



PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)



O'AHU INVASIVE SPECIES COMMITTEE
www.oahuiscc.org

Email: oisc@hawaii.edu ● Call/Text: 808-286-4616



PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)

This informational packet is designed to provide farmers and ranchers with guidance on preventing the intrusion of devil weed onto their properties and managing it effectively if identified.

Devil weed (A.K.A Siam weed, bitter bush) is a well-documented pest in Africa, Asia, and Oceania and is considered one of the world's worst 100 invasive species by the Global Invasive Species Database. It is highly invasive and on the Hawai'i State Noxious Weed List. Devil weed received a high score on the Hawai'i Weed Risk Assessment (HWRA), suggesting it has the potential to be exceedingly invasive in Hawai'i.

The O'ahu Invasive Species Committee (OISC) is a project under the University of Hawai'i-Pacific Cooperative Studies Unit. Comprising a collaboration between government entities, private and non-profit organizations, and individuals dedicated to preventing the introduction of new alien pests, managing emerging pests on both public and private properties, and raising awareness about the dangers posed by invasive species. By eradicating the most harmful invasive plants and animals, we contribute to safeguarding our watersheds, ecological diversity, agricultural sector, and local community.

While the majority of OISC's fieldwork focuses on island-wide eradication of harmful pests, we will participate in containment efforts when and where they are needed concerning "high-impact" species, such as devil weed. By providing outreach to communities most impacted and in the highest risk areas of introduction for devil weed, we hope to engage these audiences as partners to tackle this problem.

By understanding the vectors, impacts, and management methods, the community can suppress the spread of devil weed and in turn, reduce the impacts to agriculture and the environment.





PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)



IMPACTS

- Toxic to livestock
- Increases fire risk
- Reduces grazing land.
- Skin & and respiratory irritants
- Reduces crop yield
- Spreads rapidly, producing 800,000 seeds/yr.
- Pathogen host to pests of kawa/awa (*Piper methysticum*)



PC: J.B.Friday

Devil weed has allelopathic effects that prevent the establishment of other plant species by releasing toxins into the soil. This facilitates the rapid establishment of devil weed, altering existing plant communities and reducing the carrying capacity of range lands. The plant has high nitrate levels in young foliage and the flowers have alkaloids which can cause livestock fatalities. The dry stems and leaves are rich in oils, significantly increasing the risk of wildfire spread and intensity.



PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)



IDENTIFICATION

- Herb or a shrub with long rambling branches
- Leaves triangular, opposite, and toothed edge
- Leaves have three-veins shaped like a pitchfork
- Flowers clustered in pale purple to off-white
- Fruits are in clusters with soft white hairs



MANAGEMENT ON O'AHU

Monitor your pastures, farms, and yards for devil weed every 3-6 months. Remove plants and dispose in the trash, NOT GREENWASTE. The average flowering season is December - February. Removing plants *before* they mature and set seed will significantly diminish the population. Scent detection dogs are trained to detect devil weed and can survey large areas. K9 services are now available (see pg. 6).



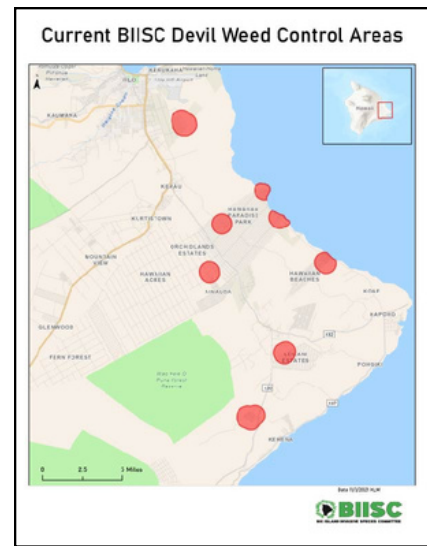
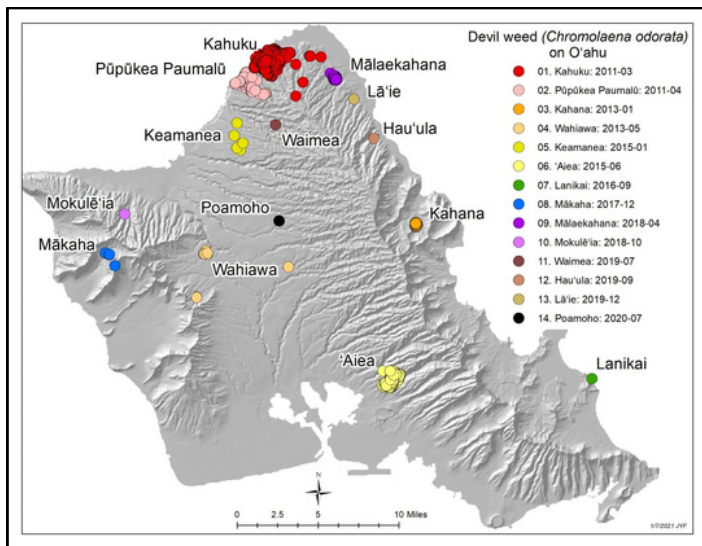


PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)

DISTRIBUTION STATEWIDE



2011

2021

now

Devil weed was first detected at the Kahuku Training Area on O'ahu in 2011. Local spread happens quickly once plants mature and seeds are easily blown by the wind. Over the years, long distance introductions have happened by hitch-hiking seeds and dispersed by human activity.

In January 2021, devil weed was detected in the Puna district and the Big Island Invasive Species Committee (BIISC) is surveying and removing all known populations in an eradication effort.

The O'ahu Invasive Species Committee (OISC) and the Army Natural Resources Program-O'ahu continue to manage the earliest infestation locations. However, devil weed on O'ahu has spread beyond existing resources for island-wide eradication.

Biocontrol research on an herbaceous, galling fly is underway. Releases on Guam have had positive results. While this won't eradicate devil weed, it will aid in suppression and help with management where it is established. To find out more about this biocontrol, visit: <https://dlnr.hawaii.gov/hisc/info/biocontrol/>

BACKGROUND INFO & MANAGEMENT

Devil Weed, Siam Weed, Jack-in-the-Bush, Triffid Weed

Chromolaena odorata

Family: Asteraceae

Description: Dense shrubs can grow up to 2.5 m (8.5ft) tall in open areas. Sprawling growth pattern reaches heights up to 10 m (33 feet) when climbing other plants. The plant is hairy, and glandular and the leaves give off a pungent odor when crushed. The leaves are opposite, triangular to elliptical with serrated edges. Leaves are 4–10 cm long by 1–5 cm wide (up to 4 x 2 inches). The white to lavender tubular flowers are in panicles that form at the ends of branches. The seeds are achenes spread by the wind, but can also cling to fur, clothes, and machinery, enabling long-distance dispersal. Seed production is about 80,000 to 90,000 per plant. In favorable conditions, the plant can grow more than 3 cm per day. Considered one of the world's worst weeds.



Distribution: Native to the Americas from Florida to Texas through Mexico into South America and the Caribbean. Introduced to tropical Asia, West Africa, Australia, western Pacific islands, and the Hawaiian islands of Oahu, HI (2011) and Hawaii Island, HI (2021).

BACKGROUND INFO & MANAGEMENT

- ▶ **Impacts:** Infests pastures, cultivated land, forest edges, trails, roadsides, and disturbed soil. Leaves contain high nitrate content which is poisonous to livestock (1). Smothers and shades out native vegetation and has allelochemicals that inhibit the growth of nearby plants (2). May cause severe skin and asthma issues for allergy-prone people and represent a fire hazard because of the presence of volatile oils in stems and leaves (3).
 - ▶ **Manual control:** Plants removed before flowering season (Dec-Feb) will help reduce seedbanks and local spread. Manual control is particularly effective on young or small plants. Plants can be hand-pulled or dug out, and leftover root material can re-sprout. Pulled plants should be hung off the ground, or bagged and disposed of in trash (NOT green waste) as cut stems can re-sprout and plants can reproduce vegetatively.
 - ▶ **Chemical control:** Used to aid manual control may be necessary for larger plants or large stands. A foliar application of 2% glyphosate in water is effective. (4) The use of triclopyr at 0.5% in water with a foliar application is also another effective method.(5) Foliar application of 1.5% imazapyr in water has shown promising results within 4 months after initial spraying. Results show that it is effective but slow-acting, so best to use it well in advance of flowering season. (4) Follow-up of treated areas is needed with hand pulling and/or combining a pre-emergent with initial foliar application to prevent re-infestation. (4) Cut-stump application of triclopyr at a dilution of 20% in biodiesel is effective when targeting larger, individual plants. (4)
- Best grazing practices are also recommended to prevent ideal habitat and massive infestation of *C. odorata* in over-grazed pastures.

- ▶ **Devil Weed Survey Services:** Conservation Dogs of Hawai'i provides a unique survey service to facilitate the early detection of devil weed using specially trained scent detection dogs. These dogs are capable of covering vast areas of land, as well as surveying access roads and trails. For further details on service rates, please contact Kyoko Johnson through email: info@conservatondogshawaii.org



Citations:

1. Sajise et al., 1974. Phill. Weed Sc. Bull. 2. Hu et al. 2013. Jnl. Food Ag. and Env. 3. HPWRA 2010. 4. ANRP pers. comm. 2021. 5. Erasmus & van Staden, 1986. Weed Res.

References:

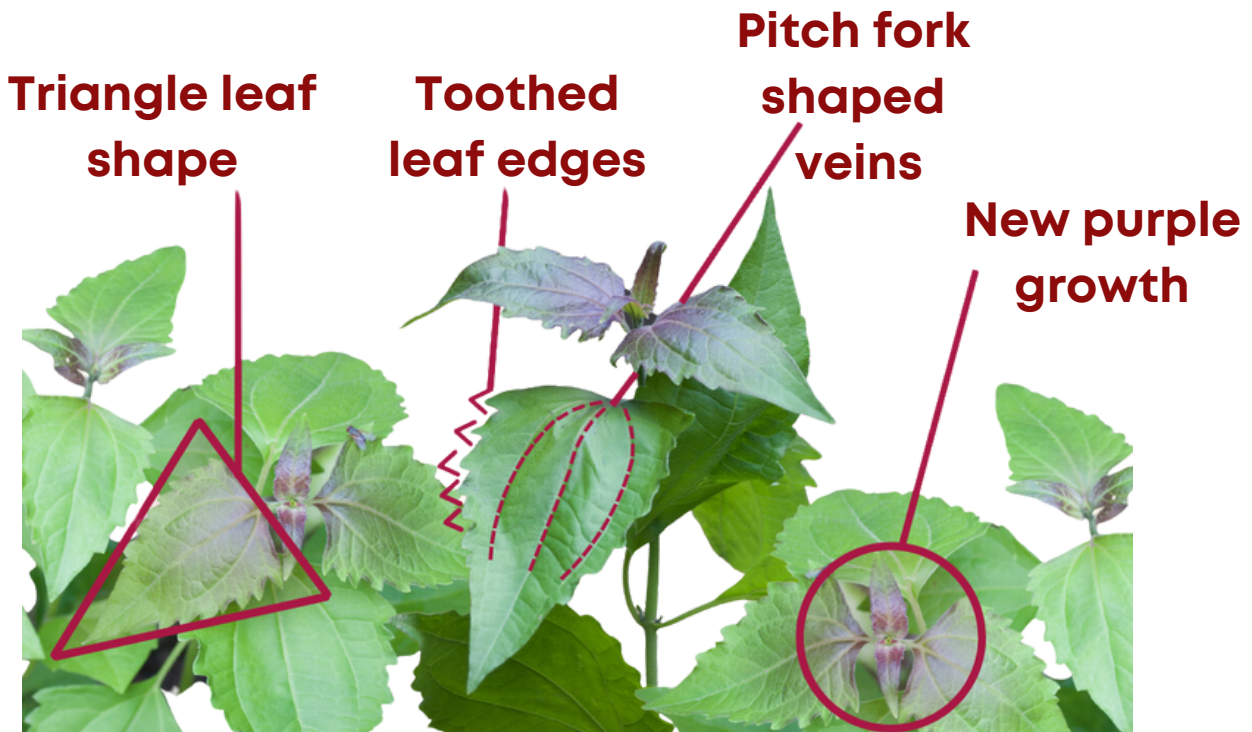
1. Sajise PE, Palis RK, Norcio NV, Lales JS, 1974. The biology of *Chromolaena odorata* (L.) R.M. King and H. Robinson. 1. Flowering behaviour, pattern of growth and nitrate metabolism. Philippine Weed Science Bulletin, 1(1):17-24
2. Hu, Gang & Zhang, Zhonghua. (2013). Allelopathic effects of *Chromolaena odorata* on native and non-native invasive herbs. Journal of Food Agriculture and Environment. 11.
3. HPWRA, #407: 2010. Koutika, L.-S./Rainey, H.J. *Chromolaena odorata* in different ecosystems: weed or fallow plant? Applied Ecology and Environmental Research. 8(2): 131-142
4. Army Natural Resources Program (ANRP) field observations.
5. Erasmus, D.J. and van Staden, J., 1986. Chemical control of *Chromolaena odorata* (L.) K. & R. achenes: effect of temperature, imbibition and light. Weed Res., 26: 75-81.



PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)



REPORT SUSPECT DEVIL WEED

Your local 'ISC' will confirm ID and provide guidance on next steps.



OAHU: EMAIL OR TEXT PHOTO TO OISC

EMAIL: oisc@hawaii.edu

TEXT: 808-286-4616

HAWAI'I ISLAND: EMAIL PHOTO TO BIISC

EMAIL: biisc@hawaii.edu

CALL: 808-933-3340

Statewide Reporting: www.643pest.org



PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)

Devil weed has some look-a-likes growing in the same area. To confirm ID, contact your local ISC (pg. 7) or report www.643pest.org. The following guide shows key features for devil weed compared to its most common look-a-likes.

You can also find more info at www.oahuISC.org or scan the QR code with your phone's camera.



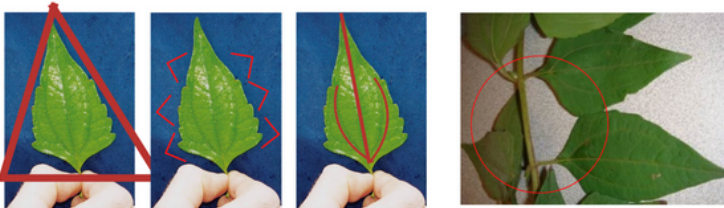
Remember to clean gear and equipment to prevent the spread and introduction of weed seeds to new locations.

DEVIL WEED LEAVES

(Chromolaena odorata)



- LEAVES ARE TRIANGULAR, TOOTHED EDGE.
- DEVIL'S PITCHFORK-LIKE VEINS FROM BASE.
- CRUSHED LEAVES HAVE A PUNGENT ODOR.
- NEW LEAF GROWTH IS PURPLISH COLOR.
- LEAF STEMS (PETIOLES) ARE NAKED.



DEVIL WEED FLOWERS

(Chromolaena odorata)



- FLOWER CLUSTERS AT END OF STEMS.
- FLOWER CLUSTERS ARE PALE PURPLE/PINK.
- SEED HEADS ARE BROWN, CLUSTERED & BUSHY/FUZZY.
- FLOWERING SEASON IS USUALLY WINTER (DEC-FEB).





PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)

DEVIL WEED LOOK-A-LIKES



ST. PAUL'S WORT



STICKY SNAKEROOT



BILLYGOAT WEED



CLIDEMIA



BLUE SNAKEWEED



LANTANA



SOURBUSH



'UHALOA

LOOK-A-LIKES



PEST ADVISORY

DEVIL WEED

(*Chromolaena odorata*)

DEVIL WEED **Vs** ST. PAUL'S WORT

(*Chromolaena odorata*)

(*Sigisbeckia orientalis*)



- LEAF STEM (PETIOLE) IS NAKED.
- LEAVES ARE TRIANGULAR WITH TOOTHED EDGE.
- NEW LEAVES ARE PURPLISH COLOR.
- PITCHFORK-LIKE LEAF VEINS FROM BASE.
- PUNGENT ODOR WHEN CRUSH LEAVES.
- FLOWER CLUSTERS ARE PALE PINK/PURPLE.

- LEAF STEMS (PETIOLES) ARE WINGED.
- REDDISH-COLOR VEINS.
- OLDER LEAVES HAVE IRREGULARLY TOOTHED EDGES.
- NEW, YOUNG LEAVES ARE NARROW AND HAVE SMOOTH EDGES.
- FLOWERS ARE SMALL & YELLOW.
- FLOWER HEADS SURROUNDED BY 5 SPINDLES (CLAYX).

LOOK-A-LIKES



PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)

DEVIL WEED

(Chromolaena odorata)

VS

SNAKEROOT

(Ageratina adenophora)



- LEAVES ARE TRIANGULAR WITH TOOTHED EDGE.
- NEW LEAVES ARE PURPLISH COLOR.
- PITCHFORK-LIKE LEAF VEINS FROM BASE.
- PUNGENT ODOR WHEN CRUSH LEAVES.
- FLOWER CLUSTERS ARE PALE PINK/PURPLE.



- LEAVES ARE TRIANGLE SHAPE
- LEAF EDGES EVENLY TOOTHED.
- LEAF LACKS THE 3-VEINED PITCHFORK.
- NO PUNGENT ODOR WHEN CRUSHED.
- FLOWERS ARE TIGHTLY CLUSTERED.
- FLOWER HEADS ARE WHITE.

LOOK-A-LIKES



PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)

DEVIL WEED **VS** BILLYGOAT WEED

(Chromolaena odorata)

(Ageratum conyzoides)



- LEAVES ARE TRIANGULAR WITH TOOTHED EDGE.
- NEW LEAVES ARE PURPLISH COLOR.
- PITCHFORK-LIKE LEAF VEINS FROM BASE.
- PUNGENT ODOR WHEN CRUSH LEAVES.
- FLOWER CLUSTERS ARE PALE PINK/PURPLE.

- LEAVES ARE OVAL.
- LEAVES ARE DEEPLY VEINED.
- LEAVES LACK PROMINENT PITCHFORK VEINS FROM BASE.
- STEMS ARE FUZZY.
- FLOWER HEADS ARE BLUEISH/PURPLE AND TIGHTLY CLUSTERED.

LOOK-A-LIKES



PEST ADVISORY

DEVIL WEED

(*Chromolaena odorata*)

DEVIL WEED **VS** BLUE SNAKEWEED

(*Chromolaena odorata*)

(*Stachytarpheta cayennensis*)



- LEAVES ARE TRIANGULAR WITH TOOTHED EDGE.
- NEW LEAVES ARE PURPLISH COLOR.
- PITCHFORK-LIKE LEAF VEINS FROM BASE.
- PUNGENT ODOR WHEN CRUSH LEAVES.
- FLOWER CLUSTERS ARE PALE PINK/PURPLE.



- LEAVES ARE OVAL-SHAPED.
- LEAF EDGES ARE TOOTHED.
- LEAF HAS A WRINKLED APPEARANCE.
- LEAVES ARE MOSTLY HAIRLESS.
- FLOWERS ARE SMALL DARK BLUE/PURPLE.
- FLOWERS ATTACH TO LONG SPIKES AT THE TIPS OF BRANCHES.

LOOK-A-LIKES



PEST ADVISORY

DEVIL WEED

(*Chromolaena odorata*)

DEVIL WEED

(*Chromolaena odorata*)

Vs

CLIDEMIA

Miconia crenata, (syn. *Clidemia hirta*)



- LEAVES ARE TRIANGULAR WITH TOOTHED EDGE.
- NEW LEAVES ARE PURPLISH COLOR.
- PITCHFORK-LIKE LEAF VEINS FROM BASE.
- PUNGENT ODOR WHEN CRUSH LEAVES.
- FLOWER CLUSTERS ARE PALE PINK/PURPLE.



- LEAVES ARE OVAL AND SMOOTH EDGE.
- LEAVES HAVE A "QUILTED" APPEARANCE.
- LEAVES HAVE 5 VEINS RUN FROM BASE TO TIP.
- FLOWERS ARE SMALL & WHITE.
- FLOWERS SITUATED AT LEAF BASE.
- FRUITS ARE DARK PURPLE/BLUE.

LOOK-A-LIKES



PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)

DEVIL WEED

(Chromolaena odorata)

VS

LANTANA

(Lantana camara)



- LEAVES ARE TRIANGULAR WITH TOOTHED EDGE.
- NEW LEAVES ARE PURPLISH COLOR.
- PITCHFORK-LIKE LEAF VEINS FROM BASE.
- PUNGENT ODOR WHEN CRUSH LEAVES.
- FLOWER CLUSTERS ARE PALE PINK/PURPLE.

- LEAVES ARE OVAL.
- LEAVES FEEL LIKE SANDPAPER.
- LEAF HAVE 1 MAIN VEIN FROM BASE.
- FLOWERS ARE LARGE, SHOWY.
- FLOWERS ARE PINK & ORANGE.
- THORNS PRESENT ON STEMS.

LOOK -A- LIKES



PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)

DEVIL WEED

(Chromolaena odorata)

VS

SOURBUSH

(Pluchea carolinensis)



- LEAVES ARE TRIANGULAR WITH TOOTHED EDGE.
- NEW LEAVES ARE PURPLISH COLOR.
- PITCHFORK-LIKE LEAF VEINS FROM BASE.
- PUNGENT ODOR WHEN CRUSH LEAVES.
- FLOWER CLUSTERS ARE PALE PINK/PURPLE.

- LEAVES ARE OVAL & FUZZY.
- LEAF EDGES ARE SMOOTH.
- SOUR/SPOILED ODOR WHEN CRUSHED.
- LEAF HAVE 1 MAIN VEIN FROM BASE.
- FLOWERS ARE LARGE, SHOWY.
- FLOWERS FUZZY & WHITE.

LOOK-A-LIKES



PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)

DEVIL WEED

(Chromolaena odorata)

Vs

'UHALOA

(Waltheria indica)



- LEAVES ARE TRIANGULAR WITH TOOTHED EDGE.
- NEW LEAVES ARE PURPLISH COLOR.
- PITCHFORK-LIKE LEAF VEINS FROM BASE.
- PUNGENT ODOR WHEN CRUSH LEAVES.
- FLOWER CLUSTERS ARE PALE PINK/PURPLE.



- LEAVES ARE OVAL-SHAPED.
- LEAVES ARE FUZZY & PALE GREEN.
- LEAF HAVE 1 MAIN VEIN FROM BASE.
- FLOWERS ARE TINY & YELLOW.
- FLOWERS ARE CLUSTERED AT BASE OF LEAF ALONG THE STEM.
- 'UHALOA IS A NATIVE HAWAIIAN PLANT!

LOOK-A-LIKES

FREE INFORMATIONAL PRESENTATION!!



Devil Weed is one of the World's Worst 100 Invasive Species and it is now established on O'ahu. The spread of devil weed on the North Shore is a threat to farms and ranches. The O'ahu Invasive Species Committee (OISC) is offering a free informational session to update you and your staff on not only devil weed, but also other invasive species that have potential impacts on agriculture such as Coconut Rhinoceros Beetle, Little Fire Ant, and other agricultural pests not yet detected on O'ahu including two-lined spittle bug, fireweed, and the Queensland long-horned beetle.

We come to you! We provide the resources to keep your staff informed on best management practices, identification, reporting information, and management guidance for common farm and range pests.



SCHEDULE YOUR FREE INFO SESSION!

Erin Bishop, OISC Outreach Coordinator

Email: oisc@hawaii.edu

call/text: 808-286-4616

Info session is about one hour. Evenings and weekends are also available if needed.





PEST ADVISORY

DEVIL WEED

(Chromolaena odorata)

NOTES PAGE



O'AHU INVASIVE SPECIES COMMITTEE
www.oahuiscc.org

Email: oiscc@hawaii.edu ● Call/Text: 808-286-4616