



# CALIFORNIA STATE SCIENCE FAIR 2005 PROJECT SUMMARY

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<b>Project Title</b> <b>The Effect of Variations of pH, Nitrogenous Fertilizer, and Temperature on the Growth of Echinochloa crusgalli</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of the experiment was to study the growth of Echinochloa crusgalli (Japanese millet) under variations of temperature, pH, and nitrogenous fertilizer. The goal was to find if the growth of Japanese Millet under these variables would be enough to potentially reduce carbon dioxide in the atmosphere, and therefore mitigate the effects of global warming.</p> <p><b>Methods/Materials</b> The main materials used included Lolium Multi-Forum Japanese Millet seeds and a Precision low temperature illuminated incubator. The solutions used included: 2L of ambient pH and ambient nitrogen solutions (Solution 1), 2L of ambient pH, high nitrogen solutions (Solution 2), 2L of low pH, ambient nitrogen solutions (Solution 3), and 2L of low pH, high nitrogen solutions (Solution 4). Sixteen pots were filled with a dirt-vermiculite mixture, and ten seeds of Japanese millet were placed in each pot. The pots were divided into four groups and watered with each of the four solutions described above. Then they were kept in an incubator at 13.3 degrees C, and were watered once a week with 60 mL with their respective solutions. At the end of the two weeks, the shoots were clipped at soil level, dried, and weighed to find their biomass. The experiment was repeated with another set of sixteen pots at 17.3 degrees Celsius.</p> <p><b>Results</b> In the control experiment, the four pots watered with solution 4 grew the most. The pots watered with solution 1 produced the second most biomass. Then came the pots watered with solution 3, and finally the pots watered with solution 2. In the variable experiment at higher temperature, the pots watered with solution 2 grew the most, followed by the pots that were watered with solution 4. Thirdly came the pots that were watered with solution 1, and lastly came the pots watered with solution 3.</p> <p><b>Conclusions/Discussion</b> Through the data, it was proven that a noticeably larger amount of biomass was produced by the Japanese millet growing in the variable experiment at 17.3 degrees Celsius. Higher temperature simulated global warming, added nitrogen simulated the presence of nitrogenous fertilizer in soil, and low pH simulated effect of acid rain. Japanese millet grown with high nitrogen content in soil and ambient pH grew the most at higher temperatures. From this study, it was found that Japanese millet can be grown in soil containing high nitrogen to prevent the harmful effects of global warming.</p>	
<b>Summary Statement</b> This experiment studied the effect of higher temperatures on the growth of Echinochloa crusgalli (Japanese Millet) under various soil conditions.	
<b>Help Received</b> Used lab equipment at University of California in Irvine under the supervision of Professor Kathleen Treseder; Professor Kathleen Treseder helped interpret results; Mother helped glue together the board.	