

The background features several thin, light gray curved lines and dashed lines that sweep across the page. A large, vibrant green speech bubble shape is centered, containing the main text. The speech bubble has a pointed bottom and a horizontal bar at the top.

# Pollinators and Beneficial Insects

**Building and Maintaining Garden Habitat**

# Who Are the Pollinators and Beneficials?

## Insects

- Bees and Wasps
- Ants
- Beetles
- Moths and Butterflies
- Flies

## Birds and Mammals

- Birds
- Bats
- Mice
- Humans
- Bear
- Rabbits
- Deer
- Squirrels

**Name a Pollinator You Saw in your Garden!**



# Methods of Pollination

## BIOTIC

### Zoophily

- Transfer of pollen by mammals
- Mutually beneficial
- Flowers tend to be attractive by smell or color

### Chiroterophily

- Transfer of pollen by bats
- Some fruits dependent on bats (banana, mangoes, guava)
- White flowers

### Ornithophily

- Transfer of pollen by birds
- Nectar feeding birds
- Tubular flowers

### Entomophily

- Transfer of pollen by insects
- Huge range of insects including winged and crawling
- Co-evolution
- Attractive flowers

## ABIOTIC

### Anemophily:

Wind or Water pollination (no animals involved)

# What do we eat that needs pollinators?



- Fruits
  - Apples, bananas, peach, blueberries, strawberries
- Nuts
  - Almonds, coconuts, cashews
- Vegetables
  - Avocados, beets, broccoli, carrots, cucumbers, pumpkin
- Other
  - Chocolate, coffee, vanilla, and sugarcane!

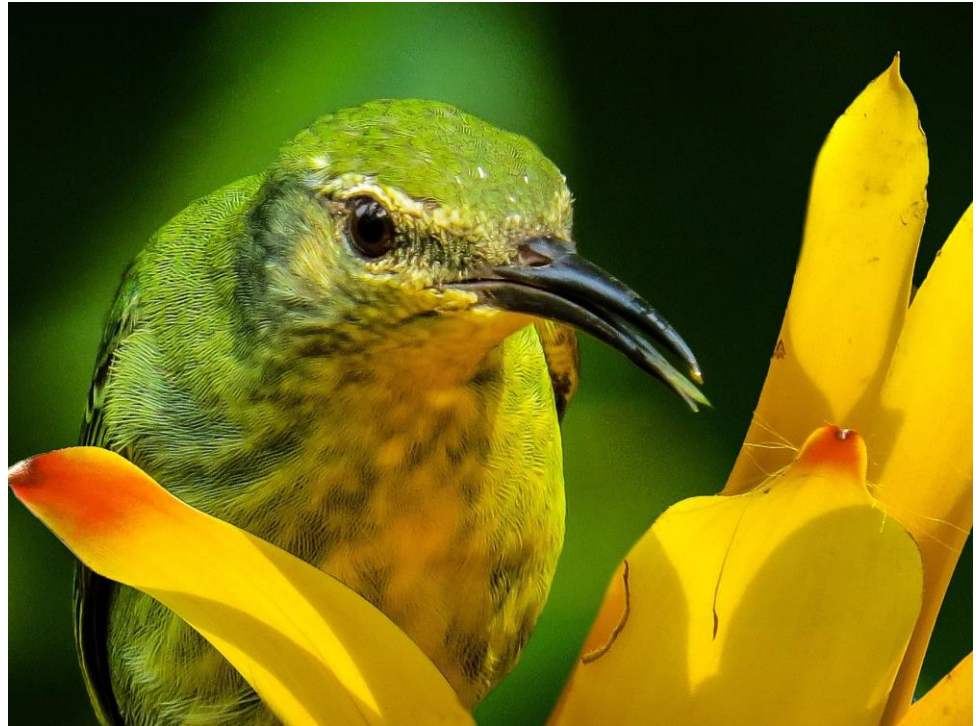
## Bird Pollination

2,000 species globally

Nectar feeders

Mostly tropical birds

Strong perch – except  
hummingbirds





# Hummingbirds

- **Anna's, Rufous, Calliope and Black Chinned**
- Anna's is a year-round resident
- Territorial
- Long bills used to feed on nectar
- Tubular flowers with thin nectar
- Red, orange, and yellow but not exclusive
- Pollen is deposited on base of bill and on their foreheads





# ▼ Insects

**Moths and Butterflies, Beetles, Flies, Ants, Wasps and Bees**



# MOTHS AND BUTTERFLIES

- Nectar feeders
- Travel longer distances than bees
- Pollen collects on legs and body as they source nectar
- Complete metamorphosis – egg -> larvae -> pupae -> adult
- Plants need to host both larvae and adults
- Lifespan – ten days to ten months - corresponds to size
- Perch on flowers – wide and flat flowers are favorites
- Good color vision including ultra-violet range – nectar guides



# MOTHS

- 1,200 species of moths in the Pacific Northwest
- Moth wingspans range from 1/10 of one inch to 6 inches
- Generally active at night
- Feathered, thickened or threadlike antennae
- Wings held horizontally or hugged around abdomen
- Silk cocoons
- Habitat loss reduces population



Sand Verbena Moth

Elegant Sheep Moth



# BUTTERFLIES

- Knobs on the ends of their antennae
- Hold wings up over body – especially when warming up
- 60°F temperature
- March until early October
- Colorful wings – for attracting a mate and for camouflage
- Can be plant species dependent
  - ❖ Red Admiral and Stinging Nettle
  - ❖ Monarch and Milkweed
  - ❖ Puget Blue and Lupine
- Many butterflies are at risk due to urbanization
  - Habitat fragmentation
  - Loss of species



Taylor's Checkerspot



Oregon Silverspot Butterfly



Mardon Skipper

Butterflies

Swallowtail and  
Monarch



# Butterflies and Moths

Taylor's Checkerspot



White lined sphinx hummingbird moth



Western Sheep Moth

The image features a central green circle with the text "Bees, Wasps, Flies, Ants" in white. Below this, the word "Hymenoptera" is written in a smaller white font. The background consists of several concentric circles, some solid and some dashed, in light grey. A dark grey, curved swoosh shape is positioned to the left of the green circle, partially overlapping it.

# Bees, Wasps, Flies, Ants

Hymenoptera

- **Native bee**
- **Solitary** - do not live in hives
- Active **February through June**
- **Travel 300 feet** from their nest compared to 2 miles like a honeybee
- Emerge **earlier in spring – fly in cooler, cloudier weather**, than honeybees
- Very important for our **fruit trees – six bees can pollinate a whole fruit tree in one day**



# Mason Bees

*Osmia lignaria*



- Carry pollen on abdomen
- Black and furry, yellow belly, honeybee size
- Males and males emerge in spring and mateSolitary nesting in **hollow stems**
- Round “bites” in leaves
- Make nectar loaf to feed their young
- Uses leaves to wall off egg chambers
- Present in summer
- Can be raised like mason bees



## Leaf Cutter Bees



*Megachile*





*Agapostemon*

- Solitary **ground** nest
- Deep vertical nest
- Two generations per year

- Semi-social **ground** nesters
- Single nest can establish in spring and reproduce through the fall



*Halictus*

Generalist floral visitors

- Solitary **ground** or **rotting wood** nest

## Sweat Bees



*Lasioglossum*



- Soil burrowers – **ground nesting**
- Nest in groups – like an apartment complex
- Carry pollen on hind legs – very hairy
- Important sunflower pollinator
- Most common in spring and summer

# Longhorned Bee

*Melissodes*

# Bumble Bees

## *Bombus sp.*

45 species in U.S.

Social annual colonies – Queen lives over winter underground

Underground: **rat burrows, compost piles**

Above ground: **rock /wood piles, old bird nests, grass clumps**

Thick fuzzy hair; yellow, orange, white and black

Round, robust bodies

Flattened plate on hind legs for carrying pollen

Perform BUZZ pollination

Important pollinators for blueberries, tomatoes, peppers



*Bombus vosnesenskii*

Urban Pollination Project  
identified this species as  
THE tomato pollinator in Seattle

## Yellow Faced Bumble Bee



- Very rare – decline since 1998
- Identified in 2013 north of Seattle, 2014 in Seattle
- Key pollinators for blueberries and cranberries
- Concerns that fungus introduced by commercially raised bumble bees has caused their decline
- Loss of habitat as well

# Western Bumble Bee



*Bombus occidentalis*



**Black Tailed Bumble Bee**

*Bombus melanopygus*



**Fuzzy Horned Bumble Bee**

*Bombus mixtus*

# Other Common Bumble Bees

- European in origin
- Hives need management
- Produce royal jelly, honey, beeswax
- Highly social – communication
- Individual colony can house 10,000 bees
- Wild hives in trees, chimneys, walls
- Still out late in the season so fall blooming plants are important
- Colony Collapse Disorder concerns
- Need 1-2 hives to cover the work that 250 Mason Bees can do

# Honey Bees

## *Apis mellifera*



Bee Fly



## FLIES



Green Bottle Fly

- Non-hairy so less efficient at carrying pollen than bees
- Many are also plant pest predators!
- Attracted to pale, dull, or dark toned flowers
- Attracted to plants that produce pollen
- Funnel like flowers
- Some are good bee mimics
- One pair of wings and large eyes differ from bees

Hover Fly





# ANTS



- Pollinate low growing flowers with flowers attached close to the stem
- Seeking nectar - gather pollen grains by accident
- Sedums can be ant pollinated in northwest



# BEETLES

Coleoptera

- Among the first insects to visit flowers
- Bowl shaped open flowers
- Attracted to white, off white and green flowers that are open during the day
- Large solitary flowers – room to roam – Magnolia
- Clusters of small flowers – room to roam
- Gather pollen by accident
- Some species are important pest predators
- Some species are also harmful plant pests – wood borers



# Pollinators in Decline

- Loss of habitat
- Pesticide use
- Insect and disease issues





Ground Beetles are fabulous **slug and snail predators**



Hummingbirds pollinate **and eat insects**

## Garden Heros!



Hover Fly larvae are the predators of **aphids, mealybugs, and small insects**



Bats eat **600-1,000** insects an hour



Bushtits **forage for insects** throughout the garden



Green Lacewing



# Beneficial Insects



Lady Beetle



Larvae also called Aphid Lions  
Adults and larvae are proficient aphid eaters



Assassin Bug



Hide and ambush their  
prey and eat almost any  
insect

# Garden Hero: Lady Beetles

Eat 50 aphids per day

Some types as many as 200-300 aphids

Also eat mealybug, scale and spider mites



## Voracious Predator: Green Lacewing

Adults and larvae feed on:

Aphids

Leafhoppers

Whiteflies

Small caterpillars

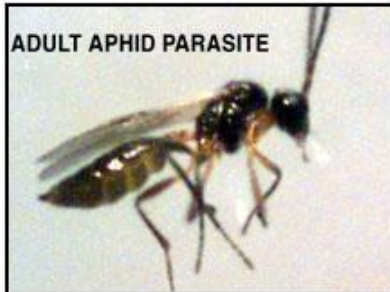
Insect eggs

Spider mites



# Clever Assistant: Parasitic Wasp

- Parasitize by **laying eggs in the host** insect. The host is entirely consumed by the developing larvae.
- Caterpillars, moths, leafminers, wood-boring beetle larvae, flies, aphids, gypsy moth, weevils, and spiders.



**Do Not Sting!!!**





## Habitat and Our Role



**Habitat;** an environment occupied by a particular species of plant, animal or any other kind of organism.



## Key Ingredients of a Healthy Habitat

### Food

- Flower nectar
- Fermenting fallen fruit
- Specific plants for larvae

### Shelter

- Canopy layers
- Snags or dead wood
- Thickets
- Hand-made shelters
- Bare soil
- Mulched areas
- Groups of plants

### Water

# Creating Healthy Habitat



Cover crops to build healthy soil, structures for nesting, diverse landscape, native plants



# Plants; because we are gardeners!

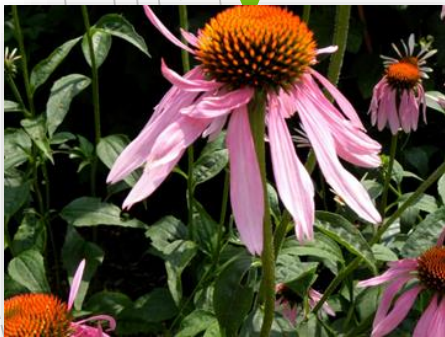


- Plant in groups – easy for pollinators
- Plant for all seasons
- Diverse – shape, size, color fragrance
- Weed flowers! Dandelions
- Plant for larvae! Caterpillars are the young of moths and butterflies
- **Know the three big families:**
- Carrot Family
- Mint Family
- Daisy Family



- Daisy
- Echinacea
- Cosmos
- Marigold
- Calendula
- Dahlia
- Sunflower
- Rudbeckia
- Zinnia
- Aster

Daisy -  
Asteraceae





## Mint - Lamiaceae



- Mint
- Lavender
- Sage
- Oregano
- Marjoram
- Bee Balm
- Thyme
- Rosemary
- Catnip
- Catmint

## Carrot - Apiaceae

Carrot

Fennel

Dill

Cilantro

Sweet Cicely

Angelica

Lovage

Celery

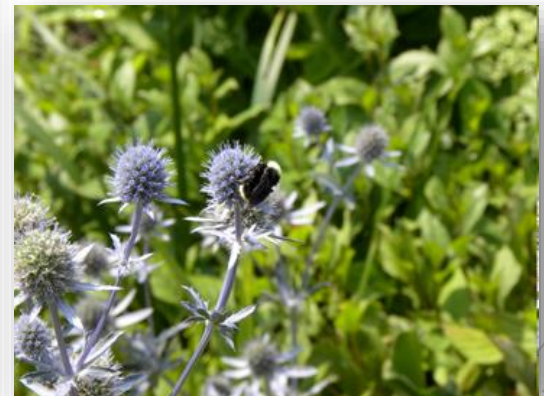
Parsley

Cumin

Coriander

Chervil

Eryngium



# Hummingbird Plants

- Agastache
- Columbine
- Fuchsia
- Monarda
- Rosemary
- Lobelia
- Penstemon
- Salvia





# Nesting Needs



- **Bumblebees:** old rodent holes, open ground, upside down flower pots, wood piles
- **Carpenter Bees:** soft dead wood, stems with pith (blackberry)
- **Leafcutter Bees:** sound, dead wood
- **Mason Bees:** pre-existing tunnels in sound, dead wood, human made houses
- **Sweat Bees:** bare compacted soil
- **Beetles:** groundcover or leaf litter
- **Birds:** tree canopy, groundcover, plant material like moss
- **Moths/Butterflies:** native shrubs for larvae

Bumble Bee  
Queen



## Resources

Garden Hotline –  
206-633-0224

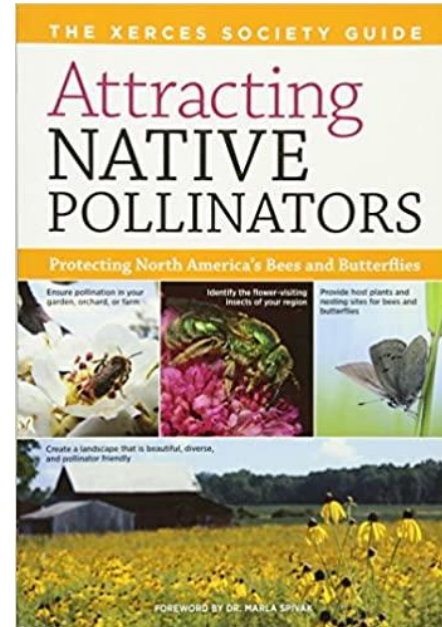
[www.gardenhotline.org](http://www.gardenhotline.org)

Xerces Society -

[www.xerces.org](http://www.xerces.org)

USDA / U.S Forest Service

<https://www.fs.fed.us/wildflowers/pollinators/animals/index.shtml>



the  
**Garden Hotline**

*Your Garden. Our Expertise.*

help@gardenhotline.org | 206.633.0224 | www.gardenhotline.org



# the Garden Hotline

*Your Garden. Our Expertise.*



**Seattle  
Public  
Utilities**



**Hazardous Waste  
Management Program**



**RainWise**

Seattle  
Public  
Utilities  
King County



**CASCADe**  
WATER ALLIANCE