

Analysis driving award-winning farm

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A dogged determination to analyse and revisit every aspect of their farm operation is key to the success of the Byrne family's innovative, award-winning business.

Driven to produce an adaptive, prosperous and sustainable business, the Byrne family of central NSW is devoted to regularly scrutinising every aspect of their continuous cropping operation.

"We're endlessly analysing our production," said Grant Byrne, speaking at this year's SANTFA conference in Tanunda. "We benchmark every paddock every year; work out our water use efficiency and why each paddock has produced what it has.

"No part of our production is left untouched, from seed placement to nutrition to marketing tools. We don't expect one aspect will be the goose that will lay the golden egg. We look at the whole system and work on all of it to make a system that is the most efficient."

This holistic and progressive approach to farming has seen the family-owned and operated enterprise receive the NSW Excellence in Agriculture award in 2010 and Conservation Farmer of the Year award in 2011. Grant has also been invited to join several international research trips.

The Byrnes farm a 6,500ha dry land broad acre property west of Peak Hill in NSW. The business, known as Byrnes Partners, is an agglomeration of 11 properties run by Grant and his wife Lee who own six of those properties, lease another three and share farm two others.

The family proudly shares the work between three generations; Grant and Lee, their son Brenton and parents Brian and Jill.

Grant and Lee took over management of the business in 2000 and have since converted it from a conventionally farmed Merino sheep operation, where 80% of the land was pasture and 20% produced stock feed, to a zero-till, continuous winter and summer cropping operation.

Known for their innovative use of technology, the Byrnes adopted controlled traffic farming even before Grant accepted compaction was an issue.

"I thought compaction was a load of rubbish," he said. "But I could see that by



ANALYSING AND ADJUSTING THE FARMING SYSTEM TO MAXIMISE WUE AND CROP PERFORMANCE PAYS OFF WITH HARVESTS LIKE THIS FOR GRANT BYRNE AND HIS FAMILY.

driving straight lines I would save a lot of overlap."

The GPS system did just that, saving 8% on hectares sown and 12.5% on hectares sprayed. Yet these savings were outstripped by the soil benefits. "All of a sudden we were driving over the same lines and the soils just exploded," said Grant.

Every aspect of our farm business has to be looked at and each aspect is revisited time and time again.

Accepting compaction as an issue was a game-changer for the Byrnes who had divided their land into 50% for sheep and 50% for cropping. Once they identified coil compaction as the limiting factor heavy clay land that had been allocated to sheep was systematically converted to cropping. "When we discovered the compaction layer and got the sheep off the heavy sodic clays the biology of the soil took over," Grant said. "Now there are no dramas dry-sowing canola into country

that we once considered only good enough for sheep."

By 2009 the Byrnes' property was 100% continuously cropped with wheat, barley, canola, chick peas and faba beans. Five years ago they also ventured into summer cropping.

The impetus for summer cropping came with the discovery of herbicide-resistant ryegrass across 200ha. After spraying out and winter following the paddock, they needed a way to make it profitable and a trip to Argentina and Germany provided the inspiration.

In South America, Grant joined a CANFA (Conservation Agriculture and No-till Farming Association) study tour that was funded by GRDC, INTA (Argentinean Department of Agriculture), CECMA (Argentinean Manufacturing Association) and Robert Peiretti, a world-renowned conservation farmer.

The tour group travelled 700km from Cordoba to Buenos Aires in Argentina, visiting research centres, farms, factories and field days.

Grant found a farming industry



GRANT BYRNE: "WE LOOK AT THE WHOLE SYSTEM AND WORK ON ALL OF IT TO MAKE A SYSTEM THAT IS THE MOST EFFICIENT."

characterised by cropping and dominated by Roundup Ready soy beans and corn. With 1,000mm of annual rainfall and beautiful, loamy top soil, Grant said it was an environment ripe for agricultural success. "As I've often said, when they were dealing out the cards to farmers, the Argentinians got all the aces and we were left holding the empty packet," he quipped.

The Argentinian farmers paid little regard to the concepts of compaction or inter-row sowing, but swore by surface residue, which became a key discovery for Grant from his travels.

"They love cover crops," he said. "They had corn coming up through a cover crop of oats and they drove home the message about MOG (Material Other than Grain). They leave the residue in the paddock and we didn't see a bad stand of corn."

The trip cemented the value of soil for the Byrnes' operation.

"Our most valued asset on the farm is the soil that my crops stand in," said Grant. "All of my cropping is designed to look after the soil by maintaining material on the surface.

"It's about reducing evaporation, increasing soil moisture efficiency and obviously reducing erosion and compaction problems, as well as insulating the soil to control the temperature.

"Considering that the South Americans and Europeans use the same inputs as we do but produce 12 to 20t/ha, the only difference I could see is that our soils have that long, dry period where the microbes

are held up by the lack of moisture.

"We're actively pushing our top soil deeper."

The Byrnes use all liquid fertiliser, with Grant not in favour of spreading urea.

"Everyone seems to throw on urea, but we don't. We feed our soils for our bugs to mineralise and release nitrogen," he said. "We try to use our soils as the motor to run our crops. I find that people think they can control Mother Nature with a hammer, but I like letting Mother Nature do what she does, and try to help her along."

Soon after returning from Argentina Grant had an opportunity to travel to Germany with Canadian distributor Muddy River.

We went through 40 factories in Argentina looking at double disc planters and the Horsch machine was the best I'd ever seen.

While in Germany he met Michael Horsch, a farmer and machinery manufacturer with a passion for soil and a comprehensive understanding of tramlining and controlled traffic systems. Cultivation was standard practice on the farms Grant visited in Germany, but he homed in on their permanent cropping systems. "One of the corn crops Michael was harvesting was doing 20t/ha and within 20 minutes it was being ploughed

up. Twenty-four hours later it was planted with wheat."

As a result, summer cropping was put on the Byrnes' agenda as a way of maintaining surface residue and reducing the reliance on pre-emergence chemicals, which is leading to herbicide-resistant weed populations.

In line with the family's methodical approach to farming, they have analysed a range of summer crops to understand each crop's optimal m growing environment.

"We've tried corn, cotton, mung beans, sunflowers and soybeans," said Grant. "We've done all the rotations and examined each crop's profitability and now we have the knowledge so that when we get a certain set of circumstances, we know which crop to grow."

The research has allowed them to take an unprecedented step for a non-irrigated farming operation: growing dry-land cotton. This summer the Byrnes planted 400ha of cotton on a paddock that was fallowed over winter and expect high returns from the venture.

"Realising that it was going to be such a hard summer, we asked ourselves what was the hardiest, toughest crop that we knew to grow and the answer was cotton," said Grant.

Past experience again provided guidance, with the Byrnes strip tilling between standing stubble and placing liquid fertiliser 200mm below the surface months before sowing the cotton, which 'looks as though it will be a very profitable crop'.



SUMMER CROPS LIKE THIS CORN ARE A RECENT ADDITION TO BYRNES PARTNERS' CROPPING PROGRAM.

They inject pre-seeding fertiliser ahead of all their summer crops.

“With such a dry climate and little likelihood of post-sowing rain, we have the nutrition placed months before we sow,” said Grant. “When the plants germinate and the roots go down into the moisture, they actually go into a nutrient bed.

“At other times we’ve put nutrient down with the seed and the plant suffered because it was growing away from the nutrients. It wasn’t until we got a shower of rain that it could access the fertiliser.”

The family’s analytical approach to farming is backed by cutting-edge technology and machinery, most of which they purpose-build themselves. It’s a strategy that began as a cost-saving measure but is now about creating equipment with the best fit for their operation.

One example is the conversion of a John Deere 9965 cotton picker into a 6,000L, 40-metre self-propelled boom spray that has covered more than 60,000ha. According to Grant, it has all the bells and whistles, including air bag front suspension, weather stations and John Deere’s Green Star control system. “It can do 60km/hr up the road. It’s an amazing piece of machinery,” he said.

The same innovative approach was used to create the farm’s air seeder. “I found an air seeder that John Deere couldn’t sell in a Melbourne yard and cut it to pieces. We drew it up on an AutoCAD program and rebuilt the entire machine.” The 20-metre seeder has a three-metre wheel base and is

set up for three-to-the-metre rows [333mm row spacing].

“The interesting thing was that the original machine was on 254mm [10-inch] row spacing and had 16 bent tines to fit around the chassis. By the time we cut it up and put it back together there wasn’t one bent tine.”

The Byrnes use a double disc planter for sowing their summer crops and are looking to try one of Michael Horsch’s machines, The Horsch Maestro, Grant saw in action in Germany.

When they were dealing out the cards to farmers, the Argentineans got all the aces and we were left holding the empty packet.

He saw countless double disc planters in South America and Europe but was most impressed with The Horsch Maestro. “We went through 40 factories in Argentina looking at double disc planters and the Horsch machine was the best I’d ever seen. It has a coulter at the front for side banding granular fertiliser but the most important feature was the canter-linked electric singulating system. When you go around a corner, each motor runs at its own speed to maintain singulation [single seed placement] within the row.”

Perfecting seed distribution, an issue they ‘discovered’ when they began summer



GRANT BYRNE RATES HIS SOILS HIS ‘MOST VALUED ASSET’. FINDING EARTH WORMS LIKE THIS ONE IN THEM IS A GOOD INDICATION THAT THE SOIL ASSET IS IN GOOD HEALTH.

cropping, is currently under the Byrnes’ microscope. They are starting to consider seeding rate in terms of the number of plants a hectare rather than kilograms of seed to the hectare, with the focus on giving the plants ‘room to grow’.

“It was a bit of an eye opener to see the impact of plant numbers on the yields of summer crops,” said Grant. “We were doing trials on corn and were told to grow 40,000 plants a hectare but our experience since then shows that 18 to 20,000 plants a hectare is a far better plant population to maximise growth in our conditions. We produced 8t/ha of dry land corn with a density of 20,000 plants a hectare compared to 2 to 3 t/ha when we sowed 40,000 seeds.”

They have also coined the term ‘elite seeds’ to describe oversized canola seed that is expected to produce higher-yielding crops. The impact of seed size



DESIGNING AND BUILDING MACHINERY, LIKE THIS 20-METRE AIR SEEDER, TO ‘FIT’ THEIR CONTROLLED TRAFFIC FARMING SYSTEM IS PART OF BYRNES PARTNERS’ FORMULA FOR SUCCESS.

was an accidental discovery after grading some of their neighbour's canola, putting aside seed that was 2.4mm in diameter and sowing it at a rate of less than a kilogram to the hectare, which is at the lower end of recommended seeding rates for canola in SA. Even at this low rate the plants from the large seeds crowded each other out and the crop didn't survive but the early performance of the crop proved the idea of 'elite seeds', which Grant is pursuing.

"We know that the big seeds are better, so we've bought a grading plant and we're going to put the seed over a gravity bed to find a tonne of this elite seed. We estimate that we can sow 300g/ha to get the right population."

This is another example of the Byrnes' readiness to make changes in their farming operation to increase profitability.

Grant illustrates their farming philosophy using a model similar to the Liebig Barrel, a barrel with different-length staves that illustrates 'the law of the minimum' which says that plant growth is limited by whichever nutrient is unavailable or in short supply.

In the Byrne Barrel, as Grant as dubbed it, the barrel has numerous holes, depicting lost efficiencies.

The holes nearest the bottom of the barrel are the most critical aspects of the operation and the size of each hole indicates how deficient the business is that area.

Grant's view is that farmers need to systematically plug the holes to improve their farm's profitability and he argues that a square plug is better than no plug at all. "It's still worth putting a square plug in a round hole," he said. "For example, if you can't buy the biggest and flashiest air seeder to go tram lining, then go a little bit of the way. Perhaps just get a spray rig onto three metres. Any steps you can take to reduce the deficiencies in your operation are worthwhile, because if you get started, you'll eventually plug all of the holes.

"We do this for every aspect of our business: when we're looking at yield, rotations, soil structure, varieties, seed quality, see placement, timeliness; anything that will affect yield.

"Every aspect of our farm business, our paddocks and our crop has to be looked at and each aspect is revisited time and time again."

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