



CALIFORNIA SCIENCE & ENGINEERING FAIR

2019 PROJECT SUMMARY

Name(s)	Project Number
Beatrice Mihalache	S2110
Project Title	Effects of Polyethylene Microbeads on Lactuca sativa var. longifolia
Abstract The objective of this study is to examine the effects of microplastics in the soil on plant health and on soil properties. Methods A group of lettuce was grown in soil with a 10% concentration of polyethylene microplastics, while a control group was grown in plain soil. After 49 days, the plant height was measured with a ruler, the biomass was weighed with a gram balance, and the root length was measured with a ruler. The water holding capacity of the soils with and without microplastics was also quantified. To visualize whether microplastics were taken in by the lettuce, fluorescent microplastics were added to the soil of another group. After 19 days, these plants were cleaned thoroughly, mashed up, and tested for fluorescent beads. Results Results demonstrated that microplastics in the soil increase the water holding capacity by 29%, that plants growing in soil with microplastics grew 17.9% taller than the control plants, and that the differences in dry biomass and root length between the two groups were not statistically significant. The analysis of the lettuce grown with fluorescent microplastics demonstrates that microplastics are carried along with the plant matter even after rinsing thoroughly with water. Conclusions This study demonstrates that microplastics do not come off the plant even after plants are thoroughly washed, which is possibly harmful to animal and human plant consumers. This study also demonstrates that microplastics in the soil significantly increase the water holding capacity of the soil and the height of the plants, which are positives for the agriculture business.	
Summary Statement I showed that microplastics in the soil increase the water holding capacity of the soil, that plants grown in soil with microplastics are taller, and that microplastics have a tenacious tendency to adhere to plant matter.	
Help Received Feedback received from Cathy Messenger, teacher & mentor at Los Gatos High School, throughout the entirety of my project. She also helped me develop a method for how to determine whether microplastics were taken in by the plants. All experiment setups, data collection, and data analysis were done by me.	