Urban Ants

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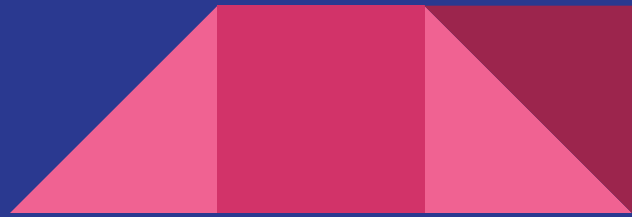
Question

How will Red and Black Harvester Ants react to polluted, semi polluted, and clean environments?

Hypothesis

If we add pollution to an ant farm, then the ants would live shorter than the ant farm without pollution because the pollution will harm their everyday life and they will not be able to live like they used to.



Research

Ants are social insects, which means they **live** in a group, or a colony. Colonies inside nests that can be built in trees, underground, or even inside special ant plants. Ant colonies are highly organized, usually ruled by a single queen, and each ant has specific jobs to do. Most ants in a colony are female workers. Some ants have been on Earth for more than 200,000 years. The biggest known ant is 2.4 inches long, and it is called the Titanomyrma giganteum. Some ants have traveled across 6 continents. Also, ants are strong, where they can carry 20 times their own weight. Most ants only live a few weeks because of humans, but the oldest recorded ant was 30 years old. Even though there are 7 billion humans on Earth, there are about 10

quadrillion ants across the Earth. That also means that the avera

Research (Continued)

human steps on about 10,000 ants in their lifetime. Ants are also rough, so when they fight, it is usually to the death. They don’t have ears but can hear with vibrations through stomping of feet. Ants don’t have lungs, but oxygen enters through the tiny holes in their bodies. There are more than 12,000 species of ants in the world. When the queen of the ant colony dies, the colony can only survive a few more months.

Materials

3 Mason Jars

39 Red and Black Harvester Ants (14 in polluted, 14 in semi polluted, and 11 in clean)

Paper and Pen (To record data)

Empty Potato Chip Bags (3 in each jar cut up into pieces.)

Sand (To make each habitat in each jar)

Ant Chow Food

Procedures

1) Add approximately half a cup of sand to each jar
2) Add approximately 10-14 red and black harvester ants to each jar
3) Feed a little bit of ant chow once a week
4) Cut up little pieces of empty potato chip bags
5) Put in 3-5 small pieces of the potato chip bag in the “Semi-Polluted” jar
6) Put in about 12-15 pieces of the potato chip bag in the “Polluted” jar
7) Do not put any pieces of the potato chip bag in the “Clean” jar
8) Observe the behavior of the ants and the progress of the underground ant hole networks

Clean Jar Observations

Day 1 - 11 Ants Alive

Height of 1st burrow: 2.5 inches (5cm)

Width of 1st burrow: 0.5 inches (1cm)

The ants are moving around they have made burrows

Day 6 - 3 Ants Alive

Height of 3rd burrow: 2 in (5 cm)

Width of 3rd burrow: 0.5 in (1cm)

Grass has started growing in the jars

Day 9 - All the ants died

Day 3 - 7 Ants Alive

sand covers all the burrows

Height of 2nd burrow: 2 inches (5cm)

growing to the top of the jar

Width of 2nd burrow: 0.5 inches (1cm)

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The ants are making burrows and eating food.

Semi-Polluted Jar Observations

Day 1 - 14 ants live

Height of 1st burrow: 2.5 inches

Width of 1st burrow: 2 inches

The ants made burrows some have died

Day 3 - 12 ants live

Height of 2nd burrow: 2 inches

Width of 2nd burrow : 1 inch

Plants started growing from a seed from the Ant chow food

Day 6 - 6 ants alive

No new burrows

Height of 1stt plant: 3 inches

Two New plants growing

Day 9 - No ants alive

No burrows

Polluted Jar Observations

Day 1 - 11 Ants Alive

Height of 1st burrow: 1 inch

Width of 1st burrow: 1 inch

Day 6 - 10 Ants Alive

They have not made any new burrows but they have connected all 4 burrows into one network.

Day 3-11 Ants Alive

Day 9 - 1 Ant Alive

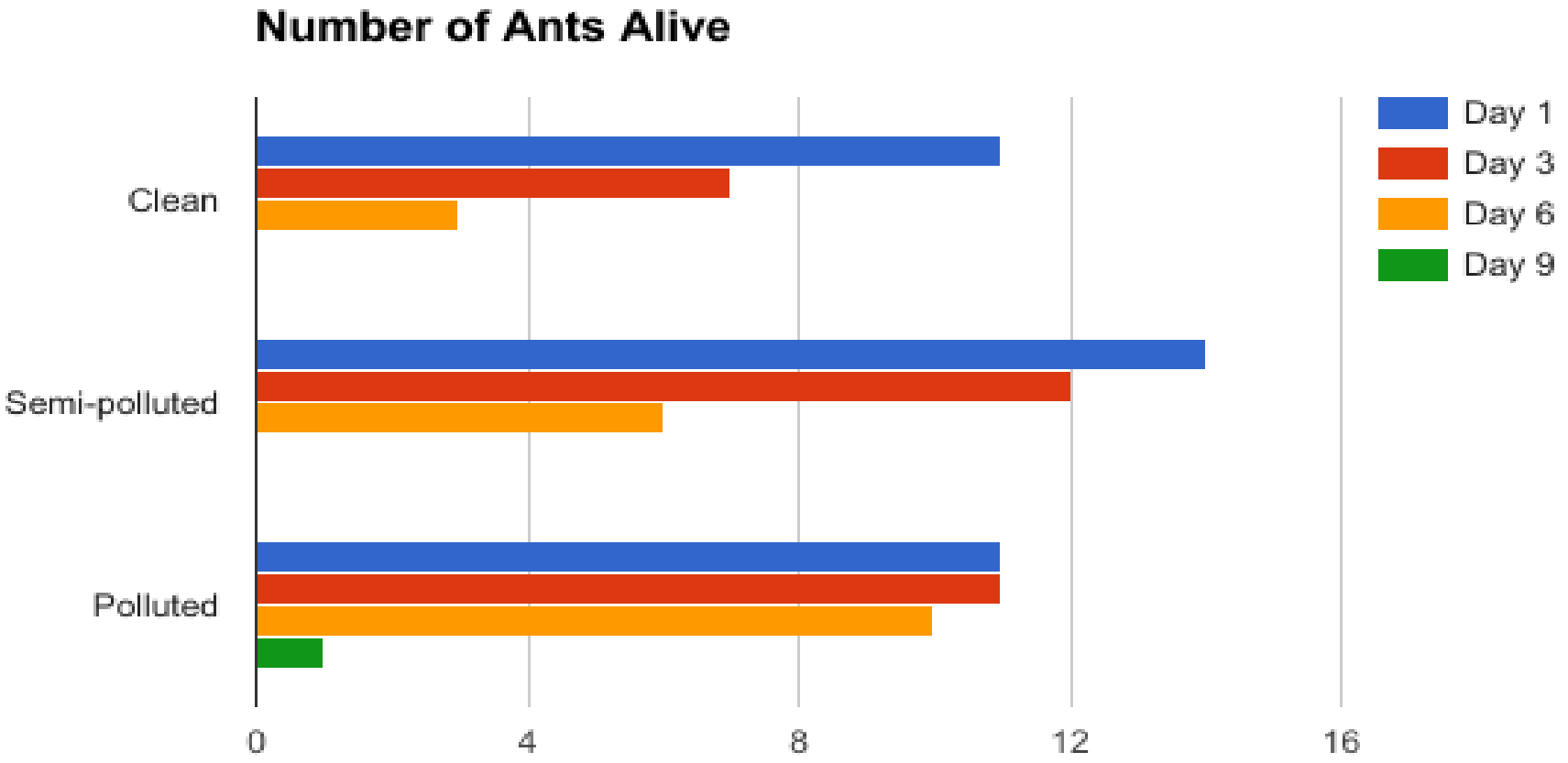
They have made 3 burrows

new burrows

No more

Height of burrows: 3 inches,1inch, 1 inch

ped eating so one ant is barely alive. Width of all 3 burrows :1cm, 4 cm, and 6 cm


Number of Ants Alive
Clean
Semi-polluted
Polluted
0
4
8
12
16
Day 1
Day 3
Day 6
Day 9

Results

The ants in the polluted jar lived longer than the ants in the clean and semi-polluted jars. Only one ant survived until Day 10 in the polluted jar, whereas the ants in the clean jar and semi-polluted jar died on Day 9.

Also, the polluted ant jar had the most burrows and the semi-polluted ant jar had the least amount of burrows. The polluted ant jar had 4 burrows that ended up being connected to one another forming a network. The clean ant jar had 3 burrows and did not connect to form a network. The semi-polluted ant jar had 2 burrows and connected to one another forming a network. The average height of the burrows for the clean ant jar was 2.2 inches and the average width is 0.5 inches. The average height of the burrows for the semi-polluted ant was 2.25 inches and the average width was 1.5 inches. The average height of the burrows for the polluted ant jar was 1.5 inches and the average width was 1 inch.

Clean (Final Day of Experiment)

Semi Polluted (Final Day of

Polluted (Final Day of Experiment)

Conclusion

In conclusion, our hypothesis which was that “the ants in the polluted jar would live shorter because the pollution would harm them “ was wrong because the ants that were in the polluted jar had lived more than the clean and the semi polluted jar. Also, the polluted ant jar had more burrows then the other jars. We believe this is because the ants in the polluted jar had adapted to the polluted world because after the experiment only one ant was barely alive in the polluted jar.

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