

STOCKPHOTO

BUTTERFLY EFFECT

by **Moria Robinson**

When I was ten, my parents gave me a butterfly net for my birthday. As I patrolled my rural neighborhood, my search for winged quarry quickly went from interest to obsession. Every sunny afternoon on Vashon Island, Washington, would find me stalking the blackberry hedge on 94th Street or the nettle patches on the gravel goat farm road. I read naturalist journals, made log sheets to track my sightings and observations, and sketched butterflies and moths I found in the garden or under the porch light in the morning. These tiny denizens of the natural world had captured me with an unexpected tenacity, and I knew that I would one day join the ranks of scientists, authors, and photographers who have dedicated their lives to this incredible group of organisms.



In the summer of 2006, I was finally able to formally immerse myself in *lepidoptera* study. My mother read about Earthwatch's Student Challenge Awards Program (SCAP) in an Earthwatch Expedition catalog and gave me the article to read. The idea of spending a week with a real biologist, participating in and observing studies I might read about in the future, was tantalizing. I was dubious about my chances, but applied anyway. In the written application, I explained my love of nature and entomology, and emphasized my desire to work in field biology and conservation. When I heard that I had been accepted, I was overjoyed. The project fit was fortuitously perfect: I

complete their larval stage within the caterpillars' bodies. Unlike *parasites*, which exploit but do not kill their hosts, *parasitoids* kill their host as a part of their life cycle. We students would contribute to each aspect of this research, guided by Dr. Dyer, his graduate students Tara Massad and Angela Smilanich, and colleagues Humberto "Beto" Garcia (La Selva Biological Research Station) and Dr. Mike Singer (Wesleyan University).

Work with wild caterpillars always begins with the simplest, yet most difficult, part of the project: finding the caterpillars. As larvae, all lepidoptera are highly evolved to feed on only certain plants (and even parts of plants). Many are specialists

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would be traveling to southeastern Arizona to research the diversity, defenses, and natural enemies of desert caterpillars with biologist Lee Dyer.

Until now, my focus had been on adult butterflies. The opportunity to explore the larval stages of both moths and butterflies, and of species that would surely be new to me, represented a whole new world.

On the Trail of Caterpillars

On July first, I left the familiar clouds and conifer forests of Seattle for the clear blue skies and hot deserts of Arizona. Dr. Dyer and the five other SCAP students met me at the airport, and, after spending the night in a hotel, we piled into a van for the journey south. Our home for the next week would be the Southwest Research Station, a cluster of buildings tucked into the stark, beautiful landscape of the Chiricahua Mountains.

On the ride down, we made our first stops for field collection. Dr. Dyer's work—and now ours—involved studying the roles of caterpillars in the Arizona desert ecosystem. The research sought to identify the diversity of caterpillar species that live in the Arizona desert mountains, valleys, and sky islands. In addition, Dr. Dyer and his graduate students were exploring the interactions among these species, their host plants, and their parasitoids—insects that

on one species or family of plants, while others are generalists and feed on an array of foliage.

We hunted caterpillars either by hand-searching foliage or by using a "beat sheet," a piece of white fabric stretched over a frame and accompanied by a stick. The beat sheet was our most productive collection method, as it would reveal the inhabitants of an entire area of foliage. We held the sheet underneath target foliage, striking the branch with the stick to dislodge any insects hidden among the leaves. If we were lucky, we would spot a caterpillar among the beetles, spiders, dead leaves, and bits of bark covering the sheet. The most common caterpillars we found were members of *noctuidae* and *geometridae*, two enormously diverse families of moths. Some were striped, blending perfectly with bark; others sported diamond patterns and erect postures that made them indistinguishable from the conifer needles on which they fed.

Once we found a caterpillar, we placed it in a plastic bag stocked with a host plant. The bag was assigned a lot number, which we would later enter into a database, and append as the caterpillars matured and were photographed. At the end of each collection day, our belt loops hung with inflated bags of leaves and caterpillars, encircling our waists in a comical, balloon-like skirt.



Left: *Spilosoma dubia*, a member of the family Arctidae (tiger moths).
Right: Using a beat sheet to hunt for caterpillars



Making Connections

At the research station, we monitored our charges carefully. Each day we gave them fresh foliage and checked for evidence of parasites, such as parasitic flies and wasps that lay their eggs on or within living caterpillars. Dr. Dyer sought to discover the specialized relationships between caterpillars and their parasitoids: Who ate whom, and why? In field research, the results often take a long time to become evident, but by recording parasitoid emergences from our caterpillars, we were helping draw connections within this little-explored area.

And so the days filled a week. Words such as *limantriid* (a family of caterpillar) and *proleg* (an anatomical character) filled our vocabulary. No bush could be passed without a lingering glance for leaf damage and, just maybe, the curving caterpillar silhouette of which we had become inordinately fond. At week's end, I was filled with information and fascinating new questions. For how many more species of lepidoptera were the larvae unknown? What about

diversity and host-specificity of hyperparasitoids—tiny wasps that parasitize the parasitoid eggs within the caterpillars?

Renewed Direction

That week in Arizona would steer the direction of my life for the next three years. I took a semester off before college to work with Beto Garcia on Dr. Dyer's caterpillar project in Costa Rica, searching the rainforest for tropical larvae and rearing them in order to track parasitization. Throughout my first two years at Middlebury College, I've focused on biology. I spent the summer working with Professor Dyer's colleague, Dr. David Wagner, on lepidoptera biodiversity research and conservation fieldwork at the University of Connecticut. Just down the road at Wesleyan were Mike and Angela, with whom we went collecting once every few weeks.

Kindred spirits and mentors seem to be around every corner. I have discovered that there is no greater feeling than that of sharing my passion with others, and that I would like to eventually work with children. I also plan to continue field work. I know that my photography and writing will be my companions on the journey. Ultimately, I hope that my words, images, and experiences will inspire in others a renewed appreciation of nature. **i**

Moria Robinson, a junior at Middlebury College in Vermont, hails from Vashon Island, WA. Moria enjoys nature photography, biking, hiking, running, travel, and playing Scrabble with her grandma. She looks forward to exploring new chapters in conservation photojournalism, teaching, and field biology.

Moria (seated, far right) with all the 2006 Desert Caterpillars SCAP participants

