Beyond Beauty

The Wildlife Value of Natives and Native Cultivars in Mt. Cuba Center's Trial Garden

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Mt. Cuba Center 3120 Barley Mill Road, Hockessin, Delaware

Mt Cuba's Mission

Mt. Cuba Center's mission is to inspire an appreciation for the beauty and value of native plants and a commitment to protect the habitats that sustain them.

In the Trial Garden we evaluate native plant species and their cultivars for their horticultural and ecological value

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Mt Cuba Center's Trial Program

(Nonbiased and self funded)

Why?: Inform public and the nursery trade, promote native plants that perform well in the mid-Atlantic region

How?: genera based, eastern United States focused, most trials run for 4-5 years are low to no maintenance after the first year. Trial Garden soils are considered "average"

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Horticultural Data Collection

Weekly Data: including measurements, observations, and ratings assigned (scale of 1-5) for foliage and habit, floral display, disease resistance. Yearly Scores calculated at the end of each season.

Final Report, Website Content: at the trial's conclusion a detailed research report is produced, and summaries and descriptions of every trialed plant is uploaded to our website.

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Insect Data Collection

The Pollinator Watch Team : A dedicated team of volunteer community scientists who observe and record insect activity in our various trials

Trials Observed: *Monarda*, *Phlox*, *Helenium*, *Echinacea,* wild hydrangea, *Vernonia*, *Solidago*

Ongoing Observations: *Hydrangea quercifolia*, *Asclepias*, *Physostegia*, *Tiarella*, *Pycnanthemum*

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Oakleaf Hydrangeas for the Mid-Atlantic Region

Ferns for the Mid-Atlantic Region

Tiarella for the Mid-Atlantic Region

Bluestems for the Mid-Atlantic Region

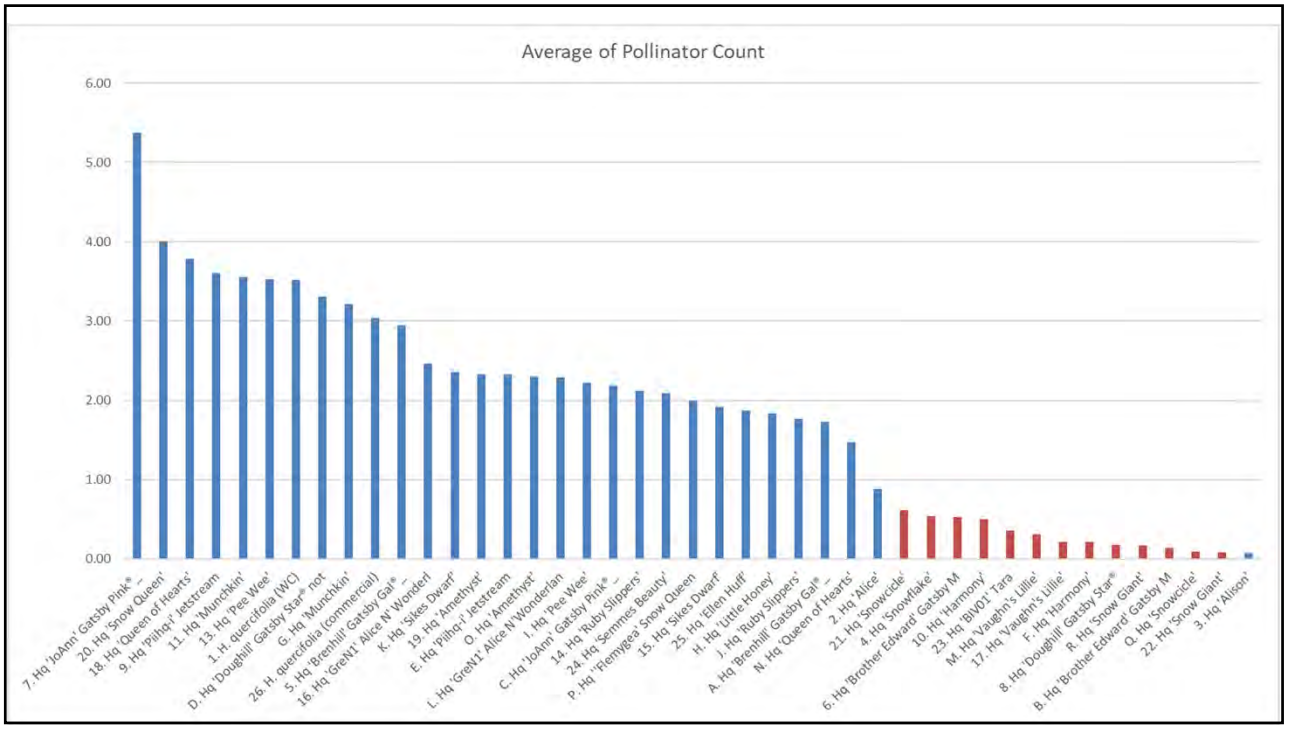
Physostegia for the Mid-Atlantic Region

Pycnanthemum for the Mid-Atlantic Region

Oakleaf Hydrangea Flower Forms

Oakleaf Hydrangea Flower Forms: Double?

Oakleaf Hydrangea Flower Forms: Wild Type



Hydrangea quercifolia ‘JoAnn’ Gatsby Pink®

(Gatsby Pink® oakleaf hydrangea)

- From Proven Winners, selected by Alan Branhagan at Powell Gardens, Kansas City MO
- Ungainly habit
- Lovely pink flowers
- Highest pollinator interest by far
- Leaves susceptible to sun damage

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Asclepias for the Mid-Atlantic Region

- Report coming in 2027
- 25 different commercially available milkweed species and cultivars included in the trial
- Garden performance and insect activity are being recorded with special attention paid to monarch butterfly and caterpillar activity

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Asclepias incarnata

(swamp milkweed)

- 7 accessions including 4 cultivars
- Accession from Florida was top performer
  - Very large (5'), upright, thick stems
  - LATE BLOOMER (Sept-Oct)
- *A. incarnata* 'Soulmate' and *A. incarnata* 'Cinderella'
- Mid-Atlantic form had a more shrubby habit

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Completed Trials

- *Solidago* (2021-2023)
- *Vernonia* (2020-2023)
- *Amsonia* (2013-2023)
- *Carex* (2018-2022)
- Wild Hydrangea (2017-2021)
- *Echinacea* (2018-2020, 2007-2009)
- *Helenium* (2017-2019)
- *Phlox* (2015-2017)
- *Monarda* (2014-2016)
- *Baptisia* (2012-2015)
- *Coreopsis* (2012-2014)
- *Heuchera* (2012-2014)
- Asters (2003-2005)

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Solidago for the Mid-Atlantic Region

- 70 *Solidago* accessions included
- Planted in September 2020, data was collected in 2021, 2022, and 2023
- looked for superior habit and form, pollinator preference, and disease resistance (rust, powdery mildew)

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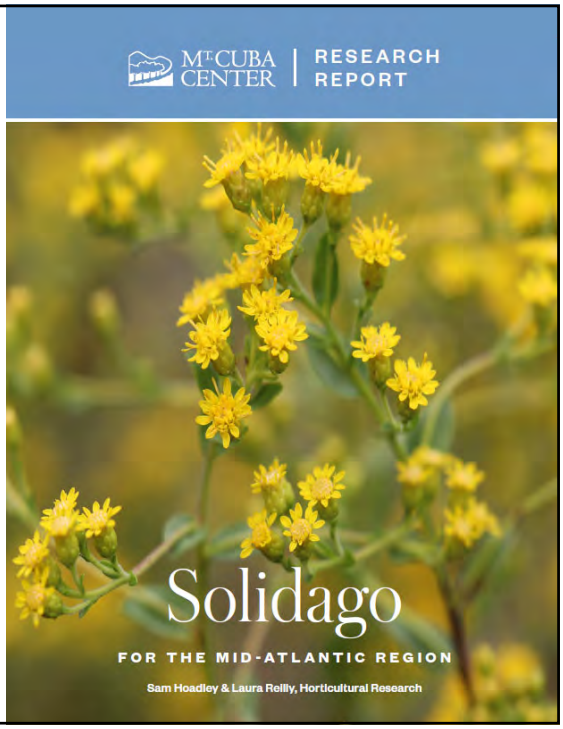

Solidago Pollinator Data

- Overall *Solidago* were heavily visited by a wide range of pollinators
- True bugs, beetles, flies, wasps, bees, and even a few small butterflies have been observed and counted over three seasons
- Bumblebees had a strong preference for a handful of these plants, bumblebee visitation was recorded separately in 2022 and 2023

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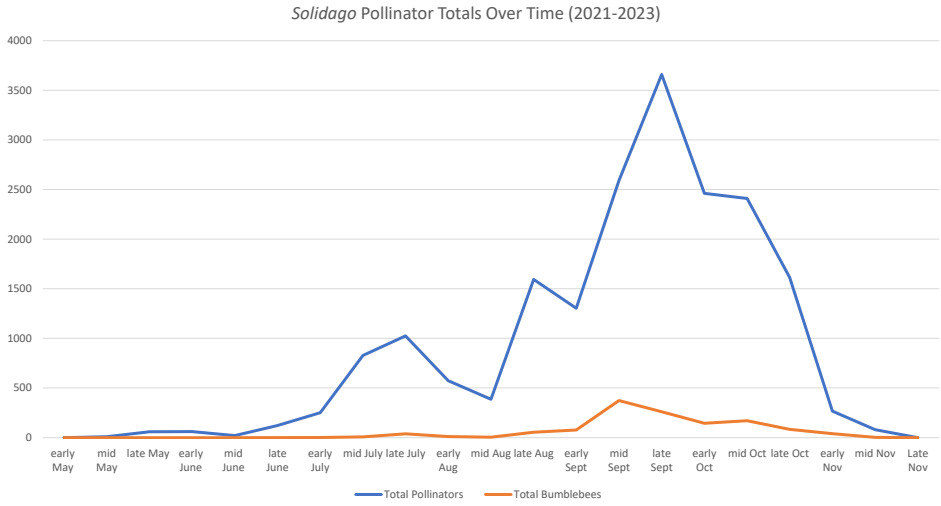

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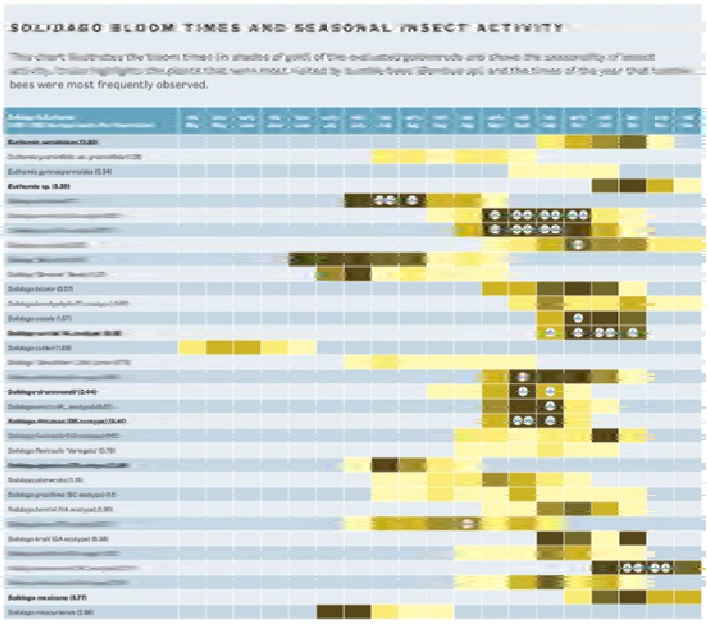

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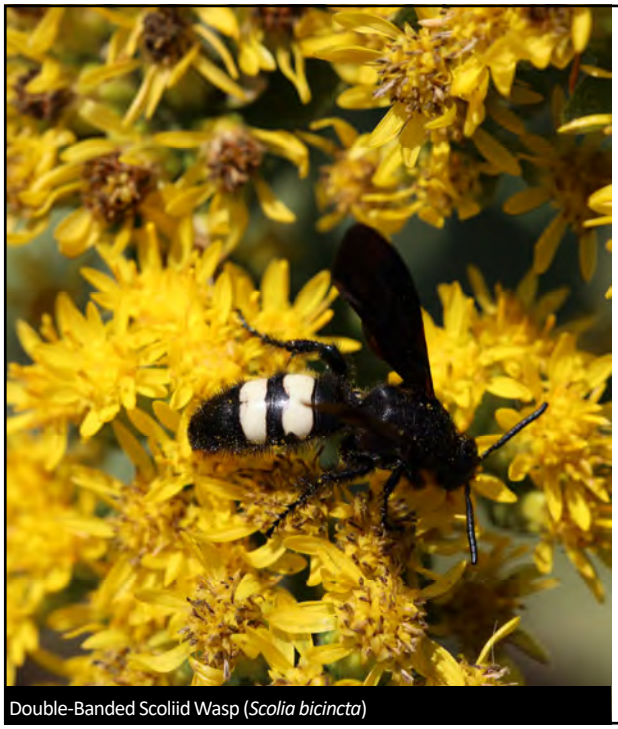
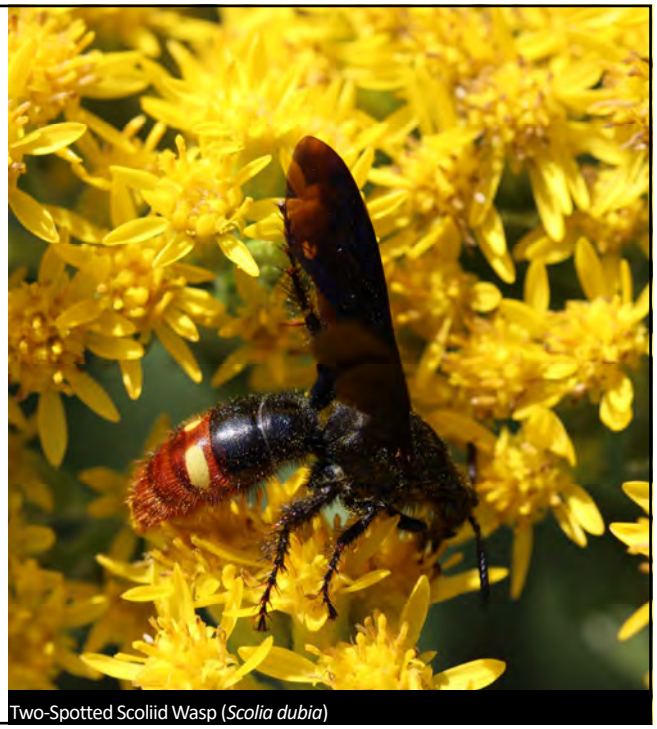


Double-Banded Scoliid Wasp (*Scolia bicincta*)



Two-Spotted Scoliid Wasp (*Scolia dubia*)

Potter Wasp (*Eumenes fraternus*)

Feather-Legged Fly (*Trichopoda pennipes*)


d-Banded Hairstreak (*Calycopsis cecrops*)


Yellow-Collared Scape Moth (*Cisseps fulvicollis*)


Locust Borer (*Megacyllene robinae*)

Brown Hooded Owlet Moth Caterpillar (*Cucullia asteroides*)

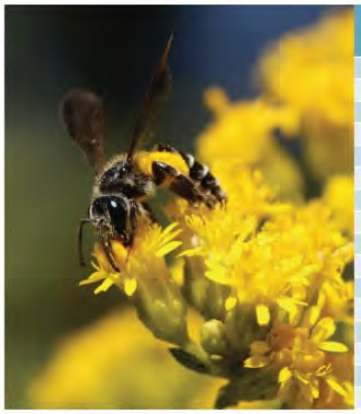
Hooded Owlet Moth Caterpillar (*Cucullia convexipennis*)


Ambush Bug (*Phymata* species)


Carolina Mantis (*Stagmomantis carolina*)

Ruby-Crowned Kinglet (*Regulus calendula*)

Magnolia Warbler (*Setophaga magnolia*)



Andrena nubecula, a goldenrod and aster specialist bee

Solidago & Euthamia	2021-23 Avg. Insects Recorded Per Observation
Solidago leavenworthii	12.37
Solidago riddellii	9.15
Solidago arguta	7.25
Solidago curtisii	**6.58**
Solidago 'Baby Gold'	6.51
Solidago kralii	6.38
Solidago erecta	6.35
Solidago arenicola	6.05
Solidago speciosa	6.05
Solidago mexicana	**5.77**
Solidago patula	5.75
Solidago discoidea	5.66
Solidago fistulosa	**5.41**
Euthamia sp.	5.39
Solidago rigida subsp. *humilis* 'Golden Rockets'	5.22
Solidago altissima	5.17

Plants in **bold** are top performers

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Solidago curtisii

(Curtis's goldenrod)

- 3.9/5, 6.58 insects per observation
- Woodland plant, similar to *S. caesia* but taller
- Material in the trial was originally collected in Alabama
- Lovely wiry charcoal grey stems
- Blooms in September and October
- *Rarely commercially available

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Solidago mexicana

(southern seaside goldenrod)

- 3.9/5, 5.77 insects per observation
- Similar to *Solidago sempervirens* but more resistant to rust
- Native to coastal marshes and dunes
- Interesting rubbery leaves, red stems
- Blooms late, October-early November
- *Commercially available (Naturescapes of Beaufort, SC)

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Solidago fistulosa

(pine barrens goldenrod)

- 4.6/5, 5.41 insects per observation
- Material in the trial originally collected in southern Delaware
- Excellent habit, disease resistance, floral display, and fall color
- Blooms in September and early October
- *Not commercially available

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Vernonia for the Mid-Atlantic Region

- 45 *Vernonia* accessions included
- Planted in October 2019, data was collected in 2021, 2022, and 2023
- looked for superior habit and form, pollinator preference, and disease resistance (rust)
- Report was published in January 2025

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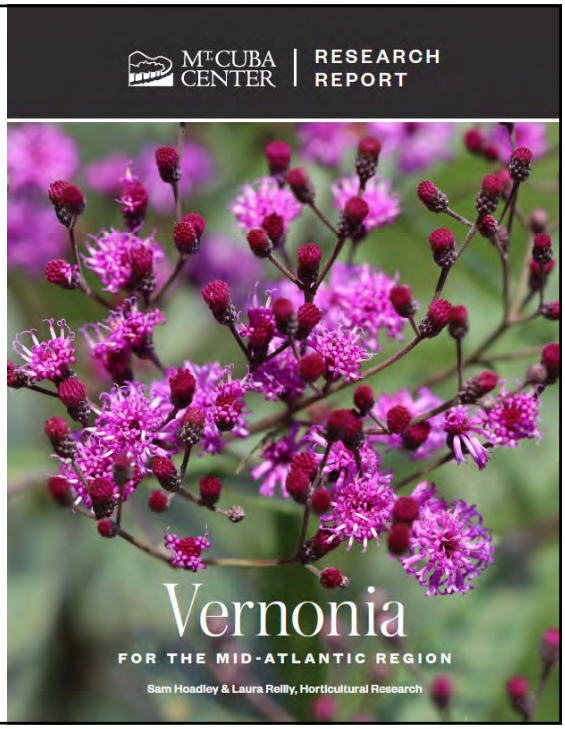

Vernonia Pollinator Data

- Large numbers of bees and skipper butterflies
- *Melissodes denticulatus*, a *Vernonia* specialist bee, was observed in the trial garden in 2021
- In addition to overall pollinator counts, this species of native bee was counted separately in 2022 and 2023

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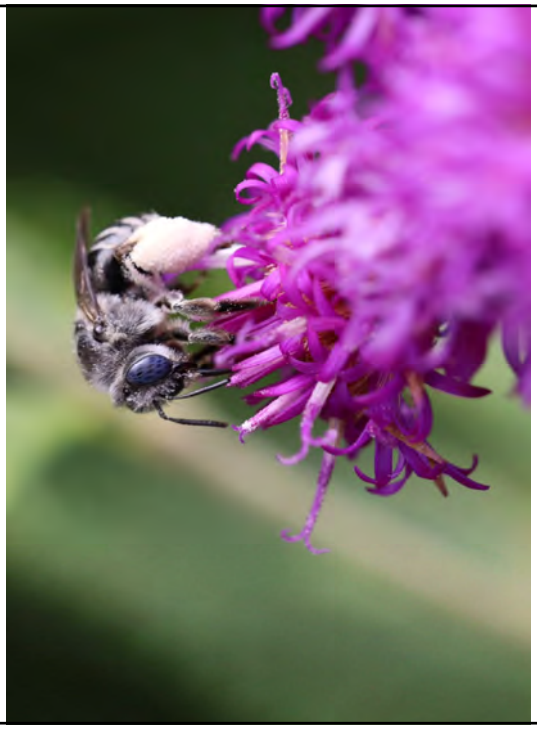
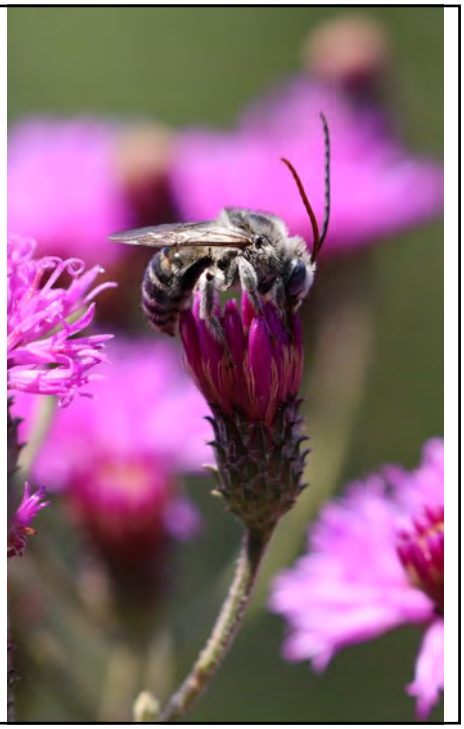
Melissodes denticulatus (denticulate longhorn bee)





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VERNONIA BLOOM TIMES AND POLLINATOR ACTIVITY

This chart illustrates the bloom times (in shades of purple) of the ironweeds in the trial and demonstrates the seasonality of pollinator activity. It also highlights the peak season of denticulate longhorn bee (*Melissodes denticulatus*) activity and features the plants that attracted the highest numbers of this specialist bee.

Vernonia	2021-23 Average Pollinators Per Observation	late June	early July	mid July	late July	early Aug	mid Aug	late Aug	early Sept	mid Sept	late Sept	early Oct	mid Oct	late Oct	early Nov	mid Nov
***Vernonia acaulis* (NC ecotype)**	**2.24**															
Vernonia acaulis (SC ecotype)	1.22															
Vernonia angustifolia (commercial source)	2.11															
***Vernonia angustifolia* 'Plum Peachy'**	**3.26**															
Vernonia arkansana (commercial source, A)	1.45															
Vernonia arkansana (commercial source, B)	1.81															
***Vernonia baldwinii* (AR ecotype)**	**4.10**															
Vernonia baldwinii (commercial source)	3.78															
Vernonia baldwinii (unknown ecotype, A)	3.65															
Vernonia baldwinii (unknown ecotype, B)	3.95															
Vernonia fasciculata (commercial source, A)	3.38															
Vernonia fasciculata (commercial source, B)	3.09															
Vernonia fasciculata (commercial source, C)	5.01															
Vernonia fasciculata (unknown ecotype)	3.06															
Vernonia flaccifolia (AL ecotype)	1.99															
***Vernonia gigantea* (AL ecotype, A)**	**3.27**															
***Vernonia gigantea* (AL ecotype, B)**	**4.94**															
***Vernonia gigantea* 'Jonesboro Giant'**	**4.23**															
Vernonia gigantea 'Purple Pillar'	2.67															
Vernonia glauca (AL ecotype)	1.11															
Vernonia glauca (commercial source)	0.44															
Vernonia glauca (unknown ecotype, A)	1.03															
Vernonia glauca (unknown ecotype, B)	1.87															
***Vernonia lettermannii* (AR ecotype)**	**1.44**															
Vernonia lettermannii (commercial source)	1.14															
***Vernonia lettermannii* 'Iron Butterfly'**	**2.86**															
Vernonia 'Mammuth'	0.79															
***Vernonia missurica* (AR ecotype)**	**2.86**															
Vernonia missurica (commercial source)	2.20															
Vernonia noveboracensis (commercial source)	3.53															
Vernonia noveboracensis (DE ecotype)	0.90															
Vernonia noveboracensis (NJ ecotype, A)	0.77															
Vernonia noveboracensis (NJ ecotype, B)	2.18															
Vernonia noveboracensis (NJ ecotype, C)	0.68															
Vernonia noveboracensis (NY ecotype)	0.36															
***Vernonia noveboracensis* (SC ecotype)**	**2.54**															
Vernonia noveboracensis 'White Lightning'	0.24															
***Vernonia* 'Summer's End'**	**1.22**															
***Vernonia* 'Summer's Surrender'**	**1.78**															
***Vernonia* 'Summer's Swan Song'**	**1.99**															

Plants in **bold** are top performers

Vernonia	2021–23 Avg. Pollinators Per Observation
Vernonia fasciculata (commercial source, C)	5.01
***Vernonia gigantea* (AL ecotype, B)**	**4.94**
***Vernonia gigantea* 'Jonesboro Giant'**	**4.23**
***Vernonia baldwinii* (AR ecotype)**	**4.10**
Vernonia baldwinii (unknown ecotype, B)	3.95
Vernonia baldwinii (commercial source)	3.78
Vernonia baldwinii (unknown ecotype, A)	3.65
Vernonia noveboracensis (commercial source)	3.53
Vernonia fasciculata (commercial source, A)	3.38
***Vernonia gigantea* (AL ecotype, A)**	**3.27**
***Vernonia angustifolia* 'Plum Peachy'**	**3.26**
Vernonia fasciculata (commercial source, B)	3.09
Vernonia fasciculata (unknown ecotype)	3.06

Plants in **bold** are top performers

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Vernonia gigantea

(giant ironweed)

- The largest species in the trial garden, ranges from 9-12’ in height with some cultivars reaching 15’ in the trials
- Sturdy pubescent stems and large lance shaped leaves have exceptional disease resistance.
- Late blooming with some starting in late August while others continue through October
- Widespread range in the eastern and central US in average soils to wet locations

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Vernonia gigantea 'Jonesboro Giant'

(Jonesboro Giant giant ironweed)

- Incredible selection of the species from Jonesboro Arkansas
- The largest herbaceous perennial we have ever evaluated, stems maxed out at 15.5' in height in 2022
- Minor issues with Japanese beetle damage in the trials but otherwise pest and disease free

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Vernonia baldwinii (AR)

(western ironweed)

- 4.0/5
- Tall species, specimens range from 6’ to nearly 9’ in height
- Broad pubescent foliage is somewhat variable amongst the various accessions
- Blooms in August into September, protruding phyllaries are diagnostic
- Native to the central US, can grow and thrive in much drier conditions than most of the taller ironweed species

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Vernonia angustifolia ‘Plum Peachy’

(Plum Peachy tall ironweed)

- Selection found by Plant Delights in Turner Co. Georgia
- Medium sized ironweed (4.5-5.5) with fine textured foliage and a mounding habit
- Wine colored flush in the stems and foliage
- Excellent floral display peaks in September, attracts large numbers of pollinators, particularly skipper butterflies

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Amsonia

- Over 10 years from 2013-2023, 20 different *Amsonia* were evaluated in full sun to part-shade
- This trial primarily focused on the ornamental qualities of the bluestars although pollinator observations took place in 2023

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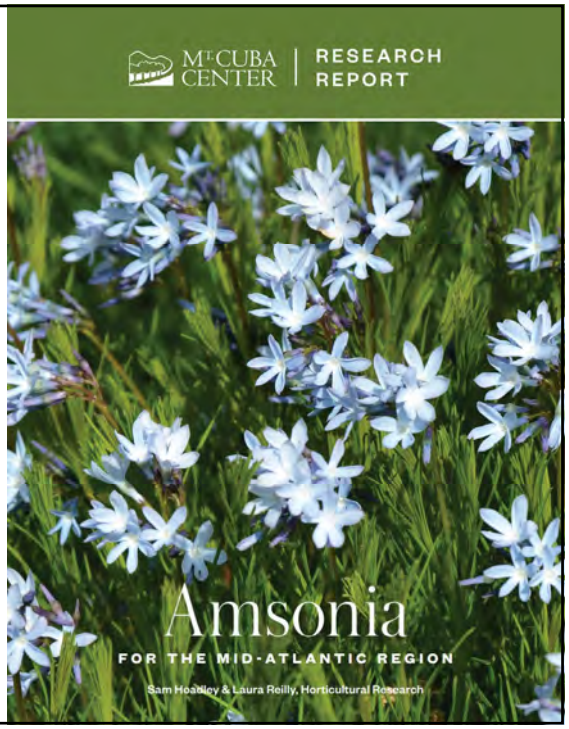

Wildlife Value

- Pollinator activity observed in spring of 2023
- Relatively few insects observed, bumblebee activity increased in late May through June
- Snowberry clearwing moths and their caterpillars observed

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Amsonia 'Blue Ice'

(Blue Ice bluestar)

- Widely available bluestar first found at a nursery in CT, originally sold as WFF Select
- Often advertised as a hybrid and at times has been sold as a native selection of *Amsonia tabernaemontana*
- Unusual rhizomatous habit, late blooming, very limited pollinator activity
- Very likely a selection of the non-native *Amsonia orientalis*

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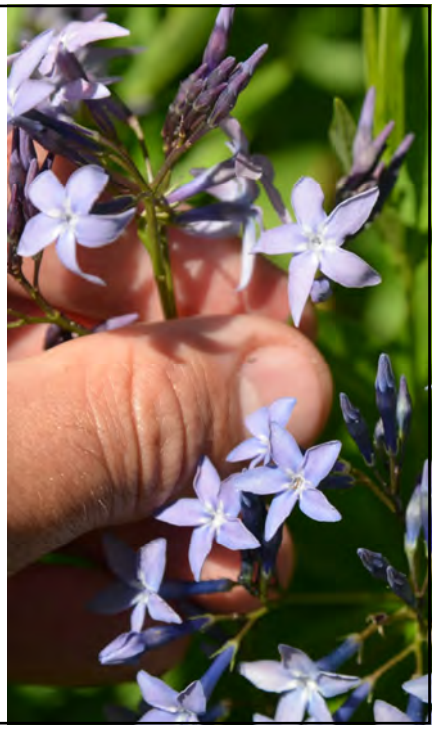

Carex

- 70 different *Carex* species and cultivars were evaluated in both sun and shade
- Evaluations took place from 2018-2021 (4-year trial with three years of data collected) and in 2022 we evaluated the various species and cultivars tolerance to frequent mowing

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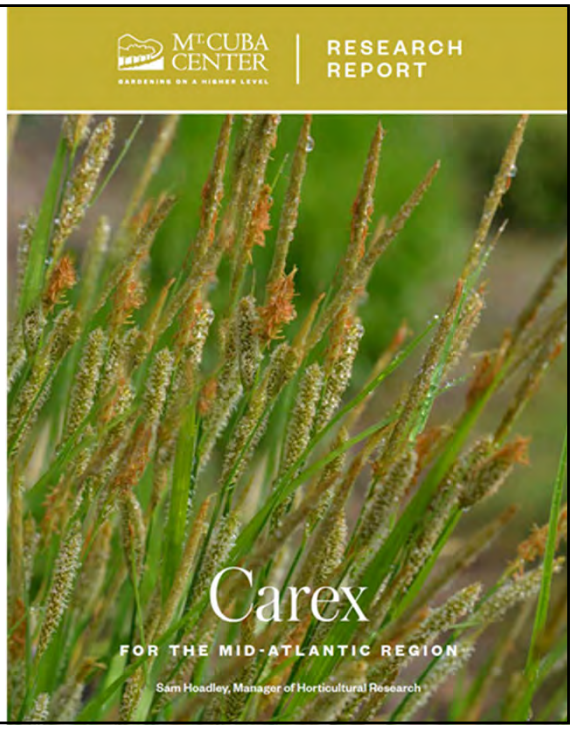

Carex Ecological Value: Host Plants & Habitat

- Most *Carex* are wind pollinated
- *Carex* are host plants for a variety of caterpillars including some species of skippers amongst others
- *Carex* seeds are an important food source for birds, mammals, and insects
- *Carex* themselves provide valuable habitat for a variety of wildlife, we have observed numerous species arthropods, mollusks, and amphibians in the trial garden

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Carex Ecological Value: Habitat

- Some *Carex* wildlife interactions will not be observed in the home garden but are of critical importance
- *Carex stricta* and the endangered bog turtle

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Carex Ecological Value: Pollinators

- *Carex fraseriana* (*fraseri*), formerly *Cymophyllus*
- Recently lumped back into Carex, several striking specimens on the path from the old visitor lot and the Copeland house
- Coarse texture, very wide and truly evergreen leaves
- Beautiful white flowers are pollinated by insects

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Wild Hydrangea

- 29 accessions including 25 cultivars and 3 species
- Trial was conducted for five years from 2017-2021
- The goals were to evaluate commercially available *Hydrangea arborescens* for horticultural value, and to test for adaptability to full sun
- Record insect preference between mophead and lacecap flower types

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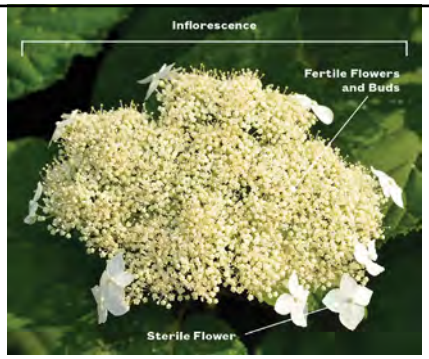
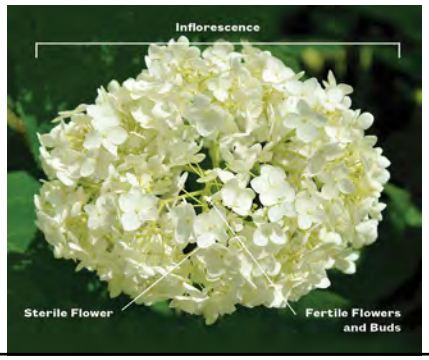
Mopheads vs. Lacecaps

- Lacecaps are more typical of wild type plants with far more fertile flowers than sterile flowers
- Mopheads, or "double flower forms", are plants that produce inflorescences with more sterile flowers than usual, natural mutations have been found in the wild





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Pollinator Data

- Pollinator Watch team from 2019 and 2021 shows a strong preference for lacecaps by pollinators
- This data was corroborated by a study conducted at Mt. Cuba by Dr. Delaney and the University of Delaware Dare to Bee Research Team

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Hydrangea arborescens ‘Haas’ Halo’

(Haas’ Halo wild hydrangea)

- Selected by Frederick Ray, formerly of DelVal University, from seedlings given to him by Joan Haas
- My favorite hydrangea in the trial, robust and oversized lacecap flower heads
- Swarmed by insects in June and July
- Reached 7’ in height, coppiced plants more compact

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Echinacea

- 75 accessions including 70 cultivars and 5 species
- Trial was conducted from 2018-2020
- The goals were to evaluate commercially available *Echinacea* for longevity and ornamental value as well as determine which species and cultivars had the most potential to support bees, wasps, and butterflies
- Included previous top performers from the 2007-2009 trial

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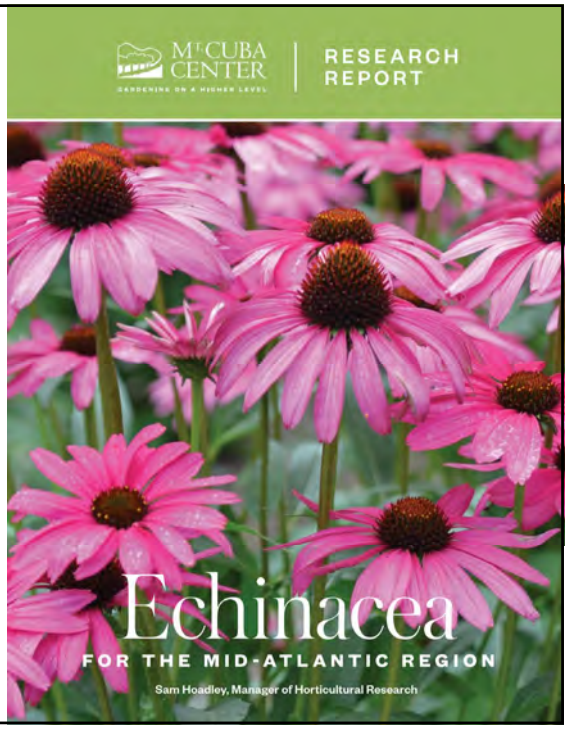
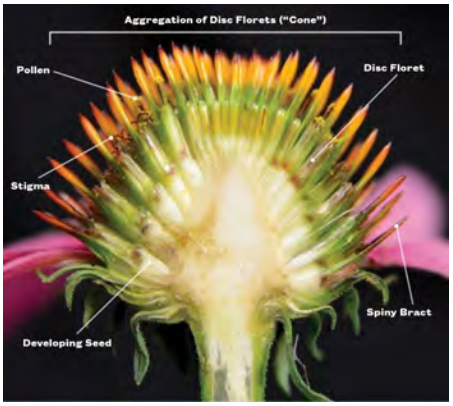


Pollinator preferred *Echinacea*, single versus double flowers



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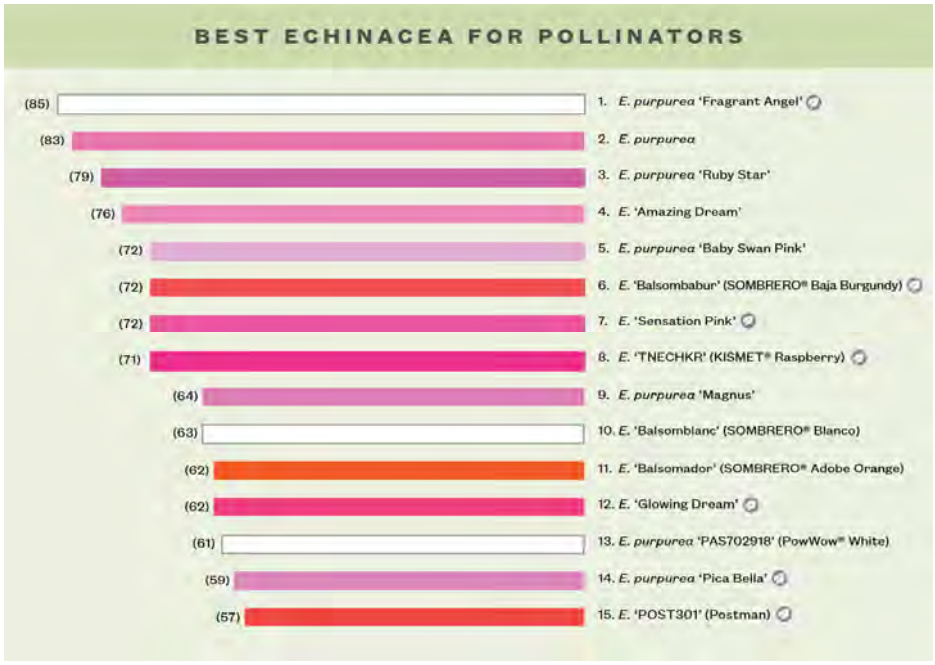

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E. purpurea 'Pica Bella'

(Pica Bella purple coneflower)

- The top performing *Echinacea* in our latest trial and tied for first in our original trial of the genus
- More compact selection of the species, vigorous and uniform
- Ranked in the top 15 cultivars for pollinator attraction

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Phlox

- 94 accessions including 86 cultivars and 8 species
- Trial was conducted from 2015-2017
- The goals were to evaluate commercially available *Phlox* and underrepresented species for ornamental value, powdery mildew resistance, and to determine which species and cultivars had the most potential to support butterflies

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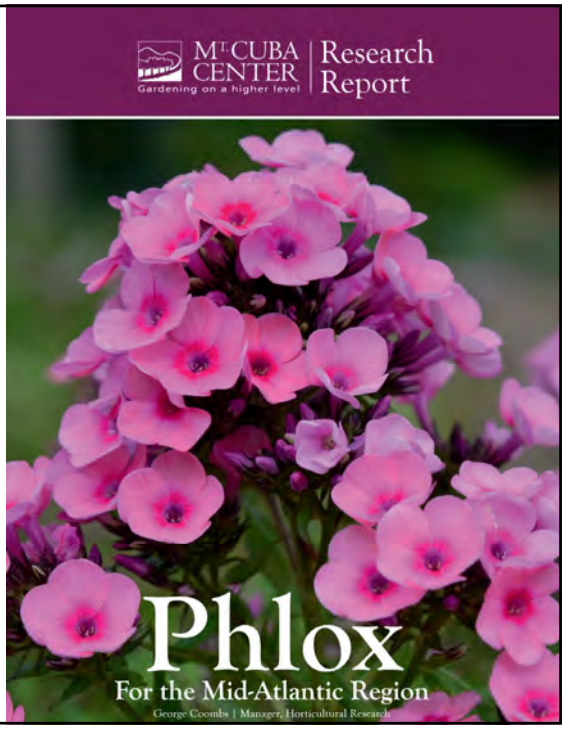

Butterfly preferred *Phlox*

Eastern Comma butterfly

American Lady butterfly

Best Phlox for Butteflies

(539)	1. *P. paniculata* 'Jeana'
(117)	2. *P. paniculata* 'Lavelle'
(116)	3. *P. paniculata* 'John Fanick'
(105)	4. *P. × arrendsii* 'Babyface'
(71)	5. *P. paniculata* 'Speed Limit 45'
(61)	6. *P. paniculata* 'Dick Weaver'
(60)	7. *P. paniculata* 'Blushing Shortwood'
(58)	8. *P. paniculata* 'Tracy's Treasure'
(56)	9. *P. paniculata* 'Thai Pink Jade'
(55)	10. *P. paniculata* 'David's Lavender'
(50)	11. *P. paniculata* 'Robert Poore'
(48)	12. *P. paniculata* 'LSS Vincent'
(45)	13. *P. paniculata* 'Shortwood'
(43)	14. *P. paniculata* 'Party Punch'
(43)	15. *P. paniculata* 'Delta Snow'

This chart shows the 15 cultivars most frequently visited by butterflies in Mt. Cuba Center's trial from 2016-2017. The number on the left indicates the total number of butterfly visits per plant observed over that two-year period. *P. paniculata* 'Jeana' averaged 539 visits per plant over a two-year period.

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Phlox paniculata 'Jeana'

(Jeana garden phlox)

- Best performing *Phlox* in our trial
- Not only a horticultural standout but it was by far the most preferred *Phlox* by butterflies
- Natural occurring variation of the species found in Tennessee with small but numerous flowers
- Extremely resistant to powdery mildew

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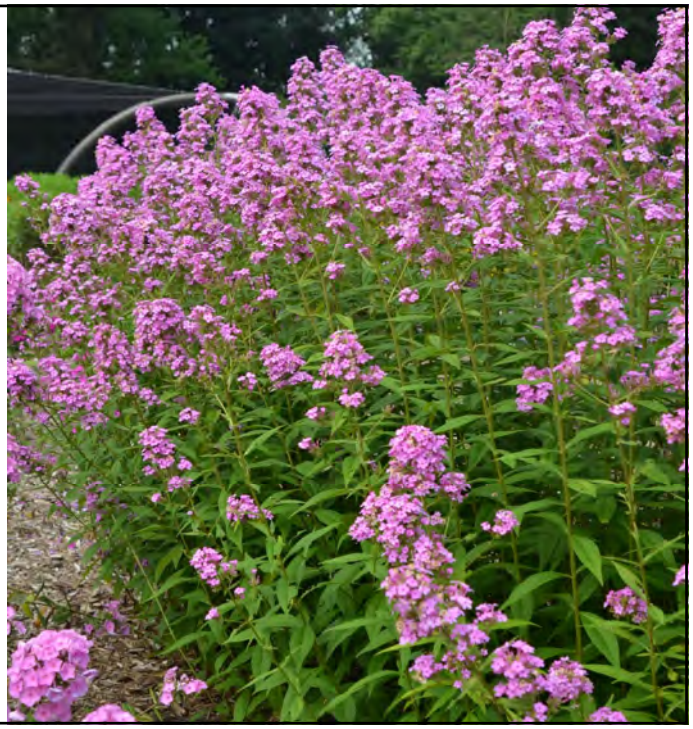

Monarda

- 40 accessions including 34 cultivars and 6 species
- Trial was conducted from 2014-2016
- The goals were to evaluate commercially available *Monarda* and underrepresented species for ornamental value, powdery mildew resistance, as to determine which species and cultivars had the most potential to support butterflies, moths, and hummingbirds

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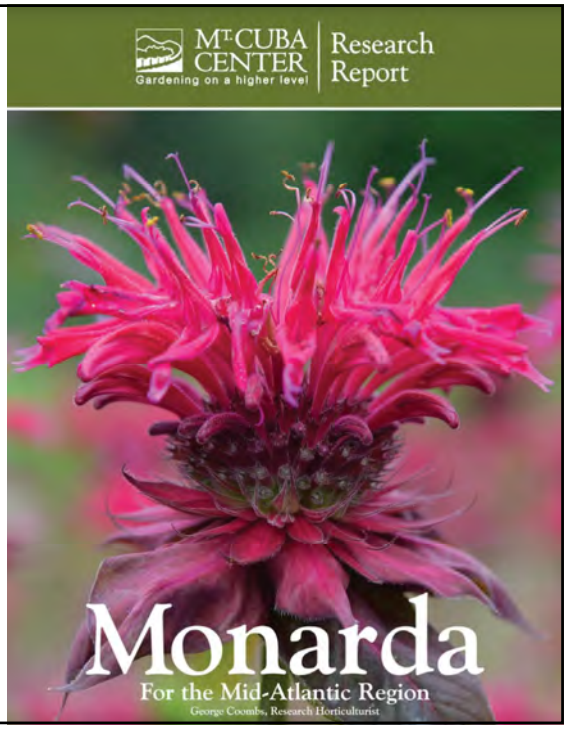

Pollinator preferred *Monarda*

Hummingbird

1. *M. didyma* 'Jacob Cline' (273)
2. *M.* 'Gardenview Scarlet' (39)
3. *M.* 'Cambridge Scarlet' (31)
4. *M. didyma* (22)
5. *M.* 'Raspberry Wine' (22)

Moth/Butterfly

1. *M. fistulosa* 'Claire Grace' (138)
2. *M.* 'On Parade' (116)
3. *M.* 'Violet Queen' (101)
4. *M.* 'Peter's Purple' (67)
5. *M.* 'Colrain Red' (61)

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M. didyma 'Jacob Cline'

(Jacob Cline scarlet bee balm)

- The best Monarda for attracting hummingbirds
- Just missed the horticultural top-performer list
- Monarda 'Gardenview Scarlet' is a good top performer alternative
- Susceptible to powdery mildew, plant in an area with excellent air circulation

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M. fistulosa ‘Claire Grace’

(Claire Crace wild bergamot)

- Best performing *Monarda* in our trial
- Not only a horticultural standout but it was by far the most preferred *Monarda* by butterflies and moths
- Compared to the species it has a sturdier habit, darker flowers, and cleaner foliage
- Introduced by Barb and Michael Bridges, owners of the now closed Southern Perennials and Herbs

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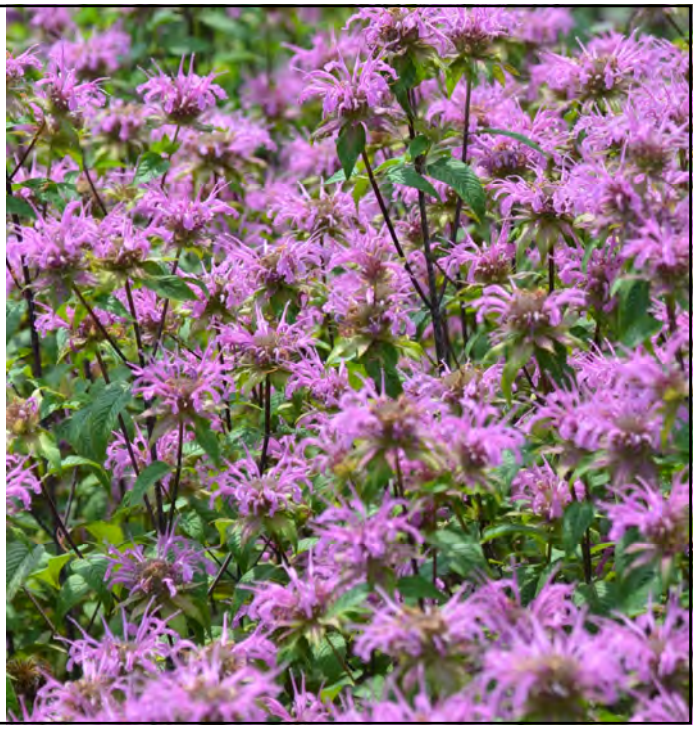

Thank you

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