NO BONES
NEWSLETTER

is published bimonthly by the
Department of Invertebrate Zoology
National Museum of Natural History
Smithsonian Institution

Announcements

November 30 Noon Dr. Mary Mickevich Discussion Group on MARBID, Mary J. Rathbun Library, W 119

IZ Holiday Party December 15 Noon Waldo Schmitt Room

Next issue deadline for material November 15

Coming soon: **Research** - Robert Hershler's field work in California on springsnails and **Collections** - Cheryl Bright's article on the Mollusk Dry Collection and the Mollusk Numeric Collection

IZ Launches Decapod Pilot Project

Cheryl Bright, Bill Moser, Karen Reed

In January the Department of Invertebrate Zoology selected the Decapod Collection to test the suitability of the Collection Profile that the National Museum of Natural History will use to objectively assess the health of collections. In all, 5800 "profile units" - shelves, drawers and tanks, located in wet and dry storage areas at NHB and MSC, allowed us to test the applicability of the indicators and the scoring categories under a variety of collection conditions. Cheryl Bright, Brian Kensley, Rafael Lemaitre, Bill Moser, and Karen Reed scanned and scored the collections in NHB and Valorie Barnes and Angela Cotton assisted with the MSC collections.

IZ added the **unit contents** (general and taxonomic), **type of collection** (dry, fluid, etc.), exact location (**profile unit address**), information about **special interest collections** (MMS, USAP material), and the "**fullness**" of each profile unit to the NMNH's six specific measures of collection health: **conservation status** (a measure of the overall physical condition of the specimens), **processing state** (a measure of the level of sorting and labeling of a collection), **storage containers** (a measure of the quality of the individual specimen containers), **arrangement** (a measure of the organization and accessibility of specimens, and the ease with which specific items can be found), **identification** (a measure of the level [family vs. genus vs. species] and perceived quality of the specimen identifications), and **inventory** (the availability of a computerized catalog record for each specimen-lot). The presence of **hot spots** (problems that needed to be corrected in the near future such as low alcohol and deteriorating stoppers or gaskets) was also considered.

The Decapod Profiling Pilot Project has already proved beneficial. The data has provided very practical information which can be used to help determine short term and long term collection management goals for the department. From the 'Hot Spots' data we can focus limited resources on areas of the collection that need immediate attention and develop collection management supply budgets for replacing poor quality specimen containers. The fullness, processing and arrangement indicators will help us plan sorting, labeling and collection reorganization projects, and the identification indicator will help us plan future "Collection Improvement Fund" projects, and justify short term visitor applications. The general and taxonomic information along with the "address" data lets us generate specimen locator guides and indexes to the collection.

LIBRARY

INVERTEBRATE ZOOLOGY LIBRARIES NEW TITLES

Brunel, Pierre, et al. **Catalogue of the Marine Invertebrates of the Estuary and Gulf of Saint Lawrence**. Ottawa: NRC Research Press, National Research Council of Canada, 1998. QL365.4.C2B78 1998 Invz

Carnevali, Maria and Francesco Bonasoro, eds. **Echinoderm Research 1998**. Rotterdam: A.A. Balkema, 1999. QL381.E89 1998 Invz

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den Hartog, J.C., ed. **Proceedings of the 6th International Conference on Coelenterate Biology** (The Leeuwenhorst, Noordwijkerhout, The Netherlands, 16-21 July 1995). Leiden: National Natuurhistorisch Museum, 1997. QL353.I535 1995 Invz

Healy, B.M. at al., eds. **Aquatic Oligochaetes: Proceedings of the 7th International Symposium on Aquatic Oligochaetes Held in Presque Isle, Maine, USA, 18-22 August 1997**. Developments in Hydrobiology 139 (Reprinted from Hydrobiologia 406, 1999). Kluwer Academic Publishers, 1999. QL391.A6I57x Invz

Heard, Richard W. **Guide to Common Tidal Marsh Invertebrates of the Northeastern Gulf of Mexico**. n.p.: Mississippi Alabama Sea Grant Consortium, 1982. QL134.H4X 1982 Invz

Hendrickx, Michael E. **Los Camarones Penaeoidea Bentonicos (Crustacea: Decapoda: Dendrobranchiata) Del Pacifico Mexicano**. Mexico: Comision Nacional para el Conocimiento y Uso de la Biodiversidad; Instituto de Ciencias del Mar y Limnologia, Universidad Nacional Autonoma de Mexico, 1996. QL444.M33H486C 1996 Invz

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Izawa, Nobue and Kenji Matsuoka. **Catalogue of Shell Collection by Mr. Takakuwa Donated to the Toyohashi Museum of Natural History, 2. Gastropoda (Part 2) Family Turbinidae-Family Trochidae**. Miscellaneous Report, No. 9. Toyohashi, Japan: Toyohashi Museum of Natural History, 2000. QL406.2.N75 1993 no.2 pt.2 2000 Moll

Jamieson, B.G.M., ed. **Progress in Male Gamete Ultrastructure and Phylogeny**. ReproductiveBiology of Invertebrates, Vol. IX, Pt. B. New York: John Wiley and Sons, Ltd. QL364.15.R45 1983x v. 9 pt. B Invz

Jamieson, B.G.M., ed. **Reproductive Biology of Invertebrates, Volume IX, Part C, Progress in Male Gamete Ultrastructure and Phylogeny**. New York: John Wiley & Sons, Ltd, New York, 2000. QL364.15.R45 1983x v.9 pt.C Invz

Kanagawa Prefectural Museum of Natural History. **Catalogue of the Brachyuran and Anomuran Crabs Donated by Prof. Dr. Tune Sakai to the Kanagawa Prefectural Museum**. Odawara, Japan: Kanagawa Prefectural Museum of Natural History, 1998. qQL444.M33K336 1998 Inv

Karaytug, Suphan, **Copepoda: Cyclopoida: Genera *Paracyclops, Ochridacyclops* and Key to the Eucyclopinae**. Guides to the Identification of the Microinvertebrates of the Continental Waters of the World, 14. Leiden: Backhuys Publishers, 1999. QL444.C73K37 1998 Invz

Kornicker, Louis S. **Myodocopid Ostracoda from the Late Permian of Greece and a Basic Classfication for Paleozoic and Mesozoic Myodocopida**. Smithsonian Contributions to Paleobiology, Number 91. Washington, D.C.: Smithsonian Institution Press, 2000. QE817.O8K67 2000 Invz

Levi, Claude, ed. **Sponges of the New Caledonian Lagoon**. Paris: Editions de l'Orstom, 1998. qQL372.8.N49S66 1998 Invz

Marshall, Julie G. and Richard C. Willan. **Nudibranchs of Heron Island, Great Barrier Reef: A Survey of the Opisthobranchia (Sea Slugs) of Heron and Wistari Reefs**. Leiden: Backhuys Publishers, 1999. QL430.4.M375 1999 Moll

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Sasaki, Takenori. **Comparative Anatomy and Phylogeny of the Recent Archaegastropoda (Mollusca: Gastropoda)**. Bulletin No. 38. Tokyo: The University Museum/The University of Tokyo, 1998. QL430.4.S27 1998 Moll

Winner, Beatrice E. **The Sexual Behavior of Mollusks: Land, Freshwater, Sea**. North Palm Beach: E.B.M., 1999. QL431.4.W56 1999X Moll

NEWSLETTER STAFF

Kristian Fauchald
chairman

Marsha Sitnik
editor
sitnik.marsha@nmnh.si.edu

Geoff Keel
production

Molly Kelly Ryan
design

Bob Skarr
library
skarr.robert@silib5.si.edu

Please submit news or articles via email or disk by the 15th of the month prior to publication.

CHAIRMAN'S COLUMN

A "New" Congress of Zoology in Athens

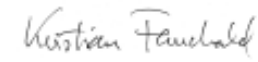
The Congresses of Zoology used to be the major meeting place for zoologists, but were overwhelmed by time and expense in putting together a weeklong event for as many as 5,000 participants. A few zoologists have taken it upon themselves to get the tradition started again. The first of these new congresses took place in Athens, Greece, in late August. It was, fortunately, a smaller event, taking place in the facilities of the Philosophy Department of the University with a gorgeous view of the city. It was fun to discuss principles of zoology in a setting overlooking the city where Aristotle, Socrates and Plato worked. Not that modern Athens looks very sedately philosophical, but the Acropolis is visible from all over, as a reminder of the past.

The participation from the Smithsonian was relatively limited. I had been invited to discuss the "taxonomic impediment for marine invertebrates" in one of the sessions. Len Hirsch from the International Center talked about international collaboration in studying biological diversity (facilitating globally, scanning locally), and Kevin de Queiroz talked about the new phylocode he and a number of associates are putting together. Harilaos Lessios from STRI presented a very interesting symposium on molecular biogeography of marine organisms.

The meeting was a success with topics ranging from biochemistry to behavior. In addition to the more technical issues mentioned above, discussions of arthropod origins, Lessios' molecular biogeography symposium and a review of recent advances in paleontology were of special interest to me.

The greatest advantage, however, was meeting people from China and Japan to Brazil and getting a much better impression of what kinds of research is being done, especially around the eastern end of the Mediterranean.

There will be another Congress in four years, perhaps in China. If the program is as interesting as on this occasion, I recommend participating. One may learn little of direct and immediate use, but the exposure to zoologists from all over the world, with different training and background, is valuable and likely to leave one a better zoologist in the long run.



Kristian Fauchald

IZ IN THE FIELD

Hurricane Season and Science

Of particular importance along tropical and subtropical coasts throughout the Gulf of Mexico and Caribbean is the near certainty of episodic natural disturbances, ranging in intensity from tropical storms to catastrophic hurricanes. Catastrophic hurricanes affect long-term ecosystem dynamics and contribute to the increase, maintenance and loss of the biodiversity.

Two of the Department's field stations are directly affected by hurricanes: Carrie Bow Cay in Belize and the Smithsonian Marine Station in Florida. At Carrie Bow Cay, the harsh blow dealt the Caribbean Coral Reef Ecosystems Program (CCRE) by the fire of 1997 was coupled with Hurricane Mitch in 1998. CCRE scientist Candy Feller is studying the long-term effects of a catastrophic hurricane on habitat complexity within the mangrove landscape, on key functional groups of mangrove-associated organisms, and on dynamic ecological processes that determine ecosystem and, ultimately, landscape functions. This study will be conducted at Turneffe Atoll, Belize, a large archipelago of mangroves off the northern mainland coast that suffered catastrophic hurricane damage in 1961. Hurricanes return to sites in much of the Caribbean on average every 30 years, and immense storms the size of Hurricane Hattie or Andrew occur at intervals of 100 yr or more (Lugo et al. 1976).

The staff of the Smithsonian Marine Station prepare for Hurricane Floyd.

SMS is no stranger to hurricanes and has taken their destructive forces into account in the building of their new facility.

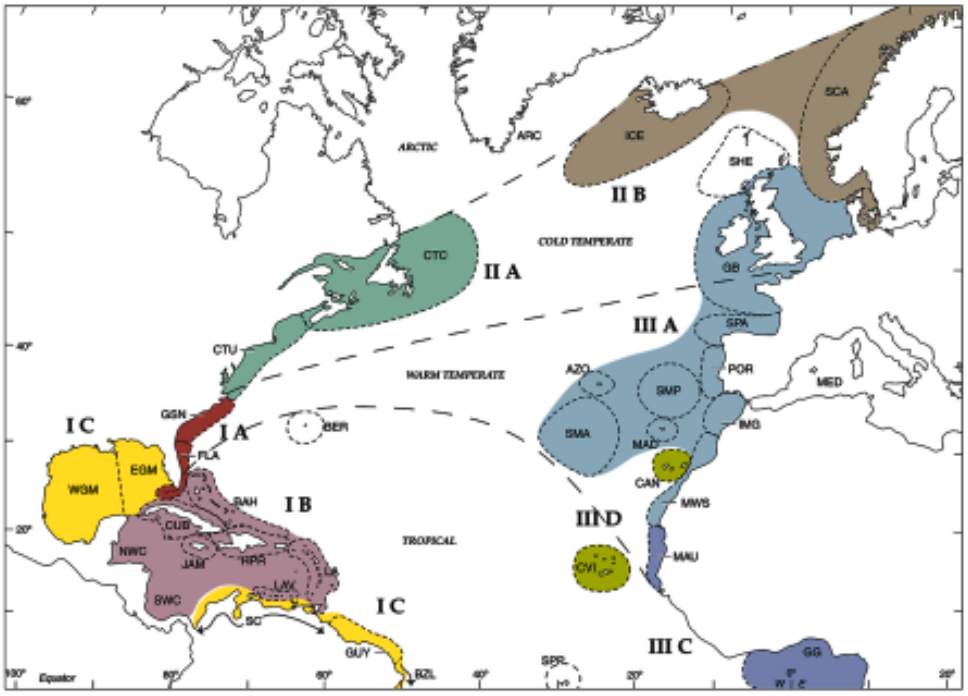
RESEARCH

Biogeographic Affinities of the North Atlantic Deep-Water Scleractinia

Steve Cairns delivered the keynote address at the "First International Symposium on Deep-Sea Corals"in Halifax, Nova Scotia to 75 attendees from all over the world. Organized by Dalhousie University and the Ecology Action Centre (Halifax), the Symposium represents a watershed in scientific exchange on deep-sea corals (deeper than 200 m) since shallow-water reef coral symposia are on their ninth meeting and draw 2000 attendees.

Deep-sea corals are as diverse and economically significant. There are more species of deep-water stony corals— 670 species— now known than of shallow. Interest in the deep-water corals of the North Atlantic is growing since they often form large banks off the coasts of Norway and Canada, habitat for literally thousands of other deep-water invertebrate and fish species. Because these deep-water banks are now being threatened by the laying of oil pipelines and commercial cod trawling, scientists will need to evaluate the North Atlantic deep-sea coral fauna and assess its health relative to these environmental factors.

That is where Cairns comes in. His keynote address at this inaugural symposium was the culmination and synthesis of about 25 years of descriptive and zoogeographic analyses of this fauna. Drawing from a paper co-authored with Ralph Chapman (ADPAutomatic Data Processing Program) entitled the "Biogeographic Affinities of the North Atlantic Deep-Water Scleractinia," he presented data on the134 species of deep-water Scleractinia known from the North Atlantic, their distribution, and depth ranges. Using clustering techniques and the ordination method called non-metric multidimensional scaling, he demonstrated that there are three main zoogeographic regions of deep-water corals in the North Atlantic: tropical and warm temperate western Atlantic, cold temperate North Atlantic, and tropical and warm temperate eastern Atlantic, and that there are eight smaller geographic subregions.



The three main regions and eight zoogeographic subregions of deep water Scleractinia in the North Atlantic. (Drawing by Molly Ryan)

Deep-water subregions were found to be concordant with the well-known shallow-water biogeographic provinces. Through qualification and quantification of the biotic and abiotic factors characterizing each of the eight subregions, Cairns hypothesized which subregion would be most and least susceptible to the extirpation of one or more species. He concluded with the thought that one cannot protect the organisms in an environment unless one knows what species occur there and where and why they occur. That was the essence of what he wanted to communicate, supported by a data matrix of 134 species x 38 regions x 2 depth ranges, or 10,184 cells.

RESEARCH

Do crustose clionid sponges kill Caribbean corals?

Klaus Ruetzler, Research Biologist

Some species of limestone-excavating sponges (Family Clionidae) cover their substrate as a thin, continuous, veneer-like crust (beta stage). This film of tissue is the result of fusion of the initially discrete incurrent and excurrent surface papillae (alpha stage) that are a common and lifelong morphological feature of most representatives of the family. In the tropical and subtropical western Atlantic, at least four species encrust reef-coral skeletons (both Scleractinia and Hydrozoa): *Cliona caribbaea* Carter, *C. delitrix* Pang, and *C. varians* (Duch. & Mich.), which occur throughout the Caribbean region, and *Pione lampa* (de Laubenfels), which was first described from Bermuda and is best known from cooler, subtropical waters. One conspicuous feature of these encrusting sponges is that many specimens border live coral or cover recently dead ones, as indicated by the clear outline of the coral calicular structure under the thin sponge cover.

Field experiments and histological study conducted on *Cliona*

Excavating sponge Cliona caribbaea overtaking brain coral Diploria strigosa; August 1997. Nails indicate borderline between the two organisms only four months earlier. (Photo: K. Ruetzler.)

caribbaea in Belize and *Pione lampa* in Bermuda indicate that the sponges overgrow stressed coral (stressed, for instance, by extended cold or hot temperature exposure) at a fast rate. Members of these species do not seem to produce toxic exudate (secondary metabolites) to affect virile coral colonies and are in fact repelled or destroyed by healthy coral polyps. However, erosion of the limestone coral skeleton from below works as a relatively slow but successful competitive mechanism even on non-stressed corals by depriving the polyps of their support. There are indications that encrusting clionids and other fast-spreading sponges may dramatically change the community structure and physical stability of shallow reefs that are readily compromised by natural or anthropogenic pressures.

RESEARCH INITIATIVES

The Ocean Biogeographical Information System (OBIS)

Mary Mickevich and Janet Gomon participated in the OBIS Workshop sponsored by The National Oceanographic Partnership Program (NOPP) and The Census of Marine Life (CoML) in September.

OBIS will be a distributed marine information system for searching and accessing individual datasets, dynamically integrating information from different data providers, and performing comprehensive modeling and analysis of geographically-referenced biological data. The National Oceanographic Partnership Program (NOPP) has recently funded eight projects to design and develop the system and begin populating it with data. In addition, NOPP has funded a project to develop a Virtual Ocean Data Hub (VODHub) for achieving the same goals with physical and chemical oceanographic data

For further information on this important initiative please contact Dr. Mickevich at 202/357-2366 or Mickevich.Mary@NMNH.SI.EDU

IZ IN THE FIELD

Final stages of re-building the Caribbean Coral Reef Ecosystems Carrie Bow Field Station. This cottage will provide housing for scientists who have been housed temporarily in the library.

RESEARCH INITIATIVES

ATBI/Discover Life in America
Quest for Leeches and Copepods in the Southern Appalachians

In September, Bill Moser and Dr. Don Klemm (US-Environmental Protection Agency) and Jan Reid participated in an All Taxa Biodiversity Inventory (ATBI)/Discover Life in America (DLIA) directive searching for leeches (Euhirudinea) and copepods (Copepoda) in the Great Smoky Mountain National Park

Moser and Klemm report that the Southern Appalachians are regionally biodiverse with an estimated 32 species of leeches in the area (North Carolina, South Carolina and Tennessee). After several thousand years of human interaction with leeches, surprisingly little is known about them. Despite their reputation or scenes from Stand By Me or The African Queen, only 50% of leeches are blood-feeding and few of the blood-feeding species attempt to feed on human blood. Recently, blood-feeding species have become heroes of modern medicine, helping increase the blood flow in tissue grafts and surgically re-attached amputated appendages, and in basic cardiovascular surgery.

Although the Great Smoky Mountain National Park was fairly dry, Bill Moser and Dr. Don Klemm investigated 18 wetland and running water sites for leeches. Approximately 8 species of leeches were collected underneath submerged rocks, logs and branches and by dip-net. The collected leeches are being identified to species and digitally photographed under a dissecting microscope. The photographs will be used to construct an interactive key to the species of leeches of the Southern Appalachian region which will contain species information pages and a complete checklist.

Reid, assisted by Willis Reid, found access to these primarily floodplain areas easy except for thick stands of poison ivy, briars, and rhododendron. The unusually dry conditions required wetting the mud to collect. Preliminary sorting has yielded several new records for the park and/or North Carolina, and at least one possible new species.

OUTREACH

Brazilian Congress on Crustacea

Jan Reid will present "Copepods in Semi-terrestrial Continental Habitats" at the I Brazilian Congress on Crustacea at São Pedro in October, and will then spend two weeks working on the BIOTASP survey project with Prof. Dr. Carlos E. F. Rocha at the Institute of Biology, University of São Paulo. Her presentation at the Congress will explain that although copepods are usually referred to as aquatic animals, they have colonized various semi-terrestrial continental habitats, for example ephemeral water, saturated and non-saturated moist organic soils, the interstitial of sandy sediments, leaf litter in humid forests, and the recesses of plants. The history of discoveries and studies of these habitats began in Europe about 130 years ago, but is still in its early stages on other continents.

Instituto de Biologia, Universidade de Sao Paulo

Jan Reid will serve as a member of the examining committee for the doctoral thesis of Edinaldo Nelson dos Santos-Silva, Dept. of Invertebrates, Instituto de Biologia, Universidade de São Paulo. Mr. Santos-Silva will defend his thesis on October 25, on the topic 'Revision of the species of the "*nordestinus* complex" (Wright, 1935) of *Notodiaptomus* Kiefer, 1936 (Copepoda: Calanoida: Diaptomidae).' Part of the thesis project included examination of type and topotype specimens deposited in the NMNH collections by Dr. Stillman Wright, a pioneer of copepod crustacean research in Brazil and Argentina in the 1930s; and later material from IZ's extensive collections of neotropical copepods.

OUTREACH

Guild of Natural Science Illustrators (GNSI) in Portugal

Molly Ryan, Alice Tangerini (Department of Botany) and Mary Parrish (Department of Paleobiology) presented "Preserving Scientific Illustrations in a Museum Environment" at the August Annual Conference Of the Guild of Natural Science Illustrators (GNSI) in Portugal.

Ryan explained the design and use of a database (FileMaker Pro) for cataloging artwork associated with species descriptions and the integral connection the artwork has to museum science.

At the University in Evora, a walled town full of 16th century buildings, attendees gave consideration to the changes technology has made in how and what is illustrated, and how illustrations are used.

As a former president of the Guild and an exhibitor (*Eusarsiella ryanae)*, **Ryan** and conference organizer Pedro Salgado provided a private tour of members' exhibit for Portugal's Minister of Science.

Crustacean Society Presentations

At the Crustacean Society Meeting Puerto Vallarta , Mexico Rafael Lemaitre presented "Decapod Crustacean Fauna from the Caribbean Coast of Colombian : Recent Advances and Discoveries", coauthored with Nestor Campos and Gabriel Navas from INVEMAR, Universidad Nacional in Santa Marta. Marilyn Schotte contributed a poster entitled "The genus *Thermosphaeroma* in Mexico and determination of a new species, *T. mendozai* (Isopoda: Sphaeromatidae)."

VISITORS

Richard and Pallis Young, University of Hawaii (5/18-9/18) Sponsor: **Mike Vecchione**

Shane Ahyong, Australian Museum, Sydney (9/4-10/7) Sponsor: **Rafael Lemaitre**

Kotaro Tsuchiya, Tokyo University of Fisheries (9/5-9/18) Sponsor: **Mike Vecchione**

Mei-Sun Yang, Alaska Fisheries Science Center, NOAA. Seminar: Food Habits of the Groundfishes in the Gulf of Alaska (9/5-9/22) Sponsor: **Linda Cole**

Margarita Shabanova, Moscow State University (9/10-10/10) Sponsor: **Kristian Fauchald**

Chia-wei Lin, National Taiwan Ocean University (9/11-9/14) Sponsor: **Brian Kensley**

Dorothy Berner, Department of Biology, Temple University. Here working with Nikolai and Frank Ferrari. Discussion group: David Frey Slide Collection. (9/11-9/22) Sponsor: **Frank Ferrari**

Irma Lira Galera, Carlos Alvarez-Silva, Guadalupe Miranda Arce, Universidad Autonoma Metropolitana-Iztapalapa, Departmental de Hidrobiologia Mexico City (9/11-...) Sponsor: **Frank Ferrari**

Emmett Duffy, VIMS (9/13-9/27) Sponsor: **Rafael Lemaitre**

Ruben Rios, VIMS (9/13-9/27) Sponsor: **Rafael Lemaitre**

Lianna Jarecki, H. Lavity Stoutt Community College, Tortola, British Virgin Islands. Seminar: "The ecology of salt ponds in the British Virgin Islands" (9/18-10/14) Sponsor: **Jan Reid**

Per Sundberg, Goteborg University, Sweden. (9/22) Sponsor: **Jon Norenburg**

Elaina Jorgenson, NMFS, NEFC (9/26-9/28) Sponsor: **Mike Vecchione**

Mark Grygier, Lake Biwa Museum. Olesen's naupliar SEM shots on hand, from which to make OHPs, animal pictures and maps. Big branciopod project Introduction: Dr. Frank Ferrari Seminar: "Branchiopod 'shrimps' from rice paddies in Japan; various lines of research, including public participation, at the Lake Biwa Museum." (9/26-10/4) Sponsor: **Frank Ferrari**

Zdravko Stevcic, Croatia. (10/2-10-6) Sponsor: **Rafael Lemaitre**

Ramiro Roman, Mexico. (10/16-10/20) Sponsor: **Brian Kensley**

Beverly Wade, Fisheries Administrator, Belize Fisheries Department, Ministry of Agriculture, Fisheries and Cooperatives. Serving on Caribbean Coral Reef Ecosystems Program Steering Committee reviewing proposals for 2000-2001 field season. (10/17-10/21)

Alberto Linder, Duke University, PEET. (Oct?) Sponsor: **Steve Cairns**

Yuri Kantor, Severtzov Institute, Russian Academy of Science, Moscow, and Dr. Andrew McArthur of MBL, Woods Hole, MA to visit in November. Yuri will be here for several weeks, Andrew for a few days. Sponsor: **Jerry Harasewych**

Nikolai Korovchinsky, Russian Sveretsov Institute of Animal Ecology and Evolution, Russian Academy of Sciences. (November) Sponsor: **Frank Ferrari**

COLLECTIONS

Minerals Management Service (MMS) Crustaceans

This is the fourth and final article in the series on MMS. Previous articles reported on Tunicates and Worms.

The MMS Crustacean collection is truly immense. After two years of concentrated efforts, by **Michael Gutknecht** and **Marty Dearie, Elvie Fornshell** a few thousand Crustacean specimens remain to be cataloged.

The vast majority of the MMS crustaceans cataloged came from the Department of Interior, Bureau of Land Management, George's Bank Benthic Infauna Monitoring Program (BIMP) and the Panama Oil Spill Project (POSP). Because the list of Crustacean species is so large, it will not be published with this article but exists in two files (A WordPerfect file, "crustace", and an Excel file, "crust1") on the "P" drive. Both files contain the same data, just done in different formats. The files can be found in P:\data\iz\mms. Persons outside the Smithsonian system can contact MMS directly for further information at 202/357-4664.

PUBLICATIONS

Benvenuti, D., G. Messana & **M. Schotte**. 2000. On a new species of *Oxinasphaera* (Isopoda, Sphaeromatidae) from Somali and Yemeni coasts, western Indian Ocean. Crustaceana 73(4): 407-415.

Fornshell, J. A. and P. M. Spina. 2000. Internal wave observations off Punta Tuna, Puerto Rico. - Marine Technological Society, Conference Proceedings II:1189-1193.

Fornshell, J. A. 2000. Variablility of the Florida Current offshore from Fort Pierce Florida as revealed by satellite imagery. Marine Technological Society 34:34-37.

Harrison-Nelson, Elizabeth and L.S. Kornicker. 2000. *Euphilomedes cooki*, a new species of myodocopid ostracode from Moreton Bay, SE Queensland, Australia. Proceedings of the Biological Society of Washington, 113(2):465-479.

Reid, J.W. and T. Ishida. 2000. Itocyclops, a new genus proposed for *Speocyclops yezoensis* Ito (Copepoda: Cyclopoida: Cyclopidae). Journal of Crustacean Biology 20(3):591-598.

Smithsonian
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Department of Invertebrate Zoology
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