

Calder Bee, Butterfly, and Bird Garden

Noah Fettig
Amanda Lautner
Lauren Maher
Betsy Vollmar

LIB 322-01
Prof. Kelly Parker

2 February 2016

Ansberry, K., & Morgan, E. "What's the Big Deal about Bees?" *Science and Children* 52.5 (2015): 24-9. ProQuest. Web. 24 Jan. 2016.

This article is about how bees are beneficial not only to the agriculture system, but to the ecosystem as a whole. The author discusses what would happen if there were no bees and why they are disappearing. This article will be beneficial to our research because it explains the role of bees not only in agriculture but also within the whole ecosystem and explains bees' essential role and why the disappearance of bees is such an important matter.

Bennett, A. B., Gratton, C., Isaacs, R., & Meehan, T. D. "Modeling pollinator community response to contrasting bioenergy scenarios." *PLoS One*, 9(11), (2014): E110676.

This article shows a link between bee abundance and bioenergy land-use strategies. When annual crops (such as corn to produce ethanol) are used to produce biofuel, native bee diversity could be reduced by 28% and bee abundance could be reduced by 71%. On the other hand, their models predict that bee diversity could increase 53% and bee abundance could increase up to 600% if a perennial grassland bioenergy production strategy was adopted instead. While not directly applicable to the installation of a bee garden, the study explains an interesting dilemma between conventional biofuel production and pollinator conservation.

Bauer, N. *California Wildlife Habitat Garden: How to Attract Bees, Butterflies, Birds, and Other Animals*. Berkeley: University of California Press, 2012. Ebook Library. Web. 02 Feb. 2016.

This book provides useful information on how to begin a successful pollinator garden. Bauer describes many host plants that provide nectar to attract butterflies, bees, and hummingbirds. In one chapter, Bauer lists plants by the familial name that attracts the Monarch butterfly, a butterfly that is common to Michigan. The book contains beautiful imagery on successful pollinator gardens. Also, Bauer mentions that plants shrubs and perennials will provide nectar and pollen year-round. This book is a very useful resource to our group because it provides insight in terms of determining what plants will be the most successful to the garden with minimum maintenance.

Deeley, A. "Planting a Bee Friendly Garden." *Beverly Bees*. Beverly Bees, n.d. [ProQuest](#). Web. 01 Feb. 2016.

This article describes the best way to go about planting a garden for bees and other pollinators, including the use of water sources. It discusses the best types of flowers to use, as well as not being afraid to use what others may consider weeds. This will be especially helpful for the practicality of actually planting and laying out our bee garden.

Derveau, S., Kessler, S. C., Mitchell, J., Simcock, K. L., & Tiedeken, E. J. "Bees Prefer Foods Containing Neonicotinoid Pesticides." *Nature* 541 (2015): 74-76. [ProQuest](#). Web. 24 Jan. 2016.

Neonicotinoid pesticides are thought to be the primary reason for colony collapse disorder. This study explains that these pesticides can attract bees, which makes their use incredibly dangerous for both maintained and wild bee populations. Both the honeybee and the bumblebee were found to prefer sucrose that had been treated with imidacloprid and thiamethoxam rather than pure sucrose. The neonicotinoid pesticides also caused both species of bee to consume less food than normal.

Fiedler, A., Isaacs, R., Landis, D., & Tuell, J. "Attracting Beneficial Insects with Native Flowering Plants." *Extension Bulletin E-2973*, 2007. Web. 24 Jan. 2016.

This article published by Michigan State University's Department of Entomology goes into detail about the importance of wild bees, as well as other insects that are beneficial to both pollination and natural pest control. Insects such as the syrphid fly and minute pirate bug, both native to Michigan, can help control aphid and other pest populations. Having access to reliable pollen and nectar sources can help increase this insect's life span, further contributing to the health of the environment. This article also includes a list of flowering plants native to Michigan that attract both bees and other pollinators and pest controllers, as well as a chart that shows the typical bloom time of the plants.

Furst, M. A., et al. "Disease associations between honeybees and bumblebees as a threat to wild pollinators." *Nature* 506.7488 (2014): 364+. [Academic OneFile](#). Web. 25 Jan. 2016.

This study looks at the connection between “managed pollinators” (such as honeybees) and the increased pathogen infection rates of wild bees and other pollinators present in ecosystems exposed to honeybees. Two of the pathogens studied between honeybees and bumblebees are the deformed wing virus (DWV) and a parasite called *Nosema ceranae*. The study calls for an increase in pathogen control in managed bee colonies in order to help the wild bees and other pollinators thrive.

Genersch, E. "Honey Bee Pathology: Current Threats to Honey Bees and Beekeeping." *Applied Microbiology and Biotechnology* 87.1 (2010): 87-97. ProQuest. Web. 24 Jan. 2016.

This article explores the importance of honeybees as the most influential pollinators of commercial crops and food supply security. Specifically, honeybees are so crucial because their pollination accounts for 35% of global food production. Not only do honeybees pollinate crops, they also pollinate a variety of wildflowers allowing for vast biodiversity within many ecosystems. Honeybees actively contribute to human food supply, agriculture, and diversifying many natural habitats. This article discusses the research performed to explore the seemingly inexplicable loss of honeybee colonies, focusing mainly on pests, pathogens, and other causes that impact the honeybee decline. This information can aid us when researching what forms of pesticides Grand Valley uses.

Gilbert, K., & Joseph, E. "Development of Agroecology Based Garden System and Educational Program at Grand Valley State University" (2010). *Student Summer Scholars*. Paper 55.

This essay highlights a project within the Community Garden at Grand Valley State University. The project incorporates multiple disciplines, using education models and agroecology to instill the importance of agriculture and environmental awareness within Grand Valley students. Because our team will be working alongside the GVSU Beekeepers and the Sustainable Agriculture Group, this paper demonstrates how community gardens, or a “Calder Community Garden,” could serve as an educational tool for environmental awareness, and the importance of pollination.

Gill, R. J., Ramos-Rodriguez, O., & Raine, N. E. "Combined pesticide exposure severely affects individual- and colony-level traits in bees." *Nature* 491.7422 (2012): 105+. *Academic OneFile*. Web. 26 Jan. 2016.

This study explores the plights of prolonged pesticide exposure to bumble bees while foraging, and the consequent effects on individual behavioral performance and overall colony production. An excessive amount or combinations of multiple pesticides within an agricultural setting where a bee may forage appears to disturb the equilibrium of the colony. For example, if one bee is exposed to pesticides for an extended period time, the bee's individual foraging can be compromised leading to an increase in mortality among worker bees within the colony. Furthermore, the overall success of the colony may be compromised. This study may be relevant to our topic because it may be useful to investigate what pesticides (if any) are used in GVSU's sprinkler systems around campus.

Greenleaf, S. S., & Kremen, C. "Wild Bees Enhance Honey Bees' Pollination of Hybrid Sunflower." *Proceedings of the National Academy of Sciences of the United States of America* 103.37 (2006): 13890–13895. PMC. Web. 24 Jan. 2016.

This article provides thoughtful insight about the crucial differences between honeybees and wild bees, and their pollination efficiency. This article also explores the interdisciplinary relationships between agriculture, ecosystem services, and biodiversity. Specifically, this article includes data that supports the claim that in the presence of wild bees, honeybees are five times more effective at pollinating sunflowers than without wild bees. Interestingly, the data collected demonstrates the importance of behavioral interactions between pollinator populations and ecosystem services, or enhanced pollination. This indicates that preserving wild bee populations may be more useful to farmers in terms of maintaining crops in times of honeybee shortages. This knowledge is useful to our group because we will need to plant wildflowers to encourage visits from both wild bees and honeybees.

Isaacs, R., & Tuell, J. "Conserving Native Bees on Farmland." *Extension Bulletin E-2985*, 2007. Web. 24 Jan. 2016.

Published by the Department of Entomology at Michigan State University, this article has a basic background on common bees that are native to Michigan, such as Mason, Leafcutter, Andrenid, Bumble, Carpenter, and Sweat bees. Information given includes a picture, description, and the common activities of each type of bee, as well as ways to assist the nest building of each type.

Kleinman, D. L., & Suryanarayanan, S. "Disappearing bees and reluctant regulators." *Issues in Science and Technology* 27.4 (2011): 33+. [Academic OneFile](#). Web. 24 Jan. 2016.

This article discusses the different causes of the colony collapse disorder and how it is affecting beekeepers. The author discusses the negative impacts agrochemicals has had and the legality of using such chemicals. This article is great for our group because it explains different phenomena related to the dying off of bees that will be useful for what to avoid for our project.

Leonard, A. S., & Papaj, D. R. "X' marks the spot: The possible benefits of nectar guides to bees and plants," *Functional Ecology* 25.6 (2011): 1293-1301. [Academic OneFile](#). Web. 24 Jan. 2016.

This article aims to bring understanding to the ways in which floral markers draw in bees and other pollinators for pollination. They study determined that bees returned to flowers with "X" shaped markers, or "nectar guides" in the center more often to pollinate when compared to flowers with no such markers. This article can help our project by giving us insight into which plants and flowers we should plant to draw bees in to pollinate our bee garden the most.

Persson, A. S., Samnegård, U., & Smith, H. G. "Gardens benefit bees and enhance pollination in intensively managed farmland." *Biological Conservation* 144.11 (2011): 2602-2606. [ProQuest](#). Web. 24 Jan. 2016.

This article discusses the importance of gardens to bee populations in heavily farmed areas. When landscapes are dominated by agriculture, bees lose places to pollinate, and end up traveling long distances to find pollen. The study suggests that bees are relying more on gardens planted in both urban and rural areas for pollination. The information in this study will be important to our work on the bee garden, and could help others see the importance of what our project aims to do.

"Restored Spaces & Environmental Projects." *Restored Spaces & Environmental Projects*. City of Philadelphia Mural Arts Program, n.d. Web. 01 Feb. 2016.

This article can give some insight for our group on how other cities, like Philadelphia, are revitalizing spaces for sustainable community use. As of now, the plot of land we are set to use has been devoid of a structure, and is sitting

empty. Restoring this plot of land will not only be an improvement for the students of Calder Art Center, but for the university as a whole.

Russell, K., & Wolfe, D. "Garden/Art: The Nature-Based Sculpture Program of the South Carolina Botanical Garden." *Environmental Communication* 4.2 (2010): 237-249. ProQuest. Web. 31 Jan. 2016.

This article discusses the benefits of introducing art into nature. It presents art in a way that is different than the typical studio showing or gallery presentation. Grand Valley already has a lot of art outside for students and guests to view, so creating an art/bee garden for the students of Calder fits into this article. It may give us some insight into how to incorporate the two items.

"Scientists Determine How to Control Parasite without Harming Bees." The University of Sussex. James Hakner, 4 Jan. 2016. Web. 24 Jan. 2016.

This article explains how to control different parasites without harming bees and the different methods and approaches that can be taken. When people are trying to get rid of specific parasites, for example, when people want to get rid of mites the process individuals typically use are very harmful to bees but there are alternative processes available that have no impact on bees. This article will be useful for our project if we decided to research Grand Valley's methods of dealing with parasites. Also, if we decide to get rid of parasites that are killing off bees we want to make sure we aren't killing them off ourselves as well.

VanEnglesdorp, D. "Weighing Risk Factors Associated With Bee Colony Collapse Disorder by Classification and Regression Tree Analysis." *Journal of Economic Entomology* 109.1 (2010). Web. 2 Feb. 2016.

This article is not just about the colony collapse disorder but it also discusses what would happen if bees were to go extinct. It also takes into account all the other possible factors that come into play when dealing with CCD. This article is useful for our project because it gives us more insight into CCD and other factors involved so we can try to avoid those factors when trying to implement the bee garden in the future.

Vaughan, M., et al. "Pollinator Meadow Installation Guide: Upper Midwest." Ed. Sara Morris. N.p.: *The Xerces Society for Invertebrate Conservation*, 2015.

This article is similar to the article, "Attracting Beneficial Insects with Native Flowering Plants" published by Michigan State University. This article from the Xerces Society goes into more detail about installing a pollen habitat for bees and some of the issues and characteristics that need to be considered before determining if a site is acceptable for a garden. These characteristics include pesticide drift, sunlight exposure, weed pressure, soil type, irrigation, and the site's history. Both short- and long-term maintenance strategies are discussed.