



Risk management for Little Fire Ants in mulch: Hawaiian Earth Products, Waikoloa Hawai`i



Supported by Hawai`i Earth Products and the County of Hawaii



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Summary

Hawaiian Earth Products is contracted by the County of Hawai`i to divert green waste from county landfills, process the material and make it available free of charge to residents as a mulch or soil additive. One facility, located near Waikoloa (Hawai`i island) diverts over 27,000 tons of material entering county landfills every year. However, many potential end users are reluctant to utilize this resource due to a perceived risk that the material may be infested with Little Fire Ants (*Wasmannia auropunctata*) and this has resulted in an imbalance between demand for finished product and supply of unprocessed material.

In order to ensure ant-free mulch, an ongoing program of testing and monitoring is recommended. This will comprise experimentation to determine if Little Fire Ants are able to survive in processed mulch along with regular testing of both raw material and finished mulch. Results will be made available to Hawaiian Earth Products management and other parties as authorized by HEP.

Background

Hawaiian Earth Products contracts to the County of Hawai`i to produce mulch from garden clippings, logs and unpainted pallets. The mulch is supplied as a soil additive to residents free of charge. Mulching green material and unpainted pallets reduces the amount of waste entering landfills which in turn saves money for the County*. Hawaiian Earth Products operate two mulching facilities on Hawai`i island: one adjacent to the Hilo landfill and another at Queen Ka`ahumanu Highway near Waikoloa. The information in this report is only applicable to the site at Waikoloa and does not apply to the Hilo site.

* See <http://www.hawaiiizerowaste.org>

One side effect of the mulching process is that unwanted invasive species are potentially able to “hitch a ride” with the mulch and become established on recipients’ properties. One such species is the Little Fire Ant (*Wasmannia auropunctata*) a rapidly spreading, stinging ant.

Little Fire Ants: biology, impacts and distribution

The Little Fire Ant (LFA) is an invasive ant species native to South America and has a pan-tropical invasive distribution. It is especially problematic in the Pacific region where it has been recorded in French Polynesia (Tahiti, Moorea and Rurutu), the Solomon Islands, Galapagos Islands, Papua New Guinea, Bougainville, Vanuatu, New Caledonia, Guam, Wallis & Futuna, Australia and Hawaii. This species prefers a moist, shaded and warm environment and does not tolerate open conditions as they are susceptible to desiccation.

Little Fire Ants are one of the world’s most serious invasive ants⁽¹⁾. In ideal conditions, population densities can exceed 80 million ants per acre⁽²⁾. This species nests in the ground and in/on vegetation, forming huge three-dimensional super-colonies⁽³⁾. Although barely 1/16” in size, their stings are extremely painful. In residential areas, these ants substantially reduce people’s interest in outdoor activities. In commercial agriculture, ants from arboreal (tree dwelling) nests sting workers trying to maintain tree crops and harvest produce⁽⁴⁾. Additionally, LFA are a quarantine pest and infested produce may be rejected for export to other parts of Hawai`i and the rest of the world.

The eastern side of Hawai`i island is badly infested with this species, especially the districts between Kalapana and Laupahoehoe. In west Hawai`i (North Kohala to Captain Cook), infestations are much less dense, however, they appear to be spreading in both urban and agricultural areas⁽⁵⁾. Residents and farmers from west Hawai`i are aware of the impacts of this species and the potential for it to be spread through the movement of “County” mulch. This, in part, has led to a reluctance by many potential mulch users to avail themselves of this product.

Hawaiian Earth Products mulching facility, Waikoloa

Site description

The Hawaiian Earth Products processing site at Waikoloa is located on Queen Ka`ahumanu Highway approximately one mile south of Waikoloa Village on the west coast of Hawai`i island (Figure 1) and spans approximately 60 acres. The site and surrounding area is barren and devoid of vegetation. Average annual rainfall for this area is 12.1”[†] with a pronounced summer “dry” season (Figure 2).

[†] Source: <http://www.idcide.com/weather/hi/waikoloa-village.htm>



Figure 1. Hawaiian Earth Products processing site at Waikoloa

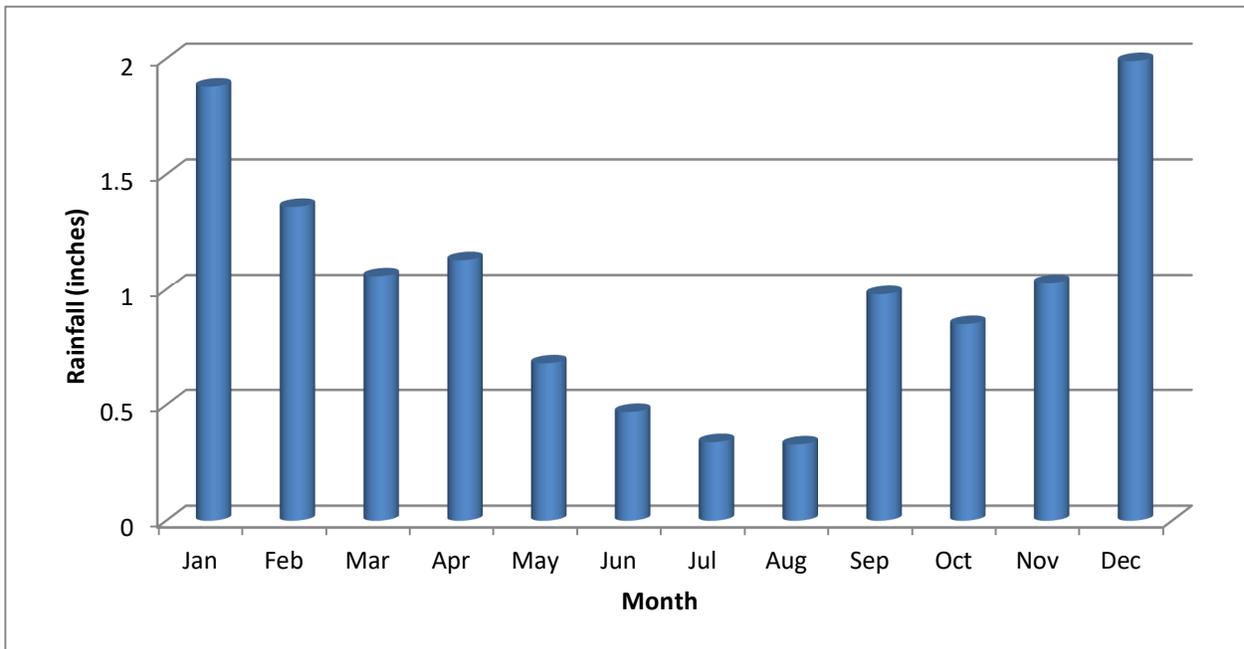


Figure 2. average monthly rainfall for Waikoloa Village (source <http://www.idcide.com/weather/hi/waikoloa-village.htm>)

Description of mulching process

Unprocessed green waste and pallets are brought to the site by residents and contractors where it remains in windrows for between 14 and 28 days (Figure 3). When sufficient material has accumulated, it is shredded with a purpose built machine (Figure 4) and the resulting mulch is placed in windrows until taken by residents or contractors (Figure 5). While in windrows, the material is regularly monitored to ensure core temperatures do not exceed 130F (54°C) as there is a serious risk of combustion at higher temperatures. Windrows are turned prior to reaching critical temperatures. There is usually sufficient processed material held on-site for 1-2 months' supply.

Problem statement

There is a perceived risk by potential end-users that processed mulch contains invasive species, especially Little Fire Ants. This is certainly the case for mulch processed at the Hilo site where testing has demonstrated the ability of Little Fire Ants to survive the mulching process (unpublished data) and where a substantial portion of unprocessed material contains Little Fire Ant colonies. These concerns have resulted in a reduced uptake of finished mulch from the Waikoloa site, potentially jeopardizing operations there. The site has only a limited capacity to hold processed material and unlike Hilo where processed mulch is removed almost immediately due to high demand, mulch at the Waikoloa site remains on-site for 1-2 months before it is moved.

Many potential end users believe an LFA infestation risk exists with the supply of "County" mulch. This



Figure 3. unprocessed material placed in windrows prior to mulching.
Figure 4. Mulching machine.
Figure 5. Mulched material in windrows prior to removal from site.

dramatically reduces demand for the product. However, the actual level of risk is unquantified. This

project aims to measure this risk and develop management processes that minimizes any risk to end users. This will be accomplished via experimentation and a system of continual external monitoring.

Recommended risk management strategy

Management of Little Fire Ants in processed mulch will be accomplished using a risk management approach. Risk management approaches recognize that the probability of an unwanted event occurring is difficult to quantify and rarely possible to prevent absolutely and attempts to balance the relative severity of a particular risk with the degree of effort needed to reduce the probability of its occurrence to a desired or predetermined level. One precept of this approach is that reduction of a particular risk to zero is not usually possible or practical. Further, the process should be transparent, based on the best available data, open to change as new information becomes available and guided by the principle of continuous improvement. It is desirable that any risk management system is auditable by a third party.

Quantification of risk

A distinct advantage of the Waikoloa plant is that the nature of the site does not favor invasion by Little Fire Ants. The site is hot, dry and devoid of vegetation. Rainfall is very low (12" per year) compared with Hilo (>100" annually). Little Fire Ants prefer warm, moist, shaded habitat and are rarely found in open or dry areas. Infestation of the site by LFA as opposed to the presence of LFA in the mulch material is therefore unlikely.

Risk will be quantified in two ways: presence of LFA in unprocessed material; and probability of survival in processed mulch.

Green waste is usually stockpiled until there is a sufficient quantity to justify preparing and operating the grinding machine. Material usually remains in an unprocessed state for 2-3 weeks before processing. This stockpile will be inspected for Little Fire Ants every month using a standardized protocol. Lures will be deployed at 10ft intervals on both sides of the windrow, left shaded and in situ for 60-90 minutes. Any ants collected will be identified under a dissecting microscope. This protocol ensures an inspection of 50-75% of all raw material received at the Waikoloa site.

Mulch, once processed, is placed in windrows for approximately one month before dispatch. During this time, moisture content drops from 35-55% to 20%, and core temperatures rise to 145F (63°C) for 3-4 days before slowly cooling to ambient temperature. The pile is turned on a regular basis to prevent combustion. This temperature profile is likely to destroy any LFA living within the mulch material and will be tested by embedding LFA samples in fresh mulch and raising the temperature to 120F (50°C) for 24 hours before measuring ant mortality. This experiment will be conducted in a laboratory using temperature controlled cabinets in order to avoid any possibility of contaminating the site with LFA.

Ongoing monitoring of processed mulch

Processed mulch remains on-site for approximately four weeks before dispatch, during this time the moisture content falls to 20% and some decomposition occurs. This stockpile will be inspected for Little Fire Ants every month using a standardized protocol. Lures will be deployed at 10ft intervals on both sides of the windrow, left shaded and in situ for 60-90 minutes. Any ants collected will be identified under a dissecting microscope. This protocol ensures an inspection of 100% of all processed material received at the Waikoloa site.

During periods of extended rain, monitoring frequency should be increased. When the Waikoloa facility stays consistently wet for more than 5 days, monitoring shall be conducted twice per month rather than the standard monthly survey.

Additional biosecurity measures

1. Material from known infested locations, including the Hilo landfill site, and material known to have LFA, must not be received at the Waikoloa facility or segregated for later disposal.
2. Loads of green waste that are known to be infested by LFA (either through driver self-declaration, or discovery of ants on material), is to be segregated and kept in a designated quarantine area. Treatments of Pro bait or similar products are to be applied monthly around the quarantine material.
3. Machinery, including shredding equipment, trucks and earthmoving machinery that are moved onto the site shall not be used until carefully cleaned to remove all organic and other matter that may harbor LFA. This cleaning process will need to occur off-site and not at the facility.
4. The site will generally be kept clean and tidy, in order to deny habitat suitable for LFA to establish. This includes avoiding the planting of vegetation or other landscaping. No dunnage, idle equipment and other material will be stored for more than one month.

References

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