Silvopastoral establishment provides insight into animal production

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Introduction

One of the silvopastoral system (SPS) establishment trials for the Steak 'n wood (Future Beef 2023) project commenced in 2021 at Brian Pastures Research Facility (BPRF), located near Gayndah in south-east Queensland. The project aims to quantify the co-benefits of SPS, relative to open pasture (OP), such as the productivity of livestock, improved animal welfare, improved on-farm biodiversity, carbon sequestration, enhanced land use and income diversification.

Methods

Three, 5 ha paired sites containing mostly native pastures with some improved pastures are grazed on a 4-week rotation utilising commercial Droughtmaster steers (initial weight, 170kg–220kg). With the establishment of the SPS, the land area was reduced to 4 ha with electric fencing to provide protection to the growing trees. Grazing pressure for the 2 systems was determined using an initial forage budget (6 head SPS and 8 head OP). Forage budgets at the beginning and end of paddock rotations, measure changing biomass of both systems. The steers are weighed, body condition scored, and hip height measured. Additional measurements include pasture yield and quality and faecal near-infrared reflectance spectroscopy.

Results

Table 1 demonstrates the comparison of SPS to OP for the first 2years of the trial.

Table 1. Two-year comparison of Silvopastoral system (SPS) vs open pasture (OP)

	Open pasture		Silvopastoral system	
Period	2023/24	2024/25	2023/24	2024/25
Carrying capacity (ha/hd)	1.9	1.9	2.5	2.5
Average LWG (kg/hd/day)	0.66	0.64	0.62	0.66
Beef production (kg/ha/year)	128	124.4	90.6	96.4
Emission intensity (kg/CO2e/kg LW)	9.1	9.3	10.1	10.2
Cattle emission (t CO2e/ha/year)	1.07	1.15	0.91	0.98
C sequestered by trees (t CO2e/ha/year)	N/A	N/A	1.2	3.7

Discussion and conclusion

The establishment of Silvopastoral systems had minimal effect on individual animal performances average daily gain and beef production (kg LWG/ha). A hectare difference in paddock sizes for the SPS, had a total kilogram of beef produced difference as expected with 2 less animals grazing SPS.

With exceptional growing seasons since the beginning of the project, the hardwood timber species have reached an optimal height and diameter to enable the protection of the electric fence to be removed. This provides an opportunity to better understand how cattle interact with each system. Using smart tracking collars and rumen bolus, the project is collecting data on cattle movement patterns and behaviours, rumen temperature, and drinking bouts and frequency in both SPS and OP treatments. These measurements will help to explain the average weight gains of the SPS steers, especially focusing on the warmer months. Year 4 will see the experiment on a level playing field with 5 ha paddocks and 8 animals in each treatment.

References

FutureBeef 2023, *Steak 'n wood: demonstrating livestock productivity and environmental service benefits on trees on farm in northern systems*, viewed 8 October 2025, https://futurebeef.com.au/resources/steak-n-wood/

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