Regional

Williams believes insects can teach us a lot

Aldemaro Romero
College Talk

Insects are everywhere and in great numbers. Their impact on us is unquestionable, but a number of scientists are expanding what we can learn from these creatures – whether for environmental reasons or to help humans to live longer. One of those scientists is Jason Williams.

Williams was born in Cedar Rapids, Iowa. He received his bachelor's degree from Luther College in Decorah, Iowa, and his master's and doctoral degrees in zoology from Miami University in Ohio. Today he is an assistant professor in the department of biological sciences at Southern Illinois University Edwardsville.

Unlike other entomologists (insect scientists), Williams did not collect bugs as a kid, but was inspired by a college professor. Today he teaches his own students about the tremendous impact insects have on our lives, from their work pollinating crops to just being pests.

"I use insects more as a tool because you can answer and ask a lot of different scientific questions with them rather than just their novelty," said Williams. He said that he studies the physiological ecology of insects, "because it helps us, from a physiological basis, determine how an animal can live where it lives within the environment or do what it does within the environment." For example, he looks at how certain insects can survive extremely low temperatures. One of the insects he uses most in his research and teaching is the goldenrod gallfly, which is extremely abundant in southern Illinois.

Despite the tremendous diversity of insects, they are relatively small and the ability to respond to changes in temperature depends on the surface of their bodies that is exposed. "Insects don't generate their own body heat and because they are so small their body temperature mimics basically or tracks very closely what the ambient temperature is," explained Williams. "So as the temperatures warm up during the day their body temperatures are going to warm up during the day. As the temperature drops at night their body temperature is going to drop. So they have to be able to respond to a wide range of temperatures. They are probably going to be some of the best animals to be able to adapt to those temperatures."

Williams said that he has seen an increasing interest among his students toward insects. "The students get the fact that when they go out and collect insects they bring in this tremendous diversity from anywhere they collect," he said. "It could be their yard where it is the typical bluegrass lawn, to a more wooded area, to grasslands. Wherever they go to collect they bring in so many different types of insects and so many numbers that it is just shocking to them the diversity that is out there."

After such an experience, Williams said, the students begin to realize all the important roles insects play, "whether through the economic side, how they are beneficial to agriculture, how they are used for legal purposes – such as in crime scenes determining time of death, and medically through something that is becoming more and more common called wound debridement therapy." There are about 5,000 hospitals that use this technique where certain species of insect – typically blowflies – are placed on wounds where they basically eat dead tissue, Williams explained.

SIUE Photo

Dr. Jason Williams at a bee hive.

When it comes to new frontiers in entomology he sees forensics as a hot new area. "The use of forensic entomology is becoming much more prevalent, so that could be something that a student could get into rather than just the academics themselves," he said.

Williams also sees the use of insects as biological indicators to better understand environmental health, particularly aquatic system health. "What types of insects are there or not there would indicate what are the factors of a stream, whether it is possibly polluted or not," he said. "So there is so much going on in research involving insects that a student could apply them to any question or interest they have and be successful."

Williams is currently focusing his energy on a project to use honeybees as a model system for understanding an issue that concerns all of us: aging. His research looks at chemicals called free radicals that play a major role in biological processes such as killing bacteria or sending signals between cells. They have also been implicated in the process of aging.

"Primarily the dogma is that free radicals are produced through just normal metabolism, but there may be other things going on," he said, adding that it is in the humble honeybee that the answers just may be found.

Aldemaro Romero is the Dean of the College of Arts and Sciences at Southern Illinois University Edwardsville. His show, "Segue," can be heard every Sunday morning at 9 a.m. on WSIE, 88.7 FM. He can be reached at College_Arts_Sciences@siue.edu.