



## Through Stickleback Eyes

**Floating face-down** in a cold lake on a rainy morning: it's just another day at the lab for Dan Bolnick and his research assistants. The lab, in this case, is a patchwork of lakes, streams, and estuaries on British Columbia's Vancouver Island.

Like Darwin studying the finches of the Galapagos, Bolnick works with three-spined sticklebacks. For the past 10 summers, he's prowled the island, investigating the sardine-sized fish's evolutionary dynamics. Sequestered in "dozens and dozens and dozens" of closely spaced bodies of water, he says, individual stickleback populations developed distinctive, coevolutionary relationships with an assortment of tiny tapeworms, nematodes, and other local parasites.

Understanding whether this constantly shifting dynamic involves

genetic changes in stickleback immune systems, he says, could help us combat parasitic diseases in humans.

Bolnick is an evolutionary biologist at the University of Texas at Austin. A recently appointed HHMI early career scientist, he's one of 50 academics chosen for their bold, potentially transformative research.

He's also interested in training next-generation scientists. "When I look for research assistants, I try to recruit future science teachers, K through 12. If they can see what research is really about, they can spread some of that excitement to their students."

That excitement is no empty promise. Bolnick's summertime range is a swath of rain forest with a spectacular mountain backdrop, home to cougars, bears, and leeches. Field work here

involves skills more common among Eagle Scouts than education majors.

Projects vary but often require team members to trap hundreds of fish and preserve them or to tag them, truck them to another body of water, pen them up in new habitats, and watch what happens.


Although "mostly city kids," Bolnick says, each season's researchers have stoutly met the challenges of camping, wading, canoeing, and close-up underwater observation.

"You could just toss traps into the water, catch the fish, and go on to the next lake," he says. "But when you snorkel, you see how behavior differs from one lake to another, and even between one fish and another. You start to see the world through stickleback eyes."

That point of view paid off last summer for research assistant Kim Hendrix, who today teaches biology at a rural Texas high school. During long hours in the water, Kim made a significant discovery. "She found that individuals living in the same place consistently choose different ways of feeding; one always pecking in the mud, another only grabbing floating food and never approaching the bottom," Bolnick says. "She was the first to document this kind of personality variation in the wild."

How those behaviors fit into the parasite-host puzzle is yet to be determined, Bolnick says. But in the meantime, there's already been progress. "Here was somebody who'd never snorkeled, watching fish she'd never seen before, doing serious science. Now she can tell her students what science is really about: You don't know what you're going to find. But sometimes, suddenly, there's something spectacular right there in front of you."

—George Heidekat

 **WEB EXTRA:** See photos from Bolnick's stickleback collection trips at [www.hhmi.org/bulletin/feb2010](http://www.hhmi.org/bulletin/feb2010).