

3000H On Combine Analyser

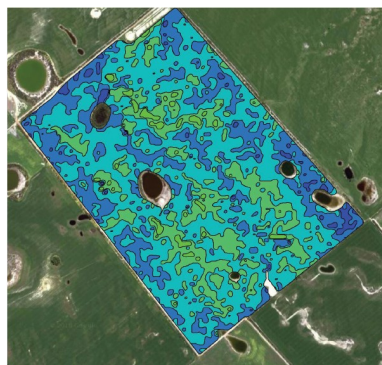
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Case Study 21. Variable Rate and the “Holy Grail”.

WA continuous cropper Matt Hill and his family don't do things by halves on their 15,000ha property north-east of the port town of Esperance. “In for a penny, in for a pound” is certainly a motto they live by when it comes to precision agriculture. The family – Matt and his wife Angela, her parents Ted and Rachel Young and brother Michael Young and his wife Jodi – began variable rate applications in 2010. They started with phosphorous replacement using yield maps before ‘getting serious’ in 2012 with Electromagnetic (EM38) and radiometric mapping combined with soil sampling to target lime and gypsum applications and have now bought new air-seeder bins to facilitate variable rate application of potassium.

In the past two years they have used (NIR) grain meters fitted to their four headers to analyse protein levels as part of their focus on nitrogen applications.

The family's investment in mapping and variable rate technology is about optimising yield potential and thereby profit, according to Matt. “A lot of people have asked me over the years, ‘how much money do you save?’ and I say, ‘I'm not trying to save any money, I'm trying to make money’. “The biggest cost in farming is often foregone potential. That's the biggest opportunity loss we have. It's not trying to save a kilo of fertiliser here or a tonne of fertiliser there, it's trying to optimise your yield and thereby maximise your profit in any given season.”



However, despite the family's investment in PA technology and Matt's countless hours calculating N rates, he still wasn't completely satisfied and continued looking for ways to improve his N management. “The question is, how do you know what you're doing is right? That did bug me,” said Matt. “Your yields might go up and that's great, but yield is only one part of the puzzle. The missing piece has always been protein. We only considered protein when the grain got to the receival site and they told us what the protein was and at that stage it was very difficult, or impossible, to apply the protein from the truck or bin back to a paddock. The guts of it is that we were doing all of this variable rate stuff but we couldn't really measure if we were getting it right and protein was the missing link.”

“When you're talking about wheat, the goal is to put enough nutrition on to achieve 10.5% protein, because when you reach that point you have optimised the yield for the nitrogen application. When a plant has enough nitrogen to express its yield, given the soil and moisture it has access to, it won't increase the yield regardless of how much nutrition you give it. It won't turn the additional nitrogen – which means additional dollars – into extra yield but it will turn it into extra protein.

“The point is that we don't get any profit benefit when our protein goes over 10.5% because we don't get paid a lot for your protein, we get paid for tonnes, so we're not really getting any money back for nitrogen we're putting on if it isn't increasing yield.”

Matt concluded that the only way to measure the effectiveness of the family's variable rate urea applications was to calculate protein during the harvesting process and spent years looking for some way of achieving that before Sydney-based Next Instruments and their CropScan 3000H On Combine Analyser. The analyser, which was launched in 2013, uses Near Infrared (NIR) technology to deliver real-time protein mapping.

“Other guys in WA are using them to mix grain with different protein levels, like blending, but that isn't my primary interest,” said Matt. “Mine is measuring the protein and creating protein maps to make sure the nutrition we apply is right. The hope is that in the next couple of years I'll generate some good nitrogen or protein maps and start picking out areas where I need more or less nitrogen.

“That's why we went for the protein meters, to fill in the last piece of the puzzle.”

Young Hill Farms bought four CropScan 3000H On Combine Analysers at a cost of about \$30,000 per unit in 2016. This season will be the second full harvest in which the family has used the technology, with 2016 considered a trial run.

“I suspect it might take two full rotations before we start to get some good information we can start using,” said Matt. “What I expect is that the analysers will be more like an umpire; to show where we've applied the right amount of nutrition and fix the areas where we haven't.

“Investing in this technology was a leap of faith but I thought it was about my turn to do something a bit risky. We are certainly doing a lot better due to all the precision ag technologies and systems we've put in place over the past six years. They're certainly making our cropping enterprise a lot more profitable than it used to be.

“Of course, the more data you produce, the more time you have to spend dealing with it. So you've got to work out whether it's worthwhile. I think it is because I think there's a lot of potential out there that we forego because we don't apply the right amount of fertiliser.”

Matt has conducted trials on the family's property that have highlighted the link between yield and grain protein in cereals.

“My best trial was a nitrogen trial that showed a yield loss when grain protein was lower than the target of 10.5%. For example, if my protein was 9.5%, which can happen often with barley, it equates to yield loss of 750kg/ha. I had put enough nitrogen on that zone to change the grain protein from 9.5% to 10.5% I would have got an extra 750kg/ha yield.

“If we're talking about wheat, an extra one per cent of protein, from 9.5% to 10.5% would also have changed the grade from ASW to APW. If that improved the price by \$10 or \$12/tonne and we got another “If you're not putting nutrition on correctly, that's the real cost of farming. That's why I've been trying to optimise the nutritional inputs. Obviously, things change year by year. Yields change with seasonal conditions. If you get a dry year it might be a 1.8t/ha year, and if that's the case you don't have to put a lot of inputs on. You might put a little on your best areas to get them up to 2.5t/ha but otherwise you've probably got enough nutrition in your soil to get your 1.8t/ha average with a very small application of N. “Being an optimist I always look at the top end, but if you have a bad season you can bring your fertiliser inputs right back and only put on what is absolutely necessary exactly where it's needed. You can save yourself a lot of money and still optimise your yield.”