



CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

Name(s) Matthew D. Trost	Project Number 31324
Project Title The Effects of Light Duration on the Photosynthesis of Anacharis	
Abstract Objectives/Goals I wanted to understand how the rate of photosynthesis in the aquatic plant <i>Anacharis</i> is affected by different light durations (on/off cycles). I believe that if the rate of photosynthesis is solely dependent on the percentage of light the <i>Anacharis</i> receives, then there should be no change between the observed rate and the expected proportional rate. Methods/Materials The experimental apparatus consisted of a ring stand, clamps, and a 60 mL syringe connected to a 1 mL graduated pipette. After filling the syringe with 0.75% sodium bicarbonate solution, the <i>Anacharis</i> was added and capped with the plunger. A lamp was positioned four centimeters away from the syringe. A timer (intervalometer) was used to turn the light on and off at designated intervals. Data was collected by measuring the movement of the meniscus down the pipette as oxygen was produced. An expected proportional response was calculated relative to the 100% on rate. Results I had predicted that the rate of photosynthesis would be proportional to the full on rate. The results did not support my hypothesis. On average, observed rates ranged from 21% under to 9% over the expected rate. Conclusions/Discussion (1) The rate of photosynthesis under new light durations greatly depends on prior light conditions; under nonconsecutive, but identical conditions, steady rates could differ by 72%. (2) A minimum amount of on time is required to achieve high photosynthetic rates; 10 seconds on/10 seconds off showed a dramatically slower rate than 5 minutes on/5 minutes off. (3) Photosynthesis was observed to continue during the dark periods, but the dark rate decreased to 33% of the on rate.	
Summary Statement My purpose was to understand the effects of light duration (on/off cycles) on the rate of photosynthesis of the aquatic plant <i>Anacharis</i> .	
Help Received I borrowed equipment from academic and industrial science labs. My dad taught me how to graph and analyze data (regression) using Excel and Powerpoint.	