Ohio Bee Survey 2020

McCammon Creek Park – Interim Report

Teresa Staats / March 16, 2022

It is estimated Ohio has 400 to 450 bee species in the state. This estimation is based upon what other neighboring states have projected.

The Ohio Bee Survey, initiated in the spring of 2020 by The Ohio State University, is the first state-wide bee survey to document bee diversity in the state. Approximately 150 bee collection kits were distributed to research volunteers with 87 of 88 Ohio counties represented. Bee surveys in Ohio have been done in the past, but these usually incorporated netting, monitoring and observation – all of

which typically miss the broad range of small bees. The Goodell and Mitchell Labs (at The Ohio State University) did recently (prior to 2020) complete a bee survey but this focused only on bumblebees.

Funding for the Ohio Bee Survey comes from The Manitou Fund (St. Paul MN). This research project is being managed by MaLisa Spring (State Coordinator of the Ohio Bee Survey), who is in the Ecology, Evolution and Organismal Biology Department at The Ohio State University.

This interim report is based upon bees collected from McCammon Creek Park. The full Ohio Bee Survey report is anticipated to be completed later in 2022.

Volunteers for the Ohio Bee Survey were recruited across the state to sample bees on a weekly basis in order to better understand species biodiversity and turnover. Sampling methodology involved using standardized bee sampling kits. These included:

- 24 bee bowls (3.5 oz. pan traps that are fluorescent blue, fluorescent yellow and white)
- 21 paint strainers (for straining field samples and then storing)
- 21 Ziploc® bags to store each week's paint strainer in the freezer
- Box to put baggies in freezer (so specimens do not dry out)
- 2 sampling signs ("Transect/research in progress" sign)
- Blank specimen collection labels
- Information request sheet
- Instruction sheet on how to sample

Volunteers provided:

- 1 gallon container
- Clean water
- Dish Soap (Blue Dawn preferred)
- Pencil
- Clipboard (for collection label sheets)
- Scissors (to cut collection label sheet)

Each volunteer selected a sampling area where collection bowls were used; this is called the "transect site." Sampling was done approximately once per week, with a minimum of 7 days between collection times. Bowls were set approximately 4 meters apart and bowl colors were alternated. Collection was not done when weather indicated a 20% or greater chance of rain nor when temperatures were below 45 degrees Fahrenheit. Survey signs were installed at each end of the transect to increase awareness and avoid disturbance of bowls.

A solution of one gallon of water and one/two drops of Dawn liquid detergent was created and this solution was poured into each bowl. Approximately 24 hours later, contents from the 24 bowls were collected and put through a paint strainer. This bees (and bycatch) from the bowls remain in the strainer which was then put into a Ziploc bag along a collection label. (A blank collection label is shown on the right.) This packet was put into a box in the freezer.

Date set: _____

Date retrieved: _____

Address: _____

City: _____

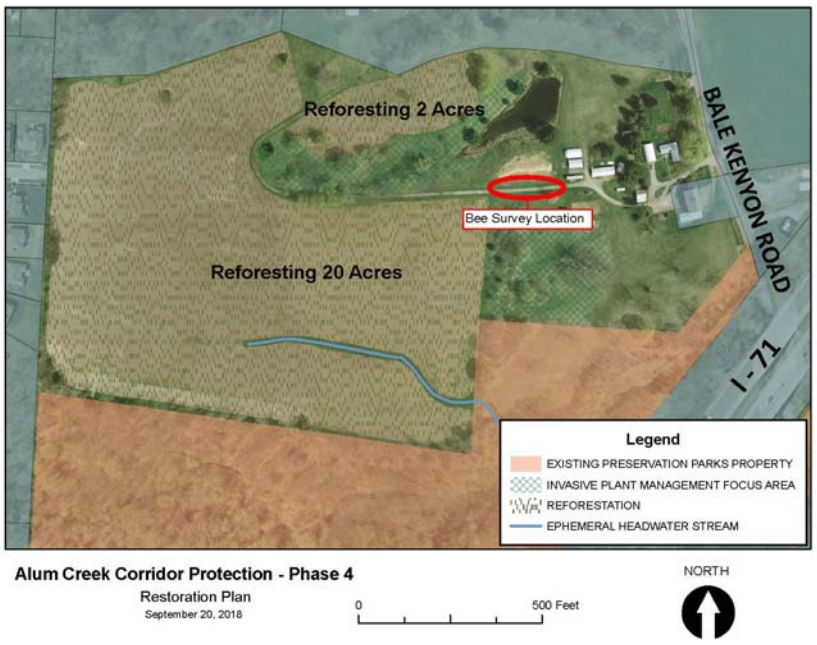
County: _____

Collected by: _____

# of bowls set vs collected: _____/_____

The Ohio survey began after the last frost (in May) and continued until first frost in the fall (September/October 2020). Bee collection for the McCammon Creek Park location began May 12 and was completed on October 9, 2020.

The site for the bee survey at McCammon Creek Park was located behind the bicentennial barn and along a two-track roadway. The bee transect was set alternatingly along both sides of the two-track. A map with the approximate area is shown below. (A copy of the research permit granted by Preservation Parks is included as an attachment to this report.)



Although recording blooming plants in the area was not a part of the Ohio Bee Survey, the plants blooming throughout this time period (in the immediate area) were noted anecdotally. These included: Thistle, various clovers, milkweed, Birdsfoot trefoil, Chicory, Phlox, Queen Anne's lace, timothy, plantain, common mullion, pokeweed, Nottingham catchfly, perennial sow thistle, Carolina horse nettle, yellow thistle, yellow star of Bethlehem, annual rye, partridge pea, false sunflower, gray-headed coneflowers, black-eyed Susan, fleabane, tick trefoils, blue vervain, asters and goldenrod.

Bee survey transects were set a total of 20 times for bee collection at McCammon Creek Park.

Upon completion of sampling by volunteers in the fall of 2020, frozen bee collections were delivered to The Ohio State University so they could be kept frozen at a lab for analysis/identification. Each volunteer's kit of bees was analyzed separately with all data maintained in a database. Both bees and bycatch specimens were labeled. Due to the pandemic, bee pinning assistance by volunteers was curtailed. Only MaLisa Spring, along with an intern and a very small number of volunteers were able to assist with this effort. As a result, the timing of pinning and identification has been very slow. [**NOTE:** I was able to assist with pinning for one day in the lab in July 2021.]

Specimens were identified by taxa: bees, robberflies, hoverflies, butterflies/moths, all other flies and all other bycatch. Bees, robberflies and hoverflies were pinned. Lepidoptera (butterflies and moths) were placed in clear envelopes. All remaining flies and bycatch were stored separately and given to other research labs to process. Select counties had spiders delivered to Dr Rich Bradley for the Ohio Spider Survey.

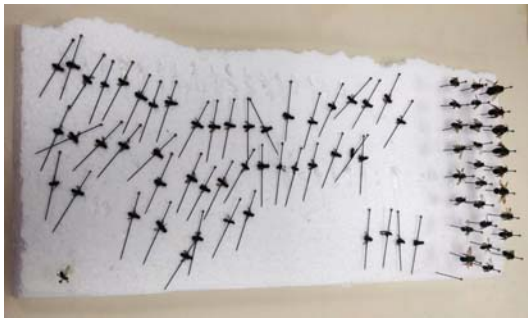
Bees were washed, dried, fluffed and pinned. Once bees were pinned, they were identified which often requires a microscope. The number of bees in kits can vary greatly. Once bee identifications were completed, a list of species was emailed to each volunteer (and to each park/agency if bee collection occurred on park/agency property).

Here are a few photos showing some of the steps in the process of identifying bees.

ONE OF THE MANY FREEZERS AT THE OSU LABS

BEES WERE WASHED IN CLOTH BAGS AND DRIED IN A TABLETOP MINI DRYER

BEES WERE SORTED AND LABELED BY TAXA



BEES WERE PINNED OR GLUED DEPENDING UPON SIZE

SPECIMEN LABELS WERE ADDED ALONG WITH DATE/LOCATION LABELS

NOTE: *A set of pinned bees for Preservation Park's use for educational efforts has been requested.*

Upon completion of bee analysis by the lab, Excel data sets were emailed to each participant as they became available. These data files will be provided to Preservation Parks, along with a copy of this report.

There were more than 53,000 bees submitted by volunteers in the 2020 Ohio Bee Survey project. Bees were identified to at least genus and to species when/as possible. It is important to remember the sampling method detects the presence of bee species, but not necessarily the absence of any particular bee species. For example, larger bees more easily escape bee bowls. However the few larger bees in the catch were often older, more ragged bees at the end of their life.

An overview of the bees collected from McCammon Creek Park are on the following page. They have been identified by genus/species and tallied based upon not only this aspect but also by the month in which they were collected.

2020 Ohio Bee Survey Analysis

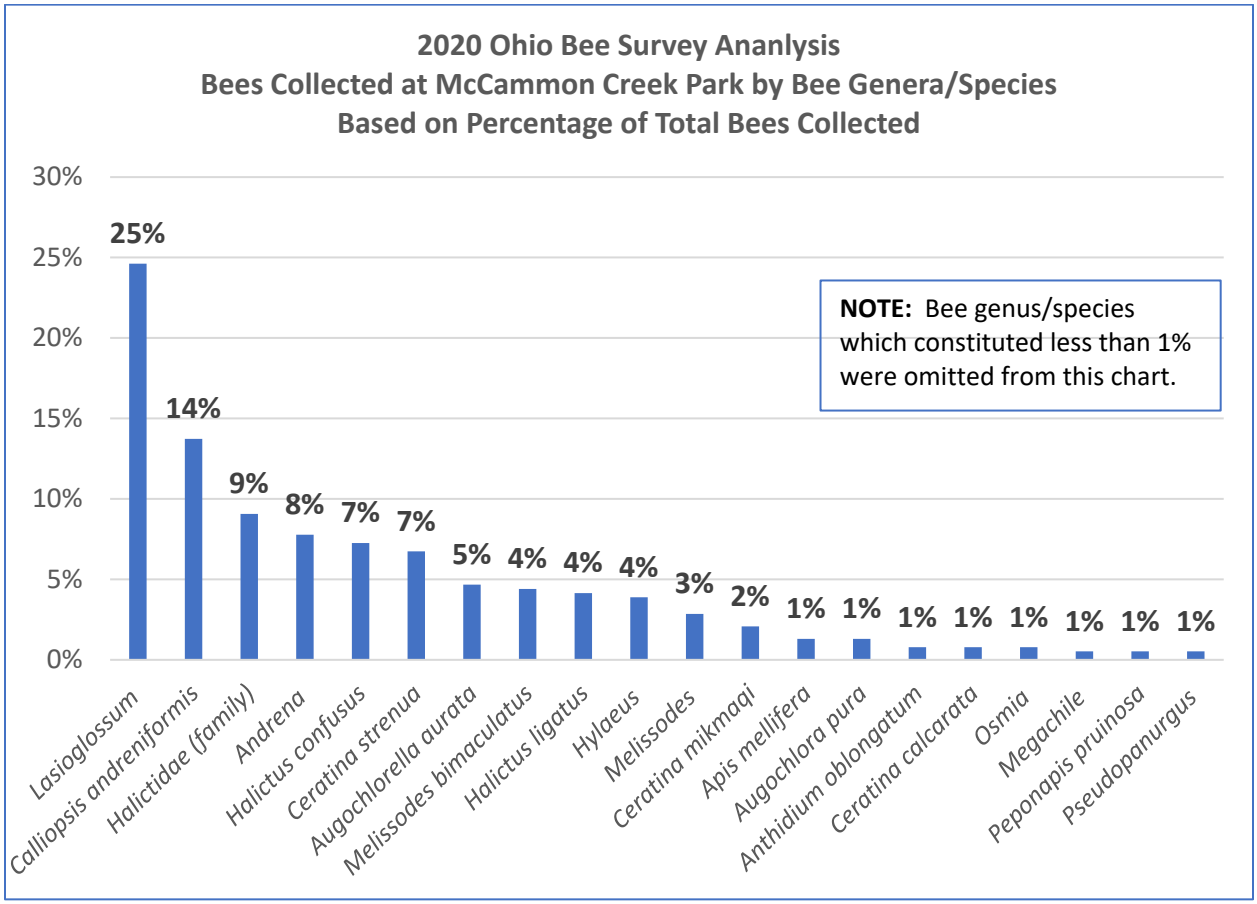
Bees Collected at McCammon Creek Park (May - Oct 2020)

Scientific Name *	May	June	July	Aug	Sept	Oct	Grand Total
Halictidae **		4	11	15	2	3	35
Agapostemon virescens					1		1
Andrena	25	2	1		2		30
Andrena carlini	1						1
Anthidium oblongatum			1	2			3
Apis mellifera		1	2		1	1	5
Augochlora pura			2	3			5
Augochlorella aurata	1	1	8	6	1	1	18
Bombus fervidus				1			1
Calliopsis andreniformis		3	26	23	1		53
Ceratina calcarata	1		1	1			3
Ceratina dupla				1			1
Ceratina dupla/strenua				1			1
Ceratina mikmaqi			6	2			8
Ceratina strenua	8	2	12	4			26
Eucera hamata			1				1
Halictus confusus	1		16	11			28
Halictus ligatus	1	1	5	8	1		16
Hylaeus		1	4	8	2		15
Lasioglossum	16	3	24	52			95
Megachile			1	1			2
Melissodes			1	1	5	4	11
Melissodes bimaculatus			11	6			17
Osmia	1	1	1				3
Peponapis pruinosa			1		1		2
Pseudopanurgus					1	1	2
Sphecodes	1						1
Triepeolus				1			1
x				1			1
Grand Total	**56**	**19**	**135**	**148**	**18**	**10**	**386**

*Bee species indicated in the above chart uses the scientific name. A reference guide is included in later pages of this interim report. It provides common names and some basic information about the bee.

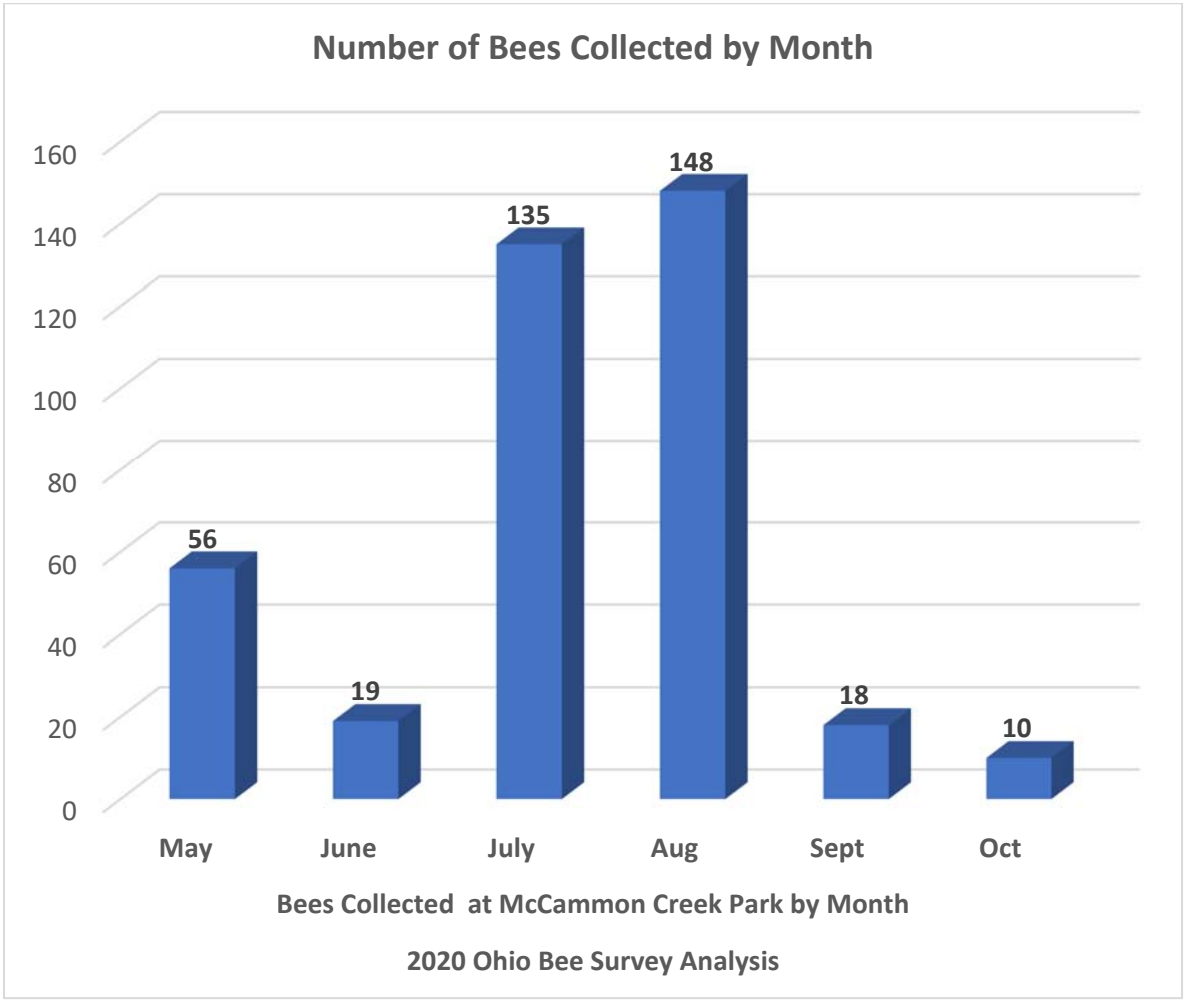
**Thirty-five bees were only able to be identified to the Halictidae family. Genus and subgenus could not be determined.

This is a look at the same data but is based upon the percentage of total bees collected during the time period. Lasioglossum (the sweat bee genus) constitutes the highest percentage of bees collected at McCammon Creek Park. Lasioglossum is the largest of all bee genera and contains more than 1700 species worldwide.[1]

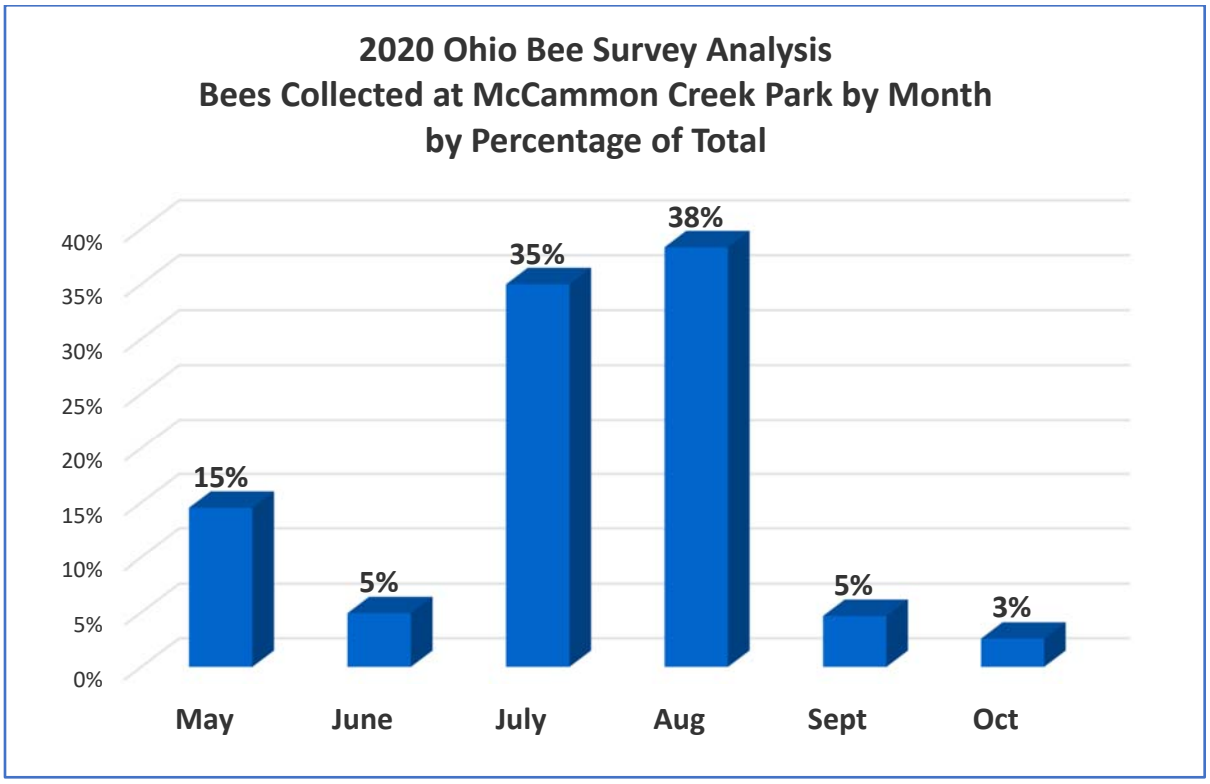


[1] Wikipedia

The graph below indicates the quantity of bees collected by month.



The graph indicated below takes a look at the same data but does so based upon the percentages of bees collected by month.



As mentioned earlier, bycatch also included an analysis of the flies and robber flies. These included the following:

2020 Ohio Bee Survey - McCammon Creek Park
Fly Analysis

Scientific Name	May	June	July	August	Grand Total
Heringia canadensis				1	1
Heringia sp.				1	1
Myolepta preiosa	1				1
Paragus sp.				1	1
Toxomerus geminatus	7	2	1		10
Toxomerus marginatus	15	24	16	3	58
Toxomerus sp.		1			1
Grand Total	**23**	**27**	**17**	**6**	**73**

Only five robber flies were collected in the bycatch:

2020 Ohio Bee Survey
McCammon Creek Park
Robber flies

Scientific Name	June	July	August
Atomosia puella	1	3	1

One can assume that the bees collected in this survey at McCammon Creek Park are a reflection of the food sources (pollen and nectar) as well as the availability of suitable nesting habitat. However, this is strictly conjecture and was not an aspect of the survey implemented.

Additional Attachments as Referenced

BEE SCIENTIFIC NAME REFERENCE GUIDE

[Information Obtained From Wikipedia]

Agapostemon virescens, the **bicolored striped-sweat bee**, is a species of sweat bee in the family Halictidae.

Andrena is a genus of bees in the family Andrenidae. With over 1,500 species. Bees in this genus are commonly known as mining bees due to their ground-nesting lifestyle.

Andrena carlini**,** the **Carlinville miner bee**[1] (*Andrena carlini*) is a species of miner bee in the family Andrenidae. Another common name for this species is Carlin's miner

Anthidium oblongatum, the **oblong woolcarder bee**, is a species of bee in the family Megachilidae, the leaf-cutter, carder, or mason bees

Apis mellifera**,** the **western honey bee** or **European honey bee** (*Apis mellifera*) is the most common of the 7–12 species of honey bees worldwide

Augochlora pura is a solitary sweat bee found primarily in the Eastern United States. It is known for its bright green color and its tendency to forage on a variety of plants. Inhabiting rotting logs, this bee can produce up to three generations per year. Both males and females have been observed licking sweat from human skin, most likely seeking salt

Augochlorella aurata is a species of sweat bee (bees attracted by the salt in human sweat) in the family Halictidae.[1][2][3] It is found in North America east of the Rocky Mountains. The body is a brilliant green metallic color, diffused to varying extents with a copper, red, or yellow color. Its length is 5 to 7 mm.[4] A common name is **golden green sweat bee**.

Bombus fervidus, the **golden northern bumble bee** or **yellow bumblebee**, is a species of bumblebee native to North America. It has a yellow-colored abdomen and thorax. It has complex behavioral traits, which includes a coordinated nest defense to ward off predators. *B. fervidus* is an important pollinator, so recent population decline is a particular concern.

Calliopsis andreniformis**,** The **eastern miner bee**[1] (*Calliopsis andreniformis*) is a species of miner bee in the family Andrenidae.

Ceratina calcarata, the **spurred ceratina**, is a species of carpenter bee in the family Apidae. to Ontario, Canada and east to Nova Scotia, Canada. [5]

Ceratina dupla, the **doubled ceratina**, is a species of carpenter bee in the family Apidae.

Ceratina dupla/*strenua*, Strenua is a small carpenter bee with ivory stripe on front tibia.

Ceratina mikmaqi, (Note: this information obtained from discoverlife.org). Morphological and molecular delineation of a new species in the Ceratina dupla species group.

Ceratina strenua, the **nimble ceratina**, is a species of carpenter bee in the family Apida.

Eucera hamata is a species of long-horned bee in the family Apidae.

Halictus confusus, the **southern bronze furrow bee** or **confused sweat bee**, is a species of sweat bee in the family Halictidae. It is a primitively eusocial bee species.

Halictus ligatus is a species of sweat bee from the family Halictidae, among the species that mine or burrow into the ground to create their nests.[1] *H. ligatus,* like *Lasioglossum zephyrus*[2]*,* is a primitively eusocial bee species, in which aggression is one of the most influential behaviors for

establishing hierarchy within the colony,[3] and *H. ligatus* exhibits both reproductive division of labor and overlapping generations.

Hylaeus (bee), a genus of bees.

Lasioglossum**,** The sweat bee genus ***Lasioglossum*** is the largest of all bee genera, containing over 1700 species in numerous subgenera worldwide.[1][2] They are highly variable in size, coloration, and sculpture; among the more unusual variants, some are cleptoparasites, some are nocturnal, and some are oligolectic. Most *Lasioglossum* species nest in the ground, but some nest in rotten logs**.**

Megachile, The genus ***Megachile*** is a cosmopolitan group of solitary bees, often called **leafcutter bees** or **leafcutting bees**; it also includes the called resin bees and mortar bees. While other genera within the family Megachilidae may chew leaves or petals into fragments to build their nests, certain species within *Megachile* neatly cut pieces of leaves or petals, hence their common name. This is one of the largest genera of bees, with more than 1500 species[1] in over 50 subgenera.[2] The alfalfa leafcutter bee (*Megachile rotundata*) is managed on a commercial scale for crop pollination, and has been introduced by humans to various regions around the world.

Melissodes is a genus of long-horned bees in the family Apidae. There are at least 140 described species in *Melissodes.*

Melissodes bimaculatus, the **two-spotted longhorn**, is a species of long-horned bee in the family Apidae.

Osmia, Mason bee is a name now commonly used for species of bees in the genus ***Osmia***, of the family Megachilidae. Mason bees are named for their habit of using mud or other "masonry" products in constructing their nests, which are made in naturally occurring gaps such as between cracks in stones or other small dark cavities. When available, some species preferentially use hollow stems or holes in wood made by wood-boring insects. *Osmia* species are frequently metallic green or blue, although many are blackish and at least one rust-red. Most have black ventral scopae which are difficult to notice unless laden with pollen.[1] They have arolia between their claws, unlike *Megachile* or *Anthidium* species.

Peponapis pruinosa is a species of solitary bee in the tribe Eucerini, the long-horned bees. Its common name is the **eastern cucurbit bee**. It may be called the **squash bee**, but this name can also apply to other species in its genus, as well as the other squash bee genus, *Xenoglossa*. This bee relies on wild and cultivated squashes, pumpkins, gourds, and related plants. It may occasionally obtain nectar from other types of plants, but the female will only use *Cucurbit* pollen to provision her young.[6] Females dig a nest in the ground near its host plants.

Pseudopanurgus is a genus of mining bees in the family Andrenidae. There are at least 130 described species in *Pseudopanurgus*. Pseudopanurgus bees often have 2 submarginal cells in their forewings. Their size range for extra-small to small, 3mm to 10mm.

Sphecodes is a genus of bees from the family Halictidae, the majority of which are black and red in colour and are colloquially known as **blood bees**.[1] *Sphecodes* bees are kleptoparasitic on other bees, especially bees in the genera *Lasioglossum*, *Halictus* and *Andrena*. The adults consume nectar, but because they use other bees' provisions to feed their offspring they do not collect pollen.

Triepeolus is a genus of cuckoo bees in the family Apidae. There are at least 140 described species in *Triepeolus*.[1][2][3][4] The majority of species whose life history is known are kleptoparasitic in the nests of bees in the tribe Eucerini, especially the genera *Melissodes* and *Svastra*.

Preservation Parks
Scientific Research Permit #05132020

Permission is hereby granted for the special use stated within areas managed by Preservation Parks of Delaware County subject to the conditions listed below.

Issued to: **Teresa Staats** Organization: **Ohio Bee Survey Participant**

Address: **687 Fescue Road, Galena OH 43021**

Phone Number(s): 740-815-5459 E-mail: **tstaats815@gmail.com**

Permit Expires: **11/1/2020** Permitted Area(s): **McCammon property**

Nature of Project: **Bee Survey**

Special Conditions: **Survey includes placing 24 small colorful bowls of soapy water for a 24 hour time period. Survey is repeated each week from May to October (21 total weeks). Each bowl will be labeled with surveyor name, phone number, and "Ohio Bee Survey" inscription. Two sampling signs will be posted at site (transect/research in progress).**

PPDC Employee: **Chris Roshon** Date: **5/13/2020**

Please read the following guidelines carefully.

- Use of Preservation Parks natural areas must be in accordance with Preservation Parks Rules and Regulations as established by the Board of Park Commissioners. A copy of these rules and regulations is attached for your reference. Exceptions for purposes of research are stipulated above. This permit is valid for the period of time specified above. Requests for extensions must be submitted in writing and be received within ten working days before the expiration of this permit. The permit may be modified, revoked, or suspended by Preservation Parks of Delaware County at any time for just cause.

- The permit holder shall submit a final report of his/her research on the Park District natural areas studied to the Natural Resources Manager. Permits may be renewed only after a report has been filed for the prior permit period. If no permit renewal is requested, a final report must be submitted within one year of the expiration date. The final report shall include:

    1.) Name(s) of Park District natural area(s) visited and date(s) of visit(s).
    2.) Research methods, results, and conclusions.
    3.) Mapped location(s) of study area(s).
    4.) Names and numbers of specimens of each species collected in each area and disposition of specimens.
    5.) Types and locations of any disturbances made.

- The permit holder, or other researchers on the project must produce the approved permit upon request. A vehicle permit must be clearly displayed in plain view on the dashboard of any research vehicle when visiting Park District areas. Any questions or concerns while on site please contact Park Police duty phone at (614) 989-1972.

Preservation Parks
DELAWARE COUNTY

2656 Hogback Road
Sunbury, Ohio 43074
(740) 524-8600
www.preservationparks.com

Preservation Parks
Scientific Research Permit #05132020

Vehicle Permit

Those listed below have permission, for the purposes stated, to access area(s) listed below. Permit holder shall produce permit upon request. Please display this permit on the dashboard of each vehicle involved in activity.

Issued to: **Teresa Staats**

Phone Number: **740-815-5459**

Permit Expires: **11/1/2020**

Permitted Areas: **McCammon property**

Nature of Project: **Ohio Bee Survey**

Chris Roshon	**5/13/2020**
Approved: PPDC Employee	Date