Northern muster

Information for rural business in north Queensland

Producing quality food and fibre for a healthy bottom line

in this edition

editorial

Welcome to the Winter/Spring 2010 edition of the *Northern* ***muster***.

This issue includes market report, Dalrymple diary and a feature on genetics and bull selection.

The bull selling season is very close. What criteria will you use to select bulls to improve the profitability of your herd?

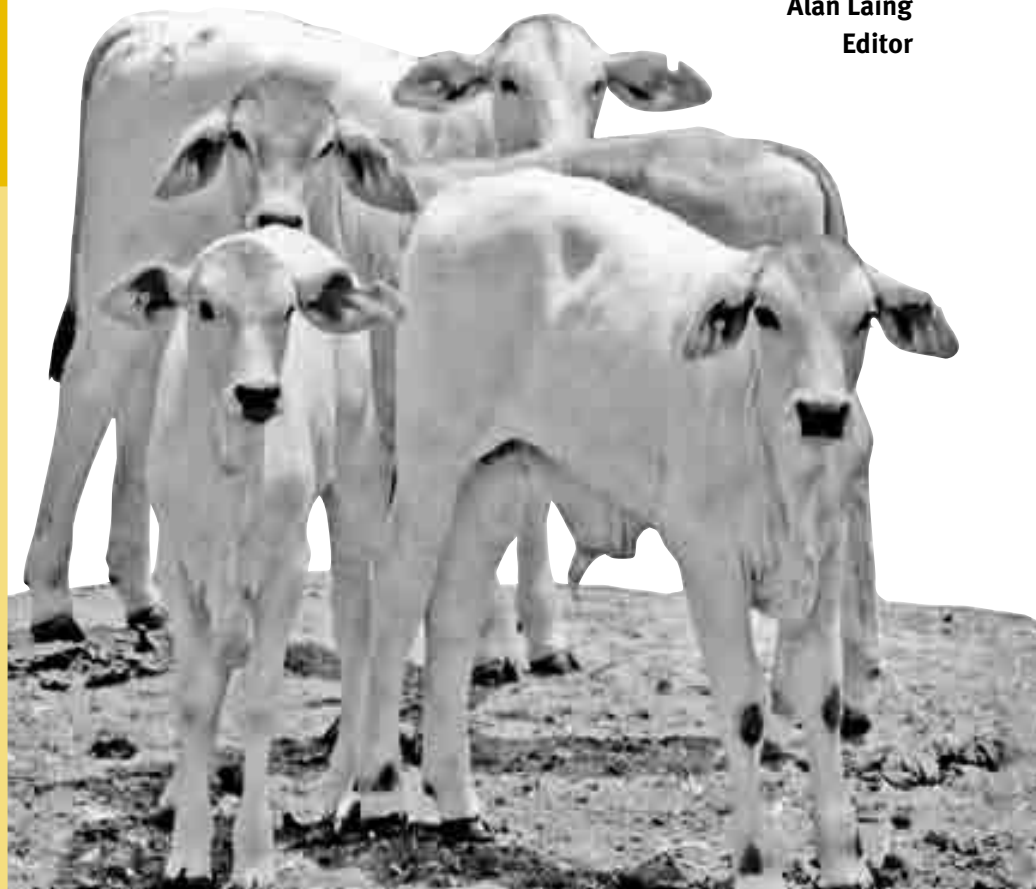
Feedback in the past has asked for Breedplan EBVs to be explained. This issue addresses the topic. Also covered are planned breeding using breeding objectives, the need for fertile bulls to do the work, understanding $Indexes and some case studies where bull buying decisions have included measured information about the bulls.

How many years does the bull you purchase today influence your herd for? If you use a bull for four years, and keep his daughters for up to 10 years, that's 15 years direct influence from one bull. Is that worth making sure he is siring enough calves and that they meet your expectations?

Enjoy the newsletter. For advice and contacting DEEDI staff, phone 13 25 23. Please fill out the feedback sheet, tell us what information you need and send it in.

Thank you to our advertisers and support teams.

Alan Laing
Editor



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Breedcow and Dynama on new computers

I have been asked about running Breedcow and Dynama on Windows Vista and Windows 7. The answer is also relevant to other 'heritage' software including some educational and games software.

Breedcow and Dynama runs just fine on the usual 32 bit Vista systems. I presume the same will apply to 32 bit Windows 7 systems. BC&D will NOT run on the 'premium' 64 bit systems. Some explanation follows.

Windows 3.1 was a '16 bit' system. Software written in 16 bit platforms can be identified by the need to limit filenames to eight characters. Breedcow and Dynama is written in a 16 bit platform, and the owners of that platform show no indications of updating. Windows 95 through to XP, and most of the Vista and Windows 7 systems, are 32 bit. These allow long filenames, so that helps identify them. The 32 bit systems will run 16 bit or 32 bit applications.

The newest and most powerful systems are the '64 bit' systems, and these no longer accommodate 16 bit software.

Apparently there's some 16 bit educational and games software out there too that suddenly doesn't work any more, so Breedcow and Dynama is not on its own.

Fortunately there is a fix. That fix is to put a piece of software behind Windows which lets you swap between operating systems – run either the new 64 bit program, or an older version such as XP, depending on the need of the moment. You'll need to keep your old XP program CDs for this.

The software that I have been referred to is called VMWare (free off the web). I understand that there are other similar programs, so this does not constitute a product endorsement. I have not used any of them myself, so I can't walk you through the steps, but if you can't use the old favourites any more, this may be the solution.

So, if you absolutely MUST have the latest 64 bit computer, and you also want to keep running the heritage software, you'll need something like VMWare or its equivalent. Your computer techie can probably advise you on this. Alternately, stick with a 32 bit system.

On another subject, the website address for the free update to existing Breedcow and Dynama installations is now:
http://www.dpi.qld.gov.au/16_6886.htm

This may change again as the old DPI becomes part of DEEDI. Watch this space.

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WQ BMP Project – First case study released

The first of four case studies for the WQ BMP project has now been completed. A small field day to launch the outcomes of the project was held at *Amity* near Mingela on the 20 June 2010.

The case study on *Amity* is based around splitting a much larger paddock into four while adopting a wet season spelling program across three of the four paddocks in the first year of the project. Results presented showed an improvement in Dry Matter Yield of between 16 – 20% after one wet season spell.

Copies of the *Amity* case study can be obtained from the DLC directly by contacting John Nicholas. This project is supported by funding from the Australian Government's Caring for our Country and NQ Dry Tropics NRM.

DLC is now online!

The Dalrymple Landcare Committee is proud to announce that our website has now opened at www.dalrymplelandcare.org.au. The site has been developed in the recent months and showcases the work of the producers in the region as well as to host useful information and resources to other information.

The targeted audiences for the site include both the general public wanting to find out more about the DLC and our members – landholders in the district. A suite of useful resources and links have been provided on the site including:

- Weed ID and control
- Training/education opportunities and tools
- Grazier focused publications
- Links to producer services in the region
- Upcoming funding/events
- History of projects/events
- Gallery of photos/PlaceStories.

I would encourage producers to take the time to visit the website. If you have any suggestions on how the site could be improved, do not hesitate to contact John.

City Country Day 2010

The second City Country Day was again heralded a success for the DLC. Over 40 people attended tours one of the three tours on offer to learn more about how food is produced and what food can be produced in the local area, as well as the importance of sustainable land management. Host properties for 2010 included *Thalanga, Wambiana* and *Riverview*.

The ages and backgrounds of the guests was varied across all tours, including a number of families. Many of the guests were also keen to take the opportunity to try hands on activities like preg testing a cow, digging potatoes or milking a cow.

Plans are underway for the 2011 City Country Day, and anyone interested in assisting or hosting a group should contact John Nicholas.

National Landcare Forum – Adelaide

The National Landcare Forum held in Adelaide during March was attended by Phil Cook, Bob Shepherd, John and Rhonda Lyons and John Nicholas. The two day forum offered little opportunity for feedback or input.

A wide range of speakers presented on the history of Landcare as well as the challenges that it is currently experiencing. The future of Landcare was also touched on in regards to the development of National Framework for Landcare. For the DLC the forum was not what we expected, and we were disappointed with aspects of the event. Queensland, the Rangelands or Landcare in the Rangelands barely rated a mention, leaving little opportunity for input or relevance to our cause.

Importantly, the DLC did make some contacts with key people in the chain and efforts are being made to bring these shortcomings of the forum to the attention of organisers.

John Lyons presented at the forum in the 'Cutting Edge Landcare Farming' session. John's presentation on the development of the Lyon's family business in conjunction with the environment and Landcare was very well presented. Over 150 attended John's presentation and it was very well received by all.

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The next DLC General Meeting is proposed for the 9 September 2010.

Our usual market trend for winter is in place in north Queensland with ample supply of all cattle descriptions and lower cattle prices. The recent announcement of a 350 kg upper weight limit for live export cattle to Indonesia will further add to the flush of slaughter stock in the market place. At present our only export works in the far north, Swift's abattoir at Townsville, is booked up for many weeks ahead and this will likely continue into the Spring. Hopefully as the year wears on and slaughter cattle supply tightens prices will improve. On the positive side for quality cattle is the wide spread rain over a lot of eastern Australia over the last 6 months which ups the demand for store stock and replacement breeders.

The value of the Australian dollar has been quite volatile over the last few months but more importantly for our industry it fell below 90 cents to the US dollar, and at present is hovering in the mid 80 cent area. If the economic situation will allow it to stay down near 80 cents it will assist our exporters and hopefully flow through to domestic prices. For the first 5 months of 2010 our beef exports were back 9% year on year at 348,883 tonnes with Japan, USA and Korea leading the way. Sales into Russia are showing promise again as supplies from Argentina remain tight.

Australia's beef exports were back 3% in 2009 to 927,277 tonnes, 7.75 million head slaughtered back 2.6% on previous year, but Queensland's exports remained steady at 535,568 tonnes. The concentration of feedlots in south-east Queensland plus the preference for growing out heavy export steers has seen Queensland supply 70% of all beef sent to Japan in 2009 (249,000 tonnes)

On the Certified Australian grass fed beef front, wheels are turning behind the scenes on developing the rules, regulations and accreditation process. Core values such as HGP and antibiotic free and no grain feeding plus MSA grading will underpin the product.

Australian feedlot numbers were back 8% in the first quarter of 2010 to 711,198 head. Feeder cattle prices, grain values and slaughter rates are not giving favourable returns, although Australia has secured market access into the EU for accredited cattle with good values and best grid prices at present are for cattle suitable for this premium feedlot market. In February this year the USA and Australia were authorised to supply the EUs new 20,000 tonne global high quality beef quota. These EU markets are by far the most lucrative available to accredited Australian producers at present.

A quick flick through any of our rural press publications of late will reveal that we have more than the usual number of cattle properties on the market in north Queensland. My reading of the situation is that our number one enemy, the cost price squeeze is biting hard, combined with high financial costs bought about by inflated property prices over the last few years.

Live export

As mentioned above the 350 kg weight restriction for cattle destined for Indonesia announced in early June has thrown a bit of a spanner into the live trade considering Indonesia took aprox 84 % of our total live exports last year. The 350 kg limit decree has been in existence since 2008 and had never been enforced until now. Just before this problem we had the news of restrictions on our live export agents obtaining import permits which had slowed down the trade as well.

Officially the Indonesian Government has expressed the desire for their country to become more self sufficient in their own beef supply which is hard to imagine with their population – land area equation.

Prices quoted for steers, mid June delivered to Townsville are $1.60 kg with no individual weights over 340 kg. Cattle are also required for a boat out of Karumba.

Interestingly during 2009 Western Australia was the main live export state with 37.7% of shipments, 34.9% Northern Territory and 21% from Queensland.

There is news of a live export shipment from Townsville destined for Egypt in late August. Male cattle only with rates for lighter cattle (290–360 kg) $1.73 delivered Charters Towers if they meet all the specifications. This boat will also take cattle up to 550 kg live weight ($1.63 kg)

Japan

At the end of May a foot and mouth disease outbreak was announced in the southern islands of the country. The outbreak is the worst on record with cases on 126 farms. There has been 285 confirmed and suspected cases and about 190,000 head (beef and pigs) culled or to about to be destroyed. The area affected is an important Wagyu production area and has resulted in the banning of Japanese exports of this high quality product. Interestingly the Japs export approximately 680 tonnes annually of Wagyu product with the main markets being Vietnam, Hong Kong and USA.

To date the disease outbreak has had no impact on domestic meat consumption and internal Government sources believe that their economy has been picking up steadily. Actual meat purchases were steadily declining during 2009 but have shown soft improvement into 2010.

Australian beef sales this year from January until end of May were 2% below the same time last year at 144,341 tonnes.

The strong value of the Yen against the US$ has assisted USA beef imports and April import volumes (6,302 tonnes) were 48% higher than April 2009 figures. All USA product must still be from animals under 21 months of age.

The Japanese Government has legislated to continue the current beef tariff (38.5%) to 31 March 2011.

Korea

Foot and mouth disease has also been detected here at the end of April and as yet it's had no impact on consumer beef purchases. In early June more talks were held in Korea on progressing a free trade agreement between our nations and from all reports there has been positive progress.

Korea's domestic cattle slaughter has declined 12% in the

first four months of 2010 and imports have risen by 16%. Our beef imports have mainly been blade, brisket and manufacturing beef.

A stronger Korean Won against the US$ has assisted the US beef importers and our share of imports is down slightly to 58% the USA 26% and New Zealand 15%. Korean domestic beef producers in 2009 supplied 47% of the total beef market.

USA

The global recession has impacted hard on the beef market in the USA with high unemployment, cheap prices from other proteins and increased dairy cow slaughter. Our high Australian dollar over the last 12 months has impacted on our exporters but many US economists expect their economy to grow up to 2% in 2010 even with unemployment still up around 10%. The US cattle herd is continuing to contract but US beef exports are expected to rise by 10% in 2010. Their food service sector has seen a slow rise in demand and with internal tight grinding beef supplies, Australian beef trimmings and 90CL product has seen a surge in prices with some lines up 30% in price from last year.

Australian exports during 2009 totaled 251,479 tonnes up 7% on the previous year. Grassfed beef continued to dominate our exports to this market accounting for 95% of the total.

At this stage the USDA has decided to not go ahead with a national identification scheme and is proposing to only trace animals that move between states.

Other Asia

China and other regional destinations have seen rapid income growth in recent years with growing urban population with increasing disposable income driving beef market development. Our exports to China in 2009 were up 97% on the previous year to 5,300 tonnes, up 15% to Taiwan to 31,300 tonnes, up 134% to Hong Kong at 7,500 tonnes. We have faced stiff competition from Brazil, NZ the USA and Canada. New Zealand has negotiated (2008) a free trade agreement with China which gives them a competitive advantage as Australia pays a tariff varying between 10–23% depending on product.

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Planned breeding using new technologies

Identifying breeding objectives is fundamental to planned cattle breeding. So who sets breeding objectives? If we are honest with ourselves we will answer 'I do', though, may be not, under that heading. Breeding objectives are the combination of various selection criteria with their respective 'weightings' or emphasis that we choose to place on each criteria. We must get it right as they frequently directly affect our herd and profitability for the next 13–16 years. Furthermore, as we understand the issues surrounding 'setting breeding objectives' we appreciate that there may be several 'best' bulls at an individual sale. So; don't just bid on a bull because someone of industry renown is bidding on that animal; they may not understand or may have very different objectives to you.

The decision made when choosing a bull/s for the herd this year will influence the enterprise profitability for the next 10 to 15 years. When buying bulls, or selecting a bull/s to use in the herd, producers make their choice by 'weighing up' many factors, including their current herd performance, the environment under which the herd is grazed and the market specifications for the turn-off animals. The selection decision is based on identifying which bull/s, from those available with relevant information, will meet the needs of the herd and enterprise, while balancing the incremental differences in one trait relative to another.

Recently, beef producers have had increased opportunity to use new technologies additional to BREEDPLAN and a Bull Breeding Soundness valuation in their selection decisions. Selection is frequently based on intuitive 'feelings' about the relative value of a range of traits, including fertility, growth, structure, carcase and temperament, with the producer comparing all the relative traits in all the animals on offer to come to the choice of one, or a few, bull/s or heifers as the case may be. Whilst genetic progress is greater when focusing on individual traits, in selection, the greatest overall and profitable progress in any herd is when all traits are progressed, with varying degrees of emphasis, at the same time.

The process of combining a number of attributes or traits into a single breeding decision is setting a breeding objective. The breeding objective should be comprised of all the traits that affect profit plus some indication of the relative emphasis each trait should receive. Hence, there is no single bull in a 'multi vendor sale' that meets the needs of all producers and all markets.

With respect to bull selection, the bull for your herd must FIRST be fertile in order to pass on the desirable traits to the progeny. Too often I am told by beef producers that they want fertile bulls; yet they pay top $ for the fattest bull on offer.

Reasoning and beauty can get confused! Therefore, the number one criteria must be for a bull to have passed a Bull Breeding Soundness Evaluation as evidenced by an Australian Association of Cattle Veterinarian certificate. The certificate is your passport for greater confidence that he can pass on his desirable genetic traits to produce adequate progeny. The development of structural soundness genetic differences (EBVs) for leg and hoof conformation (in some breeds) will provide marginal benefits in a fertility trait largely influenced by semen quality and mating ability.

Many beef producers have experienced the definite benefits afforded the bull buyer using the various growth EBVs in addition to carcase EBVs. With increased

attention to meat quality, more recently, genetic differences have been developed for temperament from either flight speed measures, crush or yard test scores. These are used similar to the regular EBVs with a positive larger docility EBV being more desirable (available by limited breeds). Since animal temperament is an important component of meat quality, the docility EBV is incorporated with the DNA markers for tenderness to produce a Tenderness EBV. Likewise for marbling, the ultrasound scan measures for % intramuscular fat have been available for some years. However, the introduction of DNA markers for marbling will enable the combination of the ultrasound measure with the DNA result to produce a single EBV for percent intramuscular fat.

To establish the selection criteria, start planning by identifying the relative impact of the various traits affecting your herd's production requirements alongside the market specifications. An example could be to list these listed criteria across the top of a page with objectives like 'increase calving rate by 10%', 'decrease calving difficulty by 5%', increase weaning weight by 20 kg, 'decrease P8 fat depth by 5 mm' and so on. Down the left of the page, list the various selection traits with all honesty and identify which on-farm and market traits are met by your selection criteria. Then across each selection criteria identify how each contributes to your breeding herd performance by satisfying either on-farm or market specifications.

A more definitive method for this process is to objectively link :

- the current herd performance for a range of economically important traits,
- the costs of production in the current herd,
- the target market specifications,
- the returns for the traits affecting market specifications, and
- the alternative sires/dams with relevant information to achieve these selection decisions.

Many breed societies have produced $Indexes for target markets such as 'Domestic', 'Jap Ox' and in other cases high marbling markets. These indexes rank available animals with genetic productivity criteria as the critical components and are appropriate to balanced selection decision. A computer program called 'BreedObject' enables an output as a $Index combining various weightings applied to a range of traits. The single $Index is reported as a genetic difference between the animals to which it is applied and quoted as an Estimated Breeding Value. A herd or region specific $Index can be considered using this facility on the web.

Never before has cattle breeding had so many positive opportunities for selection. However, the basic criteria remain the same with the need for beef producers to remain objective and focussed on traits that are measurable, heritable and economically important to their business.

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Understanding the various BREEDPLAN EBVs

BREEDPLAN currently reports EBVs for a range of economically important traits. These traits include:

Weight	Fertility/calving	Carcase	Other
Birthweight Milk 200 day growth 400 day weight 600 day weight mature cow wt	Scrotal size Days to calving Gestation length Calving ease	Eye muscle area Fat depth Retail beef yield Intramuscular fat Carcase weight Shear force*	Docility Net feed intake* Structural soundness* Flight time*

*Trial EBV

The above traits cover several areas of vital importance to both bull breeders and commercial producers. This allows a balanced approach to designing efficient breeding programs for various environments and to target specific markets.

It should be noted that EBVs will only be available if sufficient data has been recorded for that trait and as such, the full range of EBVs may not be available for each particular Breed Society/Association.

Always compare an EBV to the current breed average EBV for that trait.

A Percentile Bands table exists for each breed. This table allows assessment of where each animal's individual trait ranks within the breed.

Calving ease

EBVs are provided for calving ease, an important characteristic for cattle. Calving difficulty has an obvious negative impact on the profitability of a herd through increased calf and heifer mortality, slower re-breeding performance and considerable additional labour and veterinary expense. EBVs for traits related to calving ease are calculated from three main sources of information – calving difficulty score, birth weight and gestation length data. BREEDPLAN produces two calving ease EBVs – Calving ease direct and Calving ease daughters.

(i) Calving ease direct

Calving ease (DIR) EBVs are estimates of genetic differences in the ability of a sire's calves to be born unassisted from 2 year old heifers. The EBVs are reported as differences in the percentage of unassisted calvings. Higher, more positive, Calving Ease (DIR) EBVs are more favourable.

(ii) Calving ease daughters

Calving ease (DTRS) EBVs are estimates of genetic differences in the ability of a sire's daughters to calve at 2 years of age without assistance. The EBVs are also reported as differences in the percentage of unassisted calvings. Higher, more positive, Calving ease (DTRS) EBVs are more favourable.

Gestation length

Gestation length EBVs are estimates of genetic differences between animals in the number of days from the date of conception to the calf birth date. Gestation length EBVs are expressed in days and are calculated from the joining date and birth date records for calves conceived by either AI or hand mating. Shorter gestation length is generally associated with lighter birth weight, improved calving ease and improved re-breeding performance among dams. In addition, calves born with a shorter gestation length are often heavier at weaning due to more days of growth. Consequently, lower or more negative gestation length EBVs are considered to be more favourable.

Birth weight

Birth weight EBVs are estimates of genetic differences between animals in calf birth weight. Calf birth weight is the biggest genetic contributing factor causing calving difficulty in heifers. Birth weight EBVs are expressed in kilograms (kgs) and are calculated based on weights of calves taken at birth. Small, or moderate, birth weight EBVs are more favourable.

Please note, whilst low birth weight EBVs are favoured for calving ease they are also generally associated with lower overall growth potential. Consequently, birth weight and growth need to be carefully balanced. Fortunately, animals can be found that have both moderate birth weight EBVs and above average EBVs for later growth.

200 day milk

200 day milk EBVs are estimates of an animal's maternal effect on the 200 day weight of its calf. In the case of sires, this estimates the maternal effect that his daughters will have on the 200 day weight of their progeny. The 200 day milk EBV is expressed as kilograms (kg) of calf live weight at 200 days (i.e. the expected difference in the weight of the calf at 200 days due to the maternal effect (milk) of the cow). The 200 day milk EBV is calculated by partitioning the difference in the 200 day weight of calves into growth and milk components.

The optimum level of milk production potential among beef cows is dependent upon the production system and environment in which the cows are run. Selection for increased milk production may be warranted when cows are run under good nutritional conditions and calves are sold as weaners. However, some environments may not support high milking cows.

Growth

In general, with all other things being equal, higher growth rates will lead to higher profitability. In most economic analyses conducted, positive emphasis on growth is warranted. BREEDPLAN calculates three growth EBVs – 200 day growth, 400 day weight and

600 day weight. These EBVs are the best prediction of the animal's ability to grow to weaning (200 day), yearling (400 day) and later ages (600 day). 200 day growth EBVs are therefore important to vealer breeders, 400 day weight EBVs for yearling breeders and 600 day weight EBVs for breeders of heavy steers. These EBVs are closely linked genetically but there is some scope to select for them individually.

(i) 200 day growth

200 day growth EBVs are estimates of the genetic differences between animals in live weight at 200 days of age due to their genetics for growth. 200 day growth EBVs are expressed in kilograms (kg) and are calculated from the weights of calves taken between 80 and 300 days of age. This EBV is a measure of an animal's early growth to weaning. It is an important trait for breeders turning off animals as vealers or weaners. Larger, more positive, 200 day growth EBVs are generally more favourable.

(ii) 400 day weight

400 day weight EBVs are estimates of the genetic differences between animals in live weight at 400 days of age. 400 day weight EBVs are expressed in kilograms (kg) and are calculated from the weights of calves taken between 301 and 500 days of age. This EBV is an important trait for breeders turning off animals as yearlings. Larger, more positive, 400 day weight EBVs are generally more favourable.

(iii) 600 day weight

600 day weight EBVs are estimates of the genetic differences between animals in live weight at 600 days of age. 600 day weight EBVs are expressed in kilograms (kg) and are calculated from the weights of calves taken between 501 and 900 days of age.

This EBV is an important trait for breeders targeting the production of animals suited for heavy weight grass or grain fed markets. Larger, more positive, 600 day weight EBVs are generally more favourable.

Mature cow weight

Mature cow weight EBVs are estimates of the genetic differences between cows in live weight at 5 years of age. Mature cow weight EBVs are expressed in kilograms (kg) and are calculated from weights taken on the cow when her calf's 200 day (weaning) weight is being measured.

Mature cow weight EBVs are an indicator of:

- Cow feed requirements – in general, lighter cows will tend to eat less and consequently have lower feed requirements and be less expensive to maintain.
- Cull cow values – the major determinant in the value of cull cows in a commercial herd will be live weight. Consequently, heavier cows may provide higher returns from the sale of cull cows.

Scrotal size

Scrotal size EBVs are estimates of the genetic differences between animals in scrotal circumference at 400 days of age. Scrotal size EBVs are expressed in centimetres (cm) and are calculated from scrotal circumference measurements taken on bulls between 300 and 700 days of age. Increased scrotal circumference is associated with increased semen production in bulls, and earlier age at puberty of bull and heifer progeny. Increased scrotal circumference also has a favourable relationship with days to calving, such that bulls with larger scrotal circumference tend to have daughters with shorter days to calving. Larger, more positive, scrotal size EBVs are generally more favourable.

Days to calving

Days to calving EBVs are estimates of genetic differences between animals in time from the start of the joining period (ie. when the female is introduced to a bull) until subsequent calving. Days to calving EBVs are expressed in days and are calculated from the joining records submitted for females.

The days to calving EBV promotes those cows that calve earlier in the season compared to those that calve later, while penalising those cows that do not calve. Variation in days to calving is mainly due to differences in the time taken for females to conceive after the commencement of the joining period. Lower, or more negative, days to calving EBVs are generally more favourable. Females with shorter days to calving EBVs also tend to be those that show early puberty as heifers and return to oestrous earlier after calving.

Carcase

BREEDPLAN combines both live animal ultrasound scanning information with abattoir chiller carcase data to calculate EBVs that provide information regarding the genetic differences in carcase composition between animals in a standard 300 kg carcase. Carcase EBVs provide a useful tool to assist breeders in targeting animals that meet market requirements.

BREEDPLAN currently produces seven Carcase EBVs:

- Carcase weight
- Rib fat depth
- Rump fat depth
- Eye muscle area
- Intramuscular fat (marbling)
- Retail beef yield
- Shear force (note, trial EBV only)

(i) Carcase weight

Carcase weight EBVs are estimates of the genetic differences between animals in hot standard carcase weight (as defined by AUSMEAT) at 650 days of age. Carcase weight EBVs are expressed in kilograms (kg).

Larger, more positive, carcase weight EBVs are generally more favourable.

Carcase weight should not be confused with yield. The carcase weight EBV is an indication of the animal's carcase weight and not an indication of the animal's yield percentage.

(ii) Eye muscle area (EMA)

Eye muscle area EBVs are estimates of the genetic differences between animals in eye muscle area at 12/13th rib site in a 300kg steer carcase. EMA EBVs are expressed in square centimetres (cm2). Larger, more positive, EMA EBVs are generally more favourable.

(iii) Rib fat

Rib fat EBVs are estimates of the genetic differences between animals in fat depth at the 12/13th rib site in a 300 kg steer carcase. Rib fat EBVs are expressed in millimetres (mm). More positive or more negative rib fat EBVs may be more favourable, depending on your breeding goals relating to the finishing ability of your animals.

(iv) Rump fat

Rump fat EBVs are estimates of the genetic differences between animals in fat depth at the P8 rump site in a 300 kg steer carcase. Rump fat EBVs are expressed in millimeters (mm).

More positive or more negative rump fat EBVs may be more favourable, depending on your breeding goals relating to the finishing ability of your animals. Stock with positive fat EBVs are likely to produce progeny that are fatter, or more earlier maturing, on average than stock with lower or negative fat EBVs. Increasing fat depth leads to a decrease in retail beef yield, however most market specifications require a minimum fat depth. Breeders aiming to breed leaner, higher yielding cattle may select for lower fat EBVs. Breeders wishing to finish their animals earlier may tend to select animals with moderate fat EBVs. Caution should be placed on selecting for extremely low fat EBVs for replacement females as this may indicate females that are more difficult to get in calf.

Differences between rib fat EBVs and rump fat EBVs can indicate differences in fat distribution among animals.

(v) Retail beef yield (RBY)

Retail beef yield (RBY) EBVs are estimates of genetic differences between animals in boned out retail beef yield in a 300 kg steer carcase. RBY EBVs are reported as differences in percentage (%) yield. Larger, more positive, RBY EBVs are generally more favourable.

(vi) Intramuscular fat (IMF)

IMF EBVs are estimates of genetic differences between animals in intramuscular fat (marbling) at the 12/13 rib site in a 300kg carcase. IMF EBVs are reported as differences in percentage (%) IMF. Larger, more positive, IMF EBVs are generally more favourable.

For markets where marbling is important (e.g. Japanese B2/B3 market, restaurant trade, etc.), higher IMF EBVs can contribute significantly to carcase value. Recent research would suggest that 1 marble score is equivalent to approximately 1.5% intra-muscular fat so the variation shown between sires is not that large. This relationship still needs more data to confirm the conversion from marble score to intra-muscular fat.

(vii) Shear force

Trial shear force EBVMs are estimates of genetic differences between animals in meat tenderness. Trial shear force EBVMs are expressed as differences in the kilograms of shear force that are required to pull a mechanical blade through a piece of cooked meat and are calculated from shear force measurements (ie. objective abattoir measures of meat tenderness), gene marker information and flight time records.

Lower, more negative, trial shear force EBVMs are more favourable. That is, lower EBVs indicate that less shear force is required and hence the meat is more tender.

Docility

Docility EBVs are estimates of genetic differences between animals in temperament. Docility EBVs are expressed as differences in the percentage of progeny that will be scored with acceptable temperament (i.e. either 'docile' or 'restless') and are calculated from temperament scores recorded on animals using either a crush or yard test when the animals are between 60 and 400 days of age (preferably at weaning).

Docility in cattle is the way cattle behave when being handled by humans or put in an unusual environment such as being separated from the mob in a small yard. What we define as poor docility is a survival trait in the wild – fear of anything unusual and the desire to escape. In domesticated cattle it is exhibited as flightiness. Importantly, docility is a highly heritable trait and so can be improved genetically. Higher, more positive, Docility EBVs are more favourable.

Net feed intake

Feed efficiency is recognised as one of the most economically important production traits, both in grazing enterprises and feedlot operations. Research has shown that large variation exists in feed efficiency between animals, and that a proportion of this variation is due to genetic differences. BREEDPLAN produces two EBVs relating to feed efficiency – Trial net feed intake (post weaning) and trial net feed

intake (feedlot finishing). Both EBVs are calculated from information collected in feed efficiency trials or by measuring levels of the blood hormone IGF1. Whilst there is a positive relationship between the two EBVs, some animals do rank differently for feed efficiency in the two different scenarios.

Structural soundness

Since cattle were first domesticated, it has been recognised that animals should conform to certain structural requirements to ensure high levels of production and adaptability to the environment. When structural integrity is not maintained, substantial financial loss can occur. These losses could be due to such things as complete bull breakdown, bulls not being able to cover the allocated cows resulting in lower conception rates, steers being unable to finish a long feeding program, or cows with badly structured udders being unable to rear their calves properly.

Trial structural soundness EBVs are provided for five important structural traits:

- Front feet angle (FA)
- Front feet claw set (FC)
- Rear feet angle (RA)
- Rear leg hind view (RH)
- Rear leg side view (RS)

Trial structural soundness EBVs are reported as an estimate of genetic differences between animals in the percentage of progeny that will have a desirable sc ore for a particular structural trait and are calculated from structural scores recorded on animals by an accredited scorer when the animals are younger than 750 days of age.

Higher trial structural soundness EBVs are more favourable. That is, higher EBVs indicate a greater percentage of progeny with a desirable score for that particular trait.

Animals with very low (i.e. negative) EBVs for each trait are identified with an additional flag to indicate the nature of their structural fault.

- Front feet angle and rear feet angle EBVs are identified with a flag of 'ST', indicating increased probability of steep feet angle and 'SH', indicating increased probability of shallow feet angle
- Front feet claw set EBVs are identified with a flag of 'OD', indicating increased probability of open divergent claws and 'SC', indicating increased probability of scissor claws.
- Rear leg hind view EBVs are identified with a flag of 'BL', indicating increased probability of bow legged rear legs and 'CH', indicating increased probability of cow hocked rear legs.
- Rear leg side view EBVs are identified with a flag of 'SR', indicating increased probability of straight rear legs and 'SI', indicating increased probability of sickle hocked rear legs.

Flight time

Trial flight time EBVs are estimates of genetic differences between animals in temperament. Trial flight time EBVs are expressed as differences in the number of seconds taken for an animal to travel approximately 2.0 metres after leaving the crush and are calculated from flight time measurements that have been recorded on animals using specialised flight time equipment.

Flight time is a simple, cost effective and easy to record objective measurement of temperament. Research has shown that in addition to the obvious benefits for ease of handling and management, animals with longer flight time (i.e. superior temperament) also have superior meat tenderness.

Higher (i.e. longer) trial flight time EBVs are more favourable. That is, higher EBVs indicate a longer time taken to exit the crush and hence better temperament.

Further information:
www.breedplan.une.edu.au
www.tbts.une.edu.au

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Fertile bulls are a 'must have' to increase your herd's profitability

Conducting any beef business means there is a need to focus on the components that most directly influence profitability. There is little value in measuring every trait in sight, or using every new technology being placed on the market, if they do not have a major benefit on the market outcome or the profitability of the enterprise.

Given that your business is essentially driven by the number of animals it can sell, their weight and price, then there is a need to focus on the relative areas that will drive that profit.

Only about 10–15% of the 30,000 plus replacement bulls needed to fill requirements in north Australia each year are currently sold with any fertility measurement describing their function. A bull with poor fertility and/or genetic traits will not pass on his desirable traits to sufficient progeny.

This has to improve if the industry is going to continue to make significant genetic progress. No matter what trait is involved, producers must know current herd performance, and that their purchases this year and in the future are going to improve the herd's $ returns. Many producers gauge their herd fertility performance on a branding percentage. However the percentage of animals calving within a 365 day inter-calving interval is often significantly less than the figure typically calculated from the number of calves branded to total number of breeders. For a producer claiming a 75% branding figure, the reality is often that no more than 50–55% of females are calving within a 365-day period – the same basis as for interest and tax paid.

Australian Association of Cattle Veterinarians have determined that fertility is the ability of a bull to achieve, by natural service, a pregnancy rate of 60% and 90% in 50 normally cycling females, within 3 and 9 weeks of mating, respectively. The beef industry is focused on profitability producing a calf from each breeder within a 365 day interval. The stud industry must have the same focus if they wish to remain viable and relevant.

Earlier research had shown fertility is often five to ten times more important than price received in terms of enterprise profitability. Growth can be up to double that affected by carcase attributes or price received. This is consistent with recent reports at MLA Beef Up Forums indicating that price received (cents/kg) frequently only accounts for about 11% of profitability in the enterprise. So optimizing fertility performance is obviously a big issue for remote and extensive herds.

How can fertility be improved?

Objective information in the form of a Bull Breeding Soundness Evaluation (BBSE) in terms of 'what we see' (phenotype) is essential and Breedplan EBVs are necessary from a genetic perspective.

The BBSE was developed by veterinarians to standardise bull fertility testing and to provide a consistent descriptor of bull fertility. The evaluation indicates whether a bull has met a set of standards for key fertility components which indicate whether a bull has a high probability of being fertile. The components are:

- Scrotal circumference (cm) and tone or resilience
- Physical examination for faults in the head, legs, joints, feet, sheath and penis
- Semen analysis for motility,
* Morphology (or structure of the individual sperm cells), and
- Mating behaviour/mating ability.

Producers may often do a reasonable job in their selection of replacement heifers but undo that good work by selecting bulls on phenotype and not on genetic performance. For example; the majority of bulls are selected on property according to looks, 'fleshiness', straight backline, and size that is often a reflection of the animals' age rather than the true genetic worth of the animal and its fertility.

The reality about genetics is that the genetic make-up of the bull is passed on from the sire to progeny whether we measure those attributes or whether we ignore them. The difference is, if we measure them, we know where we are going for the next 13–16 years! The 'mickey' of unknown genetic worth is going to affect your herd function and profitability well into the next decade.

Selection of bulls that meet minimum fertility standards has been a difficulty to many beef producers for a long time. For some time limited reproductive information has been included in sale catalogues — 'limited', because many seedstock producers only supply the information that buyers either ask for or are prepared to pay for; or relate an animal to some judges showmanship.

The Australian Association of Cattle Veterinarians (ACV) oversees the BBSE practices with appropriate certification. The certificate provides a standard of assessment for veterinary evaluation of the various reproductive traits important to beef producers. This evaluation is conducted prior to sale and details the identification of the sire, date and location where the evaluation was conducted, the assessments

made and relevant disease information (as shown in the example in figure 1 on page 19). It is purely an evaluation of a range of measures on that date on which it was done and does not provide any guarantee or imply the number of calves that the bull will sire in either single or multiple sire matings.

The BBSE is not a genetic evaluation of reproductive traits, but an indication of the animal's present reproductive function. However, this certificate is far superior to 'the lack of' or 'distorted' information that is frequently available to many bull buyers. This evaluation can also be conducted on property as an annual bull test prior to mating to identify any bull that is declining in fertility.

In the sale catalogues, bull sellers are able to provide in association with each bull in the catalogue/or list, a summary of the tests conducted by the examining veterinarian. This BBSE summary will be in the form of:

Scrotum	Physical	Semen	Morphology	Serving
35.5	✓	✓	P	nt

Key
35.5 = Scrotal size or circumference in cm
✓ = Pass
P = OK under natural mating
× = Fail
na = Not applicable
nt = Not tested.

The resultant certificate (figure 1) should be sought out by bull buyers when choosing between bulls as they also provide details of aspects of the evaluation that cannot be seen in the live animal e.g. percent normal spermatozoa and mating behavior details (if conducted).

Many of us are very comfortable in discussing the feet, leg and joint structures in animals and are very confident in making a selection decision to purchase or otherwise or use a bull based on what we see. The features of a bull that are clearly visible need little reinforcing in the selection process. However, what we can not see (without a microscope) often needs a little explanation.

Understanding the morphology myths

Morphology in a BBSE is basically the 'structure' of individual sperm cells. The structural attributes that are not clearly visible (or that require a microscope to view) are frequently just as important, if not more important as far as affecting a bulls fertility.

So let's go back to the basics of semen production. Unlike the female that has her 'quota' of eggs at the start of life, the bull is continuously producing semen within the tubules in the testicles.
The testicles are about 2°C cooler than body temperature. Between the head, body and tail of

the epididymis there is a long tube for storage and maturation of the spermatozoa produced. This production pipeline takes about 6–8 weeks from the start of production to when the semen is ready for ejaculation. As semen is continually produced, unused semen is excreted in the urine of all bulls.

So can a bull's fertility change?

How often do we think about what affect various treatments we apply to a bull, have on his fertility? For example, when a bull is bought at a sale after being 'stuffed full of feed' (or more nicely put 'prepared for sale') and we then 'let him down' (reduce his weight considerably); do we affect his fertility? When a new bull has a fight with the current herd sires and is lame for a few days; does that affect his fertility? In fact any stress that we place on a bull, either as part of our production system or our husbandry programme, can affect the quality or structure of the spermatozoa in the continuous production of semen from within the testicles to each of the storage glands along the reproductive tract.

Can we examine and categorise the semen produced by a bull?

Yes. Many breeders will be aware that upon the collection of semen either by electro-ejaculation or rectal massage, semen is examined crush-side for colour (no blood or urine staining allowed) and density of spermatozoa which is ranked on a 1 (clear to cloudy) to 5 (thick creamy colour) basis. In addition, when using low power magnification, the amount of swirl or vigorous swimming motion of all the spermatozoa is scored on a 1 (no swirl; generalised flickering of individual sperm only) to 5 (fast distinct swirl with continuous dark waves) basis. Once completed, the percentage of individual sperm that are swimming forward freely and independently is recorded. This assessment is a compulsory measure of fertility to meet BBSE standards. Based on extensive research the ACV has determined that a threshold of 30% progressively motile sperm is a pass on a BBSE. In addition, the sample must be free of large numbers of pus cells.

The final evaluation of the semen is the percentage of individual spermatozoa that are structurally normal – the morphology. To record the %Normal sperm, a sample of the semen collection is placed in a small tube with a special diluent and sent off to one of the accredited morphologists. The morphologist will examine 100 individual spermatozoa and record all the abnormalities present.

The morphologist report will detail the % Normal sperm and the percentages of the following abnormalities: %Proximal Cytoplasmic Droplets (PD); %Mid-Piece Abnormalities (MP); %Abnormal Tails and Loose Heads (T&H); %Pyriform Heads (Py); %Knobbed Acrosomes (KA); %Vacuoles & Teratoids (V&T); %Swollen Acrosomes (SA). Maximum thresholds have been set for each of these categories based on their potential impact on the fertility of the bull e.g. PD–20%, MP–30%, T&H–30%, Py–20%, KA–30%, V&T–20% and SA–30%.

A frequent concern by producers is – why do subsequent samples from the same bull differ in %Normal sperm?

As outlined previously, the spermatozoa are continuously produced and are therefore subject to any stressors in the body (including rise in body temperature, disease, etc.) until the time of ejaculation or excretion. Because the stress or rise in body temperature may have been over an extended time, it will have differing effects on the spermatozoa depending on where they were at, in the production process, on the occasion of the stress/temperature. The morphology result is an indication of the quality of the semen at that point in time alone. However, if the %Normal is high, the bull has somewhat more of a buffer and can afford to decrease more in %Normal as a result of stress than a bull that inherently/genetically produces low %Normal semen. If on the first sample, a bull produces a low %Normal sperm, then the bull should be retested between 42 and 56 days after the first test to gain a more representative sample of his true semen quality. That of course is assuming that the bull is not suffering from any longer term adverse affects or ongoing stress.

Therefore, when a BBSE is conducted and the morphology results are presented, there should always be an interpretation of the results in light of the bull's vaccination history, any prior stress imposed on the bull and the bull's age and scrotal size. The semen sample tells us something about the bull's fertility when the sample was taken. When associated with subsequent or previous samples, we can gain a better understanding of the potential fertility of the bull.

Are all the details in a BBSE always available?

Unfortunately NO. Veterinarians often only do the components of the BBSE that the stud breeder requests. Furthermore, whilst some breed societies have supported the BBSE process, in principal, they have NOT gone so far as requiring a COMPLETE BBSE as a prerequisite for bulls to be included in a breed society endorsed sale or multi-vendor sale. It is therefore, essential for all bull buyers to seek

STOCKLICK TRADING

think lick... think STOCKLICK

Custom Made
Livestock Supplements

UREA BASED PROTEIN & PHOSPHOROUS MIXES & MOLASSES MIXES

NQ Breeder Loose Mix

A balanced supplement high in urea suitable for use during the dry season

Analysis:

Equiv. Crude Protein	89.55%
Crude Protein	5.85%
Min. Phosphorous	2.3%
Min. Salt	28%
Urea Equivalent	30.88%
Min. Calcium	3.78%
Min. Sulphur	3.36%
Fibre	3.11%
Essential Trace Minerals	
Vitamins A, D, E	

Daily Intake: 80 to 160grams/head/day

LG Weaner Lick Loose Mix

Paddock supplement for weaners 150 -200kg to ensure maximum developmental growth.

Analysis:

Equiv. Crude Protein	49.44%
Crude Protein	9.4%
Min. Phosphorous	1.29%
Min. Salt	33.9%
Urea Equivalent	17.1%
Min. Calcium	2.09%
Min. Sulphur	2.12%
Fibre	6.57%
Essential Trace Minerals	
Vitamins A, D, E	

Daily Intake: 130 to 255grams/head/day

CHARTERS TOWERS OFFICE
Lot 6 Flinders Highway
Charters Towers Qld 4820
Ph: (07) 4787 7007
Fax: (07) 4787 7008
Contact: Scott Adams 0408 880 593
Craig Cook 0428 646 916
Goscelyn Smith 0408 773 157

MT GARNET OFFICE
Lot 1 Battle Creek
Mt Garnet Qld 4872
Ph: (07) 4097 0081
Fax: (07) 4097 0082
Contact: Steve Flett 0429 970 081

ROMA OFFICE
Lot 2 Kimbler Road
Roma Qld 4455
Ph: (07) 46204700
Fax: (07) 46204799
Contact: Doug Kriedemann 0437 257 967

out and cite the certificate in advance of purchasing your 'new investment' as it is too late after the bull has been assigned to you in the auction. Alternatively, buy your bulls from vendors that clearly and openly identify the BBSE standards of their bulls. Interestingly, some studs request this information themselves when buying a bulls/s, but fail to provide this service to their clients in turn. The best feedback you can give to your bull supplier is to only buy/pay for bulls with the essential information rather than many kilograms of grain from a feeder!

Managing the new investment – the new sire!

Just because a bull has four legs, a head and a set of testicles, it does not necessarily mean he is permanently a functional bull. How he is handled, what stressors he has undergone, the level of nutrition available and other factors can all have a strong effect (either positive or negative) on the ultimate fertility and functionality of that bull, and his fertility is dynamic, meaning it can change due to these and other stressors/circumstances.

Relocation to a new environment, subjecting bull to new viral and bacterial challenges, fighting and other issues associated with establishing new social groups, could all have often unseen impacts on semen quality. These impacts then flowed through to fertility in the herd.

Where possible, incoming bulls should be kept with animals of similar age, and bulls coming from very different geographic and climatic environments, should be relocated much earlier than those animals bought from a similar environment to your herd. Even within genotypes, some bulls adapt to more stressful environments more readily than others -these being more likely to have their semen quality affected.

Regardless of whether you have sourced bulls out of the paddock or the sale ring, the need for some objectivity in selection remains the same.

John Bertram
Principal Extension Officer (Beef)
DEEDI
Ph 07 4671 6700

Figure 1. An example of a BBSE certificate that you – the bull buyer- can demand at the time of purchase, could be as follows:

Bullville Veterinary Clinic

Address

Station Road,
PO Box 30, Indooroopilly, Queensland 4068.
Phone 07 33787944
Fax 07 38783559
Mobile 04 2747 8239
Email: bullivets@email.com.au

Veterinarians

Dr Maree Jones
Dr Tom Smith
Dr Bill Chappel

Report: Bull Breeding Soundness Evaluation

This report was compiled exclusively for the use of the person to whom it is addressed. No other person or corporation has any authority to make use of any or all of this report.

This report is valid only when signed by the evaluating veterinarian and the bull's owner or agent

Summary

To: Mr Jack Shepherd Handsome Station, Quilpe, Queensland 4000

Place of examination: *Handsome Station* Date: *3 July 2010*
Brand: *XXXX on offside* Breed: *Santa Gertrudis*

Bull:	Age
Number/name:	Yr : Month
Charter Stowers 1965	1 : 08

Scrotum	Physical	Semen	Morphology	Serving
35.5	✓	✓	✓	nt

I hereby certify that information included in this report is in full accordance with the standards for evaluation and reporting bull breeding soundness as published by the Australian Association of Cattle Veterinarians

Veterinarian:
Signature:

I hereby certify that there has been no medical or surgical intervention of congenital abnormalities of the listed bull(s), whether genetic or not, to enable the above-mentioned standards to be met

Owner/Agent:
Signature:

Data recorded:

Physical		Serving	
Condition score	3	Serves	3
Testes tone	3	Penis	Normal
Penis	Normal	MS function	Normal
Feet	Normal		
Legs	3		
Leg joints	Normal		
Gait	Normal		
Head	Normal		
Semen			
Density	4		
Mass activity	3		
Motility	80%		
Morphology			
Normal sperm	79%		

General comment:

Measuring breeder performance to improve performance and long term profitability

Profitable beef businesses of the future will be those that have already started some years earlier to improve the inherent fertility of their herd through monitoring performance, identifying problem areas and making sound management decisions.

For long term profit, breeder performance can be maximised if:

- each cow conceives early in the mating period and calves within an interval of one year or less between calves;
- each cow successfully rears its calf to weaning;
- each calf weaned meets desired weight targets.

Due to the length of the gestation period the average cow must re-conceive within 12 weeks of calving, to produce calves within an interval of one year or less.

	months
Pregnancy (approx 284 days)	9.3
Calving to cycling (6 weeks)	1.35
Cycling to conceiving (6 weeks)	1.35
Total	12 months

To make progress the first step is to measure reproductive performance.

While the ultimate test of a cow's performance is that she successfully rears her calf to weaning, determining problem areas in is this complex process is more difficult. There a number of reproductive measures that can be used, some of which are listed in the following tables. Level or intensity of management and reproductive history will determine which of these measures are most useful and relevant to the individual business. Producer partners in the Value in Beef project have found that different measures are relevant under different management scenarios with specific objectives and targets. The Cashcow project aims to determine which measures of breeding herd performance are best related to business profit (Fordyce pers comm). Outcomes from this project will be delivered when the Cashcow research is completed.

Seasonal mating and foetal aging together are paramount for accurate measurement of breeder performance, and for identifying areas for improvement.

Individual NLIS identification is necessary for tracking lifetime performance. Foetal aging 12–13 weeks after bulls have been removed will identify all current pregnancies in seasonally mated herds. With continuous mating, foetal aging will not pick up all pregnancies plus it is harder to define the mating period unless 'late' pregnant cows are culled.

Measuring heifer performance

From recent CRC research we know age and weight at puberty are highly heritable. This means genetic progress can be made in these traits.

Once in calf, first calf heifers experience the energy drain of lactating while still growing. This leads to weight loss and failure to re-conceive. However there are those heifers which are more fertile and do re-conceive. These are the heifers that should be producing the breeding females of the future.

Measuring mature cow performance

Body condition at time of calving is a major factor determining a cow's ability to conceive while lactating. While the ability of a cow to conceive while lactating is influenced by nutrition and mating management (to prevent dry season lactations), we now know this trait is highly heritable. This means genetic progress can be made in female breeding cattle in this trait.

The link between mature cow weights, the average pasture quantity and quality and body condition score is essential when establishing breeding objectives. Remember though that the bulls contribute the most to genetic progress. This is due the number of calves they sire in a lifetime. Objective selection of key traits such as fertility and growth is strongly recommended.

Weaning percentage can be calculated in various ways and this makes it difficult to compare between herds. For consistency it should be: number of calves weaned/number of cows mated to produce those calves (inclusive of pregnancy tested empty females).

Cows which calve regularly are likely to continue to do so. For some producers knowing the percentage of cows calving regularly from year to year is of value in measuring herd performance, and for identifying mothers of future breeders.

Foetal aging will give a profile of the conception pattern,

Table 1. Measuring heifer performance

Measure (heifers)	Problem areas	Key strategies
Age at joining /age at calving	Age/Weight at puberty	Nutrition, genetics
Heifer conception %	Weight at puberty	Nutrition, genetics, disease control
1st calf heifer conception %	Condition score at calving Weight at calving	Nutrition (inc spike feeding), genetics, early weaning, seasonal mating
Mating period/calving spread	Body condition score, sub fertile and infertile bulls	Genetics, bull fertility (BBSE), season

Table 2. Measuring mature cow performance

Measure (mature cows)	Problem areas	Key strategies
Conception %	Condition/weight, lactational anoestrus, bulls, reproductive disease	Nutrition, genetics, vaccination, seasonal mating, strategic weaning.
Branding %	Foetal and calf losses (disease, genetic defects, cow factors, predators, stress)	Eliminate problem cows (and don't breed from daughters) Predator control Disease control
Weaning %	All of above	All of above
Wet cow conception %	Lactational anoestrus, condition/weight	Seasonal mating, nutrition, genetics, genotype
Conception pattern (ie % early conceptions in mating period, spread in conception by month)	Bulls (infertile, sub fertile), reproductive diseases, poor nutrition	Bull fertility (BBSE), vaccination (for vibrio, etc) Adjustment to mating times
Intercalving interval (ICI)	Condition/weight, anoestrus Bulls, disease	Nutrition, genetics, strategic weaning
% losses conception to weaning	Foetal and calf losses	Vaccination, nutrition, genetics
Breeder / Mature cow weight	Mature size vs pasture availability	Breeding objectives matching environment and animal requirements

and hence calving pattern. This is useful for determining the percentage of cows conceiving early in the mating period, and whilst lactating. This information is useful in seasonally mated situations where fine tuning performance is the objective. Replacement heifers should be preferentially selected from these early conceiving cows and conversely, calves from late conceiving cows should be considered cash flow.

Cows with long intercalving intervals are not as profitable to the business as cows which conceive early in the mating period and while lactating. By the time empty (and late pregnant) cows can be identified and sold they have represented a cost in pasture consumption, lick consumption, and handling.

Acceptable losses conception to weaning will depend on how extensive and tightly managed the operation is. In extensive situations, some may view greater than 10% losses as unacceptable. Diseases that cause conception and/or pregnancy failure include vibrio, trichomoniasis, leptospirosis, pestivirus and neosporosis.

Including weaner information

Other important measures are weaning weight and percentage of calves weaned at the first round. Weaning weight is a component of reduced age of turnoff, necessary for targeting premium markets. Reducing age of turnoff in turn increases the importance of fertility. Most producers would like as many calves as possible weaned at the first round. A significant 'spread' of weaners is not as profitable as a tighter spread. A higher percentage of weaners at first round gives cattle a good start for earlier turnoff.

Measuring profitability

A fertile herd makes a significant contribution towards long term profitability. Increased reproductive rates enables greater selection pressure on replacement females and thereby greater opportunity for genetic progress and increased profitability.

Marketing non performers results in short term profitability. To improve long term profitability, the fertility of a herd needs to improve.

One way of measuring the profitability of a herd is to calculate Gross Margin per Adult Equivalent (GM/AE) and Gross Margin/Breeder. The GM/AE can be compared against other herds and also within the herd (for both male cattle and female cattle). Different classes, or ages of female cattle can be compared. The GMs for groups of females in the breeding herd may range from $30.00 to $150.00 or more. This is ultimately driven by fertility, assuming acceptable survival rates. The weight of weaner produced will impact on male GM, and is also related to female fertility.

The Breeding Edge workshop covers aspects of this article in more detail. If interested contact your local beef officer.

Felicity Hamlyn-Hill
Beef Extension Officer, Charters Towers
Ph 07 4761 5151

Table 3. Measuring weaner performance

Measure (weaners)	Problem areas	Key strategies
Average weaning weight (1st round, 2nd round)	Time of calving, low inherent growth rates Nutrition Dry season lactations	genetics, seasonal mating, nutrition (inc spike feeding)
Proportion weaners 1st round	Calving creep (later and later calves due to season, disease, and long ICI)	Nutrition, genetics, vaccination, seasonal mating, strategic weaning.
Weight of calves weaned / cows mated	Time of calving, low growth Nutrition	All of above

Improve your bottom line with selection indexes

With many traits to consider when deciding on your next bull purchase, it is often difficult to know which traits you should concentrate on to get the best return for your dollar in relation to the performance of their progeny. Selection indexes can assist you in this selection decision by providing an EBV for profit, or $EBV, allowing producers to select the most profitable breeding bulls for their specific production system and target market.

With the cost/ price constraints that face most production enterprises, it is essential that management consider all available options to continually improve the efficiency of the business to maintain and ultimately improve profitability. As a producer of beef cattle, genetic improvement of your herd for economically important traits provides a very cost effective option for achieving continual improvement in the efficiency of production of your business.

With bull sales upon us again for another year it is important that you utilise as much information as possible to help select the right genetic package to make favourable genetic change for commercially important traits. Genetic change is both permanent and cumulative meaning that selection decisions made in the breeding herd today will be reflected in the genetic merit of the next generation and built upon from selection decisions in future generations. The genetic merit of the herd can, of course, be taken higher or lower for one or more traits depending on the breeding animals selected. Obviously, the aim will be to continually improve the genetic merit of the herd for those traits that have the best economic return but how do you identify animals that possess the superior genetics and how much emphasis should you place on the individual traits to ensure the future herd provides the optimal profitability for your production system?

Selection indexes provide a simple solution to this complex problem by placing an economic weighting on each of the traits identified as profit drivers in the enterprise and relating this weighting to the genetic merit of the animal as described by its' Estimated Breeding Values (EBVs) for the respective traits. The Australian beef industry uses a system called BreedObject to combine the economic weighting for each trait with the genetic information for each animal to derive a single EBV for profit. The EBV for profit is expressed in dollars ($) and provides an estimate of genetic differences between animals in net profitability per cow joined for a particular production system/ market scenario.

There are currently twelve beef cattle breeds in Australia that have selection indexes available. The table below shows the six breeds, and their available indexes, which have at least one selection index that is suitable for production systems common in the northern beef industry. Full details of the respective indexes can be accessed from the BREEDPLAN website http://breedplan.une.edu.au and following the links 'Technical'/ 'BREEDPLAN Tip sheets'/ Understanding Australian Selection indexes'.

Breed	#	Name of selection index
Brahman	1	Jap Ox
Santa Gertrudis	2	Export production, Domestic production
Belmont Red	2	Export steer, domestic steer
Angus	4	Supermarket, CAAB, Jap B3, Northern Terminal
Red Angus	3	Supermarket, Vealer, Northern Steer
Charolais	3	Domestic supermarket, Export, Live export

Breeds, and their available selection indexes, which have at least one index relevant to Northern beef production systems.

The selection index $EBV can be used in the same way as any other EBV for individual traits. The following steps are recommended when using Selection Indexes in selection:

Identify the index within a breed that best matches your production system.

Compare the animals available for selection to the current breed average for that index and use the percentile bands table to determine how they rank within the breed. (Both breed average selection index values and percentile bands tables are available in sale catalogues and the BREEDPLAN website by following the links 'Technical'/ 'Breed specific documents' and selecting the breed of interest).

Assess the individual EBVs of the animals selected by the index to best match your requirements (animals with the same $EBV for an index may have different EBVs for individual traits and selection can be further refined based on specific traits requiring additional attention in your herd).
Use selection indexes in conjunction with other traits of economic importance that may not be described by EBVs e.g. semen quality, structural soundness and temperament.

As with individual trait EBVs, the selection index $EBV will normally be used to compare animals to estimate the additional genetic benefit that will, on average, be provided in the progeny of one animal over another. The advantage of the selection index $EBV is that it puts an actual dollar value on that genetic benefit. If, for example, you were looking to buy a Brahman bull for a self replacing herd

producing grass fed Jap Ox in a tropical environment and you had Bull A with a Jap Ox index of +$30 and Bull B with a Jap Ox index of +$60 to choose from, you can do a quick calculation on the additional profit that will be realised in the progeny of one bull over the other. The difference in index value between the two sires is $30. Given that half the genetics come from the sire and half the genetics are in your cow herd, the expected difference in profitability of the progeny from these bulls is calculated by taking half the difference in their profitability. In this case, Bull B's progeny will, on average, be $15 more profitable per cow mated than Bull A's i.e. (1/2 x (Bull B Jap ox index of $60 – Bull A Jap ox index of $30)). If Bull B were joined to 200 cows in his breeding lifetime i.e. 40 cows per year for 5 years, he will provide an additional $3000 in profit compared to Bull A. It is important to note that the additional profit is across the entire production chain and considers the long term benefit generated by the bull's daughters in the breeding herd (when referring to a self replacing index).

For further information in using Selection indexes to assist in your next breeding selection, please contact

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Bull selection decisions with a profit driven focus

The following are some examples of northern producers using breeding objectives, targeting fertility and premium markets including MSA, using Breedplan and other measured data to make bull selection decisions.

The examples are seven different herds across four breeds. Five of these have done a Breeding Edge Workshop. All have decided to make their breeder herds more profitable by selecting sires with a profit driven focus.

1. A Brahman bull breeding nucleus

This herd has a bull breeding nucleus to breed bulls for their own commercial breeders and sell some bulls to regular clients.

'We are looking for good functional bulls that will enhance the profitability of our herd. We have focussed on three main traits that effect profitability – growth rate, fertility and temperament. The sires we purchased have well above average 600 day growth EBVs, have a quiet temperament and are from cows that have a proven ability to conceive while lactating. We are in the early years of applying greater pressure to and objectively measuring our bull breeding nucleus but the results are encouraging.'

These bulls have

- fertility (above average scrotal size EBV for those measured and good dam reproductive history) and above average growth
- good temperament
- meet objectives to improve fertility, growth and combinations for fat and store markets
- were affordable within budget.

2. A crossbred commercial herd

This breeding herd has objectives to improve fertility and targets for premium beef and store markets.

'We understand

- a bulls affect on a cow herd genetically is far greater than the cows
- the difficulty of trying to get a calf every year from a cow and having that calf born at the right time of year
- the need to use the growing season with appropriate growth genetics.

We have realized that we needed to seek bulls that not only suited our country, but had a documented history. We focused on a number of things:

- age of the bull's mother at first calf;
- how long the gestation period was;
- how many calves she had in her life so far.

We only picked bulls that came from a cow that has had a calf every year. To compliment this we matched low birth weights with high 400 and 600 day growth compared to breed average. We also had the ability to pick bulls with flight speed tested for quiet temperament and high tick resistance, of which all proved accurate. We also only picked bulls with high semen morphology. Observing these bulls during mating, they are very virile and chasing cows all the time.'

These bulls hit the targets for

- above average growth
- above average scrotal size (for fertility)
- above average eye muscle area (for muscling and carcase type)
- excellent dam reproductive records
- above minimum scrotal size
- high sperm morphology
- high tick resistance
- excellent measured temperament ratin

3. A Droughtmaster bullock and bull breeder

This herd targets premium grass fed bullocks, cull heifers and breeds bulls for sale. The herd has high fertility and strives to maintain fertility and produce quality bullocks heavier and younger.

Details on six Brahman bull purchases

	Weights (kg)					Milk (kg)	Scrotal size (cm)	Days to calving	Carcase wt (kg)	Jap Ox Index ($)	Dam's calving history
	Birth	200 day	400 day	600 day	Mat. cow						
Brahman breed av.	2.4	17	23	32	38	0	0.3	1.2	20	20	
B1	3.6	27	40	59	66	2	0.7	-7.4	31	$56	3 calves in 3 years
B2	3.2	23	31	49	54	-3	1.1	-9.2	27	$54	3 calves in 3 years
B3	4.9	32	46	51	66	1	-	-	35	$29	6 calves in 6 years
B4	6.1	38	56	93	106	-1	-	-	47	$55	6 calves in 6 years
B5	5.2	31	46	74	88	-1	-	-	43	$42	2 calves in 2 years
B6	4.6	28	45	67	80	1	-	-	39	$39	8 calves in 9 years

Details on four Belmont Red bull purchases (EBVs)

	Weights (kg)					Milk (kg)	Scrotal size (cm)	EMA (sq cm)	Rib fat (mm)	Rump fat (mm)	Retail beef yield (%)	IMF %
	Birth	200 day	400 day	600 day	Carcase							
Belmont Red breed av.	2.2	12	16	22	13	4	0.6	1.5	-0.4	-0.5	0.5	0.1
BR1	7	30	48	64	-	2	1.5	2.8	-2	-2.5	1.9	-0.5
BR2	3.9	18	17	32	15	0	1	1.8	1.2	1.4	-0.2	0
BR3	3.4	17	20	27	14	-2	1.1	2	-0.5	-0.7	1	-0.3
BR4	3.4	18	21	25	15	1	1.9	2.3	-1.2	-1.8	1.3	-0.2

Details on four Belmont Red bull purchases (Raw data measurements)

	Age first calf (mths)	No of calves	Calf interval (days)	Scrotal (cm) 10/8/09	Tick score	Flight time	Pen score	Rump fat (mm)	Rib fat (mm)	EMA (sq cm)	IMF %
BR1	26	4	486	40	Very high	0.6	1	12	8	110	3.3
BR2	25	7	361	37	High	1.01	1	15	10	123	3.8
BR3	27	4	358	35	Very high	0.67	1	10	6	100	4.4
BR4	23	6	364	37	Very high	0.69	1	5	4	107	2.8

Bull DM1 is a high growth, high scrotal size and high eye muscle area bull that is also very attractive.

Bulls DM2 and DM3 are above average bulls for growth, scrotal size and eye muscle area. Bull DM3 is also above average in the carcase traits of IMF, rump and rib fat.

Bull DM4 is breed average for growth but high for the carcase traits.

Bull DM5 is a purchased bull that has proved himself in the herd and is leaving good performing progeny.

Bull DM6 is a purchased bull selected on type, BREEDPLAN measured growth and raw data on scrotal size and carcase.

As a package, these bulls will continue to improve weight for age, fertility of daughters and carcase paramaters.

4. A commercial store steer and bullock herd

This is a small herd looking to improve fertility, growth and type in the herd.

This bull is a example of a high performing balanced package. He has better than moderate growth, close to breed average scrotal size and high in all carcase traits. This bull will improve growth and carcases.

Selected Droughtmaster bulls both purchased and home bred (EBVs)

	Weights (kg)					Milk (kg)	Scrotal size (cm)	Carcase wt (kg)	EMA (sq cm)	Rib fat (mm)	Rump fat (mm)	Retail beef yield (%)	IMF %
	Birth	200 day	400 day	600 day	Mat. cow								
Droughtmaster breed av.	-0.1	11	17	22	23	5	1.2	13	0.7	0	0.1	0.6	0
DM1	1.4	19	35	59	-	-	2.7	-	1.6	-1.7	-2	1.8	-1
DM2	-	16	24	35	-	7	1.7	-	2.1	-0.7	-0.8	1.3	0
DM3	-	13	22	29	-	-	1.4	-	1.2	0	0.1	0.7	0.2
DM4	-	9	15	22	-	5	0.9	-	1.5	2.2	2.8	-0.3	0.7
DM5	-	24	30	42	-	-	1.7	-	0.9	-0.5	-0.6	0.7	0.3
DM6	-	18	29	42	-	-	-	-	-	-	-	-	-

Purchased Droughtmaster bull (EBVs)

	Weights (kg)					Milk (kg)	Scrotal size (cm)	Carcase wt (kg)	EMA (sq cm)	Rib fat (mm)	Rump fat (mm)	Retail beef yield (%)	IMF %
	Birth	200 day	400 day	600 day	Mat. cow								
Droughtmaster breed av.	-0.1	11	17	22	23	5	1.2	13	0.7	0	0.1	0.6	0
DM7	-	12	28	35	-	-	1.1	-	21	108	2.4	0	0.7

5. A commercial herd of high grade Brahmans

Problems identified by this producer were low fertility and ordinary carcase performance. So, he decided to try a different approach to improve these traits and use a different breed retaining environment adaption and measured traits for growth and fertility.

A bull was selected and the second crop of calves are now weaned. The results are more than pleasing. Further purchases of bulls with measured traits are in the pipeline.

EBVs	Birth wt (kg)	Milk (kg)	Growth (kg)			Scrotal size (cm)
			200 day	400 day	600 day	
Belmont Red breed av.	2.2	4	12	16	22	0.6
BR5	2.6	5	17	28	39	1.7

This bull has high growth and scrotal size EBVs. His dam started young and has an outstanding fertility record.

6. A commercial herd, mixture of high grade Brahmans and crossbreds

This property's owners realized how much further they could go ahead with cattle performance by using the measuring technology available including BREEDPLAN.

Issues with their operation included low fertility and growth in the existing herd and some markets demanding softer cattle.

They decided to try some bulls of a different and 'softer' breed with a performance recording background and with figures available.

These bulls are all above breed average for growth. They are close to or above breed average for scrotal size EBV and all out of cows that calve every year.

Details on four Belmont Red bulls

EBVs	Birth wt (kg)	Milk (kg)	Growth (kg)			Scrotal size (cm)
			200 day	400 day	600 day	
Belmont Red breed av.	2.2	4	12	16	22	0.6
BR6	1.8	2	14	24	35	0.5
BR7	3.3	3	13	28	27	0.5
BR8	4.1	-1	18	36	40	0.9
BR9	4.6	3	22	38	46	1.1

They will contribute to increased growth and fertility.

7. A commercial high grade Brahman herd

This herd produces bullocks. Issues in their production system include low weight for age, not enough fat cover at slaughter, and low fertility in breeders. There is also a desire to get some production into the premium markets that require less *Bos indicus*.

Some Angus bulls have been used over Brahman cows but checking up has revealed they have mostly been below or around breed average.

The Angus sires have been found to be available for AI and have been shortlisted for their balance of traits and all in the high end of performance.

Bull A1 has 1807 progeny analysed on BREEDPLAN. All these bulls have high levels of fertility, growth and carcase traits. They will breed high performing crossbred daughters for future breeders and produce bullocks to target premium markets such as MSA.

Alan Laing
Senior Extension Officer (Beef), DEEDI Ayr
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	Calving ease dir (%)	Calving ease dtrs (%)	Gestation length (days)	Weights (kg)					Milk (kg)	Scrotal size (cm)	Days to calving
				Birth	200 day	400 day	600 day	Mat cow			
Angus breed av.	0	0.4	-2.5	4.6	36	68	86	80	12	1.2	-2.5
A1	1.9	1.7	-4.3	2.7	41	83	100	83	10	2.8	-4.1
A2	-0.4	0.4	-3.9	4.3	44	80	110	81	19	2	-4
A3	0.1	2.1	-1.9	3.6	30	70	94	80	13	2.4	-5.1
A4	-1.5	1	-1.8	8.2	45	83	104	97	16	2.3	-5.8

	Carcase wt (kg)	EMA (sq cm)	Rib fat (mm)	Rump fat (mm)	Retail beef yield (%)	IMF %	Long fed/CAAB index	Heavy grass fed steer index	Short fed domestic index	Terminal index
Angus breed av.	48	2.8	-0.1	-0.1	0.2	0.8	86	71	63	63
A1	63	5.4	0.9	1.5	-0.3	2.5	$125	$88	$80	$74
A2	66	7.7	1	0.9	0.3	2.2	$135	$97	$81	$85
A3	61	7.7	2.7	2.2	-0.8	3.9	$145	$85	$70	$72
A4	61	7.7	2.2	2.7	-0.7	3.8	$146	$91	$80	$80

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Improving profitable traits using BREEDPLAN

A herd breeding objective can target fertility, growth and high carcase quality.

Using BREEDPLAN over 12 years, these targets have been achieved in a carefully selected *bos taurus* herd. A herd profile has been created over 900 recorded cows with above average growth, high fertility and top 5% marbling and eye muscle area.

A tool for northern breeders to improve carcase quality is to use AI. It is important when using AI to improve carcase traits to access MSA, that the biggest profit driver, fertility is not compromised.

Recent research coming out of Beef CRC Projects in northern and southern Australia have shown the importance of genetic fat to maintain fertility.

In northern Australia where there has been a lot of crossbreeding with Charolais and Brahmans, important EBVs to select for are bulls with positive scrotal size, positive fat, and a more moderate maturity pattern.

The next step is to add in carcase improvement. There are elite AI bulls that are in the top 5% for EMA and top 1% for marbling.

Examples of these are:

	Birth wt	600 day wt	Days to calving	Rib fat	IMF	EMA
Breed average	4.6	86	-2.5	-0.1	0.8	2.8
NOR B77	+3.8	+111	-5.0	+2.8	+3.2	+9.1
NOR C574	+1.7	+104	-4.1	+1.8	+2.6	+6.9

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Worms and meat sheep in the tropics

Rearing sheep in the tropics has some advantages over rearing sheep in the pastoral zone. One advantage is the abundance of good quality feed. But this advantage needs to be tempered with an understanding that the conditions that favour good pasture growth are the same conditions that favour the cycling of worm infections. While meat sheep are touted as being more resistant to worm infections, the results from our testing laboratory would indicate otherwise. Worms produce gastrointestinal disturbances in the host and consequently malnutrition. A high plane of nutrition will delay the inevitable and this may be the reason why meat sheep seem to be more resistant to worm infections.

Barbers pole is the predominant worm parasite of meat sheep in the tropics.

Other important worms, the scour worms such as the black scour worm and the nodule worm are often present. Scour worms suppress appetite and sheep loose weight.

Worm management

- Use WormTest every 4 weeks in the wet season
- Develop a fast rotational grazing system during the wet summer months for improved worm control
- Always follow a drench with a WormTest 10 days later
- Condition score sheep for weight loss caused by scour worms

Barber's pole worms

Some facts about this worm. It:

- kills sheep
- kills sheep quickly
- kills sheep often without any warning

Barber's pole worms live in the abomasum (4th stomach) and suck blood from the lining of the wall resulting in anaemia. The adult worms each suck around 0.05 ml of blood per day. A burden of 1000 worms can remove about 50 ml of blood per day. Work on 6% of bodyweight to identify the volume of blood in a weaner. The immature worm burden also sucks blood.

Signs of a heavy infection include a lack of stamina, pale gums and lower inner eyelid, bottle-jaw and constipation.

The goal is to recognize any build-up in worm numbers through regular visual inspections and laboratory testing and treat sheep before productivity is compromised.

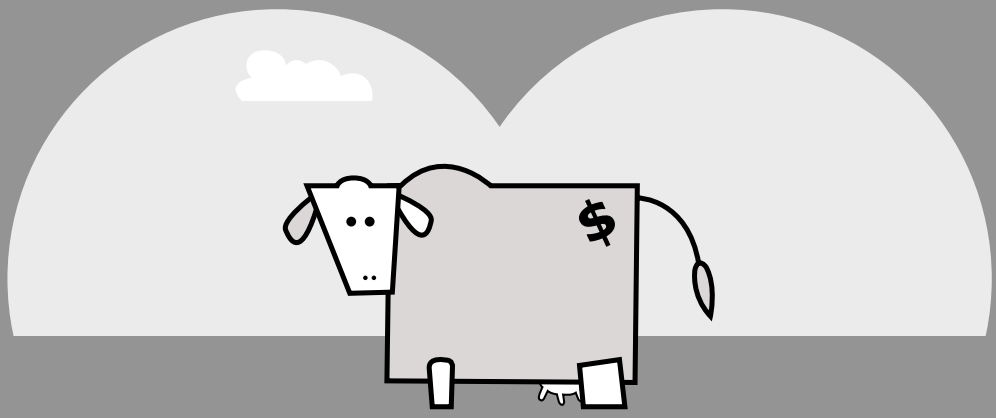
Worm testing

Weekly visual inspection of sheep for any signs of infection combined with laboratory testing for the level and nature of the parasite burden will help producers to make the better decisions about the timing of drench treatments.

www.wormboss.com.au/grow

There will be more worm-related information next issue.

WormTest laboratory
AgriScience, Animal Research Institute
Ph 07 3362 9447 or 13 25 23



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