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New Plant Records from Midway Atoll, Kahoʻolawe, and Maui[1]

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The following contributions include new state, island, and high elevation records from Midway Atoll, Kahoʻolawe, and Maui. All records are for nonindigenous species. Images of the material examined can be seen at starrenvironmental.com. Voucher specimens and collections mentioned in the text are housed in Bishop Museum's Herbarium Pacificum (BISH), Honolulu, Hawai'i.

Aizoaceae

Trianthema portulacastrum L. **New island record**

Commonly known as horse purslane, this plant is previously documented in Hawai'i from the islands of Kaua'i, O'ahu, and Maui (Wagner *et al.* 1999; Herbst & Wagner 1996; Lorence & Flynn 2006). Recently, it was also found naturalized on the island of Kahoʻolawe in a gravelly area on the side of the main road, just outside of Base Camp, near the point on the south side of Honokanai'a Bay.

Material examined. **KAHOʻOLAWE**: Honokanai'a, just off road in gravelly disturbed area, lowland disturbed coastal grassland, with *Prosopis pallida* and *Cenchrus ciliaris,* few patches here and there in open areas, 25 ft [8 m] (20.509839 N, -156.681968 W), 14 Dec 2017, *Starr & Starr 171214-01.*

Brassicaceae

Arabidopsis thaliana (L.) Heynh. **New state record**

Known as mouse-ear or thale cress, this species was recently found at the summit of Haleakalā National Park during early detection surveys. About 20 small plants were found growing in a disturbed area near the parking lot and sidewalk areas. This is one of a handful of temperate species that have recently established in the high traffic areas of the summit area. Plants were hand pulled but had gone to seed and continue to germinate from a seed bank. A winter annual native to Eurasia (Europe, Asia, and NW Africa) in tropical Afro-alpine ecosystems and naturalized worldwide in disturbed areas as a pioneer of rocky, sandy, and calcareous sites (Wikipedia 2018). *Arabidopsis thaliana* was the first plant to have its entire genome sequenced and is widely used to study molecular biology (Kew Science 2018). Previously not known in Hawai'i, this species can be distinguished by the following characteristics. "Annual (rarely biennial) plant, usually growing to 20–25 cm tall. The leaves form a rosette at the base of the plant, with a few leaves also on the flowering stem. The basal leaves are green to slightly purplish in color, 1.5–5 cm long and 2–10 mm broad, with an entire to coarsely serrated margin; the stem leaves are smaller and unstalked, usually with an entire margin. Leaves are covered with small, unicellular hairs (trichomes). The flowers are 3 mm in diameter, arranged in a corymb; their structure

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is that of the typical Brassicaceae. The fruit is a siliqua 5–20 mm long, containing 20–30 seeds" (Wikipedia 2018).

Material examined. **MAUI**: East Maui, Haleakalā National Park, summit, near parking lot, in crack between cinder and sidewalk near the bottom of the stairs to the Summit Building, in sparse subalpine rock land, in association with *Argyroxiphium sandwicense* subsp. *macrocephalum* and *Dubautia menziesii*, 10000 ft [3048 m] (20.709977 N, -156.252851 W), 03 May 2017, *Starr & Starr 170503-01*.

Lobularia maritima (L.) Desv. **High elevation record**

Sweet alyssum was originally reported from low sandy areas of Kure Atoll, Midway Atoll, and "apparently sparingly naturalized on Maui" (Wagner *et al.* 1999). It has since been reported as naturalized from the islands of Molokaʻi, Oʻahu, and Hawaiʻi, mostly in low elevation sites, except for Hawaiʻi where it was collected at 2,700 ft (823 m) (Lorence *et al.* 1995; Wagner & Herbst 1995; Oppenheimer 2003; Staples & Herbst 2005). On Maui, this species has been collected within Haleakalā National Park near the Kalahaku Lookout, elevation 9,200 ft (2,804 m), and in the summit region at Science City, elevation 10,000 ft (3,048 m), representing a more widely naturalized status and new high elevation record.

Material examined. **MAUI**: East Maui, Haleakalā National Park, above Kalahaku Lookout, subalpine sparse grassland, in association with *Leptecophylla tameiameiae*, *Argyroxiphium sandwicense* subsp. *macrocephalum*, and *Deschampsia nubigena*, 9,200 ft [2,804 m] (787,274 E, 2,295,335 N), 14 Aug. 2000, *Starr & Starr 000814-01*; East Maui, Haleakalā National Park, Science City, near PanSTARRS telescope, in sparse subalpine rock land, in association with *Leptecophylla tameiameiae*, *Deschampsia nubigena*, and *Oenothera stricta* subsp. *stricta*, 10,000 ft [3,048 m] (20.707034 N, -156.256174 W), 05 May 2017, *Starr & Starr 170505-01*.

Euphorbiaceae

Ricinus communis L. **New island record**

Castor bean was first reported from Midway in 1955 from both Sand and Eastern Island (Neff & DuMont 1955). At the time, they reported there were a few small plants found on Eastern with large patches found on Sand, some far from residences. In 1999, no plants were found on Eastern, but there were still several patches, some large, found scattered about Sand Island and control work to remove all patches began (Starr & Starr 2015). By 2015, only a few seedlings were seen and pulled on Radar Hill (Starr & Starr 2015). Similarly, in 2017, a larger fertile plant was found growing out of the remnant concrete structure in the same area (Radar Hill) (Starr & Starr 2017). Though previously reported from the atoll, this is the first collection.

Material examined: **MIDWAY ATOLL**: Sand Island, near Town, Radar Hill, one plant in flower and fruit growing out of the old radar facility concrete remnants, in coastal disturbed scrub in association with *Lobularia maritima, Solanum americanum,* and *Euphorbia peplus*, 25 ft [8 m] (28.212721 N, -177.379711 W), 28 Jun 2017, *Starr & Starr 170628-01.*

Nyctaginaceae

Boerhavia coccinea Mill. **New island record**

Boerhavia coccinea, scarlet spiderling, is previously known from Kure Atoll and all the main Hawaiian Islands except Niʻihau (Wagner *et al.* 1999; Starr *et al.* 2003; Oppenheimer & Bartlett 2002; Oppenheimer 2003). It is also now reported here as a new island record for Midway Atoll. The collection was made in 2017 from the Community

Garden, where a small patch was found. Plants had both flowers and seeds. It was first sighted on Midway in 2015 by Meg Duhr-Schultz and has been targeted for eradication since. Scattered individual plants continue to be found from the Community Garden north to the old Cannon School.

Material examined: **MIDWAY ATOLL**: Sand Island, Town, Community Garden, single small patch or plant in garden, in flower and fruit at the time, in coastal urban disturbed garden, in association with *Eleusine indica, Lobularia maritima,* and *Cymbopogon citratus*, 15 ft [5 m] (28.213183 N, -177.376065 W), 16 Jun 2017, *Starr & Starr 170616-01.*

Poaceae

Ehrharta erecta Lam. **High elevation record**

First recorded from Maui as a new naturalized grass (Herbst & Clayton 1998), recent collections of *Ehrharta erecta* made from disturbed areas of Haleakalā National Park represent new high elevation records for this species in Hawai‘i. The grass is common at the Haleakalā Visitor Center at 9,769 ft (2,977 m), and a few small patches occur along the walkway up to the Red Hill Summit Building at about 10,000 ft (3,048 m).

Material examined. **MAUI**: East Maui, Haleakalā National Park, Haleakalā Visitor Center, in cinder areas of subalpine shrubland, common near the bathrooms, main building, and main path to the parking lot, in association with *Dubautia menziesii*, *Silene struthioloides*, and *Deschampsia nubigena*, scattered clumps at base of boulders, 9,769 ft [2,977 m] (20.714978 N, -156.250041 W), 23 Jul 2013, *Starr & Starr 130723-03*; Haleakalā National Park, summit, in rocks near foot path by parking lot, subalpine sparse rock/grassland with *Argyroxiphium sandwicense* subsp. *macrocephalum*, scattered clumps at base of boulders, 10,000 ft [3,048 m] (20.709954 N, -156.253322 W), 01 Aug 2013, *Starr & Starr 130801-02.*

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LITERATURE CITED

Herbst, **D**.**R**. **& Clayton**, **W**.**D**. 1998. Notes on the grasses of Hawai‘i: new records, corrections, and name changes. *Bishop Museum Occasional Papers* **55**(1): 17–38.

Herbst, **D**.**R**. **& Wagner**, **W**.**L**. 1996. Contributions to the flora of Hawai‘i. V. *Bishop Museum Occasional Papers* **46**(2): 8–12.

Kew Science. 2018. Plants of the world online. Available at: http://www.plantsoftheworldonline.org/ (Accessed 24 Jan 2018).

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

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

Neff, **J**.**A**. **& DuMont**, **P**.**A**. 1955. *A partial list of the plants of the Midway Islands. Atoll Research Bulletin, No. 45*. The Pacific Science Board, National Academy of Sciences, National Research Council, Washington, D.C.

Oppenheimer, **H**.**L**. **& Bartlett**, **R**.**T**. 2002. New plant records from the main Hawaiian Islands. *Bishop Museum Occasional Papers* **69**(2): 1–14.

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

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

Starr, **F**., **Starr**, **K**. **& Loope**, **L**.**L**. 2003. New plant records for the Hawaiian Archipelago. *Bishop Museum Occasional Papers* **74**(2): 23–34.

Starr, **F**. **& Starr**, **K**. 2015. *Botanical survey of Midway Atoll*. Report prepared for the US Fish and Wildlife Service, Honolulu.

Starr, **F**. **& Starr**, **K**. 2017. *Botanical survey of Midway Atoll*. Report prepared for the US Fish and Wildlife Service, Honolulu.

Wikipedia: **The free encyclopedia**. 2018. Wikimedia Foundation, Inc. Available at: http://www.wikipedia.org (Accessed 23 Jan 2018).

Wagner, **W**.**L**. **& Herbst**, **D**.**R**. 1995. Contributions to the flora of Hawai‘i. IV. New records and name changes. *Bishop Museum Occasional Papers* **42**(2): 13–27.

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. 1,919 pp.