



Horticultural Report

A photograph of a field of tall, purple, spiky flowers, likely Salvia (Sage), under a bright sun. A bee is visible on one of the flowers in the foreground. The background shows more of the same flowers and some green trees under a clear blue sky.

Cincinnati Zoo & Botanical Garden Pollinator Watch 2023

Jerome Stenger, Horticulture

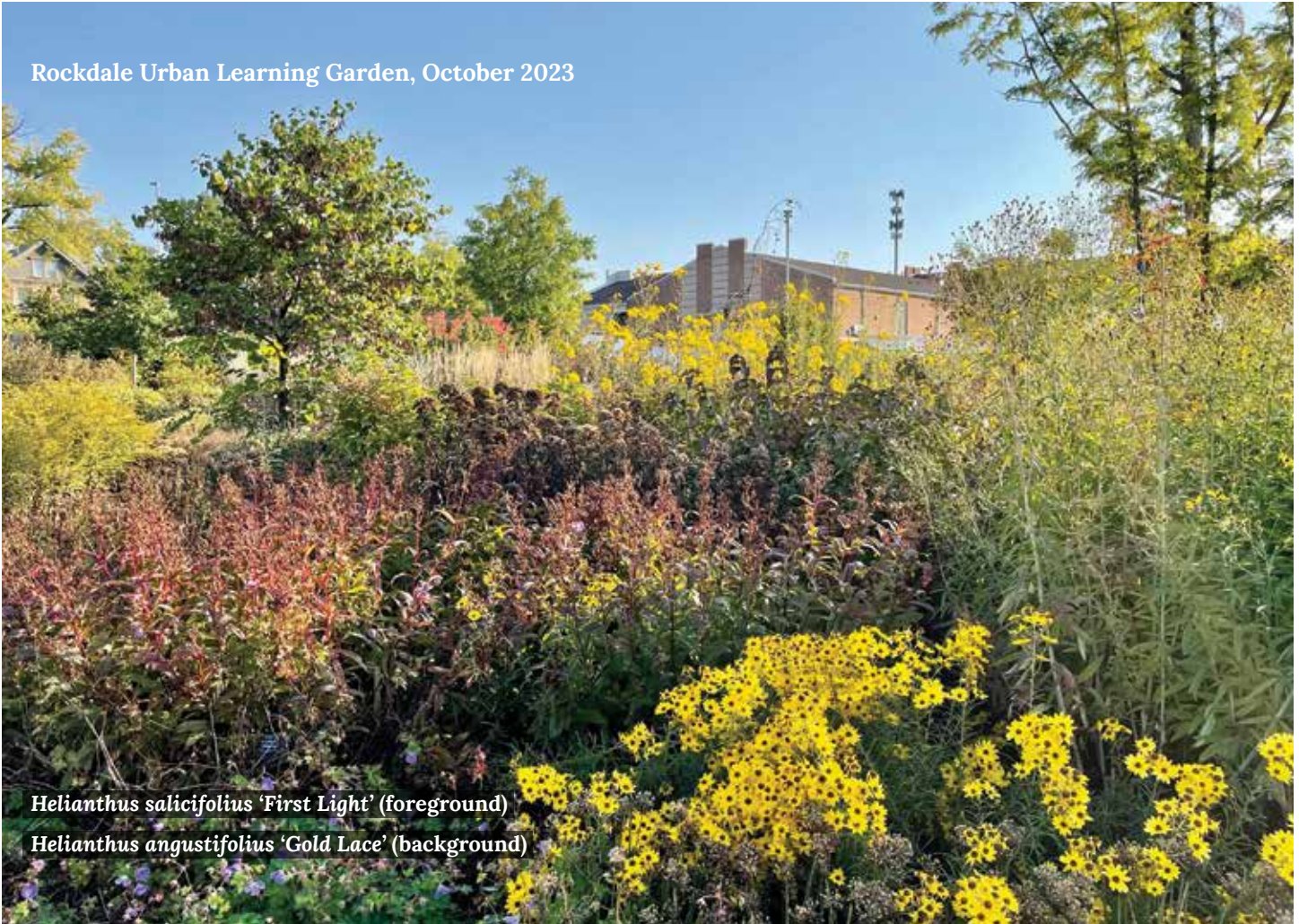
Sam Moore, Americorp

Mark Plucinski, Americorp

Carpenter bees on *Solidago speciosa*



Rockdale Urban Learning Garden, October 2023



Helianthus salicifolius 'First Light' (foreground)

Helianthus angustifolius 'Gold Lace' (background)

The Cincinnati Zoo & Botanical Garden has been a leading steward in sustainable urban landscapes since its founding in 1873. This year, the Zoo received the highest level of accreditation awarded by the Arbnet Arboretum Accreditation Program and the Morton Arboretum, becoming the first zoo in the world to hold a Level IV honor. Our commitment to conservation and sustainable urban/suburban landscapes spills out from our immersive animal habitats and Zoo landscapes. It takes place two blocks east at Rockdale Academy, where we've installed one of the largest learning gardens in the country with help from the Cincinnati Reds Community Fund. It takes place at Bowyer Farm in Mason, OH, where we've restored an ancient wetland, planted browse fields to feed our animals, and operate our Native Plant Program. It lives behind the scenes at the Zoo's Center for Research of Endangered Wildlife (CREW), where we cryopreserve rare plants.

With that support and momentum, the Zoo's Horticulture department has spearheaded programs like **Pollinator Watch**, which seeks to observe and document plant-pollinator interactions at the Zoo and nearby community gardens to determine which plants are best at attracting pollinators. As a vast plant trialing site, we have the luxury of canvassing a broad set of unique, wonderful plants, many of which you can find in garden centers and many of which we hope to see an increased demand for in the coming years. This data informs the landscaping choices we make at the Zoo and we want to share it with you, the Midwestern plant enthusiast.

WHY POLLINATOR GARDENS?

The term *pollinator garden* is not just a theme but a mindset. After all, most themed gardens - be it cottage, formal, food, rock, near-native, faux-tropical - are also, accidentally, pollinator gardens, assuming they host a tableau of flowering plants. By making a few practical adjustments to your space and adopting a holistic gardening approach, you can transform it into a high-functioning *pollinator habitat*. This report highlights some of the specific plant choices you can make. Most importantly, we hope this inspires you to reflect on your space, be it a yard or a balcony, and think about how you can tap into the green grid in sustainable, low-maintenance ways. Pollinator gardens speak to our blunt interest in pretty things but more importantly to our desire to aid sterile, suffering landscapes.



Bumblebee on *Echinacea purpurea* 'Ruby Star'



Heuchera villosa 'Autumn Bride' (window box)

Lagerstroemia 'BLACK DIAMOND® Precious Pink'

POLLINATOR WATCH

The goal of Pollinator Watch is simple - observe plants in flower and record what you see. Sounds pretty easy, but there are many obstacles to sound data. As a research contributor, knowing your exact location in the labyrinthine Zoo or Rockdale Urban Learning Garden is tough enough. Field identification of insects is most difficult, especially with the smaller ones, which can be nearly impossible. Plant labelling in the garden is essential, and laborious. After all that, entering data repeatedly into a phone app (Survey123 by ArcGIS) while battling screen glare on a hot sunny day is no one's idea of fun.

Despite the obstacles, 17 Horticulture volunteers and 2 Americorp service members logged over 400 hours of field time, collecting 5,310 data points from March 20 to November 20. We laid eyes on 266 perennial varieties and 87 shrub varieties. Though trees are the most important facet of any pollinator habitat, we excluded them from Pollinator Watch due to the difficulty of observing their blooms up close. Annuals were also excluded, but a separate smaller study was done in 2023 and those results are included. In the end, enough data was collected to present a fair pollinator snapshot for 174 perennials and 50 shrubs.

Plants were only observed in calm conditions above 55 degrees. Insect abundance counts were done in a 1.5'x1.5' imaginary box close to the plant over 10 seconds. Insect diversity counts were done for 20 seconds over the entire grouping of each plant variety. Seasonal bloom times were measured in relation to a plant's peak bloom. Subjective 1-5 ratings were assigned for ornamental curb appeal and pollinator visitation.



Clouded sulphur leaving
Aster laevis 'Bluebird'



Bumblebee on *Helianthus eggertii*

ABUNDANCE NOTES

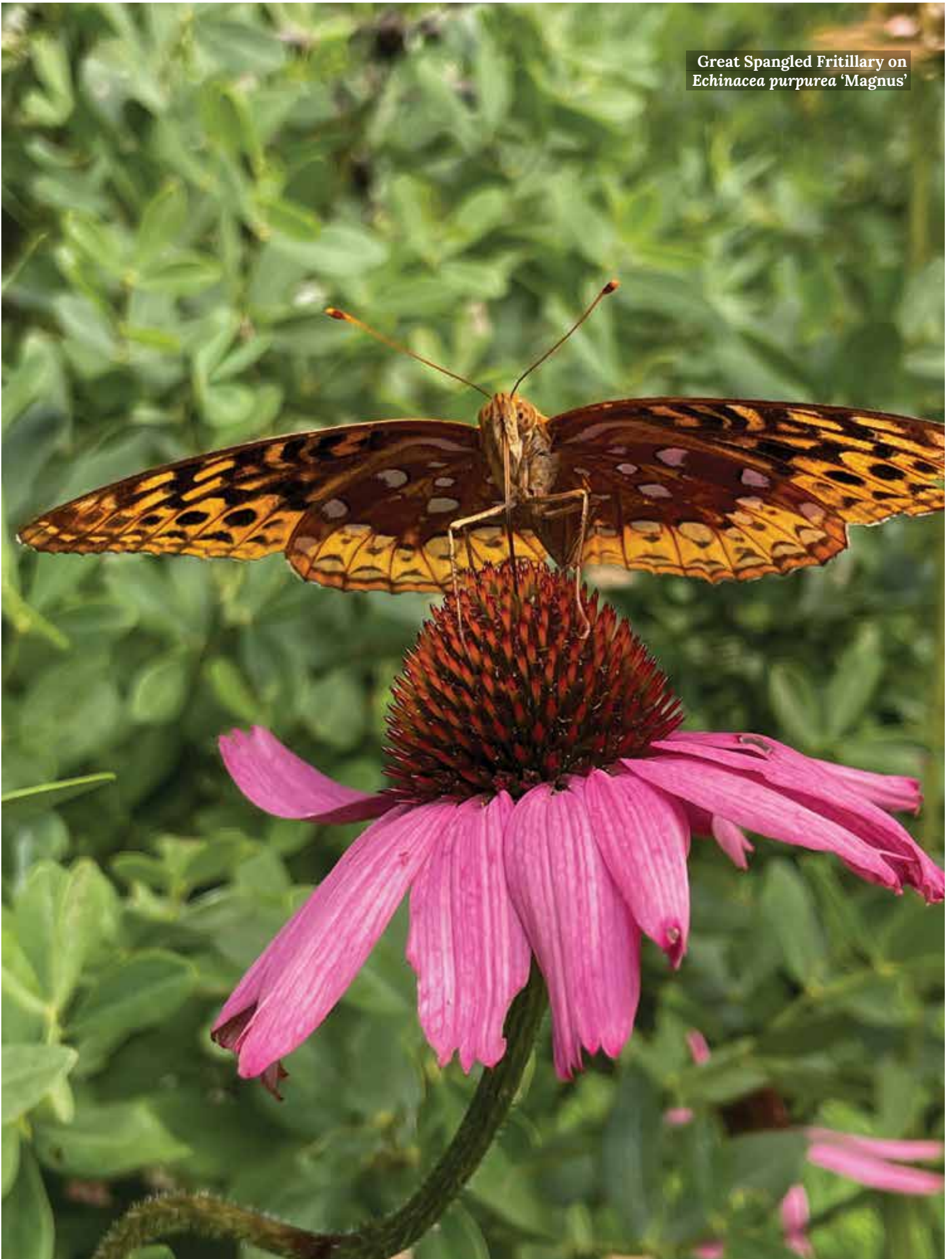
- Of the 224 plant varieties, 195 were cultivars. Some form of pollinator visitation was documented on 95% of total plant varieties and 97% of cultivars.
- Only 11 plant varieties had no documented pollinator visitation (5%). Of those, 10 bloomed in mid-spring when overall pollinator activity was low.
- *Agastache* 'Blue Fortune' ranked 6th of 224 in average pollinator abundance (8.1) and brought in all 9 insect diversity groups we looked for. It's truly one of our best pollinator plants. But, its overwhelming success could devalue other great plants with lesser metrics, which is not the purpose of this report.
- *Echinacea paradoxa* ranked 163rd of 224 in average pollinator abundance (1.3) and brought less than half the insect diversity groups of *Agastache* 'Blue Fortune'. Does that render *E. paradoxa* a bad pollinator plant? Of course not. A 1.3 abundance average is nothing to scoff at. Over the course of an entire mid-June day, that equates to potentially hundreds of pollinator visits. When we factor in other ecological perks, such as its support of the food web as a native host plant, or the nutritional value of its seed to songbirds, we are reminded that gardens are dynamic environments that reward diversity.
- *E. paradoxa* is also really pretty, if that means anything to you.
- Pollinator plant rankings are illuminating and fun, but they are relative. This is why you won't see numbered rankings in this report.

Hydrangea paniculata 'Pinky Winky'
Hemerocallis 'The Jury's Out'
Perovskia 'Sage Advice'



Echinacea paradoxa

Great Spangled Fritillary on
Echinacea purpurea 'Magnus'



PERENNIALS

Average Pollinator Abundance

- 9.3 Eryngium yuccifolium
- 8.8 Allium 'Millenium'
- 8.1 Agastache 'Blue Fortune'
- 8.1 Pycnanthemum muticum
- 7.3 Aster tataricus 'Jindai'
- 7.3 Solidago odora
- 7.1 Nepeta 'Walker's Low'
- 7.0 Chrysanthemum 'Campfire Glow'
- 6.9 Solidago speciosa
- 6.8 Agastache 'Purple Haze'
- 6.7 Calamintha nepeta 'Montrose White'
- 6.6 Aster laevis 'Bluebird'
- 6.5 Allium 'Summer Peek-a-Boo®'
- 6.4 Calamintha nepeta 'Blue Cloud'
- 6.3 Allium 'Lavender Bubbles'
- 6.3 Sedum 'Autumn Fire'
- 6.3 Salvia nemerosa 'SALLYROSA™ April Night'
- 6.2 Sedum 'Autumn Joy'
- 6.0 Agastache rugosa 'Little Adder'
- 6.0 Nepeta racemosa 'Blue Wonder'
- 5.7 Salvia nemerosa 'COLOR SPIRES® Violet Riot'
- 5.6 Allium lusitanicum 'Summer Beauty'
- 5.1 Salvia greggii 'MIRAGE™ Blue'
- 5.0 Agastache 'Black Adder'
- 5.0 Allium 'Serendipity'
- 4.8 Perovskia atriplicifolia
- 4.8 Sedum 'ROCK N' ROUND® Popstar'
- 4.7 Physostegia virginiana 'Pink Manners'
- 4.6 Foeniculum vulgare 'Bronze'
- 4.6 Salvia nemerosa 'COLOR SPIRES® Crystal Blue'
- 4.5 Origanum 'Drops of Jupiter'
- 4.5 Solidago rugosa 'Fireworks'
- 4.4 Eupatorium maculatum 'Gateway'
- 4.4 Eupatorium dubium 'Little Joe'
- 4.4 Sedum 'Pure Joy'
- 4.3 Aster oblongifolius 'Raydon's Favorite'
- 4.3 Liatris microcephala
- 4.3 Nepeta subsessilis 'PRELUDE™ Blue'
- 4.0 Agastache 'Blue Boa'
- 3.9 Echinacea tennesseensis
- 3.9 Rudbeckia laciniata 'Autumn Sun'
- 3.6 Monarda bradburiana
- 3.5 Helianthus angustifolius 'Gold Lace'
- 3.5 Heuchera villosa 'Autumn Bride'
- 3.5 Hosta 'Guacamole'
- 3.4 Vernonia 'Summer's Swan Song'
- 3.3 Echinacea 'BUTTERFLY™ Purple Emporer'
- 3.3 Leucanthemum s. 'AMAZING DAISIES® Daisy May'
- 3.3 Stachys monieri 'Hummelo'
- 3.2 Scutellaria incana

Average Pollinator Abundance was measured by counting insects within a 1.5 sq. ft. section of the plant for 10 seconds. In order to qualify, plants had to be observed at least 4 times during their bloom season.



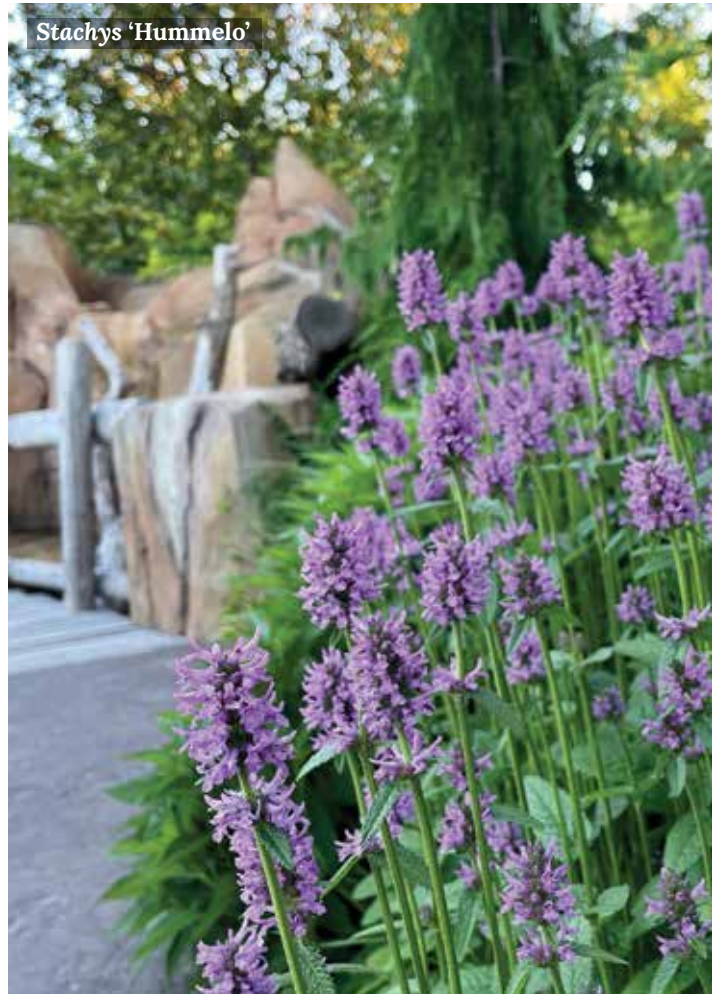
Eupatorium maculatum 'Gateway'



Physostegia virginiana 'Miss Manners'



Stachys 'Hummelo'



SHRUBS

Average Pollinator Abundance

Average Pollinator Abundance was measured by counting insects within a 1.5 sq. ft. section of the plant for 10 seconds. In order to qualify, plants had to be observed at least 4 times during their bloom season.

10.9	Hydrangea arborescens 'Haas Halo'
8.6	Hypericum kalmianum 'Blues Festival'®
8.3	Hydrangea quercifolia 'Sikes Dwarf'
7.9	Hypericum 'Sunny Boulevard'®
7.5	Symphoricarpos 'Proud Berry'®
6.7	Spiraea 'DOUBLE PLAY® Blue Kazoo'®
6.0	Hydrangea paniculata 'Pinky Winky'®
5.6	Hydrangea quercifolia 'Pee Wee'
5.2	Viburnum nudum 'Blue Muffin'®
4.6	Rosa 'OSO EASY® Double Pink'
4.4	Buddleja 'MONARCH® Prince Charming'
4.4	Viburnum nudum 'Winterthur'
3.9	Diervilla 'KODIAK® Red'
3.8	Hydrangea paniculata 'Fire Light'®
3.7	Buddleja 'Grand Cascade'
3.3	Buddleja 'CHRYSALIS™ Blue'
3.2	Buddleja 'CHRYSALIS™ Cranberry'
3.1	Lagerstroemia 'CENTER STAGE® Red'
3.0	Cornus 'Cardinal'
2.9	Buddleja 'Pink Cascade'
2.9	Diervilla 'KODIAK® Orange'
2.8	Buddleja 'CHRYSALIS® Pink'
2.7	Buddleja 'LO & BEHOLD® Purple Haze'
2.3	Diervilla 'KODIAK® Black'
2.3	Fothergilla 'Blue Shadow'
2.3	Hydrangea quercifolia 'Ruby Slippers'
2.2	Rosa 'Rise Up Ambersness'®
2.1	Buddleja 'LO & BEHOLD® Ruby Chip'
1.9	Buddleja 'HUMDINGER® Orchid Annie'
1.8	Fothergilla major 'Red Licorice'
1.8	Hydrangea quercifolia 'Gatsby Star'®
1.6	Deutzia gracilis 'Chardonnay Pearls'®
1.6	Hydrangea quercifolia 'Snow Queen'
1.4	Rosa 'OSO EASY Double Red'®
1.3	Buddleja 'CHRYSALIS™ Purple'
1.3	Buddleja 'PUGSTER Pink'®
1.3	Hydrangea arborescens 'INVINCIBELLE® Spirit II'
1.3	Hydrangea paniculata 'Little Lime'®
1.3	Rosa 'OSO EASY Lemon Zest'®
1.3	Viburnum carlesii 'Spice Girl'®
0.9	Buddleja 'PUGSTER Amethyst'®
0.9	Exochorda 'SNOW DAY® Blizzard'
0.8	Cephalanthus occidentalis 'Sugar Shack'®
0.7	Hibiscus syriacus 'Azurri Blue Satin'®
0.7	Itea virginica 'Fizzy Mizzy'®
0.5	Hydrangea arborescens 'Lime Rickey'®
0.4	Indigofera kirilowii 'NC Form'
0.3	Viburnum carlesii 'Compactum'
0.0	Calycanthus 'Aphrodite'
0.0	Calycanthus floridus

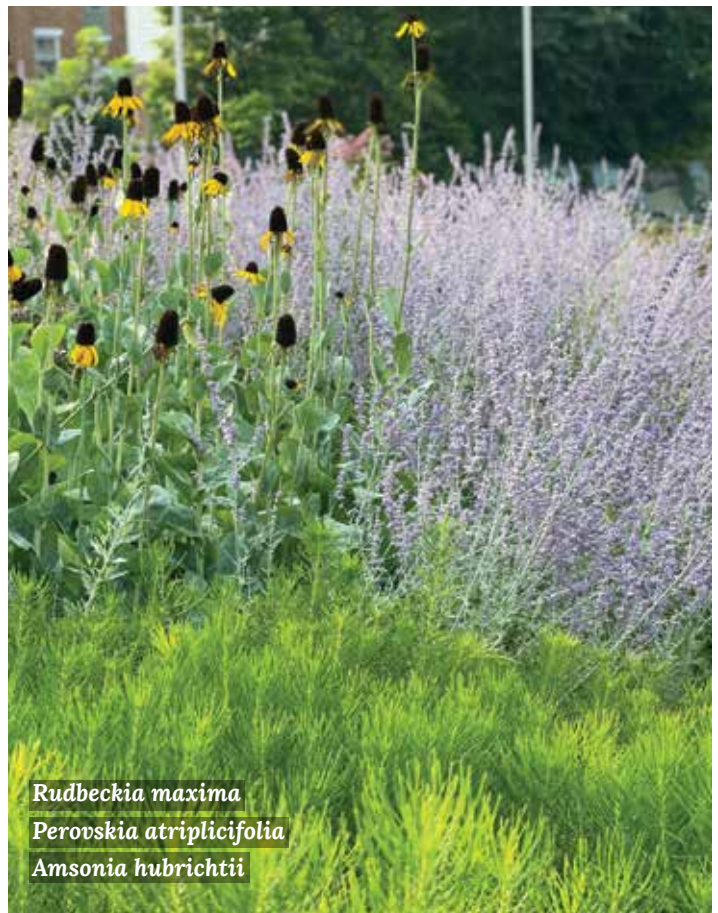
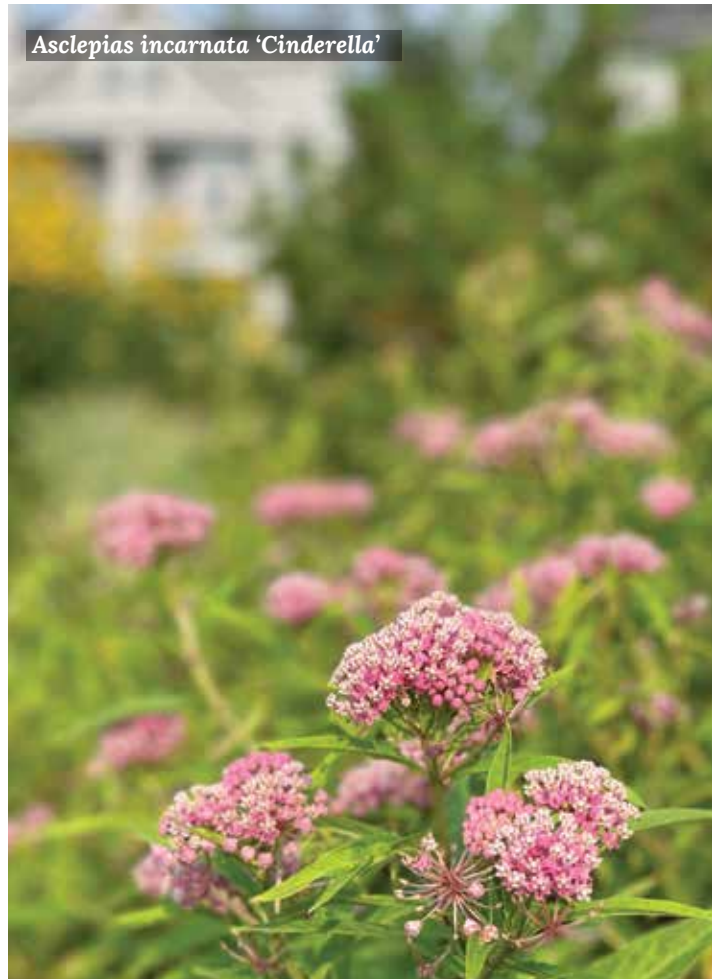


Carpenter bee on *Hibiscus* 'Lohengrin'



SEASONALITY NOTES

- In the following pages, we order every plant in the research not just by bloom month but also by peak bloom week. Weeks are labelled in a 1-52 format. Peak bloom range for our data set occurred between weeks 15-42 (April 9th to October 15th).
- Also listed with each plant are total number of bloom weeks and range. Continuous, overlapping bloom is key to a good pollinator habitat. Periods of rebloom were not included in the research.
- Though floral rewards in spring are bolstered by flowering trees (not included in our research), herbaceous perennial flowering is limited during this time, kick-starting in late spring and reaching peak in mid-late summer. Floral rewards overall are most limited in fall, as woody plants prepare for dormancy and a relatively small batch of herbaceous perennials carry the floral torch into November. Prioritize spring and especially fall for blooming.
- Consider the entire plant palette, from the largest canopy trees to the smallest front border annuals. Use native host plants mixed with good non-native pollinator plants. Extend the flowering season with proper tree selection and the incorporation of annuals into your gardens. For annual recommendations, see page 26.
- Wait until spring to perform garden cutbacks and set debris along the edge of the yard. Insects overwinter their eggs in pithy plant stems.



Rudbeckia maxima
Perovskia atriplicifolia
Amsonia hubrichtii



APRIL

Perennial/Shrub Bloom Schedule

Green=shrub Blue=insufficient pollinator data, bloom time accurate

Peak Week	Plant	Avg. Abund.	Total Bloom Weeks	Week Numbers
15	<i>Viburnum carlesii</i> 'Spice Girl®'	1.3	4	14-17
15	<i>Euphorbia robbiae</i>	0.9	8	13-20
15	<i>Epimedium</i> 'Frohneiten'	0.6	4	14-17
15	<i>Epimedium</i> 'Pink Elf'	0.3	4	14-17
15	<i>Viburnum carlesii</i> 'Compactum'	0.3	4	14-17
15	<i>Epimedium pinnatum colchicum</i>	0.0	4	14-17
15	<i>Epimedium</i> x <i>rubrum</i>	0.0	4	14-17
15	<i>Epimedium</i> x <i>sulphureum</i>	0.0	4	14-17
15	<i>Epimedium</i> 'Merlin'		3	15-17
16	<i>Fothergilla</i> 'Blue Shadow'	2.3	3	14-18
16	<i>Pulmonaria</i> 'Trevi Fountain'	2.2	7	13-19
16	<i>Fothergilla major</i> 'Red Licorice'	1.8	3	14-18
16	<i>Pulmonaria</i> 'Twinkle Toes'	0.6	6	14-19
16	<i>Epimedium</i> 'Fire Dragon'	0.0	4	14-17
16	<i>Epimedium</i> 'Akebono'		4	14-17
16	<i>Epimedium</i> 'Orange Queen'		4	14-17
17	<i>Cornus</i> 'Cardinal'	3.0	4	16-19
17	<i>Brunnera macrophylla</i> 'Alexander's Great'	2.5	6	15-20
17	<i>Brunnera macrophylla</i> 'Sterling Silver'	2.5	6	15-20
17	<i>Sedum ternatum</i>	1.2	8	15-22
17	<i>Amsonia tabernaemontana</i> 'Storm Cloud'	1.0	6	15-20
17	<i>Exochorda</i> 'SNOW DAY® Blizzard'	0.9	5	15-19
17	<i>Brunnera macrophylla</i> 'Queen of Hearts'	0.4	6	15-20
17	<i>Epimedium</i> 'Niveum'	0.0	3	16-18



Other Notable Blooms

- Azalea (sp.)
- Chaenomeles (sp.)
- Cornus sericea*
- Dicentra eximia*
- Forsythia (sp.)
- Gelsemium sempervirens*
- Lilac (sp.)
- Mertensia virginica*
- Philadelphus coronarius*
- Phlox subulata*
- Rhododendron 'PJM'
- Spiraea x cinerea*
- Viburnum burkwoodii*
- Viburnum x rhytidophylloides*
- Zanthoxylum americanum*



MAY

Perennial/Shrub Bloom Schedule

Green=shrub Blue=insufficient pollinator data, bloom time accurate

Peak Week	Plant	Avg. Abund.	Total Bloom Weeks	Week Numbers
18	Salvia 'COLOR SPIRES® Pink Dawn'	2.1	6	16-21
18	Salvia 'FASHIONISTA® Moulin Rouge'	1.4	7	16-22
18	Packera obovata	0.8	5	15-20
18	Salvia 'FASHIONISTA® Ballerina Pink'	0.5	7	16-22
18	Polygonatum 'Ruby Slippers'	0.5	5	17-21
18	Polemonium 'Touch of Class'	0.3	8	15-22
18	Polygonatum biflorum	0.2	5	17-21
19	Viburnum nudum 'Blue Muffin®'	5.2	4	18-22
19	Salvia nemerosa 'May Night'	2.9	6	17-22
19	Deutzia gracilis 'Chardonnay Pearls®'	1.6	6	17-22
19	Salvia nemerosa 'Tidal Pool'	1.1	7	17-23
19	Lonicera sempervirens 'Major Wheeler'	0.9	16	17-32
19	Geranium macrorrhizum 'Bevan's Variety'	0.8	5	17-21
19	Amsonia 'Starstruck'	0.3	4	18-21
19	Polemonium 'Golden Feathers'		6	16-21
19	Calycanthus floridus	0.0	7	17-23
20	Spiraea 'DOUBLE PLAY® Blue Kazoo®'	6.7	4	19-22
20	Salvia nemerosa 'SALLYROSA™ April Night'	6.3	6	17-22
20	Salvia nemerosa 'COLOR SPIRES® Violet Riot'	5.7	6	17-22
20	Salvia nemerosa 'COLOR SPIRES® Crystal Blue'	4.6	6	17-22
20	Monarda bradburiana	3.6	5	18-22
20	Baptisia 'Midnight Prairieblues'	3.2	4	19-22
20	Salvia nemerosa 'Perfect Profusion'	1.8	7	17-23
20	Amsonia hubrichtii	1.8	5	18-22
20	Salvia nemerosa 'NEW DIMENSION™ Blue'	1.7	5	18-22
20	Baptisia 'DECADENCE® Lemon Meringue'	1.3	3	19-21
20	Baptisia 'Honey Roasted'	1.0	3	19-21
20	Amsonia hubrichtii 'Butterscotch'	0.7	5	18-22
20	Amsonia hubrichtii 'String Theory'	0.7	5	17-21
20	Dianthus 'ROCKIN™ Rose'	0.2	6	18-23



MAY (cont)

Perennial/Shrub Bloom Schedule



Baptisia 'Solar Flare Prairieblues'



Bumblebee on *Penstemon calycosus*



Sweat Bee on *Nepeta subsessilis*
'PRELUDE Blue'

Peak Week	Plant	Avg. Abund.	Total Bloom Weeks	Week Numbers
21	<i>Nepeta</i> 'Walker's Low'	7.1	8	18-25
21	<i>Nepeta racemosa</i> 'Blue Wonder'	6.0	7	19-25
21	<i>Nepeta subsessilis</i> 'PRELUDE™ Blue'	4.3	7	18-24
21	<i>Baptisia</i> 'Burgundy Blast'	2.5	3	20-22
21	<i>Nepeta grandiflora</i> 'Summer Magic'	2.2	8	18-25
21	<i>Nepeta</i> 'Purple Haze'			19-24
21	<i>Baptisia</i> 'DECADENCE® DELUXE Pink Lemonade'	1.8	3	20-22
21	<i>Lonicera reticulata</i>		4	20-23
21	<i>Baptisia</i> 'American Goldfinch'	1.5	2	20-21
21	<i>Baptisia</i> 'Solar Flair Prairieblues™'	1.3	3	20-22
21	<i>Rosa</i> 'OSO EASY Lemon Zest®'	1.3	13	20-32
21	<i>Baptisia</i> 'DECADENCE® Sparkling Sapphires'	1.2	3	20-22
21	<i>Baptisia sphaerocarpa</i>	1.0	2	20-21
21	<i>Baptisia</i> 'DECADENCE® DELUXE Blue Bubbly'		3	20-22
21	<i>Amsonia</i> 'Blue Ice'	0.6	6	19-24
21	<i>Clematis</i> 'Violet Stardust'	0.5	3	20-22
21	<i>Phlox</i> 'Earlibeauty® Rose Bouquet'	0.4	5	19-24
21	<i>Indigofera kirilowii</i> 'NC Form'	0.4	4	20-23
21	<i>Scutellaria resinosa</i> 'Smoky Hills'	0.2	6	19-24
21	<i>Dianthus</i> 'ROCKIN™ Red'	0.0	6	19-24
21	<i>Phlox</i> 'Opening Act Blush'		5	19-24
22	<i>Viburnum nudum</i> 'Winterthur'	4.4	8	17-24
22	<i>Iris versicolor</i> 'Purple Flame'		4	20-23
22	<i>Penstemon digitalis</i> 'Pocahontas'	3.0	6	20-25
22	<i>Nepeta</i> 'Cat's Pajamas'	2.9	9	17-25
22	<i>Penstemon calycosus</i>	2.8	7	20-26
22	<i>Penstemon</i> 'Blackbeard'		6	20-25
22	<i>Penstemon</i> 'Onyx and Pearls'	2.3	6	20-25
22	<i>Penstemon</i> 'Midnight Masquerade'	2.0	6	20-25
22	<i>Iris versicolor</i>	2.0	4	20-23
22	<i>Aruncus</i> 'Chantilly Lace'		4	20-23
22	<i>Itea virginica</i> 'Fizzy Mizzy®'	0.7	5	20-24
22	<i>Calycanthus</i> 'Aphrodite'	0.0	12	20-31

OTHER NOTABLE BLOOMS

- | | |
|-----------------------------------|--------------------------------|
| <i>Aronia</i> (sp.) | <i>Physocarpus opulifolius</i> |
| <i>Allium schoenoprasum</i> | <i>Podophyllum peltatum</i> |
| <i>Aquilegia canadensis</i> | <i>Polemonium reptans</i> |
| <i>Bignonia capreolata</i> (vine) | <i>Salvia officinalis</i> |
| <i>Calycanthus floridus</i> | <i>Sambucus canadensis</i> |
| <i>Deutzia</i> (sp.) | <i>Spiraea</i> (sp.) |
| <i>Dodecatheon meadia</i> | <i>Thymus vulgaris</i> |
| <i>Iris germanica</i> | <i>Tiarella cordifolia</i> |
| <i>Paeonia</i> (sp.) | <i>Viburnum dentatum</i> |

JUNE

Perennial/Shrub Bloom Schedule

Green=shrub Blue=insufficient pollinator data, bloom time accurate

Peak Week	Plant	Avg. Abund.	Total Bloom Weeks	Week Numbers
23	Monarda bradburiana 'Prairie Gypsy'	2.8	5	21-26
23	Penstemon 'Dark Towers'		6	20-25
23	Aruncus dioicus	2.3	4	22-25
23	Phlox 'Fashionably Early Flamingo'	1.5	5	21-25
23	Phlox 'Solar Flare'	1.4	5	21-25
23	Spigelia marilandica	0.6	11	21-31
23	Achillea millefolium 'Pomegranate'	0.6	6	22-27
23	Gillenia stipulata	0.0	4	21-24
23	Phlox 'Fashionably Early Crystal'	0.0	5	21-25
24	Hydrangea arborescens 'Haas Halo'	10.9	6	22-27
24	Hypericum kalmianum 'Blues Festival' [®]	8.6	5	21-25
24	Hydrangea quercifolia 'Sikes Dwarf'	8.3	5	22-26
24	Hydrangea quercifolia 'Pee Wee'	5.6	5	22-26
24	Diervilla 'KODIAK [®] Red'	3.9	5	22-26
24	Stachys monieri 'Hummelo'	3.3	7	22-28
24	Diervilla 'KODIAK [®] Orange'	2.9	5	22-26
24	Veronica 'MAGIC SHOW [®] Wizard of Ahhs'	2.5	9	21-29
24	Asclepias incarnata 'Cinderella'		5	22-26
24	Coreopsis verticillata 'Zagreb'	2.3	5	23-27
24	Diervilla 'KODIAK [®] Black'	2.3	5	22-26
24	Hydrangea quercifolia 'Ruby Slippers'	2.3	5	22-26
24	Veronica 'Skywalker Blue'	2.2	8	21-28
24	Rosa 'Rise Up Ambersness' [®]	2.2	6	20-25
24	Veronica 'Magic Show White Wands'	2.0	9	21-29
24	Monarda didyma 'Jacob Cline'		6	22-27
24	Hydrangea quercifolia 'Gatsby Star' [®]	1.8	5	22-26
24	Veronica 'MAGIC SHOW [®] Purple Illusion'	1.6	8	22-29
24	Hydrangea quercifolia 'Snow Queen'	1.6	5	22-26
24	Echinacea paradoxa	1.3	6	22-27
24	Hydrangea arborescens 'INVINCIBELLE [®] Spirit II'	1.3	6	22-27
25	Leucanthemum s. 'AMAZING DAISIES [®] Daisy May'	3.3	10	24-33
25	Asclepias tuberosa	2.1	13	22-34
25	Nepeta 'Junior Walker' [™]	2.1	9	20-28
25	Leucanthemum 'Madonna'	1.8	10	24-33
26	Hypericum 'Sunny Boulevard' [®]	7.9	8	22-29
26	Echinacea tennesseensis	3.9	10	23-32
26	Echinacea 'BUTTERFLY [™] Purple Emperor'	3.3	10	23-32
26	Leucanthemum superbum 'Becky'	3.1	11	23-33
26	Echinacea 'Cheyenne Spirit'	2.2	10	23-32
26	Lavandula 'Phenomenal' [™]	1.6	8	24-31
26	Asclepias syriaca	1.6	5	24-28
26	Achillea 'Sassy Summer Sangria'	0.0	5	24-28



Spigelia marilandica

OTHER NOTABLE BLOOMS

- Abelia (sp.)
- Aesculus parviflora
- Asclepias syriaca
- Astilbe (sp.)
- Cornus amomum
- Cornus racemosa
- Hemerocallis (sp.)
- Hosta (sp.)
- Ilex verticillata
- Itea virginica
- Sambucus canadensis
- Viburnum nudum
- Vitex agnus-castus



Sweat Bee on Echinacea tennesseensis

Praying Mantis on Hibiscus 'Fireball'



Rudbeckia maxima



Hoverfly on *Tradescantia ohioensis*

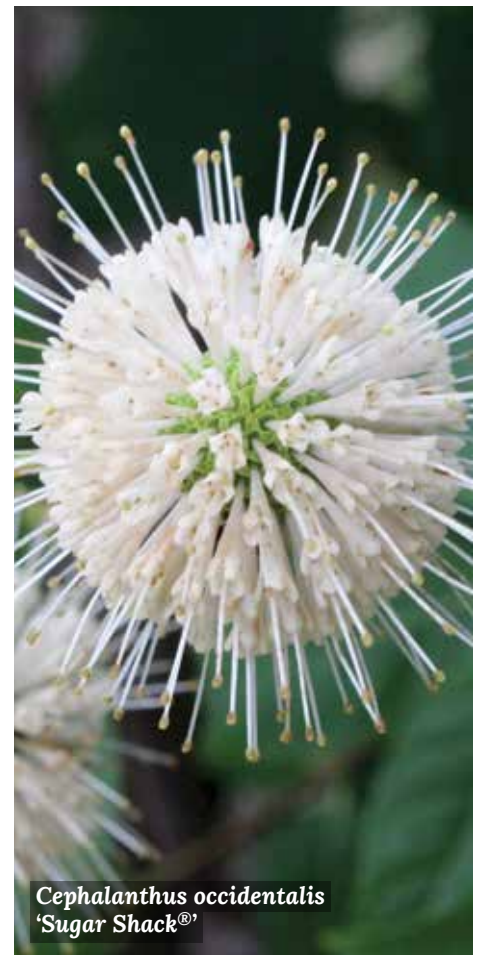


JULY

Perennial/Shrub Bloom Schedule

Green=shrub Blue=insufficient pollinator data, bloom time accurate

Peak Week	Plant	Avg. Abund.	Total Bloom Weeks	Week Numbers
27	<i>Hydrangea paniculata</i> 'Pinky Winky'®	6.0	8	27-34
27	<i>Scutellaria incana</i>	3.2	11	26-36
27	<i>Monarda fistulosa</i> 'Claire Grace'	3.0	3	26-28
27	<i>Echinacea</i> 'Pixie Meadowbrite'	2.4	9	24-32
27	<i>Echinacea</i> 'Glowing Dream'	2.0	10	23-32
27	<i>Buddleja</i> 'HUMDINGER'® Orchid Annie'	1.9	10	24-33
27	<i>Hydrangea paniculata</i> 'Little Lime'®	1.3	8	27-34
27	<i>Cephalanthus occidentalis</i> 'Sugar Shack'®	0.8	5	25-29
27	<i>Hydrangea arborescens</i> 'Lime Rickey'®	0.5	10	22-31
28	<i>Origanum</i> 'Drops of Jupiter'	4.5	8	27-34
28	<i>Agastache</i> 'Blue Boa'	4.0	12	26-38
28	<i>Liatris spicata</i> 'Kobold'	3.0	6	26-31
28	<i>Coreopsis verticillata</i> 'Mayo Clinic Flower of Hope'	2.9	12	25-36
28	<i>Echinacea</i> 'Sombrero Tres Amigos'	2.8	10	24-33
28	<i>Echinacea</i> 'Sombrero Baja Burgundy'	2.7	10	24-33
28	<i>Echinacea purpurea</i> 'Ruby Star'	2.7	9	26-34
28	<i>Liatris spicata</i> 'Floristan Weiss'	6	6	26-31
28	<i>Echinacea</i> 'Sombrero Granada Gold'	2.5	10	24-33
28	<i>Solidago canadensis</i> 'Little Miss Sunshine'	2.4	6	25-30
28	<i>Echinacea</i> 'KISMET'® White'	2.3	10	23-32
28	<i>Echinacea purpurea</i> 'Magnus'	2.3	10	23-32
28	<i>Buddleja</i> 'LO & BEHOLD'® Ruby Chip'	2.1	12	26-37
28	<i>Echinacea purpurea</i> 'White Swan'	2.0	10	23-32
28	<i>Echinacea</i> 'Artisan Red Ombre'	1.9	9	23-31
28	<i>Echinacea</i> 'Fiery Meadow Mama'	1.5	10	23-32
28	<i>Echinacea</i> 'Green Twister'	1.4	8	25-32
28	<i>Rudbeckia maxima</i>	0.8	5	25-29



JULY (cont)

Perennial/Shrub Bloom Schedule



Agastache 'Black Adder'



Eastern Swallowtail on
Phlox paniculata 'Jeana'



Pycnanthemum incanum

Peak Week	Plant	Avg. Abund.	Total Bloom Weeks	Week Numbers
29	Pycnanthemum incanum		12	26-36
29	Eryngium yuccifolium	9.3	6	27-32
29	Agastache 'Blue Fortune'	8.1	14	24-38
29	Agastache 'Purple Haze'	6.8	11	26-36
29	Allium 'Summer Peek-a-Boo®'	6.5	11	24-34
29	Agastache rugosa 'Little Adder'	6.0	10	27-36
29	Physostegia virginiana 'Pink Manners'	4.7	12	25-36
29	Hydrangea paniculata 'Fire Light®'	3.8	10	27-36
29	Physostegia virginiana 'Miss Manners'	2.6	12	25-36
29	Phlox 'Luminary Ultraviolet'	2.0	13	27-39
29	Phlox paniculata 'Jeana'	1.8	16	22-37
29	Agastache 'Mango Tango'	1.8	7	28-34
29	Kniphofia 'Solar Flare'	1.3	18	25-42
30	Allium 'Millenium'	8.8	14	23-36
30	Pycnanthemum muticum	8.1	12	26-36
30	Symphoricarpos 'Proud Berry®'	7.5	9	27-35
30	Agastache 'Black Adder'	5.0	15	24-38
30	Allium 'Serendipity'	5.0	13	24-36
30	Agastache 'Peachie Keen'	3.2	12	27-38
30	Silphium trifoliatum	2.5	7	27-33
30	Salvia azurea	2.1	12	27-38
30	Phlox 'LUMINARY™ Opalescence'	1.9	13	26-38
30	Hibiscus syriacus 'Azurri Blue Satin®'	0.7	11	27-37

OTHER NOTABLE BLOOMS

- | | |
|------------------------|---------------------------|
| Clethra alnifolia | Parthenium intergrifolium |
| Crocsmia 'Lucifer' | Ratibida pinnata |
| Helianthus divaricatus | Rhus (sp.) |
| Hibiscus (sp.) | Silphium (sp.) |
| Lobelia cardinalis | Verbena hastata |
| Monarda fistulosa | Veronicastrum virginicum |



Eryngium yuccifolium

AUGUST

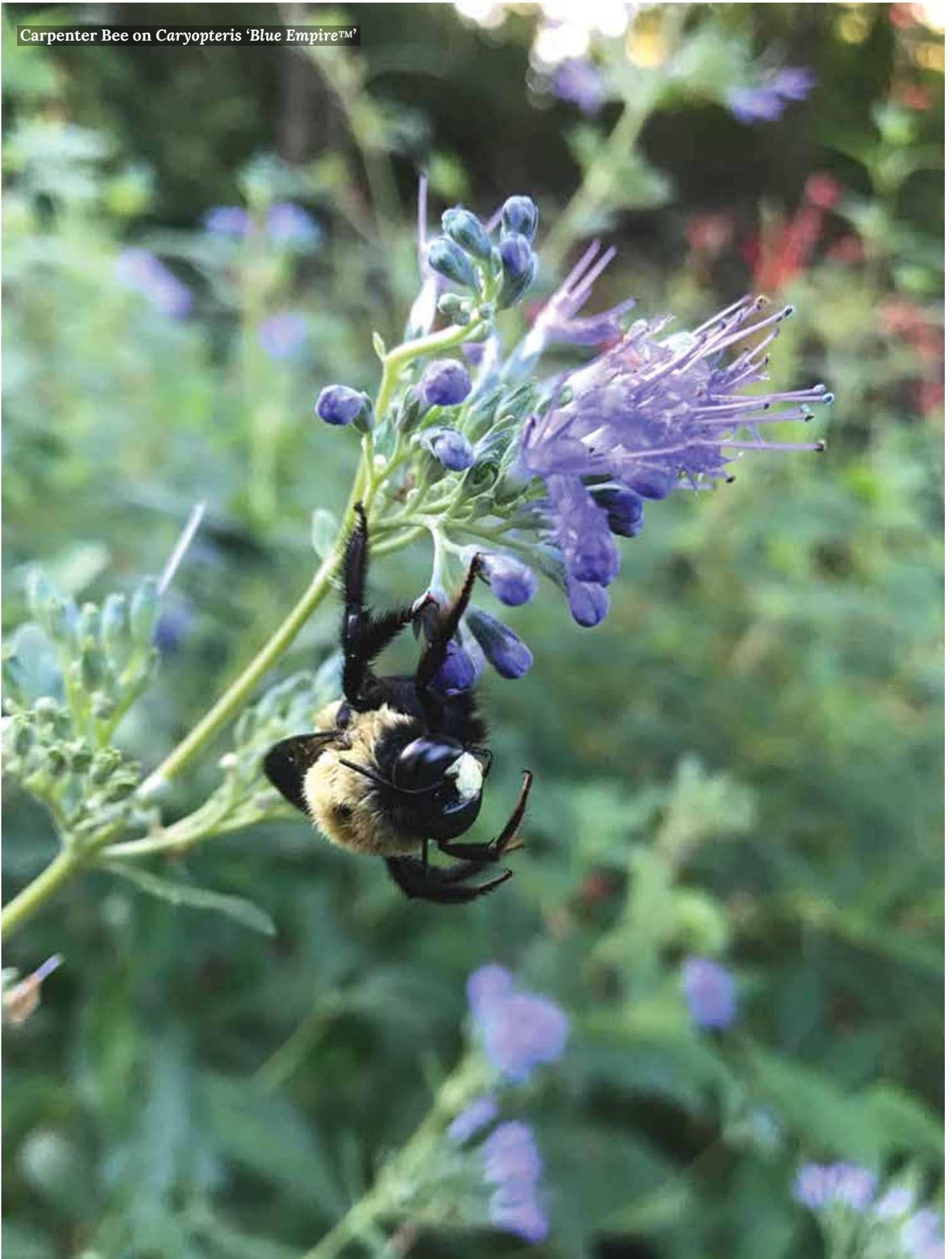
Perennial/Shrub Bloom Schedule

Green=shrub Blue=insufficient pollinator data, bloom time accurate

Peak Week	Plant	Avg. Abund.	Total Bloom Weeks	Week Numbers
31	<i>Allium lusitanicum</i> 'Summer Beauty'	5.6	13	24-36
31	<i>Rudbeckia laciniata</i> 'Autumn Sun'	3.9	8	28-35
31	<i>Hosta</i> 'Guacamole'	3.5	9	28-36
31	<i>Geranium</i> 'Rozanne'	2.9	14	26-39
31	<i>Calamintha nepeta</i> 'Marvalette Blue'	2.7	10	26-35
31	<i>Rudbeckia</i> 'American Gold Rush'	2.4	9	28-36
31	<i>Phlox</i> 'LUMINARY™ Backlight'	0.8	11	27-37
32	<i>Rosa</i> 'OSO EASY® Double Pink'	4.6	15	22-36
32	<i>Coreopsis tripteris</i> 'Gold Standard'	2.4	13	28-40
33	<i>Solidago odora</i>	7.3	4	32-35
33	<i>Calamintha nepeta</i> 'Montrose White'	6.7	22	22-43
33	<i>Calamintha nepeta</i> 'Blue Cloud'	6.4	22	22-43
33	<i>Foeniculum vulgare</i> 'Bronze'	4.6	8	29-36
33	<i>Eupatorium maculatum</i> 'Gateway'	4.4	6	30-35
33	<i>Eupatorium dubium</i> 'Little Joe'	4.4	6	30-35
33	<i>Buddleja</i> 'Grand Cascade'	3.7	10	28-37
33	<i>Heuchera villosa</i> 'Autumn Bride'	3.5	6	31-36
33	<i>Buddleja</i> 'CHRYSALIS™ Blue'	3.3	11	28-38
33	<i>Buddleja</i> 'CHRYSALIS™ Cranberry'	3.2	11	28-38
33	<i>Perovskia atriplicifolia</i> 'Sage Advice'	3.0	13	26-38
33	<i>Buddleja</i> 'Pink Cascade'	2.9	10	27-36
33	<i>Buddleja</i> 'CHRYSALIS® Pink'	2.8	11	28-38
33	<i>Buddleja</i> 'LO & BEHOLD® Purple Haze'	2.7	9	28-36
33	<i>Calamintha nepeta</i> 'White Cloud'	2.1	11	27-37
33	<i>Echinacea purpurea</i> 'Fragrant Angel'	1.6	10	26-35
33	<i>Buddleja</i> 'CHRYSALIS™ Purple'	1.3	11	28-38
33	<i>Buddleja</i> 'PUGSTER Pink®'	1.3	10	27-36
33	<i>Buddleja</i> 'PUGSTER Amethyst®'	0.9	10	27-36
34	<i>Allium</i> 'Lavender Bubbles'	6.3	16	22-37
34	<i>Perovskia atriplicifolia</i>	4.8	15	26-40
34	<i>Liatris microcephala</i>	4.3	7	31-37
34	<i>Lagerstroemia</i> 'CENTER STAGE® Red'	3.1	9	32-40
34	<i>Perovskia atriplicifolia</i> 'Blue Steel'	2.8	12	30-41
35	<i>Buddleja</i> 'MONARCH® Prince Charming'	4.4	17	22-38
35	<i>Vernonia</i> 'Summer's Swan Song'	3.4	7	31-37
35	<i>Vernonia lettermannii</i> 'Iron Butterfly'	2.2	7	32-38



Carpenter Bee on *Caryopteris* 'Blue Empire™'



SEPTEMBER/OCTOBER

Perennial/Shrub Bloom Schedule

Peak Week	Plant	Avg. Abund.	Total Bloom Weeks	Week Numbers
SEPTEMBER				
36	Sedum 'Autumn Fire'	6.3	10	30-39
36	Sedum 'Autumn Joy'	6.2	10	30-39
36	Sedum 'ROCK N' ROUND® Popstar'	4.8	11	29-39
36	Sedum 'Pure Joy'	4.4	11	28-38
37	Solidago speciosa	6.9	9	35-43
37	Chelone lyonii 'Hot Lips'	2.8	7	34-40
37	Anemone hupehensis 'Prince Heinrich'	1.1	5	35-39
37	Chelone lyonii 'Tiny Tortuga'	0.6	7	34-40
38	Solidago rugosa 'Fireworks'	4.5	6	36-41
38	Aster divaricatus 'Eastern Star'	2.8	10	32-41
38	Sedum 'Lemonjade'	2.6	7	33-39
38	Anemone 'Dreaming Swan™'	0.3	10	34-43
39	Anemone 'Lucky Charm'	1.0	10	35-4
OCTOBER				
40	Anemone 'Honorine Jobert'	1.6	7	38-44
41	Aster tataricus 'Jindai'	7.3	5	40-44
41	Aster laevis 'Bluebird'	6.6	8	37-44
41	Salvia greggii 'MIRAGE™ Blue'	5.1	8	37-44
41	Aster oblongifolius 'Raydon's Favorite'	4.3	7	38-44
41	Helianthus salicifolius 'Autumn Gold'	2.8	4	39-42
41	Tricyrtis 'Sinonome'	1.8	8	37-44
41	Helianthus salicifolius 'First Light'	1.4	6	39-44
41	Rosa 'OSO EASY Double Red®'	1.4	13	32-44
41	Tricyrtis 'Samurai'	1.3	8	37-44
42	Helianthus angustifolius 'Gold Lace'	3.5	7	39-45
44	Chrysanthemum 'Campfire Glow'	7.0	4	43-46





Vernonia 'Summer's Swan Song'



Tricyrtis 'Samurai'



Solidago rugosa 'Fireworks'
Aster oblongifolius 'Raydon's Favorite'

PERENNIALS AND SHRUBS

Pollinator Diversity

Insect Groups	Plant	Avg. Abund.
9	Allium 'Millenium'	8.8
9	Agastache 'Blue Fortune'	8.1
9	Pycnanthemum muticum	8.1
9	Calamintha nepeta 'Montrose White'	6.7
9	Calamintha nepeta 'Blue Cloud'	6.4
9	Sedum 'Autumn Fire'	6.3
9	Sedum 'Autumn Joy'	6.2
9	Agastache 'Black Adder'	5.0
9	Sedum 'ROCK N' ROUND® Popstar'	4.8
9	Solidago rugosa 'Fireworks'	4.5
9	Rudbeckia laciniata 'Autumn Sun'	3.9
9	Leucanthemum superbum 'Becky'	3.1
9	Geranium 'Rozanne'	2.9
9	Aster divaricatus 'Eastern Star'	2.8
9	Buddleja 'LO & BEHOLD® Purple Haze'	2.7
9	Coreopsis tripteris 'Gold Standard'	2.4
9	Nepeta grandiflora 'Summer Magic'	2.2
9	Vernonia lettermannii 'Iron Butterfly'	2.2
8	Allium 'Lavender Bubbles'	6.3
8	Perovskia atriplicifolia	4.8
8	Salvia nemerosa 'COLOR SPIRES® Crystal Blue'	4.6
8	Buddleja 'MONARCH® Prince Charming'	4.4
8	Aster oblongifolius 'Raydon's Favorite'	4.3
8	Buddleja 'Grand Cascade'	3.7
8	Echinacea 'BUTTERFLY™ Purple Emperor'	3.3
8	Buddleja 'CHRYSALIS™ Blue'	3.3
8	Buddleja 'Pink Cascade'	2.9
8	Phlox 'Luminary Ultraviolet'	2.0
8	Buddleja 'HUMDINGER® Orchid Annie'	1.9
8	Phlox paniculata 'Jeana'	1.8

- Listed here are the 18 plants that checked the box of all 9 insect diversity groups over the entire season and the 12 plants that checked 8 of 9 insect diversity groups.
- Because field identification of insects is challenging, we broke diversity into 9 identifiable groups (carpenter bee, bumblebee, honeybee, tiny bee, fly, wasp, beetle, butterfly and skipper). If visitation from a group was observed even once on a plant during an observation, a box was checked for that diversity group.
- In the end, we have a very general snapshot of the pollinator groups that visited plants throughout the season.
- Plants with longer bloom lengths tend to have higher diversity counts simply because the longer a plant blooms, the more times we will observe it. As in life, generally the more you look at something, the more you'll find. Perhaps next year's data will include a diversity average or more precise data about the volume of visitation as it relates to insect diversity.
- Of the 6 shrubs that brought 8 or 9 insect diversity groups, all were from the *Buddleja* genus.
- The 'tiny bee' group was devised midway through the season and became a catch-all for any small unidentifiable flying thing, of which there were many.



Bumblebee on *Scutellaria incana*



Drone Fly on *Leucanthemum* 'Becky'

ANNUALS - WE'RE HERE TOO!

In the time of naturalistic landscapes and ecological-minded garden designs, annuals tend to get left out of the conversation. After all, they do only live for one year and are generally much more dependent on water than other plants. Though they are not a solution to restoring wild lands, they have enormous value in urban and suburban garden spaces, pushing bloom from frost to frost in landscapes and containers.

Though Pollinator Watch 2023 did not survey annuals, pollinator interactions were observed more informally within our Annual Trials Program. Here is a general list of pollinator-friendly annual genera from our gardens that consistently brought pollinator abundance and diversity.

In 2024, annuals will be included in Pollinator Watch.

- Angelonia**
- Bidens**
- Bracteantha**
- Celosia**
- Cleome**
- Dahlia**
- Euphorbia**
- Gomphrena**
- Helianthus (Sunflower)**
- Lantana**
- Pentas**
- Salvia**
- Scaevola**
- Torenia**
- Verbena bonariensis (Tall Verbena)**
- Zinnia**



Hummingbird Clearwing Moth on *Lantana*



Silver-spotted Skipper on *Gomphrena* 'Fireworks'

POLLINATOR GARDEN NOTES

Larval Host Plants

The *Lepidoptera* order (butterfly/moth) life cycle relies on the leaves of host plants to feed larval stage caterpillars. Most host plants are native and have special coevolved relationships with native insects. Monarchs, for example, can only lay eggs on plants of the milkweed genus (right: *Asclepias incarnata*). Some non-native host plants such as parsley, fennel, dill, and queen anne's lace (*Apiaceae* family) host Black Swallowtail caterpillars.



Trees

All pollinator habitats begin with the placement of trees. Some early bloomers like red maples (right) provide valuable early season pollen and nectar. Some native trees like oaks support hundreds of caterpillar species. All trees provide habitat for wildlife, purify the air, cool temperatures, stabilize the soil, absorb water runoff and sequester carbon.



Moths and Hummingbirds

There are over 140 butterfly species in Ohio and over 3,000 species of moth. Not all of them pollinate, but don't forget about the nocturnal (and some diurnal) moth pollination occurring in your garden. The Ruby-throated Hummingbird is our only common hummingbird species. Keep them happy with sugar water feeders and a diversity of flowering plants, especially those with tubular flowers, such as the vine *Lonicera sempervirens* or something from the *Salvia* genus. (right: Luna Moth caterpillar glowing under black light)



General Cultivar Rules

Plants with double flowers are bred to produce an abundance of colorful, densely-packed petals which can block pollinators from accessing pollen and nectar. A good example of this is double-flowering *Echinaceas* (right). Also, plants selected for darker purple leaf color are less likely to appeal to caterpillars due to raised anthocyanin levels in the foliage.



POLLINATOR GARDEN MAINTENANCE



World of the Insect Hillside Garden, August 2022, Cincinnati Zoo & Botanical Garden

- 1 Full sun is important for pollinators. Pollinator insects cannot generate their own body heat and so rely on the warmth of the sun to wake up every morning and fly.
- 2 Plant diversity begets insect diversity. A pollinator garden should have a variety of trees, shrubs, perennials, and annuals to provide nutrition to pollinators throughout the year.
- 3 Planting native host plants is a great way to attract particular pollinators to your garden that have co-evolved with specific plants.
- 4 Plant densely layered drifts of plants to create a green network of food and shelter that naturally suppresses weeds and limits mulching needs.
- 5 Install a water source (bird bath, small pond, etc.) to hydrate and cool off your pollinators.
- 6 Let your garden stand through winter. Perform garden cutbacks in late spring. Insects overwinter and lay eggs in pithy stems and fallen leaves. Keep debris in piles on the side of your yard.
- 7 Shrink your lawn. Reduce mowing and raise your mower blade if you do mow.

Rockdale Academy students, volunteers and Zoo horticulturists planting pollinator plants that were used in this research at the Rockdale Urban Learning Garden.



THE TEAM

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Have you registered your garden with our
Plant for Pollinators program?

cincinnati-zoo.org/gardens/plant-for-pollinators


Plant for Pollinators

Our Mission

Creating Adventure
Conveying Knowledge
Conserving Nature
Serving Community

Our Strategic Objective

Inspire Every Visitor With Wildlife Every Day!



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