



Three-course dining on offer for livestock

A pasture cropping system provides Dongara farmer, Keith Tunney, with an expanded production system and essential protection to a fragile landscape. Keith explains the system he has developed to Lucy Kealey.

“My farm, on the Western Australian coast about 3.5 hours north of Perth, is basically a sand dune. Generally the soil is referred to as deep grey sands. I call them gutless sands!” Keith said.

“Grazing is my main business. I run about 500 beef cattle and about 2000 sheep, for lambs and wool. I have tried cropping but the average yield is about one tonne per hectare – for wheat or lupins – and this country is not really suited to annual cropping.

I started a pasture improvement program pretty much as soon as I got here, 13 years ago. The pasture was all annual pasture and not good pasture at that – double-gees, blue lupins, brome and Paterson’s curse.

Now, about half the property is planted to perennials. I have planted subtropical perennial species such as signal grass, Gatton panic and fine Rhodes grass.

I also grow tagasaste (lucerne tree) on 15 metre row spacings in an alley system. There’s more than 400 hectares of country with alleys.

I have planted subtropical perennial grasses up the inter-rows and then I pasture crop over the top of that.

Basically, the livestock have a three-course meal on offer!

key points

- Subtropical perennial species provide feed into summer and respond to early breaks and summer storms
- An over-sown annual crop provides grazing opportunities during winter and the potential of grain harvest, at no detriment to perennial pastures
- Year-round groundcover from the pasture cropping system protects the soil surface from wind and water erosion.

farm info.

Case study: Keith Tunney

Location: Dongara, Western Australia

Property size: 1306 ha

Mean annual rainfall: 450 mm

Soils: Deep grey sands

Enterprises: Grazing – cattle and sheep; some cropping



Photo: Brad Whittle

Inspecting pasture cropping with lupins over perennial grasses at Dongara, WA were (left to right) John McGrath, Keith Tunney (farmer), David Ferris (EverCrop) and Geoff Moore.

Introducing better-suited plants

The carrying capacity when I got here was about 1.0 dry sheep equivalents per hectare. With pasture manipulation using tagasaste and subtropical perennial grasses my stocking rate is now up around 6 DSE/ha.

The lift in carrying capacity is also due to rotational grazing. When I bought the place it had seven paddocks, now it is has 45!

The subtropical perennials provide additional grazing throughout the year. If we get a summer storm, I’ve got feed during summer. If we have an early break, we have feed on hand within 7-10 days. With the annual pastures you are waiting 4-6 weeks after the break just to get a green pick.

The root systems of the perennial grasses go down five metres, and tagasaste has a root system that goes down 10-15 m.

Any fertiliser that leaches through this lovely sand of ours gets recycled. The perennials also pull up any moisture from rain during the season.

The annuals can’t chase any moisture that goes past 100 millimetres. The perennials give me better value from fertiliser and moisture.

The subtropical perennials work well in this gutless sand. They also establish much better than the winter-active perennials. I have tried to get ryegrass established on this country but with no real success.

Because it is non-wetting sand, unless it rains continually for a week or more, it is hard to get new seedlings established.

The other great benefit of these sub-tropical perennials is they are summer-active so they stop the country blowing away.

Value-adding the perennials

I always wanted to plant over the top of the pasture to value-add the perennials. Also, because the sands are non-wetting, there are too many gaps – not enough plants per square metre. So after I got the perennials established, I wanted to fill the gaps economically and without ripping the perennials out. It costs \$130/ha to put them



in, so you don't really want to rip them up the next year.

I designed and built a double-disc opening machine that safely sows through the perennials without disturbing them. I can establish annuals – such as serradellas, ryegrass, oats for feed or sometimes crop.

I have been pasture cropping for about three years now.

Pasture cropping success during 2010

This year I was chasing some lupins for the sheep. I had a 40 ha paddock of perennials I had put in three years ago and I decided to plant over the top of them with Wonga lupins, that I had left in the box.

I set up a trial with Sarah Knight (from the Mingenew-Irwin Group) and the *EverCrop* team from the Future Farm Industries CRC, to work out what sowing rates were best.

We trialled 50 kilograms, 100 kg and 150 kg seed per hectare (see Science behind the Story for results). While the 150 kg/ha rate yielded highest there wasn't as much pasture underneath it.

The rest of the paddock (sown at 100 kg/ha) averaged 1.1 t/ha, which is 0.2 t/ha (one bag to the acre) better than normal.

I increased yield but also, there was a huge volume of feed on offer (FOO) underneath.



Photo: David Ferris

Keith Tunney's cattle took advantage of the plentiful subtropical perennial pasture on offer after the lupin harvest.

I had 200 head of cattle in there for eight days, and they were very happy.

There is still about 0.6 t/ha (three bags) of lupins on the ground, that the header had shattered and thrown out, which is fine because lambing ewes will go in there during March.

In addition to the 40 ha with lupins, more than 800 ha of perennial pasture had Yagan barley sown over it this year. It was put in before the break of season, purely to have fresh feed for cattle and sheep, early in the autumn.

Clear-cut benefits

By pasture cropping this year, I've been able to better my previous crop yields, have the benefit of letting the perennial subtropicals get well established during winter, and I have got a perfect paddock set up for lambing.

In a year where I had 300 mm, when I should have had 500 mm, the paddock is still going to be a winner for me. It has shown that the pasture cropping system still performs in a lean season.

What's more I can put stock in the paddock and the soil is not going anywhere. The perennials will stay there and hold the ground together." 🌱

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science behind the story

By David Ferris and Perry Dolling

- The Northern Agricultural Region (NAR) of WA is dominated by broadacre cereal cropping, based around wheat in rotation with narrow-leaf lupins and canola. The region is highly susceptible to wind erosion, due to a high proportion of sandplain soils, and concerns about the sustainability of continuous cropping are increasing.

Innovative growers, like Keith Tunney, are keen to develop farming systems based on perennial species to minimise the risk of erosion, improve soil fertility and mitigate the impact of variable seasons.

Facilitated discussions with such growers, extension specialists and industry representatives in the region identified subtropical grasses as the most promising option to increase the perennial component on sandplain soils and pasture cropping as a potential system to continue grain production.

Pasture cropping involves planting a winter crop into a living summer-active perennial pasture. Complementary growth periods reduce competition

between crop and pasture species grown together.

The Western Australian *EverCrop* team is working with growers to evaluate the viability of the approach in the medium-rainfall zone of the NAR. However, the systems being evaluated in WA are based on introduced subtropical grasses (panic and Rhodes grass) rather than native (C4) grass species, which underpin pasture cropping systems in the eastern States.

Two broad applications are envisaged:

- For livestock-dominant systems the crop could provide feed to supplement the perennial pasture, with crops 'locked up' and harvested only in years with excess feed.
- For cropping-dominant systems, where feed is a secondary consideration, pasture cropping might stabilise fragile soils, improve soil health and prevent summer weeds from growing.

During 2010, Keith Tunney, Sarah Knight (from the Mingenew-Irwin Group) and the *EverCrop* team established

a demonstration to assess the viability of a lupin crop sown over a subtropical perennial pasture and the influence of lupin sowing rate on grain yield.

The crop yielded 0.6 tonnes per hectare where sown at 50 kilograms/ha, 1.1 t/ha where sown at 100 kg/ha, and 1.4 t/ha where sown at 150 kg/ha. There was also an added bonus of about 2 t/ha green feed available for Keith's cattle after harvest!

These results highlight the potential for pasture cropping in WA; however, it is early days and further work across a range of sites and seasons is needed.

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