

Insect hunters aim to track down every species in the world

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By Jonathan Bloom, Globe Correspondent | April 17, 2006

PUNTA CANA, Dominican Republic -- At 4:30 a.m., the student group set off, the darkness illuminated only by their headlamps.

When they arrived at the giant gri gri tree, Brian Farrell, a Harvard biology professor and leader of the expedition, launched a plume of plant-based chemicals into the branches with what looked like a leaf-blower and watched the bugs begin to fall.

As the insects dropped into the white parachute cloth spread out beneath the tree, Farrell alternately quizzed his students on the names of the insects and excitedly pointed out cool ones. "Look at that big stink bug!" he called at one point.

These Harvard students were spending their spring break in the Dominican Republic with a serious purpose: cataloguing all the species on earth.

Farrell, who is carrying out the idea of his colleague E.O. Wilson in the effort to create an Encyclopedia of Life, decided to start small, and since 2002, he has been recording species of insects in the Dominican Republic. He and his students have so far catalogued 4,000 of 6,000 known insect species. They've already discovered more than 200 new species, and they expect to find thousands more before finishing up their Dominican work in about 2011.

In addition to simply recording biological diversity, the aim of the research is to compile known information and new data gathered from the field into one centralized place on the Internet, Farrell said. That way, when inspectors at an airport, for instance, come across a shipment that includes a strange insect, they can figure out what the creature is and whether it poses any danger.

Such a face book of the earth's biodiversity will become even more useful in time, Farrell said.

"We will face biological threats that are growing because of increased proximity with each other," he said. "The idea is to get all that information online within a few mouse clicks."

Of course, cataloguing the world's animals and plants is an ambitious goal. The Encyclopedia of Life's timetable is directly related to how many researchers and institutions put their weight behind it. Wilson predicts that with full financial support, the project could be completed in two to three decades. Others are not as optimistic.

"Even if George W. Bush gave me a blank check like he gives [Secretary of Defense Donald] Rumsfeld, I'd say at least 50 years, because we need to train a great cadre of scientists around the world," said F. Christian Thompson, alluding to the military budget under Bush's defense secretary, Donald Rumsfeld.

Thompson, a research entomologist at the Smithsonian Institution, was involved in an earlier attempt, to catalogue life on earth. That project began in the Peruvian Amazon and encountered such a flood of insects that the researchers were overwhelmed, and their work was derailed.

At Punta Cana, the morning's "fogging" haul wasn't spectacular. Farrell blamed the slight Caribbean breeze for diminishing the fog's effectiveness. The solution: start a half-hour earlier the next day.

Once collected, each insect is digitally catalogued by an automontage program that merges 30 images with

different focal lengths to provide a sharp picture. Farrell also plans to post DNA bar codes online at some point.

Cradling three-inch katydids, Farrell used words like "beautiful" and "magical."

"It's just a Western cultural thing, that repulsion. It's learned behavior," he said. "When we start out as kids we're not afraid of insects, we're attracted to them."

Just don't call them bugs. "It's kind of frowned upon," Farrell said. "It's like using 'weeds' for all plants."

In 2004, on another spring break trip, Farrell's group made the first confirmed sighting of the lime swallowtail butterfly -- an agricultural pest in Asia and the East Indies -- in the Caribbean. The butterfly defoliates citrus trees, accounting for hundreds of millions of dollars' worth of damage in the Old World tropics. "That's a great dramatic example -- now agriculture departments can warn farmers to avoid damage. You digitize it and put it on the Web for everyone to benefit," he said.

In addition to fogging, researchers use green lights at night to attract insects to a white sheet. Once the insects are attracted to the light, researchers use the kind of jar-in-hand collection typical of kids on a summer night. Other methods to collect the insects from the sheet: wet fingering -- using fingers moistened with spit -- and sucking insects into captivity with a hose-and-vial contraption.

In general, foggings in the Dominican Republic don't unleash the same torrent of insects as they do in the Amazon. But the relative scarceness is part of why Farrell chose the Dominican Republic for the search -- it's more feasible. "It's big enough to be interesting, but small enough to be doable," said Farrell.

Another reason he chose the island nation is because he knows and loves it. He's been visiting for nearly 20 years to spend time with the family of his Dominican wife, Irina.

He also employs two Dominican researchers at the Autonomous University of Santo Domingo to catalogue the collection's insects and works with the Puntacana Ecological Foundation.

"Brian has expanded the whole concept" of the Encyclopedia of Life "in a unique way," said Wilson. "He's involved a whole country."

Wilson has followed Farrell's lead and taken four research trips to the Dominican Republic to study his favorite subject, ants. "Going to the Dominican Republic was entirely his conception," Wilson said. "I've made the Dominican Republic a focus of my current research because of the infrastructure, the collaboration I can have with Dominicans, and the welcoming atmosphere that Brian's project has created."

For more information on the project, or to view catalogued insects, go to www.biocaribe.org. An exhibit of Farrell's insect art runs through April 26 at the Cambridge Multicultural Arts Center, 41 Second St. in Cambridge (www.cmacusa.org). ■