

# Assessing the impacts of an invasive thrips (*Klambothrips myopori*)

## infestation on native *Myoporum* in Hawaii

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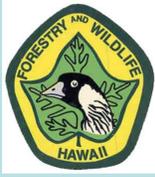


Figure 1. Healthy *Myoporum sandwicense* (left), *M. sandwicense* flowers (middle) and *Myoporum* thrips (right).

### BACKGROUND

Naio, *Myoporum sandwicense*, is a dominant tree species native to Hawaii and is both culturally and ecologically important (Fig. 1A,B). *Myoporum* thrips, *Klambothrips myopori*, is a recently established insect pest which infests naio in Hawaii (Fig. 1C). The pest was first found attacking naio on Hawaii Island in December 2008. Feeding by the thrips causes distortion in young leaves and gall-like symptoms (Fig. 2A,B). High infestation by the thrips causes branch die-back, and can eventually result in tree death (Fig. 2C,D).

*Myoporum* thrips likely originate from New Zealand or Australia, however the first documented infestation occurred in California where the pest was found attacking ornamental *Myoporum* species. Given the frequency of inter-island transport of goods and people, and the precedence of pest range expansions, this species is likely to spread throughout the Hawaiian Islands.

The Hawaii Department of Agriculture conducted initial delimiting surveys to assess the distribution, and determine whether *Myoporum* thrips should be the target of eradication efforts. Subsequent surveys revealed that the pest was widely established throughout Kailua-Kona, Kohala, Waikoloa and Waimea, making eradication unfeasible.

In 2010 the Hawaii State Division of Forestry and Wildlife (DOFAW) was awarded a US Forest Service Special Detection Monitoring Program Grant to evaluate the impacts of *Myoporum* thrips on naio. DOFAW has partnered with the University of Hawaii at Manoa, Department of Plant and Environmental Protection Sciences to complete on the project, and field studies have been ongoing since October 2010.

### PROJECT OBJECTIVES

- 1) Define the current distribution of the *Myoporum* thrips infestation on Hawaii Island.
- 2) Determine impact of *Myoporum* thrips across a variety of habitat types and elevational gradients.
- 3) Monitor *Myoporum* thrips density and distribution over time in infested areas, and measure rates of spread.
- 4) Evaluate the potential for management and control of *Myoporum* thrips
- 5) Help train field personnel (state/federal/private) to detect *Myoporum* thrips and identify infestations



Fig. 3. Staff monitoring at State Koaia Sanctuary, a naio with infested foliage at Pelekane Restoration area.

### SURVEY AND MONITORING PROTOCOLS

**Delimiting surveys** are currently being conducted on state, federal and private lands across Hawaii Island. Presence/absence data are collected based on visual inspections of plant foliage (Fig. 4).

**Monitoring sites** have been established at nine locations on Hawaii Island. Sites span an elevational gradient from sea level to 7000ft (Fig. 4) and include an array of habitat types.

**Thrips densities** are assessed from foliage samples collected on a monthly basis (5-10 infested shoots taken from 5-10 randomly selected trees). Shoots are individually bagged and taken to the laboratory. Shoots are then individually placed in a plastic containers containing 70% alcohol, allowed to sit for several minutes, then shaken to dislodge the thrips. Alcohol and water rinses are passed through a sieve to isolate thrips for counting.

**Impact to trees** will be measured by the continuous monitoring of 10 randomly selected trees at each site. Five shoots have been selected and tagged per plant. Infestation level for each of the selected shoots will be assessed monthly using the following scale: 0 = no galls; 1 = < 33% of the tissue is galled; 2 = 33-66% of the tissue is galled; 3 = > 66% of the tissue is galled.

**Natural enemies** that are observed during monthly monitoring will be collected, preserved and identified to gain an understanding of potential natural enemies which could contribute to thrips control.

**Habitat level factors** such as elevation, level of disturbance, density of naio, and forest composition will also be qualitatively documented to determine association with thrips occurrence and variation in density/infestation level.

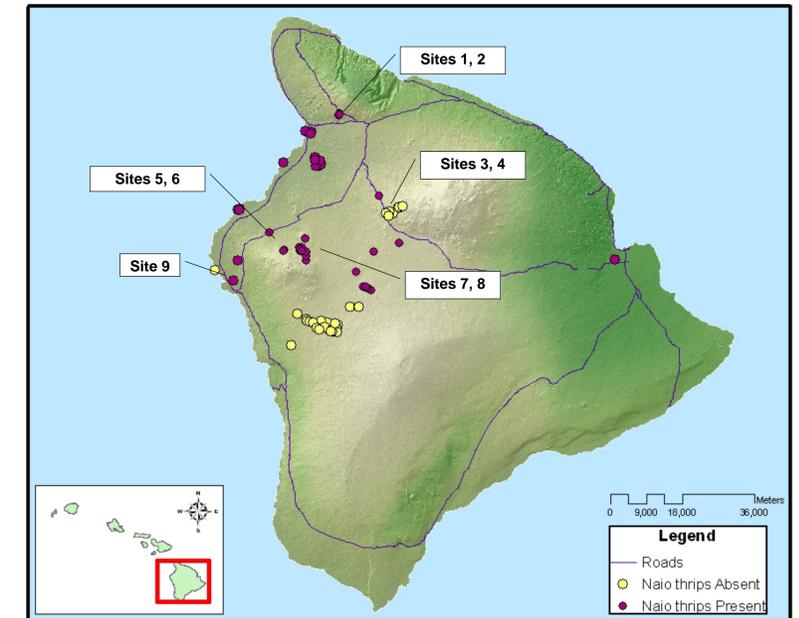


Figure 4. Current distribution of *Myoporum* thrips in Hawaii.

### PREVENTING FURTHER SPREAD

DOFAW and UH researchers have been meeting with land and resource managers to provide education on *Myoporum* thrips detection and identification, as well as the importance of quarantine practices to prevent spread. Extension has also been directed to restoration ecologists and field crews who utilize naio in habitat restoration projects. Propagation and out-planting of naio is not currently recommended as preliminary observations indicate that young plants are particularly susceptible to mortality as a result of thrips infestation.



Figure 5. *Myoporum* thrips cause mortality in young naio

Although the project will not stop the spread of *Myoporum* thrips on Hawaii Island, it will give resource managers a better understanding of *Myoporum* thrips ecology and dispersal rates across landscapes, as well as assess the impacts they have on our native ecosystems. This information can better inform management actions when or if *Myoporum* thrips become established on other Hawaiian islands.

### ACKNOWLEDGEMENTS

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### Progression of thrips damage on *Myoporum* foliage



Figure 2. Healthy naio foliage (A), distortion in young leaves (B), gall-like symptoms (C) and branch die-back (D).