

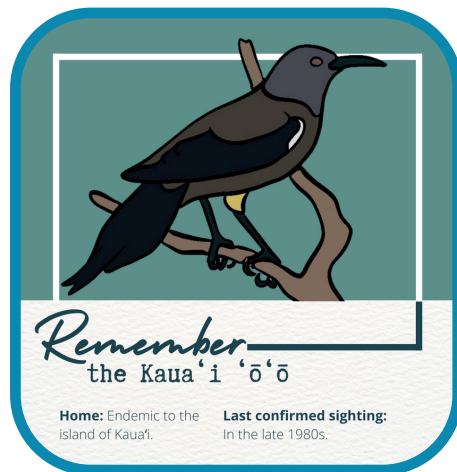


# SAVING OUR HONEYCREEPERS WITH MOSQUITO CONTROL



## Why are our native honeycreepers dying?

They are dying because of a disease called avian malaria that is transmitted by introduced mosquitoes. Our honeycreepers evolved in Hawai'i over millions of years before mosquitoes came in the early 1800s. Our birds show little to no immunity to the disease and for some species, like 'i'iwi, a single bite from a mosquito with avian malaria can result in death.



## Why do we need to save these birds?

Our native honeycreepers play an important role in our forests and watersheds. They keep forests vigorous and alive by pollinating 'ōhi'a flowers, dispersing seeds from native plants, and eating insects from trees to keep them healthy. We have already lost many native bird species, like the Kaua'i 'ō'ō, and cannot afford to lose any more. They also play an important role in Hawaiian culture and are considered messengers of the gods.

## Why are we doing this now?

Once abundant and found in forests ma uka to ma kai, most honeycreepers are now limited to cooler high-elevation forests. However, warmer temperatures due to climate change are allowing mosquitoes and avian diseases to invade these high-elevation habitats. Alarmingly, several forest bird species are predicted to go extinct within the next few years, including 'akikiki and 'akeke'e, two species found only on Kaua'i.



## How can we save the honeycreepers?

By controlling mosquitoes in our forests. We are using two methods: mosquito larvae control and mosquito "birth control" to suppress mosquito populations.



## How do you control mosquito larvae?



We are using a natural product called Bt or "Dunk". It is available at local hardware stores and approved for use in organic agriculture. Bt is added to standing water where mosquitoes breed. Bt kills mosquito larvae before they can complete their life cycle. Bt occurs naturally in soil and has been used in mosquito control for more than 30 years. It is used worldwide and on the mainland, even in residential areas.

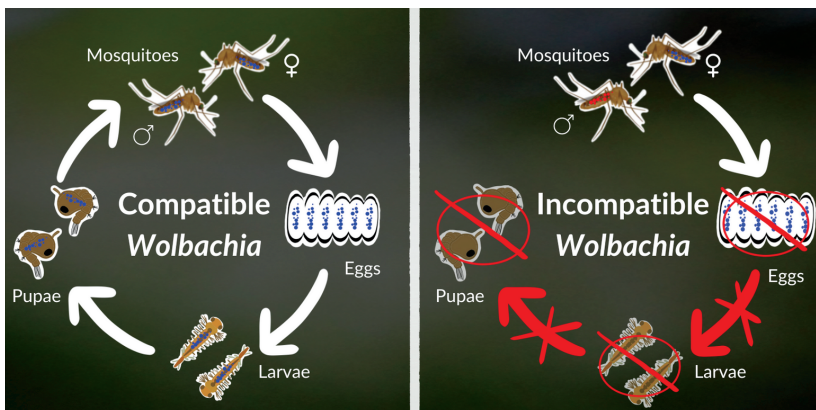
## What happens when other animals ingest Bt?

Bt is not harmful when used as directed. Bt kills only non-native mosquito and midge larvae, and has not been shown to make people or other mammals sick. Bt will not harm people, pets and other animals, aquatic life like fish or shrimp, or other insects, including native stream arthropods.

## What is Mosquito "Birth Control"?

The Incompatible Insect Technique (IIT), or mosquito "birth control", is an insect population suppression technique currently used in the U.S. and other countries to control human diseases. This technique uses a type of bacteria called *Wolbachia*. *Wolbachia* naturally occurs in over half of all insect species worldwide, including in the wild non-native mosquitoes already in Hawai'i and the fruit flies in our kitchens. *Wolbachia* can't be transmitted from insects to humans, birds, or dogs.

## How does Mosquito "Birth Control" Work?



If male and female mosquitoes carry incompatible strains of *Wolbachia*, any eggs laid by the female do not develop. Thus, the next generation of mosquito eggs will not hatch, causing the wild mosquito population to decrease. The project aims to release male incompatible mosquitoes into the critical habitats of the honeycreepers. Male mosquitoes do not bite nor spread diseases.

## I have more questions, who can I ask?

Email us: [info@kauaiforestbirds.org](mailto:info@kauaiforestbirds.org)

