elevation. This species is typically associated with native and non-native plant taxa such as 'a'ali'i, Christmas berry, kawelu, *Ageratina* spp. (pamakani), ko'oko'olau, *Carex meyenii*, and *Melinis minutiflora* (molasses grass) (HHP 1994q2 to 1994q8, 1994q10, 1994q11).

The primary threats to *Lepidium* arbuscula are habitat degradation and/or destruction by feral goats; potential impacts from military activities; competition with alien plants including Christmas berry, lantana, Maui pamakani, molasses grass, silk oak, strawberry guava, *Ageratina riparia* (Hamakua pamakani), and *Myrica faya* (firetree); and potential fire. The population at the head of Kapuhi Gulch is also threatened by its proximity to a road (HHP 1994q4, 1994q5, 1994q7 to 1994q11).

In 1937 Fosberg and Hosaka collected a specimen of *Lobelia gaudichaudii* ssp. *koolauensis* on Oahu which they described the following year as a variety of *Lobelia gaudichaudii* and named it for the Koolau Mountains (Fosberg and Hosaka 1938). Lammers (1988, 1990) has elevated the variety to a subspecies.

Lobelia gaudichaudii ssp. koolauensis, a member of the bellflower family, is an unbranched, woody shrub 0.3 to 1 m (1 to 3.5 ft) tall. The leaves are inversely lance-shaped to rectangular, 8 to 19 cm (3 to 7.5 in) long, and 1.3 to 2.8 cm (0.5 to 1.1 in) wide. The leaf edges are thickened or curled under, fringed with hairs toward the base, and sharp-pointed at the tip. The flowering stalk is two to six-branched and 40 to 70 cm (16 to 28 in) long. The hairless bracts are lance-shaped to eggshaped and 18 to 32 mm (0.7 to 1.3 in) long. The calyx lobes are triangular, lance-shaped or egg-shaped, and 10 to 15 mm (0.4 to 0.6 in) long. The corolla is greenish or yellowish white and 50 to 75 mm (2 to 3 in) long. The tubular portion of the flower is curved, with spreading lobes. The fruit is an eggshaped capsule. The subspecies koolauensis is distinguished by the greenish or yellowish white petals and the branched flowering stalks. 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 (Lammers 1990).

Historically Lobelia gaudichaudii ssp. koolauensis was known from only two populations in the central Koolau Mountains on Oahu (HHP 1994s1, 1994s2). Currently this subspecies is known from a single population on the Manana Ridge system in the central Koolau Mountains on privately owned

land (HHP 1994s1). The total number of plants is estimated to be less than 250. *Lobelia gaudichaudii* ssp. *koolauensis* typically grows on moderate to steep slopes in 'ohi'a or 'ohi'a-uluhe lowland wet shrublands at elevations between 640 and 730 m (2,100 and 2,400 ft). Associated plant taxa include alani, ko'oko'lau, naupaka, 'uki, and kanawao (HHP 1994s1, 1994s2).

The primary threats to the single remaining population of *Lobelia gaudichaudii* ssp. *koolauensis* are habitat degradation and/or destruction by feral pigs, competition with the noxious alien plant Koster's curse, trampling by hikers, potential overcollection, landslides, and a risk of extinction from naturally occurring events and/or reduced reproductive vigor of the one remaining population (HHP 1994s1; L. Mehrhoff and C. Russell, pers. comms. 1994).

In 1919 Rock described a new variety

In 1919 Rock described a new variety of *Lobelia hillebrandii* based on a specimen collected by Hillebrand in the 1800's. Rock (1919) named this variety *Lobelia hillebrandii* var. *monostachya*. Degener elevated this variety to the species level and transferred it to a new genus as *Neowimmeria monostachya* (Degener 1974). Lammers (1988) transferred the species back to the original genus as *Lobelia monostachya*.

Lobelia monostachya, a member of the bellflower family, is a prostrate woody shrub with stems 15 to 25 cm (6 to 10 in) long. The leaves are stalkless, linear, hairless, 7 to 15 cm (2.8 to 6 in) long, and 0.4 to 0.7 cm (0.2 to 0.3 in) wide. The flowering stalk is unbranched. The corolla is pale magenta, 15 to 18 mm (0.6 to 0.7 in) long, and approximately 5 mm (0.2 in) wide. The lobes of the corolla overlap spirally. The species is distinguished from others in the genus by the narrow, linear leaves without stalks and the short pink flowers (Lammers 1990).

Historically Lobelia monostachya was known only from the Koolau Mountains and had not been seen since its original discovery in the 1800's in Niu Valley and in the 1920's in Manoa Valley (HHP 1991a1, 1991a2). In 1994 Joel Lau discovered one individual in a previously unknown location in Wailupe Valley on State-owned land. Since then a total of eight plants has been found. This species occurs on steep, sparsely vegetated cliffs in mesic shrubland at an elevation of about 290 m (950 ft). Associated plant taxa include Artemisia sp. (ahinahina), Carex meyenii, Psilotum nudum (moa), and Eragrostis sp. (kawelu) (HHP 1994ff).

The major threats to *Lobelia* monostachya are predation by rats; competition with the alien plants

Christmas berry, Hamakua pamakani, *Kalanchoe pinnata* (air plant), and molasses grass; and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the low number of individuals in the only known population (HHP 1994ff).

E.P. Hume first described *Melicope* saint-johnii as Pelea saint-johnii based on a specimen he collected with E. Christophersen and G. Wilder at Mauna Kapu on Oahu (St. John 1944). Thomas Hartley and the late Benjamin Stone (1989) transferred Hawaiian Pelea species to the Pacific genus Melicope. The new combination, Melicope saintjohnii, was published in the same paper (Hartley and Stone 1989). Other published names that refer to this taxon are Evodia elliptica var. elongata, Pelea elliptica var. elongata, P. elongata, and P. saint-johnii var. elongata (Hillebrand 1888, St. John 1944, Stone 1966, Stone et al. 1990).

*Melicope saint-johnii,* a member of the rue family (Rutaceae), is a slender tree 3 to 6 m (10 to 20 ft) tall. The leaves are opposite or occasionally occur in threes on young lateral branches. The leaves, 6 to 16 cm (2.4 to 6.3 in) long and 3 to 8.5 cm (1.2 to 3.3 in) wide, are narrowly to broadly elliptic, sometimes elliptic egg-shaped or rarely lance-shaped. Three to 11 flowers are arranged on an flowering stalk 9 to 22 mm (0.4 to 0.9 in) long. The flowers are usually functionally unisexual, with staminate (male) and pistillate (female) flowers. The staminate flowers have broadly eggshaped sepals which are hairless to sparsely covered with hair. The triangular petals, 6 to 8 mm (0.2 to 0.3 in) long, are densely covered with hair on the exterior. The pistillate flowers are similar in hairiness to staminate flowers, but are slightly smaller in size. The dry fruit, 7 to 12 mm (0.3 to 0.5 in) long, splits at maturity. The exocarp (outermost layer of the fruit wall) is hairless, whereas the endocarp (innermost layer) is hairy. This species is distinguished from others in the genus by the combination of the hairless exocarp, the hairy endocarp, the densely hairy petals, and the sparsely hairy to smooth sepals (Stone et al. 1990).

Historically Melicope saint-johnii was known from both the Waianae and Koolau Mountains—Makaha to Mauna Kapu in the Waianae Mountains and Papali Gulch in Hauula, Manoa-Aihualama, Wailupe, and Niu Valley in the Koolau Mountains (HHP 1994t1 to 1994t15, 1994ee; Takeuchi 1992). Today eight populations of this species are found on Federal (Lualualei Naval Reservation), State, and private land from the region between Puu Kaua and Puu Kanehoa to Mauna Kapu in the