

*Schiedea membranacea* (NCN)

*Schiedea membranacea*, a member of the pink family (Caryophyllaceae), is a short-lived perennial herb. This species differs from other *Schiedea* species on Kauai by having five-to seven-veined leaves and an herbaceous habit (Wagner *et al.* 1999).

Research suggests that this species largely requires outcrossing for successful germination and survival to adulthood. Pollinators for *Schiedea membranacea* are unknown, since none have been seen during the daytime, and none were observed during one set of night observations. Little else is known about the life history of *S. membranacea*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1998a).

*Schiedea membranacea* is currently known from the western side of the island of Kauai, on State and privately owned lands at Poopooiki Valley, Milolii Ridge, Kuia Valley, Awaawapuhi Valley, Nualolo Valley, Kahuamaa Flats, Waialae Falls, Koaie Canyon, and the right branch of Wainiha Valley. On State lands it occurs within the Alakai Wilderness Preserve, Halelea Forest Reserve, Kuia NAR, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve. There are currently 10 occurrences containing 344 to 348 individuals (GDSI 2000; HINHP Database 2000; Wood and Perlman 1993; 61 FR 53070; K. Wood, *in litt.* 1999; ).

This species is typically found on cliffs and cliff bases in mesic or wet habitats in lowland or montane shrubland or forest communities dominated by *Acacia koa*, *Pipturus* spp. and *Metrosideros polymorpha* or *Urticaceae* shrubland on talus slopes at elevations between 422 and 1,259 m (1,386 and 4,131 ft). Associated native plant species include *Alphitonia ponderosa*, *Alyxia oliviformis*, *Asplenium* spp., *Athyrium sandwicensis* (akolea), *Bobea brevipes*, *Boehmeria grandis*, *Cyrtandra* spp., *Diplazium sandwichianum*, *Dodonaea viscosa*, *Eragrostis variabilis*, *Hedyotis terminalis*, *Hibiscus waimeae*, *Joinvillea ascendens* ssp. *ascendens* (ohe), *Labordia helleri* (kamakahala), *Lepidium serra*, *Lysimachia kalalauensis* (NCN), *Machaerina angustifolia*, *Mariscus pennatifolius*, *Melicope* spp., *Myrsine* spp., *Perrottetia sandwicensis*, *Pisonia* spp., *Pleomele aurea*, *Poa mannii*, *Poa sandwicensis*, *Pouteria sandwicensis*, *Psychotria* spp., *Psydrax odorata*, *Remya kauaiensis*, *Sadleria cyatheoides* (amau), *Scaevola procera*, *Thelypteris*

*cyatheoides* (kikawaio), *Thelypteris sandwicensis* (palapalaia), or *Touchardia latifolia* (HINHP Database 2000; 61 FR 53070; K. Wood, pers. comm., 2001).

Habitat degradation by feral goats, pigs, and deer; competition with the nonnative plant species *Ageratina riparia* (Hamakua pamakani), *Erigeron karvinskianus*, *Lantana camara*, *Passiflora tarminiana*, *Psidium cattleianum*, *Rubus argutus*, or *R. rosifolius*; loss of pollinators; and landslides are the primary threats to *Schiedea membranacea*. Based on observations indicating that snails and slugs may consume seeds and seedlings, it is likely that introduced molluscs also represent a major threat to this species (Service 1998a; Wood and Perlman 1993; 61 FR 53070).

*Schiedea spergulina* var. *leiopoda* and *Schiedea spergulina* var. *spergulina* (NCN)

*Schiedea spergulina*, a member of the pink family (Caryophyllaceae), is a short-lived perennial subshrub. Of the 22 species in this endemic genus, only two other species have smooth seeds. *Schiedea spergulina* differs from those two in having very compact flower clusters. The two weakly defined varieties differ primarily in the degree of hairiness of the inflorescences, with *S. spergulina* var. *leiopoda* being the less hairy of the two (Wagner *et al.* 1999).

Little is known about the life histories of either *Schiedea spergulina* var. *leiopoda* or *S. spergulina* var. *spergulina*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Historically, *Schiedea spergulina* var. *leiopoda* was found on a ridge on the east side of Hanapepe on Kauai. One occurrence with approximately 135 to 150 individuals is now known to grow in Lawai Valley on Kauai on privately owned land (GDSI 2000; HINHP Database 2000).

*Schiedea spergulina* var. *spergulina* was historically found in Olokele Canyon, but is now known only from the right branch of Kalalau Valley, Koaie Canyon, and Waimea Canyon. A total of three occurrences numbering approximately 208 individuals is reported on State-owned land within the Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and the Puu Ka Pele Forest Reserve. However, it has been estimated that this species may number in the thousands on Kauai (GDSI 2000; HINHP Database 2000; Service 1995).

Both varieties of *Schiedea spergulina* are usually found on bare rock outcrops or sparsely vegetated portions of rocky cliff faces or cliff bases in diverse lowland dry to mesic forests at elevations between 21 and 90 m (69 and 294 ft) for *S. spergulina* var. *leiopoda* and elevations between 144 and 828 m (474 and 2,718 ft) for *S. spergulina* var. *spergulina*. Associated native plant species include *Acacia koa*, *Artemisia australis*, *Bidens sandwicensis*, *Carex meyenii*, *Chamaesyce celastroides*, *Dianella sandwicensis*, *Doryopteris* spp. (kumuniu), *Eragrostis variabilis*, *Erythrina sandwicensis* (wiliwili), *Gahnia* spp., *Heliotropium* spp. (ahinahina), *Lepidium serra*, *Lipochaeta connata*, *Microlepia strigosa*, *Nestegis sandwicensis*, *Nototrichium sandwicense*, *Panicum lineale*, *Peucedanum sandwicense*, or *Wilkesia gymnoxiphium* (HINHP Database 2000; Lorence and Flynn 1991; Service 1995; 59 FR 9304; K. Wood, pers. comm., 2001).

The major threats to *Schiedea spergulina* var. *leiopoda* are habitat destruction by feral goats and competition with nonnative plants such as *Furcraea foetida* (Mauritius hemp), *Lantana camara*, or *Leucaena leucocephala*. Individuals have also been damaged and destroyed by rock slides. This variety is potentially threatened by pesticide use in nearby sugarcane fields, as well as being at risk of extinction from naturally occurring events (e.g., hurricanes) and/or reduced reproductive vigor due to the small number of existing individuals (Lorence and Flynn 1991; Service 1995; 59 FR 9304).

*Schiedea spergulina* var. *spergulina* is threatened by competition with nonnative plant species, including *Erigeron karvinskianus*, *Lantana camara*, *Melia azedarach*, or *Triumfetta semitriloba* (Sacramento bur). The area in which this variety grows is used heavily by feral goats, and there is evidence that plants are being browsed and trampled (HINHP Database 2000; Lorence and Flynn 1991; 59 FR 9304).

*Schiedea stellarioides* (lauililihi)

*Schiedea stellarioides*, a member of the pink family (Caryophyllaceae), is a slightly erect to prostrate subshrub with branched stems. The opposite leaves are very slender to oblong-elliptic, and one-veined. This short-lived perennial species is distinguished from other *Schiedea* species on Kauai by the number of veins in the leaves, shape of the leaves, presence of a leaf stalk, length of the flower cluster, and shape of the seeds (Wagner *et al.* 1999).