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

JANUARY-FEBRUARY 1984

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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OYSTER BREEDING RESEARCH EXPANDED

Having obtained useful, positive responses in an ongoing selective breeding program of modest size, new collections of wild American oysters, *Crassostrea virginica*, were obtained from a number of locations in the northeast and mid-Atlantic areas for the purpose of establishing a larger program. Grow-out phases of the work will be done in cooperation with the State of South Carolina. Information on the management of such programs will be provided to commercial hatchery operators.

DATA EXCHANGED WITH OAD, NOAA

Rather extensive genetic data sets on mackerel egg viability, abnormality, and chromosome mutation, and heavy metal and hydrocarbon contamination of surface waters and plankton were provided Ocean Assessments Division, Stony Brook University, NY, for statistical review by staff at the Brookhaven National Laboratory. This was for the purpose of comparing various proposed general indices of environmental degradation, and their particular sampling requirements.

ALGAL POPULATIONS INCREASE AT 27°C

Several algal species that are potential larval or juvenile bivalve food sources were tested for their capacity to reproduce at 27°C. This represents a 7-8°C increase over our laboratory incubation temperature to which these strains have adapted. This information should be useful to academic or commercial institutions that are culturing algae, but have no facilities for maintaining cool temperatures believed to be optimum for algal culture.

Several initial experiments revealed those species with temperature tolerance to 27°C. Recent experiments were conducted by taking daily density readings for 14 days in two kinds of culture containers, Erlenmeyer flasks and test tubes. The latter were incubated in a horizontal position since it was possible that an increase in exposure to light could affect the algal response. Of the 8 species used, 5 did show a somewhat better growth in tubes.

Isochrysis sp (Tahiti) produced populations at 27°C equal to or better than those at 20°C. This species is an isolate from Tahiti and presumably has the genetic makeup that allows for this tolerance. By contrast, the British isolate of *Isochrysis* that is in common use is notoriously sensitive to elevated temperatures.

Another species, *Pavlova gyrans*, demonstrated an unusual tolerance to a high temperature for a chrysophyte. Growth at 26°C was between 80 and 90% of that at 20°C. Other species which were

chlorophytes (with one exception) yielded growth in test tubes at 27°C that range from 58-76% of that obtained at 20°C.

Strains will be incubated at the high temperature for some time to determine if tolerances increase or decrease.

SURF CLAM GROWTH IN NURSERY AQUACULTURE SYSTEMS COMPARED

An experiment to determine the seawater requirement to support growth at different biovolumes of surf clams, *Spisula solidissima*, in three types of nursery culture systems was completed. Growth results of clams in active and passive upflow columns indicate that stocking density is more critical than in raceways. Analysis of phytoplankton stripping in the columns reveals that the clams closest to the incoming seawater remove the majority of the phytoplankton and, consequently, limit overall population growth. The raceways were more efficient in the quantity of seawater required to produce increases in biomass. Efficiency of the columns did not increase when the flow rate of seawater was increased for a given biovolume of clams. Trials were conducted at different intervals throughout the growing season and temperature was held at 22°C. Carrying capacity in all systems was related to ambient seasonal productivity levels.

KILLER BACTERIA AT CLAM HATCHERY

Since July 1983, a mysterious mortality has occurred at the Bluepoints Inc. clam hatchery, West Sayville, Long Island. At first, pesticides in the raw seawater were thought to be linked to the hatchery's lack of production. After a thorough search for pesticide presence, however, the Milford larval disease investigation concluded that a pathogenic bacterium, recovered from dying larvae, probably caused the mortality. We are now seeking to locate the source of this pathogen so that the hatchery can resume normal operations when it opens this March.

Other studies show that suspension of oyster blood cells in calcium- and magnesium-free salt solutions after pre-treatment with dimethyl sulfoxide will stop their attachment to such surfaces as plastic and glass. Since attachment of cells to surfaces normally prevents certain types of test-tube experiments, we may now have a means of improving our *in vitro* studies of disease resistance in molluscan blood cells.

PUBLICATIONS AND REPORTS

Tettelbach, S. T., L. Petti, and W. J. Blogoslawski. 1984. Survey of *Vibrio* associated with a New Haven Harbor shellfish bed, emphasizing recovery of larval oyster pathogens, pp. 495-509. In: R. R. Colwell (ed.), Vibrios in the Environment. John Wiley and Sons, Inc., New York.

STUDY OF CROAKER AND CLIMATE COMPLETED

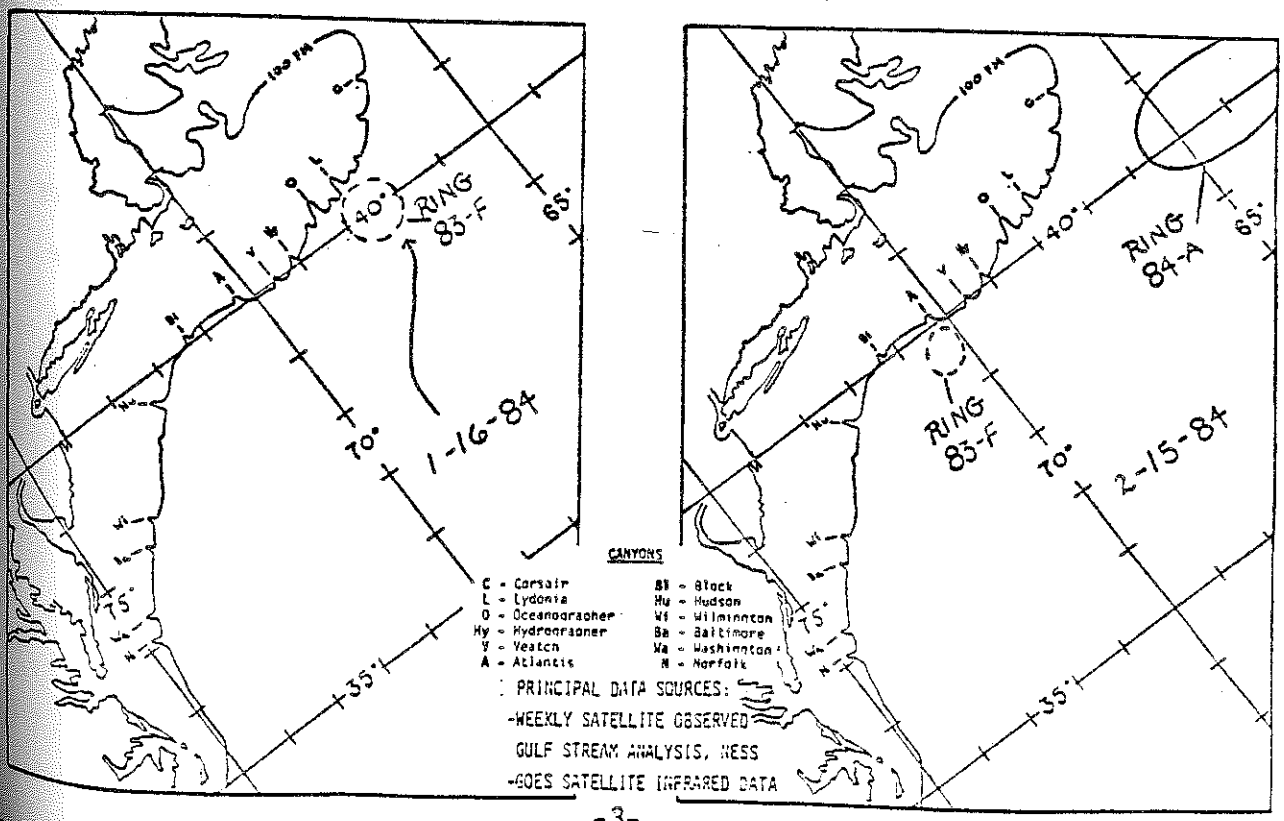
A study of variations in abundance of croaker in Chesapeake Bay and the influence of climate on them was completed in February with the reception of the final report from the Virginia Institute of Marine Science. The study, supported by the Northeast Fisheries Center since 1980, was conducted principally by Brenda Norcross, a PhD candidate, under the direction of Dr. Herbert Austin of the College of William and Mary. The final report, "Climate Scale Environmental Factors Affecting Year-Class Fluctuations of Atlantic Croaker (Micropogonias Undulatus) in the Chesapeake Bay," identifies two environmental factors which influence abundance; timing of the change from summer winds to fall winds over the shelf off Chesapeake Bay and winter water temperature in tributaries of the bay, where juvenile croaker over-winter.

SHIP-OF-OPPORTUNITY TEMPERATURE AND PLANKTON TRANSECTS

A total of 10 XBT (Expendable Bathythermograph) and 4 CPR (Continuous Plankton Recorder) Transects were occupied during January - February as follows: Gulf of Maine - 2 CPR and 2 XBT, Southern New England - 2 XBT, Middle Atlantic Bight - 2 CPR and 4 XBT, Gulf of Mexico - 2 XBT.

GULF STREAM RING LOCATIONS

Announcements of Gulf Stream ring locations in mid-January and mid-February (see charts below) were sent to Commander, Atlantic Area, U.S. Coast Guard for publication in the February and March issues of the Atlantic Notice to Fishermen.



SEABED OXYGEN CONSUMPTION RATES IN NEW YORK BIGHT APEX REMAIN UNCHANGED SINCE 1974

Studies have shown that seabed oxygen consumption rates for the New York Bight, as a whole, have not changed significantly since the 1974-75 investigation despite a general trend of declining consumption rates during this period. These rates reflect aerobic metabolism and integrate the variables affecting this process.

Seabed oxygen consumption affected by dredge spoil has lowered significantly in response to decreased dumping. This decrease, however, has been offset by increased rates of oxygen consumption in sediments impacted by sewage sludge disposal, which has increased in volume since 1974.

PHYTOPLANKTON GROWTH POTENTIAL USUALLY NITROGEN - LIMITED IN NORTHEASTERN WATERS

Assay of 23 samples completed a long-term algal study of the relative scarcity of phytoplankton nutrients in northeast waters. Statistical analyses of assay results, which identify nitrogen to be most critical in this respect, are near completion. Our cooperative survey with the New Jersey Department of Environmental Protection for the red tide dinoflagellate, *Gonyaulax excavata* in New Jersey did not detect vegetative cells in the Navesink and Shrewsbury River or cysts in the Atlantic City area. We had included on these occasions use of a hand pumping system for water and sediment collections which is a favored method in New England and New York surveys by other investigators.

JUVENILE BLUEFISH GROW FASTER ON FISH DIET

During 1981 and 1983, a field program was developed to investigate the relationship between feeding and growth of juvenile bluefish in Sandy Hook Bay, New Jersey. This area is one of many inshore regions along the Middle Atlantic Coast which serve as important nursery areas for this species during summer and early fall. Stomach contents from fish sampled in 1981 showed that these juveniles fed predominantly on a few fish species, including silversides, anchovy and killifish. In contrast, during 1983 there were shifts in diet composition and diversity as the summer progressed with fish in June consuming a wide variety of planktonic

and benthic organisms while by September, diet was limited to a few crustacean and fish taxa. Comparison of growth and condition between the two groups of juvenile bluefish showed that, generally, growth was highest when consumption of fish prey was also high. The results suggest that, at least in this study, availability of certain prey types, specifically silvesides and anchovy, may limit growth and condition of juvenile bluefish during their first year and ultimately influence survival and subsequent recruitment to the fishery.

COPPER, MERCURY CAUSE HISTOLOGICAL CHANGES IN FLOUNDER GILLS

Scanning electron microscopy has revealed changes in the gills of windowpane flounder (*Scophthalmus aquosus*) exposed to copper or mercury. Gills from animals exposed to 20 ppb copper or 10 ppb mercury for 60 days showed significant decreases in the number of chloride cell openings (apical pits) and those exposed to 5 ppb mercury showed an increase relative to the controls. Exposure to 10 ppb copper produced no significant changes in apical pit counts. Chloride cells are part of the osmoregulatory system, having to do with ion regulation.

In addition, the 10 ppb mercury exposure produced discrete areas of raised epithelium, or "bumps", on the gill filaments that occurred more frquently on the 10 ppb exposed gills than on the 5 ppm or controls gills.

Current work focuses on determining the etiology of the "bumps", and combining this information with the apical pit counts to develop a comprehensive model of the fish's response to copper or mercury exposure, and its ultimate effect on the fish's ability to survive.

PUBLICATIONS

Luczkovich, J. J. and B. L. Olla. 1983. Feeding behavior, prey consumption and growth of juvenile red hake. Trans. Am. Fish. Soc. 112:629-637.

Marshall, H. G. and M. S. Cohn. 1983. Distribution and composition of phytoplankton in northeastern coastal waters of the United States. Estuarine, Coastal and Shelf Science 17:119-131. 8 map figs.

Pearson, W. H., D. L. Woodruff, P. C. Sugarman and B. L. Olla. 1984. The burrowing behavior of sand lance, *Ammodytes hexapterus*: effects of oil-contaminated sediment. Mar. Environ. Res. 11:17-32.

WINTER MARMAP I SURVEY FINDS LARVAL SAND LANCE IN HIGH ABUNDANCE FOR 8TH CONSECUTIVE YEAR

The January/February 1984 MARMAP ichthyoplankton survey found dense concentrations of sand lance larvae from western Georges Bank to the Virginia capes. Major concentrations of larvae were midway out on the shelf off Southern New England. In the winter of 1983 we observed a 15-fold increase in the number of sand lance larvae on Georges Bank. This was the first time since 1976, when we discovered the population explosion of sand lance, that large concentrations of larvae occurred on Georges Bank. However, based on preliminary observations of 1984 samples, the center of larval abundance shifted back to shelf waters south and west of Nantucket Shoals where it was situated from 1977 through 1983.

Larval herring were collected from eastern Georges Bank for the first time since 1979. Although their numbers appear small, it is encouraging to again find evidence of spawning in that portion of our survey area that once provided the major spawning beds for herring off the northeastern United States. Gadid eggs were also observed in Georges Bank samples. Shipboard identifications were not made but were probably pollock and/or cod eggs.

Several meetings were held with Marine Ecosystem Research Laboratory (MERL) personnel from URI to plan for cooperative research on thermal stratification's influence on larval cod and haddock growth and survival to be conducted in the MERL microcosms. Haddock embryos are currently being incubated for the initial set of experiments.

GROWTH OF EARLY LIFE STAGES

A study of the growth, survival, and biochemical composition of sand lance larvae at prey densities of 10, 50, 100, and 500 plankters per liter is underway. Larvae will be reared to metamorphosis at low density in 200-l containers. Haddock were successfully spawned in the laboratory. The larvae will be used in studies of growth and survival at prey densities of 10, 50, 100, and 500 plankters per liter in 200-l containers.

PCB'S AND FISH LARVAE

Studies of the effects of Hudson Raritan Estuary water on the viability of fish embryos is continuing. A total of 7 bioassays were completed with summer flounder. Work with winter flounder is in progress. Preliminary results from the first water collection suggest that the levels of selected metals, chlorinated hydrocarbons, and petroleum hydrocarbons remain relatively constant during storage of water at 4°C.

APPLICATION OF PATTERN RECOGNITION SYSTEM

It has become clear that the automated zooplankton analyzer has many applications beyond those it was designed for. For example, we recently tested its ability to age cod, by otolith analysis. The results are still preliminary, but suggest that, using image analysis techniques, we can age cod otoliths with an accuracy approaching 90% at a rate of 500 per day. This is approximately 20-25 times faster than traditional techniques. Further work is needed to see whether this result holds for other species.

We are beginning a cooperative project with the Graduate School of Oceanography of the University of Rhode Island to explore the possibility of using the image analyzer to discriminate spawning stocks of Atlantic salmonids using scales as input.

THE SHARK NEWSLETTER READIED FOR DISTRIBUTION

The newsletter "The Shark Tagger-1983" was prepared in January and February by project staff. In February, the layout was finalized and submitted to the printer; 2,000 will be sent out to cooperating sportsfishermen by April 1st.

PUBLICATIONS AND REPORTS

Buckley, L. J., S. I. Turner, T. A. Halavik, A. S. Smigielski, S. M. Drew, and G. C. Laurence. 1984. Effects of temperature and food availability on growth, survival, and RNA-DNA ratio of larval sand lance (Ammodytes americanus). Mar. Ecol.-Prog. Ser. 15:91-97.

Cohen, R. E., and J. M. Doyle. 1984. Notes on the ecology, development and taxonomy of common calanoid copepods of the Georges Bank-Gulf of Maine region. Nat. Mar. Fish. Serv., Northeast Fish. Ctr., Woods Hole Lab. Ref. Doc. No. 84-02, 153 pp. (Also MARMAP Contrib. No. MED/NEFC 84-01).

Schlitz, R. J., R. G. Lough, and P. R. LeBlanc. 1983. Physical features and zooplankton biomass of shelf water entrained by warm-core ring 82-B. EOS, Trans. Am. Geophys. Union 64:1083 (Abstract only).

ILLUSTRATED KEY TO AMERICAN PENAEOID SHRIMPS BEGUN

Currently it is difficult to identify some species of penaeoid shrimps of the eastern Pacific and the western Atlantic. To enable a wide variety of users to more easily identify shrimps, Dr. Isabel Pérez Farfante (Canet) has begun preparation of an illustrated key. She traveled to Miami to work with an illustrator in preparing the 100 illustrations which will be needed for the key. The Southeast Fisheries Center is helping to support this project.

AMERICAN FISHERIES SOCIETY COMMITTEE ON COMMON NAMES OF AQUATIC INVERTEBRATES

In early 1982, the above committee (CCSNAI) was formed to study and propose methods for standardizing common names for aquatic invertebrates of America north of Mexico. Common names are governed by no recognized codes, as are Latin names, and multiple synonyms or homonyms often exist among common names of species having special interest to man. The confusion which can result from these instances may be of little consequence in local applications, indeed provincial names are often aptly descriptive; but in trade, for example, where Canadian and United States market or customs regulations apply, informality is an impediment because single adopted common names (official names) must be used for the purposes of unambiguous recognition.

Under chairmanship of Dr. Robert F. Hutton, NMFS, a committee of 10 from NMFS, state and university organizations has developed a set of working "Principles Governing Selection of Common Names of Aquatic Invertebrates from America North of Mexico," and is now coordinating preparation of lists of common names for mollusks and decapod crustaceans. Dr. A. B. Williams has written and revised several drafts of the "Principles" (adapted from the "AFS List of Common and Scientific Names of Fishes from the United States and Canada, 4th ed.") and is chairing the subcommittee responsible for designating common names of decapod crustaceans. After internal review of these names, and parallel review of the mollusk names, the lists of names for the two groups will be reproduced for circulation and review by a wide audience. Names of selected other groups may be added. All will eventually be issued in published form in the hope that uniform common names will gain acceptance.

ROCK SHRIMP STUDY ACCEPTED FOR PUBLICATION

A monograph on the 12 species of rock shrimps (genus Sicyonia) occurring in the American Pacific by Dr. Isabel Pérez Farfante (Canet) has been accepted for publication by the NMFS Fishery Bulletin. Until a few years ago, rock shrimps were discarded from the large commercial catches of penaeoid shrimps made in both the eastern Pacific and western Atlantic. It was commonly thought that, because of their hard shells, they would be rejected by the consumers and the processing

industry; however, increased demand for shrimp encouraged the fishermen and dealers to bring the larger of these species to market, and now the production is readily absorbed. Two species are well known: the ridgeback prawn (S. *edentis*) on the west coast and the brown rock shrimp (S. *brevirostris*) on the east.

The monograph is based on the study of over 4,000 specimens. It contains a key for identification of the species together with descriptions and color notes - color pattern being an infallible feature for field identification. Information on reproduction, habitat, and maps of the range of each species are included, as well as present or potential economic value.

PUBLICATIONS

Collette, B. B. and C. Nauen. 1983. An annotated and illustrated catalogue of tunas, mackerels, bonitos and related species known to date. FAO Fish. Synop. No. 125, vol. 2.

ERYTHROCYTIC NECROSIS IN YELLOWTAIL FLOUNDER

Despite the desire by fish pathologists to use hematological parameters in the assessment of fish health, there are only few examples of the successful application of these techniques for feral fish. For the most part, blood dyscrasia(s) and various forms of anemia have been studied in teleost fish under experimental or in intensive culture conditions. In the course of examining the blood of yellowtail flounder, captured in the Gulf of Maine or Georges Bank versus those collected near Long Island, it was observed that nuclear fragmentation and putative degeneration of erythrocytes was most severe (number of cells per slide) in the more northerly sample. Light and electron microscopic examination of the affected erythrocyte nuclei revealed an unusual pattern of chromatin segregation and eventual dissolution of the nucleus into dense inclusion bodies. Further characterization of the abnormal cells indicated that they are normocytic, slightly hypochromic, and the pattern of nuclear fragmentation resembled that observed by Smith (1968, 1969) for salmonids that had been fed folic acid deficient diets. Unfortunately, hematocrit values for the Gulf of Maine/Georges Bank specimens are not available; however, information on this subject from fish examined on NEMP cruises is being sought.

MACKEREL BLOOD PARASITES AND POPULATION VARIABILITY

The NEFC "Big Mack Attack" was begun in 1982 to examine the relationship, if any, of disease on Northwest Atlantic mackerel stocks. One aspect of this program is monitoring the prevalence of *Haematractidium scombri*, a unique blood parasite of Atlantic mackerel. In addition, questions concerning the pathogenicity of this parasite and its means of transmission are being addressed.

The data from 717 mackerel sampled February through September of 1982 have been analyzed to determine the prevalence and significance of *H. scombri* in Atlantic mackerel. The overall results show 23% mackerel infected with *H. scombri*. The results of examining the data by age groups reconfirm the findings of a previous study: that age-2 mackerel have a higher prevalence and higher intensities of infection than older fish.

Almost 500 mackerel heads were examined for ectoparasites in efforts to find a potential vector for the blood parasite. More than 40% (203/499) of the mackerel had gills infested with the monogenetic trematode, *Kuhnia scombri*, which occurred singly or in numbers up to 32 per fish. Since *Kuhnia* ingests blood from its fish host, it was considered a potential vector of *Haematractidium*. However, the prevalence of *Kuhnia* does not correlate well with the prevalence of *Haematractidium* in the mackerel population. *Kuhnia*'s prevalence is higher in fish $\geq$ age-3 than in age-2 fish, whereas the reverse is true for *H. scombri* prevalence (see Fig. 1).

Yet the relationship, or lack of relationship, between *Haematractidium* and *Kuhnia* is perplexing. For example, age-1 mackerel collected near Montauk, Long Island, are not parasitized by *Haematractidium* nor by *Kuhnia*, but age-1 mackerel collected near Boothbay Harbor, Maine, are parasitized

by both, although infrequently by *Kuhnia*. Furthermore, preliminary observations of *Kuhnia* on the gills of age-1 mackerel captured in 1983 near Boothbay Harbor and held 4 months in captivity show a dramatic increase in the percentage of fish infested and the number of monogenes per fish over that seen in wild fish. This would be expected since the monogenes have direct transmission from one fish to another and the fish are in a confined area. More surprising is that after 4 months in captivity 86% (24/28) of these age-1 captive fish were infected with *Haematractidium*, whereas only 32% (14/40) wild-caught age-1 fish were infected with *H. scombri*. These data suggest that transmission of *H. scombri* may have been occurring in the laboratory. How *H. scombri* was transmitted, if not via *Kuhnia*, remains a question, and further examination of gills and tissues of captive fish may provide some clues.

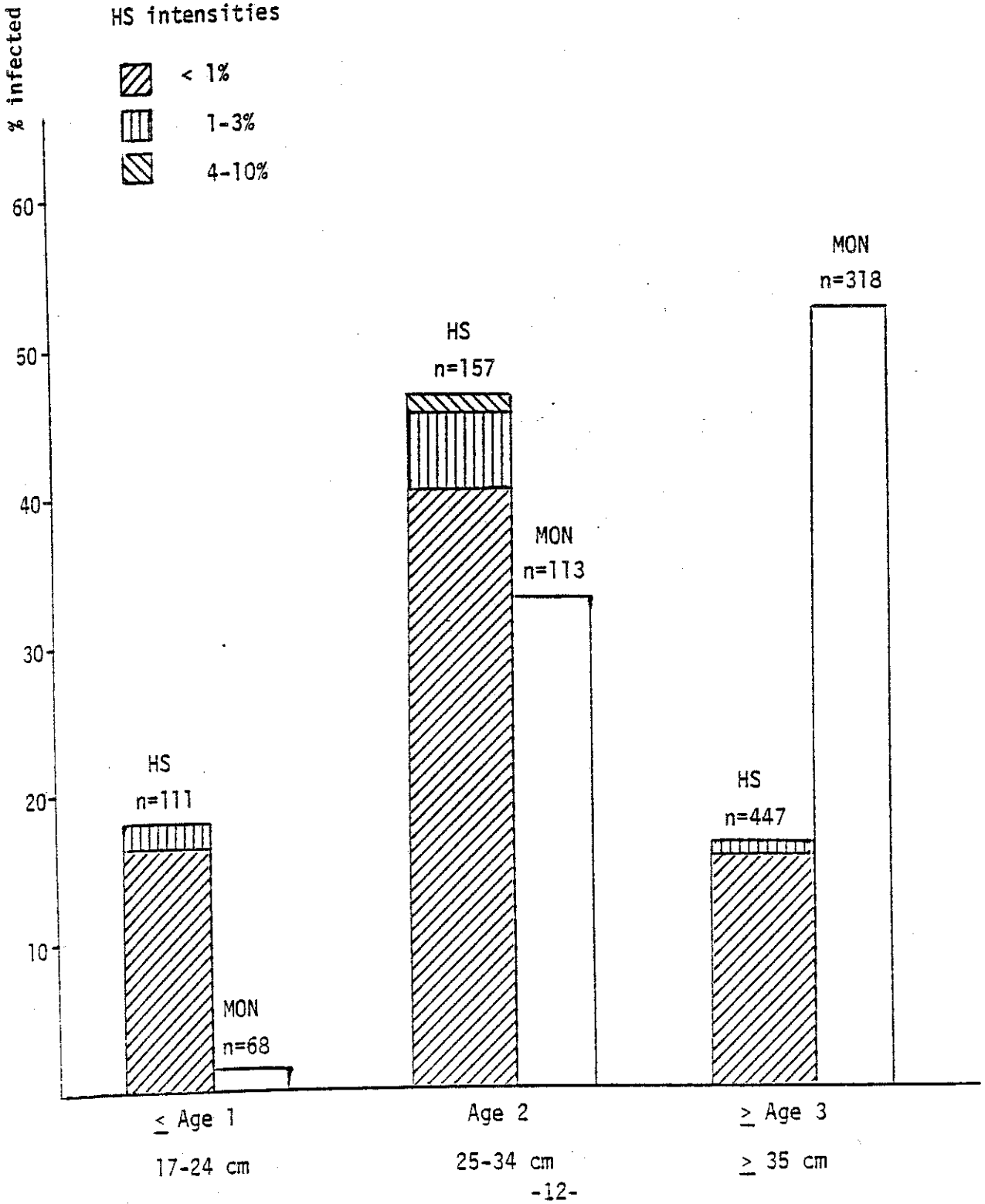
Recent publications suggest that fish infected with hemoparasites may experience fatalities when exposed to additional stress. To determine what effect *H. scombri* may have on its host, 66 captive fish were subjected to handling and preparation of blood smears on two occasions in order to stress them. The results indicated no marked difference in mortality rates of uninfected versus infected or high intensity infected versus low intensity infected fish. However, mackerel are extremely sensitive to handling and perhaps another method of stressing fish may prove more useful, e.g. thermal stress.

It is apparent from this study over the past 2 yr that emphasis on sampling age-1 fish from winter through autumn is important to disclosing information on the means of transmission of *H. scombri* and its potential for adversely affecting the health of mackerel. Matching the forklength distribution of our samples to the forklength distribution of the survey catch data for the *Admiral Arciszewski* shows that our winter samples are skewed toward larger fish. Extra effort is being made this year to sample age-1 mackerel during the winter months in cooperation with the Polish vessels and during the other seasons through cooperation of commercial fishermen and state and federal fisheries agencies.

PUBLICATIONS AND REPORTS

Tettelbach, S.T., L.M. Petti, and W.J. Blogoslawski. 1984. Survey of *Vibrio* associated with a New Haven Harbor shellfish bed, emphasizing recovery of larval oyster pathogens, pp. 495-509. In R. Colwell, ed., Vibrios in the environment. John Wiley & Sons, Inc.

Prevalence of *Haematractidium* (HS) and *Kuhnia* (MON) according to age in over 700 mackerel (*Scomber scombrus*) collected in 1982



RESOURCE ASSESSMENT DIVISION
JANUARY-FEBRUARY 1984 NEWSLETTER

RAD ASSISTING WITH MULTISPECIES MANAGEMENT PLAN DEVELOPMENT

Resource Assessment Division (RAD) staff members are working to provide scientific information to the New England Fishery Management Council for use in development of the Atlantic Demersal Finfish plan. The management plan, scheduled to be drafted by August, is intended to recognize the multispecies nature of the New England finfish fishery while minimizing both management intervention and the risk of recruitment failure. RAD staff members have been compiling stock-recruitment information by species to assist the Council in defining minimum acceptable levels of abundance. Other work has been aimed at defining species groups in terms of ecological and operational units. A team effort is essential, because the Council is initially considering at least twelve major species from a multispecies perspective.

COMMERCIAL SEA SAMPLING PROGRAM EXPANDED

The Northeast Fisheries Center initiated an expanded commercial sea sampling program in the Northeast Region in January. A minimum of 26 trips are proposed for 1984 covering the area from Maine to Virginia. Trips will be undertaken on vessels from major and less major New England ports and from Middle Atlantic ports as well. Vessel captains and/or owners are being contacted and invited to participate. Assessment scientists and port agents will be placed aboard such vessels to collect information during actual fishing operations. This program will provide the opportunity to obtain more detailed catch and effort data on a per-tow basis. Length measurements of fish discarded at sea, marketable catch and age samples will also be obtained; such information will be integrated into the NEFC computer data base for purposes of fish stock assessment.

WITCH FLOUNDER FISHERY INTENSIFIES

A recent assessment for witch flounder in the Gulf of Maine region indicates a substantial increase in exploitation of this resource. Landings have increased from an average of 3,300 MT during the late 1970's and early 1980's to 5,100 MT in 1982, and landings for 1983 are expected to approximate 7,000 MT. To a large extent, this reflects development of a combined fishery for witch flounder and American plaice during warmer months and by-catch in other fisheries (such as northern shrimp) in which effort has been increasing. Since survey indices have declined since 1981, this trend implies a significant increase in fishing mortality. Harvests on the order of 5-6,000 MT during the early 1970's were followed by declines in abundance and biomass and reduced landings, and it is therefore questionable whether recent catch levels can be sustained.

INAUGURAL MEETING OF NASCO HELD

Representatives of several nations from both sides of the Atlantic gathered in Edinburgh, Scotland during the week of January 16-20 to participate in the inaugural meeting of the North Atlantic Salmon Conservation Organization (NASCO). The purpose of NASCO is to promote the conservation, restoration, enhancement and the rational management of salmon stocks in the North Atlantic Ocean. NASCO is comprised of a Council and three regional Commissions which are responsible for developing scientific research programs and regulatory measures to reduce the interception of salmon by foreign offshore fisheries. It consists of both salmon producing and salmon harvesting nations working together for the first time. The US delegation was comprised of three Commissioners to NASCO (Allen Peterson, Frank Carlton and Richard Buck) as well as government advisors and scientists. Not unexpectedly, the inaugural meeting was basically procedural. Peterson was appointed by the multi-nation delegation to the post of Vice-President of NASCO's Council and Buck was appointed Vice-Chairman of the North American Regional Commission. Regulatory measures, scientific research and scientific and statistical information will be the main focus of NASCO's activities in the future. The next meeting will again be held in Edinburgh beginning May 22, 1984.

HERRING LANDINGS ON THE DECLINE

The Gulf of Maine herring fisheries have undergone sharp declines within the last two years. Landings in the coastal Maine juvenile herring fishery have declined from 48,200 metric tons (MT) in 1981 (the highest catch since 1963) to only 18,200 MT in 1983. This decline is believed attributable both to reduced availability of juvenile herring to the fixed gear fisheries and to reduced recruitment levels. Similar declines have occured in the Jeffreys Ledge adult herring fishery, where landings declined from 36,200 MT in 1980 to only 4,300 MT in 1983. Here, declining abundance, changes in availability, and a weak export market associated with recovery of European herring stocks all appear to have contributed to the decline in landings.

Northeast Fisheries Center (NEFC) and Massachusetts Division of Marine Fisheries (DMF) research vessel survey results indicate decreased abundance of herring during the last several years. No evidence of improved recruitment has been found in Maine larval herring surveys or in Massachusetts DMF estuarine seine surveys in which 'brit' (age 1) herring have been routinely collected. A recently completed NMFS winter survey will be used to evaluate relative abundance of herring as a supplement to these alternative survey methods.

US-CANADA SCIENTIFIC DISCUSSIONS

The sixth annual meeting between USA and Canadaian scientist was hosted by the NEFC Woods Hole Laboratory from 14-17 February. Participants included 17 Canadians, 38 NEFC personnel, and visitors from local universities. This year's agenda encompassed

plenary sessions on US recruitment initiatives, US multispecies assessment work, data exchanges, tagging studies, joint research, and assessment methodology. Working groups were conducted on herring, cod, squid, diseases and parasites, mackerel, flatfish, lobster, haddock, ageing, hake, pollock, scallops and recruitment.

HADDOCK ASSESSMENT MARKS CONTINUED DECLINE

The NEFC has recently released an assessment of the Georges Bank and Gulf of Maine haddock resource. Results for Georges Bank indicate a continued decline in abundance since the brief period of recovery in the late 1970's. Landings have declined from 27,500 MT in 1980 to only 12,600 MT in 1983; stock biomass estimates and research vessel survey indices declined by over 70% during the same period. The 1984 catch is expected to be substantially less than 10,000 MT. A reversal of this trend does not appear likely before 1986 at the earliest, since research survey indices for recent year classes are very poor.

The outlook for the Gulf of Maine stock is somewhat brighter, although abundance appears to be lower compared to former years. Landings in the last several years have averaged around 6,500 MT and will probably remain near this level in 1984. Future prospects appear better since the 1979, 1980, and 1982 year classes seem relatively strong.

FISH DISEASE SURVEY METHODS TO BE STANDARDIZED

Key NEFC survey unit staff participated in an ICES-sponsored cruise and workshop which focused on the methodologies of fish disease surveys. Some differences in disease prevalence were identified as a function of variations in data collection, disease diagnosis criteria and data evaluation. Practical work with the catches and discussions of the results of these exercises were carried out in addition to the formal presentation of prepared papers. A final report on standard procedures for conducting a disease survey will be submitted as an ICES document.

US-POLISH RESEARCH FISHERY FOR MACKEREL UNDERWAY

Two Polish factory trawlers (Admiral Arciszewski and Kniosik) departed Boston on January 6 to begin a research fishery for mackerel. This cooperative fishery has been conducted annually since 1981 by the GRYF Deep Sea Fishery Company (Szczecin), the Sea Fisheries Institute (Gdynia) and the NEFC. Aboard each vessel a Polish and a NEFC scientist/technician collect data. By the first port call in New York (January 25), the vessels had successfully located and fished on mackerel from off northern New Jersey to the mouth of Chesapeake Bay. Initial mackerel catch between vessels totaled about 1,800 MT. Periods of intensive searching will be alternated with routine fishing operations. The two vessels will be permitted to take a total of up to 5,000 MT of mackerel in the conduct of the research activity. Work is expected to be completed by late March or early April.

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GLOUCESTER LABORATORY

BIMONTHLY NARRATIVE REPORT
JANUARY - FEBRUARY 1984

RESOURCE UTILIZATION DIVISION

Haddock Surprise

Haddock has often been cited as being practically unique among our gadoid fishes for its either low or complete lack of ability to produce formaldehyde and dimethylamine from trimethylamine oxide. In a recent study at this laboratory, an alert observer demonstrated that vacuum-packed haddock fillets developed an unexpectectedly unacceptable tough texture during frozen storage. In a related family member (red hake) we have shown in the past that molecular oxygen is a potent inhibitor of the TMAO-demethylase enzyme and that vacuum packaging greatly accelerates the rate of the enzyme's activity. We are now trying this lead with haddock and textural changes will be monitored by an array of biochemical, physical, and sensory methods.

Sorbate Preservation

Fresh blue crabmeat normally has an acceptable shelf life of 13 days (no organoleptic attribute of appearance, odor, flavor, or texture averaging below 5.0, borderline, on a 9 point scale). One experiment has been completed on the shelf life of plastic packaged refrigerated blue crabmeat that had been dipped in 2.5 potassium sorbate (KS). The sorbate dipped crabmeat outlasted the non-dipped crabmeat by 5 days at an average score of 6.6. At this point the samples were depleted and now more samples will be prepared to determine the end point.

ICES International Intercalibration Exercise for Petroleum Hydrocarbons

Three samples of mussel homogenate were received from Dr. Farrington of the Woods Hole Oceanographic Institution. The samples were divided in half, worked up and chromatographed by the Grimmer method which is modified for alkane analysis. Two control experiments were conducted to optimize the Farrington procedure, which will be used on the second half of the samples.

Cooperation and Patience

The Gloucester Laboratory and NMFS Inspection Service's Northeast Regional Office have been jointly examining commercially produced fish blocks of several species from several nations using three draft Standards for Grades of fish blocks. So far, and the job has not yet been completed, over 300 fish blocks have been examined for a total of over two and a half tons of edible fish flesh. In order to analyze and store the data, a computer program is being developed.

NMFS/URI Cooperative Fisheries Engineering Unit

Additions and modifications to the NOAA Vessel Gloria Michelle were made in this period. Among these were conversion of the after tank area into a much needed lazaret (storage area) and a new ramp. The Gloria Michelle underwent its compulsory triennial inspection by NOAA fleet inspectors and passed handily.

The URI connection consisted of constructing a miniature scale model door for bottom survey trawls for testing in the URI tow tank.