

Contact Information



East Branch Ginger

**Certified Organic and
Disease-free Ginger Seed**

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Edible Ginger, Grown Locally

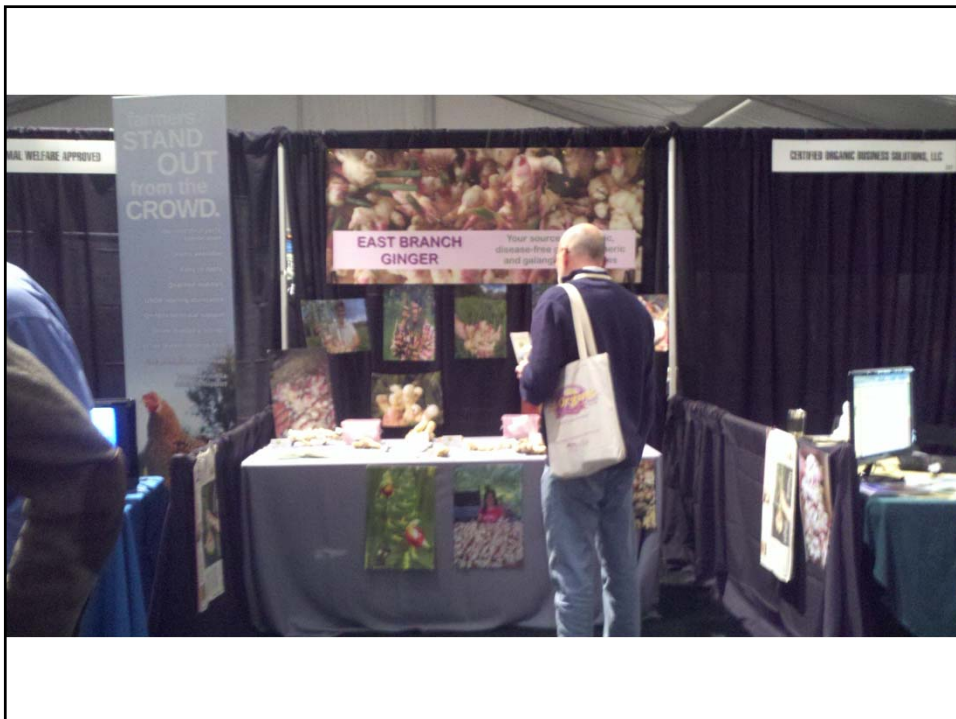
Presentation Given by:
Susan Anderson of
East Branch Ginger,
representing Puna
Organics



About East Branch Ginger

Susan Anderson

- Represent Puna Organics
- History
- Horticulture Degree
- Garden Center
- Farm
- Johnny's
- Goals



About Puna Organics

- Hugh “Biker Dude” Johnson
- Elvira
- Dan
- Folks who work there
- History



Your Hawaiian Retreat



Elvira

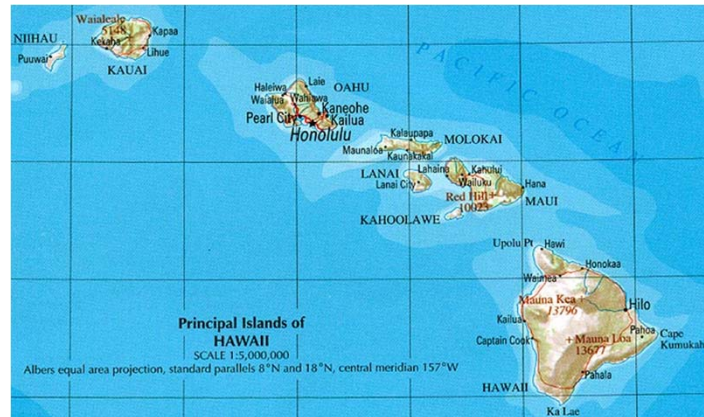




Puna Organics History

- Almost 20 years farming ginger in Hawai'i
- Offer many varieties of organic ginger for organic commercial market – field grown
 - Brother Bubba Baba (blue ginger), Yellow Hawaiian, Da Kine Ruhi, galangal (Thai Ginger)
- Turmeric
- Seed
 - Big Kahuna in 2011 – replaced with Ruhi in 2012
 - Turmeric, Ruhi, Galangal (Thai Ginger), Yellow Hawaiian

Hawai'i



http://www.aaccessmaps.com/show/map/us/hi/hawaii_island

Commercial Ginger In Hawaii



Clean Seed Project

- Started to help farmers combat:
 - Bacterial Wilt (*Ralstonia solanacearum*)
 - *Fusarium* spp.
- Tissue Culture
- Grow on plantlets
- Bag Culture
- Clean Seed for farmers



Photo courtesy of University of Hawai'i at Hilo

Shows *Ralstonia solanacearum* (Bacterial Wilt) in ginger from field

What is Culinary Ginger?

Zingiber officinale Roscoe





Worldwide Crop

- Australia
- Peru
- China
- US – Hawai'i
- Vietnam
- Thailand
- India
- Middle East
- Japan
- Africa
- Just to name a few...



What Can We Do With Ginger?

- Cook – fresh, frozen, or dried
- Medicinal
 - Digestion
 - Anti-nausea
 - Anti-inflammatory properties
 - Do your research first!
- Pickling
- Candied
- Teas
- Juicing
- Many, many other options!





How Is Clean Seed Produced at Puna Organics?

- Tissue Culture
- Grow on plantlets for 2-3 seasons
- Fresh tissue culture each year
- Produce clean ginger seed rhizomes in bag culture
- Grown in cocopeat
- Sustainable, reusable media
- Seed is dipped, cut, cured and shipped to your door from Hawai'i













Seed Pieces

- Seed pieces are around 2oz. (about 8 pieces per pound)
- Maximizes root and shoot potential
- All cut from Grade A ginger
 - Commercial Ginger is graded and Grade A is choice ginger for commercial market
 - All seed is cut from this choice ginger grade



Shipping Your Ginger Seed

- All Ginger shipped at the beginning of week
 - No shipments sitting at waypoint over weekend
- FedEx 2 day air
 - 2 days
- Email tracking numbers
 - Do not want ginger sitting at final destination in case it's too cold

When Ginger Arrives...

OPEN THE BOX(ES)!

- Crucial step – give ginger fresh air from the long trip!
- Presprout right away!
 - If not possible then...
 - Place all seed pieces on a wire rack or table with a fan
 - Can hold like this for a few days to 5 days
 - Temps between 55F-90F
 - Presprout ASAP

If there is mold on your seed...

- Fresh air for 5-6 hours or overnight
 - As described earlier
- Planting/Presprouting right away
 - Planting limits access to oxygen for the mold
 - Planting also introduces any beneficial fungi and bacteria that may be in your media/soil to the surface mold on your ginger; these beneficial organisms like to eat molds like this...
- Disinfect

Disinfecting seed pieces

- Seed was already treated with a hydrogen peroxide dip before it shipped
 - It used to be iodine until regulations were changed in HOFA certification, rendering iodine not acceptable any longer

Before dipping your seed, check with your certifying agency to be sure these methods are acceptable!

Dipping Seed Pieces - Bleach

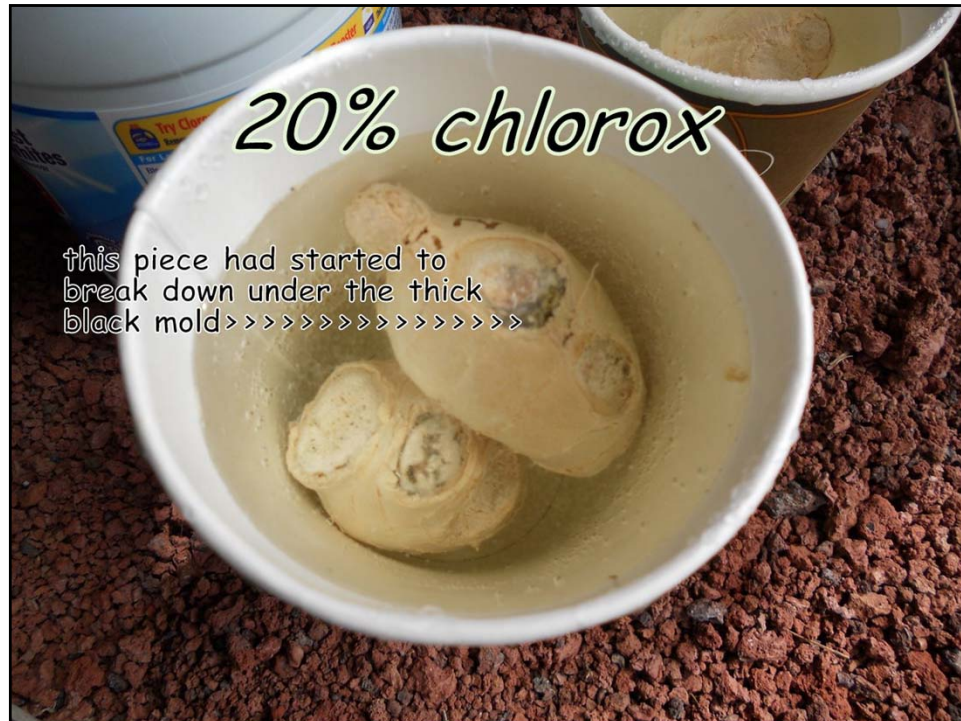
- Bleach (clorox, chlorine)
 - Use a 20% solution (a 1:5 ratio of bleach:water)
 - Soak seed for 15 minutes
 - Place on wire racks with fan to dry out for a day or two until chlorine dissipates
 - Plant as soon as possible after the seed has dried

**REMINDER: CHECK WITH CERTIFYING AGENCY ABOUT BLEACH
DIP TREATMENT BEFORE DIPPING ANY SEED**

OR

- Use hydrogen peroxide dip according to label instructions (check about applications in OG)





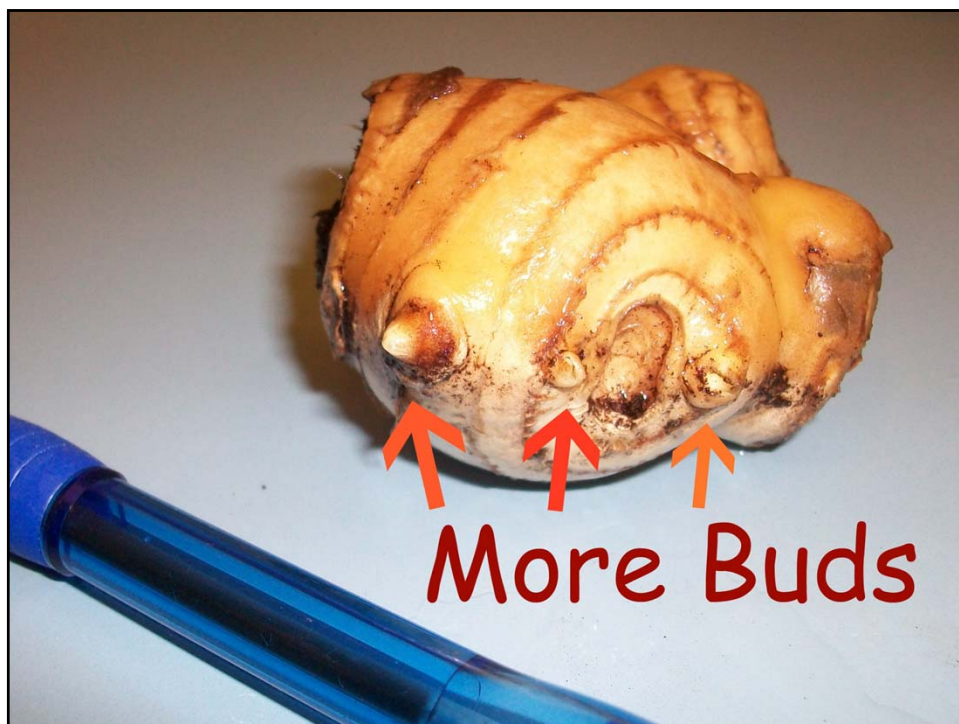
Immediately out of 20% solution... seed still has some discoloration

Presprouting – Why?

- We are not in Hawai'i or any other tropical area so...
 - Have to extend our season somehow
 - Mimic planting the rhizomes into warm soil
 - Goals:
 - Get the root and shoot buds to start growing
 - Start canopy growth so that plants are in full leaf during our long days
 - Increase yields – as day length decreases, rhizome growth increases until season's end

Swelling of Buds - new rhizome growth, new shoots, new roots





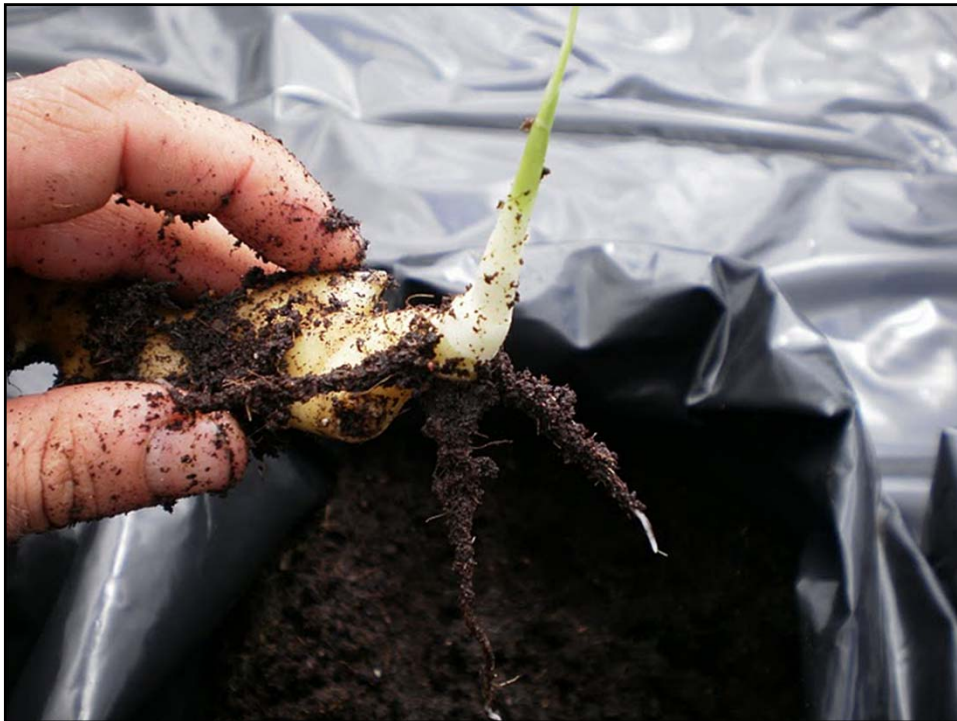
Presprouting – How?

- Place seed pieces in any well-drained media
- Containers to use:
 - Open 1020 seedling flats
 - 4" or 6" pots
 - 1 gallon pots
 - Bulb crates
 - ANYTHING THAT WILL DRAIN AND HAS A DEPTH OF ABOUT 2-3"



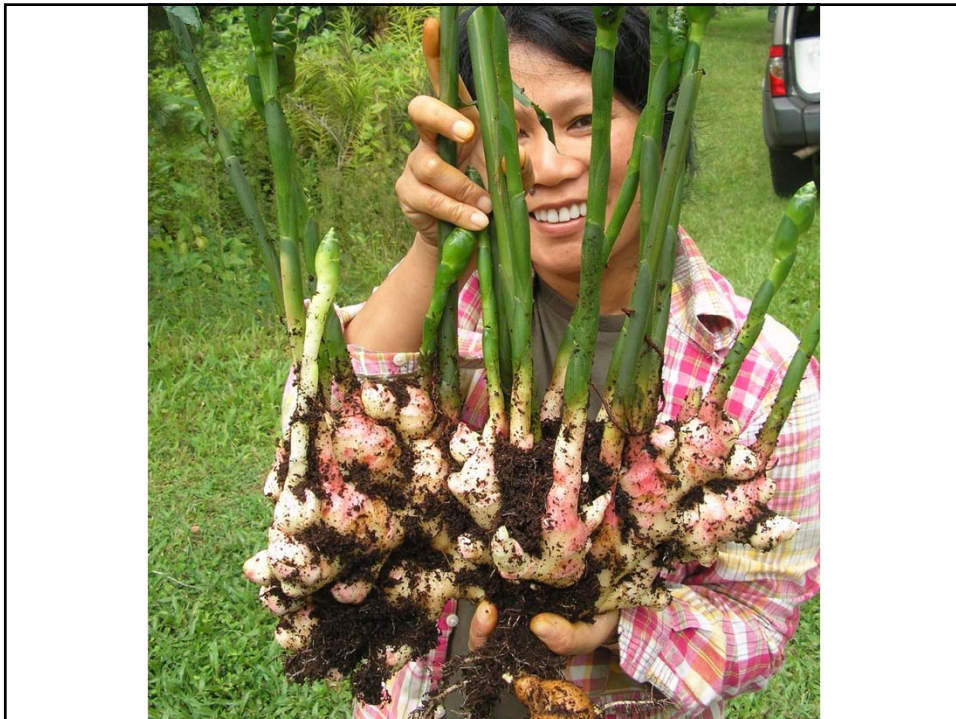
Presprouting – How?

- Add about an inch to two inches of media to the containers you're using
- Place seed pieces on media
- Cover with about an inch of media
- Water in
- Water when media becomes dry to the touch
 - Rhizomes are not actively taking up water or nutrients right now
 - DO NOT OVER WATER DURING THIS STAGE



Presprouting – How?

- Keep pots/flats in a warm environment
 - Preferably 70-80F
 - If cooler (not below 65F), then allow more time for presprouting
- Options for heating pots/flats
 - Heat mats
 - Germ Chamber
 - Inside the house (near heat register or wood stove)
 - Greenhouse – if warm enough



Presprouting – How Long?

- Typically 4-6 weeks
- Can hold ginger pieces in this stage for 8-10 weeks
 - Feed the ginger if presprouting longer than 6 weeks
- Benefits of presprouting:
 - Get a head start on the growing season
 - Can hold seed pieces until soil is ready if weather not breaking



Ways To Grow Your Crop

- Hoop house/High Tunnel
 - Soil
 - Containers
- Field
 - Soil
 - Containers
- Greenhouse
 - Soil
 - Containers

Soil Culture

- Soil MUST be actively warming from 55F
 - Even at night! No lower than 55F at night
 - Use soil thermometers
 - Check probes first thing in the morning before sun hits the structure to get accurate “lowest” reading for the day
 - Use low tunnels or row covers to expedite soil warming



Soil Thermometers

Soil Culture

- Soil should be well-drained and have adequate water-holding capacity
- Should have good CEC
- Feed more often if soil has little water-holding capacity because of nutrient leaching

Seeding Rates/Spacing

- 25-30 pounds per 100 feet = seed pieces 5" on center in the row
 - 50 foot row would take about 15 pounds of ginger seed to plant
- Rows 3 feet on center from row to row
 - This allows room for hilling



Seeding Rates/Spacing

- Dig 4" trench into soil
 - Don't forget to preplant fertilize in trench!
- Place presprouted seed pieces in bottom of trench
- Cover with about 1-2" of soil
- Keep area well weeded throughout crop cycle





In tropical field production there is a double row and the plantings are on four foot centers to allow room for hilling. This spacing is common to maximize field space without compromising yields. On the mainland, the canopy does not get as big so row-to-row spacing can be smaller. There are many different ways that ginger is, and can be grown. These are our recommendations for spacing to ,maximize yields in limited space, such as inside a hoop house... expensive real estate in those hoop houses!

Water

- Consistent water supply is important for ginger to yield well
- Drip irrigation with timer helps deliver water consistently
- Do not over water – may wash nutrients away from crop
- Very important to water well after canopy establishment – deep drinks, not daily short waterings
- pH – ginger is tolerant of pH fluctuations as long as there's enough food available (ideal 6.0-6.7)



Hilling

- Leave room for hilling between rows
- If soil depth is shallow then hill with anything that is not decomposing
- Feed at every hilling
- More on details of hilling later
- Control weeds – ginger is a poor competitor for nutrients



Bag/Container Culture Media

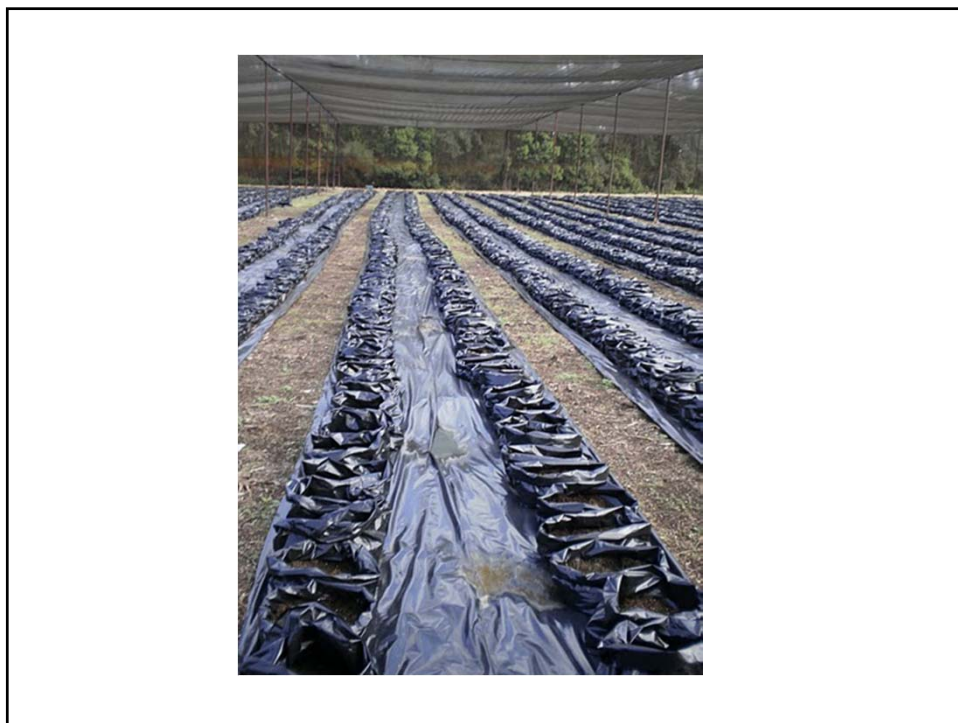
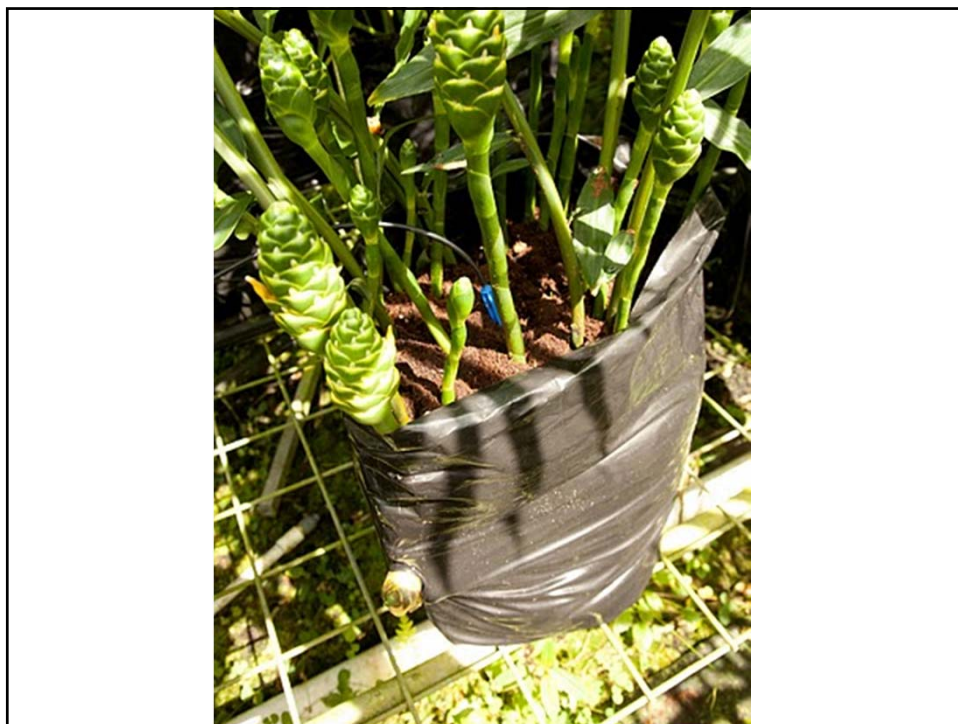
- Use well-drained media that has good water-holding capacity
 - Cocopeat works very well to cultivate ginger in containers
 - Does not compete for nutrients (as long as salts are leached out and gypsum is used)
 - AeroCoir – available 4/1
 - Has excellent water-holding capabilities
 - Seedling media
 - Anything that is not decomposing!
 - Must be well-drained



Bag/Container Culture

Bags/Containers

- Must have capacity to hill crop
 - Total depth of container should be at least 12-18"
- We recommend 15 gallon grow bags
- Blow mold plastic containers are flexible enough for ginger
- Fabric bags
- Containers must be well-drained



Bag/Container Culture

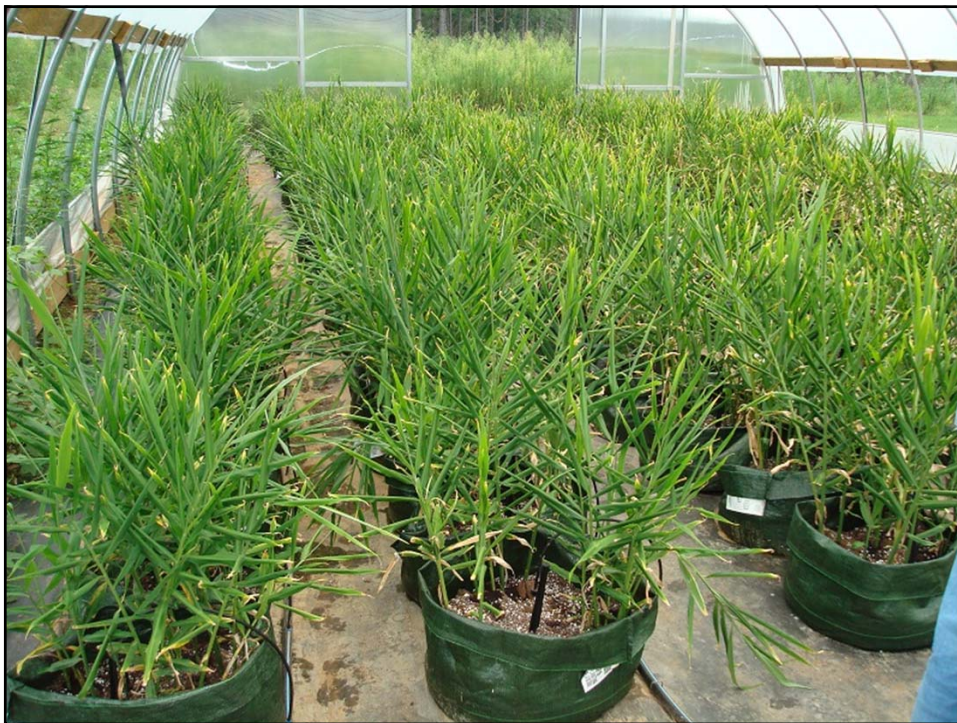
Spacing

- 2.5 seed pieces per 15 gallon bag
 - Example: 15 pounds of ginger will plant about 50 bags
- Place about 4" of media in bottom
- Place seed pieces on that media
- Cover with about 1-2" of media

Bag/Container Culture

Spacing

- Bags/containers can be shoulder to shoulder or spaced apart BUT...
 - Ginger likes the increased humidity around the canopy
 - Tight spacing helps with drip irrigation
 - Tight spacing keeps root zone shaded in NC!



Bag/Container Culture

Fertilizer/Amendments

- Preplant and at each hilling, depending upon soil nutrient availability
 - May increase fertilizer regime if media is binding
 - Ginger is a hungry crop so feed it!
- Use gypsum at each feeding to increase nutrient availability to the ginger crop

Field Grown Culture

- Follow instructions for Hoop House/High tunnel culture
- Presprouted seed will be placed out later than in high tunnel
- Use techniques to expedite soil warming (low tunnels, row covers)
- Approximately a week to two weeks after tomatoes transplanted out??

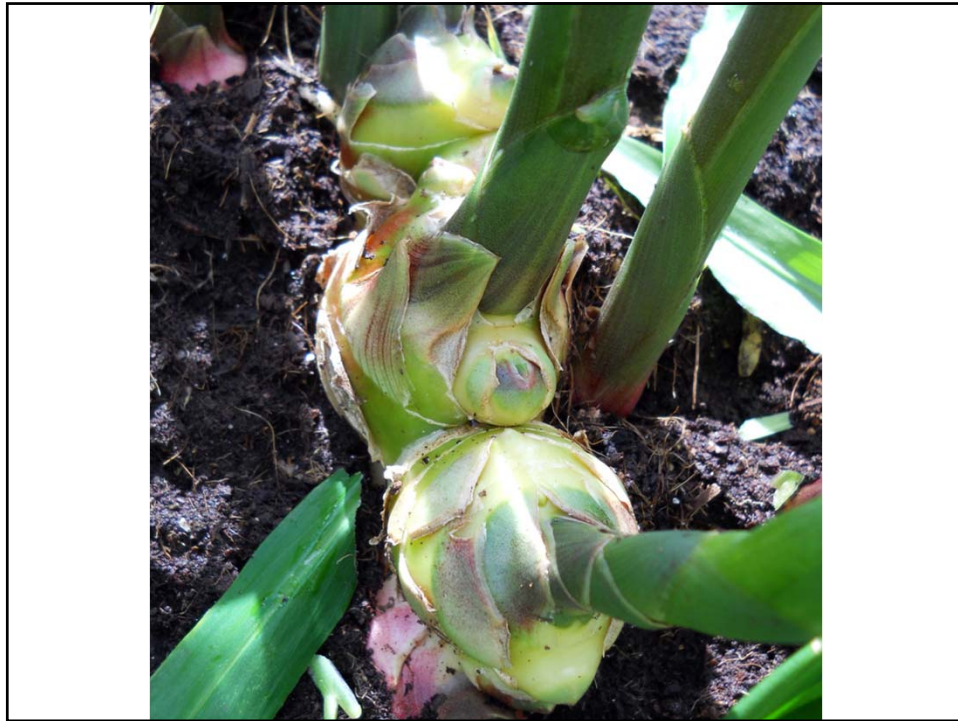


Hilling – In Depth

Why?

- Cultivated crop – higher yields when crop is hilled
- Natively ginger is understory plant
- Reduce sunscald in full sun





Hilling – In Depth

How?

- Field – use soil or any well-drained, non-decomposing media
- Bag/container – use growing media that ginger is planted in



Hilling – In Depth

How?

- Add about 3-4" each time you add soil/media
 - May cover some leaves – that's fine
- Hill 3-4 times during the growing season
- Add amendments and fertilizers at each hilling
 - Ginger is a heavy feeder
 - Can add extra feedings, too

Hilling – In Depth

When?

- First Hilling
When base of shoot(s) turn from bright white to bright pink





Hilling – In Depth

When?

- Second Hilling
 - 4-6 weeks after first hilling
 - Add food and amendments
 - Add 4-6" of soil/media
 - Okay if some leaves are covered
- Third Hilling
 - Same as above (don't forget to feed)





In Depth - Fertilizers

- Get a baseline soil test if growing ginger in the soil
- Gypsum – use to make nutrients more available to the ginger
 - Heavy feeder so amending with gypsum will aid in uptake
 - Check with certifying agency about use of gypsum

Gypsum Helps Ginger



Fertilizer Options

- Any mild fertilizer (around 5-5-5) that is fed often to the crop
 - At least 4-5 times per season
- Many studies show that ginger is heavy feeder
- Local poultry fertilizers
- Compost and fish emulsion are not enough to maximize yields

Fertilizer Options

Examples of OG Sources

- Sustane – 4-6-4
- Cheep Cheep – 4-3-3
- Harmony – 5-4-3
- Replenish – 3-4-3
- Check local sources – they are often cheaper
- Espoma – Garden Gypsum
- Local turf suppliers may have organic gypsum

Supplements

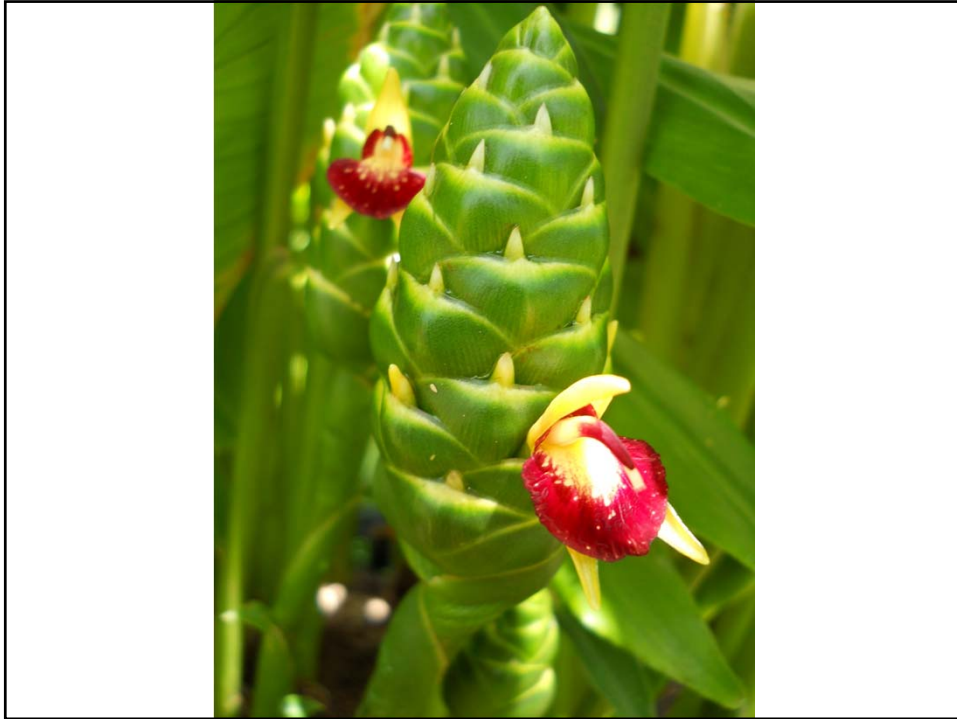
Use these supplements as insurance to maximize yields (soil or containers):

- Actinovate
- Trichoderma
- Gypsum



In Depth - Media

- Cocopeat
 - Low salt (low EC), OMRI certified
- Soilless Media
 - Well drained but adequate water holding capacity
 - Cannot be actively decomposing
 - Will steal nutrients from ginger crop



Baby Ginger

What are the Differences between Baby and Mature?

- Baby – no fibers, no skin to peel, flavor is less complex but still spicy, very tender, less storage time after harvest
 - Can be pickled, candied because so tender
- Mature – has thick skin to peel, tough fibers running through flesh, takes about 4 months longer to grow, more storage time after harvest
- The two are essentially different crops



Baby Ginger

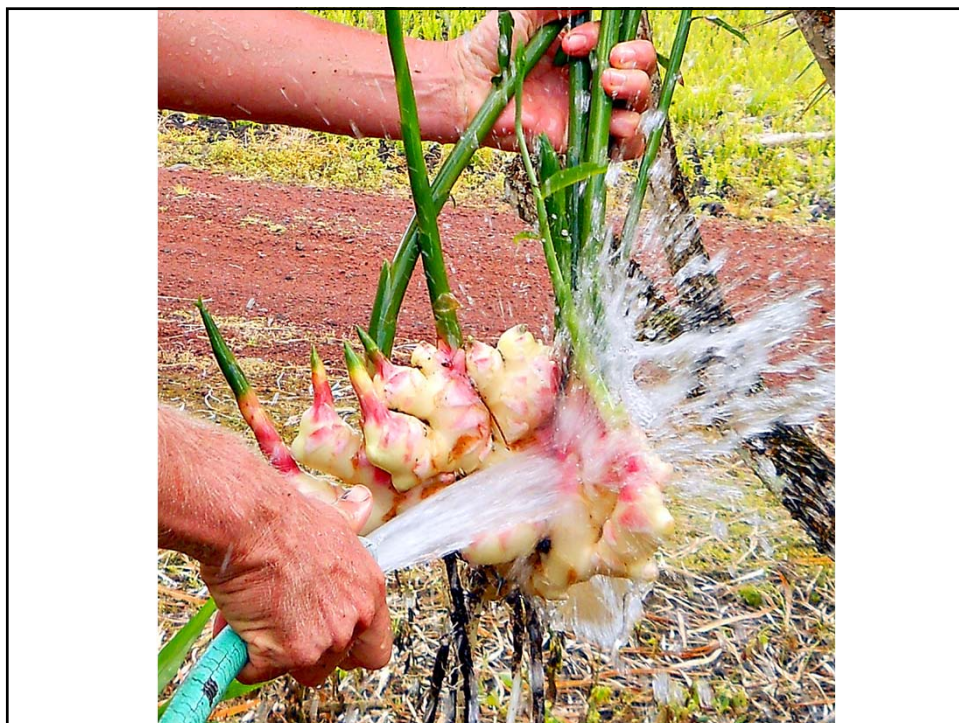
- How long to grow?
 - From beginning of presprout to harvest is about 4-6 months, depending upon cultural inputs
- How long will I be able to harvest Baby Ginger?
 - The harvest window is about 4-6 weeks
 - Rhizomes will just become more mature



Baby Ginger

- Harvest
 - Soil – hand dig using a lifting tool under the clump of rhizomes
 - Container/bag culture – tip bag/container on its side and dump media out until you can pull rhizome clump from bag
 - Be “gingerly” with your containers to sterilize and reuse them for a few seasons
 - After harvest, rinse soil/media from rhizomes for market or use
 - Wash with the pick bud scales





Why Baby?

- Good crop for locally grown ginger on the mainland
- ROI for Baby most likely higher than mature
- They are very different crops
- Mature ginger culture
 - Expensive on the mainland to mature
 - If ROI and profit made then go for it!
 - Competition is stiff that time of year from commercial ginger growers in China, Peru and...

Marketing Baby Ginger

- Ways to sell Baby Ginger
 - Rhizome piece(s)
 - Example: box of pre-weighed 4oz. pieces to market
 - Charge by the each
 - Stem
 - Example: harvest rhizomes and leave 12-18" of stem on for market
 - Charge by the each or by the bunch
 - Nice presentation



Marketing Baby Ginger

- Ways to sell (continued)
 - By the pound
 - Perhaps less sticker shock to customer if sold by the oz.
 - By the hand (section of whole rhizomes)
 - Beautiful presentation!
 - Perhaps a good way to sell to chefs in season



Marketing Baby Ginger

- Pricing Examples
 - Bin of 4oz. Pieces with a sign “\$4 each” = \$16 per pound
 - Rhizome pieces with stem still on for \$2.50 each
 - Whole hands for \$7-10, depending upon weight
 - By the pound if sticker shock is not a concern

Marketing Baby Ginger

- Storing Baby Ginger
 - Harvest what you need for market/ restaurants/ own use
 - Leave the rest in the ground to store
 - Harvested, washed rhizomes will store for about 2 weeks at room temp
 - Long term (5-8 weeks) – store at 60F with 50-60% Relative Humidity
 - Freeze
 - Chopped, sliced, whole rhizomes, cubes (!)

Marketing Baby Ginger

- Educate customers
 - Start now by showing them pictures of what you'll be bringing to market
 - Use pics on the website for your marketing
 - Instruct them in the ways they can store ginger
 - Encourage them to calculate how much they use in a year
 - They can then purchase all their ginger from you this fall and freeze it!
 - Instruct them on how to use ginger

Yields for Baby Ginger

- If all cultural requirements met and depends upon when harvested:
 - 8 pounds per pound planted
 - Example: 20 pounds will yield about 160 pounds of Baby Ginger
 - Market extrapolation – 50 member CSA
 - This would allow for about a pound of ginger for each box for 3 weeks
- Reminder: There are about 8 seed pieces in a pound of seed ginger



Yields for Baby Ginger

- Dig up a plant or two near harvest time to see if it's ready
- You can begin digging once rhizomes start growing – late August
- Increase market potential (harvest window) by getting some ginger in earlier to presprout and some a few weeks later
- Try planting some ginger in containers and some in soil to open harvest window

Uses for Baby Ginger

- Fresh eating
- Pickling
- Candied
- Juiced
- Teas
- Medicinal
- Freeze for use later
- Recipes in fall via newsletter

Insects

- Insects – not many on the mainland that attack ginger but it is not widely grown
 - Grasshoppers, a few caterpillars, katydid observed but not destructive feeding
- If insects observed feeding, hand pick off individuals
- Aphids: use standard treatments already in use in your system
 - Banana aphid ([Pentalonia nigronervosa](#)) observed in California, Florida and Mexico – pest of ginger in the tropics



If you are unsure of an insect pest on your ginger, call Cooperative Extension

Take pictures and send them to Debbie Roos

Insects

- Nigra scale, Hibiscus scale, Florida Black Scale, etc. (*Parasaissetia nigra*) – Found throughout the world
 - Has been observed in many states in the US
 - Potential ginger pest

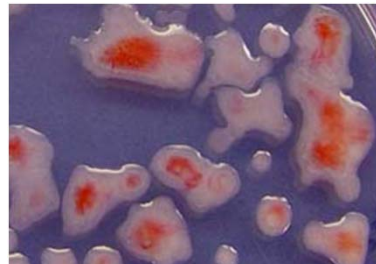


Diseases

Bacterial Wilt

(*Ralstonia solanacearum*)

- Major ginger disease wherever ginger is grown commercially
- Race 4 Biovar 3 and 4 attack ginger
- Symptoms: yellowing foliage, wilting plants due to vascular clogging





Diseases

Bacterial Wilt Control

- Begin each crop with clean seed
- Cull infected plants
- Crop rotation (very long out of host plants)
- Clean equipment to reduce inoculum
- Grow in containers
- Control nematodes
- Very difficult to manage once soil is infected



Diseases

- Nematodes: *Ditylenchus* sp., *Helicotylenchus* sp., *Meloidogyne* sp. (root knot), *Pratylenchus* sp., *Radopholus similis*, *Rotylenchulus* *reniformis* (reniform), *Tylenchorhynchus* sp., *Xiphinema americanum*
- Not all of these nematodes occur in all regions
- Talk to Cooperative Extension about which ones are in your area and how to knock back populations if established numbers in your field soil

Diseases

- *Fusarium* spp.
 - Species that infect ginger include:
 - *Fusarium Oxysporum* f.sp. *Zingiberi* – Fusarium yellows
 - *Fusarium* sp. – Rhizome rot
 - Symptoms: yellowing leaves, wilting due to vascular clogging
 - Control:
 - Plant clean seed with every crop
 - Keep crop healthy!
 - Hard to manage once soil is infected
 - Crop rotation out of potential host crops





Diseases

Conclusion

- Start with clean seed every season
 - DO NOT USE STORE BOUGHT GINGER FOR SEED
 - Whether saving seed or buying seed, scout crop regularly for disease symptoms
 - If in doubt, call East Branch and/or your Cooperative Extension agent

How can you get clean seed?

- Order seed from East Branch Ginger every spring
 - Availability from mid-late February until early-mid April
 - Exact time depends upon crop maturity at Puna Organics
 - Order on website, call, snail mail
 - Take checks, credit cards, money orders
 - Reminder: we offer disease free (bacterial wilt and fusarium), certified organic ginger seed

What else do we offer?

KNOWLEDGE

- We offer the knowledge throughout the entire season that you can lean on to have a successful crop
- Call, e-mail, write when you have questions/comments regarding your ginger crop
- What questions I cannot answer, the farmers in Hawaii can

Daniel Kelly



Hugh Johnson 'Biker Dude'



Elvira Johnson



The Crew at Puna Organics



Organic Commercial Ginger For Seed?

- Taking a risk planting into soil!
- If you want to try a store bought piece, plant in a container placed well away from your main ginger crop!



Can you save your own seed?

PROS

- Cheaper (maybe)
- Satisfying

CONS

- More expensive (maybe)
 - Have to mature the ginger
- Not making ROI
- Heat HH or GH in cold snap
- Disease pressure from previous season
- Seed pieces not as robust as ones grown in Hawai'i
 - This could decrease yield potential in subsequent seasons

CONS CONTINUED

- Space considerations
 - Example: You sold 240 pounds of ginger last year
 - You have to harvest about 45-55 pounds of ginger to get the 30 pounds to plant after cutting
 - There are culls in the seed cutting process
 - Reminder: 30 pounds plants about 100 fifteen gallon grow bags or about 100 row feet
 - Must heat a space to have soil temps remain 55F (day and night) to avoid rhizome damage and mature the ginger
 - Dip, cut and cure the seed the following season for use

Homeowners

- Pot culture
- Landscape culture
- Overwintering





Turmeric

- Nice selection made by farmer in Hawai'i to be less bitter, better yielding
- Grow on for 7-8 months from beginning of presprout for robust orange color and higher curcumin levels





Seed Available This Year

Ruhi

- White Ginger
- Yellow at tips
- High in curcumins
- Rich Flavor
- Great as baby
- High yielding



Seed Available This Year

Hawaiian Yellow

- Japanese yellow ginger grown in Hawai'i
- A rare variety
- Pungent and deep flavor
- Vibrant yellow color
- Slow growing
- Low yielding



Seed Available This Year

Galangal

- Thai ginger
- Floral, piney flavor
- Very high yields
- No hilling
- Needs 8 months from beginning presprout



Next Year or Two?



Conclusions

- Ginger is easy to grow it's just very different than what we're used to
- We're here to help you season after season
– NEWSLETTER
- Baby Ginger is a niche crop that will help you stand out
- Organic seed
- Very high quality
- Disease-free

Questions?



Sources for Information Herein

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Contact Information



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Disease-free Ginger Seed**

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