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Investigating the meat quality of Boran cattle

Boran cattle have been subject to prolonged natural selection under harsh environmental conditions for centuries and are now considered an early maturing medium-frame animal. The Boran breed is known for its low production costs and ability to produce an excellent carcass that can be marketed off the veld.

In South Africa, most beef calves are finished in feedlots and carcass weight is therefore a key factor when determining the price to be paid per animal. Carcasses that do not meet specifications are generally penalised. Genetic selection can be used to address traits such as undesirable carcass size or fat cover. For this reason, carcass traits should also be an important consideration when selecting beef cattle.

Some of the Boran bulls tested during the project.

Determining carcass quality

The Boran Cattle Breeders' Society undertook a test project to determine the growth and carcass quality of the Boran. The project was used to measure growth, carcass, meat quality and conformation traits. The feed intake of individual bulls was also measured to determine their feed conversion and growth ability.

Feed conversion ratio is economically important because it quantifies feed efficiency – it therefore forms part of the breeding goals and selection criteria of breeders. It is here where the importance of the well-known phrase 'You must measure to know' really comes to the fore.

Meat quality is a vital consideration among consumers. Although environmental factors have a huge effect on meat quality, especially tenderness, the genetic basis of the end product should not be neglected as it also has a decisive impact on meat quality.

The tenderness of meat cannot be measured on a live animal, nor is it correlated with any of the other traits of the animal. Meat tenderness can therefore not be predicted by measuring any of the animal's other traits. The only way to predict the tenderness of meat, is to measure the carcasses and to include information from genomic markers in estimated breeding values.

Carcass traits can be measured on live animals by means of real-time ultrasound (RTU) scanning. RTU scanning allows for the collection of objective carcass information from live animals, instead of slaughtering offspring in order to gather information.

It is possible to select for specific carcass traits, since fat thickness, eye muscle area (EMA) and marbling are between 20 and 25% hereditary. Larger carcasses with less fat and more marbling should fetch the best price, although South African farmers are not currently remunerated for marbling.

The Boran bull test project

Feedlot traits were measured during a twelve-week feed intake and growth test among a group of Boran bulls under comparable conditions. Carcass traits were also measured using RTU technology. After completion of the growth test, the bulls were slaughtered and the carcass traits measured. Linear conformation traits, including the height and position of the hump, were also recorded. The tenderness of the meat was determined on day three and day 28 of the aging process. After completion,

Carcasses of Boran bulls from the project.

RTU scanning of a bull during the project.

The skin thickness of participating bulls was also measured.

the data was statistically analysed and correlations between all traits calculated.

Boran bulls were purchased from eight different breeders, each delivering between one and 19 bulls. A total of 55 bulls successfully completed the test. The Boran bulls weighed between 148 and 280kg (a difference of 132kg) and were between 218 and 373 days (seven to twelve months) old at the time of their arrival, a difference of 155 days. There was an adjustment period of around 28 days before the growth test commenced to allow the bulls to adapt to the ration and feeding stations.

During the test, the bulls' daily intake was measured and they were weighed weekly. Growth test data for average daily gain (ADG), feed intake and feed conversion ratio (FCR) were recorded. At the end of the test, body measurements such as scrotal circumference, shoulder height, body length and skin thickness were measured and RTU scans conducted.

Other essential linear body features such as hump height and position, sheath angle, shank length and conformation were also measured. RTU scanning was used to measure subcutaneous fat thickness on the rib and rump, the EMA and marbling.

Carcass traits were measured post slaughter. This included carcass weight, dressing percentage, warm and cold pH, hump measurements and carcass marbling. Meat tenderness was measured after day three and 28 of aging using the Warner-Bratzler apparatus, a device which measures the cutting force in kilograms needed to cut through a meat sample. Afterwards, the data was statistically analysed.

The results

Some of the key findings from the project included the following:

- Correlations between traits indicated that carcass traits can be successfully predicted through growth monitoring and RTU measurements on live animals. It can subsequently be used to identify the best bulls in the breed for carcass traits.
- The meat tenderness tests indicated that, compared to other beef cattle breeds, the Boran's meat can be considered to be very tender.
- Conformation score is strongly correlated with important weight and conformation traits.

This study indicates that animals which meet production requirements, already exist within the Boran breed. Measuring the growth of animals will therefore make it possible to identify suitable genetics for growth and carcass traits. SF

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