

Contributions to the flora of Hawai'i. VII¹

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More than 10 years have passed since the publication of the *Manual of the flowering plants of Hawai'i* (Wagner *et al.*, 1990). Since that time we, and other interested botanists, have attempted to keep the information in the *Manual* current through the publication of new information in scientific journals. The Hawaii Biological Survey, initiated by the Hawaii State Legislature in 1992 as a program of the Bishop Museum, has greatly helped us in this task. Since 1994, the Hawaii Biological Survey has published the annual *Records* of the Survey. These comprise short papers listing new state or island records of plants and animals, longer papers describing new taxa or reviewing various aspects of the islands' flora or fauna, and updates of the information published in the *Manual* (Evenhuis & Miller, 1995, 1996, 1997, 1998).

A reprint of the *Manual* is scheduled to be published in late spring of 1999¹. It will include a supplement presenting information, listed in tabular form, acquired since 1987, the *Manual's* mandatory cut-off for incorporation of new information. This paper follows in the spirit, format, and purpose of the previous publications. It contains new information included in the supplement, but gives additional information about the entries. It also notes taxa of Hawaiian plants published as new or resurrected since the publication of the *Manual*, as many are in journals overlooked by or unavailable to the general public.

This paper reports previously unpublished Hawaiian plant records for 10 new state and 9 new island records, 15 new naturalized records, 5 new synonymies, 5 corrections of previous misidentifications, 2 identifications of taxa previously known only to the generic level, 1 resurrection of native taxa previously relegated to synonymy, 1 orthographic correction, and 13 taxonomic changes. Also included are summaries of similar information published elsewhere over the past few years, which may have been overlooked by casual users of general taxonomic literature in Hawai'i. All identifications were made by the authors except where otherwise noted.

Acanthaceae

Hypoestes phyllostachya Backer

New naturalized record

The first herbarium specimen of *Hypoestes phyllostachya* in Hawai'i was made in 1985, but the plant had been grown as an ornamental in the state for many years prior to that time. The following collection is the first record of the species as naturalized in Hawai'i. The mother plant is growing in an abandoned garden of a tenant farmer who had leased the land from Amy Greenwell to grow coffee. It apparently is at least sparingly naturalized as there are many seedlings in the area. The species also is cultivated as an ornamental on Kaua'i and O'ahu but is not known to have escaped on either of these islands.

Material examined. HAWAII: South Kona District, Amy B.H. Greenwell Garden, Captain Cook, ca. 1500 ft, 19 May 1990, *Botany Dept. sub G. Staples 625* (BISH).

Pseuderanthemum variable (R. Br.) Radlk.

The Herbarium Pacificum Staff (1998: 8) first reported *Pseuderanthemum fasciculatum* (Oerst.) Leonard as new to the state. According to D. Wasshausen of the Smithsonian Institution (pers. comm., 1998), an authority in the family, the collection docu-

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menting the presence of the species in Hawai'i was an incorrectly identified specimen of *P. variable*.

Ruellia brevifolia (Pohl) C. Ezcurra

In her revision of the southern South American members of the genus *Ruellia*, Ezcurra (1993: 802) placed *R. graecizans* Backer (Wagner *et al.*, 1990: 174) in synonymy under this taxon.

Sanchezia speciosa Leonard

Correction

The author for this newly naturalized species reported by Lorence *et al.* (1995: 20), was incorrectly given as J. Leonard. The correct author is E. Leonard. Following Brummitt & Powell (1992: 367), the standard form for the citation of this author's name is Leonard.

Amaranthaceae

Nototrichium divaricatum Lorence

This species is known only from the Nā Pali coast region, Kalalau, Honopū, and Pohakuaō Valleys, at ca. 600–1100 m, Kaua'i (Lorence, 1996: 64). It differs from other species of the genus by its compoundly branched inflorescences with divaricate branches and shorter spikes, 5–20 (–35) mm long, with (4–) 8–30 (–66) flowers per spike. It is known only from north-facing cliffs and ridges in diverse mesic forests; its conservation status is rare.

Areceaceae

Pritchardia lanaiensis Becc. & Rock

Read & Hodel (1990: 1365) included *P. lanaiensis* only as a note in their treatment of the genus explaining that the taxon had not been placed because its identity remained in doubt. They stated that further work may determine that it is a distinct species, a conclusion reached by C. Gemmill (pers. comm., 1997) as a result of her studies of the genus. Read & Hodel (1990) stated that if the taxon were accepted, it would key out near *P. lowreyana* Rock in their treatment of the genus, while Beccari & Rock (1921: 42), believe that it is most closely related to *P. affinis*.

Pritchardia limahuliensis H. St. John

The type was collected in Limahuli Valley, Kaua'i (St. John, 1988: 177). According to Gemmill (1998: 21) it differs from other Kaua'i species in its combination of a short inflorescence, barely equaling or just slightly longer or shorter than the petiole; leaf blades green, not densely silvery tomentose, ca 80 cm long; moderate habit up to 10 m tall, with a trunk DBH of ca. 12 cm; small crown with ca. 14 leaves; and ellipsoid fruit. This species is very rare and should be considered endangered.

Pritchardia perlmanii Gemmill

This new, endemic species of palm was described from Kaua'i by Gemmill (1998: 18). It is characterized by the combination of its slender trunk, 5–10 m tall; symmetrical crown with ca. 30 leaves; leaf blades ca. 105 cm long, lower surface glabrous to sparsely lepidote; inflorescence with two orders of branching; glabrous rachillae; and distinctively shaped obovoid to pyriform fruits. It presently is known only from Wai'oli Valley where it occurs primarily on the north-facing slopes and steep sidewalls of the valley at an elevational range of 420–850 m. An estimated total of 500 trees are in the valley occurring in populations ranging from 25–50 individuals. The species should be considered endangered.

Asteraceae***Adenostemma viscosum* J.R. Forst. & G. Forst. Taxonomic change & misidentification**

Following the taxonomy of King & Robinson (1987: 58), the taxon published in Wagner *et al.* (1990: 254) as *Adenostemma lavenia* (L.) Kuntze actually is *A. viscosum*.

***Delairea odorata* Lem.**

The placement of *Senecio mikanioides* Otto ex Walp. (Wagner *et al.*, 1990: 356) in the monotypic segregate genus, *Delairea*, has recently gained wide acceptance (Bremer, 1994: 500; Jeffrey, 1992: 83; Mabberley, 1997: 218; among others). We include this taxonomic concept in the supplement to the revised edition of the *Manual*.

***Dubautia kenwoodii* G.D. Carr**

Dubautia kenwoodii is one of the two new species of the genus described from Kaua'i in 1998 (Carr, 1998: 8). The taxon is known only from a single collection made on the steep slopes near the rim of Kalalau Valley, growing in a Diverse Lowland Mesic Forest community. It differs from other species of *Dubautia* in its combination of uniseriate, firmly coalescent bracts; cymose-glomerate capitula; and coriaceous, lustrous leaves with sharply cartilaginous-toothed margins and abruptly narrowed, broadly clasping bases.

***Dubautia syndetica* G.D. Carr & Lorence**

Dubautia syndetica is known only from the headwaters of the Wahiawa Stream, mostly on the slopes of the Wahiawa Mountains draining into the northern end of the Kanaele Swamp basin, 680–950 m, Kaua'i. The taxon occurs as scattered to locally abundant individuals along the banks of the upper reaches of the Wahiawa Stream, its tributaries, and the adjacent slopes of Kapalaoa (Carr & Lorence, 1998: 4). It differs from other species of *Dubautia* in its combination of uniseriate, somewhat coalescent bracts; coarsely glandular peduncles; glandular corolla tubes; and conspicuously strigose achenes. These features suggest a hybrid origin from *D. laxa* Hook. & Arn. subsp. *hirsuta* (Hillebr.) G.D. Carr and *D. raillardii* Hillebr.

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

Euchiton japonicus was reported as a new state record in 1997 (Wagner *et al.*, 1997: 54). The record was based upon a single collection from the Upper Waiākea Forest Reserve, Hawai'i Island, in 1983. Since the publication of that record two other specimens inadvertently omitted from that publication have been rediscovered: one is a new island record, the other an earlier record from the island of Hawai'i.

Material examined. MAUI: East Maui, Haleakalā National Park, Kīpahulu Valley, along Koukou, 10 Jul 1983, *Medeiros 462* (BISH). HAWAII: Mauna Loa, along Stainback Hwy, ca. 18 mi. above junction with Volcano Highway, ca. 5000 ft, disturbed roadside, 13 Aug 1974, *Herbst & Ishikawa 4069* (BISH).

Kalimeris indica* (L.) Sch.Bip. subsp. *indica

Boltonia indica (L.) Benth. is mentioned in passing by Wagner *et al.* (1990: 242) as having been reported as a garden escape on O'ahu but at that time was not believed to be fully naturalized. It was later reported to be naturalized on Kaua'i (Nagata, 1995: 11). A recent treatment of the genus *Kalimeris* by Gu & Hoch (1997:785) accepts *K. indica* as the correct name for this taxon.

***Leucanthemum vulgare* Lam.**

Modern studies of the Asteraceae tribe Anthemideae, which include the two species of *Chrysanthemum* treated by Wagner *et al.* (1990: 286), have shown that the genus *Chrysanthemum* is not monophyletic. Recently, a better understanding of the relationships between the genera within the tribe has been achieved, leading to revised generic concepts of the *Chrysanthemum* complex. *Chrysanthemum*, as applied in the historic concept of the genus used by Wagner *et al.* (1990) comprised more than 200 species, all but 3 of which have now been transferred to at least 14 other genera. Following the taxonomy of Bremer & Humphries (1993: 141) *Chrysanthemum leucanthemum* L. is now *Leucanthemum vulgare*.

***Tanacetum parthenium* (L.) Sch.Bip.**

According to the Bremer & Humphries (1993: 103) study mentioned in the preceding entry, *Tanacetum parthenium* is the correct name for the species treated as *Chrysanthemum parthenium* (L.) Bernh. by Wagner *et al.* (1990: 286).

Pseudelephantopus spicatus* (Juss. ex Aubl.) Vahl **Taxonomic change*

Following Clonts (1972), Wagner *et al.* (1990: 310) included *Pseudelephantopus Rohr* in *Elephantopus*. This delimitation has subsequently not been followed (e.g., Bremer, 1994: 233). We here return to the concept of *Pseudelephantopus* as a distinct genus, differing from *Elephantopus* in that its capitula are not densely held in tight glomerules, its subtending bracts are not specialized but are foliaceous, its clusters of capitula are arranged in long spikes, and at least some or all pappus bristles are bent or curled (Bremer, 1994: 232).

Balsaminaceae***Impatiens sodeni* Engl. & Warb. ex Engl. **Taxonomic change****

Following the taxonomy of Grey-Wilson (1980: 90), *I. oliveri* C.H. Wright ex W. Watson. (Wagner *et al.*, 1990: 380) is now considered a synonym of *I. sodeni*.

Boraginaceae***Heliotropium procumbens* Mill. **New island record****

var. *depressum* (Cham.) Fosberg

Documented as occurring in low elevation, dry sites on Midway Atoll, French Frigate Shoals, O'ahu, and Maui (Wagner *et al.*, 1990: 396), *Heliotropium procumbens* var. *depressum* is now also known from Kaua'i.

Material examined. **KAUA'I:** Kawaihau District, Kapa'a Town, along Highway 56, vacant lot near Otsuka's Furniture with secondary vegetation, 5–10 m, 21 Feb 1995, Lorence 7638. (BISH).

Brassicaceae***Nasturtium microphyllum* Boenn. ex Rchb.**

Nasturtium, which is often reduced to synonymy of *Rorippa*, is recognized as a distinct genus by Al-Shebaz & Price (1998: 126), a status supported by chloroplast DNA studies. These new molecular results show that the aquatic species with hollow stems sometimes placed in *Nasturtium* are more closely related to *Cardamine* than *Rorippa*, where they are often placed. The name change from *Nasturtium microphyllum* to *Rorippa microphyllum* (Boenn. ex Rchb.) Hylander ex Love & Love reported in Wagner & Herbst (1995: 18) should now be changed back to *Nasturtium microphyllum*, the name originally used in the Manual (Wagner *et al.*, 1990: 411).

Cactaceae***Selenicereus macdonaldiae* (Hook.)**

Britton & Rose

Selenicereus grandiflorus (L.) was reported as a newly naturalized species by Lorence *et al.* (1995: 28). The plants in Hawai'i formerly called *S. grandiflorus* are misidentified specimens of *S. macdonaldiae*, the correct name for our taxon.

Misidentification**Campanulaceae**

In a series of papers, Lammers, alone or in collaboration with other botanists, published many changes to the treatment of the Campanulaceae in the *Manual* (Lammers, 1990). To call attention to these changes, they are listed below, with a brief statement of the change.

***Clermontia arborescens* (H. Mann) Hillebr. subsp. *wailoluensis* (H. St. John) Lammers**

Resurrected by Lammers (1991: 25) from synonymy of *C. arborescens* subsp. *wai-hiae* (Wawra) Lammers (Lammers, 1990: 427) and now recognized as a distinct subspecies.

***Clermontia grandiflora* Gaudich. subsp. *maxima* Lammers**

Known from a single collection made in a montane cloud forest at 1645 m on the windward slopes of Haleakalā, East Maui (Lammers, 1991: 77).

***Clermontia peleana* Rock subsp. *singuliflora* (Rock) Lammers**

Resurrected by Lammers (1991: 32) from synonymy of *C. peleana* (Lammers, 1990: 435) with a new status and combination.

***Cyanea calycina* (Cham.) Lammers**

Published as a subspecies of *C. lanceolata* in 1993 (Lammers *et al.*, 1993: 439), the taxon was later raised to the specific level (Lammers, 1998: 32).

***Cyanea cylindrocalyx* (Rock) Lammers**

Originally treated by Lammers as a subspecies of *C. grimesiana* Gaudich. (Lammers, 1990: 451), Lammers (1998: 31) now recognizes this taxon as a distinct species.

***Cyanea dolichopoda* Lammers & Lorence**

Known only from the "Blue Hole" area at the head of the north fork of the Wailua River, ca. 700 m in elevation (Lammers & Lorence, 1993: 432). Although collected in 1990 this species may have gone extinct after Hurricane 'Iniki.

Cyanea dunbariae* Rock*Orthographic correction**

The name of this taxon (Lammers, 1990: 448) should be spelled *C. dunbariae* as it was named in honor of a Mrs. L. M. Dunbar, who collected the type material.

***Cyanea eleeleensis* (H. St. John) Lammers**

Originally described by St. John (1987: 341) as *Delissea eleeleensis*, Lammers has transferred the taxon to the genus *Cyanea* (Lammers, 1992: 129).

***Cyanea habenata* (H. St. John) Lammers**

Originally described by St. John (1987: 342) as *Delissea habenata*, Lammers transferred the species to the genus *Cyanea* (Lammers, 1998: 33).

***Cyanea kahiliensis* (H. St. John) Lammers**

Originally described by St. John (1987: 343) as *Delissea kahiliensis*, Lammers transferred the species to the genus *Cyanea* (Lammers, 1998: 33).

***Cyanea kolekoleensis* (H. St. John) Lammers**

Originally described by St. John (1987: 344) as *Delissea kolekoleensis*, Lammers transferred the species to the genus *Cyanea* (Lammers, 1992: 130).

Cyanea kuhihewa Lammers

Known only from Limahuli Valley on northern Kaua‘i where it is an element of the Lowland Wet Forest vegetation association at 520–580 ft elevation (Lammers, 1996: 238).

Cyanea mauiensis (Rock) Lammers

The name *C. grimesiana* var. *mauiensis* Rock was resurrected by Lammers (1998: 31) from synonymy of *C. grimesiana* Gaudich. subsp. *grimesiana* (Lammers, 1990: 451) and elevated to the specific rank.

Cyanea munroi (Hosaka) Lammers

The name *C. grimesiana* var. *munroi* Hosaka was resurrected by Lammers (1998: 31) from synonymy of *C. grimesiana* Gaudich. subsp. *grimesiana* (Lammers, 1990: 451) and recognized as a distinct species.

Cyanea remyi Rock

In a note, Lammers (1990: 466) stated that the holotype, and only known specimen of *C. remyi*, was too fragmentary to be able to identify. He tentatively referred it to *C. truncata* (Rock) Rock. The rediscovery of the plant from the “Blue Hole” on Kaua‘i enabled him to determine that it was a distinct species (Lammers & Lorence, 1993: 432).

Cyanea

Phylogenetic analyses based on molecular data indicate that the genera *Cyanea* and *Rollandia* are monophyletic, and that the species of *Rollandia* are highly derived within the genus *Cyanea*. This has required the transferring of *Rollandia* species to the genus *Cyanea* (Lammers *et al.*, 1993). The taxonomic changes are listed below:

Cyanea calycina (Cham.) Lammers

Rollandia lanceolata Gaudich. subsp. *calycina* (Cham.) Lammers as treated by Lammers (1990: 483) is now a synonym of *Cyanea calycina* (Lammers, 1998: 32).

Cyanea crispa (Gaudich.) Lammers, Givnish, & Sytsma

Rollandia crispa Gaudich. as treated by Lammers (1990: 481) is a synonym of *Cyanea crispa* (Lammers *et al.*, 1993: 439).

Cyanea humboldtiana (Gaudich.) Lammers, Givnish, & Sytsma

Rollandia humboldtiana Gaudich. as treated by Lammers (1990: 483) is a synonym of *Cyanea humboldtiana* (Lammers *et al.*, 1993: 439).

Cyanea koolauensis Lammers, Givnish, & Sytsma

A new name for *Rollandia angustifolia* (Hillebr.) Rock because the name *C. angustifolia* was preoccupied in *Cyanea*.

Cyanea lanceolata (Gaudich.) Lammers, Givnish, & Sytsma

Rollandia lanceolata Gaudich. as treated by Lammers (1990: 483) is a synonym of *Cyanea lanceolata* (Lammers *et al.*, 1993: 439).

Cyanea longiflora (Wawra) Lammers, Givnish, & Sytsma

Rollandia longiflora Wawra as treated by Lammers (1990: 484) is a synonym of *Cyanea longiflora* (Lammers *et al.*, 1993: 439).

Cyanea parvifolia (C.N. Forbes) Lammers, Givnish, & Sytsma

Rollandia parvifolia C.N. Forbes as treated by Lammers (1990: 484) is a synonym of *Cyanea parvifolia* (Lammers *et al.*, 1993: 439).

Cyanea purpurellifolia (Rock) Lammers, Givnish, & Sytsma

Rollandia purpurellifolia Rock as treated by Lammers (1990: 484) is a synonym of *Cyanea purpurellifolia* (Lammers *et al.*, 1993: 439).

Cyanea st.-johnii (Hosaka) Lammers, Givnish, & Sytsma

Rollandia st.-johnii Hosaka as treated by Lammers (1990: 484) is a synonym of *Cyanea st.-johnii* (Lammers *et al.*, 1993: 440).

Cyanea sessilifolia (O. Deg.) Lammers

Resurrected by Lammers (1998: 32) from synonymy of *Rollandia longiflora* Wawra (Lammers, 1990: 484) and transferred to the genus *Cyanea*.

Delissea lanaiensis (Rock) Lammers

A taxonomic change elevating *D. sinuata* subsp. *lanaiensis* (Rock) Lammers (Lammers, 1990: 471) to the specific level (Lammers, 1998: 34).

Caryophyllaceae

Schiedea globosa H. Mann

New island record

The following collection represents a first record of this widespread species on the island of Hawai'i. It was previously known from steep, north-facing rocky slopes or cliffs in coastal habitats, 0–300 m, southeastern O'ahu, the north and northwest coasts of Moloka'i, and the north coasts of East and West Maui (Wagner *et al.*, 1990: 512).

Material examined. **HAWAII:** Kohala Mountains, Waipi'o Valley, sea cliffs, E of valley along coast, one plant, 6 Dec 1995, *Perlman & Wood 15191* (PTBG, US).

Schiedea hawaiiensis Hillebr.

Resurrection

TYPE: HAWAIIAN ISLANDS. **HAWAII:** Waimea, *Lydgate s.n.* No original material located so we here designate a neotype. TYPE: HAWAIIAN ISLANDS. **HAWAII:** Pohakuloa Training Area, west side along MPRC access rd. at power pole #402, *Metrosideros* forest with *Zanthoxylum hawaiiense*, *Dodonaea*, and *Tetramolopium consanguineum*, 1,200 yr old pahoehoe lava, 1,640 m, 3 Dec 1996, *Gon & Tierney s.n.* (neotype, US 335666!, here designated).

This species was included in the synonymy of *Schiedea diffusa* by Wagner *et al.*, (1990: 511). The only collection, which was from near Waimea, Hawai'i, and deposited in Berlin, apparently was destroyed during World War II. Despite a few discrepancies between the descriptions of *S. diffusa* and *S. hawaiiensis*, notably the habit, leaf shape, inflorescence, and seed surface morphology, we included it with *S. diffusa*. As we had no material to examine, and as the only species of the genus known from the island of Hawai'i was *S. diffusa*, we assumed that Hillebrand's description was inaccurate. When Wagner and Weller examined the 1996 Pohakuloa Training Area collection, it was thought to represent a new island record for *S. pubescens* Hillebr., albeit a depauperate one. Seeds from this collection were grown in the University of California, Irvine, as part of the ongoing monographic, evolutionary, and ecological studies of *Alsinidendron* and *Schiedea* by A.K. Sakai, W.L. Wagner, and S.G. Weller. When the first few sets of leaves appeared, it was clear that the collection did not represent *S. pubescens*. The plants had narrower leaves and the habit was more erect. The plants also grew much more quickly to the flowering stage, unlike *S. pubescens* which typically grows vegetatively for a long period before flowering. When the plants flowered they fit Hillebrand's original description of *S. hawaiiensis* exactly. We here use the new collection as the neotype for the species. The following is an emended description based upon Hillebrand's description augmented by the results of the recent studies of the wild collection and its cultivated offspring.

Perennial herbs or subshrubs, pale yellowish green throughout or stems purple-tinged in lower portion of the plant (at least in cultivation); stems 3–7 dm long or perhaps longer, ascending to sprawling when longer, conspicuously compressed-quadrangular, the angles weakly winged, glabrous throughout, except sparsely puberulent at the base of the internodes of the inflorescence and on

the margins and adaxial surface of bracts and sepals. Leaves opposite, the blades thinly coriaceous, 4–5.8 cm long, 1.7–2.8 cm wide, ovate to elliptic-ovate, with only the midvein evident, the midvein slightly eccentric, purple on lower leaves, margin very slightly thickened, apex acuminate to acute, base acute to obtuse, petioles 0.5–0.7 cm long, the base often slightly flared at juncture with stem and the leaf pair slightly connate. Flowers perfect, in dichasia and upper lateral branches forming an open, panicle-like inflorescence 30–40 cm long, the branches 8–20 cm long, spreading, each branch with 5–12 flowers, sparsely puberulent with hairs 0.3–0.5 mm long at the base of the internodes of the inflorescence; bracts yellowish green, foliaceous, the lower ones foliaceous and nearly as large as the leaves, those in the upper part of the inflorescence and subtending the flower narrowly subulate, 3–5 mm long, ciliate and puberulent on the adaxial surface with hairs 0.1–0.2 mm long; pedicels 4–10 mm long at anthesis, elongating slightly in fruit, conspicuously asymmetrically flattened. Sepals 3–4 mm long, lanceolate, dull yellowish green, purple tinged, opaque, concave to shallowly navicular toward the apex, oriented at 90° to the pedicel at base, then abruptly curved upward at 130°–160° angle to the pedicel, often strongly inrolled late and post anthesis, abaxially smooth and rounded, glabrous, adaxially moderately puberulent with hairs 0.1–0.2 mm long, margins weakly scarios, ciliate, apex attenuate. Nectary base 0.7 mm long, broadened and flattened at base, dark yellow, the nectary shaft 1.8–2 mm long, apex deeply bifid. Stamens 10; filaments weakly dimorphic; anthers attached near the middle, subequal, yellow. Styles 3–4, the stigmatic area extending nearly the full length of the style. Capsules broadly ovoid, 3.5–4 mm long. Seeds 0.9–1 mm long, suborbicular, asymmetrical, compressed brown, margin tuberculate.

Flowers of greenhouse-grown plants of *S. hawaiiensis* often produce teratological forms such as styles arising from anthers, extra nectaries and stamens, completely divided nectary shafts, atypically formed nectaries, and an extra small ovary with a single style growing laterally from the base of the main ovary. These may reflect genetic abnormalities resulting from an extreme level of autogamy in the only known individual of this apparently outcrossing species.

Chenopodiaceae

***Salsola tragus* L.**

New island record

The following collection documents a new island record of this species from Kaho‘olawe. It previously was known only from near Waimea and the Pohakuloa Training Area on the island of Hawai‘i.

Material examined. **KAHO‘OLAWA:** S.E. quadrant, slightly south of Beck’s Cove, 243.8 m, 24 Apr 1989, *Aschmann s.n.* (BISH 634258, 634259); S.W. extremities of a hard pan area, 18 Apr 1990, *Aschmann s.n.* (BISH 634257).

Cyperaceae

***Carex inversa* R. Br.**

Shaw & Douglas (1995) recently reported the discovery of *Carex inversa* in the Pohakuloa Training Area on the island of Hawai‘i. They report the taxon as new to Hawai‘i and the United States. We have not seen the specimens.

Cyperus

Taxonomic change

The majority of recent botanists specializing in *Cyperus* and Cyperaceae no longer recognize the subgenera of *Cyperus*, except for *Kyllinga*, at the generic rank (Tucker, 1994). Strong & Wagner (1997: 39) elected to follow the broad circumscription of the genus to include the subgenus *Mariscus* in their discussions of the Hawaiian members of that subgenus; the 3 taxa listed below also must be included in this change in taxonomic concepts.

***Cyperus odoratus* L.**

Torulinium odoratum (L.) S.S. Hooper in Wagner *et al.* (1990: 1434) should now be considered in the genus *Cyperus* (Tucker, 1994: 180).

***Cyperus polystachyos* Rottb.**

Following the taxonomic treatment of Tucker (1994: 72), the sedge treated as *Pycreus polystachyos* (Rottb.) P. Beauv. by Wagner *et al.* (1990: 1425) should now be included in the genus *Cyperus*. Also the infraspecific taxa previously recognized do not seem to warrant recognition but rather represent genetic variation that occurs widely within this variable taxon.

Cyperus sanguinolentus* Vahl*Taxonomic change**

The genus *Cyperus* as recently circumscribed by specialists necessitates the inclusion of the species treated by Wagner *et al.* (1990: 1426) as *Pycreus sanguinolentus* (Vahl) Nees here.

Eriocaulaceae***Eriocaulon scariosum* Sm.****Identification**

An unidentified species of *Eriocaulon* (sp. A) was reported from the island of Hawai'i by Wagner *et al.* (1990: 1440). It has been identified as *Eriocaulon scariosum* by S. Phillips (pers. comm., 1998).

Euphorbiaceae***Aleurites moluccana* (L.) Willd.****Correction**

var. *katoi* O. Deg., I Deg. & B.C. Stone

Aleurites moluccana var. *katoi*, included in synonymy under *A. moluccana* by Wagner *et al.* (1990: 598) has an incorrect authority citation. The authors are O. Deg., I. Deg., & B.C. Stone.

***Chamaesyce eleanoriae* Lorence & W.L. Wagner**

Known only from the Nā Pali coast at elevations of 270–1100 m, northern Kaua'i (Lorence & Wagner, 1996: 68). It is the only Hawaiian species of the genus to consistently have white-glandular cyathial appendages. Apparently it is restricted to cliff habitats, steep ridge tops, and steep rocky slopes in wind-swept areas; it appears to be relatively rare and is vulnerable to decline if the impact of feral goats continues at the present pace.

***Phyllanthus distichus* Hook. & Arn.**

Govaerts & Radcliffe-Smith (1996: 176) made two new combinations in the native species of *Phyllanthus*: *P. distichus* var. *degeneri* (Sherff) Govaerts & Radcl.-Sm. and var. *ellipticus* (Muell. Arg.) Govaerts & Radcl.-Sm. We do not recognize these new combinations; they were published without a critical review of the taxonomy of this Hawaiian species.

Fabaceae***Desmodium heterophyllum* (Willd.) DC.****New island record**

The following collection documents a new island record for this naturalized legume. *Desmodium heterophyllum* was previously reported from the islands of Moloka'i and East Maui (Wagner & Herbst, 1995: 20).

Material examined. **HAWAII:** Hamakua District, Kapulena, common along cane road paralleling the Lower Hamakua Ditch, 1000 ft, 12 Jul 1996, *Herbst 9791* (BISH).

***Indigofera hendecaphylla* Jacq.**

Du Puy *et al.* (1993) concluded that *Indigofera spicata* Forssk., sensu lato, comprised two separate species: *I. spicata*, restricted to Africa, Yemen, Madagascar, and the Mascarenes; and *I. hendecaphylla*, which is widely distributed throughout the Old World tropics and subtropics to the Pacific Islands. Following the species concept of Du Puy *et al.*, the plant treated as *I. spicata* by Wagner *et al.* (1990: 675), is *I. hendecaphylla*.

***Kanaloa kahoowawensis* Lorence & K.R. Wood**

Known only from two plants on 'Ale'ale stack on the south coast of Kaho'olawe Island (Lorence & Wood, 1994: 137–45), this unique mimosoid legume apparently was relatively common, at least on leeward O'ahu, in the Pleistocene. Lorence & Wood believe the affinities of the Hawaiian endemic to be with the *Leucaena* and *Dichrostachys* groups of the Mimoseae tribe from which it differs in its tergitate leaves, monosperous fruits inertly dehiscent along two sutures with the valves separating into inner and outer envelopes, and large cordiform seeds. Hughes (1998) in a morphological phylogenetic analysis showed *Kanaloa* to be an isolated sister clade to one consisting of *Calliandropsis*, *Alantsilodendron*, *Dichrostachys*, *Gagnebina*, *Leucaena*, *Schleinitzia*, *Desmanthus*, and *Neptunia*. The two clades are in turn a sister clade to *Xylia* and *Parkia*.

***Pueraria montana* (Lour.) Merr. var. *lobata* (Willd.) Maesen & S.M. Almeida**

Following the taxonomy of Wiersema *et al.* (1990: 430), the plant treated by Wagner *et al.* (1990: 693) as *P. lobata* (Willd.) Ohwi is now considered a variety of *P. montana*.

Flacourtiaceae

***Xylosma hawaiiense* Seem.**

Govaerts & Radcliffe-Smith (1996: 175) published a new name, *Drypetes sherffii* Govaerts & Radcl.-Sm. to replace *D. forbesii* Sherff, a name previously used by Pax & Hoffmann. This new name was published without a critical review of names in the Hawaiian Euphorbiaceae. *Drypetes forbesii* is a later homonym for this species of Flacourtiaceae.

Geraniaceae

***Geranium hillebrandii* Aedo & Muñoz Garm.**

Aedo & Muñoz Garmendia (1997: 725) discovered that the binomial *Geranium humile* applied to a Hawaiian endemic species in the genus had previously been used by Cavanilles. This requires that a new epithet be selected for the Hawaiian taxon. The authors chose the new name to commemorate W. Hillebrand, who originally described *G. humile* and who authored the *Flora of the Hawaiian Islands*.

Gesneriaceae

***Cyrtandra munroi* H. St. John**

New island record

Cyrtandra imparis H. St. John

New synonymy

Cyrtandra acmule H. St. John

New synonymy

Cyrtandra imparis H. St. John, *Phytologia* 63: 489. 1987. **Syn. nov.** TYPE: HAWAIIAN ISLANDS. **MAUI:** West Maui, south branch of Makamaka'ole Stream, 1000 ft, 28 Nov 1950, *W. H.*

Hatheway 457 (BISH 520421!, HOLOTYPE;). Another sheet of *Hatheway 457* (BISH 520422), in which the inflorescence is at an earlier stage of maturation than the holotype, is annotated in pencil with an "A" directly after the collection number. St. John designated this sheet as an isotype of *C. imparis* and returned it to BISH with the holotype of that species. It was noted subsequently by Wagner that the missing type of *C. acmule* was the sheet St. John had so annotated and had designated as an isotype of *C. imparis*.

Cyrtandra acmule H. St. John, *Phytologia* 63: 487. 1987. **Syn. nov.** TYPE: HAWAIIAN ISLANDS. MAUI: West Maui, south branch of Makamaka'ole Stream, 1000 ft, 28 Nov 1950, *W. H. Hatheway 457A* (BISH 520422!, HOLOTYPE). Apparently St. John intended his epithet to be spelled "acmule." The letter "A" was appended in pencil directly after the collection number, apparently by St. John, to a second sheet of *Hatheway 457*, as discussed above.

The types of *Cyrtandra imparis*, *C. acmule*, and one additional collection represent previously unknown localities for *C. munroi* on West Maui, none of which were reported by Wagner *et al.* (1990: 1196). The West Maui specimens differ slightly from Lāna'i plants primarily in that the leaves are larger (up to 30 cm long and 13 cm wide) and less pubescent. *Cyrtandra munroi* is known from scattered collections in low elevation rain forest, probably about 910–920 m, on the west and east sides of Lāna'ihale above Waiopa'a, Lāna'i, from the south branch of Makamaka'ole Stream at about 300 m, and Kahana Valley.

Additional material examined. MAUI: West Maui, Makamaka'ole Gulch, 1200 ft, common in area, 11 Apr 1971, *Bishop et al. 047127* (BISH); Pu'u Kukui Watershed, S wall of Kahana Valley, on steep slope just below the ridge line, 695 m, 17 Jun 1997, *Oppenheimer 204* (US); Wailuku District; Makamaka'ole Gulch; east fork along pipeline trail; above Camp Maluhia, ca. 100 plants, 27 May 1992, *K. R. Wood et al. 1937* (PTBG).

***Cyrtandra biserrata* Hillebr.**

Cyrtandra higashinoi H. St. John

Cyrtandra ustulata H. St. John

Cyrtandra hemisphaerica H. St. John

New island record

New synonymy

New synonymy

New synonymy

Cyrtandra higashinoi H. St. John, *Phytologia* 63: 479. 1987. **Syn. nov.** TYPE: HAWAIIAN ISLANDS. MAUI: East Maui, Kahikinui, Manawainui, U.S. Fish & Wildlife Service Forest Bird Survey Transect 25, Station 19, 5960 ft, 20 Jun 1980, *P. K. Higashino & R. A. Holt 9226* (BISH 520519! and a portion in spirit collection, HOLOTYPE; BISH! 2 sheets, ISOTYPES).

Cyrtandra ustulata H. St. John, *Phytologia* 63: 483. 1987, non H. St. John, *Phytologia* 63: 493. 1987. **Syn. nov.** *Cyrtandra hemisphaerica* H. St. John, *Phytologia* 65: 200. 1988. **Syn. nov.** TYPE: HAWAIIAN ISLANDS. MAUI: East Maui, Kahikinui Forest Reserve, Wailaulau Gulch, 5350 ft, *A. C. Medeiros 234* (BISH 520719!, HOLOTYPE).

Additional specimen examined. MAUI: Kahikinui, Wailaulau drainage, common in remnant pockets of native vegetation on S slope, 4,000 ft, 12 Dec 1985, *Hobdy 2460* (BISH).

St. John described several new species of *Cyrtandra* in a series of papers cited by Wagner *et al.* (1990: 739); these publications have since been evaluated. Some, like the following, represent new distributional records. The types of two of these names, *C. ustulata* and *C. higashinoi*, and one additional collection represent a range extension of a Moloka'i species to Maui. The type of *C. ustulata* appears to represent a high elevation form of *C. biserrata* and differs from other collections of this species in its somewhat more coriaceous leaves and conspicuously smaller leaf serrations. The type locality for *C. higashinoi* is slightly more than 2 km east; this form of *C. biserrata* is morphologically very similar to the Moloka'i populations but has slightly smaller leaf serrations. A third collection of *C. biserrata*, also from the Wailaulau drainage area but at 1220 m, is similar

in that it also has only slightly smaller serrations than the Moloka'i populations. Further exploration of the East Maui locations is needed in order to evaluate the situation. *Cyrtandra biserrata* apparently is rare and local in montane rain forest, 760–1160 m. It presently is believed to be restricted to a small area of eastern Moloka'i including Wailau, Puko'o, and Mapulehu Valleys and Oloku'i; but also is known from three collections from East Maui, the Kahikinui Forest Reserve and Wailaulau and Manawainui Gulches.

Liliaceae

Hippeastrum striatum (Lam.) H.E. Moore **Misidentification**

The specimens in the Bishop Museum herbarium which were reported as *H. puniceum* (Lam.) Vahl by Wagner *et al.* (1990: 1463) were incorrectly identified. The museum specimens have been annotated *H. striatum* by Alan Meerow.

Loganiaceae

Labordia triflora Hillebr.

Labordia triflora was resurrected by Motley (1995: 221) based upon additional information obtained from a recently discovered small population of the species. Before its rediscovery, only the type was available for study, and it was surmised that that collection may have represented an anomalous specimen of *Labordia tinifolia* var. *lanaiensis* Sherff (Wagner *et al.*, 1990: 861).

Lythraceae

Ammannia coccinea Rottb.

Misidentification

Wagner *et al.* (1990: 865) included two species of *Ammannia* in their treatment of the genus in Hawai'i. *Ammannia auriculata* Willd. does not occur in Hawai'i; specimens formerly identified as that species were incorrectly identified specimens of *A. coccinea* (S. Graham, pers. comm., 1996).

Lythrum maritimum Kunth

Correction

This species was once considered to be indigenous to the Hawaiian Islands (Wagner *et al.*, 1990: 868). It is now believed to be an early introduction to the state (S. Graham, pers. comm., 1996).

Malvaceae

Hibiscadelphus woodii Lorence & W. L. Wagner

Known from a population of four trees on the rim of Kalalau Valley, north of Kahuama'a Flat, 1020 m, Kaua'i (Lorence & Wagner, 1995: 183), this highly endangered species differs from others in the genus by its glabrate leaves, except for rare stellate trichomes adaxially, and sparse stellate trichomes on the veins and in the principal vein axils abaxially; its stellate trichomes on the calyx, with rays free to the base; and its yellow corollas with a coppery tinge, rapidly becoming purplish maroon with age.

Hibiscus brackenridgei A. Gray subsp. *molokaiana* (Rock ex Caum) F.D. Wilson

Hibiscus brackenridgei subsp. *molokaiana* was resurrected from the synonymy of *H. brackenridgei* subsp. *brackenridgei* (Wagner *et al.*, 1990: 883) and raised from the varietal to subspecific rank (Wilson, 1993: 278).

Meliaceae***Toona ciliata* Roem.**

In their treatment of *Toona ciliata*, Wagner *et al.* (1990: 920) stated that the plants naturalized in Hawai'i could be referred to variety *australis* because of their glabrous leaflets. According to Edmonds (1995: 366), the species of this genus exhibit a wide range of genetic variation and many of the morphological features used by earlier workers, including leaf indumentum types and density, merely represent slight morphological variants and should not be formally recognized as taxa.

Myrtaceae

In their studies of the bloodwood eucalypts, Hill & Johnson (1995) completed extensive field observations on nearly all of the species throughout their natural range, analyzed new phylogenetic information, and re-evaluated previous cladistic studies in the *Eucalyptus*. Their studies led them to conclude that the bloodwoods should be maintained as a separate genus which they named *Corymbia*. The taxonomic changes concerning the species which have become naturalized in Hawaiian are as follows:

***Corymbia calophylla* (Lindl.) K.D. Hill & L.A.S. Johnson**

Eucalyptus calophylla R. Br. as treated in Chippendale (1990: 951) is now considered a synonym of *Corymbia calophylla* (Hill & Johnson, 1995: 249).

***Corymbia citriodora* (Hook.) K.D. Hill & L.A.S. Johnson**

Eucalyptus citriodora Hook. as treated by Chippendale (1990: 952) is a synonym of *Corymbia citriodora* (Hill & Johnson, 1995: 388).

***Corymbia ficifolia* (F. Muell.) K.D. Hill & L.A.S. Johnson**

Eucalyptus ficifolia F. Muell. as treated in Chippendale (1990: 953) is a synonym of *Corymbia ficifolia* (Hill & Johnson, 1995: 245).

***Corymbia gummifera* (Gaertn.) K.D. Hill & L.A.S. Johnson**

Eucalyptus gummifera (Gaertn.) Hochr. as treated by Chippendale (1990: 956) is a synonym of *Corymbia gummifera* (Hill & Johnson, 1995: 233).

Nyctaginaceae***Boerhavia acutifolia* (Choisy) J.W. Moore **Taxonomic change****

According to the late F.R. Fosberg (pers. comm., 1990), the species he treated as *B. glabrata* in Fosberg (1990: 978) is *B. acutifolia*. He had tentatively included *B. acutifolia* in his 1990 treatment as a synonym of *B. glabrata* without having seen the type of *B. glabrata*. After seeing the type at L he concluded that the two were distinct species.

Oleaceae***Olea europaea* L. subsp. *cuspidata* (Wall. ex G. Don) Ciferri**

Following the taxonomy reported by Green (1994: 328) and his annotations of specimens at BISH, the species treated by Wagner *et al.* (1990: 992) as *Olea europaea* L. subsp. *africana* (Mill.) P. Green is more correctly called *Olea europaea* subsp. *cuspidata*, an older name.

Orchidaceae***Habenaria rodeiensis* Barb. Rodr. **Identification****

A single collection of an orchid naturalized in a pasture in Kula, Maui (Wagner *et al.*, 1990: 1468), has been identified by E.A. Christenson as *H. rodeiensis*, a species native to South America.

Oxalidaceae***Oxalis debilis* Kunth**

The taxon treated as *Oxalis corymbosa* DC. by Wagner *et al.* (1990: 1002) is now considered a synonym of *Oxalis debilis* (Mabberley, 1997: 516).

Piperaceae***Peperomia blanda* Kunth var. *floribunda* (Miq.) H. Huber**

This widespread lowland species, long known in Hawai'i as *Peperomia leptostachya* Hook. & Arn. (Wagner *et al.*, 1990: 1029) was recently placed in synonymy by Huber (1987: 294) under *Peperomia blanda* var. *floribunda*. This new combination has also been taken up by Fosberg (1992: 181), Florence (1997: 173), and Welsh (1998: 214).

Poaceae***Bromus madritensis* L.****New naturalized record**

Included in a note by O'Connor (1990: 1505), *Bromus madritensis* is here treated as a naturalized species. The following collections document its presence on three islands of Hawai'i. It is native to Europe, the Mediterranean, and western Asian areas, but has been widely introduced elsewhere. Keys in Herbst & Clayton (1998) include the grasses, such as this species, that were mentioned but not accepted as naturalized by O'Connor (1990), and can be used for their identification.

Material examined. **MOLOKA'I:** Settlement Trail, 29 Mar 1915, *Forbes 650.Mo.*(BISH). **MAUI:** growing along roadside above Makawao, Apr 1979, *Hobdy 489* (BISH). **HAWAII:** in meadow south of Kilauea near Kipuka Nēnē, locally frequent, 2600 ft, 22 Mar 1945, *Fagerlund & Mitchell 1011* (BISH).

Bromus rubens* L.*New naturalized record**

This species also was included only in a note by O'Connor (1990: 1507), but we here accept it as a naturalized species. It also is native to Europe, the Mediterranean, and western Asian areas.

Material examined. **MOLOKA'I:** Mauna Loa, Pu'u Nana, occasional in pasture, 1300 ft, 16 Apr 1937, *Hosaka 1845* (BISH); Kala'e, rare in pasture, 1400 ft, 17 Apr 1937, *Hosaka 1853* (BISH). **HAWAII:** South Kohala, Waiki'i, 6000 ft, 16 May 1940, *Hosaka 2521* (BISH); Hawaii Volcanoes National Park, Kipuka Nēnē, 3000 ft, 15 Aug 1966, *Herbst 271* (BISH).

Chloris truncata* R. Br.*New naturalized record**

The presence of *Chloris truncata* in Hawai'i was mentioned in a note by O'Connor (1990: 1513). We believe that it should be considered as naturalized in Hawai'i. The following collections document it from O'ahu and Kaho'olawe; it also has been reported from Maui (Whitney *et al.*, 1939: 41). It is native to Australia.

Material examined. **O'AHU:** Punchbowl, 24 Mar 1904, *Smith s.n.* (BISH 118369); Honolulu, Fort Shafter, 23 Jun 1916, *Hitchcock 13849* (BISH); Grown by U.S. Experiment Station, n.d., *McClellan s.n.* (BISH 118367). **KAHO'OLAWA:** eastern central part of island, slope of Moa'ula, 1300 ft, 25 Apr 1980, *Cuddihy & Char 425* (BISH); eastern central part of island, slope of Moa'ula, 1300 ft, 25 Apr 1980, *Cuddihy & Char 430* (BISH).

Cynodon nlemfuensis* Vanderyst*New naturalized record**

Cynodon nlemfuensis was included as a note in O'Connor's treatment of the genus (1990: 1520) stating that it was an adventive at least on Moloka'i and Hawai'i. Although

not common, it should be considered as naturalized in Hawai'i. A key in Herbst & Clayton (1998: 22) can be used to assist in its identification. It is an African species.

Material examined. **MOLOKA'I:** Kaunakakai, near beach, 20 ft, 11 Nov 1974, *Herbst & Spence 5096* (BISH). **HAWAI'I:** Hawai'i, 29 Jan 1963, *Shipman s.n.* (BISH 118468).

***Digitaria horizontalis* Willd.**

New naturalized record

Digitaria horizontalis has been collected once on O'ahu, in an abandoned pineapple field where it was common. O'Connor (1990: 1530) reported the species from Lāna'i based upon a collection by Sakimura in 1944. This specimen could not be located. *Digitaria horizontalis* is native to tropical regions of North and South America.

Material examined. **O'AHU:** Waipi'o, forming extensive mats in abandoned pineapple fields, 650 ft, 8 Nov 1967, *Herbst 696* (BISH).

***Ehrharta calycina* Smith**

New state record

A collection made in 1997 is the second known collection of this species from Hawai'i, the first being from a trial grass plot at the Haleakalā Branch of the Hawaii Agricultural Experimental Station at Makawao, Maui (*Hosaka, 2444*). The collection is from a small, but definitely naturalized, population growing intermixed with the endemic *Eragrostis atropioides* and several naturalized grasses such as *Bromus catharticus* and *Pennisetum setaceum*. It is native to South Africa but has become naturalized in other parts of the world. A key, given below, can assist in differentiating the three species of *Ehrharta* naturalized in Hawai'i.

Material examined. **MAUI:** Haleakalā Branch Station, Makawao, 9 Apr 1939, *Hosaka 2444* (BISH). **HAWAI'I:** North Kona District, Pohakuloa Training Area, Pu'u Ke'eke'e, 5600 ft, growing with *Eragrostis atropioides* and several other species of naturalized grasses in a bowl on the western side of the cinder cone, 1 Dec 1997, *Herbst 9843* (BISH).

KEY TO THE SPECIES OF *EHRHARTA* IN THE HAWAIIAN ISLANDS:

1. Callus hairy, palea almost as long as the fertile lemma, finely 2-nerved, spikelets in narrow panicles or racemes *E. stipoides*
1. Callus without hairs, palea shorter than fertile lemma, 1-nerved, spikelets in open panicle or raceme (2)
- 2(1). Sterile lemmas with long hairs on sides, keel, or margin, acute or mucronate, spikelets 4–8 mm long *E. calycina*
2. Sterile lemmas glabrous or strongly scabrous, occasionally with tuft of hair at the base, awnless, spikelets 3–5 mm long *E. erecta*

***Eragrostis ciliaris* (L.) R. Br.**

New naturalized record

Based upon the specimens examined below, *Eragrostis ciliaris* (O'Connor, 1990: 1537) should be considered a naturalized species in Hawai'i. It is widespread in tropical parts of the world.

Material examined. **O'AHU:** Barbers Point, roadside weed in limestone quarry, 5 ft, 9 Jun 1976, *Herbst 5872* (BISH); Kahaka'aulana I, Ke'ehi Lagoon, 30 Apr 1978, *Herbst & Walker 6090* (BISH).

***Eragrostis unioloides* (Retz.) Nees ex Steud.**

New naturalized record

Mentioned by O'Connor (1990: 1538) as an adventive on Hawai'i Island, *Eragrostis unioloides* is here considered a naturalized species. It is native to tropical Asia.

Material examined. **HAWAI'I:** Pepe'ekeo, along plantation road next to Kawainui Gulch, 14 May 1958, *Kawasaki, s.n.* (BISH 118925); Kaumana Substation, disturbed vegetation on 1881 lava

flow, 320 m, 16 Nov 1982, *Wagner & Stemmermann 4634* (BISH); Hilo Airport, 11 Nov 1986, *Stemmermann 7128* (BISH); Puna District, along highway southeast of Lava Tree State Monument ca. 1 mile past junction of road to Kapoho, 200 m, 13 Mar 1988, *Wagner et al. 5969* (BISH).

***Glyceria fluitans* (L.) R. Br.**

New naturalized record

Three collections have been made of this species: one on East Maui in 1916, and two on Hawai'i in 1951 and 1953; the present status of the species in the Hawaiian islands is unknown. Though not treated as such by O'Connor (1990: 1482), it appears to have been at least sparingly naturalized on two islands.

Material examined. **MAUI:** East Maui, Haleakalā crater, open bog in crater, 6000–10000 ft, 2–5 Oct 1916, *Hitchcock 14996* (US). **HAWAI'I:** North Kohala, Kahua, rare in moist pasture, 3700 ft, 15 Aug 1951, *Hosaka 3646* (US); same locality, 9 Jun 1953, *Hosaka 3694* (US).

***Hackelochloa granularis* (L.) Kuntze**

New naturalized record

A single collection of this species was made in 1941, on the island of Hawai'i (O'Connor (1990: 1483). Though not treated as such by O'Connor (1990), the collection appears to represent a naturalized population of this pantropical species. Its present status is unknown.

Material examined. **HAWAI'I:** Wai'ohinu, Ka'ū, in pasture, rare, 22 Aug 1941, *Hayselden s.n.* (US).

***Hordeum vulgare* L.**

New naturalized record

Although there may be some question as to whether this species should be considered an escape, as O'Connor (1990: 1552) reported it, because it usually is cultivated and is short-lived outside of cultivation. We have included it here as a naturalized species. This is the cultivated barley of temperate areas.

Material examined. **KAUA'I:** Kumuwela Ridge, Waimea Canyon, dry open slope, 1100 ft, 28 Dec 1935, *V.O. Fosberg 17* (BISH). **O'AHU:** Waimānalo, edge of cane field, 100 ft, 24 Mar 1927, *Leehman 306* (BISH); Wai'anae Mountains, Mokule'ia, Peacock Flats, Piko Trail, dry, open brushy country, 460 m, 4 Dec 1936, *Fosberg 13047* (BISH). **MAUI:** East Maui, 'Ulupalakua, occasional in open pasture, 8 Apr 1937, *Hosaka 1785* (BISH); East Maui, Waiakoa, Dr. C.M. Cooke's place, rare, 2800 ft, 13 Apr 1937, *Hosaka 1826* (BISH). **HAWAI'I:** Parker Ranch, Pu'u Papapa, volunteer in plowed field, 3000 ft, 16 June 1932, *Ewart 252* (BISH); South Kohala, Waiki'i, abundant in pasture, 4000 ft, 7 Sep 1936, *Hosaka 1583* (BISH); Volcano, end of 'I'iwi Road, Kokubon farm, planted as green manure, 4000 ft, 7 May 1984, *Higashino 10330* (BISH).

***Ixophorus unisetus* (K. Presl) Schltdl.**

The following collections document the presence of *Ixophorus unisetus* on three islands in Hawai'i. It appears that the species was first grown in experimental plots at the agricultural experimental station in Honolulu, and later grown experimentally in test fields or pastures on Kaua'i and Lāna'i; the Mānoa specimens may represent collections of a sparingly naturalized species. The present status of this species is unknown, but, as grasses are not well collected in Hawai'i, there remains the possibility that it may still be extant on one or more of the islands on which it once grew. It is included here, along with several other poorly known grasses, to alert the botanical community; and to call attention to the note concerning it in O'Connor (1990: 1483). The species is native to Mexico.

Material examined. **KAUA'I:** Kekaha, Field J, 5 Sep 1941, *Caum s.n.*, (BISH 119543, 119544). **O'AHU:** Honolulu, experimental station, 19 Sep 1927, *Cooke 7* (BISH); Honolulu, King Street, campus of Kamehameha Schools, cult. for forage, 26 Jan 1928, *Brown 1471* (BISH); Honolulu, Mānoa

Valley, 27 Dec 1942, *Krauss s.n.* (BISH 119548); Honolulu, Mānoa Valley, 11 Jan 1943, *Krauss 7* (BISH). **LĀNA'I**: Ko'ēle, introduced grass, seed from experimental station, Honolulu, no date, *no name 708* (BISH 119542); seed furnished by U.S. Experimental Station, no date, *Munro 532* (BISH).

***Lolium temulentum* L.**

New naturalized record

Although there are no recent collections of this species in the Bishop Museum herbarium and its present status is unknown, we have included it here as naturalized in Hawai'i. This will serve to call attention to the species as it very likely is still extant as a pasture grass in Hawai'i. It is native to the Mediterranean and SW Asia. The following key will aid in distinguishing the species of the genus present in Hawai'i.

KEY TO THE SPECIES OF *LOLIUM* IN THE HAWAIIAN ISLANDS:

1. Upper glume reaching or exceeding the uppermost lemma; florets elliptic to ovate, turgid *L. temulentum*
1. Upper glume much shorter than the rest of the spikelet; florets oblong or lanceolate-oblong, not turgid (2).
- 2(1). Lemma awned; annual *L. multiflorum*
2. Lemma awnless; perennial *L. perenne*

Material examined. **O'AHU**: without locality, Apr 1925, *Lee 276* (BISH); Wai'ālae, Hind Clarke Dairy, sea level, 17 May 1926, *Haddon 289* (BISH); Nanakuli, at top of cliffs near Nanakuli, 16 Feb 1936, *Whitney 4053* (BISH). (Two other sheets are in the Bishop Museum, one with no label information; the other by an unknown collector in 1913 on either Maui or Hawai'i Island.)

***Paspalum distichum* L.**

New state record

This species is very similar to *P. vaginatum* Sw. and is considered by some as conspecific with it. In this treatment, *P. distichum* is considered a distinct species. It is widespread throughout the subtropics.

Material examined. **KAUA'I**: U.S. Fish & Wildlife Reservation, Hanalei Valley, in and around taro patches, 10 ft, 18 Jul 1977, *Herbst 5954* (BISH). **O'AHU**: Mokule'ia, 16 Sep 1936, *Dillingham, s.n.* (BISH 120043, 120044). An additional collection from Maui made by C. Imada in 1998 is reported elsewhere in this year's *HBS Records*.

***Paspalum paniculatum* L.**

New naturalized record

O'Connor (1990: 1575) treated this and the previous taxon as adventives, but we believe that it is common enough to be considered a naturalized species in Hawai'i. It is native to South America.

Material examined. **O'AHU**: Hakipu'u, Ko'olaupoko, single plant in grass garden, 9 Feb 1939, *Ripperton & Lyman s.n.* (BISH 448985). **HAWAI'I**: Ka'u District, Ka'u Forest Reserve, Kiolaka'a Ranger Station below Kiolaka'a Kea'a Homestead Addition, 1950 ft, 13 Aug 1980, *Cuddihy & Davis 527* (BISH); Hilo, Veterans Cemetery, occasional in vacant field adjacent to cemetery, 53 m, 23 July 1996, *Nagata 4432* (BISH).

***Phalaris minor* Retz.**

New naturalized record

O'Connor (1990: 1483) reports that *Phalaris minor* has been recorded as an escape on three islands: O'ahu, Moloka'i, and Hawai'i. We believe that it should be treated as a naturalized species. It is native to the Mediterranean and SW Asian areas but has been

widely introduced to other parts of the world.

Material examined. **O‘AHU:** Schofield Barracks, weed on edge of a sugar cane field, 30 Jun 1916, *Hitchcock 13915* (BISH). **MOLOKA‘I:** Mauna Loa, May 1903, *Munro 126* (BISH). **HAWAI‘I:** Mauna Loa Truck Trail, near horse corral at end of trail, probably introduced in horse feed, 6600 ft, May 1939, *Olson s.n.* (BISH 120196); Ka‘ohe, Pohakuloa State Park, in pens at bird propagation facility, apparently brought in with bird feed, 6500 ft, 7 Jul 1977, *Herbst 5945* (BISH).

***Phleum pratense* L.**

New naturalized record

Phleum pratense was treated as an escape by O‘Connor (1990: 1483). We accept it here as a naturalized species in Hawai‘i. It is native to the temperate Old World.

Material examined. **KAUA‘I:** Waimea Drainage Basin, west side, Waineke paddock, 3 Jul– 18 Aug 1917, *Forbes 1019.K* (BISH). **O‘AHU:** Wai‘anae Mountains, Mt. Ka‘ala summit, occasional in disturbed places near Army installations, 4000 ft, 10 Sep 1950, *Hatheway et al. 338* (BISH). **MAUI:** Makawao, Hawaiian Agricultural Experiment Station, branch station, in grass garden, 2100 ft, *Hosaka 2597* (BISH).

***Rhytidosperma pilosum* (R. Br.) Connor & Edgar** **New island record**

In the earlier literature concerning the Hawaiian flora, this species was listed as *Danthonia pilosa* R. Br. (e.g., O‘Connor, 1990: 1522). A later paper (Herbst & Clayton, 1998: 34) calls attention to the fact that Connor and Edgar had transferred this taxon to a new genus, and that a more current name for the species was *Rhytidosperma pilosum* (R. Br.) Connor & Edgar. Originally the grass was known only from the island of Hawai‘i; the following collection documents its occurrence on the island of Maui, a range extension for the species.

Material examined. **MAUI:** [East Maui], Haleakalā Crater, base of Crystal Cave, 7200 ft, on open cinder slope with *Deschampsia*, *Styphelia*, *Sophora*, 25 Jun 1998, *Haus s.n.* (BISH); Haleakalā nursery, volunteer, 13 Sep 1938, *no name s.n.* (BISH 448988).

Polygonaceae

The genus *Polygonum* has presented taxonomic problems since its establishment by Linnaeus in 1753. In the ensuing years, several authors have attempted to divide the genus into more natural units, the most recent being Louis-Philippe Ronse Decraene who chose to investigate the floral morphology of the genus as a research topic for his Master of Science degree in plant taxonomy. His data supports the division of *Polygonum* into two tribes containing ten genera, a classification that is gaining wide acceptance. Following the taxonomy of Ronse Decraene & Akeroyd (1988), the Hawaiian species of *Polygonum* (Wagner *et al.*, 1990: 1060–1064) are treated in 3 distinct genera; the taxonomic changes required to bring the *Manual* into compliance with their classification scheme are listed below:

***Persicaria capitata* (Buch.-Ham. ex D. Don)** **Taxonomic change**

Masamune

Polygonum capitatum F. Ham. (Wagner *et al.*, 1990: 1063) is now considered a synonym of *Persicaria capitata* (Ronse Decraene & Akeroyd, 1988: 367).

***Persicaria chinensis* (L.) Nakai** **Taxonomic change**

Polygonum chinense L. (Wagner *et al.*, 1990: 1063) is now considered a synonym of *Persicaria chinensis* (Ronse Decraene & Akeroyd, 1988: 367).

***Fallopia convolvulus* (L.) A. Love** **Taxonomic change**

Polygonum convolvulus L. (Wagner *et al.*, 1990: 1063) is now considered a synonym

of *Fallopia convolvulus* (Ronse Decraene & Akeroyd, 1988: 369).

***Persicaria glabra* (Willd.) Gomez de la Maza Taxonomic change**

Polygonum glabrum Willd. (Wagner *et al.*, 1990: 1064) is now considered a synonym of *Persicaria glabra* (Wilson 1990: 632).

***Persicaria punctata* (Elliot) Small Taxonomic change**

Polygonum punctatum Elliot (Wagner *et al.*, 1990: 1064) is now considered a synonym of *Persicaria punctata*.

Potamogetonaceae

***Stuckenia pectinata* (L.) C. Borner**

In a previous publication, Herbst (1997: 4) reported that Les & Haynes (1996) had elevated *Potamogeton* subg. *Coleogeton* to generic status and had made a new combination for one of the species of *Potamogeton* treated by Wagner *et al.* (1990: 1608), *Coleogeton pectinatus* (L.) Les & Haynes. Shortly after the article appeared, it was discovered that Borner had provided an earlier generic name *Stuckenia*, rendering the generic name *Coleogeton* superfluous. *Stuckenia pectinata* is the correct name for this species (Haynes *et al.*, 1998: 241).

Primulaceae

***Lysimachia daphnoides* (A. Gray) Hillebr.**

In their revision of the Hawaiian species of *Lysimachia*, Marr & Bohm (1997: 272) recognize St. John's *L. kahiliensis* as a valid species. As the species is based on a single, incomplete specimen collected in 1909, we take a conservative stance and believe it best that it be considered conspecific with *L. daphnoides* (Wagner *et al.*, 1990: 1080), which it closely resembles, at least until additional material is available for study.

***Lysimachia hillebrandii* J.D. Hook. ex A. Gray**

In their revision, Marr & Bohm (1997) recognize 3 of St. John's species that we believe fall within the variable *L. hillebrandii* complex (Wagner *et al.*, 1990: 1081). The species are: *Lysimachia haupuensis* H. St. John, *L. ovoidea* H. St. John, and *L. waianaensis* H. St. John (Marr & Bohm, 1997: 268, 274, and 284, respectively). Subspecific status may prove to be appropriate for some of these entities upon further analyses of the overall variation pattern.

***Lysimachia iniki* Marr**

Known only from the "Blue Hole" at the headwaters of the north fork of the Wailua River, 720 m in elevation, Kaua'i. Approximately 25 plants from two populations are known, growing on rocky or mossy wet cliffs (Marr & Bohm, 1997: 270).

***Lysimachia pendens* Marr**

Like the previous species, known only from the wet mossy or rocky cliffs of the "Blue Hole" where it is rare (Marr & Bohm, 1997: 275). Material of this species was included by Wagner *et al.* (1990: 1080) in *L. filifolia* C.N. Forbes.

***Lysimachia scopulensis* Marr**

A member of the Diverse Lowland Mesic Forest vegetation association growing on the steep cliffs of upper Kalalau Valley, 780–880 m in elevation, Kaua'i (Marr & Bohm, 1997: 282).

***Lysimachia remyi* Hillebr.**

Marr & Bohm (1997: 275) newly delimit the species and subdivide it into 4 subspecies. At present, we maintain our broad delimitation of the species (Wagner *et al.*, 1990: 1083) and do not recognize the new subspecies, which do not seem to represent natural groupings.

Rhizophoraceae***Bruguiera sexangula* (Lour.) Poir.****Misidentification**

Specimens of the O'ahu population of *Bruguiera* collected by personnel of the U.S. Forest Service Institution of Pacific Islands Forestry in October 1997 were sent to Norman C. Duke of Mangrove Research, Australia, for verification (J.A. Allen, pers. comm., 1997). Dr. Duke determined that the taxon previously called *B. gymnorrhiza* (L.) Lam. by Hawaiian botanists (Wagner *et al.*, 1990: 1099) was based upon incorrectly identified specimens of *B. sexangula*. *Bruguiera sexangula* is characterized by petals with obtuse tips that either lack or have 2 relatively short bristles at their tips. In contrast, *B. gymnorrhiza* has petals with acute tips, each extended into three filamentous appendages (J.A. Allen *et al.*, unpubl.). The Hawaiian populations had earlier been correctly identified by Degener (1934) in his *Flora Hawaiiensis*, and Ding Hou (1958: 464) in his treatment of Rhizophoraceae of the Malesian Region.

Rubiaceae***Psydrax odorata* (G. Forster) A.C. Sm. & S.P. Darwin**

In a note under the genus *Canthium*, Wagner *et al.* (1990: 1119) stated that recent studies indicated that the Hawaiian indigenous species, *Canthium odoratum* (G. Forster) Seem., would more correctly be placed in the genus *Psydrax*. The combination was not available when the *Manual* went to press. The new combination has since been published (Smith & Darwin, 1988: 230) and should now be adopted.

***Coprosma granadensis* (L.f.) Heads**

Noting that no character or combination of characters has been found which separate the genera *Coprosma* and *Nertera*, Heads (1996) has reduced *Nertera* to a section of *Coprosma*, subgenus *Coprosma*. Following this taxonomic concept, *Nertera granadensis* (L.f.) Druce (Wagner *et al.*, 1990: 1158) is now *Coprosma granadensis* (L.f.) Heads (Heads, 1996: 388).

***Hedyotis flynnii* W.L. Wagner & Lorence**

Known only from northern and northwestern Kaua'i, in valleys along the Nā Pali coast from Limahuli to Kawai'ula, 450–1100 m; most of the collections have been made in Kalalau Valley. The species is usually restricted to north and northeast-facing cliffs and steep, narrow ridge crests and outcrops. It generally occurs in windswept areas in small populations of 30 to 50 or more scattered plants (Wagner & Lorence, 1998: 311).

***Hedyotis schlechtendahlia* subsp. *waimeae* (Wawra) W.L. Wagner & Lorence**

Wagner *et al.* (1990: 1150) included this taxon in synonymy of *H. schlechtendahlia* Steud. var. *schlechtendahlia* (as *H. glaucifolia* (A. Gray) Fosberg var. *waimeae* (Wawra) Fosberg). Wagner & Lorence (1998: 316) reassessed the taxon and proposed that it should be accepted as a valid subspecies of *H. schlechtendahlia*.

Hedyotis schlectendahliana subsp. *remyi* (Hillebr.) Fosberg

As part of the reevaluation by Wagner & Lorence (1998), *Hedyotis schlectendahliana* var. *remyi* (Hillebr.) Fosberg was restored to subspecific status.

Rutaceae

Melicope munroi (H. St. John)

New island record

T.G. Hartley & B.C. Stone

The following collection extends the range of this Lānaʻi species to eastern Molokaʻi. It was determined by Rock as *Pelea molokaiensis* Hillebr. and redetermined in 1989 but not reported by Stone *et al.* (1990: 1196).

Material examined. MOLOKAʻI: above Kamolo, April 1910, *Rock 10222* (BISH).

Melicope sessilis (H. Lév.) T.G. Hartley (ined.) **Taxonomic change**

In their treatment of the genus *Pelea* (now *Melicope*) Stone *et al.* (1990: 1199) placed *P. sessilis* in synonymy under *P. parvifolia* Hillebr. Hartley (in press) has transferred it to the genus *Melicope* as the earliest name for this species. Earlier Hartley & Stone (1989: 121) provided a new name, *M. mauii* T.G. Hartley & B.C. Stone, for *P. parvifolia* Hillebr. as the epithet had already been used in *Melicope*. However, they did not realize then that if *P. sessilis* H. Lév. is placed in the synonym of this species, the correct final epithet is *sessilis* as it is the oldest available name. For nomenclatural purposes this combination is not accepted as being made here; it will be published by T.G. Hartley in a forthcoming monograph of the non-Hawaiian members of the genus.

Verbenaceae

Stachytarpheta australis Moldenke

Taxonomic change

The description of the plant treated by Wagner *et al.* (1990: 1321) as *S. dichotoma* (Ruiz & Pav.) Vahl is actually that of *Stachytarpheta australis*, a species with which it had often been confused in the past. The type of *S. dichotoma* is the same taxon as *S. cayennensis* and has been placed in synonymy with that species.

Stachytarpheta cayennensis (Rich.) Vahl

In his revision of the genus *Stachytarpheta* in Australia, Munir (1992: 145) considers *S. cayennensis*, *S. dichotoma*, and *S. urticaefolia* as conspecific, retaining *S. cayennensis* as the oldest valid name and placing the other two in synonymy.

Viscaceae

Korthalsella Tiegh.

Note

In a synopsis of the genus *Korthalsella*, Molvray (1997) proposed many sweeping taxonomic changes, some of which concern the Hawaiian members of this genus. Her delineation of the taxa is based upon her morphological and anatomical evaluations as well as the molecular evidence. The proposed changes are listed below. We believe that these changes should be further evaluated before they are adopted.

Korthalsella complanata (Tiegh.) Engl.: included by Molvray in the broadly delimited and widespread *K. taenioides* (Commerson ex DC.) Engl. forma *taenioides*.

Korthalsella cylindrica (Tiegh.) Engl.: Molvray accepted this taxon at the specific level, but extended its distributional range to include Tahiti.

Korthalsella degeneri Danser: placed in synonymy under *K. taenioides* (Commerson ex DC.) Engl. forma *horneana* (Tiegh.) Molvray.

Korthalsella latissima (Tiegh.) Danser: placed in *K. taenioides* (Commerson ex DC.) Engl. forma *pendula* (Wawra) Molvray, a taxon native to Australia and the Hawaiian Islands.

Korthalsella platycaula (Tiegh.) Engl.: placed along with *K. complanata* in *K. taenioides* (Commerson ex DC.) Engl. forma *taenioides*.

Korthalsella remyana Tiegh.: Molvray proposed a change in status for this taxon, as a form of the widespread *K. taenioides* (*K. taenioides* (Commerson ex DC.) Engl. forma *remyana* (Tiegh.) Molvray), and extended its distributional range to include Tahiti.

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