(1906)

**Adaptive and reproductive traits in Nguni type breed under communal management conditions**

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## Introduction

Fertility is regarded as the most important traits for profitability in the beef enterprise (Williams *et al.*, 1991). Body condition score (BCS) has been implicated as the most important factor influencing the reproductive performance of beef cows such as postpartum interval to oestrus (Wegner *et al.*, 1988). Poor BCS is generally associated with reduced conception rates and longer intervals. Furthermore, the condition of breeding cattle has a marked influences on the success at mating (Nicholson *et al.*, 1987). Scrotal circumference (SC) measurements are associated with testis development, total sperm production and quality (Williams *et al.*, 1991). It is a potentially useful indicator of reproductive potential in beef cattle and therefore plays a role in the breeding soundness examination. The objective of this study was to evaluate the adaptive and reproductive traits of beef cattle under communal management conditions.

## Materials and Methods

Data were collected from Muledzhi Communal Dipping Tank situated north of Thohoyandou in the Northern province, Data consisted of 769 records for BCS, 140 for SC and 663 for Skin thickness (ST), which were collected over the periods of three months (September, October & December). The environment in this area is characterized by seasonal rainfall with hot, wet summers and cool, dry winter. The vegetation type is Savanna mixed bushveld. BCS was recorded by one person, the scale used from one to five (1=emaciated and 5=obese). Types of breed used were Nguni type breed. Data were analyzed using General Linear Models procedure (SAS, 1989). The following models (Model I for BCS, II for SC and III for ST) were used to analyze sources of variation:

Model I: $Y_{ijklmn} = \mu+R_i+B_j+S_k+A_l+M_m+RA_{il}+BS_{jk}+SA_{kl}+Ei_{jklmn}$

where $\mu$ = overall mean; $R_i$ = effect of village; $B_j$ = effect of breed type;
$S_k$ = effect of sex; $M_m$ = effect of month;
$RA_{il}$ = interaction between village and age;
$BS_{jk}$ = interaction between breed type and sex;
$SA_{kl}$ = interaction between sex and age;
$E_{ijklmn}$ = Random error effect (assumed NID (0, $\sigma^2$)).

Model II was similar to Model I, except that it included the interaction between sex & month ($SM_{km}$), and age & month ($AM_{lm}$). Model III was also similar to Model II, but with the inclusion of the interaction between village and breed ($RB_{ij}$).

## Results and Discussion

Analysis of Variance for BCS, SC and ST are shown in Table 1.

Table 1. Analysis of variance for Body Condition Score (BCS), Scrotal Circumference (SC) and Skin thickness (ST).

| | BCS | | SC | | ST |
|---|---|---|---|---|---|
| Sources DF | MS | DF | MS | DF | MS |
| VILLAGES | 3 | 0.20 $^{ns}$ | 3 | 28.56 $^{ns}$ | 3 | 14.53$^{ns}$ |
| BREED | 1 | 0.03 $^{ns}$ | 1 | 1.11 $^{ns}$ | 1 | 2.08 $^{ns}$ |
| SEX | 1 | 0.02 $^{ns}$ | 1 | 1.20 $^{ns}$ | 1 | 10.58 $^{ns}$ |
| AGE | 4 | 3.01** | 4 | 98.10** | 4 | 147.58** |
| MONTHS | 2 | 0.95 $^{ns}$ | 2 | 16.69 $^{ns}$ | 2 | 18.42** |
| VILLAGES*AGED | 12 | 0.78** | - | - | - | - |
| BREED*SEX | 1 | 1.88** | - | - | - | - |
| SEX*AGED | 4 | 1.24** | - | - | - | - |
| SEX*MONTHS | - | - | 2 | 41.51** | - | - |
| AGED*MONTHS | - | - | 8 | 51.85** | 8 | 22.13 $^{ns}$ |
| VILLAGES*BREED | - | - | - | 1 - | 3 | 14.43** |

$^{ns}$ Not Significant; ** $P < 0.01$; $R^2$ (BCS) = 0.10; $R^2$ (SC) = 0.32; $R^2$ (ST) = 0.16

BCS, SC and ST were not influenced by village, breed and sex (P>0.05). Age caused a variation in BCS, SC and ST (P<0.01). Reproductive traits were not affected by months. Least square means for BCS, SC and ST are indicated in Table 2. October seems to be the best month, judged by the condition of the animals. Condition scores tended to increase with the age of the animals. Nguni bull reach peak SC when they are three years of age (28.15cm) and then decline. Skin thickness increased with age up to four years and then declined.

Table 2. Least square means for Body Condition Scores (BCS), Scrotal circumference (SC)(cm) and Skin thickness (ST) (cm).

| | | BCS | | SC | | ST |
|---|---|---|---|---|---|---|
| **EFFECT** | **n** | **LSM±SE** | **n** | **LSM±SE** | **n** | **LSM±SE** |
| μ | 769 | 2.33± 0.08 | 140 | 25.83±2.25 | 663 | 10.93±0.35 |
| **VILLAGES** | | | | | | |
| 1 | 301 | 2.32±0.08 | 50 | 26.44±2.37 | 2391 | 11.76±0.58 |
| 2 | 227 | 2.39±0.08 | 39 | 26.29±2.35 | 202 | 10.76±0.34 |
| 3 | 161 | 2.35±0.08 | 28 | 24.21±2.43 | 151 | 10.03±0.89 |
| 4 | 80 | 2.39±0.09 | 16 | 27.36±2.92 | 71 | 9.95±0.69 |
| **BREED** | | | | | | |
| Nguni | 724 | 2.38±0.03 | 131 | 25.68±1.09 | 620 | 10.79±0.15 |
| Others[2] | 45 | 2.35±0.12 | 2 | 26.47±3.82 | 43 | 10.48±0.64 |
| **SEX** | | | | | | |
| Male | 278 | 2.37±0.10 | 96 | 26.29±1.93 | 253 | 10.77±0.36 |
| Female | 491 | 2.35±0.07 | | | 410 | 10.48±0.35 |
| **AGE[3]** | | | | | | |
| 1 | 70 | 2.04±0.10 | 16 | 21.82±2.47 | 63 | 8.60±0.51 |
| 2 | 212 | 2.27±0.08 | 43 | 25.57±2.14 | 178 | 9.86±0.39 |
| 3 | 195 | 2.46±0.08 | 42 | 28.15±2.19 | 169 | 11.57±0.41 |
| 4 | 145 | 2.42±0.08 | 15 | 27.85±2.64 | 132 | 11.79±0.40 |
| 5 | 147 | 2.63±0.10 | 17 | 26.97±2.92 | 121 | 11.32±0.40 |
| **MONTHS** | | | | | | |
| Sep | 304 | 2.28±0.07 | 57 | 27.56±2.22 | 301 | 10.27±0.36 |
| Oct | 159 | 2.42±0.09 | 28 | 24.81±3.49 | 154 | 10.67±0.42 |
| Dec | 306 | 2.39±0.07 | 48 | 25.85±1.99 | 208 | 10.95±0.41 |

[1]Village: 1= Tshithuthuni, 2= Muledzhi, 3= Vuvha, 4= Mapate.
[2]Others: Brahman, Bonsmara, Simmentaler, Jersey, Friesian, and Africander.
[3]Age: 1= <1yr, 2= >1yr and <2yrs, 3= >2yrs and <3yrs, 4= >3yrs and <4yrs, 5= >5yrs.

The reproductive performance of Nguni cattle under communal management conditions was not affected by differences between Villages. This is characterized by their ability to adapt and survive in extreme conditions. Nguni cattle are known to breed even in low BCS. Trends on the SC with age was similar to results obtained by Bourdon *et al.*, 1986.

**Conclusion**

In conclusion, Makerenchian *et al.* (1985) stated that even though the Nguni breed has smaller SC its potential fertilizing capability is high and compares favourably with other breeds. Skin thickness also plays a role in the ability of the animal to adapt to environmental factors such as tick infestation and extreme temperatures.

**References**


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