Growing Great Tomatoes

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The Challenge:
- Keep plants alive and healthy
- Produce fruit in hot summers with unpredictable rainfall

How:
- Follow best management practices
- Address common problems
Tomato Best Management Practices

- Soil Preparation
- Variety Selection
- Planting
- Fertilization
- Watering
Tomatoes grow best in rich, dark soils. They require good drainage but soil must also be able to hold moisture and nutrients. Ideal pH is 6.2 – 6.5. Does this describe your soil?
Solution: Organic Matter!

- Compost, pine bark soil conditioner, aged manure
  - **Peat moss** inferior to compost
- **Incorporate into soil each season!**
  - Spread 2”-3” layer, mix in 6”-8” deep
- Adds some nutrients, helps soil hold **water** and **nutrients**, supports **beneficial microbes**
Hydrangeas
flower pink in basic soils
And blue in acid soils

Soil pH

• Changes in pH affect nutrient availability

• 6.2 – 6.5 ideal for tomatoes and most vegetables

• Soil testing is the most accurate way to determine pH!

• Both high and low pH levels are common in SE NC
Soil pH

- **Lime** raises pH
  - Must mix into the soil, **takes 6 months** to completely react
- **Sulfur** lowers pH
- **Gypsum/landplaster** supplies calcium without changing pH
- **Adjust based on soil test results**

Applying lime to soil surface after planting provides no benefit to crops.
Soil Testing

- FREE!
- Drop off samples at any Extension Office or Pender Pines Nursery
- Sample veg. gardens each year, **any time** of the year
- Take **4-5 samples** from garden and mix together to fill one box
- **Results posted online** in 4-12 weeks
 Soil Test Results

• Will tell you the pH of your soil
  • If you need to add lime, and how much

• What nutrients are needed and how much of each to add

• Does not determine:
  • If diseases or chemicals are present in the soil
  • Drainage problems
  • If organic matter needs to be added
Variety Selection

- Dozens of varieties are available as plants from garden centers
- 100’s can be grown from seed
- **Consider:**
  - Growth habit
  - Fruit type/size
  - Disease resistance
  - Adapted to south
Types of Tomatoes

- **Determinate**
  - Mature crop all at once
  - Good for canning
  - Plants stay smaller

- **Indeterminate**
  - Set successive crops over long season
  - Keep growing = tall plants
  - **Semi-determinate** keep producing over long season but plants stay relatively compact

Indeterminate varieties need tall support trellises
Types of Tomatoes

- **Round Fruited**
  - Varieties producing medium size tomatoes grow best
  - Beefsteak types are most difficult

- **Paste Tomatoes**
  - Aka Roma or Pear tomatoes
  - For cooking and canning
  - Generally easy and productive

- **Cherry and Grape**
  - Easiest!, most are indeterminate
  - Very reliable and productive
  - Best type for beginners!
Heirloom Tomatoes

- Local selections that have been preserved over the years
- **Flavor but little disease resistance**
- Some better adapted to south than others:
- Most are **indeterminate**
- Can save seed – come “true to type”
Disease Resistance

- **Hybrids** developed for disease resistance
- Most important disease resistance to look for:
  - **F** - Fusarium
  - **N** - Nematodes
  - **TSW** – Tomato Spotted Wilt Virus
- **No tomato is resistant to all** (or even most) tomato diseases!
- **No resistance to soil born wilt diseases**

Planting resistant varieties is the ONLY way to manage tomato spotted wilt virus.

Heirloom varieties have no resistance to this disease.
Most Reliable Varieties

- **Celebrity**
  - Determinate, large round, F & N resistant
  - **Bush Celebrity** is good for containers

- **Better Boy**
  - Indeterminate, large round, F & N resistant

- **Big Beef**
  - Indeterminate, extra large fruit, F & N resistant
  - **Big Boy** is similar, NOT F,N resistant

- **Cherry Tomatoes**
  - **Sweet 100, Sweet Million**, and **Juliet** are favorites

  ‘**Amelia**’ and ‘**Crista**’
  are determinate hybrid tomatoes resistant to **tomato spotted wilt virus**, Fusarium and nematodes. Not as flavorful as older varieties.
Planting!

- Plant early April – early May
  - Late March with frost protection or at coast
- Plant July for fall crop
  - Pests and diseases make fall crops more challenging
- Space plants 3’ apart
- Need at least 6 hours direct sun per day

When setting out plants grown in peat pots, be sure to completely bury the pot!
Plant Deep!

- Tomatoes will produce roots along their stems – deep planted tomatoes have larger root systems.

Tall, leggy tomatoes can be planted laying sideways, with the top 3-4 sets of leaves above ground.
Planting Tips!

- Cage tomatoes at planting time
- Avoid planting tomatoes in the same location year after year
- Plant multiple varieties
- Plant in a couple of different locations
- Mulch to conserve moisture, reduce weeds, and keep soil cool

Cages should be at least 4’ tall – taller indeterminate varieties
Containers

- Great if have limited space – on patios to keep away from **deer**
- Large containers – at least 5 gallon size
- For best results use **potting soil** (not garden soil)
- **Slow release fertilizers** work well
- **Water daily**, especially in summer

**Topsy turvy planters** do not provide any additional benefit.

**Earth boxes** are popular because they are self watering.
Fertilizers are usually needed to supply some of the nutrients plants need

- **Compost alone** rarely supplies enough nutrients

Both **organic** and **synthetic** fertilizers are available

- **Synthetic fertilizers** usually have higher concentrations of nutrients
- **Organic fertilizers** are better for the soil, are less likely to cause water pollution or burn plant roots

Fertilizer injury on young tomato plant
Fertilizers

- Usually contain:
  - **Nitrogen** = green leafy growth – too much reduces yield!
  - **Phosphorus** = roots, flowers, seeds – many soils have enough
  - **Potassium** = makes plants tougher! Very important for **flavor**!
- Look for blends with **more K than N**, eg. 6-6-12
- Use **soil test results** to determine if additional nutrients are needed
Fertilizers

- **Time release fertilizers** (Osmocote) = very good, slowly release nutrients over 2-6 months
- **Organic fertilizers** readily available, naturally slow release – nutrients not readily available in cold weather
- **Liquid fertilizers** (Miracle Grow, Compost tea) = fast food, quick boost but no sustained feeding
  - Easy to apply too much nitrogen with Miracle Gro!
Watering

- Tomatoes need at least 1” water per week
- If no rain, will need to supplement
- **Avoid wetting leaves** – increases foliage diseases
- **Drip systems or soaker hoses** work well

Drip irrigation delivers water through pipes directly to the soil
Southern Bacterial Wilt – a soil born disease that is deadly for tomatoes
Blossom End Rot

- Technically caused by calcium deficiency in developing fruits
- Most often due to over fertilization (too much N) or uneven moisture
- Keep evenly moist!
  Water regularly and mulch
- Soil test to see if pH is low or if calcium is deficient
Blossom Drop, Poor Fruit Set

- **Common cause:** **Heat**
  - Daytime highs in the mid 90’s or above, or nighttime lows above 75 will cause blossoms to shed without setting fruit

- **Poor pollination** can also cause blossom drop
Protect and Encourage Beneficials

- **Plant flowers** to attract pollinators

- **Best flowers for beneficials:**
  - Umbelliferae: fennel, dill, cilantro, Queen Anne’s lace
  - Daisy type flowers: purple coneflower, black eyed Susans
  - Most herbs – basil, mint, lemon balm
  - Salvias, Asclepias, Zinnia, Yarrow, buckwheat, hairy vetch

- **Minimize use of pesticides,** especially insecticides

Honeybees are very susceptible to most insecticides
**Other Heat Related Problems**

- Uneven or slow ripening
- Internal white spots
- Green shoulders
- Poor flavor

**To minimize:** Keep plants watered, make sure potassium levels adequate, shade plants
- **Fruit splitting or cracking**
  - Fluctuations in soil moisture levels
  - Common after heavy rainfall
  - Keep plants evenly moist

- **Leaf Rolling**
  - Not damaging
  - Caused by environmental conditions
  - Some varieties more prone than others
Soil Born Diseases
- No way to treat – persist for years
- Do not grow tomatoes in these soils (or eggplant, peppers)
- Try large containers

Tomato Spotted Wilt Virus
- Spread by thrips (tiny insects)
- Look for TSW on label
Tomato Spotted Wilt Virus

Silver or white plastic reflective films can reduce TSW by confusing thrips.
Root Knot Nematodes

- Cause stunting, wilting, low yields
- **Plant resistant varieties**
- Add **organic matter**
- **Till soil** to expose
- **Remove crop roots** at end of season

Roots of tomato plant infected with Root Knot Nematode (left). Healthy roots right.
Managing Nematodes

- **Cover crops** – French marigolds, mustard
- Alternate planting location every other year in rows or blocks
- **Marigolds** – French or African – plant summer
- ‘Pacific Gold’ mustard – plant fall/spring

*Figure 1. Strip-crop arrangement.*
Leaf Spots

- Damaging, but not as deadly as wilt
- **Keep foliage dry**
- **Space properly**
- **Practice crop rotation**
- Remove infected leaves when first noticed
- **Spray**: organic – *B.t. subtilis* (Serenade) and copper; conventional – mancozeb, chlorothalonil
Early Blight

- Foliage Disease
- Distinctive bulls-eye leaf spots
- Starts on bottom leaves and move up the plant
- Plants look ‘burnt up’ by late summer – does not cause wilting
- **Spray:** organic – *B.t. subtilis* (Serenade) and copper; conventional - mancozeb
Insects

• If you plant it, they will come!!!
• **Scout regularly** to find problems before they become established
• Have problems properly **identified** before treating
Tomato Hornworms

- Voracious feeders!
- Usually first show up in June
- Hand pick or spray
- **Organic**: B.t. (Dipel) or Spinosad
- **Synthetic**: bifenthrin – check pre harvest interval
Parasitic Wasps
Bugs!

- Feed on fruits with needle like mouthparts
- **Cause ‘cloudy spot’**
- No organic control except hand picking
- Bifenthrin

Feeding injury causes yellow spots to form just under skin – does not affect flavor. Fruits are still edible
Best Advice

- Plant as early as possible
- **Plant several varieties**
- Plant deep
- **Soil test!**
- Apply slow release fertilizer
- **Water regularly**
- Mulch
- **Monitor pests and treat early**
Gardening News by Email

**Pender Gardener** – regular updates about sustainable lawn and landscape care, great plants, and pest management

- **To Subscribe**: send an email to **mj2@lists.ncsu.edu**
- Leave the subject line blank
- In the body of the message put: **subscribe pendergardener**

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- In the body of the message put: **subscribe foodgardener**
Upcoming Free Classes

- **Gardening at the Beach 101**
  - May 15, 2pm – 4pm
  - Surf City Community Center
  - Call (910) 328-4887 to register

- **Growing Great Tomatoes**
  - April 3, 10:30 – noon, Hampstead Library
  - April 14, 10:30 – noon, Burgaw Library
  - Call 259-1235 to register for 4/3 or 4/14

- **Growing Healthy Soil**
  - April 21, 10am – 11:30, Pender Extension Office, Burgaw
  - Call 259-1235 to register
Master Gardener Spring Plant Sale

Pender Extension Center
801 S. Walker St., Burgaw
Thurs, April 19, 2pm – 6pm
Fri, April 20, 8:30am – 6pm
Sat, April 21, 8:30am – Noon

- Many varieties of vegetables, herbs, annuals, perennials, and Knockout roses
Ask questions, bring samples for id, soil test supplies, pick up information

- **Poplar Grove Farmer’s Market**, 2nd Wed of each month, April - October (9am – 1pm)
- **Hampstead Library**, 3rd Monday of each month, April - October (10:30am – 1pm)
- **Events**: Poplar Grove Herb Fair, Burgaw Springfest, Blueberry Festival . . .

- **Become a Master Gardener!**
  - Training begins in August! Contact Pender Coop. Extension