sustainable agriculture

Pasture Cropping: an option for marginal land

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Pasture cropping is the sowing of winter cereal crops in rows between summer active perennial pastures as a means of integrating livestock and cropping enterprises to the benefit of both systems. The theory of pasture cropping is that livestock graze the pastures during summer and autumn, and the cereal crop during winter and early spring, then they are removed so the crop can regenerate and the grain harvested with minimal trade-off in yield. The system takes advantage of the different seasonal growth patterns of the summer-active perennial pastures and the winter-active crops (Figure 1). Often a herbicide is applied to the pasture before seeding to render it dormant until the crop is harvested, thus reducing competition between the pasture and crop and associated decreases in grain yield.

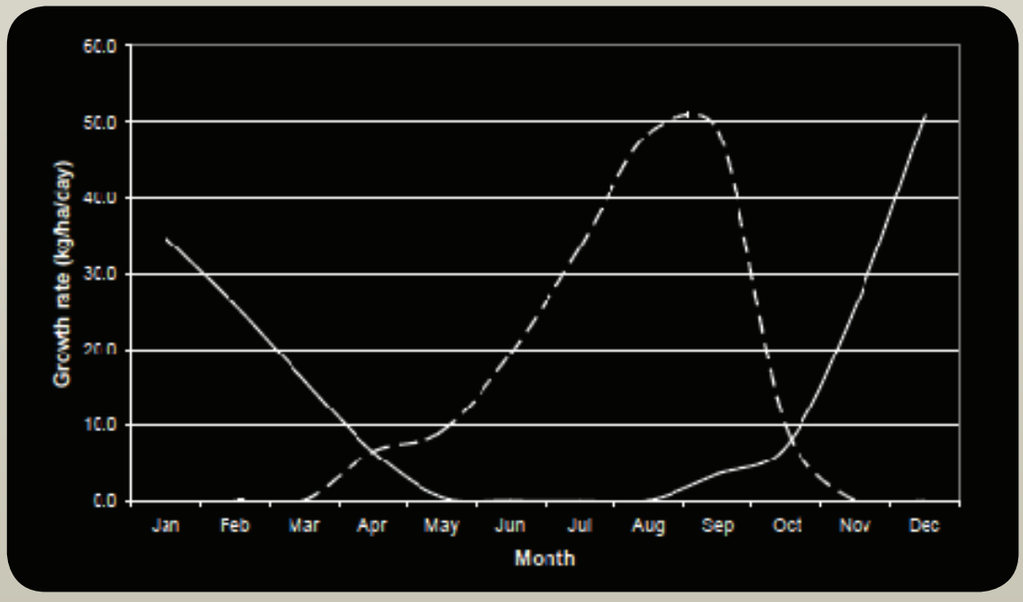

Figure 1: An example of the complementary growth patterns of a perennial grass (solid line) and an annual cereal (dashed line). Source: NSW DPI Primefact 875/2009 'Pasture Cropping'.

Advantages sought from pasture cropping include the management of seasonal risk, through diversifying land use, production of green feed over summer, and options for managing marginal soils, through maintaining protective ground cover throughout the year. The pasture component benefits the cropping system through improving soil health and stability, and preventing growth of summer weeds. From a livestock perspective, inclusion of the cropping component provides feed early in the season to supplement the perennial pasture. To make adoption of a pasture cropping system worthwhile, the extra green feed produced in summer and autumn must result in increased livestock production (higher stocking rates) to a level that offsets any resulting losses in grain production.

What they do in the east

The application of pasture cropping in the Eastern States has been thoroughly researched. Generally the perennial pasture used in the system is lucerne, as it is of high nutritive value, and as a legume it also adds nitrogen to the soil, however in the Central West of NSW and the Mallee regions of SA and VIC farmers have been sowing winter cereals directly into pre-existing native perennial pastures, such as Red grass and Warrego summer grass. Utilising native pastures means that input costs of re-sowing introduced pastures are reduced. Farmers have reported little decrease in grain yield, while observing an increase in pasture seedling growth, improved soil fertility and less dependence on fertiliser inputs for the same production level, which have all resulted in improved production and profitability.

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What is working for WA?

The Future Farm Industry CRC's EverCrop project is exploring the potential value of pasture cropping as a viable system on the sandplain soils of the northern agricultural region in WA, substituting lucerne with the subtropical perennial grasses Rhodes grass (Chloris gayana) and Gatton panic grass (Megathyrsus maximus), which have proven to be productive pastures in this area. A perennial legume called Siratro is also being trialled as an alternative pasture.

In 2008 trial plots of Gatton panic, Rhodes grass and Siratro were established in Moora. Buloke barley was intercropped across the perennial plots in 2009. At a nitrogen fertiliser rate of 50kg/ha, pasture row spacing of 36cm and crop row spacing of 18cm, differences in barley yield between pasture crop plots compared to the crop-only control plots were negligible (Table 1).

Table 1: Yield (t/ha) of barley sown over differing treatments

Treatment	Yield (t/ha)
Control- barley	2.8
Siratro	2.9
Rhodes Grass	2.6
Gatton Panic	2.6

In terms of pasture production, dry matter available six weeks after harvesting in the pasture cropping plots of Siratro, Gatton panic grass and Rhodes grass at the same fertiliser rate and row spacings as above were similar to the permanent pasture control plots (Table 2).

Table 2: Pasture dry matter (t/ha) available six weeks after harvesting

Perennial pasture species	Dry matter in pasture crop (t/ha)	Dry matter in control pasture (t/ha)
Siratro	0.25	0.13
Gatton panic	0.82	0.72
Rhodes grass	2.61	2.52

Is it viable for the Avon Basin?

The WA wheat belt differs from the Eastern States areas where pasture cropping has been successfully implemented, not just in term of rainfall patterns, but also in soil types, native pasture species and farming systems. The viability of pasture cropping in WA will be limited by the ability of farmers to establish a summer active perennial pasture base, as the pasture provides the backbone to the system. While early trials have demonstrated the integration of pasture cropping in the northern agricultural region, this is an area with sufficient summer rainfall to allow perennial pastures to persist. It remains to be proven if the practice is viable in other areas with less summer rainfall, and better soils types where crop yield penalties may be higher.

A Wheatbelt Natural Resource Management (WNRM) program, Soil Conservation Incentives Program (SCIP) is aimed at the widespread adoption of farm practices that maintain and improve soil quality; in particular the program attempts to address threats to the soil including wind and water erosion, soil acidity and soil carbon. As part of this program there are growers within the Avon Basin that are trialling summer active perennial grasses to determine whether there is the potential to practice pasture cropping on their marginal land. These grower trials are in the early stages but in some instances it looks promising.

To find out more about Pasture Cropping visit www.wheatbeltnrm.org.au or visit the Future Farm Industries CRC website: www.futurefarmonline.com.au/ and search 'Pasture Cropping' or contact David Ferris: david.ferris@agric.wa.gov.au.

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