



BIOSPHERE

The Weekly Bulletin of Biology

Biology Colloquium: Friday, 9 March 2012, 2:00 pm in CR 5125

“Adult Stem Cells in Lung Repair and Carcinogenesis”

Brigitte Gomperts, Ph.D.

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New Publication

Dr. Paul Wilson is author of the lead chapter in a new book titled, *Evolution of Plant–Pollinator Relationships*. His chapter is “Macroevolution for plant reproductive biologists.”

An Extremophile Road Trip

—Brenton Spies

The sunny California coast is a remarkably long (750 miles) and beautiful stretch of coastline. Many hope to take to the open road along Hwy 1, making pit stops at some of California’s hidden coastal towns or pulling off the road to take a snapshot at one of the many scenic vista points. I have done this many times with friends and family, and was excited to have the opportunity to do it again for my master’s thesis project. *Or was I?*

Before my journey began last July, I spent a year planning this project and my research goals. Many hours were spent smoothing out the logistics with my advisor, Dr. Mark Steele, and numerous experts in the field of study. What did I want to study, you ask? Fish, of course. And the one I

chose is endangered. Everyone wants to work on an endangered species, *right?* I quickly learned why it is so difficult to do so. Before starting my research, I had to obtain seven permits, clearance at two military bases, and approval to collect on private property from a cowboy that had a large number of cattle.

There was a lot to get done in a very short amount of time and I was flying solo on this road trip. The endangered Tidewater Goby, *Eucyclogobius newberryi*, was the target, and a small target it is, reaching a maximum length of about 45 mm. The Tidewater Goby is a California native species that specializes in seasonally closed estuaries, such as Malibu Lagoon. This species is somewhat of an extremophile because it has the ability to survive and reproduce in habitats that have extremely high variations in temperature, salinity, and dissolved oxygen. Did I mention they also thrive in habitats that discharge raw sewage? These seasonally closed estuaries, however, are highly impacted by anthropogenic disturbances, and are being lost or manipulated at a considerable rate.

So, I set up my pickup truck for a four-month trek up and down the California

coast. Being a poor and hungry graduate student, I had to slum this trip as much as I could: no hotels and few campsites with amenities. For the next four months my truck was my dorm, kitchen, storage unit, and laboratory. There were 21 sites along the coast that I planned to sample, from San Diego to Humboldt. The plan was to do the trip twice. But, of course, research has its complications.

I started down south and worked my way up the coast, trying to sample a site or two a day. The first trip was focused on placing temperature recorders at each site, which would take hourly measurements for the next four months. Each estuary along the coast is different in size, habitat structure, and the amount of freshwater input from surrounding streams. These factors, in addition to many others, influence the temperature gradients found in an estuarine system. Because the tidewater goby is considered to be adapted to habitats with high temperature variations, I was interested to determine how variations in temperature affect early life-history characteristics, such as growth and larval duration.

To measure the life-history characteristics, I needed goby otoliths. Otoliths are calcium carbonate structures found in the ears of fish. Their function is to detect both sound and gravity, which help with balance and movement. Otoliths also provide a history of an individual through daily growth bands much like growth rings of a tree. Once I had my temperature data from the first road trip, the second and third trips focused on retrieving the temperature loggers and collecting gobies to analyze their otoliths.

My permits allowed me to collect a small number of gobies from each site to bring back to CSUN for analysis. The Tidewater Goby lives in the shallower parts of estuaries, which are typically composed of thick sludgy sediment. To collect these fish, I constructed a one-man push-net,

which is operated much like a lawn mower. How does it work? Well, the 1 x 1-m framed net is pushed along the muddy bottom and collects all the organisms in its way. It was a very useful tool, but in habitats that were extremely muddy, I felt like I was pushing one of those tractor tires used for strength training by football players—football players who notably have access to showers and beds instead of the baby wipes and foam mattress I relied on for the entire trip.

When I returned from my final trip, with my targeted samples of gobies and the scent of estuarine sludge infused into my skin, I had traveled almost 8000 miles and probably consumed more Red Bulls than most will in a lifetime. It's hard staying awake on the open road when you're by yourself. Sunflower seeds, loud music, and fresh air just don't cut it after awhile. An abundance of Red Bulls do so "give-you-wiings."

It was an arduous summer, but I learned quite a lot along the way, and it was a great career builder. The term "road trip" has a whole new meaning in my eyes now. The information gained through this research is another step forward in better understanding the biology of the endangered Tidewater Goby and the threatened habitat it calls home; so I feel it was worth every mile. Many have asked if I would do it again if I had the chance—absolutely, but not without a field assistant.

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