



Plants Manual

2024

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PLANTS



Introduction:

Community Through Colors operates La Finca de Hamberto, a small-scale USDA-certified organic farm in Vieques, Puerto Rico, and educational project AVES (Apoyo en Vieques para la Educación y la Sostentabilidad). We are a proud member of the Vieques Agricultural Collective. Vieques is a historically underserved community with a majority Spanish-speaking population.

La Finca operates as a learning farm, hosting educational seminars, assisting others with at-home farming and livestock rearing, and preparing for natural disasters through food security. Currently, 99% of food on Vieques is brought from mainland Puerto Rico by ferry, which is routinely unreliable in bad weather. The few existing farms on Vieques currently face resource insecurity and climatic challenges, making the work we do here extremely important. Consequently, the farm is built primarily from recycled materials, including shipping pallets otherwise destined for the landfill. La Finca de Hamberto produces a variety of vegetables, herbs, and specialty goods, including arugula, mustard, bok choy, radish, basil, microgreens, goat cheese, soap, canned vegetables, pesto, tostones, and more.

The purpose of this guide is to provide useful information and farm processes for plant management we have developed at La Finca de Hamberto. This guide is intended to help the following farming populations: farmers in the Caribbean region; historically underrepresented/underserved farmers; socially disadvantaged farmers; and limited-resource farmers. ***NOTE: This document provides information on operations at Community Color's La Finca de Hamberto Farm, and is not applicable to all farms or farming operations. Please feel free to use or adapt the information in this manual to best suit your needs.***

Safety:

Before starting a task or operating machinery, please be aware that without proper attire or preparation you may sustain injuries. We recommend the following at all times:

- Closed shoes (Work boots, Hiking boots, or Rubber boots)
- Protective clothing (Long pants, High socks, Long sleeve shirts etc.)
- Sun protection (Hats, Long sleeves, Sunscreen)
- Gloves while working with spiny/thorny vegetation or fencing materials

Note: This is just a recommendation, as we understand a preference for comfort, but you must be aware of the risks in not wearing protective attire during certain tasks. Please understand you may be denied from participating in a task due to improper attire. Our first priority is to avoid accidents and injury.

The following section outlines protocols and schedules for watering, seeding and propagation, transplanting, harvesting, fertilizing, and garden equipment maintenance. This is a living

document and will be updated as needed to reflect the most current processes at La Finca de Hamberto.

WATERING SCHEDULES AND INSTRUCTIONS

Watering generally happens twice a day in the morning and evening, before 9am or after 4pm. Watering during midday is highly discouraged, since a high portion of the water will evaporate rather than soak into the dirt, and water droplets landing on leaves will magnify the sun and the hot water will burn the plant.

Before watering, it is important to test for hydrated soil. One of the most important resources for plants is water. You can check the water content of the soil once a day before your watering to determine the current status of the soil or you can check the water content after you have watered to ensure plants have received enough water. There are two methods to test soil hydration.

Finger method: A quick test is to dip your finger into the pot and pull it out. If the soil clumps and sticks to your hand and feels moist, that plant is most likely properly watered. If it sticks completely like mud, you might be overwatering the plant. If it comes out like powder and doesn't really stick to your hand, it will need more water.

Hand method: Another way to test if a substrate is moist enough is to grab a handful and squeeze it. If it's powdery and does not retain shape at all, it needs more water. If it retains its shape, but does not release too much excess water when squeezed, it doesn't need any more or less water. If it feels too muddy, runny, and does not retain its shape at all after squeezing, it is overwatered. A quick solution to overwatered soil is to carefully drain excess water and cease watering until soil has dried.

Observe! Plants may not be able to talk, but they can communicate about their needs. Common complaints and solutions are listed below.

- Wilty plants or browning leaves. This may appear as the top of the plant beginning to droop towards the ground, or leaves starting to dry, wilt, brown, or fall off. This often indicates that the plant does not have enough water.
 - Solution 1: Add water. If the plant has not been dry for a while, simply adding water may solve the problem and revive the plant.
 - Solution 2: If the soil has been dry a long time, it may also start to pull away from the edges of the container. This means the water is becoming hydrophobic and is full of air. If possible, this plant should be bottom watered until the soil has recovered. Fill a container larger than the pot approximately one third the way with water and place the potted plant into the water. The soil will begin to soak up

water as necessary for the plant. This ensures water reaches the roots quickly and allows the soil to slowly rehydrate.

- Solution 3: If the soil has been dry or hot for too long, it may have died. Dead soil lacks indigenous microorganisms (IMOs) and this soil will not retain water or feed the plants. If this is the case, replace the soil or attempt to revive with compost.
- Rotting plants, erosion exposed roots, or standing water in pots. This may appear as slime or spores on the plants that may begin to attract flies or smell, roots which have been exposed as a result of soil shifting or spilling in heavy rains, or standing water in a pot. A more subtle symptom occurs when only one pot in a group of pots contains wet soil. This indicates that the plant is overwatered and the roots are not taking up sufficient water.
 - Solution 1: Cease watering until the plant has dried out, and then continue.
 - Solution 2: Repot the plant. Standing water could indicate that the pot does not have holes for drainage.
 - Solution 3: Add sand or drainage rocks to the soil to increase flowthrough of water.
 - Solution 4: If the plant is dead and is no longer taking up water, causing a single pot in a group of pots to appear significantly wetter than the others, compost the plant and dump the dirt in the reused dirt pile.
- Leaning: once plants germinate, you may notice sprouts begin to lean or point in odd directions. This is often an indicator that they are looking for more sunlight; use this in combination with observing size, leaf, and root development to make the decision to transplant.
 - Solution 1: Relocate trays to increase access to sunlight.
 - Solution 2: Turn pot or tray 180 degrees to straighten plant
 - Solution 3: Transplant plant

Below you will find information on how to water the plants in the nursery and trailer garden.

NURSERY

1. Turn on the water for the hose to the nursery
 - a. Turn on the main spigot (metal bar counterclockwise) and the hose split for the nursery hose (the black knob on the left leading to the hose labeled “nursery” should be parallel with the hose
2. Check soil and water plants using the “shower” setting
 - a. Radish microgreens should be watered only in bottom watering trays (do NOT get the leaves wet)



- i. Make sure the water level is not above the dirt level so that the dirt is not flooded. If necessary use small rocks or almond nuts to level the tray
 - ii. If there is already water in the trays from a previous watering event, dump the trays and do not add more water. This will prevent stale water from causing the plants to mold
 - iii. Microgreens may be watered if needed starting 12 hours after they have been unstacked and ceasing 36 hours prior to harvest
 - b. Cactus (pineapple, dragonfruit) and orchids (vanilla) should be thoroughly watered only when the soil is dry. This is called a wet-dry cycle
 - i. Do not water directly on pineapple crown
 - c. For seedlings or small plants, hold the hose at least a foot or two away and gently water. If the plants begin to fall over, increase distance or decrease water pressure
 - d. If necessary, remove weeds from seed trays
3. Drain and wrap hose
 - a. Close the water spigot and drain all of the water from the hose
 - b. Leave the hose nozzle in the off position
 - c. Wrap the hose such that the hose is entirely off the ground without kinks or warps
4. Report any issues
 - a. Yellow leaves or discoloration
 - b. Dying plants
 - c. Insect or animal activity
 - d. Rotting leaves or excess water



TRAILERS

1. Turn on the water for the hose to the trailers
 - a. Turn on the main spigot (metal bar counterclockwise) and the hose split for the container garden (black lever flipped to the right) for the hose labeled “container garden”
 - b. Walk to the trailer hose and make sure the second hose split is perpendicular to the hose leading to the goats and parallel to the hose for the container garden
2. Check soil and water plants using the “shower” setting
 - a. Mint like to be flooded
 - b. Succulents do not need much water



**You do not need to water the foliage; aim for the soil underneath the leaves. Watering the foliage of trees can be misleading and gives us the illusion that it has water, when the

soil could have received little water. Always make sure you are properly hydrating the soil.

3. Remove weeds from pots as necessary
4. Turn of the water and drain all of the water from the hose
5. Wrap the hose such that the hose is entirely off the ground without kinks or warps

PROPAGATIONS (morning only)

1. Empty and refill water for propagations
 - a. Check for mold, slime or rot. If there is mold or rot, discard the propagation. If there is slime, gently wash the propagation with water and replace in the jar



MICROGREEN SEEDING

1. Soak 2.5 pounds of sunflower and 2 pounds of peas for four hours prior to planting to break the germination barrier
 - a. Make sure the seeds are completely covered with water. If the seeds are floating, this may require adding a lid or plate to keep them submerged. Seeds absorb a lot of water, so add a few extra inches of water
2. Radish seeds and some other types of microgreens do not need to be soaked
**apportion 1lb red/purple radish and 1lb white/green radish to plant

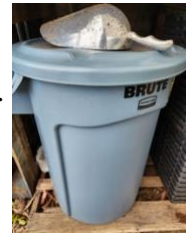


3. After four hours, remove the water from the sunflower seeds
 - a. Place a metal bowl on a scale and zero the weight. Then, strain the seeds through a colander to remove the water, and dump wet seeds into the metal bowl
 - b. Divide the weight by thirteen to determine seed density in each tray. (~5oz +/- 0.5oz)



4. Prepare trays for planting by evenly distributing damp dirt into each tray
 - a. Prepare 25 black trays for sunflower (5 trays per pound) and 20 green trays for radish (10 trays per pound) and 4 blue trays for pea (2 trays per pound)

- b. Mix dirt from the dry dirt bucket with water in the wet dirt bucket, until the water is damp enough to hold shape but not dripping water. Any old stagnant wet dirt should be removed prior to mixing fresh dirt for use
- c. Add just less than one level scoop of wet dirt into each tray. Evenly distribute dirt so each tray is approximately half full. Use a second tray to uniformly compress the wet dirt



- d. Evenly distribute prepared seed across all trays
 - i. Sunflower/pea: use the weight calculated in step 3b for each tray
 - ii. Radish: 1.6oz radish into each tray
- e. Leave seeds on dirt surface; do not cover with dirt
 - i. For smaller seeds such as radish, sprinkle seeds across the tray so minimal adjustment is necessary, otherwise seeds may be rolled under the dirt
- f. Stack the seed trays on top of each other in piles of no more than eight, under the canopy but near the edge. Place an empty tray on the top, and add three or four heavy rocks



5. After two days, the seeds should start germinating and the sprouts will start pushing the trays up. Unstack trays

- a. Radish should be unstacked and placed on bottom watering trays in the front row; sunflower may be unstacked along the back row



SEED TRAYS

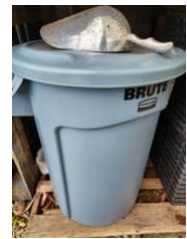
Finca Hamberto uses three different types of seed tray, a 50 cell seed tray, 72 cell seed tray, and paperpot seed trays. Seed trays should only be used as a backup method if seeds cannot be directly seeded into the ground. Paperpot seed trays should only be used if you are seeding a long row bed with lines of plants that are at least six inches apart.

Seed tray dimensions: A 50 cell count seed tray is an overall good tray for most crops, and allows the plants to have more root development. If you choose to use a 72 cell count tray, monitor plants and ensure they are transplanted as soon as the roots are ready.

Selecting starting medium: There are different substrates, soils, and additives appropriate for plants of different ages and species. The Organic Growing Mix is a good choice for most seedlings. Some tree seeds or tomato seeds may prefer a mix of reused soil and compost, and others may prefer a mix of sand or crushed leaves, but consult with the plant manager prior to experimenting with different substrates.

1. Prepare dirt

- a. Mix dirt from the dry dirt bucket with water in the wet dirt bucket, until the dirt is damp enough to hold shape but not dripping water. Any old stagnant wet dirt should be removed prior to mixing fresh dirt for use



2. Add wet dirt to fifty cell trays so that each cell is full

3. Use a second tray to press down on the first tray and compact the dirt, maximizing nutrients available to the plant

4. For seeds with high germination, plant one seed per cell. For seeds labeled with low germination, plant two or three seeds per cell after confirming with the plant manager

a. Make sure to prevent contamination

- i. Use clean, dry hands when reaching into a stock seed container
- ii. If you return extra seeds to the stock seed container, make sure they are clean, dry, and not contaminated
- iii. Make sure any dirt returned to the bins are free of seeds

b. Seed orientation

- i. If the seed is small, orientation does not matter
- ii. If the seed is large, plant the radicle oriented downwards. Usually this will be at the point of a seed, but may also be on one of the edges. The radicle



appears to be a scar, or rough bump, on the seed where the roots will emerge

- c. Seed depth
 - i. The depth in which you must plant a seed is usually double its size. Imagine if you're planting a bean, now imagine an imaginary bean on top of the bean you are planting. That's the depth in which you must plant that seed
5. Top off each cell with more dirt, making sure the seeds are not disturbed
6. Label each tray
 - a. Write the name and the date in capital letters on a piece of masking tape and stick onto the front of the container. This helps to keep track of which plants have been planted, which ones need to be planted, and which seeds fail to germinate within the expected timeframe

HOOP HOUSE IRRIGATION

1. Make sure the blue outlet valve leading away from the container is perpendicular to the white pipe



2. CTC uses solar and battery power at the farm irrigation pumps. Check the charge on the solar controller (white box to the right of battery). The battery should be above at all times, otherwise wait until the battery is charged to turn on the irrigation
 - a. The battery should be on. If the battery is not on, the controller likely be fluctuating between 40- due to direct electrical input from panels



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50V
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60
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3. Check the water reserve to ensure the water level is sufficiently high to cover the pump
4. Check the panels to make sure there are no obstructions and the wires are properly connected



5. Press the power button on the white box to turn the system on. The pump should start buzzing in the water.
6. Once the tank is full, open only the valve that leads to the hoop house to empty the tank

- a. Ensure the drip tape is flat and straight along the beds. If drip tape is shifted or kinked, realign and secure with stakes. Check for leaks in the drip tape and if necessary, refer to the repair section to fix
- b. For drip irrigation, make sure the flood irrigation valves are closed
- c. Repeat step 2, filling the container a total of twice



HARVEST and ORDER SHEET

Date: __/__/__

Time of Order Request __: __

Initials: _____

Name	Arugula	Mustard	Radish	Bok Choy	Mixed	Sunflower	Daikon	Pea	Eggs	Other
TOTAL										

Notes: _____

Type	# Small market bag	# Large market bag	Restaurants/Individuals	Extra	Total
Sunflower					
Radish					
Pea					

Farmers Market Example	Restaurants/Community Example
Pea (2.5oz) \$5	Pea (2.5oz) \$5
Pea (10oz) \$20	Pea (10oz) \$20
	Pea (16oz) \$35
Radish (2.5oz) \$5	Radish (2.5oz) \$5
Radish (11.5oz) \$20	Radish (8oz) \$14
	Radish (11.5oz) \$20
Sunflower (4oz) \$5	Radish (12oz) \$21
Sunflower (16oz) \$20	Radish (16oz) \$28
	Radish short stem (16oz) \$33
	Sunflower (4oz) \$5
	Sunflower (8oz) \$10
	Sunflower (16oz) \$20

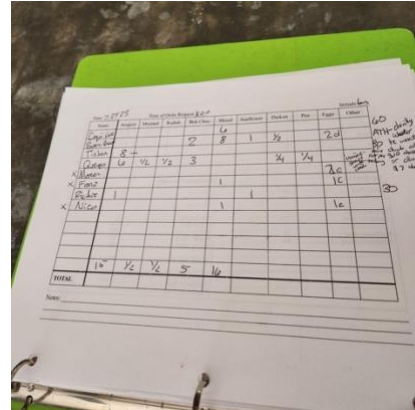
MICROGREEN HARVEST

1. Text restaurants and customers requesting produce orders between 10am and 11am
 - a. Send the following text to individuals who are currently purchasing: “Good morning! What would you like us to harvest for you this week?”

- b. Transcribe orders to the order sheet in the order notebook

2. Set up the wash station by cleaning the sinks, wiping down all surfaces, and rinsing the buckets

- a. Use a sponge at the wash station to thoroughly remove any dirt, leaves or other debris from the sinks. Rinse the sinks using the hose, making sure the hose does not touch the ground
 - b. Fill each of the five sinks with water, three quarters full



- i. After each of the five sinks is full, turn of the main spigot and open one of the blue sink spigots to drain the pressure from the pipe

- c. Scrub clean two blue buckets

- i. Leave one with the wash station to transport greens to the dry station
 - ii. Take one to the harvest station to transport greens to the wash station

3. Set up the harvest station

- a. Use the white folding table stored next to the workbench in the nursery. Wipe down the table, and then set up clean blue bucket to collect greens and harvester

4. Harvest in the order of radish* - pea - sunflower

- a. Use the ryobi battery marked with electrical tape only for the harvester

- i. Check each tray for spots of mold, discoloration, or “damping off”

1. If present in a small section, use a knife to cut around the affected area
 2. If present in a large section or throughout the tray, discard the entire tray
 3. If not present, proceed to step ii



- ii. Align the harvester with the edge of the tray, carefully avoiding the cutting edge, and then move the harvester evenly along the base of the tray. It is important to ensure that the harvester blade is always running at maximum speed and that the machine is moved along the tray at an intermediate pace
 - iii. Collect in a blue harvest bucket

5. Wash hands at the hand-wash station

6. Transfer the microgreens to the wash station. Each set of microgreens should be washed five times to ensure dirt, seed shells, and bad leaves are removed

- a. Agitate the water in a circular motion to separate seed shells from greens

- b. The second wash should be 80% free of seed shells, and the third wash should be 99% free of any seed shells. Silver grates and strainers may also be helpful to remove seed shells from the harvest
 - c. Water should be thoroughly cleaned using a strainer between each type of microgreen to prevent contamination
7. Prepare the drying station
- a. Set up three large tables in the upstairs kitchen, next to each other and touching to form one large working surface
 - b. Use a cloth and diluted vinegar to clean and sanitize the tables
 - c. Lay out white microgreen towels on the tables so that the entire surface is covered and the towels overlap by at least two inches
 - d. Close all doors and windows to keep the dogs and cats out of the area



8. Transfer washed greens from the wash station to the dry station
- a. Load the greens dryer. Do not crush greens into the metal bowl, but fill loosely and completely to the top
 - b. Close the lid and turn the dial. Machine will stop automatically
 - i. The first two dials should be off; turn the spin timer to 1
 - c. Spread out the greens as much as possible underneath a fan and monitor dampness levels. The radish will take the longest to dry, however, they quickly become too dry, so it is important to check frequently and occasionally turn to dry evenly
 - d. Turn on the overhead fan



9. Package
- a. Use the green microgreen towel scissors to cut microgreen paper towels in half sheets parallel to the short edge such that the sheet is approximately square
 - b. Place a half paper towel in the bottom of a plastic produce bag, and add the dry greens on top of the paper towel. Twist tie the top to close, leaving some air in the bag similar to a chips bag
 - i. Radish microgreens should be tied with a red (any unique color) twist tie



- ii. Sunflower and pea microgreens should be tied with a green (any unique color)twist tie
- c. Start by packaging orders from restaurants or community members, and then divide the leftovers into bags for the farmers market according to the weight/cost chart below

Variety	Small bag	Large bag
Radish	2.5oz	11.5oz
Sunflower	4oz	16oz
Pea	2.5oz	10oz
Mixed	3.5oz (1:1:1.5 rad:pea:sun)	14oz

- i. Start with 20 small radish bags, 35 small sunflower bags, and 10 small pea bags. If there is more product, package the rest into large bags. Once all small and large bags are filled, any extra product can be packaged into additional small bags if insufficient quantity for another small bag

10. Label the bags

- a. For community members and restaurants, label the bag with the name of the customer in black sharpie
 - i. If you make a mistake writing the name, do NOT cross out the marking and relabel the same bag. Instead, discard the original bag and label a new bag with the customers name
- b. For the farmers market, label each bag with the type of sprout only in the proper color (rad, sun, pea) but do NOT include date or weight
- c. Calculate yield and sales and write on the back of the order sheet

11. Put into the refrigerator

- a. Stack bags of product in green stackable bins and place in the refrigerator
 - i. Make sure not to crush any bags
 - ii. Bins should be cleaned with vinegar prior to entering the refrigerator
 - iii. Try to keep microgreen varieties separate
 - iv. Customer orders should be placed in the racks at the top of the refrigerator

12. Clean trays

- a. Harvested trays should be emptied along the fenceline to allow additional germination from remaining seeds
- b. Each tray should be scrubbed clean and returned to the nursery to prevent mold or other contamination using the blue scrubbie
 - i. Allow to dry before stacking and returning to the nursery



13. Laundry

- a. Immediately after use, wash the white towels in the washing machine separate from all other laundry. Once washed and dried, immediately fold and return without setting on any tables or dirtying
 - i. Store in blue storage containers labeled microgreen towels



GREENS HARVEST

1. Check the order book for a list of produce to be harvested
 - a. Harvest should start as soon as possible before the sun comes up and wilts the leaves
 - b. Use the red harvest buckets to transport produce from the field to the wash station
 - i. One full red bucket, not tightly packed, is approximately 3lb leafy greens



2. Types of greens:

RADISH

MUSTARD

ARUGULA

BOC CHOY



3. Harvest greens

- a. Use the designated yellow harvest scissors
 - i. If scissors are dirty, they may be carefully cleaned with diluted vinegar
- b. Rotate through plants each harvest to allow beds to rest and vigorously regrow. Anything that is not restaurant quality (left) should be eaten at the farm (middle) or fed to rabbits (right)



- c. For arugula, mustard, and radish, pick approximately $\frac{2}{3}$ the leaves on each plant, starting around the outside with the larger and more mature plants and leaving the innermost baby leaves to keep the plant alive and encourage increased leaf production
 - i. Efficient harvest technique is to grab a section of leaves, bend them away from the plant, and cut



- d. For bok choy, cut the entire plant at the base of the plant, keeping all leaves intact
 - i. If the plant has two bundles of leaves, cut only one and leave the other to grow for another week



- e. If the leafy greens bolt/flower, clip the stem of the flower while leaving the rest of the plant intact
- f. Transfer greens to the wash station at least every half hour or once the bucket fills to prevent packing or wilting of leaves

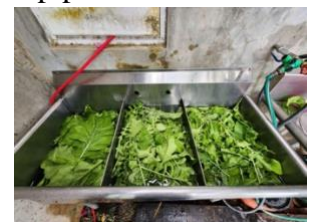
- 4. Set up the wash station by cleaning the sinks, wiping down all surfaces, and rinsing the buckets
 - a. Use the blue sponge at the wash station to thoroughly remove any dirt, leaves or other debris from the sinks



- b. Rinse the sinks using the hose, making sure the hose does not touch the ground
 - i. Flip the blue lever located on the main spigot vertical to turn on the water
 - ii. Turn the red knob parallel with the hose to turn on the hose
 - iii. Turn the blue knob parallel with the white pipe to start water flow to the sinks
- c. Fill three of the sinks with water, three quarters full
 - i. After each of the three sinks is full, turn of the main spigot and open one of the blue sink spigots to drain the pressure from the pipe



- 5. Wash hands at the hand wash station



- 6. Dump harvested leaves into the first sink

- a. If slightly wilted, allow leaves to set in water for at least 10 minutes to regain water content
- b. Wash leaves three times to remove dirt, dust, and bugs
 - i. If there are eggs or fungus on the leaves, identify species and determine an appropriate pest management technique
- c. Once leaves are washed, transfer to the drying station
 - i. Leaves do not have to be fully dry prior to packaging, however, if they are dripping water it is a good idea to gently shake the leaves prior to packaging and make sure the bags do not accumulate too much water weight
- d. Gently package leaves in a clear produce bag. Each full bag should hold 1lb of greens.
 - i. For the mixed bags, package mustard first, then radish and arugula for ease of packaging
 - ii. Leaves do NOT need to be all oriented in the same direction



7. Move finished bags into the designated refrigerator upstairs in preparation for delivery



BASIL HARVEST

La Finca de Hamberto grows several varieties of basil, including: Purple Ruffles Basil, Thai Basil, Sweet Basil, Giant Italian Basil, and Genovese Basil. The protocol for pruning, harvesting, and caring for each variety is the same.

1. Once the basil is approximately 6 inches tall, or has 6 sets of leaves, it is time to start pruning the basil
 - a. Prune above the second set of true leaves to encourage branching
 - b. Each branch which grows to six or eight leaves should be pruned back to the first set of leaves
2. Any flowers which begin to grow should be removed as early as possible

Purple Ruffles



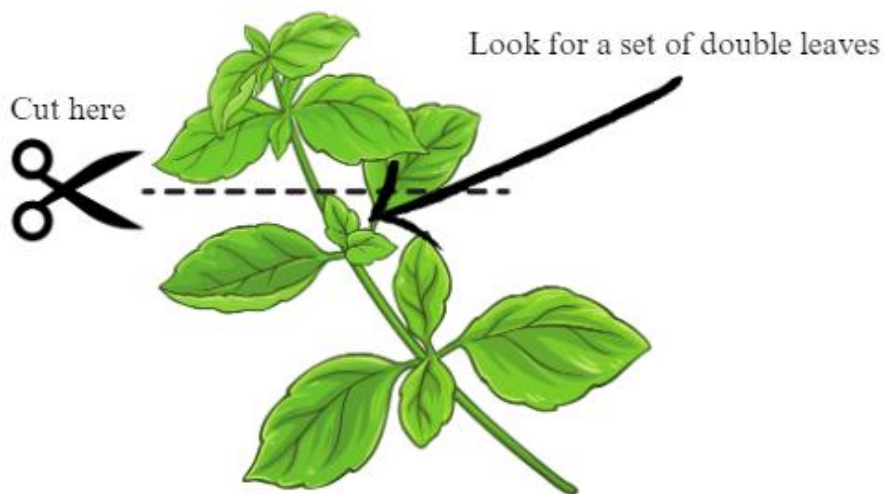
Sweet



Italian



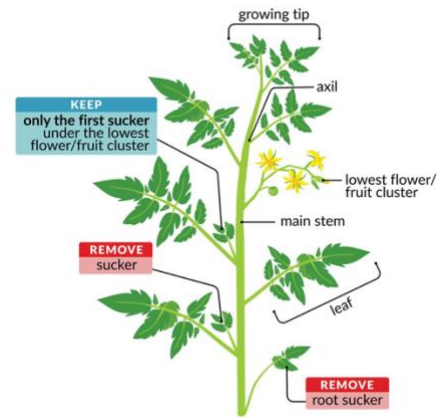
Thai



PRUNING AND WEEDING

What to look for when pruning:

- Dead leaves
- Leaves that touch the ground. These leaves encourage insects and prevent upward growth
- Leaves or stems that look injured/sick, are spotted, or are yellow
- Crops like tomatoes produce “suckers” which are small shoots, or leaves, that sprout out from where the stem and branch of a tomato plant meet. These do not produce fruit and draw energy away from the plant, so they can be removed
- Pruning the top of most crops promotes healthier, thicker growth, while maximizing space. Auxin, the plant hormone that promotes vertical growth and inhibits lateral growth, is produced at the apex of the plant. Removing this allows the plant to divert energy into becoming bushy and producing food
- Plants like basil and lettuces may “bolt” and produce flowers and seeds; prune these in order to extend harvest period but make sure to save the seeds
- Certain plants such as strawberries may produce “runners,” which look like vines. Do NOT prune these, since this is how strawberry plants propagate without dropping seeds



1. Work section by section to maintain radish, arugula, and mustard
 - a. Use one of the red harvest buckets to collect weeds and discarded leaves
 - i. Remove weeds from the root if possible
 - ii. Prune discolored or spotty leaves, or leaves in high density starting with the ones on the ground the outside of the plant
 - iii. Remove any dead or infected plants
 - iv. Remove any flowers by the stem to encourage continued leaf production
 - b. Observe and report any fungus, mold, dampened sections, insect activity, or other issues
 - c. Discolored leaves or weeds may be fed to the goats, sheep, rabbits, or cows, only if there is no mold present on the leaves. In the presence of mold, dump leaves in the compost



2. For the bok choy
 - a. Remove any discolored or spotty leaves
 - b. Remove any large plants which are already bolting/flowering
 - c. Leaves from large plants that are bolting and unsellable may be collected for farmhouse consumption; other leaves may be fed to the goats, sheep, rabbits, or cows



3. For the basil

- a. For small plants, remove any flowers or stems with discolored leaves
- b. For large plants, cut the basil at the third node above the ground and collect the leaves for pesto



4. For the irrigation

- a. Realign the T-tape as needed
 - i. T-tape should lay on the bed in a straight line, equidistant from the other tapes, not crumpled, distorted, or in the walkways
 - ii. T-tape should be loosely held down by stakes
 - iii. White stripe should be facing down
 - iv. If the wood chips start to shift, talk to plant manager about adding more



FEEDING

Plants require a variety of nutrients, including nitrogen, phosphorus, and potassium. Plants also require a significant source of carbon to grow. La Finca de Hamberto processes plant material and animal byproducts to create rich compost and liquid fertilizer for the plants.

SUPPLEMENT “TEA”

There are two types of supplement tea discussed here, the compost tea and manure tea. Manure tea is slightly stronger and not as hygienic as compost tea, but may be more readily available.

Compost Tea: Compost tea is a great way to add nutrients and healthy IMO's to your soil organically. With only a small amount of high quality compost you can make a large amount of potent tea.

1. Rain water or tap water that has been sitting for 24 hours (discard after 36 hours)
2. 2 cups compost per 5 gallons of water (use a paint bucket for collection)
3. 2 tablespoons honey, fruit juice, or brown sugar to feed healthy bacteria
4. Optional: cup of sargassum to feed healthy fungi

Combine all ingredients and let rest for 24 hours. Strain before use. Dilute the tea to 4 cups per gallon of water. Apply in the morning (to avoid UV radiation killing the healthy organisms in the tea) using a sprayer. Foliar application is OK for sick plants, but soil application is safer for the IMO's in the tea, since it protects them from the sun and heat and provides a substrate for growth. Compost tea can be used monthly and even bi-weekly as needed during the growing period.

Manure Tea: Manure tea is slightly different from compost tea, but is an equally good way to supply nutrients to plants.

1. 12 cups aged manure
2. 5 gallon paint bucket and water

Collect aged manure from preferably chicken or horse. 12 cups is sufficient for a 5 gallon bucket-approximately $\frac{1}{3}$ of the paint bucket will be manure and $\frac{2}{3}$ water. You can mix these two ingredients into the bucket, however, to avoid having to strain it again later, it is recommended to put the manure into an old pillowcase and tie it in “tea bag” fashion for the paint bucket. Leave for a few days to steep; compost tea is left for no longer than 24 hours but manure tea can be left in a sunny location for up to a week. In the tropics, fermentation processes are faster and manure tea should be used within three days.

****Stir the compost tea several times during the day until it is used. This introduces oxygen to the tea and aids in aerobic fermentation, helping prevent smell.**

Once ready for use, dilute 1 cup of tea per gallon of water. Because it is manure tea, you have to be a little selective about where to use it.

1. DO NOT use on root crops (carrots, potatoes, etc.) as these will not benefit from the quantity of nitrogen that this tea provides
2. DO NOT use for mints, basils, or other herbs whose leaves are consumed directly from the plant
3. DO pour directly into the soil for leafy greens such as kales, pak choi, and lettuces, avoiding direct contact with foliage, to stimulate leaf growth over root growth

COMPOSTING

Compost should be turned at least once a week, according to the following protocol. When needed, compost may be sifted from bay 4 into the plant wheelbarrow and incorporated into the designated area.



1. Turn 5 → 4
2. Turn 3 → 5
3. Turn 0 → 3
 - a. IFF sufficiently composted

*section 1 is for chicken palace hay that is mixed with bones

**section 6 is unused because the papaya trees are in the way

***section 7 is for large carbon (giant sticks)

****section 2 is overflow/extra

Remove any non-organic material from the compost area. Plastic, tape, ties, and silverware may occasionally end up in the compost area along with composted food scrap material.



Note: compost in bays 0,3,5 must be temperature monitored in accordance with organic standards. Temperatures must be maintained at minimum 130°F for three days.

Note: ideal C:N ratio in compost is 30:1. Refer to the C:N chart for starting ratios of common feedstock.

Note: it is important to understand that compost should be fully broken down prior to application in soil. During the decomposition process, compost requires Nitrogen and Oxygen and produces organic acids, ammonia, and ethylene oxide. Therefore, applying compost before it is fully processed will temporarily reduce availability of nitrogen and oxygen and increase solubility of heavy metals, prevent seed germination, and inhibit root growth.

Table 1. Characteristics of Compost Feedstocks ¹

Material	% N (dry wt)^{2,3}	C:N (wt/wt)⁴	Moisture % (wet wt)	Bulk Density (lb/cu yd, wet wt)
Plant Residues				
Apple filter cake	1.2	13	60	1,197
Apple pomace	1.1	48	88	1,559
Corn stalks	0.6 - 0.8	60-73	12	32
Cottonseed meal	7.7	7	-	-
Cull potatoes	-	18	78	1,540
Fruit wastes	0.9-2.6	20-49	62-88	-
Potato processing sludge	-	28	75	1,570
Rice hulls	0.3	121	14	202
Soybean meal	7.4	4-6	-	-
Vegetable produce	2.7		87	1,585
Animal Residues				
Blood wastes	13-14	3-3.5	-	
Crab wastes	6.1	5	47	240
Fish wastes	10.6	4	76	-
Poultry carcasses	2.4	5	65	-
Shrimp wastes	9.5	3	78	-
Manures				
Broiler litter	1.6-3.9	12-15	22-46	756-1,026
Beef	1.5-4.2	11-30	67-87	1,323-1,674
Dairy	3.7	13	83	775
Horse	1.4-2.3	22-50	59-79	1,215-1,620
Layers	4.0-10.0	3-10	62-75	1,377-1,620
Sheep	1.3-3.9	13-20	60-75	-
Swine	1.9-4.3	9-19	65-91	918
Turkey litter	2.6	16	26	783

Table 1. Characteristics of Compost Feedstocks

Table 1. (continued)

Material	% N (dry wt)^{2,3}	C:N (wt/wt)⁴	Moisture % (wet wt)	Bulk Density (lb/cu yd, wet wt)
Municipal Wastes				
Food waste	1.9-2.9	14-16	69	-
Paper	0.2-0.25	127-178	18-20	-
Refuse (mixed)	0.6-1.3	34-80	-	-
Sludge	2.0-6.9	5-16	72-84	1,075-1,750
Straw, Hay, Silage				
Corn silage	1.2-1.4	38-43	65-68	-
Hay (legume)	1.8-3.6	15-19	-	-
Hay (non-legume)	0.7-2.5	32	-	-
Straw (wheat)	0.3-0.5	100-150	-	-
Wood and Paper				
Bark (hardwood)	0.1-0.4	116-436	59	471
Bark (softwood)	0.04-0.39	131-1,285	40-50	225-370
Corrugated cardboard	0.1	563	-	259
Newsprint	0.06-0.14	398-852	-	195-242
Sawdust	0.06-0.8	200-750	-	350-450
Wood chips/shavings (hardwood)	0.06-0.11	451-819	-	445-620
Wood chips/shavings (softwood)	0.04-0.23	212-1,313	-	445-620
Yard Wastes				
Grass clippings	2.0-6.0	9-25	82	300-400
Leaves	0.5-1.3	40-80	38	100-300
Seaweed	1.2-3.0	5-27	53	-
Shrub trimmings	1	53	15	429
Tree trimmings	3.1	16	70	1,300

BIOGAS

1. Empty the bucket of poop water onto the banana field



2. Scoop poop into the designated poop bucket
- Ideally cow, but may also use goat, rabbit, sheep, or pig
 - Add water to make sludge
3. Empty poop smoothie into the biogas intake valve, adding more water as necessary to wash the poop down



4. Rinse the bucket and intake valve and seal with plunger



NUTRIENT DEFICIENCIES

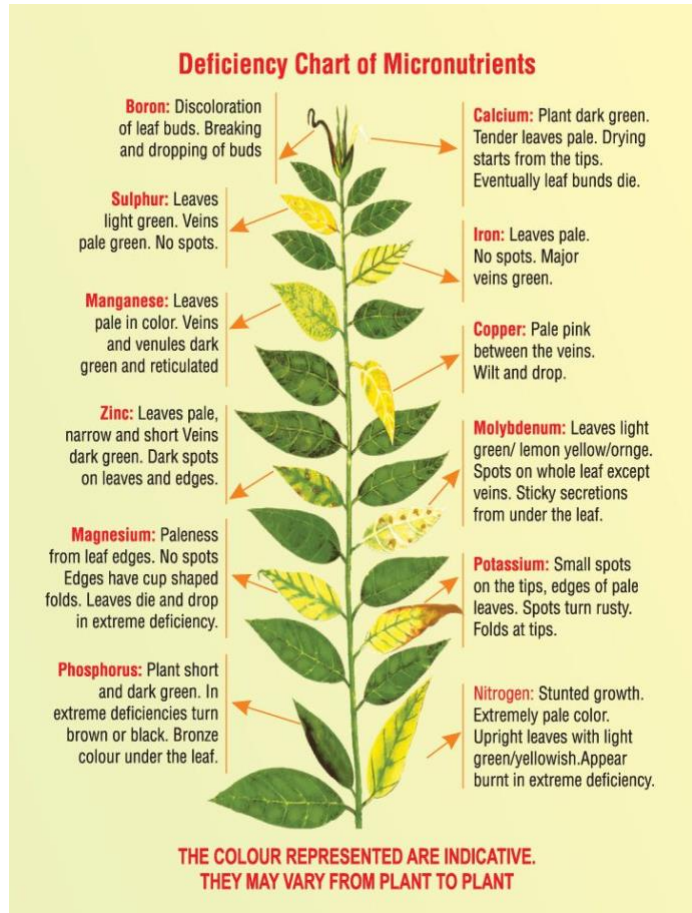
Plant leaves provide a lot of useful information regarding the health of the plant. This section provides a general guide on what certain deficiencies might look like on the plant, but it is important to keep in mind that some deficiencies may look very similar. Use this as a guide to know when to fertilize and with what to fertilize.

A lot of nutrient deficiencies can be combated with proper fertilizing with compost. For example, nitrogen can be added with manure or coffee grounds, phosphorus from termite nest soil, and potassium from banana peels.

In accordance with organic regulations, synthetic fertilizers may not be applied to crops at Finca Hamberto. Please confirm with the plant manager prior to applying garden inputs. If you do apply garden inputs, activity must be recorded in the appropriate organic record.

PLANTING SCHEDULE

Finca Hamberto uses the rainy season, moon phases, and restaurant demand to plan seeding and harvest schedules. Although this may vary slightly depending on weather, bed availability, and seed availability, the following schedule may be considered a general guide to planting/harvesting crops in Vieques.



Planting Calendar 2024

Variety	JAN 1-11	JAN 12-25	JAN 26-FEB 9	FEB 10-FEB 24	FEB 25-MAR 10	MAR 11-MAR 25	MAR 26-APR 8	APR 9-APR 23	APR 24-MAY 7	MAY 8-MAY 23	MAY 24-JUN 6	JUN 7-JUN 21	
FRUITS													
Banana													
Plantain													
Mango													
Starfruit								C	C	C	C	C	
Papaya	C	C	C	C	C	C	C	C	C	C	C	C	
Pineapple								C	C	C	C	*root	
Coconut			C	C	C	C	C	C	C	C	C	C	
Breadfruit											C	C	
Jackfruit						SS		SS					
Avocado													
Quenepa												C	
Pomarroza													
Cherry		SS		SS					C	C	C	C	
Guayaba		SS		SS									
Guamabana					C	C	C	SS	C	SS			
Passionfruit										SS		SS	
Pomegranate		SS		SS								C	
Tamarindo		SS					C	C	C	C	C	C	
Mamey Sapote					C	SS	C	SS	C	C	C	C	
Anon					C	SS	C	SS	C	C	C	C	
Tomato	C	SS	C	I	C	I	C	C	C	C	C	I	
Pepper	C	SS	C	I	C	I	C	C	C	C	C	I	
Cucumber	C	C	C	C									
Corn													
Okra				SS		I	SS	I		I	SS	C	
Eggplant	C	I	C	I	C	C	C	C					
Corazon		SS		SS	C	C	C	C	C	C	C	C	
Coconut	C	C	C	C	C	C	C	C	C	C	C	SD	
Pineapple					C	C	C	C	C	C	C	I	
Squash	C	C	C	C									
Cashew	C	C	C	SS	C	SS							
Pumpkin	C	C	C	C									
Citrus	C	C				SS		SS		SS			
Tamarand		SS		SS	C	C	C	C	C	C	C	C	
Melon	C	SD	C	SD		SD					C	C	
Cacao	C	C	SS	SS	SS	SS	SS						
Coffee	SS	SS	SS	SS	SS								
ROOTS													
Yautia	C	C	C	C	C	C	C	C	C				
Yuca													
Potato	SD		SD		SD				C	C	C	C	
Carrot	SD	C	SD	C	SD	C	SD	C		C			
Beet	SD	C	SD	C	SD	C	SD	C		C		C	
Radish	SD	C	SD	C	SD	C	SD	C	SD	C	SD	C	
Green Onion	C	SD	C	SD	C	SD	C	SD	C	SD	C	SD	
Onion	C	C	C	C	C	C	C						
Garlic													
LEAVES													
Arugula	C	SD	C	C	C	SD	C	C	C	C	C	C	
Cilantro	C	SD	C	C	C	C	C	C	C	C			
Celery		SD			C	C	C	C	C	C	C		
Mint	C	C	C	C	C	C	C	C	C	C	C	C	
Oregano	C	I	C	C	C	C	C						
Mustard	C	SD	C	C	C	SD	C	C	C	C	C	C	
Radish	C	SD	C	C	C	SD	C	C	C	C	C	C	
Boc Choy	C	SD	C	C	C	SD	C	C	C	C	C	C	
Recao	C	SD	C	C	C	SD	C	C	C	C	C	C	
Cabbage		I	C	I	C	C	C	C	C	C	C	C	
Spinach	C	SD	C	C	C	SD	C	C	C	C	C	C	
Brussel Sprouts	SS	I	C	I	C	I	C				C	C	
Broccoli	C	I	C	I	C	C	C						
Cauliflower								C	C	C	C		
Leyenda/ legend:	SD	Siembra directa/ Direct Sow					C	Cosecha/ Harvest					
	I	Transplante/ Transplant					SS	Siembra semillero/ seed tray prep					
Compost Tea													
	ENE			FEB				MAY		ABR		MAY	
	CT			CT				CT		CT		CT	
Mulching													
	M			M				M		M		M	

JUN 22-JUL 5	JUL 6-JUL 21	JUL 22-AUG 4	AUG 5-AUG 19	AUG 20-SEP 2	SEP 3-SEP 17	SEP 18-OCT 2	OCT 3-OCT 17	OCT 18-NOV 1	NOV 2-NOV 15	NOV 16-DEC 1	DEC 2-DEC 15	DEC 16-DEC 30
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TRANSPLANTING

After plants have germinated, almost all crops can safely stay for ~2-4 weeks in their seed trays. However, approximately 10 days prior to transplanting, seedlings should be “hardened”. Hardening means they will slowly receive less water and more sunlight. In other words, they should begin a gradual transition to an environment more similar to where the plant will live.

Once crops are hardened, they can be transplanted into the garden. Key things to consider:

- Rainy days are optimal for planting
- Transplanting should be done after peak heat hours or early enough in the morning to avoid transplant shock
- If you have a planned transplant day, refrain from watering the plants the day prior as wet soil in the seed tray will make removing the soil and plant in one piece
 - We reuse the seedling trays, so please be gentle when removing the plugs!
- When transplanting, make sure the plant is deep enough. The hole should be at least as large as the pot, so that when the plant is transplanted the soil and roots may be completely covered. If the soil is dry, it may be a good idea not to completely fill the hole after planting the tree so the tree is at the lowest point in the ground and may accumulate water
- If you are transplanting from poor soil, it may be a good idea to remove the old dirt so the roots can breathe. Gently brush away the old soil, supporting the plant. Once the soil is removed, gently transfer to new soil. Plants should be monitored to ensure roots survive the transition
- Plants such as tomato and tomatillo should be planted at least $\frac{4}{5}$ underground. The small hairs on the stem will eventually turn into the root system, and so planting these plants deep will create a stronger plant.



PROPAGATION

One of the most important activities at Finca Hamberto is plant propagation. This ensures continued production of food bearing plants. Plants may be grown at Finca Hamberto or distributed around the island for a more resilient food production. This section describes a variety of common propagation methods.

SEED SAVING

Fruit or pit: Remove the seeds from the fruit and spread on a flat surface to prevent seed layering. Dry the seeds, monitoring for mold or insect activity. Once seeds are dry, package in a brown seed bag with a desiccant and label the date, seed origin, and variety. For avocado, seeds should be placed in water until the seed cracks open, growing roots and a shoot.



Pod or dry seed: Remove the seeds from the plant and dry if necessary. Once seeds are dry, package in a brown seed bag with a desiccant and label the date, seed origin, and variety.

Note that seeds will eventually lose the ability to germinate. Therefore, seeds should be planted or donated as soon as possible. Seed saving is only temporary.

CUTTINGS

Propagating from cuttings is often an efficient way to multiply plants, but not all plants grow easily from cuttings. A list of plants commonly propagated from cuttings includes:

- Basil: cut a 4" basil cutting directly below a leaf node. Remove the lower leaves and place in water. Change the water daily until roots begin to grow.
- Mint: cut a 4" basil cutting directly below a leaf node. Remove the lower leaves and place in water. Change the water daily until roots begin to grow.
- Oregano (brujo, small-leaf): cut a 4" oregano cutting and remove the lower leaves. Place directly into soil and provide sufficient water until roots begin to grow.
- Rosemary: cut a 4" rosemary stem and place into water, change daily, until roots begin to grow
- Tomatoes: cut a 4" tomato stem or sucker and place directly into soil. Provide sufficient water until roots begin to grow
- Yuca: cut a 10" section of yuca. Place directly into soil, making sure the cutting is oriented in the proper direction
- Green onion: cut the green onion at the boundary between green and white. Place the roots in water for a few days until the onion begins to grow again
- Vanilla: cut a section of vanilla with at least 4 leaves. Allow the cut sections to dry for 48 hours, then place in an appropriate substrate, ensuring proper orientation

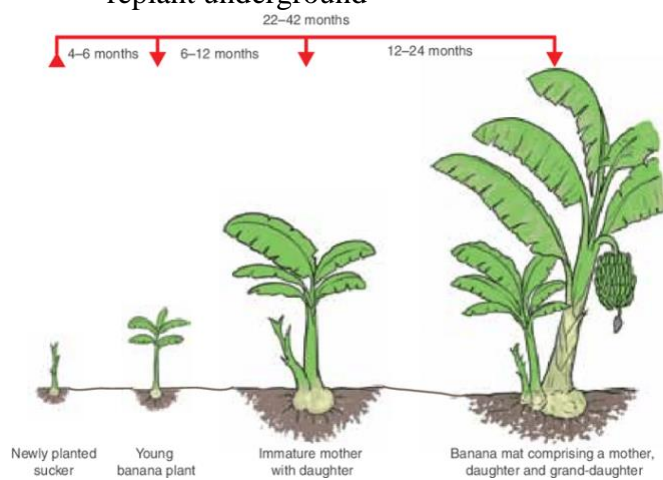
ROOTS, RUNNERS, and CROWNS

Ginger, turmeric, yautia, and potatoes are examples of plants which produce new buds directly from the root, called vegetative propagation. For these plants, cut the budding section from the main root and clean to remove any rot. Plant a few inches underground.



For bananas and plantains, wait until the mother plant fruits. Then, follow the procedure outlined below:

1. Cut the mother ~6" from the ground
2. Leave one daughter plant and one granddaughter plant (two total) attached to the original root system
3. Cleanly slice away any other granddaughter plants with a chunk of root system and replant underground



Strawberries produce runners, or clones of the original plant, which take root and form a secondary plant. These plants may be left to naturally root, or may be clipped and relocated. If clipped, runners should be placed in water for approximately a week to two weeks to form roots, and then may be transplanted into soil.

Pineapples may be propagated by seed or crown and, although less bountiful, crown propagation is often more efficient. To propagate a crown, place it into approximately an inch of water and wait a few days to several weeks for roots to form. The water level should be high enough to cover the bottom of the pineapple, but not too high or else the pineapple will rot. Change the water every few days and wash the base of the pineapple if it becomes covered in slime. Once there are a few inches of roots on the pineapple, it is ready to be planted. If the pineapple does not root, it may have to be cut or additional lower leaves removed. To cut, use a sharp, clean knife to slice a small portion from the base of the pineapple to increase fresh surface area exposure to water. To remove leaves, carefully pull off the bottom few layers of leaves to expose the inner core. Roots will grow from the nubs, so ensure these are exposed to water.

