southern Waianae Mountains. Fewer than 150 individuals of this species are currently known (HHP 1994t1 to 1994t4, 1994t7, 1994t14, 1994t15, 1994ee; Takeuchi 1992; Takeuchi and Paquin (s.n.) 1985; J. Lau, pers. comm. 1994). This species typically grows on mesic forested ridges from 500 to 853 m (1,640 to 2,800 ft) elevation. Associated native plant taxa include mamaki, 'ohi'a, Coprosma longifolia (pilo), Hedyotis schlechtendahliana (kopa), Labordia kaalae (kamakahala), and Psychotria hathewayi (kopiko) (HHP 1994t1 to 1994t4, 1994t7, 1994t14, 1994t15, 1994ee; Takeuchi 1992; Takeuchi and Paguin (s.n.) 1985).

The primary threats to *Melicope saint-johnii* are habitat degradation and/or destruction by feral goats and pigs; potential predation by the black twig borer; potential fire; and competition with alien plants such as Christmas berry, firetree, Hamakua pamakani, huehue haole, lantana, Maui pamakani, and silk oak (HHP 1994t3, 1994t4, 1994t13, 1994t14, 1994ee; J. Lau, pers. comm. 1994).

Myrsine juddii was first described by Hosaka in 1940, based on a specimen he collected with Fosberg in the Koolau Mountains. In an action not supported by other taxonomists, Otto and Isa Degener (1971, 1975) transferred this species from Myrsine to the genus Rapanea. Hosaka's concept of Myrsine is currently followed (Wagner et al. 1990). The specific epithet honors Albert Judd, who had a keen interest in conservation of the native Hawaiian flora.

Myrsine juddii, a member of the myrsine family (Myrsinaceae), is a many branched shrub ranging from 1 to 2 m (3.5 to 6.6 ft) tall. The leathery leaves, 4 to 12 cm (1.6 to 4.7 in) long and 1.5 to 3.2 cm (0.6 to 1.3 in) wide, are narrowly inverse lance-shaped or more elliptic. The upper leaf surface is hairless, whereas the lower surface is sparsely to moderately covered with short, coarse, stiff, whitish or brownish hairs toward the base and along the midrib. The leaf base is broadly wedgeshaped to heart-shaped, and the margins are smooth and curl under. The flowers are unisexual and the plants are dioecious (male and female flowers are on separate plants). Flowers occur in groups of four to eight in tight clusters surrounded by small bracts. The yellowish green petals are narrowly inverse lance-shaped, 2.8 to 3.2 mm (0.1 in) long. The fleshy, round fruit contains a single seed. This species is distinguished from others in the genus by the hairiness of the lower leaf surface and the shape of the leaf base (Wagner et al. 1990). In addition, the hairy leaves

distinguish this species from all other species of *Myrsine* on Oahu (Environmental Impact Study Corporation 1977).

*Myrsine juddii* has been reported from only three populations in the central Koolau Mountains—the North Kaukonahua-Kahana Summit divide: Peahinaia Trail; and Puu Kainapuaa to Poamoho Trail. These populations are found on private and State land leased by DOD for Kawailoa Training Area (HHP 1994u1 to 1994u3). The total number is between 500 and 3,000 individuals, with all but 5 to 10 of these in a single, poorly defined population (HHP 1994u2). Myrsine juddii typically grows in wet forests dominated by 'ohi'a or a mixture of 'ohi'a and uluhe at elevations between 580 and 860 m (1,900 and 2,820 ft) (HHP 1994u1 to 1994u3). Associated plant taxa include 'uki, Cheirodendron trigynum ('olapa), Melicope clusiifolia (kolokolo mokihana), Psychotria mariniana (kopiko), Syzygium sandwicensis ('ohi'a ha), and the proposed species Chamaesyce rockii (HHP 1994u2).

The primary threats to *Myrsine juddii* are habitat degradation and/or destruction by feral pigs, potential impacts from military activities, competition with alien plants such as Koster's curse and strawberry guava, and a risk of extinction from naturally occurring events and/or reduced reproductive vigor due to the small number of extant populations (HHP 1994u2, 1994u3; C. Russell, pers. comm. 1994).

In 1825, James Macrae, botanist on H.M.S. *Blonde*, collected a plant on Oahu that George Bentham described and named *Phyllostegia hirsuta* (Wagner *et al.* 1990). This species has been maintained in the current treatment of the Hawaiian members of the genus (Wagner *et al.* 1990).

*Phyllostegia hirsuta*, a member of the mint family (Lamiaceae), is an erect subshrub or vine with stems densely covered with coarse or stiff hairs. The wrinkled leaves are egg-shaped, generally 17 to 30 cm (6.7 to 12 in) long, and 7.3 to 18 cm (2.9 to 7 in) wide. Both leaf surfaces are moderately covered with long, flat hairs. The upper surface is inconspicuously dotted with glands, while the lower surface is more densely glandulose. The egg-shaped floral bracts are 3 to 6 mm (0.1 to 0.2 in) long. The flowers have two lips—the upper one is approximately 3 mm (0.1 in) long and the lower one is 5 to 7 mm (0.2 to 0.3 in) long. The tubular portion of the flower is slightly curved. The corolla is white and usually purple-tinged on the upper lip. The fruit is a nutlet about 3 mm (0.1 in) long. This species is

distinguished from others in the genus by the texture, hairiness, and size of the leaves and the length of the upper bracts (Wagner *et al.* 1990).

Historically *Phyllostegia hirsuta* was known from widespread populations in the Waianae and Koolau Mountains on Oahu. In the Waianae Mountains, this species ranged from the head of Kukuiula (Pahole) Gulch to North Palawai Gulch (HHP 1994v1 to 1994v3, 1994v6, 1994v16, 1994v18 to 1994v20, 1994v22, 1994v31, 1994v33 to 1994v36). In the Koolau Mountains, this species ranged from Pupukea-Kahuku Trail to Palolo, almost the entire length of the Koolau Mountains (HHP 1994v4, 1994v5, 1994v7 to 1994v15, 1994v17, 1994v21, 1994v23 to 1994v30, 1994v32). The distribution of this species in the Waianae Mountains is now restricted to ten populations in the southern part of the historical rangefrom the ridge between Makaha and Waianae Kai to the south fork of North Palawai Gulch (HHP 1994v2, 1994v3, 1994v6, 1994v19, 1994v20, 1994v31, 1994v33 to 1994v36). The current distribution in the Koolau Mountains is six populations scattered over a 10 km (6 mi) length of the summit—from Kawainui Gulch in Kawailoa Training Area to South Kaukonahua drainage (HHP 1994v26 to 1994v30, 1994v32). Approximately 150 to 200 individuals remain in the 16 populations. These populations occur on Federal land in Lualualei Naval Reservation and Schofield Barracks Military Reservation; State land, including Mount Kaala NAR; and private lands, including TNCH's Honouliuli Preserve and land leased by DOD for Kawailoa Training Area. Phyllostegia hirsuta is usually found on steep, shaded slopes in mesic to wet forests dominated by 'ohi'a or a mixture of 'ohi'a and uluhe between 600 and 1,100 m (1,970 and 3,610 ft) elevation. Associated plant taxa include 'ala'a, kanawao, mamaki, pilo, Hedyotis terminalis (manono), Myrsine lessertiana (kolea lau nui), and native and alien ferns (HHP 1994v2, 1994v3, 1994v6, 1994v19, 1994v20, 1994v26 to 1994v36).

The primary threats to *Phyllostegia* hirsuta are habitat degradation and/or destruction by feral pigs; potential impacts from military activities; and competition with Christmas berry, huehue haole, Koster's curse, lantana, prickly Florida blackberry, and strawberry guava (HHP 1994v2, 1994v3, 1994v19, 1994v27, 1994v29 to 1994v31, 1994v34 to 1994v36).

Based upon a specimen collected in 1977 by John Obata, Gerald Carr, and Daniel Palmer on Oahu, St. John (1987a) described *Phyllostegia kaalaensis*,