

# **NEW ENGLAND ESTUARINE RESEARCH SOCIETY**

## **FALL MEETING**

**October 3-5, 1974**

**Bishop Conference Center  
University of Connecticut  
Storrs, Connecticut**

## **ABSTRACTS**

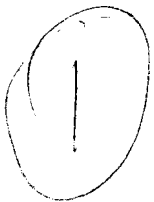
[NOTE: The abstracts for the papers presented at this meeting were never printed and made available to participants, and they have never been seen since that time by anyone other than myself. What you will find here is a compilation of the original submissions as mailed by presenters to the Program Chair of the meeting. Scanning errors have been corrected, but other marks such as letterhead printing, receipt date stamps and hand-written notations made by the original Program Chair have been retained to preserve the historical integrity of these documents. – NEERS Historian, March 2006]

## Abstract

Birge-Ekman box cores were used to sample the benthic invertebrate fauna near the Woods Hole, Mass. sewage outfall and a control area in Great Harbor. Percent composition, percent-similarity index and diversity ( $H(s)$ ) of the samples showed a pronounced seasonal fluctuation at the control site. Seasonal fluctuations did not occur at the outfall. The outfall fauna was dominated by small nematode worms. It is suggested that the year-round maintenance of a nematode dominated community is a mechanism for rapid utilization of the excess organic material available around the outfall.

[Benthic Community Structure Near the Woods Hole Sewage Outfall

Jean Nichols Driscoll and Gilbert T. Rowe, Woods Hole Oceanographic Institution, Woods Hole, MA]





UNIVERSITY OF MAINE *at Orono*

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Ira C. Darling Center for Research, Teaching and Service  
(The Marine Laboratory)

Walpole, Maine 04573  
207/ 563-3146

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August 28, 1974

Dr. H. P. Jeffreys  
Graduate School of Oceanography  
University of Rhode Island  
Kingston, Rhode Island 02881

Re: NEERS meeting paper

Dear Dr. Jeffreys:

If I am not too late, I would appreciate your consideration of the following paper to be given at the October NEERS meeting.

Title: Reproduction of Nereis diversicolor in cold and warm water environments of the Sheepscot River estuary, Maine.

Abstract: As reported in the literature, different populations of Nereis diversicolor appear to show considerable reproductive variation in reference to time. The reproductive period of N. diversicolor is being examined in three locations in the Sheepscot River estuary of Maine. Two locations are natural cold water sites; the third is warmed by effluent of the Maine Yankee Nuclear Power Plant located in Wiscasset. Data collected over 14 months tends to indicate the reproductive period of N. diversicolor in the warm water site lags two months behind that of the cold water sites. It has also been noted that the reproductive period of N. diversicolor is summer in Maine, as compared to late winter and early spring in European waters. Presently, laboratory studies are commencing to study the effect of temperature (lethal dosage - 50%) on both adults and larval N. diversicolor.

Thank you for your attention.

Sincerely,

Peter B. Schroeder

PBS/sc

ABSTRACT FOR OCTOBER N.E.E.R.S. MEETING

VITAMIN B<sub>12</sub> AS AN ECOLOGICAL FACTOR FOR CENTRIC DIATOMS  
IN THE GULF OF MAINE. Dorothy G. Swift, Graduate School of  
Oceanography, Univ. of Rhode Island, Kingston, R. I. and  
Robert R. L. Guillard, Woods Hole Oceanographic  
Institution, Woods Hole, Mass.

Vitamin B<sub>12</sub> activity (range 0.1 to 1.9 ng l<sup>-1</sup>) in Gulf of Maine  
water samples was measured by bioassay. Highest  
concentrations occurred during winter. There were lower  
concentrations in spring samples and vitamin B<sub>12</sub> decreased  
during the bloom. Concentrations increased during the summer  
at depths greater than 25 m. Twelve clones (6 species) of  
centric diatoms isolated from the spring bloom were rendered  
axenic and studied in the laboratory. Unlike most centric  
diatoms, none of these has an absolute requirement for  
vitamin B<sub>12</sub>. However vitamin B<sub>12</sub> stimulated growth of most  
clones by eliminating or reducing the lag phase and  
increasing the growth rate, allowing bloom population  
densities to develop 4 to 54 days sooner with B<sub>12</sub> present.  
Because the natural population removes vitamin B from the  
water during the spring bloom and in the laboratory this  
results in stimulation of growth, we conclude that these  
centric diatoms respond as vitamin B<sub>12</sub> auxotrophs during the  
spring bloom.

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PROJECTION: 2 x2 slides.

8-27



Matoira H. Chanley  
P.O. Box 645  
New Suffolk, NY 11956

### Some Notes on Lobster Nutrition

Observations and preliminary experimental information will be presented relative to feeding captive lobsterlings on "wild" foods in several situations. Obvious size differences occurred which could be attributable to diet, space, water quality, a combination of these, or some unsuspected factor.

This is work in progress and I am hopeful of gleaning input from other NEERS members, so would appreciate a Friday time. There will be a few Kodachrome slides.

Matoira H. Chanley  
Biologist, Shelter Island Oyster Co  
Greenport, New York  
and  
Research Associate, SUNY  
Stony Brook, New York



TITLE: Ecology and Metabolic Adaptation of Cancer irroratus (Say)

The change in population abundance, population locus, occurrence of ovigerous females, and the molt cycle was studied in a field survey of Cancer irroratus, a common estuarine crab from the maritimes to North Carolina. These field studies were complemented by in vitro laboratory studies on the metabolic adaptation of C. irroratus hepatopancreas and gill tissues.

Field work showed a change in abundance and population loci, which was correlated to seasonal behavior patterns. An apparent migration takes place in the winter, as these crabs move inshore to molt, mate and spawn.

The in vitro studies of C. irroratus hepatopancreas metabolism showed this tissue to be quite temperature independent under seasonal acclimitization conditions. Preliminary biochemical studies indicated that Krebs cycle carbon flow was not altered by temperature acclimation. Pentose shunt metabolism did not significantly contribute to metabolic turnover in fully acclimated crabs. The metabolic pathway utilization therefore mirrors the eurythermal characteristics of this crab.

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Graduate School of Oceanography • Narragansett Bay Campus

23 August 1974

To: Dr. H. P. Jeffries



From: James N. Kremer

Subject: Proposed paper for the October meeting of NEERS.

Title: Some Consequences of Increased Biological Detail in an  
Estuarine Ecosystem Model

Abstract: A deterministic ecological simulation model of Narragansett Bay has been developed which incorporates a high degree of biological detail. Such properties include light acclimation to stochastic incident radiation and luxury uptake of nutrients by the phytoplankton, and resolution of zooplankton into adult, egg and juvenile stages. The uncertainty that accompanies the parameters associated with these details results in substantial flexibility in the response of the model, although certain consistent patterns and limits are clear. The response of the model with and without the detailed formulations provides some insights into the consequences of the assumptions within the complex system.

SPECIES DIVERSITY OF ALGAE ATTACHED TO EXPOSURE  
PANELS IN THE VICINITY OF A NUCLEAR GENERATING  
STATION AT MILLSTONE POINT, CONNECTICUT

by

Robert E. Hillman

William F. Clapp Laboratories  
Battelle Columbus Laboratories  
Duxbury, Massachusetts 02332



Since exposure panels were placed in the environment around the site of a nuclear generating station at Millstone Point, Connecticut in June, 1968, a total of 47 taxa - 11 green algae, 26 red algae, and 10 brown algae - have been identified as having attached to and grown on these panels. The panels are presently exposed at six sites around the power plant, one site being a control site, where no effect of the thermal discharge from the nuclear generating station is anticipated. The studies include two and one half years of preoperational information and approximately three and one half years of data acquired since the plant went into operation in December, 1970.

Through 1973, there was a significant increase in the algal species diversity at all exposure panel sites except at the intake, where wave action frequently caused damage to the panel racks, and at the effluent quarry, where the rack had been exposed for only five months. Looked at as a whole, the entire Millstone Point area experienced a significant increase in algal species diversity, as indicated by the exposure panel data. Since data from the control site are included in the data used for the species diversity index, it is not likely that the nuclear generating station affected the algal species diversity over the past six years. If the increase in diversity index can be taken as an indication of improvement in water quality, then this increase might be indicative of the efficacy of water pollution control measures in the State of Connecticut, at least in the eastern end of Long Island Sound.



THE EFFECTS OF DISSOLVED LEAD ON THE GROWTH  
OF THE MARINE DIATOM SKELETONEMA COSTATUM

Richard Rivkin

Department of Biology City College of New York New York, N.Y. 10031

ABSTRACT

The growth rate and maximum yield of Skeletonema costatum, in batch culture, was inhibited by dissolved lead at concentrations of 0.05 to 10.0  $\mu\text{g Pb/l}$ , suggesting that lead could reduce the growth of S. costatum by as much as 55% in the lower Hudson River estuary. Specific growth rate, maximum yield, and respiration/cell decreased and, photosynthesis/ cell and cell volume increased in response to an increasing lead concentration in the medium. At 0.1 and 1.0  $\mu\text{g Pb/l}$ , protein/carbon and chlorophyll-a/carbon ratios did not significantly differ from the control, and the increased cellular carbon, protein and chlorophyll-a observed at these concentrations reflect an increase in cell volume. However, the protein and chlorophyll-a/carbon ratios were significantly ( $p=.01$ ) higher and lower, respectively, than the control at 10.0 $\mu\text{g Pb/l}$ ; reflecting a changed chemical composition of the cell. The rates of cell division (growth rate), and mitochondrial respiration decrease relative to photosynthesis and carbon and protein production; resulting in an increase in cell volume, excretion of the photosynthate, and an alteration of the chemical composition of the cell.

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Graduate School of Oceanography • Narragansett Bay Campus

To Dr. H. P. Jeffries

From Patricia Kremer

I would like to deliver the following paper at the October Neers meeting.

Title: The Impact of the Ctenophore Mnemiopsis leidyi as a Predator

Abstract:

The ctenophore Mnemiopsis leidyi is seasonally abundant in Narragansett Bay during the late summer and fall. The dramatic summer increase in ctenophore biomass coincides with a drop in zooplankton biomass. This work has investigated the feeding rates of Mnemiopsis leidyi on mixed natural zooplankton attempting to quantitatively assess the cropping impact of the ctenophores. These studies have been conducted for a variety of sizes of ctenophores over a 10 C temperature range. Instantaneous clearing rates of greater than 20% per day have been calculated for areas of concentrated ctenophore biomass, indicating that their predatory effect on zooplankton can be considerable.

The Larval Development of the  
Wood Boring Piddock Martesia striata Linnaeus

Paul J. Boyle and Ruth D. Turner

Marine Biological Laboratory  
Woods Hole, Mass,

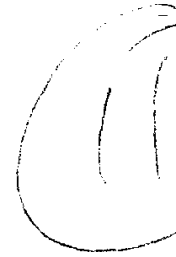
Museum of Comparative Zoology  
Harvard University  
Cambridge, Mass.

Abstract

Adult Martesia striata were obtained from Sanibel Island, Florida in January 1974. Immediate attempts to induce spawning were unsuccessful. The animals released eggs and sperm spontaneously in an aquarium at 21 °C one month after collection. Eggs measured 46.8  $\mu$  in diameter. Straight hinge larvae measured 68  $\mu$  long by 59  $\mu$  high, with a 45  $\mu$  hinge line. A tooth and socket were fully developed on the ventral shell margin when the larvae were about 210  $\mu$  long by 200  $\mu$  high. Well developed pediveligers measured 235  $\mu$  long by 23621 high. Pediveliger stage larvae metamorphosed and successfully penetrated wood fifty days after they were spawned as eggs. Larval cultures were maintained at 26 °C, and salinity remained almost constant at 31 ‰. Pediveliger larvae immersed in water of 15 ‰ salinity for 48 hours recovered with no apparent ill effects when returned in steps to a salinity of 31 ‰. Sub lethal effects, including changes in shape of the velum and inability to exhibit normal swimming and crawling activity occurred at a salinity of 10 ‰. LD<sub>50</sub> occurred at exposure to salinity of 4 ‰ for 48 hours. Scanning electron microscope (S.E.M.) photographs of the velum during the umbo stage revealed a tuft of apical flagella. Hinge structure was of the pholad pattern of C.B.Rees (1950), but S.E.M. photographs illustrated considerable detail. Concentric growth rings on the shell were regular and exceptionally clear. Fine scale shell sculpture was evident only in S.E.M. observations.

( projection requirements : 2" X 2" slides)

UNDERWATER OBSERVATIONS AND PHOTOGRAPHIC  
DOCUMENTATION OF THE PROPOSED BROWNS LEDGE  
DUMP SITE, RHODE ISLAND SOUND



An area of one nautical mile square (Lat.  $41^{\circ}23'25''$  and Long.  $71^{\circ}17'58''$ ) located approximately one mile south of Browns Ledge has been recommended as a possible "regional" dredge spoil disposal site. The selection of the site was made by the State of Rhode Island and the Commonwealth of Massachusetts. Biologists/divers from the New England Division Corps of Engineers and the National Marine Fisheries Laboratory, Woods Hole conducted a co-operative reconnaissance SCUBA survey of the area during June 1974. Five dives were made within the designated disposal area at depths of 30-39.5 meters. Another six dive stations were completed in the trough which separates the Ledge proper. Information on the epibenthos, bottom sediments and topography, and prevailing hydrological conditions are described. The survey served to provide an immediate baseline appraisal on the suitability of the area for receipt of polluted dredge spoils. Bottom sediment samples have been analysed for heavy metals and various organic constituents. These test results are compared with known concentrations at established dumping grounds in Long Island Sound and off Newport, Rhode Island.

[Gilbert L. Chase, Department of the Army, New England Division, Corps of Engineers, Waltham, MA]

11/11/71  
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Heart Transaminase in the Rock Crab, Cancer irroratus,  
Exposed to Cadmium Salts

Edith Gould

National Marine Fisheries Service  
Middle Atlantic Coastal Fisheries Center  
Milford Laboratory  
Milford, Connecticut 06460

ABSTRACT

1. Heart muscle of the rock crab, Cancer irroratus, was found to contain large amounts of the transaminase, aspartate aminotransferase (E.C. 2.6.1.1).
2. There was no significant difference with sex.
3. In crabs exposed to cadmium chloride, heart transaminase activity increased significantly over the controls, at all seasons of the year, whereas in crabs exposed to cadmium nitrate, transaminase activity was slightly depressed.
4. After in vitro electrolyte stress, a higher fraction of transaminase activity remained in the heart muscle preparations from cadmium-exposed crabs than in preparations from control crabs.
5. Electrophoretic studies of the hemolymph showed no significant difference between cadmium-exposed and control crabs in total protein patterns or in hemocyanin structure and peroxidatic activity.
6. Results are discussed from the standpoint of physiological stress.

Title: The ecology of the burrowing sponge Cliona celata Grant

William K. Macy III

Graduate School of Oceanography, University of Rhode Island, Narragansett, RI

Reiswig (1971a & b, 1972, 1973) extensively studied the ecology of three Jamaican demosponges. Unfortunately, little is known about the biology of most other sponges. Cliona celata Grant, a common burrowing sponge, known well to oyster growers as a pest, has been the subject of my investigations. A bed of these sponges covering some 2.7 km<sup>2</sup>, in Greenwich Bay, Rhode Island, has been mapped and biomass determinations made. Individuals ranged in **size** from 15 to 6500 grams live weight, with a mean density of 2.9 sponges m<sup>-2</sup>, weighing 3640 ± 2965 g live m<sup>2</sup> (x ± 95% C.I.). Organic content was low (8.71 ± 2.52% of dry wt.), and varied widely even within a single sponge.

Metabolic measurements were made on naturally acclimated animals in a flow-through system. Respiration and excretion were found to increase logarithmically with temperature, on a per gram ash-free basis. Temperature coefficients (Q<sub>10</sub>) were found to be approximately 2.4 for both processes over the temperature range of 5 to 20°C. Metabolism per unit biomass did not decrease with increasing size over the range of sizes tested. Present work seeks to examine feeding rates and establish whether or not regular activity patterns exist for this sponge.

8-27

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The Role of U.S. Mariculture  
in Meeting Human Food Requirements

Mariculture in the United States is considered a rich man's hobby, capable of producing only limited amounts of luxury foods. Technologically the industry has been unusually slow to develop and relatively sophisticated systems in this country can seldom produce even luxury foods economically. In spite of this reputation some forms of mariculture have the potential to produce significant amounts of cheap animal protein that would fill some of the world food needs. Changes in public attitudes and national policies are needed now to initiate the technological development necessary to realize this potential.

Paul Chanley, Biologist  
Shelter Island Oyster Co.  
Greenport, New York

August 25, 1974

President H. P. Jeffries  
Graduate School of Oceanography  
University of Rhode Island  
Kingston, Rhode Island 02881

Dear President Jeffries:

In response to the flyer announcing the NEERS Fall Meeting to be held at Storrs, Connecticut, I submit an- title and abstract of some current research. While the topic does not cover research on either New England or estuarine subjects, the information contained therein should be of interest to anyone doing research on benthic invertebrates or dealing with marine trophic structures.

Title: Definition of Feeding Types in Marine Benthic Invertebrate Populations : A New Approach

Abstract: A survey of the literature indicates that present classifications cannot accomodate some methods of feeding utilized by benthic polychaetes, e.g., the seeking out of plant food. A new approach, which accounts for all feeding types presently known to be used by polychaetes has as a basic division the method of feeding and the content of the diet. Methods of feeding are said to be: (a) suspension, (b) substrate, and (c) forage. Many polychaetes use two of these methods; a few use all three. The content of the diet can be considered from the point of view of particle size or type of food; it is suggested that these two may be indistinguishable to some polychaetes. Only a few polychaetes are known to be strictly herbivorous or carnivorous. Most are omnivores, or more appropriately, opportunists. Comparison of this classification with feeding in other benthic invertebrates is welcomed.

I expect to use a maximum of 5 35 mm slides. Thank you for considering this contribution to the meeting.

Yours truly,



Charlene D. Long  
69 Windsor St.  
Arlington, Mass. 02174



ABSTRACT

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An Engineering Approach to Estuarine Research

by

R.J. Szechtman

Recently it has become evident that the ocean is not the infinite sink for anthropogenic wastes that was once thought. Increasingly, researchers of this problem are finding evidence in many of our estuaries and near-shore coastal waters, that man's impact is anything but insignificant.

This paper describes an ongoing research program that is attempting to document the nutrient impact of man's wastes on Long Island Sound by applying a material balance approach.

The paper describes the current research program, references previous papers by the author that apply this technique to the problem, and concludes with a description of the type of results one might expect to obtain from this approach.

NASSON COLLEGE  
SPRINGVALE, MAINE  
04083

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ABSTRACT

Power plant entrainment: Relative roles of  $\Delta T$ , maximum temperature, and entrainment time on zooplankton mortality. G. J. Leverage, D. Bertrand, R. Ciullo, C.R. Gilmore. Nasson College Biology Dept., Springvale, Maine, 04083.

Field study data at W.F. Wyman Station, Cousin's Island Maine, suggest that zooplankton mortality is due to AT effects (discharge minus inlet temperature) during winter conditions of 0-4<sup>0</sup> C ambient temperatures, and to maximum temperature effects (discharge temperatures in excess of 32<sup>0</sup> C) during summer conditions. However, laboratory studies using programmed temperature changes indicate that maximum temperature effects are the most important cause of zooplankton mortality, given the relatively short 5 minute entrainment time at Wyman Station.