

## New Hawaiian Plant Records for 2000

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These previously unpublished Hawaiian plant records report 16 new state (including naturalized) records, 25 new island records, and 14 nomenclatural and taxonomic changes that affect the flora of Hawai'i. The ongoing incorporation of the state Endangered Species Program herbarium developed by the Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife (DLNR/DoFaW), into the BISH herbarium has brought to light a number of voucher specimens from the 1970s and 1980s that are first records for the state or for particular islands. These records supplement information published in Wagner *et al.* (1990, 1999) and in the Records of the Hawaii Biological Survey for 1994 (Evenhuis & Miller, 1995), 1995 (Evenhuis & Miller, 1996), 1996 (Evenhuis & Miller, 1997), 1997 (Evenhuis & Miller, 1998), 1998 (Evenhuis & Eldredge, 1999), and 1999 (Evenhuis & Eldredge, 2000). All identifications 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.

### Acanthaceae

#### *Barleria repens* Nees

#### New naturalized record

A relatively recent introduction to Hawai'i as an ornamental plant groundcover, this species was noted to spread out of planted areas and to have the potential to become invasive when it was first correctly identified (Staples & Herbst, 1994). Now there is evidence that *B. repens* has begun to move out of gardens and to appear in settings where it is clearly not cultivated. Collectors on all islands should monitor its distribution and abundance in the event that control measures become necessary.

This South American herb is typically less than 12" tall, has opposite, elliptic-ovate leaves 1–2" long, and axillary salmon-pink flowers about 1.75" long with a 5-lobed limb 1–1.5" across. The base of the flower is enclosed in 2 large papery bracts that persist in fruit, turning semi-transparent with darker veins. The slender capsule splits open forcibly and flings out the 4 flat, plate-shaped, 0.25" diameter seeds.

*Material examined.* O'AHU: Kuli'ou'ou Ridge trail, mixed alien mesic forest of *Acacia con-fusa*, *Psidium*, *Lantana*, 8 Sep 2000, *F. Kraus s.n.* (BISH 665308).

#### *Dicliptera chinensis* (L.) Juss.

#### New island record

This species is frequently confused (in the herbarium) with *Blechnum pyramidatum* (Lam.) Urban [Syn. *B. brownei* Juss.]. When several specimens were recently reidentified in the Bishop Museum herbarium, the following specimen was found to represent a new island record for the Big Island.

*Material examined.* HAWAII: Hāmākua Ditch, Lālākea, at the main weir, start of lower Hāmākua Ditch, 20° 04' N, 155° 25' W, elev. 1000 ft, 2 Aug 1996, *D.R. Herbst 9792*.

#### *Hemigraphis reptans* (G. Forst.) T. Anderson

#### New island record

The range of *H. reptans* in the Hawaiian Islands was reported to be Kaua'i, O'ahu, and Hawai'i (Wagner *et al.*, 1990). The following specimen documents its existence as a naturalized plant on Moloka'i; elsewhere in these Records it is documented from Maui (Oppenheimer & Bartlett, 2002). The species is grown as a cultivated ornamental on all inhabited islands and is likely to escape cultivation anywhere it is grown.

*Material examined.* MOLOKA'I: North shore, Waiehu landsheaf, nearly prostrate herb growing in disturbed area, elev. 20–30 ft, 8 Sep 1987, *S. Anderson s.n.* (BISH 605522).

***Justicia spicigera* Schltld.****New naturalized record**

The following specimens document this Central American species as naturalized in the Hawaiian Islands. It was formerly known only in cultivation as an ornamental plant. It is likely that it has escaped on other islands as well. Mexican indigo is a shrub to 6' tall with opposite leaves, the blades oblong-lanceolate to ovate, up to 7" long; inflorescences are few-flowered, one-sided racemes composed of 1.5" long, orange or red, 2-lipped flowers, the lower lip recurved.

*Material examined.* **O'AHU:** Honolulu, lower Round Top in disturbed dry forest along roadside above stream, near 2010 Round Top Drive, elev. ca. 61 m, 25 Mar 1998, *G. Ray & E. Gibney 100*. **MOLOKA'I:** Hālawā Valley, naturalized in areas along road, elev. ca. 100 ft, 9 Jul 1983, *K. Nagata 2671*.

***Odontonema cuspidatum* (Nees) Kuntze****New island record**

Fire spike was first reported as a naturalized species by Lorence *et al.* (1995) from the island of Kaua'i. The following collections document its widespread distribution on the Big Island. Elsewhere in these *Records* it is documented as naturalized on Maui (Oppenheimer & Bartlett, 2002). Grown throughout the state as an ornamental shrub, *O. cuspidatum* is likely to escape and become naturalized anywhere it is grown.

*Material examined.* **HAWAII:** Ka'ū Distr., Keauhou Ranch, growing in a collapsed lava tube about 30 ft from Pu'u 'Ō'ō Road, in midst of a pasture area, elev. 4020 ft, 4 Jan 1980, *L.W. Cuddihy (ESP) 93*; along Saddle Road about 10 mi from Waimea, in forest above pasture area, 1 May 1990, *D. Mueller-Dombois s.n.* (BISH 573852); Keaukaha, about 50 ft from Kalaniana'ole Hwy, found in small ravine off Nēnē St., elev. 20 ft, 12 Jan 1973, *S. Ishikawa 208*; South Kona Distr., near Ho'okena, growing on roadside with *Schinus* and other non-native vegetation, elev. ca 1000 ft, 22 Aug 1987, *L.W. Cuddihy 2073*.

**Amaranthaceae*****Achyranthes aspera* L.****New island record**

The following specimen represents the first documented record for the existence of this naturalized species on Moloka'i.

*Material examined.* **MOLOKA'I:** roadside at the 19 mile marker east of Kaunakakai, ca. 15 m elev., 28 May 1998, *N. Matayoshi s.n.* (BISH 652141).

**Annonaceae*****Annona cherimola* Mill.****New naturalized record**

Field collectors recorded the cherimoya as naturalized on the Big Island as early as 1926 and it has been sporadically collected ever since from trees that were clearly not cultivated. Not treated in the *Manual* (Wagner *et al.*, 1990, 1999), this is the second recorded Annonaceae naturalized in the Hawaiian Islands, the first being *Artabotrys hexapetalus* (L.f.) Bhandari (Nagata, 1995).

The cherimoya is a semi-deciduous tree to 25' tall with alternate, distichous, elliptic to obovate leaves 4–6" long, their undersides grayish velvety hairy; the axillary trimerous flowers greenish white, ca. 1" long; and the aggregate fruits ovoid, 4–7" long, the surface bullate, pale green, the flesh white.

*Material examined.* **HAWAII:** Kona side of Wai'ōhinu, forming large thicket in moderately dry region on mauka side of road, completely naturalized, 25 Jul 1926, *O. Degener 7276*; North Kona Distr., Pu'uwa'awa'a, "wild," Aug–Sep 1917, *J.F. Rock 12961*; same loc., 30 Aug 1916, *A.S. Hitchcock 14507*; Pu'uhuluhulu, pasture near escarpment transect, elev. 2640 ft, common at this site and Pu'uwa'awa'a cone, population sterile, 26 Dec 1989, *W. Takeuchi 5777*.

**Apiaceae*****Coriandrum sativum* L.****New island record**

Previously reported as naturalized on O'ahu, this specimen documents Chinese parsley (coriander) as a naturalized plant on Kaua'i.

*Material examined.* **KAUA'I:** Waimea Distr., Kōke'e State Park, in fence line at NE side of Div. of Forestry and Wildlife nursery site, elev. 3980 ft, 2 Apr 1997, *T. Flynn & G. Kawakami 6123* (BISH, NY, PTBG, US).

***Torilis arvensis* (Huds.) Link****New state record**

This specimen, originally collected as *Daucus pusillus* Michx., was reidentified by Lincoln Constance in 1991 but overlooked until now. It represents the first state record for a second species of *Torilis* in the Hawaiian Islands. *Torilis arvensis* is native to central and southern Europe and is naturalized in California (Hickman, 1992). It can be distinguished from *T. nodosa* by the following key (adapted from Hickman 1992: 166):

- 1. Plants erect; peduncle longer than leaf; umbel open, not head-like; outer and inner fruit-halves equally prickly ..... *T. arvensis*
- 1. Plants spreading; peduncle shorter than leaf; umbel dense, head-like; outer fruit-half prickly, inner only tubercled ..... *T. nodosa*

*Material examined.* **KAUA'I:** Kalalau Trail, in dry disturbed soil along trail at Pōhakuao, 14 Jun 1989, R. Hobdy, *S. Perlman & S. Gon 3059*.

**Araliaceae*****Schefflera actinophylla* (Endl.) Harms****New island record**

Octopus tree, already well known as an invasive arboreal weed on Kaua'i, O'ahu, Maui, and Hawai'i is here reported for the first time from Moloka'i. Although this voucher may have been from a planted tree, it documents the occurrence of *S. actinophylla* on the island and suggests one area where adventive seedlings and naturalized populations should be sought.

*Material examined.* **MOLOKA'I:** Kalaupapa National Historical Park, within the settlement area, 17 Sep 2000, *B.H. Gagne 3154*.

**Asteraceae*****Crepis vesicaria* L. subsp. *taraxacifolia*****New state record**

(Thuill.) Thuill.

This is the first record in Hawai'i for this western European subspecies of *Crepis vesicaria*, which has become widely established in the Canary Islands, Madeira, North America, New Zealand, and Australia (Babcock, 1947). A detailed discussion of the variation in this species, with a key to subspecies, descriptions, and illustrations, is available in Babcock's monograph of *Crepis* (Babcock, 1947).

*Material examined.* **HAWAI'I:** Puna Distr., Halepua'a ahupua'a, along side of Puna Trail in shade of mango trees, on cinder, ca 100 ft, 16 Apr 1979, *L. Yoshida 79.099*.

***Euchiton japonicus* (Thunb.) Anderb.****New island record**

Following the adjustment in the taxonomic concepts for the tribe Gnaphalieae adopted by Wagner et al. (1997), *E. japonicus* was first recognized to be naturalized in Hawai'i based on a single Big Island collection. This specimen represents the first record from Maui.

*Material examined.* **MAUI:** East Maui, Kīpahulu Valley, Haleakalā National Park, 1340 m, 10 Jul 1983, *A. Medeiros 462*.

***Hypochoeris radicata* L.****New island record**

Rough cat's-ear was reported to be naturalized on all the main Hawaiian Islands except Ni'ihau and O'ahu (Wagner et al. 1990). The following specimen, from a roadside where hydromulching had recently taken place, is the first documentation for it on O'ahu.

*Material examined.* O'AHU: Honolulu, Upper Nu'uau Valley along Pali Hwy., near upper junction with Nu'uau Pali Dr., 21° 21' N, 157° 48' W, elev. 1000 ft, 1 Sep 1999, R. Heu s.n. (BISH 662906).

***Taraxacum officinale* W.W. Weber ex F.H. Wigg. Correction**

The authorship for the common dandelion as stated in the *Manual* (Wagner et al., 1990) is at odds with other reference works (Mabberley, 1997). It appears that the authority should be changed to "W.W. Weber ex F.H. Wiggers" as noted above.

***Zinnia maritima* HBK****Taxonomic change**

Syn. *Z. palmeri* A. Gray

The completion of accounts of the Asteraceae in several floras for Mexico and Central America has brought to light some name changes affecting species naturalized in Hawai'i. The weedy zinnia reported in the *Manual* (Wagner et al., 1990) as *Z. palmeri* was reduced to synonymy under the widespread and variable *Z. maritima* by Rogers McVaugh in the Compositae account for the Flora Novo-Galiciana (McVaugh, 1984).

***Zinnia peruviana* (L.) L.****New island records**

Previously documented from the islands of Lāna'i, Maui, and Kaho'olawe (Wagner et al. 1999: 379), the following collections extend the range of *Zinnia peruviana* to the islands of Moloka'i and Hawai'i. Although the specimen from Moloka'i was collected in 1948 and was annotated by the authors of the *Manual* in 1984, it seems to have been overlooked when the account of *Zinnia* was written (Wagner et al. 1990). Fosberg noted that the species was "said to be very abundant at other seasons."

*Material examined.* MOLOKA'I: Nā'iwa, road above 'Umipa'a, weedy along stony roadside, 22 Feb 1948, F.R. Fosberg 29558. HAWAI'I: South Kohala Distr., collected east of Queen Ka'ahumanu Highway between Mauna Lani Drive and Puakō turnoff, elev. 200 ft, 4 Feb 1991, E. Funk s.n. (BISH 662876).

**Begoniaceae*****Begonia vitifolia* Schott****Nomenclatural change**

Misapplied: *B. reniformis sensu* Hawaiian authors

According to determinations for Hawaiian voucher material made by J. Doorenbos, a specialist in *Begonia* taxonomy, the plants naturalized in Hawaii are not *B. reniformis* but are instead the similar (and easily confused) *B. vitifolia*.

**Cactaceae*****Opuntia monacantha* (Willd.) Haw.****Nomenclatural change**

Syn. *Opuntia vulgaris sensu* Hawaiian authors, not of P. Miller; *O. cordobensis sensu* Hawaiian authors, not of Spegazzini.

Correct application of the name *Opuntia vulgaris* Mill. has long been confused, because Miller based the name on a mixture of elements that can be interpreted in various ways. A thorough nomenclatural review of the problem has established that 2 distinct taxa were included in Miller's taxonomic concept and the correct name for one of these, an erect, spiny species native to eastern South America, is *O. monacantha* (Leuenberger, 1993). Although the name *O. vulgaris* is widespread in older botanical and horticultural refer-

ence literature and will likely continue to appear in popular gardening books, the nomenclatural working group for the International Organization for Succulent Plant Study had already accepted Leuvenberg's conclusion and the name change was taken up in an official checklist of Cactaceae names (Hunt, 1992), as well as in other references (Walters et al. 1989).

Routine verification of the voucher specimens for Cactaceae as part of the In Gardens of Hawaii II project revealed that naturalized and cultivated Hawaiian prickly pear specimens that had been called *O. vulgaris* and *O. cordobensis* are actually *O. monacantha*.

### **Ceratophyllaceae**

#### ***Ceratophyllum demersum* L.**

#### **New island record**

Grown as an aquatic ornamental in Hawai'i at least since 1934, *Ceratophyllum demersum* was previously known to have become naturalized in Kanahā Pond, Maui, and in Waipi'o Valley, Hawai'i. The following collection documents its presence as a naturalized plant in the Salt Lake area of O'ahu. Elsewhere in these *Records* it is documented as naturalized on West Maui (Oppenheimer & Bartlett, 2002).

*Material examined.* O'AHU: Honolulu Distr., growing in Salt Lake periphery channel with *Bacopa* and *Ipomoea aquatica*; the colony covered about one acre, 3 Oct 2000, E. Funk s.n. (BISH 666283).

### **Chenopodiaceae**

#### ***Bassia hyssopifolia* (Pall.) Kuntze**

#### **New island record**

Previously known in Hawai'i from a few collections made on O'ahu and Maui, *Bassia* was recently collected on Moloka'i. Elsewhere in these *Records* a range extension is documented for East Maui (Starr et al. this volume).

*Material examined.* MOLOKA'I: Kawela, growing along Kamehameha V Hwy, near sea level, 16 Dec 1999, D. Herbst, R. Palmer, & D. Paul 9875.

#### ***Chenopodium album* L.**

#### **New island record**

This annual herb, previously collected as a naturalized weed only from the Kula area on Maui (Wagner et al., 1990), has now been collected twice on the Big Island.

*Material examined.* HAWAII: western slope of Mauna Kea, west of Pu'u La'au, locally common in open understory of *Sophora/Myoporum* forest with *Lepidium*, *Bromus*, *Plantago*, and *Senecio madagascariensis*, elev. ca 6200 ft, 23 Sep 2000, C. Imada & M. Legrande 2000-21; South Kohala Distr., in open grassland east of Queen Ka'ahumanu Hwy. between Mauna Lani Drive and Puakō turnoff, 200 ft. elev., 4 Feb 1991, E. Funk s.n. (BISH 662898).

#### ***Chenopodium ambrosioides* L.**

#### **New island record**

Based upon the specimen cited below, the range of *Chenopodium ambrosioides* now includes the island of Kaua'i. It also has been documented from the islands of O'ahu, Lāna'i, Maui, and Hawai'i.

*Material examined.* KAUA'I: Nā Pali Coast, growing along stream in Awa'awapuhi Valley, ca. 300 ft elev., 19 Jul 1979, C. Corn et al. ESP-386.

### **Crassulaceae**

In the course of having Crassulaceae voucher specimens identified for the In Gardens of Hawaii II project, a number of specimens previously called *Kalanchoe* were renamed by Dr. Nigel Taylor as *Bryophyllum* species. A follow-up query to Dr. Taylor brought this response: "Please note that a consensus of Crassulaceae workers now accept *Bryophyllum*

(incl. *Kitchingia*) as distinct from *Kalanchoe*" (Taylor, pers. comm. 1995). This was sufficient impetus to investigate the situation in the botanical and horticultural literature.

For many years *Bryophyllum* Salisbury has been submerged in the larger genus *Kalanchoe* Adanson. The horticultural literature in general has maintained all species in *Kalanchoe* (L.H. Bailey Hortorium, 1976; Everett, 1980–1982; Huxley *et al.*, 1992, Cullen *et al.*, 1995). The *Manual* (Wagner *et al.*, 1990: 567–68) likewise reported 2 naturalized species of *Kalanchoe* (and one garden escape) for the Hawaiian Islands; subsequently, 2 further species were documented as naturalized on Kaua'i (Lorence *et al.*, 1995).

However, when the search was broadened to include botanical literature from the Afro-Malagasy region, it became clear that researchers studying wild plants in their area of origin recognize both genera (Fernandes, 1983; Wickens, 1982, 1987, and references cited therein). And, a recent attempt at a consensus classification for the Crassulaceae has accepted both genera, while pointing out the need for further systematic study, because removing *Bryophyllum* may result in a paraphyletic *Kalanchoe* (Eggl *et al.*, 1995). According to this classification, *Bryophyllum* comprises about 35 Madagascan species, and *Kalanchoe s.str.* includes about 50 species distributed in Africa, Arabia, Madagascar, and Asia (Eggl *et al.*, 1995).

Species of *Bryophyllum* and *Kalanchoe* are popular garden plants in Hawai'i, with a few species widespread in home gardens and numerous others cultivated by succulent plant enthusiasts. To aid in the correct identification of the two genera, the following diagnostic features may be helpful:

- 1. Flowers pendulous; sepals  $\pm$  united, calyx tubular or broadly campanulate; stamen filaments attached near base of corolla tube ..... *Bryophyllum*
- 1. Flowers usually erect or upward-angled, not pendulous; sepals joined only at base; stamen filaments attached above middle of corolla tube ..... *Kalanchoe*

All 4 species heretofore reported as naturalized in the Hawaiian Islands (plus one garden escape) are now classified as *Bryophyllum*, and name changes are necessary for them. One new island record is reported. It should be noted that recent evidence indicates that some genuine *Kalanchoe* species are also naturalized and these will be reported in a later paper. The following key, adapted from the Crassulaceae account written for A Tropical Garden Flora (Staples & Herbst, in press), will aid in identification of the 5 *Bryophyllum* species naturalized in the Hawaiian Islands.

- 1. Leaves (at least lower ones)  $\pm$  cylindrical or pencil-like, apex flaring, petiole absent or not distinct from blade (2).
- 1. Leaves with a broad blade set off from narrower petiole (3).
- 2(1). Plant scrambling or climbing, stem to 20 ft long; leaves opposite; corolla green-purple to violet-black ..... *B. beauverdii*
- 2. Plant erect, stem to 6 ft tall; leaves usually in whorls of 3; corolla pale orange to deep magenta ..... *B. tubiflorum*
- 3(1). All (or at least some) leaves compound ..... *B. pinnatum*
- 3. All leaves simple (4).
- 4(3). Leaf blade broadest at or above middle, apex rounded ..... *B. fedtschenkoi*
- 4. Leaf blade broadest at base, apex long-tapering ..... *B. daigremontianum*

***Bryophyllum beauverdii* (Raym.-Hamet) Taxonomic change**

A. Berger

Syn. *Kalanchoe beauverdii* Raym.-Hamet

Noted in the *Manual* (Wagner *et al.*, 1990: 567) as a garden escape based on a single voucher from the Big Island, further collecting will likely prove this species to be fully naturalized. Unlike all other *Bryophyllum* species in the Islands, it is a vining-scrambling plant that can reach 2 meters in length.

***Bryophyllum daigremontianum* Taxonomic change  
(Raym.-Hamet & H. Perrier) A. Berger & New island record**Syn. *Kalanchoe daigremontiana* Raym.-Hamet & H. Perrier

First reported as naturalized on Kaua'i (Lorence *et al.*, 1995), the following specimen represents the first documentation for *B. daigremontianum* as a naturalized species on O'ahu. The species has been abundant at the locality for years, a popular walking trail used by hundreds of city residents on weekends; it is surprising that no one has collected it before.

*Material examined:* O'AHU: Ko'olau Poko Distr., Makapu'u Point state wayside, 21° 18' N, 157° 39' W, naturalized in disturbed coastal dry mixed community, 7 Nov 1996, C. Annable & D. Atha 3119.

***Bryophyllum fedtschenkoi* Taxonomic change**

(Raym.-Hamet &amp; H. Perrier) Lauz.-March.

Syn. *Kalanchoe fedtschenkoi* Raym.-Hamet & H. Perrier***Bryophyllum pinnatum* (Lam.) Oken Taxonomic change**Syn. *Kalanchoe pinnata* (Lam.) Pers.***Bryophyllum tubiflorum* Harv. Taxonomic change**Syn. *Kalanchoe tubiflora* (Harv.) Raym.-Hamet**Cyperaceae*****Bolboschoenus maritimus* (L.) Palla subsp. New island record***paludosus* (A. Nelson) T. Koyama

This indigenous wetland sedge had been collected on all of the main Hawaiian Islands except for Lāna'i and Hawai'i. This represents the first collection from Hawai'i.

*Material examined:* HAWAI'I: North Kona Dist., Makalawena, along margin of 'Ōpae'ula Pond, 8 Nov 2000, P. Van Dyke *s.n.* (BISH 666167).

**Fabaceae*****Clitoria heterophylla* Lam. New state record**

This specimen documents the existence of a second naturalized *Clitoria* species in the Hawaiian Islands. *Clitoria heterophylla*, native to Madagascar and the Mascarene Islands (Polhill, 1990) and cultivated in Java (Backer & Bakhuizen, 1963), is a twining herb with 5–7 leaflets per leaf, the leaflet shape varying from node to node along the stem, often orbicular to broadly obovate, blue flowers, and slightly curved or straight oblong pods up to 4.5 cm long, containing 5–10 subrectangular brown seeds. It can be distinguished from *C. ternatea*, butterfly pea, by means of the following key (translated and adapted from Polhill 1990).

1. Leaflets ovate to elliptic, usually 1.5–6.5 × 1–4 cm; corolla length 3.5–5.5 cm; pods 6–12.5 × 0.7–1.2 cm..... *C. ternatea*
1. Leaflets heteromorphic, varying from node to node, linear to suborbicular, 0.4–3.5 × 0.1–1 cm; corolla length 2–3 cm; pods 1.5–3.5 × 0.4–0.5 cm ..... *C. heterophylla*

Detailed descriptions are available in both cited sources. The collector noted that “more than one population was present in a pasture with *Panicum maximum*, California grass, sourgrass, and *Waltheria*.”

*Material examined.* **HAWAII:** ‘Upolu Point, field next to airport, Oct 1997, V. Caraway 153.

***Cytisus palmensis*** (H. Christ) Hutch.

**New island record**

Scotch broom has not previously been reported from the Big Island. The following specimens document its existence near Hale Pohaku, where it may have been planted or could be a self-sown weed.

*Material examined.* **HAWAII:** Hāmākua Distr., Mauna Kea, Hale Pōhaku, growing in *Eucalyptus* planting makai of the dormitories, 6 Oct 1981, S. Anderson 451.

***Kummerowia striata*** (Thunb.) Schindl.

**Taxonomic change**

Syn. *Lespedeza striata* (Thunb.) Hook. & Arn.

Routine taxonomic verification of voucher specimens in BISH revealed that the single specimen called *Lespedeza striata* in the *Manual* (Wagner *et al.*, 1990) is now referred to the segregate genus *Kummerowia* Schindl. Consultation of legume nomenclature references (e.g., Wiersema *et al.*, 1990) revealed that numerous floras accept this segregate as a valid taxon. While not reported as conclusively naturalized in the *Manual*, the name change for this species is noted here.

The status of *K. striata*, as well as that of a number of other forage legumes included in the *Manual* based on single voucher specimens made many years ago, requires further field research and elucidation. It is not clear that these persist at the present time as part of the naturalized flora. The current status of such legume taxa warrants further investigation.

***Lupinus arboreus*** Sims

**New state record**

An erect shrub, to about 2 m tall, with much branched stems. Leaves palmately compound with 5–11 oblanceolate, folded or flat hairy leaflets. Inflorescence 10–25 cm long, flowers subwhorled, loosely arranged. Calyx with conspicuous lobes 3–6 mm wide at base, densely hairy; corolla yellow, 13–18 mm long. Fruits 3–6 cm long by 7–10 mm wide, villos.

*Lupinus arboreus* is native to California and is presently found along the U.S. west coast from Los Angeles County north to Washington; it has also been introduced to other parts of the world, mostly for use as a sand binder. This species was discovered during an extensive botanical survey of the Pōhakuloa Training Area by a team from the Center for Ecological Management of Military Lands, Department of Forestry Sciences, Colorado State University, Fort Collins, Colorado. Its discovery was reported by Shaw in 1997, but is repeated here as the original report (Shaw, 1997) was not widely distributed. The plant was growing in a *Sophora chrysophylla* association in Mauna Kea State Park and was considered rare.

*Material examined.* **HAWAII:** Mauna Kea State Park, 0.2 miles east of the Saddle Road on Cavalry Trail, 6480 ft elev., collected ca. 1990, Douglas, Hindes, Durkin & Popolizio *s.n.* (BISH 666241).



***Pueraria montana* (Lour.) Merr. var. *chinensis* Nomenclatural change**

(Ohwi) Maesen &amp; S.M. Almeida

Syn. *Pueraria lobata* (Willd.) Ohwi var. *thomsoni* (Benth.) Maesen

Geesink (in Wagner *et al.*, 1990), following the taxonomy adopted by the most recent reviser of the genus (Maesen, 1985), reported 2 varieties of *Pueraria* from the Hawaiian Islands: var. *thomsoni* from Kaua'i and var. *lobata* from O'ahu, Maui, and Hawai'i. Subsequently, nomenclatural corrections that changed the name of the species and varieties occurring in Hawai'i were published (Maesen & Almeida, 1988). The name changes for the species and its variety *lobata* were reported earlier (Herbst & Wagner, 1999), but the second variety in Hawai'i was apparently overlooked. We here report the name change for the variety heretofore known as *thomsoni*, now called *chinensis*.

***Senna surattensis* (Burm. f.)****New island record**

H.S. Irwin &amp; Barneby

Reported in the *Manual* (Wagner *et al.*, 1990) to be naturalized on Kaua'i, O'ahu, and Maui, the following collections may have been overlooked when the distribution of *S. surattensis* was being compiled. They document that *S. surattensis* was well established on Moloka'i by the 1930s.

*Material examined.* **MOLOKA'I:** Puna'ula Valley, wooded canyon bottom, elev. 100 ft, 28 Dec 1932, *H. St. John* & *F.R. Fosberg* 12831; along highway 46 some 7 mi E of Kaunakakai, elev. 10 ft, 31 Aug 1972, *S. Ishikawa* 139; Mapulehu Valley, margin of cultivated field, elev. 200 ft, 28 Dec 1932, *H. St. John et al.* 12763.

**Lamiaceae*****Plectranthus prostratus* Gürke****New naturalized record**

Native to eastern Africa, *P. prostratus* has been cultivated in Hawai'i as a groundcover and container plant. It is a succulent, mat-forming herb with decumbent stems that root at the nodes; opposite, firm-fleshy leaves 0.5" long with triangular to broadly ovate blades, often with obscurely scalloped or angled margins; erect inflorescences of long-pedicelled, violet, 0.2" long flowers, the pedicels radiating out from the main rachis like spokes of a wheel; and 4 tiny nutlets contained in the persistent, papery calyx.

This sprawling herb was apparently originally planted in its present location but appears to be naturalizing in the area. It is growing in open *Leucaena* scrub along with *Verbesina*, *Coccinia*, *Sida fallax*, and *Momordica*, and forms groundcover masses on thin soil and rocks.

*Material examined.* **O'AHU:** Makapu'u, on dry rocky bluff on mauka side of entrance to Sea Life Park, 21 May 2000, *C. Imada* 2000-14.

**Lemnaceae*****Landoltia punctata* (G. Mey.) Les****Taxonomic change**

&amp; D.J. Crawford

In a recent publication, Les & Crawford (1999) proposed that *Spirodela punctata* was sufficiently distinct from the other 2 described species of *Spirodela* to warrant being placed in its own genus. They accordingly erected the genus *Landoltia*, which was named to commemorate Elias Landolt for his contributions to the systematics and biology of the Lemnaceae in his more than 45 years of studying the family. *Landoltia* can be distinguished from *Spirodela* by the following characters:

Character	Spirodela	Landoltia
Prophyllum at base of frond	present	present, but reduced
Number of veins in frond	7–16	3–7
Number of roots	7–21	(1–)2–7(–12)
Root length	up to 4 cm	up to 7 cm
Frond L to W ratio	1–1.5	1.5–2 times

*Spirodela punctata* (G. Mey.) C.H. Thomps., recently documented from the state (Wagner *et al.*, 1997: 57–59; Wagner *et al.*, 1999: 1902), is now referred to *Landoltia punctata* (G. Mey.) Les & D.J. Crawford.

### Liliaceae

#### *Zephyranthes citrina* Baker

#### New island records

First reported in the state from Kaua‘i in 1995 (Lorence *et al.*, 1995), this is the first naturalized record of the yellow rain lily from O‘ahu and Maui. Collector’s notes for the O‘ahu voucher indicate that the plants appeared about one week after a rainstorm and the population extended in patches for about one mile along the roadside. Flowers were observed in the same area in mid-July 2000, but when we returned to make a voucher a few days later the flowers had disappeared. The collector’s notes for the Maui specimen indicate that the population appeared to be sparingly naturalized along the roadside and that capsules with seeds were present, as well as flowers.

Collectors are encouraged to watch for the ephemeral blooms of rain lilies on all islands and to try and collect vouchers to better document their existence and abundance throughout the state. It would also be useful to know if these plants are spreading through seed or by vegetative means only.

*Material examined.* **O‘AHU:** growing on roadside between Waialua and Schofield Barracks along the winding section of road [e.g., Hwy. 830, Kaukonahua Rd.], elev. 300–400 ft, 14 Sep 1992, C. Corn *s.n.* (BISH 665946). **MAUI:** East Maui, Pā‘ia, on west side of Baldwin Ave., just mauka of Pā‘ia School, in grassy roadside verge, 20° 54' N, 156° 21' W, 28 Aug 2000, F. Starr & K. Martz 000828-1.

### Malvaceae

#### *Bastardia viscosa* (L.) HBK

#### New state record

Small shrub, the stems viscid and often with long hairs. Leaves ovate to cordate, 4–8 cm long with serrate to nearly entire margins and an acute to acuminate apex, both surfaces with stellate hairs, the lower surface often viscid; petioles 0.5–1 times the length of the blade. Flowers solitary in leaf axils, usually in leafy terminal panicles; pedicels at least twice as long as calyces; calyces 4–5 mm long, viscid; petals yellow, 5–7 mm long; styles 6–8. Fruits 5–6 mm in diameter, 6–8-celled, stellate pubescent.

*Bastardia viscosa* occurs in low elevation, disturbed habitats from southern Texas to Peru. In Hawai‘i it is known from a single collection made in secondary vegetation near Ho‘okena Beach, South Kona, Hawai‘i. An illustration of the species can be found in Fryxell (1988: 119).

*Material examined.* **HAWAI‘I:** South Kona Distr., along road to Ho‘okena Beach, in secondary vegetation of *Jasminum*, *Leucaena*, *Chamaesyce*, *Portulaca*, *Bidens*, and *Pithecellobium*, ca 30 m elev., 23 Jan 1997, T. Flynn & D. Lorence 6120a.

#### *Sida spinosa* L.

#### New island record

Previously reported to be naturalized on O‘ahu and the Big Island (Wagner *et al.*, 1990) and subsequently discovered on Kaua‘i (Lorence *et al.*, 1995) and Maui (Oppenheimer *et al.*, 1999), this is the first documentation for *S. spinosa* on Lāna‘i.

*Material examined.* **LĀNA'I:** a weed at the airport, 7 Jul 1986, *R. Hobdy* 2577.

### Myricaceae

Recent systematic review of the genera in the Myricaceae (Wilbur, 1994) has resulted in the splitting of *Myrica* into 3 genera. This leads to a name change for fire tree, an aggressive naturalized pest species in the Hawaiian Islands.

#### *Morella faya* (Aiton) Wilbur

#### Nomenclatural change

Syn. *Myrica faya* Aiton

Wilbur's recognition of the genus *Morella* Lour. as a segregate from *Myrica* necessitated several new combinations for North American taxa. His new combination for the Azorean *M. faya*, fire tree, made in a footnote (Wilbur, 1994: 103), is easily overlooked.

### Myrtaceae

#### *Leptospermum laevigatum* (Gaertn.) F. Muell.      **New naturalized record**

Earlier reported to be a candidate for naturalized status (Herbarium Pacificum staff, 1999), this specimen documents the occurrence of *L. laevigatum* on O'ahu as an unambiguously naturalized element in the flora.

*Material examined.* **O'AHU:** Lā'ie, Lā'ie Trail, growing along dirt road in disturbed forest of *Eucalyptus*, *Casuarina*, *Syzygium cumini*, 8 Apr 2000, *C. Imada* 2000-5.

#### *Rhodomyrtus tomentosa* (Aiton) Hassk.

#### New island record

Although Wester (1992: 144) noted that downy rose myrtle was present on Lāna'i, the authors of the *Manual* seem to have overlooked the following voucher specimen, which documents the species' presence on that island. The collectors noted that the plants were "evidently set out in rows...for reforestation" but this was surely the nucleus for an infestation of this aggressive invasive species.

*Material examined.* **LĀNA'I:** northwest side of Kapano Gulch, elev. ± 2000 ft, 28 Jul 1963, *O. & I. Degener* 28503.

### Poaceae

#### *Avena barbata* Pott ex Link

#### New island record

Formerly noted as occurring only on O'ahu (Wagner *et al.*, 1990), this is the first naturalized record of slender wild oat from the Big Island.

*Material examined.* **HAWAII:** South Kohala Distr., Nohonaohae cinder cone, elev. ca 3000 ft, growing in summit crater, 19 Mar 1980, *L.W. Cuddihy* 238.

#### *Brachiaria mollis* (Sw.) Parodi

#### New state record

Syn. *Panicum molle* Sw.

Native to the West Indies, widespread in Mexico and Central America, and extending to South America, this is the first collection for this grass in the Hawaiian Islands. In recent literature, the species has been classified as either *Brachiaria* or *Panicum*, depending on the generic concepts adopted (McVaugh, 1983). The following diagnosis and comments are adapted from the grass account in the *Flora Novo-Galiciana* (McVaugh, 1983): plant a coarse annual, 20(–100) cm tall, the leaves and sheaths softly and finely pubescent, not papillose, the panicles shortly exserted or included, the branches (racemes) spreading, spikelets pilose, stalked, 3–4 mm long, solitary or paired, acuminate, the achene pale, transversely rugulose. How this grass associated with riverbanks and moist places in its native environment came to be growing at the eastern tip of O'ahu in a dry, rocky site subjected to intense insolation and salt spray exposure is a mystery.

*Material examined.* **O'AHU:** Makapu'u Head, on rocky crag above sea, side trail off the paved road, only seen in one area but locally abundant there, 14 Dec 1997, *G. Staples & B. Pope 1153* (BISH, K, US).

***Eragrostis leptostachya* (R. Br.) Steud.      New island record**

Formerly documented only from Moloka'i (Herbst & Clayton, 1998: 27), a grass collected by Ken Nagata on Maui in 1997 was identified as this species by W.D. Clayton.

*Material examined.* **MAUI:** Spreckelsville, rare, along cane haul roads, elev. ca 9 m, 14 May 1997, *K. Nagata 4450*.

***Phyllostachys aurea* Rivière & C. Rivière      New naturalized record**

Long cultivated in the Hawaiian Islands as an ornamental, this is the first report of this dwarf bamboo as a naturalized element in the flora. The sizable population on windward O'ahu apparently spread vegetatively from a roadside ornamental planting; it now fills more than one acre of steep hillside and has formed a virtual monoculture, excluding other plant species. Populations of a similar small bamboo have been observed in the Puna District of Hawai'i island, but remain unvouchered.

*Phyllostachys aurea* has arching culms 4–15 ft tall that vary from green to golden yellow in color, typically have thick walls, prominent nodes, with a whitish waxy ring below each stem node. The distichous leaves are up to 6 per twig, lanceolate-oblong, glabrous, paler on the underside, with deciduous white cilia at the opening of the leaf sheath. This bamboo has not been observed to flower in Hawai'i up to the present time.

*Material examined.* **O'AHU:** Kailua, along Pali Hwy, just *makai* (seaward) of junction with Kamehameha Hwy, extensive thicket spreading downslope from road on steep hillside, 28 Nov 1992, *G. Staples & D. Herbst 880*; same loc., 27 Dec 1992, *G. Staples, D. Herbst, & S. Medbury 883*.

**Rosaceae**

***Rosa xdamascena* Mill.**

**New naturalized record**

The existence of the summer damask rose as a cultivated plant is well documented in the Hawaiian Islands, where this hybrid has been grown since the early 1820s (Nagata, 1985). It has not heretofore been reported as naturalized, but there is increasing evidence that it escapes cultivation and spreads locally and aggressively by vegetative means in higher elevation sites where cooler, moist conditions prevail. The Big Island specimen cited below notes on the label "Volcano, where thoroughly naturalized." Field collectors are encouraged to look out for it and better document its existence, distribution, and abundance on all islands. We report all vouchers in BISH to facilitate further collecting efforts and field observations on the biology of this rose.

*Material examined.* **MOLOKA'I:** Kawela, Pu'u o Ka'eha, cultivated by mountain cabin, elev. 3500 ft, 23 Dec 1932, *H. St. John et al. 12476*; Waikolu Valley, at the head and east rim, elev. 3600 ft, 18 Jun 1962, *Y. & K. Kondo s.n.* (BISH 64520); Kamakou Preserve, near head of Hanalilolilo Trail, elev. 1050 m, 17 Jul 1984, *W.L. Wagner et al. 5397*. **MAUI:** East Maui, top of Olinda Road, cultivated and escaping from garden, spreading from abandoned plantings, 20° 48' N, 156° 16' W, 30 Oct 1997, *F. Starr & K. Martz 971030-1*. **HAWAI'I:** Kilauea, Volcano, Aug 1908, *Forbes, Brigham, & Thompson s.n.* (BISH 64524).

**Rubiaceae**

***Coffea liberica* Hiern**

**New naturalized record**

Liberian coffee plants were noted in all size classes in alien lowland forest along the Maunawili Falls trail. The slender-trunked trees were up to 20 ft tall. It can be distin-

guished from *Coffea arabica* (also naturalized in this area) by its larger leaves (6–14" long) usually widest above the middle and with the apex rounded or obtuse and briefly tapering (3–8" long, widest near the middle, apex acuminate in *C. arabica*); and corolla lobes (5–)6–11 (vs. 5–7).

*Material examined.* O'AHU: Maunawili Valley, Maunawili Falls trail, forming solid stands in alien lowland forest, 22 Jul 2000, C. Imada & G. Staples 2000-11.

### Sapindaceae

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

Fern tree is a commonly cultivated street tree on O'ahu, where its deeply divided, fern-like leaves with distinctive winged rachises produce an attractive, densely rounded crown. It was mentioned in Wagner *et al.* (1990) as a species that might escape cultivation. Seedlings were collected in an alien lowland forest adjacent to a Maunawili subdivision. Adult trees were not noted in the surrounding area, and it is probable that the seeds of the fleshy purple fruit had been bird-dispersed into the forest.

*Material examined.* O'AHU: Maunawili Valley, Maunawili Falls trail, seedlings noted in alien lowland forest under mango canopy, 22 Jul 2000, C. Imada & G. Staples 2000-10.

### Scrophulariaceae

#### *Antirrhinum orontium* L.      **New island record**

Previously known only from O'ahu and Maui, this is the first record for this naturalized species from Kaho'olawe.

*Material examined.* KAHO'OLAWA: area around Lae o Hikiula (Kūheia), more prevalent further inland, 6 Jul 2000, Z.E. Ellshoff s.n. (BISH 664558).

### *Torenia* L.

The *Manual* treated as sparingly naturalized a single species, *T. asiatica* L., found in wet areas of the Big Island from Hilo to Volcano (Wagner *et al.*, 1990: 1246). Identification of Hawaiian voucher material of *Torenia* by Dr. Takasi Yamazaki in the course of the In Gardens of Hawai'i II project revealed that 3 species are present in the islands, the most widespread in cultivation being *T. fournieri* Lindl. ex E. Fourn., and 2 naturalized species, *T. asiatica* and *T. glabra* Osbeck. Much of the BISH voucher material previously identified as *T. asiatica* has actually proved to be *T. glabra*.

The following key provides diagnostic characters to separate these three species; it is adapted from the revision of the genus *Torenia* in Indochina (Yamazaki, 1985), where full descriptions, synonymies, and illustrations are to be found for all 3 species. All specimens examined are cited for *T. asiatica* and *T. glabra* to give collectors a better grasp of their known range and to clarify the taxonomic concepts adopted here. No specimens are cited for *T. fournieri*: it is cultivated on all inhabited islands and could escape from cultivation wherever it is grown if suitable moist habitats are available.

1. Longer pair of stamens without appendages on filaments; stems ± erect, not rooting at nodes ..... *T. fournieri*
1. Longer pair of stamens with filiform or clavate appendages on filament near attachment point to corolla; stems prostrate, rooting from lower nodes ..... 2.
2. Corolla 2–2.5 cm long; calyx 10–13 mm long, narrowly 5-winged (wings ca 0.8 mm wide) ..... *T. glabra*
2. Corolla 3–3.5 cm long; calyx 13–15 mm long, 5-ridged ..... *T. asiatica*

***Torenia asiatica* L.****Taxonomic clarification**

Native to India, Burma, Thailand, and Malesia (Yamazaki, 1985), there is only a single *bona fide* specimen of *T. asiatica* known from the Hawaiian Islands. It was collected in *Metrosideros* rain forest.

*Material examined.* **HAWAII:** Upper Waiākea Forest Reserve, along Disappointment Trail (Pu'u Maka'ala access road), off Stainback Hwy., elev. ca 3600 ft, 26 Jul 1983, *W.L. Wagner, R. Gustafson, & W.C. Martin 4843*.

***Torenia glabra* Osbeck****New naturalized record**

*T. asiatica sensu* Hawaiian authors

Native to Nepal, Bhutan, Assam, Vietnam, southern and central China, and the Japanese island of Kyushu (Yamazaki, 1985), the majority of Hawaiian specimens of naturalized *Torenia* are actually this species. Although widespread on the Big Island, a single weedy specimen has been collected at the back of Mānoa Valley in a wet, sheltered area. Interestingly, the earliest specimen collected (in 1977, *Degener 35245*) noted that this species is a "pretty exotic dangerously spreading among grass and moss."

*Material examined.* **O'AHU:** Honolulu, Lyon Arboretum, weedy groundcover, naturalizing in section H-34, 4 Sep 1996, *K. Shigematsu s.n.* (BISH 645937). **HAWAII:** South Hilo Distr., Waiākea, Keaukaha Military Reservation, 19° 43' N, 155° 25' W, elev. 60 ft, 5 Jul 1996, *D.R. Herbst 9781*; Hilo Forest Reserve, Humu'ula Trail, elev. 2800 ft, 21 Oct 1982, *R. Imoto (ESP) 372*; Puna Distr., Kamoamoā *ahupua'a*, Volcano Rd. on lava flow below Pu'u Kamoamoā, elev. ca. 2360 ft, 6 Jun 1979, *J.D. Jacobi & P.K. Higashino 1334*; Hawai'i Volcanoes National Park, Small Tract, 'ōla'a, more than 0.5 mile from road in closed *Cibotium/Metrosideros* forest, elev. 3900 ft, *L.W. Cuddihy 1918*; NW of Glenwood, on North Peck Rd., 6 Sep 1980, *F.R. Fosberg 60544*; near Mountain View, along back roads, elev. ca. 1500 ft, 1 Apr 1983, *K. Nagata 2642*; land of 'ōla'a, along North Kūlani Rd., about 1/2 mile from Mountain View, elev. 1400 ft, 16 Dec 1975, *D. Herbst & S. Ishikawa 5595*; Volcano, abandoned forestry cabin on Kalanikoa St., 13 Jun 1977, *O. Degener 35245*.

**Acknowledgments**

We thank the collectors of the cited specimens and our many BISH volunteers for assisting us in making them available for study. Vicky Caraway, Patricia Douglas, Betsy H. Gagné, Ron Heu, Kim Martz, Forest Starr, and Peter Van Dyke graciously allowed us to incorporate collections they made into this paper. The authors are grateful for specimen identifications to G. Carr (HAW, *Crepis*), W.D. Clayton (K, Poaceae), the late L. Constance (UC/JEPS, Apiaceae), J. Doorenbos (WAG, *Begonia*), E. Landolt (Z, Lemnaceae), B. Leuenberger (B, *Opuntia*), G.P. Lewis (K, *Clitoria*), J.B. Phipps (UWO, *Rosa*), N. Taylor (K, *Bryophyllum, Kalanchoe*), W.L. Wagner (US, *Euchiton*), and T. Yamazaki (TI, *Torenia*). The Hawai'i Department of Land and Natural Resources, Division of Forestry and Wildlife is thanked for its financial, material, and staff support for the ongoing integration of the state Endangered Species Program herbarium into the BISH herbarium. Bishop Museum acknowledges the John D. and Catherine T. McArthur Foundation for its prior support of the Hawaii Biological Survey, which enabled the taxonomic research reported here.

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