



# Objective quantifications

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Leighton Wilksch uses a handheld GreenSeeker® for making mid season yield predictions in Landmark's large scale trial plots.

The Landmark Product Development Group has been using a handheld GreenSeeker® to assess their replicated plot trials and paddock demonstrations since September 2005. The addition of GPS and mapping software in 2006 has enabled Normalised Difference Vegetation Index (NDVI) maps to be produced and treatment results to be analysed.

For Landmark's annual large scale replicated plot trial program, the GreenSeeker® has become the method for making mid season yield predictions. The long growing season in South Australia in 2005 enabled the GreenSeeker® to be calibrated for yield, as NDVI readings taken off plots in that year, correlated closely with yield. Now most trial plots are assessed with the GreenSeeker® at least twice a year. The GreenSeeker® has helped pick differences between treatments that are difficult to assess by other quantitative means. As NDVI is basically a measure of plant biomass and 'greenness', it can be used to measure treatments that promote or retard growth compared to an untreated control. Nutrition, insecticide, fungicide and herbicide trials have all been assessed using the GreenSeeker®.

A trial of in-furrow and foliar fungicides for stripe rust control conducted at Riverton SA in 2005. A visual assessment of stripe rust pustules on the flag and flag-1 leaves of Wyalkatchem wheat was taken at the end of October. This gave a subjective measure of stripe rust as compared to the untreated.

When statistically analysed a 78% relationship was found between the visual assessment of stripe rust control and final yield.

At the same time the plots were scanned with the hand held GreenSeeker®. The relationship of NDVI to yield, showed a slightly stronger relationship at 81%, suggesting the GreenSeeker® provided a reliable quantitative substitute for visual assessment.

Using the GreenSeeker® in fertiliser trials, plant uptake of nitrogen has been tracked and uptake of granular (urea) to fluid forms (UAN) compared.

Assessing pre-sowing herbicide trials with the GreenSeeker® has provided some interesting data. In 2006, a trial of 12 herbicide treatments for controlling annual ryegrass (ARG) was run. This trial had areas of high weed density (623ARG/m<sup>2</sup>) and low weed density (93ARG/m<sup>2</sup>).

ARG counts were taken one month after sowing wheat and five weeks later the plots were scanned with the GreenSeeker®, the delay allowed

surviving ARG plants time to bulk-up. A strong correlation between ARG density and NDVI was found in the high weed density half of the trial (Figure 1a), whereas no correlation was found where the weed pressure was much lower (Figure 1b). Plant assessments indicated no crop damage from the various herbicides, so it was assumed that the contribution wheat made to the NDVI figure was the same in each plot.

Other research organisations have been interested in our work and the GreenSeeker® is providing plant breeders with a quantitative assessment for variety comparisons. NVT trials are visually scored for plant vigour and growth throughout the season, using the GreenSeeker® is a way to reduce time taken and possible errors that may occur when doing this tedious and arduous task.

**For more information**  
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Figure 1a. High correlation between weed density and NDVI.

Figure 1b. Poor correlation between low weed pressure and NDVI at the same level of wheat establishment.

