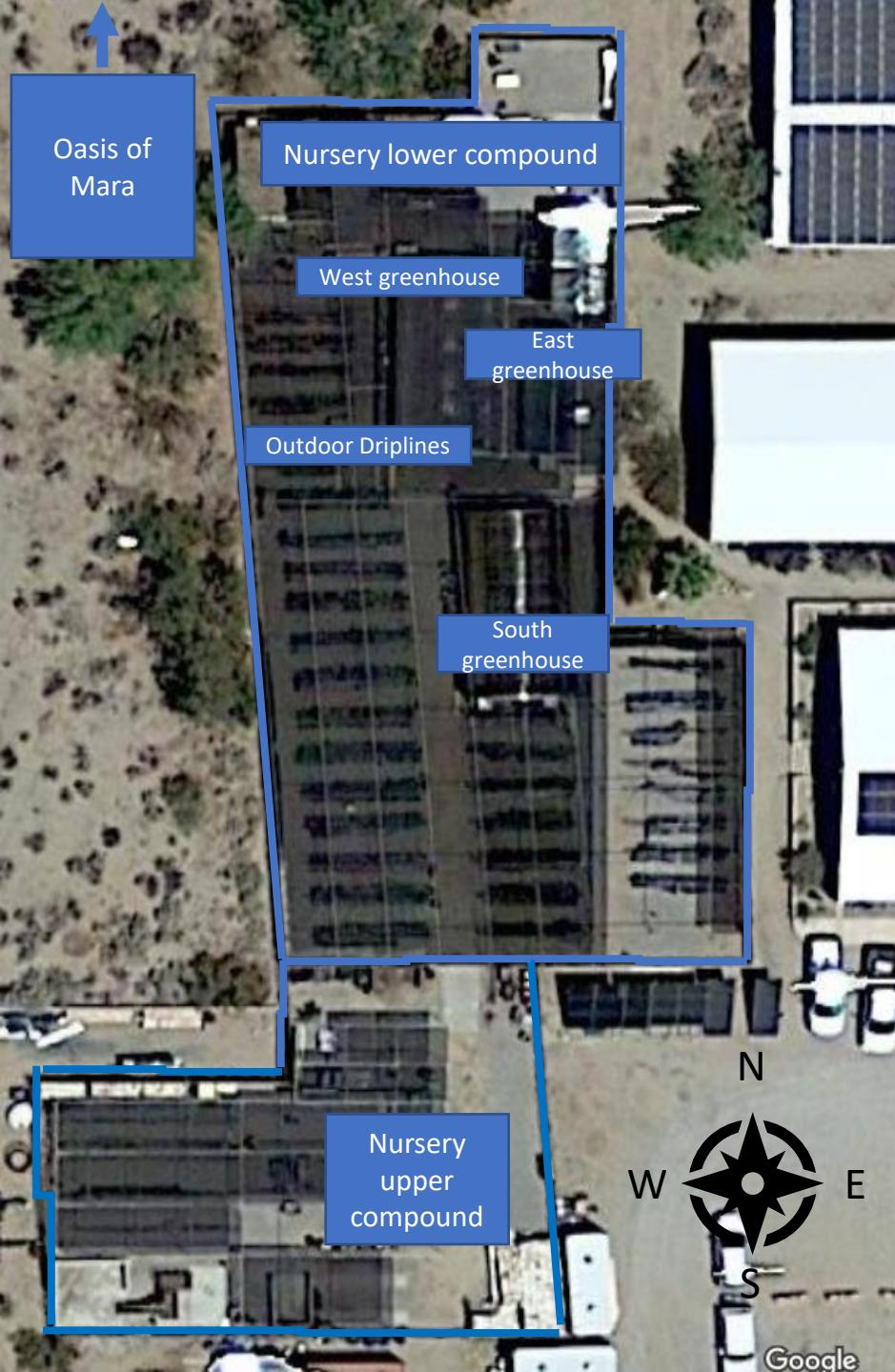


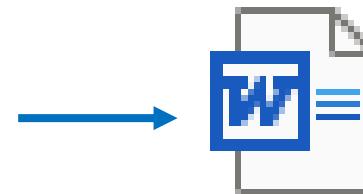
Standard Operating Procedure 2025

Updated: 06/09/2025

Overview of Nursery



PLEASE READ This additional
archived SOP for maintenance and
other information.



Entire SOP.doc

Index of SOP

- [Oasis of Mara Watering](#)
- [Lower Compound Storage](#)
- [Seed Collection](#)
- [Seed Lab](#)
- [East Greenhouse](#)
- [West Greenhouse](#)
- [South Greenhouse](#)
- [Transplanting](#)
- [Outdoor Drip-lines](#)
- [Upper Compound](#)
- [Pest Management](#)
- [Record Keeping](#)
- [Important Links](#)
- [Propagation Tips!](#)

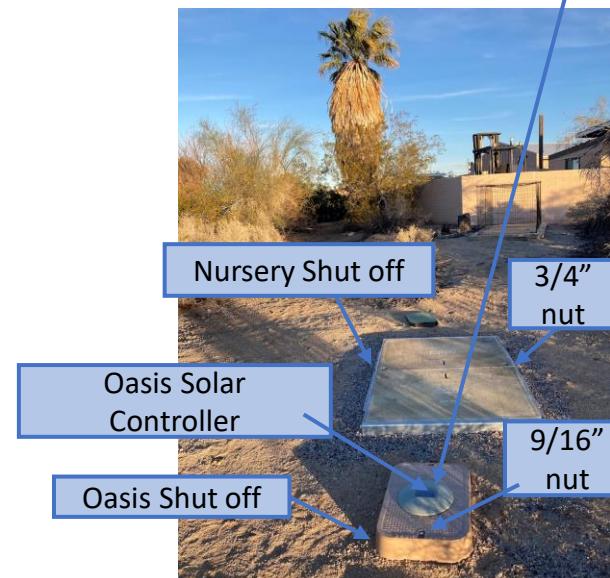
Oasis of Mara Watering

Nursery Technicians are responsible for overseeing irrigation to the palm trees in The Oasis. The controller is in the seed lab. The remote is in the top drawer of the NE desk. There is a charger in that drawer as well. You turn it on by holding the center button. Stand next to the solar paneled box. Then go to radio uplink-(20 for main Oasis for example), connect, then program, and then set the time, days, and duration. There are uplink numbers on the controller or on the box itself. The controller is for the main oasis and for palm trees starting from the south right behind the maintenance compound, the old VC area, north of the old VC building, one across the Parking lot from the old VC, and a cluster on that island more south of that parking lot. Change schedule seasonally. Winter watering- 4 hrs., 4 times a week. Summer schedule is outlined in slide 7 (Oasis Station Numbers..).

Please water the 2 fan palms in front of the admin building during summer.

There is a hose behind the cultural building, next to the outside AC unit.

Leave on a trickle in the shade for a couple hours for each palm.



Instructions to close vault: 1. loosen the nuts all the way 2. close the box 3. tighten until slide is pulled up against wall panel



2 Fan Palms by admin building

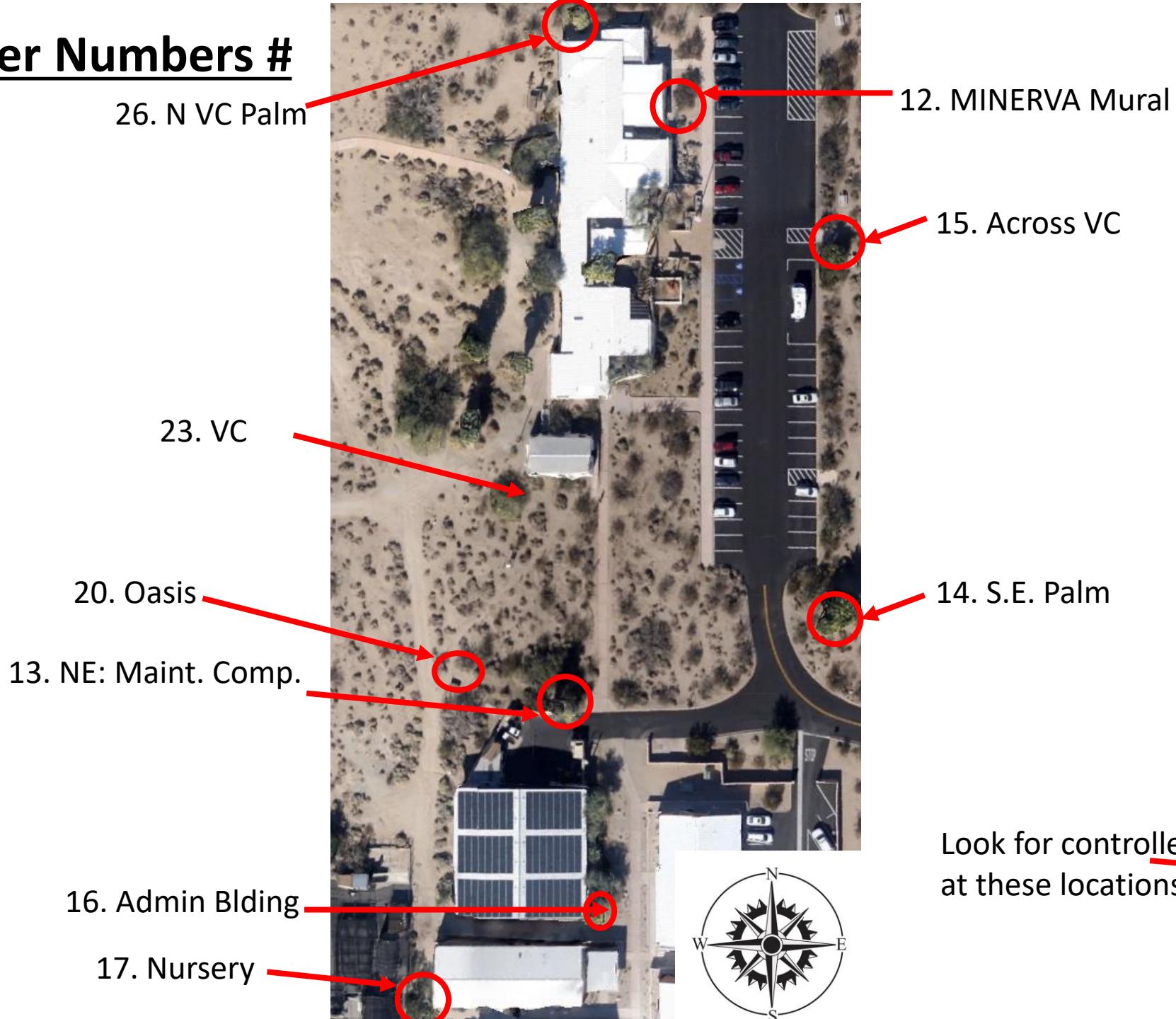
Water large palm on
slow stream for 2
hours
once a week



Water small palm on
slow stream for 20
minutes
once a week



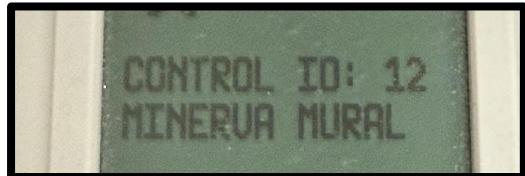
Oasis Controller Numbers



Look for controllers
at these locations



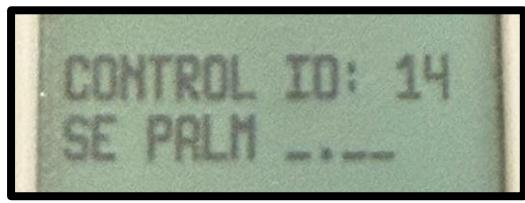
Oasis Station Numbers and **Summer** Schedule



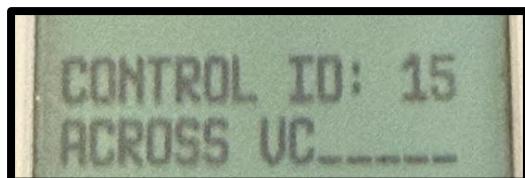
-Th-4am-1hr



-M,Th,Su-12am-5hrs

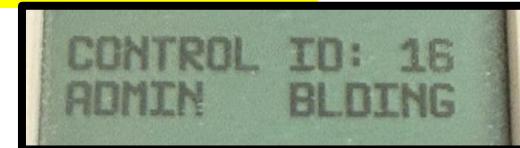


-M,W,F,Su-12am-5hrs

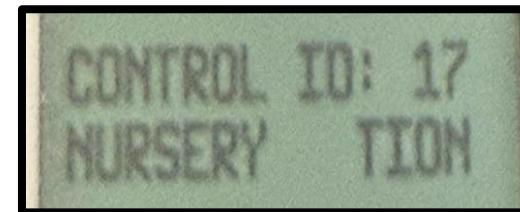


-M,W,F,Su-12am-5hrs

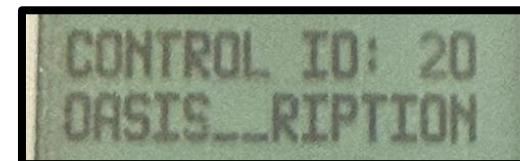
-Lower watering in the Fall



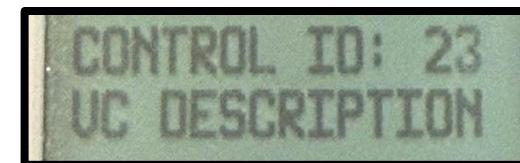
-Does not have water to the line.
Requires hand watering.



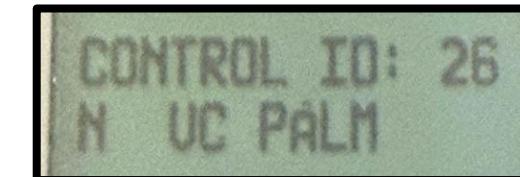
-M,W,Sa 4am 3hrs.
Panel located on SGH next
to gate. Waters palm, cultural,
and outdoor picnic tables.



-M,W,Thu,Fri,Su -
11pm-5hrs



-Tu,Th,Fri,Sat- 8pm-5hrs
Waters palms around
trailhead including inside
compound where VC was.



-M,W,F,Su-12am-5hrs

DIG Troubleshooting Guide

-
- Does the LEIT RC2ET remote connect to the LEIT-2ET panel?
 - If no the panel needs to be replaced. You can double-check and see if the remote connects to another panel before discarding the current panel.
 - 2. Does the solenoid turn on the water?
 - If the solenoid clicks, but the water does not turn on, you need a solenoid that fits that diaphragm.
 - If you need any help call Dig at 1(800) 322-9146



LEIT
Dispositivo de Control Remoto
por Radio Bidireccional

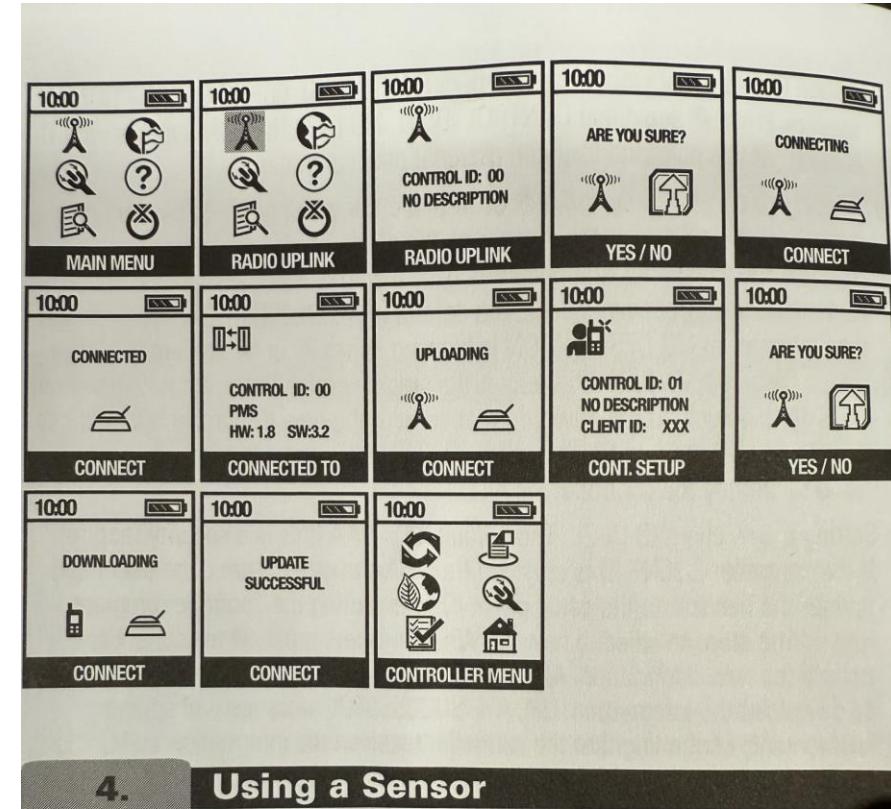
How to install a new solar controller

After a couple years the solar controller
Stops charging and needs replacement.

LEIT-2ET First time set up

1. Let charge in sun for one day.
2. Splice the yellow wires together so it sends out a signal looking for a remote.
3. On the LEIT RC2ET remote, go to radio uplink, control ID:00 as shown >>>
4. Wire the red striped wire on the panel to the red striped wire on the solonoid, and same with the white striped wire.
5. Waterproof nuts with electrical tape.

Document style instructions for the same procedure are on the next slide



4. Using a Sensor

NOTE: Do not install a sensor until the controller has been given an ID # by the LEIT RC2ET remote control handset.

4.1 Sensor Installation

Remove the **WATERPROOF CONNECTORS** from the LEIT controller. Splice the yellow (or yellow and black) wires and splice them. Splice the normally closed (N/C), black wires. Connect one of each wire to the yellow and black wires from the controller. Connect one wire from the sensor using **WATERPROOF CONNECTORS**. The sensor will override the program.

LEIT 2 ET First time set up

Two Yellow Wires on controller to remain DISCONNECTED until Handset Setup is complete.

- 1 – Go to SETUP icon on Handset
- 2 – Go to TIME and DATE to set date format + date/time on Handset *MUST enter date/time*
- 3 – Go to HANDSET SETUP on Handset
- 4 – In HANDSET SET UP – assign HANDSET ID for the handset and CLIENT ID for the handset
(*NOTE* Try to avoid using HANDSET ID 01, instead use 02 or higher. 01 is Default HANDSET ID)



Ex: Handset ID: 00 (any two #'s) change to 55



Control ID: 00

Client ID: AAA (Default) change to USA

Client ID: AAA (Default)

- 5 – Connect Yellow wires once Handset ID/Client ID has been set **and** LEIT2ET has charged for 60+ minutes

THINK OF CLIENT ID LIKE A PASSWORD TO CONTROLLERS

- 6 – Use Radio Uplink to connect to LEIT2ET controller **for the very first-time using CONTROL ID: 00**
- 7 - Once connected to LEIT2ET with Control ID 00, user can change the Control ID of the controller in cont. setup
(*RECOMMENDATION* Avoid using Control ID: 01) +Go to Controller setup once connected to set control ID+
- 8 - After Control ID is set to 02 or above, CLIENT ID needs to be entered (***MUST** match Handset Client ID*)



Notice that the Control IDs are different. Notice that the Client IDs are the same.

If Control ID 10 is used on both controllers in the same area, the Handset will connect to both LEIT 2 ETs with Control ID 10 at the same time, and you will be very confused.



To RESET the LEIT2ET Solar Controller

-Do this when you want to make sure a controller is not programmed to the handset already, so that it can connect to the handset on Radio-uplink -00. **Sometimes the solar controller just needs to be reset to be able to connect to the remote**

1. Charge the solar controller in the sun all day
2. Disconnect the two yellow wires
3. Using a 9Volt battery, touch one of the yellow wires to the + positive terminal, and the other yellow wire to the – terminal at the same time for 2 seconds
4. Flip the battery and touch the yellow wires to the opposite polarity for 2 seconds

-The reset has been completed-

1. Connect the two yellow wires with a waterproof wire splice
2. Using the RC2ET Handset, connect to the LEIT2ET via the ‘Radio Uplink’ icon, using ID#: 00 and navigate to ‘Controller Setup’ to set the new ID#

-If the controller does not connect to the handset after completing the below steps, the solar controller is not charging and should be discarded.

Lower Nursery Compound Storage Containers



Tool shed. Hand tools, power tools, irrigation supplies, pvc parts. There is water damage in the roof. There is little likelihood of mold. There was a proposal to rebuild this shed.



Shed A. Rolls of chicken wire, hardware cloth, seed storage jars, newspaper.



Shed B. Seed collection equipment, wire, screens, tarps,



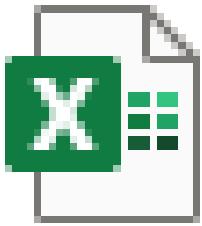
Shed C. Wet wall pads, empty tubs



Seed lab. Work space for nursery operations. Plant tags, newspaper, seed blower, reference books, refrigerator for current project seeds.

Seed Collection

Seed Collection

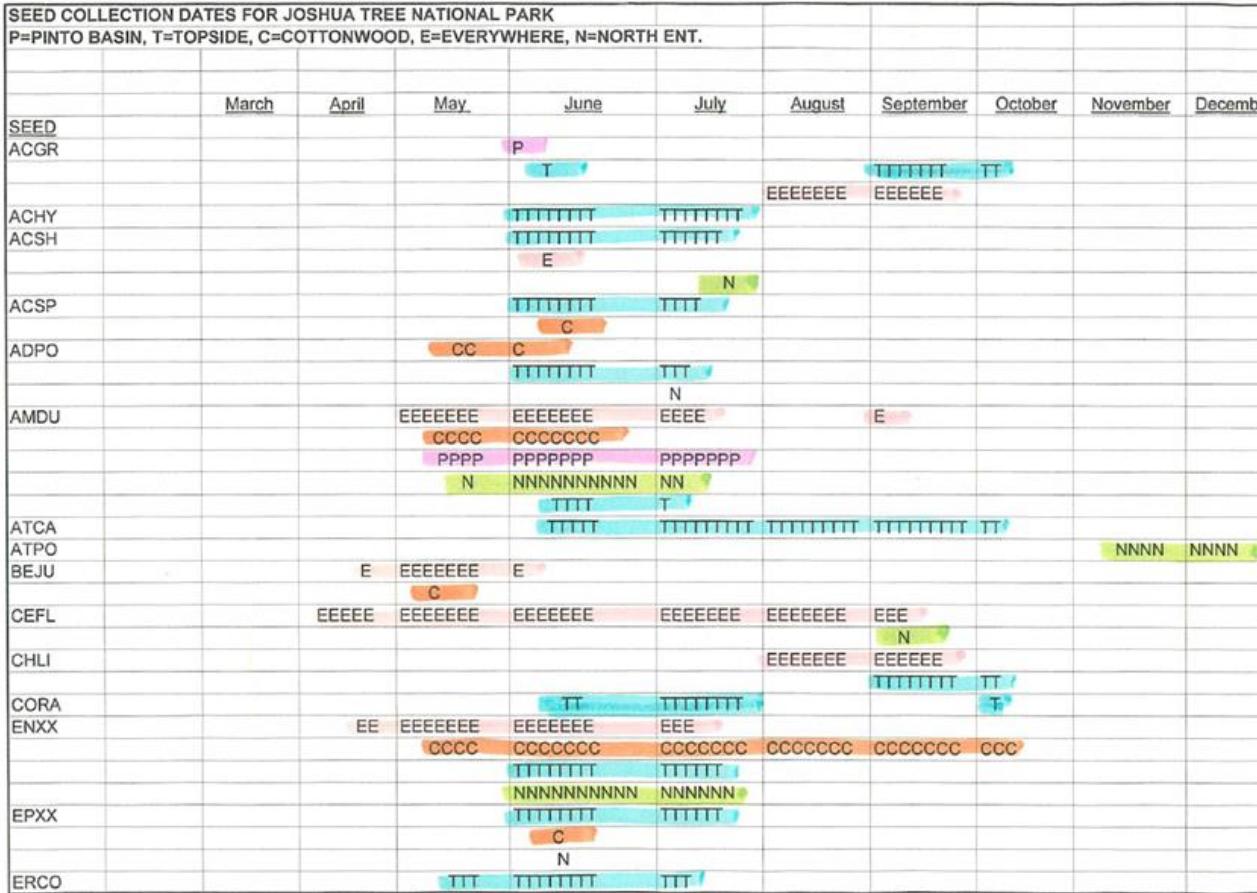


Seed_Collection_ Database

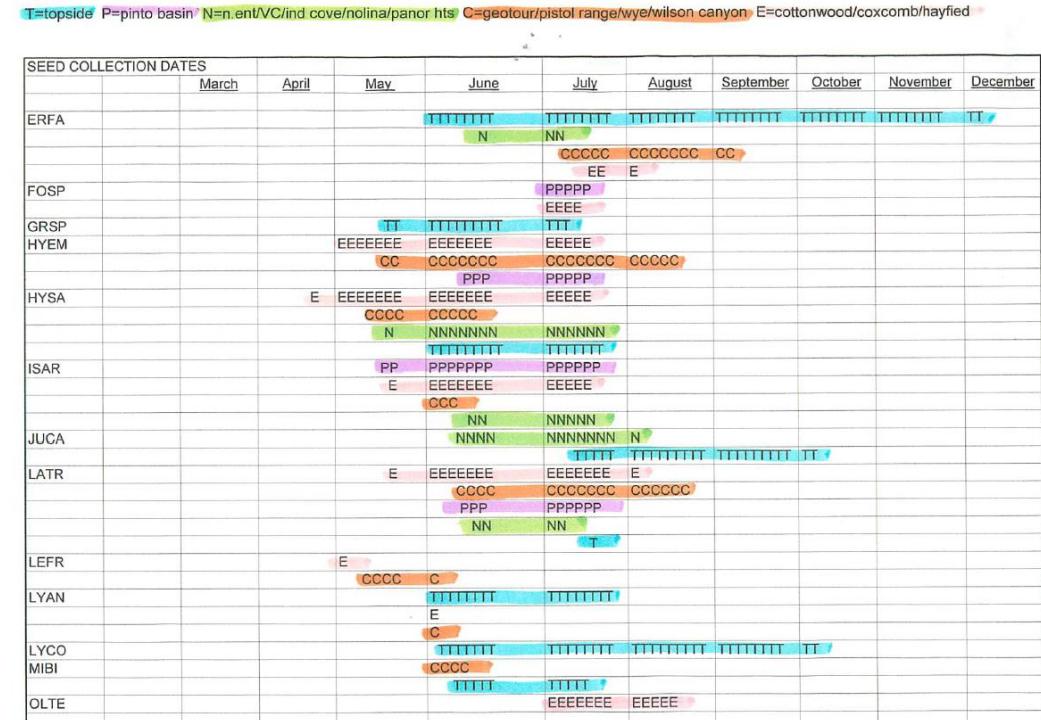
Location in R-drive since this is an actively edited document?
I guess its in the CALR propagation database and in



Seed Collection Times per species



Seed Collection Times per species



Seed Lab

Seed Cleaning, Storage, and Germination

Seed Storage (Pre-cleaned)

- Seeds are left to dry for a minimum of 4 weeks before processing
- Seeds are hung up on a wire so they are not eaten by rodents



Seed Cleaning

- Remove plant material and chaff
- Tools used are a seed blower, sieves, debearders, tweezers, and paper plates
- JOTR moderately cleans seeds because they will be stored to use actively in restoration projects. This means that we leave some chaff in the seed collection



How To Clean
Seed



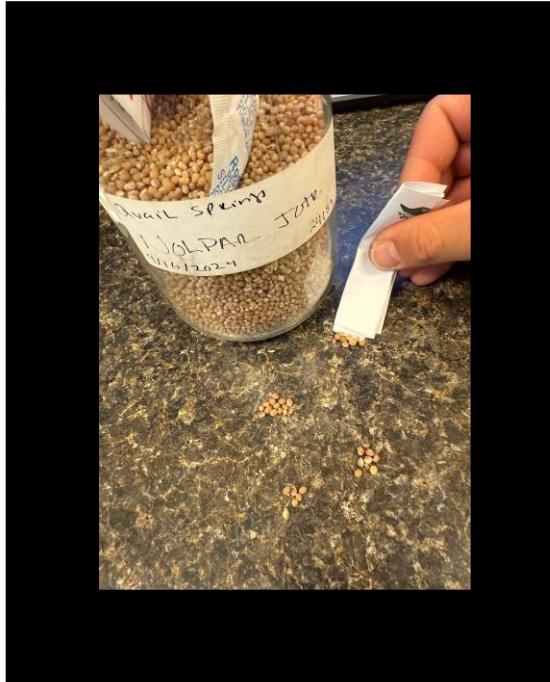
Seed Storage (Post-cleaned)

- Once cleaned include label, put in database, and store in fridges/freezers. Have Pinto Wye walk in fridge for (long term storage?) and seeds you can't freeze, maybe Jojoba and Pine? Seeds in the fridge in seed lab and (in future) freezers in The Compound are for current projects. The Maintenance Compound seed storage and cleaning room is a N1 key.



Germination

- You can use the germination rates to calculate how many seeds to sow. You can record the number of seeds on the clipboard.



| Propagation Number | Project | Species Code | Seed Location | Date planted | Number of seeds |
|--------------------|---------|--------------|---------------|--------------|-----------------|
| 129 | | | | | |
| 130 | | | | | |
| 131 | | | | | |
| 132 | | | | | |
| 133 | | | | | |
| 134 | | | | | |
| 135 | | | | | |
| 136 | | | | | |
| 137 | | | | | |
| 138 | | | | | |
| 139 | | | | | |
| 140 | | | | | |
| 141 | | | | | |
| 142 | | | | | |
| 143 | | | | | |
| 144 | | | | | |
| 145 | | | | | |
| 146 | | | | | |
| 147 | | | | | |
| 148 | | | | | |
| 149 | | | | | |
| 150 | | | | | |
| 151 | | | | | |
| 152 | | | | | |
| 153 | | | | | |
| 154 | | | | | |
| 155 | | | | | |
| 156 | | | | | |
| 157 | | | | | |
| 158 | | | | | |
| 159 | | | | | |
| 160 | | | | | |



Propogation_For
m

Germination Rates

[Jean's Published Articles](#)

Master Species List

Our “Species_Inventory” list of what needs to be planted.

R:\Vegetation\Nursery\!!IMPORTANT!!!\FY24-FY25_Work_Plan

Seed Pre-treatments for Germination

Soaking

- Replace water every few hours
- 12-24 hours



Leaching

- Constant flow of water
- 12-24 hours



Scarification

- Sandpaper
- Nicking seed coat with nail clippers
- Dipping seeds in 10% bleach solution (~30sec-1min)

Get one of the small metal pots and wire screens from the shelf in the back of the west greenhouse. Place the seed bundle(s) in the pot and press the screen on top so it is holding the seeds down. Get a mesh cloth and a rubber band from the small clay pots on the desk. Bundle the seeds in the mesh and wrap with the rubber band, making sure the cheesecloth is not compacting the seeds together. Insert the tag in the rubber band.

East greenhouse (EGH)

Seed flat propagation

Sowing Seeds



Seeds on flats before being covered with dressing



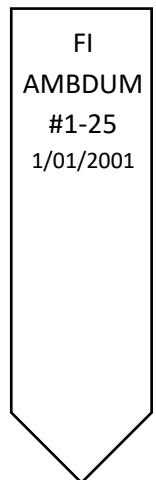
Single sheet of newspaper to keep from going through or mesh bottom flat with no newspaper.

Seed Flat Dressing—that goes on top of the seeds:
*3 cups soil mix *3 cups fine vermiculite



Place the plastic label identifying project/species/propagation # into the mix along one of the edges of the flat

Project abbreviation — FI
Species code — AMBDUM
Propagation number — #1-25
Date planted — 1/01/2001



When watering in, do not hold the spray in one spot over the flat; it will wash away or uncover the seeds.

The gentle passes of spray allow the water to soak in without disturbing the seeds.

East Greenhouse

Soil

- ▶ Seed Flats: perlite and vermiculite

*6 Cups of coarse vermiculite *15 cups perlite

- ▶ Cells and Pots: Coco coir

- ▶ Summer Watering

7am-7pm for 25 seconds every 60 minutes. Set to 80 degrees

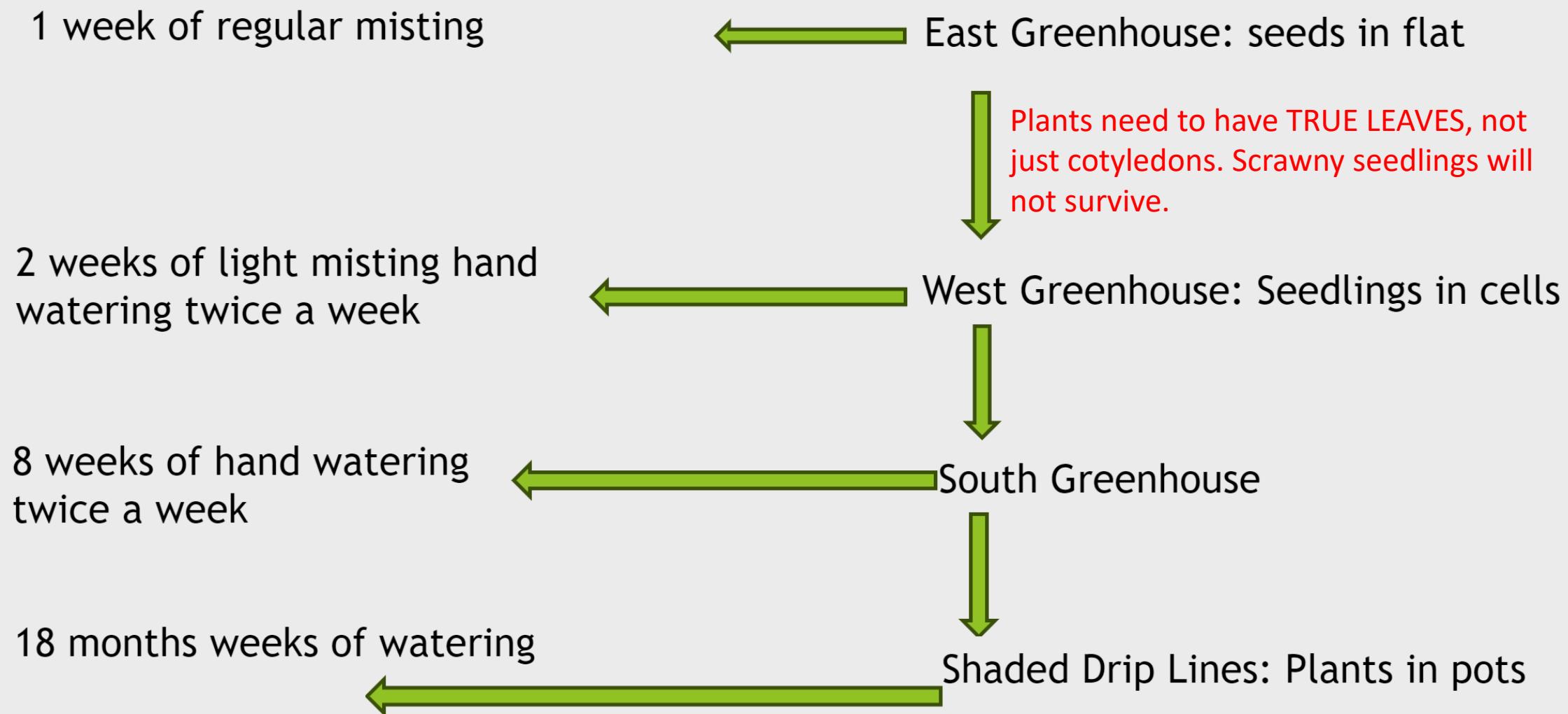
- ▶ Winter Watering

7am-7pm for _____

Do Not Overwater! Should not be heavy wet. It will stunt seedling growth!



Flow chart propagation sequence



East Greenhouse Maintenance on swamp cooler



This yellow box is in the upper compound.
Here is the oil for the fan.



January_2023_Useful_Nursery_Info.doc

Maintenance on Swamp Cooler^



Back of heater outside of EGH
where shut off valve can be found

West greenhouse (WGH)

Planting seedlings

Folding/wrapping paper pots



Make two marks $4 \frac{1}{2}$ inches apart on one of the desks in the seed lab with a sharpie. (4.5 inches is the minimum width that our funnels will fit when filling paper pots.)

- Get a stack of pre-sorted newspaper from the tan bin.
- With a paper right-side up fold one of the sides in toward the center.
- Then fold the other side in toward the center making sure that it fits within the $4 \frac{1}{2}$ " guidelines.
- Tuck the right side fold (open edges) into the left fold (closed edge). Make sure the bottom edge of the paper stays parallel to the desk edge or the pot will be funnel shaped.



Keep the folded pots in stacks of 60 (sixty paper pots fill 15 two-gallon pots; 15 two-gallon per cart.) Put finished pots in the brown crate in the seed lab.



The folded edge is the top of the pot
and is not covered with plastic



Contact Information for Newspaper Resource:

Terry Hartl

He is a paper route newspaper delivery driver

His phone number is 7603655388. Terryhartl@gmail.com. You can pick up large stacks of newspapers from him.

Try 2" compostable pots into pvc. The newspapers tend to break apart. Can try slitting some of the felt paper pots so roots can protrude. If using the felt bags wrap in plastic so uses less soil and doesn't dry out. Also try the 2" plastic pots. Can also directly transplant Joshua Trees into PVC.

Filling Paper Pots (1)

Preparation

- Bring a stack of 60 paper pots from the seed lab to the upper compound.
- Get 15 two-gallon black pots from the stacks of clean pots next to the soil bin, and a scoop and funnel from the tall Rubbermaid cabinet.
- Get an empty cart for the finished paper pots.
- Fill a green wheelbarrow with soil from the bin (or directly from the soil mixer), and wet it down with the hose and sprayer attachment on shower setting. The soil should be thoroughly moistened, but not so much that it clumps or holds its shape when squeezed. (Note: it is more effective to add several shovelsful of soil, wet, and mix, rather than fill the wheelbarrow with soil and then try to wet and mix.)



Filling paper pots

- Place a two-gallon pot on a cinderblock or one of the green irrigation box covers.
- Take a paper pot from the stack and open it into a cylinder. Make sure the plastic wrap is below the top (folded edge) of the newspaper.
- Put the paper pot into the two-gallon pot with the folded edge at the top and begin to scoop soil into the paper pot.
- Fill the soil to the top, shaking the paper pot gently as you fill to settle the soil.



Filling paper pots (2)

- Add three more paper pots, one at a time, repeating the above steps. If the paper pots need to be adjusted in the two-gallon pot, slide them rather than lifting so soil does not fall out. Be careful not to tear the rim of the paper pot (it forms a reservoir for water) or spill excess soil into the two-gallon pot (clumps of wet soil can create a breeding ground for soil gnats and algae.)
- Once the paper pots are full, gently tamp the soil down by tapping the two-gallon pot firmly against the irrigation cover several times. Continue filling and tamping until the soil level is $\frac{1}{2}$ " to 1" below the rim of the paper pots. If the paper pots are under-filled the soil level will sink when watered, making planting seedlings difficult. Do not firm the soil with your fingertips, it may inhibit water absorption. **Over compacted growing medium restricts root growth, reduces shoot growth, and disrupts water drainage, all of which increase the susceptibility of your seedlings to root diseases.**
- Place the filled pots on the cart. One cart can hold 15 two-gallon pots each with 4 paper pots.



Watering

- Take the cart to the hose by the soil bin. Turn the hose on and adjust the water so it flows at a strong trickle, but not so strong that it pushed soil out of the pots. **Water each pot 4-6 times or until water drips from the bottom.** The number of rounds depends on how moist the soil was to begin with as well as how firmly the pots were tamped down.
- **Let the pots drain several hours or overnight before planting seedlings.** Push the cart to the west greenhouse for planting.

!!!WARNING !!!!!

There was survival of 20% in winter 2025. We switched to using Cococoir in the Paper Pots and got 70% survival. You could also mix soil and cococoir to make the cococoir go further and improve aeration for seedlings. We may have been overwatering.





Planting seedlings (1 Preparation)

Preparation



- Bring the flat of seedlings to be planted to the west greenhouse. From the shelf under the bench, get the tongs, container with toothbrush handles, and the empty Tupperware container.
- Fill the Tupperware container and water bottles with water.
- Select a toothbrush from the container using the tongs and rinse it in the Tupperware container. (The toothbrushes are stored in a diluted Physan/water solution to prevent algae growth. Physan can be harmful to the skin, so use the tongs as a precaution.)



Planting into paper pots

- Place a two-gallon pot with filled paper pots onto the workbench.
- Use a toothbrush (handle, not bristle part) to mix the perlite into the soil.
- Dig a hole for the seedling with the toothbrush.
- Use the toothbrush to gently dig up a seedling from the flat. Push the toothbrush handle to the bottom of the flat and carefully loosen the soil so the roots are not broken. Hold the seedling by its leaves, not the stem, to ensure you don't crush any root hairs.



Planting seedlings (2 Planting)



- Place the seedling in the hole to at least the depth it was in the flat. Make sure all the roots will be covered by soil. Burry deep so it does not dry out the roots.
- Use the toothbrush to push soil back into the hole and gently firm it around the seedling. Do not compact the soil with your fingers as it can slow water absorption. **Watering the seedling in will compress the soil.**



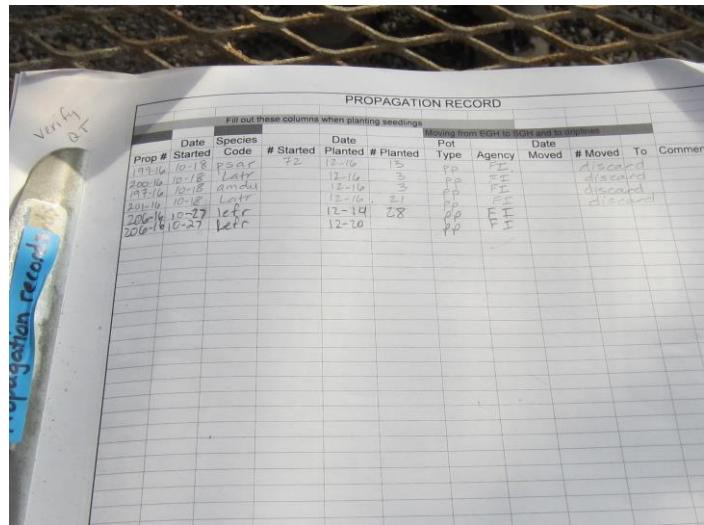
- Water the planted seedlings thoroughly using one of the water bottles. A few squirts will do.
- Place a tag in each paper pot.
- Move the two-gallon pot to one of the benches.

| | |
|----------------------|-----------|
| Project abbreviation | FI |
| Species code | AMBDUM |
| Propagation number | #1-01 |
| Date planted | 1/01/2001 |
| Date transplanted | 1/21/2001 |



Can reuse tags. Try bending if snaps its too old to reuse. Wetting the tag or eraser with water will make erasing previous information easier. Or can just use a marker on the white tag to indicate project color.

Planting seedlings (3 Cleanup)



Make sure to record all the planting information on the propagation record sheet.

The how-to for filling this out is under record

keeping - [Slide 62 \(hold ctrl+click\)](#)

The clipboard will be in the seed lab.



Physan container and spray bottle

Physan solution in spray bottle: 1 Tablespoon Physan/1 gallon water
Store in marked 1-gallon container

Cleanup

- Return the flat to the east greenhouse.
- Empty the water bottles onto the gravel.
- Rinse the toothbrush off and return it to the Physan solution.
- Use the whisk broom from the bench shelf to sweep off dirt on dry portions of the bench.
- Rinse the bench with the hose.
- Spray the bench with the Physan disinfectant stored on the wire rack.

Clean toothbrushes in Pysan solution



Change the Physan solution when the liquid level gets low or debris accumulates

Once have **two sets of true leaves**, can move into S. Greenhouse. Can record even when moving from West Greenhouse to South Greenhouse

Misting

- Summer* Set to 80 degrees.
Misting 20 seconds every 60 minutes for humidity and hand water twice a week. Too much misting can cause root rot!!!!!!

Winter* 10 sec per 75 min
hand water once a week

*You can manually close PVC ball valves to water specific plants



Misting Part 2

Joshua Trees can damp off by watering more than 20 sec every 60 min in the summer and more than 15 minutes every 75 minutes win the other seasons.

Caveat-

If you mist less than the above amounts, you risk drying out the seedlings over the weekend, which is a VERY REAL concern. The soil volume in pots is minimal compared to the wild, thus requiring more regular watering to retain soil moisture similar to the field. The small the pot the more regular the watering needs to be.



West Greenhouse Wetwall pads

- 15 6x12x48in from [One-Side Coated Evaporative Cooling Pads for Greenhouse – Greenhouse Megastore](#)
- Ordered 3 of the 5 pack

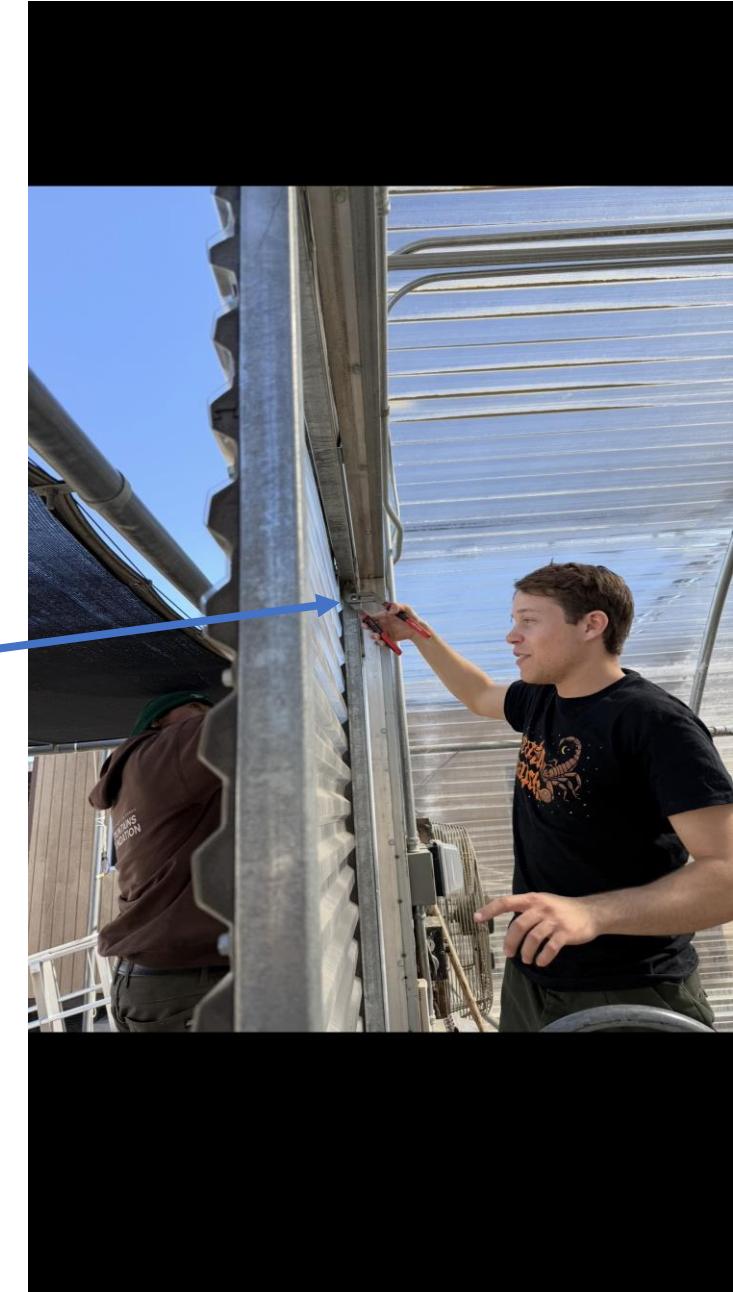


Door Maintenance

Front Bolt



Back Bolt



Front Bolt:

Tighten bolt to pull door up using
9/16th wrench. So, it does not scrape ground.

Back Bolt:

Hold bottom of screw with pliers,
while tightening bolt

South greenhouse (SGH)

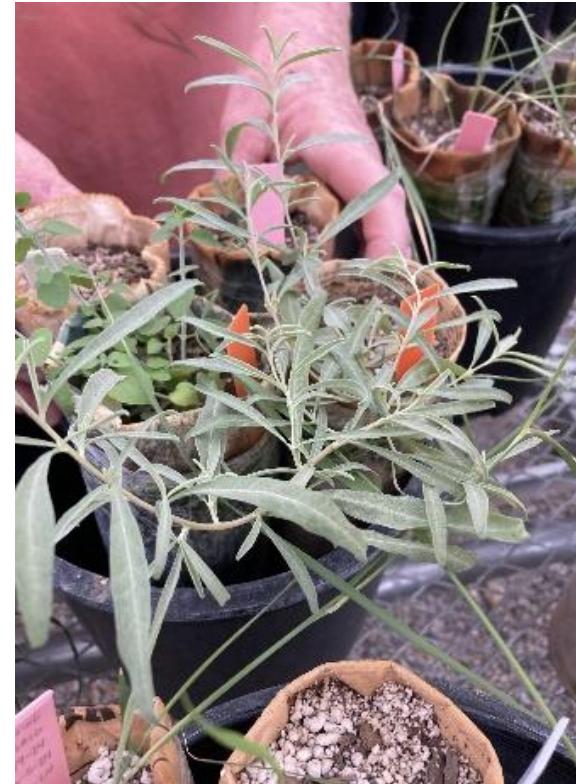
Harden up plants and hand watering

Time in South Greenhouse

During the hot summer months, small plants cannot handle stress of going from 80 degrees in a greenhouse to 100 degrees with a dry wind.



= Too Small



=big enough to go outside

- Joshua Trees grows slowly and need to be in South Greenhouse for a couple months.
- Once ready, transplant into PVC and put outside.

Organization

- In South Greenhouse, it may be helpful to keep plants organized by projects if counting for project species inventory and for recording in clipboard when transplanting
- Watering South Greenhouse before transplanting may cause pots to fall apart.



Wetwall

Keep wetwall on 'On' during summer. If on Auto, it overflows when it turns off at night.

SGH Pads Replacement

- 15 6x12x36in from [One-Side Coated Evaporative Cooling Pads for Greenhouse – Greenhouse Megastore](#)
- Bought 3 of the 5 pack



Open ball valve only to line so that it does not overflow wetwall.

Keep water level at gauge level. If on auto turn on, when it turns off it drains and if water level is too high it will overflow.



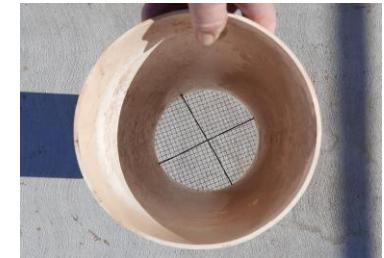
Submersible pump for both SGH and WGH.
Replacement pump in Shed A.

Transplanting

Transplanting; preparation (1)

Setting up ½ talls

- Stage empty ½ talls on the cement pads in the upper compound.
- Place the pots with drilled holes facing up on the cement pads.
- Insert wires through the holes in the pot bottom to form a cross shape.
- Bend the wire ends down against the side of the pot.
- Set the pots back down with wires at the bottom.
- Get the 6" metal screens from the tall Rubbermaid cabinet and drop one into each pot. They may have to be adjusted to lie flat.
- There are smaller screens, wires, and pots for JBWD and for projects that you need to carry the pots into the wilderness.
- We have also been using the smaller 4" pots for projects where we have to carry plants into the field. However, I'm not sure how many will survive in the field without water.



Old soil

- Dump one or two flats of discarded seedlings into one of the yellow wheelbarrows. The rest of the wheelbarrow can be filled with soil from dead plants



Transplanting; preparation (2)

Old soil

- Take the wheelbarrow to the staged ½ talls.
- Get an orange safety cone from the small Rubbermaid cabinet and put into a pot to use as a funnel.
- Use one of the short shovels to add a large scoop of the old soil to the pot. This should fill up about 4" of the pot.



I like to move the pots around my seat as I am filling.

Now we an Easy-up to add shade in the morning. They are located

Position chairs next to wheelbarrows

Stage the four green wheelbarrows with new soil.
* One batch of soil fills all four green wheel barrows.



Transplanting (3)

1.



Make sure the plant is at the correct level in the pot before removing the plastic.

2.



This is the correct level for the plants to sit below the top of the pot (about 2"). The plant should sit low enough so a person can grab the pot with their thumb inside.
Add or remove soil to desired level.

3.



Add soil almost to the top of the paper pot. Gently shake the PVC pot and tamp it to settle the soil. Might put tag in wheelbarrow for safekeeping incase the pot falls apart.



4.



Tear off the top portion of the paper pot. This allows better water absorption and ensures that the plastic has been removed.



Add a few more scoops of soil to completely cover the top of the paper pot. Gently tamp the pot again to make sure the pot is covered.

Make sure the tag stays in the pot.

Transplanting (4)

Watering

Water the transplants. Use the hose on moderately low flow or use either the spray attachment or watering wand. Make two rounds over the plants.

Record Keeping

Write the date on the tags and enter the amount planted on the clipboard.

Moving plants onto driplines

- Load $\frac{1}{2}$ talls into the electric cart or onto a nursery cart. If using a metal nursery cart load plants from front to back so the cart doesn't tip over. Keep projects grouped together on the cart.
- Unload the $\frac{1}{2}$ talls onto the weed cloth in columns of three, making sure each column lines up with a set of spaghetti tubes.
- Pull all the spaghetti tubes in a set out towards you. Choose three that will reach to each pot. The shortest tube will go in back, the longest in the front pot.
- If the tubes have a brown spray emitter, they are acting as plugs. Replace them with one of the metal silver/black emitters (bubblers). **There are two styles of the metal emitters.**
- The older ones have one closed end and can only be inserted into the tubing one way. The newer style is designed so that it can flip to act as a plug. **Make sure the black end is inserted into the tubing so water will flow out.**
- The emitter should be pushed into the tubing just enough so it doesn't fall off. If it's pushed on too firmly no water will come out.

Clean up

- When the soil on the cement pads has dried, sweep it into piles. Use the dustpan to collect it and dump it into one of the yellow wheelbarrows.
- Empty all the plastic/paper into the trash can.
- Put away the scoops. Move the wheelbarrows and chairs back into their resting spots.



Outdoor Driplines

Dripline repair/emitter checks (1)

Preparation

- Get one of the black tool caddies containing metal emitters and brown plugs, connectors, scissors, and metal clips. They are located on the bench outside the south greenhouse.
- Spare emitters are in the white five-gallon buckets beneath the bench.

Checking and repairing lines

- I like to repair during watering in addition to checking that each plant is receiving water.
- To replace a connector, wedge a pair of blue scissors between the connector and the main line and use it as leverage to either pop out the connector or snap it off. If it snaps, use the scissors to carefully poke the residual piece into the main line (Figure 1).
- Cut off the spaghetti tubing with the remainder of the connector, attach a new connector, and insert it into the hole on the main line. (Figure 2 & Figure 3).
- If the connector is difficult to insert, the red tool can be used to enlarge the hole. Just push it in and leave it until you're ready to put the repaired line in. The goal is to make the hole temporarily larger (Figure 4).



Irrigation repair tool caddy



Figure 1



Figure 2



Figure 3



Figure 4

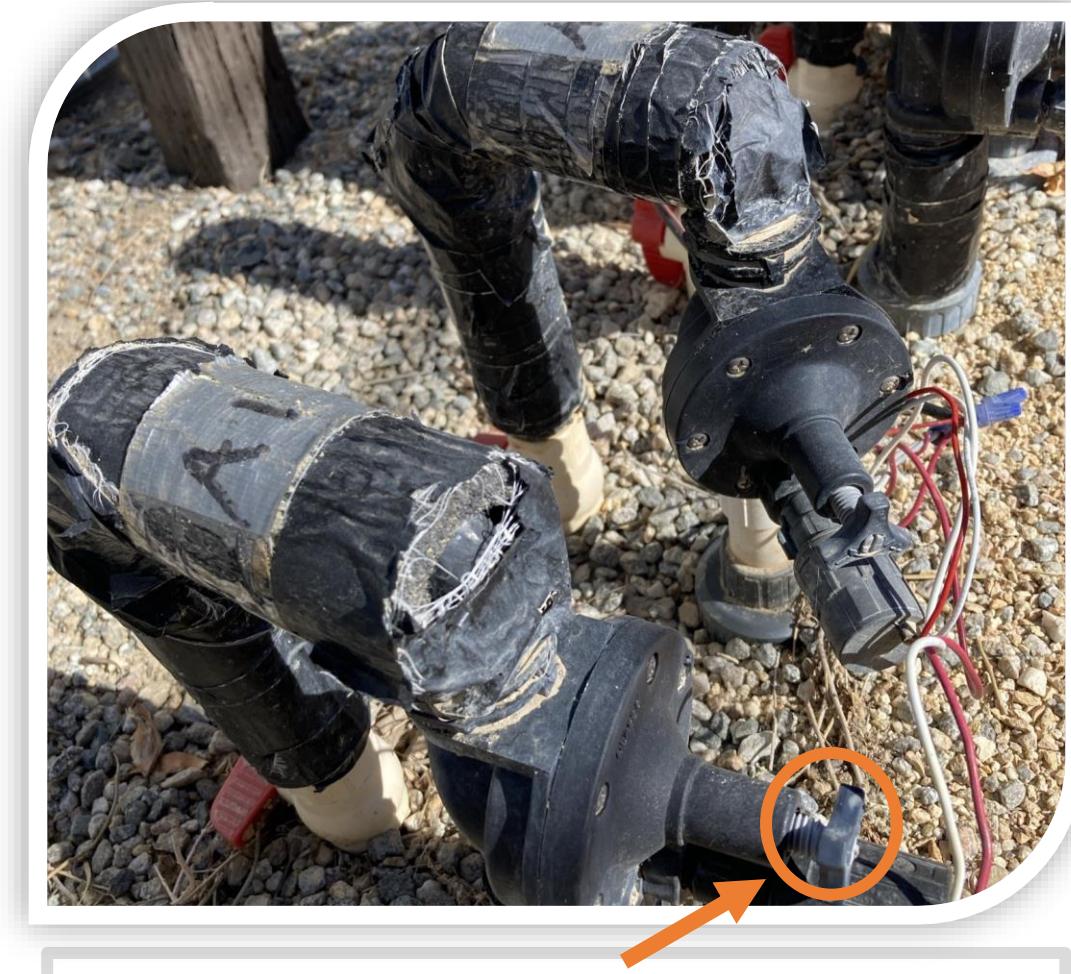
Dripline Settings



Summer- Water MWF, check lines while running

JBWD=6 min, YUCBRE=8min, Cactus=6 min, Plants=10min

Winter- Water once a week five minutes, Cactus hand watered



Adjust the flow-control screw of water

Under 50% shade cloth in summer. *Put **frost cloth** over plants when temps reach 32 degrees. Frost cloth is located in a black tote outside the South Greenhouse.



Dripline Settings Pt2

- Many Joshua Trees and other plants on the driplines outside of the SGH damped off. I was watering twice a week in Spring/ Early Summer. The Encelia and Yucca were on valve 9 and valve 8 (I moved the ENC further away by the time I took the photo). The first line of Joshua Trees right next to the greenhouse seems fine, but valve 8 and 9 were almost all dead. Over established 40 YUCBRE died. There was not much root mass, so it was not that they were just to big for the pot, also the other species of various ages damped off. I believe the cool air from the greenhouse was killing these plants.

Hardening-Off

Harden off plants two months before out planting. The Geology and Elk Fire restoration is occurring in November, The Indian Cove out planting occurs in December of 2025. In September, start incrementally lowering water for the half of the Geo and Elk plants that are going out this year. Then water the week of out planting for sure. In October start lowering watering for Indian Cove. The week of out planting water Indian Cove plants for sure.

Upper compound

Staging area, soil mixing, and storage

Mixing Soil

- PPE (Personal Protective Equipment) for mixing soil is a dust mask and safety goggles, used to prevent dust from getting in the eyes, nose, and mouth while emptying bags into the soil mixer.
- Empty the bags into the mixer alternating potting soil and perlite. The last bag should be potting mix as it covers the perlite and helps to minimize the dust.

Steps

- Move three bags of the 3 cubic foot size potting mix to the soil mixer and stack them on the grating on top of the mixer.
- Move 3 bags of the 4 cubic foot size perlite to the soil mixer and place them on the platform at the top of the steps.
- Fill buckets with sand up to the line X12 buckets. (Lines marked 5.5 in up from bottom measure approximately 1 cubic foot amount.
- Fill coffee pot with 11cups of Ozmocote 13-13-13 slow release fertilizer.

Sand

Make sure it is coarse washed concrete sand (washcon). Must be coarse sand, NOT plaster sand.
12 tons to fill sand bin. Order from Hi-Grade

Let the soil mix a few minutes to allow the components to incorporate

PPE (Personal Protective Equipment)



- **Respirator or dust mask** — You must wear the full-face respirator or a dust mask while emptying the perlite and mulch into the mixer.
- **Safety goggles** — You must wear safety goggles

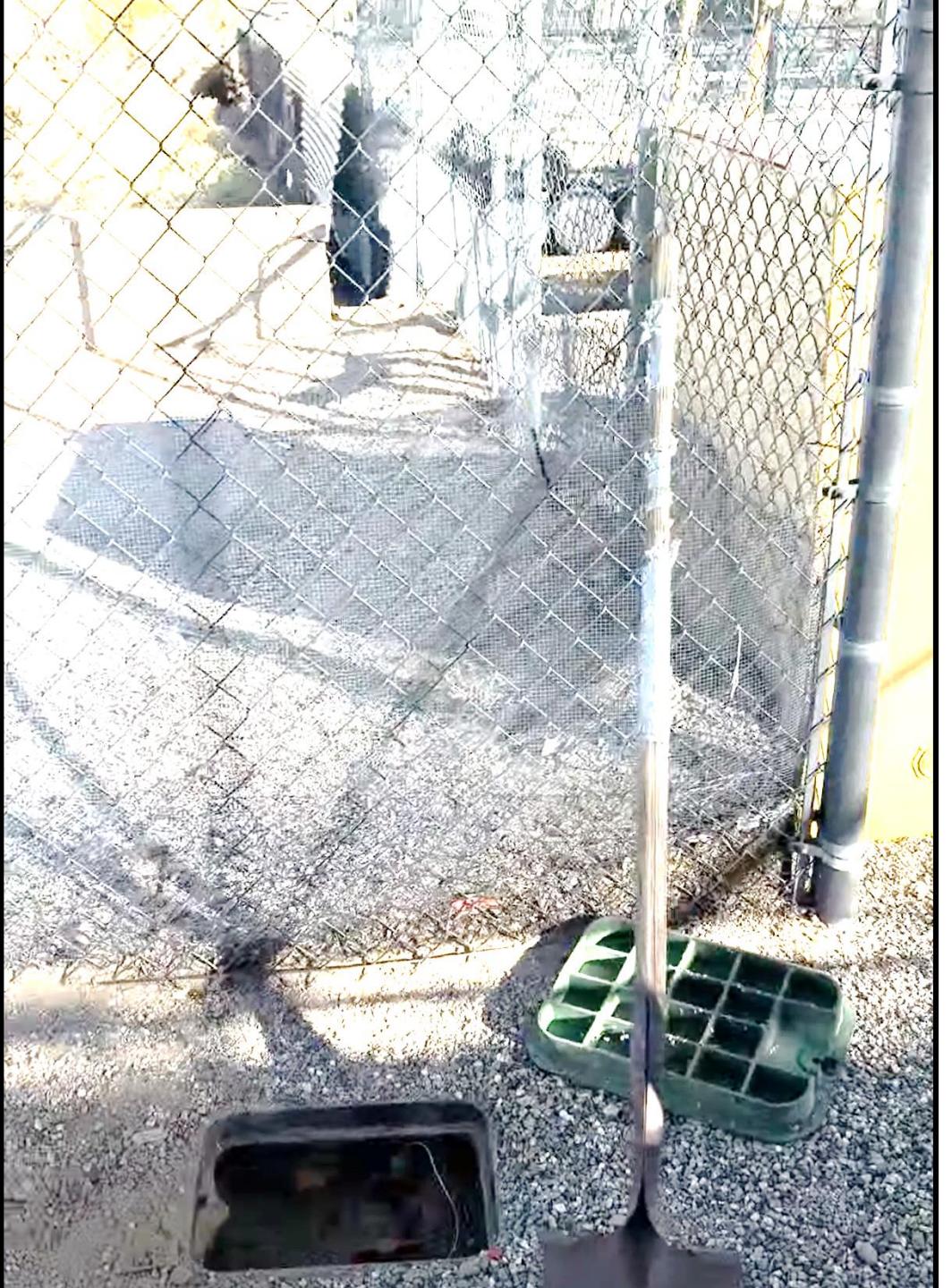
Soil Mixer



Grease

Grease gun

once a year to grease gun the three soil mixer zerk fittings. Last done 2/26/2025



Driplines in Upper Compound

This is the ball valve and solenoid for the upper compound driplines. It is located north of the driplines by the small gate that goes out to where the cages are kept. There are ball valves on each dripline. There is only enough pressure for one dripline to run at a time. There was a proposal to install another irrigation line to the upper compound.

Washing pots

Toss the red hose with attachment over the fence to the compost bin.



The flat setting on the spray attachment works well.



Take a pot from the stack of dirty pots and spray it clean over the compost bin, ensuring that all dirt and root material is washed out of the pot.

Place clean pots face-up on the gravel area next to the compost bin or stack them on a cart as in photo above. Spray the inside bottom of pot with Physan .

Let the pots dry thoroughly before stacking them to prevent them from sticking together.

Making PVC Pots

Cutting pvc into $\frac{1}{2}$ tall pots (1)

PPE

Eye protection, hearing protection such as earplugs or earmuffs, gloves, and a dust mask to reduce particle inhalation. They should all be located in the seed lab.

Marking pots

- The 10' long sections of pvc will probably be stored outside the upper nursery compound. Carry the number of pieces you want to cut into pots into the upper compound.
- They need to be marked into 15" sections before cutting. Tools needed are a tape measure and a sharpie.
- Two options for marking 1) lay the long section of pvc onto a table and stabilize it so it doesn't roll or 2) place the long section of pvc into the chute and mark it there.
- Start measuring at the narrow end of the pipe (not the flared bell end). Lay the tape measure on top of the pvc and mark off every 15", pulling the tape out as you mark.

Cutting pots (based on 2023 protocol)

- Set up the chop saw and chute on the blue folding ladder (should be in the upper compound)
- Use an extension cord to connect chop saw to the electrical outlet on the main power box
- Load a marked pvc section into the chute. The flared/bell end will not slide past the chop saw blade, so load that end first and make sure the bell sticks out beyond the blade. Rotate the pvc so all the marks are facing up.
- Pull the pvc section through the chute and past the blade until the first mark is directly under the blade.
- One person can control the pvc if the chute isn't warped and the pipe can slide through and rotate smoothly.
- The current chop saw cannot cut through a 6" diameter pipe in one motion. Make a partial cut and then rotate the pipe with the blade spinning to make the entire cut.
- Look at Photo 1 on the next page. Try to visualize that 15" of pvc are sticking out to the right beyond the chop saw blade.
- Grip that portion of pipe with your right hand. You will use this hand to rotate the whole section of pvc while cutting.
- Your left hand will control the power and cutting.
- The power trigger for the saw is located under the handle. Squeeze the trigger to start the blade. (The blade will only spin while the trigger is depressed. As soon as the trigger is released the power is cut, though the blade will continue to spin for a short time.)
- Once the blade is spinning at full speed lower it down to make the initial cut on the top. Keep the power going and rotate the pipe away from you until the blade has cut through the entire diameter.
- The beginning and end of the cut doesn't automatically line up every time. You may have to adjust the pipe horizontally while rotating it to get the ends to meet.
- To smooth out uneven, jagged edges, press the pot against the flat of the blade and it will sort of grind/melt the spot down.



Cutting pvc into pots (2)

Photo 1



These photos are to show the setup of how the pvc slides through the chute and under the saw blade. **This is the wrong type of pvc; it is schedule 40 and it is much too thick and heavy for pots.** These also appear to be 20' lengths. We usually **purchase 10'** lengths of sewer pipe.

Drilling half-talls

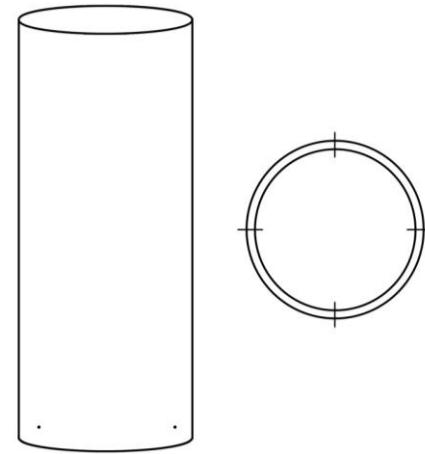
Preparation

- Get the nursery drill from the tall metal cabinet in the seed lab. There are another two drills located in the cabinet to the left of the door in the tool shed if needed.
- Batteries for all the drills are stored on top of the bookshelf in the seed lab. Check to make sure batteries are charged by placing them in the chargers located on either side of the bookshelf.

Drilling

- Place a half-tall flat on the ground, bracketed between your feet. If the pot has a flared “bell” end, drill the holes in the narrow end.
- Drill a hole about $\frac{3}{4}$ " (roughly one finger’s width) from the rim of the pot.
- Rotate the pot 90 degrees and drill another hole, continuing until you have four holes.
- Make sure the bit is placed firmly against the pot before drilling so that it does not slide and hit fingers or feet.

When done stack pots against the fence with the drilled end closest to you (facing out away from the fence).



Ordering PVC Pots

- The best deal is Ferguson Indio Branch. The other option for the SDR 35 PVC is Core & Main, which has a \$300 delivery fee, so not a good deal.

We require SDR 35 PVC. It is half the thickness as schedule 40 so that we can squish it to get the plants when out planting. Also, it is lighter.

Integrated Pest Management

COMMON GREENHOUSE PESTS



SPIDER MITES

Adult spider mites are less than 1/20 of an inch long, and live in colonies on the undersides of leafy vegetation. In warmer parts of California they infest plants year-round, but are more numerous in June-September, and thrive particularly well in dry, dusty conditions. Mites cause damage by sucking plant juices from leaves. Presence of spider mites is marked by fine webbing on leaves. Damage is evident when leaves begin to look spotty, bronze colored, or turn yellow and fall off.

© University CA IPM website, 2000

APHIDS

Aphids have a pair of tubules called cornicles on their hind ends, which distinguish them from all other insects. Adult aphids may be green, yellow, red, brown, or black. Female aphids reproduce asexually and give birth to live young. Typically large groups of aphids feed on plants, sucking out the juices with their piercing mouth parts. Damage includes curling, yellowing, and stunting of leaves. Aphids also produce large amounts of sticky honeydew, which encourages the growth of sooty black mold.



© Wikimedia Commons

Can use Diatomaceous Earth for Black Aphids. Put a lot to coat plant. Was on ATRCAN, ENCFAR, AMBSAL, AMBDUM.

COMMON GREENHOUSE PESTS



© Wikimedia Commons

MEALYBUGS

Mealybugs have a powdery or fuzzy appearance due to waxy secretions that help protect newly laid eggs. They insert their stylus into plant foliage and suck the juices. Once a mealybug anchors itself to a plant, it usually stays there. Mealybug infestations can cause plants to lose leaves and grow slowly, even causing death. Also, plant viruses and fungi are often introduced to the host plant. In the JOTR nursery, mealybugs prey on Creosote and Cheesebush plants. Look for yellowing leaves along stems as an indicator.

WHITEFLIES

Whiteflies usually occur in groups on undersides of plants. They have yellow bodies and white wings, along with a mealy white wax covering the wings and body. Like spider mites, whiteflies multiply quickly in warm weather and can reproduce year-round in parts of California. Whiteflies suck phloem sap out of plants and excrete honeydew, causing yellowing or death of leaves. Sooty mold can grow on plants as a result.



© Wikimedia Commons

Record Keeping

Record keeping

Use the **propagation record sheet** when you:

- Sow seeds- propagation number sheet
- Plant seedlings- propagation record sheet
- Move plants from the west greenhouse to the south greenhouse
- Move plants from the south greenhouse to onto the driplines

| PROPAGATION RECORD | | | | | | | | | | |
|--|---------|---------|-----------|---------|-----------|---|------|-------|---------|---------|
| Fill out these columns when planting seedlings | | | | | | | | | | |
| Prop # | Date | Species | # Started | Date | # Planted | Moving from EGH to SGH and to driplines | | | | |
| | Started | Code | | Planted | | Pot | Date | Moved | # Moved | To |
| 199-16 | 10-18 | psar | 72 | 12-16 | 13 | PP | FI | | | discard |
| 200-16 | 10-18 | Latr | | 12-16 | 3 | PP | FI | | | discard |
| 197-16 | 10-18 | amdu | | 12-16 | 3 | PP | FI | | | discard |
| 201-16 | 10-18 | Latr | | 12-16 | 21 | PP | FI | | | discard |
| 206-16 | 10-27 | leftr | | 12-19 | 28 | PP | FI | | | |
| 206-16 | 10-27 | leftr | | 12-20 | | PP | FI | | | |

R:\Vegetation\Nursery\General_Information\Databases
Document is called - 20180926_CALR

Here is the document to input physical propagation records, done at least yearly in Summer, a new iphone can extract text into Xcell and you can input Excel into Access



Microsoft Access
Database

(Print Sheets 1&2)



Sowing_Form

(Click on Sheet1)



Transplanting_For
m

Important Links

Contacts, Shopping, Presentations

Volunteer Contacts

Available upon request

Available upon request

- Make sure to give volunteers clear instructions. For example, if you have them put plants on the driplines, make sure and watch them flip the emitters. It is hard to go through every plant and try to find the pots that the emitters are the wrong direction.

Presentations:

JBWD first four Friday Mornings in May
Reminder to send to all staff to invite them to plant sale and course
R:\Vegetation\Nursery\!!IMPORTANT!!!\JBWD_Class

Shopping Links

• Order concrete sand from Hi Grade Materials
\$18.99
is 1/8
This
Outd
\$17.99
is 1/8
[Amazon](#)

EGH
\$90.00
3 pads
•
Us
Pas

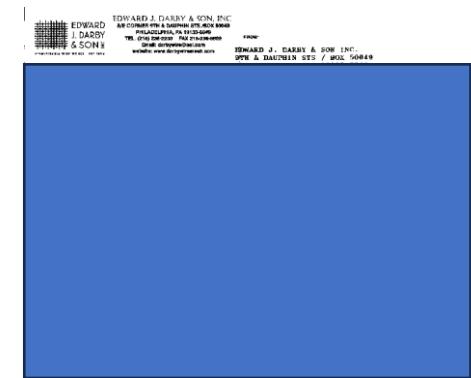
Order coursed wash concrete sand from Hi Grade Materials
Order PVC from Ferguson Indo for free delivery, instead of \$300.

[ef_cm_sw_r_cp_ud_ct_QYTHSGHGR8B303Q6YH8_5](#)

[ef_cm_sw_r_cp_ud_ct_QYTHSGHGR8B303Q6YH8_6](#)

[bler Pad - Pack of 3 : Tools & Home Improvement](#)

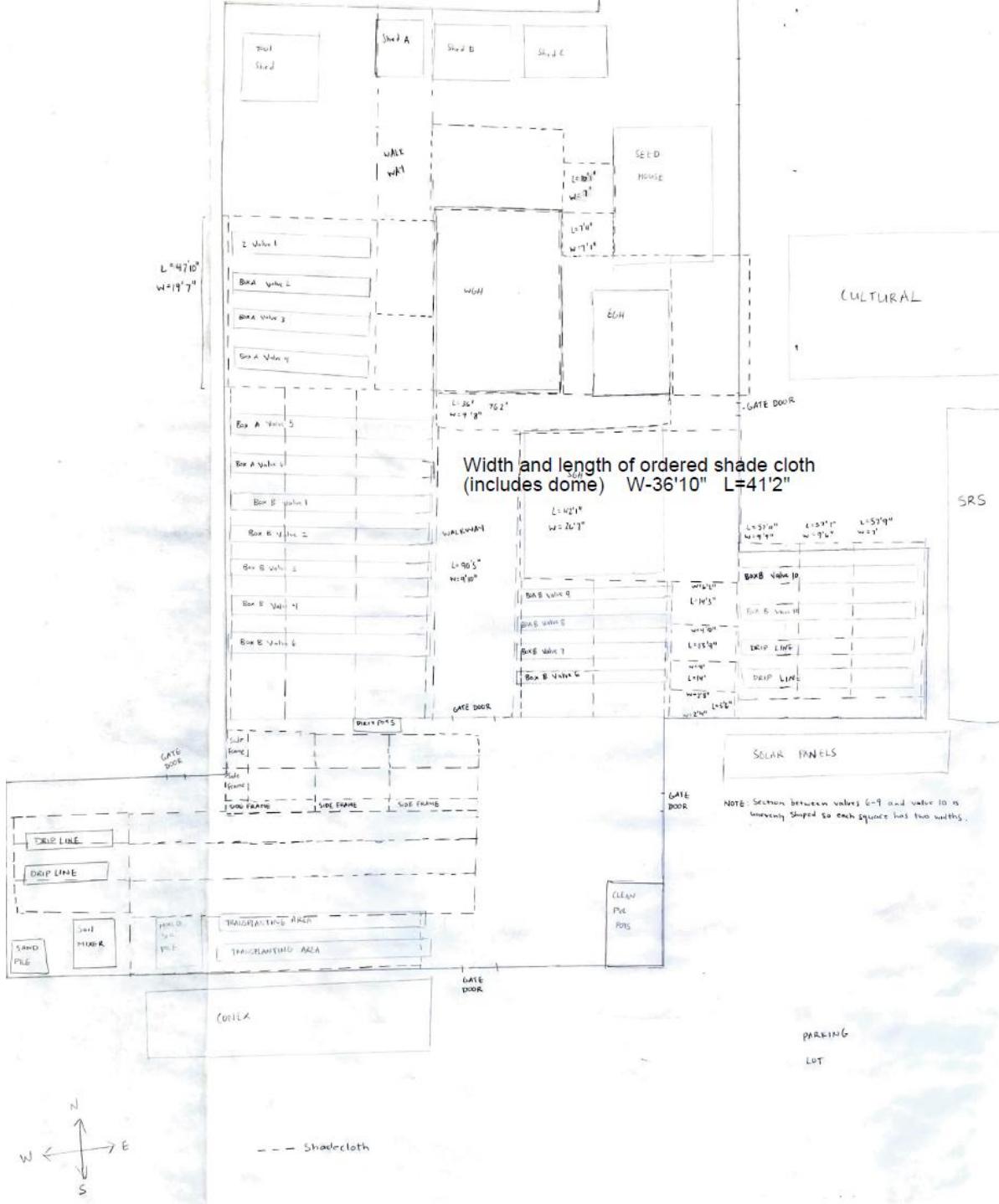
Mesh Screens:



EDWARD J. DARRY & SON, INC.
MANUFACTURERS & IMPORTERS OF
PHILADELPHIA, PA 19136
THE DARRY COMPANY
Darry Distributors
www.darrymesh.com

EDWARD J. DARRY & SON, INC.
5TH & DAUBEN STS / MOI 50849

Shade cloth



When fall/winter temperatures begin to consistently stay below 90 degrees F (Oct, Nov) the shade-cloth should be untied and removed. Store the rolled shade cloth in the storage compound, covered with a tarp to prevent weathering.



Staff & Contributors

- **Zhuba Goldenlamb Nursery Tech.**
zhubaz@gmail.com

Watering restoration sites has not been successful. Yucca need more moisture and were eaten by ground squirrels. I recommend caging yucca roots and watering restoration sites.

Propagation Tips

June 20th, 2025 (Early Summer)

- Misting 15 minutes every 65 sec
- Wetwall at 60 degrees Fahrenheit
- Fan at 80 degrees Fahrenheit

SENARM- Soil $\frac{3}{4}$ of paper pot, perlite and vermiculite mix on $\frac{1}{4}$ top of pot. Direct Sow.

COLRAM- Cold stratification. Soil $\frac{3}{4}$ of paper pot, perlite and vermiculite mix on $\frac{1}{4}$ top of pot. Direct Sow.