

Transpiration

How much water is produced hourly during photosynthesis?

Is it measurable?

Does it vary from a sunny location to a shady one?

Do different plants produce the same amount of water?

**Experiment conducted on Ossabaw Island Georgia
June 5, 2002 by:**

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RATIONALE

During the photosynthesis process, green plants make their own food, giving off water and oxygen as by-products. Our group wondered how much transpiration water is actually produced and could it be measured. We also thought about different plants, do they produce different amounts of water? Then we thought; if the sun is the power source for photosynthesis, do plants growing in shaded areas produce less water?

In attempt to answer these questions, we devised an experiment that we could conduct in one day while on Ossabaw Island Georgia.

HYPOTHESIS

Our hypothesis consists of three parts:

- 1. The transpiration rate of certain green plants is measurable by common means.**
- 2. A plant growing in a sunny location will produce more water than the same species plant growing in full or semi-shade.**
- 3. Different species of plants will produce different amounts of water during photosynthesis.**

DESIGN OF EXPERIMENT

We chose three plant species for our experiment: wax myrtle, dog fennel, and Chinese tallow. These were chosen because each was readily available near our campsite on Ossabaw Island. Each was also growing in both a sunny and a shady location.

We began our experiment at 10:30 AM on Wednesday June 5, 2002.

Materials used:

Sandwich sized zip-lock baggies

Titration syringe

Notebook & pen

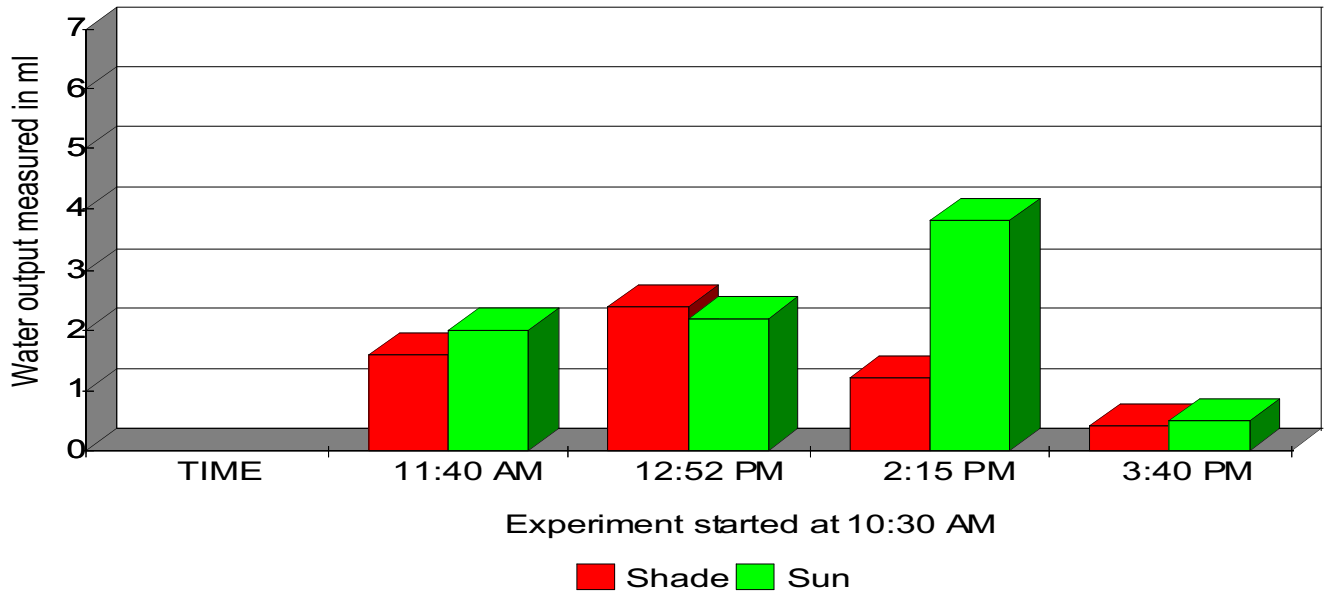
Procedure:

We placed a zip-lock baggy over each specimen and zipped it closed as much as possible. We then came back in approximately one hour to examine the results. We used a titrator syringe to extract and measure the water. We recorded our results and repeated the procedure three more times during the day at roughly one-hour intervals.

RESULTS

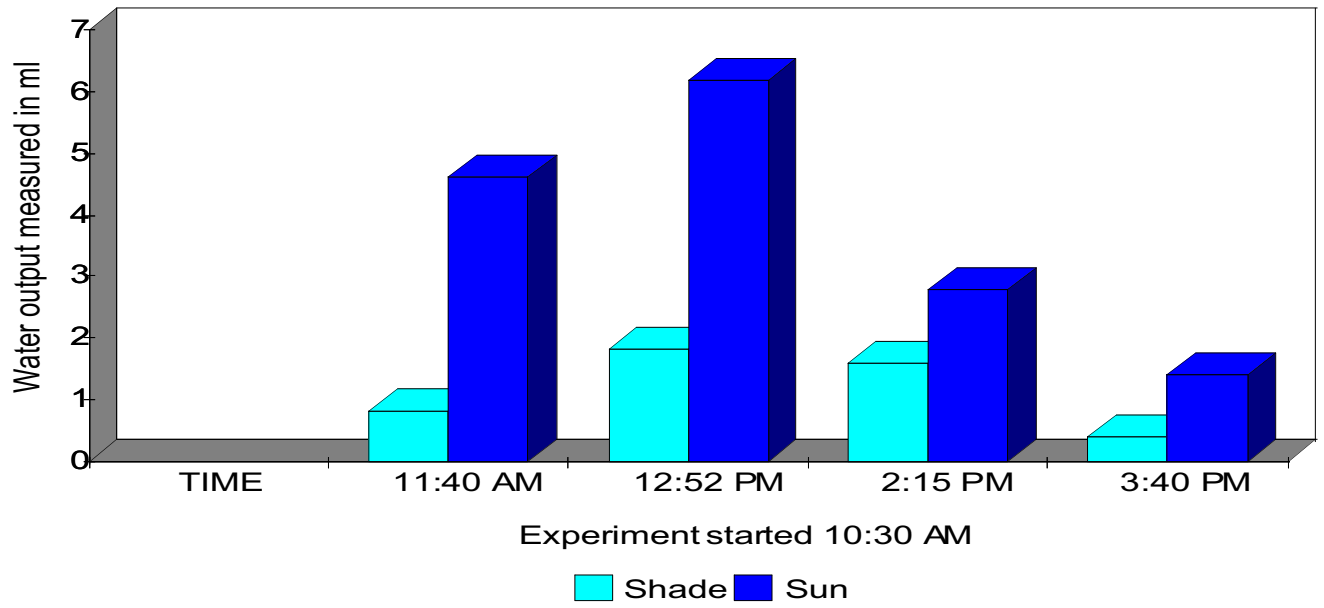
WATER PRODUCTION DURING PHOTOSYNTHESIS

Wax Myrtle: Shade vs. sun



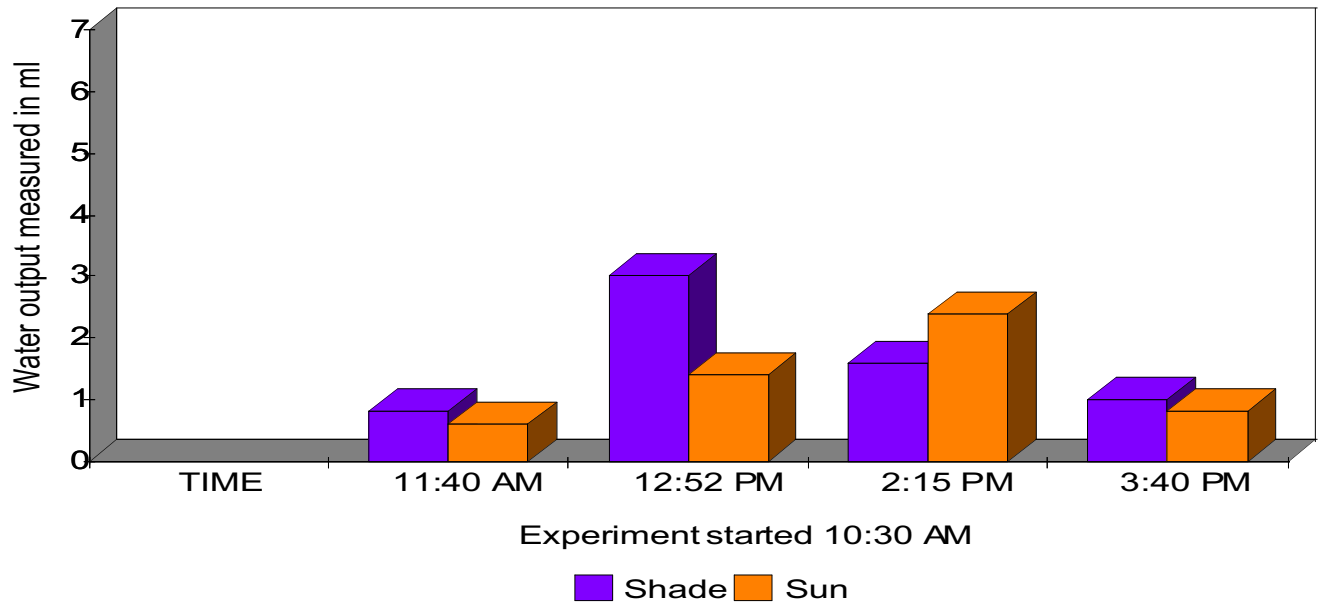
WATER PRODUCTION DURING PHOTOSYNTHESIS

Dog Fennel: shade vs. sun



WATER PRODUCTION DURING PHOTOSYNTHESIS

Chinese Tallow: shade vs. sun



CONCLUSION

- 1. It is possible to measure the amount of water produced by green plants using simple equipment.**
- 2. Plants in the shade occasionally produce more water than those in the sun.**
- 3. Different plants do produce different amounts of water during photosynthesis. We found that the dog fennel had the highest output, followed by the wax myrtle. The Chinese tallow had the lowest output.**

LIMITATIONS

Our experiment contained several flaws and limitations. First, we used a very small sample which may not be representative of all plants of these species.

The concepts of shady and sunny were not clearly defined. The position of the sun changed during the day and the shady areas became sunnier at times. Likewise, the sunny areas became shadier at times. The use of baggies may have allowed some water vapor to escape, altering the results. We did not measure surface area of the portion of the plant that was placed inside of the baggy. We simply placed as much as possible in the baggy. We were unable to check the moisture content of the soil at each location. This could have altered the results.