Ovarian activity, conception and pregnancy patterns of cows in the semiarid communal rangelands in the Eastern Cape Province of South Africa

N. Nqeno, M. Chimonyo*, C. Mapiye, M.C. Marufu

Department of Livestock and Pasture Science, University of Fort Hare, P. Bag X1314, Alice 5700, South Africa

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ABSTRACT

A study was conducted to determine the seasonal trends in ovarian activity, conception and pregnancy status of cows on communal rangelands in the Eastern Cape Province of South Africa. Ovarian activity and pregnancy status of 200 cows were determined through trans-rectal palpation in June, and October 2007 and January 2008. Month of conception was obtained by subtracting the estimated age of the foetus from the month when pregnancy diagnosis was performed. Body weights and body condition scores (BCS) were collected every month between March 2007 and January 2008. Although cows in the perennial grasslands had higher ($P < 0.05$) body weights and BCS than those in the annual grasslands, they had a significant weight and condition loss between March and October. More than 90% of the cows in the annual grasslands were cycling in January ($P < 0.05$). Over 60% of the cows in the perennial grasslands conceived between December and March compared to 46% in the annual grasslands. About 40% of the cows were pregnant in June in the annual and perennial grasslands. There were more cycling and pregnant cows with a BSC of 3 in the perennial grasslands in June and October compared to annual grasslands ($P < 0.05$). Odds ratio estimates of cows exhibiting ovarian activity and pregnancy in the communal areas were highest for BCS. It was concluded that most cows conceived and exhibited ovarian activity between November and March, especially in the perennial grasslands. Future research should focus on supplementary feeding using locally available feed resources to improve cow reproductive performance in the dry months, particularly in the annual grasslands.

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1. Introduction

In South Africa, most of the cattle kept under the communal production system are crosses of imported beef breeds with the local Nguni cows (Mapiye et al., 2009). Although the Sanga breeds (*Bos taurus africanus*) such as Nguni and the crosses are reported to be well adapted to the tropics and sub-tropics (Bó et al., 2003), their reproductive performance under communal production conditions is sub-optimal (Chimonyo et al., 2000a; Kanuya et al., 2006;

Matiko et al., 2008). In the communal areas of South Africa, for example, both age at first calving and calving intervals exceed two years (Ainslie et al., 2002). Factors that influence reproductive performance of cows include nutrition, parity, genotype, milk yield, suckling, diseases and general herd management (Chimonyo et al., 2000a, 2000b; Montiel and Ahuja, 2005; Matiko et al., 2008). The relative impact of these factors on reproductive efficiency of cows on communal rangelands of South Africa is not well understood and therefore, warrants investigation.

Communal rangelands in South Africa are categorised into sweet and sour based on vegetation type and the amount of precipitation received per annum. Vegetation in the sweet rangelands is generally comprised of perennial

grasses that remain nutritious and palatable all year round, while sour rangelands are mainly composed of annual grass species, which lose nutritive value and palatability during the dry season (Ellery et al., 1995; Lesoli, 2008). In addition, sweet rangelands receive less rainfall (<500 mm/annum) than sweet rangelands, which receive between 600 and 800 mm of rainfall per annum. The effect of rangeland type on cow reproduction efficiency is largely unknown.

Assessment of reproductive efficiency of cows under communal conditions has conveniently been conducted in areas where the cattle are penned every night (Chimonyo et al., 2000a, 2000b; Kanuya et al., 2006). Very little information is available on the reproduction efficiency of cows in the communal areas, where distant grazing areas and physical barriers such as mountains restrict routine movement and night enclosure of cattle, and consequently, monitoring of reproductive performance.

Although there are several well-developed techniques for assessing reproductive efficiency of cows, there are many communal areas where the effective application of such technologies is difficult or virtually impossible. For example, ultrasonography requires the presence of good cattle handling facilities and the availability of trained personnel. More significantly, ovarian activity is best assessed by the frequent collection of milk (Matiko et al., 2008), blood (Chimonyo et al., 2000b) and faecal samples (Montiel and Ahuja, 2005) for progesterone assays. These techniques are capital-intensive and inapplicable under conditions where the cows are inaccessible or unavailable for frequent collection of milk, blood and faecal samples for assays of reproductive hormones, particularly progesterone. Although the accuracy of trans-rectal palpation to detect ovarian activity is relatively low (around 70%), it is an inexpensive and feasible method of determining ovarian activity and pregnancy status of cows (Chimonyo et al., 2000a, 2000b; Kanuya et al., 2006). In such communal areas, the relationships between body condition and ovarian function, month of conception and pregnancy status of cows in the communal rangelands are, however, not established. More importantly, trends in ovarian function, conception and pregnancy patterns in the communal rangelands in South Africa have not been determined. The objective of the study was, therefore, to compare the ovarian function, conception and pregnancy status of cows on communal rangelands in the Eastern Cape Province of South Africa.

2. Materials and methods

2.1. Study sites

For the purpose of this study, a multi-stage sampling procedure was used. Initially, the two major rangeland types that are common in South Africa: the sweet and sour rangelands were identified. Participatory rural appraisals were randomly conducted on six communities from each rangeland type (Moyo et al., 2008). One community was then selected from each rangeland type based on willingness to participate and accessibility throughout the year. The sweet rangeland was represented by Sterkspruit community, located in the Ukahlamba District Municipality. Cala in the Chris Hani District Municipality represented the sour rangeland.

Sterkspruit is found in Ukhahlamba District Municipality of the Eastern Cape Province of South Africa. It is situated 30°37′ S and 27°22′ E at an altitude of 1507 m above sea level. It has a semiarid climate. Fig. 1 shows the rainfall patterns for the Sterkspruit and Cala between March 2007 and February 2008. Sterkspruit received most rainfall between October and April (460 mm) and less
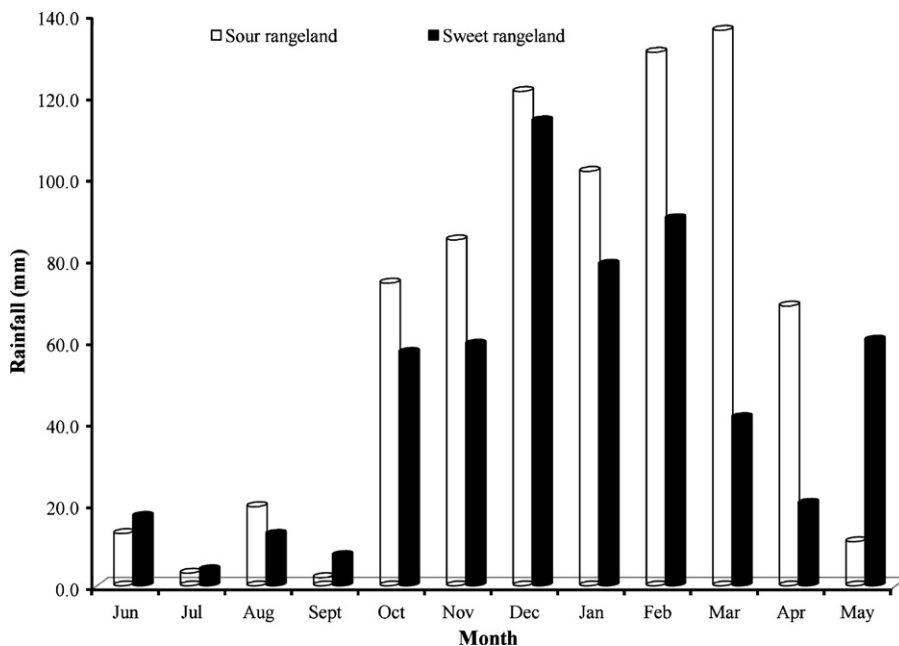

Fig. 1. Mean monthly rainfall data for the sweet rangeland (Sterkspruit) and sour rangeland (Cala) between March 2007 and February 2008.