



Perennials perform well on WA's south coast

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ABOVE: The ability to provide green feed during summer cement's lucerne's role in productive livestock systems on WA's south coast. (Photo: Paula Jacobsson)

The latest results from the **EverGraze® – More Livestock from Perennials** Western Australian Proof Site are a testament to the project's adage 'Right plant, Right place Right purpose'.

Even under drought conditions perennials have proven their worth in terms of, productivity and persistence.

WA **EverGraze** Proof Site Leader Paul Sanford said trials in the high-rainfall farming systems of the WA south coast set out to test whether profits from Merino ewes mated to terminal sires could be increased by boosting the weaning percentage and introducing perennials.

"The project also aimed to improve environmental outcomes through reduced groundwater recharge and improved groundcover," Paul said.

The focus of the research was a 60-hectare Proof Site located on Rodney and Bernadette O'Meara's property at Wellstead, 100 kilometres east of Albany, WA. The site is typified by sandy soils, with an average annual rainfall of 550 millimetres.

Pasture types consisted of kikuyu* (Whittet), lucerne (SARDI 10), summer-active tall fescue (Quantum Max P), chicory (Puna) and setaria/panic (Splenda/green panic) each combined with annual species such as subterranean clover. Merino ewes grazed the site and were joined to Poll Dorset rams – with lambing during July.

Modelling the outcomes

"Before the research started, we carried out detailed computer modelling to determine the optimum mix of annual and perennials

at the site and the likely returns from using perennials compared with all annual pastures," Paul explained.

The modelling revealed that under average seasonal conditions, the most profitable option would be to combine perennials with annuals on 70 per cent of the farm. Under this scenario, perennials were predicted to increase profits by \$50/ha compared with annual-based pastures (see Table 1).

Later, the profitability of the perennial system was also modelled for a range of seasons including dry and wet years in addition to the average season.

Between 2006-08, researchers took detailed measurements of pasture production, composition, quality and persistence at the site and measured animal performance.

key points

- Latest **EverGraze** results from south coast Western Australia pitted a combination of perennials and annuals against annuals only for profitability, productivity and persistence
- Computer modelling predicted perennial pastures would out-perform annuals in all but the driest of years
- Under drought conditions perennials still proved their worth and of the species trialled, kikuyu came up trumps for productivity and persistence.

Table 1. Predicted profits based on pasture and animal measurements

Season	Rainfall (mm)	Pasture type	Profit (\$/ha)	Profit difference as a result of perennials (\$/ha)	Optimum % perennial pasture
Pre-experimental modelling assuming average seasonal conditions					
Average season	600	Annual	32	–	–
		Perennial	82	50	70
Profit results based on modelling pasture and animal data					
Dry seasons	378	Annual	-97	–	–
		Perennial	-89	8	30
Average seasons	524	Annual	78	–	–
		Perennial	114	36	40
Wet seasons	646	Annual	230	–	–
		Perennial	302	72	20

Weed Risk Note: Kikuyu has a high weed risk in WA, NSW and SA. Any system considering kikuyu should consider the potential risk to other values. In particular, assess whether natural vegetation is at risk. A kikuyu Management Guide is in preparation.

“The measurement period coincided with a period of severe drought, with rainfall of 290, 333 and 427 mm compared with the long-term average of 550 mm,” Paul said.

“It is important to note the economic analysis from the Proof Site is in broad agreement with the modelled dry season.”

On-the-ground results

The modelling predicted perennials in an average season would increase profit compared with annual pastures. However under the drought conditions experienced, the estimated profitability of perennials and annuals was similar.

According to Paul, the benefit of perennials to a producer's bottom line during a dry year is marginal.

“The perennial advantage during summer and autumn over annuals is reduced due to lack of moisture,” he said.

The losses for both perennial and annual pastures in the region, and limited benefits from perennials, is in line with local producer experience during the past three years.

“Based on the information collected at the site and modelling, we now suggest the optimum perennial area on a farm in this region is 20-40%,” Paul said.

Despite tough seasonal conditions, per-head performance of the ewes mated to terminal sires was high, with weaning rates averaging 120%, weaning weights about 26 kilograms and fleece weights of 4.4 kg/hd greasy. Lamb turn-off averaged 201 kg liveweight/ha.

However, stocking rates were lower than predicted, and had to be reduced from 13 dry sheep equivalents per hectare in early 2007 to 8DSE/ha by 2008 due to drought.

“However, our modelling predicts perennials will be more profitable than annuals during average and wet seasons, by \$36 to \$72 per hectare respectively,” Paul highlighted.

“Perennials can provide pasture growth and green feed during summer when soil moisture is adequate. Annuals finish in spring and only provide dry feed outside the growing season.”

Pasture performance

All perennials, except kikuyu, were grazed rotationally.

“Kikuyu is best managed under set stocking, but species such as lucerne, chicory, and tall fescue require rotational grazing to allow the rest period critical to their persistence,” Paul explained.

Kikuyu, lucerne, chicory and setaria/panic persisted well throughout the trial period, despite the dry conditions (see Table 2).

“However, the summer-active tall fescue did not persist despite being spelled from grazing during summer and autumn,” Paul revealed.

“The summer-active types of tall fescue are unsuited to the deep sands and variable rainfall of this region. However, results from

Table 2. Pasture growth and basal cover of different perennials at Wellstead

	Year	Kikuyu	Tall fescue	Lucerne	Chicory	Setaria panic	Annual pasture
Pasture yield (tDM/ha)	2006	5.4	4.1	3.9	2.2	1.4	4.0
	2007	4.5	1.2	3.2	2.7	2.3	3.3
	2008	4.6	2.2 ^a	5.4	2.4	2.3	3.4
	TOTAL	14.5	7.5	12.5	7.3	6.0	10.7
Basal cover (%)	2006	84	3.7	1.4	2.7	1.0	—
	2007	85	0.0	0.3	2.6	4.0	—
	2008	97	4.2 ^a	0.3	2.9	5.0	—

^a resown tall fescue

an *EverGraze* satellite site in the area suggest winter-active tall fescue is persistent during drought as a result of its summer dormancy.”

“In contrast, summer-active tall fescue persisted well on heavier soils with higher rainfall on the west coast of WA and at eastern Australian *EverGraze* sites.”

Kikuyu pasture produced 35% more dry matter than the annual control pasture, demonstrating its drought tolerance and ability to grow and provide green feed during summer and autumn.

During 2008, lucerne had the highest production due to strong growth during summer. Throughout the three years, the area of lucerne sown contracted most likely due to soil constraints. The best of the lucerne maintained plant density throughout the trial, illustrating the importance of site selection.

Chicory yield was lower than the most productive pastures due to a lack of companion annual species to provide winter pasture growth. Particular attention needs to be given to establishing sub-clover and temperate grasses to fill the winter feed gap in chicory pastures. Chicory had the highest forage quality (average 11.2 megajoules/kg and 18.4 % crude protein) so is well suited to young stock during summer and autumn.

The setaria and panic pasture was sown on the poorest soils at the site and so yield was constrained by soil conditions. However, their drought tolerance, particularly that of panic, is very good.

“The results suggest these subtropical grasses have a lower yield potential under sheep grazing than kikuyu in this environment,” Paul said.

Right plant, Right place, Right purpose

The results from the research highlight the importance of matching plants to soils and landscape and thinking carefully about their intended purpose and management.

‘Kikuyu is King’ on the WA south coast according to Paul. “It is robust, can handle set stocking, survives dry years and provides groundcover and green feed during summer.

“It responds to summer rain and fits well with sheep systems on the south coast.

“Furthermore, kikuyu will maintain sheep through autumn, allow higher stocking

rates and reduced supplementary feed requirements.”

Paul does concede that lucerne provides a highly nutritious feed for livestock during late spring through to autumn.

However, it is only suited to particular soils (soil pH(CaCl₂) > 5) and rotational grazing is essential for persistence.

Chicory's persistence was surprising and the Wellstead experience shows it is drought tolerant. While yield was lower than other species, it provided high-quality forage and when used correctly to finish lambs or to flush ewes before joining, has a purpose on many farms in the region.

“The important thing is to plant chicory with a winter-active species,” Paul advised.

“In contrast, summer-active tall fescue was not the right plant for the region but is suited to heavier soils in higher-rainfall areas.”

Looking to the future

EverGraze in WA is moving to measure the on-farm benefits of perennials at four locations from Manjimup to Esperance. At each site, researchers will measure pasture and animal performance on annual and perennial pastures under typical farming conditions. The measurements will provide a better idea of the likely benefits of perennials in different soil, climate and grazing situations.

In addition, *EverGraze* has 10 on-farm Supporting Sites where producers are measuring their pastures and animals.

Paul would like to acknowledge the team involved with this research, Eric Dobbe, Paula Jacobsson, Elysha McCready, Jeremy Ryan, Andrew Bathgate and John Young. Details of these sites, current results, farm case studies and fact sheets detailing the management and use of perennials are available the *EverGraze* website www.evergraze.com.au.

EverGraze® is a FFI CRC, MLA and AWI research and delivery partnership. ↓

More information

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