

## **BIISC Target Pests: How Are they Chosen and What's on the Lists?**

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Roughly 10,000 new plant species have been introduced to Hawaii since European contact. Of these, about 200 species are considered invasive, meaning that they cause economic or environmental harm. As many of these species are widely established, total eradication is often not feasible; however, management activities can attempt to contain populations in a defined area, or exclude invasive species from ecologically, culturally, or economically important locations. Given that there are numerous potential targets, and limited resources available for their control, how does BIISC select which species deserve attention?

BIISC is overseen by an advisory committee of scientists and resource managers, and works with the Hawaii Invasive Species Committee, local land managers (e.g. watershed partnerships), state and federal agencies to identify species of concern. We select species based on reviews of scientific literature, funding, access to private landholdings, and input from partners and the community.

Our categories of target species are organized according to the time line of invasions. We have an early detection watch list of species not known to be present in a district or on the island but invasive elsewhere; we have detected species that pass criteria to be rapid response species for control; target species that have become more widespread but still valuable to control; and opportunistic species that are often well-established but may be controlled in an area. Historically BIISC has been primarily focused on weed species but we are beginning to devote more attention to insect, invertebrate, and vertebrate pests, as well as restoration initiatives. In addition, outreach education is done for many problem species that are not actively worked on by BIISC field crew.

BIISC primarily focuses on weed species that affect natural areas, though also assists the United States Forest Service, Hawaii Department of Land and Natural Resources, and Hawaii Department of Agriculture with, respectively, forest pests, vertebrate control, and agricultural pests. BIISC is funded by an array of competitive federal, state, and land manager grants, some of which support general operation and some of which are site and species specific.

### **Categories of Target Species:**

#### **Early Detection (looking for species not known to be present on island or in district)**

Our Early Detection team performs roadside surveys mapping exotic plants all over the island. The plants are evaluated based on scientific study of plant traits and behavior, invasiveness elsewhere, and expert interviews. By doing this, BIISC is able to sift a small list of targets out of the vast number of naturalized species on the island. Ideally, the botanists will find known invasive species in early stages before they have had a chance to naturalize, and the BIISC crew removes them with permission from the landowner, e.g. palo verde (*Parkinsonia aculeata*). Other times, known invasives will be found naturalizing in a small population and meet the criteria for rapid response control. For some early detection species the goal is only mapping distribution, while others will be controlled when possible. See the Early Detection section of the BIISC website for more detail.

**Outreach Species Targets:** Education is done for many species that are deemed invasive based on agency lists or other authority but not necessarily acted upon by BIISC. Focus species are often chosen by impacts to human health, or other impacts to society (such as invasive pests currently decimating honey bee populations), and state-wide priorities. Emphasis is often given to pests that are not yet present in a district or island.

*Examples:* little fire ants (*LFA*, *Wasmannia auropunctata*), naio thrips (*Klambothrips myopori*), West Nile Virus

## **BIISC staff perform field control for the following categories:**

### **Rapid Response**

Species are chosen for rapid response actions based on criteria such as size of population, invasive behavior elsewhere, the Hawaii Weed Risk Assessment score, expert interviews, feasibility of control, and landowner agreement.

Examples: Smoke Bush (*Buddleja madagascariensis*), Rubbervine (*Cryptostegia madagascariensis*) Cherokee Rose (*Rosa laevigata*), Mexican Palo Verde (*Parkinsonia aculeata*), and Empress Tree (*Paulownia tomentosa*).

### **Target Species**

These species are chosen by the BIISC committee for control actions based on potential for environmental harm, feasibility of control and containment, and partner funding. These alien pests affect recreational areas, pastures, tourism, State and private conservation reserves, native forest watersheds, agriculture, and the island's quality of life

**Our target species include:** Miconia (*Miconia calvescens*), Pampas Grass (*Cortaderia jubata*), Wax Myrtle (*Morella cerifera*), Plume Poppy (*Bocconia frutescens*), Rauwolfia (*Rauwolfia vomitoria*), and Red Mangrove (*Rhizophora mangle*).

### **Opportunistic, often Well Established**

BIISC staff occasionally supports field efforts led by other agencies and partnerships. Well established species typically are not cost-effective to control, but can be important to control in defined sites when funding and community/partner support are available. BIISC can maintain pest free buffers around partners lands to prevent encroachment of new problems.

Examples: Albizia (*Falcataria moluccana*, often creates safety hazard for roadways or adjacent buildings, weakens native trees and promotes other invasives), Koster's curse (*Clidemia hirta*, problem in forest reserves), firetree (*Morella faya*, threatens native trees in Hawaii Volcanoes National Park), Gorse (*Ulex europaeus*) and fireweed (*Senecio madagascariensis*) which cause problems on Mauna Kea slopes.

### **Miscellaneous/Monitoring/Invertebrate & Vertebrate Work**

(This category only used if species does not fall under early detection) BIISC occasionally supports work by other agencies in monitoring species distribution, fence-building, or other cooperative effort, and is becoming more active in vertebrate and invertebrate work. In partnership with other agencies, BIISC will occasionally survey for priority insect pests like naio thrips or little fire ants (LFA).

Examples: Palamanui Long Term Monitoring Plots data collection, some Little Fire Ant (LFA, *Wasmannia auropunctata*) surveys

Coqui (*Eleutherodactylus coqui*): Historically Coqui response efforts were guided by the multi-agency Coqui Frog Working Group. Some staff have been based with BIISC but the Coordinator is based with DOFAW. There is little remaining funding for coqui control on the Big Island and thus community response efforts are vital.

**Preservation/Restoration**

*BIISC is just beginning to explore the possibility of working in these arenas.*

Examples: growing/outplanting native species, the Hawaiian endangered coot (*Alae keokeo*) surveys and habitat restoration