

Alternate forage crops for Southern WA

Is there value in millet compared to barley in filling current farming systems summer feed gaps in HRZ of Western Australia?

With the limited availability of feed in the autumn and early winter seasons, and the increase in frequency of summer rainfall, there is an opportunity for producers to take advantage of such events to contribute to filling feed gaps in their farming systems. This producer demonstration site looks to compare millet and barley to determine the effect on feed value, stocking rates and live weight gain of prime lambs in the high rainfall zone (HRZ) of Western Australia.

Over two years (2020/2021), a total of 210ha of barley stubble was grazed with 620 lambs. Results were compared to 880 lambs grazing a total of 170ha of millet on a property in Green Range, Western Australia.

"The millet was sown (2021) in optimum conditions and received 30mm of rain in week one. Unfortunately, only another 17mm was received for the following 5 weeks before grazing," Ryan Smith said.

Due to the seasonal conditions across both years, the millet growth was highly variable and showed signs of heat and moisture stress before grazing. This resulted in a much greater biomass of barley, averaging 3.4t/ha compared to the millet at 1.4t/ha.

A benefit of the millet crop, however, is its fast growth and high yield along with its ability to germinate at soil temperatures of 15°C. Millet's ability to germinate at lower soil temperatures is important because it allows producers to sow earlier than other summer crops. By sowing millet earlier, producers can utilise greater soil moisture leading to earlier growth and biomass.

The environmental factors recorded over the two years reflect the changing environment in the region, one which producers must adapt to, to keep up with demand.

"Summer rainfall in our area is happening more frequently. In 2021 alone we had over 90ml of rain over January to the start of March," Ryan said.

There is an opportunity for producers to take advantage of the shifting seasons and utilise the summer rainfall events to their advantage.

Is alternate admissible?

Over the two years, not only were Shirohie millet's nutritive values higher (Table 1) when compared to the barley stubble, but in year one the average daily gain (ADG) was over double that achieved by the barley (Table 2), despite poor seasonal conditions.

Table 1: Nutritive Value analysis of forages over the two years.

NV Analysis	Barley stubble		Millet	
	Year 1	Year 2	Year 1	Year 2
Crude protein (% DM)	2.7	3.2	21.0	11.1
Digestibility (DMD - %DM)	43.4	47.9	81.3	66.3
Est. Metabolisable Energy (MJ/kg DM)	7.2	7.8	13.6	12.5

Table 2: Stocking rates and weight gain of lambs grazing millet and barley stubble over the two years.

Description	Barley stubble		Millet	
	Year 1	Year 2	Year 1	Year 2
Stocking Rate (lambs/ha)	3.7	2.0	5.6	3.8
Weight gain (Avg Kg) per lamb	3.6	6.1	7.6	4.9
Average weight gain (grams/head/day)	7.2	7.8	13.6	12.5

It is interesting to note that at the completion of the 42-day grazing period in Year 1, the total live weight gain per hectare was higher for the millet (18.4kg of liveweight/ha) compared to 12.2kg of liveweight/ha for the barley stubble, despite individual animals growing more on the barley (Table 3). This was able to occur due to the higher stocking rate and feed quality



Table 3: Cross-bred lamb liveweight gains and calculated profit over the two years.

Description	Barley stubble		Millet	
	Year 1	Year 2	Year 1	Year 2
Total weight gain (kg lwt/ha)	13.2	12.2	42.2	18.4
Average weight gain (grams/head/day)	120.0	145.2	253.3	116.7
Profit (calculated per ha)	\$117	\$79.6	\$176	\$42
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in the millet.

Is it financially viable?

For Year 1 there was quite a profit from both forages, with the millet producing 50% more profit per ha (\$176/ha). In year 2 the millet generated revenue of \$132/ha compared to the barley stubble at \$79.60/ha. However, once additional costs associated with planting the millet crop (\$90/ha) are considered, and with barley costs at zero as the cropping enterprise has already paid for the costs of growing it, total profit was \$37.60/ha higher for the barley stubble compared to growing millet over the 2021/22 summer (Table 3). In conclusion one year millet was more profitable and the other year the barley stubble.

"It was a very dry summer (2021/2022) which limited the potential millet growth. In a better year, the biomass would have been greater and so the revenue generated would have been higher."

Summer Cropping requires producers to consider the risks and rewards, and this study aims to help local producers consider their options in future years.

At the conclusion of the study, the Smith's have recognised the importance and use of alternate forage crops to fill the feed gap on their property. They will, however, look to try a more drought and heat-tolerant species compared to millet in the future.

"Even optimistic summer cropping producers should ensure they have significant soil moisture before planting summer crops," said Ryan.

This Producer Demonstration Site was funded by Meat and Livestock Australia, delivered by Stirlings to Coast Farmers, with technical support from consultant Lucy Anderton for economic analyses.

Takeaway messages for producers from the PDS include:

- The summer crop (millet) had a higher nutritive value than the barley stubble, with a higher crude protein, digestibility and metabolisable energy.
- Despite the environmental stress, the millet had an average daily gain (ADG) of 253g/head, which was over double the 120g/hd/day achieved by lambs on barley stubble during year one.
- There was a much greater biomass in the barley stubble, which averaged 3.4t/ha compared to 1.4t/ha of millet.
- Millet growth was highly variable and showed signs of heat and moisture stress before grazing.

