VEGETABLE PRODUCTION TOPICS

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WHAT’S NEW IN CORN

- Sweet corn – occurred as a mutant among native American culture 1000’s of years ago.
  - First ‘American’ varieties offered in early 1800’s
- Until late 1960’s all varieties were ‘su’-types
  - ‘Su’ = sugary– standard sweet corn very rapidly converts sugar to starch becoming doughy and less sweet.
- In the 1960’s new types of sweet corn were developed:
  - ‘Se’ = sugary enhanced; ‘sh2’– shrunken, ‘Supersweets’
CORN

- ‘Se’ types – creamier; convert sugar to starch noticeably slower, 7 – 10 days giving longer shelf-life window of top quality. Benefits from isolation but is not necessary.
- ‘Sh2’ types – lost the gene for sugar to starch conversion. Will stay juicy and sweet for weeks; shuck can begin to turn brown and corn is still juicy.
- Recessive trait so isolation from standard and ‘se’ types is needed. Pollination by standard or ‘se’ types result in reversion to starchy-type corn.
Some newer types have now been produced combining the genetics of ‘su’, ‘se’, and ‘sh2’ types.

Genes for sugar conversion are present but ‘silenced’ allowing breeders to get desirable characteristics without the rapid conversion.

These varieties have a long shelf-life, very sweet taste with creamy texture and tender skin.

Referred to as: Xtra-tender, Ultrasweet, or Triplesweet.
‘Su’ – ‘Silver Queen’ (w) still is popular; many ‘se’ and ‘sh2’ are sold as ‘Silver Queen’. ‘Merit’ (y) is still popular among home gardeners. ‘Quick Silver’ (w), ‘Gold Queen’ (y), and ‘Seneca Horizon’ (y) are other recommended varieties.

Due to quick conversion, these varieties are recommended for home use or road-side stand sales where the product will usually be cooked within hours of picking.
VARIED S

Many ‘se’ varieties are still used for road-side stand trade as most commercial growers use ‘sh2’-varieties due to latitude in harvesting and shelf-life.

‘Snowbelle’ (w) has long been popular. Others include: ‘Sweet Ice’ (w), ‘Bodacious’ (y), ‘Sweet Rhythm’ (bc).

Among ‘sh2’-types and extra-sweets: ‘Summer Sweet 7311 W’ (w), ‘Xtra Tender 375 A’ (w), ‘Merai 130Y’ (y), ‘Prime Plus’ (y), ‘BSS 0977’* (bc), and ‘Summer Sweet 8102’ (bc). * = Bt-corn
BT-CORN

- Bt corn has genes for producing the insecticidal proteins of the bacterium, *Bacillus thuringiensis*.
- These are the same genes inserted into cotton to produce ‘Bt cotton’.
- These proteins are safe for most other creatures except caterpillars.
- When caterpillars eat these proteins, their gut gets holes in it, and they die.
- These proteins are produced throughout the vegetative part of the corn plant but in only about 2/3’s of the grains and silks.
Bt-corn is to be used in the late season when armyworms, corn borer, and earworm populations are at their highest.

The Bt proteins serve to protect the vegetative portions of the plant from attack of these caterpillars to allow a normal-sized plant to grow.

- Armyworms and corn borers can severely damage pre-silking corn plants in late summer.

After silks appear, a regular spray program for protecting ears is needed to produce ears of the quality needed for wholesale marketing.
TOMATOES

- Tomatoes are the most popular garden crop in the country and the most-despised grocery store item as well.
  - That is a marketing opportunity!!
- Commercial tomato varieties are firm and pack easily and normally have multiple disease resistance but are lacking in taste and texture.
- Home garden varieties are bred for taste and texture but are often soft, prone to cracking, and have limited disease resistance.

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TOMATO PROBLEMS

- Tomato spotted wilt
- Bacterial wilt of tomato
A virus disease vectored by thrips. It stunts and kills plants. Can be non-symptomatic on plants with fruit showing irregular ripening.

Yellow blotches and rings or ring spots.

Insecticidal control of thrips does not limit initial infection, which is the main problem.

Virus transfer is so fast that the insecticide does not kill fast enough.

Harbored in a variety of weeds. Goes from winter annuals to crop in spring and back to summer annuals then to winter annuals as crops finish.
TOMATO SPOTTED WILT

- Control consists of management of winter annual weeds in planting area well before planting time (not much success yet).
  - Dandelion, chickweed, swinecress, sowthistle, rabbit tobacco, evening primroses, many others.
- Use reflective mulch to repel thrips (aphids and whiteflies, too).
- Plant after main spring thrips flights (varies but usually April).
- Use TSWV-resistant varieties.
RESISTANT VARIETIES

- Home garden varieties in general are NOT resistant to TSWV.
- Acceptable varieties for home gardeners and roadside sales are ‘Amelia’ and ‘Crista’; also have RKN resistance – important in non-fumigated crops.
- Other varieties are commercial types with limited appeal to direct marketers: ‘Quincy’, ‘Bella Rosa’, ‘Fletcher’, ‘Mountain Glory’; no RKN resistance.
BACTERIAL WILT OF TOMATO

A soil-borne disease caused by a bacterium found throughout the southeast.
No resistance to speak of in commonly available cultivars.
Most management is cultural: good rotation (know hosts and non-host ‘supporters’ – peanut, ragweed), use non-nutritive composts for antagonism.
Tomato Grafting

- First reports of vegetable grafting occurred in Asia in the 1920’s.
  - Fusarium wilt of melon

- Popularized in Japan and Korea
  - Tunnel and Greenhouse production

Slide courtesy of F. Louws – NCSU 2009
Grafting is carried out at 2-5 leaf stage.

Rootstock and scion stems are severed at a 45° angle, and reattached with a rubber grafting clip.

Grafts are moved into a chamber where they can heal before being planted in the field.

Slide courtesy of F. Louws – NCSU 2008
# Commercial Rootstock Selection

F. Louws NCSU 2008

<table>
<thead>
<tr>
<th>Rootstock</th>
<th>TMV</th>
<th>Corky</th>
<th>Fusarium Wilt</th>
<th>Verticillium Wilt</th>
<th>Bacterial Wilt</th>
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<td>** HR HR **</td>
<td>HR</td>
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**HR** = Highly Resistant, **MR** = Moderately Resistant, **S** = Susceptible

* = De ‘Ruiter Seed Co.  ** = Takii Seed Co.  *** = Dai Honmei
**** = D Palmer Seed Co.  ***** = Rijk Zwaan  ****** = Bruinsma Seed Co.
TOMATO CRITICAL NEEDS

- Tomatoes need proper pH – 6.2 – 6.5
  + Low exchange soils need higher end of range.
- Limestone needs to be incorporated at least 3 mos. prior to planting.
- Calcium addition to fertilizer program will not completely overcome low pH problems.
- Wilting during hot periods usually results in blossom-end rot in 4 – 5 days.

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CALCIUM UPTAKE

- Proper watering is essential for calcium uptake.
  - Mass flow – large volumes of water needed.
- Potash will compete with calcium for uptake.
  - Potash additions need to be calculated not just added.
- Calcium is immobile in the plant; foliage uptake will go to the end of the leaf and not distribute throughout plant.
  - Fruit does not take up foliar calcium well.
PRE-PLANT FERTILIZER

- Phosphorous should be added according to soil test and disked in well prior to bedding.
  - Highly colored piedmont soils often take a lot of P.
- Use soil test results and apply 50 lb of N and K to make 125 lb/A in-bed before bedding.
  - The remainder of the N & K are added as fertigation.
- Fertilizer should contain 0.5 lb boron per acre.
- In-season tissue analyses can be used to adjust fertility program.
# FERTIGATION SCHEDULE FOR LOW K SOILS

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<tr>
<th>Days after planting</th>
<th>Daily N</th>
<th>Daily Potash</th>
<th>Cumulative N</th>
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Cumulative amounts are in lb/Acre  
Daily amounts are in lb/A/day  

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FERTILIZER MATERIALS

- Good quality liquids on the market; 20-20-20 and 20-10-20 are usually not good choices.
  - No need for the P thru the drip and wrong form for N usually.
- 7-0-7 and 4-0-8 are easy to use since they are 1:1 or 1:2 in respect to N and K.
- 5 gallons per acre per week of 7-0-7 = 0.5 lb N/A/day; 10 gal = 1.0 lb N/A/day
- 4-0-8 would take approximately twice as much to equal the same amounts of N
- Measure fertilizer and water for tomatoes!

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TISSUE ANALYSIS

- Use most recently matured terminal leaflet.
- Right at first bloom (Univ. of Florida)
  - N = 2.8 – 4.0%, P = 0.2 – 0.4 %, K = 2.5 – 4.0 %
  - Ca = 0.8 – 2.0 %, Mg = 0.3 – 0.5 %
  - Micronutrients usually good but deficiencies can occur; Boron is important for bloom set and preventing some cracking. B = 15 – 30 ppm
    - Sprayable boron supplements work well.
- If foliar supplements are used, leaves must be washed and dried well for tissue analysis.

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APHIDS AND SQUASH VIRUSES

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APHIDS

- Small soft-bodied insects often called plant lice.
- Winged and wingless forms, high reproductive rate.
- Aphids carry many plant virus diseases.
- Two particular problems on squash.
  - the green peach aphid and the melon aphid.
APHIDS

Aphid mummy – an aphid parasitized by a small wasp

Melon aphids

Green peach aphid

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SQUASH VIRUSES

- Non-persistent, stylet-borne viruses.
  - Cucumber mosaic virus
  - Watermelon mosaic virus
  - Zucchini yellow mosaic virus
  - Papaya ringspot virus

- Other means of control.
  - Varieties genetically-engineered with multiple virus resistance.
  - ‘precocious yellow gene’ varieties.
  - Varieties with traditionally bred resistance to viruses.
POINTS TO REMEMBER

- Very uniform stands that emerge at the same time affect landing behavior of aphids.
- Excellent weed control may reduce inoculum.
- Use varieties with the most resistance, bio-tech resistance is usually stronger than traditional.
- ‘Precocious yellow gene’ varieties can be used if buyer accepts yellow peduncle.