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Wynn-dow of opportunity—reversing Wynn cassia dominance at Spyglass Research Station

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Abstract

Maintaining a desirable grass–legume balance is critical for sustaining pasture productivity and livestock performance in northern Australian grazing systems. At Spyglass Beef Research Facility, Queensland, paddocks sown with buffel grass (*Cenchrus ciliaris*) and Wynn cassia (*Chamaecrista rotundifolia*) have substantially changed composition since 2021, with Wynn cassia increasing from approximately 40% to more than 80% of total standing dry matter (TSDM) in some areas. Following concerns about the potential loss of the grass component, a demonstration trial was established in 2026 to investigate potential contributing factors to Wynn cassia dominance and test some strategies for restoring a more desirable grass–legume balance. Pasture composition studies over 5 years were used to develop potential control interventions including small plot assessment of fluroxypyr herbicide at either 600 mL/ha or 1200 mL/ha applied to Wynn dominated pastures which were spelled from grazing. Biomass and botanical composition were assessed before treatment and again two months after application. All treatments resulted in a reduction in Wynn cassia contribution to TSDM and an increase in buffel grass biomass, but herbicide effects were modest (17-19% reductions in Wynn cassia contribution compared to 16% in the untreated plots). Total pasture biomass increased across all treatments. These preliminary results indicate that strategic herbicide application, combined with wet-season spelling, could potentially reduce Wynn cassia dominance and promote buffel grass recovery. Ongoing monitoring will determine the persistence of these responses and help define an optimal grass–legume balance for productive and resilient grazing systems on infertile tropical soils.

Introduction

The addition of legumes to native grass pastures can significantly improve pasture quality and cattle production in north Queensland (QDAF 2024). Maintaining a desirable grass/legume balance is influenced by grazing management, seasonal conditions, and pasture palatability and selection by cattle. Wynn cassia (*Chamaecrista rotundifolia*) is an introduced perennial pasture legume which grows well on lighter infertile soils through parts of tropical and sub-tropical Queensland. It has been shown to improve animal production in native systems (Quirk *et al.* 1992, Partridge and Wright 1992) either in grazed pastures or when fed as hay. However, reported low palatability and consumption by cattle (NTDBIRD 2005) can affect production and it appears the palatability is influenced by environmental and agronomic conditions.

Wynn cassia dominance was observed at the Queensland Government Spyglass Beef Research Facility located west of Townsville, where ~1500 hectares of infertile red and yellow earths were historically sown with buffel grass (*Cenchrus ciliaris*) and Wynn cassia to improve pasture productivity. These paddocks play an important role at Spyglass due to their high feed quality, suitability for research trials, and proximity to infrastructure. A marked increase in Wynn cassia over the last ten years has reduced the utility of these key paddocks. To better manage these pastures, a demonstration site has been established to investigate strategies for reducing Wynn cassia dominance and to restore a desirable grass/legume balance. Initial trials include (1) monitoring pasture composition and grazing management and (2) testing the efficacy of varying herbicide application rates combined with wet season spelling.

Methods

A series of visual surveys of pasture yield and composition were conducted between 2021 and 2025 by revisiting permanently marked points within the buffel-Wynn pastures at the end of each wet season. These results were retrospectively compared with rainfall coinciding with grazing in an attempt to understand their potential contribution to the development of observed Wynn cassia dominance.

In April 2026, within a randomised block design (3 replicates), varying rates of fluroxypyr (33.3% active ingredient+ wetter) were applied to 360m² plots of tall (~50 cm) and dense pastures. Treatments received either 600mL/ha or 1200mL/ha applied using a boom spray attached to a buggy, or no herbicide at all. All plots were excluded from grazing cattle following treatment and will be grazed during the dry season. Pasture yield and composition assessments (Botanal method, n=30 per plot) were undertaken along transects in February prior to herbicide application and again in June 2026.

Simple descriptive statistics are reported at this stage, with more rigorous analysis to be completed following further pasture assessments.

Results and Discussion

Development of Wynn cassia dominance

Surveying of the permanent monitoring revealed a significant change in the pasture composition, with Wynn cassia increasing from 40% to over 80% of the livestock available pasture in some areas (Figure 1).

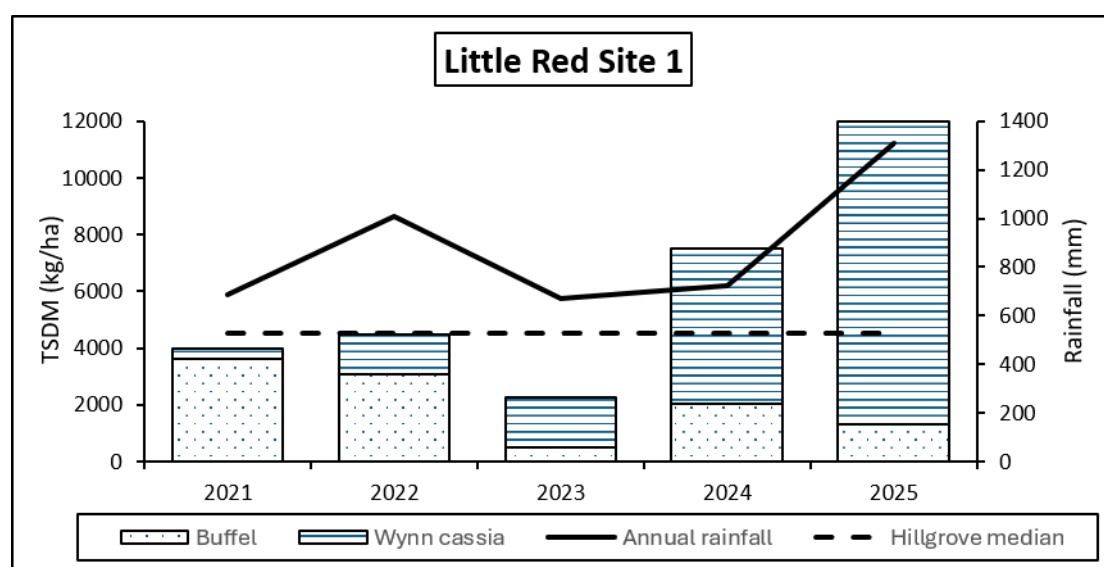


Figure 1: Example of the increase in the Wynn cassia contribution to the TSDM observed across the buffel grass/Wynn cassia paddocks at Spyglass. Annual rainfall presented for Spyglass and the long-term (>100 years) median for nearby Hillgrove station.

This shift has coincided with a run of years where rain fell early in the wet season (October-April) and project activities on the property required continued moderate grazing in the areas described above. Spelling of pastures in the early wet season is critical for maintaining pasture condition and productivity, particularly for tropical grasses (Scanlan *et al.* 2011, O'Reagain *et al.* 2014). Grazing records collected and collated by DPI staff showed that during 2024 and 2025 the buffel/Wynn cassia paddocks received very little rest in November and December (Table 1), while more than 200mm of rain fell during these months in those years (Table 2). 2022 and 2023 also received above average November/December rainfall. The long-term median for nearby Hillgrove Station (approximately 20km south) is 25mm and 60mm for November and December respectively. While grazing records are not available for the years prior to 2024, grazing management of the paddocks at this time of year has been consistent for several years. It appears this lack of early wet season rest in years with early rain led to preferential grazing of the buffel grass and limited grazing pressure on the Wynn cassia, resulting in large increases in the Wynn cassia biomass.

Table 1. Weeks of spell received by buffel/Wynn cassia paddocks in November and December in 2024 and 2025.

Paddock	Weeks spelled - November/December	
	2024	2025
Red Dam	0	0
Little Red	0	1
Middle	3	1
No Name	0	0
Cockatoo	3	4
Arsenic	3	1

Table 2. November and December rainfall recorded near the buffel/Wynn cassia paddocks between 2022 and 2025.

Lucky Break rainfall (mm)		
	November	December
2022	128	42
2023	104	65
2024	43	173
2025	37	129

Herbicide treatments combined with wet season spelling to reduce Wynn cassia yield

The percentage contribution of Wynn cassia to TSDM was reduced in all herbicide and spelling treatments (Fig. 2). The greatest reduction was observed in the plots with herbicide treatments (17-19%) compared to 16% in the control plots. The overall TSDM increased across all treatments in the absence of grazing and the buffel grass TSDM increased across all treatments. These modest herbicide effects could be related to the dense canopy present at application, which may have prevented herbicide from contacting sufficient Wynn cassia plants for effective uptake of herbicide. The herbicide application was also relatively late, and this might have reduced the effectiveness of the herbicide with conditions beginning to dry.

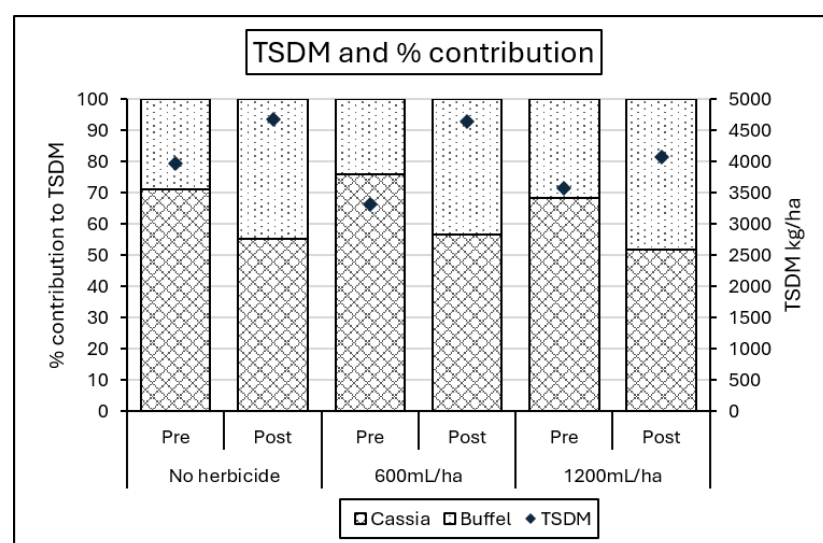


Figure 2. TSDM and percentage contribution to the TSDM of Wynn cassia and Buffel grass prior to and following fluroxypyr application.

Overall, there has been a reduction in the contribution of Wynn cassia in the pasture sward following the application of herbicide and wet season spelling. It is not understood what the ideal Wynn cassia/buffel grass composition will be in this situation given the apparent lack of grazing preference for Wynn cassia at Spyglass, though a target ratio of 30/70 would likely increase the pasture quality through nitrogen fixation and increased palatability.

Assessments will continue to be undertaken at the site to track the shift in the Wynn cassia/buffel grass composition over time, while also considering other approaches for improving the pasture composition and quality. It could be more effective to apply herbicides to actively growing and previously grazed pastures (to reduce biomass), which could allow for more effective contact of the herbicide on the cassia leaf surface and better uptake of the herbicide through the plant.

Further split plot studies within the site could also look at the effects of fertiliser application and the introduction of other legumes to improve pasture quality. There is also potential to assess the cost/benefit of the herbicide application regarding expected improvements in animal production. This may also be compared with other tools for managing pasture composition, such as fire, particularly given the effect of fire on Wynn cassia dynamics is not well understood.

Conclusions

Grazing management and seasonal conditions coincided to reduce the quality of some of the most productive paddocks at Spyglass station. Simple strategies to restore a desirable grass/legume composition have shown some promise with further benefits expected to compound over time.

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