

February

NORTHEAST FISHERIES CENTER

BIMONTHLY REPORT



United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Center
Woods Hole, Massachusetts 02543

MARCH-APRIL 1984

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The Northeast Fisheries Center's "Bimonthly Report" is an unedited compilation of reports by the Chiefs/Directors of the Center's nine major research programs, summarizing key research activities and publications/reports during the bimonthly period. This "Bimonthly Report" does not constitute a publication and is for information only. All data should be considered provisional. Reference to trade names does not imply endorsement.

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AQUACULTURE DIVISION

GENETIC EFFECTS OF CONTAMINANTS

Factor and canonical correlation analyses of measures of Atlantic mackerel egg health, heavy metals in sea surface waters, toxic hydrocarbons in plankton samples, temperature and salinity have been completed on combined May '77 and '78 sample sets from the New York Bight. Statistical work was done by Dr. S. Chang of the Sandy Hook Laboratory. Sample size was 10 for each of the two years. Early and late-stage mortality was associated positively with aromatic hydrocarbons and negatively with low salinity, and positively with PCBs and negatively with temperature. Mitotic abnormality was primarily associated positively with aromatic hydrocarbons and negatively with salinity, and secondarily with PCBs (positively) and negatively with temperature. Mitotic index was also associated with PCBs and aromatic hydrocarbons and with physical factors as well. Slower development rates were associated with lower temperature or with lower salinities, but also associated with higher PCB and aromatic hydrocarbon levels. Embryo malformation was associated positively with heavy metal levels of microlayer and subsurface waters. Canonical correlations between the environmental and biological factors were significant. Similar results were obtained earlier with the '77 data alone.

OYSTER BREEDING PROGRESSES

First, second, and third generation strains and full-sib lines of the commercial American oyster, *Crassostrea virginica*, have been obtained. First generation strains are comprised primarily of geographic hybrids of widespread populations from Texas, South Carolina, Rhode Island, and Massachusetts crossed with local oysters from Long Island Sound. These groups can provide basic information on genetic and environmental variability and on the feasibility of utilizing such stocks for commercial aquaculture, as a hybrid combining fast growth (south - if not just due to a longer growing season) with cold tolerance (north).

Techniques for inducing polyploidy are being used in conjunction with interspecies hybridization in an effort to obtain the long-desired, but hitherto unsuccessful hybrid of American and Japanese (*C. gigas*) oysters. Potential use of gynogenetic techniques in oyster breeding continues to be of interest and exploration. *C. gigas* were acquired recently through the cooperation of researchers from the University of Washington.

ALGAL CHEMICAL COMPOSITION INFLUENCED BY NITRATE LEVEL

Analyses of stationary phase *Dunaliella tertiolecta* and *Tetraselmis maculata* cultured in reduced-nutrient basal medium containing varying amounts of nitrate and phosphate enrichments revealed a linear relationship between the protein/carbohydrate ratio of algal cells and nitrate concentration in the growth medium. Varying phosphate in the medium did not result in any significant changes in the protein, carbohydrate or lipid composition of these algal species. These observations, coupled with the demonstration of N-limitation of *T. maculata* growth in our reduced-nutrient X1 formulation, indicate that nitrate concentration in the growth medium exerts the greatest influence upon the growth and chemical composition of these flagellates in culture. This observation is of importance in understanding the similarities and differences between cultured algae and natural populations, particularly in light of the growing body of evidence suggesting that natural populations are often N-limited.

HATCHERIES REQUEST ASSISTANCE WITH LARVAL MORTALITY

Samples of bacteria and larvae were collected from shellfish hatcheries in Round Pond, Maine, and Martha's Vineyard, MA, upon request of the operators. Examination in the field revealed severely stressed larvae as normally found in *Vibrio* infections. Subsequent laboratory tests showed bacterial populations too reduced in number for a diseased state. With consultation from our investigation, both hatcheries were advised on methods to reduce stresses to larvae and healthy cultures have resumed.

VITAL STAINING FOR MOLLUSCAN CELLS

In vitro tests using immune response cells require a simple method to determine whether the cells are living or dead. Living cells have been shown to exclude certain dyes under the proper conditions of exposure time and dye concentration. Exclusion of trypan blue is the most commonly used viability test. To our knowledge no one has adequately compared this and other vital staining techniques for use with molluscan cells. We compared trypan blue, eosin-Y, and nigrosin vital staining methods on oyster cells that were either living or killed (5 min treatment with 50% methanol in seawater at -20°C). Of the three tests, the trypan blue method was superior, but identified only 82 to 93% of the killed cells. To improve on these results we are now examining three methods which are reported to produce a fluorescent signal inside living cells. Oyster cells and serum were found to have no innate fluorescence at the light wavelengths needed for these methods.

PUBLICATIONS

Brown, C. and G. Rowland. 1984. Characterization of exotoxin produced by a shellfish-pathogenic *Vibrio* sp. J. Fish Dis. 7: 117-126.

A NOAA Technology Brief, "Aquaculture Methodology for Rearing Molluscs", (83/NMFS/036) was published in NTIS Technology Notes, abstracted from a publication written by R. Ukeles and G.H. Wikfors.

ATLANTIC ENVIRONMENTAL GROUP

Submitted by

Dr. Merton C. Ingham, Director

1983 DRAFT REPORTS OF ENVIRONMENTAL CONDITIONS AVAILABLE

The following reports of oceanographic conditions in the coastal and offshore waters of the northeastern U.S.A. in 1983 are now available to NOAA Scientists in draft form. They have been submitted to the International Council for the Exploration of the Sea (ICES) for publication in Annales Biologiques and to the Northwest Atlantic Fisheries Organization (NAFO) to be included in the Scientific Council Research Document series at the June meeting. Until then, the draft copies might prove useful as sources of information, but should not be quoted or cited.

Armstrong, Reed S. Variation in the Shelf Water Front Position in 1983 from Georges Bank to Cape Romain.

Armstrong, Reed S. Bottom Temperatures on the Continental Shelf and Slope South of New England During 1983.

Cook Steven K. Water Column Thermal Structure Across the Shelf and Slope Southeast of Sandy Hook, New Jersey in 1983.

Jossi, Jack W. and Daniel E. Smith. Continuous Plankton Records: Massachusetts to Cape Sable, N.S., and New York to the Gulf Stream, 1983.

McLain, Douglas R. and Merton C. Ingham. Sea Surface Temperatures in the Northwestern Atlantic in 1983.

Price, Carol A. and Peter J. Celone. Anticyclonic Warm Core Gulf Stream Rings off the Northeastern United States During 1983.

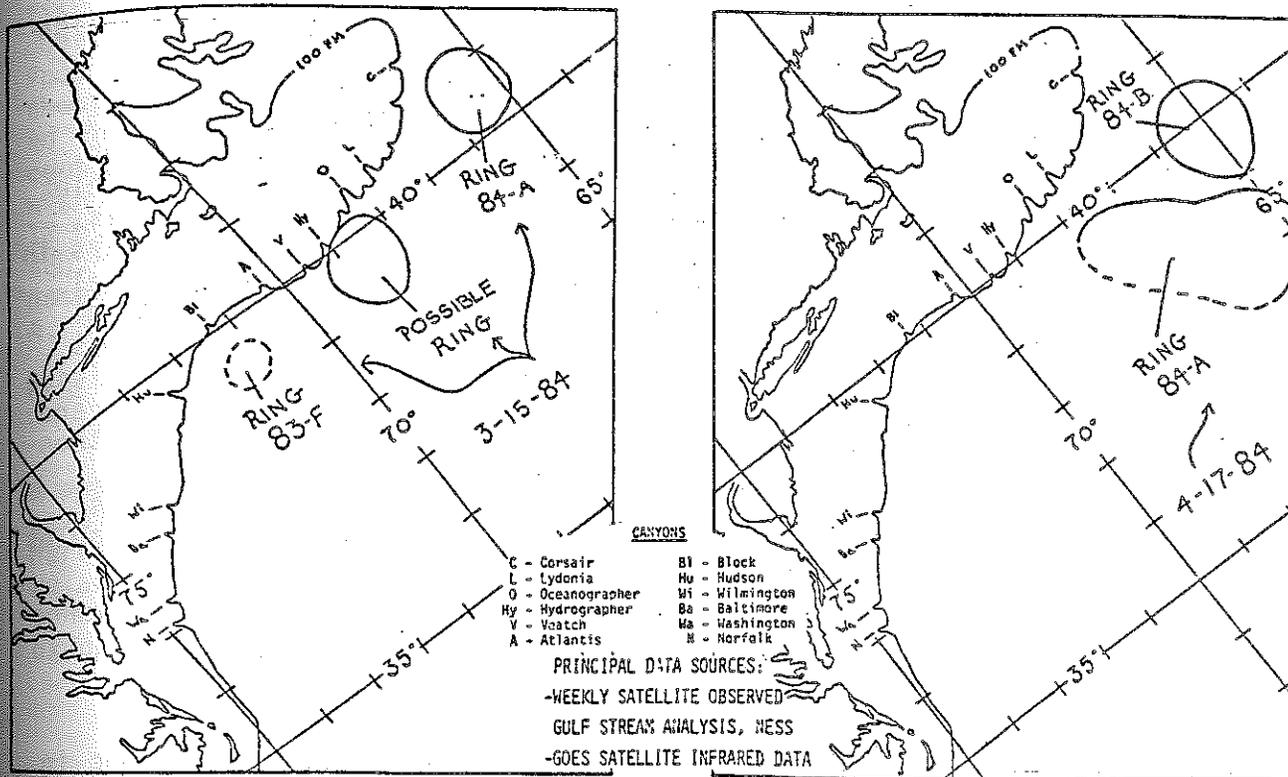
If you wish copies of any of the above, write or call Joyce Denecour (401-789-9326) of the Atlantic Environmental Group.

SHIP-OF-OPPORTUNITY TEMPERATURE AND PLANKTON TRANSECTS

A total of 11 XBT (Expendable Bathythermograph) and 4 CPR (Continuous Plankton Recorder) Transects were occupied during March - April as follows: Gulf of Maine - 2 CPR and 3 XBT, Southern New England - 2 XBT, Middle Atlantic Bight - 2 CPR and 4 XBT, Gulf of Mexico - 2 XBT, Middle Atlantic Bight - 2 CPR and 4 XBT.
Contact: Steven Cook, FTS 838-7142.

GULF STREAM RING LOCATIONS

Announcements of Gulf Stream ring locations in mid-March and mid-April (see charts below) were sent to Commander, Atlantic Area, U.S. Coast Guard for publication in the April and May issues of the Atlantic Notice to Fishermen. Contact Reed Armstrong, FTS 838-7142.



ENVIRONMENTAL ASSESSMENT DIVISION

ENVIRONMENTAL ASSESSMENT, PATHOLOGY DIVISIONS BEGIN NEW PROGRAM MONITORING CONTAMINANTS IN SEDIMENTS, FISH AND SHELLFISH

NEC's Environmental Assessment and Pathobiology Divisions have begun implementing a program, to be conducted jointly with other NOAA elements, to characterize rigorously pollutant levels and gross fish pathology in northeastern bays and estuaries. This "Status and Trends" Program will include measurements to document metals, PCBs, pesticides and polynuclear aromatic hydrocarbons in sediments, bivalve molluscs and several organs of bottom fish species; the fish will also be examined for histopathological disorders. The monitoring is scheduled to be conducted approximately every three years, starting in Spring 1984. Initial sampling will be done in upper and lower Chesapeake and Delaware bays, Barnegat (NJ) Inlet, Raritan Bay, central and western Long Island Sound, Shinnecock Inlet (Long Island), Rhode Island Sound, Buzzard and Massachusetts bays, the Newburyport-Portsmouth (NH) area, and Casco and Penobscot bays in Maine. Based on statistical analyses of variability in historical data, subsequent sampling will be adequate to detect changes of a factor of two or greater for metals, five for organic contaminants and three for pathology. The program will therefore yield definitive information on relative pollution problems in the areas studied, and on whether these problems are increasing. This information can then guide managers in focusing efforts to conserve or restore fish habitats. Status and Trends is a nationwide effort; the Southeast and Northwest Centers of NMFS will use the same methods and variables to monitor habitat conditions along the southeast, Gulf and west coasts. Contact: J. Pearce (FTS 342-8205).

MUSSEL STUDIES INDICATE CADMIUM POLLUTION

The mussel, *Mytilus edulis*, has been proposed by various investigators as a good subject for monitoring pollutants present in the water column. To gather information on pollutant input by various river systems into Long Island Sound, therefore, we sampled mussels from ten riverine systems and inshore areas along the Connecticut coast for analyses of copper, cadmium, and PCBs.

Levels of PCBs in mussels from all 10 stations sampled were low, ranging from a mean of 0.049 to 0.115 ppm (wet wt.). Copper levels were also low in all mussel samples, with means ranging from 1.0 to 2.3 ppm. The levels of cadmium in mussels were low with the exception of those taken from Bridgeport, where the mussels had a mean level of 5.1 ppm. Mussels from other stations had mean levels of cadmium ranging from 0.41 to 1.3 ppm.

These results indicate that no unusual source of PCB or copper contamination was present in the sample site areas. The unusually

high level of cadmium found in mussels taken near Bridgeport suggests a point-source contamination problem for this metal at this area. Further samples of mussels will be taken from a wider area in and near the Bridgeport site to substantiate these findings. Contact: A. Calabrese (FTS 642-5205).

DEVELOPMENT OF SUMMER CONSUMPTION RATES OF BLUEFISH

Results from a four-year laboratory study on food consumption rates for three different groups of adult bluefish averaging 500, 1500, and 5000 g have shown that during summer periods in which these fish would be in residence along the New England and Middle Atlantic coasts, meal size for each group increased with increased periods of food deprivation up through two days. After that point however, even though the fish were without food for as long as five days, there was no increase in the average amount consumed. However, optimal food consumption, as indicated by percent body weight per day, did vary with the size of the fish with 500 g fish feeding optimally every 12 h, 1500 g of fish every 24 h and 5000 g of fish every 24 to 48h. Completed analysis of the data will provide estimates of the potential impact of this predator as prey populations. Contact: A. Studholme (FTS 342-8277).

CASE STUDY OF SCALLOP

Several elements of the Division are working on a case study of a population of scallops off the coast of New Jersey. Frequent samplings (bi-weekly) of this scallop population have occurred since March to determine changes in reproductive potential which may be related to food availability (phytoplankton spring bloom), contaminants (heavy metals), water temperature and low dissolved oxygen. Contact: J. Pearce (FTS 342-8205).

PUBLICATIONS

Calabrese, A., J. R. MacInnes, D. A. Nelson, R. A. Greig, and P. P. Yevich. 1984. Effects of long-term exposure to silver or copper on growth, bioaccumulation and histopathology in the blue mussel *Mytilus edulis*. Mar. Environ. Res. 11: 253-274.

O'Reilly, J. E. and D. A. Busch. 1984. Phytoplankton primary production on the northwestern Atlantic shelf. Rapp. P.-v. Reun. Cons. int. Explor. Mer. 183: 255-268.

Pearce, John B. (ed.). 1983. Reviews of Water Quality and Transport of Materials in Coastal and Estuarine Waters. ICES Cooperative Research Report No. 118: 1-215, Feb. 1983.

Thomas, J. P., E. J. Carpenter, H. Curl, R. Ferguson, G. Knauer, P. Kremer, J. E. O'Reilly, S. Nixon, P. B. Ortner, M. M. Patmatmat, J. H. Sharp, and S. Tarapchak. 1983. Biological Rate Measurements; Working Group Report to the NOAA Quality Assurance Program. NOAA Working Group Special Report, Dec. 1983, 15 pp.

BIMONTHLY REPORT

MANNED UNDERSEA RESEARCH & TECHNOLOGY PROGRAM

UNDERSEA RESEARCH SYMPOSIUM SCHEDULED

NOAA and the University of Connecticut are sponsoring a three-day undersea research symposium entitled "Undersea Research and Technology - Scientific Applications and Future Needs" at the Avery Point campus, May 22-24. A total of 35 research scientists will present the results of recently completed or ongoing research in the areas of (1) fisheries, (2) pollution, (3) sea floor processes and (4) ocean services (gear behavior and calibration, gear impact, marine sanctuaries etc.). Formal presentations will also be given by representatives of the five (5) National Undersea Research Centers (Hawaii, California, St. Croix Island, North Carolina and Connecticut). Keynote addresses will be presented by Senator Weiker and Dr. Byrne. Registered attendees will span academia, sea grant, state and federal governments and the fishing industry as well as Connecticut state legislators. Investigators from the Great Lakes states will also participate. The primary objective of this symposium is to define priority research goals for the undersea scientist for the immediate (10-20 yrs) future with special emphasis to the newly established Northeast Undersea Program, University of Connecticut at Avery Point.

NATIONAL UNDERSEA RESEARCH PROGRAM ESTABLISHED UNIVERSITY OF CONNECTICUT AT AVERY POINT

The NEFC is working (Technical Monitor) closely with the University of Connecticut in a "cooperative (NOAA/U. Conn) agreement" to sponsor and organize a national undersea research program that would focus its attention on undersea research requirements of the Northeast, New Jersey to Maine. The science communities in Maine, New Hampshire and Rhode Island have been contacted; Massachusetts, Connecticut, New York and New Jersey will be canvassed by June. Research proposals will be submitted by December 30 for FY 1985 operations. A national peer review will be conducted by January 31 with the top rated proposals receiving vessel and dive system time. A very broad base of interest has been expressed in the program from the New England, Southern New England, Mid-Atlantic Bight and Great Lakes regions; we anticipate a minimum of 40-50 proposals submitted by Fall, 1984. Much of the proposed research will be complimentary to NEFC's missions and goods.

PUBLICATIONS AND REPORTS

Witman, J.D. 1983. Disturbance and contrasting patterns of population structure in the Brachiopod, *Terebratulina septentrionalis* (Couthouy) from two subtidal habitats. J. Exp. Mar. Biol. Ecol., 73: 57-79.

Hulbert, A.W., K.J. Pecci, J.D. Witman, L.G. Harris, J.R. Sears and R.A. Cooper. 1983. Ecosystem definition and community structure of the macrobenthos of the NEMP Monitoring Station at Pigeon Hill in the Gulf of Maine. NOAA Tech. Mem. NMFS-F/NEC-14. 143 pp.

MARINE ECOSYSTEMS DIVISION

submitted by

Dr. Kenneth Sherman, Chief

MARINE FISHERIES LAB KICKS OFF NATIONAL YEAR OF THE OCEAN

More than 200 students from South Kingstown Junior High School, Charho Regional High School and Jamestown Elementary School toured the National Marine Fisheries Service laboratory in Narragansett recently as a kickoff to the nation's Year of the Ocean.

In addition to seeing how space age technology can be used in oceanographic research, the more adventurous were able to sample a meal of the future: a minced meat extraction of underutilized, highly nutritious species of fish.

The "Star Wars" theme included high-speed computers which translate satellite images of sea-surface temperature into charts used by fishermen to locate ocean fronts used by migrating fish.

The students were also shown another electronic device, the only one of its kind in the world, which measures and classifies plankton. That fully automated system is part of a joint research and development project being conducted with laboratories in France and Japan.

Another display demonstrated how scientists use surveys of fish eggs and larvae to estimate the abundance of fish stocks.

Oceanographers, biologists, mathematicians, chemists, and officials from the Narragansett Laboratory were on hand to describe to the students the variety and challenge of professional opportunities in the ocean sciences.

The Year of the Ocean officially began 10 March, the first anniversary of President Reagan's proclamation of an exclusive economic zone of the 200 nautical miles immediately off the United States' coast. Contact Wes Pratt (401-789-9326 or FTS 838-7142)

POSSIBLE OCEANOGRAPHIC INFLUENCES ON HADDOCK AND COD SURVIVAL

Marianna Pastusak of the Sea Fisheries Institute in Gdynia, Poland, visited the Fisheries Oceanography Investigation during March and April. She worked with staff members of the Marine Ecosystems Division to describe the influx of slope region water and plankton onto Georges Bank through Great South Channel. This continues work begun last fall and a manuscript for publication is being planned. The results indicate that the influx of slope water properties can be used to characterize the recirculation of water around Georges Bank and that interannual variability appears to exist in the magnitude of this influx and likely in the degree of recirculation of the Bank waters. This process has important implications, and may provide a means for quantifying mortalities of haddock and cod in relation to

recruitment success based on variability in the interannual retention of fish larvae on the Bank. Contact David Mountain (617-548-5123 or FTS 840-1271).

US-JAPAN COOPERATIVE PROGRAM

Dr. Takeo Ishii of the University of Tokyo visited the Narragansett Laboratory to discuss progress on automated plankton analysis here and in Japan. Plans were finalized for a cooperative project, funded by NSF, in which a team of 4 Japanese scientists will spend 3 weeks in Narragansett, learning about our techniques for computerized identification of zooplankton. In the fall of 1985, four American scientists from NMFS, the University of Rhode Island, and the University of Denver will visit Japan to learn about the use of color in image analysis, and study the Japanese algorithms for identification of phyto- and bacterioplankton. Contact Mark Berman (401-789-9326 or FTS 838-7142).

POSSIBLE REDUCTION IN KRILL BIOMASS

NEFC scientists participated in an NSF-funded expedition to the Antarctic to study superswarms of antarctic krill, *Euphausia superba* took place 15 February to 2 April. Protea VI, the last leg of a 9-month cruise on the RV Melville, included personnel from Scripps Institute of Oceanography, NMFS-NEFC, Texas A&M, University of Washington and the University of Rhode Island, in an effort to: 1) determine the biological and physical parameters leading to the formation and maintenance of superswarms, 2) determine the most effective means of sampling krill, and 3) investigate the effect of the swarming phenomenon on the associated pelagic and benthic communities. A thorough hydroacoustic and bongo net survey of the area from the South Orkneys to Elephant Island, the South Shetlands and the Bransfield Straits located very few krill and no significant swarming. In general, waters of the area contained only large numbers of salps and were otherwise barren of phytoplankton, zooplankton, marine mammals, and birds. Water temperatures were 1-2 degrees above normal and there was evidence of reduced ice cover on the islands. The absence of commercial fishing fleets and observations taken at the British station at South Georgia suggests the anomalous conditions were widespread. It is uncertain at this time whether numbers of krill found during the cruise were indicative of conditions throughout the austral summer or if the higher temperatures may have resulted in earlier, or reduced, spawning. The krill biomass in the region was reported to be 30 times less than the long-term average around South Georgia. The reduction in biomass could have serious impact on whale, bird, and fish stocks dependent on krill as a principal prey species. Contact Kenneth Sherman (401-789-9326 or FTS 838-7142).

SAND LANCE LARVAL SURVIVAL HIGHER THAN HADDOCK LARVAE

Studies of the growth, survival, and biochemical composition of larval sand lance and haddock are in progress. Preliminary results demonstrate the ability of both species to grow and survive at relatively low plankton densities. Sand lance, however, appear to be considerably better adapted for growth and survival at low plankton densities. This observation is consistent with the early life histories of the two species.

Survival of sand lance larvae for the first 46 days after hatching was 89, 88, 74, and 10% at 500, 100, 50, and 10 plankters per liter, respectively. These values correspond to daily mortality coefficients of 0.0029, 0.0032, 0.0051 and 0.0546 going from the higher to the lower prey densities. Daily specific growth rates in length were 2.40, 1.56, 1.13, and 0.67% per day, respectively.

Survival of haddock larvae for the first 32 days after hatching was 26, 15, 12, and 1% at 500, 100, 50, and 10 plankters per liter. These values correspond to daily mortality coefficients of 0.052, 0.069, 0.078, and 0.177, going from the higher to the lower prey densities. Daily specific growth in length ranged from 0.94 to 0.33% per day.

Cooperative studies with the University of Rhode Island School of Oceanography's MERL mesocosm systems are underway. Growth and survival of larval haddock in stratified (thermocline) and well-mixed systems is being monitored as well as associated primary and secondary production constituents. Contact Geoffrey Laurence (401-789-9326 or FTS 838-7142).

MARMAP SURVEYS REVEAL THAT PRODUCTION OF HERRING LARVAE REMAINS LOW.

Production of herring larvae over the once-productive spawning beds in the Georges Bank region were again at depressed levels during the 1982/83 spawning season. For the fifth consecutive year we failed to catch a single larva over the eastern half of the Bank, or that part of the survey area where spawning was most intense during the 1950's and 1960's. Young herring were moderately abundant in the Massachusetts Bay area in both October and November and around German Banks off western Nova Scotia in October; otherwise their distribution was limited to scattered occurrences, mostly along the western edge of the Gulf of Maine. Young herring, 7 to 19 mm, occurred over the northwestern part of Georges Bank in November, but these larvae apparently originated in the Massachusetts Bay area. Contact Wally Smith (201-072-0200 or FTS 342-8260).

PUBLICATIONS AND REPORTS

- Bolz, G. R., and R. G. Lough. 1984. Retention of ichthyoplankton in the Georges Bank region during the autumn-winter seasons, 1971-77. *J. Northw. Atlan. Fish. Sci.* 5(1):33-45.

Casey, J., W. Pratt, and C. Stillwell. 1984. The shark tagger, 1983 summary.

Durbin, E. G., A. G. Durbin, R. W. Langton, and R. E. Bowman. 1983. Stomach contents of silver hake, *Merluccius bilinearis*, and Atlantic cod, *Gadus morhua*, and estimation of their daily rations. Fish. Bull. 81:437-454.

Kane, J. 1984. The feeding habits of co-occurring cod and haddock larvae. Mar. Ecol. Prog. Ser. 16:9-20. (Also, MARMAP Contribution MED/NEFC 82-38.)

NATIONAL SYSTEMATICS LABORATORY

ICHTHYOLOGIST FROM PEOPLES REPUBLIC OF CHINA BEGINS YEAR-LONG STUDY

Dr. Jinxiang Su, Associate Professor at Shanghai Fisheries College began a year-long visit to the National Systematics Laboratory and Division of Fishes of the Smithsonian Institution in April. His study is supported by a grant from the World Bank. He has published on the anatomy of the silver carp, rearing red sea bream, and the tetraodontiform fishes of China. Dr. Su will study mackerels, halfbeaks, and needlefishes of the Far East with Dr. Bruce B. Collette of the National Systematics Laboratory, and other groups of fishes with ichthyologists from the Smithsonian Institution and National Science Foundation. Contact Dr. Bruce B. Collette (202/357-2524).

NOAA CORPS OFFICER TO STUDY CORAL TAXONOMY

Lt. Stephen C. Jameson has had his request for full-time training at the University of Maryland approved. Majoring in the study of corals under Dr. Dennis Taylor of the Horn Point Environmental Laboratory, Lt. Jameson will be assigned to the National Systematics Laboratory to do research on the taxonomy of stony corals for his Ph.D. degree starting in the fall of 1985. There are few experts on the systematics of stony corals in the world so this training and research will provide NOAA with its own expert. Contact Dr. Bruce B. Collette (202/357-2524).

MANUSCRIPT ON EASTERN PACIFIC MUD SHRIMPS COMPLETED

A draft manuscript was completed describing the 19 species of mud shrimps (*Upogebia*) found in the eastern Pacific. Of these, 15 are new to science, 2 formerly recognized are restricted and redescribed, and 2 more are resurrected from synonymy. A key has been prepared that also includes the 6 species known from the western Atlantic. These filter-feeding, tube-dwelling shrimps were abundant in benthic samples taken during the 1970's in an evaluative survey of shallow marine ecosystems of Panama prior to a proposed sea-level canal. Preparation of the illustrations needed for this manuscript continues. Contact Dr. Austin B. Williams (202/357-2639).

MONOGRAPH ON DECAPOD CRUSTACEANS PUBLISHED BY SMITHSONIAN

"Shrimps, lobsters, and crabs of the Atlantic coast of the United States, Maine to northern Florida," by Austin B. Williams will be issued by the Smithsonian Press in May. This monograph treats 342 species, includes a general introductory systematic discussion of the groups, and an analysis of their zoogeographic affinities. A general key to families is followed by family, subfamily, generic and specific accounts, with keys to categories below family scattered through the text. Each species account includes

abbreviated synonymy, recognition characters, figure(s), measurements, habitat, type-locality, and general remarks on life history and ecology. Selected references through 1979 and a few later papers are cited. Contact Dr. Austin B. Williams (202/357-2639).

The book can be purchased from the Smithsonian Institution Press, 1111 North Capital Street, Washington, D. C. 20002, 202/357-1793 at a cost of \$35.00. Orders or questions should be directed to the Press.

OCEAN SCIENCE DAY

In response to the Ocean Science Day open house that "kicked off" NOAA's Year of the Ocean activities, nearly 200 people visited the NEFC's Oxford Laboratory. Attendees included students from five schools as well as a group from the Maryland Coastal Resources Advisory Committee. It is this group of some 100 members appointed by county and city governments and representatives of conservation and special interest groups who make recommendations to the Maryland Department of Natural Resources, the legislature, and the Governor on matters related to Chesapeake Bay and coastal zone planning. Contact Dr. Aaron Rosenfield (301-226-5193).

INTERNATIONAL DIAGNOSTIC SERVICES

As part of our international diagnostic services activities, histological examinations of oysters (*Crassostrea gigas*) from Lochcarron, Aberdeen, Scotland, were conducted at the request of the California Department of Fish and Game. Certification of sampling and historical records of pests and diseases were obtained from the Department of Agriculture and Fisheries for Scotland. No pathogenic organisms were detected in this sample of seed oysters. Results of the inquiry have been reported to the requesting agency in California who is responsible for permitting or excluding introduction or export of shellfish stocks from state waters. Contact F. Kern.

OCEAN PULSE-AMPHIPOD STUDY

A detailed study of benthic amphipods collected on Ocean Pulse cruises and infected with dinoflagellate-like parasites indicates that there are two and perhaps three major types of these parasites. Thirteen species of amphipods are infected by the dinoflagellate-like forms, and with few exceptions, only one type of parasite is found in each of the amphipod species. The amphipod genus *Unciola* is the major exception and also has a different parasite, possibly a dinoflagellate.

Until about 10 years ago, parasitic dinoflagellates were merely considered interesting curiosities that were occasional parasites of a number of marine invertebrates and fish. In the 1970's, scientists at the Oxford Laboratory and elsewhere discovered that dinoflagellates are not only sometimes common parasites of certain decapods (crabs and shrimp), but may cause extensive mortalities of either eggs or later stages. From these studies and the current ones on amphipod parasites, it now appears that dinoflagellates may be one of the most characteristic parasite groups in the marine environment. Further, it appears that rather than only a few broadly distributed and non-host specific species, the parasitic dinoflagellates may well have undergone broad radiation, and be much more host specific than previously assumed. Contact P. Johnson.

ANADROMOUS CLUPEIDS-STOCK IDENTIFICATION STUDIES

A recent workshop conducted by the Hudson River Foundation (February 8-9, 1984) emphasized the need for stock identification in managing American shad and other anadromous clupeids. During 1983,

studies were initiated to determine if parasite tags might prove useful in separation of stocks of these species. The material we used was collected during the 1983 winter herring assessment cruise aboard the R/V *Delaware II*. Our preliminary results using ectoparasites only indicated that this approach was promising.

The possibility of extending this study to cover several years, a wider geographical area, and endo- as well as ectoparasites was discussed with Dr. Leslie Uhazy on the faculty of the University of Missouri, an expert on parasites of shad. He agreed that the winter herring assessment cruises presented a unique opportunity to study the parasites of large numbers of clupeids during their first year of life and before they have traveled far from their nursery areas. In addition, we hope to relate the parasite burdens of these fishes to their food habits with assistance from food habit investigators at Woods Hole. As part of this study, two graduate students from the University of Missouri participated in the 1984 herring assessment cruise and collected a large number of first year shad, blueback and alewife, plus some older fish. They will spend the remainder of this year enumerating and identifying these parasites. The results obtained this year will enable us to target some specific geographic areas and specific ages and species of anadromous clupeids for study in 1985 and 1986, so that a useful data base is established for using parasite tags in stock assessment studies. Contact M. Newman.

SOUTHERN FLOUNDER DISEASE

Up to 5% of the southern flounder being taken by the winter trawl fishery in Pamlico Sound, North Carolina, are exhibiting cutaneous ulcers. The fish appear to be in good condition and have no other remarkable lesions. Histopathological examination did not reveal any evidence of systemic disease. Microbiological studies are still underway. The area in which the fish were captured was not known to be polluted. It may be that the disease is related to these fish occupying an area at their extreme northern range combined with spawning stress and increased freshwater run-off from unusually heavy winter rainfall. Contact M. Newman.

TOXICANT RELATED STUDIES ON STRIPED BASS LARVAE

Over the past several years, numerous studies on the striped bass (*Morone saxatilis*) and their larvae have been conducted along the east coast of the United States especially in the Chesapeake Bay and its tributaries. Previous experiments conducted by NEFC investigators have shown that striped bass larvae exposed to copper may develop lesions of the cornea that could result in blindness. Presently, tissues from prolarvae exposed to a multicontaminant mixture, derived from the research of Dr. P. Mehrle (USFWS), are being studied in conjunction with work that was conducted by Lenwood Hall (Applied Physics Laboratory, Johns Hopkins University). Thus far, no obvious lesions of the sensory systems (i.e. olfaction or vision) have been observed; however, an in-depth look at the brain, liver, and intestinal epithelia is in progress. Currently, the collaboration with members of the Applied Physics Laboratory is continuing with an *in situ* study of developing striped bass larvae in the Nanticoke River at Vienna, Maryland (L. Hall), and a laboratory study on the effects of arsenic and/or selenium on growth, behavior, and morphology (R. Klauda). Contact J. Bodammer.

PUBLICATIONS

Sawyer, T.K., E.J. Lewis, M.E. Galasso, and J.J. Ziskowski. 1984. Gill fouling and parasitism in the rock crab, *Cancer irroratus* Say. Mar. Environ. Res. 14: 355-369.

RESOURCE ASSESSMENT DIVISION

MARCH - APRIL 1984 NEWSLETTER

CONGRESSIONAL SUBCOMMITTEE HEARS TESTIMONY ON STRIPED BASS

On March 20, 1984, the Subcommittee on Fisheries and Wildlife Conservation and the Environment of the Committee on Merchant Marine and Fisheries heard testimony related to a bill introduced by Representative Claudine Schneider (RI). The bill calls for a three-year moratorium on the catch, sale, or possession of striped bass from North Carolina to Maine. The bill is intended to reduce fishing mortality on the seriously-depleted stock. Among those testifying on the bill was Dr. John Boreman, Resource Assessment Division, NEFC, who described the current status of production and fisheries for striped bass in the Northeastern United States.

CENTER SCIENTIST CHAIRS ICES WORKING GROUP

Emory Anderson chaired the February 28--March 6 meeting in Copenhagen, Denmark of the ICES Mackerel Working Group. This Working Group has the responsibility of assessing the North Sea and Western (west of the UK) mackerel stocks as well as horse mackerel in the Northeast Atlantic. The two mackerel stocks have both declined considerably in recent years to record low levels, with the North Sea stock being in worse condition. However, the Western stock has been fished very heavily since about 1978 and is on the verge of a sharp decline due to poor recruitment.

US BUTTERFISH CATCHES HIGH: DISCARD A SERIOUS PROBLEM

Landings of Atlantic butterfish by US fishermen during January--February 1984 totalled 5,600 metric tons (MT), the highest ever for the US winter butterfish fishery. The record yearly total for US landings was 8,900 MT in 1982. In addition, the record high discard rates (50%) of age 0 butterfish observed during August--December 1983 appear to be continuing into 1984. Present estimates of discard are about 30--50% of the landed catch. These high discard rates have resulted from the presence of the strong 1983 year class as well as decreased abundance of older, larger butterfish. The development of a new "supersmall" market category has encouraged the intense fishery on small butterfish, but has also helped to maintain the high discard rates as not all small fish are acceptable in the new market category. The large catches of small butterfish will result in lost yield and reduced recruitment to the spawning stock.

CO-OPERATIVE RESEARCH FISHERY FOR MACKEREL A SUCCESS

The US-Polish cooperative research fishery for Atlantic mackerel which began in early January is now nearing completion. The two

Polish factory trawlers, Admiral Arciszewski and Kniazik, have been conducting searching and fishing operations primarily between New Jersey and North Carolina, but have gone as far north and east as Georges Bank. Mackerel have been found throughout the New Jersey--North Carolina area, and catches through the end of March have totalled about 4,600 MT. The presence of the two Polish trawlers has benefited some US trawlers fishing for mackerel and participating in joint ventures with East German and Dutch trawlers. They have received assistance from the Polish vessels in locating and catching mackerel.

ATLANTIC SALMON RESEARCH

The establishment of the North Atlantic Salmon Conservation Organization (NASCO), under an international treaty which took effect on October 1, 1983, has resulted in an increase in Atlantic salmon research in the Resource Assessment Division. V. Anthony, J. Boreman and A. Lange have prepared several studies summarizing available statistics on the Atlantic salmon fisheries and reviewing the status of the stocks of salmon in the Northwestern Atlantic. Additional studies, being conducted under contract, have been designed to develop methods for determining the contribution of U.S. origin salmon to the high seas fisheries off eastern Canada and West Greenland. Results of these studies will be used by the U.S. Commissioners to NASCO to form the basis of their decisions regarding proposals for management of Atlantic salmon stocks.

PUBLICATIONS AND REPORTS

Burns, T.S., R. Schultz and B.E. Brown. 1983. The commercial catch sampling program in the northeastern United States. Pages 82-95 in Sampling commercial catches of marine fish and invertebrate. W.G. Doubleday and D. Rivard, eds. Can. Spec. Publ. of Fish. and Aquat. Sci. 66.

Anthony, V.C. 1983. Planning and organization. Pages 15-19 in Sampling commercial catches of marine fish and invertebrates. W.G. Doubleday and D. Rivard, eds. Can. Spec. Publ. of Fish. and Aquat. Sci. 66.

RESOURCE UTILIZATION DIVISION

FISH WASTE UTILIZATION

Experiments on the production of liquified fish (silage) from fish wastes appear to be successful. A forty-five pound batch of silage was made from haddock and flounder frames in about 2 hours by repeated grindings through a 1/2 and 1/4 inch Hobart grinder then adding 3.5 percent (w/w) of formic acid, 50 percent water and blending for one minute in a heavy duty blender. Several drops of Tenox 26 antioxidant was added to the slurry, and it was allowed to digest overnight, after which it was blended again for 30 seconds. This last blending makes the slurry more liquid but adds more air to it as evidenced by stratification of heavier water from the lighter solids after stabilization for 24 hours. The product is practically odorless and stable at room temperature. Samples were taken to the U. Mass Agricultural Station in Waltham and to a private lab for proximate and chemical analyses. Work will continue on refining the process.

ISOELECTRIC FOCUSING

During the fall of 1981, at the request of the Arizona Attorney General, we identified by isoelectric focusing several species of fish suspected of being misbranded. After more than two years of litigation, the defendant pleaded "no contest," and the supermarket chain involved was fined \$80,000 while the supplier was fined \$125,000. In addition, the supermarket chain agreed to have its fish tested twice a year for conformity with labeling laws.

STATUS AND TRENDS MEETING

Donald F. Gadbois participated in a meeting convened by Dr. Knoble on proposed future work for NOAA's Office of Ocean's Assessment Division by NMFS. A status and trends program is being formulated in which the Northeast, Southeast, and Northwest Centers would participate in the collection of specified samples from designated locations and sites. The Gloucester Laboratory would be involved in analyses for organic contaminants in sediments, liver, and stomach contents.

A TEDIOUS EXAMINATION

In collaboration with the USDC Inspection Service's Northeast Regional Office, we have been examining commercial fish blocks (several species and several countries of origin) using the three draft Standards for Grades of Fish Blocks. A computer program to store the data has been developed. The data (roughly seven thousand observations) are being entered. A program to analyze the data is being developed.

NMFS/URI FISHERIES ENGINEERING GROUP

The Fisheries Engineering Group, using R/V GLORIA MICHELLE and with the cooperation of divers from the MURT program in Woods Hole, has succeeded in making the first underwater video recordings of traditional New England trawl gear, a Yankee 35, while it was being fished. This is the initial step in an effort to produce video records of a variety of new and traditional trawl gear from which comparisons of performance can be made. Although this first attempt was aimed at testing and developing the techniques for handling the equipment and "flying" a vehicle near the trawl, we accomplished more than expected in spite of poor weather and marginal underwater visibility.