



# Common Insects: Wasps

## Hymenoptera: Ichneumonidae

- Largest family in all of Insecta, ~3,300 spp.
- Host range includes: flies, beetles, wasps, bees







# Common Insects: Bees

## Hymenoptera: Apidae

- Long-tongued bees; arguably most important in terms of angiosperm evolution and pollinator services;
- Includes honeybees, carpenter bees, cuckoo bees;
- Most exhibit eusociality.



# BACKYARD BEES OF NORTH AMERICA

## Beyond Honeybees: Native Pollinators

4,000+ native species

Generally more efficient at pollination; generalists

May have different preferences than honeybees

NOT Aggressive



Green sweat bee: *Agapostemon*

Green sweat bee: *Augochlorella*

Mining bee: *Andrena*

Mining bee: *Calliopsis*

Mining bee: *Calliopsis*

Mining bee: *Calliopsis*

Mining bee: *Andrena*

Mining bee: *Andrena*

Green sweat bee: *Agapostemon*

Green sweat bee: *Agapostemon*

Sweat bee: *Halictus*

Sweat bee: *Halictus*

Mining bee: *Andrena*

Mining bee: *Andrena*

Mining bee: *Andrena*

Mining bee: *Andrena*

Mining bee: *Macrotera*

Mining bee: *Macrotera*

Mining bee: *Macrotera*

Mining bee: *Perdita*

Mining bee: *Perdita minima*  
(smallest bee in North America)

Alkali sweat bee: *Nomia*

Sweat bee: *Halictus*

Sweat bee: *Lasioglossum (Dialictus)*

Sweat bee: *Conanthalictus*

Mining bee: *Pseudopanurgus*

Mining bee: *Protandrena*

Mining bee: *Perdita*

Sweat bee: *Lasioglossum (Dialictus)*

Sweat bee: *Lasioglossum (Dialictus)*

Sweat bee: *Lasioglossum (Dialictus)*

Mining bee: *Protandrena*

Mining bee: *Protandrena*

Mining bee: *Perdita*

Mining bee: *Perdita*

Alkali sweat bee: *Nomia*

Sweat bee: *Lasioglossum (Lasioglossum)*

Mining bee: *Protandrena*



Bumble bee: *Bombus*



Squash bee: *Peponapis*



Squash bee: *Xenoglossa*



Digger bee: *Centris*



Squash bee: *Peponapis*



Carpenter bee: *Xylocopa*



Carpenter bee: *Xylocopa*



Carpenter bee: *Xylocopa*  
(Largest bee in North America)

# Why Meadows?

## **Beyond Honeybees: Native Pollinators**

Ground-dwellers—70%

Bare ground

Abandoned nests



# Why Meadows?

## **Beyond Honeybees: Native Pollinators**

Cavity nesters—25-30%

Hollow/pithy stems—sumac, raspberries, milkweed

Dead wood—holes created by borers, bee hotels





# Common Insects: Butterflies and Moths

## Lepidoptera: Noctuidae

- Largest family in Lepidoptera, ~2,900 species;
- Mostly nocturnal, heavy-bodied moths;
- Some fruit feeders, mostly plant feeders; some major economic pests.





# Common Insects: Butterflies and Moths

## Lepidoptera: Saturniidae

- Largest moths in North America; up to 150mm wingspread;
- 68 North American species;
- Mostly nocturnal.









# Common Insects: Butterflies and Moths

## Lepidoptera: HesperIIDae

- Skippers, nearly 300 spp.;
- Feed inside sheltered cocoons as larvae;
- Many larvae overwinter and emerge in spring as adults.





# Common Insects: Butterflies and Moths

## Lepidoptera: Hesperiiidae

- *Papilioninae*: Swallowtails
- Includes some of the largest, and most colorful species in this order.





# Common Insects: Butterflies and Moths

## Lepidoptera: Nymphalidae

- ~210 spp.
- Brush-footed butterflies;
- Many beautiful and ornamental species, including:
  - Monarch butterfly
  - Great spangled fritillary
  - Red amirable
  - Zebra butterfly





# Tying it All Together

## Diverse landscapes:

- Add complexity to food webs
- Support higher species richness
- Afford more stability
- Prevent pest outbreaks
- Attracts and conserves wildlife species

















# Your yard and the landscape

Made up of 5 vegetative layers:

- 5—Canopy
- 4—Mid-story
- 3—Shrub layer
- 2—Herbaceous ground cover
- 1—Lawn/grass cover

Diversity at each of these layers is key!

Questions?





# Native Groundcovers

## Bee Balm (*Monarda fistulosa*)

- Perennial; 3'X4'
- Summer flowers
- Clay, dry soils
- Tolerates drought
- Full sun



# Native Groundcovers



## Bee Balm (*Monarda didyma*)

- Perennial; 3'X4'
- Summer flowers
- Clay, dry soils
- Tolerates drought
- Full sun





# Native Groundcovers

## Anise hyssop (*Agastache foeniculum*)

- Perennial; 3'X3'
- Summer flowers
- Average, well-drained soils
- Tolerates drought
- Full sun; pt. shade
- Bees, bees, bees!









# Native Groundcovers

## Mountain mint (*Pycnanthemum* sp.)

- Several species available
- Summer flowers
- Drought tolerant (shade)





# Native Groundcovers



## Goldenrod (*Solidago* sp.)

- Perennial;
- Fall blooming;
- Wide range of conditions;
- Full sun;
- Look for colors throughout the fall:
  - *S. graminifolia*—late summer
  - *S. rugosa* ‘Fireworks’—early fall
  - *S. speciosa*—Summer—fall
  - *S. gigantea*—late fall





# Native Groundcovers

## Blue grama grass (*Bouteloua gracilis*)

- Clumping grass <8" tall; 1' seed heads
- Full sun/drought tolerant
- Can be mowed—low maintenance turf alternative





# Native Groundcovers

## Joe Pye Weed (*Eutrochium* sp.)

- Several species available
- Summer—early Fall flowers
- Fertile soils;
- Moisture;
- Pt. shade-sun

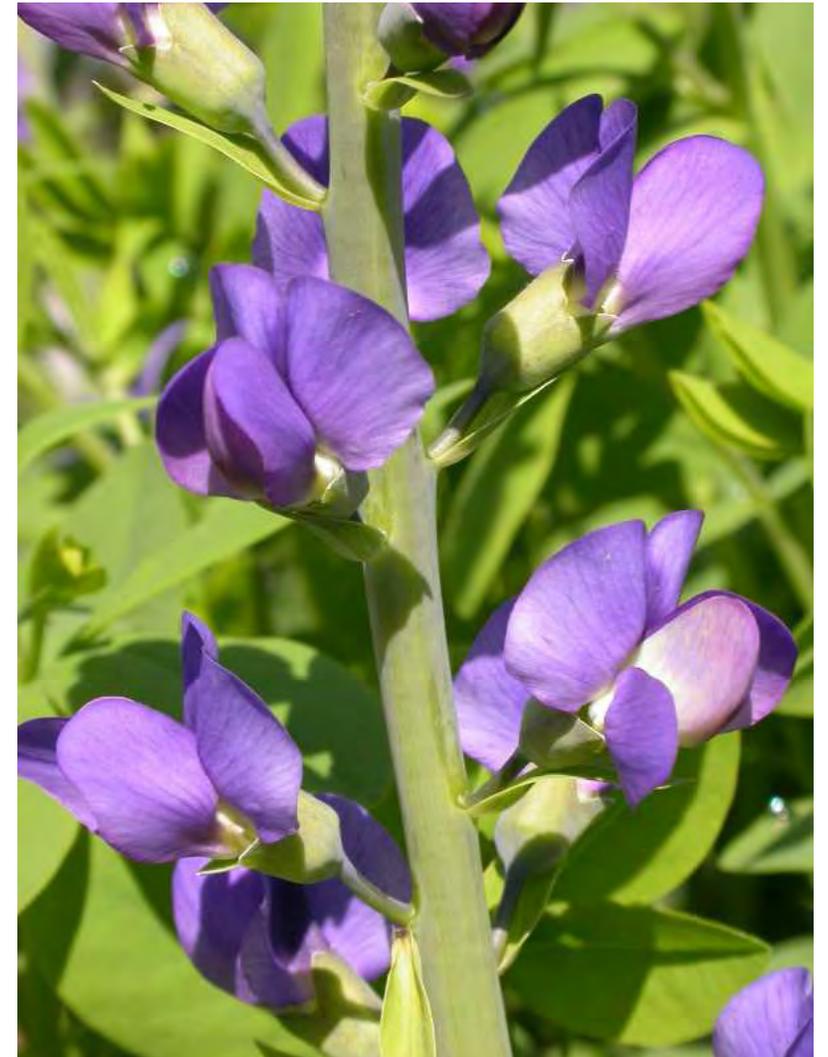




# Native Groundcovers

## Indigo (*Baptisia alba* or *B. australis*)

- Perennial shrub;
- Late spring—summer blooms; purple or white
- Full sun—shade
- Member of the ‘bean’ family—fixes nitrogen





# Native Groundcovers

## Indian Pink (*Spigelia marilandica*)

- Late spring;
- 1.5' X 1'
- Pt.—full shade;
- Rich, humusy soils  
(think forest understory)

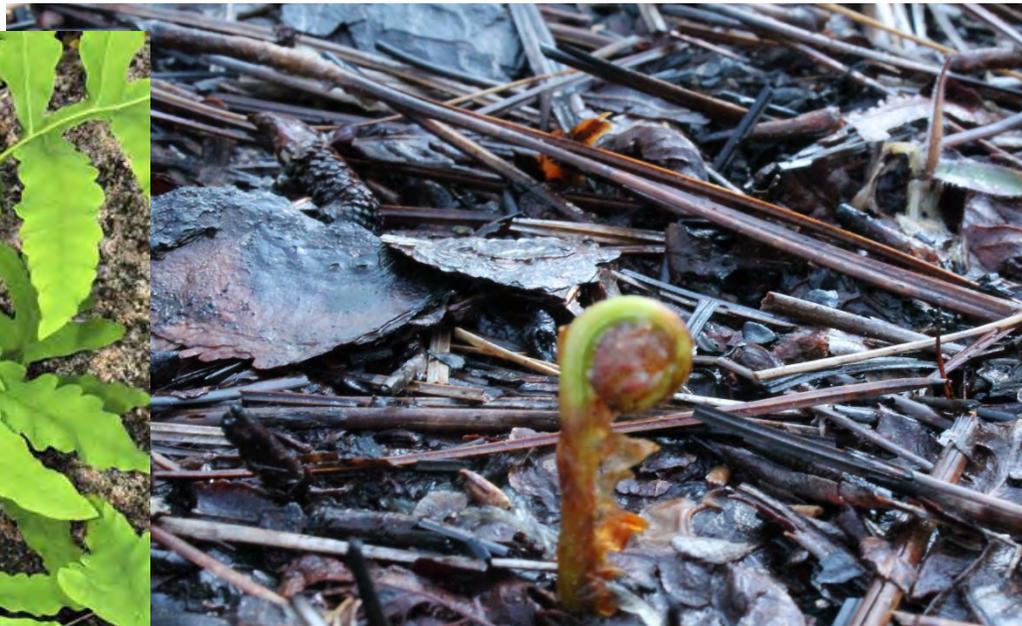


# Native Groundcovers



## Ferns (Various species)

- Part-shade—shade
- Average soils; dry—moist
- Some evergreen



# Your yard and the landscape

Made up of 5 vegetative layers:

- 3—Shrub Layer

Remember: Diversity at each of these layers  
is key!



# Native Shrubs

## Buttonbush (*Cephalanthus occidentalis*)

- Deciduous shrub
- Blooms June—August
- Moist soils; wet woods, marshes, pond edges
- Most soil types
- Supports bees and songbirds;







# Native Shrubs

## Spicebush (*Lindera benzoin*)

- Deciduous shrub—3-9' tall
- Strongly aromatic
- Spring flowers
- Red berries—early fall
- Stream margins
- Host plant for spicebush swallowtail





# Native Shrubs



## Virginia Sweetspire (*Itea virginica*)

- Perennial shrub;
- Full sun-to part shade
- Low maintenance once established
- Most soil types





# Native Shrubs

## Oakleaf Hydrangea (*Hydrangea quercifolia*)

- Southeastern U.S. native
- Large shrub up to 6' tall
- Shady sites; well-drained to moist soils
- Beautiful fall color



# Native Shrubs



## **Oakleaf Hydrangea (*Hydrangea quercifolia*)**

- Southeastern U.S. native
- Large shrub up to 6' tall
- Shady sites; well-drained to moist soils
- Beautiful fall color



# Native Shrubs



## Blue Star (*Amsonia* sp).

- Perennial
- Full sun-to part shade
- Low maintenance once established
- Most soil types
- Interesting foliage; many varieties!





# Native Shrubs

## Switchgrass (*Panicum virgatum*)

- Perennial; clumping/upright
- Full sun
- Dry conditions



'Cape Breeze'



'Dallas Blues'

Credit: Northcreek Nursery

# Your yard and the landscape

Made up of 5 vegetative layers:

- 4—Mid-story





# Mid-story Trees

## Fringe-tree (*Chionanthus virginicus*)

- Tall shrub/small tree—20' tall
- March/April flowers—fragrant
- Full sun—part shade
- Dry woodlands/  
savannahs





# Mid-story Trees

## Witch Hazel (*Hamamelis virginiana*)

- Deciduous tree
- 10-20' tall
- Flowers in the fall
- Medium water; low maintenance
- Sun—part shade; moist to well-drained soils; rain gardens



# Mid-story Trees



## Red buckeye (*Aesculus pavia*)

- Deciduous tree
- 20' tall
- Red flowers in spring
- Sun—part shade
- Moist, well-drained soils



# Your yard and the landscape

Made up of 5 vegetative layers:

- 5—Canopy

Diversity at each of these layers is key!



# Canopy Trees

## Ironwood, American Hornbeam (*Carpinus caroliniana*)

- Deciduous tree
- Up to 35'
- Moist, shady areas; well-drained
- Typically found with:
  - American beech
  - Chestnut Oak
  - Red maples
  - Ash
  - Hickory



Credit: Univ. Kentucky



Credit: Univ. Kentucky





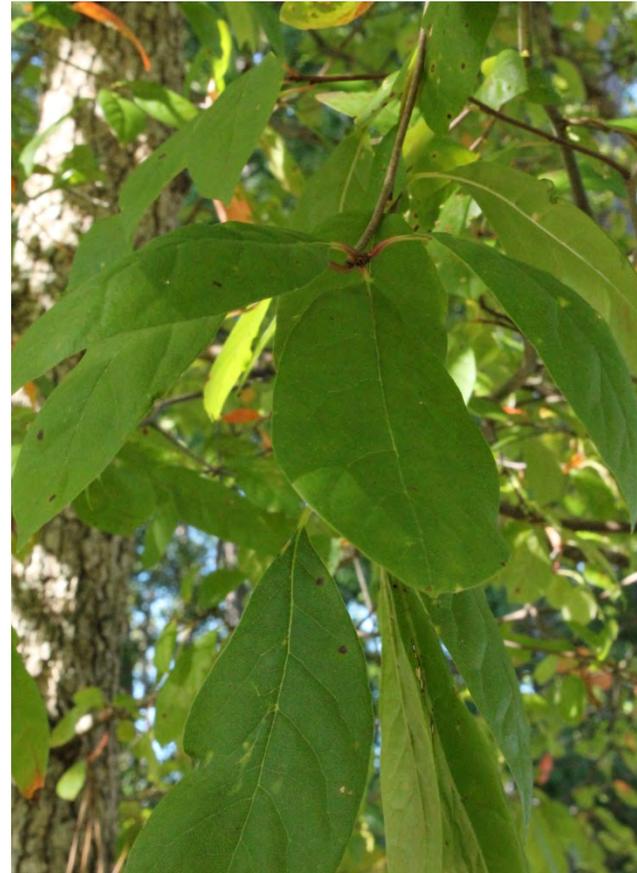


# Canopy Trees



## Black gum (*Nyssa sylvatica*)

- Deciduous tree
- 80-100'
- Moist, well-drained soils
- Full sun—part shade





# Canopy Trees

## The Shotgun Approach: Oak Trees

- Support over 500 species of lepidopterans
- Insectivorous birds—350-570 caterpillars/day

