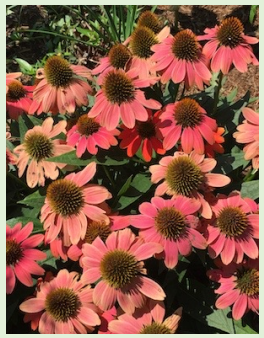
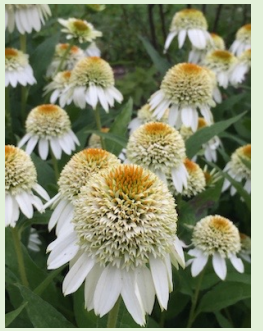
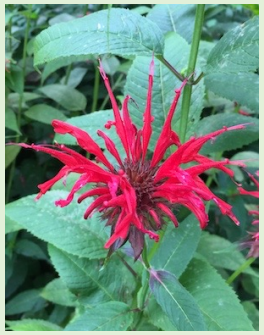









Native Plant Species & Cultivars

Virginia Cooperative Extension
Virginia Tech
Virginia State University

MGNV
Master Gardeners of Northern Virginia
Arlington • Alexandria
mgnv.org


Sustainable Landscaping 2024





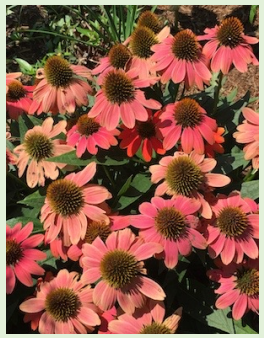


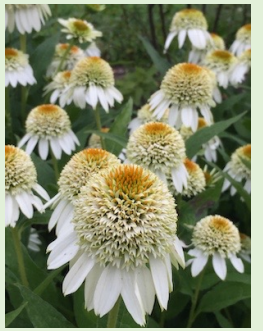
Challenges to gardeners

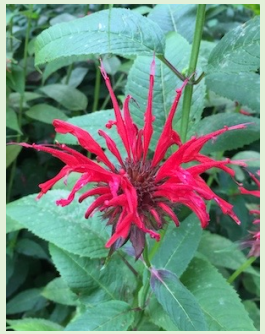
- Nursery stock dominated by non-native ornamentals
- Large Mid-Atlantic nurseries carry only 25% native species
- Majority of those native plants only available as cultivars
- Lack of information on sources of plants & how they were propagated





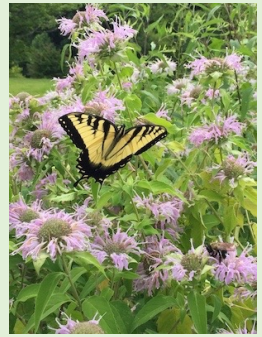







Overview

- Definitions of botanical terms
- Trials of woody plants
- Trials of herbaceous plants
- Recommendations & Resources

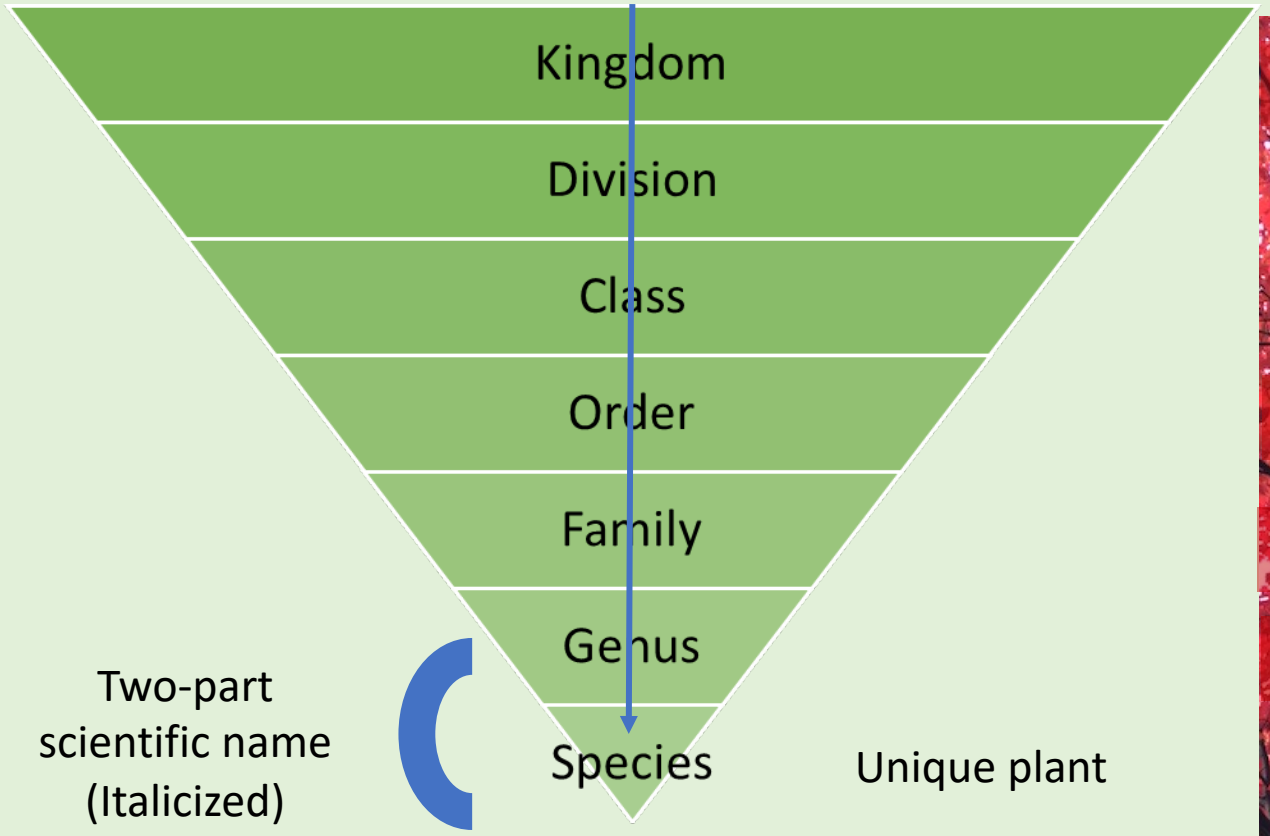









Hierarchy of plant classification



Two-part scientific name (Italicized)

Unique plant

Plants

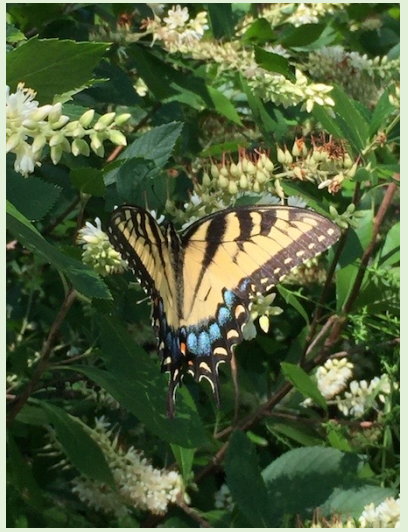
Woody plants w/ compound or lobed leaves & multi-petaled flowers

Insect-pollinated

Lobed leaves & winged samaras

Species

- Genetically distinct plant form found in the wild in a particular geographic region
- No human involvement in its evolution
- Has evolved as part of an ecosystem
- Interacts with other plants that share the same physical environment
- Has special relationships with animals as part of food web:
  - Nectar & pollen for insects
  - Fruit & seed for birds & other animals
  - Larval host plant for Lepidoptera




Species

- Reproduces sexually through pollination of its flowers & production of seed
- Has genetic variability to adapt to changes in environment
- May also reproduce vegetatively (asexually) by:
  - Rhizomes (horizontal underground stems)
  - Stolons (runner, stem along ground)
  - Suckering (forming sprouts at base)

Cultivar

- Cultivated variety of a species
- Larger role of horticulture trade in bringing certain plants to market
- Named and propagated by a nursery
- Name in single quotes (not italicized) following species name
- E.g., *Phlox paniculata* ‘Bright Eyes’
- Cultivars of native plants sometimes referred to as “nativars”

“Discovered” Cultivar

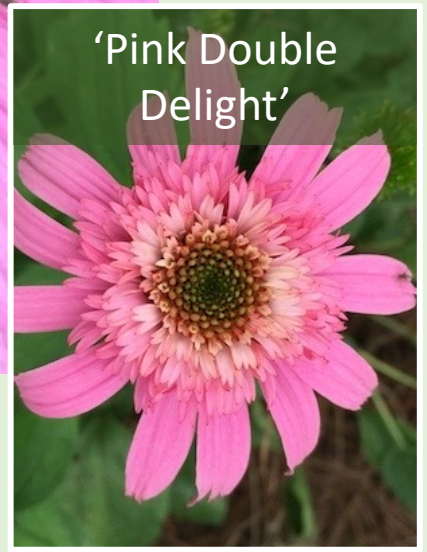
- Can originate from a naturally occurring individual mutation within a species
- Discovered by a horticulturist in a wild population
- Judged distinctive enough to market
- Referred to as “a natural selection”
- May be produced commercially by seed (genetically variable) or propagated vegetatively for volume efficiency

Mutation with large, gray-green pubescent foliage and dense mat-forming habit
Found on property near Virginia Beach, VA

Named for nearby Lynnhaven River

“Bred” Cultivar

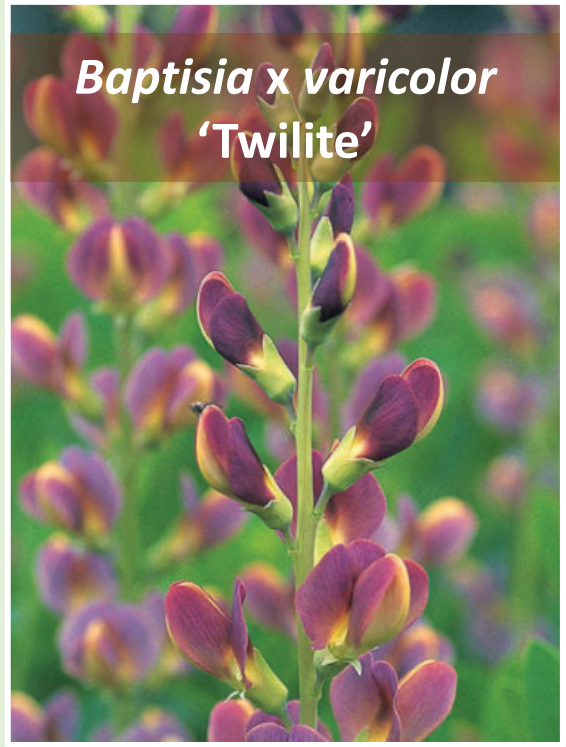
- Result of selective breeding for certain traits preferred by humans
- Propagated vegetatively to retain desired traits in offspring
- Lack genetic variability to promote biodiversity (clones)
- Chosen cultivar name often reflects a featured characteristic
- May also have trademark name
- E.g., *Viburnum dentatum* ‘Christom’ BLUE MUFFIN®



Hybrid

- Cross-pollination between two species in same genus
- Can occur in nature with plants in proximity (within 500’)
- Resulting seed = new plant
- Most created by plant breeders
- Combine traits of both parents
- Ideally indicated by “x” in the scientific name

X =



Displays intermediate characteristics, a blend of colors of the parents

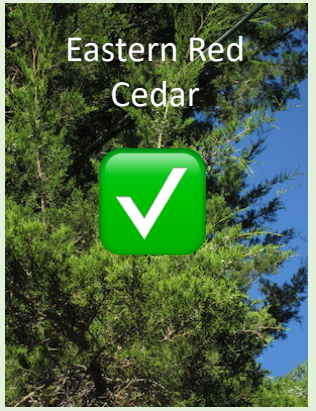
Trials of Woody Plants

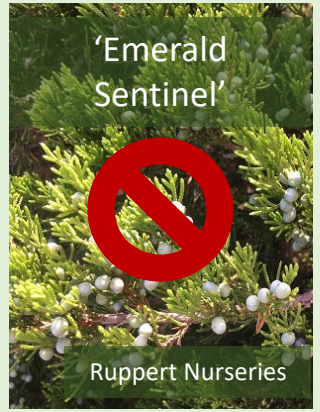
Baisden/Tallamy study of woody plants

- Experimental garden at Mt. Cuba Center, Hockessin, DE (2014-2016)
- Studied potential impact of cultivars on insect herbivores
- Focus on feeding of the caterpillar stage of butterflies & moths
- (Tallamy's "Ten-step Rule")
- Measured effect of 6 traits of trees and shrubs on feeding preference
- Insects collected via vacuum sampling

Impact of leaf color change

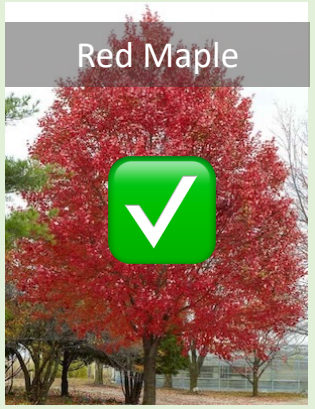
- Compared three species/cultivar pairs:
  - Eastern Red Cedar / ‘Emerald Sentinel’
  - Winged Sumac / ‘Lanham’s Purple’
  - Arrowwood / ‘Red Feather’
  - Cultivar foliage change (blue, purple or red)
- Clear feeding preference for species
- Replacement of chlorophyll by anthocyanins or carotenoids = deterrent
- **Species with unchanged leaf color = best choice as larval host plants**





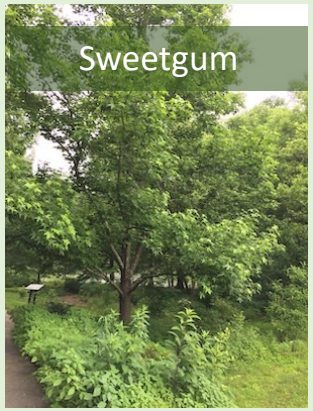
Impact of intense fall color

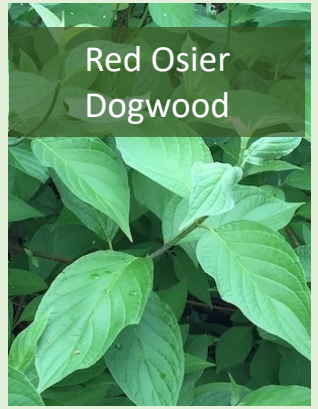
- Compared three species/cultivar pairs:
  - Arrowwood / ‘Crimson Tide’
  - Red Osier Dogwood / ‘Baileyi’
  - Red Maple / ‘Red Sunset’
  - Cultivars with more intense coloration
- Clear feeding preference for species
- **Species with unchanged fall color = best choice as larval host plants**

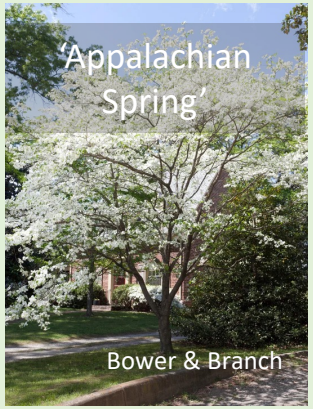


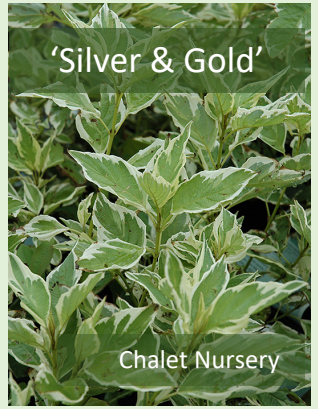
Measuring effects of additional traits

- Comparison for:
  - Growth habit
  - Disease resistance
  - Variegated foliage
  - Enhanced fruit size /yield
- Mixed results
- No evidence that these traits degrade insect-based food webs
- **Cultivars acceptable to insect herbivores as larval host plants**







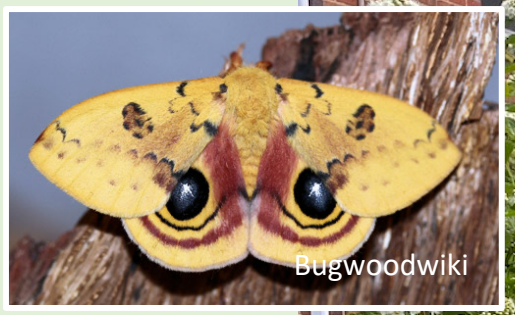


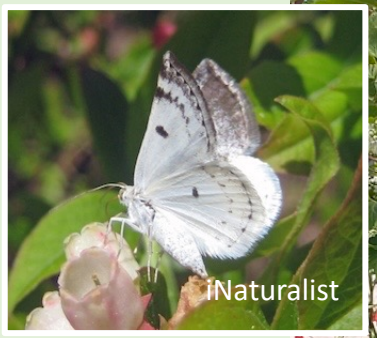
Impact of leaf color

Common Ninebark

Physocarpus opulifolius

- Green, lobed leaves
- Host plant for caterpillars of:
  - Io Moth
  - Bluish Spring Moth
  - Glorious Habrosyne
  - Hitched Arches Moth





Numerous cultivars of Ninebark

- ‘Amber Jubilee’
- ‘Aurea’
- ‘Burgundy Candy’
- ‘Caramel Candy’
- ‘Center Glow’
- ‘Coppertina’
- ‘Dart’s Gold’
- ‘Diabolo’
- ‘Ginger Wine’
- ‘Lady in Red’
- ‘Lemon Candy’
- ‘Luteus’
- ‘Nanus’
- ‘Nugget’
- ‘Snowfall’
- ‘Summer Wine’
- Sweet Cherry Tea’

Some modified for height

Ornamental but cannot serve as larval host plants

Most modified for leaf color

Impact of modified height

Virginia Sweetspire

Itea virginica

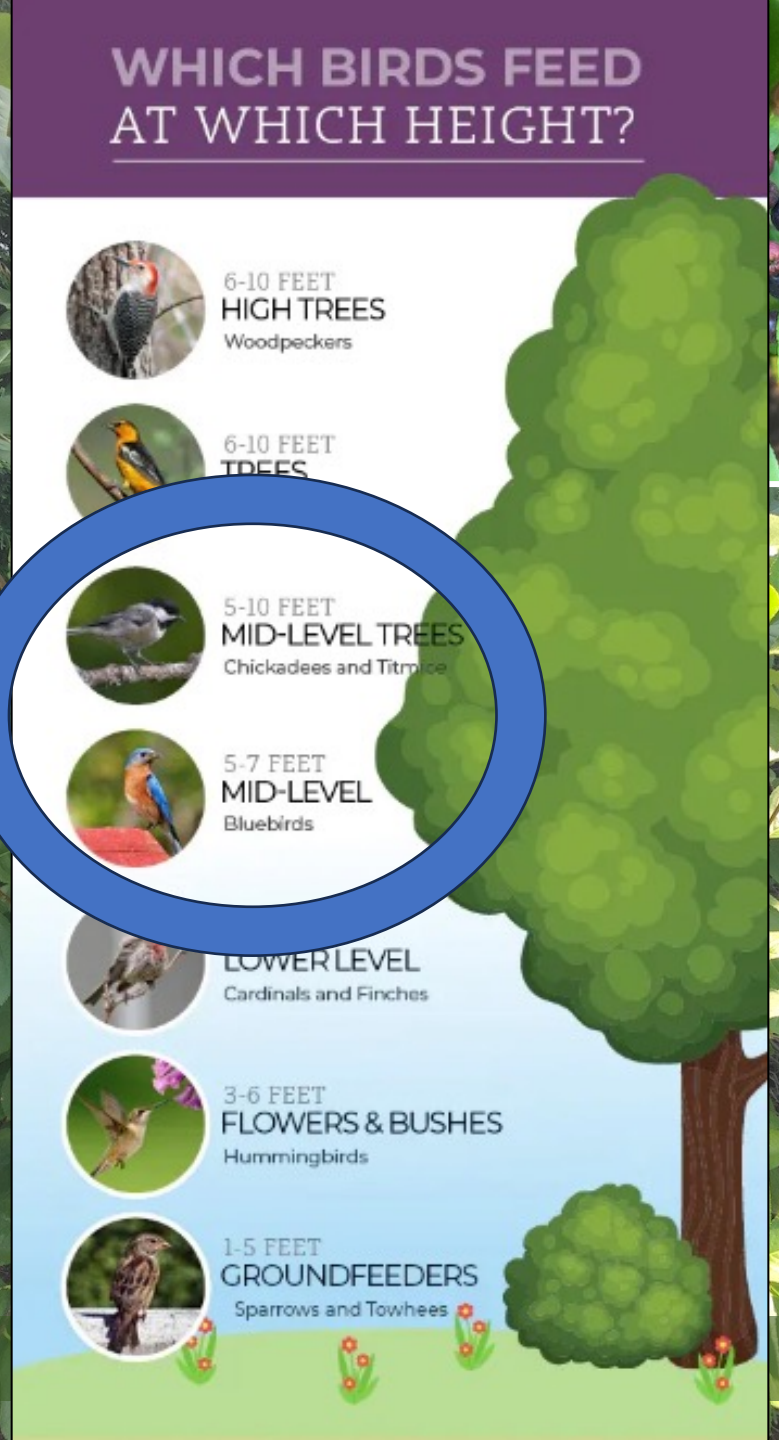
- Host plant for caterpillar of American Holly Azure
- Leaves & flowers of cultivars appear unmodified
- **Shorter cultivars acceptable for caterpillars and pollinators**

Impact of modified height

Black Chokeberry

Aronia melanocarpa

- Leaves and flowers unmodified
- **Cultivars acceptable for caterpillars and pollinators**
- Fruit of shortest cultivar is close to ground height
- **Raises questions about comfort of birds feeding at that level**

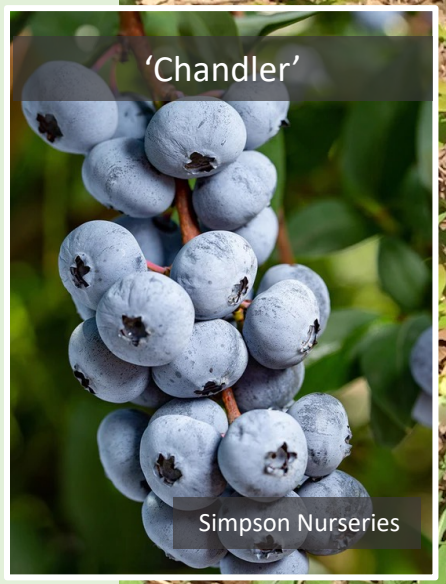


Impact of fruit size

Highbush Blueberry

Vaccinium corymbosum

- Leaves and flowers unmodified
- **Cultivar acceptable for caterpillars and pollinators**
- Impact of enhanced fruit on birds
- **Larger fruits require more manipulation & may be hard for birds to swallow**



Keystone genus Supporting 288 species

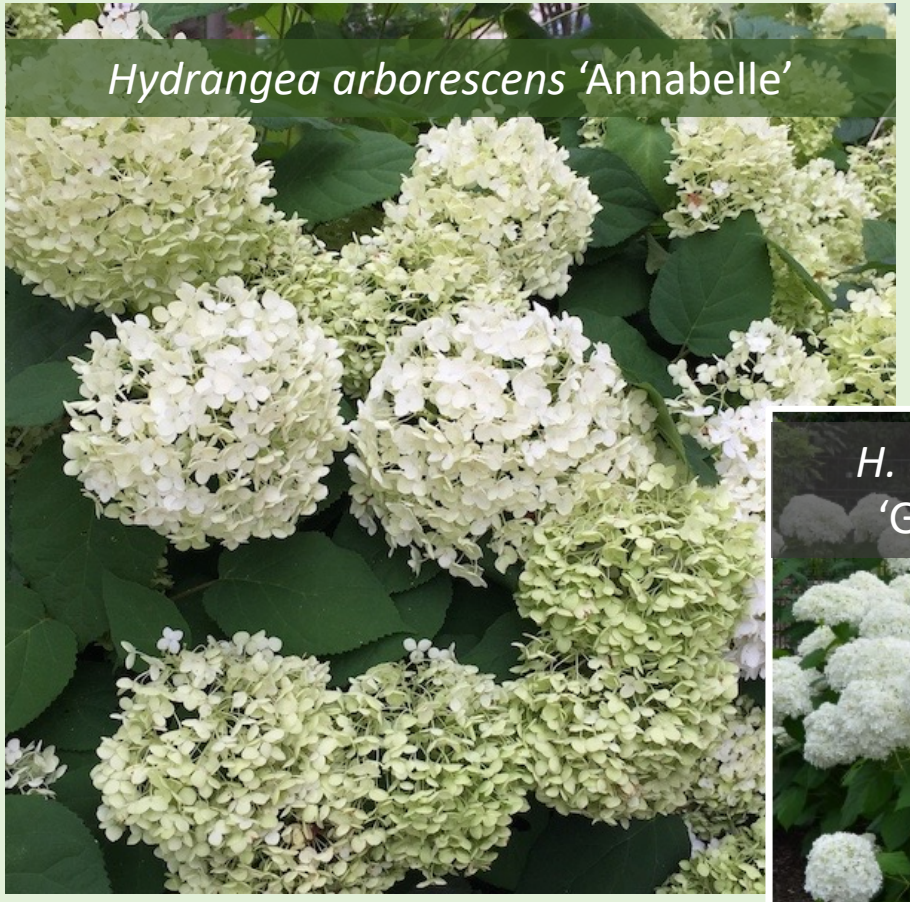
World’s largest blueberries, the size of cherries

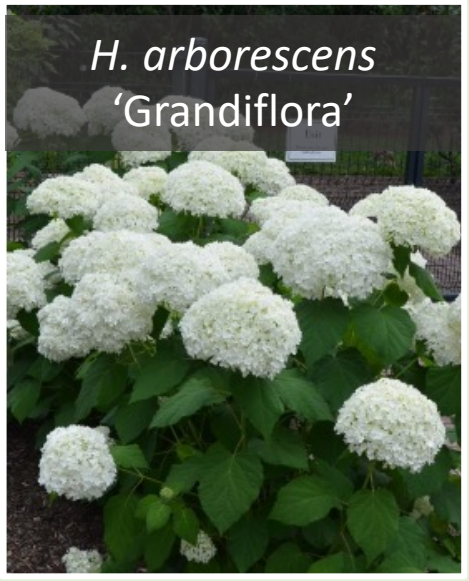
Mt. Cuba trials on Wild Hydrangea & cultivars

- Trial conducted 2017-2021
- Species (*Hydrangea arborescens*) blooms in June on new wood
- Inflorescences consist of hundreds of white fertile flowers
- Flower color is not affected by pH of soil as with non-native species

Early cultivars of Wild Hydrangea

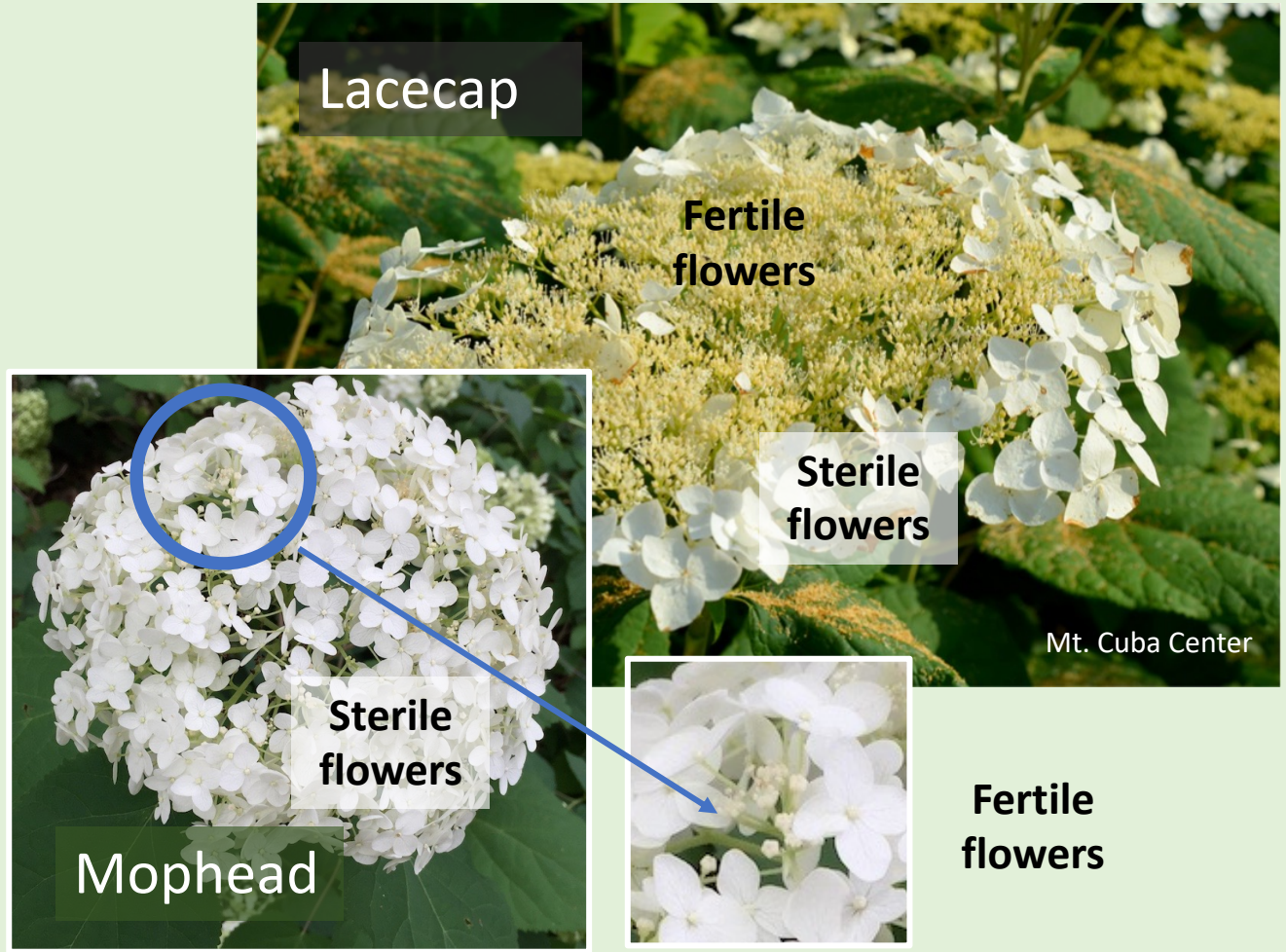
- Naturally occurring variants with mophead mutation
- Produced commercially as
  - *Hydrangea arborescens* ‘Grandiflora’
  - *Hydrangea arborescens* ‘Annabelle’
- Weak stems & floppy habit due to large size of flowerheads





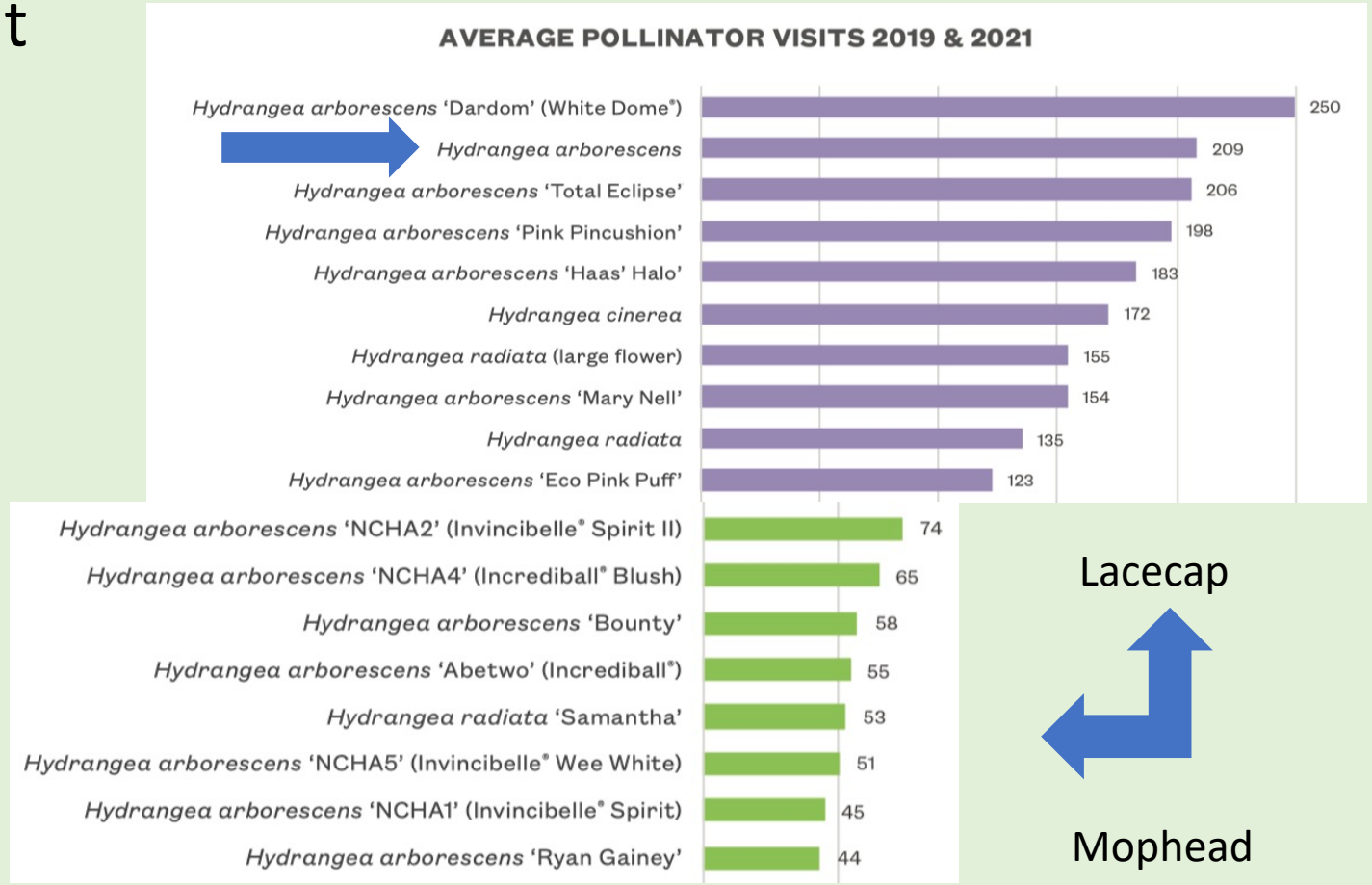
Newer cultivars of Wild Hydrangea

- Result of selective breeding for desirable garden traits:
  - Compact habit
  - Sturdy stems
  - New flower forms & colors
- Two categories of flower forms:
  - Lacecap – fertile flowers with showy ring of sterile flowers
  - Mopheads – masses of sterile flowers, few hidden fertile flowers
- Mopheads especially popular, but don't support pollinators

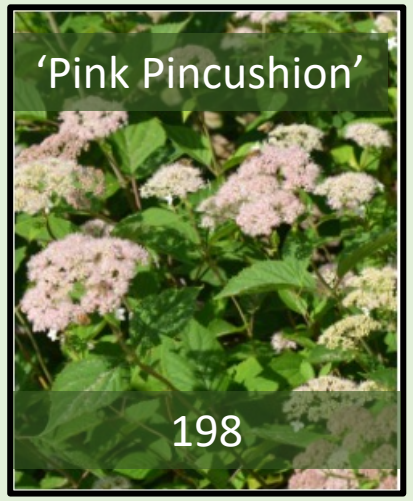


Pollinator visitation to Wild Hydrangeas

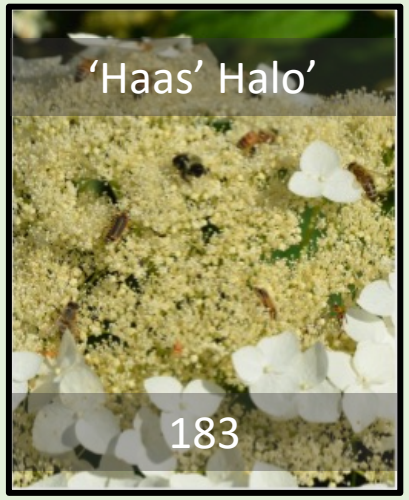
- Visits recorded during plant plant trials in 2019 & 2021
- Observations recorded by Pollinator Watch Team
- Daily observations during bloom season
- **Lacecap preferred over mophead**

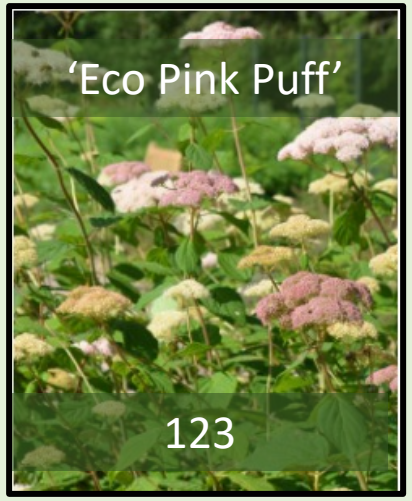


Top-rated Wild Hydrangeas for pollinators



One cultivar of *Hydrangea arborescens* ranked above the species

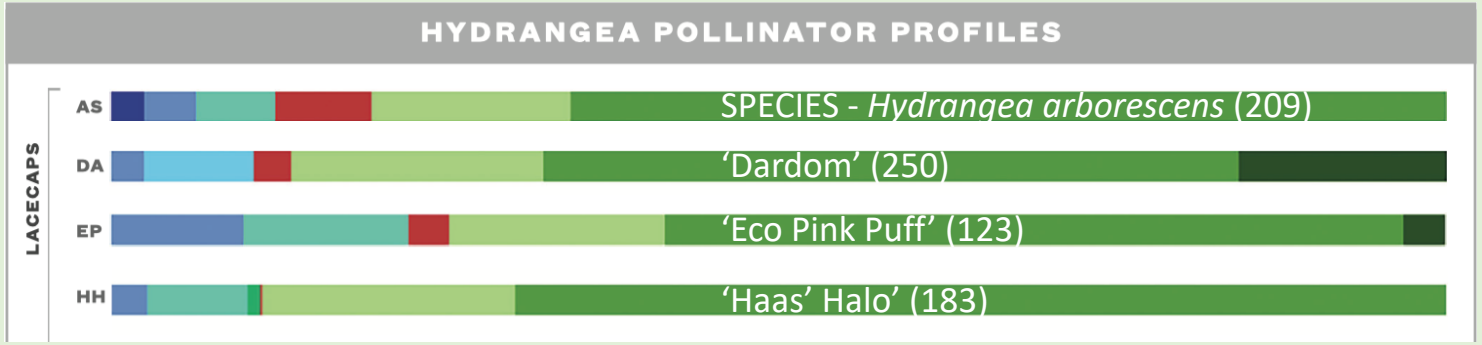




Straight species generally preferred among lacecaps

University of Delaware pollinator study

- Conducted 2018 in Mt. Cuba trial gardens
- Dr. Deborah Delaney & Lindsey Cathcart, U of DE
- Filmed inflorescences for 10-minute intervals
- Reviewed footage to ID and count insect visitors
- Pollinators visit lacecaps more than mopheads
- **Visitation profiles vary**



Beetles
- Cantharidae
- Cerambycidae
- Mordellidae
- Nitidulidae
- Scarabaeidae

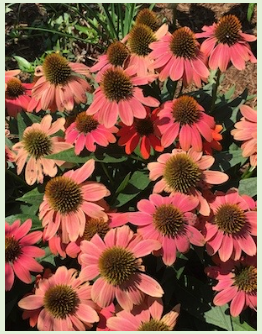
Flies
- Conopidae
- Syrphidae

Bees and Wasps
- Andrenidae
- Apidae
- Halictidae
- Vespidae

Apidae = bumble bees, carpenter bees
Andrenidae = mining bees (small-medium)
Halictidae = sweat bees (small)











QUESTIONS?







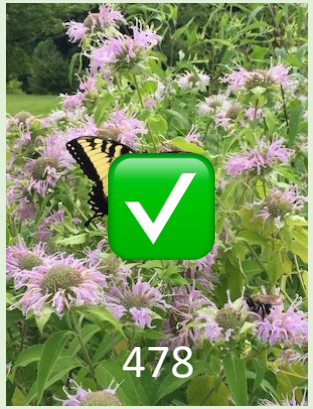


Trials of Herbaceous Plants

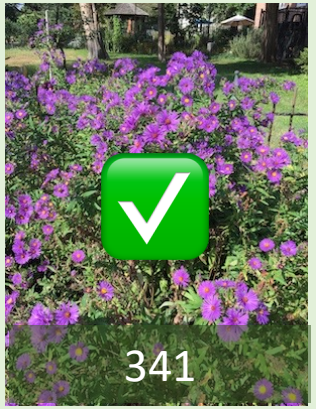
Penn State Extension pollinator trial

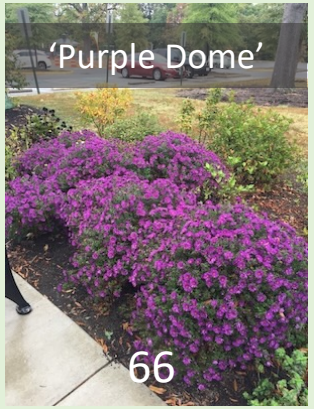
- Bees, Bugs & Blooms (2012-2014)
- Evaluating native plant species & cultivars for attracting pollinators
- Master Gardeners planted 4,500 plugs of herbaceous perennial plants at state research center
- Weekly monitoring
- Evaluation of insect visitation, plant vigor & blooming

Comparison of species vs cultivars

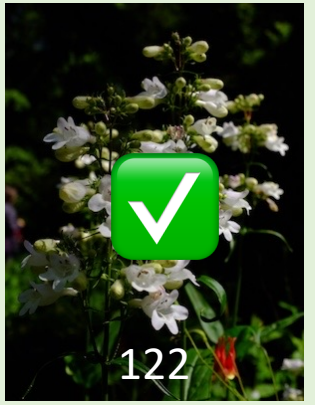


Monarda fistulosa
Wild Bergamot

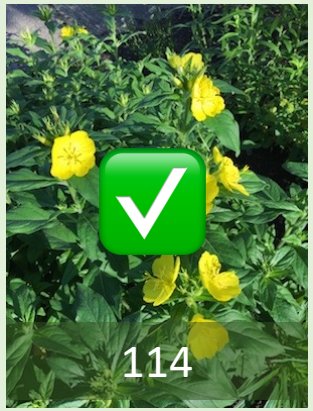


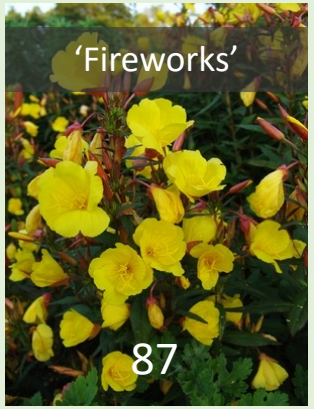


Symphyotrichum novae-angliae
New England Aster

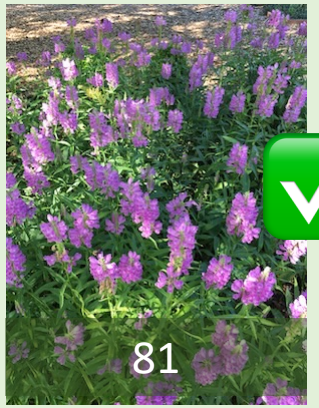


Penstemon digitalis
Foxglove Beardtongue





Oenothera fruticosa
Sundrops

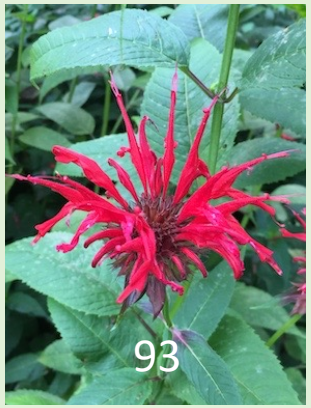


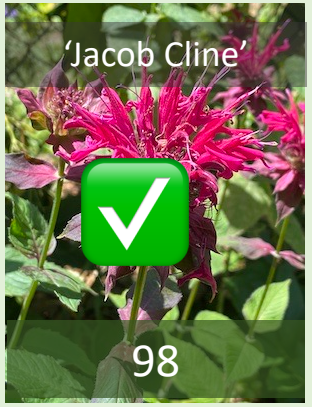
Physostegia virginiana
Obedient Plant

Straight species preferred or equal

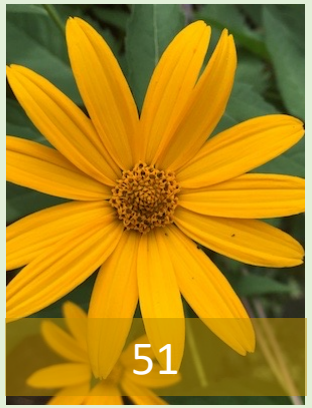
More comparisons

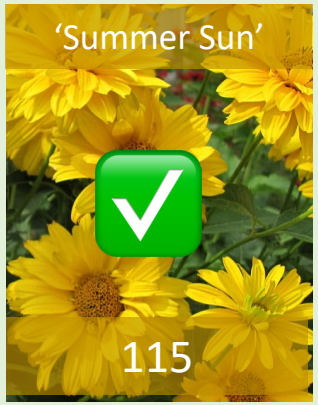
Cultivar preferred ✅



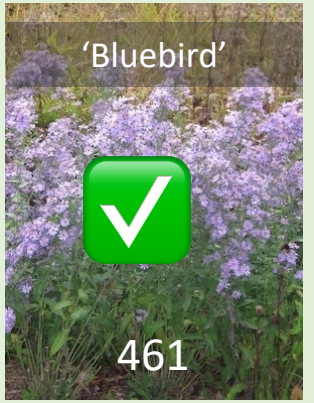


Monarda didyma
Scarlet Beebalm





Heliopsis helianthoides
Oxeye



Symphyotrichum laeve
Smooth Aster

Symphyotrichum oblongifolium
Aromatic Aster

Coreopsis verticillata
Threadleaf Coreopsis

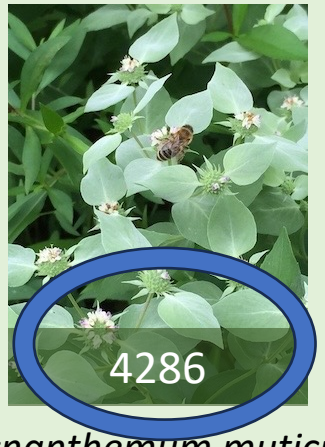
Conclusions

Results of 14 direct comparisons:

- ~ 50% of species better
- In other cases, cultivars outperformed species

“It appears that it is not possible to generalize that the cultivar is better than or poorer than the species.”

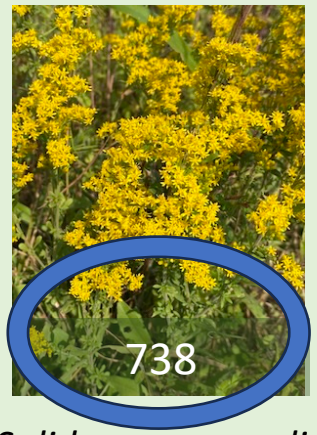
Top 10 plants for total pollinator visits ✅



Pycnanthemum muticum
Clustered Mountain-mint

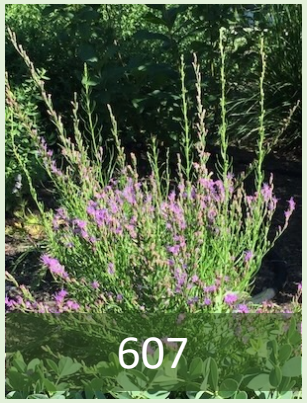
Solidago rigida
Stiff Goldenrod

Eryngium yuccifolium
Rattlesnake Master



Solidago nemoralis
Gray Goldenrod

Eupatorium hyssopifolium
Hyssop-leaf Thoroughwort

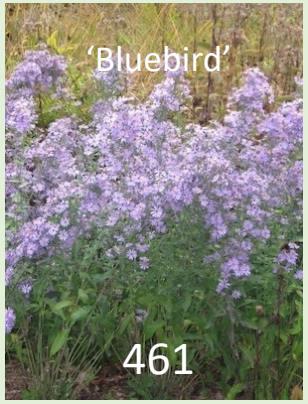


Liatris microcephala
Dwarf Blazing Star

Eutrochium dubium
Coastal Plain Joe-pye-weed

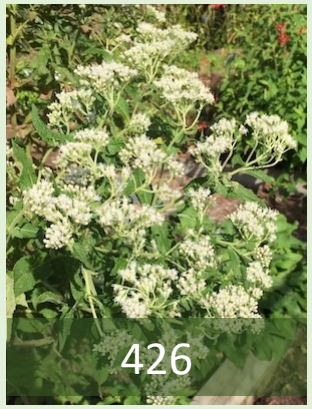
Asclepias incarnata
Swamp Milkweed

Monarda fistulosa
Wild Bergamot



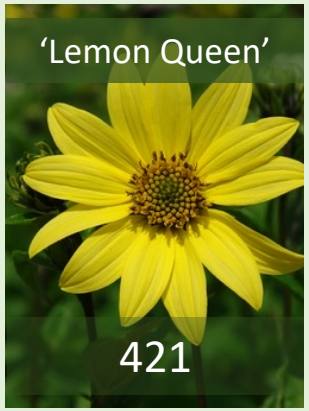
Symphyotrichum laeve
Smooth Aster

Second 10 plants for pollinator visits ✅

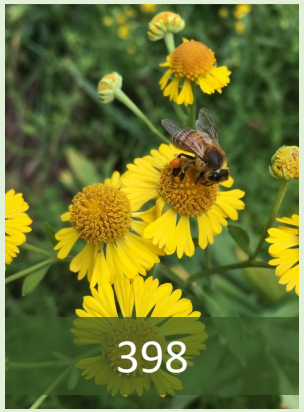


Eupatorium perfoliatum
Common Boneset

Veronicastrum virginicum
Culver's-root



Helianthus
hybrid



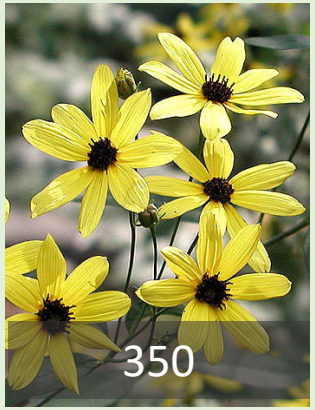
Helenium autumnale
Sneezeweed

Symphyotrichum oblongifolium
Aromatic Aster

Monarda
hybrid

Coreopsis verticillata
Threadleaf Coreopsis

Monarda punctata
Spotted Beebalm

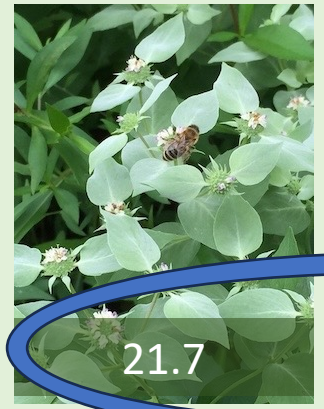


Coreopsis tripteris
Tall Coreopsis

Symphyotrichum novae-angliae
New England Aster

Top 10 plants for insect diversity

72 insect species identified

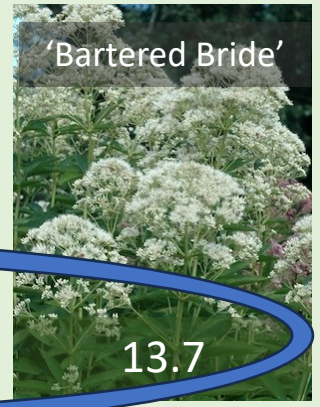


Pycnanthemum muticum

Solidago rigida

Eupatorium hyssopifolium

Eryngium yuccifolium



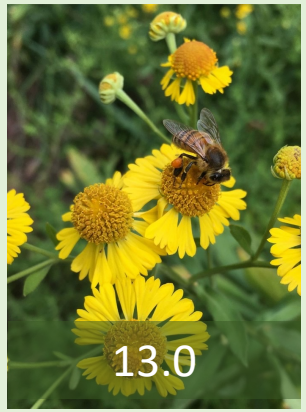
Eutrochium fistulosum

Coreopsis tripteris

Helianthus divaricatus

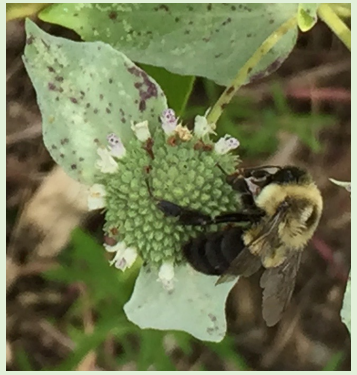
Symphyotrichum laeve

Eutrochium maculatum



Helenium autumnale

Best plants for attracting specific insects



Best plants for sheer # of bee and syrphid visitors

- Clustered mountain mint (Pycnanthemum muticum): 19 bees/syrphids*
- Gray goldenrod (Solidago nemoralis): 14 bees/syrphids
- Pink tickseed (Coreopsis rosea): 14 bees/syrphids
- Lance-leaved coreopsis (Coreopsis lanceolata): 13 bees/syrphids
- Spotted joe pye weed (Eupatoriadelphus maculatus 'Bartered Bride'): 12 bees/syrphids
- Rattlesnake master (Eryngium yuccifolium): 12 bees/syrphids

Best plants for attracting bumble bees

- Lemon queen sunflower (*Helianthus* 'Lemon Queen'): 8 bumble bees*
- New England aster (*Symphyotrichum novae-angliae*): 8 bumble bees
- Purplestem aster (*Symphyotrichum puniceum*): 7 bumble bees
- Stiff goldenrod (*Solidago rigida*): 6 bumble bees
- Coastal plain joe pye weed (*Eupatoriadelphus dubius*): 6 bumble bees
- Wild bergamot (*Monarda fistulosa*): 6 bumble bees

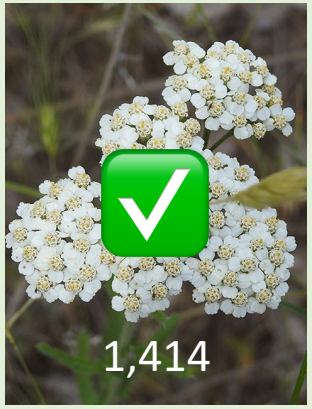
Best plants for attracting butterflies

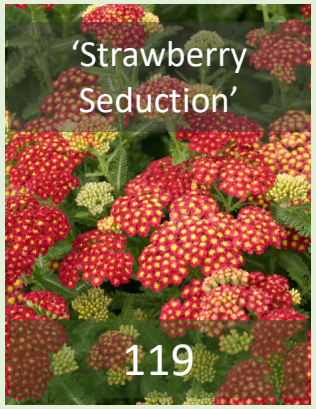
- Coastal plain joe pye weed (*Eupatoriadelphus dubius*): 17 butterflies/skippers*
- Blue mistflower (*Conoclinium coelestinum*): 5 butterflies/skippers
- Showy aster (*Eurybia spectabilis*): 4 butterflies/skippers
- Sweet joe pye weed (*Eutrochium purpureum* subsp. *maculatum* 'Gateway'): 3 butterflies/skippers
- Dwarf blazing star (*Liatris microcephala*): 3 butterflies/skippers

Annie White study

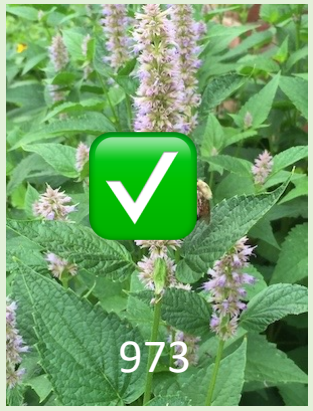
- Research done for PhD dissertation, University of Vermont (2012-2015)
- Evaluated differences between native wildflowers & cultivars in supporting pollinators
- Plots at two research sites (farms)
- 11 species paired with cultivars
- Visited 4 times per month, May to October in 2013 and 2014
- Visitation rates observed during 5-minute scans

Species preferred ✅ over other forms

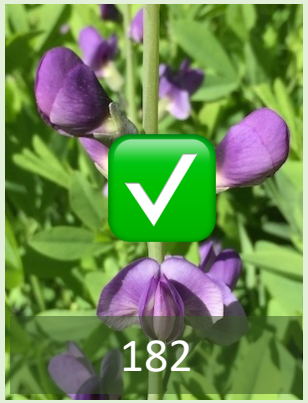


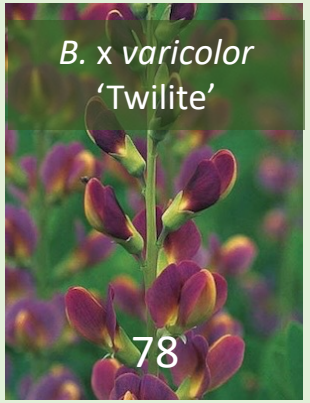


Achillea millefolium
Yarrow

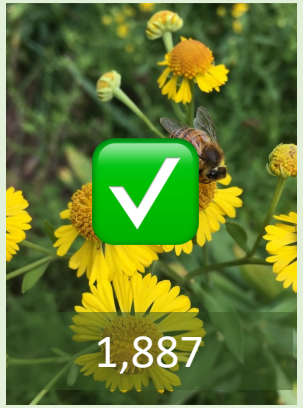


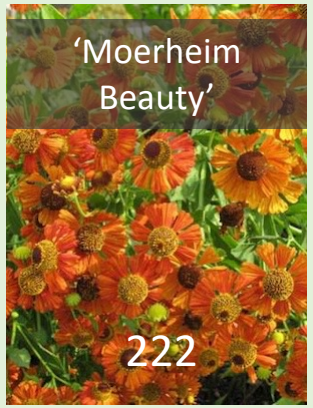
Agastache foeniculum
Anise Hyssop



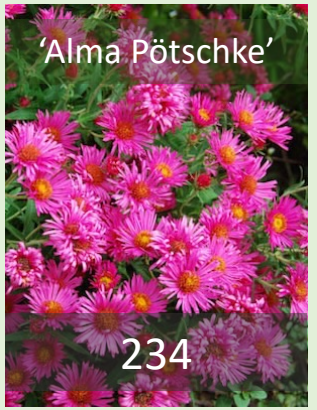


Baptisia australis
Blue Wild Indigo

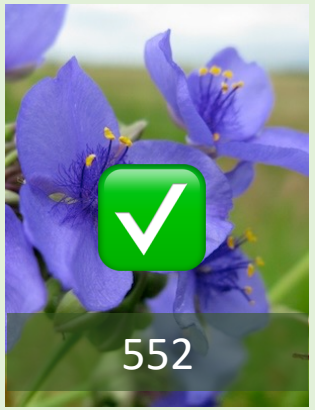




Helenium autumnale
Helen’s Flower

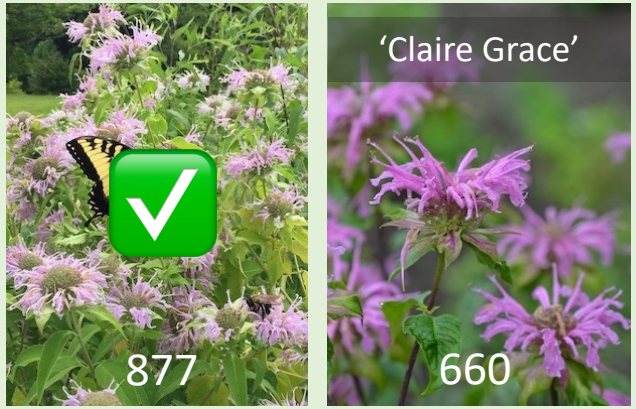


Symphyotrichum novae-angliae
New England Aster

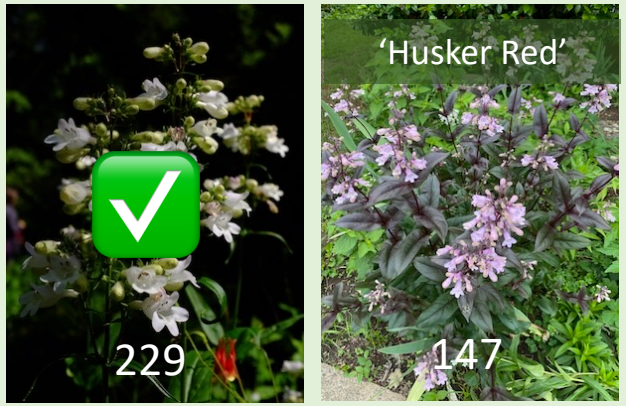


Tradescantia ohiensis
Ohio Spiderwort

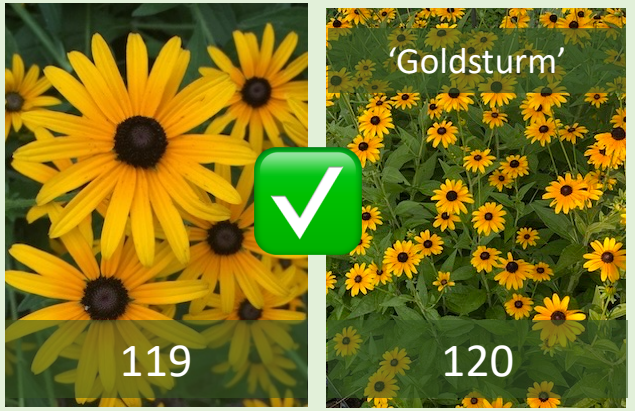
Additional pairings



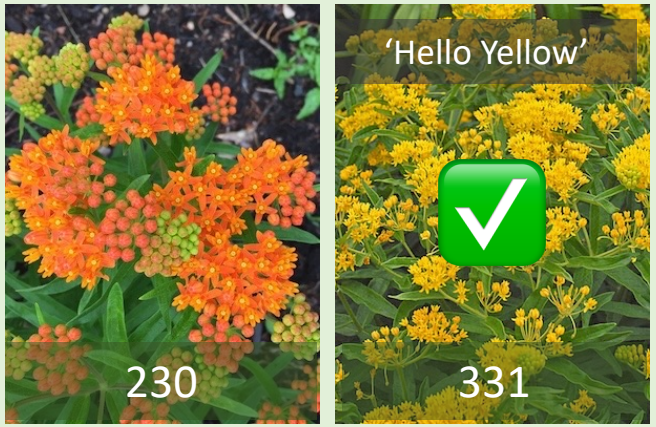
Monarda fistulosa
Wild Bergamot



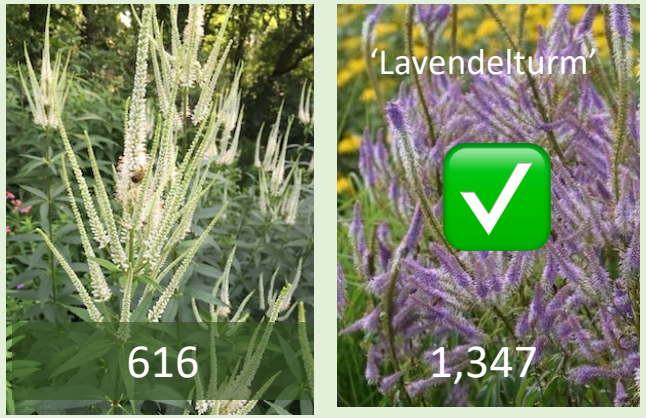
Penstemon digitalis
Foxglove Beardtongue



Rudbeckia fulgida
Orange Coneflower



Asclepias tuberosa
Butterfly-weed



Veronicastrum virginicum
Culver’s-root

Cultivars need to be evaluated on an individual basis

Pollinator profiles for pairs

No bumble bees

✅ **= species preferred**

Fewer wasps to cultivar

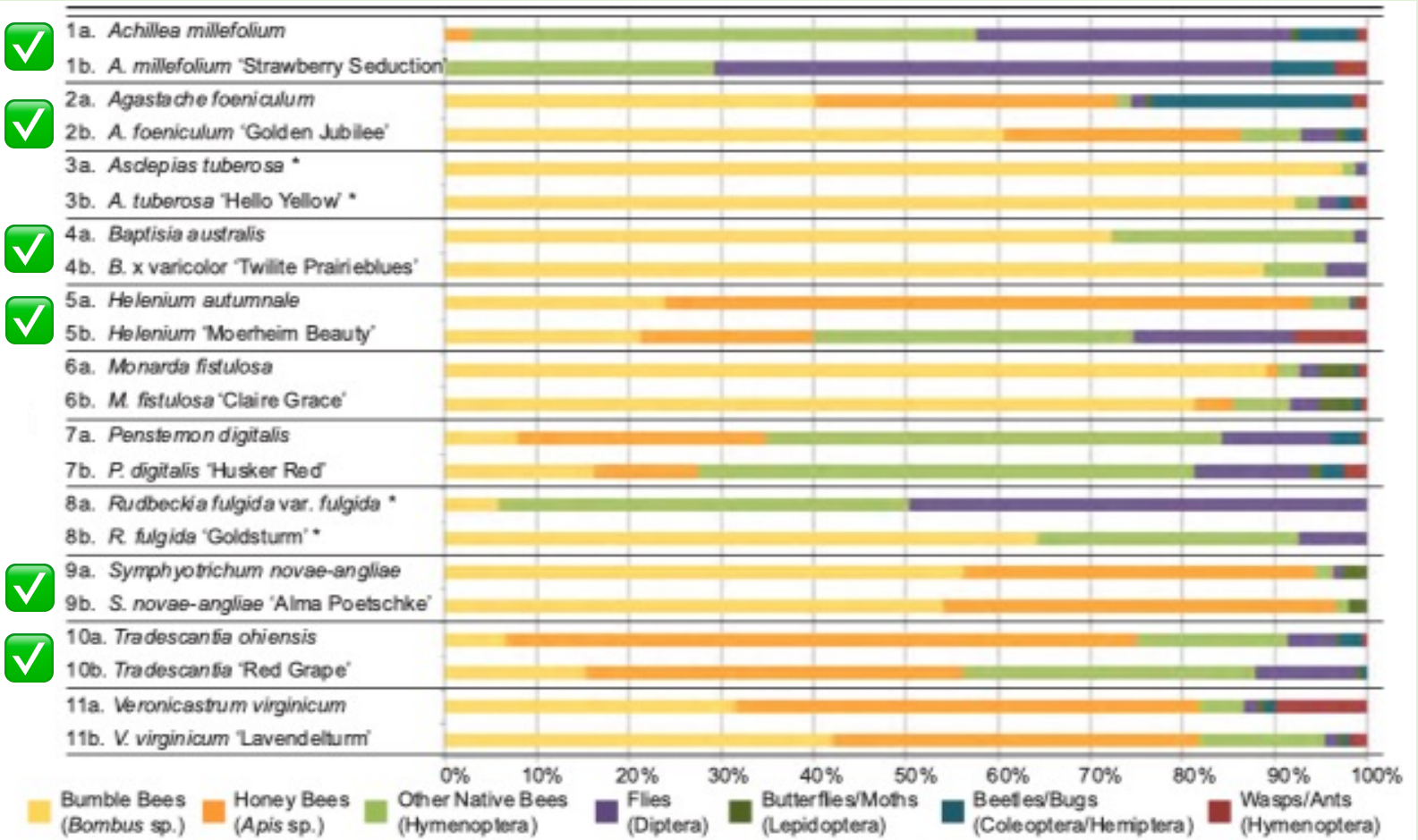
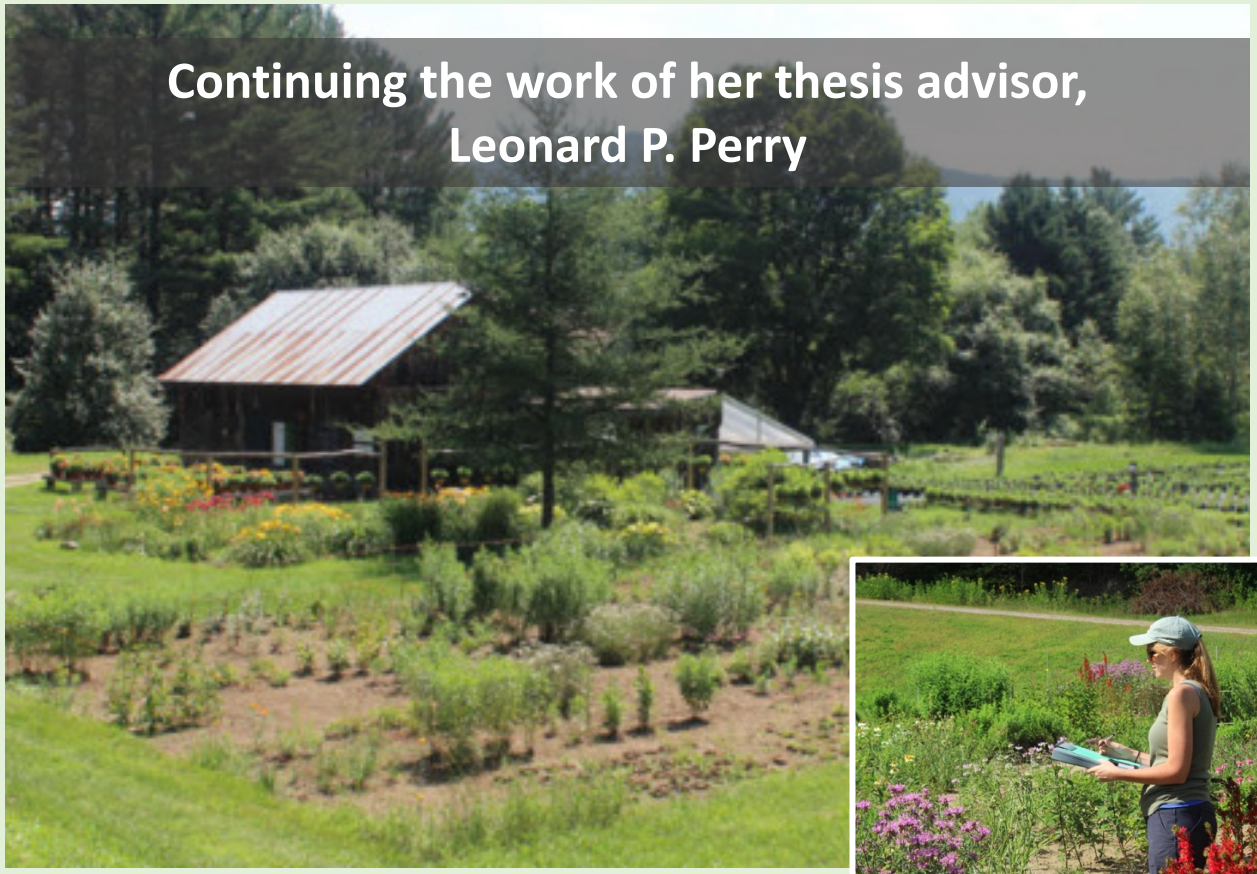


Figure 2.6. Proportions of pollinator groups observed visiting each native species and native cultivar at Site A from 2013-2015.
* Plants studied only at Site B where no honey bees were present in the landscape at bloom time.

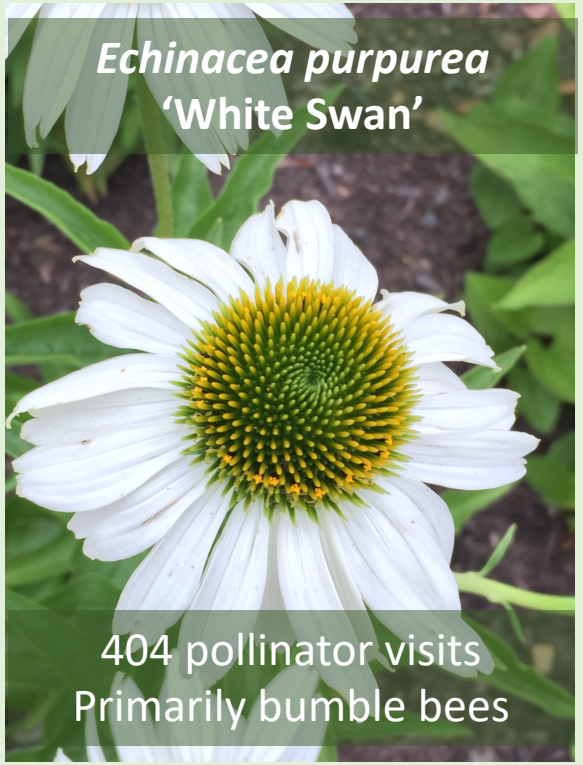
Evaluation of Purple Coneflower & cultivars

- *Echinacea purpurea* one of most widely promoted species
- Subject of intensive breeding efforts; ~ 200 varieties
- Focus: selecting traits valuable to ornamental gardeners
- Study to evaluate benefits of cultivars & hybrids to pollinators
- Research gardens at two farms (part of larger 2013-2014 study)
- 48 five-minute observations



Plants evaluated in study & results

Species grown from seed



Popular cultivar grown from seed, same form, different color

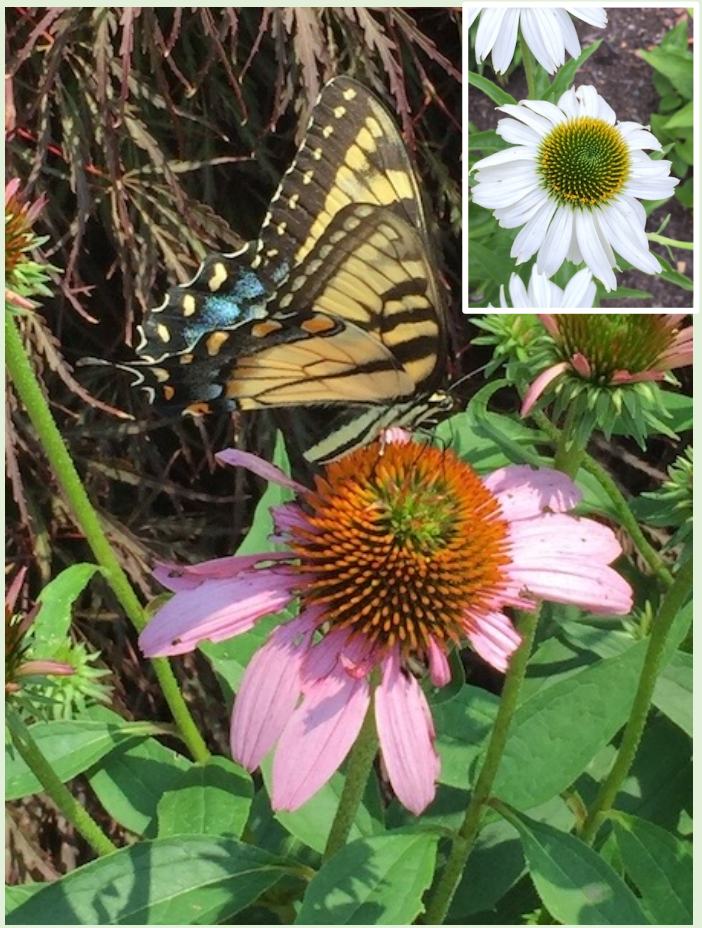
Patented, double-flowered cultivar, propagated via tissue culture

Interspecific hybrid cultivar ('White Swan' crossed with *E. purpurea* x *E. paradoxa*)

Conclusions

Breeding of cultivars & hybrids decreases pollinator support

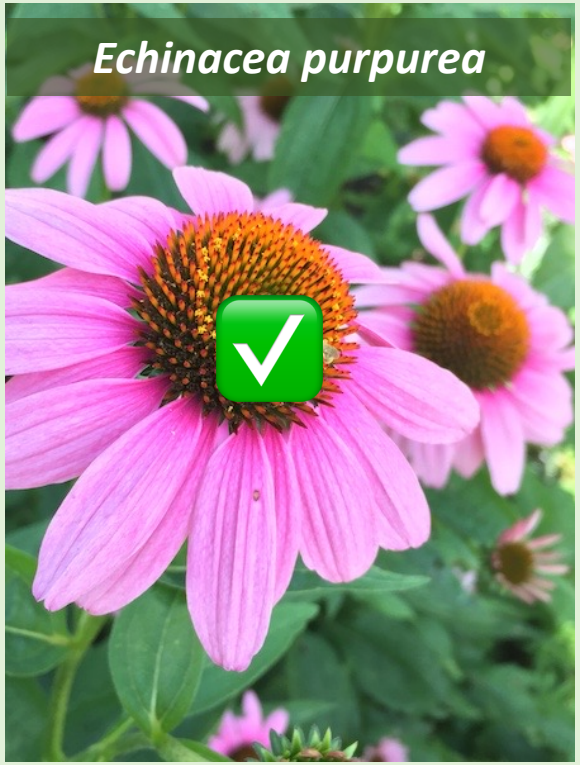
Bees strongly preferred species; then ‘White Swan’ over others

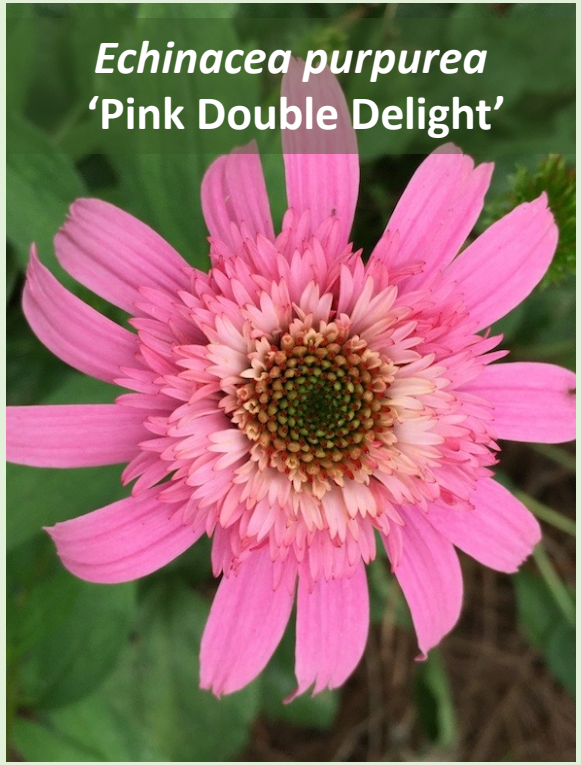


Butterflies & moths preferred species & ‘White Swan’

Flies/bugs/beetles/wasps/ ants exhibited no strong preferences

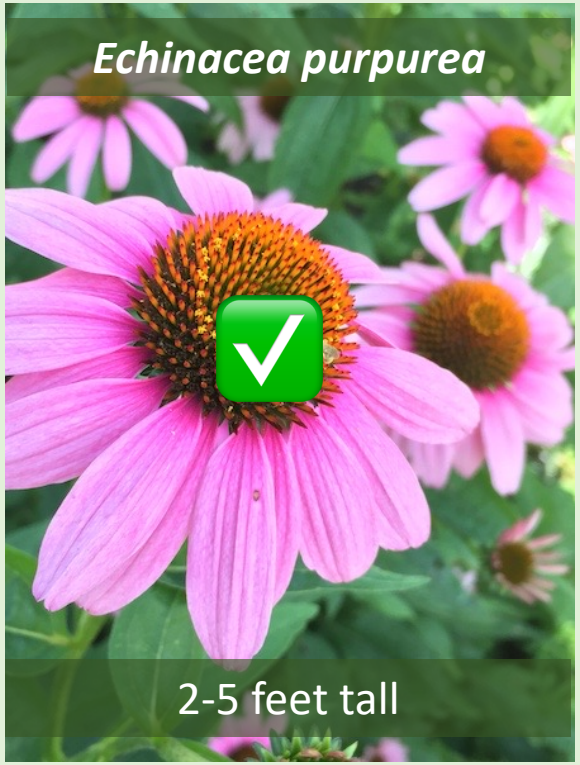
Effect of color trait on pollinators





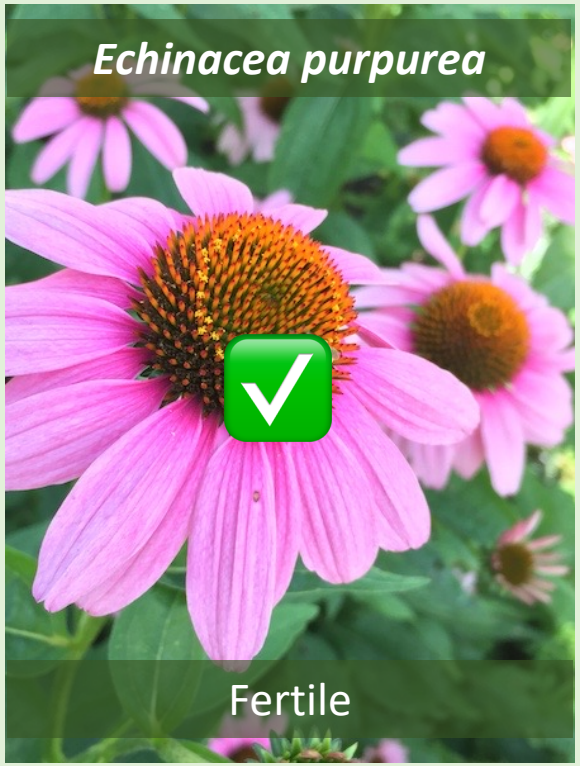
Color a significant signal; enables pollinators to discriminate flowers at a distance.
Bumble bees are eusocial and use systems of communication to improve foraging efficiency.
Bumble bees prefer colors they have learned are associated with higher floral rewards.

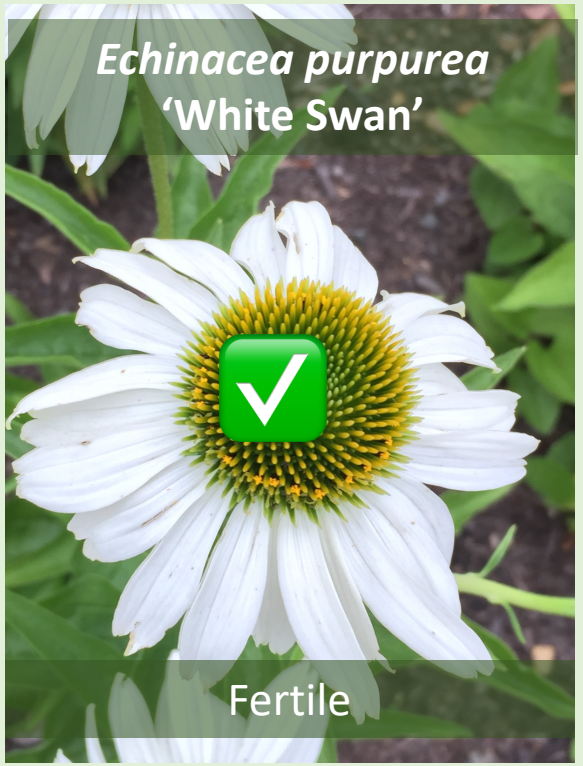
Effect of size trait on pollinators



Compactness equates with fewer flowers and fewer floral rewards.
In pollinator gardens, best to make use of vertical space with taller plants.

Effect of sterility trait on pollinators





Extra petals replace reproductive parts, reducing/eliminating floral rewards.
Breeding for sterility to increase bloom duration affects nectar and pollen production.

Recommendations

- Traditional breeding done for traits humans find desirable
- Breeders should introduce selections that also maximize nectar & pollen production to support pollinator populations

Comparison of nectar production

- Measured nectar in *µl* with disposable microcapillary tubes
- Used refractometer to measure sugar concentration
- Discussion on nectar in thesis
- Comparison of *Lobelia* species and hybrids

Hummingbird pollinated

Hummingbirds attracted to color

Bumble bee pollinated

Hybrids

Nectar: 5.47 *µL*

Nectar: 0.72 *µL*

but undernourished

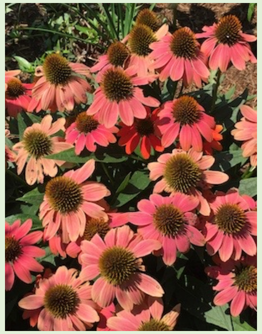
Nectar: 0.89 *µL*

Nectar: 0.79 *µL*

Hybrid modifications of flowers can have an unforeseen negative impact on floral resources for wildlife











QUESTIONS?









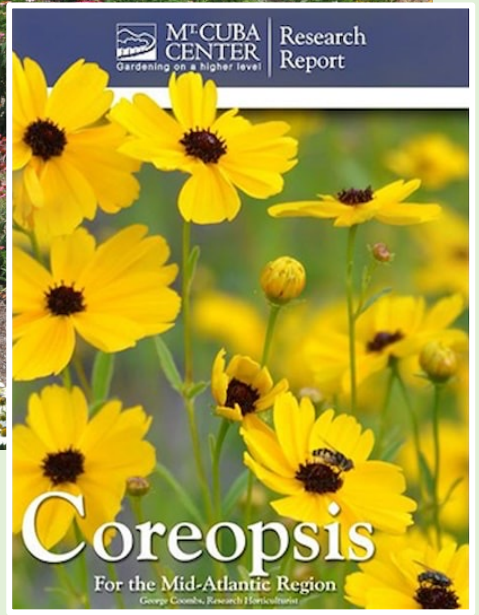
Additional Research on Herbaceous Plants

Mt. Cuba Center

- Non-profit botanical garden
- Former du Pont estate near Wilmington, DE
- Grows plants native to Piedmont region of Mid-Atlantic
- Evaluates those plants & related cultivars and hybrids
- Multi-year trials simulating home gardening conditions
- Strive to introduce desirable new plants to nursery trade

Plants rated on 1-5 scale

Publish reports on findings (2005 to present)

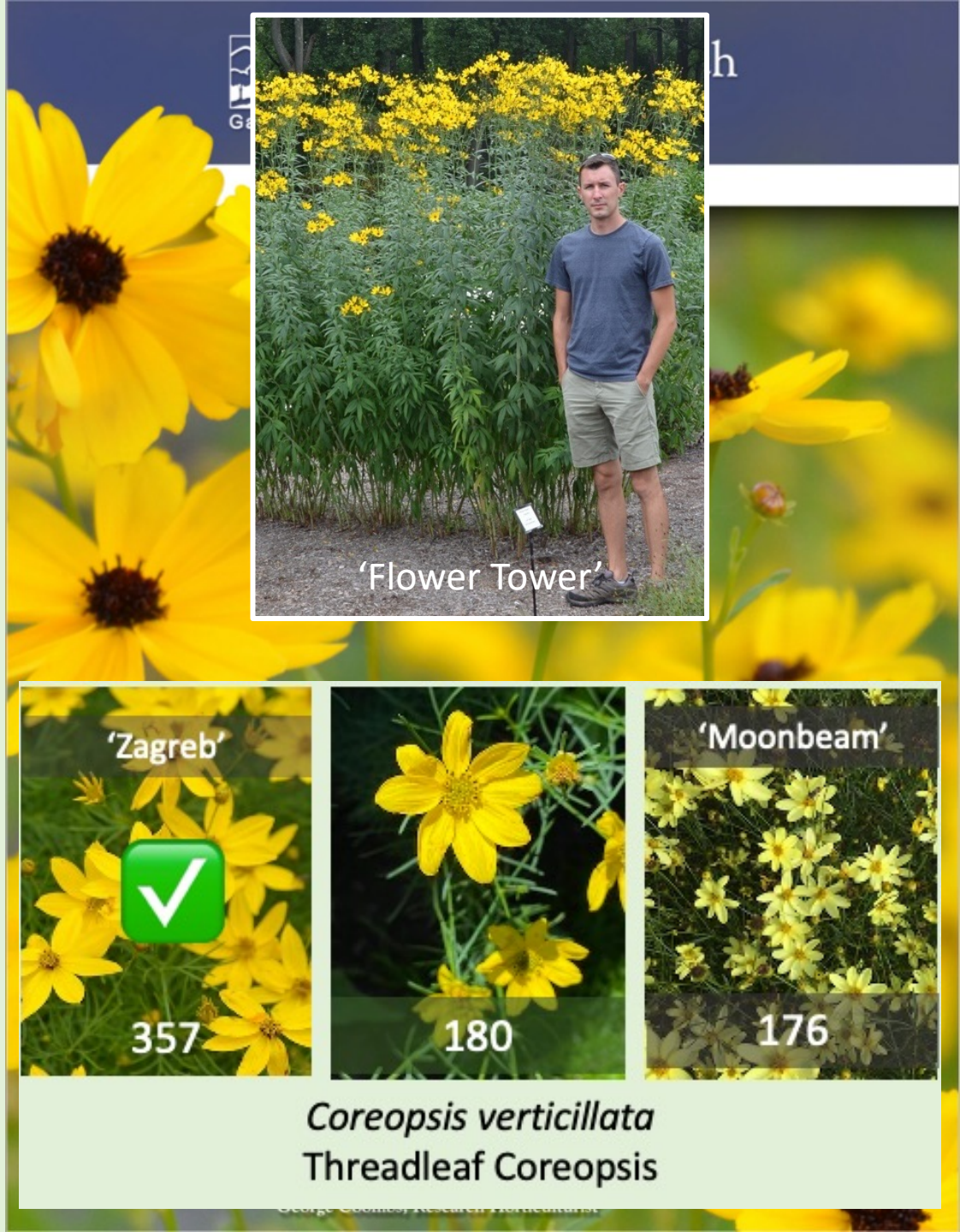


Asters

- Grew 56 species from Asteraceae Family (2002-2005)
- Measured plant performance but not benefit to pollinators
- Smooth Aster ‘Bluebird’ & Aromatic Aster ‘October Skies’ ranked high (4.8 & 4.7)
- New England Aster ‘Purple Dome’ (3.9) described as more manageable than species

Coreopsis

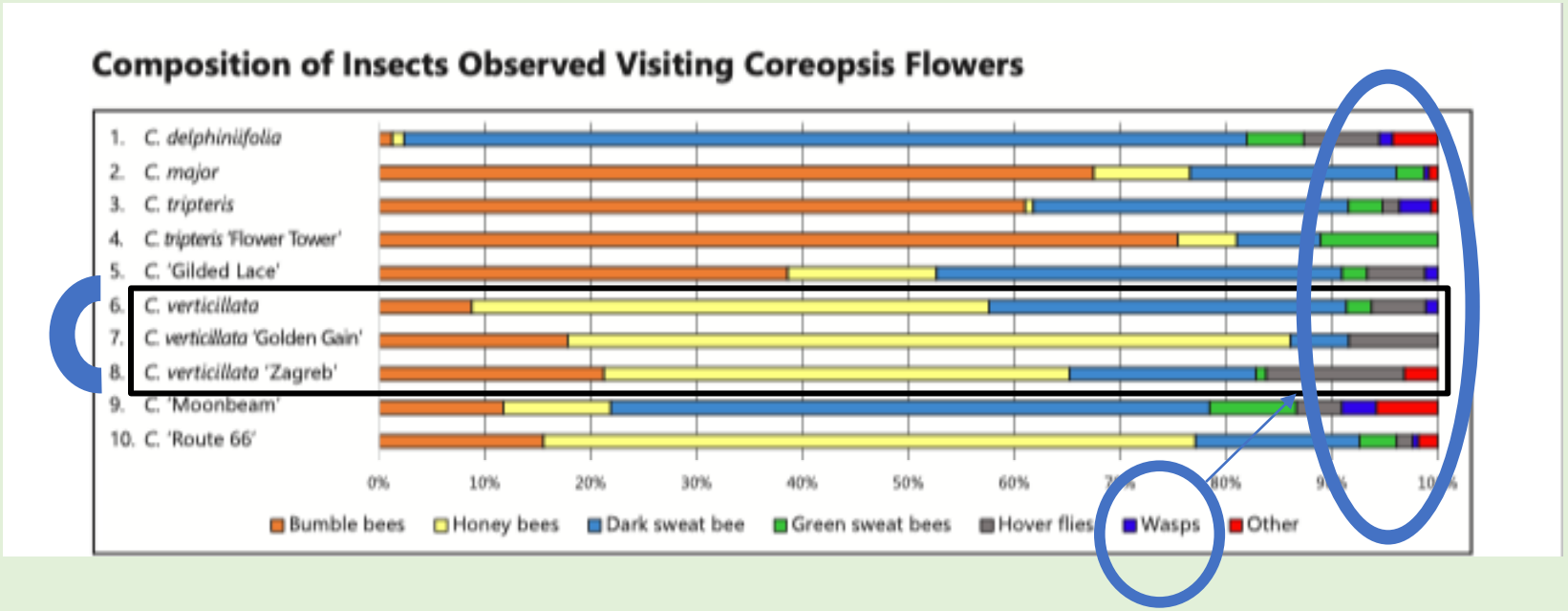
- Grew 13 perennial species and related cultivars & hybrids (2012-2014)
- Many popular cultivars performed poorly (disease/winter survival)
- Cultivars of Tall Coreopsis ranked high, (4.7) but too large for home garden
- ‘Zagreb’ cultivar of *C. verticillata* ranked above species (4.5 vs 4.4)
- Conducted pollinator diversity study: vacuum sampling & visual observation



Insect visitation

1. *C. delphiniifolia*
2. *C. major*
3. *C. tripteris*
4. *C. tripteris* 'Flower Tower'
5. *C.* 'Gilded Lace'
6. *C. verticillata*
7. *C. verticillata* 'Golden Gain'
8. *C. verticillata* 'Zagreb'
9. *C.* 'Moonbeam'
10. *C.* 'Route 66'

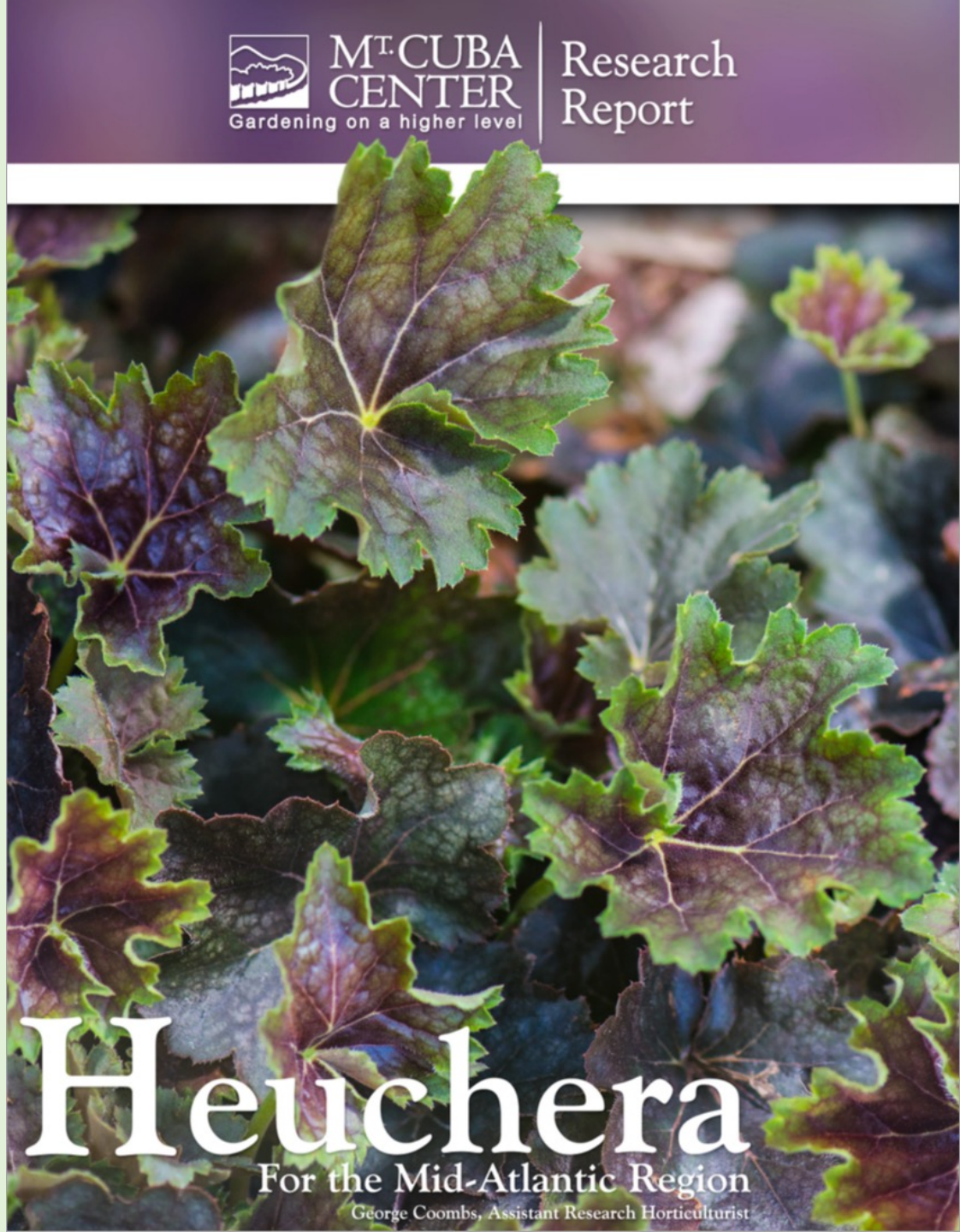
Coreopsis Pollinator Diversity (2014)
6 species of mining bee (*Andrenidae*)
4 species of carpenter bee (*Apidae*)
1 species of honey bee (*Apidae*)
1 species of masked bee (*Colletidae*)
10 species of sweat bee (*Halictidae*)
3 species of leafcutter bee (*Megachilidae*)
9 genera of wasps (*Hymenoptera*)
3 genera of hover flies (*Syrphidae*)
2 families of beetles (*Coleoptera*)
3 families of moths/butterflies (*Lepidoptera*)



- Each plant supports a sightly different community of pollinators
- 91% bees & flies, but natural predators (wasps) also important
- Further study to determine how color, shape & pollen production affect preferences

Heuchera

- Grew 83 cultivars of popular, shade-garden perennials (2012-2014)
- Hybrids derived from native Alumroot:
  - *H. americana*: Medium-size leaves w/ scalloped edges & silver veil
  - *H. villosa*: Large, angular, hairy leaves
- Most plants rated on their foliage; floral display rated separately
- No data on use by insects



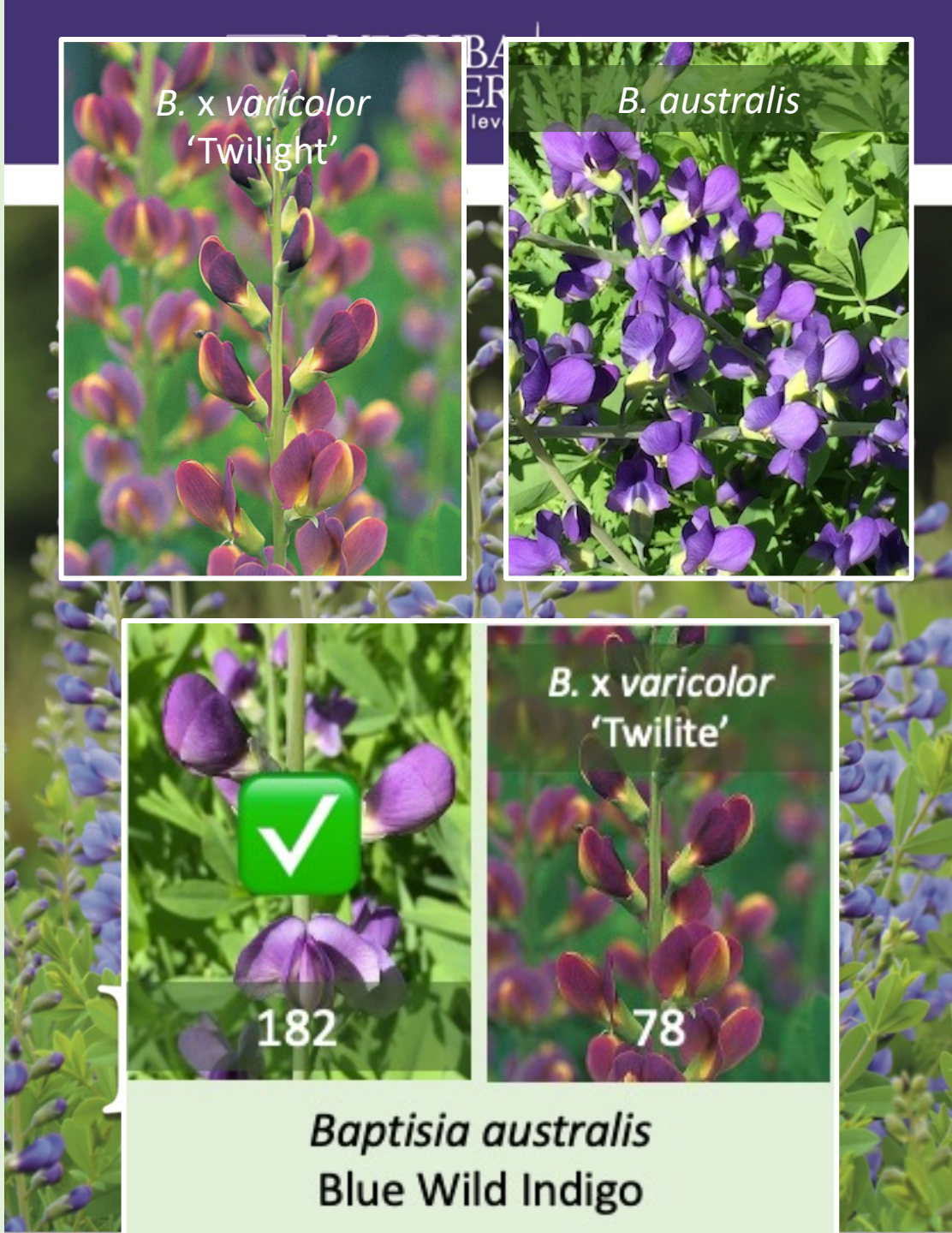
Both *Heuchera* species are larval hosts for moth caterpillar

Preferred over top-rated hybrid grown for foliage color

Both species provide nectar & pollen for small bees, including specialist

Baptisia

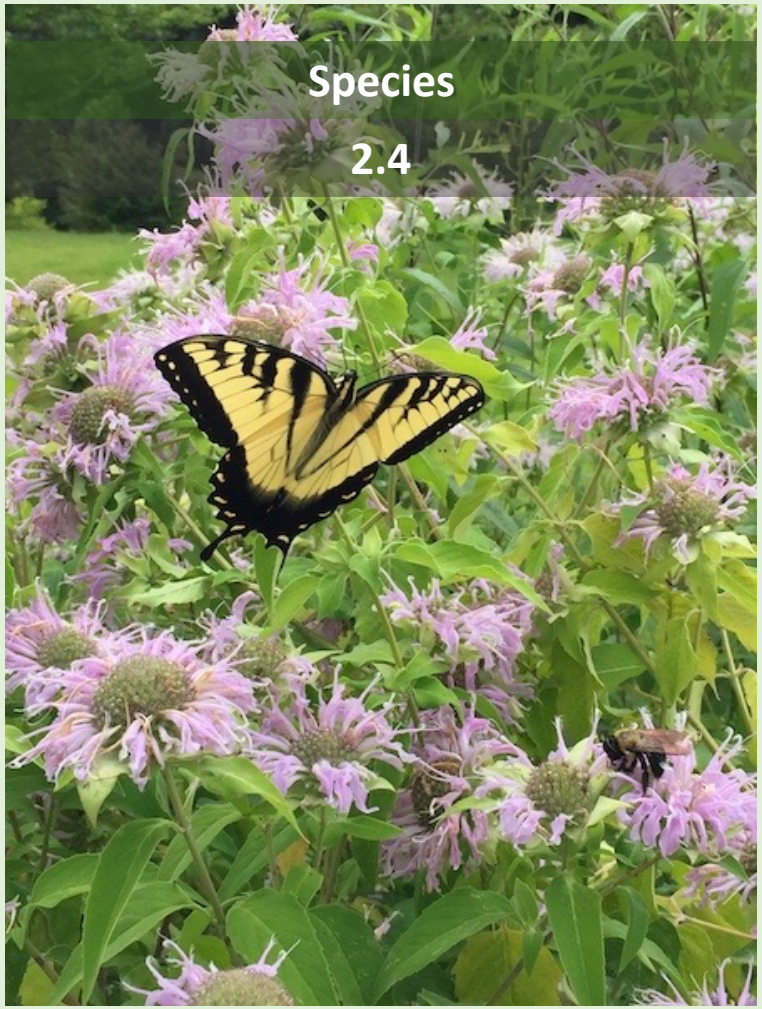
- Grew 46 selections of 11 different species (2012-2015)
- Focus on floral displays with lush, sturdy foliage
- Mention use as food source for bumble bees & larval host plant, but no comparative data
- ‘Twilite’ hybrid ranked high (4.6), above *B. australis* (3.7) and dwarf variant, *B. australis* var. *minor* (4.0)



Monarda

- Grew 40 hybrids or selections of 2 native species (2014-2016)
  - *Monarda didyma* (Beebalm)
  - *Monarda fistulosa* (Wild Bergamot)
- Breeding focus on creating compact, disease-resistant selections with large, colorful flowers
- Compact hybrids performed poorly
- Trial focus on habit, mildew resistance, leaf retention & flower coverage

Wild Bergamot (*Monarda fistulosa*)

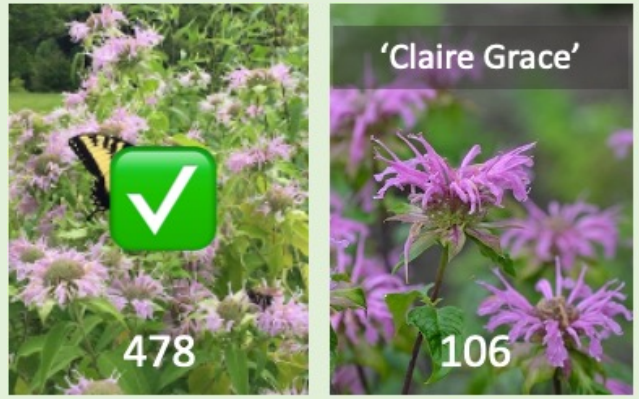


Species:
Powdery mildew resistance very poor

Naturally occurring cultivar:
Sturdy, upright habit, good resistance to powdery mildew

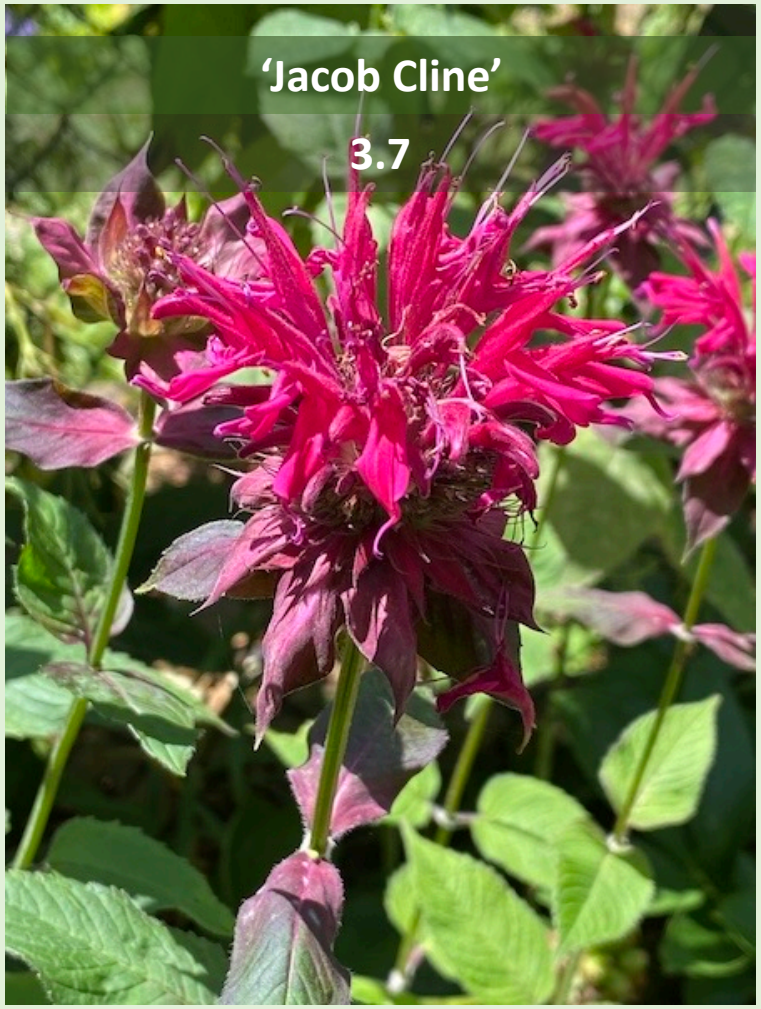
2016 Citizen Science Project on Visitation

'Claire Grace' top compared to hybrids (species not tested)

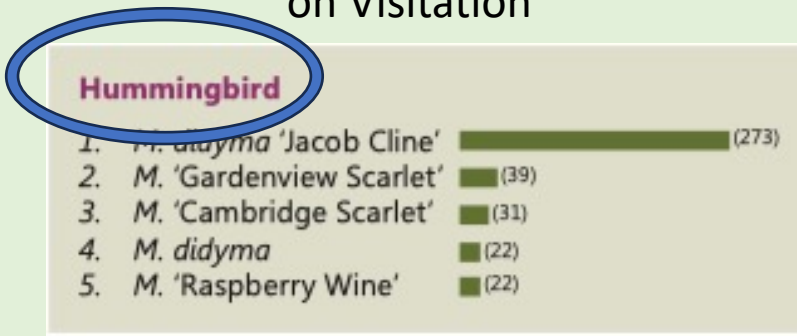


Species top in Penn State trials & Annie White trials

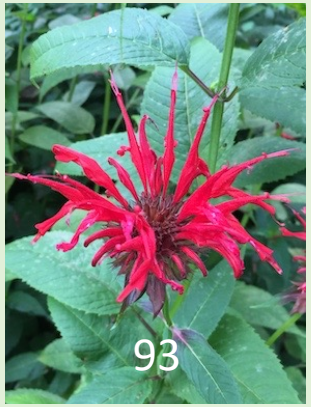
Scarlet Beebalm (*Monarda didyma*)

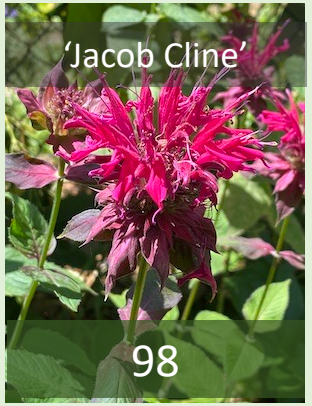


2016 Citizen Science Project on Visitation



‘Jacob Cline’ significantly higher than hybrids and species





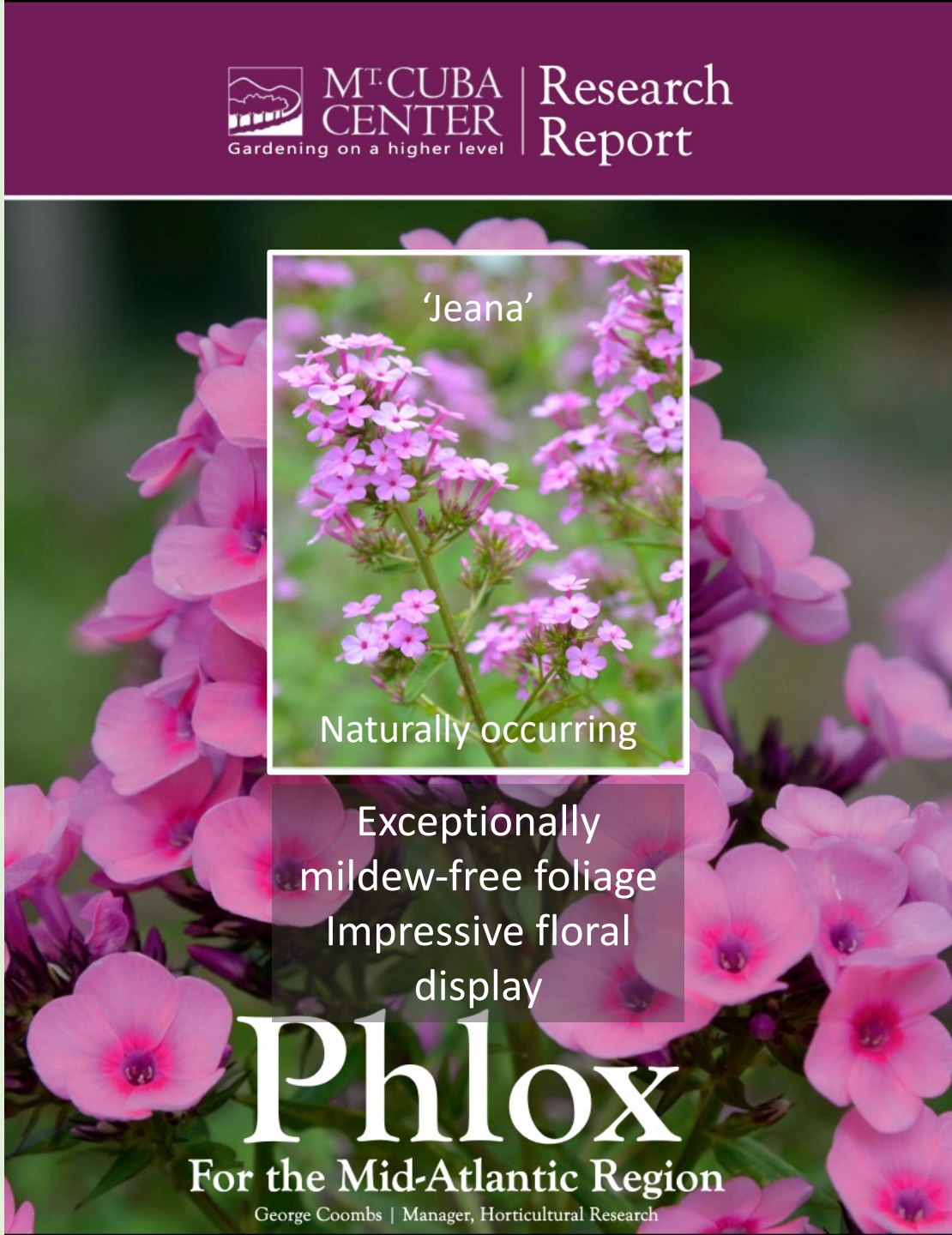
Species close in Penn State trials

Species:
Low flower coverage
Powdery mildew resistance poor

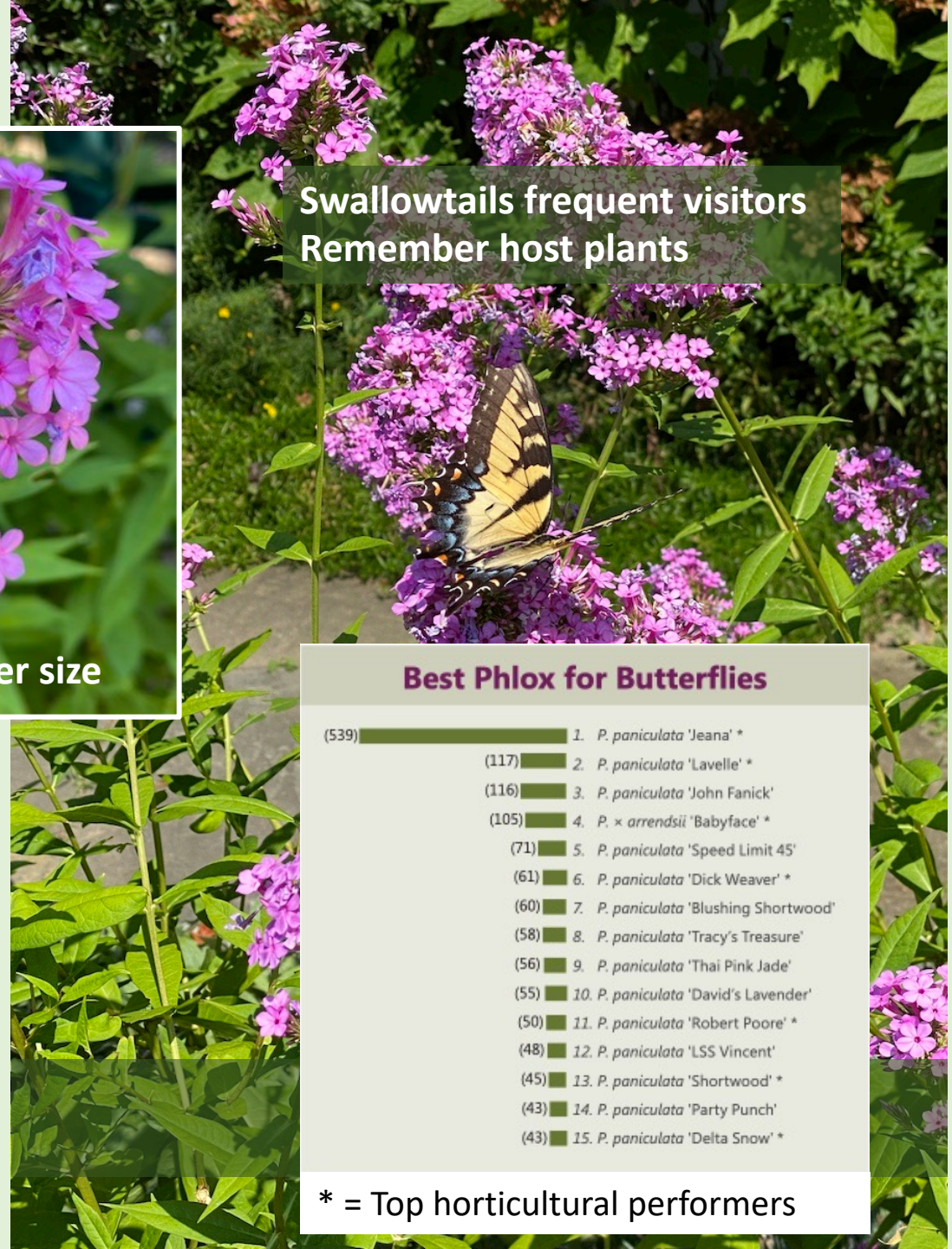
Naturally occurring cultivar:
Vigorous, abundant flowers
Fair resistance to powdery mildew

Phlox for Sun

- Grew 94 hybrids or selections of sun-loving native species (2015-2017)
  - 66 of *Phlox paniculata* (Garden Phlox)
- Trial focus on flowers, foliage quality, habit, powdery mildew resistance
- ‘Jeana’ ranked top (4.8) among *Phlox paniculata* cultivars
- Also conducted an evaluation of butterfly preference

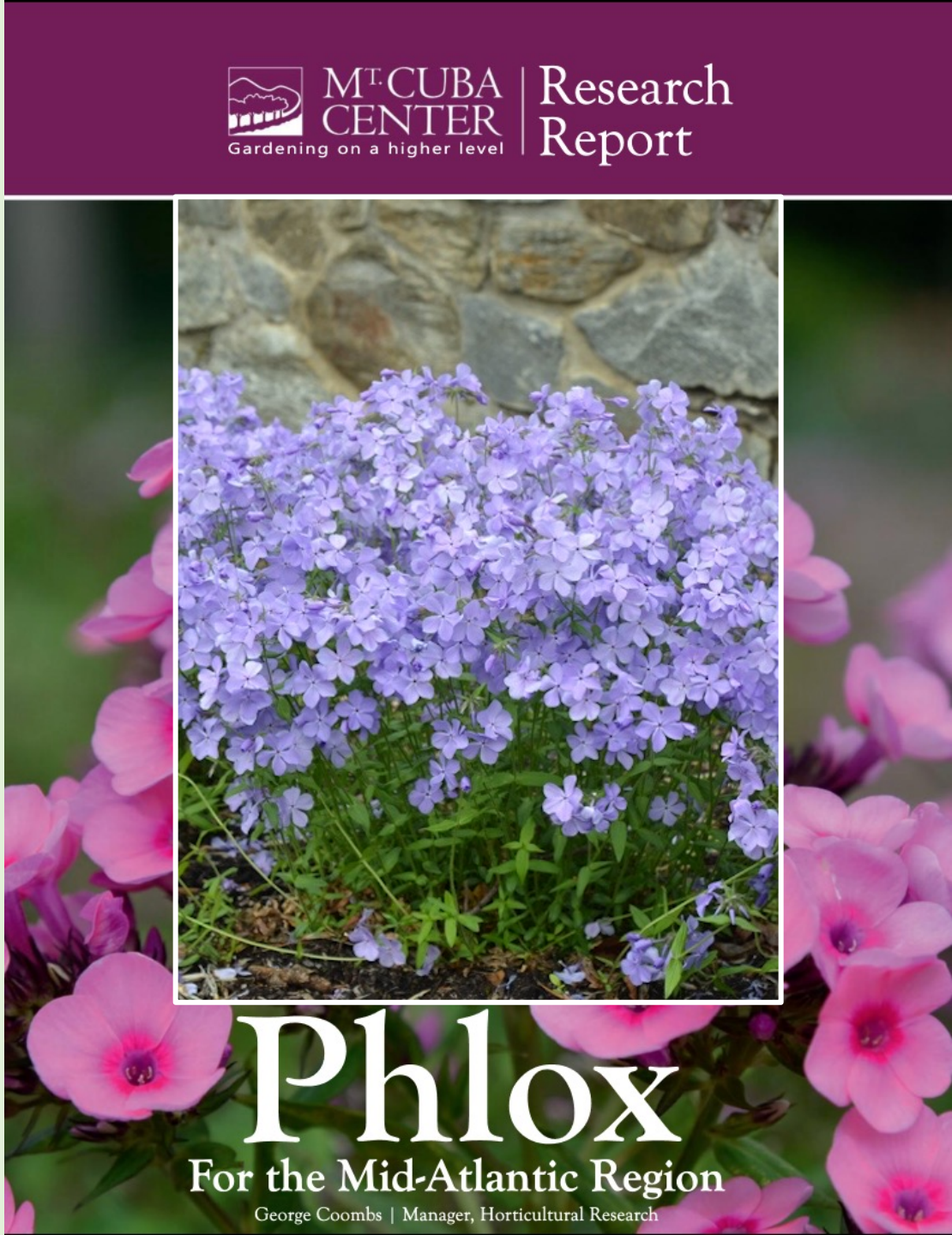


- Monitored butterfly visitation 2016-2017
- Hour-long shifts by Pollinator Watch volunteers
- *Phlox paniculata* ‘Jeana’ overwhelmingly preferred
- U of DE graduate student: No correlation between visitation and quantity or sugar content of nectar
- Shallowness of flower tube may allow butterflies quick access to many flowers



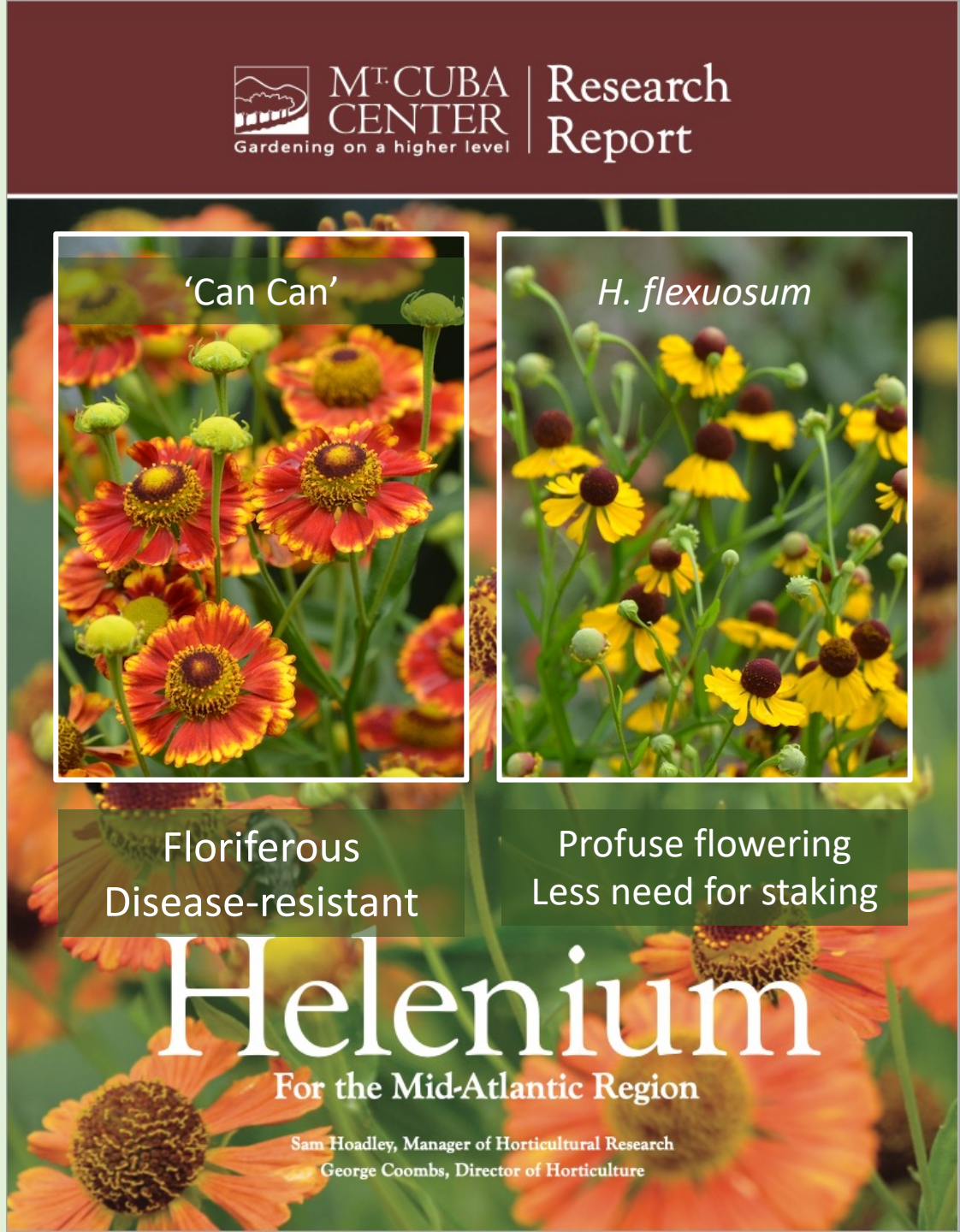
Phlox for Shade

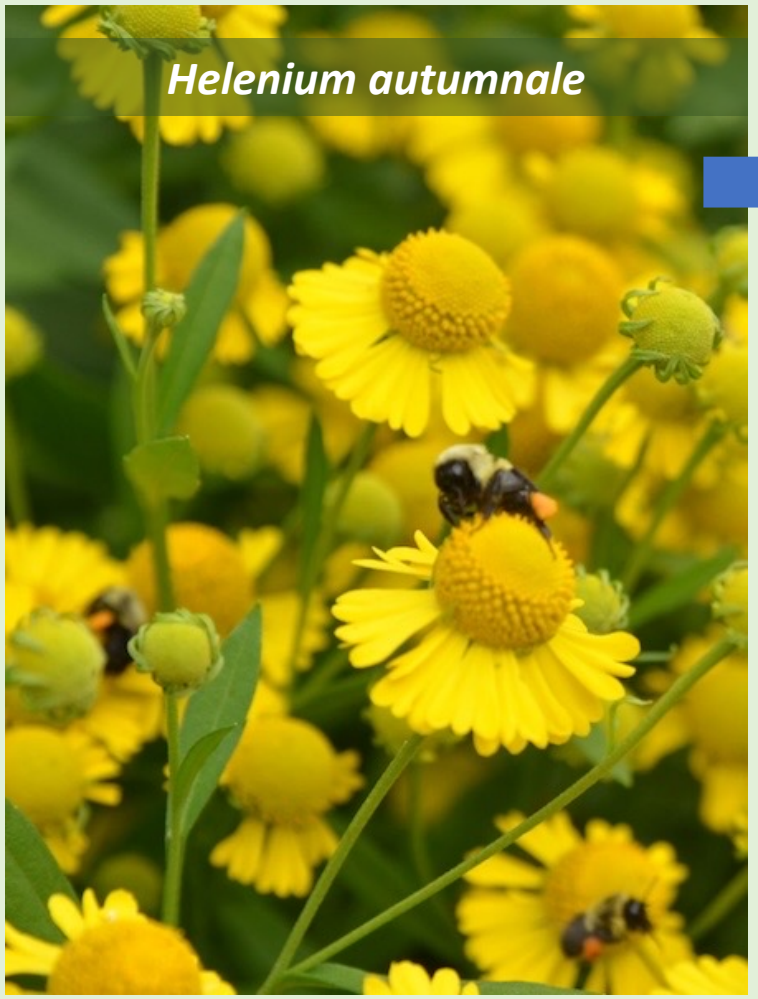
- Grew 43 selections of two native shade-loving species
  - *Phlox divaricata* (Woodland Phlox)
  - *Phlox stolonifera* (Creeping Phlox)
- Trial focus on habit, vigor, and floral display
- Creeping Phlox easier to grow
- Powdery mildew a significant problem with Woodland Phlox (defoliation)
- No data on use by wildlife



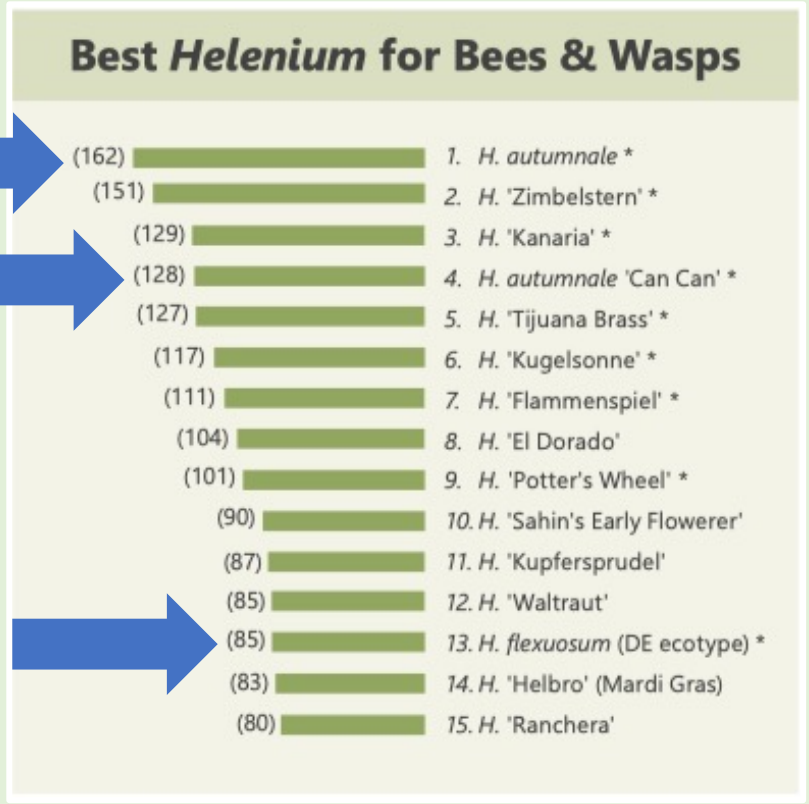
Helenium

- Grew 44 taxa, including species, cultivars & hybrids (2017-2019):
  - *Helenium autumnale* (Helen's Flower)
  - *Helenium flexuosum* (S. Sneezeweed)
- Native to Americas but most breeding in Germany & Netherlands
- Origin of hybrids & cultivars unclear
- 'Can Can' cultivar of *H. autumnale* rated just above species (4.1 & 3.9)
- Species of *H. flexuosum* rated 4.0

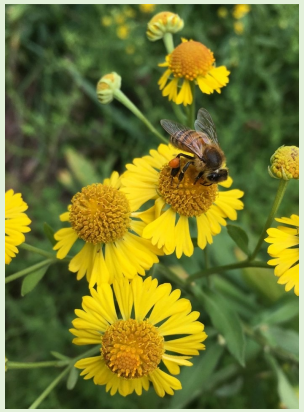




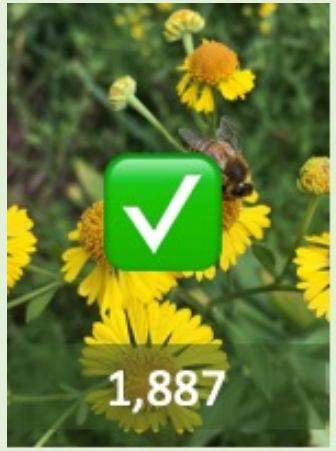
Visitation Statistics



Observed for 1 minute, twice weekly during growing seasons, 2017 & 2018



In Top 10 for insect diversity &
Top 20 for total visits
in Penn State trial

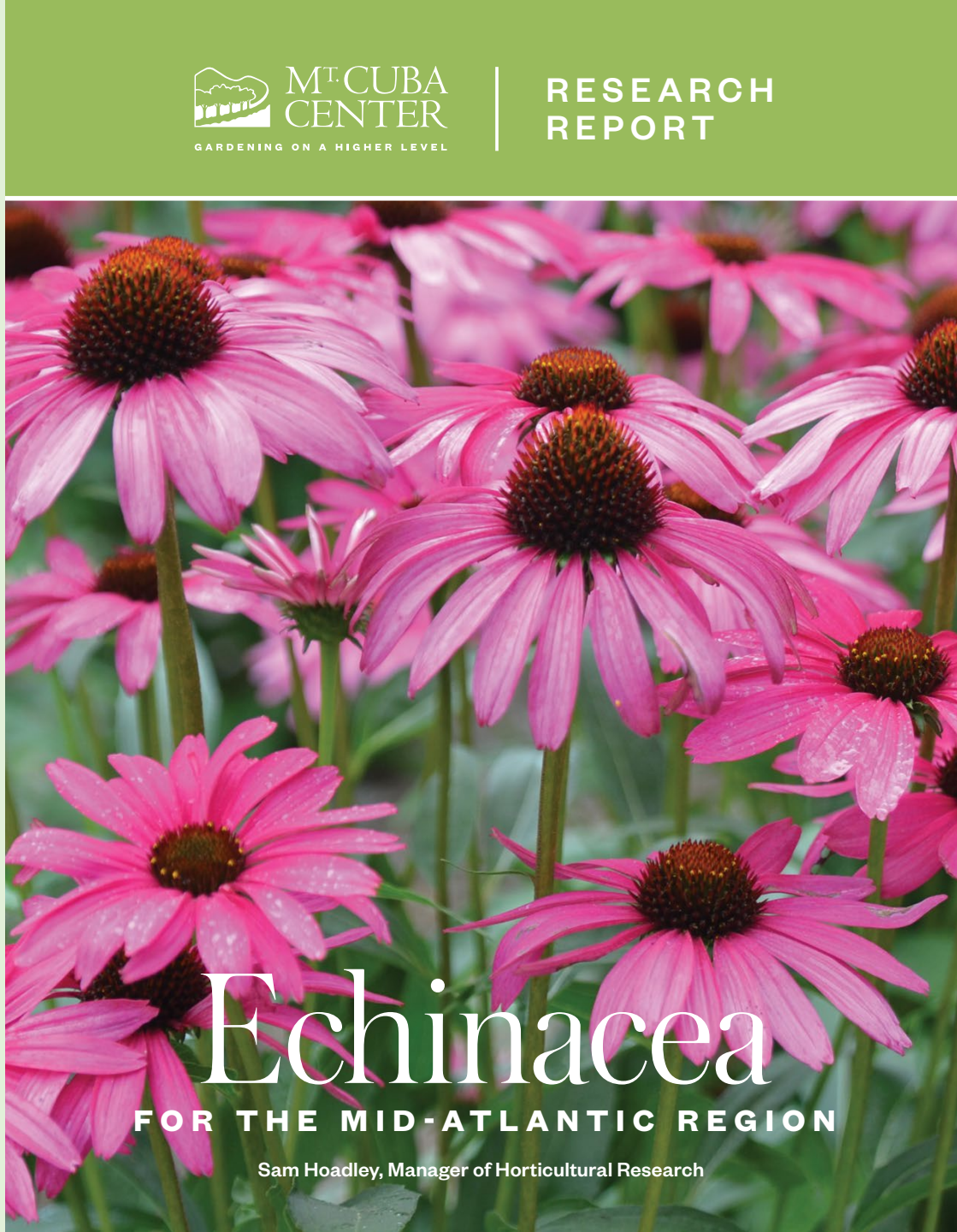


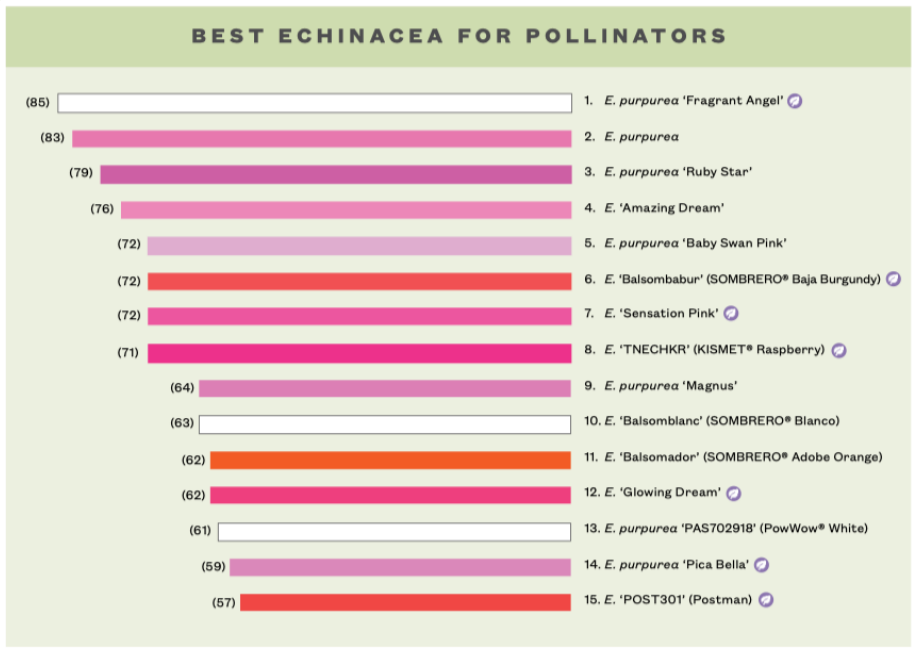
Helenium autumnale
Helen's Flower

Topped hybrid in Annie White trial

Echinacea

- *Echinacea purpurea* extremely popular & origin of many cultivars
- Repeat of earlier 2007-2009 trial with focus on evaluating new cultivars
- Grew 75 species, cultivars & hybrids (2018-2020)
- 5 species native to TN and Midwest
- Some plants short-lived due to infection rates of aster yellows
- Added component of pollinator study





Majority bees & wasps, some butterflies

All reproductive parts

Petals replace cone

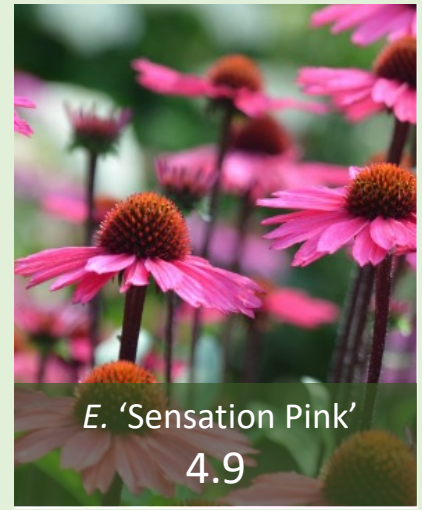
Echinacea purpurea
'Fragrant Angel'
4.4

Echinacea purpurea
3.8

Echinacea purpurea
'Ruby Star'
4.1

E. 'Amazing Dream'
3.1

Echinacea purpurea
'Baby Pink Swan'
3.5

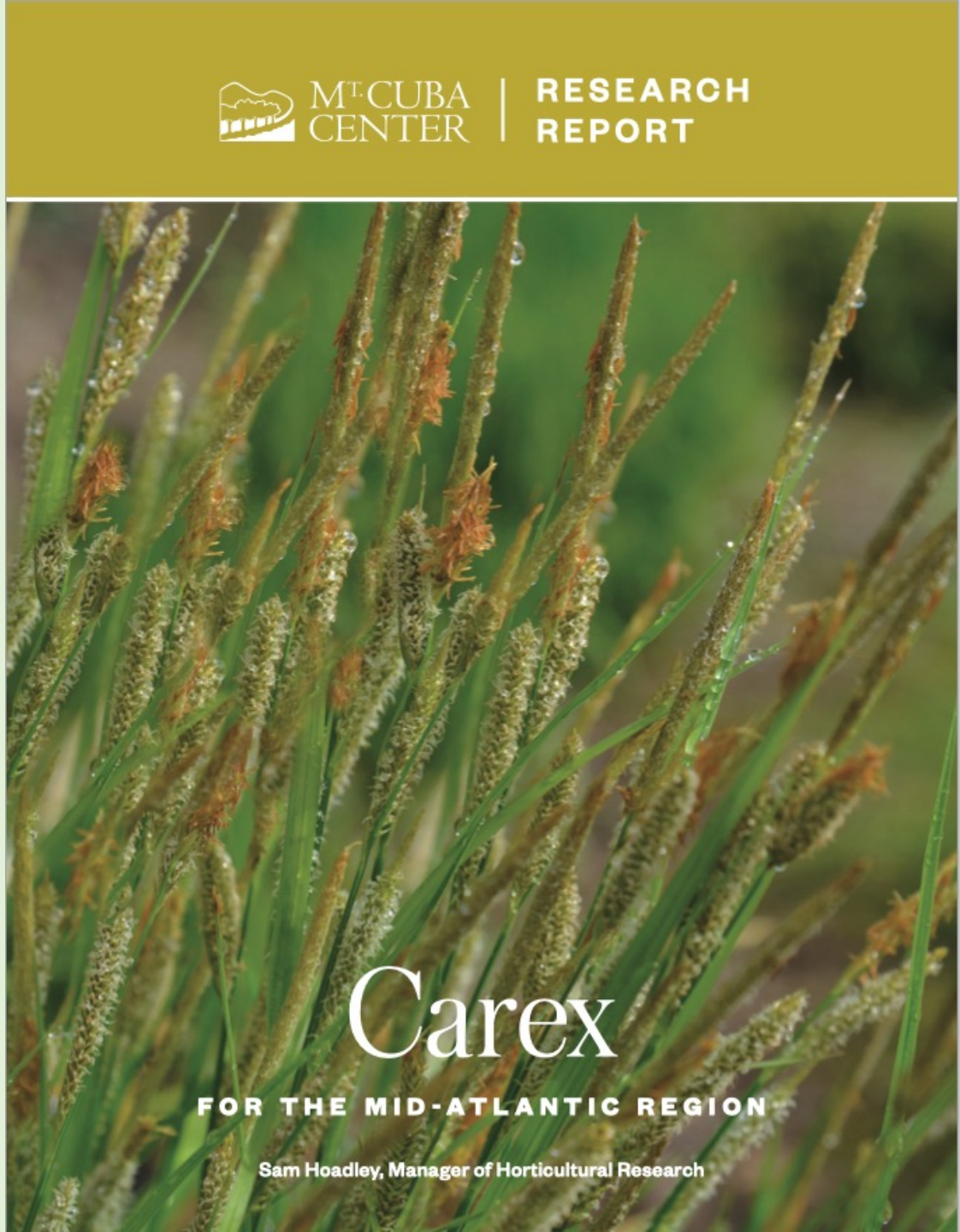


E. 'Sensation Pink'
4.9

All lower photos Mt. Cuba

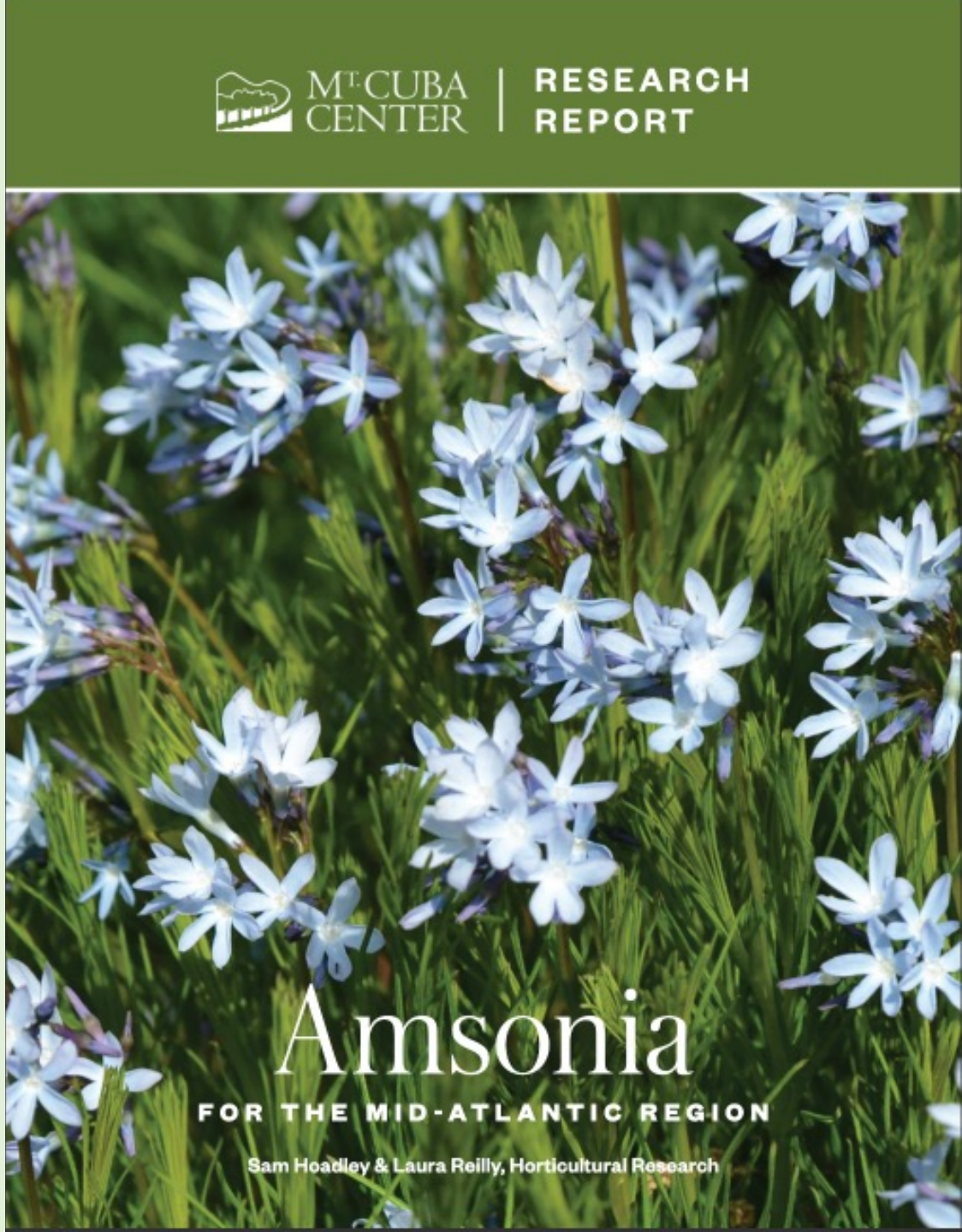
Carex

- Grew 65 species & 5 cultivars of native sedges (2018-2022)
- Wind-pollinated, but offer seeds & cover and serve as larval host plants
- Growing popularity as ground covers or as specimens & accents
- Evaluation of horticultural qualities, vigor, and adaptability (sun & shade)
- Final year: response to biweekly mowing to assess potential as lawn substitutes



Amsonia

- Rated 20 taxa, including species (some native to Southeast), cultivars, and hybrids (2013-2023)
- Evaluated for habit, vigor, and floral display
- Observations of pollinator interaction April to June 2023
- Diversity of pollinators (butterflies, native bees, and hummingbirds), but low total numbers
- Host plant to Snowberry Clearwing



OSU Garden Ecology Lab Study

- Doctoral work of Jen Hayes
- Field trials 2020-2022 to compare West Coast native species & cultivars
- Data collected on pollination visits & diversity
- Nectar samples to be analyzed for sugar content and volume
- Nutrient composition of pollen samples to be analyzed for effect on adult bees & developing larvae

OSU study

- Using multispectral photography for analysis of UV markers
- Changes in fluorescence among cultivars may confuse pollinators

Recommendations & Resources

Spectrum of choices (based on gardener priorities)

Ecological value **Benefit to pollinators** **Aesthetic value**

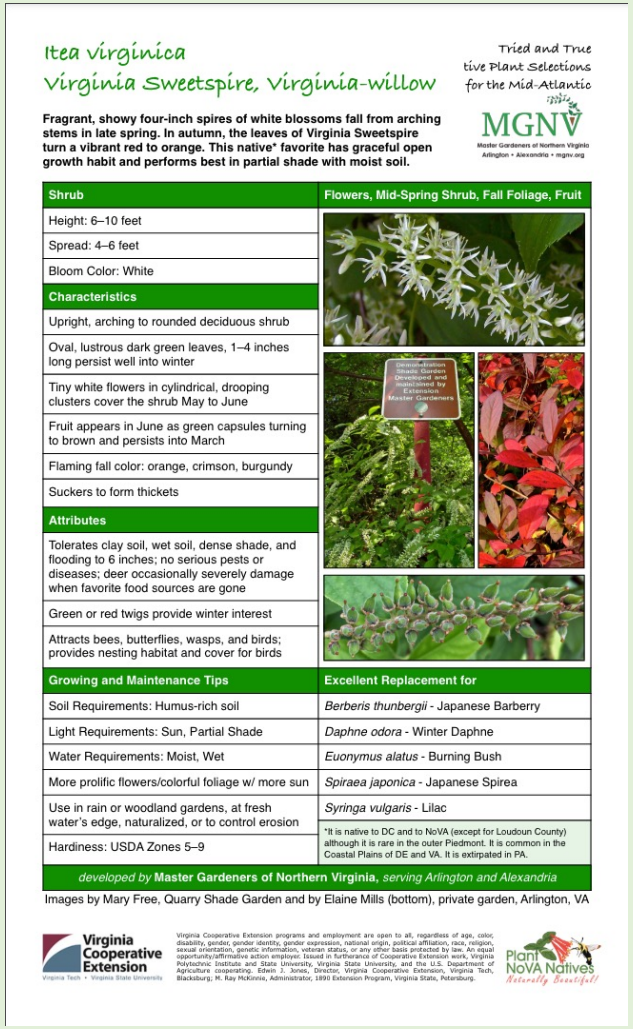
Conservation projects **Sustainable landscapes** **Ornamental gardens**

Local ecotype native species	Unmodified native species	Natural mutation of native species	Moderately modified cultivar	Highly modified cultivar or hybrid
				

[Judge on case-by-case basis]

Generally, the fewer the changes, the more beneficial

Determining appropriate native plants



Itea virginica
Virginia Sweetspire, Virginia-willow

Tried and True tive Plant Selections for the Mid-Atlantic
MGNV
Master Gardeners of Northern Virginia
Arlington • Alexandria • mgnv.org

Fragrant, showy four-inch spires of white blossoms fall from arching stems in late spring. In autumn, the leaves of Virginia Sweetspire turn a vibrant red to orange. This native* favorite has graceful open growth habit and performs best in partial shade with moist soil.

Shrub	Flowers, Mid-Spring Shrub, Fall Foliage, Fruit
Height: 6–10 feet	
Spread: 4–6 feet	
Bloom Color: White	
Characteristics	
Upright, arching to rounded deciduous shrub	
Oval, lustrous dark green leaves, 1–4 inches long persist well into winter	
Tiny white flowers in cylindrical, drooping clusters cover the shrub May to June	
Fruit appears in June as green capsules turning to brown and persists into March	
Flaming fall color: orange, crimson, burgundy	
Suckers to form thickets	
Attributes	
Tolerates clay soil, wet soil, dense shade, and flooding to 6 inches; no serious pests or diseases; deer occasionally severely damage when favorite food sources are gone	
Green or red twigs provide winter interest	
Attracts bees, butterflies, wasps, and birds; provides nesting habitat and cover for birds	
Growing and Maintenance Tips	**Excellent Replacement for**
Soil Requirements: Humus-rich soil	*Berberis thunbergii* - Japanese Barberry
Light Requirements: Sun, Partial Shade	*Daphne odora* - Winter Daphne
Water Requirements: Moist, Wet	*Euonymus alatus* - Burning Bush
More prolific flowers/colorful foliage w/ more sun	*Spiraea japonica* - Japanese Spirea
Use in rain or woodland gardens, at fresh water's edge, naturalized, or to control erosion	*Syringa vulgaris* - Lilac
Hardiness: USDA Zones 5–9	*It is native to DC and to NoVA (except for Loudoun County) although it is rare in the outer Piedmont. It is common in the Coastal Plains of DE and VA. It is extirpated in PA.

developed by **Master Gardeners of Northern Virginia,** *serving Arlington and Alexandria*

Images by Mary Free, Quarry Shade Garden and by Elaine Mills (bottom), private garden, Arlington, VA

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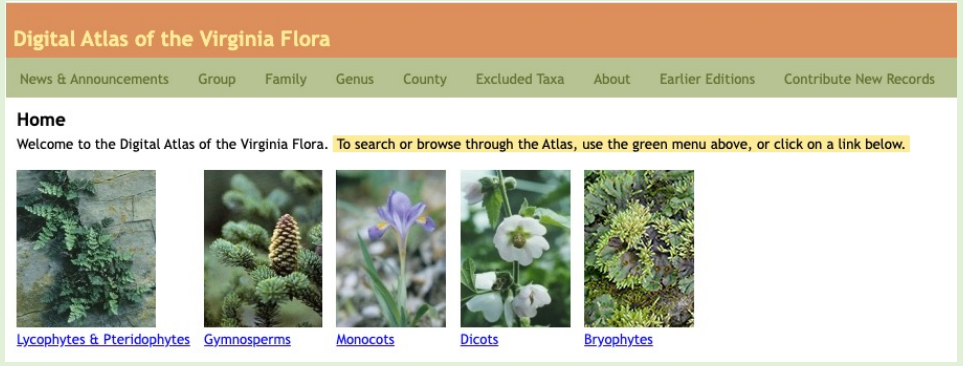
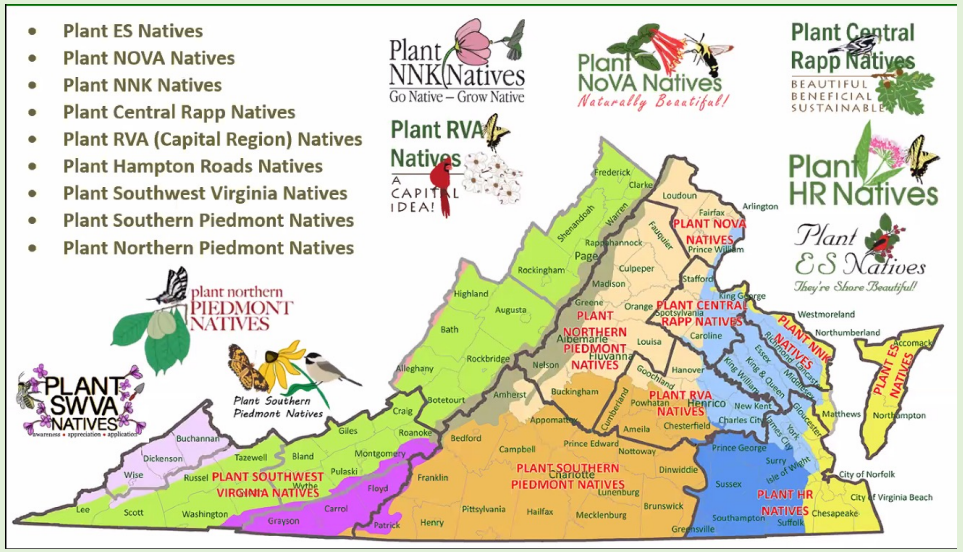
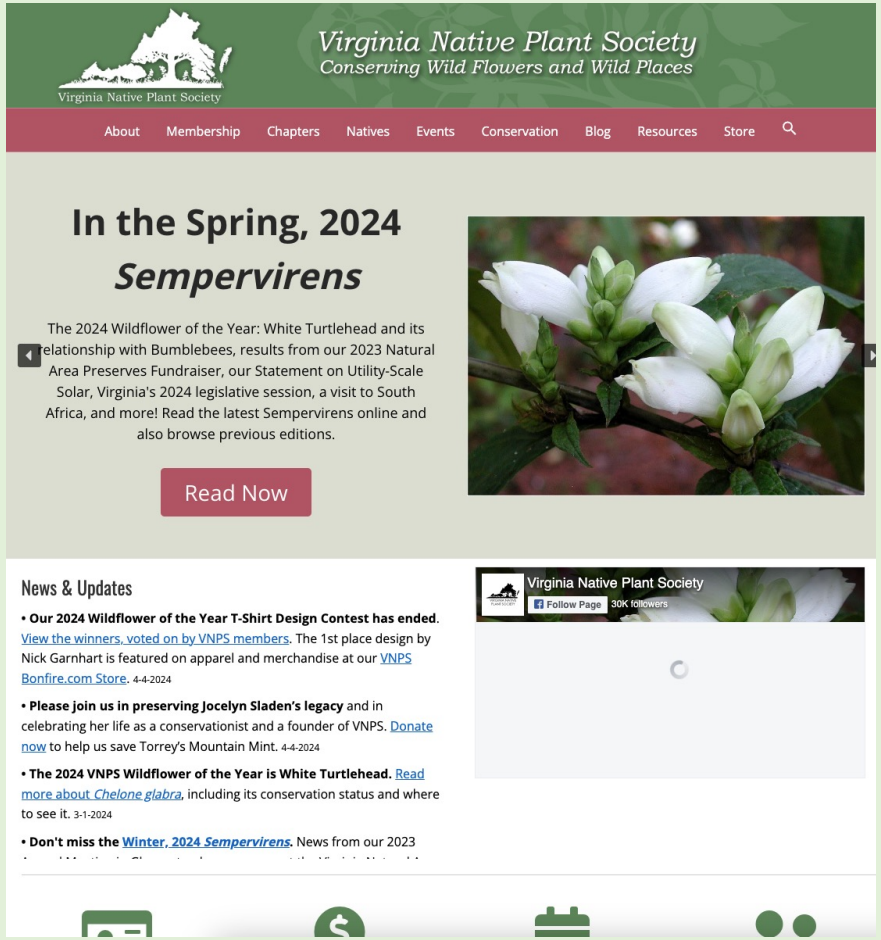
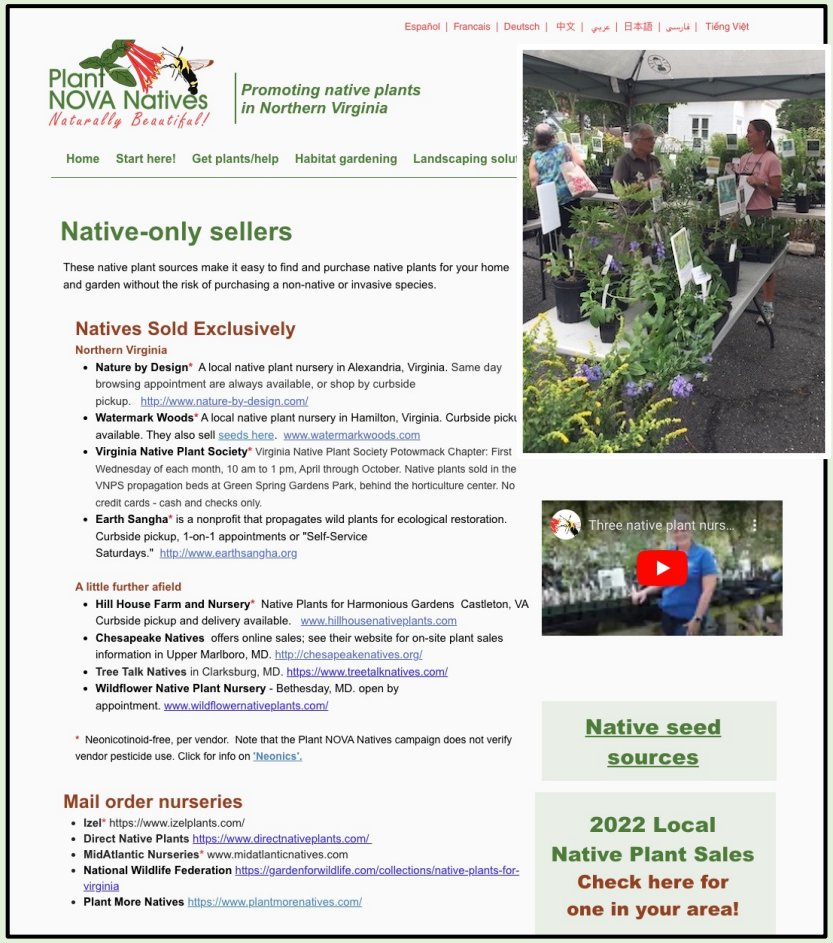
Plant NoVA Natives Naturally Beautiful!

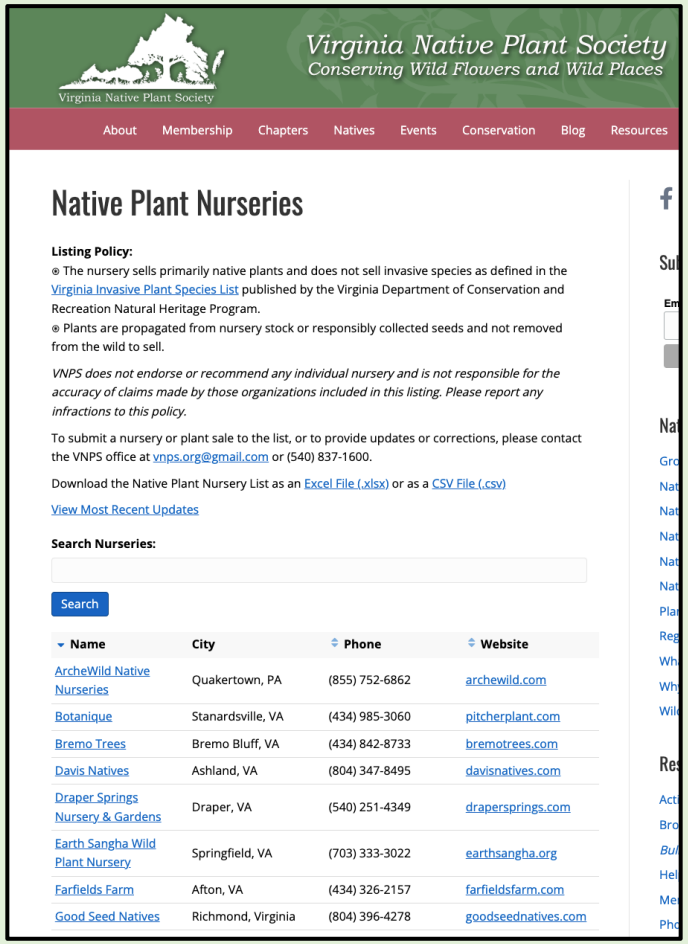


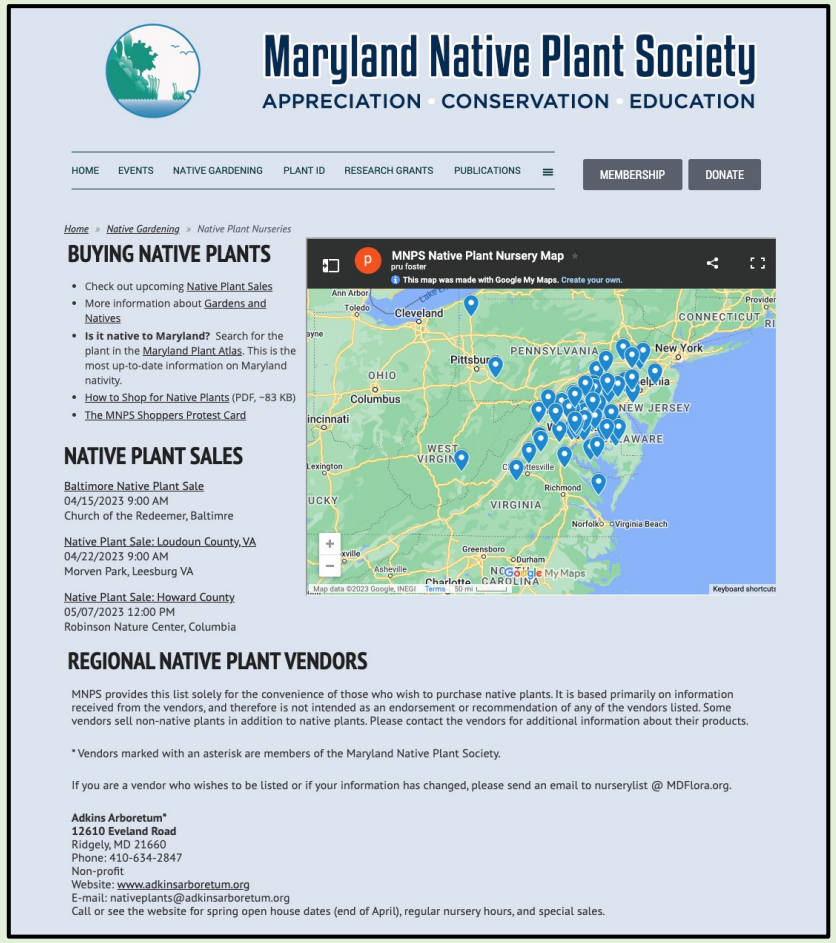




Buying native plants

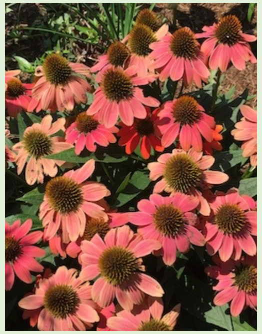
















QUESTIONS?