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## New plant records from the Big Island for 2021

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The Big Island Invasive Species Committee (BIISC) has supported its Early Detection program since May 2008. Roadside surveys are conducted on major, secondary, tertiary, and residential roads in all districts on Hawai'i Island. Here, BIISC Early Detection documents 1 new state record, 8 new naturalized records, 2 new island records, and 1 eradication.

A total of 10 plant families are discussed. Information regarding the formerly known distribution of flowering plants is based on the *Manual of the Flowering Plants of Hawai'i* (Wagner *et al.* 1999), *A Tropical Garden Flora* (Staples & Herbst 2005), and information subsequently published in the *Records of the Hawaii Biological Survey*. Voucher specimens are deposited at Bishop Museum's *Herbarium Pacificum* (BISH), Honolulu, Hawai'i, and the herbarium at the National Tropical Botanical Garden (PTBG), Lāwa'i, Kaua'i.

### Acanthaceae

#### *Strobilanthes hamiltoniana* (Steud.)

Bosser & Heine

#### **New naturalized record**

This is the first naturalized collection of Chinese rain bells in the state. Cultivated plants are purported to be sterile, but naturalization has occurred in many tropical locales and it is becoming an invasive weed on the island of Réunion (Wu *et al.* 2011). In 2004, a survey showed that Chinese rain bells covered about 1,000 ha of wet mountain areas on La Réunion between 900 m and 1,500 m elevation (Kiehn 2011). It has been observed on Hawai'i Island that many cultivated plants seem to be sterile; however, naturalization has been observed in Mountain View and Pāhoa.

*Material examined.* **HAWAII:** Puna Distr, Hwy 130, mile marker 15 near steam vent pullout, vigorous shrub, 5–6 ft [1.5–1.8 m] tall, with abundant, pink, tubular flowers, growing in shady conditions, 2150716N 295995E, 3 Nov 2015, *J. Parker, R. Parsons & M. Murphy BIED183*.

### Asteraceae

#### *Chromolaena odorata* (L.)

R.M. King & H. Rob

#### **New island record**

First collected as naturalized on O'ahu in 2011 (with thorough description of characteristics; Frohlich & Lau 2012), devil weed has been detected in 11 locations on Hawai'i Island in the Puna and South Hilo Districts (Molly Murphy, pers. comm.). This highly invasive shrub exhibits allelopathic effects on crops such as corn, and toxic effects on cat-

tle (Mabberley 2008). Devil weed was selected as an eradication target by the BIISC Steering Committee in April 2021. Control of this species is ongoing in coordination with the Hawai'i Department of Agriculture.

According to interviews with residents who have had *Chromolaena* naturalize on their properties, the introduction mechanism of *Chromolaena* to Hawai'i Island was through online seed sellers that labeled it as "Mexican dream herb" (*Calea ternifolia* Kunth), a plant reported to increase the intensity of dreams when consumed. Thus, this was not an issue of contaminated seed, but a total misidentification of the species among online sellers. Browsing eBay and other online marketplaces frequently show photos of *Chromolaena* incorrectly labeled as *Calea*. From one (or potentially multiple) importations of the mislabeled seed, live plants were distributed between friends and family around Puna, furthering its spread in Hawai'i (Molly Murphy, pers. comm.).

*Material examined.* **HAWAI'I:** South Hilo Distr, Pana'ewa Drag Strip, Hilo, semi-woody forb to 8 ft [2.4 m], leaves with pitchfork venation, terminal panicles, heavily fruiting with many tufted seeds, many naturalizing plants in this location and growing in mowed area, 2177091N 287513E, 9 Feb 2021, S. Kaye, J. Parker & R. Parsons BIED214.

### *Gaillardia pulchella* Foug.

### New island record

Indian blanket or blanket flower has previously been collected as naturalized on O'ahu, Maui, Moloka'i, and Kaua'i. While previous collections have all been near the coast, this specimen was collected at just above 9,000 ft [2,700 m] elevation. Strother (2006) stated an elevational range for *G. pulchella* of up to 1800 m, but this collection represents a large shift in viable range. The plasticity in regards to elevation range may come about due to the hybridization of *G. aristata* Pursh and *G. pulchella*, which, according to Staples & Herbst (2005), are probably the majority of cultivated gaillardias currently grown. This plant may have originated from cultivated plants of hybrid origin, but was distinguished from *G. aristata* on the basis of the length of the receptacular setae (Barbara Kennedy, pers. comm.).

*Material examined.* **HAWAI'I:** Hāmākua Distr, Hale Pōhaku, Maunakea, small forb with rosette of leaves and inflorescence with bright orange/yellow flower, achenes present, 2186787N 242581E, 17 Nov 2014, A. Sullivan & R. Parsons BIED182.

### Burseraceae

#### *Bursera simaruba* (L.) Sarg.

### New naturalized record

Gumbo limbo is native to tropical regions of the Americas from South Florida, Mexico, the Caribbean, Brazil, and Venezuela (USDA 2010b). It is not often cultivated outside of its native range. Burseraceae is known as the family whose members produce the oils frankincense and myrrh, while the genus *Bursera* is more often found cultivated by succulent growers who dwarf specimens in containers (Staples & Herbst 2005). Gumbo limbo was found spreading into a vacant lot from an intentional planting in a Kona condo property. Three large, mature, cultivated trees were observed to have canopies full of fruit in January 2021. The adjacent vacant lot had around 20 mature, fruiting trees spread across the 3-acre [1.2 ha] property.

*Material examined.* **HAWAI'I:** North Kona Distr, Kailua-Kona, Walua Rd, trees with peeling red and green bark and pinnately compound leaves, inflorescence axillary with multiple blueberry-sized fruit, population of 11–20 fruiting trees and multiple seedlings growing in vacant lot, 2173321N 186709E, 4 Jan 2021, J. Parker & R. Parsons BIED213.

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**Caprifoliaceae*****Lonicera hildebrandiana* Collett & Hemsley      New naturalized record**

Giant Burmese honeysuckle is by far the largest honeysuckle in the genus *Lonicera* with 12–15 cm long, slender, tubular, fragrant, yellow flowers. It was introduced to Hilo by H. Shipman sometime in the 1930s and may have been removed by the same party, as he said it was found to grow “too rankly” (Staples & Herbst 2005). It was found growing near an abandoned nursery in Volcano Village. Several individuals were present on both sides of the road, climbing high (>50 ft [15 m]) into the native forest canopy. Over the course of subsequent visits, it was clear that the heavy weight of the liana had toppled at least one large ‘ōhi‘a tree. This species was selected as an eradication target by the BIISC Steering Committee in August 2021.

*Material examined.* **HAWAI‘I:** Puna Distr, private road off of Volcano Rd, Volcano Village, thick vine climbing to 50 ft [15 m] high on top of ‘ōhi‘a trees, glossy, opposite, large leaves with stipules, green, fleshy fruit with 2 seeds each, 2150086N 265843E, 30 Aug 2016, *J. Parker & R. Parsons BIED191*.

**Dicksoniaceae*****Dicksonia squarrosa* (G. Forst.) Sw.      New naturalized record**

Rough tree fern, or whekī, is native to New Zealand and forms a woody trunk up to 7 m tall. It is easily recognized by the black stipe bases on the trunk (Brownsey & Perrie 2021). It was found naturalizing in an abandoned nursery in Volcano Village next to possibly cultivated individuals. Judging by the presence of standing, crownless trunks, they had been cultivated there long enough that some had died of old age. It was reported that a tree fern similar to this record was growing at the Volcano Art Center, but the groundskeeper had removed them before a collection could be made.

Staples & Herbst (2005) reported: “At least five species of *Dicksonia* are cultivated in Hawai‘i. They differ from *Cibotium* in having upper, outer indusium valves that are green and only slightly differentiated from the blade segment, and leaf blades with the pinnae gradually becoming smaller toward the base.” This species may be of concern because of its ability to spread vegetatively via rhizomes, forming dense thickets, making it one of the most common tree ferns in its home range of New Zealand (Poole 1966).

*Material examined.* **HAWAI‘I:** Puna Distr, Volcano, Volcano Village, tree fern up to 25 ft [7.6 m] tall in 7–8 clumps near abandoned home, average frond length 55.75 in [1.4 m], 2150086N 265865E, 30 Jan 2020, *J. Parker & R. Parsons BIED212*.

**Malpighiaceae*****Heteropterys brachiata* (L.) DC.      New naturalized record**

Red wings is a woody vine native to Central and South America (POWO 2023). It has wind-dispersed samaras and the ability to climb high (>60 ft [18 m]) into native and introduced forest, which aids the dispersal of its seeds. This plant is easiest to spot when the terminal ends of the vines are full of the bright red samaras. It differs from *H. glabra* Hook. & Arn. in having stipules and more than 2 glands on the leaves (Barbara Kennedy, BISH, pers. comm.). This species was selected as an eradication target by the BIISC Steering Committee in August 2021.

*Material examined.* **HAWAI‘I:** Puna Distr, Paradise and 29<sup>th</sup> Ave, Hawaiian Paradise Park subdivision, woody, strangling vine, lenticels present on bark, compound leaves, opposite, 6–8 leaflets, reddish new growth, pink-purple flowers with red samara-type winged fruits, climbing into the tops of trees at this site with many seedlings present, 2164375N 291760E, 28 Apr 2016, *J. Parker & M. Murphy BIED184*.

**Poaceae*****Cenchrus elegans* (Hassk.) Veldkamp****Eradication**

*Cenchrus elegans* was previously reported as naturalized on Hawai'i by Parker & Parsons (2016), where about 10 apparently naturalized plants were found. However, subsequent resurveys found that the plants had disappeared. As this was the only recent report of *C. elegans* naturalizing on Hawai'i, it should now be considered a questionable naturalization across the state, based on old collections from O'ahu (Faccenda 2022).

***Imperata cylindrica* (L.) Raeusch.****New naturalized record**

*Imperata cylindrica*, commonly called cogongrass, has now been found growing along a roadside in Hawaiian Paradise Park (HPP). The colony is approximately 0.5 acre [0.2 ha] in area. Only one population was found in HPP despite extensive roadside surveys in the Puna subdivisions. Interviews with local residents indicate that the patch of cogongrass at HPP has been present for many years. It is unclear how this species arrived in Hawai'i.

Cogongrass is a federal noxious weed (USDA 2010a) and is currently under an eradication campaign by the Hawaii Department of Agriculture and the Big Island Invasive Species Committee, and most of the known HPP population has already been destroyed (Molly Murphy, pers. comm.). Any plants found should be reported to these agencies for eradication.

Cogongrass is one of the world's 100 worst weeds (Lowe *et al.* 2000) and has major ecological impacts in areas where it has become established, including invading undisturbed native vegetation, increasing fire frequency, and decreasing community diversity (Estrada & Flory 2015). Cogongrass has several traits that lend itself to its invasive nature, including wind-dispersed seeds, aggressive rhizomatous growth, allelopathy, tolerance to poor soils, and being readily adapted to fire.

The following description is from Flora of China (Wu *et al.* 2006: 584).

"Perennial, basal sheaths becoming fibrous; rhizomes widely spreading, tough, scaly. Culms solitary or tufted, 25–120 cm tall, 1.5–3 mm in diam., 1–4-noded, nodes glabrous or bearded. Leaf sheaths glabrous or pilose at margin and mouth; leaf blades flat or rolled, stiffly erect, 20–100 × 0.8–2 cm, culm blades 1–3 cm, adaxial surface puberulous, margins scabrid, base straight or narrowed, apex long acuminate; ligule 1–2 mm. Panicle cylindrical, copiously hairy, 6–20 cm, lowermost branches sometimes loose. Spikelets 2.5–6 mm; callus with 12–16 mm silky hairs; glumes 5–9-veined, back with long silky hairs ca. 3 times glume length, apex slightly obtuse or acuminate; lower lemma ovate-lanceolate, 2/3 length of glumes, ciliate, acute or denticulate; upper lemma ovate, 1/2 length of glumes, denticulate, ciliate, palea equal to lemma. Anthers 2, 2–4 mm. Stigmas purplish black. Fl. and fr. Apr–Aug. 2n = 20."

*Material examined.* **HAWAII:** Kea'au, Hawaiian Paradise Park, naturalized, tall grass growing up to 6 ft [1.8 m] tall, white, fluffy cylindrical seed heads present only on grass that had been mowed, leaf blades stick straight up, end in a point and have an off-center white midrib, 27 Dec 2021, *J. Parker BIED216*.



**Figure 1.** *Imperata cylindrica* as seen at HPP. **A**, Drone view of population. **B**, inflorescence.

### Scrophulariaceae

#### *Digitalis purpurea* L.

#### New naturalized record

Foxglove is an erect biennial or short-lived perennial up to 1.8 m tall with racemes of large, showy, tubular, purple, pink or white flowers with dark spots. All plant parts contain cardiac glycosides and are extremely toxic to humans and livestock when ingested (DiTomaso & Healy 2007). The site where the plants were found was a recently disturbed area off of Stainback Highway. The source of the infestation is unclear, but it has been observed in Hawai‘i that certain seed packets (such as those labeled as “pollinator” or “wildflowers”) sometimes contain *D. purpurea* seeds. Historically, there are two cultivated vouchers at BISH from this island collected in 1948 and 1964. When flowering, foxglove is easily distinguished from surrounding vegetation in Hawai‘i, but in vegetative form it resembles common mullein (*Verbascum thapsus* L.). However, mullein leaves are densely covered in star-shaped (stellate) hairs and the margins have unevenly rounded teeth (DiTomaso & Healy 2007). This species was selected as an eradication target by the BIISC Steering Committee in April 2021. Thank you to Dave Lorence (NTBG) for identifying this.

*Material examined.* **HAWAI‘I:** South Hilo Distr, Kūlani Prison entrance, Stainback Hwy, forb with basal rosette of simple, tomentose leaves to 15 in [38 cm] long, many tubular flowers borne on 5 ft [1.5 m] tall flowering stalk, branched at base, flowers white with purple dots in throat, fruit a fleshy green capsule, 2163600N 258723E, 26 Jun 2019, *J. Parker, R. Parsons & M. Murphy* BIED210.

### Urticaceae

#### *Phenax hirtus* Wedd.

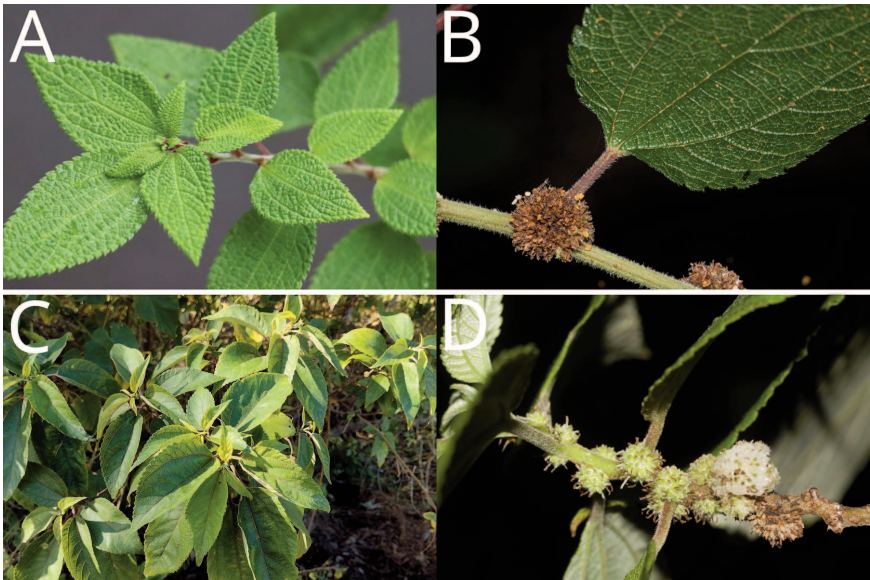
#### New state record

*Phenax* is a genus made up of 12 species from tropical America (Mabberley 2008). Identification of this collection took some time, as it resembles native genera such as *Pipturus* and *Boehmeria*, while also having characteristics of Old World genera like *Pouzolzia*. Warren Wagner at the Smithsonian Institution sent photos of the collection to colleagues Alexandre Monro, Ib Friis, and Melanie Thomas in Europe, who decided on the determination. This is the first record of a *Phenax* species being present in Hawai‘i. It

was collected along a trail in the Honua‘ula Forest Reserve north of Kailua-Kona. The infestation at that site is dense and well-established and the population limits extend north to Makalei Golf Course and south to Palani Ranch. There is evidence that this species has been spreading from this area for 30 years, based on a collection from 1990. *Phenax hirtus* has not been observed in any other district on the island, as of October 2021.

*Phenax* can be distinguished from the native māmakei (*Pipturus albidus*) in having lanceolate leaves, while māmakei leaves are more ovate to cordate (Figure 2a, c), and the inflorescences of *Phenax* are dry, brown balls, instead of the fleshy, white fruits of māmakei (Figure 2b, d). BIISC is working to contain this species to the forest reserve by treating it along corridors at the population limits.

*Material examined.* **HAWAII:** North Kona Distr, Pipeline Trail, Makā‘ula O‘oma section, Honua‘ula Forest Reserve, sprawling shrub to 5 m tall, forming thickets, abundant along wide trail, growing in full sun and shade, near many outplantings of native flora, leaves alternate, small and variable, 1–5 in [2.5–12.7 cm], with crenate margins, 2183156N 190115E, 27 Feb 2017, *J. Parker; L. Perry, R. Parsons & T. Sullivan BIED206*; Honua‘ula Ahupua‘a, Honua‘ula Forest Reserve–Makā‘ula O‘oma section, North Kona, growing along road between Makalei Golf Course and forest reserve boundary, 2,600 ft [790 m], 30 Oct 2019, *J. VanDeMark 780636*; North Kona Distr, along Mamalahoa Hwy near Huehue Ranch, dense shrub 8 ft [2.4 m] tall, 1,600 ft [490 m], 14 Feb 1990, *K.M. Nagata 4067*.



**Figure 2.** Comparison of *Phenax hirtus* with māmakei (*Pipturus albidus*). A–B, *Phenax hirtus* leaves and fruits. C–D, Māmakei leaves, flowers, and fruits.

**Vitaceae*****Leea indica*** (Burm. f.) Merr.**New naturalized record**




Bandicoot berry is a sprawling shrub to treelet, 6–35 ft [1.8–10.7 m] tall, with greenish white flowers and blue-black fruit (Staples & Herbst 2005). It was introduced to Hawai‘i (O‘ahu?) by Joseph Rock under the name *Leea sambucina*, prior to 1917, but is rarely grown in Hawai‘i (Staples & Herbst 2005). This collection is from a naturalized population in ‘Akaka Falls State Park. It has also been collected as “adventive” from O‘ahu near the Lyon Arboretum. This species has been selected as an eradication target by the BIISC Steering Committee in August 2021. Thank you to Dave Lorence (NTBG) for identifying this.

*Material examined.* **HAWAI‘I:** South Hilo Distr, ‘Akaka Falls State Park, scrambling, vining shrub with stiff aerial roots that sprout when branch is horizontal, leaves compound with digipinnate formation, many small green flowers on compact umbel, fruit a green berry, 3–4 seeds, 2196858N 274591E, 26 Sep 2019, *J. Parker & R. Parsons BIED211*.

**ACKNOWLEDGMENTS**

We thank the Bishop Museum *Herbarium Pacificum* staff, along with Kelsey Brock, Alex Lau, Danielle Frohlich, Warren Wagner, Alexandre Monro, Ib Friis, and Melanie Thomas for assisting us with plant identifications and specimen cataloging. Thanks to the herbarium at the National Tropical Botanical Garden in Kaua‘i. Thanks to Clyde Imada for his helpful “Native and Naturalized” plants list. A big thanks to the indispensable “Plants of Hawai‘i” website and Flickr page hosted by Forest and Kim Starr.

**REFERENCES**

- Brownsey, B.J. & Perrie, L.R.** 2021. *Dicksonia squarrosa* (G.Forst.) Sw. *Flora of New Zealand*. Available at: <https://www.nzflora.info/factsheet/Taxon/Dicksonia-squarrosa.html> (Accessed 5 October 2021)
- DiTomaso, J.M. & Healy, E.A.** 2007. *Weeds of California and other western states*. University of California, Davis. 2 vols. 1760 pp.
- Estrada, J.A. & Flory, S.L.** 2015. Cogongrass (*Imperata cylindrica*) invasions in the US: mechanisms, impacts, and threats to biodiversity. *Global Ecology and Conservation* 3: 1–10.
- Faccenda, K.** 2022. Updates to the Hawaiian grass flora and selected keys to species: Part 1. *Bishop Museum Occasional Papers* 148: 41–98. 
- Frohlich, D. & Lau, A.** 2012. New plant records for the Hawaiian Islands 2010–2011. *Bishop Museum Occasional Papers* 113: 27–54. 
- Kiehn, M.** 2011. Invasive alien species and islands, pp. 365–384. In: Bramwell, D. & J. Caujapé-Castells, J (eds.), *The biology of island floras*. Cambridge University Press, Cambridge.
- Lowe, S., Browne, M., Boudjelas, S. & De Poorter, M.** 2000. *100 of the world’s worst invasive alien species: a selection from the global invasive species database* (Vol. 12). Auckland: Invasive Species Specialist Group.
- Mabberley, D.J.** 2008. *Mabberley’s plant-book*. Third edition. Cambridge University Press, Cambridge, UK.
- Parker, J.L. & Parsons, B.** 2016. New plant records from the Big Island for 2015. *Bishop Museum Occasional Papers* 118: 17–22. 

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- Poole, A.L.** 1966. Tree ferns. In: McLintock, A.H. (ed.), *An encyclopaedia of New Zealand*. Te Ara. Available at: [http://www.teara.govt.nz/en/1966/ferns-tree\\_](http://www.teara.govt.nz/en/1966/ferns-tree_) (Accessed 5 October 2021)
- POWO.** 2023. Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Available at: [give url] (Accessed 10 October 2023)
- Staples, G.W. & Herbst, D.R.** 2005. *A tropical garden flora*. Bishop Museum Press, Honolulu. 908 pp.
- Strother, J.L.** 2006 *Gaillardia*. In: Flora of North America Editorial Committee. *Flora of North America*. Volume 19. Oxford University Press, New York.
- USDA.** 2010a. Federal noxious weed list, v. 1.0. Available at: [https://www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/weeds/downloads/weedlist.pdf](https://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/weedlist.pdf) (Accessed 13 January 2022).
- USDA.** 2010b. *Bursera simaruba*. Germplasm Resources Information Network, Agricultural Research Service, United States Department of Agriculture (USDA). Available at: <https://plants.sc.egov.usda.gov/home/plantProfile?symbol=BUSI> (Accessed 20 January 2021).
- Wagner, W.L., Herbst, D.R. & Sohmer, S.H.** 1999. *Manual of the flowering plants of Hawai'i*. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu. 1,919 pp.
- Wu, Z.Y., Raven, P.H. & Hong, D.Y.** (eds.) 2006. *Flora of China*. Volume 22. Poaceae. Missouri Botanical Garden Press, St. Louis. 733 pp.
- Wu, Z.Y., Raven, P.H. & Hong, D.Y.** (eds). 2011. *Flora of China*. Volume 19. Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae. Missouri Botanical Garden Press, St. Louis. 884 pp.