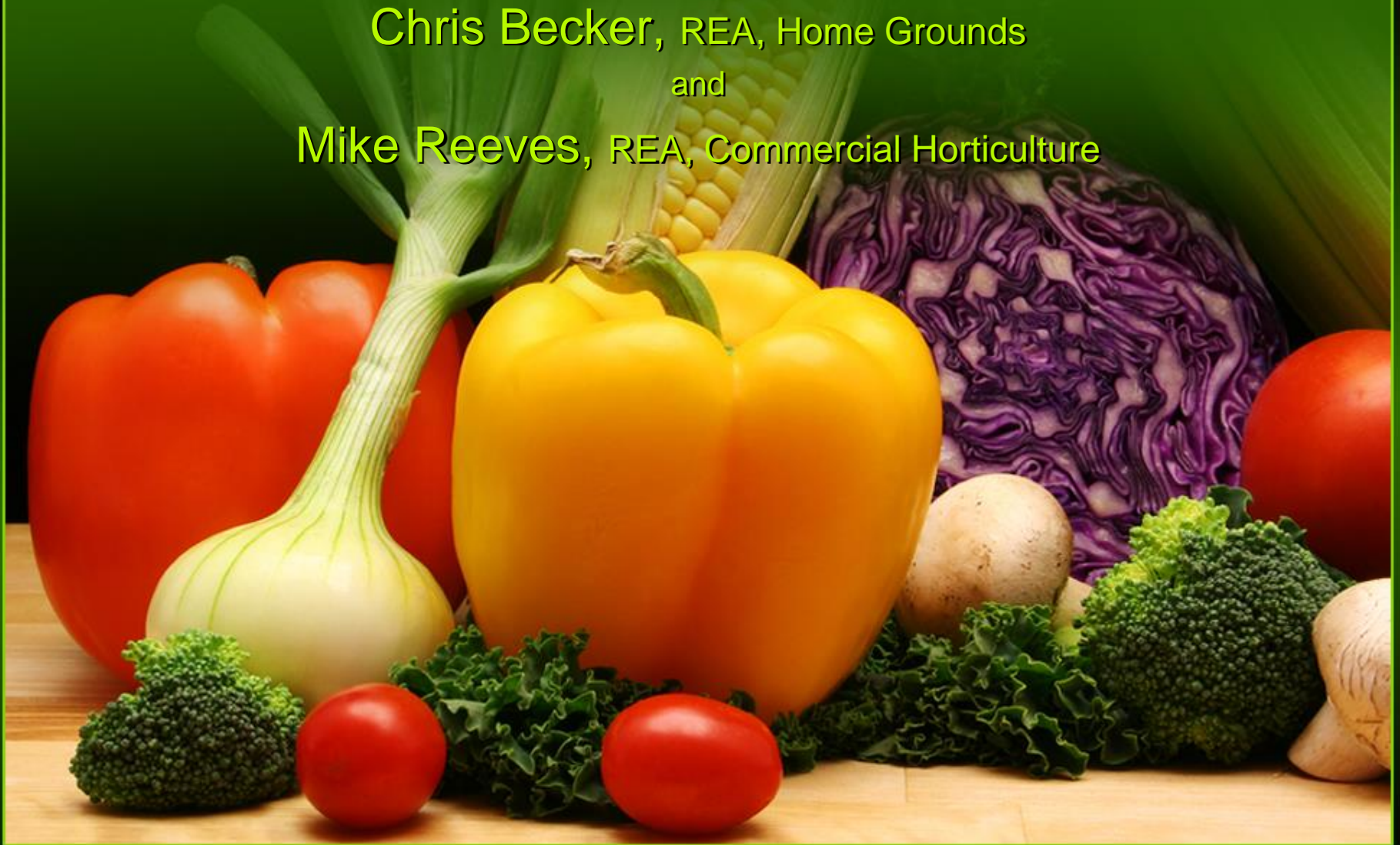


Home Vegetable Gardening

Chris Becker, REA, Home Grounds

and

Mike Reeves, REA, Commercial Horticulture



Why Do We Grow Gardens

- Fresh source of vegetables to eat and enjoy
- Pesticide and nutrient application is known
- Provides a great source of exercise
- Gardening is therapeutic
- Sense of achievement
- Ability to preserve

Planning a Garden

- How many people will you feed?
- Where will the garden be located?
- How big will the garden be?
- Will it be a raised garden ?
- What will you grow?
- What are the soil requirements?

Garden Size

Under ideal care and management, including irrigation, a minimum of 1,000 square feet of garden space per person should be adequate.

That is a space about
20' x 50'

Do allow enough space to practice crop rotation. This prevents any one plant family from being grown in the same location more than one year.



Site Selection

When selecting your garden site, there are several factors that need to be addressed.

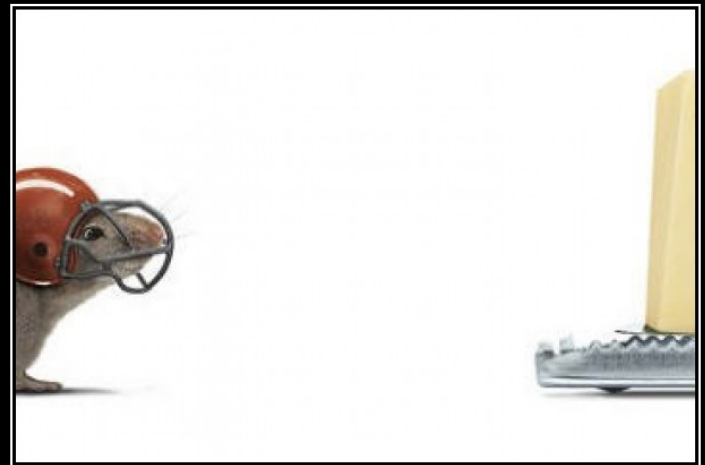
- Sun requirements
- Competing plants
- Convenience
- Irrigation source
- Well drained soil



Is this a good garden site?

Preparation

- Soil test kit
- Well drained soil
- Soil composition
- Soil amendments and organic matter
- Cultivating, tilling
- Spacing



PREPARATION

"By failing to prepare you are preparing to fail."
Benjamin Franklin

Soil Preparation

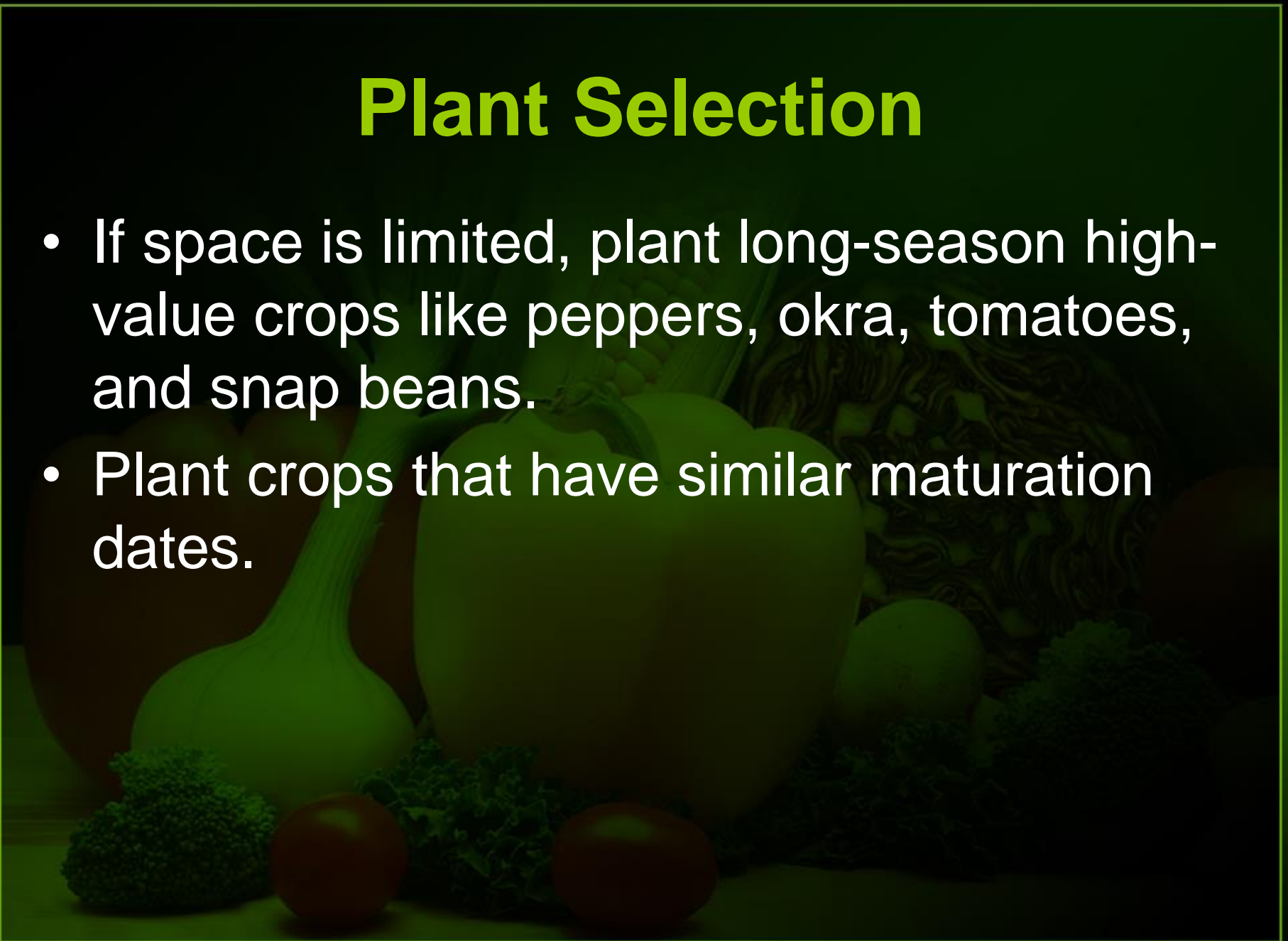
- Well Drained - Dig a small hole 8"x 8" and fill with water, it should drain at least an inch an hour. A well drained soil will be $\frac{1}{2}$ soil and $\frac{1}{2}$ airspace, with 2-4% organic matter.
- Amendments - compost, leaf mold, grass clippings, and manure. Make sure that the materials are well decomposed. (fresh compost may steal nutrients) Increases aeration, water penetration, moisture holding capacity, source of nutrients.

Soil Preparation

- Cultivating or tilling the soil should be done to help incorporate nutrients and amendments into the soil. The soil should be broken up approximately 8 inches deep into the plow layer. Let the garden sit through one good rain to allow the seed bed to settle and firm the soil.

Plant Selection

- If space is limited, plant long-season high-value crops like peppers, okra, tomatoes, and snap beans.
- Plant crops that have similar maturation dates.



Plant Families



Nightshade Family

- Pepper
- Tomato
- Potato
- Eggplant

Mustard Family

- Cabbage
- Cauliflower
- Broccoli
- Brussels sprouts
- Turnips
- Radish

Plant Families



Squash Family

- Squash
- Cucumber
- Melons
- Pumpkins
- Zucchini

Legume Family

- Beans
- Peas
- Cowpea
- Peanut

Plant Families

A collection of fresh vegetables including onions, leeks, chives, garlic, and tomatoes. The background is a dark, textured pattern.

Grass Family

- Corn
- Wheat
- Rice
- Sorghum
- Millet

Lily Family

- Asparagus
- Onions
- Leeks
- Chives
- Garlic

Plant Families



Carrot Family

- Carrots
- Celery
- Dill
- Cilantro
- Parsley

Aster Family

- Lettuce
- Artichoke
- Tarragon
- Chamomile
- Sunflower

So Why Did We Just Go Through All That?

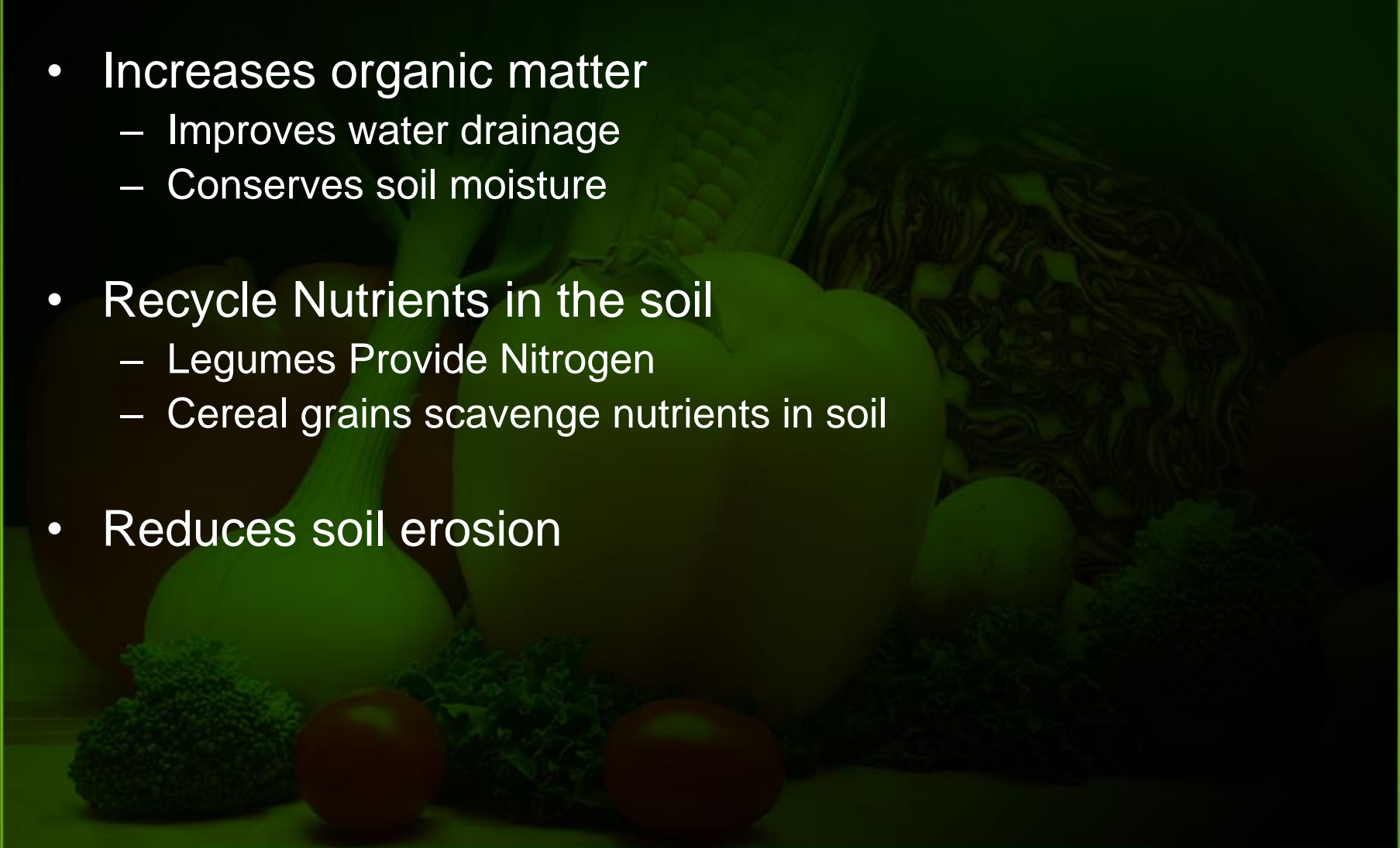
- Crop rotation - rotating crops of a different family in the garden as to help manage and control disease outbreaks. Rotating crops on a yearly basis is recommended.
- This year grow tomatoes, peppers, potatoes in one area of the garden. Next year grow those plants in another area of the garden.

Cover Crops



Benefits of Cover Crops...

- Increases organic matter
 - Improves water drainage
 - Conserves soil moisture
- Recycle Nutrients in the soil
 - Legumes Provide Nitrogen
 - Cereal grains scavenge nutrients in soil
- Reduces soil erosion



Attributes of a Good Cover Crop

- Biomass production
- Produce Nitrogen
- Drought Tolerant
- Not Invasive
- Disease suppression
- Nematode suppression
- Weed Suppression (Alleopathy)

Attributes of a Good Cover Crop



Beneficial Habitat





Winter Cover Crops

- Cereal Grains

 - Rye

 - Wheat

- Legumes

 - Crimson Clover

 - Hairy Vetch

 - Aust. Winter Pea

- Others

 - Canola/Rape

 - Radish

- Mixes

 - Rye, Vetch, Clover

 - Canola/Clover



Rye
Planting Date Sept-Nov
Seeding Rate 100 lbs/ac

23 40'



Crimson Clover

Planting Date Sept-Nov

Seeding Rate 20-40 lbs/ac

Inoculant-clover



Mixture: Rye 50lbs/ac
Legume 20-25 lbs/ac
Planting Date Sept-Nov

Schedule for planting fall cover crops followed by vegetables

- Plant fall cover crops Sept-Nov
- Terminate fall cover crops Mar-Apr
- Plant summer cash crop Late Mar-July

Summer Cover Crops

- Grasses

Sudan/Sudex Sorghum

Pearl/Foxtail Millet

- Legumes

Iron Clay Pea

Velvet Bean

Soy Bean

SunHemp

- Others

Sunflower

Buckwheat

- Mixes

Iron Clay Pea/Sunflower

Grasses or Corn/Velvet

Bean



Iron/Clay Pea

Planting Date Late April/June

Seeding Rate 40-75 lbs/ac

Mixtures: Many Combinations
Planting Date April-June



Schedule for planting summer cover crops and fall vegetable crops

- Plant summer cover crops Apr-Early June
- Terminate summer cover crops late July-Aug
- Plant fall cash crop Aug-Sept
 - Or...plant a winter cover crop.

Cover Crops

- Cover crops increase organic matter
- Legumes provide additional nitrogen
 - Recommended nitrogen rate may be reduced
- Cover crops conserve soil moisture
- Cover crops reduce erosion
- Suppresses Weeds
- Breaks disease, insect, and nematode life cycles

Variety Selection

- Select vegetable varieties that are adapted to your area.
- Disease/Insect resistance or tolerance.
- Consider the life of the produce, (canning tomatoes, salads, sandwiches, etc).
- Consult other gardeners
- Keep a journal
- Consult seed catalogs
- Early production vs. late production

Planting Dates

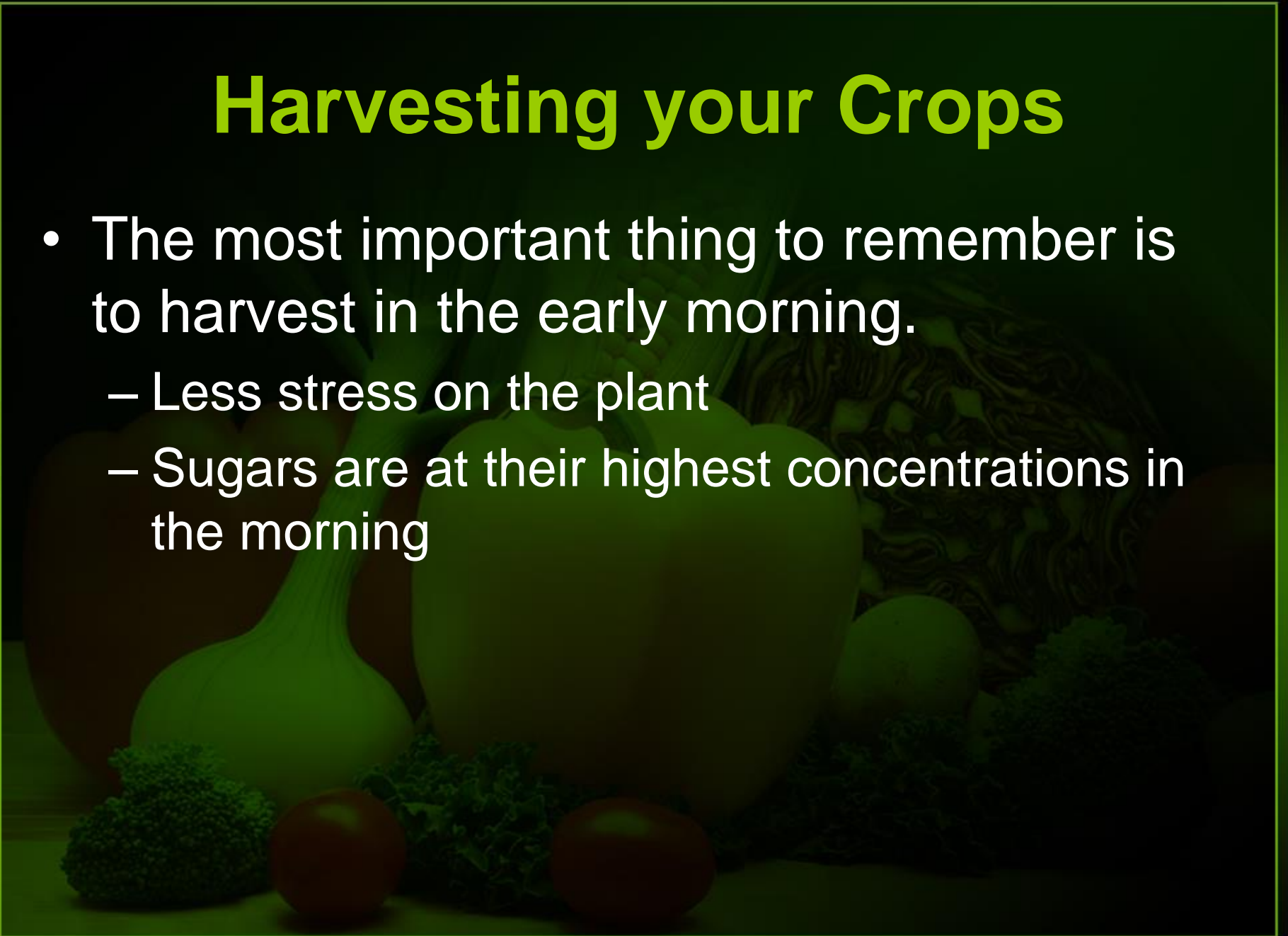
- Cool-season crops are generally:
 - hardy, frost-tolerant
 - seeds germinate at cooler soil temperatures
 - see ANR-1061 for optimal soil temperatures
 - shallower root systems
 - plant size is smaller
 - fruit/product can be stored at or near 32°F

Planting Dates

- Warm season crops
 - Tender warm season crops
 - beans, sweet corn, tomatoes
 - Very tender warm season crops
 - okra, cantaloupe, super-sweet corn
 - Soil temperature needs to be near 70 degrees.
- Some crops will grow in fall
 - Ex.- broccoli, collards
- Reference Publication ANR-63

Harvesting your Crops

- The most important thing to remember is to harvest in the early morning.
 - Less stress on the plant
 - Sugars are at their highest concentrations in the morning



Planting



Planting

- Space plants according to their spacing requirements
- Some vegetables may need more space than others
- If you allow too much space, some vegetables will get too large (sweet potatoes, cabbage)
- Use a planting line
 - optimize space in small gardens
 - looks neater

Planting

Warm Season

- cowpea
- bell, sweet, hot pepper
- tomato, eggplant
- cucumber, watermelon, cantaloupe, pumpkin
- winter squash
- okra, sweet potato
- snap bean, lima bean

Cool Season

- asparagus
- broccoli, cauliflower
- Brussels sprouts
- cabbage
- collards, turnips, mustard
- English pea
- radish, beet, carrot, onion
- garlic, chives, Irish potato

Refer to publication ANR-47 Alabama Gardeners Calendar for help with planning your garden

Planting Seeds

- The actual depth depends on the soil type and moisture content.
- In sandy soils where moisture could be a limiting factor, seeds should be planted on the deeper side.
- In clay soils where adequate moisture is available, they should be planted on the shallow side.

Planting Seeds

- Don't sow seeds thickly
- Small seeds
 - carrots, turnips, cabbage
 - 1/4 to 1/2 inch deep
- Large seeds
 - beans, corn, peas
 - 1-2 inches deep
- Rule of Thumb
 - planting depth equivalent to 2 to 3x's seeds diameter



Planting Transplants

- Best to plant just a bit deeper than root ball, expose stem to soil
- Water to settle roots
- Use starter solution
- Use proper spacing
 - too close reduce yields or small fruit size
 - waste space/weed problems

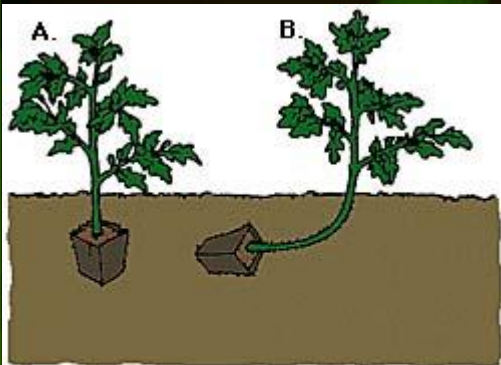


Fig. 2. Plant tomatoes slightly deeper than they were first growing (A). If plants are leggy, set them as shown (B).



Planting Transplants



Easy-Moderate

- tomato
- eggplant
- pepper
- broccoli
- Brussels sprouts
- lettuce
- onion

Difficult

- cucumber
- watermelon
- cantaloupe
- summer squash
- Irish potato
- sweet corn

Fertilization and Liming



Beverly Hills Manure Co.
#1 in the #2 business



Fertilization



- Plants require sixteen nutrients to live and thrive.
- The nutrients are broken down into two categories.
- The categories are macro and micronutrients.

Macronutrients

- Essential nutrients that are required in larger quantities than the micronutrients.
- Nutrients from atmosphere – C, H, O
- Primary macronutrients – N, P, K
- Secondary macronutrients – Ca, Mg, and S

Micronutrients

- Essential nutrients that are required in smaller quantities than the macronutrients.
- Cl, Fe, B, Mn, Zn, Cu, and Mo
- Neither is more important than the other, only needed in different quantities

Macronutrients

Nitrogen

- Necessary part of all proteins, enzymes and metabolic processes involved in the synthesis and transfer of energy.
- Part of chlorophyll, green pigment responsible for photosynthesis.
- Helps plants with rapid growth, increasing seed and fruit production and improving the quality of leaf and forage crops.

Phosphorus

- Essential part of the process of photosynthesis.
- Involved in the formation of all oils, sugars, starches, etc.
- Effects rapid growth.
- Encourages blooming and root growth.

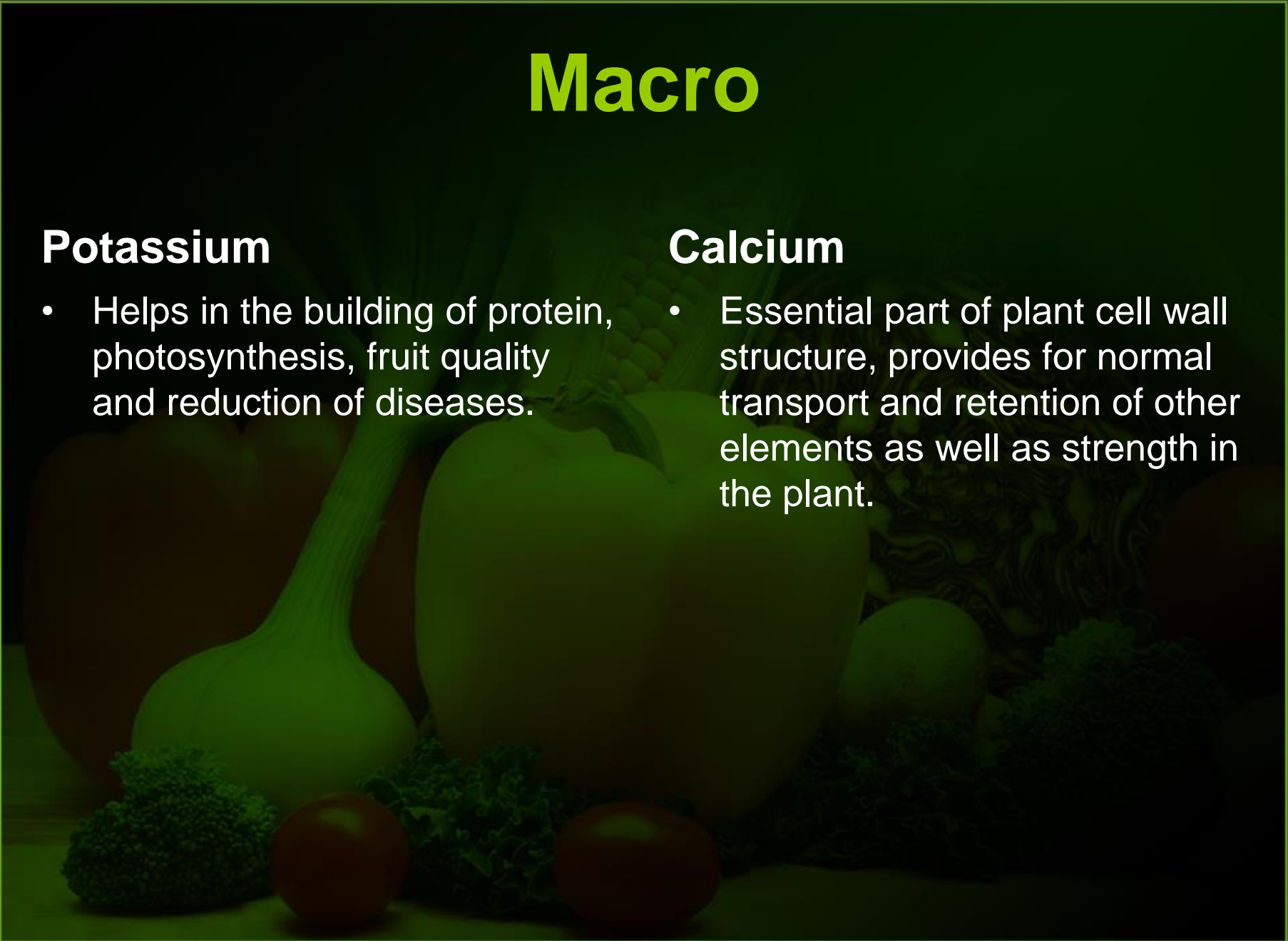
Macro

Potassium

- Helps in the building of protein, photosynthesis, fruit quality and reduction of diseases.

Calcium

- Essential part of plant cell wall structure, provides for normal transport and retention of other elements as well as strength in the plant.



Macro

Magnesium

- Part of the chlorophyll in all green plants and essential for photosynthesis.
- Helps activate many plant enzymes needed for growth.

Sulfur

- Promotes activity and development of enzymes and vitamins
- Improves root growth and seed production.
- Helps with vigorous plant growth and resistance to cold.

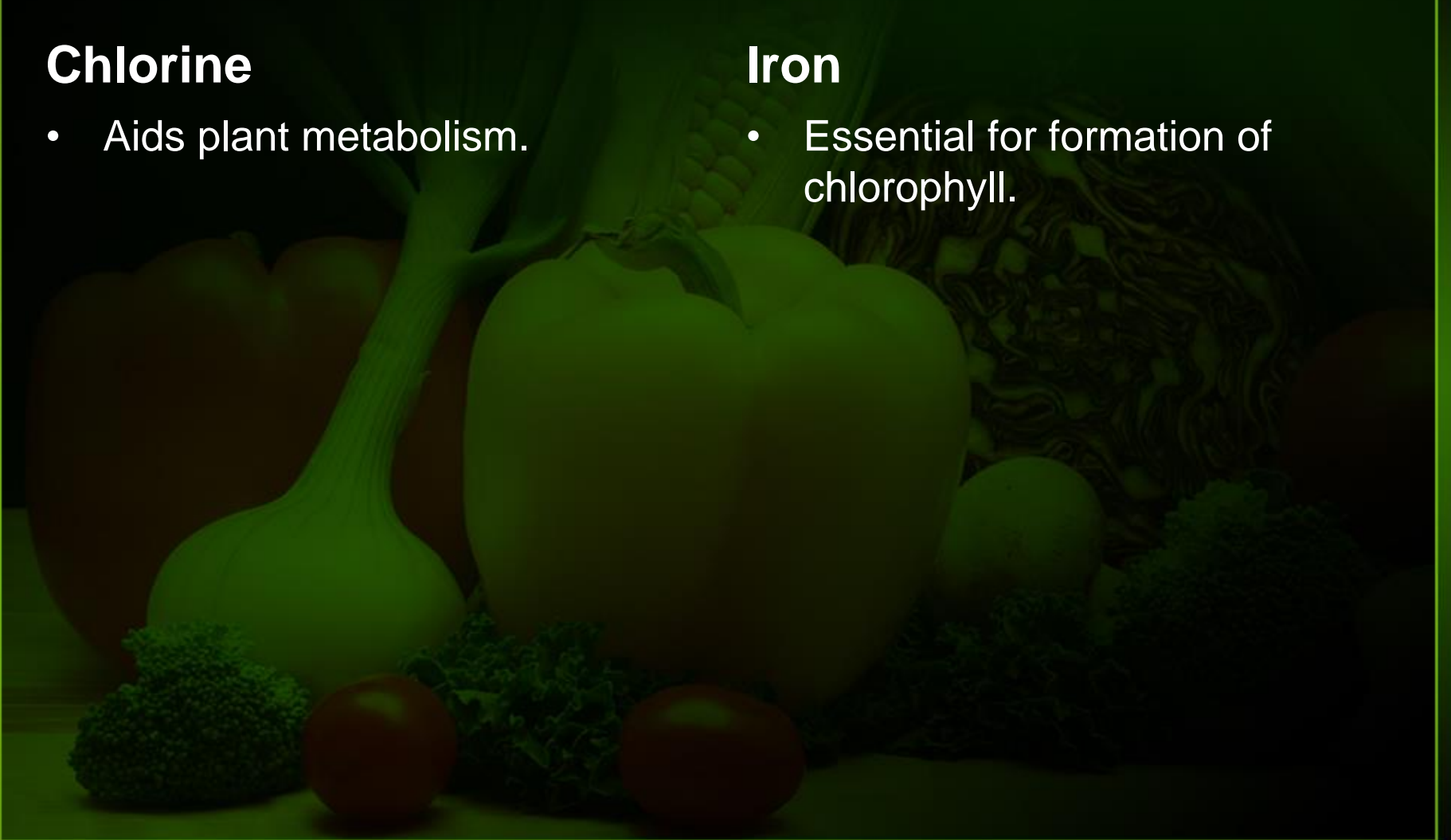
Micro

Chlorine

- Aids plant metabolism.

Iron

- Essential for formation of chlorophyll.



Micro



Boron

- Helps in the use of nutrients and regulates other nutrients.
- Aids production of sugar and carbohydrates.
- Essential for seed and fruit development.

Manganese

- Functions with enzyme systems involved in breakdown of carbohydrates, and nitrogen metabolism.

Micro



Zinc

- Essential for the transformation of carbohydrates.
- Regulates consumption of sugars.
- Part of the enzyme systems which regulate plant growth.

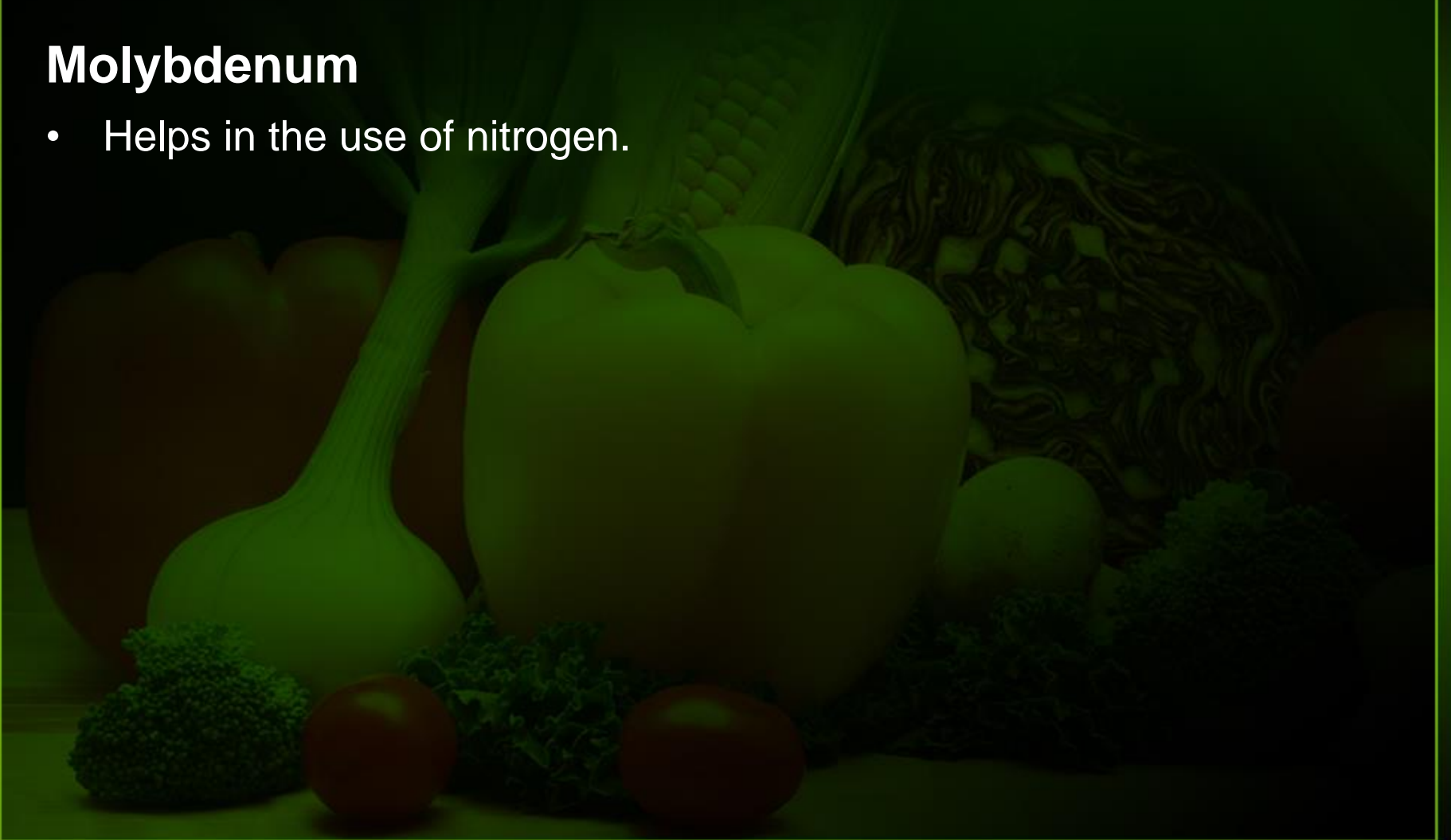
Copper

- Important for reproductive growth.
- Aids in root metabolism and helps in the utilization of proteins.

Micro

Molybdenum

- Helps in the use of nitrogen.



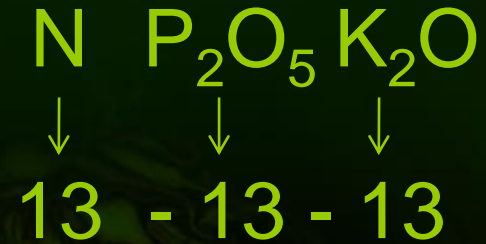
Impress your friends and neighbors with your Master Gardener knowledge!

- Know the 16 essential elements for plant growth
- C HOPKNS CaFe Mg B Mn CuZn MoCl



Fertilization

- 13-13-13
- 15-0-15
- 34-0-0 (ammonium nitrate)
- 0-0-60 (muriate of potash)
- 0-45-0 (superphosphate)
- 16-0-0 (sodium nitrate)
- 13-0-44 (potassium nitrate)
- 15-0-0-15%Ca (calcium nitrate)



rapitest[®] Soil Test Kit



VERY IMPORTANT!!!!!!

Always soil test prior to adding fertilizer or lime.
Prevents wasting time, money, excess chemicals,
and prevents pollution.

SOIL TEST RESULTS

LAB No.	Sender's Sample Designation	Crop	Soil Group*	pH**
09693	Lawn	Zoysia	3	6.8
Recommendations for Zoysia:				
Ground Agricultural Limestone = 0.0 tons/acre				
Fertilizer N-P ₂ O ₅ -K ₂ O = 80-0-0 pounds/acre				
Lab Result				
Soil pH = 6.8				
Phosphorus***	P = 86 lb/acre	Potassium	K = 392 lb/acre	
Potassium***	K = 392 lb/acre	Magnesium	Mg = 289 lb/acre	
Magnesium***	Mg = 289 lb/acre	Calcium	Ca = 3307 lb/acre	
Calcium***	Ca = 3307 lb/acre			
See Comment 1				
See Comment 2				
Method of Analysis = Mehlich-1				

Comment No.1: Per 1,000 sq. ft. apply 1 pound N (3 pounds 34-0-0 or equivalent) when spring growth begins and repeat in mid-summer. If more growth or better color is desired make additional applications of 1 pound N at 2 month intervals. A pint of dry fertilizer is approximately 1 pound.

Comment No.2: Final remark - For small areas, comments give examples of ways to meet the fertilizer recommendations. Other fertilizer grades or materials that supply equivalent amounts of plant nutrients may be used with equal results. If you need assistance in calculating amounts of other materials to use, contact your county agent or fertilizer supplier. A pint of dry fertilizer is approximately 1 pound.

The number of samples processed in this report is: 1

* 1. Sandy soil (CEC < 4.6 cmol_ckg⁻¹)

* 2. Loams and Light clays (CEC = 4.6-9.0 cmol_ckg⁻¹)

** 7.4 or higher - Alkaline ----- 6.6-7.3 - Neutral ----- 6.5 or lower - Acid ----- -5.5 or lower - Strong Acid

*** Extractable nutrients in pounds per acre

If soil group = 1, 2 or 3, Method of Analysis = Mehlich-1. If soil group = 4, Method of Analysis = Miss/Lancaster.

* 3. Clays and soils high in organic matter (CEC > 9.0 cmol_ckg⁻¹)

* 4. Clays of the Blackbelt (CEC > 9.0 cmol_ckg⁻¹)

Fertilization

- pH - numerical measure of the acidity or alkalinity of a solution, measured on a scale of 0 to 14. Neutral solutions (such as pure water) have a pH of 7, acidic solutions have a pH lower than 7, and alkaline solutions have a pH higher than 7.
- The pH of the soil can determine several factors affecting plant growth such as:
 - Availability of macronutrients decreases in low pH soils.
 - Availability of micronutrients decreases in high pH soils.
 - Below 5.5 manganese and aluminum can become toxic
 - Poor bacterial growth

Fertilization

- The pH of the soil can be altered up or down by adding particular materials.
- To increase pH add lime to the soil. Reduces harmful effects of low pH. Changes some of the hydrogen ions into water and CO_2 . Amount of lime needed varies with soil type. Clays and organic soils require more lime.
- To lower pH add an acidifying agent to the soil such as ammonia sulfate, sulfur coated urea or sulfur.

Organic Fertilizer

- Advantages:
 - slow-release N source
 - improve soil by adding organic matter
- Disadvantages:
 - requires large quantities
 - Horse manure analysis - 1.7-0.7-1.8
 - risk high P levels and groundwater contamination



Fertilizers

Manure Type	Nitrogen (N)	Phosphorus (P_2O_5)	Potassium (K_2O)	Calcium (Ca)	Organic matter %	Water content %
Undried						
Cattle	0.5	0.3	0.5	0.3	17	80
Sheep	0.9	0.5	0.8	0.2	17	65
Poultry	0.9	0.5	0.8	0.4	30	65
Horse	0.5	0.3	0.6	0.3	27	69
Swine	0.6	0.5	0.4	0.2	16	78
Dried						
Cattle	2.0	1.5	2.2	2.9	70	8
Sheep	1.9	1.4	2.9	3.3	54	11
Poultry	4.5	2.7	1.4	2.9	59	9

In 100 lbs of fresh cattle manure there is 0.5 lbs of available N.

Fertilizers

Material	N %	P ₂ O ₅ %	K ₂ O %	Other Nutrients	Relative availability of nutrients
Rock Phosphate	0	25	0	25% Ca	Slow
Greensand ocean deposit	0	0	9		Slow
Alfalfa pellets	3	0.5	3		Slow
Bone meal	2	15	0	20% Ca	Slow
Fish emulsion	4	2	2	1% Ca	Fast
Blood meal	13	0	0		Slow
Wood ashes	0	2	5	20% Ca	Fast
Soybean meal	7	2	2		Medium
Cottonseed meal	7	2	2		Slow
Compost	1.5	1	1.5	2% Ca	Slow
Epsom salts	0	0	0	10% Mg	Fast
Gypsum	0	0	0	22% Ca 16% S	Medium
Corn gluten	9.5	0.5	0.5		Medium

Maintaining Soil Fertility

Crop Rotation – Alternating plantings each year between heavy feeders and soil-building crops, (legumes), and light feeders (root crops).

Cover Crops – Grow crops during the off-season that are not harvested, but are composted or tilled in. Winter rye, hairy vetch, crimson clover, and winter wheat.

Composting – Breaking down organic material. Only difference is N source.

Feed the soil with organic matter and the soil will feed your plants. Instead of feeding with synthetic fertilizers.

DONT WORRY.
IT'S ALL
NATURAL!



Manures

In ideal situations manure should be applied to gardens when it has been composted.

If fresh manure is going to be used, it should be applied the fall before planting and incorporated into the soil.

If fresh manure is to be used it should be incorporated into the soil 60 days before harvesting any crop that will be consumed without cooking.

Side-Dressing

Sprinkle 1 tablespoon of ammonium nitrate in an 8-inch circle around the base of each plant after the first fruit is about 1½ inches in diameter. Repeat this application at 4- to 6-week intervals as needed to maintain a modest growth rate.

Too much nitrogen before the first fruit is set often results in excessive vine growth and blossom drop.

10 Insects that cause damage in vegetables

- Aphids
- Colorado Potato Beetle
- Corn Earworm
- Cucumber Beetle
- Japanese Beetle
- Spider Mites
- Squash Vine Borers
- Thrips
- Cabbageworms, diamondback moths
- Stink bugs, squash bugs

Squash bug



What is IPM?

- Integrated pest management (IPM) is a threshold based decision management system which leads to judicious use of multiple pest control tactics.”
- IPM is currently insecticide-intensive...
- Major losses occur due to:
 - *Lack of early detection of insects*
 - *Insecticide resistance by misuse*
 - *Loss of natural control with insecticides*

Major Insect Pests – Research Plots



Tomato fruitworm,
Helicoverpa zea



Colorado potato beetle
Leptinotarsa decemlineata



Grasshopper

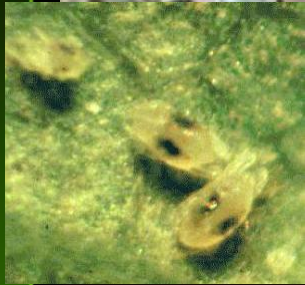


Tomato hornworm, *Manduca*
quinquemaculata

Major Insect Pests – Research Plots



Spider mites
(*Tetranychus* sp.)



Beet armyworm, *Spodoptera exigua*



Fall armyworm, *Spodoptera frugiperda*



Yellowstriped armyworm,
Spodoptera ornithogalli

**Striped
Cucumber
Beetle**



**Spotted
Cucumber
Beetle**

Squash vine borer



Sucking insect pests of vegetables



Brown stink bug
(Euschistus servus)

Bugguide.net



Southern green stink
(Nezara viridula)



Predatory stink bug

Stink Bug Fruit Damage

Fruit Exterior



Fruit Interior



Emerging Pest on Vegetables: Leaffooted Bugs



Leptoglossus phyllopus



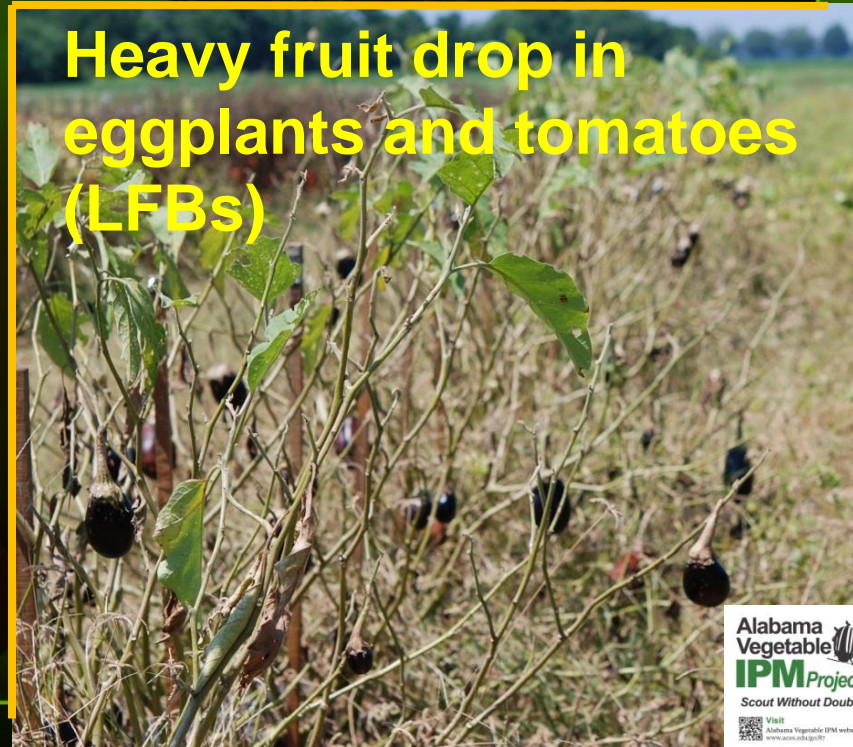
Leptoglossus gonagra



*Leptoglossus
zonatus*



Heavy fruit drop in
eggplants and tomatoes
(LFBs)



LFBs can destroy produce rapidly



Feeding injury: Uneven ripening, green islands, corky tissue formation, fruit drop

Result: Yield & quality loss, poor keeping quality off-flavored, and misshapen fruits

Spider mites



- Major pest of open field & high tunnel crops
- Extensive webbing on leaves/stems
- Rapid buildup in hot dry weather
- Difficult to control with approved pesticides

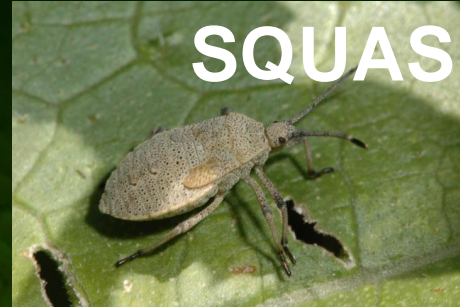
Major focus in 2013 research – Squash Insect Pests

SQUASH VINE BORER



Prefer cucumber, squash, gourd.
Larvae overwinter in soil.
Females lay 150-200 eggs singly.
Moths are clear-winged.
Row covers & field sanitation

SQUASH BUGS



Both adults & nymphs
feed. Overwinter as adults.
Eggs laid in masses.
Heavy feeding causes
sudden wilting of squash.
Remove crop debris
promptly.

Emerging Crop Pests: Invasive Insects



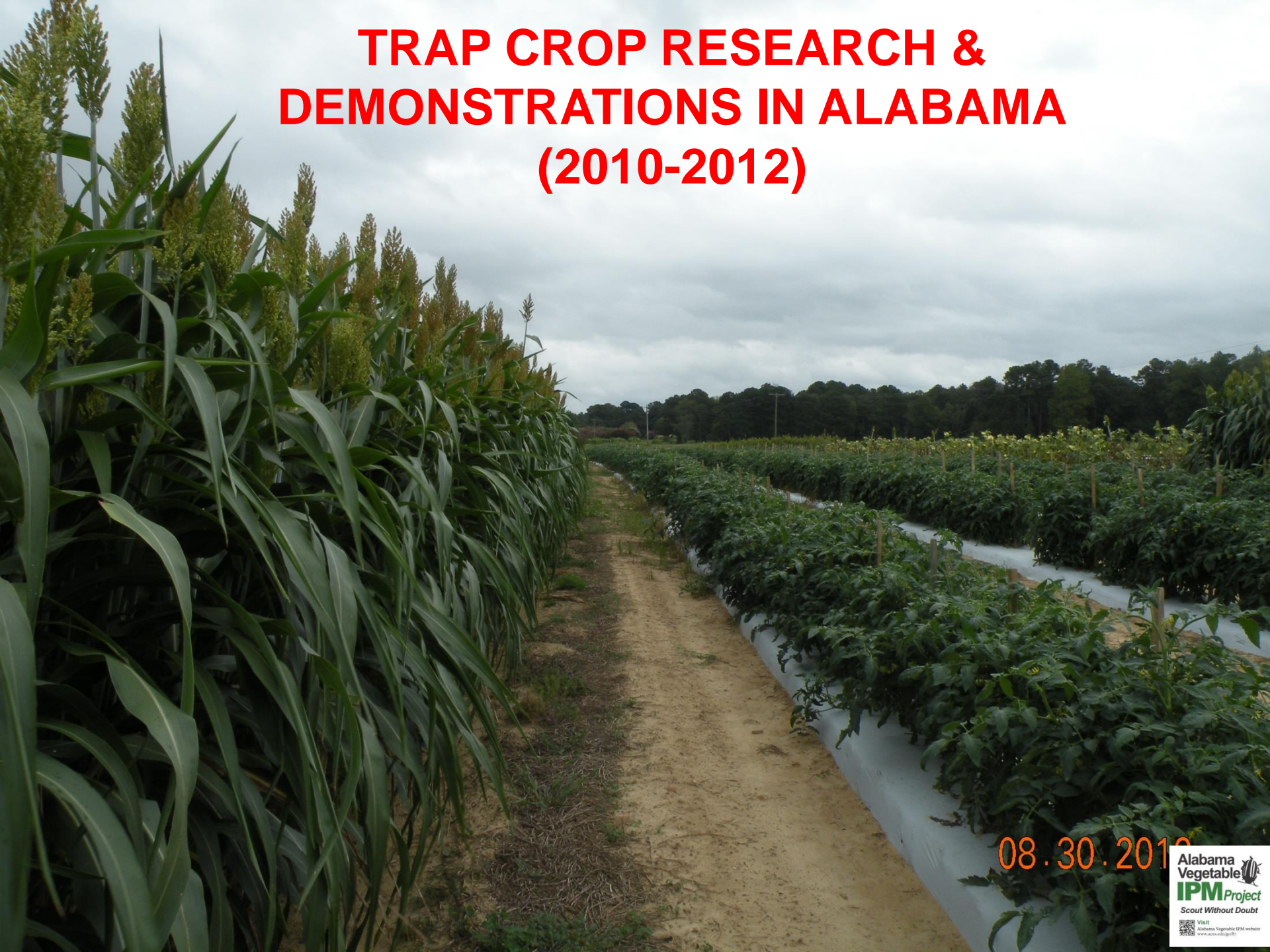
Steven Jacobs PSU

Brown
marmorated
stink bug,
*Hyalomorpha
halys*

Bean plataspid, *Megacopta cribraria*
Detected in AL in 2010
Seeks shelter in homes
Infests kudzu, soybean, kidney beans,
lima beans, etc.

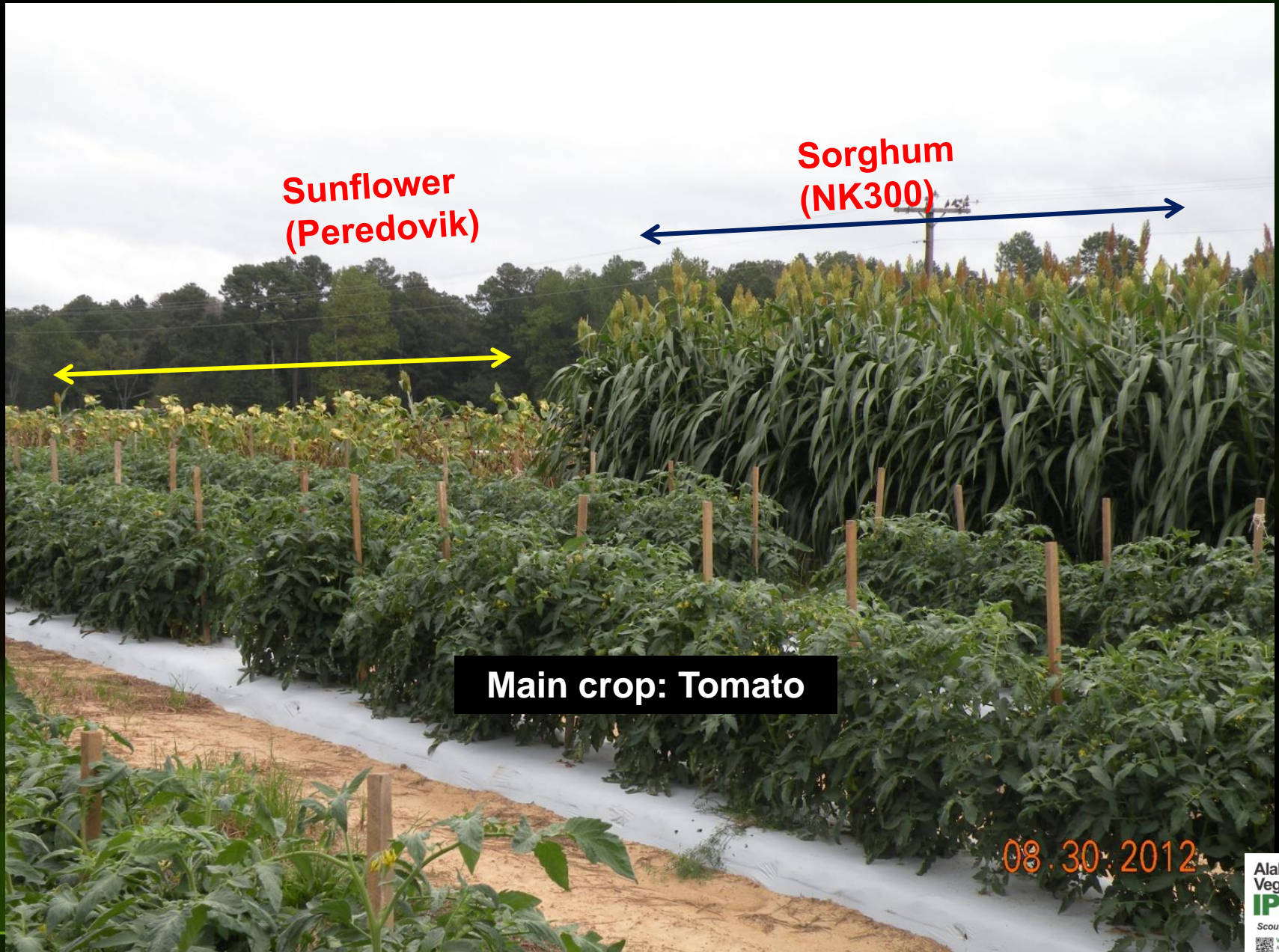
UGA Photos

TRAP CROP RESEARCH & DEMONSTRATIONS IN ALABAMA (2010-2012)



08.30.2012


Perimeter trap crop study (Cullman, AL, 2012)



Alabama Vegetable Extension IPM Website



ALABAMA COOPERATIVE
Extension
SYSTEM
Alabama A&M and Auburn Universities




Commercial Horticulture

Site Actions  Browse Page Sign In

Vegetable

Commercial Horticulture Comm Hort Blog **Vegetable** sites.aces.edu  

[Vegetable Images](#)
[Conference Pictures](#)

 All Site Content

INSECT PESTS OF VEGETABLES



Vegetable IPM resources:

- [Pest identification and scouting techniques](#)
- [Pest management research](#)
- [IPM Factsheets](#)
- [IPM Communicator Newsletter](#) (statewide)
- [Extension Presentations](#) (by Dr. A)
- [Annual IPM Web Conferences](#)
- [Extension Tech. Web Conference](#) (for Ext. Educators)

For organic vegetable producers (commercial & home grounds):

Extension resources: [eOrganic](#) (eXtension channel for organic producers)

[Content Editor Web Part \[4\]](#)

Welcome to Dr. A's Vegetable Entomology Site

This website is part of the IPM-CORE or the Integrated Pest Management Communication REsources project funded by federal and state grants. IPM-CORE is designed to be reached to thousands of Alabama vegetable producers through the synchronized use of modern communication channels in order to provide momentum to the increase the adoption of IPM and sustainable agriculture practices in the state. IPM-CORE aims to benefit the conventional as well as the organic/transitioning vegetable producers.

Site development: Dr. Avayana Maiumdar (Dr. A)

www.aces.edu/go/87

Join Vegetable IPM on Facebook!

Alabama Vegetable IPM Project
Scout Without Doubt

Visit
Alabama Vegetable IPM website
www.aces.edu/gip/

Alabama Vegetable IPM
202 likes · 17 talking about this

Government Organization
The goal of this page is to provide integrated pest management updates to vegetable producers, gardeners, and crop advisors.

About Photos Likes Videos

Highlights =

Status Photo / Video Event, Milestone +

Write something...

Alabama Vegetable IPM added 5 photos to the album Insect Pest Identification & Management.
51 minutes ago

43 Friends
Like Alabama Vegetable IPM

Recent Posts by Others on Alabama Vegetable IPM

North Alabama Smart Yards
Check out the North Alabama Smart Yards Extension Page fo...
July 26 at 12:14pm

Good Food Project
<http://www.southernshare.org/News-and-Media/Press-Rel...>
July 12 at 10:49am

Advantages: Live updates, interact with researchers, videos and photos, IPM contest

The IPM Communicator (A FREE electronic newsletter)



ABOUT THE NEWSLETTER
 Welcome to Alabama Cooperative Extension System (ACES). The main purpose of this newsletter is to provide readers information about IPM and other major crop issues through a single publication. ALL articles that promote IPM and sustainable farming practices can be published in the IPM Communicator. Currently, there are about 400 subscribers and many commercial websites receive or post this newsletter online resulting in a wide readership. Other readers can download or view the newsletter at ACES website (www.aces.edu/ip128). There is a multi-institutional editorial board that works TWICE every FRIDAY during the summer months. Research and Extension personnel from any educational institution in Alabama can submit IPM-related articles of high relevance for immediate release to the audience; authors should pay attention to the guidelines for format and submission deadlines (Wednesday of each week). Readers from other states should check with their university Extension personnel for any recommendations. To subscribe, please email bugdoctor@auburn.edu. Once your name is added to the list, you will get a welcome message from the IPM COMM Library.

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 Henry Fadamiro - Associate Professor, Alabama IPM Coordinator, Auburn Univ.
 Pathology Department, Auburn Univ.
 Altonne Pathology Department, Auburn Univ.
 of Horticulture, Auburn Univ.
 Associate Dean, Tuskegee Univ.

IN THIS SPECIAL ISSUE...
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Entomology

Love your iPhone? Then you will like this! As many insect pest outbreaks are occurring in Alabama, the IPM HOTLINE for peanut and vegetable producers is now CALL TOLL FREE 1-800-446-0375 and select weekly topics of this newsletter. You can listen to the along with pest outbreak information. This IPM Hotline will operate for the rest of the summer

LCB ALERT IN PEANUTS

HIGH ALERT FOR LESSER CORN STALK BORERS (LCB) IN PEANUTS
 Based on the LCB statistical model on the AWIS weather services website (<http://www.awis.com/Misc/Peasut/Peanut.htm>), there is a high risk of borer outbreak in the southern part of Alabama. Counties that are on high alert for LCB include Coffee, Dale, Henry, Houston, Geneva, and Covington. LCB outbreaks are associated with the incidence of aflatoxin contamination in peanuts, so it is very important scout fields and look for caterpillars (Fig. 1) inside silken tunnels wrapped around pods and stalks. Dry soil seen in many peanut fields in SE Alabama is conducive for LCB development. This week I scouted several peanut fields in Henry, Houston, Geneva, Dale, and Covington Counties, and analyzed ~35 lb of soil I brought back for thorough analysis. I could not find live LCB larvae in the laboratory analysis despite despite despite. I am keeping a close eye on the situation. If you have any concerns or to report an LCB outbreak, please call at 251-331-8416.

Alabama County map for reference
 Image: <http://cms.distribution.aces.edu/news/images/Alabama-Map.jpg>

caterpillars
 hatched to plant
 makes insecticid
 use. If disapp
 which

Dr. Ayanava Majumdar
 Extension Entomologist
bugdoctor@auburn.edu

**To signup: Email bugdoctor@auburn.edu
 Or sign up today on the sheet provided!**

BACILLUS THURINGIENSIS

- Bt – A naturally occurring soil bacteria used to control caterpillar pest
- Controls caterpillars by destroying the “gut”.
- Now genetically engineered into some crops such as cotton, corn, soybeans and a few sweet corn varieties.
- Bti – Targets larva of mosquitoes and blackflies

Some insects are “good guys”

- Some insects eat other insects
- Some crops require pollination by bees
 - Ex. - cucurbits



Beneficial Insects



- Larva of a Lacewing (Neuroptera) feeding on an aphid



- Predatory wasp (Hymenoptera) preparing to lay egg in an aphid.

Lady Beetle and Lace Wing



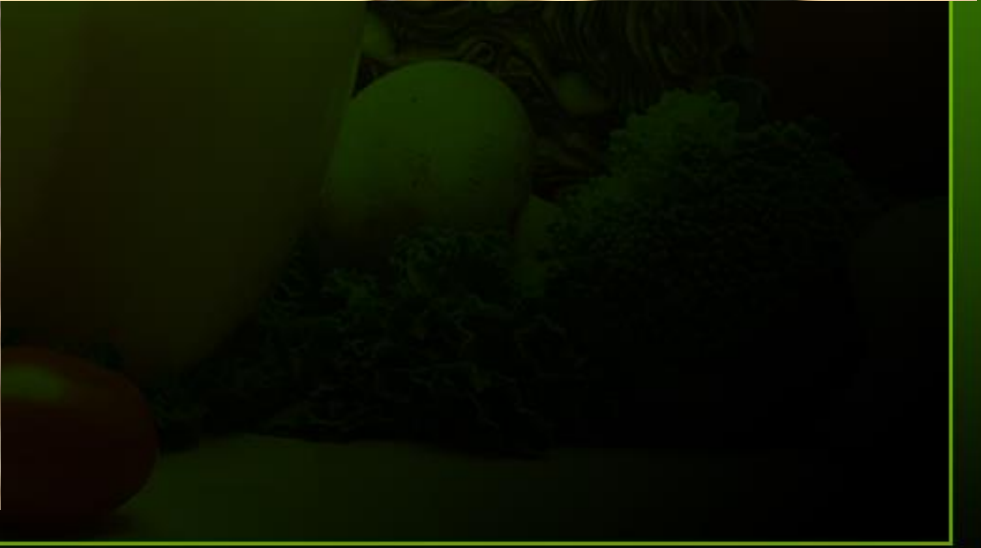
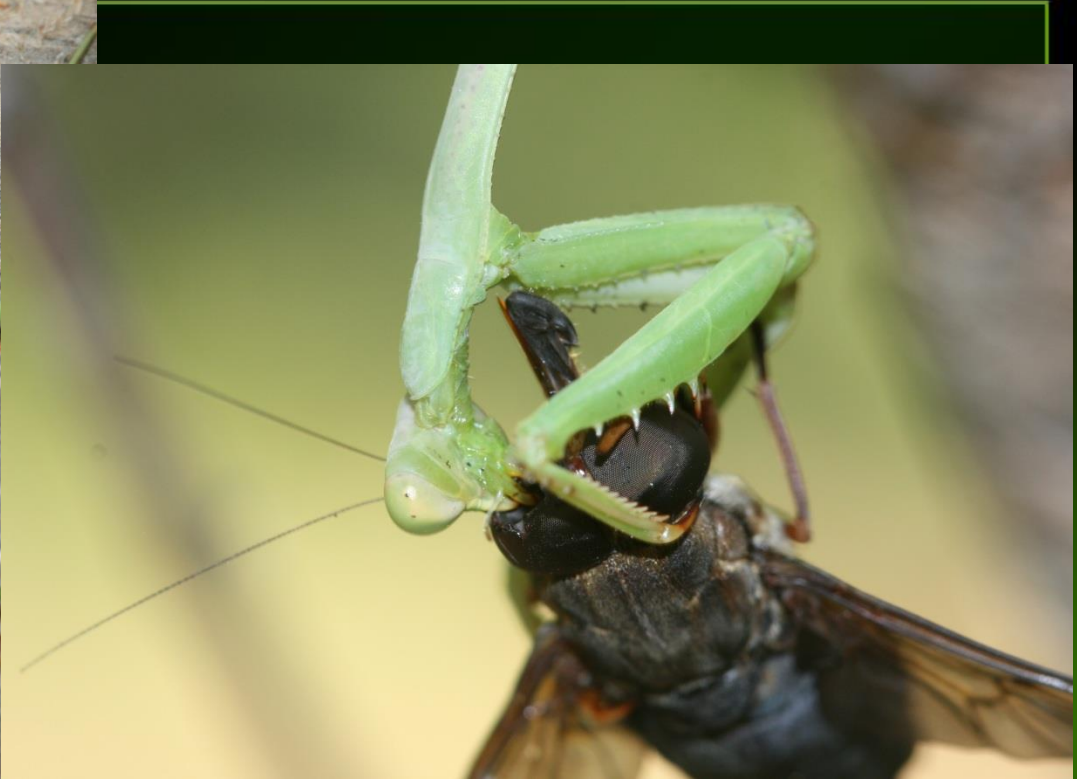
beneficials



- Soldier bug (Hemiptera) feeding.



- Praying mantis (Mantodea) feeding



Insecticides

- Know the active ingredient
- Know the formulation
 - Liquid, what percentage a.i.
 - Ready to use (RTU) or concentrate
 - Dust
 - Granules
- **READ THE LABEL!**

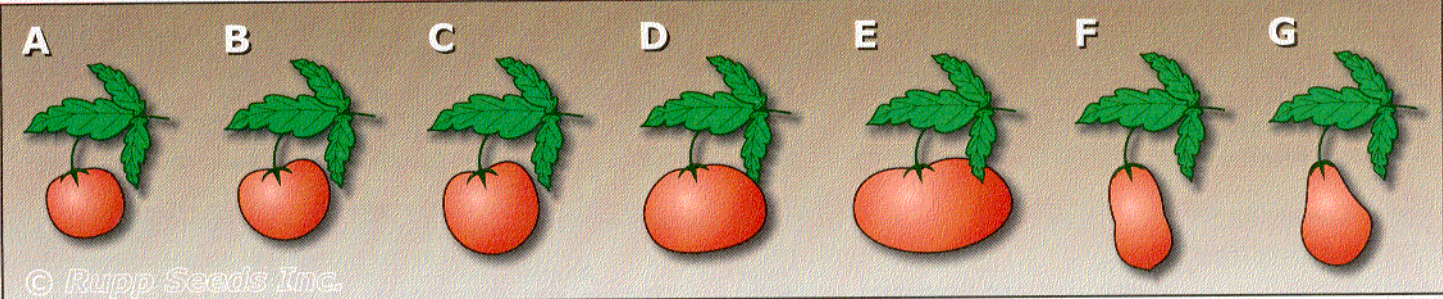
Disease Control

- Keep plants vigorous
- Crop rotation
- Sanitation
- Daconil is a good multi-crop fungicide
- Insect control?
- Use resistant varieties



Disease Resistance

TOMATO



© Rupp Seeds Inc.

TOMATO TERMS				TOMATO DISEASE CODES			
GS	Green Shoulders	DT	Determinate	ASC	Alternaria Stem Canker	N	Nematodes
LGS	Light Green Shoulders when ripe	INDT	Indeterminate	BS	Bacterial Spec	TMV	Tobacco Mosaic Virus
UG	Uniform Green Gene ripe fruit are a uniform color		vining type used primarily in home gardens	BW	Bacterial Wilt	SW	Spotted Wilt
				EB	Early Blight	VW	Verticillium Wilt
				FR	Fusarium Race 1 or 2		
				GLS	Gray Leaf Spot		

- What do the all the letters mean?
 - V,F,N...This variety is resistant to Verticillium wilt, Fusarium wilt, and Nematodes

Early Blight

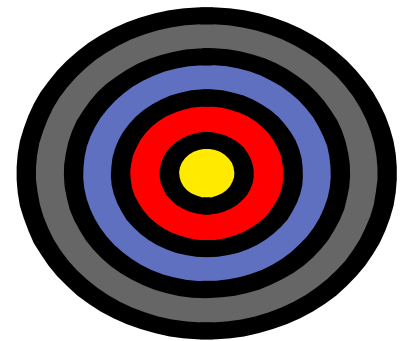


Early Blight

- Caused by the fungus *Alternaria solani*
- Survives on plant debris
- Begins on older leaves as irregular spots that enlarge to ½ inch in diameter
- Develop concentric rings and a yellow halo
- Plants appear to “fire-up” from their base
- Warm, wet weather favor its development



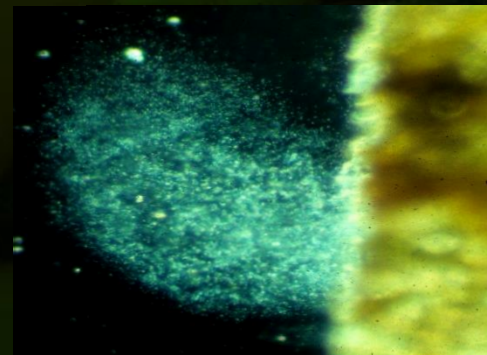
EARLY
BLIGHT



Southern Blight



Bacterial Spot



Bacterial
ooze

Bacterial Spot Control

- Use disease free transplants
- Avoid overhead irrigation
- If bacterial spot develops, apply a copper-based fungicide with maneb or mancozeb



Fusarium Wilt

- Soil borne fungus that invades the roots
- Plugs-up the water conducting vessels
- Causes yellowing and wilting of leaves
- Whole plant eventually wilts/dies



Fusarium Wilt Control

- Plant Fusarium wilt resistant varieties
- Plant in well drained soils
- Infested soil can be solarized to reduce disease inoculum
- Plant tomatoes in infested area in garden only every fourth year (crop rotation)



TOMATO WITH AND WITHOUT A FUNGICIDE SPRAY PROGRAM



FUNGICIDES

**NO
FUNGICIDES**

Fungicides with a wide range of crops on their label

- Broad spectrum disease control
 - Protectant-fungicides
 - Control many leaf and fruit diseases
 - Labeled for most vegetable crops
-
- Chlorothalonil
 - Mancozeb
 - Maneb
 - Copper – Bacterial disease control
-
- Small Farm/Home Garden: Acme, Bonide, Dragon, Hi-Yield, Ortho, Southern Ag, etc...

Diseases with Insect Vectors

- Tomato Spotted Wilt Virus
- Bacterial wilt of Cucurbits
- Cucumber Mosaic Virus on Tomatoes and Cucurbits
- Thrips
- Cucumber beetles
- Aphids



Tomato Spotted Wilt Virus



COMPOST!



Raw materials

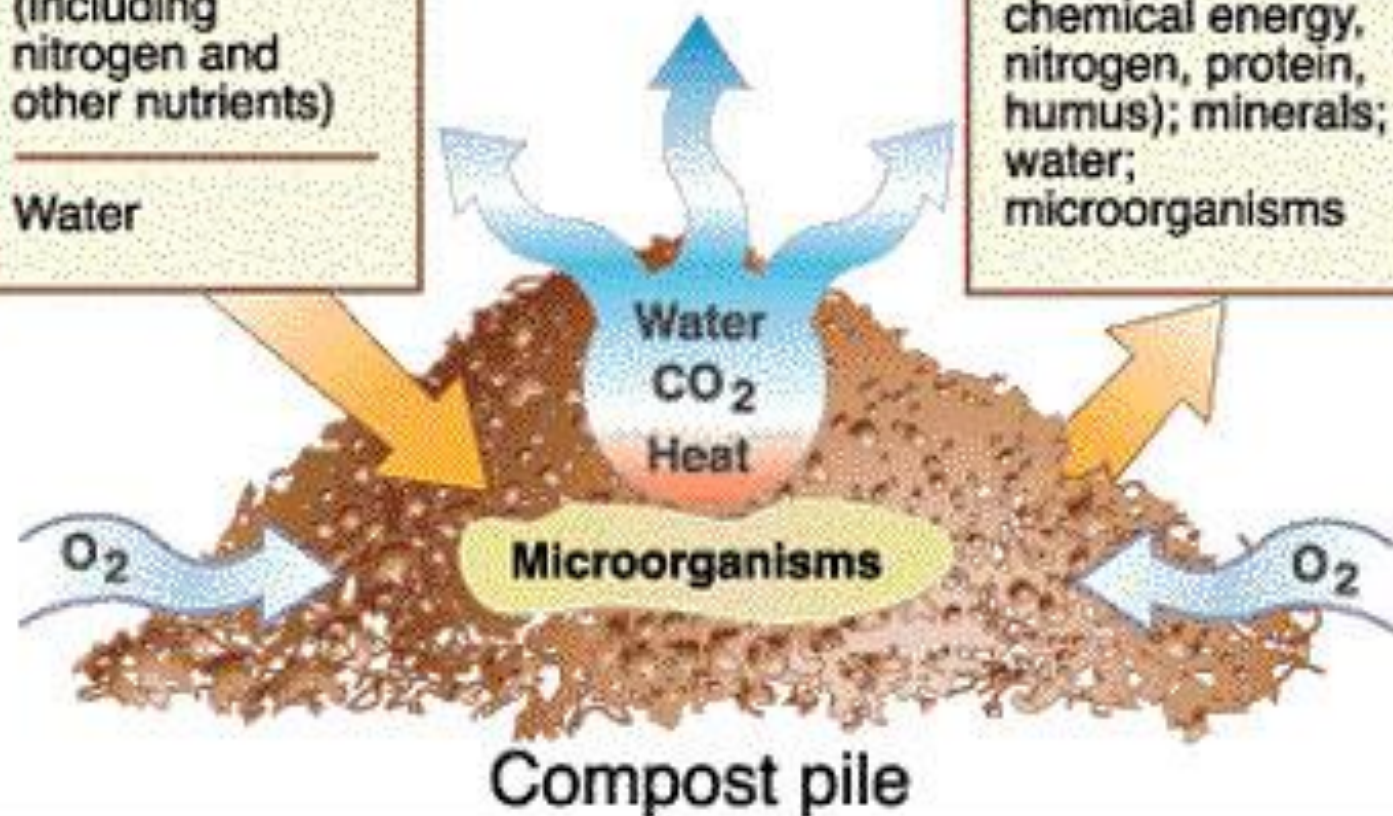
Organic matter
(including carbon,
chemical energy,
protein, nitrogen)

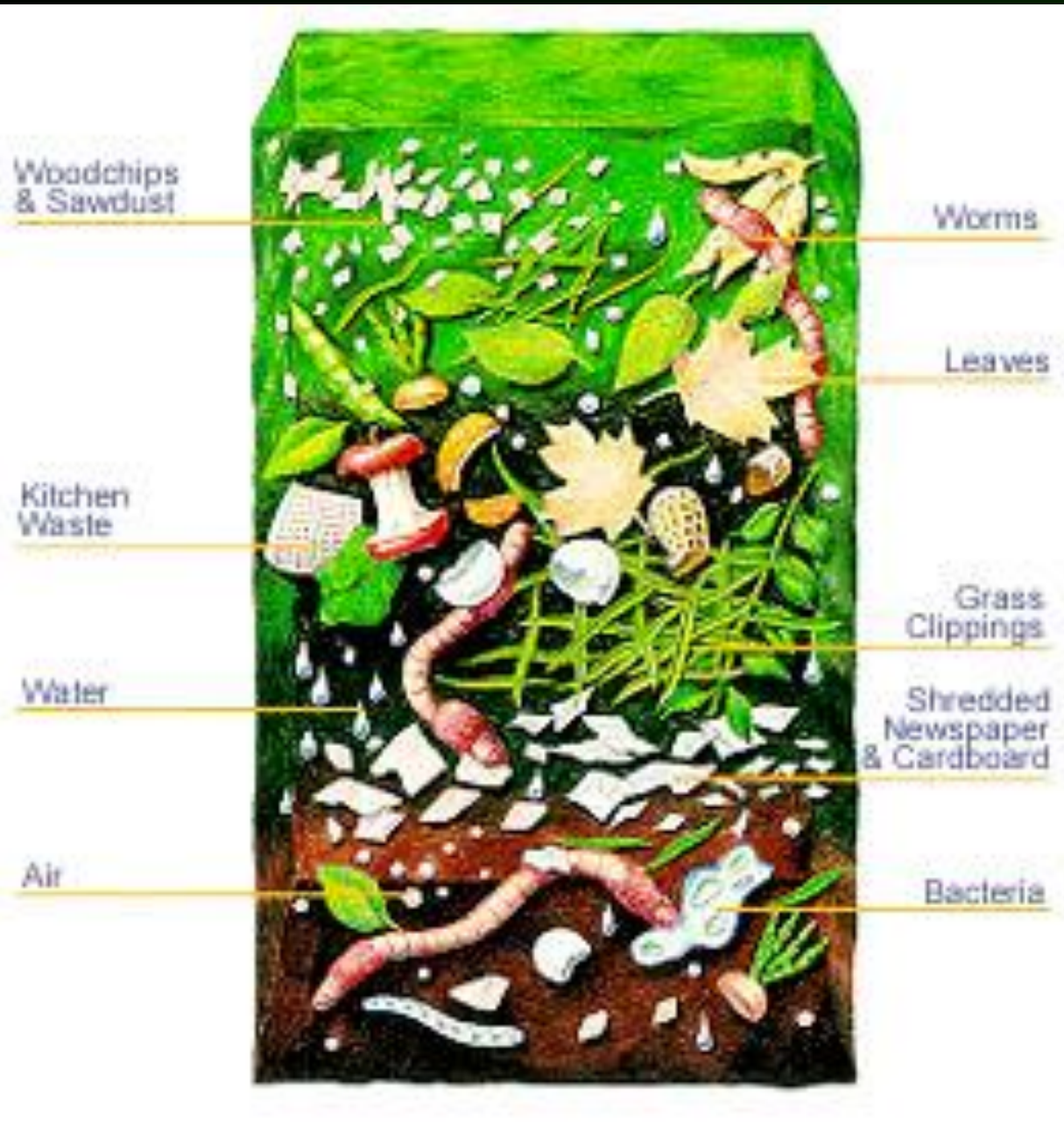
Minerals
(including
nitrogen and
other nutrients)

Water

Finished compost

Organic matter
(including carbon,
chemical energy,
nitrogen, protein,
humus); minerals;
water;
microorganisms





Composting

- Compost is the result of organic matter breaking down/decaying over time
- This occurs in nature but takes years to complete in many instances
- In the home garden the environment can be manipulated to speed up the process
- Microorganisms are the main ingredient in compost

Compost

The background of the slide features a dark, textured image of a compost pile. In the foreground, several fresh vegetables are visible, including a large green bell pepper, a head of broccoli, and several red tomatoes, suggesting the compost is made from kitchen scraps.

- Adds Organic Matter
- Improves Soil Tilth
- Increases Beneficial Soil Organisms
- Suppresses Weeds when used as a mulch
- Conserves Moisture
- Helps soil drain better

Compost Recipe

- Grass clippings
- Leaves
- Bark
- Fruit
- Egg shells
- Coffee grounds
- Poultry litter
- Pig Manure

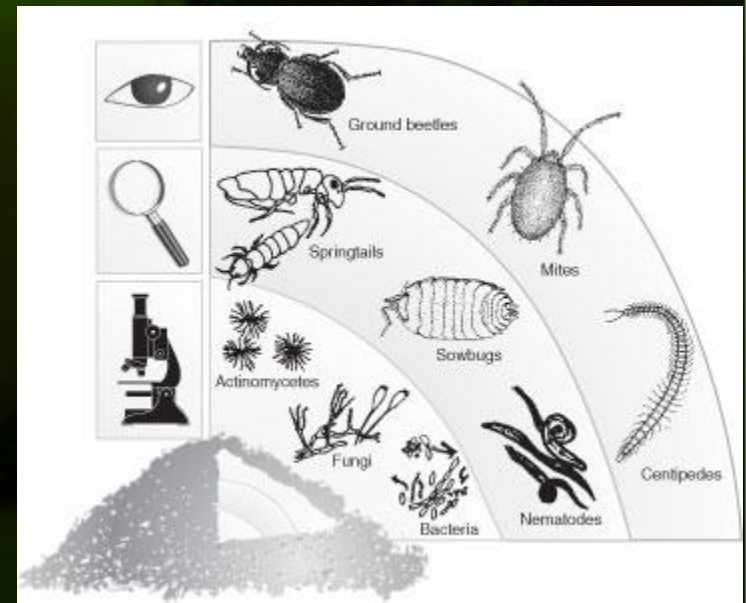


Compost No No's

- Butter
- Cheese
- Chicken
- Fish
- Lard
- Meat
- Milk
- Peanut butter
- Salad dressing
- Sour cream
- Vegetable oil
- Yogurt

Composting Biology

- Bacteria begin to break down plant materials
- Next fungi join in aid in breaking down materials
- Insects and earthworms also help in the process



Composting Chemistry

Everything organic has a given ratio of carbon to nitrogen (C:N) in its tissues. A C:N ratio of 30:1 is ideal for the activity of compost microbes. This balance can be achieved by mixing. Composts often are deficient in nitrogen when wood wastes are added to the mixture.

Carbon:Nitrogen Ratio

Food wastes	15:1
Sawdust, wood, paper	400:1
Straw	80:1
Grass clippings	15:1
Leaves	50:1
Fruit wastes	35:1
Rotted manures	20:1
Cornstalks	60:1
Alfalfa hay	12:1
Pig manure	5-7:1
Poultry litter	10:1
Coffee grounds	20:1
Cow manure	20:1
Leaves	30-80:1

Composting

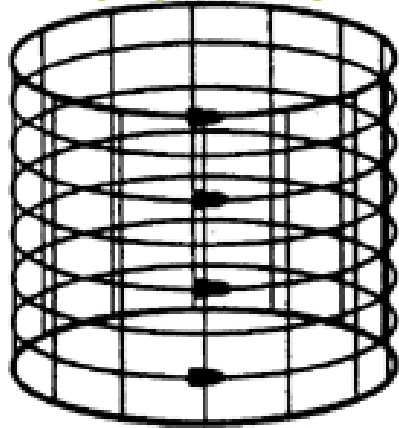
A large compost pile insulates itself and holds the heat of microbial activity. Its center will be warmer than its edges. Piles smaller than three feet cubed (27 cu. ft.; 3-4' tall) have trouble holding this heat in the winter, while piles larger than five feet cubed (125 cu. ft.; 5-6' tall) do not allow enough air to reach the microbes at the center.

Composting

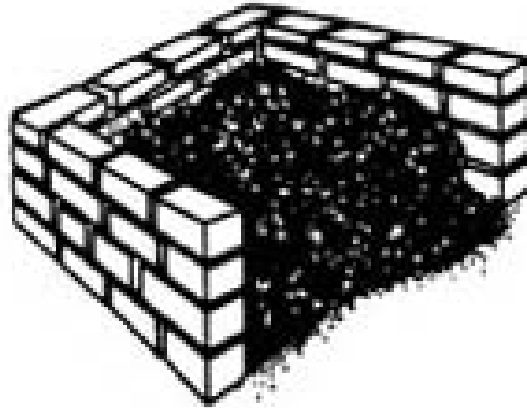
Microbes function best when the compost heap has many air passages and is about as moist as a wrung-out sponge. Extremes of sun or rain can adversely affect this moisture balance. Generally, the moisture content of the compost should be 50 to 60% on a total weight basis. Wet piles that leach water are deficient in oxygen, and can ferment and cause odor problems.

Compost Construction

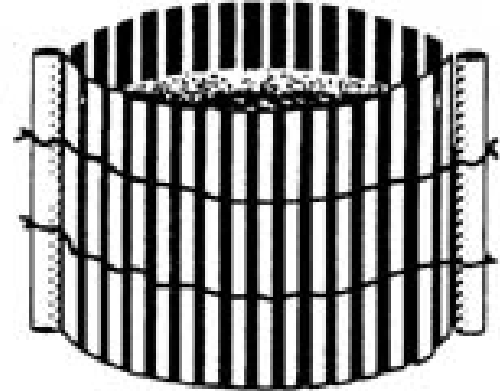
Woven Wire Bin



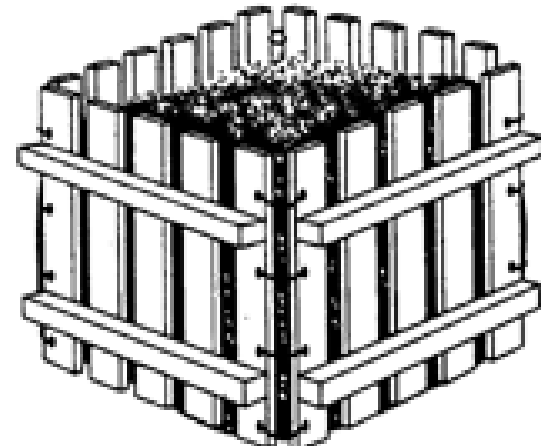
Block Bin



Snow Fence Bin



Turning Bins

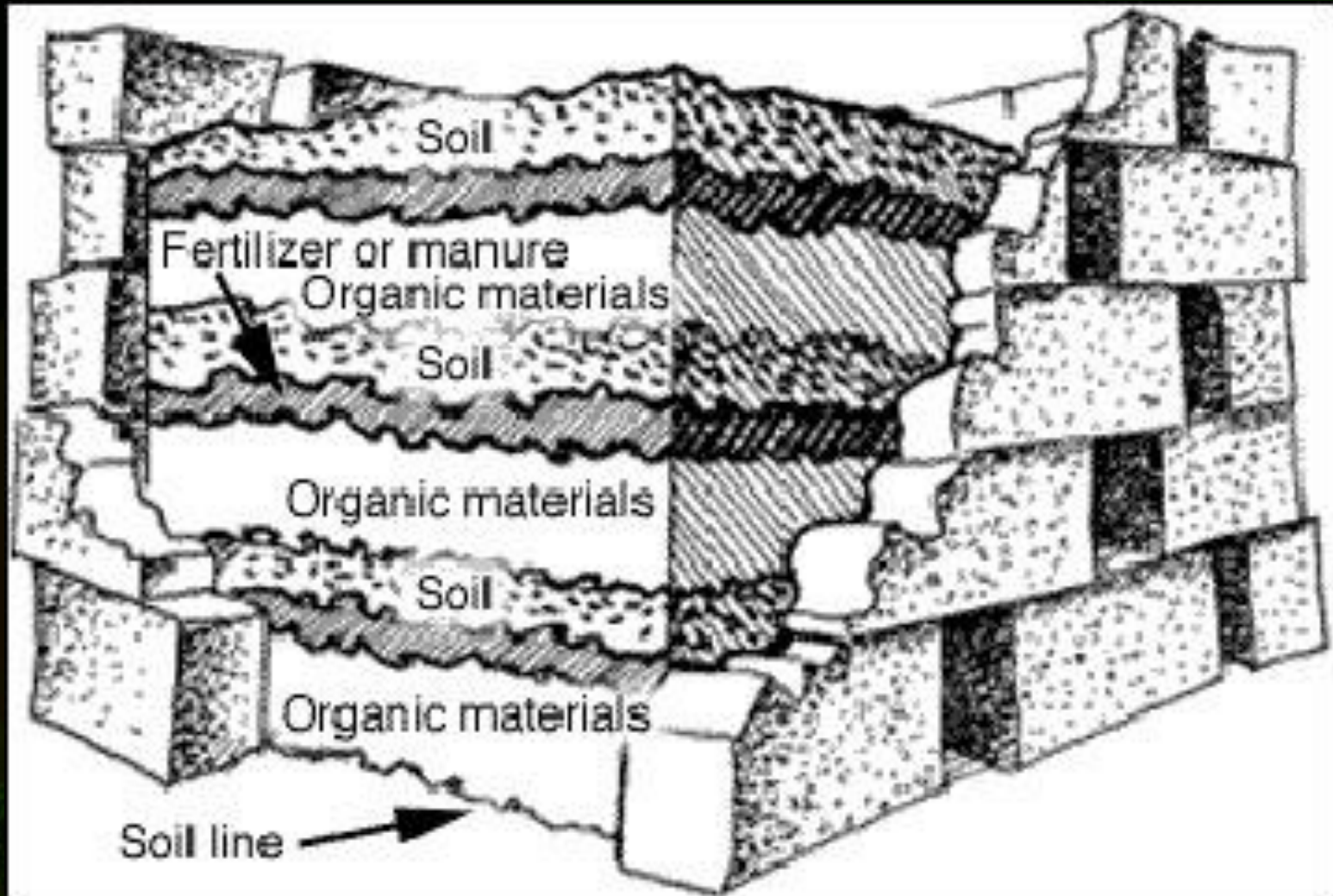


Wooden Pallet Bin

Compost Construction



Compost Construction



Compost Construction

- Remove grass or groundcover beneath compost pile location to allow for direct contact between microorganisms and compost material
- **1st layer:** 3-4" of chopped brush or other coarse material on top of the soil surface. This material allows air circulation around the base of the heap.
- **2nd layer:** 6-8" of mixed scraps, leaves, grass clippings, etc. Materials should be "sponge damp."
- **3rd layer:** 1" of soil serves as an inoculant by adding microorganisms to the heap.

Compost Construction

- **4th layer:** (optional) 2-3" of manure to provide the nitrogen needed by microorganisms. Sprinkle lime, wood ash, and/or rock phosphate over the layer of manure to reduce the heap's acidity. Add water if the manure is dry. Add one pound of urea fertilizer or 10 pounds of composted poultry manure per yard of leaves or ground brush if organic sources of nitrogen are not available. Soak these high carbon materials with water before composting. Manure generally should not be used in cities to reduce the potential for fly problems.
- **5th layer:** Repeat steps 1-4 until the bin is full. Scoop out a "basin" at the top to catch rainwater under summer conditions.

Compost Trouble Shooting

Symptom	Problem	Solution
Bad odor	Not enough air	Turn pile, add material if too wet
Center is dry	Not enough water	Moisten and turn pile
Compost is damp and warm only in the middle	Too small	Collect more material and mix old and new materials
Compost is damp and sweet smelling, but no heat	Lack of nitrogen	Mix in nitrogen source



Raised Bed Gardening



Raised Bed Gardening

Raised bed gardening is a form of gardening in which the soil is formed in 3–4 foot wide beds, which can be of any length or shape. The soil is raised above the surrounding soil (6 inches to waist high), sometimes enclosed by a frame generally made of wood, rock, or concrete blocks, and enriched with compost.

Maximizes Space

Raised bed gardens can help maximize all available space and are typically smaller than traditional gardens making them a more convenient option in areas with limited space.



Alternative to Poor Soil

Raised beds can be utilized as solutions for areas with poor and rocky soil or sloped terrains.



Increased Drainage and Organic Matter

Raised beds are usually filled with high quality soil mixes that have large amounts of organic matter which improves drainage and may increase yields.



Early Planting

Soil raised above ground level tends to drain better and warms up much quicker in the spring, thus allowing for faster seed germination and transplant growth.



Eliminates Physical Limitations

Higher soil levels and improved soil quality provides a means for better access, less maintenance, and easier harvest.



Higher Yields

Dense planting techniques result in higher production per square foot of garden and helps reduce weed seed germination.



No Weather Restrictions

Raised bed gardens can be entered and maintained soon after rains or irrigation without compacting soils.



No Heavy Equipment

No expensive power cultivation equipment is needed.



Aesthetic Value

The formal orderliness and arrangement of a raised bed or container garden can be extremely attractive and a prized addition to the home landscape.



Construction



Complete Square Foot Gardening Package

Vegetable Gardening Made Easy!

*No tilling,
No shoveling,
No heavy lifting*



Package includes:

Untreated pine to create 4'x4' vegetable garden
(up to 16 different types of vegetables and herbs)
Weed barrier for base
Nails & string
Organic soil mix (3 bags each: Hen Manure,
Complete Landscape Mix & top soil)
Step-by-step instructions
Seeds & plants sold separately

**Autumn
Hill**
NURSERY &
LANDSCAPING

***Everything you need to
easily start your own
garden today***

\$74.99







1 Cabbage



9 Green Beans



1 Pepper



16 Onions



1 Broccoli



9 Green Beans



4 Lettuce



32 Green Onions



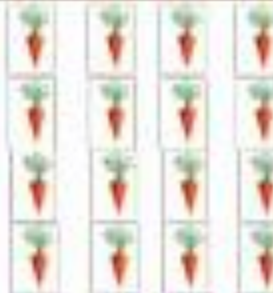
1 Cauliflower



16 Beets



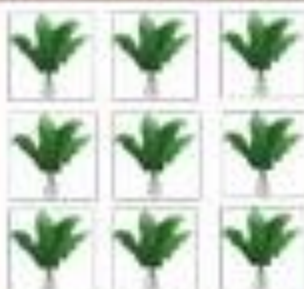
4 Lettuce



16 Carrots



1 Cherry Tomato



9 Spinach



16 Carrots



32 Radish

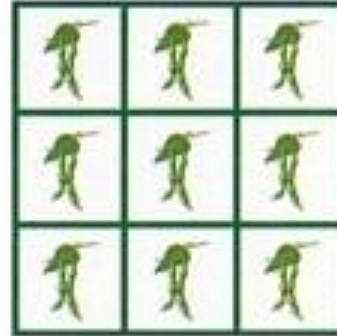
Broccoli



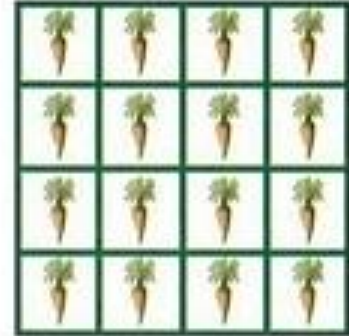
Leaf Lettuce



Bush Bean



Carrot



Cabbage



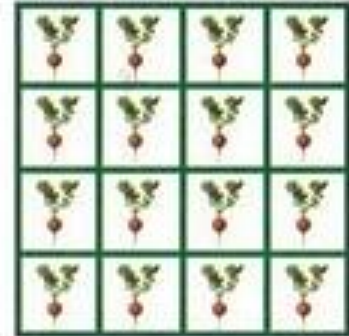
Swiss Chard



Spinach



Radish



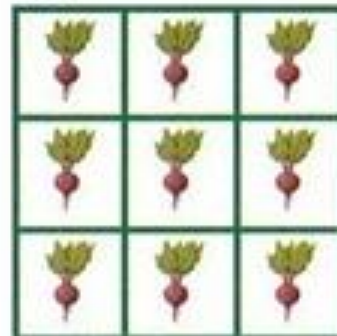
Pepper



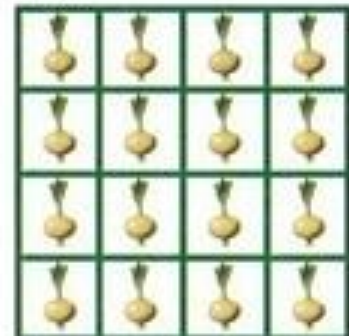
Marigold



Beet



Onion



















Organic Gardening



"Who needs pesticides? Most of the insects around here die of obesity."

Organic Gardening

Gardening technique that uses natural and organic materials and methods, and avoids using practices and synthetic chemicals that may be detrimental to health or environment. Does not mean chemical free.



Organic Gardening

- Soil fertility
- Insect control
- Pest control



Maintaining Soil Fertility

Crop Rotation – Alternating plantings each year between heavy feeders, soil-building crops, (legumes), and light feeders (root crops).

Cover Crops – Grow crops during the off-season that are not harvested, but are composted or tilled in. Winter rye, hairy vetch, crimson clover, and winter wheat.

Composting – Breaking down organic material. Only difference is N source.

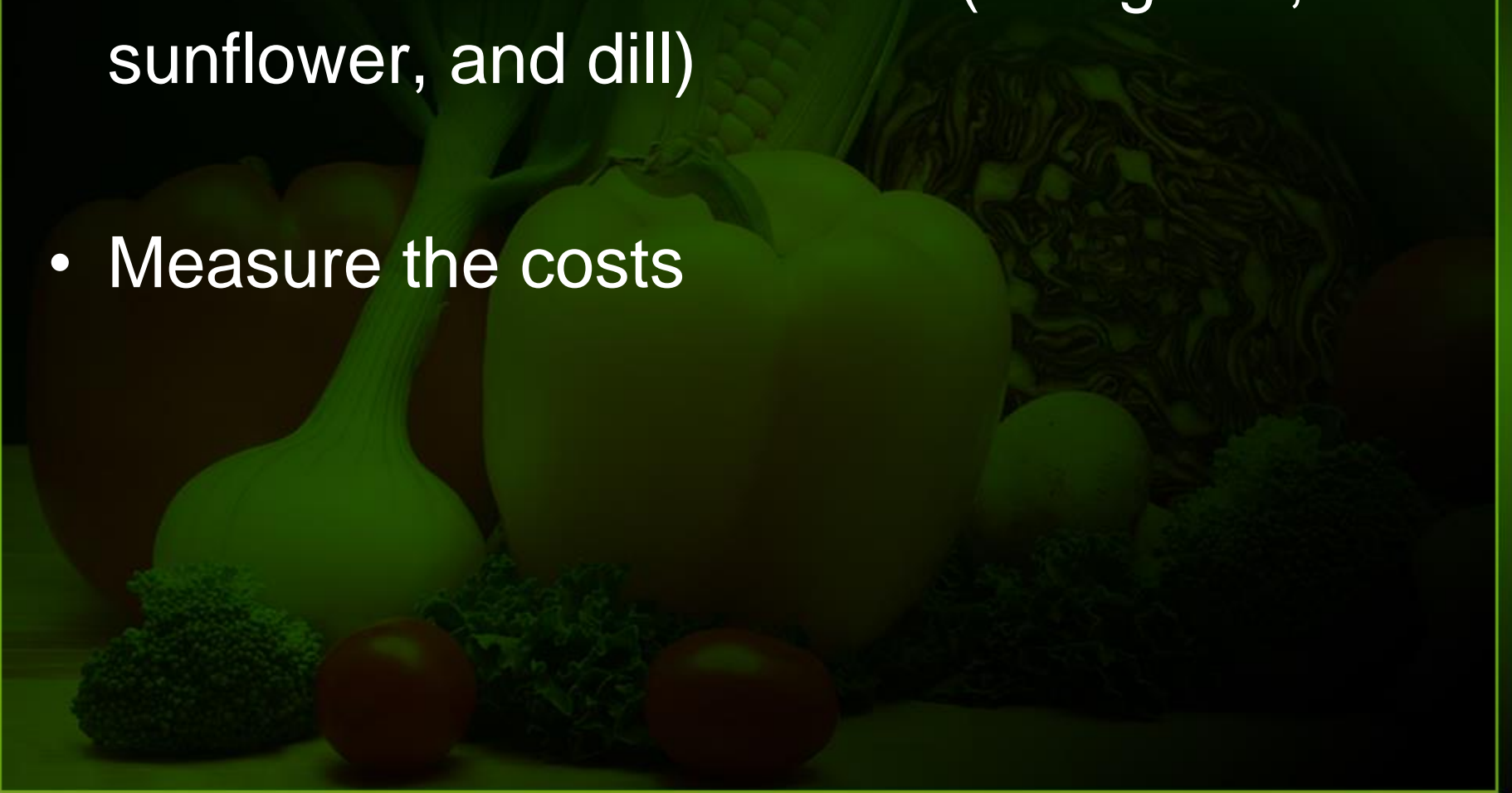
Feed the soil with organic matter and the soil will feed your plants. Instead of feeding with synthetic fertilizers.

Insect Control

- Best method is selection of resistant varieties
- Control begins with healthy plants
- Plant early
- Encourage beneficial insects
- Know your pest

Insect Control

- Plant beneficial attractants (marigolds, sunflower, and dill)
- Measure the costs



Insect Control



- Insecticidal soaps
- Lemon dish detergent and water
- Garlic and water
- Neem
- Bt (*Bacillus thuringiensis*)

Insect Control

- Pyrethrums (extract from daisy)
- Rotenone (extract of certain legumes)
- Diatomaceous earth
- Horticultural oils
- Soil solarization

Disease Control



- Resistance
- Disease free seeds and transplants
- Site selection
- Crop rotation
- Plant spacing

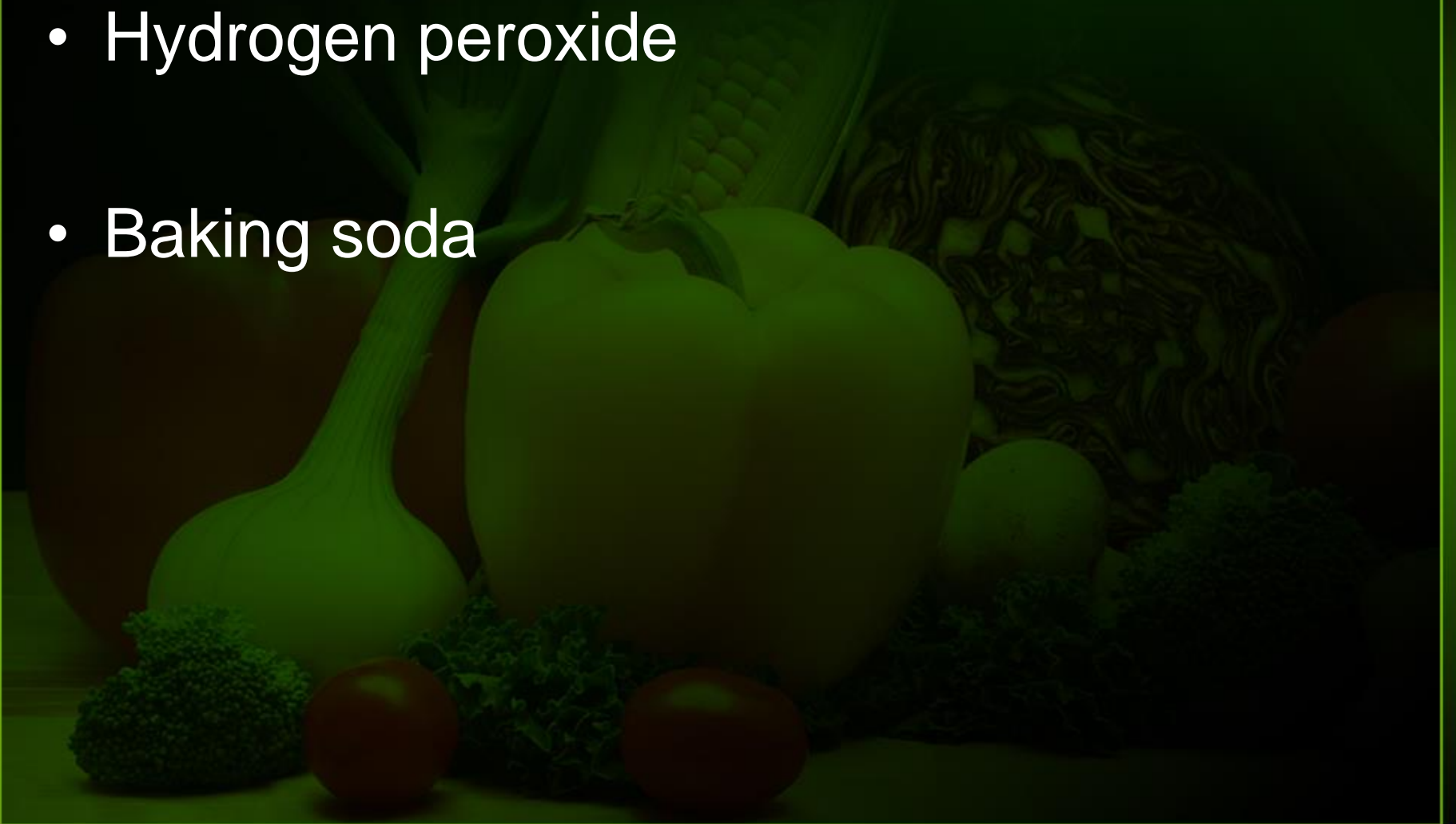
Disease Control



- Mulching
- Remove infected plants
- Sanitation
- Copper (Bordeaux mixtures or sulfates)
- Compost tea

Disease Control

- Hydrogen peroxide
- Baking soda



Weed Control



Weed Control

- Cultivation and hand weeding often is the best choice.
 - Avoid cultivating too deep (tiller)
- Some chemical available
 - Problems with using herbicides in the garden
 - Crop specific. Residues. Calibration. Availability.
- Use mulches
- Avoid letting weeds go to seed.



Weed Control



- Pulling
- Transplanting
- Drip irrigation
- Vinegar
- Citric acid

Weed Control



- Corn gluten
- Flame weeding
- Cultivation
- Mulches
- Plant spacing

Amelia



- Resistance
 - TSWV
 - Fusarium 1,2, & 3
 - Verticillium wilt
 - Nematode
- Good Taste



Crista



- Resistance
 - TSWV
 - Fusarium 1,2 & 3
 - Verticillium wilt
- Good Flavor



Bella Rosa

- Resistance
 - TSWV
 - Fusarium 1 & 2
 - Gray leaf spot
 - Alternaria stem canker
 - Verticillium wilt
- Heat set ability
- Good Flavor



Celebrity

Growth: Semi Determinate
Fruit Load: Heavy

Fruit Size: Large
Flavor: Acidic, Real Good



Carnival

Growth: Determinate
Fruit Load: Very Heavy

Fruit Size: Large
Flavor: Acidic, Very Good



Brandywine (Sudduth)

Growth: Indeterminate
Fruit Load: Low/Moderate

Fruit Size: Large/Extra-Large
Flavor: Acidic, Very Good



Cherokee Chocolate

Growth: Indeterminate

Fruit Load: Light/Moderate

Fruit Size: Medium/Large

Flavor: sweet/acidic, good



Paul Robeson

Growth: Indeterminate
Fruit Load: Moderate/Heavy

Fruit size: Medium/Large
Flavor: acidic, real good



Azoychka

Growth: Indeterminate
Fruit load: Low/Moderate

Fruit size: Small/Large
Flavor: Acidic, real good, citrus flav.



Persimmon

Growth: Indeterminate
Fruit Load: Low/Moderate

Fruit Size: Large/Extra-Large
Flavor: Sweet, very good



Momotaro

Growth: Indeterminate
Fruit Load: Heavy

Fruit Size: Small/Medium
Flavor: Sweet/Acidic, Very good



Tomatoes



- Determinate vs indeterminate
- don't use too much N
- don't cultivate too deep
- use mulch
- use preventive fungicide/insecticide program (every 7 days)
- control aphids and thrips
- blossom end rot?



Sweet Corn

- How sweet do you want it?
- Su (regular sweet corn)
 - Silver Queen
- Se (sugar enhanced)
 - Silver King
- Sh2 (super-sweet)
 - How Sweet It Is
 - *Must be Isolated*





A Fresh Look at Older Watermelon Varieties

**Mike Reeves,
Regional Extension Agent, Commercial Horticulture
Arnold Caylor,
Director, North Alabama Horticulture Research Center**

Varieties Evaluated

- AU Producer
- Desert King
- Charleston Gray
- Long Crimson
- Allsweet
- Legacy
- Black Diamond
- Verona
- Piñata (hybrid)
- Pure Orange (hybrid)
- Mid-Night (hybrid)
- AU Golden Producer
- Moon & Stars
- Ed's Yellow



Watermelon Cuttin'!



Rating for taste



Tasters said that all melons had good taste, but their favorites were:

1. AU Golden Producer (5 first place votes)
2. AU Producer (1 first place vote)
3. Charleston Gray
4. Mid-Night (1 first place vote)

Thanks for your attention!



ANY QUESTIONS?