

Investigating producer interest in and experience with tropical perennial grasses in inland NSW

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Abstract: *Projected climate conditions and farm systems modelling suggest an extended summer-autumn feed gap for central and southern inland NSW. Tropical perennial grasses may be an effective option to fill this expected feed gap in these areas. Research has commenced to identify the key factors enabling and constraining producers to effectively trial and manage these tropical perennial grasses. Three workshops were held with experienced producers followed by two workshops with producers interested in trialling tropical perennial grasses. This paper presents some preliminary findings from these workshops. Producers identified two critical factors in establishing a tropical grass pasture: preparing a weed-free seedbed and sowing the seed as shallow as possible. Interested producers identified that they required information that was relevant for their climate and soil type. This included information relating to species selection, seasonal production and livestock performance. The experiential knowledge collected, and the identified information needs will guide research priorities so that regionally relevant packages can be developed, and appropriate support provided to producers and their advisers. Together these will reduce the uncertainty and risk for producers in central and southern inland NSW intending to trial tropical perennial grasses.*

Key words: farmers, feed gap, C4 grasses, trialling, establishment, pasture

Introduction

Projected climate conditions and farm systems modelling for south-eastern Australia (south of 33°S, east of 135°E) suggest the existing summer-autumn feed gap will be extended for red meat producers across central and southern inland NSW (Cullen *et al.* 2009; Moore and Ghahramani 2013; CSIRO and BoM 2015, 2018). In addition to experiencing

warming temperatures, these areas are also experiencing an increase in the frequency of summer rainfall events (CSIRO and BoM 2018). To maintain productivity, additional forage options will need to be explored to address the risk associated with a reduced growing season of temperate forage species and to take advantage of summer rainfall (Cullen *et al.* 2009; Moore and Ghahramani 2013). Tropical perennial grasses may be a productive option to ensure the feedbase is sustained into the future in these areas. These grasses are responsive to summer rainfall and nitrogen applications, are persistent and recover rapidly after an extended dry period (Boschma *et al.* 2015). As well, there are species suited to a wide range of soils including acid soils (McCormick *et al.* 1998).

The multi-disciplinary research program, “Increasing livestock production by integrating tropical grasses into farming systems”, is now in the fourth year of a five-year program. Field sites have been established in central and southern inland NSW to evaluate the agronomic potential of tropical grass species including digit grass cv. Premier, panic grass cv. Gatton and Makarikari grass cv. Bambatsi. A social research component in the project is exploring producer interest in and experience with tropical perennial grasses. It is also identifying the key factors enabling or constraining producers to effectively trial and manage these grasses.

The research approach for the social component is to use a mix of qualitative and quantitative methods in a three-staged approach. It was proposed to conduct a series of workshops with purposefully selected producers and key informants (Stage 1, qualitative), a broader survey of experienced and inexperienced producers (Stage 2, quantitative) and semi-structured interviews with purposefully selected producers (Stage, 3, qualitative). To date, the

workshops have been completed and the survey distributed across northern and central NSW closed in mid-April 2021. The focus of this paper is on the producer workshops in which we present some important preliminary findings.

Workshop approach

Five workshops were conducted with purposively selected producers. Workshops held at Purllewaugh (near Coonabarabran), Bingara and Dubbo engaged 31 producers who had successfully established and were managing tropical grass pastures. A key outcome of these workshops was a set of 'lessons learned' (Sinclair et al. 2019). Workshops held at Orange and Cowra engaged 14 producers interested in trialling tropical grasses but have limited or no experience with these grasses. A key outcome from these workshops was a set of 'information they needed to know'.

Preliminary workshop findings

"Lessons learnt by experienced producers"

The experienced producers identified what they believed were critical 'success' factors in establishing and managing tropical grasses in northern inland NSW. Two key factors identified by these producers were:

1. Prepare a weed-free seedbed: Controlling weeds prior to sowing was critical. This may take two to three years or more if necessary, to ensure the seedbank of annual summer grasses is run down. Sowing forage and cereal crops over winter and maintaining a weed-free summer fallow was a common strategy. As one Bingara producer explained: *"We knew that pre-sowing preparation was critical. We sowed oats for two years to clean-up the country."*

2. Sow seed shallow: Sowing as shallow as possible was critical. As most tropical seeds are small, the chosen sowing method needs to place the seed just under the soil surface. As one Purllewaugh producer explained his particular sowing technique: *"Critical to sow seed shallow. From experience, [it's] fine when dropped on the ground and a press wheel following. This is one of the main reasons for failure and once a seed is too deep it isn't going to change"*.

Another three factors the experienced producers considered important included:

4. Sow small areas: Establishment costs are high and sowing small areas spreads the cost over time. It is preferable to start with the least productive country and preferably not on a heavy soil type. *"Something important for the southern blokes: we are all growing digit on lesser country"*, explained a Purllewaugh producer.

5. Store soil moisture: It is important to conserve subsoil moisture prior to sowing and to sow before an expected rainfall event. As one Dubbo producer explained: *"It's all about weed control and soil moisture ... We won't sow without subsoil moisture"*.

6. Once established, maintain soil fertility: It is important to know the phosphorous, sulphur and nitrogen status by soil testing and correcting any deficiencies to ensure pasture persistence and productivity. Nitrogen needs to be applied strategically with at least an annual application or when extra feed is required. As one Purllewaugh producer explained: *"The more you feed your grasses, the better they will feed your stock. That is, healthier grasses have far higher nutritional value"*.

"What interested producers want to know"

The interested producers identified key knowledge and skills they required to assist them in their decision-making about trialling tropical perennial grasses. Critically, this information had to be relevant to their climate and soil type.

Key topics and the items interested producers identified included:

- **Establishment:** seed bed preparation, sowing window, sowing rate and depth and sowing equipment.
- **Seed:** seed availability, cost and quality (purity and viability) for the various grass species.
- **Species selection:** species selection appropriate for local conditions. For example, what species are appropriate where soil temperatures fall below 10°C in winter. Also, the potential for species mixes and legume options.
- **Soil nutrition:** soil testing for nutrient levels and fertiliser requirements to maintain pasture productivity.

- **Seasonal production and forage quality:**

seasonal pasture growth rates and changes in forage quality with regrowth.

- **Grazing management:** grazing strategy to maintain persistence and livestock (beef cattle and sheep) performance.

The interested producers also identified several benefits in adding tropical grasses to their feedbase. A major benefit was the ability of tropical grasses to provide feed in summer and autumn enabling livestock to achieve targeted liveweight gains which under traditional temperate grass-based pastures (i.e. phalaris, cocksfoot and fescue) is difficult. As one Orange producer explained: *“If we can have a grass that can fill in the feed gap and can last 15–20 years ... would be fantastic”*.

Other benefits identified included the ability to rapidly respond to increasing summer rainfall events, provide competition for summer weeds, provide increased ground cover to reduce erosion risk and as way to more effectively utilise low productivity soils.

One constraint identified was the time required to prepare a weed-free seedbed. *“I’m interested. But my problem is that it is going to take three years for a clean paddock”* explained one Orange producer. Another identified constraint related to the perceived unavailability of high-quality seed at an affordable price. *“One of the biggest handbrakes ... is seed supply ... trying to get good quality seed at a fair price ... it’s hard”* explained another Orange producer.

These findings highlight the challenges and benefits for producers intending to include tropical perennial grasses in their feedbase. These grasses are expensive to establish requiring particular attention to controlling summer weeds prior to sowing and sowing the seed shallow to avoid an establishment failure (Lodge and Harden 2009; Lodge *et al.* 2010). They also need to be strategically managed to optimise forage quality and for long-term persistence. Using producer experiential knowledge important principles were identified that new producers can adopt to reduce their uncertainty and risk when trialling these grasses.

Conclusions

For producers in southern and central NSW tropical perennial grasses are a relatively new pasture option requiring new knowledge and skills. The experiential knowledge collected, and the information needs identified from the workshops will guide research priorities so that regionally relevant packages can be developed, and appropriate support provided to producers and their advisers in these regions. Producers intending to trial tropical grasses will have the capacity and confidence to successfully trial tropical perennial grasses.

Acknowledgments

We gratefully acknowledge the contribution of producers for participating in the workshops. This study is funded through the Livestock Productivity Partnership between NSW Department of Primary Industries and Meat and Livestock Australia’s MLA Donor Company.

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