Annual Beef Bulletin
Jaarlikse Vleisbees Bulletin 2019

Animal Production
Diereproduksie

National Beef Recording and Improvement Scheme
Nasionale Vleisbeesaantekening en -Verbeteringskema
The National Beef Recording and Improvement Scheme

Commercial beef producers can increase their profitability by:
- Improvement on weaning, year and eighteen months’ weights
- Bull selection to support breeding goals from auction catalogues
- Identification of best performing replacement heifers
- Identification of profitable cows
- Identification of non-efficient animals

Additional benefits:
- Data captured on the National Database (INTERGIS) and compliance with Animal Improvement Act
- Farmer’s Days with stakeholders
- Data available for research purposes and technology development
- Central bull testing facilities and technical staff for regional support
- On-farm Phase D bull testing
- Accredited technicians for Real-time Ultrasound Scanning for carcass traits
- Services comply with internationally accredited standards
- Affordable fees (subsidised by government)
- Training courses in beef herd management, BLUP, performance testing and the auction catalogue
- Affordable on-farm consultation fee

Herd reports generated from the National Database as a selection tool.
A true reflection of your beef herd performance on profit drivers.

For more information about our services, products and price list, contact Dr Ben Greyling, tel. (012) 672-9052 or e-mail: ben@arc.agric.za or visit the web: www.arc.agric.za

ARC Performance tested - your quality assurance trademark
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Kopiereg voorbehoud: LNR-Diereproduksie
Geen gedeelte van hierdie publikasie mag gedupliceer, gereproduseer of gepubliseer word in enige vorm nie, teny skriftelike toestemming van die Algemene Bestuurder: LNR-Diereproduksie vermy is.

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Photographic Recognition:
Selected photos supplied by
Farmer’s Weekly
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FROM THE EDITOR

Turning challenges into opportunities

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It is a widespread tradition to dream big when a new year kicks off, and farmers are no exception in this regard. Many of their dreams for 2019 were however shattered due to another drought that has already resulted in losses amounting to billions of rands across the agricultural sector. Nelson Mandela once said that a winner is a dreamer who never gives up, which is easier said than done in such difficult times. One thing is for sure though, when going through difficult times we need to think more innovatively, take hands and pool our resources to meet our challenges. Negativity can prevent us from recognizing the opportunities behind the challenges, while a positive attitude is an important and necessary ingredient of our dreams for the future.

The livestock industry of South Africa is the primary contributor to our agricultural GDP and plays a prominent role in job creation, food security and the overall economy of our country. An alarming fact is that more than one out of five people in South Africa are food insecure, amidst our country’s rapidly expanding population. The bottom line is by 2050 we will have to feed 70 million people. This already puts tremendous pressure on our country’s red meat industry. The demand for beef specifically is estimated to increase by about 23% over the next decade and industry will have to seize the opportunities to satisfy this demand through more profitable and sustainable production. This means that we need to put mechanisms in place to ensure beef production does not fall behind in this regard. We will also have to ensure that all farmers have access to the full value chain of beef production, whilst transferring knowledge, skills and technology more aggressively in order to strengthen both our national and international markets. In addition, it is also vital that we tap into all our resources to ensure we enhance the competitive capabilities of the emerging sector that owns almost half of our country’s beef cattle.

It is generally acknowledged that science and technology will play an increasingly important role in exploiting the opportunities within agriculture. In fact, according to the FAO, new technologies will play the most important role when it comes to our ability to increase food production, more so than any other factor. The Agricultural Research Council (ARC), which is a key role player on the continent when it comes to research and the development and implementation of technologies, is committed towards ensuring that knowledge and technology are developed and applied in line with the demands and challenges faced by industry. One of the ARC’s mechanisms in this respect is the National Beef Improvement Scheme, which has been supporting producers for over 60 years with scientific tools and services aimed at producing beef more profitably and sustainably. We firmly believe that by investing in and supporting our beef producers, it is indeed an investment in our country’s economy and future. We also firmly believe that this can only happen if we join hands and seize the opportunities together. I’m a firm believer that we should never stop dreaming, and my wish is that 2020 will be filled with opportunities that will exceed all your expectations.
SUSTAINABLE FARMING

How to reach that dream?

Only 4% of any nations worldwide are normally farmers. The number of really successful farmers in most of the countries is rather lower and closer to 1% of the population. So the chance for everyone in a country to be farmers is not possible and not every one of the 4%, who will try to make a living out of farming, will succeed. A farm worker may know what to do at a farm but there is no guarantee at all that even a very good farm worker can become a successful farmer at all.

A real farmer is a person who knows everything he/she is doing in his/her field of farming; he can do everything himself/herself or at least know how to get it done. He/she has to be a manager, equipped with a variety of skills like bookkeeping, record keeping, able to do proper planning, to make sure the plans are followed and done, control the farming activities and be able to make quick and effective decisions when needed. He has to be in control of his finances and farm profitably and sustainably to keep on farming.

When you dream to be a farmer one day, just know that it is never just an overnight success story. Farming per se is not a blooming business of big bucks and a nice life sitting on the porch while your bank account bursts with all the money you collect.

Today farmers live with severe stress; lack of finance and every bank or service provider want their payments to be done, while you have planted the crops waiting for rain to secure a harvest, or you’ve done every effort to feed your cattle, sheep and goats to keep them alive, while you start getting drained by all the efforts to combat against droughts, securing enough income to cover your running costs, just to survive.

Also sometimes very successful farmers in South Africa went bankrupt due to droughts, manipulation of prices, and poor access to markets and pricing of products. Financial institutions are there to make money out of you but when things become difficult they normally put more pressure on you, the farmers, to get the money back which they lent to you. The government may help you with inputs to get started. That grants are not always guaranteed and are just a privilege, a bonus but never an annual gift. Just know that it will not happen every year. If you are unable to make a profit and save money for the next crop season, you will not be able to proceed again. Easy come, easy go. You can just call yourself a farmer when you can proceed on an annual basis with your farming on your own. If you have to depend on grants or loans that you can’t pay back, you will surely be sold out and removed from the farm. Then you can’t sit and wait for better days, you then have to work somewhere to earn an income to make a living. A real man/woman will not stay dependent; they will make an effort to do something to earn an income for their family to survive.

HOW CAN YOU THEN SECURE TO BE ESTABLISHED SUSTAINABLE ON YOUR FARM?

The first step to successful farming is to get knowledge about the farming venture of your dreams. Always live to know more and more about farming and consider everything to secure the best possible income and secure a viable profit when you plan a certain type of farming. When you lack profit you will surely not make it. Go for training at an Agricultural College, Agricultural Training Centre, University or regular training courses in the field of agriculture. Join a study group and take part in WhatsApp groups to access information or to get a point of looking for information.

The second step is experience. It is always better to get experience working for someone else who knows what it is all about in that field of farming. Just when you are 100% sure you know every aspect of that business you can consider the opportunity to start on your own, running your own farming business. Make sure that you know every aspect in the field of farming of your choice, from the planning phase, record keeping, what impact on it, to the marketing of the products you produce. Get used to the whole value chain and make sure you know everything about that farming venture before starting on your own. Know where to get information and where to get the inputs you will need to run such a farming business. You must be able to do it yourself and if it is specialised services, you have to be able to arrange and pay for those services.

The third step is access to assets and enough available finance. Without that no farming can be started at all. Always start with what you have. When you have access to land like communal land, try to rear the animals you like. The best is to...
purchase the cattle, sheep, goats etc with the money you have or worked for. While you are working, your father or worker can look after your animals to raise the numbers. Apply from the beginning the best practices and principles to make a success of what you do. Remember the farm is not money, just when you sell the farm you can get money.

Those activities you do on the farm like planting vegetables, crops, rearing cattle etc are the activities that can give you an income, only if you do it correct and can create an income out of that. When you purchase a farm make sure you can pay it off in full. If you can’t pay the whole purchase price and transfer duties and you have to register a bond, make 100% sure you will be able to pay off the bond annually with ease. That is why it is always better to purchase a running farming business that includes the farming equipment, cattle, sheep etc you needed to create the income you are going to need to pay your requested annual loan amount. When you miss a payment you will be at risk and the chances will be good to lose everything very soon when you fail to pay back the loan.

I know a farmer today who worked in the 1960’s/70’s in Johannesburg. He has a job during the day working in a garden and during the evenings he worked as a butler in the house just to get enough money to reach his dream. He started to buy heifers or cows with calves now and then on a regular basis and his father looked after his cattle. So while he was working the heifers started calving and become more and more and in 1983 he got a farm to lease which he managed to purchase during 1994. He already gathered more than 300 breeding cows and several Brahman and Braunvieh bulls of quality at that stage. He managed to pay off the farm very soon because he discovered very fast that the interest is going to kill him if he does not pay off the farm as soon as possible. He sold half of his cattle and calves to pay off his bond and a few years later he managed to have more than 300 productive cows again on that farm. His policy is still; pay off your debts as soon as possible. His name is Ponki Makinita farming on the farm Klipbult in North West.

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ALWAYS START WITH THOSE THINGS THAT CAN GIVE YOU MONEY IN THE POCKET

When you purchase a crop farm with nothing on it and you have nothing to farm with, there is no way that you can succeed as a farmer. When you purchase a crop farm and say you paid it off in full, you should also be able to get access to all the necessary inputs and farming equipment to prepare the crop fields, plant, control weeds and pest and to harvest the crops to sustain your farming venture as a crop farmer. Remember when you do dry land crop farming you always have the risk of droughts. Never proceed with planting when the soil is not at a minimum of 1-meter deep moist. A crop farmer needs at least 150 hectares’ dry land and no debts if you just depend on an income from the crop field for a living. It is always better to spend money on something that can surely give you returns instead of putting you at any risk.

Dira gore o kgone go itirela bokamoso mo lefatsheng go phedisa ba lelapa gore ba tswelelapele ka go ja mofufuts o wa patla wa gago. Agang bokamoso ka boikarabelo gore bana ba rona ba kgone go itirela sa go phele mo lefatsheng ka boitumelo le ka lerato gore morafe wa rona o phele ka kagiso. Pula!!!!!
A PRACTICAL APPROACH
to evaluating land reform in South Africa
The PLAS case

INTRODUCTION

As most readers know, farmers in South Africa differ widely in terms of economic performance and scope. This variation is not captured well in the current terminology of commercial and smallholder farmers, let alone the misnomers ‘subsistence’ or ‘emerging farmers’. Current tools used to describe and subsequently support farmers are often crude and unfocused. Most surveys are too long and invasive. Small and larger farmers alike are getting tired of being subjected to these interviews in the name of research, whilst they perceive no gains from these exercises.

The ARC developed a profiling survey that focuses on seven key criteria, to engage beneficiaries, over a period of a decade. These main types of criteria focus on assets available for agricultural endeavours; input and labour use; productivity; enterprise income generated; technology and support use; food security status and social capital parameters.

When the ARC was requested during 2016 to form a consortium with Entsika Consulting, to evaluate the Proactive Land Acquisition Strategy (PLAS), this survey tool formed the basis of the evaluation of the ±2000 farms that an ARC expert panel evaluated over the following two-year period. This article will describe how this was executed, and why the process is deemed useful for engaging farmers to establish the potential of their ventures.

METHODOLOGY

Land reform aims to address injustices caused by past policies by providing land to disadvantaged people, raise their agricultural productivity and income and create employment. PLAS was launched in 2006 specifically to address challenges in land reform, including beneficiary selection, support, and optimal land use. By 2016, the Department of Land Reform and Rural Development realised that progress was suboptimal and an evaluation was ordered. This led to the ARC’s involvement. The survey tool described above was used to interview roughly 2000 beneficiaries of the PLAS initiative.

As the data was obtained from PLAS beneficiaries across the country, the ARC team simultaneously set about establishing a process or methodology to evaluate this data. Based on the task description, specific questions were expected to be answered: How can the potential of a farm be established? How can the performance of the farmer be determined? How can this be done scientifically, repeating the process over all PLAS farms, using a practical, credible method that takes the natural resource base of the farm as point of departure and relate this to production potential? At the same time, the method also had to establish the condition and sufficiency of on-farm infrastructure and the farmer’s capacity. It had to integrate relevant social and economic dimensions and clearly establish market access and participation. Lastly, the methodology had to determine the factors that limits productivity as well as the risks that threaten the particular farm. All this would enable the team to describe the potential of the farm, performance of the farmer, key support measures required and policy recommendations.

Using an iterative, participatory process involving a trans-disciplinary expert team of ARC scientists, a ten-step process emerged. The first step was to determine the land potential, using natural resource data, maps and expertise. After determining the potential of the land, suitable commodities were identified based on what is done in the area in which the farm is situated, market access and historic production. Once commodities and enterprises had been agreed upon, commodity budgets were developed to establish potential income from the farm. These simple budgets or commodity standards developed during this process, included consultation with industry bodies and experts. The potential and actual income achieved was then used to calculate potential and actual return on investment – based on the purchase price of the land, and where applicable further investment in recapitalisation. Hereafter the infrastructure on the farm was scored by evaluating staff housing; all the equipment available, water reticulation; fencing and the fixed assets, including the buildings. The most difficult part entailed scoring the capability of the beneficiary or farmer. This was based on his or her productivity, the sustainability of farm enterprises, the overall condition of the farm and integration into the relevant value chains and support systems.

The general perception of the farmer in terms of socio-economic conditions in the area, security, societal values and cooperation and food security was also determined. Finally, farm specific limitations (for instance, limited water rights, invading plants and risks (theft, fire, disease) were established. In conclusion, the farm was categorised according to potential and specific recommendations were provided to improve its performance. This process allowed for comparison of potential and actual
performance across districts, across commodities and across the country. It also established return on investment, labour needs and use, natural resource, legal, infrastructural and marketing implications. Using the methodology, the team could also provide criteria for suitable beneficiary profiles; support analysis as well as policy and implementation recommendations.

RESULTS

Over the last few months, the team presented the methodology to peers and interested parties in the sector, to share insights obtained but more importantly, to obtain suggestions on how to improve the methodology. A number of M&E specialists, scientists and industry experts was interviewed. The process was extended to postgraduate students at the best agricultural university in the world - Wageningen University and Research.

Overall, all stakeholders consulted deemed the methodology used by the ARC expert panel as credible. It is effective technically, accurately establishing natural resource potential, optimal commodities and enterprise viability. A valid criticism is that the method was less effective in picking up softer, human issues. For instance, how optimal commodity mix relates to farmer aspirations, capacity and strategy. It was learnt early on that establishing actual production is problematic, as most farmers are reluctant to give too much away in terms of their production and income. However – there is a remedy for this. Engagement with Wageningen revealed that farmers in the Netherlands actively participate in the evaluation of their enterprises – as monitoring of farm specific data is an ongoing process in which the farmer is a crucial partner.

The farmer allows the evaluators to access information from, for instance, the bank, input supplier and market agents, which limits the time required for an interview. The farmer also gains access to his or her own data and that of his fellow farmers (anonymously, of course) so that he or she can compare and identify possible improvements.

The ARC should in future aim for a more participatory data collection process and regular consultation with farmers on the information obtained and the analysis thereof. It is also important that engagement with farmers is focused on key, important issues and forms part of a broader goal of improving farm and farmer performance through a long-term, continued engagement.

CONCLUSIONS

To summarise, true engagement with the farmer instead of a once off consultation will facilitate trust and improve data reliability of any evaluation. The method developed by the ARC team in question has extensive application in agricultural research and development and could inform long term monitoring and evaluation. Engagement based on participation and mutual learning will facilitate mutual understanding of capabilities, attitude, limitations and performance. Farmers will participate in evaluation as it informs on farm decision making regarding production, marketing and farm management, and can also shape support and policy.
The ARC’s National Beef Recording and Improvement Scheme is celebrating its sixtieth anniversary this year and since its inception has been instrumental in enhancing the capacity and level of performance of our country’s beef production industry. In fact, recent studies have shown that the return from investing in the Scheme is significant, contributing immensely to food security, profitability and sustainability of our industry.

The Scheme’s main focus is to apply recording of performance data and associated technologies in a manner that will improve the genetic potential of our animals. This is of particular importance in view of our limited resources and climate change that brings about new challenges to improve and adapt to our changing ecosystem. Countless farmers have been implementing performance recording over many decades and the objective of the National Beef Performers Awards is to give recognition to these farmers and to honour them for their efforts to improve our National herd.

This awards event has become one of the most prestigious on our country’s agricultural calendar and includes some of the most sought after accolades in the beef production industry. It should be noted that the Scheme does not stand alone in this formidable task – it is supported by government (DAFF) and numerous stakeholders of industry, some of which have become synonymous with the awards, including Farmer’s Weekly, Molatek and GMPBasic who all contribute towards the awards event.

SEVEN CATEGORIES WERE PRESENTED DURING THIS YEAR’S AWARDS CEREMONY, WHICH INCLUDED THE FOLLOWING:

1. The ARC National Special Performance Test Class sponsored by DAFF
2. The ARC National Best Elite Cow Awards sponsored by Farmer’s Weekly
3. The ARC National Platinum Bull Awards sponsored by GMPBasic
4. The ARC National Emerging Beef Farmer of the Year Award sponsored by DAFF
5. The ARC National Beef Cattle Improvement Herd of the Year Award sponsored by DAFF
6. The ARC National Mentor of the Year Award sponsored by Molatek
7. The ARC National KyD Province of the Year Award sponsored by Molatek
This very popular award category has been presented for over forty years and rewards only the bulls with exceptional performance traits. Bulls that were awarded Gold or Silver merit certificates when they completed a standardised growth test (Phase C) of the National Beef Recording and Improvement Scheme during 2018 are eligible to compete in this award category. Residual Feed Intake or RFI, a trait that describes a bull’s ability to utilise feed efficiently, is also considered. Only one bull per breed eventually is identified as representative of the entire breed in terms of performance and functional efficiency. Bulls are not adjudicated across breeds as during earlier years (interbreed adjudication), meaning that every bull is crowned as the overall national winner within the participating breed.

Table 1 lists the 19 bulls with their respective performance figures.

### Table 1: ARC National Special Performance Test Class sponsored by DAFF

<table>
<thead>
<tr>
<th>Breed</th>
<th>Bull ID No</th>
<th>Born</th>
<th>Centre tested</th>
<th>ADG (g)</th>
<th>FCR</th>
<th>RFI</th>
<th>Adjusted Shoulder Height (mm)</th>
<th>Adjusted Body Length (mm)</th>
<th>Adjusted Scrotum Circum. (mm)</th>
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<tr>
<td>Afrikaner</td>
<td>SS 17 0050</td>
<td>01/12/2017</td>
<td>Glen</td>
<td>1665</td>
<td>124</td>
<td>6.24</td>
<td>1226</td>
<td>1383</td>
<td>285</td>
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<tr>
<td>Afrisim</td>
<td>JJ 17 0001</td>
<td>01/07/2017</td>
<td>Irene</td>
<td>1881</td>
<td>118</td>
<td>6.43</td>
<td>1205</td>
<td>1406</td>
<td>354</td>
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<td>Beefmaster</td>
<td>BC 17 0050</td>
<td>27/02/2017</td>
<td>WINTER CASTLES TRADING 34 CC</td>
<td>1882</td>
<td>116</td>
<td>5.09</td>
<td>1193</td>
<td>1330</td>
<td>359</td>
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<tr>
<td>Boran</td>
<td>JH 17 0120</td>
<td>26/11/2017</td>
<td>Irene</td>
<td>1569</td>
<td>120</td>
<td>4.91</td>
<td>-1116</td>
<td>1280</td>
<td>270</td>
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<td>Brahman</td>
<td>BBS 17 0713</td>
<td>09/04/2017</td>
<td>Vryburg</td>
<td>1549</td>
<td>119</td>
<td>5.50</td>
<td>1311</td>
<td>1484</td>
<td>323</td>
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<tr>
<td>Braunvieh</td>
<td>LT 17 0004</td>
<td>20/12/2017</td>
<td>Glen</td>
<td>1951</td>
<td>110</td>
<td>5.82</td>
<td>1204</td>
<td>1485</td>
<td>337</td>
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<td>Charolais</td>
<td>DS 17 0278</td>
<td>11/09/2017</td>
<td>Vryburg</td>
<td>1940</td>
<td>101</td>
<td>5.43</td>
<td>1347</td>
<td>1492</td>
<td>340</td>
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<td>Chianina</td>
<td>D 17 0139</td>
<td>21/12/2017</td>
<td>Vryburg</td>
<td>1640</td>
<td>95</td>
<td>5.74</td>
<td>1275</td>
<td>1456</td>
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<td>Dexter</td>
<td>JD 17 0010</td>
<td>23/08/2017</td>
<td>Sernick</td>
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<td>103</td>
<td>5.57</td>
<td>1275</td>
<td>1456</td>
<td>331</td>
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<td>Limousin</td>
<td>XRL 17 0008</td>
<td>17/08/2017</td>
<td>Vryburg</td>
<td>1764</td>
<td>113</td>
<td>5.62</td>
<td>1275</td>
<td>1456</td>
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<td>PinZyl</td>
<td>PZ 17 0395</td>
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<td>123</td>
<td>5.77</td>
<td>1203</td>
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<td>Romagnola</td>
<td>FPC 17 0003</td>
<td>19/08/2017</td>
<td>Sernick</td>
<td>2013</td>
<td>109</td>
<td>5.20</td>
<td>1261</td>
<td>1454</td>
<td>316</td>
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<td>SA Angus (Black)</td>
<td>FG 17 0583</td>
<td>26/7/2017</td>
<td>Western Cape</td>
<td>2219</td>
<td>116</td>
<td>4.51</td>
<td>1258</td>
<td>1470</td>
<td>368</td>
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<td>SK 17 1697</td>
<td>10/10/2017</td>
<td>WINTER CASTLES TRADING 34 CC</td>
<td>1819</td>
<td>112</td>
<td>5.88</td>
<td>1217</td>
<td>1441</td>
<td>334</td>
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<td>30/11/2017</td>
<td>Vryburg</td>
<td>2050</td>
<td>127</td>
<td>4.91</td>
<td>1273</td>
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<td>02/10/2017</td>
<td>Irene</td>
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<td>114</td>
<td>5.50</td>
<td>1303</td>
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<td>294</td>
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Table 2 lists the owners of the bulls and their contact details.

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<tr>
<th>Breed</th>
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<th>Town</th>
<th>E-mail</th>
<th>Cell No</th>
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</thead>
<tbody>
<tr>
<td>Afrikanr</td>
<td>JJ 17 0001</td>
<td>Janes Wasserman</td>
<td>Potchefstroom</td>
<td><a href="mailto:janes@mweb.co.za">janes@mweb.co.za</a></td>
<td>082 789 3400</td>
</tr>
<tr>
<td>Afrikanr</td>
<td>JS 17 0508</td>
<td>Mark Ford</td>
<td>Grahamstown</td>
<td><a href="mailto:mark@fordproperties.co.za">mark@fordproperties.co.za</a></td>
<td>082 577 0817</td>
</tr>
<tr>
<td>Afrisim</td>
<td>BH 17 0049</td>
<td>Louis de Wet</td>
<td>Senekal</td>
<td><a href="mailto:francois@ceceng.co.za">francois@ceceng.co.za</a></td>
<td>082 805 5101</td>
</tr>
<tr>
<td>PinZ’yl</td>
<td>JD 17 0139</td>
<td>Johan Daffue &amp; Son</td>
<td>Bloemfontein</td>
<td><a href="mailto:ansie.daffue@gmail.com">ansie.daffue@gmail.com</a></td>
<td>082 338 5319</td>
</tr>
<tr>
<td>PinZ’yl</td>
<td>JD 17 0010</td>
<td>Xourel Limousins</td>
<td>Coligny</td>
<td><a href="mailto:derick@xourel.co.za">derick@xourel.co.za</a></td>
<td>079 602 5376</td>
</tr>
<tr>
<td>Romagnola</td>
<td>PZ 17 0395</td>
<td>Bertie van Zyl Edms Ltd</td>
<td>Mooketsi</td>
<td><a href="mailto:grootboom@zzz.co.za">grootboom@zzz.co.za</a></td>
<td>082 336 7199</td>
</tr>
<tr>
<td>SA Angus (Black)</td>
<td>SK 17 1697</td>
<td>Francois Coertzen</td>
<td>Vanderbijlpark</td>
<td><a href="mailto:francois@ceceng.co.za">francois@ceceng.co.za</a></td>
<td>082 804 6557</td>
</tr>
<tr>
<td>SA Angus (Red)</td>
<td>M 17 0063</td>
<td>Kallie &amp; Helene vdr Merwe</td>
<td>Kei Road</td>
<td><a href="mailto:knottfarming@gmail.com">knottfarming@gmail.com</a></td>
<td>082 321 0673</td>
</tr>
<tr>
<td>Simbra</td>
<td>WC 17 0068</td>
<td>Llewellyn Angus</td>
<td>Ottosdal</td>
<td><a href="mailto:vasant@lantic.net">vasant@lantic.net</a></td>
<td>083 634 4410</td>
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<tr>
<td>Simmentaler</td>
<td>WC 17 0049</td>
<td>Llewellyn Angus</td>
<td>Simbra</td>
<td><a href="mailto:langus@vodamail.co.za">langus@vodamail.co.za</a></td>
<td>082 805 5101</td>
</tr>
<tr>
<td>Sussex</td>
<td>NJB 17 0034</td>
<td>Nico Bouwer</td>
<td>Succo</td>
<td><a href="mailto:langus@vodamail.co.za">langus@vodamail.co.za</a></td>
<td>082 805 5101</td>
</tr>
<tr>
<td>Tuli</td>
<td>TT 17 0020</td>
<td>Stephen Mains-Sheard</td>
<td>Tuli</td>
<td><a href="mailto:crosswayfarm@gmail.com">crosswayfarm@gmail.com</a></td>
<td>082 272 6158</td>
</tr>
<tr>
<td>Beefmaster</td>
<td>BS 17 0108</td>
<td>Janes Wasserman</td>
<td>Beefmaster</td>
<td><a href="mailto:janies@mweb.co.za">janies@mweb.co.za</a></td>
<td>082 789 3400</td>
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<tr>
<td>Brahman</td>
<td>BBS 17 0713</td>
<td>Boshoeck Brahman Stoet</td>
<td>Vryburg</td>
<td><a href="mailto:haasbroeksakkie@gmail.com">haasbroeksakkie@gmail.com</a></td>
<td>083 268 6662</td>
</tr>
<tr>
<td>Braumvieh</td>
<td>LT 17 0004</td>
<td>Abie Radermeyer</td>
<td>Petrusville</td>
<td><a href="mailto:arenddbrademeyer@gmail.com">arenddbrademeyer@gmail.com</a></td>
<td>083 282 3996</td>
</tr>
<tr>
<td>Charolais</td>
<td>DS 17 0278</td>
<td>Dami Stemmett</td>
<td>Senekal</td>
<td><a href="mailto:dami@luidkeels.info">dami@luidkeels.info</a></td>
<td>083 264 1231</td>
</tr>
<tr>
<td>Chianina</td>
<td>D 17 0139</td>
<td>Louis de Wet</td>
<td>Polokwane</td>
<td><a href="mailto:info@marlofarms.co.za">info@marlofarms.co.za</a></td>
<td>073 333 8632</td>
</tr>
<tr>
<td>Dexter</td>
<td>JD 17 0010</td>
<td>Johan Daffue &amp; Son</td>
<td>Bloemfontein</td>
<td><a href="mailto:ansie.daffue@gmail.com">ansie.daffue@gmail.com</a></td>
<td>082 338 5319</td>
</tr>
<tr>
<td>Limousin</td>
<td>XRL 17 0008</td>
<td>Xourel Limousins</td>
<td>Coligny</td>
<td><a href="mailto:derick@xourel.co.za">derick@xourel.co.za</a></td>
<td>079 602 5376</td>
</tr>
<tr>
<td>PinZ’y</td>
<td>PZ 17 0395</td>
<td>Bertie van Zyl Edms Ltd</td>
<td>Mooketsi</td>
<td><a href="mailto:grootboom@zzz.co.za">grootboom@zzz.co.za</a></td>
<td>082 336 7199</td>
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<tr>
<td>SA Angus</td>
<td>FG 17 0583</td>
<td>Francois Coertzen</td>
<td>Vanderbijlpark</td>
<td><a href="mailto:francois@ceceng.co.za">francois@ceceng.co.za</a></td>
<td>082 804 6557</td>
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<td>SA Angus (Red)</td>
<td>PZ 17 0395</td>
<td>Bertie van Zyl Edms Ltd</td>
<td>Vanderbijlpark</td>
<td><a href="mailto:francois@ceceng.co.za">francois@ceceng.co.za</a></td>
<td>082 804 6557</td>
</tr>
<tr>
<td>Santa Gertrudis</td>
<td>M 17 0063</td>
<td>Kallie &amp; Helene vdr Merwe</td>
<td>Kei Road</td>
<td><a href="mailto:knottfarming@gmail.com">knottfarming@gmail.com</a></td>
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<td>Stephen Mains-Sheard</td>
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<td><a href="mailto:crosswayfarm@gmail.com">crosswayfarm@gmail.com</a></td>
<td>082 272 6158</td>
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</tbody>
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The ARC National Special Performance Test Class Winners
BREED BETTER BEEF

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SUBSCRIPTION OPTIONS INCLUDE PRINT OR DIGITAL MAGAZINE SUBSCRIPTIONS, WEEKLY EMAIL NEWSLETTER.
Cows which participate in this award category are judged on performance figures only, so visual appraisal does not come into play in this category. Participating cows have to exhibit, amongst others, outstanding reproduction figures and also have to perform exceptionally well regarding other economically important traits such as maternal ability and pre-weaning growth rate (weaning weight). This award category is also contested among cows across all breeds, and each cow represents the overall national winner within a breed. Farmers Weekly have been the ARC’s valued sponsor of this highly sought award for more than 40 years and has contributed significantly to our collective efforts in shaping and upholding the image and reputation of this award.

Both registered and commercial cows are eligible to participate for this award. The following criteria is taken into account and includes age at first calving; the average inter-calving period; days since the last calving; the completeness of records for weaning weights; performance records (Breeding Values) regarding wean direct and wean maternal; birth maternal (where available) and the number of calves with reliable weaning weights. For commercial cows where no BLUP breeding values are available, the criteria evaluated include, in addition to criteria already mentioned, the weaning index of the cow’s calves individually as well as for all calves weaned. Additional criteria used to identify the best performing cow per breed include breeding values for birth and weaning; average efficiency index (if available); approval ratio (percentage of her progeny approved for registration by the relevant breeders’ society); reproduction index and the percentage of performance tested calves.

Table 3 lists the 20 ARC National Best Elite Cows winners.

Table 4 lists the owners of these cows.
## 2019 ARC National Elite Cow Awards sponsored by Farmer’s Weekly

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<th>Breed</th>
<th>Cow ID No</th>
<th>Age (yrs)</th>
<th>Number Calves</th>
<th>Age s&lt;sup&gt;1&lt;/sup&gt; calving (months)</th>
<th>Ave. ACP&lt;sup&gt;2&lt;/sup&gt; (days)</th>
<th>Reproductive Index&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Average Weaning Index&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Birth Weight EBV&lt;sup&gt;4&lt;/sup&gt; (kg)&lt;sup&gt;5&lt;/sup&gt;</th>
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1. Ave. ICP - Average Inter Calving Period
2. Reprod Index - Reproduction Index (based on age at first calving and average ICP<sup>2</sup>)
3. Average Weaning Index - Average weaning weight index of calves
4. Birth Weight EBV - Estimated Breeding Value for birth weight
5. Weaning Weight EBV - Estimated Breeding Value for weaning weight
6. Dir - Direct EBV
7. Mat - Maternal EBV
<table>
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<tr>
<th>Breed</th>
<th>Cow ID No</th>
<th>Owner</th>
<th>Town</th>
<th>E-mail</th>
<th>Cell No</th>
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</thead>
<tbody>
<tr>
<td>Afrikaner</td>
<td>NV 09 0027</td>
<td>Jannie Visagie</td>
<td>Kimberley</td>
<td><a href="mailto:jannie.visagie@vodamail.co.za">jannie.visagie@vodamail.co.za</a></td>
<td>082 788 5510</td>
</tr>
<tr>
<td>Afrisim</td>
<td>JJ 09 0928</td>
<td>Janes Wasserman</td>
<td>Potchefstroom</td>
<td><a href="mailto:janes@mweb.co.za">janes@mweb.co.za</a></td>
<td>082 789 3400</td>
</tr>
<tr>
<td>Ankole</td>
<td>NANK 09 0008</td>
<td>Cyril Ramaphosa</td>
<td>Ntaba Nyoni Estates CC</td>
<td><a href="mailto:kobus@ntabayoni.co.za">kobus@ntabayoni.co.za</a></td>
<td>079 385 8537</td>
</tr>
<tr>
<td>Beefmaster</td>
<td>BA 10 0206</td>
<td>Ntaba Nyoni Estates CC</td>
<td>JA Danhauser</td>
<td><a href="mailto:consideratasa@gmail.com">consideratasa@gmail.com</a></td>
<td>082 655 4271</td>
</tr>
<tr>
<td>Bonsmara</td>
<td>VDL 08 0043</td>
<td>Pieter Erasmus en Seuns</td>
<td>Parys</td>
<td><a href="mailto:erasmusvdl@gmail.com">erasmusvdl@gmail.com</a></td>
<td>083 655 0718</td>
</tr>
<tr>
<td>Boran</td>
<td>E 08 0088</td>
<td>Ellof Muller</td>
<td>Makado</td>
<td><a href="mailto:elloffmuller.cm@gmail.com">elloffmuller.cm@gmail.com</a></td>
<td>082 416 6518</td>
</tr>
<tr>
<td>Braford</td>
<td>BB 09 0109</td>
<td>Lotie &amp; Charlotte Schuite</td>
<td>Mosselbay</td>
<td><a href="mailto:heilbofarms@mweb.co.za">heilbofarms@mweb.co.za</a></td>
<td>082 573 9377</td>
</tr>
<tr>
<td>Brahman</td>
<td>BEL 08 0139</td>
<td>Jan &amp; Esta Hattingh</td>
<td>Pierre vReyneveld</td>
<td><a href="mailto:hattinghboesman@gmail.com">hattinghboesman@gmail.com</a></td>
<td>082 445 5460</td>
</tr>
<tr>
<td>Brangus</td>
<td>SB 10 0669</td>
<td>Kosie &amp; Rene Smith</td>
<td>Vreede</td>
<td><a href="mailto:smithbrangus@rooksein.co.za">smithbrangus@rooksein.co.za</a></td>
<td>082 800 2947</td>
</tr>
<tr>
<td>Brauvhieh</td>
<td>HB 09 0004</td>
<td>JJ Besters &amp; daughters</td>
<td>Vrede</td>
<td><a href="mailto:bstershans@gmail.com">bstershans@gmail.com</a></td>
<td>083 469 1258</td>
</tr>
<tr>
<td>Dexter</td>
<td>WP 09 0019</td>
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<td>Petrusburg</td>
<td><a href="mailto:amadeusdexters@gmail.com">amadeusdexters@gmail.com</a></td>
<td>073 289 5111</td>
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<tr>
<td>Drakensberger</td>
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<td>Bullfontein</td>
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<td>Limousin</td>
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<td>Tulbagh</td>
<td><a href="mailto:larhone@obiekwa.co.za">larhone@obiekwa.co.za</a></td>
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<td>Mooketsi</td>
<td>grootboomzz2.co.za</td>
<td>082 336 7199</td>
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<tr>
<td>SA Angus (Black)</td>
<td>WB 10 0110</td>
<td>GB &amp; Warren Gatcke</td>
<td>Ficksburg</td>
<td><a href="mailto:wgatcke@gmail.com">wgatcke@gmail.com</a></td>
<td>082 853 5426</td>
</tr>
<tr>
<td>SA Angus (Red)</td>
<td>SK 09 1075</td>
<td>Scott King</td>
<td>Tarkastad</td>
<td><a href="mailto:scottmarking@gmail.com">scottmarking@gmail.com</a></td>
<td>078 925 8265</td>
</tr>
<tr>
<td>Santa Gertrudis</td>
<td>LL 07 0057</td>
<td>Koos Lock</td>
<td>Schweizer-Reneke</td>
<td><a href="mailto:kooslap@locklore.co.za">kooslap@locklore.co.za</a></td>
<td>082 578 9758</td>
</tr>
<tr>
<td>Simbra</td>
<td>BE 08 189B</td>
<td>Bles &amp; Bernard de Klerk</td>
<td>Danielskuil</td>
<td><a href="mailto:ALES1973@gmail.com">ALES1973@gmail.com</a></td>
<td>082 202 5911</td>
</tr>
<tr>
<td>Simmentalaler</td>
<td>HJW 08 0020</td>
<td>Dolf Theunissen</td>
<td>Riverwalk</td>
<td><a href="mailto:27824529879@vodamail.co.za">27824529879@vodamail.co.za</a></td>
<td>082 452 9879</td>
</tr>
<tr>
<td>Sussex</td>
<td>CN 07 0063</td>
<td>Annealea van Nieker</td>
<td>Reitz</td>
<td><a href="mailto:Annealea.van.nieker@gmail.com">Annealea.van.nieker@gmail.com</a></td>
<td>072 261 6667</td>
</tr>
</tbody>
</table>
VEESIEKTES IDENTIFIKASIE & NASPEURBAARHEID

“MOET NIE WAG TOT DIE VEESEIKTES RAMP JOU KUDE TREF NIE”

DAN IS DIT TE LAAT!

BRUSELLOSE, TB, BEK-EN-KLOUSEER (FMD), KNOPVELSIEKTE, SLENKDALKOORS........

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Affectionately known as the “best from the best” category, recipients of this award had to be bred from an Elite cow. The bulls themselves have to display exceptional performance figures and it is possible that more than one bull per breed can be eligible for this award, although as a rule very few bulls qualify due to the stringent adjudication criteria. Eligible bulls must have received a Gold Merit certificate when they completed a Phase C test of the ARC and its dam had to receive her Elite cow status during the year in which the bull received his Gold Merit award. Eligible bulls also had to complete their Phase C tests between 1 January 2018 and 31 December 2018. GMPBasic, one of the ARC’s valued partners, has been sponsoring this award category for seven years in a row now, a category that has already been contested for 24 years.

Table 5 lists the 8 Platinum Award bulls.

Table 6 lists the Platinum Award owners of these bulls.

<table>
<thead>
<tr>
<th>BREED</th>
<th>BULL ID No</th>
<th>ADG Index</th>
<th>FCR Index</th>
<th>Adjusted Scrotum circum.</th>
<th>Dam ID No</th>
<th>Age (yrs)</th>
<th>Calv- ings</th>
<th>Age 1st calving (mths)</th>
<th>Aver. ICP (days)</th>
<th>Birth Weight</th>
<th>Weaning Weight</th>
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<td>Bonsmara</td>
<td>NFS 17 0371</td>
<td>101</td>
<td>108</td>
<td>379</td>
<td>NFS 08 0025</td>
<td>11</td>
<td>9</td>
<td>23</td>
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<td>-0.10</td>
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<td>Brahman</td>
<td>GBS 17 0004</td>
<td>123</td>
<td>108</td>
<td>255</td>
<td>HBS 04 0075</td>
<td>15</td>
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<td>36</td>
<td>371</td>
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<td>Limousin</td>
<td>XRL 17 0008</td>
<td>113</td>
<td>115</td>
<td>340</td>
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<td>370</td>
<td>XRL 08 0002</td>
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<td>*21</td>
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<td>122</td>
<td>278</td>
<td>SS 09 0020</td>
<td>10</td>
<td>8</td>
<td>27</td>
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<tr>
<td>Simbra</td>
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<td>113</td>
<td>320</td>
<td>WC 08 0070</td>
<td>11</td>
<td>8</td>
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<td></td>
<td>HLM 17 0164</td>
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<td>117</td>
<td>325</td>
<td>WC 09 083C</td>
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<td>7</td>
<td>35</td>
<td>387</td>
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<tr>
<td>Simmentaler</td>
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<td>111</td>
<td>370</td>
<td>PJ 01 0017</td>
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<td>29</td>
<td>367</td>
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<td>20.0</td>
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* Normal Calvings & Embryo
### The owners of the 2019 ARC National Platinum Award Bulls

<table>
<thead>
<tr>
<th>Breed</th>
<th>Bull ID No</th>
<th>Owner</th>
<th>Town</th>
<th>E-mail</th>
<th>Cell No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonsmara</td>
<td>NFS 17 0371</td>
<td>Sernick Bonsmara</td>
<td>Edenville</td>
<td><a href="mailto:pieter@sernick.co.za">pieter@sernick.co.za</a></td>
<td>082 384 0020</td>
</tr>
<tr>
<td>Brahman</td>
<td>GBS 17 0004</td>
<td>Heinrich Bruwer</td>
<td>Molopo</td>
<td><a href="mailto:heinrichbruwer1@gmail.com">heinrichbruwer1@gmail.com</a></td>
<td>079 506 8198</td>
</tr>
<tr>
<td>Limousin</td>
<td>XRL 17 0008 &amp; XRL 17 0019</td>
<td>Xourel Limousins</td>
<td>Coligny</td>
<td><a href="mailto:derick@xourel.co.za">derick@xourel.co.za</a></td>
<td>079 602 5376</td>
</tr>
<tr>
<td>Santa Gertrudis</td>
<td>SS 18 0021</td>
<td>Desmond Robertson</td>
<td>Brandfort</td>
<td><a href="mailto:dolene@desley.co.za">dolene@desley.co.za</a></td>
<td>082 494 7032</td>
</tr>
<tr>
<td>Simbra</td>
<td>WC 17 0068</td>
<td>Llewellyn Angus</td>
<td>Arlington</td>
<td><a href="mailto:langus@vodamail.co.za">langus@vodamail.co.za</a></td>
<td>082 805 5101</td>
</tr>
<tr>
<td>Simmentaler</td>
<td>HLM 17 0164</td>
<td>Lourens Muller</td>
<td>Lindley</td>
<td>l <a href="mailto:hmuller@gmail.com">hmuller@gmail.com</a></td>
<td>066 290 9880</td>
</tr>
<tr>
<td></td>
<td>FRO 17 0060</td>
<td>Joasu Trust</td>
<td>Lichtenburg</td>
<td><a href="mailto:johanenherman@gmail.com">johanenherman@gmail.com</a></td>
<td>082 853 9534</td>
</tr>
</tbody>
</table>
The ARC National Emerging Beef Farmer of the Year Award

BACKGROUND & HISTORY
This is another flagship award of the ARC that acknowledges emerging beef farmers who are members of the Kaonafatso ya Dikgomo Scheme of the ARC and who have excelled when it comes to how they manage and improve their herds and enterprises making use of record keeping, amongst others. These awards commemorate their 17th anniversary this year. Finalists, aiming to become fully-fledged commercial farmers, from each of our country’s provinces are identified and they ultimately contest for the title of National Winner. The Kaonafatso ya Dikgomo Scheme focus on assisting emerging cattle farmers to apply beef recording and improvement technology to facilitate accurate selection for economically important traits and increased productivity and profitability of their herds. Emerging farmers serviced and developed through the KyD Scheme are also registered on the Intergis (national database) and to date more than 8000 emerging farmers are members of KyD.

PURPOSE
To acknowledge members of the Kaonafatso ya Dikgomo Scheme who perform well on specific criteria related to recording, management and performance of their herds;

To encourage emerging cattle farmers to improve their standard of living through higher returns from animal production and job creation;

To promote participation in the Kaonafatso ya Dikgomo Scheme;

To promote sound breeding and management principles in the beef industry; and

To demonstrate the benefit of performance testing, practically, by identifying outstanding herds.

Part of the prize for the winner of this category includes an all-paid visit to the annual conference of the Beef Improvement Federation (BIF) in the USA.

Provincial winners of the ARC’s National Emerging Beef Farmer of the Year Award

Sponsored by DAFF

22
The winner of the 2019 ARC National Emerging Beef Farmer of the year Award is Piet Phahlane, Milkhout-fontein Portion 186Jr, Bela-Bela, Gauteng

<table>
<thead>
<tr>
<th>Province</th>
<th>Breed</th>
<th>Herd size</th>
<th>Name</th>
<th>Farm Name</th>
<th>Town</th>
<th>Cell No</th>
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</thead>
<tbody>
<tr>
<td>Eastern Cape</td>
<td>Beefmaster, Boran &amp; Nguni</td>
<td>210</td>
<td>Tembisa Sibiya</td>
<td>Mimosa park</td>
<td>East London</td>
<td>072 826 7767</td>
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<tr>
<td>Free State</td>
<td>Bonsmara</td>
<td>76</td>
<td>Mojalefa Mashao</td>
<td>Bultfontein</td>
<td>Bloemfontein</td>
<td>081 074 9447</td>
</tr>
<tr>
<td>Gauteng</td>
<td>Nguni</td>
<td>95</td>
<td>Piet Phahlane</td>
<td>Milkhoufontein Portion 186JR</td>
<td>Bela-Bela</td>
<td>073 155 1420</td>
</tr>
<tr>
<td>Kwa-Zulu Natal</td>
<td>Brahman</td>
<td>150</td>
<td>Mzamo Welcome Mncube</td>
<td>Zagila Farm</td>
<td>Vryheid</td>
<td>063 391 5990</td>
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<tr>
<td>Limpopo</td>
<td>Bonsmara</td>
<td>125</td>
<td>Lebajoa Jimmy Aphahe</td>
<td>Doornpoort</td>
<td>Mookgopong</td>
<td>082 349 8262</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>Bonsmara</td>
<td>105</td>
<td>Petros Sibanyoni</td>
<td>Eensaamheid</td>
<td>Emalahleni</td>
<td>082 688 2621</td>
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<td>Northern Cape</td>
<td>Bonsmara</td>
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<td>Moagi Segame</td>
<td>Perth Communal</td>
<td>Kuruman</td>
<td>079 806 4446</td>
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<tr>
<td>North West</td>
<td>Bonsmara</td>
<td>53</td>
<td>Mmabaeti Molelekoa</td>
<td>Harantopa Enterprise</td>
<td>Ventersdorp</td>
<td>082 801 8142</td>
</tr>
<tr>
<td>Western Cape</td>
<td>Nguni</td>
<td>140</td>
<td>Dawied Diedrieks</td>
<td>Kleinmorewag</td>
<td>Stellenbosch</td>
<td>078 225 5143</td>
</tr>
</tbody>
</table>

Dr Thulasizwe Mkhabela (ARC), Mr Aaron Makena, Mr Piet Phahlane & Mr Joël Mamabolo (DAFF)
The objective of this highly sought after and fiercely contested award category is to acknowledge outstanding achievements of breeders who make use of performance recording and related technologies to improve the genetic potential of their herds. They also have to demonstrate superior management skills related to breeding and herd management. In a nutshell, contestants have to exhibit exceptional attributes when it comes to breeding and management of their herds making use of a variety of approaches and technologies. Breeders and herds across breeds in southern Africa can enter this award category and it is also not restricted to breeds making use of particular service providers – herds making use of any service provider may participate. Numerous criteria are considered when adjudicating this award category, including the level of reproduction of the herd; overall participation and implementation of performance testing as a tool for improvement; cow efficiency in the herd (including post-weaning performance); the completeness of performance records; the size of the cow herd (must consist of at least 50 cows); the calving performance of the herd; genetic trends and progress in the herd and the application of modern scientific breeding techniques. The role and reputation of the participating herd owner is also considered and his or her role in the industry, especially when it comes to giving leadership and guidance to other farmers and stakeholders. Part of the prize for the winner of this category includes an all-paid visit to the annual conference of the Beef Improvement Federation (BIF) in the USA.

**Table 8** lists the 2019 ARC National Beef Cattle Improvement Herd of the Year participants.
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Beef Fat 33+ (V77577) (Act 36 of 1947)
To become the National Mentor of the Year, a person should exhibit exceptional qualities when it comes to leadership skills, show his or her commitment to be involved with industry and also be recognised for his or her contributions by the formal structures of industry. Farmers who demonstrate their commitments to other breeders and who may be prominent breeders themselves, and who have a track record of ploughing back their experience and knowledge are eligible to participate. Criteria that are considered also include involvement in training and mentoring of fellow farmers and leadership provided to ensure capacity building and information dissemination to fellow farmers and industry as a whole. A track record of farmers who want to enter should reflect their ability to build capacity among fellow farmers is also highly desirable and will form part of the adjudication criteria. The winner of this category was announced during the formal Awards Event on 29 August 2019.
The objective of this award is to recognise the province with the highest number of participating farmers in the scheme (KyD). These farmers must be registered on the INTERGIS and must have loaded data on the database between March of the year preceding the award and April of the year of the award. The three provinces with the highest number of participating farmers will receive the accolades Platinum, Gold and Silver respectively. This award was only introduced in 2016 and the winners and recipients of these awards were announced during the awards event on 29 August 2019.

The finalists for the KyD province of the year are: Kwa-Zulu Natal, Limpopo & Mpumalanga.

The ARC National KyD Province of the Year Award for 2019 was awarded to Kwa-Zulu Natal (Platinum award).
INTRODUCTION

Livestock is frequently accused of producing large quantities of greenhouse gases (GHG) and using large quantities of water in the production of beef or milk. Some of the assumptions used to calculate the carbon or water footprint of livestock products are questionable. In studies with more realistic and justifiable assumptions, the water requirement for red meat production and for the production of total milk solids in whole milk and in skim milk powder, is much lower.

In addition, to quote percentages does not always make sense. In industrialized countries the GHG emissions for agriculture is less than 6%, simply because the contribution of their energy sectors, mines and manufacturing industries to GHG emissions is large. In non-industrialized countries the relative contribution by agriculture can be 40% - 50%, but the actual contribution can be considerably less than the 6% by the industrialized countries. When considering mitigation options, it is obvious that a 10% reduction in GHG emissions by the energy and mining sectors would be far more effective than a 10% reduction in the 5% - 10% contribution of agriculture. So, the proposed “meat free once a week” argument will not do much to rectify the problem, as other sources of protein for human consumption are required, which may even have a higher carbon footprint.

It must be realized that ruminant livestock are important to mankind since most of the world’s vegetation biomass is rich in fibre. Only ruminants can convert this high fibre containing vegetation into high quality protein sources (i.e. meat and milk) for human consumption and this will need to be balanced against the concomitant production of methane. Despite this important role of ruminants, they are specifically being targeted and singled out as producing large quantities of GHG that contribute to climate change.

LIVESTOCK PRODUCTION AND GREENHOUSE GASSES

Livestock agriculture is the world’s largest user of land resources and Sub-Saharan Africa is not different. In South Africa approximately 84% of the surface area is available for farming. However, a large part of this is not suitable for crop production, with approximately only 13% that is arable. The greater part of South Africa (71%) is only suitable for extensive livestock farming. The result is that the primary beef cattle farming (cow-calf production cycle) in South Africa is largely extensive. However, more than 75% of cattle slaughtered in the formal sector is finished in feedlots on maize and maize by-products. Under natural rangeland conditions, decomposition of manure is aerobic, leading to production of carbon dioxide and water as end products. Part of the carbon dioxide released from the aerobic digestion of manure is absorbed during the regrowth of the surrounding vegetation, rather than released into the atmosphere. The carbon sequestration measurement of this has been largely neglected and therefore the quantitative effect is not known. This is in sharp contrast to intensive systems in large parts of Europe and North America, where large quantities of manure are stockpiled, often for long periods, and undergo anaerobic decomposition. Anaerobic decomposition of manure, as found in the intensive cow-calf systems, feedlots and intensive dairy systems, produces methane as one of the major end products.

The effect of methane from livestock on global warming is totally overplayed by groups with their own agenda. They frequently quote values and figures that are based on questionable assumptions or they are just wrong.

The most important Greenhouse Gasses are:

- Carbon dioxide – 49%
- Methane – 18%
- Nitrate gasses – 6%

The sources of methane production are demonstrated in Figure 1, and indicates that more than 30 % of methane production is anthropogenic (man-made).

The sources of anthropogenic (man made) CH₄ production can be summarized as follows:

- Gas & coal mining / Natural gas – 19%
- Enteric fermentation (ruminants, including game) – 16%
- Rice cultivation – 12%, (but there is no slogan that says - Eat less rice)
- Biomass burning (veld fires) – 8%
- Land fills (dumping sites) – 6%
- Animal waste (including manure) – 5%

Using this information a simple calculation can be made. Ruminants contribute to 21% of anthropogenic methane production (16% from fermentation and 5% from waste). However, methane forms only 18% of GHG, thus 21% of 18% is less than 4%. The contribution of primary ruminant production to GHG is therefore less that 4%.

It should however be noted that the global warming potential of methane is approximately 23 times more than that of carbon dioxide, but its atmospheric lifetime is 12 years, compared to 100 to 200 years of carbon dioxide. Although it has a larger effect, the duration of the effect is much shorter. This is one of the aspects that is frequently ignored.

It is also important to ask the question, what will happen with the vegetation if it is not consumed by product producing ruminants (meat, milk, fibre)?

The following three things can happen to the vegetation:
- It can be consumed by other animals that will also emit methane
- It can burn, which will produce carbon dioxide that is released into the atmosphere with a atmospheric lifetime 100 to 200 years
- It can rot and produce Nitrate gasses with a global warming potential of approximately 300 times more than that of carbon dioxide

**LIVESTOCK PRODUCTION AND WATER USAGE**

The water footprint or the amount of water required to produce 1 kg of product is of relevance. Some of the assumptions on which published figures are based, are debateable. For example, in one calculation where it is claimed that the water requirement is 15500 L/kg beef, it is assumed that it takes three years to produce 200 kg of boneless beef. In the estimate, only 155 L of water were calculated for drinking, cleaning and post farm gate activities; the remainder being accounted for by irrigation of the crops to be used for feed of the cattle and the rain that fell on the property.

These figures have been widely quoted by anti-livestock activists. In studies with more realistic and justifiable assumptions, it was calculated that the water requirement for red meat production was 80 to 540 L/kg; the large variation being due to differences in production systems and efficiency. In extensive conditions (such as Sub-Saharan Africa) water needs of the animal itself is the major contributor to the total requirement, which amounts to about 4 L per kg feed dry matter intake, with a 50 % increase in hot weather.

The argument is sometimes advanced that the water used in livestock production should rather be channelled to crop and vegetable production which require less water, but this is not true for areas where crop and vegetable production is not viable. In South Africa, agriculture is consuming 74.5% of the rainfall. From this, 60% is utilized by the natural vegetation, 12% by dry land crop production and 2.5% by irrigation. However, natural vegetation (rangelands) and dry land crop production use only “green” water, i.e. rain water that is stored in the soil after precipitation. It is called “green” water because only green

![Figure 1 Sources of natural and anthropogenic methane production](Image)
plants growing in the soil utilise this water. It cannot be used by/or for anything else. In extensive grazing systems the natural vegetation, which is the food source of livestock, uses only “green” water. This water cannot be used for crop production. This is often in areas unsuitable for crop production because of inadequate rainfall and/or poor quality of soils. The quantity of water used for the production of livestock products (e.g. kg meat) in the extensive rangeland areas is therefore irrelevant in the calculation of water consumption for beef production. Natural rangelands not utilised by livestock or game would result in water being wasted.

In terms of food production, it means that green water can only be used for the production of meat or other animal produce under extensive grazing systems on natural rangelands, as is the case in South Africa. These systems are critical for providing food security in such areas, which dominate almost all less developed countries. Natural rangelands in these areas do not use “blue” water (runoff water to streams, dams etc. or water stored in underground aquifers). This is completely different from intensive systems of Europe and North America. Since only the rain that infiltrated into the soil is used, there is no water cost for the production of the rangeland. Nothing needs to be done to capture or extract this water other than applying good rangeland management to ensure a dense basal vegetation cover to avoid excessive runoff that would lead to damaging floods, erosion, silting up of dams, etc.

### A Balance between Food and Nutrition Needs

In addition to the formulation of strategies aimed at greener food environments, health considerations (such as nutrient-density), in addition to carbon footprint calculations, should be considered. Choosing nutrient-rich foods and reducing the intake of nutrient-poor energy dense foods is one way of reducing the amount of food (and resources) required to meet nutritional needs.

Food systems should produce more nutritious foods, not just more food, and guarantee an adequate supply animal source food. Any reduction in the consumption of meat and dairy products may compromise the dietary intakes of those nutrients that meat and dairy products supply in relatively large proportions. The risk is greatest where those nutrients are already in short supply or where there is evidence of low status. The role of livestock in the wellbeing of humans should not be under estimated. Livestock food products form an integral part of human nutrition and is especially important for in early childhood cognitive development.

The lower bioavailability and quality of these essential nutrients from plant-based sources should also be taken in consideration when comparing different food sources. In terms of protein produced per unit of water, animal products are more efficient than fruit and other food crops such as grains and vegetables. It is therefore important not to overlook the importance of animal products in providing bio-available nutrients.
HEAT STRESS
IN BEEF CATTLE

Background

High summer temperatures influence both human and animal, and together with high humidity, the effect can be even worse. Heat stress defined as a combination of ambient temperature, humidity, solar radiation and wind (speed). These factors can change the environment in such a way that it has a negative effect on the production and profitability of beef cattle production systems. Livestock can withstand higher ambient temperatures during periods of lower humidity. Beef cattle can cool themselves down primarily through a combination of the respiratory tract and skin evaporative loss (sweating). Cattle that are well adapted for warm, humid environment will there for be well adapted with a short hair cover with a loose skin, which increase the skin surface.

According to research, will high temperatures (above 27°C) coupled with high humidity cause heat stress in cattle, which can lead to reduced breeding efficiency, milk production, feed intake, and limited weight gain. In the worst-case scenario, heat stress may increase the chance of illness and may even cause death. The result of heat stress is an increase in body temperature and the animal need to cool down to regulate its body temperature.

Method to measure heat stress

USA Scientists developed a “temperature-humidity index” known as “THI” and it is a combination of temperature and humidity. This may warn producers in time about heat stress periods in the nearby future. Wind speed also plays an important role for cattle to cool down and does not form part of this index.

Together with the “THI” and a “Livestock Safety Index” known as “LSI” determines a warning, dangerous or emergency and defined as:

- Livestock alert – LSI 24-25.5: Heat stress observed and precautionary measures to reduce heat stress conditions in confinement housing or livestock trailers.
- Livestock Emergency: LSI 29 and higher: These conditions are most likely to occur when air temperature exceeds 32°C. No cloud cover and little air movement are additional hazards found in such heat stress weather. Livestock should not be worked or transported when the emergency index is higher than 29.

Management practises to minimize heat stress

1. Provide shade without limiting airflow. Trees, buildings and sunshades or sprayers on rooftops while animals housed in intensive systems.
2. Change your feeding patterns. A second strategy is to feed cattle less in the morning and more in the evening to encourage greater feed intake. For confined cattle (e.g. feedlot pens) deliver 70% of the days scheduled feed two to four hours after the peak ambient temperature of the day.
3. Avoid handling cattle after 10 am.
4. Supply cattle with enough cool drinking water, which will also improve feed intake.
5. Market ready animals are more likely to experience heat stress because of their low lung capacity relative to body weight.
6. Selection for adapted animals to their environment plays an important part in a sustainable and profitable cow-calf production system. It happens that all animals are not well adapted in feedlots especially animals that are transported from other areas.
Summary

Livestock in general, exposed especially in an extensive production system, which is the most common production system in South Africa. Performance testing and good record keeping is an objective measure to eliminate non-performers and select well-adapted good performing animals in their environment. Multi sire breeding will also ensure higher calving rates during the mid-summer breeding season. The breed choice of the breeding bull in a harsh environment is important to ensure well-adapted bulls that are able to do their work during the breeding season.

References

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FROM DATA TO TECHNOLOGY:
What does the future hold for animal genetics?

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Introduction
Farmers must constantly think innovatively, because what is good for today may not necessarily be good enough for tomorrow. Without innovation we will surely stagnate. However, one of the cornerstones of innovation is technology that is used on a daily basis to address old problems or challenges. DNA technology has become a necessity when it comes to our efforts to take animal production forward. When the sheep Dolly was cloned in 1996, new emphasis was given to the impact and role it can and will play. Twenty-three years later, it is even more strongly emphasized when DNA technology is used to change a human’s DNA to render their offspring resistant to HIV. Animal production is a key component of agriculture, and it is becoming increasingly important to address its most critical issues, especially those relating to food security. To put things into perspective, South Africa’s population will be close to 70 million by 2050, amid the worrying fact that more than one in five people in our country still have insufficient access to food. The growing number of people in our country will naturally put a huge strain on the demand for protein, and it is predicted that the demand specifically for beef will increase by more than 20% within the next 9 years.

DNA based technology to the rescue?

Our livestock sector, which already contributes almost 49% to our agriculture’s gross domestic product, will play an increasingly important role in food security. Currently, the sector supports nearly 13 million people in our country amid challenges such as unsustainable and un- or poorly profitable production levels in large parts of the production chain. It will also mean that we will have to focus stronger on the transfer of skills, knowledge and technology to ensure we take our farmers forward. The bigger picture is that farmers will increasingly have to produce more efficiently (“more from less”), and technology has already become indispensable and will become even more so in the foreseeable future.

Genomics

Genomics already allows us to identify both good and bad DNA in our animals and use the information in selection programs to accelerate genetic improvement. Many genes and gene markers (DNA sequences, including SNPs) have also been identified in this regard in a variety of species such as cattle, pigs, sheep, goats and even game. In essence, it comes down to the fact that the order in which the DNA building blocks of an animal are arranged will determine the performance of an animal in a specific environment. Specific gene markers have already been identified and shown to be associated with traits of economic importance such as feed intake, growth rate, feed efficiency and milk production, just to name a few. Genomics in a nutshell is simply the addition of an animal’s DNA information to the recipe that calculates an animal’s breeding values. Ultimately, a genomically enhanced breeding value (GEBV) will enable a farmer to apply selection more intensively, accurately and at an earlier age, all of which contribute to increased profitability.
Genetic manipulation: From wishful thinking to reality

Newer and even more revolutionary applications of DNA technology include genetic manipulation/editing which means we change the DNA of an animal, human or plant to produce a desired effect, for instance an animal that is resistant to a disease or one that grows faster than average. From a gene manipulation point of view, traditional breeding is time-consuming, expensive and dependant on sufficient variation for selection. Genetic manipulation on the other hand offers the possibility that variation and even new traits can be created. Scientists are already able to manipulate genes very accurately in order to either eliminate certain traits (adverse traits) or to create beneficial traits and a large variety of animals have already been genetically engineered under research practises. Examples include double-muscled calves, pigs that are resistant to viral diseases, dairy cows producing anti-allergic components in their milk, and pigs that are more environmentally friendly by being able to process phosphate better, excreting up to 70% less phosphate depending on their diet. Very recently, Angus cattle have also been genetically modified to improve their resistance to heat stress by regulating their body temperature more effectively (Figure 1). These cattle would for instance be better adapted and able to perform under hot tropical climatic conditions where they would normally struggle to perform at their best.

Conventional performance testing and record keeping - still “king”?

In the midst of all the new technologies at our disposal, we should never underestimate the value and impact of conventional (and often very basic!) performance recording and testing. Without the performance data of our animals we are basically stranded. We must also always remember that the genetic abilities or merit of an animal cannot be seen with the naked eye for most traits. Furthermore, the environment complicates things, because of its influence on how most of the genes are expressed and what the animal's phenotype looks like. In short, performance testing involves record keeping and collecting data from your animals, even for the most basic characteristics such as birth and weaning weight, inter-calving period, age of cows at first calving and post-weaning growth and feed efficiency, to name but a few of the most important traits.

Data collected, recorded and processed into information over many decades has largely assisted farmers to make informed decisions for more profitable and more efficient beef production. Subsequent studies have also clearly verified that the returns from investing in performance testing were significant. Data collected over many years for the Afrikaner breed for instance highlighted the progress they made regarding cow efficiency and a reduction in methane emissions that relates to a more environmentally friendly beef production system. Cow-calf efficiency is central to our ability to reduce the carbon footprint of our livestock and research has indicated, by analysing performance data, that the Afrikaner's level of methane production (measured as “enteric methane emission factor” or MEFenteric) was reduced by 12% between 1980 and 2013. Furthermore, cow efficiency which is a combination of inter-calving period, feed intake (measured in terms of a large stock unit) and the kilogram of calf weaned, was also significantly improved. Without performance data, it would have been impossible to conduct the necessary research and demonstrate these positive outcomes.

The microbiome and epigenetics

More recent and interesting developments using DNA technology include the characterization of the microbe population (so-called microbiome) in the rumen of cattle, sheep and other species. We know that the rumen's microbiome is largely responsible for the digestion of the food that ruminants consume as well as the animal's ability to metabolize methane gas, one of our greenhouse gases. Since the level of methane production is largely determined by the composition of the animal's microbiome, it makes it possible in the near future to select animals that are more environmentally friendly by looking at their microbiome and also to formulate a suitable ration for optimal performance and less methane production.

A new field of molecular genetics, called epigenetics, is also rapidly developing. It involves studying how and under which environmental conditions (including the diet) an animal or human's DNA sequence is modified (not changed!). These modifications on the DNA level allow animals to adapt and respond to environmental factors, often in the short term. The DNA changes can also be transmitted to the offspring and may dictate or influence the offspring's phenotype.

Summary

Considering all the tools that farmers already apply, their refined management and farming techniques and the technologies that they employ, we can certainly say that we are already in the era of precision livestock farming. Given the need to farm profitably and sustainably and also to effectively deal with food security challenges, one can almost say a farmer will struggle to make ends meet if he or she does not make use all the available tools and technologies. It is important to keep in mind that performance testing of animals forms the basis of a profitable breeding program, and without records it will be almost impossible to know whether you are achieving this goal or not.
Cattle grazed in South Africa encounter numerous environmental stressors but they are expected to grow to a certain weight to be economic in abattoirs which is simpler under feedlots but tougher under free range. Growth to market weights before set ages are critical to beef enterprises and it also mitigates carbon contribution. It is recorded that estimates of the magnitude of CO2 reduction based only on an increase of average daily gains from 0.2 kg/head/day to 0.4 kg/head/day and from 0.4 kg/head/day to 0.6 kg/head/day suggest methane emissions would be reduced drastically. On farm productivity leads to reduction in methane emission by cattle which is good for the issues of climate change.

In retrospect, Woolworth Free Range (WWFR) beef market specification set a new expected beef growth performance. It requires animals' on-hook to be weighing 200 kg (approx. 400kg live), actually, they pay better when it is 240kg (approx.480kg live) before the sixth teeth are fully develop or around 36 months. South Africa beef recording schemes tracks growth until 18 months and left a gap of growth performance until 36 months. The High Value Beef Partnerships (HighVBP) project presented an opportunity to record growth of smallholder farmer’s cattle from weaning to slaughter. The HighVBP recruits and support smallholder farmers to farm to meet WWFR beef specifications with or without 1% concentrates supplementations. Our desktop projections during the planning stages were faced with no data to benchmark the growth rates of cattle on free range. Free range beef specifications allow 1% concentrate supplementation and this also presents another dimension of knowledge gap on growth rates of these animals under this nutrition regime.

The study projected that for the animals to reach this weight they need to be growing at 0.5kg/day throughout their growth stages. From birth to wean we expect growth of up to 1kg per day but then slows down to 0.4kg after 24 months when they are just on range. So farmers in HighVBP needs to keep their herds growing at this rate to meet the market specification. The figure below depicts an ideal situation at which they must grow. But increasing the growth rates to 0.6 – 0.8 kg/day would allow those same animals to be slaughtered between 18 months and 2 years of age or they could be retained to older ages at substantially higher slaughter weights, thereby earning even higher premium prices.

The study tracks growth of over 200 castrated steers on different farms. This past years 91 steer were slaughtered from two farms and this is worth sharing with the farmers. The farmers in both cases supplemented their animals with 1% concentrates of their daily intake during the dry season and during the finishing stages. At the beginning of the FR specification cold carcass weight of 180kg was accepted until May 2019, when it was increased to 200kg.

**Figure 1** shows growth of individual steers on each farm. To note is that from month six to thirteen there was high growth and most gained over 110 kg in that period. The period was followed by no growth and loss until month 16. Some animals lost up to 50kg at this period. After this period the animals showed a fast growth until slaughter at month 26. The points labelled as FR200 and FR180 shows animals that would have made it if the minimum weight was 180kg or 200kg. The animals labelled as FRF are those that have failed due to weight limit.

**Target weights for free range markets**

![Graph showing target weights for free range markets](image)
Figure 2 shows the average growth of the whole herd. It is important to note the animals grew to this level and were slaughtered when they still had 10 months to grow. The animals were slaughtered in autumn as farmers were not willing to take them over winter again.

In conclusion, farmers need to have a dry season feed supplementing plan or your animals will lose up to 50kg. The other issues to note is that with some bit of feeding the animals can reach the target weight within two years. This is highly possible if the farm is stocked correctly. If a farmer can feed 1% concentrates as from wean the animals may be fully grown by 18 months. Feeding them younger may results in faster growth than when finished in the last months before slaughter. It might also be economical to feed them earlier. Don't forget that the best beef is in an animal younger than 3 years, so try to get it out of your farm before this age.
ARC-Animal Production hosted the first and very successful ARC Agri Indaba at the ARC-Animal Production Irene Campus from 29-30 August 2019. The Agri Indaba’s focus was Livestock agriculture and the event provided a platform to highlight ARC Research and Development products and services. The aim of the Agri Indaba was to bring together key stakeholders in the agricultural sector, especially farmers, to create the opportunity for interaction, marketing and exposure.

The event also allowed Breeders’ Societies, as well as individual farmers and agricultural input suppliers, to market themselves and to share their farming experience and knowledge with other role players. Key activities included exhibitions by the eleven ARC Programmes and a number of private businesses with an agricultural focus, numerous live practical demonstrations presented by ARC staff that included the application of technologies to advance our efforts in breeding, management and performance testing. Seven different beef breeds were also on display, discussed and demonstrated during formal sessions by the different Breed Society representatives, as well as ARC staff. Approximately 450 people attended the Indaba during the two days.

On 29 August 2019, the Agri-Indaba featured the prestigious 2019 ARC National Beef Performers Awards, which is a platform for recognising excellence among elite stud breeders and smallholder farmers participating in our National Beef Cattle Improvement Scheme and the Kaonafatso ya Dikgomo Scheme, respectively.
The event, co-hosted and supported by the Department of Agriculture, Land Reform and Rural Development (DALRRD), Farmer’s Weekly, Molatek and GMPBasic, was attended by 230 invited guests. The ARC President and CEO, Dr Shadrack Moephuli, officially opened the awards and expressed appreciation for the good working relations between the ARC and the livestock industry, he also reiterated the ARC’s commitment towards providing new world-class agricultural farming know-how and technologies to ensure international competitiveness of the sector.

The 2019 ARC National KyD Province of the Year Award winner: Mr Amon Piet Phahlane (Nguni, Bela Bela, Gauteng) and the 2019 ARC National Beef Cattle Improvement Herd of the Year Award: Dr Pieter De Kock (Afrikaner, Thabazimbi, Limpopo).

Farmer’s Weekly, a strategic media partner of the ARC in the Beef Performers Awards, presented a workshop on 30 August 2019 titled “Profitable Cattle Breeding Workshop”. More than 100 participants attended the workshop where the following ARC-AP researchers also presented: Dr Klaas-Jan Leeuw on “The basics of livestock nutrition” and Dr Ben Greyling on “New developments in performance testing”.

ARC Agri Indaba 2020 will be hosted from 27–29 August 2020 at the ARC-Animal Production Irene Campus, Irene, Centurion. The ARC would like to extend an invitation to all Breeders’ Societies and agricultural input suppliers to participate in this event and display your animals/products.

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The time was 22h20, Saturday 15th June 2019. As the wheels of our Flight EK766 bid farewell to the terra-firma of Oliver Tambo Airport, our journey to the 2019 Beef Improvement Federation Conference had begun.

As recipient of the 2018 “ARC - National Beef Cattle Improvement Herd of the Year Award”, my prize included this trip and I had invited my wife Karen to join me.

Our flight went to Dubai and then onto O’Hare International Airport - Chicago, before finally landing at Joe Foss Field Airport – Sioux Falls. Amy Abrams, Graduate Research Assistant from South Dakota State University was there to meet us and kindly shuttle us to our hotel in Brookings, South Dakota. This finally brought an end to a 27-hour trip.

Tuesday, 18th June dawned and we explored the town of Brookings. We were welcomed by fresh air, clean streets and friendly locals. The evening brought on the Opening Reception at the University Comfort Suites and Convention Centre.

Wednesday, 19th June bore the theme “Applications of Technology” and brought with it the welcome by Dr. Barry Dunn, President of South Dakota State University, followed by presentations on “Cattle Reproduction and the Correlated Acceleration of Genetic Gain” and updates on “Gene Editing”. After a break for tea we enjoyed talks by 4 “Elite Commercial Producers”, including Tylor Braden from King Ranch. Lunch was followed by an awards ceremony which included the “BIF Commercial Producer of the Year”, “Continuing Service” and “Ambassador Awards” along with the “Frank Baker and Larry Cundif Scholarship Awards”. Tea was followed by breakout sessions, which were actually feedback sessions, where one could choose between “Advancements in genomics and genetic prediction”, “Advancements in producer applications” and “Advancements in efficiency and adaptability”. The evening function was fantastic and was hosted at “Club 71” based on the South Dakota State University Campus Football Stadium.

Thursday, 20th June bore the theme “Utilization of Big Data” and started with feedback on “Multi-breed Genomic Evaluations” followed by “An update on the Latest Agri-tech Emerging in the Australian Grazing Industries”. This interesting talk by Dr. Mark Trotter covered grazing management and animal security using satellite technology. Tea was followed by feedback on “Big Data in Agriculture” and lunch. Much like the previous day, lunch was followed by an awards ceremony where the “BIF Pioneer Award”, “Seedstock Producer of the Year Award” and the “Roy Wallace Scholarship Award” was presented. The newly appointed BIF Board of Directors was announced and an invitation was extended to the envisaged 2020 BIF Conference. Tea was followed by breakout sessions, which included “Advancements in emerging technology”, “Advancements in end product improvement” and “Advancements in selection decisions”.

The conference was concluded with an evening social and BBQ at the South Dakota State University State-of-the-art Cowl/Calf Education and Research Facility.

We visited a prominent Charolaise breeder, a winery and Sioux Falls. The conference was again an opportunity to get an update on what is happening in the USA animal production world and to make more interesting international friends. Thank you to the ARC for this opportunity.

Some of the highlights of the trip:
- How clean and free of litter the streets of the towns were.
- The friendliness of service providers towards customers.
- The respect with which the rural youth treat older people.
- The reliance breeders place on technological advancements to increase productivity and profits in their breeding operations.

It was an honour to make a new friend in the person of Dr. Joe Cassady, Chairman of the BIF 2019 Organizing Committee.
With Lee Leachman from the “Lee Leachman Cattle Company” and current President of BIF whom I had last seen in South Africa back in 2012. Lee offers 2000 bulls a year, Continental/British composites bred for their EPD’s and sold at 4 auctions.

With Tracy Holbert, who is associated with Mound Creek Brangus and Blackwater Cattle Company and exporter of semen straws. I had not seen since 2011.

There were 456 conference goers, some of whom came from Australia, Canada and from South Africa.

Sioux Falls in town of Sioux Falls.
Anguskoeie

Vrugbaarheid • Moederskapvaardighede • Temperament

Angusbulle

Kalwingsgemak • Natuurlike poenskoppe • Ideaal vir kruisteling
Hoër speengewig

6 Redes om te teel met Angus

1. Markaanvraag
Angus-en Anguskruisbeeste is hoog in aanvraag weens konsekwente prestasie in 'n reeks markte.

2. Markveelsydigheid
Angus het uitstekende karkehalte, goeie bespiering en gematigde volwasse patrone wat maksimum markveelsydigheid bied.

3. Superieure vrugbaarheid en moederskapvaardighede
Anguskoeie is uitstekende moeders met goeie melkproduksie. Hulle is beste wat maklik kalf en maklik versorg word.

4. Vleisgehalte
Angus is regoor die wêreld bekend vir hul vermoe om konsekwent vleis van die hoogste gehalte te lever.

5. Beste veelsydige prestasie
Een van die belangrikste kenmerke van Angus is die ontsaglike balans van uitsers vrugbare, produktiewe vroulike diere en hoëgehalte-karkasse geskik vir 'n wye reeks markte.

6. Groot opgetekende genepeol
Angusbeeste word op elke kontinent in die wêreld geteel. Die groot hoeveelheid Angusdiere bied 'n ontsaglike poel beskikbare gene wat die ras in staat stel om te reageer op nuwe uitdagings en kommersiële eise.

Angusse is die wydverspreidste en mees gesogte gematigde vleisbeersas in die wêreld.

www.angus.org.za
Loading data on the National Animal Database

We are pleased to announce that all cattle pedigree data from SA Studbook has been uploaded to the National Database. The process of loading this data was not a simple one to undertake, due to the difficulties involved in merging the historical data of two complex databases. We are currently looking at the loading of the non-historic data as well as performance data.

LRF breeds

It seems that not everyone knows that the pedigree and performance data of the breeds in South Africa and Namibia that fall under the Livestock Registering Federation (LRF) are uploaded to the national database on a weekly basis. This has been done for a number of years now. However, there are differences between the two systems especially with regards to the performance data and generated indexes.

Phase C testing for Cows

Recently a number of cows were included in a Phase C test which is not a regular occurrence and has been some time since this last happened. We believe it is definitely something the farmers should consider doing in order to build the beef performance data for cows. The functionality to capture data, process it into information and extract comprehensive reports on the data collected are easily accessible and available on the Intergis.

Successful ICAR Accreditation

Something that seemed to quietly slip by was the ARC’s accreditation by ICAR. In March 2019 the ARC applied for and was granted certificates by ICAR in several areas, including for the production recording and genetic evaluation in beef cattle which is now valid until 1st April 2024.

Bloemfontein Office Relocated

On 1 June, the operational section of the INTERGIS, based in Bloemfontein, moved to their new premises. The address is Fedsure Building, 4th floor, 62St Andrews Street, Bloemfontein, 9301. Their postal address, telephone numbers and e-mail addresses remain the same.

Computer Equipment

Every four years there is a roll out of computer equipment in the ARC which means that all printers and personnel laptops and computers are replaced. This is just one of the aspects that enable the ARC to keep abreast with the latest technologies. This resulted in some applications having to be set up on the new equipment again, which can be a tedious experience. Fortunately, it did not have any major impact on the Intergis users or operations. It was a successful rollout and gave everyone the opportunity to clean up old data repositories and to once again start working on fresh platforms.
Accurate Performance Testing, EBV’s and their use

1. The bigger the group of animals to test the better. For instance, when weaning animals weigh them ALL including the ones being culled. Remember if only the “good” ones get weighed the spread from light to heavy is being cut off giving a skewed picture.

2. The correct management grouping is vitally important. For example, if mating groups ran separately for 3 months in similar pastures then together for 3 or 4 months before weaning they can be grouped together. If one group was fed extra, then those calves and their dams are in their own management group and should be marked accordingly. If this is not done the growth EBV’s (estimated breeding values) of the fed group will be inflated and will not be a true genetic value but an environmentally influenced value. This is often the case with show animals that are not given their own management group.

3. Breeding seasons simplifies performance testing and increases the accuracy thereof. When animals are grouped in a 60 or 90-day mating and then calving period, total management including weighing and measuring for performance traits becomes easier. We also have bigger groups of animals together. Shorter breeding seasons also puts pressure on selection for fertility.

4. A breeding objective for every stud and commercial breeder is a necessity. If you don’t have one, then performance testing as a tool is largely wasted on you. With a breeding objective, e.g. fertility, ease of calving and the breeding of heavy weaners, you can then select for these desired traits. You then buy bulls or rams having the desired EBV’s for birth and weaning.

5. Linking bulls or rams between seasons and breeders increases the accuracy of performance testing. “Rolling over” some bulls between seasons and groups of females increases the accuracy of EBV’s (estimated breeding values). The same applies if common bulls are used between two or three herds that do active performance testing e.g. by swopping bulls between two seasons while using some of the previous season’s bulls. The more that bulls can be directly compared to each other in the same management grouping the better.

6. Weigh and measure for all traits that your breed subscribes to. Ease of calving, calving weight, weaning, 400, 600 day and mature weights, scrotum size, sheath /navel score, carcass traits, residual feed intake and days to calving (fertility) are traits that come to mind. Remember some of these traits are correlated to each other but one shouldn’t rely on correlations. The more you measure the more you will know.

7. Always compare the EBV’s for different traits with the breed average to see if the animal is better or worse than the breed. Some catalogues don’t show the breed averages clearly. For example, a bull may have a wean or 200 day EBV of +12 and the breed average may be +15. This means the bull is actually 3 kg below the present breed average for that weight. The +15 for the breed usually means that from a certain base year, say 1993, the breed average may have been 220 kg, the breed as a whole has improved its average weaning weight by 15 kg to 235 kg. So the +12 bull’s weaning weight is estimated at 232 kg.

8. EBV’s should always be assessed together with their accuracy. EBV’s are, simply put, the average genetic value of a certain trait e.g. weaning weight that an animal will carry over onto its progeny. (See EBV calculation below). Pedigree, own performance, progeny and correlations all play a role. Young bulls offered at sales don’t have progeny yet so we depend on their pedigrees and own performance data. If this is in place then accuracies of above 60%, which are valuable for selection, will be reached.

Calculation of EBV

- **EBV** = (weight of individual – average weight of group) x heritability e.g. 400 day weight
  = (380KG – 350KG) x 0.4 (40% HERITABILITY)
  = 30KG x 0.4
  = + 12 kg based on own performance.

- An EBV is the prediction of the genetic value of a trait e.g. 400 day weight as above.

- The animal’s own performance, pedigree and progeny and correlations are used.
When 10 or more progeny of a bull have their own data up to weaning the accuracy of EBV’s for growth traits, for example, increases dramatically and the EBV then starts stabilizing. The higher the accuracies the more one can rely on EBV’s as a selection tool e.g. over 80% accuracy is regarded as very reliable.

9. An EBV for a trait of an animal denotes what the average of the progeny will be for that specific trait - NOT HOW ALL the progeny will perform. Stud and commercial breeders often have a misconception that a bull with a high accuracy EBV for a trait, lets say weaning weight, means that is how all his progeny will perform for that trait. Look at your full brothers and sisters in your own family and see how they differ for various “traits”.

Always remember quantitative genetics works on averages as every single progeny (except identical twins) will differ for certain traits due to so many gene combinations that can take place. Over, lets say, 25 progeny of a high accuracy (80%+) bull the average of those progeny for, lets say, weaning weight will be on or very close to the average between the dams and sires EBV (Figure 1).

By using bulls with good EBVs you improve your cow herd like this …..

EBV of new bull

The average of the new bulls daughters lies here (yellow upright line) between the new bulls EBV (green upright) and the present herd average (red upright). THE PROGENY AVERAGE HAS MOVED TO THE HEAVIER SIDE

Figure 1 Movement of herd average for a trait.

10. EBV’s should always be used in conjunction with visual appraisal when final selection of animals takes place. When selecting a bull look at the EBV’s of the bulls on offer and mark the bulls with the desired EBV’s you need for your herd. Then you go and select one or a few of them visually.

Structural correctness, muscling and masculinity in bulls and femininity in females, and other visual characteristics, also play an important role in the overall assessment of an animal. For instance, buying a bull or ram with excellent EBV’s but with leg problems like straight hocks and pasterns, or roll claws or weak pasterns will result in him not lasting very long and maybe breeding the problem into your herd.

11. Rand indexes are basically an economic value put on certain EBV’s for certain production systems and should be used for selection purposes if available. This could be a weaner system, a feedlot system or a grassfed system, for example. If your breed has these Rand indexes use the index closest to your production system to select the bulls with the higher Rand indexes to buy or to use. Thereafter you look at individual EBV’s for cut-offs e.g. birth weight and calving ease.

12. GEBV’s (genomic enhanced estimated breeding values) are not too far away and will increase the accuracies for traits. DNA testing (e.g. the 50K SNP test) will result in marker genes and combinations being identified for certain traits but this will not replace conventional performance recording. On the contrary. The phenotypic performance data of animals will be needed to identify which genes and gene combinations are responsible for which traits, for example growth up to weaning or fertility or good residual feed intake. Phenotypic data stays “King”.

Remember to follow a balanced approach when breeding. For example, if you achieve very high weaning weights but your herd’s mature mass is also higher, birth weight has gone up, calving ease has decreased and overall fertility has gone down you have probably not progressed at all regarding the amount of beef produced per hectare over the long-term.

The correct breeding objective will help you to benefit tremendously from using accurate performance testing and utilizing EBV’s properly. Optimum for your farming system is the key, not maximum. This is where Rand Indexes for various systems helps so much.
“Beef cattle farmers are high at risk as production declines and fertility may become poor in South Africa because of climate change”

M. Nkadimeng, G.M. Pyoos-Daniels & M. Bopape - ARC-Animal Production, Irene - NkadimengM1@arc.agric.za

World demand for meat is expected to rise by more than 200% from 229 million tons in 1999 to 465 million tons in 2050. Global surface temperature is also expected to rise by up to 4.0°C in the year 2100. This means global numbers of farm animals as well as their productivity will have to increase to meet such demand. However, extremely high temperatures experienced towards the end of 2015 and the beginning of 2016 in South Africa effected production and fertility of livestock. It is known that high environmental temperature is one of the major factors contributing to the reduced fertility of farm animals. Stressed animals by heat try to protect themselves by not reproducing and this leads to a decline in production rates.

An in vitro embryo production study at the Agricultural Research Council (ARC) demonstrated the mechanisms associated with the influence of elevated temperature on animal reproduction. It was reported that, heat stress decreases the viability of oocyte (cow egg) and embryos during exposure to high temperature. Embryos exposed to heat stress showed reduced number of trophectoderm cells that forms the body of the fetus and inner cell mass that represent the umbilical cord. Growth performance of beef cattle has also dropped drastically in the 2015/16 hotter season. Average daily gain (ADG) from birth to weaning of calves out of specialized sire lines decreased when compared to growth performance in the 2014/15 and 2016/17 cooler seasons.

The Bonsmara decreased by 46%; Angus by 29%; and the Simmentaler by 33%. The Afrikaner and Nguni were the least affected with a decrease of 5% and 17% respectively. The ARC has a new GrowSafe® System from Canada, which correlated ADG derived from partial and full body weights, the correlations of ADG over shorter test periods, are low. When measuring ADG of either estimates over longer test trials, the correlation is higher which now allows the ADG to be measured from partial body weights over a test period of only 8 weeks. The negative effects of climate change on animals will be the consequence of combined changes due to the magnitude of extreme weather events. Breeding with indigenous breeds such as the Afrikaner and Nguni are possible considerations in this climate change era as they are characterized as well adapted to harsh conditions. Furthermore, South Africa must look into different genotypes and possible genetic mechanisms involved in survival of beef cattle to heat stress.

![Figure 1](https://example.com/image1.png)  
**Figure 1** Image taken from a Thermal imaging camera detecting an animal under heat stress (in red)

![Figure 2](https://example.com/image2.png)  
**Figure 2** Represent a healthy cow egg (A); heat stressed cow egg (B), stained healthy mature embryo (C) and, stained heat stressed embryo with reduced amount of cells (D)
ARC-ANIMAL PRODUCTION

ARC-Animal Production conducts fundamental and applied research with partners to generate new knowledge, develop human capital and foster innovation in agriculture through technology development and dissemination, and competitive commercialization of research results, in support of developing a prosperous agricultural sector.

WE ALSO PROVIDE SCIENTIFIC SERVICES IN THE FOLLOWING AREAS:

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Food loss and waste is defined as the decrease in quantity or quality of food along the food supply chain, although in practice there is no commonly agreed definition. Food loss occurs along the food supply chain from harvest up to, but not including, the retail level. For example, any food that is discarded, incinerated or otherwise disposed along the food supply chain and does not re-enter in any other productive utilization. Food waste occurs at the retail and consumption levels, such as food that deviates from what is considered optimal, leftovers, etc. According to FAO, in developing countries food waste and losses occur mainly at early stages of the food value chain and can be traced back to financial, managerial and technical constraints in harvesting techniques as well as storage and cooling facilities. The South African beef industry is one of the fastest growing agricultural sectors, however, animal by-products are not efficiently used. Animal blood is a readily available animal by-product in the abattoirs that can be recovered to reduce food loss. It is estimated that approximately two million cows in South Africa are slaughtered per year and that 12 litres of blood per cow is wasted at the bleeding area.

World’s food losses in the meat industry

Abattoirs that process blood, use it for manufacturing of animal feed, such as carcass meal. In other abattoirs blood is treated as waste and is discarded. These abattoirs get rid of blood by burying or spraying it onto the fields to fertilise pastures. The reason for burying blood may be the lack of suitable facilities and technology to properly collect or handle blood. Improper disposal of blood can be a health risk and could be detrimental to the environment. This problem can be alleviated by hygienically collecting blood using a hollow knife so that the blood can be used for human consumption by making the blood sausages and other food products.

Food loss is a global concern: Everyone has a part to play in reducing food loss and waste

In order to take part in the reduction of food loss, our meat technology section of the Agricultural Research Council-Animal production (ARC-AP) is currently focusing on the utilisation of the less utilised meat-by products (intestines, organs, and blood) in processed meat products. Our study titled “Utilization of slaughterhouse blood as an edible by-product of meat” has shown that livestock blood can add value to the South African meat market. The blood was hygienically collected from the cattle slaughtered at the experimental abattoir of the ARC-AP. The cattle blood mixed with the beef trimmings and organs was used to manufacture the blood sausages (Figure 1).

Figure 1 Blood sausage
The iron found in blood sausages is mostly haem-iron which is well absorbed by the body, and therefore, useful for food based strategies designed to combat iron deficiency anaemia. The iron content of blood is as high as 400-500 mg of iron per litre. Utilization of livestock blood in various foods will help to alleviate the protein-energy malnutrition and iron deficiency anaemia. These macro-and micro nutrient deficiency diseases are wide spread in South Africa, especially in poor communities.

Livestock blood also has functional properties such as water binding capacity, fat emulsifying and colouring capacity when used in foods. Edible animal blood is also used as protein and iron enrichers. Besides its nutritional and functional properties, animal blood has sensory properties that are acceptable for human consumption. Our study demonstrated more than 70 % acceptability of the blood sausages and some consumers showed interest to purchase such products if they are available in the market. Furthermore, we found that livestock blood has long been used as food in South Africa. Ethnic groups that already eat cooked livestock blood in South Africa mix it with edible offals (intestines, tripe, tongue, etc.).

The cooked blood product has different names depending on the ethnic group, for example, it is called ‘bobete’ in Sotho languages, while it is ‘ubende’ in Nguni languages. It is obvious that livestock blood is an important part of the cultural "food basket" of the majority of people in South Africa.

Therefore, in order to reduce food losses, South Africa needs to efficiently use the blood of the animals slaughtered in the abattoirs to make food for human consumption. This will increase food security, reduce environmental pollution and a further incentive will be the increased profits that will be made through adding value to the blood. The utilisation of blood as a by-product of meat is not only economical, but environmentally and ethically appropriate as well. The 2017 report of the world wide fund for nature has shown that approximately a third of the food produced in the world today goes to waste, and South Africa is no exception. Like the rest of the world, food not consumed in South Africa simply ends up in landfill, adding further pressure to an already over-extended waste-disposal system.

Laboratory analysis was conducted to determine safety, nutritional value and consumer acceptance of the products as well as purchase intent. The results of the study showed that the blood sausages are safe to eat. Regardless of high pH (6.4) and water activity (0.97), microbial growth of the blood sausages remained controlled throughout the storage period of 11 and 21 days at 4 °C (normal refrigeration temperature) in the overwrap and vacuum packaging, respectively. Only micro-organisms known to be common in blood based products and derivatives were assessed. Lipid oxidative stability of the sausages exceeded spoilage limits after at least 25 days of frozen storage in the overwrap packaging. It should be taken into consideration that the preservatives were not used in the formulation. From the nutritional point of view, the protein content of the blood sausages was approximately 15 %, which is comparable to that of lean beef. The iron and ash contents found in the blood sausages were very high compared to that of lean beef. The iron content was 284.28mg/kg on dry basis, and the ash content was 2.9 %. High ash content implies high mineral content. However, it should be noted that nutritional value of blood sausage is mainly explained by the ingredients used, such as amount of blood, and many other ingredients used in the formulation (cereals, vegetables, etc.). Literature has shown that the whole blood contains about 18-19 % protein similar to that found in lean meat, and that the protein from blood sausages provides essential amino acids such as lysine. This makes it a good complement for cereal.

"Prevent and reduce; be part of the solution" Let’s all tackle the South Africa food loss problem
Research have shown that marbling adds significantly to the palatability of beef due to its specific contribution to juiciness and flavour. Beef with low levels of marbling will lead to meat that is perceived to be dry and less tasty. This has led to a renewed interest by beef producers farming with traditional beef breeds to increase the marbling scores of their seed stock. Since RTU scanning give breeder’s data about the marbling content of their breeding stock, more and more cattle breeders request RTU scanning for marbling. The following points need to be kept in mind when requesting RTU scanning for marbling scores for selection purposes.

1. Intramuscular fat content (% fat) or marbling score is late maturing. Fat is deposited after bone and muscle, and then fat is firstly deposited abdominally, then inter muscular, then subcutaneous and then intramuscular.

2. The major nutritional and/or management tool for increasing the development of marbling is to maximise the availability of net energy (and glucose) for fat synthesis during the finishing phase.

3. Selection for high levels of muscularity is known to reduce both fat percentage and intramuscular fat at a given carcass weight.

4. The best time therefore to scan for marbling is later in life, about the time the animal is rounding off for slaughter on a diet that supplies surplus energy for intramuscular fat deposition! When the conditions discussed in this article are not met, coupled with the fact that marbling scores are the least accurate of all the RTU scores taken, then marbling scores should be used very conservatively for selection purposes!

5. Keep in mind that the Breedplan manual advises that animals need to be scanned between 300-800 days of age. It is also specified that a minimum rib fat depth of 5mm is required for animal classes to ensure that sufficient variation is present for genetic differences in fat depth and marbling to be expressed. It is also advised that groups do not have an average weight of less than 300 kg, as animals smaller than that might not be large enough to collect analysable marbling images from.

Based on points 1, 2 and 3 discussed above, it is critically important to indicate different contemporary groups especially when the different contemporary groups are based on different feeding regimes.
Afrikanerbees Week 2020

- Afrikanerbees uitstallings
- Afrikaner Skou
- Basiese- en gevorderde kursusse
- Simposiums
- Afri Beef restaurant
- Diere hantering demonstrasies
- Gala Dinee
- Nasionale veiling
- Karkas- en snit demonstrasies en besprekings – Johan Pienaar
- Weeg en meet van diere
- Tatoeëring
- Oor tags
- Voorkoming van veediefstal
BACKGROUND

Indigenous Livestock, and breeds developed from these breeds, e.g. the Bonsmara and Dorper sheep, form the backbone of sustainable livestock production in South Africa. These breeds are better adapted to survive and reproduce under harsher environments. This will become even more important in the era of climate change. The Afrikaner is extremely well adapted to the climatic and other conditions encountered under extensive ranching in South Africa. The Afrikaner cattle breed is one of three indigenous beef breeds in South Africa (the others are the Drakensberger and Nguni) and among the oldest indigenous breeds in South Africa. Since the ARC already has herds of Bonsmara and Nguni cattle, it was appropriate to establish an Afrikaner herd.

COLLABORATION WITH INDUSTRY

ARC-Animal Production has been collaborating with the Vaalharts Research Station, of the Northern Cape Department of Agriculture, Land reform and Rural Development, on a crossbreeding project, which includes the Afrikaner breed. In addition, the ARC is the service provider for the Afrikaner Cattle Breeders’ Society in respect of pedigree and performance recording through the INTERGIS. Surplus Afrikaner females and bulls transferred from Vaalharts to ARC Irene during 2018 formed the basis of the current herd.

STATUS OF THE HERD

Currently the Afrikaner cowherd at Irene consist of two Studbook Proper (SP) cows, three F3 cows, ranging from 5 to 8 years old, and five F1 heifers. Four SP heifers purchased at the 80th National Afrikaner Auction at Hoopstad in October 2019 will add to the herd's variation of genetics from some of the most prominent herds in the country.

AIM OF THE HERD

The aim is to establish an elite Afrikaner herd with between 25 and 30 breeding cows. The breed played a role in the development of six composite breeds in South Africa. If the ARC establishes such a herd, it can be utilized for research purposes, for example fertility, since a major gene for fertility may possibly exist in the Afrikaner. It can also contribute for genetic material and phenotypes to the Afrikaner Beef Genomics project, and provide better links between the different Afrikaner herds. Plans for the herd include the supply of breeding stock to other ARC herds as well as superior genetic material to communal and emerging farmers on ARC auctions hosted at the ARC Agri-Indaba at Irene.
Improved cow-calf efficiency is the key to reduce the carbon footprint of beef production

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ARC-Animal Production, Irene - Gscholtz@arc.agric.za

Introduction

An effective way to reduce the carbon footprint, is to reduce animal numbers and increase the production per animal unit. Increased productivity generates less greenhouse gas (GHG) emission per unit of product. The goal should therefore be to improve production efficiency and revenue and not merely genetic change or higher production. Selection for many of the traditional traits may increase production, but not necessarily productivity or efficiency of production.

The cow-calf production cycle is responsible for most of the energy consumed and in beef cattle it is approximately 72% of the energy consumed from conception to slaughter. In the mature beef cow, maintenance requirements represent 70% of her feed expenses and the average feed cost per cow is 42% of the total annual production cost.

It is therefore clear that if cow maintenance requirements per unit of product can be reduced, it will decrease the carbon footprint.

The principle of Large Stock Units

In South Africa, a Large Stock Unit (LSU) is defined as the equivalent of an ox with a live weight of 450 kg which gains 500 g per day on grass pasture having a mean digestible energy of 55% and to maintain this, 75MJ metabolizable energy per day is required. This is similar to the Animal Unit used in North America.

It is important to note that the LSU equivalent of cows with the same body weight but different frame sizes is different. Furthermore, the relationship between cow weight and LSU is not linear. The differences in LSU units between animals of the same body weight, but with different frame sizes is based on the principle that there are differences in the voluntary feed intake between such animals, although they have the same body weight.

The daily feed requirements and LSU’s of cows with calves of different frame sizes are indicated in Table 1. Using the IPCC Tier 2 approach, it was estimated that the enteric methane emissions factor (MEF_{enteric}) of a LSU = 94 kg methane/year.

### Table 1

<table>
<thead>
<tr>
<th>Cow weight</th>
<th>Small frame</th>
<th>Medium frame</th>
<th>Large frame</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daily feed intake</td>
<td>LSU</td>
<td>Daily feed intake</td>
</tr>
<tr>
<td>350</td>
<td>10.0</td>
<td>1.11</td>
<td>10.6</td>
</tr>
<tr>
<td>400</td>
<td>11.0</td>
<td>1.22</td>
<td>11.7</td>
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<tr>
<td>450</td>
<td>11.9</td>
<td>1.32</td>
<td>12.6</td>
</tr>
<tr>
<td>500</td>
<td>12.8</td>
<td>1.42</td>
<td>13.6</td>
</tr>
<tr>
<td>550</td>
<td>13.7</td>
<td>1.52</td>
<td>14.5</td>
</tr>
<tr>
<td>600</td>
<td>15.3</td>
<td>1.69</td>
<td>17.8</td>
</tr>
</tbody>
</table>

Feed requirements and LSU’s of cows with calves of different frame sizes
Cow efficiency

The three component traits that influence efficiency in beef cows are:

- Weaning weight of the calf.
- Feed requirements to produce the calf. Cow Large Stock Units (LSU) can be used to estimate cow feed requirements, since it is linked to daily feed intake.
- The frequency at which a calf is produced. The inter-calving period (ICP) can be used to estimate calving percentage.

Cow efficiency is therefore defined as: Weaning rate [can be deducted from ICP] x (205-day weaning weight of calf/cow LSU).

An example of the calculation is given below, where the weaning rate is 80%, the 205-day weaning weight is 202kg and the cow weight (small frame breed) is 450kg.

Example: 0.80 x (202kg / 1.32 LSU) = 122.4 kg weaned per LSU mated.

If the carrying capacity is known, then it can also be expressed in kg calf weaned per ha. For example, if the carrying capacity is 6 ha/LSU then the kg calf weaned will be 20.4kg per ha.

Likewise the MEF_{enteric} can be calculated as being 0.77kg methane/kg calf weaned.

Changes in the cow efficiency and the carbon footprint of four South African indigenous/locally developed breeds over a period of 33 years were studied. The results are presented in **Table 2**.

From **Table 2**, it is clear that the cow efficiency in all four of these breeds improved by between 10% and almost 19%. This resulted in the reduction of the carbon footprint, as measured by the MEF_{enteric}, by between 6.65 and 12%. Such results will be important if a carbon tax is to be introduced for livestock products. **Figure 1** depicts an Afrikaner cow that weaned a calf that weighed 66% of her own body weight.

A similar study indicated that in two exotic breeds the cow efficiency decreased by 4%, resulting in a higher carbon footprint. The question that arises is whether this is the result of "wrong" selection, or is it already the impact of climate change that is influencing cow efficiency.
Selection of cow efficiency

The ideal beef cow will be one that use less resources to produce the same output, which will be a reflection of biological efficiency. The historic definition of biological efficiency has been defined as the kilogram of calf weaned per cow exposed, but this has changed with the realization that it is important to have some input-output relationship. Figure 2 depicts an extreme example of cow efficiency.

There are basically only two measures of cow efficiency, namely calf weaning weight/cow weight ratio and calf weaning weight/cow weight ratio. Recently, the kilogram calf weaned per Large Stock Unit (KgC/LSU) as breeding objective, was investigated as a measure of cow-calf efficiency. The heritability of this trait (h^2) and its genetic correlation (r_g) with cow weight is indicated in Table 3.

<table>
<thead>
<tr>
<th>Breed</th>
<th>Bonsmara</th>
<th>Afrikaner</th>
<th>Angus</th>
<th>Charolais</th>
</tr>
</thead>
<tbody>
<tr>
<td>h^2 KgC/LSU</td>
<td>0.26</td>
<td>0.52</td>
<td>0.24</td>
<td>0.21</td>
</tr>
<tr>
<td>r_g KgC/LSU and cow weight</td>
<td>-0.83</td>
<td>NA</td>
<td>+0.84</td>
<td>-0.75</td>
</tr>
</tbody>
</table>

From Table 3 it can be seen that the trait KgC/LSU has a moderate to high heritability. However, there were major differences in the nature of the relationship between KgC/LSU and cow weight among the different breeds. This clearly demonstrates that the use of such ratio traits as selection criteria has theoretical defects, since it places inconsistent emphasis on the component traits. This will result in variable responses to selection. In spite of this, the use of calf/cow weight ratios is still common practice.

The way forward

A “Cow Productivity index” is a more effective alternative, with minimal to no defects, and should include cow weight and calf weight but restricting cow weight. A restricted selection index will limit or restrict improvement of cow weight which is also associated with high maintenance cost. There are two alternative restricted indexes that should be considered, viz (1) improve efficiency by increasing pre-weaning gain, while holding cow weight constant; or (2) by holding pre-weaning gain constant and reducing cow weight.

A trait, “Accumulated productivity” (ACP), which is defined as kg of calf weaned/year over the cow’s lifetime, was investigated for the Afrikaner breed and the h^2 was found to be 0.39. This indicates the existence of an additive genetic component as demonstrated by the moderate heritability estimate. The genetic correlation estimates between ACP and the reproductive traits (AFC, and CI) are often moderate to high and negative. The implication is therefore that selection based on ACP could result in genetic gains favourable toward these traits in beef cattle.
Hou jou vinger op die pols van landbou
INTRODUCTION

The backbone of a cow-calf production system is the selection and integration of heifers into the beef herd. The replacement heifer is the foundation of a productive cow herd, and its selection and development can greatly impact the economics of the farm operation through its genetics, future performance and longevity. A good heifer management program is an essential component in overall reproductive management and ensuring performance of the breeding herd. Good heifer management achieves early puberty, higher weaning rates, low mortalities and early identification of females for turnoff. The objective is for only efficient first-calf cows entering the main cow herd at 3 years of age.

WHY A GOOD HEIFER MANAGEMENT SYSTEM IS REQUIRED

Heifers suffer greater nutritional demands than cows as they are attempting to reproduce and grow simultaneously. Unless mating is well controlled, a high proportion of heifers can have their initial lactation during a dry season, because puberty can be reached at any time. Usually only well-managed heifers will conceive during their initial lactation.

The above factors result in low calf output and high mortalities. As well, inappropriate timing of initial lactation, coupled with poor nutrition, may permanently stunt heifers, thus reducing their turnoff value.

SELECTION OF HEIFERS

Focus on traits that are economically important.

A heifer has no proven track record in traits such as reproduction, ease of calving and maternal ability, therefore use all available information of her mother and, where applicable, her father and other relatives to make an informed decision at selection.

Where available, breeding values (rather than indices) should be used in selection.

Use breeding values in balance with other important traits, especially functional efficiency.

GENERAL PRACTICES AND MANAGEMENT OF HEIFERS

Essentially, weight, condition and growth rate are more important than age, as this will determine the health of both cow and calf. Ensure that heifers are suited to the production environment, as first calvers have high nutritional needs. Manage heifers and first-calf cows separately.

HEIFER SELECTION PROCESS

■ First Selection at weaning.
  The traits that need consideration at this stage are the following:
  Wean direct breeding value; wean maternal breeding value, reproduction traits, hereditary defects, functional problems, frame size, hormonal imbalances, and temperament.

■ Second selection before breeding.
  The traits, which should be evaluated at this stage, are the following:
  ▪ Pre-wean and post-wean growth, 12-months and / or 18 months' indices.

■ The third selection of heifers occurs when pregnancy diagnosis is made.
  At this stage, all heifers that are not pregnant should be culled.
  ▪ If more pregnant females remain than needed for replacement and/or building the herd, it can be considered to also cull the heifers that became pregnant late in the breeding season.

■ The fourth selection of heifers (in actual fact first-calf cows) is when they have calved. Cull all first-calf cows that had difficult calvings, considering off course that there were no other environmental factors involved, such as overfeeding, shortly before calving. Or the use of a bull that gives large calves at birth, which could have caused the high birth weights.

■ The final selection (of first-calf cows) takes place during the weaning season.
  ▪ Cull all first-calf cows whose calves have a low (under 90) weaning index.
  ▪ Also cull first-calf cows with a low (under 90) cow efficiency index.
BREEDING OF HEIFERS

In selecting the best time of year to breed heifers, it is recommended to synchronise lactation with the raining season to improve the chance of heifers successfully rearing calves and of re-conceiving during the first or second lactation. A heifer that calves synchronised with the raining season is much easier and cheaper to manage than one that calves out of season.

Generally, once females began to cycle, a joining period spanning over three cycles or nine weeks is required to achieve a 95% pregnancy rate. About 90% will get pregnant within a couple of cycles and 95% within three cycles. A bull to female ratio of 1:15 is recommended and the breeding bulls should have passed a Bull Breeding and Soundness Examination.

Get heifers at 65% of expected mature weight at breeding. Use short breeding season: 45 – 65 days. Breed heifers: 4 – 6 weeks before the cow’s breeding season. Use proven ease-of-calving bulls on heifers.

NUTRITIONAL MANAGEMENT

Nutritional management is important so that heifers reach desired critical mating weight and are in body condition score of 3 or better at calving. Maintain adequate body condition and growth during their first lactation. A good simple approach is to manage nutrition to keep heifers well above maintenance so the skeleton keeps growing. Heifers must have access to adequate pasture, water and supplementation to keep them in the best possible condition. When heifers and first-calf cows lose condition prior to calving, their reproductive systems tend to shut down, which significantly reduces their chances of re-conceiving during lactation.

Good management of heifer nutrition starts with good pasture management and grazing management. Seasonal conditions, pasture condition, soil type, stocking rates, land condition, and grazing management all greatly affect pasture quality and quantity. Both pasture quantity and quality are important because both affect consumption of dry matter and hence the nutritional status of the animal. Additional nutrients may be required to enable pregnant heifers to cycle again following calving. Supplements may be necessary to correct major mineral deficiencies, which can impact significantly on feed intake, growth rates and fertility.

GENETIC IMPROVEMENT

Both age at puberty and weight at puberty are highly heritable. This means genetic progress can be made in these traits. Sire-effects alone can account for variations of at least 100kg in weight at puberty of female puberty. Additionally, heifers that conceive early in the breeding period can be identified and recorded for future reference.

Good management of heifer nutrition starts with good pasture management and grazing management. Seasonal conditions, pasture condition, soil type, stocking rates, land condition, and grazing management all greatly affect pasture quality and quantity. Both pasture quantity and quality are important because both affect consumption of dry matter and hence the nutritional status of the animal. Additional nutrients may be required to enable pregnant heifers to cycle again following calving. Supplements may be necessary to correct major mineral deficiencies, which can impact significantly on feed intake, growth rates and fertility.

ACKNOWLEDGEMENTS

Finding value in cattle shows in an era of modern breeding

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According to Llewellyn Angus, the Brahman breeders’ societies in South Africa and Namibia offer a good example of how breed societies can effectively combine the showing of animals with an equally important focus on genetics and scientific breeding. The showing of cattle is often used by stud breeders to market their animals. However, as genetic values become more prominent as a tool to improve the performance of herds, is there still a place for the showing of cattle? Show judge and breeder Llewellyn Angus investigates.

Showing or exhibiting animals to determine which the phenotypically ‘best’ animal is has been practiced for a long time. As many breeders will tell you, they enjoy farming with animals that offer visual appeal. However, these animals must earn money for their breeders. Breeders and buyers put an economic value on animals for two main reasons: their genetic or breeding value (what they can bring in financially in terms of production), as well as their appearance.

An animal’s visual appeal is determined by its structural correctness and functional efficiency, as well as characteristics such as coat colour and shine, masculinity and muscle development, or femininity in the case of females. Estimated Breeding Values (EBVs), on the other hand, provide insight about an animal’s genetic value for certain genetic measurable traits such as birthweight, calving ease or weaning weight.

The benefits of showing

This is not to say that there are no benefits to showing cattle. Show animals are scrutinised by cattle judges, like me, to the finest detail for structural correctness, functional efficiency and breed characteristics. When judging bulls, a lot of emphasis is placed on overall masculinity, the scrotum and sheath, legs, which are an indicator of walking ability, and on muscling. When judging females, the animals are evaluated for their femininity, udders, whether they have the wedge-shape build and capacity to carry and birth a healthy calf, as well as their legs and walking ability. Through economically the best to breed with. Phenotype, or what an animal looks like, is a combination of genotype and the environmental factors that the animal has been subjected to. From this point of view, one assumes that show cattle have been subjected to favourable environmental conditions so that they can be in the best possible condition. However, the ‘prettiest’ cow, economically speaking, is not necessarily the one with the most phenotypically correct appearance, but actually the one that weans a good calf each year under normal ranching conditions.

There is no harm in participating in shows as a hobby, but if showing is part of your business of breeding productive and efficient cattle, then you could be mixing up your objectives. Breeders of certain breeds do still pay big money for show prize winners or champions, even if these animals have poor EBVs. But how much longer will this trend last? Show cattle, with their higher level of nutrition and hands-on management, cannot be compared directly with a large herd of cattle on the veld that are more often than not the animals that are actually making the money on the farm. They are, in effect, an isolated group of animals that are supposed to represent the ‘better’ animals that a particular breeder has to offer. But how do we define ‘better’?

The expenses of showing, and the maintenance cost of show animals, can easily total R10 000 per animal per year or more.

Looks versus performance

A question that has long plagued the tradition of showing cattle is whether the best-looking animals, which are crowned winners at shows, are also
visual inspection, a show judge can determine whether an animal is coarse or fine-boned, large, rangy or podgy, whether it has good breadth and capacity, poor or good muscling in bulls, or too much definition of muscling depending on the breed.

In addition, whether or not an animal adheres to breed characteristics can also be evaluated visually. Therefore, visual appraisal remains important for show and non-show animals when assessing cattle for structural faults and functional efficiency. The old saying “form follows function” still holds true. These days' inspectors, who are usually judges as well, also consider the EBV's of stud animals during on-farm inspections.

Making 'figures' count

Where do 'figures' come in with show cattle? The animals are weighed and measured for traits such as birth weight and weaning weight, scrotum circumference, yearling weight, 600-day weight and hip height. Also, when judging cows over three years old, it is imperative to check the number of calves they have had and to discriminate against less fertile cows. As Dr Cliff Lamb from Texas A and M University puts it: “Females selected for breeding without the necessary fertility metric will have a negative impact on the herd's overall fertility”. This also applies to show cattle. But a breeder might ask what happens if the management grouping of show cattle wasn't done accurately.

This may very well result in overblown actual weights and EBV's for growth. For this reason, the biggest problem presented by the smaller management groupings within which show cattle are measured and judged is the resulting lower accuracies of EBV's when compared with the larger farm cattle management groups. On-farm we can typically have 10 to 15 calves in a contemporary group, but with show cattle we may have only two or three animals in a group, which is insufficient for accurate performance testing. A possible solution will be to select animals for showing only after the yearling weights and scrotum size have been performed on the entire management group.

Combining figures and visual assessment

Some examples where performance figures and visual assessment are already combined in the show ring include the Simmentaler, Simbra and some other breeds' super-cow class, where cows only qualify if they have had at least three calvings, and where a Simdex (Simmentaler reproduction index) is combined with a visual assessment score to determine an overall winner.

The existing Breedplan BLUP (best linear unbiased prediction) bull classes of various breeds, where certain EBV values are combined with a visual score, is a good example of crossover show classes. The Agricultural Research Council’s awards, as well as the South African Stud Book’s annual Phase C Performance Test Awards, are similar, where every breed society decides visually which bull of the qualifying bulls is the breed winner. These qualifying bulls have attained certain minimum performance criteria. According to international show judge, Dr Thomas Grupp of Bayern Fleckvieh Genetics, when judging show animals in events where performance figures are also taken into account, there must be a balance between the visual appraisal and the placing of animals based on performance test scores and EBV figures. Martin Seyfferdt, another show judge, agrees that if figures are available, they must be used, but there must be a balance between them and the visual appraisal.

When buying bulls for breeding, though, one must first look at the figures to identify which animals' breeding values will achieve the breeding objectives set for a particular herd. Only thereafter a visual appraisal of those bulls with the desirable breeding values is warranted. Ultimately, one must remember that certain attributes or qualities can be determined via visual appraisal, but others can only be determined by recording performance data resulting in EBV's.
breeder should make use of all the tools at his or her disposal when assessing animals. When looking at cattle breeds throughout the world that have placed the emphasis on showing, it is clear that those breeds have lost market share. The breeders that have focused instead on improvement, based on the genetic trends of the whole breed, and on the whole breed’s good and bad attributes, gained market share.

In South Africa, there are a number of breeds, including most of the synthetic cattle breeds such as the Bonsmara, that do not show at all, and this has not necessarily harmed their market share growth. Breed statistics in South Africa actually show the opposite.

The future of showing

Traditional showing does have its place in the industry, as long as participating breed societies and the commercial beef industry are aware that what is put on display in the show ring is only part of the whole story. Over time, due to economic and labour constraints, showing as we know it today will probably become less popular and only the bigger shows will survive, while open inspection days of animals on-farm, and young bull days, will become more popular.

When breeders start paying less for traditional show winners, and more for phenotypically correct animals with the required EBV’s, whether they be show-winning animals or not, the industry as a whole will be moving in the right direction. Visual assessment for structural correctness and other attributes will always be important, but stud breeders must remember that their bread and butter are the commercial breeders to whom they supply 90% or more of their stud bulls, and for these breeders, a bull must move the commercial herds forward in terms of performance.

Breed Societies should consider limiting showing in the conventional way, and instead pursue new ways to promote their breeds, including open inspection days, young bull days or non-halter showing. If a society chooses to continue showing, participating breeders should try to select show animals only after a year old so that all traits and weights up to then would be directly comparable in big management groups. When a society or breeders make showing their first priority, they are forgetting about balancing the breed and its objectives. No breed should be bred for the show ring, but for the farm.
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The Complete Breed
Mr Ferreira enrolled for a B.Agriculture Honours degree, majoring in animal production management during 2018. During the graduation ceremony on 11 April 2019 at UFS the degree was awarded to Mr. Ferreira. For his research project he worked on Phase C data of Braham bulls. These bulls were tested at the four ARC testing centres and four private centres. The topic was Non-genetic factors affecting feedlot performance of SA Brahman bulls. From this study it came to light that the herd where the bulls originated from had an effect on the performance of the bulls. The non-genetic factors are mostly beyond the control of the breeder, indicating that the breeding objectives of the breeders play an important role.

I would like to thank ARC-AP for affording me the opportunity to complete my Bachelor of Agriculture Honours majoring in animal production management. I would like to thank the Brahman Cattle Breeders’ society of South Africa for releasing the data for this study.
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INTRODUCTION

The aim of these guidelines is to assist breeders in applying good management and recording practices to optimize their herds’ genetic evaluations, i.e. to optimize the amount, correctness and effectiveness of your herd’s data that is used in a BLUP analysis. The accuracy value, reported with each breeding value, only reflects the amount of data available to predict a specific breeding value. It does not reflect the correctness of the data used for the prediction.

For all types of recordings, there are two basic aspects of importance, namely:
- Correct (and honest) recording; and
- Complete recording.

Management practices that can influence the accuracy of breeding values:
- Animal recording;
- Parentage recording;
- Performance recording;
- Contemporary groups; and
- Genetic linkages

ANIMAL RECORDING

Animal details, particularly the correct sex and birth date, are essential for assigning an animal to the correct contemporary group (e.g. sex and birth season) and for applying the correct correction factors (e.g. for age) in the genetic evaluation (BLUP) model.

- Ensure all calves are recorded at birth, also to keep the reproduction records of cows complete.
- Ensure that all animal details (particularly birth date and sex) are recorded correctly.
- Ensure that birth notifications are submitted on time for all calves.

PARENTAGE RECORDING

Assigning the correct parents to a calf is one of the most important factors for genetic evaluations, because this is the basis of all genetic relationships of that particular animal. Incorrect parentage recording not only influences the accuracy of the breeding values of the particular animal, but also of all its relatives. The more performance-tested relatives of an animal included in the BLUP analysis, the more accurate the breeding value predictions of that animal will be.

- If possible, make use of single sire matings or, if multiple sires are used, do parentage confirmation by means of DNA analyses.
- Record mating groups correctly and ensure that these records are kept in a safe place.
- Record AI sires correctly from the semen straws.
- If AI is followed with mating within 28 days of the last AI date, parentage confirmation should be done by means of DNA analysis.
- For all calves born from embryo transplants, do parentage confirmation by means of DNA analysis.
- Mark calves and record calves’ particulars, including the dam and sire, as soon as possible after birth.

PERFORMANCE RECORDING

In general, guidelines on animal performance recording are aimed at identifying – as far as possible – environmental (non-genetic) effects that may have influenced the performance of a specific animal.

- Ensure that all selected traits are recorded for the group, because recording of a specific trait will enhance the accuracy of other correlated traits. (E.g. the recording of yearling weight will increase the accuracy of weaning weight and vice versa).
- Ensure that the weighing/measuring instrument (e.g. your scale) is in good working order and calibrated correctly.
- Weighing procedures:
  - Weigh all animals of a contemporary group on the same day or, if not possible, on consecutive days, i.e. avoid weighing animals of a contemporary group on dates that are far apart. This is to eliminate weighing date effects (e.g. quality and/or quantity of pastures which may change from one weighing date to the next, etc.).
  - Weigh all animals after being withheld from food and water for 12 hours. This practice will decrease weight variation due to gut fill.
Ensure that an animal is correctly identified – preferably before the weight is recorded.

Ensure that the weight is correctly observed and recorded.

Reset the scale’s zero, if needed, with regular intervals when weighing a group of animals.

Compare the recorded weight with (recent) previous weights of the animal. If any discrepancy is observed, weigh the animal again to make sure the correct weight is recorded.

Check for reading/writing errors when recorded data is transferred to your computer or input documents.

CONTEMPORARY GROUPS

One of the most important issues in animal recording, for genetic evaluation purposes, is properly defined contemporary groups. Poorly or wrongly defined contemporary groups are probably the most important source of low prediction accuracy in genetic evaluations.

A contemporary group can be defined as a group of animals born in the same year/season (similar age range), at the same location (same herd or farm), of the same sex, and managed alike from birth to the time of measurement (same feeding regime, date of measurement, etc.). Of these factors, poorly or wrongly defined seasons, extended age ranges, restructured contemporary groups due to animals moving from one group to another and animals assigned to the wrong management groups, are the most common sources of poorly or wrongly defined contemporary groups.

In general, guidelines on contemporary or management groups are aimed at ensuring that any contemporary group is defined in such a way that all (or at least all significant) environmental effects - except for those that are corrected for in the evaluation model, e.g. dam age – are the same for all animals within a particular group. This (combined with good genetic links between groups) will ensure that BLUP can effectively separate genetic and environmental effects within any particular group.

The grouping of animals is done basically in two ways, namely:

- Automatic groupings, e.g. breed, herd, birth year and season, sex, birth status (single/twins), etc.;
- Farmer supplied (or influenced) management groups, e.g. weighing date, calf age, rearing status and feeding status.

A farmer can do little about the automatic grouping aspects and therefore it will be discussed very briefly:

AUTOMATIC GROUPING

- **Herd:**
  Only calves bred and weighed in the same herd or locality can be compared. The locality (farm or test centre) where a group (herd or test group) of animals is kept at a specific point in time is called the “keeper”. If a farmer has more than one farm where the animals (within breed) are managed as independent, separate herds and/or the climate, veld type, management or quantity and/or quality of forage differ substantially (e.g. one farm in the highveld region and another farm in the lowveld), these farms should preferably be handled as two herds or “keepers”. On the other hand, animals of different owners that are run and managed together can be handled as one “herd” or keeper to enlarge contemporary groups.

- **Birth year & season:**
  Only calves born in the same calving year and season can be compared. (The maximum allowed variation in birth dates in the National Beef Recording and Improvement Scheme is 100 days).

- **Sex:**
  Only calves of the same sex can be compared.

- **Birth status (single/twin):**
  Only calves of the same birth status can be compared. Single calves are not compared to twins. While twins can be compared with other twins (that had the same rearing status, etc.), the low occurrence of twins usually does not facilitate this.

- **Embryo transfer calves:**
  Embryo transfer calves are not compared with calves suckling their own dams.

The assigning of animals to management groups is obviously the area where the farmer can play a major role in optimising the genetic evaluations of his herd. All calves assigned to different rearing status and/or feeding status groups within a particular test, will be evaluated separately.
**IMPORTANT**

- Keep groups large, but homogeneous.
- Do not mix or split up groups unnecessarily.
- The most obvious management practice is to use one (or two, depending on your circumstances) short breeding season instead of running the bulls with the cows for extended periods or even the entire year. Breeding seasons should be a maximum of 90 days, preferably shorter, e.g. 75 or 63 days. This will ensure large contemporary groups based on the birth dates of calves. In the National Beef Recording and Improvement Scheme, only calves born within a period of maximum 100 days can be evaluated in the same group.
- With regard to birth weights, please remember to complete the Birth Weight Group Code field at the recording of births, to ensure that calves are linked to the correct group in the estimation of birth weight EBV’s.
- Ensure that all animals in the particular group fit into the age limits for that particular phase/recording (e.g. 151 to 250 days of age for weaning weight).
- Try to weigh all calves in a particular group on the same day or, if not possible, within the same week.
- Ensure that all animals in a particular group are recorded, i.e. no selective recording should be done. (E.g. do not only record birth weight for big calves or difficult births – such recordings are of no value and may actually be very misleading).
- Ensure that all animals in the group had the same treatment from birth to a particular weighing. Animals weighed at 12- and 18 months should be grouped, as far as possible, in the same groups as they were at weaning (except if some animals’ management and/or feeding differed or they were bought in, in which cases those animals should be grouped separately). There are two reasons for this:
  - Firstly, it accounts for bias due to culling or selection at weaning; and
  - Secondly, it accounts for bias due to management and nutrition at weaning.
- All calves that were fed concentrates before weaning should be assigned to a separate feeding status group, even for post weaning weights.
- Bulls sent to central performance tests (Phase C) should be evaluated with their contemporaries for weaning weight, i.e. do not evaluate such bulls in a separate wean test.
- Bulls tested post weaning on concentrates (e.g. Phase C – Central Performance Tests) should not be grouped together with pasture raised bulls for 12- and/or 18 months weights.
- Calves from first parity cows should not be evaluated in separate contemporary groups from older cows, unless the first parity cows received preferential nutrition and/or management, in which case it should be indicated as such.
- Weigh all calves at weaning and, as far as possible, do not mix calves of different weaning groups for any post weaning weights.
- Rotate groups across camps to minimise the camp effect on any particular group. If this is not possible, and the quality and/or quantity of the pastures in different camps differ significantly, assign different feeding status codes to these groups.
- Assign the appropriate rearing status codes to all calves, e.g. calves raised by foster dams, etc.
- Assign the appropriate remark codes to all “abnormal” calves, e.g. sick calves, injured calves, etc.

<table>
<thead>
<tr>
<th>Rearing Status Code</th>
<th>Feeding Status Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Suckling own dam</td>
<td>1 = Ca/P lick</td>
</tr>
<tr>
<td>2 = Suckling foster dam</td>
<td>2 = Protein/Energy lick</td>
</tr>
<tr>
<td>3 = 2/twins suckling dam</td>
<td>3 = No lick</td>
</tr>
<tr>
<td>4 = 1/twin suckling dam</td>
<td>4 = Concentrate</td>
</tr>
<tr>
<td>5 = Dam also milked</td>
<td>5 = Other lick</td>
</tr>
<tr>
<td>6 = Calf hand raised</td>
<td>6 = Plant Pastures</td>
</tr>
<tr>
<td>7 = Embryo Transfer suckling recipient dam</td>
<td>7 = Crop residues</td>
</tr>
<tr>
<td></td>
<td>8 = Green fodder</td>
</tr>
</tbody>
</table>

Rearing- and Feeding Status Codes available on INTERGIS to assist with defining of animals to the correct contemporary groups
Participation in competitive showing of cattle is discouraged, because such cattle get preferential feeding and management and should therefore be evaluated in separate groups. This applies not only to young animals, but also to calves whose dams are showed.

If castration is done, try to postpone it until weaning weights have been recorded.

Genetic linkages enable BLUP to benchmark the genetic merit of animals from different herds, birth years, seasons and management (rearing and feeding) groups. Sires contribute by far the most to genetic linkages. A link sire can be defined as a sire having performance recorded progeny in other herds, years, seasons and/or management groups. If, for example, all calves in Group 1 are from sire A and all calves in Group 2 are from sire B (and the cows from group A are unrelated from the cows in group B), benchmarking the genetic merit of these two groups will be impossible. Genetic linkages determine the “effective progeny” of a sire in a contemporary group.

**HOW TO IMPROVE ON GENETIC LINKAGES**

- Make use of widely used AI bulls. This is by far the easiest and most effective way to establish genetic linkages.
- Establish a system of exchanging bulls between herds. This is particularly helpful to establish genetic linkages between herds if AI is not used.
- Use more than one bull per season in your herd, including at least one (preferably two or more) AI bull.
- Have calves from as many sires as possible (at least two) in each management group. Where all calves in a specific contemporary group are the progeny of one sire, these progeny’s information is of no value in calculating this sire’s breeding values. The reason for this is that the number of effective progeny for that particular sire is zero, which implies that the genetic (sire) effect cannot be effectively separated from the environmental (contemporary group) effect. It is a common practise in some herds to mate a specific sire only with heifers. If all calves from such a sire are evaluated in a separate contemporary group, the number of effective progeny from this sire is zero.
- Try to have a mix of AI bulls and own bulls’ calves in each management group.
- Try not to replace all bulls in the same year. If you have to, at least try to use some of the previous year’s AI bulls.
- Buy bulls (and females) from (and sell to) performance recorded herds.

- After the mating season has ended, run cows in one big group. If this is not possible, regroup the cows to ensure that cows from at least two (preferably more) mating groups are represented in each new cow group. After the mating season has ended, avoid keeping the mating groups intact and separate.
- Avoid mating the same group of cows to the same bull year after year, i.e. regroup the mating groups from year to year. The best time for this is at weaning to ensure that they are familiar to their new group before they start calving.
- Ensure that the extended pedigrees of imported semen/bulls are recorded on the central database (INTERGIS).
- When entering bulls for a central performance test (Phase C), send at least three bulls from the same weaning group. These bulls should be the progeny of at least two sires of which at least one sire is a link sire (a sire of which one of more son has previously been tested in a Phase C test).

For further assistance, please contact Frans Jordaan at 012 672 9085, Fransj@arc.agric.za or The National Beef Scheme (Dr Ben Greyling) at 012 672 9052, ben@arc.agric.za.
Beef Breeding in South Africa

2nd Edition

CONTENTS
Part 1
Twelve chapters covering the following aspects:
- Understanding beef breeding
- Advances in breeding technologies
- Practical implications of beef breeding

Part 2
Description and performance of all 34 beef and dual purpose breeds recognized in South Africa

CONTRIBUTORS
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REVIEWS / RESENSIES
The book is a comprehensive guide to beef cattle breeding in South Africa. It is a unique publication that can be used by animal scientists, students, emerging farmers, commercial beef producers and all those with an interest in beef cattle breeding.
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Beef Breeding in South Africa should be on every cattlemans shelf, as well as at all agricultural colleges and cattle related governmental institutions and universities. This excellent reference is concisely written, with correct scientific nomenclature, thus indicating the well above average stature of local animal scientists.
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- Peter Massmann, former Breed Director

Die redakteur van die boek kan getuig van die uitgebreide kennis en die投入 van die ouer. Die boek is beslis waardevol vir koeienboere en vele ander daardie interesseerde.
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PRICE / PRYS
R 200.00 PER COPY (plus R 50.00 postage and packaging if applicable)
R 290.00 PER KOPIE (plus R 50.00 posgeld en verpakking indien toepaslik)

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WHAT IS THE ROLE/RESPONSIBILITY OF SEED STOCK PRODUCER?

To enable the commercial- and stud breeder who purchase genetics from the seed stock producer, to be more profitable. Therefore genetic improvement of economically important traits is of utmost importance. The correct choice of a breeding bull is the most important factor which will influence the success of your beef enterprise. Usually bulls are only 3%-5% of the total herd but their contribution to the genetic composition of the calf crop is 50%. The three most recently bulls used in a beef cattle herd contribute nearly 90% of the herd’s genetic composition. The value of a bull should be considered in the long term. The bull will have immediate impact over 1-5 years in direct siring of progeny and will have an additional 3-10 years impact on the cow herd. It will have a further reduced impact on the cows of the future 20 years. The success of a breeding programme will depend on whether the bull will improve your cow herd or not. Important to realize that if an average heifer (50% percentile) is bred to average bull (50% percentile) by the time the calf is able to be mated it will be below average (bottom 50%) in the breed. Reason?

WHAT IS THE “CORRECT” BULL?

Bull selection can be the most powerful method of genetic improvement in the herd, but bulls with low fertility, structural problems and low libido may reduce the weaning percentage of the herd. Select bulls that will produce replacement heifers that are well adapted (calve every year) to your environment and management. It is important that a bull is mainly selected for his genetic ability which will support the breeding goals for the herd. It is also important to keep in mind that good genetics can be hidden with poor feeding and bad genetics can be hidden with good feeding. A bull’s CV is based on his own performance information as well as from his relatives. The “qualifications” of this bull are expressed as Estimated Breeding Values (EBV’s). The bull’s CV must determine its suitability for the specific needs of a herd, such as fertility, an improved growth rate, frame size of his daughters, an increase in milk production etc.

IMPORTANT TRAITS FOR BULL SELECTION

It is important to determine breeding objectives based on traits of economic importance. Your selected bull should complement your breeding objectives and all available information on the bull should be investigated prior to the purchase date. Consider traits such as fertility, growth, efficiency and quality traits and try to avoid extreme breeding values, especially for mature weight which is an indication for frame size. Commercial breeders should select for low birth weights and above average for 200 and 400-day growth rates. Always keep the fertility figures of the dam in mind.

FERTILITY

Fertility is one of the important proxy indicators for adaptation. The calving % for the different sectors (Scholtz, 2010) was as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>All stud breeds in performance testing</td>
<td>76%</td>
</tr>
<tr>
<td>Commercial herds in performance testing</td>
<td>83%</td>
</tr>
<tr>
<td>Total commercial sector</td>
<td>61%</td>
</tr>
<tr>
<td>Emerging sector</td>
<td>48%</td>
</tr>
<tr>
<td>Communal sector</td>
<td>35%</td>
</tr>
</tbody>
</table>

And if we look at calving intervals of breeds in South Africa:

<table>
<thead>
<tr>
<th>Calving Interval</th>
<th>Breeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;400 days (&gt;90%)</td>
<td>2 breeds</td>
</tr>
<tr>
<td>400 - 439 days (80-90%)</td>
<td>14 breeds</td>
</tr>
<tr>
<td>440 - 480 days (68-79%)</td>
<td>12 breeds</td>
</tr>
<tr>
<td>&gt;480 days (&lt;68%)</td>
<td>2 breeds</td>
</tr>
</tbody>
</table>

This is a clear indication that more focus should be on fertility to avoid these low calving percentages. It is a concern is that the calving interval of 10 breeds increased by 10 days or more from 1999-2008. The question we should ask-“ is this an indication that climate change is starting to have an effect on beef production? Scrotal circumference can be a valuable indicator of a bull’s fertility (if it’s measured correctly). It is a well-known fact to cow-calf producers that scrotal
circumference is important for sire selection decisions. A bull’s scrotal circumference is the best estimate of semen quantity.

**GROWTH**

The physical appearance of an animal is 70% due to environmental influences and only 30% is genetic composition, depending on the heritability of a trait. An estimated breeding value is a numerical value that predicts the genetic merit for a specific trait and should be considered in light of its accuracy. Weaning weight and year weight of cattle can be genetically increased by selection and by selecting for weaning weight or year weight should result in improved growth rate at different stages for growth. The high positive genetic correlation between weaning weight and year weight (.69) will allow breeders to use weaning weight as effective selection criteria even if the primary selection objective is post weaning growth. If growth rate is an objective some caution should be given to minimizing the correlated response of increasing birth mass. Rather select for curve bender bulls which has a good growth tempo after birth but then taper off to “middle of the road” frame sizes and cow weights.

**FEED EFFICIENCY**

Utilization of feed has long been recognised as one of the most essential factors in determining profitability in the case of beef cattle production. Efficiency measures the inputs needed to create a desired output. Take in consideration that 75% of the cost of rearing beef cattle is related to feed cost, 70-75% of feed intake in the lifetime of cattle are utilized for maintenance and 29% of feed are utilized for growth and milk production. The Importance of improving the efficiency of feed intake becomes very important in the light of ever increasing feed prices.

**MATURE COW SIZE AND EFFICIENCY**

Ideal frame size and profitability remains a contentious subject among cattle farmers. While one farmer wants to incorporate medium-framed cows in his herd because they require less maintenance, the other allows his animals to become as heavy as possible, because every kilogram of beef means money in his pocket. The farmer’s production system, available natural resources and market will determine the ideal frame size to select for. To measure cow efficiency, we can use calf weaning weight/cow weight ratio (MacNiel.2007), Calf weaning weight/cow metabolic weight ratio (Rasby, 2010) and Jordaan 2015 suggested investigation into kg calf weaned per large stock unit as measure of cow calf efficiency or cow productivity. Scholtz 2015 investigated Cow efficiency by taking feed requirements in consideration for cows of different frame sizes. He found that large frame cows must wean a calf 51% of her own body weight @ 150kg/LSU where a small frame cow only needs to wean a calf of 45% of her own body weight to be efficient. A more efficient animal will breed more efficient progeny.

**BULL SELECTION AND PERFORMANCE TESTING**

Performance tests are an important complement to other criteria, such as conformation and genetic variation, in bull selection. Performance testing helps us to determine how individual animals perform as well as provide a means of improving efficiency of beef production by improving herds of cattle. We can also apply this information to continually strive to improve the overall consistency of the beef product.

As mentioned earlier, a bull’s CV includes all his performance information as well as the performance of his relatives. All this information is summarized in one Estimated Breeding Values (EBV) per trait. The EBV is a combination of an animal’s own performance, the performance of his relatives as well as the performance of his progeny. Genetic progress can be increased with the effective use of EBV’s, without adverse effects on other traits.

Remember the old saying “a good bull is ½ your herd but a bad bull is your whole herd
Phase C tests is the only test where feed intake can be measured. Feed conversion ratio (FCR) is the amount of feed the bull consumes to gain 1 Kg in body mass. At the end of the test the results are compared to the 10-year rolling average per breed per station, by doing this the environmental effects are taken out of consideration. If the bull qualified for a gold merit and his mother had 7 or more natural calves the bull could qualify for the platinum award. This award is the highest achievement a bull can receive. By obtaining the platinum award, it states that the bull has growth and comes from a highly fertile cow. Bulls can receive the following merits, gold, silver and bronze. If a bull fails to meet the requirements for bronze, the bull will be sent back to the farm without any certificate. For the merits bulls receive performance certificates.

Bull calves shall only be eligible for testing if the owner can certify that these bull calves have been immunized against anthrax, botulism, black-quarter and lumpy skin disease and bovine rhinotracheitis (IBR) two weeks prior to arrival at the Phase C centre. Immunisation against gall-sickness, red water and heart water, although not compulsory, is recommended.

Only bull calves 151 to 250 days of age at arrival of which the arrival weight falls within the minimum and maximum range per breed (obtainable from the testing stations), as determined from time to time by the General Manager, shall be accepted for testing. The arrival weight will be calculated as the average of two consecutive days' weights.

Members are recommended to test at least three bulls per weaning group together in a Phase C1 or C2 test. It is also highly recommended that these bulls be the progeny of at least two sires of which at least one sire is a linking sire, in other words a sire of which one or more progeny has already been tested in a Phase C test.

Bull calves shall be tested under standardised conditions for a period of 84 days following an adaptation period of 28 days. Bull calves struggling to adapt during the adaptation period shall be withdrawn and the owner shall be notified to collect the bull from the testing centre. The same standard diet shall be fed to all bulls tested at a testing centre.

Growth rate shall be indicated by means of average daily gain during the 84-day test period. Individual feed consumption shall be recorded in order to evaluate the feed conversion ratio. Feed conversion ratio shall be expressed as of kg feed consumed per kilogram live weight gained.
### CEDARA BULL TESTING CENTRE

<table>
<thead>
<tr>
<th>Test No Toets Nr</th>
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For enquiries relating to the Cedara bull testing centre please contact
Johan Binedell at Tel: +27 (0)33 330 5668, Cell: +27 (0)83 799 6600 - E-mail binedellj@arc.agric.za

### Elsenburg BULL TESTING CENTRE

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For enquiries relating to the Elsenburg bull testing centre please contact
Thinus Viljoen at Tel: +27 (0)21 809 3327, Cell: +27 (0)72 470 8386 - E-mail: viljoent@arc.agric.za
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For enquiries relating to the Glen bull testing centre please contact Thivha Netshilema at Tel: +27 (0)51 861 2144, Cell: +27 (0)72 137 5794 - E-mail: netshilemat@arc.agric.za

### Irene Testing Centre

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For enquiries relating to the Irene bull testing centre please contact Jurgen Hendriks at Tel: +27 (0)12 672 9260, Cell: +27 (0)84 304 3904 - E-mail: hendriksj@arc.agric.za
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For enquiries relating to the Vryburg bull testing centre please contact:
Tebogo Serapelwane at Tel: +27 (0)12 672 9499, Cell: +27 (0)83 711 2224  -  E-mail: tebogo@arc.agric.za

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For enquiries relating to the Winter Castles bull testing centre please contact:
Brent McNamara at Cell: +27 (0)84 819 291,  -  E-mail: brent@itts.co.za
Sakkie van der Merwe at Tel: +27 (0)41 404-7210, Cell: +27 (0)82 537 1487   -   E-mail: sakkie@arc.agric.za

The site is located in Alexandria, Eastern Cape.
HOE Kom SANTA GERTRUDIS?

- 'n Mediumraam vleisbees
- Uitstekende aanpassingsvermoëe
- 'n Kombinasie van gehardheid met vleis
- Klein kalfies met lae geboortegewig en besonderse naspeen groei
- Bemarkbaar vanaf veld of aangeplante weidings
- Gewild in voerkrale as gevolg van bogemiddelde GDT
- Uitslag persentasie bogemiddeld
MUCH MORE FARMER AND FARM GATE
- Small, lively calves
- Hybrid vigour when crossed with indigenous breeds.
- Sought by feedlots because of their exceptional growth and muscle
- Longevity of cows

MUCH MORE FEEDLOTS
- Limousins have great average daily gains, feed conversion ratios and an exceptional net feed intake

MUCH MORE ABBATOIR
- Incredible slaughter percentages of 65% plus.

MUCH MORE MEAT PROCESSOR
- Amazing meat yield of up to 85% sale-able meat and very little wastage in terms of fat and bone.

MUCH MORE FOR THE CONSUMER
- Tender and tasty meat with low fat for the healthconscious consumer.

LIMOUSINS NATURALLY BREED
MUCH MORE MEAT!