Basics Of Tomato Management In Structures

Missouri Tomato School
Missouri Tomato School
Joplin, MO – August 14, 2017

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Greenhouses / High Tunnels are for Environmental Modification

- temperature
- light
- insects, diseases, and weeds
- air pollutants
- water
Why Modify the Environment?

- allow crop production at a time when it would otherwise be impossible or not profitable (low yield or quality).
High Tunnels – A Season Extender

- Looks like a greenhouse, BUT
  - No heaters
  - No fans
  - No electricity
- Looks like a duck, but does not quack like a duck
- Poor man’s greenhouse
- http://hightunnels.org
Greenhouse Tomatoes
Higher Quality & Value

- locally grown
- vine ripened
- not breakers or gassed
- uniform size & shape
- good red color
- good flavor

higher quality --> higher value
Looks easy, lot to learn!
Almeria, Spain

“sea of plastic”

Growers have a lot to learn before getting into the hydroponic tomato business.
But, that is just the beginning.
continue learning every year.
Huge, multi-acre range
Grow, then Sell Tomatoes

- Don’t even think about growing greenhouse tomatoes unless you have a market to sell them
- Investigate the market in your area first
- Wholesale?
- Retail?
- Small grower?
  - Sell locally
- Have alternative buyers
Get Educated

- Greenhouse Tomato Short Course
- Extension publications
- Books
- Newsletters
- Visit growers
- Internet
- Facebook page
The Greenhouse Structure

- See vendor list in Greenhouse Tomato Handbook
- Listen to speakers at GHSC
- Determine size
- Site location
- Sales on site?
- Plan for drainage
  - 1–2% slope
Learn The Language

- See the Greenhouse Tomato Growers’ Glossary
- Learn the terminology
- Feel free to suggest words to add if you find other terms you don’t know

Start Small

- 1 or 2 bays
- Not 6
- Not 12
- Not 5 acres

“Well you said start small…”
Who will do all the work?

- Labor – yes there is work to do
- Average 20 hours per week per bay over the life of the crop
  - Do it all by yourself?
  - Family labor?
  - Hire part time labor?
  - Hire full time labor?
- Be sure labor is available when you need it
Get your water tested
- In Mississippi – Mississippi State Chemical Laboratory
- 1 Gallon in CLEAN jug (not from milk!)
  i.e. from bottled water
- Not all water is created equal
- Water quality can change over time
  - Especially community water
Temperature Control

- Heaters (64°F min)
- Fans (keep it under 90°F)
- Vents
- HAF
- Shade Materials?
- Pad & Fan system?
- Fogging?
How Many Plants?

- **Plant Population**

- **5 square feet per plant**
  - Length X width / 5 = number of plants
  - 24 X 96 \( \Rightarrow \) 460 plants       30 X 96 \( \Rightarrow \) 576 plants

- 3 or 4 plants for 2 cubic foot lay-flat bag

- 2 plants per 5 or 7 ½ gallon upright bag

- 14 inches between stems in the row

Notice the “V-formation”
Types of Tomato Plants

- **Determinate**
  - Height is genetically determined
  - Top of plant ends with a flower cluster
  - Earlier first harvest
  - Will produce for short season

- **Indeterminate**
  - Height is NOT genetically determined
  - Top of plant is vegetative shoot
  - Will grow and produce over long season
  - Higher total yield
Tomato Types – use, color, size, age

- Canning
- Slicing
- Pickling
- Red
- Pink
- Yellow
- Orange
- Green
- Beefsteak
- Cherry
- Roma
- Grape
- Cluster (TOV)

- Heirloom
- Open pollinated
- Hybrid
- GMO? There are none!

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Variety

- Choose a good variety.
- Pick a greenhouse variety.
- Look for
  - Good yield & size
  - Red color
  - Excellent disease resistance
  - Free of disorders
For Greenhouse Production

In most cases ....

- Red
- Indeterminate
- Beefsteak
- Roma, cherry, grape - if good market exists.
- Greenhouse variety – not field or home garden type which are not well adapted to greenhouse conditions.
- *Can deviate from this based on market demands.*
Greenhouse Tomato Varieties

- Trust (De Ruiter / Seminis / Monsanto) – being phased out!
- Big Dena (Syngenta)
- Geronimo (De Ruiter / Seminis / Monsanto)
- Torero (De Ruiter / Seminis / Monsanto)
- Heritage (Rijk Zwaan)
- Starbuck (De Ruiter / Seminis / Monsanto)
- Foronti (De Ruiter / Seminis / Monsanto)
- Rebelski (DRW7749) (De Ruiter / Seminis / Monsanto)
- Tanager (Yuksel Seeds)
- Blitz, Quest, Matrix, Clarance, Ambiance, Tresco, Match – all discontinued
- Cluster types – Success, Tradio
High Tunnel Production Varieties

- Applause
- BHN 589
- Big Beef
- Celebrity
- Mountain Majesty

- Mountain Spring
- Red Defender
- Red Deuce
- Rocky Top

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Greenhouse – Choose a good growing medium

- Pine bark (composted fines)
- Perlite
- Coconut coir
- Rockwool
- Peat-lite mixes
- Soil
- Sand
- Newer Alternatives
Have the right tools

- Pollinator or bumblebee hive
  - (Class A, B, C)
- pH meter
- EC meter
- High/low thermometer
Design A Good Irrigation System

- Not as simple as it sounds
- Get help from an irrigation engineer
- Choose proper emitters
- Use filters
- Plan for fertigation
  - Bulk tank
  - Injector
Fertility & Nutrition

- Use a greenhouse hydroponic tomato fertilizer
- Use correct pH (5.6–5.8)
- Get regular tissue analysis
Tissue Analysis
How to Take Sample

- Snap off 10 to 12 leaves total
- Not more than 1 per plant
- Randomly selected from throughout greenhouse
- Choose leaf just above golf ball sized fruit
- Send to laboratory for analysis
What Makes Good Tomato Flavor?

- Correct Fertility
  - Not too weak
  - Increasing EC improves flavor
- Correct pH
  - Lower pH (more acid) improves flavor
- Maturity – vine ripened
- Lots of sun
  - Plants turn sunlight into sugar
  - More sun ➔ more flavor
Have A Support System

- Wire Height
  - Average – 7 feet high
  - Higher for the taller grower
  - Lower for the shorter grower
- Be sure it has good support
  - 600 plants with fruit load can weigh 3 to 4 tons!
- 3 feet apart in V-formation over row
- Tie strings to wire above and clip to base of plant

*note: this does not refer to group therapy, but that may be useful as well
Tomato Pruning & Training
for the greenhouse

- Train to 1 main stem!
- Remove suckers once/week
- Tie top of string to horizontal wires overhead
- Tie or clip bottom of string to base of plant
- Attach under a leaf, NOT under flower cluster or fruit which can cause damage.
- Once per week, either add plant clip OR twist string around stem, *always in the same direction.*
Be Prepared for Insects and Diseases

- They happen.
- Greenhouse structure does not prevent insects and diseases from getting in.
- Insects do not know if you are organic.
- Consider a double door entry.
- Prevention works best.
- Understand IPM.
Do not use Roundup in the greenhouse
Do not use Roundup outside the greenhouse when plants are inside the greenhouse
Do not use any herbicides in the greenhouse
Do not use any herbicides outside the greenhouse when plants are inside the greenhouse
Roundup residual
Quiz – Which Herbicide is OK to use in GH?
Maintain Your Equipment

- Heaters
  - Should be ready in advance of need
- Fans
- Vents
- Emitters
- Injectors
- Pumps

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Use a Vented Heater ONLY

- Heaters must be vented to the outside with a stack.
- Do not use any space heaters in the greenhouse which exhaust into the greenhouse.
- Do not use so-called “100% efficient heaters”.
- Ventless heaters may be ok for chickens, but NOT for tomatoes.
- Ethylene and carbon monoxide in exhaust gas will kill flowers, severely reducing yield.
Be A Worrier!

- Check your work.
- Use pH and EC meter to check nutrient solution daily and after mixing.
- Use a gallon jug at 1 emitter to check volume per day.
- Walk the greenhouse every day.
  - Look for wilting plants.
  - Look for critters.
Use Diagnostics Resources When Needed

- Local County Agent or Area Horticulture Agent
- Extension Vegetable Specialist
- Digital diagnostics
- Diagnostics laboratory
- Friends in the business
You Are Not ONLY A Grower

You Are Also A…

- Seller
- Marketer
- Promoter
- Industry Representative
Know Your Product – What’s So Good About It?

- Vine ripened
- Good red color
- Great flavor
- Locally grown
- Not breakers or gassed
- Uniform size and shape
- Nutrition & health benefits
- Excellent quality

**higher quality --> higher value**
Sell Quality

- Grade your fruit well.
- Do not sell cull or #2 and #1 fruit to same buyer.
- Build your reputation for high quality.
- Keep your customers happy.
- Aim for repeat business!
- Develop a brand name customers associate with high quality.
- Logo!
Know When to Harvest

- Red – same day retail
- Light red – retail and close wholesale
- Pink – wholesale close and mid range
- Turning – wholesale long range
- Breaker – never
- Green – NEVER EVER
  - Except for fried green tomatoes
Use Stickers for Promotion

Cost per sticker

For round 3/4 inch label...

- 0.2 cents per sticker (i.e. 5 for a penny; including the plate charge)
Self Serve Sales

$5 Bag
Please put money in box. Thank you!

$3 Bag

Cucumbers 50¢ Each

Tomatoes
Publication Resources

- Greenhouse Tomato Handbook
- Tomato Troubles: Common Problems with Tomatoes *(NEW!)*
- Greenhouse Tomato Growers’ Glossary
- Environmental Control for Greenhouse Tomatoes
- Greenhouse Tomatoes – Pest Management in Mississippi
- Budget For Greenhouse Tomatoes

*All are on the web site*
Greenhouse Tomato Handbook

Everybody here gets one.
Also available in Spanish

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Internet Resources

- Greenhouse Tomato FAQ
  http://extension.msstate.edu/crops/commercial-horticulture/greenhouse-tomatoes

- Greenhouse Tomato Short Course
  www.greenhousetomatosc.com

- Facebook
  www.facebook.com/GreenhouseTomatoShortCourse
Greenhouse Tomato Short Course

www.greenhousetomatosc.com

- Raymond, Mississippi
- March 6 & 7, 2018
- Expert Speakers
- Educational Materials
- Growers from 20+ states
- Meals Included
- Exhibitors
Greenhouse Tomato Survival Kit
10 DVD Set

http://greenhousetomatosc.com (click DVD tab)
Thanks for coming.

Questions?