

## ILC2018 Poster and Producer paper\*

# ‘Redlands for Regions’: Producer demonstration sites of psyllid-resistant leucaena across north Queensland

## *‘Redlands for Regions’: Un proyecto de sitios de demostración a nivel de productor de leucaena resistente a Heteropsylla cubana en el norte de Queensland, Australia*

JOE ROLFE<sup>1</sup>, BERNIE ENGLISH<sup>1</sup>, CRAIG LEMIN<sup>1</sup>, STUART BUCK<sup>2</sup>, JIM FLETCHER<sup>3</sup>, ROBERT CAIRD<sup>1</sup>, EMMA BLACK<sup>4</sup>, LINDSEY PERRY<sup>5</sup>, BRON CHRISTENSEN<sup>6</sup> AND NIGEL TOMKINS<sup>7</sup>

<sup>1</sup>Queensland Department of Agriculture and Fisheries, Mareeba, QLD, Australia. [daf.qld.gov.au](http://daf.qld.gov.au)

<sup>2</sup>Queensland Department of Agriculture and Fisheries, Rockhampton, QLD, Australia. [daf.qld.gov.au](http://daf.qld.gov.au)

<sup>3</sup>Queensland Department of Agriculture and Fisheries, Mackay, QLD, Australia. [daf.qld.gov.au](http://daf.qld.gov.au)

<sup>4</sup>Queensland Department of Agriculture and Fisheries, South Johnstone, QLD, Australia. [daf.qld.gov.au](http://daf.qld.gov.au)

<sup>5</sup>Queensland Department of Agriculture and Fisheries, Cloncurry, QLD, Australia. [daf.qld.gov.au](http://daf.qld.gov.au)

<sup>6</sup>The Leucaena Network, Theodore, QLD, Australia. [leucaena.net](http://leucaena.net)

<sup>7</sup>Meat and Livestock Australia, Brisbane, QLD, Australia. [mla.com.au](http://mla.com.au)

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### Introduction

Leucaena, a tree legume with potential to greatly improve cattle performance, has not been readily adopted in northern Queensland primarily due to prevalence of the psyllid (*Heteropsylla cubana*) insect in higher rainfall zones. Psyllids reduce edible biomass in leaves by 40–52%, combined with a 46–83% reduction of stem yield (Bray and Woodroffe 1991). Losses to the Central Queensland beef industry due to psyllid impact on animal performance are estimated at \$2 M per year (Mullen et al. 1998). Cultivar Redlands is a psyllid-resistant leucaena variety recently developed by Meat and Livestock Australia (MLA) and the University of Queensland. This new variety has the potential to lift productivity of cattle enterprises in the north. To accelerate early adoption and demonstrate benefits of the new variety to the grazing industry, the Redlands for Regions (R4R) project matched producer funds with PIFT-MDC (Producer Initiated Fast Track-MLA Donor Company) funding. The R4R project, led by The Leucaena Network (TLN), includes 7 trial sites in psyllid-prone areas with moderate to high rainfall from Mackay to the Atherton Tablelands in north Queensland. These sites will act as a platform for industry promotion and adoption of this promising new variety in accordance

with TLN Code of Practice (CoP). The project supplied seed and technical assistance via Department of Agriculture and Fisheries (DAF) staff during the preparation and establishment phases to demonstrate best management practice for leucaena in these psyllid-vulnerable rainfall zones. This paper summarizes the extension processes employed during the project and highlights the challenges and successes at the project sites.

### Planning and Site Selection

In May 2017, north Queensland-based DAF staff compiled a list of producers interested in establishing leucaena and the merits of each site based on location, soil types, expected psyllid pressure and the agronomic skills, confidence and capacity of the particular producers. In October 2017, producer agreements were finalized with 6 property owners (Table 1) with an additional property owner selected in December, independent of R4R funding.

The DAF team assisted MLA with engaging producer co-operators for the project. Once MLA had selected the sites, DAF provided technical and agronomic support including soil tests and interpretation, equipment requirements, fertilizer recommendations, seedbed preparation, planting and herbicide advice. Early development and

Correspondence: J. Rolfe, Queensland Department of Agriculture and Fisheries, Mareeba, QLD 4880, Australia.  
Email: [joe.rolfe@daf.qld.gov.au](mailto:joe.rolfe@daf.qld.gov.au)

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**Table 1.** Names and location of 7 beef producers and their properties involved in the early pilot program for growing the Redlands leucaena variety in north Queensland.

Region	Property and Owner	Expected prevalence of psyllids
Mackay	Hazelwood, Mackay - Mark and Linda Degura	Moderate to high
	Mt. Spencer, Nebo - David Wright	Moderate to high
	Woonon, Sarina – Wayne and Scott Davis	Moderate to high
Townsville	Swans Lagoon, Millaroo - Peter Malpass	Moderate to high
	Four Mile, Woodstock - Gerard and Elizabeth Lyons	Moderate to high
Northern	Goshen, Mount Garnet - Brett Blennerhassett	Very high
	Quincan Springs, Pearamon - Peter and Colleen McLucas	Very high

establishment success were monitored at the respective sites where applicable, and local paddock walks conducted. Members of TLN and DAF coordinated 6 field days (total of 55 producers attended) on the northern sites to expose beef producers (R4R producers and the wider industry) to the latest leucaena establishment and production techniques. Field day topics included site selection, site preparation, planting, establishment and herbicide programs.

**Materials, Methods and Results**

*Goshen (Brett and Theresa Blennerhassett)*

The Goshen site consists of infertile red-earth soils. The Blennerhassetts purchased a heavy-duty Norseman twin-row leucaena planter with precision depth control (Figure 1) and leucaena was sown in February and March 2018 in twin rows (900 mm apart) with inter-row spacing of 10 m. Placing seed at 15–25 mm depth reduced time to emergence and improved overall establishment in comparison with planting at depths >30 mm under the same conditions. Approximately 56 ha of Redlands was successfully established at Goshen. Performance of this stand will be observed in comparison with a 40 ha stand of the psyllid-prone cultivar Cunningham, which pre-dates the Redlands planting.

*Quincan Springs (Peter and Colleen McLucas)*

This site on the Atherton Tablelands has deep, fertile red basalt soils. Redlands was sown into 32 ha (divided into 4 × 8 ha paddocks) in single rows with 15 m inter-row spacing in February 2018 using an adapted corn planter. Despite problematic seedbed preparation due to project delays and high residual organic matter levels, good establishment was achieved across the entire site. Weed control (tropical grasses and legumes plus broad-leaf weeds) was challenging at the site. Despite several frosts during June, leucaena was not affected. Stock were introduced to the site in August 2018 when leucaena plants were about 2 m tall (Figure 2).



**Figure 1.** The Norseman precision planter (left) and twin row Redlands leucaena seedlings (right) on Goshen.



**Figure 2.** Peter McLucas (Quincan Springs) and Bernie English (DAF) inspect leucaena seedlings (top) and cattle grazing the trial area in August 2018 (bottom).

### Townsville sites

The soils at the Townsville site, Four Mile, are infertile, poorly structured yellow sandy-earths with low water-holding capacity and poor drainage. They were deemed unsuitable for leucaena establishment. Despite this, the Lyons family invested considerable effort in ground preparation and refining sowing techniques. Soils at the Swans Lagoon site were only marginally better and were also considered unsuitable for leucaena. About 30 ha of Redlands was sown at each site during February and March 2018 as conditions allowed but the unsuitable soils, plus hot, dry conditions and weed competition all contributed to poor establishment. When inspected in May 2018, leucaena was small and unthrifty at both sites and unlikely to survive.

### Mackay sites

No attempt was made to establish leucaena at the Mackay sites in the 2017/18 growing season. Site preparation is underway currently at all sites and planting will take place over the 2018/19 spring-summer period.

- At Woonon, soil testing and interpretation have been completed across the 27 ha paddock selected for sowing with leucaena. Paddock clearing and initial cultivation have also been completed. A challenge with this site is high grass yields (>10,000 kg DM/ha).
- At Mount Spencer, the Wright family is being assisted by agricultural consultants Farmacist. In addition to soil sampling and analysis the 16 ha paddock was cleared of regrowth in 2017 and cultivated twice in late August 2018. Planting strips at 10 m spacing have been marked with a GPS and double-ripped. Paddock and soil variability will also be mapped using Electro-magnetic (EM) surveys prior to planting.
- At Hazlewood, an old sugarcane paddock was cultivated in March 2018 to incorporate trash from the previous cane crop. Soil samples have been collected and EM mapping data are available. Two additional cultivations were performed in May and the site was planted to pasture. Strips for planting leucaena rows were ripped at 10 m spacing using a GPS guidance system. Leucaena will be planted in the 2018/19 wet season in single rows with 10 m inter-rows.

## Discussion and Conclusions

Under R4R, Redlands has been successfully established at both northern sites. At Goshen, planting of further areas with Redlands is planned for the 2018/19 growing season. The Townsville sites seem unsuitable for leucaena and

would be more suited to development with improved pastures comprising a mix of grasses and legumes such as Rhodes (*Chloris gayana*), Keppel (*Bothriochloa pertusa*), Seca (*Stylosanthes scabra*) and Verano (*S. hamata*). Despite these recommendations, collaborators at both sites intend to plant more areas with Redlands in 2018/19. At Swans Lagoon, irrigated soils currently being trialled with Rhodes grass and *Desmanthus* sp. would be better suited to leucaena than the paddock previously used. DAF staff will continue to advise managers of Swans Lagoon to locate future leucaena plantings on these areas.

### Learnings

Experiences from the project reinforce what is already known. Successful leucaena establishment is dependent on selection of appropriate soils/land types, good seedbed preparation, adequate soil moisture, good weed control, timely access to equipment and acquiring the necessary agronomic skills. Correct setting and control of planting depth were also of particular importance at the sites selected.

### Future

While the R4R program is due to be finalized by March 2019, recommendations for future work include:

- Recording the performance of cattle grazing Redlands at the Mackay sites, assuming successful establishment during the 2018/19 wet season;
- Recording the performance of cattle grazing Redlands at Quincan Springs [to assess the cost: benefit of adding leucaena to highly productive grass-legume pastures on the Atherton Tablelands, which already achieve liveweight gains (LWGs) up to 250 kg/head/year]; and
- Comparing LWGs produced on Redlands with that on Cunningham at Goshen.

Such project activities would link closely with the Pinnarendi grazing trial (Mount Garnet), where productivity of Redlands is being compared with that of Wondergraze and initial grazing data indicate daily LWGs during the dry season of 0.4 kg/head. Continuing a series of trial and demonstration sites across north Queensland will expose beef producers to the practical challenges and production benefits of growing leucaena and sustainable management under the leucaena CoP.

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## References

(Note of the editors: All hyperlinks were verified 3 May 2019.)

Bray RA; Woodroffe TD. 1991. Effect of leucaena psyllid on yield of *Leucaena leucocephala* cv. Cunningham in south-east Queensland. *Tropical Grasslands* 25:356–357. [bit.ly/2LiDmng](https://bit.ly/2LiDmng)

Mullen BF; Gabunada F; Shelton HM; Stür WW; Napompeth B. 1998. Psyllid resistance in *Leucaena*. In: Shelton HM; Gutteridge RC; Mullen BF; Bray RA, eds. *Leucaena - adaptation, quality and farming systems*. Proceedings of a workshop held in Hanoi, Vietnam, 9–14 February, 1998. ACIAR Proceedings No. 86. ACIAR, Canberra, ACT, Australia. p. 51–60. [purl.umn.edu/135197](https://purl.umn.edu/135197)

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