

is a low, somewhat woody, short-lived perennial herb with arched or nearly prostrate stems that may be up to 150 cm (59 in) long. Aside from being a coastal species, this species is the only member of its genus on Oahu with four-parted disk florets. This variety has narrower leaves, spaced more closely along the stem, than those of *Lipochaeta lobata* var. *lobata*, the only other variety of the species (Wagner *et al.* 1999).

Flowering of *Lipochaeta lobata* var. *leptophylla* is probably rain-induced. Occurrences may consist of fewer distinct individuals than it appears because many plants are connected underground by the roots and are probably clones. Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors (Service 1998b).

Historically, *Lipochaeta lobata* var. *leptophylla* was known from the southern Waianae Mountains of Oahu, from Kolekole Pass to Lualualei. Currently, there are a total of 147 individuals found in 4 occurrences on State, Federal, city, and county lands at Lualualei-Nanakuli Ridge, Kauhiuhi, Puu Hapapa, Mikilua, and Kamaileunu Ridge. (EDA Database 2001; GDSI 2001; HINHP Database 2001; Wagner *et al.* 1999).

*Lipochaeta lobata* var. *leptophylla* typically grows on cliffs, ridges, and slopes in dry or mesic shrubland at elevations between 256 and 978 m (840 and 3,208 ft). Associated native species include *Artemisia australis*, *Bidens* sp., *Carex meyenii*, *Diospyros* sp., *Dodonaea viscosa*, *Eragrostis* sp., *Melanthera tenuis* (nehe), *Peperomia* sp., *Psydrax odorata*, and *Stenogyne* sp. (NCN) (HINHP Database 2001; EDA, *in litt.* 2001).

The major threats to *Lipochaeta lobata* var. *leptophylla* include competition from nonnative plant species such as *Ageratina adenophora*, *Ageratina riparia*, *Erigeron karvinskianus*, *Grevillea robusta*, *Kalanchoe pinnata*, *Lantana camara*, *Leucaena leucocephala*, *Melinis minutiflora*, *Passiflora suberosa*, and *Schinus terebinthifolius*; habitat degradation by feral pigs and goats; fire; and a threat of extinction from random environmental events and/or decreased reproductive vigor due to the small number of individuals and occurrences (HINHP Database 2001).

#### *Lipochaeta tenuifolia* (Nehe)

*Lipochaeta tenuifolia*, a member of the aster family (Asteraceae), is a low growing, somewhat woody, short-lived perennial herb with short, more or less erect branches. Its five-parted disk

florets and its deeply cut, stalkless leaves separate this species from other members of the genus (Wagner *et al.* 1999).

*Lipochaeta tenuifolia* has been observed flowering in April. Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors (Service 1998b).

*Lipochaeta tenuifolia* occurs in the northern half of the Waianae Mountains of Oahu, from Kaluakaula Gulch to Kamaileunu Ridge and east to Mt. Kaala, and northwest, southwest, southeast, and north of Puu Ku Makalii on State, Federal, city, and county lands. The 41 known occurrences contain between 759 and 1,174 individuals (EDA Database 2001; GDSI 2001; HINHP Database 2001).

*Lipochaeta tenuifolia* typically grows on ridgetops and bluffs in open areas, protected pockets of dry to mesic forests and shrublands, and forests dominated by *Diospyros sandwicensis* at elevations between 67 and 978 m (220 and 3,208 ft). Associated native species include *Artemisia australis*, *Bidens* sp., *Carex meyenii*, *Diospyros* sp., *Dodonaea viscosa*, *Doryopteris* sp. (kumu niu), *Dubautia* sp., *Eragrostis* sp., *Myoporum sandwicense*, *Osteomeles anthyllidifolia* (ulei), *Psydrax odorata*, *Reynoldsia sandwicensis*, *Rumex* sp., *Santalum* sp., *Sapindus oahuensis*, or *Schiedea* sp. (HINHP Database 2001; Wagner *et al.* 1999).

The major threats to *Lipochaeta tenuifolia* are habitat degradation by feral goats and pigs; competition for light and space from nonnative plant species including *Ageratina riparia*, *Aleurites moluccana*, *Blechnum appendiculatum*, *Coffea arabica* (coffee), *Grevillea robusta*, *Hyptis pectinata*, *Lantana camara*, *Leucaena leucocephala*, *Melinis minutiflora*, *Panicum maximum*, *Psidium cattleianum*, *Rivina humilis*, *Schinus terebinthifolius*, or *Toona ciliata*; and fire (HINHP Database 2001; 56 FR 55770).

#### *Lobelia gaudichaudii* ssp. *koolauensis* (NCN)

*Lobelia gaudichaudii* ssp. *koolauensis*, a short-lived perennial member of the bellflower family (Campanulaceae), is an unbranched, woody shrub 0.3 to 1 m (1 to 3.5 ft) tall. The species is distinguished from others in the genus by the length of the stem, the length and color of the corolla, the leaf width, the length of the floral bracts, and the length of the calyx lobes. The subspecies *koolauensis* is distinguished by the greenish or

yellowish white petals and the branched flowering stalks (Lammers 1990; 61 FR 53089).

*Lobelia gaudichaudii* ssp. *koolauensis* has been observed in flower in September and in fruit in December. Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors (Service 1998b).

Historically, *Lobelia gaudichaudii* ssp. *koolauensis* was known from only two occurrences in the central Koolau Mountains on Oahu. Currently, this subspecies is known from five occurrences in the central Koolau Mountains, on Federal, State, and private lands at Waimano-Waiawa Ridge, Waimano, the plateau above Sacred Falls, and Kaukonahua Gulch. The total number of plants is estimated to be fewer than 270 (EDA Database 2001; GDSI 2001; HINHP Database 2001).

*Lobelia gaudichaudii* ssp. *koolauensis* typically grows on moderate to steep slopes in *Metrosideros polymorpha* lowland wet shrublands and bogs at elevations between 383 and 867 m (1,256 and 2,844 ft). Associated native plant species include *Bidens* sp., *Broussaisia arguta*, *Cibotium* sp., *Dicanthelium koolauense* (NCN), *Isachne distichophylla* (ohel), *Machaerina angustifolia*, *Melicope* sp., *Sadleria pallida*, *Scaevola* sp., or *Vaccinium dentatum* (ohelo) (HINHP Database 2001; EDA, *in litt.* 2001).

The primary threats to *Lobelia gaudichaudii* ssp. *koolauensis* are habitat degradation and/or destruction by feral pigs; competition with the nonnative plant species *Axonopus fissifolius*, *Clidemia hirta*, *Pterolepis glomerata*, and *Sacciolepis indica*; trampling by hikers; landslides; and risk of extinction from random environmental events and/or reduced reproductive vigor of the few remaining individuals (HINHP Database 2001; 61 FR 53089).

#### *Lobelia monostachya* (NCN)

*Lobelia monostachya*, a short-lived perennial member of the bellflower family (Campanulaceae), is a prostrate woody shrub with stems 15 to 25 cm (6 to 10 in) long. The species is distinguished from others in the genus by its narrow, linear leaves without stalks and its short pink flowers (Lammers 1999).

This species has been observed in flower in May and June. Little else is known about its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific