

small shrub. This short-lived perennial species is distinguished from other species of the genus by its leaf shape and width, calyx lobe shape, and corolla length (Wagner *et al.* 1999).

Little is known about the life history of *Lysimachia filifolia*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Historically, *Lysimachia filifolia* was known only from the upper portion of Olokele Valley on Kauai. This species is now also known from Oahu, and the "Blue Hole" area of Waialeale, Kauai. There is currently one occurrence containing a total of 20 to 75 individuals on State-owned land on Kauai within the Lihue-Koloa Forest Reserve (GDSI 2000; HINHP Database 2000; Service 1995).

This species typically grows on mossy banks at the base of cliff faces within the spray zone of waterfalls or along streams in lowland wet forests at elevations between 177 and 1,308 m (581 and 4,290 ft). Associated native plant species include *Antidesma platyphyllum*, *Bidens valida* (kookoolau), *Bobea elatior* (ahakea lau nui), *Chamaesyce remyi* var. *kauaiensis* (akoko), *Cyanea asarifolia*, *Dubautia plantaginea* ssp. *magnifolia* (naenae), *Eragrostis variabilis*, *Machaerina angustifolia*, *Melicope* spp., *Metrosideros polymorpha*, or *Panicum lineale* (HINHP Database 2000; Service 1995; Wagner *et al.* 1999; 59 FR 9304; K. Wood, pers. comm., 2001).

The major threats to *Lysimachia filifolia* on Kauai include competition with nonnative plant species; habitat degradation by feral pigs; and the risk of extinction on Kauai from naturally occurring events (e.g., landslides and hurricanes), due to the small number of individuals in the only known population (HINHP Database 2000; 59 FR 9304).

Mariscus pennatiformis (NCN)

Mariscus pennatiformis, a short-lived member of the sedge family (Cyperaceae), is a perennial plant with a woody root system covered with brown scales. *Mariscus pennatiformis* is divided into two subspecies, ssp. *bryanii* and ssp. *pennatiformis*, which are distinguished by the length and width of the spikelets; color, length, and width of the glume; and by the shape and length of the fruit. This species differs from other members of the genus by its three-sided, slightly concave, smooth stems; the length and number of spikelets; the leaf width; and the length and diameter of stems (Koyama 1990).

Mariscus pennatiformis is known to flower from November to December after heavy rainfall. Additional information on the life history of this plant, reproductive cycles, longevity, specific environmental requirements, and limiting factors is generally unknown (Service 1999).

Historically, *Mariscus pennatiformis* was known from Kauai, Oahu, East Maui, the island of Hawaii, and from Laysan Island in the Northwestern Hawaiian Islands). *Mariscus pennatiformis* ssp. *bryanii* is only known from Laysan Island. *Mariscus pennatiformis* ssp. *pennatiformis* is currently found only on East Maui. It was last seen on Kauai in 1927 (GDSI 2000; HINHP Database 2000; K. Wood, in litt. 1999;).

Mariscus pennatiformis is found at elevations between 544 and 1,104 m (1,785 and 3,621 ft) in open sites in *Metrosideros polymorpha*-*Acacia koa* mixed mesic forest. Associated native plant species include *Alsinidendron viscosum*, *Antidesma platyphyllum* var. *hillebrandii*, *Carex alligata* (NCN), *Cyperus laevigatus* (makaloa), *Dianella sandwicensis*, *Diospyros hillebrandii*, *Diospyros sandwicensis*, *Dodonaea viscosa*, *Leptecophylla tameiameia*, *Myrsine linearifolia*, *Nestegis sandwicensis*, *Panicum nephelophilum*, *Poa sandwicensis*, *Psydrax odorata*, *Schiedea stellarioides*, or endemic ferns (HINHP Database 2000; Koyama 1990; K. Wood, pers. comm., 2001).

Threats to *Mariscus pennatiformis* on Kauai include grazing and habitat destruction caused by ungulates; competition from nonnative plant species; and extinction from random naturally occurring events (e.g., landslides or hurricanes) (Service 1999; 59 FR 56333).

Melicope knudsenii (alani)

Melicope knudsenii, a member of the rue family (Rutaceae), is a tree with smooth gray bark and yellowish brown to olive-brown hairs on the tips of the branches. This long-lived perennial species is distinguished from *M. haupuensis* and other members of the genus by the distinct carpels present in the fruit, a hairless endocarp, a larger number of flowers per cluster, and the distribution of hairs on the underside of the leaves (Stone *et al.* 1999).

Little is known about the life history of *Melicope knudsenii*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Historically and currently, *Melicope knudsenii* is known from Maui and

Kauai. On Kauai, this species is known from 10 occurrences on State-owned land, with a total of 10 individuals, in Poopooiki Valley, Kuia Valley, Mahanaloa Valley, Makaha Ridge, Koaie Canyon, Koaie Falls, and Kawaiiki Valley within Kuia NAR and Na Pali-Kona Forest Reserve (GDSI 2000; HINHP Database 2000; Service 1995; 59 FR 9304; K. Wood, pers. comm., 2001).

Melicope knudsenii grows on forested flats with brown granular soil in lowland dry to montane mesic forests at elevations between 111 and 1,141 m (364 and 3,745 ft) with *Alectryon macrococcus*, *Antidesma platyphylla*, *Bobea brevipes*, *Carex meyenii*, *Cryptocarya mannii*, *Diospyros sandwicensis*, *Diplazium sandwichianum*, *Dodonaea viscosa*, *Euphorbia haeleeleana*, *Gahnia becheyi* (NCN), *Hedyotis* spp., *Hibiscus waimeae*, *Isodendron laurifolium*, *Leptecophylla tameiameia*, *Melicope* spp., *Metrosideros polymorpha*, *Myrsine lanaiensis*, *Nestegis sandwicensis*, *Panicum nephelophilum*, *Peucedanum sandwicense*, *Pisonia sandwicensis*, *Pittosporum kauaiensis*, *Pleomele aurea*, *Pouteria sandwicensis*, *Pritchardia minor*, *Psychotria hobdyi*, *Psydrax odorata*, *Rauvolfia sandwicensis*, *Remya kauaiensis*, *Scaevola procera*, or *Xylosma hawaiiense* (HINHP Database 2000; Service 1995; K. Wood, pers. comm., 2001).

The major threats to *Melicope knudsenii* on Kauai include competition with the nonnative plant *Lantana camara*; habitat degradation by feral goats and pigs; fire; black twig borer; and the 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 existing individuals and populations (Service 1995; 59 FR 9304).

Melicope pallida (alani)

Melicope pallida, a member of the rue family (Rutaceae), is a tree with grayish white hairs and black, resinous new growth. The long-lived perennial species differs from *M. haupuensis*, *M. knudsenii*, and other members of the genus by the presence of resinous new growth, leaves folded in clusters of three, and fruits with separate carpels (Stone *et al.* 1999).

Little is known about the life history of *Melicope pallida*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).