

Sowing seeds of legume success in Central Queensland

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Introduction

Establishing perennial legumes into tropical grass pastures increases the productivity and profitability of beef businesses in Northern Australia. However, to achieve these benefits an initial establishment of at least 4 plants/m² is required. Under central Queensland conditions, reliable legume establishment is achieved through fallowing to store soil-moisture prior to sowing, obtaining a fine-but-firm seed-bed that is weed-free, planting an adequate rate of high germination seed and lightly covering or rolling to achieve seed-soil contact at the wettest time of year. This paper summarises the agronomic practices used to achieve successful legume establishment at 9 field trial sites across central Queensland in 2025.

Methods

Trial site locations were selected to cover the variety of soil types (sandy-loam to heavy clay), and average annual rainfall (500–900 mm) and mean minimum winter temperature (6–13 °C) gradients across central Queensland. All sites started as perennial grass-pastures and were fallowed between 5 and 18 months to accumulate soil-water prior to sowing and break down organic matter. Most sites were cultivated (with implements such as offset disc ploughs) and some were also sprayed with herbicide. After the desired seedbed was prepared and approximately 250–700 mm of accumulative rainfall was received over the fallow period, planting commenced in February 2025. All sites were initially rolled with a Cambridge ring roller to reduce clods, or to increase seedbed firmness. Seed was broadcast on the surface then rolled again to improve seed-soil contact. Bare stylo (*Stylosanthes spp*) legume seed with an average germination of 37% (range 12–60%) was sown at 2.1 kg/ha. Herbicide was applied after sowing at all sites to control grass and broadleaf weeds during the initial establishment phase. Between 3-5 months after sowing, plant density (plants/m²) was assessed. Challenges encountered during the establishment process were recorded.

Results

All sites established successfully with an average legume plant population of 11.3 plants/m². Low populations occurred where less germinable seed was applied. Challenges encountered included reducing the high starting pasture biomass and background pasture and weed-seed populations. This was managed through multiple cultivation and herbicide operations in the fallow period and some in-crop herbicide applications after planting. The main seed germination event occurred within about 5 weeks from planting, with some sites receiving high rainfall totals (around 280 mm) whereas other sites had lower rainfall totals (around 90 mm) over the same period.

Discussion and conclusion

Successful legume establishment at 9 trial sites on a range of soil types and rainfall conditions demonstrates the value of good agronomic practices to achieve a plant density of over 4 plants/m². The process of 1) fallowing to store moisture and control weeds, 2) cultivating to prepare a seed bed, 3) rolling for good seed-soil contact, 4) sowing high germination seed and 5) spraying to control in-crop weeds reduces the risk of a failed establishment in summer-dominated rainfall environments (Peck et al, 2015). Despite this process being conducted on small areas for research trials, these principles are equally applicable, and successful, in commercial sized situations.

References

Peck et al., (2015). Proceedings of the 17th ASA Conference, Hobart, Australia.

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