# CALIFORNIA STATE SCIENCE FAIR
## 2010 PROJECT SUMMARY

**Name(s)**
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**Project Number**
**J2009**

**Project Title**
# Affecting Aquatic Plant Growth by Varying the Ratio of Nitrogen to Phosphorus

**Abstract**

**Objectives/Goals**
An efficient use of nitrogen (N) and phosphorous (P) in agriculture could improve plant production and decrease the chances of pollution runoff. I tested how the N:P ratio would affect the growth of aquatic plants. My hypothesis was that plants grown in water with the Redfield ratio 16:1 would grow better than plants grown with other ratios.

**Methods/Materials**
I used the compound KNO3 as a source of N and KH2PO4 as a source of P. I determined how much N and P are in each compound by dividing the atomic mass of the compound by the molecular weight of N or P. Using the compounds I made six different N:P solutions: a control 0:0, the Redfield ratio 16:1, and four others 1:16, 8:1, 1:8, and 8:8. I tested the growth of two types of plants (Lysimachia nummularia and Lemna minor) in each solution for a total of twelve conditions. I measured plant growth and decay by counting the number of new and dying leaves/fronds on days 8, 17, and 24.

**Results**
Conditions with more N had better plant growth by day 24 than either the control or conditions with more P. L. nummularia in the 16:1 and 8:1 conditions had 10 new leaves as compared to the control (7 leaves), 1:16 and 8:8 (5) and 1:8 (3). The results for L. minor were similar the 16:1 condition had 15 new leaves on day 24 as compared to the control (2). Out of the losses for L. nummularia the Redfield and the 1:8 ratios had the least of amount of leaf decay (10). For L. minor the Redfield had the least decay (11) and 8:8 had the greatest decay (18).

**Conclusions/Discussion**
More N than P in the water led to increases in the number of leaves. For farmers to improve their crops they should put at least a ratio of 8:1 in their fertilizers. Controlling the N:P ratio could make crops grow quicker and maybe not as many people would go as hungry.

**Summary Statement**
Determing the best nitrogen to phosphorous ratio that leads to good plant growth.

**Help Received**
Mom and Dad taught me basic chemistry and helped me type, prepare solutions, and put together board.