Annual Beef Bulletin
Jaarlikse Vleisbees Bulletin
2020

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Animal Production
Diereproduksie

agriculture, land reform & rural development
Department:
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

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April 2024

National Beef Recording and Improvement Scheme
Nasionale Vleisbeesaantekening- en Verbeteringskema

National Beef Recording and Improvement Scheme

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For more information contact
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FROM THE EDITOR

"Life doesn't get easier or more forgiving; we get stronger and more resilient"

Dr Ben Greyling
ARC-Animal Production, Irene - Ben@arc.agric.za

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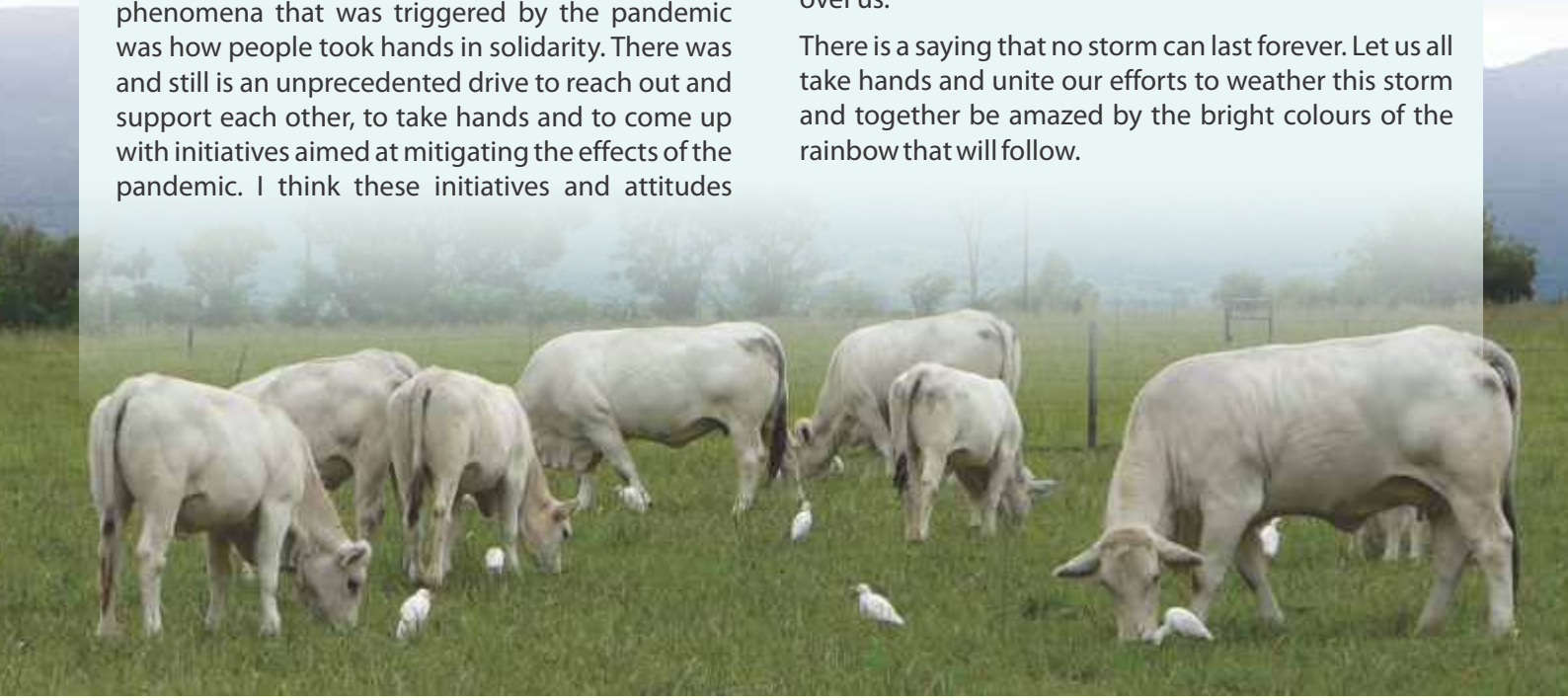
The challenges that 2020 brought upon us was a true test for our resilience. In a year where our world was turned upside down by the Covid-19 pandemic, we had to make sacrifices and adapt to an environment that, at times, was almost unbearable. One of the most concerning factors was the one of uncertainty – we did not really know how the effects of the pandemic would materialise and how it would ultimately affect our daily lives. The unknown sparked many concerns and fumed our fears of what may lie ahead. Besides the terrible toll that it took on the lives of thousands of South Africans, the pandemic also wreaked havoc on our economy and the rest of the world.

An optimist will always tell you that every dark cloud has a silver lining. Despite the economic meltdown of our economy as a whole, the agricultural industry grew by 15% during the second quarter of the year (2020) - a true reflection of the resilience of the sector. This against the backdrop that the livestock industry, which contributes close to 49% of the agricultural GDP, suffered setbacks due to an FMD outbreak late in 2019 that was also accompanied by drought in certain sectors of the country. Agriculture thus truly stood the test of time during extreme hardship. One of the outstanding phenomena that was triggered by the pandemic was how people took hands in solidarity. There was and still is an unprecedented drive to reach out and support each other, to take hands and to come up with initiatives aimed at mitigating the effects of the pandemic. I think these initiatives and attitudes contributed immensely to the fact that agriculture showed a positive growth in a time where many industries were brought to their knees. It also unquestionably highlighted the importance of national and household food security as a priority.

The economic meltdown prompted experts to strongly advocate global cooperation in order to restore normal economic activities. They are also adamant that the fourth industrial revolution characterized by digital globalization has emerged even stronger. We have subsequently transformed our approaches to do the things we do - we now focus very strongly on how to trade, work and adapt our social lives making use of digital tools. Who would ever have predicted that we will watch sport and music concerts on-line without any physical attendance of spectators?

Although we are not out of the woods yet, there is a lot to be grateful for. On a year-to-year basis for instance the average auction price for weaner calves was 46% higher in 2020 than the year before. Many sectors within the agricultural industry has also already started to make significant recoveries similar to other industries that are vital contributors to our economy. These and many other positive developments, are the proverbial silver lining of a dark cloud that is hanging over us.

There is a saying that no storm can last forever. Let us all take hands and unite our efforts to weather this storm and together be amazed by the bright colours of the rainbow that will follow.



THE RED MEAT INDUSTRY

2010 to 2030

Gerhard Schutte
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This article is a philosophical overview of the red meat industry over the past ten years as well as the next ten years.

The red meat industry is a very complex industry with a complex value chain and the ten years are divided into two periods of five years.

2010 until 2015

This was a time of relative prosperity where the whole industry was more or less in balance in terms of the value chain. We were still in the phase of moving away from a regulated era to a deregulated era. Producers during this time became more involved in the marketing of their own product. Climatic conditions were during these times generally more favorable and the industry grew into a net exporter. The markets have been in balance in terms of the meat/maize price relationship and the whole value chain made fair gains. It was an era with relatively favorable growth, which has obviously been positive for the producer price of red meat. Animal diseases were under control, we had a foot and mouth disease free sone status and state functions have been delivered fairly effectively. The local market absorbed nearly all production and because of the fact that the industry became more competitive internationally, imports of red meat were on a relatively low level. Good progress has also been made in terms of genetics and herd management, the game industry flourish and grew, which left less land available for red meat production, relieving the pressure in the market. It has also been a period of increasing buying power and population growth in South Africa, which had a positive impact on the producer price.

During this time, the industry focused strongly on the development of the developing sector to specifically promote enterprises in that sector. The statutory levy contributed significantly to this goals and good cooperation was obtained from the National Marketing Council in terms of the implementing of such projects.

It was a period in time when stock theft and predation were relatively under control due to the fact that capacity still existed within the state authorities to be helpful in this regard.

2015 until 2020

This era was characterised by the worst drought in the country, which put farmer's cash flow and production under serious pressure, resulting in down-scaled herds. Price volatility was the order of the day and profitability came under serious threat. In order to survive economically, the larger units and especially the feedlot industry became vertical integrated with a drastic extension in the size of units.

The control of animal diseases became problematic and erosion diseases like brucellosis became an increasing problem for producers. The ultimate loss of South Africa's foot and mouth disease free zone status had a very negative impact on the industry and exports became under pressure. Imports of livestock from neighboring countries led to a lot of emotion and it proved to be very disruptive in the market. It was also an era of low economic growth with pressure on producer prices and losses in the value chain have often been to the cost of producers, who are price takers. The department of agriculture and the state functions became more ineffective and government policy, especially with regard to the possibility of expropriation without compensation, resulted in serious investing uncertainty. During these times the hides and skin prices as well as the leather industry became internationally under enormous pressure.

The impact of the Covid-19 pandemic will most likely stay with us for a long time to come, but the fact that the industry was able to keep on producing during the pandemic as well as the demand for our product during the time, was very encouraging. Not only Covid-19 presents a serious challenge, but the listeria outbreak also put the spotlight on food security, which should receive more attention. The industry during this time also focused strongly on codes of best practices in terms of the natural resource, the livestock and farm workers.

The industry is also now once again member of the International Meat Secretariat (IMS), confirming our commitment to be an international role player. Despite of this negative time period, the industry managed to be internationally competitive and research and development played an important role in this. The industry is also currently in the process of focusing more on industry and development needs when it comes to the funding of research and development in the industry. During these times, the very modest statutory levy played an important role to facilitate an empowering environment for the industry.

It became clear that producers had to accept own responsibility for predation management and the combatting of stock theft as state capacity were a growing problem in this regard.

The next ten years

The industry has the potential to increase exports from the current 5 % of production to 20% of production. This will represent a whole new level for the total industry. It will have to be a team effort within the value chain. A traceability system must in future grow from an initial industry implemented voluntary system which controls market access to a system which is recognised by the authorities and which is internationally accredited. A traceability system will have to grow from the industry and current service providers and systems must be utilised on this basis. The principal of compartments must also be applicable and feedlots may possibly be used as a base for this.

Traceability systems will have to be combined with tracking systems and financial institutions will have to be convinced to buy into it in order for producers to use livestock as collateral to acquire funding.

The control of animal health will have to be a greater team effort between the industry and the department and we will have to accept that the industry will have to provide much more capacity in order to reach its goals. Self-regulating will have to be much more important, supported by a statutory levy in the industry. The statutory levy will most likely have to be increased in order to provide meaningful support.

It will have to be an era where profitability levels must be increased while a greater degree of centralising of abattoir and processing capacity will most likely take place. The commercialisation of the developing sector will have to play an important role in order to promote the industry, while a voluntary grading system can play an important role in improving consumer assurance on national and international level. The further extension of brand marks will also have to take place in order to satisfy consumer's needs. The industry's consumer education programs will also have to gain momentum due to various myths and due to the fact of green movements' attacks on our product and industry are increasing.

It will increasingly be a function of the producer organisation to undertake production development. The only way to stay internationally competitive is a well-developed research and development program.

The research and development program will also have to address the risks of the greenies and the carbon and water footprint of the industry, while animal health will have to receive more attention. Research on consumer behavior, -patterns, -spending will be critical to grow the consumption of our product.

It is of critical importance that greater investment confidence in agriculture and agriculture related issues will be confirmed on the political front in order to create policy certainty for agriculture to flourish.

The food relationships with the industry structures of our neighboring countries and within the international meat secretariat will have to be further enhanced.

The transformation agenda and implementing of enterprise development will play a critical role in terms of the future of the red meat industry.

All the fundamental aspects are in place for the industry to go from strength to strength in the next ten years. In order to achieve this, it is necessary that producers stay on the forefront of technical and market information, while producer organisations have an important role to play.

DIE ROOIVLEISBEDRYF

2010 tot 2030

Gerhard Schutte
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Dié artikel is 'n filosofiese oorsig oor die rooivleis-bedryf oor die afgelope tien jaar asook die volgende tien jaar wat kom.

Die rooivleisbedryf is 'n baie ingewikkelde bedryf met 'n ingewikkelde waardeketting en daarom sal ek graag die afgelope tien jaar in twee periodes van vyf jaar elk wil verdeel.

2010 tot 2015

Dit was 'n tyd van redelike voorspoed waar die hele bedryf min of meer in balans was in terme van die waardeketting. Ons was steeds in die fase om finaal weg te beweeg van 'n gereguleerde era na 'n gedereguleerde era. Produsente het in dié tyd ook baie meer betrokke geraak in die bemarking van hul eie produk. In dié tydperk was die klimatologiese toestande oor die algemeen baie gunstig en het die bedryf gegroei tot 'n netto-uitvoerder. Die markte was in balans in terme van die vleis/mielieprys-verhouding en die hele waardeketting het regverdige winste gemaak. Dit was 'n era met relatief gunstige ekonomiese groei wat natuurlik positief was vir die produsenteprys van rooivleis. Dieresiektes was onder beheer, ons het 'n bek-en-klouseer vrye-sone status gehad en staatsfunksies is relatief doeltreffend uitgevoer. Die binnelandse mark het omtrent al die produksie geabsorbeer en weens die feit dat die bedryf al hoe meer internasionaal kompeterend geraak het, was invoere van rooivleis op 'n relatiewe lae vlak.

Goeie vordering is ook gemaak in terme van genetika en kuddebestuur, die wildbedryf het floreer en gegroei, wat minder grond beskikbaar gelaat het vir rooivleisproduksie, wat die aanbod in die mark verlig het. Dit was ook 'n tydperk van groter koopkrag en bevolkingsgroei in Suid-Afrika, wat positief geïmpakteer het op die produsenteprys.

In hierdie tyd het die bedryf baie sterk gekonsentreer op die ontwikkeling van die ontwikkelende sektor om spesifiek ondernemings in daardie sektore te bevorder. Die statutêre heffing het 'n wesenlike bydrae gelewer om dit te bewerkstellig en baie goeie samewerking is verkry van die Nasionale Bemarkingsraad in terme van die implementering van sulke projekte.

Dit is 'n tydperk waar veediefstal en predasiebestuur relatief onder beheer was weens die feit dat kapasiteit binne die staatsowerhede steeds bestaan het om hiermee behulpsaam te wees.

2015 tot 2020

Dit was 'n era met die grootste droogtes in die land, wat ernstige druk op boere se kontantvloei en produksie geplaas het en kuddes is afgeskaal. Pryswisselvalligheid was aan die orde van die dag en winsgewendheid het ernstig onder druk gekom. Ten einde ekonomies te oorleef, het die groter eenhede en veral die voerkraalbedryf vertikaal geïntegreerd geraak met 'n drastiese uitbreiding in die grootte van die eenhede.

Die beheer van veesiektes het al hoe meer problematies geraak en erosie-siektes soos brucellose het 'n al hoe groter probleem geraak vir produsente. Die uiteindelike verlies van Suid-Afrika se bek-en-klouseer vrye-sone status het 'n baie negatiewe uitwerking op die bedryf gehad en uitvoere onder druk geplaas. Invoere van lewendehawe vanuit buurlande het emosies opgejaag en was baie ontwrigtend in die mark. Dit was ook 'n era van lae ekonomiese groei met druk op produsentepryse en verliese in die waardeketting is dikwels na produsente, as prysnemers, afgewentel. Die departement van landbou en die owerheidfunksies het al hoe meer ondoeltreffend geraak en regeringsbeleid, veral met betrekking tot die moontlikheid van onteiening sonder vergoeding, het groot beleggingsonsekerheid geskep.

In dié tyd het die huide- en velpryse sowel as die leerbedryf internasionaal onder geweldige druk gekom.

Die impak van die Covid-19 pandemie sal sekerlik nog lank met ons wees, maar dit was positief dat die bedryf tydens die pandemie kon aanhou produseer en die vraag na ons produk was in dié tyd baie bemoedigend. Dit is nie net Covid-19 wat 'n groot uitdaging verteenwoordig nie, maar die listeria-uitbreking het ook die kollig op voedselveiligheid geplaas, wat meer aandag behoort te kry. Die bedryf het in dié tyd ook sterk gefokus op kodes van beste praktyk in terme van die natuurlike hulpbron, die vee en plaaswerkers.

Die bedryf het ook weer lid van die Internasionale Vleissekretariaat (IMS) geword, wat ons verbintenis bevestig dat ons 'n internasionale rolspeler is. Ten spyte van 'n negatiewe tydperk het die bedryf internasionaal kompeterend gebly en het navorsing en ontwikkeling 'n groot rol hierin gespeel. Die bedryf is ook in die proses om meer te fokus op bedryfs- en ontwikkelingsbehoeftes wanneer dit kom by die befondsing van navorsing en ontwikkeling in die bedryf. In dié tyd het 'n baie beskeie statutêre heffing 'n groot rol gespeel om 'n bemagtigende omgewing vir die bedryf daar te stel.

In hierdie tydperk het dit al hoe duideliker geword dat produsente self verantwoordelikheid vir predasiebestuur en veediefstalbekamping moet aanvaar en was dit duidelik dat veediefstalbekamping in terme van staatskapasiteit 'n groeiende probleem geraak het.

Die volgende tien jaar

Die bedryf het die potensiaal om uitvoere van die huidige 5 % van produksie na 20 % van produksie te verhoog. Dit sal die dwarslat vir die hele bedryf lig. Dit sal 'n spanpoging binne die waardeketting moet wees. 'n Naspeurbaarheidstelsel moet in hierdie tydperk beweeg van 'n aanvanklike bedryfs-geïmplementeerde vrywillige stelsel wat marktoegang beheer na 'n stelsel wat deur die owerheid van die dag erken en internasionaal geakkrediteer kan wees. 'n Napeurbaar-heidstelsel sal uit die bedryf uit moet groei en huidige diensverskaffers van stelsels moet op die basis gebruik word. Die beginsel van kompartemente sal ook moet geld en voerkrale kan moontlik as basis gebruik word.

Naspeurbaarheidstelsels sal gekombineer moet word met opspoorbaarheidstelsels en finansieringsinstellings sal oortuig moet word om in te koop ten einde lewendehawe as kollateraal te gebruik om finansiering te bekom.

Die beheer van dieregesondheid sal 'n al hoe groter spanpoging tussen die bedryf en die departement moet raak en ons sal moet aanvaar dat die bedryf ook meer kapasiteit daar sal moet stel ten einde sy doelwitte te bereik. Selfregulering sal 'n al groter rol moet speel en sal deur 'n statutêre heffing in die bedryf ondersteun moet word. Die statutêre heffing sal waarskynlik verhoog moet word ten einde sinvolle ondersteuning te verleen.

Dit sal 'n era moet wees waar winsgewendheidsvlakke sal moet verhoog en daar sal waarskynlik ook 'n groot mate van sentralisering van abattoir- en verwerkingskapasiteit plaasvind. Die kommersialisering van die ontwikkelende sektor sal 'n groot rol moet speel ten einde die bedryf te bevorder, 'n vrywillige graderingstelsel kan 'n baie groot rol speel om verbruikersgemoedsrus op nasionale en internasionale vlak te verbeter. Die verdere uitbreiding van handelsmerke sal ook moet plaasvind ten einde aan die verbruikers se diverse behoeftes te voldoen. Weens verskeie mites en weens die aanslag van groen bewegings op ons produk en bedryf sal verbruikersopvoedingsprogramme ook meer momentum moet kry.

Dit sal al hoe meer die funksie van produsente-organisasies word om produksie-ontwikkeling te doen - dit is die enigste manier om binne 'n goed-ontwikkelde navorsing- en ontwikkelingsprogram internasionaal kompeterend te bly.

Die navorsing- en ontwikkelingsprogram sal ook die risiko's ten opsigte van die groenes moet afdek en die koolstof- en watervoetspoor van die bedryf sowel as dierewelsyn sal meer aandag moet geniet. Navorsing oor verbruikersgedrag, -patrone, -besteding sal krities wees om die verbruik van ons produk te laat groei.

Dit is krities noodsaaklik dat groter beleggingsvertroue in landbou en landbou-verwante kwessies op die politieke front bevestig sal word ten einde beleidsekerheid te skep vir landbou om te floreer.

Die goeie verhoudings met die bedryfstrukture van ons buurlande en binne die internasionale vleissekretariaat sal verder uitgebou moet word.

Die transformasie-agenda en implementering van ondernemingsontwikkeling sal 'n kritiese rol speel in die toekoms van ons bedryf.

Al die fundamentele aspekte is in plek vir die bedryf om in die volgende tien jaar van krag tot krag te gaan. Ten einde daarin te slaag is dit noodsaaklik dat produsente op die voorpunt van tegniese- en markinligting sal bly en produsente-organisasies het 'n groot rol om te speel.

RPO RED MEAT ROOIVLEIS

Hiermee nooi ons elke teler en boer uit om sy veiling in die *Red Meat/Rooivleis* tydskrif te adverteer. Die tydskrif

- word na die meeste rooivleisprodusente in Suid-Afrika versprei.
- bereik 11 500 bees- en skaapboere landswyd.
- is 'n kragtige medium om inligting by medeboere uit te bring.
- sluit digitale bemarking op die RPO e-bulletin in.
- het sakpas-tariewe.

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THE ARC NATIONAL BEEF PERFORMERS VIRTUAL AWARDS 2020

Presented by the
National Beef Recording and Improvement Scheme

Zelda King, Frans Jordaan & Ben Greyling - ARC-Animal Production, Irene - Zelda@arc.agric.za

The National Beef Recording and Improvement Scheme of the ARC, in collaboration with other research programmes, has focused very strongly for more than six decades on the adoption and implementation of technologies aimed at improving the biological and economic efficiency of our national herd. The ultimate aim is to ensure optimal and sustainable use of our natural resources and to capacitate farmers to enhance their contributions, through profitable production, to lasting food security in our country. On an annual basis, the Scheme gives recognition to farmers, across all spectrums of production that have excelled in their quest to manage their enterprises and breed animals that will ensure sustainable and profitable operations. Our annual awards event has since its inception become a platform where exceptional achievements from our farmers are recognised, in particular relating to their efforts to improve the genetic potential of our national herd. Their contributions are also put into perspective in view of our declining and often limited resources. To achieve our goals, the Scheme thus also puts a high premium on collaboration with farmers across all sectors, government and other stakeholders in agriculture to strengthen our collective effort to enhance production and access to beef value chains.

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THIS YEAR THE AWARDS CONSISTED OF EIGHT 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 KyD Province of the Year Award *sponsored by Molatek***
4. **The ARC National Emerging Beef Farmer of the Year Award**
5. **The ARC National Mentor 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**
8. **The ARC National Commercial Beef Producer of the Year *sponsored by Molatek***

The ARC National Best Elite Cow Awards

farmer's weekly

Sponsored by Farmer's Weekly

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 42 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 22 ARC National Best Elite Cows with their respective performance figures
Table 2 lists the owners of these cows

TABLE 1 2020 ARC National Elite Cow Awards *sponsored by Farmer's Weekly*

Breed	Cow ID No	Age (yrs)	Number Calves	Age 1st calving (months)	Ave. ICP[1] (days)	Average Weaning Index[2]	Birth Weight EBV (kg)[3]	Weaning Weight EBV (kg)[4]	
							Dir[5]	Dir[6]	Mat[7]
Afrikaner	VZI 08 0066	12	9	31	379	-	0,62	10,0	13,6
Afrisim	JVR 10 0052	10	7	37	367	-	1,20	7,0	8,6
Ankole	A 06 0009	14	9	32	364	-	-	-	
Beef Shorthorn	BLK 09 0063	11	8	32	369	101	1,47	4,3	6,9
Bonsmara	GCD 11 0053	9	7	28	359	110	1,02	13,2	12,7
Boran	QT 10 0024	10	7	35	355	103	1,02	6,0	7,3
Braford	BB 11 0120	9	6	34	370	-	0,10	9,0	2,0
Brahman	WIL 12 0598	8	7	31	363	-	1,30	18,0	9.0
Charolais	CB 10 0007	10	8	27	369	107	-1,68	8,9	13,1
Dexter	JM 10 0010	10	8	27	345	110	-0,16	2,0	6,0
Drakensberger	QH 08 0037	12	9	36	376	101	0.87	7.7	6.7
Limousin	LR 06 0015	14	11	29	379	-	2,00	16,0	9,0
PinZ^{2}yl	FR 10 0013	10	7	23	368	99	-0,38	1.0	-3.2
Romagnola	DT 08 0149	12	9	29	386	108	1,26	6,6	7,0
SA Angus (Black)	GT 11 0495	9	7	21	388	95	1.00	-0.15	9.0
SA Angus (Red)	FW 11 0056	9	7	23	363	97	1.00	9.0	1.7
Santa Gertrudis	KT 10 0010	10	8	27	359	-	0,10	15,0	4,0
Simbra	LZ 07 0129	13	10	27	352	-	1,00	18,0	5,0
Simmentaler	LH 08 0098	11	10	23	354	-	1,70	25,0	8,0
South Devon	JM 10 1141	10	7	35	369	112	0,11	15,3	4,7
Sussex	NJB 07 0065	13	10	25	386	104	-0.51	3.0	15.3
Tuli	E 11 0003	9	7	30	358	104	1,03	9,8	8,7

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

BREED BETTER BEEF

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TABLE 2 The owners of the ARC National Best Elite Cow Awards

Breed	Cow ID No	Owner	Town	E-mail	Cell No
Afrikaner	VZI 08 0066	Peet van Zijl	Makwassie	peetvzijl@vanzijl-inc.co.za	082 990 0623
Afrisim	JVR 10 0052	Hentie Jansen van Rensburg	Noordbrug	obgynae@icon.co.za	082 825 2168
Ankole	A 06 0009	Morné de la Rey & Simon Hodgson	Brits	morne@embryoplus.com	082 553 1260
Beef Shorthorn	BLK 09 0063	Allistair & Laurence Brown	Alexandria	blackstonebeef@gmail.com	083 236 4040
Bonsmara	GCD 11 0053	Craig Handley	Bathurst	chandley@intekom.co.za	082 808 6132
Boran	QT 10 0024	Brandon Brooks	Polokwane	dbrooks@brenmill.co.za	082 783 1971
Braford	BB 11 0120	Lotie Gordon & Charlotte Schuite	Rosendal	heelbofarms@gmail.com	082 573 9377
Brahman	WIL 12 0598	Lourens & Irma du Plessis	Thabazimbi	brahman@louma.co.za	083 895 7190
Charolais	CB 10 0007	Louwrens Viljoen	Clocolan	louw@louwcoecharolais.co.za	082 334 4877
Dexter	JM 10 0010	Willie du Plessis	Riversdal	willie.dplessis@gmail.com	082 457 1779
Drakensberger	QH 08 0037	Liesel Foster	Zastron	fosterliesel@gmail.com	082 373 2427
Limousin	LR 06 0015	AJ du Toit	Tulbagh	larhone@obiekwa.co.za	082 566 4319
PinZ^{2}yl	R 10 0013	Fanie Potgieter	Mooketsi	grootboom@zz2.co.za	082 336 7199
Romagnola	DT 08 0149	Dail van Rensburg	Delareyville	dail@cluesnet.co.za	082 809 8841
SA Angus (Black)	GT 11 0495	Gielie Geldenhuys	Ceres	merinogtg@breede.co.za	082 460 6327
SA Angus (Red)	FW 11 0056	Friedel Keyser	Eston	rosewood@mweb.co.za	082 774 9901
Santa Gertrudis	KT 10 0010	Pieter Niemand	Worcester	niemand@breede.co.za	082 840 6134
Simbra	LZ 07 0129	Riaan van Zyl	Winburg	rotswand1@gmail.com	083 384 1681
Simmentaler	LH 08 0098	Annelise & Danie Bezuidenhout	Delmas	anneke@sideline.co.za	082 415 2292
South Devon	JM 10 1141	John & James Miller	Cathcart	james@breede.co.za	082 517 4887
Sussex	NJB 07 0065	Nico Bouwer	Delareyville	njbouwer@lantic.net	083 272 6158
Tuli	E 11 0003	Dave Mullins	Kenton-on-Sea	mullins@isat.co.za	082 299 7953

AFRIKANER

VZI 08 0066 Beyersrus Afrikaner Stud Peet & Lindé van Zijl

AFRISIM

JVR 10 0052 Hentie & Monica Jansen van Rensburg

ANKOLE


A 06 0009 Morné de la Rey & Simon Hodgson

BEEF SHORTHORN


BLK 09 0063 Allistair & Laurence Brown

BONSMARA


GCD 11 0053 G.L. Handley & Son Craig & Shelley Handley

BORAN


QT 10 0024 Brooks Borane Brandon Brooks

BRAFORD

BB 11 0120 Heelbo Boerdery Lotie Gordon & Charlotte Schuite

BRAHMAN


WIL 12 0598 Lourens & Irma du Plessis

CHAROLAIS


Charolais CB 10 0007 Louwcoe Charolais Louwrens & Louise Viljoen

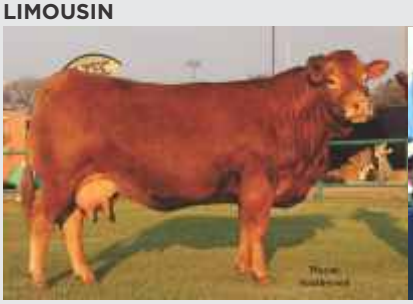
DEXTER


JM 10 0010 Willie du Plessis

DRAKENSBERGER


QH 08 0037 Liesel Foster

LIMOUSIN




LR 06 0015 La Rhone Agri (Pty) Ltd AJ du Toit

PINZ²YL

R 10 0013 Fanie Potgieter

ROMAGNOLA

DT 08 0149 Dail van Rensburg

SA ANGUS (Black)

GT 11 0495 Gielie Geldenhuys

SA ANGUS (Red)

FW 11 0056 Friedel Keyser

SANTA GERTUDIS

KT 10 0010 Breede Santas Pieter Niemand

SIMBRA

LZ 07 0129 A.P. van Zyl Riaan van Zyl

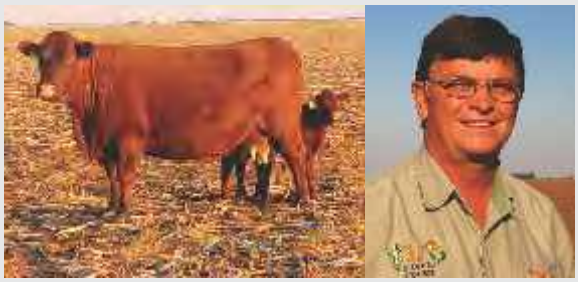
SIMMENTALER

LH 08 0098 Annelise & Danie Bezuidenhout

SOUTH DEVON

JM 10 1141 Winston Farms (Pty) Ltd John & James Miller

SUSSEX



NJB 07 0065 Nico Bouwer

TULI

E 11 0003 Dave Mullins

The ARC National Platinum Bull Awards

Sponsored by GMPBasic

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 2019 and 31 December 2019. 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 25 years already.

Table 3 lists the 7 Platinum Award bulls

Table 4 lists the owners of these bulls

TABLE 3 2020 ARC National Platinum Bull Awards *sponsored by GMPBasic*

BULL					DAM							
Breed	Bull ID No	ADG Index	FCR Index	Adjusted Scrotum circum.	Dam ID No	Age (yrs)	Calv-ings	Age 1st calving (mnths)	Aver. ICP (days)	EBV (kg)		
										Birth Weight	Weaning Weight	
										Dir	Dir	Mat
Bonsmara	NFS 18 0464	120	107	410	NFS 10 0120	10	7	31	394	4.30	31.1	18.3
	FHK 18 0076	113	123	365	FHK 09 0071	11	7	36	364	0,74	17,2	4,1
Brahman	R14 18 0002	125	108	284	GBS 07 0002	13	*16	34	368	1,10	12,0	6,0
	GBS 18 0010	114	110	337	GBS 10 0020	10	7	36	359	2,80	23,0	7,0
Limousin	DL 18 0149	121	120	321	DL 10 0125	10	7	29	336	1.80	14.0	5.0
Santa Gertrudis	M 18 0054	129	123	357	M 09 0064	11	9	36	362	2,20	20,0	7,0
Simmentaler	PN 18 0500	115	110	386	PN 07 0352	13	*23	26	437	1,20	21,0	4,0

* Normal Calvings & Embryo

TABLE 4 The owners of the 2020 ARC National Platinum Award Bulls

Breed	Bull ID No	Owner	Town	E-mail	Cell No
Bonsmara	NFS 18 0464	Sernick Bonsmara	Edenville	pieter@sernick.co.za	082 384 0020
	FHK 18 0076	Ferdi Hartzenberg	Lichtenburg	dewet172@gmail.com	082 414 6988
Brahman	R14 18 0002	Ruan Combrinck	Babanango	ruancombrinck15@gmail.com	083 652 7757
	GBS 18 0010	Heinrich Bruwer	Molopo	heinrichbruwer1@gmail.com	079 506 8198
Limousin	DL 18 0149	John & Tracey Devonport	Houghton	john@devonport.co.za	083 454 3095
Santa Gertrudis	M 18 0054	Hebzibah Santa Stud	Ottosdal	vasvat@lantic.net	082 534 3991
Simmentaler	PN 18 0500	Peet & Gert Nienaber	Rustenburg	gertnienaber@yahoo.com	082 808 6390

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- Belangrike bestuursinligting op hande om ingeligde bestuursbesluite te neem
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NFS 18 0464 Sernick Bonsmara Nick Serfontein

BONSMARA

FHK 18 0076 Ferdi Hartzenberg

BRAHMAN

R14 18 0002 Ruan Combrinck

BRAHMAN

GBS 18 0010 Heinrich Bruwer

LIMOUSIN

DL 18 0149 Devlan Limousins John & Tracey Devonport

SANTA GERTRUDIS

M 18 0054 Hebzibah Santa Stud Kallie, Helene & Johan van der Merwe

SIMMENTALER

PN 18 0500 Peet & Gert Nienaber Gert Nienaber

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Excellence in Research and Development

The ARC National KyD Province of the Year Award

Sponsored by MOLATEK

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.

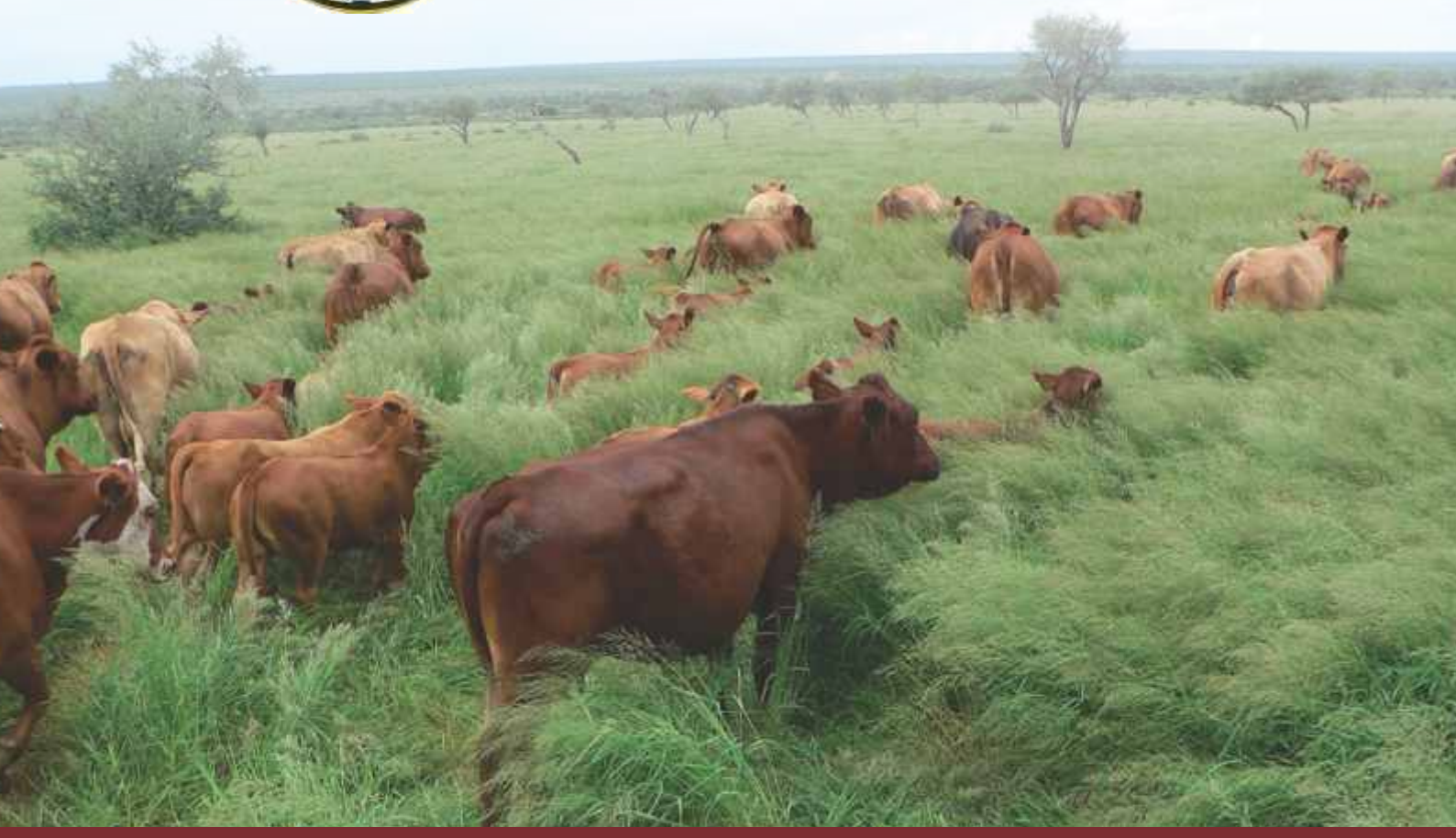
This year's finalists for the KyD Province of the Year were:
Kwa-Zulu Natal, Limpopo & North West

The ARC National KyD Province of the Year Award for 2020 was awarded to

Kwa-Zulu Natal (Platinum award)

Gold was awarded to North West

Silver was awarded to Limpopo



The ARC National Emerging Beef Farmer of the Year Awards

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Background & History

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 18th 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;

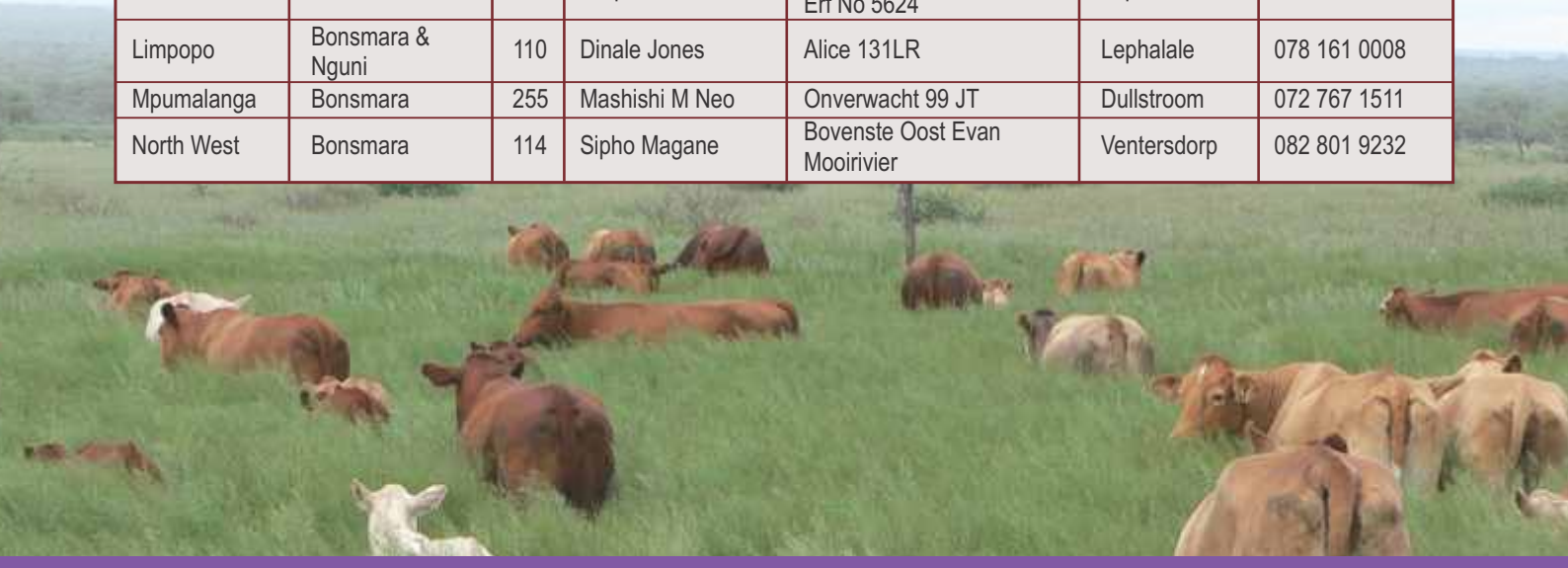
1. To encourage emerging cattle farmers to improve their standard of living through higher returns from animal production and job creation;
2. To promote participation in the Kaonafatso ya Dikgomo Scheme;
3. To promote sound breeding and management principles in the beef industry; and
4. To demonstrate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

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

The finalists for 2020 are listed in ***Table 5***

TABLE 5 2020 ARC National Emerging Beef Farmer of the Year Awards: Provincial Winners

Province	Breed	Herd size	Name	Farm Name	Town	Cell No
Eastern Cape	Boran, Charolais & Senepol	888	Zolani Ncingwana	Fusion Farm	Cedarville	082 651 7711
Free State	Simmentaler x Nguni	74	Dintoe Taunyane	North End Farm	Thaba Nchu	082 620 8396
Gauteng	Nguni	124	Lerato Senakhomo	Farm Portion 15 Bulfontein	Nigel	083 486 5899
Kwa-Zulu Natal	Boran X	126	Tsepo Molefe	The Edgeford Gold Erf No 5624	Impendle	082 452 9919
Limpopo	Bonsmara & Nguni	110	Dinale Jones	Alice 131LR	Lephalale	078 161 0008
Mpumalanga	Bonsmara	255	Mashishi M Neo	Onverwacht 99 JT	Dullstroom	072 767 1511
North West	Bonsmara	114	Sipho Magane	Bovenste Oost Evan Mooirivier	Ventersdorp	082 801 9232



Eastern Cape

Zolani Ncingwana

Free State

Dintoe Taunyane

Gauteng

Senakhomo Nguni Stud
Lerato Senakhomo

Kwa-Zulu Natal

Tsepo Molefe

Limpopo

Modisa Phala (Pty) Ltd
Dinale Jones

Mpumalanga

Mashishi M Neo

North West

Sipho Magane

The winner of the 2020 ARC National Emerging Beef Farmer of the Year Award was awarded to

Senakhomo Nguni Stud
Lerato Senakhomo

Nigel, Gauteng
083 486 5899

The ARC National Mentor of the Year Award

Sponsored by MOLATEK

This award category was introduced to give recognition to farmers with exceptional leadership skills, in particular focusing on building capacity, skills and information dissemination to fellow farmers and industry at large. In short, this award category assesses how a farmer ploughs back his or 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 2020 was awarded to

Matshidiso Mooketsi
Barui-Driehoek

082 356 1711

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The ARC National Special Performance Test Class

This very popular award category has been presented for over forty years and rewards only 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 2019 are eligible to compete in this award category. Residual Feed Intake or RFI, a trait that describes a bull's ability to utilise feed efficiently, is also considered. Only one bull per breed eventually is identified as representative of the entire breed in terms of performance and functional efficiency. Bulls are not adjudicated across breeds as during previous years (interbreed adjudication), meaning that every bull is 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 2020 ARC National Special Performance Test Class

Breed	Bull ID No	Birth Date	Centre tested	ADG		FCR		RFI	Adjusted Shoulder/Hip* Height (mm)	Adjusted Body Length (mm)	Adjusted Scrotum Circum. (mm)
				(g)	Ind	Kg/Kg	Ind		Height	Length	Scrotum
Afrikaner	SS 19 0012	25/01/2019	Glen	1677	123	5.14	123	-	1206	1393	310
Afrisim	J 18 0050	18/08/2018	Irene	1777	113	6.00	112	-	1214	1505	324
Beef Shorthorn	BLK 18 0473	09/09/2018	Wintercastle	1642	97	6.10	100	-	1171	1346	305
Boran	ZIP 18 0140	12/12/2018	Glen	1541	29	5.44	116	-	1178	1331	312
Braunvieh	DEK 18 0101	29/12/2018	Vryburg	2285	130	5.27	114	-	1281	1529	347
Chianina	D 18 0147	05/05/2018	Vryburg	2361	124	5.07	112	-	1412	1492	337
Dexter	JAKS 18 0003	13/03/2018	Sernick	1630	105	5.90	103	-	1117	1351	300
Limousin	DL 18 0149	10/10/2018	Irene	2074	121	4.94	120	-2.036	*1318	1461	321
Pinzgauer	KS 18 0019	25/09/2018	Western Cape	1810	111	5.46	109	-	1236	1430	341
PinZ^{2}yl	PZ 18 0313	08/11/2018	Irene	1692	119	5.30	128	-	1206	1378	322
Romagnola	ZX 18 0009	15/10/2018	Vryburg	1947	101	5.64	102	-	1361	1464	351
SA Angus (Black)	FG 18 0658	29/07/2018	Western Cape	1936	101	5.72	104	-	*1218	1465	330
SA Angus (Red)	RCM 18 0069	16/05/2018	Sernick	2150	115	5.19	109	-	1258	1448	375
Santa Gertrudis	JH 18 0065	19/07/2018	Vryburg	1941	120	5.42	122	-1,400	*1288	1405	371
Simbra	WC 18 053A	25/08/2018	Irene	1676	96	5.89	106	-1,244	*1263	1439	345
Simmentaler	CSS 18 0530	10/08/2018	Western Cape	2091	108	4.75	109	-1,831	*1248	1463	369
Sussex	CC 18 0038	02/08/2018	Glen	2219	125	5.13	116	-	*1282	1487	320

AFRIKANER

SS 19 0012 Jacquies Steenkamp

AFRISIM

JJ 18 0050 Janes Wasserman

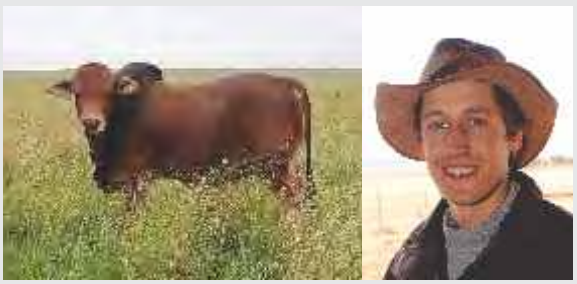
TABLE 7 The owners of the ARC National Special Performance Test Class Bulls

Breed	Bull ID No	Owner	Town	E-mail	Cell No
Afrikaner	SS 19 0012	Jacquies Steenkamp	Rouxville	jacquiessteenkamp@gmail.com	083 531 8539
Afrisim	JJ 18 0050	Janes Wasserman	Carletonville	janes@mweb.co.za	082 789 3400
Beef Shorthorn	BLK 18 0473	Allistair & Laurence Brown	Alexandria	blackstonebeef@gmail.com	083 236 4040
Boran	ZIP 18 0140	Zippo Lamprecht	Dewetsdorp	bloodlineboran@gmail.com	082 396 9071
Braunvieh	DEK 18 0101	Erik de Klerk	Kimberley	erik@airportn8.co.za	082 787 5859
Chianina	D 18 0147	Louis de Wet	Polokwane	rene@marlofarms.co.za	073 333 8632
Dexter	JAKS 18 0003	Hendrik Strydom	Petrusburg	amadeusdexters@gmail.com	073 289 5111
Limousin	DL 18 0149	John & Tracey Devonport	Houghton	john@devonport.co.za	083 454 3095
Pinzgauer	KS 18 0019	Rudi van Graan	Mosselbay	karu1@mweb.co.za	082 445 3598
PinZ^{2}yl	PZ 18 0313	Fanie Potgieter	Mooketsi	grootboom@zz2.co.za	082 336 7199
Romagnola	ZX 18 0009	Jurie Smit	Thabazimbi	juriecelia@gmail.com	083 287 3301
SA Angus (Black)	FG 18 0658	Fredericksburg Angus Stud	Franschoek	stefan@fredericksburg.co.za	082 610 5397
SA Angus (Red)	RCM 18 0069	RC Malherbe	Hertzogville	malherberc8@gmail.com	084 851 8262
Santa Gertrudis	JH 18 0065	Johan Havemann	Delareyville	santarust@lantic.net	082 523 8191
Simbra	WC 18 053A	Llewellyn Angus	Arlington	langus@vodamail.co.za	082 805 5101
Simmentaler	CSS 18 0530	Werner Stander	Mosselbay	wstander@icon.co.za	082 777 0250
Sussex	CC 18 0038	C.B. Cillié	Bloemfontein	ccillie@bfn.co.za	083 388 0830

BEEF SHORTHORN

BLK 18 0473 Allistair & Laurence Brown

BORAN



ZIP 18 0140 Zippo Lamprecht

BRAUNVIEH

DEK 18 0101 Erik de Klerk

CHIANINA

D 18 0147 Elevato Chianina Stud Louis de Wet

DEXTER


JAKS 18 0003 Hendrik Strydom

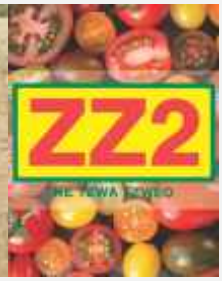
LIMOUSIN


DL 18 0149 Devlan Limousins John & Tracey Devonport

PINZGAUER


KS 18 0019 Rudi van Graan

PINZ²YL

PZ 18 0313 Fanie Potgieter

ROMAGNOLA

ZX 18 0009 Jurie Smit

SA ANGUS (Black)


FG 18 0658 Fredericksburg Angus Stud Stefan Terblanche

SA ANGUS (Red)


RCM 18 0069 RC Malherbe

SANTA GERTRUDIS


JH 18 0065 Heinrich & Johan Havemann

SIMBRA


WC 18 053A Wisp-Will Simbra Stud Llewellyn Angus

SIMMENTALER


CSS 18 0530 Werner Stander

SUSSEX


CC 18 0038 C.B. Cillié Callie Cillié & Erina

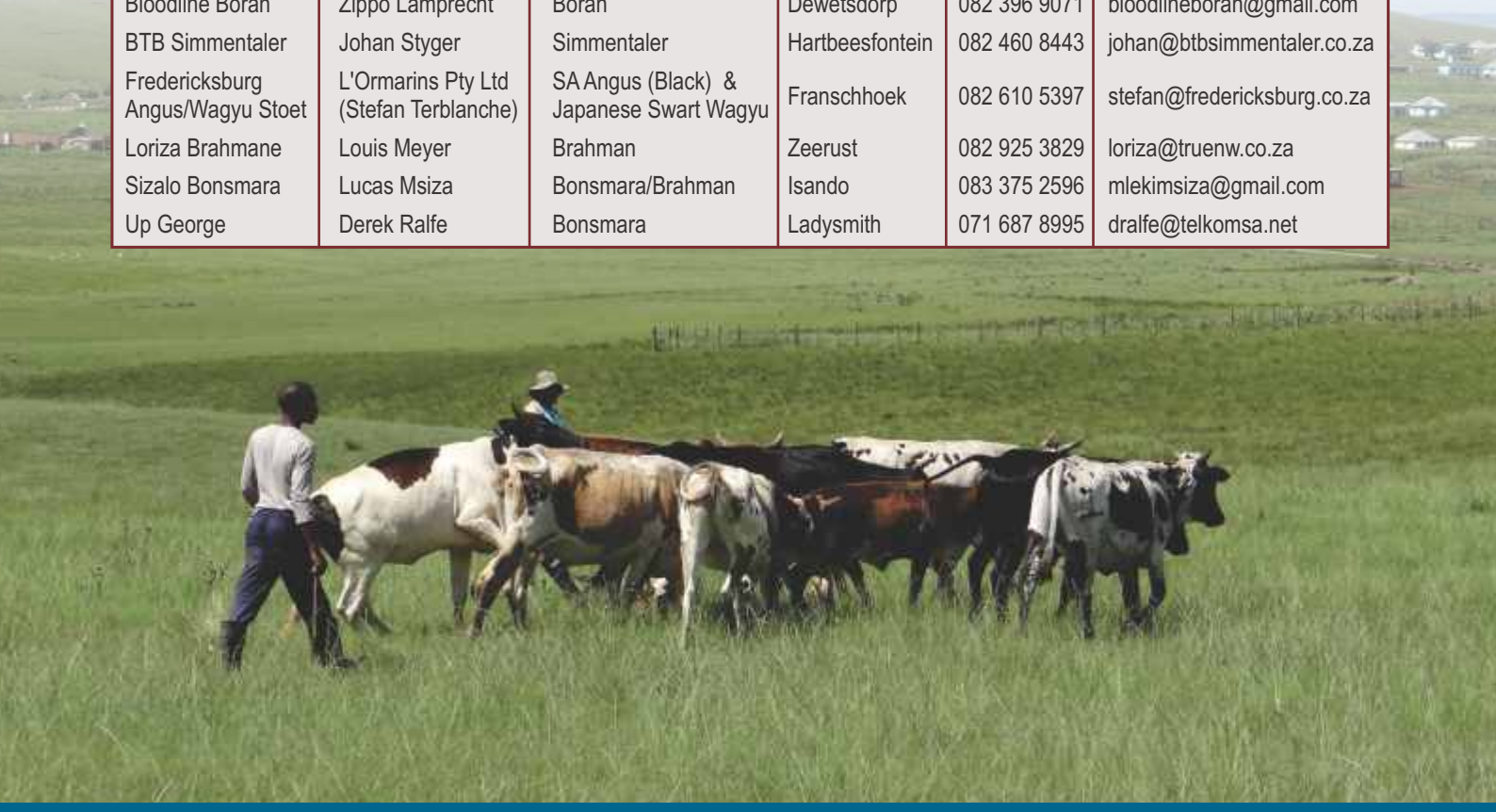
The ARC National Beef Cattle Improvement Herd of the Year

To be eligible for this award category, a farmer had to excel among a number of performance indicators, not only those directly involved with managing and breeding his or her own herd. This award category is also one of the most fiercely contested and highly sought after accolades in industry. Besides being adjudicated on how they implement performance recording and related technologies to improve the genetic potential of their herds, their involvement with industry, interaction with their fellow farmers and their efforts to build and add value to the beef production industry is also assessed. Breeders and herds across breeds in southern Africa can enter this award category while farmers making use of any of the service providers in southern Africa are eligible to enter. Herd related traits that are assessed include 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. Part of the prize for the winner of this category includes an all-paid visit to the annual conference of the Beef Improvement Federation (BIF) in the USA.

Table 8 presents the Top 6 participants for the 2020 ARC National Beef Cattle Improvement Herd of the Year Award

TABLE 8 2020 ARC National Beef Cattle Improvement herd of the Year Award

Herd	Owner	Breed	Town	Cell No	E-mail
Bloodline Boran	Zippo Lamprecht	Boran	Dewetsdorp	082 396 9071	bloodlineboran@gmail.com
BTB Simmentaler	Johan Styger	Simmentaler	Hartbeesfontein	082 460 8443	johan@btbsimmentaler.co.za
Fredericksburg Angus/Wagyu Stoet	L'Ormarins Pty Ltd (Stefan Terblanche)	SA Angus (Black) & Japanese Swart Wagyu	Franschhoek	082 610 5397	stefan@fredericksburg.co.za
Loriza Brahmane	Louis Meyer	Brahman	Zeerust	082 925 3829	loriza@truenw.co.za
Sizalo Bonsmara	Lucas Msiza	Bonsmara/Brahman	Isando	083 375 2596	mlekimsiza@gmail.com
Up George	Derek Ralfe	Bonsmara	Ladysmith	071 687 8995	dralfe@telkomsa.net



Bloodline Boran

Zippo Lamprecht

BTB Simmentaler

Johan Styger

Fredericksburg Angus/Wagyu Stoet

L'Ormarins Pty Ltd
Stefan Terblanche

Loriza Brahmane

Louis Meyer

Sizalo Bonsmara

Lucas Msiza

Up George (Bonsmara)

Derek Ralfe

The winner of the ARC National Beef Cattle Improvement Herd of the Year for 2020 was awarded to

Bloodline Boran
Zippo Lamprecht

Dewetsdorp, Free State
082 396 9071

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ARC National Commercial Beef Producer of the Year Award

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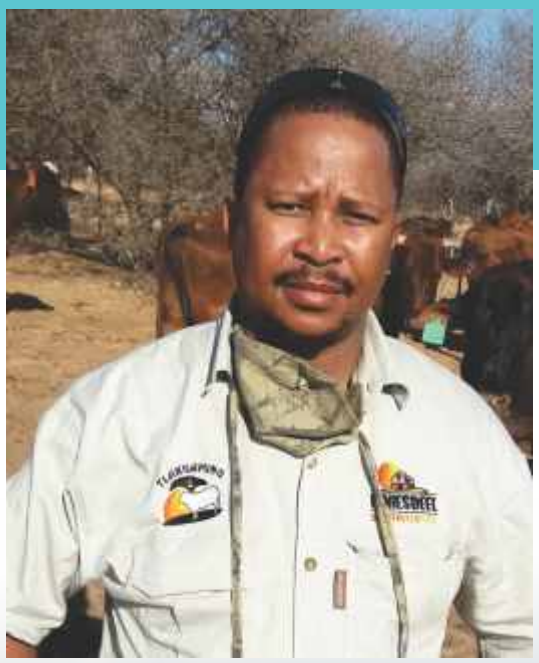
This award category recognises the achievements of commercial farmers who do not focus on stud breeding. The commercial farmer must exhibit a record of accomplishment of implementing performance testing and related technologies to improve his/her commercial herd. The candidate must also have a record of accomplishment of his/her interaction and mentorship under an established breeder and evidence of significant progress in his/her own enterprise. The recipient should furthermore exhibit a passion and enthusiasm for breeding genetically superior animals, making use of established management principles and available technologies.

The ARC National Commercial Beef Producer of the Year Award for 2020 was awarded to



Tiro Mongwaketsi, TM Farming - 082 813 9948

agriculture, land reform
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Department:
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

The Department of Agriculture, Land Reform and Rural Development is the custodian of the Animal Improvement Act, 1998 (Act 62 of 1998)(AIA). AIA provides for the breeding, identification and utilization of genetically superior animals in order to improve the production and performance of animals in the national interest.

Amongst other purposes, the legislation provides for declaration of animal improvement schemes which are the cornerstones for performance recording, which is scientific tool applied for animal improvement or breeding of genetically superior animals in South Africa. The Agricultural Research Council have been designated to implement the schemes on behalf of the Department. The AIA also provides for promotion, control and regulation of importation, exportation, sale and distribution of animal breeds and trade in genetic material which includes semen, ova, eggs and embryo. This Act is very important for all animal owners who wish to operate in the animal breeding fraternity. It is therefore important for such producers to be well acquainted with the requirements of this Act. The Registrar of Animal Improvement exercises powers and perform the duties conferred or imposed to him or her under this Act.

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Genomic Signals of Selection

Emphasise Environmental Adaptation of the Afrikaner and Brahman Cattle Breeds

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After domestication, cattle were exposed to different environments, diseases, and were forced to adapt to various localities, resulting in numerous cattle breeds of diverse genotypes that we see today. Over 1000 cattle breeds are recognized worldwide with about 40 of those in South Africa. Two key driving forces are mainly involved in the differentiation of cattle breeds. First, there was adaptation to different breeding systems where through man-made or artificial selection for economic traits in the breeding objectives (e.g., growth, meat, milk and reproduction), cattle genomes were shaped to increase the frequency of the favoured alleles (genes). The second factor was the adaptation to different environments (agro-climatic conditions), where through natural selection, animals tend to survive and reproduce in their specific environments passing favourable alleles to the next generation, thereby increasing their frequency in the population over time. A combination of these forces shapes the genetic architecture of the breed by leaving footprints or signals that can be identifiable using high-density genome-wide SNP markers. In searching for the signals of selection (also known as signatures of selection or selective sweeps), scientists locate the regions of the genome with reduced variability (increased similarity). These regions may indicate strong positive selection to further increase the frequency of alleles that underlie some of the phenotypes we see. In addition to continuous productive ability, knowledge of selection signals unique to a particular breed provides a valuable resource towards protection of the breed.

The Afrikaner cattle evolved exceptionally well to the harsh South African (SA) climatic conditions mainly in extensive production systems with poor veld conditions. The breed exhibit greater adaptive mechanisms to cope with drought conditions, extreme heat stress and lower susceptibility to tropical diseases. The Brahman is considered the hardiest cattle breed and survives in the most extensive conditions throughout SA. Its short glossy hair allows it to adapt well in very hot and humid conditions whist making it difficult for parasites to attach. The observed adaptive mechanisms will position the breeds to remain productive with climate change. In this research, we identified potential signals of selection unique to the Afrikaner and Brahman cattle breeds.

Strong signals selection were identified in chromosomes 5, 7, 8, 11, 12, 14 and 15 for the Afrikaner and 5, 7, 8, 8, 11, 12, 14 and 15 for the Brahman. These regions of the genome that may be under strong selection were examined further, to search for the underlying genes and their functions in relation to economic traits. Gene functions were categorised into adaptation, metabolism, production and reproduction. The distribution of genes underlying signals of selection categorised by their major functions (i.e., metabolism, production, reproduction and function/adaptation) are presented below, for the Afrikaner (Figure 1) and the Brahman (Figure 2) cattle. The distribution of genes involved in adaptive differentiation ranked higher for both breeds than genes involved in metabolism and reproduction. For the Afrikaner, none of the signals detected and genes were associated with production, which is unexpected because some Afrikaner cattle breeders have been selecting for increased growth rate for many decades. Only 11% production genes were identified for the Brahman cattle. One possible explanation is that while breeders/artificial selection aimed at improving growth, natural selection increased frequency of genes for fitness to survive and reproduce under the harsh SA environmental conditions, especially for the Afrikaner cattle.

In the era before genomics, Frisch already observed in 1981 that in a stressful environment improvement in growth rate as

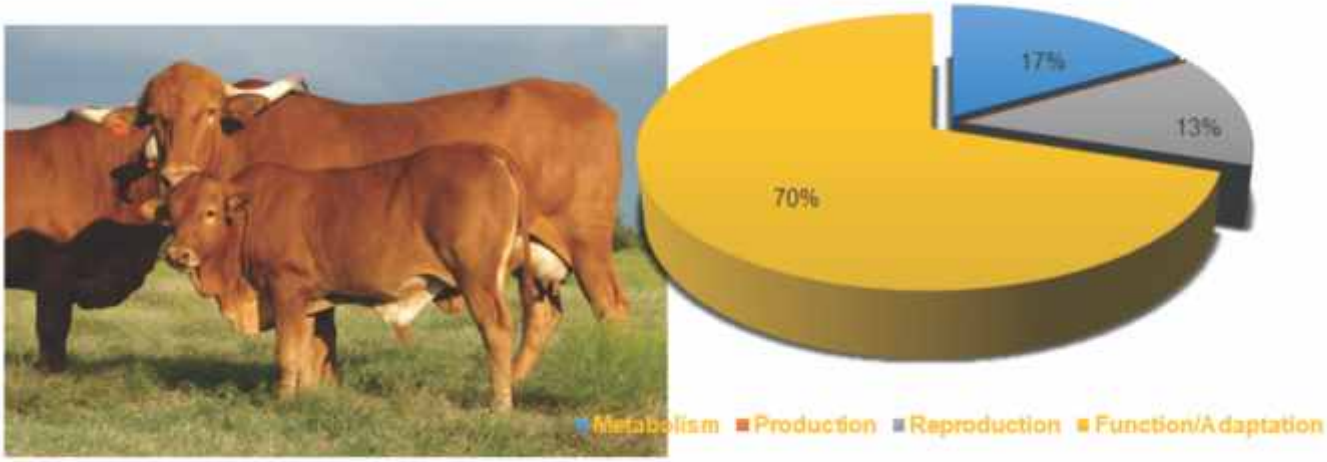

Figure 1 *The distribution of genes underlying signals of selection in the Afrikaner cattle categorised by their major functions*

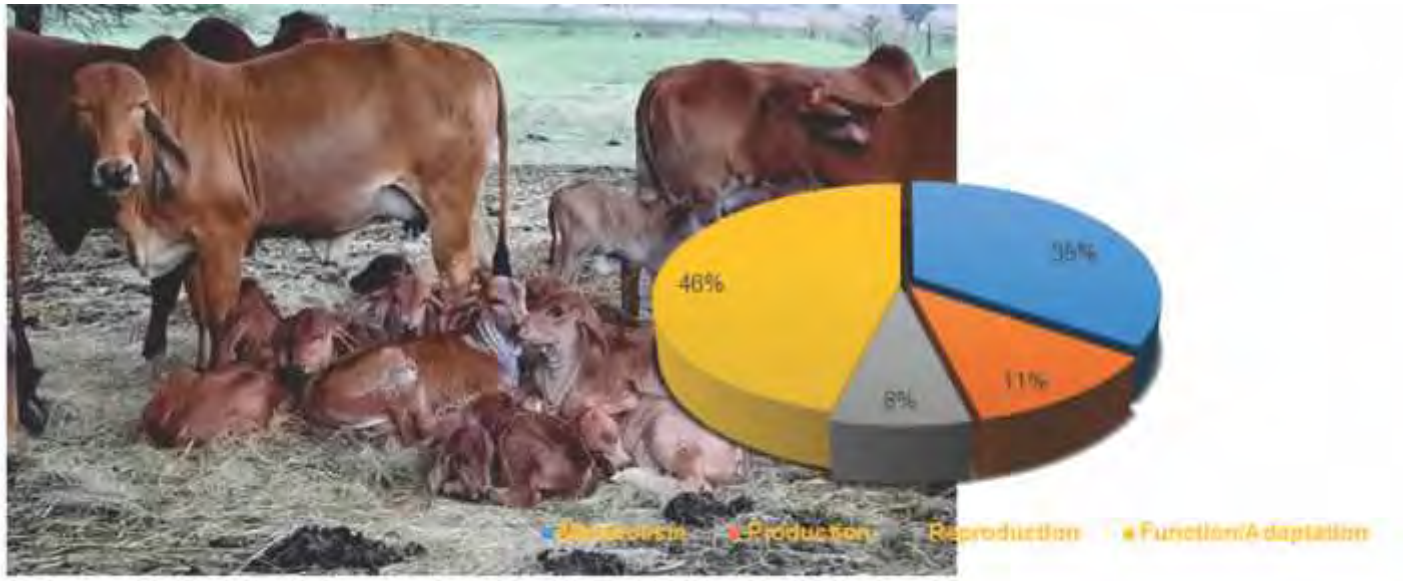

Photo by courtesy of Karen Hiemstra

Figure 2 *The distribution of genes underlying signals of selection in the Brahman cattle categorised by their major functions*

a response to selection was achieved entirely through increases in resistance to environmental stress.

It is well established that the Afrikaner and Brahman cattle breeds are among the most adapted to South African environments. Artificial and natural selection have left footprints and signals in the genome of animals. Our results now show the distinctive footprints of adaptation in the genome of these cattle breeds, indicating that selection historically favoured survival over production. This knowledge of divergence signals may be crucial in preserving this unique genome signals while improving the production and productivity of the breeds.

References

Frisch, J.E., 1981. Changes occurring in cattle as a consequence of selection for growth rate in a stressful environment. J. Agric. Sci., Comb. 96, 23-38.

OLD PROBLEMS BESETTING SMALLHOLDER

BEEF CATTLE SECTOR PERSIST: A Call for Problem Solving Hats

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According to Stats SA, 2016, the national beef herd has about 483 270 farmers with less than 10 animals, 118 000 with more than 10 animals and 14 000 with more than 100 animals. While the demand for beef is increasing and is relatively lucrative, South African livestock productivity in smallholder and communal settings remains low, limiting the opportunities offered by this sector to enhance livelihoods. One of the key constraints faced by this sector is lack of problem solving capabilities within supporting agencies. Thus the sector continues to struggle with old problems that constraint its growth. There is a need for effective organizational arrangements to resolve most of these entrenched problems. Years of implementing on-farm research and service/ 'research for outcomes' starting from 1995 to date has revealed problems that beset the smallholder beef industry. This article identifies a list of challenges expressed in various literature and in data collected within the following three projects i.e. Kaonofatso ya Dikgomo (1995 to current), Beef Profit Partnerships (1999-2006) and High Value Beef Partnerships (HighVBP) (2013-current). The three projects are all multi-disciplinary and had industry and international collaborators. Their designs included complementing partnerships with farmers and enterprises along the value chain.

The problems looks easier to resolve if presented within standalone discipline issues like health, reproduction, nutrition, breeding & genetics, range management, farm management etc. But as the ongoing problems demonstrate, trying to address them individually has not worked. Here, the attempt is made to bundle them into three categories examining the production-health nexus, free-market nexus and social-extension-support nexus. The problem items are critical for development of the industry and they requires new thinking and actions to resolve them. The HighVBP project funded by Australian Centre of International Research is in implementation until December 2021 and is used to provide data describing the problems that are still emerging strongly even in 2020.

Production-Health Nexus

To present this basic biology-nexus, a beef cattle farm scenario is used. If your farm or communal range land is overstocked there will be a time that animals on your farm will not have enough feeds. Beef cattle need feeds to stay healthy, grow, reproduce, feed calves with milk and be a product acceptable to the market place. Often smallholder enterprises are characterised by high mortality, low post-weaning growth, older age at first calving, long calving intervals, high weight loss during dry seasons, low weaning weight, overgrazed rangelands, bush encroachment, poisonous plants, etc.

This is very common among the sector and they are strong indicators that especially farmers without money to provide supplementary feeds for their herds overstock farms. Table 1 presents the performance of herds in the HighVBP project from 2017 to 2020. The indicators presented were collected at least over two seasons at each farm and the farmer had feedback which led to some improvement in some cases. The Veld Condition Assessment Tool was used to determine stocking rates on the 40 farms and on average the farms were overstocked by 57 animals, 24 were overstocked, four (4) were understocked and 12 were correctly stocked.

How do we start to intervene and lead the 24 farmers to destock the excess 57 animals? An additional herd in a communal community is overstocked by 844LSU. Average pregnancy rate of the group is 53% which is better than the national average for smallholder sector but the best and worst case had pregnancy rates of 85% and 18% respectively. How do we intervene to move the farmers with 18% to desirable rates? Destocking is critical.

TABLE 1 Problem indicators and level of performance

Problem	HighVBP	Optimal
Over-Stocking Status	57 animals	Zero
Pregnancy rate	53%	85%
Pre-weaning growth rates	0.89kg/day	1kg/day
Annual post weaning growth rates	0.19kg/day	0,6kg/day
Steers weight loss during dry period	27,8kg	0kg

The pre-weaning growth of calves in the herd was relatively good but very low after weaning. On average the animals were losing 27,8kg during the dry season. So resolving stocking rates is the leverage point for the production-health nexus. In the HighVBP farmers were informed if they stocked correctly which is deemed critical knowledge to induce change.

The Free Market Nexus

This nexus presents a scenario that beef farming in South Africa is conducted under free market conditions. Prices that farmers receive are based on a willing buyer, so beef farmers are price takers even though the demand for the animals is very high. Eastern Cape prices are always lower because they have the biggest herd – demand supply principle applies. The price is also affected by the meat classification system which uses mainly age of the animals to determine the given price ranges. New quality markets approved by SAMIC like the Free Range and Grass-fed Beef are slowly being introduced but the pricing is still driven by the meat classification scheme forces. Auction is one entrenched market available to smallholder farmers but prices are unknown in advance of the sale and the logistics to access these sales always erodes the farmers bargaining power. Auctions are still mainly held at pre-1994 sites that are usually great distances from sites of the communal farms sites. Informal markets always presents themselves to smallholder farmers and even though the size of the market is small (one or a few animals sold at any one time) informal markets give farmers a chance to negotiate prices.

However, this results in unpredictable price signals and a lack of growth in prices especially for weaners even though beef prices at retail outlets kept increasing. The outbreak of FMD and Covid-19 pandemic led to more chaotic trends in current prices. The table below shows the trend of prices for Free Range beef, Feedlot, Standard C Grade and Weaners in the past three years through to September 2020. The old problem is that farmers still do not put on a profit-thinking hat when it comes to their cattle enterprises.

They still just produce with no market in mind and do not sell when the prices are at the best. They still sell to cover immediate financial needs rather than looking for the best time to sell and save money for when needed. The months indicate some trends where prices are usually low and some erratic trends over three years.

Social–Extension/ Farmer Support Nexus

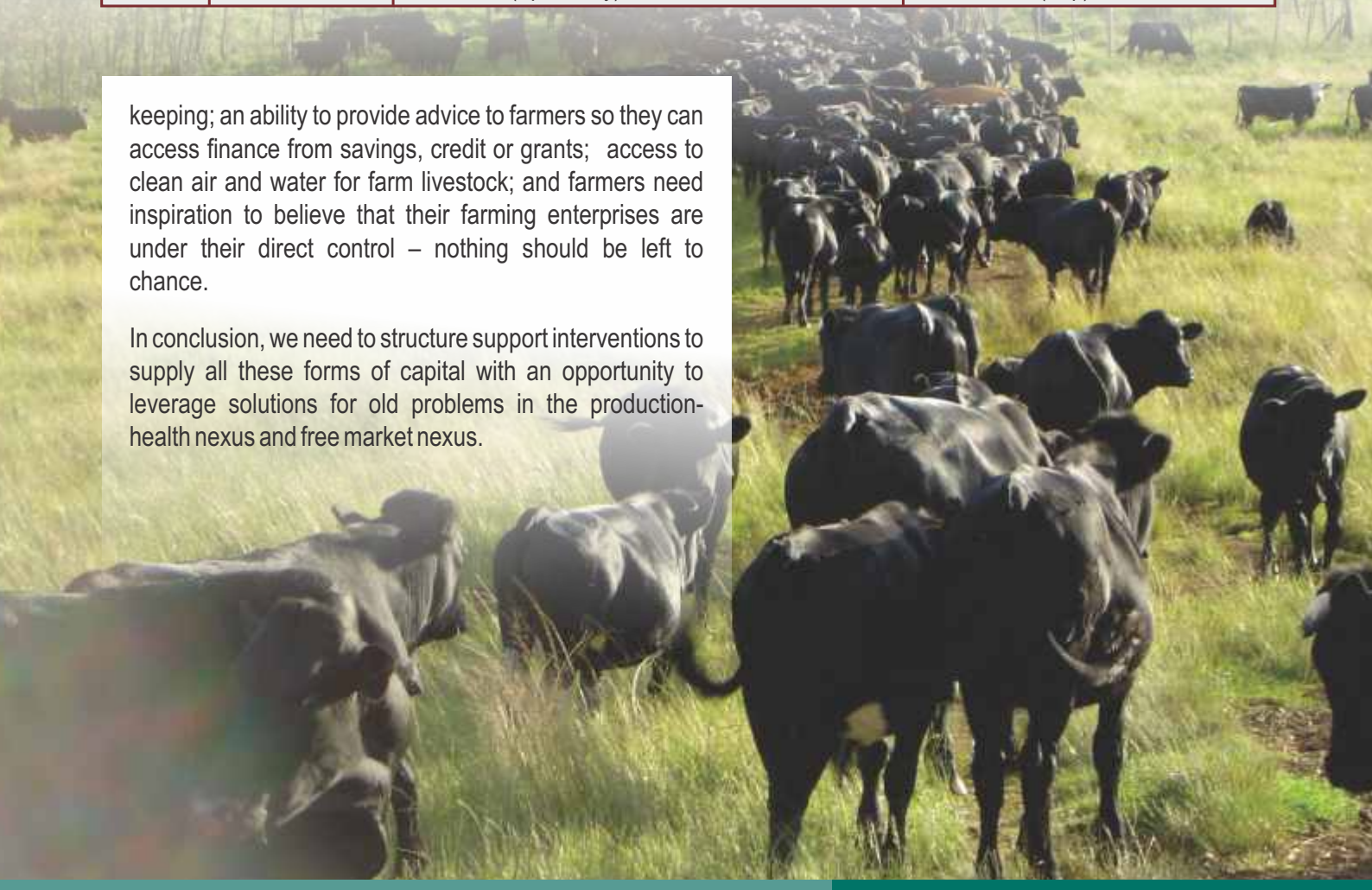
If cattle farms were regarded as non-farming enterprises, they would need access to all forms of capital to ensure functionality and profitability. In my earlier study it was confirmed that smallholder beef farmer enterprise support requires supply of knowledge, human, physical, social, environmental, cultural, financial, natural and psychological forms of capital. In simple language the forms of capital needed for beef farming includes: knowledge of beef farming enterprises and profitable beef production systems; access to people who know how cattle should be farmed to maintain or improve the rangeland; infrastructure to support beef farmers and processes to ensure the farmers are able to access the infrastructure needed by their farms; create linkages developed with networks of people to support or add value to beef farming enterprises; acknowledgement that cattle farming is also driven by our culture of cattle-

TABLE 2 The worst and best cattle prices in a year

Year	Markets	Worst Price (Period)	Best Price (Period)
2017	Free Range Feedlot Grade C Weaners	R45.50 (Nov) R45.50 (Dec) R39.00 (Oct, Nov, Dec) R27.00 (Dec)	R48,50 (Dec) R47,50 (Aug) R42,00 (Dec) R36,78 (Oct)
2018	Free Range Feedlot Grade C Weaners	R44.00 (Nov) R44.00 (Nov) R39.00 (Jul, Aug, Sep, Oct, Nov & Dec) R25,13 (Dec)	R47,50 (May & June) R47,50 (May & June) R42,00 (Jan & Feb) R38,33(Feb)
2019	Free Range Feedlot Grade C Weaners	R38.00 (May) R38.00 (May) R35.00 (May) R25,13 (Jan)	R45.00 (Jul, Aug, Sep &Oct) R45.00 (Jul, Aug, Sep &Oct) R37,50 (Dec) R31,54 (Mar)
2020	Free Range Feedlot Grade C Weaners	R40.00 (Apr) R39.50 (Apr) R35.50 (Apr & May) R26.50 (Apr & May)	R47,50 (Feb & Mar) R47,00 (Feb & Mar) R39,00 (Jan, Feb, Mar) R36,33 (Sep)

keeping; an ability to provide advice to farmers so they can access finance from savings, credit or grants; access to clean air and water for farm livestock; and farmers need inspiration to believe that their farming enterprises are under their direct control – nothing should be left to chance.

In conclusion, we need to structure support interventions to supply all these forms of capital with an opportunity to leverage solutions for old problems in the production-health nexus and free market nexus.



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BEEF PRODUCTION AND CLIMATE RESILIENCE:

PART 1 - The Way forward

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The major challenges faced by the livestock sector towards 2050 are associated with climate change and the environmental impact of the sector. Projections indicate that the increase in average temperature may be between 1.5 and 2°C. It will range from 0.5°C at sea level to as much as 3°C in the eastern parts of Namibia and western Botswana. Rainfall projections indicates a generally drier southern African region, except for central regions and Eastern Cape, where it will be wetter. Significant reduction of more than 40 mm/annum are predicted in the eastern parts of Limpopo and Mpumalanga, the south-western Cape and the Cape south coast. Livestock farmers will have to adapt to these significant climate changes predicted.

About 84% of South Africa's land is available for agriculture, but most of this land cannot be used for crop production. Only 13% of this land area is arable, with approximately 71% only suitable for extensive livestock farming. Most of the fibre rich vegetation can only be utilized by ruminants, which convert the vegetation into high quality protein and other nutrients for human consumption. Foods from animal sources are essential for the human diet, since they support early childhood and cognitive development. It also plays a critical role in increasing food security, improving nutrition, reducing poverty, and improving human health.

Since most of South Africa's agricultural land is only suitable for livestock farming, towns in non-metropolitan areas came into being largely as a result of the commercial livestock farming activities in the district. This implies that by far the majority of town economies and the sustenance of the associated mostly poverty stricken peri-urban communities are dependent on the money spent by commercial and emerging livestock farmers in the district. In addition, livestock is critical for many of the poor, often contributing to multiple livelihood objectives and offering ways out of poverty.

The livestock sector also makes a substantial contribution to the GDP from agriculture and its contribution is approximately 49% of the agricultural GDP. The commercial livestock sector consists of more than 38 000 commercial farms, which employs approximately 250 000 people, with an additional 1.5 million direct dependents. South Africa's emerging and communal farmers, comprises of about 1.4 million households, with an additional 10 million dependants, that are involved in livestock production: 613 000 own cattle, 429 000 own goats, 215 000 own sheep and 112 000 own pigs. The livestock sector therefore directly supports close to 13 million people (22% of the population).

After poultry, the beef cattle sector is the largest livestock sector. However, in contrast to the poultry sector it is largely dependent on extensive production systems. The way forward will have to include the mitigation of heat stress and the utilization of adapted genotypes. The use of alternative production systems and breeding objectives will be discussed in Part 2.

MITIGATION OF HEAT STRESS

Temperature, solar radiation, humidity and wind all have direct effects on animals. Temperature is the factor that has the largest direct effect on livestock production. Most livestock perform at their best at temperatures between 4 and 24°C. With the current trends in global warming, temperatures in large parts of Southern Africa will frequently rise above this comfort zone. It is therefore important that livestock are adapted to these higher temperatures.

Heat stress is a common cause of reproductive inefficiency in especially beef cattle, since the fertility of the bull is effected. Semen quality decreases when bulls are exposed to high temperatures. After a period of heat stress, semen quality does not return to normal for approximately eight weeks because of the length of the spermatic cycle, adding to the carry-

over effect of heat stress on reproduction. It is important to note that only one day of heat stress may reduce semen quality and potential fertility. If bulls cannot increase the rate of heat loss from the body when they are exposed to high temperatures, semen quality and potential fertility are reduced. Seasonal warning systems can assist farmers to mitigate this effect. For example, farmers can plan to use multi-sire breeding and/or bulls from tropical adapted genotypes, to mitigate possible male infertility, if they are warned in time.

There are indications that cow fertility is also effected by heat. Impaired oocyte development and death of the early embryo as a result of heat stress will compromise reproduction. At the Roodeplaat Research Station, a negative correlation was found between minimum temperature during the breeding season and calving percentage, which may indicate that the cows were unable to cool down at night, leading to lower conception rates and/or early embryonic resorptions or deaths. The ARC is busy with research in this regard in collaboration with the University of the Free State and Absolute Genetics.

However, growth is also affected by climate. Results from the Vaalharts Research Station indicated that average maximum temperature per season had a negative effect on pre-weaning weight and 35% of the variation in weaning weight could be explained by maximum seasonal temperature.

UTILIZATION OF ADAPTED GENOTYPES

There are a number of different indigenous beef breeds in Southern Africa. These breeds are productive and represent a rich complement of indigenous genetics. They can survive in harsh local environmental conditions (heat stress, droughts) and adaptation to other conditions (low quality of grazing, low susceptibility to diseases).

Weight loss in the indigenous Afrikaner breed after 24 hours without water was only 2% whereas it was 15% in an exotic breed. A 24-hour period of water deprivation also did not reduce the feed intake of the Afrikaner, whereas that of the exotic breed was reduced by 24%.

It has been demonstrated that the Nguni breed is the most resistant to ticks of all breeds in South Africa and that its production is least affected by ecto-parasites. In the case of the Nguni, tick infestation resulted in a weaning weight reduction of only 4.4 kg, whereas it was 29.5 kg in the case of the exotic breed under situations of severe tick infestation.

The 2015/16 summer was the warmest and driest year ever recorded in South Africa. In the preceding 9 summers there were on average 1.9 heat waves per summer with 6.5 heat wave days. In the 2015/16 summer, there were 12 heat waves totalling 71 heat wave days. A crossbreeding project is being conducted at the Vaalharts Research Station, in which the indigenous or locally developed Afrikaner, Bonsmara and Nguni cows (known as Sanga cattle), are mated with Afrikaner, Bonsmara, Nguni, Angus and Simmental bulls. The weaning weights of crossbred Sanga sired calves (Afrikaner, Bonsmara, Nguni) and Angus/Simmental sired calves between the 2015/16 and 2016/17 seasons were compared, since the 2016/17 was a wetter and cooler season (***Table 1***). The Sanga sired calves and Angus/Simmental sired calves had the same 205-day corrected weaning weight (171 kg) in 2015/2016.

In contrast, the 2016/2017 summer season was cooler and wetter, resulting in the weaning weight of the Angus/Simmental sired calves being 27 kg heavier than the Sanga sired calves (210 kg versus 183 kg). A decrease in the growth of the calves is the result of two factors, namely a reduced milk intake due to reduced milk production of the cow and the calf consuming

TABLE 1 Weaning weights of Sanga sired calves and Angus/Simmentaler sired calve between the 2015/2016 and 2016/2017 seasons

Season	Sanga sires			British / European sires	
	Afrikaner	Bonsmara	Nguni	Angus	Simmental
2015/2016	179 ± 27 kg	161 ± 21 kg	172 ± 31 kg	176 ± 43 kg	166 ± 27 kg
Mean	171 kg			171 kg	
2016/2017	176 ± 34 kg	186 ± 28 kg	186 ± 27 kg	204 ± 37 kg	215 ± 16 kg
Mean	183 kg			210 kg	

reduced amounts of forage with lower quality in addition to the lower production milk of the cow. During the 2015/2016 season it was also found that the growth of exotic genotypes decreased by 17% whereas that of the Sanga types reduced by 9% during periods of heat stress.

It is clear that breeds will be more productive under warmer climates and this may lead to their "re-discovery". Unfortunately, there is still a lack of proper recording in some breeds for the identification of the desired genetic material.

Acknowledgement

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The University of the Free State is playing an integral part in this research and their contribution is acknowledged. Likewise, the support of the ARC management is acknowledged.

Vitamin A in Beef Cattle

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Vitamin A plays a big role in the wellbeing and performance of ruminants and for our focus here; beef cattle. Vitamin A is formed by processes in the body from carotenes, with the beta- carotenes providing the greatest Vitamin A activity. These carotenes are found in green leafy materials (pasture grass or legumes, green tree leaves) which provide sufficient amounts of carotenes to form Vitamin A in the body of cattle.

In the body excess amounts of Vitamin A and carotenes are mostly (90%) stored in the liver from where they can be mobilized to perform essential functions. These functions include ensuring of optimal growth, reproductive processes, immunity status, proper kidney function, bone growth, nerve tissue development and maintenance, vision and maintenance of gut lining and lungs (epithelial tissue).

Carotenes are unstable and degrade over time. Exposure to air and sunlight (UV rays) decreases the carotene content as does the keeping of hay and feeds (concentrates, licks) in storage for long periods. During the dry season, grass yellows and its nutrient content diminishes, especially the vitamin A content. Mature cattle have sufficient reserves to deal with periods of limited or unavailable carotenes from pasture, although the indication of how long these reserves can ensure a healthy cow differ. Some articles talk about a 3 months' worth of reserves and lower in younger animals. Stress increases the requirement for Vitamin A, especially during pregnancy and calving when cows are in need of more Vitamin A.

During the mating season (February/March), there is sufficient carotenes in the grass for the bulls to ensure healthy sperm. Where bulls are with the cow herd for the whole year, their Vitamin A reserves are similar as described for cattle (see previous paragraph).

During the dry winter months when cattle graze on standing hay pastures or during extend periods of drought, they may be supplemented with a forage (photo 2), you find that the older cattle may not show Vitamin A deficiency symptoms, whilst young calves may start to show symptoms quickly.

Symptoms of Vitamin A deficiency include night blindness (work in the dark with your animals to observe this). Other less obvious signs are rough hair coat, reduced feed intake, low growth rate, diarrhea and improper bone growth. More important symptoms are low conception rates, resorption of the fetus, abortion, stillbirth, blind calves (Photo 1), abnormal semen and reduced libido. Also an increased susceptibility to respiratory and other infections. The less obvious signs can also indicate other diseases or nutrient deficiencies, therefore always consult with a veterinarian on what probable causes there can be for the observed symptoms.

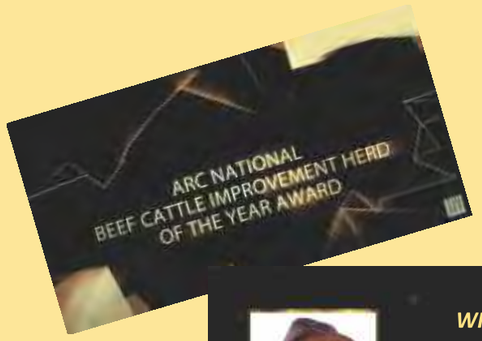
For most beef cattle access to feeds containing sufficient carotenes is very important, in light of the above. Where a February/March breeding season is followed, cows are pregnant during winter and calf before there is sufficient green grass available to provide carotenes. It is during this time that the cow needs Vitamin A the most, but supply is limited. Where this is combined with extended drought periods, cows can show some of the deficiency symptoms described above and Vitamin A deficiency may result in severe losses (lower calving percentages) to the farmer.
When providing commercial winter licks to your herds, ensure that they are containing Vitamin A or carotenes and are not older than one month (the activity of the Beta carotene reduces over time, making it less available to form Vitamin A in the body). Alternatively, give Vitamin A injections as per instruction on the bottle every 2 or 3 months. If uncertain, do consult with a veterinarian.

To close off, an incident in Australia (Toorak, in NW Queensland) to highlight the importance of Vitamin A. In 2004 the, to date the only, reported case of gestational deficiency of Vitamin A was reported in beef calves. The farm had a period on 10 months with no rainfall and no trees to eat green leaves. The cows were looking great despite the drought with no sign of Vitamin A deficiency. Out of the 406 calves

born during November, 168 died within 24-48 hours after birth. Symptoms included battling to suckle on a teat, nervous system dysfunction, blindness, depressed, drooping of the head, not following the cow. This was an extreme case and after looking at all possibilities as symptoms could indicate other causes, it was found through liver biopsy that the calves were severely deficient in Vitamin A, supported by the observation of blindness. Their conclusion was that in dry years Vitamin A deficiency is possible a significant cause of neonatal mortalities in northern Australian beef herds.

2020 ARC NATIONAL BEEF PERFORMERS AWARDS

CONGRATULATIONS TO ALL THE WINNERS!



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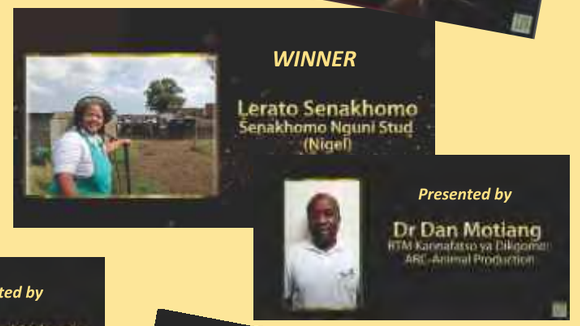

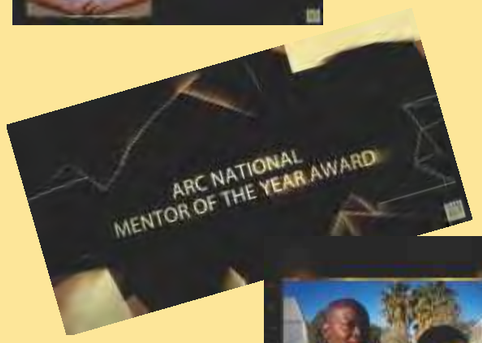

A very successful 2020 ARC National Beef Performers Awards ceremony was virtually presented on Thursday, 26 November 2020 at 18:00 by Plaas Media on behalf of the ARC-Animal Production National Beef Recording and Improvement Scheme.

The awards video is available on Plaas TV YouTube

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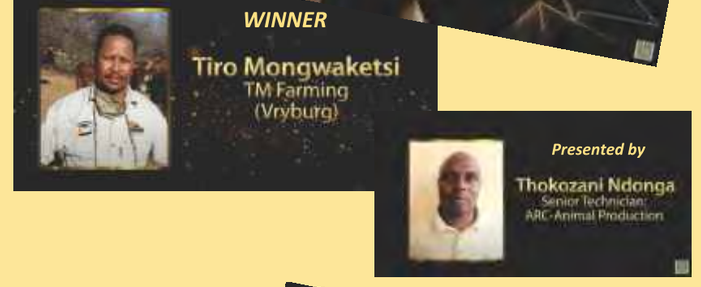

Designed by Una-Lou Jordaan
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Die toonaangewendste **INHEEMSE RAS** in SA is die **AFRIKANERBEES**

Die Afrikaner het 'n dik vel met kort, glansende, rooi hare, wat parasiet-, bosluis- en vliegweerstandig is. Die Afrikaner is ook weerstandig teen siektes, veroorsaak deur die byt van die tsetsevlieg, snotsiekte wat deur wild oorgedra word, kry feitlik nooit beesdiarree en rooiwater nie en sterf nie aan knopvelsiekte nie.

Afrikanerbeeste is hittetolerant. Hulle handhaaf steeds hulle voedingspeil in hittetoestande en selfs in temperature van 48°C bly hulle produseer. Vir 'n wêreld waar aardverwarming gaan toeneem, is die Afrikaner dus die ideale ras om mee te boer.

Die eindproduk van die beesbedryf is vleis, en die vleis van die Afrikanerbees dra nou die handelsmerk, naamlik Afribeef.

Die Afrikanerbees dra 'n dubbelgeen vir vleissagtheid. Indien u Afribeef sou eet, eet u 'n smaaklike porsie proteïen wat op sigself 'n eetervaring is. Dit het ook die volgende ongeëwenaarde eienskappe:

- Laag in kilojoules;
- laag in skadelike LDL-cholesterol, maar hoog in goedaardige HDL-cholesterol;
- geen bygevoegde antibiotikas;
- geen groeistimulante;
- geen hormone; en
- geen skadelike bakteriële lading nie.
- Die geel vet van Afribeef bevat hoë konsentrasies karoteen wat van die dier se veldvoeding afkomstig is, en anti-karsinogenies is. Volgehoue gebruik van Afrikaner-veldvleis verminder jou risiko op kanker.

Die vraag bly: kan enige bestaande beesboer of nuwe jong boer dit bekostig om met beeste te boer wat nie Afrikanerbees-genetika dra nie? Die antwoord bly 'n onomwonde NEE.

Kontak die kantoor by 051 447 7405 / President: dr. Pieter de Kock by 082 809 7496 vir meer inligting of besoek ons webblad op www.afrikanerbees.com

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ORIGIN

Cross breeding between the Afrikaner and Simmentaler breeds is not a new concept, and has been a popular breeding practice since the early to middle 1900's.

CHARACTERISTICS AND GENERAL APPEARANCE:

1.1. GENDER AUTHENTICITY:

The bull appears masculine and powerful, with a strong head and a typical more often than not, white patch on the forehead (calves are de-horned at an early age), a deep, heavy and powerful neck, somewhat of a dewlap (not as prominent as that of the Afrikaner), a firm hump (again not as big as that of the Afrikaner), a long deep, well-muscled body, well-formed reproductive organs, strong well positioned legs with hard hooves, shiny short coat with visible darkening of the neck and front part of the hump.

The cow appears true to type and in balance with her environment in size and weight, smooth shiny coat, well developed vulva and udder and narrower in the neck and face than the bull.

QUALITIES:

- Heat, parasite and disease tolerant.
- Good walking and grazing ability.
- Easy calving.
- Exceptional mothering qualities.
- Longevity.
- Exceptional quality meat.
- Performs well in feed lot.
- No-nonsense minimum care, maximum profit breed.
- Easy handling in controlled circumstances, due to their placid temperament.

BEEF PRODUCTION AND CLIMATE RESILIENCE:

PART 2 - Alternative Production Systems and Breeding Objectives

Michiel Scholtz, Motshabi Chadyiwa, Jurgen Hendriks, Frans Jordaan & Anette Theunissen - ARC-Animal Production, Irene - GScholtz@arc.agric.za

In South Africa, beef cattle are largely dependent on extensive production systems. In addition to the mitigation of heat stress and the utilization of adapted genotypes, which is discussed in Part 1, the way forward will have to include the use of alternative production systems and breeding objectives.

ALTERNATIVE PRODUCTION SYSTEMS

The type of production strategy to follow in Southern Africa will depend primarily on the environment and level of management. In the case of beef cattle, the effective use of crossbreeding may have specific advantages. Under commercial farming practices with fair managerial skills, but where conditions are still harsh with relatively low levels of nutrition, terminal crossbreeding with small indigenous cows may succeed in improving the output of beef cattle farming. This advantage follows since any system with large calves (feeders) from small breeding cows will be more efficient than one with calves and cows of the same size, simply because small dams eat less than large ones. This higher efficiency arises from a potential increase in weaning weight of up to 46% per cow exposed to mating, while the feed energy requirement only increases by 1%. In addition, and of particular importance for local food security, is the use of locally adapted, low-input maternal breeds and the improvement of the production potential of the progeny by using terminal sire breeds. However, such a system will only be viable if the natural environment can support the higher production, and managerial demands can be met.

Examples from South Africa indicate that cow productivity (defined as kilogram calf weaned per Large Stock Unit mated) increased by:

- 12% with Brahman x Afrikaner cows
- 14% with Simmentaler x Afrikaner cows
- 16 with Charolais x Afrikaner cows
- 21% with Angus x Nguni cows

When a F1 Afrikaner cow is used cow productivity increased by up to 49%. In the case of the Charolais x Afrikaner cross, there was a 27% increase in value of meat and 27% less feed was consumed from weaning to slaughter.

ALTERNATIVE BREEDING OBJECTIVES

Cow efficiency

An effective way to reduce the carbon footprint from livestock and to support climate-smart production is to reduce the animal numbers and increase the production per animal. Increased productivity generates less greenhouse gas emission per unit of product. Any production system or breeding objective must be set up to improve production efficiency and revenue from product sales and not merely to achieve genetic change. Selection for many of the traditional traits will increase production, but not necessarily productivity or efficiency of production.

The cow-calf production cycle represents approximately 72% of the energy consumed from conception to slaughter. In the mature cow, the maintenance requirements represent 70% of her feed expenses and the average feed cost per cow is 42% of the total annual production cost. If cow maintenance requirements are reduced, the feed energy requirements will be less and this should reduce the input cost of the cow and thus improve cow efficiency, which demonstrates why improved cow efficiency is so important.

Cow efficiency is a complex, multi-trait measure that is variable, depending on differences in production

environments and management systems. The three main component traits that affect cow efficiency are weaning weight of the calf, feed requirements to produce the calf, and the frequency at which a calf is produced. Weaning weight and fertility of extensive kept beef cattle can be measured, but it is not possible to measure feed requirements directly. However, the principle of a Large Stock Unit (LSU) can be used to estimate the feed requirements of cows. Likewise, the weaning percentage can be derived from the inter-calving period.

The formula to estimate cow efficiency is:
Cow efficiency = (weaning weight of the calf/ LSU) x weaning percentage

Example:

A medium frame cow of 450kg weans a calf of 210kg and has an inter-calving period of 420 days.
Cow efficiency = (210kg / 1.4 LSU) x 0.85 = 127.5 kg calf weaned per Large Stock Unit mated.

If the carrying capacity of the farm is available, the cow efficiency can be converted to kg calf weaned per hectare. If the carrying capacity is 6 ha/LSU then the cow efficiency 21.25 kg calf weaned per ha in the example.

In the case of the Afrikaner breed, the cow efficiency increase by 18% over a period of 25 years, which resulted in a decrease of 12% in the carbon footprint.

The challenge is to define breeding objectives that will improve cow efficiency and not just increase production. A possible breeding objective is kg of calf weaned per Large Stock Unit mated. However, a ratio has challenges and it is proposed to evaluate the total contribution of the following traits on the "methane budget/balance" of the cow-calf production system:

- longevity of a cow, fertility (number of calves born over a lifetime)
- size of her calves
- feed efficiency and
- maintenance cost of the cow.

These traits can be combined in a selection index for a cow-calf "methane budget/balance", and the ARC is in the process of developing such an index.

POST WEANING TRAITS

Selection for post weaning traits will increase production, but not necessarily efficiency of production. Selection for a trait such as feed conversion ratio can be improved by either better growth or lower levels of intake or both. The ratio in which they will change also varies between animals. Alternative efficiency traits have thus been identified, namely residual feed intake (RFI) and residual daily gain (RDG). Residual feed intake (RFI) is improved by reducing feed intake without changing growth, whereas RDG is improved by increasing growth without affecting feed intake.

The selection for reduced RFI will reduce feed costs and improve beef production profitability. It will also lead to less methane emissions since a positive correlation exists between RFI and methane production, thus reducing the carbon footprint of beef cattle. Low RFI animals produce up to 25% less methane and eats less than high RFI animals, which will result in more efficient cows. No significant differences were observed between low and high RFI heifers in respect of fertility/productivity traits, such as calving difficulty, average calving date, age at first calving, calf birth weight, calf pre-weaning growth rate, calf weaning weight and heifer productivity.
The difference in RFI and methane production between high and low RFI animals cannot be explained by the difference in feed intake alone.

The major reasons for the difference in RFI include differences in:

- protein turnover, tissue metabolism and stress
- mitochondrial function (energy production takes place in the mitochondria)
- heat increment of fermentation in the rumen (heat production results in energy that is lost)
- digestibility in the rumen
- activity (temperament)

It is recommended that the two traits, or growth and feed intake, be combined in a selection index with economic weights for feed cost and body weight. The ARC is in the process of investigating the economic weights of feed cost and body weight in diverse genotypes, which includes a dairy breed.

Acknowledgement

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Die Belangrikheid van Prestasie getoetste Bulle

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Wat is die rol / verantwoordelikheid van die stoetteler?

Om die kommersiële en mede stoetteler, wat genetika aankoop, in staat te stel om meer winsgewend te wees. Dit word wyd aanvaar dat die kommersiele produsent die primere klient van die stoetteler is. Die meeste manlike stoetdiere word deur kommersiele produsente gekoop. Daarom is genetiese verbetering van ekonomies belangrike eienskappe van uiterste belang is. Die regte keuse van 'n teelbul is die belangrikste faktor wat die sukses van u beesvleisonderneming sal beïnvloed. Gewoonlik is bulle 3% - 5% van die totale kudde, maar hul bydrae tot die genetiese samestelling van die kalf aanwas is 50%. Die drie bulle wat laaste in 'n vleisbeeskudde gebruik was, dra bykans 90% tot die kudde se genetiese samestelling by. Die waarde van 'n bul moet oorweeg word op die langtermyn. Die bul sal 'n onmiddellike impak hê oor 1-5 jaar as die direkte vaar van nageslag en sal 'n addisionele invloed van 3-10 jaar op die koeikudde hê. Die bul se invloed sal sal ook 'n verdere matige impak hê op die koeie oor die daaropvolgende 20 jaar. Die sukses van 'n teelprogram sal afhang van of die bul u koeikudde sal verbeter of nie.

Wat is die "regte" bul?

Bull keuse kan die mees effektiewe metode vir genetiese verbetering in die kudde wees, maar bulle met lae vrugbaarheid, strukturele probleme en lae libido kan die speenpersentasie van die kudde verminder. Kies bulle wat vervangingsverse sal produseer wat goed aangepas is (wat ook elke jaar kalf) vir u omgewing en bestuur. Dit is belangrik dat 'n bul hoofsaaklik gekies word vir sy genetiese vermoë wat die teeldoelwitte vir die kudde sal bevorder. Dit is ook belangrik om in gedagte te hou dat goeie genetika "weggesteek" kan word deur swak voeding en dat swak genetika "weggesteek" kan word met goeie voeding. 'N Bulle se "CV" is gebaseer op sy eie prestasie-inligting sowel as van sy familie en ander verwantes. Die "kwalifikasies" van hierdie bul word uitgedruk as beraamde teelwaardes (EBV's). Die "CV" van die bul moet bepaal wat geskik is vir die spesifieke behoeftes van 'n kudde, soos vrugbaarheid, 'n verbeterde groeitempo, raamgrootte van sy dogters, asook 'n verbetering in melkproduksie, ens.

Belangrike eienskappe met die seleksie van 'n bul

Dit is belangrik om teeldoelwitte te bepaal op grond van eienskappe van ekonomiese belang. Die gekose bul moet die koper se teeldoelwitte aanvul, en alle beskikbare inligting oor die bul moet voor die aankoopdatum ondersoek word. Oorweeg eienskappe soos vrugbaarheid, groei, voer doeltreffendheid en kwaliteitseienskappe en probeer ekstreme teelwaardes vermy, veral ten opsigte van volwasse gewig, wat gekorreleerd is met raamgrootte. Kommersiële telers moet selekteer vir lae geboortegewigte en bo-gemiddelde gewigte vir 200 en 400-dae (groeitempo). Hou altyd die vrugbaarheidsyfers van die vroulike diere in gedagte. Die reproduksie syfers verskyn ook op die veilingskatalogus.

Vrugbaarheid

Vrugbaarheid is een van die belangrikste indikasies van aanpasbaarheid. Alhoewel vrugbaarheid laag oorerflik is (3% tot 10% word wereldwyd as die norm aanvaar) en eksterne faktore, soos voeding en gesondheid, n groot rol speel in vrugbaarheid, beteken dit nie dat ons nie vordering kan toon te opsigte van vrugbaarheid deur seleksie nie. Vrugbaarheids problem stam nie net van vroulike diere af nie en n bul wat nie vrugbaar is nie, kan tot groter finansiele verliese ly, veral as mens in gedagte hou dat n bul ongeveer 50% van die genetiese samestelling van die kalf bydra end at n bul in n kudde ongeveer 80%tot die teelvordering bydra.

Die belangrikste maatstawe van vrugbaarheid eerstens die hoeveelheid kalwers gebore ten opsigte van die hoeveelheid koeie gepaar (kalf presentasie) en tweedens die hoeveelheid dae tussen kalwing (TKP). Die gemiddelde kalfpresentasie van die kommersiele sector is tans 61% terwyl die TKP ongeveer 436 dae is. Hierdie syfer lyk egter nie goed as dit vergely word met die 83% gemiddelde kalf presentasie van die kommersiele boer wat aan prestasietoetsing deelneem nie.

Dit is belangrik om die bul- en koeifamielies te identifiseer wat die gene vir vroulike vrugbaarheid dra. In die geval van n bul kan n streng bulseleksie maatstaf wees deur nie bulle te kies wie se ma nie op tweejarige ouderdom gekalf het nie en nie op enige stadum oorgeslaan het nie. Dis belangrik om na spesifieke punte op te let soos funksionaliteit, aanpasbaarheid vir die omgewing, skrotumomvang, semen kwaliteit, en libido. Dis ook uiters belangrik om te kyk na sy prestasiedata en sy teelwaardes, wat n indikasie sal gee van se genetiese potensiaal

Groei

Die fisiese voorkoms van 'n dier is 70% te wyte aan omgewingsinvloede en slegs 30% te wyte aan sy

genetiese samestelling, afhangend van die oorerflikheid van 'n eienskap. 'n Beraamde teelwaarde is 'n numeriese waarde wat die genetiese meriete vir 'n spesifieke eienskap voorspel, maar die akkuraatheid van die teelwaarde moet ook in ag geneem word. Die speengewig en die jaargewig van beeste kan geneties verhoog word met behulp van seleksie en, deur vir speengewig of die jaargewig te selekteer, kan die groeitempo in verskillende groeistadiums verhoog word. Die hoë positiewe genetiese korrelasie tussen speengewig en jaargewig sal telers in staat stel om speengewig as effektiewe seleksiekriteria te gebruik, selfs al is die primêre seleksiedoelstelling vir na-speense groei. As die groeitempo 'n doelwit is, moet in ag geneem word dat geboorte gewig ook kan verhoog a.g.v. die hoë korrelasie tussen groei eienskappe. Selekteer liewer "curve bender bulle" wat na geboorte 'n goeie groeitempo het, maar wat dan afplat om te verseker koeigewigte en raam tipe word beperk.

Voerdoeltreffendheid

Die voer van diere word lank reeds erken as een van die belangrikste metodes om die winsgewendheid van vleisbees produksie te verhoog. Doeltreffendheid meet die insette wat nodig is om 'n gewenste uitset te behaal. Neem in ag dat tot 75% van die koste van die grootmaak van vleisbeeste verband hou met voerkoste. Tot soveel as 70-75% van die voerinname in die leeftyd van beeste word gebruik vir onderhoud terwyl 29% van die voer aangewend word vir groei en melkproduksie. In die lig van die stygende voerpryse, word die verbetering in die doeltreffendheid van voer verbruik al meer belangrik.

Volwasse koei grootte en doeltreffendheid

Die ideale raamgrootte en winsgewendheid bly 'n omstrede onderwerp onder beesboere. Terwyl die een boer mediumraam koeie in sy kudde wil opneem omdat hulle minder onderhoud benodig, laat die ander een sy diere so swaar moontlik word, want elke kilogram beesvleis beteken geld in sy sak. Die boer se produksiestelsel, beskikbare natuurlike hulpbronne en mark sal die ideale raamgrootte bepaal Om koeie se doeltreffendheid te meet, kan ons kalf speengewig / koei gewig verhouding gebruik (MacNiel.2007), kalf speengewig / koei metaboliese gewig verhouding (Rasby 2010) en Jordaan (2015) stel voor dat ondersoek gedoen word na kg kalf gespeen per grootvee-eenheid as maatstaf vir koei-kalfdoeltreffendheid of koei-produktiwiteit. Scholtz (2015) het koei doeltreffendheid ondersoek deur voervereistes in ag te neem vir koeie met verskillende raamgroottes. Hy het bevind dat koeie met 'n groot raam 'n kalf van 51% van haar eie liggaamsgewig moet speen @ 150 kg / LSU, waar 'n koei met 'n klein raam slegs 'n kalf van 45% van haar eie liggaamsgewig moet speen om doeltreffend te wees. 'n Doeltreffender dier sal ook doeltreffender nageslag teel.

Bul seleksie en prestasietoetsing

Prestasietoetsing is 'n belangrike aanvulling tot ander kriteria, wat bouvorm (funksionele doeltreffendheid) en genetiese variasie insluit, in die seleksie van 'n bul. Prestasietoetsing stel ons instaat om te bepaal hoe individuele diere presteer, asook om die algemene doeltreffendheid van beesvleisproduksie te verbeter deur kuddes se genetika te verbeter. Ons kan hierdie inligting ook toepas om voortdurend daarna te streef om die algemene kwaliteit van beesvleis as produk te verbeter.

Soos vroeër genoem, bevat 'n bul se "CV" al sy prestasie-inligting sowel as die prestasie-inligting van sy verwantes. Al hierdie inligting word saamgevat in een Beraamde Teelwaardes (EBV of Estimated Breeding Value) vir elke eienskap. Die EBV is 'n kombinasie van 'n dier se eie prestasie, die prestasie van sy familie en die prestasie van sy nageslag word ook in ag geneem. Genetiese vordering kan verhoog word met die doeltreffende gebruik van EBV's, sonder om ander belangrike eienskappe nadelig te affekteer Dis egter baie belangrik om in gedagte te hou dat hierdie hulpmiddel wat teelwaardes bied, nie veel sal help as balans en logika van die produksie stelsel oor die hoof gesien word nie. Teelwaardes is n voorbeeld waar daar n magdom inligting oor eienskappe vervat is. Die gevaar le in die ooreiwerige toepassing daarvan sonder om na die korrolasie tussen eienskappe te kyk.Klem op enkeleienskappe ten koste van ander belangrike eienskappe wat wins bepaal, kan telers en die bedryf skade berokken. Sodra 'n balans behoorlik in plek is, kan die moderne ontwikkelings op genetiese terrein reg aangewend word.

Onthou die ou gesegde:

"n Goeie bul is die helfte van jou kudde, maar 'n swak bul is jou hele kudde!!

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NS0 V18/24.4.2/1435 Act 13/2003

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A PROUD BRAND OF Ascendis HEALTH

Beef Cattle Improvement under Heat Stress Conditions

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INTRODUCTION

The summer season of the years 2015-2016 was one the most extreme seasons ever recorded with frequent heat waves and lower than the average rainfall per year. An increase in the levels of heat stress is a reality, even more so in sub-tropical Africa where the rate of ambient temperature increase is almost double the rate of the global increase. As hot and humid climatic conditions increase, the negative impact on livestock production will become more severe. According to the Intergovernmental Panel on Climate Change's report of 2007, South Africa is one of the regions globally that will be most vulnerable to future climate variability. It is therefore anticipated that rising temperatures caused by future climate change will have a negative impact on the environment and on livestock production in general.

The potential economic losses to the industry due to decreased performance as a result of heat stress was already quantified by USA researchers in 2003. This decrease in performance include, a reduction in feed intake, a negative influence on growth and reproduction, as well as an increase in mortality rates. Cattle respond to environmental conditions differently than humans and are more sensitive to environments of high temperature and humidity and are more susceptible to heat stress than humans under the same environmental conditions.

The increase in global average surface temperature by 2100 is predicted to be between 1.88°C and 4.08°C. These predictions suggest that negative effects of heat stress on livestock production will become more apparent in the future together with an increasing world population; the need for food supply will continue to increase rapidly.

WHAT IS HEAT STRESS?

Core body temperatures of beef cattle is in the range of 38.6°C and normally higher than ambient temperature which ensure heat exchange from the animal to the environment. Heat stress may however occur when ambient temperatures rise above 28°C with high levels of humidity, as mentioned, when the animal is unable to cool down and maintain normal body temperature. Other environmental factors also influencing heat stress levels and are a combination of temperature, humidity, direct exposure to sunlight (solar radiation) and wind speed. Ruminants produce additional heat internally through fermentation in the rumen during digestion and also enhance heat stress conditions.

Picture 1 *Increased ambient temperatures may lead to more natural disasters such as droughts and veld fires and influence the natural production environment of cattle in a negative way*

Picture 2 *A bull in a central bull testing station at the ARC Irene campus Feeding bins under roof offer some shade while feeding*

INFLUENCE OF HEAT STRESS ON PRODUCTION

Several studies have investigated effects of beef production on greenhouse gas emissions and subsequent climate change. But what is the impact of higher average temperatures on the production of beef?

The summer mating season in South Africa occurs during mid-summer when the ambient temperature venture outside the thermal comfort zone of cattle. Traits, influencing the profitability of a commercial beef production system, such as fertility and growth, are negatively influenced when cattle are exposed to extreme environmental conditions.

In general, drought conditions also result in lower average rainfall and higher ambient temperatures, which reduce the quality and quantity of natural grazing. These factors can change the production environment negatively, which influence the profitability and sustainability of a beef production system.

Research done by the Agricultural Research Council under extreme South African conditions of a well-adapted Bonsmara herd investigated the influence of environmental factors such as average rainfall per summer season, length of the rainfall season and average temperature per season, on the growth performance of weaner calves. Results indicated that average maximum temperature per season had the biggest negative effect on the production of the herd.

INFLUENCE OF HEAT STRESS ON REPRODUCTION

Bull fertility are susceptible to heat stress and has a negative effect on potential female conception and pregnancies. Management of body temperature of bulls before and during collection of semen for artificial in semination (AI) is a major concern since studies indicated that the number of sperm cells and sperm motility dropped dramatically while subjected to heat stress.

Research indicated a six to eight week period for semen quality to return to normal after heat stress conditions. The influence of heat stress on bull fertility cannot be under estimated and even short-term exposure to heat stress may cause long-term consequences in bull fertility.

Picture 3 *The general beef production system in South Africa is under extensive conditions on natural grazing, with supplement feeding and a winter lick during the dry and harsh winter months*

Picture 4 *Cow productivity may also be negatively influenced if the bull was exposed to extreme summer temperatures*

HOW TO MITIGATE THE NEGATIVE EFFECT OF HEAT STRESS ON PRODUCTION

During drought conditions, producers can supply additional and supplement feeding to mitigate the loss in production but increase the input costs. Practical improvements is provision of shade or cooling systems together with an improved flow of air, especially in intensive systems such as feedlots and milking parlours. It is however not that easy to control or change the environment in an extensive production system.

The availability of cool and good quality water with adequate bunk space is also critical to ensure enough water intake of animals under severe conditions. The transport of animals should be avoided during these hot conditions. Handling of cattle must furthermore be avoided during the day and rather carried out during early morning and late afternoons.

SELECT FOR ADAPTATION

Hide color is a high risk factor because dark hair has lower reflectance values and dark skin absorbs a greater proportion of solar radiation. Other factors such as illness (e.g. respiratory pneumonia), subcutaneous fat cover and temperament may also increase the risk of heat stress. Cattle in feedlots, especially those that are market ready may suffer from heat stress due to a decrease in lung-body weight capacity. More adapted cattle with a smooth and short hair cover and a loose skin with more skin surface will be more adapted for a harsh and warm environment.

GENETIC SELECTION

It is impossible for the breeder to change the ambient weather conditions but selection may mitigate the effect of heat stress. Selection of more adapted animals and to purchase animals from breeders from the same region. Also important is the “breed choice” or composites, which suits the production environment. Producers need to meet the production and quality standards determined by the commercial market.

These requirements may include a minimum growth rate and/or calf weight at wean, especially if the producer supplies calves for the feedlot market. These factors will determine the breeding objectives for the herd.

BREEDING OBJECTIVES

It is recommended to purchase registered bulls with breeding values to ensure improvement on traits of economic importance. By selecting the best breed-ing material for his environment, the breeder will

Picture 5 *Performance testing and purchasing of bulls with BLUP breeding values is of utmost importance to breed adapted and efficient performing progeny*

Picture 6 *Animals in the GrowSafe system at the ARC's Irene bull testing centre to evaluate their growth and feed intake over time*

be in a better position to be sustainable in a challenging environment.

Variation of traits between breeds and within breed for growth tempo and reproduction enable the breeder to do complete performance testing of his herd to identify the best performing cows. Reproduction reports available on the National database (Integrated Recording and Genetic Information System) are valuable tools to assist the breeder to identify efficient producing cows. When replacing older cows this information become valuable to identify inefficient cows and cows weaning below than average weaners in the herd.

Residual Feed Intake (RFI) is another trait to include in breeding objectives to breed animals for the future with less feed intake requirements. Selecting bulls with low residual feed intake breeding values will ensure progeny with lower feed intake and better-feed efficiency. Bulls are tested in South Africa by the ARC and other testing facilities to identify “low” RFI bulls. Within a more challenging environment, these bulls may be more in demand in the nearby future.

BREEDING SYSTEMS

Long-term solution100s include multi-sire breeding and/or bulls from tropical adapted genotypes, to mitigate the effect of heat stress, especially for the latter part of the breeding season. This will enable producers to still have a good calving rate during extreme summers.

Dam lines, from tropical adapted genotypes in a crossbred breeding system will limit cow size to improve production efficiency. “Climate-smart” beef production indicates less number of animals to reduce carbon emissions but an increase in production per large stock unit. The three major components which determine cow efficiency, are production, maintenance requirements of the cow and reproduction rate.

Crossbreeding studies at the Vaalharts Research Station in the Northern Cape provided information on the effects of heterosis on production traits, using the Afrikaner and its crosses as the dam line and European (Charolais and Simmentaler), British (Hereford) and Zebu (Brahman) breeds as sire lines.

A study on early warning systems for sustainable beef production in warmer parts of the country is still in progress. A temperature-humidy index specificly developed per region might also assist breeders if extreme summers are predicted in advance and mitigation measures can be put in place prior to the mating season etc.

SUMMARY

Global warming is expected to have more extreme effects on Africa than the other continents. The effects of global warming on sustainable livestock production are related to the effect of ambient temperature (heat stress, nutritional stress, lowered production and reproduction), climate (rainfall, humidity, solar radiation), altered patterns of animal and plant diseases (threats of new disease, frequency of existing diseases), nutritional value of pastures and change in pasture composition (growth, yield and stocking rate) and the adaptation of animals to the production environments.

Ambient temperature is the factor that has the largest direct effect on livestock production, while nutritional stress has the largest indirect effect on grazing of the animals in the tropics and subtropics. Livestock in the southern African countries will need to adapt to higher ambient temperatures, lower nutritional value of the grass in some cases, and the expansion of diseases, especially ticks and tick borne diseases, as a result of global warming. The development of mitigation strategies and a livestock discomfort index are therefore important to ensure sustainability.

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Basic Beef Cattle Farming Concepts:

Guide for Beginners

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I often hear potential beef cattle farmers asking themselves a question like, "Will the beef cattle enterprise yield returns?" as they intend in investing in the enterprise. There is a variety of factors to consider when starting a beef cattle enterprise. Cattle farming can be personally and financially very rewarding but before getting into beef cattle farming, small holders/emerging farmers need to consider whether they, their family and their farm are ready for a full-time beef cattle farming operation.

Producing beef cattle on a small farm does not require expensive infrastructure. Determining your motivation for wanting a herd (such as pasture management, financial gain or personal pleasure), your level of cattle knowledge and skills and the amount of time you have available will provide a sound starting point for making the correct decision.

Consider your farm's infrastructure (such as cattle yards, animal handling equipment and properly fenced paddocks), feed availability and the health and regulatory responsibilities that come with being a cattle owner. If you decide that cattle business is for you, then it is time to consider the most appropriate breed, type and number of cattle you should purchase.

Choosing a breed

General purpose, purebred or crossbred beef breeds are suitable if your intention is to control pasture and enjoy home-grown meat. These breeds are most easily sourced from local cattle sales or nearby beef producers.

If you were looking at breeding a more specific and desirable breed of cattle, it would be wise to contact the relevant breed association to discuss your options. Attending agricultural farmer's days and workshops is another great way to gather information. One consideration when selecting a breed is whether you want to invest in a polled (hornless) or horned breed. For inexperienced operators, polled breeds are easier and safer to handle.

If you do choose a horned breed, it is advisable to utilize the services of an experienced handler, veterinarian, or animal health technician who can safely and humanely remove the developing horns of young animals.

Knowledge and skills

While it could be argued that cattle are less work than sheep, they still require a great deal of effort. You will need to regularly monitor their feed and water supplies and their general wellbeing. Depending on the age and sex of the animals, you may need to drench, vaccinate, identify, mark (castrate) and wean calves.

Some people can be nervous when handling cattle mainly because of the animal's body size. For this reason, it is important to choose a breed with a good temperament.
You may prefer to make use of the services of an experienced cattle handler to carry out some of the more difficult handling activities, such as marking and castration.

Basic farm infrastructure

Some cattle, especially bulls, can weigh in excess of one tonne, so for your herd's safety, and the smooth operation of your farm, secure fencing is a necessary. Safe and nutritious feed, water and shelter resources are also essential.

A strong set of cattle yards with a loading ramp is a key requirement. The yards will be used when cattle are delivered to your property and when they leave, for handling activities such as marking and vaccination and for weaning calves from their mothers.

Fencing

If you plan to have livestock, you will need fencing– and effective fencing, as you are responsible for stray animals. There are many types of fencing - from portable to permanent, and livestock species vary in their fencing needs. Some animals do well with high tensile electric fence while others require a mesh style of fencing. Make an effort to research what type of fencing you will need for your operation. Check with your local Department of Agriculture, Land Reform and Rural Development (DALRRD) for more information about livestock fencing alternatives and specifications. They should be able to refer you to contractors who install fencing and sell fencing supplies. Consider putting up a perimeter fence and using portable, temporary fencing to form smaller paddocks within the perimeter to rotationally graze livestock.

Handling facility

Adequate restraint of livestock is very important to ensure proper handling of animals and this is achieved if the handling facility is in good working condition. These facilities are utilized to perform beef cattle management activities such as

vaccination, ear tagging, branding, dosing, spray dipping, castration, pregnancy diagnosis and other important activities. A proper handling facility prevent injuries and ensure safety of the animal handlers as well as safety of animals being handled. Different materials and designs to build a good working infrastructure are available in the market; contact your local agricultural cooperatives stores or local Department of Agriculture offices in this regard.

The following beef cattle infrastructure/ handling facilities specifications are recommended:

Crush pen
Length = 30m – Holding 20 animals at a time.
Width = 0.75m.
Height = 1.4m above floor/ground level.

Neck clamp
Length = 2.4m.
Width = 0.5m bottom + 1.2m top.
Height = 2.1m with a handling? Weight of 350kg.

Loading ramp
Length = 3.6m.
Width = 0.8m.
Height = 1.2m

Cattle weighing scale

Monitoring growth of animals at different stages of production is an important indicator for evaluating growth performance in order to select the best animals for breeding. In the beef industry, the price of an animal is determined by its live weight (rand per kilogram).This price margin offered by the market of course also changes from time to time. Every cattle farmer need to have a fixed cattle weighing scale that is in a good working condition to monitor the growth of animals on the farm.

Water supply

Water resources include streams, rivers, lakes, ponds, wetlands, springs, wells as well as any means of conveying the water to your facility. You should be familiar with the location of the water resources on your farm. Consider what the water needs will be for your enterprise. For example, horticultural enterprises need a source of water for irrigation. Livestock owners will need to have a reliable and drinkable source of water for their livestock. Whatever the water is used for, you need to determine:

- Is there enough water for your operation?
- Is there a way to bring water from its source to where you need it?
- Will you need to install water lines, irrigation structures or animal watering facilities?

Keep in mind that all water lines and structures will need to be appropriately sized to fit their purpose. For example, if water lines are too small, you may not be able to deliver enough water to your livestock-watering trough to meet their needs.

Feeding and water troughs

Feed is one of the highest single input or production cost in any beef cattle farm enterprise. To maximize the effective utilization of feed by livestock, it is advisable to have feed troughs on the farm to prevent feed spillage and wastage. Feed and water troughs need to be secured on the ground to prevent cattle from knocking the bunkers around. Space between feeding troughs should be adequate enough and at least 2-3 meters apart to prevent cattle injuries and fighting.

Water troughs are a key requirement to provide water to animals where they are grazing to avoid unnecessary walk to drink water. Ensure that water troughs are monitored for leaks and that they are cleaned regularly. Different designs of feed and water troughs are available in the market. You can visit your local agricultural/livestock cooperatives and retail shops to choose the design you like.

Equipment

There is a wide array of equipment available for all enterprises. “Equipment” could mean a tractor, hammer meal and mower or it could mean a hoe and a rake or specialized equipment for processing. So, where do you start? The key is to start small, and to build up your farm operation gradually to help you get to know what you need and when you need it. For example, before you purchase equipment talk with other farmers to learn what is essential and investigate options for equipment rental or options to buy used equipment.

There are a few basic questions to consider when thinking about equipment:

- Assess what you have and what you need. Ensure that equipment is sized correctly for the job you intend to do with it. For example, ensure that your tractor has adequate horsepower to pull the baler you intend to use.
- Do you really need it? It may be more economical to rely on a

custom operator to assist you or to lease equipment. New or used -there are obvious advantages to each.

- Consider your needs and financial resources carefully to make the best purchase.

Evaluating your farm's infrastructure

Different farm enterprises will require different types of infrastructure, equipment, and resources. It is important to have a good idea of what supporting infrastructure your operation will require and to do an inventory on what exists. A good inventory will help in determining whether the enterprise you are considering is feasible at this point, or whether you have some work to do.

As you evaluate what you will need for your farming enterprise, also begin to track the potential costs of necessary improvements.

- What do I have?
- What do I need? (What do I really need?)
- How will I get what I need?
- How much will it cost?

Buildings

What types of buildings will be needed for the beef cattle enterprise you are considering?

- Will I have livestock that need housing? Remember, livestock facilities need to be correctly sized.
- Will I need storage facilities for livestock feed, equipment, or product that I will produce?

Do an inventory on existing buildings such as barns, outbuildings, sheds and houses.

- Are these buildings in good repair?
- Are they adequately sized for your enterprise?

You may be able to rent facilities, so keep an open mind when inventorying.

Power source

You need to ensure that you have an adequate power source for your enterprise. Some operations may require different power levels, so make sure that there is adequate power capacity on your farm. Over-loading older or limited circuits can be hazardous and even disastrous. You may wish to consult with a licensed electrician to determine if your electrical source and wiring is adequate to suit your needs. If you rely on power for critical elements of your operation, consider having a back-up generator on hand in case of power outages.

Pasture of livestock

Putting too many animals on too little land causes reduced productivity to both and can damage the quality of the land in the long-term. As a rule, allow for about one hector of pasture for each one animal unit of cows for the growing season. If you would also like to provide hay for your livestock's winter-feed needs, include another hector of pasture per every 460 kg of animal. To get help on establishing a successful grazing system, contact your Local Department of Agriculture or Agricultural Research Council – Animal production.

Viable land units per agricultural commodity, across agro-ecological zones of South Africa: Extensive beef cattle farming

A high level of fertility, or reproductive performance, is fundamental to an efficient beef cattle enterprise. Fertility is commonly measured in terms of calf crop percentage, and no single factor in commercial cowcalf operations has greater bearing on production efficiency than the number of calves weaned per cowherd.

Calves are weaned and grown to a certain weight and then sold in order to obtain income. Hence, the more offspring sold, the more productive the farm is. According to the commodity standard, an example of a herd consisting of 250 cows, at a reproductive rate of 70%, will deliver 175 calves per year. With a value of R6500 each, these calves will ensure a total gross income of R1 137 500. Should you subtract the 35% that is the recommended calculation as the cost of producing (input cost) these 175 calves (based on various publications), your profit would be R739 375. To have 250 cows (and about 10 bulls) on your farm, you need quite a big farm. In the southern Bushveld of Limpopo, the long term grazing capacity is roughly 7 hectares per livestock unit. You therefore would need a farm of 1820 hectares to host this herd. Moreover, if this was the only enterprise on your farm, it would barely be a viable commercial unit in view of the fact that, according to farm categorization, a commercial farm need to generate a net profit of R700 000 per year.

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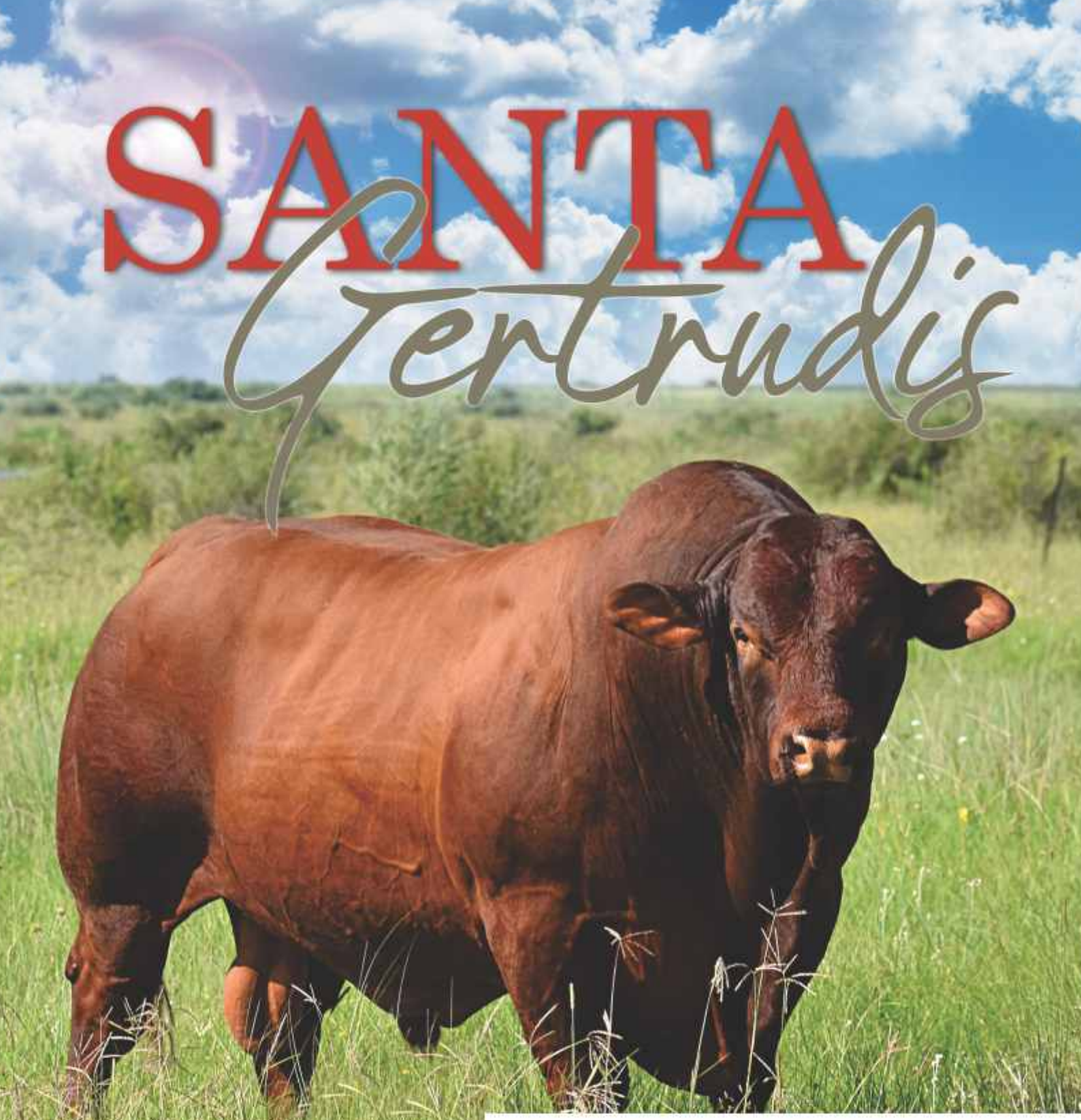

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INTERGIS

Developments and News

Corrie van Zyl & Graham Buchanan - ARC-Animal Production, Irene - VanZylC@arc.agric.za

EVERYDAY AFFAIRS

The INTERGIS team is always busy with something. Their tasks include queries, data processing issues, and maintenance of existing programs, new development and collaboration with other role players in the industry. This requires that the ARC staff must always be available to provide a service, regardless of the need. Fortunately, the ARC was able to do this without interruption during the COVID-19 lockdown, due to the ARC providing the necessary infrastructure and technology. Not with standing this, preparations had to be made under tight time lines and circumstances to issue the relevant network and hardware access for staff who did not have them, enabling them to work from home. This ensured that operations and services could continue with limited impact.

ANKOLE NEWS

The Ankole Cattle Breeders' Society of South Africa drafted a new constitution that was adopted a year ago. As a result, new mating tables were developed and several breed limits had to be adapted. Among other things, provision was made to store the horn measurements with its appropriate dates in the database and the INTERGIS Interface was adapted to reflect it together with the "Safari Club International (SCI)" index. A report outlining the horn measurements was also made available.

AFRIKANER & AFRISIM NEWS

The Afrikaner & Afrisim Society make use of the INTERGIS as their system provider, including support and scientific guidance and advisement. We are in the process of developing a procedure to flag cows that have not calved due to the drought. Due to the harsh and pro longed drought been a factor beyond human control, the Society has asked us to cater for breeders who can breed with the cows without penalizing them on AFC & ICP. This will be a handled in a manner that ensures a fair process based on scientific principles, to avoid the system been manipulated to the benefit of any party.

GROWSAFE

In early 2020, the Intergis team met with a GrowSafe representative from Canada. Since then, several discussions have taken place on integration between the GrowSafe system and the INTERGIS to load feed efficiency data as efficiently as possible, taking into account the large amounts of data accumulated. In the long-term, GrowSafe aims to provide their clients such as the ARC with the ability to automatically transfer data from their system to enable direct integration between systems, and the Beef Scheme in collaboration with the INTERGIS team is excited to work with GrowSafe on this initiative.

PHASE D (EXTENSIVE) TESTING

In the last quarter of this year, the Beef Scheme will be introducing an Interim Report for Phase D on-farm tests, similar to the Interim Report, which is already available for Phase C central-tests. The Interim Report has proven popular amongst the Beef Scheme clients, providing them with regular updates on the progress of their bulls and cows in test.

COMMERCIAL FARMING

New developments on the INTERGIS mobile framework were implemented this year, which has created a good technical springboard for further mobile application for beef cattle farmers that will give them the ability to view their herd and animal details conveniently anytime from their preferred mobile device. It is envisaged that this would help put tools such as animal selection in a simplified manner in the hands of commercial breeders, and enable better herd management practices.

RESEARCH

Data is extracted from the INTERGIS regularly (upon receipt of request authorisation) for use by ARC researchers, as well as by Agricultural students from many universities and from the livestock industry. This data is a critical success factor to the researchers and the projects they work on, many of which involve international collaboration.

Die Rol van die Wetenskap en Tegnologie in die Vleisbees Waardeketting

Ben Greyling & Frans Jordaan - ARC-Animal Production, Irene - Ben@arc.agric.za

Die gesegde dat ons nie tegnologie gebruik nie maar tegnologie leef, weespieël maar net hoe afhanklik ons van tegnologie geraak het. Om die waarheid te sê dit het so integrale deel van ons lewens geword dat ons dit as vanselfsprekend aanvaar. Die Covid-19 pandemie het die belangrikheid van tegnologie uitgelig - ons woon kongresse, sportbyeenkomste en selfs musiek-konserte virtueel by, doen inkopies al hoe meer "aanlyn" en reel virtuele vergaderings, om maar net 'n paar te noem. Uit ondervinding weet ons ook dat moeilike tye dikwels ons swak en sterk punte na vore bring. Van die menige negatiewe effekte van die pandemie sluit in die feit dat ons land se BBP met 'n astronomiese 51% gekrimp het in die tweede kwartaal van die jaar in vergelyking met die 1.8% afname in die eerste kwartaal. Die goeie nuus is egter dat ons landbousektor met 15% gegroei het oor dieselfde tydperk.

In die lig van die nagevolge van die pandemie en die toenemende vraag na beesvleis sal boere alles moet uithaal en wys om meer winsgewend en volhoubaar te produseer. Tans produseer ons boere net oor die een miljoen ton beesvleis per jaar en na raming sal die vraag na beesvleis met meer as 20% styg oor die volgende dekade. Dit is vanselfsprekend dat daar geweldig druk op produsente sal wees om meer doeltreffend, winsgewend en volhoubaar vleis te produseer ten einde te kan deelneem aan die vleisbees waarde-ketting wat inherent baie kompeterend is. Lg. is dinamies en tot 'n groot mate vertikaal geintegreer. Dit beteken dat baie voerkrale, wat tussen 70-80% van ons beesvleis prosesseer, hul eie slagpales het en ook direk vleis lewer aan die groot- en selfs kleinhandel. Boere sal dus hul produksie stelsels sodanig moet bestuur en optimiseer om te kan inpas by die vereistes van hierdie ketting.

MAAK STAAT OP DIVERSITEIT EN VOORKOM VERLIESE

Een van ons vleisbeesbedryf se sterk punte is ons diversiteit van genetika in die vorm van verskeidenheid beesrasse waarmee geboer word en wat aangepas is by die uiteelopende omgewings van ons land. Diversiteit, spesifiek as dit kom by dieregenetika, is een van die belangrike bestandele wat boere in staat stel om te reageer op verandering, hetsy goed of sleg. DNS tegnologie het onmisbaar geword in boere se pogings om genetiese variasie te kwantifiseer en te selekteer vir ekonomies belangrike eienskappe. Verskeie genetiese merkers is reeds geidentifiseer wat met ekonomies belangrike eienskappe geassosieer word, soos bv. voerdoeltreffendheid. Verder is heelwat studies ook gedoen op die vlakke van genetiese variase binne rasse asook oor rasse heen, m.a.w. hoe rasse geneties van mekaar verskil.
Hierdie inligting is baie belangrik en handig as dit kom by hoe uniek bepaalde rasse is, hoeveel genetiese variasie binne die ras is (wat baie belangrik is vir hul vermoë om te kan aanpas) en hoe die ras van ander rasse verskil ten einde ons genetika verantwoordelik te kan bewaar en te bestuur.

Studies gedoen op gewasse oor die wêreld heen het aangetoon dat van die grootste verliese reeds op die plaas plaasvind, onder andere a.g.v. siektes. Dit knou nie net die boer se inkomste nie maar kan ook daartoe lei dat die verbruiker uiteindelik meer vir kos moet betaal. Dieselfde beginsels kan tot 'n groot mate geld vir 'n vleisbees produsent. Ons moet onthou dat verliese nie net gekoppel is aan vrektes nie – 'n verlies kan ook toegeskryf word aan 'n inkomste verbeur a.g.v. ondoeltreffende produksie, soos bv koeie wat nie kalf nie dra ook by tot verlaagde inkomstes. As dit kom by genetiese siektes, is daar 'n groot veskeidenheid wat reeds geidentifiseer is en waarvoor toetse gedoen kan word ten einde van die slegte gene ontslae te raak.

Nuwer ontwikkelinge in die veld van DNS tegnologie sluit in epigenetika, 'n verskynsel waar die omgewing 'n dier (of mens) se DNS sodanig beinvloed (nie verander nie!) dat bepaalde gene òf onderdruk word òf aangeskakel word. Interessant genoeg kan baie van hierdie epigenetiese veranderinge oor 'n paar geslagte oorgedra word. Die omgewing in hierdie geval sluit in temperatuur (veral hitte), dieet, stress, chemikalieë en ander faktore waarvan

ons nog baie min weet. So, byvoorbeeld is gevind dat melkkoeie onder hitte stres ligter kalwers geproduseer het met verswakte immuunstelsels. Die samestelling van bepaalde skaaprasse se dieet het ook epigenetiese verandering laat plaasvind wat die gewig van hul F2 nageslag nadelig beinvloed het. Navorsing op epigenetika sal ons in die toekoms in staat stel om komplekse eienskappe, soos siekte-bestandheid en reproduksie, beter te verstaan en die inligting aan te wend om produktiwiteit aan te spreek.

SAMEVATTING

Sonder twyfel het tegnolgie onmisbaar geword in die eeu waarin ons leef, of dit digitale tegnologie, DNS tegnologie of enige ander van die hordes beskikbare tegnologiee is. Die groot vraag is tot watter mate gebruik ons dit of is baie van ons die spreekwoordelike laatkommers in baie gevalle wat eers wil kyk wie dit gaan gebruik en of dit waarde gaan toevoeg tot my onderneming. Die groot pluspunt van DNS tegnologie is die feit dat dit homself reeds bewys het, veral as dit kom by die karakterisering, bewaring en bestuur van ons genetiese hulpbronne. Dit speel ook 'n al hoe groter en belangriker rol om produsente in staat te stel om te kan deelneem aan die beesvleis waardeketting.

The Role of Science and Technology in the Beef Value Chain

The saying that we do not use technology but live technology only reflects how dependent we have become on technology itself. In fact, it has become such an integral part of our lives that we often take it for granted. The Covid-19 pandemic highlighted the importance of a few technologies - we attend congresses, sporting events and even music concerts virtually, shop more and more online and arrange virtual meetings, just to name a few. From experience, we also know that difficult times often highlight our weaknesses as well as strengths. Some of the many negative effects of the pandemic include the fact that our country's GDP shrank by an astronomical 51% in the second quarter of the year compared to 1.8% in the first quarter. The good news, however, is that our agricultural sector has grown by 15% over the same period that was characterised by enormous contractions of most industries.

In light of the decline of our economy and the increasing demand for beef, farmers will have to pull out all the stops to produce more profitably and sustainably. At present, our farmers produce just over one million tonnes of beef per year and it is estimated that the demand for beef will increase by more than 20% over the next decade. It goes without saying that there will be tremendous pressure on producers to produce meat more efficiently, profitably and sustainably in order to be able to participate in the beef cattle value chain which is inherently very competitive. This chain is of course dynamic and, largely, vertically integrated. This means that many feedlots, which process between 70-80% of our beef, have their own abattoirs and supply meat directly to the wholesale and even retail trade. Farmers will therefore have to manage and optimize their production systems in order to be able to align themselves with the requirements and demands set by the value chain.

RELY ON DIVERSITY AND PREVENT LOSSES

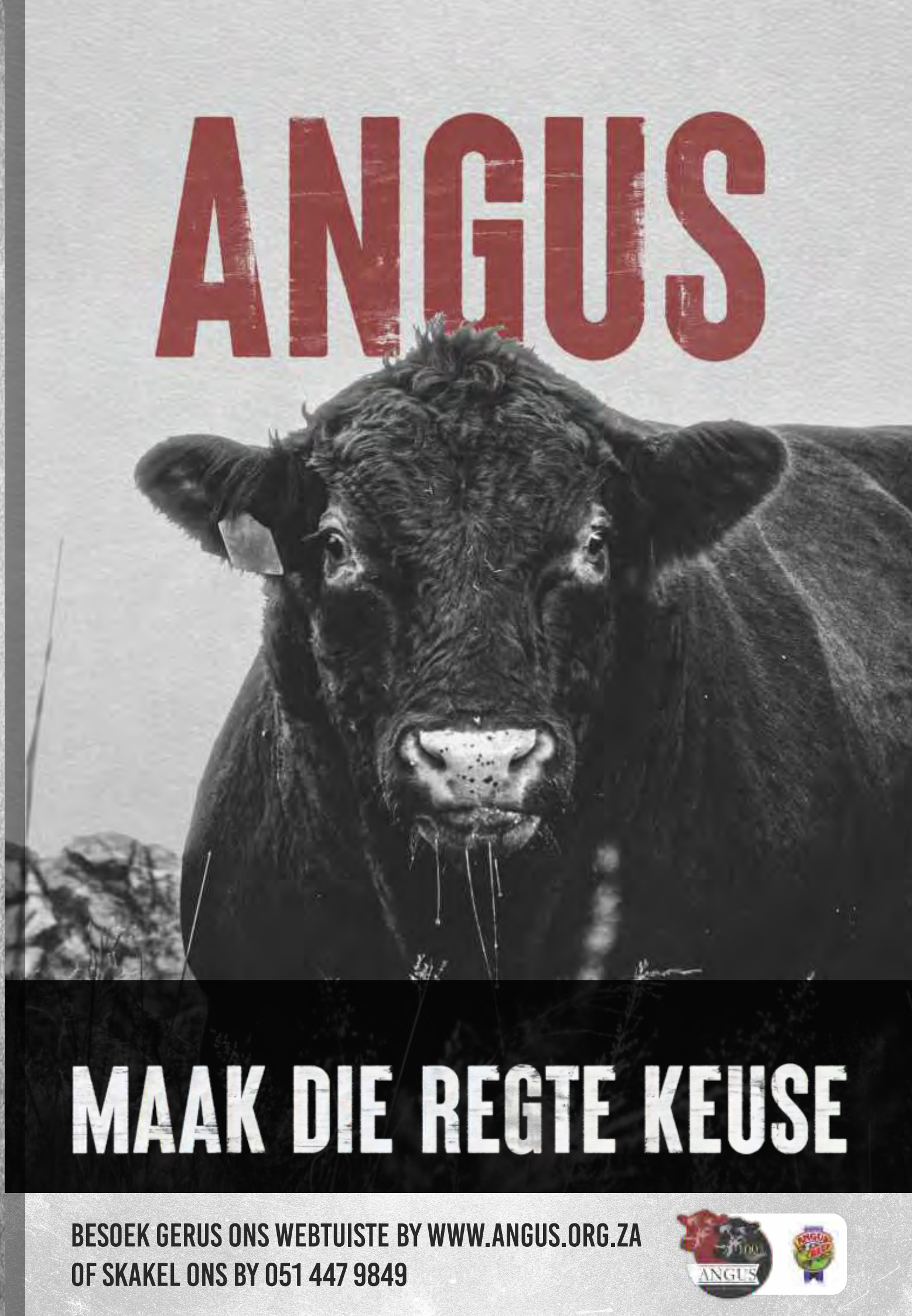
One of the strengths of our beef cattle industry is the variety of beef breeds which offer a diversity of genetics that are adapted to the different environments of our country. Diversity, specifically when it comes to animal genetics, is one of the key ingredients that enables farmers to respond to change, whether good or bad. DNA technology has become indispensable in farmers' efforts to quantify and select genetic variation linked to economically important traits. Several genetic markers have for instance already been identified that are associated with traits linked to profitability, including feed efficiency. Furthermore, many studies have also investigated the levels of genetic variation within as well as among breeds, revealing the extent to which breeds are genetically different from each other. The level of genetic variation within a breed is an important indicator of its fitness and ability to adapt to change while information regarding the degree to which breeds are structured is central to our ability to devise breeding, management and conservation strategies for our breeds.

Studies done on crops around the world have shown that some of the biggest losses are already happening on the farm, amongst others, due to diseases and pests. This not only impacts negatively on the farmer's income but can also lead to the consumer eventually having to pay more for food. The same principles can apply to a large extent to a beef producer. We must keep in mind that losses and subsequent reduced income are not only linked to deaths - a loss can also be attributed to an income forfeited due to inefficient production, such as cows that do not calve every year. There is a big variety of genetic diseases that has already been identified and for which many can be tested in a DNA laboratory in order to eliminate unwanted genes from the herd and ultimately in the breed as well.

Newer developments in the field of DNA technology include the study of epigenetics, a phenomenon where the environment influences the DNA of an animal (or human) in such a way that certain genes are either suppressed or switched on. Interestingly, many of these epigenetic changes can be transmitted to progeny over several generations. The environment in this case may include temperature (especially heat), diet, stress, chemicals and other factors of which we know very little about at present. As an example, dairy cows under heat stress were found to produce lighter calves with weakened immune systems. Another study on epigenetics revealed that the composition of certain sheep breeds' diets adversely affected the weight of their offspring. Research on epigenetics will in future enable us to better understand complex traits, such as disease resistance and reproduction, to name but two, and to use the information to address productivity amongst others.

SUMMARY

Without a doubt, technology has become indispensable in our current lifetime, whether it be digital technology, DNA technology or any other available and of course affordable technology. The big question is to what extent do we use it or are many of us the proverbial latecomers in many cases who first want to see who is going to use it and whether it is going to add value to my business? The outstanding benefit of DNA technology in particular is the fact that it has already proven itself, especially for characterizing, conserving and managing of our genetic resources. It also plays a prominent role in enabling producers to participate in the beef value chain, which is paramount to the sustainability of any farmer's enterprise.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The Methods for Assessing Rangeland Condition:

Implications on Rangeland Productivity and Period of Camp or Farm Occupation by Animals

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INTRODUCTION

Rangelands cover approximately 80% of the land surface of South Africa, and are critical for essential ecosystem goods and services that include among others provision of grazing resources for livestock. Millions of people rely on rangelands for their livelihood, carbon sequestration and fresh water services (Naidoo et al. 2013) among others. Large parts of South Africa' natural grazing is in poor conditions owing to overexploitation of the rangelands which leads to an abundance of unpalatable grass species, spread of invasive and indigenous tree species (Ramoelo et al 2018). This is often the consequence of the lack of good rangeland management strategies, which threatens the sustainability and productivity of rangelands, thus livestock performance and farm profitability.

WHY DETERMINE RANGE CONDITION?

The purpose of conducting rangeland condition assessment is to understand the natural potential of the range, develop farm-specific grazing management plan for efficient and sustainable livestock production. The overarching key factor in rangeland management is to match the livestock numbers to the grazing capacity, and the period of rest to provide an interrupted grass development or recovery. It is also worth noting that the presence of palatable, unpalatable grass species, level of bush encroachment among others play a pivotal role in determining grazing capacity of a rangeland.

Picture 1 *Degraded rangeland with poor plant cover, bush encroachment and soil erosion (Picture taken by Hosia Pule)*

RANGELAND ASSESSMENT AND TECHNIQUES

There are a number of rangeland techniques that can be used to assess the range condition, in which the choice of a method can be made to suit the objective of the study, skills set and labour requirement, reliability and applicability of the method in the various agro-climatic conditions or a combination of a number of these factors. It must be noted that it is not everyone, especially farmers or landowners who may have the technical skills to use various rangeland assessment techniques. On the other hand, different techniques could provide different results that may have negative or positive impact on rangeland, animal performance or both.

An on-farm trial study was conducted at Towoomba Agricultural Research Station, Limpopo province to determine the most accurate and least-sensitive rangeland assessment condition without compromising rangeland production and animal performance. For the purpose of this popular article, we will show how the different techniques (step point, cover abundance and visual) resulted in different grazing capacities and thereby different stocking rates. This therefore raises a question that is yet to be answered.

HOW DATA WAS COLLECTED

We used three rangeland condition assessment (cover abundance, step point and visual) methods simultaneously in each of the three camps occupied by three Bonsmara herds (breeding cows, heifers and bulls). The methods were chosen based on their ability to determine rangeland condition score (%) and grazing capacity (ha/LSU). The three assessment methods were used simultaneously at each of the three sites in each of the camps before cattle were allowed to occupy the camps.

Surveyed sites were permanently marked using GPS coordinates as reference point for continuous rangeland condition monitoring. All the experimental animals were weighed before to determine total number of large stock units (LSU) in each herd

and their period of camp occupation, based on the rangeland assessment methods.

WHAT DID THE DATA TELL US?

A choice of the rangeland assessment technique can give different grazing capacities for the same areas, which could lead to either overestimation or underestimation of the duration your animals should spend in each camp. This in turn may have negative implications both on the veld condition as well as the animal performance. It is for this reason that it is critical to relate the different rangeland assessment methods with animal performance; for sustainable natural resource management and improved livestock production.

WHAT DOES THIS MEAN TO RANGE AND ANIMAL PERFORMANCE?

- Range condition assessment cannot be done in isolation from animal production
- Optimum livestock productivity is attained when it is aligned to rangeland productivity
- Range in good condition improve animal performance and farm economic returns

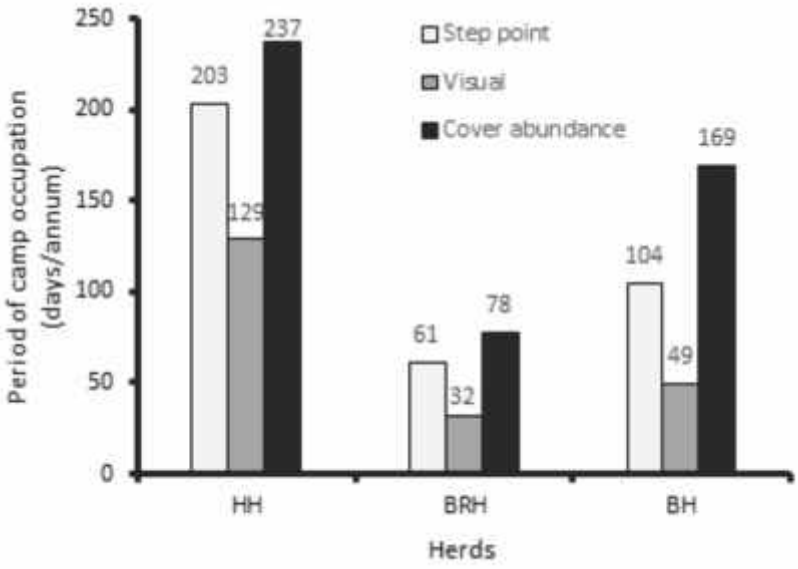

Figure 1 *Period of camp occupation from different range condition assessment (step point, visual and cover abundance) methods used in different Bonsmara (HH (heifers), BRH (breeding cows) and BH (bulls)) herds during the wet season*

TAKE HOME MESSAGE

- An understanding of the rangeland condition provide the farmers with an opportunity to adopt a suitable veld assessment method for their farm, and develop grazing management plans suitable for their specific conditions. This is vital for efficient and sustainable livestock production.

Picture 2 *River-line contrast showing bush encroachment on the right side of the river- form of rangeland degradation (Picture taken by Maree HC)*

- Different rangeland condition assessment methods has the potential to recommend varying grazing capacities, period of occupation and stocking rate, which may have impact on the rangeland and livestock.
- In cases where the condition of the rangeland is good but the animal performance is poor, one needs to re-evaluate their management strategy.
- Rangeland and livestock management require collaborative efforts from farmers, extension officers, rangeland and animal scientists.

Eerste GrowSafe Tegnologie

in KwaZulu Natal

Johan Binedell & Jurgen Hendriks - ARC-Animal Production, Irene - BinedellJ@arc.agric.za

Die akkurate meet van voerverbruik in die vleisbeesbedryf is van groot belang indien voerdoeltreffendheid en dus winsgewendheid verbeter wil word. Daar is egter relatiewe hoë koste daaraan verbonde om individuele inname te meet, maar dit is van groot belang aangesien voerkoste die grootste uitgawe is in die vleisbeesketting. Daar is dus n geleentheid vir die ontwikkeling van n platvorm om die nodige inligting so effektief moontlik te versamel wat gebruik word om vir voerdoeltreffendheid te selekteer, aangesien dit huidiglik op relatiewe klein skaal plaasvind. “GrowSafe” is van die wêreld leiers op die meting van voerdoeltreffendheid wat in verskeie eienskappe uitgedruk kan word waarvan voeromset vermoë (VOV) en netto voerinname (NFI) die bekendste is. GrowSafe-ingenieurs, rekenaar- en dier wetenskaplikes het 'n intelligente individuele meet-, moniterings- en bestuur platform ontwikkel vir diere, wat data van verskeie bio-elementêre en omgewing sensors verkry, ontleed, optimaliseer en aanbied in “realtime” met behulp van 'n standaard persoonlike rekenaar wat aan GrowSafe-bedieners gekoppel is.

GrowSafe se gevorderde data-verkrygings platform bevat geïntegreerde hardeware- en sagteware-analise wat produsente van data voorsien om beter besluite vir hul bedrywighede te neem. GrowSafe help vandag om doeltreffender, omgewings vriendeliker en gesonder diere in 22 Amerikaanse state, sewe Kanadese provinsies en op plase in Mexiko, Australië, Brasilië, Uruguay, Namibië, Suid-Afrika, Nieu-Seeland, Rusland en Europa te produseer.

Met die GrowSafe-stelsel word elke dier individueel geïdentifiseer d.m.v 'n RFID (radiofrekwensie-identifikasie toestelle) oorplaatjie; terwyl elke voerbak met 'n RFID-antenna toegerus is. Daar is 'n aantal voerbakke en beeste kan by enige voerbak vreet. Die voerbakke is almal op weegselle en sodra die dier vreet, word die nommer outomaties geskandeer en die voerbak geweeg. As die dier klaar gevreet het , word die voerbak met 'n resolusie van 10 gram geweeg. Dit meet dus die inname elke sekonde as die dier vreet. Die vermoë om die inname per dier voortdurend te monitor, sorg vir beter beheer van diergesondheid, want in die meeste gevalle waar gesondheidsprobleme voorkom, kan 'n afname in inname verwag word. Probleme met voer, byvoorbeeld waar diere weens smaak of reuk nie voer wil inneem nie, kan ook dadelik opgetel word. Diergedrag kan bestudeer word, soos die duur van voeding, hoeveelheid voer per voeding, aantal voedings per dag, diere verwantskappe, ens. Aangesien die individuele voeding van diere nie plaasvind nie, verminder dit die moontlikheid van menslike foute en menslike ver-ontwrigting. Voer kan op enige punt aangevul word, en die stelsel sal dit identifiseer en aanteken as sulks.

Die liggaams weging stelsel word by die drinkbakke geplaas en maak ook gebruik van weegselle waarop die dier staan wanneer hy drink. Dit werk op dieselfde manier as die voerinname-stelsel, en maak ook gebruik van die RFID-etikette om diere te identifiseer. Met die drink stelsel word 'n gedeeltelike liggaamsgewig geneem elke keer as die dier water drink. Dit word gedoen deur slegs die voorkwart te weeg en 'n formule te gebruik om die totale gewig te beraam. Die opsie is beskikbaar om waterverbruik aan te teken, soos met voerinname, is dit ook belangrik om te weet wanneer, hoeveel keer en hoeveel water individuele diere drink.

Diere sal water verskeie kere per dag drink, en dit sal 'n meer akkurate maatstaf van liggaamsgewig en groei gedurende die toets gee, aangesien gewig gedurende die toetsperiode meer gereeld aangeteken word. 'n Groot voordeel van die voortdurende weging van die diere is dat dit meer akkurate gewig data verskaf, vergeleke met die insidentele drukgang wegings. Met die neem van liggaamsgewigte op n weeklikse of twee weeklikse inkremente is die aanbevole toetslengte huidiglik minstens 70 dae. Die hoeveelheid voer en water wat n dier voor die weging inneem “gutfill” dra egter by tot variasie en moet die toetslengte dus minstens 70 dae wees om groei akkuraat te meet. GrowSafe maak dit egter moontlik om verskeie gewigte per dier per dag te neem wat van die variasie kan uitskakel, die moontlikheid bestaan dus om die toetslengte te verkort en dus ook onkostes te verlaag.

DIE STASIE

Die toetssentrum staan bekend as die “Livestock Alliance Efficiency Centre - Beef” (LABEC -Beef) en is geleë in die

Middellande van Natal naby Mooirivier. Die stasie word kommersieel bedryf en het ten doel om noue samewerking te bewerkstellig met die LNR, Stamboek, Breedplan, Ras genootskappe, boere en voedings instansies.

Die oogmerk met die toets stasie is om verskillende aspekte wat 'n impak op die waarde ketting het na te vors of te toets, byvoorbeeld:

- Genetika, met fokus op RFI (Residual Feed Intake), GDT, VOV as deel van prestasie toetsing.
- Optimale voeding op basis van ras, ouderdom, geslag ens.
- Voedings konsepte, byvoorbeeld alternatiewe op groei bevorderaars en antibiotika, ensieme, tipe grond-stowwe, optimale vlakke van energie en proteïne, vesel, ens.
- Uitslag persentasies, karkas graderings, vleis kwaliteit, ens.

As eerste vertrekpunt sal die aanvanklike fokus wees op die verbetering van intensiewe boerdery-ondernemings soos voerkrale op die plaas en hul lewering van vee, netwerke, en vestiging van 'n volledig geïntegreerde onafhanklike waardeketting deur uitgebreide waarde-ketting- vennootskappe en kleinhandel verhoudinge. Livestock Alliance (die vennoot vir gesamentlike ondernemings en die verskaffings ketting koördineerder) fokus daarop om 'n vennootskap van wederseidse voordele te vorm (Joint Venture - JV) met vee-belanghebbendes in hul hoedanigheid as private sake-eienaars.

'n Belangrike doelwit van Livestock Alliance sal wees om nie net 'n rol te speel in die geformaliseerde kommersiële bees - en skaap waardeketting nie, maar ook met landelike gemeenskappe en opkomende boere. Die doel van Livestock Alliance in die opkomende boerdery segment is om deur bemagtiging hierdie onderbenutte sektor toegang te gee tot 'n professionele waardeketting waarin volhoubaarheid en kommersieel lewensvatbaarheid ontwikkel sal word deur opleiding en die daar stel van praktiese kundigheid deur ondersteunings netwerke tussen kommersiële boere en die opkomende boere, dus om die opkomende boer toegang te gee tot die kompeterende kommersiële waarde ketting.

TOEKOMS

Livestock Alliance kan ook verdere rasverbeterings programme fasiliteer, waar benodig, in samewerking met die rasgenootskap en organisasies soos die Landbounavorsingsraad.

Genetiese variasie binne en tussen rasse benodig unieke voedings oplossings. Faktore soos residuele voerinname (RFI), voeromset Verhouding (VOV), groei, vleis kwaliteit (marmering), ens., kan weten-skaplik getoets word binne die Livestock Alliance-model. Hierdie inligting kan dan aan die ras-genootskappe en / of LNR verskaf word om die akkuraatheid van teelwaardes en seleksie-inligting te verbeter en om rasse vir spesifieke eienskappe te bevorder. Resultate en terugvoer van Livestock Alliance kan in die toekoms 'n bestuurs- en bemarkingsinstrument vir die rasgenoot-skappe word.

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Non-genetic Factors affecting Feedlot Performance of SA Brahman Bulls

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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 amounts 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 will become bigger, requiring more feed for gaining weight, growth and 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 however 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 following non-genetic factors affect the feedlot performance of the weather: the station where the bulls where tested (thus environment) and the weight of the bull when the test started. The purpose of this study was to determine the non-genetic factors that have an effect on the feedlot performance of SA Brahman bulls. Most of the meat consumed from the formal markets in SA, is produced from cattle in a feedlot system. 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 Brahman bulls tested during 1982 – 2017 were included. Bulls were grouped according to the month within which their adaptation period of 28 days started. The reason why the bulls were grouped according to the start of adaptation is that at the start of adaptation bulls were moved from the farm to a new environment, and at the start of test, bulls have already adapted to the new environment. These months were grouped according to season. The majority of the animals (544) started the adaptation period from May to June, with fewer bulls (78) which started their adaptation between September and October. The tested bulls, originating from 81 herds, were distributed all over South Africa. Data of 1449 Brahman bulls was analysed. The data were obtained from the national database - Integrated Registration and Genetic Information System, also known as the INTERGIS. 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 the bulls (within a breed) tested within the previous 10-year period. This is to compensate for the environmental effect on performance. Since in the end of the test the results are affected by the environment, by comparing animals to the 10-year average the effect of the environment are eliminated from the results. In addition, also the management and feed ration are standardized at all the central ARC testing centres.

Results indicated that environmental factors had an effect on the performance of the bulls in the feedlot. Listed below in Table 1 are the factors that have an effect on the feedlot performance of the bulls. Traits marked with "*" had a significant effect on the performance of bulls whereas traits marked with "NS" did not have a significant effect on the performance of bulls.

In ***Table 1*** below shows which variables had an effect on the traits measured.

TABLE 1 Significance level for each independent variable affecting each measured trait

Variables	ADG	FCR
b_year	*	*
b_season	NS	NS
adap_year	NS	*
adap_season	*	NS
adap_age	NS	NS
Station	NS	*
Bweight	NS	*
Herd	*	*

b_year = birth year, b_season = birth season, adap_year = year adaptation started, adap_age = age the bull was when adaptation started, station = station where bull was tested, bweight = weight at start of test, ADG = average daily gain, FCR = feed conversion ratio, herd = herd where bull tested originated from, **NS = Not significant, * = significant (P < 0.05).**

In ***Table 2***, the number of animal records and the averages are illustrated. The average FCR in SA is 4.5 kg–7.5 kg, the average in table 2 for FCR are within this range.

TABLE 2 Descriptive statistics for each evaluated trait evaluated

Variables	Amount	Average
ADG	1449	1,202
FCR	1449	7,25
BWEIGHT	1449	274
EWEIGHT	1449	410

ADG = average daily gain, FCR = feed conversion ratio, bweight = weight at start of test, eweight = weight at end of test

Summary

The following non-genetic factors had an effect on the feedlot performance of SA Brahman bulls: The birth year, which may have an effect due to lower rainfall and difference in ambient temperature. This may negatively affect milk production resulting in possible lighter weaner calves. During seasons with low rainfall, there will be less feed available and less feed consumed by the cow that will negatively affect her milk production and it will impact on the growth of the calf. The particular test station, which indicate the environment and weather conditions, has a significant effect on the performance of the bull in particular on FCR, and the performance of bulls therefore are compared to a 10-year rolling average to compensate for these environmental effects. It should be noted that the 10-year rolling average per station is not comparable across stations, in particular due to the environment that differs among the stations. The herd of origin is the herd where in the bull was born, which indicate that some breeders select more intensively for growth and feed efficiency. Weight at the beginning of test had a significant effect on FCR. Lighter bulls grow better than heavier bulls at start of test. Compensatory growth are however experienced when bulls arriving for test are below the required body weight. This is in contrast with bulls arriving heavier at the start of test. To address this challenge, minimum and maximum weights are prescribed per breed at arrival date.

The study further emphasizes the importance of breeding objectives for the feedlot market to ensure efficient and profitable beef production. The SA Braham Cattle Breeders` society currently supply breeders with a breeding value for feed efficiency and the more tests are done the more accurate these values will become. This breeding value will become an important selection tool, and by using these, breeders can select for animals that produce more from less. Animals that are more efficient will in turn also lead to a reduction in greenhouse gasses, which is central to assist in the mitigation of global warming.

The global trend is however to focus more on RFI (Residual Feed Intake) since it is phenotypically independent of growth and body weight. The trait is also moderately heritable (18-49%) which enable us to improve feed efficiency by selecting for efficient animals.

Acknowledge

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I would like to thank ARC: AP for affording me the opportunity to complete my Bachelor of Agriculture Honours majoring in animal production management.

I would like to thank the Brahman Cattle Breeders` society of South Africa for releasing the data for this study.

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Management Acitivities

in Beef Cattle Farming: Dehorning of Calves

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Horns and their growth

Horns are the pairs of hard, bonelike, permanent growths projecting from the heads of cattle. They grow from a unique area of skin cells at the base of the horn. At about two months of age, horns become attached to the frontal bone of the skull. A sinus lies within the skull beneath the horn bud. As the horn grows and attaches to the skull, this frontal sinus joins into the adjacent portion of the horn.

Horned cattle have horns because they have not been dehorned or they are not polled. Some breeds are naturally (genetically) hornless because they do not grow horns. Dehorning of horned cattle is the process of removal of their horns or the process of preventing their growth. A polled animal is one that grew no horns or one that was dehorned. Disbudding by chemical or hot iron destroys the horn-producing cells of the horn bud. Surgical disbudding removes the horn bud and the horn-producing cells of the horn bud. Dehorning removes the horn and horn-producing tissue after horns have formed from the bud.

Reasons for dehorning among others are to reduce the risk of injury and bruising to herd mates, prevent financial losses from trimming damaged carcasses caused by horned feedlot cattle during transport to slaughter. Dehorned cattle require less space at the feed bunk and in transit, decrease risk of injury to farm workers, horses and dogs. Decrease risk of death, illness and setback by dehorning young calves versus older calves. Gain a price advantage by offering hornless cattle at auction. Produce docile cattle that are easier to handle and decrease aggressiveness at the feed bunk. Enhance on-farm safety for animals, producers and employees and facilitate easier use of handling facilities.

Owners may choose to manage their cattle with or without horns. For beef cattle, the selection will depend on the available handling facilities, the producer's ability, the awareness of dehorning effects, and the market available for the calves. Owners with guaranteed buyers willing to purchase calves with horns and testicles in place) at the same price as processed calves that are castrated and dehorned), might be advised to avoid these procedures. However, this buyer is very rare. Most purchasers of horned calves are well aware of the risks associated with processing older calves and routinely bid less at auction. Preconditioned (castrated, dehorned, vaccinated, bunk-adjusted) calves may bring a premium price. Generally, horned cattle are discounted at auction.

Breeding horns off cattle

Dehorning requires labour and imparts risks to the animal and the operator. In addition, producers and consumers have concerns about animal welfare implications associated with dehorning techniques. Breeding polled cattle is a non-invasive way to dehorn the cattle population. Polled inheritance is very complex. Nonetheless, the beef industry is making steady progress towards dehorning through genetics. Producers may resist breeding strategies to dehorn because of a belief that the polled gene is associated with impaired productivity. To date, research studies show no difference for several important traits between horned and polled cattle. Within the beef breeds, producers have access to polled genetics.

The use of a naturally polled bull from naturally polled ancestors over horned breeding cows should result in the birth of polled calves. Continuous use of polled bulls over these female offspring should ensure that all calves continue to be polled. This method has obvious advantages where polled breeds are available with production characteristics similar to those of horned cattle.

Dehorning age

Dehorning at a young age minimizes hazards to the calf, the cow-calf producer, and the breeder. Hazards for calves and owners include sickness or death following dehorning of older calves. Decreased live weight gains in the weeks following dehorning of older calves and loss of productivity. Many producers choose to dehorn new-born calves because techniques are easier for the operator. Dehorning is less stressful on new-born calves. Concerns for animal welfare should be considered, although there is no evidence that pain differs between young and older calves,

there is less risk with dehorning of young (less than eight weeks) calves. The cow/calf producer's decision to dehorn and the timing (age) will be influenced by his or her facility, available labour, expertise with the techniques, awareness of the impact of the procedure on calf health and productivity, and market for the calves. The feedlot purchaser is able to selectively purchase horned or dehorned (polled) cattle with price as well as some of the above factors influencing the decision. It is each owner's responsibility to ensure humane and safe completion of the dehorning procedure on the calves entrusted in their care.

Timing of operations

Normal management procedures provide a convenient time for dehorning. At one day of age, insertion of an identification ear tag and debudding could be performed at the same time. Some beef producers prefer to batch the calves up weekly during calving season and dehorn many at one time. Others will catch all calves prior to turning them to grass with their mothers. This may be when calves are six to eight weeks of age. Dehorning at an early age (less than eight weeks) reduces the risk of serious infection because the horn bud is removed without opening the sinus (cavity) into the skull. When surgically dehorning older calves, the sinus is opened. Avoid the summer and autumn periods when dehorning calves. The risk of infection and fly strike is very high. Dehorn in early spring and winter is recommended. On each farm, the timing of dehorning will be based on the management system in operation. Dehorning at a young age should suit most management systems.

Economic significance

At packing plants, trim from bruised carcasses of animals in groups with horned cattle is twice that of comparable groups of hornless cattle.

Welfare significance

Livestock owners and veterinarians recognize that some people consider dehorning offensive. Nonetheless, dehorned cattle create a safer workplace for herd mates, handlers and workers - a benefit that outweighs the short period of discomfort at dehorning time. All methods of physical dehorning cause pain and side effects. Young calves recover quicker and have fewer complications than older calves. There is no evidence to show young calves experience less pain than older calves. Use of polled bulls is a welfare-friendly alternative to dehorning. South African beef producers are increasing their use of polled bulls. Control of bleeding is essential when dehorning older calves.

Technique for dehorning

Restrain the calf with a halter tied to a ring, a post, or the head gate of the chute. Disinfect the site with an alcohol swab.

Choice of dehorning methods

The choices of dehorning techniques range from genetic to surgical. The risks to the calf and the operator vary with each technique. Many producers choose to dehorn new-born calves because the techniques are easier for the operator, less stressful on the calves and they demonstrate concern for the animals' welfare.

Polled bulls

Horned or polled cows mated to a naturally polled bull will give birth to polled calves. However, some non-naturally polled bulls carry the gene for horns and will not breed true for the polled trait.

Chemical dehorning

Caustic chemicals will prevent the growth of horns when properly applied to the horn buds of new-born (less than one to three weeks of age) calves. The chemical destroys the horn-producing cells around the horn bud. The chemicals are available as sticks or pastes (***Figure 1***). To protect yourself, wear gloves when applying the chemicals. To protect the calf, avoid application near its eyes. Do not use caustics in rainy weather.

Figure 1 *Dehorning paste is a caustic chemical applied to horn buds to destroy horn-producing cells*

Figure 2 *The circle at the base of the ear shows the location of the horn bud in a young calf. The horn bud is readily visible after pushing back the hair. Reposition the hair over the paste and bud after applying the dehorning paste*

Hot iron dehorning

Hot iron dehorners are available in versions heated by a furnace or fire. The head of the iron is a hollow circle and it fits over the horn bud. Proper application of the hot iron will destroy the horn-producing skin at the base of the horn. This technique works well for calves up to 12 weeks old. There are several sizes of dehorning irons. The proper size is one where the burner makes a complete ring around the base of the horn

Figure 3 *An electric hot-iron dehorner will destroy the horn-producing skin at the base of the horn bud*

Scoop, Gouge or Barnes – Type dehorner

Scoop dehorners are used for calves ranging in age from two to four months with horns up to four inches long (Figure 4). Some operators claim better dehorning with a rectangular-shaped scoop because it removes an even ring of skin around and with the horn bud. When used properly, it does not go too deep, but the dehorner can open the frontal sinus when used at the top end of the age and horn-size range. The blades must be kept sharp for best results.

Figure 4 *A Barnes-type dehorner scoops the horn and horn-producing skin surrounding the horn base. Unreliable when done incorrectly, leads to scars and requires expertise. It also requires control of bleeding - pulling arteries or cautery.*

Aftercare

Dehorning and debudding are surgical procedures. Calves require observation and aftercare following the surgery. Observe closely for bleeding for 30-60 minutes after dehorning. When bleeding is present, cauterize with a hot iron to stop the bleeding. Wounds usually heal well with no treatment. A fly repellent and a wound dressing are often recommended. For 10-14 days after dehorning, look for signs of infection and treat as needed. Get professional help for calves showing severe pain or infection.

Disinfection of equipment

Diseases can be spread from animal to animal on dehorning equipment contaminated with blood. Enzootic bovine leucosis virus and the wart virus are two examples. It is essential to disinfect the tube and Barnes-type dehorners after each calf is dehorned.

Consult with your Veterinarian

This document describes procedures and techniques for dehorning young calves. Advantages and disadvantages exist for each method. Producers should consult with their local veterinarian and or animal health technician for advice prior to attempting unfamiliar procedures. For purchase of different dehorning tools, the producers can visit their local cooperatives shops for prices.

How do Environmental Conditions affect Meat Colour/Tenderness:

A Look at how physiological Stress/Heat Stress affect Meat Colour and Tenderness from 5 SA Breeds

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Meat colour is the most important visual quality affecting consumer decisions to purchase meat. Often an attractive, bright colour is a consideration for the purchase. Meat colour is influenced by myoglobin, a protein that is responsible for the majority of meat's red colour. Myoglobin doesn't circulate in the blood but is fixed in the tissue cells and is purplish in colour. When it combines with oxygen, it becomes oxymyoglobin and produces a bright red colour. The colour of beef can vary from deep purplish red to brown subject to the amount and chemical state of myoglobin and by the meat structure, which is linked to its ultimate pH (Final pH at 24 hrs after slaughter). Although perceived negatively, dark meat could also be attributed to specie and breed characteristics. For instance, it was observed that Nguni produced darker meat than other beef breeds. On the other hand, Brahman meat may be lighter and differ structurally from other breeds.

Meat tenderness is a quality of meat evaluating how easily it is chewed or cut. Tenderness is a very important quality, as tender meat is softer, easier to chew, and generally more palatable than harder meat. Tenderness is perhaps the most important of all factors influencing meat eating quality, with others being flavour and juiciness.

The effect of breed on meat colour and juiciness

This study compared the colour and eating quality (Tenderness and juiciness) between 5 SA beef breeds. The breeds included *Bos indicus* (Brahman), Sanga type (Nguni), British *Bos taurus* (Angus), European *Bos taurus* (Charolais) and the composite Bonsmara. The animals were slaughtered at the A-age class (zero permanent incisors) and fat class 2 to 3. Directly after dressing, the animals were split and placed in a room at 10°C for 6 hrs after which they were placed in the chillers at ± 4°C. Steaks were sampled at the loin and aged for up to 3, 9, 14 and 20 days at ± 4 °C. The aged steaks were analysed for colour using a 10 member trained panel, for tenderness using Warner Bratzler shear force and for juiciness. The research study was conducted in two Phases; the second Phase was treated exactly as the first Phase.

Results of the study showed that for Phase 1, Nguni produced the darkest steaks, followed by Angus and Bonsmara. Charolais produced the lightest steaks. Meat colour from Angus, Bonsmara, Brahman and Nguni was comparable for both Phase 1 and Phase 2 for all breeds, except for that of Charolais (***Figure 1***). Charolais produced the lightest meat during Phase 1 which was rated as light pink, and meat from this breed was darker during Phase 2, rated as pink. In addition, the Phase 2 pH at 24 hours for Charolais and Nguni was high compared t*Figure 2*). During phase 2 of the study, Nguni and Charolaise breeds showed to have higher ultimate pH, lower glycogen and other energy components. As an indigenous breed, Nguni is adapted to sub-tropical climate and harsh conditions. This could explain its lower energy needs, lower glycogen and other energy components, and explain the natural tendency to produce darker meat. On the other hand, the higher ultimate pH, lower energy components and darker meat of Charolais is not normal for this breed, and could be caused by heat stress pre-slaughter due to harsh conditions experienced during Phase 2. Both Phase 1 and Phase 2 slaughters were during spring (October-November) and the maximum SA temperatures this season is around 27°C, but during Phase 2, there were several days where environ-mental temperatures reached a maximum of 31°C. This is believed to have had an impact on meat colour for the Charolais. These hash environmental conditions during Phase 2 also affected meat juiciness and tenderness. Juiciness, as measured by drip loss was found to be higher for the Brahman breed (***Figure 3***), this breed has also shown to have the lowest pH (***Figure 2***) during Phase 2. Brahman could have also experienced some level of stress due to the harsh environmental conditions, this breed also showed a lighter meat colour compared to Phase 1.

The effect of breed on meat tenderness

During Phase 2, Angus and Nguni produced the most tender meat; Bonsmara produced the least tender meat (***Figure 4***). Whereas during Phase 1, Brahman, Angus and Nguni produced the least tender meat. Bonsmara and Charolais produced the most tender meat. It can therefore be concluded that, depending on certain uncontrollable conditions prior to slaughter (such as environmental climate conditions in the case of this study) similar beef cattle breeds can produce meat with variable tenderness. On the other hand, extended ageing of up to at least 20 days *post mortem* eliminates most of the meat tenderness differences between breeds, and then compares favourably.

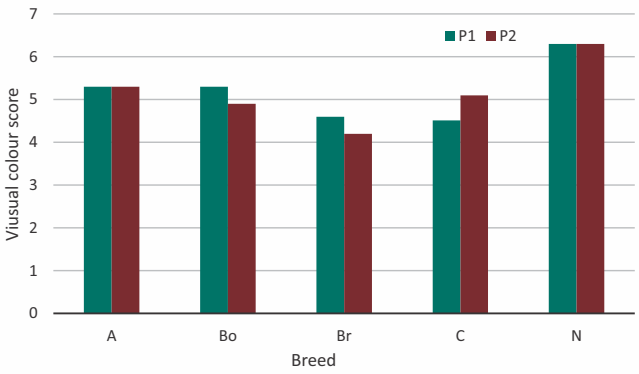

Figure 1 *Effect of breed on visual colour as assessed by a 10 member trained panel for steaks from beef loins of the 5 SA beef breeds. A- Angus, Bo- Bonsmara, Br- Brahman, C- Charolais and N- Nguni.*

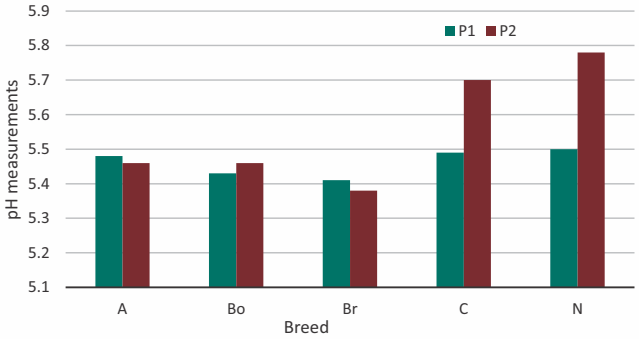

Figure 2 *The final pH at 24 hours after slaughter (pHu) for both Phase 1 (P1) and Phase 2 (P2). A- Angus, Bo- Bonsmara, Br- Brahman, C- Charolais and N- Nguni.*

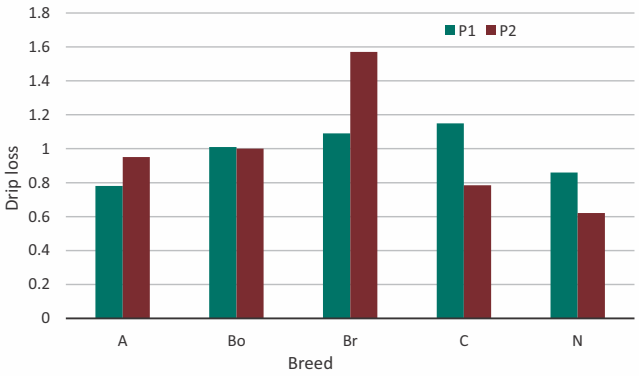

Figure 3 *Effect of breed on drip loss*

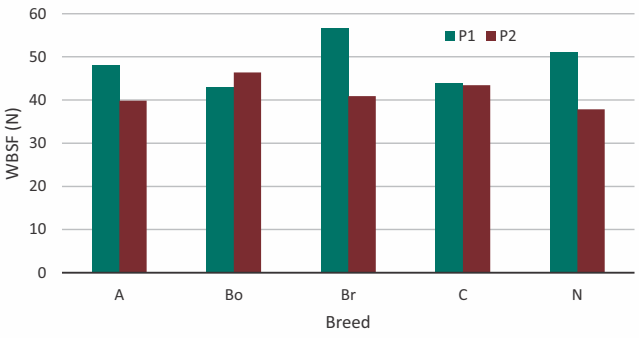

Figure 4 *Effect of breed on meat tenderness)*

‘n Eerste vir Vryburg

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6 Braunvieh bulle van 3 telers in 1 toets

Gedurende 2019 was daar 3 telers wat saam 6 bulle in 'n Fase C toets ingeskryf het. Dit was `n eerste vir Vryburg.

By begin van aanpassing moet die bulle tussen 151–250 dae oud wees. Die bulle se ouderdomme het gewissel tussen 202–244 dae en die toets periode was vanaf 18 Julie 2019–07 November 2019.

Die bulle het `n gemiddelde GDT (Gemiddelde Daaglikse Toename) van 1.937kg/dag en gemiddelde VOV (Voeromsetverhouding) van 5.68 gehad. Ten tye wat die toets afgesluit het, was die 10 jaar “rollende” gemiddeld vir GDT 1.763kg/dag en VOV 6.15 vir Armoedsvlakte toetssentrum.

Die keuring is deur `n senior interras beoordeelaar behartig. Op grond van die bulle se prestasie het die bulle gesamentlik 2 Goud, 2 Silwer en 1 Brons meriete ontvang. Die bulle se skrotum omvang het gewissel vanaf 340mm–365mm.

De Klerk Braunvieh se bul DEK18010 – Rocket was gekies as die 2020 LNR Nasionale Spesiale Prestasietoetsklas toekening vir die Braunvieh ras. Die bul wen ook die Farmers` Weekly toekening.

Erik de Klerk

Beef Cattle Record Keeping:

A Guide for new Entrants

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One of the greatest challenges for livestock producers is keeping all of their records up to date. There are different types of records that can be kept for a beef operation and there are a variety of options or methods for tracking that information.

Care should be taken when selecting a record keeping option – it should be easy to use, easily accessible and it should provide the necessary information for the operation to remain sustainable and profitable.

An efficient management system in place means you are able to manage your future more efficiently based on the availability of records and information. Making well-informed decisions are dependent on the availability of an applicable record keeping system.

Importance of record keeping on a livestock farm

Record keeping is a necessary element of good livestock business management. With no written records, farmers have to depend on their memory while making decisions regarding their farm practices. Nevertheless, memories can become unreliable after a few days, months or years. Thus, recording of the performances of the animals can be done easily if animals have some form of identification. Thus, both animal recording and identification are always required. If we know what is happening on the beef cattle farm we need to maintain some useful farm records. Farm records are like the progress report cards that students get at school. If farmers have farm records, they can tell how well they are managing their farm in comparison to other farmers. Farmers can also see the strengths and weaknesses in their farm operations by analyzing their records. It is also important to have accurate facts and figures when borrowing money, seeking government funding and submitting tax returns.

To succeed in beef cattle farming, the following factors and sources of information need to be recognised and understood in aid of creating a management information system (records).

Climate and its direct effect on the animal

Restricted breeding seasons are chosen based on the climatic conditions of areas. It also determines feed supply of that region, which need to be matched with different production stages of your herd. Cows should calf when there is enough grazing of good quality, for their own maintenance and milk production.

Health management

A good health maintenance program should be in place to ensure survival and performance of livestock. Disease prevention programs keep herds healthy and productive. Animals with good disease resistance reduce the cost of production significantly, as less money is spent on medication.

Nutrition

Fluctuating availability of feeds and specific nutrients demand better understanding of nutrition and supplementary feeding by farmers. Beef cattle convert grass into proteins (meat) of high quality. It is important for them to get a balanced ration to convert maximally.

Reproduction and Breeding

Fertility is the most important trait in the profitability of beef cattle farming. The number of calves born in a herd directly affect the income and the expenses of the beef enterprise. Animals should reproduce offspring with better genetics that will thrive on the farm and particular area. Since growth is one of the primary traits of economic importance, management and selection should ensure that progenies grow faster on the same farm under the same management

Economics

Lastly, production economics and markets should be the underlying driving factor in the management of beef cattle farming. The market should dictate the manage-ment style of the herd.

To monitor all these aspects successfully farmers need to keep records. Records provide the ability to monitor and control the production process. They enhance efficiency and sustainability of resource use. Records also help identify opportunities to improve management in beef cattle farming. Records are also vital for providing a measure of the sustainability of beef production as a business in your particular area. However, the record system must be cost effective, easy and simple, and the record keeper/farmer must ask himself" What do I need to know about my farm?" In addition, it must be stressed that the record system must be used. No system will work if it is not being used.

Types of records to be maintained in beef farming

Calving register

This register maintains the records of calving that takes place on the farm. It maintains dam and sire number of the calf, calf number, sex and its date of birth and any other remarks like type of calving (normal/abnormal) and birth weight.

Individual Animal Identification

It is a given fact that seedstock producers already do this for genetic evaluation, but as mentioned, individual animal ID is becoming an imperative practice in beef industry in the country for biosecurity

Tools for recording
Ear tags, Pen, Book / Sheets
Calendar, Scale, Measuring tape

reasons. From a biosecurity standpoint, this is important even if there is no national identification database because individual animal identification ensures traceability, which is essential when it comes to disease management and compliance while also proving ownership of an animal.

Growth record of young stock

This record maintains the weight of the young stocks at different intervals or production stages.

Livestock register

This register records the number of the animals at the farm along with their identification number, date of birth, sire number, dam number, calf and its gender, date of calving, date of purchase, date of sale/auction/death.

Herd health register

This register maintains the record of the diseased animals along with history, symptoms, diagnosed disease, treatment given and name of the veterinarian who treated the animal

Cattle breeding register

This register maintains the details of breeding practices on the farm such as cow number, date of calving, date the cow was on heat and serviced along with the bull number, date of successful service, pregnancy diagnosis records, expected date of calving, actual date of calving, calf number etc.

Animal History sheet

This sheet records the animal number, breed, date of birth, sire and dam number, number of lactation, date of disposal/death, cause of disposal etc.

Advantages of record keeping at the farm

- Records provides a basis for evaluation of animals from past records, hence, it help in selection and culling of animals.
- Helps in preparing pedigree and history records of animals.
- Helps in assessing the past records and performance and enables a farmer to design better breeding plans, to check inbreeding, select superior parents and also to help the farmer to design better replacement and culling practices.
- Helps in progeny testing of bulls.
- Helps in analysing feeding cost and benefits from animal product outputs, which is vital to formulate economic feeding strategies for optimal production.

Measurements of inputs

Feed supplements, medical treatments and rain dates are cheap and easy to record. With this information, inputs required to support production under any production system can be determined. Time and labour requirements can also be determined.

Measurements of output/adaptation

In beef production, biological processes that encourages higher returns are those that involve measures of growth rate, body size, reproductive rate and survival of offspring. Weights at different ages provide information needed to quantify the individual animal growth rate and body size. Body weight at a specific age also provides additional indicators; e.g.:

- Birth- calving difficulty
- Weaning- mothering ability
- One year-maturity weight
- 18 months-adaptation

Number of calves weaned and weights when marketed are direct measures of productivity of the herd. Inbreeding affects reproductive rate and progeny fitness in beef cattle, thus it is considered not desirable. Pedigree records shall provide information to avoid inbreeding completely. Proper records are thus essential to detect and avoid reproductive problems timeously.

Measurements of product quality

In stud breeding, farmers will always pay more for proven good genetic material. The breeding value of the animal for any given trait is derived from its records and those of its relatives. An estimated breeding value of the animal reflects the genetic merit of the animal for a particular trait, thus reflecting whether the animal is below or above average in terms of a trait of economic importance. Recent consumer trends in South Africa and globally are refocusing attention to beef quality. Lean meat and good marbling is becoming more appealing to local consumers, as has been the trend in many developed countries. Thus, records in the future should also look at carcass quality.

Summary

There are many different methods for keeping records on a livestock operation. The key is to develop a method that is both easy to use as well as easily accessible and effective. In beef production, it is very easy to keep records, as a farmer do not have to do it every day. The ARC with its Livestock Improvement Schemes helps emerging beef cattle farmers adopt record keeping and to convert the records into information that can be interpreted and applied to enhance the farming enterprise.

Centralised Growth Test Schedules at ARC Test Centres for 2021

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

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

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

Bull calves will be tested under standardised conditions for a period of 84 days following an adaptation period of 28 days. Bull calves struggling to adapt during the adaptation period will be withdrawn and the owner will be notified to collect the bull from the testing centre.

The same standard diet will be fed to all bulls tested at a testing centre. If necessary, changes will be implemented at the beginning of a new test. A uniform diet will be compiled for all testing centres using the best available feedstuffs. Bull calves will be fed a standardized complete growth diet comprising at least 20 percent roughage. Bull calves will be individually fed *ad lib* during the 84-day test period. On arrival bull calves will be treated against internal and external parasites and, if necessary, skin diseases. Bull calves will be spray-dipped regularly. Bull calves will be fitted with neck belts to which their transponder and pen number will be attached. This number will be the official number of the bull during the test and will be linked to the interim reports and final reports of the test.

CEDARA BULL TESTING CENTRE BULTOETSSENTRUM

TEST DATES TOETSDATUMS 2021

Test No Toets Nr	Arrival Aankoms	Adaptation Aanpassing	Test period Toets periode	Departure Vertrek	Born after Gebore na
1	30-12-20	06-01-21	03-02-21 / 28-04-21	05-05-21	01-05-20
2	27-01-21	03-02-21	03-03-21 / 26-05-21	02-06-21	29-05-20
3	24-02-21	03-03-21	31-03-21 / 23-06-21	30-06-21	26-06-20
4	31-03-21	07-04-21	05-05-21 / 28-07-21	04-08-21	31-07-20
5	28-04-21	05-05-21	02-06-21 / 25-08-21	01-09-21	28-08-20
6	26-05-21	02-06-21	30-06-21 / 22-09-21	29-09-21	25-09-20
7	30-06-21	07-07-21	04-08-21 / 27-10-21	03-11-21	30-10-20
8	28-07-21	04-08-21	01-09-21 / 24-11-21	01-12-21	27-11-20
9	25-08-21	01-09-21	29-09-21 / 22-12-21	29-12-21	25-12-20
10	29-09-21	06-10-21	03-11-21 / 26-01-22	02-02-22	29-01-21
11	27-10-21	03-11-21	01-12-21 / 23-02-22	02-03-22	26-02-21
12	24-11-21	01-12-21	29-12-21 / 23-03-22	30-03-22	26-03-21

For enquiries relating to the Cedara bull testing centre please contact
Johan Binedell at Tel: +27 (0)33 330 5668, Cell: +27 (0)83 799 6600 - E-mail binedellj@arc.agric.za

ELSENBURG BULL TESTING CENTRE BULTOETSSENTRUM

TEST DATES TOETSDATUMS 2021

Test No Toets Nr	Arrival Aankoms	Adaptation Aanpassing	Test period Toets periode	Departure Vertrek	Born after Gebore na
1	11-01-21	14-01-21	11-02-21 / 06-05-21	07-05-21	09-05-20
2	15-02-21	18-02-21	18-03-21 / 10-06-21	11-06-21	13-06-20
3	15-03-21	18-03-21	15-04-21 / 08-07-21	09-07-21	11-07-20
4	10-05-21	13-05-21	10-06-21 / 02-09-21	03-09-21	05-09-20
5	26-07-21	29-07-21	26-08-21 / 18-11-21	19-11-21	21-11-20
6	13-09-21	16-09-21	14-10-21 / 06-01-22	07-01-22	09-01-21
7	27-09-21	30-09-21	28-10-21 / 20-01-22	21-01-22	23-01-21
8	18-10-21	21-10-21	18-11-21 / 10-02-22	11-02-22	13-02-21
9	09-11-21	12-11-21	10-12-21 / 04-03-22	05-03-22	07-03-21

For enquiries relating to the Elsenburg bull testing centre please contact
Tinus Viljoen at Tel: +27 (0)21 809 3327, Cell: +27 (0)72 470 8386 - E-mail: viljoent@arc.agric.za

GLEN BULL BULL TESTING CENTRE BULTOETSSENTRUM

TEST DATES TOETSDATUMS 2021

Test No Toets Nr	Arrival Aankoms	Adaptation Aanpassing	Test period Toets periode	Departure Vertrek	Born after Gebore na
1	29-10-20	05-11-20	03-12-20 / 25-02-21	04-03-21	29-02-20
2	26-11-20	03-12-20	31-12-20 / 25-03-21	01-04-21	28-03-20
3	24-12-20	31-12-20	28-01-21 / 22-04-21	29-04-21	25-04-20
4	21-01-21	28-01-21	25-02-21 / 20-05-21	27-05-21	23-05-20
5	18-02-21	25-02-21	25-03-21 / 17-06-21	24-06-21	20-06-20
6	18-03-21	25-03-21	22-04-21 / 15-07-21	22-07-21	18-07-20
7	15-04-21	22-04-21	20-05-21 / 12-08-21	19-08-21	15-08-20
8	13-05-21	20-05-21	17-06-21 / 09-09-21	16-09-21	12-09-20
9	10-06-21	17-06-21	15-07-21 / 07-10-21	14-10-21	10-10-20
10	08-07-21	15-07-21	15-08-21 / 04-11-21	11-11-21	07-11-20
11	05-08-21	12-08-21	09-09-21 / 02-12-21	09-12-21	05-12-20
12	02-09-21	09-09-21	07-10-21 / 30-12-21	06-01-22	02-01-21

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

IRENE BULL TESTING CENTRE BULTOETSSENTRUM

TEST DATES TOETSDATUMS 2021

Test No Toets Nr	Arrival Aankoms	Adaptation Aanpassing	Test period Toets periode	Departure Vertrek	Born after Gebore na
1	18-11-20	19-11-20	17-12-20 / 11-03-21	18-03-21	15-03-20
2	04-01-21	05-01-21	02-02-21 / 27-04-21	04-05-21	01-05-20
3	27-01-21	28-01-21	25-02-21 / 20-05-21	27-05-21	24-05-20
4	22-02-21	23-02-21	23-03-21 / 15-06-21	22-06-21	19-06-20
5	24-03-21	25-03-21	22-04-21 / 15-07-21	22-07-21	19-07-20
6	26-04-21	27-04-21	25-05-21 / 17-08-21	24-08-21	21-08-20
7	02-06-21	03-06-21	01-07-21 / 23-09-21	30-09-21	27-09-20
8	05-07-21	06-07-21	03-08-21 / 26-10-21	02-11-21	30-10-20
9	28-07-21	29-07-21	26-08-21 / 18-11-21	25-11-21	22-11-20
10	30-08-21	31-08-21	28-09-21 / 21-12-21	04-01-22	25-12-20
11	06-10-21	07-10-21	04-11-21 / 27-01-22	03-02-22	31-01-21
12	25-10-21	26-10-21	23-11-21 / 15-02-22	22-02-22	19-02-21

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VRYBURG BULL TESTING CENTRE BULTOETSSENTRUM

TEST DATES TOETSDATUMS 2021

Test No Toets Nr	Arrival Aankoms	Adaptation Aanpassing	Test period Toets periode	Departure Vertrek	Born after Gebore na
1	04-01-21	07-01-21	04-02-21 / 29-04-21	03-05-21	02-05-20
2	01-02-21	04-02-21	04-03-21 / 27-05-21	31-05-21	30-05-20
3	01-03-21	04-03-21	01-04-21 / 24-06-21	28-06-21	27-06-20
4	29-03-21	01-04-21	29-04-21 / 22-07-21	26-07-21	25-07-20
5	21-04-21	29-04-21	27-05-21 / 19-08-21	23-08-21	22-08-20
6	24-05-21	27-05-21	24-06-21 / 16-09-21	20-09-21	19-09-20
7	21-06-21	24-06-21	22-07-21 / 14-10-21	18-10-21	17-10-20
8	19-07-21	22-07-21	19-08-21 / 11-11-21	15-11-21	14-11-20
9	16-08-21	19-08-21	16-09-21 / 09-12-21	13-12-21	12-12-20
10	13-09-21	16-09-21	14-10-21 / 06-01-22	10-01-22	09-01-21
11	11-10-21	14-10-21	11-11-21 / 03-02-22	07-02-22	06-02-21
12	08-11-21	11-11-21	09-12-21 / 03-03-22	07-03-22	06-03-21

For enquiries relating to the Vryburg bull testing centre please contact
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WINTER CASTLES BULL TESTING CENTRE BULTOETSSENTRUM

TEST DATES TOETSDATUMS 2021

Test No Toets Nr	Arrival Aankoms	Adaptation Aanpassing	Test period Toets periode	Departure Vertrek	Born after Gebore na
1	18-01-21	20-01-21	17-02-21 / 12-05-21	03-05-21	15-05-20
2	15-02-21	17-02-21	17-03-21 / 09-06/21	10-06-21	12-06-20
3	15-03-21	17-03-21	14-04-21 / 07-07-21	08-07-21	10-07-20
4	12-04-21	14-04-21	12-05-21 / 04-08-21	05-08-21	07-08-20
5	17-05-21	19-05-21	16-06-21 / 08-09-21	09-09-21	11-09-20
6	21-06-21	23-06-21	21-07-21 / 13-10-21	14-10-21	16-10-20
7	12-07-21	14-07-21	11-08-21 / 03-11-21	04-11-21	06-11-20
8	16-08-21	18-08-21	15-09-21 / 08-12-21	09-12-21	11-12-20
9	13-09-21	15-09-21	13-10-21 / 05-01-22	06-01-22	08-01-21
10	18-10-21	20-10-21	17-11-21 / 09-02-22	10-02-22	12-02-21
11	15-11-21	17-11-21	15-12-21 / 08-03-22	09-03-22	12-03-21

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Tinus Viljoen at 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

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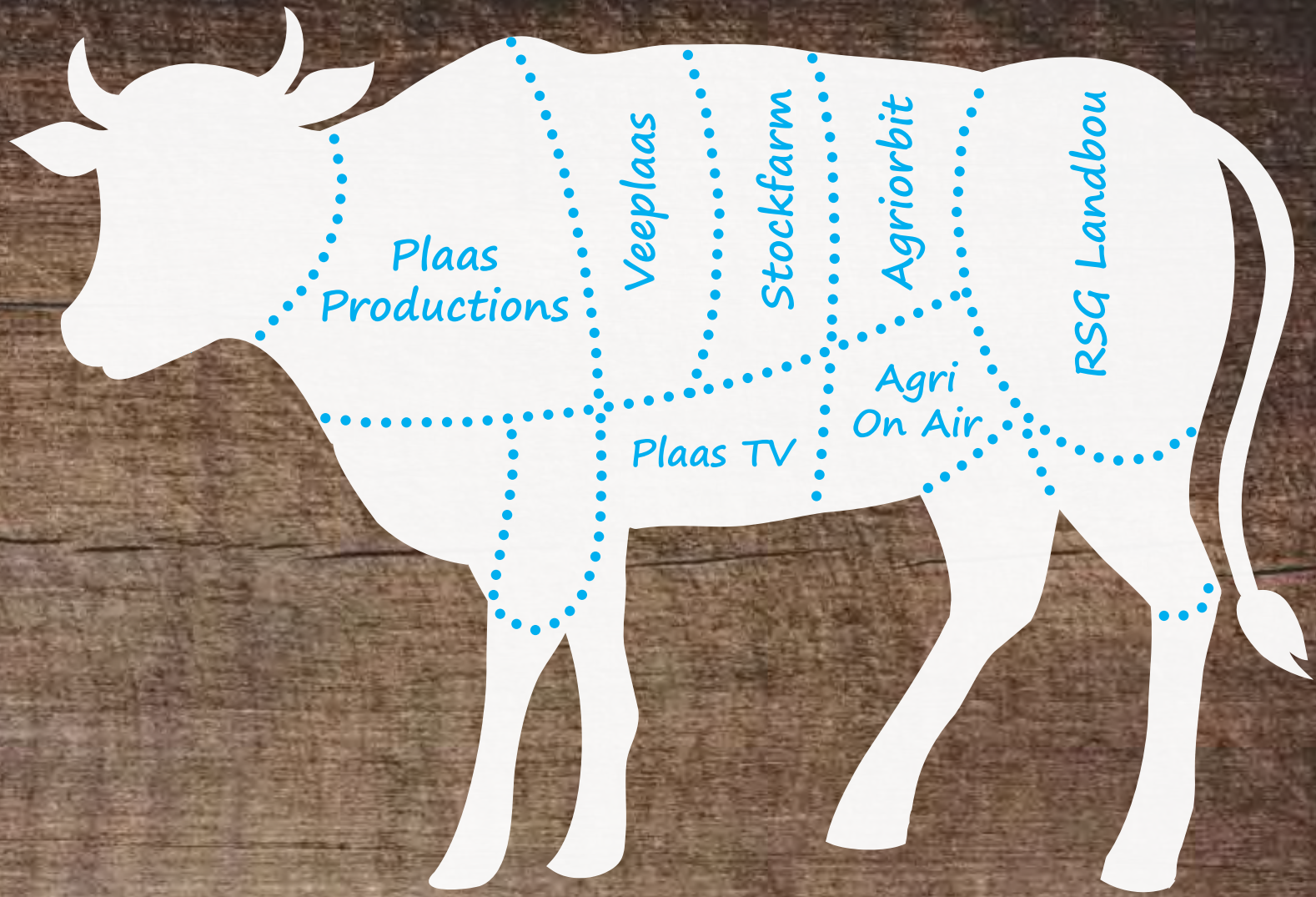

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