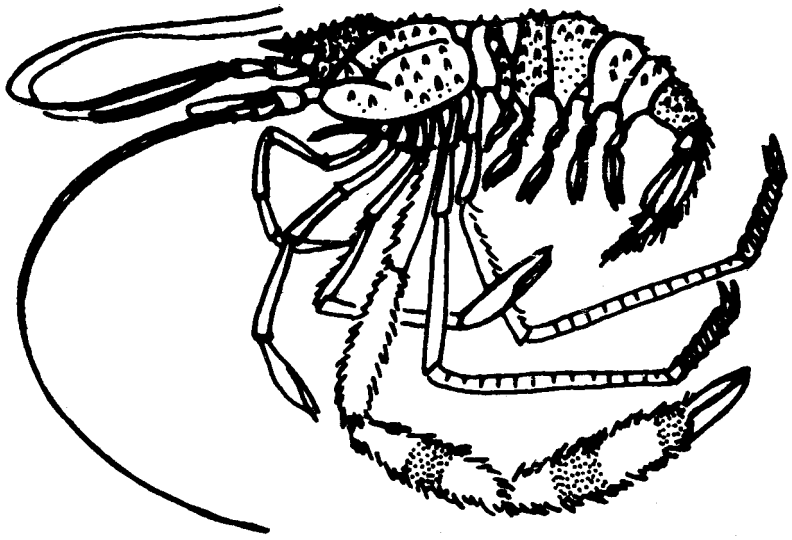
Ray Waldner

ASSOCIATION OF ISLAND MARINE LABORATORIES

OF

THE CARIBBEAN

Thirteenth Meeting



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INTRODUCTION

The thirteenth Meeting of the Association of Island Marine Laboratories of the Caribbean was hosted by the Instituto de Investigaciones Marinas de Punta de Betin, Colombia from 10 to 14 October, 1978. Members were welcomed to the meeting at a cocktail party at the Hotel Santa Mar on the evening of 9 October. The next morning the meeting was officially opened by the President of the Association, Gabriel Roldán Pérez. Welcoming addresses were presented by a representative of the Colombian organization for the advancement of sciences, COLCIENCIAS; and by a representative of the Colombian Government. Thirty-one papers were presented during ten scientific sessions for the next two and one-half days. On the evening of 11 October, participants were treated to a meal of excellent native food and entertained by a troup of dancers performing a series of regional dances depicting the more important folklore of Colombia at the Punta de Betin marine laboratory. After the close of the scientific session on the morning of 12 October, participants were invited to a luncheon at Bahia Concha, snorkeling or swimming in the Bay, and Scuba diving off the R/V Tortuga, a vessel of the marine laboratory. Guided excursions were made to Sierra Nevada de Santa Marta, Tayrona National Park, and Cienaga Grande de Santa Marta on 13 to 15 October.

A meeting of the Esecutive Board was conducted on the evening of 10 October by:

Gabriel Roldán-President	Ingvar Kristensen-Curacao
Meredith Jones-1st Vice Pres.	Idelisa Bonnelly-Dominican Rep.
Norman Engstrom-Sec.Treas.	Luis Almodóvar-Puerto Rico
Charlene Long-1st Mem.-at-Lg.	Manuel Hernández-Puerto Rico
Finn Sander-Barbados	John Cubit-Panama
Hernando Sánchez-Colombia	Alan Lin-Cumaná, Venezuela
Bernd Werding-Colombia	

Bernard Slavat addressed the Board to explain the role of the International Union for the Conservation of Nature and Natural Resources in the Caribbean. The Bitter End Field Station, Southern Illinois University, Virgin Gorda; and the Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Miami, were invited to Association membership.

The General Business meeting was held on the evening of 11 October, 1978. The invitation of Idelisa Bonnelly de Calventi, Director of Centro de Investigaciones de Biología Marina, Santo Domingo, to host the next meeting of the Association was accepted. Charlene Long was appointed to a committee to search for outside support for student travel to meetings. Meredith Jones was appointed chairman, with Rolf Bak and Vance Vicente, members, of a committee to revise the Bylaws of the Association. Several topics (1) required attendance of officers at meeting (2) increasing the

number of Members-at-Large, and (3) Expansion of the Proceedings into a journal were suggested, discussed, and tabled. New officers were elected:

President-Idelisa Bonnelly	1st Member-at-Large-Charlene Long
1st Vice Pres.-Meredith Jones	2nd Member-at-Large-Vance Vicente
2nd Vice Pres.-Rolf Bak	3rd Member-at-Large-Hernando Sánchez
Sec.-Treas.-Ernest Williams	

The meeting was an outstanding success and will be long remembered by all participants. The Association is grateful to Gabriel Roldán, Bernd Werding, Hernando Sánchez, Friedemann Koster, the staff and students of INVEMAR, COLCIENCIAS, and the Colombian Government for making the Thirteenth Meeting of the AIMLC productive, memorable, and enjoyable.

Ernest H. Williams, Jr. - Editor

PRELIMINARY RESULTS OF A STUDY ON THE DISTRIBUTION AND SURVIVAL OF JUVENILE HERMATYPIC SCLERACTINIA IN CURACAO

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We studied the occurrence and distribution of juvenile hermatypic Scleractinia, from depths of three to 32 m, on the coral reef at the southwest coast of Curacao. In sixty, one m^2 quadrats over natural hard substrata we counted 917 juvenile colonies belonging to ± 24 species.

The most common juveniles present over the year-long study period were polyps and small colonies (<four cm) of *Agaricia agaricites*. There was a striking absence of juveniles of some common reef species such as *Acropora palmata* and *Montastrea annularis*. This suggests important differences in the reproductive strategies and life histories of these corals.

Some 400 juveniles were observed every fortnight over a period of six months. Only ± 37 % of these juvenile corals remained unharmed by biological and physical factors during this period.

Proc. Assoc. Is. Mar. Labs. Carib. 13:3

MAINTENANCE OF STABLE LOCAL POPULATIONS OF *Lytechinus variegatus* BY IMMIGRATION OF ADULTS-

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The densities of sea urchins in seagrass meadows have been monitored from November, 1974 to June, 1977 at Punta Pitahaya on the southwest coast of Puerto Rico and from October, 1975 to June, 1977 at a site near Guayacan about 5 km east of Punta Pitahaya. Throughout this period, the populations of *Lytechinus variegatus* have remained remarkably stable despite an absence of significant larval settlement. The size frequency distributions of urchins at the two sites are persistently different between the sites but show no clear changes within each location. Size frequencies did not change markedly seasonally or annually. The modal test diameter of *Lytechinus variegatus* at shallow (1 m deep) Punta Pitahaya station was 3.6 cm in November, 1974 and 3.7 cm in June, 1977, ranging from 3.5 to 4.3 cm during intermediate samplings. At a shallow (1 m deep) Guayacan station, the modal test diameter was 2.5 cm in October, 1975 and 2.8 cm in June, 1977 with a corresponding range of 2.6 to 2.9 cm.

Available data suggest that the *Lytechinus variegatus* population off Punta Pitahaya is maintained by immigration of adults rather than by larval recruitment and that seasonal onshore-offshore migrations also occur there.

Proc. Assoc. Is. Mar. Labs. Carib. 13:4

LOS MOLUSCOS COMUNES DE LA LAGUNA DE PUERTO VIEJO, REPUBLICA DOMINICANA

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Universidad Autónoma de Santo Domingo

La recolección e identificación de los moluscos en la laguna de Puerto Riejo, Azua forma parte de los estudios biológicos sobre las lagunas costeras y zonas de manglar de la República Dominicana. Durante el año 1976 y parte del 1977 se encontraron 100 especies de moluscos: 76 especies de gasterópodos y 24 especies de bivalvos.

Las especies más abundantes de gasterópodos fueron: *Nerita tessellata, Littorina angulifera, N. versicolor, Tegula excavata, Planaxis lineatus, P. nucleus, Tectarius muricatum, Mitrella ocellata, Strombus ranius* y *Thais haemastoma floridiana*. El mayor número se encontró en la costa rocosa donde los más típicos fueron *Cittarium pica, Tegula excavata, Nerita tessellata, Planaxis lineatus* y *raninus, S. gigas, Murex pomum* y *Cerithium litteratum*. En el manglar las especies características fueron: *Littorina angulifera* y *Bartillaria minima; Nerita tessellata* se observó ocasionalmente. Entre los corales de la región interna del arrecife las especies más comunes fueron: *Thais deltoidea, Tegula fasciata, T. lividomaculata* y *Columbella mercatoria*.

Por otra parte, las especies más abundantes de bivalvos en la laguna fueron: *Isognomon radiatus, I. alatus, Branchidontes dominguensis, I. bicolor, Pinna carnea, Crassostrea rhizophorae, Barbatia dominguensis, Arca zebra* y *Chama macerophylla*. El mayor número de bivalvos se encontró entre la *Thalassia: Pinna carnea* y *Chama congregata*, esta última sobre los gasterópodos *Vasum muricatum* y *Strombus raninus*.

En rocas sumergidas se recolectaron *Isognomon radiatus* e *I. bicolor* y en las raíces del mangle las principales especies fueron *I. alatus* y *Crassostrea rhizophorae*. Entre los corales predominó *Chama macerphylla*.

Este trabajo se realizó con los auspicios de la Organización de Estados Americanos (OEA) (Fondo del Mar del Plata) y la Secretaría de Estado Agricultura a través del Proyecto de Educación Profesional con el Centro de Investigaciones de Biología Marina (CIBIMA).

ISOZYMES OF TROPICAL SEA ANEMONES

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The isozyme patterns of malate dehydrogenase (MDH, E.C.1.1.1.37), lactate dehydrogenase (LDH E.C.1.1.1.27), glucose-6-phosphate dehydrogenase (G6PD, E.C.1.1.1.49) and superoxide dismutase (SOD, E.C.1.15.1.1.) of four tropical sea anemones, *Zoanthus sociatus*, *Palythoa variabilis*, *P. mamillosa* and *Condylactis gigantea*, were studied using polyacrylamide gel electrophoresis.

When anemones were acclimated to the cold, both qualitative and quantitative changes of MDH isozymes of *Z. sociatus* and *P. variabilis* and changes in the G6PD isozyme patterns of *Z. sociatus* were observed.

Starvation caused changes in MDH isozyme patterns of *Z. sociatus* and *C. gigantea*.

The observed isozyme patterns are discussed with respect to physiological adaptation strategies to changing environmental conditions.

Proc. Assoc. Is. Mar. Labs. Carib. 13:6

POLYCHAETA FROM A NORTHERN PUERTO RICAN ESTUARY: A PRELIMINARY SURVEY

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As part of an ecological study of the Rio Espiritu Santo estuary on the north coast of Puerto Rico, 546 polychaetes were separated into 11 species in 9 families. Seventy percent were *Tharyx* sp., 19 percent were Capitellidae species and 8 percent were *Sigambra tentaculata* (Treadwell, 1941). The remaining eight species each represented less than one percent of the total.

Seventeen stations were sampled along 4.4 kilometers, extending from the head of the estuary to the Atlantic Ocean. Most of the stations were clustered around river mouths, one of which, about mid-way to the ocean, receives sewage outfall.

The two major as well as two of the less common species had a pattern of delimited distribution by station. *Tharyx* sp. and *Sigambra tentaculata* were found from the outfall north to the Atlantic Ocean. *Stenoninereis martini* and Capitellidae species were found from the outfall south to the head of the estuary.

What is known about the biology of the species collected substantiates these distribution patterns. For instance, *Sigambra tentaculata* was collected at stations directly in river mouths only and has been so reported from several other North Atlantic localities. However, explanations for the division of the estury into a northern and southern part, with an overlapping portion at the outfall, will have to come following further studies, such as of salinity values and of the amount of sewage entering the estuary at the outfall.

Proc. Assoc. Is. Mar. Labs. Carib. 13:7

INFORME PRELIMINAR DE LAS ESPECIES DE CANGREJOS DE LA FAMILIA XANTHIDAE (CRUSTACEA, DECAPODA, BRACHYURA) ENCONTRADOS EN PISCADERABAAI, CURACAO

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El conocimiento de las especies de la familia Xanthidae en Curacao, y específicamente en Piscaderabaai, es muy limitado. Gran parte de los estudios realizados con expecímenes de la isla datan de Rathbun (1930), que reporta 31 especies pertenecientes a 19 géneros, para Curacao.

Para la realización de esta investigación se tomó como base una franja de 4.06 km de largo en Piscaderbaai y un intervalo de profundidades entre 0 y 20 mts; y se realizaron muestreos regulares durante cuatro meses, observando en cada uno temperatura, tipo de sustrato y condiciones ecológicas del área. Una gran parte de las especies identificadas en esta investigación no han sido reportadas para la zona.

Para este informe preliminar, no se han tenido en cuenta las especies encontradas en el interior de corales, tales como: *Acropora palmata*, *Porites porites*, etc. las que se reportarán en un informe posterior.

Se relaciona el número de individuos con la profundidad para determinar su abundancia, teniendo en cuenta para esta relación los diferentes géneros y especies colectadas.

Este trabajo continuará hasta Julio de 1978 y se procurará abarcar algunas áreas previamente determinadas en Venezuela y Colombia, para realizar un estudio comparativo de la fauna de Xanthidae en estas regiones.

Proc. Assoc. Is. Mar. Labs. Carib. 13:8

ECHINOID MORTALITY AT JOBOS BAY, PUERTO RICO

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The mechanisms found to regulate mortality of *Lytechinus variegatus* (Lamarck), *Tripneustes esculentus* (Leske) and *Diadema antillarum* (Philippi) in five stations in the *Thalassia* meadows at Jobos Bay are discussed. The conclusions are based upon three years of field data.

Biological mechanisms such as predation by *Cassis tuberosa* (Linne) account for heavy mortality of *Lytechinus* and *Tripneustes* but not *Diadema*. Predation by wading birds, Louisiana heron (*Hydranassa tricolor*), little blue heron (*Florida caerulea*), and common egret (*Casmerodium albus*) place additional pressure (yearly or seasonal, depending on the species) on *Lytechinus* and *Tripneustes* populations localized in the shallow zones of the *Thalassia*.

Physical mechanisms such as spring tides (during the months of April - June) expose the shallow zones of the *Thalassia*, subjecting *Lytechinus* and *Tripneustes* to lethal temperatures or desiccation. Wind-caused waves sweep over the shallow zones of *Thalassia* meadows transporting all loose urchins to the shore where they die. In the offshore cays surroudning the bay, populations of rats (*Rattus norvegicus*) take advantage of the dead *Lytechinus* and *Tripneustes*, eating their inner soft tissues.

Causes of death of 161 urchins whose tests were collected from August, 1975 to August, 1976 indicate the following:

Biological mechanisms of mortality:	16%
Physical mechanisms of mortality:	58%
Non-determined causes of mortality:	26%

At Jobos Bay, biological mechanisms account for small but relatively constant source of mortality throughout the year, while physical mechanisms are responsible for "mass mortalities" that are seasonal in their occurrence. These observations conflict with the characterization of tropical seagrass meadows as non-physically controlled systems.

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THE COLONIZATION OF BARBADOS COASTAL WATERS BY THE COPEPOD *Oithona oculata*

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It is porposed that *Oithona oculata* colonized the waters off Barbados and other Caribbean islands by migrating around the Cape of Good Hope and crossing the Atlantic Ocean via the South Equatorial Current. The results show that it is permanently established and becoming increasingly important numerically in the Barbados inshore plankton. Raw data on all the developmental stages of *O. Oculata* indicate a high biotic potential and adaptability to its new environment. The high concentrations confined to the leeward side of the island suggest that a retaining mechanism, presumably an eddy system, functions to maintain populations of this copepod close to shore.

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REGENERATION IN THE SCLERACTINIAN CORALS *Agaricia agaricites (A. purpurea)* AND *Porites astreoides*

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To study the regeneration capacity of corals *in situ*, artificial lesions were made on colonies of *Agaricia agaricites* and *Porites astreoides*. The experiments were carried out at the southwest coast of Curacao at a depth of 25 m and 18-23 m, respectively. The various types of lesions (1 cm^2 + underlying skeleton and 5 cm^2 tissue + underlying skeleton) were all surrounded by living coral tissue.

In three to four weeks, all lesions were colonized by fleshy and filamentous algae. *P. astreoides* appeared to be able to overgrow these colonizing organisms, whereas in *A. agaricities*, colonizing algae mostly prevent successful regeneration. The latter is in contrast with results previously obtained with *A. agaricites* colonies at a depth of 10 m. *A. agaricites* and *P. astreoides* show different kinds of regeneration mechanisms.

In *A. agaricites*, complete recovery of small tissue lesions (1 cm^2) was observed in only two colonies (n=25) and only one colony (n=26) managed to overgrow a tissue + skeleton lesion (1 cm^2). In *P. astreoides*, complete recovery of small tissue lesions (1 cm^2) and small tissue + skeleton lesions (1 cm^2) was observed in 14 colonies (n=22) and 13 colonies (n=25), respectively. Also, 75% recovery of tissue lesions (1 cm^2) and tissue + skeleton lesions (1 cm^2) takes place much faster in *P. astreoides* than in *A. agaricies*. Both corals were unable to overgrow large tissue + skeleton lesions (5 cm^2).

In *A. agaricites*, recovery is faster when only tissue is removed. In *P. astreoides*, not much difference was found between the regeneration rates of tissue lesions (1 cm^2) and tissue + skeleton lesions (1 cm^2), presumably because remnants of living coral tissue are present in the porous skeleton under both tissue and tissue + skeleton lesions.

More information about the regeneration mechanisms of *P. astreoides* was obtained by staining coral skeletons with Alizarin Red-S. It appeared that in this coral, injuries activate a relatively more rapid calcification.

THE SPONGE *"Anthosigmella varians"* (D&M) DE LAUBENFELS, A MAJOR DETERMINATION ON THE STRUCTURE OF BENTHIC COMMUNITIES IN PUERTO RICO

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Center for Energy and Environment Research

The sponge *Anthosigmella varians* is widely distributed throughout the West Indian region where it appears to be endemic. The author reported this species for Puerto Rico where it inhabits coral communities, fringing coral reefs, algal communities, and other benthic community types. The major findings are:

1. Gigantic encrusting ecophenotypes (some >50 m^2 in area) occur where there exists extensive flat or relatively even substrates exposed to heavy wave action and/or strong currents in clear water (Depth Range: 0.3-37.5 m);

2. During lateral propogation *Anthosigmella* encrusts and kills virtually all sessile benthic organisms including other sponges and hermatypic corals such as *Diploria, Siderastrea, Montastrea, Eusmilia, Acropora,* the hydro coral *Millepora*, and probably others;

3. Evidence suggests that *Anthosigmella varians* exerts a selection pressure in favor of most aggressive coral types (family Mussidae);

4. The data indicate that *A. varians* is a new coral boring species.

The general competitive character of *A. varians*, the monopolization of large spatial resources (a limiting factor in benthic communities), reduction of niche availability by creating habitat homogeneity, and its coral boring activity are considered as major factors in the structure and stability of the community.

Proc. Is. Mar. Labs. Carib. 13:12

OBSERVACIONES SOBRE PORCELANIDOS (CRUSTACEA:ANOMURA) EN EL CARIBE COLOMBIANO

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Los porcelánidos tienen su distribución principalmente concentrada en el eulitoral y el alto infralitoral. Es un estudio extenso de la familia Porcellanidae en la región de Santa Marta y en las Islas del Rosario, cerca de Cartagena, se encontraron 29 especies de las cuales dos, *Petrolisthes magdalenensis* y *P. rosariensis*, son nuevas, *P. tonsorius* ha sido encontrado anteriomente únicamente en el Pácifico, y *Psidia brasiliensis*, conocida en algúnos sitios del Brasil, fué reportada por primera vez en el Caribe y representa el primer reporte de este género en el área.

Se ha presentado una especial atención a la distribución en el campo y a la relación de las diferentes especies con otros organismos.

No se ha podido verificar ninguna relación de comensalismo obligatorio de porcelánidos con corales. *Pachycheles ackleianus* tiene una relación muy estrecha con una sílicoesponja; *Porcellana sayana*, comensal conocido de crustáceos, fue encontrado con frecuencia con el holoturio *Astichopus multifidus*. *Minyocerus angustus* es un comensal obligatorio de estrellas del mar y fué encontrado sobre un *Astropecten* sp.

Una relación muy llamativa mantiene *Clastoechus vanderhosrti* con el erizo *Echinometra lucunter*. El crústaceo nunca fué encontrado fuera de los huecos que hatica *Echinometra* en el litoral rocoso y por lo tanto parece ser un comensal obligatorio.

Proc. Is. Mar. Labs. Carib. 13:13

ISOPODS OF SOME MARINE FISHES FROM PUERTO RICO AND ADJACENT AREAS

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From July, 1974 until the present, over 2,000 collections of fish parasitic isopods have been made in Puerto Rico, Mona Island, U. S. and British Virgin Islands, and the central and southern Bahamas. The species of isopods are listed in phylogenetic order, numbered, and noted as new species (*), or as not recorded previously as parasites of fish (**). Hosts infested by each isopod are listed after each isopod. New host records are noted (*): (1) *Aegathoa* sp.* - *Gobionellus stigmaturus** (2) *Anilocra laticauda* Milne Edwards, 1840 and (3-8) six new species of *Anilocra** will be discussed in the next article. (9) *Agarna culumus* (Haller, 1880) -*Acanthurus chirurgus*; (10) *Cymothoa oestrum* (Linnaeus, 1758) - *Caranx crysos**, *C. hippos**, *C. latus*, *C. ruber*, *C. bartholomaei**, *Euthynnus alletteratus**, *Priacanthus arenatus*, *Selar crumenophthalmus*, *Sphyraena barracuda**; (11) *Mothocya nana* (Schioedte and Meinert, 1883-84) - *Hyporhamphus unifasciatus**, *Tylosurus crocodilus**; (12) *Mothocya* sp.* - *Apogon conklini**, *A. Lachneri**, *A. pigmentarius**; *Lironeca redmanii* Leach, 1818 - *Scomberomorus cavalla*, *S. maculatus*, *S. regalis**; (14) *Renocila* sp.* - *Apogon maculatus**, *A. townsendi**, (15) *Rocinella signata* Schioedte and Meinert, 1879 - *Acanthurus chirurgus**, *Sphyrna mokarran**, *Lachnolaimus maximus*, *Epinephelus itajara**, *Lutjanus analis*, *Ginglymostoma cirratum*, *Dasyatis americana*, *Aetobatus narinari**, *Anisotremus surinamensis**, *Haemulon sciurus**, *H. album**, *Priacanthus cruentatus**, *Sphyraena barracuda**, *Calamus calamus*, *Lutjanus griseus**, *Pseudupeneus maculatus**, *Chromis multilineatus**, (16) *Excorallana antillensis* (Hansen, 1890)** - *Epinephelus striatus**, *Gerres cinereus**, *Centropomus ensiferus**, *Aetobatus narinari**, (17) *E. oculata* (Hansen, 1890)** - *Phaeoptyx pigmentaria**, *Apogon maculatus**, *Centropomus ensiferus**; (18) *E. sexticornis* (Richardson, 1901)** - *Lutjanus griseus**, *Centropomus ensiferus**, (19) *E. tricornis* (Hansen, 1890) - *Epinephelus itajara**, *E. striatus**, *Priacanthus cruentatus**, *Sphyraena barracuda*, *Lutjanus apodus**, *Dasyatis americana**, *Aetobatus narinari*, *Scarus coerulens*, *Epinephelus guttatus**, *Elops saurus**, *Centropomus ensiferus**; (20) *Alcirona insularis* Hansen, 1890 - *Gobiosoma evelynae** (21) *A. krebsii* Hansen, 1890 - *Bodianus rufus**, *Pseudupeneus maculatus**, *Scarus coeruleus**, *Emmelichthyops atlanticus**, (22) *Alcirona* sp.*- *Epinephelus striatus**, *E. tigris**, *Lutjanus analis**, (23) *Gnathia puertoricensis* Menzies and Glynn, 1968** - *Acanthurus bahianus**, *Alutera schoepfii**, *Echenis naucrates**, *Epinephalus itajara**, *Haemulon album**, *Labrisomus filamentosus**, *Lutjanus cyanopterus**, *Sphyraena barracuda**; (24) *Gnathia* sp.* - *Decadon puellaris**, *Lutjanus buccannella**, *Serranus phoebe**.

Proc. Is. Mar. Labs. Carib. 13:14

ISOPODS OF THE GENUS *Anilocra*, PARASITES OF SOME WEST INDIAN FISHES

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Marine fishes were examined for parasites of the genus *Anilocra* in Puerto Rico and adjacent islands, Mona Island, the U. S. and British Virgin Islands, and the Bahama Islands. Twenty-four species of fishes were found to be infected. These parasites, formerly believed to be of one species, *Anilocra laticauda* Milne Edwards 1840, are divided into a complex of seven species; *Anilocra laticauda* parasitizing *Epinephelus adscensionis, E. cruentatus, E. fulva, E. guttatus, Haemulon aurolineatum, H. carbonarium, H. chrysargyreum, H. flavolineatum, H. macrostomum, H. plumieri, H. sciurus* and *Paranthias furcifer; Anilocra* n. sp. 1 parasitizing *Chaetodon capistratus, C. ocellatus, C. sedentaris* and *C. striatus; Anilocra* n. sp. 2 parasitizing *Acanthurus chirurgus* and *A. bahianus; Anilocra* n. sp. 3 parasitizing *Chromis cyanea* and *C. multilineata; Anilocra* n. sp. 4 parasitizing *Holocentris ascensionis* and *Myripristis jacobis; Anilocra* n. sp. 5 parasitizing *Holocanthus tricolor;* and *Anilocra* n. sp. 6 parasitizing *Abudefduf saxatilis.* Interesting geographical distributions were found in *Anilocra* n. sp. 2 parasitizing *Acanthurus chirurgus* exclusively in Puerto Rico and east to the Virgin Islands and *A. bahianus* exclusively from Mona Island north and again parasitizing *A. chirurgus* on the coast of Florida. The same distributional pattern was found in *Anilocra* n. sp. 4 parasitizing *Holocentris ascensionis* exclusively in Puerto Rico and east and parasitizing *Myripristis jacobis* from Mona Island north and again parasitizing *H. ascensionis* on the coast of Florida. *Anilocra* n. sp. 3 shows another interesting distribution parasitizing *Chromis multilineata* exclusively at Mona Island and east and *C. cyanea* exclusively in the Bahamas and on the coast of Florida.

Damage by the parasite ranged from erosion of scales and discoloration of skin to actual bone deformation around the site of attachment.

Proc. Is. Mar. Labs. Carib. 13:15

ASPECTS OF THE BIOLOGY OF *Astrophyton muricatum*

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The species *Astrophyton muricatum* is the most abundant shallow water West Indian representative of the ophiuroid family Gorgonocephalidae. During the day the great abundance of *A. muricatum* remains hidden from view, but nocturnally it is found in large numbers perching on top of coral prominences and gorgonians at depths of 0.5 to 17 m on the shallow reefs of La Parguera, Puerto Rico. The branched arms of *A. muricatum* uncoil into a plankton catching convex net, often about one meter in diameter. During daylight hours individuals hide in crevices or under coral. Small individuals are often seen curled up in the gorgonians *Pseudopterogorgia* and *Gorgonia*.

This study involved feeding, growth, and densities of *Astrophyton muricatum*. Investigations have shown the animal to catch a great variety of plankton with the fine mesh of arms which are equipped with small hooks imbedded in the epithelium. Analysis of gut contents have shown that zooplankton between 0.5 mm and 2.0 mm are actually ingested by the animal with copepods, shrimp larvae, larvaceans, and fish larvae the major food sources. Individual growth records for 40 animals have been recorded for periods of time ranging from 6 to 20 months. Individuals were measured every two months which could be done since each animal returned to the same location every night from its daily hiding place. Populations of *Astrophyton muricatum* have been found to be as high as $0.4/m^2$ with an average density of $0.25/m^2$ from 3,452 m^2 sampled on Enrique Reef, La Parguera, Puerto Rico.

Proc. Is. Mar. Labs. Carib. 13:16

SEAGRASSES AND THE EVOLUTION OF MARINE GAMMARIDEAN AMPHIPODS

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A relationship is implied between the seaward invasion and evolution of marine gammaridean amphipods and the development of seagrasses during the Cretaceous Period. Seagrasses introduced a form of slowly degrading organic detritus previously absent in shallow marine waters. The subsequent evolution and divergence of many marine detritivores such as gammaridean amphipods may have been more than coincidental. Primitive gammaridean amphipods were well adapted to exploit this food source and may have used it as an avenue of invasion to marine environments. The fossil record indicates that amphipods and seagrasses both became abundant during the Cretaceous. The earliest amphipod fossils are from the family Gammaridae which is predominantly freshwater with some brackish and marine members. Detritivory is well established within the family and partly evidenced through their strong mandibles which bear triturive molars for grinding coarse food. Present work has shown that species of several genera including *Gammarus*, *Melita* and *Elasmopus* feed directly upon dead seagrass leaf material and utilize it in their nutrition. Another primitive family, Hadziidae, whose members are mostly freshwater aquifer and cave species has three unusual exceptions which are marine. Two of these are *Thalassia* detritivores.

Morphological studies give strong evidence for the evolution of fully marine families from primitive gammarid-type stock. The development of seagrasses may have provided an avenue of invasion from freshwater and a habitat and food source for a center of divergence among marine gammaridean amphipods.

Proc. Is. Mar. Labs. Carib. 13:17

NOTAS SOBRE LOS MANGLARES DEL SUR DE LA REPUBLICA DOMINICANA

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Este trabajo constituye el primer estudio sobre las condiciones en que se encuentran los manglares del sur de la República Dominicana (Bahía de Puerto Viejo, Playa de Puerto Tortuguero, Provincia de Azua, Desembocadura del Río Baní, Provincia Peravia, Playa de Guibia y Bahía de Andes, Boca Chica, Distrito Nacional). Se estudió además la flora marina bentónica macroscópica, la flora costera, las aves y algunos invertebrados asociados a este ecosistema. El trabajo cubre un período desde el 22 de oct. de 1975 al presente año. Por otra parte, se define su importancia para las pesquerías, la agricultura y como agentes protectores de la costa. Se recomienda dar protección inmediata a los manglares del sur, prohibiendo la quema de mangle, para la extracción de carbón vegetal. Como han sido tan ampliamente afectados, se necesitaría un período de aproximadamente diez (10) años de reposición que permita a la naturaleza equilibrar la zonación típica del manglar, por tanto se discute la posibilidad de reforestación de algunas zonas específicas.

Este trabajo se realizó con los auspicios de la Organización de los Estados Americanos (OEA) (Fondo del Mar de Plata) y la Secretaría de Estado de Agricultura a través del Proyecto de Educación Profesional con el Centro de Investigaciones de Biología (CIBIMA).

Proc. Is. Mar. Labs. Carib. 13:18

ALGAS MARINAS BENTICAS INDICADORAS DE UN AREA AFECTADA POR AGUAS DE SURGENCIA FRENTE A LA COSTA CARIBE

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El presente trabajo es el resultado de un estudio realizado para establecer la relación entre ciertos factores medioambientales y la flora béntica del litoral Caribe de Colombia. Para propósito de este estudio, esta franja costera ha sido dividida en dos Areas. El Area 1 se encuentra entre cabo Tiburón y la desembocadura del Río Magdalena, caracterizada por aguas cálidas con muy pequeñas fluctuaciones de la temperatura del agua superficial. El Area 2 se extiende desde la desembocadura del Río Magdalena hasta Castilletes y sus aguas se encuentran afectadas por una surgencia costera (Upwelling) cuyo núcleo se localiza al Oeste de la Península de Guajira.

Como resultado de este "Upwelling" se presentan variaciones considerables en los factores físico-químicos que actúan sobre la flora béntica allí establecida por cortos períodos o por todo el año.

También determinan la ausencia de algunos géneros y especies típicas de estas latitudes.

Los parámetros utilizados para detectar tal fenómeno oceanográfico son los mismos dados por Díaz-Piferrer para el afloramiento Venezolano. A los indicadores diológicos citados por dicho autor para Venezuela, el autor del presente trabajo añade el alga parda *Ectocarpus confervoides* (Roth) Le Jolis, encontrada en el área de surgencia en Colombia.

Simultáneamente se realiza un estudio comparativo con Venezuela, de estas plantas indicadoras. Se encontraron similitudes y diferencias originadas por la contracorriente de aguas cálidas que invade la surgencia significative Colombiana, a las diferentes fuerzas de Corriente Caribe y Corriente Guayana que inducen a los respectivos fenómenos oceanográficos, factores climáticos, topografía del fondo e influencias de aguas continentales en estos afloramientos.

Proc. Is. Mar. Labs. Carib. 13:19

TIPOS DE VEGETACION MARINA BENTONICA EN EL LITORAL DEL PARQUE NACIONAL TAYRONA COSTA CARIBE COLOMBIANA

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Se estudiaron los tipos de vegetación marina en el litoral del Parque Nal. Natural Tayrona (Departamento del Magdalena, Municipio de Santa Marta), durante los meses octubre a diciembre del año de 1974; estos meses corresponden a los más lluviosos del año en la región.

Los métodos utilizados son modificados de la fitosociología terrestre; las apreciaciones cualitativas de abundancia y presencia siguen las escalas de Braun-Blanquet.

Los tipos de vegetatión se distribuyen verticalmente según la zonación en cada uno de los hábitats estudiados, a saber: rocoso, areno-rocoso y areno-fangoso, cada uno dividido a su vez, según el grado de exposición al aleaje, en de exposición fuerte, media y suave. A pesar de algunas diferencias en la estructura de la costa y en el origen geológico de las dos mitades en que podría dividirse el litoral, éste se considera uno solo respecto a la vegetación.

En el litoral rocoso se describe un tipo de vegetación para el supralitoral superior y tres para el supralitoral inferior; dos para el mesolitoral superior y cuatro para el mesolitoral inferior así como cuatro tipos para el sublitoral. Cada tipo de vegetación recibe el nombre de las especies dominantes en él, así, por ej.: tipo *Laurencia papillosa-Centroceras clavulatum*.

Igualmente se describen 17 tipos más para los hábitats indicados, incluyendo los dominados por fanerógamas marinas y los que se establecen sobre raíces fulcreas de mangle.

Se incluyen anâlisis mediante índices de similaridad para zonación y sustrato.

Proc. Is. Mar. Labs. Caribe 13:20

Salmonella anatum Y *Alteromonas putrefaciens* EN EL LAGO ENRIQUILLO, REPUBLICA DOMINICANA

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Se reporta por primera vez el aislamiento de las bacterias *Salmonella anatum* y *Alteromonas putrefaciens* de las aguas hipersalinas del Lago Enriquillo (Salinidad de 35 a 90%) y los arroyos sulfurosos aledaños, La Azufrada y los Borbollones. Entre enero y junio de 1977 se hicieron 8 recolecciones y se tomaron 16 muestras para los estudio microbiológicos en medio del lago y en la desembocadura de estos arroyos. Se detectaron estas bacterias en muestras tomadas a la orilla de los arroyos en áreas cercanas a la Playita y la Caimanera en la Isla Cabritos.

En pruebas de laboratorio estos microorganismos demuestran alta tolerancia a la sal (0-8%). Su identificación fue comprobada por el Instituto Pasteur en Paris.

Alteromonas putrefaciens, anteriormente conocida como *Pseudomonas putrefaciens* o *P. rubescens*, un microorganismo Gram negativo monótrico polar, se encuentra en distintos ambientes, pero especialmente en las aguas. Demuestra considerable tolerancia a cambios de temperatura y a bajas concentraciones de oxígeno. *A. putrefaciens* produce H_2S en ciertos medios de cultivo como la *Salmonella*, por lo que se puede confundir con ella. Se considera como agente de alteración en varios productos de la industria alimenticia: conservas de carnes, pollo, pescado, leche, mantequilla y aceites vegetales y se ha aislado de heces, orina, pus, secreciones nasofaríngeas humanas, también de bovinos y porcinos.

Salmonella anatum se reconoce como agente etiológico de desórdenes intestinales y fue también aislada de carne fresca y procesada de bovinos.

A pesar de que no hay balnearios en el Lago, estas bacterias representan un potencial peligro para los moradores, especialmente para los pescadores y consumidores de tilapias. Sería interesante determinar si estas bacterias provienen de portadores humanos o a de alguna de las especies de animales (cocodrilos, aves y peces que viven en el lago o en sus orillas.).

Este estudio fue realizado como parte de las investigaciones ecológicas del Lage Enriquillo bajo los auspicios de la Secretaría del Estado de Agricultura a través del Proyecto de Educación profesional y el Proyecto Multinacional de Ciencias del Mar de la Organización de Estados Americanos con el Centro de Investigaciones de Biología Marina (CIBIMA).

PRIMARY PRODUCTIVITY OF BENTHIC ALGAE ON THE CORAL REEF OF CURACAO

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In this investigation the primary productivity of the coralline, microphytic and macrophytic algae is measured on the coral reef of Curacao at depths between 10 and 40 m. The field work began in January, 1977. The estimates of production are derived from measurements of O_2 respiration in light and dark bottles *in situ*. O_2 is measured by Winkler titration.

At this moment (12 August, 1977), we have a series of data for midday productivity (1100-1400) at 10 m depth. Gross and net productivity per unit of algae covered substrate (mg $O_2.cm.^{-2}.h^{-1}$) of the major components of the vegetation were: *Hydrolithon boergesenii* 0.010-0.011 gross and 0.007-0.009 net, *Ostreobium quekettii* 0.012-0.021 gross and 0.009-0.017 net, and "dense vegetation" 0.030 gross and 0.025 net. "Dense vegetation" indicates the algal turf found in territories of the Dusky Damselfish *Pomacentrus fuscus*. Substrates with *Ostreobium* usually also have a sparse cover of very small microphytes which introduces variation in the measurements. Light intensities at 10 m depth varied between 200 and 400 microeinsteins. m^{-2} $sec.^{-1}$, well above the light values at which productivity of shallow-water coralline and filamentous algae becomes maximal (Wanders 1976; Aguatic Botany 2:235-270). Nevertheless midday productivity of these plants was at 10 m approximately 1/2 to 1/3 of the value found previously at 0.5-3m. This suggests that the shallow and deep-water algae differ considerably in their photosynthetic response to light.

The experiments are continuing, and more data will be available at the AIMLC meeting in October, 1977.

Proc. Is. Mar. Labs. Carib. 13:22

ANOTACIONES ECOLOGICAS Y SISTEMATICAS SOBRE LOS PECES DE LA FAMILIA POMACENTRIDAE DEL CARIBE COLOMBIANO

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La familia pomacentridae está constituida por no menos de 300 especies de pequeños peces habitantes principalmente de los mares tropicales, con una marcada preferencia por los arricifes coralinos. Sus hábitos los convierten en una de las familias ícticas más interesantes para los estudios ecológicos y etológicos; ademas, sistemáticamente constituven uno de los más arduos problemas de la ictiología. Corrientemente se te divide en 4 subfamilias, de las cuales Premminae y Amphiprioninae, ambas monogenéricas, son conocidas exclusivamente de la región Indo-Pacífica, recibiendo el nombre de peces anémonas o payasos por su amplia gama de coloración.

Las otras dos subfamilias son la Pomacentrinae y la Chrominae. La primera es separada en dos tribus, la Pomacentrini y la Abudefdufini. Pomacentrini incluye alrededor de seis géneros, de los cuales sólo existe en el Atlántico Occidental *Eupomacentrus* (incluído en *Pomacentrus* por algunos autores) con por lo menos diez especies. Estas especies son altamente ligadas al benthos del cual toman su alimento, desarrollando un comportamiento fuertemente agresivo enfocado intraespecíficamente. La excepción a este comportamiento es *E. planifrons* cuyas agresiones van dirigidas principalmente a los individuos pertenecientes a otras especies. Merece destacarse igualmente *E. otophorus*, la única especie de la familia de hábitos estuarinos en el área.

La tribu Abudefdufini posee unos diez géneros representados en el Atlantico Occidental por dos, *Abudefduf* y *Microspathodon*. El primero tiene dos especies en el área, una perteneciente al complejo mundial *A. saxatilis*, y la otra *A. taurus*, probablemente la misma especie de ambas costas de América, algunas veces incluída en el género *Nexilarius*. *Microspathodon chysurus* es la única especie del género en el Caribe, sus hábitos son muy interesantes, siendo probable que desarrolle, en ciertas ocasiones, un comportamiento ectoparasítico en sus estadios juveniles. La subfamilia Chrominae incluye unos 5 géneros aproximadamente, de los cuales en el Atlántico Occidental solo existe *Chromis*, representados por unas seis especies pertenecientes a dos grupos-subgéneros-relativamente definidos. El uno abarca las dos especies de alimentación planctófaga, típicas de aguas someras. El otro incluye a especies habitantes de aguas más profundas y alimentación más heterogénea que el grupo anterior.

Proc. Is. Mar. Labs. Carib. 13:23

THE BEHAVIOR OF *Chromis cyanea* (POEY), POMACENTRIDAE

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Chromis cyanea is one of the pomacentrids which possess territories on the reef. The territorial males show agonistic behavior towards other territory-owners and elaborate coutship-behaviour towards ripe females. The different behavior patterns are accompanied by five different colour patterns. The behaviour of *C. cyanea* was recorded on an underwater-tape recorder while diving with SCUBA gear. The protocols were subjected to different analyses. These showed that there existed a clear temporal organisation of the behaviour. The different behaviour patterns could be grouped in what appeared to be different systems. Each of the different colour patterns was positively correlated with one of these systems. In this way the colour patterns can be used to explain the causation of the different behaviour patterns. It also helps to explain differences in behaviour between males which live at a high population density and males which live at a low population density.

Proc. Is. Mar. Labs. Carib. 13:24

NOTES ON JUVENILES OF SOME GROUPERS IN CURACAO AND BONAIRE

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Juveniles of *Epinephelus cruentatus, E. fulvis, E. adscensionis* and *Mycteroperca interstitialis* were studied. They can be found during and after the spawning season from July.

The distribution of the juveniles of these four species is different: those of *E. fulvus* are found from a depth of 1.5 to 5.0 m, those of *E. cruentatus* from 4.6 to 12.1 m. Juveniles of *M. interstitialis* are found from 18.2 to 24.3 m and those of *E. adscensionis* in very shallow water.

The phenotype of the eggs points to a pelagic larval life.

During the first year of their life juveniles of *E. cruentatus* form seven growth rings in their otoliths. A high agreement was found between calculated and observed body lengths. Both *E. cruentatus* and *E. fulvus* have a body length of about eight cm when they are one year old.

Juveniles of *E. cruentatus* feed 80 percent on shrimps and 20 percent on fish. About the same percentages are found for *E. fulvus*. Juveniles of *M. interstitalis* feed probably more on fish.

Proc. Is. Mar. Labs. Carib. 13:25

COMPETITION AND COEXISTENCE AMONG SEVEN SPECIES OF DAMSELFISHES (PISCES, POMACENTRIDAE) OFF SOUTHWEST PUERTO RICO

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Seven nominal species of damselfishes of the genera *Eupomacentrus* and *Microspathodon*, which constitute an ecological guild, coexist on the reefs off southwest Puerto Rico. Possible explanations for this coexistence are: (1) food or space resources are partitioned among specialized species, (2) chance factors, including the generation of habitable spaces, are responsible, and (3) predation or disease is limiting. Evidence from this and other studies indicates that the species in question are generalists in regard to their modes of feeding and reproductive seasonality, not specialists as would be expected if partitioning of these resources was occurring. Some habitat partitioning is evident.

Behavioral studies provide evidence that (1) the ethological patterns of the guild members differ, (2) the species which first arrives at a habitat patch is normally capable of holding it in the face of competition from other species, and (3) if two species reach a vacant habitat patch at the same time the outcome of the ensuing competition for space can often be predicted. Available data indicate that these damselfishes are not limited or greatly affected by predation or disease.

Proc. Is. Mar. Labs. Carib. 13:26

THE EFFECTS OF TRAP-FISHING ON REEF COMMUNITIES IN JAMAICA

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Reef fish stocks around Jamaica have been chiefly exploited by the use of wooden-framed wire-mesh traps with a maximum mesh diameter of 3.30 or 4.13 cm. The abundance and mean size of many species has been reduced by over-fishing, especially on the north coast, where the submarine shelf is so narrow that fishing effort is highly concentrated (Munro, 1974; J. Cons. Int. Explor. Mer. 35(3):337-350).

Some reef fishes are less vulnerable to capture by the traps, particularly those that are very small, that are very restricted in their movements or that commonly feed in the water-column above the reef. More vulnerable are the medium to large roving bottom-feeders, which include most of the herbivores, invertebrate predators and carnivores. It is likely that many of these species limit the populations of other reef organisms by predation or that many of these species limit the populations of other reef organisms by predation or competition. If their own populations have been greatly reduced, it seems probable that some other benthic organisms may increase in numbers. Thus the relative abundance of territorial damsel-fishes, algae, corals, echinoids and other benthic invertebrates may be changed or changing from what it was before trap-fishing itensified.

Proof of any such effect is not yet available. Data from surveys repeated over time are meagre and comparisons with surveys replicated at other localities should be made with caution. Possible changes are discussed and data are presented on the abundance of the echinoid *Diadema antillarum* at Discovery Bay. Potential competition with this animal from herbivorous fishes has been reduced. Potential predators, notably the queen trigger-fish (*Balistes vetula*), are rare on reefs in this area.

Proc. Is. Mar. Labs. Carib. 13:27

ORGANIC MATTER IN THE SEDIMENTS OF THE GULF OF CARIACO AND THE GULF OF PARIA

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Both the Gulf of Paria and the Gulf of Cariaco are located in the northeastern coast of Venezuela. The Gulf of Paria receives a large amount of terrestrial material from the Orinoco River and its tributaries. The gulf is connected to the Caribbean Sea in the north by the Boca de Dragon and to the Atlantic Ocean in the south by the Boca de Serpiente. The gulf is 135 km long and 72 km wide. The Gulf of Cariaco is characterized by upwelling and has a rich fauna. The water of the gulf is separated from the Caribbean Sea by a sill in the entrance of the gulf. The gulf is 62 km long and the maximum width is 15 km.

The organic carbon, organic nitrogen, organic phosphate, carbohydrate and protein contents in the sediments of 31 stations in the Gulf of Paria and 119 stations in the Gulf of Cariaco were determined. The Gulf of Cariaco had much higher organic content than the Gulf of Paria. The factors which might influence the organic matter were discussed. The distribution of organic matter in these two gulfs was also studied. According to the organic matter content, the Gulf of Cariaco could be divided into three zones. High organic content was encountered in the middle of the gulf; medium value was at the eastern end of the gulf and low value was at the entrance of the gulf. There was no big variation in the distribution of the organic matter content in the Gulf of Paria.

Proc. Is. Mar. Labs. Carib. 13:28

THE EFFECTS OF RIVERMOUTH SANDBAR FORMATION ON ESTUARINE CIRCULATION

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The circulation and hydrological characteristics of three estuarine systems on the north and western coasts of Puerto Rico, where sandbar development is significant, were investigated. Two distinct wave energy coastal environments and river flooding patterns were chosen to determine the differential effects of river-ocean dynamics in the formation of sandbars and their subsequent influences in estuarine circulation. Río Grande de Loíza and Río La Plata are located on the high wave energy coastal sector of the island. Río Grande de Añasco is located on the western low energy coast of the island. Rainfall distribution in these two coastal areas is somewhat different.

Results of the investigation showed that:

(1) Littoral longshore drift is mainly responsible for the development of spitbars on the areas studied;
(2) The Loíza River spitbar alignment shifts according to the intensity of the ocean dynamics processes (seasonal). Spitbar formation across La Plata River outlet is unidirectional all throughout the year. Wave regime and shifting currents influence the size, shape, and seaward migration but do not affect its alignment tendency;
(3) The Añasco River sandbar formation processes are similar to that of Río Loíza although the latter is under greater dynamic stresses and flooding conditions;
(4) The pollution handling capability of Loíza, La Plata and Añasco Rivers is quite limited. Their estuarine environment can be overloaded quite easily due to weak circulation (low flow and obstructed river inlets) of the waters;
(5) Spitbar development across river mouths promote sedimentary pollution, reduction of flushing time characteristics (increase residence time of pollutants), and decrease the aeration processes in the estuaries.

Proc. Is. Mar. Labs. Carib. 13:29

DETERMINACION POR METODOS RADIOQUIMICOS DE PERDIDAS INORGANICAS DURANTE LA CALCINACION DE MATERIAL MARINO

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Para determinar la composición inorgánica de muestras marinas es necesario liberarlas de la masa orgánica y recuperar cuantitativamente la parte inorgánica. En el caso de la calcinación, un método muy difundido para el tratamiento de meustras marinas, se puede determinar si la diferencia en peso es totalmente debida a la eliminación de los componentes orgánicos o si hay pérdidas inorgánicas, utilizando el siguiente método radioquímico: una cantidad conocida de la muestra se traza con ^{90}Sr (u otro trazador-según el elemento que se desea estudiar), se transfiere a una plan cheta de contaja, se cuenta dos veces por 10 minutos cada vez, antes y después de la calcinación a la temperatura seleccionada y a intervalos prefijados de tiempo, se comparan las actividades relativas asi obtenidas y, si no hay una diferencia significativa entre ellas, es indicación que no hubo pérdidas de componentes inorgánicos. Este método se aplicó sobre conchas de *Lima scabra* de las costas orientales de Venezuela (Turpialita, Edo. Sucre) calcinadas a 550o y 750oC por un máximo de 15 horas y se encontró que la probabilidad de que haya pérdidas inorgánicas es igual o superior a la probabilidad de que no haya una variación significativa en la actividad de una misma muestra sin calcinar, siendo la probabilidad en el primer caso 0,583-0,960 y en el segundo caso 0,509-0,912.

Proc. Is. Mar. Labs. Carib. 13:30

ECOLOGIA DEL LAGO ENRIQUILLO, REPUBLICA DOMINICANA

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El Lago Enriquillo es el más grande de las Antillas, con una extensión aproximada de 250 km.^{2}. Se encuentra en el suroeste del país entre las provincias Independencia y Bahoruco, cerca de la frontera de Haití. Formaba parte de un canal marino del Cenozoico que unía las Bahías de Neiba y Puerto Príncipe. El suelo está compuesto por arcillas calcáreas impermeables del Pleistoceno. Tiene tres (3) islas: La isla Cabritos, con 12 km. aproximados de longitud, la Islita, con 1.7 km. y la Barbarita con 1.2 km., actualmente unidas a tierra firme por el descenso del nivel de las aguas. Las aguas del Lago son hipersalinas (entre 35 y 97 °/₀₀) a 42 metros bajo el nivel del mar. Como único aporte de agua dulce algunos arroyos desembocan en el lago.

Las zonas de vida corresponden al bosque espinoso subtropical en la región Oriental y en las demás áreas al bosque seco subtropical. La temperatura media anual es de 22.5°C. y la precipitación total anual inferior a 980 mm. Predominan los bosques de acacias (*Prosopsis juliflora*) con otros árboles dispersos y abundantes cactus.

Entre los elementos importantes de la fauna se encuentra el cocodrilo americano (*Crocodylus acutus*) que representa probablemente la población aislada más grande del mundo. También se encuentran las iguanas, *Cyclura cornuta* y *C. ricordi*, cuyas poblaciones están en peligo. Entre las aves está el flamenco americano, *Phoenicopterus ruber ruber* y la cuchareta *Ajaia ajaja* así como gran cantidad de aves acuáticas Ciconiformes y Caradtiformes.

Se enfatiza la necesidad de realizar un programa de conservación a fin de preservar este importante ecosistema.

Este trabajo se realizó con los auspicios de la Organización de Estados Americanos (OEA) (Fondo del Mar del Plata) y la Secretaría de Estado de Agricultura a través del Proyecto de Educación Profesional con el Centro de Investigaciones de Biología Marina (CIBIMA).

Proc. Is. Mar. Labs. Carib. 13:31

ASPECTOS ECOLOGICOS DE CORALLIMORPHARIA Y ACTINIARIA EN LA REGION DE SANTA MARTA

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Se describen doce especies de Corallimorpharia y Actiniaria en la región de Santa Marta, considerando algunos aspectos ecológicos tales como sustratos, rangos de profundidades y algunos tipos de asociaciones con otros organismos.

Corallimorpharia y Actiniaria presentan un grado de adaptación de acuerdo al tip de sustrato, existiendo especies que viven enterradas, encima de sustratos duros, entre oquedades y grietas formadas por cantos rodados o trozos de corales muertos.

Algunas especies tales como:

Bartholomea annulata, *Stoichactis heliantus*
Condylactis gigantea, *Bunodosoma granuliferum* y
Calliactis tricolor.

presentan relaciones específicas con crustáceos.

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IMPACT OF HEATED EFFLUENTS FROM A POWER PLANT ON SEAGRASS BEDS

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A one year study (1/76-1/77) has been completed on *Thalassia* bed communities occurring under different environmental conditions. The effects of heated effluents from a power plant in Guayanilla Bay on *Thalassia* are:

(1) Significantly lower total biomass values (Max. = 385 gr DW/M^2) than in control areas (Max. = 4.750 gr DW/M^2) ($P<0.05$, ANOVA);
(2) Lower production of roots, rhizomes, stems, and leaves;
(3) Thinner leaves and rhizomes;
(4) Inhibition of sexual reproduction and higher lignin content. The following evidence indicates that the high temperature from the effluents is a principal factor in lowering the production of *Thalassia*:
    (a) A negative correlation ($r = -0.69$, $P<0.05$) between temperature and total biomass of *Thalassia*, (Max. values at 25-27°C, Min. values at 34-35°C);
    (b) A significant drop in total biomass in October, following the warmest months ($P<0.05$ ANOVA):
    (c) Laboratory studies indicated that *Thalassia* seedlings are inhibited from development at temperatures >35°C, and maybe lower;
    (d) In terrestrial grasses higher lignin content is associated with high temperatures.

The urchin herbivore and gastropod herbivore food chains, two major components in the trophic dynamics of *Thalassia* beds have been eliminated from areas exposed to the heated effluents. Fury-thermal species, rather than stenotopic taxa, are more evident in seagrass beds exposed to the heated effluents. This suggests that the high temperatures of the heated effluents are disturbing the flora and fauna associated with the *Thalassia* community.

In addition to other factors, bottom sediment resuspension from the power plant cooling system has decreased the water transparency in eastern Guayanilla Bay. A significant positive correlation ($r = +0.82$, $P<0.01$) between water transparency measured by mean secchi depth readings (Z SD) and maximum depth limit of *Thalassia* was found. The increased turbidity (Z SD 1.1-1.3 m) in seagrass beds exposed to the effluents has limited the depth distribution of *Thalassia* to 1 m where in clearer waters (Z SD=5.0 m) the depth limit is 4.7 meters.

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