

CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

Name(s) **Project Number Umair M. Mahmood** 38160 **Project Title** Investigating the Ingestion of Synthetic Polymers by Mearworms vs. **Superworms** Abstract **Objectives/Goals** Approximately 50% of the plastic we use goes to waste after one use. The average erican throws away e Ai 185 pounds of plastic each year. The solution: mealworms! The purpose of this project was to compare mealworms and superworms for their ability to consume plastic products. Dested styrofoam, high density polyethylene, polyester, and nylon to see whether beetle larvae are able to ingest these synthetic polymers. Would the worms be able to consume plastics other than styroform? Some research stated mealworms are more efficient than superworms at consuming styrofoan so this project will also investigate whether mealworms and superworms differ significantly in their consumption of plastics. **Methods/Materials** I obtained 1,000 superworms and 1,000 mealworms. I set up ten plastic test boxes with 200 mealworms or superworms in each, along with one of the synthetic portrol. I tested the amount of material consumed by the worms from two blocks of tyroioam, twenty pieces of high density polyethylene, two pieces of polyester, two pieces of nulon, a carrot and lettuce (the control). I monitored these boxes for five weeks, and weighed the test material every third day, using a scale with 0.001 gram accuracy. Results I tested 2,000 worms and evaluated over 100 data points. During the course of the experiment, the mealworms ingested 0.111g of styrotoam, and the superweyms ingested 4.037g of styrotoam, more than 36 times the amount consumed by the merlworms. The mealworms also ingested 0.045g of high density polyethylene, and the superworms consumed 0.02 grams. The mealworms ingested of nylon, only 0.016 grams, while the superworms consumed 0.079g of nylon. The mealworms consumed none of the polyester, but the superworms ingester 0.041 gram of polyester. **Conclusions/Discussion** My results revealed that neither the mealworns por the superworms ingested significant amounts of synthetic polymers except for tyrotyam. Sontrary to my hypothesis, the superworms consumed significantly more styrofoam than the mean vorms. Superworms also consumed small amounts of nylon and polyester, and surprisingly, both works consumed small amounts of high density polyethylene. My project suggests superworms, and to some extent mealworms, in a landfill setting might be an effective resource for eliminating styrofoam, although neither worm would make a significant reduction to other disposed plastics. Summary Statement I tested the mealwor as and superworms in their ability to consume plastics, after the experiment I found was consumed the most. that the styrofoam **Help Received** None. I designed, built, and performed the experiments myself.