Coqui Frog

Suspect coqui? Send pics and videos to: www.643pest.org

Listen to a coqui infestation from Hawai'i Island

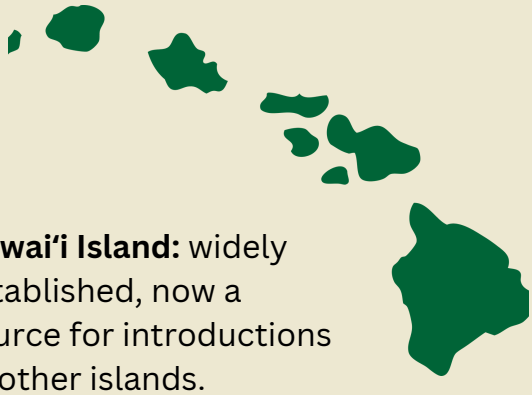
The coqui is a tree frog, native to Puerto Rico, and was unintentionally introduced to Hawai'i around 1988. Coqui frogs are on the Hawai'i State Injurious Species due to their invasive impacts.

Coqui frogs now occupy an estimated 60,000 acres on Hawai'i Island and have populations on Maui and O'ahu. The remaining Hawaiian islands work every day to prevent hitchhiking coquis from becoming established state-wide.

Impacts:
Lack of predators and environmental controls allow coqui frog populations to explode outside their native range and disrupt Hawaiian forests.

- Eat huge quantities of insects, including native species
- Loss of insect services such as pollination and nutrient cycling
- Disrupt the balance of vulnerable native ecosystems
- Potential food source for snakes if they were to arrive
- Loud, incessant, and annoying call from dusk until dawn
- Adverse economic impacts on tourism
- Decreased export plant sales
- Disclosure requirements for real estate transactions have resulted in decreased property values in some locations.

Control work:
- Night surveys
- Remote audio monitoring devices
- Hand capture/manual removal
- Chemical removal using citric acid sprays



Hawai'i Island: widely established, now a source for introductions to other islands.

Maui: MISC has slowed the spread from Maliko Gulch while keeping the rest of Maui from being affected; single "outlier" frogs have been caught all over the island.

Moloka'i: There are currently no populations of coqui on Molokai.

O'ahu: Eradicated a breeding population in Wahiawā in 2008. Numerous single hitchhiking frogs are reported each year and controlled by HDOA. There are 3 established breeding populations on O'ahu: Waimānalo, Kuliouou Summit, and Pālolo Valley. OISC, HDOA, and DLNR are working to control all locations.

K**aua'i**: A breeding population of coqui covering about 10 acres was discovered in Lawai in 2001. After extensive efforts by KISC and partners, the island was declared officially coqui-free in June 2012.

Contact OISC with any questions: E: oisc@hawaii.edu / Call/text: 808-286-4616

Citric Acid Control FAQs

Citric acid is currently the only legal and Environmental Protection Agency (EPA) approved agent for controlling coqui frogs is citric acid. When coqui frog control efforts first began in Hawai'i, the University of Hawai'i College of Tropical Agriculture and Human Resources (UH-CTAHR) evaluated the efficacy of several different chemical controls that could be used to control coqui frogs including citric acid, caffeine, pyrethrins, hydrated lime, and baking soda. Citric acid proved to be the most effective and safest chemical control.

Citric acid naturally occurs within the tissues of many plants (such as citrus fruit and pineapples) and is a key component of metabolic processes like the Krebs cycle. It is widely used in household cleaning products and can also be found in many soft drinks and processed foods. The citric acid OISC uses comes as a powder and is then mixed with water to make the 14% solution.

WHAT IS CITRIC ACID? Citric acid naturally occurs within the tissues of many plants (such as citrus fruit and pineapples) and is a key component of metabolic processes. It is widely used in household cleaning products and can also be found in many soft drinks and processed foods. The citric acid used to control coqui frogs comes as a powder and is mixed with water to make the 14% solution.

WILL CITRIC SPRAYS STAY IN THE ENVIRONMENT? Citric acid poses little risk to the environment. The Environmental Protection Agency (EPA) has classified citric acid as "Generally Recognized as Safe." or "GRAS." Citric acid breaks down quickly when it comes in contact with naturally occurring organisms found in surface water and soil and does not accumulate. According to the EPA, "no significant adverse effects to humans or the environment are associated with the proper use of citric acid as a pesticide."

IS CITRIC ACID HARMFUL TO PEOPLE? Citric acid is a skin and eye irritant. Direct contact with citric acid should be avoided as it is classified as a severe eye and moderate skin irritant. Our field crews wear PPE such as long pants, closed-toe shoes, long sleeves, and gloves while spraying and mixing citric acid solution. They also carry water to rinse with or flush their eyes if needed. Due to the risk of irritation based on direct exposure to citric acid MISC staff avoids spraying near where animals are kept and recommends that pets be kept indoors with the windows closed if active citric spraying is happening next to the home.

DOES CITRIC ACID SPRAY KILL THE PLANTS? Citric acid must touch the coqui frogs' skin to be effective, which requires that plants in the area be liberally sprayed with the citric acid solution. According to testing performed by UH-CTAHR most plants can withstand this treatment with no ill effects but some plants are sensitive and will drop some of their leaves. Sensitive plants include, but are not limited to, mock orange, orchids, air plants, anthurium, calathea, and streptocarpus. OISC takes care to avoid these plants and if they are inadvertently sprayed they are immediately rinsed with fresh water.

WILL IT IMPACT OTHER SPECIES? Citric acid controls coqui frogs by absorption through the skin which quickly and humanely kills coqui frogs. Greenhouse frogs, another non-native species, are also susceptible if they come into contact with citric acid. Other soft-bodied invertebrates such as slugs, snails, and worms may be similarly affected, but only for a short amount of time as citric breaks down quickly. Insects and other animals do not absorb citric acid through their skin and while they may be temporarily irritated by the spray, there are no long-term, residual impacts. Researchers have looked into this as well; a 2014 study by Pitt et al found that endangered Hawaiian Hoary Bats are at low risk for harmful exposure to citric acid.

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