National Beef Recording and Improvement Scheme
Nasionale Vleisbeesaantekening en -verbeteringskema
Herd reports generated from the National Database as a selection tool. A true reflection of your beef herd performance on profit drivers.

National Beef Recording and Improvement Scheme

Commercial beef producers can increase their profitability by:

- Improvement on weaning, year and eighteen months’ weight
- 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

For more information:
Dr Ben Greyling
012 672 9052
ben@arc.agric.za

ARC Performance tested - your quality assurance trademark
From the Editor

THE ARC NATIONAL BEEF PERFORMERS AWARDS 2021

- The ARC National Best Elite Cow Awards sponsored by Farmer’s Weekly
- The ARC National Platinum Bull Awards sponsored by GMPBasic
- The ARC National KyD Province of the Year Award sponsored by Molatek
- The ARC National Emerging Beef Farmer of the Year Award
- The ARC National Mentor of the Year Award sponsored by Molatek
- The ARC National Special Performance Test Class
- The ARC National Beef Cattle Improvement Herd of the Year Award

- On-farm growth performance testing of bulls (Phase D) services
- Positive prospects for local red meat industry
- Challenges and fundamentals of economically sustainable beef cattle farming operations
- Probiotics in Beef Animal Production Revision
- Adaptation of farm animals to stressful environments
- Cow efficiency for climate-smart beef production
- Heartwater vaccine development – current status at ARC-OVR
- How temperature-humidity-index influence fertility of Bonsmara cows in a warmer climate
- Integrated Registration and Genetic Information System (INTERGIS)
- Why the South African meat classification system needs to change
- Department of correctional services beef herds participating in beef performance testing to improve production
- The value of Phase C testing in the Beef Industry
- Performance of Braunvieh bulls in Phase C tests
- Progress on elite Afrikaner herd at Irene – December 2021
- RFI- A Measure of Feed Efficiency
- What will be the effect of climate change on future beef production
- Phase C requirements and rules
- Centralised growth test Schedules at ARC test centres for 2022
The saying “Farming is a profession of hope” is often quoted when difficult times prevail on the farm. Many farmers will however also tell you that hope is always rewarded at some point. The current status as well as future prospects within our agricultural industry are in many instances a reflection of this saying. In fact, one cannot help but be thankful when you look at our socio-economic status of 2021, especially when compared to 2020. Agriculture, for example, took second place out of our country’s ten most important industries and boasted with a growth of 6.2% during the second quarter of 2021. This growth is partly due to a significant increase in animal production. The positive outlook also gains new significance when it is taken into account that agriculture and related service industries generated more than R351 billion in 2019. The important role of the livestock sector is reflected in the fact that it contributes almost 50% to the gross value of agricultural production. It is further estimated that the beef industry on its own could add as much as an additional R8.2 billion to the gross value of production within the next ten years, hence the saying that this industry can be regarded as the “sleeping giant” of agriculture.

In order to stimulate growth in our industry, the economy as a whole must also grow. It is a fact that people’s spending patterns, habits and preferences when it comes to food consumption change in response to changes in the economy. It is thus comes as no surprise that the demand for foods, including beef, will change in response to the strength of the economy. This means of course means that we must position ourselves correctly and in a timely manner in order to take advantage of opportunities created by a changing economy. In order to achieve this, we need to ask the right questions, which include what are the factors that influence profitable and sustainable production and what tools, especially scientific technologies, are available that can be used to not only maintain but also to stimulate production. To answer these questions, we require the availability of data and statistics that reflect trends and developments over years. For example, our national herd has remained relatively constant in size over the past decade, amid the fact that beef production has increased by about 20% - a true reflection of an improvement in production figures. We also know that more than 3.2 million animals were slaughtered during the 2019/20 production season, which represents an offtake rate of just over 26%. Experts agree that this figure compares well with international trends according to the literature. Production volumes during 2019/20 further amounted to more than 1 million tons while consumption was more than 98% of what was produced locally.

Dr Ben Greyling
Research Team Manager
ARC-Animal Production, Irene
ben@arc.agric.za

Farming is a profession of hope
Despite current production figures and in view of future forecasts, there is still much room for improvement in production efficiency, especially in view of the predicted significant increase expected in the demand for beef over the next decade. Farmers, scientists and stakeholders are well aware of the bottlenecks and challenges faced by our industry, which include the fact that our national herd is not productive enough. The latter is caused by, among other things, low reproduction- and high mortality rates and non-optimal production efficiency. This ultimately affects and in fact may limit our farmers’ competitive participation and access to our country’s beef value chains. An example of how non-optimal production efficiency affects the competitiveness and profit margins of a beef enterprise is found within the feedlot industry. According to formal reports, the desired type of feedlot animal is, as expected, one of the three most important components for a profitable recipe. The Average Daily Gain in weight (ADG) has also been shown to be a critical factor - a meager 0.2 kg / day in ADG improvement has been shown to have a dramatic effect on profit margins.

We must remember that livestock is also critical for many of the poor that work in the informal sector. Our emerging and communal farmers, involved in livestock production, consist of about 1.4 million households with an additional 10 million dependents. By diversifying, transforming and optimizing our resources, we can enable more small and emerging farmers to access local markets and eventually the beef cattle value chains. This is central to our efforts to ultimately ensure and in fact enhance not only regional and national food security, but also the survival of the sector as a whole. It is noteworthy that the challenges and opportunities faced by the South African beef industry have much in common with the rest of the world. For example, the Agricultural Outlook 2021-2030 report of the Organization for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization (FAO) of the United Nations emphasized that improving productivity is an international challenge and that it can be achieved, inter alia, through mainly improved genetics and better herd management practices.

Performance testing as conducted by the National Beef Cattle Improvement Scheme has for many decades played a central role in our pursuit of increased productivity and competitiveness and ultimately sustainability of beef cattle production. The Scheme focuses strongly on the adoption and implementation of technologies, training and the provision of diversified services to industry that are aimed at enabling farmers to make informed decisions when it comes to the genetic improvement of their animals. The latter is of course central for addressing production efficiency. It is all a mouthful, but ultimately, the perseverance of our country’s farmers is a critical factor that will determine whether they will achieve their goals. Farmers cannot however operate in isolation, so it is vital that all role players within industry take hands to face our challenges and seize opportunities as a strong team. My wish is that in 2022 we will, as a team, seize the many opportunities presented to the beef industry in order to ensure a brighter future for all of us.
Recognising and awarding the achievements of our farmers is but one of the many goals of the ARC’s National Beef Recording and Improvement Scheme. This is in line with its primary mandate, which is to facilitate the adoption and implementation of technologies that are aimed at enhancing the production efficiency of our national herd, to enable farmers to produce more profitably and in a sustainable manner to increase their contribution to national food security. This of course will also contribute towards the socio-economic well-being of our nation. The Scheme has been collaborating for many decades with stakeholders of industry and research institutions to address their demands and to ensure we adapt to a changing industry. One of the ultimate indicators of whether the Scheme is successful includes the growth and development of our farmers and the impact they are making. The Scheme annually hosts it national awards to recognise and award the exceptional advances that farmers have made, making use of performance recording and related technologies and it covers the entire spectrum of the production industry. The Scheme thus puts a high premium on collaboration with farmers across all sectors, government and other stakeholders in agriculture in order to strengthen our collective effort to enhance production and access to our country’s beef value chains.

**This year the awards consisted of seven categories**

1. The ARC National Best Elite Cow Awards sponsored by Farmer’s Weekly
2. The ARC National Platinum Bull Awards sponsored by GMPBasic
3. The ARC National Emerging Beef Farmer of the Year Award
4. The ARC National Mentor of the Year Award sponsored by Molatek
5. The ARC National KyD Province of the Year Award sponsored by Molatek
6. The ARC National Special Performance Test Class
7. The ARC National Beef Cattle Improvement Herd of the Year Award
This award category only considers actual performance data of participating cows. Participating cows should exhibit exceptional reproduction figures and other economically important traits such as maternal ability and pre-weaning growth rate (weaning weight). This award category is also contested, as in the past, among cows across all breeds and only one cow per breed will be crowned as the top female of each participating breed. Our valued partner, Farmers Weekly, have been the sole sponsor of this award category for 43 years in a row, which in itself is indeed praiseworthy.

Both registered and commercial cows are eligible to participate and specific qualification criteria include 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 1 lists the 16 ARC National Best Elite Cows with their respective performance figures, while Table 2 lists the owners of these cows.

### Table 1: 2021 ARC National Best Elite Cow Awards sponsored by Farmer’s Weekly

<table>
<thead>
<tr>
<th>Breed</th>
<th>Cow Id</th>
<th>Age (Years)</th>
<th>Number calves</th>
<th>Age 1st calving (months)</th>
<th>Avg ICP1 (days)</th>
<th>Avg weaning index⁵</th>
<th>Birth weight EBV (kg) ³</th>
<th>Weaning weight EBV (kg) ⁴</th>
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<tr>
<td>Afrikaner</td>
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<td>15</td>
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<td>392</td>
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<td>-</td>
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<td>NMS 12 0007</td>
<td>9</td>
<td>7</td>
<td>29</td>
<td>371</td>
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<td>8</td>
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<td>26</td>
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<td>106</td>
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<td>36</td>
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<td>-</td>
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<td>363</td>
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<td>8</td>
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<td>26</td>
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<td>99</td>
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<td>13</td>
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<td>-</td>
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<td>Senepol</td>
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<td>113</td>
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<td>-</td>
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<td>-</td>
<td>1,20</td>
<td>27,0</td>
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<td>350</td>
<td>111</td>
<td>-1,06</td>
<td>11,2</td>
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<tr>
<td>Tuli</td>
<td>R 12 0208</td>
<td>8</td>
<td>7</td>
<td>23</td>
<td>360</td>
<td>107</td>
<td>1,55</td>
<td>5,4</td>
</tr>
</tbody>
</table>

1. Avg ICP - Average Inter-calving period
2. Avg weaning index - Average Weaning Weight Index on calves
3. Birth weight EBV - Estimated Breeding Value for Birth Weight
4. Weaning weight EBV - Estimated Breeding Value for Weaning Weight
5. Dir - Estimated Breeding Value for Birth Weight Direct
6. Dir - Estimated Breeding Value for Weaning Weight Direct
7. Mat - Estimated Breeding Value for Weaning Weight Maternal
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**Table 2: The owners of the 2021 ARC National Best Elite Cow Awards**

<table>
<thead>
<tr>
<th>Breed</th>
<th>Cow Id</th>
<th>Owner</th>
<th>Town</th>
<th>E-mail</th>
<th>Cell no</th>
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<tr>
<td>Afrikaner</td>
<td>SK 09 0129</td>
<td>Seun Steenkamp</td>
<td>Bothaville</td>
<td><a href="mailto:gapsteenkamp@telkomsa.net">gapsteenkamp@telkomsa.net</a></td>
<td>073 156 6127</td>
</tr>
<tr>
<td>Ankole</td>
<td>A 06 0004</td>
<td>Marielize Brotherton</td>
<td>White River</td>
<td><a href="mailto:marielize@seasonsinfrica.com">marielize@seasonsinfrica.com</a></td>
<td>083 305 8130</td>
</tr>
<tr>
<td>Beef Shorthorn</td>
<td>NMS 12 0007</td>
<td>Neil Dry</td>
<td>Magaliesburg</td>
<td><a href="mailto:beefgen@skyafrica.co.za">beefgen@skyafrica.co.za</a></td>
<td>083 778 8000</td>
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<tr>
<td>Bonsmara</td>
<td>CKB 12 0043</td>
<td>Chris Krugell</td>
<td>Springs</td>
<td><a href="mailto:chris.krugell@gmail.com">chris.krugell@gmail.com</a></td>
<td>084 556 3003</td>
</tr>
<tr>
<td>Boran</td>
<td>TZ 12 0039</td>
<td>Theo van Zyl</td>
<td>Ladybrand</td>
<td><a href="mailto:theovanzyl@vodamail.co.za">theovanzyl@vodamail.co.za</a></td>
<td>082 466 2467</td>
</tr>
<tr>
<td>Braford</td>
<td>T 11 0104</td>
<td>Theuns &amp; Marlene de Jager</td>
<td>Ladysmith</td>
<td><a href="mailto:marlene.dejager@gmail.com">marlene.dejager@gmail.com</a></td>
<td>072 909 1861</td>
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<tr>
<td>Brangus</td>
<td>DD 10 0097</td>
<td>Christopher Sparks</td>
<td>Harrismith</td>
<td><a href="mailto:sparks@mniarchitects.co.za">sparks@mniarchitects.co.za</a></td>
<td>083 701 0029</td>
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<tr>
<td>Drakensberger</td>
<td>PU 05 0058</td>
<td>Pikkie Uys</td>
<td>Wakkerstroom</td>
<td><a href="mailto:pikkieuyuskwakkerstroom@gmail.com">pikkieuyuskwakkerstroom@gmail.com</a></td>
<td>082 857 5022</td>
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<tr>
<td>Limousin</td>
<td>DL 10 0051</td>
<td>John &amp; Tracey Devonport</td>
<td>Balfour</td>
<td><a href="mailto:sabine@devonport.co.za">sabine@devonport.co.za</a></td>
<td>083 454 3095</td>
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<tr>
<td>Nguni</td>
<td>EX 13 0221</td>
<td>Hannes Eksteen</td>
<td>Piketberg</td>
<td><a href="mailto:exteen@telkomsa.net">exteen@telkomsa.net</a></td>
<td>082 946 2157</td>
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<tr>
<td>Santa Gertrudis</td>
<td>DT 08 0236</td>
<td>Dail van Rensburg</td>
<td>Delareyville</td>
<td><a href="mailto:dail@cluesnet.co.za">dail@cluesnet.co.za</a></td>
<td>082 809 8841</td>
</tr>
<tr>
<td>Senepol</td>
<td>GN 12 0627</td>
<td>Boetie Hattingh</td>
<td>Brandfort</td>
<td><a href="mailto:boetie@vodamail.co.za">boetie@vodamail.co.za</a></td>
<td>082 306 2469</td>
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<tr>
<td>Simbra</td>
<td>BW 12 025A</td>
<td>Riaan van Zyl</td>
<td>Winburg</td>
<td><a href="mailto:rotsand1@gmail.com">rotsand1@gmail.com</a></td>
<td>083 384 1681</td>
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<td>Simmentaler</td>
<td>AH 09 0005</td>
<td>Niel &amp; Abraham van Heerden</td>
<td>Bethlehem</td>
<td><a href="mailto:nielvanheerden@yahoo.com">nielvanheerden@yahoo.com</a></td>
<td>072 207 1600</td>
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<tr>
<td>South Devon</td>
<td>BG 12 0050</td>
<td>Gielie &amp; Barrie van Zyl</td>
<td>Kimberley</td>
<td><a href="mailto:bfhboerdery@vodamail.co.za">bfhboerdery@vodamail.co.za</a></td>
<td>083 459 7616</td>
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<tr>
<td>Tuli</td>
<td>R 12 0208</td>
<td>Albie Rautenbach</td>
<td>Reitz</td>
<td><a href="mailto:raueasy@telkomsa.net">raueasy@telkomsa.net</a></td>
<td>082 959 5759</td>
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</table>
The ARC National Best Elite Cow Awards

Category 1

Afrikaner

Seun Steenkamp
Afrikaner SK 09 0129

Marielize Brotherton
Ankole A 06 0004

Ankole

Beef Shorthorn

Neil Dry
Beef Shorthorn NMS 12 0007

Chis Krugell
Bonsmara CKB 12 0043

Bonsmara

Boran

Theo van Zyl
Boran TZ 12 0039

Theuns de Jager
Braford T 11 0104

Braford

Brangus

Christopher Sparks
Brangus DD 10 0097

Pikkie Uys
Drakensberger PU 05 0058

Drakensberger
The ARC National Best Elite Cow Awards

Category 1

Limousin

John & Tracey Devonport

Limousin DL 10 0051

Hannes Eksteen

Nguni EX 13 0221

Nguni

Santa Gertrudis

Dail van Rensburg

Santa Gertrudis DT 08 0236

Boetie Hattingh

Senepol GN 12 0627

Senepol

Simbra

Riaan van Zyl

Simbra BW 12 025A

Niel van Heerden

Simmental AH 09 0005

Simmental

South Devon

Barrie van Zyl

Gielle van Zyl

South Devon BG 12 0050

Albie Rautenbach

Tuli R 12 0208

Tuli
Besides having exceptional performance figures themselves, bulls can only qualify for this award if they were bred from an Elite cow, therefore the saying that it is the “best from the best” award category. 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 2020 and 31 December 2020. 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 been contested for 26 years already.

Table 3 lists the 11 Platinum Award bulls  
Table 4 lists the owners of these bulls

### Table 3: 2021 ARC National Platinum Bull Awards sponsored by GMPBasic

<table>
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<th>Breed</th>
<th>Bull Id</th>
<th>ADG index</th>
<th>FCR index</th>
<th>Adjusted Scrotum circum.</th>
<th>Dam Id</th>
<th>Age (yrs)</th>
<th>Calvings</th>
<th>AFC (months)</th>
<th>Avg ICP (days)</th>
<th>Birth weight EBV (kg)</th>
<th>Weaning weight EBV (kg)</th>
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</thead>
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<td>9</td>
<td>35</td>
<td>384</td>
<td>0,90</td>
<td>2,7</td>
</tr>
<tr>
<td>Limousin</td>
<td>YF 19 0001</td>
<td>116</td>
<td>113</td>
<td>299</td>
<td>LR 09 0067</td>
<td>12</td>
<td>9</td>
<td>31</td>
<td>407</td>
<td>1,80</td>
<td>16,0</td>
</tr>
<tr>
<td>Santa Gertrudis</td>
<td>M 19 0048</td>
<td>124</td>
<td>116</td>
<td>324</td>
<td>M 09 0062</td>
<td>12</td>
<td>9</td>
<td>38</td>
<td>354</td>
<td>2,60</td>
<td>18,0</td>
</tr>
<tr>
<td></td>
<td>HH 19 0029</td>
<td>123</td>
<td>115</td>
<td>346</td>
<td>VV 02 0128</td>
<td>19</td>
<td>15</td>
<td>27</td>
<td>388</td>
<td>1,00</td>
<td>12,0</td>
</tr>
<tr>
<td>Simmental</td>
<td>CSS 19 0975</td>
<td>102</td>
<td>111</td>
<td>385</td>
<td>CSS 13 0213</td>
<td>9</td>
<td>9</td>
<td>31</td>
<td>432</td>
<td>1,80</td>
<td>20,0</td>
</tr>
</tbody>
</table>

### Table 4: The owners of the 2021 ARC National Platinum Award Bulls

<table>
<thead>
<tr>
<th>Breed</th>
<th>Bull Id</th>
<th>Owner</th>
<th>Town</th>
<th>E-mail</th>
<th>Cell no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afrikaner</td>
<td>PP 19 0050</td>
<td>NWDARD - Nkosinathi Bareki</td>
<td>Potchefstroom</td>
<td><a href="mailto:nbareki@nwpg.gov.za">nbareki@nwpg.gov.za</a></td>
<td>018 299 6578</td>
</tr>
<tr>
<td>Bonsmara</td>
<td>FHK 19 0225</td>
<td>De Wet Hartzenberg</td>
<td>Sannieshof</td>
<td><a href="mailto:dewel172@gmail.com">dewel172@gmail.com</a></td>
<td>082 787 5036</td>
</tr>
<tr>
<td></td>
<td>EHE 19 0262</td>
<td>Daan Viljoen</td>
<td>Bethlehem</td>
<td><a href="mailto:dirk@dirkvil.co.za">dirk@dirkvil.co.za</a></td>
<td>083 630 8302</td>
</tr>
<tr>
<td></td>
<td>NFS 19 0205</td>
<td>Nick Serfontein</td>
<td>Edenville</td>
<td><a href="mailto:pieter@senick.co.za">pieter@senick.co.za</a></td>
<td>082 384 0020</td>
</tr>
<tr>
<td></td>
<td>NFS 19 0462</td>
<td>Nick Serfontein</td>
<td>Edenville</td>
<td><a href="mailto:pieter@senick.co.za">pieter@senick.co.za</a></td>
<td>082 384 0020</td>
</tr>
<tr>
<td>Braunvieh</td>
<td>JC 20 0006</td>
<td>André Reitsma</td>
<td>Klein-Boetsap</td>
<td><a href="mailto:andre.kainos@gmail.com">andre.kainos@gmail.com</a></td>
<td>071 896 1466</td>
</tr>
<tr>
<td>Charolais</td>
<td>BB 20 0060</td>
<td>Dewald van der Merwe</td>
<td>Lichtenburg</td>
<td><a href="mailto:dewaldtael@gmail.com">dewaldtael@gmail.com</a></td>
<td>079 898 0785</td>
</tr>
<tr>
<td>Limousin</td>
<td>YF 19 0001</td>
<td>Johan Fourie</td>
<td>Modimolle</td>
<td><a href="mailto:johan.allphase@gmail.com">johan.allphase@gmail.com</a></td>
<td>082 093 7650</td>
</tr>
<tr>
<td>Santa Gertrudis</td>
<td>M 19 0048</td>
<td>Johan &amp; Helene van der Merwe</td>
<td>Ottosdal</td>
<td><a href="mailto:vsvat@lantic.net">vsvat@lantic.net</a></td>
<td>071 380 3492</td>
</tr>
<tr>
<td></td>
<td>HH 19 0029</td>
<td>Howard Hobson</td>
<td>Ladybrand</td>
<td><a href="mailto:pineskopf@gmail.com">pineskopf@gmail.com</a></td>
<td>082 410 2401</td>
</tr>
<tr>
<td>Simmental</td>
<td>CSS 19 0975</td>
<td>Werner Stander</td>
<td>Faerie Glen</td>
<td><a href="mailto:wstander@icon.co.za">wstander@icon.co.za</a></td>
<td>082 777 0250</td>
</tr>
</tbody>
</table>
VEESIEKTES IDENTIFIKASIE & NASPEURBAARHEID

“MOET NIE WAG TOT DIE VEESIEKTES RAMP JOU KUDDE TREF NIE”

DAN IS DIT TE LAAT!

Alle formate van diere identifikasie word gebruik.

Contact: Rachelle Cloete - 083 630 7181 support@gmpbasic.co.za

VEESIEKTES IDENTIFIKASIE & NASPEURBAARHEID

“MOET NIE WAG TOT DIE VEESIEKTES RAMP JOU KUDDE TREF NIE”

DAN IS DIT TE LAAT!

Alle formate van diere identifikasie word gebruik.

Contact: Rachelle Cloete - 083 630 7181 support@gmpbasic.co.za

MULTI SPESIES: Beeste - Skape - Bokke - Varke - Volstruise - Wild

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

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• Dragtigkeitstoets aantekening
• Aantekening van doseer, prosedures, produksie, re-produksie en ander behandelinge
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• Elektroniese inlees van inligting om foute te beperk

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13 JAAR
**ARC National Platinum Bull Awards**

**Category 2**

**Afrikaner**
- Khomotso Kgawane & Nkosinathi Bareki
- Afrikaner PP 19 0050

**Bonsmara**
- Daan Viljoen
- Bonsmara EHE 19 0262

**Braunvieh**
- André & Annexmarie Reitsma
- Braunvieh JC 20 0006

**Charolais**
- Dewald vd Merwe
- Charolais BB 20 0060

**Limousin**
- Johan Fourie
- Limousin YF 19 0001
ARC National Platinum Bull Awards

Category 2

Santa Gertrudis

Howard Hobson
Santa Gertrudis HH 19 0029

Werner Stander
Simmentaler CSS 19 0975

Helene, Kallie & Johan
van der Merwe
Santa Gertrudis M 19 0048
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 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.

This year’s finalists for the KyD province of the year are:
Eastern Cape, KwaZulu Natal & Mpumalanga

The ARC National KyD Province of the Year Award for 2021 was awarded to

**Platinum Award:**
Kwa-Zulu Natal

**Gold was awarded to:**
Eastern Cape

**Silver was awarded to:**
Mpumalanga
NEW IMPROVED FORMULATION

BEEF FAT 33+
YOUR CATTLE AND YOUR PROFIT GROW TOGETHER!

With Molatek’s expertly formulated protein concentrate, Beef Fat 33+, it’s not only your beef cattle that will be showing off their bulging muscles and increased mass ... your pocket will be bulging with extra profit as well.

• Economical beef cattle finishing with the lowest cost per kg mass increase.
• Includes a growth enhancer which stimulates feed conversion and growth rates.
• Uses high-quality natural protein which is balanced according to the amino acid profile needed for optimal carcass growth.
• Counteracts feeding disorders and coccidiosis.
• Ensures maximum profit.
• Suitable to finish off bulls and show cattle.

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MOLATEK: +27(0)13 791-1036 | www.molatek.co.za | molatek@rclfoods.com

Beef Fat 33+ (V17357) (Act 36 of 1947)
This is another flagship award of the ARC that acknowledges emerging beef farmers that are members of the Kaonafatso ya Dikgomo (KyD) Scheme of the ARC and that have excelled when it comes to how they manage and improve their herds and enterprises making use of record keeping, amongst others. This award category commemorates its 19th 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 focuses 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.

1. To encourage emerging cattle farmers to improve their standard of living through higher returns from animal production and job creation;
2. To promote participation in the Kaonafatso ya Dikgomo Scheme;
3. To promote sound breeding and management principles in the beef industry; and
4. To demonstrate the benefit of performance testing, practically by identifying outstanding herds.

The provincial winners for 2021 are listed in Table 5.

Table 5: 2021 ARC National Emerging Beef Farmer of the Year Awards: Provincial Winners

<table>
<thead>
<tr>
<th>Province</th>
<th>Breed</th>
<th>Herd size</th>
<th>Name</th>
<th>Farm name</th>
<th>Town</th>
<th>Contact nr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Cape</td>
<td>Bonsmara</td>
<td>103</td>
<td>Desmond Siteti</td>
<td>Tower Hill Farm</td>
<td>Makhanda</td>
<td>083 418 5558</td>
</tr>
<tr>
<td>Free State</td>
<td>Bonsmara</td>
<td>97</td>
<td>Tracy Marobobo</td>
<td>DoornDraai 207</td>
<td>Ventersburg</td>
<td>067 808 3503</td>
</tr>
<tr>
<td>Gauteng</td>
<td>Bonsmara</td>
<td>95</td>
<td>Eve Tepsy</td>
<td>Eve’s Eden Farm</td>
<td>Vanderbijlpark</td>
<td>082 787 6134</td>
</tr>
<tr>
<td>KwaZulu-Natal</td>
<td>Bonsmara, Drakensberger, Brahman</td>
<td>450</td>
<td>Basile Mathonsi</td>
<td>Nozinkaniso Trading CC</td>
<td>Vryheid</td>
<td>061 503 7490</td>
</tr>
<tr>
<td>Limpopo</td>
<td>Bonsmara</td>
<td>120</td>
<td>Baloyi Topsy</td>
<td>Tamahasi 48SLQ</td>
<td>Lephaleale</td>
<td>083 742 9942</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>Brahman</td>
<td>162</td>
<td>Ntuli Sphiwe</td>
<td>31 Leeuwfontein</td>
<td>Verena</td>
<td>082 607 0086</td>
</tr>
<tr>
<td>North West</td>
<td>Nguni</td>
<td>84</td>
<td>Karabo Mosiako</td>
<td>Bossieslaagte</td>
<td>Delareyville</td>
<td>082 290 6145</td>
</tr>
</tbody>
</table>
The winner of the 2021 ARC National Emerging Beef Farmer of the year Award was awarded to Gauteng

Eve’s Eden Farm
Vanderbijlpark
082 787 6134
Kaonafatso ya Dikgomo

A new dawn has broken: Contributing to Food Security through Animal Improvement

Agricultural Research Council’s Kaonafatso ya Dikgomo is a dedicated animal recording scheme for emerging/smallholder farmers

Eligibility and Participation

Any emerging/smallholder cattle farmer can participate in the scheme and it is operational in all nine provinces.

For more information about the scheme, contact 012 672 9111

For more general information about the Agricultural Research Council, please visit our website at www.arc.agric.za
The primary aim of this award category is to acknowledge farmers with exceptional leadership skills and efforts in building capacity and skills through information dissemination, mentoring and assisting fellow farmers to adopt and implement the relevant technologies and management skills to enhance their productivity and sustainability. In short, this award category assesses how a farmer ploughs back his/her skills, knowledge and experience to the benefit of others. Farmers who enter this category should have a record of accomplishment that attests to their efforts to train and mentor others and very importantly to show the impact of their actions and mentoring initiatives.

The ARC National Mentor of the Year award for 2021 was awarded to

John & Tracey Devonport
Devlan Limousins - 083 454 3095

Nkosinathi Bareki
North West Dept. of Agriculture and Rural Development - 018 299 6578
Running for over four decades, this award category aims to recognise bulls with exceptional performance traits. Bulls, which 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 2020, 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 is eventually identified to represent the entire breed and adjudication criteria includes both performance traits and functional efficiency. Every bull that participates on behalf of its breed is thus crowned as the overall national winner within the participating breed.

Table 6 lists the 17 bulls with their respective performance figures

Table 7 lists the owners of the bulls

### Table 6: 2021 ARC National Special Performance Test Class Bulls

<table>
<thead>
<tr>
<th>Breed</th>
<th>Bull Id</th>
<th>Birth date</th>
<th>Centre Tested</th>
<th>ADG (g)</th>
<th>FCR Kg/kg</th>
<th>RFI Ind</th>
<th>Adjusted Shoulder Height (mm)</th>
<th>Adjusted Body Length (mm)</th>
<th>Adjusted Scrotum Circum. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afrikaner</td>
<td>TK 19 0123</td>
<td>22/11/2019</td>
<td>Irene</td>
<td>1351</td>
<td>6.10</td>
<td>114</td>
<td>1135</td>
<td>1269</td>
<td>330</td>
</tr>
<tr>
<td>Afrisim</td>
<td>JJ 19 0180</td>
<td>29/09/2019</td>
<td>Irene</td>
<td>1479</td>
<td>6.53</td>
<td>106</td>
<td>1232</td>
<td>1423</td>
<td>405</td>
</tr>
<tr>
<td>Beefmaster</td>
<td>BC 19 0559</td>
<td>13/09/2019</td>
<td>Winter Castles</td>
<td>1568</td>
<td>5.65</td>
<td>109</td>
<td>1170</td>
<td>1382</td>
<td>362</td>
</tr>
<tr>
<td>Beef Shorthorn</td>
<td>NMS 19 0041</td>
<td>25/09/2019</td>
<td>Semick</td>
<td>1956</td>
<td>4.43</td>
<td>122</td>
<td>1289</td>
<td>1472</td>
<td>374</td>
</tr>
<tr>
<td>Boran</td>
<td>YF 19 0042</td>
<td>18/11/2019</td>
<td>Irene</td>
<td>1531</td>
<td>6.01</td>
<td>106</td>
<td>1143</td>
<td>1246</td>
<td>328</td>
</tr>
<tr>
<td>Brahman</td>
<td>WRR 19 0103</td>
<td>04/12/2019</td>
<td>Buffland</td>
<td>1443</td>
<td>4.89</td>
<td>118</td>
<td>-1,325</td>
<td>1399</td>
<td>348</td>
</tr>
<tr>
<td>Braunvieh</td>
<td>LT 19 0003</td>
<td>22/12/2019</td>
<td>Vryburg</td>
<td>2042</td>
<td>5.82</td>
<td>104</td>
<td>*1219</td>
<td>1351</td>
<td>242</td>
</tr>
<tr>
<td>Charolais</td>
<td>BB 20 0060</td>
<td>12/01/2020</td>
<td>Vryburg</td>
<td>2885</td>
<td>4.27</td>
<td>128</td>
<td>-1,325</td>
<td>1399</td>
<td>348</td>
</tr>
<tr>
<td>Limousin</td>
<td>DL 19 0151</td>
<td>04/10/2019</td>
<td>Irene</td>
<td>1750</td>
<td>5.81</td>
<td>106</td>
<td>*1225</td>
<td>1397</td>
<td>318</td>
</tr>
<tr>
<td>Pinzgauer</td>
<td>GB 19 0217</td>
<td>02/12/2019</td>
<td>Buffland</td>
<td>1619</td>
<td>5.80</td>
<td>101</td>
<td>-1,325</td>
<td>1386</td>
<td>320</td>
</tr>
<tr>
<td>SA Angus (Black)</td>
<td>SCJ 19 0131</td>
<td>30/07/2019</td>
<td>Western Cape</td>
<td>1947</td>
<td>5.20</td>
<td>113</td>
<td>-1,325</td>
<td>1465</td>
<td>338</td>
</tr>
<tr>
<td>SA Angus (Red)</td>
<td>SCJ 19 0048</td>
<td>15/05/2019</td>
<td>Western Cape</td>
<td>2078</td>
<td>5.96</td>
<td>100</td>
<td>-1,325</td>
<td>1455</td>
<td>360</td>
</tr>
<tr>
<td>Santa Gertrudis</td>
<td>FF 19 0056</td>
<td>27/11/2019</td>
<td>Vryburg</td>
<td>2527</td>
<td>4.76</td>
<td>122</td>
<td>-1,325</td>
<td>1476</td>
<td>359</td>
</tr>
<tr>
<td>Simbra</td>
<td>ZM 19 0015</td>
<td>12/03/2019</td>
<td>Irene</td>
<td>2056</td>
<td>6.98</td>
<td>102</td>
<td>-1,325</td>
<td>1378</td>
<td>390</td>
</tr>
<tr>
<td>Simmentaler</td>
<td>AB 19 0119</td>
<td>08/10/2019</td>
<td>Dhofstee</td>
<td>2360</td>
<td>4.79</td>
<td>100</td>
<td>-1,325</td>
<td>1572</td>
<td>371</td>
</tr>
<tr>
<td>Sussex</td>
<td>NJB 19 0026</td>
<td>07/05/2019</td>
<td>Vryburg</td>
<td>1886</td>
<td>5.90</td>
<td>100</td>
<td>-1,325</td>
<td>1441</td>
<td>334</td>
</tr>
</tbody>
</table>
Table 7: The owners of the 2021 ARC National Special Performance Test Class bulls

<table>
<thead>
<tr>
<th>Breed</th>
<th>Bull Id</th>
<th>Owner</th>
<th>Town</th>
<th>E-mail</th>
<th>Cell no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afrikaner</td>
<td>TK 19 0123</td>
<td>Pieter &amp; Elbie de Kock &amp; Ben Foulds</td>
<td>Thabazimbi</td>
<td><a href="mailto:elbiedeekock@lantic.net">elbiedeekock@lantic.net</a></td>
<td>083 394 4833</td>
</tr>
<tr>
<td>Afrisim</td>
<td>JJ 19 0180</td>
<td>Janes Wasserman</td>
<td>Carletonville</td>
<td><a href="mailto:janes@mweb.co.za">janes@mweb.co.za</a></td>
<td>082 789 3400</td>
</tr>
<tr>
<td>Beefmaster</td>
<td>BC 19 0559</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>Beef Shorthorn</td>
<td>NMS 19 0041</td>
<td>Neil Dry</td>
<td>Magaliesburg</td>
<td><a href="mailto:beefgen@skyafrica.co.za">beefgen@skyafrica.co.za</a></td>
<td>083 778 8000</td>
</tr>
<tr>
<td>Boran</td>
<td>YF 19 0042</td>
<td>Johan Fourie</td>
<td>Modimolle</td>
<td><a href="mailto:johan.allphase@gmail.com">johan.allphase@gmail.com</a></td>
<td>082 093 7650</td>
</tr>
<tr>
<td>Brahman</td>
<td>WRR 19 0103</td>
<td>Christiaan &amp; Miek Botha</td>
<td>Swartwater</td>
<td><a href="mailto:mieke@weltevreden.co.za">mieke@weltevreden.co.za</a></td>
<td>079 229 4385</td>
</tr>
<tr>
<td>Braunvieh</td>
<td>LT 19 0003</td>
<td>Abie Rademeyer</td>
<td>Petrusville</td>
<td><a href="mailto:arendbrademeyer@gmail.com">arendbrademeyer@gmail.com</a></td>
<td>083 282 3996</td>
</tr>
<tr>
<td>Charolais</td>
<td>BB 20 0060</td>
<td>Dewald van der Merwe</td>
<td>Lichtenburg</td>
<td><a href="mailto:dewald@tacet.co.za">dewald@tacet.co.za</a></td>
<td>079 898 0785</td>
</tr>
<tr>
<td>Limousin</td>
<td>DL 19 0151</td>
<td>John &amp; Tracey Devonport</td>
<td>Balfour</td>
<td><a href="mailto:john@devonport.co.za">john@devonport.co.za</a></td>
<td>083 454 3095</td>
</tr>
<tr>
<td>Pinzgauer</td>
<td>GB 19 0217</td>
<td>Z22 - Fanie Potgieter</td>
<td>Mooketsi</td>
<td><a href="mailto:grootboom@z22.co.za">grootboom@z22.co.za</a></td>
<td>082 336 7199</td>
</tr>
<tr>
<td>PinZyl</td>
<td>PZ 19 0314</td>
<td>Z22 - Fanie Potgieter</td>
<td>Mooketsi</td>
<td><a href="mailto:grootboom@z22.co.za">grootboom@z22.co.za</a></td>
<td>082 336 7199</td>
</tr>
<tr>
<td>SA Angus Black</td>
<td>SCJ 19 0131</td>
<td>Seymour Currie</td>
<td>Blaauwborg</td>
<td><a href="mailto:jdfarms@mweb.co.za">jdfarms@mweb.co.za</a></td>
<td>083 327 9186</td>
</tr>
<tr>
<td>SA Angus Red</td>
<td>SCJ 19 0048</td>
<td>Seymour Currie</td>
<td>Blaauwborg</td>
<td><a href="mailto:joycesangusstud@gmail.com">joycesangusstud@gmail.com</a></td>
<td>072 143 6114</td>
</tr>
<tr>
<td>Santa Gertrudis</td>
<td>FF 19 0056</td>
<td>Juan Freeman</td>
<td>Delareyville</td>
<td><a href="mailto:marius@ramref.co.za">marius@ramref.co.za</a></td>
<td>084 549 4432</td>
</tr>
<tr>
<td>Simbra</td>
<td>ZM 19 0015</td>
<td>Pieter Meyer</td>
<td>Lindley</td>
<td><a href="mailto:pmeyer82@gmail.com">pmeyer82@gmail.com</a></td>
<td>082 334 8906</td>
</tr>
<tr>
<td>Simmentaler</td>
<td>AB 19 0119</td>
<td>Peter &amp; Lucille Abrahamse</td>
<td>Three Rivers</td>
<td><a href="mailto:peterabr@xsinet.co.za">peterabr@xsinet.co.za</a></td>
<td>082 568 1212</td>
</tr>
<tr>
<td>Sussex</td>
<td>NJB 19 0026</td>
<td>Nico Bouwer</td>
<td>Delareyville</td>
<td><a href="mailto:njbouwer@lantic.net">njbouwer@lantic.net</a></td>
<td>083 272 6158</td>
</tr>
</tbody>
</table>
**ARC National Special Performance Test Class**

**Category 6**

**Boran**
- Johan Fourie
- Boran YF 19 0042

**Brahman**
- Christiaan & Mieke & Lian Botha
- Brahman WRR 19 0103

**Braunvieh**
- Abie Rademeyer
- Braunvieh LT 19 0003

**Charolais**
- Dewald vd Merwe
- Charolais BB 20 0060

**Limousin**
- John & Tracey Devonport
- Limousin DL 19 0151

**Pinzgauer**
- Fanie Potgieter
- Pinzgauer GB 19 0217

**PinZyl**
- Fanie Potgieter
- PinZyl PZ 19 0314

**SA Angus Black**
- Seymour Currie
- SA Angus Black SCJ 19 0131
SA Angus Red

Seymour Currie
SA Angus Red SCJ 19 0048

Simbra

Pieter Meyer
Simbra ZM 19 0015

Sussex

Nico Bouwer
Sussex NJB 19 0026

Santa Gertrudis

Juan Freeman
Santa Gertrudis FF 19 0056

Simmentaler

Peter & Lucille Abrahamse
Simmentaler AB 19 0119
To be eligible as a nominee for this category, a farmer had to excel in a number of performance traits of his or her herd. It has become one of the most prestigious award categories that also adjudicate the level to which the nominee is involved with industry, his or her interaction with their fellow farmers and their efforts to build and add value to the beef production industry. Breeders and herds across breeds in southern Africa can enter this award category. Traits that are assessed that relates to the performance of the herd itself includes 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 contributions and reputation of the participating herd owner is also considered, in particular regarding his or her leadership and guidance to other farmers and stakeholders.

The 2021 ARC National Beef Cattle Improvement Herd of the Year finalists are presented in Table 8.

**Table 8: 2021 ARC National Beef Cattle Improvement Herd of the Year Award**

<table>
<thead>
<tr>
<th>Herd Name</th>
<th>Owner</th>
<th>Breed</th>
<th>Town</th>
<th>E-mail</th>
<th>Cell no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boshoff Afrikaners</td>
<td>Werner Boshoff</td>
<td>Afrikaner</td>
<td>Ellisras</td>
<td><a href="mailto:werner@bulkfuel.co.za">werner@bulkfuel.co.za</a></td>
<td>066 212 5080</td>
</tr>
<tr>
<td>BTB Simmentaler</td>
<td>Johan Styger</td>
<td>Simmentaler</td>
<td>Hartbeesfontein</td>
<td><a href="mailto:johan@btbsimentaler.co.za">johan@btbsimentaler.co.za</a></td>
<td>082 460 8443</td>
</tr>
<tr>
<td>Eksteen Nguni’s &amp; Sanga’s</td>
<td>Hannes Eksteen</td>
<td>Nguni &amp; Sanga</td>
<td>Piketberg</td>
<td><a href="mailto:exteen@telkomsa.net">exteen@telkomsa.net</a></td>
<td>071 987 8257</td>
</tr>
<tr>
<td>Fredericksburg Angus &amp; Wagyu Stud</td>
<td>L’Ormarins Pty Ltd</td>
<td>Angus &amp; Wagyu</td>
<td>Franschhoek</td>
<td><a href="mailto:stefan@fredericksburg.co.za">stefan@fredericksburg.co.za</a></td>
<td>082 610 5397</td>
</tr>
<tr>
<td>Ja-Niel Herefords</td>
<td>Danie van Breda</td>
<td>Herefords</td>
<td>Stellenbosch</td>
<td><a href="mailto:danie@orcrest.co.za">danie@orcrest.co.za</a></td>
<td>082 850 6101</td>
</tr>
<tr>
<td>Kolskoot Borane</td>
<td>Gideon Botha</td>
<td>Boran</td>
<td>Luckhoff</td>
<td>gideon@<a href="mailto:bea@vodamail.co.za">bea@vodamail.co.za</a></td>
<td>082 386 7724</td>
</tr>
<tr>
<td>Pan Lochner Boerdery</td>
<td>Mary Lochner</td>
<td>Hugenoot</td>
<td>Marken</td>
<td><a href="mailto:mary@netmobile.co.za">mary@netmobile.co.za</a></td>
<td>082 553 4135</td>
</tr>
<tr>
<td>RAT Brahmane</td>
<td>Riaan Theron</td>
<td>Brahman</td>
<td>Koppies</td>
<td><a href="mailto:riaan@rsms.co.za">riaan@rsms.co.za</a></td>
<td>082 921 2347</td>
</tr>
<tr>
<td>Sizalo Bonsmara</td>
<td>Lucas Maiza</td>
<td>Bonsmara/Brahman</td>
<td>Isando</td>
<td><a href="mailto:mlekimsiza@gmail.com">mlekimsiza@gmail.com</a></td>
<td>083 375 2596</td>
</tr>
</tbody>
</table>
The winner of the ARC National Beef Cattle Improvement Herd of the Year for 2021 was awarded to

**BTB SIMMENTALER**
Hartbeesfontein
082 460 8443
Importance of performance testing

Proper bull selection is the most rapid way to make genetic improvements to the cattle herd. Performance testing provides valuable information that can be used in selection of superior breeding animals. Evaluation of performance traits is part of a complete bull evaluation that will help match the needs of the cow herd with the right herd sires. Structural sound-ness and health should be evaluated along with performance data and Expected Progeny Differences (EPD). This information can also be useful in marketing bulls. Data from an on-farm test, combined with breed association record programs, provide prospective buyers with good indications of under-lying genetic merit for traits measured.

On-farm tests evaluate the post-weaning performance of beef bulls under uniform conditions or contemporary group, meaning a group of animals of similar age, sex and breed composition raised under the same management conditions. When used in conjunction with breed association record programs, on-farm test reports can be completed with little additional work beyond completion of breed association records.

Which bulls should be tested?

Bulls being considered for sale as breeding animals or being incorporated into a breeding program are potential candidates for performance testing. Bulls should be evaluated at weaning for structural soundness and conformation. Bulls with poorly formed hoofs, legs or eyes may not perform well in a pasture-breeding scenario and may need to be culled at weaning. At least a minimum of 10 bulls of the same breed should be tested to allow each bull’s performance to be compared to the average performance for the group.

Weaning records required

The success of an on-farm bull test is largely dependent on proper record keeping. Calves should be properly identified (unique ear tag, tattoo, brand or combination) at birth. Calf identification number, calf birth dates, dam identification number, dam birth date, sire identification number and calf birth weights should be recorded. Weaning date and actual weaning weight should also be recorded at weaning. Adjusted 205-day weaning weights can then be calculated using the following formula:

\[
\text{Adjusted 205-day weaning weight} = \left( \frac{\text{weaning weight} - \text{birth weight}}{\text{weaning age in days}} \right) \times 205 + \text{birth weight} + \text{age-of-dam weaning weight adjustment.}
\]

Types of on-farm growth performance tests (Phase D)

There are two types of on-farm performance tests for bulls: Single and multiple herd test. The breeder may choose a feeding regime of intensive, semi intensive and extensive feed-based tests. The intensive test simulates a feedlot or finishing program, while the semi intensive and extensive based test relies more on pasture, energy licks and hay. Breeders can choose the test that best fits their resources and marketing plan.

When should bulls be placed on Phase D test?

Calves within a contemporary group should have a maximum age range of 100 days. Intensive based tests provide animals with high levels of energy intake and test interval takes a minimum of 84 days after a minimum of 21 days adaptation. The age of bull calves in a test group should not vary by more than 100 days with a minimum individual age of 151 days and a maximum individual age of 425 days at the start of adaptation. The adaptation period should preferably start a minimum of 7 days after the bull calves have been weaned, to prevent weight loss during the adaptation period due to wean shock. The adaptation period shall be short for intensive and single herd tests and longer for extensive and multiple herd tests. During the adaptation period the bulls should be fed the same diet as during the test period and should gain weight before the test could commence. Bulls struggling to adapt and/or to gain sufficient weight during the adaptation period shall be withdrawn and the owner shall be notified that such bull cannot participate in the test.
Getting bulls ready to test

Bulls enrolled in an on-farm bull test are not only being compared with one another for growth performance and other economically important traits, but they are also being developed into young breeding animals. At the conclusion of the test, bulls should be injured free and in good condition. An injured, sick or dead bull will make small profits. There is a financial investment in producing bulls to the post weaning stage. These bulls may either be used in future breeding programs or sold as market animals in the case of bulls that are injured or are inferior potential breeders. Bulls will generally return more on the initial investment if they are used in the farm’s breeding program or sold as breeding animals rather than as market animals. Thus, it is important to ensure the health of the bulls on test.

Bulls need to be healthy when entering the on-farm growth performance-testing program. If performance differences result from sickness, an accurate comparison of the genetic potential for post weaning performance of a sick bull versus a healthy bull may not be made. The paddock and pasture in which the on-farm test will be conducted should be free of hazards such as stray barbed wire or nails.

Preventing digestive upset in bulls on test is a concern that should be addressed before the testing period even begins. For the intensive based test, a minimum three weeks warm-up period for bulls to adjust to the test ration is vital to maintaining the digestive integrity of the animals. Bulls should be slowly adapted to the test ration by starting them off with a small amount (5 to 10 kg’s per head per day). Increase the amount of the test ration by approximately 1 kg per head per day until the bulls eventually start leaving feed in the trough. At the same time, slowly decrease the amount of roughage (hay) offered to shift from a roughage-based diet to a concentrate-based diet.

Test data collected

Data to be collected on each bull during the test includes:

- Number of animals in contemporary group.
- On-test weight (initial test weight after adaptation period concluded).
- Bull weights every 14 days after initial weight.
- Final test weight.
- Hip height & body length.
- Yearling scrotal circumference.
- Ultrasound scan for carcass traits (optional).

- Average daily gain, which is used to calculate feed efficiency. Average daily gain (ADG) can be calculated as:

\[
ADG = \frac{\text{final weight} - \text{initial weight}}{\text{days on test}}
\]

Weight per day of age can be calculated anytime bulls are weighed using the following equation: Weight per day of age = weight ÷ age in days

Index can be used to rank bulls within their contemporary groups for certain performance measures such as ADG, weight per day of age and adjusted yearling weight.

For example, ADG index can be calculated as:

\[
\text{ADG index} = \left( \frac{\text{ADG of bull}}{\text{average ADG of entire contemporary group}} \right) \times 100
\]

An index of 100 is equal to the average of the group. If a bull has an ADG index of 105, then its ADG is 5 percent higher than the average of his contemporaries.

All the above-mentioned data is captured, stored, verified in the national database which is the integrated registration and genetic information system (INTERGIS). The test results and reports obtained from INTERGIS is sent back the breeders to make informed selection decision.

Hip or shoulder height measurement

Frame score is used to describe the skeletal size of cattle. Frame size is often one factor that buyers consider when selecting a bull. Hip or shoulder height measurements can be converted to frame scores and are a useful tool for evaluating the lean to fat index of an animal. Although actual hip/shoulder height may increase as an animal matures, most animals should maintain the same frame score throughout their life using appropriate growth/height curves. This allows one frame score to be used for an animal, regardless of when that animal’s hip/shoulder height is evaluated. The recommended site for hip height measurement is at a point directly over the hooks or hips and shoulder of an animal. Care should be taken to ensure that the bull is standing on solid, level ground with his legs set firmly beneath him.

Scrotal circumference measurement

Measurement of yearling scrotal circumference provides an indication of a bull’s semen producing capacity. Scrotal circumference is also correlated with age at puberty of a bull’s daughters and female siblings. In other words, the daughters of a bull with larger scrotal circumference should reach puberty at
an earlier age than the daughters of a bull with smaller scrotal circumference. Yearling scrotal circumference measurements should be taken at the end of the test. Scrotal circumference should be measured in centimetres with a circular tape by palpating the testicles gently but firmly down into the bottom of the scrotum. Place the scrotal tape around the testicles close to the body, tighten loosely and slide carefully downward allowing the loop to enlarge until the largest scrotal circumference is obtained. It should be noted that breed associations may recommend higher minimum scrotal circumferences. Breed differences in scrotal circumference may result from differences in rate of maturing.

**Ultrasound Scanning for Carcass Traits evaluation**

In recent years, ultrasound scanning for carcass traits has evolved as a useful tool for obtaining valuable carcass information from a live animal. Body composition traits that can be measured include 12th to 13th rib fat thickness, rump fat thickness, ribeye area and intramuscular fat percentage (marbling).

Intramuscular fat percentage is measured at position between the 12 and 13 rib horizontal to back line, ribeye area and rib fat thickness are measured also at the position of 12 and 13 rib vertical between the 12 and 13 rib and rump fat thickness is measured at position of the rump in line of the sacral area and hip bone on a 900 angle. Each of these traits is at least moderately heritable and is significant in the determination of red meat quality and yield for individual animals. With information flow increasing throughout the beef industry, it is becoming increasingly important for breeders to learn as much as they can about how their animals and their progeny perform in the feedlot. Ultrasound scanning of bulls in a finishing environment provides information for a live potential breeding animal and will help breeders to produce calves that fit market specifications.

Yearling bulls can be scanned at approximately 365 days of age to provide a good indication of how sibling steer and heifer mates will perform on the rail. Breedplan has established a window of between 300 to 800 days for minimum and maximum age at scanning that must be complied with in order for the data to be used in the national cattle evaluation. Agricultural research council certified technician can perform this service for a subsidised fee resulting to a breeder paying a fair and reasonable price for the service. This often needs to be scheduled well in advance of the desired scanning date. Breedplan has additional breed specific ultra-sound guidelines and publish a list of technicians who are certified for RTU scanning. It may be advantageous for several producers interested in having their bulls scanned to arrange for a technician to service multiple farms in one area in one trip. This may help lower the cost of scanning for an individual farm by spreading the travel costs of the technician out across several farms.
Other Considerations

At the conclusion of the test and prior to utilizing a bull in a breeding program or selling a bull, a breeding soundness evaluation (BSE) should be performed. A BSE is a practical method for identifying bulls with less than satisfactory breeding potential. A breeding soundness evaluation consists of a physical examination, scrotal circumference measurement and semen evaluation. Developing bulls from weaning to yearlings on rations and pastures can be costly. Keeping records of costs associated with developing bulls will help in determining a market price that will cover the costs of bull development. Sometimes it may be tempting to sell bulls enrolled in a performance test during the actual testing period. By waiting until the completion of the test to sell a bull off the test, you will gain valuable information and will increase the accuracy of the performance information for the other bulls in the test. In addition, bulls sold right off a performance-testing program, particularly an intensive-based test, and placed immediately in a pasture breeding situation may not adapt well to the sudden change in diet. Just as the “adaptation” period was important for starting bulls on a performance test, bulls can benefit from a four to six weeks “hardening” period off a feed-based test to readjust to a forage-based diet. Reducing grain intake and increasing exercise prior to cow herd exposure can facilitate reproductive performance. For a bull test to be most effective in separating bulls based on genetic potential for growth performance, it is important that bulls placed on test remain on test throughout the duration of the test.

The main objective of an on-farm growth performance bull test is to evaluate post-weaning performance of bulls under uniform conditions. Data collected from bulls that did not complete the test cannot be used in comparisons with the animals that remained on test for the duration of the testing period. Removing bulls from the contemporary group lowers the value of the test and can bias the results, especially if high- or low-performing bulls are removed. Removing low-performing bulls from the test based on interim test weights may increase the test average for growth performance; however, the performance of the high-performing bulls will then be closer to the average of the group.

How to start on-farm bull growth performance test.

Beef cattle breeders can contact ARC regional office to enquire more on participating or learning more about on-farm growth performance bull testing programs or other on farm services like RTU and consultation in South Africa. ARC technicians will consult with a particular breeder regarding bull-testing program guidelines and coordinate your on-farm growth bull performance test. Participating in an on-farm growth bull-testing program can provide valuable selection and marketing information that can help improve the genetics of a breeder’s herd, increase the amount of information available to prospective bull buyers and increase the value of the bulls the breeders sell.
The Bureau for Food and Agricultural Policy (BFAP) recently released the 2021 edition of the BFAP Baseline, presenting an outlook of agricultural production, consumption, prices and trade in South Africa for the period 2021 to 2030.

Over the next ten years, global meat production is expected to expand by 14%, reflecting continuous productivity gains, as well as herd expansion in the America’s, China and Africa, according to the BFAP Baseline.

**The Beef Industry**

Beef is popular amongst South African consumers. Despite rapid growth in exports from 2012 to 2015, volumes have stabilised since at approximately 5% of production. While the volume share is small, exports typically comprise higher value products exported into premium markets. This provides price support to producers and enables them to deliver the remainder of the carcass into the domestic and regional market, where beef products comprise a range of more affordable and higher value products at retail level.

Consumers are price sensitive however, as illustrated by the decline in domestic consumption levels post 2016, when domestic supply constraints following the drought resulted in sharp price gains. Over the next three years, the effects of current herd rebuilding efforts are expected to reflect in production volumes, alleviating current supply constraints and mitigating further price gains to below general inflation levels. Combined with the recovery in consumer spending power, this will enable consumption growth of 13% over the ten-year period to 2030.

As producers continue to rebuild herds and constrain current supply, beef prices have increased sharply and on average for 2021 are expected to trade 6% higher than in 2020. This is however insufficient to fully offset the increases in feed grain prices, resulting in a further weakening of the beef to maize price ratio, which offers a basic indicator of profitability. From 2022 onwards, as feed prices normalise, this ratio improves to levels comparable to 2011, well below the peaks of 2017, but sufficient to induce production growth of 1.6% per annum over the coming decade.

The industry has moved successfully from a net
importing to a net exporting position over the past decade, broadening its market beyond the limited domestic growth. Its competitiveness in the export market will benefit further from the persistently weak exchange rate, but the constant risk of disease outbreak and the implications that this can have for market access reduces the incentive to invest in large-scale export driven expansion. While the share of exports in domestic production is projected to grow to 7% by 2030, this growth can be accelerated significantly if the constant risk related to animal disease is better mitigated.

Critical to better management of animal diseases is implementation of the Veterinary Strategy, as well as full implementation of an identification and traceability system. Such a system exists in the form of LITS-SA and if it can be successfully introduced as (again) proposed in the Agriculture and Agro-processing Masterplan, export growth can be accelerated substantially, whilst at the same time enabling developing producers to supply additional weaner calves.

Implementation of a combination of actions that speak to animal health, competitiveness, market access and inclusivity can enable a drastic acceleration of beef production growth in South Africa. Estimations indicate that an additional R8.2 billion can be added to the gross value of production above the baseline by 2030. The scenario also incorporates expanded market access for exports, enabled by the traceability system, and improved productivity for developing producers to supply at least 250 000 additional weaners by 2030, relative to the baseline, as well as a combination of actions to expand feed grain production. Under this scenario, South Africa would export 24% of beef production by 2030.

THE LAMB INDUSTRY

Lamb prices increased by 15.7% in 2020, despite the lower world price and weaker local consumer purchasing power. The increase was underpinned by supply constraints, emanating from a combination of the 90% increase in live sheep exports - to reach an estimated total of 152 000 animals, a 47% reduction in live sheep imports, from mainly Namibia, and national sheep herd rebuilding following an extended drought period in a number of sheep production regions.

The first quarter of 2021 has also seen higher lamb and mutton prices, despite a stronger Rand, and while higher prices would be expected to support production expansion, the continued challenges associated with livestock theft and predation in especially extensive production systems remain a limiting factor, resulting in a consolidation of production volumes in the coming decade. The size and sustainability of the live sheep export market remains uncertain, and though price driven expansion through more intensive production systems is possible, it would require significant capital investment.

In future, increased imports from Namibia, who is also in a herd rebuilding phase at present, should keep local prices in check over the medium term, reducing further incentives for such investments. Over the baseline period, domestic demand growth is weak due to the prolonged nature of the economic recovery and the high price of lamb relative to other meat types. As such, to achieve further growth in the industry, focus will have to move to the export market. As is the case for beef, exports of high value premium lamb and mutton cuts could support value chain profitability, whilst enabling more affordable products to local consumers from the rest of the carcass.
Hiermee nooi ons elke teler en boer uit om sy veiling in die Red Meat/Rooivleis tydskrif te adverteer. Die tydskrif
• is die amptelike mondstuk van die Rooivleisprodusente-organisasie (RPO), wat meer as 12 000 rooivleisprodusente verteenwoordig.
• bereik met elke uitgawe sowat 10 000 bees- en skaapboere landswyd, wat elk die tydskrif direk via e-pos ontvang.
• is ’n kragtige medium om inligting by medeboere uit te bring.
• sluit digitale bemarking per e-nuusbrief in.
• het sakpas-tariewe.

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Challenges and Fundamentals of Economically Sustainable Beef Cattle Farming Operations

Llewellyn Angus
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Introduction/Challenges

There are some common challenges or limiting factors for profitable beef production that emerging farmers or new commercial farmers are usually faced with. Overgrazing as a result of overstocking or incorrect pasture management and low fertility as a result of insufficient or unbalanced nutrition are limiting factors. Low selection for fertility and an inadequate health program is often a challenge. The use of random bulls resulting in a mixture of unadapted breed types would also be a limiting factor. Lack of funds or knowledge for correct infrastructure development could also be a challenge.

Pasture Management

The pasture your animals run on is their chief source of nutrition. The most important aspect for sustainable beef, or other ruminant, farming would be to manage your pastures well. Rotational grazing of natural pastures is the most important management tool. Along with this, one must determine what the recommended stocking rate would be for your area. One must also assess if your pasture is in a good condition. If it is not one will have to understock e.g. if your area has a stocking rate of 4ha/LAU/annum you would maybe only stock at 5ha/LAU.

Infrastructure

Inadequate infrastructure in the form of fencing for camps and water supply for each camp would make good pasture management almost impossible. The resting of camps for proper rotational grazing is then not possible. If continuous grazing takes place then stocking rate becomes even more critical and overstocking would result in a quick decline of the total carrying capacity for that farm.

Rotational grazing

An excellent practice with rotational grazing in the summer rainfall areas would be to rest roughly 50% of your pasture in the summer for the winter. In the following season switch to the other 50% to rest in the summer and utilize in the winter. Burning of sweet or mixed veld for utilization in spring and summer is not advisable. Rather try to graze off redundant material. When there is a heavily overgrazed camp or area, it would be advisable to exclude this area from utilization and withdraw cattle completely for a season or two.

In sourveld areas burning can only be done very judiciously and rather bring in the help of an extension officer or pasture scientist. Rather try to periodically “clean up” the veld by grazing it short and utilizing excess material. Veld that is very sour and underutilized could be burnt so that young palatable regrowth can be utilized by cattle. Burning of sour veld once every three years seems to be an acceptable practice in most sour areas.

Fertility

This is still the most important economic aspect of a beef herd itself. Fertility has a management component as well as a genetic component.

Correct management for higher fertility would give much quicker economic results than trying to select fertile cattle under sub-standard veld and other management conditions. Supplementary feeding in the form of phosphate licks in summer and protein licks in winter is most advisable in the summer rainfall areas. Regarding selection, animals that do not calve regularly under favourable conditions should be culled. Rather keep less oxen and keep more females that can reproduce.

Strict mating seasons simplify herd management. Pregnancy testing of females after the breeding season ensures easy selection against infertile animals. Weaned heifers and bulls should be kept separate from the main female herd. The selling of bull weaners and excess heifer weaners to feedlots or the local sale is highly advisable. This is the main source of income of a beef herd. Mating of heifers with bulls should only take place once they are well grown out and have a weight at least 65% of mature mass e.g. at least 325 kg if the mature cow herd weighs round 500 kg.
**Health program**

A basic health program that applies to your area is crucial. Consult a vet for an area specific program. Generally speaking, the inoculation of weaners before weaning against anthrax (compulsory), black quarter and botulism is highly recommended. Inoculation of female calves against contagious abortion with strain 19 between 4 and 8 months is a must. Alternatively inoculate your herd with RB51 after consulting a veterinarian. Dosing of calves at weaning is very important. Periodic pour-on treatment against ticks or dipping is essential and very area specific. At least an annual sheath wash for trichomoniasis and vibriosis and fertility testing of herd bulls is essential.

**Farm with breed types adapted to your area or system**

This aspect will always be of the utmost importance. The more extensive the conditions or your own unique farming system the higher the zebu (Brahman) percentage or indigenous Sanga type (Nguni, Afrikaner) cattle would be needed. This is purely because these cattle breeds are more adaptable and hardy than the higher producing bos taurus types like the Angus or Simmentaler. The synthetics are usually a combination of Sanga or Zebu and Bos Taurus cattle. The Bonsmara would be the classic example of Sanga X Bos Taurus. Other synthetics like Beefmaster, Droughtmaster, Simbra, Brangus and Bovelder are a combination of Brahman and Bos Taurus cattle.

As Southern Africa has vast more extensive drier areas the synthetics are very popular as they have a combination of adaptation to these conditions with a reasonably high beef production or growth rate. Every beef cattle farmer must make sure that the breed type he farms with is adapted to his own environment. It is more advisable to farm with a specific breed than to do random or unplanned crossbreeding.

**Crossbreeding**

Only venture into crossbreeding if it is structured and the management levels are reasonably high. It would entail at least two breeds of bulls and two different cow herds. Structured crossbreeding results in heterosis or hybrid vigour leading to better growth rates, higher fertility and better longevity of the cow herd. The further the two or three breeds are related to each other in crossbreeding the higher the levels of hybrid vigour. A classic example would be Brahman/Angus or Brahman/Simmentaler crosses.

**Selection of the right bulls**

When replacing bulls make sure the bull that is bought in will complement the cow herd. Buy bulls that are structurally sound and properly performance tested with their own weights and measurements like scrotal size. If, for instance, you have a degree of dystocia (calving problems) make sure the new bull has a good ease of calving estimated breeding value (EBV) and birth weight EBV's that are around or below the breed average.

Make sure the bull will still give you a reasonably heavy weaner calf. Good weaning EBV’s will ensure that the weaning weight and price for weaners would be acceptable. 75% of weaners in SA go into the feedlots so this is where the commercial beef farmer makes his money.

Also, bear in mind that the mature mass figures of the bull you buy are around breed average unless your present cows are too small. Big mature cows have higher maintenance requirements that can lead to low body condition in adverse conditions and when suckling. This would have an adverse effect on pregnancy % and herd fertility.

**In summarizing**

In order to operate an economically sustainable beef cattle farming operation a balanced approach would be necessary starting with good pasture or grazing management. Fertility has the biggest effect on profitability. Remember that a poor calf is better than no calf at all. Supplementary feeding and herd health aspects must be in place. Do not jump around with breed types but rather breed cattle that are suited to your environment and specific farm and management conditions. Remember to try to replace your older bull or bulls with a performance tested bull that has breeding values benefitting your specific herd and conditions.

“It is the eye of the stockman that makes his cattle fat.” Nothing can replace good management.
Introduction

Beef animals are rich with beneficial gut microbial communities that are crucial for better growth and health. Manipulating these communities in a positive way can result in better overall health and productivity of the beef cattle. There are thousands of beneficial microorganisms in the gut of any animal. These microorganisms are known as probiotics and can play different beneficial roles in the gut health of the animal, either singly or in combination with others.

Probiotics are live beneficial microorganisms that when ingested into the body of a host in a right quantity, would effect a health benefit to the host. These microorganisms may be bacteria, fungi or yeasts. Probiotics have been used extensively in maintaining human health and to lesser extent in animals to enhance their productivity.

Some desirable effects of probiotics in beef animals

- Improve immune function
- Fight off bad microorganisms in the gut
- Effect an appreciable average weight gain
- Improve nutrient absorption and feed conversion rate
- Reduce fats and cholesterol deposits in the animal carcass

Probiotics and antibiotics compared

Currently, the use of probiotics as alternatives to antibiotics to improve animal health and productivity is being well received in the developed countries. There has been growing public and scientific concern about the use of antibiotics as feed additives in animal production. Examples of antibiotics used in beef cattle production include monensin, lasalocid, penicillin, tetracycline and laiodium. All of these antibiotics are recalcitrant and leave residues in meat and meat products, which affect humans as the final consumers. The development of antimicrobial resistant strains of microorganisms is the most germane negative effect of the use of antibiotics in the beef cattle production. This problem can be eliminated naturally, through the use of probiotics in animal production.

Why are probiotics a better alternative to antibiotics?

Probiotics have the ability to modulate immune system and intestinal microflora, prevent and control enteric pathogens, and the ability to play a role in growth performance. Probiotics can reduce the number of specific pathogens (Salmonella typhimurium and/or E. coli O157:H7) due to their ability to compete with pathogens for absorption at the intestinal layers.

Specific examples in beef cattle

- The supplementation of yeast to intensive beef diets is reported to have increased the daily live weight gain and feed conversion efficiency (FCE).
- A study showed that probiotics did not change the dry matter intake, but increase average daily gain (ADG) in beef animals inoculated with a combination of Propionibacterium and Lactobacillus acidophilus.

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- The supplementation of yeast to intensive beef diets is reported to have increased the daily live weight gain and feed conversion efficiency (FCE).
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- Another study reported that final body weight (BW), ADG and hot carcass weight were significantly higher for steers treated with probiotics as compared to the control animals.

Why South African farmers must subscribe

Consumers around the world are now consistently demanding better products, including antibiotic free beef with desirable sensory qualities. Switching from antibiotics to probiotics as a feed additive for growth promotion and other prophylactic uses is one promising way of achieving this. Governments need to come up with regulations that encourage the use of safe, green products like probiotics. Information regarding the benefits of probiotics in beef cattle production must be made accessible to South African beef farmers.
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Adaptation of farm animals to stressful environments

Climate change is a reality and livestock (ruminants) will have to adapt to these more stressful climatic conditions. This can be done through genetic, biological and physiological adaptations.

Stress in farm animals is caused by exposure of the animals to adverse environments. In the case of environmental stress, the homeostasis of the animal is affected, which influences both production and reproduction. If the degree of environmental stress that animals experience can be measured, the degree of adaptation of the animal can be measured. In animal production, there is selection pressure to improve production, which often reduces fitness, disease resistance, and tolerance at higher temperatures. It is becoming increasingly clear that climate change will put more environmental stress on livestock worldwide. These stressors include rising temperatures, changing rainfall patterns, more frequent droughts, extreme events such as severe storms and floods, out-of-season frosts, and the wider spread certain diseases.

Warmer (tropical and subtropical) climates have both direct (temperature, radiation, humidity and wind) and indirect (digestibility of feed, intake, quality and quantity of grazing, spread of diseases) effects on livestock. Under these challenges, the balancing of genotypes (breeds) with production environments is becoming increasingly important. Genotypes with the correct (appropriate) genetic potential for growth, milk production, disease resistance and fertility will become increasingly important. However, the challenge remains how to measure adaptability and select for it.

Factors such as digestibility of feed, quality and quantity of grazing all have indirect effects on animals. The southern African vegetation may change from C3 to C4 grasses and in some areas; the grazing capacity is expected to decline. Nutritional stress has the largest indirect effect on grazing ruminants in the tropics and subtropics. In these environments, natural pasture has both lower nutritional value and lower tiller density than in temperate regions. As a result, climate change will have the greatest impact on ruminant livestock.

The adaptation of animals to stressful environments can be divided into genetic, biological and physiological adaptations.

**Genetic adaptation**

It is generally accepted that tropical and subtropical breeds have a lower productivity. The most important characteristic of these tropical and subtropical breeds is better survival under difficult and stressful conditions, caused by increased parasite load and diseases, a lower availability and quality of feed and adaptation at higher temperatures. Contrary to popular belief that animals have lower productivity, studies have shown that these breeds have the ability to survive, grow and reproduce in the presence of endemic stressors.

Animals selected for higher production are more exposed to behavioural, physiological and immunological problems. Furthermore, they tend to be more susceptible to diseases and heat stress. It is important to take note of this in the light of the expected climate change. There are more than 100 studies indicating that selection for higher production may be associated with metabolic, reproductive and health disorders in broilers, pigs and dairy cattle.

**Biological adaptation**

There are a number of morphological and anatomical adaptations that make animals more adaptable. These include the following:

- Body size and conformation: Tropical and subtropical breeds are generally smaller than breeds from temperate regions. The limbs, tails, ears and navel skins of animals from warmer areas are also longer.

- Digestion and function: Heat stress has an effect on how the nutrients are utilized. The energy metabolism is shifted to carbohydrate utilization and lipid oxidation is reduced. This makes the animals less efficient. Animals with different eating habits also secrete different saliva volumes and the saliva that secreted also different in its buffer capacity and protein composition. All these
factors has an effect on the digestion of the feed.

Skin and hair characteristics: This includes both the skin and hair colour as well as thickness and the number and structure of sweat glands. Animals from hot and humid regions have more melanin pigmentation compared to the animals found in cool and dry regions. Lighter hair also contributes to improved heat tolerance. Contrary to popular belief, animals with dark (black) skin are more heat tolerant.

Adipose tissue (fat): Localized fat deposition is observed in tropical breeds such as the hump of Zebu cattle and fat-tailed sheep. These breeds also tend to have less subcutaneous fat deposition than breeds from temperate regions. Adapted animals show a balance between lipogenesis (metabolic process by which fatty acids are stored in the fat) and lipolysis (breakdown) of the adipose tissue. When there is sufficient feed available, these fatty acid reserves can be maintained for weeks. During periods of drought, the fatty acids are used as an energy source and as building blocks for cellular proteins.

Note: The question is what will be the effect on adaptation when emphasis is placed on subcutaneous fat as part of selection for meat quality.

Behaviour: Animals change their behaviour in warmer climates to control their internal body temperature, by seeking shade or other cooler microclimates, by changing activity patterns, body postures (Sheep standing with their heads under each other) and feed intake patterns. We found with the GrowSafe system at Irene that less adapted genotypes changed their feeding pattern during periods of heat stress and consumed feed only in the late afternoon and evening. The more adapted genotypes reduced the amount of feed they consumed at a time, but ate more frequently throughout the day.

Well-adapted animals are characterized by a minimum loss of body weight when exposed to stress such as nutritional deficiencies, heat or high humidity. They also have a better resistance to diseases. Such animals are also less affected by irregular access to water. Prof Bonsma found that the weight loss in Afrikaner cattle after 24 hours without water was only 2%, while it was 15% in an exotic breed. After a 24-hour period without water, the feed intake of the Afrikaner did not decrease, while that of the exotic breed decreased by 24%.

It has already been mentioned that heat stress affects the grazing patterns of livestock, but the amount of water consumed also increases drastically. Water is used by the animals to regulate body temperature by exhaling warm and moist air from the lungs (sheep cool down in this way because they cannot sweat). The water that is lost through exhalation (sheep and cattle) or sweat (cattle), leads to the loss of essential minerals. It is therefore important that adequate water is provided during periods of heat stress as well as the necessary mineral supplementation through licks.

In ruminants, a nitrogen (N) deficient diet reduces feed intake by limiting microbial growth and organic matter digestion in the rumen. The optimum level of ammonia (NH3) in the rumen of cattle for proper microbial activity is 50 mg/l. It has been reported that Nguni cattle maintained their body weight better during winter than other breeds, the reason being that they had higher blood urea and ruminal NH3 levels. There appears to be a mechanism in the breed through which NH3 is recirculated in the body with lower excretion through the kidneys.

There are also indications that heat stress may affect meat colour and tenderness in some breeds.

Conclusion

Southern African livestock production will be affected by global warming. This can be mediated using a variety of resources and tools that may become available. While breed resources and genetic variation for adaptation may hold the most important merit, management interventions and genetic approaches for improved thermoregulation may also contribute to improved production. There are also opportunities for the development of new production systems and feeding strategies that can secure climate-smart livestock production.
Afrikaners can be withheld from water for up to 24 hours without any negative effect.

Nguni has a mechanism by which urea is recycled in the body with a lower excretion by the kidneys.

Heat stress may affect meat colour and tenderness.

The financial contribution of the National Research Foundation (NRF) towards this research through grant UID 135438 is acknowledged.
Background
The livestock industry is challenged with changes in the production environment as a result of climate change and global warming. The need to select more adapted genotypes to improve production efficiency is now more relevant than ever before. Performance testing of the cowherd is thus important to constantly evaluate production levels and for selection on specific traits for improvement. Apart from these challenges the livestock industry are under constant criticism for its contribution to greenhouse gas emissions, which contribute to global warming and climate change. Producers need to produce “more from less” and more efficient cows will improve the sustainability and profitability of the herd. The Integrated Registration and Genetic Information System (INTERGIS) is an objective computerized system and can be used by farmers to identify high performing animals as breeding stock. The system has been used for many decades to assist farmers to make use of data, including performance trait data, to manage their herds in a sustainable manner. The main objective is to improve on production efficiency of the cowherd and it is important to make an informed decision when purchasing a bull, which will enhance the breeding goals of the herd.

Production and reproduction records make it easier to identify old cows with below average herd performance. These cows need to be replaced with good quality heifers to maintain and improve herd production. Reports generated by the INTERGIS provide reproduction records for each cow in the herd.

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**Integrated Registration and Genetic Information System**

The Integrated Registration and Genetic Information System (INTERGIS) is the National livestock database of South Africa and managed by the Agricultural Research Council (ARC), on behalf of Department of Agriculture, Land Reform and Rural Development (DALRRD). Although the system is not considered a farm management system it can still assist cattle producers in selection decisions. The system is based on the rules and guidelines of the National Improvement Schemes, also managed by the ARC, on behalf of National government. The National Beef Scheme’s recording services are divided into 4 Phases (A to D), aimed at addressing different performance trait measurements of which the information is summarized in a range of valuable reports. Phases A and B of the National Beef Improvement Scheme is a platform for evaluating reproduction and production of the cow herd. A wealth of information are packaged in report format and can be applied as an objective and very effective selection tool. The focus needs to be on traits of economic importance, such as fertility and growth, to ensure more sustainable beef cattle enterprise. The ARC is a member of the International Committee for Animal Recording (ICAR) and audited every 5 years by ICAR officials to ensure the INTERGIS and the Beef Scheme comply with International recording standards.

**Traits of Economic Importance**

Emphasis should be on cow efficiency as a breeding objective to ensure optimum production of the herd. Well adapted, fertile, medium frame cows with sufficient milk production are important for optimum growth of weaner calves, and will improve on cow efficiency. Recording of these traits in phase A of the National Beef Improvement Scheme makes it possible to select for suitable cows. Post weaning on-farm testing (phase B1 and B2) of heifers (without the support of the dam) is an indication of heifer adaptation in an extensive environment.

**Birth notifications**

Phase A of the National Beef Improvement Scheme (NBIS) is the reproduction (A1) and suckling phase (A2). Birth notifications can be send to the INTERGIS after birth of the calf. The calf is created on the system with a unique identification number and linked to its pedigree. Sire and the dam of the calf and additional information such as birth date, sex and birth weight (if the calf was weighed) are also captured. Just by sending in a birth notification additional reproduction information are generated by the system such as age-at-first calving (in the case of heifers) and inter-calving-period in the case of cows.

**Interpretation of reports**

Reports can either be viewed on-line, or electronically mailed to the farmer. A few of the most relevant reports and how to apply the information for selection purposes will be discussed.

**Reproduction**

In the “herd reproduction report”, cows are listed from oldest to the youngest and her age, age at first calving (AFC), number of calves (nC), days since last calving (DLC) as well as her average inter-calving-period (ICP) appears on the report. Non-performing cows not complying with the minimum reproduction norms set for the herd can be identified. Especially cows with longer inter-calving- periods or cows that do not produce a calf every year can be easily identified and culled. Cows that calf late in the calving season can also be easily identified. (Abbreviations appear at the bottom of each report)
Additional to this report is the “herd status report” which indicates the age distribution of the cowherd. It is important to ensure that the average cow age of the herd falls within the optimum production age group, which is usually between 4 – 10 years of age. Older cows need to be replaced with good quality heifers on an annual basis of between 10 to 15% replacement ratios to maintain the optimum production efficiency of the herd.

**Production**

The newborn calf receives a unique identification number on the system and whenever the farmer request a complete herd list report (“selection list”), all active animals on his farm will appear and be sorted according to the identification number and sex of the animals. Additional information on this report includes pedigree and indexes per growth trait based on age-adjusted weights. For cows, her own performance indexes, number of calves, age at first calving, average inter-calving-period and the average wean index of all her calves are given. Her average wean index is an indication of her production efficiency. This report enables the farmer to cull inefficient cows, in particular cows with a below 90 percent average wean index for all her calves.

![Selection List report](image)

**Performance testing**

**Weigh list**

The system makes life easier for farmers to do performance testing by generating a weigh list prior to the weigh date. Whenever the farmer decides to weigh his calves, the weigh list is generated and calves born in the calving season prior to the weaning season appear on the weigh list. The only outstanding data on the weigh list is the weight of the calf and cow weight (additional) that can be recorded on the weigh list and sent back to the INTERGIS team via email to be processed.
Growth test report (wean)

The complete wean group with the actual wean weight, 205 day weights adjusted for age of the calf and the wean index appear on the growth test report. Wean indexes serve as selection criteria, especially for replacement heifers to improve the genetic potential of the herd and increase the production level.

Growth test reports (post wean)

Similar to the wean reports, reports for one year old and 18 month old weights can also be requested as a weigh list, completed and processed after the weighing date. The indexes on post wean reports are valuable and indicate the best-adapted heifers in an extensive environment. Farmers who are registered as users on the
INTERGIS can connect to the system via the internet and can view pedigree information and performance figures of their own herd. It is not necessary to print reports; they can be viewed and electronically mailed in different file formats. The reports are in “PDF” format as well as “CSV” and can be used in “Excel” for further use.

**ADDITIONAL REPORTS**

Several other reports are also generated by the system, which include auction catalogues on behalf of breed societies. Growth test reports, in additional post wean test phases of the beef scheme, such as phase C (centralized testing of bulls) and phase D (on-farm testing of bulls) can also be generated.

**HOW CAN I IMPROVE PRODUCTION EFFICIENCY FROM GENETIC SOURCES FROM OUTSIDE MY HERD?**

The most economical alternative option is to change the breeding bull. Genetic improvement of the herd is possible if selection of the breeding bull is based on information on the auction catalogue. Genetically superior bulls can be selected from auction catalogues by interpretation of fertility figures of the dam as well as growth performance information of the bull itself. The herd bull needs to compliment the breeding objectives of the herd to ensure genetic improvement of the herd. The ARC can be contacted for support on the interpretation of auction catalogues.

**CROSS BREEDING**

Small to medium frame Sanga derived cows mated with European or British breed bulls will give the optimum heterosis benefit. The F1 cross heifers selected for replacement in a well-managed cross breeding system increase the volume of production (kilogram calf produced for your market) and will improve cow efficiency. A well-structured crossbreeding system helps producers to achieve an increase in production and a reduction in production costs or input costs. Indeed, pricing differences, popularity and perceptions of some breeds and colour patterns may influence the breed choice in such a system. Heterosis generated through crossbreeding can significantly improve an animal’s performance for especially lowly heritable traits. Crossbreeding has been shown to be an efficient method to improve reproductive efficiency and productivity in beef cattle.

*Bull selection from auction catalogues are very important to ensure genetic improvement of the herd, especially when breeding your own replacement heifers*
Crossbred F1 heifers from the Vaalharts cross breeding research project. Results indicated substantial improvement in cow efficiency if landrace breed cows are crossbred with British and European breed bulls. The commercial producer also has the advantage of a F1 cross heifer as replacement for older less efficient cows. The F1 cross heifer will improve on fertility and milk production and produce more kilogram calf for the commercial market.

**Summary**

Historically, the INTERGIS system was mainly used by the stud industry but is of value to the commercial beef industry and at a subsidized annual fee to commercial farmers. Additional benefits include unbiased official reports to feedlot agents as proof of growth potential of weaner calves. Performance reports add significant value to when farmers market or sell their breeding stock to other farmers. Potential buyers can make better-informed decisions when buying adapted and good performing heifers as replacements. More focus on production efficiency on herd level will improve beef production on a National level and have a positive influence on profitability, food security and sustainability of livelihoods in the beef industry.
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The beautiful ‘bont ticks’ Amblyomma spp., is found in warm and moderately humid areas of the eastern coastal belt and northern parts of South Africa. Unfortunately, this tick can transmit the bacterium called Ehrlichia ruminantium, that causes the disease Heartwater (HW) in cattle, sheep, goats and antelope. The first symptom of HW is a high fever followed by nervous signs, fluid retention in the heart, lungs and brain, which finally leads to death. Treatment with the antibiotic oxytetracycline is only effective if administered before nervous signs appear. Tick infestations can be controlled by the application of chemical pesticides (dipping the animals), but resistance to acaricides has been observed and animals may lose immunity to tick-borne diseases as a result of the lack of a natural challenge. The alternative is to vaccinate susceptible animals to protect them against fatal disease. A “live blood vaccine” is commercially available in South Africa that is based on an “Infection and Treatment” method.

**Live blood vaccine**

This vaccine is made by bleeding sheep infected with the Ball3 strain of E. ruminantium. This live HW blood vaccine needs to be stored and distributed at temperatures below -70°C in order to keep the bacteria alive. The infected blood is then administered by injecting it directly into a vein. To prevent the live bacteria in the blood from killing the vaccinated animals, they are then given an antibiotic when the animal develops a temperature to prevent fatal disease. This is a complicated process which makes life difficult for the farmer. Furthermore, the aim of a vaccine is to induce long lasting protection against a disease. However, the HW blood vaccine is not always effective in protecting animals against fatal heartwater.

Consequently, to overcome some of the shortcomings of the live blood vaccine, the Agricultural Research Council – Onderstepoort Veterinary Research (ARC-OVR) is developing several different alternative vaccines: an attenuated Welgevonden strain vaccine, an inactivated/killed vaccine containing a cocktail of strains and a new generation DNA vaccine.

**Attenuated vaccine**

In contrast to the Ball3 strain the more virulent Welgevonden strain protects animals from most of the known E. ruminantium strains in South Africa. Fortunately this Welgevonden strain was successfully attenuated in cell culture at OVR. This means that the bacteria are alive and can replicate but they do not cause the disease. Thus this vaccine is suited for use in areas where HW is known to occur. The attenuated Welgevonden strain vaccine is able to induce 100% protection and is at an advanced stage of development in collaboration with Onderstepoort Biological Products.

**Inactivated vaccine**

In situations where neither the live Ball3 blood vaccine nor the attenuated Welgevonden vaccine protects animals from HW, due to the presence of breakthrough strains, alternative vaccines need to be employed. This necessitates an in depth knowledge of the different genetic and antigenic strains present. Currently there are 15 different characterised strains in South Africa and studies are continuing to identify more. Because not all E. ruminantium strains can be successfully attenuated, such important breakthrough strains can be included in a tailored chemically inactivated/killed cocktail vaccine to ensure protection against HW. Inactivated HW vaccines have not been very successful in the past. However, efforts are being made at OVR (in collaboration with CIRAD, France) to improve its effectiveness by including the correct cocktail of strains and adjuvants.

**DNA vaccine**

One novel approach being intensively studied at Onderstepoort is to inject selected pieces of the genetic material (DNA) of the HW bacterium that is responsible for producing protective antigens, directly into an animal. The animal’s cells then take over and produce the antigen itself. This vaccine is not based...
on infectious bacteria as in the current blood vaccine, but on specific components called antigens that can activate the animals’ immune defence system. Therefore, this vaccine could be used in areas where the tick vector is present but where E. ruminantium does not yet occur. The first experimental DNA vaccine did not give the expected results for a number of reasons. After evaluating the possible causes of failure, the researchers went back to the drawing board to redesign this vaccine. They considered the fact that the immune system only recognises a small part of an antigen/s of the bacterium. To keep the new vaccine simple and effective, they removed unnecessary parts of the antigen focusing only on the actual parts that were likely to result in protection against HW. This was a long process since 270 antigens were selected and each was tested in turn for their ability to activate an immune response. The idea is to select the most effective parts from the best antigens and then combine these in a single highly potent multi component DNA vaccine. Preliminary testing of such a vaccine protected three sheep out of five when HW infected ticks were fed on them. This was a promising indication that the vaccine team at the ARC-OVR is moving in the right direction. Research to improve this vaccine to reach acceptable protection levels is continuing.

We know that HW is an economically important disease that threatens not only the health of susceptible animals but also the livelihood of South Africans. Therefore, the successful development of an effective vaccine against HW is of utmost importance and of top priority.
How temperature-humidity-index influence fertility of Bonsmara cows in a warmer climate

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Increasing Temperatures

With the South African annual average temperature projected to increase by 1.5 to 2 times the global rate by 2050, the temperature in the Northern Cape Province, which is by large extensively used for livestock farming, is expected to increase twice as fast as the country’s forecast. Figure 1 shows the projected annual average temperatures changes throughout the Northern Cape over the period 2021-2050 under the Representative Concentration Pathways (RCP 8.5) scenario (CSIR 2019). These higher annual average temperatures are likely to increase evaporation rates, which may; influence water availability, reduce crop, pastoral and animal outputs and have a negative impact on food security in the province (DAEARDLR, 2021).

In beef cattle, heat stress is a common cause of reproductive inefficiency (Nardone et al., 2010). The maximum ambient temperature the day after mating has a big impact on fertilization. Heat stressed oocytes reduce the ability for fertilization and therefore compromise the developmental stages of the embryos. The critical period for survival of the embryo is between four and six days after fertilization. Both the ambient temperature and the nutritional status of the female have a significant effect on the survival of the embryo during this period. Furthermore, the Inter-Calving Period (ICP) in high producing cows tends to increase over time as production rates such as weaning weight increase and this creates a concern over the reproduction rates (Rust & Rust, 2013). Never the less, the negative impacts of heat stress on the productivity and reproductive performance of cattle and the economic consequences have been well documented (Nardone et al., 2010; Amundson et al., 2005; Ronchi et al., 2001; Meyerhoeffer et al., 1985; Hansen, 2009). However, most of these studies were conducted in developed countries and limited information exists regarding the environmental effects in the warmer climates of South Africa. Subsequently, the effect of heat stress on cow fertility is often ignored.

The Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAERDLR) - Northern Cape in collaboration with the ARC-Irene, seek to make recommendations with regard to future selection and management of beef herds in warmer climatic areas. In a study that was done at Vaalharts Research Station the aims were to firstly determine whether seasonal change in the summer temperature-humidity-index (THI) could be ascribed to climate variability or a long-term climate change trends. Secondly, the study attempted to determine the correlation between the average THI during the preceding mating season of Bonsmara cows and their corresponding average ICP. The THI data was collected from the local weather station, while the ICP of the cow herd was extracted from the INTERGIS. The average THI for the summer months from 1999 to 2018 was determined with the formula THI = 0.8 *(Ta)+ (RH/100) *(Ta – 14.4) + 46.4 (Admundson, et al., 2006) where RH indicates the relative humidity and Ta indicates the dry-bulb temperature.

The Vaalharts Research Station is situated at 27°57'19" South and 24°50'41" East with mixed Tarchonanthus veld, Veld type No 16b, 4 (Acocks, 1975) and has a carrying capacity of 10 ha/LSU (Theunissen, 2011). The climate is classified as semi-arid and it is characterized by hot summers, with an average temperature of 32°C during December and January and cold winters with the lowest monthly average temperature of –0.5°C during July (Theunissen, 2011). The annual rainfall is 440 millimetres per annum (Scholtz & Theunissen, 2010).

Results and Discussion

The THI at the Vaalharts varied between 69.86 and 73.97 for the period between 1999 and 2018, but a linear regression shows that there is a definite upward trend with an increase of 0.1067 units per year. The ICP varied between 373 and 482 with linear regression also showing an upward trend. This results suggests that approximately 45% of the variation in ICP...
could be explained by the variation in the THI of the preceding mating season. A high correlation ($r=0.67$) between THI and ICP was found. This outcome should be interpreted with caution since environmental and animal effects were not corrected for, with statistical analysis.

As it can be seen that increased THI during the summer mating season negatively affected the ICP of cows in the subsequent calving season (Figure 2), the opportunities to mediate high THI by using a variety of breed resources and other technological tools must be considered. For sustainability, balancing challenging environments with adapted breeds may become a crucial element for efficient and increased prolificacy, growth, milk production and resistance to disease. While breed resources and genetic variation for future adaptability may hold the most important merit, management interventions such as spring or extended breeding seasons and genetic approaches for improved thermoregulation in animals may counteract the future adverse environmental conditions in warmer areas.

Environmental management interventions on their own may not be sufficient and/or arduous to mitigate the negative impacts of increased THI on the productivity and reproductive performance in cattle. Under certain managerial skills, it may be possible to identify alternative cattle breeds (purebreds, composites and crossbreds) that may be more adaptable to increased THI. The use of on-farm THI, early-warning climate forecasting, heat wave predictions and animal production records can also aid cattle producers.

However, more research will be needed for the development of new production and management systems, including early warning systems and lick supplement strategies, which may secure climate-smart beef production.
Figure 2: The THI during the summer mating season and the ICP of cows in the subsequent calving season
Since June this year, the Dexter SA Society has also started using the ARC as service provider. This means that we now have four breeders’ societies that make use of our registration services with the Afrikaner Cattle Breeders’ Society as registering authority. The other breeds are the Afrikaner, Afrisim and Ankole.

In view of our dire economic climate due to the COVID-19 lockdowns, the ARC has increased the annual fees for registration services on the INTERGIS by only 4% for the financial year 2021/2022. It was good news for the breeders, especially with the accompanying drought plaguing some parts of the country.

**ARC as research institution**

The Agricultural Research Council (ARC) is a research institution that conducts agricultural research and the INTERGIS with its national animal database is the ideal source of information for this purpose. Numerous data extractions are done for our researchers that enable them to do their individual research. Statistics and information from the database were also provided to other role players in the industry, such as the Department of Agriculture, Land Reform and Rural Development (DALRRD), universities and service providers in the livestock industry.

**INTERGIS involvement in the Kaonafatso ya Dikgomo Scheme (KyD)**

The INTERGIS accommodates the KyD scheme that has been implemented to accelerate meaningful participation of smallholder farmers in the commercial sector. As always with relatively new schemes, there are a constant need for new developments. It is worth mentioning that provision has been made for capturing the disability status of participants on the national database. It is also available to other schemes if needed. Ongoing support is provided to the scheme especially with regard to membership applications and numbers for quarterly reports to name just a few.

**Breeders’ Societies**

Due to the severe and prolonged drought that was a factor beyond human control, the Afrikaner Cattle Breeders’ Society asked the ARC to develop a procedure to flag cows that did not calve due to the drought. It is aimed at not penalizing breeders for the cows in question, which now obviously have particularly high age at first calving (AFC) and longer inter calving periods (ICP). It was implemented earlier this year and is based on scientific principles, to prevent the system from being manipulated to the benefit of any party. It is also time-bound and will only apply for a limited period.

Noteworthy is that constitutional changes and approved amendments are dealt with on an ad hoc basis. There were several requests that included the adaptation of mating tables and amendments to reports as well as the introduction of new operational procedures to ensure more efficient service delivery and support.

**Other projects**

The INTERGIS team is regularly involved in projects with other role players in the industry. It involves the supplying of information and in other cases the development of applications, web pages, mobile applications and databases. For example, we were able to bring all the role players together for the establishment of a sustainable breeding program of indigenous farm animal genetic resources (FAnGR) for smallholder goat farmers and demonstrate to them how to use the system to their benefit. Their ultimate goal is to conduct research for breeding values in the future. Another example was the collaboration with the other campuses of the ARC, where programs were developed to compile a comprehensive farm report for DALRRD that includes geographical information. This project was initiated by a section within the ARC Animal Production Institute at Irene.

**Operations**

Almost all operational matters relating to the INTERGIS are managed from the Bloemfontein office. The division is involved in the registration and processing of data, the handling of queries and the provision of electronic reports and information about the herds to the breeders’ associations. This includes registrations and various performance related data from the schemes. Contrary to general expectations due to the Covid-19 lockdowns, operations continues at full capacity. With the expectation of possible delays, new development has been done to give them the functionality (according to predetermined permissions and security levels) to manipulate data so that they can accelerate and improve service delivery.
There are two ‘material’ profit drivers in the production of beef in South Africa - Quality of beef produced and Quantity of beef produced

1. Quality of beef produced

This relates to the amount of fat cover over the meat and the producer is rewarded for this in the current classification system. Research is currently underway to enhance the classification system to reward marbling. This is a very important profit driver as it determines taste of the meat. In addition, we are trying to develop our export markets to compete with other countries globally.

2. Quantity of beef produced

This important profit driver is completely ignored in the current classification system and there is no incentive for the producer to produce beef with a more muscular animal. If one goes to the “Ask the Meat Man” website (http://askthemeatman.com/yield_on_beef_carcass.htm#breakdown), you will find the results of their numerous tests where they have cut up and measured carcasses in the U.S.A. for over 50 years. The results are quite amazing! If one compares the yield of saleable meat (the proportion of the carcase that can be processed and sold to the customer) from a lean, bulky, beefy and well-muscled carcase to the yield from a flat, low muscled and very fat carcase, it is a massive 35% differential. This is mainly due to huge amounts of fat and bone being produced, which is wastage.

Yield from a lean, choice 300lb side = bulky, well-muscled, low fat carcase:

- Fat & bone (waste) = 15%
- Usable meat cuts (take-home meat) = 85%
- \(\frac{85}{85} = 100\%\)

Yield from an average, choice 300lb side = medium muscled, fat carcase:

- Fat & bone (waste) = 30%
- Usable meat cuts (take-home meat) = 70%
- \(\frac{70}{85} = 82.5\%\)

Yield from a very fat, choice 300lb side = low muscle, flat, very fat carcase:

- Fat & bone (waste) = 45%
- Usable meat cuts (take-home meat) = 55%
- \(\frac{55}{85} = 65\%\)

There is a 35% (100% - 65%) differential in saleable meat between a lean, bulky, well-muscled carcase with low fat and that of a flat, low-muscled and very fat carcase.
Some sides of beef are fatter than other sides of beef. Because excess fat is removed during cutting, carcase fatness will affect how much take-home meat a side of beef will yield.

The amount of fat and bone that must be trimmed (cutting loss) from a side has an influence on the “quantity” of saleable meat produced. I have spoken to numerous other influential beef industry role-players, namely Dr Michael Bradfield, Professor Frikkie Nesar and Dr Phillip Strydom; and they all agree that this profit driver needs to be addressed for the benefit of the industry and the beef breeds that produce much more beef naturally. We live in South Africa; an emerging market country; with lots of poverty. Not like the first world countries Australia and the U.S.A. We are trying to feed a nation and to produce more beef sustainably and cost-effectively, and yet this important profit driver is just ignored in South Africa.

As a beef industry we need to transform ourselves and understand that we are not only trying to improve the ‘quality’ of our beef so we can compete with the global export markets, but we are also trying to feed our nation with large quantities of affordable beef.

Feedlots and meat processors – want the ‘quantity’ profit driver

It is common knowledge that feedlots discriminate against a few of our indigenous breeds – they discriminate and pay lower rates per kilogram. This problem can be solved by using the correct breed of bull and crossing it with these indigenous breeds to create a muscular slaughter animal.

We need to encourage breeding with the right animals that feed and convert grass & grain effectively with good average daily gains and feed conversion ratios. These animals will finish with the right amount of fat cover (even if fed for longer). It costs the same to process a small carcase versus a large carcase. In addition, feedlots and meat processors want animals with high slaughter percentages, excellent retail beef yields, eye muscle areas and good conformation.

A possible, simple solution to the problem

Our classification system does have a conformation score of 1–5. It relates to the ‘quantity profit driver’. Without costing the industry a cent more, at slaughter a flat, low-muscled carcase with a conformation score of a 1 & 2 should be penalised, and a round, bulky, beefy carcase of 4 – 5 should be rewarded extra. This would immediately give an incentive to the cattle producers to farm with the correct breed of animal.

How does one determine the reward/penalty? Assume the carcase weight price is R50 per kilogram. Take 10% - it’s easy to understand and work out.

For example:
Conformation score 1 – R5.00 (penalise)
Conformation score 2 – R2.50 (penalise)
Conformation score 4 + R2.50 (reward)
Conformation score 5 + R5.00 (reward)

As one can see, this does not cost the industry a cent more and is easy to implement.

The large feedlots and meat processors (the same businesses) would also benefit enormously from this change, as they would automatically get more of the right type of animals in their feedlots, which would feed and convert maize and grass into meat more efficiently… We compete against an effective, advanced chicken industry. In addition, they would get higher slaughter percentages. Finally, they would add large quantities of saleable meat when they cut the meat off the bone add more profit to their bottom line and feed our nation cost effectively.

Even with a ‘disconnect’ between when a weaner is purchased and finally slaughtered, this change in the classification system would encourage the producers and the feedlot buyers to procure these efficient, beefy calves.

**Conclusion**

We need to transform our industry to address the problem of poverty so that we can feed our nation and produce more beef sustainably and cost-effectively by using the right breed of bull. There is a massive 5% differential between a lean, bulky, well-muscled, efficient carcase and a very fat, low muscled, flat carcase. For this reason, the classification system needs to change to encourage and give producers an incentive to produce more “quantity of beef” naturally, so that all the ‘role players’ in the industry and the South African consumer can benefit.
“Setting the course. Starting today.”
BACKGROUND

The Agricultural research council and the directorate production workshops and agriculture of the department of correctional services are working together to ensure the efficient and economically production of quality meat as well as other farm products for the inmates. The National beef cattle recording and improvement scheme of the ARC is accelerating the participation of all correctional services management centres in performance testing of their animals to achieve production efficiency.

THE PURPOSE FOR THE INVOLVEMENT OF THE ARC WITH DCS?

The purpose is to improve the genetic potential of the correctional services beef herds by using superior genetics breeding bulls. To provide for the breeding, identification and utilisation of genetically superior animals in order to improve the production and performance of animals.

SERVICES RENDERED BY ARC TO CORRECTIONAL SERVICES

The services among other include advisory services: Animal recording and birth notification, Wean test report: All cattle belonging to DCS are registered on the National database, INTERGIS that is managed by the ARC. A unique individual animal identification, based on ICAR guidelines, forms the bases to upload individual animals in the herd onto INTERGIS. Thereafter performance data such as the individual calf weaning weights are loaded on INTERGIS to evaluate the growth potential of individual animals. More than 2000 total herd is registered on INTERGIS from seven correctional centres.

WEAN TEST REPORT

ARC assisted the correctional centres by generating performance reports from the weigh list, wean test report and farm evaluation report. These reports assist the herd managers to select best performing animals and to cull the non-performing animals. The performance of the herd is evaluated and any improvement is made based on the performance reports. Each test report can be evaluated to determine progress in future. It is recommended to cull all heifers with a wean index below 90 for replacement heifer to ensure genetic improvement. The breeding objectives that include fertility, growth and milk production are then set for the herd to improve production efficiency. The National beef Scheme allows the wean age to a minimum of 150 and maximum of 250 days for the weights to be considered as wean weights. ARC also assist the correctional centres with the wean test summary to advise them on breeding seasons, calving season and weaning seasons depending on their specific regions.

With only visual selection of the bull, it is impossible to predict if it breeds huge calves at birth but the breeding values confirmed it. These EBV’s assist the herd managers to identify the bulls that fit best into their breeding objectives and bulls which are strong on more than one trait of importance such as growth and fertility. Breeding values also assist to avoid certain traits, which can have a negative influence on the efficiency of the beef herd.

ASSISTING CORRECTIONAL SERVICES TO PURCHASE BREEDING BULLS

ARC has assisted a list of correctional services management area to purchase stud-breeding bulls with the aim of improving beef production of their herd. To interpret the auction catalogue is a challenge to most commercial farmers, ARC assisted by recommending the bulls on the auction catalogue that has potential in meeting their breeding goals. The breeding values that are considered are Birth direct, wean direct, milk production, scrotum size and frame size (body length and shoulder height).

THE LIST OF DEPARTMENT OF CORRECTIONAL SERVICES MANAGEMENT AREAS SERVICED BY ARC

ARC regional offices service all the correctional services in all South African provinces with performance testing. ARC regional offices are Vryburg (North West), Glen...
Correctional services management areas currently participating in beef cattle recording and improvement scheme

Gauteng region - Leeuwkop centre, Baviaspoort centre, Zonderwater centre and Devon centre.
Free State - Groenpunt centre, Mpumalanga - Barberton centre & North West - Rooigrond.

THE IMPORTANCE OF GENETIC IMPROVEMENT IMPORTANT TO THESE CORRECTIONAL FARMS

To ensure the efficient and economically viable production of quality meat as well as other farm products for the inmates. Breeding goals such as increased growth in beef cattle animals to increase productivity. The aim is to reduce feed production cost as slaughter group animals will reach the slaughter weight at a younger age. By evaluating their weaning weights (amongst others), there is a lot of opportunity for improvement.

ARC technicians visit the facilities on regular basis for animal improvement services. These visits include farm visit and consultation. ARC also manages other schemes on behalf of the Department of Agriculture Land Reform and Rural Development and National milk recording and improvement scheme is one of them.
The value of Phase C testing in the Beef Industry

In South Africa, almost all weaners are (produced) born on natural pasture (veld conditions). In contrast, approximately 75% of all beef produced in South Africa comes from feedlots. This means that most weaners are grown and rounded off in feedlots.

Selected bulls are evaluated immediately after weaning. Evaluation takes place under intensive (feedlot) conditions and under standardized conditions, at a central testing station. When one also considers that the arrival weight of calves nearly doubles during the testing period, it is clear that feedlots play a massive role in the provision of high quality beef to the consumer.

Why immediately after weaning?

- To minimize pre-test environmental influences as experienced on different farms and conditions. Bulls are also in a growing phase, which will maximize the test results and the bulls will be relatively lean at the end of the test.
- Age and weight limits ensure that bulls are at the same physiological state.

What makes Phase C unique?

- It is the only phase where individual feed intake is recorded, as bulls are fed ad lib during the test.
- Besides the purchase price of calves, feed cost is the 2nd highest cost component in a feedlot.

Therefore feed intake and feed conversion efficiency is an important component of production costs.
- Feed conversion ratio (FCR) is calculated as kg feed/kg weight gain. FCR is the most accurate method of estimating breeding values for feed conversion efficiency.
- It is the only phase where same breed animals from different farms and years are directly compared (without BLUP information available).

Other benefits

- A growth testing period comprising of 28 days adaptation and 84 days is conducted within stipulated guidelines and rules.
- Validation is done by an independent institution to assure accuracy of the test data.
- Bulls are weighed regularly to monitor growth and to identify any potential problems.
- Standardized diet, with special specifications, are used in all ARC approved testing centres.

Market value of Phase C tested bulls

- Currently the average bull price of all breeds is approximately R 45 000.
- Bulls tested in Phase C conditions fetch approximately 15% higher than the average price.

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Phase C bulls that were winners in the ARC National Special Performance Test Class 2021
(Photos supplied by Mr Seymour Currie)
THE MOTHER COW OF AFRICA

- Longevity
- Fertility
- Disease resistant
- Good temperament
- Strong herd instinct
- Early maturity

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- boran@boran.org.za
- Breed advisor: 082 821 1527
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- Boran Cattle Breeders’ Society of SA
Performance of Braunvieh bulls in Phase C tests

**Background**

Due to a continuous rise in the population that is associated with an increased demand for protein, sustainable beef production is also becoming more important to ensure the demand is met over the long term. Together with the rise in the population, the natural resources are also under pressure and beef producers need to produce the proverbial “more from less”.

The combination of decreasing hectares available for crop production, increased utilization of grain for fuel, increased input costs and an increase in feed costs are some of the key factors that highlight the changing dynamics of agriculture.

Feed costs amount to 55% – 70% of the total production cost, and a 10% improvement in feed efficiency of animals may result in a feed cost saving of several hundred million rand per annum for the industry as a whole. Measuring efficiency may result in decisions that increase productivity without increasing costs of production resulting in greater margins. Feedlot studies in the USA demonstrated that a 10% improvement in average daily gain (ADG) as a result of a 7% increase in appetite improved profitability 18%, whereas, a 10% improvement in feed efficiency returned a 43% increase in profits. By improving feed efficiency, it will contribute to a more sustainable and profitable production system. FCR is one of the traits calculated at the end of all Phase C tests at ARC test centres and bulls consume on average 3% of their body weight in feed per day. The average feed conversion ratio in SA (FCR) is 4.5 kg – 7.5 kg, and depicts the actual feed consumed to gain one kg in live mass. The less feed consumed by a bull to gain mass, the more efficient it becomes.

It should however be mentioned that when selecting for a low FCR and high average daily gain (ADG), over time your animals may reach higher mature weights, requiring more feed for maintenance. Since growth is of economic importance, e.g., weaning weight has a direct monetary value; farmers select this trait to improve their profitability. Care should also be taken when selecting for higher weaning weights since growth traits are highly correlated. Care should also be taken to avoid bigger calves at birth since it may result in calving difficulties while heavier mature weights will require an increase in maintenance requirements. The purpose of this study was to determine what happened with the growth and efficiency of Braunvieh SA bulls. Most of the meat consumed from the formal markets in SA, is produced from cattle coming through feedlot systems. A 1% improvement in feed efficiency has the same impact as a 3% increase in rate of gain. Improvements in efficiency of beef production are vital and necessary to sustain the cattle industry.

**Research on bulls in feedlot-conditions**

Performance data from four ARC centralized testing stations were analysed by the ARC in a recent study and Braunvieh bulls tested during 1999 – 2020 were included. Bulls were grouped according to the year within which their adaptation period of 28 days started. The reason why the bulls were grouped according to year are that the most of them were not tested in groups but alone. Data of 397 Braunvieh bulls was analysed. The data were obtained from the SA Studbook database.

After the adaptation period, bulls entered the intensive growth test stage for an 84-day period.

By completion of the test, the results were compared to the 10-year rolling average for ADG and FCR per station and per breed. The 10-year rolling average, is the average of the performance of bulls (within a breed) tested within the previous 10-years; this gives an indication of how an animal performed compared to the breed. In addition, the management and feed ration are standardized at all the central ARC test centres.

In graph 1 it can be noted that ADG remained relative unchanged and FCR improved. A reduction in FCR is favourable, since less feed is consumed to reach a certain level of growth.

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In graph 2 it should be mentioned that shoulder height and body length remained constant, however scrotum circumference decreased in size. Between the largest scrotum circumference and the smallest, there is a 28mm difference. The decrease in scrotum circumference is not desirable; scrotum circumference is correlated to fertility.

Graph 1 The relationship between ADG and FCR is illustrated

Graph 2 The relationship between scrotum circumference, shoulder height and body length are illustrated.
**Summary**

Presently the global trend is to select for RFI (residual feed intake) as means of improving feed efficiency since it is a moderately heritable trait. RFI is phenotypically independent from growth and body weight, meaning that selection for RFI should not affect growth or mature size. On the other hand, strict selection for FCR can lead to an increase in growth rate and thus an increase in mature weight, which might not always be desirable.

Body length and shoulder height remained relatively constant through the years, ADG showed a slight decrease whereas the trend for FCR showed quite a significant decrease, with close to a 0.5kg reduction in the amount of feed needed to gain 1kg of body weight. Frame size did thus not change, however the reduction in the amount of feed consumed to grow indicates that through phase C testing breeders were able to select animals that are more feed efficient and thus more profitable.

**Acknowledgment**

I would like to thank my co-author for his contribution.

I would like to thank the Braunvieh SA cattle breeders’ society of South Africa and SA Studbook for releasing the data for this study.
Progress on elite Afrikaner herd at Irene – December 2021

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BACKGROUND
The ARC-Animal Production and the Northern Cape Department of Agriculture, Environment, Land Reform and Rural Development in the Northern Cape has been collaborating on a crossbreeding project, which includes the Afrikaner breed. As part of the collaboration, surplus animals are transferred to Irene, which created the opportunity to select superior animals for breeding and formed the basis of the herd. The herd was registered in 2019 with only 14 cows from five different Afrikaner herds, which makes it quite unique. The first pure “SP” bull was purchased from the “Beyersrus” Afrikaner Stud herd, during the 2019 National Afrikaner auction at Parys in October 2019 and mated to all the females.

SELECTION CRITERIA
Selection is based on scientific principles. Performance information is most important and although functional efficiency is considered, it will not be the most important criteria for selection. The ARC wants to empower breeders with profitable cattle and selection for “good looks” will not be the basis of our selection. Since officials started purchasing breeding material, traits such as fertility and growth, formed the basis of selection from the auction catalogue. Prior to the auction animals are inspected by breed inspectors and therefor “quality control” regarding functional efficiency has been done on behalf of the potential buyer.
Integrated Recording and Genetic Information System (INTERGIS)

The complete herd is captured on the national database (INTERGIS) to ensure good record keeping and proper pedigree information. Basic herd management such as a fixed breeding season from December to March was implemented. Performance testing forms the basis of herd management and weighing of all calves at wean is compulsory. Performance testing for the herd started with the purchase of the first breeding bull. Reproduction information from the mother and breeding values of the bull are most important to support our breeding objectives to supply fertile animals with good growth potential to commercial producers. All birth notifications are sent to INTERGIS to ensure completeness of the herd on system.
**Purpose of the herd**

The herd will serve as a demonstration herd at Irene during training sessions. The application of reports from the national database can be explained and the application thereof in the herd as a selection tool. The campus are visited by farmers during farmer’s days and the breed will be promoted as a well-adapted breed that can produce grass fed branded beef as well as a commercial breed, in a well-defined cross breeding program to supply fast growing calves to the feedlot industry.

**Progress made and future plans**

The herd was already awarded by the Afrikaner breeder’s society for a good inter calving period for a small herd. One of the bull calves was tested at the Irene bull testing center in a centralized phase C test and was rewarded with a silver merit for good growth- and feed efficiency ability. The herd will serve as a source of genetic material to other ARC experimental farms and as breeding material for small scale farmers. The ARC are involved on numerous projects to develop small scale beef farmers into commercial beef producers and to become part of the commercial value chain. New proposed projects with national government are initiated and show good potential for future collaboration.
Feed efficiency

The term efficiency implies a ratio of inputs and outputs, and in this case feed. The animal’s biological efficiency is determined by its ability to convert feed into meat. Feed efficiency is important in the beef herd, as up to 65% of the feed on the farm is used to meet mature cow maintenance requirements.

Heifers and cows should be able to produce and reproduce on veld (extensively). After weaning, the offspring must be able to perform and adapt to intensive feedlot conditions. More than 70% of all meat produced in SA comes from feedlots, where feed is a major cost. It is estimated that in America with their big feedlots, a 10% improvement in feed efficiency will save the industry +/- 20 Billion Rand a year.

The common measurement of feed efficiency is feed conversion ratio (FCR), which tells us how much feed an animal needs to produce 1 KG of meat. However, being a ratio trait, improvement in FCR could be due to a decrease in feed intake or an increase in growth rate. If not careful in your selection, selecting for bulls with a higher weight gain (WG) and a lower feed conversion ratio (FCR), will by default, result in breeding larger framed animals and thereby increasing maintenance costs.

Research have shown that testing for residual feed intake (RFI) as a measurement for feed efficiency, is independent of growth traits, and selecting animals biased on RFI, will not affect the mature size of the breeding herd.

RFI

RFI is the difference between actual feed intake and predicted feed intake needed by an animal for maintenance and growth. The predicted feed intake is derived from a regression model using the body weight and growth tempo during a specific period of growth. To explain the principle and highlight differences when it comes to feed efficiency, Dr Gorden Carstens of the USA made use of a 77 day growing trial done in the USA to demonstrate these differences. Producers may assume that 2 steers with the same body weight and ADG will have the same predicted feed intake and also be equally efficient (Table 1 below). This assumption may be completely be invalid. We should also remember that feed efficiency speaks directly to profitability of an animal as mentioned earlier.

Table 1: Summary of performance indicators relating to feed efficiency of two steers during a 77 day growing trial.

<table>
<thead>
<tr>
<th></th>
<th>INITIAL BODY WEIGHT</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>244KG</td>
<td>0.96KG</td>
<td>243KG</td>
<td>0.98</td>
</tr>
<tr>
<td>681KG</td>
<td>684KG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>779KG</td>
<td>559KG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+98KG</td>
<td>NETT FEED INTAKE</td>
<td>-125KG</td>
<td></td>
</tr>
</tbody>
</table>

When the actual feed intake is measured we see however that the steer on the left on the table have consumed 98kg more than predicted and the steer on the right 125kg less. The more efficient steer (negative RFI) gained almost the same, but ate 220KG less feed than the less efficient steer (positive RFI). In a feedlot situation the more efficient animal will therefore also have a better feed conversion ratio due to the fact that they need less feed to achieve the same growth.
What we also have to keep in mind is that the South African feedlot industry prefers certain minimum growth rates and carcass weights, which may not always be achieved through selection for RFI alone. A trait such as residual growth rate should also be investigated and these two may be used in a simplified selection index by farmers.

When we are looking for bulls for our replacement heifers it will be of importance to select these bulls that have a negative RFI, to breed more efficient animals without affecting the growth rate or the mature cow size. This can reduce the maintenance requirements of the cow herd by 9-10%.

Low RFI animals tend to digest feed better. This could be due to differences in body composition and metabolic processes such as metabolisable energy and the breakdown of protein. Research has shown us that benefits of low RFI animals includes a lower carbon footprint, a lower weight of the liver, stomach and intestines, lower percentage internal fat and higher % carcass protein.

**The importance of testing for feed efficiency**

It is important to test for efficiency, because ultimately we are talking about financial gain by producing more efficient animals. By testing bulls and participating in a performance testing scheme cattle breeders are contributing data to the national data base and empowering us to do research and produce meaningful data. Cattle breeders can utilize scientific performance data and facilities, such as the ARC’s testing stations, to empower themselves to make the correct choices regarding their animals and the progeny, to achieve their breeding goals.

The cost of testing must be seen as a long term investment in our herds and in the future of efficient beef production with the potential to be more profitable. The ARC has some of the best technologies and scientific expertise, and farmers are encouraged to contact the ARC in this regard. Bull testing is not a luxury, it is an investment in your herd and it is the future of efficient and profitable red meat production in South Africa.
A breed of its own
Climate change will have a smaller impact on livestock production in many of the northern hemisphere countries, as most livestock are kept in protected environments (stables, barns, etc.) and receive supplementary feed. In many developing countries of the southern hemisphere, however, the situation is different, as livestock are mainly kept extensively. Livestock production in these countries will be more sensitive to climate change.

Forecasts of climate change in southern Africa agree that the subcontinent will generally become warmer and drier. The forecasts show increases in the average temperature from 1.5 °C to 2 °C by 2050 and 3 °C by 2100. These forecasts range from 0.5 °C on the coast to 3 °C in eastern Namibia and western Botswana. Rainfall projections confirm a generally drier southern African region, except for the central interior regions and the Eastern Cape, where a wetter future is predicted. The most significant rainfall reductions of more than 40 mm/annum are predicted for the eastern parts of Limpopo and Mpumalanga, the south-western Cape and the Cape south coast.

The climate of Southern Africa is expected to become more unstable, with high temperatures (heat waves) during the summer as well as severe cold (cold fronts) during the winter. Prolonged periods of below-average rainfall and severe seasonal droughts and floods can also be expected. More veld fires, due to the weather, are also envisaged.

The 2015/2016 season is an example of such extreme conditions. This season was the driest and warmest season that was ever experienced in South Africa since climate records were kept. For example, there were 12 heat waves that lasted a total of 71 days. This is going to be a global trend. Europe, for example, had its hottest summer with very high temperatures and record rainfall leading to floods in Germany and Belgium in 2021. The veld fires in Greece and Spain are also attributed to climate change.

An article published in the South African Journal of Science in 2020 (article no. 7614) indicates that the seasons in South Africa have already changed. The researchers analyzed the data from 35 selected meteorological weather stations of the South African Weather Service. The data was used to make a statistical classification of the South African seasons, based on the daily temperature data. The new seasons are shown in Table 1. From this it is clear that summer is already six months long (October to March) and spring only one month (September).

<table>
<thead>
<tr>
<th>Season</th>
<th>Months</th>
</tr>
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<tbody>
<tr>
<td>Summer</td>
<td>October/November/December/January/February/March</td>
</tr>
<tr>
<td>Early autumn</td>
<td>April</td>
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Effect on livestock production

Climate change will have both direct and indirect effects on livestock. Factors such as temperature, radiation, humidity and wind all have a direct effect on livestock. Ambient temperature is the factor that has the greatest direct effect on livestock production. Most livestock perform at their best at temperatures between 4 and 24 °C. In Southern Africa the temperatures will regularly rise above this comfort zone and it is therefore important that livestock adapt to these higher temperatures.

The effect of climate change on livestock production can be summarized as follows:

- Decrease in feed production from dryland and irrigated pastures, which can lead to an increase in feed costs.
- Decrease in grain production, which can result in higher feed costs. (It is predicted that the area where maize can be produced in South Africa can decrease by up to 30%).
- Reproduction may decrease due to the effect of heat stress on fertility.
- Lower milk production due to heat stress and poorer nutrition. It will also affect the preweaning growth of beef calves.
- Poorer growth rate and lower feed conversion efficiency, especially in beef cattle during periods of heat stress.
- Change in the distribution of livestock diseases and pests. This includes ticks and tick borne diseases.

In the case of beef cattle, the effect of climate change can be addressed by using more adapted genotypes, the application of alternative breeding objectives or the implementation of alternative production systems.

Short term strategies

Since seasons of lower than average rainfall and high temperatures will occur more frequently, it is important that farmers have, or develop, short-term strategies or management practices. This may include the following:

- During seasons of heat stress, a solution may be to make use of multi-sire breeding and/or the use of bulls from tropical adapted genotypes, to mitigate possible male infertility.
- Introduction of alternative, more drought resistant crops which can provide grain sources for basal animal feeds such as sorghum. These alternative grains may be used in different forms of silage or balanced rations.
- Reduce animal numbers in order to manage stocking rates. This suggestion is easier to implement for both commercial and small holder farmers on privately-owned land, but rather difficult for livestock owners on communal land where decision-making regarding reducing stock numbers involves many owners who may not easily agree to the idea.
- Every possible source of hay counts in situations of drought and the possibility of ammonization of poor quality hay could be considered. If poor quality hay is ammoniated with ammonia, the quality of the hay can be drastically improved. However, expert advice must be sought before this is done.
- Poor quality hay from across South Africa could pose a threat in the distribution of weeds in grazing lands. To reduce chances of introducing undesirable plant species that may come with purchased fodder, feeding must be restricted to specific locations on the farm.
- Consider feeding alternative feeds, like shredded scrub (boskos). This implies that bushes and the smaller branches of trees are shredded and used as animal feed. Livestock can eat other feedstuff than just hay. In fact, they will do well on many other types of feed such as shredded scrub.
- Since the drought is normally compounded by extreme heat, taking into consideration that hide texture and hair colour impacts on animal thermal regulation and heat stress, farmers need to make sure that their livestock have access to water and shade.
- Livestock movement needs to be restricted, particular during the hot periods of the day. In addition, the movement of livestock when providing drought feed should be restricted as far as possible, since livestock that is allowed to move about a lot will spend more energy, which is not productive and it places a burden on maintenance requirements.
- Provide feed at night during extreme heat periods. Livestock tend to consume more feed during the night during periods of heat. It is therefore important to ensure there is feed available during the night.
- Control parasites and provide the same salt and mineral mixture during drought as during normal periods. Cattle under nutritional and heat stress are less resistant to parasites than under normal conditions.
CONCLUSION

Livestock production in Southern Africa, especially in the developing sector, is vulnerable and at high risk of being severely affected by climate change. The social awareness of droughts as well as its effects and countermeasures should be improved. This can be done through training, brochures, leaflets, bulletins, internet, radio, television, newspapers, etc.

Global warming is going to have a negative effect on food production from animals; while human food of animal origin is important for the cognitive development of children in early childhood.

The financial contribution of the National Research Foundation (NRF) towards this research through grant UID 135438 is acknowledged.
Entering your bull for Phase C?  
A few requirements and rules to take note of

Centralised growth testing centres are all about assessing a young bull’s post wean growth and daily feed intake under standardised and scientifically controlled and managed environments.

There are however certain requirements that must be met before any calf can be admitted to a phase C test. Animals must be free of hereditary defects. Listed below is the most important requirements that must be met for an animal to participate in a Phase C test.

- **Participation** – animals should be eligible for registration or recording. Grade bull calves shall only be allowed for testing if they are approved by the breeders’ society concerned.
- **Please take note that you need to submit a copy of the animal’s birth certificate with the application.**
- **Age and weight** - Only bulls 151 to 250 days of age at the beginning of adaptation, of which the arrival weight falls within the minimum and maximum range per breed, shall be accepted for testing. These age and weight limits are strictly applicable and unfortunately, no exceptions will be allowed.
- **Veterinary Requirements** – Animals shall only be eligible for testing if the owner can certify that they 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.

**The following inoculation programme is recommended:**

- 2-3 months old - Anthrax and gall-sickness inoculations
- 3-4 months old - Combined black-quarter/botulism inoculation
- 5-6 months old - Combined black-quarter/botulism (2nd inoculation) and lumpy skin disease
  - Animals must be free of internal and external parasites as well as ringworm, mange, warts and footrot.
  - It is recommended that all animals be vaccinated against respiratory tract infections at least a month before arrival (Bovishield Gold or other).
  - All animals will be dosed and immunized against bovine rhino tracheitis (IBR), virus scours and para-influenza on arrival at the testing centre.

**Number of bulls**

- Members are recommended to test at least three bulls per weaning group. 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 of more progeny has already been tested in a Phase C test.

**Other rules**

- Merit awards will be made at the end of each test, as stipulated in the Rules of the National Beef Recording and Improvement Scheme.
- Only Gold, Silver and Bronze merits will be awarded based on the performance criteria. Animals will be branded accordingly if they pass inspection done at end of test by a breed representative.
Entering your bull for Phase C?
A few requirements and rules to take note of

Please take note that the weaning index of animal will not be taken into consideration when merits are awarded and thus weaning weights are not a prerequisite for testing.

* Insurance of bulls for the period tested at an ARC test centre must be done by the owner himself, with an insurance company of his choice. The owner of bulls that are not insured, carry the risk of any injury or mortality that may occur whilst at the test station.

* The total cost of the test must be paid before the bulls will be released and is done at the end of test.
Farmers also have the assurance that Phase C tests are conducted by ARC technicians accredited under the International Committee for Animal Recording (ICAR) and thus conform to internationally accepted standards and guidelines. Performance data generated from Phase C is a valuable tool in the quest to select for superior performing animals, thus it is highly regarded by industry as a means to improve profitability and sustainability of our national herd.
Angus - the breed with meat quality, calving ease, naturally polled and fertility.
The choice for crossbreeding to encompass heterosis.
Centralised growth test Schedules at ARC test centres for 2022

Melville Ferreira
ARC-Animal Production, Armoedsvlakte, Vryburg

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For enquiries relating to the Cedara bull testing centre please contact

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Thivha Netshilema: Tel: +27 (0)51 861 2144 | Cell: +27 (0)72 1375 794 | E-mail: netshilemat@arc.agric.za

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For enquiries relating to the Elsenburg bull testing centre please contact
Tinus Viljoen: 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
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For enquiries relating to the Irene bull testing centre please contact
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## IRENE BULL TESTING CENTRE
### IRENE BULTOETSSENTRUM

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## VRYBURG BULL TESTING CENTRE
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For enquiries relating to the Winter Castles bull testing centre please contact
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Tinus Viljoen: Tel: +27 (0)21 809 3327 | Cell: +27 (0)72 470 8386 | E-mail: viljoent@arc.agric.za
The site is located in Alexandria, Eastern Cape.
"SO REG IN JOU KRAAL"

GESELS SAAM:

LandbouRadio  @LandbouRadio
@LandbouRadio1 landbouradiog@gmail.com
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:

- Animal Recording and Improvement through the National Improvement Schemes e.g.
  - National Beef Cattle Improvement Scheme
  - National Dairy Cattle Improvement Scheme
  - National Pig and Small Stock Improvement Schemes
  - Kaonafatso ya Dikgomo for smallholder farmers
- Quantitative and Qualitative Analytical services for feed and food analysis
- Animal Forensic Services
- National Genetic Evaluation of Livestock (e.g. BLUP Analysis)
- Germplasm Conservation of farm animal genetic resources
- Information dissemination through training and capacity development

TRAINING COURSES:

- Beef Breeding and BLUP Technology
- Beef Cattle Management
- Cattle and Pig AI
- Small Stock Management
- Introductory and Advanced Meat Processing
- Pig Production
- Poultry Production
- Dairy Production and Processing
- Range/Veld and Pasture Management

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