Upcoming Events


Aquaculture America 2023: Feb. 23-26, 2023. New Orleans, Louisiana. For more information: www.was.org


Aquaculture 2025 (Triennial): Mar. 5-9, 2025. New Orleans, Louisiana. For more information: www.was.org

If you would like to announce a meeting, conference, workshop, or publication of interest to NSA members, please contact the QNL Editor, Steven Allen (salen@bowdoin.edu).

President’s Message

Kenneth K. Chew
October 29, 1933 – September 24, 2022

As I look back on my previous contributions to the Newsletter, I see that climate change has been a recurring theme. Let me start this one in the same vein. I just got back from a taxing hiking trip to Marble Canyon, AZ. While there, we spent some time on the banks of the Colorado River and Lake Powell. The lake now contains about 25% of its full volume and if the water level continues to decrease there will be water shortages and rolling power blackouts all across the Southwest. You might want to reconsider retirement in Phoenix. I found some quagga mussel (Dreissena rostriformis) and New Zealand mud snail (Potamopyrgus antipodarum) shells at a boat washing station at Lee’s Ferry, just upstream of the Grand Canyon. Invasive species are everywhere. Here in Louisiana, the low water level in the Mississippi River has stalled shipping and revealed several previously submerged shipwrecks. The low water has raised new discussions about the benefits and negative aspects of diversions of river water into some coastal marshes to reclaim lost land. How all of this plays out (along with sea level rise) in the next twenty or so years will be quite interesting.

Meanwhile, the NSA moves forward. I am anticipating a fine annual meeting next March in Baltimore. It will be my final one as your President, and I would like to thank the other officers, members of the Executive Committee, the staff, and our membership for the privilege of serving you. The Association will continue to be in capable hands when the newly-elected officers assume their duties. The staff of the NSA deserves special recognition in that they have managed rescheduling of both the Baltimore and Charlotte (2024) meetings with aplomb. The JSR and Newsletter were delivered on schedule, as well. Time is growing short for the submission of abstracts for the Baltimore meeting (deadline is 12/15) and you can check out the schedule of special paper sessions and the plenary speakers on our website. There will also be a Scallop Gallop at the meeting, so bring your running or walking shoes. Remember to renew your membership for the year ahead, and round up items for the auction.

Finally, the Awards Committee is exasperated with the paucity of applications from students for the awards that the Association funds. The process is simple, and the NSA has always been extremely supportive of students. I have, however, heard some comments about re-directing some of the funds for the awards since there seems to be so little interest. The ball is in your court, people. With that, I have to get to work on my abstract, and I will see everyone in Baltimore.

Lewis Deaton, President

In this issue:

• Abstract Deadline: December 15, 2022
• New On-line Oyster Aquaculture Business Planning Tool
• Nautilus Population Research
• Shellfish Donations Needed
• Probiotics & Larval Oyster Survival


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National Shellfisheries Association (quarterly Newsletter) 2022(4)
SHELLFISH DONATIONS NEEDED!

Plans are well underway for the 115th meeting in Baltimore and that means we are soliciting seafood donations for the opening President’s Reception – shellfish, crab, shrimp. Whole and shucked product is most welcome. A raw bar may be possible where we can feature individual growers. If not, the hotel chef will perform his magic. If necessary, the conference can cover the cost of shipping product to Baltimore. A big turnout is expected and lots of shellfish needed, so please consider sending your best! All donations support a successful meeting and all donors will be recognized.

Contact Sandy Shumway for details (Sandra.shumway@uconn.edu).

EXCOM Members

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Student Travel Awards

To assist with the costs of attending this meeting, the SEF Student Endowment Fund Committee is supporting great opportunities for graduate student members of the NSA that plan to present their original research.

Student Presentation Awards

The NSA will also be adjudicating competitions for both its Thurlow G. Nelson (Outstanding Oral) and Gordon Gunter (Outstanding Poster) Presentation Awards. The winner of these awards will receive two years membership in the NSA. Graduate students wishing to participate in these competitions should do the following:

- Submit their abstracts by the conference deadline of December 15, 2022.
- Email Peter Kingsley-Smith (kingsleyjohnp@dnr.sc.gov) indicating their wish to compete for one of these awards no later than December 31, 2022. You must include your name, presentation type (oral or poster), and presentation title.
- Ensure current membership status by either joining the NSA or renewing their student membership no later than December 31, 2022.

More information about the travel and presentation awards can be found at: https://www.shellfish.org/esa/student-presentation-and-travel-awards/.

Calling judges! Finally, if you are willing to help judge oral and/or poster presentations by graduate students wishing to compete for the Nelson and/or Gunter Awards, please contact Peter at the email address above.

BalLOTS ARE ON THEIR WAY.

Watch your mailbox!

NEW PAID LIFE MEMBER

Thank you, Tony D’Andrea

Log-in to renew and update your membership status (www.shellfish.org), or contact the Secretariat with any questions (secretariat@shellfish.org)
MEETING REMINDERS

Please consider contributing a film for our NSA at the MOVIES - these presentations will be shown continuously throughout the conference, so you can stop in any time you have a chance. Questions: Eric Heupel (eric@heupel.com)

BOOK YOUR HOTEL ROOM EARLY:
https://book.passkey.com/e/50358179
PLEASE STAY AT THE MARRIOTT - THE CONFERENCE HOTEL.

REGISTER NOW FOR THE MEETING:
https://shellfish.memberclicks.net/annual-meeting---registration

The ABSTRACT DEADLINE is DECEMBER 15, 2022. Submit your abstract now (www.shellfish.org)!

STUDENTS: Remember to enter the lottery for room and registration waivers. DEADLINE is DECEMBER 15, 2022. Download your application now:
Questions: Missy Southworth (melsouth@vims.edu)

The SCALLOP GALLOP will take place under the watchful eye of race organizer President Deaton. Watch for details.

Don’t forget your AUCTION items. Bring them to the meeting or, if you cannot attend, send ahead to Sandy Shumway (address on back of the Newsletter) before March 15, 2023.
Six years ago, the important American journal Science printed a surprising story: “World octopus and squid populations are booming (https://www.science.org/doi/10.1126/science.abp8960).” The first paragraphs of this counterintuitive report (surprising in that all many marine populations are increasing in light of climate change, overfishing, and ocean acidification) even analogized the world’s cephalopod populations to those wild animals that have not only survived, but thrived amid human civilization and cities, such as rats, raccoons, coyotes, and pigeons. Reports from many sites of the global ocean report, in the six years since this surprise, indicate that the numbers of squid, cuttlefish, and octopus continue to enlarge. One reason for this success, according to the 2016 report, was the short lifespan of cephalopods, noting: “Like rodents, cephalopods are highly adaptable to changes in their environment, researchers say—in large part because most species live just one or two years, dying as soon as they give birth. That allows them to respond rapidly to disturbance.”

So much for the “dibranachiate” cephalopods? How about those with four gills rather than two, and hard shells on their backs? What about the cephalopods that are not rapid reproducers with short lives, such as the nautiloids? Enter new observations of the longest lived of cephalopods: the species of Nautilus and Allonautilus.

Unlike other cephalopods, females of the two recognized genera of extant nautiloids, in Nautilus and Allonautilus produce but 10-20 eggs per year. The eggs are large, and more than a year will pass before the hatchlings chew out of their tough eggs and immediately begin the same foraging lifestyle as their mature parents. But it then takes more than 15 years for these newborns to reach reproductive maturity. And as in so many other aspects of reproduction, these nautiloids differ markedly from all other cephalopods, they do not die after first mating, but live at least five more years – perhaps 50 more years. Like so many larger animals of the Mesopiotic Zone (200-800 m), they grow slowly, live a long time, but produce few young each year.

It has not been the search for their flesh that has imperiled the nautiluses and allonautiluses that differ markedly from all other cephalopods, for close to a century been the centers of the nautilus shell trade, and their populations have indeed crashed. But elsewhere, our recent study of nautilus populations suggests a different story. They may be increasing in numbers.

In 2015, researchers from Australia and the United States came to study the nautilus in Ndrova, Papua New Guinea. Ward had last visited in 1984, when he and a collaborator were among the first people to examine a live fuzzy nautilus, a species belonging to a new genus that they later named Allonautilus scrobiculatus. Ward and his colleagues had come back to see if the live fuzzy nautilus and the better-known chambered nautilus (Nautilus pompilius) were still there, and to try out some new research tools.

Ward and his team of researchers attached battery-powered transmitters to several nautiluses to learn more about the animal’s behavior and the surrounding water temperature. Since the two species coexist, the experiment was also a chance to investigate differences in their behavior.

Are Nautiluses Increasing in Population as Commercially Fished Teleost and Cartilaginous Fish Disappear from the Mesopthic Zone?

Nautiluses Increasing in Population as Commercially Fished Teleost and Cartilaginous Fish Disappear from the Mesopthic Zone?

Recruits Corner

Fellow Recruits,

We hope you’ve had an enjoyable fall and are beginning to look forward to heading to Baltimore for the NSA 115th Annual Meeting!

The meeting will be held at the Baltimore Marriott Inner Harbor at Camden Yards in Baltimore, Maryland, from March 26 - 30, 2023. In case you haven’t submitted yours yet, the abstract deadline is December 15th. Students presenting at the conference are also strongly encouraged to apply for Student Endowment Fund Travel Awards. Travel awards are given in the form of either shared lodging or registration waivers and are awarded based on a lottery system. The deadline to apply is December 15th. Students who receive a Travel Award will be expected to volunteer their time during the conference to help with registration, loading talks, or staffing the NSA sales booth. For more information on how to apply check out the NSA website: https://www.shellfish.org/sef-student-presentation-and-travel-awards

Early-bird registration for the Annual Meeting ends January 18th, so make sure to register by then to take advantage of the discounted registration price. On that note, discounts are also available for members of NSA, so make sure to renew your NSA student membership! Memberships run the calendar year and will expire on December 31st.

As always, there will be fun events and activities at the meeting that are just for students. The schedule is still being ironed out but we anticipate bringing back favorite events such as the Mentor-Mentee Breakfast and a student field trip, so watch your inbox and the Student Recruits Facebook page (https://www.facebook.com/groups/2216454881732029) for more details to come!

Please feel free to contact your Recruit Co-chairs with ideas, questions, or concerns!

Hannah and Fiona

hannah.i.collins@uc.edu
fcboard@uw.edu

Preparing Your Poster

Presenting a poster may seem less prestigious than giving an oral presentation, but it is a great opportunity for one-on-one interaction with colleagues to discuss your research.

Read the entire Science article: https://www.science.org/doi/10.1126/science.366.6466.766

Preparing Your Poster

Bright colors and flashy font styles can be distracting to viewers. Focus on the information that is essential to understanding your methods, results, and conclusions.

Use large, clear figures, and brief bullet-pointed text.

Practice your poster presentation in front of colleagues and friends just as you would an oral presentation.

http://www.internationalpectinidworkshop.org
Hello from the West coast, where October felt a lot like August this year. We held the 76th Annual Shellfish Conference of the National Shellfisheries Association Pacific Coast Section (NSA-PCS), September 20-22, 2022, in conjunction with the Pacific Coast Shellfish Growers Association (PCSGA). The conference was held in eastern Washington at the Wenatchee Convention Center in the heart of apple country. This conference was in-person and had about 275 registered participants. It was so nice to see everyone and the conference was a success.

The conference included 48 oral presentations across 13 sessions, and five workshops: Shellfish Producer BMPs and Compliance; Fishing Vessel Safety, Observing Vessel Crew, and Inclusion (JEDI); How Has Climate Change Impacted Your Business?; 2021 Atmospheric Heatwave Impacts on Intertidal Shellfish and Implications for the Future; and Biosecurity: Planning for the Worst — Potential West Coast OShV-1 outbreak. There were 18 vendors present at the tradeshow with the latest technologies in aquaculture.

This year’s conference keynote speaker was Dr. Yoshitaka Ota from the University of Washington. He gave a talk titled, “Ocean Equity – to protect oceans, we need to protect those who live within nature.” The luncheon speaker was author David B. Williams who talked about his book, “Nautilus: A Human and Natural History of Puget Sound.” Both speakers were very enjoyable. This year’s John Lenz Profiles in Innovation Speaker Series was a social hour in memory of the past PCSGA president and friend, John Lenz of Chelsea Farms.

The NSA-PCS provided funding to support the participation of students at the conference. Student participation was low this year compared to conferences in the past. The 2022 NSA-PCS Best Student Presentation award was a tie between Miranda Roethler (University of Washington) and her talk entitled “Effects of Climate Change on Bull Kelp Phytoplankton” and Henry Fleener (Oregon State University) and his talk entitled “Optimizing a Flow-through System for Rearing Bivalve Larvae”. Congratulations to Miranda and Henry. All the students did a wonderful job presenting their research and we look forward to seeing them in the future. Additional support for students to attend the meeting was also generously provided by Arcadia Point Seafoods, Brenner Oyster, Chelsea Farms, Chuckanut Shellfish, Pacific Shellfish Institute, Rock Point Oyster Company, LLC, SEAPA, oceanfarmr, Jorstad Creek Shellfish, Inc., Whiskey Creek Shellfish Hatchery, and National Fish and Oyster. A big shoutout to all the sponsors and the students. I encourage students to think about presenting their research next year and reach out if you have any questions.

The NSA-PCS auction fundraising was done as a hybrid this year, there was an online bidding format with the auction items present at the conference. A big ‘thank you’ to NSA-PCS board members Katie Houle (Pacific Shellfish Institute) and Annie Raymond (Jamestown S’Klallam Tribe) for coordinating both the online auction and items showcased at the conference. The auction was successful and lots of fun. Proceeds from the auction, individual donations, the student fundraiser, and registration fees totaled more than $10,000 this year. This will help the NSA-PCS sponsor more students to attend future events. Thank you to all who donated, participated, and ran those bids up.

The annual business meeting was held during the 2022 conference. There were 20 NSA-PCS members attending the annual board meeting. Elections were held and a new Treasurer and Member-at-Large were voted in: welcome Laura Spencer and Derek Epps. The current board is made up of the following: Chair: Sandy Zeiner (Northwest Indian Fisheries Council); Past Chair: Jodie Toi (Puget Sound); Vice Chair: Sandy Zeiner (Jamestown S’Klallam Tribe); Treasurer: Laura Spencer (Washington University); and Members-at-Large: (1) Margaret Homerding (Nisqually Indian Tribe) (2) Derek Epps (Seattle Shellfish Inc.), and (3) Matt Nelson (Swimomish Indian Tribal Community).

The NSA-PCS Executive Committee held a Zoom meeting on February 14, 2022 to discuss the budget, student volunteers, and the 2022 conference logistics. A post conference wrap-up session with the PCSGA was held on October 10-12, 2022. The 2023 Conference Planning Committee meeting will be held on January 28-29, 2023, in Transylvania, and the 2024 Conference Planning Committee meeting will be held on January 27-28, 2024, in Washington, D.C.

Peter Ward, Professor of Biology University of Washington Ward is also analyzing the composition of nautilus shells to track climbing temperatures in the deep sea, and looking to nautilus behavior to predict how these changes might affect the animals.

Ward believes nautiluses may already be seeking refuge in cooler, deeper water to cope. Below 800 meters, the pressure is enough to make their shells implose. So far, through around Mimas, the nautiluses seem to be adapting.

Back in the lab in Seattle, Washington, Ward analyzed his collection of Ndrova nautiluses—some from 1984, the shell fragments from 2015, and a whole fuzzy nautilus shell he bought in a curio shop in Adelaide, Australia.

With a whole shell, you can take a chunk of any depth—the thin partition between the internal chambers—and the oxygen isotopes trapped within provide a record of the average sea temperature over the month or so the chamber took to form. “So a shell is a 20- or 25-year record of temperature,” Ward says, almost like tree rings. Meanwhile, the tiny samples taken from the shells of 13 living animals in 2015, each provide a single data point—a snapshot of the sea temperature when their last chamber grew.

The results showed the 1975 animals inhabited waters averaging between 12-14°C, while those from 1984 and 2015 lived in temperatures of around 16°C. Ward was surprised the shells offered no evidence of warming water over those three decades, but says it is possible the nautiluses simply moved deeper to stay cool. Since the transmitters the team attached to the animals in 2015 record water temperature and depth, in future sessions of the experiment the living nautiluses may reveal with more certainty how their home might be changing.
Oregon State University Research Discovers Probiotic Combination Drastically Improves Larval Oyster Survival

By: Molly Rosbach, Oregon State University

The survival rates of oyster larvae were significantly boosted by treating them with specific combinations of probiotics, Oregon State University researchers found in a recent study. With only a one-time application, the probiotics also boosted larval growth, metamorphosis and settlement, meaning that in addition to more oysters surviving past the larval stage, they also fared better at transitioning to juveniles and anchoring to shells and other surfaces. The findings could be a major boon to oyster farms where pathogens can kill off a whole season’s worth of larvae, costing hundreds of thousands of dollars at a time.

“The results definitely exceeded our expectations,” said Carla Schubiger, project leader and co-author on the study and an Assistant Professor in the OSU Carlson College of Veterinary Medicine. “Just a 40-50% improvement in larval survival would be huge, but here we have over 80% increased survival at times. That’s very, very significant for the industry. Antibiotics are not allowed in hatcheries, so this will be the first tool they can actually use to increase their production.”

Shellfish are big business in Oregon, and oyster sales account for close to $5 million annually, according to a 2010 report from the Pacific Coast Shellfish Growers Association. In oysters, as in humans, the organism’s overall function depends on help from good bacteria living within the host’s gastrointestinal tract. The goal of the study was to pinpoint which types of these beneficial bacteria were best at fighting off pathogenic bacteria that can kill oyster larvae.

The pathogen, *Vibrio corallilyticus*, is common in marine aquaculture, so oyster farms need a cost-effective way to defend against it. The OSU researchers grew several strains of naturally occurring bacteria and screened them for their ability to fend off *V. corallilyticus* under laboratory conditions. They then selected the strains that performed best against the pathogenic bacteria.

The team grew larvae in water conditions comparable to those used by oyster farms. When the larvae were 24 hours old, they were treated with the different strains of cultivated probiotics, first individually, and then in combinations of the most promising strains. At 48 hours old, the larvae were exposed to *V. corallilyticus*.

The results were striking. Compared with the untreated control group, four of the individual probiotic strains increased larval survival rates by up to 86%.

Fourteen to 16 days later, the probiotics appeared to still have an effect, with treated larvae displaying significantly higher rates of natural settlement and metamorphosis into adolescent oyster spat, along with significantly larger shells than the untreated larvae produced.

The exact mechanism that aided the oysters is unknown, but the improved growth and settlement rates were an unexpected perk on top of the improved survival rates, Schubiger said. “It’s possible that we influenced something very early in their development, like the immune response, to make them do better later in life,” she said.

The research team envisions applying the probiotic treatment as freeze-dried material that can be sprinkled into the larval spawning bucket. Treating the larve so early in their life cycle means they only need a very small amount of material, making the probiotic treatment more cost-effective.

The next steps will be to test a combination with a fourth probiotic and to work on growing the probiotic bacteria alongside the microalgae that serve as the initial food source for the larvae, so the treatment could be integrated into their spawning process from the very beginning, Schubiger said.

The research team included lead author David Madison, formerly of the OSU College of Agricultural Sciences, along with co-authors Spencer Lunda (Carlson College of Veterinary Medicine), Ryan Mueller (College of Science), and Chris Langdon (College of Agriculture Sciences). The study was funded by a National Oceanic and Atmospheric Administration National Sea Grant award and a NOAA Salmonstall-Kennedy grant.

New Online Oyster Aquaculture Business Planning Tool from UMD Extension

The oyster aquaculture industry has grown steadily in recent years. States, like Maryland, that revised their leasing program to encourage investment have seen significant expansion. Advances in hatchery technology, breeding programs, field production and robust business planning have helped that occur. A critical part of starting a new business, or expanding an existing one, is to understand economic forces that can make or break the enterprise. More businesses fail because of poor business practices than any other cause. Critically analyzing these forces at the outset can help make it a success.

We are proud to announce the rollout of the new University of Maryland Extension Online Economic Spreadsheet Tool (OEST), thanks to funding from the National Sea Grant Office and Maryland Sea Grant. This tool allows users to build a complete and robust business plan forecast by entering production cost and revenue assumptions in an online program that runs a Monte Carlo simulation to predict a range of outcomes. Monte Carlo simulations randomly pick values from entered ranges for each iteration of the simulation and consider potential outcomes for good and bad production years. At the conclusion of the simulation, mean values are computed for program outputs to provide the user with minimum, maximum, and most likely outcomes. In this case, the tool will provide reports which can be used for business planning or applying for farm financing.

This tool will be useful for anyone planning a new oyster aquaculture business, considering expanding an existing one, or comparing different financial assumptions of a currently operating business for both on-bottom and water column applications. The tool contains the option to input financing terms for up to three separate loans allowing farmers to evaluate the impact of borrowing money for their operation. For those users in Maryland, the tool includes the option to include up to three loans from the MARBIDCO Shellfish Aquaculture Loan Fund, a state program that has been highly useful to growing the industry.

Once the OEST input fields are filled and the simulation is run, several useful reports are generated. The financial summary report displays the net present value (NPV) of the operation along with an internal rate of return (IRR) for funds contributed to the project by the user. In addition, the OEST will predict annual cash flow and income statements for a 10-year time frame. The 10-year period allows time for multiple crops to reach harvest, providing a more accurate forecast of long-term financial feasibility. Reports can be downloaded in a variety of common file formats and include graphics to help interpret the results.

The privacy of the users is protected. The tool does not collect or share any information with the University of Maryland or any other entity. Users may choose to save the model information to their personal computer drive, to be shared by the user, or uploaded to the tool at a later time.

It is hopeful this tool is valuable for oyster farmers and we want to know how it is helping the industry! Thus, before the tool page loads, users will be asked to participate in an optional follow-up survey for the University of Maryland Extension Program to evaluate the effectiveness of the tool and gather user feedback for future improvements. Please consider participating in the survey, as stakeholder feedback is critical for Extension faculty to improve programming and further develop new tools.

To access the tool and basic instructions, visit: https://go.umd.edu/aquaculturebusiness. Select “model” to open the OEST tool.

Matt Parker, University of Maryland Extension mparkel1@umd.edu

Figure 2: Example of financial term inputs used in the OEST model. Credit: Matt Parker
The survival rates of oyster larvae were significantly boosted by treating them with specific combinations of probiotics, Oregon State University researchers found in a recent study. With only a one-time application, the probiotics also boosted larval growth, metamorphosis and settlement, meaning that in addition to more oysters surviving past the larval stage, they also fared better at transitioning to juveniles and anchoring to shells and other surfaces. The findings could be a major boon to oyster farms where pathogens can kill off a whole season’s worth of larvae, costing hundreds of thousands of dollars at a time.

“The results definitely exceeded our expectations,” said Carla Schubiger, project leader and co-author on the study and an Assistant Professor in the OSU Carlson College of Veterinary Medicine. “Just a 40-50% improvement in larval survival would be huge, but here we have over 80% increased survival at times. That’s very, very significant for the industry. Antibiotics are not allowed in hatcheries, so this will be the first tool they can actually use to increase their production.”

Shellfish are big business in Oregon, and oyster sales account for close to $5 million annually, according to a 2010 report from the Pacific Coast Shellfish Growers Association. In oysters, as in humans, the organism’s overall function depends on help from good bacteria living within the host’s gastrointestinal tract. The goal of the study was to pinpoint which types of these beneficial bacteria were best at fighting off pathogenic bacteria that can kill oyster larvae.

The pathogen, Vibri coralliilyticus, is common in marine aquaculture, so oyster farms need a cost-effective way to defend against it. The OSU researchers grew several strains of naturally occurring bacteria and screened them for their ability to fend off V. coralliilyticus under laboratory conditions. They then selected the strains that performed best against the pathogenic bacteria.

The team grew larvae in water conditions comparable to those used by oyster farms. When the larvae were 24 hours old, they were treated with the different strains of cultivated probiotics, first individually, and then in combinations of the most promising strains. At 48 hours old, the larvae were exposed to V. coralliilyticus.

The results were striking. Compared with the untreated control group, four of the individual probiotic strains and four of the most promising strain combinations increased larval survival rates by up to 86%.

Fourteen to 16 days later, the probiotics appeared to still have an effect, with treated larvae displaying significantly higher rates of natural settlement and metamorphosis into adolescent oyster spat, along with significantly larger shells than the untreated larvae produced.

The exact mechanism that aided the oysters is unknown, but the improved growth and settlement rates were an unexpected boon to oyster farms where pathogens can kill off a whole season’s worth of larvae, costing hundreds of thousands of dollars at a time.

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The exact mechanism that aided the oysters is unknown, but the improved growth and settlement rates were an unexpected boon to oyster farms where pathogens can kill off a whole season’s worth of larvae, costing hundreds of thousands of dollars at a time.
Hello from the West coast, where October felt a lot like August this year. We held the 76th Annual Shellfish Conference of the National Shellfisheries Association Pacific Coast Section (NSA-PCS), September 20-22, 2022, in conjunction with the Pacific Coast Shellfish Growers Association (PCSGA). The conference was in western Washington at the Wenatchee Convention Center in the heart of apple country. This conference was in-person and had about 275 registered participants. It was so nice to see everyone and the conference was a success.

The conference included 48 oral presentations across 13 sessions, and five workshops: Shellfish Producer BMPs and Nutrition; Monitoring Your Aquaculture System, and Inclusion (JEDI); How Has Climate Change Impacted Your Business; 2021 Atmospheric Heatwave Impacts on Intertidal Shellfish and Implications for the Future; and Biosecurity: Planning for the Worst – Potential West Coast OshV-1 outbreak. There were 18 vendors present at the tradeshow with the latest technologies in aquaculture.

This year’s conference keynote speaker was Dr. Yoshitaka Ota from the University of Washington School of Marine and Environmental Affairs, who gave a talk titled, “Ocean Equity – to protect oceans, we need to protect those who live within nature.” The lunchtime speaker was author David B. Williams who talked about his book, “Homewaters: A Human and Natural History of Puget Sound.” Both speakers were very enjoyable. This year’s John Lentz Profiles in Innovation Speaker Series was a social hour in memory of the past PCSGA president and friend, John Lentz of Chelsea Farms.

The NSA-PCS provided funding to support the participation of students at the conference. Student participation was low this year compared to conferences in the past. The 2022 NSA-PCS Best Student Presentation award was a tie between Miranda Roethler (University of Washington) and her talk entitled “Effects of Climate Change on Bull Kelp Photophysiology” and Henry Fleener (Oregon State University) and his talk entitled “Optimizing a Flow-through System for Rearing Bivalve Larvae”. Congratulations to Miranda and Henry. All the students did a wonderful job presenting their research and we look forward to seeing more excellent presentations from the students in the future. Additional support for students to attend the meeting was also generously provided by Arcadia Point Seafoods, Brenner Oyster, Chelsea Farms, Chuckanut Shellfish, Pacific Shellfish Institute, Rock Point Oyster Company, LLC, SEAPA, oceanfarmar, Jorstad Creek Oyster Co., Seattle Shellfish, Inc., Whiskey Creek Shellfish Hatchery, and National Fish and Oyster. A big shoutout to all the sponsors and the students. I encourage students to think about presenting their research next year and reach out if you have any questions.

The NSA-PCS auction fundraising was done as a hybrid this year, there was an online bidding format and with the auction items present at the conference. A big thank you to the NSA-PCS board members Katie Houle (Pacific Shellfish Institute) and Annie Raymond (Jamestown S’Klallam Tribe) for organizing both the online auction and items present at the conference. The call for presentations will open April 1, 2023 with titles due May 1, 2023, in Seaside Oregon at the Seaside Convention Center. This conference was in-person and had about 275 people registered.

 face a viable future as long as humans with a “collecting” gene require mollusks by the billions for shell collections.

Nautiluses and allonautiluses are drawn to baited traps, and their keen sense of chemoreception in them from even kilometers away. Trap yield has long been the only means of assessing population numbers, and these in reality were simply measures of trapping effectiveness, perhaps as much due to trap design and deployment. A cancel, the degree of bait scent dispersal around the traps, where low but constant current areas bring in more animals than either higher currents, where scent molecules disperse, or no current, where only small areas around the traps draw in specimens. In the early twenty-first century, Australians began to use BRUVS (Baited Remote Underwater Video Systems) to document population numbers of many bait seeking animals – including nautiluses. Animals drawn to traps, but not entering them, could not be observed or their numbers tallied. We adapted the Australian systems and proceeded to seek to understand population numbers of these archeic animals across the vast tropical Pacific Ocean regions they occupy. So far, we have been to the Philippines, Australia, Fiji, Samoa, Palau, Vanuatu, and multiple sites across the vast expanse of Papua New Guinea.

From 2011 to this year, we deployed these deep-water video systems, which can record the comings and goings of animals drawn to bait for up to 15 hours, thanks to the improvements in video recorder cards as well as the giant rechargeable batteries powering the strong lights pointed at the bait. The animals that made their way to bait varied. Many kinds of arthropods, with shrimp most abundantly, but strange, deep-water fish and sharks were observed. But among the most abundant visitors were nautiluses, and in Papua New Guinea, the much rarer and more elusive allonautiluses as well.

My recent trips, separate voyages through COVID restrictions, flying the newly-narrowed seats of current air travel, to Fiji and New Ireland, and Papua New Guinea, both in 2021, lent optimal conditions for the state of health of chambered cephalopod populations. But seeing them emerging out of the dark into the hard light of the video systems brought back images from my other job: past NSF Conference Planning Committee Chair Rodie Toole (Puget Sound). Vice Chair of the the team for presenting papers. Thank you to all the sponsors and the students. I encourage students to think about presenting their research next year and reach out if you have any questions.

The NSA-PCS Executive Committee held a Zoom meeting on February 14, 2022 to discuss the budget, student volunteers, and the 2022 conference logistics. A post conference wrap up session with the PCSGA was held on October 10, 2022 by Zoom. The 2023 Conference Planning Committee meeting is scheduled for April 1, 2023 with titles due May 1, 2023, and full abstracts by June 30, 2023. You can find more information at: https://pescga.org/annual-conference or follow us on Facebook.

Sandy Zeiner Pacific Coast Section Chair

Ward is also analyzing the composition of nautilus shells to track climbing temperatures in the deep sea, and looking to nautilus behavior to predict how these changes might affect the animals.

Ward believes nautiluses may already be seeking refuge in cooler, deeper waters to cope. Below 800 meters, the pressure is enough to make their shells implode. So far, though, around Mawu, the nautiluses seem to be adapting.

Back in the lab in Seattle, Washington, Ward analyzed his collection of Ndrova nautiluses—some from 1984, the shell fragments from 2015, and a whole fuzzy nautilus shell he bought in a curio shop in Adelaide, Australia.

With a whole shell, you can take a cheek of the thin partition between the internal chambers—and the oxygen isotopes trapped within provide a record of the average sea temperature over the month or so the chamber took to form. "So a shell is a 20- or 25-year record of temperature," Ward says, almost like tree rings. Meanwhile, the tiny samples taken from the shells of 13 living animals in 2015, provide a single data point—a snapshot of the sea temperature when their last chamber grew.

The results showed the 1975 animals inhabited waters averaging between 12-14°C, while those from 1984 and 2015 lived in temperatures of around 16°C. Ward was surprised the shells offered no evidence of warming water over those three decades, but says it is possible the nautiluses simply moved deeper to stay cool. Since the transmitters the team attached to the animals in 2015 record water temperature and depth, in future versions of the experiment the living nautiluses may reveal with more certainty how their home might be changing.


Peter Ward, Professor of Biology University of Washington

...continued from page 4
Are Nautiluses Increasing in Population as Commercially Fished Teleost and Cartilaginous Fish Disappear from the Mesopelagic Zone?

Six years ago, the important American journal Science printed a surprising story: “World octopus and squid populations are booming (https://www.science.org/content/article/world-octopus-and-squid-populations-are-booming).” The first paragraph of this counterintuitive report (surprising in that all wild marine populations are increasing in light of climate change, overfishing, and ocean acidification) even analogized the world’s cephalopod populations to those wild animals that have not only survived, but thrived amid human civilization and cities, such as rats, raccoons, coyotes, and pigeons. Reports from many sites of the global ocean report, in the six years since this surprise, indicate that the numbers of squid, cuttlefish, and octopus continue to enlarge. One reason for this success, according to the 2016 report, was the short life-span of cephalopods, noting: “Like rodents, cephalopods are highly adaptable to changes in their environment, researchers say—in large part because most species live just one or two years, dying as soon as they give birth. That allows them to respond rapidly to disturbance.”

So much for the “dibranchiate” cephalopods? How about those with four gills rather than two, and hard shells on their backs? What about the cephalopods that are not rapid reproducers with short lives, such as the nautiloids? Enter new observations of the longest-lived cephalopods: the species of Nautilus and Allonautilus.

Unlike other cephalopods, females of the two recognized genera of extant nautiloids, in Nautilus and Allonautilus produce but 10-20 eggs per year. The eggs are large, and more than a year will pass before the hatchlings chew out of their tough eggs and immediately begin the same foraging lifestyle as their mature parents. But it then takes more than 15 years for these newborns to reach reproductive maturity. And as in so many other aspects of their lives, the nautiloid-babies born from all other cephalopods, they do not die after first mating, but live at least five more years—and perhaps 50 more years. Like so many larger animals of the Mesopelagic Zone (200-800 m), they grow slowly, live a long time, but produce few young each year.

It has not been the search for their flesh that has imperiled the nautiluses and allonautiluses that differ markedly from all other cephalopods, their gorgeous shells. The Philippines and Indonesia have for close to a century been the centers of the nautilus shell trade, and their populations have been known

A chambered nautilus (Nautilus pompilius) faces next to a fuzzy nautilus (Allonautilus scrobiculatus). Photo credit: Peter Ward.

Nautilus: the Most Well-Known Mysterious Animal

The nautilus is called kalogreu in the local Titan language of Papua New Guinea. Nautilus shells can sell for US $1,000 on eBay. Between 2005 and 2014, trade data collected by the US Fish and Wildlife Service indicated that more than 100,000 whole nautilus shells and 800,000 parts were imported into the United States alone.

The earliest nautiloids had straight, conical shells, but they soon evolved the coiled spiral with interconnected internal chambers that are present in all modern nautiluses today. In their current incarnation, they’ve cruised the oceans for at least 100 million years.

While octopuses, cuttlefish, and squid die young after laying a thousand eggs, nautiluses don’t mate until they are at least 10 years old, then lay a handful of eggs that take a year to hatch.

In 2015, researchers from Australia and the United States came to study the nautiluses in Ndova, Papua New Guinea. Ward had last visited in 1984, when he and a collaborator were among the first people to examine live fuzzy nautilus, a species belonging to a new genus that they later named Allonautilus scrobiculatus. Ward and his colleagues had come back to see if the fuzzy nautilus and the better-known chambered nautilus (Nautilus pompilius) were still there, and to try out some new research tools.

Ward and his team of researchers attached battery-powered transmitters to several nautiluses to learn more about the animal’s behavior and the surrounding water temperature. Since the two species coexist, the experiment was also a chance to investigate differences in their behavior.

Please feel free to contact your Recruit Co-chairs with ideas, questions, or concerns!

Hannah and Fiona
hannah.i.collins@uconn.edu
fchboad@uav.edu
Don’t forget your AUCTION items. Bring them to the meeting or, if you cannot attend, send ahead to Sandy Shumway (address on back of the Newsletter) before March 15, 2023.

MEETING REMINDERS

Please consider contributing a film for our NSA at the MOVIES - these presentations will be shown continuously throughout the conference, so you can stop in any time you have a chance. Questions: Eric Heupel (eric@heupel.com)

BOOK YOUR HOTEL ROOM EARLY:
https://book.passkey.com/e/50358179
PLEASE STAY AT THE MARRIOTT - THE CONFERENCE HOTEL.

REGISTER NOW FOR THE MEETING:
https://shellfish.memberclicks.net/annual-meeting---registration

The ABSTRACT DEADLINE is DECEMBER 15, 2022. Submit your abstract now (www.shellfish.org)!

STUDENTS: Remember to enter the lottery for room and registration waivers. DEADLINE is DECEMBER 15, 2022. Download your application now:
Questions: Missy Southworth (melsouth@vims.edu)

The SCALLOP GALLOP will take place under the watchful eye of race organizer President Deaton. Watch for details.

Bonus: what is the common denominator?
SHELLFISH DONATIONS NEEDED!

Plans are well underway for the 115th meeting in Baltimore and that means we are soliciting seafood donations for the opening President’s Reception – shellfish, crab, shrimp. Whole and shucked product is most welcome. A raw bar may be possible where we can feature individual growers. If not, the hotel chef will perform his magic. If necessary, the conference can cover the cost of shipping product to Baltimore. A big turnout is expected and lots of shellfish needed, so please consider sending your best! All donations support a successful meeting and all donors will be recognized.

Contact Sandy Shumway for details (Sandra.shumway@uconn.edu).

Ballots are on their way.
Watch your mailbox!

NEW PAID LIFE MEMBER
Thank you, Tony D’Andrea

Log-in to renew and update your membership status (www.shellfish.org), or contact the Secretariat with any questions (secretariat@shellfish.org)

A Call for Action from the NSA Student Endowment Fund Committee

As part of the 115th Annual meeting of the National Shellfisheries Association, to be held in Baltimore, Maryland, from March 26 – March 30, 2023, the NSA Student Endowment Fund (SEF) Committee is supporting great opportunities for graduate student members of the NSA that plan to present their original research.

Student Travel Awards

To assist with the costs of attending this meeting, the SEF Committee is supporting great opportunities for graduate student travel. More information about the travel and presentation awards can be found here.

Student Presentation Awards

The NSA will also be adjudicating competitions for both its Nelson and/or Gunter Awards. If necessary, the SEF Committee will receive two years membership in the NSA. Graduate students wishing to participate in these competitions should do the following:

• Submit their abstracts by the conference deadline of December 15, 2022
• Email Peter Kingsley (kingsleymp@dnr.sc.gov) indicating their wish to compete for one of these awards no later than December 31, 2022. You must include your name, presentation type (oral or poster), and presentation title
• Ensure current membership status by either joining the NSA or renewing their student membership no later than December 31, 2022

More information about the travel and presentation awards can be found at: https://www.shellfish.org/sef-student-presentation-and-travel-awards/

Calling judges! Finally, if you are willing to help judge oral and/or poster presentations by graduate students wishing to compete for the Nelson and/or Gunter Awards, please contact Peter at the email address above.
President’s Message

Kenneth K. Chew
October 29, 1933 – September 24, 2022

As I look back on my previous contributions to the Newsletter, I see that climate change has been a recurring theme. Let me start this one in the same vein. I just got back from a taxing hiking trip to Marble Canyon, AZ. While there, we spent some time on the banks of the Colorado River and Lake Powell. The lake now contains about 25% of its full volume and if the water level continues to decrease there will be water shortages and rolling power blackouts all across the Southwest. You might want to reconsider retirement in Phoenix. I found some quagga mussel (Dreissena rostriformis) and New Zealand mud snail (Potamopyrgus antipodarum) shells at a boat washing station at Lee’s Ferry, just upstream of the Grand Canyon. Invasive species are everywhere. Here in Louisiana, the low water level in the Mississippi River has stalled shipping and revealed several previously submerged shipwrecks. The low water has raised new discussions about the benefits and negative aspects of diversions of river water into some coastal marshes to reclaim lost land. How all of this plays out (along with sea level rise) in the next twenty or so years will be quite interesting.

Meanwhile, the NSA moves forward. I am anticipating a fine annual meeting next March in Baltimore. It will be my final one as your President, and I would like to thank the other officers, members of the Executive Committee, the staff, and our membership for the privilege of serving you. The Association will continue to be in capable hands when the newly-elected officers assume their duties. The staff of the NSA deserves special recognition in that they have managed rescheduling of both the Baltimore and Charlotte (2024) meetings with aplomb. The JSR and Newsletter were delivered on schedule, as well. Time is growing short for the submission of abstracts for the Baltimore meeting (deadline is 12/15) and you can check out the schedule of special paper sessions and the plenary speakers on our website. There will also be a Scallop Gallop at the meeting, so bring your running or walking shoes. Remember to renew your membership for the year ahead, and round up items for the auction.

Finally, the Awards Committee is exasperated with the paucity of applications from students for the awards that the Association funds. The process is simple, and the NSA has always been extremely supportive of students. I have, however, heard some comments about re-directing some of the funds for the awards since there seems to be so little interest. The ball is in your court, people. With that, I have to get to work on my abstract, and I will see everyone in Baltimore.

Lewis Deaton, President

Upcoming Events

Aquatourism America 2023: Feb. 23-26, 2023. New Orleans, Louisiana. For more information: www.was.org
Aquatourism 2025 (Triennial): Mar. 5-9, 2025. New Orleans, Louisiana. For more information: www.was.org

In this issue:
• Abstract Deadline: December 15, 2022
• New On-line Oyster Aquaculture Business Planning Tool
• Nautilus Population Research
• Shellfish Donations Needed
• Probiotics & Larval Oyster Survival