SOUTH AFRICA | NAMIBIA | ZIMBABWE

LRF-TS news

JULY 2022

Progress is Possible in Less Heritable Traits

A common misconception in livestock breeding is that traits with low heritability are not worth pursuing. This article will examine how significant genetic progress in low heritability traits can still be achieved.

Heritability is not the only determinant of the speed of genetic progress

There are multiple components that determine the rate of genetic progress for any given trait. Some components are determined by the breeder and include selection intensity (how hard you select for/or cull on the trait) and generation interval (average age of parents – determines the rate at which younger and superior genetics enter the herd). The remaining elements are functions of the trait itself and include the amount of the variation observed in the trait that is due to genetics (heritability) and the amount of genetic diversity (genetic variation that exists in the trait). These genetic parameters vary between traits, and also between breeds of cattle. More information on how these components interact to determine the rate of genetic progress can be found in the BREEDPLAN Guide to Genetic Improvement tip sheet, available via the Help Centre on the BREEDPLAN website.

Genetic variation can compensate for lower heritability

Typically, faster genetic progress occurs when genetics explains a greater proportion of the observed variation in the trait (higher heritability). However, for some lowly heritable traits, high levels of genetic variation can compensate for this and allow reasonable genetic progress to be made. This phenomenon can be observed by comparing Days to Calving and Gestation Length. Days to Calving has lower heritability but considerable genetic variation, whereas Gestation Length has a much higher heritability but less genetic variation (see Table 1 over page).

The figures in the following graphs (see next page) depict the genetic trends for Days to Calving and Gestation Length that have been achieved in example Bos indicus and Bos taurus breeds in Australia. While the generation interval will be equal for both traits, each of the other components that determine genetic progress (selection intensity, heritability, and genetic variation) will vary between the traits. The comparison of the genetic trends of the two traits in Figure 1 reveals that the low heritability of Days to Calving is not inhibiting the genetic

IN THIS ISSUE

Editor – Anne Cooke

Trait	Heritability	Indication of Genetic Variation (difference in progeny performance between the Top 5 and Bottom 5 sires)
Days To Calving	Low	31.2 days
Gestation Length	High	5.9 days

Table 1: Indication of the Genetic Parameters that influence thepotential selection response. The indication of the genetic variation of the two traits was sourced from Angus Australia Sire Benchmarking Program (average across cohorts 1-3 and 5-7).

progress that is possible in the trait when compared with a higher heritability trait like Gestation Length.

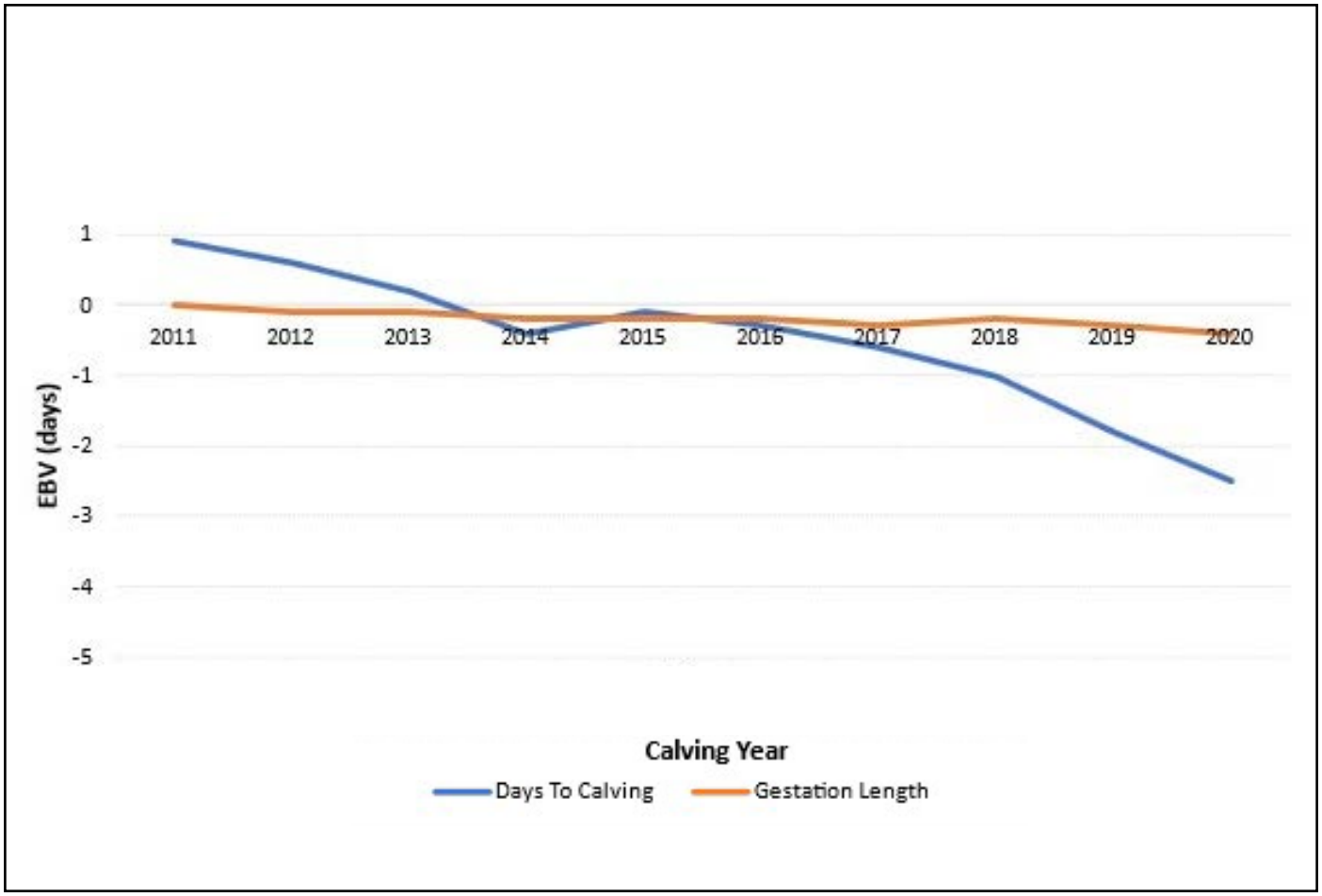
Genetic variation and recording levels are related

The differences in selection intensity and recording levels between the cattle industries in Northern (Bos indicus) and Southern Australia (Bos taurus) are evident in the genetic responses displayed in Figure 1. While both example breeds have favourable responses in both Days to Calving and Gestation Length, the Days to Calving response is much larger in the Bos indicus breed. This likely reflects the greater emphasis placed on fertility in Northern Australia. In addition to the greater selection intensity, the subsequent higher recording of days to calving data in Northern Australia allows the true spread of the trait to be more accurately quantified which leads to greater observed variation in the trait. The recording of correlated traits and the inclusion, where available, of genomic information into the BREEDPLAN analysis also aids in the description of the trait. For example, age at puberty (AP) and lactation anoestrus interval (LAI) both contribute to the Days to Calving EBV and can increase both the accuracy and variation of the Days to Calving EBV. Unfortunately due to the complexities and cost of recording, the collection of age at puberty and lactation anoestrous interval has been mainly limited to research herds.

For lowly heritable traits, the best breeding approach may be the avoidance of introducing the undesirable genetics into the herd. If introduced, the low heritability of these traits can make it harder to identify individuals with the undesirable genetics. This means that their removal will take considerable time and selection emphasis that could be better applied to other traits in the herd's breeding objective. Many non-BREEDPLAN traits fall into this category.

Summary

Although the heritability of a trait is one of the key determinants of the rate of genetic progress, it should not determine whether a trait is included in a herd's breeding objective. Instead, breeding objectives should include all traits that are important to the breeder and/or their clients' production systems. Some of the most important traits in cattle production (e.g. fertility) are lowly heritable. However, as this article has demonstrated with Days to Calving, significant gains can still be made in lowly heritable traits.



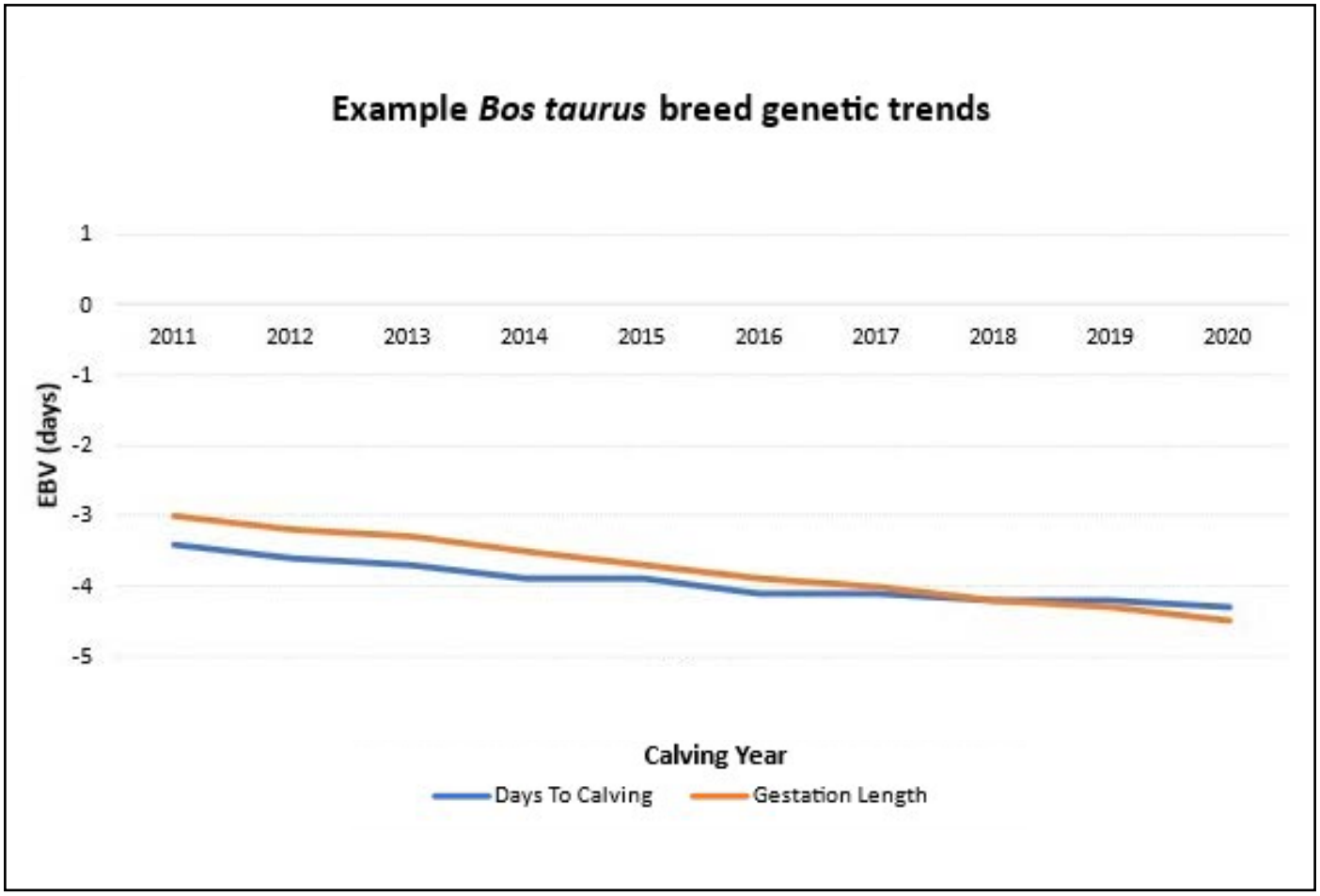


Figure 1: Genetic trends of Days to Calving and Gestation Length over the last ten years in examples of *Australian Bos indicus* and *Bos taurus* cattle breeds.

International Evaluations: A Key Focus for ABRI

The Agricultural Business Research Institute (ABRI) has the infrastructure, experience and knowledge to conduct genetic evaluations for beef breeds on an international scale. The ABRI's research and development team regularly conduct projects that explore opportunities to address international reach and demands from breeders.

Two examples of international evaluations that ABRI is currently progressing include one for the Hereford breed and one for the Brahman breed.

One of the realities of our national seedstock industries is that breeders do source genetics from outside the country, predominantly via semen, but also embryos. And it's not just the Australian industry that does this. Globally, we see that most breeds bring in genetics sourced from other countries to help add to genetic improvements being made in local populations.

Despite the use of overseas genetics, the level of across-country linkage remains low for several beef breeds. This sits in strong contrast with the dairy industry, where high levels of AI have created considerable genetic linkage between countries. While the global dairy industry has considerable experience and methodology for conducting evaluations across countries, the situation for beef cattle breeds is not as well developed.

This means seedstock beef breeders are left with the challenge of identifying improved genetics from overseas populations, often without an objective means of benchmarking alternative sources with their own herd genetics. In other words, they have

THE INTERNATIONAL HEREFORD PROJECT

ABRI has been working with seven Hereford breed clients for this project: Hereford Australia Ltd, New Zealand Hereford Association, the Canadian Hereford Association, Hereford Cattle Society (in the United Kingdom), Hereford Cattle Breeders Society of Namibia, Hereford Association of Uruguay, and the Hereford Association of Argentina.

With permission from these participants, ABRI has been able to use the recorded performance (and genomic) data on the breed society databases to scope the degree of genetic linkage between the respective populations. The first round of test results was presented at the World Hereford Congress in 2020. Opportunity has also arisen for a number of Hereford populations throughout Europe to contribute data to the International Hereford Evaluation. This continues to be a priority R&D project undertaken by ABRI.

At present, the project is in a validation stage. According to ABRI's manager of Genetics Research and Development, Dr. Brad Crook, this is where we look at how much prediction accuracy there is with international EBVs compared to the current national EBVs.

"There's not much point in reporting international EBVs if they don't carry some level of prediction accuracy about the performance of future progeny. It's easy to generate numbers – whether we are talking EBVs and EPDs. The important point is knowing how well the numbers can predict true outcomes from breeding decisions," said Brad.

There is also some more detailed genomic R&D underway with this International Hereford Project, to answer specific questions about the influence of certain SNPs on trait expressions in the Hereford breed.

INTERNATIONAL BRAHMAN R&D

ABRI has been working with Brahman populations in Australia, Southern Africa (South Africa, Namibia, and Zimbabwe) and the USA to develop an international evaluation of the Brahman breed. The most recent development includes the release of first round results using ABRI's online services, allowing each participating country to review current young bulls and sires relevant to their own population.

They can look at how those individuals rank in the international population being evaluated. The second stage will provide all parties with access to the wider population of young bulls and sires regardless of country. Validation of international Brahman EBVs is also being progressed to determine what, if any, enhancements to the model are necessary to improve the accuracy of prediction.

limited scope in making informed objective decisions about alternative genetics to source.

One of the questions often asked of the BREEDPLAN team is: "How do I compare the EPDs or EBVs on overseas animals, from overseas evaluations, with the BREEDPLAN EBVs reported on bulls in my own country and animals in my own herd?" A related question is: "How do I know if alternative AI sires will move me in the right direction, when I can't make direct comparisons on the breeding values recorded?"

The answer in many instances is through "trial and error". That is why ABRI remains committed to the development of international evaluations for beef breeds, to provide seedstock breeders with an additional level of evaluation across all available genetics on a common playing field. Importantly, this doesn't mean that national evaluations need to be replaced by an international evaluation, because we could be talking about a range of playing fields. International evaluations would at least provide one level of benchmarking for more strategic selection decisions about alternative genetics.

Furthermore, the range of traits recorded in common across all populations and all countries is rather limited. For example, BREEDPLAN provides EBVs for female fertility traits such as Days to Calving, yet this is not a trait being reported in other overseas evaluations.

One of the questions to be explored in the development of international evaluations is how to model country specific trait expressions at the genetic level. As an example, how do birth weights on Australian Hereford cattle correlate genetically with birth weights on Hereford cattle in other countries? This impacts on how the model of international evaluations should be best defined.

There is also the practical need of validating international EBVs. For example, to what extent do international EBVs predict future progeny performance in the participating countries? Such outcomes also help to better define the models needed for international beef evaluations.

ABRI is looking to report on such results through the integration of their online ILR System, as these are all important components in developing a practical commercial and international evaluation of specific beef breeds.

NEWS FROM SOUTH AFRICA

ONCE-OFF DNA SNP OFFER FOR LRF SOCIETIES

As societies worldwide are moving over to SNP testing instead of Microsatellite testing, the LRF decided to seek ways in which they can assist their affiliated breed societies and breeders to build their genomic reference populations and assist in the move to SNP testing. At the end of 2020, the LRF approached Neogen, one of the world's largest DNA service providers, to start delivering SNP services to LRF members. A DNA pipeline was implemented for the LRF societies, which enables breeders to send DNA samples through their society offices to Neogen's laboratory in Scotland.

The pipeline was tested by various societies and breeders which started to make use of the service. The LRF however realised that due to cost constraints, most breeders were reluctant to completely move over to SNP testing. After last year's LRF council meeting on the 12th of October 2021, the LRF executive negotiated a once-off deal with Neogen in Scotland for doing SNP testing for a limited period between November 2021 and March 2022 at a very cheap price of only R370.00 (excluding VAT) per sample. The special offer also included a standard defect bundle as negotiated with each society. The main purpose of this special offer was to allow breeders to test their bulls on SNPs, so that in future they only need to test their calves to do sire verification by using SNPs. Secondly, societies could use the offer to further build on their genomic reference populations.

Breeders from South Africa, Namibia and Zimbabwe took up the special offer and in total the LRF societies submitted more than 5000 samples to Neogen. One or two of the societies will possibly now be in a position to, if the quality of their data is good enough, start to look at moving over to Genomically enhanced Estimated Breeding Values (GEBVs) in the near future.

The results for these tests are starting to come in and we are very excited to see what the future holds for SNP testing in Southern Africa.

RTU SCANNING

Looking under the hide has always been a challenge for cattle breeders. As carcass traits can only be measured in slaughtered animals, the collection of phenotypic records for carcass traits has been slow for most breeds. A technology that has been around for a few decades, but vastly underused in cattle breeding, is the real-time ultrasound (RTU) scanning technology.

By using this technology carcass traits, i.e., eye muscle area (EMA), Rib- and Rump fat and intramuscular fat, can be collected and analysed in live animals. Thus, more phenotypic records can be gathered by breeders. Various studies have shown that the traits recorded with the ultrasound machine is highly corrected with the traits recorded in slaughtered animals.

To boost the collection of carcass traits, the LRF bought an RTU scanning machine in 2021. An operator has been trained. Since then, she has scanned more than a thousand animals in South Africa and Zimbabwe.

The BREEDPLAN guideline suggests that in order for measurements to be included in the BREEDPLAN evaluations, animals should be scanned between 300- and 800-days of age. If you are interested in scanning your animals, please contact the LRF office or download the request form from the LRF website: http://www.lrf.co.za/wp-content/uploads/2022/01/LRF-RTU-scanning-request-form-2022v1.pdf

BY IZAAN DU PLOOY

ZIMBABWE LINKING IN WITH THE REGION

NEOGEN

Zimbabwean Brahman breeders responded positively to the Neogen special offer to SNP profile active parents and a total of 75 samples from 5 studs were submitted for testing. Breeders and indeed the Brahman Society look forward to genomic estimated breeding values (GEBV's), especially for the difficult and expensive to measure traits.

BREED RUNS

The Zimbabwean stud industry welcomes the availability of genetic evaluations for Simmental which have been combined with SA Simmentaler breed runs and keenly awaits the inclusion of Simbrah in the SA Simbrah breed runs towards the middle of the year.

Simmentaler Genetics Event on 10th February 2022

The Simmentaler Breed Improvement Club of South Africa held a genetics event on the farm Schoemansfontein, Hartbeesfontein.

The event started with leading breeder and registered scientist Llewellyn Angus, conducting a bull selection demonstration, using the latest Simmentaler Breeders Index genetic tool followed by phenotypic selection. All attendees had the opportunity to apply the principles on a group of young bulls from BTB Simmentalers.

Koos Kooy a Simmentaler breeder from Kwazulu Natal and CEO of the Beef Alliance Growsafe NFI testing station at Mooirivier, emphasized the importance of NFI as an efficiency trait. Koos further presented the initial results from the 2020 Simmentaler bull cohort NFI bull tests at Mooirivier.

Izaan du Plooy, Technical Officer of the Livestock Registration Federation (LRF) presented a roadmap for Simmentaler's move to G-EBV's. The value of genotyping fully described influential phenotypes was discussed in detail.

Johan Styger, Simmentaler Breeder, workshopped cow efficiency including age of first calving and cow size. A lively group discussion followed on cow herd key performance indicators and management systems.

BY JOHAN STYGER

Ed Barry - Board Member of the Simmentaler Society, Johan Styger - Chairman Simmentaler BIC, Jan Holliday - President of Simmentaler Society, Mechi Scheider - Chairman of LRF.

Attendees Simmentaler 10 Feb 2022 Genetic Event.

NEWS FROM ZIMBABWE

ZIMBABWE HERD BOOK BREEDER'S REQUIREMENT COURSES (MARCH TO MAY 2022)

The ZHB held a number of courses around the country aimed at ensuring breeders have an in depth understanding of requirements to maintain their stud records with their respective breed Herd Books. The course covered all aspects of data recording, submissions and returns including system of on-farm recording, means of collating and submitting data returns (birth notifications, transfers and cancellations). The process to identify contemporary groups and collection of performance records was discussed in detail. The presentation included an introduction to genomics.

Attendance and participation was excellent with 123 breeders at courses in Gweru (1st March), Esigodini (2nd March), Chinhoyi (17th March), Macheke (31st March) and Beatrice (6th April). After each course attendees had the opportunity to visit several stud herds and interact with fellow breeders (Philip and Linda Reed's Anivai Tuli and Reed Brahman, Bruce Ndlovu's Camen Brahman, John Crawford's Portelet Ayrshire and Brahman, Mukono and 4BX (four breed cross) projects, Jan Kageler's Oldonyo Red Angus, Maree Osborne's Blue Gums Mashona and Wayne Greave's Enondo Brahman).

A capacity turnout is expected at the next course to be held at Lobenvale Farm, Borrowdale, on Friday 13th May.

A copy of the PowerPoint presentation and data capture templates can be downloaded from tinyurl.com/zhbbreederrequirements and tinyurl.com/zhbtemplates. Gallery can be found at http://livestockzimbabwe.com/ZHBgallery.html

BY DR MARIO BEFFA

Clockwise From Top: 1st & 2nd Course in Gweru & Esigodini, visit to Anivai Tulis, Reed Brahmans & Camen Brahmans. 3rd Course at Portelet Estate with Brahman, Tuli, Shona, Angus & 4BX. 4th course at Bluegums Mashona Stud 3. Craig Dupreez from ZHB and Attendees at the Breeders Course at Bluegums. 5th Course at Beatrice Country Club & Enondo Brahman Stud.

NEWS FROM NAMIBIA

Producers and breeders in Namibia are thankful for the past raining season. Most of the country received normal to above normal rainfall. Unfortunately there are areas that still experience problems regarding grazing and water. The main maize production area experienced a shortage of rain towards the end of the raining season that will negatively impact on the total tonnage produced.

Producers and breeders are all facing problems regarding restocking; the drought had severe consequences on the National Herd but also within the Breed Societies. It will take at least three years to recover the lost number of animals. This resulted in a rise in the prices for female animals, both in the Commercial and Stud Breeding Sectors. Prices at Stud Auctions have also improved.

After the 2021 Stockman School a meeting was held together with the late Dr. Michael Bradfield, with Neogen Laboratories to negotiate a special price for genotyping of stud sires and influential cows. No calves were allowed to be genotyped. This was a joint project for Namibia and South Africa, in an effort to assist breeds in attaining the goal of Single-Step Analysis. From Namibia the following breeds participated; Brahman 540 animals (386 males and 154 females), Wagyu (181 animals, all the Fullblood and Purebred animals – Namiba is well linked genetically to the South African population, but also to the Australian and USA population) and Hereford (31 animals).

The Brahman Breed Societies of Namibia and South Africa now are nearing there first goal; the minimum number of genotypes to form a reference population. In Namibia all the herd sires of the BGP Participants have now been genotyped as well as a large number of influential cows, as well as a number of herd bulls from non-BGP herds.

The Namibian Brahman Breeders Society, at their AGM during 2021 decided that all herd sires used after 1/10/2021, have to be genotyped, if not their calves will hang until such time that the sire is genotyped.

During 2020 and 2021 five smaller Breed Societies in Namibia were fortunate to share in a project between a large feedlot, the University of the Orange Free State and Unistel. The Braunvieh genotyped 96 animals, the Santa Gertrudis 72 animals, the Hereford 72 animals, the Limousin 24 and the Beefmaster also 24 animals. Together with the animals genotyped during Phase 1 of the BGP THE Braunvieh now has 118 genotypes, the Santa Gertrudis 102 animals, and the Herefords, through the private genotyping by one of the breeders has 90 genotypes.

The Breed Societies that were part of BGP 1 are hoping that the current negotiations regarding BGP2 will be successful, for it will bring them back on track with their revised 10-year Management Plans. If BGP 2 does not come off the ground, the Breed Societies will continue, but it will be at a much slower pace.

The current situation in South Africa, regarding FMD, is a major problem to Namibian Stud Breeders, as no genetic material (animals) can be imported. Furthermore there are only a very limited number of Semen Collection and Embryo Centre that are registered for export of semen or embryos, to Namibia.

BY JACQUE ELS

OKABRA INFORMATION DAY, NAMIBIA

The OKABRA Information Day was held on Saturday 28th May 2022 at the Schneider's Okamutombe Farm, Grootfontein, Namibia, home to the Okabra Brahman and Okasim Simmentaler studs. A wide spectrum of 150 cattle producers from all over the country attended the event where the theme was fertility.

The Okabra Brahman and Okasim Simmentaler studs are of the very few studs with a 5-star BreedPlan rating, reflecting the Schneider's comprehensive data recording, including fertility (days to calving and scrotal circumference), carcass traits (eye muscle area, sub-cutaneous and intramuscular fat), meat quality and feed efficiency, over above the standard weights.

With fertility being four times more important than any other trait, the Schneider family discussed their management and breeding programme to measure and select for fertility and shared their impressive trends for fertility measures (reduced days to calving and increased scrotal circumference) while showing positive gains for weaning and yearling weights and reducing cow mature size.

Dr Mario Beffa, Manager of the Zimbabwe Herd Book, was invited to make a presentation on matching mature weight to environment to maximise fertility. Other presentations included an overview of male and female reproductive organs and cycle, supplementation and practical management practices with a focus to maximise fertility. The day was concluded with a visual appraisal of Brahman and Simmental bulls, cows and heifers fertility trait leaders.

BY JACQUE ELS

Photos, Clockwise From Top:

Dr Mario Beffa at the Okabra Information Day.

Attendees at the Okabra Information Day.

Demonstration of some of the Okabra Cattle.

BREEDPLAN Selection Indexes: An Update

What are Selection Indexes?

Selection indexes assist beef producers make "balanced" selection decisions, taking into account the relevant growth, carcase, fertility and efficiency attributes of each animal to identify the animals that are most profitable for their particular commercial enterprise. Like breeding values (EBVs), selection index technology is a well-established, science based methodology that is used in many livestock species around the world. Selection Indexes provide an overall "score" of an animal's genetic value for profit for a specific production system and are calculated based on weightings placed on individual traits that are deemed to be important for that production system. As such, selection indexes reflect both the short term profit generated by a bull through the sale of his progeny, and the longer term profit generated by his daughters if they are retained in the herd.

Why do Selection Indexes require updating?

With the value of the cattle and the costs of production being a significant component of each selection index, these need to be updated periodically to reflect any economic changes that may have occurred. These revisions must also reflect the anticipated changes expected in the coming years as this is when animals breed using the new indexes will have their genetic potential realised (aka when they are born, raised, mated and/or marketed).

An additional factor that has encouraged the updating of the selection indexes is improvements in the software, BreedObject, that is used to create the selection indexes. Like BREEDPLAN, research into improving the BreedObject software is ongoing and thus new selection indexes will reflect the recent improvements made in the software. More information on the most recent enhancements to the BreedObject software can be found in the Summer 2018 SBTS & TBTS Update Magazine. Since 2018, a number of breed societies have released updated selection indexes (see breakout box).

SINCE 2018, THE FOLLOWING SOCIETIES HAVE RELEASED UPDATED SELECTION INDEXES

AUSTRALIA:

- Angus Australia
- Australian Limousin Breeder's Society
- Australian Wagyu Association
- Belmont Australia
- Charolais Society of Australia
- Herefords Australia Ltd.
- Performance Herds Australia

INTERNATIONAL:

- Beef Shorthorn Cattle Society (UK)
- Brangus Society of South Africa
- National Association of Hungarian Charolais Cattle Breeders
- New Zealand Angus Association
- New Zealand Herefords
- Simmentaler Cattle Breeders' Society of South Africa

Selection indexes are currently under development for a number of additional breed societies, both domestically and internationally. It is anticipated that some of these breed societies will release their new selection indexes in the coming months.

Where to find more information on Selection Indexes

More information on selection indexes, including how best to use them (in conjunction with EBVs, visual appraisal etc.) is available from the Help Centre on the BREEDPLAN website. These include both general and breed-specific tip sheets. The general selection index tip sheets are:

1. An Introduction to Selection Indexes
2. A BREEPLAN Guide to Animal Selection

Breed-specific tip sheets cover how to use the relevant breed society selection indexes, and their technical specifications.

Simmentaler Society of South Africa Release New Selection Indexes

Two new selection indexes for the Simmentaler Society of South Africa were released in conjunction with their March 2020 BREEDPLAN analysis. Producers are advised to use the selection index that is most relevant to their (and/or their clients) production system.

The new selection indexes are described below:

Simmentaler Breeders Index: Estimates the genetic differences between animals in net profitability per cow joined in an example self-replacing purebred Simmentaler herd. A portion of the heifers are retained for breeding and so maternal traits are of importance. This index assumes steers and surplus heifers will be finished in a feedlot for 160 to 180 days and weigh 480 to 555kg when marketed at 13 to 14 months of age.

Simmentaler Profit Index: Estimates the genetic differences between animals in net profitability per cow joined for an example crossbred self-replacing herd using Simmentaler bulls over Bos indicus content cross females. A portion of the heifers are retained for breeding and so maternal traits are of importance. This index assumes steers and surplus heifers will be finished in a feedlot for 140 to 160 days and weigh 420 to 490kg when marketed at 12 to 13 months of age.

The selection indexes are reported as an EBV, in units of net profit per cow mated (Rand) for a given production system/market scenario. They reflect both the short-term profit generated by a sire through the sale of his progeny, and the longer-term profit generated by his daughters in a self-replacing cow herd (where applicable).

This selection index was developed by the Simmentaler Society of South Africa in conjunction with staff from Southern Beef Technology Services (SBTS) at the Agricultural Business Research Institute (ABRI). Further details can be found in the Using South African Simmentaler Selection Indexes (https://breedplan.une.edu.au/using-selection-indexes/using-south-african-simmentaler-selection-indexes/) tip sheet, available via the Help Centre on the BREEDPLAN website.

BY IZAAN DU PLOOY

Brangus Society of South Africa Release New Selection Indexes

The Brangus Society of South Africa has released their first Selection index, called the Replacement & Feedlot Index. It is available for viewing on Internet Solutions after their April 2022 BREEDPLAN analysis.

The selection index was developed for a specific production system/market scenario as described below and are expressed in units of net profitability per cow mated (Rand). Producers are advised to use the selection index if it is relevant to their (and/or their clients) production system.

The Replacement & Feedlot Index is focused on efficient beef production while also targeting the following specifications:

Replacement & Feedlot Index: Estimates the genetic differences between animals in net profitability per cow joined for a typical self-replacing commercial Brangus herd. Steers are finished in a feedlot and are marketed at approximately 500 kg live weight (265 kg HSCW & 5 mm P8 fat depth) at 14 months of age. Selected heifers are retained for breeding and the balance marketed as yearlings at 420 kg (215 kg HSCW & 8 mm P8 fat depth). As some daughters are retained, maternal traits are also of importance.

This selection index was developed by the Brangus Society of South Africa in conjunction with staff from Southern Beef Technology Services (SBTS) at the Agricultural Business Research Institute (ABRI). Further details can be found in the Using South African Brangus Selection Index (https://breedplan.une.edu.au/using-selection-indexes/using-south-african-brangus-selection-index/) tip sheet, available via the Help Centre on the BREEDPLAN website.

BY IZAAN DU PLOOY

BREEDPLAN Top Tips: Live Weights

Recently, we have been contacted by a number of producers who have queried if they need to identify whether a live weight is a 200, 400 or 600 day weight when submitting it to BREEDPLAN for analysis. In addition, we have heard from several producers who are concerned because they believed they had entered a certain weight type, only for it to be subsequently analysed in a different weight category.

For example, a producer may have entered what they believed to be a 200 day weight, only for it to be shown as a 400 day weight in the 'Traits Analysed' for the animal.

There is no requirement to identify whether a live weight is a 200, 400 or 600 day weight. Instead, producers should be aware that the BREEDPLAN evaluation will identify whether to analyse live weights as 200, 400 or 600 day weights dependent on the average age of the animals in the contemporary group, as shown in Table 1.

Generally, the average age of many contemporary groups falls inside these age definitions. However, if calves are weighed when they are around 300 and/or 500 days of age, then producers are more likely to observe that the trait is not analysed in the way they were expecting.

Average Age of Contemporary Group	Trait Analysed
80 - 300 days	200 Day Growth
301 - 500 days	400 Day Weight
501 - 900 days	600 Day Weight

Table 1. The BREEDPLAN evaluation will analyse live weights dependent on the average age of the animals in the contemporary group.

Collecting Samples for DNA Testing Purposes Tip Sheet Now Available

A new BREEDPLAN tip sheet, Collecting Samples for DNA Testing Purposes, has recently been made available. This tip sheet outlines the major applications of DNA information for beef breeders and the common sample types typically collected by producers for DNA testing purposes.

In addition, the tip sheet outlines a number of considerations for beef producers when collecting samples for DNA testing purposes, particularly when collecting these for inclusion in Single-Step BREEDPLAN analyses.

The Collecting Samples for DNA Testing Purposes tip sheet can be accessed via the Help Centre on the BREEDPLAN website.

An associated short video has also been published; it can be accessed here or by scanning the QR code shown on this page.

A DNA pipeline has been implemented for most of the LRF societies, including the Namibian (through NSBA) and Zimbabwean (through the Zimbabwe Herd Book) societies. For more information on how to submit DNA samples through your society, please contact your society office.

BY JEANINE LABUSCHAGNE

HERDMASTER SUPPORT OFFICER

Breeding for Improved Meat Standards Australia Values and Compliance

Editor's Note: We first ran this article back in July 2015. During the 13-14 financial year, a first had been achieved, over 3 million cattle had been presented for MSA grading. Across the country, MSA compliance was at 92.6%, with meat colour (a MSA specification until 30 June 2017) and pH being the most common reasons for non-compliance. In the 20-21 financial year, more firsts were achieved – the proportion of the national adult cattle slaughter graded for MSA had passed 50%, and MSA compliance was at an all time high. Given these record achievements, and the continuing relevance of MSA grading to Australian beef producers, we thought it worthwhile to update this article.

Meat Standards Australia (MSA), an eating quality grading system for Australian beef and sheep meat, has continued to grow in recent times with over 3.3 million cattle being presented for grading using MSA standards and pathways during the 2020-21 financial year. Representing 53% of the national adult cattle slaughter, this is the highest proportion of graded MSA cattle on record.

This is complemented by strong growth in MSA producer registrations, processor uptake and expansion, as well as an increase in consumer awareness of MSA.

It is estimated that the MSA grading program delivered an additional $157 million in farm gate returns for beef producers in the 2020-21 financial year, representing a valuable opportunity for producers supplying these markets.

BREEDING FOR MSA PROGRAMS

There are many factors which affect an individual carcase's suitability for both MSA and company/brand programs. Many of the factors that affect the eating quality of a carcase are heavily influenced by animal handling and management on-farm, during transport and at the abattoir. Many components are also influenced by the genetic makeup of the animal.

Opportunities consequently exist to improve the suitability of animals for marketing into MSA programs, through the adoption of suitable breeding and selection strategies.

Understanding MSA Compliance

Cattle consigned to MSA must comply with a number of minimum grading specifications; otherwise, they will be downgraded to non-MSA product and won't receive a premium.

To be considered MSA compliant, carcases must meet the following specifications:

- Muscle pH of equal to or less than 5.70
- Minimum rib fat of 3 mm
- Adequate fat coverage over the entire carcase

Across Australia, carcases graded during 2020-21 achieved a record 95.5% compliance to MSA specifications. The most common reason for non-compliance was not meeting muscle pH specifications. Only a small percentage of carcases did not meet the minimum MSA requirement of 3 mm rib fat.

Selecting Genetics for Improved MSA Compliance

The different components affecting whether carcases meet MSA compliance specifications are all influenced to some extent by genetics and can be improved through the selection of animals with appropriate genetics.

1. Muscle pH

Low muscle glycogen levels in the live animal prior to slaughter can have several undesirable impacts. One is dark meat colour, commonly referred to as 'dark cutting', which results in an unappealing product for consumers. Furthermore, if there is only a small amount of muscle glycogen present pre-slaughter, pH may not decline to the required level.

Maintaining glycogen levels pre-slaughter is consequently of utmost importance and can be achieved by minimising stress and/or activity both on-farm and in the lead up to slaughter. Cattle with poor temperament have an adverse effect on the cattle around them, all of which results in higher pH carcases and a higher incidence of dark cutting.

Selection for improved temperament can be achieved by

ensuring that all animals used in a breeding program have acceptable temperament, and when available, selecting animals with superior Temperament EBVs. BREEDPLAN publishes two Temperament EBVs; these are Docility (typically reported in *Bos taurus* breeds) and Flight Time (typically reported in *Bos indicus* breeds and their crosses).

Docility EBVs are estimates of genetic differences in the percentage of an animal's progeny that will be scored with acceptable temperament, with higher EBVs associated with superior temperament. For example, an animal with an EBV of +20% would be expected to on average produce a greater percentage of progeny that have acceptable temperament than a bull with an EBV of –2%.

Flight Time EBVs are estimates of genetic differences between animals in temperament, expressed as differences in the number of seconds taken for an animal to travel approximately two metres after leaving the crush. Higher Flight Time EBVs, which indicate a longer time take to exit the crush (and hence a better temperament), are more favourable. For example, a bull with an EBV of +0.80 would be expected to on average produce progeny that took 0.7 of a second longer to exit the crush than a bull with an EBV of -0.60.

Research has also demonstrated that animals with higher muscle content, as defined by size of carcase eye muscle area (EMA) adjusted for hot standard carcase weight, is strongly associated with reduced incidence of dark cutting. A reduction in the incidence of dark cutting in high muscled cattle also complements the other advantages of muscular cattle, such as increased retail beef yield and processing efficiency.

Selection for increased muscle content in a standard weight carcase can be achieved by selection of animals with higher EMA EBVs. EMA EBVs are estimates of the genetic differences between animals in eye muscle area at the 12/13th rib site in a standard weight steer carcase, with higher EBVs associated with larger eye muscle area. For example, an animal with an EMA EBV of +4.4 mm would be expected to produce calves with larger eye muscle area than an animal with an EMA EBV of +1.0 mm, relative to carcase weight.

2. Rib Fat Thickness & Fat Distribution

Rib fat thickness is the measured depth of subcutaneous fat over the quartered rib site between the 5th and 13th ribs. A covering of fat is needed to protect the high value primal cuts from rapid chilling, which can cause toughening, and to enhance eating quality and appearance.

In addition to minimum fat levels, a key requirement for all beef markets is to have adequate cover over the high value cuts along the loin (back) and rump. MSA requires carcases to have adequate fat coverage over all major primals, with an area of inadequate fat distribution not being greater than 10cm x 10cm over each individual primal.

Selection for adequate rib fat and fat distribution can be achieved by selection of animals with appropriate Rib and Rump Fat EBVs. Rib and Rump Fat EBVs are estimates of the genetic differences between animals in fat depth at the 12/13th rib and P8 rump site respectively in a standard weight steer carcase, with higher EBVs associated with greater fat depth. For example, an animal with a Rib Fat EBV of +0.4 mm would be expected to produce calves with more fat than an animal with a Rib Fat EBV of -0.6 mm, relative to carcase weight.

BREEDING FOR INCREASED MSA INDEX VALUES

In addition to MSA compliance, all animals meeting MSA grading specifications are now provided with MSA Index values, and increasingly processors are offering additional price premiums for animals with superior MSA Indexes.

Understanding MSA Index

The Meat Standards Australia (MSA) Index, expressed as a single number ranging from 30 to 80, predicts the eating quality of an individual beef carcase. A higher MSA Index indicates that the carcase has a higher predicted eating quality.

The MSA Index value that a carcase receives is based on the eating quality of 39 different cut by cook combinations, weighted to account for the differences in the percentage of the total carcase that each cut represents. The MSA index is independent of any processing inputs and is calculated using only attributes influenced by pre-slaughter production.

The MSA Index provides beef producers with an opportunity to benchmark the impact of genetic and management changes on their herd's predicted eating quality across time, even when they are processed in different locations, by different processors, or at different times. In situations where a premium is paid for carcases with superior eating quality, the MSA Index also provides a valuable opportunity to increase sale price.

Factors Underlying the MSA Index

The key factors impacting on eating quality that are influenced by the producer include:

- Tropical breed content (TBC), verified or determined by hump height measurement
- MSA Marbling Score
- Ossification
- Hormonal Growth Promotant (HGP) Status
- Milk Fed Vealer Category
- Saleyard Status
- Rib Fat
- Hot Standard Carcase Weight (HSCW)
- Sex

The effect that each of the individual factors has on MSA Index varies. Whether an animal has been treated with an HGP, whether an animal is a milk fed vealer and/or whether an animal has been sold directly to slaughter have a very high impact on the overall MSA Index value of a carcase, followed by MSA Marble Score, hump height, tropical breed content and ossification. Rib fat, HSCW and Sex have relatively lower impacts on the overall MSA Index value. See Table 1.

The values presented in Table 1 are the average effect calculated for 2.8 million carcases across all states of Australia. * Relative importance indicates the size of effect changing that trait will have on the MSA Index within a herd, if all other traits remain the same. **Hump height can be used in conjunction with carcase weight as the determinant or verification of TBC during MSA grading.

Selecting Genetics to Improve MSA Index Score

Whilst many of the factors that affect the MSA Index are heavily influenced by animal management and handling, there is also an opportunity to increase MSA Index values through genetic selection.

1. Marbling

MSA Marble Score is an assessment of the intramuscular fat deposits at the quartered site between the 5th and 13th ribs. MSA Marble Score provides an indication of the distribution and piece size, as well as the amount of marbling. MSA marble

Carcase Input	Size of Effect on the MSA Index (units)	Clarification of Effect	Relative importance of these traits in changing the MSA Index*
HGP status	5	The MSA Index of carcases with no HGP implant is around 5 Index units higher	Very High
Milk-fed vealer	4	The MSA Index of milk fed vealer carcases is around 4 Index units higher	Very High
Saleyard	5	Carcases which were consigned directly to slaughter and NOT processed through a saleyard have a MSA Index around 5 Index units higher	Very High
MSA Marbling	0.15	As MSA marbling score increases by 10, the MSA Index increases by around 0.15 Index units	Very High
Hump height (for cattle greater than 0% TBC)**	-0.7	As hump height increases by 10mm, the MSA Index decreases by around 0.7 units. In carcases which have no TBC, hump height has no impact on MSA Index	Very High
Tropical Breed Content (TBC)**	0% = 0 12% = -1.6 18% = -3.2 25% = -3.9 38% = -4.7 50% = -5.2 75% = -5.5 100% = -6.3	As declared TBC content increases from 0 to 100%, the MSA Index decreases by up to 6.3 units	High
Ossification score	0.6	As officiation score decreases by 10, the MSA Index increases by 0.6 Index units	High
Rib Fat	0.1	As Rib Fat increases by 1 mm, the MSA Index increases by 0.1 Index units	Medium
Hot standard carcase weight (HSCW)	0.01	As HSCW increases by 1 kg, the MSA Index increases by <0.01 Index units	Low
Sex	0.3	With low ossification values, females have a higher index value than steers by around 0.3 Index units	Low

Table 1. The effect of carcase attributes on the MSA Index. Source: "Using the MSA Index to optimise beef eating quality" in Meat Standards Australia beef information kit.

scores range from 100 to 1190 in increments of 10, with higher scores indicating greater marbling.

As MSA Marble Score increases by 10, the MSA Index has the potential to increase by 0.15 Index units, or rather an increase in MSA Marble Score of 100 (roughly equivalent to a 1 unit increase in AUSMEAT marble score) equates to a 1.5 unit increase in MSA Index.

Selection for improved MSA marble score can be achieved by selecting animals with higher Intramuscular Fat (IMF) EBVs. Intramuscular Fat EBVs are estimates of genetic differences between animals in intramuscular fat at the 12/13th rib site in a standard weight steer carcase, with higher IMF EBVs associated with greater marbling in the carcase. For example, an animal with an IMF EBV of +2.9% would be expected to produce progeny with more marbling in a standard carcase than the progeny of an animal with an IMF EBV of +0.2%.

2. Ossification

Ossification is the process whereby the cartilage present around the bones changes into bone as the animal matures, and is a measure of the physiological maturity of the carcase. Although it can be roughly associated with the animal's chronological age, ossification takes into account the entire developmental lifespan of the animal which may be affected by nutrition, sickness and/ or temperament. Ossification scores range from 100 to 590 in increments of 10, with lower scores indicating less physiological maturity.

As ossification score decreases by 10, the MSA Index potentially increases by 0.6 Index units, or rather, a decrease in ossification score of 100 equates to an increase in MSA Index of 6 units. Therefore, younger animals with lower levels of ossification tend to have a higher MSA index values than older animals with higher ossification values.

Selection for lower ossification scores can be achieved by selecting animals with higher 200 Day Growth, 400 Day Weight and 600 Day Weight EBVs, as calves which grow more quickly will reach target live weights at a younger age with lower ossification score. 200 Day Growth EBV, 400 Day Weight EBV and 600 Day Weight EBV estimate the genetic differences between animals in live weight at 200, 400 and 600 days respectively due to an animal's growth genetics. In all three cases, higher EBVs are associated with heavier weights at the respective age. For example, an animal with a 400 Day Weight EBV of +60 kg would be expected to produce heavier progeny at 400 days of age than an animal with a 400 Day Weight EBV of +20 kg.

3. Rib Fat

Whilst of utmost importance in determining whether carcases are compliant to MSA specifications, rib fat thickness also has an impact on MSA Index.

A 1 mm increase in rib fat corresponds to a potential increase in the MSA Index of 0.1 Index units, or rather, an increase of 10 mm in fat depth equates to an increase in MSA Index of 1 unit.

Selection for increased rib fat can be achieved by selection of animals with higher Rib Fat EBVs. Rib Fat EBVs are estimates of the genetic differences between animals in fat depth at the 12/13th rib site in a standard weight steer carcase, with higher EBVs associated with greater fat depth.

Whilst a higher level of rib fat is favourable for superior eating quality and MSA index, this benefit needs to be balanced with the negative effect that higher levels of rib fat may have on carcase yield.

4. Carcase Weight

Whilst an important specification in most livestock grids, carcase weight only has a small impact on MSA Index, with MSA calculating that as HSCW increases by 1kg, the MSA Index will potentially increase by less than 0.01 Index units. In other words, an increase in HSCW of 100kg equates to an increase in MSA Index of 1 unit.

To select for heavier carcasses at the same maturity (ossification), animals with higher Carcase Weight EBVs should be selected.

Carcase Weight EBVs are estimates of the genetic differences between animals in hot standard carcase weight, with higher Carcase Weight EBVs associated with heavier carcases. For

To Improve	Select for Higher
Muscle pH	Temperament (Docility/Flight Time) and Eye Muscle Area (EMA) EBVs
Rib Fat Thickness & Fat Distribution	Rib and Rump Fat EBVs
Marbling	Intramuscular Fat (IMF) EBVs
Ossification	200 Day Growth, 400 Day Weight and 600 Day Weight EBVs
Carcase Weight	Carcase Weight EBV

example, an animal with a Carcase Weight EBV of +60 kg would be expected to produce progeny with heavier carcases than an animal with a Carcase Weight EBV of +30 kg.

TAKE HOME MESSAGES

Whilst many of the factors that affect the eating quality of a carcase and its suitability for MSA programs are heavily influenced by animal handling and management, many factors are also influenced by the genetics of an animal.

Selection of animals with acceptable temperament, higher Docility EBVs, higher Eye Muscle Area EBVs and appropriate Rib & Rump Fat EBVs can improve MSA compliance, whilst selection of animals with higher IMF EBVs to increase marbling score, higher Growth EBVs to reduce ossification score, higher Rib Fat EBVs to increase carcase fatness and higher Carcase Weight EBVs to increase HSCW at the same maturity, will increase MSA Index values and thus increase the eating quality of your herd.

To further discuss breeding for MSA programs, please contact SBTS & TBTS staff. More information about Meat Standards Australia is also available via the MLA website.

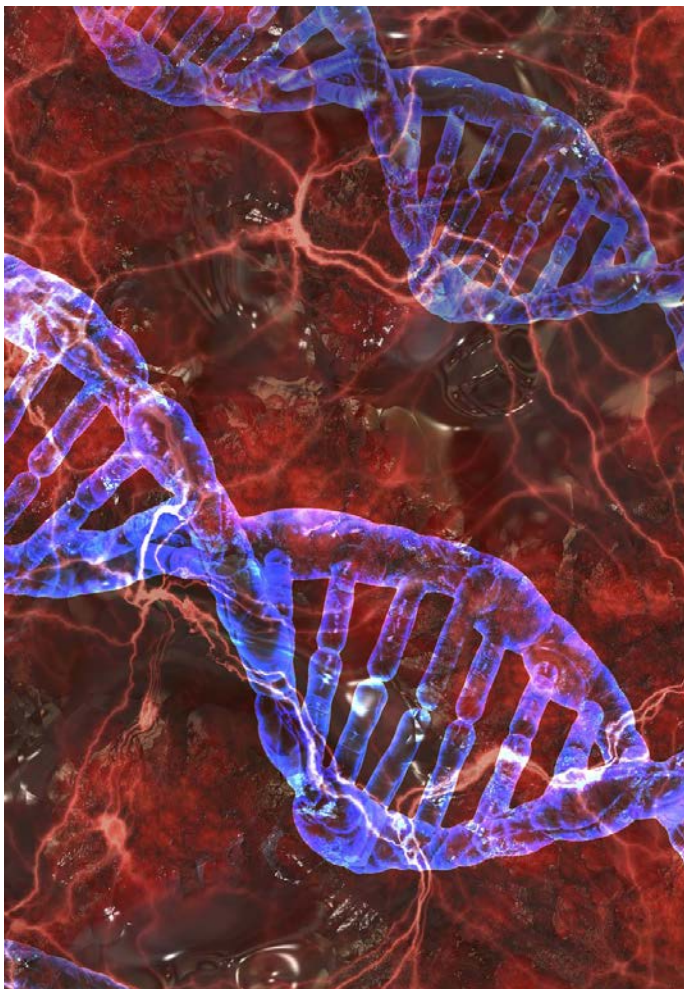
Gene Editing

The following background information article has been prepared to inform interested parties on the topic of gene editing. This follows the September 2021 announcement by the Red Angus Association of America[1] that they are going to provide herd book registry for gene edited Red Angus. It is fair to say that the topic of gene editing is very divisive. On one hand, it is based on Nobel Prize winning science and has the potential to enable faster genetic progress in the limited of number of traits that are influenced by single genes of major effect. On the other hand, concerns have been raised about safety, beef consumer resistance, and the possibility of regulatory hurdles limiting the pursuit of this breeding approach.

Gene editing is a technology that allows DNA to be modified at a precise location. The basic method involves cutting DNA at a specific location based on recognition of the specific target DNA sequence. The cut site is then repaired using the natural DNA repair mechanisms of the cell. These repairs can be directed to introduce small changes, delete, or replace DNA, therefore 'editing' the genome. In some cases, gene editing will be difficult, but not impossible, to detect in the subject animal and their descendants.

While gene editing is scientifically considered to be a separate technique to the technique for creating genetically modified organisms (GMOs), a number of countries have applied the same laws and regulations to both techniques. In Australia, the regulation of gene technology is the responsibility of the Office of the Gene Technology Regulator2 (OGTR) and, as of September 2021, the OGTR does not consider an animal to be a GMO when gene editing is used to delete DNA. However, the OGTR considers an animal and its descendants to be GMOs if gene editing is used to introduce or replace DNA (even if the new DNA is from the same species, e.g. the poll gene). Therefore, the resulting animals and their descendants are subject to the same extensive regulatory and testing requirements as other GMOs.

In simple terms, the advantage of gene editing is that it allows a breeder to introgress genes from other breeds or populations without the need to grade up over multiple generations. As such, gene editing requires knowledge of the function of the DNA being edited, and edits can only be applied to a small number of DNA locations in each animal to be edited. Thus, gene editing is only suitable to the limited number of traits where single genes of major effect have been identified. Well known examples of these include coat colour variants, horn/poll and a number of recessive genetic conditions. While the aforementioned examples all exist in cattle, gene editing technology can also be extended to allow the introgression of genes from other species, but with associated ethical, safety and regulatory concerns.



A further consideration for the use of this technology in cattle breeding include whether genetic material from gene edited animals and their descendants can be shared across borders, which will depend on the regulations of the jurisdictions (country, state etc.) involved3. Additionally, where a gene edit influences (directly or indirectly) traits that are included in a genetic evaluation, the similarity in performance between related animals (excluding direct descendants) will be reduced and this will adversely influence the accuracy of the relevant EBVs for this animal.

It is strongly advised that all individuals seek independent legal and scientific advice if the importation of genetic material from gene edited animals and/or their descendants is being considered.

1 https://www.beefmagazine.com/beef/beef-breed-approves-gene-edited-traits-animal-registration

2 https://www.ogtr.gov.au/

3 More details can be found in the records of the Fourth International Workshop on Regulatory Approaches to the Agricultural Applications of Animal Biotechnology - https://sites.google.com/a/vt-.edu/animalbiotechresources/2020-online-workshops

New South African Grading System Assures Quality for Consumers

With money becoming scarcer by the day in South Africa, consumers are becoming more and more concerned about price. This is one side of the coin. On the other side, while consumers may have less to spend, they are willing to pay more for quality.

It is with these two contrasting views in mind that the South African Meat Industry Company (Samic) has decided to investigate a new grading system for beef. Its purpose is to ensure consumer satisfaction each time meat is purchased, as well as a willingness to pay a little bit extra for good quality. Producers will therefore be able to increase their profits.

Rudi van der Westhuizen, executive director of Samic, says they plan to have a grading system in place within the next two years, which will give consumers the assurance that the meat they buy is always of the same quality. This system will provide a description of the meat's quality and will ultimately determine consumers' preferences. Samic has appointed Dr Philip Strydom to research the system.

Classification and Pricing

Rudi emphasises that the new system will not replace the current meat classification system. This classification system is designed to inform the producer, abattoir and retailer about certain quality aspects of the carcass purchased in order to determine the price of the meat. Yet the consumer, who is in fact the price determiner, cannot know whether the meat will meet his or her requirements.

The current classification system, he explains, provides information regarding the carcass's age, fat distribution, conformation, damage if any, and the mark for AB, B and C classes. The price is determined by the abattoir and retailer, with consumers having no say in the process; they must buy their meat based on visual assessment and trust.

Red Meat Prices Set to Increase

With a shrinking disposable income, consumers are becoming increasingly picky about the quality of the meat they buy. According to Rudi, meat prices will come under pressure in the near future due to the drought conditions experienced over the past few years. Producers will be retaining animals to rebuild their herds and supply is expected to be significantly lower than demand.

This trend became visible last year already. "A flattening beef and sheep industry paved the way for pork producers to enter the market with cheaper meat. Pork prices are currently very

low, which means more fresh pork is sold over the counter than before. Last year 300 000 more pigs were slaughtered, while 400 000 fewer sheep and 150 000 fewer head of cattle were slaughtered," says Rudi.

He adds that the South African chicken industry received some good news, with the ad valorem tax on imported chicken products set to be adjusted. As a result, people are likely to purchase less imported chicken as the price difference between domestic and imported chicken will not be as great.

Grading System

"We need to keep up with market developments. The plan is therefore to put in place a new grading system that can be used in conjunction with the classification system," explains Rudi.

This new grading system will add value to the meat. Certain measurements will be used to evaluate the meat's tenderness, taste and juiciness, providing a fair prediction and indication of the quality of a specific meat cut. This way, consumers can weigh up the choice between price and quality.

Samic intends to use the Australian grading system, which Dr Strydom is currently investigating and adapting for the local market.

"It is the most sought-after system in the world. This system allows carcasses to be tested during slaughter, after which they go to the cold room and are retested the following day. This allows carcasses to be ranked according to expected eating quality. This means that B class meat could potentially sell for more than A class meat.

"The pH reading also provides information on how animals were treated while being loaded. Were they chased down which

lead to higher stress levels? How were animals transported and handled during offloading? How did the muscle to meat conversion, or rigor mortis, progress during the first 18 hours post slaughter? Here we look at the rate of cooling relative to meat conversion," explains Dr Strydom.

By using the grading system, the label on the meat packaging will provide consumers with a clear indication of the quality of the meat.

Testing and Grading Process

Dr Strydom adds that they are planning on using consumer panels to determine how South Africans respond to different production and slaughter scenarios, and ultimately to different eating experiences.

"We will be using the preferences of more than 2 000 consumers to create a prediction model with which the meat needs to comply. We cannot use the Australian grading system in its current form, because South Africans do not necessarily have the same tastes as their Australian counterparts. There are also a few unique production factors and processes that must be added and tested."

Several factors will be included in this test, such as type of feed, use of growth stimulants, how quickly the animal has grown, whether the carcass has been chilled properly, etc.

Using a star system will be ideal, he says. For example, meat with three stars will be suitable for everyday use, four stars will represent a better cut, and five stars will indicate a prime meat cut that consumers can purchase for select occasions. The meat's tenderness, juiciness, taste and acceptability will determine the number of stars awarded. For example, meat with fewer than three stars will be used for canning purposes.

Dr Strydom says the process will be long and will need to be adjusted from time to time as new factors emerge. He is very excited about the new grading system and says it creates a generic brand for farmers, abattoirs and retailers to ensure they provide quality meat to the consumer.

Financing the Project

Rudi also explained how the project will be financed. As an independent third party acting in the best interest of the South African red meat industry, Samic will use the revenue from audits and inspections to fund the project.

"We will use the funds at our disposal to provide an improved dining experience for consumers and negotiate a better price for farmers."

The system is expected to become fully operative within the next two or three years. The level of contribution by each participant in the value chain will determine the benefits each party will derive from it.

He advises livestock producers to start paying attention to the way in which animals are handled on-farm. According to their surveys, more than 50% of animals taken to the abattoir appear to have been subjected to unnecessary stress. Stress must be eliminated to optimise meat quality.

For enquiries, contact Rudi van der Westhuizen on 082 900 3005 or Dr Philip Strydom on 012 672 9340. – Koos du Pisanie, Stockfarm

Link to original article: https://www.agriorbit.com/2022/new-grading-system-assures-quality-for-consumers/

ARTICLE COURTESY OF PLAAS MEDIA

Brahman Meat Quality – Where Are We in 2022?

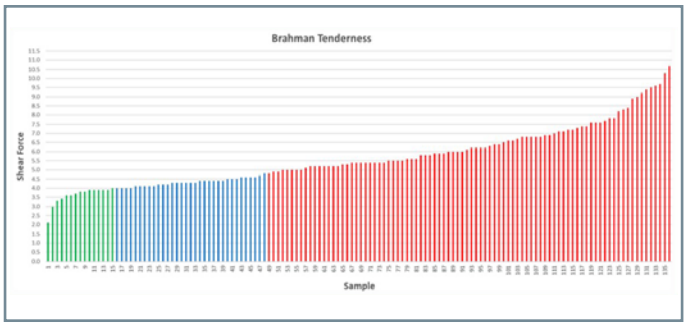
Southern African Brahman breeders had been made aware of this very important aspect of our Breed a number of years ago at the start of the Brahman Beef Genomics Project. Outside the project we also felt the necessity to prove the myths around "the tough meat of humped cattle" incorrect, as the feedlots and other institutions discriminate against Brahman beef.

At this point, the Brahman Society received back the results of four groups of data, slaughtered and tested at different facilities.

The first group constitutes 203 samples accumulated during the BGP and tested at the ARC's API. The second group was generated from a phase D and C test at Bufland when 51 samples were tested at the University of the Free State. The third group was generated from a group tested for RFI at the test station of Koos Kooy in KZN. The last group was generated at the private Grow-safe test facility of Thys Meyer in Lindley, and tested for Meat Quality at the University of the Free State.

Group 1

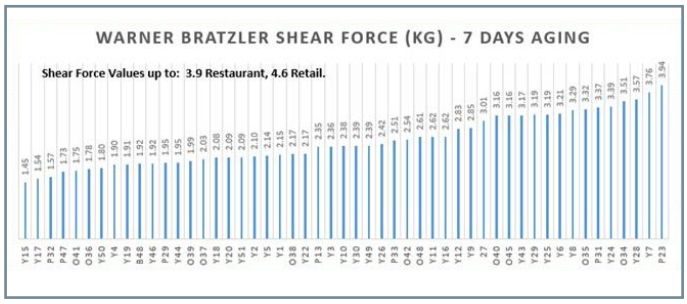
In this test group, 33.8% of the samples met at least Retail requirements. The most tender sample had a Shear Force value of 2.1 and the toughest sample had a value of 10.7. This group had been finished (before slaughter) at various ARC test centers as well as the Sernick Feedlot. The Meat Quality tests were done by Dr Phillip Strydom, from the ARC API, now from the Department of Animal Sciences, University of Stellenbosch.



In this group, Namibian samples were included, tested as part of the first cycle of the BGP from 2015 to 2017.

Group 2

In this group 51 bulls were slaughtered (at Vencor in Polokwane) after completing a phase C/D test at Bufland. 30 Sires were represented, which offered quite a wide genetic range in the tests.



The tests were done at the University of the Free State, by Professor Arno Hugo, Dept of Food Science.

Some of Professor Hugo's Observations:

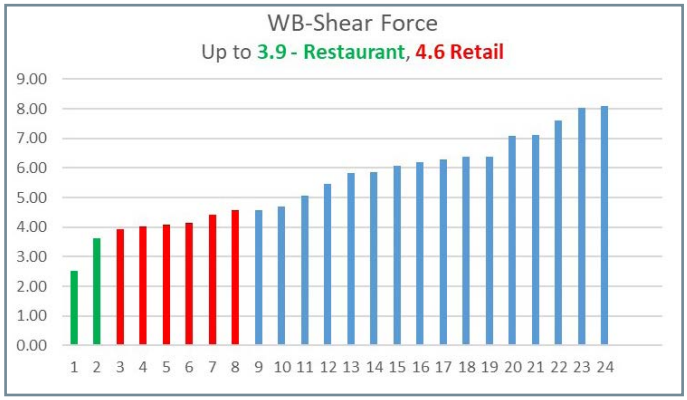
The Warner-Bratzler Shear Force (tenderness) of the 7-day aged meat samples were very good. It ranged from 1.45 kg to 3.94 kg with an average shear force value of 2.50 kg. For retail purposes, a shear force value below 4.6 is considered acceptable. All the Brahman samples adhered to this requirement. For food service use, a shear force value below 3.9 is

considered acceptable. There was only one sample with shear force value above 3.9 kg. It is quite impressive that nearly all of the 7-day aged Brahman samples were acceptable for use in the restaurant industry.

The absence of dark cutting meat is a sign of good temperament of the animals, good transport conditions and proper handling before slaughter. Absence of dark cutters is usually a clear indication that stress was limited during the transport and slaughtering process.

Group 3

The meat samples in this group were sourced from bulls tested for RFI at the facility of Koos Kooy, Director of the Livestock Alliance (Pty) Ltd. in KZN. Twenty-four bulls were slaughtered and the samples transported to the University of the Free State.



The tests were done at the University of the Free State, by Professor Arno Hugo, Dept of Food Science.

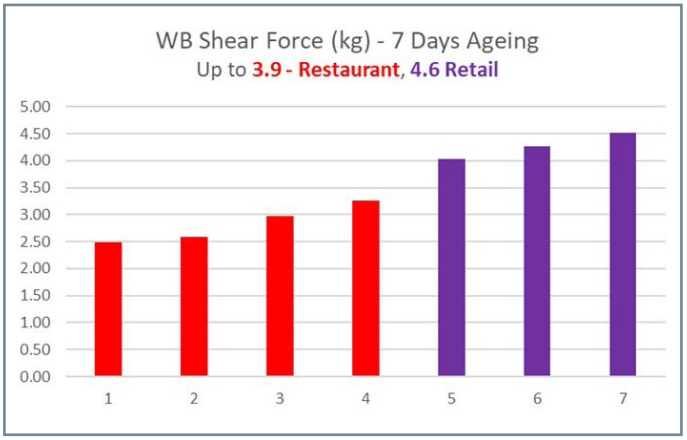
Observations by Prof Hugo:

The Warner Bratzler Shear Force (tenderness) of the 7-day aged meat samples ranged from 2.51 kg to 8.09 kg with an average shear force value of 5.50 kg. For retail purposes, a shear force value below 4.6 kg is considered acceptable. Nine of the 24 Brahman samples adhere to this requirement. For food service use, a shear force value below 3.9 kg, is considered acceptable. This means that only two of the 7-day aged Brahman samples were acceptable for use in the restaurant industry. Fifteen of the 24 Brahman sirloin cuts were not suitable for retail or foodservice utilization. One must however remember that all sirloin cuts could have benefited from a longer ageing period.

Summited by the South African Brahman Society

Group 4

A small group of Brahman bulls were slaughtered after being RFI tested at the private Grow-safe test facility of Thys Meyer in Lindley. The bulls were slaughtered at the Sernick Feedlot, and the samples transported to the University of the Free State.



The tests were done at the University of the Free State, by Professor Arno Hugo, Dept of Food Science.

In this group all bulls conformed at least to Retail requirements, with four acceptable for food services (shear force value equal or less than 3.9).

Two Messages are Important to Convey to Brahman Producers:

1. Variation with-in the Breed does exist, which implies that selection for tenderness can be done.
2. According to Prof Hugo there was no indication of a significant correlation between hump height and tenderness.

Shear Force is an indication of meat tenderness, and as we know Zebu type cattle are the black sheep of tough meat, along with the perception that the higher the hump, the tougher the meat. There is a tendency to discriminate against hump-cattle by various institutions, but both these ideas can be proven wrong with these tests, and the promise of selection potential is again accentuated.

Summary

In all of these results, the SOP for cut-removal was adhered to. Keep in mind that the bulls were tested and finished in different locations across SA. Then slaughtered at different abattoirs, where handling and slaughter procedures may differ slightly.

"Heritability of Meat Tenderness is stated as being medium to high, so genetic progress can be made relatively fast, but depending on factors like slaughter procedure, addition of growth stimulants, ageing, etc." (refer to results from Dr Philip Strydom, BGP results, July 2017).

Brahman Goals and Targets

The SA Brahman Society is committed to see through the actions initiated by the BGP, viz. the creation of a reference population for all the Brahman traits, serving as a starting point for the production of GEBVs.

Meat quality is of such importance that, even though it will take longer to accumulate enough samples to initiate the calculation of an EBV, it remains a priority.

The SA Brahman Society would like to thank our colleagues and fellow-breeders in Namibia for their support, motivation and contribution to promote our Breed in Southern Africa.

Genotype by Environment Interaction for Production Traits of the South African Jersey Breed

Feedback from Mr Matthew Kinghorn (Data Analyst at the Simbra Society) on his master's degree, which he is currently doing through the University of the Free State.

From the year 2009 to 2019 milk production in South Africa increased from 728 to 2772 tonnes per farmer annually, whilst the number of dairy farmers had decreased from 3551 to 1253. Increases in production and demand for dairy products coupled with low milk prices and increasing production costs have made it difficult for farmers to remain in financial contention, leaving them with two main options (1) increase the number of cows being milked or (2) increase the milk production per cow in an effort to meet market demands.

Additional challenges faced by dairy farmers include the availability of feed and unpredictable weather conditions, both of which have knock-on effects on the quality and quantity of milk production, and on the sustainability and profitability of dairy farms.

In South Africa dairy farmers generally farm using two main production systems (Pasture and Total Mixed Ration), under varying climatic conditions and as such dairy cows experience varying magnitudes of environmental stress, emphasising the need to quantify genotype by environment interactions (G x E) for different production environments. Genotypes that are similar can have varied responses to changes in their environments resulting in potential re-ranking of genetic values in different environments.

A closer look into G x E between production systems has the potential to provide more reliable comparisons of dairy Sires through more accurate genetic evaluations. The aims of this study are firstly to find an appropriate genetic model for the evaluation of the South African Jersey breed, and thereafter to determine if a G x E interaction exists between different productions systems for production traits in the South African Jersey Breed.

The first part of this study is still in progress, and preliminary findings will be presented at the 12th World Congress on Genetics Applied to Livestock Production (WCGALP), to be held in July 2022.

Photo courtesy of Lianne Herbst

BREEDPLAN Top Tips: ET Calves

While the recipient dam doesn't influence the genetics of the ET calf, there are maternal effects on the embryo and resulting calf that are attributable to the recipient dam. For example, consider a situation where two full-siblings embryos are implanted into recipient dams of different breeds (e.g. one a beef breed and one a dairy breed).

The recipient dams are run together in the same paddock through their pregnancy, over calving and up to weaning of the resulting ET calves. At weaning, the ET calf reared by the dairy breed recipient dam is considerably heavier than the calf reared by the beef breed recipient dam. As these two full-sibling ET calves are of similar genetic merit and raised in the same environment, the difference in their weights is more likely due to the greater maternal ability (including milk production) of the dairy cow recipient, than due to the genetics of the calf. To ensure that the BREEDPLAN analysis can account for the maternal effects when analysing the performance of ET calves, information on recipient dams is required.

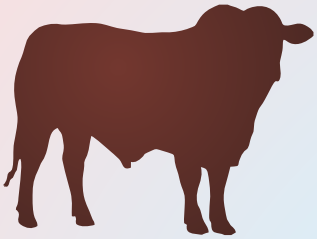
Beef producers should be aware that BREEDPLAN will only analyse ET calves in a contemporary group with other ET calves, and never with calves conceived from natural matings and/or AI programs. To maximise the size of ET calf contemporary groups, consider running all ET programs at a similar time.

Within the contemporary group of ET calves, BREEDPLAN will account for the maternal effect of the recipient dams by either:

1. In the vast majority of BREEDPLAN analyses, by only comparing ET calves in contemporary groups if they are out of recipient dams of the same breed. That is, ET calves out of Angus recipient dams could be placed in a contemporary group together but could not be contemporary grouped with ET calves out of Hereford recipient dams. For this reason, it is recommended that producers try to use recipient dams that are of the same breed content.

2. In a minority of BREEDPLAN analyses, all ET calves are analysed in the same contemporary group but adjustments, based on the breed of the recipient dam, are made to account for differences in maternal effect.

No matter which method is used by your BREEDPLAN analysis, it is important that recipient dam information (including breed and year of birth) is recorded with your breed society. This will allow the BREEDPLAN analysis to account for the maternal effects of the recipient dam on your ET calves. If this recipient dam information is not provided, your ET calves will be analysed in single animal contemporary groups, which means that their performance will not contribute to the calculation of their EBVs.



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Accessing Support in Application of Genetic Technologies

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