



# E-SLATE

## American Academy of Underwater Sciences (AAUS)

### EDITORIAL BOARD NOTE – March 2012

Welcome to the March E-Slate. This month's issue features a presentation of the 2012 Conrad Limbaugh nominees, a report from the 2011 OWU-AAUS intern as well as information about upcoming conferences and educational programs. We encourage you to submit new publications to share with the membership. It is a great opportunity to highlight research from your home institution. In addition, we welcome news, announcements, job postings, and images of underwater work at [aaus@disl.org](mailto:aaus@disl.org). Current and past issues of the E-Slate are available at [www.aaus.org](http://www.aaus.org).

### NEWS/ANNOUNCEMENTS

#### AAUS Spring BOD Meeting

The spring AAUS Board of Directors meeting will be held in Atlanta, Georgia hosted by the Georgia Aquarium. The BOD will meet March 03-04, 2012.

#### AAUS Conrad Limbaugh Memorial Award

The AAUS Conrad Limbaugh Memorial Award is presented annually to an individual who has made a significant contribution in diving safety and diving leadership on behalf of the scientific diving community.

Conrad Limbaugh was an underwater naturalist and Chief Diving Officer for of Scripps Institution of Oceanography, where he directed the diving program. He was killed in a scuba diving accident in the Mediterranean on March 20, 1960. Limbaugh graduated from Whittier College in 1948 and did graduate work at the University of California at Los Angeles before going to Scripps Institution in 1950. He was largely responsible for developing the diver-training program at Scripps, as well as many research techniques used by marine scientists.

Voting for this year's award will be open from March 01-31, 2012. Please cast your vote for this year's nominees via the Member Clicks Poll at [www.aaus.org](http://www.aaus.org) (community, polls) no later than 11:59 p.m. PST on March 31 for award selection consideration.

The 2012 nominees follow:

#### Dennis Divins

Dennis Divins, UCSB's Diving Safety Officer from 1970 to 2004 has not only taught thousands of divers, but he has

also inspired countless young biologists to pursue their careers in the marine world. His tireless dedication of the pursuit of safe diving practices while still taking the time to enjoy and respect the ocean is reflected in an impeccable safety record for the program he directed. Although retired, he continues to be a mentor, advocate and friend to many of the divers he has taught and remains active in the Santa Barbara diving community.

#### Danny Gouge

Involved with the Virginia Institute of Marine Science (VIMS) diving program since 1978, Danny became the DSO for VIMS in 1982 and served in this capacity through retirement in 2007 after 30 years of service to the scientific diving community. He authored three diving safety manuals for the Institute, and led the program to early AAUS organizational membership in 1987. Danny served on the AAUS Board of Directors 1991-1992 as the Statistics Chair and on the VIMS Diving Control Board and maintained both a diving instructor certification and a 100 ton US Coast Guard license from 1980-2007. Career highlights include a 7-day saturation in Aquarius (1995); and dives to the USS Monitor, with and without the Johnson Sea-Link submersible (1993). After retirement, he moved to cave country in north-central Florida, and has since received the Abe Davis Safe Cave Diving Award issued by the National Speleological Society Cave Diving Section. Currently, Danny is employed by the University of Florida (where his wife is DSO), and remains active in science diving through instruction, consulting services, participation in several AAUS committees, and is fortunately making regular trips to the tropics on science diving missions; this in addition to his primary duties which are those of Station Manager at UF's Seahorse Key Marine Lab off Cedar Key.

#### Stephen C. Jewett

Stephen C. Jewett, Ph.D., is a Research Professor at the School of Fisheries and Ocean Sciences, University of Alaska Fairbanks. Since 1972 he has been conducting research on benthic ecology, trophic interactions, benthic impact assessments, pollution/contamination monitoring, Arctic ecosystems, and teaching scuba techniques for scientific diving. Most of his research has focused on impact assessment issues in marine waters, such as effects from El Niño, Kasatochi Volcano eruption, commercial trawling, log storage, offshore dredging, mercury and radionuclide contamination, Alyeska Pipeline Terminal operations, *Exxon Valdez* oil spill, and offshore/onshore mining. Dr. Jewett has published 85 peer-reviewed journal articles/book chapters; with many as senior author. His honors include:

the 2004 UAF Emil Usibelli Distinguished Research Award; the 2004 Wildlife Society Wildlife Publications Award for Outstanding Monograph (co-recipient); and the 2006 Fulbright Scholar: Senior Specialist in Environmental Science at Catholic University of the North, Chile. Over the past 38 years Dr. Jewett has conducted much of his research in both the Arctic and the Antarctic utilizing cold-water science diving techniques.

#### John Reed

Since 1976 John has been very involved in the dive program at Harbor Branch Oceanographic Institution (HBOI) in Florida which has been an organizational member of AAUS since 1987. He started as a scientific lockout diver using helium-oxygen rebreathers and has been DSO and chairman of HBOI's Diving Safety Control Board since 1987. He has been instrumental in establishing a quality scientific dive program with a staff of 60 research and commercial divers. He has logged 35 deep-water lockout dives from *Johnson-Sea-Link* submersibles, >2000 scientific scuba dives, and more than 200 dives in the *Johnson-Sea-Link* and *Clelia* submersibles. He served on the Board of Directors of the American Academy of Underwater Scientists (AAUS) 1993-1995 and 1989-1990. John is Senior Research Scientist at HBOI and is Principal Investigator for the Robertson Coral Reef Research and Conservation Program. His primary emphasis is research and conservation of deep and shallow water coral reefs, including deep water *Lophelia* and *Oculina* reefs, and shallow water reefs of the Caribbean, Bahamas and Florida. He has been Chief Scientist for over 60 worldwide research expeditions. John also heads the Collections and Taxonomy Department for the Biomedical Marine Research Program (BMR). He is curator for HBOI's museum of biomedical collections (>30,000 deep and shallow water marine organisms), submersible videotapes and photographic archives. John's research on the deep-water *Oculina* coral reefs off Florida has resulted in over 60 publications and the establishment of a 300 nm<sup>2</sup> Marine Protected Area. His current research on deep-water *Lophelia* reefs and the discovery of >300 deep-water reefs off Florida may be instrumental in their protection as a proposed 23,000 nm<sup>2</sup> deep-water coral Habitat Area of Particular Concern. John received his B.S. from the University of Miami and M.S. specializing in marine ecology from Florida Atlantic University in 1975.

#### **Jenna Walker (OWU-AAUS Intern 2011)**

*Excerpts from Jenna Walker's report. View entire report at [http://www.owuscholarship.org/sites/default/files/2011\\_AAUS\\_Internship\\_Report.pdf](http://www.owuscholarship.org/sites/default/files/2011_AAUS_Internship_Report.pdf)*

Located in Anacortes, Washington, Shannon Point Marine Center of Western Washington University was selected as the host site for the internship in 2011. I arrived in Anacortes, Washington after a cross-country flight and three-hour bus ride, eventually making my way to Shannon

Point Marine Center. There I met SPMC's Diving Safety Officer (DSO) Capt. Nate Schwarck, M.S. who immediately showed me around the facilities and diving locker.

The AAUS is well known for their diving safety record and rigorous education/training standards, standards that I became familiar with during the course of my internship. I worked through both theoretical and practical training modules before participating in scientific diving activities as required by Shannon Point. Eventually I acquired a letter of verification from SPMC's scientific diving program, recognized by all AAUS sites, allowing me to further my career in marine science with the ability to use scientific diving as a research tool.



OWU-AAUS interns Mykle Hoban (2010) and Jenna Walker (2011)

The waters near Anacortes are not the friendliest of diving territories. Besides frigid temperatures, average visibility is around 3-4 m and strong current systems leave average slack windows of 20 minutes between 0.5 kt ebb to flood tidal exchanges. Even though it was a challenging environment, I am very grateful for my experience as I feel it made me a better diver. It is one of those reassuring things that if you can make it here, you feel prepared to handle diving most anywhere. Helping Shannon Point with their scientific diving tasks allowed me to acquire experience in a variety of diving techniques. I did organism collections for staff researchers, REU students, and community outreach tanks. We sampled surface and benthic water from the Salish Sea for water quality analysis. A CTD was retrieved and redeployed monthly for local water profile analysis by the Washington State Department of Ecology. And finally we completed a survey of SPMC's sea water intake system for the Washington Department of Natural Resources to assess the local impacts of building the system. By far the star of the summer was our research with native Pinto abalone. The Puget Sound Restoration Fund (PSRF) and the

Washington Department of Fish and Wildlife (WDFW) funded two days of brood stock dives where we collected solitary, reproductively isolated adult abalone for hatchery efforts. These were some of the most interesting dives we did, lots of beautiful habitat and kelp forest canopies. Eventually I had to rinse off my gear for the final time, pack up, and head back to the east coast. I had an absolutely fantastic summer and hope to return to Anacortes one day, but for now I am off to Woods Hole Oceanographic Institution where I will be diving as a field technician for some physical oceanographers!

### AAUS Website

AAUS is experiencing difficulties with the current website, [aaus.org](http://aaus.org). If you experience login problems or cannot obtain the information you need from the site, please contact the AAUS office at [aaus@disl.org](mailto:aaus@disl.org) or 251-591-3775. We are in the process of building a new custom website with an anticipated launch in late spring.

### AAUS BOD Call for Nominations

AAUS is seeking individuals to run for the position of Director-at-Large. The Director-at-Large position involves a three year term commencing on January 01, 2013. Duties and committee responsibilities will be assigned by the President. Candidates must be voting members in good standing with the Academy. Please submit nominations to one of three nominating committee members:

Christian McDonald ([cmcdonald@ucsd.edu](mailto:cmcdonald@ucsd.edu))

Steve Sellers ([Steven\\_Sellers@nps.gov](mailto:Steven_Sellers@nps.gov))

Dave Pence ([dpence@hawaii.edu](mailto:dpence@hawaii.edu))

The nominating committee will present a list of nominees and candidate bios to the Board of Directors on March 31, 2012. Candidates will be asked to submit responses to several questions to be provided to the AAUS membership as part of the election process. Balloting will open on May 01 and close June 30, 2012.

### 2012 Organizational Member Dues

2012 OM dues are now due. Please check your profile at [www.aaus.org](http://www.aaus.org) to be sure all of the information is correct as we begin to migrate our database to our new website.

### Rebreather Forum 3.0

AAUS has partnered with DAN and PADI to co-sponsor and convene RF3, May 18-20, 2012 in Orlando, FL (<http://www.rf30.org>). RF3.0 will provide AAUS Diving Officers and scientific divers with an opportunity to thoroughly consider the possibilities of incorporating rebreather technology into the underwater research tool box. AAUS, DAN and PADI are bringing together experts to present and discuss issues relevant to rebreathers, rebreather safety and to help plot a forward path.

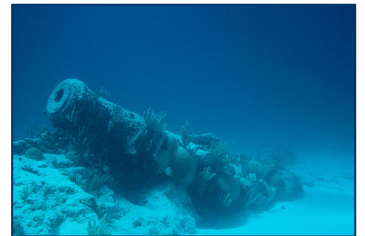
### 2011 AAUS Statistics

2011 statistics are due now. Please begin compiling and submitting these numbers! Statistics are submitted at <http://stats.diveaaus.com>. Please review 'AAUS Statistics Collection Criteria and Definitions' (Statistics Collection page) or contact Cheryl Thacker ([cthacker@ehs.ufl.edu](mailto:cthacker@ehs.ufl.edu)) or Mike Dardeau ([mdardeau@disl.org](mailto:mdardeau@disl.org)) with questions.

## STUDENT OPPORTUNITIES

### Maritime Archaeology Field School in Bermuda

Saint Mary's College of California and the University of Rhode Island will be offering a joint Field School in Maritime Archaeology in Bermuda during July 2012. This annual field school has been conducted in cooperation with the Bermuda Maritime Museum since 1999. The field school is a research-based learning experience that exposes students to a variety of activities including archival research, artifact conservation,



archaeological survey, and underwater excavation and documentation of historic shipwrecks. The field school will be conducted from July 16 to August 08, 2012. Training leading to AAUS qualification as a Scientific Diver-in-Training will be provided in advance of departure for Bermuda. Classroom work related to maritime history and maritime archaeological field methods will comprise week one of the field school. Underwater research and documentation of 16th and 17th century shipwrecks will be conducted in Bermuda during the remaining weeks. For additional information, contact [jallan@stmarys-ca.edu](mailto:jallan@stmarys-ca.edu) or [rodmath@mail.uri.edu](mailto:rodmath@mail.uri.edu).

### Channel Islands National Park Internship

Channel Islands National Park's (CINP) Kelp Forest Monitoring Program has two Student Conservation Association (SCA) internships available from May-November, 2012. The intern will assist with all aspects of CINP long-term kelp forest monitoring program (KFMP). Desirable candidates would have a minimum of 50 logged cold water dives, an AAUS-recognized scientific diving certification, some vessel experience and excellent references. To apply, send a resume with cover letter that explains your interest in this internship, summarizes your dive history, and includes at least three references to David Kushner ([david\\_kushner@nps.gov](mailto:david_kushner@nps.gov); 805-658-5773). Candidate selection will be mid-March.

### 2012 Underwater Field School in Albania

Transylvania University and the Albanian Center for Marine Research are offering a field school in underwater

archaeology and coastal ecology for the 2012 field season. Students will gain hands on experience participating in the ongoing underwater research while learning theory and methods in classroom sessions taught by experts in the field. Day trips and daily dives will expose students to a variety of site types found underwater, as well as the best practices for conducting question based research, survey, documentation, and site development over the three week field school. Deadline to apply is March 15, 2012. For more information, check out [www.albaniamarinecenter.org](http://www.albaniamarinecenter.org).

### **Scientific Diving Course in Albania**

The Albanian Center for Marine Research (ACMR) is offering a scientific diving course for the 2012 field season. This course complies with the 100-hour AAUS Standards for Scientific Diving. Students will gain diverse diving experience, participate in ongoing underwater research, and learn diving theory and methods in classroom sessions taught by experts in the field. Deadline to apply is March 15, 2012. Visit [www.albaniamarinecenter.org](http://www.albaniamarinecenter.org).

## **JOB OPPORTUNITIES**

### **Underwater Explorers Program**

The Underwater Explorers (UE) Instructors at Monterey Bay Aquarium will be responsible for delivering Underwater Explorers programs to the public. They are the primary response team for in-water safety and rescues of participants. Instructors are responsible for teaching children ages 8-13 about the natural history of our tide pools and ocean. Instructors will introduce participants to the use of specialized scuba gear; lead them on surface dives in the Great Tide Pool and serve as in-water interpreters of its habitats and animals. Instructors are also responsible for daily support of Husbandry for the Great Tide Pool exhibit, as well as minor repair of selected Underwater Explorers equipment. The UE Assistant Supervisor will assist the UE Supervisor in the daily operations and logistics of the program. In addition, they will be required to perform all duties of the UE Instructor position. All staff must be divemasters or higher. Apply online with the jobs link at [www.montereybayaquarium.org](http://www.montereybayaquarium.org).

### **Safety Program Manager/Dive Safety Officer**

The Safety Program Manager/DSO for Clearwater Marine Aquarium will work with all staff, including department heads, within the organization and a diverse team of volunteer divers, in the implementation of overall CMA safety policies and dive safety procedures as well as establish and enforce guidelines to ensure safety throughout the facility for both staff and visitors. The Manager will possess a broad knowledge base in all aspects OSHA requirements and guidelines for safety at CMA and safe diving protocols at CMA. The Safety Program Manager will

also be responsible for periodic inspections of CMA's facilities and equipment to ensure all local and federal safety codes and guidelines are met. Please submit your cover letter and resume to [d-desantis@cm-aquarium.org](mailto:d-desantis@cm-aquarium.org).

## **UPCOMING EVENTS**

### **41st Annual Benthic Ecology Meeting**

The 41st annual Benthic Ecology Meeting will be held in Norfolk, Virginia at the Waterside Marriott Hotel from March 21st-24th, 2012. The Benthic Ecology Meeting (BEM) is one of the largest scientific meetings for marine biologists in the USA where the AAUS will again be an exhibitor. The 41st meeting will be hosted and organized by Dr. Mark Butler, Old Dominion University (ODU) - an AAUS Organizational Member - and held in the Norfolk Waterside Marriott Hotel. At the 2012 BEM we anticipate more than 700 registrants; a mix of the nation's top marine ecologists and up-and-coming graduate and undergraduate students. Following BEM tradition, the 2012 meeting will be a four day event, kicking off with registration and a social Wednesday evening, scientific presentations Thursday - Saturday, and concluding with a Saturday evening banquet. A poster session will be held Thursday evening, a film festival on Friday evening at the Nauticus Maritime Museum, and a closing banquet on Saturday evening in the Ted Constant Center - ODU's basketball arena. There will also be a free luncheon for students on Saturday on the ODU campus, hosted by the ODU College of Sciences. Breaking BEM tradition, the 41st BEM will be the first meeting held under the auspices of the newly formed Benthic Ecology Meeting Society but the BEM will retain its informal nature. Visit the symposium website at <http://sci.odu.edu/bem/>

### **DAN DMT Course**

DAN Diver Medical Technician (DMT) program will be offered April 13-20. To inquire about availability or register for any DAN continuing education courses, contact DAN Education (919-684-2948; [oxygen@diversalernetnetwork.org](mailto:oxygen@diversalernetnetwork.org)).

### **Second Annual Dive Medicine Conference**

The second Annual Dive Medicine Conference at Danbury Hospital, CT is scheduled for Saturday, April 14, 2012. Contact Martin Folan ([mfolan9371@att.net](mailto:mfolan9371@att.net)) for details.

### **DAN Diving and Hyperbaric Medicine Course**

The 71<sup>st</sup> DAN Diving and Hyperbaric Medicine Course will be held April 28 to May 05 at the Fort Young Hotel in Dominica. This six-day course is designed primarily for physicians. Emergency medical personnel, paramedics, nurses and professionals with interest in diving medicine will also find the course valuable. Contact DAN Education

at 919-684-2948, ext. 556 or 800-496-446-2671, ext. 556 or [cme@dan.org](mailto:cme@dan.org). Visit: <http://www.diversalertnetwork.org/?a=events&eventNo=989>.

## NEW PUBLICATIONS

**Albins MA, Lyons PJ. Invasive red lionfish *Pterois volitans* blow directed jets of water at prey fish. MEPS. 2012; 448:1-5**

Field and laboratory observations of feeding by invasive Pacific red lionfish *Pterois volitans* were conducted during June through August of 2008, 2009 and 2010 near Lee Stocking Island, Bahamas. Observations of this invasive marine predator revealed a previously undocumented piscivorous behavior. While slowly approaching prey fish, lionfish produce jets of water directed toward their prey. These jets may confuse or distract prey, and often result in prey fish facing the attacking lionfish, increasing the probability of head-first capture and swallowing. While a variety of fishes are reported to create directed water jets, to our knowledge, this is the first report of a fish that does so during the capture of fish prey. This behavior may confer a high degree of predatory efficiency, and thus contribute to the dramatic success of this Pacific invader of tropical Western Atlantic and Caribbean coral reefs.

**Christoforidi V, Koutlianos N, Deligiannis P, Kouidi E, Deligiannis A. Heart rate variability in free diving athletes. Clin Physiol Funct Imaging. 2012 Mar; 32(2):162-6**

The aim of the study was to evaluate the cardiac autonomic activity in free diving (FD) athletes. Thirteen Greek male free divers (group I, aged 33.4±6.3 years, 6.6±4.5 years of training experience) volunteered to participate while 13 age-matched sedentary subjects served as control group (group II). All subjects were submitted to ambulatory 24-h ECG recording for heart rate variability (HRV) analysis on a day of regular activities with no exercise or training. The results showed that group I had significantly lower minimum and mean heart rate by 23.9% ( $p<0.001$ ) and 20.6% ( $p<0.001$ ), respectively. All the measured time and frequency domain indices of HRV which reflect cardiac parasympathetic activity were higher in group I than in group II by 37.6% to 146% ( $p<0.001$ ). Conclusively, the resting cardiac autonomic activity and especially the parasympathetic branch was significantly increased in free divers compared to untrained subjects. This finding should be rather attributed to the accumulated effect of both exercise training and frequent exposure to FD stimulus.

**Hausmann D, Laabing S, Hoth S, Plinkert PK, Klingmann C. Assessment of the peripheral hearing system of sport divers. Undersea Hyperb Med. 2011 Nov-Dec;38(6):515-26.**

**OBJECTIVE:** To investigate the effect of regular scuba diving on the hearing thresholds of sport divers who have no history of noise exposure or ear-related accidents. Comprehensive topographic examination of the peripheral hearing system of sport divers. **DESIGN:** Cross-sectional study. **SETTINGS:** General sport diving community. **PARTICIPANTS:** 81 sport divers with a mean of 300 dives each were compared to a control group of 81 non-divers. **MAIN OUTCOME MEASURE:** Participants were classified into three age groups. Examination included microscopic otoscopy, tympanometry, pure-tone audiometry (PTA) including air and bone conduction, speech audiometry and otoacoustic emissions (OAE). **RESULTS:** PTA suggested significant differences of the hearing thresholds at several frequencies between sport divers and non-divers in all age groups, although a Bonferroni correction for multiple testing was applied. Interestingly, the results were contradictory. Divers obtained better hearing results in air conduction, whereas non-divers showed better results in bone conduction. Speech audiometry and OAE did not reveal significant differences. **CONCLUSION:** There are no published studies of the peripheral cochlear system of divers that have used a combination of PTA, speech audiometry and OAE. All studies suggesting hearing impairment in divers were based on PTA and might have been influenced by a lack of accuracy of PTA. Our results suggest that diving does not adversely affect the hearing system of sport divers. A thorough test battery of audiological methods implying PTA, speech audiometry and OAE may contribute to offer more reliable results to answer the question of whether commercial or military divers are at higher risk for hearing deterioration.

**Ingels J, Vanreusel A, Brandt A, Catarino AI, David B, De Ridder C, Dubois P, Gooday AJ, Martin P, Pasotti F, Robert H. Possible effects of global environmental changes on Antarctic benthos: a synthesis across five major taxa, Ecol Evol. 2012; 2(2): 453-85.**

Because of the unique conditions that exist around the Antarctic continent, Southern Ocean (SO) ecosystems are very susceptible to the growing impact of global climate change and other anthropogenic influences. Consequently, there is an urgent need to understand how SO marine life will cope with expected future changes in the environment. Studies of Antarctic organisms have shown that individual species and higher taxa display different degrees of sensitivity to environmental shifts, making it difficult to predict overall community or ecosystem responses. This emphasizes the need for an improved understanding of the Antarctic benthic ecosystem response to global climate change using a multitaxon approach with consideration of

different levels of biological organization. Here, we provide a synthesis of the ability of five important Antarctic benthic taxa (Foraminifera, Nematoda, Amphipoda, Isopoda, and Echinoidea) to cope with changes in the environment (temperature, pH, ice cover, ice scouring, food quantity, and quality) that are linked to climatic changes. Responses from individual to the taxon-specific community level to these drivers will vary with taxon but will include local species extinctions, invasions of warmer-water species, shifts in diversity, dominance, and trophic group composition, all with likely consequences for ecosystem functioning. Limitations in our current knowledge and understanding of climate change effects on the different levels are discussed.

**Kneller W, Higham P, Hobbs M. Measuring manual dexterity and anxiety in divers using a novel task at 35-41 m. *Aviat Space Environ Med.* 2012 Jan;83(1):54-7.**

**BACKGROUND:** Nitrogen narcosis has a detrimental impact on the manual dexterity of divers and prior research has suggested that this impairment may be magnified by anxiety. Preliminary findings of the effects of depth (i.e., narcosis) and subjective anxiety on a novel test of manual dexterity are presented. **METHODS:** There were 45 subjects who were given a test of manual dexterity once in shallow water (1-10 m/3-33 ft) and once in deep water (35-41 m/115-135 ft). Subjective anxiety was concurrently measured in 33 subjects who were split into 'non-anxious' and 'anxious' groups for each depth condition. **RESULTS:** Subjects took significantly longer (seconds) to complete the manual dexterity task in the deep (mean = 52.8; SD = 12.1) water compared to the shallow water (mean = 46.9; SD = 8.4). In addition, anxious subjects took significantly longer to complete the task in the deep water (mean = 48.6; SD = 6.8) compared to non-anxious subjects (mean = 53.2; SD = 9.9), but this was not the case in the shallow water. **DISCUSSION:** This selective effect of anxiety in deep water was taken as evidence that anxiety may magnify narcotic impairments underwater. It was concluded that the test of manual dexterity was sensitive to the effects of depth and will be a useful tool in future research.

**Lessios HA, Lockhart S, Collin R, Sotil G, Sanchez-Jerez P, Zigmund KS, Perez AF, Garrido MJ, Geyer LB, Bernardi G, Vacquier VD, Haroun R, Kessing BD. Phylogeography and bindin evolution in *Arbacia*, a sea urchin genus with an unusual distribution. *Molec Ecol.* 2012; 21(1): 130-44.**

Among shallow water sea urchin genera, *Arbacia* is the only genus that contains species found in both high and low latitudes. In order to determine the geographical origin of the genus and its history of speciation events, we constructed phylogenies based on cytochrome oxidase I and sperm bindin from all its species. Both the mitochondrial and the nuclear gene genealogies show that *Arbacia* originated in the temperate zone of the Southern

Hemisphere and gave rise to three species in the eastern Pacific, which were then isolated from the Atlantic by the Isthmus of Panama. The mid-Atlantic barrier separated two additional species. The bindin data suggest that selection against hybridization is not important in the evolution of this molecule in this genus. Metz et al. in a previous publication found no evidence of selection on bindin of *Arbacia* and suggested that this might be due to allopatry between species, which obviated the need for species recognition. This suggestion formed the basis of the conclusion, widely spread in the literature, that the source of selection on sea urchin bindin (where it does occur) was reinforcement. However, the range of *Arbacia spatuligera* overlaps with that of two other species of *Arbacia*, and our data show that it is hybridizing with one of them. We found that even in the species that overlap geographically, there are no deviations from selective neutrality in the evolution of bindin.

**Littler MM, Littler DS. Bloom of the giant *Anadyomene gigantodictyon* sp. nov. (Anadyomenaceae, Cladophorales) from the outer slope (25–50 m) of the Belize barrier reef. *J Phycology.* 2012; 48(1): 60-3.**

A giant form of *Anadyomene*, most similar to *Anadyomene pavonina* (J. Agardh) Wille, a rare and diminutive alga endemic to Florida, appeared as up to 10 m long net-like strands covering 10%–80% of a 0.5 km region of the 25–50 m deep Belizean outer reef slope where none had been present up to 12 months earlier. This new species, described herein as *Anadyomene gigantodictyon* Littler and Littler, is characterized by a unistratose blade or cluster of blades formed by the polychotomous branching of uniseriate veins, with the interstices, or spaces between the veins, completely or partially filled with cells that are smaller than those of the veins, with cylindrical to ovate cells. The cells at mid-blade are 1.7–2.0 mm in length and 0.2–0.3 mm diameter; interstitial cells are parallel and not juxtaposed. All cells are joined in one plane and form species-specific, fan-shaped patterns with secondary interstitial cells loosely or tightly woven.

**Luiz OJ, Madin JS, Robertson DR, Rocha LA, Wirtz P, Floeter SR. Ecological traits influencing range expansion across large oceanic dispersal barriers: insights from tropical Atlantic reef fishes. *Proceed Roy Soc B: Bio Sci.* 2012; 279(1730): 1033-40.**

How do biogeographically different provinces arise in response to oceanic barriers to dispersal? Here, we analyse how traits related to the pelagic dispersal and adult biology of 985 tropical reef fish species correlate with their establishing populations on both sides of two Atlantic marine barriers: the Mid-Atlantic Barrier (MAB) and the Amazon–Orinoco Plume (AOP). Generalized linear mixed-effects models indicate that predictors for successful barrier crossing are the ability to raft with flotsam for the deep-water MAB, non-reef habitat usage for the freshwater

and sediment-rich AOP, and large adult-size and large latitudinal-range for both barriers. Variation in larval-development mode, often thought to be broadly related to larval-dispersal potential, is not a significant predictor in either case. Many more species of greater taxonomic diversity cross the AOP than the MAB. Rafters readily cross both barriers but represent a much smaller proportion of AOP crossers than MAB crossers. Successful establishment after crossing both barriers may be facilitated by broad environmental tolerance associated with large body size and wide latitudinal-range. These results highlight the need to look beyond larval-dispersal potential and assess adult-biology traits when assessing determinants of successful movements across marine barriers.

**Paul VJ, Kuffner IB, Walters LJ, Ritson-Williams R, Beach KS, Becerro MA. Chemically mediated interactions between macroalgae *Dictyota* spp. and multiple life-history stages of the coral *Porites astreoides*. Mar Eco Progress Series. 2011; 426: 161-70.**

Competition between corals and macroalgae is often assumed to occur on reefs, especially those that have undergone shifts from coral to algal dominance; however, data examining these competitive interactions, especially during the early life-history stages of corals, are scarce. We conducted a series of field and outdoor seawater-table experiments to test the hypothesis that allelopathy (chemical inhibition) mediates interactions between 2 common brown macroalgae, *Dictyota pulchella* and *D. pinnatifida*, and the coral *Porites astreoides* at different life-history stages of the coral. *D. pinnatifida* significantly reduced larval survival and larval recruitment. The extracts of both *D. pinnatifida* and *D. pulchella* significantly reduced larval survival, and the extract of *D. pulchella* also negatively influenced larval recruitment. There was no measurable effect of the crude extracts from *Dictyota* spp. on the photophysiology of adult corals. Our results provide evidence that these *Dictyota* species chemically compete with *P. astreoides* by negatively affecting larval settlement and recruitment as well as the survival of larvae and new recruits. Macroalgae may perpetuate their dominance on degraded reefs by chemically inhibiting the process of coral recruitment.

**Rocha LA, Brito A, Robertson DR. *Sparisoma choati*, a new species of Parrotfish (Labridae: Scarinae) from the tropical eastern Atlantic. Zootaxa. 2012; 3152: 61-7.**

The parrotfish *Sparisoma choati* is described from the tropical eastern Atlantic Ocean. It is genetically unique and also differs from its congeners by coloration as follows: initial phase individuals and females greyish brown to greyish red, with chin and belly paler and reddish brown scales irregularly distributed along flanks resulting in a general mottled appearance; terminal phase individuals with brownish red head and upper half of anterior two-

thirds of body, ventral portion of central third of body bright yellow-green, posterior third of body dark greenish gray and dark spot on upper fifth of pectoral fin base. The new species is found in rocky reefs along the coast and oceanic islands off West Africa, from Cape Verde and Senegal south to the islands of São Tomé and Príncipe and Angola.

**Thom SR, Milovanova TN, Bogush M, Bhopale VM, Yang M, Bushmann K, Pollock NW, Ljubkovic M, Denoble PJ, Dujic Z. Microparticle production, neutrophil activation and intravascular bubbles following open-water scuba diving. J Appl Physiol. 2012 Feb 9. [Epub ahead of print]**

The goal of this study was to evaluate annexin V-positive microparticles (MPs) and neutrophil activation in humans following decompression from open-water scuba diving with the hypothesis that changes are related to intravascular bubble formation. Sixteen male volunteer divers followed a uniform profile of four daily scuba dives to 18 meters of sea water for 47 minutes. Blood was obtained prior to and at 80 minutes following the first and fourth dives to evaluate the impact of repetitive diving and intravascular bubbles were quantified by trans-thoracic echocardiography carried out at 20 minute intervals for 2 hours after each dive. MPs increased by 2.4-fold after each dive, neutrophil activation occurred as assessed by surface expression of myeloperoxidase and the CD18 component of  $\beta_2$  integrins, and there was an increased presence of the platelet-derived CD41 protein on the neutrophil surface indicating interactions with platelet membranes. Intravascular bubbles were detected in all divers. Surprisingly, significant inverse correlations were found among post-diving bubble scores and MPs; most consistently at 80 minutes or more after the dive on the fourth day. There were significant positive correlations between MPs and platelet-neutrophil interactions after the first dive and between platelet-neutrophil interactions and neutrophil activation documented as an elevation in  $\beta_2$  integrin expression after the fourth dive. We conclude that MPs- and neutrophil-related events in humans are consistent with findings in an animal decompression model. Whether there are causal relationships among bubbles, MPs, platelet-neutrophil interactions and neutrophil activation remains obscure and requires additional study.

**Vaslet A, France C, Phillips DL, Feller I, Baldwin C, Carole C. Stable-isotope analyses reveal the importance of seagrass beds as feeding areas for juveniles of the speckled worm eel *Myrophis punctatus* (Teleostei: Ophichthidae) in Florida. J Fish Biol. 2011; 79(3): 692-706.**

The feeding habits and habitats of the speckled worm eel *Myrophis punctatus* were studied on the mangrove edge of the Indian River Lagoon (IRL, Florida) using gut-content

and stable-isotope analyses of carbon ( $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ). Four taxa were identified through analyses of gut contents, and the index of relative importance suggested that amphipods, microphytobenthos and annelids are the most important food sources in the fish's diet. To assess the feeding habits of the fish after their recruitment to the IRL, these food sources were collected from mangroves and nearby seagrass beds for isotope analyses. Stable isotopes constituted a powerful tool for discriminating fish prey items from mangroves (mean  $\pm$ s.d.  $\delta^{13}\text{C} = -20.5 \pm 0.6\text{‰}$ ) and those from seagrass beds (mean  $\pm$ s.d.  $\delta^{13}\text{C} = -16.9 \pm 0.6\text{‰}$ ), thus providing good evidence of food source origins. The 56 *M. punctatus* collected [ $10.0 < \text{total length (LT)} < 16.2 \text{ cm}$ ] had average isotopic signatures of  $\delta^{13}\text{C} = -16.7 \pm 0.2\text{‰}$  and  $\delta^{15}\text{N} = 8.2 \pm 0.1\text{‰}$ . A significant depletion in  $^{13}\text{C}$  was observed for larger juveniles ( $15.0 < \text{LT} < 16.2 \text{ cm}$ ), suggesting that they found a portion of their food in mangroves. Estimation of the trophic level from stable isotopes (TL<sub>iso</sub>) was similar among different size groups of juvenile fish (TL<sub>iso</sub> = 3.2–3.5); therefore, *M. punctatus* was considered a secondary consumer, which is consistent with its zoobenthic diet. The concentration-dependent mixing Stable Isotope Analysis in R (SIAR) model revealed the importance of food sources from seagrass beds as carbon sources for all the fish collected, with a significant increase in mangrove prey contributions, such as annelids, in the diet of larger juveniles. This study highlights the importance of seagrass beds as feeding habitats for juveniles of *M. punctatus* after their recruitment to coastal waters.

**Wangpraseurt D, Weber M, Røy H, Polerecky L, de Beer D, Suharsono, Nugues MM. *In Situ* Oxygen Dynamics in Coral-Algal Interactions. PLoS ONE, 2012; 7(2): e31192.**

**BACKGROUND:** Coral reefs degrade globally at an alarming rate, with benthic algae often replacing corals. However, the extent to which benthic algae contribute to coral mortality, and the potential mechanisms involved, remain disputed. Recent laboratory studies suggested that algae kill corals by inducing hypoxia on the coral surface, through stimulated microbial respiration.

**METHODS/FINDINGS:** We examined the main premise of this hypothesis by measuring *in situ* oxygen microenvironments at the contact interface between the massive coral *Porites* spp. and turf algae, and between *Porites* spp. and crustose coralline algae (CCA). Oxygen levels at the interface were similar to healthy coral tissue and ranged between 300–400  $\mu\text{M}$  during the day. At night, the interface was hypoxic ( $\sim 70 \mu\text{M}$ ) in coral-turf interactions and close to anoxic ( $\sim 2 \mu\text{M}$ ) in coral-CCA interactions, but these values were not significantly different from healthy tissue. The diffusive boundary layer (DBL) was about three times thicker at the interface than above healthy tissue, due to a depression in the local topography. A numerical model, developed to analyze the

oxygen profiles above the irregular interface, revealed strongly reduced net photosynthesis and dark respiration rates at the coral-algal interface compared to unaffected tissue during the day and at night, respectively. **CONCLUSION:** Our results showed that hypoxia was not a consistent feature in the microenvironment of the coral-algal interface under *in situ* conditions. Therefore, hypoxia alone is unlikely to be the cause of coral mortality. Due to the modified topography, the interaction zone is distinguished by a thicker diffusive boundary layer, which limits the local metabolic activity and likely promotes accumulation of potentially harmful metabolic products (e.g., allelochemicals and protons). Our study highlights the importance of mass transfer phenomena and the need for direct *in situ* measurements of microenvironmental conditions in studies on coral stress.

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American Academy of Underwater Sciences  
101 Bienville Boulevard, Dauphin Island, AL 36528  
Tel 251 591 3775 Fax 251-861-7540  
[aaus@disl.org](mailto:aaus@disl.org) [www.aaus.org](http://www.aaus.org)

**Editor:** Heather Fletcher - [aaus@disl.org](mailto:aaus@disl.org)  
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