

# Paired rows part of new farming system

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**On-farm development of a paired-row seeding system has increased the efficiency of Jason Pfitzner's cropping program and generated interest from other growers searching for accurate seed placement, increased seed bed utilisation and a reduction in soil throw.**

Dry seeding, split-row seeding and chaff carts are all part of Jason and Michael Pfitzner's farming system.

Jason and his father Michael, who farm 3,035 ha in the Lower North of SA, have been no-till farmers since 1995.

The home property is at Eudunda but they also have land at Bower, Neil's Flat and Ngapala. Soil types across their property range from silt and light 'ashy' soil through high-alkaline limestone country to heavy red clay, quartzite and some acid soils. Annual rainfall varies from 200 to 500 mm.

They have 1,820 ha of cropping land, which is sown every year, and 1,215 ha of grazing country, where their sheep are run during winter when the 'inside' cropping country is under crop.

They run 500 Merino ewes, which are mated to poll Dorset rams for cross-bred lamb production.

Until Jason left school the main enterprise was a piggery, with up to 120 sows producing around 1,500 piglets a year for the bacon market. A complementary cropping program produced grain for the pigs, with only surplus grain, usually wheat, sold off-farm.

An early interest in no-till farming led Michael to build an air seeder by welding two International 211 cultivators together; fitting the chassis with bolt-on knife points and trailed Agmaster rotary harrows and rollers.

Michael was attracted to direct drill by the potential to reduce input costs, and his decision to build his own seeder was motivated by a need to limit the capital outlay, he said.

He sold the fabricated seeder several years later and replaced it with an extended Gason air seeder bar he fitted with adapted knifepoints and press wheels.

In 2010 he increased his row spacing to 254 mm; a change designed to overcome trifluralin damage caused by soil throw



JASON PFITZNER CHECKS THE STUBBLE OF A 2012 WHEAT CROP.

while keeping the crop rows close enough together to maintain crop competition on the weeds. He also added an extended draw bar to improve the tracking of the Gason, which was strong and sowed well in dry conditions, but tended to travel off line.

## Jason's enthusiasm for innovation and system improvement seems endless.

From the mid 1990s, Jason and Michael gradually increased the size of their property by buying several local parcels of land, and in 2006 they decided to move away from pigs and focus on cropping. The cost of renovating the run-down piggery was outweighed by the 'phenomenal' grain prices at that time, and their increasing holdings made a cropping-focussed enterprise more viable.

The move out of pigs prompted a change from growing mainly barley for pig feed to a rotation that today comprises two seasons of wheat followed by barley then a break crop, either canola, peas or chickpeas.

Selecting a suitable break crop has been a challenge for the Pfitznors, who found the gross margin of harvesting vetch for sheep feed unattractive and lost 100 ha of Kasper peas to bacterial blight. Chickpeas have been good in recent years, and Jason is keen to try two new varieties of peas, PBA Oura and Pearl, which are claimed to be blight-resistant and 15% higher yielding than Kasper.

In 2009 Jason started 'playing' with paired seeding boots, after seeing commercial systems he thought could be built more simply and with better wear resistance.

Paired or split boot systems deliver seed down both sides of the furrow, rather than in the centre; the theory being that the risk of fertiliser toxicity is reduced by separating the seed and the fertiliser.

Placing seed in the side of the furrow also offers some protection from waterlogging, especially in clay soils.

Jason also saw potential for split rows to increase weed competition through better seed bed utilisation.

“We’ve got some fairly gutless soil, and my idea was to sow into the side of the furrow so the seed had access to good top soil. I wanted a boot that would provide positive seed placement and minimise soil throw, trash and mud build but did not deep-band fertiliser.”

Fertiliser placement is the big issue.

“A lot of people using deep banding have experienced that dormant phase in June, with crops not growing because it’s cold and wet. They’ve put money into all this fertiliser but, with seed above a deeper band of fertiliser, the plants aren’t getting it. It’s not where they need it. Then, when things dry out and the roots grow down to seek moisture, they hit a band of concentrated fertiliser that is toxic to plants when they’re moisture stressed.

“That doesn’t happen with seed and fertiliser at the same depth.”

Jason’s experience with commercially available paired row boots included blocked fertiliser tubes and inaccurate seed placement. There were also difficulties with depth control, particularly when seeding deep to access moisture lower in the soil.



KORD WHEAT SOWN IN 2011 WITH THE PROTOTYPE ROOT BOOTS. MOVING THE BOOT CLOSER TO THE KNIFEPOINT LESSENE SOIL THROW.

## MANAGEMENT MORE IMPORTANT THAN VARIETY

Getting the crop in early and managing fertiliser inputs are more important than selecting crop varieties based on frost tolerance, according to Jason Pfitzner, who farms in the Lower North, where winter temperatures frequently fall below 0°C.

“We try not to juice crops up with urea too much because they get too sappy. If you have a high sugar content in your plant - a high brix level - it will reduce the frost risk”.

Jason, who has dry-sowed canola since 1995 and wheat since 2005, places a high priority on getting robust plants out of the ground early.

“Get the crop in as early as possible so you’ve got something established. Nine times out of 10, if you don’t get your crop in the ground early you’re going to suffer from poor water use efficiency. Frost can happen at any time; it’s just another gamble we take as farmers”.

Having land spread over a wide area is also a significant risk management strategy.

“Because we’ve got a fair spread of country, we spread our risk out with our seeding times. We try to finish up on the more frost-prone areas so we get the lower-risk areas in first.”

In 2010 he achieved encouraging results sowing safflower with a paired-row wing he made for a rubber seeding-hose tail. The wing was a welded ‘Y’ of steel pipe fitted to the hose tail to distribute the seed to the sides of the seeding furrow. A spring fitted inside the rubber tail hose increased the soil engagement.

This approach provided horizontal rather than vertical separation, with seed placed either side of a central line of fertiliser to minimise the risk of fertiliser toxicity, but with the seed and fertiliser at the same depth, which improved seedling access to the fertiliser and reduced losses due to leaching.

While results in the paddock were good, the rubber tail proved not strong enough for a paired-row system, and this, coupled with problems getting through trash and subsequent seed displacement issues, sent him back to the drawing board.

His next design, which he used for his





CAPTURING WEED SEEDS WITH A HOMEMADE CHAFF CART HAS REDUCED THE PFITZNER'S WEED BURDEN BY 70%.

entire 2012 cropping program, had the 'Y' boot tucked in behind the knife point to prevent residue built up in front of the boot. The wing profile was streamlined by using a horizontal blade with a slicing action that reduced drag and minimised seed 'bounce' by allowing the soil to flow over and around the seed.

The first positive result Jason noticed was early and vigorous crop emergence. The crops, which had been dry-sown into soils with little stored moisture, 'absolutely bounced out of the ground'.

"We noticed emergence a day after the first rain. A neighbour who had dry-sown using conventional knife points had to wait another 10 days for emergence."

Even though 2012 remained dry, the Pfitzners' crops were resilient, which Jason sees as a key indicator that the placement of seed away from fertiliser is working. "Our crops hung on well and our screenings were minimal. We had absolutely nothing over 2% and most of the paddocks were less than 1%.

"That was proof to me that the whole system was starting to work. We saw benefits from early canopy closure, with fantastic weed competition during the growing season and good ground cover after harvest.

"In-crop weed numbers were the lowest we have ever seen, germination and yield were consistent across different soil types and paddock conditions and the crops produced 'a little bit more on less soil moisture' in 2012 than in 2011."

As a control to check the effect of his new design, which now carries the name 'rootboot', Jason left one tine on the bar with a single boot. A visual inspection of

## CHAFF CART 'WEAPON OF CHOICE' IN WEED WAR

A chaff cart was 'weapon of choice' for Eudunda farmer Jason Pfitzner when he was faced with the need for a physical, non-chemical weed control option.

He opted for weed seed collection over measures such as growing hay or fallowing paddocks for grazing, and set about building his own chaff cart and a blower to carry the chaff from the header to the cart.

That was in 2005, and he used the cart for the first time during harvest that year.

Jason and his father Michael saw a dramatic improvement in weed control almost immediately, with an estimated 70% reduction in weed numbers in the first year.

Not having header chaff rows in the paddocks also made it easier to sow dry the following season.

And, instead of burning the chaff from last season, he has used it as sheep feed, with good results.

"The sheep are just annihilating it. There's not much left of the chaff piles and the sheep are doing so well on them. There might be more nutrition in the chaff this year due to the tight finish and minimal summer rain to spoil it".

During the 2012 harvest Jason noticed the ryegrass hadn't lodged as it often had in previous seasons, so more of the ryegrass seed was picked up by the header and ended up being removed in the chaff cart.


He attributes this to the split-row 'rootboot' he has developed that produces paired crop rows 76 mm apart, reducing the inter-row space from 254 mm, the nominal row spacing, to 178 mm. In this environment the ryegrass grows taller because of increased shading and is then supported by the closer-spaced crop plants.

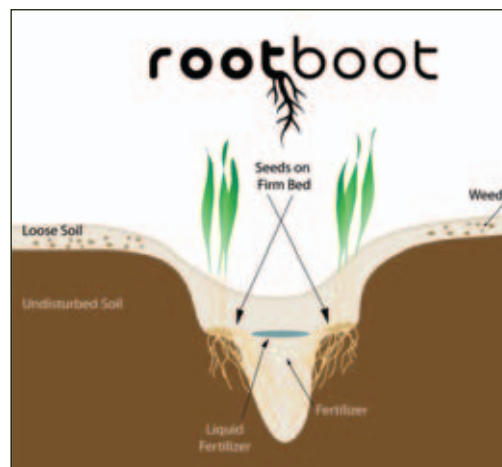
the crop ahead of harvest revealed 20 to 30% more heads in rows planted with the rootboot than in the single row.

The changes made to the cropping system in 2012 make it hard to pinpoint which factor had the biggest positive impact on crop emergence, resilience and ultimately yield, Jason said.

Further trials would be needed to work out whether the increased soil disturbance from the rootboot, the use of liquid fertiliser or the level placement of seed and fertiliser was more significant, or whether they all played a role.

His success with his paired-row rootboot system last year has prompted Jason to place provisional patents on it and he has reached an agreement to have the boot manufactured, with units already sold to growers locally and as far away as Albany, in WA.

Jason's enthusiasm for innovation and system improvement seems endless. In addition to further refining the rootboot he is working on developing a disc seeder, with harvest also in his sights. "I've got some harvesting ideas too, which are a little bit hare-brained, but I'll get there." 



THE LATEST VERSION OF THE ROOTBOOT (TOP) AND A DIAGRAM SHOWING WHAT IT IS DESIGNED TO ACHIEVE IN THE SOIL.