Understanding Integrated Pest Management

Definition:

“IPM is an approach to pest control that utilizes regular monitoring to determine if and when treatments are needed. IPM employs physical, mechanical, cultural, biological and educational tactics to keep pest numbers low enough to prevent intolerable damage or annoyance. Chemical controls are used as a last resort, and the least-toxic chemicals are preferred.” From IPMopedia / Toxipedia

Why IPM?

- Pesticides are by design toxic and meant to kill things
- Increase in pesticide use over the course of agriculture has not netted an increased benefit in pest management
- Lawns cover an area measured as 40.5 million acres (2008)
- In 2007 total pesticide use in U.S. = 78 million pounds
- Top pesticides used were herbicides, 2,4-D - broadleaf weed killer on lawns and glyphosate - non-selective weed-killer in the landscape
- Ratio of pesticide use by homeowner on their lawns compared to agricultural use = 10 to 1.
- Pesticide use poses threats to non-target organisms – aquatic, insect and mammal
- Risk to humans = toxicity of the material used and length and intensity of exposure to that material
**What's in That Pesticide?**

- 5% active Ingredient versus 95% inert ingredients
- Inert ingredients can also be harmful - not required to be listed on the label
- In some cases inert ingredients are considered “trade secrets”
- Use your resources to learn about pesticides
  - Safety Data Sheets – aka Material Safety Data Sheet
  - Grow Smart, Grow Safe website
  - Washington Toxics Coalition
  - Northwest Coalition for Alternatives to Pesticides – NCAP
- Neonicotinoids and bees – multiple cases of large bee die offs in response to exposure to pesticides in this group.

**IPM Steps**

- Prevention
- Monitoring and Observation
- Intervention

**Prevention**

- This is the main work of gardening
  - Mulch - prevent weeds, maintain soil moisture and moderate soil temperature
  - Improve soil – test soil, add compost, fertilize properly, use cover crops
  - Plant right plant in right place
  - Remove diseased or pest infested plant parts
  - Avoid overcrowding – prune for air flow, don’t plant too closely
  - Water in the morning – deeply and slowly and avoid wetting foliage
  - Rotate vegetable crops – especially tomato, onion and cabbage family
o Plant a diverse garden to encourage beneficial insects and helpful wildlife – they will help manage pests

o Use floating row cover to prevent insect damage
  - Imported Cabbage Worm and cabbage family
  - Carrot Rust Fly and carrot family
  - Leaf Miner and Chard family
  - Peas and pea leaf weevil

o Silver flashing, mulch and flea beetle

o Set up slug and snail traps – beer or yeast in containers around susceptible plants

**Monitoring and Observation**

- Detective work! Observe your garden all year long
- Learn about your plants needs and the issues they might be prone to
  - Native habitat
  - Mature size and shape
  - Soil, sun and water needs

- Learn about common pest, weed and disease issues – **know their life cycles**
  - Complete and simple metamorphosis in insects
    - Stink Bugs – simple – egg to nymphs to adult
    - Imported Cabbage Worm Butterfly – complete – egg to larvae to pupae to adult
  - Annual, biennial and perennial weeds
  - Tap roots versus fibrous roots
  - Fungal, bacterial, viral diseases
• Learn to tell the difference between pests and beneficial insects
  o Pests damage your plants
  o Beneficial insects eat or parasitize pests
  o Some beneficial insects have life stages that also eat your plants – learn tolerance for these stages
• Keep a notebook – track your observations
• Practice tolerance – is their enough need to intervene?

Intervention
• Assess your tolerance levels for any given issue – clover in the lawn, rhododendron root weevil, aphids on kale
• Review plant placement guidelines – maybe plant is in the wrong place?
• Assess for a problem plant that needs to be removed
• Review your plant care practices – pruning, more or less water, fertilizer?
• Treat the issue
  o Cultural
  o Mechanical
  o Biological
  o Chemical

Cultural
• Adjust watering practice
• Prune out to provide air flow
• Use fertilizer if needed
• Remove mulch from base of plant
• Improve soil drainage
• Add compost to improve water retention
**Mechanical**

- Remove the pest – squish, toss, spear, salt, flick, spray with water
- Pull the weed – hand tools designed to pop out weeds, moisten soil before pulling, catch before they go to seed
- Many weeds are edible – learn which and eat your weeds!

**Biological**

- Employ beneficial insects – purchase and release or build habitat
  - Ladybeetles, green and brown lacewing, hoverflies, parasitoid wasps and flies, soldier beetles, minute pirate bugs, beneficial nematodes
- Pesticides developed using microbial agents
  - Btk or *Bacillus thuringiensis* subspecies *kurstaki* - controls tent caterpillar
  - Bti or Bacillus thuringiensis israelensis – controls mosquitoes
- Developed from soil dwelling bacterium
- Can be considered chemical control

**Chemical**

- Use as a last resort
- Use lowest toxicity products first
  - Soaps – Potassium fats of fatty acids – purchase or make
  - Oils – herb oils, dormant oil (petroleum based)
  - All pesticides can have off target harmful effects
    - Soap and oil are harmful to aquatic animals when they get into waterways
    - Not selective to the pest you are targeting – neonics and bees
Choose certified organic products – USDA, WSDA, OMRI, Oregon Tilth and other certifying agencies

Avoid toxic pesticides

- Read and follow all label instructions including mixing instructions, which plants you can apply to and for which pests
- Find the MSDS for each product you purchase

Creating a Wildlife Friendly Garden

Build Habitat – one of the most crucial things you can do to encourage wildlife

- Plant diverse sizes and shapes of plants to accommodate diverse wildlife
- Plant diverse species of plants which will attract different types of wildlife
- Don’t be overly tidy – leave some wild spaces for wildlife
  - Hollow reed stems for solitary bees
  - Seeded flowers for birds
  - Un-mulched ground for ground dwelling bees
  - Leave moss intact for bird nests
  - Provide larval food plants for butterfly caterpillars – tolerate damage as they need to eat the leaves!
    - Milkweed for Monarchs
    - Willow for Western Tiger Swallowtail
- Plant dense areas for shelter – birds need places to escape from predators
- Provide snags, wood blocks, rock piles for basking, nesting and safe sites
- Provide a water source – puddles for butterflies, fountains or baths for birds
**Plant to Attract Common Pollinators**

Pollinators will help fruiting plants produce

- **Birds - Hummingbirds** – Anna’s (year round) and Rufous, nectar plants
  - Tubular flowers – honeysuckle, snapdragon, sage, hollyhock
  - Red flowers – fuchsia, flowering currant, weigela,
  - Native plants – dogwood, madrona, twinberry, salmonberry
  - Plant early to late bloom for Anna’s hummingbirds
- **Butterflies and Moths** – Day and night flyers, nectar plants
  - Short tubular flowers – mint, marigold, oregano, lupine
  - Fragrant flowers – lilac, lavender, dianthus, wallflower
  - Flat flowers – aster, angelica, dill, calendula
  - Native plants – maple, madrona, Douglas fir, salal, twinberry
- **Bees** – Solitary and social, ground and aerial nesters –
  - different species have different needs
  - native flowering plants are important – including forbs

**Plant to Attract Beneficial Insects**

Beneficial insects will help manage pests

- **Daisy Family**  Common garden flowers – some are edible - Calendula, Cosmos, Dahlia, Echinacea, Marigold, Rudbeckia, Sunflower, Zinnia
- **Mint Family**  Common kitchen herbs- Mediterranean plants – Lavender, Rosemary, Sage, Thyme, Mint, Oregano, Marjoram
- **Carrot Family**  Common kitchen herbs – Dill, Fennel, Parsley, Cilantro/Coriander, Lovage, Angelica, Sweet Cicely
General Advice for Attracting Pollinators and Beneficials

- Use native flowering plants – native fauna recognizes native flora
- Plant in groupings to maximize effect – 3 foot diameter or square area
- Include plants that bloom in three seasons – spring, summer and fall
- Intermix flowering plants with edible plants
- Plant cover crops and let them bloom – crimson clover, buckwheat and Phacelia

Plant to Attract Other Beneficial Wildlife

Wildlife will help manage pests

- **Bats** – night blooming flowers, white flowers, scented flowers
  Bats can eat 1,000 insects per hour!
- **Snakes** – tall grasses and rock areas to provide shelter and basking sites
  Snakes eat slugs!

Resources

Books

- Wildlife of the Pacific Northwest – David Moskowitz, Timber Press
- Gardening with Native Plants of the Pacific Northwest – Arthur R. Kruckeberg, University of Washington Press
- Attracting Native Pollinators – Xerces Society, Storey Publishing
- Gardening for Butterflies – Xerces Society, Timber Press
- Insects of the Pacific Northwest – Pete Haggard and Judy Haggard, Timber Press
- Attracting Beneficial Bugs to Your Garden – Jessica Walliser, Timber Press

Native Plant Sources

Go-Native King County https://green2.kingcounty.gov/gonative/index.aspx

King Conservation District Plant Sales http://kingcd.org/programs-native-walk-up-sale.htm

General Help

Garden Hotline www.gardenhotline.org 206-633-0224

Monday through Saturday 9:00 am to 5:00 pm