Modelling Report

Upscaling the Savernake pasture species demonstration site

Lucerne vs. Volunteer annual ryegrass: Impact on productivity, profitability and drought resilience.

To upscale the demonstration sites that were established by a consortia of project partners, Susan Robertson (Charles Sturt University) used GrassGro software to compare different practices using representative enterprise details for the region. This document contains key take aways from the upscaling of Riverine Plains pasture species demonstration site at Savernake, NSW.

This model was developed based on a First Cross ewe and November joining (April lambing) enterprise.

The Savernake pasture species model

The species simulation aimed to answer; 'does increased perenniality (Lucerne) increase productivity, profit and resilience to drought compared with annual pasture?'

The model revealed a distinct advantage of lucerne in extending the growing season. Lucerne can be seen to demonstrate significantly higher pasture growth rates from mid-spring through to early winter, effectively prolonging pasture productivity (Figure 1). In contrast, volunteer annual ryegrass exhibited a decline in productivity during this summer period, revealing that rotationally grazed lucerne supported higher stocking rates than the volunteer annual ryegrass.

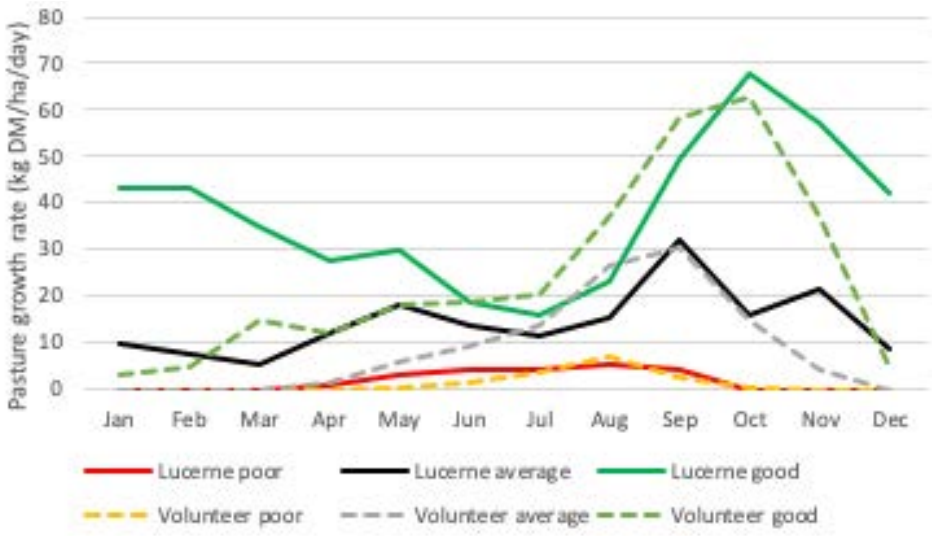

Figure 1: Mean monthly pasture growth rates for volunteer ryegrass and rotationally grazed lucerne pastures in poor, average and good seasons at Finley 1970–2019 (Robertson, 2024).

This project received funding from the Australian Government's Future Drought Fund

Maintaining ewe condition during pregnancy is pivotal for maximising lamb survival, and therefore, overall enterprise productivity. For the April lambing enterprise, as shown in Figure 2, the monthly mean condition score of ewes was maintained at a greater level year-round for ewes grazing lucerne, compared to volunteer annual ryegrass. However, the modelling identified a rapid decline in the condition score of ewes during pregnancy grazing on both the volunteer ryegrass and lucerne pastures. This emphasises the importance of supplementary feeding to maintain ewe condition when pregnant over summer through to lambing in autumn.

The mean gross margins for volunteer annual ryegrass trailed behind lucerne, driven by increased feed costs and lower lamb sale weights. Volunteer ryegrass incurred negative gross margins in drought years due to these elevated feed expenses required for First Cross ewe maintenance. In contrast, lucerne maintained positive gross margins during drought, due to higher income from the sale of sheep. Figure 3 represents the cumulative gross margin over time, with results highlighting a large financial benefit in grazing First Cross ewes on lucerne pastures. This modelling showed lucerne pastures consistently outperformed ryegrass in ewe and lamb growth, resulting in higher income during average and good seasons. Overall, lucerne was shown to outperform volunteer annual ryegrass across all seasons.

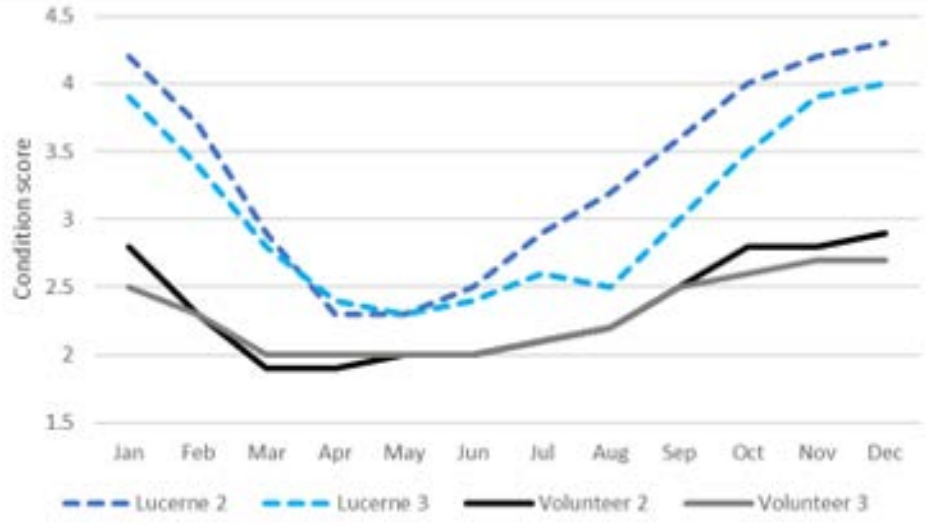

Figure 2: Monthly mean condition score of ewes in average seasons (50th percentile) for a First Cross ewe enterprise grazing volunteer ryegrass or lucerne pastures at different stocking rates (2 or 3 ewes/ha) (Robertston, 2024).

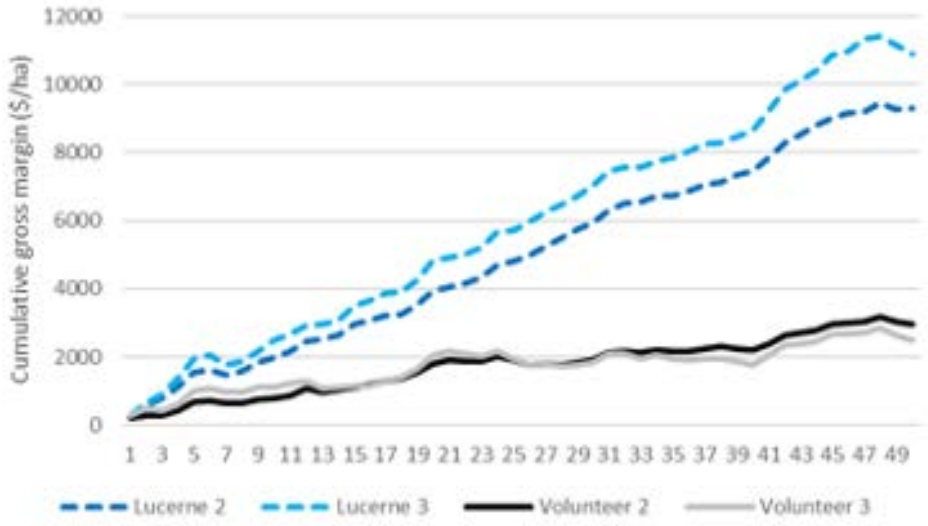

Figure 3: Cumulative gross margin ($/ha) for a First Cross ewe enterprise grazing volunteer ryegrass or lucerne pastures at 2 or 3 ewes/ha (Robertson, 2024).

Key messages

- Lucerne is a valuable temperate perennial legume pasture capable of producing high-quality feed for stock from spring to autumn.
- To support persistence, lucerne cultivars and sowing rates should be carefully selected to achieve target plant densities and productivity for the given farming system. This selection should also take into consideration the regions climate which includes annual rainfall and temperature patterns.
- Well-managed lucerne pastures serve as valuable assets for enhancing livestock farmer's drought resilience.
- Pasture species with a longer growing season may reduce the need for supplementary feed and support higher stocking rates or promote greater weight gain in sheep.

Sophie Hanna and Chantelle Gorman assessing the root structure of the lucerne site

For more information

Details about the demonstration sites, as well as the results, are published in Research for the Riverine Plains, 2024.

riverineplains.org.au

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The information presented in this fact sheet is derived from Grassgro modelling conducted by Susan Robertson (CSU).