Texas A&M AgriLife Extension

ENTO-028
03/14

Collecting and Maintaining Colonies of Red Imported Fire Ants for Study

Bastiaan M. Drees
Extension Entomologist Emeritus
Texas A&M AgriLife Extension Service

Students and scientists are often interested in using the red imported fire ant, *Solenopsis invicta* Buren (Hymenoptera; Formicidae), as a test animal for conducting observation, research, or science projects. Collecting and culturing fire ants is relatively easy and these insects are readily available in Southern environments. However, school districts may have restrictions prohibiting the use of live animals, including fire ants, in science fair projects.

Fire ants are potentially hazardous organisms that can sting repeatedly and, in some cases, cause serious medical emergencies (see *Medical Problems and Treatment Considerations for the Red Imported Fire Ant*). Take every caution to avoid any problems fire ants may cause whenever these insects are used as experimental subjects.* Adult supervision for students using fire ants in their experiments is essential.

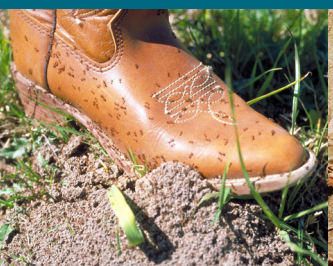
Hobby and nature stores occasionally sell one or more models of the Ant Farm. These devices are not suitable for fire ants, which can easily escape from these units. These structures are designed to house one of the harvester ant species (*Pogonomyrmex* spa.)** that may be a suitable alternative to using red imported fire ants as experimental animals.

Field Collecting Fire Ant Colonies

You can collect red imported fire ant colonies from the field using a standard 5-gallon plastic bucket and methods derived from Banks et. al (1981) as described below. Using a cotton pad, apply talcum powder (baby powder) liberally to the inner surface of the bucket. The ants can't climb dusted vertical surfaces as long as the surface remains dry. Also dust gloves, rubber boots, and shovel handles with talcum powder to more safely keep ants from crawling onto the person collecting them. Shovel ant mound dirt quickly into the bucket. After collecting the ants, be sure to cut any grass or twigs that may form a bridge to the top of the bucket and re-coat with talcum powder.

* Neither the Texas A&M AgriLife Extension Service nor Texas A&M AgriLife Research can assume liability for anyone who may choose to use fire ants for study and may experience problems from ant stings, bites, or colonies that escape indoors.

** Worker harvester ants (not queen ants or brood—larvae, eggs, or pupae) are commercially available from ANT FARM, Dept. 25, P.O. Box 246, Culver City, CA 90230, but may require several weeks for delivery.





Extracting Ant Colonies from Soil

In the laboratory, let the bucket remain undisturbed for a few days for the ants to organize their colony in the bucket. For extra protection, place the bucket in a larger container or tray filled with soapy water (2 ounces of liquid dishwashing detergent per gallon of water) as a moat to prevent escape. Some studies can be done while the ants remain in buckets. To extract the ant colony from the soil, slowly drip water into the buckets, constantly observing the water level. The ants (workers, queen[s], winged males, and female reproductives) and worker ants carrying brood (eggs, larvae, and pupae) will move to the top of the soil and ultimately float or "raft" on the water's surface. Using a slotted spoon, scoop out the ants and brood and place them into a plastic colony tray with the inside surface coated with a substance such as the liquid Teflon-like product, Fluon, or talcum powder, which prevents the ants from escaping. Sticky substances such as Tanglefoot may be somewhat effective until the surface gets covered with debris, old, or wet. You can also place the colony tray inside a larger pan containing soapy water about 1 inch deep, which will drown any escaping ants.

Colony Trays

Any plastic tray can serve as a colony box, including cat litter boxes or clear plastic boxes. Line the bottoms of the colony trays with paper towels to create an area for worker ants to forage for food and water.

The actual colony (queen[s] and brood) is normally housed in plastic Petri dishes with the bottoms partially filled with plaster (or Castone) and the tops with holes melted into them to allow the worker ants to move in and out of these nest chambers. To increase the humidity level in the nest chamber, moisten the plaster with water each week. Make the petri dish more attractive as a dark nesting site by covering the entire Petri dish with a paper towel or sheet of red plastic to omit light.

Working with Laboratory Colonies

To manipulate colonies and work with the ants, wear thick rubber gloves coated with talcum powder, being careful to keep your arms upright to maintain vertical surfaces the ants cannot climb. Estimate the numbers of ants per colony based on the assumption that one small (100 millimeter in diameter) Petri dish full of fire ants plus brood contains roughly 10,000 ants, while one large (150 millimeter in diameter) Petri dish can accommodate 20,000 ants. Be sure your clothes, hair, and jewelry do not fall into the colony tray when observing or working with the ants.

Maintaining Laboratory Colonies

Maintain the colonies at room temperature and feed a standard artificial fire ant diet regime.

1. Provide a constant water supply with "water tubes" consisting of standard-sized test tubes filled with water to within 3 centimeters from the top and plugged with a compacted wad of cotton pushed down so that the cotton becomes saturated.
2. Prepare honey water, a 1:3 mixture of honey and water, and offer it to the colony in a small dish or bottle cap at a rate of about ½ tablespoon per day.
3. Provide two frozen crickets or mealworms of any growth stage (late instar larvae, pupae, or adults) daily.
4. Offer a prepared diet (described on the next page) to the colony daily, cut into ⅓- to ¼-inch cubes, in a small dish or bottle cap. (Optional for long-term ant colony cultures.)

Recipe for Fire Ant Food

10 small hen's eggs. Reduce the number according to size. For example, use only 8 extra-large eggs; otherwise the mixture will be too wet.

0.45 kilograms (1 pound) hamburger meat

1 heaping teaspoon peanut butter (optional)

1 cup sugar

½ teaspoon salt

2 milliliters vitamins (Poly-Vi-Sol multivitamin supplement for infants made by Mead Johnson)

4 packets (¼ ounces) unflavored gelatin

800 milliliters water

Brown the hamburger meat and drain the fat. Heat the water over a medium flame and slowly add the gelatin while stirring constantly. Then add the sugar and stir until dissolved. Mix the eggs in an electric blender with the salt and vitamins; slowly add the hamburger. Stir this mixture at low speed for 2 minutes. Add the mixture from the blender to the water solution and cook until it begins to thicken (not boil). Remove the mixture from the heat, pour it into a pan and allow it to cool. Cut the solidified, prepared ant food into cubes and freeze until ready for use.

Citation

Banks, W. A., C. S. Lofgren, D. P. Jouvenaz, C. E. Stringer, P. M. Bishop, D. F. Williams, P. D. Wojcik, and B. M. Glancey. 1981. *Techniques for Collecting, Rearing, and Handling Imported Fire Ants.* U.S. Dept. Agric. Tech. AAT-S-21. 9 pp.

Acknowledgment

This Fire Ant Plan Fact Sheet was originally written and released in May 1998 and revised in May 2002 and September 2012. Sherry L. Ellison was a co-author of the original manuscript. Harlan Thorvilson of Texas Tech University reviewed this fact sheet.

References

Medical Problems and Treatment Considerations for the Red Imported Fire Ant
u.tamu.edu/ento-005

Managing Red Imported Fire Ants in Urban Areas
www.extension.org/pages/11004/managing-imported-fire-ants-in-urban-areas-printable-version

Broadcast Baits for Fire Ant Control
www.agrilifebookstore.org/product-p/e-628.htm

Fire Ant Control: The Two-Step Method and Other Approaches
www.agrilifebookstore.org/product-p/ento-034.htm

For more information regarding fire ant management, see Extension publications *Managing Red Imported Fire Ants in Urban Areas, Broadcast Baits for Fire Ant Control*, or *Fire Ant Control: The Two-Step Method and Other Approaches* posted on http://AgriLifeBookstore.org.

Texas A&M AgriLife Extension Service

AgriLifeExtension.tamu.edu

More Extension publications can be found at *AgriLifeBookstore.org*