



Ants on a black-eyed susan by: Kerry Wixted

# Ants

- Ants often are attracted to nectar. Most ants are poor at cross pollination but some species defend plants from herbivorous insects.
- Ants are attracted to flowers that are low growing, inconspicuous, and have flowers close to the stem.
- Ant-pollinated plants in North America include Small's stonecrop (*Diamorpha smallii*), alpine nailwort (*Paronychia pulvinata*), and Cascade knotweed (*Polygonum cascadense*).





Bat covered in pollen by: Ami Pate, National Park Service

# Bats

- Some bats pollinate plants while others disperse seeds.
- Bats are often attracted to flowers that are open at night, are aromatic, are large, and are white or pale in color.
- Over 300 species of plants depend on bat pollination including agave, mangos, [wild] bananas, and guavas.
- All of Maryland's bats are insectivores and do not visit flowers.





Sweat bee visiting an aster by: Patty O'Hearn Kickham CC by NC ND 2.0

# Bees

- Bees often are the most effective pollinators.
- Bees are often attracted to brightly colored flowers that are blue, yellow, or a mix. They like flowers that are aromatic, are open in the day time, and have a shallow landing platform.
- Over 430 species of bees can be found in Maryland, 70% of which nest in the ground.
- Most of Maryland's bee species are specialists, visiting a select number of flower species.





Locust boring beetle on goldenrod by: Kerry Wixted

# Beetles

- Beetles are the most numerous pollinators worldwide and are among the first insects to visit flowers.
- Beetles are often attracted to bowl-shaped white or dull green flowers that smell fruity or spicy.
- Many beetles locate flowers by smell.
- There are 2,200 species of beetles in Maryland but not all are pollinators.







Ruby-throated hummingbird visiting cardinal flower by: Valerie Seger

# Birds

- Birds like ruby-throated hummingbirds feed off of nectar.
- Hummingbirds are often attracted to red or orange tubular shaped flowers.
- Hummingbirds feed their young insects.
- There are 2,000 bird species globally that feed on nectar, the insects, and the spiders associated with nectar bearing flowers.





Eastern tiger swallowtail on swamp milkweed by: Kerry Wixted

# Butterflies

- Butterflies feed off of nectar but many species provide little cross pollination.
- Butterflies are often attracted to brightly colored flowers that are clustered, open during the day, provide ample nectar, and provide landing platforms.
- Butterflies have good vision but a weak sense of smell.
- There are over 150 butterfly species in Maryland.





Hover fly on an aster by: Judy Gallagher CC by 2.0

# Flies

- Flies are not as hairy as bees or as efficient in carrying pollen, but some are good pollinators.
- Flies are often attracted to pale and dull colored flowers that have a putrid or rotten scent.
- Some flies mimic bees and wasps but only have a single pair of wings.
- Flies known as midges pollinate plants like chocolate.





Hummingbird clearwing moth and *Monarda* by: Andy Reago and Chrissy McClarren CC 2.0

# Moths

- Moths feed off of nectar but many species provide little cross pollination.
- Some moths fly during the daytime while most fly at night.
- Moths are often attracted to white or dull flowers that are clustered, open during the late afternoon or night, and provide ample nectar.
- Moths often have a good sense of smell.
- There are over 2,500 moth species in Maryland.







Blue-winged wasp on goldenrod by: Kerry Wixted

# Wasps

- Wasps can be important pollinators and are relatives of bees and ants.
- Wasps are often attracted to flowers in the Aster family.
- Many wasps feed their young paralyzed insects while adults feed upon pollen and/or nectar.
- Fig wasps are important pollinators for figs.
- Over 1,200 species of wasps can be found in Maryland.





## Pollinator Syndromes

"Pollinator Syndromes" describe flower characteristics, or traits, that may appeal to a particular type of pollinator. Such characteristics can be used to predict the type of pollinator that will aid the flower in successful reproduction. A combination of color, odor, quantity of nectar, location and type of pollen, and flower structure can each affect a potential pollinator's ability to locate a flower and its food resources.

Trait	Type of Pollinator							
	Bat	Bee	Beetle	Bird	Butterfly	Fly	Moth	Wind
<b>Color</b>	White, green or purple	Bright white, yellow, blue, or UV	White or green	Scarlet, orange, red or white	Bright red and purple	Pale, or dark brown, purple	Pale red, purple, pink or white	Pale green, brown, or colorless
<b>Nectar guides</b>	None	Present	None	None	Present	None	None	None
<b>Odor</b>	Strong and musty; emitted at night	Fresh, mild, pleasant	None to strongly fruity or foul	None	Faint but fresh	Putrid	Strong sweet; emitted at night	None
<b>Nectar</b>	Abundant; somewhat hidden	Usually present	Sometimes present	Ample; deeply hidden	Ample; deeply hidden	Usually absent	Ample; deeply hidden	None
<b>Pollen</b>	Ample	Limited; often sticky, scented	Ample	Limited	Limited	Limited	Limited	Abundant; small, smooth
<b>Flower Shape</b>	Bowl shaped; closed during day	Shallow; with landing platform; tubular	Large and bowl-shaped	Large, funnel-like; strong perch support	Narrow tube with spur; wide landing pad	Shallow; funnel-like or complex with trap	Regular; tubular without a lip	Regular and small

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Mason bee female by: USGS Bee Inventory and Monitoring Lab; note small stinger



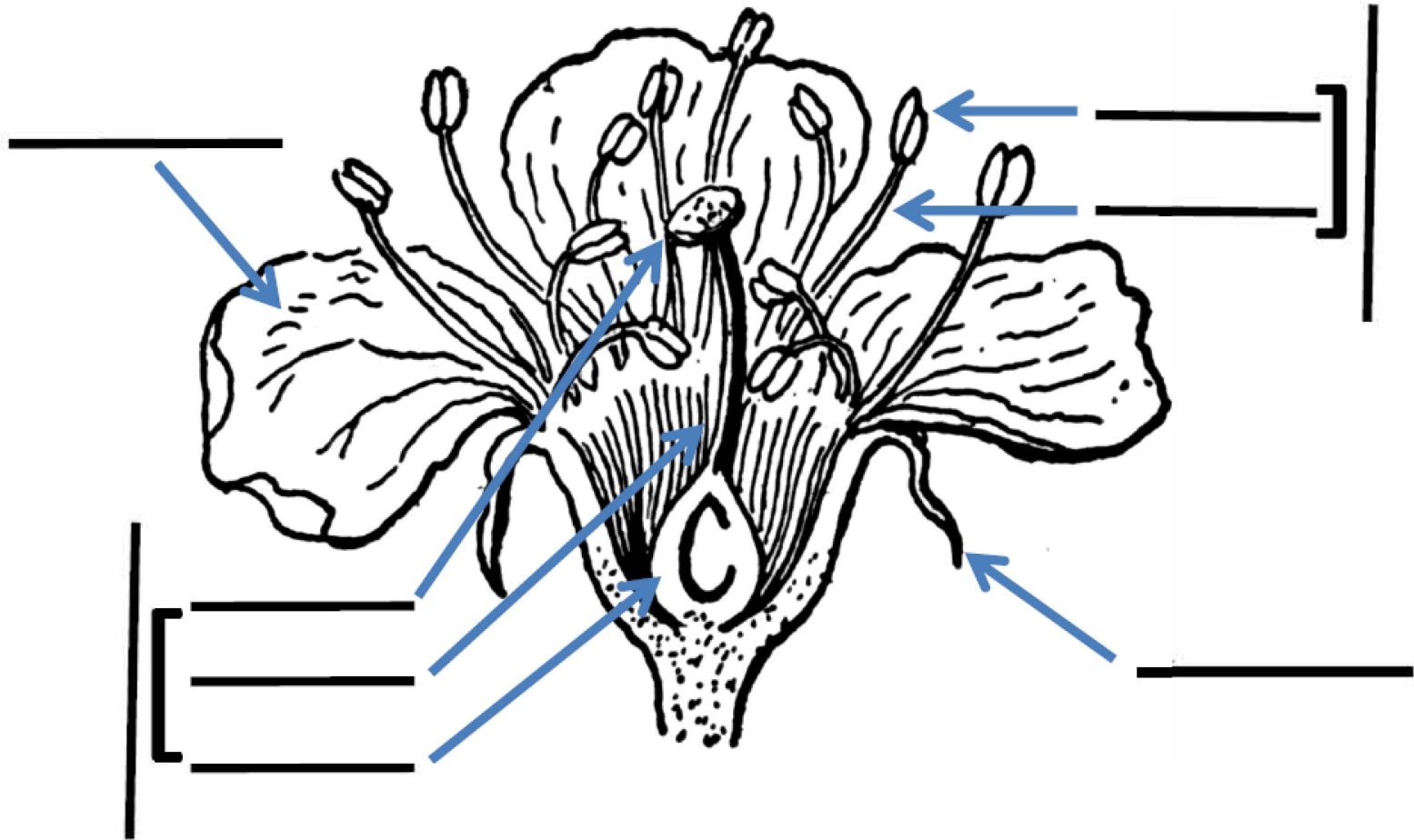
Sweat bee covered in pollen by: USGS Bee Inventory and Monitoring Lab



Mason bee nesting in artificial bee house (left); Ground nesting bee colony holes (right) by: Kerry Wixted

# Label the Parts of a Flower

Anther	Filament	Ovary	Petal	Pistil	Sepal	Stamen	Stigma	Style
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# Flower Dissection Sheet

<p><b>Draw Your Flower</b></p>		<p><b>Pistil</b></p>	<p><b>Petals= Corolla</b></p>
		<p><b>Stigma</b></p>	
<p><b>Anther</b></p>	<p><b>Stamen</b></p>	<p><b>Style</b></p>	<p><b>Sepals= Calyx</b></p>
<p><b>Filament</b></p>		<p><b>Ovary</b></p>	