

New plant records for the Hawaiian Islands 2015–2019

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Here we document seven new state records, eight new naturalized records, six new island records, and three species spreading adventively. A total of 18 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) and information subsequently published in the *Records of the Hawaii Biological Survey*. All supporting voucher specimens are deposited at Bernice Pauahi Bishop Museum's *Herbarium Pacificum* (BISH), Honolulu, Hawai'i.

Acanthaceae

Justicia gendarussa Burm.f.

New state record

Justicia gendarussa, a species native to Southeast Asia and cultivated widely throughout Asia for its use as a medicinal species for the treatment of various ailments and as a birth control method for men (Winn 2011), can be found in streambeds and roadsides in its native range. It is often naturalized where grown, to the extent that its true native range is unknown (Anonymous 2005). Several individuals of this species were found near a local swimming hole. The full description of this species from *Flora of China Online* (Hu & Daniel 2011) is as follows:

“Subshrubs 0.7–1.5 cm tall, much branched. Stems subterete, swollen at nodes, glabrous. Petiole 3–10 mm; leaf blade narrowly lanceolate, 6–10 × 1–1.5 cm, glabrous, secondary veins 5–8 on each side of midvein, base cuneate to attenuate, margin subsinuate, apex acute to shortly acuminate. Spikes terminal or axillary, 3–12 cm, interrupted, usually in a leafy panicle; peduncle 0.5–1.5 cm; bracts triangular, 2–6 × 1–2.5 mm, basal ones longer than calyx then gradually smaller with apical most ones shorter than calyx, margin ciliate, apex acute; bracteoles elliptic to linear-lanceolate, ca. 3 × 1 mm, margin ciliate, apex acute. Calyx ca. 5 mm, 5-lobed; lobes linear-lanceolate, 3–4 × ca. 0.5 mm, subequal, apex acuminate. Corolla creamy white, 1.2–1.5 cm; tube basally cylindric and ca. 2 mm wide for 8–9 mm; lower lip violet dotted basally, cuneate-obovate, 6–10 mm broad, 3-lobed, lobes oblanceolate and 3–5 × ca. 3.5 mm; upper lip violet blotched, triangular, ca. 7 × 3.5 mm, 2-cleft. Stamens exserted; filaments 3–6 mm, glabrous; anther thecae oblong, ca. 1.2 mm, superposed, lower one spurred at base, upper one muticous. Ovary glabrous; style ca. 1 cm, glabrous; stigma capitate, shortly 2-lobed. Capsule clavate, ca. 1.2 cm. Fl. Jan–Apr. 2n = 28, 30.”

Material examined. MAUI: Ke‘anae, Ching’s Pond, several shrublike plants ca 2 m tall, naturalized in wet lowland streambed amongst boulders with *Ardisia elliptica* and *Polygala paniculata*, 27 Oct 2014, F. Starr & K. Starr 141027-02.

Amaranthaceae

Amaranthus polygonoides L.

New state record

This species was previously uncollected in the state of Hawai‘i, but now has been found in several roadside locations on O‘ahu. In its native range in the mainland U.S., it can be found in disturbed habitats and coastal areas (Flora of North America Editorial Committee 1997). It has been introduced to Europe and Asia, where it has been described as a “casual” alien (GBIF Secretariat 2019). It is likely, given the circumstances in which this species has been found on O‘ahu, that it is being spread on mowing equipment. The full description from *Flora of North America Online* (Mosyakin & Robertson 2003) is as follows:

“Plants annual, glabrescent proximally, pubescent distally, becoming glabrous at maturity. Stems erect-ascending to prostrate, branched mostly at base and in proximal 1/2, 0.1–0.5 m. Leaves: petiole ± equaling blade; blade ovate, obovate-rhombic to narrowly ovate, sometimes lanceolate, 1.5–3(–4) × 0.5–1.5(–2) cm, base cuneate, margins entire to undulate-erose, apex rounded, obtuse, or emarginate, mucronate. Inflorescences axillary, congested clusters. Bracts of pistillate flowers lanceolate or linear, 1–1.5 mm, 1/2 as long as tepals. Pistillate flowers: tepals 5, connate in proximal 1/3 (entirely distinct in all other species), with 3 prominent veins abaxially, spatulate or somewhat clawed, equal or subequal, 2–3 mm, apex rounded or retuse, mucronate; style branches somewhat spreading; stigmas 3. Staminate flowers intermixed with pistillate; tepals (4–)5; stamens 2–3. Utricles cylindrical or narrowly turbinate, 2–2.5 mm, ± equaling tepals, smooth proximally or roughened toward tips, indehiscent or tardily dehiscent. Seeds dark reddish brown to black, lenticular, 0.8–1 mm diam., shiny.”

Material examined. O‘AHU: Waikele, H-1 westbound off-ramp, dry to mesic disturbed roadside, herbs ca 0.33 m tall, ca 100 plants in a small patch, D. Frohlich & A. Lau 20181201; Wai‘anae HDOT baseyard, low-growing herbs in a mowed field growing with roadside ruderal vegetation, occasional on property, not common, 21 Sep 2019, A. Lau & D. Frohlich 2019092101.

Asteraceae

Hedynois rhagadioloides (L.) F.W. Schmidt

New state record

This species, which is native to the Mediterranean, is naturalized in California and Texas on the U.S. mainland. This thorny herb has proven to be difficult to control at Schofield Barracks on O‘ahu, where thousands of individuals were found naturalized in several locations. The full description of this species comes from *Flora of North America Online* (Strother 2006):

“Annuals, (5–)10–60+ cm; taprooted. Stems usually 1, erect, branched distally, ± hispid to setose (hair tips often forked). Leaves basal and cauline; basal ± petiolate, distal sessile; blades lanceolate, linear, oblanceolate, oblong, or ovate, margins entire or dentate to pinnately lobed (faces ± hispid). Heads borne singly or in loose, corymbiform arrays. Peduncles ± inflated distally, not bracteate. Calyculi of 3–10+, deltate to lanceolate or lance-linear bractlets. Involucres campanulate to cylindrical, 3–12 mm diam. (larger, ± globose in fruit). Phyllaries 5–13+ in 1 series, linear-navicular (± keeled, each ± enfolding subtended ovary or cypsel), subequal, margins little, if at all, scarios, apices acuminate.

Receptacles flat, ± pitted, glabrous, epaleate. Florets 8–30+; corollas yellow (often reddish proximally, greenish abaxially). Cypselae dark brown to black, cylindrical to fusiform (usually ± arcuate), not beaked, ribs 12–15, faces ± scabrous or barbed; pappi persistent, whitish; on outer cypselae often coroniform (distinct or connate, erose to fimbriate scales); on inner cypselae 0–5+, cuneate to lanceolate or subulate outer scales plus 5+, lance-aristate to subulate-aristate, inner scales. $x = 9$."

Material examined. **O'AHU:** Schofield Barracks, Kolekole ranges, MAF landing zone, sprawling herb in disturbed open area, naturalized, thousands of plants present, 25 May 2013, *J. Beachy & J. Gustine-Lee US Army 313*; Schofield Barracks South Range, at MOUT training facility, sparingly naturalized in non-native dominated habitat, 16 Feb 2015, *J. Beachy, K. Cloward, C. Osaki & E. Long US Army 373*; Schofield Barracks, Kolekole ranges, MAF landing zone, multiple naturalized populations in the area, 23 Mar 2015, *J. Beachy & J. Hawkins US Army 377*.

Elaeocarpaceae

Elaeocarpus argenteus Merr.

New state record

This species is not known to be cultivated, nor has it been collected as a weed, outside its native range of the Philippines. Its introduction history to Hawai'i is unclear. It is scattered and rare in native-dominated forest near the summit ridge of the central Ko'olau Mountains. Some individuals found in the area have been controlled, and others remain. Reports from local botanists indicate there may be a more established population in Punalu'u Valley. It is possible the species was intentionally introduced to that valley at some point. This species can be distinguished from other *Elaeocarpus* known in Hawai'i by the following combination of characters: branchlets glabrous; petiole 1.5–2 cm long, swollen at base and at apex; leaf blades elliptic-oblong, leathery, and glabrous, with glands (or domatia) on underside at junctions of the midvein and secondary veins, the margins crenate, apex acuminate; racemes 5–7 cm long, peduncle densely pubescent; flowers bisexual, the buds ellipsoid with an acute apex; petals laciniate. The full description of this species from *Flora of China Online* (Tang & Phengklai 2007) is as follows:

"Trees evergreen. Branchlets brown, terete, glabrous. Petiole 1.5–2 cm, glabrous, slightly swollen at each end; leaf blade elliptic-oblong, usually tapered to base, 6.5–8 × 2–2.5 cm, leathery, glabrous, lateral veins 5 or 6 per side, midvein raised on both surfaces, axils mostly prominently glandular abaxially, base obtuse or acute, margin shallowly sparsely crenate, apex acuminate. Raceme 5–7 cm; peduncle densely pubescent. Pedicel 5–6(–8) mm, densely appressed-pubescent. Flowers bisexual; buds ellipsoid, ca. 4 mm, apex acute. Sepals 5, lanceolate, abaxially densely minutely gray pubescent, adaxially keeled. Petals 5, oblong-obovate, ca. 4 mm, abaxially silvery sericeous, adaxially white villous in lower part and along margin, upper 1/3 laciniate; segments 12. Stamens ca. 28; filaments ca. 1 mm, villous; anthers linear, ca. 2 mm, minutely puberulent, not awned but pubescent at apices. Disk 5-lobed, villous. Ovary villous, 2-loculed; style tomentose on lower 1/2. Drupe ovoid, ca. 8 × 6 cm; exocarp obscure, glabrous; endocarp inconspicuously verrucose. Fl. and fr. unknown."

Material examined. **O'AHU:** Central Ko'olau, upper Kaluanui, single small tree in native-dominated wet forest., though others noted in central Ko'olau summit area, UTM 612183, 2384083, 12 Mar 2015, *L. Reynolds & R. Pender 2015031201*; Ko'olau Mountains, upper Pe'ahināi'a, near summit, single tree with white bark, ca 5 m tall, 8–9 cm diam trunk, very young trees of same description in Pe'ahināi'a observed in the past, 7 Dec 2005, *J. Beachy US Army 29*.

Fabaceae*Albizia procera* (Roxb.) Benth.**New naturalized record**

Albizia procera, a species native to China and Southeast Asia, has been found naturalized in several locations in central O'ahu. While there are examples of this tree that are clearly planted in the landscaping at Wheeler Army Airfield, several medium-sized to small trees on Wheeler were observed in places that do not look like deliberate plantings. The full description of this species comes from *Flora of China Online* (Delin & Nielsen 2010):

"Trees, deciduous, to 15 m tall. Branchlets slightly pubescent or subglabrous. Leaf petiole with an oblong gland ca. 1 cm above base; pinnae 3–5 pairs, 15–20 cm; petiolules ca. 2 mm; leaflets 6–12 pairs, ovate to subrhombic, 3–4.5 × 1.2–2.2 cm, subleathery, sparsely appressed pubescent, main vein closer to lower side, base oblique, apex obtuse or emarginate. Heads ca. 20-flowered, arranged in axillary or terminal panicles. Flowers uniform, sessile. Calyx 2–3 mm, glabrous. Corolla yellow-white, ca. 6 mm; lobes lanceolate, ca. 2.5 mm, apex pubescent. Staminal tube longer than corolla tube. Ovary glabrous, subsessile. Legume ligulate, flat, 10–15 × 1.5–2.5 cm, glabrous. Seeds 8–12, obovoid-elliptic; pleurogram obovate-elliptic. Flowers May–Sep, fruits Sep–Feb of following year.

Material examined. **O'AHU:** Waipi'o, along Kamehameha Hwy just south of Mililani, near south end of Kīpapa Gulch, dry/mesic roadcut, upright tree with sparse canopy 10–12 m tall, scattered on roadcut, more trees in area, UTM 602253, 2570026, 06 Jan 2017, *A. Lau 01*; perimeter of Wheeler Army Airfield, along Kunia Road, growing with *Spathodea campanulata*, planted *Carex wahuensis*, tree 30 ft [9 m] tall, ca 5 plants, 850 ft [260 m], UTM 599428, 2376407, 16 Jan 2019, *K. Kawelo US Army 505*.

Calliandra surinamensis Benth.**New island record**

This record represents the first collection of this species as naturalized on Kaua'i, having been collected in 1987 naturalizing in a fencerow and into a pasture in Kalaheo. It was first collected as naturalized on West Maui in 2009 (Starr & Starr 2011).

Material examined. **KAUAI:** Kōloa Distr., Kalaheo, along Waha Road 0.5 mi [0.8 km] east of intersection with Papalina Road, small tree 3 m tall, naturalized locally in fence row and adjacent pasture, 600 ft [185 m], 1 May 1987, *D. Lorence & T. Flynn 5202*.

Leucaena ×spontanea C.E. Hughes & S.A. Harris**New island record**

Leucaena ×spontanea, a hybrid of *L. leucocephala* and *L. diversifolia*, was found sparingly naturalized in an O'ahu botanical garden, in proximity to its parent species. It was previously recorded as naturalized on East Maui (Oppenheimer 2004). This species is so named in reference to its spontaneous occurrence when the two parent species are brought together in cultivation. The complete description of this hybrid is from Hughes (2010):

"Small to medium-sized tree, 5–15(–20) m tall, bole diameter 30–40 cm, with a short bole, heavy branching, and a wide, open, spreading crown. Bark mid-grey-brown with shallow rusty orange-brown vertical fissures, inner bark green. Shoots terete, mid-orange brown, glabrous or sparsely puberulent. Leaves (19–)24–27(–30) cm long, (10–)11–14 cm wide; petioles (including pulvinus) (30–)32–36(–38) mm long, with a single green or reddish green, sessile, elliptic or rounded, cupulate nectary, 2.8–3.5 × 2–2.5 mm, often slightly wider at distal end than at the base, at the distal end on adaxial side of petiole; rachis 14–21 cm long, with 1 or 2 nectaries, 2.6 × 1.4 mm, elliptic, discoid, or shallowly crateriform, at the distal end, apex of rachis extending beyond the terminal pinnae as a slender pointed glabrous mucro 2.5–4 mm long, curling when dry; pinnae

(10–)11–16(–18) pairs; pinnular rachis 6.5–9 cm long, angled, sparsely puberulent, with 1 or 2(–3) sessile discoid elliptic nectaries, 0.3×0.7 mm, at base of terminal pairs of leaflets; leaflets (22–)26–36(–48) pairs per pinna, (6.2–)8–10(–11.9) mm long, 1.2–2(–2.3) mm wide, nearly sessile, asymmetric, linear, acute or acuminate apically, rounded and strongly asymmetric basally, glabrous except ciliate at margins, asymmetric midrib and 1 or 2 secondary veins visible on dried leaflets. Capitula (17–)20–24(–28) mm in diameter at anthesis, in fascicles of (1–)2–5 in leaf axils on actively growing shoots, the leaves developing with the capitula, each capitulum with 130–160 flowers; peduncles 24–33 mm long, angled, densely or sparsely pubescent with an involucre of bracts at the distal end. Flowers subtended by peltate bracts, 2.5–3 mm long, 0.8 mm in diameter; calyx 3–3.3 mm long, hairy on distal half and ciliate on lobe margins, pale whitish green; petals 4.7–5.4 mm long, free, hairy on distal half and ciliate on margin, pale whitish green; filaments 7.5–9.5(–10) mm long, white or pale pink; anthers hairy, white or pale pink, apiculum absent; ovary 2.5–2.8 mm long, covered in white hairs at distal end, pale greenish white, with 18–24 ovules, style 12–13 mm long, white or pale pink, with a terminal tubular stigma, exerted strongly beyond the anthers. Pods (8–)10–15(–18) cm long, (12–)15–20(–22) mm wide, linear-oblong, the apex rounded with a short pointed beak, the base truncate, 14–20-seeded, valves chartaceous or membranous, mid-green when unripe, turning mid-brown, glabrous, opening along both sutures, endocarp not partitioned between seeds. Seeds 6.5–7 mm long, 2.9–3.5 mm wide, compressed, oblong, dark reddish chest nut-brown, glossy, pleurogram visible, U-shaped with 95% arm extension.”

Material examined. **O‘AHU:** Ho‘omaluhia Botanical Garden, edge of garden grounds, mesic lowland disturbed site, sparingly naturalized at this site, growing with both *Leucaena diversifolia* and *L. leucocephala*, 08 Dec 2015, *A. Lau 2015120801*.

***Platymiscium stipulare* Benth.**

New naturalized record

Previously found as a small adventive population in a suburban setting, this species has now been collected on O‘ahu spreading into a forest reserve in Nānākuli.

Material examined. **O‘AHU:** Nānākuli Valley, terminus of ranch road into forest reserve, dry to mesic lowland forest reserve, scattered about, young and older trees present, UTM 2366896, 592106, 1 Apr 2016, *T. Takahama 20160401A*.

***Tephrosia pumila* (Lam.) Pers.**

New naturalized record

This species, which is widespread throughout tropical regions, was found scattered throughout a weedy roadside location near Kahului Airport on the island of Maui. The full description comes from *Flora of West Pakistan* (Stewart 1982):

“Annual or short lived perennial, branches procumbent, stem pilose. Leaf imparipinnate, petiole c. 3–10 mm long, rachis up to 4.5 cm long; leaflets 7–13, c. 4–20 mm long, up to 8 mm wide, oblong or oblanceolate truncate to retuse, glabrous or pubescent above, pilose below; stipules up to 4 mm long. Inflorescence terminal or leaf-opposed, a 1–3-flowered raceme. Bract 2–3 mm long. Pedicel 2.5–4 mm long. Calyx hispid, tube c. 1.5 mm long, teeth 2.5–3.5 mm long. Corolla white, pale-pink or purplish. Vexillum c. 6–10 mm long. Fruit 3.5–4 cm long, c. 4 mm broad, pubescent, curved towards the tip, 8–14-seeded.”

Material examined. **MAUI:** Kahului Airport, growing in a gravel pile, low prostrate mats 60–80 cm diam, 30 May 2012, *R. Hobdy 4340*; Kahului Airport, on edge of rental car storage lot and *kiawe* shrubland, scattered along margin of *kiawe* thicket and grassy parking area, lowland coastal scrub with *Prosopis pallida*, *Boerhavia coccinea*, *Cenchrus ciliaris*, 20.509839 N, -156.443906 W, 21 Nov 2017, *K. Starr & F. Starr 171121-01*; *loc. cit.*, 26 Jan 2018, *F. Starr & K. Starr 180126-01*.

Vigna luteola (Jacq.) Benth.

New island record

This species, which has previously been collected as naturalized on the islands of Kaua'i (Frohlich & Lau 2012), O'ahu (Staples *et al.* 2003), and West Maui (Oppenheimer 2019), was found in a roadside location on the island of Hawai'i, vining up several trees and along the ground.

Material examined. **HAWAII:** HDOT staging area vining up a nearby tree, growing with *Urochloa maxima*, *Bidens pilosa*, 7 × 7 m patch, three other patches in this area, another farther north towards Ikaika St., UTM 284912, 2174021, 10 Jan 2019, *A. Lau & D. Frohlich 2019011001*.

Gentianaceae

Chelonanthus acutangulus Slooten

New state record

This species, which is native to Brazil, Venezuela, Trinidad, and the Guianas, was found on O'ahu growing out of erosion matting along an Army access road and in an LZ on the same installation. The introduction pathway for this species remains unclear. Over 200 plants total were found and treated with herbicide in these two areas. The full description of this species is from *Flora of the Guianas Online* (Mota de Oliveira 2014; *as C. alatus*):

"Herb to subshrub, up to 2.5 m high, unbranched to sparsely branched. Stems and branches up to 1.1 cm in diam., strongly quadrangular, 4-angled to 4-winged, wings 0.1–1.3 mm wide; internodes 0.5–30.3(–47.3) cm long. Leaves sessile, cauline, evenly distributed along stem; blade membranaceous, elliptic, 2.9–23.2 × 1.2–8(–12) cm, margin not thickened, flat, apex acute to acuminate, base attenuate, obtuse to truncate. Inflorescence 3–100-flowered; bracts ovate with obtuse (acute) apex, 0.8–9.4 mm long; pedicel 4–9 mm long. Flowers erect to horizontal; calyx green, 4–8 × 3–6 mm, lobes ovate, 2–6 × 2–4 mm, margin membranaceous, apex obtuse; corolla white, cream, with dark green spot on apex of each corolla lobe, funnel-shaped to campanulate, 20–50 mm long, 8–21 mm wide at mouth, lobes ovate, 3–11 × 4–13 mm, apex obtuse or acuminate; stamens exserted or not, filaments 14–40 mm long, straight, or curved downward close to anther, anthers white to pale green, oblong, 2–3.8 mm long, straight to slightly curved; pollen exine with muri fragmented into elongated to knob-like processes that are thickened along equatorial zone; pistil 24–34 mm long, ovary 4.4–5.6 × 2.1–2.6 mm, style 14–23 mm long, stigma lobe elliptic to obovate, 2.8–4.4 × 1.1–2.3 mm. Fruit nodding, brown, 8–23 × 3–10 mm; seeds brown, 0.1–0.4 mm in diam."

Material examined. **O'AHU:** Kawailoa, Drum Road, herb up to 1 m tall, sparingly naturalized population of ca 15 plants, growing out of erosion control matting, 9 Mar 2016, *J. Hawkins & J. Rellamas US Army 428*; Kawailoa, Drum Road, after LZ Pu'u Kapu near mile marker 10, open canopy on hot, dry, 45-degree slope, growing with *Spathoglottis plicata*, *Pterolepis glomerata*, *Metrosideros polymorpha*, *Nephrolepis brownii*, *Clidemia hirta*, *Bidens alba*, 170 plants (incl. seedlings) in 2 areas within black mesh erosion control matting, all treated with herbicide, UTM 2387579, 601753, 5 May 2016, *J. Hawkins & J. Rellamas US Army 443*.

Juncaceae

Juncus acuminatus Michx.

New island record

This species has previously been documented from the islands of Maui and Hawai'i (Wagner *et al.* 1999), and is now known to occur on O'ahu. It was found growing in pooled water on a streamside boulder in full sun.

Material examined. **O'AHU:** Waimea Valley, along Kamanui Stream, small naturalized population in a lowland riparian area, growing in puddles on large boulder, UTM 599169, 2392103, 03 Jun 2013, *A. Lau & D. Frohlich 2013060301*.

Lamiaceae***Callicarpa macrophylla*** Raeusch.**New naturalized record**

This species is not common in cultivation in Hawai'i but has been documented in cultivation since 1928. It is native to tropical and subtropical Asia, where it grows in a variety of habitats, including disturbed areas as well as mixed forests. It does not appear to be documented as naturalized anywhere else. A small population was observed along the Ko'olau summit in native-dominated forest. It can be distinguished from other *Callicarpa* in Hawai'i by its lanceolate-elliptic leaves that are pointed at both ends, more open inflorescence heads that are 1–3 inches [2.5–7.5 cm] in diameter, and white fruits (Staples & Herbst 2005).

Material examined. **O'AHU:** Waiawa, near summit ridge, wet native-dominated forest, small tree to 3 m height, small naturalized population, ca 5 plants of various sizes present, UTM 615097, 2374408, 22 Apr 2015, *M. Berger s.n.* (BISH 763743).

Lauraceae***Neolitsea cassia*** (L.) Kosterm.**New naturalized record**

This species was previously published as showing signs of naturalization on O'ahu (Lau and Frohlich 2013), where a single naturalized tree was found in secondary forest on the Likeke Trail above Ho'omaluhia Botanical Garden. A naturalized population is documented here from secondary forest surrounding the garden, where it is an occasional to locally common element of the vegetation, primarily in shady, non-native dominated habitat. It is a small tree distinguishable from other taxa in Lauraceae in Hawai'i by its alternate leaves with two sub-basal lateral veins, which do not have a cinnamon-like scent when crushed, the flowers in umbels, sessile on very short branchlets at the internodes. Keys and a full description can be found in *Flora of Ceylon* (Dassanayake *et al.* 1995).

Material examined. **O'AHU:** Ho'omaluhia Botanical Garden, near Kahua Kuou section, small tree to ca 5 m, occasional to common in non-native secondary vegetation surrounding cultivated areas of garden, occasional in areas *mauka* of garden grounds, 2 Jun 2015, *A. Lau 2015060201*.

Moraceae***Ficus religiosa*** L.**New island record**

This species has previously been documented as naturalized on the islands of Maui and Hawai'i (Oppenheimer & Bustamente 2014; Parker & Parsons 2012), and O'ahu (Frohlich & Lau 2008), although the original O'ahu record is considered adventive (Wagner *et al.* 2012). Since it was first found, it has become increasingly common and established as naturalized on the island, particularly in urban areas throughout Honolulu. Some plants are repeatedly cut back but resprout vigorously and have reached maturity under these circumstances.

Material examined. **O'AHU:** Honolulu, along H-1 freeway, at Pali exit ('ewa bound), dry lowlands in urban setting, 5 m tall, established in and widening seam in concrete wall next to freeway, figs at various stages of development, 02 Dec 2014, *A. Lau 2014120201*.

Piperaceae***Piper divaricatum*** G. Mey.**New naturalized record**

Native to tropical South America, this *Piper* species does not appear to be widely introduced to regions outside of its native range. It has been introduced to at least two botanical gardens on O'ahu and was found naturalizing in one on the windward side of the

island. It is capable of forming thickets in dense shade. It can be distinguished from other species of *Piper* in Hawai'i by its shrub habit, subcoriaceous leaves with pinnate venation, young stems green with white spots, and swollen nodes. A key and full description is available in *Bulletin of the British Museum* (Tebbs 1990).

Material examined. O'AHU: Ho'omaluhia Botanical Garden, near Kahua Kuou section, sparsely branched shrub 2 m tall, growing in dense shade at edge of *hau* thicket, spreading from plantings in Tropical American section, capable of forming dense thickets, UTM 623736, 2365214, 14 Apr 2015, A. Lau 2015041405.

Poaceae

Paspalum arundinaceum Poir.

New island record

This species has been previously documented on Maui (Snow & Davidse 2011), and is now known to occur on O'ahu as well. The population occurs over at least an acre of pastureland. Reports indicate that it can create thickets of vegetation that can cut skin, and may be unpalatable to cattle.

Material examined. O'AHU: Ka'a'awa Valley, Kualoa Ranch, NW slope of valley in a cattle pasture, lowland disturbed rangeland, ca 1.5 m tall, occupying at least an acre, 22 Oct 2015, P. Conant s.n. (BISH 765243).

Pteridaceae

Adiantum trapeziforme L.

New naturalized record

This tropical American fern species, which is moderately popular in cultivation, was found growing along a popular trail in central O'ahu. This species can be distinguished from other *Adiantum* in Hawai'i by its twice-pinnate, mostly trapezoid-shaped, unequal-sided leaflets 1–2 inches [2.5–5 cm] long, on slender, short, jointed stalks. The color of the stalks ends abruptly at the leaflet blades (Staples & Herbst 2005).

Material examined. O'AHU: Kaluaao Falls Trail, mesic non-native forest, erect to arching terrestrial fern to ca 1 m tall, rhizomatous, ca 5 plants in the area, naturalized, UTM 614507, 2367346, 29 Jan 2016, K. Kawelo & J. Rohrer US Army 408.

Salicaceae

Flacourtia zippelii Slooten

New state record

This species, which is native to Papua New Guinea, was found widely scattered throughout a botanical garden on the windward side of O'ahu. A parent plant had been accessioned to the garden and was still present at the time of collection. Individuals of all size classes were noted. A full description of this species can be found in *Trees of Papua New Guinea* (Conn & Damas 2019). An abridged description follows:

“Large canopy tree (up to c. 30 m high) or small sub-canopy tree (10–20 m high); bole cylindrical (up to c. 25 cm diam.); bark grey or brown, smooth; bark exudate (sap) absent; terminal buds not enclosed by leaves...Leaves... simple, (7.0–)12.0–21.0 cm, (30.0–)50.0–70.0(–90.0) cm, symmetric (to very slightly asymmetric), entire or coarsely crenate, acuminate, venation pinnate, secondary veins open, prominent, leaves lower surface dark green (sub-glossy), upper surface green, indumentum (hairs) absent. Inflorescence axillary, flowers on an unbranched axis, cones absent; flowers unisexual, with male and female flowers on the same plant, stalked; flowers 2.0–3.0 mm long, up to 10 mm diameter; perianth present, with all sepals and/or petals (tepals) similar or petals absent, inner perianth pale yellow, green, or cream-coloured (sepals); 4–5, free or some or partly joined (slightly joined at base); stamens 15 (c.), ovary superior, carpels joined

(when more than one), locules 4–5; styles free, 4 (usually persistent in fruit)–5. Inflorescence arranged on unbranched axis, fruit 15.0–20.0 mm long, red, non-fleshy to fleshy drupe; seeds (1–)2(–4), to about 5 mm long (5–8 mm long), not winged, broad (as wide as long), seed 1–10 mm diam. (c. 6 mm diam.).”

Material examined. **O‘AHU:** Ho‘omaluhia Botanical Garden, just *mauka* of Kahua Kuou section, tree to 5 m tall, naturalized population including trees ca 18 m tall, juvenile plants rare and well scattered in garden, 19 May 2015, *A. Lau 2015051901*.

Urticaceae

Pilea spruceana Wedd.

New state record

This species is a sparsely villous, low-growing herb with oblong to ovate-oblong, ciliate leaves 2–8 cm long and 1.5–4 cm wide, purple-tinged below and dark green above with silver stripes along the central vein, and crenate-serrate, sparingly ciliate margins. Leaves are strigillose above, villous beneath, with punctiform and fusiform cystoliths (more punctiform at the margins). Plants are monoecious or dioecious, with pistillate flowers in short-peduncled cymes (Killip 1937). Hundreds of individuals were found spread along a more than 60-meter stretch of streambed in east Maui; the nearest residence was over 300 feet away [90 m] from the collection.

Material examined. **MAUI:** Nāhiku, growing along seasonal streambank with *Mangifera indica*, *hau*, *Miconia calvescens*, herbaceous plant ca 4–6 in [10–15 cm] tall, no flowers or fruit seen, hundreds of individuals along >200 ft [120 m] stretch of stream, UTM 2305596, 802548, 20 Jun 2019, *D. Frohlich & A. Lau 2019062001*.

Violaceae

Viola hederacea Labill.

New naturalized record

Known also by the common name Australian violet, this low-growing herb is occasional in cultivation in Hawai‘i, having been first documented here in 1977. It is grown elsewhere outside its native range, and has become naturalized in at least China (Chen *et al.* 2007). It can be distinguished from other species of *Viola* in Hawai‘i by a stoloniferous habit, the plants essentially stemless with leaves in rosettes, the leaves kidney-shaped with rounded apices. A key and full description can be found in *A Tropical Garden Flora* (Staples & Herbst 2005). It was found along a dirt road through mesic secondary forest in the vicinity of home sites. When not flowering, its vegetative resemblance to other common weeds in Hawai‘i (such as *Centella asiatica*) may limit the degree to which this species is noticed and documented as naturalized by field botanists.

Material examined. **O‘AHU:** Pālehua, side road leading to single cabin, mesic secondary forest, growing in partial shade in non-native dominated secondary forest, naturalized patch of ca 100 plants, 28 Jul 2015, *K. Kawelo US Army 397*.

TAXA SHOWING SIGNS OF NATURALIZATION

Asteraceae

Carthamus tinctorius L.

This species, known by the common name safflower, is cultivated as a source of vegetable oil, dye, as an ornamental, and as birdseed. Given its location in a public park, it is likely to have been brought in for birdseed, as the species is a common component in birdseed mixes. It is believed to have originated in the Mediterranean, but today it is only found in cultivation and escapes where grown (Keil 2006). Two mature plants with many small

seedlings were found in this area; a separate immature plant was noted elsewhere in the park in a coral fill pile.

Material examined. **O‘AHU:** Ala Moana Beach Park, Magic Island, near lifeguard stand, herb to 0.5 m tall, leaves spiny along margins, flower heads thistle-like, petal/corolla lobes yellow, aging to orange, dry coastal area near cultivated setting, open canopy, growing with *Melilotus indicus* and *Medicago*, 17 Mar 2017, *D. Frohlich & A. Lau 2017031701*.

Convolvulaceae

Ipomoea corymbosa (L.) Roth ex Roem. & Schult.

This species was found sprawling over a *Leucaena leucocephala* shrub along a major highway in Anahola, Kaua‘i. Although there are a few houses in the area, this vine was not obviously planted or tended. This species commonly naturalizes where it is grown. The full description of this species from *Kew Bulletin* (Wood *et al.* 2015) is as follows:

“Liana climbing to about 7 m over shrubs and small trees; stems woody, usually glabrous. Leaves petiolate, 4–10 × 3–9 cm, ovate, cordate with rounded auricles, narrowed to an obtuse, shortly mucronate apex, glabrous or (rarely) pubescent, abaxially paler; petioles 2–5 cm. Inflorescence of lax compound cymes terminal on the main stem and on lateral branchlets 5–20 cm long; secondary peduncles 1–5 cm, bracteoles c. 2 mm, scale-like; pedicels 7–17 mm, sepals slightly unequal, oblong, obtuse, nearly completely scarious, glabrous, outer 10–11 mm, inner 11–14 mm; corolla 2.5–3 cm, campanulate, cream with dark center and yellow midpetalline bands, glabrous, limb c. 1.5–2 cm diam. Capsule narrowly ovoid, 11–14 × 3–4 mm, glabrous, style persistent, seeds 1–2, 4–5 mm diam., subglobose, tomentose.”

Material examined. **KAUAI:** Kūhiō Road near intersection with Hui Road, Anahola area, growing with *Leucaena leucocephala*, *Megathyrsus maximus*, *Lantana camara*, vine forming small patch (5 × 5 m) overhanging roadside vegetation, 15 Mar 2019, *A. Lau & D. Frohlich 2019031501*.

Primulaceae

Ardisia solanacea (Poir.) Roxb.

This species, one of several *Ardisia* species either naturalized or spreading adventively in Hawai‘i, was found spreading 10 meters away from the parent plant in a botanical garden in central O‘ahu. The full description of this species comes from *Flora of China* (Chen & Pipoly 2010):

“Shrubs or trees to 6 m tall, glabrous. Branchlets prominently angular, 5–7 mm in diam. Petiole canaliculate, 1–2 cm; leaf blade elliptic or oblanceolate, 12–20 × 4–7 cm, papery, conspicuously black punctate and punctate-lineate abaxially, not prominently punctate adaxially, base cuneate or narrowly decurrent on petiole, margin subrevolute, entire, apex acute; lateral veins ca. 20 on each side of midrib, raised on both surfaces, marginal vein absent. Inflorescences at bases of new shoots, paniculate with racemose or rarely corymbose branches, 3–8 cm. Flowers leathery, pink, ca. 1 cm. Sepals broadly ovate to reniform, ca. 3 mm, densely black punctate, base subauriculate, margin subentire or crenulate, ciliate, scarious, apex rounded. Petals nearly free; lobes broadly ovate, ca. 9 mm, punctate, margin entire, hyaline, apex obtuse or acute. Stamens subequalling petals; filaments ca. 1/4 anther length; anthers linear-lanceolate, densely punctate dorsally, longitudinally dehiscent, apex acute. Pistil subequalling petals; ovary globose, densely punctate; ovules numerous, multiseriate. Fruit purplish red or blackish, oblate, 7–9 mm in diam., densely black punctate. Fl. Feb–Mar, fr. Aug–Nov. 2n = 46.”

Material examined. **O‘AHU:** Wahiawā Botanical Garden, *Ficus* overstory with mixed botanical garden species, growing in dappled shade, flowers hot pink, cupped upward, leathery, fruits immature, 5 plants growing 10 m away from parent plant, 16 Jul 2012, *A. Lau & D. Frohlich 2012071602*.

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