The Backyard Garden: *It’s a jungle out there...*

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The IPM Toolbox

- Pest identification, life cycle - “weak links”
- Some damage can be tolerated…it’s a numbers game
- Selection of the right tool
  - Pesticide label
- Non-targets and the environment
Basic Management Tactics

- Removal of crop/weed debris in fall
- Soil test
- Healthy transplants...get off to a vigorous start
- Scout garden regularly...some problems can develop quickly
Attracting Beneficial Insects to your Garden

- Predators
- Parasites
- Pollinators
Trichogramma Wasp
Predatory Stink Bugs
Syrphid Flies
Seven Spot Ladybird Beetle
Massachusetts State Insect - 1974
Floating Row Cover

- Water and Light Permeable
- Uncover during pollination
- Do not use when temperatures exceed 80 F

Different Grades
- Lighter – insect control
- Heavier – frost
## Cape Cod Hazardous Waste Collection - 2017

<table>
<thead>
<tr>
<th></th>
<th>Pounds</th>
<th>Gallons</th>
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</thead>
<tbody>
<tr>
<td>All Materials</td>
<td>332,000</td>
<td>70,000</td>
</tr>
<tr>
<td>Pesticides</td>
<td>33,000</td>
<td>19,000</td>
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![Hazardous Waste Caution Sign]
Active Ingredient - Imadacloprid
OP’s and Carbamates – “Old School”

- Broad spectrum and effective
- Sevin - aphid outbreaks...

Record Applications …plant and target pest
Bt – *Bacillus thuringiensis*

- Caterpillar pests only
- Non-toxic to people and beneficials
- Timing and Coverage
Pyrethrum

- **Chrysanthemum family**
- Quick knockdown
- No residual control
- Spray in early evening to extend activity
- Relatively non-toxic
Synthetic Pyrethroids

- “thrins”
- Broad spectrum with residual control
- Low mammalian toxicity
- Toxic to Bees and Aquatics including fish
  - Spray in evening, do not treat flowers
  - Dried residue on foliage and no soil mobility
Insecticidal Soap

- Contact activity
- Dried residue not active
- Soft-bodied insects
- Phyto
- 98F+
Oils

- **Aphids, mites and beetle larvae**
- **Use Caution**
  - 90F+ or below 40F
  - Water stress...
  - New growth...
Neem Seed Oil

- Several modes of action
- Systemic
- Non-toxic to people and beneficials
Spinosad

- Bacterial metabolite
- Low impact on predators & parasites
- Toxic to bees
Japanese Beetle Traps

- Pest control ???
- Attract more beetles than they trap...
- Buy one for your neighbor instead... 😊
Spotted Wing Drosophila

- Pest of RIPENING, soft skin fruits
- Many generations/season
- *Timely Harvest & Insecticides*
Brown Marmorated Stink Bug

- 300 host plants...fruits & vegetables

- Cape Cod Situation???
Brown Marmorated Stink Bug – Key Characteristics
BMSB as Home Invader
Winter Moth
Winter Moth Damage - Blueberry
Biological Control of Winter Moth
Brassica/Crucifer Group

- Cabbage
- Broccoli
- Cauliflower
- Kale
- Brussel Sprouts
- Kohlrabi
Imported Cabbageworm

Pierid Butterfly

Caterpillar (larva)
Imported Cabbageworm

Options:
- Row Covers – early season
- Bt for small larvae, ¼”
- Neem
- Spinosad
- Pyrethrum
- Pyrethroids
Cross-striped Cabbageworm

- Pay attention
  - Eggs laid in masses

- Options - same as Imported Cabbageworm
Cabbage Root Fly

- Flies lay eggs in soil at base of plant
- Three generations
Cabbage Root Fly

- **Options**
  - Row covers
  - Planting time
Flea Beetle

- Beetles emerge early spring

- Options
  - Row cover
  - Spinosad
  - Pyrethrum
  - Pyrethroids
Cabbage Aphid

- Insecticidal Soap
- Pyrethrum
Solanaceous/Nightshade Group

- Tomato
- Pepper
- Eggplant
- Potato
- Tomatillo
Colorado Potato Beetle

Adult

Eggs

Larvae
Colorado Potato Beetle

- Two Generations

- Options:
  - Spinosad
  - Pyrethrum
  - Pyrethroids
  - Neem
Tomato Hornworm

Options
- Bt... small larvae
- Spinosad
- Pyrethrum
- Pyrethroids
- Hand pick
...and now for something completely different...

- Polyembryony

- Brachonid wasp
Curcurbit Group

- Summer Squash
- Winter Squash
- Cucumber
- Melons
- Pumpkin
- Gourds
Striped Cucumber Beetle

- Adult beetles emerge in spring

- Options
  - Row covers
  - Pyrethrum, Pyrethroids, Spinosad
  - Trap Crop – Blue Hubbard
Bacterial Wilt

- Summer Squash, Cucumber, Muskmelon & Pumpkin – very susceptible
- Winter Squash & Watermelon resistant
- No control options
Squash Bug

- Adults emerge during summer
- Pumpkins and winter squash preferred
Squash Bug Damage

- Adult stage difficult to control

- Options
  - Pyrethrum
  - Spinosad
  - Pyrethroids
Squash Vine Borer

- Moths emerge in June…

- Options
  - Row cover…until bloom
  - Spinosad or a Pyrethroid on stems
Legumes

- Snap Beans
- Peas
- Dry Beans
- Peanuts
Mexican Bean Beetle

- Adults emerge early summer

Options
- Spinosad
- Pyrethrum
- Pyrethroids
Japanese Beetle

- Adult beetles emerge mid summer
- Larvae feed on roots of grasses
Alliums

- Onion
- Scallion
- Leek
- Garlic
- Chive
- Shallot
Onion Root Fly

- Flies emerge early spring
- Three generations
- Options
  - Row Cover
“Ticks and Gardening…”

“...the ultimate marriage!”

Deer Ticks ...One bite can change your life...
Got Dirt??? Join the Cooperative Extension Master Gardeners...
Questions?

Master Gardener Hotline  508-375-6700
Bonus Slides! How does Larry do it???
Leafy Greens

- Spinach
- Beet Greens
- Mixed Oriental Leaves
- Swiss Chard
- Arugula
- Lettuces
Leaf Miner Flies

- Flies lay eggs on bottomside of leaves
- Larvae burrow in and feed between the leaf surfaces
- Row Cover or Spinosad is effective

Mine expands from a point as larva grows

Adult
Umbellifers

- Carrot
- Celeriac
- Celery
- Parsley
- Fennel
- Dill
Umbelliferous feeding insects rarely cause significant damage

- **Carrot Rust Fly** – larvae feed on root, like onion and cabbage root flies
  - If established as a problem consider row covers

- **Leafhoppers** – suck plant juices and lead to yellowing, loss of plant vigor

- **Black Swallowtail** – Caterpillars feed on foliage, but usually not in large numbers
Asparagus

- Striped and Spotted versions
- Adult Beetles emerge in spring...Row Covers or Pyrethrum applied to spears
- Spinosad or Soap applied to ferns to control larvae
Cutworms – Black Cutworm Most Common

- Moth larvae that work at night...hide in soil during the day
- Cut off plant at base
- Also feeds on pepper, tomato, eggplant, potato, squash
- Sporadic problem
Cutworms

- **Collars made out of paper or plastic can be an effective barrier**

- **Wrapping stems with newspaper also works**
Tomato Fruitworm

- Same as Corn Earworm
- Moths carried up from Southern states on storm fronts in July/August
- Look for larvae initially on leaves

Options:
- Bt
- Spinosad
Seed Corn Maggot

- Flies emerge in early spring and lay eggs in soil – also feeds on peas
- Attracted to high organic content soils
- Can reduce stand density

Options

- Row cover until plants are seedling stage
Onion Thrips

- Tiny – about 1/16”
- Scrape leaves and feed on plant juices
- If using row covers for onion fly, you will control thrips
- Pyrethrum
- Pyrethroids

Look for brown lines on leaves
Three Lined Potato Beetle

- Similar life cycle & damage as Colorado Potato Beetle
- Occasional pest of tomato and potato
- They REALLY enjoy tomatillo though…
- Same management as Colorado PB
Sweet Corn

- THE Ultimate Backyard Challenge
- Corn Borer, Corn Earworm & Fall Armyworm
- Spinosad applications on 3 to 6 day interval June to end of harvest
- Treat silks NOT tassles...bees forage corn pollen