

*princeps*, are distinguished by the branching and pubescence of the stems; the size, pubescence, and venation of the leaves; the density of the inflorescence; and the orientation of the flowers (Wagner *et al.* 1999).

Little is known about the life history of this plant. Reproductive cycles, longevity, specific environmental requirements, and limiting factors are generally unknown. However, individuals have been observed in fruit from April through September (Service 1999).

Historically, *Plantago princeps* was found on the islands of Hawaii, Kauai, Maui, Molokai, and Oahu. It no longer occurs on the island of Hawaii. Two varieties of the species, totaling seven occurrences, with 542 to 670 individuals, are extant on the island of Kauai, on both State (Halelea Forest Reserve, Lihue-Koloa Forest Reserve, and Na Pali Coast State Park) and privately owned lands. Historically on Kauai, *Plantago princeps* var. *anomala* was reported from a ridge west of Hanapepe River. Currently, this variety is found in the left branch of Kalalau Valley and Puu Ki. *Plantago princeps* var. *longibracteata* was historically known from Hanalei, the Wahiawa Mountains, and Hanapepe Falls. Currently, five occurrences are known from Waioli Valley, Alakai Swamp, the left branch of Wainiha Valley, and Blue Hole (GDSI 2000; HINHP Database 2000; Service 1999; 59 FR 56333).

*Plantago princeps* var. *longibracteata* is found in windswept areas near waterfalls in *Metrosideros polymorpha*-*Cheirodendron* montane wet forest with riparian vegetation at elevations between 347 and 1,598 m (1,139 and 5,244 ft). Associated native plant species include *Antidesma platyphyllum* var. *hillebrandii*, *Bidens forbesii*, *Bobea elatior*, *Boehmeria grandis*, *Cyrtandra* spp., *Diplazium sandwichianum*, *Freycinetia arborea*, *Gunnera kauaiensis*, *Hedyotis centranthoides*, *Hedyotis elatior*, *Huperzia* spp., *Isachne pallens* (NCN), *Machaerina angustifolia*, *Perrottetia sandwicensis*, *Pilea peploides* (NCN), *Pipturus* spp., *Sadleria cyatheoides* (amau), or *Tetraplasandra* spp. (K. Wood, pers. comm., 2001).

*Plantago princeps* var. *anomala* is found in *Metrosideros polymorpha* lowland to montane transitional wet forest on cliffs and ridges, growing on basalt rocky outcrops. Associated native plant species include *Bidens sandwicensis*, *Carex meyenii*, *Carex wahuensis*, *Charpentiera elliptica*, *Hedyotis* spp., *Lipochaeta connata*, *Lysimachia glutinosa*, *Lysimachia kalalauensis*, *Melicope* spp., *Myrsine*

*linearifolia*, *Poa mannii*, or *Wilkesia gymnoxiphium* (K. Wood, pers. comm., 2001).

The primary threats to both species of *Plantago princeps* on Kauai are herbivory and habitat degradation by feral pigs and goats and competition with various nonnative plant species. Ungulate herbivory is especially severe, with numerous observations of *P. princeps* individuals exhibiting browse damage (Service 1999; 61 FR 53108).

#### *Platanthera holochila* (NCN)

*Platanthera holochila*, a member of the orchid family (Orchidaceae), is an erect, deciduous herb. The stems arise from underground tubers, the pale green leaves are lance- to egg-shaped, and the greenish-yellow flowers occur in open spikes. This short-lived perennial is the only species of this genus that occurs in the Hawaiian Islands. It is distinguished from other Hawaiian orchids by its underground tubers that lack roots at the nodes or pseudobulbs, and the shape and length of its dorsal sepal (Wagner *et al.* 1999).

Little is known about the life history of *Platanthera holochila*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Historically, *Platanthera holochila* was known from the Alakai Swamp, Kaholuamano area, and the Wahiawa Mountains on Kauai, and scattered locations on Oahu, Molokai, and Maui. Currently, *P. holochila* is extant on Kauai, Molokai, and Maui. On Kauai, there are two occurrences with 24 to 34 individuals reported on State-owned lands (Alakai Wilderness Preserve) at Kilohana and the Alakai Swamp (GDSI 2000; HINHP Database 2000).

*Platanthera holochila* is found in montane *Metrosideros polymorpha*-*Dicranopteris linearis* wet forest or *M. polymorpha* mixed bog at elevations between 803 and 1,563 m (2,635 and 5,128 ft). Associated native plant species include grammitid ferns, *Carex montis-eeka* (NCN), *Cibotium* spp., *Clermontia fauriei* (oha wai), *Coprosma elliptica* (pilo), *Dichantheium* spp., *Leptecophylla tameiameia*, *Lobelia kauaensis*, *Machaerina angustifolia*, *Myrsine denticulata* (kolea), *Oreobolus furcatus*, *Rhynchospora* spp. (kuolohia), *Vaccinium* spp., or *Viola kauaensis* (Service 1999; 61 FR 53108; K. Wood, pers. comm., 2001).

The primary threats to *Platanthera holochila* on Kauai are habitat degradation and destruction by pigs; competition with nonnative plants; and a risk of extinction on Kauai from

naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor, due to the small number of remaining populations and individuals. Predation by introduced slugs may also be a potential threat to this species (Service 1999; 61 FR 53108).

#### *Schiedea nuttallii* (NCN)

*Schiedea nuttallii*, a member of the pink family (Caryophyllaceae), is a generally hairless, erect subshrub. This long-lived perennial species is distinguished from others in this endemic Hawaiian genus by its habit, length of the stem internodes, length of the inflorescence, number of flowers per inflorescence, and smaller leaves, flowers, and seeds (Wagner *et al.* 1999).

Little is known about the life history of *Schiedea nuttallii*. Based on field and greenhouse observations, it is hermaphroditic (flowers contain both male and female sexual parts). Plants on Oahu have been under observation for 10 years, and they appear to be long-lived. *Schiedea nuttallii* appears to be an outcrossing species. Under greenhouse conditions, plants fail to set seed unless hand-pollinated, suggesting that this species requires insects for pollination. Fruits and flowers are abundant in the wet season but can be found throughout the year (Service 1999).

Historically, *Schiedea nuttallii* was known from Kauai and Oahu and was reported from Maui. Currently, it is found on Kauai, Oahu, and Molokai. On Kauai, one occurrence with 10 to 50 individuals is found on Haupu Peak on privately owned land. The status of individuals previously found in Limahuli Valley is currently unknown (GDSI 2000; HINHP Database 2000; Service 1999; 1 FR 53108).

*Schiedea nuttallii* typically grows on cliffs in lowland diverse mesic forest dominated by *Metrosideros polymorpha* at elevations between 37 and 702 m (120 and 2,303 ft). Associated native plant species include *Antidesma platyphyllum* var. *hillebrandii*, *Bidens valida*, *Chamaesyce celastroides*, *Eragrostis variabilis*, *Hedyotis acuminata*, *Hedyotis fluvialtilis* (kamapuaa), *Heteropogon contortus*, *Lepidium* spp. (anaunau), *Lobelia niihauensis*, *Perrottetia sandwicensis*, *Pisonia* spp., or *Psychotria* spp. (Service 1999; K. Wood, pers. comm., 2001).

*Schiedea nuttallii* is threatened on Kauai by habitat degradation and/or destruction by feral pigs, goats, and possibly deer; competition with several nonnative plants; landslides; predation by the black twig borer; and a risk of extinction from naturally occurring