National Shellfisheries Association
Quarterly Newsletter
Est. 1908
2025(1)

President's Message

As we move further into 2025, I am excited about the opportunities ahead for the National Shellfisheries Association. One of the most anticipated events of the year is the Triennial Meeting in New Orleans, March 6-10, 2025. I hope to see many of you at this prestigious gathering, which will bring together professionals from the World Aquaculture Society, the American Fisheries Society - Fish Culture Section, the National Aquaculture Association, and many others representing the global aquaculture community.

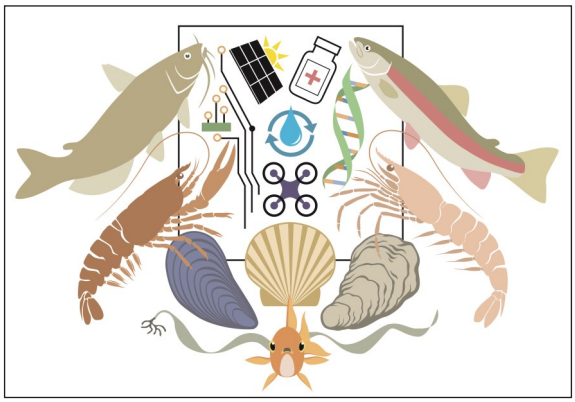
Innovation continues to shape our field, as highlighted in several *Newsletter* articles. From the installation of a hybrid reef in St. Andrew Bay, Florida, to the formation of "Seawool" fabric from discarded oyster shell, NSA members are exploring cutting-edge solutions to coastal challenges. Sustainability remains at the forefront of our work. For example, efforts to combat the invasive European green crab have taken a culinary turn, with scientists and chefs promoting recipes featuring green crabs.

A core part of the mission of the NSA is to advance and promote the work of current scientists while inspiring and encouraging the next generation of researchers to explore biology, ecology, production, economics, and management of shellfish resources. Mentorship plays a vital role in this mission, helping to guide and support young scientists as they develop their skills, build professional networks, and contribute to the future of shellfish research and management. The NSA remains dedicated to fostering student involvement by providing travel and registration funding for Aquaculture 2025 and student presentation awards that recognize excellence in research.

Wishing you all a successful and inspiring year ahead!

Yours in service,
Aswani K. Volety, *President*
UNCW Chancellor

Aquaculture '25
See you in New Orleans!



https://www.was.org/meeting/code/AQ2025

In Memoriam:

Anthony Calabrese

Feb. 25, 1937 - Dec. 14, 2024

Link to obituary: https://www.echovita.com/us/obituaries/ct/guilford/anthony-calabrese-19014539

Memorial contributions can be made to the Alzheimer's Association CT Chapter (https://www.alz.org/ct)

In this issue:

2024 George Abbe Student Research Grant Update

Awardee: Nihal Guennouni

Virginia Institute of Marine Science

"Quantifying the response of blue crabs: How natural and fishing mortality affect the transmission and incidence of Heratodinium perezi*"*

The mobile and opportunistic predator, *Callinectes sapidus*, is widespread from the coasts of Brazil to the Gulf of Maine and has sustained a significant fishery for over 100 years in the coastal bays of Virginia and Maryland. The blue crab undergoes a complex life history marked by various ontogenetic shifts. For instance, in the Chesapeake Bay, female blue crabs migrate to spawn in high salinity regions at the mouth of the Bay. Subsequently, post-larvae, or megalopae, are advected by currents into structurally complex habitats such as seagrass beds, where they seek refuge from predation and metamorphose into juveniles (5-30 mm carapace width). At this life stage, blue crabs are highly susceptible to predation by larger cannibals and parasitism, such as by the dinoflagellate *Hematodinium perezi*. As part of a larger NSF funded project, my project investigated how disease impacts the dynamics of predator-prey systems, focusing on the blue crab, *Callinectes sapidus*, infected with *Hematodinium perezi*.

Photo credit: James Loving

A hyper-endemic parasite, *H. perezi*, infects the hemolymph of blue crabs and causes high mortality. In the blue crab - *Hematodinium* system, prevalence can reach 100% in juveniles during peak seasons; however, predators can mitigate host-parasite interactions in aquatic systems through density-dependent effects of predation. Density-dependent cannibalism and predation can be represented through a predator functional response (FR), where the FR is the quantity of prey consumed per predator as a function of prey density. As generalist predators and cannibals, blue crabs often follow a type III positively density-dependent FR.

Given that the FR may vary by different predator-prey combinations and is influenced by behavioral and physiological traits, it is important to determine if altered crab behavior derived from infection by *H. perezi* affects susceptibility of crabs to predation and cannibalism. Thus, given the high prevalence of *H. perezi* on the eastern shore of Virginia, infections may change the FR in this system, therefore altering the population structure and dynamics for the blue crab. The main objective of my project is to explore how cannibalism impacts the transmission of *H. perezi* by quantifying the FR for cannibals on uninfected and infected prey in the blue crab-*Hematodinium* system.

The effect of density-dependent cannibalism on uninfected and infected juveniles was investigated. In order to understand how the FR can change between infected and uninfected juveniles, a mesocosm setup was utilized to test the hypotheses, using uninfected and infected blue crabs as prey at 4 different densities (1, 2, 4, and 8 per 0.2 m^2) and one uninfected cannibal blue crab per trial as predators. Each tank harbored sand, seawater, and an artificial seagrass mat made of green ribbon tied in half to replicate a natural seagrass shoot. Using mesocosms was essential for capturing the functional response while controlling for confounding factors, such as alternative prey, that would be challenging to quantify in a field setting - particularly when comparing relative versus ambient juvenile blue crab densities. Similarly designed experiments in 2023 showed that the seagrass densities needed to be increased because habitat complexity was a major driver in the functional response. Cannibals preying on uninfected juvenile blue crabs exhibited a type II functional response, while infected juveniles showed no clear density-dependent relationship. This contrasted with previous studies on smaller megalopae and juvenile blue crabs in seagrass habitats, which reported a type III FR indicating that the prey did not have adequate structural refuge from the cannibals in the mesocosms. As a result, the artificial seagrass mats used in 2024 were assembled at densities high enough to provide refuge from predation (1075 shoots m^{-2}).

Results showed that infected juvenile prey experienced a lower proportional mortality than uninfected prey. This was contrary to the hypotheses as previous studies have indicated that selective predation on sick individuals is common in predator-host-parasite relationships since the infected individuals are easier to target. Given that heavy infections of *H. perezi* can induce lethargy and reduced evasion to predation, it was surprising to see that infected juvenile prey had a higher probability of surviving. Uninfected blue crabs followed a type III FR. Similarly, cannibals preying on infected juvenile prey followed a type III FR, resulting in a low-density refuge for the prey. This has important implications for disease persistence in the blue crab population as *Hematodinium* can persist at low densities and continue to transmit infectious dinospores into the water column.

I am grateful for this student grant opportunity that helped my study on blue crab population dynamics through mesocosms, as the financial demand for the equipment and lab maintenance is intensive.

Two years of experiments quantifying FR in the context of cannibalism and disease for blue crabs will help future studies, in particular the effects of *H. perezi* on large (>60 mm CW) infected crabs cannibalizing infected and uninfected juvenile prey (10-30 mm CW) in mesocosms. Since this study only explored uninfected cannibals to both infected and uninfected prey, it would be valuable to investigate how infected cannibals may induce a change in the FR as infection can alter search times for the predator. With lower glycogen levels as a result of infection by the parasite, infected cannibals may spend less time foraging, maintaining a type III FR and allowing *H. perezi* to continue infecting blue crabs throughout the population.

Hybrid Reef-mimicking Structure Installed to Protect from Coastal Flooding

U.S. Air Force officials installed a new kind of structure in the waters of St. Andrew Bay on the shore of the Tyndall U.S. Air Force Base in northwest Florida on October 30, 2024. The structure was the first section of a Rutgers University-designed 'self-healing' reef made of custom-designed concrete modules and living oysters. The reef is designed to protect the base and its people from hurricanes and tidal surges. The concrete provides a hard substrate that oysters need for attachment and is designed specifically so that more oysters will naturally gravitate to the structures over the next year.

Rutgers Reefense team members (from left to right): David Bushek, Hani Nassif, Richard Riman, Jenny Shinn, Reid Holland, and Michael Ruszala. Photo credit: D. Bushek

This experimental reef is funded through the Reefense Program of the Defense Advanced Research Projects Agency (DARPA), to assess whether it provides adequate coastal defense against storm damage, coastal flooding, and erosion. Hurricane Michael, a Category 5 hurricane that devastated the Florida Panhandle in October 2018, tore apart Tyndall's hangars, damaged several supersonic stealth fighter jets known as F-22 Raptors and left much of the base in ruins. "This experiment will document the Reefense modules' ability to help protect and enhance the bay shoreline and make it more robust and resilient," said lead scientist David Bushek.

The structures are honeycombed, two-feet-square, 450-pound modules and are comprised of a special engineered, low carbon footprint concrete. The holes in the modules are designed to absorb and dissipate wave energy, protecting the shore beneath and the shallow area closer to the shoreline.

Oysters grow in clusters, not as individual animals, and form natural seawalls in shallow water by attaching to each other and this 'living' reef protects the shoreline. But as an organic structure, they can break up during large storms. These newly -installed modules are more durable and will serve as a hybrid living shoreline as they contain both human-made and natural components.

Abstracted from Rutgers Today *(Oct. 31, 2024): https://www.rutgers.edu/news/researchers-us-military-install-concrete-modules-self-healing-oyster-reef-structure-florida*

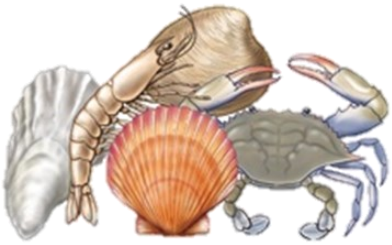
If You Can't Beat 'em - Eat 'em

European green crabs are aggressive invaders that have seriously impacted inshore habitat and fisheries in the northeast United States. Joe Roman, conservation biologist at the University of Vermont, is the founder and editor of the *Eat the Invaders* website ('Fighting Invasive Species, One Bite at a Time'). Working with Mary Parks, founder of www.GreenCrab.org, a non-profit that educates the public on the harm of green crabs, they share a goal of mitigating the crabs' effects by encouraging the public to 'be like otters'. The website promotes recipes that center European green crabs such as spicy curry green crab, Furlong bisque, green crab tomato soup, and green crab scampi.

Americans consume enormous amounts of seafood, and green crabs are already on the menu in Europe and the Mediterranean so it is has some promise. Wulf's Fish, a seafood wholesaler and retailer in Boston began selling frozen green crabs online in 2021. The Shipwright's Daughter, a restaurant in Mystic, Connecticut that opened in 2022, goes through 200 lbs of green crabs a week, working them into several dishes, such as seared scallops on green crab fried rice with garlic aioli, and bigeye tuna drizzled with crab-infused oil.

Bon Appétit!

Abstracted from: New York Times Magazine*, 2/2/2025*



An Update from the NSA Student Endowment Fund Committee

Student Travel Awards

To assist students with the costs of attending the upcoming Aquaculture 2025 meeting in New Orleans, the SEF Committee adopted a lottery-based system that offers waivers for either registration costs or accommodation costs. The SEF Committee received 26 applications from students, 25 of which were eligible. Of those, a total of 16 students received funding, with 10 students being with provided shared accommodation at no cost (5 rooms x two students per room) and 6 students being with provided registration waivers.

ATTENTION: Calling Graduate Student Presenters & Presentation Judges!

Student Presentation Awards

At the triennial meeting, the NSA will be adjudicating competitions for both its Thurlow C. Nelson (Outstanding Oral) and Gordon Gunter (Outstanding Poster) Presentation Awards. The winner of these awards receive membership for two years in the Association and a certificate of accomplishment. If you will be a graduate student presenter at the meeting (or are a recent graduate presenting your Masters or Ph.D. research) and want your presentation (oral or poster) to be considered for these awards, please contact Peter Kingsley-Smith to be added to the list (kingsleysmithp@dnr.sc.gov). Please note that you must have paid your 2025 NSA membership dues in order to be eligible for these awards (preferably well before the meeting).

And of course, the Presentation Awards would not be possible without judges. If you will be attending the Triennial meeting and are willing to serve as a judge, please contact Peter Kingsley-Smith (kingsleysmithp@dnr.sc.gov) to be added to the list of judges. More information will be forthcoming once the schedule of eligible presentations and the judges list have been finalized.

More information about both of these student support opportunities can be found here: https://www.shellfish.org/sef-student-presentation-and-travel-awards.

We look forward to seeing you in New Orleans!

Peter Kingsley-Smith
Missy Southworth
NSA Student Endowment Fund Committee Co-Chairs

2024 Mollusc of the Year - A Luminous Land Snail

The snail, *Phuphania crossei*, from Thailand received more than half the votes cast for the 2024 International Mollusc of the Year. It was nominated by Dr. Arthit Pholyotha of the Department of Biology at Chulalongkorn University in Bangkok, Thailand who discovered the snail in August 2020. It is an air-breathing land snail found only in the tropical forests of Thailand. It is named after the Phu Phan mountains in the northeast of the country. It is also known as the 'living glow stick' because it can constantly produce its own bioluminescent light from cells on the foot and the mantle, a rare trait among terrestrial snails.

Bioluminescence of Phuphania crossei *during diapause. (Photo credit: Yuichi Oba)*

The International Mollusc of the Year competition was started in 2020 by the Senckenberg Society for Nature Research, the LOEWE Centre for Translational Biodiversity Genomics and the International Society for Mollusc Research to raise awareness and protect the rich diversity of molluscs around the world. Anyone can nominate their favorite species, from any geographic area. Species from marine, land, and freshwater environments are eligible.

Because of its victory, *Phuphania crossei* will have its genome sequenced by the LOEWE CTBG. Although molluscs are the second largest animal phylum after arthropods, relatively few mollusc species have been fully sequenced. As a result, little is known about the genomic basis of species diversity, their adaptive abilities, or the natural products they produce. "As bioluminescence has evolved independently in several lineages of organisms, decoding the genome of *P. crossei* can help us understand the mysterious world of glowing molluscs that live in the sea, in freshwater, or on land," explains jury member Dr. Carola Greve, laboratory manager at the LOEWE Centre TBG.

The other finalists were the wavy sea butterfly (*Clio recurva*), the Coosa fiveridge (*Amblema elliottii*), the wavy bubble snail (*Micromelo undatus*), and the Atlantic brief squid (*Lolliguncula brevis*).

Recruits Corner

Fellow Recruits,

We hope everyone had a safe and relaxing holiday season. The New Year means we are looking forward to our annual conference, and this year is a special treat–it's the Triennial! Aquaculture 2025 will be March 6–10, 2025 in New Orleans, LA.

We strongly encourage everyone to make travel plans early. The conference is the week after Mardi Gras. Need a room?

Check out the Room Share List for opportunities to share rooms with other students. Also, take advantage of early student registration. **Register by February 21st for a student rate** of $295. After February 21st, the student registration rate increases to $360.

We have some fun events planned for the students at the conference: start the conference on the student field trip to the **Audubon Aquarium and Insectarium** on March 6th, meet a new mentor at the **Mentor/Mentee Breakfast** on March 7th, or take a spooky tour through the **New Orleans French Quarter** with your fellow students on March 8th. These events will be held in conjunction with the World Aquaculture Society and American Fisheries Society-Fish Culture Section, so students will have the opportunity to meet many new people and network across all the organizations. All of these activities also require early sign up, so if you are interested in participating, follow the instructions in your emails.

To facilitate communication during the conference, we will be hosting a Discord server again. It is a free app available for iOS and Android, so download the app on your way to be able to chat with other students. **The link to this discord server will be sent to student recruits over email - please do not share or disseminate the link.**

Student recruits who have received Student Endowment Fund Travel Awards will be required to volunteer at the conference. Make sure to sign up for slots. Any other students who would like to help and volunteer are welcome to sign up as well. Volunteering is a great way to meet your peers, get involved, and help the conference run smoothly.

Stay in the loop by following the Student Recruits page on the NSA website (https://www.shellfish.org/student-members), the NSA Recruits Facebook group (https://www.facebook.com/groups/2216454881732029), and on Instagram (@nationalshellfisheries).

As always, please don't hesitate to direct any questions to Hannah (hannah.i.collins@uconn.edu) or Emily (efuqua@fsu.edu).

Hannah and Emily

AUCTION ITEMS WANTED

Time to clean out some of those treasured tchotchkes and share with your fellow collectors. Remember – anything shellfish or fish goes at this meeting!

Bring it with you to New Orleans!

SAVE THE DATES

118th NSA Annual Meeting
Mar. 22-26, 2026. Portland, Oregon

119th NSA Annual Meeting
Mar. 21-25, 2027. Baltimore, Maryland

120th NSA Annual Meeting - Triennial
Feb. 7-11, 2028. Seattle, Washington

121st NSA Annual Meeting - TBD

Oyster Shells Repurposed as 'Seawool'

Eddie Wang, founder of Creative Tech Textile, a Taiwanese company established in 2010, produces an "eco-fabric" - a polyester material made from recycled plastic bottles - but felt its texture was a bit ordinary. Wang remembered that residents of his seaside hometown of Yunlin used discarded oyster shells that littered the streets during the harvest as insulation for their homes. "They burned the shells and painted the residue on the walls. The houses then became warm in the winter and cool in the summer, so I was curious about why oyster shells have such a miraculous effect." So he started working with a research institute to experiment making fabric out of the oyster shell residue, in 2013 coming up with the right formula that produces a material similar to wool.

A piece of Seawool from a textile factory in Tainan. Credit: Sam Yeh

Today, his factory in Taiwan uses around 100 tonnes of oyster shells a year to churn out around 900 tonnes of Seawool, a trademarked and patented fabric. The fabric and clothing generate around NT$200 million (US $6.1 million) a year, with the bulk of it sourced by outdoor and sustainability clothing brands in Europe and the United States.

The small island of Taiwan has a hefty appetite for oysters, harvesting an estimated 200,000 tonnes a year with the fleshy meat appearing in local cuisine such as crispy omelets and silk-like noodle dishes. But its popularity also means that about 160,000 tonnes of shells are discarded yearly, according to data from the agricultural ministry. They pile up on the streets of aqua-farming towns—the majority in western cities such as Yunlin, Changhua and Chiayi - causing environmental issues by emitting fishy smells and providing breeding sites for mosquitos.

At Wang's factory, the shells are ground into nano beads and combined with yarn made from recycled plastic bottles. "Oyster shell is a material with low thermal conductivity - it does not absorb heat nor does it dissipate heat", Wang said. Turning the shells - which capture and store carbon dioxide from the atmosphere - into Seawool also does not require water, making it a low-carbon product, said Wang.

"When I was a child, no one wanted oyster shells - they were dumped and discarded everywhere. It's good that the waste has been turned into gold now."

Abstracted from Phys.org (August 2025): https://phys.org/news/2024-08-gold-oyster-shells-repurposed-magic.html

NSA Pacific Coast Section News

Welcome to a New Year and I hope the winter weather is being kind to you. This is the time for NSA-PCS/PCSGA Planning Committee starts developing the Annual Conference and Tradeshow details. This year, the conference will be at the Hilton Vancouver in Vancouver, Washington from September 8-11, 2025. Over the next few months, we will formalize agenda topics, workshops, speakers, and other fun details such as the auction, Fun-run, and student fundraisers. If you would like to present your research at this year's conference, presentation titles/ abstracts and workshop titles will be open sometime in April. If you need any more information on the conference, please contact NSA-PCS Chair Sandy Zeiner (szeiner@nwifc.org).

NSA-PCS and the PCSGA will be again co-sponsoring the "Dr. Kenneth Chew Student Research Grant" in honor of the late Dr. Kenneth Chew. This research grant provides $1,200 annually to a graduate student to support their research. Please watch for more details on this great opportunity and how to apply. For more information, contact nsapcs@gmail.com or Sandy Zeiner.

If you have not renewed your annual dues, please do, and do not forget to check the PCS box and pay an extra $10 to be a part of the Pacific Coast Section of NSA.

The NSA-PCS Facebook page is your best resource for news and information about the Pacific Coast Section and our events and annual meetings. Please join our community online. You can like NSA-PCS on Facebook at: https://www.facebook.com/pages/Pacific-Coast-Section-of-the - National-Shellfisheries-Association/1438569826443936

I look forward to Spring and seeing you at Aquaculture 2025 in New Orleans, Louisiana.

Sandy Zeiner
Pacific Coast Section Chair

National Shellfisheries Association
Pacific Coast Section
Founded 1971

AND…..

The **NSA 118th** Annual Meeting is coming to the Pacific Northwest in 2026

WATCH FOR UPDATES

www.shellfish.org

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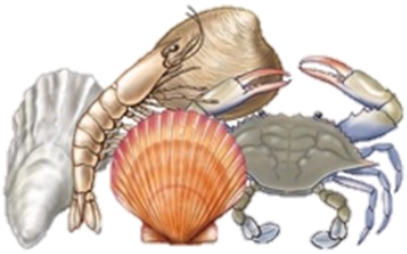

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Upcoming Events

22nd International Conference on Diseases of Fish and Shellfish: Sept. 1-4, 2025. Heraklion, Greece. For more information: https://eafp.org

79th Annual Shellfish Conference and Tradeshow: Sept. 9-11, 2025.Vancouver, Washington. For more information: https://pcsga.org/annual-conference

12th International Conference on Fisheries & Aquaculture: Sept. 16-17, 2025. Hanoi, Vietnam. For more information: https://aquaconference.com

Aquaculture Europe 2025: Sept. 22-25, 2025. Valencia, Spain. For more information: www.was.org

28th Biennial Coastal & Estuarine Research Federation (CERF): Nov. 9-13, 2025. Richmond, Virginia, USA. For more information: https://conference.cerf.science/

NACE/Milford Aquaculture Series: Jan. 7-9, 2026. Portland, Maine, USA. For more information: https://www.northeastaquaculture.org/

Aquaculture America 2026: Feb. 16-19, 2026. Las Vegas, Nevada. For more information: www.was.org

118th NSA Annual Meeting: Mar. 22-26, 2026. Portland, Oregon, USA. For more information: www.shellfish.org

24th International Pectinid Workshop: Apr. 22-28, 2026. New Bedford, Massachusetts, USA. For more information: http://pectinidworkshop.com

7th World Conference on Marine Biodiversity: Nov. 17-20, 2026. Belgium. For more information: https://www.wcmb2026.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 (stevenmallen@gmail.com).