

A Comparison of Opti-Sciences CCM-200 Chlorophyll Meter and the Minolta SPAD 502 Chlorophyll Meter

Nick Knighton and Bruce Bugbee
Crop Physiology Laboratory-Utah State University

Introduction

Handheld chlorophyll meters are an easy way to non-destructively estimate chlorophyll content of leaves. The chlorophyll meters in this study both measure ratios of radiation transmitted through the leaf at two wavelengths. The SPAD measures the RVI (Ratio Vegetative Index) at 940 nm and 650 nm while the CCM-200 uses 940 nm and 660 nm.

The leaf area measured by each handheld meter also differs. The SPAD 502 measures a 0.06 cm² area while the CCM-200 a 0.71 cm² area.



Figure 1. The Minolta SPAD 502.



Figure 2. The Opti-Sciences CCM-200.

Materials and Methods

Measurements were taken using Minolta SPAD 502 and Opti-Sciences CCM-200 handheld chlorophyll meters. Measurements were taken on Roscolux colored plastic filters (Figure 3) and then on leaves of a *ficus benjamina* tree. Plastic filters were used as leaf models because of their similarity to leaf spectra and their uniformity of color. SPAD data was then plotted against the CCM data and regressions were plotted.



Figure 3. Roscolux Colored Filters.

Results

When plotted against SPAD measurements, CCM-200 showed a high second order correlation on plastic filters (Figure 4).

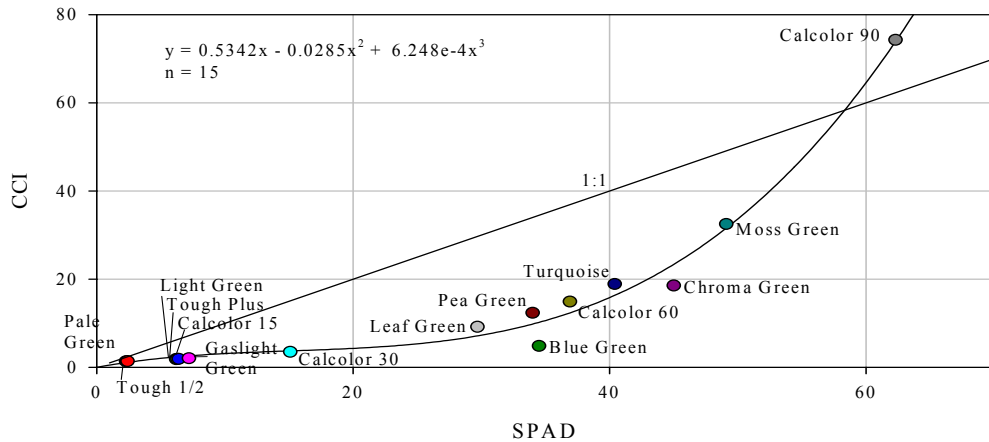


Figure 4. Graph of SPAD measurements against CCM-200 measurements. The data shows a strong third order correlation.

Measurements taken on *ficus benjamina* showed results similar to those taken on the plastic filters (Figure 5).

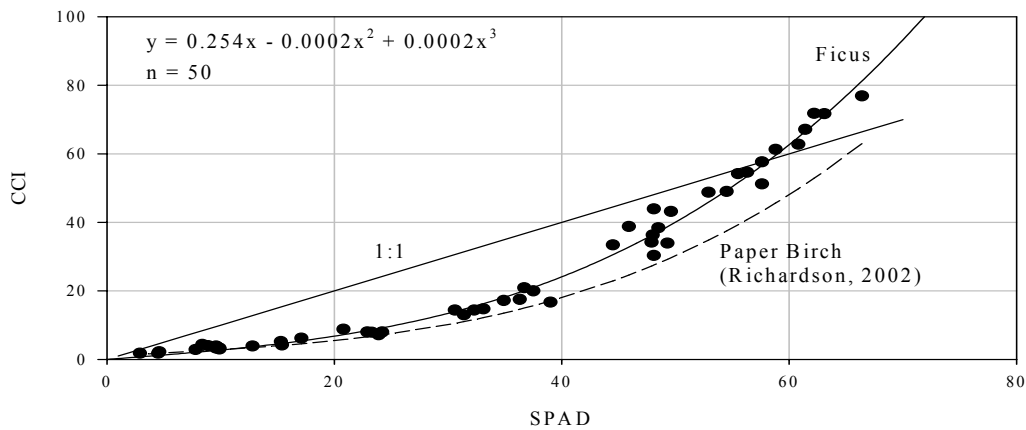


Figure 5. The relative chlorophyll content of *ficus benjamina* as measured by the SPAD 502 and the CCM-200. Paper Birch data generated from Richardson, 2002.

Conclusion

The Opti-Sciences CCM-200 chlorophyll meter and the Minolta SPAD 502 chlorophyll meter show a curvilinear relationship. Correlations done on plastic filters were similar to those done on actual leaves.

Literature Cited

Richardson, A. D., S. P. Duigan, G. P. Berlyn. 2002. An evaluation of noninvasive methods to estimate foliar chlorophyll content. *New Phytologist*. 153:185-194.