Exploring the use of strip and disc systems on Eyre Peninsula to improve drought resilience

Adopting a strip and disc system: taking the good with the bad

Foreword

Improving drought resilience in low and medium-rainfall zones is a key focus for growers on the Eyre Peninsula.

Ag Innovation and Research Eyre Peninsula (AIR EP) identified strip and disc systems as a priority topic for investigation by the Minnipa node of the South Australian Drought Resilience Adoption and Innovation Hub.

The following case studies were commissioned to capture the experiences of farmers who have adopted strip and disc systems, including their decision-making process, their equipment and the pros and cons of their system for their soil types, rotations and rainfall. These case studies are intended to be a small snapshot from South Australian growers outlining their adoption pathway and methodology. Some growers have had little guidance or support during their strip and disc adoption process, others have worked closely with an agronomist throughout the process.

The case studies feature growers Kelvin Tiller, Pinery, and Paul Bammann, Cleve, as well as agronomist Michael Brougham (Elders Roseworthy) who were invited to share their experience of strip and disc systems with EP growers at a workshop held at Rudall in March 2024.

These case studies should be read in conjunction with *A needs analysis for the barriers to adoption of strip and disc systems on the Eyre Peninsula*, available from the **AIR EP website.**

Kelvin Tiller

Where:	Pinery, SA
Enterprise:	Continuous cropping in wheat-lentil rotation
Cropping area:	2600ha
Soil type:	70% sandy loam with areas of dune swales; 30% light red clays
Rainfall:	340mm
Average yields:	Wheat 3.5 t/ha; lentils 1.5 t/ha

A 'best for business' approach has guided Kelvin Tiller's investment in strip and disc machinery.

Kelvin, who farms at Pinery in the Lower North, started the transition to a strip and disc system in 2011 when he bought a second-hand disc seeder.

He was starting to run into reliability issues with his old tyne seeder, which was also pulling up rocks – presenting a significant hazard at harvest.

"I didn't set out to switch to a strip and disc system, one thing just led to another," Kelvin said.

"It ended up being a bit of a journey.

"I was actually pricing up new tyne seeders and then a second-hand disc seeder came up locally. It was only two years old and even though I'd never used a disc seeder, I thought, 'others can make it work, so why can't I?'.

"I could see the advantage in a disc seeder in helping me get through chaff and heavy stubble loads.

"I guess I'd call myself an early adopter as there were probably only three or four other disc seeders in the area at that time."

The equipment

Kelvin is now on his second disc seeder – an 18-metre John Deere disc drill on 250-millimetre row spacings, which is wider than his original tyne seeder. It is a single disc opener with Aricks residue managers.

"For me residue managers were key in the early stages of adopting a disc seeder and I've had them right from the start," he said.

"Both machines I've owned have had residue managers and we would struggle to get through residues without them."

In 2013, Kelvin purchased a second-hand stripper front to help manage the extra stubble that came with the switch to a disc seeder.

He initially bought 32ft (9.75m) stripper front and now uses a 42ft (12.8m) Shelbourne Reynolds stripper front, also purchased second-hand.

"When we initially switched from the draper front to the stripper front, it wasn't efficient to have the smaller 32ft front on a bigger header, which is why we upgraded to the 42ft model," Kelvin said.

While the tyne seeder has found a new home elsewhere, Kelvin has retained a draper front for reaping about 90 per cent of his lentils.

"On occasions when we have a wet seeding I may wish we had the old tyne machine, but in reality we can just wait for the ground to dry up a bit and then get sowing again.

"If I'd kept it, I would just have an old worn-out tyne machine sitting in the shed that I'd only use for maybe two per cent of the time."

The benefits

One of the main benefits Kelvin has found with the strip and disc system is better stubble retention.

"I can't quantify it, but in tighter years we are retaining more moisture and we are definitely reducing erosion on our lighter soils," he said.

The strip and disc system gives Kelvin the ability to move through different soil types without making changes to the seeder and to sow with precision at higher speeds. The disc seeder also makes conditions more favourable at harvest, particularly for lentils.

"With the disc seeder, we're not dragging a tyne so we're not pulling big rocks up and it leaves the ground a lot cleaner, with more stubble cover and no straw clumps," he said.

In the early days after transitioning to a disc seeder, Kelvin noticed crop emergence was a lot more even, leading to big gains in early crop establishment.

"I believe I can get a crop up on less moisture than I could with a tyne seeder as we're not disturbing the soil as much. We can get 10mm of rain and then sow because the discs aren't turning the soil and drying it out."

Kelvin has decreased the fertiliser down the tube and switched to straight DAP rather than a blend.

"We now only use 50 to 80 kilograms per hectare of straight DAP at seeding, whereas we used to use 120 to 140kg/ha of a nitrogen blend like 20:12. However, that's as much about managing fertiliser toxicity as it is about our tight legume rotation where we don't need as much N upfront."

Whilst using a stripper front can increase the ground speed of harvesting, it needs to be balanced by logistics of grain handling.

Kelvin Tiller and Michael Brougham pictured with Kelvin's stripper front header.

"There's no point pulling off more tonnes in an hour than you can store or move out of the paddock so we make sure we don't get too far ahead of ourselves," Kelvin said.

Kelvin said a lot of his soil types seem to attract snails but the stripper front is a good way to manage them, as snails do not seem to show up in grain samples.

The challenges

Like everything in farming, the benefits have to be weighed up against the risks. Pre-emergent herbicide options for strip and disc systems are limited, which is why Kelvin and his agronomist Michael Brougham are conducting their own on-farm trials.

"We're using those trials to compare different soil types and situations and work out which herbicides are safe with our system," he said.

Kelvin also has to spend more time monitoring pests as the stripper straw is a more favourable habitat for millipedes, slaters, slugs and mice. In particular, the higher stubble provides mice with more shelter from predators.

"The increase in bugs is one negative impact but like everything in farming, it's a compromise," he said.

"We were aware that could be an issue and we do probably bait a bit more for mice now."

While he agreed there is more maintenance with a disc seeder compared to tynes, Kelvin said no seeder is 'set and forget'.

"We know we need to replace the discs every season, so we set aside a couple of days to do that every year," he said.

"Three of us did the whole machine in a day one year.

"There is more attention to detail with a disc seeder with a lot more moving parts and wear points. Bearings also need replacing every five to seven years but the later models are all greaseless."

When it comes to frost risk, Kelvin believes a severe enough frost event will not discriminate between different farming systems.

"The strip and disc system is aiming to retain more moisture in drier climates, but drought years just tend to be more prone to frost anyway."

Kelvin says fire risk is another thing growers need to be conscious of.

"We're mindful that stripper stubble is standing 800-900mm high and is closer to machinery exhausts. We think pretty carefully about where we put our petrol augers and trucks and our firefighting unit is always close by," he said.

"If we had a really big stubble load we'd think about cutting low for a few laps around infrastructure and houses to reduce risk."

Final thoughts

With continuing advancements in crop genetics and general agronomy, Kelvin says it is hard to say whether they are still seeing real gains with the strip and disc system.

He hopes that good crop establishment with healthy plants gives them a good payback, but admits he would not hesitate to go back to a tyne machine if he felt it was best for business.

“If I was making the decision now, I’m not sure I’d purchase a disc seeder,” he said.

“The engineering of tynes and points has come a long way since I owned one of those seeders and it’s possible I’d get just as good results with a new tyne machine and points than I do with my current disc seeder.”

Kelvin believes most growers are open to trying something new, especially when it opens up other options.

“The disc seeder has been particularly good on our lighter country and, combined with the stripper front, it has given us opportunities to add value in different ways, including by cutting and baling straw to sell and by managing grazing for sheep.

“We noted that sheep tended not to graze through stripper straw, so we used the stripper front on sandy rises to minimise stock traffic and protect that fragile soil.

“If we’ve had a harvest with big grain losses, either mechanical or environmental, then we might bring in some sheep to lightly graze those paddocks and get rid of any grain that will attract rodents.”

Kelvin’s advice for growers thinking about adopting a strip and disc system is to keep their options open as no one size fits all.

“If my property was all heavy clay soils, I probably wouldn’t have bought a disc seeder as they get too sticky and it makes a wet seeding even more complicated.

“We find the disc seeder works well across varying soil types like ours.

“If you want to make a strip and disc system work, you will. However, you need to be prepared for stuff-ups as things will probably go wrong.

“It’s important to do your own trials and be ready to learn along the way.”

An agronomist’s perspective

Michael Brougham from Elders Roseworthy has been Kelvin Tiller’s agronomist for the past 10 years.

He has worked closely with Kelvin looking at pre-emergent herbicide options for his strip and disc system.

“There’s probably only about 10 per cent of farmers in our area using strip and disc systems,” Michael said.

“There’s a perception that it’s the next big thing, but most people are aware there’s challenges and costs associated with it.

“It’s well known that herbicide safety is an issue with disc seeders. We’ve done a lot of trials over the past 10 years with Kelvin in front of his seeder looking at soil types and different parts of the rotation, particularly when a new product comes out.

“We really don’t know what’s safe until we’ve done our own work on-farm.

“Kelvin has Aricks wheels which move just enough crop residue and soil out of the path of the disc that means he gets excellent crop safety and certainty with most of the regularly used pre-emergent herbicides.”

Michael says the pros of a system can only become obvious once it has been in place for a while.

One example of this is the harvestability of lentils.

“In a strip and disc system, you can have a bigger cereal straw load that is flattened after sowing and rolling lentils,” he said.

“Kelvin has a tight wheat-lentil rotation and when you’re reaping lentils with a draper front, it is scraping the ground all day every day.

“With strip and disc, you’re reaping lentils on a big straw load and the header slips beautifully on the straw so there is much less wear and tear on the machine.”

Michael says another bonus of the high straw load is when there is rain at harvest. The straw thatch prevents mud from splashing onto lentils and the plants sticking to the ground.

“The stubble also dries out quicker than mud, so harvest can start again earlier after a rain event,” he said.

Michael says moisture retention in the wheat-lentil rotation is also excellent with the strip and disc system.

“You can’t get any better protection of moisture than stripper front straw laid flat on the ground after sowing and rolling lentils,” he said.

"In some soil types you just can't maintain enough stubble with a tyne seeder. With a disc seeder, you can retain every piece of residue on those more vulnerable soil types.

"That's particularly good for conditions after reaping lentils – you don't have fully exposed soils that are vulnerable to drift.

"High stubble loads can be the clincher that pushes farmers into getting a disc seeder. Erosion is also a major factor in adoption.

"If farmers have erosion and a lot of hectares to get over then a strip and disc system can be a natural progression to retain more stubble, reduce erosion and increase efficiency."

However, Michael believes strip and disc systems are most risky in high-rainfall situations.

"Stripper fronts may not be suitable every year in a high-rainfall areas because they can leave too much residue," he said.

"You really need to find that 'sweet spot' for residues."

Michael says the dry seeding conditions of 2024 meant Kelvin was able to sow wherever he wanted, whereas a lot of the farmers with tyne seeders had to wait for rain as some soils would have drifted if sown dry.

"One thing about disc seeders is they can have reduced penetration in really tight soils," he said.

"If there isn't enough weight on the bar, the seeder just skims on top of the soil surface and the grower can not only end up with seed not in the ground, it's also exposed to herbicides and mice.

"We can also see those effects in compacted areas in paddocks like wheel tracks. If a farmer has a lot of tight soils, they will need to wait for rain with a disc seeder."

Conversely, when conditions are wet at seeding, Michael says growers with a disc seeder do not have as long to sow during the day.

"If it's a dewy morning, the discs can't cut the stubble and a dew at night stops seeding due to blockages so it adds up to shorter sowing days and reduce machinery efficiency," he said.

"Even with a disc seeder, it's still about balancing time of sowing with risks of crop production. Just because you can sow earlier, it doesn't mean you should.

"We had a lot of frost during the 2024 season. Increased stubble loads can increase frost risk by insulating the soil, but if you end up having to cut for hay because the crop is frosted then the paddocks are easy to cut.

"Disc seeders leave the soil surface really flat, no furrows, less stones ripped up so you can get in there with the mower conditioner into a nice flat paddock and there's much less risk of machinery damage."

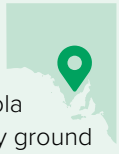
Michael says there is definitely a lot more maintenance involved with disc seeders and that may not suit all businesses in terms of skill set or time available.

"High stripper stubble load also increases insect and mice pressure which requires more monitoring and preventative applications of pesticides to ensure the best crop establishment is achieved," he said.

"Some farmers love the finer detail of something like a disc seeder and make time for maintenance. Others might prefer to spend an extra week at the shack instead."

Paul Bammann, Bammann Ag

Where:	Cleve, SA
Enterprise:	Continuous cropping, mainly wheat-lentil-canola rotation, lupins on sandy ground
Cropping area:	7000ha
Soil type:	15% sandy, 85% red brown earth
Rainfall:	325-390mm
Average yields:	Wheat 3 t/ha; lentils 1.5 t/ha; canola 1.5 t/ha



Moisture conservation and erosion mitigation were the driving factors behind Cleve grower Paul Bammann's decision to switch to a disc seeder in 2010.

"We weren't growing much of a crop on sandy patches, then that crop was cut low in the cereal phase and low again with the break crop phase, leaving the soil quite exposed," Paul said.

"We also wanted to retain more moisture in those areas."

Now entering his fifteenth year with a disc seeder, Paul has noticed a number of benefits and has plenty of advice for growers looking to adopt a strip and disc system.

The equipment

In the early days of using a disc seeder, Paul admits they were flying blind, learning on the go and making plenty of mistakes.

"We did do a few little trials early on. We sowed half a paddock with the disc seeder and the other half with the tyne seeder.

"We didn't see any yield penalty from using the disc seeder — in fact, we actually saw a yield gain.

"The disc seeder worked well but we did run into residue management issues with straw laying on the ground, so in 2020 we bought a stripper front to improve disc seeder performance and increase harvest efficiency."

The Bammanns now run a 12.5-metre bar with NDF SA650 single disc openers on 240-millimetre row spacings. They have three harvesters – two with 42 ft (12.8m) Shelbourne Reynolds stripper fronts and one with a draper front.

"We previously used residue managers on our seeder but sometimes they became problematic and it was just another thing to look after.

"Now that we're running a stripper front, we're getting less hairpinning so it's more viable to use the disc seeder without residue managers."

The benefits

For the Bammanns, a strip and disc system offers multiple benefits including less erosion, increases in harvest and seeding efficiency, less issues with rocks, less dust when spraying and fuel savings both at sowing and harvest.

Paul says they definitely see less erosion on their sandy patches since switching to strip and disc, while they are also getting better crop germination on sandy areas.

"Like most people in the district, we just pick a date to start sowing and we go," he said.

"Sowing dry is better with a disc and we can also take advantage of smaller rain events because there's less soil disturbance.

"In a dry start like 2024, some soils come up hard and cloddy with a tyne seeder which reduces germination. We didn't see that with the disc seeder.

"Soil penetration isn't normally an issue with our seeder – even in drier soils – because we've got enough weight in the bar. I do encourage other people looking into disc seeders to make sure they have enough weight on the bar.

"In a high-yielding year, the stripper fronts are 1.5 times more efficient than the draper in cereals. We've got our own trucks and we also use contractors to transport grain and, if we need to, we will put grain bags down so we can keep headers moving."

"We still use the draper front in lentils and sometimes even in cereals if we want to keep all three harvesters moving."

"Even if we reap cereals with the draper front, we still cut higher and the disc seeder doesn't have any trouble getting through it.

"Seeding efficiency is really good for the size of our bar – we average 16 kilometres per hour.

"We also end up with quite a thatch covering the soil which helps to conserve more moisture. That thatch definitely has a cushioning effect when running header front on the ground reaping lentils – there's a lot less wear and tear."

The challenges

Paul says some of the challenges with his strip and disc system include pre-emergent herbicide safety, mice and the intricacies of a disc seeder.

“We’re definitely more limited with pre-emergent herbicides, particularly in wheat and lentils. There’s some we just can’t use,” he said.

“Early on we did some trials with pre-emergents and worked out Sakura® and prosulfocarb are okay in our system, but for the other common pre-ems the safety wasn’t as good. We get around that to an extent by seeding a bit deeper, which seems to help with crop safety.

“Ryegrass is not too much of an issue any more, but we are seeing a bit of an increase in milk thistle, we’re more limited with pre-emergent herbicides for them in the lentil phase.”

In a high-yielding year where wind damage left a lot of grain on the ground, Paul saw big differences in the paddocks that were reapt with a draper front compared to the stripper front.

“Stripper straw was a much more favourable habitat for mice because they could feed 24/7, protected from predators,” he said.

“Our baiting wasn’t as efficient as it could’ve been because we only had mouse bait with 25 milligrams of zinc phosphide in the shed, but we really needed 50mg baits.”

Final thoughts

While Paul says he is aware of instances where maintenance costs are higher for disc seeders compared to tynes, their machine has been “really good”.

“We go through two sets of discs each season. You have to make sure the discs are sharp and the boots are adjusted right,” he said.

“It is a more complicated system and you can’t take shortcuts or you’ll get burnt. In a way, that’s worked well for us because it keeps us more strict with our maintenance.”

Paul says there’s now quite a few strip and disc systems in the Cleve district, with several neighbours running multiple disc seeders and stripper fronts.

“There might still be a place for our tyne seeder if we need to bring certain pre-emergent chemistry back in at some point, but if we do then we will just be using tynes at a shallow depth.”

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