Records of the Hawaii Biological Survey for 2007. Edited by
Neal L. Evenhuis & Lucius G. Eldredge. *Bishop Museum
Occasional Papers* 100: 55 pp. (2008)

RECORDS OF THE HAWAII BIOLOGICAL SURVEY FOR 2007[1]

These are the *Records of the Hawaii Biological Survey for 2007* and contain the notes on Hawaiian species of plants and animals including new state and island records, range extensions, and other information.

New plant records from O‘ahu for 2007

DANIELLE FROHLICH & ALEX LAU (Hawaii Biological Survey, Bishop Museum, 1525 Bernice Street, Honolulu, Hawai‘i 96817-2704, USA; email: danielle.frohlich@bishopmuseum.org)

We document 15 new naturalized records, 1 new state record, 10 new island records, and 1 notable adventive species showing signs of naturalization. While primarily based on O‘ahu Early Detection (OED) surveys during the past year, we also include unpublished records of naturalization noted by other agencies. A total of 21 plant families are discussed. Previously documented distributions for plants included in this paper are based on the *Manual of the Flowering Plants of Hawai‘i* (Wagner *et al.* 1999) and information subsequently published in the *Records of the Hawaii Biological Survey*. Voucher specimens are deposited at Bishop Museum’s *Herbarium Pacificum* (BISH), Honolulu, Hawai‘i.

Asclepiadaceae

Calotropis gigantea (L.) W.T. Aiton **New island record**

A native to several regions including India, Sri Lanka, China, Malaysia, and Indonesia, *Calotropis gigantea* is widely cultivated as an ornamental in tropical regions worldwide and has become widely naturalized in many of these areas, including northern Australia (Staples & Herbst 2005). This species has been previously documented as naturalized on both Kaua‘i and Maui. On O‘ahu, it was found naturalized in a dry, grassy road construction site, with no mature individuals in the area.

Material examined. **O‘AHU**: Found during North/South road survey (UTM 598437, 2360755), small shrub sapling ca 0.6 m tall, no fruits or flowers, lone individual found sprouting in dry grassy pasture in road construction area, 76.2 m, 15 Oct 2007, *A. Lau & D. Frohlich 2007101508.*

Cryptostegia madagascariensis Bojer ex Decne. **New island record**

Long cultivated in Hawai‘i, this species was first documented as naturalized on Moloka‘i from a collection made in 2004 in a wet mangrove habitat, where it covered about three acres (Staples & Imada 2006). On O‘ahu, it was observed sprouting out of cultivated naupaka hedges in a dry coastal setting and has persisted there through the current drought, outlasting the dead and dying *naupaka*. The species has also been observed escaping cultivation in Koko Crater, growing on barren exposed rocky soil.

Material examined. **O‘AHU**: Diamond Head Road, along beach parking area (UTM 623799, 2350920), woody vine with stems to 4 m long, exuding copious white sap, several plants sprouting

1. All articles in this publication constitute Contribution No. 2008-005 to the Hawaii Biological Survey.

up on both sides of road, mostly out of thick naupaka hedge, 36.5 m (120 ft), 27 Apr 2007, *A. Lau & D. Frohlich 2007042702*.

Bignoniaceae

Radermachera sinica (Hance) Hemsl. **New naturalized record**

This species is native to Asia and was previously uncollected as naturalized in the state. It is a tree up to 10 m tall, with glabrous petioles, leaf axis, and inflorescences. Leaves are 2(or 3)-pinnately compound; leaf rachis is about 30 cm long; lateral petiolules less than 5 mm long, terminal one about 1–2 cm long; leaflets ovate to ovate-lanceolate, 4–7 x 2–3.5 cm, glabrous, base broadly cuneate, margin entire, apex caudate-acuminate, lateral veins 5 or 6 on each side of midrib. Inflorescences are paniculate, terminal, erect, 25–35 cm long; bracts are linear-lanceolate, about 10 cm long, deciduous, bractlets linear, 4–6 cm long. Calyx has 5 ovate-lanceolate teeth about 12 mm long. Corolla is white to pale yellow, campanulate-funnelform, 6–8 cm long, lobes rounded, about 2.5 cm long. Stamens 4, didynamous; staminode present, filiform. Ovules 2-rowed. Style exserted; stigma 2-lobed. Capsule is terete, nodding, angular, about 85 x 1 cm; pericarp is thin and leathery, indistinctly lenticellate; septum terete, slightly compressed. Seeds are ellipsoid, with a 2 cm x 5 mm wing (Zhang & Santisuk 1994). Several individuals were found naturalizing on O‘ahu in Waimea Botanical Garden along an access road about 150 m from the accessioned tree.

Material examined. **O‘AHU**: Waimea Botanical Garden, naturalizing along access road to water treatment facility, ca 150 m from accessioned tree, disturbed site with several pig wallows, tree seedling, ca 0.5 m, no fruit or flowers seen, several small (<1 m tall) seedlings growing along road, 2 m, 25 Jan 2007, *D. Frohlich & A. Lau s.n.* (BISH 725935).

Brassicaceae

Sisymbrium officinale (L.) Scop. var. ***officinale*** **New island record**

A widespread weed found most often in cultivated fields and pastures, this species was previously known from Kaua‘i, Moloka‘i, Lāna‘i, Maui, and Hawai‘i (Wagner *et al.* 1999). The following voucher was collected among other roadside weeds in the Ko‘olau range of O‘ahu.

Material examined. **O‘AHU**: South Range, Schofield Barracks, along roadside, herbaceous to slightly woody, 1 m tall, no smell, 13 Mar 2007, *S. Iott s.n.* (BISH 726889).

Bromeliaceae

Aechmea bracteata (Sw.) Griseb. **New naturalized record**

Previously uncollected as naturalized in the state, *Aechmea bracteata* can be distinguished by its very large, conspicuous sheaths that form an ellipsoid tank. The outer walls of the tank are covered in scurfy brown scales. Leaf bracts are lanceolate, drooping, entire, and reddish pink. The inflorescence is paniculate, with the lower branches elongate and divided. Floral bracts are spreading, broadly ovate, with an acuminate tip (Smith & Downs 1979). Due to its flat, smooth, ovoid seeds disseminated by birds, this epiphyte generally grows where a large branch meets the trunk on rough-barked trees (Dejean & Olmsted 1997). This species was found naturalizing about 10 m above the ground in a tree in Waimea Botanical Garden. It was planted by the garden in the notch of a nearby tree and has spread to notches in surrounding trees.

Material examined. **O‘AHU**: Waimea Botanical Garden, growing in branches of tree, ca 10 m above ground, 2 m, 25 Jan 2007, *D. Frohlich & A. Lau s.n.* (BISH 725942, 725943).

Caprifoliaceae

Lonicera japonica Thunb. **New island record**

Japanese honeysuckle, native to Japan, Korea, and China, is common in cultivation and widely naturalized in the eastern U.S. While the clones grown in Hawai‘i were believed to be incapable of setting fruit, fruiting specimens have been collected on Kaua‘i, Maui, and now in Wahiawā, O‘ahu. This species was previously documented as naturalized on Kaua‘i, Maui, and the Big Island and is now known to be sparingly naturalized in lower Waihe‘e Valley, O‘ahu. Further cultivation of this species in Hawai‘i should be discouraged.

Material examined. **O‘AHU**: Waihe‘e Valley, naturalized on ridge, sprawling over vegetation, 8 Dec 2007, *J. Preble 2007120801*.

Costaceae

Costus speciosus (J. König) Sm. **New island record**

Costus speciosus, or crepe ginger, native to Indo-Malesia, is widely cultivated throughout the tropics and has become naturalized in some areas (Staples & Herbst 2005). It was introduced to Hawai‘i in 1860, and despite its reputation as a less-aggressive weed (Staples & Herbst 2005), has been collected as naturalized on Kaua‘i, Lāna‘i, Maui, and now on O‘ahu, where it was collected in Waimea Botanical Garden. Individuals of this species have been seen growing throughout the valley far from the original planting.

Material examined. **O‘AHU**: Waimea Botanical Garden, herb ca 3 m tall, 25 Jan 2007, *D. Frohlich & A. Lau s.n* (BISH 725952).

Cyperaceae

Cyperus sanguinolentus Vahl **New island record**

Previously known from the island of Hawai‘i under the synonym *Pycreus sanguinolentus* (Vahl) Nees (Herbst & Wagner 1999; Wagner *et al.* 1999), this species is now known from O‘ahu, at 1225 m at the Ka‘ala summit parking spot in a wet, disturbed grass and sedge area.

Material examined. **O‘AHU**: Ka‘ala by parking spot outside bog fence, 1225 m, 3 Apr 2007, *S. Ching USArmy 55*.

Davalliaceae

Davallia fejeensis Hook. **New naturalized record**

First collected in Hawai‘i in 1947, lacy hare’s-foot fern is now widely cultivated on O‘ahu, and probably on other islands as well. It is now naturalized at least in Nu‘uanu Valley, often growing epiphytically in the lower branches of large trees but sometimes trailing along logs or at soil level. There are several other *Davallia* species in cultivation, none of which have yet been documented as naturalized. *Davallia fejeensis* can be distinguished by its usually epiphytic habit; young rhizomes covered in hairy, peltate scales; fronds 30–60 cm long; blades 4–5 times pinnately compound, the ultimate segment linear and 1-veined; and sori solitary at the segment tips (Staples & Herbst 2005).

Material examined. **O‘AHU**: Nu‘uanu (UTM 621836, 2360521), naturalizing in mesic forest, twining at top of trees and along roots, “snakeskin” scales on rhizomes, new shoots covered in dense fuzzy scales, blades infertile, 20 Mar 2007, *A. Lau & D. Frohlich s.n.* (BISH 726867).

Euphorbiaceae

Sauropus androgynus (L.) Merr. **New naturalized record**

Grown in Hawai‘i since at least 1973 for its edible leaves, *Sauropus androgynus* is a 1–3 m tall shrub with alternate, shortly petiolate, 2–10 cm long, ovate to lanceolate leaves

arranged in 2 rows along lax branches. A dioecious plant, 1–4 flowers arise in clusters in the leaf axils, and the fruit is a 1.5 cm long capsule(Staples & Herbst 2005). Propagated in Hawai‘i by seed (Staples & Herbst 2005) and possibly dispersed by birds, this relatively new arrival is spreading occasionally and has established itself in at least one location in Waimanalo.

Material examined. **O‘AHU**: Frankie’s Nursery, naturalizing in back part of nursery, shrub to ca 1 m tall, fruits bright yellow, ca 1 cm diam., 23 Mar 2007, *D. Frohlich & A. Lau s.n.* (BISH 726888).

Fabaceae

Acacia mangium Willd. **New naturalized record**

Acacia mangium is native to Queensland, Australia as well as the Molucca Islands and Papua New Guinea. It has been planted and become naturalized in many Pacific island-groups, including the Cook Islands, Palau, Saipan, and Pohnpei. In Hawai‘i it has been rarely cultivated in agricultural experiment stations and botanical gardens, as well as used in erosion control projects in natural areas. It is now naturalized in Kahuku and Kāne‘ohe on O‘ahu, spreading from sites where planted, potentially being dispersed in part by ants. The Kahuku population is currently being controlled by U.S. Army Natural Resources. *Acacia mangium* can be confused with another nonnative acacia, *A. auriculiformis*, which both have broad phyllodes, inflorescences in spikes, and coiled pods. *Acacia mangium* can be distinguished by phyllodes with prominently reticulate secondary veins (not prominent in *A. auriculiformis*), white to cream-colored spikes (yellow spikes in *A. auriculiformis*) and a pubescent calyx (calyx glabrous in *A. auriculiformis*) (Orchard & Wilson 2001).

Material examined. **O’AHU**: Kahuku Training Area, roadside on ridge east of Kaunala Gulch, tree 10–15 m tall, 150–200 mature trees planted, with 200+ seedlings, 122 m (400 ft), 28 Jan 2003, *M. Keir s.n.* (BISH 695023, 695024); Kāne‘ohe, Ho‘omaluhia Botanical Garden, tree to 4 m tall, infructescences dense, composed of many tightly coiled pods, 28 Jan 2007, *A. Lau s.n.* (BISH 731069); Kāne‘ohe, 3 m tall sapling growing along side of road in strip of grass between sidewalk and street, no mature trees seen in neighborhood, 27 Sep 2007, *A. Lau & D. Frohlich 2007092703*.

Caesalpinia crista L. **New naturalized record**

Previously known from only one cultivated collection in Hawai‘i, this plant was found climbing up to 13 m in *Eucalyptus* trees, as well as smothering ground-level vegetation, occupying approximately 200 square meters of alien forest. Like other species in the genus, *Caesalpinia crista* is armed with stout, recurved prickles along its branches and leaf rachises. It can be distinguished from the other climbers in the genus by being glabrous, with bipinnate leaves 20–30 cm long, pinnae with only 2–3 pairs of coriaceous leaflets 2–5 cm long, and panicles of 1 cm long, yellow flowers (Huang & Ohashi 1993).

Material examined. **O‘AHU**: Tantalus (UTM 621850, 2358933), plant with stout, recurved prickles climbing to 13 m on *Eucalyptus* sp. and smothering understory vegetation over approximately 200 square meters, 16 Nov 2007, *A. Lau 2007111601*.

Platymiscium stipulare Benth. **New naturalized record**

First planted in Hawai‘i by Dr. William Hillebrand and sometimes used as a street and shade species, this tree produces many wind-dispersed seeds that germinate readily. J.F. Rock, in his book *Leguminous Plants of Hawaii,* notes that hundreds of seedlings were spread throughout the Foster Estate, where the first individual was located (Staples & Herbst 2005). Because of its behavior in Hawai‘i, this plant has been cited as a potential

serious invasive for the islands (Staples *et al.* 2000). *Platymiscium stipulare* can reach up to 21 m in height. Leaf petioles are 3.8–7.6 cm long, with usually 5 ovate or elliptic glossy, leathery leaflets. Inflorescences are axillary and have 1 raceme per leaf axil, with paired yellow flowers about 1.25 cm long. Fruit is ellipsoid-oblong, 1.9–2.5 x 1.25–1.70 cm, and greenish (Staples & Herbst 2005).

Material examined. **O'AHU**: Kānewai Park (UTM 2355089, 623261), behind swimming pool in dry, barren walkway, single plant growing 30 m from nearest mature trees, growing against fence and adventive *Tabebuia,* small tree ca 4 m tall, no flowers or fruit seen, 16 Aug 2007, *D. Frohlich & A. Lau 2007081607.*

Pueraria phaseoloides (Roxb.) Benth. **New state record**

Native to southern China and Southeast Asia, *Pueraria phaseoloides,* or tropical kudzu, has become naturalized in many tropical areas of the world. Because of its invasive tendency, this species has been declared a noxious weed in several of these places, including Hawai'i. This species is a perennial, twining herb. The stems are densely covered in stiff, brown hairs; leaves are trifoliate with broadly ovate leaflets. Both leaf surfaces are also covered in stiff brown hairs. This species has small, lanceolate, basifixed stipules (which distinguish it from *P. montana* var. *lobata,* which has peltate stipules). The flowers are 12 mm long, the standard and wing petals purple with white margins, situated at the top of long peduncles in axillary pseudoracemes. The pedicels are short and nodulose, with lanceolate bracts and bracteoles. Pods are linear, slender, pilose, 5–8 cm long and 4 mm wide (Huang & Ohashi 1993). This species was found spreading widely in several open areas in Kahalu'u and Waihe'e Valleys.

Material examined. **O'AHU**: Kahalu'u (UTM 2371107, 619769), sprawling through *Wedelia* in partial sun, growing on slope, no flowers or fruit seen, 17 Aug 2007, *D. Frohlich & A. Lau 2007081708.*

Malvaceae

Hibiscus makinoi Jôtani & Ohba **New naturalized record**

A rarely cultivated species in Hawai'i, *Hibiscus makinoi* is native to the Ryukyu Islands and Kyushu, Japan (Jôtani & Ohba 1984). In the past, this species has been confused with *H. mutabilis,* to which it bears a strong resemblance. These two species diverge in having a different type of indumentum. Whereas *H. mutabilis* has both long glandular hairs and dense stellate hairs with long arms on the young shoots, leaves, pedicels, epicalyx, and calyx, *H. makinoi* is covered only in dense stellate hairs with shorter arms. In addition, *H. makinoi* differs in having subulate or narrowly lanceolate (not linear) epicalyx segments, and leaf lobes with obtuse (not acuminate) apexes (Jôtani & Ohba 1984). Interestingly, the leaf morphology in the material examined has slightly acuminate (not blunt) tips but otherwise matches named material.

Material examined. **O'AHU**: Waimea Botanical Garden, in dry area near side road, 50 m away from accessioned *H. makinoi* plants, shrub 1.5 m tall, no flowers seen on naturalizing individuals, but many seed heads per plant, producing copious seed, mostly mature fruiting individuals, 25 Jan 2007, *D. Frohlich & A. Lau s.n.* (BISH 725940).

Moraceae

Ficus religiosa L. **New naturalized record**

Ficus religiosa, or bo tree, is a widely cultivated plant worldwide, mostly due to its religious significance to both Hindus and Buddhists, because the Buddha is traditionally said

to have received enlightenment under this species. A famous specimen of *F. religiosa* grown at Foster Garden produced several adventive seedlings in the early part of 2007 (N. Hoffmann, pers. comm.). Consequently, it was discovered that the specific pollinator wasp, *Blastophaga quadraticeps,* is now present in Hawai‘i. *Ficus religiosa* is a dioecious tree that lack aerial roots and has cordate to ovate leaves with petioles 3.5–15.0 cm long and a long “drip tip” at the apex. Figs are paired and sessile and are produced at the leaf axils just below the leaves. The receptacle is globose, about 1 cm in diameter, and ripens to pink, purple, or black (Staples & Herbst 2005). This species has naturalized in mesic to wet areas of Israel and Florida (Starr & Starr 2003). A naturalizing individual was found growing near a drainage pipe in a neighborhood in Kāne‘ohe.

Material examined. **O‘AHU**:.Kāne‘ohe (UTM 2368339, 625024), seedling coming out of crack in sidewalk near drain spout in residential area, roots to 10 cm deep, sapling ca 0.6 m tall, no flowers or fruit seen, *A. Lau & D. Frohlich 2007101901.*

Piperaceae

Piper betle L. **New naturalized record**

Betel pepper, native to Malaysia, is occasionally cultivated in Hawai‘i, presumably for use with betel nut (*Areca catechu*) and calcium oxide (Staples & Herbst 2005). This dioecious woody vine can root at its nodes and was observed in three distinct populations climbing tree trunks up to 7 m into the canopy, forming thickets over fallen vegetation, and trailing along the ground in lowland wet to mesic alien forest. This species can be distinguished from other members of the genus by its glabrous leaf margins, woody vine habit, and joined fruits that are embedded in the rachis (fruit free from rachis and each other in *P. nigrum*) (Staples & Herbst 2005).

Material examined. **O‘AHU**: Mānoa, Nāniu‘apo (UTM 624939, 2359436), climbing to 7 m into canopy, at least 3 populations, 22 Oct 2007, *A. Beebe & C. Sousa OISC20071022*.

Poaceae

Lolium perenne L. **New island record**

Perennial ryegrass was previously known from Hawai‘i (Wagner *et al.* 1999) and Maui (Starr *et al.* 2003), occurring in higher-elevation sites from 850–2830 m. Widely naturalized in temperate regions, this species was occasionally seen at 213 m in the construction site of a new, large housing development. Seeds were possibly transported on soiled heavy machinery brought in from another island.

Material examined. **O‘AHU**: Makakilo (UTM 2362789, 595525), dry lowland housing development construction site, growing in bare soil, clump-forming grass to 0.5 m tall, 213 m (700 ft), *A. Lau & D. Frohlich 2007040*.

Rosaceae

Eriobotrya japonica (Thunb.) Lindl. **New island record**

Loquat, native to China and Japan, was introduced to Hawai‘i in 1851. It is now commonly grown in the state as an ornamental and for its fruit, which is produced best at elevations over 2500 ft [ca 300 m] (Staples & Herbst 2005). Previously collected as naturalized on Kaua‘i and Maui, this species was found spreading from one mature tree in lowland mesic forest in Kalihi Valley, O‘ahu.

Material examined. **O‘AHU**: Kalihi (UTM 2362263, 620238), tree to 6 m tall, one 3 m sapling and 100+ seedlings occasional in vicinity and up to 30 m below tree, 365 m (1200 ft) (~30 m below main ridge), 12 Aug 2006, *A. Lau s.n.* (BISH 731468, 731469).

Santalaceae

Santalum album L. **New naturalized record**

Skolmen (1980) reports over 7500 plantings of *Santalum album* throughout O‘ahu’s forest reserves. It was perhaps originally planted in the Diamond Head area, but recently was observed in all size classes and thoroughly established in an abandoned parking area and other empty lots on the mauka slopes surrounding the crater. *Santalum album* can be distinguished from native species of *Santalum* by its tree habit, ovate to lanceolate leaves (sometimes with glaucous new growth), and 7 mm long black drupes with a subapical receptacular ring (Wagner *et al.* 1999).

Material examined. **O‘AHU**: Diamond Head (UTM 2352279, 623352), coastal empty residential weed lot, 3 m tall tree thoroughly established in at least the large tracts of abandoned parking and other lots, 21 m (70 ft), 27 Apr 2007, *A. Lau* & *D. Frohlich 2007042701*.

Sapindaceae

Allophyllus cobbe (L.) Raeusch. **New naturalized record**

Planted in several botanical gardens around the state, *Allophyllus cobbe* has spread from its original plantings in both Waimea Botanical Garden (where it has proven to be an aggressive invader) and in Ho‘omaluhia Botanical Garden, near Kāne‘ohe, O‘ahu. In Waimea, this plant has spread, both by seed and by root fragments, despite gardeners’ efforts to control it.

Material examined. **O‘AHU**: Waimea Botanical Garden, naturalizing throughout garden, seedling 0.5 m tall, 2 m, 25 Jan 2007, *D. Frohlich & A. Lau s.n.* (BISH 725941).

Urticaceae

Procris pedunculata (J.R. Forst. & G. Forst.) Wedd. **New naturalized record**

Not commonly found in cultivation but planted in several botanical gardens on O‘ahu, including Foster Garden and Waimea Botanical Garden, *Procris pedunculata* is a monoecious shrub not previously collected as naturalized in the state. This species can be identified by its leaves, which are oppositely arranged with one of the pair minute. Leaves are narrowly obovate, and cuneate at the base. Lamina are 8–15 cm long, 2.5–4.0 cm wide, with crowded elongated cystoliths. The male inflorescence is cymose, few-flowered, with a peduncle to 3 cm long. Male flowers are pedicellate, with 5 tepals. The female inflorescence is capitulate, sessile, and many-flowered. Female flowers are sessile, 1 mm long, with short, brush-like stigmas. Fruit is a 1.5 mm long achene (George 1989). In Waimea Botanical Garden, this species has spread sparingly throughout the garden and was collected growing on a moss-covered rock far from the original planting.

Material examined. **O‘AHU**: Waimea Botanical Garden, growing on rock in thick moss with several other individuals, shrub 35 cm tall, 2 m, 25 Jan 2007, *D. Frohlich & A. Lau s.n.* (BISH 725938).

Verbenaceae

Verbena bonariensis L. **New island record**

Previously collected as naturalized on Moloka‘i, Lāna‘i, Maui (Wagner *et al.* 1999), and Kaua‘i, *Verbena bonariensis* is now known from O‘ahu as well, found occasionally in a revegetation site at Castle Junction. Only two grasses (carpetgrass and kikuyu grass) were purposefully introduced as hydromulch to the site (Dacus 2007), but several other species new to the island have also sprouted in the area. Lorence & Wagner (1995) reported a very

similar situation from Kaua‘i, where *V. bonariensis* came up in a newly revegetated roadside area along with *Senecio madagascariensis,* a species which also turned up at the Castle Junction site. The O‘ahu Invasive Species Committee surveyed the area and removed all located *V. bonariensis* and is assisting the Hawaii Department of Agriculture in managing *S. madagascariensis*.

Material examined. **O‘AHU**: Pali/Kamehameha Hwy Junction (Castle Junction), single plant 2 m tall in a 2 x 3 m patch with inflorescences, rooting where stem hit the ground, may have flowered previously, 10 May 2007, *K. Kawelo s.n.* (BISH 727457).

Verbena rigida Spreng. **New island record**

Previously collected only from the Parker Ranch area on Hawai‘i, this species is now known from O‘ahu as well, naturalized in a hydromulch site at Castle Junction. The O‘ahu Invasive Species Committee surveyed the area and removed all individuals of this species.

Material examined. **O‘AHU**: Castle Junction, in hydromulch site, extremely weedy, crowded area, sprawling herb with stiff hairs, 7–15 cm tall, flowers royal purple, in closely packed racemes, no fruits seen, *OISC s.n.* (BISH 727460).

Vitex parviflora Juss**.** **New naturalized record**

Vitex parviflora, a species valued as a timber product in its native range of the Philippines and eastern Indonesia, was planted widely in O‘ahu forests between 1919 and 1936 (Staples & Herbst 2005). Over 7,000 trees of this species were estimated to have been planted on O‘ahu, 65 of which were planted in the Waiāhole area, where several individuals of various size classes were found spreading along roadsides (Skolmen 1980). Because of its numerous, bird-dispersed fruits, this species has been cited as a potential invasive species for Hawai‘i (Staples *et al.* 2000). *Vitex parviflora* is a mostly glabrous tree up to 15 m tall. Leaf petioles are 5–10 cm long, with three stalked, elliptic to oblong-elliptic leaflets 7.6–17.8 x 4.5–5.6 cm, with wavy margins. Inflorescences are in terminal, downy panicles to 20 cm long. Flowers are about 0.6 cm long, with entire calyx margins, and blue to purplish corolla. Fruit is globose and black, about 0.6 cm in diameter, with a flat, persistent calyx.

Material examined. **O‘AHU**: Waiāhole (UTM 2376112, 617898), along roadside, tree ca 5 m tall with lavender flowers, inflorescence ca 15 cm long, copious black, round berries, several individuals of various size classes seen in area, *D. Frohlich & A. Lau 2007111501.*

Vitaceae

Cissus quadrangularis L. **New naturalized record**

Grown as a novelty ornamental in the mainland U.S., *Cissus quadrangularis* thrives in hot, dry areas and roots readily by stem cuttings (Staples & Herbst 2005). Previously, it was reported as questionably naturalized on O‘ahu near Koko Crater. It has now been confirmed as naturalized in ‘Aiea, along Ka‘amilo Street.

Material examined. **O‘AHU**: ‘Aiea, Ka‘amilo Street, lowland roadside weed area, forming thicket in *Leucaena* understory, 134 m, 26 May 2007, *A. Lau & D. Frohlich 2007042603.*

Adventive Species Showing Signs of Naturalization

Araliaceae

Schefflera arboricola (Hayata) Merr.

This ornamental shrub or climber was introduced to horticulture in 1970 and has since become very common in Hawai‘i’s cultivated flora. When allowed enough space, one individual can become a massive climbing shrub 8 m tall and 13 m wide (Staples & Herbst

2005). This species was recently collected as naturalized on Maui (Starr *et al.* 2003) and has been collected growing out of the cracks in a sidewalk on O‘ahu, indicating it is reproductive and capable of dispersal on this island as well. Given its biological characteristics, further cultivation of this species should be discouraged.

Material examined. **O‘AHU**: Mariner’s Ridge (UTM 2356084, 634405), lowland residential cultivated area, 60 cm tall juvenile growing out of a crack, several large *S. arboricola* trees in neighborhood, 200 m (660 ft), 29 Mar 2007, *A. Lau & D. Frohlich 2007032903.*

Acknowledgments

We thank Clyde Imada for help with plant identification and document editing. Also, many thanks to the staff and volunteers at BISH, especially Amanda Harbottle, Derral Herbst, and Barbara Kennedy. Thank you to David Orr for showing us around Waimea Botanical Garden; your help has been invaluable. Thanks to everyone at OISC and Army Natural Resources for field collections and support.

Literature Cited

Dacus, **C**. 2007. Re: Aloha from OISC. Metzler, Katy. Honolulu.

Dejean, **A**. **& Olmsted**, **I**. 1997. Ecological studies on *Aechmea bracteata* (Swartz) (Bromeliaceae). *Journal of Natural History* **31**(9): 1313–1334.

George, **A**.**S**. (ed.). 1989. *Flora of Australia*. Hamamelidales to Casuarinales. Australian Government Publishing Service, Canberra. 219 pp.

Herbst, **D**.**R**. **& Wagner**, **W**.**L**. 1999. Contributions to the flora of Hawai‘i. *Bishop Museum Occasional Papers* **58**: 12–36.

Huang, **T**.**-C**. **& Ohashi**, **H**. 1993. Leguminosae, pp. 160–396, *In:* Hsieh, C.-F., T.-C. Huang, Z.-Y. Li, H.-C. Lo, H. Ohashi, C.-F. Shen, J.-C. Wang & K.-C. Yang (eds.), *Flora of Taiwan*. Vol. 3. Institute of Ecology and Evolutionary Biology, National Taiwan University, Taipei. 1084 pp.

Jôtani, **Y**. **& Ohba**, **H**. 1984. *Hibiscus makinoi*. *Journal of Japanese Botany* **59**(7): 219–221.

Lorence, **D**. **& Wagner**, **W**.**L**. 1995. Contributions to the flora of Hawai‘i. III. *Bishop Museum Occasional Papers* **41**: 19–58.

Orchard, **A**.**E**. **& Wilson**, **A**.**J**.**G**. (eds.). 2001. *Flora of Australia*. Mimosaceae Acacia Part 2. CSIRO Publishing, Melbourne & Canberra. 536 pp.

Skolmen, **R**.**G**. 1980. Plantings on the forest reserves of Hawaii 1910–1960. Institute of Pacific Islands Forestry, U.S. Forest Service, Honolulu.

Smith, **L**.**B**. **& Downs**, **R**.**J**. 1979. *Bromelioideae (Bromeliaceae)*. The New York Botanical Garden, New York. 652 pp.

Staples, **G**.**W**. **& Herbst**, **D**.**R**. 2005. *A tropical garden flora*. Bishop Museum Press, Honolulu. 908 pp.

———., **Herbst**, **D**.**R**. **& Imada**, **C**.**T**. 2000. Survey of invasive or potentially invasive cultivated plants in Hawai‘i. *Bishop Museum Occasional Papers* **65**: 1–35.

———. **& Imada**, **C**.**T**. 2006. New Hawaiian plant records for 2004. *Bishop Museum Occasional Papers* **88**: 6–9.

Starr, **F**. **& Starr**, **K**. 2003. *Ficus religiosa*- bo tree: Moraceae. *Plants of Hawaii: Report*. Haleakala Field Station, Maui, Hawai‘i, United States Geological Survey, Biological Resources Division.

———., **Starr**, **K**. **& Loope**, **L**.**L**. 2003. New plant records from the Hawaiian archipelago. *Bishop Museum Occasional Papers* **74**: 23–34.

Wagner, **W.L.**, **Herbst**, **D.R. & Sohmer**, **S.H**. 1999. *Manual of the flowering plants of Hawai'i*. Rev. ed. 2 vols. University of Hawai‘i Press and Bishop Museum Press, Honolulu. 1919 pp.

Zhang, **Z.-Y. & Santisuk**, **T**. 1994. Bignoniaceae, p. 218. *In*: Wu Z.-y. & Raven, P.H. (eds.), *Flora of China.* Vol. 18. Scrophulariaceae through Gesneriaceae. Science Press, Beijing & Missouri Botanical Garden, St. Louis. 449 pp.

New Hawaiian plant records from *Herbarium Pacificum* for 2007

CLYDE T. IMADA, SHELLEY A. JAMES, & BARBARA H. KENNEDY (Hawaii Biological Survey, Bishop Museum, 1525 Bernice St., Honolulu, Hawai‘i 96817-2704, USA; email: cimada@bishopmuseum.org)

These previously unpublished Hawaiian plant records report 1 new state record, 8 new island records, and 1 new naturalized record affecting the flora of Hawai‘i. All identification were made by the authors, except where noted in the acknowledgments, and all supporting voucher specimens are on deposit at BISH, except as otherwise noted.

Convolvulaceae

Convolvulus arvensis L. **New island record**

Previously reported as naturalized on O‘ahu and Maui (Wagner *et al.* 1990: 552), field bindweed is now recorded from Moloka‘i. Although on the Department of Agriculture noxious weed list for the State of Hawaii (Hawaii Administrative Rules, Title 4 Subtitle 6 Chapter 68) adopted in 1992, the species is still apparently only sparingly naturalized in the state in low elevation, dry areas. It is native to Eurasia and most commonly found as a weed in temperate areas.

Material examined. **MOLOKA‘I**: Ho‘olehua, on Moloka‘i High School track, 13 Jul 2007, *S. Dunbar 398.*

Cyperaceae

Cyperus involucratus Rottb. **New island record**

Previously reported as naturalized on Midway Atoll, Kaua‘i, O‘ahu, and Maui by Wagner *et al.* (1990: 1395) under the name *C. alternifolius* subsp. *flabelliformis,* this often-cultivated wetland ornamental sedge has since been reported as a weed on Hawai‘i (Imada *et al.* 2000: 11) and Moloka‘i (Oppenheimer 2007: 23). Umbrella sedge is now recorded from Lāna‘i growing in a seep area along a hot, dry coastal trail. It is native to tropical Africa, Madagascar, Mauritius, and the Mascarene Islands (Wagner *et al.* 1990: 1395).

Material examined. **LĀNA‘I**: Mānele Bay, along coastal trail heading west, 18 m, 9 Dec 2007, *C. Imada, S. James, & P. Imada 2007-18.*

Eleocharis geniculata (L.) Roem. & Schult. **New island record**

Wagner *et al.* (1990: 1402) reported this pantropical wetland sedge as naturalized on Kaua‘i, O‘ahu, and Moloka‘i; later, Oppenheimer (2003: 10) collected it on Maui. *Eleocharis geniculata* is now additionally recorded from Lāna‘i growing luxuriantly in the same seep area as the *Cyperus involucratus* vouchered above, along a hot, dry coastal trail.