



Bees and Forage: Natural Habitat Creation

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Bee Forage Sources:

- What's out there, what's major, and when
- What you can add
- What's good for natives is (usually) good for your bees (not always vice versa!)
- Choices you make for your bees impact natives' health!
- Where to learn more



What Bees Prefer

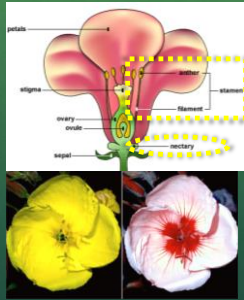
- Seasons of bloom
spring, summer, fall
- Nectar and pollen rich
local native plants are most reliable
- Flower color
white, yellow, blue, UV
- Flower shape
range for different bees



Photo: Sam Droege, USGS BML

Bee and Flower Basics

- Two structures are important: stamen (pollen) and nectaries
- Bees can tell when to visit: UV markings
- Flower shape matters: small/large, short/long
- Hybrids often sterile developed for decoration, not for pollination



Flower viewed by a human (left), and some flower viewed by bee (signaling for pollination services)

Sources for Local Managed Colonies

- Early Spring
For recovery/buildup
- Spring
Nectar Flow
- Summer
Sustaining blooms
- Late Summer/Fall
Dearth and urban helpers



Red Maple, esp. early Spring pollen



Black Locust, major May nectar



Wildflowers predominate: more pollen than nectar



Asters to the rescue?

A Dirty Little Secret

- Honey bees adore many invasives
- Negative impact on native ecologies
- Some invasives are tempting (i.e. bloom in dearth)
- Remember: honey bees are not native, native bees are critically important



Spotted Knapweed: Please Don't!

Honey Bees Require Sources of Surplus to Survive Winter



Major honey source: May

Tulip tree (washingtonpost.com)



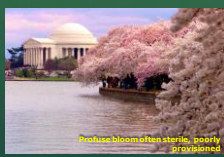
Major honey source: May-June

Linden/Basswood (Floridata)



Major honey source: April-May

Black Locust



Poor honey source: sterile, poorly developed

Cherry? Not so much.

You will see these two again later!



Dandelion (*Taraxacum officinale*)
Spring appearance signals need to prepare mature hives for nectar flow



White clover (*Trifolium repens*)
Appearance in June throughout summer months may signal reduced need to feed (requires rain/lower temps)

Photos: Wikipedia

Early Blooms Important to Honey Bees



Skunk Cabbage
(*Symplocarpus foetalis*)
V. early sign of nectar



Willow family
(*Salix*)
V. early pollen



Maple family
(*Acer*)
Nectar & pollen



Eastern Redbud
(*Cercis canadensis*)
Primarily pollen



Hollies
(*Ilex*)
Nectar contributor



Herb and Deadnettle
(*Lamium*)
Useful bec. early



Crocus
(*Crocus*)
Another early boost



Fruit-bearing Trees, not ornamental. Wild and cultivated. Apple, pear, cherry, plum, etc.
(*Many families*)
Require extra effort for pollen/nectar



Spring/Summer Plants: The Main Event



Black Locust



Tulip Poplar



Basswood/Linden



Clover: White, Dutch, Sweet, Crimson. All great.



Blackberry & Raspberry
(*Rubus*)



Milkweeds
(*Asclepias*)



Kitchen herbs
Esp. *thyme, oregano, mint, lavender, chives*

Fall Plants Important to Honey Bees



Green roofs, an urban bonus. Succulents, often *Sedum*



Clover: White, Yellow, Sweet.



Goldenrod (*Solidago*)



Asters (*Asteraceae*)



Kitchen herbs
Esp. *thyme, oregano, mint, lavender, chives*



Russian Sage (*Petrowskia*)

Gardening for Bees

- About Native Bees
- Your Garden
- What to Plant
- Best Practices
- Select Resources



About Native Bees

- Native Bee Facts
 - 4,000 species in US
 - 400 in our area
 - Vegetarians
 - Not likely to sting
 - 90% solitary
 - Others social
 - 70% ground nesters
 - Can be specialists or generalists



Moisset and Buchmann, *Bee Basics: An Introduction to Our Native Bees*.

About Native Bees

- Native Bee Needs
 - Habitat
flowers, nesting areas, water
 - No contact with pesticides



Photo: Sam Droege, USGS BLM

About Native Bees

- Native Bee Nesting
 - Bare ground
loose or sandy soil
 - Hollow stems
dead stems, cut bamboo,
or drilled wood
 - Dead wood
bees chew their own holes



About Native Bees

- What You Can Do
 - Plant pollinator plants
 - Leave bare patches of
dirt for nesting
 - Supply dead wood for
nesting
 - Have a water source
 - Don't use pesticides



Photo: Sam Droege, USGS BML

Your Garden for Bees

- Size
the square footage
- Exposure
sun or shade
- Soil type
moisture, acidity, drainage
- Uses
grow food, play, relax



What to Plant

- Woody Plants
trees, shrubs, vines
- Perennials
- Annuals
- Ground Covers
- Vegetables
- Herbs



Woody Plants: Fruit Trees

- Apple
- Plum
- Cherry

Woody Plants: Ornamental Trees

- American Holly (*Ilex opaca*)
- Black Locust (*Robinia pseudoacacia*)
- Black Tupelo (*Nyssa sylvatica*)
- Fringetree (*Chionanthus virginicus*)
- Linden/Basswood (*Tilia spp.*)
- Oak (*Quercus spp.*)
- Painted Buckeye (*Aesculus sylvatica*)
- Persimmon (*Diospyros virginiana*)
- Red Buckeye (*Aesculus pavia*)
- Redbud (*Cercis canadensis*)
- Silky Camellia (*Stewartia malacodendron*)
- Southern Catalpa (*Catalpa bignonioides*)
- Southern Magnolia (*Magnolia grandiflora*)
- Sweet Bay (*Magnolia virginiana*)
- Tulip tree (*Liriodendron tulipifera*)
- Willow (*Salix spp.*)

Woody Plants: Shrubs and Vines

- American Beautyberry (*Callicarpa americana*)
- American Snowbell (*Styrax americanus*)
- Blue Beard (*Caryopteris × clandonensis*)
- Creeping Blueberry (*Vaccinium crassifolium*)
- Elderberry (*Sambucus nigra*)
- Fothergilla (*Fothergilla gardenii*)
- Fragrant Sumac (*Rhus aromatica*)
- Inkberry (*Ilex glabra*)
- Possumhaw (*Viburnum nudum*)
- Pussywillow (*Salix discolor*)
- Raspberry (*Rubus coronarius*)
- Red Chokeberry (*Photinia pyrifolia*)
- Summersweet (*Clethra alnifolia*)
- Virginia Sweetspire (*Itea virginica*)



American beautyberry (USDA)



Red chokeberry (thismia.com)



Virginia sweetspire (USDA)



Summersweet (USDA)

Perennials

- Blue Wild Indigo (*Baptisia australis*)
- Carolina Doll's daisy (*Boltonia caroliniana*)
- Elegant Blazingstar (*Liatris elegans*)
- Green and Gold (*Chrysogonum virginianum*)
- Maryland Golden Aster (*Chrysopsis mariana*)
- Milkweed (*Asclepias* spp.)
- Narrowleaf Sunflower (*Helianthus angustifolius*)
- Savanna Sneezeweed (*Helenium pinnatifidum*)
- Showy Aster (*Eurybia spectabilis*)
- Spotted Beebalm (*Monarda punctata*)
- Sweet Goldenrod (*Solidago odora*)



Blue wild indigo (www.wildflower.org)



Spotted bee balm (Dr. Sara Tangren)



Sweet goldenrod (gobotany.com)



Showy aster (Connecticut Botanical Society)

Annuals



Sweet alyssum (*Lobularia maritima*)



Zinnia (*Zinnia x hybrida*)

Groundcovers



Dandelion (*Taraxacum officinale*)



White clover (*Trifolium repens*)

Photos: Wikipedia

Vegetables

Legumes such as bean and peas
Curcubits such as squash, pumpkin,
cucumber, gourd, watermelon, and
cantaloupe

Herbs

For Bees:	For Beneficials:
Borage	Dill
Chives	Fennel
Lavender	
Lemon balm	
Mint	
Oregano	
Rosemary	
Sage	
Thyme	

Best Practices

- Avoid Pesticides
 - Reduce diversity and abundance of flowering plants
 - Can have long residuals
 - Weaken insects
 - Impair reproduction



Best Practices

- Alternatives
 - Integrated Pest Management (IPM)
 - Beneficial insects



Best Practices

- Avoid Invasives
 - Destroy habitat by crowding out natives
 - Provide inferior forage and nesting



Autumn olive, GFDL

Select Resources

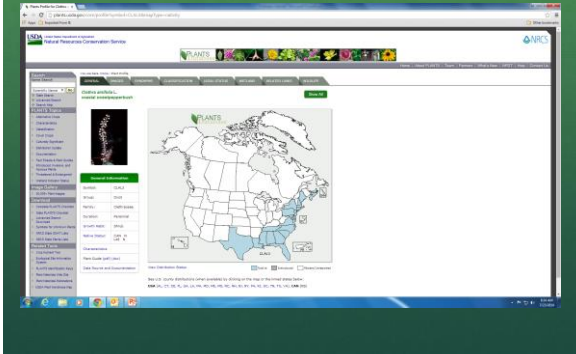
Plant Search:

USDA at plants.usda.gov

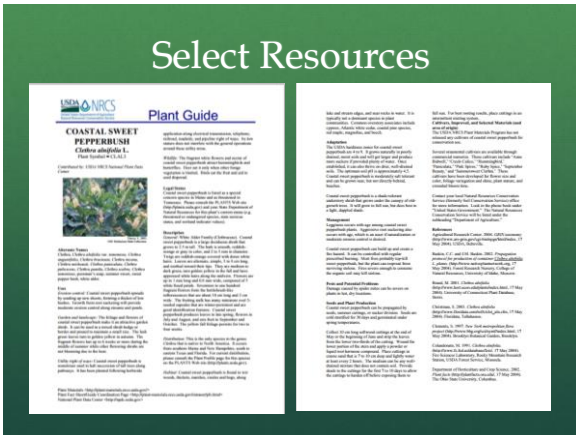
Ladybird Johnson Wildflower Center at www.wildflower.org

Wikipedia at www.wikipedia.org

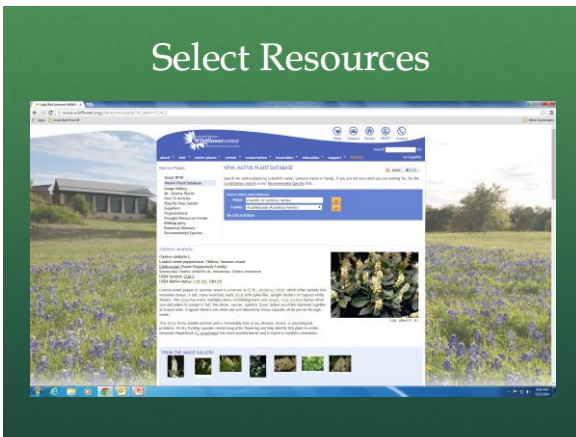
Select Resources



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Select Resources

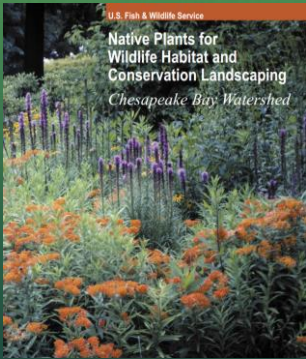


Select Resources

Native Plants:

Native Plants for Wildlife Habitat and Conservation Landscaping

<https://www.fws.gov/Chesapeakebay/pdf/NativePlantsforWildlifeHabitatandConservationLandscaping.pdf>



Available Online

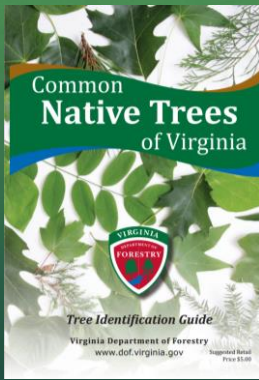
The image displays two pages from a detailed plant resource table. The table is organized into columns for plant name, a small photograph of the plant, and various characteristics such as height, bloom time, and habitat preferences. The plants listed include species like Black-eyed Susan, Purple Coneflower, and Milkweed.

Select Resources

Native Trees:

Virginia Department of Forestry's Common Native Trees of Virginia

http://www.dof.virginia.gov/infopubs/Native-Tree-ID-spreads_2016_pub.pdf



Available Online or for Purchase



Select Resources

Pollinators:

Pollinator Partnership at pollinator.org

Promotes the health of pollinators, critical to food and ecosystems, through conservation, education, and research

Signature initiatives include the NAPPC (North American Pollinator Protection Campaign), National Pollinator Week, and the Ecoregional Planting Guides

The image shows the cover of a book titled "SELECTING PLANTS FOR POLLINATORS". The cover is divided into four quadrants: top-left shows a monarch butterfly, top-right shows a rural landscape with a barn, bottom-left shows autumn trees, and bottom-right shows a forest path. Text on the cover includes "A REGIONAL GUIDE FOR FARMERS, LAND MANAGERS, AND GARDENERS IN THE SOUTHEASTERN MIXED FOREST PROVINCE" and lists states: "INCLUDING THE STATES OF VIRGINIA, NORTH CAROLINA, SOUTH CAROLINA, GEORGIA, ALABAMA, MISSISSIPPI, AND PARTS OF TENNESSEE, LOUISIANA, TEXAS, ARIZONA, OKLAHOMA, AND MARYLAND". The NAPPC logo is at the bottom left.

Regional Pollinator Guides Available Online

Select Resources

Pollinators:

Xerces Society at www.xerces.org

A nonprofit organization that protects wildlife through the conservation of invertebrates and their habitat. Established in 1971, the Society is at the forefront of invertebrate protection worldwide, harnessing the knowledge of scientists and the enthusiasm of citizens to implement conservation programs.

Select Resources

Local Media:

Washington Post at
www.washingtonpost.com

Garden column by Adrian Higgins on Thursdays



Washington Post
 Sept. 12th, 2013
Local Living
 Section Featured
 Plants for
 Pollinators



Washington Post
 July 19th, 2018
Local Living
 Section Featured
 Plants for
 Honeybees

Select Resources

Native Bees:

USGS scientist Sam Droege's website of native bee photographs

Bee Inventory and Monitoring Lab:
<https://www.flickr.com/photos/usgsbiml>

Last Word

**DO NOT USE
PESTICIDES OR HERBICIDES**

(BUT ESPECIALLY NOT WHEN PLANTS ARE FLOWERING)



Images are
Great for
Bee ID

Photo: Sam Droege, USGS BIML
