2002/NT01

Producer Research Support

Establishing Introduced Pasture Grasses

Sturt Plateau Best Practice Group Inc.

The Sturt Plateau Best Practice Group Inc. set out to assess the suitability of Jarra and Strickland grass as introduced pasture species for commercial use across a range of soil types and rainfall conditions on the Sturt Plateau.

The species are not seen as reliable replacements for the standard district species of Buffel, Sabi and Indian Blue grasses at this time, but could be a valuable palatable addition where reliable establishment conditions are optimised and grazing can be controlled in early years.

Contact details
Roxie Holzwart
RSD MS 1953
KATHERINE NT 0852
Tel 08 8975 9974

The project

Jarra and Strickland grasses did not establish well in the very poor 2002-03 wet season when sown on cultivated fertilised areas at seven sites across the Sturt Plateau. The grasses did persist over three variable years under a range of grazing pressures, and when sown into areas already established with perennial pasture grasses such as Buffel and Sabi. The grasses were readily eaten by stock (and locusts at one location) and did set seed at all locations. However, over the three years of the project, spread and production has been limited. At more than one site, the species had increased significantly during the good 2005/06 wet season (year 4) competing successfully with other improved grass species.

Objectives

1. Have at least five sites of more than 4ha of Jarra grass planted on five of the suitable land systems of the Sturt Plateau by June 2004. Sites to be geographically distributed to cover the range of rainfall conditions across the region;
2. Plant at least one site of 4ha of Strickland grass on the Sturt Plateau by June 2004;
3. Monitor and assess established populations in the year of planting and after the following wet season using 'Grass Check' or a similar process for each site; and
4. Assess the suitability of Jarra and Strickland grass *(Digitaria milanjiana)* as introduced pasture species for commercial use across a range of soil types and rainfall conditions on the Sturt Plateau.

What was done

Sites were selected on major grazing land units of the Sturt Plateau in October 2002. All plots had 20kg seed and 500kg of 19:13:0:9 fertilizer applied. Plots were sown at approximately 2kg seed and 100kg fertiliser/ha.

Most of the sites were lightly grazed in the 2003 dry season.

Any of the sites that had reasonable germination and establishment in 2002/03 were top dressed in the 2003/04 wet season.

A comprehensive pasture survey and analysis of results were undertaken in 2003 (PIRD Report 2003) and visual assessments were made by members in 2004 and 2005.

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Contact Gerald Martin -
Producer Research Support Coordinator.

Tel 08 8556 2900 or
producersupport@mla.com.au

What happened?

Weather

2002/03: Seasonal conditions were not favourable for the establishment of pastures across most of the district. The rains arrived late (early to mid-January) and finished early (late February/early March). Distribution during the season was also poor with two monsoonal periods of intense rainfall and a dry period in between.

2003/04: The Sturt Plateau received much more than average rainfall from mid-December to March, Jarra grass evaluation sites receiving between 40 – 75 inches (1000- 2000mm) of rain over the period. Subsequently soil conditions were waterlogged.

2004/05: The season was again below average but with adequate rainfall to promote growth of perennial pasture species.

Establishment and Growth

2002/03: Given the seasonal conditions the results were encouraging. (see PIRD report 2003 for details). Plants which established and survived set light amounts of seed at all locations.

Some of the issues in establishing small seeded grass pastures were highlighted:

- Weather conditions for the 10 - 14 days after planting are critical to establishment. Seeding depth is shallow which means that even one day without rain can dry out the surface and kill a germinating seed. If the seed is planted too deep it will not establish, as the emerging shoot is not strong enough to reach the surface. Soil moisture (under the seed) is generally not sufficient to germinate seed;
- Seed quality (germination) is a combination of how much will germinate immediately and how much will remain viable and germinate with subsequent rain during the season of planting and in the following season;
- At Sunday Creek and Dry River where the demonstration sites were established in old cultivation areas, other aggressive grass species dominated the pasture this year. Jarra is slow establishing and is susceptible to competition from more aggressive species. Once established however, it is able to compete with these by sending out runners from the crown after the first rains of the new season; and
- Anecdotal evidence suggests domestic livestock and native animals (including insects) find Jarra grass palatable. Grazing management is critical in the first year of establishment to have the population of established plants surviving the first dry season. These will produce runners to colonise the area at the start of the next wet season to give ground cover. Seedlings are slow to establish from seed, management of native herbivores is difficult and control of insects generally not economic.

  Experience with Jarra in areas around Katherine and further north (and Queensland planting as well) have produced variable results in the first year and many plots that have appeared to be a failure in the first year have turned into useful stands in subsequent years. Management of the areas in the first year is important to longer-term success.

2003/04: Inspections by producers revealed some good performance of the sown species in a very different wet season to the establishment year.

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2004/05: After another light season, areas of Jarra that survived the first year and developed in the wet year 2003/04, struggled to persist on sites that were heavily grazed. On less heavily utilised sites both Jarra and Strickland persisted and thickened-up.

2005/06: Although outside the scope of the project timetable, at the Sunday Creek site at least, a surprising amount of Jarra was observed to be seeding above species such as Buffel, Sabi and Indian Blue grasses following a good average wet season.

A pasture walk was held at the Sunday Creek site in April 2004 attended by around 27 people. Members discussed their experience with Jarra, were shown how to positively identify it, and heard of experiences with the species further north. A more general discussion on improved pastures ensued.

Discussion

The discussion is centred around project performance against nominated objectives.

1. Have at least 5 sites of at least 4 hectares of Jarra grass planted on 5 of the suitable land systems of the Sturt Plateau by June 2004.

Seven sites were established covering the range of rainfall conditions across the region.

2. Plant at least 1 site of 4 hectares of Strickland grass on the Sturt Plateau by June 2004.

Strickland was sown in a site at Birdum Creek Stationn. Strickland is suggested as a line of *Digitaria milanjiana* that has better drought tolerance than Jarra and is considered more suited to drier areas.

3. Monitor and assess established populations in the year of planting and after the following wet season using 'Grass Check' or a similar process for each site.

Comprehensive sampling was undertaken after the establishment year. Visual inspections were made following the next two wet seasons but given the generally low establishment rates, any formal pasture composition measurements were not warranted.

Poor establishment conditions in 2002-03 affected the overall results. However over the same conditions the district standard species of Buffel and Sabi grass apparently performed better than Jarra or Strickland, as did the legume species Verano and Seca Stylo.

The various demo sites provided a range of challenges to the new introductions and after two light years, interspersed with an exceedingly wet year, that Jarra persists is encouraging. Members intend to monitor the persistence over the coming years, but this project has shown that Jarra is unlikely to surpass Buffel, Sabi or Indian Blue Grass as the preferred grass species for intensive pasture development in the district. However its persistence and spread over four seasons at some sites suggests that if sown in commercial areas into properly managed conditions that it could provide a more digestible and nutritious species.

A further disincentive is the high cost of seed when compared to the standard species. The project was not designed to test economic benefits of the establishment of Jarra, but given the above discussion, it is clearly economically less palatable than the standard species.

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Next steps

The project was considered to have adequately shown that Jarra and Strickland are not as reliable as Buffel And Sabi grasses in this district, but it was disappointing that the establishment year was so tough. A project design that allowed for plantings to occur over 2 – 3 years may have given a more realistic and fairer assessment. Alternatively further development of seasonal forecasts could help ensure that pasture plantings were carried out in years with high probability of establishment success.

The project encouraged much discussion and learning about pasture grass establishment and management. The group's priorities now include an investigation of new legume species suitable for the district, and including improved pasture sites in the project, 'Carrying Capacities for the Sturt Plateau' being undertaken through the Tropical Savannas CRC (on the major native pasture communities on the plateau).

Meat & Livestock Australia
Level 1, 165 Walker Street
North Sydney NSW 2060
Tel 02 9463 9333
Fax 02 9463 9393
Free Phone 1800 023 100 (Australia only)
www.mla.com.au