Vegetables

FSMG Intern Class

Agenda

- Introduction & Round Table
- Types of Seed
  - Heirloom/Hybrid/GMO
- Planting Overview
  - Seed vs. Transplants
  - Crop Rotation
- Types of Gardens
- Irrigation
- Top Garden Vegetables

Introduction

Hey Y'all

Round Table

- Who we are
  - Bob Williams, FSMG 2015, Vegetable Specialist
  - Nancy Szabo, FSMG 2015, Vegetable Specialist
- Who are you
  - Tell us about your experience with vegetable gardening
  - What you like to grow or would like to grow

Types of Seed

Heirloom/Hybrid/GMO

Types of seed

- Heirloom
  - At least 50 yrs old
  - Seed that has been handed down for generations in a region or area
  - Stable traits from one generation to the next, open-pollinated
- Hybrid
  - Cross-pollination of two different varieties of a plant, aiming to produce an offspring, or hybrid, that contains the best traits of each of the parents
  - Consistent results
- Genetically Modified Organism (GMO)
  - Living beings that have had their genetic code changed in some way
  - Answer to world hunger or the devil incarnate?
  - GMOs are present in 60 to 70 percent of foods on US supermarket shelves
    - sugar beets, soybeans, cotton and feed corn

Planting Overview

Transplants, Seeds, & Rotation

Seed vs. Transplants

- Advantages
- Disadvantages

Tomatoes love to be transplanted

- Tomato plants can be transplanted several times and still produce an abundant amount of fruit.
- Many gardeners prefer to start tomatoes by seed in small pots, then transplant them into larger pots as the plant grows until it is ready to set in the garden.
- Tomatoes are the most popular garden plant purchased at garden centers as seedlings then transplanted in the garden.

Peppers

- All different varieties of peppers thrive when transplanted – everything from bell peppers to poblano peppers, to jalapenos.
- Peppers can also be started by seed in small pots or purchased as seedlings.

Eggplant

- Eggplant is another vegetable that can be transplanted successfully in the garden.
- Don’t be in a hurry to set out eggplant in the garden as they need soil that is at least 70° F in order to grow and thrive.
- Eggplant loves hot weather – the hotter the better!.

Okra

- Because okra has a long taproot, the seeds should be sowed directly into the garden soil.
- If you must transplant okra into the garden, make sure the seedling has only developed two of its true leaves.
- Try to avoid disturbing the roots.

Beans and Corn

- Beans and corn should always be sowed directly into the garden.
- These crops perform much better by direct sowing.
- Crop yields will be significantly lower if you try to transplant or if the roots of these plants are overly disturbed.

Root Crops

- Seeds of any root crop such as beets, onions, potatoes, radishes, parsnips, or carrots should always be sowed directly in the garden.
- Attempting to transplant root crops will usually end in dead or unproductive plants.

Recap

- There are many vegetable plants that can be successfully grown by using either method.
- *Cucumbers, squash, kale, pumpkin, melons and gourds* can be grown by transplanting or by sowing the seeds directly in the garden.
- When transplanting these vegetables be sure not to disturb the roots and provide some shade during very hot days until the plants are well established.

Planting Charts

- Planting Dates
- Recommended Varieties For Texas
- Crop Planting Guides

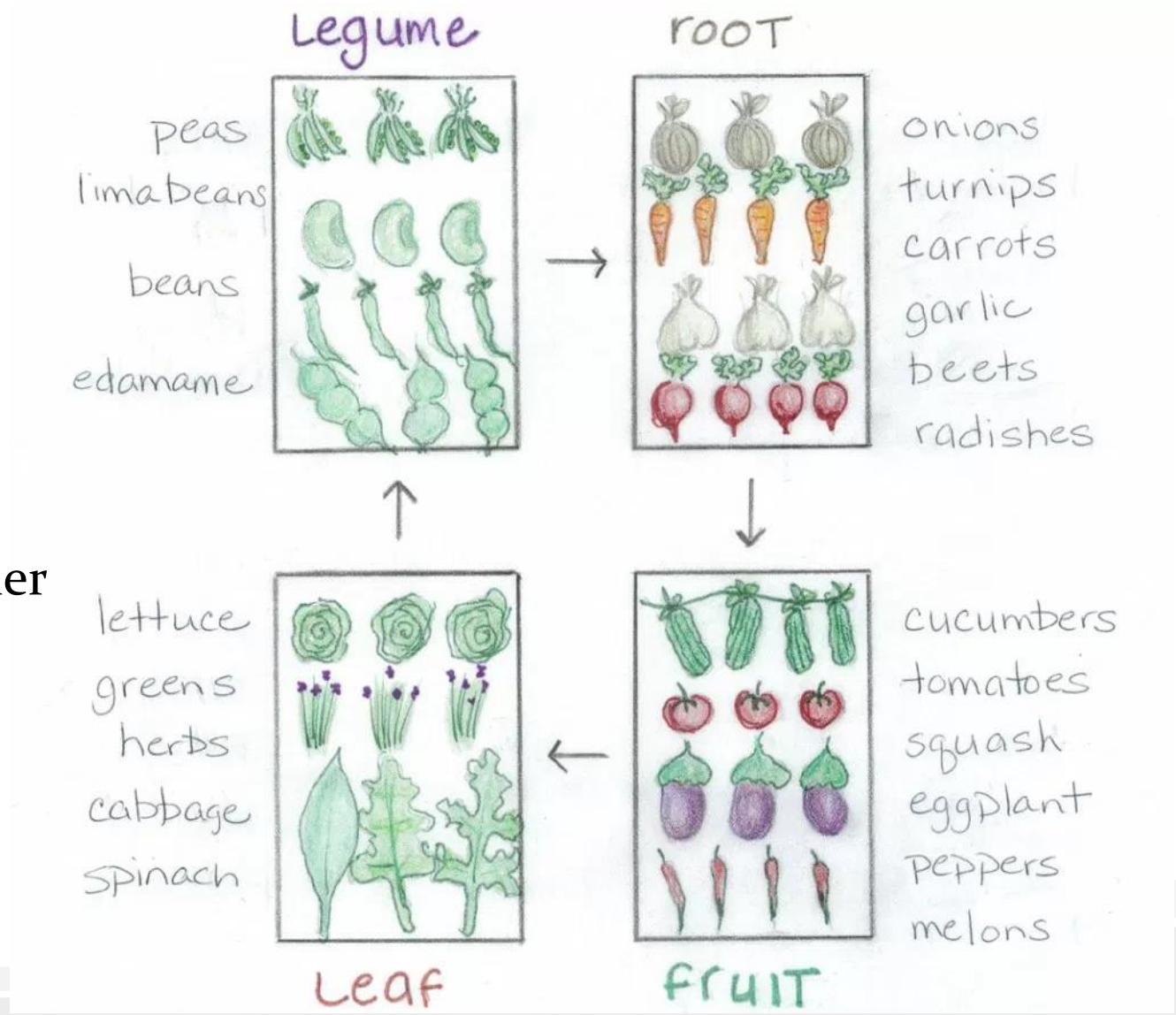
Dates, Varieties and Guides

https://easttexasgardening.tamu.edu/

https://aggie-horticulture.tamu.edu/

Layout & Rotation

- Position of sun
  - Plants need more/less sun
  - Direction of sun
  - Height of plants
- Temperature
  - Cool weather vs Hot weather
- Crop rotation
  - Legume
  - Root
  - Fruit
  - Leaf



10- min Break

Garden Methods

How Do You Grow your Garden?

Planning

- Location, location, location
- Sun (6-8 hrs direct)
- Water/Drainage
- Space available
- Time for maintenance
- Family size
- What do you like to eat?

Gardening Methods

- Row
- Wide Row
- Raised Bed
- Vertical
- Straw Bale
- Square Foot
- Keyhole
- Container
- Hügelkultur

Row Gardens

- Commercial gardening – single row of product with required space between rows
- Good if large acreage
- Farm equipment for auto tilling, planting
- Not water efficient
- Takes a lot of land

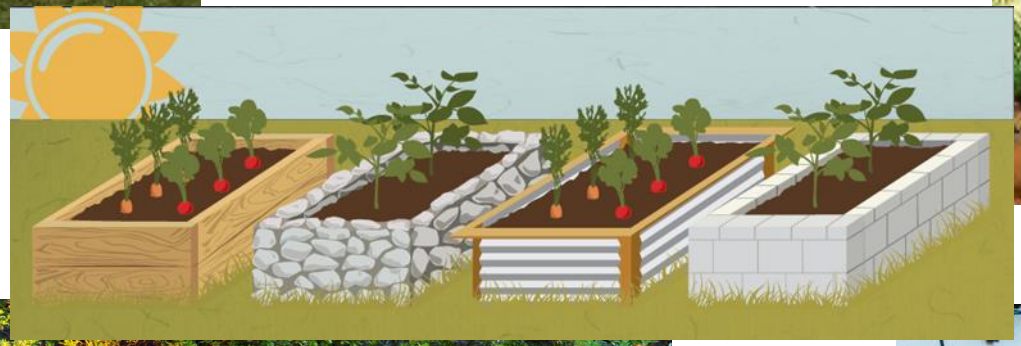
Wide Row

- Three foot rows ideal – length arbitrary
- Deep tilling with raised soil – about 18”
- Double-digging, trench gardening
- Amend soil, mulch
- Walkways laid with newspaper, then straw, wood chips
- Grow more in less space, intensive gardening
- Water only the beds – not the walkways


Everyday-vegetable-garden.com

Raised Bed

- A type of wide row with supports
- Best is 3’-4’ wide, length is up to you
- Height is what works best for you
- Use materials on hand or build
- Can apply lasagna techniques
- Water efficient, no till, easier on the back and knees



Vertical Gardening

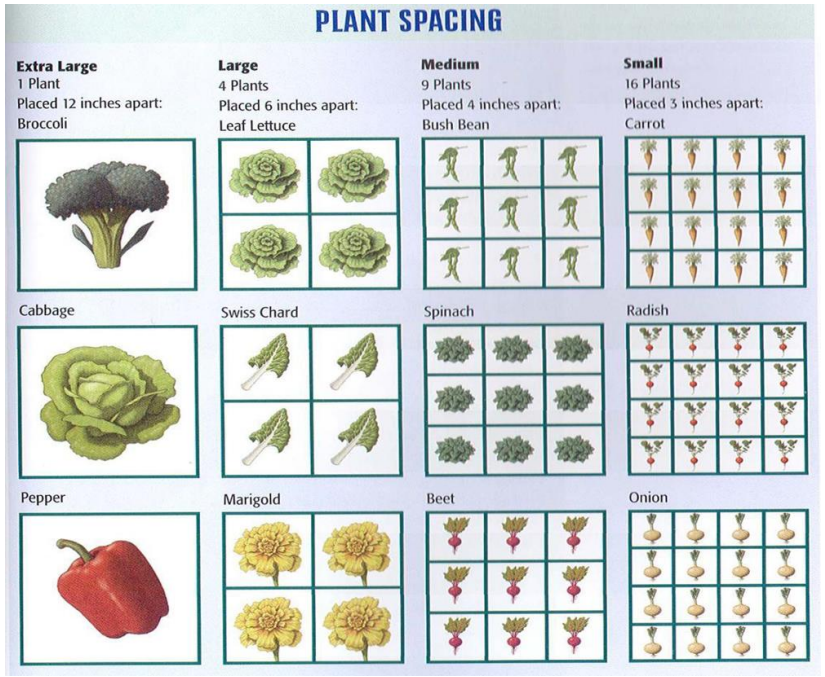
- Grow up – not out
- Great for limited space
- Ideal for vining vegetables, fruits
- Deep, well-drained soil for best root development
- Allows sun and wind to reach plants – can dry out faster
- Provides shade for sensitive plants
- Combine with straw bale, square foot, raised bed
- Cattle panels, trellis, net strings, old ladders, poles, etc.

Straw Bale Garden

- Straw bale provides structure
- Cut a hole in straw, fill with good soil, plant
- 1 to 3 plants per bale
- Provides its own mulch, becomes its own compost
- No tilling
- Requires a lot of water

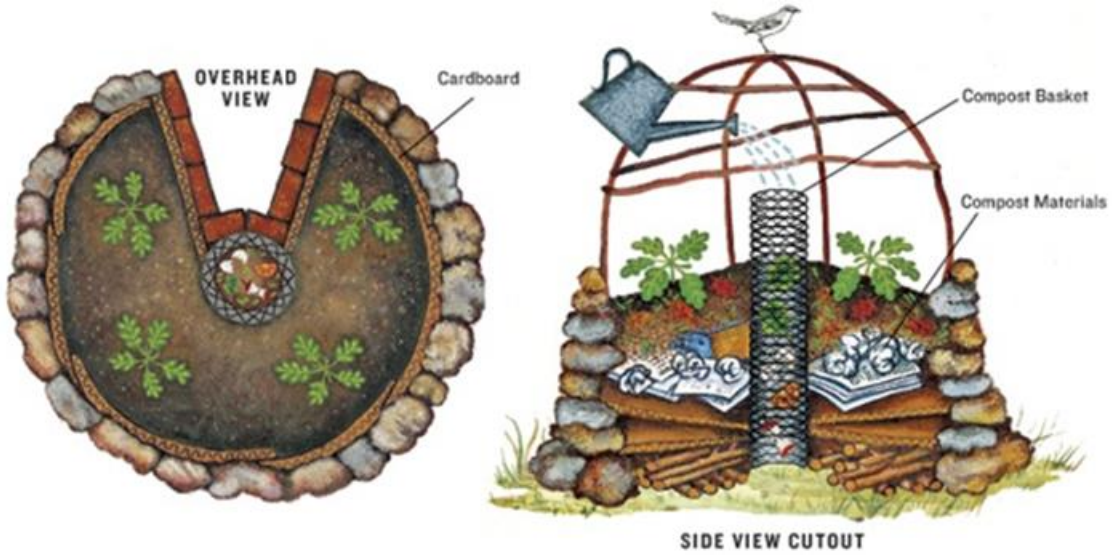
Square Foot Gardening

- Mel Bartholomew (PBS) designed in 1981
- Build up your garden in a series of squares
- Each square is 12 inches x 12 inches, an area of 1 square foot
- Grouping the small 1 foot squares together into blocks
- Plant per spacing requirements
- Continuous planting
- Saves on time, water, work and money


PLANT SPACING
Extra Large
1 Plant
Placed 12 inches apart:
Broccoli
Large
4 Plants
Placed 6 inches apart:
Leaf Lettuce
Medium
9 Plants
Placed 4 inches apart:
Bush Bean
Small
16 Plants
Placed 3 inches apart:
Carrot
Cabbage
Swiss Chard
Spinach
Radish
Pepper
Marigold
Beet
Onion

Keyhole Gardening

- Sustainable gardening method using kitchen and garden waste as food for your garden
- Round, raised garden with pie-shaped slice or keyhole
- Constructed of any kind of material
- Ideal for harsh, dry growing climates
- Less: bending, water, weeding, fertilizer
- Critter resistant

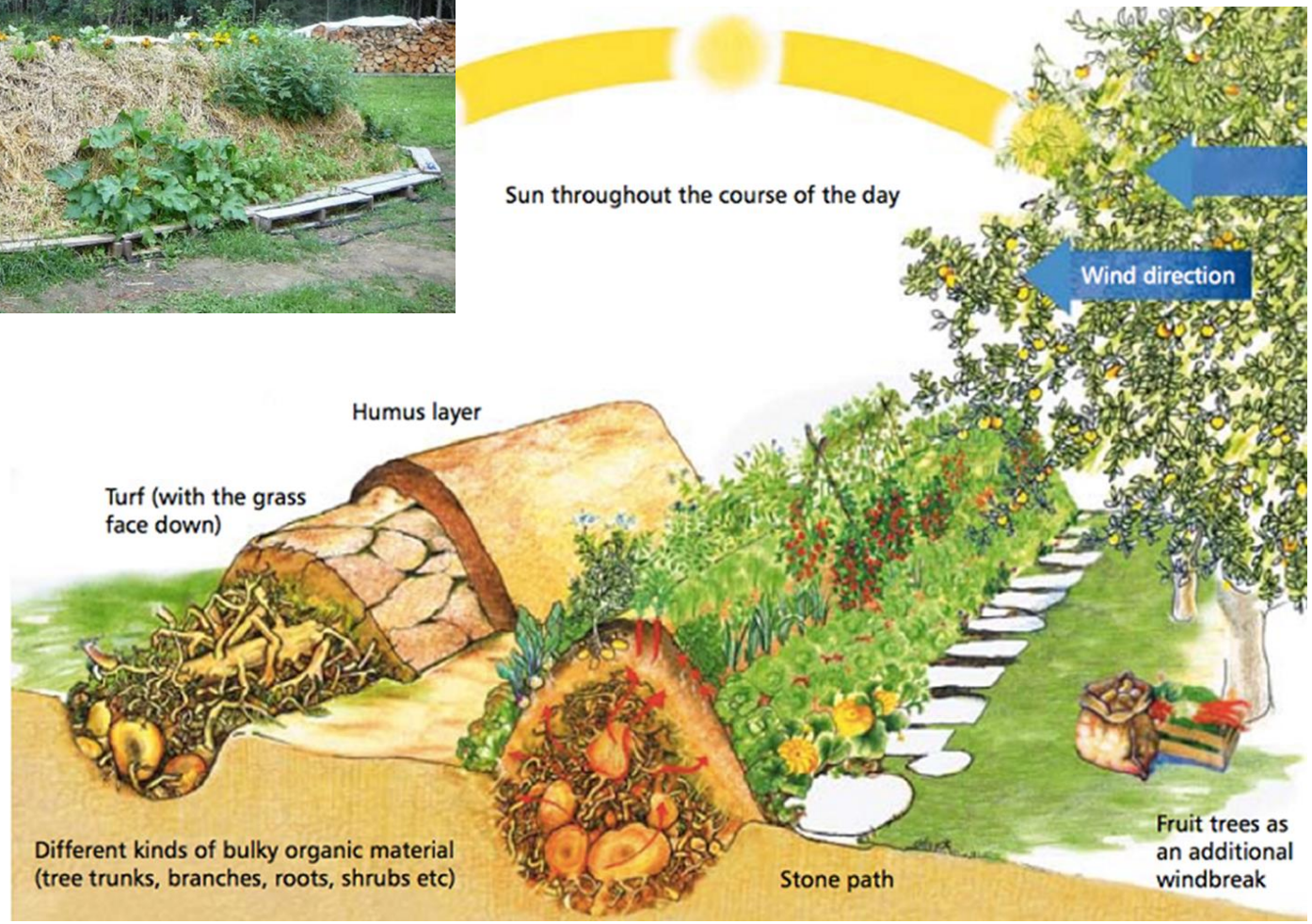


Container Gardens

- Ideal for limited/no yard
- Can control soil, light-weight potting soil, not garden soil
- Require consistent water, daily to 2 x day
- Grow plants that tolerate limited space
- Pot size for mature plants
- Mix vegetables with flowers and herbs

Hügelkultur

- Germanic word meaning “mound or hill culture”
- Great for less than ideal soil conditions
- Conserve water
  - Logs soak up water and slowly releases it
- Nutrient rich soil
  - Decaying compostable materials
- Uses yard debris
  - Stays out of landfill or burn piles
- No-till
  - Tilling is time consuming and needs special equipment
  - Tilling harms and/or kills beneficial insects


Sun throughout the course of the day
Wind direction
Humus layer
Turf (with the grass face down)
Different kinds of bulky organic material (tree trunks, branches, roots, shrubs etc)
Stone path
Fruit trees as an additional windbreak

Irrigation

What is irrigation and how do we do it?

Common Irrigation Systems

- Surface irrigation.
  - Water is distributed over and across land by gravity, no mechanical pump involved.
- Localized irrigation
- Drip irrigation
- Sprinkler irrigation
- Center pivot irrigation
- Lateral move irrigation
- Sub-irrigation
- Manual irrigation

Drip Irrigation

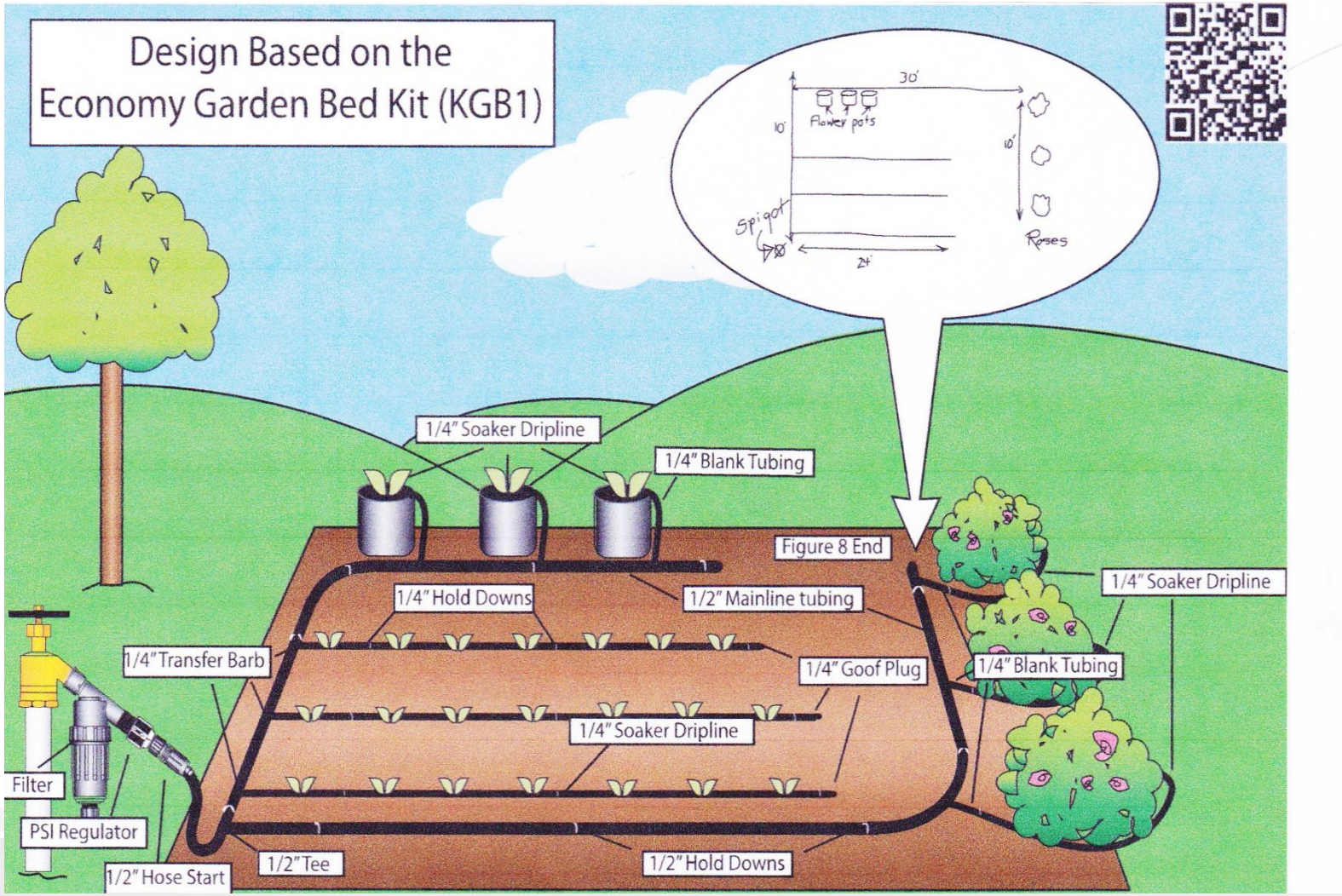
- Saves water , money & time. ENOUGH SAID !!!
- Delivers water directly to the root zone
  - No damage to leaves
- Automatic timers or irrigation clocks can be set to deliver water to flowers , vegetables and landscapes when the plants need it
- Discourages the growth of weeds, no surplus water
- Protected from certain diseases like powdery mildew

Drip Irrigation - Benefits

- East to Install!
- Low Cost compared to professionally installed systems
- Does not interfere with existing systems
- No license to install
- No electrical needed
- Properly used low impact irrigation does not waste water
- Eases new gardener’s frustration with water practices

Direct Delivery to the Plant !

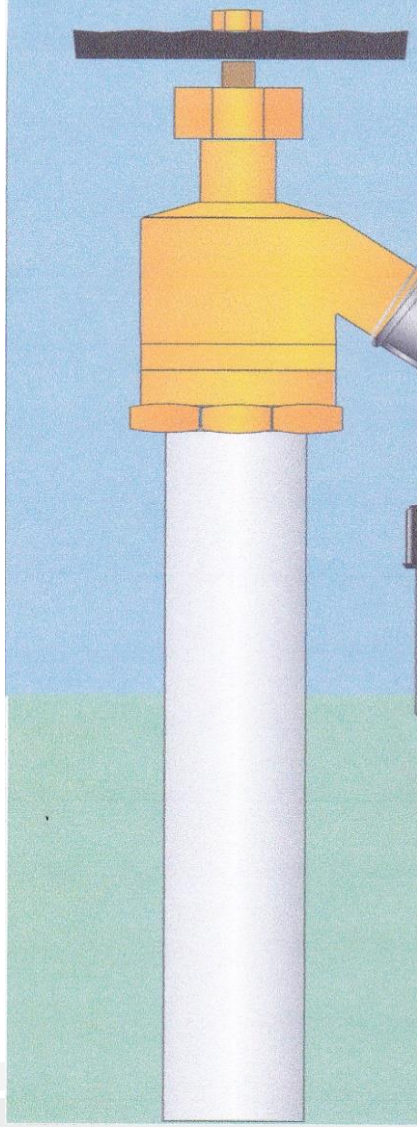
What a basic system looks like



Simple System – Gravity Powered

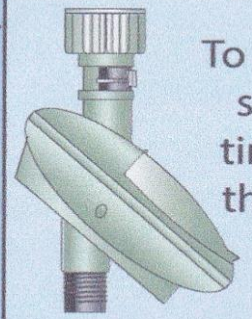
Emitters

Typical backyard garden hose threaded start



Screen Filter

Removes sediment and other particles large enough to clog emitters.



To automate this system add a timer between the spigot and the filter.

PSI Regulator

Reduces incoming water pressure which is sometimes too high for drip irrigation systems.

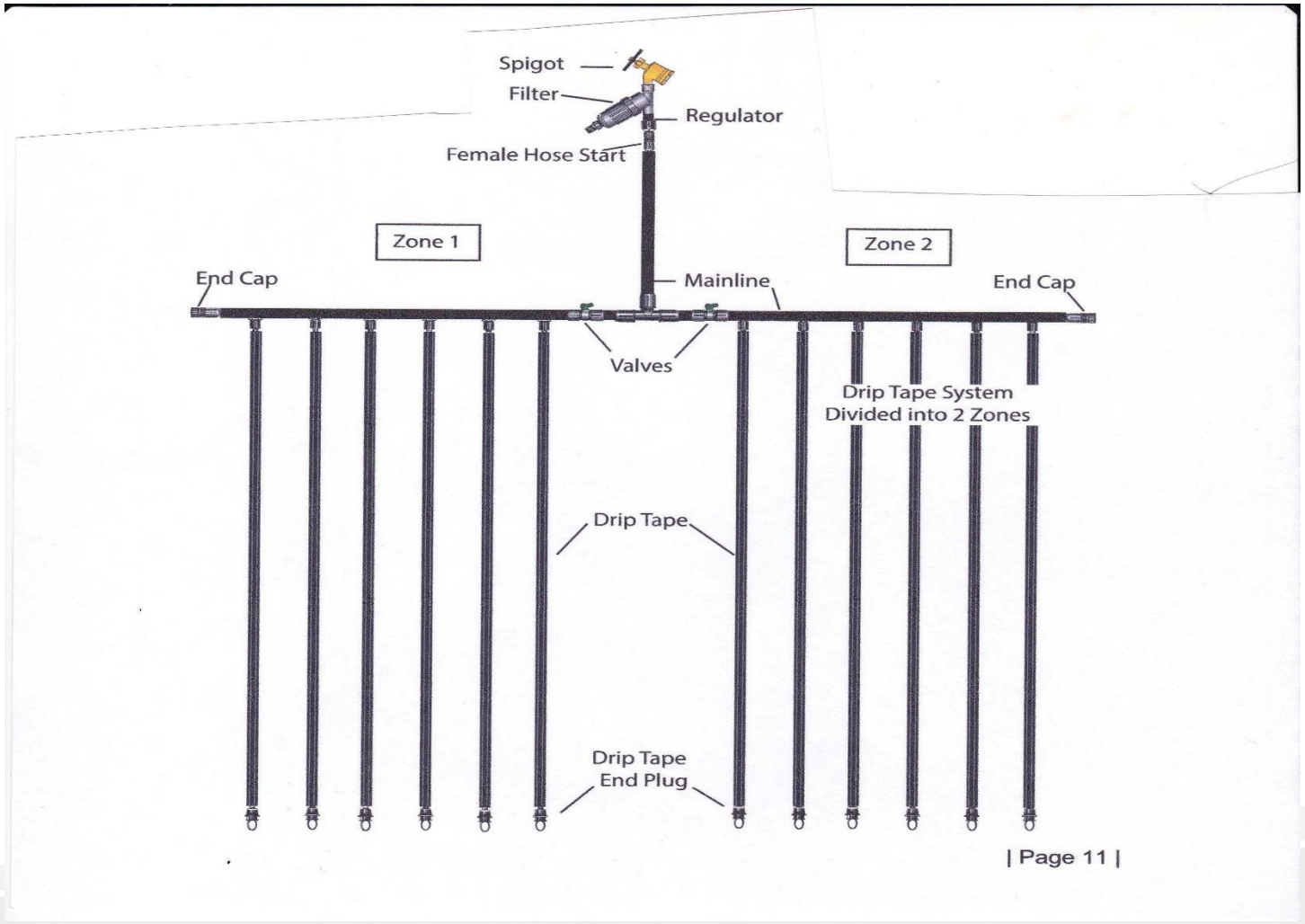
Female Hose Start

Attaches the mainline to the last hose threaded connection in the sequence.

Mainline Tubing

Carries the water throughout the drip irrigation system to attached emitters, emitter tubing, drip tape, sprayers, sprinklers, and other watering products.

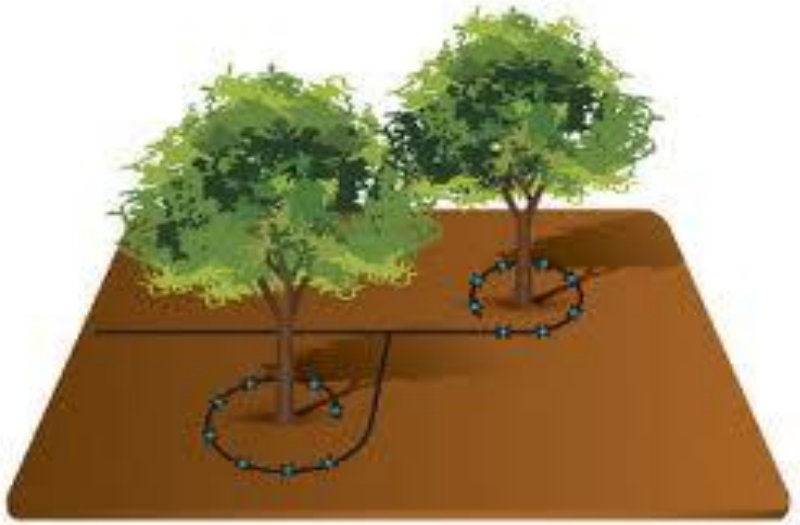
Large In-ground Garden System



Installation Tips

- Before rolling out, warm tubing in the house or sun
- Consider mulching over the tubing
  - increases lifespan
  - Protects from UV rays
- Once installed and before adding emitters, flush with clean water
- Add backflow prevention
- Automate with a timer

Drip Line System



10-Min Break

Vegetables

Top Garden Vegetables + More

Vegetables

- Tomatoes
- Peppers
- Cucumbers
- Beans
- Onions
- Greens
- Melon
- Root
- Corn
- Others

Tomatoes

- Determinate
- Indeterminate

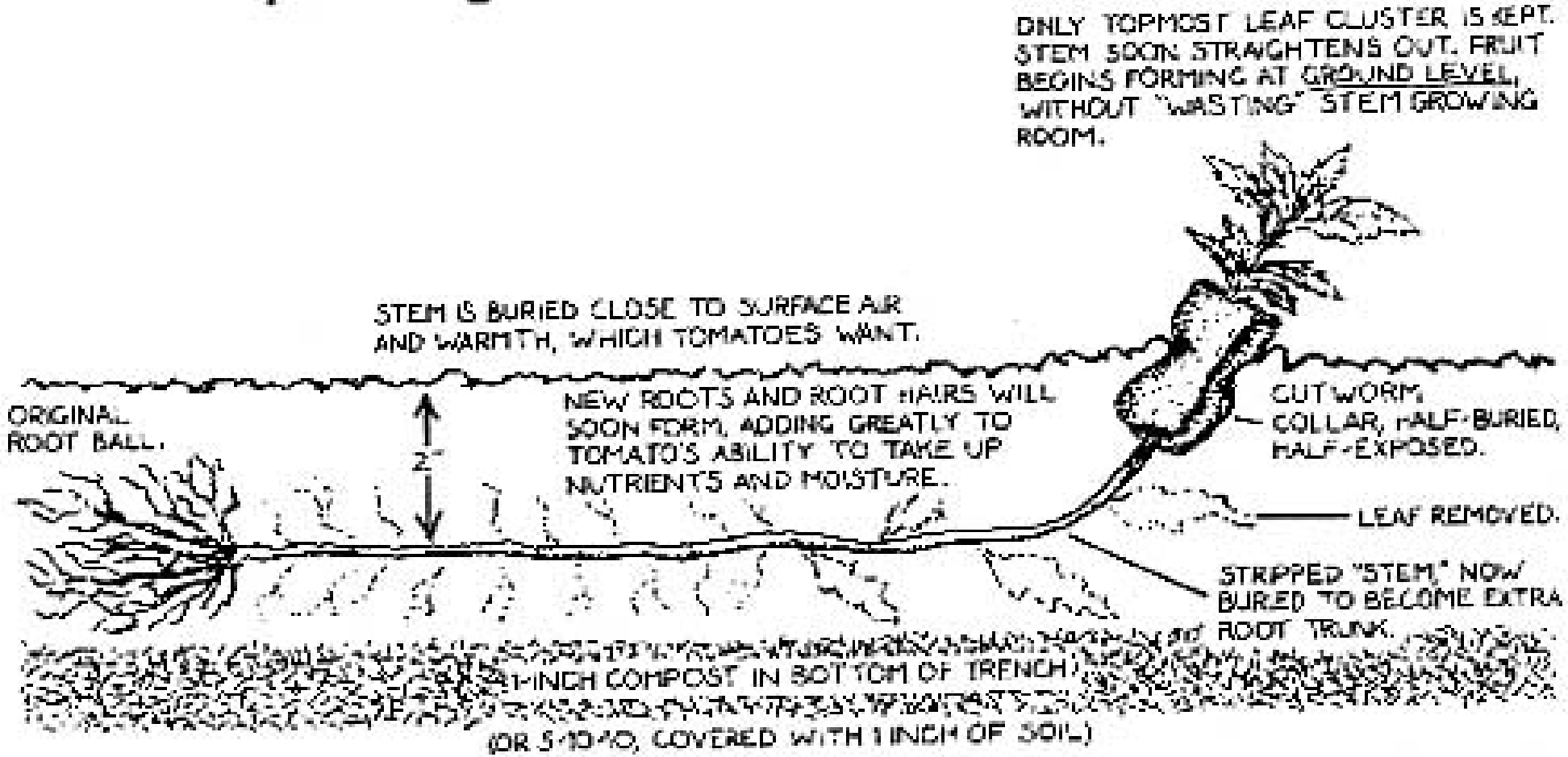
How to Plant

- Choose healthy looking young stocky transplants
- Harden off if needed
- Bury deep, covering the bottom two or three stems
- Plant two to three feet apart
- Water thoroughly!
- Support with study system.....
- Lanky plants can be buried in a trench
- Buy varieties know to do well in your area
- (Clint's Method) (gypsum, fertilizer, Epsom Salt)

How to Grow

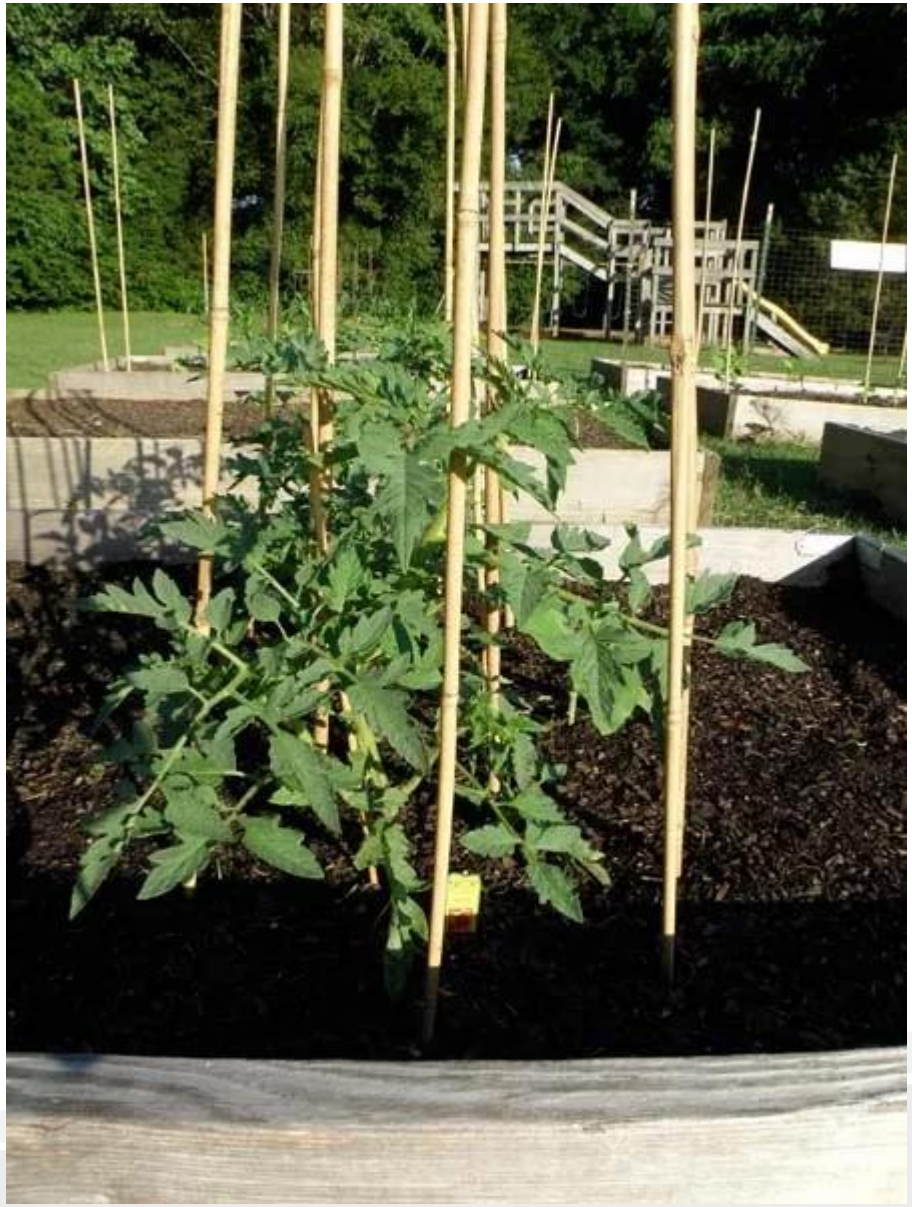
- Fertilizer Needs
  - Heavy Feeder: Use a starter solution for transplants and side dress when the first Fruit sets 1 1.2 oz of 21-0-0 per 10 feet of rows; side dress again at first harvest; repeat every two weeks.
- Common Problems
  - Diseases: Early blight, lead spot, Verticillium and Fusarium wilts, late blight, nematodes, Bacterial spot
  - Insects : Flea beetle, horn worm, stink bugs, potato beetle, aphids, white flies, cutworms

"Trench-planting" a tomato



Growing

- **Cages** – Store bought or home made
- **Stakes** - Install wood or re-bar stakes at least six feet tall at planting time. As the plants grow, tie the stems loosely to the stakes with twine or strips of fabric
- **Vertical Twine** - a pole is run between two stakes, then cords are run from the pole down to stakes placed in the ground. You plant your favorite tomatoes (or cucumbers or beans) beside the low ends of the cords, then the plants climb diagonally to the tops.
- **Florida Weave Method**



Florida Weave Method

- Used for long rows of Determinant Tomatoes
- Use a heavy twine, jute will weather and break

Peppers

- From transplant April 1-May 30, seed started 8 wks before LFD
- pH 5.5 – 7.0
- Love heat, soil temp over 70^0-85^0
- Like to be a bit crowed
- Fertile soil
- Too much nitrogen retards fruiting
- All green pepper are not ripe – only ripe when they turn red/yellow/orange

- Sweet: Big Bertha, Jupiter, Purple Bellle, Top Banana
- Hot: Super Chili, Hungarian Yellow Wax, Long Red or Slim Cayenne, Hidalgo Serrano, Jalapeno, TAM Mild Jalapeno, Habanero

Peppers

Cucurbits

- Cucurbitaceae family is the species with the most food used for human consumption.
- Common types of cucurbits
  - Cucumbers
  - Pumpkins
  - Summer/Winter Squash
- Includes muskmelons and watermelon
- Grow from either seed or transplant

Cucumbers

- Varieties include
  - slicer or fresh salad type
  - pickle type
  - dwarf-vined or bush varieties

- Space 12-18 inches apart, provide support except bush style
- Heavy feeder like tomatoes
  - same disease and insect problems
- Misshapen fruit due to
  - low fertility or
  - poor pollination
  - inconsistent water

Beans

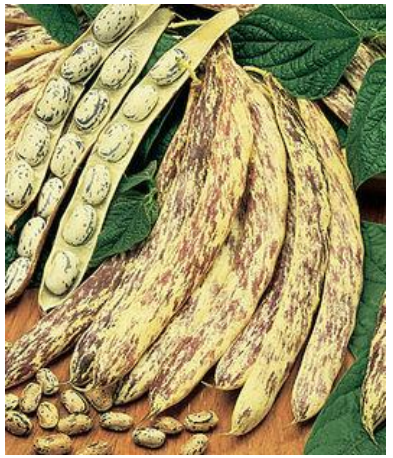
- Direct sow, after LFD, mid-March
- PH 6.5, well-drained
- Full sun
- Germination soil temps 70^0 - 80^0
- Seeds – eyes down
- Avoid overhead watering
- Legume family
- Fertilize at planting time – fish emulsion
- Plants add nitrogen to soil

- Bush
  - Green; Blue Lake 274, Top Crop, Contender
  - Yellow; Goldencrop, Golden Wax
  - Purple; Royalty Purple
  - Striped; Dragon Tongue
- Pole
  - Green; Blue Lake, KY Wonder
  - Purple; Purple podded
  - Yard-long; Chinese red noodle, Asparagus
- Shell
  - Black, Pinto, Purple Hull, Sweet Cream, Lima

Purple Roaylty
YellowWax
Green Bush

Italian flat

Endame



Dragon
Tongue

Scarlet Runner

Pinto

Melon Subgroup

- Muskmelons
  - Cantaloupe, Honeydew and Casaba, Crenshaw, other melons
- Originated in the middle east
- Planted from seed or transplant
- Prefer sandy soil
- Long growing season (80-100 days)
- Require a lot of space - too much for small gardens – can grow vertical
- Plant hills 36 inches apart with 60-90 inches room to spread
- Heavy feeder. Average moisture early, but dry in maturity as fruit sets
- Poor flavor and lack of sweetness
  - low fertility, wet weather, cool temps, picking too young

Watermelon

- Native to Africa
- Need warm temperatures (up to 80°F during the day)
- Long growing season, 90-110 days
- Sow seed directly outdoors, wait until the soil temp is 70°F to avoid poor germination
- Amend soil with aged manure, seaweed, and/or compost before planting.
- Are heavy feeders
- Space about 2 feet apart in 5-foot-wide hill. If in rows, space 6 feet by 6 feet apart.
- Drip irrigation and black plastic mulch
- Melons need about an inch of water each week

Greens

- Direct sow, early spring Feb 1-Mar 1
- pH 6.5 – 7.0
- Soil temps 40^0 - 60^0
- Full sun, part shade
- Needs compost, consistent water
- Prefers cool weather, tolerant of light frost
- Pick early for micro-greens
- Cut and come again harvest fpr longevity
- Mesclun – is not a variety but a mix of greens

- Lettuce: Leaf (Black seeded Simpson, Salad Bowl, Red Sails); Romaine; Cos; Butterhead (Buttercrunch, Tom Thumb); Iceburg (Classic, Parks Mission)
- Kale; Dwarf Blue Curled, Blue Knight, Lacinato, Red Russion
- Bitter: Mustard (Tendergreens, FL Broadleaf, Southern Giant Curled), Collard (Blue Max, Georgia) Turnip (All Top, Topper, Purple Top)
- Arugala: Rocket
- Swiss Chard: (Fordhook Giant, Ruby, Rhubarb)
- Spinach: (Coho, Melody, Iron Duke, New Zealand)


Mustard Greens
Suehlihung
No. 2
Ruby Streaks
Golden Frill
Osaka Purple

Onions & Leeks

- Come in a wide variety of shapes, sizes, and colors.
  - White, yellow, or red
  - Range in size, small pickling to large Spanish cultivars
  - Globe, top, or spindle shaped
- Onions can be planted from seed, sets or transplants (available in bunches)
- Sets are from last years crop, transplants are from this years
- Short day onions, (Texas 1015) form bulbs as soon as days reach 10 to 12 hours sunlight
- Long-day types need 13 to 16 hours of daylight
  - Grow in more northern latitudes
- Grow tops in cool weather, form bulbs when weather warms

Onion varieties for East Texas

- Texas 1015
- Yellow Granex
- Texas Legend
- Red Creole
- Southern Bell Red
- Texas Early White

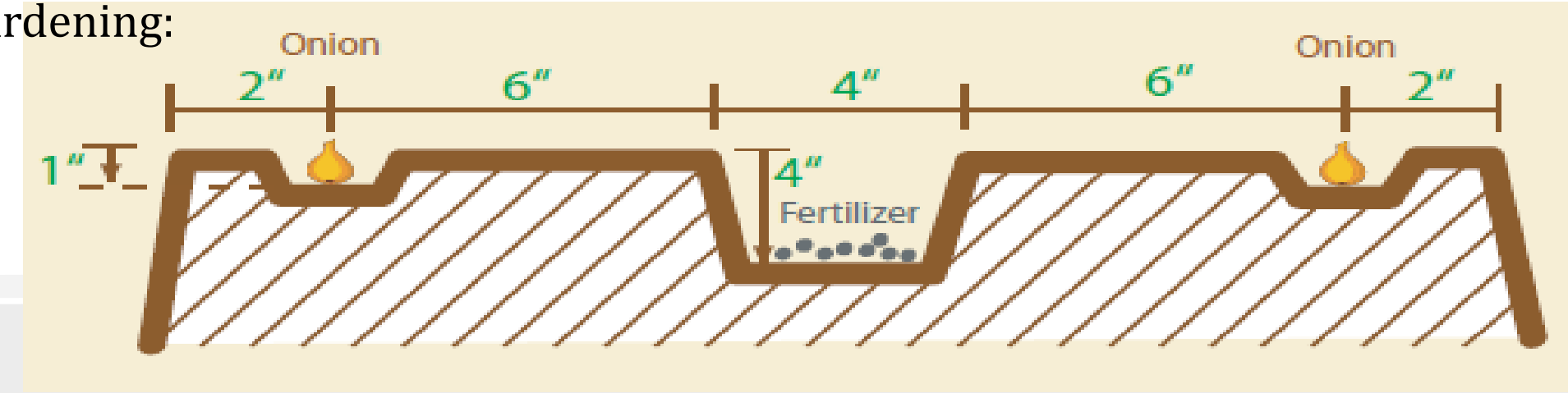
Four Steps To Growing Big Sweet Onions

- **Soil Preparation**
  - Onions require full sun and good soil drainage. Choose a location that gets plenty of direct sun.
  - Onions grow best on raised beds or raised rows at least 4" high and 20" wide.
  - The soil should be loose and crumbly. If it's compacted, work in compost to improve aeration and drainage.
  - To stop weeds for up to six weeks, rake a pre-emergent herbicide, such as Treflan or corn gluten meal, into the top inch of soil before you plant.
- **Soil Type**
  - Onions prefer soil with a pH between 6.2 and 6.8. If your soil is too acidic, mix in ground limestone, available at your garden center. If it's too alkaline, add peat moss.

Planting

- Plant your onions 4-6 weeks before the last estimated Spring freeze.
- For best growth and yield, onions need fertilizer right from the start. Use a fertilizer with the middle number high than those of the other two, such as a 10-20-10.
- For smaller gardens, such a square foot garden, plant four onions per square or for scallions

For row gardening:



Root Vegetables

- Potatoes, Irish
  - Feb 1-15
  - Soil temp 45^0
  - pH 5.0 – 6.5
  - Full Sun
  - Fertile soil
  - Cut starts in 1.5” pieces with eyes, let heal 2-4 days
  - Red (LaSoda, Norland) White (Kennebec) Yellow (Yukon Gold)
- Potatoes, Sweet
  - April 15–June 15
  - Soil temp 65^0 - 90^0
  - pH 5.5 – 6.5
  - Full Sun
  - Composted soil
  - Slips – purchase or grow
  - Beauregard, Jewel, Codner

Root Vegetables

- Beets
  - Feb 1 - 15
  - Soil temp 65^0 - 75^0
  - pH 6.5 – 7.5
  - Full Sun, light shade
  - Deep, composted soil, moderate watering
  - Roots can grow up to 3 ft
  - Pacemaker 111, Early Wonder, Explorer, Detroit Dark Red

Root Vegetables

- Turnips
  - Feb 1 – Mar 10
  - Soil temp 40^0 - 75^0
  - pH 5.5 – 6.8
  - Full Sun, light shade
  - Fertile, light soil, moderate water
  - Tokyo Cross, Royal Globe II, White Lady

Sweet Corn

TABLE 1. PROPERTIES OF SWEET CORN TYPES. [2]

Type (genes)	Shelf Life (days) *	Sugar Content
Sugary (*su*)	1 to 3	normal
Sugary Enhanced (*se*)	3 to 5	Slight to moderate or even high
Supersweet (sh_2)	5 to 10	high
Synergistic (full *su* + half sh_2)	3 to 5	moderate
Improved Supersweet (half *su* + full sh_2)	5 to 10	very high

* Under optimal storage conditions

Sweet Corn

- Avoid cross-pollination between super sweet varieties and non-super sweet varieties.
- Delay sowing fungicide-treated seeds until soil temperature is at least 55--60°F
- Sow 3/4-1" deep, 6-7" apart (or 2 seeds every 9", thinning to 1 plant), rows 30-36" apart.
- Arrange in blocks of at least 4 rows for proper pollination, which is needed for well-filled ears.
- Successive plantings can be made through early summer
- Growers prefer to extend the sweet corn season by planting varieties of different maturities

Sweet Corn - Fertilization and Pests

- Common Rust & Southern Rust
  - Fungus that attacks the leaves
- Maize Dwarf Mosaic
  - Maize dwarf mosaic, caused by several related viruses, is generally the most important of the viral diseases of sweet corn. The viruses are vectored by aphids, and the viruses spread systemically within the plant after infection. Infected plants are stunted and show a mottling of the leaves.
- Stewart's Wilt
  - Bacterium that overwinters in and is vectored by the corn flea beetle.
- Northern Corn Blight
  - Also attacks the leaves
- Corn Earworms
  - The larval form of an adult moth, which lays a single egg in the green silk of a corn stalk. The eggs hatches and the worm feeds on the silk of the corn for about two weeks, eventually ending up in our market baskets.

Other

- Asparagus
  - 1 yr. crowns, Feb-Mar
  - Soil temp 60⁰ - 70⁰
  - pH 6.5 – 7.5
  - 6-8 hrs. Sun
  - Fertile well-drained soil, heavy water
  - Harvest after 3rd yr.
  - Jersey Giant, Martha Washington

Okra

- Seed mid-April, transplants
- Soil temp 70⁰ - 90⁰
- pH 6.0 – 8.0
- Full Sun
- Composted soil, low water
- Clemson Spineless, Emerald, Burgandy

Other

- Kohlrabi
- Brussel Sprouts
- Eggplant
- Pumpkin

- Bok Choy
- Radish
- Broccoli
- Cauliflower

Questions