



Sniffing Out LFA Invaders with Canines

By Cynthia Hara, O'ahu Master Gardener

Dogs possess a significantly more powerful sense of smell compared to humans due to having a much higher number of olfactory receptors and a larger area of the brain dedicated to processing smells. Dogs have between 100 to 300 million scent receptors, whereas humans have around 5 to 6

million. Dogs only need 1 part per trillion to locate an odor. In addition, dogs can track to an odor source by following the ever-increasing density of the odor molecules.

The mission of Conservation Dogs of Hawai'i is to utilize this olfactory advantage to detect invasive species and mitigate their impact on wildlife and the environment in Hawai'i and beyond. The mission also includes training dog handler teams to conduct field surveys and assessments. In September 2024, three O'ahu dog teams began training to search for Little Fire Ants (LFA). My 8-month old (at that time) Labrador Retriever, Willow, and I were invited to be one of the 3 dog teams. One of the responsibilities of a Master Gardener is to promote environmental awareness of invasive pest management. Based on this, Willow's training was used as the basis for my Master Gardener Intern Project.

LFA (*Wasmannia auropunctata* sp.) are a uniform yellow-red to light brown in color and 1.5 mm in length (half the size of a sesame seed). They do not build mounded dirt nests and nests in a variety of habitats including trees, around potted plants, irrigation lines, and in electrical boxes. The [negative impacts](#) of these ants include delivering a painful sting when disturbed, infestation of agricultural fields and farms where they damage crops, and the cost and difficulty in managing large infestations. It is difficult to eradicate and control infestations as colonies can recover after a single application, so any effective plan involves multiple applications every 4-6 weeks over a span of a year.

As part of the dog team, the handlers needed to be educated on how to physically identify and collect LFAs. We assisted in 2 post treatment surveys in Maunawili and Lanikai. The labor-intensive surveys were spearheaded by the [O'ahu Invasive Species Committee](#)



(OISC) and included manpower from the [Hawai'i Ant Lab](#) (HAL) and [DLNR's Division of Forestry and Wildlife](#) (DOFAW).

The major steps in training Willow to be successful in searching for LFA were as follows:

- Step 1: Build independent drive to search for treats.
- Step 2: Dead (previously frozen) LFA were placed in a mason jar. Willow trained to hold her nose in the mouth of the jar by treating her every time she put her nose in the jar. This is imprinting the odor on the dog. Once she had consistently done that, 4 blank jars were added (total of 5 jars) and she needed to clearly indicate the jar that contain the LFA. When successful, she was highly rewarded.
- Step 3: Live LFA were collected and placed into a Training Aid Delivery Device (TADD). The TADD is a containment system that lets the LFA odor out but not the LFA. Initially these containers were visually hidden in small outdoor areas such as in parks and Willow had to search for it. A lot of time and energy was spent getting her to focus on finding the odor, to ignore other enticing smells and most importantly for me to see when she was “on odor”. When a dog encounters a target scent, they exhibit a Change of Behavior (COB). COBs include a change of speed, change in direction and change of focus when the dog encounters the target odor. The dog must then pinpoint the direct source of the odor, in this case the TADD holding the LFA, and communicate that back to the handler. As we progressed as a team, the search area expanded and required more leash handling skills as Willow is a fast-moving dog. Group training (all 3 LFA dog teams) was on a bi-weekly basis at nurseries, with independent training on the off weeks at other locations.

In March 2025, approximately 6 months after LFA training started, the certification test was administered. There were 2 blind hides within the nursery and Willow successfully found both. During the same month, we were invited by the Department of Land and Natural Resources (DLNR) to the Kahuku Loop Trail to conduct an LFA survey with Willow. **The Ma‘akua Ridge Trail is closed to the public due to high LFA infestation.** The personnel



from DLNR Department of Forestry and Wildlife and O'ahu Invasive Species Committee (OISC) were on site that day to conduct a LFA survey. We started our hike on the Hau'ula Loop Trail, which had no known LFA infestation. Willow did not show any signs indicating LFA presence. Once on the Ma'akua Ridge Trail, she sped up as she approached the previously marked boundary of the LFA infestation. Once within the infestation zone, she appeared to be searching but unable to pinpoint specific LFA colonies. Based on this, it was determined it would not be useful to utilize the dogs within high infestation areas, although the dogs could potentially help

delimit, or find the edges of, a new infestation area.

Due to the ability of the dogs to detect a very low density of LFA, they can be advantageously utilized to identify a LFA colony before it becomes widespread. **The future focus of our dog teams will be to provide no cost LFA surveys to nurseries and farms. In addition to surveys, the dogs can be used to screen incoming plants to ensure LFA is not being brought into the property.**

If you would like further information on LFA dog surveys and/or other types of conservation work using dogs, please visit www.ConservationDogsHawaii.org.

To do your part in eradicating this invasive pest from O'ahu, watch a 3-minute [video recording](#) on how to survey for LFA and how to request a free test kit.

