Senepol crossbreeding meat quality research summary

Tim Schatz, Principal Pastoral Production Research Officer, Berrimah Farm

Summary: Recent research has found that crossbreeding with a tropically adapted Bos Taurus such as Senepol may be a way for northern cattle producers with Brahman herds to produce animals with improved meat quality. Research conducted by the NT Department of Primary Industry and Fisheries (DPIF) on F1 Senepol x Brahman cross steers and Brahman steers (that had been managed together all their lives) found that meat from the F1 Senepols was more tender.

The NT DPIF has been conducting a research program to determine whether crossbreeding with Senepol bulls is a viable way for north Australian cattle producers with Brahman herds to produce animals that will perform well under harsh northern conditions, and will be suited to both the South East Asian live export market and the Australian domestic market. This would increase the marketing options for northern producers as their cattle often suffer a price penalty in Australian domestic markets due to a perception that Brahman cattle from northern Australia have poor meat tenderness. Live export has been the main market for many northern producers for a number of years and demand for their Brahman cattle has been strong as the cooking methods used in South East Asia mean that meat tenderness is less of an issue.

Figure 1. First cross Senepol and Brahman steers in the Smithfield feedlot.
However it would be advantageous for northern producers to be able to produce cattle that are in demand in both the live export and Australian domestic markets so that they are less vulnerable to live export fluctuations. It was thought that crossbreeding Brahman herds with a tropically adapted *Bos taurus* breed such as the Senepol (a breed developed in the Caribbean from the West African N'Dama breed crossed with Red Poll, known to combine good adaptation with good meat quality and polledness) may be an efficient way of producing animals that perform well under north Australian conditions and will be suited to both the live export and Australian domestic markets. The NT DPIF has been conducting research to test this strategy since 2008 and part of this research has been to determine whether the F1 Senepol x Brahman cross actually grades better in abattoirs and has more tender meat than Brahmans.

This research compared the meat quality of F1 Senepol x Brahman steers and Brahman steers that had been bred on DPIF research stations in the Katherine/VRD region and then grazed improved pasture together for a year after weaning at the Douglas Daly Research Farm (NT). In July 2013, 25 steers of each genotype were transported to the Smithfield feedlot (Proston, Qld) where they were fed for 73 days and then slaughtered at the Dinmore abattoir where MSA assessment was conducted on the carcases. Striploin samples were collected from each carcase and evaluated for tenderness and other meat quality parameters at the University of New England (UNE) meat science laboratory.

MSA carcase assessment found that the F1 Senepol steers on average were graded 2 boning groups better than the Brahmans (the price received for carcases is determined by the boning group that they are graded into). The average boning group was 6.3 for the F1 Senepols and 8.3 for the Brahmans. Shear force tests conducted by the UNE meat science lab were used to assess the tenderness of the meat and the striploin samples from the F1 Senepol steers were found to have significantly lower (P=0.003) average shear force values than the Brahmans (3.43 kg vs 3.86 kg).

It should be noted that while the meat of the F1 Senepols was found to be more tender than the Brahmans, that the meat from the Brahman steers in this study was actually found to be quite tender (shear force values of below 4.0 kg are considered to be tender). The shear force values for the Brahman steers in this study were quite low in comparison to values that have been found from other Brahmans (evaluation of data from 1,298 Brahman striploin samples found that the average shear force was 5.5 kg with a range of 2.53 to 16.88 kg - Rod Polkinghorne pers. comm.). The good tenderness results found for both genotypes in this study is likely to be due to the fact that they had grown well and were relatively young for their weight at slaughter (the average estimated age at slaughter of the steers was 21.5 months and the average carcase weight was about 238 kg).

This meat quality study combined with previous research which has found that the F1 Senepols perform at least as well or better than Brahmans in every growth and fertility measure studied so far by the NT DPIF, suggests that crossbreeding with a tropically adapted *Bos taurus* breed such as the Senepol may be a good way for north Australian cattle producers to increase their marketing options.

Note- While Senepols have quite good tick resistance, they are as susceptible to tick fever as British *Bos taurus* breeds and so it is worthwhile ensuring that Senepol bulls have been vaccinated for tick fever if they are going to be transported to locations where ticks are a problem. Tick fever is not likely to be a problem in their progeny if they are used in a crossbreeding program with Brahman cows as they will have better resistance due to their higher Brahman content, and also calves can acquire resistance to tick fever if they are bitten by ticks while suckling from cows that have resistance.

For more information, contact:

Tim Schatz
Principal Pastoral Production Research Officer
NT Department of Primary Industry and Fisheries
P:08 899 92332   Email: tim.schatz@nt.gov.au
2010 NT Pastoral Industry survey shows ongoing development and intensification of management

Trish Cowley, Pastoral Production Officer, Katherine Research Station

The 2010 NT Pastoral Industry Survey report is now available – online and in hard copy. It follows on from the 2004 pastoral industry survey, which was widely used as a planning and benchmarking tool. The survey seeks to document cattle and land management practices in order to monitor industry changes and identify industry needs. Between March 2011 and February 2012, 127 cattle producers were interviewed across the Territory, generally over several cups of tea! While the initial aim was to finish surveying by mid-2011, the suspension of live cattle exports led to the suspension of surveying. With industry reeling, DPIF staff didn’t start surveying again until September in 2011, and still focussed on capturing practices of the 2010 calendar year. Questions regarding development plans and challenges and issues facing cattle producers were undoubtedly affected by the export suspension, which left a legacy of uncertainty and a decline in industry confidence.

What’s in the report? You will find the percentage of producers carrying out different cattle and land management practices, as well percentage of cattle under different management practices. Some of the topics covered include:

- Infrastructure development
- Turnoff and market
- Cattle management practices
- Animal health
- Grazing land management practices
- Weeds, pest animals
- Improved pastures and hay
- Producer attitudes about the challenges of managing pastoral businesses

The report breaks the results down into the regions of the NT (see Table 1). Separate reports are due to be released soon for each region. The following is a snapshot of the report.

Table 1: Regional differences reported in the 2010 NT Pastoral Survey

<table>
<thead>
<tr>
<th>Region</th>
<th>No. properties surveyed</th>
<th>Average property size (km²)</th>
<th>Average herd size (hd)</th>
<th>Av. no. staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice Springs</td>
<td>31</td>
<td>3,799</td>
<td>5,800</td>
<td>6</td>
</tr>
<tr>
<td>Barkly</td>
<td>13</td>
<td>6,653</td>
<td>36,000</td>
<td>27</td>
</tr>
<tr>
<td>Katherine</td>
<td>63</td>
<td>2,232</td>
<td>11,000</td>
<td>8</td>
</tr>
<tr>
<td>Top End</td>
<td>20</td>
<td>497</td>
<td>3,600</td>
<td>5</td>
</tr>
<tr>
<td>NT Wide</td>
<td>127</td>
<td>2,794</td>
<td>11,000</td>
<td>9</td>
</tr>
</tbody>
</table>

Infrastructure development

Based on producer estimates, 85% of the surveyed area was utilised for grazing purposes, 4% was classified as not yet developed and another 8% was classified as unproductive. The average property size was 2794 km², down from 3122 km² in 2004. This may be due to surveying a different sample of properties, but potentially reflects property subdivisions that occurred between surveys. Private businesses owned more properties and land area than corporate companies, but companies ran the largest percentage of cattle, reflecting their greater presence in premier cattle country in the Barkly region and the Victoria River District in the Katherine region.
Data on infrastructure development, changes in carrying capacity suggest that while a moderate investment in development occurred between the surveys, producers did not realise the increases in carrying capacity that they had anticipated. In 2004 producers predicted a 29% increase in carrying capacity by 2009 and a 54% increase by 2014, based on their plans for infrastructure development. Producer estimates in the 2010 survey suggested that there was only a 10% increase in adult equivalents across the NT between 2004 and 2010, lower than anticipated. Sixty seven per cent of producers carried out water point development and 48% carried out paddock subdivision during 2009 and 2010. This reflected the development intentions captured in the 2004 survey where 80% of producers stated an intention to develop water points and 60% to subdivide paddocks.

On average producers spent $200,000 per property on capital development over 2009 and 2010. This equated to $21 per adult equivalent (AE) run. Capital expenditure per property was highest in the Barkly region, no doubt related to larger property sizes. However capital expenditure per adult equivalent run was highest in the Top End at $49/AE suggesting the greatest intensity of development occurred there.

Producers remained confident about further development potential, predicting a 17% increase in carrying capacity by 2015 and a 25% increase by 2020 in the 2010 survey, driven largely by Barkly and Katherine producer estimates. Crude indicators of watered area (dividing the grazed area by the number of water points) suggest that there is greater development potential in the Katherine and Barkly regions compared to other regions regarding water point development.

**Markets**

Live export remained a major market for NT producers over both survey periods, with an estimated 57% of turnoff going to live export in 2010. The only significant change was an increase in the percentage of producers sending cattle to abattoirs, from 38% in 2004 to 55% in 2010. This no doubt reflected the change in cull cow markets as a result of Indonesia enforcing the 350 kg weight limit in early 2010.

**Breeder management**

There was some evidence of increased intensification of breeder management between the survey periods. In 2010 there was an increased number of producers carrying out 3 rounds of mustering, pregnancy testing, segregating breeders based on pregnancy status, weighing heifers prior to joining and culling empty heifers after joining. The most significant change was the percentage of producers individually identifying animals for performance recording purposes, which doubled. A moderate number of Barkly and Alice Springs producers used electronic identification tags (EID) in 2004 as this was required when transporting cattle interstate, but very few producers in the Top End and Katherine regions did. In 2010 47% of producers in the Katherine region and 64% in the Top End reported individually identifying cattle for management purposes, which represented an 89% and 94% increase, respectively.

**Bulls**

The average reported bull percentage decreased from 4.3% in 2004 to 3.6% in 2010. There was no change in semen testing of bulls prior to purchase (43% of properties), suggesting that this was not the cause of lowered bull numbers. There was an increase in the percentage of producers breeding their own bulls, from 24% in 2004 to 36% in 2010.

**Supplementation**

Fewer producers were supplementing cattle in 2010 (80%) compared to 2004 (92%). Dry season supplementation was more common than wet season supplementation across both surveys, with 80% and 62% of producers supplementing across the Barkly, Katherine and Top End regions in 2010, respectively. Those that supplemented in the wet season supplemented a greater proportion of their stock, with 49% of stock on the surveyed Barkly, Katherine and Top End properties supplemented
during the 2010 dry and 42% supplemented during the wet. Producers in the Katherine and Top End regions had the highest reliance on supplementation. Conversely, Alice Springs producers carried out the least supplementation, with 30% of producers feeding for part of the year, and another 26% supplementing all year.

Staff

On the surveyed properties, 566 seasonal staff and 585 permanent staff were employed in 2010, suggesting that approximately 2100 staff were employed by pastoral properties in NT in 2010, based on having surveyed 54% of enterprises.

This is only a taste of NT Wide survey results! If you want to learn more about particular practices, email trisha.cowley@nt.gov.au for a hard copy or grab it online at: http://bit.ly/1cXYzq

Phosphorus Supplementation in a dry year…

*Whitney Dollemore, Pastoral Production Officer, Katherine Research Station*

A drier than normal wet season is expected this year for the Katherine region as there is a 60-70% chance of below average rainfall until January. Meaning, for every ten November to January outlooks with similar odds to these, about three or four of them would result in above-average rainfall over these areas, while about six or seven would be below average (BOM, Nov.2013). In conjunction with the reduced pasture growth this year, if the forecast is correct, the Nov-Jan period will have a large effect on the amount pasture grown for the 2014 dry season. This in turn, increases the risk of reduced cow body condition, lower pregnancy rates in 2014 and lower weaning rates in 2015.

At the end of the dry season the pasture is supplying insufficient energy, protein and phosphorus for pregnant or lactating heifers and cows. If the amount of rainfall expected is reduced until January the regular annual period of nutritional deficiency will be extended. Management strategies are crucial to ensuring the survival and production of your cattle. Supplementation is one strategy to overcome the nutritional deficiency left by the pasture.

Feeding urea supplements is widely practised in this region and when feeding for an extended period, as is likely this year it is important to remember that cattle will eat up to 20% more pasture. We are required to take this into account when stocking paddocks. The combination of urea and phosphorus in the late dry season will be particularly beneficial for cattle that are lactating. For more information on late dry season supplementation see, the Katherine Best Practice manual.

Once pasture growth is underway in response to sufficient rainfall, it will present an opportunity for the cattle to replace body reserves used throughout the dry and store what is required for the following dry season. During the wet season energy and protein are no longer limiting cattle production as phosphorus (P) is the most limiting nutrient. Feeding wet season P will increase the supply of phosphorus above that of the pasture to enable the cows to meet the requirement of lactation and/or replenish body reserves in order to get back in calf. Cashcow, a 4 year study investigating factors that affect breeder fertility across northern Australia, has identified that a wet season phosphorus to metabolisable energy (P:ME) ratio above 500mg P/MJ ME during the wet season is a major factor in the likelihood of a breeder getting back in calf within 4 months of calving.

The P requirement for breeding stock is 10g/day and the common target for P supplementation is to aim to supply 6 – 8 grams P/head/day. This amount of supplementation is aimed at trying to get cows to move from a high risk to low risk of P deficiency (P:ME>500).

Things to consider in having cattle consume the required amount of P for the least cost include:
• the daily intake and the % of P in the supplement can be used to calculate how many grams of P that each animal will consume. The lick can be varied to achieve the target intake of P,
• method of delivery - blocks vs. loose lick taking into account animal preference, the weather, paddock access during the wet season and water solubility of the supplement.
• the option of supplementing with straight Kynophos or Biophos rather than a mix

<table>
<thead>
<tr>
<th></th>
<th>Without P</th>
<th>With P</th>
</tr>
</thead>
<tbody>
<tr>
<td>GM/10,000 AE</td>
<td>$859,600</td>
<td>$1,105,600</td>
</tr>
<tr>
<td>GM/AE</td>
<td>$85.95</td>
<td>$110.56</td>
</tr>
<tr>
<td>GM difference/AE</td>
<td>$24.61</td>
<td></td>
</tr>
</tbody>
</table>

Phosphorus supplementation gives the most benefit for money spent where P is deficient. The gross margin figures in the above table are taken from a Breedcow analysis of two supplementation options for breeders grazing acutely phosphorus deficient country which is typical in the Katherine region. The two supplementation options explored include; a dry season supplement alone (Without P) and a year round supplementation (With P : dry season supplement and wet season loose lick comprising of 50% salt, 40% P and 10% Gran am, assuming an intake of 100g/day – which would supply a breeder with about 8gP/AE/day). It was assumed that the cost of P supplement was $882.90/t delivered (which equates to $11.14/AE). This modelling shows that the added supplement costs of the wet season lick can be recovered in under 3 years based on the assumed benefits; a 10% increase in weaning rate, a 15kg/year increase in live weight gain and a 2% reduction in breeder mortalities (estimated from the MLA publication – Phosphorus management of beef cattle in Northern Australia, available from http://www.mla.com.au/Publications-tools-and-events/Publication-details?pubid=6024). Other possible management practices that lower P requirement include weaning as close to the end of the wet season as possible and herd segregation.

Herd segregation allows for targeted supplementation for high risk animals.

Both management practices work to further increase the efficiency of P supplementation.
Conservation and indigenous land burns too much, and pastoral land not enough, but it depends on land type

Robyn Cowley and Dale Jenner, Katherine and Alice Springs Pastoral Production

Why we did the study

There is debate about whether woody plants are on the increase or decline, and whether the country needs more or less fire to address this. In some areas there are programs to reduce damaging hot late fires to protect endangered plants and animals that are fire sensitive and to reduce greenhouse gas emissions. But on pastoral land we often hear how we need to increase fire frequency to reduce woody plants, and that hotter fires are better. Are they both right?

We suspected that the story probably varied across land types and land uses, so we analysed satellite based fire data to help us better understand optimal fire management for the pastoral zone of the northern NT for the best pastoral productivity and conservation outcomes.

What we did

Using data from the NAFI website, we looked at fire frequency for the full year and for the late dry season for different land types and land uses between 1997 and 2010. Land types were classified according to pastoral value (based on pasture quality, pasture growth and accessibility) to either high productivity (black soils), moderate productivity (good red soils) or low productivity (rocky, inaccessible, and or low pasture quality. e.g. spinifex sandstone escarpments and sandplains). Land use was based on the primary land use and divided into pastoral, indigenous pastoral, indigenous, defence and national park.

What we found

Fire frequency varies with land use

On average, defence land burnt the most frequently, followed by parks, Indigenous, then pastoral (Table 1). However although defence and park land had the highest annual fire frequency, their late dry season fire frequency was similar to or lower than other land uses (Table 1). In fact only 28% of defence and 48% of park fires were late season fires, compared to most of the fires on indigenous and pastoral land. This reflects a deliberate policy of implementing early fires to reduce the frequency of later dry season fires on defence and park land.

Table 1: Average annual and late dry season fire frequency (percent of years there is a fire) for different land uses in the VRD.

<table>
<thead>
<tr>
<th>Land type</th>
<th>Average annual fire frequency</th>
<th>Average late dry season fire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defence</td>
<td>39% (2 in 5 yrs)</td>
<td>11% (1 in 10 yrs)</td>
</tr>
<tr>
<td>Park</td>
<td>31% (1 in 3 yrs)</td>
<td>15% (1 in 6 yrs)</td>
</tr>
<tr>
<td>Indigenous</td>
<td>26% (1 in 4 yrs)</td>
<td>21% (1 in 5 yrs)</td>
</tr>
<tr>
<td>Indigenous Pastoral</td>
<td>26% (1 in 4 yrs)</td>
<td>16% (1 in 6 yrs)</td>
</tr>
<tr>
<td>Pastoral</td>
<td>19% (1 in 5 yrs)</td>
<td>14% (1 in 6 yrs)</td>
</tr>
</tbody>
</table>

While the average fire frequency reported in Table 1 gives a good quick snapshot of fire frequency with land use, it can be misleading, because the average masks the large variation in fire frequency within a land use. Table 2 breaks down the proportion of different land uses that had different fire frequencies.

- More of pastoral (51%) and indigenous pastoral land (37%) was infrequently burnt (0-2) fires between 1997 and 2010 (Table 2) compared to other land uses.
- For defence, conservation and indigenous land uses only between 9 to 15% of the land area was infrequently burnt.
The late dry season fire frequency was more similar across land uses (Table 2) but

- A greater proportion of defence and pastoral land (55% & 45%) was *infrequently* burnt late in the dry (0-1 late season fires) compared to other land uses (11-33%).
- A greater proportion of indigenous (65%) and indigenous pastoral (43%) land had 3 or more late season fires compared to other land uses (21-34%).

### Table 2: Percent of land use area with different fire frequency in the VRD between 1997-2010.

<table>
<thead>
<tr>
<th></th>
<th>Whole year</th>
<th>Late dry season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of fires</td>
<td>0 1 2 3-4 ≥ 5</td>
<td>0 1 2 3-4 ≥ 5</td>
</tr>
<tr>
<td>Park</td>
<td>1 2 10 44 43</td>
<td>11 23 33 29 5</td>
</tr>
<tr>
<td>Defence</td>
<td>3 2 4 23 69</td>
<td>19 36 24 18 3</td>
</tr>
<tr>
<td>Indigenous</td>
<td>0 2 13 65 20</td>
<td>2 9 24 57 8</td>
</tr>
<tr>
<td>Indigenous Pastoral</td>
<td>8 12 17 31 32</td>
<td>12 20 25 35 8</td>
</tr>
<tr>
<td>Pastoral</td>
<td>16 17 18 32 17</td>
<td>22 22 22 26 7</td>
</tr>
</tbody>
</table>

*Fire frequency varies with land type on pastoral land*

Table 3 shows the breakdown in broad land types for the VRD. On indigenous and park land there was very little high productivity land (1-5% black soils). Defence and indigenous pastoral land were composed of just 14% black soils, while pastoral land was 29% black soils.

### Table 3: Area of land by grazing value and land use in the VRD region

<table>
<thead>
<tr>
<th>Grazing value</th>
<th>Defence</th>
<th>National Park</th>
<th>Indigenous</th>
<th>Indigenous pastoral</th>
<th>Pastoral</th>
</tr>
</thead>
<tbody>
<tr>
<td>High (black soils)</td>
<td>14%</td>
<td>5%</td>
<td>1%</td>
<td>14%</td>
<td>29%</td>
</tr>
<tr>
<td>Moderate (good red soils)</td>
<td>19%</td>
<td>25%</td>
<td>7%</td>
<td>37%</td>
<td>26%</td>
</tr>
<tr>
<td>Low (poor red soils)</td>
<td>66%</td>
<td>70%</td>
<td>92%</td>
<td>49%</td>
<td>45%</td>
</tr>
<tr>
<td>% total VRD</td>
<td>9%</td>
<td>12%</td>
<td>8%</td>
<td>13%</td>
<td>59%</td>
</tr>
</tbody>
</table>

- On parks and defence land, there was little difference in fire frequency across the different land types, with low, moderate and high productivity land types having similar fire frequency.
- On grazed land (pastoral and indigenous pastoral), the best country burnt the least, and the worst country burnt the most.
- On pastoral land the poor red soils burnt 1 in 4 years, the good red soils 1 in 6 years, and the black soils 1 in 10 years. This compares with the recommended 1 in 4 year fire that is recommended to manage woody thickening on pastoral land in the VRD.
- Fire frequency of low productivity land types was similarly high across all land uses (1 in 4 to 1 in 3 years).
- For the black soils, fire frequency was much lower on grazed land (1 in 10 years on pastoral land, 1 in 5 to 1 in 4 years on indigenous pastoral vs. 1 in 3 years on parks and defence land).
- The high late dry season frequency on indigenous land may reflect the large percentage of low productivity land types (92%), which tend to be rugged and inaccessible. Once fires start, they will be difficult to access and control. The best way to reduce late dry fires in these situations would be through deliberate fire prevention programs like in Arnhem land (WALFA) and the Kimberley (EcoFire) where patchy early dry season fires are used to reduce fuel loads, creating natural fire breaks which reduce the frequency and extent of late dry season fires.
So what?

The variation in fire frequency across land uses and land types helps to explain the diverging opinions about whether there is too much or too little fire and its effects on woody ‘thickening’ or ‘thinning’ in tropical savannas. We did find higher fire frequency on large parts of defence and conservation land, but also more early dry season fire, demonstrating the move to reduce the impact of later fires on fire sensitive species. On grazed areas however, rather than too much fire, the very low fire frequency on the most productive land types, is consistent with observed increases in woody trees and shrubs.

But when it comes to the low productivity land types, fire frequency is similarly high across all land uses, even on pastoral land. This suggests an opportunity for carbon farming (see box) – managing fire on the low productivity land types to reduce the frequency of damaging late dry season fires, with the added benefits of protecting fire sensitive species and infrastructure from uncontrollable wildfires while reducing GHG emissions.

The solution for grazed landscapes

- increase fire frequency on the grazed red and black soils to manage woody cover and keep pastures productive (1 in 4 years)
- on the least productive land types (which are not used for grazing, even on pastoral land use areas), there may be potential to reduce fire frequency, leading to better conservation of fire sensitive species and reductions in fire related greenhouse gas emissions (carbon farming)

Learning more about fire on your station

The story varies station to station. We can now provide the fire frequency information from 1997 to 2010 for all VRD stations, by broad land type and land systems. Contact Robyn Cowley on 0419 829 493 or robyn.cowley@nt.gov.au if you would like a report on fire frequency for your station.

Potential carbon farming opportunity?

Late dry season fires are hotter and produce more greenhouse gases (methane and nitrous oxide) than early dry season fires. By reducing the frequency and timing of late dry season fires, you help species that are sensitive to fire, and reduce greenhouse gas (GHG) emissions.

Currently the 600-1000mm rainfall savanna burning methodology is being developed. Once it is approved, neighbouring stations and land uses will be able to jointly develop a combined savanna burning project to manage areas with frequent late dry season fires, to reduce GHG emissions, gaining carbon credits for avoided GHG emissions.

Whether implementing a carbon farming project will make or cost money will however depend on what your current fire regime is, how much you can reduce fires, particularly late hot fires, and what the carbon price is at the time.

_The staff at Katherine Research Station would like to wish you all a very merry Christmas and a wet, safe and prosperous New Year._

_Please note: Our front office will be closed from Friday 20th of December 2013 until Monday 6th of January 2014._

_For animal health emergencies, please call 0467 740 233._

_For other emergencies, please call 0427 600 388._
All the Bulls are gone…

Whitney Dollemore, Katherine Pastoral Production and Gehan Jayawardhana

The annual Douglas Daly Research Farm (DDRF) bull tender was completed on the 15th November 2013 with full clearance. All of the 58 Selected Brahman, 40 Composite and 4 Senepol X bulls were sold. A summary of the prices is in Figure 1.

Table 1. Summary of bull tender prices by breed

<table>
<thead>
<tr>
<th>Breed</th>
<th>Average Price</th>
<th>Top Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brahman</td>
<td>$1,600</td>
<td>$4,600</td>
</tr>
<tr>
<td>Composite</td>
<td>$1,300</td>
<td>$3,300</td>
</tr>
<tr>
<td>Senepol X</td>
<td>$700</td>
<td>$700</td>
</tr>
</tbody>
</table>

The bulls sold from DDRF are part of the Selected Brahman and Composite program managed by the NT DPIF. This herd undergoes rigorous selection for fertility traits and consequently produces sires that have some of the best EBVs for fertility. Scrotal circumference has been identified by the Beef CRC as a trait that is correlated with heifer age of puberty and female days to calving. It can be seen from the graphs in Figure 1 comparing the DDRF herd with the breed average that the scrotal circumference and days to calving EBVs of the DPIF Selected Brahmans and Composites have moved away from the breed average.

Figure 1. October 2013 Brahman Group Breedplan. Herd compared with breed genetic trends.

The use of EBVs in selection of potential sires is a tool to show the genetic contribution a particular bull will have on the performance of your herd for particular traits. This is extremely helpful when you have a particular goal in mind for the direction of your business. It can be confusing when looking at the raw EBVs to decide which animal has the right genetics for you. This is why selection indexes are created. A selection index aims to put emphasis on the traits you feel are the most important for your market or environment, for example the Northern Live Export Selection Index which gives a dollar value for traits that are important to producers supplying Live Export.

The breeding goal for the DDRF herd is to breed cows that will produce a calf each year from 3 years of age. This objective is achieved in a number of environments as the animals are at DDRF till 3 years of age, after which the Brahmans are sent to Kidman Springs (VRD). To achieve this objective selection has been performed in both females and bulls. Females are culled if they are not pregnant and wet in first round and bulls are selected at 12 and 18 months for breeding. The bulls are selected on a combination of scrotal circumference, growth and dam performance. To continue to have a large variety of genetics to choose from semen is sourced from bulls with a large scrotal circumference EBV and low days to calving (DTC) EBV. The DTC EBV is calculated by the difference between the date when bulls are put in with the cows and the birthdate of the calf. The average gestation length is 0 when looking at a DTC EBV and so; a negative DTC EBV indicates a cow that conceived quickly when the bulls were introduced. In the DDRF herd this identifies the females that can conceive whilst lactating. Selection of bulls that has good EBVs in traits required to achieve your breeding objective is
important as he will continue to influence the makeup and performance of your herd for the next 15 years.

Accessing Breedplan gives you the option of using existing selection indexes such as the Northern Live Export Selection Index or customising a selection index to value animals in relation to your breeding goal. The selection index in Fig.2 has been developed with emphasis on fertility with moderate growth by weighting scrotal circumference, 600 day growth, DTC and moderate mature cow size. This index is placing huge importance on fertility. Figure 2 shows a comparison between herd average DTC EBVs and the selection index we have customised.

Figure 2 shows the DDRF Composites and Brahmans have the best herd average for DTC and based on the selection index created to identify fertile herds. These herds will breed bulls that will give you sons with large scrotal circumferences and good growth to 600 days and daughters with a moderate mature cow weight, shorter gestation and quicker reconception which is important to keep cows calving at the optimum time of the year.

Figure 2. Average fertility selection index and days to calving EBVs grouped by stud.

It is important to understand this article discusses only the genetic contribution a bull could bring to your herd.

Production of an animal = genetic ability of the animal x environment (nutrition)

The number of calves a cow will produce is still related to nutrition. However, if nutritional requirements are met through appropriate stocking rates, supplementation and breeder management such as controlling the time of calving, the genetics will be most important as the gain is cheap, cumulative and permanent. The animals with superior fertility genetics are identified every muster when looking for the wet pregnant cows that are on the same nutrition as those that have a calf every 2 years.
Tis the season of plant poisoning

Chris Materne and Jodie Ward, Pastoral Production

At this time of year, when pasture quantity and quality dwindle and fresh shoots start appearing after early rains, local stock may become poisoned from eating something they shouldn’t. The new shoots of many plants contain concentrated toxins which may be lethal, while at other stages of maturity they are either not toxic or their effect on the animal is not so serious. The Katherine region is home to many poisonous plants but just because they are present, does not mean that there will be a problem — it’s about risk management.

Step 1: Know your plants

The first step is to know what potentially poisonous plants your stock have access to and the location of these plants on your property or station.

Step 2: Identify the situations that may lend to plant poisoning

The second step is to identify likely scenarios where poisoning might occur and undertake measures to reduce the risk of it occurring, such as avoiding putting new cattle in known problem areas, or avoiding mustering certain paddocks after flushes of green pick. Ruminants have a remarkable negative feedback mechanism where they are able to differentiate between plants that have made them ill, from those that don’t, and will selectively graze accordingly. On top of that, the majority of the poisonous plants found in the Katherine region are not overly palatable to cattle and horses, meaning that often problems will arise in situations where stock are not given an option to graze much else, such as in stockyards.

Step 3: Be familiar with the symptoms of plant poisoning

The third step is to know the symptoms of poisoned stock appropriate to the plants in your area and monitor your stock’s behaviour.

Step 4: Act quickly if plant poisoning is suspected

The last step is to act quickly if you suspect your stock have become poisoned. If possible move all animals away from the poisoning source, supplement with hay and contact the Department of Primary Industry & Fisheries to investigate.

Poisonous plants in the Katherine region include but are not limited to, Ironwood (Erythrophleum chlorostachys), Rattlepods (Crotalaria spp.), Button grass (Dactyloctenium radulans), Pigweed (Portulaca oleracea), Noogoora burr (Xanthium pungens), Birdsville indigo (Indigofera linnaei) and Bellyache bush (Jatropha gossypifolia).

Ironwood poisoning affects both horses and cattle. Ironwood is commonly found on the northern Katherine and Gulf regions. The fatal effect of poisoning can occur very quickly, especially when young plants or fresh leaves have been consumed. Symptoms of Ironwood poisoning include staring eyes, abdominal straining, loud heart sounds, pale gums and difficulty breathing. The best management strategy to prevent ironwood poisoning is to keep stock away from the plant especially in the young stages of growth. Although tree removal would be ideal, clearing Ironwood encourages extensive suckering which is when the plant is most toxic to stock. Trials have shown that only 2 grams of Ironwood leaves in amongst other feed can kill otherwise healthy cattle. There are no known treatments for Ironwood poisoning.

Rattlepods are widespread across the Katherine region. There are many species which are identifiable by their yellow pea shaped flowers. The toxin in most of the Rattlepod species is pyrrolizidine alkaloid, which affects the liver of cattle and horses. This toxin is generally a cumulative poison, building up in the system before the animal displays symptoms of sickness which occur once the affected animals are
on better nutrition. Horses will experience weight loss, jaundice, muscle twitching, yawning and aimless wandering also known as Kimberley Walkabout Disease. Cattle will display poor growth, weakness, wasting and again, wandering around aimlessly before collapsing and dying. Currently there is no known treatment for Rattlepod poisoning for cattle or horses. As it is generally not a very palatable plant and livestock will generally eat these plants only when palatable pasture species are unavailable.

**Button grass** growing in nitrogen rich soils such as in stockyards can cause nitrate poisoning which affects cattle by preventing the transport of oxygen in the blood. Within hours of access to the plants poisoned stock may show symptoms of rapid breathing and bluish gums before convulsing and dying. Under normal circumstances button grass is excellent fodder, however poisoning has occurred when hungry stock are given access to lush Button grass growing in stockyards.

**Pigweed** is also commonly found in stockyards. When hungry stock consume high volumes of Pigweed over a short period of time, clinical symptoms of poisoning may vary from those of nitrate poisoning (as is the case of poisoning from Button grass) or those of oxalate poisoning. Such symptoms may include rapid breathing, convulsions and death to muscle tremors, staggered gait, diarrhoea and fluid build-up in the dewlap or brisket. Prevention includes feeding and watering stock outside the yards where pigweed is not commonly found.

The **Noogoora burr** plant itself is most poisonous from germination until it is beyond the two leaf stage of growth, although the burr itself is always toxic. Noogoora burr contains carboxyatractyloside which causes cattle to stop eating, grind their teeth, kick at their flanks, stand with their legs apart and may charge when approached. When the animal goes down, it may either start convulsing before getting up and running blindly into things, or it may slip into a coma before dying. Noogoora burr is also a Class B and C weed under the *Weeds Management Act*, making the best poisoning prevention strategy to kill the plant with herbicides or remove animals from areas where the plant is germinating.

**Birdsville indigo** poisoning affects horses and is mainly found on red soil or the area of transition between red and black soil types. Clinical symptoms include loss of condition and an uncoordinated gait, especially in the hind legs. Treatment of poisoned horses varies in level of success, however stomach drenching with 400g of gelatine in warm water daily for 3 days is reported to provide some relief. Prevention of Birdsville indigo poisoning can be achieved by providing high protein and good quality feed. Interestingly, dogs fed horsemeat from poisoned horses have been known to become poisoned as well.

**Bellyache bush** is widespread throughout the Katherine region and can cause irritant diterpenoid poisoning in cattle and horses. This type of poisoning irritates the animal’s digestive system causing colic and scours. In severe cases affected animals may die after 24 hours. Fortunately Bellyache bush is not very attractive to livestock with poisoning usually only occurring when there is nothing else for the animals to eat. Bellyache bush is a Class A weed under the *Weeds Management Act*, and current attempts are being made to eradicate this species.

Investigating plant poisoning is never straight forward and in many cases, although symptoms of poisoning are detected, it may not always be the direct cause of death. In addition, it may not always be one plant, but a cocktail of a few. If you suspect your stock to have plant poisoning be sure to contact your local stock inspector in Katherine on 0467 740 233.

For more information about poisonous plants a helpful book to have on hand is "Poisonous plants, a field guide", written by Ralph Dowling and Ross McKenzie, published in 1993 by Department of Primary Industries, Queensland.

**Key Messages:**
- Just because poisonous plants are in your area does not mean you will have a problem. Manage the risk.
- Be aware of the poisonous plants on your station and know the clinical symptoms of poisoning for each.
- Contact the Department of Primary Industry and Fisheries as soon as possible if you suspect your animals have become ill from eating poisonous plants.
KRS Lucerne Trial

Grant Cutler, Senior Technical Officer, Katherine Research Station

The Plant Industry Team have been busy in recent months establishing a lucerne (*Medicago sativa*) variety trial in the Putland Paddock at KRS. Lucerne has been trialled previously in the Northern Territory, but was found to persist poorly over the wet season and has not been widely adopted by industry. New experimental lines have been developed in Kununurra that have been observed to have better persistence over a wet season than current commercial lines. The purpose of the current lucerne trial at KRS is to evaluate these new experimental lines, as well as some commercial lines, for their persistence over the coming wet season.

The trial was dry sown under irrigation on 23 and 24 September, which despite the heat had good emergence and produced a good established population. Approximately 50ml of irrigation is being provided on a weekly basis in conjunction with additional rainfall to ensure the lucerne does not succumb to moisture stress.

The main issues that have been encountered with the lucerne trial post emergence include high weed pressure, particularly from nutgrass (*Cyperus rotundus*), volunteer cavalcade (*Centrosema pascuorum*) and senna (cv. *obtusifolia* and *ocidentalis*). These weeds are a major concern when growing lucerne especially in the Top End as there are few selective herbicides that can be used. Due to the weed pressure encountered, the persistence trial has also incorporated various herbicide treatments with the aim of developing a herbicide program which would allow prime, weed-free lucerne hay to be produced.

Current herbicides have only been trialled prior to the first cut and have shown varied levels of success. The most successful treatment has been Daconate 720 (720g/L MSMA) which has controlled most weeds, in particular the volunteer cavalcade, with some success on nutgrass also. Other herbicides trialled include Sempra (750 g/kg HALOSULFURON-METHYL) and Jaguar (Bromoxynil 250 g/L and diflufenican 25 g/L) have shown limited success, particularly on senna, with volunteer cavalcade quickly out-growing the herbicide damage; we suspect it may out-compete the lucerne over the wet season. The next phase of the herbicide application trials will occur after the first hay cut; better herbicide results may occur once the lucerne has formed a crown.

![Image of lucerne field](image.png)

*Figure 1: Herbicide test strip of Sempra (on the right) showing limited success against volunteer cavalcade and minimal success against nutgrass.*

Population analysis of the different varieties since establishment shows that the populations are at equilibrium, or slowly declining, which could be due to the combination of heat and weed pressure. There is little doubt with regards to the lucerne being able to persist over the wet season, but the main question is to what extent it will persist and how it will cope with the weed pressure. Interested parties are encouraged to visit KRS to check out the trial; you can contact Grant on 8973 9779 or grant.cutler@nt.gov.au to organise an appointment.
Have you seen it?

FutureBeef partners currently engage northern beef producers through a range of face-to-face activities including training workshops, producer demonstration sites, field days, RD&E projects, forums (including Beef Up and Next Gen forums), and property visits.

FutureBeef also has extensive online resources available via the FutureBeef website futurebeef.com.au. At the Multimedia Library you have access to videos which have been created from live webinars and presentations. Have you seen them?

At the FutureBeef YouTube Channel you can also view and share these videos. The Channel is growing in popularity with an estimated 1,970 views captured between 1 July – 30 September, that’s a 43% increase on the previous quarter. There are a total of 44 northern beef educational videos available covering a suite of topics. The three most popular videos over the July-September reporting period were “Feedlot Industry Investment” (receiving 644 views), “Pasture Fed Cattle Assurance System – What’s involved?” (286 views) and “Grazing Systems – fact or fiction” (147 views).

If you haven’t checked out the multimedia section of the website or the FutureBeef YouTube Channel, we’d encourage you to do so. Be cautioned, you will need reliable internet access to avoid frustration with slow previewing.

Here is a snapshot of the video topics available at your fingertips!

- Breeding and genetics
- Business management
- Feedlots
- Grazing land management
- Health and disease
- Husbandry
- Markets and marketing
- Nutrition
- Pastures and forage crops

Visit the multimedia library <www.futurebeef.com.au/resources/multimedia>
Visit the FutureBeef YouTube Channel <www.youtube.com/user/FutureBeefAu>

The FutureBeef Program is a collaborative extension program aimed at bringing the latest research technologies and best management practice knowledge, skills and training to northern beef producers.

Will you be brave and shave?

Well, one of our Pastoral Production girls in Tennant Creek is! Helen McMillan will be participating in next year’s World’s Greatest Shave, held from 13-16th March 2014. She is going to take on the clippers and hope to raise some money for the Leukaemia Foundation. But all that hair is not going to waste; she will be donating her no longer needed locks to the Pantene Beautiful Lengths Program, where it will be made into a wig for those who have lost their hair from cancer treatment. So if you wish to show your support, head on over to her page or drop into the Tennant Creek DPIF office to pledge a donation. The greatest donation will have the honour of wielding the clippers!

To donate, find Helen’s Page at: http://bit.ly/1bcz0Th OR Search for Helen McMillan at:

http://www.worldsgreatestshave.com/ click Sponsor’!
Cyber Geek – website of interest

**Website:** Agistment.net.au

Looking for agistment? Head on over to Agistment.net.au to either find what is available or register your spare paddock. The website was created by David Birchmore who became inspired to make the site by his own frustrations when trying to find and fill agistment opportunities.

The site is easy to navigate. To locate agistment properties, simply scroll down the navigation bar on the left hand side to find the region you are interested in. The NT has been broken down into Darwin/Daly, Arnhem, Roper-McArthur, Barkly, Alice Springs and Victoria River regions. The NT has only recently been added to the site and as yet, only has 1 property registered available, however it is only a matter of time before this is not the case!

Already a proven success in Queensland and New South Wales, David hopes to expand the website to cater for all Australian states making the process of locating agistment easier for all concerned.

Another eventful year at KRS

*Neil MacDonald, Regional Director, Katherine Research Station*

As always, December is a time to look back on the year, and 2013 has certainly not been dull.

After a difficult year we are now looking forward to the future with some optimism. We have high hopes that next year’s Federal Government white paper on Northern Development will help the Katherine Region to at last start to realise its considerable agricultural potential. Changes in the Pastoral Land Act that allow a broader range of enterprises on pastoral land are already resulting in plans for broad acre cropping. The pastoral industry, after a couple of very difficult years, is looking brighter with record export figures through Darwin and an increase in property sales.

At the same time I appreciate that many horticultural producers have had a difficult year, with a poor mango harvest and disappointing prices for pumpkin and other crops. Hopefully 2014 will treat you more kindly.

We had one very sad event last month. Stuart Henson, our Quarantine Officer, died suddenly from a stroke on the 6th of November. Stuart was quiet and conscientious, and as the horticultural producers will know, he was always reliable. Stuart was devoted to his two young children who have since gone to live with their uncle’s family in Townsville.

Only one KRS baby was born this year, Kieren and Rowena McCosker’s second son Archer born in February. Heidi Wright, who has been helping Pastoral with social media, left us last month to help her family with their properties in western NSW and she is also expecting a baby early in the new year.
After a period of relative stability, there will be a couple of major departures from the Plant industry group in early January who we will greatly miss. Both will be hard to replace.

Malcolm Bennett will be leaving to go back to his original home area on the Atherton Tablelands. Mal has been a Senior Agronomist at KRS since the 1980s, and in that time has been our main expert on broad-scale cropping. He was well known in earlier days for his work on sesame and since then has worked on biofuels, peanuts, cereals, and cropping systems. His comprehensive knowledge and wise advice has always been in great demand from farmers and potential investors.

Melissa Fraser is also leaving shortly after Christmas to take up a soil science position near her family in South Australia. Mel has been team leader of the Katherine Plant Industry team for almost four years, and in that time she has shown remarkable energy and leadership. Mel was instrumental in initiating two large projects on minimising nitrous oxide emissions and maximising nitrogen fertiliser efficiency in the hay, sugar and horticultural industries. These projects will leave the Katherine team plenty to carry on with over the next three years. We wish both Mal and Mel the best for the future.

We therefore expect some new faces to join the Katherine Plant Industry team next year. One that is already here is Grant Cutler, who came to us first for short term work as a student. Grant is from Kingaroy and is in the process of finalising his agricultural science degree from the University of Queensland's Gatton College.

I wish all our readers a safe and happy Christmas and all good wishes for the year ahead.

Neil MacDonald
## Live Cattle Exports via Darwin Port – November 2013

Please note that the ‘NT CATTLE’ figures are NT cattle exported through the Port of Darwin only; some NT cattle are exported through interstate ports.

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### OTHER LIVESTOCK EXPORTS VIA DARWIN PORT (includes NT and Interstate Stock)

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### NATIONAL CATTLE PRICES - W/E 29/11/2013

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</tr>
<tr>
<td><strong>Year ago</strong></td>
<td>269</td>
</tr>
</tbody>
</table>

#### TRADE STEER

<table>
<thead>
<tr>
<th></th>
<th>ESTIMATED DRESSED WEIGHT PRICE (CENTS/KG)</th>
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<tbody>
<tr>
<td></td>
<td>SALEYARDS</td>
</tr>
<tr>
<td></td>
<td>NSW</td>
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<tr>
<td><strong>This week</strong></td>
<td>338</td>
</tr>
<tr>
<td><strong>Last week</strong></td>
<td>334</td>
</tr>
<tr>
<td><strong>Year ago</strong></td>
<td>344</td>
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</table>

#### LIVE EXPORT QUOTES

<table>
<thead>
<tr>
<th></th>
<th>ESTIMATED LIVE WEIGHT PRICE (CENS/KG)</th>
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<tr>
<td></td>
<td>LIGHT STEERS (260-360 KG)</td>
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<tr>
<td></td>
<td>Darwin</td>
</tr>
<tr>
<td><strong>This week</strong></td>
<td>210</td>
</tr>
<tr>
<td><strong>Last week</strong></td>
<td>210</td>
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<tr>
<td><strong>Year ago</strong></td>
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**Prices courtesy of Meat & Livestock Australia**

www.mla.com.au

### CURRENCY EXCHANGE RATES

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</thead>
<tbody>
<tr>
<td>Brunei Dollar</td>
<td>1.12607</td>
<td>1.15885</td>
<td>1.11804</td>
<td>1.25804</td>
<td>1.076</td>
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<tr>
<td>Indonesian Rupiah</td>
<td>10,668.1</td>
<td>10,564.4</td>
<td>9,676.94</td>
<td>10,011.71</td>
<td>1830</td>
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<tr>
<td>Philippine Peso</td>
<td>39,7789</td>
<td>40,8904</td>
<td>39,5922</td>
<td>42,6079</td>
<td>19,84</td>
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<tr>
<td>Malaysian Ringgit</td>
<td>2.91359</td>
<td>2.98597</td>
<td>2.92041</td>
<td>3.18699</td>
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<tr>
<td>Euro</td>
<td>0.67043</td>
<td>0.69005</td>
<td>0.67272</td>
<td>0.8872</td>
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<tr>
<td>US Dollar</td>
<td>0.91106</td>
<td>0.94868</td>
<td>.88931</td>
<td>1.03570</td>
<td>0.752</td>
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Prepared by the NT Department of Primary Industry and Fisheries

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# Katherine Region Events Calendar

<table>
<thead>
<tr>
<th>Event</th>
<th>Location</th>
<th>Date</th>
<th>Website</th>
</tr>
</thead>
</table>

Please email with updates of events happening in your area: jodie.ward@nt.gov.au

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**EXPRESSIONS OF INTEREST – 2014 RANGELANDS MANAGEMENT COURSE & STOCK COURSE**

An interactive course developed for station staff to enhance their skills & knowledge in the area of land & production system management in the VRD/Katherine or Sturt Plateau regions.

**What:** 1½ -2 day course covering topics such as pasture species, dynamics and management | Weed management & poisonous plants | Animal nutrition | Biodiversity

**Where:** On-station

**When:** March-May – dates on request from stations

For more information or to organise a course on your station, please contact:

- **Trudi Oxley**
  - Tel: (08) 8973 9763
  - Email: Trudi.Oxley@nt.gov.au

- **Jodie Ward**
  - Tel: (08) 8973 9730
  - Email: Jodie.Ward@nt.gov.au

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