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New Hawaiian plant records from Maui County for 2008

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Ongoing field work, collections, and research continue to produce new, previously unpublished distributional records for the Hawaiian flora. In this paper, 2 new naturalized records, 25 new island records, and a single range extension are reported. A total of 28 taxa in 23 plant families are discussed. Three species are pteridophytes, 22 are dicotyledonous angiosperms, and 3 are monocots. Four of the taxa are native species. Information regarding the formerly known distribution of flowering plants is based on the *Manual of Flowering Plants of Hawai‘i* (Wagner *et al*. 1999) and information subsequently published in the *Records of the Hawaii Biological Survey*. Distribution and taxonomy of ferns follows *Hawai‘i’s Ferns and Fern Allies* (Palmer 2003).

Voucher specimens are deposited at Bishop Museum's *Herbarium Pacificum* (BISH), Honolulu, with duplicates at the National Tropical Botanical Garden (PTBG), Lāwa‘i, Kaua‘i. A few specimens may be at only one facility; only in these cases is the herbarium acronym cited.

Aizoaceae

Tetragonia tetragonioides (Pall.) Kuntze **New island record**

This succulent annual herb has been documented from Midway Atoll, Nihoa, Kaua‘i, O‘ahu, Moloka‘i, Maui, and Hawai‘i (Wagner *et al.* 1999: 178; Oppenheimer *et al*. 1999: 7; Starr & Martz 2000: 10; Starr *et al*. 2003: 23, 2006: 31). On Lāna‘i it was found in scattered upland sites in waste areas with other weeds.

Material examined. **LĀNA‘I**: Lāna‘i City, S of Iwi‘ole Gulch, naturalized in waste areas, 495 m, 27 May 2008, *Oppenheimer H50805*.

Asclepiadaceae

Stapelia gigantea N.E. Br. **Range extension**

A small, erect succulent that escapes cultivation into dry, rocky areas on O‘ahu, Moloka‘i, and West Maui (Wagner *et al*. 1999: 241; Oppenheimer *et al*. 1999: 7; Wysong *et al*. 2007: 2–3), Zulu-giant was found on leeward East Maui on open ‘a‘ā flows in degraded remnant dry forest.

Material examined. **MAUI**: East Maui, Palauea ahupua‘a, 207 m, 17 Jun 2008, *Oppenheimer & D. Crow H60804.*

Asteraceae

Heterotheca grandiflora Nutt. **New island record**

Probably on all of the main islands but not documented from Ni‘ihau and Moloka‘i (Wagner *et al*. 1999: 326), *H. grandiflora* was found on Moloka‘i in a feral goat-ravaged area with very sparse vegetation. It may be unpalatable to these animals.

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Material examined. **MOLOKA'I**: East Kawela, 490 m, 17 Sep 2008, *Oppenheimer & R. Kallstrom H90808.*

Boraginaceae

Cynoglossum amabile Stapf. & J.R. Drumm. **New island record**

In Hawai'i, this biennial herb is naturalized and locally common in grassland and pastures on Hawai'i (Wagner *et al.* 1999: 394) and is now known from Maui as well.

Material examined. **MAUI**: East Maui, Makawao Distr, 'Ulupalakua, 585 m, 28 Jan 2007, *Oppenheimer H10717.*

Brassicaceae

Lepidium virginicum L. **New island record**

Naturalized in disturbed sites from sea level to 2,500m on Kure Atoll (Starr *et al.* 2003: 26), Midway Atoll, O'ahu, Moloka'i, Maui, and Hawai'i (Wagner *et al*. 1999: 409), this peppergrass was later reported from Kaua'i (Lorence *et al*. 1995: 27). It was recently found growing on Lāna'i, also in disturbed areas.

Material examined. **LĀNA'I**: Keōmuku Rd, annual herbs in remnant shrubland, 250 m, 9 Jan 2008, *Oppenheimer H10808* (BISH); Lāna'i Airport, weed in waste area near unpaved parking, 390 m, 25 Mar 2008, *Oppenheimer H30808*.

Caricaceae

Carica papaya L. **New island record**

An early introduction to Hawai'i and extensively cultivated for the edible fruit, papaya has been reported as sparingly naturalized on Kaua'i, Moloka'i, Maui, and Hawai'i (Wagner *et al*. 1999: 497-98; Oppenheimer & Bartlett 2000: 3). On Lāna'i it was found randomly scattered along a gulch bottom.

Material examined. **LĀNA'I**: Maunalei Gulch, naturalized along gulch bottom in *Aleurites* forest, 400 m, 29 May 2008, *Oppenheimer & Perlman H50811*.

Caryophyllaceae

Stellaria media (L.) Vill. **New island record**

A weedy herb documented from Kure Atoll, Kaua'i, O'ahu, Lāna'i, Maui, and Hawai'i (Wagner *et al.* 1999: 528), and more recently from Midway Atoll (Starr *et al.* 2003: 26), this chickweed was recently found on Moloka'i.

Material examined. **MOLOKA'I**: Waihānau Stream, locally common in disturbed *Metrosideros/Dicranopteris* forest, in shady intermittent stream bed, among rocks with other weeds such as *Psidium, Fraxinus*, *Rubus, Solanum, Erigeron,* 915 m, 25 Sep 2008, *Oppenheimer H90813.*

Convolvulaceae

Dichondra micrantha Urb. **New island record**

Recently reported as a naturalized element of the Hawaiian flora on O'ahu and Maui (Oppenheimer & Bartlett 2002: 6), this low-growing herb is now known from Lāna'i as well.

Material examined. **LĀNA'I**: Lāna'i City, N of Iwi'ole Gulch, naturalized creeping herbs in muddy drainage in grassy area near pasture with other weeds, 505 m, 30 May 2008, *Oppenheimer H50818.*

Cyperaceae

Carex longii Mack. **New island record**

Naturalized on East Maui and Hawai‘i (Strong & Wagner 1997: 37–39), this sedge was collected in a disturbed, wet area on Moloka‘i.

Material examined. **MOLOKA‘I**: upper S fork of Kaunakakai Gulch, W of Hanalilolilo, along Forestry Rd near second culvert, occasional herb in wet, muddy unpaved roadside with other weedy taxa such as *Kyllinga, Conyza, Persicaria, Lotus, Paspalum, Hedychium*, 1090 m, 26 Sep 2008, *Oppenheimer H90823*.

Elaphoglossaceae

Elaphoglossum paleaceum (Hook. & Grev.) Sledge **New island record**

Of the 9 native species of *Elaphoglossum*, this is the only taxon with a distribution outside the Hawaiian Islands. It was reported from all the main islands [excluding Ni‘ihau and Kaho‘olawe] except Lāna‘i at 875–2075 m elevation (Palmer 2003: 158).

Material examined. **LĀNA‘I**: Kūnoa Gulch, rare, growing at base of rough-barked *Leptospermum* tree on stream bank, 845 m, 26 Mar 2008, *Oppenheimer & Perlman H30811*.

Euphorbiaceae

Antidesma pulvinatum Hillebr. **New island record**

Occasional in dry to mesic forest on O‘ahu, Moloka‘i, Maui, and Hawai‘i (Wagner *et al*. 1999: 601), this endemic tree is locally common at the head of Maunalei Gulch on Lāna‘i, where the upper drainages of Waialala and Kūnoa Gulches plunge and join the main stream corridor. Besides a small stand of *Pittosporum confertiflorum*, it was the only native tree species observed in this area.

Material examined. **LĀNA‘I**: Maunalei Gulch, locally common trees to 9 m tall, with yellow-tan fissured bark, 440 m, 29 May 2008, *Oppenheimer & Perlman H50813*.

Fabaceae

Acacia melanoxylon R. Br. ex Aiton **New island record**

In the generic notes for *Acacia* Mill. (Wagner *et. al*. 1999: 640), it was reported that this species had been planted on Kaua‘i, O‘ahu, Moloka‘i, and Maui, and was definitely naturalized on East Maui. Later it was documented from Kaua‘i (Lorence *et al.* 1995: 36). On Moloka‘i it is naturalized in several areas of Moloka‘i Forest Reserve. It spreads via root suckers and also seed, although the production of viable seed in Hawai‘i has been a matter of debate. Pat Bily (pers. comm.) has germinated seeds collected on East Maui. This is a polymorphic species in Australia, and several forms have been introduced to Hawai‘i. Recently, localized control was initiated by the Division of Forestry and Wildlife, The Nature Conservancy, and Moloka‘i Invasive Species Committee staff.

Material examined. **MOLOKA‘I**: NE of Pu‘u Makali‘ili‘i, 1010 m, 16 Jan 2008, *Oppenheimer H10810;* Kikiakalā, headwaters of Waihānau Stream, 940 m, 17 Jan 2008, *Oppenheimer H10812*.

Desmodium barbatum (L.) Benth. & Oerst. **New state record**

This species has not been previously reported from Hawai‘i. It is a prostrate, mat-forming species and the inflorescence is conspicuously long-pilose, with purple-lavender corollas. It is widespread from Africa to tropical America, the Indian subcontinent, and elsewhere, with several varieties named. It may have been introduced intentionally as a forage

legume, as it seems so far to be restricted to pastures and adjacent areas on the east end of Molokaʻi, where it grows with *D. incanum* and *D. triflorum*.

Material examined. **MOLOKAʻI**: Moakea, S side of Pāpio Gulch, naturalized in pastures and waste areas, flowers purple, 295 m, 7 Nov 2007, *Oppenheimer H110716* (BISH, MEXU, PTBG); Hālawa Valley, Pōʻala, locally common, prostrate, in open areas along unpaved contour road on S side of valley, 310 m, 22 Jul 2008, *Oppenheimer, Duvall, Penniman & Holmes H70804*.

Gesneriaceae

Cyrtandra macrocalyx Hillebr. **New island record**

Rarely collected and known from along streams and gulches in mesic to wet forest on Molokaʻi (Wagner *et al.* 1999: 769), this understory shrub was collected in similar habitat on the windward slope of Haleakalā, East Maui. Wagner *et al.* (1999b: 35) listed the species as occurring in ʻĪao Valley, West Maui as well, apparently based on Hobdy's specimen, cited below, which was the type of *C. iaoensis* St. John, now reduced to synonymy.

Material examined. **MAUI**: West Maui, ʻĪao Valley, Nākalaloa Stream, ubiquitous in forest understory, 762 m (2500 ft), 16 Oct 1980, *R.W. Hobdy 912* (BISH); East Maui, Hāna Distr., western tributary headwaters of Waiokamilo Stream, occasional, branched shrubs to 1.75 m tall, 1071 m, 23 Oct 2007, *Oppenheimer et al. H100715* (BISH).

Iridaceae

Crocosmia* x*crocosmiflora **New island record**

(Lemoine ex E. Morr.) N.E. Br.

A hybrid of horticultural origin naturalized in Hawaiʻi on Kauaʻi, Oʻahu, Maui, and Hawaiʻi (Wagner *et al*. 1999: 1446), this herb is also sparingly naturalized on Molokaʻi.

Material examined. **MOLOKAʻI**: S rim of Kuhuaʻawi Gulch, near Forestry barracks, 650 m, 6 Jun 2008, *Oppenheimer & Perlman H60802* (BISH).

Lamiaceae

Leonotis nepetifolia (L.) R. Br. **New island record**

Introduced as an ornamental and naturalized on Kauaʻi, Oʻahu, Molokaʻi, Maui, and Hawaiʻi (Wagner *et al*. 1999: 803; Oppenheimer 2003: 14), this annual herb is common along much of the lower and drier end of Maunalei Gulch, Lānaʻi.

Material examined. **LĀNAʻI**: Maunalei Gulch, locally abundant in dry, disturbed areas, 85 m, 29 May 2008, *Oppenheimer & Perlman H50808*.

Ocimum basilicum L. **New island record**

No naturalized *Ocimum* species have been previously documented from Lānaʻi. The common or sweet basil is known from Niʻihau, Oʻahu, Molokaʻi, Maui, and Hawaiʻi (Wagner *et al.* 1999: 808), and now from Lānaʻi.

Material examined. **LĀNAʻI**: W rim of Maunalei Gulch, few plants scattered on ridgetop in remnant shrubland; leaves aromatic, 620 m, 10 May 2006, *Oppenheimer & J. Penniman H50611*.

Lauraceae

Persea americana Mill. **New island record**

Avocado was introduced to Hawaiʻi in 1825 for its edible fruit and is naturalized in disturbed mesic sites on Kauaʻi, Oʻahu, Maui, and Hawaiʻi, but also probably on some of the other main islands (Wagner *et al*. 1999: 848). Now it is known from Lānaʻi, where it occurs under similar conditions.

Material examined. **LĀNAʻI**: Maunalei Gulch, sparingly naturalized trees along gulch bottom upstream from old pump station, in *Aleurites* forest, 335 m, 29 May 2008, *Oppenheimer & Perlman H50809*.

Marattiaceae

Angiopteris evecta (G. Forst.) Hoffm. **New island record**

Since its introduction to Hawaiʻi in 1927, mule's-foot fern has spread rapidly and is invasive on Kauaʻi, Oʻahu, Lānaʻi, Maui, and Hawaiʻi (Palmer 2003: 49; Wood 2006: 18). A single large, fertile plant was recently found (and destroyed) on Molokaʻi in a remote area where it was obviously not under cultivation. More plants likely exist in the rough terrain. The Molokaʻi Invasive Species Committee was notified.

Material examined. **MOLOKAʻI**: Waihānau Stream, large fern to 3 m tall on mossy intermittent stream bank in shady, disturbed *Metrosideros/Dicranopteris* forest, 900 m, 25 Sep 2008, *Oppenheimer H90816*.

Myrtaceae

Lophostemon confertus (R. Br.) Peter G. Wilson & J.T. Waterh. **New island record**

A forestry tree since 1929 planted on Kauaʻi, Oʻahu, Molokaʻi, Maui, and Hawaiʻi, previously documented as naturalized on Oʻahu, Lānaʻi, and Maui (Wagner *et al*. 1999: 964; Oppenheimer 2004: 14; Oppenheimer 2007: 28), Brisbane box also occurs on Molokaʻi.

Material examined. **MOLOKAʻI**: WNW of Puʻu Kaʻeo, along 4WD road, sparingly naturalized trees from forestry plantings in disturbed areas along road, in *Metrosideros/Dicranopteris* wet forest, 1020 m, 29 Aug 2008, *Oppenheimer H80830*.

Melaleuca quinquenervia (Cav.) S.T. Blake **New island record**

Naturalized on Kauaʻi, Oʻahu, Molokaʻi, Maui, and Hawaiʻi (Wagner *et al.* 1999: 964), paperbark also occurs on Lānaʻi.

Material examined. **LĀNAʻI**: between Haʻalelepaʻakai & Puʻu Kole, sparingly naturalized trees in degraded *Metrosideros/Dicranopteris* forest, on slopes and near ridge tops, 1000 m, 7 Jan 2008, *Oppenheimer, Wood, Perlman & Bacon H10804*.

Syncarpia glomulifera (Sm.) Nied. **New island record**

This species was included as a short note in the Myrtaceae discussion (Wagner *et al.* 1999: 948). Planted on all of the main islands except Niʻihau and Kahoʻolawe, it was reported to have escaped in Kamakou Preserve, Molokaʻi. It was previously documented as a naturalized species on Maui (Oppenheimer 2003:16). The following voucher specimen documents this species as definitely naturalized on Molokaʻi.

Material examined. **MOLOKAʻI**: Kūpāʻia Gulch, emergent trees, naturalized on upper slope in mesic shrubland, 925 m, 26 Sep 2008, *Oppenheimer H90822*.

Ophioglossaceae

Ophioglossum petiolatum Hook. **New island record**

This small, indigenous fern is ephemeral, and usually appears after winter rains. It has been documented from all the main islands [excluding Niʻihau and Kahoʻolawe] except Molokaʻi, where it was suspected to occur (Palmer 2003: 199). Recently it was collected there at the margin of a small puddle created by rain runoff from the roof of a small building.

Material examined. **MOLOKAʻI**: Kaunakakai, Kalanianaʻole Colony, vicinity of Ololo Spring, 10 m, 23 July 2008, *Oppenheimer, Duvall, Penniman & Holmes H70806*.

Proteaceae

Macadamia integrifolia Maiden & Betche **New naturalized record**

A second species of *Macadamia* F. Muell. has been found naturalized in the Hawaiian Islands. Previously, *M. tetraphylla* was reported from Maui (Oppenheimer 2004: 16–17). *Macadamia integrifolia* is native to tropical rainforests of Queensland, Australia and was introduced to Hawai‘i prior to 1837; it forms the basis for the mac nut industry in Hawai‘i (Staples & Herbst 2005: 470). It differs from *M. tetraphylla* by having leaves usually in whorls of 3 per node (vs. 4 per node), with entire margins on adult leaves (vs. spiny), rounded leaf apices (vs. pointed), and having a smooth seed coat (vs. rough). The population where the cited specimen was collected is not far from a commercial macadamia nut farm, and the area has populations of feral deer, pigs, and goats, any one or all of which potentially disperse the seeds.

Material examined. **MOLOKA‘I**: Pālā‘au, Pu‘u Lua, occasional on steep slopes in *Casuarina* thickets, trees to 6 m tall, flowers white, fragrant, 480 m, 3 Apr 2007, *Oppenheimer H30703*.

Rubiaceae

Spermacoce latifolia Blume **New island record**

This herb was previously documented from Kaua‘i and Maui (Lorence *et al*. 1995: 51; Oppenheimer 2004: 17; Lorence & Flynn 2006: 4). Its occurrence on Moloka‘i in pastures, waste areas, and open disturbed sites is consistent with observations of this species on Maui.

Material examined. **MOLOKA‘I**: Moakea, S side of Pāpio Gulch, naturalized in pastures and waste areas, locally common, 295 m, 7 Nov 2007, *Oppenheimer H110715*.

Solanaceae

Cestrum nocturnum L. **New island record**

Often referred to locally as night-blooming jasmine, this cultivated species is naturalized on Kaua‘i, O‘ahu, Maui, and Hawai‘i (Wagner *et al.* 1999: 1255; Oppenheimer & Bartlett 2000: 8; Starr *et al.* 2003: 32; Oppenheimer 2007: 31). On Lāna‘i it was found to be locally abundant in scattered sites along the bottom of Maunalei Gulch. Many seedlings were also observed and it is apparently not browsed by deer or mouflon.

Material examined. **LĀNA‘I**: Maunalei Gulch, naturalized shrubs to 2.5 m tall along gulch bottom where Wai‘alalā Gulch enters, in *Aleurites* forest, 440 m, 29 May 2008, *Oppenheimer & Perlman H50812*.

Nicandra physalodes (L.) Gaertn. **New island record**

Widely cultivated as an ornamental and naturalized in dry to mesic, disturbed habitats on Kaua‘i, O‘ahu, Moloka‘i, Maui, and Hawai‘i (Wagner *et al*. 1999: 1260), apple of Peru was recently found on Lāna‘i.

Material examined. **LĀNA‘I**: Maunalei Gulch, locally abundant on dry slopes & talus, 40 m, 29 May 2008, *Oppenheimer & Perlman H50807*.

Zingiberaceae

Alpinia zerumbet (Pers.) B.L. Burtt & R.M. Sm. **New island record**

A popular ornamental and widely cultivated, shell ginger was recently reported to be naturalized on Kaua‘i (Flynn & Lorence 2002: 16) and West Maui (Oppenheimer 2008: 35). Now it is known from Moloka‘i, where it forms clumps and small dense stands in scattered areas throughout Moloka‘i Forest Reserve. Recently, localized control was initiated

by the Division of Forestry and Wildlife, The Nature Conservancy, and Molokaʻi Invasive Species Committee staff.

Material examined. **MOLOKAʻI**: Upper Kaunakakai Gulch, NE of Kaulahuki, vicinity of Waikolu Park, naturalized herbs to 2 m+ tall in *Eucalyptus* forest, 1130 m, 16 Jan 2008, *Oppenheimer H10809*.

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Literature Cited

Flynn, **T**. **& Lorence**, **D**.**H**. 2002. Additions to the flora of the Hawaiian Islands. *Bishop Museum Occasional Papers* **69**: 14–17.

Lorence, **D**.**H**. **& Flynn**, **T**. 2006. New naturalized plant records for Kauaʻi and Hawaiʻi. *Bishop Museum Occasional Papers* **88**:1–5.

———.,**Flynn**, **T**. **& Wagner**, **W**.**L**. 1996. Contributions to the flora of Hawaiʻi. III. New additions, range extensions, and rediscoveries of flowering plants. *Bishop Museum Occasional Papers* **41**: 19–58.

Oppenheimer, **H**. 2003. New plant records from Maui and Hawaiʻi Counties. *Bishop Museum Occasional Papers* **73**: 3–30.

———. 2004. New Hawaiian plant records for 2003. *Bishop Museum Occasional Papers* **79**: 8–20.

———. 2007. New plant records from Molokaʻi, Lānaʻi, Maui, and Hawaiʻi for 2006. *Bishop Museum Occasional Papers* **96**: 17–34.

———. 2008. New Hawaiian plant records for 2007. *Bishop Museum Occasional Papers* **100**: 22–38.

———. **& Bartlett**, **R**.**T**. 2000. New plant records from Maui, Oʻahu, and Hawaiʻi islands. *Bishop Museum Occasional Papers* **64**:1–10.

———. **& Bartlett**, **R**.**T**. 2002. New plant records from the main Hawaiian islands. *Bishop Museum Occasional Papers* **69**: 1–14.

———., **Meidell**, **J**.**S**. **& Bartlett**, **R**.**T**. 1999. New plant records for Maui and Molokaʻi. *Bishop Museum Occasional Papers* **59**: 7–11.

Palmer, **D**.**D**. 2003. *Hawai'i's ferns and fern allies.* University of Hawaiʻi Press, Honolulu, 324 pp.

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

Starr, **F**. **& Martz**, **K**. 2000. New plant records for Midway Atoll. *Bishop Museum Occasional Papers* **64**: 10–12.

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

———., **Starr**, **K**. **& Loope**, **L**.**L**. 2006. New plant records from the Hawaiian

Archipelago. *Bishop Museum Occasional Papers* **87**: 31–43.

Strong, **M**.**T**. **& Wagner**, **W**.**L**. 1997. New and noteworthy Cyperaceae from the Hawaiian Islands. *Bishop Museum Occasional Papers* **48**:37–50.

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

———., **Bruegmann**, **M**.**M**., **Herbst**, **D**.**R**. **& Lau**, **J**.**Q**.**C**. 1999b. Hawaiian vascular plants at risk: 1999. *Bishop Museum Occasional Papers* **60**. 1–58.

Wood, **K**.**R**. 2006. New plant records and rediscoveries within the Hawaiian Islands. *Bishop Museum Occasional Papers* **88**: 15–19.

Wysong, **M**., **Hughes**, **G**. **& Wood**, **K**.**R**. 2007. New Hawaiian plant records for the island of Moloka'i. *Bishop Museum Occasional Papers* **96**:1–8.