

BUGS! A GARDEN ECOSYSTEM EXPERIMENT

BY GRANT SCHOOL 5TH GRADERS

GRANT ELEMENTARY SCHOOL



INTRODUCTION

At Grant Elementary School, 5th graders received funding to design experiments and research how to grow healthy plants. We decided to study how different soil types can affect a garden ecosystem. We learned how organisms affect garden ecosystems and experimental design systems. Our work will help other learners and gardeners in the community.

Scientific Question: How do Green Peach Aphids (*Myzus persicae*) and Convergent/Pink Lady Beetles (*Hippodamia convergens*) affect the growth of a Rainbow Chard (*Beta vulgaris*) plant? We studied if chard plants introduced to aphids, aphids and lady beetles, or no insects grow the healthiest so we can inform gardeners about insects in their gardens.

METHODS

Scientific Question: How do Green Peach Aphids (*Myzus persicae*) and Convergent/Pink Lady Beetles (*Hippodamia convergens*) affect the growth of a Rainbow Chard (*Beta vulgaris*) plant?

Independent Variables

- ❖ 130 aphids/plant in one treatment of 20 plants
- ❖ 130 aphids and 3 lady beetles/plant in one treatment of 20 plants
- ❖ 0 insects in a control of 20 plants

Constants

- ❖ Type and amount of light, water and potting soil
- ❖ Plant location in south facing windows and plants were rotated
- ❖ Enclosed in same lightweight fabric

Dependent Variables

- ❖ Number of foliage leaves
- ❖ Length of the longest leaves
- ❖ Width of the widest leaves

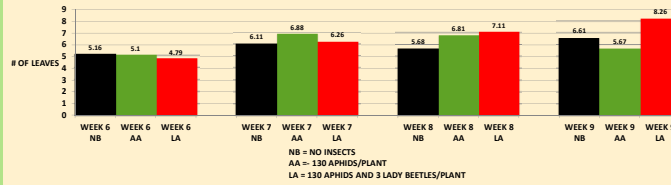
Hypotheses:

1. The plants with no insects would grow the healthiest because they had no aphids at all.
2. The plants with the lady beetles and aphids would also do well since the beetles would eat the aphids.
3. The plants with only aphids would not grow as well since the aphids would eat the nutrients from the plant.
4. The plants with lady beetles would grow the most, longest and widest leaves because the beetles would eat the aphids and having an insect in the plants is closer to a plant's natural habitat.



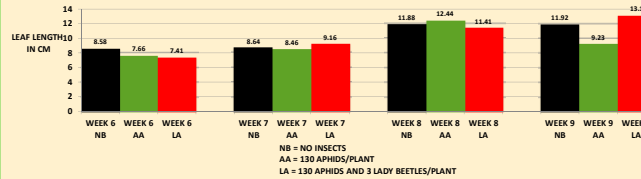
RESULTS

NUMBER OF FOLIAGE LEAVES ON CHARD PLANTS WITH GREEN PEACH APHIDS AND LADY BEETLES



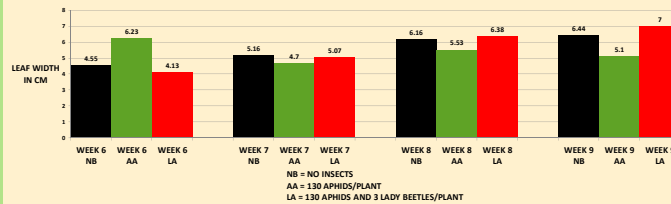
1. From week 8 to week 9, the average leaf number for the aphid plants decreased more than 1 leaf.
2. The lady beetle plants began with the lowest average leaf number (4.79) but increased the most (3.47) and in week 9 had the highest average leaf number (8.26).
3. The no insect plants increased and then decreased every other week. As a result these plants have about the same number of leaves every week.

LEAF LENGTH ON CHARD PLANTS WITH GREEN PEACH APHIDS AND LADY BEETLES



1. From week 8 to week 9, the average leaf length for the aphid plants decreased more than 3 cm. The aphid plants were the only plants that decreased.
2. The lady beetle plants began with the lowest average leaf length (7.41 cm) but increased the most (5.69) and in week 9 had the longest average leaf length (13.1 cm).
3. All three treatments had their largest increase from week 7 to week 8.

LEAF WIDTH OF CHARD PLANTS WITH GREEN PEACH APHIDS AND LADY BEETLES



1. Even though the aphids began with the widest leaves (6.23 cm), by week 9 these plants had the thinnest leaves (5.1 cm) with a decrease of 1.13 cm. They were the only plants to decrease their leaf width.
2. The lady beetle plants began with the lowest average leaf width (4.13 cm) but increased the most (2.87 cm) and in week 9 had the longest average leaf width (7 cm).
3. All three treatments had their largest increase from week 7 to week 8.

CONCLUSIONS, WONDERINGS, AND THOUGHTS

Overall: The lady beetle plants had the most leaves, the longest leaves, and the widest leaves. We think they grew better than the aphids because the aphids had no predator in their food chain. However, we cannot reliably compare the results of the control plants because there was a cross contamination of aphids into our control plants during measuring. We wonder how well the control plants would grow without insects at all.

Another important observation we made was it took 3-4 weeks for the aphids to make a decrease in the leaf number, length, and width. However, after 2 weeks, the aphid plants looked droopy, wilted, and sick. The data results were the similar through week 8. We wonder what would happen to the results in week 10.

We advise gardeners to use lady beetles to control aphids. Gardeners can plant plants to attract lady beetles to their gardens. Lady beetles like to eat the sweet honeydew from the aphids and they like similar plants that other insects like such as flowering natives.



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