

the size of the flower heads (Wagner *et al.* 1999).

Lipochaeta kamolensis has been observed flowering from December through February, as well as in April. The growing season coincides with the wet season between November and April to May. Plants are deciduous and appear to be metabolically inactive during the dry season. Little else is known about the life history of *L. kamolensis*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are otherwise unknown (Service 1997; 57 FR 20772).

Historically, *Lipochaeta kamolensis* was known from Kamole Gulch, west of Kepuni Gulch, and 7.2 km (11.8 mi) southeast of Ulupalakua Ranch Office. This species still occurs in Kamole Gulch, on State-owned (Department of Hawaiian Home Lands (DHHL)) land. The only known occurrence, which extends over an area of about 40 ha (100 ac), is estimated to contain fewer than 500 individuals (GDSI 2001; HINHP Database 2001; Service 1997; Wagner *et al.* 1999; 57 FR 20772; K. Wood, *in litt.* 1999).

Lipochaeta kamolensis typically grows in gulches or on gentle slopes outside gulches in dry shrubland at elevations between 40 and 602 m (132 and 1,974 ft) and containing one or more of the following associated native plant species: *Dodonaea viscosa*; *Ipomoea indica* (koali awa); or *Plumbago zeylanica* (iliee) (Service 1997; Wagner *et al.* 1999; 57 FR 20772; R. Hobdy, pers. comm., 2001; K. Wood, *in litt.* 1999).

The major threats to *Lipochaeta kamolensis* are habitat destruction, predation by cattle and goats, competition with nonnative plants such as *Lantana camara* (lantana), fire, and the one occurrence being subject to extinction by random environmental events (Service 1997; 57 FR 20772).

Melicope adscendens (Alani)

Melicope adscendens, a long-lived perennial of the rue family (Rutaceae), is a sprawling shrub with long, slender branches covered with gray hairs when young, which become hairless when older. *Melicope adscendens* is distinguished from other species of the genus by its growth habit, the distinct follicles (chambers) of its fruit, and the persistent (remaining attached) sepals and petals (Stone *et al.* 1999).

Melicope adscendens fruits have been collected in March and July. Little else is known about the life history of *M. adscendens*. Flowering cycles, pollination vectors, seed dispersal

agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1997; 59 FR 62346).

Melicope adscendens has been found only on the southwestern slope of Haleakala; two plants, separated by an unspecified distance, were found by Forbes in 1920. Today, there are 16 occurrences on State (Kanaio NAR) and privately owned lands at Puu Ouli and on the border of the Hana and Makawao Districts (GDSI 2001; HINHP Database 2001; Service 1997; 59 FR 62346).

This species typically grows on aa lava (a particular type of lava flow with very sharp edges) with pockets of soil in *Nestegis sandwicensis* (olopua)-*Pleomele auwahiensis* (hala pepe)-*Dodonaea viscosa* lowland mesic forest or open dry forest containing one or more of the following associated native plant species: *Alphitonia ponderosa* (kauila); *Chamaesyce celastroides* var. *lorifolia* (akoko); *Leptecophylla tameiameia*; *Osteomeles anthyllidifolia* (ulei); *Pouteria sandwicensis* (alaa); *Santalum ellipticum* (iliahialoe); or *Xylosma hawaiiense* (maua) at elevations between 761 and 1,209 m (2,497 and 3,967 ft) (HINHP Database 2001; Service 1997; 59 FR 62346; R. Hobdy, pers. comm., 2001; K. Wood, *in litt.* 1999).

Major threats are habitat damage and trampling by cattle; competition with nonnative plant species, including *Bocconia frutescens* (NCN), *Lantana camara*, and *Pennisetum clandestinum* (kikuyu grass); and reduced reproductive vigor or extinction from random environmental events caused by the small number of individuals and narrow distribution. Potential threats include habitat degradation and damage to plants by axis deer (*Axis axis*), feral goats, feral pigs, black twig borer (*Xylosandrus compactus*), fire, and ranch activities (HINHP Database 2001; Service 1997; 59 FR 62346).

Melicope balloui (Alani)

Melicope balloui, a long-lived perennial of the rue family (Rutaceae), is a small tree or shrub. New growth has yellowish brown woolly hairs and waxy scales; plant parts later become nearly hairless. *Melicope balloui* is distinguished from other species of the genus by the partially fused carpels of its four-lobed capsule (dry fruit) and usually persistent sepals and petals (Stone *et al.* 1999).

Little is known about the life history of *Melicope balloui*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and

limiting factors are unknown (Service 1997; 59 FR 62346).

Melicope balloui has been found only on the northern and southeastern slopes of Haleakala. There are 3 known occurrences with a total of approximately 50 individuals on private and federally owned (Haleakala National Park) lands within the East Maui Watershed Partnership at Puu O Kakae and Palikea Stream (GDSI 2001; HINHP Database 2001; Service 1997; 59 FR 62346; K. Wood, *in litt.* 1999).

Melicope balloui typically grows in mesic to wet forest between 781 and 1,596 m (2,561 and 5,267 ft) in elevation and containing one or more of the following associated native plant species: *Acacia koa*; *Cibotium chamissoi* (hapuu); *Cibotium glaucum* (hapuu); *Diplazium sandwicianum*; *Melicope clusiifolia*; *Metrosideros polymorpha*; or *Sadleria pallida* (amau) (HINHP Database 2001; Service 1997; 59 FR 62346; J. Lau, Hawaii Natural Heritage Program, pers. comm., 2001).

Major threats are habitat degradation and damage to plants by feral pigs and axis deer and reduced reproductive vigor or extinction caused by random environmental events caused by the small number of existing occurrences and individuals. Potential threats include competition with nonnative plant species such as *Clidemia hirta*, *Paspalum conjugatum*, *Paspalum urvillei*, and *Psidium cattleianum* (strawberry guava); susceptibility to black twig borer; and predation by rats (HINHP Database 2001; Service 1997; 59 FR 62346).

Melicope ovalis (Alani)

Melicope ovalis, a long-lived perennial of the rue family (Rutaceae), is a tree growing up to 5 m (16 ft) tall. New growth has fine, short, brownish hairs, but soon becomes hairless. Leaves are opposite, leathery, and broadly elliptic. Bruised foliage has an anise odor similar to that of *M. anisata* (mokihana). *Melicope ovalis* is distinguished from other species of the genus by the almost entirely fused carpels of its capsule, its nonpersistent sepals and petals, and its well-developed petioles (leaf stems) (Stone *et al.* 1999).

Little is known about the life history of *Melicope ovalis*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1997; 59 FR 62346).

Melicope ovalis has been found only on the eastern and southeastern slopes of Haleakala. There are two occurrences with approximately 200 individuals,