Ginger and Turmeric Production

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Presentation Plan

• Quick overview of high tunnels
• Production information about Turmeric and Ginger
• Discussion and questions
Season Extension

• refers to anything that allows a crop to be cultivated outside of its normal outdoor growing season.
Opportunity

- Season extension and out of season growth
  - Maximum yield and increased quality
  - Less insect and disease pressure
- Organic
- Locally grown
- Specialty crops
Ways to achieve an extended growing season

- Greenhouse
- High tunnel or hoop house
- Plastic mulch
- Row covers
- Cultural practices
High Tunnel

- Resembles a conventional greenhouse
- Crops are grown in the soil
- Season extension
  - Spring earliness
  - Fall extension
- Protects crops from adverse environmental conditions
High Tunnel vs. Greenhouse

- **Greenhouse**
  - Electrical input
    - Exhaust fans, evaporative cooling, heater, circulation fans
  - Crops usually grown in containers
  - Usually permanent
  - Cost $$$
  - Crops grown year-round

- **High Tunnel**
  - No electricity
    - No automated systems - no fans, heater, controls
  - Crops grown in the ground, conventionally
  - Temporary
  - Cost $
  - Functions to extend the growing season, limited
Single Bay

Multibay

HIGH TUNNELS

PVC
High Tunnel Costs

- Materials = approximately $3-4/SF
- Construction = $1-2/SF

Example
- 26’ x 96’ round tunnel
  - materials $8,735
  - construction $3,744
High Tunnel Production of Fresh Baby Ginger Root
(Zingiber officinale)
Ginger (Zingiber officinale)
The official name Zingiber drived, using the Indian Sanskrit name for ginger - singabera, or shaped like a horn.

Other spices in the same family with ginger are Tumeric and Cardamom.

Ginger plant

The ginger plant has a long history of cultivation, having originated in Asia. Ginger is considered a tropical plant, has dark-green erect steams and lanced-shaped leaves that produces underground rhizomes. The plant may reach 2-4 ft in height.
Sustainable Ginger Production

• Market

• Seed-piece selection, mature, disease-free seed-piece, minimum 2 ounces

• Disease management, remove diseased plants and discard them as soon as possible

• Ginger is a heavy-feeder crop, and it will deplete your soil, fertilization and organic material is critical
Sustainable Ginger Production

- Mounding plant, otherwise you will be marketing partially green ginger

- Plant spacing, 3 feet between rows and two feet between plants in the same row

- Shade

- Rotation

- Ginger is photoperiod sensitive crop, long days are needed for plant-foliage development
Ginger Seed Rhizomes

Ginger Seed-Rhizome

- Use only mature, clean, disease-free ginger hands
- Cut the selected hands into 2-4 oz sections, sterilizing the knife after each cut
- Each seed-piece should have two to four well developed “eyes.”
- Surface-sterilize the seed-pieces in a 10% solution of household bleach (1 part bleach in 9 parts water) for 10 minutes
- Cure the seed-pieces in a clean, disease-free area for three days or more before planting

(Hepperly, P. and Francis Zee, 2004)
In February, plant the seed piece in a one gallon pot ½-¾ filled with soilless potting mix (2 parts Compost, 2-4 parts Sphagnum Peat Moss, 1 part Perlite, and 1 part Vermiculite). Maintain in a greenhouse. 

In May the potted plants are ready to be transplanted in the high tunnel.
Tissue Culture plants
September
Fertilizer

• Ginger responds well with adequate fertilizer application.
• For detail of fertilizer need see

Mounding (Hilling)

Is the periodic covering of the upward-expanding rhizomes. It is an important process in ginger production.
Armyworm, *Pseudaletia unipuncta* potential problem with high tunnel ginger production
leaf-spot *Phyllosticta zingiberi*
Diseases

Bacterial wilt (*Pseudomonas solanacearum*) - wilt of entire plant, rhizome rot.

- spreads by infested soil adhering to hands, boots, tools, vehicle tires and field equipment, water from irrigation or rainfall, and infected ginger rhizomes (Janse 1996).

- Infects ginger roots and rhizomes through openings where lateral roots emerge or wounds caused by handling, parasitic insects or root-knot nematodes (Swanson et al. 2005).
Diseases

Bacterial wilt (*Pseudomonas solanacearum*) - wilt of entire plant, rhizome rot.

- The pathogen survives in soils within infected plant debris in soils and as free bacteria.

- Crop losses: Crop loss can be complete in heavily infested soils.
Bacterial streaming from an infected ginger rhizome suspended in water. The streaming begins only a few minutes after placing the cut rhizome in water.

Milky, bacterial ooze forming the cut surface of a discolored, infected ginger rhizome

Diseases

- **Bacterial soft rot** (*Erwinia* sp.) - Leaf, pseudo stem and rhizome rot.

- **Bacterial leaf blight** (*Xanthomonas* sp.) - Leaf blight.

- **Fusarium yellows and rhizome rot** (*Fusarium oxysporum f. sp. zingiberi*) - Wilt of entire plant, rhizome rot.

- **Pythium soft rot** (*Pythium graminicola, P. splendens* and *P. aphanidermatum*): root rot, and soft rot of rhizomes.
Rhizome Rot
Fusarium oxysporum
Root-knot nematode
Shade
Ginger prefers 30% shade, high tunnel plastic provide sufficient shade. However, if you are growing it under field conditions, you need to intercrop it with other crops, Corn and Pigeon pea.
Local Knowledge
Seed-Piece removal
Ginger Deseeding Experiment
Deseeded
Date harvested and Yield per plant (lbs.) for two treatments; ginger plants were ‘deseeded’ and ‘seed not removed’ at transplanting.
VSU, Randolph Farm, 2017.

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<td>Number of plants with BW</td>
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High tunnel grown ginger yield/plant 2014 season, VSU Randolph Farm (lbs.)
223% increased from 2007 to 2015
Turmeric, *Curcuma longa*

- Is a rhizomatous herbaceous perennial plant of the ginger family, Zingiberaceae.
- It is native in Southeast Asia. Growing turmeric requires 9-11 month from planting the rhizome seed pieces until the harvest.
- In temperate zones as in Virginia, where the growing season is 7-8 month, it is recommended to grow turmeric in high tunnel structure
Turmeric, *Curcuma longa*

The roots are used for a multitude of purposes including

- Spice,
- Food flavoring and coloring agent
- In cosmetics, for coloring fabric
- For medicinal purposes
Turmeric production

Start in January
Sprouting is slow, greenhouse temperature >75 F helps with sprouting
September
Turmeric weight (grs.) per plant, September 16-October 27, 2015, VSU, Randolph Farm.

- 7.8 lbs.
- 3.1 lbs.
Education and marketing