

# SPECTRAL EVOLUTION

## Measuring Efficient Light Usage in Plants

When used with spectral measurements from a field spectroradiometer such as the PSR+ from Spectral Evolution, the Photochemical Reflectance Vegetation Index (PRI) and Red/Green Vegetation Index (Red/Green) can provide researchers with important data on the ability of vegetation to efficiently use sunlight for photosynthesis. This data can provide a picture of plant health including an assessment of plant stress.

One of the 19 vegetation indices offered with DARWin SP Data Acquisition software and the PSR+ field spectroradiometer, PRI looks at the carotenoid pigments, especially the xanthophyll pigments absorbed by plants. The pigments can signify growth rate and biomass production. PRI uses the wavelengths of light from 400 to 700 nanometers and has a measurement range of -1 to 1 with healthy vegetation falling between the values of -0.2 to 0.2 in the PRI index.

In addition to PRI, the PSR+ with DARWin SP includes the Red/Green Index for growth cycle studies, stress detection of canopies, and prediction of potential crop yield. The Red/Green Index measures the expression of leaf redness caused by anthocyanin to the green caused by chlorophyll. It can be used as an indication of leaf production and/or stress. The means of the bands in the red range are divided by those in the green range. The typical range for green vegetation is 0.7 to 3.

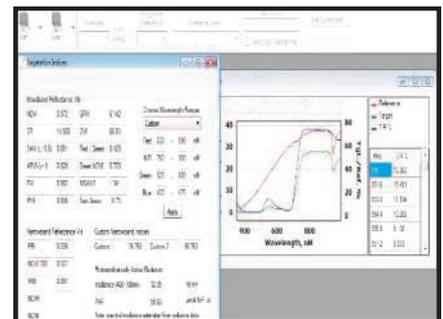
In addition to these two types of vegetation indices all Spectral Evolution spectroradiometers include DARWin SP Data Acquisition software with immediate access to 19 different vegetation indices via popup menus. In addition to those mentioned above, they include:

- ◆ Simple Ratio Vegetation Index (SR)
- ◆ Soil Adjusted Vegetation Index (SAVI)
- ◆ Infrared Percentage Vegetation Index (IPVI)
- ◆ Water Band Index (WBI)
- ◆ Photosynthetically Active Radiation (PAR)
- ◆ Normalized Difference Water Index (NDWI)
- ◆ Normalized Difference Nitrogen Index (NDNI)
- ◆ And more.

The PSR+ is a high resolution, field portable spectroradiometer ideally suited for vegetation, canopy and crop studies. With its solid state design and three photodiode arrays, it provides a rugged and reliable way to measure plants in situ. Auto-shutter, auto-exposure and auto-dark correction deliver fast one-touch operation. Spectral Evolution field spectroradiometers are available with accessories that include our handheld contact probe, benchtop probe, and unique leaf clip with separate ILM-105 light source to keep heat away from your samples.



*The PSR+ with our unique leaf clip can take field measurements to determine plant health.*



*Leaf scan with pop-up Vegetation Index window in DARWin SP Data Acquisition software.*

Watch a video on our PSR+ field spectroradiometer with leaf clip attachment on our YouTube channel at:  
<https://www.youtube.com/watch?v=Gdza5EY-EUo>

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