



Mt. CUBA
CENTER

RESEARCH
REPORT



Vernonia

FOR THE MID-ATLANTIC REGION

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Variegated fritillary (*Euptoieta claudia*) visiting *Vernonia gigantea*



Vernonia trial in August

VERNONIA is a diverse genus of plants in the aster family (Asteraceae) with a name that honors William Vernon, an English botanist active in the mid-Atlantic region of the United States in the late 17th century. *Vernonia* are known by the common name ironweed, which may refer to their tough, almost woody stems, the general hardiness of the genus, or perhaps the rusty color of their maturing seed heads. While examples of *Vernonia* can be found on almost every continent, this trial focused on *Vernonia* species native to the eastern United States.

The ironweed species found in the mid-Atlantic region are medium to tall herbaceous perennials that produce purple flowers in summer and fall, and are often found in moist meadows, seeps, and roadside ditches. The substantial size and cultural preferences of these locally native species may make their incorporation into cultivated settings a challenge. However, a handful of *Vernonia* species from the wider Eastern Temperate Forest ecoregion offer some excellent options for smaller garden spaces and drier soil conditions.

Ironweeds are hubs of ecological activity and can boost the garden's capacity to provide pollen and nectar to late season pollinators, to host caterpillars and other insects, and to feed winter birds with their seeds. *Vernonia* are also considered to be exceptionally resistant to browsing by mammals, making them an attractive and practical option for gardeners who live in areas with high deer pressure.

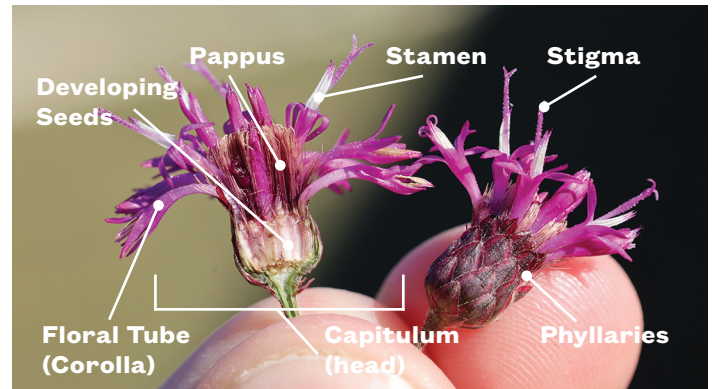
This trial evaluated 45 different *Vernonia* species and cultivars in full sun over a four-year period from 2020-2023 and focused on their ornamental and ecological value. Fungal diseases including rust and powdery mildew were common in this trial, although some *Vernonia* remained virtually free of infection. The *Vernonia* trial was grown in "average" garden soil best described as clay-loam with a pH near 6.5. Throughout the trial, plants were given minimal care. Supplemental water was provided only during the first year after planting to encourage establishment. Mt. Cuba Center is located near Wilmington, Delaware and is within USDA hardiness zone 7a.

VERNONIA FLOWERS

Ironweeds produce purple or magenta flowers from midsummer to fall depending on the species or cultivar. The phenology chart on pages 16–17 shows the bloom period for the plants in the trial. Although the flowers of many aster family members are composed of both petal-like ray florets and central disc florets, *Vernonia* flower heads contain only disc florets. These florets produce nectar and pollen and contain the reproductive parts of the flower, a floral tube (corolla), and a modified calyx known as the pappus. Flower heads, also called capitula, cluster to form a capitulescence (inflorescence composed of capitula) at the ends of *Vernonia* stems. The number of disc florets per capitulum, the color and length of the pappus, details of the scale-like phyllaries at the base of the capitulum, and bloom time can be useful diagnostic features when identifying *Vernonia* in the field or garden.



Capitulescence of *Vernonia gigantea*



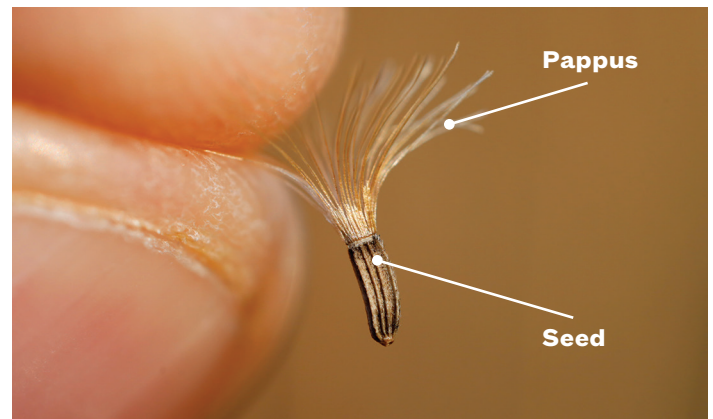
Cross section of *Vernonia missurica* capitulum

VERNONIA SEEDS

Vernonia fruits, technically classified as cypselsae, develop a single seed in fall, and are disseminated via wind thanks to their feathery pappus. Depending on the species of ironweed, the pappus can be white, copper or even purple and adds beauty to the late fall and early winter landscape. In addition to their ornamental value, ironweed seeds are relished by birds such as sparrows, finches, and juncos. Growing *Vernonia* from seed is straightforward and requires a simple cool moist stratification period of approximately 60 days to overcome dormancy. This stratification can be done artificially in a refrigerator, or by direct sowing of seeds into a garden bed in late fall where they will be exposed to natural temperature fluctuations over the winter months. After the seeds have been stratified, they will readily germinate, and the resulting seedlings typically bloom in their second growing season. If multiple species of *Vernonia* are grown in close proximity, hybrids are likely to occur, potentially leading to interesting and unusual plants. However, these hybrids may be undesirable for those that are looking to cultivate a landscape with only wild-type plants.



Seed heads of *Vernonia acaulis*



Vernonia glauca seed

VERNONIA FOLIAGE AND HABIT

The *Vernonia* evaluated in this trial are clump-forming herbaceous perennials that emerge from their winter dormancy in late April through May. Ironweeds can be slow to appear in spring, but they make up for this delayed start with rapid summer growth. Some species achieve truly monumental size by late summer while others are considerably more compact. A large portion of the ironweed species in the trial have a tall vase-shaped habit with slightly arching stems and broad lance-shaped leaves. Many of these taller plants prefer moist to wet soils. In contrast, several species and cultivars in the trial have shorter, mounding habits and fine, sometimes threadlike, foliage. These smaller ironweeds are well suited to gardens and landscapes with limited space and are often more tolerant of average to dry soil conditions. One species, *Vernonia acaulis*, has a distinctive habit. It produces basal rosettes of large spoon-shaped leaves which give rise to short, slender flowering stems and airy inflorescences.



Tall vase-shaped habit of *Vernonia flaccidifolia*



Mounding habit of *Vernonia lettermanii*



Basal rosette of *Vernonia acaulis*

GARDEN CARE

Ironweeds require minimal yearly maintenance aside from a late winter or early spring cutback of the previous year's dead stems. The stems of some species, such as *Vernonia lettermannii*, can persist for more than a year and provide habitats for cavity-nesting bees when left at a length of 8-24 inches. Many perennials tolerate a late spring cutback of growing stems to reduce the ultimate size of the plant and improve their habit, a technique often referred to as the Chelsea Chop, named for the Chelsea Flower Show held in late May. To test the response of *Vernonia* to hard spring pruning, one plant of each type was reduced by half in early June. The Chelsea Chop was most effective with lower-growing plants with fine foliage such as *V. lettermannii* which, when unpruned, have a tendency to flop and develop open centers by late summer. Large upright species and cultivars, especially those with thick stems such as *Vernonia gigantea*, did push new growth and develop a denser branching structure after the cutback. However, the union of the new stems with the old stems proved to be weak and prone to breaks making them poor candidates for the Chelsea Chop. All pruned plants showed a delay in bloom time by a few days to a few weeks. Transplantation and division of *Vernonia* is best done in either spring or fall. The crowns and thick fleshy roots can be lifted and moved or split into smaller divisions.



Cutting back *Vernonia* 'Summer's End' in early June



Vernonia lettermanii 'Iron Butterfly' control plants (left) and cutback plant (right) in mid September



Seed heads of *Vernonia angustifolia* 'Plum Peachy' in November

THE VERNONIA TRIAL

Mt. Cuba Center's *Vernonia* trial examined the ornamental and ecological value of 45 different examples of ironweed. This evaluation included an assembly of species and cultivars purchased from commercial sources and ironweeds that were grown from wild-collected seed. The seed-grown plants included commonly cultivated species and several ironweeds that are rarely seen in a horticultural setting including *Vernonia acaulis*, *Vernonia flaccidifolia*, and *Vernonia texana*.

The *Vernonia* were planted in October of 2019 and were allowed to establish in 2020. Horticultural and pollinator data were collected from 2021 through 2023. Each week in spring, summer, and fall, the *Vernonia* were rated on a scale of 1–5 (1 being poor and 5 being excellent) for the overall plant (foliage, form, vigor, habit), floral display, and disease resistance. Yearly scores were determined from weighted averages composed of 50% overall plant score, 25% floral score, and 25% disease resistance score. Final scores represent the average of the three yearly scores.

The top performers featured on the following pages represent the plants that received a three-year average score of a 4.0 or higher. The highest performing plant received a score of 4.5. Top performers account for 13 of the 45 *Vernonia* types planted in 2019.



ADDITIONAL RESOURCES

In addition to the data table on page 19 of this report describing the 45 trialed *Vernonia*, Mt. Cuba's website features a description and additional photos of all plants that completed at least one year of the evaluation. For plants that did not perform well in the conditions of the Trial Garden, suggestions are provided as to how they could be utilized with greater success. The website also includes a downloadable spreadsheet that can generate lists of *Vernonia* based on aesthetic qualities, potential pollinator value, and preferred growing conditions. These resources can be accessed via the QR code or at mtcubacenter.org/vernonia.

***Vernonia angustifolia* ‘Plum Peachy’ – Plum Peachy tall ironweed**

Rating	Height Range	Habit	Foliage Texture	Floral Display	Avg. Pollinators Per Observation
4.5	4.5' – 5.5'	mounding	fine	excellent	3.26

Vernonia angustifolia ‘Plum Peachy’ is an incredible selection of the species found on a grit outcrop in Turner County, Georgia by Plant Delights Nursery. Despite the well-drained habitat in which Plum Peachy tall ironweed originated, this selection performed well in the average garden soil of the Trial Garden. Plum Peachy tall ironweed develops a uniform mounding habit with graceful fine-textured foliage that has the added ornamental bonus of a wine-colored blush in the stems and leaves. The spectacular floral display of *V. angustifolia* ‘Plum Peachy’ peaks in September with clouds of magenta flowers that are favored by bees and skipper butterflies. The ornamental value of this plant continues into fall and early winter thanks to its spectacular seed heads crowned by a purple-infused pappus that glows in the morning and evening sunlight.



***Vernonia gigantea* (AL ecotypes A & B) – giant ironweed**

<i>Vernonia</i>	Rating	Height Range	Habit	Foliage Texture	Floral Display	Avg. Pollinators Per Observation
<i>Vernonia gigantea</i> (AL ecotype, A)	4.2	9.5' – 12'	upright vase	medium	good – excellent	3.27
<i>Vernonia gigantea</i> (AL ecotype, B)	4.4	9.5' – 10.5'	upright vase	medium	excellent	4.94

Four forms of the aptly named giant ironweed were included in the *Vernonia* trial. Three were determined to be top performers, including two examples of seed-grown plants from Alabama described here, and *Vernonia gigantea* ‘Jonesboro Giant’, which is discussed on page 11. *Vernonia gigantea* proved to be exceptionally adaptable to the average garden soils in the Trial Garden, displaying tall upright stems and clean disease-resistant foliage. The *V. gigantea* ecotypes from Alabama were among the last ironweeds to bloom, starting in late September and continuing through October and occasionally into early November. Approaching 12 feet in height, the towering inflorescences attracted some of the highest numbers of pollinators in the trial. Monarch butterflies were frequently observed on giant ironweed, and the peak bloom time of this species aligned with the southern migration of monarchs to the Sierra Madre mountains in Mexico. While the imposing stature of this species might rule out its use in smaller landscapes, *V. gigantea* is worthy of consideration where space allows.



***Vernonia* ‘Summer’s Swan Song’ – Summer’s Swan Song hybrid ironweed**

Rating	Height Range	Habit	Foliage Texture	Floral Display	Avg. Pollinators Per Observation
4.3	3.5'	mounding	fine	excellent	1.99



Vernonia ‘Summer’s Swan Song’ is a stellar hybrid selected by Jim Ault at Chicago Botanic Garden. This cross of *Vernonia lettermannii* and *Vernonia angustifolia* ‘Plum Peachy’ inherits the best traits of the parents, including the delicate thread-like foliage of *V. lettermannii* and the purple-flushed stems and leaves of Plum Peachy tall ironweed. Summer’s Swan Song hybrid ironweed maintains a compact habit and mounding form that offers a beautiful and adaptable option for gardeners with limited space. In addition to its many ornamental qualities, this hybrid proved to be more than just a pretty plant. Like its parent, *V. angustifolia* ‘Plum Peachy,’ *V.* ‘Summer’s Swan Song’ attracted many pollinators in September, at the end of its bloom period. The trial included two additional hybrids from Jim Ault and, while all three are top performers, Summer’s Swan Song hybrid ironweed was the most reliable and floriferous of the group.

***Vernonia missurica* (AR ecotype) – Missouri ironweed**

Rating	Height Range	Habit	Foliage Texture	Floral Display	Avg. Pollinators Per Observation
4.1	8' – 9.5'	upright vase	medium	good	2.86



In the wild, *Vernonia missurica* is found in the central United States where it occurs in habitats with both wet and dry soils, suggesting it would be adaptable to a variety of cultivated settings. Missouri ironweed is identified by its tall upright stems which, along with the undersides of its leaves, have a dense covering of whitish hairs. Two examples of this species were included in the trial, one wild-collected in Arkansas and the other commercially sourced, but only the wild form of this species scored high enough to be a top performer. The Arkansas ecotype was similar in appearance to the commercially sourced *V. missurica* but performed better due to sturdier stems and greater disease resistance. This wild-sourced plant also bloomed slightly later into the fall and attracted large numbers of bees and various species of butterflies, including monarchs.

***Vernonia* ‘Summer’s Surrender’ – Summer’s Surrender hybrid ironweed**

Rating	Height Range	Habit	Foliage Texture	Floral Display	Avg. Pollinators Per Observation
4.1	4.5' – 5'	mounding	fine	good	1.78

Vernonia ‘Summer’s Surrender’ is one of several outstanding introductions from Jim Ault’s breeding programs at Chicago Botanic Garden. The genetics from one parent, *Vernonia lettermanii*, conferred excellent disease resistance, an attractive mounding habit, and fine-textured foliage. This foliage is slightly broader than the other Chicago Botanic hybrids, likely from the influence of the other parent, *Vernonia arkansana*. Summer’s Surrender hybrid ironweed produces a profusion of purple blossoms in August although its display was less prolific and shorter-lived than *Vernonia* ‘Summer’s Swan Song’. Of the three hybrids that we evaluated, Summer’s Surrender hybrid ironweed was marginally taller and more upright than the others but still maintained a relatively low mounding habit, making it a viable option for smaller garden spaces.



***Vernonia acaulis* (NC ecotype) – stemless ironweed**

Rating	Height Range	Habit	Foliage Texture	Floral Display	Avg. Pollinators Per Observation
4.1	3.5' – 4'	low airy	coarse	excellent	2.24

Vernonia acaulis is the most unique *Vernonia* species in the trial. The other ironweeds in the evaluation develop upright stems of varying heights capped with clusters of flowers. However, *V. acaulis* begins its growing season with a tidy basal rosette of broad rounded leaves that hug the soil surface. The vegetative phase of this species is followed in late July through September by slender 3.5' stems bearing airy purple-pink inflorescences. This long-blooming species proved to be quite adaptable to the average soils in the Trial Garden and based on its natural habitat in the southeastern United States, it would likely tolerate much drier conditions. While this species has been difficult to commercially source, it is a small yet charismatic plant that would be an asset in almost any garden.



Photo: Paul Wilson

***Vernonia lettermannii* ‘Iron Butterfly’ – Iron Butterfly narrowleaf ironweed**

Rating	Height Range	Habit	Foliage Texture	Floral Display	Avg. Pollinators Per Observation
4.1	2.5' - 3'	mounding	fine	good	2.86



Vernonia lettermannii ‘Iron Butterfly’ began its journey to horticultural fame as a seedling in Allan Armitage’s trials at the University of Georgia before being sent along with some of its siblings to North Creek Nursery for further evaluation. One plant of the group stood out to North Creek’s owner, Steve Castorani, who named it Iron Butterfly as a nod to its tough and adaptable nature, its ability to attract pollinators, and to the American rock band. Compared to the wild form of *Vernonia lettermannii* in the trial, Iron Butterfly narrowleaf ironweed has a more compact habit and is more floriferous. Perhaps the most exceptional quality of this selection is its finely textured emerald foliage that remains virtually untouched by disease throughout the entire growing season. Iron Butterfly narrowleaf ironweed did develop an open splaying habit by late summer that could be easily improved if grown in drier soils or by cutting it back in late May or early June. Pollinators flocked to the small but abundant flower heads of this selection in August and September.

***Vernonia lettermannii* (AR ecotype) – narrowleaf ironweed**

Rating	Height Range	Habit	Foliage Texture	Floral Display	Avg. Pollinators Per Observation
4.1	3.5' - 4'	mounding	fine	good	1.44



Vernonia lettermannii is an uncommon plant in the wild where it can be found in rocky riparian habitats in the Ozarks, sometimes growing alongside *Amsonia hubrichtii* (Hubricht’s bluestar). In its native haunts, narrowleaf ironweed is adapted to conditions that can be dry but occasionally flood, which may explain this species’ adaptability to the average garden soils in the Trial Garden. Two examples of this species were evaluated, one commercially sourced and the other collected from Arkansas. The wild-sourced example is slightly taller and has a more open habit than the cultivar, *Vernonia lettermannii* ‘Iron Butterfly’, but has the same beautiful disease-resistant feathery foliage and accordingly scored very well. This plant was not as floriferous as Iron Butterfly narrowleaf ironweed but still attracted many insect pollinators. The commercially purchased example of the species displayed possible hybrid characteristics and proved to be extremely susceptible to rust, which dramatically decreased its garden performance and its ability to attract pollinators.

***Vernonia gigantea* ‘Jonesboro Giant’ – Jonesboro Giant giant ironweed**

Rating	Height Range	Habit	Foliage Texture	Floral Display	Avg. Pollinators Per Observation
4.0	12.5' - 15'	upright vase	medium	good	4.23

Vernonia gigantea ‘Jonesboro Giant’ was selected by Plant Delights Nursery in 2000 in Jonesboro, Arkansas because of its exceptionally sturdy habit. Like other examples of giant ironweed, this selection grows with an upright vase-shaped form and has proven to be tough, adaptable, and disease resistant in typical garden conditions. As the common name suggests, giant ironweeds are large plants, but *V. gigantea* ‘Jonesboro Giant’ dwarfs even the tallest of its wild-type counterparts in the trial. This perennial skyrocketed to an astounding height of 15.5' in late summer of 2022. Given its impressive size, this selection remained upright for most of the evaluation despite several severe summer storms. In late September into October, *V. gigantea* ‘Jonesboro Giant’ is topped with large inflorescences that were admired by gardeners and frequented by late-season insect pollinators and ruby-throated hummingbirds. For those gardens that can accommodate a plant of this size, *V. gigantea* ‘Jonesboro Giant’ makes a statement that will stop visitors in their tracks.



***Vernonia* ‘Summer’s End’ – Summer’s End hybrid ironweed**

Rating	Height Range	Habit	Foliage Texture	Floral Display	Avg. Pollinators Per Observation
4.0	4' - 4.5'	mounding	fine	good	1.22

Vernonia ‘Summer’s End’ is a fine-textured and low-growing product of Jim Ault’s breeding program at Chicago Botanic Garden. This hybrid of *Vernonia lettermannii* ‘Iron Butterfly’ and the Texas native *Vernonia larseniae* falls in between the shorter *Vernonia* ‘Summer’s Swan Song’ and taller *Vernonia* ‘Summer’s Surrender’ in height and bears a superficial resemblance to both. Like *V. ‘Summer’s Surrender,’* Summer’s End hybrid ironweed produces green stems and leaves that lack the red to purple flush of color displayed in *V. ‘Summer’s Swan Song.’* While the floral show of Summer’s End hybrid ironweed was impressive in September, the bloom time was the shortest of the three Chicago Botanic Garden hybrids and this hybrid attracted the fewest pollinators.



***Vernonia baldwinii* (AR ecotype) – western ironweed**

Rating	Height Range	Habit	Foliage Texture	Floral Display	Avg. Pollinators Per Observation
4.0	7.5' - 8.5'	upright vase	medium	excellent	4.10



Vernonia baldwinii is a species of ironweed found in open areas and prairies in the central United States with some populations extending as far west as Colorado. This trial included four different examples of *V. baldwinii* from both commercial sources and wild-collected seed. While all examples of the species were similar in appearance, with tall upright habits, densely packed flower heads, and telltale protruding phyllaries, one plant collected in Arkansas outperformed all the rest. The Arkansas example was taller than the other forms of western ironweed and produced exceptionally large inflorescences that were a tremendous draw for a variety of pollinators during its bloom period from August through September. This species in general proved to be very adaptable to the average garden conditions in the Trial Garden and thrived over four growing seasons. Western ironweed's adaptability and its ability to draw scores of pollinators makes it an attractive and valuable addition to a variety of garden settings and styles.

***Vernonia noveboracensis* (SC ecotype) – New York ironweed**

Rating	Height Range	Habit	Foliage Texture	Floral Display	Avg. Pollinators Per Observation
4.0	6.5' - 10'	upright vase	medium	good	2.54



Vernonia noveboracensis, or New York ironweed, is a common species that can primarily be found in moist to wet meadows and roadside ditches throughout the eastern United States. The *Vernonia* trial included several examples of this species, with five originating from wild collections from various locations in the mid-Atlantic region, one wild collection from South Carolina, and one white-flowered cultivar named *Vernonia noveboracensis* 'White Lightning'. White Lightning New York ironweed and the mid-Atlantic forms of this species struggled to adapt to the average garden conditions of the Trial Garden, exhibiting weak growth, mediocre floral displays, and poor resistance to rust and powdery mildew. In contrast, the South Carolina form was taller and much more robust than the other trialed *V. noveboracensis* and proved to be exceptionally disease resistant. The SC ecotype New York ironweed also bloomed in September through October, significantly later than the other forms of *V. noveboracensis*, which produced flowers from late July through August.



Vernonia noveboracensis in Mt. Cuba Center's natural lands

VERNONIA OF THE MID-ATLANTIC PIEDMONT

An interesting finding of this evaluation was that the two ironweed species that occur in the natural areas surrounding Mt. Cuba Center, *Vernonia noveboracensis* and *Vernonia glauca*, did not score well in the trial. Their poor ratings show that these species may not readily adapt to common garden conditions and that careful selection of planting sites is needed to coax out their best qualities. With proper siting, these locally native ironweed species can be both beautiful and ecologically valuable to our local fauna.



Vernonia noveboracensis seed heads

Vernonia noveboracensis **(New York ironweed)**

New York ironweed is common in northern Delaware and the surrounding region where it can be found in wet meadows and floodplains. Some populations are denizens of roadside ditches while others can occur in breathtaking masses that create a sea of purple when they bloom in late summer and early fall. Cool moist-to-wet root zones and full sun to light shade seem to be required for optimum growth and vigor. During fall and early winter, this species can be identified by habitat and its bronze-to-purple pappus coloration.




Vernonia glauca seed heads

Vernonia glauca **(broadleaf ironweed)**

Vernonia glauca is a less common species than New York ironweed, both in the wild and in cultivation. From a distance it can resemble *V. noveboracensis*, but is often found in drier habitats, particularly on the edges of woodlands and in forest clearings. Compared to New York ironweed, the foliage of *V. glauca* is broader and the back of the leaves has a whitish cast. The white to cream-colored pappus is a distinguishing feature of this species in addition to having more numerous phyllaries compared to *V. noveboracensis*.

VERNONIA POLLINATOR ATTRACTION AND VALUE

The community scientists of Mt. Cuba Center’s Pollinator Watch Team recorded pollinator visits to blooming *Vernonia* in the Trial Garden in 2021, 2022, and 2023. On a near daily basis a member of the Pollinator Watch Team randomly selected a single inflorescence from each type of ironweed and observed pollinator activity for 60 seconds. Cutback plants were excluded from the observations along with several ironweeds that either never bloomed or did not survive long enough to be observed. For each ironweed, the average pollinator count per plant was determined by totaling the pollinator visits and dividing by number of observations over the three-year period. The ironweeds with the highest average pollinator count were a mix of the earliest species to bloom, such as *Vernonia fasciculata*, the latest to bloom, including *Vernonia gigantea*, as well as some of the most robust plants that bloomed in mid-season, such as *Vernonia baldwinii*. For many species and cultivars of *Vernonia*, the health of the plant while it was in bloom appeared to be closely tied to the number of pollinator visits. The chart below highlights the ironweeds that had the highest average pollinators per observation. See also the chart on pages 16 and 17 for information on average insects per observation and an illustration of the seasonality of pollinator activity for all plants in the trial.



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

Plants in **bold** are top performers

VERNONIA AS HOST PLANTS



Yellow woolly bear caterpillar

Photo: Paul Wilson

The capacity for the genus *Vernonia* to support wildlife does not stop at its ability to attract and benefit pollinators. Several species of caterpillars were observed feeding on the foliage and flowers of the ironweeds in the Trial Garden, including the yellow woolly bear (*Spilosoma virginica*). Additionally, during moth surveys conducted at Mt. Cuba Center, the elusive *Vernonia* stem borer moth (*Papaipema cerussata*) was observed near a wet meadow that hosts a robust population of New York ironweed. Although this moth was never seen in the Trial Garden, these observations further demonstrate the vital role that *Vernonia* plays in wild ecosystems.

VERNONIA SPECIALIST BEE: *MELISSODES DENTICULATUS*

An exciting pollinator observed in the *Vernonia* trial was an ironweed specialist, *Melissodes denticulatus*, commonly known as the denticulate longhorn bee. Specialist pollinators collect pollen from a single family, genus, or species of plant to complete their life cycle, in contrast to generalist pollinators like bumblebees that can use pollen and nectar from a variety of unrelated plants. Denticulate longhorn bees are solitary ground nesters, and females rely on ironweed pollen to provision their nests to feed their young. Male and female *M. denticulatus* are half to two thirds the size of a European honeybee and are black and white with grey-blue eyes. Female bees are easy to spot thanks to the brush-like hairs (scopae) on their hind legs that are laden with the characteristic white pollen of ironweeds.



Male denticulate longhorn bee







Female denticulate longhorn bee

In 2022 and 2023, the Pollinator Watch Team counted *M. denticulatus* separately to determine which of the trialed species and cultivars were used by this native specialist bee. *Melissodes denticulatus* were first observed in low numbers in early July, then their numbers spiked in late July through August before virtually disappearing after the month of September. The trialed plants that had the greatest visitation from *M. denticulatus* bloomed during August and were healthy and floriferous, such as *Vernonia baldwinii*. Two locally native species of ironweed, *Vernonia glauca* and *Vernonia noveboracensis*, also bloom during peak *M. denticulatus* activity but attracted few denticulate longhorn bees likely due to their poor health and flower production in the trial. However, healthy wild counterparts of *V. noveboracensis* in Mt. Cuba's natural lands were frequented by *M. denticulatus*. Plants that flowered outside the window of late July–September had few *Melissodes* visits despite robust flowering. (See the chart pages 16 and 17 for a detailed representation of *M. denticulatus* activity in the Trial Garden).

To best support *Melissodes*, choose ironweeds that are well-suited to your garden conditions and that bloom in sync with the *Vernonia* species found in surrounding natural areas. Natural land managers could consider delaying seasonal mowing of fields containing *Vernonia* until they have finished flowering. If the *Vernonia* are mowed too early they will still flower, but their blooms could be delayed to a point where their flowers may not be available to specialist pollinators like *M. denticulatus*.

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
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)	1.61				
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 flaccidifolia (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'	2.57				
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

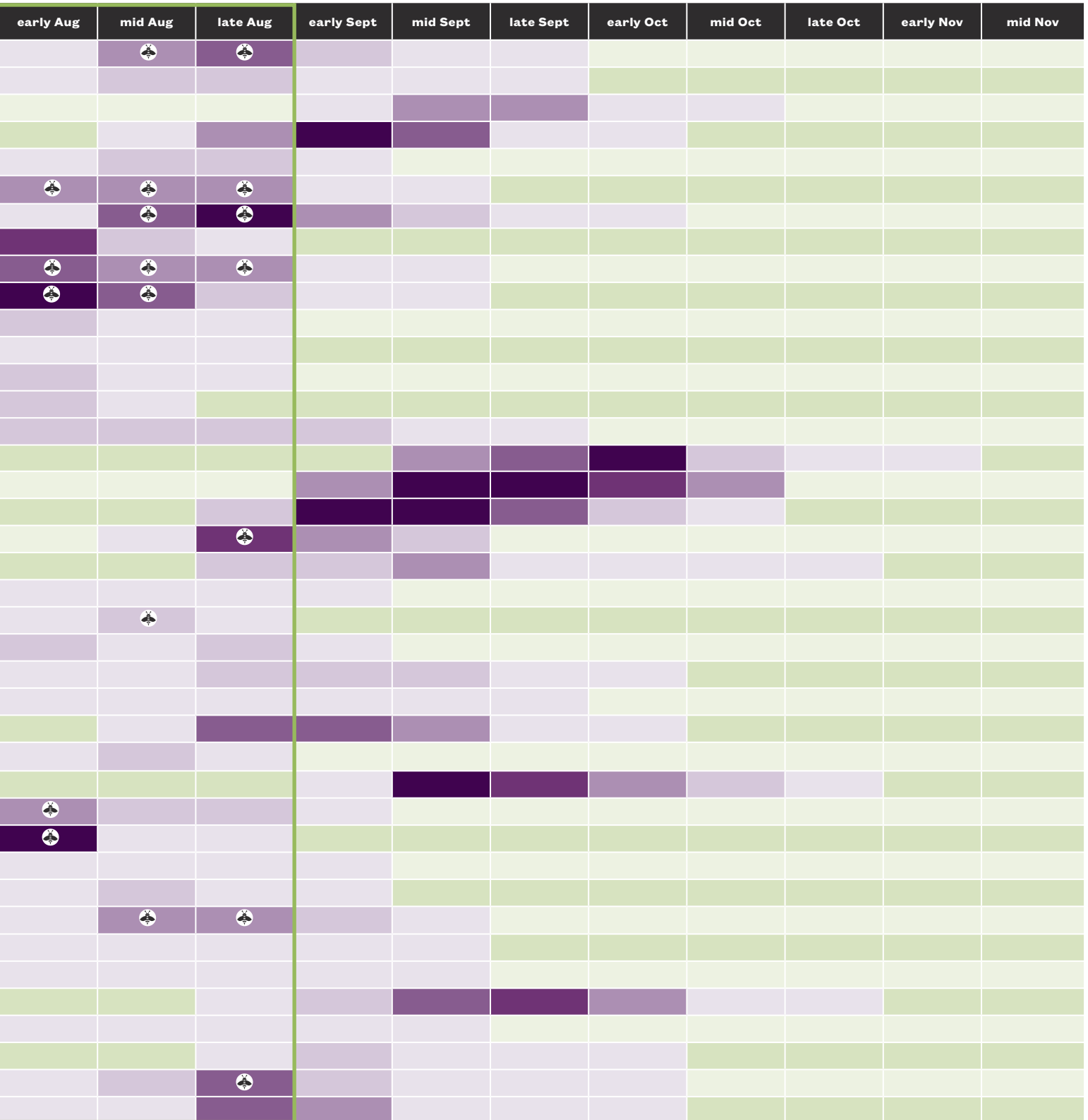
Average Pollinators Per Observation:



***Melissodes denticulatus* Observations:**

More than 10 *Melissodes denticulatus* observed

Peak *Melissodes denticulatus* activity





Adult ironweed curculio

Photo: Paul Wilson

IRONWEED CURCULIO (*RHODOBAENUS TREDECIMPUNCTATUS*)

The ironweed curculio (*Rhodobaenus tredecimpunctatus*) is a weevil native to the eastern United States that is commonly seen on ironweeds and other large herbaceous perennials in the aster family. In late spring and early summer adult weevils utilize their distinctive snout and mouthparts to excavate trenches through the outer stem layers of the host plant and deposit eggs in the openings. Once the eggs hatch, the weevil larvae feed on the spongy pith and slowly make their way downwards towards the base of the plant where they eventually pupate and emerge as adults the following year. This weevil was observed in the Trial Garden on the largest species of ironweed, but scars left by trenching on the stems were superficial, and the larval feeding inside the stems appeared to have little to no effect on the overall health of the plant. Only *Vernonia gigantea* ‘Purple Pillar’ seemed to suffer adverse effects, as the hollowed stems buckled in late summer storms. The weevils may benefit other wildlife in an unexpected way, as woodpeckers were observed on several occasions landing on the stems of *Vernonia gigantea* in pursuit of the protein-rich larvae inside.

DISEASES IN THE *VERNONIA* TRIAL

In Mt. Cuba Center’s trial plots, the density of potentially susceptible plant material can lead to high levels of pests and disease. Rust and powdery mildew both had considerable impact on several ironweed species in the trial, especially those that were already stressed due to a mismatch between the Trial Garden conditions and the sun and moisture requirements of the plants in the wild. Most of the disease pressures can be mitigated by selecting adaptable and disease-resistant species and cultivars or by taking care to plant the more susceptible species in garden locations or landscapes that closely reflect their wild habitats.



Powdery mildew on ironweed foliage



Rust on ironweed foliage

POWDERY MILDEW AND RUST

Powdery mildew is a broad term for a family of fungal pathogens that appear as a white dusty film on leaf and stem surfaces. These fungi proliferate in areas with poor air circulation, particularly when the weather is warm and dry in the day and cool and humid at night. For the most part, powdery mildew infections did not dramatically affect the overall health of the ironweeds in the trial. However, another fungal pathogen, commonly called rust, caused more deleterious effects. In mid-summer, bright orange pustules would appear, particularly on the undersides of leaves, and progress from the oldest to the newest leaves. In cases of severe rust infection, susceptible ironweeds like *Vernonia noveboracensis* and *Vernonia fasciculata* would be completely defoliated by late summer.

Vernonia	Rating	Avg. HxW	Habit	Foliage Texture	Bloom Time	Floral Display
Vernonia acaulis (NC ecotype)	4.1	3.5' x 3'	low airy	coarse	early August - mid September	excellent
<i>Vernonia acaulis</i> (SC ecotype)	3.7	3.5' x 3.5'	low airy	coarse	early August - early September	good
<i>Vernonia angustifolia</i> (commercial source, A)	*	n/a	upright wispy	fine	n/a	n/a
<i>Vernonia angustifolia</i> (commercial source, B)	3.1	6.5' x 4'	upright airy	fine	mid September - early Oct	good
<i>Vernonia angustifolia</i> (SC ecotype)	*	.5' x .5'	upright wispy	fine	n/a	n/a
Vernonia angustifolia 'Plum Peachy'	4.5	5.5' x 8.5'	mounding	fine	early September - late September	excellent
<i>Vernonia arkansana</i> (commercial source, A)	3.2	8' x 6.5'	upright vase	medium	early August - early September	good
<i>Vernonia arkansana</i> (commercial source, B)	3.4	6' x 11'	upright vase	medium	mid July - early September	good
Vernonia baldwinii (AR ecotype)	4.0	8.5' x 8'	upright vase	medium	early August - late September	excellent
<i>Vernonia baldwinii</i> (commercial source)	3.2	6' x 8'	upright vase	medium	mid July - late August	good
<i>Vernonia baldwinii</i> (unknown ecotype, A)	3.5	6.5' x 9.5'	upright vase	medium	early August - early September	good
<i>Vernonia baldwinii</i> (unknown ecotype, B)	3.5	5.5' x 7.5'	upright vase	medium	mid July - early September	good
<i>Vernonia fasciculata</i> (commercial source, A)	3.6	7' x 5'	upright vase	medium	early July - mid August	good
<i>Vernonia fasciculata</i> (commercial source, B)	3.3	5' x 6'	upright vase	medium	early July - mid August	good
<i>Vernonia fasciculata</i> (commercial source, C)	3.6	6' x 6'	upright vase	medium	early July - mid August	excellent
<i>Vernonia fasciculata</i> (unknown ecotype)	2.7	7.5' x 3.5'	upright vase	medium	early July - early August	good
<i>Vernonia flaccidifolia</i> (AL ecotype)	3.6	7.5' x 13.5'	upright vase	medium	early August - late September	good
Vernonia gigantea (AL ecotype A)	4.2	12' x 6.5'	upright vase	medium	mid September - mid October	good
Vernonia gigantea (AL ecotype B)	4.4	10' x 6.5	upright vase	medium	early September - mid October	excellent
Vernonia gigantea 'Jonesboro Giant'	4.0	15' x 16'	upright vase	medium	early September - mid October	good
<i>Vernonia gigantea</i> 'Purple Pillar'	3.6	11' x 10'	upright columnar	medium	late August - mid September	good
<i>Vernonia glauca</i> (AL ecotype)	3.9	5' x 5'	upright vase	coarse	late August - late September	good
<i>Vernonia glauca</i> (commercial source)	2.4	8.5' x 7.5'	upright vase	medium	late August	poor
<i>Vernonia glauca</i> (unknown ecotype, A)	2.6	3.5' x 3'	upright vase	medium	early August - late August	good
<i>Vernonia glauca</i> (unknown ecotype, B)	3.1	6' x 5'	upright vase	coarse	early August - early September	good
<i>Vernonia larseniae</i> (unknown ecotype)	*	n/a	mounding	fine	n/a	n/a
Vernonia lettermannii (AR ecotype)	4.1	4' x 7'	mounding	fine	early August - late September	good
<i>Vernonia lettermannii</i> (commercial source)	2.7	3.5' x 4'	mounding	fine	mid August - early September	poor
Vernonia lettermannii 'Iron Butterfly'	4.1	3' x 6'	mounding	fine	early September - late September	good
<i>Vernonia</i> 'Mammuth'	3.5	6.5 x 4.5	upright vase	medium	early August - late August	good
Vernonia missurica (AR ecotype)	4.1	9.5' x 10'	upright vase	medium	early September - mid October	good
<i>Vernonia missurica</i> (commercial source)	3.7	6.5' x 6'	upright vase	medium	late July - early September	good
<i>Vernonia noveboracensis</i> (commercial source)	3.1	4.5' x 7'	upright vase	medium	mid July - late August	good
<i>Vernonia noveboracensis</i> (DE ecotype)	*	6' x 5'	upright vase	medium	mid August - late August	good
<i>Vernonia noveboracensis</i> (NJ ecotype, A)	2.9	5.5' x 4'	upright vase	medium	mid August - early September	good
<i>Vernonia noveboracensis</i> (NJ ecotype, B)	3.4	6.5' x 6'	upright vase	medium	early August - early September	excellent
<i>Vernonia noveboracensis</i> (NJ ecotype, C)	3.5	6.5' x 6.5'	upright vase	medium	mid August - early September	good
<i>Vernonia noveboracensis</i> (NY ecotype)	*	5' x 5'	upright vase	medium	mid August - late August	poor
Vernonia noveboracensis (SC ecotype)	4.0	10' x 8'	upright vase	medium	early September - mid October	good
<i>Vernonia noveboracensis</i> 'White Lightning'	2.0	3.5' x 3.5'	upright vase	medium	early August - early September	poor
<i>Vernonia</i> 'Southern Cross'	*	3.5' x 3.5'	mounding	fine	late August	poor
Vernonia 'Summer's End'	4.0	4.5' x 4'	mounding	fine	late August - early October	good
Vernonia 'Summer's Surrender'	4.1	5' x 6'	mounding	fine	early August - late September	good
Vernonia 'Summer's Swan Song'	4.3	3.5' x 6'	mounding	fine	early August - late September	excellent
<i>Vernonia texana</i> (AR ecotype)	*	1.5' x .5'	upright wispy	fine	n/a	n/a

RATING KEY: 5=excellent, 4=good, 3=fair, 2=poor, 1=very poor
Plants in **bold** are top performers

*Did not complete the trial
Visit mtcubacenter.org/vernonia for more information



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SCAN HERE

for more data, photos, and
information from the *Vernonia* trial or
visit mtcubacenter.org/vernonia.

ABOUT MT. CUBA CENTER

Mt. Cuba Center is a botanic garden that highlights the beauty and value of native plants to inspire conservation. Once the private estate of Pamela and Lammot du Pont Copeland, Mt. Cuba opened to the public in 2013 and now spans 68 acres of gardens and over 1,000 acres of natural lands. Featuring formal and naturalistic gardens and three miles of scenic trails, Mt. Cuba's stunning landscapes demonstrate how native plants can enrich our environment. Mt. Cuba is recognized as a leader in native plant research, education, and open space preservation, having protected 15,000 acres in the mid-Atlantic region. The gardens are open Tuesday-Sunday April into June, and Wednesday-Sunday July through November, with lively events throughout the open season. Gardening, art, and conservation classes are offered year-round in person and online. Learn more at mtcubacenter.org.

ABOUT TRIAL GARDEN RESEARCH

Mt. Cuba Center's Trial Garden, managed by Sam Hoadley and Laura Reilly, evaluates native species and cultivars for their horticultural and ecological value. This research aims to provide gardeners and the horticulture industry with information about superior plants for the mid-Atlantic region as well as highlight the important ecosystem services native plants provide. Mt. Cuba Center has conducted Trial Garden research since 2002. For more information about the completed evaluations of *Amsonia*, *Carex*, wild hydrangea, *Echinacea*, *Helenium*, *Phlox*, *Monarda*, *Baptisia*, *Coreopsis*, *Heuchera*, and asters visit mtcubacenter.org/research/trial-garden.

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FRONT COVER: *Vernonia gigantea*.

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