

Blueberry Pollination

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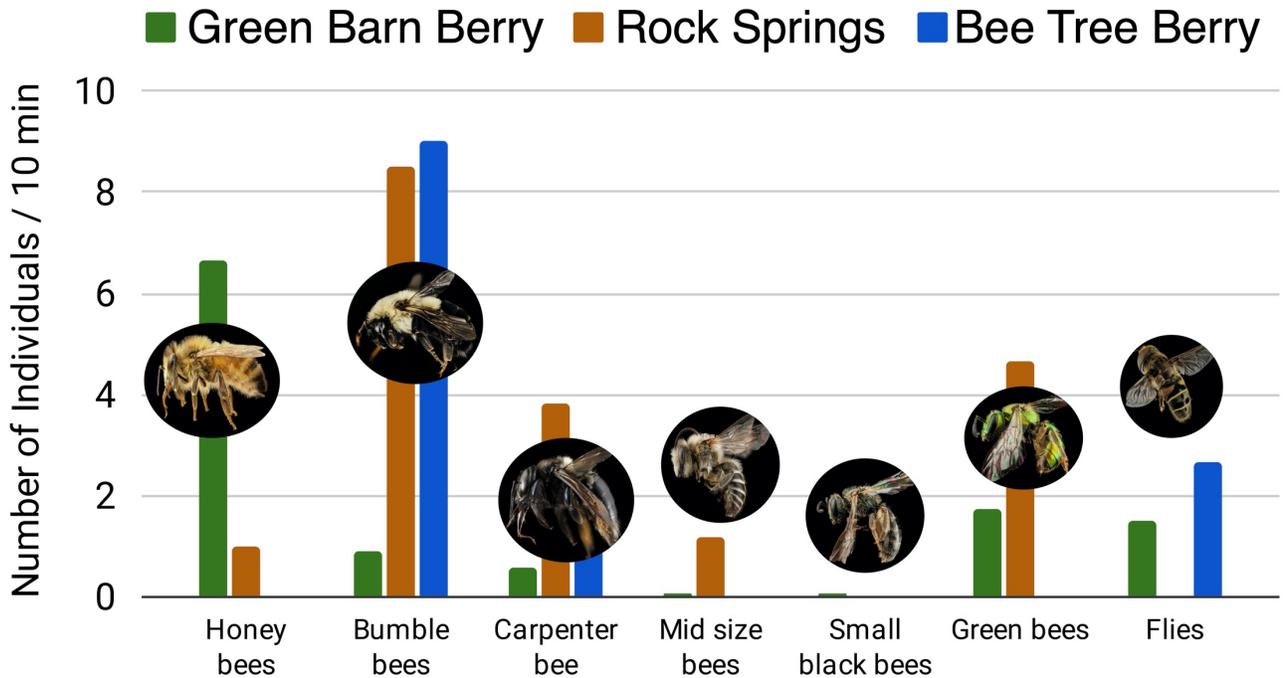
POLLINATOR DIVERSITY AND SERVICES

Blueberries depend on bee pollination to maximize yields. While different blueberry cultivars vary in their dependence for crop pollination, lack or suboptimal bee visitation can decrease fruit set and fruit weight. As part of our NE-SARE funded project, we are working on characterizing the pollinator community and the benefits of pollination for the blueberry crops in your farm. In 2019, we visited your farms to characterize the pollinator community and set up our experiments to quantify pollination limitation. This report provides a report of the information we collected. Specifically, you will find information about the pollinator diversity and abundance in your farm, and to what degree your crop yields benefit from pollination services. In 2021, we plan to repeat this experiment.



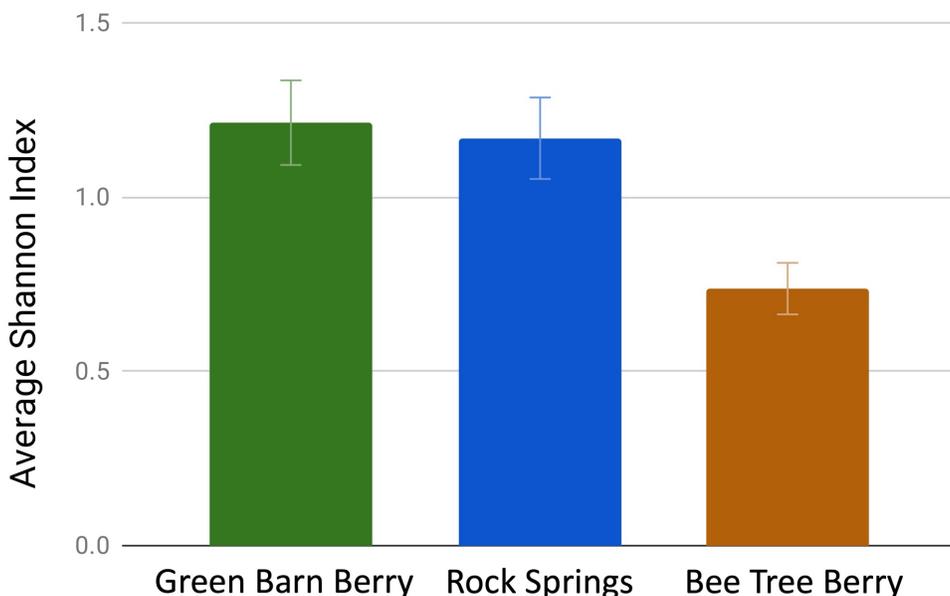
1. POLLINATOR ABUNDANCE

The number of pollinators observed visiting flowers varied across the different sites. The most common visitors across all farms included bumble bees, honey bees, green sweat bees and carpenter bees.



2. POLLINATOR DIVERSITY

Pollinator diversity is quantified taking into account the abundance and the number of species (a.k.a. richness) in the community. The figure below shows the value of diversity measured as “Shannon Index” of the three farms sampled in 2019.

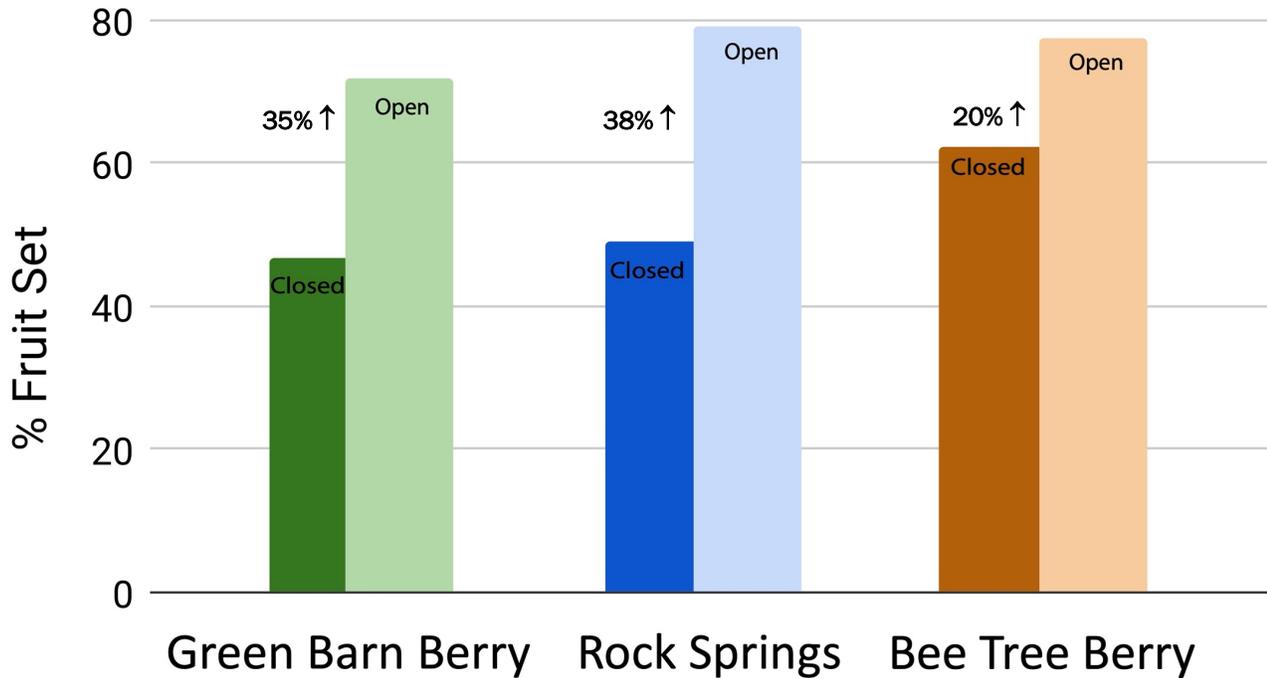


NOTE: Despite finding a higher number of species in “Bee Tree Farms”, the overall diversity was lower because we found lower abundance of floral visitors.



3. BENEFITS OF POLLINATION

One way of capturing the benefits that your crop receives from pollination is by mimicking a system where the flowers do not interact with pollinating insects. To quantify this, we bagged branches with blueberry flowers in your farms (closed) and compared the percent of fruit produced to branches with unbagged flowers (open). **We found that the percent of fruit produced is at least 20% higher with insect pollination!** An additional metric we were not able to measure, such as fruit weight, size, and other quality measures, might show additional effects of insect pollination. These data were collected from different cultivars, which may have different levels of tolerance to self-pollination.



Closed Pollinated Branch

Open Pollinated Branch





4. LIST OF BEE SPECIES VISITING BLUEBERRY FLOWERS

In addition to quantifying the abundance of bees visiting blueberry flowers at your farms, we collected bees at each site and identified all individuals to species. We found 21 bee species across sites and new records of the list of bee species visiting blueberry crops in Pennsylvania!

Bee Family	Species Name	Common name	Green Barn	Rock Springs	Bee Tree Farm
Apidae	<i>Apis mellifera</i>	Honey bees	X	X	X
	<i>Bombus bimacultus</i>	Bumble bees		X	
	<i>Bombus griseocollis</i>				X
	<i>Ceratina mikmaqi</i>	Carpenter bees		X	
	<i>Xylocopa virginica</i>				X
Andrenidae	<i>Andrena frigida</i>	Mining bees		X	
	<i>Andrena tridens</i>			X	
	<i>Andrena cressonii</i>			X	
	<i>Andrena miserabilis</i>			X	
	<i>Andrena carlini</i>		X		
	<i>Andrena dunningi</i>		X	X	
	<i>Andrena vicina</i>		X	X	
	<i>Andrena imitatrix</i>			X	
	<i>Andrena nasonii</i>			X	
	<i>Andrena forbesii</i>			X	
Colletidae	<i>Colletes inaequalis</i>	Cellophane bees			X
	<i>Colletes thoracicus</i>				X
Halictidae	<i>Augochlorella aurata</i>	Sweat bees		X	
	<i>Lasioglossum pilosum</i>				X
Megachilidae	<i>Osmia lignaria</i>	Mason bees		X	



5. OTHER RESOURCES

For more information about wild bees of Pennsylvania or pollinating species of blueberries in our region, check out these additional resources.

Kilpatrick SK, López-Urbe MM (2020) Checklist of the Bees of Pennsylvania. <https://lopezuribelab.com/checklist-bees-pennsylvania/>

López-Urbe MM, Amon N, Watrous K, Fleischer S. (2018). Who Pollinates Pennsylvania Blueberry Plants? Penn State Extension Fruit Times. <https://extension.psu.edu/who-pollinates-pennsylvania-blueberry-plants>



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Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture. Where trade names appear, no discrimination is intended, and no endorsement by Penn State Extension is implied. This publication is available in alternative media on request.

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