



A SYSTEMS APPROACH TO ELIMINATING QUARANTINE PESTS ON FLORAL GINGER

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Introduction

In the field, floral ginger is often heavily infested with ants, aphids, soft scales, and mealybugs. If unchecked, pest buildup can make after harvest disinfection time consuming and difficult, if not impossible. Field use of insecticides alone, however, cannot eliminate all quarantine pests. Therefore, a combination of field pest management and treatment after harvest is recommended for quarantine security on floral ginger exported from Hawai'i. The advantage of control in the field followed by treatment after harvest is that pest levels are reduced to the point that the treatment is 100 percent effective. These procedures plus a final inspection for live insects ensure pest-free flowers that meet quarantine security requirements.

Field Pest Management

Monitor the field, identifying the pests and pest levels. Use pest levels as the basis for making decisions on when to apply insecticides. In order for the after harvest treatment to be 100 percent effective, less than 6 percent (6 out of 100 flowers) should be infested with mealybugs in the field, and less than 33 percent (33 out of 100) should have aphids. A flower is considered infested if a single live insect is found. Monitoring should be incorporated into a year-round field management program because insects continuously reproduce in Hawai'i's mild climate. Monitor pest levels by pulling down on tight, lower bracts and green leaf sheaths to expose ants, aphids, and mealybugs. Scales can be found anywhere on the flower, stem, or foliage. Spraying based on pest identification and levels is more economical than spraying on a calendar basis. Other advantages of this tactic include conserving natural enemies and avoiding the development of pesticide resistance.

Apply insecticides as foliar sprays at the label rate, providing adequate coverage and targeting the flowers. Several applications at 2-week intervals may be necessary to achieve control. The insecticides used must be labeled for outdoor use on general ornamentals and

should be effective against the target pests.

Ant control is a necessity. Ants feed on the honeydew secreted by aphids, soft scales, and mealybugs and protect these insects from attack by natural enemies (parasites and predators). This leads to higher pest populations. An insecticide barrier treatment is effective against ants foraging into the infested ginger. The barrier treatment consists of spraying between bases of ginger stalks and within a 2-foot radius around the ginger clump. Dursban or Pageant (active ingredient: chlorpyrifos, Dow Elanco of Indianapolis, Indiana) is effective as an insecticide barrier treatment.

Sanitation is another part of good pest management for floral ginger. Remove all mature flowers from the field, regardless of marketability, so that flowers do not serve as hosts where pests can multiply. Use wide spacing when planting and keep plants trimmed back to avoid overgrown fields that are difficult to spray. Wide spacing prevents easy spread of pests from plant to plant.

After Harvest Treatment

An insecticidal soap (active ingredient: potassium salts of fatty acids) mixed with a pyrethroid, such as Mavrik Aquaflo (active ingredient: fluvalinate, Sandoz of Des Plaines, Illinois) is recommended as a dip for cut flowers and foliage. This dip is the second half of the systems approach for floral ginger. There are several insecticidal soaps and pyrethroids on the market.

Follow the label rates for mixing, since concentrations vary. Thoroughly mix the soap and pyrethroid in water. Protect the solution from heat and sunlight, and replace it at least once a week. To treat ginger, submerge the flowers, agitating them at the beginning and end of a 5-minute dip period. Avoid oversoaking. Do not rinse. Allow flowers to air dry before packing. Inspect each flower at packing and discard or scrub those with insects.

SPECIAL NOTE: The 5-minute dip with agitation is only recommended for ginger from fields where successful pest management is practiced. For flowers that are not treated in the field and are heavily infested

with insects, a 2-step treatment is necessary. The first step is a wash in a cleaning solution, e.g., LOC (Liquid Organic Cleaner, Amway of Ada, Michigan), in which bracts are opened to expose insects and the leaf petioles and stalks scrubbed to remove scales. The tiny, green leaflets just below the flower harbor green scales and should be clipped off. The second step is the 5-minute dip in soap and pyrethroid.

An alternative to chemical insecticidal dip after harvest is hot water immersion of ginger. Research has demonstrated that a systems approach consisting of insecticide application before harvest and hot water immersion after harvest at 49°C (120°F) for 12 minutes provided quarantine security, eliminating all insect pests of floral ginger including aphids, mealybugs, cardamom thrips, green scales, and ants. Vase life of hot water treated flowers was not affected in small, experimental tanks. Testing is continuing to confirm the safety and efficacy of the treatment in large, commercial capacity tanks.

Safety for After Harvest Dip Treatment

Insecticidal soaps and Mavrik Aquaflow have the signal word "CAUTION" which indicates the lowest level of the three categories of risk to workers. Some pyrethroids are in higher risk categories. Read labels carefully. Avoid breathing spray mist and contacting eyes, skin, or clothing. All safety precautions on the label regarding protective clothing and equipment must be followed. Eye protection, elbow-length rubber gloves, rubber or plastic apron, and waterproof boots are necessary because of possible exposure by splashing. The label may have additional requirements. When the dip is not in use, a locked cover over the dip container will prevent animals and children from contacting the pesticide.

Disposal of Used Dip Solutions

Proper disposal of the chemicals must be considered in setting up a dip operation. Used dip solutions should be disposed of by applying to approved crops in accordance with all label directions, including dilution rate and approved site. Contact the Hawai'i Department

of Agriculture, Pesticide Branch, if in doubt about proper disposal.

Precautionary Statement

Use pesticides safely. Follow the pesticide label. Consult with the Cooperative Extension Service or the Hawai'i State Department of Agriculture for authorized special local need registrations or additional information. The user is responsible for the proper use, application, storage, and disposal of pesticides.

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