

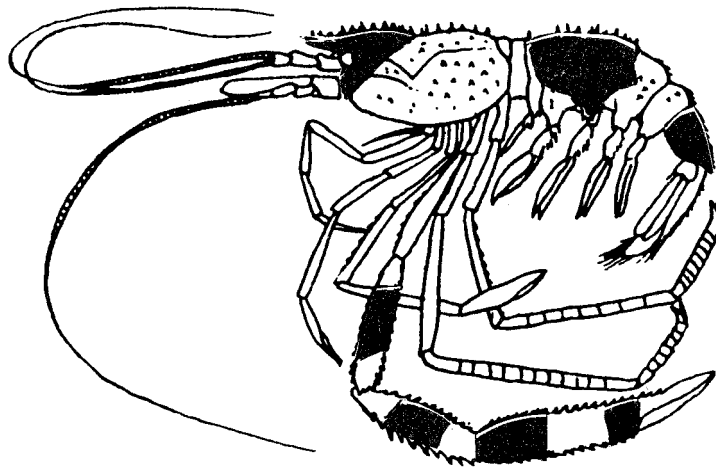
Jay Waldner

ASSOCIATION OF ISLAND MARINE LABORATORIES

OF

THE CARIBBEAN

Sixth Meeting



Estación de Investigaciones Marinas de Margarita

Isla Margarita, Venezuela Jan. 20-22, 1965

Date of publication: June, 1965



Estación de Investigaciones Marinas de Margarita, Venezuela; site of the Sixth Meeting of the Association of Island Marine Laboratories of the Caribbean.

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OF THE CARIBBEAN

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The Estación de Investigaciones Marinas de Margarita served as the host station for the Sixth Meeting of the Association of Island Marine Laboratories of the Caribbean during the period January 20 - 22, 1965.

Member institutions and representatives that participated are as follows:

BELLAIRS RESEARCH INSTITUTE OF MCGILL UNIVERSITY, St. James, Barbados, B. W. I., John B. Lewis, Director.

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INSTITUTO OCEANOGRAFICO, Universidad de Oriente, Cumaná, Edo. Sucre, Venezuela. Rafael Antonio Curra, Dean E. Holt, George A. Seiglie, Gustavo Ascanio and Renard Bleiberg.

LIST OF OTHER PARTICIPANTS:

Carlos Atilano
Centro de Investigaciones Pesqueras
Cumaná, Edo. Sucre, Venezuela

Pedro J. Bermúdez
Dirección de Geología
Ministerio de Minas e Hidrocarburos
Caracas, Venezuela

Idelisa Bonnelly de Calventi
Instituto de Biología Marina
Universidad Autónoma de Santo Domingo
Santo Domingo, Dominican Republic

Capitán J. Ma. Burgaña
Centro Profesional INCE-La Salle
Edificio Fundación La Salle
Caracas, Venezuela

William C. Cummings
Institute of Marine Science
University of Miami
Virginia Key
Miami, Florida, USA

Humberto Díaz
Departamento Hidro-Biología
Escuela de Biología
Universidad Central de Venezuela
Caracas, Venezuela

Joseph Jay Ewald
Instituto Venezolano de Investigaciones
Científicas
Apartado No. 1827
Caracas, Venezuela

Héctor L. Gámez
Ministerio de Minas e Hidrocarburos
Dirección de Geología
Piso 19 - Oficina 1920
Caracas, Venezuela

Helen L. Hayes
Biology Branch
Office of Naval Research
Department of the Navy
Washington D. C., USA

C. P. Idyll
Institute of Marine Science
University of Miami
Miami, Florida, USA

Sophie Jakowska
Dept. of Pathology
Food & Drug Research Labs. Inc.
27 West 96 St. 8D, New York, USA

Meredith L. Jones
Division of Marine Invertebrates
U. S. National Museum
Washington, D. C., USA

Guillermo Machado
Fundación Los Roques
Apartado 5248
Caracas, Venezuela

Francisco Mago Leccia
Museo de Biología
Universidad Central de Venezuela
Apt. Postal 10098
Sábana Grande, Caracas, Venezuela

Rafael Martínez
Centro de Investigaciones Pesqueras
Cumaná, Edo. Sucre, Venezuela

Takeshi Nemoto
Centro de Investigaciones Pesqueras
Cumaná, Edo. Sucre, Venezuela

Ing. Manuel Puebla
Universidad de Sonora
Hermosillo, Sonora, México

Luis A. Rivas L.
Fundación La Salle
Avda. Cota Mil entre El Teleférico
y Colegio La Salle
Edif. Fundación La Salle
La Colina, Caracas, Venezuela

Luis Salazar
Centro de Investigaciones Pesqueras
Cumaná, Edo. Sucre, Venezuela

Oswaldo Silva
Centro de Investigaciones Pesqueras
Cumaná, Edo. Sucre, Venezuela

Donald A. Thomson
Dept. Zoology
University of Arizona
Tucson, Arizona, USA

Luis E. Valdés V.
Fundación La Salle
Edif. Fund. La Salle
La Colina, Caracas, Venezuela

Antonio José Villegas
Fundación La Salle
Edif. Fund. La Salle
La Colina, Caracas, Venezuela

The Board of Directors, representatives from member institutions, and other participants were very pleased with the organization of the conference and the splendid hospitality offered by the Administration of the La Salle Foundation, the staff of the Margarita Island marine station, the Governor of Margarita, and the Rotary Club. All participants enjoyed the special activities given by the governor, the Rotary Club and the La Salle Foundation. Noteworthy was the interesting field trip to Isla Cubagua where dredging was undertaken for the pearl oysters that have long made the island famous.

Two laboratories were added to the list of institutional members of the Association. These are the Instituto de Biología Marina, Universidad Autónoma de Santo Domingo, Dominican Republic and Fundación Los Roques, Venezuela.

Mrs. Helen L. Hayes of the Office of Naval Research reported for Dr. John Olive, Executive Director of the American Institute of Biological Sciences, the formation at the Naples Zoological Station, of the Mediterranean Association for Marine Biology and Oceanology in Dec. 1964. She relayed the greetings of that new organization to the Association of Island Marine Laboratories of the Caribbean. She read sections from the minutes and described the objectives and structure as well as future plans of the MAMBO.

She also notified the members of the availability of the Hydrobiology Newsletter, published by the George Washington University Biological Sciences Communication Project, and suggested that interested persons write for copies to 2000 P. St., Washington D. C., U.S.A. if they are not already on the mailing list taken from the World Directory of Hydrobiology and Fisheries Institutions.

Abstracts of the papers presented at the meeting follow in the order that they were delivered. The paper by Frank J. Schwartz was read by Juan G. González.

INTER-AMERICAN MIGRATIONS AND SYSTEMATICS OF THE
WESTERN ATLANTIC COWNOSE RAY,
RHINOPTERA BONASUS

by
Frank J. Schwartz
Chesapeake Biological Laboratory
Solomons, Maryland

During the 1958-63 period, 12,327 cownose rays, Rhinoptera bonasus (Mitchill), were tagged with monel strap tags. Specimens were captured in pound nets between June 5 and September 5 when huge flotillas of this species occupy the upper portions of Chesapeake Bay. To date 127 rays have been recaptured from Chesapeake Bay south to Venezuela. After a mass exodus about September 5, a steady southerly migration occurs with schools passing Cape Hatteras by October 15 and off northern Florida by December 10. Tagged specimens have been recovered from Lake Maracaibo, the northeastern side of Margarita Island, Trinidad, and off northern Brazil. How they move through or around the islands of the Caribbean, where they are unheard of, or between the east coast of Florida and northern South America remains unknown. Their arrival on the northern coast of South America occurs in mid-January and they seem to remain in these areas until early March when they again begin their northward migration.

Another population of rays exists in the Gulf and migrates clockwise from the Yucatán Peninsula throughout the coastal bays. The fall migration of this population from the west coast of Florida to Yucatán occurs with schools often containing 10,000 individuals.

These rays which occur south to Río de Janeiro, Brazil, are generally believed to represent two species, Rhinoptera bonasus and Rhinoptera brasilensis. A review of their systematics and morphology indicates they are the same species which should be designated Rhinoptera bonasus. Although much is known of their biology in northern waters, information is greatly needed from South America and the West Indies on seasonal migrations, abundance, citings of schools, etc. as this may help to explain how they reach South America.

(author's abstract)

THE REPRODUCTIVE HABITS OF THE SERGEANT MAJOR,
ABUDEFDUF SAXATILIS (LINNAEUS)

by
William C. Cummings
Institute of Marine Science
University of Miami

This paper was based upon a doctoral dissertation by Mr. Cummings. Prepublication, in any form, of University of Miami dissertations is prohibited by the University; however, an abstract of the paper will appear in the proceedings of the next meeting of the Association.

(editor's note)

LIGHT INTENSITY AND GROWTH OF REEF CORALS

by

P. J. Roos

Caribbean Marine Biological Institute
Curacao Neth. Ant.

The coast of Curacao is, for the greater part, a cliff of coral limestone, interrupted by landlocked bays. On the south and south-west coasts, that is, on the lee of the island, ridges of limestone debris occur, and in some places sandy beaches. The following general description applies to these south and south-west coasts.

Between the bays, where no beach or debris ridge is present, the water depth directly below the cliff is about 3 meters. The beaches slope gradually and the ridges slope more steeply towards this depth. Usually there is a flat sandy plateau, which gradually shelves towards a depth of 8 - 10 meters. This depth is reached at about 100 meters from the shore. At this point the bottom slopes very steeply as is shown by the deep-blue open water. For that reason this demarcation line is called "the blue edge". This name is also applied to the entire area along the top of the slope in which coral growth is very abundant. Beyond the blue edge, the bottom slopes directly to a depth of about 45 m. Here a sloping area covered with sand and a few boulders begins. Coral growth is very rich along the blue edge. Descending the slope from the edge the corals become gradually less densely crowded, and at a depth of about 45 m, the lower depth limit of the living reef is reached.

Down this slope there exists a certain stratification of reef corals, not only in species, but also in the growth form of certain corals.

Several corals, which above the blue edge are massive and more or less spherical, e. g. Meandrina meandrites, Dichocoenia stokesii, Porites asteroides, Montastrea annularis and Colpophyllia natans, attaining their lower depth limit between 20 and 30 m. There they assume a flat, dishlike shape. The plane of the disc is horizontally directed. Some of these corals occur in dim caves and niches. In these localities also, a discoid form is reached but with an oblique plane directed to the opening of the niche or cave.

As light intensity is the limiting factor in determining the lower depth limit of reef coral growth, light intensity probably determines the characteristic growth form of the above mentioned corals near their lower depth limit. This also may be true for the slanting discoid forms of the same corals in caves and niches.

In both case the plane of the disc is perpendicular to the direction of incidence of the light penetrating towards the coral. In both cases, the light intensity at the coral is the same, i. e. about 10% of the incident light intensity at the water surface.

Light penetrating water gradually diminishes as a result of absorption. As a result of scattering, the penetrating light becomes more and more diffuse, and together with absorption, the light vector diagram changes with depth.

Near the surface its form depends upon sky conditions and the position of the sun. At greater depth this light vector diagram approaches an ellipsoid with a vertical axis. The volume of the diagram greatly diminishes with depth. It is possible that a certain coral reaches its lower depth limit in areas where light intensities from directions other than that of the axis of the light vector ellipsoid are insufficient for coral growth. Then only the corralites pointed in the direction of the axis of the diagram will receive enough light. Somewhat deeper, light from this direction will be also limiting and then the lower depth limit is reached. In this way growth near the lower depth limit of the coral will be only in a plane perpendicular to the axis of the light vector diagram. In the same way obliquely flat colonies occur in caves and niches where the axis of the light vector diagram, in the direction of the general light incidence, is not vertical.

Experiments are being carried out to measure the influence of light intensity on the metabolism of several reef corals, i. e. on the oxygen consumption-production balance.

Light conditions at different depth are being measured, and also the content of chlorophylls of several corals, in order to confirm the above hypothesis.

(author's abstract)

NOTES ON THE FAMILIES PEGIIDAE AND SIPHONINIDAE *

by
George A. Seiglie
Instituto Oceanográfico
Universidad de Oriente
Cumaná, Edo. Sucre, Venezuela

The taxonomic position of the family Pegidiidae, including its genera, as well as its relations with the family Siphoninidae are discussed. A new genus Siphonida and three new species, Pegidia bermudezi, Rugidia minuta, and Siphonida aurantiata.

(author's abstract)

*In press in the Caribbean Journal of Science (Spanish).

GROWTH AND BREEDING IN DIADEMA

by

John B. Lewis

Bellairs Research Institute of McGill University
St. James Barbados, B. W. I.

Growth rates of Diadema were determined from laboratory reared specimens and from size frequency distributions in a natural population. Juvenile urchins which were spawning for the first time and were approximately one year old had test diameters of between 25 and 30 mm. Two year old urchins which were spawning for the second time had reached a size of 45 to 50 mm. test diameter.

Diadema had a relatively short spawning period. The peak of spawning activity was in April and May of 1963 and 1964.

Secondary growth takes place in the gonads after spawning. This results in the production of nutritive bodies from non-maturing eggs and sperm.

(author's abstract)

THE SPECIES DISTRIBUTION OF SOME NATURALLY OCCURRING
QUATERNARY AMMONIUM COMPOUNDS

by
John R. Beers
Bermuda Biological Station
St. George's West, Bermuda, B. W. I.

The species distribution of homarine (N-methyl picolinic acid), trigonelline (N-methyl nicotinic acid), glycine betaine, carnitine (the betaine of β -hydroxy- γ -amino butyric acid), and γ -butyrobetaine has been studied in a series of invertebrates, mainly brachyuran Crustacea and echinoderms. Separation and identification of these nitrogenous bases was by paper chromatography and, where applicable, ultraviolet absorption spectra.

Homarine was found in all marine crustaceans but could not be positively identified in any of the fresh-water or terrestrial species examined. Of the nine species of echinoderms studied, homarine was detected in only a single species.

Trigonelline, an isomer of homarine, was identified in some marine Crustacea. It was never found in higher concentration than homarine.

Glycine betaine was the most commonly occurring base studied. Also, in relation to the other quaternary ammonium compounds, it was present generally in high concentration.

Carnitine was detected commonly in species possessing glycine betaine and/or homarine. It was also found in several echinoderms which showed no other quaternary bases.

γ -Butyrobetaine was not identified positively in any of the species surveyed.

The results show that the distribution of these quaternary ammonium bases is in general accord with a role in osmotic phenomena.

(author's abstract)

AN AIML CO-OPERATIVE STUDY OF THE PLANKTON ECOLOGY
AND RELATED HYDROGRAPHY OF THE TROPICAL
ATLANTIC AND CARIBBEAN
(Final Report)

by
John R. Beers¹
David M. Steven²
John B. Lewis³

An intensive study of primary production and the related hydrographic and nutrient characteristics has been conducted at off-shore sites near Barbados (15°12'N latitude, 59°47.5'W longitude) and Jamaica (17°51.7'N latitude, 76°42.9'W longitude). Observations have been made at regular monthly intervals for periods of not less than two years. In addition to the off-shore station at Jamaica, similar studies at three locations in the near-shore waters and Kingston Harbour have been made for comparative purposes. The level of primary production was, in general, relatively low throughout the year at the off-shore sites. At Barbados, gross primary production ranged from 0.19 gC assimilated/m²/day to 0.62 gC/m²/day and averaged 0.38 gC/m²/day or 139 gC/m²/year. Gross primary production at Jamaica ranged from 0.08 to 0.52 gC/m²/day. The average was 0.18 gC/m²/day or 66 gC/m²/year. Net primary production never exceeded 0.28 gC/m²/day (range: 0.03-0.28 gC/m²/day) at Jamaica. Average daily production was 0.11 gC/m²/day.

Evidence of regularly recurring variations of a cyclical nature were seen in the magnitude of productivity at both Barbados and Jamaica. Off Jamaica, short-term peaks in the Spring and Fall alternated with periods of relatively low productivity during the Summer and Winter. At Barbados productivity increased during the Spring, was relatively high throughout the Summer, and then dropped during the Fall to low values which persisted throughout the Winter.

Phytoplankton production is believed to be controlled primarily by the availability of nutrient salts. The levels of nitrate, nitrite, and phosphate generally were low in the waters of the euphotic zone throughout most of the year. Both the temperature and salinity structure of these waters is such that there is little possibility of the relatively nutrient-rich deeper waters mixing well with the waters of the upper 100 m. A thin layer of high salinity water exists in the upper part of the permanent thermocline and presents a barrier to large-scale vertical mixing. A temperature difference of 3-6°C at Jamaica and 4-7°C at Barbados was consistently found between 100 m and 200 m.

A relatively high concentration of nitrite found at the base of the euphotic zone provides indirect evidence of active nitrogen regeneration.

The period of relatively high phytoplankton production at Barbados was generally correlated with the presence of low salinity waters in the upper approximately 25 m. While Winter salinities in the upper 25 m off Barbados generally averaged between 35.6 and 35.8 ppt, this dropped during the late Spring and Summer to a low of 33.8 ppt in mid-June of 1962 and approximately 34.2 ppt in early August of 1963. Relatively high levels of phosphate and, to a much lesser degree, nitrate were found in the upper 25 m at the times of low salinity.

(authors' abstract)

1. Bermuda Biological Station, St. George's West, Bermuda.
2. Department of Zoology, University of the West Indies, Mona, St. Andrew, Jamaica.
3. Bellairs Research Institute of McGill University, St. James, Barbados.

LA OCEANOGRAFIA Y LOS FORAMINIFEROS EN VENEZUELA

by
Pedro J. Bermúdez
Universidad Central de Venezuela
and
Ministerio de Minas e Hidrocarburo
Caracas, Venezuela

En el presente trabajo se hace relación de las investigaciones previas sobre los foraminíferos en los mares venezolanos. Se llama la atención sobre la gran importancia que tienen los foraminíferos recientes en los estudios de oceanografía. El autor ha tratado de resumir en pocas palabras los cambios de las microfaunas de foraminíferos planctónicos en las formaciones geológicas del Plioceno, Pleistoceno y Subreciente en la cuenca Oriental de Venezuela, llamando la atención de los cambios de orientación en el enrollamiento de las conchas de los foraminíferos en relación con los cambios de temperatura de los mares. Algunos de estos cambios han tenido lugar en tiempos geológicos relativamente recientes y otros en los mares actuales. También llama la atención de la presencia o ausencia de ciertas especies planctónicas en relación con los cambios de temperatura estacionales del año.

El autor está pendiente de publicar un trabajo sobre los sedimentos del Mioceno medio al Reciente de la Costa Oriental de Venezuela donde dará una información más detallada al respecto.

(author's abstract)

HIDROGRAFIA Y FITOPLANCTON EN EL CARIBE ORIENTAL
VENEZOLANO. JULIO-1962 -DICIEMBRE-1963

by
Antoni Ballester 1
Ramón Margalef 2
Jiro Fukuoka 3

Se exponen en líneas generales los resultados de dieciséis campañas realizadas a lo largo de este período.

Destaca de entre ellos el establecimiento de una zona de afloramiento (upwelling) cerca de la costa oriental de Venezuela. En el estudio sistemático de las poblaciones fitoplanctónicas del área de afloramiento se pone de manifiesto su carácter atípico, de alta productividad, contrastando con el plancton de Trichodesmium establecido en las áreas que rodean el enclave extratropical.

Han sido estudiados también los transportes verticales de masas de agua correspondientes a la Fosa de Cariaco.

Finalmente se anuncian algunos resultados de los estudios preliminares en la zona estuarina del río Orinoco.

(authors' abstract)

- 1 and 3 Estación de Investigaciones Marinas de Margarita, Venezuela.
2 Instituto de Investigaciones Pesqueras, Barcelona, España.

PIGMENTOS FOTOACTIVOS EN LA ZONA MACCTE Y EN
AREAS CONTIGUAS DEL CARIBE ORIENTAL VENEZOLANO

by
Antoni Ballester
Punta de Piedras
Apartado 144
Edo. Nueva Esparta
Isla Margarita, Venezuela

Durante veintiocho meses consecutivos se han realizado determinaciones sistemáticas de la distribución de pigmentos fotoactivos en la mayor parte de las estaciones del área estudiada.

Las distribuciones de estos pigmentos, de las relaciones entre ellos y del cociente D430/D665 han sido estudiadas en conexión con los esquemas dinámicos de los principales nutrientes y los movimientos de transporte de las aguas.

Determinaciones de productividad primaria verificadas por medio de radio-isótopos y/o deducidas de la variación en la concentración de oxígeno en vaso cerrado y en mar abierto, han sido comparadas con las concentraciones de pigmentos.

(author's abstract)

FOOD HABITS OF THE NASSAU GROUPER (EPINEPHELUS STRIATUS)

by

John E. Randall
Institute of Marine Biology
University of Puerto Rico
Mayagüez, Puerto Rico

The serranid fish Epinephelus striatus (Bloch), popularly known as the Nassau grouper, is recorded from Brazil to North Carolina and Bermuda. It is a common species in the Florida Keys and the West Indies where it is one of the most important sport and commercial fishes of the region. It has been well illustrated by Longley and Hildebrand (1941) and Bardach, Smith and Menzel (1958). It is said to attain a maximum weight of 55 pounds, but rarely exceeds 20 pounds. The young are often found in seagrass beds; typically the adults are residents of reefs. Some data on growth of the species were obtained by Bardach and Menzel (1957) and Randall (1962). The only previous information on food habits known to the writer is that of Beebe and Tee-Van (1928) who reported the food as small fish.

The stomach contents were examined from a total of 250 Nassau groupers ranging in standard length from 170 to 686 mm. (the largest weighed 23 pounds). These fish were almost all taken by spearfishing in 166 collecting stations from 1958 to the present time in the Virgin Islands and Puerto Rico in less than 120 feet of water. None captured with traps or with rotenone were included in this analysis (large fishes collected with rotenone often eat smaller organisms that die from the poison before the fishes themselves succumb). Occasionally the speared groupers regurgitated some or all of the contents of their stomachs when being carried to the surface. It was usually possible to recover this material.

The stomachs of 100 of the Nassau groupers were either completely empty or contained only a small amount of unidentifiable material. The food of the 150 remaining groupers was by volume 53.0% fish, 39.4% crustacean, 5.3% cephalopod, 1.6% gastropod and .7% pelecypod. The figure of 39.4% for crustaceans is divisible as follows: crabs 22.9%, stomatopods 5.6%, shrimps 5.1%, lobsters 3.6%, hermit crabs 1.3%, isopods .2%, and unidentified .7%.

Table 1 shows the relative abundance of the various families of fishes that constituted the prey of E. striatus, and when possible, the identification of these fishes. Numbers in parentheses after species names indicate the frequency of occurrence in stomachs. The preponderance of parrotfishes is in part due to their being readily recognized at the family level, in spite of digestion, because of their unique dentition.

Table 1. Analysis of the Fishes Found in the Stomachs of Nassau Groupers.

Family of Fishes	Number of Times Found in Stomachs	Identification
Parrotfishes (Scaridae)	13	<u>Sparisoma aurofrenatum</u> <u>Scarus vetula</u> <u>Scarus</u> sp.
Wrasses (Labridae)	6	<u>Clepticus parrae</u> (3) <u>Halichoeres bivittatus</u> (2) <u>Halichoeres gamoti</u>
Damselfishes (Pomacentridae)	5	<u>Chromis multilineata</u> <u>Chromis cyanea</u> <u>Pomacentrus fuscus</u> <u>Microspathodon chrysurus</u>
Squirrelfishes (Holocentridae)	4	<u>Holocentrus rufus</u> (2) <u>Holocentrus</u> sp. <u>Myripristis jacobus</u>
Snappers (Lutjanidae)	4	<u>Ocyurus chrysurus</u> (3) <u>Lutjanus</u> sp.
Grunts (Pomadasydae)	3	<u>Haemulon aurolineatum</u> (2) <u>Haemulon flavolineatum</u>
Morays (Muraenidae)	3	<u>Gymnothorax moringa</u> <u>Muraena miliaris</u>
Round herrings (Dussumieridae)	2	<u>Jenkinsia lamprotaenia</u> (2)
Lizardfishes (Synodontidae)	2	<u>Synodus intermedius</u>
Sea basses (Serranidae)	1	<u>Hypoplectrus puella</u>
Goatfishes (Mullidae)	1	<u>Pseudupeneus maculatus</u>
Bigeyes (Priacanthidae)	1	<u>Priacanthus cruentatus</u>
Surgeonfishes (Acanthuridae)	1	<u>Acanthurus</u> sp.
Trunkfishes (Ostraciidae)	1	<u>Lactophrys</u> sp.
Silversides (Atherinidae)	1	
Anchovies (Engraulidae)	1	

The crabs from the grouper stomachs included majids (Mithrax verrucosus, Mithrax cinctimanus, Mithrax sp., Macrocoelema and three Stenorynchus seticornis), portunids (three of them Portunus sebae and one Chronius ruber), calappids (Calappa flammea and Calappa sp.), porcellanids (Petrolisthes galathinus), and xanthids. Some of the crab remains consisted of single chelae or legs. Four of the stomatopods were Gonodactylus oerstedii, and one was Pseudosquilla ciliata. Shrimps included penaeids, alpheid (three represented only by one chela), and carideans. The lobsters included both Panulirus argus (one stomach contained only one leg and another an antenna in three pieces) and P. guttatus. Petrochirus diogenes and Paguristes depressus were among the three hermit crabs taken from stomachs (none with gastropod shells).

Eight of the ten stomachs with cephalopod remains contained octopuses (one with a mass of eggs), and the remaining two, squids. Three of the five fish with other mollusks in their stomachs had eaten Strombus gigas and one the ark Barbatia cancellaria. The Strombus were found without shells, and the ark with both valves intact but soft tissues absent (presumably digested, unless the empty shells were accidentally ingested). Randall (1964) has suggested that E. striatus and other predaceous fishes lacking crushing dentition may have obtained their food of Strombus after the soft parts were made available by other predators.

The larger Nassau groupers fed more upon fish and less on crustaceans. 46.7% of the 150 groupers with food in their stomachs had eaten only fish. This percentage increased to 58.7 for the 92 fish of the 150 that were over 300 mm. standard length. Crustacean remains were reduced from 32.7% for the whole group of 150 fish to 21.7% for those over 300 mm. long. This tendency for the larger individuals of E. striatus to eat more fish is not unexpected. Most of the crustaceans available as food to predaceous fishes are small. As a predaceous fish grows, fishes become progressively more important as potential food organisms.

All of the fish collected for this study were obtained during daylight hours. Fishermen have informed the writer that the Nassau grouper may be caught at night with hook and line. Further study is needed to demonstrate the relative importance of night feeding and whether, as one would expect, there is at least some difference in the diet at night. Data on the food habits of the young are also needed.

This research was supported in part by National Science Foundation Grant G-5941 and Federal Aid in Fish Restoration (Dingell-Johnson Project F-2-R). The author is grateful to R. B. Manning, L. P. Thomas, A. J. Provenzano, and P. W. Glynn for assistance in the identification of crustaceans from grouper stomachs.

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EXPERIMENTAL MARINE AQUARIUM FOR THE INSTITUTO
OCEANOGRAFICO, UNIVERSIDAD DE ORIENTE
CUMANÁ, VENEZUELA

by
R. A. Curra
D.E. Holt
R. Bleiberg

Instituto Oceanográfico
Universidad de Oriente
Cumaná, Venezuela

The Oceanographic Institute of the Universidad de Oriente, Colorado, Cumaná, 400 meters from the Caribbean Sea and 25 meters above sea level, has made an intensive survey of various types of experimental marine aquaria facilities in use at different marine laboratories.

The filter-inlet units for the system described in this paper are of the rapid-flow sand-filter type.

In the proposed pumping and flushing system, two 5 H. P. continuous-operation pumps are used, each one capable of supplying the 100 liters per min. necessary for normal operation of the system. The maximum pumping capacity, at 265 liters/min. each, will allow the pumps to function normally in the lower half of their operating curves.

Various safety measures have been incorporated into the aquarium system such as: automatic thermal and pressure overload switches, an alarm system actuated by these switches, and a pump house to laboratory phone circuit.

The pump house piping complex is designed on a bimodal basis, allowing either filter-inlet for supply, either pump for pressure, or either main supply line to transport the water to the laboratory.

The primary supply system consists of two lines of three-inch polyvinyl chloride (PVC) tubing, each approximately 650 meters in length. The terminus for these lines is the reservoir-settling tank (9 x 4 x 1 m) situated at a level of + 1.5 meters with respect to the secondary supply system level. The reservoir-settling tank is divided into two independent sections in which normal water retention time is 120 minutes.

The design includes both a fresh and a salt water high pressure flushing system for the primary supply and discharge lines and the filter-intake units.

The secondary distribution system consists of rectangular overhead channeling of fiberglass coated Apamate wood. This channeling is divided longitudinally by a 22 cm. high strip, forming in this manner a continuous flow of circulating water capable of an entire change of tank water each 2.4 hours.

The aquarium room contains ten, 1 cubic meter, experimental tanks. The basic tank construction is of reinforced concrete with 20 mm. thick plate glass walls on three sides for maximum observation area. By means of removable partitions, experimental tankage is available from 200 to 5000 liters.

The tank-support tubing, encased in the concrete pillars, gives a strong platform for mounting measuring instruments or additional aquaria over the main tanks.

Two of the main tanks constitute a constant temperature system. In this isolated system the water, in closed circulation, is filtered, passed through an ultra-violet bactericidal unit and then adjusted in temperature between the limits of 5° 45° C.

The two aquaria racks contain nine 80-liter and twelve 60-liter tanks, respectively, on three tiers.

The aquarium room contains a laboratory table with provision for six workers and has a circulating water trough running the entire length of the table with space for up to eighteen 40-liter tanks.

Air, and both 110 and 220 volt A.C. electric lines run above all tanks and, along with a gas line, are available on the wall above the laboratory table.



View of some of the participants of the Sixth Meeting of the Association of Island Marine Laboratories of the Caribbean

1. John B. Lewis 2. Joseph Jay Ewald 3. C. P. Idyll 4. Dean E. Holt 5. Rafael Antonio Curra 6. Antonio José Villegas 7. Héctor L. Gámez 8. William C. Cummings 9. George A. Seiglie 10. John R. Beers 11. Pedro J. Bermúdez 12. Fernando Cervigón 13. Manuel Puebla 14. Francisco Mago Leccia 15. Luis E. Valdés V. 16. John E. Randall 17. F. Creutzberg 18. Piet Roos 19. Juan G. González 20. Helen Hayes 21. Idelisa Bonnelly de Calventi 22. Donald A. Thomson 23. Sophie Jakowska 24. Gustavo Ascanio 25. Helen A. Randall

