Precision ag delivers the ‘one and five-percenters’ needed for sustainable farming

SNAPSHOT

Growers: Julian and Shauna Cross

Location: Kumbia, Queensland

Farm size: 515 hectares

Annual average rainfall: 760mm

Soil types: chocolate forest country, red soil over basalt at 600mm or 1500mm

Enterprise mix: dryland broadacre crops and cattle

Crop program (2020): Winter - cereals 100% (Elmore$^{\phi}$ CL wheat, Drover oats for hay and seed) Summer - maize 50% (gritting varieties for human and stockfeed), legumes 50% (Virginia peanuts and Jade AU mungbeans)

Rotation: peanuts-maize-wheat

Photo: Julian Cross

Julian Cross in a field of peanuts.

A combination of drought and the soil-borne disease sclerotinia has forced Kumbia farmer Julian Cross to throw his standard rotations “out the window”.

Sclerotinia has become a major problem for peanut growers in the Burnett region which produces 90% of Australia’s peanuts. Outbreaks are more likely in heavier soils and can cause losses of up to 30% in an average year and a complete wipe-out in very wet years.

Despite using fungicides for 30 years, and taking part in research to find effective treatments, Julian said the build-up of the pathogen has kept getting worse on his heavier brown clay forest country.

He’s previously used a square plough to break it up as a last resort, but is concerned that repeated cultivation will undo all the benefits from a decade of controlled traffic farming (CTF).

“It got to the point where the only way out of it was basically to give the country a spell away from peanuts,” he said. “We’ve now swung towards mungbeans, but the last three years have been a drought nightmare.”

The annual average is 780mm, but Julian said rainfall totals during the past three years have been more like 450mm.

Julian and his wife Shauna produce peanuts, maize, wheat and mungbeans on 445ha of undulating country 10km south east of Kumbia, in the foothills of the Bunya Mountains.

They also run a herd of 30 Droughtmaster-Charbray cross breeders on 70ha of forest country, improved pasture and Leucaena, the leguminous forage tree.

How it started

Driven by a desire to reduce erosion on the hills, Julian bought a Beeline autosteer system in 2008 and converted from conventional tillage farming to strip tilling.

“From there it just evolved,” he said. “The next thing was controlled traffic, the following year we got the header to match up and everything followed after that.”

In 2016, Julian changed over to a Topcon system that allowed section control of spraying. He began yield monitoring two years later, although it’s taken a while to sort out problems with calibrating and retrieving data from the YieldTrakk on the Case IH 2588 header.

In the meantime, Data Farming co-owner Tim Neale helped Julian use soil tests and normalised difference vegetation index (NDVI) to do his first variable rate fertiliser application in December 2020.

“On the first application, the deep first application of potash and DAP which we put on with the strip till down to 30cm, that volume for the paddock didn’t change,” he said. “But when we came to apply the nitrogen at planting time in January we didn’t use as much. We saved on the poorer areas we’d been over fertilising and that’s probably the first thing I noticed.”

Maize harvested at Julian Cross's farm.

Photo: Julian Cross

From blanket coverage of 140kg/ha, the variable rate application averaged 105kg/ha on a 35ha field, a saving of 25 per cent.

Julian has high hopes that using variable rate fertiliser will help him better manage the significant variation in soil types – from chocolate forest country to red soil over basalt at 600mm or 1500mm – across the farm.

What's next

Next on the list is variable rate seeding which would allow plant density to be better targeted to the water holding capacity of the different soil types.

Julian said variable rate herbicide application would have been handy in summer when small rain events caused more weeds to come up in the softer soils but fewer on the harder ones. The main problem weeds are wild radish and feathertop Rhodes grass.

"I need to do a bit of homework there," he said. "In hindsight, we could have been saving a fair bit of chemical on some of it."

Julian also would like to have accurate yield monitoring on the peanut harvester, although that's easier said than done – in some soil types, extra dirt sticks to the peanuts when they're dug, and that weight is counted in the bin as extra yield.

"That's a bit of an issue we haven't quite worked out how to get around," he said. "We'll probably have to identify those areas and fudge the figures accordingly to avoid a false reading."

Julian attributes the biggest gains so far to strip tilling and CTF, especially in dry seasons.

"It takes five or eight years to soften the subsoil deep down," he said. "Once we got that happening, it was incredible what we managed to grow on very little rain. And then the rest of it, like the variable rate, it's all wonderful because you've got to keep picking up those extra one and five percenters to keep going."

Julian has two tips for growers interested in exploring precision agriculture: do a lot of homework, which includes talking to other growers about what they've learned, and keep it simple, taking tiny steps rather than expecting to be able to "do it all at once".

MORE INFORMATION

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