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New plant records for the Hawaiian Islands 2010–2011[1]

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O‘ahu Early Detection here documents 26 new naturalized records, 8 new state records, 31 new island records, 1 range extension, and 2 corrections found by us and other individuals and agencies. In addition, several species showing signs of naturalization are mentioned. A total of 42 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 Hawai‘i Biological Survey*. Voucher specimens are deposited at Bishop Museum’s *Herbarium Pacificum* (BISH), Honolulu, Hawai‘i.

Acanthaceae

Megaskepasma erythroclamys Lindau **New island record**

This species, which was previously found naturalizing on O‘ahu, can be distinguished by its 1–2" long showy burgundy bracts and white, tubular, 2-lipped corollas with 2 fertile stamens (Staples & Herbst 2005). Parker & Parsons (this volume) report this species as naturalized on Hawai‘i Island.

Material examined. **KAUA‘I**: Hā‘ena, in neighborhood *makai* of highway, near Tunnels Beach, UTM 442390, 2457621. Coastal residential setting; sparingly-branched shrub to 6 ft tall, growing out of a hedge. Inflorescence bracts magenta. Species is planted as an ornamental and sparingly naturalized in the area, 9 Mar 2010, *OED 2010030904.*

Aizoaceae

Sesuvium verrucosum Raf. **New state record**

Sesuvium verrucosum is native to North and South America, and prefers coastal habitats as well as reservoir margins and ephemeral desert ponds (Ferren 2003). This species was first collected on Maui, in Kīhei. It had been misidentified as *S. portulacastrum.* The species was then collected in a dry limestone coastal flat just above the intertidal zone at Maunalua Bay, O‘ahu. This species has also been reported from O‘ahu (but so far not collected) from Kalaeloa to Pearl Harbor. It was then collected from Moloka‘i, in a residential coastal area. It is variable in its native range, and it is unclear whether or not it is hybridizing with the native *S. portulacastrum* where these species co-occur in Hawai‘i. Description of this species from *Flora of North America:*

> “Plants perennial, papillate with crystalline globules abundant, glabrous. Stems prostrate, to 1 m, forming mats to 2 m diam., branched from base, finely verrucose; not rooting at nodes. Leaves: blade linear to widely spatulate, to 4 cm, base tapered or flared and clasping. Inflorescences: flowers solitary; pedicel absent or to 2 mm. Flowers: calyx lobes rose or orange adaxially, ovate-lanceolate, 2–10 mm, margins scarious, apex hooded or beaked, papillate abaxially; stamens 30; filaments connate in proximal 1/2, reddish; pistil 5-carpellate; ovary 5-loculed; styles 5. Capsules ovoid-globose, 4–5 mm. Seeds 20–40, dark brown to black, 0.8–1 mm, shiny, smooth” (Ferren 2003).

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It is unclear whether this species was intentionally or accidentally introduced, although it does not appear to be widely cultivated.

Material examined. **O'AHU**: Shoreline of Maunalua Bay. Dry rocky (limestone) setting near the intertidal zone. Low groundcover. Stems creeping along ground with stems upright to about 20 cm off the ground. No rooting at nodes seen. Leaves glaucous, flowers magenta above, stamens many, pistils usually five. Only 2 plants seen in immediate area, but has been seen by collectors elsewhere on O'ahu, 16 Apr 2009, *OED 20090416O1.* **MOLOKA'I**: Pu'uhala, Kanoa Pond. 21.069°, -156.964°. Mat-forming herb, no rooting at nodes. Corollas pink. New island record, 13 Jun 2011, *A. Dibben-Young s.n. 748342.* **MAUI**: East Maui, Kīhei (Waiohuli), *makai* side of South Kīhei Rd, 200 m N of McDonalds. Roadside, crawling on *Bassia hyssopifolia*, plant not abundant, 22 Aug 1999, *F. Starr & K. Martz 990822-2*.

Araliaceae

Schefflera arboricola (Hayata) Merr. **New island record**

This species has previously been collected as naturalized on Maui and O'ahu (where it has subsequently been seen naturalizing widely throughout a forest bordering a botanical garden.) On Kaua'i, it was seen naturalizing along the roadside and into pastures in a residential neighborhood. Elsewhere in this issue, Parker & Parsons report this species as naturalized on Hawai'i island.

Material examined. **KAUA'I**: Kapahi. 21°56'16.4"N, 159°31'07.1"W. Large shrub of 7 m, up to 20 cm basal dia. Fruiting profusely, fruit orange turning dark red when ripe. Naturalizing in pastures and hedgerows along road, 11 Oct 2008, *C.Trauernicht & T. Portner 582.*

Schefflera heptaphylla (L.) Frodin **Correction and new naturalized record**

This species is very rarely grown on O'ahu, perhaps only occurring in botanical gardens. It was first collected in 1992 at Ho'omaluhia Botanical Garden by Derral Herbst who at that time noted it "escapes all over the garden and is becoming weedy." This species is capable of establishing in dense shade as well as open areas. The currently-known distribution is in or near the garden, so it may be a good candidate for garden staff to control where found. Additionally, a specimen collected as "showing signs of naturalization" at Lyon Arboretum in 2005 and identified as *Schefflera taiwaniana* by Daehler & Baker (2006) more closely fits the species concept of *S. heptaphylla.* Consequently, *Schefflera taiwaniana* should not currently be considered a naturalized or adventive species in the state. Description of this species from *Flora of China* (Xiang & Lowry 2007):

> "Trees, to 15 m tall, andromonoecious. Petiole (5–)10–30 cm; petiolules 1.5–5 cm; leaflets 6–9(–11), elliptic to oblong-elliptic or obovate-elliptic, 7–18 × 3–5 cm, papery to leathery, densely stellate pubescent when young, glabrescent except on midvein and in axils of veins, secondary veins 7–10 pairs, tertiary veins inconspicuous, base attenuate or cuneate to obtuse or rounded, margin entire, often serrate or pinnately lobed on young plants, apex abruptly acute to acuminate. Inflorescence a terminal panicle of umbels, densely stellate tomentose, glabrescent; primary axis to 35 cm; secondary axes 25(–35) cm, with a terminal umbel of bisexual flowers and several to many lateral umbels of bisexual or more often male flowers, usually also with 1 to several bisexual flowers borne just below apical umbel; pedicels 4–5 mm. Calyx pubescent at first, entire or 5- or 6-toothed. Ovary 5–9(or 10)-carpellate; styles united into a thick column less than 1.5 mm. Fruit globose, ca. 5 mm in diam., inconspicuously angled when dry; styles persistent, to ca. 1.5 mm."

Material examined. **O'AHU**: Kāne'ohe, Ho'omaluhia Botanical Garden, 21.53°N, 157.48°W. This species escapes all over the garden and is becoming weedy. Malaysian Section. Tree: 40' tall with 10" diameter d.b.h. Trees just flowering; petals greenish white. 27 Dec 1992. *D. Herbst 9604*; Lyon Arboretum. Naturalized sapling 1.5 m tall growing in thicket at edge of main road leading to the waterfall, 24 May 2005, *C. Daehler 1202;* Kāne'ohe, near Ho'omaluhia Botanical Garden. 21.387575°N, 157.811049°W, 240 ft. This species is established over at least several acres, with 10–20 matures and 100+ saplings over 1 m tall. UTM 623251, 2365509. Tree about 12 m tall w/straight bole growing at a slight angle. Younger infl somewhat contained within leaves at end of branch. Lflt margins undulate. Leaves of saplings pinnately lobed and variable, with purple midvein and fewer stellate hairs on the axils. Lowland mesic to wet secondary forest, growing with *Hibicus tiliaceus, Schefflera actinophylla*, 27 Oct 2011 *OED 2011102701*

Schefflera insularum (Seem.) Harms **New naturalized record**

This *Schefflera* species, which is native to the Philippines (Seemann 1865: 80) and is extremely rare in cultivation in Hawai'i and elsewhere, was seen naturalizing in scattered localities within Ho'omaluhia Botanical Garden in Kāne'ohe. Description of this species (translated from Latin): "Leaflets 5–7, elliptical pointed teeth; tufted tomentum caducous; petals linear, free; stamens 7; 7-locular ovary." (Seemann 1865).

Material examined. **O'AHU**: Kāne'ohe, adjacent to main road at Ho'omaluhia Botanical Garden. 21.3885962°N, 157.809835°W, 240 ft. Sparingly naturalized in this location. Species is scattered elsewhere in the garden as well. UTM 623376, 2365623. Scrambling shrubby habit, up to 8 ft tall. Leaves glossy green. Infl on short side branches. Lowland mesic to wet secondary forest, growing among *Bridelia insulana, Clerodendrum chinense,* 10 Oct 2011, *OED 2011101001.*

Arecaceae

Coccothrinax barbadensis
(Lodd. ex Mart.) Becc. **New naturalized record**

Silver thatch palm is native to the Caribbean and was first collected in Hawai'i in 1961, though it was likely grown here before that time. It is a solitary-trunked fan palm ranging from 16–50 ft in height, distinguished by the woven, burlap-like fibers surrounding the upper trunk, petioles which are biconvex in cross section, triangular hastulas surrounded by a yellow halo, and fronds which are glossy green above and silvery below (Staples & Herbst 2005). This species is occasional to common in cultivation in Hawai'i. On O'ahu, it was noted occasionally naturalized and well-distributed in a dry lowland residential area. On Kaua'i, a sparingly naturalized population was found in a less densely-populated dryland area, growing in the shaded understory of *Leucaena leucocephala*.

Material examined. **O'AHU**: Kailua, Lanikai (UTM 633696, 2365199). Growing in mock orange hedge, palm about 3 m tall. 2 individuals naturalized next to fence in yard, species is occasionally seen spreading in neighborhood. D. Hodel says ID likely, but this species also has a propensity to hybridize, 4 Jun 2009, *OED 2009040602*. **KAUA'I**: Niumalu off Hulemalu Rd UTM 462212, 2427083. Lowland dry to mesic secondary forest, growing with *Leucaena lecocephala*. Palm about 3.5 m tall. Fruits mostly unhealthy, old, dry. Sparingly naturalized population; smaller plants growing in understory of *Leucaena*. See BISH #583884, 22 Apr 2010, *OED 2010042201.*

Asclepiadaceae

Cynanchum gerardii (Harv.) Liede **New naturalized record**

Cynanchum gerardii, a plant native to Ethiopia, South Africa, Madagascar, the Comores, Saudi Arabia, and Yemen, and only known to be cultivated on O'ahu at Koko Crater

Botanical Garden, was found in two separate locations. The first sighting was by a member of the OISC field crew, who found a small patch climbing up the side of Koko Crater above the botanical garden's *Erythrina* grove. The second location for this species was along the Koko Head Trail, a popular hiking trail that follows the rim of the expired volcano. The population covered approximately 15 square ft, smothering a *Leucaena leucocephala* patch (J. Atwood 2011, pers. comm.). The description of this species from *Flora of Somalia:*

> "Climber, 0.5–3 m high; stems semisucculent, finely striate, obscurely glaucous, glabrescent, basally corky, with thin, yellowish bark. Leaves scale-like, often not exactly opposite, 0.8–1.2 × 0.5–0.8 mm, acute. Inflorescences 4–7-flowered; peduncle 0–2.5 mm long; pedicels 2–4.5 mm long. Flowers sweetly scented; corolla-lobes c. 3 × 1–1.5 mm, deflexed, ovate, acuminate, green to greenish white. Corona white, cup-shaped, c. 1.5 mm long, slightly exceeding the gynostegium, tube more than 3/4 of corona length, staminal parts triangular, apically erect to inflexed, with straight margins, connate to the filament. Gynostegium sessile, 1.5 × 1.2 mm; anther wings 0.4 mm long; connective appendages 0.4 × 0.5 mm, ovate to triangular, narrower than the anthers, strongly inflexed; stigmatic head white, 0.8 × 0.2, flat to depressed-conical. Follicles 1(–2) per flower, 8–12 cm long, with shortly beaked tip. Seeds 5–6 × 2–3 mm, pear-shaped, densely pubescent, not winged, with tuft of c. 2 cm long hairs." (Liede-Schumann 2006)

Material examined. **O'AHU**: Koko Crater Botanical Garden, UTM 636719, 2354330. New naturalized record. Climbing up side of crater above *Erythrina* grove in mixed alien vegetation. Also found growing thickly in a 5 meter × 5 m area along the Koko Head trail in a *Leucaena leucocephala/ Hylocereus undatus* thicket. Sprawling leafless vine. Flowers minute, fruits a dehiscent pod, 4 Apr 2011, *OISC 2011040401*.

Asteraceae

Chromolaena odorata (L.) R.M. King & H. Rob. **New state record**

Chromolaena odorata, a sprawling shrub native to Central and South America, was recently found by O'ahu Army Natural Resource Program field crew members on an annual road survey of Army training grounds in Kahuku. This species was not previously known to be in the state and has proven to be a serious weed in many parts of the world, including Australia, South Africa, India, Philippines, Micronesia, Palau, and Guam (McFadyen & Skarratt 1996). It received a score of 28 on the Hawai'i-Pacific Weed Risk Assessment (Hawaii Pacific Weed Risk Assessment 2011), which suggests that it has a high potential to be invasive in Hawai'i. While *C. odorata* thrives in open, sunny areas, it also can grow in shade, and at Kahuku has been observed growing beneath *Casuarina* sp. stands (OANRP Staff December 2011). This species' ability to tolerate drought and fire, reproduce rapidly and prolifically both from seed and vegetatively, and to produce compounds toxic to grazing animals as well as humans, makes it a species of utmost priority for removal from the area (Hawaii Pacific Weed Risk Assessment 2011). Unfortunately, the infestation area is heavily used for military training during the week and for motocross on the weekends, which makes the likelihood of this species spreading to other parts of the island quite high. The currently-known occupied range covers over 3,390,000 square meters, and 1500 plants in total (immature and mature) have been counted so far. Several organizations on the island are involved in the control of this species, including the O'ahu Invasive Species Committee, the Hawai'i Department of Agriculture, O'ahu Early Detection, Marine Corps Base Hawai'i, Department of Fish and Wildlife, the Fish and Wildlife Service, and the Hawai'i Motorsports Association (OANRP Staff December 2011).

Description of *Chromolaena odorata* from *Flora of North America:*

> "Perennials or subshrubs, mostly 80–250 cm. Stems erect or sprawling to subscandent, hispidulous to coarsely short-pilose. Petioles 5–20 mm. Leaf blades (3-nerved) narrowly lanceolate to deltate-lanceolate or ovate-lanceolate, 3–10 × 1–4 cm, margins coarsely dentate to subentire. Heads usually 5–50+ in (terminal or lateral) corymbiform arrays. Involucres cylindric, (7–)8–10 mm. Phyllaries in 4–6(–8) series, apices of the inner appressed, rounded to truncate (sometimes slightly white-petaloid or expanded). Corollas purplish to light blue to nearly white or slightly pinkish." (Nesom 2006)

Material examined. **O'AHU**: Kahuku Training Area off Bravo Rd, near Opana radar tracking station. Found on an OANRP road survey. Further surveys revealed a mostly scattered, occasional population over many acres, with one particularly dense infestation in a nearby small gulch. Species appears to be growing with and occasionally outcompeting *Psidium*. Sprawling, climbing vine to 2.5 m high in *S. terebinthifolius* thicket. Flowers white to pale lavender. Achenes brown-grey, 3–4 ridged with pappus of equal length. Dry to mesic lowland flattened ridge top, secondary forest growing among *Schinus terebinthifolius*, 11 Jan 2011, *H. Pali USARMY 199.*

Bignoniaceae

Podranea ricasoliana (Tanfani) Sprague **New island record**

This attractive vining species which has previously been described as naturalized on Maui, was found on Kaua'i spreading into a roadside secondary forest. Parker & Parsons (this volume) report this species as naturalized on Hawai'i Island.

Material examined. **KAUA'I**: Kōloa Distr, Kalāheo. Weedy wet secondary forest. Collected along upper end of Pu'uwai Rd. Liana; flowers large, delicate with whitish pink corolla. Growing thickly throughout tree canopies. Naturalized, 15 Oct 2007, *C. Trauernicht & M. Clark 206.*

Pyrostegia venusta (Ker Gawl.) Miers **New naturalized record**

Pyrostegia venusta, or Orange trumpet vine, a colorful, often expansive vine native to Brazil and Paraguay and frequently cultivated worldwide (Staples & Herbst 2005), was found naturalizing along a streamside in Kaua'i, thickly covering nearby trees and ground over a 100 × 50 ft area. On O'ahu, it was seen smothering a grove of trees on a military base, away from landscaped areas. Although fruit is seldom produced, this species is occasionally found growing well beyond planted sites. The description of this species from *A Tropical Garden Flora* is as follows:

> "Vine. Leaflets usually two, ovate, 1.5–2.5 inches long, base rounded, apex acute; tendril sometimes present, 3-forked. Inflorescence a more or less dense terminal panicle. Flower calyx cup-shaped, margin densely ciliate; corolla red-orange with narrow, valvate, conspicuously whitish-margined lobes, stamens projecting. Fruit linear, strongly compressed, 8–12 inches long." (Staples & Herbst 2005)

Material examined. **O'AHU**: Schofield Barracks off Beaver Road, across from Range Control. 1000 ft. Growing amongst *Schinus terebinthifolius, Urochloa maxima*. Woody vine; very long, rambling, up to 40 ft into trees. Large orange tubular flowers, 26 Jan 2010, *US Army 179.* **KAUA'I**: Along Kaumauli'i Highway, over Wahiawā Stream, UTM 443526, 2424257. Lowland roadside area. Large vine blanketing canopy of nearby treesor sprawling along ground over an area of maybe 100 × 50 ft. Flowering heavily, corollas bright orange. No fruits seen. Perhaps originally planted in the area, this species has now spread significantly beyond its planting site in at least this area of the island. It is believed to fruit only rarely in Hawai'i, but occasionally is found growing well beyond planting sites, 18 Feb 2010, *OED 2010021801.*

Tabebuia pallida (Lindl.) Miers **New naturalized record**

Tabebuia pallida can be found in dry and wet forests in its native range of Central and South America and the Caribbean. It has shown to be invasive in the Seychelles, where it

establishes in disturbed sites, forming dense thickets that shade out more desirable native plants (Weber 2003). Individuals of this species were found spreading from cultivation on both O‘ahu and Kaua‘i. This plant has been treated as a synonym of *T. heterophylla* (DC.) Britton (Missouri Botanical Garden 2011), with which it is said to differ primarily by number of leaflets. Populations of the species on Kaua‘i were seen with a range of leaflets spanning the variability of both species. The taxonomic boundaries of these species need further study; the Bishop Museum currently recognizes both species as distinct. The description of this species from Weber (2003):

> “A tree of 5–35 m height with a grayish deeply fissured bark. Leaves are 8–15 cm long and palmately compound with 3–5 spreading leaflets. Petioles are 5–25 cm long. The leaflets are broadly elliptic, 5–22 cm long and 2-11 cm wide. Inflorescences are terminal panicles and consist of many pink rose or white flowers with corollas of 5–7 cm length. Fruits are cylindrical and dehiscent capsules of 10–20 cm length and c. 15 mm width, containing numerous winged seeds.”

Material examined. **O‘AHU**: Hālawa Valley, *mauka* portion of H3 access road. Lowland mesic roadside. Growing on rock/concrete embankment with mixed alien species. Sapling 2 m tall, branches upright; leaves glossy to flat green, leaves all simple, aside from one very shallowly-lobed leaf. Flower bud yellowish green. There were several individuals of this species of various size classes growing on the same embankment. There were no simple-leaved parent trees in the immediate area, though this species is efficiently wind-dispersed, 29 Sep 2009, *OED 2009092902.* **KAUA‘I**: Po‘ipū, Lukika Pl. Growing in hibiscus hedge. Tree about 2.5 m tall, almost all leaves simple, flowers pink. New island record- occasionally naturalized in neighborhood, 14 May 2010, *OED 2010051401.*

Caryophyllaceae

Petrorhagia velutina (Guss.) P.W. Ball & Heywood **New island record**

This slender herbaceous plant, previously collected from Maui and Hawai‘i (Wagner *et al.* 1999), was found on O‘ahu in a mowed field in Schofield Barracks.

Material examined. **O‘AHU**: Schofield Barracks West range; Area X, Dragon X landing zone. Herbaceous plant growing in a large mowed field. From 10 to 25 cm tall, often single inflorescence (but occasionally branched.) Pink, distinctive 2-lobed petals; fruits a papery husk. Perhaps reached O‘ahu from military vehicles, 15 Apr 2010, *US Army 184.*

Celastraceae

Catha edulis (Vahl) Endl. **New naturalized record**

Catha edulis, or Khat, as it is known in East African countries where it is consumed as a stimulant, is not known to be cultivated in Hawai‘i outside of botanical gardens. On O‘ahu, it was found very sparingly naturalized, spreading to a dry plateau overlooking Waimea Botanical Garden. The description for this species from *Flora of China:*

> “Evergreen shrubs, 1–5 m tall; young branches with white, fine lenticels. Petiole 3–8 mm; leaf blade elliptic or narrowly elliptic, 4–7 × 2–4 cm, leathery, base narrowly attenuate, slightly decurrent, margin obtusely serrate, apex obtusely shortly acuminate. Cymes single, small, 1.5–2 × as wide; peduncle 5–10 mm, 2–4-branched, branches short, less than 3 mm; pedicel 1–3 mm, up to 5 mm in fruit. Flowers 3–5 mm in diam.; sepals 5, triangular-ovate, ca. 1 mm; petals 5, white, narrowly ovate or narrowly oblong. Stamens 5, filamentous, shorter than corolla. Ovary free, surrounded by disk; stigma 3-lobed. Capsule orange-red, cylindric, ca. 8 × 3–4 mm, dehiscing from above, loculicidally in 3 valves, usually only 1 seed maturing per valve. Seeds black-brown, narrowly ovoid, 3–4 mm, with membranous basal wing.” (Ma & Funston 2008)

Material examined. **O'AHU**: Elehāhā drainage, upper Waimea, 700 ft. Small tree ca. 2 m tall. Roadside vegetation, 9 Dec 2003, *K. Kawelo s.n.* (BISH #704780).

Clethraceae

Clethra lanata M. Martens & Galeotti **New naturalized record**

Clethra lanata, or Nance macho, as it is sometimes called in its native range of Central America, is only known to be grown in botanical gardens in Hawai'i. It was seen very sparingly naturalized, spreading outside the boundaries of the National Tropical Botanical Garden on Kaua'i. Description of this species from *Flora of Panama:*

> "Trees or sometimes shrubby, 2–30 m tall, sometimes buttressed at base; young branches, petioles, and bases of peduncles densely rusty-brown lanate. Leaves grouped toward the tips of branchlets with smaller young leaves at the apices; blades of mature leaves obovate, elliptic-obovate or oblong-obovate, 7–18 cm long, 3–9 cm wide, chartaceous to subcoriaceous, obtuse or acute at apex, narrowed at the base, the margin entire to slightly denticulate due to the emergence of the veins from the leaf blade, the midrib prominent below, scattered stellate or simple pubescence above, denser in vein furrows, below somewhat paler with two! types of pubescence, one short, stellate, and forming a layer covering entire lower surface, the other long, simple or stellate, and confined to the veins and veinlets, either layer may be absent on some individuals; petioles stout, up to 2 cm long. Inflorescences many flowered, 4–10 simple or branched fasiculate racemes, 8–26 cm long, the upper part of peduncle and pedicels pale, densely tomentose, the pedicels 2.5–7 mm long. Flowers white, very sweetly aromatic; sepals 5, ovate, 3-5 mm long, puberulent-tomentose within, tomentose without; petals 5, obovate, short-fimbricate, slightly longer than the sepals, pilose within, glabrous without; stamens 5, filaments subulate, glabrous, the anthers sagittate; ovary transversely-elliptic, densely pilose, the style 1.5–2.5 mm long, the stigma 3-lobed, lobes spreading. Capsule transversely-elliptic, pilose to tomentose, to 6 mm in diam; seeds 3, compressed." (Robertson 1967)

Material examined. **KAUA'I**: Upper Limahuli Valley. *Meterosideros/Dicranopteris* disturbed ridgetop with large *Andropogon* and *Clidemia* patches. Collected just off the ridge from the Wainiha Pali to the top of Limahuli Falls, future site of fenceline. Tree just N of the ridge about 10 ft down steep waterfall side. With *Syzygium sandwicensis, Psychotria mariniana, Ilex anomala, Bobea, Alyxia.* Small tree, sterile, w/one old empty peduncle up high. Tree about 12 ft tall. Leaf abaxially w/ brown pubescence and raised veins, dark green adaxially w/ impressed veins. Petioles pubescent, 6 Jan 2009, *N. Tangalin & E. Griffin-Noyes 1876.*

Commelinaceae

Tradescantia spathacea Sw. **New island record**

Tradescantia spathacea, or Oyster plant, a sturdy plant commonly seen grown as a groundcover, was first collected as naturalized on O'ahu. On Kaua'i, several populations were seen growing out of a fallen log and scattered in the understory of a *Casuarina* grove.

Material examined. **KAUA'I**: Kalāheo, on Papalina Rd near Pālama St. Lowland dry/mesic roadside area, growing on fallen log. Herb with purple undersides to leaves. No planted individuals in area. Scattered populations along road in dense *Casuarina* stand, 19 Feb 2010, *OED 2010021906.*

Costaceae

Costus scaber Ruiz & Pav. **New naturalized record**

This species, native to Mexico, the West Indies, Central America, and tropical South America (Staples & Herbst 2005), was found on Kaua'i in a pasture off Kahuna Rd in Kapa'a. *Costus scaber* can be distinguished by a line of short hairs along the midrib of the

upper surface of the leaves, ovoid to cylindrical inflorescences 1.4–4.0 in long that are terminal on leafy stems. Inflorescences have red-orange bracts with shredded, fibrous margins. Calyxes are up to 0.25 in long, and the red-orange inch-long stamens are about as long or longer than the yellow labellum (Staples & Herbst 2005).

Material examined. **KAUA'I**: Kapa'a Homesteads, off Kahuna Rd. UTM 462427, 2444371. In pasture near fence with *Sphagneticola trilobata, Macroptilium atropurpureum*, 31 Mar 2010, *OED 2010033102.*

Crassulaceae

Bryophyllum laxiflorum (Baker) Govaerts **New naturalized record**

This succulent decumbent herb, which has only two specimens in the *Herbarium Pacificum* and is not known to be a popular ornamental in Hawai'i, was found spreading locally down a dry, rocky slope within a 40 × 8 ft area. It was colonizing small patches of soil between rocks, a niche also being occupied by native *Peperomia* species. Distinguishing features of this species include decumbent stems with pale green leaves more or less evenly spaced on the stem; circular or ovate to oblong leaf blades with blunt teeth along the margin, leaf bases truncate with very small to large upturned auricles. The inflorescence is a small, loose corymb, flowers are few, pendent; calyx tube 1.2–1.3 cm, lobes 6.0–6.5 × 4.5 mm. Anther and styles project from the corolla tube; filaments are fused for 6.0–9.5 mm (European Garden Flora Editorial Committee 1995)

Material examined. **O'AHU**: Ko'olau Mountains on Mau'umae Trail, lower portion. UTM 626174, 2355842. Dry lowland ridge, growing among rocky dry cliffs and along trail in small rock cracks. Low-growing succulent herb with erect stems. Stems, leaves, and inflorescence with pink cast. Leaves otherwise glaucous green with scalloped margins, the lower portion/lobes of larger leaves upturned. Flowers pendulous, corolla lobes reddish. Locally abundant naturalized herb growing among native *Peperomia* spp. in the same niche habitat, 2 Nov 2010, *OED 2010110201.*

Cupressaceae

Callitris columellaris F. Muell. **New island record**

Some 407 individuals of this species were planted in forest reserves on O'ahu between 1910 and 1960 (Skolmen 1980), which may help to explain its spread. This gymnosperm, previously found naturalizing on Maui, was collected on O'ahu in a couple of lowland roadside areas in Schofield Barracks. Many individuals of varying size were seen.

Material examined. **O'AHU**: Schofield Barracks East Range in area along Higgins Rd. In vegetation off-road around buildings and in forested areas. Guava and *Eucalyptus*-dominated forest. Individuals of varying size (3–7 m) in area. Cones round, split open when dry, 2–3 cm across. New island record, 26 May 2009, *J. Beachy & K. Kawelo US Army 158;* Schofield Barracks East range along Centerline Road. Mesic lowland roadside area. Tree about 5 m tall. Male and female cones present; seed cones open in star shape. Lots of plants in the general area of various sizes; seedlings and immatures present and common. Naturalizing, 7 Jan 2010, *US Army 176.*

Cupressus lusitanica Mill. **New naturalized record**

Cupressus lusitanica, a tree native from Mexico to Central America, has been planted widely in Hawai'i, both as a forestry species [939 individuals were planted on O'ahu alone (Skolmen 1980)] and as an ornamental, particularly by early Portuguese settlers (Staples & Herbst 2005). Distinguishing features of this species include sharply pointed leaves all the same shape and size, ovoid seed cones that are glaucous when young that open at maturity, and reddish-brown seeds (Staples & Herbst 2005).

Material examined. **O'AHU**: Kuaokalā Road. Young fruits glaucous, seeds reddish-brown, thin. New naturalized record, 19 Jan 2009, *K. Kawelo US Army 115;* Schofield Barracks East Range, at fill disposal site off Centerline Rd, 920 ft. Disturbed dry/mesic lowland area. Growing with mixed alien vegetation. Approximately 4 m tall tree with branches low to ground, bushy habit. Male "cones" yellow, at tips of branches. Female cones on lower branches, young ones glaucous. Not many small trees seen, but many trees in area, and do not look planted, 7 Jan 2010, *US Army 177*.

Euphorbiaceae

Euphorbia lactea Haw. **New naturalized record**

Although this species is not known to flower in cultivation, it has been reported as naturalized from the Caribbean and Florida. Naturalization events must therefore occur vegetatively (Staples & Herbst 2005). On O'ahu, *Euphorbia lactea* was collected spreading in dry roadside alien scrub vegetation. Individuals of varying size classes were seen. The population on Kaua'i was spreading by vegetative means along a streamside cliff. *Euphorbia lactea* is a candelabra-shaped succulent shrub 10–25 ft tall, with dense stems, 3- or 4-angled dark green with mottled white branches, paired spines to 0.2" long, grayish, straight. The leaves are quickly deciduous, leaf blades are ovate, spatulate to rounded, and 0.25–0.50" long. Flowers are unknown (Staples & Herbst 2005).

Material examined. **O'AHU**: Koko Crater, near road to Hanauma Bay. UTM 635595, 2353210. Mixed alien scrub, several individuals of varying sizes in area. Spiny shrub about 2 m tall. No fruits or flowers. 30 Jun 2009, *OED 2009063002;* **KAUA'I**: Hanapēpē, along Hanapēpē Stream, growing on cliff sides. Dry lowland rocky cliffs. Cactus-like *Euphorbia* with shrubby habit, to about 2 m tall. Stems green on edges/outside half, with white coloration near middle. No flowers or fruit present. Spreading by vegetative means along cliff sides, 22 Jun 2010, *OED 2010062201*.

Euphorbia leucocephala Lotsy **New naturalized record**

Euphorbia leucocephala, or Puno-puno, an attractive shrub commonly seen grown as a hedge or specimen plants in Hawai'i gardens, was found on Kaua'i growing out of a *Eugenia uniflora* hedge in a lowland residential area. It was also seen in non-cultivated situations in other parts of the same neighborhood. Description of this species from *A Tropical Garden Flora* is as follows:

> "Evergreen shrub 4–8 feet tall, crown rounded; branches green tinged reddish. Leaves whorled, 4 to 12 per node; petioles 0.25 to 1.25 inches long; blades more or less elliptic, 1 to 2.5 inch long by 0.25 to 1 inch wide, dull to dark green, underside paler, apex with tiny mucro. Inflorescence in showy panicles; blades oblanceolate to spatula-shaped. 0.5 to 0.75 inches by 0.15 to 0.2 inches, white with green veins. Cyathea inconspicuous, whitish, glands pale green. Fruit not seen." (Staples & Herbst 2005)

Material examined. **KAUA'I**: Līhu'e. Small individual poking out of dense *Eugenia uniflora* hedge. No mature individuals seen in local vicinity. Shrub about 2.5 ft tall, 2 Apr 2010, *OED 2010040201*.

Homalanthus populneus (Geiseler) Pax **New naturalized record**

Homalanthus populneus, a species known in Hawai'i from one specimen taken from Ho'omaluhia Botanical Garden, was found spreading near an untended side road close to the garden. The description of this species taken from H-J Esser's "Revision of *Omalanthus* (Euphorbiaceae) in Malesia" (now *Homalanthus* nom. cons.):

> "Tree up to 10 meters tall, dbh 18 cm, with slender, terete, crooked to straight trunk, numerous spreading, flexible branches, and a flattish but spreading crown; without but-

tresses. Glabrous. Bark pale brown to grey, non-fissured but lenticelled and mottled with pale patches, with greyish lenticels, yellow on the inside, very thin, soft.... Stipules 0.8 to 2 cm long. Leaves: petiole 1 to 15 cm long, glandless; lamina orbiculate to ovate to lanceolate, 3 to 22 by 1.5 to 20 cm, base rounded to slightly emarginate to, rarely, cuneate, not or indistinctly (up to 1 mm) peltate, very base often attenuate, apex acuminate, lower surface usually whitish with larger veins of different color, rarely not whitish at all, side veins in 9 to 15 pairs below the apex, angle of divergence 50 to 60 (up to 80) degrees, partially to completely joined towards the margin, tertiary veins percurrent, quaternary veins reticulate and usually indistinct, adaxially without any prominent gland, but often with 2 glandular auricles up to 0.6 mm long, abaxially with 1 to 3 glands on each half of blade, 0.2 to 0.5 mm in diameter, and close to the margin, basal ones sometimes enlarged, and close to or touching the midvein if not absent. Inflorescences 3 to 30 cm long, usually bisexual, occasionally wholly staminate, staminate part 6 to 9 mm in diameter. Bracts of staminate cymules 0.75 to 1.5 mm long, with a pair of large undivided glands 0.5 to 1.5 mm long and only slightly (0.2 to 0.3 mm) overtopped by the bract. Staminate flowers (1–) 3 per cymule; pedicel 0.6 to 3 mm long; sepals 2, about 0.6 mm long; stamens (6–) 8 to 10 per flower with filaments about 0.4 mm long and anthers about 0.3 mm long. Pistillate flowers 0 to 4 (–21) per thyrse; pedicel 3 to 12 mm long; sepals 2, soon caducous; ovary about 2 mm long, bicarpellate, papillate, style about 0.6 to 1.5 mm long, stigma 1.5 to 3 (–6) by 0.6 to 0.7 mm, apically undivided to slightly emarginate to shortly divided, glandular over its whole length or only the apical or basal 0.5 mm glandless. Fruits 2 to 4 (–8) per infructescence; bract persistent; pedicel sulcate, not carinate, style 0.3 to 1 mm long, the stigma 1.5 to 3 by 0.6 mm; regularly opened fruits not uncommon, opening primarily loculicidally, pericarp about 0.2 to 0.3 mm thick, remaining columella slightly alate." (Esser 1997)

Material examined. **O'AHU**: On road towards Board of Water Supply building, 21.3886709221213, -157.810172089729. Shrub/tree with spreading crown. ~7 ft tall, leaning over. Flowers minute, with basal glands. In mixed alien botanical garden setting. Associated vegetation: *Clerodendrum chinense, Falcataria, Bridelia insularum*, 20 Oct 2011, *OED 2011102001*.

Manihot esculenta Crantz **New naturalized record**

Manihot esculenta, or Tapioca, is a prominent crop worldwide and a popular source of starch for many cultures in Hawai'i. It was found naturalized in two separate locations on Kaua'i, and along the Hālawa access road on O'ahu. *M. esculenta* can be either a shrub or an herb 3–10 ft tall, with brittle, knobby stems and swollen, elongate roots. Leaf petioles are 2–7 in long and can be green or reddish; leaf blades are usually divided, or the upper portion can occasionally be entire. Leaves have 3–7 lobes which are narrowly elliptic to narrowly oblanceolate, 4–8 in × 0.66–1.50 in, undersides are white and margins are smooth. Inflorescences are axillary, flowers are green or yellowish, more or less flushed red, 0.33–0.50 in long. Fruit is 0.50–0.75 in long and often winged. Seeds are oblong and mottled tan to brown (Staples & Herbst 2005).

Material examined. **O'AHU**: H3 Hālawa- UTM 2367484, 617550. New naturalized record. Semiwoody tree with brittle stems, petioles crimson. No flowers or fruit seen. Patch of 6–10 plants growing in thick Guinea grass understory, 15 Oct 2009, *OED 2009101501*. **KAUA'I**: UTM 464691, 2443006. Lowland mesic residential setting. Sprawling shrub/thicket about 8-10 feet tall, occasionally climbing trees to 20 ft high. Large naturalized patch covering about 0.25 acres, forming a monoculture/thicket. Downslope from a cultivated patch. 10 Mar 2010, *OED 2010031001*; Hoary Head Range, E of Omoe, 210 m. Appears naturalized, but fairly local. Along cane road. Shrub ca 2.5 m tall. 6 Apr 1988, *W. L. Wagner & C. Imada 6005.*

Pedilanthus tithymaloides (L.) Poit. subsp.
padifolius (L.) Dressler **New naturalized record**

This easily-cultivated species which is used as an ornamental as well as a medicinal plant in many tropical regions of the world (Staples & Herbst 2005), has escaped cultivation on O‘ahu. *Pedilanthus tithymaloides* subsp. *padifolius* is a distinctive shrub 1–10 ft tall, with succulent branches, and inflorescences in flat-topped clusters. The cyathia involucres are slipper-shaped and tubular with a basal spur protruding from the back; the subspecies is characterized by its obovate or elliptic leaves that are widest above the middle (Staples & Herbst 2005).

Material examined. **O‘AHU**: Kamilo Iki. UTM 634558, 2355049. 200 ft. Growing with *Leucaena* in rocky hillside near residential lawn area. Herb about 0.5 m tall. Flowers crimson, slipper-shaped. Fruits numerous. See also BISH #726000. 3 Apr 2009, *OED 2009040301;* Waipi‘o Peninsula, within area controlled by Navy, along coastal road, UTM 605651, 2361445, 15 ft. Small, localized, naturalized population with unknown initial introduction history. Somewhat commonly cultivated on island but no obvious cultivation near collection site. Succulent shrub to 2 ft. Lowland coastal non-native vegetation dominated by *Prosopis pallida* and *Cenchrus ciliaris*, 9 Dec 2010, *OED 2010120901.*

Fabaceae

Acacia mangium Willd. **New island record**

Acacia mangium, an easy-to-grow forestry species that was widely planted in the Pacific and elsewhere as a forestry tree, frequently naturalizes where grown and is known to spread from plantings. It tolerates degraded areas and seems to prefer moist to wet sites. It has been previously collected as naturalized on O‘ahu, and was found on Kaua‘i growing out of a pile of debris in a pasture in Lumaha‘i Valley, and also spreading fairly extensively from a forestry planting in Wailua. Parker & Parsons (this volume) report this species as naturalized on Hawai‘i Island.

Material examined. **KAUA‘I**: Lower Lumaha‘i Valley, in pasture near highway, UTM 445357, 2456701. Coastal mesic pasture. Sapling/tree to 8 ft tall, no flowers or fruit present. 2 naturalized individuals growing in rockpile in middle of an *Ageratum conyzoides*-dominated portion of a pasture. This species was also noted as naturalized in upper Wailua on Loop Rd, probably spreading from experimental tree planting sites, 11 Mar 2010, *OED 2010031101.*

Bauhinia glauca (Benth.) Benth. subsp.
tenuiflora (C.B. Clarke) K. Larsen &
S.S. Larsen **New naturalized record**

Bauhinia glauca, a species native to Southeast Asia and India (Chen *et al.* 2010), but not known to be cultivated in Hawai‘i outside botanical gardens, was found on O‘ahu, smothering the canopy of *Aleurites moluccana.* Description of the species (with subspecies characters in brackets):

> “Climbers, with tendrils. Young branches reddish pubescent, later glabrous. Stipules linear, ca. 4 mm; petiole sparsely pubescent, [1–2(–3) cm; leaves relatively large, 7–9 cm, primary veins 9–11, apex bifid to only 1/5], …tip of lobes rounded. Flowers in short dense corymbs; bracts linear, ca. 5 mm; bracteoles similar, inserted near middle of pedicel. Pedicel slender, 10–20 mm. Flower buds ovoid, [hairy]. Receptacle striate, tubular, [receptacle 25–30 mm (longer than pedicel)], subglabrous. Calyx splitting into 2 or 3 reflexed segments. Petals white, subequal, broadly obovate, 8–12 mm including claw 2–3 mm. Fertile stamens 3; filaments glabrous, ca. as long as petals; anthers red, ellipsoid, ca. 2 mm. Staminodes 7, 2 in between stamens, ca. 3 mm, 5 short, subulate, connate at base.

Ovary ca. 8 mm, glabrous, shortly stalked; style very short; stigma obliquely peltate. Legume flat, 18–25 × 3–5 cm, thinly valved, indehiscent. Seeds flat, ovoid, 5–8 mm." (Chen *et al.* 2010b)

Material examined. **O'AHU**: Ho'omaluhia Botanical Garden, near BWS pumping station fence. UTM 623222, 2365401. Sprawling over *Aleurites moluccana* in mixed alien lowland forest. Large, extensively sprawling vine with trunk ~7 in dia at base. Covering large area, dense blanketing growth in parts. Flowers white, about 1 in across. Pods dark brown, flat. New naturalized record, 21 Oct 2011, *OED 2011102102.*

Calliandra houstoniana (Mill.) Standl.
var. ***calothyrsa*** (Meisn.) Barneby **New island record**

Calliandra houstoniana var. *calothyrsa,* a nitrogen-fixing species native to Central America and northern South America, is frequently cultivated in Asia as a forestry species (CAB International 2005). It has been collected as naturalized on Maui and Lāna'i, and now on Kaua'i, where a small population was spotted spreading along a roadside and into a nearby field. Parker & Parsons (this volume) report this species as naturalized on Hawai'i Island.

Material examined. **KAUA'I**: Kaumuali'i Hwy near Halfway Bridge UTM 453515, 2428694. Lowland mesic roadside area. Tree/shrub about 15 ft tall. Probably planted somewhere in the general area, but now spreading to at least roadside and open areas, 7 Jun 2010, *OED 2010060702.*

Desmodium cajanifolium (Kunth) DC. **New island record**

Desmodium cajanifolium, a weedy species previously found naturalized along roadsides and in open forests on the Big Island, was seen on Kaua'i growing in *Leucaena*-dominated secondary vegetation.

Material examined. **KAUA'I**: Kōloa, road to Kāhili Mt. Park, 0.4 mi from Hwy 50, at 720'. 8–10' herb; spindly, sparingly branched; leaves matte green olive green above, below paler, dull, raised yellow green veins; standard and keel pale lilac, wings darker pink. Secondary vegetation; *Panicum maximum, Leucaena*, 18 Nov 2004, *T. Flynn 7159.*

Peltophorum pterocarpum (DC.) K. Heyne **New naturalized record**

Peltophorum pterocarpum, or Yellow poinciana, a native to Southeast Asia and northern Australia, is occasionally planted as a street tree in the Hawaiian Islands. This species is easily cultivated from seed, which it produces in abundance. It was found on Kaua'i scattered throughout a residential area. The description for this species from *Flora of China* is as follows:

"Trees, 4–15 m tall. Young shoots, petioles, and inflorescences ferruginous hairy; old branches with yellowish, small lenticels. Leaves 30–42 cm; petiole robust; rachis 25–35 cm; pinnae 7–15 pairs, opposite, 8–12 cm; leaflets (7–)10–21 pairs, crowded together, oblong-obovate, 1.2–1.7 cm × 5–7 mm, leathery, abaxially pale green, adaxially deep green, base oblique, margin entire, apex rounded, mucronate. Panicles terminal or axillary, densely ferruginous puberulent; bracts caducous, 5–8 mm. Pedicels ca. 5 mm, ca. as long as flower buds, 5–7 mm from one another. Flower buds globose, 5–8 mm in diam. Sepals ovate, 5–8 × 4–7 mm, outside ferruginous tomentose. Petals obovate, 1.5–1.7 cm × 8–10 mm, densely ferruginous pubescent at middle of both surfaces, long clawed. Filaments ca. 1.2 cm, hirsute at base; anthers ca. 3 mm, sagittate at base. Ovary stalked, hairy, 3- or 4-ovuled; style filiform, much longer than ovary, smooth; stigma discoid, 3-lobed. Legume winged, compressed, fusiform, narrowed to both ends, longitudinally veined at middle part; wings 4–5 mm wide. Seeds 2–4." (Chen *et al*. 2010a)

Material examined. **KAUA'I**: Kapa'a, Kaehulua Rd, near intersection with Ka'apuni Rd. UTM 465781, 2441964. Lowland residential and secondary vegetation. Tree about 10 ft tall, pods brown. Scattered individuals throughout this neighborhood, 10 Mar 2010, *OED 2010031003.*

Pueraria montana (Lour.) Merr. var. ***lobata*** (Willd.) Sanjappa & Pradeep **New island record**

Kudzu, a vining species notorious in many tropical and subtropical areas for its ability to smother surrounding vegetation, has been previously described as naturalized on O'ahu, Maui, and the Big Island. On Kaua'i, it was collected in the Hanalei National Wildlife Refuge, growing along a streambank.

Material examined. **KAUA'I**: Hanalei NWR, valley along river 10'. Liana; leaves dull medium green, raised white veins above, greenish gray, pale green rained veins below; calyx lobes pale yellow; standard purple, basal pale yellow green spot; wings purple, keel slightly paler, 8 Oct 1991, *T. Flynn 4748.*

Stylosanthes scabra Vogel **New island record**

This species, occasionally used as a marginal forage for livestock (Skerman *et al.* 1988), has been found naturalizing on the islands of O'ahu, Moloka'i, Lāna'i, Maui, and Hawai'i. It was recently collected from a pastured area on Kaua'i.

Material examined. **KAUA'I**: Kōloa District, Ala Kalanikaumaka Rd. ca 100 m from junction with Koloa Rd, 21.54°N, 159.28°W , 73 m. Locally common. Woody herb to 3 ft; leaves red-green above, grey-green below; corolla: keel yellow, standard yellow fading white. Ruderal vegetation with *Desmodium, Panicum, Chamaecrista* and *Stylosanthes*, 26 Mar 2009, *T. Flynn 7438*.

Vigna luteola (Jacq.) Benth. **New island record**

Vigna luteola, a forage species naturalized throughout the tropics and subtropics and previously collected as naturalized on O'ahu, was found on Kaua'i growing in a coastal species restoration site. It is unclear how this species came to be growing in that location.

Material examined. **KAUA'I**: Kōloa District, Lāwai Bay, 21°53'22"N, 159°30'12"W, 3 m. Vine twining in and around *Scaevola*; stems pale green, leaves dark glossy green above w/ obvious reticulate venation, below glossy, paler w/ obvious venation; peduncle erect, pale green; calyx pale green; standard greenish yellow w/in, yellow green w/out. Coastal, growing in "Native coastal restoration" site fronting Allerton Estate. *Scaevola, Wedelia, Vigna* spp., *Stenotaphrum, Ipomoea*, 6 Oct 2008, *T. Flynn 7401.*

Iridaceae

Dietes iridioides (L.) Sweet **New naturalized record**

Dietes iridioides, a species used often as an accent plant in landscaping, has been found naturalizing on a ridgetop on O'ahu. The description of this species from *A Tropical Garden Flora:*

> "Plant 1 to 2 feet tall; leaf blades linear to sword-shaped, 10 to 16 inches by 0.25 to 0.6 inches, veins not obvious. Inflorescence scape bracts not obviously paired, 1 to 1.25 inches long, brownish. Flowers 1.5 to 2 (–4) inches, white with yellow blotch and beard on outer tepal, inner tepal white, tepal claws often orange-dotted; style branches bluish. Fruit ovoid-cylindrical, 0.8 to 1.2 inches long, rough-walled, furrowed, apex beaked." (Staples & Herbst 2005)

Material examined. **O'AHU**: Wai'anae Mountains, Manuwai along eastern fenceline of Manuwai fence, 2100 ft. Naturalized, forming a patch. Plant was sterile at field collection site- collected and grown

until flowering at residence in Kahaluʻu. Clumping herb, leaves less than 0.5 m long. Outer tepals white with yellow-brown markings, inner tepals purple. Growing with *Metrosideros polymorpha, Grevillea robusta, Dodonaea viscosa, Clidemia hirta*, 15 Jun 2011, *J. Beachy US Army 214.*

Juncaceae

Juncus effusus L. **New island record**

Juncus effusus, which has the common name Japanese mat rush, is believed to have been brought to Hawaiʻi in the early 1900s to be used as a source of matting material (Wagner *et al.* 1999). It is widely naturalized on the islands of Oʻahu, Molokaʻi, Maui, and Hawaiʻi, and now on Kauaʻi, where it was collected in Kōkeʻe State Park.

Material examined. **KAUAʻI**: Kōkeʻe State Park, between Pihea trail and Pihea peak. *Metrosideros*-dominated wet forest with *Cheirodendron, Vaccinium, Sadleria*, and *Clermontia*. Erect herb; stems glossy green, whitish green at base; spikelets whitish. Pith appears to be solid, 21 May 2008, *T. Flynn 7395*.

Lamiaceae

Ocimum basilicum L. **New island record**

Ocimum basilicum, or Sweet basil, is widely cultivated and naturalized in Hawaiʻi and worldwide. It has been previously collected on Niʻihau, Oʻahu, Molokaʻi, Lānaʻi, Maui, and Hawaiʻi. On Kauaʻi, it was found sparingly naturalized on a residential roadside bordering pastureland.

Material examined. **KAUAʻI**: Mauka of Kapaʻa town on Hauʻiki Rd, UTM 462767, 2442577. Lowland roadside area. Herb to 1 ft tall. Very sparingly naturalized in roadside area with pastureland on one side and residences on the other, 31 Mar 2010, *OED 2010033104.*

Myricaceae

Morella cerifera (L.) Small **New island record**

This species has previously been documented as naturalized on Maui. It is documented here as established on Hawaiʻi Island, where two populations are known in the Hilo area, along Mohouli St and along Stainback Hwy near Panaʻewa Zoo. It was known to exist on the island in the literature (Kurten *et al.* 2008), but apparently not citing an herbarium specimen. This species is not listed as planted on Big Island Forest reserves in Skolmen (1980), although it may have been planted there at some point. The Mohouli Street population is an extensive, dense thicket, and significant control work has been performed in that area (J. Parker 2011, pers. comm.). This species is also documented here as at least adventive on Kauaʻi, where it was seen in a coastal residential area spreading significantly throughout one resident's yard, perhaps only by root suckers. It is unclear whether it was originally planted in this location.

Material examined. **KAUAʻI**: Hāʻena, on Hāʻena Place. Coastal residential setting. 2–3 m tall shrub. Adventively spreading locally. Only male plants noted, though only a few individuals were inspected, 9 Mar 2010, *A. Lau & D. Frohlich 2010030902.* **HAWAIʻI**: Sunrise Ridge subdivision on Mohouli St extension between Komohana St and Kaumana Dr. Growing with *Melastoma septemnervium, Melochia,* other weedy species on thin soil on roadside. Distribution of the plant in the area is unknown but it is common just above Komohana St for about 1 km on Mohouli St. Appears to occupy at least 70 acres, 19 Mar 2003, *s.n.*; Several large trees 7–8 m tall and a few (not many) apparent seedlings along Stainback Hwy between Panaʻewa Zoo and Hawaii Belt Hwy, 26 Apr 1985, *R.L.Stemmermann 6936.*

Myrsinaceae

Ardisia crenata Sims **New island record**

Known in Hawai‘i as Hilo holly, this ornamental plant has escaped cultivation to become an occasional to common element of mesic and wet lowland forests, where it commonly grows in densely shady understory. It has been documented as naturalized on O‘ahu, Maui, and Hawai‘i islands. It is documented here as very sparingly naturalized along a roadside on Kaua‘i. It is not unlikely that this species is also established in forested areas of Kaua‘i, although surveys of these areas have not been done by the collectors mentioned here.

Material examined. **KAUA‘I**: Lāwa‘i, off Piko Rd. 1 m tall columnar shrub. No flowers seen; fruits abundant, red. Single naturalized plant coming out of cultivated hedge. Very sparingly naturalized in immediate area, 24 Feb 2010, *D. Frohlich & A. Lau 2010022401*.

Myrtaceae

Pimenta dioica (L.) Merr. **New island record**

Also known as Allspice, this species has previously been collected as naturalized on Kaua‘i and Maui. The collection below is from a population on O‘ahu, in Makiki, known to the authors to extend above Maunalaha Trail where it occupies more than an acre in various densities, occasionally forming dense thickets. Parker & Parsons (this volume) report this species as naturalized on Hawai‘i Island.

Material examined. **O‘AHU**: E side of Maunalaha Trail, behind Hawai‘i Nature Center, Makiki, Honolulu. About 200 m. Vegetation: mostly *Eucalyptus* with other alien species. Small tree 2.5 m tall. Flowers white, no fruit present. Many trees, most in bud, 16 Jul 2002, *F. Kraus FK 06*.

Pimenta racemosa (Mill.) J.W. Moore **New naturalized record**

Also known as Bay Rum tree, this native to the Caribbean is somewhat rare in cultivation on O‘ahu. It can be distinguished the other species of *Pimenta* naturalized in Hawai‘i by more obtuse to subcircular leaves (vs. oblong-elliptic to elliptic-lanceolate in *P. dioica*), the apex usually rounded (vs. obtuse to acute), and by flowers with 5 sepals and 5 petals (vs. 4 sepals and 4 petals) (Staples & Herbst 2005). It is naturalized in Moanalua Valley on O‘ahu, probably as an escape from cultivation in the area. It is well scattered over many acres. No extensive dense stands were seen, but thorough surveys off-trail were not performed.

Material examined. **O‘AHU**: Moanalua Valley, along trail. Lowland mesic, predominantly nonnative secondary forest, in valley floor. Probably planted in some areas but now naturalized and occasional to common along lower portion of trail. Usually scattered, but occasionally forming small dense patches (3 × 3 m), 26 May 2011, *A. Lau 2011052601*.

Ochnaceae

Ochna thomasiana Engl. & Gilg **New island record**

This species has previously been documented as naturalized on O‘ahu, Lāna‘i, and Maui. It is now known to be very sparingly naturalized on Kaua‘i as well, where it was seen escaping cultivation in a somewhat dry lowland residential area.

Material examined. **KAUA‘I**: Kalāheo, off Pu‘u Rd, on Ai Rd. Dry/mesic lowland residential roadside area, in an herbicided field. Very sparingly naturalized in the area. Cultivated elsewhere on island, 19 Feb 2010, *A. Lau & D. Frohlich 2010021902.*

Orchidaceae

Dendrobium mirbelianum Gaudich. **New state record**

This species is native to the Moluccas, New Guinea, the Bismarck archipelago, northeastern Australia, and the Solomon Islands, where it grows as an epiphyte in mangroves

and forests more or less near sea level. It is known to have populations with cleistogamous flowers, which means that it can produce self-pollinating flowers that remain closed. It is reported to be commonly cultivated in some regions and to form natural hybrids (Cribb 1986). Although this species had not been collected from cultivation, it is most likely an escape from a garden or nursery. It appears established as naturalized, occurring in scattered localities along the Schofield-Waikāne trail. Sterile individuals closely resembling the vouchered material were also noted in Kahana Valley by the collectors, as low as about 300 m. This *Dendrobium* belongs to section *Spatulata* (Cribb 1986), and can be distinguished from other members of this section primarily by floral characters, which include: flowers greenish yellow to olive brown, veined with purple brown on the lip; callus white, marked with purple or violet; petals spathulate, acute to subacute, not twisted; lip 3-lobed, side lobes elliptic, mid-lobe recurved, ovate, acute, margins erose and undulate; callus of five erose ridges, the central one longest and slightly dilated towards apex at middle of mid-lobe (Cribb 1986).

Material examined. **O'AHU**: Schofield-Waikāne trail, 2000 ft. Epiphyte. Naturalized in area, 13 May 2009, *K. Kawelo s.n.* (BISH# 736798); Waikāne trail, near summit ridge, growing near trail about 0.15 mi from Pu'uka'aumakua. 1800 ft. Native *'ōhi'a* forest, epiphytic on *Metrosideros polymorpha*. Plant was sterile but was grown till flowering at a residence in Kahalu'u, 31 Dec 2010, *J. Rohrer US Army 202*.

Dendrobium rhombeum Lindl. **New state record**

This species is endemic to the Phillipines, and although it is listed as a synonym of *D. heterocarpum* Wall. ex Lindl. by some sources, it is believed to be a distinct taxon and a valid name by a taxonomic expert of the region (J. Cootes 2011, pers. comm.). It was seen forming a small, locally naturalized population in *'ōhi'a/uluhe* forest in the central Ko'olaus of O'ahu. It is likely an escape from cultivation, though no previous vouchers of this species in Hawai'i have been deposited at BISH. This species flowered when leafless, on a very short (1.0–1.5 cm) peduncle. It is differentiated from the related *D. heterocarpum* in labellum characters including overall shape, as well as arrangement of labellum hairs (J. Cootes 2011, pers. comm.). In our specimen the labellum apex is somewhat acute, and hairs are somewhat whitish.

Material examined. **O'AHU**: Ko'olau Mountains, Kīpapa trail. Epiphytic on *Psychotria mariniana*. A few stems from base, up to 30 cm tall. Corolla lobes cream colored, throat yellow with maroon markings. Collected in wild and grown to maturity at Mānoa residence, 12 Oct 2010, *J. Lau s.n.* (BISH# 749851).

Epidendrum nocturnum Jacq. **New state record**

This species is native to Florida, the West Indies, and Central and South America. One listed common name is Night-smelling epidendrum, which refers to its flowers which are fragrant at night. *E. nocturnum* is known to have cleistogamous flowers (Hágsater 2002). This ability to self pollinate may aid in its ability to spread outside its native range. This species was found very sparingly naturalized in the Wai'anae Mountain range near Pu'u Kaua, perhaps an escape from cultivation somewhere on island. It can be distinguished from other species of *Epidendrum* by its cespitose habit; relatively short (3 cm) inflorescence rachis; long (6 cm), linear-lanceolate, yellowish sepals and petals; and ellipsoid, 3 cm long capsules. A full description of the species can be found in the *Flora of North America,* which is currently available online (*Flora of North America* website 2011).

Material examined. **O'AHU**: 'Ēkahanui, near Pu'u Kaua, ca 3000 ft elevation. Epiphyte, 1 Nov 2009, *K. Kawelo US Army 172*.

Phytolacaceae

Phytolacca dioica L. **New naturalized record**

This species is native to tropical South America, where it has been planted as a shade tree and given the common name Bella sombra. It is capable of storing large quantities of water, and therefore is resistant to drought and fire (Staples & Herbst 2005). It is a fast-growing tree which can grow in nutrient-poor soils, thriving in dry, hot conditions (Staples & Herbst 2005). It is dioecious, and can be distinguished from other species of *Phytolacca* in Hawai‘i by its tree habit. Although usually encountered in Hawai‘i as a smaller tree, it may grow up to 18–20 m, and has a thickened trunk which may fan out at the base. The leaves are elliptic to ovate, more or less fleshy; the inflorescences are pendant racemes. Flowers of both male and female plants are greenish white (Staples & Herbst 2005). It was seen spreading locally and sparingly naturalized in Lualualei, where it was escaping from experimental planting sites nearby. Individuals of all size classes were seen.

Material examined. **O‘AHU**: Lualualei NavMag, 580 ft. Dry lowland valley floor, nonnative scrubland dominated by *Leucaena leucocephala* and *Cenchrus ciliaris*. Female and male trees to 20 ft tall, both collected from a small naturalized population, 8 Dec 2010, *A. Lau, D. Frohlich & A. Hebshi 2010120801*.

Pinaceae

Pinus elliottii Engelm. **New island record**

This species has previously been documented as naturalized on Moloka‘i. It was extensively planted in forestry plots in the Pu‘u Ka Pele Forest Reserve on Kaua‘i and is now firmly established as naturalized, spreading from these plantings. A sparingly naturalized population is also now known from O‘ahu, on Mau‘umae ridge.

Material examined. **KAUA‘I**: Waimea, Kōke‘e, Mākaha Ridge rd, 1.75 mi W of Hwy 550. 12 m × 25 cm tree; canopy broadly conical; leaves in fascicles of 2; young female cones glaucous green, purple scale tips. Abundantly naturalized along road and ridge top, 28 Apr 2006, *D. Lorence & T. Flynn 9515*; Kōke‘e, along contour road between Kauhao and Kā‘aweiki ridges. 3200 ft. Mesic secondary forest. Species was heavily planted in the area and has also thoroughly established naturalized populations surrounding and at significant distances from planted sites, 23 Jun 2010, *A. Lau & D. Frohlich 2010062301*. **O‘AHU**: Mau‘umae trail, at ca 1300 ft growing among *uluhe, koa,* and *‘iliahi*. This species is occasional along a section of this trail, 12 Jun 2008, *A. Lau 2008061201*.

Pittosporaceae

Pittosporum pentandrum (Blanco) Merr. **New island record**

This species has previously been documented as naturalized on O‘ahu and Hawai‘i islands, where it escapes from planted sites. It is documented here as spreading on Kaua‘i as well, also escaping cultivation to become sparingly naturalized.

Material examined. **KAUA‘I**: Princeville area, near *mauka* intersection of Kapi‘olani Lp and Kamāmalu Lp. Lowland residential setting. 10 ft tall tree. Sparingly naturalized in the area. Also noted as sparingly naturalized in Wailua residential roadside areas, 11 Mar 2010, *D. Frohlich & A. Lau 2010031103.*

Pittosporum viridiflorum Sims **New island record**

This species has previously been documented as naturalized on Lāna‘i, Maui, and Hawai‘i islands. It is documented here naturalized on O‘ahu as well, where it was spreading from planted individuals in Kāne‘ohe. One other BISH specimen indicates spread and naturalization as well; a single, apparently naturalized tree in Waimānalo near a trail. The material

from Kāne‘ohe was cultivated and naturalized, and was introduced under the name *P. ripicolum*, which is currently considered a synonym of *P. viridiflorum.* Interestingly, plants of these populations displayed consistently undulate leaf margins, while the vast majority of specimens were flat margined. This character may well fit within the current concept of *P. viridiflorum,* which is stated to be a highly variable plant (Staples & Herbst 2005).

Material examined. **O‘AHU**: Ho‘omaluhia BG, near African section lawn. Growing in unmanaged area, among *Citharexylum caudatum*, *Ardisia elliptica*, and *Medinilla cumingii*. Species is spreading through other unmanaged areas as well. Tree about 10 ft tall, 7 Apr 2011, *D. Frohlich & A. Lau 2011040701*.

Plumbaginaceae

Plumbago auriculata Lam. **New island record**

Also known as Blue plumbago, this species has previously been documented as naturalized on Maui. It is documented here as sparingly naturalized on both Kaua‘i and O‘ahu islands, where it was spreading from cultivation in dry sites. The O‘ahu population was on the dry rocky slopes of Punchbowl crater, among *Cenchrus ciliaris*, *Hylocereus undatus*, and other secondary vegetation. Because of the attractive and vigorous nature of this ornamental hedge plant (Staples & Herbst 2005) it is likely this species escapes often in lowland residential areas, only to be tolerated and maintained.

Material examined. **KAUA‘I**: Po‘ipū. In mixed alien lowland vegetation. Shrub about 3 ft tall, flowers lavender, 17 May 2010, *OED 2010051701*. **O‘AHU**: Punchbowl area, on Prospect St. Vining shrub to about 1.5 m, flowers lavender. At least locally naturalized on Punchbowl slope, growing along road cut area as well as through a *Hylocereus* thicket above road cut, across road from the probable planting site. 21 Aug 2008, *D. Frohlich & A. Lau 2008082101.*

Poaceae

Entolasia marginata (R. Br.) Hughes **New island record**

This Australian species has previously been collected as naturalized on Hawai‘i Island. It is now known from O‘ahu as well, where it was found naturalized in mesic, mostly nonnative forest in Pālehua. More information including keys and full descriptions can be found in the *Flora of New South Wales* (Harden 1993). The information in this flora is currently available online as part of the New South Wales Flora Online project (The Royal Botanic Gardens and Domain Trust).

Material examined. **O‘AHU**: Pālehua, Upper gulch off road by HUA 13 & 14. *Elepaio* territory. 2000 ft. Weedy forestry plants with remnant native stands, 10 Oct 2011, *K. Kawelo US Army 233*.

Leptochloa panicea (Retz.) Ohwi subsp.
brachiata (Steud.) N. Snow **New state record**

This species has a very broad natural distribution. Within the species, there are 3 subspecies recognized, and so far all material seen has been identified as *L.p.* subsp. *brachiata*. This subspecies is native to the tropical and subtropical regions of the Americas. It is regarded as a weed in its native range, as it grows successfully in agricultural areas, warranting control work (Harris 2010). It has also naturalized in Australia (Snow 2004). It is documented here as sparingly naturalized in Waimānalo, at a large nursery, where it was growing along margins of maintained areas as well as coming up in potted plants. It is likely this plant arrived as an accidental introduction, perhaps as seed in ordered nursery stock or materials. It can be distinguished from other species of *Leptochloa* by its race-

mose panicle branches, erose to ciliate ligules, and hairy sheaths. A full description of the species can be found in the *Flora of North America* (Snow 2003).

Material examined. **O'AHU**: Waimānalo, Leilani nursery. Rural nursery lowland nursery setting. 40–50 plants total, most growing out of pots. Grass about 1 m tall, 24 Aug 2011, *J. Ho 20110801*.

Miscanthus floridulus (Labill.) Warb. ex K. Schum. & Lauterb. **New state record**

This species is native to temperate and tropical regions, in China, Japan, and some Pacific islands. It has become naturalized on Guam (Space & Falanruw 2000). In both its native and naturalized range it commonly forms thickets, and this species is adapted to and resprouts readily from fire (Bassler & Aguon 2006). It is documented here as sparingly naturalized, where it was seen as only a few well scattered mature individuals in a dry lowland military training area. It is possible it arrived here as an accidental introduction through military training activities. Due to its limited known population size and the likelihood of it expanding its range and contributing to fire hazard, it is likely this population will receive control work, in an effort to remove it from the island. The genus is closely related to *Saccharum*, from which it can be differentiated by its spikelet pairs being unequally pedicillate (as opposed to sessile-pedicillate pairs in both *Saccharum* as well as most other andropogonoid grasses), as well as having non-disarticulating inflorescence branches (Wagner & Lorence 2002). The plant is a large, clump-forming grass, its culms growing from 1.5–4.0 m. The leaves are cauline, blades with a prominent midrib, the blade margins scabrous; the inflorescence is oblong elliptic in outline, the main axis 25–45 cm; racemes are numerous, 10–30 cm long, and are appressed to ascending; the spikelets are awned, with white, spreading callus hairs which are 4–6 mm long (Chen & Renvoize 2006).

Material examined. **O'AHU**: Northern Ko'olau range, Kahuku training area, near Pahipahi'ālua gulch. Dry to mesic lowland slope. Mixed forestry trees with *Osteomeles* understory, 2-3 m tall bunchgrass, about 2.5 m in diameter. Single naturalized individual, but others scattered in the area, 14 Mar 2011, *A. Lau 2011031401*.

Schizachyrium condensatum (Kunth) Nees **New island record**

This commonly misidentified species has previously been documented from Hawai'i Island, where it is an invasive species and fire threat, particularly in Hawai'i Volcanoes National Park (Stone *et al*. 1992). It is documented here as well-established on Kaua'i as well, where it was seen forming thickets or mixed in with other vegetation in pastures, along roadsides and in other open areas, primarily in the Kōloa and Līhu'e districts.

Material examined. **KAUA'I**: Lāwa'i, off Lauoho Rd. Mesic Lowland secondary vegetation, on slope near property. Clump forming grass to about 1.5 m, sending up many upright culms. Inflorescences bushy topped. Naturalized. Seen occasional to common in roadsides and pastures in the area, 17 Feb 2010, *A. Lau & D. Frohlich 2010021701*.

Rubiaceae

Galium aparine L. **Correction and new island record**

The specimen cited below had previously been reported as a new island record for Moloka'i, under the name *Sherardia arvensis* L. (Oppenheimer 2008). It was incorrectly identified, and has been determined as *Galium aparine* L. This represents a new island record for *G. aparine* on Moloka'i. This species has been found to be capable of autogamy, which means it is capable of self fertilization (Chen & Ehrendorfer 2011). It has

previously been documented from Maui (Starr & Starr 2011). Although there are currently no specimens at BISH to document the presence of *S. arvensis* on Moloka‘i, it may occur there. *Galium* can be distinguished from *Sherardia* by the following characters: well-developed calyx, capitate inflorescences (*Sherardia*), vs. indistinct calyx, lax inflorescences (*Galium*). *Galium aparine* can be distinguished from other *Galium* species currently documented in Hawai‘i by its longer, wider leaves (10–60 mm long × 3–10 mm wide) (Chen & Ehrendorfer 2011; Wagner *et al.* 1999). A full description of the species can be found in the Flora of China (Chen & Ehrendorfer 2011).

Material examined. **MOLOKA‘I**: Kawela, Pu‘u Kolekole Cabin, naturalized sprawling herbs around cabin in wet forest, 1200 m, 4 Apr 2007, *Oppenheimer, Perlman & Tangalin H30706*.

Rutaceae

Melicope elleryana (F. Muell.) T.G. Hartley **New naturalized record**

Also known sometimes as Pink Euodia, this species from Australia is occasionally cultivated elsewhere. It is rare in cultivation in Hawai‘i. It is documented here as sparingly naturalized where two large trees of this bird-dispersed plant were seen at long distances from the assumed parent plant, spreading into non-native dominated wet secondary forest, as well as *‘ōhi‘a/uluhe* forest in windward O‘ahu. This species, with pellucid glands noticeable with a hand lens, can be distinguished from other Rutaceae in Hawai‘i by the following combination of characters: larger tree to 25 m tall, leaves opposite, trifoliate; leaflets elliptic, ovate, or obovate, 5.5–20.0 cm long; inflorescences usually ramiflorous, the axis to 5 cm long, showy; petals pink (The Royal Botanic Gardens and Domain Trust 2011). No evidence of natural hybridization in this species has been found by weed risk assessment specialists (Hawaii Pacific Weed Risk Assessment 2011) so it is unclear whether this species represents a hybridization threat to native species of *Melicope*.

Material examined. **O‘AHU**: Kāne’ohe, near Likeke Trail, *mauka* of H3 Fwy. Lowland mesic to wet secondary forest, growing with *Arthrostemma ciliatum, Psidium guajava*. About a 12 m tall tree, lower branches horizontal. Infructescences ramiflorous, immature fruits green. At least sparingly naturalized in the area, 27 Oct 2011, *D. Frohlich & A. Lau 2011102702*.

Murraya paniculata (L.) Jack **New island record**

Also known in Hawai‘i as Mock Orange, this species was seen spreading from planted individuals along Pu‘u road in the Kalāheo area of Kaua‘i. It has previously been documented as naturalized on O‘ahu and Maui.

Material examined. **KAUA‘I**: Kalāheo, on Pu‘u Rd. UTM 444804, 2423874. Mesic lowland roadside, mixed alien vegetation. Upright shrub to about 8 ft, growing among *Schinus terebinthifolius.* One of many scattered naturalized individuals of this species in the area. Also commonly planted in the area, 19 Feb 2010, *D. Frohlich & A. Lau 2010021903*.

Sapindaceae

Filicium decipiens (Wight & Arn.) Thwaites **New island record**

Also known as Fern tree, this species has been previously documented as naturalized on O‘ahu, Maui, and Hawai‘i islands. It was seen sparingly naturalized in a residential area of Kapa‘a, apparently spreading from planted trees in the area.

Material examined. **KAUA‘I**: Kapa‘a, in ditch along Kawaihau Rd near Bettencourt Ln. Mesic lowland residential and agricultural area. Sapling about 10 ft tall, one of several in the area, 29 Mar 2010, *D. Frohlich & A. Lau 2010032901.*

Schizaeaceae

Lygodium japonicum (Thunb.) Sw. **Range extension**

Lygodium japonicum is a vining fern species known to be particularly problematic in Florida, where it infests both intact native ecosystems and disturbed sites (Center for Aquatic and Invasive Plants 2011). It was previously found on Oʻahu in grassy hills above Heʻeia State Park, and is now known to be growing in Nuʻuanu, Kāneʻohe, and in Hālawa in a native plant restoration site.

Material examined. **OʻAHU**: Hālawa Valley, in restoration area along access road at 840 ft. Vine-like fern in a 2 × 2 ft patch. Native/mixed alien restoration area along the H3 Hwy. June 2011, *A. Beebe OISC 20110601*.

Simaroubaceae

Ailanthus altissima (Mill.) Swingle **New state record**

Also known as Tree of Heaven and native to Asia, this species has become a notorious invasive species in many areas of the continental U.S. (as well as elsewhere worldwide) following its introduction in 1784 as a medicinal and ornamental tree (Invasive Species Specialist Group 2011). A small population was found within a 1 acre residence in Kōkeʻe, Kauaʻi. Because this species is able to produce very long underground runners, it is unclear just how many individuals make up this population. At this point it is uncertain whether any seedlings were ever found at the site. A control program was immediately initiated after the population was found. The field crew located and controlled 4 mature individuals, and pulled at least 57 smaller, sapling-sized plants, which may have all been root suckers. The population continues to re-sprout, but the numbers are decreasing with each visit, and it currently seems likely the population will be eradicated from the site. This species is recorded as planted in some of Hawaii's state forest reserves (Skolmen 1980), and therefore should be searched for as it represents a threat to Hawaii's agriculture and native ecosystems. It can be distinguished from other members of the order Sapindales in Hawaiʻi by its pubescent, pinnately-compound leaves, the leaflets with at least one glandular tooth at the base, the crushed leaves with a moderate to strong odor (described by the collectors as a "burnt peanut" smell at time of collection), and fruits being samaras (Peng & Thomas 2008). Further information about its identification can be found in the *Flora of China* (Peng & Thomas 2008). Much more information about its invasiveness is available online.

Material examined. **KAUAʻI**: Kōkeʻe, along residential side road, about 1 km *makai* of Kōkeʻe lodge. Rural residential setting among mixed secondary and native mesic forest. Small tree/sapling about 6 ft tall, new growth often reddish. Leaves smelling musty, like burnt peanut butter, not necessary to crush leaves to get strong odor, 25 Jun 2010, *A. Lau & D. Frohlich 2010062501*.

Solanaceae

Solanum melongena L. **New naturalized record**

Also known as Eggplant, this species is very common in cultivation in Hawaiʻi as well as other tropical and subtropical areas of the world. Many cultivars of this plant exist, which display variation in fruit size, shape, and color. Domesticated forms often lack spines (Staples & Herbst 2005). A small naturalized population was seen in windward Oʻahu, where individuals of this species with occasional spines were seen scattered in a pasture area.

Material examined. **OʻAHU**: Mālaekahana, in pasture with *Solanum torvum*. Shrub about 0.5 m tall. Fruits bright orange-yellow, pulp white. Flowers lavender. Some spines, but not particularly

spiny. Several individuals scattered in pasture, 5 Nov 2009, *D. Frohlich & A. Lau 2009110501*; Koʻolauloa, Mālaekahana. 40 ft elev. In pasture. 60–100 cm tall, spininess and flowers like *S. linneanum;* fruits golden yellow 4–5 cm diam. Leaves with shape and pubescence like *S. torvum* (common nearby), 16 Apr 2005, *R.W. Hobdy 4201*.

Solanum torvum Sw. **New island record**

This weedy, bird-dispersed shrub is established as naturalized in some lowland areas of Kauaʻi, particularly in agricultural areas, occasionally forming thickets. It had previously been documented from Oʻahu, Maui, and Hawaiʻi islands.

Material examined. **KAUAʻI**: Wailua, on Koki Rd. Lowland disturbed roadside area. 8 ft tall shrub, flowers white, fruits green ripening to black. Locally naturalized along road and in adjacent pastures, 5 Apr 2010, *D. Frohlich & A. Lau 2010040502*.

Sterculiaceae

Melochia umbellata (Houtt.) Stapf **New island record**

Previously documented as naturalized on Hawaiʻi, Maui, and Oʻahu islands, this species is also naturalized on Kauaʻi, at least in the Kalāheo area and apparently also in Nuʻalolo Valley. The population in Kalāheo was not extensive, where several mature trees were seen scattered along a short section of road, in mesic secondary forest.

Material examined. **KAUAʻI**: Kalāheo, on Puʻu Road, *makai* of Kukuiolono Park. UTM 444965, 2423067. Sparingly branched tree to about 20 ft tall, copious immature fruit developing. One of about 4 individuals in the area, growing in different size classes, 19 Feb 2010, *A. Lau & D. Frohlich 2010021901;* Nuʻalolo ʻĀina Valley, Na Pali Coast. Growing near stream bed in area dominated by exotic plant species. Small shrubby tree. No flowers or fruit present, 18 Jul 1979, *G. Clarke, L.W. Cuddihy, L. Yoshida & C. Corn ESP 340*.

Verbenaceae

Clerodendrum glabrum E. Mey. **New naturalized record**

A plant with medicinal uses (Staples & Herbst 2005), this species has been known to grow in natural areas in the Kēʻē area, where it is believed it is persisting from planted trees. A small naturalized population was noted along a roadside area in Hāʻena, consisting of a few mature trees and several saplings. This population was growing in dense shade, in wet to mesic lowland secondary vegetation. It can be distinguished from other *Clerodendrum* in Hawaiʻi by its habit being a small tree or shrub, whorled or opposite leaves, relatively short corolla tubes, and corollas being white or yellowish (Staples & Herbst 2005).

Material examined. **KAUAʻI**: Hāʻena, along highway just west of Hāʻena beach park. Lowland wet to mesic secondary forest and roadside vegetation with some nearby residential areas. Tree to about 10 ft tall, sparsely branched, fruiting. Though believed to be intentionally introduced to the Kēʻē area, reproducing by seed in this area at significant distance from Kēʻē, 9 Mar 2010, *D. Frohlich & A. Lau 2010030903*.

Vitaceae

Cissus verticillata (L.) Nicolson & C.E. Jarvis **New naturalized record**

Also known as Princess vine, this species, which is native to tropical America, the Caribbean, the Galapagos, and Africa, was first collected in Hawaiʻi in 1973. The label data for this first collection suggests it had already naturalized at that time. It has been collected several times since then in clearly naturalized situations but was never written up in the *HBS Records*. It is occasional to rare in cultivation here. This species is now thor-

oughly established on Oʻahu in lowland roadsides and secondary forest including the Makiki-Tantalus area, Waimānalo, and Waimea. It has also established populations in the Kōloa Distr of Kauaʻi. The Kauaʻi populations may still be possible to remove, although this will require significant work. This invasive, bird-dispersed vine can blanket tree canopies and may form masses of long hanging aerial roots. It can be distinguished from other *Cissus* in Hawaiʻi by its simple, fleshy, acute-apexed leaves, forked tendrils, and more or less flat-topped, yellow-green inflorescence branches. The fruits ripen to black (Staples & Herbst 2005).

Material examined. **OʻAHU**: Vine growing on *Leucaena* shrubs near junction of Round Top Dr and Maunalaha Rd. Also found with *Amaranthus,* grasses. Leaves simple. Fruit black, 9 Oct 1973, *S. Ishikawa 310;* Haleʻiwa, Waimea Audubon Center. Garden planting, accession # 86c244. Planting removed from collection, but become widely naturalized in the area, Oct 2005, *D. Orr s.n* (BISH# 726216); Waimānalo, Waikupanaha St along side of road, growing over *Haole koa*, lowland mesic forest, agricultural land. Vine, up to canopy at about 7 m. Inconspicuous white flowers, fruits black berries. Many individuals with copious fruit, covering large area along side of road, 10 Aug 2006, *D. Frohlich, A. Lau, K. Starr & F. Starr 0608101*. **KAUAʻI**: Kōloa Distr, Kōloa. Weedy roadside scrub of mostly *Haole koa* on Hapa Rd. Vine, yellow inflorescence, tendrils. 10 Oct 2007, *C. Trauernicht & M. Clark 192*; Lāwaʻi, on Lauoho Rd just west of Lāwaʻi Cannery. UTM 447537, 2423734. Smothering vine up to 40 ft in trees, 23 Feb 2010, *A. Lau & D. Frohlich 2010022305*.

Tetrastigma pubinerve Merr. & Chun **New island record**

This species is somewhat rare in cultivation in Hawaiʻi. It was previously documented as naturalized on Maui, where a particular infestation was noted to occur over about 4 acres (Oppenheimer & Bartlett 2000). It was noted along a dry to mesic roadside area on Kauaʻi, thickly covering the canopy of small trees for a stretch of about 80 yards.

Material examined. **KAUAʻI**: Vine sprawling over 80-yd long area. Growing over *Leucaena leucocephala*. Kapaʻa. UTM 465656, 2442097, 31 Mar 2010, *D. Frohlich & A. Lau 2010033101.*

Species showing signs of naturalization

Aizoaceae

Aptenia cordifolia (L. f.) Schwantes

Aptenia cordifolia, or "Hearts and flowers" as it is commonly called in the nursery trade, is a species frequently used in Hawaiʻi as a groundcover, bedding plant, or potted specimen. It is easily grown by rooting tip cuttings and is salt and drought-tolerant. It has recently begun to spread into natural areas in Central and Southern California, overwhelming surrounding vegetation (Cal-IPC 2011). On Kauaʻi, this species was found persisting in a yard waste dumpsite over a lithified dune ecosystem.

Material examined. **KAUAʻI**: Līhuʻe, Māhāʻulepū, 21°53'78"N, 159°24'342"W 130 ft. Creeping herb; succulent leaves pale green tinged pink, glaucous below with pinkish midvein; young stems succulent reddish; tepals numerous, cream to pale yellow green, more yellow at base; filament s reddish. In dump over lithified dunes; *Leucaena, Prosopis, Bontia, Sida,* 8 Oct 2002, *T. Flynn & R. Culbertson 7110.*

Apocynaceae

Allamanda schottii Pohl

Allamanda schottii, an ornamental species used frequently in landscaping in Hawaiʻi, was found spreading locally on on a roadside survey of Kauaʻi. The description of this species from *A tropical garden flora:*

> "Shrub 5 to 8 feet high; branchlets glabrous; sap slightly milky and later clear. Leaves in whorls of 3 to 5, petioles 0.1 to 0.25 inches long. blades obovate to narrowly elliptic, 2.6 to 5.25 inches by 0.65 to 1.4 inches, underside shortly pilose on midvein. Flower sepals narrowly elliptic, 0.4 to 0.5 inches by 0.1 to 0.15 inches; corolla narrowly funnel-shaped to more or less cylindrical, 1.5 to 2 inches long, limb to 2.2 inches, yellow, throat inside red-lined, outside streaked lengthwise. Fruit formed but often aborted." (Staples & Herbst 2005).

Material examined. **KAUA'I**: Kapahi. 21°5'21"N, 159°19'9"W. Collected on roadbank. Growing beneath Christmasberry, *haole koa*, and *Bougainvillea*. Vine spreading across roadbank. Yellow bell-shaped flower. Appears to be naturalizing along bank, 25 Oct 2007, *C. Trauernicht& M. Clark 222.*

Araliaceae

Polyscias filicifolia (C. Moore ex E. Fourn.) L.H. Bailey

Polyscias filicifolia, a cultigen (a plant whose origin is primarily due to intentional human activity) (Spencer & Cross 2007) or series of cultigens that probably originated in Malesia or the western Pacific and is believed to have abortive seeds in Hawai'i, was observed by a local ecologist and gardener popping up from seed near a fence in an urban community garden plot on O'ahu.

Material examined. **O'AHU**: Ala Wai Community Garden, Honolulu. Landscaped urban corridor along path at stream. 1 m tall and 0.5 m wide shrub- not planted. Collector observed plant growing over 2 years. Flowered and grew after recent rain. Jan 2011, *P. Clifford s.n.* (BISH# 747744).

Bromeliaceae

Werauhia gladioliflora (H. Wendl.) J.R. Grant

Both a terrestrial and epiphytic bromeliad in its home range from southern Mexico to French Guiana, *Werauhia gladioliflora* [a name sometimes considered to be a synonym of *Vriesea gladioliflora* (H. Wendl.) Antoine] is able to grow at elevations extending from sea level up to 1300 m. On O'ahu, it has begun to colonize localized areas around a botanical garden.

Material examined. **O'AHU**: Lyon Arboretum, Economic Section H33. UTM 623946, 2359844. In lowland wet/mesic secondary forest. Growing in *Dimocarpus longan* tree, forming dense covering over trunk/branches in more or less dense shade. Epiphyte to about 0.5 m tall; leaves purple on underside, green above; fruiting bracts dried brown on live plants; seeds with silky hairs, many per capsule. Spreading adventively by seed about 30 ft away from planted individuals, 16 April 2010, *OED 2010041601.*

Moraceae

Ficus pumila L.

Also known as Creeping fig, this species is a very commonly cultivated climbing vine in Hawai'i. It has not previously been documented to spread and become naturalized either by seed dispersal or vegetative means in Hawai'i. Here we document the finding of a 10 × 10 m patch found off trail in mixed native/nonnative mesic forest on O'ahu, in Honouliuli, where it was seen trailing across the ground as well as climbing trees. It is unclear how this plant came to be here, though it is possible it spread here by vegetative means. To our knowledge it is the only known plant/population seen outside of cultivation. The figs of this species should be monitored for the presence of a pollinating wasp and/or viable seeds.

Material examined. **O'AHU**: Honouliuli Preserve, 'Ēkahanui gulch. UTM 593810, 2372094. Scrambling, climbing vine established in varying densities over about a 10 × 10 m footprint. Established in the area, at a significant distance from a trail, 25 May 2010, *K. Kawelo US Army 188*.

Maclura tinctoria (L.) D. Don ex Steud.

This species was seen spreading at least adventively in a lowland dry roadside area on O‘ahu, adjacent to both residential and agricultural areas. Its planting status is unclear at the site, and further surveys could possibly reveal that it is part of a naturalized population.

Material examined. **O‘AHU**: Waimalu, end of Kilinoe St, adjacent to Waimalu Str. 4 to 5 m tall trees with milky sap, both male and female trees present. Thorns variable in size or non-existent. Adventive or perhaps naturalized in the area. Multiple size classes in immediate area, 3 Sep 2010, *D. Frohlich & A. Lau 2010090301*.

Pinaceae

Pinus taeda L.

This species has previously been documented as naturalized on Lāna‘i. It was collected on Kaua‘i near where it was planted, where label data suggests it is at least adventive, but may very well have become naturalized. Further surveys or follow up may reveal a naturalized population here. Parker & Parsons (this volume) report this species as naturalized on Hawai‘i Island.

Material examined. **KAUA‘I**: Nā Pali-Kona Forest Reserve, Mākaha Valley N of Mākaha Ridge Rd and Kokio-ke‘oke‘o picnic area. Planted on ridgetop, becoming naturalized locally. Mixed mesophytic forest with *Acacia koa* dominant, also *Metrosideros, Pelea, Antidesma, Nestegis*, and *Hedyotis*, 15 May 1987, *D. Lorence, T.Flynn & R.DeLappe 5219*.

Solanaceae

Solanum mammosum L.

Three individuals of this species were seen in a parking lot area in lowland windward O‘ahu with unclear planting status, though appearing naturalized. This species is rare to occasional in cultivation here, usually found in garden collections rather than as part of a landscape plan for shopping center parking lots.

Material examined. **O‘AHU**: Kāne‘ohe, shopping center parking lot near Long’s, near Ha‘ikū Rd and Kamehameha Hwy. Lowland semi-landscaped area. Shrub, multistemmed from base, stms more or less brittle. Pruned back, but about 4 ft tall. Fruit immature. Patch of 3 individuals, apparently naturalized, 22 Mar 2010, *D. Frohlich & A. Lau 2010032201*.

Verbenaceae

Clerodendrum myricoides (Hochst.) Vatke

This species is occasionally grown in Hawai‘i and was noted in a pasture area on Kaua‘i where several individuals appeared naturalized along a fenceline. This species apparently forms fruit in Hawai‘i (Staples 2005) and is likely dispersed by birds. It is very likely this population represents a sparingly naturalized one, though this status was not clearly stated by the collectors.

Material examined. **KAUA‘I**: Kōloa Distr, Kalāheo. Collected at pasture edge on Po‘ohiwi Rd. Small, purple, butterfly shaped flowers. Several individuals appeared to be naturalized along pasture fenceline, 15 Oct 2007, *C. Trauernicht & M. Clark 207*.

Vitaceae

Vitis vinifera L.

Specimens of this species have been collected on Hawai‘i island which mention adventive status or growing in areas well away from cultivation. A specimen identified as either *V. vinifera* or a hybrid involving that species (as *V. vinifera vel. aff.)* was also found growing along a roadside, well away from cultivated settings, in Kōke‘e, Kaua‘i.

Material examined. **KAUA‘I**: Along Halemanu stream, near Waipo‘o Falls trail. Sprawling to 15 ft over top of *Corynocarpus laevigatus* in mixed alien roadside vegetation. Fruits immature, 25 Jun 2010, *D. Frohlich & A. Lau 2010062503.* **HAWAI‘I**: Kona–Ka‘ū Boundary, adventive at roadside, 25 Jul 1926, *O. Degener 30,255*; Kīlauea Iki trail. A grape-like vine growing near the bottom east side, Kīlauea Iki. 3 Aug 1943, *A.L.M. Mitchell 704*.

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