Cross-Pollinating Ideas: What Bee Research in Greece Taught Me About Global Science Collaboration

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Students exploring bee nesting habitats overlooking the Aegean Sea. (All photos by Avery Roe.)

This summer, I spent two months on the island of Lesvos, Greece, the setting of the National Science Foundation-sponsored Pollinators, Climate Change, and the Aegean Archipelago Research Experience for Undergraduates (REU). Our team of seven students and four senior researchers from various backgrounds in the U.S. worked to untangle the interacting stressors impacting bees in Greece and around the world. Throughout the program, led by John Barthell, Victor Gonzalez, and John Hranitz, I developed tremendously important skills in designing streamlined experiments, collecting field data, analyzing observations, and communicating my findings. However, as I look back on the experience, the most transformative aspect of this opportunity was the chance to engage in international collaboration, which not only enhanced the research process but also opened my eyes to the importance of global scientific cooperation.

Twelve miles off the Turkish coast and surrounded by the Aegean Sea, Lesvos is an ideal environment to study the impact of climate change on pollinators. It is a hotspot for bee speciation, characterized by its remarkable diversity of habitats and more than 600 species of bees. The unique landscape, shaped by centuries of human interaction and natural forces, presented a living laboratory to observe the impacts of confounding environmental stressors on pollinators. With the help of our international collaborators, we compared similar effects, such as rising temperatures, phenological mismatch, and habitat destruction, across vastly different environments. It was through this comparative lens that patterns began to emerge—patterns that might otherwise go unnoticed without the integration of knowledge across borders.

Leafcutter bee visiting a thistle flower on a mountaintop in Lesvos.

Two species of carpenter bee native to Lesvos captured during a field collection trip.

Drs. Theodōra Petanidou and Thomas Tscheulin, ecologists at the University of the Aegean in Mitilini, Lesvos, have made significant contributions to the field of pollination ecology in Greece. The collaboration with these scientists and the REU, which began ten years ago, has resulted in a longstanding and multifaceted knowledge base of bee diversity, conservation, and threats to bee health on the island. We learned a great deal from their experiences with bees and the culture of conservation in Greece, and they directly supported our research efforts by providing access to study sites, materials, and facilities. Dr. Petanidou shared the extensive pollinator collection at the university and a wealth of information about pollination dynamics on Lesvos, while Dr. Tscheulin worked with us to set up a camera monitoring system around several ground-nesting bee aggregations. Every year, they work closely with the REU team to develop pertinent questions, while the conclusions from each summer steer their research in new directions.

Working alongside Greek citizens and scientists offered insights into local ecosystems and culture that no textbook could fully convey. The data we gathered and the conclusions we drew became part of a larger narrative that transcends individual borders. I quickly realized how important this kind of collaboration is—not just for scientific advancement, but also for fostering personal connections, trust, and understanding. In a world where political tensions often strain relationships between nations and climate change looms, science is a way to bring people together over a shared pursuit of knowledge and a common goal.

As a young entomologist with big aspirations, the opportunity to conduct guided yet independent research in a foreign country felt like the groundwork I needed to step into my career, which will now undoubtedly involve international collaboration. I discovered this opportunity at the 2023 ESA meeting in National Harbor, Maryland, after talking with Dr. Gonzalez about his research on pollinator thermal tolerance in Greece. Looking towards the future, I plan to present the work I did during the REU at the 2024 ESA meeting.

I miss Lesvos and its salty lagoons, the fruit trees laden with apricots, figs, and pomegranates, and the hundreds of bee species and communities I got to know. Months later, I remember afternoons spent in Dr. Petanidou's lab, drinking homemade lemonade and discussing our role in saving the bees. In those moments, I developed a deeper appreciation for how the challenges we face—climate change, biodiversity loss, and environmental degradation—are global and require a unified international response. By fostering a scientific community that transcends national boundaries through its network of individual connections, we can begin to address these issues with the urgency and at the scale that they demand.

As students, we represent the future of entomological research; we are the people stepping into the shoes of our professors. How can we fortify connections that bridge international borders? What breakthroughs await us if we truly unite as a global scientific community? Like bees buzzing amongst the flowers, how will we cross-pollinate ideas amongst nations?

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