Insect Exposure to Tomato Plants

Problem Statement: How does different insect exposure effect damage done to tomato plants?

Hypothesis: I think that the group with aphids will show the most damage in tomato plants because one of aphid's food sources is the veins and leaves of tomato plants.

Independent Variable: Insects exposed to plant

Dependent Variable: Damage done or not done to tomato plant

Control Variables:

- Size/material of mason jar
- Amount of water given
- Temperature
- Light exposure
- Amount of soil
- Amount of time plant exposed to insects
- Time intervals for collecting qualitative data
- Soil brand
- Tomato plant

Materials:

- 4 Mason jars
- 100 Aphids
- 20 Ladybugs
- Water
- Camera
- 4 tomato plants

- Graduated cylinder
- Clock
- Soil
- Marker
- Scissors

Procedure

1. Label 4 mason jars using a marker 1 through four
2. Using scissors, poke 10 holes in each mason jars cap
3. In each mason jar, add 25mL of soil and loosely shake to even out in jar
4. In each mason jar, put 1 tomato plant in the soil
5. Pour 10 mL of water into each mason jar
6. Leave mason jar 1 with nothing else in it to act as control
7. In mason jar 2, add 10 ladybugs and shut lid
8. In mason jar 3, add 50 aphids and 10 ladybugs, then shut lid
9. In mason jar 4, add 50 aphids and shut lid
10. Place each jar next to each other in same environment
11. Collect qualitative data for each jar at 6:00 am and 6:00 pm for 3 days

Tomato Plant Observations

	Jar 1 (Control)	Jar 2 (Ladybugs)	Jar 3 (Ladybugs and aphids)	Jar 4 (Aphids)
Day 1, 6:00am	Tomato plant contains no holes or apparent damage. Green leaves and small hairs on stem.	Like control. Contains no holes/damage. 3 lady bugs rest on the plant, while other 7 are on the glass of jar.	Aphids have attracted to stem of plant, while some are still on glass jar. Ladybugs are also on the jar.	Like jar 3, many aphids are on plant stem, while some are still on glass of the jar
Day 1, 6:00pm	Many water droplets have formed on the	Ladybugs rest on leaves or bottom of jar.	Aphids and lady bugs are on plants. Some	No damage visible to plant, but majority of

	glass of the inside of the jar.	No sign of damage of the tomato plant. Water droplets also on the inside of jar 2.	aphids have died, while roughly 5-10 are no longer in jar, most likely because ladybugs consumed them.	aphids are on stems/leaves of plant
Day 2, 6:00am	Looks similar to 6pm from yesterday. No changes in apperence of plant or water droplets in jar.	Ladybugs are not moving much, and rest on the leaf of tomato plant. No damage to plant.	Some damage to a few leaves that have a high consentration of aphids. There are small punctures in leaves from aphid consumption. More aphids missing, same number of alive ladybugs.	More holes found on many leaves in jar fours tomato plant. Some aphids have stopped moving, while others are crawling and active on leaves of tomato plant.
Day 2, 6:00pm	Shows same characteristics as last observation, although appears to have grown in size slightly. More visible roots from side of jar.	Same number of ladybugs, however two have died. Still no damage to tomato plant (no holes or wilting)	Rouphly half of original aphid quantity has vanished from visibility from outside of jar. Believed to have been consumed by ladybugs. Some holes in new areas of leaves of tomato plant.	More holes than jar three found on tomato plant leaves. Majority of aphids alive and active on stems and leaves of tomato plant.
Day 3, 6:00am	The plant looks exactly the same as last time I collected qualitative data on it. Plant shows no holes, or wilting on leaves.	No damage can be seen on the tomato plants. Lady bugs show little activity, and continue to stay on plant and the side of mason jar.	Very few aphids left that can still be seen from outside of the jar. Same number of lady bugs, with no new damage visible on tomato plant	More holes located on leaves of tomato plant, as well as slight wilting on the edges of leaves located lower to the bottom of the jar (where most

			leaves or stem.	holes are located on leaves).
Day 3, 6:00pm	No damage that can be seen. Some moister is still visible on the inside of the walls of the mason jar.	Two more lady bugs have died; however, many are now active. One has flown from one side of the jar to the other. No visible damage to the tomato plant.	Roughly three to five aphids still visible, while all lady bugs still alive. Only a few holes are visible compared to jar four.	Mostly the same number of holes as last time I checked, however there is more wilting on the corner of some of the leaves of the tomato plant.

Pictures

Day 1:

6:00am

6:00pm

Day 2:

6:00am 6:00pm

Aphid indicated on the side of jar in red circle.

Day 3:

6:00am 6:00pm

Conclusion:

Based off of the data that I have collected and the experimentation that I have done, I can conclude that aphids are destructive to tomato plants, while ladybugs pose no threat to the destruction of them through consumpltion. In jar four, the most damage was done to the tomato plant, showing both holes in leaves and also wilting. However, in the jar two, the tomato plant looked extreamly similar to the jar one tomato plat (control), which showed no visible damage. Jar three, which contained both ladybugs and aphids, had less damage then jar four, but more then jar two. This is most likley because while aphids were initially feeding on the plant, the ladybugs preyed on them and diminished the aphids damage to the tomato plant.