The Society for Integrative & Comparative Biology

SICB Newsletter

Volume Spring 2007

Experiences in Integrative and Comparative Biology

SICB members like a good story about an expedition, a field experience, a lab experiment, or another researcher! To spice up our newsletter, I have asked some of the leaders of SICB to relate one or two experiences that might be of interest to the membership. This issue features Ron Dimock, SICB Treasurer and Linda Walters, SICB Program Officer.

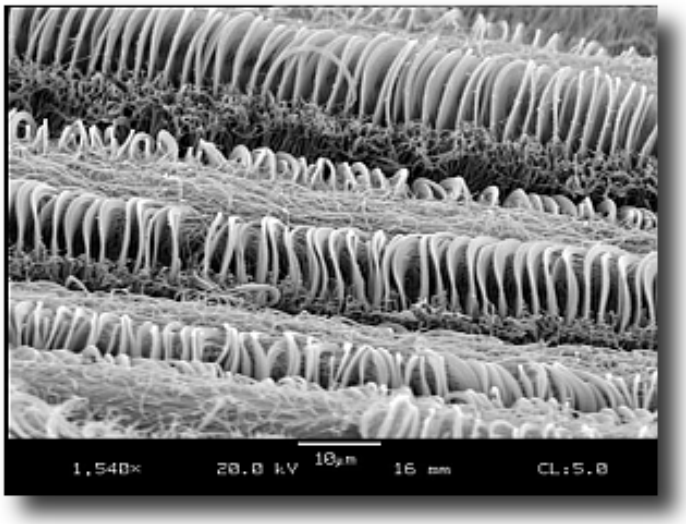
Lou Burnett, SICB Secretary

Ron Dimock, SICB Treasurer

I've always really liked clams...

My fondness for clams started with *Mya arenaria* that I consumed in large quantities from 'clam shacks' in New Hampshire and Maine as a kid. When I got to college, I had the good fortune to become immersed not only in clams, but invertebrates at large, in the company of the likes of George M. Moore, Lorus and Margery Milne, Emory Swan, Art Borror, Alan G. Lewis and others at the University of New Hampshire. Having never once considered being pre-med, I saw my career appear before me during a summer course in the Natural History and Taxonomy of Marine Invertebrates with Norman Meinkoth, a visiting professor from Swarthmore. The road trip to Lubec, Maine, Passamaquoddy Bay and the fringes of the Bay of Fundy, with 30 ft+ tides and a couple cases of beer shared with 3 traveling companions turned me on to marine invertebrates.

1968 at USCB. On the left is Eldon Ball, now Senior Fellow at the Research School of Biological Sciences, Canberra, Australia



Several gill filaments of the freshwater mussel Hyridella depressa, Australia, showing lateral-frontal cirri and frontal cilia. (2006)

At the urging of Art Borror, and a growing interest in diving in water other than the Gulf of Maine, I ended up at Florida State University with Mike Greenberg, who taught me experimental biology and hooked me with comparative physiology/integrative biology. A master's thesis that required only the hearts of oysters enabled my wife and me to eat more *Crassostrea* bodies, fixed every way imaginable, than any one should, so much so that she refused to eat oysters for years after. With the fauna of the Gulf under my belt (literally), we moved to Santa Barbara, the tutelage of Demorest Davenport, and the opportunity to spend a summer at Friday Harbor sharing a lab with then graduate student, Dennis Willows. The rest, as they say, is history, ultimately involving 35+ years of teaching invertebrate biology at Wake Forest University and more than 20 summers teaching the marine invertebrate course at the Duke Marine Lab on the North Carolina coast.

But the salinity of my blood, and of my clams, was becoming diluted living 5 hrs from the coast. My fondness for bivalves continued unabated, but unionid mussels are not the gourmet item of choice. However, they have given me the better part of a full career, serving first as hosts to symbiotic water mites and my Davenport-inspired experimental approach to symbioses, and later to functional morphology, development and even shades of immunology and molecular biology as my focus shifted to the host mussels and their bizarre life history. I mean really, what quirk of intelligent design would house Pac Man-like mussel larvae in water tubes of mom's gills, to be released to become temporary parasites on the fins or gills of an unsuspecting fish host that has been conned into upstream transport and the avoidance of being a larva swept down to the sea?

Mussels have taken me from the 1000-year old canals of The Netherlands, complete with shards of 17th Century clay pipes, and lots of broken glass, to the Australian Outback where every second living thing is poisonous or can eat you. Along the way I've had the good fortune to nudge a number of neophytes along the path to discovery and satisfaction that has been good to me for nearly 40 years.

Intertidal: St. Ann's Bay, Jamaica, 2003

A Baker's Dozen Sampler:

Dimock, R. V., Jr., and J. G. Dimock. 1969. A possible "defense" response in a commensal polychaete. Veliger 12: 65-68.

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Pruitt, N. L. and R. V. Dimock, Jr. 1979. The effects of temperature and eyestalk extracts on oxygen consumption of the crayfish Cambarus acuminatus (Faxon). Comp. Biochem. Physiol. 62A: 631-634.

Dimock, R. V., Jr. 1983. In defense of the harem: intraspecific aggression by male water mites. Ann. Entomol. Soc. Am. 76: 463-465.

Dimock, R. V., Jr. and C. Davids. 1985. Spectral sensitivity and photo-behaviour of the water mite genus Unionicola. J. Exp. Biol. 119: 349-363.

Tankersley, R. A. and R. V. Dimock, Jr. 1992. Quantitative analysis of the structure and function of the marsupial gills of the freshwater mussel Anodonta cataracta. Biol. Bull. 182: 145-154.

Polhill, J. B., V., and R. V. Dimock, Jr. 1996. Effects of temperature and pO2 on the heart rate of juvenile and adult freshwater mussels (Bivalvia: Unionidae). Comp. Biochem. Physiol. 114A: 135-141.

Edwards, D. D. and R. V. Dimock, Jr. 1997. Genetic differentiation between Unionicola formosa and U. foili (Acari: Unionicolidae): cryptic species of molluscan symbionts. Invert. Biol. 116: 124-133.

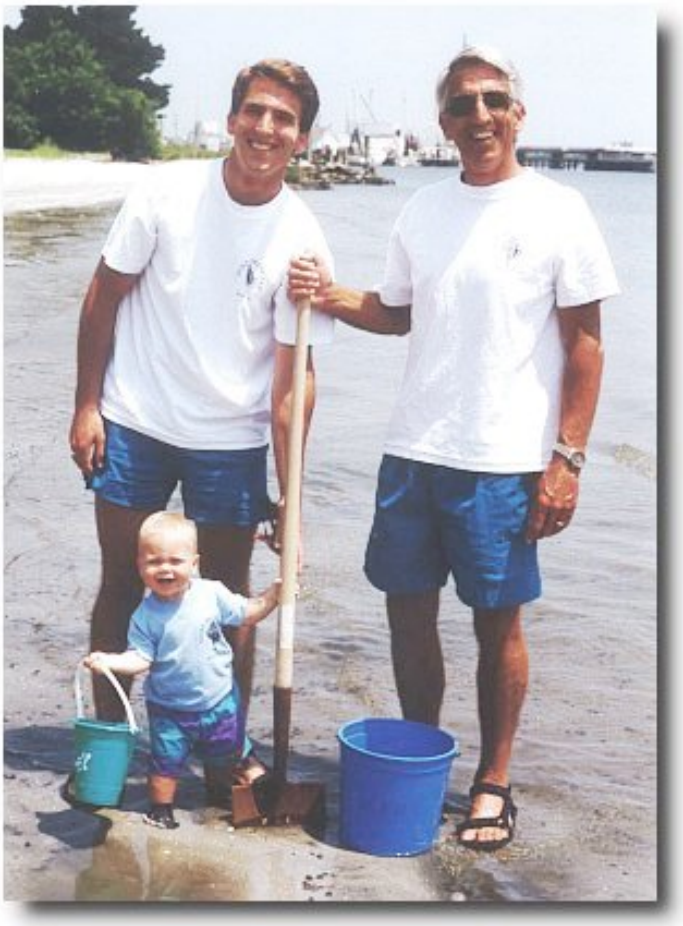
Schwartz, M. L. and R. V. Dimock, Jr. 2001. Ultrastructural evidence for nutritional exchange between brooding unionid mussels and their glochidia larvae. Invert. Biol. 120: 227-236.

Dimock, R. V., Jr. 2000. Oxygen consumption by juvenile Pyganodon cataracta (Bivalvia: Unionidae) in response to declining oxygen tension. pp. 1-8. In, R. A. Tankersley, D. I. Warmolts, G. T. Watters, B. J. Armatage, P. D. Johnson and R. S. Butler,(editors. Freshwater Mollusk Symposium Proceedings, Ohio Biological Survey, Columbus, Ohio.

Fisher, G. R. and R. V. Dimock, Jr. 2002. Ultrastructure of the mushroom body: digestion during metamorphosis of Utterbackia imbecillis (Bivalvia: Unionidae) Invert. Biol. 121: 126-135.

Rogers-Lowery, C. L. and R. V. Dimock, Jr. 2006. Encapsulation of attached ectoparasitic larvae of freshwater mussels by epithelial tissue on fins of naive and resistant host fish. Biol. Bull. 210: 51-63.

Rogers-Lowery, C. L., R. V. Dimock, Jr. and R. E. Kuhn. 2007. Antibody response of bluegill sunfish during development of acquired resistance against the larvae of the freshwater mussel *Utterbackia imbecillis* Develop. & Comp. Immunol. 31: 143-155.



3 generations: Mudflat, Duke Marine Lab, 1994, with son Jeff and grandson Colby, not quite 1 yr old.

Linda Walters, SICB Program Officer

When I began my faculty appointment at the University of Central Florida in Orlando 10 years ago, I decided that I would use my training in marine ecology to address both basic and applied questions on how humans are impacting the coastal environment, especially in Florida. Currently in my lab, my students and I are looking at how recreational boat wakes are causing the decline of intertidal oyster reefs and restoration of the same, ballast water disinfectants, dispersal and DNA forensics of invasive flora and fauna, and the ecology of coral larvae in situ. I am presently on sabbatical and decided to spend my year addressing two questions with marcoalgae that greatly interested me, but I did not have time to pursue during the regular academic year. I first spent two months in the St. Thomas at the University of the Virgin Islands looking at foraging by the long-spined sea urchin *Diadema antillarum* from the point of view of the algae. This keystone herbivore has recently returned to the USVI and other locations in the Caribbean after a 20+ year absence and resource managers are eager to learn if this return will mean the end of algal blooms on coral reefs. My colleagues and I ran simple feeding trials and found this urchin is a very fussy consumer avoiding many species. With the avoided species, the urchin usually shreds the biomass, creating many fragments. These fragments can then attach to substrates and continue growing as clones. There will have to be a really huge increase in *Diadema* numbers to remove all of the unpalatable macroalgae. From there, I went with my family to Australia for 4 months to look at vegetative fragmentation in the green alga *Caulerpa taxifolia.* The invasive form of this macroalgae is listed as one of the world's 100 worst invasive species. Australia is the only country where both invasive and native populations of *Caulerpa* can be found. I am running lab and field manipulations in New South Wales (with invasive *Caulerpa*) and in Moreton Bay in Queensland (native form) to determine the minimum viable fragment size. While these experiments are still underway, I can say that there are many significant differences between the two forms and the invasive appears much better suited for dispersing, survival and attachment. University of Queensland's marine lab is on North Stradbroke Island and is one of the nicest facilities I have had the pleasure of working at over the past 20 years. Additionally the island is a wonderful, small community that is very safe, has incredible sand flats and white sand beaches, and, according to my 10-year old son, has the best gelato on this planet!