



# Final report

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## PDS Sustainable Long Term Leucaena Grass Production in Northern Australia

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## Abstract

The Sustainable Long Term Leucaena Grass Production in Northern Australia Producer Demonstration Site aimed to address the protein drought experienced by northern Australia cattle producers for long periods of the year.

The tropical legume, Leucaena has the potential to augment the relatively poor nutritional value of the northern Australia's native grass pastures, enabling timely and improved weight gains to meet market specifications. More than 7.5 million ha of the Northern Territory is suitable for leucaena-grass grazing systems however limited access to experienced local producers and assistance has proven a barrier to the take up and successful establishment of the legume.

The Sustainable Long Term Leucaena Grass Production in Northern Australia project aimed to successfully establish up to six producer-based leucaena trial plantings to determine the most suitable variety and row spacings suitable for Northern Territory conditions.

Three sites were successfully established however fire resulted in the withdrawal of one of these sites. A fourth site was unable to undertake establishment activities within the project due to alternative diversification, however, remains committed to the inclusion of leucaena in their grazing system in the future. The two remaining sites demonstrated successful establishment and improved productivity through one live weight gain trial on each site, demonstrating the potential benefit to the Northern Territory grazing industry.

Extension activities were directly provided to more than 190 observer producers across six field days and workshops. Project progress and periodic outcomes were also promoted through other Network activities, at [www.leucaena.net](http://www.leucaena.net) and in project case studies for dissemination to the grazing industry. Complementary to the Sustainable Long Term Leucaena Grass Production in Northern Australia project was the development of the Northern Best Management Code of Practice, a collaborative outcome from the Northern Territory Government, The Leucaena Network, Northern Territory Cattlemen's Association, NT Farmers and project producers.

Interest from Northern Territory graziers to improve productivity and profitability with leucaena remains high, however due to alternative opportunities for high-value enterprise diversification with the developing cotton and horticultural industries, the propensity to undertake leucaena plantings in the near future has reduced from the initial levels experienced at the commencement of this project. However, it is envisaged that interest in pasture development with leucaena will increase over the next three to five years as the increased profitability provided by diversification will provide the financial wherewithal for property development, or there will be a percentage of natural attrition out of the new industries and a return to a focus on grazing. The activities undertaken within this project and the continued presence of The Leucana Network in the Northern Territory grazing industry will continue to provide ongoing support for those graziers.

## Executive summary

### Background

More than half of Australia's beef herd is located in northern Australia. A key challenge faced by northern producers is to obtain the rapid weight gains required to meet market specifications because of the relatively poor nutritional value of tropical grass pastures for long periods of the year. More than 7.5 million ha of the Northern Territory is suitable for leucaena grass pastures however a history of failed establishment or management and limited access to experienced local producers and assistance has previously proven a barrier to the take-up of leucaena as an addition to grazing systems.

Producers are now looking to maximise their output from their Leucaena plantings through increased carrying capacity; improved cattle live weight gains; earlier finishing and the ability to meet the market. The development of a psyllid tolerant leucaena variety, Redlands will provide suitable coastal areas of the Northern Territory to include leucaena in their grazing systems.

To address the barriers to uptake, the Sustainable Long Term Leucaena Grass Production in Northern Australia aim was to successfully establish producer-based leucaena trial plantings to determine the most suitable variety – Redlands, Wondergraze or Cunningham; and row spacings suitable for Northern Territory conditions.

The activities and outcomes of the project were disseminated to the wider Northern Territory grazing industry through field days, workshops, trade stands, video blogs and the development of case studies.

A concurrent activity resulting from the commencement of this project has been the collaboration of the Northern Territory Government, industry representatives, local producers and The Leucaena Network to develop the Northern Territory Best Management Code of Practice for Establishing and Managing Leucaena Pastures.

### Objectives

By August 2022 the PDS activities will:

1. Demonstrate the most suitable leucaena-grass pasture system for northern Australia across 4 to 6 sites in NT  
The two successful sites demonstrate that leucaena could be successfully established in the Douglas Daly region of the Northern Territory with the preferred cultivar being Wondergraze and then Cunningham; and row spacings of 14m with twin rows with 75cm to 1m spacings.
2. Quantify the benefits of leucaena-grass pasture system through a minimum of one round of grazing trials at each site.  
The two grazing trials by the successful producers demonstrated wet season weight gains up to 1.3kg per head per day or 4.1kg per day per hectare; and dry season weight gains (without supplementation) of 0.3kg per day or 1.0kg per day per hectare.

3. Promote best management practice to 100 other producers and graziers across a minimum of four field days throughout the three-year period.

Four dedicated project field days were hosted by trial producers throughout the three-year period with attendance of 98 producers and graziers. In addition, the project was showcased at three additional NT departmental field days with an attendance of more than 100 attendees.

4. Increase the adoption of best practice leucaena-grass pastures by 10% of the observer producers by the end of the three-year period.

Currently, only one producer has undertaken additional leucaena plantings as a direct result of the project. This is significantly reduced from the expected adoption due to opportunities presented by other high value enterprise diversification opportunities available to local graziers.

The post-project survey has indicated an increase in the propensity to introduce leucaena into grazing systems by 106% over the next two to five years.

5. Provide capacity building through upskilling of local agronomy services in Leucaena best practice through the provision of two Leucaena 101 workshops focussing on advisory and extension knowledge.

Attendance by the region's agronomy services at all project producer workshops and field days resulted in significant capacity building of the ability for local agronomy services to provide high-value assistance to local graziers.

6. Development of case studies on each producer site (4 to 6) documenting trial processes, outcomes and feedback for dissemination through The Leucaena Network channels, NTDPIR, NTCA, NT Farmers, Future Beef and MLA media.

Case studies were developed for the two successful sites. These were disseminated through subsequent workshops and field days; trade stands at Beef 2021, NTCA 2021 Conference, NT Farmers Food Futures 2021 Conference, and the Northern Beef Producers Expo; and at all Network workshops and events.

Both producers also featured in the Leucaena Network's 'Let's Talk Leucaena' information video available at [www.leucaena.net](http://www.leucaena.net)

## Methodology

This PDS aimed to involve up to six producers located in the Douglas Daly region of the Northern Territory, as identified by the NT Department of Industry, Tourism and Trade (DITT). DITT would provide support and agronomy services to the trial producers.

Each site would plant either a 5ha irrigated trial site (single variety); or a 30ha dryland site comprising plantings of three cultivars – Redlands, Wondergraze and Cunningham; at row spacings from 6m to 18m.

Once successfully established, each site would undertake at least one round of grazing trials to assess live weight gains from the leucaena-grass pastures.

## **Results/key findings**

Three sites were successfully established however fire resulted in the withdrawal of one of these sites. A fourth site was unable to undertake establishment activities within the project due to alternative diversification although remains committed to the inclusion of leucaena in their grazing system in the future.

The two remaining sites demonstrated successful establishment and improved productivity through one live weight gain trial on each site, demonstrating the potential benefit to the Northern Territory grazing industry.

There was minor psyllid pressure experienced by the plantings in the Douglas Daly region, resulting in a preference for the Cunningham or Wondergraze varieties.

The preferred row spacing was wider than expected at 12m to 14m to enable the jarrah inter-row pastures to be grazed to the same intensity as the leucaena, however more intensive grazing systems would benefit from closer 7m row spacings.

Live weight gains averaging 1.3kg/head/day during the wet season and 0.3kg kg/head/day during the dry season were experienced as part of the grazing trials.

## **Benefits to industry**

Knowledge that leucaena is able to be successfully established in the Northern Territory to improve enterprise productivity.

Facilitation of experienced graziers with local knowledge of strategies for successful leucaena establishment and use.

Capacity building of agricultural service providers to provide current and timely, local advice and support to potential leucaena producers.

## **Future research and recommendations**

Opportunities for further assistance to the Northern Territory's leucaena industry include further assessment of indicative ratios of dry feed to leucaena required for optimum productivity throughout both the dry and wet seasons; additional live weight gain trials for further reinforcement of the potential of leucaena to add value to productivity and sustainability during varying seasons; ongoing exposure to experienced leucaena producers for knowledge sharing; and the continuation of access to qualified advice at all stages of the leucaena journey, particularly until grazing commences.

## PDS key data summary table

Project Aim:			
	Comments		Unit
<b>Production efficiency benefit (impact)</b> Animal production efficiency kg LWT/ha ; kg LWT/DSE, AE or LSU Pasture productivity – kg DM/ha Stocking rate – DSE, AE or LSU/ha Reproductive efficiency – marking %, weaning % Mortality rate (%)	<i>Comparison with: unimproved pastures of much lower carrying capacity and feed quality est 0.1kg dry season and 0.3 – 0.5kg wet season</i>	0.3 Dry season 1.3 Wet season	kg/hd/day kg/hd/day
<b>Number of core participants engaged in project</b>		4	
<b>Number of observer participants engaged in project</b>		208	
<b>Core group no. ha</b>		172,463	ha
<b>Observer group no. ha (survey respondents)</b>		137,036	ha
<b>Core group no. cattle</b>		21,900	hd cattle
<b>Observer group no. cattle (survey respondents)</b>		9750	hd cattle
<b>% change in knowledge, skill &amp; confidence – core</b>	<i>Knowledge and confidence of leucaena</i>	78%	
<b>% change in knowledge, skill &amp; confidence – observer</b>	<i>Knowledge and confidence of leucaena</i>	85%	
<b>% practice change adoption – core</b>	<i>Propensity to adopt further leucaena plantings</i>	75%	
<b>% propensity for practice change adoption – observers</b>	<i>Propensity to adopt further leucaena plantings</i>	106%	

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# 1. Background

## 1.1 Aim

Leucaena grazing varieties were initially made available to Australian graziers in the early 1960's by CSIRO. Since that time, the industry has flourished with the development of improved cultivars particularly the recent addition of the psyllid tolerant Redlands variety. This and the expected successful outcome of current research into a sterile variety will open up the benefits of increased cattle carrying capacity and weight gain to vast numbers of producers in Northern Australia.

More than half of Australia's beef herd is located in northern Australia. However, a key challenge faced by northern producers is to obtain the rapid weight gains required to meet market specifications because of the relatively poor nutritional value of tropical grass pastures for long periods of the year. As indicated in the preliminary insights from the MLA commissioned report the Adoption of Leucaena Grass Pastures in the Northern Beef Industry Project undertaken by Rural Consulting Group, approximately 16% (88,106,354 ha) of Northern Australia fits the broadest temperature/rainfall/soil requirement for leucaena, comprising 6048 properties and 6,302,595 cattle. 5% of Northern Australia meets the ideal rainfall and soil characteristics for leucaena equating to 3,549,222ha of land in the Northern Territory that is ideal for grazing development with leucaena-grass pastures, not considering tenure restrictions.

Producers are now looking to maximise their output from their Leucaena plantings through increased carrying capacity; improved cattle live weight gains from .7 to 1.5 kg per day and 250 kg per annum; earlier finishing and the ability to meet the market. This benefits the red meat industry as a whole however places significant pressure on leucaena plantings.

Current estimates of leucaena plantings in the Northern Territory are less than 1,000 ha, with significant plantings over the previous 30 years of which less than 24% were successful or remain. Some of the reduction in plantings may be attributed to utilising establishment and grazing strategies more suited to southern and eastern land types and climates and high psyllid pressure in coastal regions. The ability to introduce the psyllid tolerant leucaena Redlands variety in psyllid prone areas of the Northern Territory will enable improved establishment and resulting increased productivity.

To date, the Leucaena industry has been most predominant in Central Queensland resulting in the compilation of industry benefits and best-practice information based on Central Queensland's climate and geography. There have been some longer-term productivity trials with leucaena pastures undertaken at the Northern Territory Government's Douglas Daly Research Farm however the Northern Australian leucaena industry would benefit from information gained from establishment trials in the emerging areas including the Northern Territory.

One issue of significance pertinent to Northern Australia and particularly the Northern Territory is the relationship between the wet and dry season and the optimal row spacings and resulting Leucaena to grass ratio to enable weight gain and pasture maintenance throughout both seasons. Excessive leucaena plant growth in the wet season will require heavy grazing to ensure height control whilst heavy grazing will affect the ability for the grass-pasture to provide the necessary biomass throughout the following long dry season. The alternative will be mechanical trimming of the Leucaena in alternate

years which is neither cost effective nor desired. This issue will have a direct influence on the row spacings, weight gain performance and grass/Leucaena consumption.

This provided a key opportunity for producer led demonstrations into the most effective leucaena-grass pasture systems for the Northern Territory incorporating row spacing, cultivar choice and management practices for successful establishment and best practice strategies to maximise the output of this grazing system. These trial sites provide valuable information to other, individual Northern Territory producers as to Leucaena best practice, as well as to the grazing industry in its entirety.

Another issue identified in the adoption of Leucaena in the Northern Territory is the limited access to qualified and experienced advice and extension support for potential producers. Currently, most extension on Leucaena plantings is provided by Peter Shotton of the Northern Territory Department of Industry, Tourism and Trade (DITT) located at the Douglas Daly Research Farm.

Initial meetings with Northern Territory Farmers (NTFarmers) and the Northern Territory Cattlemen's Association (NTCA) and individual agronomy service providers have indicated a recognition of the benefits of Leucaena and a belief that there is significant potential for future plantings requiring a higher level of expertise to be available to graziers, through the engagement of their own agronomy services. This provided a significant opportunity for capacity building of local agronomists and service providers to assist this emerging industry with knowledgeable and proven information and assistance.

Overall, this Producer Demonstration Site aimed to generate the information required for successful development and management of leucaena-grass pastures in the Northern Territory. This then has a direct impact on the long-term sustainability of both the individual grazing enterprises and the communities in which they reside.

## **1.2 Methodology**

This PDS aimed to involve up to six producers located in the Douglas Daly region of the Northern Territory. Consultation by the NT Department of Industry, Tourism and Trade (DITT) identified four Douglas Daly based graziers to form the core producers for the project. Support and agronomy services to the trial producers and localised reporting on all four sites was provided by DITT.

One irrigation site was identified with an irrigated 5 ha block Redlands (psyllid tolerant) leucaena under trickle tape irrigation to be planted. This site was not to be replicated due to the inability of water access by other producers but was to be compared against the dryland sites to determine any productivity benefits between irrigated and dryland leucaena.

The remaining four dryland sites would each plant a 30ha trial site comprising Wondergraze, Redlands and Cunningham planted from 6 m to 18 m (single) rows.

The inclusion of the three different varieties in the trial would enable the producers to determine which is the most suitable variety for their property and the region. The ability to compare the three varieties in-situ will also assist to determine if there is a potential psyllid challenge in the area which has not been documented to date.

Prior to sowing, soil samples from each site were collected to assess the fertiliser requirements and benchmarking initial soil fertility levels.

Fully established trial sites, including the 5ha irrigated trial site would undertake a live weight gain trial to enable the collection and comparison of live weight gain data.

Historic qualified data on live weight gain trials on pasture only assess through previous trials at the Douglas Daly Research Farm would provide the control data for comparison of the live weight gain achieved by the leucaena-pasture system.

Extension and adoption activities would include open field days at each trial site and promotion of the activities of the trial through The Leucaena Network and local industry bodies.

### **1.3 Initial Trial Establishment**

Four producers were identified through DITT's Producer Group to participate in the PDS. Individual consultation was undertaken with each of these producers to secure their commitment to the trial and to identify the trial sites on each property. The trial producers were:

Christopher and Amanda Howie – Bindaroo Pastures, Douglas Daly

Logan Reid – Blackbull Station, Douglas Daly

Brett and Suzanne Gill – Malilangwe, Douglas Daly

Tony Hayne – Douglas Station, Douglas Daly

Pre-Project Core producer surveys are available for viewing in Appendix One.

Post-Project Core producer surveys are available for viewing in Appendix Two.

#### **1.3.1 Bindaroo Pastures**

Property owners Chris and Amanda Howie confirmed the site's suitability with soil tests prior to planting and early establishment was reviewed by both DITT's Peter Shotton and QDAF's Stuart Buck. The site was located at the entrance to Bindaroo Pastures in a small paddock suitable for ongoing review of the leucaena and for finishing or backgrounding smaller numbers.

Bindaroo Pastures 10ha irrigated trial site was planted on 29 January 2019 in twin rows with 7m spacings and 80cm centres. A lower emergence percentage (50%) resulted in a replant undertaken on 21<sup>st</sup> February 2019 which resulted in the more acceptable 70% germination and emergence.

Early establishment of the site was encouraging however a mite infestation at the site in March 2019 hindered subsequent growth. Application of insecticide addressed this issue however the plants did not gain the full benefit of the expected seasonal growth.

In August 2019, the trial paddock was part of the property subjected to a hot fire. 85% of the plantings were affected by the fire of which approximately 40% recovered. The property owners had intended to undertake a re-plant in 2020 however the opportunity to enter the cotton industry, which became permissible in the Northern Territory in 2018, resulted in a re-focus of the business agronomy activities towards cotton and a withdrawal from the trial.

The remaining 40% of leucaena on Bindaroo Pastures remains in place and is utilised as a standard pasture paddock.

### 1.3.2 Blackbull Station

Blackbull had an existing 60ha of established or early established leucaena prior to commencing the trial. This site had experienced significant weed pressure resulting in some establishment issues and an unexpected workload to ensure successful establishment.

Blackbull's manager, Logan Reid determined a trial site located in the middle of Blackbull Station based on the excellent existing pasture growth to complement the leucaena, the existing smaller paddock size, enabling ease of movement of cattle through the leucaena paddocks once established. This decision was also supported with soil testing of the site.

**Blackbull Station undertook the demonstration site planting on 12-13 January 2020 with twin rows with 60cm centres with 10 ha Cunningham at 6m row spacings, 10 ha Redlands at 12m row spacings and 10ha Wondergraze at 18m row spacings. An additional 17 ha of Cunningham at 6m row spacing was also planted to fill the trial paddock.**

### 1.3.3 Malilangwe

An interest in maximising Malilangwe's grazing productivity led Brett and Suzanne Gill to participate in this establishment trial.

Two sites were considered on Malilangwe however after consultation, one site was deemed preferable. This was also supported by soil tests.

Despite a significantly reduced rolling average rainfall for Malilangwe over 2019 and the beginning of 2020, the trial plantings were undertaken on what was classed as 'dry' conditions for the NT wet season on 31 January 2020. Planting was based on forecasted imminent follow up rain. However, with a lack of follow up rainfall and any significant rain events for the remainder of the wet season, germination was very poor, at approximately 40%.

A review of the plantings in April 2020 identified additional establishment losses due to the dry conditions with ongoing establishment at approximately 20% and a high level of seedling stress.

Due to the low and uneven Leucaena row establishment, dry conditions and the unlikely result of much of the Leucaena surviving the dry season it was decided to utilize the available pasture for cattle grazing (dry season) and re-plant the trial next wet season (2020 – 2021)

A successful re-plant was undertaken on 20 January 2021 with twin rows with 75cm centres. 3.5 ha each of Cunningham, Redlands and Wondergraze was planted in 7m row spacings and an additional 3.5 ha each of Cunningham, Redlands and Wondergraze was planted in 14m row spacings. Improved pasture of Jarrah grass was planted the following day in 5m strips between the 7m leucaena rows and 10m strips between the 14 metre rows. The plant was successful with 80% germination however heavy predation in rows closest to retained bushland was experienced, resulting in 70% establishment.

A light graze was undertaken 11 months after establishment with several grazes during the following wet season.

### 1.3.4 Douglas Station

Tony Hayne of 'Douglas Station' commenced the trial with intentions of establishing a total 1000ha of leucaena over a two-year period. Insufficient, consistent rain prevented initial planting of the trial

followed by a refocus of the business agronomy activities to cotton resulting in a withdrawal from the trial.

## 2. Objectives and Outcomes

**By August 2022 the PDS activities will:**

**1. Demonstrate the most suitable leucaena-grass pasture system for northern Australia across 4 to 6 sites in NT by:**

*a. Assessing optimal row spacing 6 m to 18 m for dryland and 3.6 m or 7.4 m for irrigated Leucaena-grass pastures for long term success and viability.*

As noted, the irrigated leucaena at Bindaroo Pastures was planted in twin rows with 80cm centres and seven metre row spacings. This was deemed optimal for both pasture growth and machinery access. Due to the subsequent decimation of the trial plot by fire, further assessment on the suitability of this row spacing was not possible.

After undertaking a six-month, dry season grazing trial, Blackbull Station's preferred row width for the smaller paddock and more intensive grazing management was 7m, however it is expected that any future plantings will be on a larger scale with 12m row spacings.

Brett and Suzanne Gill have found that due to the amount of jarrah grass required to balance large quantities of available leucaena from all cultivars, the 14 metre, twin rows with 750mm centres is the preferred row spacing for Malilangwe's plantings. They believe this spacing ensures that cattle receive sufficient nutrients from both pasture species for maximum weight gain and allows them to turn cattle off the paddock with both leucaena and grass at similarly grazed levels.

*b. Assessing the most suitable leucaena cultivar for each trial site*

A review of Blackbull's plantings at six months indicated that whilst plant height, population and growth varied significantly over the entire trial paddock, one specific cultivar could not be identified as experiencing better or worse establishment. Due to the drier conditions in the initial twelve months of establishment, all three varieties had some leaf drop and small plants < 0.2 m high appeared stressed due to no significant rainfall since early establishment.

Full establishment and subsequent grazings have indicated that either Cunningham or Wondergraze have performed better on Blackbull Station with similar biomass and recovery with a slight preference for Wondergraze. Redlands has not performed as well as expected and has exhibited a very low biomass.

Both Malilangwe's first and second plantings also indicated that there was not one variety which experienced better or worse establishment, plant population or growth. However, once fully established, the Wondergraze variety had more foliage and biomass consistently across grazings. It is to be considered whether the Cunningham plantings were disadvantaged, being the variety closest to the native bushland and more susceptible to predation.

As with Blackbull, the Redlands variety on Malilangwe has a lower biomass, compared to the other two cultivars.

Whilst, based on previous trials undertaken on the Douglas Daly Research Farm, it is expected that the Douglas Daly region will experience some psyllid pressure in the future, it is not expected that it will

be significant enough to dramatically affect the productivity of the non-psyllid varieties of Wondergraze or Cunningham. In more coastal areas of northern Australia, where psyllid pressure can be intense, the Redlands variety would be more suitable, exhibiting increased tolerance of psyllids and a quicker recovery from infestations.

*c. Determining and documenting effective management strategies to address seasonal growth issues of leucaena-grass pastures*

The definitive wet and dry seasons experienced by the Northern Territory's Top End provides both benefits and challenges in the establishment and long-term management of leucaena as part of a grazing system.

Site Preparation

The Top End long-term average wet season rainfall of more than 1200mm usually ensures sufficient soil moisture for successful leucaena establishment however difficulties can be experienced in site preparation. The rampant pasture and weed growth resulting from the rainfall and warmer days can provide a high level of ground cover to remove by either mechanical or chemical means to enable seed planting and soil contact for pre-emergent herbicides.

The propensity for monsoonal rains and resulting potential soil erosion on bare ground may limit the site preparation for leucaena plantings to strip cultivation through mechanical or chemical methods rather than full paddock cultivation to enable the sowing of improved pasture concurrently. This is an individual decision for each grazier to balance the erosion risk with increased weed pressure on the emerging seedlings.

No-till planting, whilst mitigating some of the risks of excessive overland flow, seed dispersion and erosion can result in low emergence and establishment due to weed or existing pasture pressure smothering the new seedlings.

Establishment

The tropical monsoonal climate generally provides an assurance of significant rainfall throughout the wet season enabling a level of confidence in being able to establish leucaena. However, like most areas of Australia, this rainfall can be patchy and not consistent across a region, resulting in either inadequate soil moisture for planting or early establishment stress or failure due to an unexpected early end to the wet season.

The monsoonal rains, if received at germination or very early establishment can result in significant seed or seedling loss due to the overland flows and/or erosion.

Weed Pressure

The Top End's monsoonal rains generally provide excellent soil moisture and establishment conditions for other plants, pastures and weeds as well as leucaena. This can result in excessive weed pressure and requires a high level of management to remove the weed pressure from the fledgling leucaena seedlings through mechanical or chemical means.

Row Spacing

The definitive wet and dry seasons experienced by the Top End of the Northern Territory provides for high levels of growth of both the leucaena and inter-row pasture during the wet season and low or no growth for inter-row pasture and minimal growth for the leucaena during the dry season. This enables high levels of grazing pressure during the wet season with rapid regeneration of both the leucaena and grass pasture. The dry season requires a higher level of management to ensure the

grass pastures are not sacrificed to maximise the grazing opportunities presented by the more resilient leucaena. The wider row spacing of up to 14m preferred by the trial producers is expected to provide sufficient pasture for even grazing.

### Long-Term Management

The excessive plant growth exhibited by all flora during the NT Top End's wet season requires vigilance in the management of 'volunteer' leucaena that may establish between rows or outside of the planted area. The corresponding increased levels of herbivore predation assists to mitigate the establishment of volunteer leucaena seedlings however if unchecked, good seasons can result in increased unwanted leucaena establishment requiring an increased workload for removal.

## **2. Quantify the benefits of leucaena-grass pasture system through a minimum of one round of grazing trials at each site.**

The successful establishment of the Blackbull Station and Malilangwe leucaena trials enabled the completion of one live weight gain trial on each property.

Blackbull Station's grazing trial on the leucaena trial paddocks commenced in June 2021 with 88 weaners with an average weight of 102.9kg, inducted on the 28 June. The weaners were removed from the paddock on 9 December 2021 with an average weight gain of 55kg. This daily weight gain of 0.3kg unsupplemented compares favourably with expected weight gain from unimproved pastures during the dry season of 0.1kg – 0.2kg supplemented.

Due to the later successful establishment of the leucaena trial on Malilangwe, a shorter-term live weight gain trial was undertaken at the end of the wet season 2022. The trial included a heavier stocking of 88 head for a period of 27 days with an average daily gain of 1.3kg per head per day. This gain is in line with the expectations of newly established leucaena in a good wet season in the region, based on historical trials undertaken at the Douglas Daly Research Farm.

Historical leucaena and pasture trial results from the Northern Territory Department of Industry Trade and Tourism's Douglas Daly Research Farm is expected to be published as part of P.PSH.2006 by May 2023.

## **3. Promote best management practice to 100 other producers and graziers across a minimum of four field days throughout the three-year period.**

The Sustainable Long Term Leucaena Grass Production in Northern Australia project objectives and periodic outcomes has been showcased through four project Field Days and at three Northern Territory Agriculture Field Days.

As part of the desired outcomes of the trial producers to have increased exposure to experienced leucaena producers and industry, each Field Day included a visit by an established leucaena producer or industry representative. Visits to each trial site and discussions with each individual trial producer were also undertaken to maximise the value of attendance of the guest producer.

The initial Field Day was held at the commencement of the project, specifically for information sharing and integration of the four individual sites located in the Douglas Daly region. The day commenced with a Leucaena 101 with agronomist Stuart Buck of Queensland Department of Agriculture and

Fisheries and researcher Peter Shotton of the NT Douglas Daly Research Farm.

The trial producers benefitted from the knowledge of more than forty combined years involvement with the leucaena industry, with a focus on the available research into the establishment and management of leucaena in the Northern Territory complementing current best practice for leucaena and establishment in Queensland.

Following the workshop, all project producers visited the four individual properties and the relevant trial sites.

The second, public Field Day was held on Thursday 10<sup>th</sup> October 2019. This was organised primarily by the DPIR (now DITT) and included a workshop incorporating the basics of leucaena establishment and management, natural resource mapping, NT pasture updates, legume agronomy, an introduction to MLA's Profitable Grazing Systems program and leucaena live weight gain trial results to date (P.PSH.2006). QDAF's Craig Lemin was in attendance to assist the trial producers and provided an overview of the results to date of the Pinnarendi, FNQ leucaena variety and productivity trial. The day culminated with a site visit to 'Bindaroo Pastures' where trial producer Chris Howie was able to provide a first-hand account of his experiences with leucaena establishment and management including weed pressure and fire. MLA's Grassfed Program Manager, Nigel Tomkins was able to attend and provide information to the producers on the assistance available to graziers through MLA.

Attendance at the Field Day was reduced by half due to a range of fires burning in the NT including several in the vicinity and towards the WA border where several registered attendees were located. A total of 22 people attended the field day.

The third project Field Day was held on-site at Blackbull Station on Wednesday 4 November 2020, attracting 40 attendees. Photos taken at the event are below (Fig.1-3). The format of the day included presentations by Blackbull Station's Manager, Logan Reid and DDRF's project manager Peter Shotton and Redlands seed producer and grazier Bruce Mayne. Updates on the development of the Northern Territory Code of Practice, University of Southern Queensland's ClimateMate program, Northern Territory Cattlemen's Association and Northern Territory Farmers Association were also on the agenda. Attendees visited both the existing and trial leucaena paddocks to view the full establishment of the earlier plantings and the early establishment of the trial paddocks after which the event finalised with the opportunity for further discussion over a barbecue dinner.

**Figure 1: Presentations in the Blackbull Shed**



**Figure 2: Blackbull Station's Manager Logan Reid presents at the Field Day**



**Figure 3: Field Day attendees view the Blackbull trial**



The project activities concluded with a final multi-site Douglas Daly Field Day which commenced in the paddock at Malilangwe with producers Brett and Suzanne Gill providing an update on the trial and subsequent productivity increases (Fig. 4). The day progressed to Blackbull Station where Logan Reid discussed Blackbull Station's leucaena experiences and visiting producer Tom Saunders of Whitewater Station gave an overview of his leucaena under trees trial to add value to uncleared land in far north



Queensland. Updates were also provided on the Northern Australia live weight gain trial and the industry activities of NT Farmers, NTCA, ClimateMates and NT NRM. The 22 attendees proceeded to view the Blackbull Station's leucaena plantings prior to progressing to the Douglas Daly Research Farm for further discussion and dinner.

All attendees at all Network Field Days were provided with information packs including Fact Sheets, Case Studies, MLA Leucaena Guide, Membership form, Network overview and presentation handouts.

**Figure 4: Malilangwe's Brett Gill presents in the trial**



Feedback from the core producers at the conclusion of the project is shown in table 1.

**Table 1: Project feedback from core producers.**

<b>Assessment Criteria</b>		<b>Rating</b> (1 = little 10 = considerable)
Average Confidence and Knowledge Prior to Project Participation		4.5
Average Confidence and Knowledge After Project		8
Percentage change in Confidence and Knowledge		78%
Success of project in meeting desired outcomes		9
Overall satisfaction with participation in the project		9
Propensity to Consider Further Leucaena establishment		8
<b>Survey commentary</b>		
Project outcomes:	<ul style="list-style-type: none"> <li>• Interactions with other growers have been useful and enjoyable.</li> <li>• Still undecided on row spacings.</li> <li>• Feed ratio query still to be answered.</li> <li>• Lots of trial and error but definite learnings.</li> </ul>	

Project Participation:	<ul style="list-style-type: none"> <li>• Time constraints not envisaged at the commencement of the trial limited my ability to fully participate.</li> <li>• Unable to participate in the other producer visits due to time constraints.</li> </ul>
Main Benefit of Participation:	<ul style="list-style-type: none"> <li>• Confidence in leucaena's fit for my operation.</li> <li>• Ending up with a productive 30ha stand of leucaena has proved the value and potential of this plant to provide high value protein to our cattle.</li> <li>• Determining the best varieties and the different ideas on establishment.</li> </ul>
Future Plantings:	<ul style="list-style-type: none"> <li>• Target of 500ha when funds allow.</li> <li>• 1,000ha is still the aim however timeline may be extended due to the introduction of significant cotton plantings requiring the reallocation of resources.</li> <li>• Unsure due to sale of property.</li> </ul>
Future Activities or Improvements:	<ul style="list-style-type: none"> <li>• Financial funding through MLA to DITT to do research on Douglas Daly Research Farm (DDRF) and to The Leucaena Network to facilitate further producer involvement in trial sites.</li> <li>• Inclusion of funding for fencing (exclusion) to enable a better trial on row spacing</li> <li>• Field visits with experienced members; executive to advise on the latest trends and growing tips.</li> </ul>

Feedback from attendees at the Douglas Daly Field Days is summarised in table 2.

**Table 2: Field Day Feedback Summary**

Douglas Daly Field Day Responses	November 2020	May 2022
<b>Number of Attendees</b>	<b>40</b>	<b>22</b>
Number of Responses	15	12
Grazier Responses	9	8
Consultants / Industry	6	4
Current Leucaena Plantings (ha)	72	117
Planned Leucaena Plantings (ha)	530	2210
Average Confidence and Knowledge Prior to Attendance ( <i>rating 1 = little 10 = considerable</i> )	4	7.5

Average Confidence and Knowledge After Attendance ( <i>rating 1 = little 10 = considerable</i> )	6	8
Percentage change in Confidence and Knowledge	91.50%	18%
Percentage of high level of satisfaction in attendance (rating of 7 or above)	100%	100%
<i>Average Propensity to Consider Leucaena - Grass grazing system (rating 1 = little 10 = considerable)</i>	8.5	9
<b>Survey commentary</b>		
	<b>November 2020</b>	<b>May 2022</b>
How could the field day be improved? (comments)	<ul style="list-style-type: none"> <li>Actual leucaena planting</li> <li>Planting methodology</li> <li>A better screen for powerpoint presentations</li> <li>Provide a copy of the presentations</li> <li>A follow up on what Logan does would be good.</li> </ul>	<ul style="list-style-type: none"> <li>More data</li> <li>Perhaps a little more information on the effects on cattle for those who do not know anything about the plant eg Rumen bug.</li> <li>I loved the presentations last year - more photos of Qld</li> </ul>
Further comments / future activities?	<ul style="list-style-type: none"> <li>Many questions were not relevant, but the information was helpful.</li> <li>Excellent day. As usual, well done. Blown away by the development in the area.</li> <li>Have the confidence to recommend planting leucaena.</li> <li>It was a thorough and engaging day – excellent!</li> <li>A great field day with great speakers.</li> </ul>	<ul style="list-style-type: none"> <li>Ran very well - lots of information.</li> <li>The Field Days are great. Interactive events on the ground!</li> <li>Timing of a field day to match green / growth phase and number of days prior to grazing</li> <li>Hold another field day earlier in the season to see growth and how it is grazed with the pasture</li> </ul>

The Sustainable Long Term Leucaena Grass Production in Northern Australia project was also showcased at two Northern Territory Department of Industry, Tourism and Trade field days held at the Douglas Daly Research Farm.

All PDS producers attended the initial NT Field Day at Douglas Daly Research Farm held 11 April 2019, attended by more than 70 graziers, industry, and service providers. QDAF’s Stuart Buck, The Leucaena Network’s Bron Christensen and DPIR’s Peter Shotton provided an overview of the trial, leucaena establishment, the Leucaena Code of Practice and the DDRF’s utilisation of its leucaena stands (Fig 5-7). This presentation was undertaken in the DDRF paddocks, in the leucaena.

**Figure 5: DITT’s Peter Shotton presenting on leucaena at the NT**



**Figure 6: PDS Producers at the NT Field Day. Logan Reid, Tony Hayne, Suzanne Gill and Chris Howie**



**Figure 7: TLN’s Bron Christensen presented on the project at the NT Field Day**



The 2021 Northern Territory Department of Industry, Tourism and Trade (DITT) Field Day was hosted at the Douglas Daly Research Farm on 28 and 29 April (Fig 8 and 9). Updates on this leucaena establishment project (L.PDS.1909) and the Northern Australian Grazing Trial Value Chain Economics for Leucaena PDS (P.PSH.2006) were presented to the 40 attendees as part of the day’s program.

**Figure 8: DITT’s presenting at the 2021 NT DITT Field Day**



**Figure 9: DITT’s presenting at the 2021 NT DITT Field Day**



All attendees at the NT DITT Field Days were provided with the opportunity to take an information pack including Fact Sheets, Case Studies, MLA Leucaena Guide, Membership form, Network overview and presentation handouts.

Fliers Promoting the Field Days are included in Appendix Three. All events were promoted through The Leucaena Network database, the NT DITT database, FutureBeef, social media and through the Northern Territory Cattlemen’s Association and NT Farmers.

Promotion of the Field Days and an overview of each Field Day's activities were included in the bi-monthly newsletter of The Leucaena Network, distributed to more than 700 industry personnel and graziers.

Media promoting the project and field days is included in Appendix Four. In addition, an interview with Matt Bran of ABC Northern Territory's Country Hour, recorded at the Blackbull Station Field Day in November 2020 and featuring The Leucaena Network's Bron Christensen and Blackbull Station's Logan Reid can be listened to at <https://www.leucaena.net/blackbull-station-establishment-sit>

**4. Increase the adoption of best practice leucaena-grass pastures by 10% of the observer producers by the end of the three-year period. This will be assessed through an annual electronic survey of all field day or activity attendees.**

The observer producers' feedback is summaries in table 3.

**Table 3: Observer Producers Survey Summary**

<b>Field Day Responses</b>	
Number of Attendees	98
Number of Responses	5
Grazier Responses	2
Consultants / Industry	3
Current Leucaena Plantings (ha)	30ha
Planned Leucaena Plantings (ha)	546ha
Average Confidence and Knowledge Prior to Attendance (rating 1 = little 10 = considerable)	4
Average Confidence and Knowledge After Attendance (rating 1 = little 10 = considerable)	7.4
Percentage change in Confidence and Knowledge	85%
Percentage of high level of satisfaction in attendance (rating of 7 or above)	100%
Percentage change in considering a Leucaena - Grass grazing system	106%
Activity / Field Day Comments	<ul style="list-style-type: none"> <li>• Satisfied with the field day. Still keen to establish.</li> <li>• Happy with what was covered across multiple field days.</li> <li>• Getting to the cold drinks a bit quicker - folks were standing around chatting for too long and it was hot!</li> </ul>
Further comments / future activities?	<ul style="list-style-type: none"> <li>• Periodic reports in the Leucaena newsletter on how local leucaena is going</li> </ul>

	<ul style="list-style-type: none"> <li>• Follow up trials for longer term data on management in efficacy in grazing</li> <li>• Sites in different rainfall/climatic zones eg Douglas Daly vs Katherine / Mataranka etc</li> <li>• Trial to evaluate required grass pasture % to leucaena %</li> <li>• Knowing more about when to plant so that money isn't wasted when a crop is likely to fail</li> </ul>
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***5. Provide capacity building through upskilling of local agronomy services in Leucaena best practice through the provision of two Leucaena 101 workshops focussing on advisory and extension knowledge.***

As noted in 2.3 a Leucaena 101 workshop for Trial Producers was held on 12<sup>th</sup> April 2019 to enable the attendance of Stuart Buck. Stuart has been involved with The Leucaena Network and the industry for more than 20 years and could bring extensive experience and information to the Northern Territory producers. Stuart was able to co-present the workshop with Peter Shotton. It was commendable that the focus of the workshop was not how leucaena is traditionally established and managed in Queensland, where most of the research has been conducted but on utilising the available research and information to complement what is known about establishing legumes and pasture in the NT, and particularly in the Douglas Daly region.

To capitalise on the attendance of many of the NT's agronomists and extension officers at the NT Field Days, it was decided to host the agronomy and service providers' upskilling as part of the producer 101 workshop. The original Leucaena 101 workshop was extended to incorporate a greater focus on the agronomy of leucaena which provided the PDS producers with an expanded knowledge of the requirements of successful leucaena establishment.

All subsequent field days were attended by a range of NT Top End agronomists and service providers, providing ongoing opportunities for further knowledge-sharing and skill enhancement. Collaborative working relationships have now been established between several agronomy services, producers and The Leucaena Network, enhancing the opportunity for localised specialised advice on best practice leucaena establishment and management in the Northern Territory.

***6. Development of case studies on each producer site (4 to 6) documenting trial processes, outcomes and feedback for dissemination through The Leucaena Network channels, NTDPIR, NTCA, NT Farmers, Future Beef and MLA media.***

Case studies of the two fulfilled trial sites have been developed.

The Blackbull Station Case Study focussed on early establishment and management, was developed in early 2021 and was distributed to attendees at all subsequent Network activities including workshops, field days and presentations; and the Leucaena Network stands at Beef 2021, Northern Territory Cattlemen's Association Conference 2021, NT Farmers Food Futures Conference 2021 and the Northern Beef Producers Expo 2022.

The Malilangwe Case Study covered both the leucaena establishment and productivity findings and was developed for distribution to all enquiries eventuating from attendance at the NTCA 2022



Conference, the NT Farmers Food Futures Roadshow 2022, the Northern Beef Producers Expo 2022 and the final project Field Day.

Both case studies will continue to be included in the information package of Fact Sheets, Flyers and Case Studies provided to all enquirers or attendees at all Network events.

Case studies are available for viewing at Appendix Five.

Logan Reid and Brett Gill were included in the Network's 'Talking Leucaena' video that was on display at Beef 2021, NTCA 2021 and Food Futures 2021. A link to this video is also included in emailed information packages to all potential producers. This video may be viewed at

<https://www.leucaena.net/talkingleucaena>

An overview of the project including activities and updates on all four sites and video footage of the four PDS producers discussing the project is available for viewing at The Leucaena Network's website at <https://www.leucaena.net/northern-territory-establishment-tr>

Periodic project updates from the trial producers and event reports including field days were uploaded to the Leucaena Network's Facebook page, which has more than 950 followers.

### **3. Northern Territory Code of Practice**

An integral, but unplanned component of the Sustainable Long Term Leucaena Grass Production in Northern Australia project was reinforcing the social licence of the leucaena industry in the Northern Territory through the development of a bespoke Northern Territory Best Management Code of Practice for Establishing and Managing Leucaena Pastures. This code of practice builds on the existing Queensland based Code to provide specific guidelines for paddock, property, and waterway boundaries as well as additional information regarding the benefits of leucaena and the delineation between common and grazing leucaena.

The development of the Code was a three-year consultative process between The Leucaena Network, the Northern Territory Government, and local producers.

The final Northern Territory Best Management Code of Practice for Establishing and Managing Leucaena Pastures was launched at the final project field day held in the Douglas Daly in May 2022.

A copy of the Northern Territory Best Management Code of Practice for Establishing and Managing Leucaena Pastures is attached in Appendix Six.

### **4. Conclusion**

The Sustainable Long Term Leucaena Grass Production in Northern Australia project demonstrated the suitability of leucaena to improve grazing productivity in the Douglas Daly region of the Northern Territory.

The Northern Territory's distinct wet and dry season provides some security of suitable conditions for the planting and early establishment of leucaena, however this distinction does not provide for the possibility of out-of-season rainfall should the wet season be less than average. Consequently, graziers must plant to each year's conditions. The monsoonal climate of the Top End of the Northern Territory requires careful planning for germination and early establishment to limit the risks of erosion, seed dispersal, crusting and once fully established, intense weed pressure.

Whilst leucaena has demonstrated its hardiness in challenging conditions, to maintain long-term productivity, careful management of the grazing of leucaena throughout the dry season is required. As demonstrated in previous research projects, the ability for producers to access qualified and experienced advice and information during the ground preparation stage through to establishment is a key component of successful and productive leucaena plantings.

Once established, leucaena has demonstrated the capacity to assist with the ‘protein drought’ experienced by graziers during the dry season and provide improved weight gains during the wet season. In addition, leucaena enables increased stocking capacity compared to native pastures. The project has demonstrated that whilst the Douglas Daly region may experience some psyllid pressure on leucaena plantings, this pressure has not been significant and non-psyllid tolerant varieties of Wondergraze and Cunningham are most suitable for the region. Row spacings of 7 to 14m (depending on acreage of planting and desired grazing management) with twin rows was most suitable for both producers who were able to successfully establish and utilise their leucaena trial.

The potential for further successful leucaena plantings in the Northern Territory has been demonstrated however concurrent to the commencement of this project was the opportunity for graziers to diversify with alternative crops including horticulture and cotton. These opportunities, whilst reducing the initial propensity for leucaena establishment, will result in graziers gaining knowledge and experience of farming systems to the benefit of future leucaena plantings; and additional financial security and capacity for grazing expansion, development, and value-adding through leucaena.

Opportunities for further assistance to the Northern Territory’s leucaena industry include further assessment of indicative ratios of dry feed to leucaena required for optimum productivity throughout both the dry and wet seasons; ongoing exposure to experienced leucaena producers for knowledge sharing; and the ability to access qualified advice at all stages of the leucaena journey, particularly until grazing commences.

#### **4.1 Key Findings**

- The Douglas Daly region of the Northern Territory is suitable for the inclusion of leucaena – grass pastures in grazing systems.
- The Northern Territory’s distinct wet and dry seasons provide both security of expected rainfall and parameters which limit the leucaena planting season within the wet season.
- The monsoonal climate of the Northern Territory requires planting strategies to limit erosion and seed dispersal from heavy rainfall and strong management capabilities to mitigate weed pressure.
- The Douglas Daly region of the Northern Territory exhibits low psyllid pressure enabling graziers to utilise all current leucaena varieties.
- The preferred variety of trial producers is Wondergraze.
- The preferred planting row width of trial producers for subsequent plantings on a larger scale will be 12 – 14 metres.
- When fully established, leucaena- grass pastures have the potential to increase both productivity and stocking rate of grazing properties in the Douglas Daly region of the Northern Territory.
- The propensity for the development of grazing land with leucaena, legumes and improved pastures in the Douglas Daly region has been tempered with the increasing adoption of diversification crops including horticulture and cotton.



## **4.2 Benefits to industry**

With more than 7.5million ha of land in the Northern Territory suitable for the successful establishment of leucaena, there is the potential for significant productivity gains for the Northern Territory beef industry from the inclusion of leucaena-grass grazing systems. The provision of high value fodder throughout the dry season will assist to mitigate the protein drought currently experienced by northern graziers and enable increased productivity through improved weight gain, shorter turn off and increased range of markets.

The activities of the project producers, as documented in the attached case studies, provide other graziers interested in establishing leucaena grass pastures with a template of their strategies for successful establishment. In addition, the project producers have shown a willingness to be industry champions, generously providing advice and assistance to potential producers.

The capacity building of the Northern Territory's agricultural service providers through attendance at the project's workshops and field days will continue to pay dividends for the north's grazing industry through the provision of qualified advice, assistance, and linkages.

## 5. Appendix

### 5.1 Core Producer Pre-Project Surveys

#### 5.1.1 Bindaroo Pastures



**MLA Producer Demonstration Sites**  
Pre project survey  
Core Participants

**PDS Name:** Sustainable Long Term Leucaena Grass Production in Northern Australia  
**PDS Code:** 1909

The following questions are used to determine your level of understanding of leucaena - grass pastures. The knowledge and skills audit is used at the start and completion of the program to allow individuals to track their skill development and adoption of new practices. It will also be used:

- To improve the content of future project meetings, and
- As part of the evaluation process for the project.

The information will be completely confidential and individuals will not be identified in the analysis of data.

**Name:** Chris and Arvinda Herrie  
**Date:** 09/12/2019

MLA may contact me to further assess the impact of their programs?  Yes  No

MLA may send me newsletters and inform me of future events?  Yes  No

The information you are providing on this form may be accessed information under the Privacy Act. Your personal information is collected for the business purposes of MLA and will not be disclosed to anyone else except to fulfill a legal obligation. It is acknowledged that the privacy standards of these organisations in relation to your information have been obtained. MLA's privacy policy can be accessed directly from MLA's website: www.mla.com.au. If you have any queries or concerns about the collection, use, storage or disclosure of your personal information, please contact MLA's privacy officer at 1800 082 000. MLA will not be able to provide you with personal information or answer any queries if you do not provide your contact details. Your personal information will not be provided to any other person without your consent. The information collected is used to provide you with services and information by visiting MLA's website: www.mla.com.au. 1800 082 000.



**Section A – Demographic Information**

**A1. Your contact details**


- Property name: Bindaroo Pastures
- Business / trading name: Hands on Agriculture
- Property address: 6720 Osloe Road, Douglas Daly NT 0822
- Postal address: PMB 190 Winnelle
- Email address: howehris10@gmail.com
- Phone: 08 80782030
- Mobile: 0428 810561

**A2. What area do you manage? (please write the number of hectares that you managed)**

- Hectares: 5400ha
- Other than the planned PDS trial plantings, please indicate your:
  - Current leucaena plantings: 10 hectares
  - Planned leucaena plantings: 5 hectares
- Timeframe for planned leucaena plantings: months or years

**A3. What numbers of livestock do you run? (please write the number of head against each of the categories of livestock that you run)**

- Number of beef breeders: 900 agisted on another property, 150 on Bindaroo
- Number of cattle turned off per year: 600
- Total number of cattle: 900 agisted and 1600
- Number of ewes: 13
- Number of lambs turned off per year: 12
- Total number of sheep: 13
- Number of goats turned off per year
- Other: 17 horse, 1 donkey



**Section B – Knowledge and Skills**

**B1. What was your main motivation in participating in this PDS?**

---

**B2. On a scale of 1 (no knowledge) to 10 (very knowledgeable) how would you rate your knowledge and skills in relation to establishment and management of Leucaena?**

1 2 3 4 5 6 7 8 9 10  
No knowledge Very knowledgeable


**B3. What are the main THREE outcomes you hope to achieve from participation in this PDS in relation to leucaena?**

- Knowledge of successful establishment strategies
- Knowledge of the most appropriate variety for my property
- Knowledge of the most appropriate row spacing
- Knowledge of potential live weight gains/economic returns
- Confidence to invest further in leucaena
- Decision as to whether I want to invest further in leucaena
- Access to DPI/RS services

**B4. What, in your opinion, are the three most important aspects when establishing leucaena?**

- Climate
- Soil suitability
- Seed variety
- Seed inoculation
- Planting depth
- Row spacing
- Other (please describe)
- History and ground preparation up to 2 yrs before planting

L. Planter and its ability to plant into your area at a consistent even dig



**B5. Do you currently undertake any farming based activities in addition to your grazing enterprise?**

- No - grazing only on native pastures
- Own fodder crops
- Fodder crops for sale e.g. hay
- Other (please describe): irrigated and dryland seed and grain crops

**B6. If you undertake farming based activities, do you undertake these activities in-house or contract these services in?**

- In-house
- Contract in

**Section C – Confidence and Practices**

**C1. Prior to commencing this PDS, how confident were you in being able to successfully establish leucaena - grass pastures?**



(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)

1 2 3 4 5 6 7 8 9 10  
Poor Very good

**C2. After completing the Leucaena 191 workshop, how confident are you in being able to successfully establish leucaena - grass pastures?**

(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)

1 2 3 4 5 6 7 8 9 10  
Poor Very good

**C3. Do you currently use the following services?**

	Normal practice	Sometimes	Rarely	Never	Not Applicable
DPR		x			
Private agronomist		x			
Consultant		x			
Other Advisor (other than accountant / solicitor)		x			

**C4. At this early stage, how confident are you that you will proceed to establishing more leucaena-grass pasture systems following the completion of this PDS?**  
*(1 being definitely not confident, 5 being really not sure at this stage and 10 being very confident even without the PDS findings)*

1   2   3   4   5   6   7   8   9   10

Definitely not confident Very confident

**C5. What other information about leucaena or leucaena – pasture systems would assist you?**

\_\_\_\_\_

\_\_\_\_\_

**C6. What other activities could assist you on your leucaena journey? (e.g. visits to other successful leucaena producers / access to services / machinery demonstrations etc)**  
*Visits to other sites, however we are too far away.*

\_\_\_\_\_

\_\_\_\_\_

**C7. What else do you need from The Leucaena Network or DPR to gain the most out of your participation in this PDS?**

????

\_\_\_\_\_

\_\_\_\_\_

### 5.1.2 Blackbull Station




**MLA Producer Demonstration Sites**  
**Pre project survey**  
**Core Participants**

**PDS Name:** Sustainable Long Term Leucaena Grass Production in Northern Australia  
**PDS Code:** 1909

The following questions are used to determine your level of understanding of leucaena – grass pastures. The knowledge and skills built is used at the start and completion of the program to allow individuals to track their skill development and adoption of new practices. It will also be used:

- To improve the content of future project meetings; and
- As part of the evaluation process for the project

The information will be completely confidential and individuals will not be identified in the analysis of data.

**Name:** Logan Reid  
**Date:** / /

MLA may contact me to further assess the impact of their programs?  Yes  No

MLA may send me newsletters and inform me of future events?  Yes  No

The information you are providing on this form may be disclosed information under this Privacy Act. Your personal information is collected for the purposes outlined in this Act and will be disclosed to other members of the network. It is necessary for the purposes of these regulations or other laws administered by MLA. Please contact us for more information. You may contact MLA on 1300 79 79 79 or from their website at [www.mla.com.au](http://www.mla.com.au). By providing your personal information you consent to MLA collecting, holding and disclosing that information in the manner outlined in this form and to providing that information to other members of the network. If you are not already a member of the network, MLA will use your name to contact you and provide you with information on the program. You may contact your member sales, industry relations or general administration team. This information is not to be disclosed to other members of the network. Tel: 1300 79 79 79 or 08 9200 1000.




**Section A – Demographic information**

**A1. Your contact details**

- Property name: Blackbull Station
- Business / trading name: Blackbull Station Pty Ltd
- Property address: Castel Road, Douglas Daly NT
- Postal address: P.O. Box 1718, Coolalinga NT
- Email address: Logan2387@hotmail.com
- Phone: 08 8978 2872
- Mobile: 0428 266 941

**A2. What area do you manage? (please write the number of hectares that you managed)**

- Hectares: 15,000

Other than the planned PDS trial plantings, please indicate your:

- Current leucaena plantings: 00 hectares    Planned leucaena plantings: undecided - hectares
- Timeframe for planned leucaena plantings: \_\_\_\_\_ months or 1-3 years

**A3. What numbers of livestock do you run? (please write the number of head against each of the categories of livestock that you run)**

- Number of beef breeders: 1,000
- Number of cattle turned off per year: 5,000
- Total number of cattle: 5,500
- Number of ewes: \_\_\_\_\_
- Number of lambs turned off per year: \_\_\_\_\_
- Total number of sheep: \_\_\_\_\_
- Number of goats turned off per year: \_\_\_\_\_
- Other: \_\_\_\_\_



**Section B – Knowledge and Skills**

**B1. What was your main motivation in participating in this PDS?**  
To learn more about leucaena and bring more of it to the Northern Territory

**B2. On a scale of 1 (no knowledge) to 10 (very knowledgeable) how would you rate your knowledge and skills in relation to establishment and management of Leucaena?**

1 2 3 4 5 6 7 8 9 10  
No knowledge Very knowledgeable

- B3. What are the main THREE outcomes you hope to achieve from participation in this PDS in relation to leucaena?**
- a. Knowledge of successful establishment strategies \_\_\_\_\_
  - b. Knowledge of the most appropriate variety for my property \_\_\_\_\_
  - c. Knowledge of the most appropriate row spacing \_\_\_\_\_
  - d. Knowledge of potential live weight gains/economic returns \_\_\_\_\_
  - e. Confidence to invest further in leucaena \_\_\_\_\_
  - f. Decision as to whether I want to invest further in leucaena \_\_\_\_\_
  - g. Access to DPIR services \_\_\_\_\_

- B4. What, in your opinion, are the three most important aspects when establishing leucaena?**
- a. Climate \_\_\_\_\_
  - b. Soil suitability \_\_\_\_\_
  - c. Seed variety \_\_\_\_\_
  - d. Seed inoculation \_\_\_\_\_
  - e. Planting depth \_\_\_\_\_
  - f. Row spacing \_\_\_\_\_
  - g. Other (please describe): Weed Control \_\_\_\_\_



**B5. Do you currently undertake any farming based activities in addition to your grazing enterprise?**

- a. No - grazing only on native pastures.
- b. Own fodder crops \_\_\_\_\_
- c. Fodder crops for sale e.g. hay \_\_\_\_\_
- d. Other (please describe): Cotton (270 ha) dryland \_\_\_\_\_

**B6. If you undertake farming based activities, do you undertake these activities in-house or contract these services in?**

- a. In-house \_\_\_\_\_
- b. Contract in \_\_\_\_\_

**Section C – Confidence and Practices**

**C1. Prior to commencing this PDS, how confident were you in being able to successfully establish leucaena - grass pastures?**  
(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)

1 2 3 4 5 6 7 8 9 10  
Poor Very good

**C2. After completing the Leucaena 101 workshop, how confident are you in being able to successfully establish leucaena - grass pastures?**  
(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)

1 2 3 4 5 6 7 8 9 10  
Poor Very good

**C3. Do you currently use the following services?**

	Normal practice	Sometimes	Rarely	Never	Not Applicable
DPIR	x				
Private agronomist	x				
Consultant					
Other Advisor (other than accountant / auditor)					



**C4. At this early stage, how confident are you that you will proceed to establishing more leucaena-grass pasture systems following the completion of this PDS?**

(1 being definitely not confident, 5 being really not sure at this stage and 10 being very confident even without the PDS findings)

1 2 3 4 5 6 7 8 9 10  
Definitely not confident Very confident

**C5. What other information about leucaena or leucaena - grass pasture systems would assist you?**

\_\_\_\_\_

\_\_\_\_\_

**C6. What other activities could assist you on your leucaena journey? (e.g. visits to other successful leucaena producers / access to services / machinery demonstrations etc)**

Visit other producers

**C7. What else do you need from The Leucaena Network or DPIR to gain the most out of your participation in this PDS?**

\_\_\_\_\_

\_\_\_\_\_

### 5.1.3 Malilangwe



**MLA Producer Demonstration Sites  
Pre project survey  
Core Participants**

**PDS Name:** Sustainable Long Term Leucaena Grass Production in Northern Australia  
**PDS Code:** 1909

The following questions are used to determine your level of understanding of leucaena – grass pastures. The knowledge and skills audit is used at the start and completion of the program to allow individuals to track their skill development and adoption of new practices. It will also be used:

- To improve the content of future project meetings, and
- As part of the evaluation process for the project.

The information will be completely confidential and individuals will not be identified in the analysis of data.

**Name:** Brett and Suzanne Gill  
**Date:** 03 / 12 / 2019

MLA may contact me to further assess the impact of their programs?  Yes  No

MLA may send me newsletters and inform me of future events?  Yes  No

The information you are providing on this form may be processed in accordance with the Privacy Act. Full personal information is collected for the purposes of assisting in the development of the PDS and will only be used for the purposes of the PDS. It will not be used for any other purpose. If you have any questions about the information you are providing, please contact the PDS Coordinator at 08 8976 2249 or via email at pds@leucaena.net.au. For more information, please visit the website at leucaena.net.au. The information you are providing on this form may be processed in accordance with the Privacy Act. Full personal information is collected for the purposes of assisting in the development of the PDS and will only be used for the purposes of the PDS. It will not be used for any other purpose. If you have any questions about the information you are providing, please contact the PDS Coordinator at 08 8976 2249 or via email at pds@leucaena.net.au. For more information, please visit the website at leucaena.net.au.



**Section A – Demographic Information**

**A1. Your contact details**

- Property name: Malilangwe
- Business / trading name: BJ & SP GILL
- Property address: 3000 Fleming Road, Douglas Daly NT 0822
- Postal address: P O Box 2000, Palmerston NT 0831
- Email address: malilangwe@actvill.net.au
- Phone: 08 89762249
- Mobile: Brett 0418 773 896 Suzanne 0488 195 753

**A2. What area do you manage?** (please write the number of hectares that you managed)


- Hectares: 2063 ha

Other than the planned PDS trial plantings, please indicate your:

- Current leucaena plantings: 0 hectares Planned leucaena plantings: 30 hectares
- Timeframe for planned leucaena plantings: 1.5 months or \_\_\_\_\_ years

**A3. What numbers of livestock do you run?** (please write the number of head against each of the categories of livestock that you run)

- Number of beef breeders: 900
- Number of cattle turned off per year: 300
- Total number of cattle: 1400
- Number of ewes: \_\_\_\_\_
- Number of lambs turned off per year: \_\_\_\_\_
- Total number of sheep: \_\_\_\_\_
- Number of goats turned off per year: \_\_\_\_\_
- Other: \_\_\_\_\_



**Section B – Knowledge and Skills**

**B1. What was your main motivation in participating in this PDS?**  
To trial leucaena as a protein source to enhance our dry grass feed for the later end of our dry season (August onwards until rain)

**B2. On a scale of 1 (no knowledge) to 10 (very knowledgeable) how would you rate your knowledge and skills in relation to establishment and management of Leucaena?**


1 2 3 4 5 6 7 8 9 10  
No knowledge Very knowledgeable

**B3. What are the main THREE outcomes you hope to achieve from participation in this PDS in relation to leucaena?**

- Knowledge of successful establishment strategies: \_\_\_\_\_ /
- Knowledge of the most appropriate variety for my property: \_\_\_\_\_
- Knowledge of the most appropriate row spacing: \_\_\_\_\_ 2
- Knowledge of potential live weight gains/economic returns: \_\_\_\_\_
- Confidence to invest further in leucaena: \_\_\_\_\_
- Decision as to whether I want to invest further in leucaena: \_\_\_\_\_ 3
- Access to DPIR services: \_\_\_\_\_

**B4. What, in your opinion, are the three most important aspects when establishing leucaena?**

- Climate: \_\_\_\_\_
- Soil suitability: \_\_\_\_\_
- Seed variety: \_\_\_\_\_
- Seed inoculation: \_\_\_\_\_
- Planting depth: \_\_\_\_\_
- Row spacing: \_\_\_\_\_
- Other (please describe): #1 sufficient rainfall \_\_\_\_\_



**B5. Do you currently undertake any farming based activities in addition to your grazing enterprise?**

- No - grazing only on native pastures: \_\_\_\_\_
- Own fodder crops: \_\_\_\_\_
- Fodder crops for sale e.g. Hay: \_\_\_\_\_
- Other (please describe): \_\_\_\_\_

**B6. If you undertake farming based activities, do you undertake these activities in-house or contract these services in?**

- In-house: \_\_\_\_\_
- Contract in: \_\_\_\_\_

**Section C – Confidence and Practices**

**C1. Prior to commencing this PDS, how confident were you in being able to successfully establish leucaena – grass pastures?**  
(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)

1 2 3 4 5 6 7 8 9 10  
Poor Very good

**C2. After completing the Leucaena 101 workshop, how confident are you in being able to successfully establish leucaena – grass pastures?**  
(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)

1 2 3 4 5 6 7 8 9 10  
Poor Very good



**C3. Do you currently use the following services?**

	Normal practice	Sometimes	Rarely	Never	Not Applicable
DPR		yes			
Private agronomist	yes				
Consultant				yes	
Other Advisor (other than accountant / auditor)	Other farmers				

**C4. At this early stage, how confident are you that you will proceed to establishing more leucaena-grass pasture systems following the completion of this PDS?**

(1 being definitely not confident, 5 being nearly not sure at this stage and 10 being very confident even without the PDS findings)

1 2 3 4 5 6 7 8 9 10  
 Definitely not confident Very confident

**C5. What other information about leucaena or leucaena – pasture systems would assist you?**  
 Indicate ratios required of dry feed to leucaena

**C6. What other activities could assist you on your leucaena journey?** (e.g. visits to other successful leucaena producers / access to services / machinery demonstrations etc)  
 Continued networking and discussion with other growers

**C7. What else do you need from The Leucaena Network or DPR to gain the most out of your participation in this PDS?**  
 Cyster fall to forecast rain

### 5.1.4 Douglas Station



**MLA Producer Demonstration Sites**

**Pre project survey**

**Core Participants**

**PDS Name:** Sustainable Long Term Leucaena Grass Production in Northern Australia

**PDS Code:** 1909

The following questions are used to determine your level of understanding of leucaena – grass pastures. The knowledge and skills audit is used at the start and completion of the program to allow individuals to track their skill development and adoption of new practices. It will also be used:

- To improve the content of future project meetings; and
- As part of the evaluation process for the project

The information will be completely confidential and individuals will not be identified in the analysis of data.

**Name:** Tony Hayes

**Date:** 9 / 3 / 2008

MLA may contact me to further assess the impact of their programs?  Yes  No

MLA may send me newsletters and inform me of future events?  Yes  No

The information you are providing on this form may be processed electronically under this Privacy Act. Such electronic information is collected for the purposes of conducting a skills audit and to be included in a report which is used to inform the development of the program. It is important that you provide accurate information at all times. Your information will be used for the purposes of the program and may be shared with other participants in the program. Your information will be used for the purposes of the program and may be shared with other participants in the program. Your information will be used for the purposes of the program and may be shared with other participants in the program. Your information will be used for the purposes of the program and may be shared with other participants in the program.



**Section A – Demographic Information**

**A1. Your contact details**

- a. Property name: Douglas Station
- b. Business / trading name: Faraday Pty Ltd Trading as Northern Veterinary Services
- c. Property address: Oolba Road – Via Adelaide River NT
- d. Postal address: P O Box 185, Noonamah, NT, 0637
- e. Email address: thvet@bigpond.com
- f. Phone: \_\_\_\_\_
- g. Mobile: 0413748217

**A2. What area do you manage? (please write the number of hectares that you managed)**

- a. Hectares: 150,000
- Other than the planned PDS trial plantings, please indicate your:
- b. Current leucaena plantings: 100 hectares Planned leucaena plantings: 1000 hectares
- c. Timeframe for planned leucaena plantings: \_\_\_\_\_ months or ... 2 years

**A3. What numbers of livestock do you run? (please write the number of head against each of the categories of livestock that you run)**

- a. Number of beef breeders: 4000
- b. Number of cattle turned off per year: 2000
- c. Total number of cattle: 12,500
- d. Number of ewes: \_\_\_\_\_
- e. Number of lambs turned off per year: \_\_\_\_\_
- f. Total number of sheep: \_\_\_\_\_
- g. Number of goats turned off per year: \_\_\_\_\_
- h. Other: \_\_\_\_\_

**the leucaena network** **mia**  
MEAT & LIVESTOCK AUSTRALIA

**Section B – Knowledge and Skills**

B1. What was your main motivation in participating in this PDS?  
Increasing increased Leucaena plantings

B2. On a scale of 1 (no knowledge) to 10 (very knowledgeable) how would you rate your knowledge and skills in relation to establishment and management of Leucaena?  
 1 2 3 4 5 6 7 8 9 10  
 No knowledge Very knowledgeable

B3. What are the main THREE outcomes you hope to achieve from participation in this PDS in relation to leucaena?  
 a. Knowledge of successful establishment strategies   
 b. Knowledge of the most appropriate variety for my property   
 c. Knowledge of the most appropriate row spacing   
 d. Knowledge of potential live weight gains/economic returns   
 e. Confidence to invest further in leucaena   
 f. Decision as to whether I want to invest further in leucaena   
 g. Access to DPR services

B4. What, in your opinion, are the three most important aspects when establishing leucaena?  
 a. Climate   
 b. Soil suitability   
 c. Seed variety   
 d. Seed inoculation   
 e. Planting depth   
 f. Row spacing   
 g. Other (please describe) Fertilization and weed control

**the leucaena network** **mia**  
MEAT & LIVESTOCK AUSTRALIA

B5. Do you currently undertake any farming based activities in addition to your grazing enterprise?  
 a. No - grazing only on native pastures   
 b. Own fodder crops   
 c. Fodder crops for sale e.g. hay   
 d. Other (please describe):

B6. If you undertake farming based activities, do you undertake these activities in-house or contract these services in?  
 a. In-house   
 b. Contract in

**Section C – Confidence and Practices**

C1. Prior to commencing this PDS, how confident were you in being able to successfully establish leucaena - grass pastures?  
 (please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)  
 1 2 3 4 5 6 7 8 9 10  
 Poor Very good

C2. After completing the Leucaena 101 workshop, how confident are you in being able to successfully establish leucaena - grass pastures?  
 (please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)  
 1 2 3 4 5 6 7 8 9 10  
 Poor Very good

**the leucaena network** **mia**  
MEAT & LIVESTOCK AUSTRALIA

C3. Do you currently use the following services?

	Normal practice	Sometimes	Rarely	Never	Not Applicable
DPR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Private agronomist	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consultant	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other Advisor (other than accountant / solicitor)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

C4. At this early stage, how confident are you that you will proceed to establishing more leucaena-grass pasture systems following the completion of this PDS?  
 (1 being definitely not confident, 5 being really not sure at this stage and 10 being very confident even without the PDS findings)  
 1 2 3 4 5 6 7 8 9 10  
 Definitely not confident Very confident

C5. What other information about leucaena or leucaena - pasture systems would assist you?  
More NI based research

C6. What other activities could assist you on your leucaena journey? (e.g. visits to other successful leucaena producers / access to services / machinery demonstrations etc)  
More experienced operators visiting our sites to provide advice

C7. What else do you need from The Leucaena Network or DPR to gain the most out of your participation in this PDS?  
Ability to manipulate weather so that my plants are ok

## 5.2 Core Producer Post-Project Surveys

### 5.2.1 Malilangwe

Page 1: Brett and Suzanne Gill, Malilangwe, Douglas Daly, Northern Territory

#### Q1

At the commencement of the project, in the pre-project survey, it was indicated that the motivation for participating in the trial was trial leucaena as a protein source to enhance our dry grass feed for the later end of the dry season. Do you feel the trial has met this outcome and how?

YES AS THE LEUCAENA PROVIDED THE PROTEIN AS REQUIRED

#### Q2

The three main outcomes you wished to achieve from participation in the project were: Knowledge of successful establishment strategies Knowledge of the most appropriate row spacing Decision as to whether I want to invest further in leucaena Have any of these outcomes been met, or partially met, by your participation in the project and if not, what activities could have assisted you in meeting these outcomes?

STILL LEARNING WITH ESTABLISHMENT BUT SECOND PLANTING WAS SUCCESSFUL. ROW SPACING STILL UNDECIDED. WILL INVEST IN MORE LEUCAENA WHEN CAPABLE.

#### Q3

It was previously indicated that there were plans for the 30 ha leucaena in 1.5 years on Malilangwe. Given that Malilangwe was able to successfully undertake the trial planting, do you have future plans for additional plantings and if so, the potential acreage and timeframe?

FINANCIAL SITUATION DOES NOT ALLOW FURTHER PLANTINGS AT THIS TIME. TARGET FUTURE PLANTINGS OF 500 HA COULD BE POSSIBLE.

#### Q4

The pre-project survey indicated your level of knowledge of leucaena was 5 and confidence in establishing leucaena was 3 at the commencement of the project and 7 after participating in the Leucaena 101 workshop. At what level is your knowledge and confidence at now, following the project activities offered and undertaken?

8

#### Q5

The pre-project survey indicated that an expected outcome would be a confidence level of 6 that you would proceed with further leucaena plantings. Has this improved or reduced through participation in project activities?

8

#### Q6

The pre-project survey indicated that project activities which could assist you would include Indicative ratios required of dry feed to leucaena; and continued networking and discussions with other growers. Has the project been able to provide this assistance and, if so, how has it assisted you?

INTERACTIONS WITH OTHER GROWERS HAVE BEEN USEFUL AND ENJOYABLE. FEED RATIO QUESTION STILL TO BE ANSWERED.

#### Q7

What has been the main benefit of your involvement in the project?

ENDING UP WITH A PRODUCTIVE 30 HA STAND OF LEUCAENA HAS PROVED THE VALUE AND POTENTIAL OF THIS PLANT TO PROVIDE HIGH VALUE PROTEIN TO OUR CATTLE THROUGHOUT THE YEAR.

#### Q8

Please advise of your overall satisfaction rating with the project (1 being low and 10 being high) and any comments about this rating and how the project could have been improved.

9

#### Q9

What future activities could be undertaken by The Leucaena Network, DITT or MLA to assist you in undertaking leucaena grazing systems on Malilangwe?

FINANCIAL FUNDING THROUGH MLA TO BOTH DITT TO DO RESEARCH ON DDRF AND TO TLN TO FACILITATE FURTHER PRODUCER INVOLVEMENT IN TRIAL SITES.



## 5.2.2 Blackbull Station

Page 1: Logan Reid, Blackbull Station, Douglas Daly, Northern Territory

### Q1

At the commencement of the project, in the pre-project survey, it was indicated that the motivation for participating in the trial was to learn more about leucaena and bring more of it to the Northern Territory. Do you feel the trial has met this outcome and how?

I believe so but it still has along was to go, there was lots of trial and error but definitely learnt. There are people I believe keen to try it just Don't have the equipment or time to do so

### Q2

The three main outcomes you wished to achieve from participation in the project were: Knowledge of successful establishment strategies Knowledge of the most appropriate variety for my property Knowledge of the most appropriate row spacing Have any of these outcomes been met, or partially met, by your participation in the project and if not, what activities could have assisted you in meeting these outcomes?

Yes establishment strategies have been learnt.

Yes definitely seen better results out of certain variety's.

Unsure on spacings as it really needed to be split into different row spacings.

### Q3

The pre-project survey indicated your level of knowledge and confidence in establishing leucaena was 6 at the commencement of the project and 7 after participating in the Leucaena 101 workshop. At what level is your knowledge and confidence at now, following the project activities offered and undertaken?

8

### Q4

The pre-project survey indicated that an expected outcome would be a confidence level of 10 that you would proceed with further leucaena plantings on Blackbull Station. Has this improved or reduced through participation in project activities or as a result of other circumstances?

9

### Q5

Are there future plans for additional plantings and if so, the potential acreage and timeframe? Or are there alternative plans for the existing leucaena?

Unsure on ha as property has changed hands

### Q6

The pre-project survey indicated that project activities which could assist you would include visits to and from other producers. Has the project been able to provide this assistance and, if so, how has it assisted you?

It did provide but I didn't have time to attend

### Q7

What has been the main benefit of your involvement in the project?

Best Variety's

Different ideas on establishment

### Q8

Please advise of your overall satisfaction rating with the project (1 being low and 10 being high) and any comments about this rating and how the project could have been improved.

8

More funding for fencing to get a better trial on row spacings

### Q9

What future activities could be undertaken by The Leucaena Network, DITT or MLA to assist you in undertaking leucaena grazing systems on Blackbull Station?

Unsure

### 5.2.3 Douglas Station

Page 1: Tony Hayne - Douglas Station, Douglas Daly, Northern Territory

#### Q1

What was the key reason for the withdrawal of Douglas Station from the project? Is there any additional activity the Network or DITT could have undertaken to assist you and enable the full participation of Douglas Station?

Time constraints not envisaged at commencement of trial. Leucaena Network and DITT could not have helped with the issues

#### Q2

At the commencement of the project, in the pre-project survey, it was indicated that Douglas Station had 100 ha established leucaena. It is noted that this has since been removed. Could you please provide a reason for the removal, particularly if it pertains to the level of satisfaction with leucaena as part of your grazing system and potential future development?

It was really poorly established due to my lack of knowledge. Replanting was proposed however trials on cotton were commenced. Leucaena will definitely be planted in the future

#### Q3

It was previously indicated that there were plans for 1,000 ha leucaena to be established on Douglas Station within two years. Is this acreage still relevant and if so, within what timeframe?

The acreage is still the aim, however the timeline may be extended. Due to the introduction of significant cotton plantings resources have had to be reallocated

#### Q4

The three main outcomes you wished to achieve from participation in the project were: Knowledge of successful establishment strategies Knowledge of the most appropriate variety for my property Confidence to invest further in leucaena Have any of these outcomes been met, or partially met, by your participation in the project and if not, what activities could have assisted you in meeting these outcomes?

All 3 have been met through viewing other participants results.

#### Q5

The pre-project survey indicated your level of knowledge of leucaena and confidence in establishing was 5 at the commencement of the project and 6 after participating in the Leucaena 101 workshop. At what level is your knowledge and confidence at now, following the project activities offered and undertaken?

7

#### Q6

The pre-project survey indicated that an expected outcome would be a high level of confidence (9 rating) that you would proceed with further leucaena plantings. Has this improved or reduced through participation in project activities?

10

#### Q7

The pre-project survey indicated that project activities which could assist you would include access to experienced operators visiting the sites to provide advice; and further NT based research. Has the project been able to provide this assistance and, if so, how has it assisted you?

Yes. Field days with participation of Leucaena Network staff and other growers

#### Q8

What has been the main benefit of your involvement in the project?

Confidence in its fit for my operation

#### Q9

Please advise of your overall satisfaction rating with the project (1 being low and 10 being high) and any comments about this rating and how the project could have been improved.

10 for all aspects other than my poor participation.

#### Q10

What future activities could be undertaken by The Leucaena Network, DITT or MLA to assist you in undertaking leucaena grazing systems on Douglas Station?

Field visits with experienced members / executive to advise on latest trends and growing tips

## 5.3 Field Day Flyers

### 5.3.1 Douglas Daly Field Day October 2019



## Northern Territory Agriculture: Pathways to Potential LEUCAENA AND PROFITABLE GRAZING SYSTEMS

Thursday 10<sup>th</sup> October 2019  
DOUGLAS DALY RESEARCH FARM  
PROGRAM

TIME	TOPIC	PRESENTER
7.30am	Breakfast at the social club	
8.45 am	An introduction – Natural Resource (NR) maps training	Caroline Green - DENR
10.15am	MLA – Grassfed beef activities	Nigel Tomkins - MLA
10.30 am	Let's talk Leucaena – economics, establishment, management. Pinnarendi Live Weight Gain Trials Code of Practice	Peter Shotton – DPIR Craig Lemin – QDAF Bron Christensen - TLN
12:00 pm	Lunch and Networking	
12.45 pm	An introduction to improved pastures and grazing management- ecosystem processes, understanding pasture growth and grazing loads. Grazing management on introduced/mixed pastures vs native pasture systems.	Arthur Cameron – DPIR Dionne Walsh - DPIR
1.45 pm	Introduction to NT PGS development and proposed program. Producer consultation and feedback session.	Rebecca Mohr-Bell – Argyll Consulting Ian Golding – Beyond Organic
2.15 pm	'Checking out your Nods' - Legume Agronomy - how to assess if nitrogen fixation is occurring in your paddocks and the basics of soil health.	Ian Golding – Beyond Organic International
3.15pm	Site Visit – Irrigated early establishment leucaena 'Bindaroo Pastures'	Chris Howie
4.45pm	DDRF Leucaena Paddock walk.	Peter Shotton – DPIR Craig Lemin – QDAF
5:30 pm	Networking and Dinner	

Please RSVP to Rebecca Mohr-Bell at [rebecca@argyllconsulting.com.au](mailto:rebecca@argyllconsulting.com.au) for catering and accommodation purposes. Limited accommodation is available at DDRF however you will need to provide your own linen or a swag.

*In the interests of reducing plastic water bottles, please bring your own bottle and water will be available all day for refills!*

the  
**leucaena**  
network





5.3.2 Blackbull Station November 2022

# FIELD DAY

BLACKBULL STATION  
DOUGLAS DALY NT  
WEDNESDAY 4 NOVEMBER 2020

FROM 1pm  
BBQ to follow

- Site visit to view trial plantings of Redlands, Wondergraze and Cunningham Leucaena
- Presentation of the data to hand from the Douglas Daly Research Farm Live Weight Gain Trial
- Leucaena 'Out of the Box' with Bruce Mayne  
Reclaiming stony ridges, planting into banks, irrigated leucaena and dry planting

- **Industry Representatives**

*Complimentary attendance thanks to the support of  
The Leucaena Network, DITT and MLA*

**Register your attendance** for catering purposes by  
**Friday 30th October 2020** to Bron Christensen - EO

The Leucaena Network

**admin@leucaena.net** 0488931691

the  
**leucaena**  
network

  
**mla**  
MEAT & LIVESTOCK AUSTRALIA

  
**NORTHERN  
TERRITORY**  
GOVERNMENT  
www.nt.gov.au

  
**MAYNE  
SEEDS**

www.leucaena.net



5.3.3 Douglas Daly Field Day May 2022

**NORTHERN TERRITORY**   
**LEUCAENA FIELD DAY**  
**WEDNESDAY 4 MAY 2022**

commencing at 1pm at

**MALILANGWE**

**Fleming Road, Douglas Daly**

12 month leucaena with early grazing

Malilangwe's Brett and Suzanne Gill will share their leucaena experiences and their findings from the results of the row spacing and varietal (Cunningham, Redlands and Wondergraze) trial and then onto

**BLACKBULL STATION**

**Cadell Road, Douglas Daly**

2-4 year established leucaena, early management and grazing inclusion

Blackbull Station's Logan Reid will provide insight into how leucaena has improved Blackbull Station's grazing profitability and performance.

including row spacing and varietal trials and live weight gain trial results

**NORTHERN AUST. LWG TRIAL RESULTS**

from Douglas Daly Research Farm, Goshen Station FNQ & Pinnarendi FNQ

**FNQ LEUCAENA UNDER TREES TRIAL**

Whitewater Station's Tom Saunders will provide an overview of the trial to plant leucaena amongst trees in uncleared paddocks - the challenges and the successes

**CURRENT CLIMATE PATTERNS**

**INDUSTRY UPDATES AND MORE**

Afternoon Smoko and BBQ dinner provided

BYO Camping Chair

Complimentary for The Leucaena Network Members

\$30 per person for non-Members

Registration essential at

<https://www.eventbrite.com.au/e/leucaena-field-day-douglas-daly-nt-tickets-256658361067> by 29 April 2022

Bron Christensen at [admin@leucaena.net](mailto:admin@leucaena.net)

or 0488931691

[www.leucaena.net](http://www.leucaena.net)



The Leucaena Network appreciates the support of MLA



### 5.3.4 NT Government Field Day April 2019



## Northern Territory Agriculture: Pathways to Potential KATHERINE AND DOUGLAS DALY FIELD DAYS

Join us at **Northern Territory Agriculture: Pathways to Potential**, two jam-packed field days at two unique Department of Primary Industry and Resources (DPIR) research stations. The field days will have a strong focus on industry development and highlight the potential of diversified farming systems in the Northern Territory (NT).

Meet industry members, view trade displays, hear from producers regarding their experience with diversification and learn about new emerging industries.

Both field days will include a number of presentations in the morning, including:

- Cotton Australia, Adam Kay - overview of the southern cotton industry, addressing misinformation.
- Tipperary Station, David Connelly - a producer's perspective of diversification and integrating cropping and horticulture into an existing pastoral business.
- Darwin Port, Peter Dummett - an overview of how the shipping industry works including considerations for potential exporters and importers.
- Department of Environment and Natural Resources - getting my project off the ground.
- Louie Dreyfus Company, Tony Geitz - cotton market opportunities, the Australian position in the global market place and an introduction to the pricing of Australian cotton.
- Archer Daniels Midland, Damian Bradford - grain market opportunities from Northern Australia
- Feed Central, Cieran Maxwell - national hay market and opportunities for hay in the NT.

Afternoons will provide attendees with the option to view current DPIR research.

#### KATHERINE RESEARCH STATION

**Tuesday 9 April**

~ Livestock ~ Cropping ~ Horticulture ~

- information about birthing sensors and how they are assisting with calf loss research in northern Australia
- preview DPIR's sale select Brahman and composite bulls
- the latest research in beef cattle genetics in northern Australia
- aspects of cover crops, integrated pest management and cucumber green mottle mosaic virus for melon cropping systems
- opportunities for learning about and ordering new mango varieties
- cotton, soybeans, forage and grain sorghum, dryland rice and various species of pasture grass for seed production
- infield discussions with DPIR and other agronomists, market specialists, regulatory bodies and seed suppliers.

&

#### DOUGLAS DALY RESEARCH FARM

**Wednesday 10 April**

~ Livestock ~ Improved pastures ~ Forage crops ~

- impact of maternal phosphorus status and subsequent weaner performance
- using livestock to assist in the control of gamba grass and subsequent livestock performance
- update on the current fly tag trials and how they are performing in the Douglas Daly region
- update on the select Brahman females and where the herd is heading next
- irrigated Leucaena and grazing with mixed pasture inter rows
- infield discussions with The Leucaena Network
- improved pastures such as Nucal and Mulato varieties
- cotton
- potential legume pastures including desmanthus, lucerne, cowpea, blue pea, and burgundy bean production.
- infield discussions with DPIR and other agronomists, seed suppliers and market specialists.

**Please confirm attendance for catering purposes and find out more by contacting:**

Joy Sherlock, Senior Extension Agronomist | [joy.sherlock@nt.gov.au](mailto:joy.sherlock@nt.gov.au) | 0436 425 441 | [www.dpir.nt.gov.au](http://www.dpir.nt.gov.au)

The field days are proudly presented by the Department of Primary Industry and Resources with support from the Department of Environment and Natural Resources, the Northern Territory Farmers Association and the Northern Territory Cattleman's Association.

#### MAJOR SPONSORS



### 5.3.5 NT Government Field Day April 2021



## SAVE THE DATE

The Department of Industry, Tourism and Trade is holding field days at Katherine Research Station and the Douglas Daly Research Farm.

### **Katherine Research Station (KRS) field day** - Tuesday 27 April

- Understanding calf loss in northern Australia
- Phenobank workshop
- It's rained! Now what?
- GRDC modelling
- View DITT Brahman & Composite bulls which will be in the upcoming sale 7 July 2021.

### **Douglas Daly Research Farm (DDRF) field day** - Wednesday 28 and Thursday 29 April

#### **Day 1: Livestock Production**

- Understanding calf loss in northern Australia
- Phenobank workshop
- It's rained! Now what?
- Adding cull cow value
- Gamba grazing management

#### **Day 2: Diversification in the Douglas Region**

- DDRF Leucaena trial
- Cotton in practice
- Best Management Practice workshop
- GRDC modelling

Day 2 is expected to conclude at 2pm.

Treat yourself to a day out, meet like-minded people and be immersed in informative presentations, hands on farm paddock tours, trade displays and machinery galore.

Breakfast and sign in will be held at both events from 8am for a 9.30am start. The day will conclude at 4.30pm at KRS and DDRF day 1 only with drinks and a barbeque.

Book your trade display at the field days by Monday 12 April 2021.

For more information or to book a trade display email Eleanor Fordyce at [eleanor.fordyce@nt.gov.au](mailto:eleanor.fordyce@nt.gov.au) or phone 0456 752 319.

[industry.nt.gov.au](http://industry.nt.gov.au)



**THE TERRITORY**  
BOUNDLESS POSSIBLE



## 5.4 Media

### 5.4.1 Blackbull November 2020 Field Day – Queensland Country Life

The screenshot shows the Queensland Country Life website. At the top, there are navigation links and a weather widget. Below the header, there's a large advertisement for Brangus cattle, including the text "BRANGUS CATTLE SALES" and "brangus.com.au". To the right of the ad is a "ROCKY BRANGUS SALE" banner. The main content area features a news article titled "Perfect summer conditions to improve pastures with leucaena". The article includes a photo of two men in a field and several paragraphs of text discussing the benefits of leucaena for pasture improvement in Northern Territory. Below the article are social media sharing icons and a "Contact Us Today" button. At the bottom of the page, there's a "From the front page" section with four small news items, a "More News" section with a grid of links, and a "Partnership Network" section.



## 5.4.2 Blackbull Field Day – NT Independent

**FIELD DAY DOUGLAS DALY**

November 4, 2020 @ 1:00 pm

**It's the Season for Leucaena**

With predictions from climate specialists that this forthcoming summer will be one of the best years to improve pasture production with the introduction of legumes such as leucaena, The Leucaena Network is keen to work with Northern Territory graziers to ensure the greatest opportunity for establishment and responsible management of the legume.

Leucaena based pastures offer one of the most productive feed-base options for northern beef producers where rainfall and soils are suitable. The recent introduction of the zoylitol tolerant variety, Redlands has provided Northern Territory graziers with the opportunity to capitalise on the increased weight gains and stocking rates from leucaena. The Network, working collaboratively with the Department of Industry, Tourism and Trade's Douglas Daly Research Farm (DDRF) is working with four Douglas Daly graziers to develop trial leucaena plantings to demonstrate best practice establishment and management strategies for leucaena in the Northern Territory.

'Blackbull Station' is one of these sites and will host a Field Day on Wednesday 4<sup>th</sup> November 2020 from 1pm to showcase the station's plantings of different row spacings and varieties of the legume.

"Local knowledge is the one of the key factors in successful establishment and management of leucaena," Glen Christensen, Executive Officer of The Leucaena Network said.

"Much of the information to date has concentrated on plantings in Central Queensland, where the industry has been established for more than 30 years, so these trial plantings will contribute much to the future of successful and responsible establishment of leucaena-grass pastures in the NT.

"This is a valuable opportunity to hear the first-hand experiences, both the successes and the challenges, that have arisen since Blackbull first introduced leucaena to their grazing system in 2017."

In addition to the establishment trial, DDRF is participating in a Northern Australia Live Weight Gain Trial for leucaena-grass pastures and the initial results from this trial will be presented at the field day as well as information and findings from previous trials undertaken at DDRF.

Redlands seed producer Bruce Wayne will also be at the field day to present on some of his "experimental" establishment and management strategies that could be applicable to Northern Territory conditions. These include converting marginal country into productive grazing land with leucaena, planting dry, using banks for maximum water retention and root development and reclaiming stony ridges. Also in attendance will be the University of Southern Queensland's Climate specialists to provide advice on how to effectively interpret weather forecasts to assist with management decisions and why this forthcoming wet season is the best opportunity for pasture improvement for a significant number of years.

Registration to attend the Field Day close on Wednesday 4 November 2020 to [admin@leucaena.net](mailto:admin@leucaena.net) [www.leucaena.net](http://www.leucaena.net)

**You May Like:**

- International Day of People with Disability Carnival of Fun
- Emotional Intelligence 1 Day Training in Darwin
- Employee Engagement 1 Day Training in Darwin
- SAI DAF @ Marston Bar Club
- Kingston Darwin Valentine's Day Sundry Season

**DETAILS**

**Date:** November 4, 2020  
**Time:** 1:00 pm  
**Event Category:** Community Events  
[View Event Website](#)

**VIEW:** Blackbull Station, Blackbull Station on Map

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## 5.5 Case Studies

### 5.5.1 Blackbull Station



## Leucaena – A Game Changer for the NT

### Logan Reid – Blackbull Station

### Douglas Daly Northern Territory



'Blackbull Station' is one of the pick of properties in Douglas Daly region of the Northern Territory however manager Logan Reid is continually looking for ways to improve Blackbull's grazing potential.

When the opportunity arose to be a part of The Leucaena Network's MLA funded Producer Demonstration Site to determine the best leucaena variety and row spacing for the Douglas Daly region, he was keen to involve Blackbull and find out this information, specifically for Blackbull Station.

The demonstration site involved a comparison of germination, establishment and longer-term productivity of the Cunningham, Wondergraze and Redlands leucaena varieties as well as trialing different row spacings at 6m, 12m and 18m across a 47ha trial site.

Logan recognised the need to ensure that Blackbull's soil was suitable for leucaena as the first step.

"Soil tests identified that Phosphorous, Sulphur and Calcium were satisfactory for leucaena with Potassium in the high range but still suitable" he said.

"Once we were assured that we could grow leucaena without the need for a huge amount of external inputs, we were eager to see what the potential of leucaena on Blackbull could be."

Due to erosion concerns, no cultivation was undertaken with herbicides used for site preparation. Planting was undertaken on the 12<sup>th</sup> and 13<sup>th</sup> January 2020 with a Lightning Mechanical two row planter with a picker finger seed drill and fertiliser hopper. Fertilizer Legume Extra (Agfert) was applied at planting.

Details of the ground preparation and plant were:

SITE PREPARATION	
Date:	16 December 2019
Herbicide	<u>2,4-D Amine 625 Herbicide (ADAMA)</u>
Application:	Active Ingredient: 700 g/L 2,4-D present as dimethylamine and monomethylamine salts Product Rate: 1.5 L/ha Application: Blanket spray over entire paddock

Implement Used:	Hardy 30m boom spray. Lilac hardy mini drift nozzles
Date:	17 December 2019
Herbicide Application:	<u>Wipe-Out Bio Herbicide (ADAMA)</u> Active Ingredient: <u>Isopropylamine salt of glyphosate</u> Product Rate: 540g/L 2L/ha Application: Banded spray over rows
Implement:	700lt 3-point linkage 2.2m boom with yellow t jet
Date:	4 <sup>th</sup> January 2020
Herbicide Application:	<u>Wipe Out Bio-Herbicide ADAMA)</u> Active Ingredient: <u>Isopropylamine salt of glyphosate</u> Product Rate: 540g/L 2L/ha Application: Banded spray over rows
Implement:	700lt 3-point linkage 2.2m boom with yellow t jet
<b>PLANTING:</b>	
Date:	12 – 13 January 2020
Implement (for all plantings):	Lightning Mechanical two row Planter (2BFY-2C) with a picker finger seed drill and fertiliser hopper.
Variety:	Cunningham
Total Plantings	10ha plus an additional 17ha outside of trial (to fill paddock)
Row Spacing:	Twin rows with 60cm centres 10ha (trial site) at 6 m row spacing 17ha (additional) at 7m row spacing to finish the paddock
Rate:	2.9 kg/ha Seed at 5cm intervals
Depth:	25mm
Variety:	Redlands
Row Spacing:	Twin rows with 60cm centres 10 ha at 12m row spacing
Rate:	2.9/ha Seed at 5cm intervals
Depth:	25mm
Variety:	Wondergraze
Row Spacing:	Twin rows with 60cm centres 10 ha at 18m row spacing
Rate:	2.9/ha Seed at 5 cm intervals
Depth:	25mm
<b>Fertiliser</b>	
Date:	12 January 2020 Applied at planting

Fertiliser Used:	<u>Legume Xtra AgFert</u> Composition: 7% N, 14 % P, 12% K + 1% zinc Implement Used: Fertiliser hopper on Lightning Mechanical 2 row planter. Product Rate: 220g/m Placement: Placed slightly beside and at depth of seed at planting – 2 – 5 cm.
Herbicide	
Date:	13 January 2020 (day after planting)
Herbicide	<u>Wipe Out Bio-Herbicide ADAMA</u>
Application:	Active Ingredient: <u>Isopropylamine salt of glyphosate</u> Product Rate: 540g/L 2L/ha Application: Banded spray over rows  <u>Spinnaker 700 WDG Application (BASF)</u> Active Ingredient: 700 g/kg Imazethapyr Product Rate: 140 g/ha
Implement:	1 m shielded sprayer on buggy
Pesticide	
Date:	13 January 2020 (day after planting)
Pesticide	<u>Regent 200SC (BASF)</u>
Application:	Active Ingredient: 200g/L Fipronil Product Rate: 10m/ha Application: targeted shield spray over rows
Implement:	1m shielded sprayer on buggy
Germination	
% Emergence:	80%
Resilience:	70%
Comments:	Due to heavy rains, 1% of newly established leucaena is showing signs of waterlogging – slightly off colour. A review on 29 January 2020, indicated that Wondergraze had the highest emergence at 14 spm. Other varieties were around 12 spm.

Logan believes that good site preparation and aiming to get the weed seed bank down prior to planting is essential for good germination and successful early establishment.

“Our wet season provides the ideal time for establishment of leucaena here in the Territory however it brings with it the potential for a prolific amount of weed pressure on the emerging and young seedlings,” he said.



Early Establishment Field Day  
Blackbull Station November 2020



“It is constant work to stay on top of the weed pressure in those first few weeks, even with the herbicides used on the mature plants prior to planting so to plant without trying to reduce the weed pressure before you start would mean so much extra work in the long run.

“Unless you are doing all the preparation required, don’t think about planting.”

An unplanned fire ravaged the paddock three months prior to planting the demonstration site which Logan believes may have assisted with the weed control.

“I am certainly not advocating for fire to be used in pre-plant weed eradication but to look on the bright side, it may have contributed to the easier establishment by the removal of much of the trash which gave a better spray coverage,” he said.

“It’s not a planting strategy we will aim for in our future plantings!”

To combat that early weed pressure, Wipe-Out Bio-Herbicide was applied using a shielded sprayer over the top of the rows about a month after planting. An additional application of Legume Extra was broadcast over the entire paddock a week after this to provide a boost to the young seedlings and pasture between the rows.

Blackbull Station has since undertaken additional leucaena plantings with a total of 67 hectares planted and more planned within the next few years.

The initial trial site has been included into Blackbull’s grazing rotation with a live weight gain trial planned.

“We know that leucaena produces additional live weight gain but it will be good to formalise this with the documentation of actual weights and the assessment of what feed is actually available to the cattle and what they are consuming,” Logan said.

“I believe if leucaena is planted in suitable grazing areas and is managed well, it provides the Territory’s grazing industry with amazing potential.”



*Early established leucaena on  
Blackbull Station November 2020*



*Leucaena and pasture on  
Blackbull Station March 2021*

## 5.5.2 Malilangwe

the  
leucaena  
network



Case Study

### Maximising Grazing Productivity with Leucaena

**Brett and Suzanne Gill**  
**Malilangwe, Douglas Daly NT**



Northern Territory graziers Brett and Suzanne Gill purchased crown lease NT portion 6071 from the NT government in late 2001 as part of the second greenfield land release in the Stray Creek land development precinct in Douglas Daly. As part of the NT government covenant requirement, they began developing the 2063 ha property and secured freehold title in 2004. They continue to work hard to transform Malilangwe into a viable and sustainable mixed grazing and cropping enterprise.

An interest in maximising Malilangwe's grazing productivity led Brett and Suzanne to participate in The Leucaena Network's Northern Territory Leucaena Establishment Producer Demonstration Site, a program supported by Meat and Livestock Australia, to establish trial leucaena plantings in Douglas Daly.

Brett and Suzanne's interest in participation in the project focused on the potential improved productivity from the introduction of leucaena.

"We had been considering the introduction of leucaena to Malilangwe for quite a while so the opportunity to undertake a trial to assist in determining if leucaena would suit our grazing system was a valuable opportunity," Brett said

Malilangwe.

[www.leucaena.net](http://www.leucaena.net)

“The ability to assess on our property, the three different leucaena varieties – Cunningham, Wondergraze and Redlands, as well as determine the optimum row spacings for our soils and climate for maximum productivity, were the key drivers of our participation.”

A soil test prior to commencing the trial confirmed the Malilangwe’s soils were suitable for successful establishment of leucaena with a soil type of grey to red earth and pH of 6.2. The site will require adequate fertiliser to achieve long-term best production and growth from leucaena. An average rainfall of 1250 mm supported the decision to trial leucaena.

Brett and Suzanne commenced site preparations for the trial in March 2019 with the application of broad leaf weed herbicides across the entire paddock. This was followed by banded application of a selective herbicides across the planned row spacings prior to planting in late January 2020. Malilangwe had experienced a drier start to the 2019-2020 wet season with only 281mm rain received prior to planting, providing the opportunity to assess the potential for a ‘dry’ plant with projections of imminent increased rainfall. 10ha each of Cunningham, Wondergraze and Redlands were planted with row spacings at 7m and 14m.



Whilst 250mm in 13 falls were received in the month following planting, final germination of 40% was deemed insufficient to continue with this initial trial and the plantings were removed.

Preparations for the trial re-plant commenced in January 2021 with the 29ha trial paddock ploughed in its entirety. Roundup was applied at 3lt/ha with Pulse surfactant at 400ml/100lt across the entire paddock after weed germination. This was done using a 21.5m Hardi linkage boom sprayer with 04 air induction nozzles.



Planting was undertaken on 20 January 2021 using a Lightning Mechanical two row Planter (28FY-2C) with a picker finger seed drill and fertiliser hopper on a John Deere 6150R tractor with GPS auto steering. Additional soil moisture allowed the planter to form a small hill over the top of the centre of the leucaena row which Brett believes allowed for improved germination. 7ha of each of the three varieties – Cunningham, Wondergraze and Redlands were planted with 3.5ha of each planted at 7m rows and 3.5ha at 14m rows. All leucaena was planted at a depth of 13mm and in twin rows with 750mm centres.

The fertiliser AgFert Legume Extra was applied at planting, placed slightly beside and at the depth of the seed at a rate of 77kg/ha. No insecticide was used. A light rainfall of 14mm was received on the day of planting with no detrimental effects.



Improved pasture of Jarrah grass was planted the following day in five metre strips between the seven metre leucaena rows and ten metre strips between the 14 metre rows. This spacing allowed for a buffer between the leucaena seedlings and the grass. Application of Verdict and Spinnaker selective herbicides was undertaken post plant within the first month of planting to prevent the faster growing Jarrah from impeding the successful establishment of the leucaena. The pasture planting was undertaken with a five metre Williams planter/combine with gravity feed and disc openers.

60mm rain was received in the evening following the planting of the pasture which resulted in some pasture seed displacement and some minor erosion over the paddock resulting in some small gaps in the leucaena rows. An additional 60mm rain was received in three falls within the first week of the planting of the leucaena.



Three weeks after planting the leucaena seedlings were approximately five centimetres tall with 80% germination.

The new leucaena plantings were affected by some predation by wallabies, mainly affecting rows closest to retained bush areas however the impact was not severe enough to warrant the construction of exclusion fencing. Whilst the heaviest impact from wildlife was experienced at the end of the 2021 dry season, the leucaena was well-enough established to recover well after the first wet season rains in October.

Malilangwe was able to undertake an initial light graze of the leucaena in late 2021, 11 months after establishment, with 240 two-year old heifers in the trial for 10 days. The paddock was fully incorporated into Malilangwe's rotational grazing system over the subsequent 2021-2022 wet season.

It was noted that initially the cattle preferred the grass pasture however once they had acquired the taste for leucaena, the cattle proceeded to feed evenly in further grazings.

Brett continues to be impressed with the speed of re-growth of the leucaena after grazing.

"We have been able to graze the trial paddock three times for about 10 days and once for a month during the current 2021-2022 wet season," he said.

"Two of the grazes was with 240 head for ten days and one graze had 420 head of smaller one-year old cattle for ten days with about two weeks rest between grazes. We have just completed a 27-day graze of 90 male cattle on the 13<sup>th</sup> April 2022."

At the end of wet season rainfall and leading into the beginning of the dry season, Brett believes the leucaena could handle further grazing however this will solely depend on timing of the last rainfall.



Brett and Suzanne have been able to use the trial to assess the most suitable variety and row spacing for Malilangwe's location, climate and soils.

"We have found that this area of the Northern Territory does not have significant psyllid pressure, and this has been verified by the findings of more than 20 years of trials at the Douglas Daly Research Farm," Brett said.

"Based on this, we are leaning towards the Wondergraze variety for Malilangwe, due to its strong establishment, branching, amount of available fodder and resilience."

The row spacing of 14 metre, 750mm twin leucaena rows was the preferred option at Malilangwe. This is due to the amount of jarrah grass required to balance with the high amount of available leucaena fodder.

"We feel we will be able to take the cattle out of the paddocks with both the leucaena and grass at similarly grazed levels at the 14m row spacings, ensuring the cattle receive sufficient nutrients from both pasture species for maximum weight gain. This is still to be confirmed though."

Brett and Suzanne have undertaken some informal live weight gain assessments and noted that the leucaena trial paddock carried 88 head for a period of 27 days and achieved an average weight gain of 1.3kg per head per day. The lightest beast achieved a 1 kg/day average gain with the heaviest gaining an average of 1.8kg/day. The entire mob gained an average of 123kg/day. The cattle were removed following rain to enable both the leucaena and the jarrah grass to recover for further grazes prior to and into the coming dry season.

Malilangwe's irrigated jarrah pastures have previously achieved an average 1kg per day per head live weight gain so the dryland leucaena has compared favourably.

Brett believes the improved nutrition provided by the inclusion of leucaena in the cattle's diet is a key factor in the improved productivity.

"Whilst key determinants of increased weight gain would be each individual's sex, age and stage of life, and we are confident that our genetic selections are a key factor in our improved productivity, the leucaena feed resource is the most important driver in realising our investment in animal genetics," he said. "The trial is certainly indicating that leucaena has the potential to be an important addition to our grazing system, increase our overall carrying capacity, our ability to turn off heavier cattle faster and heightened productivity of our entire cattle enterprise."



## 5.6 Northern Territory Code of Practice

the  
leucaena  
network



### NORTHERN TERRITORY Best Management Code of Practice Establishing and Managing Leucaena Pastures

*"Promotes the responsible establishment and management of combined leucaena grass pastures"*

#### Preamble

Leucaena (*Leucaena leucocephala* subspecies *glabrata*), when planted with improved grass species has the capacity to provide a sustainable and profitable forage grazing system in northern Australia. Leucaena has been grown commercially across parts of Australia since the late 1970s. It is recognised that Leucaena is a valuable forage when managed properly, but it constitutes a threat to the natural environment if not contained in those areas in which it has been planted or controlled in those areas that it has invaded. This document is based on the "Code of Practice for Managing the Weed Potential of Grazed Leucaena Pastures" first developed in Queensland in 2010. It has been adapted for Northern Territory conditions.

#### Weed Potential

If Leucaena is ungrazed or unmanaged there is potential to form dense thickets over time. The current environmental impacts come from **both** ungrazed 'common' Leucaena (*L. leucocephala* subsp. *leucocephala*) and commercial cultivars of the subspecies *L. leucocephala* subsp. *glabrata*. Mature plants in these situations can produce a quantity of seed which has a dormancy period (that can be many years) before germination occurs. Leucaena seed can be unintentionally spread multiple ways including via wind, birds, grazing animals, and water flow if near waterways. Leucaena seed has the potential to stay viable in the soil for many years and if established in dense thickets, can be difficult and time-consuming to eradicate.

#### Common Leucaena

The common Leucaena (*L. leucocephala* subsp. *leucocephala*) has been naturalised in coastal and urban areas of northern Australia for more than 100 years, long before the release of commercial cultivars for grazing. In the Northern Territory, Leucaena is commonly referred to as Coffee Bush and is typically found in peri-urban, disturbed, and roadside areas.

#### Cultivated Leucaena

It must be noted that commercial cultivars of the subspecies *L. leucocephala* subsp. *glabrata* are managed on-farm for productive purposes. Nevertheless, where unmanaged it also has a similar weed potential to the common Leucaena. The Leucaena Network actively promotes this **Code of Practice** for responsible management of commercial Leucaena varieties.

Commercial Leucaena pastures **must not** be allowed to contribute to a weed problem beyond the extent of the Leucaena plantation or property boundary.

## Commercial Benefits

Leucaena presents an opportunity for Northern Territory beef producers to diversify their grazing operations. Once Leucaena is established, it can be used to significantly improve animal productivity compared to unimproved native pastures, mainly through superior live weight gains for the breeding herd and for finishing steers. Grazing trials in established Leucaena areas have demonstrated at least 50 kg/hd/year live weight gain benefit for Leucaena over grass only pastures. Preliminary desktop analysis for the Katherine and Victoria River District indicates an increase in gross margin per steer of approximately \$150 when Leucaena is used.

## Environmental Benefits

The effects of Leucaena-finishing of cattle on greenhouse gas emissions, production, and profitability at the whole farm level has also been modelled using the Beef Greenhouse Accounting Framework. Finishing steers on Leucaena has been shown to effectively increase animals carried and live-weight turnoff by 15% and 31%, respectively, compared to grass pastures. The National Livestock Methane Program determined that average methane output (g/kg live weight gain) was 28% less on Leucaena – grass pastures compared to grass (Rhodes) only pastures.

In addition, Leucaena enhances nitrogen (N) supply to the soil which improves grass growth and groundcover, and enhances soil reserves of organic matter which in turn stimulates soil biological activity and improves the soil structure.

## Recommendations for Producers

In order to promote the sustainable and long-term economic benefits of Leucaena, it is essential that the risks of weed spread are mitigated by the adoption of the Code of Practice (NT) by all landowners who have Leucaena planted on their properties.

The Leucaena Code of Practice (NT) is actively promoted by The Leucaena Network in the Northern Territory and provides clear guidelines to minimize the environmental risk of unmanaged Leucaena in regional and rural areas.

The use of Leucaena for any purpose other than as a highly managed and well contained forage crop for animal production is **not** supported by industry bodies and Government agencies and should be discouraged.

## Aims of the Code

- Limit the unplanned spread of Leucaena through responsible planting strategies
- Minimise seed set in grazed stands
- Minimise the risk of seed dispersal
- Control escaped plants from grazed stands



## NT LEUCAENA CODE OF PRACTICE PRINCIPLES

Plant Leucaena **ONLY** if you intend to manage it and are prepared to accept responsibility to control Leucaena that establishes outside the planted area on your property. Under this Code of Practice, it is necessary to implement **ALL** the following management practices in order to mitigate the risk of Leucaena spreading from planted areas.

- a) Fully fence Leucaena plantations to manage grazing operations and avoid the risk of stock spreading seed.
- b) Maintain a Leucaena-free minimum separation distance between Leucaena plantation fencing and the property boundary, in accordance with corresponding property boundary buffer widths recommended in the Northern Territory Planning Scheme Land Clearing Guidelines (NTPS Guidelines) (see **Table 1**).

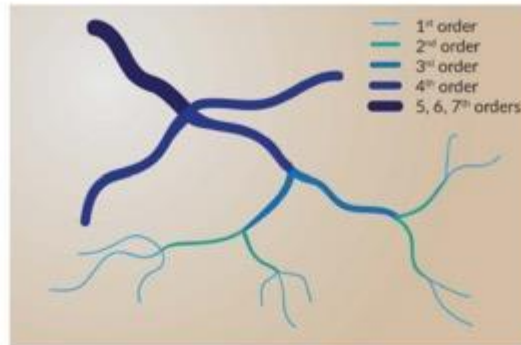
**Table 1** - Minimum separation distance between property boundary and Leucaena fencing

Property size (ha)	Minimum distance from property boundary to Leucaena fence (m)
<8	25
8 to 20	50
20 to 100	100
>100	200

- c) Maintain a Leucaena-free minimum separation distance of 250 m between Leucaena plantation fencing and the boundary of NT and Commonwealth National Parks, Conservation Reserves, and private Conservation Reserves.
- d) Only plant Leucaena in areas where rivers, creeks, floodways and other sensitive drainage features cannot disperse or collect seed. Maintain a minimum Leucaena-free separation distance between Leucaena plantation fences and the outer edge of the features described in **Table 2**.

Stream order can be determined from a topographic map of an appropriate scale (generally 1:100,000 or 1:50,000) (see **Figure 1**). A stream order spatial dataset is also available on NR Maps <https://nrmaps.nt.gov.au/nrmmaps.html>. Use this dataset as a guide only and field verify the location of riparian areas prior to planting.

- e) Establish and maintain a minimum 10m wide Leucaena-free buffer of vigorous grass-pasture between Leucaena plantation fences and Leucaena plantations.



**Figure 1** – Stream orders (NTG, 2019).

**Table 2** – Minimum separation distances between Leucaena plantation fencing and drainage features (adapted from the NTPS Guidelines)

Drainage feature	Stream Order	Minimum separation distance (m)	Measured from (see Appendix 1)
Drainage depression	Not applicable	<b>100</b>	The outer edge of the drainage depression, which is the extent of the associated poorly drained soils and associated vegetation
Intermittent Streams and Creeks	1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , and 4 <sup>th</sup>	<b>100</b>	The outer edge of the riparian vegetation or levee (whichever is the greater). If braided channels are present, the edge of the outer-most stream channel.
Rivers	5 <sup>th</sup> or higher	<b>250</b>	
Low/Medium Value Wetlands and Groundwater Dependent Ecosystems	Not applicable	<b>100</b>	The outer edge of areas that are dominated by plants adapted to seasonally saturated and/or inundated conditions
High Value Wetlands and Groundwater Dependent Ecosystems	Not applicable	<b>250</b>	
Sinkholes	Not applicable	<b>100</b>	The outer edge of the sinkhole perimeter.

- f) Establish and maintain vigorous grass-pasture in the Leucaena plantation inter-rows to:
- provide competition to minimise establishment of volunteer Leucaena seedlings
  - minimise the risk of seed being transported during heavy rain events
  - productively utilize fixed nitrogen that the legume-based system produces
  - maintain groundcover and prevent soil erosion.
- g) Graze or cut Leucaena to a height of less than 3 m to keep it within the reach of cattle and to minimise flowering and seed set.
- h) Monitor for Leucaena spread by regularly inspecting buffer zones, drainage areas, watercourses and property boundaries to detect and control Leucaena seedlings and plants. Control Leucaena plants found within buffer zones or outside of paddock or property boundaries. Chemical control is recommended in these areas. Refer to the Northern Territory Weed Management Handbook for recommended chemicals [www.nt.gov.au/weeds](http://www.nt.gov.au/weeds).
- i) Report the location and control of any Leucaena plants that have escaped from dedicated grazing paddocks to areas outside Leucaena plantation fencing to the Northern Territory Weeds Management Branch of the Department of Environment, Parks and Water Security (DEPWS) on (08) 8999 4567 or email [weedinfo@nt.gov.au](mailto:weedinfo@nt.gov.au).
- j) Register Leucaena plantations with The Leucaena Network
- k) Promote the responsible management of Leucaena in accordance with this Code including communicating the requirements of the Code to new managers and/or owners of the property.
- l) Keep abreast of developments in best management practices for Leucaena and adaptively manage related operations according to any changes or developments.
- m) Remove any Leucaena plantations on your property that you do not intend to manage in accordance with the requirements of this Code.

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The Northern Territory Leucaena Best Management Code of Practice was developed in consultation with the Department of Environment, Parks and Water Security and Northern Territory grazing representatives. The following organisations endorse the adoption of the Code of Practice to maintain a sustainable and profitable beef industry using Leucaena pastures:

NT Department of Industry, Tourism, and Trade  
NT Farmers  
Northern Territory Cattlemen's Association

## Appendix 1. Examples to assist interpreting the NT Leucaena Code of Practice in relation to NT Land Clearing Guidelines

### Example Scenario 1:

*Typical example for pastoral lease or unzoned freehold property where new clearing of native vegetation in accordance with an approved permit will be required in order to establish a Leucaena plantation.*

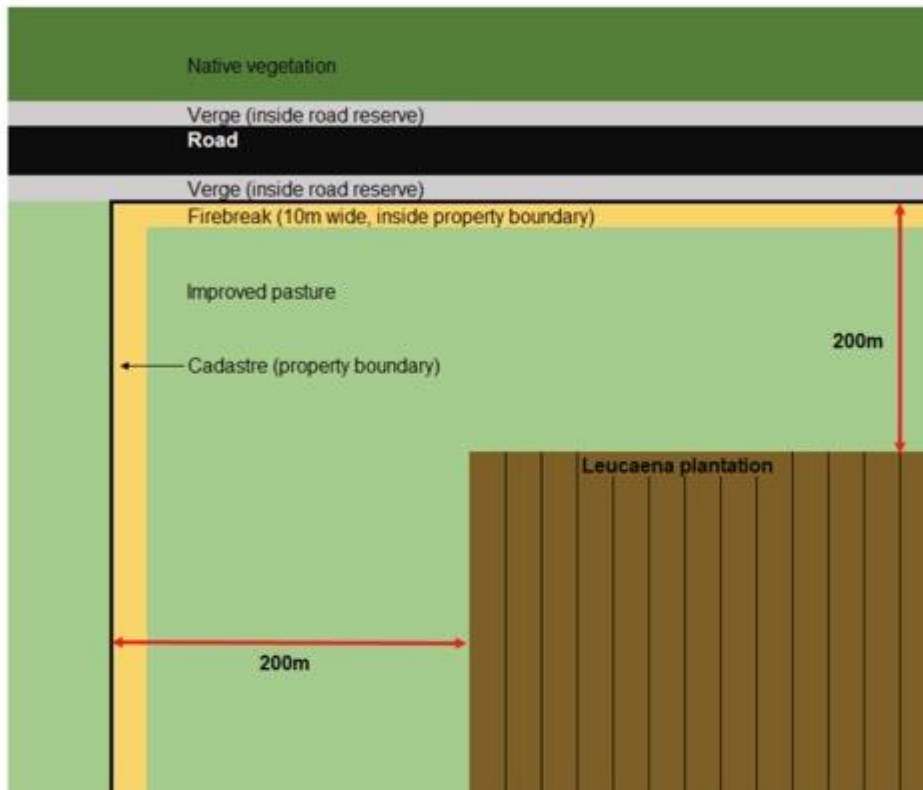


- ✓ Property is >100 ha and cadastral (property boundary) is fenced.
- ✓ Area surrounding Leucaena plantation is characterised by native vegetation and has not previously been cleared.
- ✓ A land clearing permit has been approved for the Leucaena plantation under the relevant legislation.
- ✓ As per the Code and in accordance with the NTPS Land Clearing Guidelines, a native vegetation buffer with a minimum width of 210 m (including a 10 m wide firebreak) has been retained along the cadastral boundary.
- ✓ As per the Code, the Leucaena plantation has been fenced. The property boundary fence line acts as part of the Leucaena plantation fence line; and as per the Code, a (minimum) 10m wide Leucaena-free grass buffer has been retained adjacent to the Leucaena plantation. The total distance from the cadastral boundary to the external edge of the Leucaena plantation is a minimum of 220 m.



### Example Scenario 2.

*Typical example for pastoral lease or unzoned freehold property where clearing of native vegetation has previously occurred and has been maintained free of native vegetation to date.*

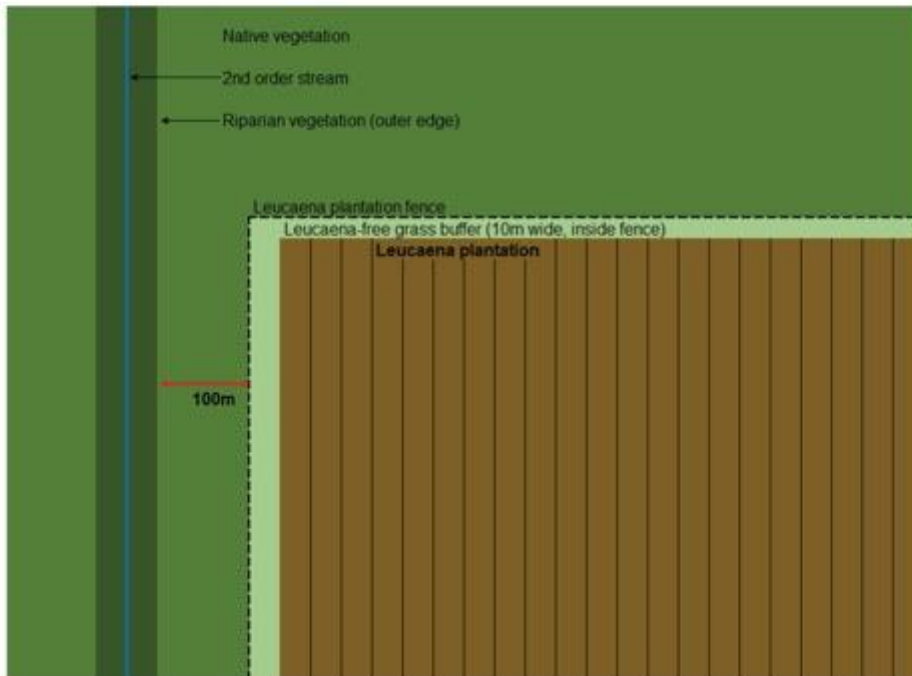


- ✓ Property is >100 ha and cadastre (property boundary) is fenced.
- ✓ Native vegetation has previously been cleared within the property, to the cadastral boundary.
- ✓ **Note: Before planting Leucaena, contact DEPWS for advice regarding whether a new clearing permit or variation to an existing permit is required.**
- ✓ As per the Code, a minimum separation distance of 200 m (including a 10 m wide firebreak) has been retained along the cadastral boundary.
- ✓ The property boundary fence line acts as the Leucaena plantation fence line; and as per the Code, a (minimum) 10m wide Leucaena-free grass buffer has been retained inside the fence line.
- ✓ The total distance from the cadastral boundary to the external edge of the Leucaena plantation is a minimum of 200 m.



### Example Scenario 3:

*Typical example for pastoral lease or unzoned freehold property.*



- ✓ Leucaena plantation is within proximity of a second order stream.
- ✓ A land clearing permit has been approved for the Leucaena plantation under the relevant legislation.
- ✓ The NTPS Land Clearing Guidelines requires a native vegetation buffer with a minimum width of 50 m to be retained along second order streams, from the outer edge of the riparian vegetation.
- ✓ As per the Code, a 100 m wide native vegetation buffer has been retained from the outer edge of the riparian vegetation to the Leucaena plantation fence line.
- ✓ As per the Code, a 10 m wide Leucaena-free grass buffer has been retained between the Leucaena plantation fence line and the external edge of the Leucaena plantation.

### References

NTG (2020). Land clearing guidelines Northern Territory Planning Scheme, Department of Environment and Natural Resources, Darwin. Available at: [https://nt.gov.au/\\_data/assets/pdf\\_file/0007/236815/land-clearing-guidelines.pdf](https://nt.gov.au/_data/assets/pdf_file/0007/236815/land-clearing-guidelines.pdf)

## 5.7 MER Report

**Project Code: L.PDS 1909**

**Milestone #: 8 (Final)**

**MER Plan: Producer Demonstration Sites**

**Project name** L.PDS. 1909 – Sustainable Long Term Leucaena Grass Production in Northern Australia

**Date:** August 2022

Evaluation level <sup>[1]</sup>	Generic Performance Measures (example)	Project Performance Measures (Please fill in and delete example)	Update as at 29.08.2022
<p><b>Inputs – What did we do?</b></p> <p><i>Describe the planned and expected inputs involved in your project, including funds, resources, development &amp; projects structures</i></p>	<ul style="list-style-type: none"> <li>• Number of core producers involved in demonstration sites &amp; their demographics</li> <li>• Number of producers observing demonstration sites &amp; their demographics</li> <li>• Number of head of livestock involved</li> <li>• Area (ha) involved</li> <li>• Project steering committee decisions and notes</li> <li>• Investments (\$'s) from MLA and other parties (cash and in-kind contributions) and what was purchased – professional time, project inputs</li> </ul>	<ul style="list-style-type: none"> <li>• Up to six (minimum of four) producers undertaking on-farm demonstration sites representing 182,000 ha and covering 17,000 head of cattle.</li> <li>• A minimum of eight demonstration plots investigating the optimum leucaena-pasture system including row spacing and management strategies for both rain-fed and irrigated leucaena in the Top End of the Northern Territory.</li> <li>• 102 observers at Field Days representing an additional 1.8 million ha and 122,000 head of cattle.</li> </ul>	<ul style="list-style-type: none"> <li>• 4 producers committed to undertaking the demonstration sites (172,500 ha and 21,000 head).</li> <li>• 3 sites completed establishment (7 demonstration plots). One withdrawn after successful establishment due to fire damage. One site not proceeding with the trial due to enterprise diversification.</li> <li>• No formal Douglas Daly Best Practice Producer Group meetings (due to covid) however regular informal, social meetings at Douglas Daly Research Farm are ongoing.</li> </ul>

		<ul style="list-style-type: none"> <li>• Funds: \$75,000 (over 3 years) from MLA utilized for professional fees, field days, bio-mass testing, pasture management subscription and video compilation</li> <li>• Funds: \$90,000 in kind contributed to professional time.</li> <li>• Utilise the PDS activities to facilitate increased interaction and meetings (twice annually) of the Douglas Daly Best Practice Producer Group.</li> </ul>	
<p><b>Outputs - What did we do?</b> <i>Describe the outputs planned/expected from your project, including engagement activities &amp; products from demonstration sites</i></p>	<ul style="list-style-type: none"> <li>• Outputs from demonstration sites (new knowledge &amp; data) (e.g. reproduction rate, weaning rate, mortality rate, gender, management methods, cost of vaccine, extra labour and cost of production)</li> <li>• Field days held, demographics collected, and M&amp;E conducted</li> <li>• Media events/outputs</li> </ul>	<ul style="list-style-type: none"> <li>• Determination of optimum leucaena-pasture system including row spacing and management strategies for both rain-fed and irrigated plantings specific to the emerging Northern Territory regions.</li> <li>• Adoption of best practice leucaena establishment and management strategies including seasonal requirements for the Northern Territory.</li> <li>• Hosting of up to 6 field days targeting 102 additional producers representing 1.8 M ha and 122,000 head of cattle.</li> <li>• Capacity building of up to ten Northern Territory extension officers / agronomists specific to best practice leucaena establishment through two Leucaena 101 Industry workshops and involvement in field days.</li> </ul>	<ul style="list-style-type: none"> <li>• Optimum leucaena planting assessments determined that Wondergraze was the preferred cultivar and row spacings of 12 – 14 metres would be preferred for future, larger scale plantings.</li> <li>• 4 dedicated Field Days held with 98 attendees. Project has been highlighted in 2 NT govt field days (April 2019 and April 2021) attended by more than 110 graziers. 6 extension staff attended the Leucaena 101 workshop. Extension and service staff have attended all field days.</li> <li>• Pasture technologies have not been able to be highlighted as part of this project due to the cessation of a leucaena mapping project with Hitachi. Alternative pasture mapping has been unavailable for this project due to cost prohibition.</li> <li>• Live weight gain trials were undertaken by both established sites with live weight gains of up to 4kg/ha/day wet season and 1kg/ha/day dry season.</li> <li>• Initial video footage from each producer uploaded on <a href="http://www.leucaena.net">www.leucaena.net</a>. Video blog</li> </ul>

		<ul style="list-style-type: none"> <li>• Exposure by core and observer producers to new technologies in pasture assessment (satellite or drone assessment supported by biomass assessment of leucaena and grass pastures), suitable for the larger property size of the NT</li> <li>• Provision of live weight gain data from trials once established.</li> <li>• Regular blog providing project updates and outcomes to date supported by video footage available at <a href="http://www.leucaena.net">www.leucaena.net</a></li> <li>• Case studies for dissemination</li> <li>• 6 media releases featuring the PDS, MLA and individual trial producers and outcomes.</li> </ul>	<p>updates provided by two of the producers and uploaded on the Network’s Facebook page and at <a href="http://www.leucaena.net">www.leucaena.net</a></p> <ul style="list-style-type: none"> <li>• Two trial producers presented for the ‘Let’s Talk Leucaena’ video displayed at NTCA and Food Futures Conference and Beef 2021. Now available on website and provided to new and intending producers.</li> <li>• There was no media undertaken at the commencement of the project at the request of the Northern Territory Government, whilst the NT Code of Practice was being developed.</li> <li>• Media release and event coverage in The Country Life and promoted by NTCA and NT Farmers and FutureBeef and MLA. Social media presence and updates on the project at The Leucaena Network FB site. Attendance at the 2020 Field Day and coverage by NT Country Hour.</li> </ul>
<p><b>Changes in knowledge, attitudes and skills - How well did we do it?</b> <i>Describe the changes in KASA that you are planning to achieve.</i></p>	<ul style="list-style-type: none"> <li>• Change in knowledge/attitudes/skills of <b>core and observer</b> participants before and after project/activity</li> <li>• Experience of producers involved in the PDS – extent to which they found the project/activity useful or of value.</li> </ul>	<ul style="list-style-type: none"> <li>• 100% of core producers have key knowledge of alternative and optimum leucaena – grass pasture options specific to the Northern Territory conditions.</li> <li>• 100% of core producers have key knowledge of leucaena management strategies specific to the Northern Territory conditions and the seasonal variances and growth patterns.</li> <li>• 100% of core producers have increased their skills and</li> </ul>	<ul style="list-style-type: none"> <li>• Field Day attendees exhibited a significant change of 91.5% in knowledge and confidence after attendance at the third field day. Change in confidence and knowledge at the final field day was less dramatic at 18%, likely due to attendance at previous field days and events.</li> <li>• The post-project survey of all Field Day attendees indicated an 85% change in confidence and knowledge of successful leucaena establishment.</li> </ul>

		<p>confidence in leucaena establishment and management requirements.</p> <ul style="list-style-type: none"> <li>• 80% of observer producers will have key knowledge of the optimum leucaena/ pasture row spacing specific to the Northern Territory.</li> <li>• 80% of observer producers will have increased knowledge of leucaena establishment and management best practice, specific to the Northern Territory.</li> <li>• 10% of observer producers will intend to initiate or increase their leucaena – pasture systems within the project timeframe.</li> </ul>	
<p><b>Practice changes – Has it changed what people do?</b>  <i>Describe the practice changes that you are expecting to achieve by the end of your project</i></p>	<ul style="list-style-type: none"> <li>• Producer (core &amp; observer) practice (relevant to the topic/project) before and after project</li> <li>• Influence the project had on practice change achieved</li> </ul>	<ul style="list-style-type: none"> <li>• 100% of core producers exhibit intention to increase leucaena plantings within five years of the project completion</li> <li>• 10% of observer producers exhibit intention to initiate or increase their leucaena – pasture systems within five years of the project completion.</li> </ul>	<ul style="list-style-type: none"> <li>○ Pre project surveys have been completed and are provided in Appendix One.</li> <li>○ Post project surveys have been completed and are provided in Appendix Two.</li> <li>○ Survey comparison indicates an increase in knowledge and confidence to successfully establish leucaena by core producers of 78% from an average rating of 4.5 to 8.7.</li> <li>○ Propensity to undertake further plantings by the three remaining core producers is high at 9.7.</li> <li>○ Field Day attendees indicated a high propensity (rating 8 – 9) to consider future leucaena-grass grazing systems for improved productivity.</li> <li>○ Whilst the establishment of leucaena-grass grazing systems by observer producers has been limited during the project time period to only one producer, the post project survey of</li> </ul>

			observer producers indicated a 106% improvement in propensity to consider a leucaena-grass grazing system. It is expected that the uptake will increase as alternative diversification activities currently being undertaken settle into 'normal' activities to again provide the time or finances for pasture development.
<p><b>Benefits – Is anyone better off?</b> <i>Describe the benefits that you are expecting to achieve as a result of the project</i></p>	<ul style="list-style-type: none"> <li>• Benefits / impacts from practice change (e.g. \$ value of decreased mortality rate compared to baseline)</li> <li>• Costs to achieve outcomes (e.g. increased inputs, labour)</li> <li>• Benefit Cost and Sensitivity analyses at the business level</li> </ul>	<ul style="list-style-type: none"> <li>• All core producers will have a minimum of 20 ha leucaena – grass pasture established.</li> <li>• All core producers will have site-specific knowledge of ideal leucaena-grass pasture establishment practices resulting in significantly reduced risk of establishment failure.</li> <li>• Core and observer producers will have knowledge of region specific live weight gains on leucaena pastures enabling better informed decisions about pasture options.</li> <li>• 100+ observer producers will be able to confidently initiate leucaena-grass pasture systems.</li> <li>• Significant benefit to Northern Australia through the adoption of strategies to increase long term, viable, high value beef production.</li> <li>• This project will add to the knowledge bank regarding establishment and management strategies for the leucaena and grazing industry as a whole.</li> </ul>	<ul style="list-style-type: none"> <li>• The two core producers have successfully established a minimum of 30 ha leucaena-grass pastures and are utilising these plantings for increased productivity.</li> <li>• All core producers indicated a high level of confidence in establishment and management strategies.</li> <li>• Live weight gain trials have been undertaken at both established sites. The outcomes have been documented in one case study (Malilangwe) with the second case study (Blackbull) to be updated to reflect the gains. The outcomes have been documented and are available for public dissemination from <a href="http://www.leucaena.net">www.leucaena.net</a>.</li> <li>• The case studies will continue to be disseminated to enquirers and through all Network events and activities.</li> <li>• 98 producers and industry personnel attended the dedicated project Field Days with an additional 110 attending the complementary NT Government Field Days. In addition, the project has been discussed at all TLN presentations, workshops and field days.</li> </ul>

<p><b>General observations / outcomes – Is the industry better off?</b></p>	<ul style="list-style-type: none"> <li>• Potential impacts (practice change &amp; productivity) at the end of the project and well after the project has concluded (e.g. 2 years later) for the broader target audience</li> <li>• What are the unintended/unexpected benefits or consequences?</li> <li>• Project learnings, barriers / enablers to adoption</li> </ul>	<ul style="list-style-type: none"> <li>• Leucaena – grass pastures adopted by an additional 10% of graziers across northern Australia (in suitable areas) by 2023 significantly increasing industry viability and profitability.</li> <li>• Live weight gains increases correlated to economic returns will provide improved enterprise and industry viability.</li> <li>• Long term establishment and management strategies for highly productive leucaena systems developed for adoption by leucaena producers throughout northern Australia which directly aligns with the outcomes of the MISP2030.</li> <li>• Increased profitability and viability for graziers and their communities.</li> </ul>	<ul style="list-style-type: none"> <li>• Two observer producers have commenced preparation for leucaena plantings with one core producer expecting to establish 1000 ha within the next 5 years.</li> <li>• A barrier to adoption continues to be the necessity for ‘farming’ skills for successful establishment, relegating pasture improvement, including leucaena to the ‘too hard’ genre.</li> <li>• The focus on high value diversification crops including cotton and horticulture has slowed the focus on pasture improvement with leucaena, however the increased income and farming skills from this diversification has the potential to aid graziers who wish to continue to develop their grazing enterprise along with alternative activities</li> </ul>
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