New Records and Accounts

Little Fire Ant, *Wasmannia auropunctata* (Roger) (Hymenoptera: Formicidae), Established at Several Locations on Guam

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Abstract. Little fire ant, *Wasmannia auropunctata* (Roger) (LFA), was identified in a karst-limestone forest adjacent to a green-waste hardfill in northern Guam in November 2011. Six additional LFA infestations were identified at private residences and small farms along the southwest coast of the island. Surveillance surveys suggest that LFA has yet to spread to the neighboring islands of the Commonwealth of the Northern Mariana Islands (CNMI), or elsewhere in Micronesia. The spread of LFA to and throughout Guam is most likely due to human transport of infested plant material from LFA infested areas of Hawaii, Australia, or the U.S. mainland. The devastating effects of LFA on agriculture and forest ecosystems observed in LFA infested areas elsewhere are likely to occur on Guam and other Micronesian islands infested by LFA. Some LFA infestations on Guam may be eradicable using control techniques in use in Hawaii and other Pacific Basin countries.

Key words: *Wasmannia auropunctata*, little fire ant, distribution, invasive species, Guam, Marianas Islands

Little fire ant (LFA), *Wasmannia auropunctata* (Roger), was first detected in a karst-limestone forest adjacent to a green-waste hardfill on Guam (latitude 13.541385° N, longitude 144.908453° E) in November 2011 (Fig. 1A). The ant was initially identified by entomologists at the University of Guam, and verified by entomologists at the University of Hawaii at Hilo and at USDA, APHIS, PPQ National Identification Services in Riverdale, MD. This report documents the first LFA infestation in the Territory of Guam, and the first LFA infestation in Micronesia at large. Previous LFA infestations reported in the Pacific Basin include those from the Hawaiian Islands of Hawaii, Maui and Kauai (Null and Gunderson 2006), New Caledonia, Vanuatu, the Territory of the Wallis and Futuna Islands (Wetterer and Porter 2003), and Northern Queensland, Australia (Windle 2007). Hawaii and Australia have direct air and sea connections to Guam and Micronesia, and the other areas have indirect air and sea connections to the region.

The ants' spread to Guam is most likely due to human transport of infested plant material to Guam from Hawaii where heavy infestations occur on the northern coast of the island of Hawaii and limited infestations on Maui and Kauai. Much of Guam's air and sea shipping pass through Hawaii en route from the U.S. mainland,

and there are multiple daily flights from Hawaii to Guam. Though regulations restricting the movement of plant material between Guam and Hawaii have been in place for many years, enforcement and inspection on Guam has been problematic in the past due to lack of trained inspectors at the seaports and airports. Interception of LFA is difficult at best due to its small size and ability to hide in small crevices or within plants. The movement of LFA within Guam may also be due to the movement of infested plant material from place to place on the island that is unregulated.

Judging from the approximately 2-ha area of the largest LFA infestation on Guam in the northern limestone-karst forest, LFA may have arrived on Guam between five and ten years ago. LFA densities in leaf litter collected at this site approach 500 workers/m^2 in some areas, and colonies exist from ground level to the canopy. LFA was the only ant recovered in leaf litter and bait samples collected along a 50-m transect in LFA infested areas, while the tramp ants *Paretrechina* sp. and *Pheidole megacephala* (F.) were the only ants found in litter and bait samples collected along a similar transect approximately 100 m north of the LFA infested area (R. Miller, University of Guam, unpublished data).

The green-waste hardfill site in northern Guam was used as an unofficial green dump for local residents to deposit plant material damaged during Typhoon Pongsona, which devastated Guam in December, 2002. Since that time the site has grown to about 4 ha and is currently a regulated and privately managed hardfill used by residents from throughout Guam. LFA surveys on Guam suggest that it is presently established on at least six other sites on the island (Fig. 1, b–g)), including several small farms and residential areas along the southwestern coast of the island.

Ant surveillance surveys in the adjacent islands of Saipan, Tinian and Rota in the Commonwealth of the Northern Mariana Islands (CNMI), and elsewhere in Micronesia, have found no LFA (R. Miller, University of Guam, unpublished data). These surveys have consisted of observations at seaports, airports, transfer centers and landfill areas, nurseries, recreational areas and commercial establishments using protein and sugar baits as well as direct observation and litter samples from sites likely to be infested with LFA.

The devastating effects of LFA on agriculture and forest ecosystems observed in ant infested areas are likely to occur on Guam, and on any other Micronesian island infested by LFA. Like some other invasive species, LFA may alter the evolutionary pathway of some native

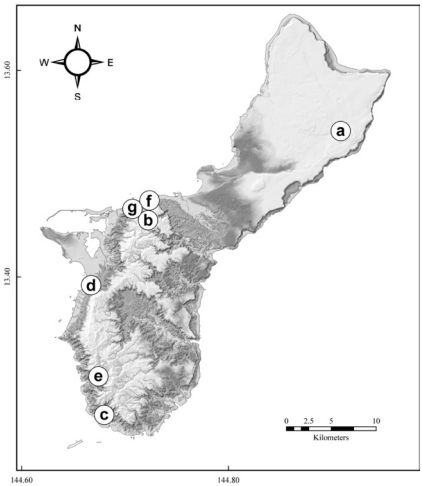

Figure 1. Map collection sites (after Burdick 2006) of *W. auropunctata* on Guam: (**a**) Primo Northern Wasteland, Yigo (N 13.5411, E 13.5411); (**b**) Nimitz Hill, Piti (N 13.4612, E 144.7080); (**c**) Pigua, Merizo (N 13.2648, E 144.6719);(**d**) Santa Rita (N 13.3919, E 144.6671); (**e**) Going to Veteran's Park, Umatac (N 13.3037, E 144.6742); (**f**) Matgue River, Piti (N 13.4685, E 144.7078); (**g**) Nimitz Hill, Piti (N 13.4641, E 144.7039).

species and may even cause their extinction through competitive exclusion, niche displacement, and predation (Mooney and Cleland 2001). On San Salvador Island in the Galapagos LFA has reduced densities and in some cases eliminated entire populations of three arachnid species (Lubin 1984). The sting of LFA may also cause blindness in indigenous and domesticated animals (Wetterer and Porter 2003).

LFA are easily distinguished from other indigenous and exotic ants found on Guam and the CNMI. They are small yellow-orange ants ranging 0.13–0.15 mm in length. They are slow-moving and monomorphic. Antennae are 11-segmented, terminating in a distinct two-segmented club. Two propodeal spines are located on the posterior mesosoma, and the pedicel is two-segmented. Two distinct antennal scrobes extend vertically from the antennal sockets on the frons.

With the exception of the green-waste hardfill site, the areas infested by LFA on Guam appear to be rather small and treatable with technology developed for LFA control elsewhere, such as that used at multiple locations in Hawaii and in Northern Queensland, Australia. A most promising strategy which may be adapted to Guam conditions is the application of ant baits using novel spray techniques, such as the application of a gelatin-based matrix containing toxicants using a compressed air spackle sprayer adapted for use in LFA infested areas of Hawaii by workers at the University of Hawaii at Hilo. In this technique granular bait formulations of insecticides are applied to control ground dwelling LFA colonies, while a sticky gelatinous bait matrix containing insecticide is sprayed onto the trunks and crowns of trees within LFA-infested areas. The ants feed on the baits and ingest small amounts of the insecticide, which is then transported by workers to the main colony and to the reproductives. Upon ingesting the bait and the insecticide, both workers and reproductive across the entire habitat spectrum occupied by LFA are eventually intoxicated and die. This system has been used successfully in Maui and in parts of Hawaii island to eradicate LFA from small areas of tropical forest and farmland. Preliminary testing by our laboratory suggests that it will be effective on Guam as well.

Acknowledgments

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