



Collecting and Maintaining Colonies of Red Imported Fire Ants for Study

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Students and scientists are often interested in using the red imported fire ant, *Solenopsis invicta* Buren, as a test animal for conducting research, science projects or observation. School districts may have restrictions prohibiting the use of live animals, including fire ants, in science fair projects.

Collecting and culturing fire ants is relatively easy, and these insects are readily available in our environment. However, **fire ants are potentially hazardous** organisms that can sting repeatedly and in some cases, cause serious medical emergencies. Therefore, **every caution should be taken** 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. The information provided below is for educational purposes only.

Neither the Texas Agricultural Extension Service nor the Texas Agricultural Experiment Station can assume liability for anyone who may choose to use fire ants for study and who may experience problems from ant stings, bites or colonies that escape indoors.

Hobby stores 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* spp.). 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. Using these ants may be a suitable alternative to using red imported fire ants as experimental animals.

Field Collection of Fire Ant Colonies

Red imported fire ant colonies can be collected from the field using a standard 5-gallon plastic bucket and methods derived from Banks et al. 1981. Talcum powder (baby powder), applied liberally to the inner surface of the bucket using a cotton pad, will prevent ants from climbing dusted

vertical surfaces as long as the surface remains dry. Shovel handles, gloves, and rubber boots should also be dusted with talcum powder to more safely exclude ants from crawling onto the collector. Shovel ant mound dirt quickly into the bucket. Be sure to cut any grass or twigs that may bridge to the top of the bucket and re-coat with talcum powder after collection.

Extracting Ant Colonies From Soil

In the laboratory, let the bucket remain undisturbed for a few days for 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 oz. liquid dishwashing detergent per gallon of water). Some studies can even be done while 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 (“raft”) on the water’s surface. Then scoop out ants and brood using a slotted spoon (like a vegetable spoon) and place them into a plastic colony tray with the inside surface coated with a substance such as Fluron® or Teflon® (EnviroSafe®) spray, or talcum powder, which prevents ants from escaping. Sticky substances such as Tanglefoot® may be somewhat effective until the surface gets old, wet, or covered with debris. The colony tray can also be placed 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.

Paper towels can be used to line the bottoms of the colony trays 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 bottoms partially filled with plaster (or Castone®) and tops with hoes melted into them to allow movement of worker ants in and out of these nest chambers. Plaster must be moistened weekly with water to increase the humidity level in the nest chamber, and the entire Petri dish must be covered with a paper towel or sheet of red plastic to omit light, thereby making it more attractive as a dark nesting site.

Working with Laboratory Colonies

To manipulate colonies and work with ants, thick rubber gloves coated with talcum powder should be worn, being careful to keep arms upright to maintain vertical surfaces up which the ants cannot climb. Numbers of ants per colony can be estimated based on the assumption that one small (100 mm diameter) Petri dish full of fire ants plus brood contains roughly 10,000 ants while one large Petri (150 mm) 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

Colonies can be maintained at room temperature and fed a standard artificial fire ant diet regime:

1. Supply water constantly in “water tubes” consisting of standard-sized test tubes filled to within 3 cm. from the top with water and plugged with a compacted wad of cotton pushed down so that the cotton becomes saturated.
2. Honey water, prepared as a 1:3 mixture of honey and water, should be offered to the colony at a rate of about ½ tablespoon per day in a small dish or bottle cap.
3. Two frozen crickets or mealworms of any growth stage (late instar larvae, pupae or adults) should be provided daily.
4. Prepared diet (described below), cut into 1/3 to 1/4 inch cubes, can be offered to the colony daily in a small dish or bottle cap.

Recipe for Fire Ant Food

- ◆ 10 small hen’s eggs. Reduce number according to size; for example, use only 8 extra large eggs, otherwise the mixture will be too wet
- ◆ 0.45 kg. (1 lb.) hamburger
- ◆ 1 heaping tsp. peanut butter (optional)
- ◆ 1 cup sugar
- ◆ ½ tsp. salt
- ◆ 2 ml. vitamins (Poly vi-Sol, multivitamin supplement for infants made by Mead Johnson)
- ◆ 4 packets (1/4 oz.) of unflavored gelatin
- ◆ 800 mls. water

Brown the hamburger and drain fat. Heat water over a medium flame and slowly add gelatin while stirring constantly. Then add sugar and stir until dissolved. Mix eggs in an electric blender with salt, vitamins; slowly add 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 heat, pour into pan and allow it to cool. This solidified, prepared ant food can be cut into cubes and frozen until ready for use.

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.

For more information regarding fire ant management, see Extension publications [B-6043](#), *Managing Red Imported Fire Ants in Urban Areas*; [B-6076](#), *Managing Red Imported Fire Ants in Agriculture*; [B-6099](#), *Broadcast Baits for Fire Ant Control*; or [L-5070](#) *The Texas Two-Step Method Do-It-Yourself Fire Ant Control for Homes and Neighborhoods*. Also visit our web site at <http://fireant.tamu.edu>.

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