Selective Filters Increase Response of Silicon Diode Spectroradiometers above 700 nm.
Dan Dallon, Glen Ritchie, and Bruce Bugbee

Introduction

- Reflectance of wavelengths above 600 nm is an important indicator of plant health.
- Silicon diode sensors have high sensitivity to green light (500-600 nm), but low sensitivity above 700 nm.
- The green radiation in sunlight saturates the detectors before significant NIR radiation is absorbed, making NIR measurements less accurate.
- The NIR signal can be increased by using a filter that decreases green radiation without decreasing NIR radiation. This allows increased instrument integration time and higher NIR absorption.

Materials and Methods

- The Lee ‘cosmetic burgundy’ filter (Lee Filters, Burbank, CA) has good characteristics for this application. Other filters might also be suitable.
- Scans taken with an ASD FieldSpec Pro JR spectrometer were used as reference.
- The effect of up to six layers of filters was tested with an Apogee/StellarNet EPP2000 spectrometer.

Conclusions

- Three layers of the “cosmetic burgundy” filter extended the accuracy of the spectrum from 800 to 920 nm.
- Three filter layers may decrease the accuracy below 700 nm.