



Figure 6.4: Black twig borer trap with collection cup removed. S. Joe is pictured collecting samples after which, the cup will be reattached to the bottom of the trap (photo by H.C. Kuo).

Counts of new entry holes accumulated over time by individual *Flueggea neowawraea* provide data on the frequency of *X. compactus* attack in the absence of treatments. This method has been used elsewhere (Gillette *et al.* 2006) to evaluate the success of experimental repellents. Using white latex paint, NRS marked all existing holes on outplanted *F. neowawraea* and have started recording new holes on a weekly basis. Preliminary results show trees accumulate one new entry hole per 2.4 inches of bole length every 9 days. An experimental test of Verbenone[®] efficacy in the field is planned but the design not yet finalized by all cooperators. At present, the experiment is planned to run for 90 days (the duration of efficacy recommended on the label) with some trees receiving Verbenone[®] and others serving as controls. Upon conclusion, attack rates between the treatment and control will be compared. Until that time, these trees will be resurveyed every 10 days to determine baseline levels of damage.

Solenopsis geminata (Hymenoptera: Formicidae)

Problem statement:

Solenopsis geminata, the tropical fire ant, has been present in Hawai‘i for over 100 years and, as the name suggests, is capable of delivering repeated, mildly painful stings. Fire ants are notorious for their stinging behavior, and respond rapidly and aggressively to any disturbance. Listed among the top five most invasive ants in Hawai‘i, *S. geminata* is common in dry, disturbed areas below 450 m elevation (Krushelnycky *et al.* 2005). Thought to be restricted to lowland areas, it was recently discovered at an elevation of 600 m on a ridge top on Army land

(Figure. 6.5). The threats posed to native species by *S. geminata* include reduced fledgling survival in seabirds (*S. Plentovich, UH Zoology pers. comm.*) and the displacement of native arthropods through predation and competition (*Krushelnicky et al. 2005*). Workers tend honeydew-producing homoptera, especially mealybugs, which, in turn, threaten native plants via overfeeding and disease transmission.

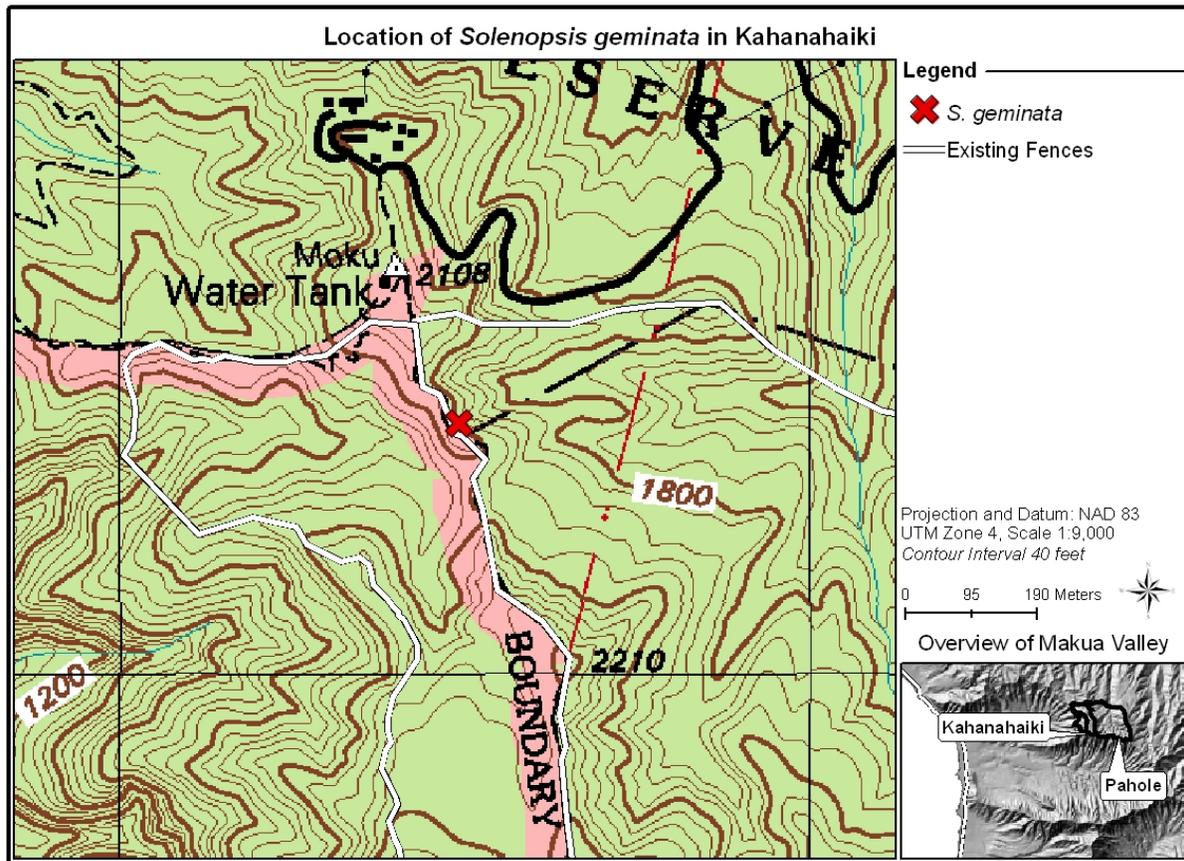


Figure. 6.5: Location of *Solenopsis geminata* (marked with a cross) in Kahanahāiki.

On March 24, 2006, Talbert Takahama (NARS specialist) reported having been stung by an unusual red ant along the Kahanahāiki fenceline. On May 6, 2006, NRS returned to the area with entomologist Paul Krushelnicky who identified the ant as being *S. geminata* and expressed surprise at it being established at such a high elevation. The following weeks were spent surveying the extents of infestation and searching surrounding ridges for additional colonies. No additional *S. geminata* colonies were found. A number of other ant species, including *Pheidole megacephala*, *Plagiolepis alluaudi*, *Technomyrmex albipes* and *S. papuana* were recorded from nearby areas but not considered for eradication. They were either innocuous or too well established for treatment to be effective. A 40 m transect with survey stations at 1 m intervals was established through the center of the *S. geminata* infestation following the fence line. NRS used methodology recommended by the Cooperative Extension Service (2004) to detect fire ants. Survey protocol involves visual searches for nests and foragers, as well as the use of baits to attract nearby foragers (if present). Chopsticks dipped in peanut butter served as bait. These were left under vegetation for 60 minutes, then retrieved and any ants found identified. In this

manner, we judged the infestation covered an area roughly 155 m² in size. It should be noted that the infestation abutted a steep cliff where further survey was impossible. Thus, the eastern boundary was determined by the geography of the area, not the absence of ants. We speculate this is, in fact, the actual boundary as the ants currently occupy an area that is hot, dry, exposed and with little vegetation while the cliff face is densely vegetated.

The mode by which *S. geminata* became established at such a remote location is unknown. The small area occupied and the low numbers of ants suggest *S. geminata* is either newly arrived or that the habitat is marginal for their survival. Though winged, *S. geminata* queens are poor fliers (P. Krushelnycky, *pers. comm*). They may have been blown up by wind from lower elevations. If transported by humans, they may have hitchhiked on personnel gear or in fence material brought to construct the fence. It should be noted, however, that NRS is careful to clean gear and it has been nearly 10 years since the fence was constructed.

Goal:

Application of Amdro[®] Fire Ant Bait (Ambrands, Atlanta, GA) to achieve eradication of *S. geminata* from Kahanahāiki. Hydramethylnon, the active ingredient in Amdro, is used by U.S. Fish & Wildlife Service (USFWS) and the National Park Service (NPS) to control ants elsewhere in Hawai‘i (such as offshore islands, Haleakalā National Park and Palmyra Atoll) and is considered safe to use in ecologically sensitive areas.

Actions:

Ant densities were monitored pre and post treatment using peanut butter baits left at 1 m intervals along the transect (described above). On April 25 *S. geminata* foragers were found at 48% (or 19/40) of all baits. Of this 48%, 5 ants, on average were present. The area was treated with 10.8 oz. of Amdro (the label rate) using a hand-held bait spreader on May 30 and, again on July 24, when *S. geminata* re-appeared. Ant eradication often requires multiple treatments because pupae are unaffected by ingestible pesticides. They are aestivating and, therefore, do not eat. Results from pre and post treatment surveys appear in Table 6.1. To date, *S. geminata* has not recurred. Monthly checks of the area will continue for 1 year after the latest treatment. If no ants are found during this time, monitoring will cease and the population will be considered eradicated.

Table 6.1. *Solenopsis geminata* monitoring results pre and post treatment

Date (2006) (MM/DD/)	# of baits with ants (of 40 total)	Visual search (2 person hours)	Notes
04/25	19	Present	
Treated on 05/30			
06/01	0	Absent	
06/05	0	Present	One nest found, but ants are behaving abnormally. Pupae present.
06/08	0	Absent	
06/15	0	Absent	
07/13	1	Present	Active nests found.
Treated on 07/24			
07/20	0	Absent	
07/27	0	Absent	
08/10	0	Absent	