

National Shellfisheries Association

QUARTERLY NEWSLETTER



SPRING 1990

LEWES, DELAWARE

NSA ANNUAL MEETING, WILLIAMSBURG, VIRGINIA

The 82nd annual meeting of the National Shellfisheries Association was jointly held with the Shellfish Institute of North America (SINA) and the National Blue Crab Industry Association (NBCIA) at the Williamsburg Hilton Hotel in Williamsburg, Virginia from April 1-5, 1990. The NSA technical program, arranged by Carter Newell, consisted of 175 oral presentations and 27 poster presentations. Of the 175 oral presentations, over 20 percent were given by students. Special sessions this year included: Red Tide, Effects of Anthropogenic Inputs on Bivalves, Reproductive Biology of Mollusks, Artica, Vibrio, Feeding by Bivalves, Production Modelling, Introductions and Transfers of Mollusks, Settlement and Recruitment, Status and Trends, and Shell Disease in Marine Crustaceans. Program Chair Newell did an outstanding job in organizing the largest ever NSA technical program. External funding for several special sessions was generously provided by New England Fisheries Development Association, Inc., U.S. Food and Drug Administration, SINA, NOAA Status and Trends Program, National Coastal Resources Research and Development Institute, and Great Eastern Mussel Farms, Inc. Thanks go to all members of NSA, SINA and NBCIA who helped make this year's meeting such a great success.

Ken Chew again organized a well-attended and very tasty Chinese Dinner at Mr. Liu's Restaurant across the street from the Williamsburg Hilton. Tuesday evening, April 3rd, was the night for "pigging-out" at the Southern Style Pig Roast at the Hilton. Entertainment was provided by the band *Morning Flight* who were ably assisted by our own John Ewart and Carter Newell who just happened to have their guitar and fiddle, respectively, handy. Bob Rheault (aka Dr. Strangelove) gave an eye-opening tongue-in-cheek slide show entitled "Do Clams Feel Pain?" Thanks to Ken, John, Carter, and Bob!

The 1990 Thurlow T. Nelson Award for best student paper was given to two individuals this year: Brad Baldwin, Horn Point Environmental Labs, University of Maryland, for his paper entitled "Omnivorous feeding by *Crassostrea virginica* larvae: consumption of naturally occurring phytoplankton, protozoa, and bacteria", and Elizabeth McGovern, School of Marine Science, College of William and Mary, for her presentation entitled "Classification of the Haplosporidiidae." In addition, two students were awarded Honorable Mention: Rikk Kvitek, Department of Zoology, University of Washington, for his presentation entitled "Paralytic shellfish poisoning toxins as a chemical defense in butter clams: the evidence", and Bonnie Brown, Chesapeake

Scientific Investigations Foundation, Richmond, Virginia, for her presentation entitled "Mitochondrial DNA analysis of native and selectively bred Chesapeake Bay oysters, *Crassostrea virginica*." Congratulations to Brad, Elizabeth, Rikk, and Bonnie for their well-prepared and well-presented papers. The Nelson Award winners were selected by a committee chaired by Sandy Shumway, and included Arnie Eversole, Susan Ford, Pat Gaffney, Mel Carriker, Mike Castagna, Roger Newell, and Michael Lesser. Papers were judged on the basis of scientific content, presentation, quality of visual aids, and handling of questions. Thanks to the committee for evaluating all of the student papers presented this year. Student Endowment Fund Travel Awards were presented for the first time to six NSA student members who presented papers at the Williamsburg Meeting. Awards went to: Beth Turner, University of Delaware; Maureen Krause and Jihyun Lee, State University of New York, Stony Brook; Brad Baldwin, University of Maryland, Horn Point; William Michener, University of South Carolina; and Jay Parsons, University of Guelph. Congratulations to Beth, Maureen, Jihyun, Brad, William, and Jay.

NSA Student Endowment Fund

The NSA Student Endowment Fund was established in 1989 to facilitate the participation of NSA student members at Annual Meetings. Students are a vital part of our organization and the Fund was established for the express purpose of providing financial assistance to student members who wish to present their research at our Annual Meetings. Student stipends vary quite a bit between institutions and many students find it difficult to finance their attendance at national meetings. Contributions to the Fund are tax-deductible since NSA is a non-profit organization and your donations will help foster the input of creative young individuals to NSA. You may also support the Student Endowment Fund with your purchase of an NSA mug or lapel pin (designed by President-Elect Sandy Shumway). NSA mugs are available for \$7.50 and lapel pins are available for \$5.00; please see the order form in this newsletter or contact: Sandy Shumway, Department of Marine Resources, West Boothbay, ME 04575, (207) 633-5572. Thank you for your support.

President's Message

The dependency of NSA on unselfish volunteers was demonstrated by the success of the recently concluded 82nd Annual Meeting in Williamsburg, VA. We had over 260 registrants; over 200 oral and poster presentations; 37 student presentations in competition for the Thurlow C. Nelson prize; plenary, invited, and contributed sessions; and a wide diversity of topics for nearly every interest in shellfisheries. The President's Reception, Banquet, Awards Luncheon, and Ken Chew's Chinese Meal allowed for pleasure to mix with business. And all of this was largely due to the hard work of many people who volunteered because of their commitment to NSA and its goals. Our 82-year-old organization will continue to thrive as long as we have dedicated people of this sort, as well as enthusiastic scientists to attend meetings and tell us of their work. Volunteers help the society in other ways as well. Elsewhere in this issue, you will find information on the various committees that strive to shape our future. My goal in asking people to help by serving on committees was to bring in individuals from all over North America, to introduce younger scientists to the governance of NSA, and to involve our Members-at-Large in at least one committee activity.

One committee that is new this year is the Constitution Committee. The responsibilities that fall on the shoulders of our Secretary-Treasurer are becoming too great for one person. Tom Soniat performed yeoman and utterly dependable service for NSA in this position this past year and deserves the Society's best thanks. However, it is time to split the position into two, which will require a Constitutional change. This will provide an opportunity to tidy up other constitutional matters as necessary. You will receive an opportunity to vote on the proposed changes in a few months.

Other matters that I would like to consider over the next year include a decision on who can print *JSR* for us most economically and efficiently. The members of our Publications Committee are attending to that now, and will soon be considering ways to make *JSR* more self supporting and to help Editor Shumway as she continues to enhance the quality and visibility of the journal.

Other changes are occurring as well. For example, this issue of the newsletter has a new appearance. This was done as a symbol of transition and as a salute to the fine efforts of John Ewart, who is turning editorial responsibilities over to Carolyn Mueller Hansen during a transition year. Our newsletter is a vital tool that allows our members to "encounter" NSA four times a year. John has been an excellent editor of the Newsletter and, because Carolyn works in the same institution and because she volunteered to help the NSA in this way, I feel confident that John's high standards will continue to be upheld.

As I said earlier, we depend on volunteers such as those named above and listed elsewhere in this issue. But we also depend on you. In addition to seeking your approval of constitutional changes, I hope to develop a questionnaire about NSA, its goals and standards, the quality of our publications and meetings, the timing of our meeting, etc. I welcome your suggestions about significant questions to be asked and I ask

you to please respond when you receive the questionnaire this autumn.

Finally, keep in mind that our next meeting will be in Portland, Maine from June 23 to 27, 1991, and that we join World Aquaculture Society and the Fish Culture Section of the American Fisheries Society to celebrate Aquaculture '92 in Orlando, Florida from May 21 to 25, 1992.

Victor S. Kennedy



1990 NSA BUSINESS AND AWARDS LUNCHEON: President Vic Kennedy (left) presenting past-President Scott Siddall with a plaque in recognition of Scott's many years of service to NSA.

83rd ANNUAL NSA MEETING 1991

The next annual meeting of the National Shellfisheries Association is scheduled for Sunday, June 23, through Thursday, June 27, 1991 in Portland, Maine. The meeting will be held at the Portland Sonesta Hotel. Sandy Shumway is chairperson of the Local Arrangements Committee and Arnie Eversole is chairperson of the Program Committee for the Portland meeting. Abstract forms will be sent out sometime in November and abstracts will be due in February. All questions about local arrangements should be directed to:

Sandra Shumway
Department of Marine Resources
West Boothbay, ME 04575
(207) 633-5572

Comments, suggestions and/or ideas for special session topics and the 1991 NSA program should be directed to:

Arnold Eversole
Department of Aquaculture,
Fisheries and Wildlife
Clemson University
Clemson, SC 29631
(803) 656-3117

Start planning now to attend!!

Summary of the 1990 Annual Business Meeting

The 1990 Business Meeting was held on Wednesday, April 4th, as part of the NSA Awards Luncheon. Outgoing President Scott Siddall thanked those members who had carried out various jobs in the organization of the past year. Especially important to the success of this year's meeting were Carter Newell (program), Tom Soniat (registration), Roger Mann (arrangements), Vic Kennedy, Sandy Shumway, and everyone else who helped with the organization and smooth running of the meeting.

Secretary-Treasurer Tom Soniat presented the financial report with a summary of the Association's accounts of the three cost centers (Administrative, Publications and Annual Meeting; see budget on this page). Audit-Budget-Finance Chair George Abbe concurred with Tom's financial report.

Honored Life Membership Awards were presented to Mike Castagna and Neil Bourne. Mike's and Neil's career accomplishments and contributions to NSA were reviewed by Roger Mann and Ken Chew, respectively. Both Mike and Neil were present to receive their awards.

President Siddall then passed the gavel to President-Elect Vic Kennedy. President Kennedy thanked Scott for his many contributions over the years and noted that Scott has held virtually every office in the NSA organization at one time or another. President Kennedy announced his 1990-91 Committee appointments:

Audit-Budget-Finance: George Abbe (Chair)
Bruce Barber
Mike Crosby

Honorary Membership: Mel Carriker (Chair)
Dave Armstrong
Cathy Enright
Susan Ford

Membership: Dot Leonard (Chair)
Neil Bourne
Ron Dugas
Peter Lawton

Program: Arnie Eversole (Chair)
Monica Bricelj
Stan Allen

Publications: Mike Castagna (Chair)
John Kraeuter
Chris Langdon
Roger Newell
Sandy Shumway
Eric Powell

Resolutions: Monica Bricelj (Chair)

Site Selection and Arrangements:
Sandy Shumway (Chair)
Vic Kennedy
Arnie Eversole

President's: Scott Siddall (Chair)
and all Past-Presidents

Elections: Scott Siddall
Vic Kennedy
Sandy Shumway

Constitution: John Kraeuter (Chair)

NSA Newsletter Editor John Ewart will be assisted by new co-editor Karolyn Mueller Hansen during 1990-91.

NATIONAL SHELLFISHERIES ASSOCIATION BUDGET SUMMARIES FOR FISCAL YEARS 1988-89, 89-90 & 90-91 (Prepared 3/21/90)

	Actual FY 88-89	Projected FY 89-90	Proposed FY 90-91
Administrative Cost Center:			
Revenues	\$20,761.61	\$18,100.00	\$18,500.00
Expenses	<u>3,843.24</u>	<u>1,661.62</u>	<u>2,898.00</u>
Net	+\$16,918.37	+\$16,438.38	+\$15,602.00
Publications Cost Center:			
Revenues	\$36,257.55	\$ 9,533.68	\$26,200.00
Expenses	<u>77,841.93</u>	<u>11,352.41</u>	<u>49,500.00</u>
Net	-\$41,584.38	-\$ 1,818.73	-\$23,300.00
Annual Meeting Cost Center:			
Revenues	\$19,948.43	\$ 2,409.51	\$26,900.00
Expenses	<u>3,589.84</u>	<u>889.00</u>	<u>14,400.00</u>
Net	+\$16,358.59	+\$ 1,520.51	+\$12,500.00
GRAND TOTAL (per FY)	-\$ 8,307.42	+\$22,569.77*	+\$ 4,802.00
BALANCE FORWARD	+\$ 6,429.61	---	---

* Balance in accounts as of 3/21/90

Audit-Budget-Finance Update

Total revenues for the 1988-89 fiscal year (October 1, 1988 to September 30, 1989) were \$76,967.59, and expenses totalled \$85,275.01 for a net loss of \$8,307.42. Much of this loss was associated with production of the *JSR*. We produced four issues in 1988, and paid for it in the 88-89 fiscal year. We had projected publication revenues to be \$27,195 and publication expenses to be \$53,900 for a net loss of \$26,705; as it turned out, revenues were \$36,257.55 and expenses were \$77,841.93 for a net loss of \$41,584.38. We were confident that this deficit would be covered by our dues increase and by profits from our annual meeting in Los Angeles in February 1989. Well it almost was. At least everyone is up to date on *JSR*, and we ended the 88-89 fiscal year with a balance of \$6429.61 (less than we would like, but still in the black). Hopefully, with some increase in membership during 1990, 100% payment of page charges by authors, a profit from the 1990 meeting in Williamsburg, and careful management of the *JSR*, we can enlarge this balance by the end of the 1989-90 fiscal year.

Our proposed budget for the 1990-91 fiscal year, which begins 1 October 1990, projects a gain of \$15,602 in the administrative cost center, a loss of \$23,300 in publication costs, and a gain of \$12,500 associated with the 1991 meeting in Portland, Maine. This would increase the Association's balance by \$4802 in 1990-91.

George Abbe, Chairman
Audit-Budget-Finance Committee

Summary of the 1990 Executive Committee (EXCOM) Meeting

The EXCOM meeting was held on Sunday, April 1, 1990. Secretary-Treasurer Tom Soniat presented the financial report with a summary of accounts of the three cost centers: Administrative, Publications and Annual Meeting. Our administrative costs are relatively small (\$1661.62 for FY 89-90 as of March 1990) while publication costs represent the largest portion of our annual expenditures (\$11352.41 for FY 89-90 as of March 1990; charges for JSR 8(2) are not included in this amount). The Annual Meeting is at least a break-even event this year and should generate additional monies for the general fund and we continue to strive to meet our financial goal of a year-end treasury balance equivalent to a one year operating budget of \$60,000.

Mike Castagna and Sandy Shumway (Chair, Publications Committee and Editor, JSR, respectively) reported on proposals submitted to NSA for the publication of the *Journal of Shellfish Research*. Proposals were received from Sheridan Press (our current publisher), Allen Press and Elsevier Publishing Company. The executive committee agreed that the Allen Press proposal was quite attractive and should be pursued. Mike will provide additional information on selection of a publisher as it becomes available.

President Scott Siddall presented a proposal to amend the NSA Constitution and By-Laws in order to divide the position of Secretary-Treasurer into two elected positions of Secretary and Treasurer. The proposed amendment will be decided by balloting the general membership.

The Sonesta Hotel in Portland, Maine was selected as the site for next year's 83rd annual meeting which will be held June 23-27, 1991. Arrangements Committee Chair Sandy Shumway is negotiating the contract with the hotel for rooms and meeting facilities.

President-Elect Vic Kennedy, our representative to the Aquaculture '92 Steering Committee, stated that the Aquaculture '92 meeting will be held in Orlando, Florida over the Memorial Day Weekend in 1992. This will be NSA's next triennial meeting with the World Aquaculture Society and the American Fisheries Society. Vic will provide updates as more information becomes available.

President Scott Siddall reported that there were 135 ballots cast in the election for 1990-91 Executive Committee officers. The results of the ballot were:

President: Victor S. Kennedy (elected in 1989)

President-Elect: Sandra Shumway

Vice-President: Arnold Eversole

Secretary-Treasurer: Thomas M. Soniat

Member-at-Large (1990-93): Bruce J. Barber

Congratulations to members of the 1990-91 EXCOM. All NSA members are reminded to send correspondence related to dues, address changes and other membership matters to Secretary-Treasurer Tom Soniat, Department of Biological Sciences, University of New Orleans-Lakefront, New Orleans, LA 70148, (504) 286-7042.



1990 NELSON AWARD WINNERS: President Vic Kennedy (left) and Nelson Award Committee Chair Sandy Shumway (right) presenting certificates to the 1990 Thurlow T. Nelson Best Student Paper winners Elizabeth McGovern and Brad Baldwin.

Short Communications

Communication received from C. Azevedo...

FINE STRUCTURE OF *PERKINSUS ATLANTICUS* N. SP. (APICOMPLEXA, PERKINSEA) PARASITE OF THE CLAM *RUUITAPES DECUSSATUS* FROM PORTUGAL

Carlos Azevedo, Department of Cell Biology, Institute of Biomedical Sciences, University of Oporto, 4000 Porto, Portugal

A new apicomplexan species, *Perkinsus atlanticus*, is described from gill filaments of the clam *Ruditapes decussatus* (Bivalvia) from Portugal, where it causes great mortality. The zoospores differ from those of other species of *Perkinsus* in size and shape, dimensions, insertion of the 2 flagella, and in the identity of the host. On the other hand, the life cycles states showed some ultrastructural differences compared with *Perkinsus marinus*, the only species previously studied in detail. When the clams were parasitized heavily, ultrastructurally similar life cycle stages were found in foot and mantle tissues.

Communication received from E. Williams and L. Bunkley-Williams...
GIANT CLAMS IN THE CARIBBEAN

We are aware of three projects in the tropical/subtropical Atlantic which are culturing Pacific giant clams (*Tridacna* spp.). We have contacted one project in Bonaire, Netherlands Antilles (with 600+ clams), we are attempting to contact one in Florida, USA, and we are searching for one in the northern Caribbean. Our project is not against businesses and is not anti-aquaculture. Our primary concern is ensuring that these clams have been screened for obvious parasites (such as *Perkinsus* spp.) and diseases. We hope to cooperate with the culture projects and with clam experts in the Pacific to prevent any diseases or parasites from being transmitted into the Caribbean. Such vigilance actually benefits the aquaculture community and protects existing fisheries resources in the region. We wish to contact any projects in our area which are culturing giant clams. We welcome any suggestions or cooperation in solving this problem. We appreciate the help of the Caribbean Aquaculture Association in searching for these clam projects. We leave the question of whether these animals would be a pest or a prodigy for the Caribbean to the theologians - Ernest H. Williams, Jr. and Lucy Bunkley-Williams, Caribbean Aquatic Animal Health Project, Department of Marine Studies, University of Puerto Rico, Lajas, PR 06667-0908 (Telephone (809) 899-2048 Ext. 211).

NOAA RELEASES REPORT ON WEST COAST SHELLFISH GROWING WATERS

NOAA's Strategic Assessment Branch recently released the third in a series of reports which evaluate the condition of the Nation's shellfish growing waters. "The Quality of Shellfish Growing Waters on the West Coast of the United States" analyzes conditions in California, Oregon, and Washington. Previous reports, produced by NOAA, covered both the east coast and the Gulf of Mexico estuarine waters.

The authors concluded that throughout the coastal areas of the United States, the molluscan shellfish industry is threatened by dramatic declines in production. Urban pollution has closed formerly healthy beds on both the East and Gulf coasts. In the Chesapeake and Delaware Bays, oysters, stressed by lowered oxygen levels (anoxia), have succumbed to diseases such as MSX and Dermo. The anoxia, a problem in many estuaries, is caused by runoff from heavily fertilized farmland and suburban lawns. The result is a dramatic decline in the nation's major source of oysters.

Chesapeake Bay produced over 32 million pounds of oysters annually until 1959. By 1989, landings had dropped 94 percent to 2 million pounds annually. Of even greater importance is the effect on the ecology of the bay. For example, prior to decline, Chesapeake Bay oysters filtered the entire bay every 3.3 days. It now takes 325 days, resulting in increased turbidity and reduced light penetration.

The West Coast of North America has, until recently, avoided many of the problems that have plagued the East Coast for more than a century. Now, however, the rapid development of West Coast metropolitan areas has placed environmental stress on the region's marine resources. Shellfish provide one of the most sensitive indicators of changing conditions. Previously healthy shellfish beds in all West Coast states have been compromised by pollution. San Francisco Bay, for instance, was producing 2.73 million pounds of oysters and 1.3 million pounds of clams annually at the turn of the cen-

tury. Today, the San Francisco Bay shellfishery has been utterly devastated by human and industrial waste.

Of the 2.3 million acres of shellfish growing waters in the West Coast estuaries, only 13 percent are classified. The reason: only public shellfishing grounds are classified. On the West Coast, all oyster production is on leased or privately-owned bottom or in leased water columns, in contrast to the East and Gulf Coasts where large areas of public harvest grounds are classified. The trend in the developing West Coast clam industry is toward leased bottom ground as well.

Over 75 percent of West Coast classified shellfish growing waters are located in Washington; 48 percent are approved, 25 percent conditionally approved, and 27 percent prohibited. Washington leads the West Coast in oyster production at an average of 6 million pounds annually. The majority of production occurs in Puget Sound and Willapa Bay, each of which produced 2.5 million pounds in 1985. Washington also leads in clam landings at over 8 million pounds, the majority of which are harvested from Puget Sound.

Between 1971 and 1985, Washington downgraded classifications from approved to conditionally approved or prohibited in 62,000 acres. These downgrades were attributed to declining water quality. Historically, these declines were linked to growth in urban areas and inadequate sewage treatment. In recent years, the declines were attributed to non-point runoff in residential suburbs, agricultural lands, and wildlife areas.

In Washington, water quality continues to decline, as evidenced by 1989 classifications. Production figures are down, while harvesting efforts have increased. Closures in formerly pristine areas such as Willapa Bay threaten shellfish production and the shellfish industry's survival.

California has experienced extensive urban growth in this century, as evidenced by the high percentage of prohibited waters -- 85 percent of potentially productive shellfish water. In 1985, oyster production in California was 1.2 million pounds, primarily from Drakes and Hum-

boldt Bays. Since 1985 many acres in Humboldt have been reclassified as conditionally approved due to non-point runoff during heavy rains. As a result, oyster production has declined dramatically. Drakes Bay has maintained good water quality; however, closures from red tide blooms have increased in frequency and aerial extent, reducing harvest time. Thus the California shellfish industry is struggling for survival.

The classification of Oregon's shellfish waters is distributed equally. Over 80 percent of the state oyster production comes from Tillamook Bay, which continues to experience closures, particularly during heavy rainfall. In spite of the increased use of Best Management Practices by Tillamook farmers, the bay is closed often and the result is a decline in production. The livelihood of the few remaining oyster growers is threatened by continuing declines in water quality.

The question raised in forums and meetings throughout the country is, "Can the molluscan shellfish industry survive?" Almost 60 percent of the processed product is imported. However, the half-shell trade still depends on domestically produced oysters and clams, and these must be harvested from clean waters. In view of the declining water quality, the U.S. cannot continue to meet the demand for this market. Unfortunately, we, as a nation, have not put a priority on preserving the water quality of our productive estuaries. Once waters are closed to shellfish harvest, they soon become unavailable for recreation and the support of other recreational and commercial species. Stricter enforcement of the provisions of the Clean Water Act and better controls on nonpoint pollution are essential, not only for the molluscan shellfish industry, but for the sake of all estuarine resources and users.

For report copies and additional information contact:

Dorothy Leonard

N/OMA31

Strategic Assessment Branch

6001 Executive Boulevard

Rockville, MD 20852

Phone: (301) 443-8843

Job Announcements

SUMMER TECHNICIAN POSITIONS are available at Rutgers Shellfish Research Laboratory starting in May 1990. We need to fill laboratory and field oriented positions in several areas of shellfish biology including genetics, larval culture, physiology, ecology, and parasitology. Dormitory accommodations will be available at both our main laboratory and hatchery. We seek talented undergraduates (or recent college graduates) who have interest in any of the above-mentioned areas. Apply as soon as possible by sending a resume and cover letter to: Dr. Stephen R. Fegley, Rutgers Shellfish Research Laboratory, P.O. Box 687, Port Norris, NJ 08349.

MOLLUSC LARVAL TECHNICIAN or PHYCOLOGICAL ASSISTANT A mollusc aquaculture facility in Woods Hole, MA seeks experienced individuals. Duties include maintenance of larval culture tanks, spawning of broodstock, maintenance of micro-algal cultures and other related hatchery chores. Good organizational skills are required. Please call or send resume to:

R. Taylor
P.O. Box 671
Woods Hole, MA 02543
(508) 540-3888.

Societies

INTERNATIONAL SOCIETY FOR MEDICAL AND APPLIED MALACOLOGY

Recognizing the need for a malacological organization devoted specifically to the concerns of applied malacology, i.e., to medical, veterinary and agricultural malacology, a group of medical, veterinary and general malacologists meeting at Los Tuxtlas, Veracruz, Mexico, in 1984 initiated such an organization, the International Society for Medical and Applied Malacology. This organization focuses its attention on mollusks as mediators of parasitic diseases of humans and other animals, and as pests to agriculture,

materials, etc. Annual dues for membership in the Society are US \$25.00, or equivalent, and should be sent to the International Society for Medical and Applied Malacology, P.O. Box 2715, Ann Arbor, Michigan 48106, U.S.A., or to Sociedad Internacional de Malacologia Medica y Aplicada, Apartado Postal 21360, Coyoacan, Mexico.

The Society publishes the *Journal of Medical and Applied Malacology*. Members receive the journal free of charge. Institutional subscription is US \$50.00, or equivalent, per year.

The Society also sponsors congresses on medical and applied malacology at periodic intervals. The First International Congress on Medical and Applied Malacology was held in Monterrey, Mexico, in June 1987. The Second International Congress on Medical and Applied Malacology (2nd ICMAM) will be held 25-30 June 1990 in Seoul, Korea. For more information please see meeting announcement below.

Courses and Meetings

SECOND INTERNATIONAL CONGRESS ON MEDICAL AND APPLIED MALACOLOGY

The Second International Congress on Medical and Applied Malacology will be held from June 25-30, 1990 in Seoul, Korea. For more information, please contact:

P.R. Chung, Secretary General,
2nd International Congress on Medical and Applied Malacology, c/o Institute of Tropical Medicine, Yonsei University, P.O. Box 8044, Seoul, 120752, Korea.

INTERNATIONAL CRUSTACEAN CONFERENCE

This conference is scheduled for Brisbane, Australia, 27 July 1990. Tentative subject areas are: aquaculture and fisheries; biogeography, paleontology and evolution; economics; ecophysiology and behavior; fauna of special habitats; feeding and physiology; parasites and

commensals; recruitment; reproduction, embryology, and larval development; taxonomy, systematic and phylogeny; and ultrastructure. Contact:

Crustacean Conference Secretariat, UniQuest Limited, University of Queensland, St. Lucia, Queensland, 4067, Australia.

AQUACULTURE INTERNATIONAL CONGRESS AND EXPOSITION

The 1990 *Aquaculture International* Congress and Exposition will be held on September 4-7, 1990 in Vancouver, British Columbia. For more information, please contact:

Project Manager, Aquaculture International Exposition, Suite 340 - 580 Hornby Street, Vancouver, British Columbia, Canada V6C 3B6. Phone: (604) 681-1988, FAX (604) 681-2059.

AQUACULTURE FAIR, VERONA, ITALY

The 5th Aquaculture Biennial International Fair will be held in Verona from October 11-14, 1990. During the Fair, the 5th edition of the International Aquaculture Conference will take place. The overall theme of the Conference series is "Efficiency in Aquaculture Production" and this year's subject is "The cost of aquaculture production".

For more information contact:

Ente Autonomo per le Fiere di Verona, Cas. Post. 525, 37100 Verona, Italy, Phone: (045) 588111, Telex: 480538 FIEREVVR.

Newsletter

Contributions:

The deadline for contributions for the next NSA Newsletter (Summer 1990 issue) is July 10, 1990.

THE NATIONAL SHELLFISHERIES ASSOCIATION WANTS YOU!!!

The National Shellfisheries Association (NSA) is an international organization of scientists, management officials and members of industry that is deeply concerned and dedicated to the formulation of ideas and promotion of knowledge pertinent to the biology, ecology, production, economics, and management of shellfish resources. The Association has a membership of more than 900 from all parts of the USA, Canada, and 20 other nations; the Association strongly encourages graduate student's membership and participation.

WHAT DOES IT DO?

- Sponsors an annual scientific conference.
- Publishes the peer-reviewed *Journal of Shellfish Research*.
- Produces a Quarterly Newsletter.
- Interacts with other associations and industry.

WHAT CAN IT DO FOR YOU?

- You will meet kindred scientists, managers and industry officials at annual meetings.
- You will get peer-review through presentation of papers at the annual meeting.
- If you are young, you will benefit from the experience of your elders.
- If you are an elder, you will be rejuvenated by the fresh ideas of youth.
- If you are a student, you will make most useful contacts for your job search.
- If you are a potential employer, you will meet promising young people.
- You will receive a scientific journal containing important research articles.
- You will receive a Quarterly Newsletter providing information on the Association and its activities, a book review section, information on other societies and their meetings, a job placement section, etc.

HOW TO JOIN

- Fill out and mail a copy of the application blank below. The 1990 dues are only \$30 (US) per year (\$20 for students) and that includes the Journal and Newsletter!!

NATIONAL SHELLFISHERIES ASSOCIATION - MEMBERSHIP APPLICATION (New Members Only)

NAME _____ For calendar year _____ Date _____
MAILING ADDRESS _____

Institutional Affiliation, if any _____
Shellfishery interests _____

Regular or Student membership _____
Student members only - advisor's signature REQUIRED _____

Make cheques (MUST be drawn on a US bank) or international postal money orders payable to the National Shellfisheries Association and send to Tom Soniat, Dept. of Biological Sciences, University of New Orleans - Lakefront, New Orleans, LA 70148, USA.

NSA Quarterly Newsletter
College of Marine Studies
University of Delaware
Lewes, DE 19958



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