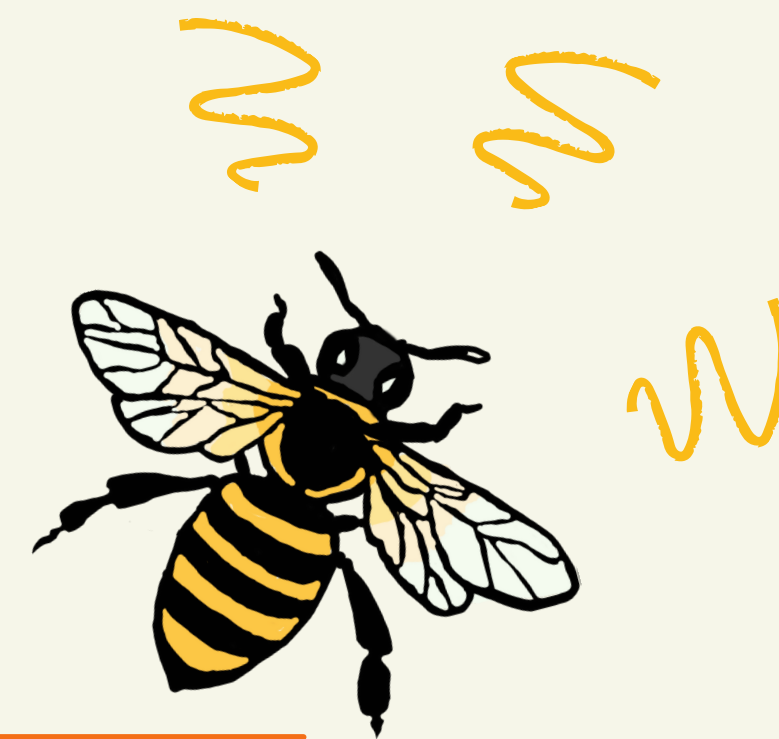


SAVING THE BEES

Bees are declining all over the United States, including Arkansas. This is mainly due to the overuse of pesticides and the lack of food. The overuse of pesticides leave bees vulnerable to disease during the winter while the lack of food can lead to malnutrition and starvation also leaving them vulnerable in the winter. Providing more food and finding alternatives to pesticides can set honey bees up to have a successful winter increasing the overall population.



INTRODUCTION

Honey bees are directly or indirectly responsible for 1/3 of all food Americas consume in a year and contribute \$15 billion per year to the U.S economy. No doubt are they important but Bees are declining all over the United States, including Arkansas. This is mainly due to the overuse of pesticides and the lack of food presented by the popularity of monoculture lawns. Planting more flora in our gardens and being mindful in our use of pesticides can lead to a positive change in our local honey bee population.

RESULTS AND DISCUSSION

According to Miller (2020) a big reason why bee populations continue to decline is a lack of food. Bees need an array of fatty acids, minerals and vitamins that can't all be provided by the same source of flowers. That is why planting more bee friendly gardens can set the bees up with healthy immune systems they need to survive harsh winters. This is backed up by a study done by Smart (2016) which shows the survival rates of apiaries after winter in relation to how much food they had access to as shown in Figure 1.

According to Vanegas (2017) Pesticides are absorbed by plants through either their roots or their leaves, and distribute it systemically to various plant tissues. As the pesticide spreads through the system, some residue enters the pollen and nectar, then makes its way into the nectar and pollen and into the bees colony. Killing them within hours or through long term exposure leading to weak immune systems and impaired brain function. Overall leading to a decreased survival rate as shown in Figure 2.

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MATERIALS AND METHODS

For planting the minimum you will need are seeds of the plants of your choice, just make sure there is a variety of them, and a shovel.

1. Make a shallow hole
2. Sprinkle a couple seeds into the hole
3. Leave some space and repeat steps 1 and 2

There is some overlap in decreasing pesticides and planting more flora; some plants repel certain pests. Petunias, lavender, onions, chives, garlic, leeks, and shallots all help repel pests from your garden. More over, household soaps diluted with water are usually efficient and for more sensitive plants garden centers also sell soap sprays. Using plant oils such as rosemary, eucalyptus, geranium, thyme, lavender, and lemongrass can be used in the garden to repel pests. Watching your use of pesticides can be enough but these are great alternatives to pesticides all together.

| Year | Site | Number colonies surviving (Percent total) |
|------|------|-------------------------------------------|
| 2010 | A | 20 (83) |
| | B | 17 (67) |
| | C | 19 (79) |
| | D | 20 (83) |
| | E | 18 (75) |
| | F | 12 (50) |
| 2011 | A | 20 (83) |
| | B | 17 (71) |
| | C | 18 (75) |
| | D | 18 (75) |
| | E | 18 (75) |
| | F | 12 (50) |
| 2012 | A | 21 (88) |
| | B | 19 (79) |
| | C | 17 (71) |
| | D | 18 (75) |
| | E | 16 (67) |
| | F | 17 (71) |

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Figure 1.

Site A had the highest survivorship over all three years and was surrounded by greater floral abundance. Floral abundance near such an apiary likely made it easier for bees to locate and exploit pollen resources. In contrast, honey bees from site F, the site with the lowest annual survivorship, may have had to travel farther and/or locate and exploit smaller patches of flowers

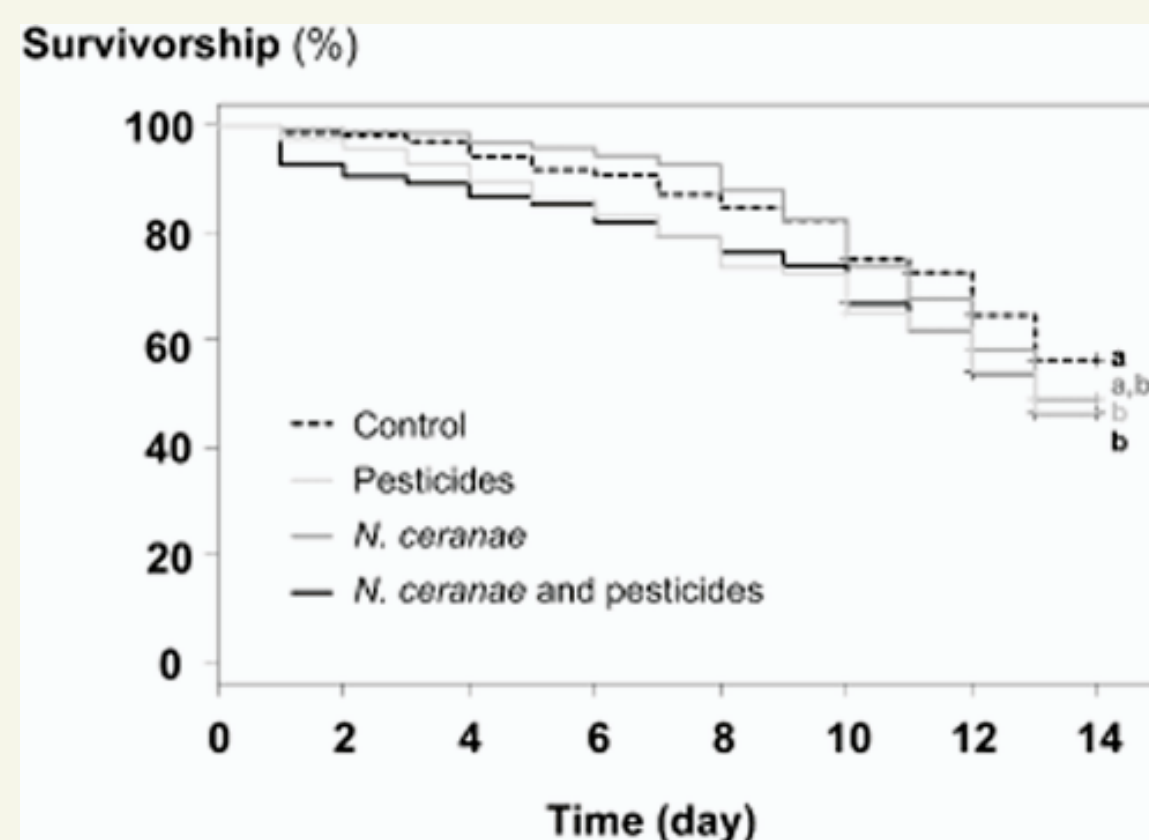


Figure 2.

Shows the difference in survival rate in honey bees affected by pesticides and both pesticides and parasites found in bee colonies. There is a significant and increasing difference between the survivorship of the control group, the pesticide group, and the pesticide and parasite group.