

Response of Plants Following a Foliar Application of 25% Citric Acid

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The use of citric acid is one of the latest strategies being explored to combat the invasive coqui frog. Citric acid is commonly found in canned soft drinks, soaps, candy, and other house hold items at very low concentrations. However, at very high concentrations citric acid becomes corrosive (25% citric acid solution has a pH of 1.5 compared to lemon juice, which has a pH of 2.3). Citric acid applied to frogs proved to be lethal. If it were used by homeowners, garden shops and nurseries, how would citric acid affect the plants, trees, and environment?

A citric acid phytotoxicity test was initiated on October 18, 2002 at CTAHR's Waiakea Research Station. A 25% citric acid solution was sprayed onto various potted plants by personnel from the Hawaii Department of Agriculture. The citric acid left a sticky residue on the surface of leaves and was not washed off for the 6-week duration of the experiment. Phytotoxic effects were observed on a number of tested plants just a few days after treatment and took up to a week for all major phytotoxic damage to become apparent (see photos). The most obvious symptoms were the initial burning of leaves, flowers, and new growing tips. The residue appeared to continue to burn the plant tissue that was most sensitive. Palms and dracaena were among the plants that were tolerant to citric acid.

Degree of tolerance of tested plants to 25% citric acid spray

Tolerant		
<u>Palms:</u>		
Areca	<i>Dracaena fragrans</i>	
Fishtail	<i>Dracaena warneckeii</i>	
Rhaphis	Philodendron	
Parlor	Syngonium	
Phoenix	<i>Ti plant</i>	
Triangle		
Sensitive		
<u>Rating: Severe</u>	<u>Rating: Moderate</u>	<u>Rating: Slight</u>
Calathea	Anthurium	Papaya
Eggplant	Bromeliad	Passion fruit
Streptocarpus	Dendrobium orchid	
	<i>Guava</i>	
	Leather leaf fern	
	Mock orange	
More Research Needed (Inconsistent results)		
Sago palm		

Other research has found that 16% citric acid is still effective against the coqui frog with much less incidence of phytotoxicity, especially when the residue is rinsed off plants within 24 hours of treatment. Valuable plants should still be tested for susceptibility at this lower rate. The Hawaii Department of Agriculture has released a label for use of citric acid, which can now be purchased and used to combat the coqui frog locally.

Plants donated by: Bromeliads Hawaii, California-Hawaii Foliage, Flowers Inc., Gines Orchids, H. Eunice Nursery, Hale Pua Nursery-Hawaii, Hawaiian Sunshine Nursery, Kurtistown Nursery, Plant It Hawaii, Puna Certified Nursery, Royal Palm Enterprise, and Schaffer Family Farm.