NORTHERN ARIZONA UNIVERSITY

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Vol. 6 No. 13 | April 15, 2009

## Environmental clues sought from ants

Ernesto Rodriguez is researching an ant species that only grows to about half a millimeter in size.

Ants get a bad rap, but an NAU student researcher is getting them respect for providing clues about environmental change.

**Ernesto Rodriguez,** a senior in environmental sciences and biology, said the tiny creatures are big indicators of an altered ecology.

“Ants are great for disappearing from an area faster than other species when an ecological disruption occurs,” Rodriguez said. “Certain ants change their distribution if conditions change such as soil chemistry, available food sources and if invasive species are introduced.”

He said the arthropods keep soil healthy by keeping it aerated and spreading seeds. They are perfect to study because they surpass or dominate other insect species in their abundance and diversity worldwide, have extensive geographical reach, live long and associate with numerous plants and organisms.

“In conservation, the displacement of a species could take years, yet with ants it is faster. If we notice a common ant species disappearing, we can run studies on several different aspects to identify what could be happening and take action to reduce or solve the problem,” he said.

Rodriguez became fascinated with ants while studying their relation to the environment during a Harvard Forest’s Research Experience for Undergraduate Students in 2007. He then was awarded a grant from Harvard to study the ant fauna located near his home in Yuma. By combining the insect research with what he was learning during an NAU biological mentoring program, and a yearlong fellowship focused on molecular genetics, Rodriguez created the Brachymyrmex Project.

The project emphasis is to further understand and indentify the Brachymyrmex depilis species. “It will be an initial step to figure out how many and where these species live so they can be used as biological indicators,” he explained. “These ants are impossible to tell apart using morphological differences, so I am trying a genetic approach in hopes to clean up their reputation and see what the real number of species in this group, which is currently used as a wastebasket for all yellow forms of the Brachymyrmex genus.”

He will apply the research this summer during work on the Navajo Ant Project initiated by Dine College

### Amazing antics

With their combined weight greater than the combined weight of all humans, ants are the most numerous type of animal on Earth.

Ants can carry 10 to 20 times their body weight and work in teams to move heavy things.

Ant brains are the largest among insects. Mushroom-shaped brain appendages have functions similar to human brains.

It has been estimated that an ant's brain may have the same processing power as a computer.

and Harvard University last year. Its goal is to produce the first scientific ant database for the Navajo Nation.

He will work with co-principal investigator Beverly Maxwell from Dine College. The research also will be used to create an ant species pages for the electronic Encyclopedia of Life.

“The Navajo reservation has been heavily damaged by uranium radiation. In this case, we want to see if any ant is a reliable indicator of ecological health,” Rodriguez noted. “However, we need to first figure out which ants are found in the region to project potential indicator species. In my case, I will learn further identification, curation and field photography techniques.”

**Neil Cobb**, an NAU assistant professor of biological sciences, told *Inside NAU* the television show that conserving a species begins with knowing how many organisms belong to it. He said Rodriguez’s work will go a long way in helping other scientists understand the arthropods.

Rodriguez, who plans to pursue a master’s in biology from NAU so he can continue his regional ant research, said last summer’s research does not show any significant impacts of uranium on ant fauna, “but several years of data might depict a different story.”