



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

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| Name(s) Hippolyte Goux | Project Number S1308 |
| Project Title The Effect of Anthropogenic Atmospheric Nitrogen Deposition on Southern California Microbial Forest Flora | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals Human activities have significantly increased the amount of biologically active forms of nitrogen released into the atmosphere that fall back down to earth as nitrogen deposition. The aim of the study was to determine how anthropogenic atmospheric deposition of Nitrogen on the forest floor affects the microbial flora of a mountain forest in southern California.</p> <p>Methods/Materials To simulate the effect of nitrogen deposition, bacteria were exposed to ammonium nitrate (NH₄NO₃) in the laboratory. Bacteria were sampled from the soil and leaf litter of two sites on Mt. Palomar, San Diego Co. California. The bacteria were isolated into pure colonies in petri dishes and then exposed to three different levels of ammonium nitrate (NH₄NO₃). The first level (low) was of 2.24878 X 10⁴ mol NH₄NO₃/100mL H₂O. The second level (moderate) was of 2.248781 X 10³ mol NH₄NO₃ / 100ml. The final level (high) was of 1.1243905 X 10² mol NH₄NO₃/100mL. For each isolate, two dishes served as controls, one was filled with 1mL of water and the other was left untouched to verify that the extra water was not affecting the results. After 24hrs., the result of the development of the bacteria was recorded by characterizing the percent of the plate covered by the colonies.</p> <p>Results Exposure of the bacteria to ammonium nitrate affected the growth percentage (the percentage of the plate covered by the colony) of bacteria. The results of the experiment supported the hypothesis that nitrogen deposition can lead to lower biodiversity of microbial flora. The bacteria could be classified into 3 categories based on their reaction to ammonium nitrate: those that became more prolific, those that were negatively affected, and those that were unaffected.</p> <p>Conclusions/Discussion The results follow the initial prediction that nitrogen deposition would alter the abundance of individual species. In a situation in the wild, one could expect that the isolates that benefited from nitrogen deposition would become more common and extirpate the species weakened by the deposition. Mt. Palomar could be exposed to the levels of nitrogen deposition tested in this study. Such exposures and changes in microbial flora could alter symbiotic relationships and lead to higher fire danger due to disruption of decomposition of fuels.</p> | |
| Summary Statement The study determined how nitrogen from human sources effects the microbial communities of a mountain forest in southern California. | |
| Help Received I contacted Michele Eatough and Edith B. Allen, University of California department of Entomology and Botany, respectively, in the background research of my topic; they gave helpful information and comments on the topic. However, they were not involved in the development of the procedure or in the | |