

SPECTRAL EVOLUTION

Broadband and Narrowband Greenness Vegetation Indices

Vegetation indices are essential tools for researchers working with vegetation applications where they need to identify and characterize plant samples without destroying them. Combinations of measured reflectance properties at two or more wavelengths using a field spectroradiometer from Spectral Evolution can provide information on specific vegetation characteristics. These characteristics form the basis for creating vegetation indices. A number of vegetation indices are based on the properties of broadband greenness and narrowband greenness.

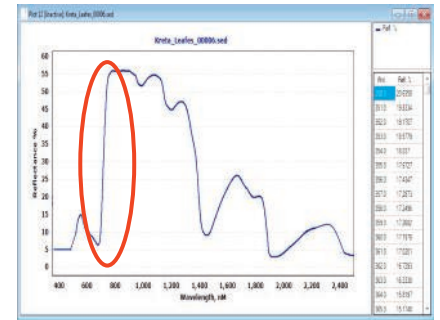
Broadband greenness measures the health of vegetation by comparing strong reflective properties in NIR wavelengths (700-1300nm) with the strong absorption features in the red wavelengths. These vegetation indices include NDVI (Normalized Difference Vegetation Index), EVI (Enhanced Vegetation Index), and ARVI (Atmospherically Resistant Vegetation Index). NDVI normalizes green leaf scattering in the NIR and chlorophyll absorption in the red. EVI uses information in the blue wavelength to improve NDVI in areas of dense canopy by correcting background noise and atmospheric influence. ARVI is resistant to atmospheric influences.

Narrowband greenness measures the overall amount and quality of photosynthetic material in vegetation. The vegetation indices in this group use reflectance bands in the red and NIR to sample the red edge portion of the spectra. The red edge is the steep slope between 690nm and 740nm caused by the transition from chlorophyll absorption to NIR leaf scattering (increased reflectance). Indices include GRVI (Green Ratio Vegetation Index), Red/Green Ratio, Green NDVI (Green Normalized Difference Vegetation Index), and NDVI705 (Red Edge Normalized Vegetation Index). These indices incorporate red edge data with a leaf specular correction.

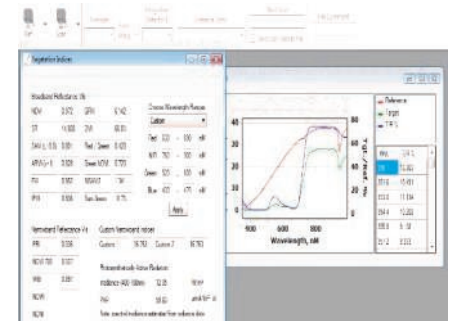
In addition to these two types of vegetation indices all Spectral Evolution spectroradiometers include DARWin SP Data Acquisition software with immediate access to 19 different vegetation indices via popup menus. In addition to those mentioned above, they include:

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

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.



Leaf scan taken with a Spectral Evolution PSR+ field spectroradiometer showing the distinctive red edge.



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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