate change. The keynote speakers were followed by Gary Wikfors (NOAA), who provided an excellent review of shellfish research at the Milford Lab, and Susan Bunsick (NOAA) who gave an overview of shellfish aquaculture permitting at the federal level. The lunchtime speaker, Cynthia Nims, got everyone ready to eat as she shared photos and stories from her recently published 'cookbook' (aka oyster porn) titled "Oysters, Recipes that Bring Home a Taste of the Sea."

The rest of the conference was composed of informative concurrent sessions on topics including regulations/permitting, best management practices, emerging species, shellfish initiatives, broodstock development, seafood safety/traceability, ocean acidification, shrimp management, wild stock management, shellfish culture/habitat interactions, and public engagement. A few dynamic workshops and discussion sessions focused on shellfish health, crisis communication, and the ever popular 'Down on the Farm'. This was also the first year that the conference featured 'Shellfish Shorts', five minute talks presented with 20 automatically-advancing slides. This popular format allowed a large amount of information to be conveyed in a very short time. Also of note, early in the morning on the final day (after much festivity in the hospitality suite the night before) more than 30 participants showed up for the first meeting of 'Women in Aquaculture'—a forum created by Kari Eckdahl and Canon Purdy for women from all parts of the aquaculture community will work together to address unique challenges of this field.

Student involvement continues to be a primary focus of the NSA-PCS mission and funding was provided to support the participation of 13 students at the conference. The 2016 NSA-PCS best student presentation was a tie between Lillian Kuehl (Western Washington University) - "The effect of diet on survival, growth, and radula morphology of *Haliotis kamtschatkana* postlarvae" and Evan Durland (Oregon State University) - "Larval culture of the Pacific oyster *Crassostrea*



Women from the shellfish aquaculture community show up in force for the first meeting of "Women in Aquaculture."

gigas in acidified conditions: comparing laboratory and hatchery environments". Both students received NSA-PCS memberships and \$200. Support for students to attend the meeting was generously provided by the Ken Chew Student Scholarship Fund, as well as contributions from the NOAA Office of Aquaculture, Arcadia Point Seafoods, Chelsea Farms, Chuckanut Shellfish, BioAquatics International, Rock Point Oyster Co., and Whiskey Creek Shellfish Hatchery.

Special thanks go to Pippa Kohn, Ralph Riccio and Molly Jackson for all of their work creating the successful Geo-Duck-Tank fundraising event—imagine hundreds of multi-colored balls being thrown at 'geoducks' (a few brave souls with flower pots tied to their heads) as they try to catch the maximum amount of 'food' (balls) in their 'siphons' (pots). Big thanks also to all those who solicited and donated items for the silent auction, especially the Jamestown S'Klallam Tribe. Proceeds from both events made the meeting a financial success for NSA-PCS and will help sponsor students at future meetings.

At the annual business meeting, elections were held. Current officers are: Chair: Laura Hoberecht (NOAA); Vice Chair: Sean McDonald (UW); Secretary: Philippa Kohn (WA Dept. of Fish and Wildlife); Treasurer: Bethany Stevick (WA Dept. of Fish and Wildlife); and Members-at-Large: 2014-17: David Fyfe (Northwest Indian Fisheries Commission), 2015-18: Julie Barber (Swinomish Tribe) and 2016-19: Chris Eardley (Skokomish Tribe). Many thanks to Kelly Toy for delivering food and beverages to the meeting.

The 2017 NSA-PCS/PCSGA annual conference will be held September 17-21, 2017, in Welches, Oregon. The call for 2017 abstracts will open April 1, with titles due May 1, and full abstracts by June 30. Please let us know early if you have an idea for a special session. As a reminder, the NSA-PCS Twitter feed and Facebook page are your best resources for news and information about the PCS and our events and annual meetings. Don't forget to follow NSA-PCS on Twitter (@nsapcs) or on Facebook: <https://www.facebook.com/pages/Pacific-Coast-Section-of-the-National-Shellfisheries-Association/1438569826443936>

Laura Hoberecht
PCS-NSA Chair

Recruits' Corner

Hello, Recruits!

Registration for the 109th annual meeting is still open! The meeting is March 26th-30th in Knoxville, Tennessee. Visit the NSA website for meeting highlights, including the special sessions that are being planned (www.shellfish.org). As you all know, student volunteers are a big part of the meeting's success and we will be counting on your help to make this meeting happen.

EARLY REGISTRATION FOR STUDENTS ENDS MARCH 1ST. There is no reason to wait until the last minute. Go to the NSA website to register today!

The annual meeting is a great opportunity for students to expand professional networks and learn about the cutting edge research happening in the world of shellfish. There are many student-specific activities planned for the meeting, including the student breakfast, the Recruits-only happy hour, and the return of the scavenger hunt! There are great prizes for the scavenger hunt this year, so be sure to get involved early on. Other activities include the opening seafood President's Reception to start the meeting off, happy hour poster sessions, the Scallop Gallop (our annual fun run!), the annual business luncheon, and the closing reception. Networking is an important aspect of the meeting for students and every effort should be made to attend the social events as well as the sessions throughout the day.

The NSA Recruits play a vital role in the success of the annual meeting. We are involved with on-site meeting registration as well as A/V support for the sessions. Additionally, we are responsible for running the sales booth throughout the meeting. All proceeds from the sales booth go to the Student Endowment Fund, so it is very important the booth is staffed during the entire meeting. We will be putting out a call for volunteers for all of these duties in January and we don't expect to be let down by this batch of Recruits!

We hope to hear from you soon! As always, email Hillary (hlane@umces.edu) or Lillian (lilliankuehl@gmail.com) with any ideas or concerns. If you haven't already, be sure to "Like" the National Shellfisheries Association on Facebook –we'll post meeting updates there as March draws closer. If you are interested in getting involved for future meetings, the Recruits are looking for new student leaders. If you are interested, please email us for more information and insight.

Have a great holiday break and we look forward to seeing everyone in March!

Hillary & Lillian



SEE YOU IN KNOXVILLE

March 26-30, 2017

The abstract deadline has been extended to

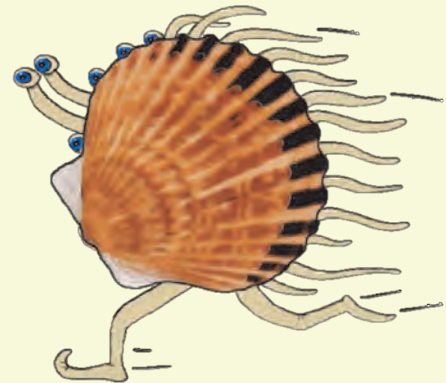
JANUARY 15TH

REGISTER TODAY!

www.shellfish.org

The Scallop Gallop

NSA 5K in Knoxville



For more information and to sign up contact Lewis Deaton:

led9784@louisiana.edu



18th International Conference on Shellfish Restoration a Success

Conference brought together a diverse group of researchers, shellfish growers, and community restoration leaders.

The closing of the May River oyster beds for the first time due to pollution concerns in 2009 stunned the community of Bluffton, South Carolina, and started a movement similar to several discussed at the 18th International Conference on Shellfish Restoration (ICSR'16), organized and hosted by the S.C. Sea Grant Consortium.

"Oysters are our bald eagle," said Kim Jones, the town's Watershed Management Division manager and a keynote speaker. "This is our rallying cry. When those beds closed, there was darn near a riot. Our community cares about this river."

The closure prompted community leaders to come together and create the May River Watershed Action Plan. Following the recommendations in that document, the town has begun to decrease polluted runoff. Yet the oyster beds have been opened and closed several times in recent years, emphasizing how much work still needs to be done.

Community efforts to restore shellfish beds were one focus of ICSR'16, held November 16-19, 2016 in Charleston, South Carolina. The theme this year was "Celebrating and Inspiring Healthy Coastal Communities." Over 130 attendees heard presentations by researchers, shellfish growers, community leaders, and restoration specialists from nearly 20 states and nine countries.

"Shellfish restoration is a growing enterprise around the world, the nation, and here in South Carolina," said Rick DeVoe, Consortium executive director and conference co-chair, who served along with co-chairs Dot Leonard of Ocean Equities LLC and Julie Davis of the Consortium. "Together with our partners and sponsors, we recognize through ICSR the efforts of many restoration practitioners to whom we look for knowledge and advice."

Among the other community-based efforts featured were the Billion Oyster Project (New York); ReClam the Bay (New Jersey); Lynnhaven River Now (Virginia); From Seeds to Shorelinesm salt marsh restoration project (South Carolina); South Carolina Oyster Restoration and Enhancement program; Galveston Bay Foundation (Texas); and The Watershed Project (California). Though each takes a different approach, the common bond is making the work fun and accessible to increase

public participation while enhancing shellfish resources and the ecosystem functions they provide.

Scientific and policy presentations included the impact of the El Niño weather pattern on growing conditions; the best methods for seeding shellfish beds in various parts of the world; using science to quantify ecological, social, and economic impacts of a restored oyster reef; local government land-use planning and zoning authority; and the success of using concrete oyster castles, reef balls, and repurposed crab traps as shellfish reef substrate.

The international aspect of the conference was emphasized as opening day keynote speaker Tristan Hugh-Jones of Atlantic Shellfish Ltd. explained the challenges of breeding oysters in ponds in Ireland. New Zealand researcher Tom McCowan from the Paua Industry Council Ltd. switched gears from his original presentation to discuss the impact of the recent earthquake that raised abalone beds above sea level near the community of Kaikoura. Keynote speaker Tom Ysebaert of Wageningen University and Research spoke about the diversity of shellfish beds in The Netherlands. Junemie Lebata-Ramos of the Southeast Asian Fisheries Development Center presented her research on restoring abalone population through family-based grow-out culture in reef flats.

At the Wednesday evening networking event, shellfish growers from North Carolina and South Carolina shucked and prepared their products for attendees to taste. The participants also gathered on Friday night for an oyster roast at Bowens Island Restaurant near Folly Beach. Exhibits were set up during the conference by Reed Mariculture, Inc., Reef Innovations/Reef Ball Foundation, Riverdale Mills Corp. and YSI. ICSR'16 sponsors were the NOAA National Sea Grant College Program, NOAA Chesapeake Bay Office, seven Sea Grant programs from around the U.S., East Coast Shellfish Growers Association, Interstate Shellfish Sanitation Conference, YSI, The Sea Pines Resort, Hoopers Island Oyster Aquaculture Company, and Riverdale Mills Corp. For more information, including the conference program and abstracts, visit www.scseagrant.org/icsr.



PCSGA — *Ecosystem Services* *Photo Competition* *Next Deadline: January 15th*

Submit your own photo and win a cash prize!

Capture an example of ecosystem services and submit it online. All submissions will become the property of PCSGA and will not be returned. Photos will be posted on the PCSGA website and Facebook page – and may be reprinted for use in promotional, research and/or marketing material.

A \$100 prize will be awarded each month to the photo that best illustrates ecosystem services. In addition, 1st, 2nd and 3rd place overall winners will be awarded prize money totaling \$1,000 at PCSGA's Annual Conference! You do not need to be present to win.

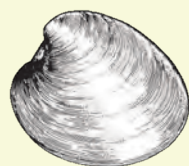
Submit your photo via email to conniesmith@pcsga.org by the 15th of each month. Submissions must include: **Name, mailing address, and a brief 1-2 sentence explanation of ecosystem service illustrated in your photo.**



August 2014 Winner Nicole Gilmore, Bellingham, WA submitted this photo of sponges using clam nets for habitat.



Help tell the Shellfish Farming Ecosystem Services Story with Your Photo



HELP SUPPORT NSA

Are you planning to attend a conference in the near future? Why not plan to support the NSA at the same time? You can easily take along some information to distribute, e.g. membership forms, meeting fliers for future NSA conferences, Newsletters, etc. This is an easy and inexpensive way to encourage new members. If you give enough notice, the materials can be sent ahead so you don't even have to carry them. So, if you know of any relevant conferences where materials might be displayed, or are willing to take materials with you (especially helpful if the meeting is overseas), please contact Sandy Shumway to make arrangements.

DON'T FORGET ABOUT THE AUCTION!

Register now: www.ipw2017.com



Working with the local media under his "Hortoon" alias, cartoonist David Horton consistently delivers his fun (and at times slightly dark), nature-oriented vignettes. David has also supported the National Shell Museum in the past, by donating original artwork to be auctioned off at fundraising events and teaching pro-bono cartoon-art classes to children. Check David's portfolio : <http://www.hortoon.com/portfolio.cfm>

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Upcoming Events

Northeast Aquaculture Conference and Exposition:

January 11-13, 2017. Providence, Rhode Island (USA). For more information: www.northeastaquaculture.org

109th NSA Annual Meeting: March 26-30, 2017. Knoxville, Tennessee (USA). For more information, visit: www.shellfish.org

21st International Pectinid Workshop: April 19-25, 2017. Portland, Maine (USA). For more information visit: www.ipw2017.com.

11th International Conference on Molluscan Shellfish Safety: May 14-18, 2017. Galway, Ireland. For more information: www.conference.ie/Conferences

For more information on these conferences:

www.was.org

Aquaculture America 2017: Feb. 12-22. San Antonio, Texas, USA

World Aquaculture 2017: Jun. 27-30. Cape Town, South Africa

Asia Pacific Aquaculture 2017: Aug. 26-29. Johor Bahru, Malaysia

Aquaculture Europe 2017: Oct. 16-20. Dubrovnik, Croatia

Aquaculture America 2018: Feb. 19-22. Las Vegas, Nevada, USA

AQUA 2018: Aug. 25-29. Montpellier, France

Aquaculture 2019: Mar. 6-10. New Orleans, Louisiana, USA

Aquaculture 2022: Feb. 27-Mar. 3. San Diego, California, USA

Aquaculture America 2023: Feb. 19-22. New Orleans, Louisiana, USA

If you would like to announce a meeting, conference, workshop, or publication that might be of interest to NSA members, please contact the *QNL* Editor, LeRoy Creswell (creswell@ufl.edu).