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National Shellfisheries Association Quarterly Newsletter

2021(3)

President's Message



Summer is here, and in Louisiana that means it is hot and humid and keeping an eye on the tropics. We have had an unusually wet year so far, and I take this as one aspect of global climate change. Those in other parts of the country are enduring drought, wildfires, heat waves, and other subtle but significant changes to the local climate. Rainfall and water temperatures have impacts on the health of coastal ecosystems, including aquaculture facilities. We will all have to adjust to meet these challenges in the future. The NSA constitutes a body of scientific and practical knowledge that will prove useful to fishery managers and other stakeholders in the future.

The Lieutenant Governor of Louisiana has published a piece in opposition to diversions of the Mississippi River to nourish eroding coastal marshes with sediment. His concerns reflect those of holders of oyster leases that will be affected by the influx of fresh water from the diversion. These conflicts among stakeholders will continue and likely increase as sea level rises and the planet warms. All of us have some interest in the outcome of planning for future changes. Reduce, recycle and repurpose should be a mantra to decrease the effects each of us has on the planet. Our family has recently signed on to have our glass collected by a local company that converts it into garden mulch. Such small changes in lifestyle may seem frivolous, but if everyone pitches in, things can change.

It is not too early to think about the next annual meeting in San Diego next Spring. This is the Triennial joint meeting with the World Aquaculture Society, the Fish Culture Section of the American Fisheries Society, the National Aquaculture Association, and others. Attendance by NSA members is usually lower than that at our regular annual meeting. This is unfortunate in that the Triennial is not only an opportunity to rub elbows with unfamiliar topics (fish, for example), but it also usually nets the NSA some cash. The more of our members that attend, the more we make. San Diego in the spring has a delightful climate, warm during the day and cool at night. Make plans to come, and if you are particularly ambitious, consider organizing a session.

Finally, as one who now finds himself in one of the hottest of covid hot spots, I beg those of you who have not gotten vaccinated to do so without delay. I was watching the news the other day and saw an anti-vax protester with a sign that said "recovery from covid = 99%". This may be true, but it also

means that one person out of one hundred does not recover. You or your family does not want you to be that one person. If we are to enjoy a normal meeting, with small rooms full of people eager to exchange information and entertaining social events without masks or undue worries, we have to tamp down on transmission of this virus. Get the shot and urge anyone else you know to follow suit.

Lewis Deaton, President

AQUACULTURE 2022

Come one, Come all, for Aquaculture Large & Small



Town & Country Resort & Convention Center
San Diego, California
February 28 – March 4, 2022

ABSTRACT DEADLINE
October 15th, 2021

<https://www.was.org/meeting/code/AQ2022>

It will have been **2 years, 11 months, and 22 days** since we last met in person (1090 days). We look forward to seeing everyone in San Diego for a grand reunion.

2020 Melbourne R. Carriker Student Research Grant Award Update

Awardee: Samuel Gurr

University of Rhode Island

*“Potential for intragenerational $p\text{CO}_2$ conditioning
of juvenile Pacific geoduck
Panopea generosa”*

Expansion and enhancement of sustainable shellfish production is necessary to prevent overexploitation of wild stock and satisfy international trade, but hatchery rearing poses a production bottleneck. Pacific geoduck (*Panopea generosa*) clams are a critical revenue source for tribal and state groups, which have been threatened by the destructive effects of ocean acidification (OA) on aquaculture in the “Pacific Northwest Seedstock Crisis”



demanding novel strategies for hatchery improvement. Hormetic priming, or the enhancement of performance under moderate levels of stress, suggests short-term stress conditioning within a generation may increase fitness and resilience under a subsequent encounter later in life. Mild oxidative stress is a common source of hormetic priming and is a hypothesized driver of longevity. Further, larval stages are sensitive “programming windows” and ideal targets for inducible acclimation due to the importance of environmental information in setting the stage for phenotypic outcomes.

My research on Pacific geoduck is centered on the advancement of sustainable shellfish production by means of intragenerational acclimatization or ‘stress memory’. Conditioning and exposure experiments ($p\text{CO}_2$

stress) were conducted in collaboration with Jamestown S’Klallam Point Whitney Shellfish Hatchery where aquaculture protocols and production timelines were critical to the investigation of geoduck responses.

In the summer of 2019, a 4-month experiment was conducted to test whether OA stress affects metabolic activity, growth, and antioxidant capacity under subsequent stress encounters. Early life-stage Pacific geoduck (pediveliger stage) were conditioned over ~3 months under ambient and elevated $p\text{CO}_2$ conditions before subjecting juvenile clams (~5 months old) to three reciprocal exposure periods over 21 days. Results show compensatory shell growth, metabolic recovery (from suppressed state), and decreased antioxidant capacity in acclimatized clams suggesting a high tolerance to $p\text{CO}_2$ regimes (~2500-5000 μatm) and plasticity of bioenergetic and subcellular responses. The larger shell size and lower antioxidant production of stress-conditioned clams in the present study could suggest adaptive subcellular mechanism(s) that function in maintaining homeostasis under frequent or intermittent stress exposures.

Physiological and cellular responses are simple yet powerful measurements that breach the gap between human and nature – perfect to capture and direct the attention of the scientific and public community to impacts of human activity by enabling organisms to tell their story. “What does not kill you makes you stronger”, is an anthropomorphic perspective that charismatically describes these findings. Inducible acclimation to climate change can spark innovation in sustainable food production with downstream effects on global food security and reduced overexploitation of wild populations. I aspire to develop strategies for enhancement of aquaculture yields spanning a spectrum of critical taxa.

The Melbourne R. Carriker Award greatly improved this research. These findings have served as a jumping-off point to investigate the molecular machinery of environmental ‘memory’ and advance understanding of stable and predictable markers of stress resilience.



The Recruits are celebrating 30 years



**Come to Aquaculture 2022
and join the festivities!**

New Membership Profile Attributes

Check the list of options for your 'fields of interest' – a few new ones have been added and if you don't see yours, let us know and it can be added.

You can also edit your delivery options for the JSR and the QNL.

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

Clamshell Currency

The California Clam Shell Scrip of 1933 is a unique form of scrip currency that arose out of the economic turmoil of the Great Depression. As Americans began pulling money out of banks, President Franklin D. Roosevelt declared a nationwide bank holiday in March 1933 in an attempt to stabilize the banking system. Due to the shortage of small change, businesses began using IOU-style notes in order to continue doing everyday transactions with customers. This led to the creation of several scrip currencies, often unique to the city's

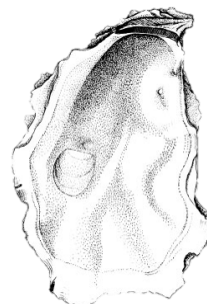


A clamshell used as scrip currency showing the name of the shop issuing the currency, its value, and, on the inside, signatures of the people whose hands it passed through. Photo credit: Newman Numismatic Portal.

culture and local economic needs. In California, the businesses in the Pismo Beach area got creative and began using the shells of the Pismo clam as placeholders for real US currency. In his article, "The California Clam Shell Scrip Currency of 1933: Crescent City and Pismo Beach's anomaly in an era of Banknote Scrip", Joshua Smith describes how customers would sign their names on the inside of the shell, which allowed the business to keep track of who had 'spent' their shells. At least 11 local businesses, which included a few pharmacies, a cigar store, and a service station, issued clams bearing their store's name and its value. The types of services customers could receive for Pismo's local scrip varied greatly, too. Denominations would vary from 25 cents to 20 dollars depending on the store, and would be reflected by the size of the clam with larger clams holding higher denominations.

When the banks were finally reopened on March 13th many of the local business continued to honor the clam scrip they had issued. Original Pismo clam shell money is now a collector's item, with pieces selling for hundreds of 'clams'.

Adapted from Hakai Magazine, July 9, 2020



Letter to the Editor of Science calls for protection of oyster reefs in China

Yang, H., Ma, M., Thompson, J.R., and Flower, R.J. 2021. Protect and regulate China's oyster resources. *Science*, 371(6531): p. 790.

Cites several NSA members

Cage Co-Culture of Eastern Oysters, *Crassostrea virginica*, with the Sea Urchin, *Lytechinus variegatus*, in the Gulf of Mexico: Moving Towards Mutual Benefits

Worldwide, both oysters and sea urchins are consumed as a premium seafood, enjoyed by many seafood enthusiasts. Historically, both species have been fished from near-shore shallow water habitats and are sold commercially. Overfishing and environmental concerns have led to an interest in aquaculture of both species. Sea urchins are desired for their high-quality gonad (roe). Fished urchins are harvested only during the peak reproductive season, typically a few months of the year. Early life stages can be cultured in a hatchery/nursery and juveniles are often seeded into nearshore habitats for grow-out. There is strong interest in cage culture of sea urchins, with technologies developing in many regions, particularly Asia and South America as well as Europe and Africa. There are some limitations, as sea urchins require high salinities, usually above 26, and they do not tolerate desiccation. The long history of oyster consumption by people worldwide has resulted in aquaculture techniques ranging from extensive methods to more intensive, containerized methods. Containerized culture (where oysters are held in bags, baskets, or other mesh containers) allows growers to grow consistently high quality product (typically with greater investments of labor as well).



Comparison of oysters held with urchins (oysters are clean) vs oysters held without urchins (heavily fouled). Photo credit: Auburn University Shellfish Laboratory.

One of the concerns of oyster cage culture is biofouling of oysters and cages. Fouling of cages may reduce water flow and limit oxygen and feed plankton availability. Biofouling is not a concern in urchin cage culture, as urchins consume epibionts attached to the cage material. Thus, we asked if there can be benefit from co-culture of these species. With funding provided by the Gulf States Marine Fisheries Commission and with the collaboration of two oyster farms in the Florida panhandle (Oyster Bay and Alligator Harbor), oysters and sea urchins were co-cultured in traditional oyster cages. Sub-adult juvenile urchins (test diameter of ca. 30 mm) were collected from St. Joseph's Bay and deployed in October 2019 in new 9 mm mesh bags (46 x 61 x 10 cm) along with ca. 40 oysters (average shell height 48 + 7 mm). Urchins were placed in bags at 2, 4 or 8 individuals per bag. Controls included cages without one species or the other. In March 2020, cages were removed and evaluated for oyster and urchin performance and bag biofouling. Outcomes were remarkable. Urchin survival was not affected by urchin density or the presence of oysters, but was affected by site, primarily related to storm damage.

All urchins grew in size and produced gonads, and gonad production was highest at lower densities. In these individuals at lower densities, gonad color was considered excellent, particularly in cages that also collected drift algae or seagrass.

Oyster survival was not influenced by urchin stocking density, and exceeded 90% in all treatments at both sites. Several size demographics, including shell height, shell length, and the SL/SH ratio (the shell fan) were not affected by urchins; however, urchins produced oysters with deeper cups, heavier shells, and greater dry tissue weight. Visually, the presence of urchins improved body condition, mantle condition and shell fullness of the oysters. Importantly, oyster shells were noticeably cleaner, having most of the epibionts removed, providing a product that required minimal cleaning. Preliminary estimates of mesh biofouling were determined by photography. Although this method only provides a qualitative estimate of the level of biofouling, urchins substantially reduced biofouling of cages in Alligator Harbor (though not in Oyster Bay). The reduction in biofouling was directly correlated to an increase in urchin density, providing a cleaner cage for oyster culture. The differences between sites warrant further investigation.

The potential of urchin/oyster co-culture is exciting. Additional research is needed to evaluate hatchery-reared urchins and to evaluate smaller oyster seed in relation to different size classes of urchins. It is hypothesized that urchins could be important in enhancing oyster aquaculture over a longer culture period, possibly reducing labor, leading to more acceptable and profitable oyster culture outcomes for the farms. There are at least two studies underway (one in North Carolina, one in Atlantic Florida) exploring some of these questions. We would be remiss if we did not indicate that urchins are themselves a seafood delicacy, with a high farm gate value. In this study, urchins that produced large gonads produced a highly acceptable roe with excellent flavor characteristics (authors professional opinion of course). We now have evidence that urchin cage co-culture, or even urchin cage culture without oysters, may be an innovative and viable industry in appropriate habitats.

We acknowledge the support of the Gulf States Marine Fisheries Commission and the Mississippi-Alabama Sea Grant for current and historical funding. We also appreciate the support of Oyster Boss and Pelican Oyster Company and the teams at AUSL and UAB for field assistance. A video presentation of this project can be viewed at <https://youtu.be/zEVXcJJciHw> (at the 36 minute mark).

Stephen Watts, University of Alabama-Birmingham
Bill Walton, Virginia Institute of Marine Science

Student Presenters: San Diego called...and it wants to see you!

As part of Aquaculture 2022, the Triennial meeting of the National Shellfisheries Association, World Aquaculture Society, and the Fish Culture Section of the American Fisheries Society, and the National Aquaculture Association will be held in San Diego, California - commonly referred to as America's Finest City - on February 28 – March 4, 2022, the Student Endowment Fund (SEF) Committee is supporting great opportunities for *graduate* student members of the NSA that plan to present their original research at this meeting.

Student travel awards

To assist with the costs of attending this meeting, the SEF provides a lottery-based system that offers waivers for either registration costs or accommodation costs. The application deadline to participate in this lottery is **November 1, 2021** and the application form can be downloaded at: www.shellfish.org/grants-and-awards

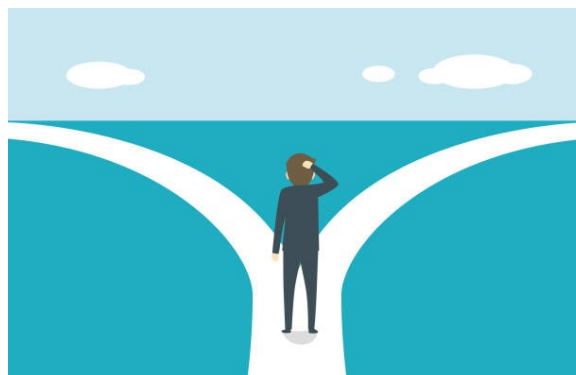
Student presentation awards

The NSA will be adjudicating competitions for both its Thurlow C. Nelson (outstanding talk) and Gordon Gunter (outstanding poster) Presentation Awards. The winners of these awards will receive membership for two years in the Association and a certificate of accomplishment. Graduate students wishing to participate in these competitions should do the following:

- Submit your abstracts by the conference deadline of **October 15, 2021**.
- Email Dr. Peter Kingsley-Smith indicating that you wish to compete for these awards no later than **December 31, 2021** (kingsleysmithp@dnr.sc.gov). Please include your name, presentation type (oral or poster), and presentation title.
- Ensure that you have renewed your membership of the NSA or joined the Association no later than **December 31, 2021**.

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

Did you spend years in school earning a Ph.D – saw the light and are now a commercial shellfish grower?
Let us know!



We will be doing an article highlighting the profitable application of your accumulated knowledge to the commercial sector.

Still Seeking Authors for Biographies for Honored Life Members

This is an on-going plea to get biographical information for Honored Life Members posted on our web page. Thanks to Jenny Shinn for her piece on A.F. Chestnut (see pg 10), and Kay McGraw, who volunteered to prepare a piece on her major advisor, Gordon Gunter. We are still seeking bios for the following individuals, several of whom are the namesakes of our major awards. All of these individuals deserve recognition and newcomers to the field should have the opportunity to learn of their contributions. It's not an onerous undertaking and can be fun – please give it some thought. If you are interested in doing some digging and writing a short biography on any of these folks, please get in touch with Sandy Shumway (Sandra.shumway@uconn.edu). The article does not have to be long, just informative. Some information can be found in *Taming of the Oyster* and contacting individuals who knew the members could also prove rewarding.

Jarvey W. Wiley
Trevor Kincaid
Pieter Korringa
Hugh Smith
Cedric Lindsay
Paul S. Galtsoff
R.E. Coker
Ronald Westley

J.L. McHugh
Walter A. Chipman
Philip Butler
Wesley Coe
Robert Lunz
Robert Ingle
H. Butler Flower

NEW DATES

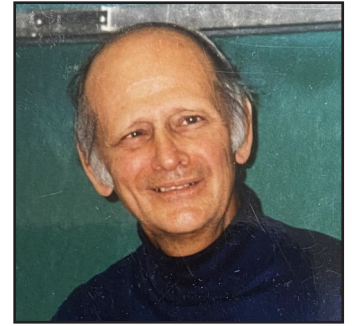


August 15-18, 2022

For more information: www.was.org

In Memoriam: Walter J. Canzonier
February 6, 1936 - June 21, 2021

Walter Canzonier, NSA Wallace Awardee, passed Monday June 21, 2021. His life was dedicated to helping the shellfish industry. Walt was a bit eccentric as The Short Fat Red-Haired Guy (TSFR-HG) from Bivalve-sur-Maurice or Old Weird Walt (OWW) from Manasquan-sur-Mer. It was a ruse, along with the greeting 'how's the garugala', that he used to eliminate affectations and pretentiousness. He was not impressed by degrees or positions. He cared about helping people learn and understand science and history so that they could be successful. He helped fishermen and farmers produce shellfish sustainably and profitably. He cared about public health, particularly when it involved shellfish. And he insisted that regulations be supported by scientific evidence - 'show me the data' he would exclaim.



Walt spent much of his career at Rutgers and the evolution of the Haskin Shellfish Research Laboratory, conducting research, designing equipment, and designing the lab itself. As a graduate student of Hal Haskin, he helped identify MSX as the cause of sudden widespread oyster mortality. But Rutgers rejected his fluency in Italian to meet a foreign language requirement because there was 'not enough science published in Italian'. So, Walt moved to Chioggia, Italy, took a position at a marine lab and began publishing his research in Italian. After a decade helping marine labs and shellfish programs across Europe, he moved back to New Jersey. His impact is not easily quantifiable in publications, grants obtained, and policies developed. It is quantified in the people he helped. John Kraeuter, NSA Past-President, Wallace Awardee and Associate Director of the Haskin Shellfish Research Laboratory best summed it up:

"It is really, really, really difficult to capture the unique individual that was Walt Canzonier. Walt was a true Renaissance individual. In addition to science (ecology, analytical chemistry, histology, bacteriology, algal and bivalve culture, and basic biology of most marine/estuarine organisms), he was remarkably knowledgeable about the history of New Jersey, Rutgers University, the New Jersey Experiment Station, the Jersey Shore, Delaware Bay and its oyster community, ATT, locations of old train lines serving NJ and the Jersey Shore, the origin of many of the rules and regulations on shellfish in NJ (and many other states), and those issues covered by the ISSC. In addition, he could tell you about the history of most mechanical and electrical devices and could repair most of them including autoclaves, boilers, anything electrical, small gas and diesel engines, and even make parts he needed by machining them. I remember learning about the glass industry in NJ, the origin of Wheaton Glass Company, coupled with an aside on the reason for the different shapes of glass milk bottles. Oh, yes, he was also an accomplished carpenter and plumber, and I'm sure I missed other things he was able to construct, repair, or design."

Most of all, Walt had a strong desire to help everyone who would expend some effort to learn. He took nearly everyone he met under his tutelage, and everyone was better for it. Walt invariably helped students, visiting professionals and others at the Haskin lab and elsewhere. Not only did he help with the science, but he helped finding equipment stored in various places around the lab or making something to do the job. He assisted with finding places to stay and helped with all sorts of paperwork (taxes, visas, grant rules and regulations, etc. etc.). Within the shellfish community, Walt helped the nearby New Jersey shellfish businesses, but was also on the phone or in person, assisting in the broad area from Massachusetts to the Carolinas and beyond, regularly attending many arduous ISSC meetings. In the 25 years I was at the Haskin Lab, Walt did all of this and worked around the lab and with numerous individuals in the Delaware Bay shellfish community - gratis. All he asked was that you learned, not just the answer to your question, but its history and how to think about solving problems. In addition, he was a great editor and would not allow vagueness, poor word choice, poor punctuation, or other grammatical errors. If you used a word incorrectly, you would receive a comment about the etymology of the word, the difference between what you said and the proper use of the word or phrase, and what to substitute.

The ubiquity of Walt's desire to help and his unique persona can be summed up by Eric Powell describing a trip that included several marine labs in Europe shortly after he became Director of the Haskin Shellfish Research Laboratory. Eric said it didn't matter where he was, after it became known that he was from the Haskin Lab, the first question asked was "How's Walt?". Walt was one-of-a-kind and the shellfish industry, particularly in NJ, will be much diminished without his presence and help. I know I will miss him.

For anyone that may have never understood what a garugala is, Walter kept this definition framed in his office: *"The Garugala, of course, is the thing that you keep in your house for entertainment, just for entertainment. If your house is large enough, you may retain several "Garugale" (note the proper pluralization, never garugalas), one in each room. It is composed of a variety of components, both physical and metaphysical in nature, and it comes in a number of forms; there are even 40 cm models for small children. It is fabricated, usually but not always, of a bit of this and a bit of that, a bit of allegria and a bit of fantasia, properly commingled and adjoined. It may be finished in various colours, and it is most common to change the colour on an annual basis. It is strictly for entertainment. The word is frequently mispronounced as garugalla; but this is certainly quite incorrect, being a dialectical term used in Roma and elsewhere. For proper operation and prolonged service, the "Garugala" requires some periodic maintenance; in very damp, especially foggy, weather one must apply a few drops of oil to critical points. This is preferably done at about 0600 every Sunday morning. It is best to use imported olive oil, extra virgine if available. It is often said that the "Garugala" originated in the ancient and elegant city of Chioggia, Italia NE, during a chance encounter of a group of scemi della Finanza with a weird eclectic from the west (hence the term OWW). - TSFR-HG 13/12/90"*

More of Walt's accomplishments can be found at the NSA website. Walt was 85 when he passed. Keep an eye on the Garugala!

David Bushek
Rutgers University, Haskin Shellfish Research Laboratory

Recruits' Corner

Fellow Recruits,

We hope that you are staying healthy and having a productive field season, despite the ongoing pandemic. Before summer gets away from us, we wanted to remind you of upcoming deadlines and opportunities.



The abstract submission deadline for the 114th Annual Meeting held February 28th - March 4th 2022 in San Diego, CA is **October 15th**. This is the Triennial meeting held in conjunction with several other societies. The Triennial meeting is a great opportunity to network and

share your work. Abstract submission and registration is on the WAS website (<https://www.was.org/meeting/code/AQ2022>). Don't forget to indicate that you are a graduate student and would like your presentation to be judged. Every year NSA gives awards for the best poster and the best oral presentation, and winners receive two years of NSA membership! Find more details on the Student Presentation Awards on page 5. We are currently coordinating with student representatives from other societies to plan several fantastic student-focused activities. We'll keep you up to date as planning continues.

For those presenting at the Triennial, don't forget to apply for the NSA Student Endowment Fund travel awards. The awards help cover lodging and/or registration at the conference. Travel awards are given by a lottery system and the deadline to submit applications is **November 1st**. (<https://www.shellfish.org/sef-student-presentation-and-travel-awards>)



Finally, start preparing your proposals for NSA student research grants. The NSA provides three separate grant opportunities for graduate students, which offer \$1250 each in flexible project funding. The deadline to submit grant applications is **November 1st**. (<https://www.shellfish.org/student-research-grants>)

As always, email Hannah (hannah.i.collins@uconn.edu) or Alex (armarquardt@vims.edu) if you have any ideas, concerns, or questions.

Hannah and Alex

Award Deadline November 1st

Nominations for:

- Honored Life Member Award
- David H. Wallace Award
- Neil Bourne - Ken Chew Award
- Paul Galtsoff Industry Award

Visit www.shellfish.org for specific award descriptions and instructions

Send nominations to the
Chair, Past-Presidents Committee:

John Scarpa

pastpresident@shellfish.org

Student Research Grant Awards:

- Melbourne R. Carriker Award
- Michael Castagna Award
- George R. Abbe Award

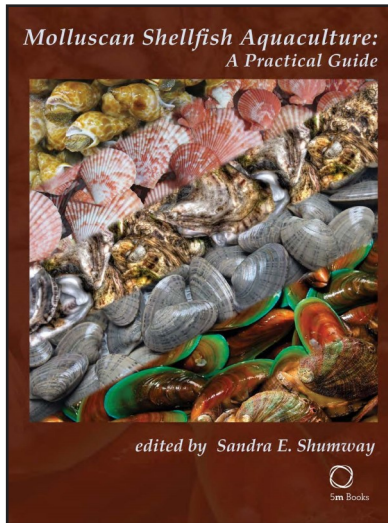
SEF Presentation/Travel Awards

Applications are available at:
www.shellfish.org



Book Review: Molluscan Shellfish Aquaculture: A Practical Guide

Don Webster and Don Meritt



Those of us in shellfish aquaculture agree with Editor Sandy Shumway's opening statement that advances in land-based hatchery systems coupled with coastal grow-out have allowed the industry to prosper, with strong potential for advances. That will continue as more researchers and students become involved in solving identified problems and building on knowledge of those who led the way. A single volume cannot include everything learned about the culture of all bivalve species. That would take volumes. This book provides a stellar history combining basics of culture that provides a path leading users to more in-depth material.

Editor Shumway assembled authors from academia and industry from around the world and recognized as experts in their disciplines and businesses. Their chapters span species and topics needed to understand this exciting and expanding area of aquaculture. The information provides an excellent 'first stop' for those interested in molluscan shellfish culture. References in the Further Reading section, with others in

individual chapters, create pathways to a wealth of additional knowledge.

Nine species groups range from edible and pearl oysters, clams and giant clams, to scallops, mussels, abalone, conch and marine snails. Chapters include biological information while advancing through their production techniques. Hatchery and nursery systems are included, as are grow-out methods to harvest. Diseases and pests affecting the animals are presented with discussion of emerging opportunities. Hatchery portions cover broodstock considerations and conditioning, as well as spawning and larval care. Largely through hatchery development molluscan shellfish production has become a leading aquaculture business.

The publication includes excellent graphics with chapters supported by quality drawings and color photographs. Many are of commercial production operations or the best research facilities in the world. Tables and graphs aid in understanding the scope and size of shellfish production.

We were pleased that the manual covers subsidiary topics critical to success in aquaculture. Site selection affects biological functioning of animals but in many geographic areas, social aspects of siting facilities raises issues of coastal use. Topics such as global warming, sea level rise and ocean acidification are important for research to aid in developing profitable businesses. Those of us who work in policy areas recognize the effect these can have on profitable shellfish businesses.

Since we generally raise molluscs to consume, we must understand potential for microbial contaminants and biotoxins that affect them. Information on classification of growing waters and consideration of potential toxins when developing effective businesses is included for reference.

Design and construction considerations for a molluscan hatchery include understanding of siting and components needed for successful operation. Worksheets provide effective planning tools with chapters on algal culture, genetics, and shellfish diseases. Genetic manipulation has made profitable production possible in areas of disease, and lines bred to grow rapidly or exhibit higher meat yield are now used. In the field, controlling biofouling on animals and gear is vitally important for production and information is included on this issue.

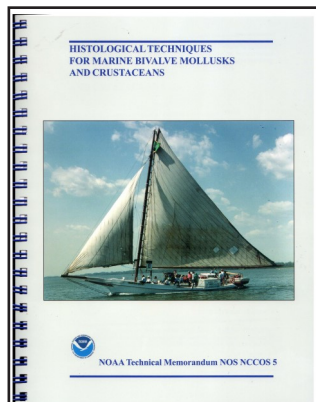
Well-researched information is provided on regulations, spatial planning, best practices and certification important when researching locations where farming may be practical. The list of certification programs includes environmental and social schemes with a worldwide suite of organizations engaged in this area.

Strong chapters address marketing and business planning. These have information on consumer demand and include advice on where and how to target a variety of markets, calculate prices and develop market plans, with a sample provided for an oyster farm. The final chapter expands market data for a sample plan over a period of years to show cost and return making a business profitable or causing it to fail. In all, the book provides a wealth of information produced by a stellar group of authors from many decades of research aimed at this important and historic segment of the aquaculture industry.

We see *Molluscan Shellfish Aquaculture: A Practical Guide* finding many audiences, such as those wanting to understand practices developed through science to lead the industry into this new century. It provides an outstanding text for courses designed to educate students – the next generation to move our industry forward - as it provides the current nexus on the suite of knowledge needed. This includes biology, engineering, and economics, as well as a foundation in policy and political issues that affect where shellfish aquaculture is conducted. We are sure it will become a standard among those with a passion to advance knowledge bringing profitable production to molluscan shellfish products throughout the world.

Two Opportunities to add to Your Personal Library

Get your printed copy of *Histological Techniques for Marine Bivalve Mollusks and Crustaceans* while supplies last.



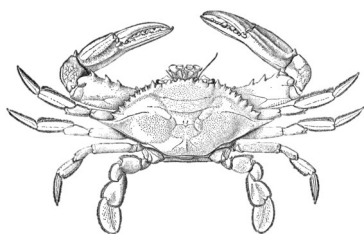
The NOAA Cooperative Oxford Laboratory is offering color copies of their 'go to' histology resource printed on waterproof paper and spiral bound for ease of use in the lab. This manual is being used worldwide as a reference guide for histological processing of shellfish, principally bivalve molluscs and crustaceans. Many of the techniques are also useful for fish and other marine species. The 2004

edition, authored by D.W. Howard, E.J. Lewis, B.J. Keller, and C.S. Smith, is available upon request at no charge (shawn.mclaughlin@noaa.gov or jay.lewis@noaa.gov). For multiple copies, help with shipping costs would be appreciated, if possible.

NOAA Cooperative Oxford Laboratory is seeking a good home for a unique collection of crustacean and other invertebrate-related journal reprints. The reprints were collected by Dr. Phyllis T. Johnson (1926-2018), a pioneer of marine invertebrate pathology (Stentiford, 2016) and world renown scientist. She was the first woman president of the Society of Invertebrate Pathology. Thousands of reprints are organized alphabetically in her collection and some foreign article translations are included. Many of the reprints were likely amassed by Dr. Johnson while researching the first published annotated bibliography of pathology literature related to non-insect invertebrates in 1968. For more information, contact shawn.mclaughlin@noaa.gov.



Stentiford, G.T. 2016. Phyllis T. Johnson – Pioneer of marine invertebrate pathology. *Journal of Invertebrate Pathology*, 138: 120-125.



NSA Pacific Coast Section News Greetings from the Pacific Coast!

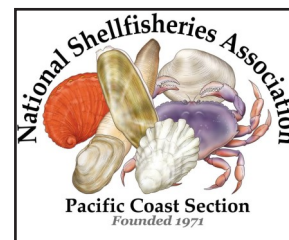
Preparations are in full swing for the upcoming 75th Annual Shellfish Conference to be held remotely September 20-22, 2021. For those of you unfamiliar with this West Coast event, it is a joint meeting of the NSA-PCS and the Pacific Coast Shellfish Growers Association and affords a great opportunity for growers, researchers, agency staff, industry partners, and students to explore new research findings, consider public policy issues facing the shellfish industry, and to share stories and learn from each other's experiences. This will be our second time hosting the event online, which means all of the benefits of a virtual meeting (i.e., plenaries in our pajamas and cheap drinks during socials) without the technological bugs. After all, we're all experts at meeting online now, right?

We anticipate three jam-packed days of insightful guest speakers and riveting presentations from seasoned professionals and bright students alike. This year's meeting will feature a keynote panel on issues of diversity, equity, and inclusion in shellfisheries, aquaculture, and science and management. Speakers will offer perspectives on making industries and institutions more welcoming and accessible. We're also pleased to announce that the John Lentz Profiles in Innovation Speaker this year will be J. Evan Ward, head of the Department of Marine Sciences at the University of Connecticut, who will share his work using video endoscopy to elucidate biological processes in bivalves. In addition to these invited speakers, we'll be treated to more than 40 contributed presentations with plenty of opportunities for Q&A. Each day will end with a focused workshop on topics relevant to West Coast shellfisheries and aquaculture: monitoring and control of European green crab; management of shell-boring polychaetes (*Polydora* spp); and updates from the Pacific Northwest Crab Research Group highlighting recent crab research across the PNW. All of this plus tradeshow spotlights, student awards, and a silent auction!

While we will miss seeing everyone in person again this year, we are excited that this virtual meeting offers new opportunities to expand participation and remove geographical (and financial) barriers. Everyone is welcome regardless of the coast you call home. It's not too late to register; cost is only \$150 for NSA members and \$100 for student members. Not a NSA-PCS member? Not a problem! Membership in the Pacific Coast Section is only an additional \$10 on top of the NSA membership fee. Register online at: <https://pcsga.org/shellfish-conference-2021>. Registration deadline is September 15th.

We hope to see you in September. Contact psean@uw.edu if you have any questions. As a reminder, the NSA-PCS Twitter feed (@nsapcs) and Facebook page (<https://www.facebook.com/pages/Pacific-Coast-Section-of-the-National-Shellfisheries-Association/1438569826443936>) are your best resources for news and information about the PCS and the 75th Annual Shellfish Conference. Please join our community online.

P. Sean McDonald
Pacific Coast Section Chair



A.F. Chestnut - Honored Life Member

By: Jenny Shinn



Alphonse (Al) F. Chestnut was born in Stoughton, Massachusetts on November 20, 1917 to parents of Lithuanian descent. The first in his family to go to college, he graduated from the College of William and Mary in 1941, where he played basketball and football as an All-American, which led to his later induction into the Athletic Hall of Fame. He worked summers for the U.S. Department of Agriculture and the Chesapeake Corp. of Virginia as an oyster biologist. He remained at W&M after graduation to coach freshman football, but soon received the offer of a graduate assistantship at Rutgers University, where he received his MS (1943) and PhD (1949) in zoology. He was a research associate at the Rutgers Oyster Research Laboratory, and then moved to The University of North Carolina Institute of Marine Sciences in Morehead City where he ultimately served as director from 1955-1980. During this time, he was also a professor of zoology. He served North Carolina on its Marine Fisheries Commission until 1985 and its Marine Science Council until 1989. He was active in regional fisheries management as well, serving for an extended period on the Atlantic States Marine Fisheries Commission and on the South Atlantic Fisheries Management Council.

Chestnut held nearly every position on the executive board of the National Shellfisheries Association at one time or another including, Secretary, Treasurer, Vice-president, and finally, President from 1953-1955. Chestnut was awarded an Honored Life Member to NSA in 1980. Involved in many other professional activities, he was also on the Editorial Board of Chesapeake Science, 1960-61. He was the host of the first AERS meeting in 1949 in Beaufort, NC, and a member of the AERS Board as Secretary-Treasurer from 1952-53. He was awarded Honorary Membership in 1981, and was a featured speaker at the AERS 50th Anniversary. Chestnut was a guest lecturer at seven colleges and universities in North Carolina and Mississippi, including Belhaven University, where his son would become a tenured professor many years later.

I had the pleasure of speaking with Chestnut's son, Al, to gather personal details about his father for this biography. Chestnut was married to his wife, Janet Wood Chestnut for 58 years and had three sons. Al, who followed in his Dad's footsteps as a biology professor, emphasized the strong role his father played in his community. He was chairman of both the Morehead City School Board (1955-1960) and Carteret County Board of Education (1961-1966) in Morehead City, NC. Furthermore, Chestnut was awarded an Outstanding Citizen Award by the N.C. Education Association in 1968. He was a devoted husband, father, and active member of his church serving as an elder for many years. He died April 18, 2001 at the age of 83.

Partial Bibliography (see website for further publications):

Chestnut, A.F. 1941. Late summer and early fall spawning of oysters and its relation to sets of commercial oysters. *Proceedings of the National Shellfisheries Association*: 37-40.

Nelson, T.C., and Chestnut, A.F. 1944. Some observations on the transplantation of two weeks old set and of older oysters *Ostrea*. *Proceedings of the National Shellfisheries Association*, 3 p.

Chestnut, A.F. 1946. Some observations on the feeding of oysters with special reference to the tide. *Proceedings of the National Shellfisheries Association*: 22-27.

Loosanoff, V.L., and Chestnut, A.F. 1948. Crabs as destroyers of oysters. Oyster Institute of North America, Trade Report No. 98. December 6: 1-2.

Chestnut, A.F. 1950. The use of a fathometer for surveying shellfish areas. *Science*, 111(2894): 667.

Chestnut, A.F. 1950. Studies on the digestive system of the oyster *Ostrea*. *Proceedings of the National Shellfisheries Association*: 11-15.

Chestnut, A.F. and Fahy, W. 1952. Studies of the setting intensity of oysters in Bogue Sound North Carolina. *Proceedings of the National Shellfisheries Association*, 49-59.

Chestnut, A.F. and Fahy, W. 1953. Studies on the vertical distribution of setting of oysters in North Carolina. *Proceedings of the Gulf and Caribbean Fisheries Institute*, 5: 106.

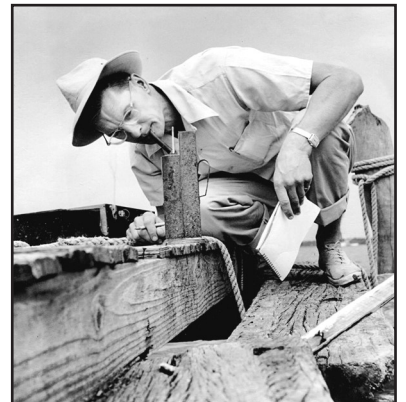
Chestnut, A.F., Fahy, W.E., and Porter, H.J. 1957. Growth of young *Venus mercenaria*, *Venus campechiensis*, and their hybrids. *Proceedings of the National Shellfisheries Association*, 47: 50-56.

Porter, H.J., and Chestnut, A.F. 1960. The offshore clam fishery in North Carolina. *Proceedings of the National Shellfisheries Association*, 51: 67-73.

Schwartz, F.J., and Chestnut, A.F. 1974. Biological Investigations of Noxious Coelenterates and Ctenophores in Coastal North Carolina. Special Scientific Report. Issue 27. North Carolina Division of Commercial and Sport Fisheries. Institute of Marine Sciences, University of North Carolina: 60 p.

Chestnut, A.F. 1974. Oyster reefs. Chapter 5. In: Odum, H.T., Copeland, B.J., and McMahan, E.A. (Eds). *Coastal Ecological Systems of the United States*. Volume 2. The Conservation Foundation, Washington D.C.: 171-203.

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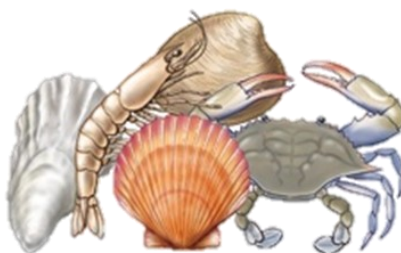
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Upcoming Events

Global Conference on Aquaculture Millennium +20: Sept. 22-27, 2021. Shanghai, China. For more information: <https://aquaculture2020.org/registration/>

Aquaculture Europe 2021: Oct. 5-8, 2021. Funchal, Madeira, Portugal. For more information: www.aquaeas.org

Aquaculture 2022 (Triennial): Feb. 28-Mar. 4, 2022. San Diego, CA. For more information: www.was.org

23rd International Pectinid Workshop: Apr. 20-26, 2022. Douglas, Isle of Man. For more information: www.internationalpectinidworkshop.org

Aquaculture Canada/WAS North America 2022: Aug. 15-18, 2022. St. John's, Newfoundland, Canada. For more information: www.was.org

Aquaculture America 2023: Feb. 19-22, 2023. New Orleans, Louisiana. For more information: www.was.org

115th NSA Annual Meeting: Mar. 21-25, 2023. Baltimore, Maryland. For more information: www.shellfish.org

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, Steven Allen (sallen@bowdoin.edu).