

# Katherine Rural Review

DEPARTMENT OF PRIMARY INDUSTRY AND RESOURCES



## EDITION #340 September 2019

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## From the Editor

Welcome to issue # 340 of the Katherine Rural Review (KRR) and nearly the last quarter of the 2019.

Well, it has been a busy couple of months, with no sign of slowing up at the Katherine Research Station (KRS).

There has been a few local bull sales with some fantastic bulls, most appealing was temperament and fertility breeding values which has been great to see. I very nearly bought a few but they would not fit in the office.

The amazing team at Territory Natural Resource Management have been running soil workshops with producers which have been well attended and a great deal of fun across the Katherine and Darwin region. The workshops have a focus on learning about the health of your soil, the interaction between nutrients and plant nutrient uptake, the role of microflora within this system and how to enhance your soil management for improved soil health that will result in enhanced profitability and long term sustainability.

The first Northern Territory (NT) cotton season since the 2000s has wound up with all producer and research crops harvested and the final data is being collated. The result was very positive for producers and a large focus is on dryland/rain fed cotton moving forward. It has been amazing to see the progress that the cotton industry has made in environmental management in the last 20 years. It has been great to be a part of this developing industry and exciting to see the plans for further expansion in the 2019/20 wet season.

Read on to find out more about supplementing phosphorous, what's happening in the world of weed control, highlights of the department's show stall, cows for schools and much more. We have a few events still to come so refer to the events summary at the end of the KRR and be sure to RSVP. The next field day at Douglas Daly Research Farm on 10 October will be one of the last before the coming wet season.

Cheers,

Ian Biggs  
Editor

## Watermelons are growing at the Katherine Research Station for the first time since CGMMV

For the first time since the cucumber green mottle mosaic virus (CGMMV) was identified in the Northern Territory, melons are being grown at the Katherine Research Station (KRS). In a partnership between [Seminis<sup>1</sup>](#) and the Department of Primary Industry and Resources (DPIR), approximately one hectare of commercial and pre-release varieties are being grown on the research station.

“The partnership allows us to assess varieties under NT growing conditions whilst remaining sensitive to recent biosecurity risks experienced by local commercial farms,” said David Rose, Regional Business Manager for the NT.

This arrangement is a win-win, as it has helped to kick-start melon research at KRS and has provided a convenient and safe trial site for variety evaluations. Regional agronomist, Dr Danilo Guinto, is managing the growth of the crop which forms part of a wider research, development and extension program for the NT melon industry, with DPIR recently delivering extension material which consolidated research and development findings into three information sheets available on the Melons Australia website<sup>2</sup>:

- [Integrated pest management](#) (IPM)
- [Cover crops](#)
- [CGMMV](#)

Before the trial was planted, wet season cover crops of sorghum, millet, caliente and a mixture (millet, lab-lab and caliente) were planted. A field walk occurred before incorporation which formed part of the KRS field day held in April 2019. In addition, an IPM program is being managed by the regional entomologist Dr Thilini Ekanayake; and a CGMMV biosecurity plan was established to reduce the risk of infection. The trial has been a steep learning curve as melons haven't been grown at the site for years.

We've received generous assistance from local growers, with Brett Dawson of Dawson's Melons lending us his planter and Michael Curtis of King's Bees supplying hives for pollination.

There will be a field day later in the year to assess the characteristics of varieties.

If you would like more information on this article, or to get hard copies of the information sheets, please contact:

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*Photo: Joy, Danny and Heshan inspecting the watermelon trial at KRS*



*Photo: Millet cover crop prior to planting watermelon variety trial at KRS*

<sup>1</sup> Seminis website: <https://seminis.com.au/>

<sup>2</sup> Melons Australia website: <https://www.melonsaustralia.org.au/>

Photos from the research farms



*Image: Bogor University students with Danny and Heshan in the KRS mango orchard*



*Image: Farm and livestock staff at KRS, L to R Melissa, Tim, Rosie, Will, Jack and Gretel*



*Image: Nick Hartley discussing cotton at KRS with Bogor University students*



*Image: Gretel and Melissa lighting up the shrub burn trial at Kidman Springs*



*Image: Well I think we do this rather well!*

## Cotton trial update

Cotton research and cultivation has a long history in the Northern Territory (NT), with early research dating from the late 1800s on the botanic gardens at Palmerston. 2019 has

seen the return of cotton to the NT with trial crops grown on both commercial farms and Department of Primary Industry and Resources research farms (Table 1).

**Table 1: Sowing and harvest dates for four cotton experiments KRS 2019**

<b>Bollgard3 cotton variety*</b>	<b>Experiment</b>	<b>Irrigation</b>	<b>Sowing date</b>	<b>Harvest date</b>
Sicot 707B3F	IRRI1	Irrigated	21 January 2019	26 June 2019
Sicot 714B3F	IRRI2	Irrigated	2 February 2019	1 July 2019
Sicot 746B3F	IRRI3	Irrigated	15 February 2019	15 July 2019
Sicot 748B3F				
Sicot 714B3F	RAIN1	Rain-fed	12 January 2019	12 June 2019
Sicot 748B3F				

\*See <https://www.csd.net.au/variety-guide> for variety information

Commercial size plantings on Edith Springs Station and Tipperary Station were commercially picked and sent to southern Queensland for ginning, while experimental plots on Katherine Research Station were hand sampled (Table 2). These trials grew the latest release Bollgard3 cotton varieties, which have been progressively developed

from the release of the first genetically modified Ingard Cotton in 1996. The Bollgard3 cotton contains three *Bacillus thuringiensis* (*Bt*) genes that code for three Bt proteins that control the caterpillars of *Helicoverpa* species. Today's varieties show great versatility and are grown from Lake Boga in Victoria to Tipperary in the NT.

**Table 2: Average yields from hand sampling of cotton experiments KRS, 2019. Commercially indicative yields achieved by applying harvest and gin factors to gross harvest values.**

<b>Experiment</b>	<b>Bollgard3 cotton variety</b>	<b>Irrigation</b>	<b>Plant row configuration</b>	<b>Yield (bales/ha)</b>
IRRI1	Sicot 707B3F	Irrigated	Full plant (100,000 plants/ha)	7.0
	Sicot 714B3F			6.9
	Sicot 746B3F			5.0
	Sicot 748B3F			7.6
IRRI2	Sicot 707B3F	Irrigated	Full plant (100,000 plants/ha)	10.4
	Sicot 714B3F			9.1
	Sicot 746B3F			8.9
	Sicot 748B3F			9.1
IRRI3	Sicot 707B3F	Irrigated	Full plant (100,000 plants/ha)	9.1
	Sicot 714B3F			9.6
	Sicot 746B3F			9.5
	Sicot 748B3F			10.3
RAIN1	Sicot 714B3F	Rain-fed	Full plant (100,000 plants/ha)	1.0
	Sicot 748B3F			1.6
RAIN1	Sicot 714B3F	Rain-fed	Single skip (66,000 plants/ha)	0.7
	Sicot 748B3F			0.7
RAIN1	Sicot 714B3F	Rain-fed	Double skip (50,000 plants/ha)	0.3
	Sicot 748B3F			0.4

The small plot experiment planted at KRS have been intensively monitored through the crop growth. The data gathered will be used to help validate the OZCOT & APSIM<sup>3</sup> crop simulation models. DPIR and CSIRO plan to use OZCOT & APSIM to simulate a cotton industry across the NT to gain insights into the industry potential on a regional scale and better understand potential risks and agronomic issues, especially in a rain-fed farming system.

In addition to the pest controlling genetically modified (GM) attributes in current cotton varieties, traditional plant breeding has developed varieties that are higher yielding in Australian conditions, with shorter crop growth periods. With parts of Australia experiencing drought conditions, one benefit of these crops is the reduced amount of water required compared to other commonly planted crop species. Combining better genetics with improved agronomy, growers now use 40 per cent less water to produce one tonne of cotton lint than 10-15 years ago.

The experiment to grow genetically modified cotton in the Territory has been ongoing since December 2018, with the first of the harvests completed in recent weeks. It is anticipated the research into diversified mixed cropping systems will play a key role in developing the Territory's agricultural industries.

Critical to the success of the trial is the department's strong focus on robust biosecurity practices such as monitoring machinery movements that will ensure the potential of a viable cotton industry to become a major contributor to the internal and export economy of the NT. The work undertaken to prevent the introduction and transportation of pests will ensure that the future of the industry is secure, instilling confidence in investors and potential investors that future crops and industry will be protected.

In addition to a thriving agricultural industry, the outcome of the program will assist industry to diversify their farming systems and production with information and strong research partnerships to support cropping systems development.



*Image: Ready for harvest irrigated SICOT 714B3F cotton in KRS cotton variety X sowing date trial. This cotton yielded 9.1 bales/ha*

### Knock your socks off with some facts about cotton

- 99 per cent of cotton grown in Australia and over 60 per cent grown globally is genetically modified to reduce pest damage without the need to resort to heavy chemical use.
- Using GM cotton varieties has reduced chemical use in cotton by 93 per cent since 1997.
- The GM varieties currently in use have three added genes for pest resistance, to help control *Helicoverpa* spp.
- Due to the contribution of cotton research and development nationally, growers now use 30 per cent less land and 40 per cent less water to produce one tonne of cotton lint than 10-15 years ago.
- Performance of new, industry standard varieties will be tested on a variety of Territory soils and climates.
- Did you know? Cotton requires less water than other commonly planted crops, such as rice, corn and tomatoes.
- The majority of Australian cotton growers are registered and audited to encourage the use of sustainable best management practices<sup>4</sup>.
- These new varieties and farming systems need to be trialled locally. There are a

<sup>3</sup>

<https://www.apsim.info/Documentation/Model,CropandSoil/Cotton.aspx>

<sup>4</sup> <https://cottonaustralia.com.au/cotton-growers/mybmp>

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number of factors related to crop growth, supply chain and sustainability that need to be fully investigated to assist the the successful establishment of a viable industry in the NT.

- Cotton growers will investigate using the NT wet season to further reduce crop waer use.
- DPIR will be partnering with farmers to develop pathways that lead to an environmentally sustainable and profitable cotton industry in northern Australia.

### Kidman Springs trial finds massive benefits from phosphorus supplementation

Many readers will be aware of the Phosphorus (P) supplementation study that has been running at the Department of Primary Industry and Resource's Victoria River Research Station (Kidman Springs) since 2014. Major benefits from P supplementation have been demonstrated over the last few years, but this year's results have been even more dramatic and indicate that P supplementation is one of the most important activities that cattle stations can adopt to improve profitability in P deficient areas. At the weaning muster in May this year, the effect of P deficiency on cows that had calved for the second time was quite confronting. The body condition of lactating P- cows (that had no access to P supplement) had deteriorated to the point where the decision was made to stop the study due to animal welfare concerns. While the study was scheduled to run for another year, the huge differences between the treatments seen so far made it hard to justify subjecting the P- cows to another year without P supplement. It would have been good to get data for another year, however if people are not convinced of the benefits of P supplementation from the results so far then running the study for another year is unlikely to make a difference.

The study began in mid 2014 by randomly allocating 179 Brahman weaner heifers to treatments that either received P supplement (P+) or did not (P-). The allocation process included stratifying for weight, making sure that the average and range of weights were similar for both treatment groups (average weight: +P =

171.7 kg, -P = 171.2 kg). The treatment groups grazed two similar, acutely P deficient (average Colwell P soil test results: 2.5 and 3.1 mg P/kg) neighbouring paddocks. The paddocks were set stocked and the treatments swapped paddocks at the first round muster (May) each year to minimise any paddock effect.

The loose lick supplement was distributed twice-weekly and fed year-round in troughs that were sheltered from rain using sheds. The wet and dry season recipes of the supplements fed to each treatment group are shown in Table 1. Basically, salt was substituted for Biofos® in the P- supplement. However, limestone was added to the P- wet season supplement to make the ratio of calcium to P the same in both licks.

*Table 1. The recipes for the loose lick supplements used in the Kidman Springs P supplementation study.*

	Wet season		Dry season	
	P+	P-	P+	P-
Ridley Biofos MCP*	42.5%		25%	
Salt	50.0%	73.5%	40%	65%
Ammonium sulphate (Gran Am)	7.5%	7.5%	10%	10%
Urea			25%	25%
Limestone		19%		

\* The sponsorship of the supplement by Ridley is gratefully acknowledged.

The heifers were first mated at two years of age for four months, from late December 2015, with the first calf crop weaned in May 2017. Two more calf crops were weaned before the study concluded at the weaning muster in May 2019. Each year, more and heavier calves were weaned from the P+ treatment, so the total weight of calves weaned from the P+ group was substantially more than from the P- group. In 2017, 2018 and 2019, an extra 3072 kg, 2804 kg and 5932 kg of weaner was weaned from the P+ treatment group (Table 2). Over the first three calf crops, the extra value of calves weaned from the P+ treatment was worth \$379 per heifer originally allocated to the treatments (the study started with 88 heifers in P- and 91 in P+).

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**Table 2. Details of the first three calf crops weaned from the P+ and P- treatments in the Kidman Springs P supplementation trial.**

Year	Treatment	Avg weaner Weight (kg)	No. of weaners	Total Weight of weaners (kg)	Sale price (\$/kg)	Total value of weaners
2017	+P	173	50	8,616	\$3.50	\$30,154
2017	-P	139	40	5,544	\$3.50	\$19,402
<b>2017</b>	<b>Diff +P vs -P</b>	<b>34</b>	<b>10</b>	<b>3,072</b>		<b>\$10,752</b>
2018	+P	185	43	7,951	\$3.00	\$23,852
2018	-P	172	30	5,145	\$3.00	\$15,435
<b>2018</b>	<b>Diff +P vs -P</b>	<b>13</b>	<b>13</b>	<b>2,806</b>		<b>\$8,417</b>
2019	+P	201	64	12,841	\$2.90	\$37,239
2019	-P	157	44	6,909	\$2.90	\$20,036
<b>2019</b>	<b>Diff +P vs -P</b>	<b>44</b>	<b>20</b>	<b>5,932</b>		<b>\$17,203</b>

A very basic economic comparison of the profitability of the P+ treatment was conducted by dividing the extra value of the weaners produced from the P+ treatment in each year by the cumulative extra cost of the P+ supplement to that

point. Table 3 shows that the cumulative return on investment for the P+ treatment was 280 per cent in 2017, 347 per cent in 2018 and had risen to 513 per cent by 2019.

**Table 3. Assessment of the return on investment in the P+ treatment in the Kidman Springs P supplementation trial.**

Year	Extra value of calves weaned from P+ each year	Cumulative extra value of calves weaned from P+	Cumulative extra cost of the P+ treatment	Cumulative return on investment from P+ treatment
2017	\$10,752	\$10,752	\$3,839	280%
2018	\$8,417	\$19,170	\$5,529	347%
2019	\$17,203	\$36,373	\$7,089	513%

However, this only tells part of the story, as it doesn't account for the greater mortality rate in P- and the heavier weight of cows in P+ (meaning that the P+ cows are likely to be more valuable at the time of culling for age). The cumulative mortality rate from the start of the study to when it was stopped in May 2019 was 13 per cent higher in P- (+P= two per cent, -P=15 per cent) and the average weight of cows was 96 kg heavier in P+. When the greater salvage value of cows in the P+ treatment (\$26,026 in May 2019) is added to the extra value of weaners produced, the return on investment by May 2019 was 880 per cent. This sort of a return on investment is quite staggering and although it is not a proper economic evaluation, it indicates how great an effect that P supplementation can have on the

profitability of properties in P deficient areas (note – a proper economic evaluation will be done in future).

Also note that it is likely that the mortality rate in P- would have been even higher if the study had not been stopped in May 2019 and efforts made to improve the body condition of P- cows that had been lactating and were in very poor condition (some were showing signs of peg leg). 29 P- cows (33 per cent of the total) were segregated in a small holding paddock and provided with hay, molasses, pellets and P supplement until their body condition improved. If this had not been done then it is likely that the mortality rate in P- would have been even higher.

The reason for the dramatic deterioration in P- cows during their second lactation is likely to be because so much P had been drained from their systems during their first and second lactations. If cows don't get enough P from their diet when they are lactating, they mobilise P from their bones and tissues to put into milk. This occurring over two lactations without their P stocks being replenished by supplementation seems to have resulted in the P- treatment crashing.

This study has documented the large effects on productivity and profitability that providing P supplements to heifers and cows can have when they are grazing P deficient country. It has shown very large returns on investment from P supplementation and is already resulting in increased adoption of P supplementation. However, it should be noted that the response will vary depending on the level of P deficiency and benefits of this scale may not be seen where P deficiency is not as severe.



*Image: P+ wet cows in May 2019*



*Image: P- wet cows in May 2019*

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## DPIR shine at the Katherine Show

The department hosts the agricultural display at the Katherine Show each year, and staff did a fantastic job again this year, sharing news from across our portfolio.

Information on the cotton trial at Katherine Research Station drew plenty of interest, with most show goers surprised to discover modern cotton crops and farming methods use far less water than they thought. The Beatrice Hill buffalo herd display also proved popular - many visitors had no idea the department even had a buffalo herd, or that buffalo are used for dairy in certain parts of Australia.

The show was the perfect opportunity for staff to share biosecurity messages, and the display included information on the emerging threat of African Swine Fever, the dangers of feeding meat swill to pigs, the need to look out for signs of citrus canker, and why we should not release pond fish into our waterways.

As well as hosting the agricultural display, staff also acted as stewards and judges. The theme for this year's show was Christmas in July, and the winning scarecrow was a grinch in a chimney created by the Katherine Special School, which is known for its outstanding scarecrow entries!

This year there was an increase in the number of fruit and vegetable entries, including an impressive 10 giant pumpkin entries. The winning pumpkin weighed 91.5kg and had to be weighed with cattle scales. The challenge is now set for Katherine pumpkin growers to break 100kg in 2020.

Department staff also manned the pavilion and provided local watermelon taste testing - thanks to Red Dirt Melons and all involved.



## Expanding knowledge about Northern Territory primary industries



*Image: Meg Humphrys teaching a session*

DPIR staff collaborated with the Arid Lands Environment Centre to run interactive workshops for primary school students at the DesertSMART EcoFair this month.

DPIR staff Meg Humphrys, Pastoral Extension Officer, and Sarah Tsai, Mining Officer, ran eight workshops over August with students from schools around Alice Springs. The workshops were well received by students and teachers, with sessions booking out in advance.

The students learned about the different cattle breeds in the Northern Territory (NT) and why they are suited to certain locations. For example, Brahman are better adapted to heat and ticks and best suited to the northern export market, while Herefords and Shorthorn are suited to the Alice Springs region because they are not tick-resistant, the climate is right for them and their meat is better suited to the southern markets in South Australia and Victoria.

The students were also introduced to the different fruits and vegetables that are grown in Central Australia and the three production districts – Ali Curung, Ti Tree and Alice Springs.

As part of the workshop, students were given maps and asked to apply stickers of each fruit, vegetable and cattle variety in the areas of the NT that they are grown. The activity improved their geography skills as well as general science and agricultural knowledge. The students were able to



*Image: Scarecrow on display*



*Image: Prizewinning pumpkins*

take the maps home to show their families what they learned and spread awareness in the community about the NT's primary industries.

## World first mango auto-harvester has shown great promise

Professor Kerry Walsh and his team at Central Queensland University (CQU) have developed the world's first mango auto-harvester that has been recently trialled at Groves Grown Fruit farm in Yeppoon, Queensland. The prototype machine takes approximately five seconds to harvest a fruit from detection to placement according to farm owner Ian Groves. Professor Walsh discussed the details of the auto-harvester at the Australian Mango Industry Association conference in Darwin last May. He indicated that the auto-harvester has the potential to solve the major labour force issues facing the mango industry. The harvester is a component of an integrated system which will ensure farmers know exactly how many fruits are on their trees, when they will be in perfect condition for the consumer, and when to employ the right number of people for picking and packing. It will not totally replace manual fruit harvesting. The end goal is to save costs and improve productivity on farm, while driving consumer demand by ensuring a top-quality eating experience every time.

At present, the harvester has a 75 per cent efficiency in automatically identifying and picking fruits in view. Professor Walsh hopes to improve its performance to more than 90 per cent efficiency, to increase speed, and to refine its construction to reduce cost. During the trials, the harvester was mounted on a trailer and towed by a ute. The next phase of research will investigate options for it to be mounted on a terrestrial drone to operate autonomously, at faster speeds, and higher accuracies. Ultimately, it is hoped that this technology will be commercialised in the near future.

Professor Walsh's team has previously delivered a near infrared spectroscopy (NIRS) measurement tool to assess the eating quality of mangoes and predict the ideal harvest time. NIRS sensors are now widely used by the mango industry.



*Prototype mango auto-harvester in action (Photos: Central Queensland University)*

## Cows for Schools Program

The Northern Territory Cattlemen's Association (NTCA) Cows for Schools program was first established in 2017 to engage with and educate NT children from the wider community, not just those from pastoral backgrounds. Originally developed from a similar program run by the Centralian Beef Breeders Association (CBBA), the program saw a massive expansion in 2019. Previously run exclusively in Darwin, the program was taken Territory-wide with additional schools being added in Katherine, Tennant Creek and a joint program with CBBA in Alice Springs.

The program involves providing a two-dimensional wooden cow to classrooms and asking the students to decorate the cow to a theme provided by the Northern Territory Cattleman's Association (NTCA). The process allows students to learn about the Northern Territory pastoral and beef industry and have fun at the same time. The cows are then put on display at the local show with winners receiving prizes that can be used within the classroom.

In addition to having the competition reach more areas, NTCA representatives were able to visit classes in Darwin and Katherine and talk to teachers and students about the competition and its theme. This year's theme was *Eco Cows, Farmers Caring for the Land* and was about the sustainability of beef production and the hard work that pastoralists do in managing the environment. This interaction with classes and the education they received from the presentation showed in the quality of cows entered this year.

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*Photo: NTCA staff member Rohan Leach presenting to a class in Darwin*

While Darwin and Katherine were run primarily by NTCA staff, Tennant Creek and Alice Springs required the help of volunteers. CBBA member Nicole Hayes was able to coordinate the program in Alice Springs and Tennant Creek teacher Kris Civatrese was able to coordinate in Tennant Creek. Kris in particular did a fantastic job in getting cows out to Daly Waters and other remote schools.

At the Katherine and Darwin shows, NTCA staff ran a popular vote to determine who the public's favourite was. At Katherine, nearly 150 total votes were tallied on the Friday morning and afternoon, with cows awarded their winners ribbons in the afternoon. In Darwin, cows received nearly 300 votes on the Thursday and Friday morning with the winning cows awarded at lunchtime on Friday by Hon Paul Kirby, Minister for Primary Industry and Resources.

Sponsorship for the program is invaluable. Ridley and Territory Rural contributed generously which helped fund construction of the cows and the prizes. The Cabinet Shop in Alice Springs also donated some cows towards the program.



*Photo: Katherine School of the Air student stands proudly with her ribbon*

Thanks goes to the CBBA, Kris Civatrese, Territory Rural, Ridley, The Darwin Pensioners Workshop and The Cabinet Shop in Alice Springs without whose help, Cows for Schools would not have been possible this year. This year's winning cows were:

### Alice Springs

**Grand champion:** Bradshaw Primary School, Class 5 Priestly

### Tennant Creek

**Grand champion:** Mungkarta School

### Katherine

**Grand champion:** Katherine South Primary School, Class 3/4 Scott

**Reserve champion:** Clyde Fenton Primary School, Class 3/4 Mackander

**Highly commended:** Katherine School of the Air, Combined Preschool, T, 1 and 2 Class

### Darwin

**Grand champion:** Roseberry Primary School, Special Education Class Jones

**Reserve champion:** Sacred Heart Primary School, Class 6 Priest

**Highly commended:** St Paul's Catholic Primary School, T/1 Bonson

### Early weed detection is the key

Accidental weed introductions continue to rise with the increased movement of people and

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vehicles in and out of managed and natural areas.

Weed management, early detection, strategic planning and swift action can mean the difference between expensive ongoing management and a successful eradication program. The Weed Management Branch uses an Incident Action Plan (IAP) decision making framework to ensure that the response to new high priority weeds is planned swiftly and effectively.

Parthenium weed costs Queensland producers more than \$22m annually in reduced production and increased management costs. In October 2018 a new incursion of Parthenium weed was detected in the Katherine region. An IAP has assisted the land holder and the Weed Management Branch with the successful management and potential future eradication of this very significant threat to industry. Monitoring surveys at the incursion site are ongoing with the number of individual seedlings being found decreasing steadily over the dry season. A Weed Spread Prevention Plan has been put in place by the land holder to minimise the risk of weed spread.



*A multiagency approach to managing Parthenium weed*

Rubber vine infestation affects a wide range of landscapes in Queensland but has not yet established in the Northern Territory. A recent incursion near the Queensland/NT border is currently under management by the landholder and the Weed Management Branch. More than 500 plants were found and treated in March 2019. Follow up monitoring and control efforts by the land holder have resulted in an excellent level of management of this particular weed infestation. Further surveillance target areas are being prioritised with survey work planned later in 2019.



*Image: Parthenium weed seedling*



*Rubber vine flower*



*Station staff and ranger training in rubber vine control*

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### *Successful management of rubber vine*

An IAP allows for collaboration and coordination of control efforts, but equally as important is the best practise weed data management that it delivers. This includes the trace back of probable incursion pathways and the prediction of future infection risks. An IAP allows for the identification and prioritisation of likely areas of risk rather than simply waiting for the next weed to be found.

The Weed Management Branch is currently finalising surveillance priorities for Parthenium weed and rubber vine across the Katherine and Barkly regions. Pastoral properties have assisted with this essential work by contributing to a survey earlier in 2019. If you would like to talk to a weed management officer, please call 8973 8857 or for more information visit [the Northern Territory Government website](https://nt.gov.au/environment/weeds).<sup>5</sup>

Proactive planning and sharing the load makes future weed incursions easier and cheaper to manage. We're all in this together!

## **Siam weed**

Native to the Americas, Siam weed has become a major land management issue across tropical areas of Asia and Africa. In 1994 it was detected in the Tully area of Far North Queensland and until recently was confined to that region. An incursion of Siam weed has recently been detected on two properties in the greater Darwin region.

Siam weed has high nitrate levels and in some countries has led to cattle deaths and abortions when stock have been accidentally fed contaminated fodder. Its rapid rate of growth

means that it has the potential to outcompete crops, pastures and native vegetation. In addition to this, Siam weed may cause skin complaints and asthma in allergy prone people.

These potential environmental, economic and health impacts, when combined with the costs associated with its control mean that it is considered one of the world's worst weeds.

The Weed Management Branch (WMB) has notified the National Biosecurity Management Consultative Committee of this most recent incursion of Siam weed. WMB is working closely with the landholders and other government departments to contain and control the current known infestation and conducting surveys to determine how far it may have spread.

As with any weed management, the early reporting of a suspected Siam weed infestation is essential to successful control and eradication efforts.

Siam weed can look similar to other weed species but there are a few outstanding features that help in identification.

The pungent smelling leaves of this scrambling climber are soft, green, hairy and roughly triangular in shape. They also have a very distinctive three-vein 'pitchfork' pattern running the length of each leaf. Pale pink-mauve tubular flowers are held in clusters at the end of the branches. The flowers can appear white if seen from a distance but will usually turn darker lilac when mature.

Siam weed flowering is triggered in mid-year by shorter day lengths and they produce enormous numbers of seeds within 8-10 weeks after flowering. Each seed has a tuft of white or brown hairs that act as a little parachute, allowing it to be easily transported by wind or water.

Preventing weed spread through biosecurity measures is as important to Siam weed management as early detection. The hairs on the seed help it attach to vehicles, clothing, footwear and animal fur. It is very important that travel through known areas of infestation is controlled

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<sup>5</sup> <https://nt.gov.au/environment/weeds>

## Katherine Rural Review

and that vehicles, machinery and any personal gear used in an infested area be cleaned thoroughly before leaving an infested area.

Let's work together to stop the spread of Siam weed. If you have seen Siam weed, or think you may have it on your property please contact the Weed Management Branch on (08) 89 99 45 67 or at [weedinfo@nt.gov.au](mailto:weedinfo@nt.gov.au).



*Image: Siam weed*

## Pastoral Feed Outlook

DPIR publishes a Pastoral Feed Outlook every quarter. If you would like to automatically receive the Pastoral Feed Outlook when it is released, click on the 'subscribe' button on our department webpage.

The Pastoral Feed Outlook includes information on:

- the current estimated feed supply
- recent and anticipated pasture growth and how these compare to long-term records
- the seasonal outlook for the coming months
- emerging drought conditions
- the risk of wildfire.

Read the latest [Pastoral Feed Outlook publication](#).<sup>6</sup>

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<sup>6</sup> <https://dpiir.nt.gov.au/primary-industry/primary-industry-publications/northern-territory-pastoral-feed-outlook>

If you have any questions about the Pastoral Feed Outlook, please contact Dionne Walsh – [dionne.walsh@nt.gov.au](mailto:dionne.walsh@nt.gov.au).

## Pastoral Market Update

The Pastoral Market Update (PMU) is a document published monthly by DPIR to provide information on livestock exports from the Port of Darwin and interstate cattle movements.

Read the latest [Pastoral Market Update](#).<sup>7</sup>

Please contact [krs.dpir@nt.gov.au](mailto:krs.dpir@nt.gov.au) if you would like assistance to subscribe to have a copy emailed monthly.

## Importing plants or plant products into the Northern Territory

Have you got an import permit and/or plant health certificate?

## Import permits for plant products

- avocado plants
- banana plants
- plantain, manila hemp
- grapevine material
- potatoes (planting)
- soybeans
- turf.

## Import permits for plant related material

- soil, compost, potting mix
- plant materials for diagnostic and lab testing

## Import permits for used machinery and equipment

- all used agricultural & earthmoving equipment and machinery
- ploughs and seeders
- tractors
- harvesters
- bulldozers
- pruning shears
- picking poles

<sup>7</sup>

[http://dpiir.nt.gov.au/data/assets/pdf\\_file/0009/728028/PMU\\_082019.pdf](http://dpiir.nt.gov.au/data/assets/pdf_file/0009/728028/PMU_082019.pdf)

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- grape related machinery/equipment/tools
- other plant related packaging, pellets and plant equipment.

## Plant health or plant health assurance certificate

- plants (household / potted / nursery) plants general (not otherwise specified)
- fruit and vegetables
- maize seed
- peanut seed
- citrus and fortunella plants
- papaya plants
- passionfruit plants
- untreated pinewood, seasoned pinewood or pinewood articles and firewood from Western Australia

## Contact

To find out more about biosecurity or quarantine contact:

### Darwin office

(08) 8999 2118

### Katherine office

(08) 8973 9704

### Alice Springs office

(08) 8951 8166

Email: [quarantine@nt.gov.au](mailto:quarantine@nt.gov.au)

## Leucaena Profitable Grazing Systems – Northern Territory Agriculture: Pathways to Potential Field Day

### What's on

Take part in the first of a series of workshops and site walks with The Leucaena Network (TLN) and Profitable Grazing Systems (PGS).

Improve your grazing systems with the new psyllid-tolerant strain of leucaena, Redlands. Topics will cover the economic advantages of incorporating Redlands leucaena as a forage

crop, where it will grow, techniques to ensure a good planting outcome and how to manage it while minimising its weedy potential.

- Visit Department of Primary Industry and Resources research farm leucaena demonstration sites and also local producers' demonstration sites.
- View slashing/mulching and other relevant equipment and talk to local contractors and machinery suppliers.
- Learn how to use Natural Resources (NR) maps. Hear about improved pastures, what will grow in your region and talk to Northern Territory seed suppliers. Get the basics about ecosystem processes, understanding pasture growth and how to work out grazing loads. Discover the key differences in managing grazing on introduced or mixed pastures vs native pasture systems.
- Learn about legume agronomy, 'checking out your nods', how to assess if nitrogen fixation is occurring in your paddocks and the basics of soil health.
- See how to use drone imaging and other technology for pasture assessment. Drones allow advanced information-gathering for automation, analysis and visualisation. Understand how remote satellite sensing and imaging of your farm or region, analysed in real time, can give you valuable data on crop quality, crop volumes, and land management.

## Where, when and how much

**Where:** Douglas Daly Research Farm

**Dates:** From 10:00am Thursday 10 October 2019 until 1:00pm Friday 11 October 2019

**NT producers:** free, limited places available.

**Industry representatives:** \$75 per person

**RSVP:** Email Rebecca Mohr-Bell at [rebecca@argyllconsulting.com.au](mailto:rebecca@argyllconsulting.com.au) for catering and accommodation purposes.

## August 2019

### Livestock disease investigations

The Department of Primary Industry and Resources provides disease investigation service, including free diagnostic testing through the Berrimah Veterinary Laboratory, to livestock owners for diagnosis or exclusion of notifiable emergency, exotic and endemic disease, including zoonotic diseases free of charge. Subsidies are available for producers to contact private veterinarians for significant disease investigations in livestock.

### Subsidies for disease investigation

- Subsidies of up to \$2,000 are available for disease investigations in cattle conducted by private vets as part of the Northern Australia Biosecurity Surveillance project.
- Subsidies for disease investigations in horses and other species, subsidies of up to \$250 are available.
- Remember that \$300 is available for cattle showing nervous signs where a post-mortem is performed and the brain is collected for 'Mad Cow' exclusion testing.

Please contact your local vet or regional Livestock Biosecurity Officer for more information.

From April-June 2019, 62 livestock disease investigations were conducted to rule out emergency diseases or investigate suspect notifiable diseases across the Northern Territory (NT).

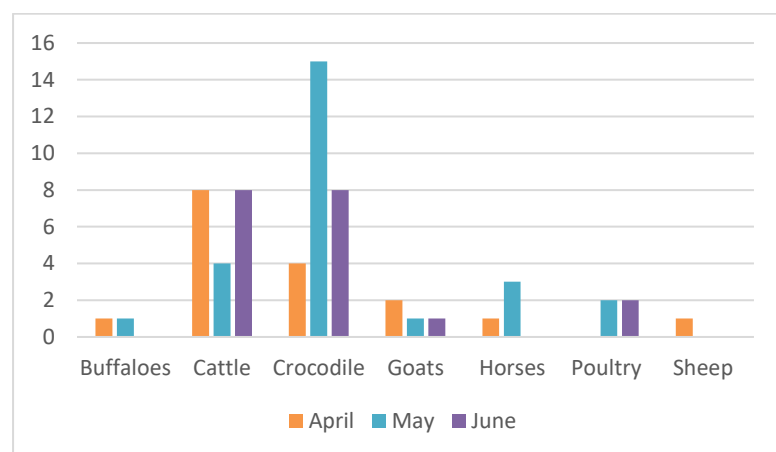


Figure 1: Livestock disease investigations in the NT, April to June 2019



## Polioencephalomalacia in the Katherine region

Approximately 800 home-bred cattle aged six to 18 months were mustered and weaned at a property in the Katherine region in May 2019. The weaners and their dams were in good condition and mustered to the yards without issue. No chemical treatments were applied, there was no access to feed supplements (lick or salt) and no other processing was conducted at mustering; the weaners were separated from their dams into a clean, weed-free holding yard with access to freshly cut green Rhodes grass hay and fresh water.

The following day a single weaner in good condition was found dead in the yard; the remaining animals appeared normal. The second day, three animals in the yard were noticed to be wobbly on their feet and staggering, with some showing signs of drooling. The manager contacted the Katherine livestock biosecurity officer on the third day when a further six animals were noted to be showing similar clinical signs. The department's biosecurity and veterinary officers attended the property that day. All affected animals were from the weaner mob; their unaffected dams were grazing in the paddock adjacent to the yards and adult animals in other parts of the property examined by the officers showed no evidence of disease.

On arrival, there were three dead weaners in the yard and two animals were collapsed, unresponsive and unable to rise. In the hours between the initial phone call and the livestock biosecurity and veterinary officers arriving at the property, a further 11 animals had developed significant neurological (nervous system) clinical signs, including head pressing, drooling, staggering, odd vocalisation and altered mentation. The two collapsed and unresponsive animals were euthanised and full post mortem examinations performed.

All affected animals were in good condition and the manager noted that the affected weaners were among the heavier individuals in the mob. Visible signs of organ malfunction in the two animals that were dissected was negligible; the younger animal had no abnormality visible to the eye and the other animal was found to have a number of firm red nodules in the left central lung lobe, which was considered incidental to the neurological signs.

Tissue and blood samples were submitted to Berrimah Veterinary Laboratory. Differential diagnoses for the nervous system signs included polioencephalomalacia, Bovine Herpes Virus 5, urea toxicity, lead poisoning, vitamin A deficiency, rabies, Australian Bat Lyssavirus and Aujeszky's disease. The lesions in the lung were tested to rule out a range of emergency and exotic respiratory diseases, including bovine tuberculosis, contagious bovine pleuropneumonia, Pasteurella and Mycoides sp infections.

The clinical findings, disease course and laboratory results pointed to a conclusion of polioencephalomalacia (PEM) as the cause of this morbidity and mortality event. PEM is a nutritional disease of well-fed, young growing animals in good condition, it is most common in animals between 6-18 months of age and occurs suddenly. In Australia, most cases are associated with a functional deficiency of vitamin B1 (thiamine). Cattle depend on the micro-organisms in the rumen to produce thiamine, and the level of daily production of this vitamin is close to the animal's daily requirement. The most common cause of thiamine deficiency is the presence in the rumen of bacteria that produce thiaminase, an enzyme which consumes, degrades and therefore reduces the availability of thiamine to the animal. In pastoral production systems, a sudden change in feed from low quality dry feed to good quality hay or lush grass will cause a sudden change in the bacterial population of the rumen, which may precipitate PEM.

The visible signs of PEM are caused at a cellular level, and relate to the transport of water across the cell membrane. Lack of sufficient vitamin B1 results in reduced activity of an enzyme involved in the cell membrane pump that transports salt molecules in and out of cells. Dysfunction of this pump results in movement of water into cells, causing swelling. While this occurs in all tissues, the effects of cell swelling are particularly noticeable in the brain, which is limited in its ability to enlarge owing to the tightly protective skull bones. As swelling progresses, the cells are compressed against the inside of the skull, causing cell death and the development of neurological signs such as depression, apparent blindness, staggering and wobbling. Champing of the jaws,

drooling and head pressing against fences and into corners are common. As signs progress, generally over 24-48 hours, animals fall and are unable to rise, with muscle tremors and convulsions becoming noticeable, and ultimately death may occur.

The likely cause of PEM in this case was the sudden change of diet from dam's milk and dry paddock forage, to high quality hay. The rumen microflora are adapted to breaking down a particular type of food, and will take up to a week to adjust to a change. The observation that the larger, heavier animals in the mob were the worst affected speaks to the fact that these are likely to have been the greediest or earliest consumers of the high quality hay. In this instance, the high quality hay provided to the animals was the only available feed source, owing to the very poor preceding wet season in the Northern Territory and consequent lack of locally produced hay.

A presumptive diagnosis was made within 24 hours of investigation. The station manager was advised to limit the amount of high quality hay given to the weaners, slowly increasing the volume, to allow the rumen microflora to adapt to the change in feed. By day 5, no further cases had occurred and mildly affected animals were returning to normal without requiring medical intervention. The veterinary officer also explained to the manager that if the same conditions were to occur again, the effects of a sudden feed quality and quantity change can be mitigated with the use of injectable Vitamin B complex for a few days after weaning. However, this may be a cost-prohibitive option when dealing with large mobs. Alternatively, close observation of the mob and injecting affected animals with Vitamin B1 early in the disease course, may lead to a remission of clinical signs within 6-24 hours. A total of 15 animals died or were humanely destroyed; morbidity was approximately three per cent and mortality less than two per cent. Cases have been reported elsewhere of losses up to 10%.



Figure 2: weaners salivating, staggering and struggling to rise



Figure 3: weaner salivating and head pressing in corner of yards

## Stock theft in the NT

The Department of Primary Industry and Resources (DPIR) collaborates with Northern Territory Police for investigations into stock theft and ownership disputes in accordance with public service and legislative requirements. Theft of property, which includes theft of cattle, is a criminal offence under the *NT Criminal Code Act 1983* and is managed by NT Police.

The *Livestock Act 2008*<sup>8</sup> and Livestock Regulations underpin the livestock identification and movement requirements for livestock in the Territory. This includes:

- brands
- waybills
- NT Health Certificates (including waybills)
- declared area movement Permits
- National Livestock Identification System (NLIS).

It should be noted that a registered NT brand is the only true proof of ownership of livestock in the NT. Cross branding of purchased cattle is an accepted industry practice but not a legal requirement under the livestock legislation. A receipt of purchase would be required for proof of ownership if cattle were not cross-branded with supporting movement documents.

All suspicions of stock theft should be reported to your local police. The Major Crime Unit from NT Police will lead the investigation with assistance from DPIR Regional Livestock Biosecurity Officers on non-compliance matters relating to brands, NLIS, and movement documentation.

## **Meat and Livestock Australia release new ‘fit to load’ guide**

The commonly used ‘Is it fit to load’ guide from Meat and Livestock Australia has recently been updated and renamed ‘Is the animal fit to load’. The guide was originally produced in 2012 to assist livestock producers and operators to meet their obligations under the Australian Animal Welfare Standards and Guidelines for the Land Transport of Livestock. The content has been updated to include the following:

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>• clear roles and responsibilities for consignors and transporters</li><li>• clear checklists to assess whether an animal is fit to load</li><li>• managing effluent</li></ul> | <ul style="list-style-type: none"><li>• loading densities</li><li>• requirements for transporting bobby calves</li><li>• using firearms or captive bolt for euthanasia</li></ul> |
|--|--|

The new guide has been endorsed by all red meat peak industry councils, Animal Health Australia, Dairy Australia, and other peak industry bodies throughout the value chain. This includes the Australian Livestock and Rural Transporters Association, the Australian Livestock & Property Agents Association, and the Australian Livestock Markets’ Association. (MLA, 2019)

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<sup>8</sup> <https://legislation.nt.gov.au/Legislation/LIVESTOCK-ACT>

The guide can be downloaded by visiting [Meat Livestock Australia's website](#).

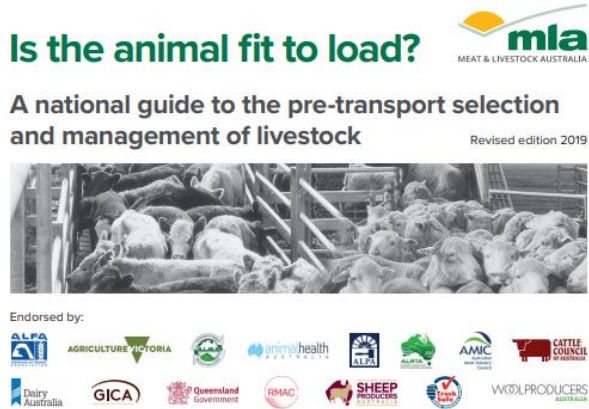


Figure 2: New 'Is the animal fit to load' guide<sup>10</sup>

## Identification and movement requirements for cattle and buffalo

### Moving cattle or buffalo off your property

It is the responsibility of the **owner** of the livestock to ensure all livestock movements comply with movement requirements before the movement begins.

If you are planning to move cattle or buffalo off your property, you **must** ensure you meet the following requirements.

- All cattle over the age of eight months must be branded with a clear, legible and permanent brand. NOTE: This does not apply to buffaloes. Buffaloes do not require a brand for movement.
- Only registered earmarks must be applied.
- Earmarks must only be applied to cattle or buffalo that have been branded with a registered brand.
- An earmark must not be longer than 8cm.
- All cattle and buffalo must be identified with an approved National Livestock Identification System device.
- All cattle and buffalo must be deemed fit for the intended journey.
- The owner of the livestock must issue a completed NT waybill prior to departure. A National Vendor Document cannot be used to replace a NT waybill for movements
- Any cattle or buffalo moving off your property that are not owned by you, must have a separate waybill.
- You must ensure all treatments and/or inspections required for movements related to cattle tick zones.

### Returning cattle or buffalo

Cattle and buffalo may be moved without a waybill and approved NLIS device if the livestock are being returned to the property on which they are usually kept after straying beyond the boundaries of the property.

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<sup>9</sup> [m.la.com.au/isitfittoload](http://m.la.com.au/isitfittoload)

<sup>10</sup> Meat and Livestock Australia 2019, *New 'fit to load' guide released*, viewed 26<sup>th</sup> August, 2019  
<<https://www.m.la.com.au/news-and-events/industry-news/new-fit-to-load-guide-released>>

## Plant and livestock sector reforms to property identification arrangements

Australia's agricultural and food traceability systems are currently the focus of a number of pieces of work, including reforms to property identification arrangements. This work is looking to opportunities to enhance Australia's traceability arrangements across animal, plant, food and fibre industries, which will benefit the management of pest and disease outbreaks, food safety, trade and market access requirements, and address increasing consumer interest in product sustainability, ethics and provenance.

### What is a property identifier?

A property identifier (or property identification code) is a unique number issued by your state or territory government to properties with livestock and is the basis of a traceability system.

### What are the proposed changes?

The proposed changes will result in a property identifier being issued for properties involved in the major plant production sectors, including properties that are part of the supply chain.

A rigorous and consistent approach to identifying those properties involved in primary production, processing and distribution is a key building block in developing a robust traceability system. As a result, all governments have committed to deliver nationally harmonised property identification arrangements across the animal and major plant production sectors. It involves agreeing to a set of principles and business rules by the end of 2019 and having necessary legislative changes in place by the end of 2022. The proposed reforms to property identification arrangements will:

- help to ensure we continue to meet the increasing expectations of consumers, both domestic and overseas, and importing countries
- in the event of a biosecurity or food safety incident, support swift and targeted action while minimising business disruption to those unaffected or uninvolved, and
- see regulatory requirements operating alongside/supporting industry tracing systems and needs, avoiding unnecessary costs.

The principles and supporting business rules have been developed by a working group comprising of all state and territory governments and the Commonwealth.

### How are we engaging industry?

To implement the proposed changes, each state and territory will be seeking to work with their respective plant and livestock industry groups (and their members) on the design and implementation of this commitment. New arrangements will mean changes to existing arrangements, and will likely have resourcing implications for all parties. In addition to your views on the principles themselves, we are interested in:

- how the proposed changes will affect your specific industry
- ways to minimise disruptions from these changes, including potential integration with existing or anticipated industry led tracing or quality assurance systems
- options to enhance system compliance.

Read more at the [Department of Agriculture and Water Resources website](#).<sup>11</sup>

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<sup>11</sup> [www.agriculture.gov.au/propertyidentificationreforms](http://www.agriculture.gov.au/propertyidentificationreforms)

## How can you get involved?

Stakeholders will be engaged through existing industry and government forums. Written submissions can be made through the [Australian Government Department of Agriculture's Have Your Say website](#).<sup>12</sup> Submissions will close on Friday 1 November 2019.

If you require further information, please contact either of the following Northern Territory representatives from the Property Identification Code working group:

### Plant Biosecurity Branch

Hannah Cooke

Plant Biosecurity Officer

08 8999 2063

### Livestock Biosecurity Branch

Greg Crawford

Regional Livestock Biosecurity Officer 08 8951 8125

## Contact the Livestock Biosecurity team

### Darwin

Regional Livestock Biosecurity Officer 08 8999 2034

Livestock Biosecurity Officer 08 8999 2030

### Katherine

Regional Livestock Biosecurity Officer 08 8973 9767

Livestock Biosecurity Officer 08 8973 9765

### Tennant Creek

Principal Livestock Biosecurity Officer 08 8962 4458

Livestock Biosecurity Officer 08 8962 4492

### Alice Springs

Senior Field Veterinary Officer 08 8951 8181

Regional Livestock Biosecurity Officer 08 8951 8125

Department website: [nt.gov.au/industry/agriculture/livestock](http://nt.gov.au/industry/agriculture/livestock)

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<sup>12</sup> [www.agriculture.gov.au/propertyidentificationreforms](http://www.agriculture.gov.au/propertyidentificationreforms).

## Katherine region events calendar

Event	Location	Date	Contact
Nutrition EDGE	Katherine	12-14 Nov 2019	Desiree Jackson 0409 062 692 <a href="mailto:desireejackson@djlm.com.au">desireejackson@djlm.com.au</a>
Northern Territory Agriculture: Pathways to Potential  The Leucaena Network and Profitable Grazing Systems Field Day/Producer Workshops	Douglas Daly Research Farm	10 – 11 October 2019	Rebecca Mohr-Bell  0438 405 779  <a href="mailto:rebecca@argyllconsulting.com.au">rebecca@argyllconsulting.com.au</a>

Please email us with updates of events happening in your area: [krs.dpir@nt.gov.au](mailto:krs.dpir@nt.gov.au)

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Katherine NT 0851

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