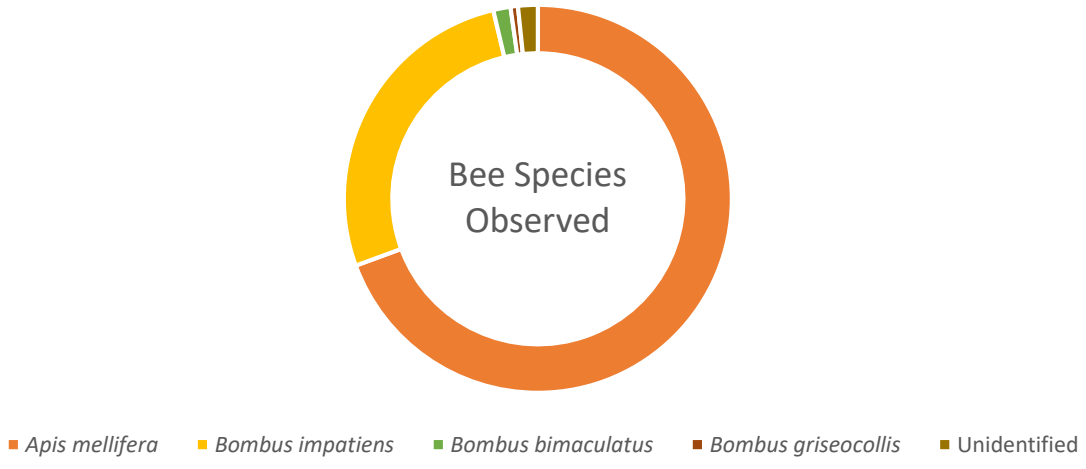
Bee Survey Data Report 2021

Quail Hollow Park

Bee surveys were conducted at Quail Hollow Park located in Hartville, Ohio beginning on June 28, 2021 and ending on October 18, 2021. Surveys were conducted nearly bi-weekly, weather permitting. Bees were observed in the prairie across 10 transects. Data was recorded on an iPad using the Survey123 app. Data collected contained the date and time, weather at the time of the survey, temperature, wind measured using the Beaufort Wind Scale, transect number at the time of each bee observation, bee species observed, the sex of the bee observed, which flower the bee was observed on, and latitudinal and longitudinal coordinates of each observation.

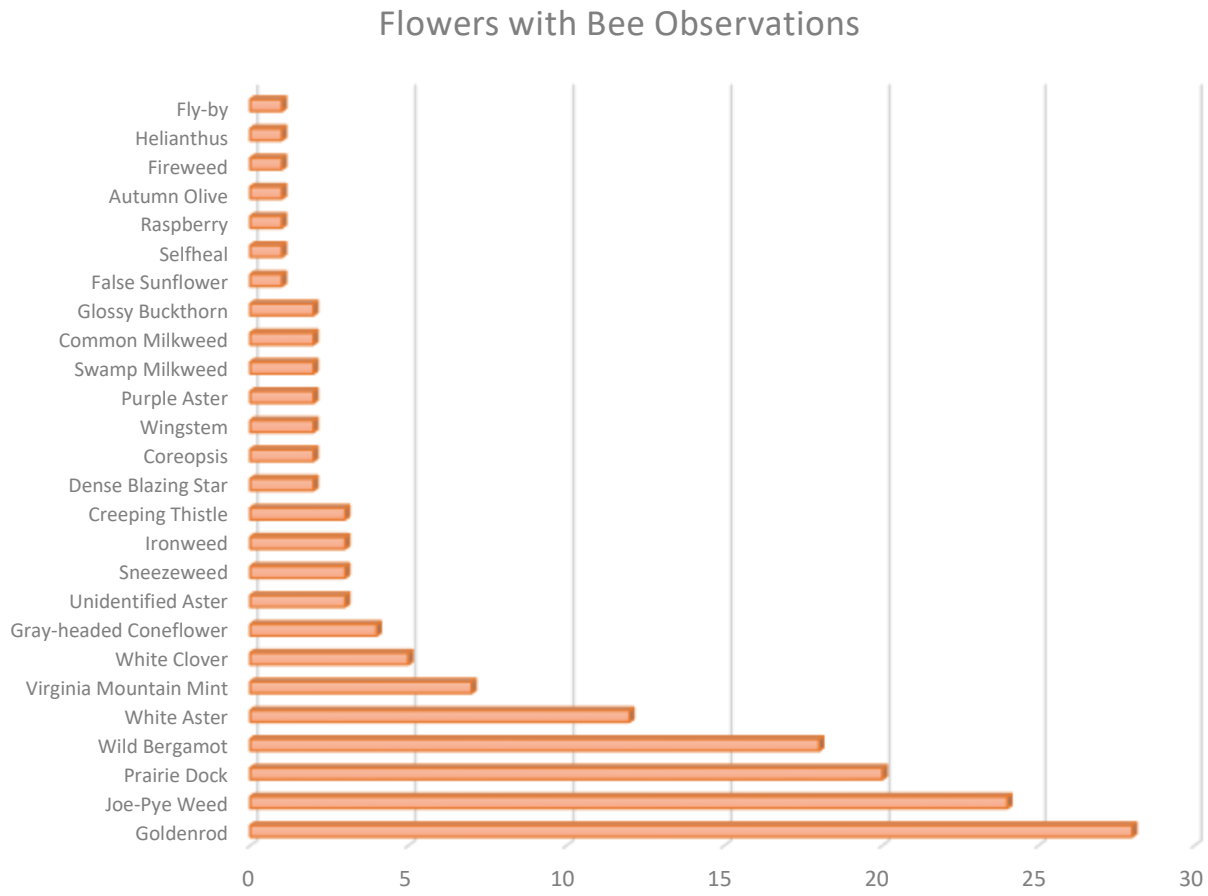
The most frequent weather conditions were Mostly Sunny (49.2%), followed by Sunny (43.6%), and Mostly Cloudy (7.1%). The most frequent temperature was 80°F (76.6%), followed by 75°F (11%), 65°F (6.7%), 70°F (3.5%), 85°F (1.8%), and 59°F (0.4%). 51.8% of observations were made when the wind was between 1-3mph, followed by 31.5% at 8-12mph, and 16.7% at 4-7mph. The bees observed were predominantly female (~99%).

There were 487 total bee observations across 282 entries. 2/487 (0.4%) were fly-bys, 485/487 (>99%) were on flowers at the time of the observation. 338/487 (69%) were western honeybees (*Apis mellifera*), 131/487 (27%) were eastern common bumblebees (*Bombus impatiens*), 7/487 (1.4%) were two-spotted bumblebees (*Bombus bimaculatus*), 3/487 (0.6%) were brown belted bumblebees (*Bombus griseocollis*), and 8/487 (1.6%) were unidentified species.



There were 282 total entries. Of the 282, 129/282 (46%) were observed on goldenrod (*Solidago spp.*), 28/282 (10%) were on joe-pye weed (*Eutrochium purpureum*), 24/282 (8.5%) were on prairie dock (*Silphium terebinthinaceum*), 20/282 (7%) were on wild bergamot (*Monarda*

fistulosa), 18/282 (6.5%) were on white aster (*Symphyotrichum ericoides*), 12/282 (4%) were on Virginia mountain mint (*Pycnanthemum virginianum*), 7/282 (2.5%) were on white clover (*Trifolium repens*), 5/282 (2%) were on gray-headed coneflower (*Ratibida pinnata*), 4/282 (1.5%) were on unidentified species of aster (*Symphyotrichum spp.*), 3/282 (1%) were found on each: sneezeweed (*Helenium autumnale*), ironweed (*Vernonia gigantea*), and creeping thistle (*Cirsium arvense*), 2/282 (0.7%) were found on each: dense blazing star (*Liatris spicata*), tickseed (*Coreopsis tinctoria*), wingstem (*Verbesina alternifolia*), purple aster (*Symphyotrichum novae-angliae*), swamp milkweed (*Asclepias incarnata*), common milkweed (*Asclepias syriaca*), and glossy buckthorn (*Frangula alnus*), and 1/282 (0.35%) were found on each: false sunflower (*Heliopsis helianthoides*), selfheal (*Prunella vulgaris*), raspberry (*Rubus idaeus*), autumn olive (*Elaeagnus umbellata*), fireweed (*Chamaenerion angustifolium*), and unidentified *Helianthus spp.* 5/282 (2%) were not observed on a flower.



From the data collected, we can see the predominant species of bees pollinating the prairie at Quail Hollow Park are western honeybees (*Apis mellifera*), and eastern common bumblebees (*Bombus impatiens*) at 96.3% combined. No threatened, endangered, or species listed on the IUCN Red List were observed. Bees were most commonly observed on goldenrod species, joe-pye weed, prairie dock, wild bergamot, white aster, Virginia mountain mint, white clover, and

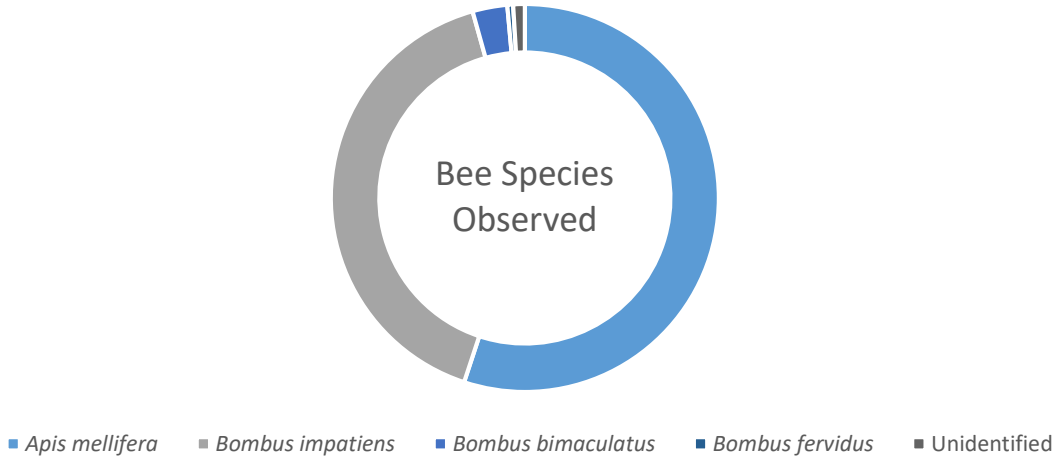
gray-headed coneflower (86.5% combined). Sunny and Mostly Sunny were the favorable conditions with 92.8% of observations being made with these weather conditions. The most favorable temperature was between 75-80°F with 87.6% of observations made between these temperatures. Higher temperatures at 85°F saw only 1.8% of observations while conditions below 75% saw a combined 10.6% of observations.

Fry Family Park

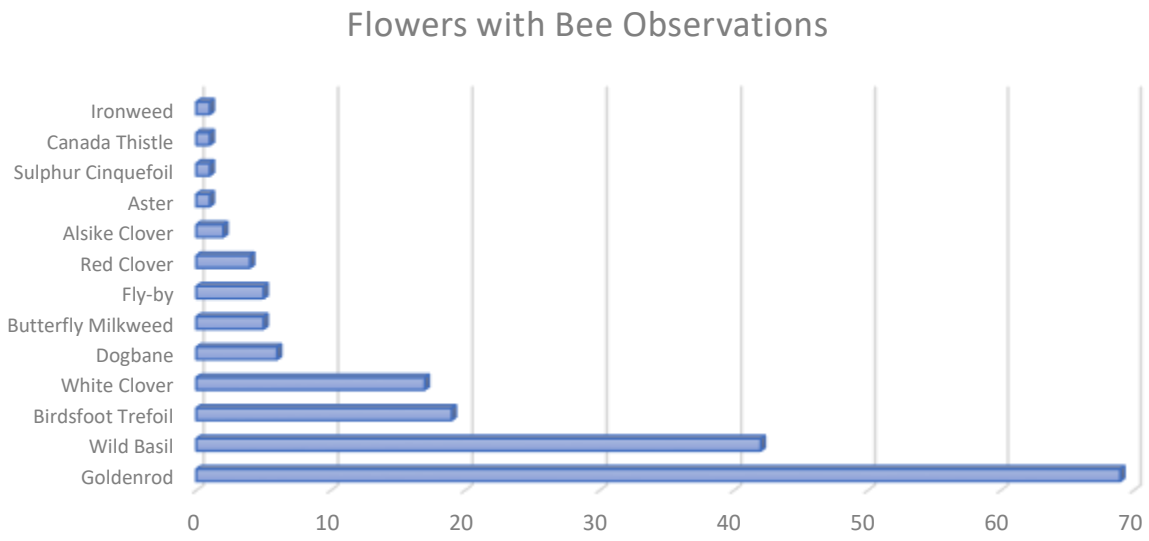
Bee surveys were conducted at Fry Family Park located in Magnolia, Ohio beginning on June 15, 2021 and ending on October 18, 2021. Surveys were conducted nearly bi-weekly, weather permitting. Bees were observed in the prairie across 10 transects. Data was recorded on an iPad using the Survey123 app. Data collected contained the date and time, weather at the time of the survey, temperature, wind measured using the Beaufort Wind Scale, transect number at the time of each bee observation, bee species observed, the sex of the bee observed, which flower the bee was observed on, and latitudinal and longitudinal coordinates of each observation.

The most frequent weather conditions were Sunny (43.9%), followed by Mostly Cloudy (29.5%), and Mostly Sunny (26.6%). The most frequent temperature was 75°F (66.5%), followed by 80°F (17.3%), 85°F (8.7%), 70°F (5.2%), 57°F (1.7%), and 62°F (0.6%). 44.5% of observations were made when the wind was between 8-12mph, followed by 38.7% at 1-3mph, 9.2% at 4-7mph, and 7.5% at 13-18mph. The bees observed were predominantly female (~99%).

There were 208 total bee observations across 173 entries. 5/173 (2.9%) were fly-bys, 168/173 (97.1%) were on flowers at the time of the observation. 114/208 (54.8%) were western honeybees (*Apis mellifera*), 84/208 (40.4%) were eastern common bumblebees (*Bombus impatiens*), 6/208 (2.9%) were two-spotted bumblebees (*Bombus bimaculatus*), 1/208 (0.5%) was a golden northern bumblebee (*Bombus fervidus*), and 2/208 (1%) were unidentified species.



There were 173 total entries. Of the 173, 69/173 (39.9%) were observed on goldenrod (*Solidago spp.*), 42/173 (24.2%) were on wild basil (*Clinopodium vulgare*), 19/173 (11%) were on birdsfoot trefoil (*Lotus corniculatus*), 17/173 (9.8%) were on white clover (*Trifolium repens*), 6/173 (3.4%) were on dogbane (*Apocynum cannabinum*), 5/173 (2.9%) were on butterfly milkweed (*Asclepias tuberosa*), 4/173 (2.3%) were on red clover (*Trifolium pratense*), 2/173 (1.2%) were on alsike clover (*Trifolium hybridum*), 1/173 (0.6%) were found on each: aster, (*Symphyotrichum spp.*) Sulphur cinquefoil (*Potentilla recta*), Creeping thistle (*Cirsium arvense*), and ironweed (*Vernonia gigantea*). 5/173 (2.9%) were not observed on a flower.



From the data collected, we can see the predominant species of bees pollinating the prairie at Fry Family Park are western honeybees (*Apis mellifera*), and eastern common bumblebees (*Bombus impatiens*) at 95.2% combined. Bees were most commonly observed on goldenrod species, wild basil, birdsfoot trefoil, white clover, and dogbane with 88.3% of observations happening on these plants combined. Sunny was the most favorable weather condition with 43.9% of observations being made with sunny conditions. Mostly Sunny and Mostly Cloudy conditions were nearly equally as favorable, with Mostly Cloudy being slightly more favorable (29.5%) than Mostly Sunny (26.6%). The most favorable temperature was between 75-80°F with 83.8% of observations made between these temperatures. Higher temperatures at 85°F saw 8.7% of observations while conditions below 75% only saw a combined 7.5% of observations. We saw less biodiversity in plant species at Fry compared to Quail Hollow, as well as fewer bee observations. However, we observed one golden northern bumblebee (*Bombus fervidus*) which is listed as Vulnerable on the IUCN Red List. The IUCN Red List goes on to say it is estimated that the golden northern bumblebee populations are experiencing an average decline of 30.69%. Bee surveys should be continued to closely monitor the bee populations at Fry, specifically for the golden northern bumblebee and any other potentially threatened species that may be nesting in the grassy areas. By increasing plant biodiversity and plant volume at Fry, we may see an increase in the number and varieties of bees observed in the future.

Overall

Quail saw more observations of honeybees and fewer observations of bumblebees than Fry. This is likely because of the honeybee colony near the prairie at Quail. Bumblebees prefer to nest in grassy areas which is likely why we observed more bumblebees at Fry than Quail. However, we had fewer individuals and observations overall at Fry considering how much grassy bumblebee habitat and potential nesting area exists. Quail also saw more diversity in the flowers bees were observed on. Adding diversity to flowering and pollinating plants could help us to see an increase in variety and number of bumblebees at Fry, as well as offering more habitat and sources of pollen for all bees.