Tropical Root Crop Production
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Tropical Root Crop Production

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Landscape by Sylvia Gordon
Tropical Root Crops in Florida

- Miami-Dade County has been main production area
  - Subtropical location – year-round production
  - Growers who are familiar with and know markets for these crops
  - Local demand, though most is exported to the eastern U.S. and is **not** locally consumed
Tropical Root Crops in Florida

- Primary commercial crops – past and current
  - **Cassava** / manioc – yuca: decreased from over 1,000 acres in the 1960s – 1980s to <30 acres today
  - **Tanier** / dasheen – malanga / yautía: decreased from 2500 acres as recently as the early 2000s to 500 acres today
  - **Taro** – malanga isleña / malanga: remains around 300 acres
  - **Sweetpotato** (red skinned / white fleshes) – boniato / batata / camote: ~6,000 acres
Why did these crops see acreage changes?

- **Cassava** – competition from Central America with higher quality product with a longer shelf life
- **Tanier** – imports; decline in yield & cormel size, probably due to viral infections of the planting stock
- **Taro** – the market is OK, but not great
- **Sweetpotato (red skinned / white fleshe**d) – imports are restricted
Cassava

Status

- Both roots and leaves can be eaten
- “Sweet” and “bitter” types
- Vegetatively propagated from stem cuttings
- Restrictions on importing propagules except those from tissue culture
- Closest source with a breeding program is CIAT (CGIAR center in Cali, Colombia)
- Cost - $2/plant
Cassava

Potential

- Ready market for leaves, especially to people from parts of Africa now living in the US
- Interest in using cassava as a biofuel
- Interest in using cassava as animal feed
  - Silage from both roots and leaves of the sweet types
Cassava

Woman harvested cassava leaves in cassava farm

Woman harvested cassava leaves to prepare cassava leaf vegetables
Cassava

How to grow it

- Select land with good drainage
- Use stem cuttings from plants that are 8 to 18 months old
- Take cuttings from the middle portion of the stem using sterilized equipment
- **Traditionally**: cut pieces 8-12” long with 9-12 nodes
- **Ministem**: cut pieces to get 2-4 nodes
  - Sprout pieces in seedling trays or other sterile planting media; use foliar fertilizer at low rates
Cassava

**Figure 6.** Scheme of cassava stalk cutting for planting: (a) division of the stalk; (b) correctly shaped cutting; (c) wrongly shaped cutting.
Cassava

People selling cassava stems in a market

Farmers selling cassava stems in farmer's market

old.iita.org
Cassava – ministems

Cassava ministems on display

Cassava ministems on display
Cassava – ministems

Cassava ministems on display
Cassava ministems showing one and two nodules on the ministems
Cassava – ministems

Proper handling of cassava planting materials
Wrong cutting (left) and right cutting (right) of cassava planting materials (ministems)
Cassava

How to grow it

- Cuttings can be sterilized in a 1% bleach solution
- Use a labeled fungicide and insecticide to protect the crop
- Plant the cuttings immediately so they do not dehydrate
- If this is not possible, use 12-20” cuttings and keep in a well-ventilated, shaded area & periodically wet them
Cassava – ministems

Handling of cassava planting materials (ministems)
Cassava – ministems

Cassava ministems treated and packaged in nylon bags

Cassava ministems treated and packaged in nylon bags ready for planting

old.iita.org
Cassava

How to grow it

- Planting: sticks can be placed slanted, vertically or horizontally.
- Avoid horizontal planting in wet areas
- Space at 20” within the row for compact plants and 30” for spreading plants
- Aim for a depth of 2 to 8”
Cassava

Women planting cassava in cassava experimental plot

Women planting cassava stems in cassava experimental plot
Cassava

Planting cassava stem of about 25cm high from ground level

Planting cassava stem of 10 nodules and about 25cm high from ground level
Cassava

Cassava ministem cuttings growing in experimental pots
Cassava ministem cuttings growing in experimental pots under research observation at IITA
Cassava

How to grow it

- Fertilizing the crop: for soils that are moderately deficient in P and K, use a ratio of 1:1:2.
- Using extra N will cause excessive vegetative growth, an advantage if leaf production is desired; however, excess N can lead to high cyanide content and bitter tubers.
- Fertilizer can be incorporated at planting or 6-8” from stems in holes 4-6” deep at 6 to 8 weeks after planting.
Cassava

- Pest problems
  - Disease
  - Cassava bacterial blight
Cassava

- Pest problems
  - Insects/Mites
  - Root & tuber scale
Cassava

- Pest problems
  - Insects/Mites
  - Mites
Ginger & Relatives

Status

- This group includes ginger, turmeric & galangal which are considered to be spices
- The top 5 countries, mostly in Asia, produce 80% of the world’s ginger
- Vegetatively propagated from rhizomes (specialized stems growing at or just below the soil surface)
- Propagules can be from product purchased at grocery stores and from some online sources
Ginger & Relatives

Potential

- Growing market for “baby” ginger – mature rhizomes which are sold before the skin thickens
- Interest in this group of plants for its medicinal properties, especially ginger and turmeric
- Container grown plants
Ginger & Relatives

Baby organic ginger from Hawaii
Ginger & Relatives

How to grow it

- Decide on the method of production: field, container, high tunnel, greenhouse
- Choose propagules from grocery stores
- Look for rhizomes which have not dried out and which are starting to sprout
- Gently break each rhizome apart so there is at least one sprout
Ginger & Relatives

Choose healthy fresh rhizomes for planting
Note: East Branch Ginger is sold out for 2013
Ginger & Relatives

- Two examples:
- Field production – Hawaii
- High tunnel production – upstate New York
Ginger & Relatives

Planting ginger in Hawaii
Ginger & Relatives

Ginger field in Hawaii

www.ctahr.hawaii.edu
Ginger & Relatives

The Hawaiian experience:

• Bacterial wilt is a devastating, soil-borne plant disease.
• Infested farms cannot be re-planted successfully
• Disease epidemics cause major crop losses
• Growers must use disease-free fields or lands not previously cultivated with ginger
• Clean ginger seed can be scarce and difficult to procure, preventing new farmers from getting started
• Pathogen-contaminated shoes or tools cause growers to quarantine their fields
• Bacterial wilt disease onset and progression can be rapid and severe, causing great crop loss in a short time
Ginger, et al.

- Pest problems
  - Disease
  - Bacterial wilt

Young ginger field in Hawaii showing early signs of bacterial wilt
Ginger & Relatives

High tunnels on the Kilpatrick Family Farm in upstate New York

This farm is an hour north of Albany, NY in USDA zone 4b.
Ginger & Relatives

Our Different Tunnels

- High Tunnels
- Hoophouse
- Mini tunnels

Kilpatrick Farm
Ginger & Relatives

Seed cut (leaving 3-4 eyes) into trays and cover with soil mix

Kilpatrick Farm
Ginger & Relatives

Trays are germinated at 80 degrees until shoots develop

Kilpatrick Farm
Ginger & Relatives

- soil needs to be 55 degrees plus to plant
- 6” deep trench for ease of hilling
- plant 6” on center in trench
- we throw a small amount of fertilizer in bottom of trench and mix in
- Rows 3-4 ft apart
- Again, drench with actinovate or other beneficial

Kilpatrick Farm
Ginger & Relatives

- hill when pink is noticed at base of stalk
- we fertilize every time we hill, about 20 lbs of 3-5-4 every hilling every 100ft
- we also put down 5-10 lbs of gypsum every time as well
- ginger is a heavy feeder but poor scavenger- needs nutrients right there.
- we also foliar feed with fish a couple times a year.

Kilpatrick Farm
Ginger & Relatives

Kilpatrick Farm
Kilpatrick Farm method
• we start harvesting after 4 months, or October 1st for us

• lift gently with fork, wash on bunching rack

• trim tops to 4” or so

• tops can be dried and used for tea

• ginger has a 2 week or so cooler life

• we freeze whatever we don’t sell fresh for the market

Kilpatrick Farm method
Yields...

- 5-10 per lb planted
- range some 2-3 lbs, some
  17.5-22
- Ginger responds to care

Kilpatrick Farm method
Ginger & Relatives

fusarium

Kilpatrick Farm
Ginger & Relatives

Nutrition deficiency
-most likely
low K

Kilpatrick Farm
Ginger & Relatives

Kilpatrick Farm
Cassava and Ginger & Relatives

Conclusions

- Find your own market(s)
- Do not use someone else’s yields or prices to predict how well you will do
- Start small and do trials to see how crops grow under your conditions
- Be realistic about how much money you might make
- If it sounds too good to be true, it probably is
For More Information...

- Sylvia Gordon
  Landscape by Sylvia Gordon, Inc.
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