

stems, leaves, flower bracts, and fruit are covered with sticky hairs.

*Tetramolopium remyi* has the largest flower heads in the genus. Two other species of the genus are known historically from Lanai, but both have purplish rather than yellow disk florets and from four to 60 rather than one flower head per branch (Lowrey 1999).

*Tetramolopium remyi* flowers between April and January. Field observations suggest that the population size of the species can be profoundly affected by variability in annual precipitation. The adult plants may succumb to prolonged drought, but apparently there is a seedbank in the soil that can replenish the population during favorable conditions. Such seed banks are of great importance for arid-dwelling plants to allow populations to persist through adverse conditions. Success in greenhouse cultivation of these plants with much higher water availability implies that, although these plants are drought-tolerant, perhaps the dry conditions in which they currently exist are not optimum. Individual plants are probably not long-lived. Pollination is hypothesized to be by butterflies, bees, or flies. Seed dispersal agents, environmental requirements, and other limiting factors are unknown (Lowrey 1986; Service 1995).

Historically, the species was known from Maui and Lanai. Currently, *Tetramolopium remyi* is known only from one occurrence on Lanai on privately owned land near Awehi Road, with a total of approximately 150 plants (GDSI 2000; HINHP Database 2000).

*Tetramolopium remyi* is found in red, sandy, loam soil in dry *Dodonaea viscosa*-*Heteropogon contortus* communities at elevations between 65 and 485 m (213 and 1,591 ft). Commonly associated native species include *Bidens mauiensis* (kookoolau), *Melanthera lavarum* (nehe), *Waltheria*

*indica*, or *Wikstroemia oahuensis* (HINHP Database 2000).

Browsing by axis deer and mouflon sheep and competition from nonnative species, primarily *Andropogon virginicus* (broomsedge) and *Panicum maximum* (guinea grass), are the main threats to the species on Lanai. Fire is also a potential threat (Service 1995; 56 FR 47686).

#### *Vigna o-wahuensis* (NCN)

*Vigna o-wahuensis*, a member of the legume family (Fabaceae), is a slender, twining, short-lived perennial herb with fuzzy stems. Each leaf is made up of three leaflets, which vary in shape from round to linear. This species differs from others in the genus by its thin yellowish petals, sparsely hairy calyx, and thin pods, which may or may not be slightly inflated (Geesink *et al.*, 1999).

Little is known about the life history of *Vigna o-wahuensis*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1999).

Historically, *Vigna o-wahuensis* was known from Niihau, Oahu, and Maui. Based on recent collections, *Vigna o-wahuensis* is now known to be extant on the islands of Molokai, Maui, Lanai, Kahoolawe, and Hawaii. On Lanai, one occurrence with at least one individual is known from Kanepuu on privately owned land (GDSI 2000; HINHP Database 2000; Service 1999; J. Lau, *in litt.* 2000).

On Lanai, *Vigna o-wahuensis* is found in *Nestegis sandwicensis* or *Diospyros sandwicensis* dry forest at elevations between 98 and 622 m (321 and 2,040 ft) (HINHP Database 2000; 59 FR 56333; J. Lau, pers. comm., 2001).

Threats to *Vigna o-wahuensis* on Lanai include habitat degradation by

mouflon sheep and axis deer; competition with various nonnative plant species; fire; and random naturally occurring events causing extinction and or reduced reproductive vigor of the only remaining individual on Lanai (Service 1999).

#### *Zanthoxylum hawaiiense* (ae)

*Zanthoxylum hawaiiense* is a medium-sized tree in the rue (citrus) family (Rutaceae) with pale to dark gray bark, and lemon-scented leaves, composed of three small leaflets. A long-lived perennial tree, *Z. hawaiiense* is distinguished from other Hawaiian members of the genus by several characteristics: Three leaflets all of similar size, one joint on the lateral leaf stalk, and sickle-shaped fruits with a rounded tip (Stone *et al.*, 1999).

Little is known about the life history of *Zanthoxylum hawaiiense*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1996a).

Historically, *Zanthoxylum hawaiiense* was known from five islands: Kauai, Molokai, Lanai, Maui, and the island of Hawaii. Currently, *Zanthoxylum hawaiiense* is found on Kauai, Molokai, Maui, and the island of Hawaii. It was last seen on Lanai in 1947 (GDSI 2000; HINHP Database 2000).

Nothing is known of the preferred habitat of or native plant species associated with *Zanthoxylum hawaiiense* on the island of Lanai (Service 1996a).

Nothing is known of the threats to *Zanthoxylum hawaiiense* on the island of Lanai (Service 1996a).

A summary of occurrences and landownership for the 37 plant species reported from the island of Lanai is given in Table 2.

TABLE 2.—SUMMARY OF EXISTING OCCURRENCES ON LANAI, AND LANDOWNERSHIP FOR 37 SPECIES REPORTED FROM LANAI

Species	Number of current occurrences	Landownership		
		Federal	State	Private
<i>Abutilon eremitopetalum</i> .....	1	.....	.....	X
<i>Adenophorus periers</i> .....	0	.....	.....	.....
<i>Bidens micrantha</i> .....	1	.....	.....	X
<i>Bonamia menziesii</i> .....	3	.....	.....	X
<i>Brighamia rockii</i> .....	0	.....	.....	.....
<i>Cenchrus agrimonioides</i> .....	0	.....	.....	.....
<i>Centaurium sebaeoides</i> .....	1	.....	.....	X
<i>Clermontia oblongifolia</i> ssp. <i>mauiensis</i> .....	1	.....	.....	X
<i>Ctenitis squamigera</i> .....	2	.....	.....	X
<i>Cyanea grimesiana</i> ssp. <i>grimesiana</i> .....	2	.....	.....	X
<i>Cyanea lobata</i> .....	0	.....	.....	.....
<i>Cyanea macrostegia</i> ssp. <i>gibsonii</i> .....	2	.....	.....	X
<i>Cyperus trachysanthos</i> .....	0	.....	.....	.....
<i>Cyrtandra munroi</i> .....	2	.....	.....	X