



WSU EXTENSION  
Cowlitz County

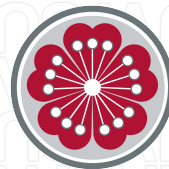
# Protecting Pollinators: It's up to US!

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“Organic pest control is about multiple lines of defense and  
not one single magic bullet”

*Paul Zimmerman*

WSU Cowlitz County Extension  
Master Gardener Program





# Mission

Engaging university-trained volunteers to empower and sustain diverse communities with relevant, unbiased, research-based horticulture and environmental stewardship education.



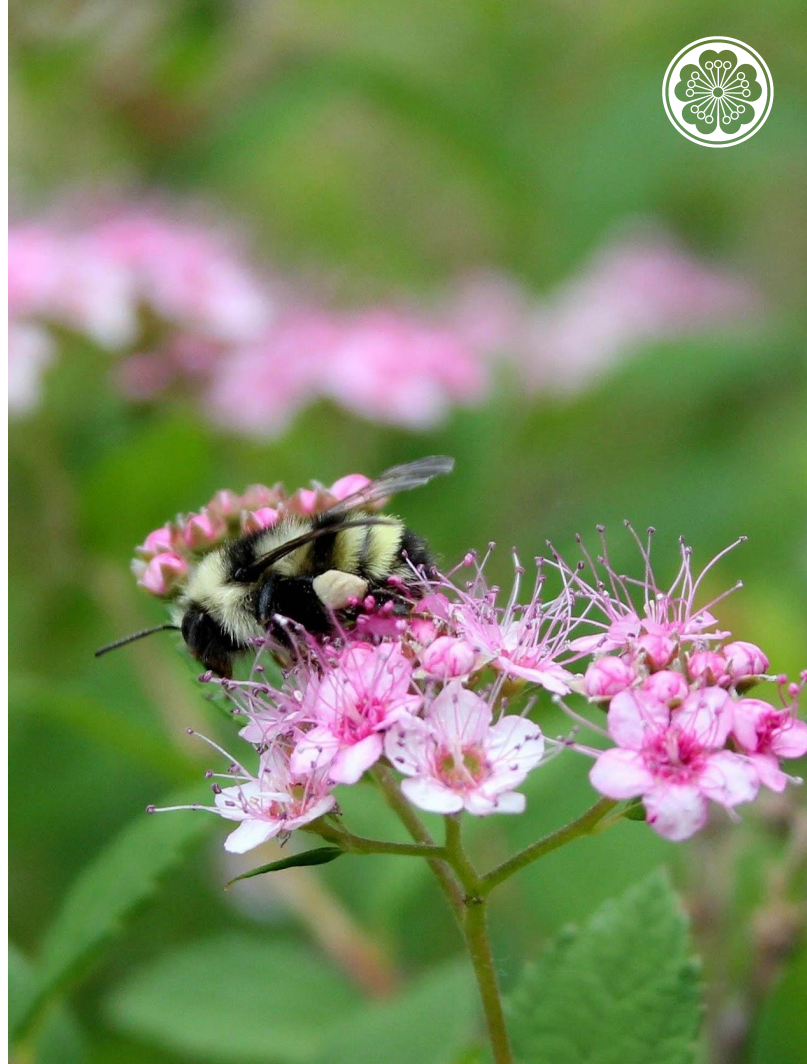
# Pollinator Health

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Teaches ways to help native bees and other pollinators thrive in home and community landscapes.

- Pollinators are responsible for 1 in every 4 bites of food we eat
- We all have a role to play in pollinator conservation
- Pollinators support plant diversity





# What we'll be talking about

- Review of creating a pollinator habitat
- The whats, whys, and hows of IPM
- Is it a problem? What's causing it?
- Is it a tolerable problem?
- What can be done to prevent problems (i.e., cultural methods)?
- Call to action--ways to manage problems
  - Mechanical, biological, chemical
- 





# Why should we care about pollinators and other beneficial insects?



- Food crops—many depend on bees to pollinate
- Seed Crops-PNW grows many seed crops-clover, alfalfa, and vegetable seeds
- Native plants-rely on pollinators to reproduce and persist in the wild
- Insect predators and parasitoids keep garden pest under control



# Population decline

The decline in Bees and other insects threatens crops, wildflowers, and native plants

Threats to these insects:

- Loss of habitat
- Pesticide use
- Disease
- Climate Change



Western Carpenter Bee - *Xylocopa californica*

# 3 STEPS TO INVITE POLLINATORS TO YOUR GARDEN



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1

Create a welcoming habitat

2

Provide food and water

3

Reduce or eliminate pesticide use



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# STEP 1

## Create a welcoming habitat



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### TOLERATE SOME GARDEN CHAOS!

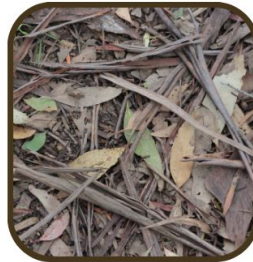
IF YOU BUILD IT, THEY WILL COME - AND YOUR GARDEN WILL GROW BIGGER AND BETTER!



*Tolerating some garden mess is important. Beneficial insects require undisturbed areas to nest, lay eggs, and overwinter.*



*Help ground-nesting bees by keeping small patches of non-mulched bare ground. Around 70% of native bees in the Pacific Northwest create slender tunnels underground for nesting.*



*Be lazy - leave the leaves! Ground covers and coarse mulches such as bark dust, straw, and organic leaf mulch help protect underground nests over the winter.*



*Provide mud and nesting blocks in your garden. Dig a couple of 4 to 6-inch holes of wet clay soil -- and add water if necessary during dry spells.*



*Leafcutting, mason, resin bees, small carpenter, and masked bees build nests in hollow or pithy stems above the ground. Leave 8 inches of plant stems, such as raspberries, grape vines, elderberry, milkweed, Sedum autumn joy, Echinacea for nesting.*



Scan for more resources





# STEP 2

## Provide Food and Water



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Saucer of water with pebbles--keep it filled, especially in hot, dry, and windy weather.



At least 3 species of flowering plants that bloom continuously from spring through fall. Early blooming spring bulbs are a welcome addition.



Planting native plants along with other plants will attract a wider variety of pollinators, including bulbs, trees, and shrubs.



Deadhead flowers to rebloom through the summer.






Plant in large groupings instead of many small planting areas. A 5'x6' garden is a good place to start. Mix in different flower shapes, heights, and textures to appeal to a variety of pollinators.



It's easy to get started: plant sales, nurseries, save and plant seeds, and swap with friends. Do your research to plant them in the right place.

## Three-Season Easy Care Pollinator Plants

	<ul style="list-style-type: none"> <li>Crocus</li> <li>1 Kinnikinnick, bearberry</li> <li>2 Tall Oregon grape</li> <li>3 Rosemary</li> <li>4 Camas spp.</li> <li>5 Borage</li> <li>6 Western redbud</li> </ul>	<ul style="list-style-type: none"> <li><i>Crocus sativus</i>, spp.</li> <li><i>Arctostaphylos uva-ursi</i></li> <li><i>Mahonia (Berberis) aquifolium</i></li> <li><i>Rosmarinus officinalis</i></li> <li><i>Camassia quamash</i></li> <li><i>Borago officinalis</i></li> <li><i>Cercis occidentalis</i></li> </ul>
	<ul style="list-style-type: none"> <li>Cocksbur hawthorn and spp.</li> <li>1 California lilac</li> <li>2 California poppy</li> <li>3 'Walker's Low' catmint</li> <li>4 Culinary thyme &amp; cvs.</li> <li>5 'Cape Blanco' broadleaf stonecrop</li> <li>6 Common yarrow</li> <li>7 Lavender</li> <li>8 Pot marigold</li> <li>9 Largeflower tickseed</li> <li>10 Blanketflower</li> <li>11 Tufted hairgrass</li> <li>12 'Rozanne' hardy geranium, &amp; cvs.</li> <li>13 Gayfeather, blazingstar</li> </ul>	<ul style="list-style-type: none"> <li><i>Crataegus crus-galli</i> and spp</li> <li><i>Ceanothus 'Victoria', 'Julia Phelps'</i></li> <li><i>Eschscholzia californica</i></li> <li><i>Nepeta x fassenii 'Walker's Low', cvs.</i></li> <li><i>Thymus vulgaris</i>, and cvs.</li> <li><i>Sedum spathulifolium 'Cape Blanco'</i></li> <li><i>Achillea millefolium</i></li> <li><i>Lavandula</i> cvs., spp.</li> <li><i>Calendula officinalis</i></li> <li><i>Coreopsis grandiflora</i></li> <li><i>Gaillardia x grandiflora, aristata</i> cvs.</li> <li><i>Deschampsia cespitosa</i></li> <li><i>Geranium 'Rozanne', and cvs.</i></li> <li><i>Liatris spicata</i></li> </ul>
	<ul style="list-style-type: none"> <li>Lamb's ear</li> <li>Bluebeard</li> <li>Cosmos</li> <li>California fuchsia</li> <li>Sunflower</li> <li>Russian sage</li> <li>1 Black-eyed Susan</li> <li>2 Canada goldenrod</li> <li>3 'Autumn Joy' stonecrop</li> <li>4 Douglas aster</li> </ul>	<ul style="list-style-type: none"> <li><i>Stachys byzantina</i></li> <li><i>Caryopteris x clandonensis</i> and cvs.</li> <li><i>Cosmos bipinnatus</i></li> <li><i>Epilobium (Zauschneria) canum</i> and cvs.</li> <li><i>Helianthus annuus</i></li> <li><i>Perovskia atriplicifolia</i></li> <li><i>Rudbeckia hirta</i></li> <li><i>Solidago canadensis</i></li> <li><i>Sedum spectabile 'Autumn Joy'</i></li> <li><i>Symphoricarum/Aster subspicatum</i></li> </ul>

Crocus: © Karen Zimmermann, Oregon State University  
lavender: © Jennifer Alexander, Oregon State University  
Bluebeard: Signe Danler, © Oregon State University

1 = Northwest native

# STEP 3

## Limit or eliminate pesticide use



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Allow some plant damage to encourage beneficial insects for pest control.

Remember, even “organic” pesticides kill both pests and our pollinators and other beneficial insects.

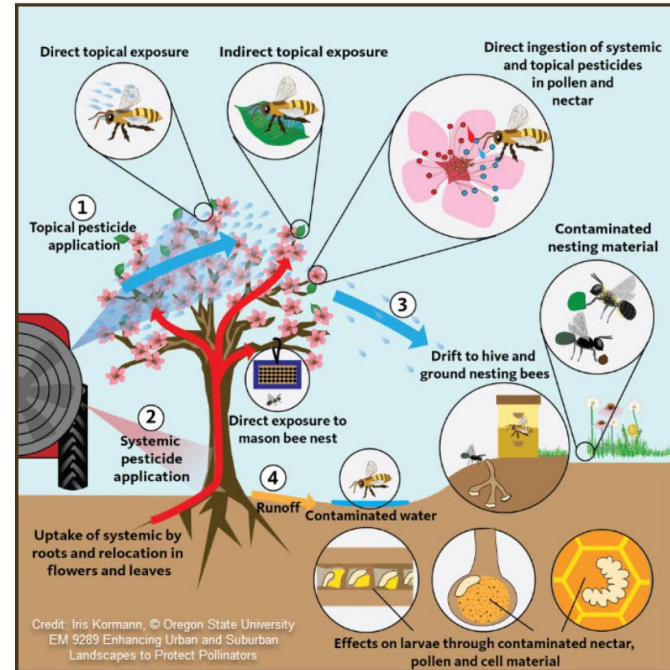


Scout your garden regularly, and handpick, prune or cover plants to control pests.

If you must spray, use soft pesticides like insecticidal soaps, , and oils, and botanicals. Follow label directions to protect pollinators and the environment. Spot spray only!



Pollinators can be exposed to pesticides in a variety of ways which endanger their health and survival.



Scan for  
more resources

# What is IPM?

**Integrated Pest Management** is a science-based approach that combines a variety of techniques. By studying their life cycles and how pests interact with the environment, IPM professionals can manage pests with the most current methods to improve management, lower costs, and reduce risks to people and the environment.

## IPM tools include:

- Alter surroundings
- Add beneficial insects/organisms
- Grow plants that resist pests
- Disrupt development of pest
- Prevention of pest problem developing
- Disrupt insect behaviors
- Use pesticides

## 1 IDENTIFY/MONITOR

Determine the causal agent and its abundance (contact your local extension agent for help).

## 2 EVALUATE

The results from monitoring will help to answer the questions: Is the pest causing damage? Do we need to act? As pest numbers increase toward the economic threshold further treatments may be necessary.

## 3 PREVENT

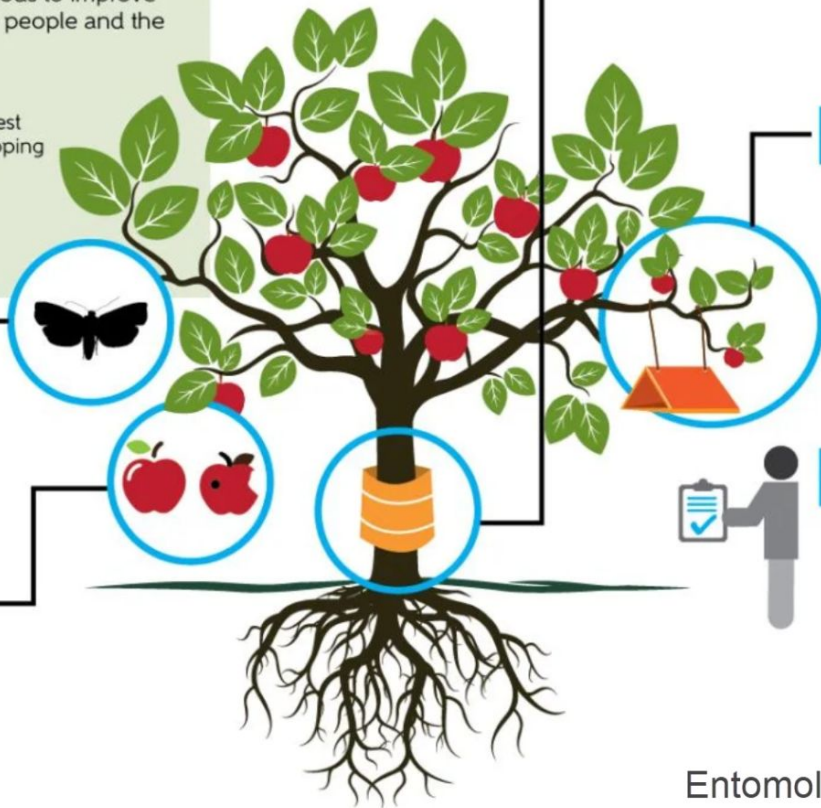
Some pest problems can be prevented by using resistant plants, planting early, rotating crops, using barriers against climbing pests, sanitation, and sealing cracks in buildings.

## 4 ACTION

IPM uses multiple tools to reduce pests below an economically damaging level. A careful selection of preventive and curative treatments will reduce reliance on any one tactic and increase likelihood of success.

## 5 MONITOR

Continue to monitor the pest population. If it remains low or decreases, further treatments may not be necessary, but if it increases and exceeds the action threshold, another IPM tool should be used.



# Why use Integrated Pest Management (IPM)?



- **Diverse Defenses:** Embrace multiple pest management strategies to cut down on pesticide use, including physical, mechanical, cultural, and biological controls.
- **Water Wisdom:** Shield our waterways from pesticide pollution.
- **Safety First:** Protect people, pets, and wildlife from pesticide exposure.
- **Sustainable Solutions:** Foster a reliable and eco-friendly pest control routine.
- **Protector of Pollinators:** Safeguard beneficial insects and pollinators from inadvertent harm by insecticides.



# IPM: The common sense approach to plant problems

1. **Monitor** the pest's activity and adjusting methods over time.

**This means going out into your garden every day.** It's easier to stop small problems than to correct large ones.

2. **Identify** the pest and host.

3. **Tolerate** harmless pests. Set a threshold to decide when it's time to act. Not every problem needs to be “treated.”

4. Use a **variety of common-sense methods** to control problems in the garden, using pesticides as a last resort!

5. **On-going evaluation** of the problem's outcome



# Prevention is KEY!

- **Right Plant Selection:**  
Choose plants suited to the location, considering their water and sunlight needs.
- **Disease-Resistant Varieties:** Opt for varieties known to resist recurring diseases.



<https://www.rose.org/single-post/dozens-of-disease-resistant-roses>

# Prevention is KEY!

- **Ground-Level Watering:** Water plants at the base to avoid wet leaves, which can lead to disease.
- **Remove Dead Plant Material:** Clear out dead plants before spring to prevent disease carryover.
- **Soil Testing:** Test soil for nutrients and minerals to determine fertilizer application needs.

## Soil Tests and Prices

**Basic Soil Test** - \$18 per sample  
Includes pH, lime requirement, nitrate nitrogen, potassium, phosphorus, calcium, magnesium, soluble salts and fertilizer recommendations.

**Basic Test + Organic Matter** - \$24

**Basic Test + Fe, Mn, Zn & Cu** - \$24  
(iron, manganese, zinc and copper)

**Basic Test + S and B** - \$26  
(sulfur and boron)

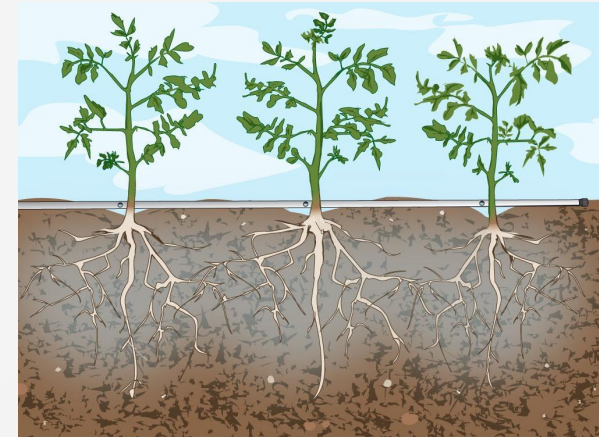
**Complete Test** - \$36  
All of the tests listed above.

**Soil Texture** - \$18  
Percentage of clay, silt, sand and gravel in the soil, and classification of the soil type.

**Toxic Metal Testing** - \$28  
Levels of lead, cadmium and arsenic in the soil, and interpretation of the results.



[simplysoiltesting.com](http://simplysoiltesting.com)





# Prevention is KEY!

- **Proper Plant Care:** Maintain regular care and watering for robust plants that resist diseases and pests.
- **Regular Inspections:** Check plants often to catch any issues early on.





# Prevention is KEY!

- **Expert Consultation:** Seek advice from Master Gardener Plant Clinic for pest identification and management strategies.

360-577-3014

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Washington State University Extension  
MASTER GARDENER PROGRAM

LET'S TALK PLANTS!

- PLANT IDENTIFICATION
- PROBLEM DIAGNOSIS
- INSECT IDENTIFICATION
- COMPOSTING

[www.mastergardener.wsu.edu](http://www.mastergardener.wsu.edu)

WASHINGTON STATE UNIVERSITY EXTENSION

Small text at the bottom right: All Extension programs and projects are available to all Washingtonians. We are here to help you succeed through our Extension programs.

The poster features a vertical background image of a garden with a shovel handle on the right. It includes a red flower logo at the top, a QR code at the bottom right, and the WSU Extension logo at the bottom left.



# Time for action!

- **Plant Pruning:** Trim away areas of plants that are affected by infestations.
- **Insect Removal:** Utilize water sprays to cleanse plants of pests.
- **Crop rotation**



# Time for action!

- Traps
  - Aluminum foil and other reflective mulches repels aphids
  - Pheromone lures and traps ([Link in resources](https://www.vivagrow.com/)) are used for detecting the presence of pests or sometimes for disrupting insect mating habits
  - Slug traps-(flour, water, and yeast)
  - Copper tape



# Time for action!

- Barriers
  - **Floating row covers** can be quite effective at excluding insects
  - **Collars** made of cardboard, tin cans, or aluminum foil and inserted halfway into the soil are effective barriers to cutworms
  - **Kaolin clay**, sometimes referred to as “China clay,” can be used to form a thin film on leaves and fruit and can protect plants



Photo by Peggy Greb, USDA Agricultural Research Service



# Biological control methods

- **Promote Natural Predators:**  
Foster an environment that attracts spiders, snakes, frogs, and birds to naturally control pest populations.
- **Utilize Nematodes:** microscopic roundworms that act as natural pest control for soil-dwelling pests Nematodes: <https://biologicco.com>



# Biological control methods



**Support Beneficial Insects:** Encourage the presence of ladybugs, wasps, lacewings, hoverflies, and ground beetles which are natural enemies of harmful pests.





# Biological control methods

## What about purchasing beneficial insects?

### For outdoor gardens:

- **Predator-Prey Dynamics:** Beneficial insects need a significant number of pests to survive; otherwise, they may leave the garden.
- **Migration Post-Release:** After consuming available pests, beneficial insects often migrate in search of more food.
- **Low Retention Rates:** A small percentage of released insects remain in the garden, with many dispersing or dying shortly after release.
- **Shipping Stress:** The process of shipping can harm beneficial insects, reducing their effectiveness upon arrival.

**Work better in a contained and controlled greenhouse environment**

# Last resort: Chemical management



- Choosing the least toxic options





# Eliminate or reduce pesticide exposure

- **Flower Guardians:** Recognize that **herbicides** can eliminate vital nectar sources for pollinators.
- **Insecticide Spectrum:** Understand the wide range of **toxicity levels** in insecticides.
- **Toxicity Factors:** Know that toxicity depends on the **chemical and exposure frequency**.
- **Pollinator Peril:** Acknowledge that these chemicals can **fatally harm pollinators** or disrupt their essential behaviors.

**Most insect pests in our landscapes can be managed without using insecticides!**



**Many are toxic to pollinating insects**



**NEVER apply pesticides to flowering plants!**

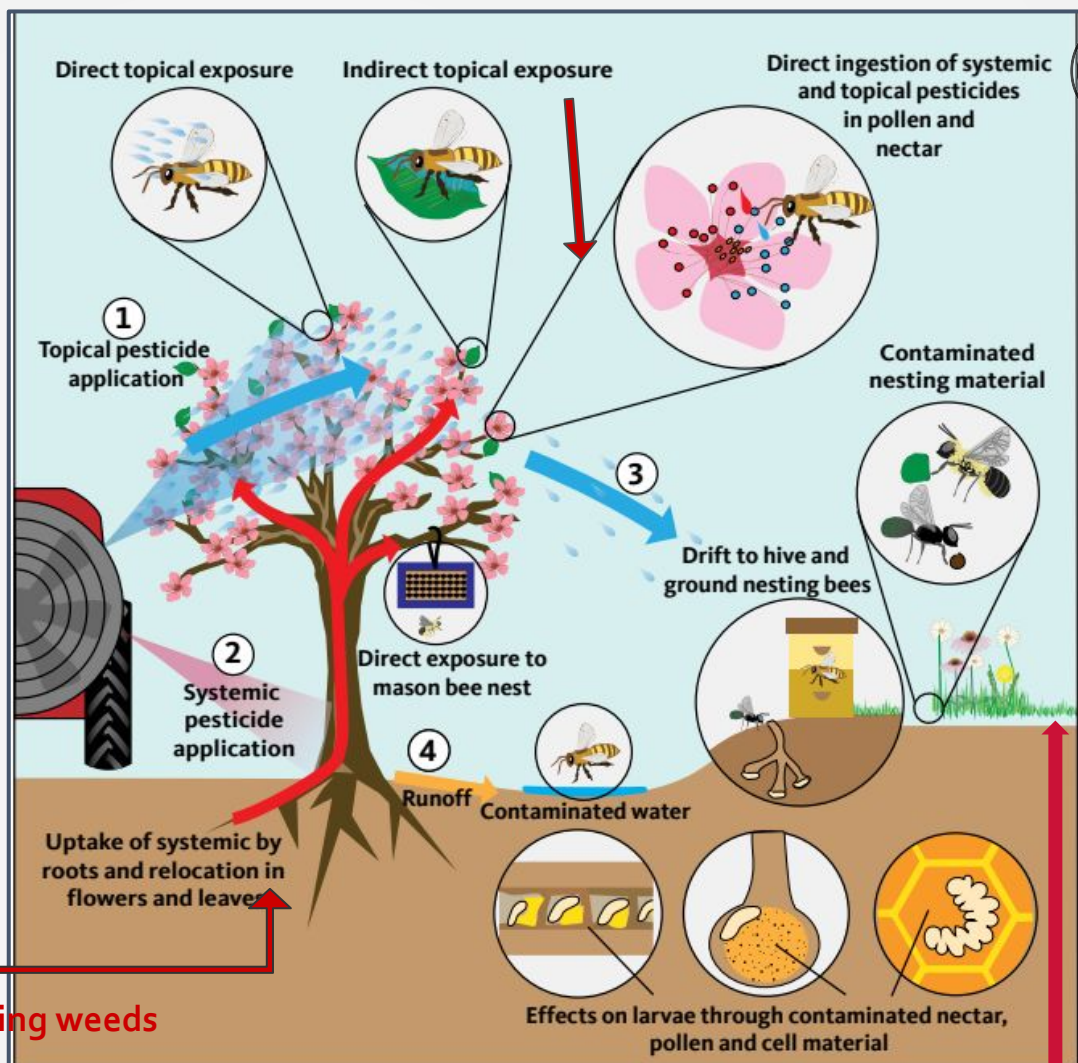
# How they are exposed



**DON'T spray during bloom**

**DON'T use soil drenches or tree trunk injections**

**DON'T allow spray to drift onto blooming weeds**



# Taking action-- Pesticides: Rules of thumb



- Follow the **label instructions** carefully. This includes applying the correct concentration of the pesticide, choosing appropriate weather conditions, and targeting the correct part of the plant.
- Do not apply a product where it could run into ponds, creeks, or other water supplies and **contaminate drinking water and kill wildlife**
- Don't spray on a **windy day**
- Never pour pesticides or other lawn and garden products down the drain.
- Don't use **systemic pesticides**
- Don't treat plants when they're blooming (Including nearby flowering weeds)
- **Spray at dusk or dawn** when pollinators are less active



# Labels

- **Bee Advisory Icon:** displayed on pesticides with potential risks to bees **Label Information:** The pesticide label should clearly state the level of toxicity to pollinators.
- **Understanding Residual Toxicity:** Residual toxicity is the duration a pesticide remains active in the environment.
- **Critical Duration:** Pesticides with a residual toxicity of eight hours or more cause most bee poisoning incidents.



## PRECAUTIONARY STATEMENTS

### CAUTION

#### HAZARDS TO HUMANS (& DOMESTIC ANIMALS)

Harmful if inhaled or absorbed through the skin. Avoid breathing vapors or spray mist. Avoid contact with eyes, skin or clothing. Users of this product must wear long-sleeved shirt, long pants, shoes and socks. Keep out of reach of children and domestic animals. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.

## ENVIRONMENTAL HAZARDS

To protect the environment, do not allow pesticide to enter or run off into storm drains, drainage ditches, gutters or surface waters. Applying this product in calm weather when rain is not predicted for the next 24 hours will help to ensure that wind or rain does not blow or wash pesticide off treatment area. This pesticide is toxic to wildlife. This product is toxic to bees exposed to direct treatment. Do not apply this product while bees are visiting the treated area.



# Labels

READ THE LABELS—it's the law!

- How to use
- Target use and insects
- How to dispose
- Protect yourself, the environment, and pollinators



Graphic: Iris Kormann, © Oregon State University

**1. OPEN THE LABEL** and look for the **ENVIRONMENTAL HAZARDS** section.

**2. BEE TOXIC PESTICIDES** will be indicated by the phrase **"TOXIC"** or **"HIGHLY TOXIC TO BEES"**. If toxic:

don't spray when in bloom → wait until all petals fall

**3. Some bee-toxic pesticides BREAK DOWN IN A FEW HOURS.** Look out for the words:

1. **"FORAGING"** or **"VISITING"** = remains toxic for more than 8 h. **DON'T APPLY TO FLOWERING PLANTS!**

2. **"ACTIVELY FORAGING"** or **"ACTIVELY VISITING"** = remains toxic for less than 8 h **ONLY APPLY IN THE EVENING WHEN BEES ARE NOT ACTIVE!**

**4. BEE ADVISORY BOX**  
Newer products may have a Bee Advisory Box, which is clearly marked by a **SYMBOL OF A BEE IN A RED DIAMOND**. Carefully read these additional instructions on how to use the product safely around bees.

**5. USE DIRECTIONS**  
Newer labels can also have additional precautions for using a products around honey bees **RENTERED FOR POLLINATION**. Instructions may vary by use.

**ENVIRONMENTAL HAZARDS**  
This pesticide is toxic to mammals, birds, fish and aquatic invertebrates.

**PROTECTION OF POLLINATORS**

**DIRECTIONS OF USE**  
Do not apply more than \_\_\_\_\_ outlined in the table below.

Plant	Pest	Directions
Fls and Vegetables	Leafrollers	repeat every 14 days if necessary
Flowers	Aphids	use less than 2 weeks apart

Graphic: Iris Kormann and Andony Melathopoulos, © Oregon State University



# Check the label for active ingredients



Don't use systemic insecticides!





# Label example

## HOW TO MIX

Add the required amount of this product to the specified amount of water, mix thoroughly, and apply uniformly to both upper and lower surfaces of plant foliage. Mix only as much spray as needed for a single treatment. In vegetable gardens, for best results, do not use more than 3 gallons of spray for 1000 sq ft of area. Do not use kitchen utensils for measuring. Keep measuring utensils with product and away from children.

Unit of Measure <sup>1</sup>	Amount of this product to Use per Pint, Quart or Gallon of Spray		
	Per Pint (16 fl oz) of Spray	Per Quart (32 fl oz) of Spray	Per Gallon (128 fl oz) of Spray
Fluid Ounces (fl oz)	0.25 fl oz	0.5 fl oz	2 fl oz
Tablespoons (Tbs)	½ Tbs	1Tbs	4 Tbs

<sup>1</sup>Conversion factors: 2 tablespoons (Tbs) = 6 teaspoons (tsp)

## HOW TO APPLY

**Shake Well Before Use**  
This product may be applied with trigger sprayer, hand-held, backpack, or hose-end sprayers. Use a hose-end sprayer that can be adjusted to provide a dilution ratio of about 2 fl oz of this product (4 Tbs) per gallon of spray.

## WHEN TO APPLY

Apply when listed pests are present. Repeat applications may be made as indicated in the Home Gardens section. See your state extension service recommendations for treatment guidelines in your area.

Crops	Pests Controlled	Maximum Number of Applications per Season	Minimum Days to Wait Before Reapplying	Minimum Days to Wait from Last Application to Harvest
cole crops (Brassica vegetables), including, but not limited to: broccoli, broccoli raab, brussels sprouts, cauliflower, javalo, Chinese broccoli, cabbage, Chinese cabbage (bok choy), Chinese cabbage (napa), Chinese mustard cabbage gai choy, collards, kale, kohlrabi, mizuna, mustard greens, mustard spinach and rape greens	cabbage looper diamondback moth imported cabbage worm leafminers worms	6	4	1
curcurbits, including, but not limited to: cucumber, edible gourds, nuskmelons (cantaloupe, honeydew, etc.), pumpkin, summer and winter squash, and watermelon	leafminers thrips worms (caterpillars)	6	5	all except cucumber, 3 cucumber, 1
fruiting vegetables, including, but not limited to: eggplant, ground cherry, okra, pepino, pepper, tomatillo, and tomato	Colorado potato beetle leafminers thrips worms (caterpillars)	6	4	1

**ALWAYS read the label!**  
**ALWAYS follow directions!**

**ENVIRONMENTAL HAZARDS**  
This product is toxic to bees exposed to treatment for 3 hours following treatment. Do not apply this pesticide to blooming, pollen-shedding or nectar-producing parts of plants if bees may forage on the plants during this time period. This product is toxic to aquatic invertebrates. To protect the environment, do not allow pesticide to enter or run off into storm drains, drainage ditches, gutters or surface waters. Applying this product in calm weather when rain is not predicted for the next 24 hours will help to ensure that wind or rain does not blow or wash pesticide off the treatment area. Rinsing application equipment over the treated area will help avoid run off to water bodies or drainage systems.

# Eliminate or reduce pesticide exposure



- **Fungicide Fallout:** While aimed at plant diseases, many fungicides pose a hidden threat to pollinators.
- **Bee Beware:** Some fungicides may not harm insects directly, yet they can weaken bees' digestion and disease resistance.
- **Toxic Transformation:** Certain fungicides can alter pollinators' detox pathways, magnifying the toxicity of otherwise harmless pesticides.

**Most insect pests in our landscapes can be managed without using insecticides!**



**Many fungicides are toxic to pollinating insects**





# Fungicide use guidelines

- Active ingredients that will **kill** bees
  - Copper
  - Pcnb
  - Sulfur
- Active ingredients that will **kill the larvae**
  - Neem oil
  - Chlorothalonil
- Active ingredients that have **synergistic effect**
  - Don't kill outright, but become more toxic because the bees can't break down the active ingredients like they normally would.
  - E.g., Myclobutanil (Spectracide Immunox) and acetamiprid (Ortho Rose & Flower Insect killer)----5X more toxic to bees than acetamiprid by itself!

# Least toxic Fungicides

- **Bacillus subtilis**
  - Serenade garden disease control
- **Mineral Oil**
  - Monterey horticultural oil
  - Bonide all seasons horticultural & dormant spray
  - Hi-yield dormant spray
- **Clove oil;peppermint oil;rosemary oil**
  - Dr. Earth final stop disease control fungicide
- **Citric Acid**
  - Earths Ally Disease Control
- **Bacillus amyloliquefaciens**
  - Monterey Complete Disease Control
- **Thiophanate methyl**
  - Bonide Infuse Systemic Disease Control Lawn & Landscape



# Labels



## Organic-Least to most toxic to beneficials

**Bt** -caterpillars--little or no toxicity to any other organism

**Diatomaceous Earth**

**Horticultural oils** (Smothers--Needs complete coverage)

**Neem Oil**--Check active ingredients--No azadirachtin (Contact-smothers)

**Azadirachtin** (Derived from neem tree but is not neem oil) (Repellent and insecticide—**apply at night**-insect must ingest)

**Insecticidal Soap** - Potassium salts of fatty acids (Contact spray-needs complete coverage--not preventive)

**Spinosad** - E.g., Entrust, Success, Regard, Bonide Captain Jack's Deadbug Brew R-T-U; **apply at night** (contact, but most effective when larvae ingest it)

**Boric Acid** - ants (Ingest)

**Pyrethrin** - highly toxic--apply at night



**NEVER apply pesticides to flowering plants!**



# Labels

## Synthetic Pesticides- ALL highly toxic to bees

Acetamiprid

Esfenvalerate

Acephate

Cyhalothrins

Bifenthrin

Malathion

Carbaryl (E.g., Sevin)

Permethrin

Cyfluthrin

Imidacloprid



**NEVER apply pesticides to flowering plants!**



# How about home remedies?

Remember, all home remedies are also chemicals and aren't necessarily safe.

How about home remedies?

- Vinegar
  - Household vinegar has 3% to 5% acetic acid and can cause eye irritation
  - Pesticide vinegar has 20% acetic acid and can cause permanent eye damage
- Milk
  - No clear scientific research about use on roses, but it doesn't prevent black spot
- Baking Soda
  - Can be useful under specific circumstances
- Dawn Dish Detergent
  - Use insecticidal soap—it's been tested and is effective without harming plant tissue. Dish detergents can wash away the leaf's protective waxy cuticle, and the plant becomes vulnerable to sun damage.
- Table Salt as an herbicide
  - Yes it can kill weeds, but the sodium left in the soil builds up to levels that are toxic to plants.
- Alcohol
  - Can cause leaf burn



# Ways to get started

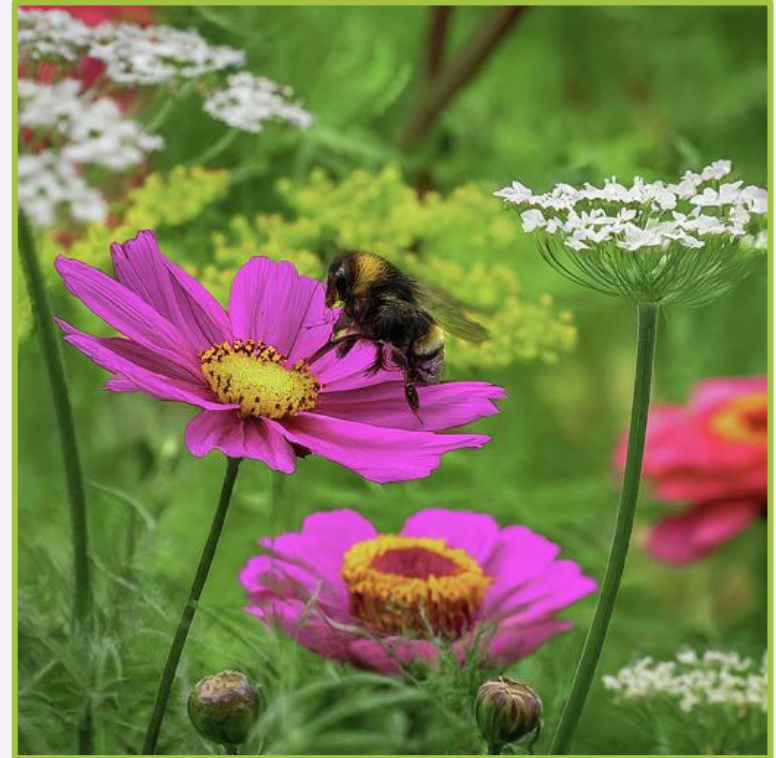
- Start small! 30 sq.ft is only a 5x6 patch!
- Lawns are not pollinator friendly--consider transforming your lawn to planting areas over time. See #1
- Use what you already have--cluster together
- Ask a friend for seedlings or cuttings, start your own seeds, haunt the Native plant sales.
- Use a combination of methods





# Tell the pollinator story

Share your knowledge to raise awareness about the challenges they face and the possible solutions to help them.



# Questions?



Alice Slusher

WSU Cowlitz Co. Extension Master  
Gardener Volunteer

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Website: [Cowlitzcomg.com](http://Cowlitzcomg.com)



For information about **becoming a WSU Extension Master Gardener in Cowlitz Co.**, contact Gary Fredricks, [garyf@wsu.edu](mailto:garyf@wsu.edu), 360-577-3014 ext. 3



**WASHINGTON STATE**  
UNIVERSITY



<http://mastergardener.wsu.edu/>





# Resources

## Find toxicity ratings

- Thurston County Grow Smart Grow Safe <https://growsmartgrowsafe.org/Products?pesticideTypeId=14>

## Labels

- WSDA Understandings Pesticide Product Labels <https://cms.agr.wa.gov/WSDAKentico/Documents/Pubs/849-NRAS-Interpreting-Labels.pdf>
- WSU Learning about Labels <https://s3.wp.wsu.edu/uploads/sites/2210/2015/05/learningaboutlabels.pdf?x89013>

## Bee impact and recommendations for use for fungicides and bactericides

- <https://www.canr.msu.edu/news/appendix-1>
- <https://www.canr.msu.edu/news/do-not-spray-highly-attractive-plants-with-insecticide-before-or-during-flowering>
- <https://www.canr.msu.edu/news/avoid-spraying-flowers-with-fungicides>

## Least toxic choices

- Chemical attractants (Predalure) <http://www.agbio-inc.com/predalure.html>
- Less Toxic Pesticides: <http://ipm.ucanr.edu/QT/lesstoxicinsecticidescard.html>
- Fungicides: Bee impact and recommendations for use for fungicides and bactericides
  - <https://www.canr.msu.edu/news/appendix-1>
  - <https://www.canr.msu.edu/news/do-not-spray-highly-attractive-plants-with-insecticide-before-or-during-flowering>
  - <https://www.canr.msu.edu/news/avoid-spraying-flowers-with-fungicides>

# Resources

## Biological control:

- Bio control: <https://greenmethods.com>
- Nematodes: <https://biologicco.com>
- Arbico Organics: <https://www.arbico-organics.com>
- Beneficial Garden Insects
  - Common Natural Enemies of Nursery Crops and Garden Pests in the PNW (excellent pocket guide)  
<https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/ec1613.pdf>
  - Beneficial Insects Spiders Creatures in Garden  
<http://pubs.cahnrs.wsu.edu/publications/wp-content/uploads/sites/2/publications/emo67e.pdf>
  - Encouraging Beneficial Insects in Your Garden-what to plant  
<https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/pnw550.pdf>

# Resources



Bee impact and recommendations for use for fungicides (great list!)

<https://www.canr.msu.edu/news/appendix-1>

The Xerces Society <https://www.xerces.org/>

The Audubon Society <https://www.audubon.org/>

The Pollinator Partnership <https://www.pollinator.org/>

The Native Plant Society <https://www.wnps.org/>

Your local Conservation District <https://wadistricts.org/>

The Woodland Park Zoo <https://www.zoo.org/pollinator>

The Washington Butterfly Association <https://wabutterflyassoc.org/>

The Washington Native Bee Society

<https://www.wanativebeesociety.org/>

DIY--good behave designs and instructions

Xerces [https://xerces.org/sites/default/files/2018-](https://xerces.org/sites/default/files/2018-05/13-054_02_XercesSoc_Tunnel-Nests-for-Native-Bees_web.pdf)

[05/13-054\\_02\\_XercesSoc\\_Tunnel-Nests-for-Native-Bees\\_web.pdf](https://xerces.org/sites/default/files/2018-05/13-054_02_XercesSoc_Tunnel-Nests-for-Native-Bees_web.pdf)

Crownbees--DIY: <https://crownbees.com/blog/diy-how-to-make-a-solitary-bee-house/>

# INSECTARY GARDEN! Seeds—where to get

- Separate seed packs—there are other sources, too.
- “Beneficial Insectary Mix” - [www.outsidepride.com](http://www.outsidepride.com)
- “Beneficial Insect Attractant Mix” - [www.johnnyseeds.com](http://www.johnnyseeds.com)
- Common garden/landscapes insect pests (and what to do about them):  
<http://hortsense.cahnrs.wsu.edu/Search/MainMenuWithFactSheet.aspx?CategoryId=13>
- Native plants for PNW Gardens [http://library.oregonmetro.gov/files/native\\_plant\\_booklet.pdf](http://library.oregonmetro.gov/files/native_plant_booklet.pdf)





# Resources

Enhancing Urban and Suburban Landscapes to Protect Pollinators **Highly Recommended**

<https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em9289.pdf>

Pollinator Garden Designs **Highly Recommended**

[https://catalog.extension.oregonstate.edu/sites/catalog/files/project/supplemental/em9289/pollinatorgardendesigns\\_062020.pdf](https://catalog.extension.oregonstate.edu/sites/catalog/files/project/supplemental/em9289/pollinatorgardendesigns_062020.pdf)