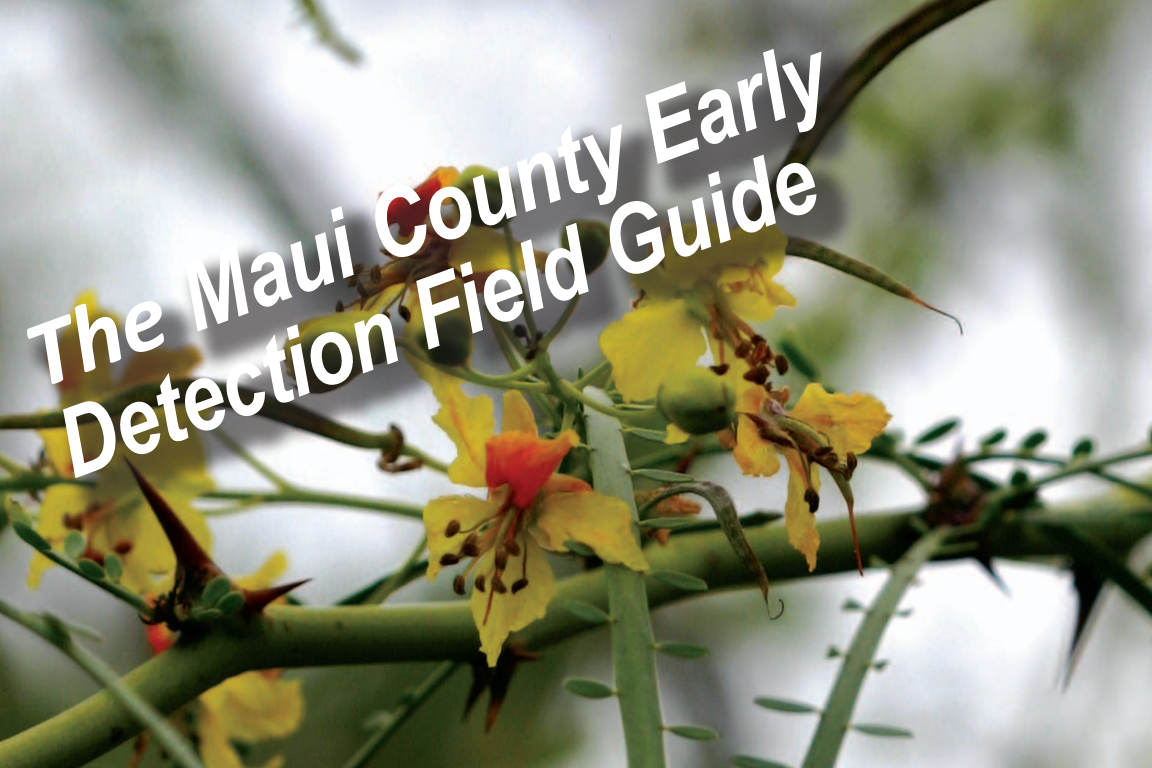




The Maui County Early Detection Field Guide

About this Field Guide

Cards have been divided into seven categories, color coded for easy navigation. The front of each card has detailed color photos and measurements to help in identification. A more complete description, along with confusing look-alikes, is on the back.

Tree	Purple	Aquatic	Blue
Shrub	Brown	Animal/Insect	Red
Grass/Herb	Green	Plant Disease	Orange
Vine	Yellow	Look-alikes	Grey

Acknowledgements

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Online version of this guide can be found at:
www.reportapest.org

Additional Resources

Hawaiian Ecosystems at Risk
(general invasive species information)
www.hear.org

Hawai'i Invasive Species Council
www.hawaiiinvasivespecies.org

Hawai'i Department of Agriculture
www.hawaii.gov/hdoa

Maui Invasive Species Committee
www.mauisc.org

Plant Pono and Hawai'i Weed Risk Assessments
www.plantpono.org

College of Tropical Agriculture and
Human Resources
www.ctahr.hawaii.edu

USGS NBII Pacific Basin Information Node
www.pbii.gov

Maui's "Sting Operation" to catch the little fire ant
www.fireantfreemaui.org

MISC's Coqui-Free Program
www.coquifreemaui.org



MISC

MAUI INVASIVE SPECIES COMMITTEE



**Pacific Basin
Information Node**
<http://pbii.gov>



The Need for Your Eyes and Ears

Maui County is in the midst of a silent invasion that threatens the islands' environment, economy, and quality of life.

Non-native plants, such as miconia, grow out of control, produce millions of seeds per tree every year, and threaten to take over unique natural areas and watersheds. Non-native animals, like the coqui frog, jeopardize peaceful nights, tourist revenue and residents' property values. Containing and removing these unwanted visitors costs Maui County, the State of Hawai'i and the federal government millions of dollars each year.

With the increase of traffic to and from the islands, the influx of invasive species is not likely to stop. Therefore, it is important for new species to be detected early and to have a program for rapid response. **This is why the early detection**

reporting system was created. It helps reduce the overall impact of invasive species. The system is designed to connect people who find early detection species with the agencies that are tasked with removing these invasive pests.

The Hawai'i Early Detection Network

Here's where you come in. By participating in an early detection reporting system, you will help increase the number of eyes and ears searching for invasive species. Whether you're driving to work, enjoying the beach, hiking, hunting, or just going holoholo (cruising or fishing), you can help keep an eye out for unusual plants and animals that don't belong here on Maui.

Take some time to learn about plants and animals on Maui so if you come across something unusual and/or new, you'll know what to do. Report a pest immediately to 643-PEST or www.reportapest.org.

What you can do...

Don't plant a pest.

- Avoid planting any plant that may potentially become invasive.
- Carefully inspect plants before purchasing to ensure they are free from unwanted pests.
- Remove invasive plants and animals on your property.

Don't buy a pest.

- Do not import, plant, sell, or move invasive plants and animals in, around, or off island.
- Report locations where invasive species are growing or for sale.
- Use non-invasive and native plants in your landscape.

Protect Hawai'i.

- Clean your hiking boots, equipment and vehicles before you go into a native area and after hikes in infested areas.

Keep pets contained.

- Do not release pets into the wild - keep parrots and rabbits caged.
- Don't dump aquarium pets or plants.
- Turn in unwanted aquarium pets or plants to a pet store.

Spread the word.

- Share what you learn with your friends and neighbors.

Support MISC activities.

- Allow the Maui Invasive Species Committee access to your property to control an invasive species.
- Tell your county and state legislators to support funding proposals and bills related to the prevention and control of invasive species in Hawai'i.

Contact Info

- Emergency Situations/Snake Reports: 911
- Report-a-Pest website: www.reportapest.org
- Pest Hotline: 643-PEST (7378)
- Maui Invasive Species Committee
573-MISC (6472)
- Hawai'i Department of Agriculture
635 Mua St., Kahului, HI 96732, 873-3555
- College of Tropical Agriculture and Human Resources (CTAHR) - Maui
310 W. Ka'ahumanu Ave. Bldg. 214
Kahului, HI 96732, 244-3242

How to Join the Eyes & Ears Team

Investigate It! Take a walk, drive to a park, or just visit a new place. Early detection begins with looking around for species listed within this field guide. In addition, it is also a good practice to keep an eye out for any new species that you recognize as a recent new arrival. It could be the next invader!



Inspect It! Take a look at the species that you've found. Compare it to the pictures and description within this guide.

Collect It! If you're unsure about what you've found, it's time to collect it. Refer to the "Collect It!" section for ways to collect a specimen without causing harm to yourself or the environment.



Report It! Now you're ready to tell someone about your findings. Use the reporting methods on the next page to let authorities know about your discovery.

Visit www.reportapest.org or call MISC at 573-MISC to sign up for updates or an invasive pest identification training.

Report your pest!!!

Online:

www.reportapest.org
or
miscpr@hawaii.edu



Walk-in:

College of Tropical Agriculture
and Human Resources (CTAHR)
310 W. Ka'ahumanu Ave. Bldg. # 214, Kahului
Hours: 9 a.m. to 5 p.m., 244-3242

Hawai'i Department of Agriculture - Maui
635 Mua St., Kahului
Hours: 7:45 a.m. to 4:30 p.m., 873-3555

Maui Invasive Species Committee (MISC)
820 Pi'iholo Road, Makawao
Hours: 7:30 a.m. to 4 p.m., 573-MISC(6472)

Phone:

Maui Invasive Species Committee: 573-MISC,
or the statewide reorting system: 643-PEST.

***If you see a snake or other dangerous
animal call 911 immediately!***

Stop! It's against the law.

It is unlawful to transport designated noxious weeds into Hawai'i or to introduce into areas within Hawai'i that are free or relatively free of that noxious weed (Chapter 152, HRS). The State of Hawai'i Injurious Species list makes it illegal to release or transport listed species to other parts of the State or to export them without a permit. For more information, visit the Hawai'i Department of Agriculture's website at www.hawaii.gov/hdoa.

Identification and Collection Guidelines



Once you've found a plant or animal that looks like an early detection species, compare it to the description and photos within this guide. Does it have a similar size, color, or shape? Don't forget to compare it to the "Look Alike" section. Sometimes the species can fool you.

Emergency Situations: Act Now!

Certain animals such as snakes, iguanas, or giant lizards, require immediate emergency response. If you come across these or other unusual animals, act immediately. **Call 643-PEST (7378). For snake sightings, call 911!**

If you can't determine if you've found an early detection species, you may want to mail or bring a sample to one of the walk-in pest reporting locations to help identify the pest. Turn the page to find out how to collect a plant, insect, or animal sample.

Photographs are very helpful.

- Submit an image for identification to reportapest-maui@lists.hawaii.edu or via the online report form at reportapest.org.
- Whenever possible, include a ruler, penny, pencil, etc. for size reference in the photo.

Report your pest.

If you think it's an early detection species, record the location (including information such as address, cross streets, mile markers, landmarks) and a detailed description of the pest. Note the size, color, identifying characteristics (flower/fruit color, or, and habitat). Once you've identified your unusual species as an early detection target report it to the authorities listed on the previous page.

Centimeters



Inches



Collection Guidelines



Submit a Plant Sample:

- Whenever possible, provide a 6" to 10" sample of the growing tip end of the stem with seeds, leaves, and flowers if available.
- Place the sample flat between a few layers of dry newspaper or paper towels. Avoid excessive folding of the leaves and place flowers so that you are looking into the center of the flower. Do this while the sample is fresh!
- Pack the wrapped bundle in plastic, preferably with a cardboard to keep the sample flat.
- Or, place fresh terrestrial plant samples directly into a plastic bag and refrigerate until they are taken to a reporting facility.
- Ensure that the package is well sealed. Don't spread the weed!

Submit an Animal Sample:

- Place insects in a non-crushable container such as a small medicine bottle or film canister.
- Tiny and/or soft-bodied specimens should be preserved in a small leak-proof bottle or vial of rubbing alcohol or frozen in a Ziploc bag. Do not submit insects in water.

- Hard-bodied specimens can be submitted dry in a crush-proof container. Do not tape insects to paper or place them loose in envelopes.
- Freeze all animals to ensure they are euthanized.

It is very important to collect information about where the plant or animal was found, so it can be found again. Please use a reporting sheet from reportapest.org, or include this information:

- name of the plant, animal, or insect (if you know);
- your name and contact details;
- the date it was collected;
- where the plant or animal was found, map coordinates from Google Map or a GPS reading, if possible, and street address, and who owns the land (if known);
- other plants growing around the area;
- approximate number of plants or animals;
- any other comments about how it may have gotten there and how invasive it appears to be.

MILK THISTLE

Silybum marianum



Don't confuse with Mexican poppy (left) which has yellow flowers and skinnier leaves or bull thistle (middle and right) which has flowers that lack thorns and uniform green leaves.

HERB

MILK THISTLE

Silybum marianum

FAMILY: Asteraceae

General Description: Milk thistle is a robust, fast growing thistle that can grow to 2-6 feet tall. It has purple flowers (1.5" to 2" long) that are surrounded by long spines. Its shiny green leaves have distinctive white veins, which give them a mottled appearance, and a wavy leaf margin covered in spiny edges.

Impacts: Milk thistle produces copious amounts of seeds (6,000 per plant) and has large leaves which will shade out other plants. It also contains high levels of nitrate which are poisonous to ruminant animals such as cattle and sheep. Seeds remain viable in the soil for up to 9 years and the plant thrives in disturbance, making eradication difficult.

Dispersal Mechanism: Thistle seeds have tiny tufts of hair (like dandelion seeds) which aid in wind dispersal. It can be spread accidentally in cattle feed, water, mud, vehicles, machinery, erosion and by animals.

Origin, Distribution, and Habitat: This thistle is native to the Mediterranean regions of Europe and North Africa. Milk thistle thrives in high fertility soils and moist areas such as riverbeds and pastures. It's a common weed in the Western U.S. and is a noxious weed in Washington and Oregon. It has been found naturalizing in the Makawao area of Maui, where MISC is working to eradicate the known populations.

Cultivation: Rarely cultivated as an ornamental, blessed milk thistle is more commonly grown for its medicinal properties. If you see this plant anywhere on Maui, please report it.

Don't confuse with:

- Mexican poppy, also known as prickly poppy, (*Argemone mexicana*), is a widespread weed on Maui with similar green and white mottled leaves. It can be differentiated by its yellow poppy-like flowers (2.5" wide), and skinnier leaves. It produces a bright yellow sap when the leaves or stems are broken.
- Bull thistle, (*Cirsium vulgare*), is a widespread weed on Maui that also has a purple flower and similar growth form. However, bull thistle has uniformly green leaves covered with small bumps.

! Hawai'i State
• Noxious Weed

COMMON MULLEIN *Verbascum thapsus*



All Images Forest & Kim Starr (USGS)



Don't confuse with primrose, with its showy flower (left) or telegraph weed (right), with its dandelion-like flower. Both have smaller thinner leaves with pointed tips.

HERB

COMMON MULLEIN

Verbascum thapsus

FAMILY: Scrophulariaceae

Hawai'i State
Noxious Weed

General Description: Herbaceous biennial that reaches up to 10' tall by its second year. Leaves range from 3" to 20" long and 1" to 5.5" wide and are covered with a dense layer of yellowish or whitish woolly hairs. The leaves grow in a rosette pattern getting progressively smaller toward the top. Small yellow flower clusters (8 to 15 mm long) grow in a random fashion along the center stalk that can be up to 10' tall.

Impacts: Mullein quickly colonizes disturbed areas and produces numerous seeds that may remain dormant for over 100 years. On the Island of Hawai'i, it infests roadsides with dense stands that can out-compete native vegetation and could do the same in similar native alpine ecosystems such as those found on Haleakalā.

Dispersal Mechanism: Mullein plants are spread in the horticulture trade and by birds. In Hawai'i, it has been speculated that seeds are dispersed in mud along roads by cars and along trails by hikers.

Origin, Distribution, and Habitat: Native to Europe, mullein is cultivated and naturalized in temperate areas of the world, including North America, Hawai'i, La Reunion, Australia, and New Zealand. Locally, it is established on the island of Hawai'i along roadsides at elevations from 5,000' to 10,000', particularly dense around 6,500'. Mullein is sparingly found and controlled on Maui. If you see this plant on Maui, please report it.

Cultivation: Common mullein has been cultivated for medicinal purposes, dyes, fish poison, and as an ornamental.

Don't confuse with:

- Telegraph weed (*Heterotheca grandiflora*) is another invasive plant growing in the sunny high altitudes of Maui. It can be distinguished from mullein by its dandelion-like flower. Leaves are smaller with pointed tips and have a strong sage smell when crushed.
- Primrose (*Oenothera* sp.) also grows in sunny high altitude areas of Maui. Its leaves are lance-like with pointed tips. Flowers are large and showy, up to 2" across.

! Hawai'i State
Noxious Weed

FOUNTAIN GRASS *Pennisetum setaceum*



Don't confuse with red fountain grass (above left) which is bigger (6'-8') with red-tinted foliage; or feathertop (above right)-long (3') which has feathery seedheads.



GRASS

FOUNTAIN GRASS

Pennisetum setaceum

FAMILY: Poaceae

Hawai'i State
Noxious Weed

General Description: Fountain grass is an erect perennial clumping grass that grows up to 3' high. The leaves are greenish-grey and have a slender, cylindrical, rolled shape. The small flowers are grouped together in an upright purple to rose-colored inflorescence that turns white as it goes to seed. Each inflorescence is 6" to 15" long.

Impacts: Originally introduced as an ornamental plant, fountain grass has become an aggressive, habitat-altering invader. It degrades the quality of pasture lands, particularly in drier areas. Fountain grass is fire-adapted and dry leaves can increase the intensity of and sustain fires that spread quickly into adjacent areas. After a fire, it resprouts faster than native plants.

Dispersal Mechanism: Fountain grass is dispersed through the horticultural trade as an ornamental grass. Seeds are also transported via the wind, water, and by seeds hitchhiking on vehicles, livestock, and humans.

Origin, Distribution, and Habitat: Native to Africa, fountain grass has invaded many types of natural areas in Hawai'i including bare lava flows, grasslands, and rangelands. The worst infestation occurs on the Island of Hawai'i where fountain grass covers at least 200,000 acres. Smaller infestations of fountain grass occur on O'ahu, Kaua'i, and Lāna'i. All known infestations are being controlled on the island of Maui. Please report all sightings.

Cultivation: Fountain grass is cultivated for its ornamental attributes.

Don't confuse with:

- Red fountain grass (*Pennisetum macrostachyum* var. *purpureum*) can be differentiated by red or purple tinted foliage and seed heads and its taller height (6' to 8'). Red fountain grass is considered a weed in Hawai'i and should not be planted.
- Feathertop (*Pennisetum villosum*) is another perennial, clumping grass with a growth structure and leaves similar to fountain grass. Feathertop produces distinctive feathery seed heads that can grow up to 3' in length. Feathertop is also considered a weed in Hawai'i and should not be planted.

! Hawai'i State
Noxious Weed

PAMPAS GRASS *Cortaderia* spp.



Don't confuse with sugarcane (left) or native Hawaiian sedges (right). Both lack curled leaves at the plants' base and the sugarcane plume is less dense.



Forest & Kim Starr (USGS)



Forest & Kim Starr (USGS)



curled leaves

Mau'i Invasive Species Committee



2'-3'

Mau'i Invasive Species Committee



Mau'i Invasive Species Committee

GRASS

PAMPAS GRASS

Cortaderia spp.

FAMILY: Poaceae

Hawai'i State
Noxious Weed

General Description: Pampas grass is a giant bunchgrass with long, slender, bright green, saw-toothed leaves. At the plant's base are dried corkscrew-shaped leaves. Pampas has large showy flower plumes (2' to 3' long) that extend beyond the foliage. Two species of pampas grass are found on Maui, *C. selloana* and *C. jubata*. Both reach heights of 9' to 10' and have loosely clumped pinkish-white seed heads. They flower July through November. Spent flower stalks are sometimes persistent for several years.

Impacts: Pampas grass grows rapidly, produces thousands of seeds per flower plume and can accumulate large clumps of biomass. Seeds are viable from 4-6 months but field evidence from Hawai'i suggests viability could be greater. Plants crowd out native species, impede access, degrade grazing lands, and create fire hazards.

Dispersal Mechanism: Pampas seeds are spread by wind, traveling up to twenty miles away from the parent plant. Humans also disperse seeds with contaminated gear. Pampas was once planted widely on Maui as an ornamental. Flower plumes are sold for dried flower arrangements.

Origin, Distribution, and Habitat: South American pampas grass was introduced to Hawai'i as an ornamental. On Maui, this plant has successfully jumped the garden fence directly into pristine upland native forests within and around Haleakalā Crater. It is found in pastures, roadcuts, gulches, yards and in remote West Maui locations.

Cultivation: Pampas grass is used as an ornamental plant for landscapes and its flower plumes are used for decorations. This distinct looking grass should never be planted; report if seen.

Don't confuse with:

- Sugarcane, *Saccharum officinarum*, has a similar seed plume as pampas but the plume is not as dense and sugarcane does not have corkscrew leaves.
- Native Hawaiian sedges (Family Cyperaceae) can be confused with young pampas grass. Native Hawaiian sedges do not produce corkscrew leaves, saw-like sharp leaf edges, tall flowering stalks, or large showy seed plumes like pampas grass.

- ! Hawai'i State
- Noxious Weed

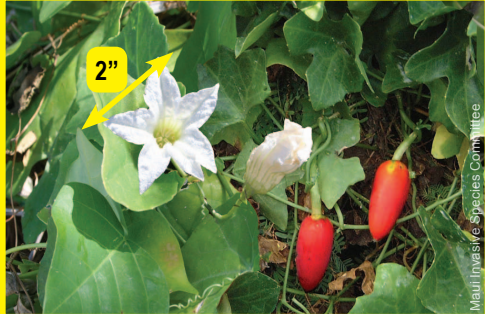
IVY GOURD *Coccinia grandis*



Maui Invasive Species Committee



Maui Invasive Species Committee



Maui Invasive Species Committee



Forest & Kim Starr / USGS



Forest & Kim Starr / USGS



Maui Invasive Species Committee

Don't confuse with bitter melon vine. Bitter melon has leaves that are more lobed, yellow flowers (left) and orange fruit (right).

VINE

IVY GOURD

Coccinia grandis

FAMILY: Curcubitaceae

**Hawai'i State
Noxious Weed**

General Description: Ivy gourd is an aggressive vine. Its leaves are 2" to 3" long and variably shaped, sometimes deeply lobed. Ivy gourd flowers are white and star-shaped, up to 2" across and have five petals. The fruits are smooth and green (1-3" long) with whitish stripes turning to a uniform crimson red when ripe. Ivy gourd is a State noxious weed.

Impacts: Ivy gourd grows aggressively and can climb over trees and shrubs as well as on fences and power lines. It can also cover archaeological sites such as *heiau* (Hawaiian temple). If left unchecked, ivy gourd can form a dense canopy that quickly smothers out its hosts under a solid blanket of vines.

Dispersal Mechanism: Ivy gourd is dispersed long distances by humans who grow the plant for food. This pest can also be dispersed unintentionally by the transport of plant material by humans. Ivy gourd seeds are spread by birds and rodents.

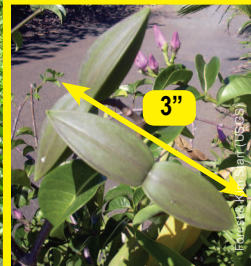
Origin Distribution and Habit: Ivy gourd is native to Africa, India, Asia, and Australia. It has been found on all Hawaiian Islands with the exception of Moloka'i. On Maui, ivy gourd was first observed in 1992 in Kahului and Kīhei. Today, this pest can still be found in Kīhei, Kahului, Ha'ikū, Makawao, Lahaina, Kā'anapali, and Kapalua. Ivy gourd is found in dry to moist areas up to 1,500' elevation. Let someone know if you see this plant.

Cultivation: Ivy gourd is cultivated for its edible leaves and fruits.

Don't confuse with:

- Bitter melon (*Momordica charantia*) is a fast growing vine also in the cucumber family. It has thin stems and deeply lobed, alternate growing leaves that are often covered in hairs. It produces yellow flowers and has oblong, prickly fruits that turn from green to yellow or orange at maturity.

RUBBER VINE *Cryptostegia* spp.



Don't confuse with purple allamanda (right) or Brazilian jasmine (left).

VINE

RUBBER VINE

Cryptostegia spp.

FAMILY: Asclepiadaceae

General Description: Rubber vine has dark glossy green leaves that grow in an opposite leaf arrangement averaging 3" to 4" long and 1" to 2" wide. The showy flowers are purple, funnel-shaped, with five petals. The large distinctive seed pods (about 3" long and 1" wide) are triangular, rigid, and grow in an opposite arrangement along the plant's stem. The seed pods can contain up to 450 brown seeds that have white silky hairs.

Impacts: Rubber vine is a notorious invader in Australia, introduced for ornamental use around 1860, and later for rubber production. It forms dense impenetrable thickets by climbing up trees and covering them. It has the ability to choke out native vegetation. In addition, rubber vine is an expensive problem for ranchers in Australia who must control the toxic plant to protect cattle and horses. This woody, self-supporting vine of the milkweed family has toxic properties that are harmful to humans and animals. The milky sap can cause burning rashes and blisters. When dry, a powdery dust emerges and may cause coughing, nose swelling and eyelid blisters.

Dispersal Mechanism: Plants are often dispersed long distances by humans. Tufts of silky hairs help disperse the seeds in the wind. Seeds are spread in floodwaters and mud, sticking to machinery and in the hooves of animals.

Origin, Distribution, and Habitat: Rubber vine is native to Madagascar where it is found along the western coastal plains, below 1,640'. On Maui, the distribution of rubber vine is still small. Please report any sightings.

Cultivation: Rubber vine has been cultivated in warmer regions of the world as an ornamental and for the production of rubber. In Hawai'i, it is grown as an ornamental and is occasionally observed on Maui in yards along driveways or fronting properties.

Don't confuse with:

- Purple allamanda (*Allamanda violacea*) This showy vine also produces a milky sap. Purple allamanda can be distinguished from rubber vine by its whorled three-to four-leaf growth pattern (arranged like spokes on a wheel). It doesn't have large seed pods.
- Brazilian jasmine (*Mandevilla sanderi*) This sa- producing vine is considered a safe alternative to rubber vine in landscaping. It can be differentiated by its dark pink to red trumpet-shaped flowers.

- ! Hawai'i State
- Noxious Weed

ASIAN AND RED MELASTOME *Melastoma* spp.



Don't confuse with Koster's curse (left), or species of tibouchina (right).

SHRUB

ASIAN AND RED MELASTOME

Melastoma spp.

FAMILY: Melastomataceae

Hawai'i State
Noxious Weed

General Description: Asian melastome (*Melastoma candidum*) and red melastome (*Melastoma sanguineum*) are two related weedy shrubs that are difficult to tell apart. They grow to 5'-15' tall. Leaves are elliptic in shape, ranging 1.5" to 4" long and 0.5" to 1.5" wide, with five to seven distinct arching veins forming a "leaf within a leaf" pattern. Red melastomes leaves are slightly longer and more pointed. Their flowers have 5 to 6 pink or light purple petals, averaging 2" across. The small berries are about 0.75" long and split open to reveal five or six cells full of seeds.

Impacts: Both species form dense monotypic thickets and can crowd out native vegetation.

Dispersal Mechanism: *Melastoma* spp. are spread long distances by humans for landscaping. Plants readily escape from gardens and are further spread by fruit eating birds and animals. Melastomataceae have also been observed moving inter-island on *hāpu'u* fern (*Cibotium* spp.) used in the horticultural trade.

Origin, Distribution, and Habitat: Asian and red melastomes, native to Southeast Asia, are cultivated in tropical areas as ornamental shrubs. In Hawai'i, they have escaped from cultivation and are now locally abundant and invasive in windward and wet areas and bog margins on Kaua'i, O'ahu, and Hawai'i Island from sea level to 3,000'. It is believed to be eradicated on Maui, so any suspected plants should be reported.

Cultivation: These species are grown as ornamental shrubs for their showy flowers and attractive foliage. Asian melastome was first introduced from Florida in 1916. Red melastome was first collected from Hawai'i Island in 1957.

Don't confuse with:

- Koster's curse (*Clidemia hirta*) is a widespread pest in Maui County, a State noxious weed, and is another Melastome species. It tends to be shorter than Asian and red melastome and the leaves are covered in stiff coarse hairs.,
- Tibouchina (*Tibouchina urvilleana*, *Tibouchina herbacea*) are two more weedy Melastome species widespread in Maui County. Their large 5" flowers are deep purple with noticeable long yellow or purple anthers. The fleshy fruits are smaller than Asian and red melastomes and do not split open at maturity.

SPANISH HEATH

Erica lusitanica

bell-like tubular flowers



Don't confuse with the native pukiawe that has smaller leaves. Pukiawe flowers have defined petals that curve back and dark red to white fruit.

Forest & Kim Starr (USGS)



up to 9'

SHRUB

SPANISH HEATH

Erica lusitanica

FAMILY: Ericaceae

General Description: Spanish heath, also known as Portuguese heath, is a fast growing small to medium woody, evergreen shrub with showy white bell-like tubular flowers and lime-green, leathery needle-like leaves. It can grow up to 9' tall.

Impacts: Spanish heath produces millions of tiny, dust-like seeds that remain viable in the soil for 4 years or more. It can invade open, sunny, disturbed areas as well as intact Hawaiian forests. It will resprout easily after damage or fire and readily recolonizes burned areas reaching densities that provide fuel for future fires.

Dispersal Mechanism: Spanish heath is a cultivated plant that can easily jump the garden fence and spread in to surrounding areas. It spreads from seed in dumped garden waste, transported in soil, and by wind and water. It can also spread on the coats of animals or get tracked on hooves, boots, or tires.

Origin, Distribution, and Habitat: Spanish heath, native to southwestern Europe, has a history of invasiveness in Australia, Tasmania, and New Zealand. All of these places have declared it a noxious weed. Though Spanish heath prefers full sunlight, it will also invade forests. It can completely take over the shrub layer of native ecosystems, particularly in cool, moist climates. On Maui, it has only been found in limited areas of upcountry East Maui. If you see this shrub anywhere, let someone know!

Cultivation: Spanish heath is suspected to have been planted alongside early carriage roads on Maui. Elsewhere in the world it has been introduced as an ornamental plant.

Don't confuse with:

- Pukiawe (*Leptocophylla tameiameia*) is a small, variable shrub that is native to Hawai'i. This shrub ranges from coastal to alpine, though it is most prominent in higher elevations. The small lance like leaves often have a dull white hue. Flowers are white to pink with 5 petals and 1/8" across. Mature fruit is a fleshy round dark red, pink or white fruit

! Hawai'i State
• Noxious Weed

YELLOW HIMALAYAN RASPBERRY

Rubus ellipticus



Don't confuse
with other *Rubus*
species such as the
'ākala (top, middle)
and blackberry.



stems covered
in bristly hairs



3"



15' or more



rounded leaf tip
clusters of 3

SHRUB

YELLOW HIMALAYAN RASPBERRY

Rubus ellipticus

FAMILY: Rosaceae

Hawai'i State
Noxious Weed

General Description: Yellow Himalayan raspberry is a rambling shrub that grows 7'-15' tall and is covered with prickles. It is the only raspberry with light green heart-shaped leaves growing in a three-leaflet pattern along the stem. The leaves average 2" to 3" long and have saw-like edges with rounded tips. The white flowers are small (up to 1/3" long). Yellow Himalayan raspberry is also the only raspberry with yellow fruit (1" long) in Hawai'i.

Impacts: Yellow Himalayan raspberry spreads by vigorous vegetative growth as well as by birds and other mammals that eat the fruit. It is hard to kill once established.

Dispersal Mechanism: In Hawai'i, yellow Himalayan raspberry is spreading from the island of Hawai'i to Maui as a contaminant in *hāpu'u* (*Cibotium* spp.) fern trunks and parts, such as mulch. Humans transport the plant long distances for use as an ornamental or as an edible crop.

Origin, Distribution, and Habitat: Yellow Himalayan raspberry is native to tropical and subtropical India. On Hawai'i Island, this pest is now naturalized in moist to wet disturbed forests from 2,270' to 5,580' elevation. It is well adapted to open sunny areas and wet shady rainforests. On Maui, it is not yet established in the wild, but with the constant importation of *hāpu'u* from Hawai'i Island, it is likely that yellow Himalayan raspberry will eventually make its way to Maui. Please report any sightings.

Cultivation: This pest is widely cultivated as an ornamental in warm regions.

Don't confuse with:

- Blackberry (*Rubus argutus*). This invasive berry is widespread in Maui County. It can be distinguished from yellow Himalayan raspberry by its white flowers and pointed leaflets and red to black fruit.
- 'Ākala (*Rubus hawaiiensis*), the native Hawaiian raspberry, can be distinguished by its pale tan stalk, large pink flower and red berry. 'Ākala is the only berry that loses its leaves in the winter.

- ! Hawai'i State
- Noxious Weed

AUSTRALIAN CHEESEWOOD

Pittosporum undulatum



Don't confuse with other trees such as the native *Ho'awa* (left) and the cape pittosporum (middle)-neither has wavy leaf margins. Macadamia nut (right) is also similar looking but has a pipe cleaner-like flower and rounded leaf tip.

TREE

AUSTRALIAN CHEESEWOOD

Pittosporum undulatum

FAMILY: Pittosporaceae

Hawai'i State
Noxious Weed

General Description: Australian cheesewood, also known as Victorian box or sweet pittosporum, is a fast growing tree that is often grown in gardens for its aromatic white flowers. It can grow from 15' to 45' and has shiny green leaves that are 2" to 6" long with distinctly undulating edges. Leaves have an alternate arrangement. Five-petal white flowers (3/4" – 1" long) are found clustered at the end of young branches and smell strongly of citrus. Orange fruit capsules are formed in the fall (approximately 1/2" long) and bear shiny black seeds.

Impacts: Australian cheesewood is a popular landscaping tree that has escaped the garden in Hawai'i, Jamaica, South Africa, New Zealand, and other Pacific and Atlantic Islands. Initially introduced to a botanical garden in Jamaica, it has become that country's most invasive plant in eastern forests, out-competing native plants in the tropical montane forest. Infested areas have up to 5,000 seedlings per square meter.

Dispersal Mechanism: Australian cheesewood is spread both by humans who use the plant in landscaping and fruit-eating birds that spread seeds great distances. Keep your eyes peeled and share any sightings.

Origin, Distribution, and Habitat: This tree is native to Australia but is widely cultivated throughout the world as an ornamental. In Hawai'i, Australian cheesewood has naturalized in disturbed mesic forests on Lāna'i and Hawai'i where it often becomes the dominant species. On Maui, it is only known to be at a few sites upcountry.

Cultivation: Australian cheesewood is cultivated for its ornamental and aromatic flowers.

Don't confuse with:

- *Ho'awa (Pittosporum glabrum)* is one of ten endemic pittosporum species in Hawai'i, typically found in native forests. Australian cheesewood can be differentiated by its undulating edged leaves.
- Cape pittosporum (*Pittosporum viridiflorum*) is native to South Africa and cultivated in Hawai'i for garden plantings. It has fragrant flowers and orange seedpods, but lacks the undulating leaf margins. This tree is also be a target pest as it readily naturalizes and should be reported.
- Macadamia nut (*Macadamia integrifolia*) also has the undulating leaf margins characteristic of Australian cheesewood, but has flowers that resemble a pipe cleaner and the fruit turns from green to brown.

BINGABING *Macaranga mappia*



Don't confuse with the parasol leaf tree, which has smaller leaves (1' long) and branched flowers.

TREE

BINGABING

Macaranga mappa

FAMILY: Euphorbiaceae

General Description: Bingabing is a large-leaved plant that grows 15' to 30' tall. Its round leaves can be as large as an umbrella up to 2' to 3' long. The stem attaches to the middle of the leaf. Bingabing flowers do not have petals. Instead, there are noticeable red bracts along the main stem.

Impacts: On Hawai'i Island, bingabing was seeded from airplanes along with many other weedy forestry species near Hilo after a fire. Today, it lines roadsides, gulches, and disturbed forests in the vicinity. Its large leaf structure creates a dense growth that can crowd and shade out other vegetation.

Dispersal Mechanism: Long distance dispersal of bingabing is achieved primarily through humans who use the plant in ornamental landscaping or reforestation. It also moves between islands in nursery stock.

Origin, Distribution, and Habitat: Bingabing is native to the Philippines and is cultivated in tropical regions throughout the world. In Hawai'i, it is known to be naturalized on the islands of O'ahu and Hawai'i in low elevation mesic to wet areas and disturbed mesic valleys (sea level to 721'). It was once planted on Kaua'i in 1927 but there are no reports that the pest has become naturalized there. Bingabing trees have been found in Upcountry and South Maui. Please report any sightings of this plant!

Cultivation: Bingabing was cultivated in Hawai'i and other tropical regions of the world for ornamental purposes and in reforestation projects.

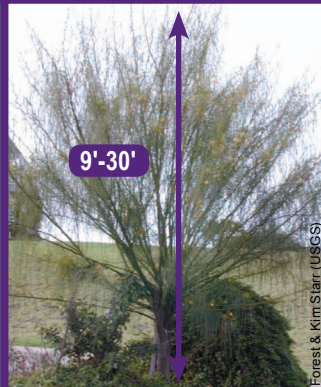
Don't confuse with:

- Parasol Leaf Tree (*Macaranga tanarius*); this relative of bingabing has already escaped into the wild on West Maui. However, in East Maui and within nurseries, parasol leaf tree is a target species. It can be distinguished from bingabing by its smaller leaves (less than 1' long) and pale green to yellowish green flower parts. If you find parasol leaf tree growing in East Maui or in nurseries, please report it.

JERUSALEM THORN *Parkinsonia aculeata*



Don't confuse with the kiawe tree, which has pipe cleaner-like flowers and 1" long thorns.



TREE

JERUSALEM THORN

Parkinsonia aculeata

FAMILY: Fabaceae

General Description: Jerusalem thorn is a shrubby, thorny tree that grows 9' to 30' tall. It has a smooth green bark and spines along its branches. Feathery leaves are formed by long flat spine-like stems measuring 10" to 16" in length with 22 – 30 pairs of small leaflets. Jerusalem thorn has small 1" yellow flowers with orange spots that hang in groups. This plant has green pods with brown or purple spots that range from 2" to 8" long.

Impacts: This pest has been planted throughout the world as an ornamental and has since escaped from cultivation. Jerusalem thorn is fast growing, drought tolerant, and able to grow in different soil types. In Australia, Jerusalem thorn can form dense, thorny, impenetrable thickets along water courses and drainages.

Dispersal Mechanism: Jerusalem thorn seeds are dispersed via waterways and during flood conditions. It is also dispersed by animals and humans who spread the plant long distances in landscaping.

Origin, Distribution, and Habitat: The full extent of Jerusalem thorn's native range is uncertain. However, it is widely cultivated and is known to spread from initial plantings in California, Arizona, Florida, Hawai'i, the West Indies, Australia, and Micronesia. On Maui, this plant was once located at three sites which have since been controlled. Share the location of any suspected plants with authorities. The potential range on Maui is suspected to be extensive, possibly wherever kiawe exists.

Cultivation: Jerusalem thorn is a hardy species and is valued as an ornamental or shade tree. Its uniquely shaped leaves, yellow flowers, shrubby weeping-like habit, drought tolerance, and ability to grow in a wide range of soils makes it an appealing ornamental. Jerusalem thorn has also been used in Africa and Pakistan to revegetate desert regions.

Don't confuse with:

- Kiawe (*Prosopis pallida*) is the common thorny mesquite found in dry and coastal areas of Maui County. It grows up to 40' tall and has 1" thorns and yellow seed pods. Jerusalem thorn can be differentiated by its long yellow flowers.

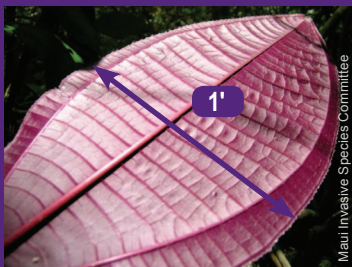
! Hawai'i State
• Noxious Weed

MICONIA

Miconia calvenscens



Don't confuse with a rubber tree (top), it lacks the 3 prominent veins, or Koster's curse (bottom), a shrub with small 2-6" long leaves.



TREE

MICONIA

Miconia calvescens

FAMILY: Melastomataceae

Hawai'i State
Noxious Weed

General Description: Miconia grows up to 50' tall when mature. It has extremely large oval leaves (averaging 3' long and 1' wide) that are a dark green on top and purple on the underside. Each leaf has three prominent leaf veins creating a distinctive "leaf-within-a-leaf" pattern. Its tiny white to pink flower clusters are very short lived, lasting one day. The berries are dark purple measuring 7 mm in diameter and contain hundreds of seeds.

Impacts: Miconia trees grow quickly and close together, shading out nearly all other forest plants with the large oval leaves. It also has a shallow root system and can cause increased erosion and landslides. Miconia quickly matures, producing fruit after three to four years and flowers and fruits several times a year. Plants produce ten to twenty million seeds a year, which can remain viable for sixteen years and possibly longer.

Dispersal Mechanism: Humans and animals are key dispersal mechanisms for miconia. Miconia has been used as an ornamental plant and in landscape projects. Seeds, about the size of a sand grain, are unintentionally spread by humans and hitchhike on clothes, boots, gear and animals. Fruit-eating birds feed on miconia dispersing seeds into pristine native habitat. Contaminated vehicles can also be another vector for the seeds. Hitchhiking seeds have been moved inter-island on hāpu'u fern (*Cibotium* spp.) stumps.

Origin, Distribution, and Habitat: Miconia, a native to Central and South America, was introduced to Tahiti in 1937 and has since overwhelmed two-thirds of Tahiti's native forests. It is responsible for threatening 25% of Tahiti's native forest species with extinction. Miconia was introduced into Hawai'i in the 1960s. On Maui, miconia can be found on the windward sides of the island and is established in East Maui.

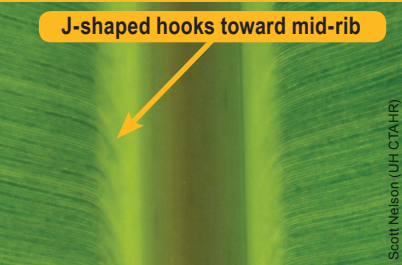
Cultivation: Miconia was primarily grown as an ornamental plant for nurseries. Inform authorities of any sightings.

Don't confuse with:

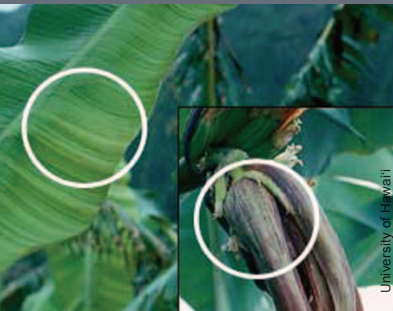
- Koster's curse (*Clidemia hirta*) is a widespread pest in Maui County and a State noxious weed. Also a Melastome species, it can be differentiated by its shrubby growth and small leaves covered in coarse hairs.
- Rubber Tree (*Ficus elastica*) is widespread in Maui County. Its leaves are shiny, leathery, and purple on both sides, without three prominent veins. This plant contains copious white latex.

BANANA BUNCHY TOP VIRUS *BSTV*

J-shaped hooks toward mid-rib



Don't confuse with the cucumber mosaic virus that flower deformity (inset) and leaf yellowing.



PLANT
DISEASE

BANANA BUNCHY TOP VIRUS

BBTV

General Description: Banana bunchy top virus is a devastating pathogen that affects banana plants. There is no cure for this virus. Symptoms that can help identify the disease are:

1. shrunk malformed leaves “bunching” at the top;
2. “Morse code” dark green streaking on the leaf stem;
3. mottled and streaked flowers;
4. dark green streaks with “J” shape on midrib;
5. presence of the banana aphid (*Pentalonia nigronervosa*).

Impacts: BBTV stunts the growth of banana plants and fruit. Eventually, banana plants may die and/or stop producing fruit.

Dispersal Mechanism: BBTV is spread by banana aphids which feed on infected plants and then transport the virus to healthy banana plants. It is also spread by the movement of infected plants. All plants with BBTV should be quarantined and reported.

Origin and Distribution: Banana bunchy top virus was first introduced to Hawai'i in 1989. It was first seen on O'ahu, then the disease made its way to the Big Island followed by Kaua'i. In 2002, BBTV was first detected on Maui in Pukalani. Since then, it has been found in Pukalani, Makawao, Kula, Kahului, Lahaina and Kihei.

Don't confuse with:

- Cucumber Mosaic Virus (CMV) is also spread by the banana aphid, but does not cause significant damage to banana fruit. Symptoms are mottling and streaking flowers. CMV does not cause the “Morse code” leaf streaking pattern of BBTV infected plants.
- Severe deficiencies of nutrients like calcium and boron cause yellowing and deformed growth of leaves.

! Hawai'i State
Injurious Wildlife

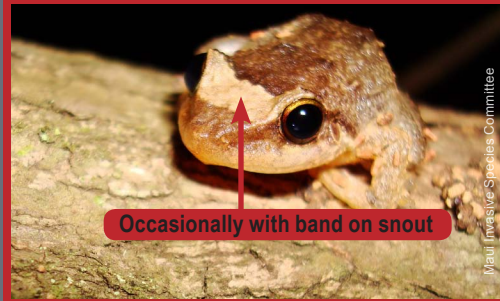
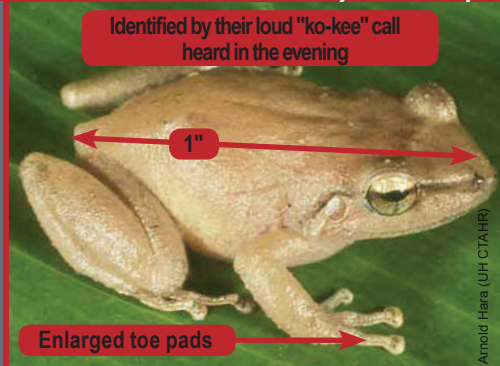


Don't confuse with the greenhouse frog (on right in both pictures), widespread in Hawai'i. Greenhouse frogs are about the size of a dime and have very small toe pads compared with coqui frogs (on left).



COQUI FROG

Eleutherodactylus coqui



ANIMAL

COQUI FROG

Eleutherodactylus coqui

FAMILY: Leptodactylidae

Hawai'i State
Injurious Wildlife

General Description: Adult frogs average 1" long, about the size of a quarter. Color ranges from light to dark brown to red, occasionally with a line down the back. Their snout is broad and rounded, and the toe pads are obvious.

Impacts: These small tree frogs are known for the male's loud (90 decibel) "ko-kee" mating call which interrupts the evening peace for residents and visitors. Coqui have no natural predators in Hawai'i and can reach population densities of up to 22,000 frogs per acre. They have voracious appetites and consume a large amount of insects, including native insects, possibly affecting food supplies for native insect-eating birds. Coqui have caused economic harm to real estate sales on Hawai'i Island where home sellers must disclose the presence of coqui on their property.

Dispersal Mechanism: Coqui frogs do not travel very far on their own, but when hidden on nursery plants, flowers, or vehicles, they can quickly spread. Most coqui arrive on Maui through infested nursery plants and flowers. Coqui travel intra-island by the movement of plants and frogs may hitch a ride on vehicles.

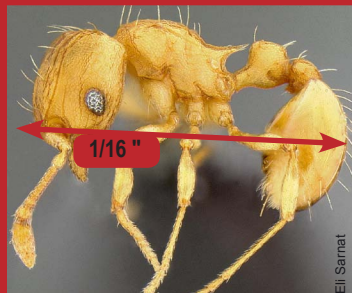
Origin, Distribution, and Habitat: Originally from Puerto Rico, coqui made their way to Hawai'i via plant shipments. They were first introduced to Maui in 1988 and detected on Hawai'i Island in 1997. Today, Hawai'i Island has the largest population statewide and Maui is second. Moloka'i and Lāna'i are coqui-free. Coqui are primarily nocturnal, seeking shelter during the day in moist leaf matter and emerge at dusk where they can be found anywhere from high in the trees to the brush on the ground. They prefer environments similar to their Puerto Rican home: hot, humid and, moist. Keep coqui from becoming widespread on Maui by reporting any suspected frogs.

Don't confuse with:

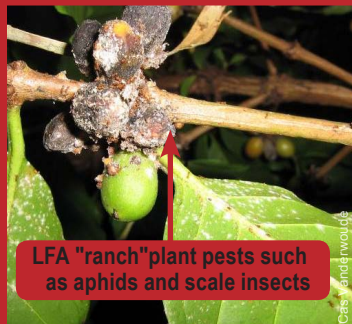
- Greenhouse frog (*Eleutherodactylus planirostris*) is widespread in Maui County. Adult greenhouse frogs are about the size of a dime whereas coqui frogs are larger, about the size of a quarter. They also have a different call which sounds similar to a cricket. Greenhouse frogs have a narrower snout and less distinct toe pads. Greenhouse frogs are only found on the ground and are also active during the day.

! Hawai'i State
Designated Pest

LITTLE FIRE ANT *Wasmannia auropunctata*



Don't confuse with the
tropical fire ant (below-
right) or any of the other
40+ ant species already
in Hawai'i. Little fire ants
(left) are much smaller
and do not have large-
headed workers.



NSECT

LITTLE FIRE ANT

Wasmannia auropunctata

FAMILY: Formicidae

General Description: The little fire ant (LFA) is a very slow moving ant, averaging 2 mm or about 1/16th" long. It gets its name from its powerful sting that can feel fire-like to the person or animal on the receiving end. Many people will develop large red welts that last hours, even days, followed by an intense itching sensation. An individual ant can deliver multiple stings, and often several ants attack at once. Little fire ants are uniform size and do not have big-headed workers.

Impacts: The speck-sized ant invades agricultural areas and nurseries putting coffee growers and fruit pickers at risk of being stung. Some farm owners have had difficulties retaining workers who fear the fire ant sting. Besides being a serious nuisance to humans, this ant has been known to attack the eyes of domestic animals and blind them. In New Caledonia LFA infestations have drastically decreased biodiversity.

Dispersal Mechanism: LFA will find their way into the nooks and crannies of potted plants, flowers, clumps of grass, and leaf litter. To the dismay of Big Island's residents, little fire ants have been known to enter homes getting into clothes, beds, furniture, and food.

Origin, Distribution, and Habitat: Originally from Central and South America, little fire ants have spread to many tropical islands including Papua New Guinea, New Caledonia, and the Galapagos. In Hawai'i they have been found on Kaua'i and are widespread on the East side of the Island of Hawai'i. LFA form super colonies, nesting in trees as well as on the ground and live in moist humid climates. They were first detected on Maui in October of 2009, and are a top priority for control. Please collect and/or report any suspected infestations of LFA immediately!

Don't confuse with:

- Tropical fire ant (*Solenopsis geminata*) is common throughout Hawai'i. It is also red and stings but can be distinguished from LFA by its much larger size (3 to 6 mm) and the presence of "big headed" workers. This ant is restricted to dry coastal areas, nests in the soil, and does not construct mounds.

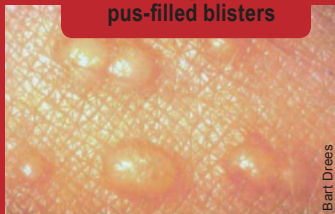
! Hawai'i State
Designated Pest

RED IMPORTED FIRE ANT *Solenopsis invicta*

Don't confuse with the tropical fire ant (below) or other 40+ ant species already in Hawai'i. Red imported fire ants do not have large-headed workers. No other ant will swarm like the red imported fire ant.



RIFA stings cause
pus-filled blisters



No other ant will swarm as
aggressively as RIFA



RIFA build cone shaped mounds

INSECT

RED IMPORTED FIRE ANT

Solenopsis invicta

FAMILY: Formicidae

General Description: Red imported fire ants (RIFA) are aggressive stinging ants currently not present anywhere in Hawai'i. They average 3 to 6 mm in length and have an opaque, shiny black abdomen. RIFA do not have "big-headed" workers. RIFA build dome-shaped mounds of soil that don't have an obvious entry hole.

Impacts: RIFA pose a serious threat to human health. Large numbers of ants will rapidly swarm on and relentlessly sting anything unfortunate enough to disturb them. In the U.S., hundreds of people are stung each year. RIFA stings cause blisters filled with white pus which lasts for several days. In infested areas, they may cause injury or death to livestock, pets, and wildlife; damage crops, ornamental plants, electrical equipment, and irrigation systems; and cause serious declines in biodiversity.

Dispersal Mechanism: RIFA are primarily dispersed via human activities such as cargo and nursery plant shipments.

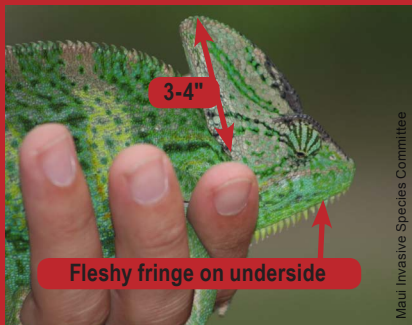
Origin, Distribution, and Habitat: Native to Brazil, RIFA were introduced to the United States in the 1930s. They have invaded over 300 million acres across the southern U.S. Though this ant has not yet established itself in Hawai'i, it gained a foothold in California in 1998. With the enormous quantity of cargo and people arriving in Hawai'i from California, there is a high risk of this ant becoming the next major severe pest invasion in Hawai'i. RIFA has been intercepted in shipments destined for Hawai'i. Inform authorities if you suspect a population of RIFA.

Don't confuse with:

- Other ants: there are over 40 types of ants in Hawai'i. Most of these ants are black to pale brown and slightly transparent. Most other ants build mounds that will have a visible opening or be surrounded by an area that is stripped of vegetation. Red imported fire ants build cone-shaped mounds with no visible opening. No other ant in Hawai'i will aggressively swarm like the red imported fire ant.

! Hawai'i State
Injurious Wildlife

VEILED CHAMELEON *Chamaeleo calytratus*



Maui Invasive Species Committee



Maui Invasive Species Committee



Don't confuse with the Jackson's chameleon. Male Jacksons' (left) have 3 horns on the front of their heads. The females lack horns (right), and neither sex has the shark-fin-like casque on its head.

ANIMAL

VEILED CHAMELEON

Chamaeleo calytratus

FAMILY: Chamaeleonidae

Hawai'i State
Injurious Wildlife

General Description: Veiled chameleons have a casque or shark-fin-like shield ranging from 3" to 4" long on their heads. A fleshy fringe runs from under the chin of each animal down the middle line of the body towards the base of the tail. Their legs and tail are long and thin, and are usually light green with vertical bands of contrasting colors. Veiled chameleons can grow up to 2' in length. Juveniles are usually light green but can also be light brown, with a small but visible casque on their heads. Immediately capture and report any chameleon matching this description.

Impacts: Veiled chameleons are able to live in a wide range of habitats and pose a threat to Maui's native birds, insects and vegetation. Fully-grown veiled chameleons may be capable of eating small birds, such as the native 'apapane and are likely to prey on rare native land snails.

Dispersal Mechanism: Veiled chameleons may enter the State through the illegal pet trade. They are invasive and illegal in Hawai'i. It is against the law to import, breed, keep as pets, sell, release, or export veiled chameleons. Penalties can include a fine of up to \$200,000 and a possible prison sentence. The Hawai'i Department of Agriculture has an amnesty program allowing a person to turn in an illegal animal without prosecution.

Origin, Distribution, and Habitat: Veiled chameleons are originally from Yemen and Saudi Arabia. They were first found on Maui in March 2002. Since then, over 200 veiled chameleons have been captured on Maui with a majority from Makawao. Chameleons are not native to Hawai'i. The discovery of pregnant females, mature males, and juveniles indicates that veiled chameleons have established a breeding population on Maui. They tolerate tropical and sub-tropical climates, and occupy mountainous regions, plateaus and valleys. They are found at altitudes ranging from 1,700 to 9,500 feet in their native habitat.

Don't confuse with:

- Jackson's chameleon (*Chamaeleo jacksonii*) grow up to 10" in length. Adult males have three horns on the front of their heads. Juveniles and females often have a blotchy color. This widespread look-alike is considered invasive in Maui County.

NEW & UNUSUAL ANIMALS, ANIMAL SIGNS, OR EVENTS

Fight the Bite!



Brown tree snake

L. Oberhofer, USDA APHIS)



Mitred conures



Red-vented bulbul

Kim Bridges



NEW & UNUSUAL ANIMALS, ANIMAL SIGNS, OR EVENTS

Snakes: Call 911! Snakes are not native to Hawai'i and are illegal. Should a brown tree snake or other snake enter Hawai'i and establish a breeding population, our island's economy, ecology, and way of life will be irretrievably altered. Illegal pets can be turned in, no questions asked, by calling the Pest Hotline at 643-PEST. If you EVER see a snake, call 911 immediately.

Any Unusual Animal: Mystery animals, such as big cats, iguanas, and monitor lizards are occasionally reported on Maui. These exotic alien species do not belong on Maui and are an immediate threat. If you EVER see an unusual animal, call 643-PEST immediately. If the animal is dangerous, call 911!

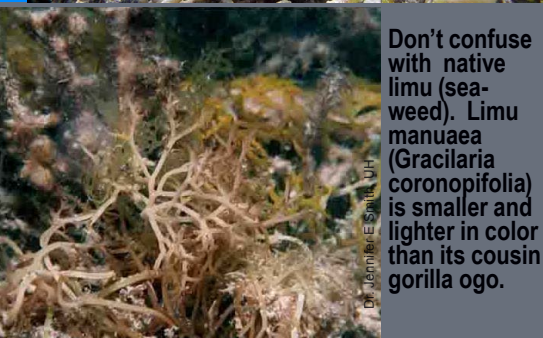
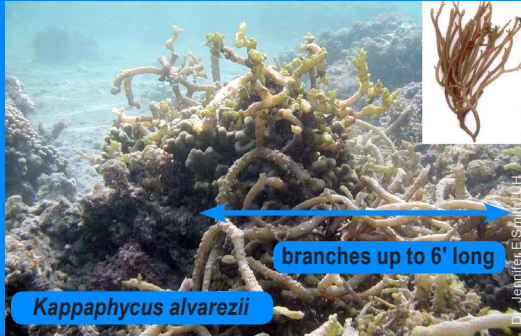
Insects: Alien insect pests can hide in fruit, vegetables, flowers and soil, costing everyone money in diseased crops and higher prices and sometimes posing human health risks. If you find unusual insects, report them to the Hawai'i Dept. of Agriculture at 873-3555 or 643-PEST.

Diseases: West Nile virus, malaria, and dengue fever are diseases spread by the bite of infected mosquitoes. They may be transmitted to humans, horses, birds and other animals. On rare occasions, humans may experience severe and fatal illnesses. These diseases are not currently found in Hawai'i. One of the first indicators are dead birds. If you find a dead native bird or an unusual occurrences of dead non-native birds (10 or more with no clear cause of death) please call the Coordinating Group on Alien Pest Species at 808-722-0995.

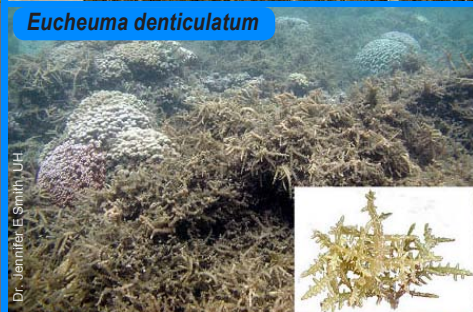
Birds:

- Mitred conures and other parrots invade seabirds' nests, damage agricultural crops, and can potentially spread invasive plant seeds such as miconia.
- Bulbuls are not known to occur on Maui and are a serious agricultural pest. They feed on bananas, papayas, flower nectar, insects, and orchid buds. Bulbuls are on the State Injurious species list, which makes it illegal to release or transport them to other parts of the State or to export them without a permit.
- Report mitred conures, parrots, and bulbuls to the Maui Invasive Species Committee at 573-MISC (6472).

INVASIVE MARINE ALGAE



Don't confuse with native limu (sea-weed). Limu manuaea (*Gracilaria coronopifolia*) is smaller and lighter in color than its cousin gorilla ogo.



ALGAE

INVASIVE MARINE ALGAE

General Description: Keep an eye out for gorilla ogo (*Gracilaria salicornia*), agar-agar (*Eucheuma denticulatum*), and smothering seaweed (*Kappaphycus* sp.) Gorilla ogo is a brittle, coarsely branched, clumping seaweed that is red to orange in color. It grows to 4" long and 1/10" around. Smothering seaweed is a tough, fleshy seaweed that grows to 6' tall and has yellow to dark red with spiky branches. Agar-agar is similar to the smothering seaweed, but with even spikier branches.

Impacts: Aquatic invasive seaweeds are one of the factors contributing to an overall decline of Hawai'i's coral reefs. They reproduce quickly and outcompete native species for space and food. Massive blooms wash ashore leaving a rotting mess and leading to tourism revenue losses. It is estimated that invasive marine algae causes Hawai'i an economic impact of \$20 million annually.

Dispersal Mechanism: Many non-native seaweeds can reproduce from small broken pieces. These pieces are transported via contaminated snorkel/dive gear, contaminated fishing gear, the ballast water of ships, aquarium dumping, in the of grazing fish and turtles, water currents, and by deliberate introductions of commercial species. Note any populations of gorilla ogo, agar-agar, and smothering seaweeds and share with authorities.

Origin, Distribution, and Habitat: Gorilla ogo is native to the Indian Ocean and South Pacific, and now can be found choking the bays and waterways of O'ahu and in limited locations on Moloka'i and the island of Hawai'i. Agar-agar and smothering seaweed are native to Southeast Asia. In Hawai'i they are currently limited to Kāne'ohe Bay on the island of O'ahu.

Don't confuse with:

- Native limu: There are around 500 species of macro algae in Hawai'i. Many of the native seaweeds, or limu, are closely related to the non-native invasive species. Look out for limu manaua (*Gracilaria coronopifolia*) which can superficially resemble gorilla ogo (*Gracilaria salicornia*). Limu manaua is skinnier and often lighter in color than gorilla ogo.