BRINGING CULTURE TO THE GARDEN USING IPM

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Principles of Integrated Pest Management (IPM)

- Proper **identification** of pest AND host species
- **Monitoring/scouting/recordkeeping**
- Determination of an **injury threshold level** (when do people notice…complain?)
- Establishment of an **action level** (when does something have to be done to prevent serious or unacceptable injury?)
- Develop treatment **strategies** (cultural, natural/biological, chemical)
- **Evaluate** the effectiveness of the IPM program

Some IPM Misconceptions…

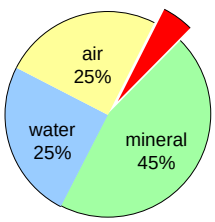
- IPM only allows the use of biocontrols and "natural" pesticides
- IPM prohibits the use of synthetic pesticides
- IPM means that low quality gardening must be tolerated

What are Cultural Practices?

- Soil Preparation
- Planting times
- Crop rotation
- Weed control
- Trellising
- Wind breaks
- Companion Planting
- Cover Crops
- Succession planting
- Pest Control
- Selecting Varieties

Soil Preparation

80% of ALL plant problems are related to root-soil interface problems



Organic matter is the key to quality

organic matter 4-5%

In vegetables gardens ***soil tilth*** is a universal limiting factor of vegetable garden quality and quantity.

Dealing with soil culture

Add annual applications of organic matter

Avoid tilling wet soils

Avoid excessive tilling

Raised Beds: Help Manage Traffic Flow

1st step ~ **75%** maximum compaction

4th step ~ **90%** maximum compaction

- **Good for close block planting**
- **Better weed control**
- **Avoid poor soils**
- **Outsmart critters**
- **Extend the growing season**

Soil temperature is a good method to judge planting times

Measure

- 4-inches deep
- 8 a.m.

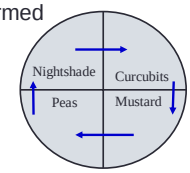
- When temps >40 degrees, you can start to plant cool season vegetables

Raising Soil Temperatures

- Soil warms quickly when dry
- Wet soil puts 90% of the sun's energy into drying the soil and is slow to warm
- Can use clear plastic to warm soils in spring
- A raised bed allows the gardener to cover the soil to keep dry and to trap heat with the use of plastic mulch

Crop Rotation

- Ideal not to re-plant the same family in the same location
  - Solanaceous: peppers, tomatoes, eggplant, potatoes
  - Curcubits: cucumbers, squash, pumpkins
  - Brassicas: broccoli, cabbage, cauliflower, kale, radishes
- Especially if a disease was confirmed
- Rotate crops into containers
- Do the best you can!



Ability of Vegetable Species to Suppress Weeds

Good
- Squash
- Beans
- Pumpkins
- Cucumbers
- Sweet corn
- Melons
- Irish potatoes
- Tomatoes
- Broccoli and Cabbage

Poor
- Lettuce
- Carrot
- Pepper
- Greens
- Onions
- Peas
- Radishes

Mulch for Weed Prevention

- Makes it difficult for weed seeds to germinate – or seedling weeds to survive
- Reduces evaporation from soil surface, cutting water use by 25 to 50 percent
- Organic mulches improve soil tilth and help lessen soil compaction
- Stabilizes soil moisture
- Prevents soil compaction
- Moderates soil temperature extremes
- Controls erosion
- Gives a finished look, improving aesthetic quality

Wood/Bark Chip Mulch

- Wood or bark chip mulch is great around trees, shrubs, perennials and small fruits
- In perennial and shrub beds, wood/bark chips can reduce the need for irrigation by as much as 50%
- Wood/bark chips are not recommended in vegetable or annual flower beds where the soil is routinely cultivated to prepare a seedbed

Grass Clippings as Mulch in Veggies

- Grass clippings make good mulch when applied in thin layers and allowed to dry between applications
- Add additional layers each week the lawn is mowed
- With a few layers, weed seed germination will be checked
- Grass clippings decompose rapidly, requiring additional layers during the growing season
- A grass clipping mulch recycles its nutrients into the garden bed
- Do not use grass clippings from lawns that have been treated with herbicides or other pesticides, for at least four weeks after application

Straw as Mulch?

- Needs to be weed-free straw (will be more expensive than regular)
- Can result in nitrogen deficiency

Newspaper Under Mulch

- Newspapers make a good underlay for a wood/bark chips or grass mulch
- The newspaper shuts out light, giving a quick stop to germinating weed seeds that were brought to the surface during cultivation for seed bed preparation
- Apply newspapers only one to two sheets thick and top with wood/bark chips or grass to hold it in place
- Any remaining newspaper may be cultivated into the soil in the fall
- Newspapers are printed with soy-based inks and are safe for use

Plastic Mulch

- Colored plastic will kill weeds more effectively than clear
- May enhance plant growth
- Will warm soil
- Can conserve water
- Can cause excessive soil wetness
- May encourage slugs and some insect pests
- May provide cover for rodents

Trellising: Give ‘em Room to Grow

- Improved air circulation reduces disease
- Improves vigor and crop size
- Vertical growing doubles available space
- Slows spread of fungal disease
- Reduces attack by insects
- Easy to harvest
- Eliminates ground rot on fruit

Any material can be used

- Plants don't care what they climb
- Make sure trellis will take the weight of the mature plant PLUS fruit

Companion Planting

- Useful for attracting beneficial insects
- Provides support or shade
- Chemical interaction not proven by research

Succession Planting During the Season

- Smaller seedlings fit well interplanted with earlier crops
- Keep beds in use throughout the growing season
- Means not sticking to spring, summer only
- Fall crops often sweeter
- Plant second crop of broccoli, cauliflower from starts in mid-June
- Sow second crop of peas in late June
- Sow second crops of lettuce, spinach in late June

Insect Pests

- Usually host specific but there are generalists
- Learn what can attack your plants, and when
- Scout often
- Control thresholds

Concept of IPM: Insect Management

- Use multiple tactics to reduce pests
- Promote plant health
- Use thresholds (economic or aesthetic)
- Plan ahead with regular scouting
  - Get a proper diagnosis
- Limit chemical applications
  - Follow rates/harvest intervals
  - Think about good timing
  - Mix up chemical classes

Fungi

- Most important problem in gardens
- Spread by spores
- Cause rot, powdery mildew, leaf spots

- Examples: Corn smut, rust

Bacteria

- More of a problem for woody plants
- Spreads in splashing water
- Dissolve tissue, leaves it greasy-looking, smelly
- Often causes wilt
- Need opening into plant – either through natural (flowers, etc.) or wounds

Humans

- Wrong plant in wrong place
- Poor cultural practices
- Purchasing diseased material
- Compaction
- Pesticide use

Abiotics

- Nutrient deficiencies
- Heat
- Water stress
- Weather

Managing Landscape Wildlife Conflicts

- Habit modification: eliminate/modify what is attractive to the wildlife
  - Food, water
  - Cover/shelter
- Exclusion
  - Fencing, netting, enclosing
- Aversion – repellents, noise, motion, lights
- Relocation
- Lethal control – trapping, shooting, poisons

Relocating Nuisance Wildlife

- Is it legal?
  - Yes, for tree squirrels, rabbits and raccoons
  - Others with permit
- Is it effective?
  - Perhaps short-term
  - Often not
  - May INCREASE the nuisance population by creating open territory and resources that attracts newcomers of the same species
- Is it safe?
  - Aggressive, scared wildlife can bite
  - Handling potentially diseased or infested animals
- Will this cause a problem for someone else?

Aversion for Nuisance Wildlife

- Taste, odor
- Motion (tapes, mirrors)
- Lights
- Motion-activated sprinklers

Resistance Codes

- V = Verticillium wilt
- F = Fusarium race 1
- FF = Fusarium race 1 & 2
- FFF = Fusarium race 1,2,3
- T = Tobacco Mosaic virus
- N = Nematodes
- CMV = Cucumber Mosaic virus
- TSWV = Tomato Spotted Wilt virus
- ASC = Alternaria Stem Canker
- St = Septoria Leaf Spot
- St = Gray Leaf Spot

Use Certified Seed or Plants

- Some viruses and fungi are seed borne
  - Tobacco mosaic virus
  - Tomato leaf curl virus
- Don't plant a problem!

Variety Selection

Answer this first:
What do you like to eat?

- Short season
- Is it cheaply available?
- Any persistent disease/insect pressure?
- Low yield or high yield?
- Aggressive growth – beware words such as "vigorous"
- What measures will you take to grow it?
- How will you use it?

Heirloom vs. Hybrid

- Heirlooms: the importance of diversity
  - Genetic diversity offers possibility of disease resistance
  - Flavor variances to please every palate
  - Varietal tolerances to environmental challenges

Hybrids vs. Heirlooms

- Hybrids – improvements for modern conditions
  - Higher disease resistance
  - Uniform produce
  - Reliable performance
  - Higher sugars
  - Shorter harvest days

Tomato Types

- Determinate
  - Bush type
  - Grow 3-5' tall
  - Bear most of their fruit in 4-6 weeks
  - Most early ripening and canning varieties
  - Don't need support
    - Semi-Determinate
      - Bush type
      - Grows 5 feet tall
      - Bear fruit in several flushes
      - Needs caging
- Indeterminate
  - Vining type
  - Continue to set grow and set fruit all summer
  - Most standard-size tomatoes
  - Need cages or staking to prevent fruit from sitting on the ground

Tomato Categories

- Currant – less than ½ inch diameter
- Cherry – ½ to 1 inch diameter
- Salad Slicers
- Canning/Pasting
- Beefsteak – usually wider than tall

New Tomatoes to Try?

- All can be harvested in ≤60 days
- Best started from seed

- Bloody Butcher (heirloom): 55 days; beefsteak
- Honeybunch: 60 days; currant
- Snow White: 55 days; cherry

Greens to consider: Miniatures!

- Mini-Romaine Trio
- Little Gem-Type Trio
- Bambi

Kale…for the nutrients

- Prizm Hybrid Kale
  - AAS introduction
  - Short, tightly-ruffled, deep-green leaves with nearly stemless stalks
  - Matures in 55-60 days
  - Pick when leaves are young—they will be sweeter

Peas…wonderful peas!

- Patio Pride pea (AAS introduction)
  - Compact plants perfect for containers
  - Harvest in just 40 days!
  - Succession sow

Sweet Corn…for a container!

- On Deck sweet corn
  - Super sweet!
- From Burpee Seed
- Plant 9 seeds in a 24” container
- Ready to harvest in just over 60 days
- Make sure potting media temp is at least 55 degrees
- May need trellising or staking; stalks reach 5’ tall