



PROPAGATING NATIVE PLANTS @ HOME

May 16, 2024
Los Altos Library



OUTLINE



About us



Setting up a
nursery



Seed
propagation

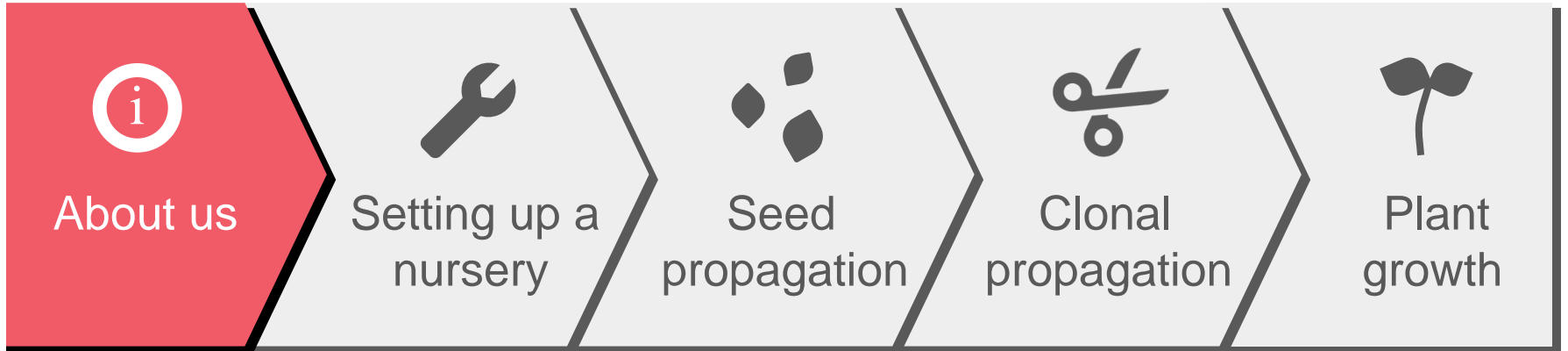


Clonal
propagation



Plant
growth

OUTLINE





ABOUT US

- * Grassroots Ecology
- * Redwood Grove

GRASSROOTS ECOLOGY

About our organization



History

501(c)(3) organization founded in 2016,
formerly Stewardship program of Acterra

Mission

To engage and educate the public to restore
local ecosystems.

Values

- Stewardship
- Hands-on Learning
- Community
- Inclusion



GRASSROOTS ECOLOGY



Where we work





ARO
ASSOCIATION OF
RAMAYTUSH OHLONE

ramaytush.org



tamien.org



amahmutsun.org



muwekma.org

Grassroots Ecology works on the unceded lands of the Association of Ramaytush Ohlone, Tamien Nation, Amah Mutsun Tribal Band, and Muwekma Ohlone Tribe.

REDWOOD GROVE

About our Redwood Grove Nature Preserve site



REDWOOD GROVE

Restoration progress



2009



2024

REDWOOD GROVE

Restoration progress



2019



2023

REDWOOD GROVE

Restoration progress



2019



2023

REDWOOD GROVE

Restoration progress



2019



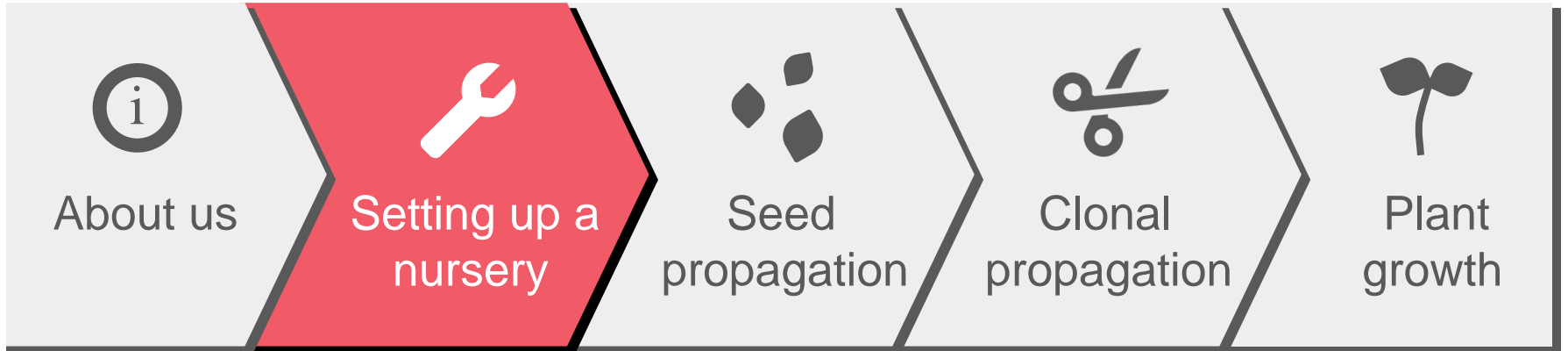
2024

About us

SUMMARY

- There are many ways to get involved in restoration with Grassroots Ecology
- Visit grassrootsecology.org to learn more

OUTLINE





Grassroots Ecology nursery shade house

SETTING UP A NURSERY

- * Grassroots Ecology nursery
- * Preventing disease
- * Nursery supplies
- * Home nursery examples
- * Gathering plant material

GRASSROOTS ECOLOGY NURSERY

About our nursery



grassrootsecology.org/nursery



GRASSROOTS ECOLOGY NURSERY Staff



Deanna Giuliano
Nursery Director /
Botanical Consultant



GRASSROOTS ECOLOGY NURSERY

Staff



Deanna Giuliano
Nursery Director /
Botanical Consultant



Siena Watson
Ecologist



Stanley Gu
Ecologist

GRASSROOTS ECOLOGY NURSERY
2023-2024 AmeriCorps Fellows



Watershed Stewards Program



Maya Nagaraj



Elisa Reclusado



Dash Ridolfi -Starr



Perla Martos



Serena Myjer



Claire Wong



Petra Boester



Laura Powers

GRASSROOTS ECOLOGY NURSERY

Locally sourced native plants

Russian Ridge
SAN MATEO COUNTY



sarahepierce, iNaturalist [CC-BY-NC](#)

Sunol
ALAMEDA COUNTY



Hank Raizen, iNaturalist [CC-BY-NC](#)

Locally sourced native plants are uniquely adapted to local conditions & wildlife

Blue-eyed grass
Sisyrinchium bellum

GRASSROOTS ECOLOGY NURSERY

Nursery history



Backyard nursery
1996

Move to Foothills Nature Preserve
2003

New phytosanitary practices
2016



PREVENTING DISEASE

Plant diseases

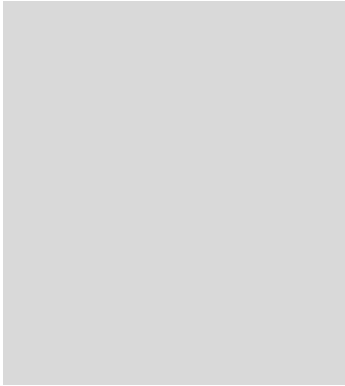
- Fungal and fungus-like pathogens are a big concern (esp. Phytophthora)
- They can kill plants, esp. seedlings (damping off) but also mature plants
- They can spread into natural plant populations (e.g. sudden oak death)

Keeping restoration plants pathogen-free is essential for protecting our native flora



PREVENTING DISEASE

Disinfectant and sanitation options



70% isopropyl alcohol spray

PREVENTING DISEASE

How do we prevent the spread of plant diseases?

1. Clean plant material
2. Clean potting mix
3. Clean pots & tools
4. Isolation
5. Monitoring



PREVENTING DISEASE

1. Clean plant material

- Use lower risk material
 - Looks healthy
 - Collect > 3 feet above ground if possible
 - Seeds usually lower risk than cuttings
- Disinfect higher risk material
 - Cuttings, seed < 3 feet, berries, nuts
 - Bleach soak



Nursery Director Deanna Giuliano rinsing acorns

PREVENTING DISEASE

2. Clean potting mix

- Higherrisk: dugup garden soil, compost
- Lowerrisk: “soiless” mixes, storebought mixes
- Heat treatment



phytosphere.com/gear/solaroven.htm



PREVENTING DISEASE

3. Clean pots & tools

- Scrub off dirt
- Disinfect



PREVENTING DISEASE

4. Isolation

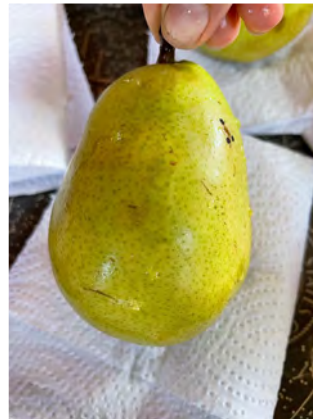
- Lift plants 3 ft above ground
- Block dust, water splashes
- Clean hands and shoes before entering nursery



PREVENTING DISEASE

5. Monitoring

- Visual inspection
- Phytophthora testing



NURSERY SUPPLIES

What do you need to start a home nursery?

- Growing mixes
- Containers
- Water
- Tools
- Growing areas



NURSERY SUPPLIES

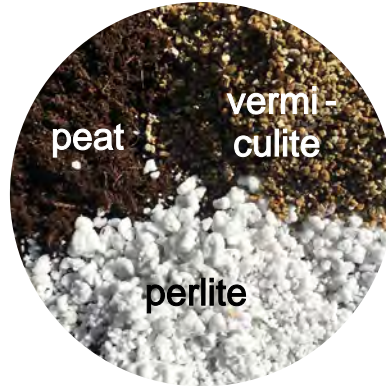
Growing mixes

Potting mix



- ~ $\frac{1}{2}$ shredded redwood
- ~ $\frac{1}{4}$ composted turkey manure
- ~ $\frac{1}{8}$ perlite
- ~ $\frac{1}{8}$ lava rock

Seed starting mix



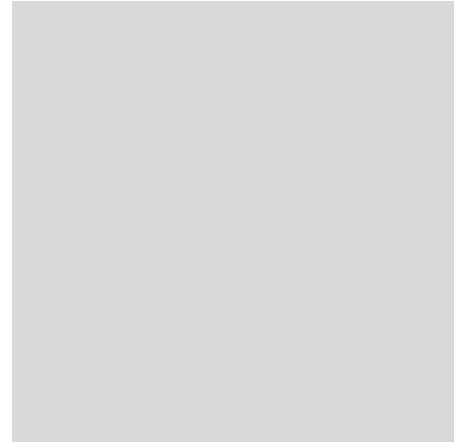
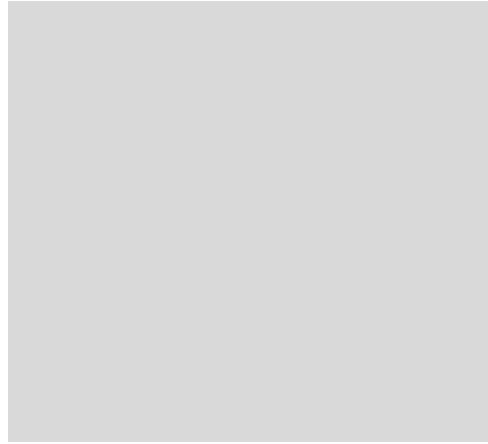
- $\frac{1}{3}$ peat
- $\frac{1}{3}$ vermiculite
- $\frac{1}{3}$ perlite

Cutting mix



- mostly perlite
- ~ $\frac{1}{10}$ peat

NURSERY SUPPLIES
Growing mixes



Bagged mixes from
garden centers

NURSERY SUPPLIES

Containers for plants

- Drainage
- Root circling



AB35

AB46

NURSERY SUPPLIES

Containers for plants

- Drainage
- Root circling



AB35



DP16

NURSERY SUPPLIES

Containers for seed starting



Plugs

For seeds



Flats

For seeds / cuttings

NURSERY SUPPLIES

Water

- Automatic irrigation
- Hand watering



Container plants can dry out quickly, esp. in summer

NURSERY SUPPLIES

Tools

- Gloves
- Plant labels
- Chopstick



NURSERY SUPPLIES

Growing areas



Shade house

- Storing mature plants or young plants in summer



Greenhouse

- Storing young plants in winter



Potting area

- Clean, ergonomic area to work on propagation

HOME NURSERY EXAMPLES

Stanley's home nursery



Stanley Gu
Ecologist



- Sawhorse table
- Covered with landscape fabric and shade cloth

HOME NURSERY EXAMPLES

Siena's home nursery



Siena Watson
Ecologist



- Table placed under tree with wire mesh protection
- Square pots and multiple species per flat allow for diversity in a small space

HOME NURSERY EXAMPLES

Siena's home nursery



Siena Watson
Ecologist



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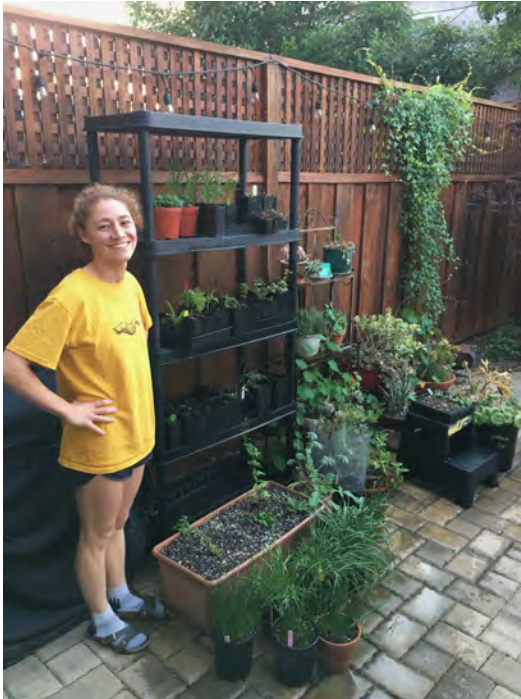
Setting up your home nursery

Examples Serena's nursery



Serena Myjer

Former Americorps member



- Space-saving stacked setup and square pots
- Challenges with light availability
- Has propagated hundreds of plants for apartment beautification and friends

Setting up your home nursery

Examples Shelley's nursery



Shelley Pneh
Ecologist

- Plants placed on pots and crates in shade of a shrub
- Slugs are a challenge
- Soil mix is 3:3:1 homemade compost, peat moss-free planting mix, perlite
- Seed / cuttings from beautiful mature garden
- Main expenses are additional seed, planting mix, and perlite (<\$150 / yr)

Setting up your home nursery



Shelley Pneh
Ecologist

Examples Shelley's nursery



cuttings



seed flat

- Plants placed on pots and crates in shade of a shrub
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Setting up your home nursery



Shelley Pneh
Ecologist

Examples Shelley's nursery



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Setting up your home nursery

In summary

- Many ways to set up a home nursery
- Can use whatever you have or can find
- Manage predation as it comes up

Just get started!



GATHERING PLANT MATERIAL

Plant material considerations

- Types of plant material
- Sources
- Genetic diversity



GATHERING PLANT MATERIAL

Types of plant material



Fruits / seeds

- Sexual reproduction



Clones

- Asexual reproduction

GATHERING PLANT MATERIAL

Sources

- Seed & cutting exchanges
- Nurseries and seed stores
- Gardens or wild collection
(ethically and with permission)



Ecologist Siena Watson collecting
Clematis seed

Considerations for wild collecting

- Legal: Get permission from the owner of land (private or public)

“A person shall not willfully or negligently cut, destroy, mutilate, or remove plant material that is growing upon public land or upon land that is not his or hers without a written permit from the owner of the land, signed by the owner of the land or the owner’s authorized agent.” (A Pen. Code § 384a)

- Ethical: Never overharvest from existing native plant populations
 - Only harvest from healthy stands of many individuals
 - Good rule of thumb- only take 5% of available seed

GATHERING PLANT MATERIAL

Genetic diversity

- More diverse = more adaptable and resilient
- Collect from multiple plants when possible



Setting up a nursery

SUMMARY

- Keep your nursery clean to prevent pathogens
- Utilize what's easily available to start your nursery
- There are many sources of native plant material

OUTLINE





Serena and Siena inspect seed flats

SEED (SEXUAL) PROPAGATION

- * Collection
- * Cleaning
- * Treatment
- * Sowing

SEED COLLECTION

Identifying the fruit / seed

- iNaturalist filter for “fruiting” ([inaturalist.org](https://www.inaturalist.org))
- CalBG seed photos (hazmac.biz/calbg/home.html)



CalBG photos by John MacDonald

SEED COLLECTION

Types of fruits



Dry

- e.g. capsules, grains
- Can usually store for years



Fleshy

- e.g. berries / berrylike fruit
- Treat / sow immediately



Nuts

- e.g. acorns, buckeyes
- Treat / sow immediately

SEED COLLECTION

Timing / ripeness

Dry



Spring beauties
Claytonia parviflora

Fleshy



California blackberry
Rubus ursinus

Nut



Coast live oak
Quercus agrifolia

SEED COLLECTION

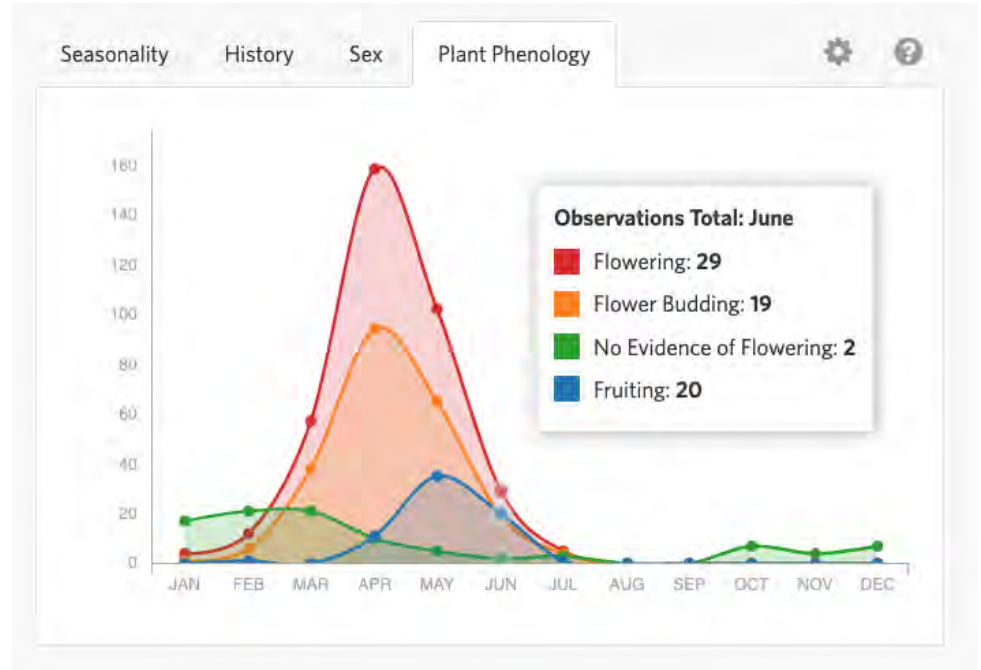
Timing

- Use online resources
- Covering seeds with bags



Cloth bag to collect seeds

G. Witteveen, Flickr CC BY-NC 2.0 DEED



Phenology graph from iNaturalist for *Claytonia parviflora*

SEED CLEANING

How to clean seed



Dry

- Let dry, crush, and separate chaff

Fleshy

- Crush and remove flesh

Nuts

- Remove husk / outer layers, sanitize

SEED CLEANING

Cleaning dry fruits / seeds

1. Let dry
2. Crush
3. Sift
4. Winnow

DEMO

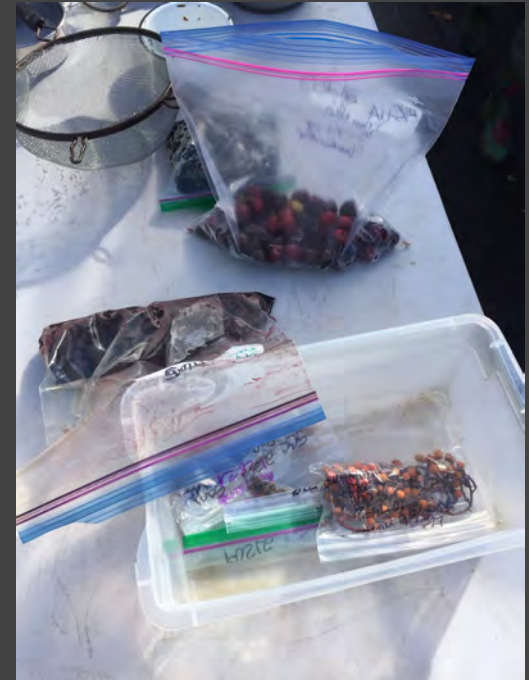


SEED CLEANING

Cleaning fleshy fruits / seeds

DEMO

1. Crush
2. Soak
3. Sift
4. Disinfect



SEED TREATMENT

Cleaning nuts

- Remove husks / caps
- Soak in bleach



SEED TREATMENT

Common types of seed treatment

- No treatment
- Cold stratification
- Scarification
 - Physical abrasion
 - Acid soak
 - Hot water soak
- Fire / smoke

Disinfect higher risk seed with
bleach or alcohol



SEED TREATMENT

Cold stratification

- Put seeds in plastic bag with some moist growing medium
- Store in fridge
- Wait for 1- 3 months depending on the species
- If seeds start germinating, sow right away



SEED TREATMENT

Acid soak

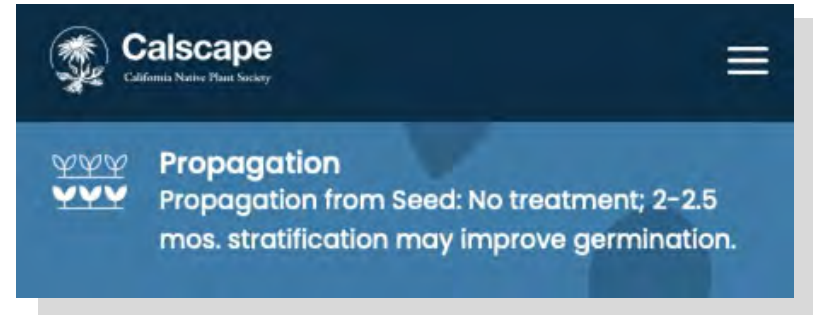
- Soak overnight in hot coffee
- Helpful for certain berries eaten by birds, e.g. elderberries (*Sambucus spp.*) and honeysuckles (*Lonicera spp.*)



SEED TREATMENT

Information on treatment protocols

- *Seed Propagation of Native California Plants* by Dara Emery
- [Calscape.org](https://calscape.org) →
- *Growing California Native Plants* by Marjorie Schmidt and Katherine Greenberg
- Native Plant Network Propagation Protocol Database (npn.rngr.net)
- California Native Plant Propagation Facebook group



NURSERY SUPPLIES

Methods of sowing seed



Plugs

SOWING

Tips

- Spread seed evenly on soil surface
- Cover with another layer of soil (ideal depth generally $\frac{1}{2}$ x width of the seed)
 - Check propagation protocols for any special requirements



SOWING

Tips

- Keep watered / moist
- Seeds should germinate within a few weeks (depending on species)



Seed propagation

SUMMARY

- Pay attention to seed ripeness when collecting
- Clean and treat your seed as needed before sowing

OUTLINE





Nursery Director Deanna Giuliano taking heel cutting of *Rhamnus crocea*

CLONAL (ASEXUAL) PROPAGATION

- * Cuttings
- * Divisions

Two types of clonal propagation



Cuttings

Rooting cut branches



Divisions

Splitting one plant into multiple

CUTTINGS

Staking

- Simplest form of cuttingStaking directly in the ground
 - Best in winter
- Some species this works well with:
 - Willows (*Salix spp*)
 - Cottonwoods (*Populus spp*).
 - Thimbleberry (*Rubus parviflorus*)
 - Ninebark (*Physocarpus capitatus*)
 - Twinberry (*Lonicera involucrata*)

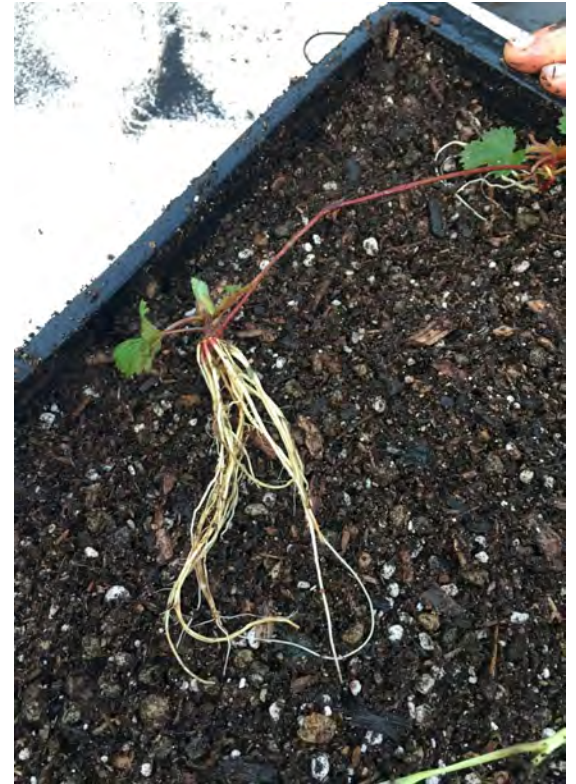


CUTTINGS

Spreading groundcovers / vines

Cuttings work well with:

- Yerba buena (*Clinopodium douglasii*)
- Strawberry (*Fragaria spp.*)
- Dutchman's pipe (*Aristolochia californica*)



CUTTINGS

DEMO

Spreading groundcovers / vines

1. Cut some long stems with many nodes
2. Rinse, disinfect with bleach, and rinse again
3. Lay stems flat on soil surface



CUTTINGS

Spreading groundcovers / vines

4. Cover with thin layer of potting mix
5. Keep watered in cool area, wait 2 months



DEMO

CUTTINGS

Spreading groundcovers / vines

6. Separate / cut rooted plants apart
7. Upsize into pots



DEMO

CUTTINGS

Woody shrubs

Cuttings work well with:

- Sages (*Salvia spp*)
- Sticky monkeyflower (*Diplacus aurantiacus*)
- Pink-flowering currant (*Ribes sanguineum*)
- Blue witch (*Solanum umbelliferum*)
- Snowberries (*Symphoricarpos spp*).
- Roses (*Rosa spp*).
- Blackberry (*Rubus ursinus*)



CUTTINGS

Woody shrubs

DEMO

1. Cut branches

- Choose healthy ones many side branches and nodes



CUTTINGS

Woody shrubs

2. Disinfect with bleach and rinse

DEMO



CUTTINGS

Woody shrubs

3. Make cutting

- 1-2 nodes below surface, 1-2 above
- At the bottom end, cut at an angle just below a node, or do a heel cutting
- Remove larger leaves



DEMO



CUTTINGS

Woody shrubs

4. Dip in rooting hormone

DEMO



CUTTINGS

Woody shrubs

5. Stick into flat filled with perlite
 - Can mix some peat or soil in for better water retention

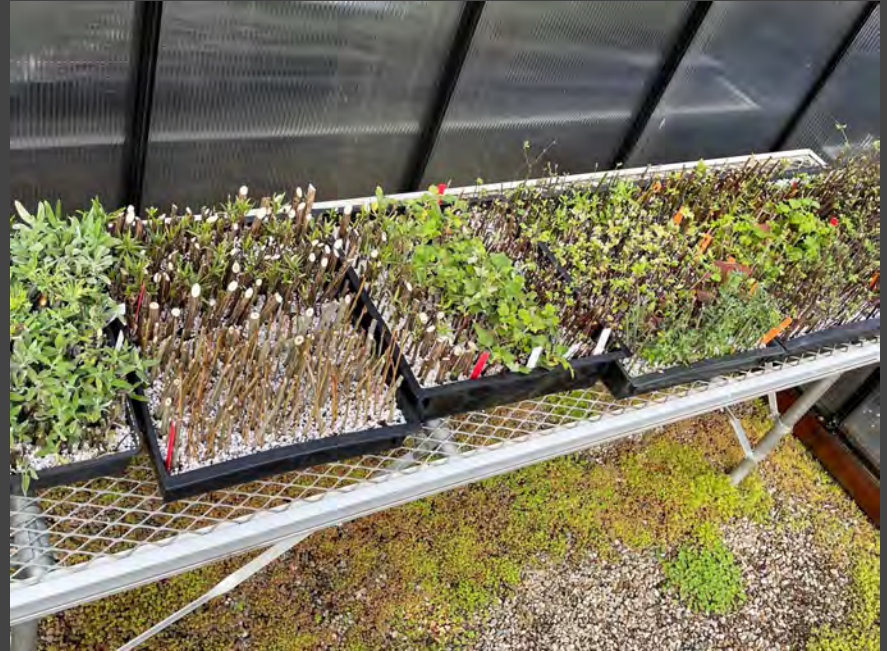


DEMO



Woody shrubs

6. Place in warm, humid area
 - In winter, use heating mat or warm place in the house
 - Put in greenhouse or under plastic dome for humidity
 - Keep in these conditions for ~ 2 weeks



CUTTINGS

Woody shrubs

7. Upsize once rooted

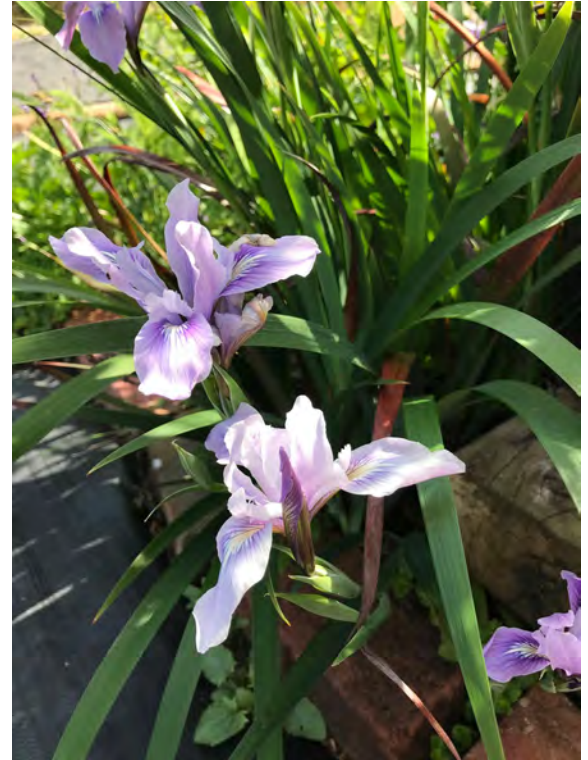


DEMO

DIVISIONS

Plants that work well with divisions

- Clumping species
 - Iris (*Iris spp.*)
 - Rushes (*Juncus spp.*)
 - Sedges (*Carex spp.*)
- Rhizomatous plants
 - Mugwort (*Artemisia douglasiana*)
 - Hedge nettle (*Stachys spp.*)
 - Bleeding heart (*Dicentra formosa*)
 - Hummingbird sage (*Salvia spathacea*)
- Bulbs / bulb-like plants
 - Wild onions (*Allium spp.*)
 - Mariposa lilies (*Calochortus spp.*)
 - Lilies (*Lilium spp.*)
- Best to do when not flowering



DIVISIONS

How to make a division

1. Take plant out of pot
2. Cut off excess roots
3. Carefully divide into multiple plants
4. Upsize each plant



DIVISIONS

Plants with underground offsets

- Onions (*Allium spp.*)
- Mariposa lilies (*Calochortus spp.*)
- Lilies (*Lilium spp.*)



DIVISIONS

Propagating offsets

1. Take plant out of pot
2. Separate out offsets
3. Upsize



Clonal propagation

SUMMARY

- Many plants can easily reproduce asexually
- We can provide conditions for cuttings or divisions to root and grow into new plants

OUTLINE



About us



Setting up a
nursery



Seed
propagation



Clonal
propagation



Plant
growth



Project Lead Paola Bueno
upsizing plants

PLANT GROWTH

- * Upsizing
- * Young plant care
- * Installation

UPSIZING

How to upsize

1. Tease young rooted plant out of cutting or seed flat



DEMO

UPSIZING

How to upsize

2. Hold plant in pot while filling in soil around the plant
 - Or pre-fill the pot and make a hole with a chopstick
3. Water in well



DEMO

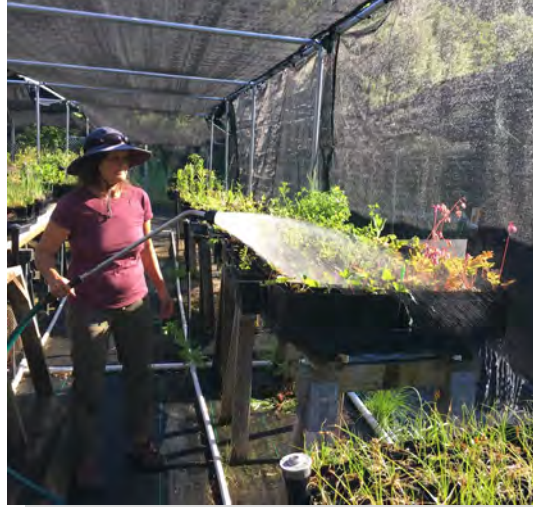
YOUNG PLANT CARE

Caring for recently upsized plants



Light & temperature

Shade / green houses, frost covers



Water

Irrigation



Nutrients

Fertilizers: fish emulsion, Sustane granules

INSTALLATION

Putting plants in the ground

- Best to install plants in late fall or early winter (Nov - Feb) during the rainy season
- Plant so that the crown of the plant matches the level of the surrounding soil
- Water plants in



Plant growth

SUMMARY

- Upsize young plants into larger containers and provide proper light, water, and nutrient conditions
- Install your plants during the rainy season



CLOSING THE LOOP

Learn more

- [Calscape.org](https://www.calscape.org) species pages often have propagation information
- *Seed Propagation of California Native Plants* by Dara Emery
(intro is available online at legacy.calscape.org/seed_propagation.php)
- *Growing California Native Plants* by Majorie Schmidt and Katherine Greenberg
- [*Raising Native Plants in Nurseries: Basic Concepts*](#) by R. Kasten Dumroese, Thomas Landis, and Tara Luna

Supporting our local ecosystems

- California Native Plant Society, Santa Clara Valley Chapter (cv.org)
- Grassroots Ecology (grassrootsecology.org)
- Indigenous tribes (nativeand.ca)



ARO
ASSOCIATION OF
RAMAYTUSH OHLONE

ramaytush.org



tamien.org



amahmutsun.org

amahmutsunlandtrust.org



muwekma.org



Chorus frog at the nursery

QUESTIONS & COMMENTS

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Feel free to share your own home
propagation tips!