

# New use for Cropscan monitor at harvest

Ken Wilson 20 Oct 2019, 7 a.m.

## Machinery



Neridup farmer Matt Hill can make more accurate calculations for variable rate nitrogen application using data from the Cropscan 3300H, mounted on the cab pillar. The header will be driven out of the shed next week to start the harvest.

UNTIL recently, most farmers understood the Cropscan 3300H grain protein monitor as a handy tool to assist with harvest logistics and generate real-time field maps for protein, moisture, oil and starch.

With the moisture data, it is easy to 'shandy' loads and make on-the-spot management decisions regarding where grain is taken after it's discharged from the header.

But Neridup (north east Esperance) farmer Matt Hill has gone one step further, using the 3300H to correlate yield and protein as a method of measuring nitrogen availability and uptake in his cereal crops.

It has helped him with a cost efficient way of employing variable rate application of nitrogen in following years' crops, based on historic data delivered by the 3300H.

According to Cropscan 3300H supplier, Next Instruments, protein is directly related to nitrogen by a factor of 0.175.

For every kilogram of protein in a tonne of grain, 175 grams of nitrogen is stripped from the soil.

By combining protein and yield data off the header, protein/yield correlation quadrant maps can be generated that clearly show how much and when nitrogen was stripped from the soil.

By identifying those zones in a paddock where the protein is less than 11.5 per cent and the yield average is average or less than average, then a positive yield response can be achieved by applying more nitrogen.

Using an approximate factor of 0.6 tonnes a hectare yield response per kilogram of nitrogen, per percentage of protein, allows you to compute how much nitrogen should be applied to achieve the optimum yield.

Mr Hill crops 15,000 hectares and said it was fairly common to apply 40 units of nitrogen (N) or about 100 litres of Flexi-N, to achieve a 10.5pc protein figure in wheat.

"Once the wheat gets to 10.5pc it doesn't need anymore," he said.

"Any N applied beyond that percentage sees the yield flatten out and the N goes into protein.

"But it has always been a question every June or July as to whether to apply more N or not, to try to optimise yield while getting as close as possible to the 10-11pc protein range, which is fairly typical on my farm and adjacent areas.

"I've been playing around with protein for about 13 years and in 2006 I started VRAing (variable rate application) phosphorous, to replace what was lost in wheat.

"About 2014 I also started to variable rate nitrogen and potassium based on yield maps and apply lime and gypsum as part of a soil amelioration program.

"But yield maps alone don't tell the whole story.



The Cropscan 3300H protein monitor is attached to the clean grain elevator where a portion of grain is directed into a 'Sampling Head' for analysis.

"Then in 2016 I bought three Cropscan 3300H monitors for my headers and they incorporated protein monitors as well, so you could generate yield and protein maps.

"The maps give more indicative data from which to make decisions so after a couple of seasons you know your low protein zones and can generate protein maps which can be turned into variable rate maps with 80pc accuracy.

"And after a couple of years that accuracy improves.

"Protein is basically the umpire because it tells you whether or not you put enough N on, based on yield zones.

"A low protein figure means you haven't put enough N on and you've forgone yield potential, which from my experience can be as much as a one tonne a hectare, for a cost of about an extra \$48 worth of N."

"My own trials have shown that to lift protein by 1pc, you need 40 units of N, which is roughly 100L/ha of Flexi-N which is 42.2 units of N.

"So for that \$48, you also increase the yield by 750 kilograms a hectare."

Mr Hill said looking over his CBH Loadnet results provided him with valuable data on the range of protein he was delivering.

"Once I saw the variation I could see the potential to make more money," he said.

"And the Cropscan monitor is a good tool to map every year to feed the protein maps into the nitrogen calculator to produce your VRA map."

The Cropscan 3300H is mounted on the clean grain elevator.

As grain passes up the elevator, a portion of the grain is directed into the sampling head where it is trapped by a set of vanes.

Near-infrared (NIR) light passes through the grain and is carried back to the NIR spectrometer in the cabin via a fibre optic cable.

The NIR spectrometer measures the amount of light absorbed by the protein, moisture and oil in the grains or oil seeds.

The more light that is absorbed by each component, the higher the per cent concentration.

When the grains have been measured, the sample is released into the downside of the clean grain elevator and is returned to the grain tank.

Samples are measured every seven to 12 seconds or around every 15 metres down the row as the combine strips the grain.

The protein, moisture and oil data are displayed on the Touch Screen PC mounted inside the cabin.

The latest CropScan 3300H menu option allows the combine operator to select from a number of storage systems in the paddock or on the farm and at the local receival site or customer.

A blending estimator can be used by the operator to estimate the average protein and moisture for the final mix from two storage systems.

For example if there is 29 tonnes of high protein wheat (12pc) in chaser bin 1, it can be blended with 70t of low protein wheat (10pc) to give an average protein of 10.6pc which would raise the load to APW as compared to 70t of ASW and thereby realise extra income.