Tackle grain quality and protein levels better with CropScan 3300H

BY RENÉ GROENEVELD

CEO Phil Clancy started Next Instruments in 1997, a business developing near infrared analysers for farmers. "We launched our first product in 2000, the portable NIR grain analyser CropScan 2000G. After a while it was clear that farmers were looking for an on combine version of the analyser. But our first attempts, from 2003 to 2008, weren't that successful," Mr Clancy says. "In 2010 we had a bit of a change of ideas and we came up with a much better way of sampling the grain. In 2013 we had a product that really worked. Since then we have fine-tuned the device." For the past six years, Next Instruments has been marketing its on combine NIR analyser. "We have completed about 300 installations worldwide."

At first users in Australia saw the ability to blend grain on farm as the main benefit. They can optimise the protein levels of their crop that way. Going to the next grade of grain can increase crop payments. Farmers can make an extra AUD$ 30 to AUD$ 50 per ton if they go from the lowest to the highest grades. In North America, where only in a few states farmers are paid based on protein, the CropScan is used in other ways. "Using the analyser can still be very useful in optimising yield," explains Mr Clancy. "Agronomists have told us that yield can be increased by applying higher rates of nitrogen fertiliser when the protein content is less than 11.5% to 12%. If you are producing a crop that has only 10% protein, then you have probably not reached your full yield potential."

Fertilisation rate

Mr Clancy points out that combining the protein and yield data with the GPS coordinates gives farmers the ability to create a protein/ yield correlation map. "These give you zones where the yield and protein have not been optimised. Next season you can basically work out where you can get the best increase in yield from adjusting your fertilisation rate. It

A growing number of farmers are investing in the CropScan 3300H, an on combine near infrared (NIR) analyser that measures protein, oil and moisture in cereal grains and oil seeds as they are stripped in a combine harvester. The Australian producer of the analyser, Next Instruments in Sydney, has seen a 50% increase in sales last year.

might be that 30% is under producing and another 30% might be already achieving full yield potential. So you could use more fertiliser in one zone and less in another."

Clancy says that the protein maps give the farmer information that has not been available before. "It shows the protein levels of the crops but also the nitrogen availability in the field. Those are the two major benefits. Farmers have on average a 7% reduction in fertiliser costs. But the increase in yield can be anything up to 30% or 40%. If you already have high yields, the increase might not be so significant."

Next Instruments has installed about 200 analysers in Australia and another 100 units around the world. In Australia, the users are predominantly wheat farmers. "They get an immediate return. However, barley growers can also get a big return, if they can ensure their barley crop is within 9.5 and 11.5% protein, the so called malt grade." Wheat farmers that use the analyser usually have between 5,000 and 10,000 hectares. They can justify buying our equipment very easily, according to Mr Clancy.

Segregating and blending grain

The system consists of several components. The first is the sampling head of the CropScan 3300H that is mounted on the clean grain elevator. As grain passes, a portion of it falls into the sampling head where it is trapped by a set

CEO Phil Clancy of Next Instruments with the CropScan 3300H that brought him an Australian export award.

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Via the sampling head of the CropScan (the black device) the grain is carried to the NIR spectrometer located in the cabin. The NIR spectrometer measures the amount of light absorbed by the protein, moisture and oil in the grains.
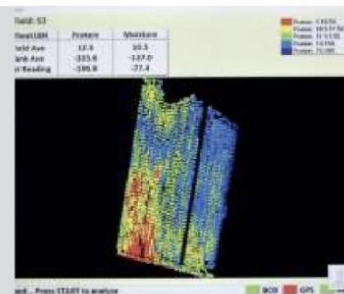
of vanes. Near infrared (NIR) light passes through the grain and is carried back to the NIR spectrometer located in the cabin via a fibre optic cable. It measures the amount of light absorbed by the protein, moisture and oil in the grains or oil seeds. The more light that is absorbed by each component, the higher the concentration. Samples are measured every 7-12 seconds or around every 15m 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 CropScan 3300H has been designed for use by farmers to segregate and blend grain in the field. The tabulated data provides the combine operator with a continuous stream of protein, moisture and oil results for each sample analysed. The paddock average, bin average and running average of five readings are displayed for all components. By clicking the field map button, the screen displays a real-time field map for protein, moisture or oil. Another click takes the operator to the trend plots screen. These plots show the progressive results plotted as a time graph. The operator can

use the software to control and direct the grains from the combine into chaser bins, field bins, trucks, silos and bags. The systems shows

Infield Blending

Mark and Jordan Hoskinson farm 8,000 hectares at Kikora in the Australian state of New South Wales. They installed a CropScan into their John Deere combine. In one wheat field Jordan noticed that there was a 4-5% variation in protein across the field. Jordan stripped grain from one section of the field where the protein content was up to 15%. He would monitor the bin average for protein as displayed on the PC. He also would monitor the tonnage in the bin. When it reached 5 tonne, he stripped grain from another section where the protein was 9-11%, and so blending the grain based on protein. When the average reached 13.5%, he would go to the field bin and unload the grain. He stripped this field over several days and trucked every load to the GrainCorp silos at Kikora. Every

the available storage bins and the running average of the grain placed in each storage system. The operator can select where the grain is

Real time protein maps offer the driver the opportunity to monitor the bin average while stripping grain.

load had been accepted as the so called APH1 grade, paying AUD$ 30 (US$ 20) per tonne more than Australian Premium White grade. The ability to blend generated an estimated $ 40,000 in higher payments.

being held and select where it is to be stored. Another function is the blending estimator. This screen allows the operator to automatically compute the result of blending grain from two or more storage systems into another silo. Sliders allow the operator to quickly adjust the tonnes of grain from each storage system that are to be placed into the collection storage system.

For example: 29 tonnes of wheat with a protein content of 12% when blended with 70 tonnes of wheat from the mother bin with protein content of 10% would produce 99 tonne of wheat with an average protein content of 10.6%. In effect the Australian Standard White (ASW) wheat from the mother bin was blended up to Australian Premium White (APW) wheat. There is a blending calculator in the system that is intended to take the guesswork out of the infield blending.

Complete management

"The software in the computer offers in fact the complete management of the grain," says Mr Clancy. "The feedback we get is exceptionally good. We have a strong twitter following and we talk to each other about many events." He says that only 20% of the CropScan users actually use the agronomic side of the system. "Most of them are using it for the grain management and the blending. But once the penny drops, and people start to see the relationship between protein and yield, they start to make some simple adjustments to their fertilisation rates. And that's when they get the big increases."

The CEO explains that Next Instruments will focus more and more on showing farmers the ropes of this kind of yield management. "Because all farmers stand to benefit from yield increases," he says. "Protein payments are often a regional thing. Not every country in the world makes these payments."

Farmers can also use the CropScan as stationary analyser. "The instrument costs about US$ 20,000. It is not a huge amount but it is a significant amount. If you want to make more use of it, you can take the sample head, the spectrometer and a computer and use a grain auger for stationary purposes. For instance you can use the system to control grain blending from one silo to another or truck. You can also use it as a benchtop instrument."

The interest in the CropScan is growing quite rapidly. "We are increasing our sales probably about 50% per year," Mr Clancy says. "We would love to reach 100% per year but we are limited by the size of the company and the resources that are available..."

CropScan made a great change for Broden Holland

Farmer Broden Holland from Young, in the Australian state of New South Wales, has been using the CropScan 3300H for three years. "We do a lot of blending to get the protein levels right when we are stripping wheat." He thought the AUD$ 20,000 (US$ 13.500) was very reasonable. "Meanwhile we realise that blending is not the only way to use it. The protein maps are really practical too." He explains that the analyser has changed his way of working quite a bit. "In the past we used to run around with a little handheld reader to get samples and work out what the protein levels were in each block," he says. The CropScan made a great change. The machine told them what their protein levels were in all the different areas of each block. Straight away they were able to blend areas, send the crop to a different area or keep it aside to harvest later if necessary.

CropScan has delivered Mr Holland and his family an increase in the payments they get for their grain. "It is always very hard to put an exact figure on it," he says. "But I would say that it makes us about AUD$ 15,000 every year: AUD$ 20 dollar per hectare extra over 3300 hectares."

The farmer uses the scanner for both wheat and canola. "In canola because it is very good in measuring the moisture content. We could combine/harvest for an additional ten hours last harvest because we had very accurate moisture readings. We noticed that other farmers had to bring their samples in to the silo to get their information. We just pulled into the paddock and knew straight away if we could keep going or not." The Brodens also used their protein maps to figure out the best urea application in the following season. "A low protein area will get a higher rate of nitrogen and a high protein area will get a lower rate of nitrogen. We probably need two or three consistent years to work out how to make the most of this. But our protein levels are a very good indication for what our nitrogen levels will have to be for the following year."

When Broden Holland clicks the field map button, he can see a real-time field map for protein, moisture or oil in his cabin.

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