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.
Sweep 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.

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

Photo credits: Merlin Tuttle, Tom Eisner, Edward Ross, Arla Altman, Chris Carvalho, Paul Growald

WWW.POLLINATOR.ORG
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
# Flower Dissection Sheet

<table>
<thead>
<tr>
<th>Pistil</th>
<th>Petals = Corolla</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stigma</td>
<td></td>
</tr>
<tr>
<td>Style</td>
<td></td>
</tr>
<tr>
<td>Filament</td>
<td></td>
</tr>
<tr>
<td>Stamen</td>
<td></td>
</tr>
<tr>
<td>Ovary</td>
<td></td>
</tr>
<tr>
<td>Sepals = Calyx</td>
<td></td>
</tr>
</tbody>
</table>

**Draw Your Flower**

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**Larry Hogan, Governor; Mark J. Belton, DNR Secretary**

[http://www.dnr.maryland.gov](http://www.dnr.maryland.gov)