



Project Bee Watch

Two Years of Survey Results

2019-20

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Background:

Project Bee Watch started in 2018, with a pilot program to survey pollinators at Audubon Greenway near Sewickley in partnership with Allegheny Land Trust. The pilot project was funded by Point Park University, Center for Inclusive Excellence and the Department of Community Engagement.

The project has three goals:

1. Collect baseline data on pollinators in southwestern Pennsylvania by surveying meadow properties owned by partner organizations.
2. Identify pollinator preference for forage plants.
3. Educate and recruit citizen scientists to serve as surveyors and ambassadors in the conservation of pollinators.

Sampling Methods:

In 2019, Project Bee Watch partnered with three organizations. The organizations include Allegheny Land Trust, Latodami Nature Center (Allegheny County Parks Department), and Pittsburgh Parks Conservancy. In 2020, a fourth partner was added, Allegheny County Parks Foundation.

Table 1. Sampling sites.

Partner Organization	Sample Site	Location	Fields Surveyed at Sample Site	No. Acres Surveyed
Allegheny Land Trust	Audubon Greenway Conservation Area	Sewickley Heights Boro, Allegheny Cnty	Audubon Greenway Fields	14
Latodami Nature Center	North Park	Pine Twp, Allegheny Cnty	North, Pigeon, and Walter Fields	37
Pittsburgh Parks Conservancy	Frick and Schenley Parks	Pittsburgh, Allegheny Cnty	Frick Environ. Center and Bartlett Fields	3
Allegheny County Parks Foundation	Boyce Park	Plum Boro, Allegheny Cnty	Indian Hill Meadow	6

Sampling methods use citizen scientists to survey all wildflowers and pollinators within a one square meter plot randomly placed within a sampling site. At each plot, surveyors identify wildflower species and record their percent cover. All pollinators that visit a wildflower inside the plot are identified and recorded for a period of ten minutes. Citizen scientists attend a training session before participating in the project.

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Results and Discussion:

Sampling Site Comparisons:

Table 2 compares the surveying results between sampling sites. Boyce Park has the greatest density of pollinators and bees. In 2017, the Allegheny County Parks Foundation planted the demonstration meadow with wildflowers including beardtongue, asters, and others. Schenley and Frick Parks has the greatest diversity of pollinators and second greatest pollinator and bee density. Around 2015, Bartlett Field in Schenley Park was planted with wildflowers. In comparison to Boyce Park and Schenley and Frick Parks, North Park and Audubon Greenway are naturalized fields, with few wildflower plantings.

Dominance of bee taxa at the four sampling sites is highly variable. For example, 45% of bees at Boyce Park are bumble bees, while the most any other site reports is 26%. European honey bees account for 43% of bees at Audubon Greenway, while the most any other site reports is 24%. Except for Boyce Park, sweat bees account for 46% of all bees at the other sites. At Boyce Park, sweat bees account for 25% of all bees.

The dominant butterfly and moth are skipper butterflies, which account for 47% of butterflies and moths at all sites except Schenley and Frick Parks. At Schenley and Frick Parks, skipper butterflies account for 70% of butterflies and moths. The dominant beetles are soldier beetles and shining flower beetles, dominant flies are hover and drone flies, and dominant wasps are mason and northern paper wasps.

Table 2. Survey results of sampling sites using data from 2019 to 2020. Boyce Park was only sampled in 2019. All insects reported are pollinators.

	Audubon Greenway	Boyce Park	Schenley + Frick Parks	North Park
No. of Volunteers	5	2	5	10
No. of Plots	161	134	403	258
No. of Pollinator Taxa	26	21	40	31
Shannon Diversity Index	2.2	2.0	2.4	2.0
Shannon Evenness	0.7	0.7	0.6	0.6
No. of Pollinators / m ² · 10 min	9.9	14.9	12.2	10.4
No. of Bees / m ² · 10 min	6.5	11.4	7.8	7.7
No. of Beetles / m ² · 10 min	1.1	2.0	1.9	0.4
No. of Butterflies+Moths / m ² · 10 min	0.6	0.7	0.8	0.6
No. of Flies / m ² · 10 min	1.3	0.7	1.3	1.6
No. of Wasps / m ² · 10 min	0.4	0.1	0.4	0.2

Forage Plant Preference:

Figures 1 to 6 show forage plant preference for pollinators. The data used to construct the figures is the sum of all sample sites and years from 2019 to 2020. For data on wildflower taxa to be included in the figures, sample plots had to have more than ten percent cover of a wildflower taxa and at least twelve sample plots had to have been collected of each taxa. Table 3 is a list of the wildflower taxa and codes used in the figures.

Table 3. Wildflower taxa and codes used in Figures 1 to 6.

Wildflower Taxa	Figure Code
American Senna (<i>Senna hebecarpa</i>)	AmSenna
Bergamot Genus (<i>Monarda</i> spp.)	Bergamot
Beardtongue Genus (<i>Penstemon</i> spp.)	BeTongue
Blackberry Genus (<i>Rubus</i> spp.)	Blackberry
Butterflyweed (<i>Asclepias tuberosa</i>)	BuWeed
Canada Thistle (<i>Cirsium arvense</i>)	CaThistle
Clover Genus (<i>Trifolium</i> spp.)	Clover
Common Milkweed (<i>Asclepias syriaca</i>)	CoMilkweed
Common Yarrow (<i>Achillea millefolium</i>)	ComYarr

Crownvetch (<i>Securigera varia</i>)	CrVetch
Common Evening Primrose (<i>Oenothera biennis</i>)	EvPrimrose
Garden Yellow Rocket (<i>Barbarea vulgaris</i>)	GardYellRock
Goldenrod Genus (<i>Solidago</i> spp.)	Goldenrod
Ground Ivy (<i>Glechoma hederacea</i>)	Grlvy
Hemp Dogbane (<i>Apocynum cannabinum</i>)	HeDogbane
Ironweed Genus (<i>Vernonia</i> spp.)	Ironweed
Mountain Mint (<i>Pycnanthemum</i> spp.)	MoMint
Oxeye Daisy (<i>Leucanthemum vulgare</i>)	OxDaisy
Queen Anne's Lace (<i>Daucus carota</i>)	QuAnLace
Tansy (<i>Tanacetum vulgare</i>)	Tansy
White Aster Genus (<i>Erigeron</i> spp.)	WhAster
Yellow Coneflower (<i>Rudbeckia</i> + <i>Echinacea</i> spp.)	YeConeflower
Yellow Sunflower (<i>Heliopsis</i> + <i>Helianthus</i> spp.)	YeSunflower

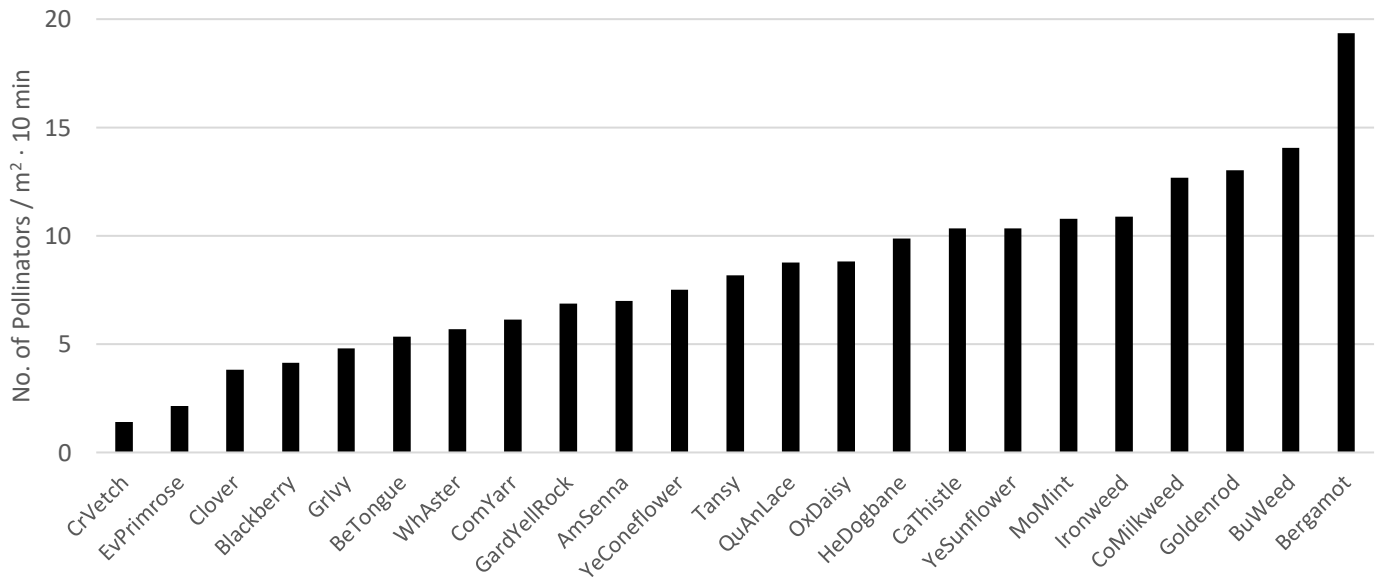


Figure 1. Density of pollinators (Class Insecta) separated by wildflower taxa using the combined data from all sampling sites and years from 2019 to 2020.

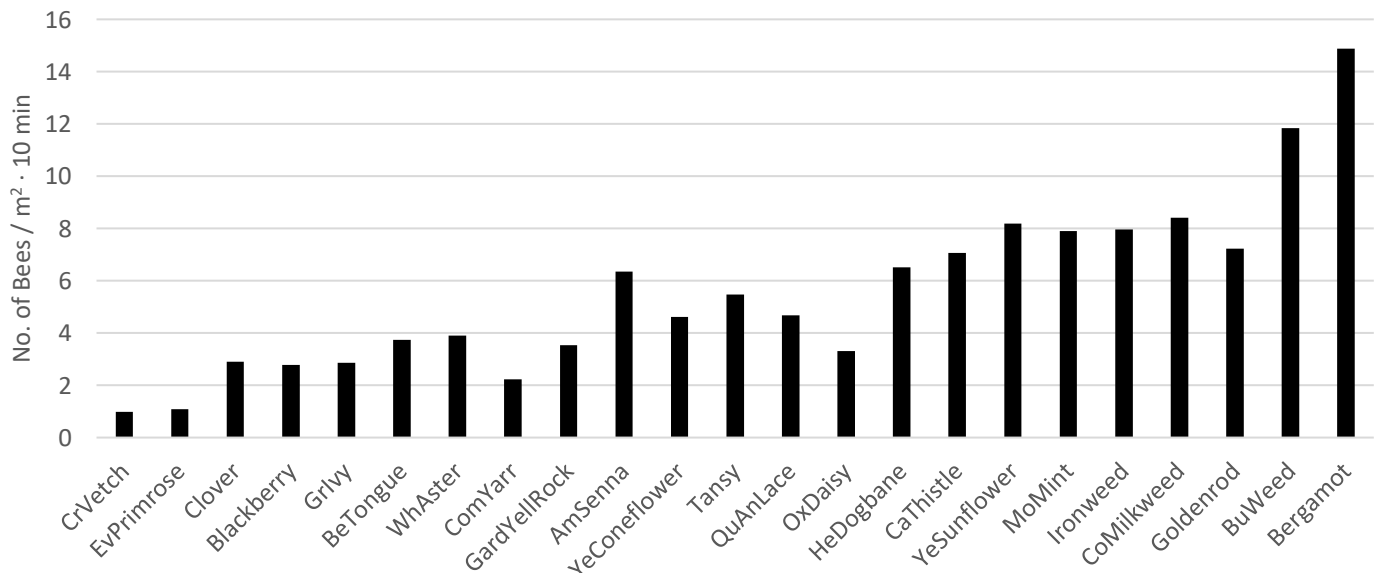


Figure 2. Density of bees (Order Hymenoptera) separated by wildflower taxa using the combined data from all sampling sites and years from 2019 to 2020.

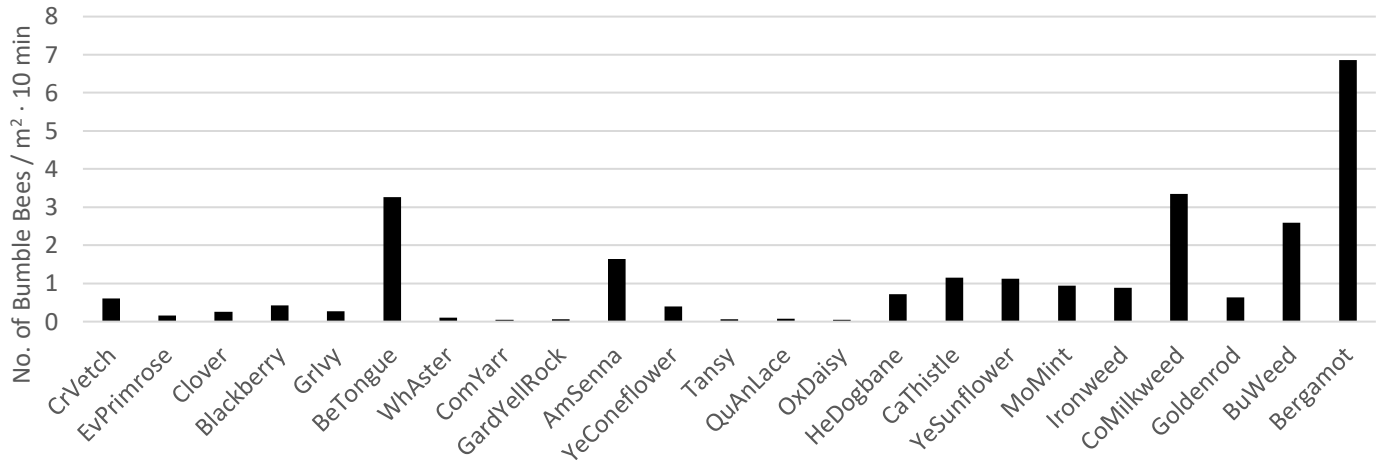


Figure 3. Density of bumble bees (Family Apidae, Genus *Bombus*) separated by wildflower taxa using the combined data from all sampling sites and years from 2019 to 2020.

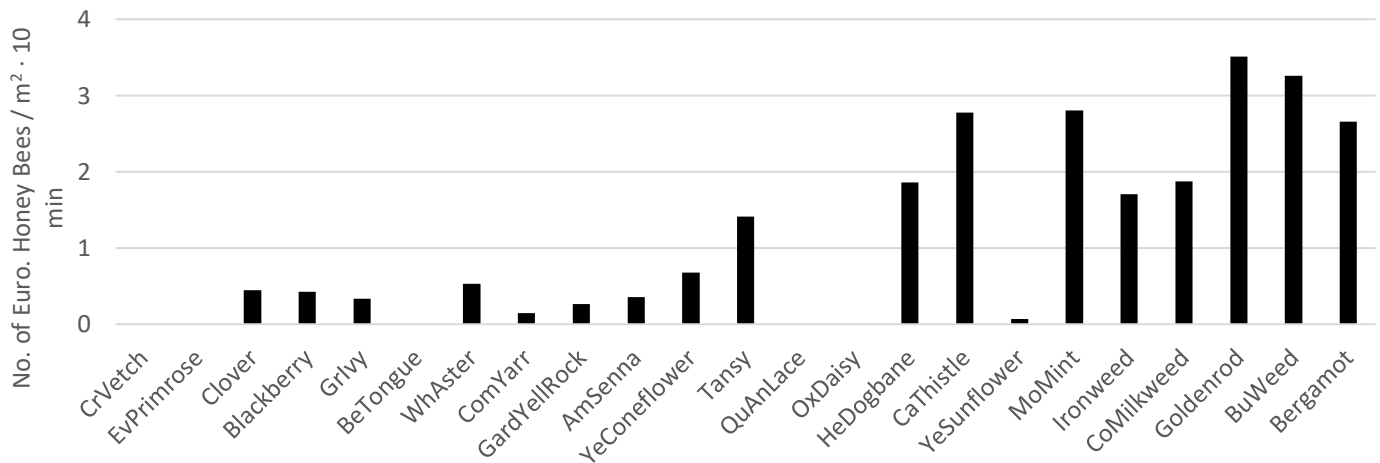


Figure 4. Density of European honey bees (Family Apidae, Species *Apis mellifera*) separated by wildflower taxa using the combined data from all sampling sites and years from 2019 to 2020.

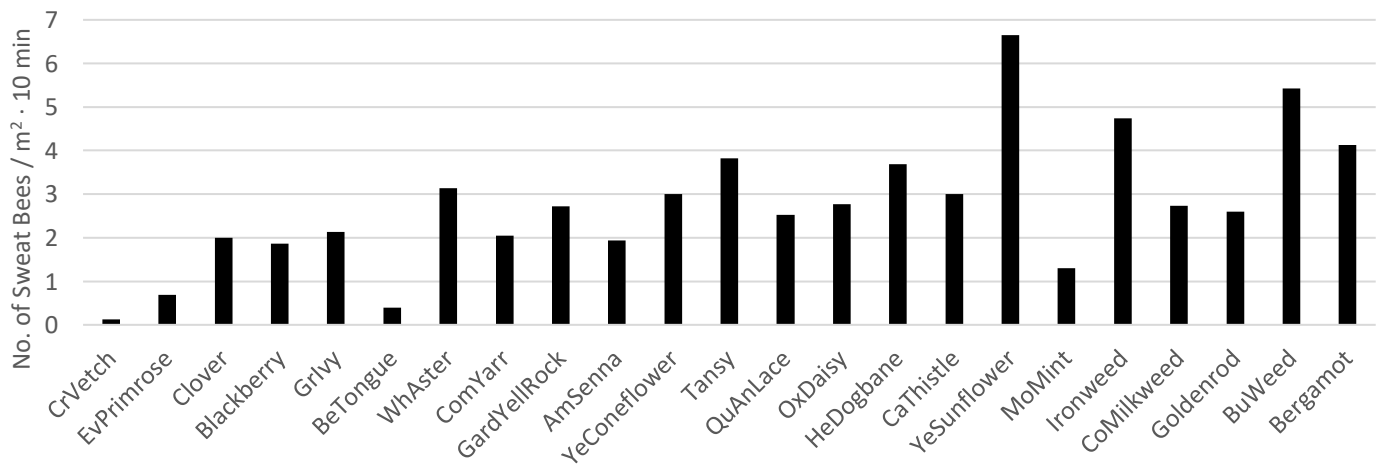


Figure 5. Density of sweat bees (Family Halictidae and Family Apidae Genus *Ceratina*) separated by wildflower taxa using the combined data from all sampling sites and years from 2019 to 2020.

Figures 1 and 2 are similar, except for a few wildflower taxa, because bees (Order Hymenoptera) dominate the pollinator community. Figure 3 shows bumble bees (Family Apidae, Genus *Bombus*) prefer beardtongue, common milkweed, and bergamot. The overwhelming abundance of beardtongue at Boyce Park is why bumble bees account for 45% of all bees at the site. Figure 4 shows European honey bees (Family Apidae, Species *Apis mellifera*) prefer Canada thistle, mountain mint, goldenrod, butterflyweed, and bergamot. Figure 5 shows sweat bees (Family Halictidae and Family Apidae Genus *Ceratina*) prefer yellow sunflower, ironweed, butterfly weed, and bergamot.

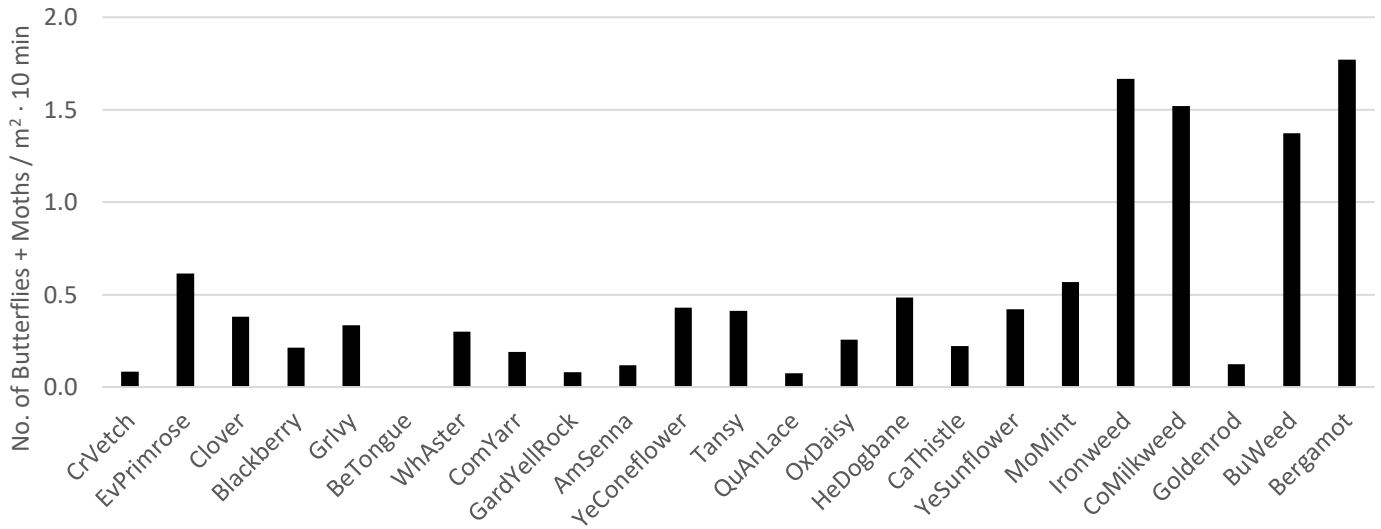


Figure 6. Density of butterflies and moths (Order Lepidoptera) separated by wildflower taxa using the combined data from all sampling sites and years from 2019 to 2020.

Figure 6 shows butterflies and moths (Order Lepidoptera) prefer ironweed, common milkweed, butterfly weed, and bergamot. Figures are not shown for flies and beetles but flies (Order Diptera) prefer garden yellow rocket and beetles (Order Coleoptera) prefer goldenrod.

Reasons for why pollinators prefer certain wildflowers includes pollen and nectar content associated with wildflowers, wildflowers that are hosts for pollinator life cycles, and blooming period of wildflowers in relation to pollinator life cycles. More detailed reasons go beyond the scope of this summary.