

BISC208-081

Lab 3 – Functional Plant Anatomy

Matthew Martin – Team 2

March 16, 2006

Materials and Methods

The biological plant studied in this experiment was eggplant (*Solanum melongena*.) The plant was six weeks old and grown under supervision. The Quibit Systems Electronic pressure sensor was used in conjunction with a water-filled connecting tube and an electronic temperature sensor (Fig. 1.) This system was collectively known as the potometer and used to measure the upward water movement in a cut stem.

Firstly, the potometer was assembled and tested by creating suction on the pressure sensor. The stem of the eggplant was severed near the soil and quickly placed in water. The stem was then cut on an angle to the desired stem height and width. A Silastic tube was selected to form a tight fit on the plant stem. The pinch clamp was first opened. The tubing was then filled with water by way of syringe one inch from the Luer fitting. The cut end was inserted snugly into the Silastic tube being sure there was no air trapped in the water column. The three-way valve was closed on the apparatus and the potometer was attached to the valve. Data was then collected by opening the valve to allow air in and closing it for one minute. This process was repeated for a total of three times. A leaf was cut off and the data collection process was repeated until no leaves remained. The leaves were then massed and a graph was constructed to show the relation of transpiration in relation to leaf mass.



Figure 1: Example of Qubit Systems Electronic pressure sensor, water-filled connecting tube, and electronic temperature sensor

Results

The results showed conclusively that leaves have a great effect on the amount of water lost to transpiration by a plant (Fig. 2.) It was found that most of the transpiration takes place in the leaves. The transpiration rate with full plant mass was found to be 4.06 microL H₂O/min, but with no leaves the plant was found to only transpire 1.19 microL H₂O/min. So while the leaves do conduct most of the transpiration, the rest must be conducted in the stem or the petiole.

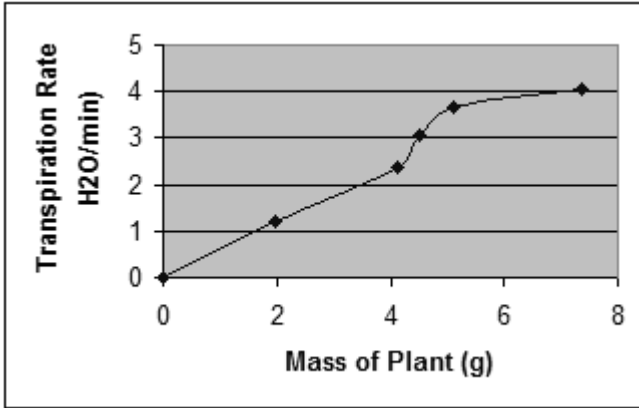


Figure 2: Effect of leaves on transpiration rate