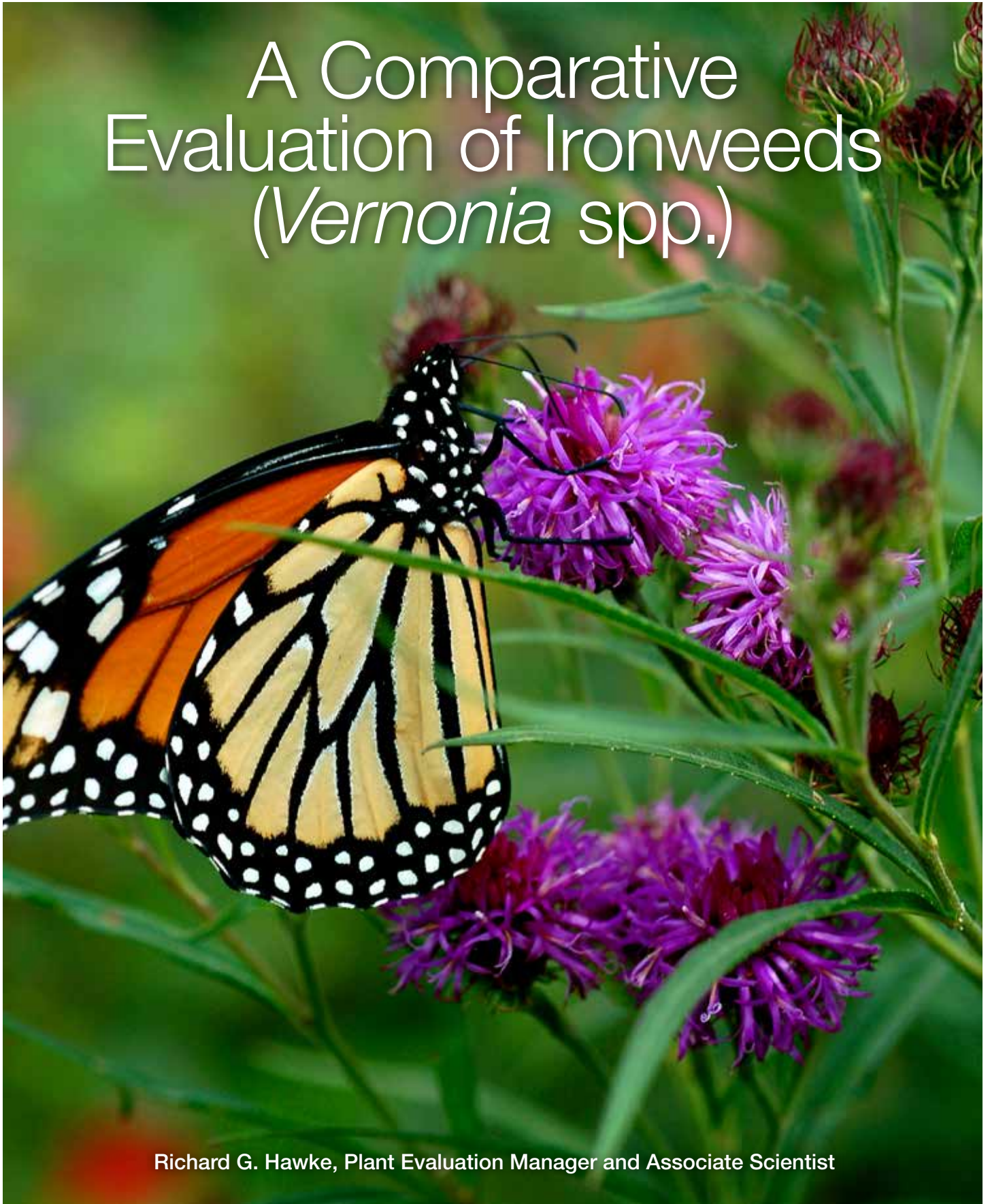




CHICAGO BOTANIC GARDEN

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A Comparative Evaluation of Ironweeds (*Vernonia* spp.)



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Vernonia gigantea

Ironweeds inhabit a broad swath of the United States, from the mid-Atlantic to the Midwest and from Minnesota south to Texas. While many are tall, even towering in height, all ironweeds offer an abundance of purple-hued flowers in late summer and early fall. Their value as a food source for pollinators is irrefutable—scores of bees, butterflies, and numerous other insects feverishly work the flowers throughout the late bloom season. Ironweeds are extraordinary ecological plants, due to their indigenesness and importance as powerhouse pollinator plants, but they are great garden plants too. At a glance, some ironweeds may seem too tall for many gardens, but recent breeding has resulted in a number of compact hybrid selections. The shorter ironweeds may have given up some size but have lost none of their ornamental appeal or draw for pollinators.

Vernonia spp. are in the aster or daisy family (Asteraceae), but lack the showier petal-like ray florets common to the composite

inflorescences of coneflowers (*Echinacea* spp.), asters (*Symphyotrichum* spp.), and sunflowers (*Helianthus* spp.). Instead, upward of 50 or more small tubular disk florets are crowded into a compact flower head or capitulum, which is surrounded by involucral bracts or phyllaries that are unique to a species and helpful in identification. Phyllaries are made up of whorls of small leaf-like structures that encase the flower heads, and may be leafy, spiny, or fringed. For several weeks beginning in mid- to late summer, purple to magenta capitula bloom in many-flowered inflorescences measuring up to a foot or more across. The genus is named for William Vernon (1688-1711), an English botanist who collected plants in Maryland. The common name may be a nod to the iron-like rigidity of the stems, or more likely refers to the cinnamon-colored hairs on the fruit.

Leaves are typically dark green and tend toward lance-shaped but can be willow-like to filiform. Conversely, silver ironweed (*Ver-*

nonia lindheimeri var. *leucophylla*) sports bright silvery white linear leaves. Leaf size enhances the robustness of some ironweeds; for example, giant ironweed (*V. gigantea*) reaches 8 feet tall, but the 10-inch long leaves make it seem even larger. On the other hand, at 3 inches long and barely wider than a sliver, the linear leaves of narrowleaf ironweed (*V. lettermannii*) look more like Arkansas blue star (*Amsonia hubrichtii*) than any of its kin. Ironweed leaves may be entirely smooth or hairy on the undersides—the soft fuzziness of Missouri ironweed's (*V. missurica*) leaves and stems are a notable case. Most of the commonly cultivated species have woody, fibrous root crowns and stiff stems ranging from several feet to 10 or more feet in height.

Ironweeds are generally easy to grow in full sun and moist, well-drained soils but are often adaptable to light shade and drier soils, and some species are drought-tolerant once established. Silver ironweed, for example, is best grown in lean, gravelly soil



Vernonia lettermanii

or decomposed granite, in full or half-day sun. Ironweeds tend to grow taller in moist conditions. Many ironweeds are hardy to at least USDA Zone 5 or colder, while others are native to warmer places in the Southeast and westward to Texas. Ironweeds are typically long-lived, growing into large clumps over time, but rarely need division. Cutting stems back by half in late spring will reduce the ultimate plant height; while thinning the crowns by selectively removing stems in spring increases air flow through the plant and can help reduce foliar diseases. Deadheading reduces unwanted seedlings, which can be prolifically produced, especially in moist areas; however, deadheading removes a food source for late-season songbirds. Powdery mildew and rust can infect foliage in late summer or fall—some species are more susceptible than others. Disease levels can be severe, thus deleteriously affecting plant health. The bitter-tasting leaves are usually not palatable to most grazing mammals including deer.

Ironweeds are both a boon and a challenge to gardeners—their size can be daunting for average gardens, but their late-bloom-

ing purple flowers attract a host of pollinators. Ironweeds put on an impressive show in native and naturalistic landscapes, meadows, and formal gardens. In early summer, the dark green foliage provides a handsome backdrop for a variety of earlier-blooming perennials; whereas, late-season bloomers such as sunflowers (*Helianthus* spp.), goldenrods (*Solidago* spp.), and big bluestems (*Andropogon gerardii* cultivars) make stellar floral companions. A shorter stature and feathery foliage sets narrowleaf ironweed (*Vernonia lettermanii*) apart from other species, and provides a pleasing textural contrast with bolder plants. Despite the large number of species—upward of 1,000 herbaceous and woody plants from the Americas, Asia, Africa, and Australia—ironweeds are not widely cultivated and still are uncommon in home gardens.

The Evaluation Study

The Chicago Botanic Garden (USDA Hardiness Zone 5b, AHS Plant Heat-Zone 5) undertook a comparative trial of *Vernonia* species and cultivars from 2012 through 2018. The goal of the trial was to determine the garden-worthiness of a variety of



Vernonia lettermanii

cold-hardy ironweeds. The trial group consisted of 17 taxa in all—representing ten species with eight associated subspecies, cultivars, or hybrid selections. Plants were acquired commercially or were grown from wild-collected seeds; seed-grown species exhibited variable traits within a taxon and included *V. arkansana*, *V. baldwinii*, *V. fasciculata*, *V. gigantea*, *V. gigantea* ssp. *gigantea*, *V. glauca*, *V. missurica*, and *V. noveboracensis*.

The ironweed trial was originally initiated in 2009 but was interrupted in 2010 by a renovation project in the evaluation garden. Due to significant changes in bed design, all plants were transplanted to pots and moved to the production nursery in June 2010. The original 11 taxa were replanted in the trial garden in September 2011; the official restart of the trial began with data collection the following spring. Several new taxa were added to the trial between 2012 and 2015 including *Vernonia angustifolia* 'Plum Peachy', *V. gigantea* ssp. *gigantea* 'Jonesboro Giant', *V. noveboracensis* 'White Lightning', *V.* 'Southern Cross', *V.* 'Summer's Surrender', and *V.* 'Summer's Swan Song'.



Vernonia 'Summer's Surrender'



Vernonia 'Summer's Surrender'

Five plants of each taxon were grown in side-by-side plots for easy comparison of ornamental traits and landscape performance. The evaluation garden was openly exposed to wind in all directions and potentially received up to ten hours of full sun daily during the growing season, which averaged 175 days per year for the 2012-2018 trial period (see Table 1). The clay-loam soil had a pH of 7.4 during this period, and although typically well-drained, the site occasionally retained excess moisture for short periods in all seasons.

Maintenance practices were kept to a minimum, thereby allowing the plants to thrive or fail under natural conditions. Trial beds were irrigated via overhead sprinklers as needed, mulched with composted leaves once each summer, and regularly weeded. Moreover, plants were not deadheaded, fertilized, winter mulched, or chemically treated for insects or diseases. Plants were cut back to near the base in late winter before new growth began.

The Performance Report

In the trial, the ironweeds were regularly observed for their cultural adaptability to the soil and environmental conditions of the full sun evaluation garden; diseases and pests; winter hardiness and survivability; and ornamental qualities associated with foliage, floral display, and plant habits. Final performance ratings shown in Table 2 are based on foliage and habit quality, flower production and floral display quality, plant health and vigor, and winter hardiness. All taxa were evaluated for a minimum of four years, except for *Vernonia angustifolia* 'Plum Peachy', which died during the second winter in two different trials, and *V. noveboracensis* 'White Lightning', which had been in the garden for only three years when the trial was terminated in autumn 2018.

Top-rated Ironweeds

Vernonia gigantea ssp. *gigantea* 'Jonesboro Giant' was the largest ironweed in the trial, reaching 144 inches tall and 60 inches wide. 'Jonesboro Giant' differed from the subspecies in being significantly taller and narrower in habit, and flowering seven to ten days earlier. The rigid stems were upright at all times, although the plants relaxed a bit in October during peak bloom.

The fine-textured inflorescences and upper stems were dark burgundy. Flower production was consistently heavy, with smallish, $\frac{3}{4}$ -inch-wide purple flower heads; the inflorescences were commonly more than 12 inches wide. The large, dark green leaves were generally healthy, with only minor powdery mildew observed. The late bloom period of 'Jonesboro Giant'—late September to early November—was occasionally truncated by early frosts in October; the historical frost date at the Chicago Botanic Garden is October 15. In addition, the large leaves were sometimes tattered by strong winds, especially on the upper half of the stems.

The soft, needle-shaped leaves of *Vernonia lettermannii* 'Iron Butterfly' had a similar feathery appearance to another Arkansas native—spring-blooming blue star (*Amsonia hubrichtii*)—rather than to any of the other ironweeds. 'Iron Butterfly' originated in the University of Georgia's trial garden, and was selected for its vigorous growth, compact habit, and floriferous nature. At 33 inches tall, 'Iron Butterfly' was 10 inches shorter than the species and had a tighter habit. Otherwise, the purple flowers were the same color and size as the species, and both taxa were equally floriferous. 'Iron



Vernonia 'Summer's Swan Song'

'Butterfly' was less prone to opening up in the center in heavy rainfall but was not untouched by this issue; damage was always more significant on the species, which was also less likely to rebound than 'Iron Butterfly'. Powdery mildew and rust were never observed on 'Iron Butterfly' or the species. These taxa were the latest of the ironweeds to emerge in the spring.

Vernonia 'Summer's Surrender' is a hybrid cross of *V. lettermannii* and *V. arkansana* made by Jim Ault, Ph.D., at the Chicago Botanic Garden in 2010. It inherited the bushy habit of *V. lettermannii* and the larger plant size and capitula of *V. arkansana*; the olive-green linear leaves—5 inches long and ½ inch wide—were intermediate between the two species. 'Summer's Surrender'

was 48 inches tall and 74 inches wide with a densely broad habit after five years, and it had a passing resemblance to 'Southern Cross'. From early September to early October, dark purple florets, packed into 1-inch-wide flower heads, were generously produced in airy inflorescences. 'Summer's Surrender' was resistant to powdery mildew and rust.

Table 1: Weather Summary for 2012-2018	2012	2013	2014	2015	2016	2017	2018
Lowest temperature °F (°C)	2(-17)	-3(-19)	-16(-27)	-13(-25)	-4(-20)	-5(-21)	-8(-22)
Lowest temperature date	1/21	1/22	1/6	2/28	1/18	12/27	1/1
Number of days below 0°F (-18°C)	0	3	24	17	13	5	9
Highest temperature °F (°C)	105(41)	96(35)	91(33)	94(34)	95(35)	95(35)	97(36)
Highest temperature date	7/5	7/18	7/17	7/17	7/24	6/12	6/30
Number of days above 90°F (32°C)	40	15	5	13	17	16	23
Last frost date	4/24	4/20	4/16	4/24	5/15	4/1	4/29
First frost date	10/6	10/22	10/19	10/17	12/12	11/6	10/13
Number of growing season days ^a	165	185	186	176	181	166	167
Annual rainfall in inches (cm) ^b	31.1(78.9)	39.1(99.3)	42.5(107.9)	43.6(110.7)	36(91.4)	47.6(120.9)	54(137.2)
Annual snowfall in inches (cm) ^c	23.4(59.4)	40.3(102.4)	66.4(168.7)	45.5(115.6)	27(65.6)	17.2(43.7)	34(86.4)

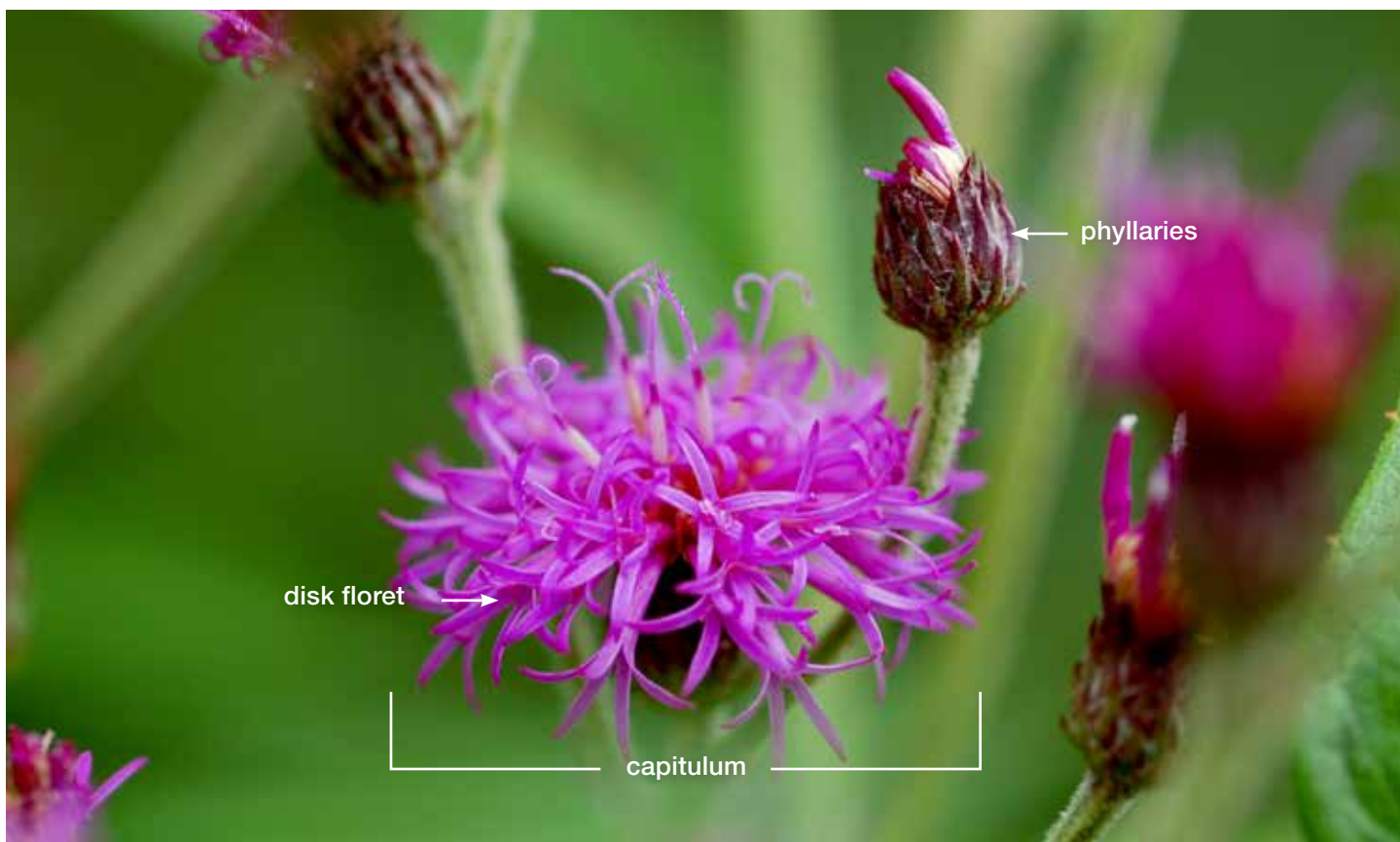
^aNormal growing season: 165 days

^bAverage rainfall: 37.7 inches (95.7 cm)

^cAverage snowfall: 36 inches (91.4 cm)

Data collected at Chicago Botanic Garden weather station

Latitude: 41°51'N. Longitude: 87°37'W. Altitude: 578.74 ft. (176.4 m)



Vernonia glauca

Vernonia ‘Summer’s Swan Song’ is a hybrid created by Dr. Ault’s crossing of *V. lettermannii* and *V. angustifolia* ‘Plum Peachy’. Similar in bushiness and fine texture to ‘Iron Butterfly’, ‘Summer’s Swan Song’ is a slightly larger plant that resists lodging because of its elongated floral branches; the interlocking of the floral branches is a unique trait that helps hold stems upright on rainy days. Deep purple florets in 1-inch-wide heads were plentiful from early September to mid-October. The feathery foliage was moderate to dark olive-green with red petioles, up to 5 inches long and less than a quarter inch wide, and disease-free. After five years in the trial, ‘Summer’s Swan Song’ measured 36 inches tall and 40 inches wide. ‘Summer’s Swan Song’ is hardy in Zone 4, despite the marginal cold-hardiness of ‘Plum Peachy’.

Other Ironweeds in the Trial

The remaining ironweeds varied in their performances, due primarily to habit quality, flower production, and/or disease problems, rather than issues related to cultural adaptability or winter hardiness. Susceptibility to foliar diseases was the main reason for lower ratings. Both powdery mildew and foliar rust were commonly observed, initially in mid-August and reaching maximum infection levels of 75 percent to 100 percent by late September. Rust was far more prevalent on the majority of ironweeds in all years of the trial; whereas powdery mildew was not observed every year and infection levels were rarely severe. Rust-infected ironweeds appeared to be healthy later into the season because the pustules on the undersides of the leaves were less noticeable until severely infected leaves began dropping. Conversely, powdery mildew more readily gave the perception of poor health because of the visibility of the disease, which ranged from a light dusting to a grey-white covering on leaf surfaces. Although infected ironweeds exhibited a

decline in health, rust and powdery mildew are obligate parasites that require living plants to grow on, so they seldom kill their hosts.

Vernonia angustifolia ‘Plum Peachy’, a selection of a southern species native from North Carolina to Mississippi, proved to be marginally cold-hardy in Zone 5b. Although ‘Plum Peachy’ successfully overwintered in two different trials—2010-2012 and 2014-2016—the plants died during the second winter in each trial. In the 2014 growing season, plants were bushy, 42 inches tall and 28 inches wide, with dark red-purple stems and a purplish tinge to the narrow leaves. Violet-purple disk florets, in 1-inch-wide heads, were moderately produced from early September to mid-October. Plants emerged weakly in spring 2015; habits remained spindly and uneven all season, and died in the following winter of 2015-2016. Rabbit browsing was a significant problem in 2015; no foliar diseases were observed.



Vernonia missurica

Long filiform phyllaries, yellowish green and incurved, distinguish *Vernonia arkansana* (synonym *V. crinita*) from other species. Purple disk florets, in large heads to 1¼ inches wide, typically bloomed from mid-August to early October on stiffly erect stems. Like many other species in the trial, the plants of *V. arkansana* were grown from wild-collected seeds; therefore, floral, foliar, and habit traits varied among the plants. The narrow, willow-like leaves—to 7 inches long—were significantly affected by late-season rust and powdery mildew. Although rust was a consistent problem resulting in significant defoliation in October of each year, powdery mildew was noted infrequently. Arkansas or curlytop ironweed is native from New York to Kansas and Wisconsin south to Arkansas.

The purple flowers of *Vernonia baldwinii* were held in loose, flattened inflorescences from early August to mid-September. Each disk floret featured a conspicuously divided and coiled style, and the recurved phyllary scales gave the involucre a barbed appearance. Given the smaller flower heads—less than an inch wide—the floral display was not as vivid as Arkansas ironweed, but



Vernonia 'Jonesboro Giant'

flower production was as profuse as other ironweeds. The lance-shaped leaves were rough on the surface and softly hairy on the undersides. White hairs clothed the erect stems, which formed robust, if somewhat

loose habits. Contrary to expectations, western ironweed did not spread or create a colony during its seven years in the trial garden. This species is native to the Central United States—from Minnesota to Texas and Illinois



Vernonia chinensis

west to Kansas—and is considered more drought-tolerant than other species.

Vernonia chinensis was one of several ironweeds that received lower ratings due to disease issues, despite heavy flower production and robust habits. Powdery mildew and rust were regularly observed from August to October, resulting in significant leaf drop by late summer. Small heads of light purple flowers were abundantly produced from mid-August to early October. Long lanceolate green leaves were held on erect green stems. Chinese ironweed did not stand out ornamentally from other species.

Vernonia fasciculata featured purple florets in dense terminal clusters. The tightly packed flower heads were not as visually impactful compared to species with looser, spreading clusters; flower production was lower than most other species, too. The dark green leaves were narrowly lanceolate, serrated, and 5 inches long. Leaves were healthy for most of the season until mid-September, when moderate powdery mildew and rust infections were noted. Prairie ironweed's greatest shortcoming in the trial was its weak to floppy habit. Plant centers were routinely open by midsummer; many stems would likely have fully lodged if they had not been held up by neighboring plants. Prairie ironweed is native to wet prairies, marshes, and ditches from Manitoba to Oklahoma and west from Ohio to the Dakotas.

At 103 inches tall, *Vernonia gigantea* (synonym *V. altissima*) was the second largest ironweed in the trial. Small flower heads, to only ½ inch wide, were held in large flat-topped panicles from late August to early October. The purple-violet florets were surrounded by purple-brown appressed phyllaries. Grayish green lance-shaped leaves to 9 inches long were purple-tinged at the terminals, as were the upper stems. The plant habit was usually robust bushy and stiffly upright. Foliar diseases were noted in most years, with rust being a greater problem than powdery mildew. Giant ironweed and *V. gigantea* ssp. *gigantea* were fairly similar in habit, plant size, and performance, except that the slightly larger purple florets of the subspecies opened two weeks later than the species. The species and subspecies have overlapping ranges throughout Eastern North America.

Vernonia glauca is described as similar to but shorter than *V. noveboracensis*, which was observed in the trial. The purple-violet flowers, in 1-inch-wide heads, were abundant from mid-August to late September. The large, lance-shaped leaves were dark green with pale undersides, and remained healthy until mid-August, when rust and powdery mildew were first observed. Severe infections were noted in late September in some but not all years. Plant habits were mostly upright but relaxed stems were occasionally observed. Broadleaf ironweed is native to open upland woods, dry and mesic prairies, and roadsides from



Vernonia noveboracensis

Pennsylvania to Kentucky and south to Alabama and Mississippi.

Vernonia lettermannii had a similar appearance to 'Iron Butterfly' and performed comparably. The differences between the species and cultivar were nearly indistinguishable in the first two years of the trial; however, the species eventually grew larger—43 inches tall compared to 'Iron Butterfly' at 33 inches tall—and looser in habit. The laxness was particularly evident during the bloom period, when the prodigious flowers weighted down the stems, exposing the crowns. Heavy rainfall and/or strong winds exacerbated the problem. Despite the propensity to relax, stems were never floppy. As with 'Iron Butterfly', no foliar diseases were observed. Narrowleaf ironweed is indigenous to western Arkansas and Oklahoma on rocky floodplains, rock outcrops, and gravel bars.

Vernonia missurica was distinctive among the ironweeds for the white pubescence that covered the stems and undersides of the dark green, lanceolate leaves; the hairy inflorescences were tinted reddish brown to purplish. From plump purple buds with fish scale-like phyllaries, bright magenta flowers bloomed from mid-August to October. Plants were generally robust, although variable in leaf color and plant size; purple-tinged leaves and purple stems were noted in the group. Powdery mildew and rust were common problems in late September; infection levels typically ranged



Vernonia trial beds in the Lavin Plant Evaluation Garden

from moderate to severe. Missouri ironweed is native to a variety of landscapes such as mesic prairies, swamps, and along railroads in the central United States.

Vernonia noveboracensis had a gangly habit in its youth, but eventually developed a strong bushy habit to 80 inches tall and 68 inches wide. From mid-August to late September, deep purple flowers were borne in massive inflorescences to nearly 2 feet across. The dark green, lanceolate leaves were coarse, to 8 inches long, and borne on stiff purplish stems. New York ironweed was rust-free during our trial; however, severe powdery mildew was common in late August and September. *Vernonia noveboracensis* is native throughout the eastern United States, from Massachusetts to Florida, on moist sites such as floodplains, pond edges, and seeps. 'White Lightning'—a seed strain developed by Jelitto Perennial Seeds—bloomed the first year from seed. Pure white flowers opened in mid-August on rigid stems to 70 inches tall and 44 inches wide. The dark green leaves were rust-free, but powdery mildew

was troublesome in the late season. 'White Lightning' was evaluated for only three growing seasons.

Vernonia 'Southern Cross' was selected from seed sown as *V. lettermannii* by Brent Horvath, Intrinsic Perennial Gardens, Hebron, Illinois. The dark green, willow-like foliage was wider than narrowleaf ironweed with a bronze cast to the terminal leaves and purplish stems. Bright purple flowers, in heads to 1 inch across, were plentiful from mid-August to late September. 'Southern Cross' was stiffly erect and bushy to 40 inches tall and 33 inches wide after four years. Severe rust was noted each year, but plants were mildew-free.

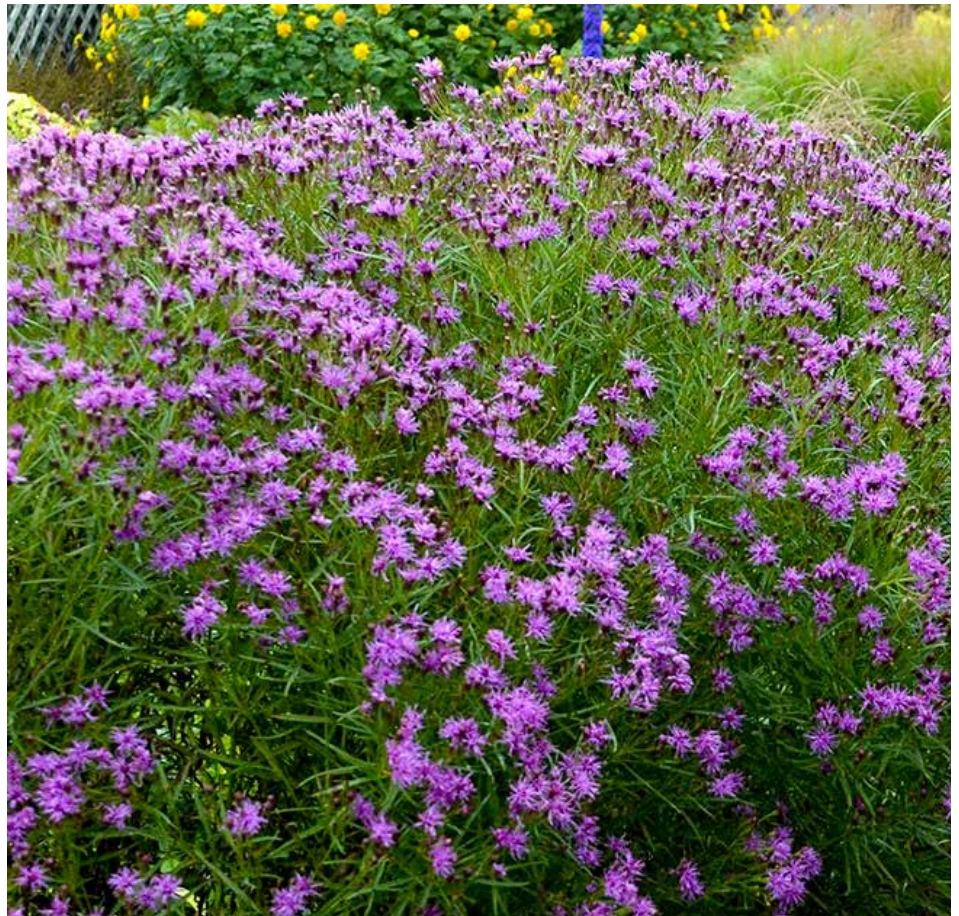
Summary

Ironweeds may be uncommon garden plants but are obvious choices for ecological and naturalistic landscapes, especially for pollinator gardens. The sheer number and variety of insects drawn to their profuse display of late-season purple flowers is astonishing. The only plant group with greater insect visitation in the Chicago Botanic Garden's trials were mountain mints (*Pycnanthemum* spp.), and in particular, silvery-leaved *P. muticum*. Ironweeds are often overlooked as garden plants due in part to their large size, and perhaps, being native plants, they are not readily available in average garden centers. Furthermore, the dearth of innovation in breeding and selecting new cultivars has until recently exacerbated the matter. Fortunately, the introduction of new compact hybrid cultivars, such as 'Southern Cross', 'Summer's Surrender', and 'Summer's Swan Song', has created excitement in the gardening world. Beyond the strong ornamental attributes, easy culture and adaptability to a variety of cultural conditions are merits of ironweeds.





Vernonia noveboracensis



Vernonia 'Southern Cross' courtesy Walters Gardens

Four ironweeds received five-star excellent ratings, including *Vernonia gigantea* ssp. *gigantea* 'Jonesboro Giant', *V. lettermannii* 'Iron Butterfly', *V.* 'Summer's Surrender', and *V.* 'Summer's Swan Song'. These top-rated ironweeds featured superior ornamental traits such as strong vigorous habits, handsome foliage, heavy flower production, winter hardiness, and disease resistance. Foliar diseases plagued the remainder of the ironweeds and were the most common cause for lower ratings. Amassing a plant group such as ironweeds in a common location is atypical of how these plants would be grown, so the proliferation of a particular disease such as rust or powdery mildew may not be a natural occurrence in every landscape. Cold hardiness was not an issue for the ironweeds, except for 'Plum Peachy', which is a selection of the southern species *V. angustifolia*. In the case of 'Plum Peachy', issues with soil moisture may have played a part in its winter loss as much as cold temperatures.

Rather than relegating ironweeds to native lists and associated landscape uses, consider that their striking purple flowers bloom at the right time to punch up the late season garden. Whether tall or short, ironweeds pair well with other late bloomers such as sunflowers (*Helianthus* spp.), goldenrods (*Solidago* spp.), and asters (*Symphyotrichum* spp.), as well as ornamental grasses such as big bluestem (*Andropogon gerardii*), Indiangrass (*Sorghastrum nutans*), and switchgrass (*Panicum virgatum*). While the issue of diseases cannot be ignored, the ornamental merits and pollinator appeal of ironweeds may outweigh these potential troubles for some gardeners.

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Table 2: Observed plant traits and performance ratings

Overall Rating ¹	<i>Vernonia</i>	Flower Color	Flower Size ²	Bloom Period	Flower Production	Plant Height	Plant Width	Rust	Powdery Mildew
★★	<i>V. angustifolia</i> 'Plum Peachy'	violet-purple	1 in.	early September to mid-October	fair	42 in.	28 in.	none observed	none observed
★★★★	<i>V. arkansana</i>	purple	1¼ in.	mid-August to early October	excellent	72 in.	55 in.	yes	yes
★★★★	<i>V. baldwinii</i>	purple	¾ in.	early August to mid-September	excellent	68 in.	50 in.	yes	yes
★★★	<i>V. chinensis</i>	light purple	⅝ in.	mid-August to early October	excellent	84 in.	50 in.	yes	yes
★★★	<i>V. fasciculata</i>	purple	¾ in.	late August to late September	good	67 in.	72 in.	yes	yes
★★★★	<i>V. gigantea</i>	purple-violet	½ in.	late August to early October	excellent	103 in.	65 in.	yes	yes
★★★★	<i>V. gigantea</i> ssp. <i>gigantea</i>	purple	¾ in.	mid-September to late October	excellent	100 in.	70 in.	yes	yes
★★★★★	<i>V. gigantea</i> ssp. <i>gigantea</i> 'Jonesboro Giant'	purple	¾ in.	late September to early Nov	excellent	144 in.	60 in.	none observed	yes
★★★	<i>V. glauca</i>	purple-violet	1 in.	mid-August to late September	excellent	72 in.	64 in.	yes	yes
★★★★	<i>V. lettermannii</i>	purple	½ in.	mid-September to mid-October	excellent	43 in.	48 in.	none observed	none observed
★★★★★	<i>V. lettermannii</i> 'Iron Butterfly'	purple	½ in.	mid-September to late October	excellent	33 in.	54 in.	none observed	none observed
★★★★	<i>V. missurica</i>	bright magenta	1 in.	mid-August to early October	excellent	74 in.	64 in.	yes	yes
★★★	<i>V. noveboracensis</i>	dark purple	1 in.	mid-August to late September	excellent	80 in.	68 in.	none observed	yes
★★★★	<i>V. noveboracensis</i> 'White Lightning'	white	¾ in.	mid-August to late September	good	70 in.	44 in.	none observed	yes
★★★★	<i>V.</i> 'Southern Cross'	bright purple	1 in.	mid-August to late September	excellent	40 in.	33 in.	yes	yes
★★★★★	<i>V.</i> 'Summer's Surrender'	dark purple	1 in.	early September to early October	excellent	48 in.	74 in.	none observed	none observed
★★★★★	<i>V.</i> 'Summer's Swan Song'	dark purple	1 in.	early September to mid-October	excellent	36 in.	40 in.	none observed	none observed

¹Overall Rating: ★★★★★ excellent, ★★★★ good, ★★★ fair, ★★ poor, ★ very poor

²Flower Size: width of a single flower head or capitulum