

*Centaurium sebaeoides* (Awiwi)

*Centaurium sebaeoides*, a member of the gentian family (Gentianaceae), is an annual herb with fleshy leaves and stalkless flowers. This species is distinguished from *C. erythraea* (bitter herb), which is naturalized in Hawaii, by its fleshy leaves and the unbranched arrangement of the flower cluster (Wagner *et al.* 1999).

*Centaurium sebaeoides* has been observed flowering in April. Flowering may be induced by heavy rainfall. Occurrences are found in dry areas, and plants are more likely to be found following heavy rains. Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors (56 FR 55770).

Historically and currently, *Centaurium sebaeoides* is known from Kauai, Oahu, Molokai, Lanai, and Maui. Currently on Oahu, 2 occurrences of this species remain with a total of between 60 and 80 individuals at Kaena Point and Koko Head on State, city, and county lands (HINHP Database 2001; Service 1999; Wagner *et al.* 1999).

*Centaurium sebaeoides* typically grows in volcanic or clay soils or on cliffs in arid coastal areas or on coral plains below 368 m (1,207 ft) elevation. Associated native species include *Artemisia* sp., *Bidens* sp., *Jacquemontia ovalifolia*, *Lipochaeta succulenta* (nehe), or *Lysimachia* sp. (kolokolo kuahiwi) (HINHP Database 2001; Wagner *et al.* 1999; 56 FR 55770).

The major threats to *Centaurium sebaeoides* on Oahu are habitat degradation by feral goats and cattle, competition from the nonnative plant species *Leucaena leucocephala*, trampling by humans on or near trails, fire, and a risk of extinction from naturally occurring events due to the small number of existing occurrences and individuals (56 FR 55770; Service 1999).

*Colubrina oppositifolia* (Kauila)

*Colubrina oppositifolia*, a member of the buckthorn family (Rhamnaceae) and a long-lived perennial, is a tree with extremely hard red wood. This species is readily distinguished from the other species in Hawaii by its opposite leaf position, dull leaf surface, and entire leaf margins (Wagner *et al.* 1999).

*Colubrina oppositifolia* has been observed in flower during January, June, September, and December and in fruit during January, June, and September. Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific

environmental requirements, and limiting factors (HINHP Database 2001).

Historically and currently, *Colubrina oppositifolia* was known from Oahu, Maui, and the island of Hawaii. Currently, there is a total of 5 occurrences containing 61 individuals on Oahu. These occurrences are found in Kaumokunui Gulch, Makaleha Valley, and Manuwai Gulch on State and private lands (GDSI 2001; HINHP Database 2001).

*Colubrina oppositifolia* is found in lowland dry and mesic forests dominated by *Diospyros sandwicensis* at elevations between 277 and 761 m (909 and 2,496 ft). Associated native species include *Alyxia oliviformis*, *Nestegis sandwicensis*, *Psydrax odorata*, *Reynoldsia sandwicensis*, or *Sapindus oahuensis* (HINHP Database 2001).

The threats to this species on Oahu are habitat destruction by feral pigs and goats; competition with the nonnative plant species *Aleurites moluccana*, *Lantana camara*, *Pennisetum setaceum*, *Psidium cattleianum*, *Schinus terebinthifolius*, and *Syzygium cumini*; damage from the black twig borer and Chinese rose beetle; fire; potential impacts from military activities; and a risk of extinction from naturally occurring events due to the small number of existing occurrences and individuals (HINHP Database 2001; Service 1996c; 59 FR 10305).

*Ctenitis squamigera* (Pauoa)

*Ctenitis squamigera*, a short-lived member of the woodfern family (Aspleniaceae), has a rhizome creeping above the ground that is densely covered with scales similar to those on the lower part of the leaf stalk. It can be readily distinguished from other Hawaiian species of *Ctenitis* by the dense covering of tan-colored scales on its frond (Degener and Degener 1957; Wagner and Wagner 1992).

Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors for *Ctenitis squamigera* (Service 1998a).

Historically, *Ctenitis squamigera* was recorded from Kauai, the Koolau and Waianae Mountains of Oahu, Molokai, Maui, and the island of Hawaii. This species is currently extant on Oahu, Molokai, Lanai, and Maui. Currently on Oahu, 8 occurrences with more than 80 individuals are found in Makaleha Valley, Kaaawa Gulch, Makua Valley, and Waianae Kai Forest Reserve on Federal, State, and private lands (EDA Database 2001; GDSI 2001; HINHP Database 2001).

*Ctenitis squamigera* is found on gentle to steep slopes in *Metrosideros polymorpha-Diospyros sandwicensis* mesic forest and diverse mesic forest at elevations of 387 to 923 m (1,269 to 3,027 ft). Associated native plant taxa include *Alyxia oliviformis*, *Carex meyenii*, *Diospyros hillebrandii*, *Dodonaea viscosa*, *Doodia kunthiana*, *Dryopteris unidentata*, *Freycinetia arborea*, *Hibiscus* sp., *Myrsine* sp., *Nestegis sandwicensis*, *Pisonia* sp., *Pouteria sandwicensis*, *Psychotria* sp., *Psydrax odorata*, or *Xylosma* sp. (HINHP Database 2001).

The primary threats to *Ctenitis squamigera* on Oahu are habitat degradation by feral pigs and goats; competition with the nonnative plant species *Ageratina riparia*, *Aleurites moluccana*, *Blechnum appendiculatum*, *Clidemia hirta*, *Psidium cattleianum*, *Psidium guajava*, *Schinus terebinthifolius*, *Syzygium cumini*, and *Toona ciliata*; fire; and decreased reproductive vigor and a risk of extinction caused by naturally occurring events due to the small number of existing occurrences (HINHP Database 2001; Service 1998; 59 FR 49025).

*Cyanea grimesiana* ssp. *grimesiana* (Haha)

*Cyanea grimesiana* ssp. *grimesiana*, a member of the bellflower family (Campanulaceae) and a short-lived perennial, is a shrub with pinnately divided leaves. This species is distinguished from others in this endemic Hawaiian genus by the pinnately lobed leaf margins and the width of the leaf blades. This subspecies is distinguished from the other two subspecies by the shape and size of the calyx lobes, which overlap at the base (Lammers 1999).

On Molokai, flowering plants have been reported in July and August. Little else is known about the life history of *Cyanea grimesiana* ssp. *grimesiana*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Currently and historically, *Cyanea grimesiana* ssp. *grimesiana* is known from the Waianae and Koolau Mountains on Oahu, Molokai, Lanai, and Maui. On Oahu, there are seven occurrences known from Palikea Gulch, North Haleauau Gulch, Pahole Natural Area Reserve (NAR), Pia Gulch, Kului Gulch, and in Waialae Iki-Kapakahi on Federal, State, city, county, and private lands containing a total of nine individuals (EDA Database 2001; GDSI 2001; HINHP Database 2001).