

Plants



Delissea undulata subsp. *undulata*

SPECIES STATUS:

Federally Listed as Endangered

Genetic Safety Net Species

Hawai'i Natural Heritage Ranking – Critically

Imperiled (G1)

Endemism – Maui, Island of Hawai'i

Critical Habitat - Designated

SPECIES INFORMATION: *Delissea undulata* of the bellflower family (Campanulaceae) is a palm-like tree with unbranched woody stems 2 to 10 m (6 to 30 ft) tall. The leaves are long and narrow or elliptic with long petioles and undulate or flat, toothed margins, about 5 to 21 cm (2 to 8 in) long and 3 to 10 cm (1 to 4 in) wide. The 5 to 15 flowering stalks each bear 5 to 20 greenish-white, slightly down-curved flowers 1.6 to 2.5 cm (0.6 to 1.0 in) long with one or two small knobs on the upper surfaces. The fruits are ovoid to globose purple berries 0.6 to 1.2 cm (0.2 to 0.4 in) long. The three subspecies of *D. undulata* can be distinguished from each other by leaf shape and leaf margin characteristics—subsp. *kauaiensis* has ovate leaves with flat, sharply toothed margins; subsp. *niihauensis* has leaves with heart-shaped bases and shallow roundly toothed margins; and subsp. *undulata* has narrower, lance-shaped leaves with undulating margins and spreading, pointed teeth. The species *D. undulata* is distinguished from closely related species in this genus by its broader leaf bases, larger flowers, and larger berries.

DISTRIBUTION: Historically, *Delissea undulata* is known from Ni'ihau, Kaua'i, Maui, and Hawai'i. Subspecies *kauaiensis* was collected west of the Hanapepe River on the island of Kaua'i in 1895 and has not been relocated. Subspecies *niihauensis* was collected twice in the 1800's on the island of Ni'ihau and has not been located since. Both of these subspecies are considered extinct. *Delissea undulata* subsp. *undulata* was reported from four valleys of southwestern Maui in the 1800' s, and from the Kona region of the island of Hawai'i. It was observed in 1971 at Puu Lehua and was subsequently thought to be extinct.

ABUNDANCE: One individual plant of subspecies *undulata* was discovered on April 24, 1992, at Pu'u Wa'awa'a, at a previously unreported location on Hualalai on the island of Hawai'i. This site is owned by the State and leased to a private individual for ranching. Harold L. Lyon Arboretum of the University of Hawai'i at Manoa is propagating seeds collected from the one remaining individual as part of an *ex situ* conservation program. The Arboretum has sent approximately 50 individual plants

propagated from seed to the State's Hawai'i forestry district for experimental outplanting in the Pu'u Wa'awa'a area. Several outplanted individuals have produced seed after only two years, although no seedlings have been produced by these outplanted individuals.

LOCATION AND CONDITION OF KEY HABITAT: *Delissea undulata* grows primarily in dry and mesic forests at about 1,000 to 1,750 m (3,300 to 5,700 ft) elevation. The substrate is a thin organic soil layer over 'a'a or pahoehoe lava. The only known wild individual grows on the brink of a collapsed lava tube at 1,070 m (3,520 ft) elevation. The vegetation is open *Sophora chrysophylla* (mamane)- *Metrosideros polymorpha* ('ōhi'a) forest with such associated species as *Santalum ellipticum* ('iliahi) and *Acacia koa* (koa). The endangered species *Nothocestrum breviflorum* ('aiea) also is found in the area of the one remaining wild individual of *D. undulata*.

THREATS:

- Damage from domestic and feral herbivores;
- Competition with alien plants;
- Fire, whether started naturally or by arson;
- Slug damage, slugs eating fruits;
- One individual known with its limited gene pool.

CONSERVATION ACTIONS: The goals of conservation actions are to not only protect current populations, but also establish new populations to reduce the risk of extinction. The USFWS has developed a recovery plan that details specific tasks needed to recover this species. In addition to common statewide and island conservation actions, specific actions include:

- Survey historic range for surviving populations;
- Establish secure *ex-situ* stocks with complete representation of remaining individuals;
- Augment wild population and establish new populations in safe harbors.

MONITORING:

- Continue surveys of population and distribution in known and likely habitats;
- Monitor plants for insect damage and plant diseases.

RESEARCH PRIORITIES:

- Develop proper horticultural protocols and pest management;
- Survey *ex-situ* holdings and conduct molecular fingerprinting;
- Conduct pollination biology and seed dispersal studies;
- Map genetic diversity in the surviving populations to guide future re-introduction and augmentation efforts.

References:

Center for Plant Conservation, 2005. National Collection of Endangered Plants.
http://www.centerforplantconservation.org/ASP/CPC_NCList_Quick.asp.

Hawai'i Natural Heritage Program. 2005. Hawaii Natural Heritage Program Search,
<http://www.hinhp.org>.

International Union for Conservation of Nature and Natural Resources, 2004, IUCN Red List of Threatened Species: Data Base Search, <http://www.redlist.org/search/search-basic.html>.

US Fish and Wildlife Service. 1996. Final Listing, Endangered ETWP; Endangered Status for the Plant *Delissea undulata*. Federal Register, Vol. 61, No. 198, (10-OCT-96), 61 FR 53124-53130, 7pp.

Wagner, W. L., D. R. Herbst, and D. H. Lorence. 2005. Flora of the Hawaiian Islands website.
<http://ravenel.si.edu/botany/pacificislandbiodiversity/hawaiianflora/index.htm> [August, 2005].

Wagner, W.L., Herbst, D.R., and Sohmer, S.H., 1999. Manual of the flowering plants of Hawai'i-- Revised Edition. Honolulu, HI: University of Hawaii Press and Bishop Museum Press. 1853p.