

Tomato Production- More Than You Ever Wanted to Know




Lycopersicon esculentum

- Nightshade: potatoes, peppers, eggplant
 - Tender, warm season perennial grown as annual
- Planted in 95% of American gardens
- Most popular garden vegetable in Arkansas
- Many varieties and types

Tomatoes – The Benefits

Lycopene
Vitamins
Minerals
Anti-oxidants



veggie power

You know veggies are good for you. But did you know that some pack more of a nutritional punch than others? Powerhouse veggies are very nutritious vegetables that provide a great return on your dietary investment. Eaten as part of a balanced diet, they may even help reduce the risk of certain chronic diseases, like some types of cancer.

Different powerhouse veggies supply different nutrients that help the body perform important functions. For example, vitamin A helps maintain healthy skin, vitamin C helps heal cuts, fiber helps keep the body's digestive tract moving smoothly, and antioxidants may help protect cells from damage caused by daily wear and tear.

Some powerhouse veggies fall into groups distinguished by color or plant type. Four examples of these groups are: dark green & leafy (spinach, kale), deep yellow & orange (carrots, sweet potatoes), bright red (tomatoes, red bell peppers), and cruciferous (broccoli, cauliflower).

Make nutrition your New Year's resolution. We'll show you how to get easy-to-prepare powerhouse veggies into your diet.

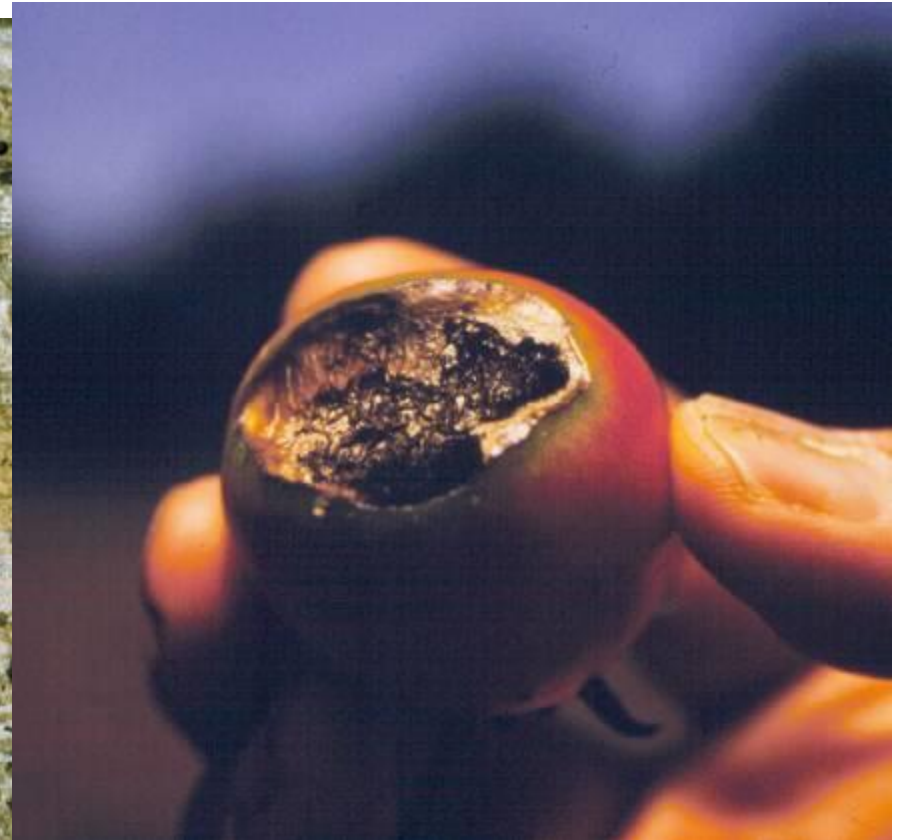
get more veggie power

TRY TO EAT POWERHOUSE VEGGIES AT LEAST TWICE A WEEK AS PART OF YOUR OVERALL VEGGIE INTAKE.

Recommending Soil Amendments for the Garden

- Agricultural Limestone to Raise soil pH
- Sulfur to Lower soil pH
- Gypsum pH neutral
- Poultry Litter
- Cover Crops
- No saw dust!

Blossom End Rot – Calcium Deficiency



pH of Soil

- Low soil pH leads to poor growth, blossom end rot of fruit and interveinal chlorosis of oldest leaves.
- Mn and Al toxicity, leaf burn and poor plant growth.

pH of Soil

- When the soil pH is too low
- Manganese and Aluminum are toxic
- Phosphorus, Magnesium & Calcium are unavailable

Preplant Fertilizer

- Preplant application $\frac{1}{4}$ to $\frac{1}{2}$ of total N
- As 50 % NH_4 50 % NO_3 forms
- Apply fertilizer according to the use demand of the plant
- All PO_4 and $\frac{1}{2}$ of K at recommended rates.
- Band fertilizer on opposite side of the row from drip tape

Use A Transplant Starter Solution



- 1 Tbs. of a soluble fertilizer high in Phosphorus
- In 1 gallon of water
- Apply 1 cup of solution per plant
- 1-1-1

Transplanting

- Use 8oz of starter solution per plant at transplanting.
- Starter solution- high in PO_4 stimulates root growth
- 8-34-16 or 10-20-10 at 200 ppm PO_4

Drip Irrigation

- Water usage is more efficient
- Improved fertilizer application efficiency
- Precise timing of fertilizer application when the plants need it

Tomatoes – The Variety







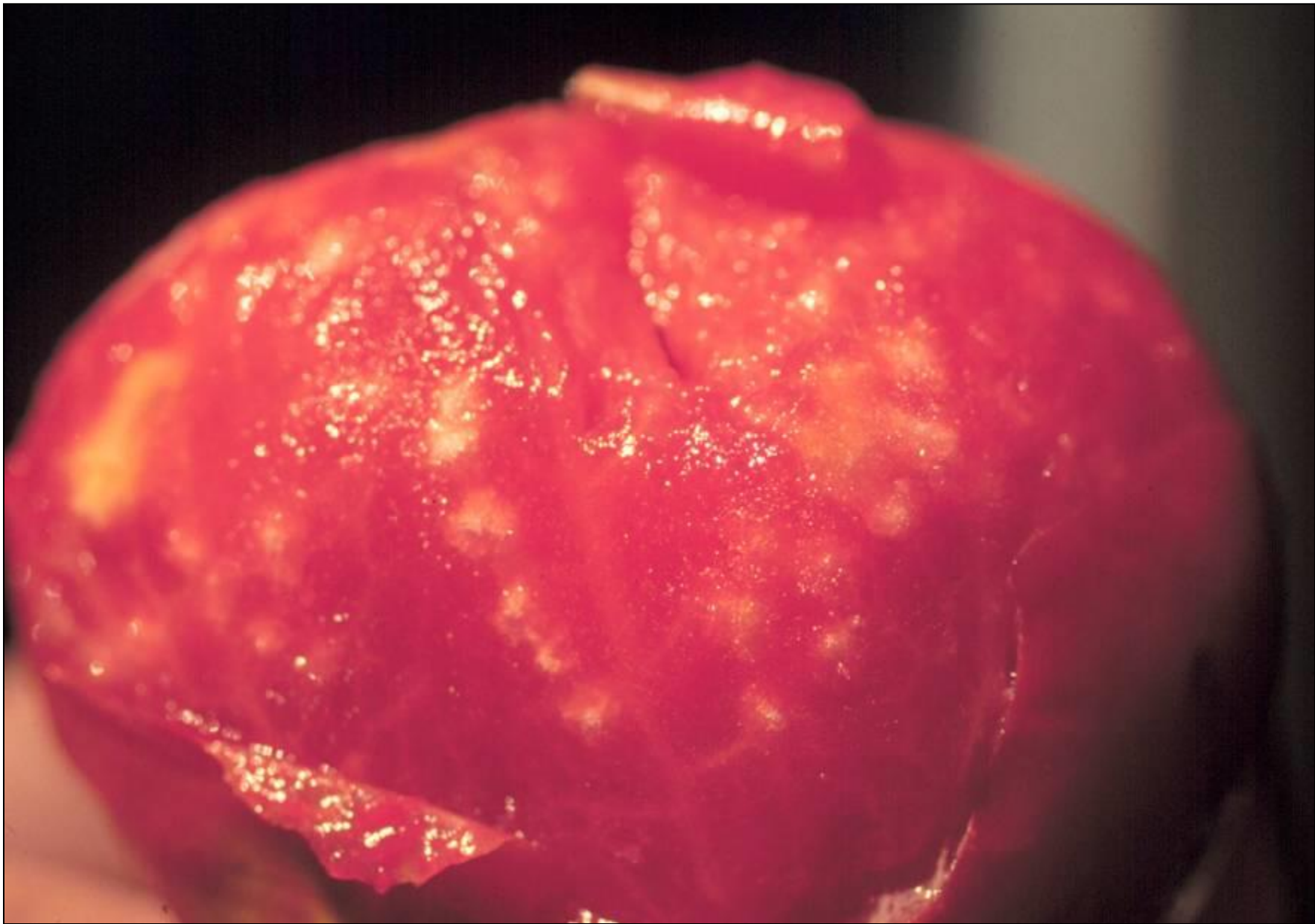
Tomato History

- From South America, used by 600 AD
- Aztec Word for Tomato is Xiotomate
- Seed taken to Southern Europe by 1519 AD
- Grown in England by Patrick Bellow 1554
- First Considered Poisonous
- Culinary Use by 1650 ?
- Seed Sent to N. America 1750

Things That Go Wrong

- Diseases
- Insects
- Environmental Disorders
- Physiological Disorders



































Chemical Injury





Sunscald



Cracking



BER



**Cat
face**



Internal BER



Spider Mite



Stinkbug







Root Knot Nematodes





TSWV- Tomato



The Secret of the Good Life

“Home Grown Tomatoes”

Home Grown Tomatoes



Fruit Set and Growth

- Tomatoes have perfect flowers
- Tomatoes are self pollinating
- Pollen formation above 72 deg night temperature is inhibited.
- Flowers need movement to release pollen.
- 95% of cells in tomato are present when the flower is pollinated

Start With a Flower



Young Fruit



- Fruit Growth is by cell expansion. 95% of the the fruit's cells are present when the flower opens.

Cat Facing , Cold Damage



Tomato Milestones

- M. Mahon, American Gardener's Calendar includes tomatoes in 1806
- Thomas Jefferson grew and ate them 1781to 1809 .
- Tomato Catsup invented 1812
- Col. Robert Johnson ate a bushel of tomatoes in 1820 in Salem NJ and Lived!
- 1876 H. & J Heinz start selling Tomato Ketchup and the modern era begins.

Planting Tomatoes

- Soil Temperature needs to be 60 deg F
- Hardening Plants – the truth !
- Plant a little deeper than root ball.
- Don't let the roots dry out!
- Fertilize with 8 oz. of starter solution.
- (1 Tbs 10-20-10 soluble fertilizer in a gallon of water.)

Check Soil Temperature 2 inches
deep at 10:30 am



Tomato Milestones

- Landreth's Seed Company est 1784 - one of the first to sell tomato seeds.
- Seed sold in Paper Packets - Shakers 1850
- Wide spread Use by 1890
- Taken to the Supreme Court and Declared a Vegetable. 1893. Nix vs. Hedden
- Declared a vegetable by USDA 1981!
- Tomato Seeds in Space 1984

Starting Transplants



Home Tomato Production

Choosing Transplants



Economical Hot Caps- The New Cloche



Tomato Trivia

- The tomato is a fruit-- Berry
- New World crop from Peru
- Grown by over 90% of Gardeners
- Grown by Thomas Jefferson at Monticello in 1781

Determinate Tomato Growth



- Determinate plants top out with flowers and quit growing.
- Indeterminate plants continue to set leaves and flowers.

Fruit Ripening

- **Fruit ripening is initiated by plant hormone called ethylene. C_2H_2**
- **Ripening starts at the blossom end and progresses to stem end.**
- **Fruit ripen best at 72-76 deg F**
- **Color, softening, and sugar/acid balance are independent but happen at same time.**

Fruit Ready to Ripen



Fruit Ripening – Genetic Manipulation

- Flavr- Savr Tomato
- Anti-sense ethylene gene
- Ethylene Generators

Spring Tomatoes



- 4 or 5 clusters of fruit
- 4 to 5 fruit per cluster
- Fruit will set until night temperatures are greater than 72 degrees

Fertilizing

- Preplant: 1 lb / 100 sq ft of a complete fertilizer (13-13-13).
- Transplanting: One cup of starter fertilizer solution per plant (1Tbs of 20-20-20 per gallon solution)
- After 1st cluster of fruit has set : Side dress each plant with 1 Tbs of a complete fertilizer (13-13-13). Repeat every 3 weeks.

Determinate Tomato Growth



- **Determinate plants top out with flowers and quit growing.**
- **Indeterminate plants continue to set leaves and flowers.**

Indeterminate Tomato Growth



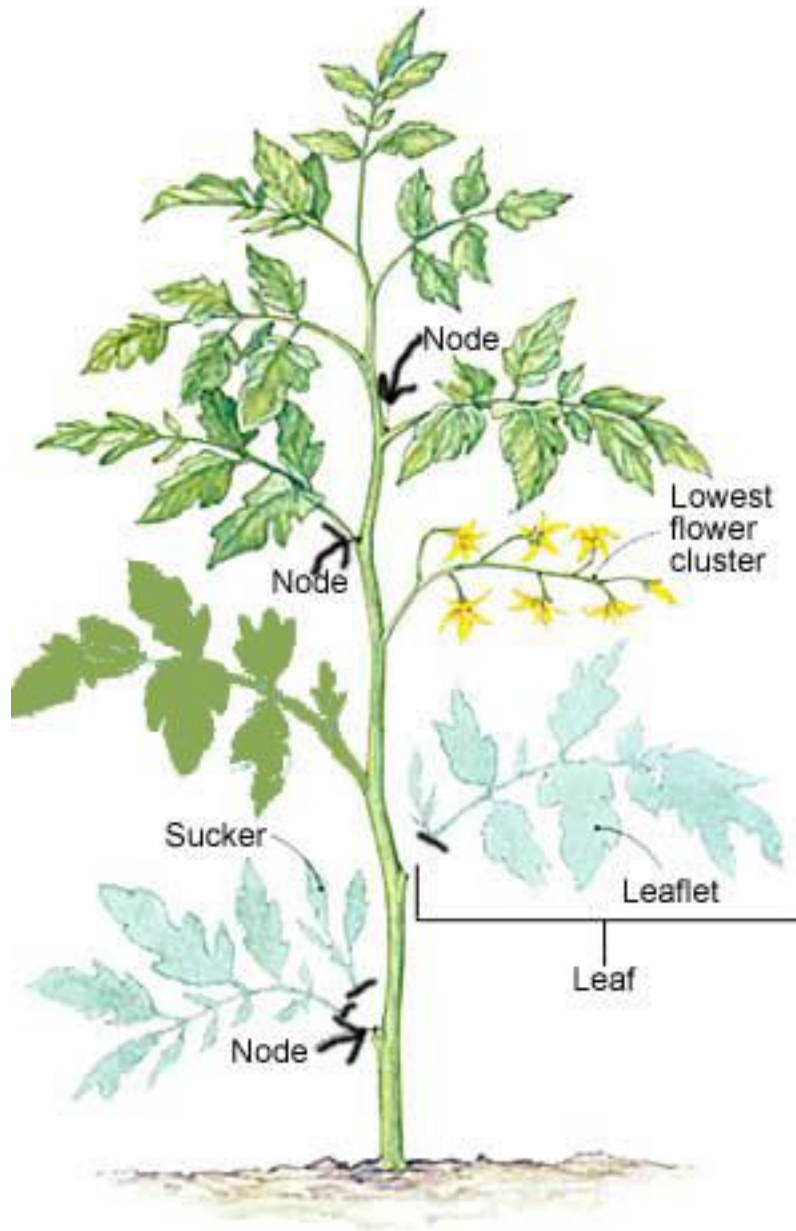
- Indeterminate plants keep growing.
- Indeterminate plants continue to set leaves and flowers.

Pruning Staked Tomatoes

Single Stem Plants

- Identify Axillary Shoots
- Pinch Them Out When They are 2" Long
- Do Not Pinch out Flowers
- Determinate Cultivars Need Less Pruning
- Indeterminate Cultivars Need Multiple Prunings

Pruning Tomatoes



Harvest

- Fruit forms at the base of flower
 - Cell division finished, fruit growth=cell growth
- Flower to ripe fruit: 2 months
- Pick when pink, ripen indoors
 - Out of sun
 - Best 70-75

Insects

Horn Worm

- Hawk Moth or Sphinx Moth
- Eats leaves quickly
- Use Dipel, Thuricide, Bt to control



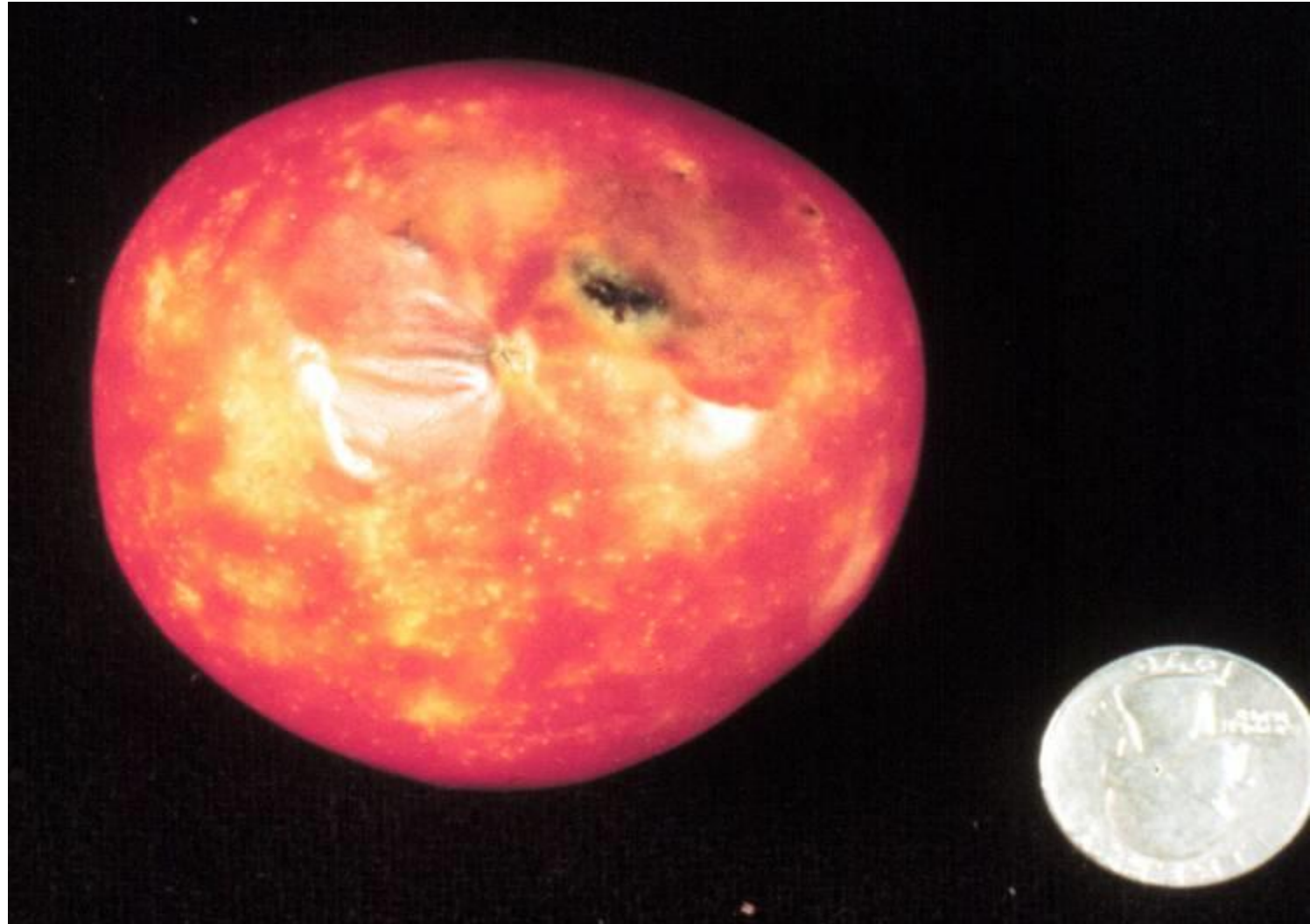
Tomato Fruit Worm



Moth lays egg at
top of plant,
larvae hatch,
move on to fruit

Spray
insecticide
weekly ex:
Sevin

Stink Bug Damage



Disease Control

- **Bacterial – Do not over use uncomposted organic material. Sawdust, litter . Use copper compounds as a bactericide.**
- **Fungal - Use Mulches to separate plants from soil. Use copper compounds. Use bicarbonate solutions on leaves. Use a fungicide such as Daconil.**
- **Virus - Resistant cultivars and sanitation**

Disease Codes

- V- Verticillium Wilt
- F- Fusarium Wilt
 - (FF- Races 1&2, FFF- Race 3)
- N- Nematodes
- Tobacco Mosaic Virus
- A- Alternai Stem Canker
- St- Stemphylium Gray Leaf Spot

Fusarium Wilt

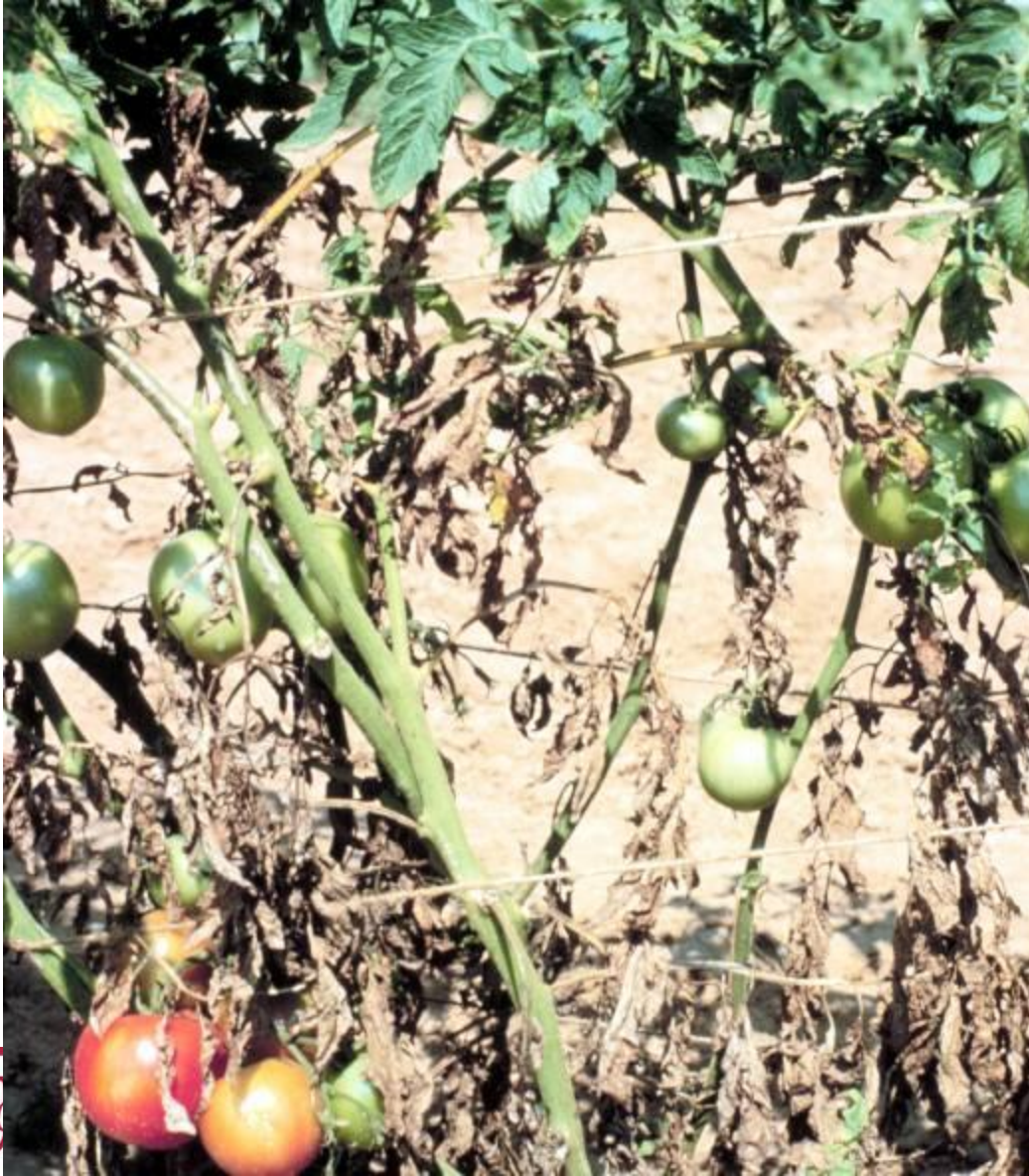
- Leaves yellow, wilt, then die
- Prevention: Resistant varieties



Grafting Tomatoes for Resistance



Septoria Leaf Spot



Early Blight



Curly Top Virus

- Beet leafhopper
- Leaf curling, stunting, chlorosis and purpling



Fruit Rot- Anthracnose



Physiological Disorders

Blossom End Rot



Magnesium Deficiency



Phosphorus Deficiency



Fruit Cracking



Cat Facing



- Cold damage

Leaf Roll



Excessive moisture or pruning

2-4 D or CMV



Home Tomato Production Types and Cultivars

- **Large Fruited or Salad Tomatoes**
- **Small Fruited or Cherry Tomatoes**
- **Processing , Plum and Saladette**
- **Specialty Types**

Abraham Lincoln

- 78 days
- 10 oz fruit
- Red round fruit
- Good yields
- Great flavor

Yields per plant :

Fayetteville 15.1 lb

Kibler 12.8 lb



Better Boy VFNASt

- 75 Days
- Indeterminate
- Heavy Foliage
- Widely adapted

Yields per plant :

Fayetteville lb

Kibler lb



Celebrity

VFFNTASt

- 70 Days
- AAS
- 7 oz globe shape
- Semi-Determinate plant

Yields per plant :

Fayetteville 11.3 lb

Kibler 15.5 lb



Mountain Spring VF

- 72 Days
- Cracking and BER resistance
- Determinate plant

Yields per plant :

Fayetteville 10.3 lb

Kibler 8.6 lb



Amelia

- 80 Days
- TSWV
- F3
- Crack tolerant
- Determinate
- SE USA



Dona VFFNT

- 65 days
- Deep red
- Excellent balanced flavor

Yield per plant :
Fayetteville 13.9 lb
Kibler 12.9 lb



Bradley

- Arkansas Variety
- 80 day
- Determinate
- 7 oz Pink
- Fusarium Wilt Resistance
- Prone to cracking
- Great flavor

Yield per plant :
Fayetteville 8.9 lb
Kibler 8.5 lb



Traveler 76

- Arkansas Variety
- 78 day
- 6 oz Pink
- Heat & Drought Resistant
- Less cracking than Bradley
- Great flavor
- BER Fayetteville



Dr. Tomato – Joe McFerren

Traveler 76



Ozark Pink

- Arkansas Variety
- 80 day
- 7 oz Pink
- Heat resistant
- Great flavor
- BER Fayetteville

Yield per plant :
Fayetteville 9.2 lb
Kibler 11.0 lb



Arkansas 7985

- Arkansas processor
- 2-3 oz round fruit
- Firm fruit
- Thick wall and skin
- Resistant to fruit rot
- Good flavor
- BER-Both



Amish Paste

- 74 days
- 8 oz meaty fruit
- Indeterminate plant





Original

F 3.3 lb/plant

K 8.5 lb/plant



Red Potato Leaf

F 2.5 lb/plant

K 9.3 lb/plant



Red Regular Leaf

F 5.8 lb/plant

K 12.2 lb/plant



Yellow

F 6.5 lb/plant

K 5.8 lb/plant

Brandywine

S

- 90- 100 days
- over 1 lb
- 'Best flavor'
- Potato or regular vines
- Original - pink (red, yellow, black)
- Cracks, catfacing, irregular shape

Persimmon

- 80 days
- 1-2 lb fruit
- Few flaws in fruit
- Big, tall plants
- Heavy yields
- Meaty fruit
- Excellent flavor



Green Zebra

- 75 days
- 3 oz striped fruit
- Green flesh
- Plants have good cover
- Great tangy flavor
- BER -Both



Cherokee Purple

- 90 days
- 10 oz fruit
- Purple skin
- Red flesh
- Cracking
- Green shoulders



Sweet 100

- 65 Days
- 1" Cherry fruit
- Indeterminate



Juliet

- 60 Days
- AAS
- Large grape
- Indeterminate plant



Grape

- 60 Days
- Elongated cherry
- Heat tolerant
- Crack resistant



Tomatoes in the Future

- From past to the future
- Gaius Plinius Secundus 0077
- Stephen Hawking 2007