**Native Species & Cultivars**

*Presentation by Elaine Mills, Extension Master Gardener, Arlington/Alexandria Unit, Virginia Cooperative Extension & Master Gardeners of Northern Virginia*
*Wednesday, February 12, 2025*

Species = genetically distinct plant form found in the wild in a particular geographic region
Cultivar = cultivated variety named and introduced into the horticulture trade

- Can be a "discovery" of a naturally occurring mutation within a species
- Can be produced through selective breeding for desired traits

Hybrid = new plant resulting from cross-pollination between two species in the same genus

**Trials of Woody Plants**

**Baisden/Tallamy Study**

Baisden, Emily C., et al. "Do Cultivars of Native Plants Support Insect Herbivores?"
*HortTechnology*, October 2018, Volume 28: Issue 5, pages 596-606

Measured effect of 6 traits of trees and shrubs on insect feeding preference:
Impact of leaf color change (in species/cultivar pairs)
**Species with unchanged leaf color = best choice as larval host plants for butterflies & moths**

Impact of intense fall color
**Species with unchanged fall color = best choice as larval host plants**

Impact of changed growth habit, disease resistance, variegated foliage, enhanced fruit size
Mixed results, but **cultivars judged to be acceptable to insects as larval host plants**

*Additional notes relating to study:*
For possible negative effect of changed growth habit (size), see
"Which birds feed at which height?"
For possible negative effect of enhanced fruit size on birds, see
Avery, Michael L., et al. "Handling Efficiency and Berry Size Preferences of Cedar Waxwings"
*Wilson Bull.,* 104(4), 1993, pp. 604-611

**Mt. Cuba Hydrangea Trial & University of Delaware Pollinator Study**

"Wild Hydrangea for the Mid-Atlantic Region"

- Lacecap cultivars preferred over mopheads for pollinator visitation
- **Species, *Hydrangea arborescens*, generally preferred**; only outranked by 'Dardom' cultivar
- NOTE: Pollinator profiles vary between species and cultivars
- **Difficult to predict effect of changes on pollinators & to make recommendations**

**Trials of Herbaceous Plants**
**Penn State Extension**
"Bees, Bugs & Blooms - A Pollinator Trial"
Evaluation of native plant species & cultivars for attracting pollinators

**Straight species preferred or equally visited by pollinators**

☑ Wild Bergamot (*Monarda fistulosa*)
❌ 'Claire Grace': naturally occurring cultivar from Tylertown, MS; disease-resistant

☑ New England Aster (*Symphyotrichum novae-angliae*)
❌ 'Purple Dome': discovered near Allentown, PA; compact, mounded form

☑ Foxglove Beardtongue (*Penstemon digitalis*)
❌ 'Husker Red': developed at U of NE; maroon-colored foliage, flowers w/pink blush

☑ Sundrops (*Oenothera fruticosa*)
❌ 'Fireworks': developed in Norway; compact, purple foliage, red stems & flower buds

☑ Obedient Plant (*Physostegia virginiana*)
☑ 'Vivid': origin unclear; compact, floriferous, long-blooming

**Cultivar preferred by pollinators**

❌ Scarlet Beebalm (*Monarda didyma*)
☑ 'Jacob Cline': discovered near Blue Ridge Parkway; vigorous, resistant to powdery mildew

❌ Oxeye (*Heliopsis helianthoides*)
☑ 'Summer Sun': introduced by breeder in Germany; compact w/ double, daisy-like flowers

❌ Smooth Aster (*Symphyotrichum laeve*)
☑ 'Bluebird': discovered in Guilford, CT garden; abundant flowers, attractive foliage

❌ Aromatic Aster (*Symphyotrichum oblongifolium*)
❌ 'Raydon's Favorite': introduced in 1992; mounded appearance, outstanding floral display
☑ 'October Skies': bushier, bluer flowers

❌ Threadleaf Coreopsis (*Coreopsis verticillata*)
❌ 'Moonbeam': hybrid cross (*C. verticillata* x *C. rosea*); compact, pale-yellow flowers
☑ 'Zagreb': developed in Croatia; compact w/ dense foliage; uniform habit

**Conclusion: Not possible to generalize that the cultivar is better or poorer than the species.**
See the attachment *Top Plant Picks – Bees, Bugs & Blooms*, for top-rated plants for total/diverse pollinator visits. This is a separate attachment on the Meeting Attachments page of the NNMG website.

## Annie White Study

White, Annie S., *From Nursery to Nature: Evaluating Native Herbaceous Flowering Plants versus Native Cultivars for Pollinator Habitat Restoration*, PhD Dissertation, University of Vermont, 2016

Evaluated differences between native wildflowers & cultivars in supporting pollinators

### Strong preference for species over cultivars bred for ornamental appearance

☑ Yarrow (*Achillea millefolium*)
❌ 'Strawberry Seduction': breeding program for unique flower colors w/long bloom duration
(Red less attractive to bees)

☑ Anise Hyssop (*Agastache foeniculum*)
❌ 'Golden Jubilee': cultivar of *A. foeniculum* or *A. rugosa;* chartreuse foliage, lavender flowers
(Both visited by bees; changed foliaged color a deterrent to beetles)

☑ Blue Wild Indigo (*Baptisia australis*)
❌ *Baptisia* x *varicolor* 'Twilite'; patented bicolor hybrid (*B. australis x B. sphaerocarpa*)
(Decreased visitation the result of color change or possibly reduced nectar and pollen)

☑ Helen's Flower (*Helenium autumnale*)
❌ 'Moerheim Beauty': hybrid of *H. autumnale* & *H. biglovii*; shorter stature, earlier bloom
(Reddish to burnt-orange coloration less attractive to bees)

☑ New England Aster (*Symphyotrichum novae-angliae*)
❌ 'Alma Pötschke': bred in Germany, may be a hybrid; more compact, magenta flowers
(All pollinator types preferred species)

☑ Ohio Spiderwort (*Tradescantia ohiensis*)
❌ 'Red Grape': hybrid from multiple crosses between three native species; magenta flowers
(All pollinators preferred species with more abundant flowers)

### Additional pairings

☑ Wild Bergamot (*Monarda fistulosa*)
❌ 'Claire Grace': selection from MS; drought tolerance & resistance to powdery mildew
(Decreased hardiness of cultivar in northern climates)

☑ Foxglove Beardtongue (*Penstemon digitalis*)
❌ 'Husker Red': cultivar with red foliage, flowers w/pink blush
(Honeybees showed preference for species, but not overall)

☑ Orange Coneflower (*Rudbeckia fulgida*)
☑ 'Goldsturm': hybrid developed in Germany; compact, shorter bloom duration
(Half of visits from flies; equal visits from all pollinators)

❌ Butterfly-weed (*Asclepias tuberosa*)
☑ 'Hello Yellow': naturally occurring mutation [per Piedmont MGs]; bright yellow flowers
(Plant form & bloom time identical)

❌ Culver's-root (*Veronicastrum virginicum*)
☑ 'Lavendelturm': bred by Ernst Pagels in Germany; pale purple, earlier & long-blooming
(All pollinators showed stronger preference for cultivar. Sold in U.S. as 'Lavender Towers')

See PowerPoint slide on pollinator profiles for pairs

**CONCLUSION:**

- **Best strategy to use native plants**
- **But mixed results highlight need for cultivars to be evaluated on an individual basis**
- **More research should be conducted to quantify floral rewards for pollinators**

## Evaluation of Purple Coneflower & cultivars

*Echinacea purpurea*: seed-grown species
'White Swan': seed-grown white cultivar w/same form
'Pink Double Delight': sterile, cloned, pink double-flowered cultivar
'Sunrise': yellow hybrid bred for sterility to increase bloom period

**CONCLUSION:**

- **Increased breeding of cultivars and hybrids decreases support to pollinators**
- **Traditional breeding done for traits humans find desirable**
- **Breeders should also introduce selections that maximize nectar & pollen production**

## Comparison of nectar production

*Lobelia cardinalis*: high nectar production (5.47 $\mu L$) appropriate for hummingbird pollinators
*Lobelia siphilitica*: lower nectar production (0. 79 µL) appropriate for bumble bee pollinators
*Lobelia* x *speciosa* 'Fan Blue': nectar production (0.89 $\mu L$) still appropriate for bumble bees
*Lobelia* x *speciosa* 'Fan Red' lowest nectar (0.72 $\mu L$); hummingbirds will be attracted to red flower color, but they will be undernourished

**CONCLUSION: Hybrid modifications of flowers can have an unforeseen negative impact on floral resources for wildlife.**

**Mt. Cuba Center Research Reports on Plant Trials**

Asters for the Mid-Atlantic Region (Trial 2002-2005)

- Measured plant performance but not benefit to pollinators
- Smooth Aster 'Bluebird' ranked 4.8 [Preferred over species in Penn State trial]
- Aromatic Aster 'October Skies' ranked 4.9 [Preferred over species in Penn State trial]
- New England Aster 'Purple Dome' (3.9) described as more manageable than species [Ranked well below species for pollinator visits in Penn State trial]

Coreopsis for the Mid-Atlantic Region (Trial 2012-2014)

- Cultivars of Tall Coreopsis (*C. tripteris*) ranked high (4.7), but too large for home garden [*C. tripteris* ranked #6 of 10 on Penn State diversity list]
- 'Zagreb' cultivar of *Coreopsis verticillata* ranked above species (4.5 vs 4.4) 'Zagreb' ranked considerably above species in Penn State trial]
- Pollinator diversity study showed varied profiles of visitation for each plant (See slide)

Heuchera for the Mid-Atlantic Region (Trial 2012-2014)

- Studied hybrids derived from native Alumroot species
- Ratings for foliage and floral display, but no data on use by insects
- NOTE: Both *Heuchera americana* and *H. villosa* are larval host plants and provide nectar & pollen for small bees, including specialist bee

Baptisia for the Mid-Atlantic Region (Trial 2012-2015)

- Ratings based on floral displays with lush, sturdy foliage
- Mention of use as food source, but no comparative data
- 'Twilite' hybrid ranked high (4.6) above *B. australis* (3.7) and dwarf variant (4.0) [Hybrid performed poorly against species for pollinator visits in Annie White trial]

Monarda for the Mid-Atlantic Region (Trial 2014-2016)

- Rated hybrids or selections of native Bee Balm and Wild Bergamot
- Focus on habit, mildew resistance, leaf retention & flower coverage
- Compact hybrids performed poorly
- 'Claire Grace' cultivar ranked above *Monarda fistulosa* species (4.5 vs 2.4) and ranked above hybrids for visitation (species not tested) [Species preferred by pollinators in both Penn State & Annie White trials]
- 'Jacob Cline' cultivar ranked above *Monarda didyma* species (3.7 vs 1.7) and ranked significantly above hybrids and species for visitation [Species was close for pollinator visitation in Penn State trials]
- *Monarda* x 'Judith's Fancy Fuchsia' ranked 4.1 for abundant flowers & mildew resistance [In top 20 for pollinator visits in Penn State trial]
- Native *Monarda punctata* (Spotted Beebalm) ranked 4.0 for abundant flowers & resistance

Phlox for the Mid-Atlantic Region (Trial 2015-2017)

*Phlox for Sun*

- Rated many cultivars and hybrids of native *Phlox paniculata*
- Focus on flowers, foliage quality, habit, powdery mildew resistance
- 'Jeana' cultivar ranked top (4.8) for garden performance & butterfly preference

*Phlox for Shade*

- Rated selections of native *Phlox divaricata* & *Phlox stolonifera*
- Focus on habit, vigor, and floral display
- Creeping Phlox easier to grow; powdery mildew a problem with Woodland Phlox
- No data on use by wildlife

Helenium for the Mid-Atlantic (Trial 2017-2019)

- Rated species, cultivars & hybrids of *Helenium autumnale* & *H. flexuosum*
- 'Can Can' cultivar rated above *H. autumnale* species (4.1 vs 3.9)
- *H. flexuosum* species rated 4.0
- *H. autumnale* best for attracting bees & wasps
  [Top 10 for insect diversity & Top 20 for total visits in Penn State trial
  Preferred over 'Moerheim' hybrid in Annie White trial]

Echinacea for the Mid-Atlantic Region (Trial 2018-2020)

- Repeat of earlier 2007-2009 trial with added pollinator study
- *Echinacea purpurea* 'Fragrant Angel' (4.4) and species (3.8) visited most by bees & wasps
- Important that plants retain cone with all reproductive parts to provide nectar & pollen

Carex for the Mid-Atlantic Region (Trial 2018-2022)

- Rated 65 *Carex* species & cultivars
- Evaluation of vigor, adaptability to sun & shade, and potential as lawn substitutes
- Wind-pollinated but offer seeds & cover and serve as larval host plants

Amsonia for the Mid-Atlantic Region (Trial 2013-2018, follow-up observation 2023)

- Rated 20 taxa, including species (some native to Southeast), cultivars, and hybrids
- Evaluated for habit, vigor, and floral display
- Observations of pollinator interaction April to June 2023
- Diversity of pollinators (butterflies, native bees, hummingbirds) but low total numbers
- Host plants for Snowberry Clearwing moth

Vernonia for the Mid-Atlantic Region (Trial 2020-2023)

- Evaluated 45 species & cultivars from commercial sources & wild-collected seed
- Of three species native to area, only V. gigantea did well in trial
- *V. noveboracensis* & *V. glauca* require supplemental water in garden settings
- *V. angustifolia* "Plum Peachy' rated highest (4.5), but did not have most visitation
- One ecotype of *V. gigantea* had high visitation
- *V. noveboracensis* may have higher than average visitation in better setting

**OSU Garden Ecology Lab Study**

"A Bee's Eye View: UV photography and bee vision," OSU blogpost, July 20, 2021
"2022 Field Update: Native plants & native cultivars," OSU blogpost, December 26, 2022
"Exploring Color through the Eyes of Bees," Garden Ecology Lab Briefs

**RECOMMENDATIONS**

- Gardeners have a spectrum of plant choices based on their priorities
- Those interested only in aesthetic value may choose highly modified cultivars or hybrids for their ornamental gardens
    - But sterile flowers won't support pollinators
    - Plants with foliage color change won't provide larval host support,
    - Changes in hybrids may have unknown effects (E.g., less nectar)
- Local ecotypes of native species are the ideal choice for conservation projects where ecological value is paramount, but they may not be available to the average gardener
- Gardeners who want to create sustainable landscapes, offering benefit to wildlife have three choices:
    - Unmodified native species
    - Cultivars that are natural mutations of the native species
    - Moderately modified cultivars, adapted for size or disease resistance
- Generally, the fewer changes from the species, the more beneficial a plant is to wildlife, but as the studies and trials show, plants must be judged on a case-by-case basis

**RESOURCES**

Plant NNK Natives
Tried & True Native Plant Selections for the Mid-Atlantic (Fact sheets on high-performing native plants)
Digital Atlas of the Virginia Flora (For presence, by county, in the state)
Virginia Native Plant Society
Plant NoVA Natives (Native-only plant sellers)
Native Plant Nurseries (VNPS list)