



Vegetable & Raised Bed GARDENING

SHERIDEN HANSEN *Assistant Professor, Horticulture | Davis County*

Vegetable Classification

Annuals

- Beans
- Radish
- Corn

Biennials

- Onion
- Carrot
- Celery

Perennial

- Asparagus
- Rhubarb



Cool Season Crops

Growing temps ~ 50-70°F

- Peas
- Onions
- Beets
- Salad Crops
- Cabbage
- Broccoli & Cauliflower
- Radishes
- Kale
- Carrots



Warm Season Crops

Growing temps ~ 70-90°F

- Tomatoes
- Peppers
- Corn
- Potatoes
- Beans
- Squash
- Melons
- Cucumbers



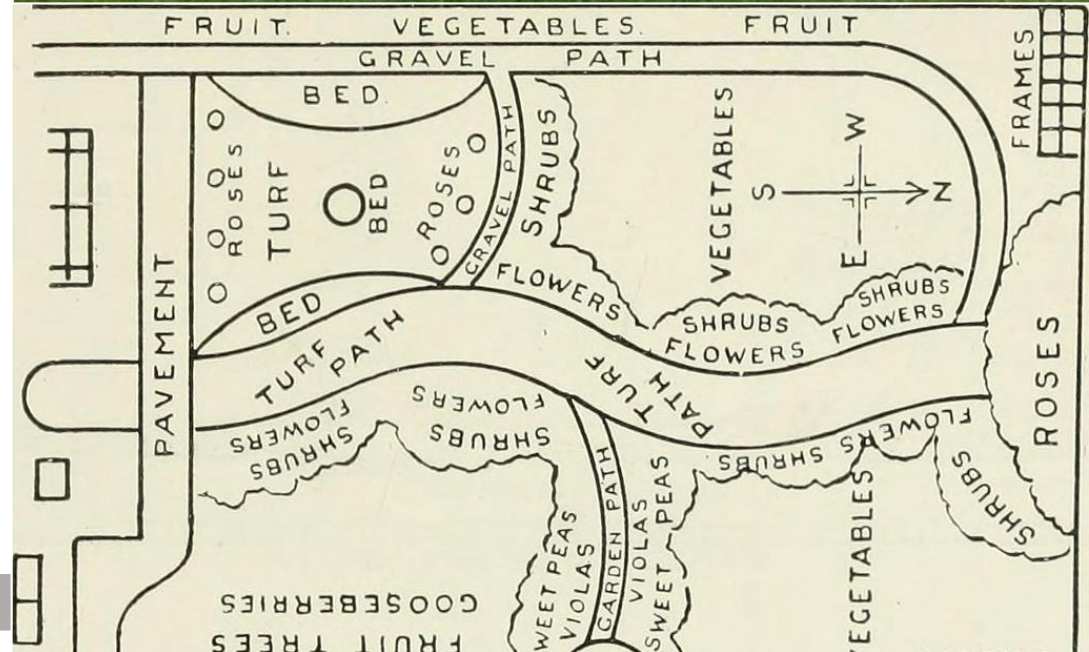
Choosing a Garden Site

- Full sun
 - 6-8 hours
- Soil
 - Well-draining
 - Most vegetables root in the top 6-8”
 - Good amount of organic matter
 - Add 2-3” compost each year
- Access to quality water



Planning the Garden

- Measure your space and sketch it out
- Tall crops on the north side to prevent shading
- Perennials placed where they won't be disturbed
- Plan for spring, summer and fall gardening
- Plan for **FULL SIZED** plants!



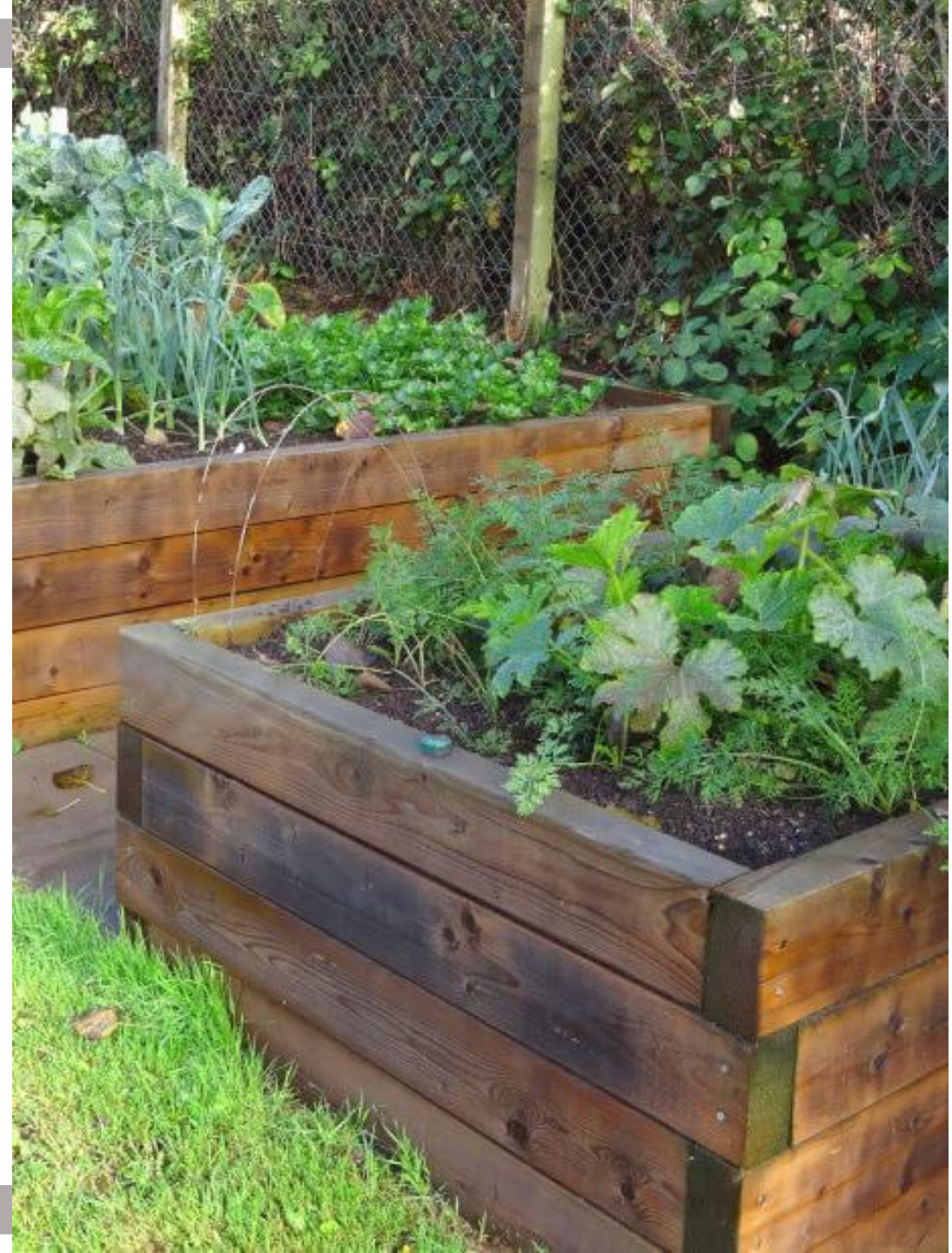
Raised Beds

- Why use raised beds?
 - Modify soil
 - Improve drainage
 - Easy to amend the soil
- Pros:
 - Attractive, easy to clean, can adjust height to suit your needs
- Cons
 - Added expense



Raised Beds

- Beds should be 3-4 feet wide
 - Work from sides to reduce compaction
- At least 8-inches deep
- Use decay resistant material for structure
 - NOT treated lumber or railroad ties
 - Redwood and cedar are excellent
- Can be any shape or style
 - Make it to fit your needs and space



Soil Preparation

- Good soil is built by adding organic matter and continually building the soil
- Soil testing (every 1-2 years)
 - Soil texture
 - Organic matter levels
 - Fertilizer needs
 - Done BEFORE you plant
- Soil testing: <http://usual.usu.edu/>



Soil for Raised Beds

- Light weight but still has some heft
- Ability to hold water and nutrients
- Use a mix
- Many ‘recipes’ available online
- What we use at the USU Botanical Center
 - 1:1 – native top soil:compost
 - Can add perlite or vermiculite
- ***YOU STILL NEED TO AMMEND EVERY YEAR!***



Tilling

- Till vs. no till?
- Never till soil that is too wet
- Hand squeeze test
 - Crumbles easily, can be tilled
- Good time to incorporate organic matter



Turning Soil in Raised Beds

- Turn with a shovel or a fork
 - Mini-tillers work too
- Good opportunity to incorporate organic matter
- Wait until soil is somewhat dry, but still wet enough to turn
- Don't turn too often
 - Once a year is plenty



Fertilizer

- N-P-K
 - Nitrogen-Phosphorous-Potassium
 - Nitrogen → greening, vegetative growth
 - Phosphorous → fruit and flower formation
 - Potassium → root growth
- Add based on soil analysis at the root zone of the plant
 - Complete fertilizer (15-7-7)
 - Incomplete fertilizer
 - 21-0-0 (ammonium sulfate)
 - 43-0-0 (urea)
- *YOU DON'T NEED MUCH!!!*

BIG BOB'S FERTILIZER

We grow 'em big
and green!

All-purpose
vegetable
fertilizer



The Scoop on Poop

- Good way to add nutrients to the soil
- Remember it takes time for material to break down
 - Add in the fall to be ready by spring
- Use caution with animal manure
 - Should be done with soil testing
 - Can create weed problems
 - “HOT” fertilizers



October 2019

Horticulture/Soils/2019-01pr

Sustainable Manure and Compost Application: Garden and Micro Farm Guidelines

Melanie Stock, Tiffany Maughan, and Rhonda Miller

Planting Seed

- Seedling depth
 - (3x rule)
- Seeding dates vary
 - Cool crops Mid-March through April
 - Usually in May
- Soil crusting
 - Add organic matter



Difficult to Establish Seeds

- Slow germination
 - Onion, beets, carrot
 - Can't allow soil to dry or crust
- Can improve success by soaking seeds in water for 24 hours before sowing



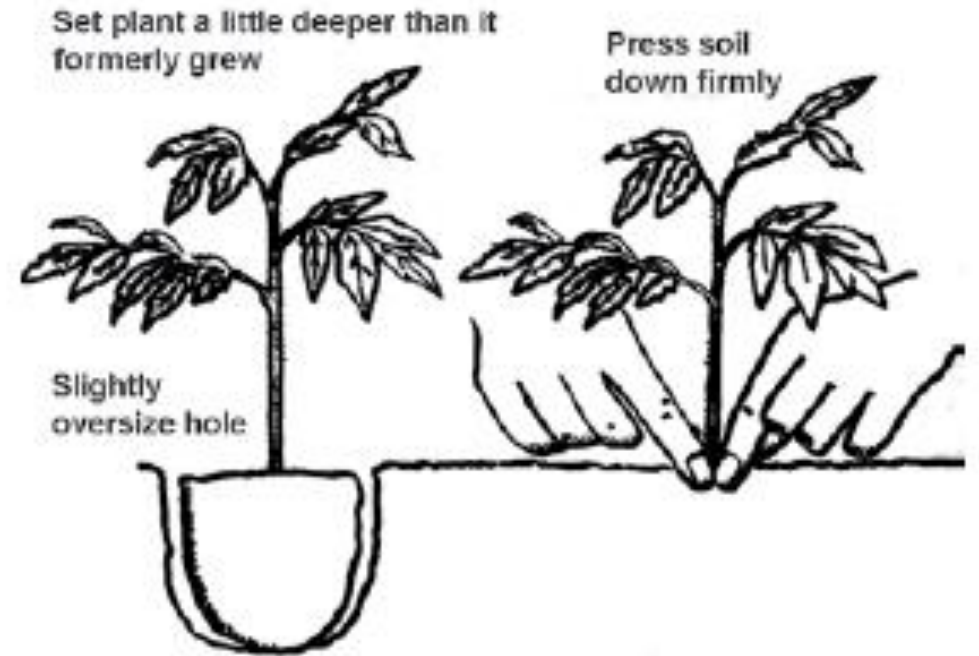
Planting Transplants

- Plant size
 - Dark green color
 - Look at roots
 - 4-6 leaflets
- Water management
 - Young plants – frequent watering
 - Frequency dependent on soil type and temperature



Transplants

- Depth varies with plant
 - Plants that develop adventitious roots can be planted deep
 - Tomatoes, solanaceous crops
 - 10-inches deep or to the first leaves
- Plant slightly deeper than the root ball to keep plants from drying out



Don't Transplant...

- Root crops
 - Carrots
 - Radish
 - Parsnip
 - Beets
 - Turnips
 - Potatoes
- Anything with a tap root
- Damages and deforms plant roots



When to Plant Outside

- Cool season crops (50-70° F)
 - As soon as you can work the soil (mid-March)
- Warm season crops (65-90° F)
 - After the danger of frost is gone
- General rule for Wasatch Front Frost Dates:
 - May 10th (Mother's Day) – last frost
 - October 5th – first frost
 - 5/10 to 10/5 is our FF growing season



Irrigation

- Water needs depend on:
 - Plant type (greens vs. fruiting plants)
 - Stage of growth
 - Plant size
- Irrigation frequency depends on:
 - Available water in the root zone
 - Soil type
 - Water use rate (tied to temperature)
 - Irrigation method (not all are equally effective)



Pest & Disease Management

- Several approaches
 - Cultural
 - Mechanical
 - Biological
 - Chemical
- Best control information is found at:
 - <https://extension.usu.edu/pests/>
- Sign up for pest alerts:
 - pestadvisories.usu.edu



UTAH PESTS

UTAH PESTS
HELPS TO SOLVE
PLANT PEST ISSUES
THAT CONCERN UTAH CITIZENS EVERY DAY

IPM PEST ADVISORIES

Pest Identification Guides

BROWSE UTAH PESTS
Fact Sheets
Slide Presentations
Utah Pests News
IPM Pest Advisories
Bees and Other Pollinators
Educational Videos
Contact Us

UTAH PESTS PROGRAMS
Utah Pests Home
IPM Integrated Pest Management
School Integrated Pest Management
Utah Plant Pest Diagnostic Lab
Cooperative Agricultural Pest

Latest News

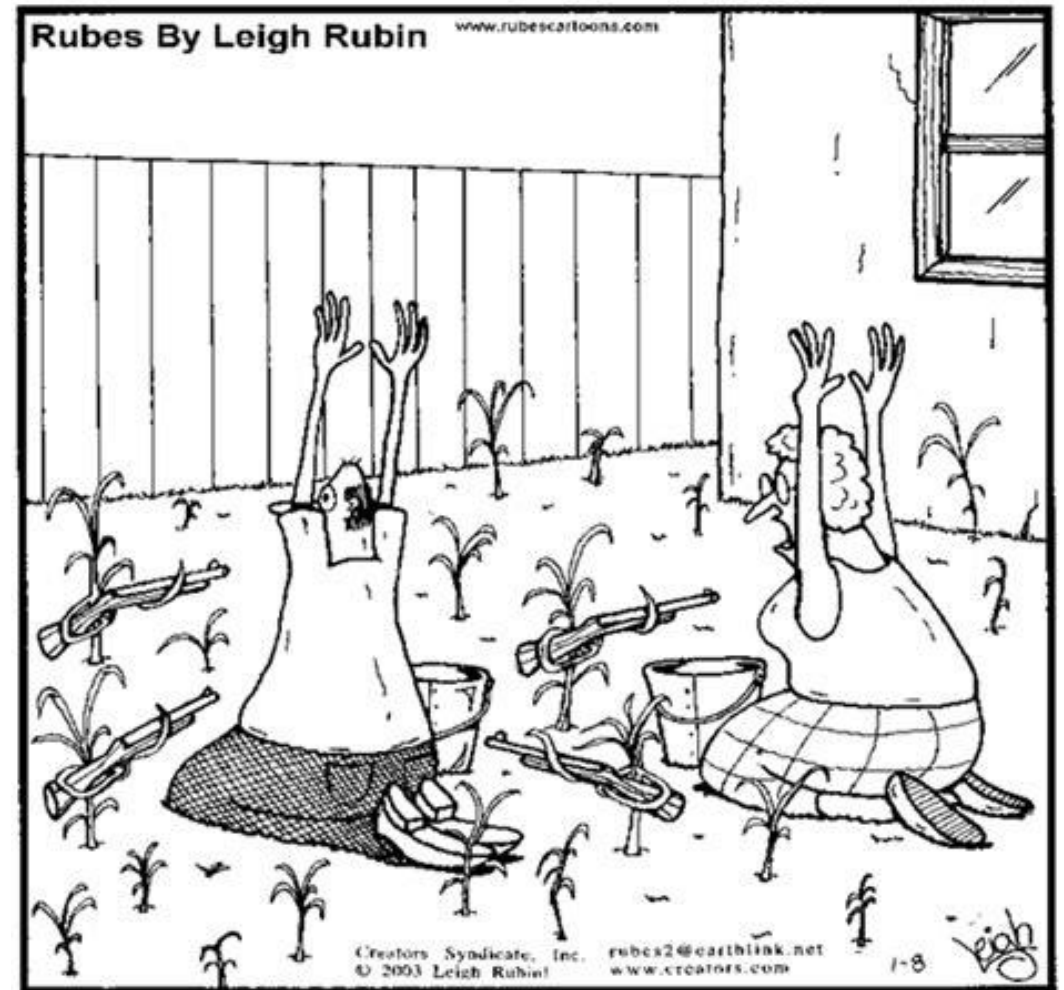


In Search of Soybeans Resistant to the Brown Marmorated Stink Bug

The invasive brown marmorated stink bug "will eat almost anything." Among its targets is soybean, the number-two crop in the United States.

Weed Control

- Exclusion/Suppression
 - Mulches
- Mechanical control is best in a home garden
 - Hoeing
 - Pulling
- General rule:
 - Avoid pre-emergent in the garden
 - 2,4-D has a 2-3 week residual
 - Glyphosate is inert when it hits the soil



"We never should have waited this long ...
Now the weeds have *completely*
taken over."

Crop Families and Specifics

- Salad crops (cool season)
 - Lettuce, cabbage, chard, kale
 - Toppers: carrots, radishes, etc.
- Fruiting crops (warm season)
 - Solanaceous: maters, taters, peppers, eggplant
 - Vining crops: melons, cukes, squash
- Legume crops (cool & warm season)
 - Peas and beans
- Grass crops
 - Corn, grains



Salad Crops

- Lettuce, chard, spinach, kale, cabbage
- Cool season:
 - Hot weather makes them bitter
 - “Bolting”
- Seed depth: shallow
- Transplant: 4-6 leaves
- Shallow rooted
 - Can’t handle water stress
- Harvest anytime



Salad Crops



butter



mixes



cos or romaine



red oak leaf



heirlooms



speckled

Salad "Toppers"

- Cauliflower, broccoli, radishes, cabbage and carrots
- Cool season
- Seed depth: shallow
- Better to transplant (cabbage, broccoli, and cauliflower)
- Shallow rooted
 - Can't handle water stress
- Harvest when head size is full or when root has sized



Salad "Toppers"



RADISH

French Breakfast, Easter Egg, German Giant



CARROTS

Atomic Red, Deep Purple, Parisian



BROCCOLI

Gypsy, Spring Raab, Romanesco



BEETS

Detroit Dark Red, Golden, Chioggia



CABBAGE

Brunswick (green),
Violaceo di Verona,
Chinese, Savoy



CAULIFLOWER

Fioretto (raab), Grafitti,
Bishop

Onions & Garlic

- Cool season
 - Good growth up to 90-degrees
- Seed:
 - Onion: Shallow
 - Garlic: 3-in. deep, 5-9-in. apart (plant in fall)
- Transplant onions at 6-8 leaves
- Onions are shallow rooted
 - Can't handle drought stress
- Harvest
 - Garlic – bottom leaves turn yellow, must cure
 - Seed onions store better than sets



Onions & Garlic



GARLIC

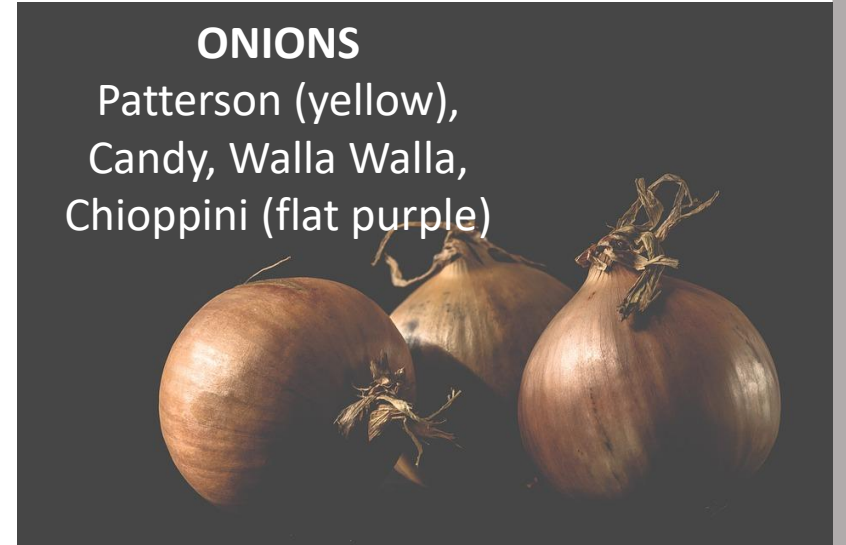
Soft neck: Inchelium Red,
Lorz Italian, Early Red Italian
Hard neck: Metichi, Music,
Chesnok Red

*Scapes of hard neck varieties
can be harvested*



SHALLOTS

Dutch Red, French Gray



ONIONS

Patterson (yellow),
Candy, Walla Walla,
Chioppini (flat purple)



BUNCH ONIONS

Red Welsh,
Evergreen Long,
Deep Purple,
Parade

Fruiting Crops

- Tomato, pepper, eggplant
 - Warm season
 - Avoid COLD temps below 50-degrees
- Seeds or transplants
- Split set (HOT >95-degrees)
- Fertilizer
 - None after flower clusters form
- Harvest when mature green to ripe
- Sensitive to irregular watering
 - Cracked shoulders
 - Blossom end rot



Blossom End Rot

- Calcium deficiency
- Calcium is immobile, symptoms show on new growth
- Even watering usually fixes problem
- Foliar calcium sprays
- Can occur with other vegetables



Tomato Terminology

- **Determinate**
 - Varieties bear once, usually paste tomatoes
- **Indeterminate**
 - Bear continually, long vines, continued growth

Too much nitrogen will force vegetative growth at the expense of fruit!



Hybrids & Heirlooms



HYBRIDS:

Big Beef, Early Girl, Beefmaster, San Vincente, Better Bush, Big Brandy, Celebrity, Celebration, etc.

HEIRLOOMS:

Mortgage Lifter, Brandywine, Green Zebra, Oxheart, Pink German, Costuloto Genovese, San Marzano, etc.



Potatoes

- Cold season
 - Avoid VERY COLD weather
- Seed potatoes
 - Large seed pieces (2 eyes)
 - Cut and dry overnight (callous)
- Uniform watering
- Vegetative before July – tubers form after
 - “Hill” in the plant as it grows
 - NO fertilizer after July
- Harvest the plant after it starts to flower
 - “New” potatoes



Vining Crops

- Squash, melons, cucumbers
 - Warm season
 - Avoid cold weather planting
- Transplants work well
- Watering
 - Flavor is best when slightly drought stressed
 - Overwatering results in cracks and pithy poor flavor
- Hot weather = bitter cucumbers
- Harvesting tips for melons



When Are Melons Ready?



**BACKGROUND
COLOR**



GROUND SPOT SHOULD BE DISTINCT



FIRST TENDRIL SHOULD BE SHRIVELED

Melons



WATERMELON

Crimson Sweet, Ali Baba, Sugar Baby, Moon and Stars, Orange Tendersweet, Georgia Rattlesnake, Red in Gold

CANTALOUPE
Hales Best Jumbo,
Hearts of Gold

FRENCH MELONS
Charentais Melon, Petit
Gris De Rennes



UNUSUAL MELONS
Tigger Melon, Pepino
Melon, Banana Melon,
Rich Sweetness



Squash & Cucumbers



CUCUMBER

Spacemaster, Sweet
Success, Marketmore,
Lemon
Japanese/Asian
Pickling
Slicing



WINTER SQUASH
Butternut, Kabocha,
Acorn, Spaghetti,
Banana, pumpkin...
so many



SUMMER SQUASH
Crookneck, Fort Knox
(yellow), Lemon Drop,
Green Tiger, Patty Pan,
Italian Ribbed

Legume Crops

- Peas and beans
 - Cool and warm season
- Soak seeds before planting
- Bush and vine types
- Water is crucial when flowering
- Harvest pods when they are young, or leave to harvest dry
- Fix their own nitrogen, require little to no fertilizer



Grass Crops

- Sweet Corn
 - Warm season
 - Seeds vs. transplants
- Pollination
 - Don't plant a single row – plant in squares
 - Water is critical at pollination
 - Each silk attached to a kernel
- Fertilizer
 - High nitrogen user
- Ears mature 15-25 days from silk production
- Starchy corn?
 - Cross-pollination? Less sweet gene dominant



Perennials - Asparagus

- Plant early
 - Trenches 8” deep
 - Cover with 2” soil, repeat until level
 - 1-2 years to establish
- Doesn't like to be wet... wait, what?
 - 1st water after 1st harvest
 - 1 x month after that
- Fertilizer after harvest
- Mow ferns late spring, mulch for weeds
- Harvest

Year	2	3	4	5
Weeks	2	4	6	8



Perennials - Rhubarb

- Ancient plant
- 1-2 years establishment
- Transplant / divisions (5 years)
 - Cover crown with 1-2" soil
 - Early spring
- Water – depends on the soil
 - Do not like wet feet
- Fertilize after harvest
- Leaves are poisonous
- Harvest:

Year	2	3
Weeks	2	3

1/3 of plant each
year after



Questions?



Why did the tomato blush?

Because it saw the salad dressing!

Thank You!

