EXTENSION PUBLICATIONS

UNIVERSITY of HAWAI'I at MĀNOA
COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESILIENCE

Devil Weed (*Chromolaena odorata*)

Characteristics and Management of an Introduced Invasive Plant in Hawai'i

At a Glance: An invasive plant that has been documented on O'ahu and Hawai'i island, devil weed (*Chromolaena odorata*) suppresses agricultural crops, overruns pastures, and affects native biodiversity; it can also fuel wildfires and kill livestock. Devil weed spread can be facilitated by human activities. This publication from the University of Hawai'i at Mānoa's College of Tropical Agriculture and Human Resilience (UHM CTAHR) describes management of devil weed in Hawai'i through cultural, physical, chemical, and biological control practices.

Figure 1. Devil weed (*Chromolaena odorata*), showing the burgundy coloring of young leaves. Photo: J.B. Friday

Background and Spread in Hawai'i

The neotropical perennial scrambling shrub *Chromolaena odorata* (L.) R.M. King and H. Robinson (Asteraceae, Figure 1) is commonly called Siam weed throughout the world (Zachariades et al. 2009). In Hawai'i, it is commonly called devil weed, probably due to the pitchfork-shaped venation on the leaves as well as its high risk of invasion and projected impacts if it establishes and proliferates across Hawai'i. Native to the Americas, devil weed is currently invasive in Africa, Asia, and the Pacific (Zachariades et al. 2009). Devil weed was first reported in the Kahuku Training Area on the North Shore of O'ahu in January 2011. Since 2011, monitoring efforts by the O'ahu Invasive Species Committee (OISC) have shown that devil weed has spread extensively southward, reaching 'Aiea and Lanikai. In 2021, devil weed was discovered on Hawai'i island, and the Big Island Invasive Species Committee (BIISC) has mapped widespread invasion, stretching from Hilo to Kalapana (BIISC n.d.). Devil weed can be spread via wind dispersal, by animals and humans, along rivers and streams, through

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Figure 2. A tall thicket of *Chromolaena odorata* (devil weed) in East Timor. Photo: J.B. Friday

Figure 3. Devil weed being removed by an O'ahu Invasive Species Committee (OISC) team member at an invaded site in Hawai'i. Photo: OISC

movement of contaminated material, and through vegetative reproduction (Zachariades et al. 2009).

Characteristics

Devil weed can grow extremely fast, up to about 9 feet in height under open-field conditions. It can reach 15 feet or more when supported by other vegetation (Figure 2). The scrambling stems branch extensively, especially when surrounded by vegetation (Figure 3).

The leaves are opposite, triangular to elliptical in shape, with tooth-like margins and three conspicuous veins that resemble a pitchfork (Figure 4). Ranging from roughly 1.5 to 4 inches long and 0.5 to 1.5 inches wide, the leaves are moderately hairy and have a pale-green color, with young leaves showing burgundy pigmentation as seen in Figure 1. When crushed or damaged, the leaves emit volatiles with pungent odors. The flowers are pale blue-lilac and tubular, forming panicles of 20–60 flowers at the ends of branches (Figure 5). Devil weed seeds are around 5 mm (0.2 inches) long, black or brown with light stripes, and with white bristles approximately 5 mm (0.2 inches) long (Figure 6).

Figure 4. Red lines highlight the three conspicuous veins that resemble a pitchfork on the leaves of devil weed. Photo: J.B. Friday

Figure 5. Devil weed flowers. Photo: J.B. Friday

Figure 6. Devil weed seeds. Photo: Vijayan Rajapuram, **CC by SA 4.0, via Wikimedia Commons**

Figure 7. Devil weed overrunning a pasture in East Timor. Photo: J.B. Friday

Invasive Potential

Several characteristics facilitate the invasive success of *C. odorata.* The plant's seed production is prolific; more than 800,000 seeds may be produced per plant annually. The seeds are dispersed easily by wind, water, animals, and people. Devil weed can rapidly invade disturbed landscapes (Zachariades et al. 2009). The weed generates allelopathic chemicals such as flavonoids, terpenoids, and alkaloids that kill competitor plants and stimulate its dominance in invaded landscapes, smothering native plants and crops, and even replacing other aggressive invasive species (Zachariades et al. 2009).

In dry areas or during prolonged dry seasons across its invasion range, devil weed becomes a fire risk due to its flammability. At the same time, devil weed is well adapted to fire and exhibits some fire resistance by resprouting from the crown after fires (Zachariades et al. 2009). Devil weed is usually not eaten by livestock. The high nitrate levels in tender foliage can cause death to livestock including goats and horses (Sajise et al. 1974). Pyrrolizidine alkaloids in the flowers of devil weed can kill goats that eat the flowers (Zachariades et al. 2009) and cause horses to become sick. Because devil weed seeds prolifically and regenerates in disturbed areas, the weed is a particularly serious threat in overgrazed pastures (Figure 7), much as fireweed (*Senecio madagascariensis*) has been in Hawai'i.

Management

Following the arrival and detection of devil weed in new environments, eradication is usually made difficult by its rapid dispersal, aided by human activity and its high reproductive capacity (Aigbedion-Atalor et al. 2019a). Several control options are available to manage the weed, including cultural control, physical control, chemical control, and biological control approaches. However, the usefulness of each method is constrained by feasibility and sustainability issues.

Cultural Control: Early detection and eradication of devil weed is essential for maintaining control. Eradication is usually only possible if detection and range delineation surveys are completed before seed set. Controlling devil weed before it flowers and sets seed is essential. To reduce the weed's human-aided spread, any vehicles, tools, equipment, apparel, or livestock that can carry devil weed seeds should be cleaned before being brought onto a property. Moving soil or green waste that is contaminated with devil weed can also spread the plant. Leguminous groundcover crops such *Pueraria phaseoloides*, *Calopogonium mucunoides*, *Centrosema pubescens*, or *Vigna unguiculata* have been reported to control devil weed in orchard systems, although most of these species are aggressive weeds themselves. Of these cover crops, *Pueraria phaseoloides* is considered the least invasive option.

Physical Control: Physically cutting down or uprooting and removing devil weed is the most common control method in areas where it is invasive. Uprooting plants is the recommended option because they will regrow if they are only cut down to the ground. Plants can be manually uprooted easily. To prevent regrowth, the stumps and roots of devil weed should be removed or killed. If uprooted stumps of devil weed remain in contact with the soil they have the potential to regrow.

Chemical Control: Chemical control trials have been conducted and have led to control of devil weed in Nigeria using herbicides (Ikuenobe and Ayeni 1998). Multiple chemical control methods have shown effective control of devil weed if applications are repeated (Table 1). Repeated annual applications of triclopyr (0.64 pounds of active ingredient per acre), hexazinone + diuron (1.78 lb a.i./acre), glyphosate (2.14 lb a.i./acre), or imazapyr (0.45 lb a.i./acre) eliminated the devil weed after the second application. Table 1 lists products containing these active ingredients that are licensed for use in Hawai'i. Always read and understand the label on the product container to determine if the intended herbicide application is approved and legal.

Biological Control: Two biocontrol agents, the specialist moth *Pareuchaetes pseudoinsulata* Rego Baros (Lepidoptera: Erebidae) and the stem-galling fly *Cecidochares connexa* Maquart (Diptera: Tephritidae) have been reported to cause significant control of devil weed in the invaded range. Both agents have provided significant control of devil weed in West and Central Africa (Aigbedion-Atalor et al. 2021) and Asia (Winston et al. 2014). *C. connexa* has been successfully released in Southeast Asia and the Pacific, including on Guam and in the Northern Mariana Islands (Cruz et al. 2006), Papua New Guinea, and Timor Leste (Day et al. 2013a,b). *P. pseudoinsulata* feeds on the leaves of devil weed, while females of *C. connexa* oviposit into devil weed stems, inducing the formation of stem galls (Figure 8) that act as nutrient sinks, diverting the plant's nutrients to the developing larvae within the galls (Figure 9). This process causes the plant to die back.

Figure 8. *Cecidochares connexa* gall on devil weed, Rota, Commonwealth of the Northern Mariana Islands (CNMI). Photo: J.B. Friday

Figure 9. *Cecidochares connexa* larva in a gall on devil weed, Rota, CNMI. Photo: J.B. Friday

Table 1. Chemical Control Agents Tested Against Devil Weed

Active Ingredient (a.i.)[a]	Trial Rate Used[a]	Products[b]
Triclopyr	0.64 lb. a.i./acre/year[c]	• Garlon® series • CrossBow® • Alligare® series • Confront® • Vastlan®
Hexazione + diuron	*1.78 lb. a.i./acre/year[d]*	Hexazinone products • Velpar® series Diruon products • Diruon series • Direx® • Karmex®
Glyphosate isopropylamine salt or glyphosate-trimesium	2.14 lb. a.i./acre/year[c]	Glyphosate isopropylamine salt products • Roundup® series • Alligare® Glyphosate • FarmWorks® Glyphosate • Farm General™ Glyphosate • Quali-Pro Glyphosate Plus
Imazapyr	0.45 lb. a.i./acre/year[c]	• Arsenal® • Habitat® • Polaris® • Chopper® Gen2 • Alligare® Imazapyr

[a] Active ingredients and rates tested by Ikuenobe and Ayeni (1998).

[b] Products licensed in Hawai'i as of December 16, 2025.

[c] This rate is lower than maximum rates allowed on products currently labeled for use.

[d] *This rate is higher than the maximum rates allowed on hexazione products currently labeled for use. Application at this rate would be illegal. Always follow the labeled rates when applying pesticides.*

Although both agents are effective, *C. connexa* is more effective than *P. pseudoinsulata* (Aigbedion-Atalor et al. 2019b). Currently, *C. connexa* has been imported into quarantine in Hawai'i, and host specificity testing has been underway since 2022. Pre-consultation and environmental assessments are occurring for this biocontrol agent, but currently there is no estimated date that this biocontrol will be available for release.

How to Report Devil Weed

Both the O'ahu Invasive Species Committee (OISC) and the Big Island Invasive Species Committee (BIISC) are actively controlling devil weed on their respective islands. On O'ahu, the goal of management of devil weed has moved from eradication to containment (OISC n.d.); on Hawai'i island the goal remains to eradicate the weed. Sightings of devil weed should be reported to the invasive species committee on that island:

- Kaua'i Invasive Species Committee: **kauaiisc.org**
- O'ahu Invasive Species Committee: **oahuisc.org**
- Maui Invasive Species Committee (includes Lāna'i): **mauiinvasive.org**
- Big Island Invasive Species Committee: **biisc.org**
- Moloka'i Maui Invasive Species Committee: **https://molokaiisc.org/**

Reports can also be made to the State of Hawai'i invasive species hotline at 808-643-PEST (808-643-7378) or **643PEST.org**.

Disclaimer

Mention of specific brand names of pesticides does not constitute endorsement of these brands or lack of endorsement of brands not listed on the part of the authors, UHM CTAHR, or the University of Hawai'i.

While the information offered here is up-to-date as of the publication of this bulletin, regulation of pesticide use is undergoing constant change. Always follow label instructions when using any herbicide. Electronic versions of all pesticide labels registered in Hawai'i may be searched on the Hawai'i Department of Agriculture and Biosecurity's licensed pesticides website (**https://dab.hawaii.gov/pi/pest/licensed-pesticides/**), the CDMS label database (**https://www.cdms.net/Label-Database/Advanced-Search**), or the National Pesticide Information Retrieval System (NPIRS, **https://www.npirs.org/state/**). These sites also include any Hawai'i Sec 24(c) Special Local Need (SLN) labels.

Conclusion

Devil weed poses a serious and growing threat to Hawai'i's agricultural lands, natural ecosystems, and pasture systems due to its rapid growth, prolific seed production, and ability to dominate disturbed environments. Early detection, prevention of spread, and rapid response remain the most effective strategies for limiting establishment and expansion across the islands. Integrated management approaches that combine cultural, physical, chemical, and eventually biological control methods offer the best opportunity for long-term suppression of this invasive species. Continued collaboration among landowners, invasive species committees, researchers, and community members will be essential to protect Hawai'i's ecosystems and agricultural resources from further impacts of devil weed.

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