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TAKE YOUR GARDEN TO HIGHER LEVEL!

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WHY?

- Intensive Vegetable Gardening Practices
  - **Increase** productivity/maximize yields
  - **Increase** sustainability
  - **Expand your garden space**
    - **Saving** time, space, energy, fertilizer, water

Intensive Gardening

- Can help solve:
  - drainage problems
  - enable use of poor sites
  - minimize soil compaction
  - eliminate need for power equipment
  - expand the growing season

Intensive gardening practices

- Healthy soil!
- Careful planning
- Wide-row planting
- Staggered planting
- Succession planting
- Inter-planting
- Vertical growing
- Cover crops
- Plastic mulches
- Season extenders

‘Beware’…INTENSIVE means

- Watering
- Thinning
- Pest control
- Sanitation
- Crop rotation
- Fertilizing/healthy soil
- Composting

Soil health

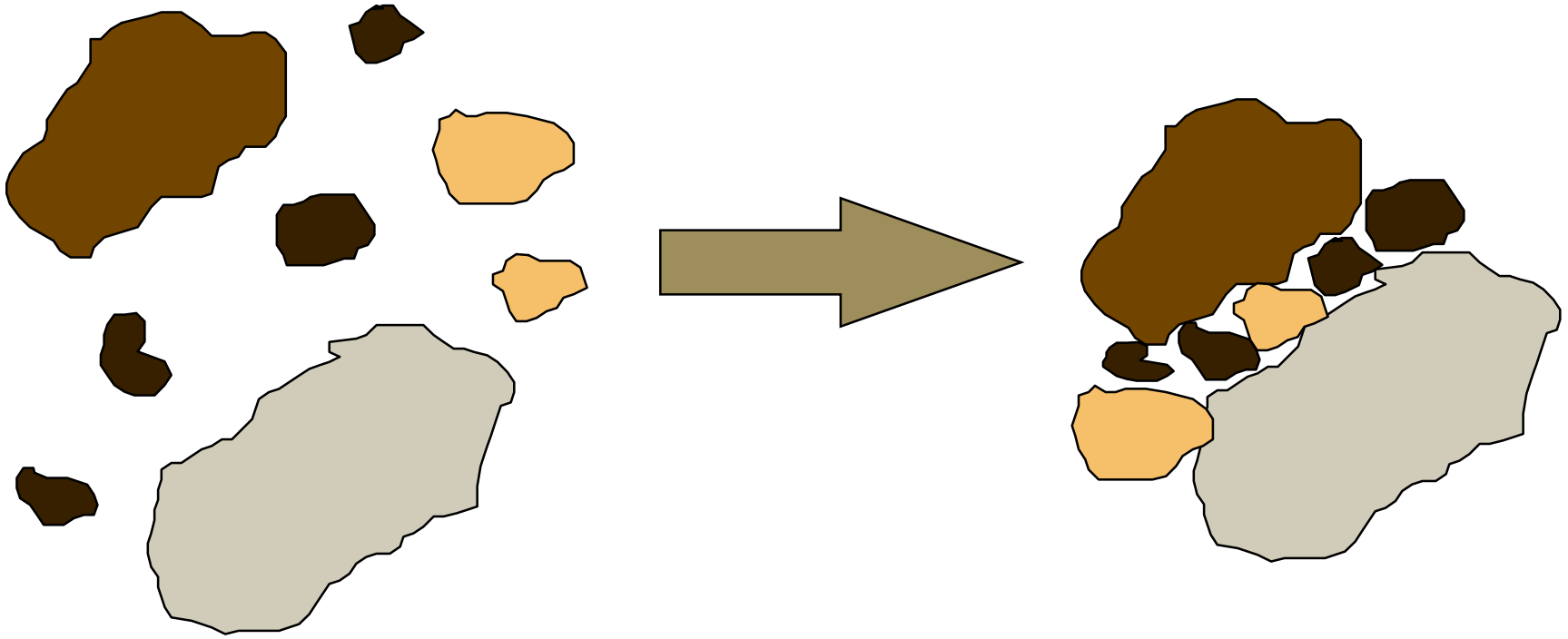
Always remember, 'feed the soil to feed the plant'

- Soil test every 3 yrs.
- Reduced tillage/cultivation
- Organic mulches
- Well-rotted manure
- Compost
- Raised beds
- Cover crops

Soil Structure

Loose

Aggregated

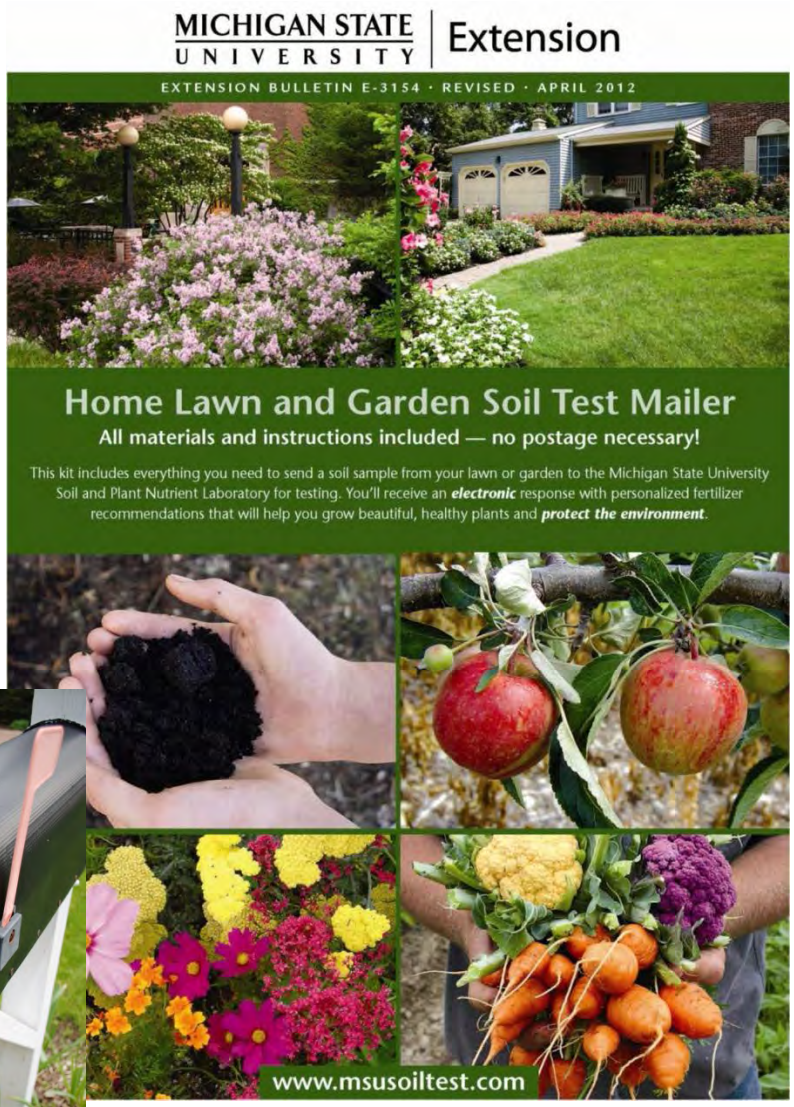


Texture vs. Structure

- Texture is unchangeable
- Structure can be improved or destroyed

www.msusoiltest.com

Smart Soils – be sure to get your soil tested to see what nutrients the soil might be lacking? What is the pH? What is the organic matter content?



Minimal cultivation

Photo by: Bookshelf Boyfriend, flickr.com

Ingrid S, flickr.com

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Smart Gardening

Organic mulches

- Are you using mulches?
  - reduce erosion and water loss?
  - add nutrients over time
  - create a more even soil temperature
  - Weed control

Weed Control Demo, Chatham, 1993

Compost

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Smart Gardening

Composting

Size

- Maximum size of 4’ x 4’ for the backyard

Photo by: Ciaran Mooney, flickr.com

Location

- Place convenient to the garden
- Not in a low spot

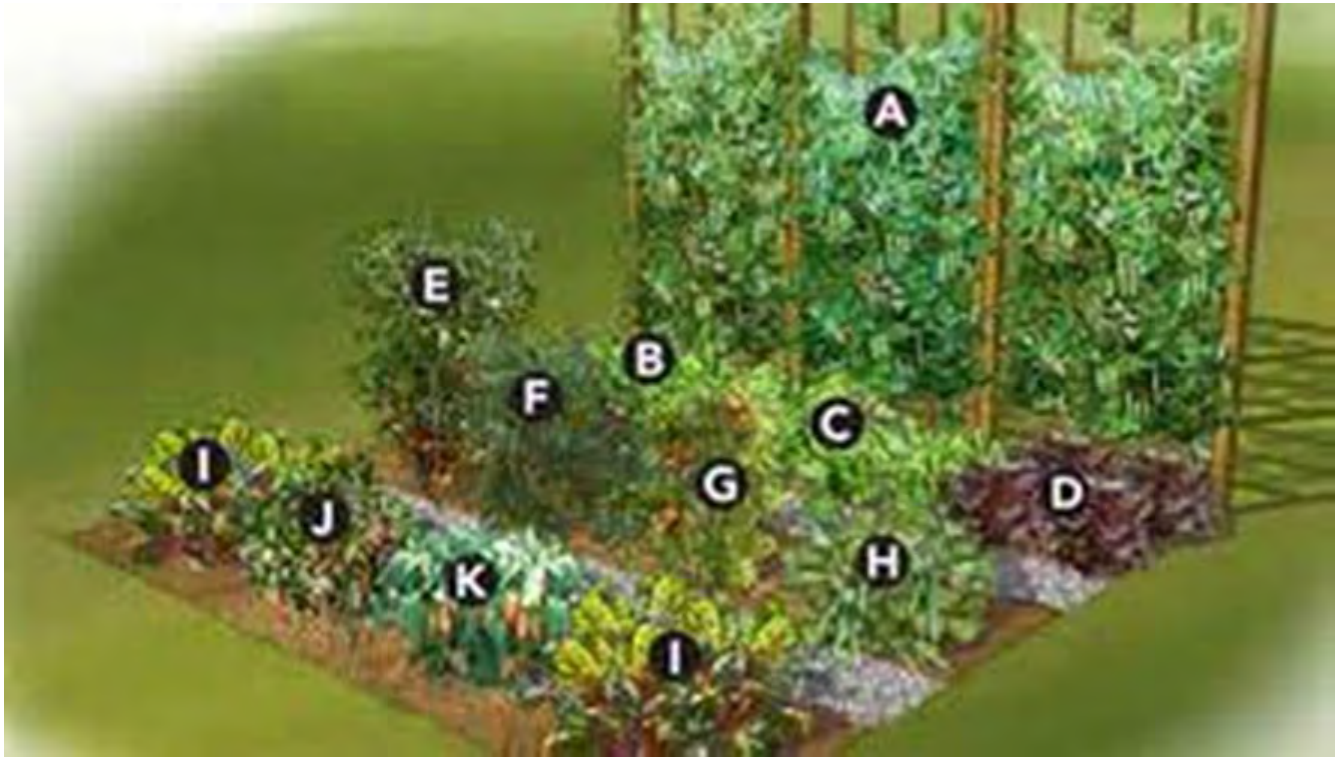
Careful planning

- Interrelationships of the plants
  - Nutrient needs
  - Shade tolerance
  - Above & below-ground growth
  - Preferred growing seasons

- Start in January and Feb.
- Your likes
- Amount needed

Intensive gardening can look beautiful while saving space and resources. (Photo credit: Karen Jeannette)

Keep records, plan, plan….



Determine

- Length of crop- short or long season crop

  i.e. (#of days to maturity)
- Appropriate planting dates
- Season specific varieties
- Soil temperature
- Length of harvest
- Crop competition

Edible Flowers

Pollinators & other ‘good guys’

Intensive gardening techniques

- Wide row
- Raised bed planting
- Square foot gardening
- Succession Planting
- Inter-planting
- Growing Vertically

Wide row

- 1-4 feet wide planting rows
- Vegetables for wide rows:
  - Beets, carrots, chard, leeks, lettuce, onions, parsnips, radishes, spinach, turnips, beans, kale, cabbage, beans, peas, garlic, shallots
- Stagger plants rather than in single file rows.

Recommended spacing

- Radishes 1”
- Onions, beets, carrots 2-3”
- Leeks, turnips, peas 3-4”
- Lettuce, bush beans 4-6”
- Cabbage, broccoli, cauliflower 18”
- Eggplant 18-24”
- Tomatoes 18-24”
  - (dependent on cultivar)

Raised bed

- Raise soil level 6-12” above ground level
- Can be supported or not
- 3-4” wide and any length
- Reduce compaction
- Plant using a wide row or broadcast
- Goal: space plants equal distances from each other on all sides

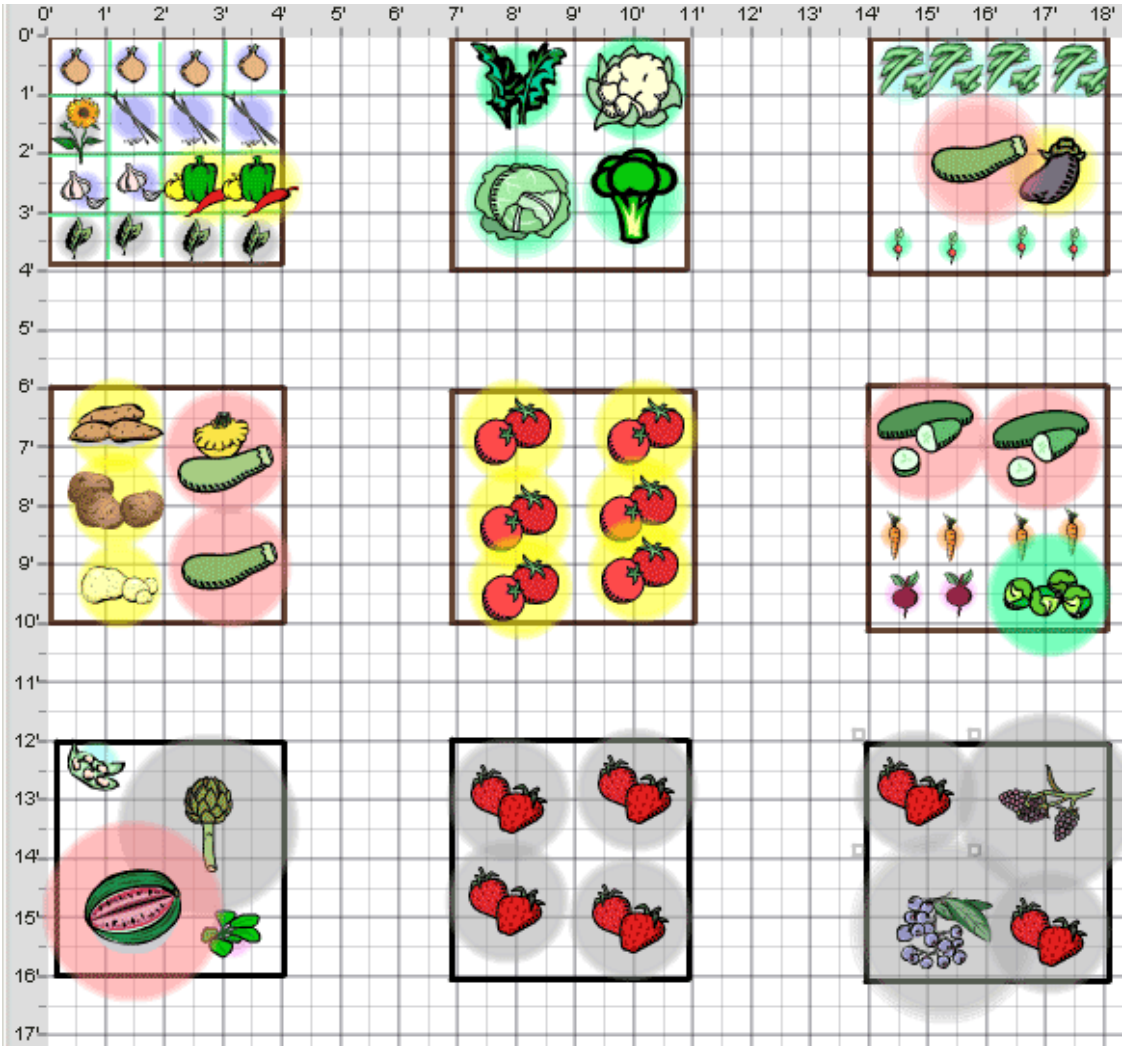
Raised beds

Raised Beds-and Space Saving options

Space-saving Options

Square-foot Gardening

Square foot garden plan



Succession Planting

- After harvesting one crop, replant space with another
  - e.g. early cabbage and broccoli followed with snap beans or zucchini
  - e.g. spring lettuce, radishes, and spinach with beets or carrots
  - e.g. after harvesting peas, plant Brussel sprouts or onions

Be sure to re-fertilize and/or add organic matter.

Be sure to keep transplants and seeds well watered.

Succession with relaying

- 2 week intervals
- Plant cultivars that vary in maturity time, e.g. 50 and 60 day beans or early, mid, and late-season corn

Succession

- Plant a spring, summer, and fall garden
  - Cool season crops (broccoli, lettuce, and peas)
  - Warm season (beans, tomatoes, peppers)
  - Cool season or a winter cover crop

Succession success

- Starting seeds indoors
- A new crop should be ready to take the place, e.g. having 6” transplants ready to go will save you time
- Be sure to recondition soil, i.e. add organic matter

Interplanting

- Planting 2 or more different crops in the same row or bed
- What do you need to know for success?
  - Length of its growing season?
  - What is its growth pattern
  - Possible negative effects on other neighboring plants?
  - Preferred growing season?
  - Light?
  - Nutrient requirements?
  - Moisture requirements?

Interplanting

Intercropping

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Smart Gardening

Interplanting

- How can it be done?
- Alternating rows in the same bed, mixing plants within a row, or by distributing various species
- Beginners – suggest alternating rows

- e.g. between pepper plants (12”) seed radishes, leaf lettuce, or spinach

Interplanting

- Mix Long-season (slow-maturing) crops like carrots with

Short-season (quick maturing) crops like radishes

Growth patterns – radishes at the base of beans or broccoli or shade tolerant lettuce, spinach, and celery planted in the shade of taller crops

Heavy feeders, like cabbage family, mixed with less gluttonous plants.

Mix root, leaf, and legumes to take advantage of nutrients.

Interplanting

- Help with insect and disease

- Spacing: Center of one plant to center of another

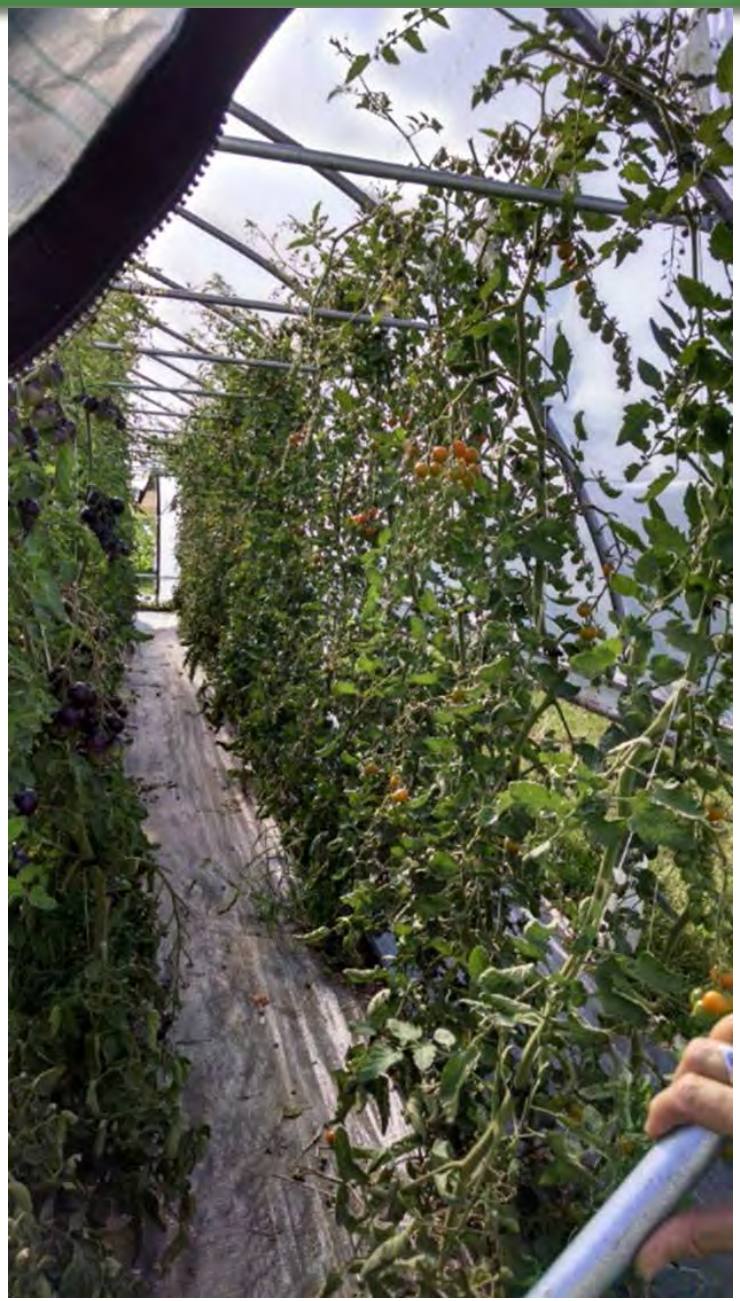
Growing vertically

- Grow upward to save space
- Make use of trellises, nets, strings, cages, panels, or poles
- Especially suited to small spaces
- Beware of shadows
- Water requirement
- Yield per square foot is high vs. yield per plant

Vertical Growing

- Tomatoes and vine crops
- Pole beans – 6-7 foot high
- Clingers (peas, cucumbers) – 5-6’ – chicken wire
- Melons & winter squash – require strong structures and slings to support heavy fruit, must train them
- Tomatoes – 1-2 main stems & loosely tied to a 5-6’ stake

Tomatoes



Pole beans

Pole beans

Melons & Winter Squash

Pole beans

Up close

At the beginning

During the season

thecasualgardener.blogspot.com

Accessible & Vertical

A test…. ☺

Cover crops

- Benefits:
  - Suppress weeds
  - Protecting soil from rain or erosion
  - Improving soil structure
  - Adding organic matter to soil
  - Fixing nitrogen
  - Scavenging soil nitrogen
  - Decreasing soil diseases and pests
  - Helps pollinators and beneficial insects

Cover crop types:

- Legumes vs. non-leguminous
- Low-growing vs. tall growing
- Cold vs. warm weather tolerant
- Annual vs. perennial

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Smart Gardening

Cover crops

- How to get started?
  - What are your goal(s)?

  - Planting – work up soil, broadcast seed, and rake it in.
  - Fall planting – 4 weeks before killing frost

  - Care – mowing may be required
  - White Dutch clover

Cover crops

- Killing – at flowering
- Mow with a mower or a weed trimmer
- Wait 1-2 days until dry and then dig them in

- Wait 2-3 weeks before planting (allelopathic)

How do I fit in cover crops?

- **Succession planting** – after lettuce, radishes, and other early vegetables, plant a fast growing cover crop, like buckwheat

- **Interplanting** – plant a cover crop 1/3 of the way through the vegetable's lifecycle, e.g. 75 day corn, seed cover crop at 25 days after sowing corn

- **Transplant** tomato or pepper plants **into a mowed mulch** of hairy vetch and rye.

Which one to use?

- Time of year and species?
  - Cereal rye (cold tolerant) vs. buckwheat (frost tender)
- Other examples:
  - Rye – annual rye vs. cereal rye
    - Plant late summer/early fall
  - Field peas/oats – nitrogen fixing and organic matter
    - Plant late summer/early fall, winter kill

Which one continued?

- Sorghum-sudangrass
  - Organic matter
  - Frost tender – mow it down to 6” when it reaches 3’ or plant 7 weeks before frost

- Buckwheat
  - Excellent smother crop
  - Don’t let it go to seed
  - Matures in 6-8 weeks

Which one?

- Clover
  - White Dutch clover – great living mulch tolerating shade and traffic
  - Yellow blossom sweet clover – excellent nutrient scavenger, builds soil structure
  - Crimson clover – attracts beneficials, looks nice
  - All help to build rich soils

- http://covercrops.cals.cornell.edu/decision-tool.php

Cover up

Legumes

- Contribute N to the soil
- Invasive ‘type’ clovers may become a problem if allowed to go to seed or spread
- Plant below heavy feeders, like corn, leave on through winter & then turn under and plant N hungry plants like greens
- Types:
  - Clover – Crimson clover

    Dutch white clover
  - Alfalfa –
  - Fava beans -

Where to buy them?

- Pay premium for small amounts rather than bulk
- Check with your local farm supply/feed store
- Mail order suggestions:
  - Peaceful Valley Farm & Garden Supply, Grass Valley, CA, 888-784-1722
  - Johnny's Selected Seeds, Winslow, ME, 877-564-6697
  - Seven Springs Farm, Check, VA, 540-651-3228

Plastic mulches

- Benefits:
  - Increased yields
  - Earlier maturing
  - Higher quality
  - Enhanced insect management
  - Weed control

Which vegetables?

- Muskmelons
- Tomatoes
- Peppers
- Cucumbers
- Squash
- Eggplant
- Watermelons
- Okra
- Strawberries
- Cut flowers

Plastic mulches

- Color affects energy-radiating behavior AND the microclimate around the plant

- Color affects the surface temperature of the mulch and the underlying soil temperature
  - Plastic must be in contact with the soil, i.e. tight stretching to avoid air pockets

Plastic mulches

- Thickness .015 mil to 1.5 mil
- Opacity
- Color
  - Silver –repels aphids
  - Blue – attracts thrips & increases tomato production
  - Yellow – attracts insects

  - Tomato – 12% increase over a 3 yr. study
  - Black 5 degrees warmer at a 2” depth
    - 3 degrees warmer at a 4” depth

Black plastic

- Can be perforated or without holes.
- Warms up the soil
- Weed

Garden in Three Seasons

- Cloches
- Row covers
- Low tunnels
- Cold frames
- High tunnels

Cloches

- a container that covers individual or groups of plants-protecting them from cold weather
- Can be as simple as a milk jug with bottom cut off
- Commercial examples include:
  - HotKaps
  - Wall ‘o Water

Cloches cont.

- Milk jugs

- Wall ‘o Water

Cloches

Row Covers

- Made from spun polyester and polypropylene.
- Some can be perforated.
- They are lightweight and can ‘float’ over most crops.
- They provide an additional 2 to 8 degrees of frost protection.

Use of row covers

- Frost protection
- Insect protection

Low tunnels

- Mini hoophouse
  - $58 or $27 if use scrap lumber
  - 9’4” L x 3’W x 20” H motherearthnews.com
  - Position ends NOT into prevailing winds
  - Johnny’s Selected seeds -

Secure low tunnels

Low tunnels

Cold frame

- Structure used to start transplants, seed directly, or produce crops.
- Captures radiant heat from sun through use of glass or transparent top.
- Hinged top for venting.

Cold Frames

- Able to extend at least 1 month on each end
- Make no larger than 3x6’
- Back – 4-6” higher

- Grow in pots or flats or directly in the soil

Basic Cold frame
Clear
Glass or Plastic
Door Hinges

Seedlings – hardening off

- ½ hour first day
- ½ hour each for a week

Cold frame

- bales

Materials

- Top
  - Glass, fiberglass, polyethylene, GH plastic, shower door
  - Snow loads
- Frame
  - Straw
  - Cinder (place holes up)
  - Cedar, cypress, redwood
- Permanent or semi-permanent

Temperature monitoring

- Rule of thumb
  - Outside temperature is below 30 degrees – leave top on
  - Outside temperature is above 40 degrees – prop open a few inches
  - Outside temperature is above 50 degrees – remove top completely; you will need to replace late in day; cover to insulate

Cold frame examples

Cold frames

- Automated system
- Less labor
- Still needs monitoring
- Electrical cost
- Initial investment

High tunnels

- Structure with single or double layer of plastic.
- Used with radiant heat of sun or with supplemental heat source.
- Crops started and grown earlier and later in the growing season.

Low tunnel w/strawberry crop

High tunnel

MSU Student Organic Farm

What practices do you see?

Questions?

- Thank you!