MEDIEVAL PEST MANAGEMENT

Strategies and practices for controlling pests historically

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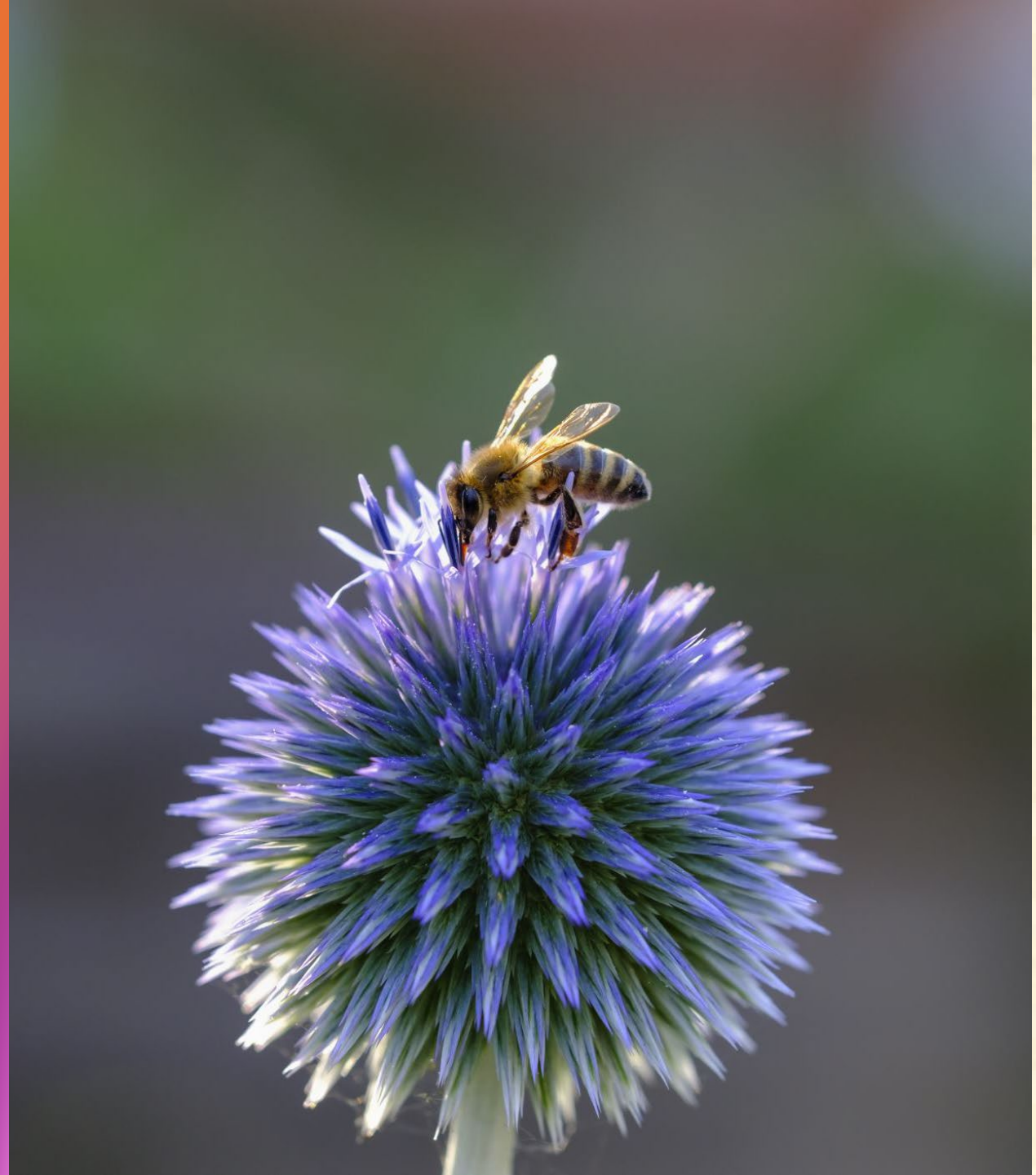


AGENDA

Beneficial Insects

What is a beneficial insects & types

Medieval Pest Management Techniques

Cultural control methods like crop rotation, companion planting, debris removal, use of garden structures, insect tolerant plant varieties and water management.

Herbal Repellents and Safety

Historical uses of herbs like rue, wormwood, mint, and garlic

Pest Issues

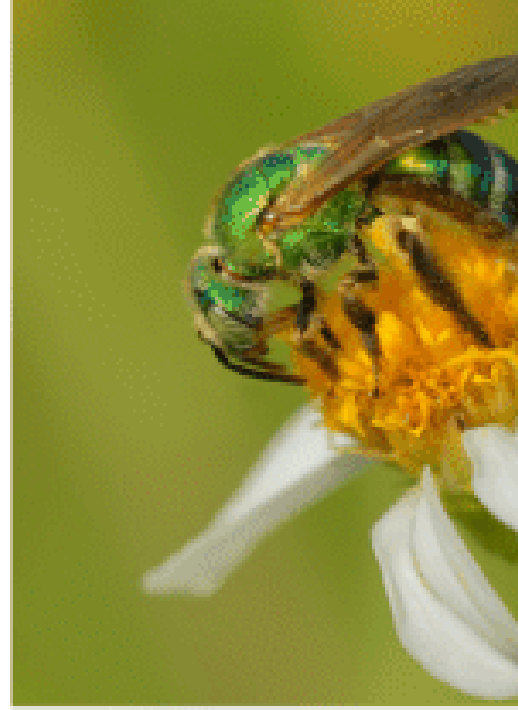
Discuss some of the top garden pests

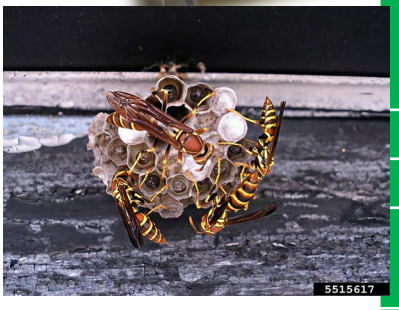
Applying Principles in Garden Design

BENEFICIAL INSECTS VS PESTS

WHAT MAKE INSECTS BENEFICIAL?

- ***Pollinator*** – insects that pollinate our flowers, trees & vegetables
- ***Predator*** – insects or their larvae that hunt & kill other insects
- ***Parasitoids*** – insects that lay their larvae on a host insect & the larvae kills the host as the larvae mature





PREDATORY INSECTS

Insect	Larvae or Adult	Predator to
Assassin Bugs	Both	Flies, caterpillars, beetles', mosquitoes, etc
Aphid Midge (Aphidoletes aphidimyza)	Larvae only	Aphids
Braconid & Chalcid Wasp	Larvae only	Aphids
Damsel Bugs & Damsel Flies	Both	Larvae eat mosquito larvae & aquatic insects Adults eat flies, mosquitoes, mots, some beetles & caterpillars
Dragonflies	Both	Larvae eat mosquito larvae & aquatic insects Adults eat flies, gnats, mosquitoes, swarming ants, termites, moths and other flying insects
Ground Beetles, Calosoma		Referred to as Caterpillar Hunters
Hoverflies	Adults	Aphids & Thrips
Lady Beetles	Both	Wide range: caterpillars, aphids, thrips, & soft-bodied insect
Green Lacewing	Larvae	Voracious feeders: aphids, insect eggs, thrips, mealybugs, immature white flies & small caterpillars
Paper Wasp	Larvae	Caterpillars, flies, spiders & beetle larvae Love tansy, caraway, fennel & plants w/ tiny flowers

PREDATORY INSECTS

Insect	Larvae or Adult	Predator to
Praying Mantis	Both	Moths, flies, roaches, beetles, crickets, aphids, grasshoppers, mosquitos
Robber Flies	Both	Larvae eat eggs, other larvae & small arthropods Adults prey on flying insects
Spiders	Adult	General Predators
Syrphid Flies	Larvae	Aphids, thrips, whiteflies & small caterpillar

PARASITOID INSECTS

- ***<u>Over 70,000 different species of wasps & Flies</u>***
  - Fairyflies (wasp)
  - Megarhyssa wasps
  - Trichopoda pennipes attach squash bugs & stink bugs
  - Cotesia wasp attack tobacco horn worm
  - Tiphia wasp attacks white grubs

Unknown artist. 1520s Hours Workshop, Loire Valley, Tours or Blois, France.

INSECTS IN ILLUMINATIONS & MANUSCRIPTS

We do not find a lot of references to pest control in medieval manuscripts. It seems the medieval gardener knew how to work with nature to help control the pests

Most of what we see in illuminations are the beneficial insects:

- Lady Birds
- Dragonflies
- Damsel Flies
- Earthworms
- Bees
- Butterflies

MEDIEVAL PEST MANAGEMENT TECHNIQUES

- ***CROP ROTATION***
  - Never plant the same crop in the same locations as it increases possibly of pest infestation (think eggs & larvae)
  - Also keep in mind, species of a crop – avoid planting cucurbits in the same spot even if different varieties
- ***COVER CROPS*** "green manure"
  - This is typically a winter planting of an annual crop instead of leaving an area fallow
  - Plants from Legume family help 'fix' nitrogen back into the soil, increasing the next year's green growth
    - Chickweed, clover, hairy vetch, alfalfa
  - Other plants used as cover crops include rye, buckwheat & mustards (which bugs tend to avoid)
  - Provides habitat for beneficial insect larvae like lacewings, lady birds, hoverflies, & ground beetles
  - Helps retain moisture levels increasing worm activity & vermicompost in that area
- ***DEBRIS REMOVAL***
  - Remove infected leaves/plants immediately and throw away/burn
  - Remove whole plant at season's end (remember what you planted there ☺)

Medieval Pest Management Techniques

Garden Structures

- Cloches are covers that are placed over plants to protect them from insects & animals
  - Keep in mind the size of the pest when choosing a cloche
- Cloth was used to cover plants to protect from pest
  - Keep in mind when using cloth, it needs to be light weight enough to allow air & water flow
  - Use natural materials or buy garden netting
  - Keep the cloth OFF of the plants
    - Use garden stakes that are taller than your plant will be
    - The challenge here is to make it was impenetrable as possible from small insects
- There is some evidence of 'hooping' with cloth, and you can use the hoops in the winter to protect tender plants from freezes

MEDIEVAL PEST MANAGEMENT TECHNIQUES

WATER MANAGEMENT – USE COMMON SENSE

- Avoid standing water
- Water needs to flow to lower the possibility of insects (like mosquitos)
- Remember beneficial aquatic insects are our friends as are fish!
- For rainwater harvesting, cover the barrel with a fine mesh to keep out mosquitos

MEDIEVAL PEST MANAGEMENT TECHNIQUES

COMPANION PLANTING- HELPS TO BOOST PLANT HEALTH, IMPROVES HARVESTS WITH SUPPORT TO POLLINATORS & HELPS REDUCE PEST STRESS

- Basil – deters thrips/hornworm on tomatoes; aphids/beetles for peppers; fleas
- Borage – attracts pollinators
- Calendula – attracts hoverflies, lacewings, & parasitic wasps
- Cosmos – attracts predatory insects
- Dill – great insectaries & host plant
- Fennel – great insectaries
- Lavendar – pollinators but deters some insects
- Marigolds – deters nematodes, whiteflies & beetles
- Mustards – many bugs are not fans and will not bother it
- Nasturtiums – deters aphids, squash bugs & whiteflies
- Onions & Chives – deters aphids
- Sweet Alyssum – attracts hoverflies

MEDIEVAL PEST MANAGEMENT TECHNIQUES

PEST TOLERANT PLANT VARIETIES

There are varieties of plants (companion plants), flowers & vegetables that pests are less likely to bother.

- Mustards – most pests seem to leave the spicier versions of mustards allow
- Sorrel – most insects seem to leave this plant alone; however, chickens love it
- Chard – some of the varieties are left alone by insects; loved by rabbits, chickens, etc.
- Johnny' Seeds is a good place to look for pest & disease resistant varieties

MEDIEVAL HERBAL REPELLANTS

Most herbal repellants seem to be focused on the home & person.

- Aconite: paste for rats
- Basil: Fleas
- Bay: scent for insect repellant
- Garlic: discourages aphids & mites
- Fireweed (Epilobium or Chamaenerion angustifolium) – burning deters flies & gnats
  - Zone 2-7
- Hellebore: paste for rats
- Horehound: soaked in milk for fleas
- Lavendar (Lavandula): deter mosquitoes & flies
- Mint: ants & small pests
  - Can take over as spreads via rhizomes
- Marjoram: lice & small insects
- Pennyroyal: fleas & rodents
- Rosemary: moths & other insects
- Rue: smell repels insects & cats
- Wormood (Artemisa vulgeris): moths, fleas & beetles
- Tansy (Tanecetum vulgare): insect repellent

MEDIEVAL HERBAL REPELLANTS

There is some evidence that gardeners used smoke not only for bee hives but to create a protective barrier around plants/gardens:

- Mugwort or juniper were used in smoke forms

PEST ISSUES

The Key here is… what is your tolerance threshold?

- Some pests support the natural ecological system in the garden
- Keep in mind… ***NO*** bad pests can also means ***NO*** good bugs
  - We need those pollinators!!
  - Insecticides are indiscriminate no matter how carefully you apply them
    - Even insecticidal soaps
- Many pests can be controlled with beneficial predatory support

Here are some of the most common pest issues. Keep in mind many can be controlled by beneficial predatory support or human intervention

PEST ISSUES

Ants – Keep in mind that ants do cultivate the soil. Natural methods take longer to work (cayenne pepper, herbs, DE, etc.)

Aphids cause leaf curl due to sucking of sap of plant. Secrete 'honeydew' which promotes black sooty mold growth

- Ants protect aphids
- Will see aphids as clusters or yellow or black small dots on plants
- High nitrogen levels cause aphids to rapidly multiply
- **CONTROL METHODS:** – Ladybugs, Green Lacewings, aphid midges & braconid/chalcid wasps; removal of plant or part of plant; high powered water; cut back on fertilizer use (use compost, seaweed, etc.); insecticidal soap; horticultural oils

Caterpillars – a lot of varieties eat all kinds of plants. Keep in mind many caterpillars will only eat their host plants and do turn into pollinators

Cabbage Looper (Trichoplusia ni)- prefer cruciferous plants

- Moth lays eggs on plant and the larvae eats the plants
- Overwinters in a cocoon in debris so clean up all old materials
- **CONTROL METHODS:** handpick off larvae & eggs; can try high powered water spray; cover rows completely; plant tolerant varieties (see below); remove all old plants in fall; control weeds as can overwinter on weeds; insecticidal soaps or Bacillus thuringiensis spray; trap craps like nasturtium, lettuce, spinach, beets, parsley, potatoes & tomatoes
- Green Winter Cabbage, Savoy Cabbage, Savoy Chieftain Cabbage and red cabbage

PEST ISSUES

Cucumber beetle – likes all Cucurbita plants & fruits. Bacteria wilt will cause the plant to die

- Black head w/ wings covered in either green w/ 12 black spots or alternating black & yellow stripes.
- Overwinter in brush and weeds
- Beetles are active when above 70 degrees F
- Eggs laid near plants & larvae will feed on plant roots w/ adults emerging midsummer
- 2 to 3 generations a year
- **Control Methods:** use row covers, trap crops, plant tolerant varieties, delay planting

Cut worms a caterpillar that turns into a Moth, they tend to attack seedlings severing stems at or below soil level or strip all leaves

CONTROL METHODS: place 3" collar around seedling w/ 1/2" in ground; trap of 1/2tsp cornmeal/bran meal in circle around stem; clean up all debris & cultivate soil to 8" depth

Grasshoppers

CONTROL METHODS: frogs, toads, birds, skunks, yellow jackets and hornets; Parasitic protozoa "NOLO Bait" or insecticidal soap

Plum Curculio – beetle that lays larvae in stone fruits when young, serious pest for peaches as both larvae & adults feed on fruits

- **CONTROL METHODS:** shake infested tree w/ something to catch them under tree/best done early in day; remove all fallen fruits; cultivate soil around tree in early spring will destroy pupating larvae on ground; do not use insecticides until after flower petals drop

PEST ISSUES

Slugs & Snails

CONTROL METHODS: Remove by hand; 5" grit barrier around plant (DE, builder sand, nut hulls, eggshells); copper strip around plant; beer traps

Squash Vine Borer (***Melittiacucurbitae***) is a beetle that lays its larvae in the ground or in the stem of Cucurbita plants

CONTROL METHODS: Remove & destroy; Bacillus thuringiensis into infected stem; cover stems w/ soil to promote roots making shorter vines; pull infected plants immediately; remove all plants at end of season (throw away); row covers

Spider Mites – sometimes easier to see damage then the mites

CONTROL METHODS: spray the plant w/ high powered water; insecticidal soap; horticultural oil sprays

If you have rose rosette which is caused by mites, pull and burn or throw away the rose bush.

Tomato Fruit worm – feeds on many different plants (cotton, corn, tomatoes)

CONTROL METHODS: Remove/dispose of infected fruits immediately; support parasitic wasps; use Diatomaceous earth to kill larvae; separate food sources.

Tomato Horn Worm is a Five-Spotted Hawk Moth (***Manduca quinquemaculata***)

- Use tomatoes as host plants but anything in the Solanaceae family

THINGS TO CONSIDER

Attract Beneficial Insects (predators, parasitoids & pollinators

- Focus on attracting beneficial insects
  - Flowers in the yellows, blues & purples are favorites of many bees & other pollinators
    - Catmint
    - Lavendar
    - Salvias
    - Daisies
    - Meadowfoam (poached egg plant)
    - Hyssop

  - Lemon Balm (*Melissa officinalis*) was rubbed on bee hives to attract swarming bees
- When planting flowers for insects, different insects prefer different flower shapes
  - Bees do not like double blossoms (lots of petals) as it is hard for them to get to the pollen

THINGS TO CONSIDER

INSECTICIDES

- While many focus on specific insects, they are indiscriminate so only spray what is necessary.
- Avoid overuse or spraying over a large crop due to one issue

DEBRIS CLEANUP

- Avoid trimming up perennials & grasses/shrubs as our beneficial insects lay on these. Wait to cut back until late February/March

Applying Principles to Garden Design

When applying these principles to your garden design, consider:

How much room do you have in each bed?

- How big does each plant get (including any companion plantings)?
- If you plant a perennial plant, how big is its 'finished' size?
  - Rosemary can get to be 4'-5' tall and that wide
  - Lavendar can spread to be nearly the same as rosemary
- When planting perennial companions, remember to review each year what does best near it as some plants may keep away necessary insects like hoverflies
- Structures:
  - If you make them permanent, remember to rotate crops
  - If not permanent, how easy is it to store the equipment each year?

References:

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