CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
31251

Project Title
Effect of Neustonic Microplastic Debris on the Pelagic Insect Halobates sericeus

Abstract

Objectives/Goals
The North Pacific Central Gyre (NPCG) is a key area of interest for investigating the effects of plastic debris on the lives of marine organisms because much of this debris is concentrated in gyres throughout the world's oceans. This study provides the first assessment of the impact of plastic debris on marine invertebrates, targeting the neustonic marine insect Halobates sericeus. This species was chosen because it utilizes floating material, including surface-level plastic, as a substrate to lay eggs.

Methods/Materials
A total of 45 historical (1972/1973) and 45 recent (2009) samples from the NPCG were sorted and analyzed with a dissecting microscope. Plastic and H. sericeus were thoroughly sorted and counted, with the H. sericeus being further classified into five age groups: juvenile, adult male, adult female, newly molted, and molts of organisms.

Results
Although the data showed that both the abundance of plastic and H. sericeus in the NPCG has significantly increased over the last forty years, the concentration of plastic debris grew faster over this time period. Data from 1972/1973 indicated that there was no correlation between the abundances of H. sericeus and plastic. However, the 2009 samples showed a significant positive correlation ($p < .0001$, $R^2 = 0.3353$).

Conclusions/Discussion
Further research is necessary to determine the specific nature of the interaction between plastic debris and H. sericeus in the NPCG, though this research does suggest the possibility of a true biological relationship between the two.

Summary Statement
I looked at the impact of surface level microplastic marine debris on the population levels of a unique oceanic insect, Halobates sericeus.

Help Received
Used lab equipment at Scripps Institution of Oceanography under the supervision of my mentor, Miriam Goldstein; Consulted with Dr. Lanna Cheng about the general biology of Halobates