

Hedyotis parvula

- **Scientific name:** *Hedyotis parvula* (A. Gray) Fosb.
- **Hawaiian name:** None known
- **Family:** Rubiaceae (Coffee family)
- **Federal status:** Listed endangered October 29, 1991
- **Requirements for Stability:**
 - 3 Population Units (PUs)
 - 50 reproducing individuals in each PU (short-lived perennial)
 - Stable population structure
 - Threats controlled
 - Complete genetic representation in storage of all PUs
- **Description and biology:** *Hedyotis parvula* is an erect to sprawling perennial shrub with branches measuring 10-30 cm long. Its oppositely arranged leaves are 1-4 cm long. Its inflorescences are borne at the tips of the branches. The flowers' corollas usually have four lobes, which are white to white tinged with purplish pink towards their tips, and measure 5-6 mm long. The flowers are either perfect (possessing both male and female reproductive parts), or pistillate (possessing only female reproductive parts). The capsules are almost round, measure about 3.3-4.0 mm long, split open across the top upon maturity, and contain small dull brown seeds.
- As with certain other Hawaiian cliff species the flowers of *H. parvula* are relatively large and white or light colored, and are prominently displayed above the plant's foliage, suggesting that the species' pollinating agent are night-flying moths. Flowering and fruiting has been recorded throughout the year. Little is known about *H. parvula*'s breeding system and seed dispersal agents.
- **Known distribution:** *Hedyotis parvula* is endemic to the Waianae Mountains, and has been documented throughout the mountain range. Recorded elevations for this species range from 720-830 m.

Hedyotis parvula

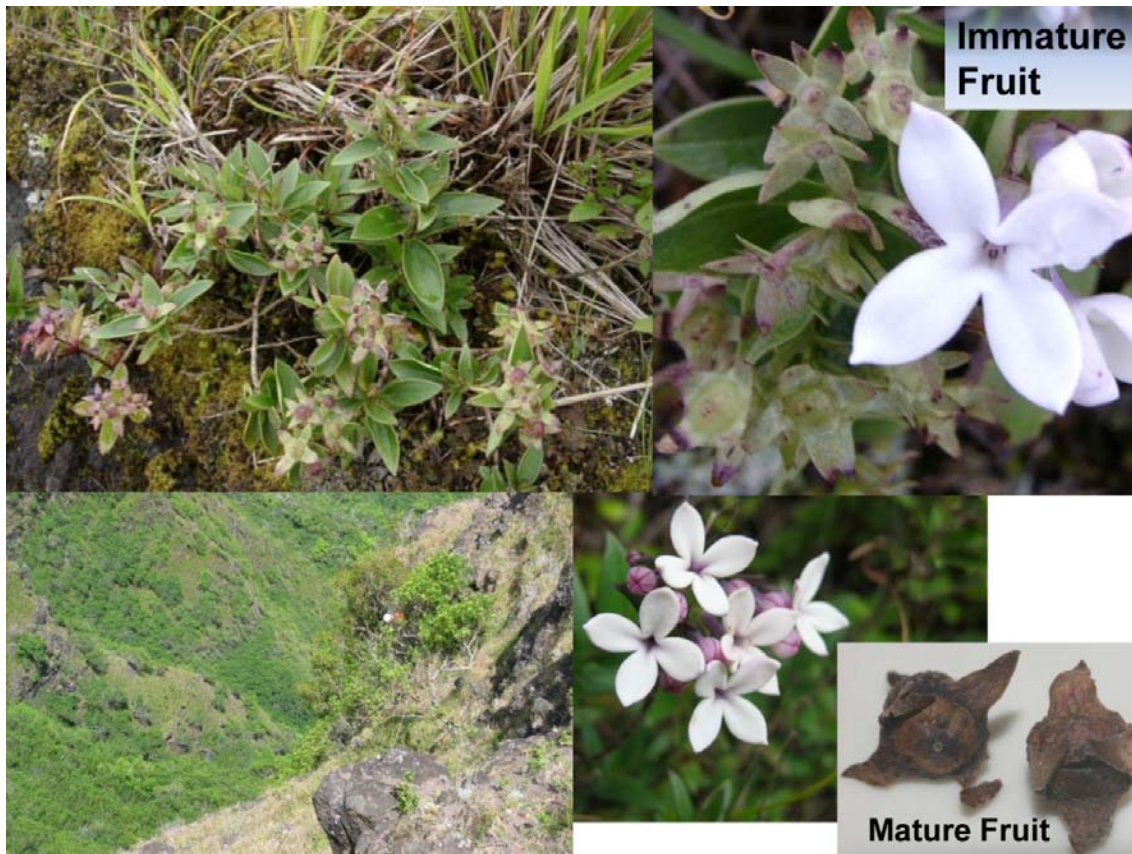
- **Population trends:** All of the currently known populations of *H. parvula* were discovered within the past three decades, so little information on the species' population trends is available.
- **Habitat:** *Hedyotis parvula* typically grows on cliff faces or on exposed rocky ridges. The vegetation in these areas is mesic, usually short and sparse, and includes native herbs, grasses, sedges, and shrubs.
- **Taxonomic background:** There are noticeable morphological differences among herbarium specimens of *H. parvula*. These differences may be genetically based. *Hedyotis parvula* forma *sessilis* is a form that was described based on its leaf shape (Fosberg 1943). It was thought that the plants from the southern Waianae Mountains represented this form, whereas the plants from the northern Waianaes represented the typical form *H. parvula* forma *parvula*. Findings from additional study of the morphological differences within the species may result in future alterations of the species' conservation plans.
- **Threats:** Feral goats and pigs constitute major threats to *H. parvula*. Although many plants grow on steep cliffs where they cannot be reached by ungulates, many others are within their reach. Furthermore, the animals degrade the plants' habitat by hastening the spread of invasive weeds and by disturbing substrates above the cliffs, thus increasing the size and frequency of landslides and rock falls, which directly affect even the inaccessible plants and their steep cliff habitat. Alien plants threaten *H. parvula* by altering the species' habitat and competing with it for moisture, light, nutrients, and growing space. Also, the spread of highly flammable alien grasses increases the incidence and destructiveness of wildfires

*Above description is an excerpt from MIT 2003. Population trends was updated from discovered date as three, rather than two, decades ago.

Fosberg, F.R. 1943. The polynesian species of *Hedyotis* (Rubiaceae). Bernice P. Bishop Mus. Bull. 174:1-102.
 Makua Implementation Team (MIT). 2003. Final Makua Implementation Plan. Prepared for the U.S. Army Garrison, Schofield Barracks, HI.

Reproductive Biology Table

Population Unit	Observed Phenology			Reproductive Biology		Seeds	
	Flower	Immature Fruit	Mature Fruit	Breeding System	Suspected Pollinator	Average# Per Fruit	Dormancy
Ohikilolo	November-January	November-June	May-June	Hermaphroditic	Moth	54 ± 47	Not Dormant
Halona	November-January	November-June	May-June	Hermaphroditic	Moth	39 ± 24	Not Dormant



**Map removed,
available upon request**

Population Units

Manage for Stability Population Units	PU Type	Which Army Action Area is the PU inside?	Management Unit(s) designated for threat control
Ohikilolo	in situ	MMR	Ohikilolo
Halona	in situ	None	Halona
East Makaleha	Reintroduction	None	East Makaleha
Genetic Storage Population Units			
None			

Population Structure

- The priority for stabilizing the population structure at the Ohikilolo and Halona Population Units is to maintain the current estimate for mature plants.
- Since the trend displayed in the monitoring estimates for the two extant PU have been stable, the plan is to maintain current estimates for Immature and Seedlings.
- NRS will work to determine an appropriate level of decline in estimates that would trigger additional management.
- The population structure for the East Makaleha PU will be established by reintroducing 200+ immature or mature plants to a single site. If population structure does not begin to develop after 5 years, another reintroduction will be initiated.

Population Unit	Population Monitoring History		
	2008 Mat/Imm/Seedling	2006 Mat/Imm/Seedling	2002 Mat/Imm/Seedling
Ohikilolo	120/28/40	119/34/34	100/18/11
Halona	97/35/19	97/35/19	none

Monitoring Plan

Ohikilolo PU

- Estimates will be made during a census of all known sites every two years. This will document a trend for each site.
- Digital photos of each site will be taken during each census and may be used to detect changes in distribution and abundance.
- Any threats to the sites will be noted.

Halona PU

- Estimates will be made during a census of all known sites every two years. This will document a trend for each site.
- Digital photos of each site will be taken during each census and may be used to detect changes in distribution and abundance.
- Any threats to the sites will be noted.

East Makaleha PU

- Monitoring of the reintroduction will begin when it is established in MIP YEAR 8 (2011)
- Digital photos of the site will be taken during each census and may be used to detect changes in distribution and abundance.
- Any threats to the site will be noted.

Genetic Storage Plan

What propagule type is used to meet genetic storage goals?	What is the source for the propagules?	What is the Genetic Storage Method used to meet the goal?	What is the proposed re-collection interval for seed storage?	Is seed storage testing ongoing?	Plan for maintaining genetic storage.
Mature Seed	in situ	Seeds (-18C and 20%RH)	5+ years	Yes	Collections will continue to be made from the in situ sites.

Genetic Storage Plan Comments: Seed storage trials are ongoing and the re-collection interval may be adjusted

Reintroduction Plan

Population Unit	Reintroduction Site(s)	Year initiated	Propagule Source	# of Founders in Source Population	# of Plants to be planted	Propagule Type	Plant Size	Pot Size
East Makaleha	East Makaleha	2011	Ohikilolo	108	216	Immature plants	10-30 cm.	4 inch round

Reintroduction Plan Comments:

East Makaleha Population Unit

- Reintroduction Site: A single site will be selected and all planting completed in 1-2 years. If initial survivorship is good, the plants will be given five years to establish population structure. If the population structure are not met in five years, additional reintroduction attempts will be initiated.
- Year initiated: Propagation for reintroduction will begin in MIP YEAR 8 (2010) and planting will begin in MIP YEAR 9 December 2011.
- Propagule Population(s) Source: Two plants from each of the available founders in the Ohikilolo PU will be propagated from collections of seed already in storage. The seeds were collected from the sites over several years and the oldest collections will be used first .
- Pot Size: Small plants will be installed into cliff habitat by personnel on rappel.

5 Year Action Plan

Population Unit	Proposed Actions				
	MIP YEAR 6 Oct.2009- Sept.2010	MIP YEAR 7 Oct.2010-Sept. 2011	MIP YEAR 8 Oct.2011- Sept. 2012	MIP YEAR 9 Oct.2012- Sept.2013	MIP YEAR 10 Oct.2013- Sept.2014
 Ohikilolo	•Monitoring	•None	•Monitoring	•None	•Monitoring
Halona	•Monitoring	•None	•Monitoring	•None	•Monitoring
East Makaleha	•None	•None	•Begin propagation	•Reintroduce	•Reintroduce •Monitoring

MIP YEAR 8 Comments: The East Makaleha PU will be established by reintroduction starting in MIP YEAR 8 (2011).

2008-2009 Stabilization Goals Update

MFS Population Units	PU Stability Target		MU Threat Control						Genetic Storage
	Has the Stability Target for mature plants been met?	Does the PU have observed structure to support the stability target in the long-term?	Ungulates	Weeds	Rodents	Fire	Slugs	Black Twig Borer	Are there enough propagules in Genetic Storage?
Ohikilolo	YES	Unk	YES	PARTIAL	NO	NO	NO	NO	YES
Halona	YES	Unk	NO	NO	NO	NO	NO	NO	YES
East Makaleha	N/A	N/A	NO	NO	NO	NO	NO	NO	N/A

2008-2009 Highlights

Major Highlights/Issues MIP Year 5

- Both extant PUs have met the stability goal of having more than 50 reproducing plants
- Genetic storage goals have been met for both extant PUs.

Plans for MIP Year 6

- Conduct a thorough monitoring of the 'Ōhikilolo PU to locate juvenile plants.

2008-2009 Taxon Status Table

Action Area: In

TaxonName: <i>Hedyotis parvula</i> TaxonCode: HedPar														
Population Unit Name	Management Designation	Current Mature (Wild)	Current Immature (Wild)	Current Seedling (Wild)	Current Augmented Mature	Current Augmented Immature	Current Augmented Seedling	NRS Mature 2008	NRS Immature 2008	NRS Seedling 2008	Total Mature	Total Immature	Total Seedling	Population Trend Notes
Ohikilolo	Manage for stability	120	28	40	0	0	0	120	28	40	120	28	40	No monitoring in the last year
Total for Taxon:		120	28	40	0	0	0	120	28	40	120	28	40	

Action Area: Out

TaxonName: <i>Hedyotis parvula</i> TaxonCode: HedPar														
Population Unit Name	Management Designation	Current Mature (Wild)	Current Immature (Wild)	Current Seedling (Wild)	Current Augmented Mature	Current Augmented Immature	Current Augmented Seedling	NRS Mature 2008	NRS Immature 2008	NRS Seedling 2008	Total Mature	Total Immature	Total Seedling	Population Trend Notes
East Makaleha	Manage reintroduction for stability	0	0	0	0	0	0	0	0	0	0	0	0	Reintroduction will begin once the fence is complete
Halona	Manage for stability	97	35	19	0	0	0	97	35	19	97	35	19	No monitoring in the last year
Total for Taxon:		97	35	19	0	0	0	97	35	19	97	35	19	

2008-2009 Genetic Storage Status Table

Population Unit Name	# of Potential Founders			Partial Storage Status			Storage Goals Met
	Current Mature	Current Imm.	NumWild Dead	# Plants >= 10 in Seedbank	# Plants >=1 Microprop	# Plants >=1 Army Nursery	# Plants that Met Goal
<i>Hedyotis parvula</i>							
East Makaleha	0	0	0	0	0	0	0
Halona	97	35	0	70	0	4	62
Ohikilolo	120	28	5	108	0	0	102
				Total # Plants w/ >=10 Seeds in Seedbank	Total # Plants w/ >=1 Microprop	Total # Plants w/ >=1 Army Nursery	Total # Plants that Met Goal
				178	0	4	164