

Flexibility and profit from summer crops

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Nuffield scholar and Shepparton farmer David Cook's change from traditional mixed farming to an opportunistic summer cropping program has improved his management flexibility and provided alternative strategies for fertiliser application and nutrient management.

David and his father Neville ran a mixed farm based on winter cropping on their property at Pine Lodge, on the Murray Plains about 20km east of Shepparton, Victoria for many years until in 2007, when they were no longer able to obtain water for the irrigation that was part of their program.

At that time they were growing broadacre crops, growing pasture seed and hay and running sheep on their 1,105ha, 300ha of which was share-farmed. With irrigation no longer an option, David decided to increase the number of crops in the rotation to look at alternative modern farming measures to gain results.

They had been using no-till seeding methods since 1997 for dryland and irrigated crops and in 2009 invested in a Cross Slot seeder and implemented a controlled traffic program on 3.1m centres.

"In the early nineties we used to burn our stubbles," David said. "It wasn't until 2009 that we converted to a full stubble



HARVEST TIME ON PINE LODGE.

retention system and implemented a controlled traffic program, which was the first step in regenerating our farming system.

"We are now doing everything we can with modern farming practices to conserve moisture and improve overall soil health."

David says the soil on the property is

inherently acid, but with a stringent liming and gypsum program he has been able to raise the pH levels closer to his target level of pH5.5 (CaCl₂).

"We have duplex soils on our farm, which can range from sandy clay loam to light clay top soil over generally very heavy clays in the sub soil. These soils tend to hold a lot of moisture and the flat topography means nowhere for the water to run. As a result we have waterlogging issues throughout the year, which has cost us considerably in production loss and profitability.

"There are about half a dozen areas on farm that are prone to waterlogging in wet winters.

"We had a very wet winter in 2012 and it took nearly six weeks with two 50mm pumps used every day to remove the surface water. If we did not use the pumps the water would have remained on the surface until harvest," he said.

The surface water and waterlogging issues prompted David to explore summer cover cropping and how he could maximise water retention over winter to increase cash flow during the rest of the year and improve soil conditions. His starting point was to research what other farmers



WATERLOGGING, AND SURFACE WATER LIKE THAT EVIDENT IN THIS 2012 FABA BEAN Paddock, IS A SIGNIFICANT ISSUE ON DAVID'S HEAVY RIVER FLAT COUNTRY.



SHEPPARTON FARMER DAVID COOK IN A HEALTHY FABA BEAN CROP.

where doing overseas, particularly in North America.

“We wanted to find a way to get water to infiltrate into the soil where we could use it and benefit from it later on. In addition, we are noticing wetter summer periods and drier springs in our area, so we thought we could find a better rotation of crops to capitalise on the moisture in the ground,” he said.

In 2004 David travelled with fellow Riverine Plains Inc committee member Mark Harmer to South Dakota, where researchers were looking at the performance of a range of summer crops in dryland summer crop rotations in low to medium-rainfall.

“The results from the South Dakota trials showed that the summer crops did not affect the yield of the following winter crop and provided another opportunity for weed control. And the yields from wheat following summer crops were better than the yields from wheat sown on a stubble fallow, which was against what we were doing at home with summer weed spraying.”

“It made me think summer cropping could be another tool for weed control, especially where you need an alternative for the control of resistant ryegrass with a winter fallow, or where seeding is delayed by a wet autumn.”

In 2009, when he learnt the University of Melbourne was looking at ways to maximise water retention in soils, he contacted the university and in the summer of 2009-10 hosted a university

and National Water Commission rain-fed summer crop trial on his property.

The trial changed his and Neville’s farming mind set and the results proved that, in certain years, summer crops could be grown in the Riverine Plains environment, David said.

“We knew there would be some uncertainty in summer cropping. We also knew that if we didn’t give it a go, we would never know.

“Growing summer crops provides an opportunity to extend the seeding window and increase the number of crops in our rotation.”

The trial paddock on ‘Pepper Tree Farm’ was sown in 2009 to three replicated trials of safflower (*Sironaria*, sown on September 4 at 12kg/ha), sunflower (Aussie Gold 62, sown on October 20 at 2.4kg/ha), White French millet (sown on December 1 at 8kg/ha), lablab Rongai, (sown on December 1 at 24kg/ha) and mungbeans (Emerald, sown on December 4 at 16kg/ha).

“It was at this time that I had to start thinking like a Queenslander; that is, we need to have the seeder ready to start whenever we have moisture.

“Traditionally, we were only sowing two months of the year but we had enough moisture to establish a crop all year round. For most people, to actually try to establish crops at any time of the year other than winter seems ludicrous, but there is an opportunity for us.

“We also saw summer cropping, or

sowing outside the conventional sowing window for winter crops, as a way to double our income and offset our risks. Being able to sow nine months of the year can generate a significant cash flow. What you lose on the winter crop by seeding late after the summer crop you make up for with the extra income, as was proved by the millet and the following wheat crop in 2010-11 and 2011-12.”

Being ready to sow nine months of the year may seem to present logistical challenges, but David sees it as a matter of juggling harvest with sowing and being ready for both.

In the first year after the 2009-10 trial David grew a Shirohie millet crop that carried through to harvest, yielding of 3t/ha. He sowed wheat in that paddock in 2010-11 and another millet crop in a different paddock in 2011-12m which again produced a grain crop.

“After the first year we were more organised to summer crop in 2010,” he said. “We had a particularly wet summer in 2010, receiving 30mm of rain in mid December, so we sowed a millet crop that season, which got through the harvest.

“The best result I have since the trial in 2009 was from the paddock with the millet in 2010, which generated a combined gross margin of \$1,850/ha from the millet and the following wheat crop,” he said.

Summer crops are also a handy back-up if wet conditions mean David is unable to get onto paddocks to sow winter crops during the optimum sowing window.



BOTTOM SOWING FABA BEANS INTO A WHEAT STUBBLE IN 2012.

Being able to sow a summer crop once the paddock is dry enough to seed and have it use the water in the soil has turned waterlogging into water storage for use later in the season.

“If we have waterlogging issues we can use the moisture over the summer months, rather than plant something late that will probably struggle,” David said.

“One of the main aims of cover crops, especially in canola and faba bean stubbles, is to produce a level of residue that can protect the soil and store any rain that falls from early autumn rain through to when we start winter seeding in April.

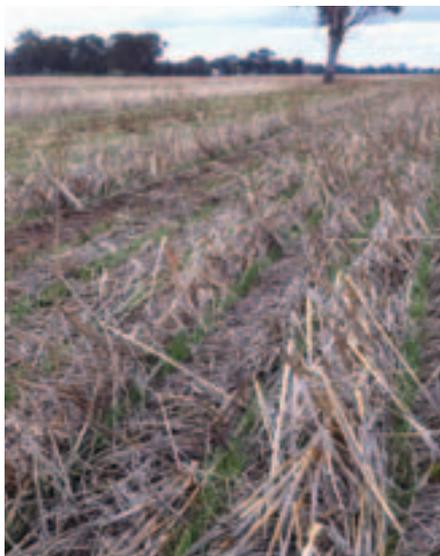
“We have sown all our summer crops as cover crops but the soil moisture from the wet seasons in 2010-11 and 2011-12 meant the crops in those years got through to harvest as cash crops.”

However, there have been some failures, notably in 2012.

“Millet and cow pea we grew in 2012-13 never really did much because they were sown on limited moisture and we had a hot dry summer. But in our mind, a failed crop is better than no crop at all.”

David says that while the cover crops may not always work, the moisture they help retain and the soil cover they provide benefit soil health.

“Because the soil is always covered with a crop it is not exposed to sun and therefore easily retains the moisture. As a result the temperature of the soil is reduced, resulting in more organic activity. We aim



MID-ROW COVER CROPPING WITH SUMMER SPECIES NOW PART OF DAVID'S FARMING SYSTEM. HERE MILLET SOWN INTO WHEAT STUBBLE IS JUST STARTING TO GERMINATE.



THIS MILLET, SOWN IN 2010 FOLLOWING AN UNSUCCESSFUL CHICKPEA CROP, GREW QUICKLY AND WAS SOON TALL ENOUGH TO ALMOST CONCEAL A QUAD-BIKE MOUNTED SPRAY UNIT.

to exploit the moisture when it is there, which is not likely to be every year, while having growing roots in the soil all year round.

“We have noticed the roots are becoming more aggressive, soaking up the moisture. My mantra has always been to build the organic carbon to hold the moisture, which will increase crop yield and productivity.

“The cover crops act as a crop buffer, reducing the soil temperature over the warmer months, which again, encourages soil activity and nutrient cycling and establishes roots in the soils.”

David suggests millet, sunflowers and potentially safflower present as having the greatest potential as summer cash crops in his environment. He does not consider corn an option, given that the summer growing season would be too dry for it in most years, given the water-holding capacity of his soils, and that the cost of growing corn is significantly greater than the cost of the other crops he is using.

“We can grow millet and we have a market for it and I like sunflowers because you can get them in a little earlier and establish them on spring moisture. Corn is too expensive for the return on investment.”

If he receives more rain during harvest in the next few summers he will plant millet and cow peas as cover crops in December, with the possibility of taking them through to grain if they look good enough.

“Millet and cow peas are good cash crops and have benefits in terms of fixing nitrogen and providing a disease break, which helps in growing a good cereal crop after them,” he said.

David's overseas research has raised questions about the fertilisers and application methods available to Australian growers and how they can better manage their current systems.

He is particularly interested in the potential of the controlled uptake long term ammonium nitrogen (Cultan) system he encountered in Germany in 2012 and is keen to trial it in his production environment.

“The Cultan system uses ammonium-based fertiliser applied as a liquid, granule (sulphate of ammonia) or gas (anhydrous N) in a concentrated band in the soil rather than urea or a nitrate based fertiliser.

“German growers using the Cultan fertilisation system use a nitrogen use efficiency (NUE) of 90-95% in their nitrogen budgets, which I was astounded by. With the fertilisers we have available I use 30-40% NUE for canola and 40-50% for wheat.

“The theory is that plants will self-regulate nitrogen uptake of ammonium based fertilisers but with urea they will take up whatever is available, which often leads to excessive vegetative growth that can result in haying off in the spring in a dry finish. There also appears to be

benefits in terms of reduced root and leaf disease with ammonium based fertilisers.”

David has a machinery share contract with neighbour and friend, Peter Jeffrey, which reduces his capital costs.

“Sharing machinery has enabled us to reduce the upfront costs and maximise return on machinery investment. We started the share system in 2008 and it has been a healthy agreement,” he said.

“We currently share a seed drill. We have known the Jeffreys for a long time, so it made a lot of sense to partner with them to share machinery.”

David plans to use his 2013 Nuffield Scholarship to investigate the relationship between nutrient availability and cover crops and seek to identify other crops that can be grown in the summer months on the Riverine Plains.



CONTROLLED TRAFFIC IS INTEGRAL TO DAVID'S FARMING SYSTEM, A POINT CLEARLY MADE BY THE PERMANENT WHEEL TRACKS EVIDENT IN THIS CROP OF WHEAT.



DESICCATING CANOLA FOR HARVEST IN 2013.

“Weather patterns have changed in the past 10 years and even low-rainfall areas are experiencing wet conditions in different times of the year. There is always an opportunity to cover crop or summer crop. You don't have to crop your entire farm, just a paddock or two can provide income you wouldn't otherwise have,” he said.

“We are going to put in our first dedicated multiple-species cover crop this autumn, with the aim of spraying it out and going back to a spring-sown crop, possibly safflower or sorghum, depending how things go.

“Everything up to now has been playing around the edges but we're still learning all the time,” he said. “I hope my studies and further research will help not only the way I farm but how others farm as well.”



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