

GUIDANCE DOCUMENT

Recovery of Native Plant Communities and Ecological Processes
Following Removal of Non-native, Invasive Ungulates from
Pacific Island Forests

Pohakuloa Training Area Plant Guide

SERDP Project RC-2433

JULY 2018

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Distribution Statement A

This document has been cleared for public release



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REPORT DOCUMENTATION PAGE

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14. ABSTRACT This plant guide was inspired by and modeled after the Pohakuloa Training Area Plant Identification cards, which were created solely for educational purposes. Therefore this guide is also intended to be a learning tool for researchers working at Pohakuloa. The production of this plant guide was 100% inspired by the Pohakuloa Training Area Plant ID Cards. The Cards are divided into the categories of Common Native Plants, Rare Native Plants, and Weeds, and it was thought that a guide using a different organizational method might be easier to use for in-field plant identification.					
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1. Ferns & Fern Allies

Order: Polypodiales

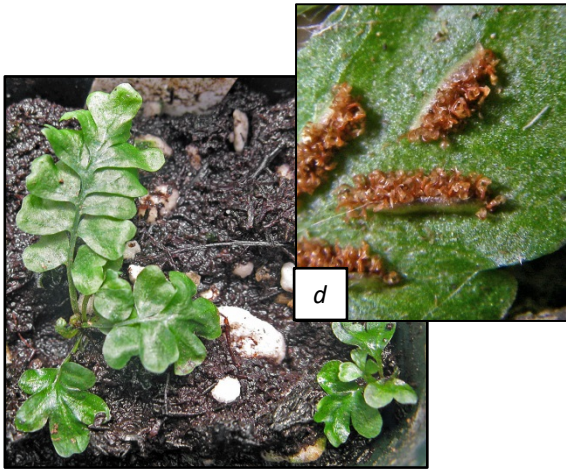
Family: Aspleniaceae (Spleenworts)

Asplenium peruvianum var. *insulare* – fragile fern (Endangered)

Delicate ENDEMIC plants usually growing in cracks or caves; largest pinnae usually <6mm long, tips blunt, uniform in shape, shallowly lobed, 2-5 lobes on acroscopic side.

Fewer than 5 sori per pinna.

Fronds with distal stipes, proximal rachises occasionally proliferous.



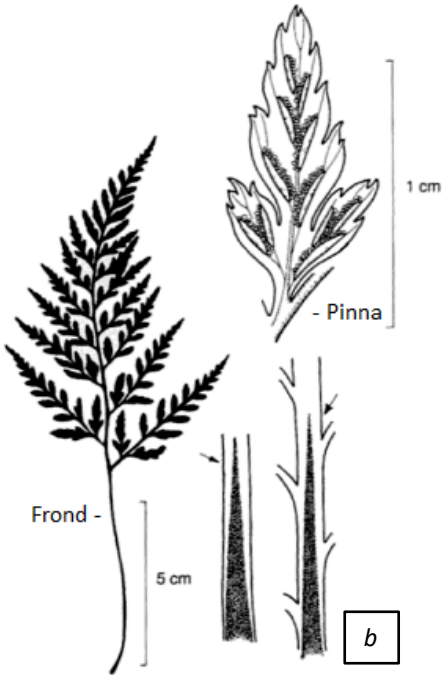
Asplenium trichomanes subsp. *densum* – ‘oāli’i; maidenhair spleenwort



Plants small, commonly growing in full sunlight. Rhizomes short, erect, retaining many dark brown, shiny old stipe bases.. Stipes wiry, dark brown – black, up to 10cm, shiny, glabrous, adaxial surface flat, with 2 greenish ridges on either side. Pinnae 15-45 pairs, almost sessile, alternate, ovate to round, basal pinnae smaller and more widely spaced. Veins inconspicuous, unforked.

Asplenium adiantum-nigrum - 'iwa'iwa (I)

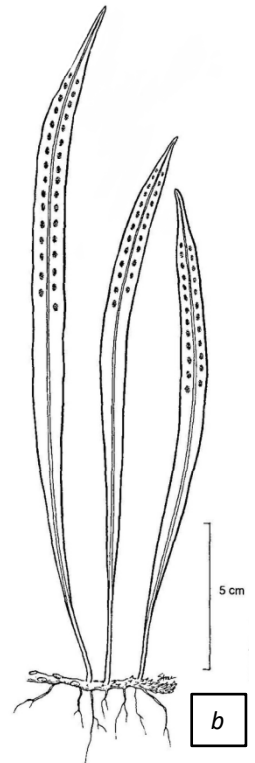
Plants small to med. Fronds 5-12cm, not proliferous. Stipes clustered, shiny, distinctly changing from light green at the distal rachises, to dark brown at the base. Common in dry, open lava fields.



Order: Polypodiales
Family: Polypodiaceae

Lepisorus thunbergianus – pākahakaha (I)

Plants small; commonly growing in trees and rocks, but may be terrestrial. Fronds in tufts; simple, linear-lanceolate, short-stalked, leathery with entire margins. Sori round or slightly oblong, alternate in single rows on either side of costae. Each sorus covered with peltate, umbrella shaped paraphyses that become deciduous on older fronds.



Order: Polypodiales

Family: Sionpteridaceae (Cliff breaks and lip ferns)

- ***Pellaea ternifolia*** – kalamoho (I)



Terrestrial or epiphytic fern found in exposed dry areas. Distinctive pinnae in clusters of 3 almost equal narrow segments, with margins that curl under (*ternifolia*). Fronds up to 12"; stipes closely spaced, either round at base or distally grooved, shiny, dark purplish brown. Sori marginal.



Order: Psilotales

Family: Psilotaceae (whisk ferns)

- ***Psilotum nudum*** – moa, pipi (I)



Small plants, commonly found growing on rocks and lava flows, but may be terrestrial or epiphytic. Stems bright greenish-yellow, upright, spreading, 3-angled, branched above. Bright yellow sporangia 3-ranked on branchlet ridges.

2. Herbaceous Flowering Plants

Family: Hemerocallidaceae (formerly in Liliaceae)

Dianella sandwicensis – ‘uki’uki (I)



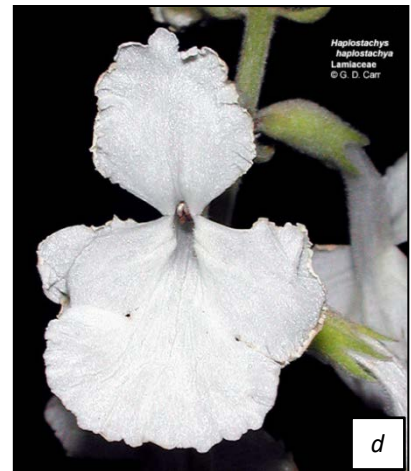
Wide, grass-like leaves growing from central clump

Flowers small & pale blue along solitary stalk

Light-dark blue round berries

Family: Lamiaceae (Mint family)

Haplostachys haplostachya – honohono (Endangered)



Erect perennial herb

White, sweet smelling flowers

Leaves w/crenate edges + fuzzy white hairs

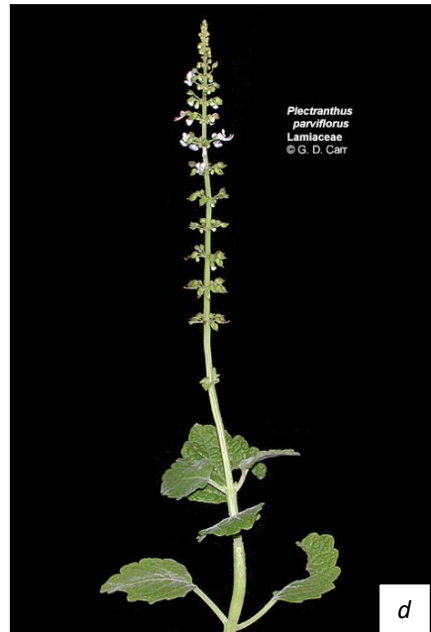
Stenogyne angustifolia – creeping mint (Endangered)



Vine w/ leaves opposite, usually lance-shaped,
margins evenly toothed
Stems square
Flowers 1 at each leaf base (red, maroon, or rarely
yellow) irregularly shaped



Plectranthus parviflorus – ala'ala wai nui wahine; spurflower (I)



Thick, velvety leaves – broad w/notched rounded
margins
Stem hairy
Flowers small, blue, irregular and in clustered nodes

Family: Lamiaceae (cont'd)

***Marrubium vulgare* – horehound (W)**



Herb with several erect angular stems
Leaves elliptic – ovate with crenate-dentate margins
White wooly pubescences dense in axillary clusters



Family: Geraniaceae

***Erodium cicutarium* – pin clover, red stem filaree (W)**



Hairy, sticky annual forming basal rosettes that spread into ascending, leafy branches.
Leaves pinnately compound, opposite w/pinnatifid leaflets.
Several bright pink flowers emerge from axils in umbels.
Carpel bodies single & narrowly shaped



Family: Portulacaceae (Purslane family)

***Portulaca sclerocarpa* – po'e; hard fruit purslane (Endangered)**



Fleshy succulent
Thick-walled capsules
Leaves pale, green, linear, nearly round in CS
Flowers 2-6 in small heads at tips of branches subtended by numerous long white hairs
Petals white or pink



***Portulaca villosa* – 'ihi, hairy purslane (Threatened)**



Similar to above but with THIN capsule walls
Flowers 3-6 in heads at the tip of branches subtended by hairs & reduced branches

Family: Asteraceae (Sunflower family)

***Bidens menziesii* – ko'oko'olau**



Small erect shrub up to 4' tall
4-5 yellow petals appearing numerous in clusters w/darker yellow centers
Leaves up to 10", partially divided to branching segments

***Dubautia linearis* subsp. *hillebrandii* – kupaoa**



Woody, branching shrub
Narrow, lance-shaped leaves come to sharp point and (usually) bunched on stem, whorled. Several species of this genera exist at PTA.

Melanthera venosa – spreading nehe (Endangered)



Delicate leaves sandpaperly to touch
Stems spreading in arc-like fashion
1-3 flower heads per inflorescence



Bidens pilosa – beggar's tick (W)

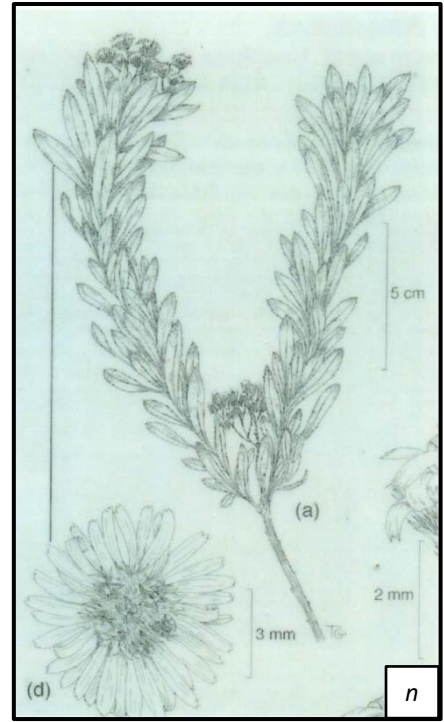
Erect annual herb up to 1.5m
Leaves pinnately compound w/3-5 leaflets
Ray flowers white, disks yellow
Achenes dark brown or black



Family: Asteraceae (Cont'd)

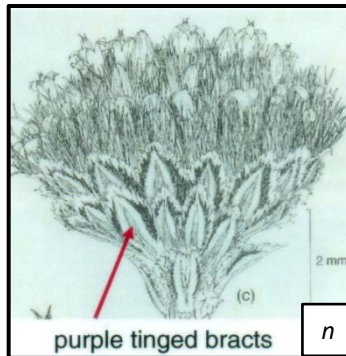
***Tetramolopium arenarium* – Mauna Kea pamakani (Endangered)**

Perennial erect shrub up to 2m
Single stemmed at base, branching above
Leaves nearly clasping stem, alternate, oblanceolate, covered with short soft hairs
margins entire or shallowly dentate,
Flowers several heads in dense clusters at tips of branches
Ray flowers white, numerous
Disk flowers maroon or rarely yellow



***Tetramolopium consanguineum* – narrow-leaf pamakani (Rare)**

Habit similar to above
Leaves linear w/stiff hairs along midrib
Flowers numerous heads in tight clusters
Purplish bracts subtending flowers
Ray florets numerous & petals lavender or white
Disk florets maroon



***Tetramolopium humile* – sub-apline pamakani (Rare)**

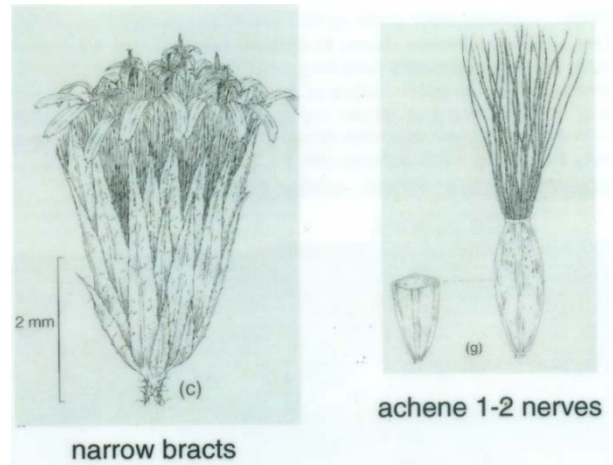


Smaller than other species
Stems densely glandular + resinous
Leaves alternate, linear
Ray petals white – purplish
Disk florets pink – purple
Pappus yellowish-brown



***Tetramolopium sp. 1** – tooth-leaf pamakani**

Leaves alternate, linear to oblanceolate, margins entire to variously and deeply toothed, pubescent (with long straight hairs to almost glabrous)
Flowers numerous heads in open clusters at tips of branches
Bracts subtending flowers long and narrow



* Undescribed species

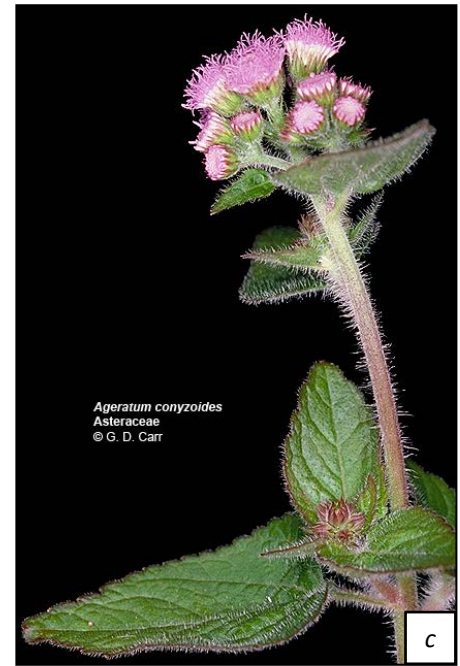
Ageratum conyzoides – maile honohono, billygoat weed (W)

Bad-smelling herb w/ stems sparsely-densely pillose

Leaves ovate

Lower leaf surface conspicuously dotted w/glands, margins crenate

Heads in flat-topped cymes, flowers bluish lavender, rarely white



Delairea odorata – German ivy (W)



Fleshy perennial vine, woody below
Leaves palmately veined, and shallowly 3-10 lobed
Yellow flowers in dense terminal cymes

Family: Asteraceae (Cont'd)

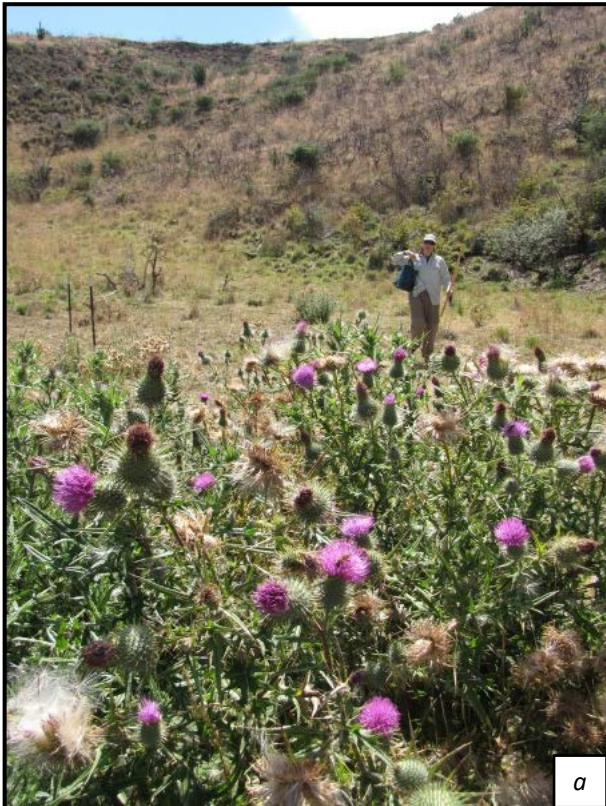
Centaurea melitensis – Napa thistle (W)

Several stems from basal rosette, branched in upper portion
Lower leaves oblanceolate pinnately lobed
Upper leaves linear and smaller
Heads in upper leaf axils, spiny often pubescent near tip



Cirsium vulgare – bull thistle; pua kala (W)

Spiny herb
Leaves simple, alternate, elliptic, toothed, w/prickly margins
Several, woolly heads w/spine tipped bracts



Family: Asteraceae (Cont'd)

Heterotheca grandiflora – telegraph weed (W)

Aromatic herb, sroun unbranched below
Leaves ovate-oblong and glandular pubescent
Inflorescence branched w/many yellow flower



Senecio madagascariensis – fireweed (W)

Erect annual OR short-lived perennial herbs
Leaves oblanceolate & pinnately veined
Stems of upper leaves cauline or clasping
Heads in terminal or axillary cymes
Disk + ray flowers yellow



Family: Asteraceae (Cont'd)

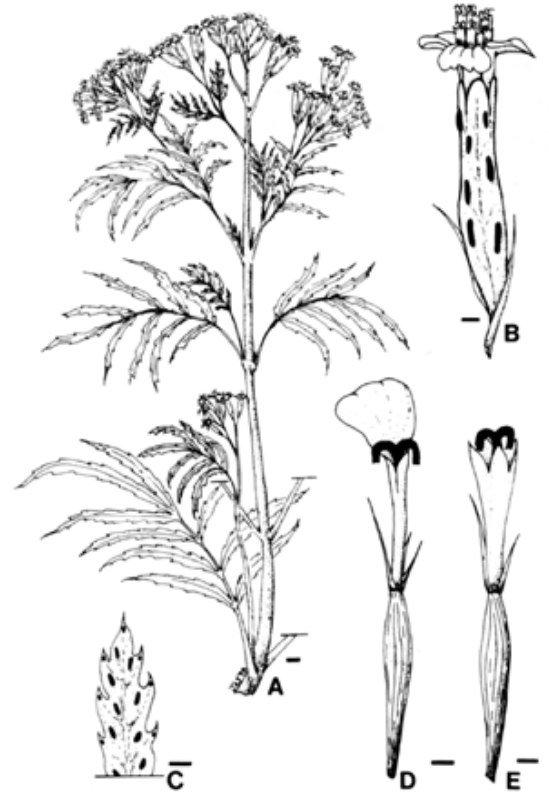
Tagetes minuta – stink weed (W)

Foul smelling annual herb

Leaves pinnately compound 9-17 leaflets, linear to lanceolate w/serrate margin

Heads numerous usually in flat topped cymes

Ray flowers yellow/orange, disks orange or yellow



Verbesina encelioides – golden crownbeard (W)



Family: Campanulaceae

Wahlenbergia gracilis – Australian bluebell (Weed)



Family: Apiaceae (the carrot family)

Spermolepis hawaiiensis – Hawai'i scaleseed (Endangered)

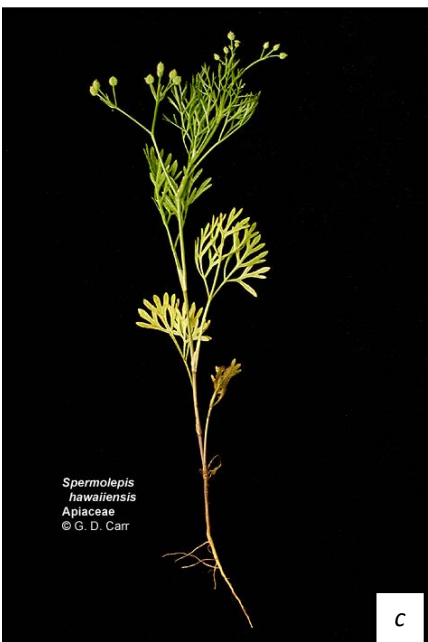
Erect herb arising from a taproot

Stems glabrous

Leaves alternate with a sheathing petiole, compound with linear segments

Flowers white, in compound umbels opposite the upper leaves and regular

Fruit 3-4mm, nearly round, ribbed, covered in hooked spines



Spermolepis hawaiiensis
Apiaceae
© G. D. Carr

Family: Apocynaceae **Subfamily:** Asclepiadoideae (the milkweed subfamily)

***Asclepias physocarpa* – balloon plant (W)**

1-2m tall herb, sparingly branched sometimes woody at base
Leaves opposite, linear lanceolate
Flowers white
Fruit is greatly inflated + covered w/soft bristles
Has latex



Family: Crassulaceae (the stonecrop family)

***Kalanchoe tubiflora* – chandelier plant (W)**

Erect succulent perennial herb, stems generally unbranched
Leaves simple, often spotted w/reddish-brown
Flower is a pendent cyme, corollas orange/scarlet



Family: Brassicaceae (the cabbage family)

***Lepidium africanum* – aromatic peppergrass (W)**

Stems long, branched, usually ascending
Stem leaves in fascicles (bunches)
Leaves 1-4cm, pinnately lobed, serrate, or entire
Siliques are oblong-elliptic w/apical notch



***Lepidium virginicum* – pepperwort (W)**

Annual or biennial herb, usually single from base, branched above
Basal leaves oblanceolate, 4-15cm long, sharply toothed to pinnatifid, upper leaves reduced
Silicles suborbicular to broadly elliptic



Family: Amaranthaceae **Subfamily:** Chenopodioideae (goosefoot family)

Chenopodium oahuense – ‘aweoweo

Goosefoot shaped, grayish leaves

Often branching woody, small shrub growing to 6' tall

Flowers and fruits in small green clusters at tips of branches

Fishy odor



Family: Amaranthaceae **Subfamily:** Salsoloideae

Kali tragus – Russian thistle; tumble weed (W)



Annual herb, light green in color, glabrous,

many branched can form a round clump

Leaves linear and spine tipped

Flowers small and clustered in leaf axils



Family: Fabaceae (legume family)

***Vigna o-wahuensis* – O’ahu cowpea (Endangered)**

Slender, twining annual or perennial herb

Sparsely to densely hirsute (hairy)

Leaflets membranous, suborbicular to rhombic-ovate, linear-deltate, or linear,

1.2-8cm long 0.1-2.5cm wide, apex bluntly acute

Flowers 1-4, pale or greenish yellow

Pods linear 40-90mm long



***Neonotonia wightii* – glycine (W)**

Twining perennial herb, stems often forming dense clumps

Densely hairy w/rusty colored hairs

Leaflets elliptic, ovate or rhombic ovate, glabrous to velvety

Flowers white, fruit mauve

Pods linear-oblong, straight or curved



Family: Fabaceae (Cont'd)

***Medicago polymorpha* – bur clover (W)**

Prostrate, sub glabrous 3 leafed clover
Inflorescence a raceme w/1-8 yellow flowers
Fruit small and round w/numerous short prickles
Various morphology



***Vicia sativa* – common vetch (W)**

Climbing annual herb
Leaflets 6-16, opposite, linear to oblong
Flowers axillary, 1-4 in condensed racemes, reddish purple
Pods green turning brown to black with maturity, oblong



Vicia sativa
Fabaceae
© G. D. Carr

C

Family: Fabaceae (Cont'd)

***Vicia villosa* – hairy vetch (W)**

Climbing annual, biennial, or perennial herb up to 2m

Leaflets 8-24, oblong-elliptic to linear-lanceolate

Flowers 15-30 in dense racemes, bluish purple, calyx hairy

Pods brown to yellowish brown, oblong, 20-40mm



Family: Scrophulariaceae (the figwort family)

***Verbascum thapsus* – Woolly mullein (W)**

Stout biennial herb, densely yellowish woolly

Basal leaves obovate, cauline leaves becoming smaller towards inflorescence

Yellow flowers in compact spike



Family: Urticaceae (the nettle family)

Hesperocnide sandwicensis – Hawaiian stinging nettle (Rare)

Erect herb

Stems and leaves covered with tinging hairs

Leaves simple, opposite, lance-shaped w/serrate margins

Achene enclosed by FUSED calyx w/multiple spikey hairs



Urtica urens – dwarf nettle (Weed)

Annual herb w/erect stems branched or unbranched from base

Sparsely pubescent w/course stinging hairs

Leaves thin elliptic to ovate w/serrate margins

Flowers clustered at nodes

Achene enclosed by OPEN calyx w/1-3 thick hairs



Family: Malvaceae (the hibiscus family)

Malva parviflora – cheeseweed (W)

Annual or short lived perennial herb w/decumbent to spreading branches

Leaves orbicular, 3-5-7 lobed with undulate margins

Lavender-blue flowers are solitary or clustered in axillary cymes



Family: Violaceae (the violet family)

Isodendron hosakae – 'aupaka (Endangered)

Few branched shrubs

Leaves alternate, shiny green somewhat tough but flexible, margins serrate

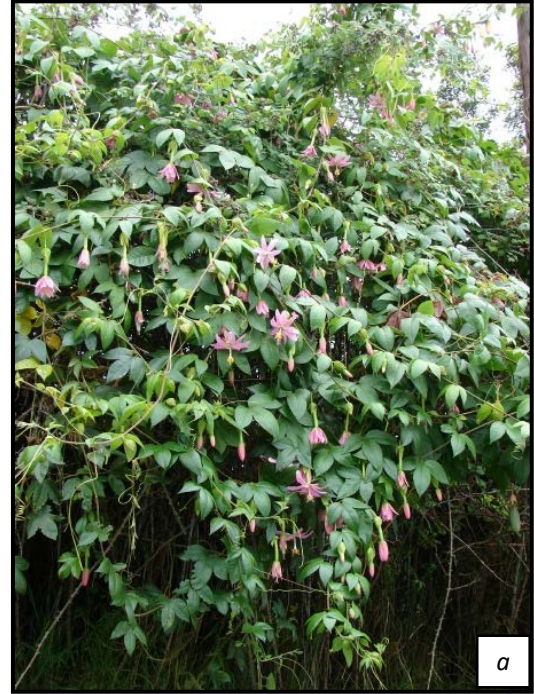
Flowers greenish yellow



Family: Passifloraceae (the passionfruit family)

***Passiflora tarminiana* – banana poka (W)**

Perennial liana that climbs trees
Leaves deeply 3-lobed + softly pubescent
Flowers pendent w/pink petals + purple or white corona
Fruit oval yellow



Family: Rubiaceae (the coffee family)

***Kadua coriacea* – kio'ele; leather-leaf sweat ear (Endangered)**

Erect perennial shrub, round woody stems
Leaves opposite, smooth shiny green,
coriaceous, often with red-purple tips
Fragrant, white, tubular flowers 4merous
Fruit a thick walled capsule



3. Shrubby Flowering Plants

Family: Caryophyllaceae (the carnation family)

Silene hawaiiensis – Hawaiian catchfly (Threatened)

Sprawling shrub up to 1.5m, rarely over 0.5

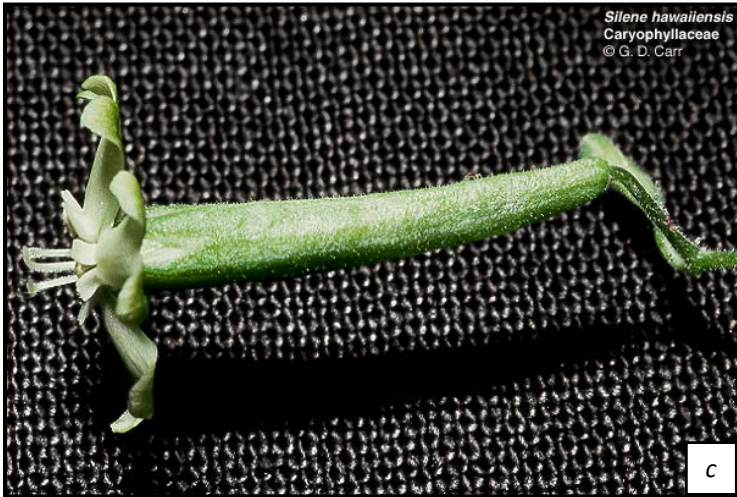
Wirey habit (stems very thin, round), somewhat spikey.

Multiple stems arising from large, tuber-shaped taproot

Leaves opposite, narrow, and linear. Recurved, usually hairy

Flowers in a small simple panicle – white and maroon

5 petals, fused at the base, cleft



Silene lanceolata – lance-leaf catchfly (Endangered)

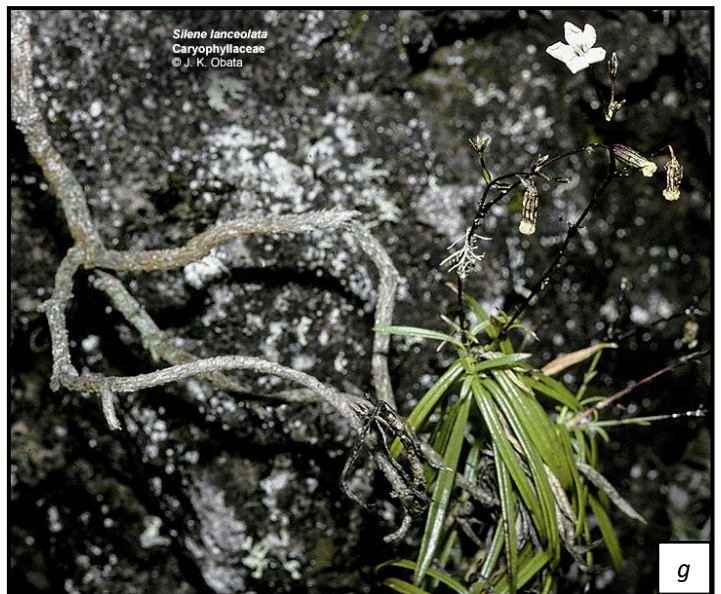
Inflorescence sticky to the touch

Leaves lanceolate, margins entire, old

leaves remaining on stem after browning

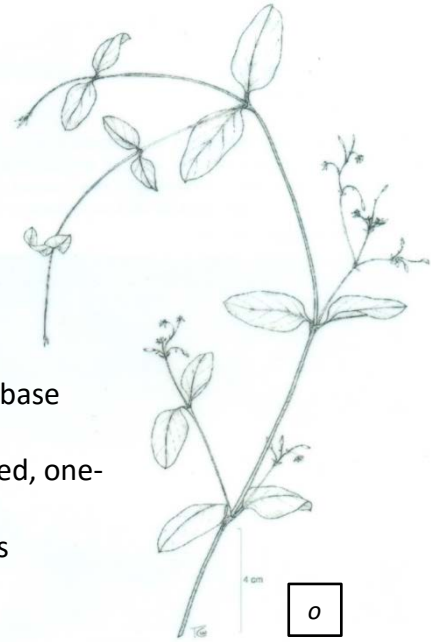
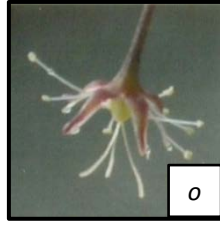
Flowers white + yellow, showy in an open

terminal florescence



Family: Caryophyllaceae (Cont'd)

***Schiedea hawaiiensis* – ma'oli'oli (Endangered)**



Arching vine stemming from woody base
Leaves/branching opposite
Leaves lanceolate to ovate, short petioled, one-
nerved + purple-tinged
Fruit a small capsule w/ ++ seeds

Family: Rosaceae (the rose family)

***Osteomales anthyllidifolia* – 'ūlei**

Shrubby up to 5', branches long, slender, arching
Leaflets small, glossy and projecting at angles
Small white flowers, bunches of 3-6
Fruits white, globular, purple at maturity



Family: Ericaceae (the heather or blueberry family)

Styphelia tamea – pūkiawe



Typically small, branched shrub w/small lance-shaped grayish-green leaves clustered densely on the stem
Small, white- light pink flowers with whitish to dark red fruits



Vaccinium reticulatum – 'ōhelo 'ai

Small, erect shrub w/rounded to oval leathery leaves
Leaves ~1" long and wide, opposite
Berries red or purplish hanging from stems borne on long pedicels



Family: Malvaceae (the hibiscus family)

***Sida fallax* – ‘ilima**

Medium, erect shrub up to 5' tall

Many orange-yellow cup shaped flowers on branch tips

Ovate leaves w/serrated margins are often grayish-green, covered in fine hairs



Family: Rutaceae (the citrus family)

***Melicope hawaiiensis* – mokihana kukae moa; manena (Threatened)**

Perennial shrub or tree up to 10m. Bark light brown, mottled, smooth

Leaves simple, opposite, leathery, typically hairy on lower surface

Flowers 3-17 in puberulent cymes



Family: Sapindaceae (the soapberry family)

***Dodonaea viscosa* – ‘a’ali’i (I)**

Multi-branched shrub

Leaves lance-shaped, twisted, sometimes reddish

Pink – red – maroon winged seed capsules



Family: Urticaceae (the nettle family)

***Neraudia ovata* – ma’oloa (Endangered)**

Perennial shrub or small tree up to 5m, sprawling, rarely erect

Stem with lenticels

Leaves alternate, simple, distigle veined with 3 prominent nerves, covered with light spots

Faint gardenia smell

Flowers clustered in leaf axils



Family: Solanaceae (the nightshade family)

***Solanum incompletum* – Pōpolo kū mai (Endangered)**

Perennial small shrub up to 3m, suckers from base

Stems and leaves armed w/ red-orange prickles

Flowers perfect, regular, petals white

Fruit yellow-orange berry, may turn black at maturity



***Solanum pseudocapsicum* – Jerusalem cherry (W)**

Erect shrub up to 1.5m, young growth sparsely hairy

Leaves simple, alternate, elliptic to lanceolate

Flower solitary to few on a peduncle, opposed by leaves

Berries red/orange and on erect pedicels



Family: Santalaceae (the sandalwood family)

Santalum paniculatum – ‘iliahi

Shrubby to a small tree up to 5m

Leaves large, ovate, broad, leathery, grayish green

Flowers small, white, triangular petals

Fruits dark purplish, hanging from branch nodes



Exocarpos gaudichaudii – hulumoa (Rare)

Small shrub or tree up to 5m

Evergreen-like appearance, stems yellowish-green, distinctly wiry

Leaves scale-like

NEVER has maroon-tipped branches



Family: Rubiaceae (the coffee family)

Coprosma montana – pilo

Creeping shrub to tree, typically less than 10ft at PTA

Leaves fleshy, small, opposite, oval, coming to an abrupt point, often clustered at tips of stems

Flowers white, star-shaped

Fruit reddish-orange



Family: Thymeleaceae

Wikstroemia uva-ursi – ‘akia



Densely branched or sprawling shrub up to almost 2m. Leaves are opposite and overlapping, with the adaxial surface much darker than the abaxial.

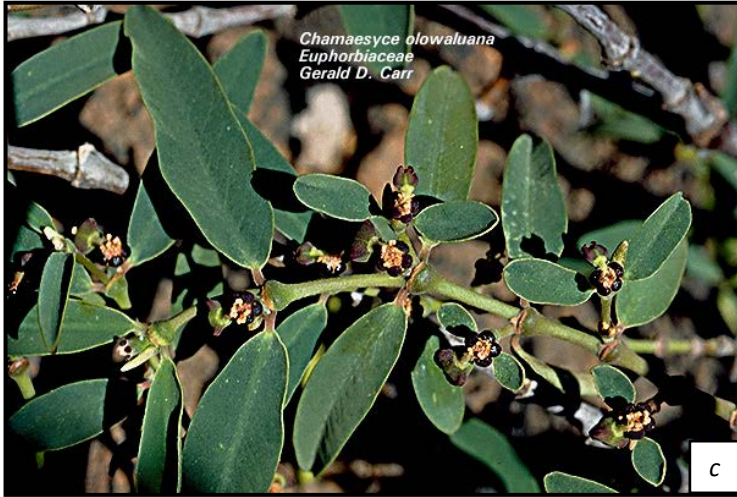
Flowers tubular, yellow to yellow-green, unisexual.

4. Trees

Family: Euphorbiaceae (the spurge family)

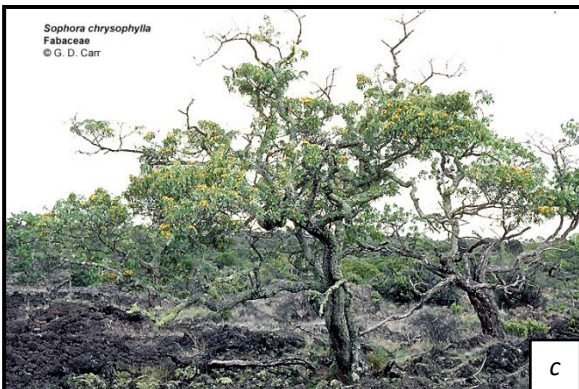
Euphorbia olowaluana – ‘akoko (Endangered)

Tree 2-9m, with milky sap, ringed nodes on branches
Leaves distichous, elliptic to lanceolate



Family: Fabaceae (the legume family)

Sophora chrysophylla – māmane



Typically less than 20' tree with rough bark
Pinnately compound leaves comprised of
12-20 leaflets
Has yellow, claw-like flowers and
distinctive beaded seeds

Family: Myrsinaceae

Myrsine lanaiensis – kolea

Small tree up to 5m

Large, waxy leaves often turning reddish w/purplish stems

Leaf veins conspicuous and round fruits hanging below terminal leaf clusters



Family: Myrtaceae (the myrtle family)

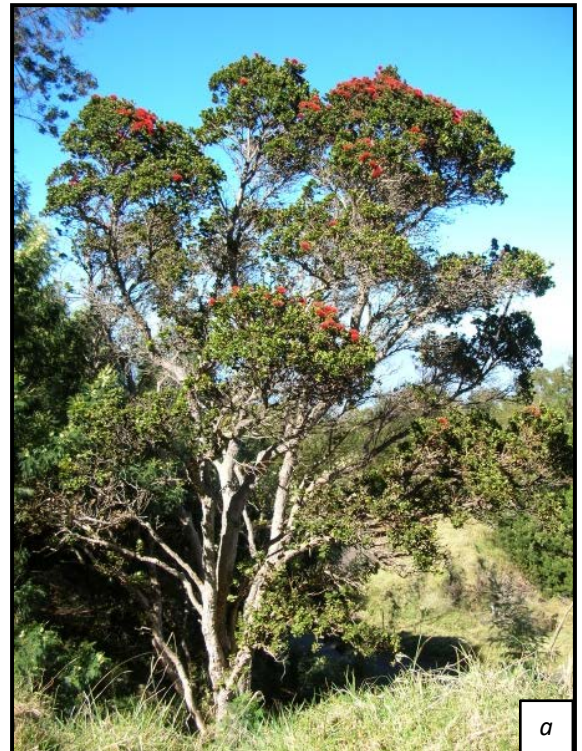
Metrosideros polymorpha – ‘ōhi‘a

Shrub to small tree

Bark rough, flaky

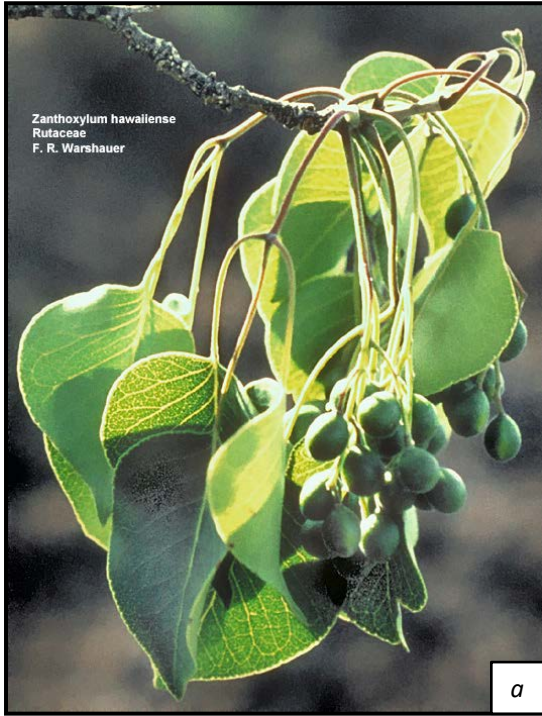
Leaves oval – round, greenish – red, sometimes silvery

Flowers have many showy stamens, usually red but can be yellow or orange



Family: Rutaceae (the citrus family)

***Zanthoxylum hawaiiense* – a'e (Endangered)**



Small tree up to 8m
Stem covered with distinct rows of lenticels
Leaves alternate, compound, trimerous
Foliage lemon-scented
Flowers white, fruit a follicle w/single black seed



Family: Scrophulariaceae (the figwort family)

***Myoporum sandwicense* – naio; false sandalwood**

Typically small tree up to 20' at PTA
Distinctive whorled, lanceolate leaves
Small white flowers with pink splotches
Globular white fruits



5. Grasses

Order: Cyperales
Family: Poaceae

Dactylis glomerata – Orchardgrass (W)



Typically plants are 50-120 cm tall, with leaves that are 2-8 mm wide and 20-30 cm long . Leaves also v-shaped near the base with a narrow tip and a prominent mid-nerve on the underside.



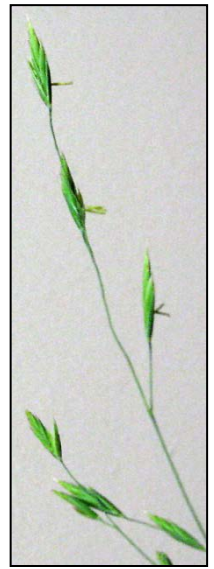
Eragrostis atropioides – Lovegrass

Grows in dense patches with a height of about 2 meters. Leaves have glabrous sheaths with hairs on ligule and along the margins. Blades are 30-40 cm long and 4-6 mm wide with a rough upper surface and glabrous lower surface.



Family: Poaceae

Festuca hawaiiensis - No common name (Rare)



Melinis minutiflora – Molasses grass

There is a strong molasses odor associated with this plant.
Grows in thick mats with slender stems, which forms
overlying layers. Leaves can be 3.6 to 24.9 cm long.



Family: Poaceae

***Cenchrus setaceus*- Fountaingrass (Invasive)**



Grows in clumps that can be up to 1 meter tall. Leaves are long and round with tall seed heads that are purple/yellow.

Family: Cyperaceae



Culms 3 angled, 15-60 cm or more tall. Leaves are stiff, linear, and may be shorter or longer than culms.

Family: Cyperaceae



Culms 3 angled, 40-100 cm tall. Leaves are coriaceous up to 8 per culm.

References and Acknowledgements

Again, it must be said that the production of this plant guide was 100% inspired by the Pohakuloa Training Area Plant ID Cards. The Cards are divided into the categories of Common Native Plants, Rare Native Plants, and Weeds, and it was thought that a guide using a different organizational method might be easier to use for in-field plant identification. BIG mahalo to the folks at PTA Natural Resource Office for creating the original set of cards, as they really did a majority of the work.

Plant descriptions have all been adapted from the existing ID Cards, as well as the following:

- Elliot, Daniella D. and S.Y. Tamashiro. *Native Plants Hawaii*. 2009. *University of Hawaii: Honolulu, HI*. <http://nativeplants.hawaii.edu/general/>
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Hawaii Native Plants

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