IPM- Integrated Pest Management

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IPM- Integrated Pest Management

- An integrated management practice that involves different or multiple modes of action to reduce or eliminate pest problems.

Terminology

- **Sign**- visual pathogen or pest
  - Ex. Mealy bug, spores

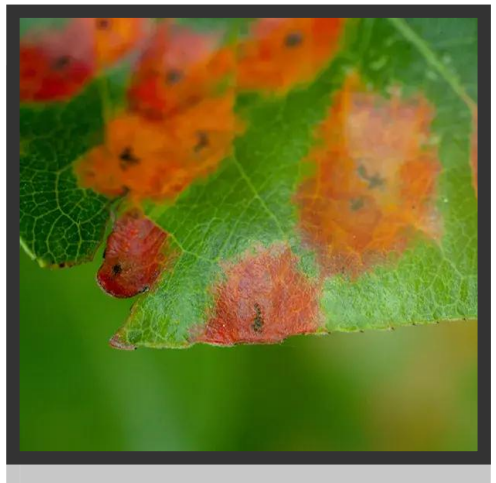
- **Symptom**- the visible effect of the pest or disease
  - Ex. Yellow leaves, wilting, chlorosis

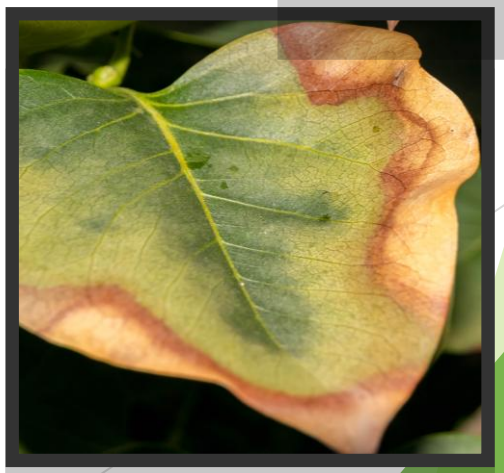
Terminology

- Abiotic factor- Non-living causal agents
  - Ex. Environment (soil, wind, sunlight, pH, drought/water), chemicals
- Biotic factor- Living organisms
  - Ex. Insects, fungi, bacteria, virus', nematodes,

Step 1 – Identify the cause: Diagnostics

- Virus
- Insect Pests
- Fungal
- Bacterial
- Animal Pests
- Cultural
- Nematodes





Diagnostics

- Look for patterns from up close and far away
- Does the damage start at the top of the plant or the bottom?
- Does a pattern happen or does it look random?
- Does the damage cover just a few leaves or a large section of the plant?
- It the damage on multiple plant or just one?
- Are they the same species or different?

Fungus: Mushrooms, Molds, Mildew

- Starts on a section of plant with dense foliage or close to soil level
- Fruiting bodies can be visible
- Patterns: fairy rings, affects plant in same genus,

Black Spot on Roses

Fungal Wilt in Oak Forest

Powdery Mildew

Rust on Carex

Sooty Mold

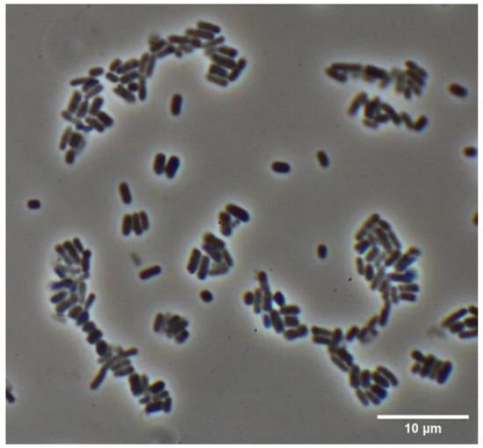
- Sooty mold grows on sugars left behind from insect secretions.
- Sooty mold growing on plants means there is likely a hidden pest problem.

Sooty mold and Scale

Sooty mold and Mealy bugs

Common Bacterial Pathogens

- Symptoms will appear in groupings either on an section of leaves or a single leaf. Not consistent over the entire plant
- Usually first seen near lower branches, closer to the soil level or in dense foliage areas
- Bacteria can be identified under a microscope
- Necrotic or discolored spots may be visible in a blotchy random pattern
- Leaf spots often have yellow hallow
- Ooze or slime may be present
- Famous plant pathogenic bacteria
  - Psuedomonas syringae- black spots
  - Ralstonia – bacterial wilt



Ralstonia bacterial wilt

Biting/Chewing Insect Pests

Viburnum Beetle

Cabbage Worm

Slugs

Japanese Beetle

Monarch Caterpillar

Common Plant Virus

- Seen in new growth
- Not curable in plants
- Does not always kill the plant but may alter the growth habit

Glyphosate damage-
can sometimes look like a virus

Aster Yellows

Mosaic virus

Tulip breaking virus -1636

Piercing/Sucking Insects

Mealy bug

Look along stems and on the bottoms of leaves

Whitefly

Scale

Spider mites

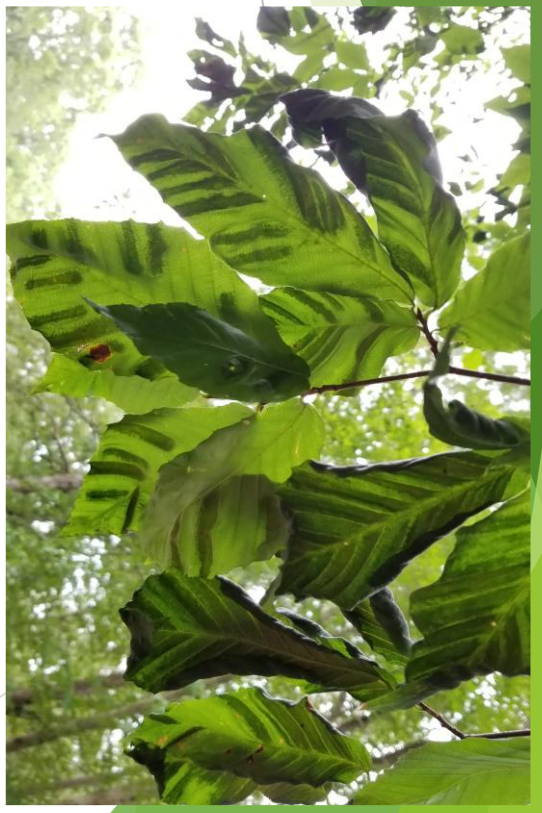
Nematodes

Microscopic worms

Wilted foliage on tomato plant

Examine roots for nodules/ galls

Beech Leaf Disease



Insect Tree Damage

- Insects bore into the bark and eat away at live tissue beneath
- Hole spacing is irregular/random
- Hole size varies on insect species

Tree Borer Beetle

Emerald Ash Borer (D shaped hole)

Comparison

Sapsucker Bird

Ash Bark Beetle

Birds

Sapsucker

Pileated Woodpecker

Common Animal Damage

Deer browsing on arborvitae

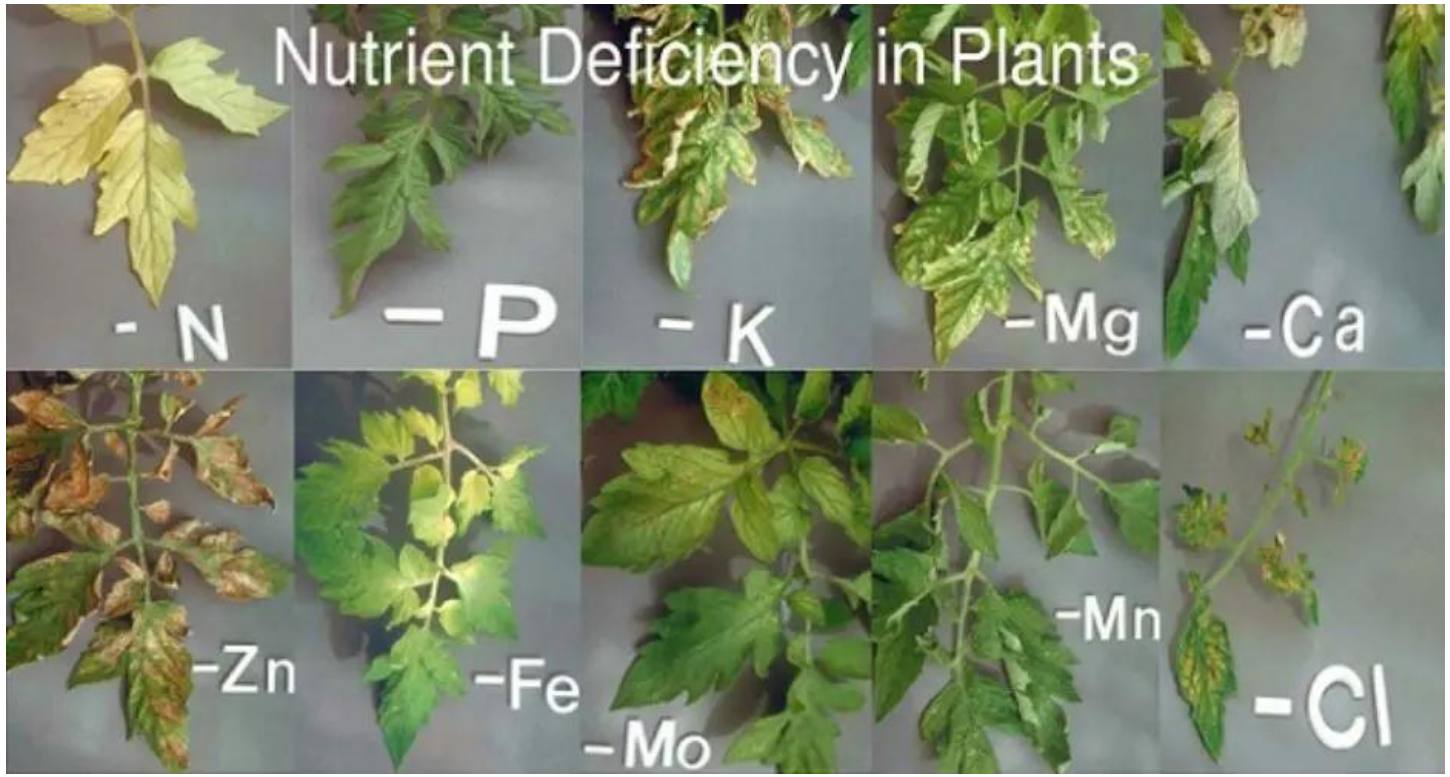
Turf damage from dog urine

Abiotic Factors

Winter Burn

Sun burn

Abiotic Factors



Salt buildup in soil

Will look more uniform over the entire plant rather than localized to one spot of the plant

Practice!
Look for patterns

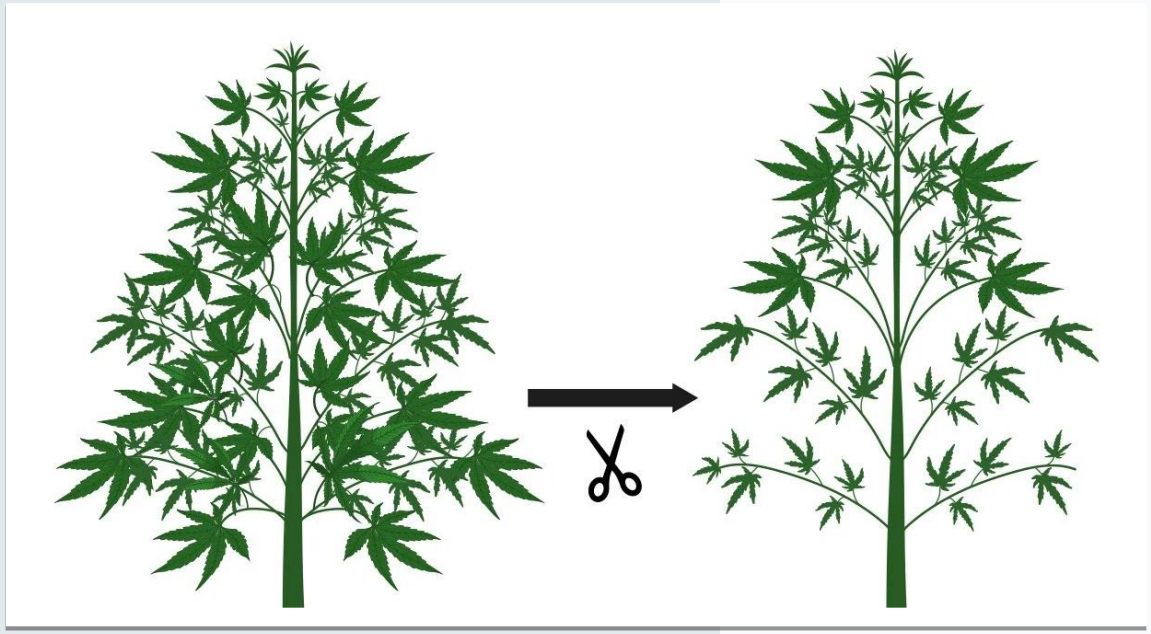
Clue: One picture is caused by abiotic factors, the other 2 are biotic

Step 2- Modes of Control

- Cultural= pruning or spacing for airflow, conditions within the site
- Mechanical= hand removal or spraying down with water.
- Chemical= pesticides
- Biological= introducing natural predators

Establish IPM Objectives

- What is the goal?
- Management plan may differ for home landscapes, parks and public gardens, house plants, greenhouse production, agriculture, orchards, nursery sales.
- What is the threshold- how much pest or disease can be present to warrant action
- Be realistic

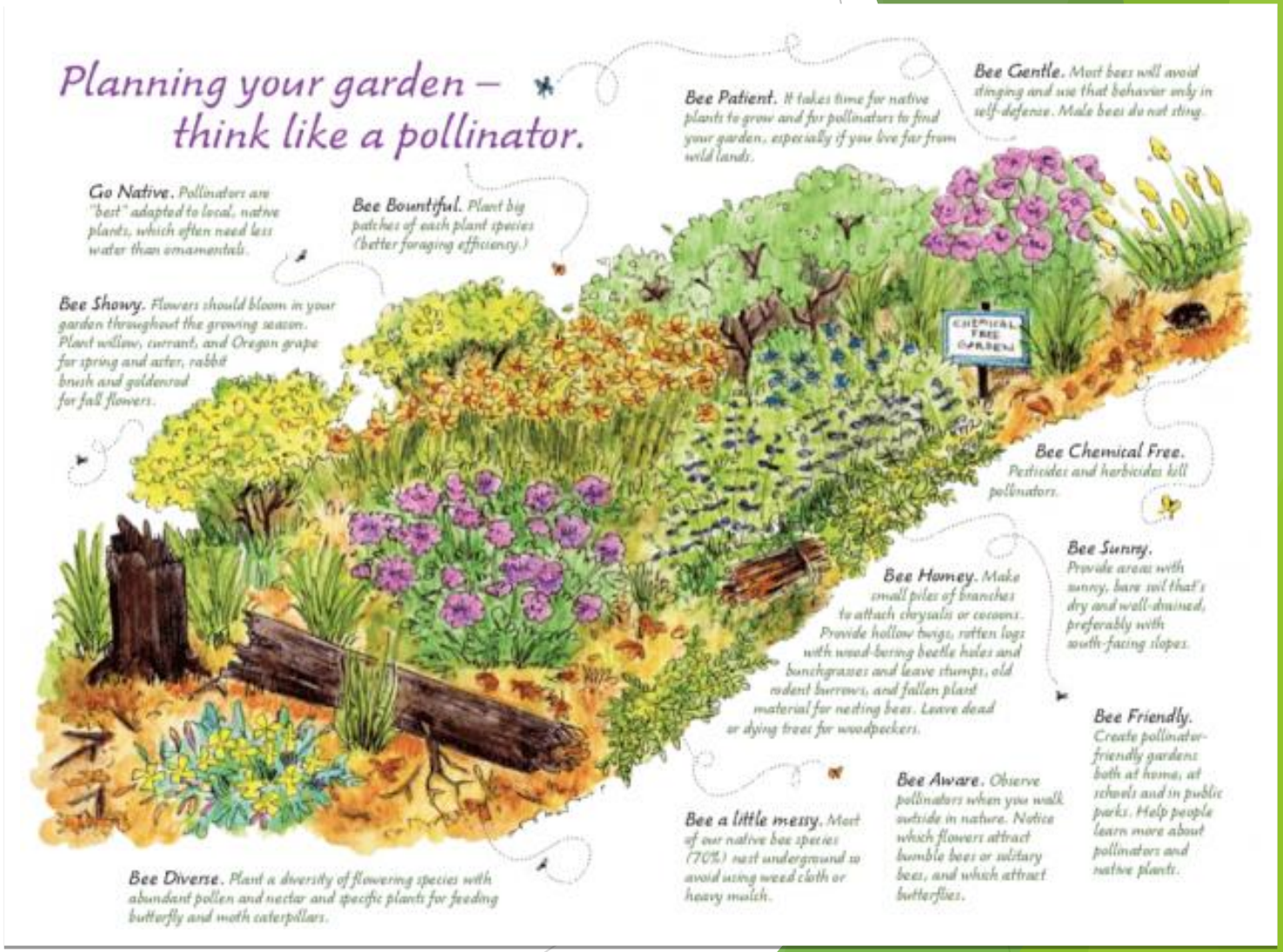


Cultural Controls

- Greenhouses should have airflow
- Mulch volcanos
- Water at soil level in the AM- leaves should not stay wet overnight
- Scout/observe nearby plants for pests and diseases
- Pots and soil should have proper drainage
- Prune plants to promote airflow
  - Pests and fungi prefer moist, protected areas
    - Ex. Punching/plunging boxwoods

Biodiversity is a Cultural Control

- Adding pollinator favorites and species richness will provide food and habitat for beneficial insects.



Biological Control

- Introducing or encouraging beneficial insects to act as natural predators of pests and diseases
- You can not use any chemical controls in practice when using beneficial insects.
- You can not have a threshold of zero if you plan to only use beneficial insects
  - If there isn't enough food (pests) present, then beneficial insects will leave. Beneficial insect populations can not eat every pest present guaranteed.
- Examples:
  - Insect Pest Biological Controls: Lady bugs and Lacewings larvae eat aphids, mealy bug, thrips.
  - Fungal Biological Controls: For phytophthora (root rot) introduce bacteria Bacillus pseudomonas to out-compete for nutrients

Mechanical Control

- Sticky paper- great monitoring tool
- Physically remove infected leaves
  - Do not compost this material- throw it in the trash.
  - Sterilize pruners with 70% rubbing alcohol before moving to a new plant
- Remove pests by hand
  - Use dish soap or rubbing alcohol and a rag or toothbrush
- Hose down plants with water
  - Enough pressure to remove insects but not rip leaves off plant

Chemical Control

- **Identify your pest** before selecting a spray, certain applications only target certain groups of insect.
- Start with Neem or horticulture oils- follow label instructions
- Foliar copper fungicides
- Foliar sprays act to suffocate
- Systemic and translaminar- sucking insects
  - Ex. Aphids, spider mites, mealy bugs, white fly
  - Insecticides are not species selective- If you spray they bad guys, **beneficial insects will also be affected.**
  - Insect populations can develop resistance to certain insecticides. Pesticides are rotated in large scale production settings.

Step 3

- Monitor
- Remember to disinfect your tools!

UMD HGIC IPM Newsletter- Monthly

- https://extension.umd.edu/programs/agriculture-food-systems/program-areas/ornamental-horticulture/ipmnet/

UMD HGIC Diagnostics Lab

- https://extension.umd.edu/programs/agriculture-food-systems/program-areas/fruit-vegetable-production/plant-diagnostic-laboratory/