

NEW ENGLAND ESTUARINE RESEARCH SOCIETY

FALL MEETING

October 7-9, 1976

**MBL
Woods Hole, MA**

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. – NEERS Historian, March 2006]

ABSTRACT

Does Succession Really Happen?

A study is in progress to determine whether or not succession occurs in the fouling assemblages of the Damariscotta estuary. The hypothesis to be tested is that the stability of the environment controls the presence or absence of succession. A graphical description of succession will be given.

[Bryan Field, Ira Darling Center, Walpole, Maine]



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Middle Atlantic Coastal Fisheries Center Milford Laboratory
212 Rogers Avenue

Milford, Connecticut 06460

August 26, 1976

Mr. Paul Chanley
Shelter Island Oyster Company Greenport,
New York 11944

Dear Paul:

Enclosed is a reprint of the only Crepidula paper that has appeared so far. I think it answers most of your questions, but keep asking new ones!

I have a title for a NEERS presentation for Woods Hole in October. It is "Rearing the gastropod, Crepidula fornicata, with some notes on fecundity and behavior."

Sincerely,

A handwritten signature in cursive script, appearing to read "Ed".

Edwin Rhodes
Fishery Biologist (Research)
ER/cw Enclosure

[NO ABSTRACT]

THE DEVELOPMENT, METAMORPHOSIS, AND NATURAL HISTORY OF THE
NUDIBRANCH DORIDELLA OBSCURA VERRILL (CORAMBIDAE: OPISTHOBRANCHIA)

Frank E. Perron* and Ruth D. Turner

Museum of Comparative Zoology
Harvard University Cambridge,
Massachusetts 02138

*Present address: Dept. of Zoology, University of Hawaii,
Honolulu, Hawaii 96822

ABSTRACT

The doridacean nudibranch Doridella obscura was raised through one complete generation in laboratory culture, and spawning behavior was monitored at monthly intervals in Barnegat Bay, New Jersey.

The nudibranchs deposited egg masses throughout the year in Barnegat Bay, and the larvae were observed to remain viable at temperatures ranging from 1.5°- 28°C. At 25°C, the eggs hatch 4 days after oviposition_ and the planktotrophic veliger larvae swim and feed for 9 days before metamorphosing on the bryozoan Electra crustulenta. The spirally coiled larval shell grows rapidly until the dorsal mantle fold is retracted from the aperture 5-6 days after hatching. Although starved larvae do not grow or metamorphose, they resume normal development upon introduction of suitable food. Newly metamorphosed juveniles consume algae and debris on the surface of the bryozoan until **they** grow large enough to attack the live zooids of E. crustulenta.

The life cycle of D. obscura is short (26 days at 25°C), and permits the nudibranchs to take advantage of short-lived E. crustulenta colonies in unstable habitats in bays and estuaries.

The Variation of Sulfate Reduction Rates
in Estuarine Sediments: Chemical Implications*

by Wm. Berry Lyons
Henri E. Gaudette
Alan D. Hewitt and
Thomas R. Fogg
Department of Earth
Sciences University of
New Hampshire Durham,
New Hampshire 03824

Bacterially mediated sulfate reduction in estuarine anoxic sediments results in the degradation of organic matter and the production of various by-products which affect diagenetic processes in the sediments and chemical fluxes to the overlying water. Sulfate reduction rate constants have been calculated for several locations in Great Bay, N.H. using the kinetic model of Berner (1974). We suggest that variations in sulfate reduction rates can effect such processes as the flux of nutrients from the sediments into the overlying water, the production and uptake of biogenic gases H_2S , CO_2 , CH_4 and O_2 , the preservation of organic material, and the removal of trace metals as insoluble sulfides in estuarine systems.

*Contribution #2 from U.N.H. C.R.E.A.M.

Application of a Research Submersible
to the Selection of Regional
Dredge Material Disposal Sites
(Or to the Victor Belongs the Spoils!)

During July 1976 the New England Division Army Corps of Engineers completed a six-day underwater survey of the Rhode Island Sound inner shelf area between Block Island and Martha's Vineyard. In-situ observations and photographic documentation were accomplished using the two-man research submersible NEKTON GAMMA. The survey was undertaken as part of a study to develop an environmentally sound regional dredge material disposal management program for the Rhode Island and Southern Massachusetts region. The objectives of the survey were to determine the distribution and relative abundance of fish and macrobenthic animals; delimit any biological critical areas such as breeding and spawning grounds or unique habitat; confirm the nature of the bottom substrate and currents; and lastly, determine more precisely the depositional or containment qualities of the proposed Browns Ledge disposal site.

[Gilbert Chase, Army Corps of Engineers, Waltham, Mass.]

Title: An autecological study of Ascophyllum nodosum in the Cobscook Bay Region of northern Maine and Campobello Island, New Brunswick

Authors: Rakovic, Robert, Christie Sievers and Larry Spencer

Abstract: Populations of Ascophyllum nodosum were examined from three different locations in northern Maine and New Brunswick, Locations were chosen on the basis of wave energy with Herring Cove, New Brunswick a high energy environment, Quoddy Head, Maine a lower energy environment and Williams Island, Maine almost totally devoid of wave action. Total biomass, age and size distribution, percent coverage by epiphytes, and photosynthetic rate were examined. Biomass varied from a high of 1353.76 gr/m at Quoddy Head to a low of 845.0 gr/m at Herring Cove. Stipe length varied from 40 cm at Williams Island to 28 cm at Herring Cove. If the assumption that the plants produce one vessicle a year holds, then the oldest population was found at Williams Island and the youngest at Herring Cove. The algae at Herring Cove carried a heavy load of epiphytes (40% in the lower intertidal zone), whereas those at Williams Island were devoid of epiphytes. Wave energy and substrate composition are believed to explain part of the results.

Projection Needs: Either slide or overhead projector

CADMIUM TOXICITY TO THE CLADOCERAN SIMOCEPHALUS IN HUMIC VS. NON-HUMIC FRESH WATERS. G. Leversee, Nason College, Springvale, Maine, J.P. Giesy, Savannah River Ecology Laboratory, Aiken, S.C.

Cadmium is a non-essential and highly toxic trace metal released by industrial processes and coal combustion, projected to increase dramatically in the next 25 years. In 48 hour toxicity tests, Cd is found to be less toxic to the cladoceran Simocephalus in humic waters (48-Hr LC50 = 35 ug/l) than in non-humic waters (48-Hr LC50 = 7 ug/l), presumably due to Cd binding by humic materials.

Dissolved organic substances from humic waters were concentrated and separated into five molecular size fractions by ultrafiltration. The Cd binding capacity and toxicity of Cd in each fraction were determined. Cd toxicity occurred at concentrations below humic-Cd saturation in all fractions. The smallest molecular size fraction (M <500) increased the toxicity of Cd over non-humic controls, despite the high Cd binding capacity of this fraction. Problems of metals binding and metals toxicity will be discussed.

Relationships between marine microorganisms and the
wood-boring isopod, Limnoria tripunctata

T.D. Sleeter, P.J. Boyle, A.M. Cundell and R. Mitchell

Division of Engineering and Applied Physics Harvard University,
Cambridge, Massachusetts 02138

Abstract: Scanning electron microscopy was used to investigate the boring activity of the marine wood-boring isopod Limnoria tripunctata. Earlier reports on the absence of a bacterial flora with the intestinal tract were confirmed. Microbial colonization of wood was most prominent in areas of the burrows furthest from the site of active boring indicating that Limnoria can penetrate wood prior to attack by cellulolytic bacteria and fungi.

Abstract submitted for NEERS Meeting in Woods
Hole, MA (7-9 October 1976)

Simulation Studies of Detrital Export in a
New England Salt Marsh. PAUL A. SOUZA (Marine
Research, Inc.)

Field data collected from the Quaise Marsh, Nantucket, Massachusetts were used to construct a computer simulation model relating observed tidal, current and particulate detrital concentration parameters. The model was used to estimate net export of particulate organic carbon (POC) and particulate organic nitrogen (PON) by the salt marsh. Initial simulations indicate a net import of POC and PON by the Quaise Marsh suggesting higher rates of organic accumulation and sedimentation than for comparable salt marsh ecosystems.

Submitted:

13, September 1976

Paul A. Souza

Phylogenetic trends demonstrated by the New England species of
Coryphella (Gastropoda: Opisthobranchia).

ABSTRACT

The six species of the genus Corynhella found in New England waters demonstrate a significant phylogenic progression. This progression to more evolutionarily advanced forms can be traced through changes in their general body shape, raduly morphology and roproductive anatomy. Concurrent changes in reproductive strategies and food sources are also demonstrated. Taken as a whole, the New England-Coryphellidae lend the greatest support to the proposed theory that. this group gave rise to a significant portion of the Aeolidacea.

Projection Requirements: for 2 X 2" slides

[Alan Kuzirian, University of New Hampshire, Durham, NH]

Title: Effects of sublethal sedimentation on various tissues of the scallop *Argopecten irradians*.

By: M. Patricia Morse, William Robinson, Carol A. Moore, and Michael Clark

Address: Marine Science
Institute
Northeastern
University Nahant,
Mass. 01908

ABSTRACT

Argopecten irradians is found in estuarine environments where activities such as dredging, construction, etc. cause sediment disturbance. Sublethal exposures are more difficult to detect. Thus a series of experiments on fed and unfed scallops are being done to study the histological changes of target tissues when the animals are exposed to sublethal doses of kaolin. Animals were collected in Orleans, Massachusetts. Experimental scallops were exposed to 0.5 gram per liter of kaolin and at two-day intervals, samples of the gill, digestive gland, amoebocytes and the mantle edge were fixed for histological examination. Preliminary results indicate a processing of the kaolin with food along with an increase in mucous production in an overall response to decrease fouling of the mantle cavity. A list of changes with controls is presented which indicates a pattern which can be utilized to monitor environment changes which result from dredging or sediment alteration in the scallop's natural environment.

(Supported in part by H.E.W. Grant # RR07143)

ABSTRACT

Marsh-Mudflat Interactions II: The Role of Epibenthic Amphipods in the Cycling of Material

Barbara L. Welsh

Zooplankton, taken in 275p and 500p nets, are being analyzed as part of an overall systems study of Pawson Marsh and its adjacent mudflat in Branford Harbor. The average concentration of organisms was greater over the mudflat than offshore in the estuary channel or inshore adjacent to the marsh berm, as was the amplitude of change between day and night. Maxima over the flats were generally reached between sundown and midnight, particularly during September, from epibenthic amphipods migrating up into the water column to more than double the biomass. However, beyond simply enriching the Smorgasbord for fashionably late diners, the nocturnal migrations of these amphipods may significantly alter the distribution of nutrient materials both particulate and dissolved. They would be particularly valuable as an anti-gravity vector to maintain the cycle of materials between the benthos and the overlying water. Once in the water column, tidal exchange can occur allowing this mudflat mechanism to affect the horizontal flux of materials between the marsh and its estuary.

We are presently calculating the potential impact of amphipod

migration on the water column (removal of smaller particulates and release of dissolved organics and inorganics), using values from the literature, and comparing these with our diurnal field measurements of changes in those same substances. With these data we are attempting to quantify the importance of the amphipods in the coupling of first the 2 subsystems of the mudflat (water column - benthos), and then, through tidal exchange, the 3 coastal subsystems (salt marsh-mudflat-estuary).

Note: "Marsh-Mudflat Interactions I: Transfer between a salt marsh and its estuary: marsh and mudflats, a coupled system" was given at the NEERS meeting Nov. 1, 1975 and at the ERF meeting in Galveston Oct. 1975.

Day--Night versus Flood-Ebb Occurences
of zooea in Branford Marsh

by

Nina K. Lepak

Abstract

Zooplankton samples were collected from Branford Marsh along three different transects during July, September and October.

The samples were examined and the numbers of zooea per 100 m³ were estimated.

All the data haven't been tabulated at this time, but the preliminary indications are that the number of zooea in the water column is influenced by both tidal and diurnal cycles. Greater numbers of zooea were generally found during the flood tides than the ebb tines. Flood tides occurring during the day showed higher numbers of zooea than flood tines at night.

This article may be considered a companion to the one being prepared by Dr. Barbara Welsh of the University of Ct.

VARIATION AND EVALUATION
OF
COASTAL SALT MARSHES

Candace A. Oviatt
Scott W. Nixon
and
Jonathan Garber

ABSTRACT

Ten intertidal salt marshes along the Rhode Island coast were sampled and compared in terms of the relative standing crop and height of tall Spartina alterniflora, density of shoots, seed production and size, fish populations, and the abundance of grass shrimp, fiddler crabs, insects and birds. The study sites included marshes that ranged from 1.2 to 130 acres and settings that included fringe marsh in dense urban developments as well as unspoiled waterfowl preserves in rural isolation. Large amounts of variation in almost all of the parameters made it virtually impossible to separate the sites with statistical significance using either univariate or multivariate techniques. Moreover, there was little meaningful inter-correlation among the parameters. While a more intensive sampling program may make it possible to separate individual marshes with statistical rigor, the results suggest that the effort involved may be too large to make comparative field sampling a part of wetlands rating or evaluation programs. The results also indicate that there is little, if any, correlation between visual esthetic perceptions of a marsh and its ecological characteristics. It is suggested that the development of "ecological" rating systems will not yield a reliable or desirable tool for the management of coastal wetlands.

The Role of Marine Microorganisms in the Initial Attack
on Wood by Marine Wood Borers

P.J. Boyle¹, A.M. Cundell¹, R. Mitchell¹ and R. D. Turner²

¹Division of Engineering and Applied Physics
Harvard University, Cambridge, MA 02138

²Museum of Comparative Zoology
Harvard University, Cambridge, MA 02138

Abstract: To assess the effect of marine microorganisms on the attack of wood by marine borers, series of pine wood discs were incubated in a mixed culture of marine bacteria and a pure culture of the marine fungus Dendryphiella salina. Additional wood discs were impregnated with a filtered homogenate of D. salina or immersed in a buffered cellulase solution to test the hypotheses that microorganisms supplement the diet of marine wood borers or soften the substrate to facilitate their initial attack. Appropriate controls were prepared for each treatment. The discs were exposed to settling larvae of the molluscan wood borer Lyrodus pedicellatus and to the wood boring isopod Limnoria tripunctata for up to 60 days. Incubation of the wood with the marine bacteria resulted in a rate of attack by L. pedicellatus which was significantly greater than the attack on the other treated discs. Differences in attack of the wood by L. tripunctata were difficult to quantify due to the complexity of their burrow system. Possible influence of marine microorganisms on the settlement of marine wood borers is discussed.

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CINEMATOGRAPHIC OBSERVATIONS OF FEEDING BEHAVIOR OF LARVAL AND POST-METAMORPHIC WINDOWPANE FLOUNDER, *Scophthalmus aquosus* (Mitchell); Doreen S. Newhouse, Piscataqua Marine Laboratory, Normandeau Associates, Inc., Portsmouth, New Hampshire and Department of Oceanography, Dalhousie University, Halifax, Nova Scotia.

On-going investigations of feeding behavior of larval and post-metamorphic windowpane flounder will be discussed. Fish have been reared in the laboratory from eggs collected in plankton tows off coastal New Hampshire. Cinematography (super-8 mm) is being employed to record feeding sequences with **six** prey-size categories of wild zooplankton. Emphasis has centered on feeding success in terms of pursuit success (the proportion of encounters with prey which elicit a feeding strike) and strike success (the proportion of strikes which result in capture of prey) with varying prey size and prey density.

For this presentation, a 35-mm slide projector and super-8 movie projector will be needed. I would be happy to provide the movie projector if one would not be available.

Abstract of Proposed Paper for NEERS
Fall, 1976

Long Term Cycles of Abundance in
Marine Organisms

For nearly seven years, a team of scientists from the University of Maine has been monitoring population levels of components of almost all levels of the food chain in the environs of a nuclear generating station and in control areas. Analysis of these data show that many taxa in several different phyla exhibit natural cycles of abundance extending over several years. The usual studies of one to three years duration are too short to detect these cycles. The relationship between type of sampling program and long-term cycles of biota will be discussed.

David Dean
Ira C. Darling Center
University of Maine at Orono
Walpole, Maine 04573

Projection needs: one, and possibly two, carousel projectors.

The Potential for Germination of Spartina alterniflora in
Relation to Substrate, Salinity and Tidal Exposure

Under high salinity conditions, germination of Spartina alterniflora was higher in sand-size sediments than in silt-size sediments. Since this difference did not occur in the freshwater treatments, the physical structure of the sediments may be important, and therefore could determine the rate of establishment of S. alterniflora from seed in high salinity conditions.

The salinity factor was also related to tides in that emersion tolerance for germination of S. alterniflora decreased with increasing salinity. This effect was even more pronounced at high temperatures (30 C) than at low temperatures (15 C).

Experiments are continuing on this tidal emersion aspect, but it may be a factor determining the shoreline heights at which S. alterniflora can be established from seed.

[Bruce Allender, University of Rhode Island, Kingston, RI]

Title:

"A fluorometric analysis of chlorophyll a distribution in Branford Harbor, Connecticut"

Author:

Priscilla W. Baillie

Abstract:

Three methods were used to study the distribution of phytoplankton in a long Island Sound estuarine system: in vivo and in vitro fluorometric techniques were used to measure pigment concentrations. Cell counts by traditional methods supported the fluorometric data.

Both daytime and nighttime samples showed little variation in chlorophyll a values by depth in the water column. This indicates that vertical migration of the phytoplankton is of little importance in this shallow, well mixed system. Diurnal fluctuations in chlorophyll a occurred mainly under tidal influence with the highest levels on the flood tide. Pigment concentrations were generally highest near the river channel and lowest near the salt marsh. It would seem that import is not the chief mechanism causing the high concentrations in this system, since chlorophyll a levels in Long Island Sound are lower than those found in the estuary.