Published online: 10 August 2023

Records of the Hawaii Biological Survey for 2023. Edited by Neal L. Evenhuis. *Bishop Museum Occasional Papers* 155: 39–54 (2023).

ISSN (online) 2376-3191

New plant records for O‘ahu

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Several updates to the Hawaiian Naturalized Vascular Plants Checklist (Imada 2019) from some recent collections on O‘ahu are reported here. These collections have revealed five new island records, two range extensions, three new state records, two potential naturalizations, four new naturalizations, and one confirmation of a naturalization record. All identifications were made by the authors unless otherwise stated. All voucher specimens cited for this paper have been deposited at the Herbarium Pacificum (BISH).

Amaranthaceae

Amaranthus polygonoides L. **Range extension**

Amaranthus polygonoides was previously only reported from roadsides in Waikele and Wai‘anae on O‘ahu (Frohlich & Lau 2020). Recent surveys around the island have revealed that this species has spread quickly, as it has already reached Kalaniana‘ole Highway in the vicinity of Ka Iwi in southeastern O‘ahu. The species is also becoming a very common weed in lawns at parks and other disturbed roadside areas across almost all lowland leeward parts of the island (Fig. 1). *Amaranthus polygonoides* is distinguished from other species of *Amaranthus* by its axillary inflorescences and pistillate flowers with tepals fused in the proximal 1/3 (Mosyakin & Robertson 2003).

Material examined. **O‘AHU**: UH Mānoa Campus, Varney Circle, crack in asphalt between road and curb, one individual in area, 21.299934, -157.818398, 6 Jan 2021, *K. Faccenda 1702*; Ka Iwi Shoreline Trail, sparsely naturalized along the Ka Iwi trail near Kalaniana‘ole Hwy across from Hawai‘i Kai Golf Course, ca. 20–30 plants, 9 Feb 2021, *M.C. Ross 1807*; *loc. cit*., 23 Mar 2021, *M.C. Ross 1809*; *loc. cit*., 28 Mar 2021, *M.C. Ross 1810*; Hawai‘i Kai, Kamilo‘iki Park off of Lunalilo Home Rd, in water retention basin at NW corner of park, common only in this depression, approximately 50 plants seen in mowed area, 21.297161, -157.687860, 3 Dec 2022, *K. Faccenda 2857*.

Atriplex muelleri Benth. **Range extension**

This species has been collected several times on O‘ahu on the western portion of the island (Imada & Kennedy 2020). *Atriplex muelleri* has since spread from the west side to most of the suitable leeward coastal areas on O‘ahu. It has been recently documented as far from the original collection sites as the southeastern portion of O‘ahu at Ka Iwi (Fig. 2). This species is similar to *A. suberecta* but can be distinguished by the fruiting bracts, which have an obtuse apex and teeth that are all more or less equal in length (Imada & Kennedy 2020). *Atriplex muelleri* is also known to be naturalized on Maui (Imada & Kennedy 2020).

Figure 1. Distribution of *Amaranthus polygonoides* on O‘ahu based on iNaturalist.org data reviewed by the authors.

Figure 2. Distribution of *Atriplex muelleri* on O‘ahu based on iNaturalist.org data reviewed by the authors.

Material examined. **O‘AHU**: Ka Iwi Shoreline Trail, growing along a southeast-facing sea bluff in sandy soil, abundant and weedy, 4–5 m, 21.1741, -157.3931, 28 Jan 2021, *M.C. Ross 1805.*

Asteraceae

Emilia praetermissa Milne-Redh. **New state record**

For the first time *Emilia praetermissa* is being reported from the Hawaiian Islands. It is known from a small population found near the easternmost lookout point at the Hanauma Ridge Trail on O‘ahu, where it grows in loamy volcanic soil with other weedy annuals. The native range for this species is tropical West Africa, but it has become naturalized in the northern part of Taiwan (Chung *et al.* 2009). The species is apparently of hybrid origin from a cross between *Emilia sonchifolia* and *E. coccinea* that underwent chromosome doubling (Olorode & Olorunfemi 1973). Interestingly, both of the parents of this hybrid cross were present at the collection site. It is unknown at this time whether this species was introduced accidentally to the collection site or formed spontaneously. The species is not known to be cultivated in Hawai‘i or elsewhere. It is at least possible that its occurrence here represents an independent origination of the species, given the presence of both parents in the area of this population. *Emilia praetermissa* can be recognized from most other species of *Emilia* by the cream or peach-colored corollas (Fig 3).

The following description is from the Flora of China (Chen *et al.* 2011:453):

> “Herbs, annual. Stems erect or ascending, to 140 cm tall, glabrous or pilose. Basal and lower stem leaves petiolate; petiole 1.5–3 cm, in basal leaves unwinged and exauriculate, in lower stem leaves winged and basally auriculate; blade broadly ovate, 4–6 × 4.5–6 cm, ± pilose, base subcordate, margin dentate, apically obtuse; median and upper stem leaves sessile, pandurate to triangular, becoming smaller upward. Capitula up to 7 in lax corymbs, rarely solitary. Involucres cylindric, ca. 10 × 3–4 mm; phyllaries 9–12. Florets distinctly exceeding involucre; corollas cream, yellowish, or pallid orange, ca. 8 mm; lobes ca. 2 mm, tinged purple or orange. Achenes ca. 3 mm, pubescent. Pappus ca. 7 mm. 2n = 20.”

Material examined. **O‘AHU:** Southeast of the Hanauma Ridge Trail, east-facing peninsula, growing with *Commelina* and several other species of *Emilia,* ca. 20 plants seen, 92–93 m, 21.155209, -157.413871, 6 Mar 2023, *M.C. Ross 1906.*

Florestina tripteris DC. **New island record**

Previously reported as naturalized only on Maui (Oppenheimer & Bartlett 2000), *Florestina tripteris* has now been found in both ‘Ewa and Wai‘anae on O‘ahu. Both populations observed consisted of less than 5 plants. It is uncertain whether there is a larger source population on the island yet to be discovered, or if this is the beginning of the species spread on O‘ahu, or if some other factor is leading to the unusually small populations of this weedy annual.

Material examined. **O‘AHU**: Wai‘anae, Pa‘akea Rd & Apana Rd, roadside weed in annual community growing on crushed coral, very sticky to touch, four plants seen, 17 m, 21.418430, -158.159054, 16 Jan 2023, *K. Faccenda & M. Ross 2993*; ‘Ewa, near Kapolei Pkwy, growing along abandoned railroad tracks in full sun, two plants observed, 12–13 m, 21.201199, -158.286700, 27 Feb 2023, *M.C. Ross 1904.*

Figure 3. *Emilia praetermissa.* **A**, head showing cream to peach-colored corollas; **B**, habit at Hanauma Ridge.

Soliva sessilis Ruiz & Pav. **New island record**

Soliva sessilis is now known to be naturalized on O‘ahu in Wahiawa, where at least two populations were found during roadside surveys. One single plant was seen at Wahiawa District Park (but the area was not searched thoroughly). Another population of over 100 plants was found on Higgins Road. *Soliva sessilis* is now known to be naturalized on Kaua‘i, O‘ahu, and Hawai‘i (Wagner & Herbst 1995; Brock *et al.* 2023).

Material examined. **O‘AHU:** Wahiawā, Wahiawā District Park, at base of stadium lights, mowed lawn, moist, sunny, rare, only this one plant seen, 282 m, 21.499531, -158.022974, 20 Feb 2023, *K. Faccenda & M. Ross 3047*; Wahiawā, Higgins Rd, about 300 m E of Kamehameha Hwy, moist roadside, occasionally mowed, common, over 100 plants seen in this area, inflorescence concealed below the leaves, 265 m, 21.487227, -158.024113, 18 Jan 2023, *K. Faccenda 3011*.

Bignoniaceae

Markhamia zanzibarica (Bojer ex DC.) K. Schum. **New naturalized record**

While botanizing in Mākaha, 3–4 individuals of *Markhamia zanzibarica* were found growing in an undeveloped area in the middle of the valley. These trees were about 3–4 m tall; two of the trees were distant from the rest, while the other two occurred in close proximity, although it is unclear whether the latter two were distinct or if the smaller one was a root sucker. *Markhamia zanzibarica* is uncommonly cultivated in Hawai‘i (Staples & Herbst 2005), where it has been present since at least the 1990s when the first herbarium specimen was made. However, the specimen notes that the specimen came from a parent tree at Ala Moana Park. Information could not be found regarding when that tree, or any others before 1990, were planted on O‘ahu. *Markhamia zanzibarica* is native from Ethiopia south to Namibia and Angola (POWO 2023), where it grows in woodlands, savanna, and riverine forests (Diniz 1988). This is the first report of the naturalization of *M. zanzibarica*, perhaps because Hawai‘i is the only place that it has been intentionally introduced for horticultural purposes (Staples & Herbst 2005). *Markhamia zanzibarica* can be recognized by its shrub to small tree habit, alternate odd-pinnate leaves with 5–9 leaflets, and flowers with dark corolla lobes and dark splotches on the throat (Fig. 4).

Figure 4. *Markhamia zanzibarica*. **A,** flowers; **B,** fruits and leaves.

The following description is taken from Diniz (1988:61):

> "Shrub 2–5 m. tall or a small often straggling tree up to 9 m. tall. Bark grey, smooth or rough, peeling off soon. Young branchlets minutely lepidote, sometimes with conspicuous lenticels. Leaves up to 35 cm. long (1) 2–4-jugate, size of the leaflet-pairs increasing progressively from the base; pseudostipules 0.5–1.7(2) cm. in diam., subcircular to reniform; petiole 2–7(9) cm. long, flat above, sometimes slightly winged, terete below, leaflet lamina 2–24.5(32.5) × 2–13 cm., elliptic, obovate or almost subcircular, sessile or with petiolules up to 5 mm. long, acute, acuminate to longly acuminate, rarely obtuse at the apex, tapering towards the often asymmetric base, pubescent and minutely scaly at both surfaces, with age becoming minutely and sparsely puberulous or even glabrous; lower surface with pubescent axillary domatiae more or less conspicuous and sometimes with small circular black glands near and on both sides of the midrib; lateral nerves 6–12(14), impressed above and prominent below; margins entire or finely toothed. Inflorescence a terminal or axillary panicle or raceme rather lax, 5–20(23) cm. long, scaly glabrous or puberulous; pedicels up to 1.5(2) cm. long, 2-bracteate below the middle; bracts 2–5(7) mm. long, triangular-acuminate, ciliate at the margins. Calyx 10–15(19) mm. long cuspidate or uncinate splitting at one side down to 8 mm. from the base sometimes provided with scattered glands towards the apex and opposite to the fissure. Corolla funnel-shaped to campanulate, tube (18) 20–30(43) mm. long, yellow-greenish flecked with maroon; lobes 10–15 mm. in diam., subcircular, sometimes with conspicuous small glands near the mouth. Stamen-filaments 9–14 mm. long adnate to the corolla tube up to c. 5 mm. from the base, corolla tube provided with pluricellular hairs at the insertion points of the filaments; anther-thecae c. 1.5 mm. long, divergent. Disk 1.5 mm. long and 2–3 mm. in diam. Ovary 3–5 mm. long, sometimes lepidote; style 15–27 mm. long. Capsule slender, 22–68 × 0.9–1.5 cm., straight or slightly falcate, glabrous, lenticellate. Seeds 4–6 × 20–40 mm. including the wing."

Material examined. **O'AHU**: Mākaha, Huipu Dr near intersection with Mākaha Valley Rd, *Leucaena* & *Megathyrsus maximus*-dominated shrubland which occasionally burns, dry, sunny, right next to road, 64 m, 21.475196, -158.198576, 16 Jan 2023, *K. Faccenda & M. Ross 2982*.

Tecomaria capensis (Thunb.) Spach **Potentially naturalizing**

Tecomaria capensis (formerly known as *Tecoma capensis*), or cape-honeysuckle, is a popular ornamental shrub commonly cultivated in Hawai'i (Staples & Herbst 2005). A collection of an apparently wild colony near the Kapālama Ridge Trail and a recent iNaturalist observation of this species growing in an empty lot in Kaimukī suggest that

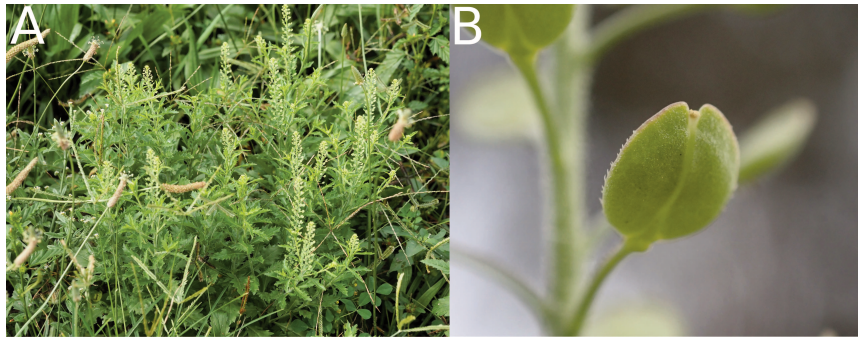

Figure 5. *Lepidium lasiocarpum*. **A,** habit; **B,** fruit showing characteristic hairs on margins.

this species may be naturalizing on O‘ahu. *Tecomaria capensis* can be recognized by its orange-red corolla, exserted stamens, apically fused anthers, and leaflets with mostly obtuse apices (Staples & Herbst 2005). Since this species is known to root from runners, it may have the potential to spread quickly in the wild (Staples & Herbst 2005).

Material examined. **O‘AHU**: Nā Pueo Park, growing with *Casuarina, Asystasia*, and *Asparagus* near start of Kapālama Ridge trail, one colony, 20–30 plants observed, 199 m, 21.202126, -157.505019, 22 Nov 2022, *M.C. Ross 1846.*

Brassicaceae

Lepidium lasiocarpum Nutt. **New state record**

A colony of 100–150 plants of *Lepidium lasiocarpum* was found along the roadside of Rt 803 about 5 km south of Waialua next to a heavily disturbed area where people park to shop at a chocolate and honey stand. A single plant was also seen about 1 km down the road towards Wahiawā. These plants were growing from moist, rich soil in full sun. Photos of the plant were sent to Ihsan Al-Shehbaz (MO), who identified it as *Lepidium lasiocarpum*, a species from the southwestern United States and Northern Mexico (Al-Shehbaz & Gaskin 2010). In its native range, this species grows in pinyon-juniper woodlands, sagebrush, open deserts, washes, waste places, streambeds, and roadsides (Al-Shehbaz & Gaskin 2010). This is the first time *L. lasiocarpum* has been reported outside of its native range (POWO 2023). *Lepidium lasiocarpum* is relatively similar to the other weedy annual *Lepidium* in Hawai‘i, but can be identified by its pinnately divided lower leaves, fruits with hairy margins, pedicels that are flattened dorsiventrally, and hirsute leaves and stems (Fig. 5).

The following description is from Al-Shehbaz & Gaskin (2010:584):

> “Annuals; hirsute or hispid, (trichomes cylindrical). Stems usually few to several, rarely simple from base, erect to ascending or (outer ones) decumbent, branched distally, (0.15–)0.6–3(–3.8) dm. Basal leaves (later withered); not rosulate; petiole (0.4–)1–3.5(–5) cm; blade spatulate to oblanceolate, lyrate-pinnatifid, pinnatisect, or 2-pinnatifid, (0.7–)1.5–4.5(–7.5) cm × (9–)12–20(–30) mm, margins rarely dentate, (lobes) entire or dentate. Cauline leaves subsessile or petioles 0.8–2.2 cm, blade lanceolate to oblanceolate, (0.7–)1.2–3.3(–5) cm × (2–)4–12 mm, base cuneate, not auriculate, margins subentire to dentate. Racemes often considerably elongated in fruit; rachis hirsute or hispid, trichomes

straight, cylindrical. Fruiting pedicels divaricate-ascending to horizontal, straight or slightly curved, (often strongly flattened), (1.8–)2–4(–4.6) × 0.2–0.7 mm (to 0.3 mm thick), hirsute to hispid throughout or adaxially. Flowers: sepals oblong, 1–1.3(–1.5) × 0.5–0.8 mm; petals (sometimes absent), white, oblanceolate to linear, (0.3–)0.6–1.5(–2) × (0.1–)0.2–0.5 mm, claw absent; stamens 2, median; filaments 1–1.4 mm; anthers 0.2–0.3 mm. Fruits ovate to ovate-orbicular, 2.8–4(–4.6) × 2.4–3.6(–4) mm, (base broadly cuneate to rounded), apically winged, apical notch (0.2–)0.3–0.6(–0.7) mm deep; valves thin, smooth, not veined, hirsute to hispid (on surface or margin); style obsolete or to 0.1 mm, included in apical notch. Seeds ovate, 1.4–2.2 × 0.9–1.4 mm."

Material examined. **O'AHU:** Central valley, Rt 803 ca. 1 km N of its intersection with Rt 801, roadside, *Megathyrsus maximus*-dominated area, only one plant seen, 279 m, 21.527461, -158.078471, 20 Feb 2023, *K. Faccenda & M. Ross 3039*; Central valley, Kaukonahua Rd, about 5 km S of Waialua near honey & chocolate stand, roadside near driveway and very close to honey stand, sunny, moist area, about 100–150 plants seen in area in a clump about 15 m in diameter in disturbed area, 21.535851, -158.088011, 29 Mar 2023, *K. Faccenda & M. Ross 3082*.

Caryophyllaceae

Sagina japonica (Sw.) Ohwi **New island record**

Sagina japonica has previously been collected only once on O'ahu at the Honolulu Airport (Wagner *et al.* 1999), where it was "probably not established." A new population was found growing in a crack in a sidewalk at the Nu'uanu Pali Lookout, along with a voucher at BISH dated 2009 from Pu'u Ka'ala confirming that the species is, in fact, established and naturalized.

Material examined. **O'AHU:** Pali Lookout, crack from sidewalk at the main lookout, cool, moist, common weed, only seen from cracks in concrete, 358 m, 21.366776, -157.793152, Jan 15 2022, *K. Faccenda 2198*; Ka'ala Rd, bog, small herbs < 10 cm tall 4,000 ft. [1,220 m] 10 Mar 2009, *US Army 126.*

Euphorbiaceae

Euphorbia serpens Kunth **New island record**

Euphorbia serpens is now known from four recent collections and several iNaturalist observations on O'ahu. The populations of this species are mostly found along the leeward coastline; however, it has also been collected in Waimānalo and observed in the North Shore (Fig. 6). This species can sometimes be confused with *E. albomarginata*, which has not been collected on O'ahu for more than 70 years (Wagner *et al.* 1997; Imada 2019). The two can be readily distinguished by the size of the involucral gland appendages, which are smaller and less conspicuous to the naked eye in *E. serpens* (Steinmann *et al.* 2016). *Euphorbia serpens* has been previously collected on Kaua'i, Maui, and Midway Atoll (Imada 2019).

Material examined. **O'AHU**: Waimānalo, intersection of Makakalo St and Mokulama St, growing from gravel on roadside in sunny area, rare, <10 plants seen, 28 m, 21.337001, -157.722045, 3 Aug 2022, *K. Faccenda 2574*; Ala Wai Community Park, growing near path adjacent to the canal, several patches observed, ca. 10–20 plants per patch, 2 m, 21.1708, -157.4945, 12 Nov 2022, *M.C. Ross 1837*; Honolulu, Sand Island State Recreation Area, growing in sand with *Prosopis juliflora* and *Sporobolus pyramidatus*, ca. 10–15 plants observed, <3 m, 21.185615, -157.525494, 20 Feb 2023, *M.C. Ross & K. Faccenda 1896;* 'Ewa Beach, One'ula Beach Park, eastern end, growing ca. 5 m from a rocky shoreline in sandy soil with *Alternanthera pungens*, ca. 100 plants observed, <3 m, 21.182334, -158.123819, 13 Mar 2023, *M.C. Ross & K. Faccenda 1909.*

Figure 6. Distribution of *Euphorbia serpens* on Oʻahu based on iNaturalist.org data reviewed by the authors.

Fabaceae

Lysiphyllum hookeri (F. Muell.) Pedley **Potentially naturalizing**

Formerly called *Bauhinia hookeri*, this species is well known from cultivation, where it has been used for urban landscaping in Honolulu (Staples & Herbst 2005). Several young individuals have recently been observed growing in yards and unkempt areas along University Avenue, suggesting that the species may be naturalizing. The young saplings were somewhat sprawling, ca. 45–50 cm tall, and not connected to any of the root systems of adult trees or cut stumps nearby. This species can be distinguished from other similar species by its weeping habit and bilobed leaves that are divided all the way to their bases (Staples & Herbst 2005).

Material examined. **Oʻahu:** Honolulu, University Ave and Date St, growing in a weedy area near the sidewalk, two young saplings observed, 2–3 m, 21.172029, -157.492846, 18 Jan 2023, *M.C. Ross 1875*.

Tephrosia noctiflora Bojer ex Baker **New state record**

During a weed survey at the University of Hawaiʻi Poamoho Research Station, about 300 plants of a shrubby pea were found growing in sunny areas on the edge of a dirt road. These plants were then identified using the keys in Gillett *et al.* (1971) and Forbes (1948) as *Tephrosia noctiflora*. *Tephrosia noctiflora* was imported into Hawaiʻi twice by the Hawaiʻi Agricultural Experiment Station (HAES n.d.; accession # 2346 & 4341) in 1929 and 1944. Before the Poamoho Research Station was transferred to the University of Hawaiʻi, it was owned by the Hawaiʻi Agricultural Experiment Station, so it is almost certain that the plants growing there now descend from the plants imported over 80 years ago.

Figure 7. *Tephrosia noctiflora*. **A,** inflorescence; **B,** fruits.

Tephrosia noctiflora is native to much of eastern Africa and India, but has been introduced in scattered locations across the tropics, including Brazil, China, Thailand, much of Malesia, and Australia (POWO 2023). It can be identified by its upright, shrubby habit, and its abundant brown hairs on the fruits, sepals, leaves, and stems (Fig. 7; Gillett *et al.* 1971). In its native range it is reported in grasslands, thickets, and as a weed of cultivated areas (Gillett *et al.* 1971)

The following description is from Gillett *et al.* (1971:182):

> "Annual or briefly perennial bushy herb 0.3–1.3 m. tall; stems tomentose. Leaf-rhachis up to 10 cm. long, including a petiole of up to 10 mm., prolonged up to 7 mm. beyond the lateral leaflets; stipules narrowly triangular, up to 8 mm. long; leaflets 11–15, cuneate-oblong or elliptic, up to 35 × 12 mm., densely appressed villous beneath, more sparsely so above; main nerves about 9 on each side. Flowers purple in moderately dense terminal pseudoracemes and often also in upper leaf-axils; bracts narrowly triangular; pedicels densely tomentose, 2–4 mm. long. Calyx densely tomentose, the hairs 1 mm. or more long; tube up to ± 2 mm. long; lobes long-acuminate, the lowest up to 8 mm. or more long, upper pair up to ± 7 mm. long, united for up to ± 2 mm. Standard densely fulvous tomentose outside, up to 11–15 mm. long, including a claw of ± 2 mm., up to 9–10 mm. wide; keel glabrous. Upper filament lightly attached, widened but not callous a little above the base; filament-sheath up to ± 6 mm., free parts up to 2–2.5 mm., anthers 0.5 mm. long. Style glabrous, tapering, twisted, bent sharply upward at base, penicillate, up to 3–5 mm. long. Pod strongly curved usually becoming deflexed so that the base is often parallel with the stem, bent sharply up near the tip, up to 5.4 cm. long and up to 5–6 mm. wide, densely silvery or fulvous tomentose, the hairs often up to 2 mm. long. Seeds 6–12, muricate, longitudinal, oblong, ±4 × 2.5 mm., distance between their centres under 5 mm.; hilum central, aril small and strap-shaped or none."

Material examined. **O'AHU:** University of Hawai'i Poamoho Experimental Station, Kaukonahua Rd, about 5 km S of Waialua, along side of dirt road inside farm, full sun areas on edge of guinea grass stand, about 250 plants seen, 21.539802, -158.089203, 29 Mar 2023, *K. Faccenda & M. Ross 3083*.

Trifolium repens L. var. ***repens*** **New island record**

This species is previously known from Kaua'i, Lāna'i, Maui, and Hawai'i (Imada 2019). It has now been collected on O'ahu from several parks, and may be spreading to other areas,

Figure 8. Distribution of *Trifolium repens* var. *repens* on O‘ahu based on iNaturalist.org data reviewed by the authors.

possibly due to lawn mowers and/or foot traffic (Fig. 8). *Trifolium repens* var. *repens* is recognized by its prostrate habit, trifoliate leaves with stipules fused to the petiole for most of their length, and white globose heads on long peduncles (Wagner *et al.* 1999).

Material examined. **O‘AHU**: Ala Moana Beach Park, Magic Island, growing in lawn with *Axonopus, Eleusine*, & *Eragrostis*, several small colonies, ca. 1.5 m diam. or less, <3 m, 28 Jan 2021, *M.C. Ross 1806*; Nu‘uanu Pali Lookout, muddy lawn with *Axonopus* & *Commelina*, one colony, ca. 1 m diam., 316 m, 21.215976, -157.473572, 23 Nov 2022, *M.C. Ross 1847*; Mililani Mauka District Park, growing in lawn in full sun near restrooms with *Oxalis* & *Axonopus*, irrigated, several colonies, ca. 2 m wide, 222 m, 21.281192, -158.019248, 1 Dec 2022, *M.C. Ross 1855*; Mānoa Valley District Park, growing on a muddy slope in full shade with *Axonopus*, irrigated, large colony, ca. 6 m wide, 52 m, 21.314741, -157.808543, 6 Dec 2022, *M.C. Ross 1858.*

Malvaceae

Abutilon indicum (L.) Sweet **Confirmation of naturalization**

Abutilon indicum is previously known from only a single collection near Honolulu in 1960 (Wagner *et al.* 1999). A recent collection of this species from a weedy lot in Honolulu indicates that it has persisted into the present. Only one plant was observed at the time of collection. An exhaustive search of the area where the species was collected turned up no cultivated plants nearby. *Abutilon indicum* can be distinguished from the more common *A. grandifolium* by the larger petals, shorter calyx lobes, and fruits with 15–22 mericarps (Fig. 9; Wagner *et al.* 1999).

Material examined. **O‘AHU**: Honolulu, Liona St, near intersection with Ke‘eaumoku St, growing in weedy area near the sidewalk, only one plant observed, 5 m, 21.175205, -157.502453, 13 Dec 2022, *M.C. Ross 1862.*

Figure 9. *Abutilon indicum.* **A,** flowers and fruits; note the fruits with 15–22 mericarps; **B,** calyx.

Corchorus olitorius L. **New naturalized record**

Corchorus olitorius is a widely cultivated subshrub native to India. It is often grown in Asian, Middle Eastern, and North African countries for fiber and food (Staples & Herbst 2005). In Hawai‘i, this species was once reported to have been naturalized in Lāwa‘i Valley on Kaua‘i, but was apparently eradicated there (Wagner *et al.* 1999). Another population was reported by Wagner *et al.* (1990) to be escaping near the lotus ponds in Hale‘iwa on O‘ahu; however, there is no evidence that the population persisted. A population of approximately 100 plants was recently discovered while botanizing near Renton Rd. in ‘Ewa Beach, confirming that *Corchorus olitorius* is indeed naturalized on O‘ahu. The population was observed in a dry, vacant area that had recently burned. The plants seemed to favor sprouting from charred soil and were becoming somewhat dominant in the burnt area (Fig. 10). This should raise some concerns about the potential for this species to quickly colonize new areas after fire. Other instances of *Corchorus olitorius* escaping cultivation on O‘ahu have also been documented in Kalihi and Wai‘anae Valley. This species is easily recognized by its semi-woody habit, leaf bases with long tail-like setae, yellow flowers, and 5-valved capsules.

The following is a description from the Flora of China (Wu *et al.* 2006:250):

> “Herbs woody, 1–3 m tall. Stipule ovate-lanceolate, ca. 1 cm; petiole 0.8–3.5 cm, puberulent; leaf blade oblong-lanceolate, 7–10 × 2–4.5 cm, glabrous, basal veins 5, lateral veins 7–10 pairs, base rounded, margin serrulate, apex acuminate. Flowers solitary or 1–3 arranged in cymes, axillary, opposite to leaves; peduncle and pedicel short. Sepals oblong, hairy at base, apex long awned. Petals oblong, as long as or slightly shorter than sepals, stalked at base; stalk ciliate. Stamens on very short androgynophore, glabrous. Ovary 5-loculed, hairy; style glabrous; stigma disk-shaped, lobed. Capsule cylindrical, slightly curved, 10-angled, robust, 5–6-valved, 3–8 cm, apex beaked, with single awn. Seeds obconic, slightly angled, separated by septum.”

Material examined. **O‘AHU:** Along Halona Dr, between Halona Pl and Kohou St, weed in garden beds along road, growing apparently cultivated in one yard, but recruiting in another yard further down the road as a weed, semi-woody herb to about 80 cm, locally common in those two patches, 21.331953, -157.869389, 25 May 2021, *K. Faccenda 1894*; Wai‘anae, Lualualei Homestead Rd, at entrance to farmland about 200 m SW of Kuwale Rd, roadside weed in dry area, rare, one adult flowering plant and ca. 20 seedlings, more plants seen at *Urochloa ramosa* site growing as weeds in farmland, 16 m, 21.440685, -158.151943, 16 Jan 2023, *K. Faccenda & M.C. Ross 2992*; ‘Ewa, growing in a vacant area that had recently burned, near Renton Rd, dry, mostly *Leucaena*-*Cenchrus*-dominated, ca. 100 plants seen, 12–13 m, 21.195993, -158.231182, 27 Feb 2023, *M.C. Ross 1901*.

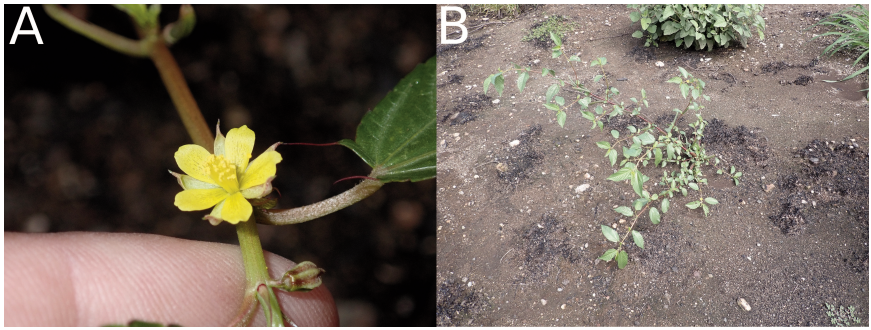

Figure 10. *Corchorus olitorius*. **A**, close-up of the flower and leaf base; **B**, habitat of the wild population in ʻEwa; note the charred root crowns from grasses that had burned during a recent fire.

Moringaceae

Moringa oleifera Lam. **New naturalized record**

Moringa oleifera is a very popular tree extensively cultivated in home gardens throughout Hawaiʻi. It has many uses, but is most often grown locally for its edible leaves and seeds (Staples & Herbst 2005). In cultivation, the trees are usually cut back to the trunk to keep the foliage and pods within arm's reach (Staples & Herbst 2005). During a recent survey of an overgrown vacant area adjacent to Renton Rd. in ʻEwa Beach, two mature unpollarded *Moringa oleifera* trees, ca. 2–3 m tall, were observed. One of the trees was growing in the middle of an abandoned dirt road and the other in *Leucaena* scrub. Several saplings were also seen growing nearby in *Cenchrus ciliaris*-dominated grasslands along Koahi St. These saplings have apparently escaped from cultivated trees in the neighborhood across the street, perhaps unsurprisingly so since these trees do well in hot, dry areas at low elevations, very similar to the conditions where this population was observed (Staples & Herbst 2005). Another species of *Moringa, M. stenopetala*, is also known to be naturalizing at Koko Crater on Oʻahu (Lau & Frohlich 2013). Although the wild populations of these two species do not currently overlap, it is still possible that they could be confused. A couplet is therefore provided below to help distinguish between them.

The following description of *Moringa oleifera* is from the Flora of North America (Olson 2010:168):

> "Plants 1–10 m, to 40 cm diam. Roots tuberous when young, woody with age. Bark pale gray or tan, smooth or finely rugose. Stems often canelike, becoming pendent with age, glabrous or finely puberulent. Leaves with pungent odor of horseradish; 30–60 cm, leaflets distributed on 4–8 pairs of pinnae; pinnae largest near base of leaf, 2 or 3 pinnate; leaflets 75–150, distalmost pairs represented by pairs of single leaflets along main rachis; blades bright to dark green, (0.5–)1–2(–3) × (0.3–)0.5–1.5(–2) mm, base rounded to cuneate, apex rounded to emarginate, glands 3–5 mm (smaller at blade apex). Panicles (5–)10–25(–35) cm, each flower subtended by glandular bract. Pedicels 5–10(–20) mm; bracteoles 2. Flowers sweet-scented, 2–3 cm; sepals 10–20 × 3–4 mm, proximal ones usually reflexed, usually puberulent, distalmost pair usually largest, ± erect, enclosing banner petal, or ± reflexed; petals cream, 1–2 cm, distalmost banner petal ± erect, others usually ± reflexed; filaments and staminodes 7–10 mm, basally pubescent, adherent distally proximal to banner petal and anthers in a 3-tiered presentation; receptacle cup-shaped, 3–4

mm; gynophore 2–3 mm, appressed to banner petal; ovary 3–5 mm, with 3 ridges. Capsules tan, 10–30(–55) × 1.5–3 cm, apex beaked, 3 (or 4)-angled; valves silvery inside. Seeds pale to dark brown, globular, 3-winged; cotyledons exuding oil when compressed."

Material examined. **O'AHU:** 'Ewa Beach, growing in middle of a dry dirt road near abandoned railroad tracks, two mature plants and several young saplings seen in nearby area, corolla white, foliage aromatic, 12–13 m, 21.208999, -158.230503, 27 Feb 2023, *M.C. Ross 1903*.

KEY TO NATURALIZED SPECIES OF *MORINGA* IN HAWAI'I (Adapted from Verdcourt 1985)

1a. Leaflets 0.5–2(–3) × 0.3–1.3(–2) cm; flowers irregular, perigynous ..... *M. oleifera*
1b. Leaflets 3.3–6.5 × 1.7–3.25 cm; flowers regular, hypogynous ..... *M. stenopetala*

Portulacaceae

Portulaca umbraticola Kunth **'Wildfire Mixed' New naturalized record**

This is the first time *Portulaca umbraticola* 'Wildfire Mixed' is being reported as naturalized in the Hawaiian Islands. Several populations have become well established on O'ahu in the southeastern part of the island near Hanauma Ridge and in the Ka Iwi area. The largest population (>1000 plants) is at Ka Iwi along a seasonally muddy portion of the trail that parallels a storm drainage canal. There are also unpublished reports of this taxon naturalizing on other islands. The plants are likely escaping from cultivation given that *Portulaca umbraticola* is one of only two species of *Portulaca* cultivated as an ornamental (Ocampo & Columbus 2012). The species is a common weed from the southwestern U.S. to Argentina, which should raise concerns about its potential to become invasive here in Hawai'i (Matthews 2003; Ocampo & Columbus 2012). There are three subspecies recognized, which can be differentiated primarily based on flower color (Matthews 2003; Ocampo & Columbus 2012). The cultivar *Portulaca umbraticola* 'Wildfire Mixed' produces flowers of various colors (Fig. 11) and may be most closely related to the South American subsp. *umbraticola* (Ocampo & Columbus 2012). *Portulaca umbraticola* 'Wildfire Mixed' is almost certainly what Staples & Herbst (2005) referred to as Portulaca 'Wildfire', which they considered to be one of the most popular cultivated portulacas in Hawai'i. The fruit contains a wing at the dehiscence line of the capsule (Fig. 11), which is diagnostic to the species (Ocampo & Columbus 2012). Unfortunately, Staples & Herbst (2005) did not describe the fruit in their treatment; however, there is little doubt that these are the same species.

The following description is from Flora of North America (Matthews 2003:501):

"Plants annual; roots fibrous. Stems prostrate to suberect; trichomes sparse at nodes and in inflorescence, stems otherwise glabrous; branches 5–20 cm. Leaf blades obovate, spatulate, or sometimes lanceolata, flattened, 10–35 × 2–15 mm, apex rounded to truncate; involucrelike leaves 4–5. Flowers 8–15 mm diam.; petals yellow or yellow tipped with red or copper, spatulate or obovate, 5–10 × 3–6 mm, apex acute or cuspidate; stamens 7–30; stigmas (3–)5–18. Capsules obovoid or turbinate, 3–5 mm diam., with encircling, expanded, membranaceous wing 0.5–1.5 mm wide proximal to suture. Seeds gray, round or elongate, flattened, 0.5–1 mm; surface cells stellate with long tubercles."

Material examined. **O'AHU**: Hanauma Ridge, locally abundant on NW-facing slopes below ridge trail, >100 plants, 10–15 m, petals yellow, 12 Jan 2022, *M.C. Ross 1812*; *loc. cit*., petals yellow, 12 Jan 2022, *M.C. Ross 1813*; Ka Iwi Shoreline Trail, locally abundant in muddy disturbed areas along the trail, >1000 plants, petals reddish yellow, 12 Jan 2022, *M.C. Ross 1814*; *loc. cit.,* petals yellow, 12 Jan 2022, *M.C. Ross 1815*; *loc. cit.,* petals white, 12 Jan 2022, *M.C. Ross 1816.*

Figure 11. *Portulaca umbraticola* 'Wildfire Mixed', photographed at Ka Iwi, 12 Jan 2022. **A,** pink-flowered form; **B,** yellow-flowered form; **C,** white-flowered form, arrow showing wing at the dehiscence line of the capsule, a diagnostic feature of *P. umbraticola*; **D,** habitat.

ACKNOWLEDGEMENTS

Mahalo to Clyde Imada for help in identifying *Portulaca umbraticola* 'Wildfire Mixed' and Barbara Kennedy for encouragement in preparation of this report.

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