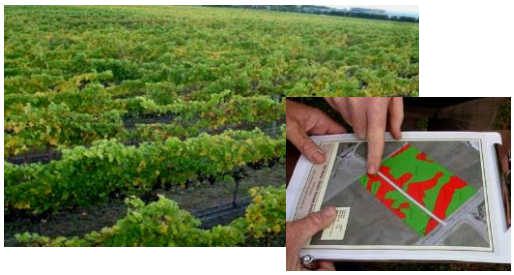
LandWISE INCORPORATED

Canopy Vigour Sensing

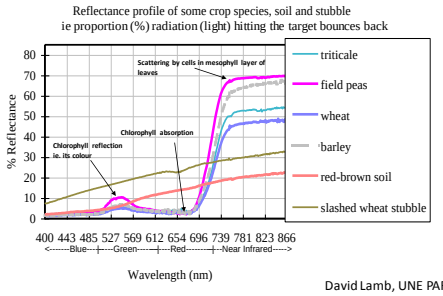
Dan Bloomer

Canopy assessment



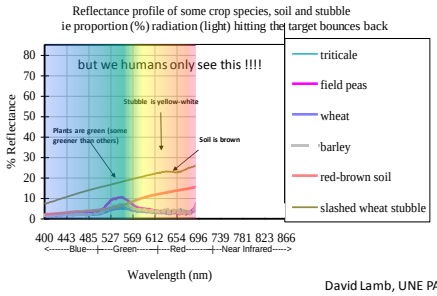
High vs Low vigour zones mapped using canopy sensors or remote sensing

The only physics you need to remember !



David Lamb, UNE PARG

Spectral signatures



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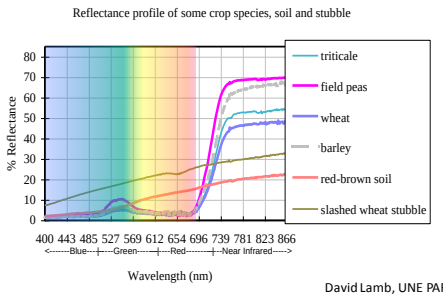
NIR is an important band !



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Normalised Difference Vegetative Index

- An assessment of greenness or vigour

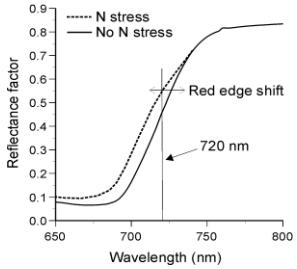
$$NDVI = \frac{NIR - Red}{NIR + Red}$$

$$NDVI = \frac{790 - 670\ nm}{790 + 670\ nm}$$

- Confounded by bulk and concentration combo

Chlorophyll Red Edge, and Red Edge Shift

- Indices that utilize the red-edge becoming more common
- Plant stress: wavelengths along red edge are "blue shifted"



Eileen Perry, Vic DPI

Optical Sensors for Remote Sensing Crops

- Passive sensors (ambient light)
  - satellite/airborne sensors
  - portable spectrometers
- Active optical sensors
  - 'green biomass' sensors
    - Greenseeker
    - Crop Circle, etc.

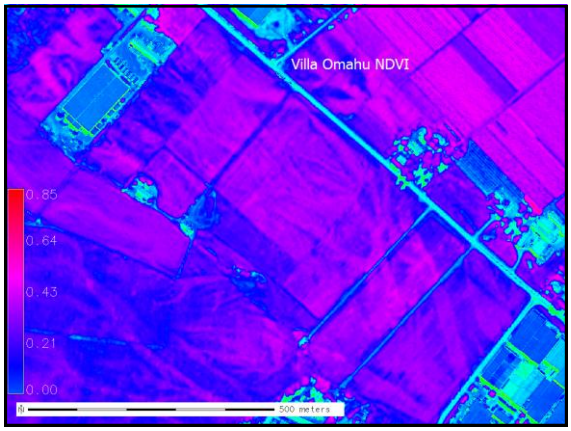
Eileen Perry, Vic DPI

New Satellite Imagers for Agriculture

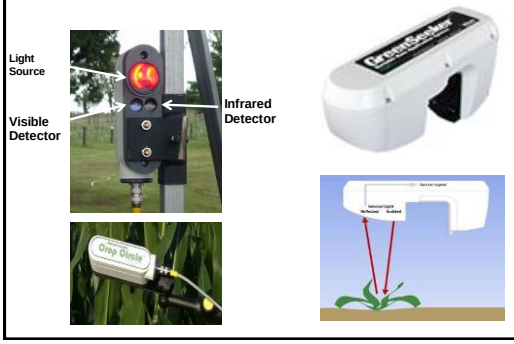
RapidEye

- **Five Spectral Bands**
  - **Blue 440-510nm**
  - **Green 520-590nm**
  - **Red 630-690nm**
  - **Red Edge 690-730nm**
  - **Near IR 760-880nm**
- **GSD 6.5 meters**
- **Daily Global Revisit Time (5 Sats)**

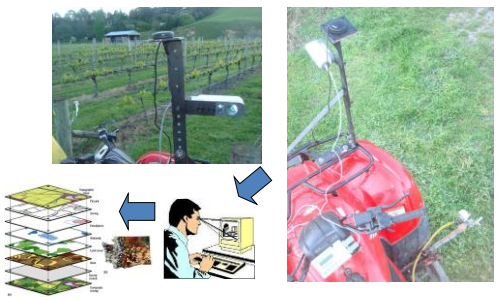
Eileen Perry, Vic DPI



Active Crop Sensors



How CropCircle sensor is used on vineyard



Caine Thompson

What does the Crop Circle measure

- Canopy vigour/vine biomass
- Side profile of canopy.
- NDVI (Normalised difference vegetation index)
  - Index of plant vigour or relative biomass of vines measured, which relates highly with quantity and quality parameters

Caine Thompson

When to carry out a NDVI Survey?

- Can be carried out any time once full canopy has been achieved.
- Usually carried out pre-verasion to pre-harvest (January through to April)

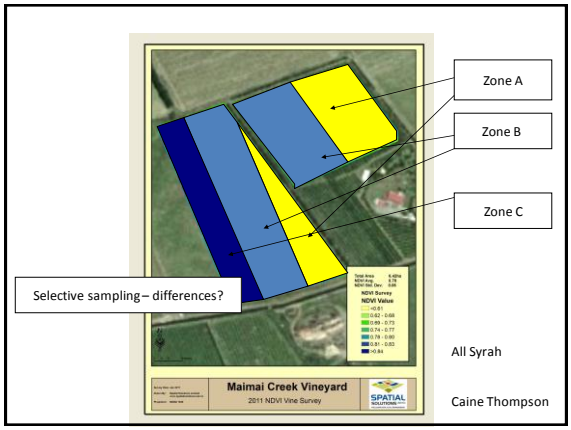
Crop Circle sensor in operation

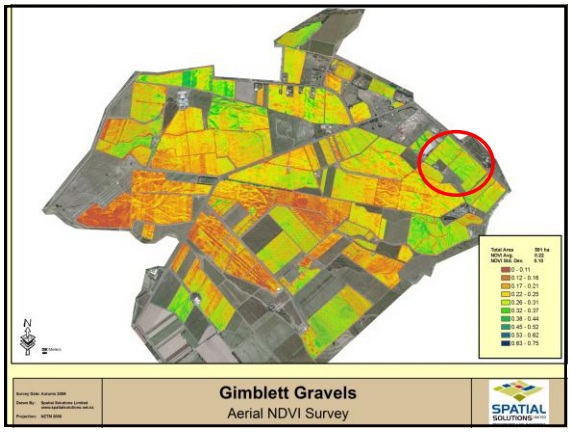
Caine Thompson

What information do you get?

- NDVI Image of the vineyard.
- Zone Map of areas of significant differences
- GPS points of zones to 'ground truth' zones

Caine Thompson





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- Tim and Peta Neale
  - precisionagriculture.com.au
- Caine Thompson and Hayden Lawrence
  - Spatial Solutions