Why Plant for Pollinators?

- Contribute to Crop Production
- Necessary for Healthy Ecosystem, 80-90% of Plant Species Require Animal Pollination
- Pollinator populations are declining around the world
- BEAUTIFUL!
- FUN!
- INTERESTING!
- ENTERTAINING!
Pollinator Habitat

✓ Eliminate or limit use of pesticides (herbicides, fungicides, etc.)
✓ Select plants native to region
✓ Provide larval host plants
✓ Provide nectar & pollen rich plants w/ range of shapes & sizes
✓ Select plants with bloom times from early spring to late fall
✓ Plant in drifts
✓ Provide water
✓ Perennial garden maintenance in spring
Why Use Native Plants?

- Provide shelter and food for wildlife and support pollinators
- Attract more pollinators than non-native varieties
- Adapted to local soil and climate conditions
  - Require less water, less fertilizer and less pest control than non-natives
A Word on Moths

- Nighttime Pollinators
Butterflies and Bees
Supporting Butterflies (and Hummingbirds)

- Plant nectar-rich, tubular and trumpet-shaped flowers
- Choose brightly colored flowers in reds, oranges, and yellow
- Provide Larval Host Plants

https://extension.psu.edu/attracting-hummingbirds

Penstemon
Larval Host Plants

- Plants that adult butterflies depend upon to raise their young.
- Female butterflies lay their eggs directly onto their host plant of choice.
- Each butterfly species has specific plants that their caterpillars will eat.
Keystone Plants for Caterpillars

Keystone Plant Genera For Caterpillars (in our region):

<table>
<thead>
<tr>
<th>Quercus  (Oak)</th>
<th>Ulmus  (Elm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salix (Willow)</td>
<td>Alnus (Alder)</td>
</tr>
<tr>
<td>Prunus (Cherries, Plums)</td>
<td>Tilia (Basswood)</td>
</tr>
<tr>
<td>Pinus (Pine)</td>
<td>Crataegus (Hawthorns)</td>
</tr>
<tr>
<td>Populus (Aspen, Cottonwood)</td>
<td>Rubus (Brambles, Blackberry, Dewberry)</td>
</tr>
<tr>
<td>Betula (Birch)</td>
<td>Castanea (American Chestnut)</td>
</tr>
<tr>
<td>Vaccinium (Blueberry)</td>
<td>Picea (Red Spruce)</td>
</tr>
<tr>
<td>Acer (Maples)</td>
<td>Fraxinus (Ash)</td>
</tr>
<tr>
<td>Carya (Hickory)</td>
<td>Viburnum (Viburnums)</td>
</tr>
<tr>
<td>Malus (Crabapple)</td>
<td></td>
</tr>
</tbody>
</table>


https://doi.org/10.1038/s41467-020-19565-4

“Diverse diet makes caterpillars more likely target for birds”
Butterfly Host Plants

1. Spicebush swallowtail
   - Host Plant: Sassafras Trees
     AND SPICEBUSH

2. Zebra Swallowtail
   - Host Plant: Pawpaw Tree

3. Gulf fritillary
   - Host Plant: Passion Vine

4. Monarch
   - Host Plant: Milkweed

5. Painted ladies
   - Host Plant: Thistles

6. Viceroy
   - Host Plant: Willow Tree

7. Tiger swallowtail
   - Host Plant: Ash Tree
   - Also Wild Cherry Tree
   - Yellow Poplar Tree

8. Red admiral
   - Host Plant: Nettles

9. Question Mark
   - Host Plant: Hackberry Tree

10. Sulphur
    - Host Plant: Maryland senna

https://kimsmithdesigns.com/tag/butterflies-and-their-host-plants/
nwf.org/NativePlantFinder/Plants

Native Plants (By Zip Code)

Discover native plants, ranked by the number of butterfly and moth species that use them as host plants for their caterpillars.

FLOWERS AND GRASSES

- goldenrod
- strawberry
- sunflower
- joe-pye weed, thoroughwort, do...
Larval Host Plants

**Monarch** – milkweeds

**Question Mark** – hackberry tree, elms and nettles

**Great Spangled Fritillary** – violets
Provide Larval Host Plants

Red-spotted purple – cherries, willows, serviceberries, hawthorn, sweet crabapple, aspen, birches

Pearl Crescent – asters

Spring (summer) Azure – flowering dogwood, wild black cherry, viburnums, blueberries, New Jersey tea
Larval Host Plants

Cecropia caterpillar (*Hyalophora cecropia*) on elderberry (*Sambucus nigra*)
Supporting Native Bees

- PA has about 400 native bees
- Solitary and non-aggressive
- Plant flowers that are purple, blue or yellow
- Flowers with single blooms provide more nectar and pollen than double blooms
Supporting Native Bees

**Annual flowers:** bachelor’s button, cosmos, larkspur, poppy, sunflower, zinnia

**Perennial flowers:** achillea (yarrow), agastache (hyssop), black-eyed Susan, coreopsis, echinacea (coneflower), monarda (bee balm), Russian sage

**Vegetables:** beans, cucumber, peas, summer & winter squash

**Herbs:** basil, borage, catnip, comfrey, coriander, dandelion, dill, fennel, lavender, mint, oregano, rosemary

**Fruits:** blackberry, blueberry, currant, raspberry, strawberry
Pollen Specialist Bees

The loosestrife bee (Genus Macropis) visits native loosestrifes (Genus Lysimachia).

Andrena erigeniae on spring beauty (claytonia virginica)

Squash bee (Eucera pruinosa) visits its favorite plant!

“The most recurrent host plant family among pollen specialist bee species was Asteraceae.” https://jarrodfowler.com/specialist_bees.html
# Plants for Pollinators

<table>
<thead>
<tr>
<th>Bloom Period</th>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Life Cycle</th>
<th>Flower Color</th>
<th>Max. Height</th>
<th>Water Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>Lanceleaf coreopsis</td>
<td>Coreopsis lanceolata</td>
<td>P</td>
<td>yellow</td>
<td>2</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Smooth penstemon</td>
<td>Penstemon digitalis</td>
<td>P</td>
<td>white</td>
<td>2</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Wild lupine</td>
<td>Lupinus perennis</td>
<td>P</td>
<td>blue</td>
<td>2</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Butterfly milkweed</td>
<td>Asclepias tuberosa</td>
<td>P</td>
<td>orange</td>
<td>3</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Dotted mint</td>
<td>Monarda punctata</td>
<td>A, B, P</td>
<td>purple</td>
<td>3</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Great blue lobelia</td>
<td>Lobelia siphilitica</td>
<td>P</td>
<td>blue</td>
<td>3</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Purple coneflower</td>
<td>Echinacea purpurea</td>
<td>P</td>
<td>purple</td>
<td>4</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Purple prairie clover</td>
<td>Dalea purpurea</td>
<td>P</td>
<td>purple</td>
<td>2</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Virginia mountain mint</td>
<td>Pycnanthemum virginianum</td>
<td>P</td>
<td>white</td>
<td>3</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Wild bergamot</td>
<td>Monarda fistulosa</td>
<td>P</td>
<td>purple</td>
<td>4</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Cup plant</td>
<td>Silphium perfoliatum</td>
<td>P</td>
<td>yellow</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

### Perennial Flowers continued

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Color</th>
<th>Height</th>
<th>Flower Season</th>
<th>Sun</th>
<th>Soil</th>
<th>Visitation by Pollinators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baptisia australis</td>
<td>false blue indigo</td>
<td>blue-purple</td>
<td>3-6'</td>
<td>May-Jun</td>
<td>sun to part shade</td>
<td>dry to moist</td>
<td>bees</td>
</tr>
<tr>
<td>Chelone glabra</td>
<td>white turtlehead</td>
<td>white</td>
<td>3-10'</td>
<td>Jul-Oct</td>
<td>sun to part shade</td>
<td>light, rich, wet to moist</td>
<td>bees</td>
</tr>
<tr>
<td>Echinacea purpurea</td>
<td>purple coneflower</td>
<td>rose-purple</td>
<td>2-4'</td>
<td>Jun-Aug</td>
<td>full sun to part shade</td>
<td>wet, well drained</td>
<td>butterflies, bees</td>
</tr>
<tr>
<td>Eupatorium spp.</td>
<td>Joe Pye weed, boneset, thoroughwort</td>
<td>pink, purple</td>
<td>1-1.5'</td>
<td>Jul-Oct</td>
<td>sun to part shade</td>
<td>wet, medium to wet</td>
<td>butterflies, bees</td>
</tr>
<tr>
<td>Geranium spp.</td>
<td>cranesbills</td>
<td>lavender, pink</td>
<td>1-2'</td>
<td>Apr-Jul</td>
<td>sun to part shade</td>
<td>med wet, well drained</td>
<td>butterflies, bees</td>
</tr>
<tr>
<td>Helianthus spp.</td>
<td>sunflower</td>
<td>yellow</td>
<td>1-6'</td>
<td>Jul-Oct</td>
<td>sun to part shade</td>
<td>dry to wet, well drained</td>
<td>bees</td>
</tr>
<tr>
<td>Liatris spp.</td>
<td>blazing star</td>
<td>lavender, purple</td>
<td>1-3'</td>
<td>Jul-Oct</td>
<td>sun to part shade</td>
<td>med wet, well drained</td>
<td>butterflies, hummingbirds</td>
</tr>
<tr>
<td>Lilium spp.</td>
<td>native lilies</td>
<td>yellow, red, orange, red or blue, violet</td>
<td>3-6'</td>
<td>Jun-Aug</td>
<td>sun</td>
<td>moist to wet</td>
<td>hummingbird</td>
</tr>
<tr>
<td>Lobelia spp.</td>
<td>cardinal flower</td>
<td>purple</td>
<td>1-4'</td>
<td>Jul-Oct</td>
<td>sun to part shade</td>
<td>dry to wet, well drained</td>
<td>bees, butterflies, hummingbirds</td>
</tr>
<tr>
<td>Lupinus perennis</td>
<td>lupine, sundial lupine</td>
<td>blue-purple</td>
<td>1-3'</td>
<td>Jul-Oct</td>
<td>sun to part shade</td>
<td>acidic, rich moist</td>
<td>butterflies, bees, hummingbirds</td>
</tr>
</tbody>
</table>

Plant list from: [Xerces Society for Invertebrate Conservation](https://www.xerces.org)

Plant list from: [Pollinator Partnership](https://www.pollinatorpartnership.org)
Plants for Pollinators

Trees for Pollinators

Hawthorn

Serviceberry
Plants for Pollinators

Shrubs for Pollinators

St. John’s Wort

Elderberry

Spicebush
Butterfly Bush

• Provides a lot of nectar, but does not support caterpillars
• Invasive Plant
  ○ Rank 2, Significant Threat – not as aggressive as Rank 1
• Deadhead after bloom to reduce spread

Alternatives

- Broadleaf Meadowsweet (Spiraea latifolia)
- New Jersey Tea (Ceanothus americanus)
- Sweet Pepperbush (Clethra alnifolia)
Plants for Pollinators

Early Blooming Perennials

- Phlox paniculata
- Wild Geranium
- Fringed Bleeding Hearts
- Wild Lupine
Plant Selection

Summer Blooming Perennials

Swamp Milkweed

Purple Coneflower

Joe-Pye Weed ‘Little Joe’
Plants for Pollinators

Late Blooming Perennials

Closed Bottle Gentian

New England Aster

White Turtlehead

Cardinal Flower
Plants for Pollinators

Vines for Pollinators

Trumpet Vine

Coral Honeysuckle
Find More Plants

Phipps Sustainable Plant Finder

• Search for:
  o Pollen
  o Nectar
  o Host plants
  o Native to SW PA

Phipps.conservatory.org/plant-finder
Planting in Drifts
Water for Pollinators
Care and Maintenance

• Pollinators overwinter in different life stages: eggs, larvae, pupae, and adults.
• And in different places:
  o hollow stems
  o leaf litter
• Don’t cut down your perennial gardens until spring (early to late April)
<table>
<thead>
<tr>
<th>Meadow</th>
<th>Garden Bed</th>
</tr>
</thead>
<tbody>
<tr>
<td>• More wild, natural aesthetic</td>
<td>• More manicured, structured</td>
</tr>
<tr>
<td>• Replication of habitat area</td>
<td>• More control over plant selection/placement</td>
</tr>
<tr>
<td>• Mixture of pollinator plants</td>
<td></td>
</tr>
<tr>
<td>• Large swaths of flowers</td>
<td></td>
</tr>
</tbody>
</table>
Meadows, Mini Meadows

Boyce Park Meadow
https://www.youtube.com/watch?v=Y-h2tbA-Dt8
Site Preparation

Competition from invasive or undesirable vegetation is the most limiting factor in upland meadow preparation. Prior to planting, all such vegetation must be fully controlled. – Ernst Seeds
Seed Selection and Sourcing

Choosing Seed

- Zone 6
- Northeast Region
- Mix of Annual, Biennial, Perennial
- Native
- Purity
- Conditions of Yard

*most meadow plants will prefer sun, at least 5 or 6 hrs*
Seed Selection and Sourcing

Use ¼ - ½lb of seed for every 500 square feet

1. Calculate area to be planted: length X width
   Ex.1) 25ft X 10ft = 250ft²
   Will need 1/8 to ¼lb of seed.

2. Then determine amount of seed needed.
   Ex.2) 20ft X 50ft = 1000ft²
   Will need ½ to 1lb of seed.
Seed Selection and Sourcing

American Meadows

- Native Seeds
- Pollinator Mixes
- Seeds by Region
Seed Selection and Sourcing

Prairie Nursery

- Native Seeds
- Seed Mixes for Soil Types and Meadow Height
- Pollinator Seed Mixes
Seed Selection and Sourcing

Ernst Seeds

- Native Seeds
- Seed Mixes for Soil Types
- Pollinator Seed Mixes
Planting

- Mix seed with a bulking agent: clay cat litter, playground sand, or vermiculite
- Broadcast the seed by hand
- Divide the seed in half
- Sew seed from north to south, then sew the other half walking east to west
Planting

• Press seed into the soil
  ▪ Use the back of a leaf rake to make sure there is good contact with the soil
  ▪ Or walk with cardboard over the seeds to press them into the soil

• Don’t cover

• Water

• 10 – 20 days to germinate
Care and Maintenance

Watering

- Water regularly early on – especially when seeds are germinating
- Use sprinkler or a soaker hose
- Plan to plant before rainy weather

* Be prepared to water!
Great Resources
Pollinator Garden Beds
Pollinator Garden Beds
Patricia Schildkamp, Unity Township, PA
Aaron McGregor and Heather Fowler, North Huntingdon, PA
Vines – native honeysuckle

Perennials – coneflower, tickseed, bee balm, 4 varieties of milkweed (common, whorled, swamp, butterfly weed), Joe-pye weed, ironweed and many more.

Trees – dogwood, redbud and river birch

Shrubs – high bush cranberry, witch hazel, elderberry, buttonbush, viburnum, rhododendron and lowbush and high bush blueberries
Drew Richards, Oakmont, PA
Rose Romboski, Cranberry Township, PA
Plant Selection and Sourcing

Prairie Nursery

- Pre-selected Plant Plugs
- Pollinator Garden for site conditions
Plant Selection and Sourcing

Prairie Moon Nursery

- Pollinator Plugs
- Specific Soil Types
Plant Selection and Sourcing

Izel Native Plants

- Native Plugs
- Larger quantities, better prices
- More “local”
Plant Selection and Sourcing

Audubon Native Plant Center

- Native species
- Wild harvested seed
- Plants native to SW PA

Audubon Society of Western Pennsylvania
614 Dorseyville Road, Pittsburgh, PA 15238
Plant Placement and Garden Design

- **Plant in drifts** – large plantings of the same plant, repeat plants
- **Place taller plants on the northern side** of the bed so as not to shade other plants
- **Include shrubs or trees as focal point**
Planting

- Maintain proper spacing by laying out all of your plant plugs or pots
- Turn plant upside down to gently remove from pot
- Loosen up pot-bound roots
- Plant level with top of soil
Water and Mulch

- Keep plants watered as they develop
- 1 inch a week – including rainfall
- Mulch when first planting, but reduce mulch overtime
- Plants of varying heights planted close together will form a weed barrier
Thank You!

Enjoy the growing season!

Juliette Olshock
jolshock@Phipps.conservatory.org
Ask Dr. Phipps – 412/665-2364