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Entomologist's Antarctica Expedition

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Prof. Matan Shelomi collecting insect specimens at Cape Tuxen, Antarctica on January 27, 2025.

Associate Professor Matan Shelomi (薛馬坦) of the Department of Entomology at National Taiwan University (NTU) recently returned from a remarkable two-month scientific expedition to Antarctica. Based at Vernadsky Research Base, a Ukrainian research station on a small island off the Antarctic Peninsula at 65° south latitude, Prof. Shelomi conducted pioneering research on one of the most extreme and isolated ecosystems on Earth.

Under the Antarctic Treaty, Antarctica remains a continent devoted solely to peaceful activities like scientific research, with no nation allowed to claim sovereignty over its territory.

In Taiwan, Prof. Shelomi focuses on studying insect gut microbiomes. But, are there insects in Antarctica? "There's just one species," says Shelomi. "The only free-living insect

on the Antarctic mainland is *Belgica antarctica*, a wingless fly that inhabits mossy soils and feeds on dirt and microbes."

Fully invited and sponsored by his Ukrainian hosts, Prof. Shelomi's Antarctic project was aimed to study the gut microbiome of *Belgica antarctica* and determine whether gut bacteria play a role in the insect's freezing tolerance. "*Belgica* can survive freezing temperatures down to -15°C," explains Shelomi. "It employs numerous strategies to withstand these brutal conditions." Upon his return to Taiwan, Prof. Shelomi plans to work closely with Ukrainian collaborators to analyze the complete microbiome of the insect's larvae using advanced molecular techniques.

Finding *Belgica antarctica* was no easy task. Prof. Shelomi often joined other researchers studying other topics, such as microplastic pollution in Antarctic streams, moss dispersal

by nesting birds, and snow algae blooms. Their expeditions involved boarding rubber Zodiac boats and sailing past towering icebergs to reach nearby islands or stretches of the Antarctic Peninsula, where larvae could be collected from the mud near bird nests, especially those of skuas.

At the Vernadsky Base itself, researchers tackled a variety of projects, including studies on Earth's magnetic field, atmospheric rivers, and the ozone hole. Their support team was a diverse station crew—including a base commander, doctor, chef, diesel generator mechanic, IT specialist, and others essential to the base's daily operations. Also, construction teams came during the Antarctic summer to expand the station's facilities. During the long, isolated Antarctic winter, a skeleton crew of 12–16 remains behind, cut off from the outside world by encroaching ice.

“Since Belgica is inactive during the winter, I was spared from having to spend a whole year there—though I imagine it would have been an even more extraordinary experience,” Prof. Shelomi reflected.

What does he miss the most about representing Taiwan in Antarctica?

“The penguins,” Shelomi says without hesitation. “The area around the base is home to over 6,000 noisy Gentoo penguin nests. It was tough to go from seeing them every day to not at all!”