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Press release : 2015 : 07 : 15 : Students, Alumnus Collaborate on Ant Research

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USFSP News

Students, Alumnus Collaborate on Ant Research

Two USF St. Petersburg students and an alumnus are engaging in the type of research that makes many people uncomfortable and itchy: creating aluminum casts of fire ant colonies to study the insects up close.

USFSP Biology seniors Paul Perry and Esan Guerin and alumnus Patrick Kowalewski make up USFSP's self-proclaimed Fire Ant Research Team. The team formed by happenstance: Paul was working with USFSP Professor of Biology Dr. Deby Cassill to determine the underground architecture of fire ant nests. Plaster was prepared and poured down the entrance to fire ant mounds. After the plaster hardened, the cast was excavated from the soil. Often, the plaster broke apart during the excavation process.

"Originally, we were casting them in pots. We were letting the ants dig their nests so we could cast them with a dental plaster," said Guerin said, who did not think that methodology was successful. "It was artificial because they were in pots, so we decided we had to make it more natural. We had to find some way to do it outside."

That was when they decided to build a furnace to melt down aluminum in order to create casts of fire ant colonies in their outdoor environment.

Perry got the idea to build a furnace while conducting an independent study with Cassill. He spent several months building the furnace in order to melt aluminum down to its purest form, which creates aluminum ingots that can be stored for later use. The idea behind the initiative is to melt the ingots and pour the molten liquid into fire ant colonies, creating 3-D sculptures of the inside chambers and tunnels as the material hardens.

Although it took several months to figure out how to best construct the furnace, they were successful building it and began pouring casts right away.

"The casting and molding allows us to look at the nest its chambers and tunnels," Guerin said, who was excited to explore the colonies from the inside-out.

Kowalewski said fire ants are more resilient than other native species.

“They’re a lot more adaptive than other ants,” Kowalewski said, adding that they spend all of their energy towards adapting to their environments. “They collaborate with one another and work to take an environment to make it their own suitable colony.”

The team’s pouring schedule varies. Some weeks they will pour upwards of 10 casts; other weeks they may not pour any. The aluminum casts of fire ant colonies can provide detailed information about the species.

“Ants are only one of a handful of animals that build permanent home in which to house mothers and their helpless young,” said Cassill, who wanted to know how ants cope with physical obstructions like roots, rocks and cavities, and how many ants occupy a chamber. She also wanted to know whether adding more ants would cause them to excavate a larger chamber or more small chambers.

“With the aluminum casting method, developed entirely by these three amazing students,” she said, “I can answer each question in a matter of days.” In August, Cassill will write a grant proposal to expand the research project on excavation that these students started.

The team plans to use the casts for academic purposes but also is considering donating some of the casts to organizations like Boyd Hill Nature Preserve and art museums.



From left: USF St. Petersburg alumni Patrick Kowalewski and senior biology majors Paul Perry and Esan Guerin.





Center: Paul Perry adds another can to the furnace to be melted down and separated into pure aluminum ingots and waste material called slag. The team goes through hundreds of cans to create several pieces of pure aluminum ingots.





An example of an aluminum cast of a fire ant nest.