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## LFA FACT SHEET 8

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(VERSION 9.1 JANUARY 2022)

# MIXING HAL GEL BAIT FOR CONTROL OF LITTLE FIRE ANTS

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**Want more information?**

go to [www.littlefireants.com](http://www.littlefireants.com)

Or contact  
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## BACKGROUND

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Ants are notoriously difficult to control around houses and other structures. Often, the use of toxic sprays and dusts has little effect. Some workers will be killed, but the ant colonies recover very quickly, and this often leads to a cycle of spraying to gain temporary relief, a fast recovery by the ants and spraying again. Decades ago, scientists researching better ways of controlling ants found that using a bait was more effective. Baits are made from a food that is attractive to ants and laced with a small quantity of slow-acting toxin. Worker ants feed on the bait, and when they return to the nest, regurgitate some to share with other workers and the queen. This approach has proven to be more effective than toxic sprays and has an added benefit of minimizing the use of pesticides.

To be effective, a bait must be attractive to ants and contain a toxin that is slow acting and effective in low quantities. If the toxin works too quickly, the worker ants become sick before returning to the nest and will not share the bait with other workers in case they also get sick.

The Little Fire Ant (*Wasmannia auropunctata*) is very difficult to control. They have many small colonies, each with many queens, and will have nests on the ground as well as in trees and other vegetation. All these small colonies are inter-connected and if some die out, they are re-populated by neighboring colonies. One problem facing the homeowner is that virtually all commercial baits consist of small granules. These are easy to spread

on the ground, but can not be applied to vegetation. Ants in the trees will not necessarily come to the ground to forage on the granules. If only the colonies on the ground are treated, neighboring ants living in trees will quickly spread back to the ground. The bait granules are also inactivated by rainfall. Once the granules become soggy, they are no longer attractive to ants. Windward locations in Hawai'i often experience regular and frequent rain. In some locations it is difficult to predict if it will rain on any given day.

## WHY USE A GEL BAIT?

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Contrary to popular belief, worker ants do not eat solids - they only consume liquids. Most granular baits are made from corn and vegetable oil, and when a worker ant finds a bait granule, she often sucks the oil out of the granule and leaves the rest behind. Ants can consume a gel bait far more easily than a granular product.

Baits in liquid or gel form do not have the same limitations as granular products. They can be applied to vegetation where they will stick to the leaves and branches and are not affected as much by rainfall. They are, however, a bit more difficult to prepare and apply compared with granular baits.

Hawai'i Ant Lab has developed a basic gel bait recipe that can be used with a variety of active ingredients to suit the individual needs of homeowners. The HAL gel bait is made with common household food ingredient like vegetable oil, water, peanut

butter, and xanthan gum (a common food thickener and emulsifier).

## LEGAL STUFF YOU NEED TO KNOW

Although HAL's Gel Bait is designed to be used with an active ingredient of the user's choice, there are only two products labeled for this use in Hawai'i. These are Tango™ (an insect growth regulator), and Advion® WDG (a toxicant).

The use of anything that acts as a pesticide, including ant baits, first needs to be registered by the Environmental Protection Agency as well as pesticide regulators in your state. The EPA registration process may take years and is generally a costly exercise. The reason for this is that any pesticide needs to be carefully reviewed and tested to make absolutely sure it is safe as well as effective. Safe for you, the environment, and other people.

## OPTIONS FOR ACTIVE INGREDIENTS

There are a couple pesticides that, added to the HAL gel bait, are effective at controlling Little Fire Ants. The amounts needed are listed in a table at the end of this section. Only mix one pesticide choice in a batch of gel bait: Tango™ OR Advion® WDG.

### TANGO™

Tango™ is a concentrate product that contains **(S)-methoprene**, an insect growth regulator (or IGR). The label provides instructions for mixing the

concentrate with a bait matrix. The manufacturer has also issued a 2(ee) recommendation that provides specific instructions for treating Little Fire Ants.

The IGR group of chemicals work by preventing affected insect larvae from completing the pupation process but has no effect on adult worker ants. It also prevents or slows down egg production by the queen. Ant colonies baited with an IGR slowly die out over a period of months as worker ants die from natural causes.

One big advantage of **(s)-methoprene** is that it is one of the safest insecticides available today. For this reason, it is often used for insect control in food crops and even drinking water. Additionally, it is extremely effective as an ant bait when used correctly. The main disadvantage of this product is that it takes longer to control insect pests because only egg production and larvae are affected, while the adults can live on. In today's world we often expect quick results and for some people 3 months is a long time to wait for results.

The slow mode of action typical of **(s)-methoprene** baits will mean that you will continue to see ants for 3-4 months, or even longer. Be patient, and repeat treatments every 4-6 weeks for several months. The repeat treatments will ensure that all colonies are properly treated. If only some colonies are controlled, the surviving ones will spread very quickly and all your efforts will have been in vain.

After a few months of treating with IGR's you may start to see fewer workers, but an

awful lot of winged queens, which are larger than the workers. DON'T PANIC! This is a normal side effect of IGRs. It's a sign the bait is working! Pat yourself on the back and keep up the good work.

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### ADVION® WDG

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Advion® WDG is a water-soluble granule that contains the active ingredient **indoxacarb**. This active is in a new class of chemicals known as oxadiazines (a sodium channel blocker). Ingestion of **indoxacarb** by insects leads to their paralysis and eventual death.

The manufacturer of Advion® WDG has applied for and been issued with a "Special Local Need" permit (or SLN) which allows users in Hawai'i to add Advion® WDG to the HAL gel bait for control of Little Fire Ants.

Advion® WDG is fast acting and usually dramatic results will be noticed in as little as 2-3 days after treatment. However, Advion® WDG is not registered for use on food plants or within the drip line of food-bearing trees nor for ground treatment.

If Advion® WDG is your bait of choice, understand that Advion® is a line of products in liquid, gel, and granular form targeting different types of insects depending on which product you select. The only Advion® product approved for use in the HAL gel bait for the control of Little Fire Ants is **Advion® WDG**. It is prohibited to mix other Advion products (Advion® Fire Ant Bait, Advion® Ant Gel, Advion® Insect Granular Bait, etc.) into the HAL gel bait.

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### CORRECT DOSAGE

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*"The dose makes the poison" Paracelsus, the father of modern toxicology (1493-1541)...*

It's easy to think that if a little bit is good, more must be better. As far as bait products are concerned, this is definitely not the case. Some pesticides are repellent at higher doses, but not detectable at lower doses. Other chemicals act too quickly in high doses, not giving worker ants enough time to share the bait with nest-mates. Additionally, using pesticides at higher rates than listed on the label contravenes pesticide use laws and regulations.

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### TREATMENT FREQUENCY

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We are often asked "*how often should I treat?*" This is actually a very good question. From experience (and some experimentation) Little Fire Ants seem to be able to completely recover from a single bait treatment in 8-10 weeks. The reason they can recover so quickly is that there are many queens in the colony, so even if some are killed by a treatment, the remaining queens simply increase their rate of egg production until the population gets back to normal levels.

However, when we apply a bait product, the surviving ants learn that the baits are toxic to them and will avoid feeding on that bait. This "memory" stays with the colony for around 4-6 weeks (we don't know the exact length of time).

So, the next treatment needs to be sooner than the time it takes for the colony to recover, but not so soon that the ants will avoid the baits. We recommend that

people treat every six weeks to fit between these intervals.

## THE GEL RECIPE

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Before mixing the gel bait, there are a few things to think about. First, this is **NOT** a job to be done in your kitchen, or using bowls and measuring cups that will later be used to prepare food. Buy all these items specifically for this purpose, mark them “Not for Food Use” or “Pesticide Use Only” and keep them in the garage or wherever you normally keep your yard care products or other chemicals. Also, make sure you have adequate protective equipment as follows:

- a sturdy pair of rubber or chemical resistant gloves,
- a chemical resistant apron,
- eye protection, and
- access to a faucet and soap for washing your hands etc. after mixing.

Also, read the pesticide label very carefully before starting and make sure you follow all directions and precautions listed. Although the pesticides we recommend are very safe, it is good practice to wear protective equipment whenever handling and mixing pesticides, no matter how benign. You never know if you are chemically sensitive or even allergic to a particular product.

## INGREDIENTS

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In addition to a pesticide, The HAL gel bait is essentially a mixture of vegetable oil, water, a protein attractant, and a thickener/emulsifier to keep everything mixed together. The table below shows the proportions you will need, depending

on the quantity you wish to make. (**All quantities are by volume**). We have rounded the quantities to make it easier to mix.

ingredient	Approximate finished quantity			
	1 quart	1 gal	2 gal	4 gal
<b>Water</b>	2 ¼ c	2 ¼ qt	4 ½ qt	9 qt
<b>Xanthan gum</b>	2 tsp	2 ½ Tbsp	1/3 c	2/3 c
<b>Peanut butter</b>	1 ½ Tbsp	6 ¼ Tbsp	3/4 c	1 ½ c
<b>Corn oil</b>	1 ¼ c	1 ¼ qt	2 ½ qt	5 qt

When mixing, you need to add the pesticide of your choice to the mixture. It is important that the pesticide rate is exactly correct (or just slightly under the required amount. Using more than the label rate of pesticide is not legal).

Pesticide quantities needed				
	1 quart	1 gal	2 gal	4 gal
<b>Tango™</b>	3 Tbsp	¾ c	1½ c	3 c
<b>Advion® WDG</b>	⅞ Tbsp (½ packet)	1⅕ Tbsp (2 packets)	3¾ Tbsp (4 packets)	7½ Tbsp (8 packets)

Note, some quantities are in teaspoons (tsp) and some are in tablespoons (Tbsp). One tablespoon is equivalent to 3 teaspoons. There are 4 cups (c) in one quart (qt). There are 4 quarts in one gallon (gal).

Only make enough bait for immediate use and do not store excess bait – it spoils quickly. A quart of bait is sufficient to treat 5,000 square feet. For larger areas, use 1-2 gallons per acre based on foliage density.



## EQUIPMENT

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- A large mixing bowl or bucket large enough to hold 1 ½ times the total volume of bait you intend to mix.
- Measuring cups, and jug



- A device for mixing. We use a cordless drill with a kitchen whisk modified so it can be fitted into the drill chuck. A paint mixer also works well in place of the whisk.

## NOTES AND "OPTIONAL" EXTRAS


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Be sure to use fresh oil in the mixture. **Don't use rancid oil** because ants will not be attracted to spoiled oil.

We often use **powdered beef liver** in place of peanut butter (use the same amount). This makes the finished bait even more attractive to LFA workers, which means they will bring more bait back into the nest. Powdered beef liver is available from health food stores and also online through E-Bay. If using beef liver, add it to the water before adding xanthan.

**Xanthan gum** is a thickener used in cooking. It is a very important ingredient that emulsifies (mixes the oil and water


together) and also thickens the mixture so it will stick to vegetation.

Health food stores often carry xanthan in stock as a  gluten-free food thickener. Xanthan can be very difficult to mix because it clumps very quickly. However, a rapid dispersal version called "xanthan RD" is available online through E-Bay and much easier to mix.

## MIXING PROCEDURE:

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Combine the pesticide, beef liver powder (if using it) and water in a large mixing bowl or bucket. Start mixing and very slowly add the xanthan gum. It can be difficult to mix the xanthan so be patient and add it very slowly and run the mixer at the highest speed safely possible. If these ingredients are not thoroughly mixed, little lumps can remain which will clog the nozzles of spray equipment. Continue to mix until everything is evenly combined. It should look like a thick sticky whitish goop (mixing stage 1)<sup>1</sup>.

Once completely mixed, add the peanut butter and mix thoroughly. Then add the oil. At this point, the oil will sit on top of the water/xanthan mixture (mixing stage 2). 

Continue to mix until everything is combined. The

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<sup>1</sup> the mixture will be much darker if using beef liver powder

bait should now have the same consistency as pudding or ketchup (mixing stage 3).



Some people like to add food coloring so its easier to see where it has been sprayed (this may stain foliage and driveways etc). You may choose to pass the gel through a sieve to strain out any clumps (optional). Always wash hands and exposed skin after mixing and before eating, drinking, using the restroom or smoking.

### INSTRUCTIONS FOR USE

- If using Tango™, you **MUST** have the attached “2ee recommendation” from Wellmark International found at the end of this fact sheet. When using Advion WDG®, you must be in possession of the SLN label found at the end of this fact sheet.
- Make sure you have adequate protective clothing. The label lists the following minimum **mandatory** personal protective equipment:
  - Long-sleeved shirt and long pants
  - Shoes plus socks
  - Chemical resistant gloves

When spraying, please consider using chemical resistant headwear, (a cap or hat) and eye protection. Some people also prefer to use a dust mask or similar, but these items are optional.

Do not treat if it is windy because this increases the risk of spray drift and the possibility that bait might be blown back towards you. Work with the wind (even if

it is only gentle) so that any possible spray drift will move away from you rather than be blown back towards you. Again, this will minimize the risk of coming into contact with the bait. Make sure that all pets, domestic animals and people are kept away from the area while you are treating. If you operate a business, you may also need to comply with the Worker Protection Standard, (40 CFR Part 170). Plan your treatment in a way that avoids the need to walk over previously treated ground. It’s a bit like painting a floor – you don’t want to paint yourself into a corner!

The spray bottle will shoot a thin solid stream of gel bait. However, the goal is to apply little globs or splatters of bait evenly over the ground and infested vegetation. Pressing the spray trigger while waving the spray bottle around normally results in an even pattern of splatters. Trees and vegetation do not need to be soaked. A single squirt up and down the trunk and 2-3 squirts through the smaller branches and leaves is more than enough. Ants foraging through the canopy will find the bait all by themselves, just try to get a nice even splatter throughout the interior of the canopy. Also, do not spray directly on ripening fruits and flowers because that may harm beneficial pollinators like bees. Always wash hands and exposed skin afterwards and before eating, drinking, using the restroom or smoking.

After use, thoroughly clean the spray bottles using a heavy duty degreaser. Failure to do this will cause the nozzles to gum up and lose their effectiveness. Spray the degreaser through the nozzle, let stand for ten minutes, then rinse well. Make sure

all internal components are clean and free of oil residue.

Although it is tempting to help things along by also using other chemical sprays, this does far more harm than good! We need the worker ants to keep on harvesting the gel baits and feeding the other ants in the colony. At this time, they are your friends and are actually helping you to control the problem.

## SPRAY EQUIPMENT

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The finished bait will have a pudding-like consistency and not every sprayer is suitable for use with this product. However, there are several equipment options available for applying the gel bait and your choice will depend on how much area you need to cover and your budget.

### LOW COST OPTION

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Good quality water spray bottles are available at most garden exchanges and hardware stores. The very cheap types do not work very well, so choose a high quality one like a 32 oz. **Zep** brand or similar. These better-quality spray bottles can shoot a stream of bait more than 15 feet making it very easy to target ant colonies nesting in trees. Remove the filter at the bottom of the intake tube before using. The filter is too fine to allow the gel into the spray pump. Also, have a wide-mouthed funnel available to fill the spray bottle.



## LARGER SPRAYERS

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Pesticide sprayers come in many forms, but most can be classified by the method used to expel the baits or pesticides.



Pump-up sprayers use compressed air to drive the bait out of the nozzle. These are usually pressurized by the user pumping air into the spray bottle (like pumping a tire) before use.

We have tested a few of these and most are not very effective. The Redmax HM20 and possibly other good quality sprayers work very well. We replace the wand and nozzle with a “D2” spray nozzle for best results. These have an effective spray distance of over 20 feet but require a strong arm to pump.



Lever-type sprayers use an external lever to operate a pump inside the sprayer (but does not pressurize the sprayer itself). The type of pump influences how well these sprayers work with a thick liquid like the HAL gel bait. One pump that seems to be very effective is the “Jacto” sprayer. This has a piston pump which is more effective at spraying thick liquids. The Jacto sprayers have a spray distance of up to 30 feet. As with the Redmax, we remove the wand and replace it with a “D2” spray nozzle.



## COMMERCIAL SPRAYERS

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For very large or commercial applications, the sprayers from R&D Sprayers are the best we have used. R&D make a range of spray equipment powered by liquefied CO2.

We adapt these to run with compressed air because its less expensive, but that requires a degree of modification. When set up correctly, R&D sprayers have an effective spray range of over 40 feet. These spray units are expensive and not really suitable for home use.

### A NOTE OF CAUTION

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There are a number of home-made devices being used and some of these use old propane tanks or other items to spray bait from a pressurized tank. We **DO NOT** recommend these because there are too many risk factors involved for them to be safe. First, propane tanks are not designed for high pressure applications and are not tested or rated for this purpose. Most tanks are old and are “out of test” which means they are even less safe. Having a pressurized tank of pesticide explode is not much fun.

## INGREDIENT SUPPLIERS

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**Tango® concentrate** is now available in 1 pint or 2.5 gallon containers from:

### **Nutrien**

900 Leilani St Hilo, HI 96720 ph. (808) 935-7191. link to map [- click here](#)

### **Garden**

300 Keawe Street. Hilo, HI 96720 ph. (808) 961-

### **Exchange**

2875. link to map [- click here](#)

**Farm Supply Cooperative Inc. Hilo**  
60 Holomua Street, Hilo, HI 96720 ph. (808) 969-7474. link to map [- click here](#)

**Farm and Garden in Kona**  
73-5582 Olowalu St Kailua-Kona, HI 96740 ph. (808)-329-4775. link to map [- click here](#)

Currently, **Advion® WDG** is only available for purchase from Ebay, Amazon, and other online retailers.

### **Xanthan gum**

Xanthan gum is a thickener used in cooking. It is available from most health food stores and is also available online by mail order. It may also be available from food stores and supermarkets.

A rapid-dispersion formulation is available online through eBay (search for “xanthan rd”) or contact Haidee directly at [philoutlet@gmail.com](mailto:philoutlet@gmail.com)

### **Corn oil**

Available from any food store or supermarket. Corn oil appears to be the most attractive but any vegetable cooking oil will work also. **Don't use rancid oil.**

### **Powdered Beef Liver**

Available at health food stores or through eBay.

### **Spray bottle**

These should be available from your favorite hardware or garden store. We tested a range of spray bottles and found the **Zep®** brand bottles work very well but the budget priced bottles were ineffective. There may be other similar bottles available under different trade names

### **Redmax sprayer**

Available from Doc Stanleys, 1133 Manono St Hilo. Ph (808) 961-6039

**Jacto Sprayer**

Available from Crop Production Services.  
900 Leilani ST Hilo. (808) 935-7191

**D2 nozzle**

Pesticide supply stores including BEI and  
CPS

# TANGO

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## **2(ee) Recommendation**

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**For the Control of Little Fire Ants in vineyards, row crops, bearing and on-bearing fruit trees, citrus and nut groves or other crop and non-crop areas**

For Distribution and Use Only Within the State of Hawaii

EPA Reg. No. 2724-420

### Directions For Use

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

FIFRA Section 2(ee) permits "applying a pesticide to a target pest not specified on the label if it is to a site on the label." and "Employing any method of Application not prohibited by labeling". The following is a Wellmark International authorized 2(ee) recommendation.

This recommendation is made as permitted by Section 2(ee) of FIFRA, as amended, and has not been submitted to or approved by EPA.

### Important

Before using this product, read and carefully observe all applicable directions, restrictions, and precautionary statements on the EPA-registered container label.

### Rates and Timing

#### **Little Fire Ant:**

Bait Preparation – Thoroughly mix TANGO™ with the appropriate bait matrix to achieve a final concentration of 0.25% S-methoprene.

Apply bait at sights of ant activity with appropriate application equipment. Bait may be applied in arboreal situations to trees, shrubs, and other plant material to control nesting ants. It is important to present and maintain a sufficient quantity of bait to obtain control of ant populations. Monitoring the area for ant activity can help to determine the optimal location for bait placement. Following bait placement, monitor for ant activity and replenish bait mixture as needed. Bait stations are not required as they may hinder bait acceptance.

**THIS 2(EE) RECOMMENDATION MUST BE IN THE POSSESSION OF THE USER AT THE TIME OF PESTICIDE APPLICATION.**

Registrant:

**WELLMARK INTERNATIONAL**

Schaumburg, IL 60173  
March, 2012



## Section 24(c) Special Local Need Label

FOR DISTRIBUTION AND USE ONLY WITHIN THE STATE OF HAWAII

### Advion® WDG

For Control of Little Fire Ant (LFA) (*Wasmannia auropunctata*) In and Around Residential, Recreational, Natural and Commercial Landscapes, Golf Courses, and Other Non-crop Areas (Including Non-bearing Fruit and Nut Trees and Vines Grown in the Listed Use Sites)

EPA Reg. No. 100-1501  
EPA SLN No. HI-210003

This label is valid until October 20, 2026 unless otherwise amended, withdrawn, cancelled, or suspended.

### DIRECTIONS FOR USE

- It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
- This label must be in the possession of the user at the time of application.
- Follow all applicable directions, restrictions, Worker Protection Standard requirements, and precautions on the EPA-registered label.
- Do not use in areas that may affect Threatened or Endangered species or critical habitat.

### Mixing Instructions

Prepare a gel matrix spray mixture consisting of water, vegetable oil, xanthan gum and a protein based product as listed in Table 1.

- Determine the volume of the Gel Matrix Spray Solution required to apply to the intended area (see Table 1) and prepare only the amount required for application to that area.
- Mix Advion WDG and xanthan gum into water.
- Add the oil and protein based product into the spray mixture.
- Mix thoroughly creating the bait matrix gel spray solution.

Do not use household utensils to measure, mix, or apply Advion WDG.

Table 1. Gel Matrix Spray Solution Components and Quantities to Prepare Advion WDG for Application to Control Little Fire Ants

Ingredients	Percent (by weight)	54 oz Gel Matrix Spray Solution w/w	Fluid oz Gel Matrix Spray Solution Measures w/v
Advion WDG (one foil packet)	0.6	0.33	0.509
Water*	62.9	33.80	31.378
Vegetable Oil*	32.9	17.90	17.432
Xanthan	0.6	0.37	0.581
Protein* <sup>1</sup>	3.0	1.60	2.833
Total	100.0	54.00	52.733

<sup>1</sup>Examples of protein sources can include but are not limited to smooth peanut butter, powdered liver, brewer's yeast, and torula yeast.

\*Slight variations in proportions are allowable.

All ingredients are measured by weight.

#### **Application Instructions**

Apply the gel matrix spray solution to plant foliage, trunk and base of plants where ants are actively foraging. Apply with a backpack, garden sprayer or spray bottle with the in-line screens removed. This application attracts ants to Advion WDG.

- Recommended application rate: 1-2 gallons of spray solution per acre depending on vegetation density.
- Do not apply more than 18 lb (2 gallons) of mixture per acre.
- For application to desirable plants, a small number should be treated and observed for phytotoxicity for at least one week before making application to the entire planting.
- Do not apply more than 2.4 oz (equal to 0.03 lb ai) of Advion WDG per acre in a single application to a treated area.
- Do not apply more than 8 applications per year to the same treated area.
- Do not apply more than 19.2 oz (equal to 0.24 lb ai) of Advion WDG per acre per year to a treated area.
- Do not re-apply within 6 weeks from the previous application if ants are still present.
- When applying to the base of plants, do not apply to the soil.
- Do not apply to any plants which are grown to provide harvestable food (fruits, vegetables, nuts, roots, tubers, etc.).

Information on LFA may be obtained from local Hawaii Cooperative Extension Service offices or the Hawaii Ant Lab.

#### **Cleaning and Disposal**

After use, thoroughly clean the spray bottles using a heavy-duty degreaser. Failure to do this will cause the nozzles to gum up and lose their effectiveness. Spray the degreaser through the nozzle, let stand for ten minutes, then rinse well.

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Expiration Date: October 20, 2026

24(c) Registrant:

Syngenta Crop Protection, LLC

P. O. Box 18300

Greensboro, NC 27419-8300

Label Code: HI1501014AA0721