

Legume production paddocks improve dry season diet quality and animal performance on fertile soils in north Queensland

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Introduction

Beef cattle production in the seasonally dry zone of north Queensland is based on uncleared native grasslands with significant nutrition deficits during the dry season (Rolfe *et al.*, 2016). Targeting improved dry season nutrition of weaners and steers, DPI researchers and Meat and Livestock Australia, are scaling-up research to commercial size paddocks after demonstrating the potential for shrub legume (e.g. stylo) and leucaena production paddocks in north Queensland (Cox *et al.*, 2025).

Methods

Commercial scale demonstrations were established on two properties to compare average daily gain (ADG) and diet quality in two production paddock systems: Site 1 - 65 ha Redlands hybrid leucaena in a run-down Buffel paddock (2 cohorts of 40 450-500 kg steers) compared to 280 ha native grass-Buffel (2 cohorts of 150 and 120 225-425 kg steers), both on alluvial soils. Site 2 - 6 ha Caatinga stylo and butterfly pea in black speargrass woodland dominated by Indian couch and grader grass (6 heifers averaging 227 kg/hd) compared to an adjacent large undeveloped paddock (cow & calves), on a red basalt soil. Both sites have soils with high available P, low S and 700-800 mm annual rainfall. Both were intermittently grazed, but the results presented below are for extended periods of continuous grazing. ADG was measured using Optiweigh™ at site 1 and individual weighing at site 2. Regular FNIRS testing was used to assess diet quality. The same dry season supplements were used at each site.

Results

Dry season diet quality (crude protein (CP) and metabolisable energy (ME) was significantly higher in the legume paddocks compared to native pastures (Table 1). Leucaena leaf was produced most of the year at site 1 and comprised a high component of the diet (50 to 100%). Diet quality in the stylo paddock at site 2 declined as the availability of legume declined but increased once pasture growth resumed after December rainfall. Higher dietary quality translated into higher ADG in the legume paddocks at both sites.

Table 1. Range of diet quality and liveweight gain of cattle grazing different paddocks (2024-25).

Site/Grazing system	Grazing period	Grazing days	ADG (kg/day)	Number recorded	FNIRS frequency	Dietary CP (%)	Dietary ME (MJ/kg DM)
1/Leucaena	3/4-25/6	84	1.02	24	6-7 weeks	12.7-13.3	8.1-8.6
1/Native grass	10/4 – 25/6	77	0.45	9	6-7 weeks	5.9-9.4	7.2-7.9
1/Leucaena	25/7-7/11	105	0.15	19	6-8 weeks	6.6-12.7	6.7-8.4
1/Native grass	25/7-7/11	105	-0.43	20	6-8 weeks	2.2-4.4	5.7-6.4
2/Stylo	1/9-29/1	150	0.29	6	8-10 weeks	3.9-11.3	5.7-7.7
2/Native grass	1/9-29/1	150	-	-	8-10 weeks	3.2-9.5	6.0-8.0

Discussion and conclusion

These results support earlier research on the development of perennial legume-based production paddocks to improve diet quality and animal performance in the dry season. The use of these systems should enable producers to also reduce dry-season nitrogen supplementation.

References

Cox *et al.*, (2025) Proceedings of the International Rangelands Congress, 2-6 June, Adelaide SA.
Rolfe *et al.*, (2016) Australian Rangelands Journal 38(3) 261-272.

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