

# ***This Week's Citation Classic***

**Kanemasu E T, Thurtell G W & Tanner C B.** Design, calibration, and field use of a stomatal diffusion porometer. *Plant Physiol.* **44**:881-5, 1969. [University of Wisconsin, Madison, WI]

**The authors describe a stomatal diffusion porometer for the measurement of stomatal conductance of plant leaves. In addition to details in design and calibration, are precautions for the field use of the instrument. [The SCI<sup>®</sup> indicates that this paper has been cited over 175 times since 1969.]**

E.T. Kanemasu  
Evapotranspiration Laboratory  
Waters Annex  
Kansas State University  
Manhattan, KS 66506

February 12, 1979

"My thesis research at the University of Wisconsin was concerned with the water relations of plants. Champ Tanner and I were interested in quantitatively assessing the water status of a plant by a nondestructive method. Because of suggestions in the literature that the near-infrared reflectance of a leaf surface changes with leaf water content, we decided to investigate it as a possible nondestructive technique of estimating leaf water potential. We found that the near-infrared reflectance of a leaf did not change until the leaf was severely wilted; therefore, we discontinued further work on that procedure. However, those months of research were not wasted. Less than three years later, I became involved in a NASA research program interpreting spectral reflectances from crop surfaces. I have continued my involvement in remote sensing using spectral information to assess crop growth and yield.

"After the work on near-infrared reflectance as a technique for assessing the plant water status, we investigated the stomatal diffusion porometer. By changing the geometry of the porometer cup and the calibration procedure,

we developed a stomatal diffusion porometer with a linear calibration. George Thurtell, who was a fellow graduate student at the time and is currently at the University of Guelph, designed the associated electronic circuit for the porometer. Major concerns with the porometer were: 1) temperature corrections, 2) effect of the porometer itself on stomata, 3) water vapor absorption characteristics of the sensor and porometer cup, and 4) calibration stability. Most of these concerns still exist in the routine operations of the instrument.

"I believe one of the primary reasons for the frequent citation of our paper is the commercial availability of the porometer, which has allowed many investigators to have access to the instrument. The instrument is relatively simple to use, and completely portable.

"While at the University of Wisconsin, Tanner and I became interested in the energy balance of water lilies which frequently covered the small lakes near the University Research Center at Hancock, Wisconsin. One summer day, a fellow graduate student, Bob Maxwell, and I rowed a small boat loaded with instrumentation to where several water lilies were growing. While setting up the instruments, we accidentally, dropped a camera overboard. Bob quickly jumped into the water and recovered the camera which had been borrowed from another graduate student, (Andrew Black, University of British Columbia). The camera was repaired but that particular experiment was never completed.

"I would like to conclude with a tribute to Champ Tanner, whose keen insight and vigorous analytical mind have contributed significantly to research in crop microclimate. Champ's inspiration has directly or indirectly motivated much of the current research in agricultural climatology."