

Spatial analysis of legume suitability in Queensland

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Introduction

Pasture legumes are recognised as the best long-term management option for increasing productivity and profitability from pasture-based production systems for large areas of Queensland. However, the land area that is suitable for pasture legumes across Queensland has not been well quantified. This study is currently underway to quantify the area that is suited to the most widely suitable and used pasture legume species using updated spatial data including land resource and long-term climate mapping, compared to trial results and commercial experience of where legumes are suited.

The results from this spatial analysis of where legumes are suited will be compared to a spatial survey and analysis of where legumes are established and naturalised, combined with an economic analysis to quantify the potential value of more widespread adoption of pasture legumes to the beef industry as part of the Queensland Pastures Resilience Program (QPRP).

Methods

Five legume species were identified as being the most widely adapted and therefore most likely to have a large potential impact on beef production in Queensland. The 5 legume species assessed were *Desmanthus* (*Desmanthus virgatus*); *Caatinga stylo* (*Stylosanthes seabrana*); *Shrubby stylo* (*Stylosanthes scabra*), *Caribbean Stylo* (*Stylosanthes hamata*) and *leucaena* (*Leucaena leucocephala*).

The spatial analysis compared research results with commercial experience of where legume species are productive and persistent, with mapping layers of landtype (soil and topography) and climate data (rainfall, frost, seasonality of rainfall). Soil and topography limitations were assessed using the Grazing Land Management (GLM) land type descriptions and mapping and rated for species suitability. Climatic limitations were defined using rainfall and frost spatial data.

The spatial analysis is still being developed at the time of writing this paper. The spatial assessment of land suitability is being developed in consultation with regional experts to ensure land suitability ratings are regionally accurate. Results from the analysis will be reviewed across Queensland to develop regionally appropriate recommendations.

Proposed results

The output from the spatial analysis will be 3 regional maps (southern, central and northern Queensland) highlighting areas that are 'suitable' (suitable with negligible or minor limitations), 'moderately suitable' (suitable with moderate limitations), and 'unsuitable' (unsuitable with severe to extreme limitations) for the 5 legume species. The spatial analysis results will be compared to a spatial survey of where legumes are already established to identify how large the legume adoption opportunity is for the beef industry. The spatial survey will assist graziers and farm advisors to assess the suitability of key legume species to their situation.

Discussion and conclusion

This work is part of a broader effort to quantify the pasture legume opportunity in Queensland by comparing the area of land currently established with legumes (roadside survey) to the potential area suitable for legumes (spatial analysis) and their estimated economic value (\$/ha). Combined these three datasets can help identify opportunities for growth in the Queensland beef industry.

This project will inform extension programs on where targeted education and awareness activities on establishment and best management of pasture legumes can have the greatest impact.

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