

Seasonal changes in nutritional status and reproductive performance of Zebu cows kept under a traditional agro-pastoral system in Tanzania

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Abstract The objectives of this study were to assess changes in nutritional status/body condition score, percentage pregnancy and calving rate in Zebu cows and to establish the relationship between body condition score loss and postpartum interval to resumption of ovarian activity. A total of 198 cows and postpubertal heifers of the Tanzanian Shorthorn Zebu kept under a traditional management system were randomly selected from 200 smallholder herds. Factors investigated during bi-weekly visits include body condition score (BCS), heart-girth circumference, milk yield and reproductive status of the animals, pregnancy/non-pregnancy and cyclicity/non-cyclicity. Local weather conditions and dates of occurrence of other reproductive events such as calving were also recorded. Calvings occurred all year round but with a strong seasonal distribution characterized by annual peaks observed between April and July. The annual calving pattern was closely related to rainfall, with peak precipitation occurring a few months before peak calving. The overall percentage pregnancy varied from 30% to 50% throughout the

year. Postpartum cows exhibited minimum mean BCS and heart-girth circumference 12–14 weeks after calving, and cows with BCS loss >1 point exhibited the longest time interval from calving to onset of ovarian activity.

Keywords Agro-pastoral system · Body condition score · Reproductive performance · Zebu cows

Abbreviations

BCS body condition score
GDP gross domestic product

Introduction

Tanzania has a cattle population of 17.7 million head (MAFS, 2002) of which about 95% are the indigenous Zebu kept in the traditional livestock sector to provide milk, meat, draught power and manure and to act as insurance against disaster. Approximately 50–70% of the cattle are kept in an agro-pastoral system in arid and semi-arid areas of the country. Livestock production contributes 18% of the total GDP and 30% of the agricultural GDP. The traditional sector accounts for 75–80% of the total milk and almost 100% of beef produced in Tanzania, so saving on imports. However, production per animal in this sector is low and is characterized by seasonal fluctuations as the animals are relatively well fed during the rainy season and therefore

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produce to their full capacity but are poorly fed during the dry season and so produce less.

The productivity of cattle in terms of meat and milk is largely dependent on their reproductive performance. On the other hand, reproductive performance is closely related to fertility. Factors affecting fertility in cows have been reported (Mukasa-Mugerwa, 1989). Higher reproductive efficiency in terms of increased pregnancy rates or reduced calving intervals maximizes production from cattle, while low reproductive rates particularly limit production efficiency. Regular calving normally results in an increase in both the number of calves born and the amount of milk produced per cow per lifetime and, consequently, influences the rate of herd replacement and the extent of voluntary culling (Salisbury *et al.*, 1978).

The relationship between milk yield and fertility of cows has been correlated with body weight, body weight changes and condition score (Baishya *et al.*, 1982; Ducker and Morant, 1984; Ducker *et al.*, 1985; Richards *et al.*, 1986). In order to improve cattle productivity it is useful to start by quantifying the extent to which cattle are affected by nutrition, disease or other environmental factors, especially when large fluctuations in the quantity and quality of forage occur, as they do in seasonally dry tropical and sub-tropical areas. Body condition scoring provides a cheap, quick, easy and reliable method of comparing herds of cattle or individual animals under differing management systems, experimental treatments, seasons or environments (van Niekerk, 1982; Nicholson and Butterworth, 1986).

Currently there is little information showing the extent of variation in nutritional status of indigenous Zebu cattle of different reproductive statuses kept in the traditional system of production. This study was therefore broadly aimed at on-farm collection of a baseline dataset on some productive and reproductive parameters of the indigenous Tanzanian Shorthorn Zebu cattle in the traditional sector. The specific objectives of this longitudinal study were (1) to assess changes in nutritional status of Zebu cows through bi-weekly monitoring of body condition score, (2) to determine the monthly proportion of pregnant cows and frequency of calving, and (3) to establish the relationship between body condition score loss and the interval to resumption of ovarian activity in postpartum Zebu cows. Such basic data are necessary in the planning of strategies aimed at improving the productivity (in terms of milk, body

condition and reproductive performance) of indigenous Zebu cows kept in the traditional agro-pastoral system.

Materials and methods

Study site

Gairo is located at 36°45' E, 6°30' S, 1200 m above sea level. The area is semi-arid, usually receiving about 600 mm of erratic rainfall per annum. Weather conditions at Gairo constitute a dry season commonly extending from June to December and a rainy season between January and May. The major land-use system is subsistence agro-pastoralism consisting of cultivation of various agricultural crops and keeping of traditional livestock that are grazed on communal land. Despite the semi-arid weather, the area is very suitable for agricultural development including livestock production because of its good road and transport connections to the large urban markets in Dar es Salaam and Dodoma.

Village and farmer selection

Three adjacent villages in Gairo Division, Kilosa District, Morogoro Region were selected for the study. Forty-six households with smallholder indigenous cattle herds were then selected in a random manner to participate in the study. Inclusion criteria were their willingness to participate in the study and set aside a land area of 0.2–0.4 ha for planting of potted seedlings of *Gliricidia sepium* multipurpose trees for future feeding of animals.

Animal management and treatment

The indigenous Tanzanian Shorthorn Zebu cattle kept in the area grazed on natural pastures and at the end of harvesting they also received some crop residues. Calves were usually allowed to suckle their dams for a few minutes immediately before milking in order to stimulate milk letdown and again after milking to remove residual milk. Cows were milked either twice or only once depending on milk production as influenced by season and feed availability. Milking of cows in a household was a gender role performed by women and cows usually ceased being milked whenever their

calves died. Tick control in the area was done by use of acaricides applied either by a knapsack sprayer or a dip tank; but the regularity of spraying/dipping varied from household to household. There are two hand-made water ponds that are accessible by the animals for most part of the year except during the peak of dry season when the ponds dry up and the animals have to travel more than 5 km for water. Usually the frequency watering during the dry season is reduced to once every two or three days.

A total of 198 cows (parity 1 to 4) and postpubertal heifers were included in the longitudinal cohort study. At the beginning of the study, each of the selected animals was permanently identified by use of a numbered neck collar. All available reproductive history of the herd and that of individual selected animals was reported by owners and was recorded. Thereafter, accurate information was collected and recorded through examination by the researchers. The nutritional status of the animals was determined by assessment of their body condition score. The examination for condition scoring was performed by inspection and whenever necessary palpation of muscle development and subcutaneous fat thickness over the lumbar vertebrae halfway between the iliac tuber and last rib, and the fat round the tail head. The body condition was assessed and scored bi-weekly using a scale ranging from 1 to 5 with 0.5 point increments (1 = very thin to 5 = very fat). The scoring technique was a slight modification of the method for condition scoring in Zebu cattle described by Nicholson and Butterworth (1986). For parturient cows ($n = 91$ and 98 lactations, of which 7 cows contributed with two lactations

each), body condition was also evaluated as maximum body condition score (BCS) loss during lactation. The heart-girth of each animal was measured in centimetres as the smallest circumference of the chest immediately behind the shoulder (Johansson and Hildermann, 1954). The quantity of daily milk yield per cow per day was estimated and recorded. An initial gynaecological examination of each animal was carried out to identify animals that were pregnant, not pregnant, cycling, not cycling and those with reproductive disorders. Subsequently, scheduled monitoring of changes in BCS, heart-girth circumference, milk yield and reproductive status were performed at bi-weekly intervals starting from September 2001 to June 2004. Dates of calving and the daily local weather conditions such as rainfall, temperature and humidity in the area were also recorded. The method and criteria used in assessing resumption of ovarian activity for postpartum cows have been defined elsewhere (Kanuya *et al.*, 2005).

Results

Semi-arid weather conditions

The average weather conditions at Gairo during the study period are shown in Table 1. The mean annual rainfall was about 620 mm with 88% of it falling between December and April. The mean (\pm SEM) environmental temperature was $21.1 \pm 0.96^\circ\text{C}$ with a range from 28°C (November and December) to 14.5°C (June to August).

Table 1 Average monthly weather conditions at Gairo (2001–2004)

Month	Temperature ($^\circ\text{C}$)		Relative humidity (%)		Rainfall (mm)
	Min.	Max.	06:00	21:00	
January	19.0	26.7	86.4	69.7	144.5
February	18.6	27.3	88.1	68.4	108.1
March	18.7	26.7	88.4	74.6	155.3
April	18.3	24.3	89.0	73.6	63.9
May	17.5	23.9	88.5	63.9	24.5
June	14.6	23.2	85.4	63.4	14.1
July	14.5	22.8	86.9	55.5	1.3
August	14.3	22.5	85.9	54.9	7.4
September	14.9	23.7	88.0	53.2	17.8
October	15.8	26.1	88.4	51.5	8.0
November	18.1	27.9	84.7	45.0	0
December	19.2	28.2	86.6	58.7	74.8

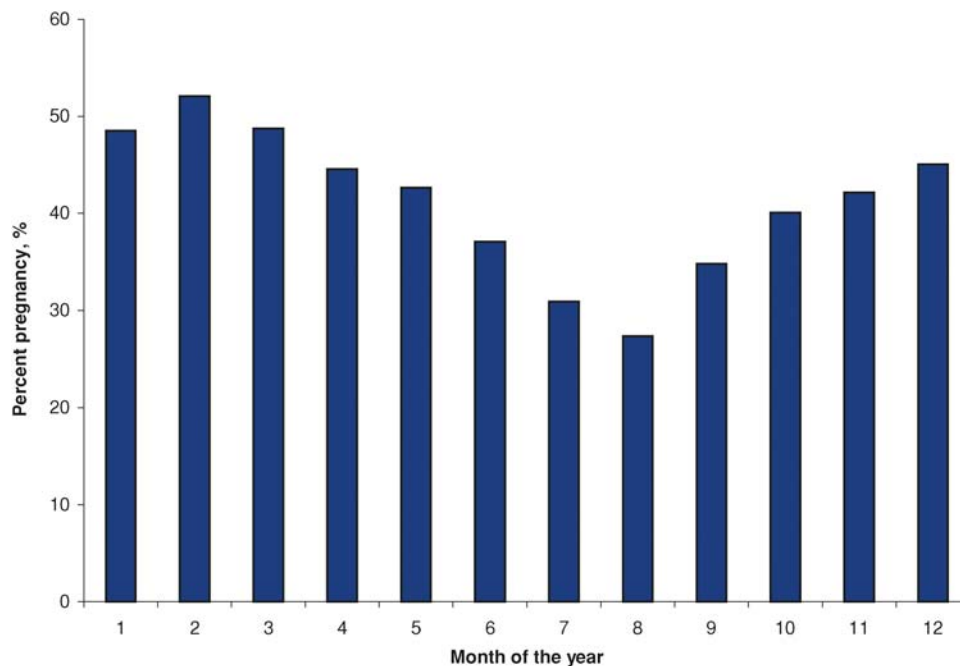
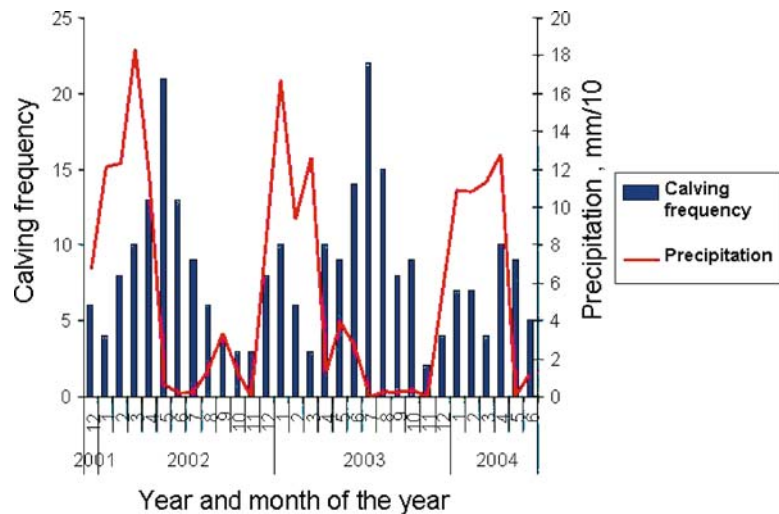


Fig. 1 Percentage pregnancy in Zebu cows at Gairo related to month of the year (2001–2004)

Fig. 2 Distribution of calving frequency in relation to precipitation and month of the year in Zebu cows under an agro-pastoral management system in a semi arid area, Gairo Tanzania, 2001–2004



Overall percentage pregnancy

The overall percentage pregnancy was related to month of the year and varied between 30% and 50% throughout the year as shown in Fig. 1. The proportion of cows found to be pregnant was highest in February of every year during the study and thereafter there was a gradual decline of this proportion until it reached a low point in August.

Calving pattern

Calving in Zebu cows occurred all year round with a strong seasonal distribution marked by a peak calving occurring between April and July (Fig. 2). The month of occurrence of peak calving frequency varied from year to year, but was always closely related to rainfall, which peaked some time before the calving season in all the years of study.

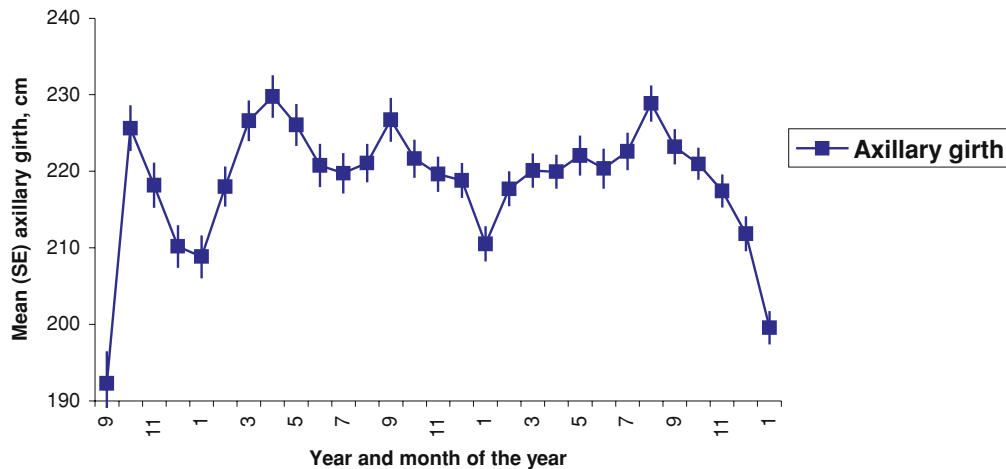


Fig. 3 Changes in mean (SE) axillary girth related to year and month of the year (September 2001 to January 2004)

Changes in axillary girth circumference, body condition score and milk yield

The average milk yield varied with month of the year (season) and the pattern of change was very similar to changes in axillary girth circumference and body condition score. Changes in mean axillary girth circumference (cm) or body condition score (1–5) and milk yield (litres/day) related to year and month of the year were as shown in Figs. 3 and 4.

There was a protracted loss of girth circumference and body condition score from calving, which continued for up to 14 weeks post partum. Similarly, milk yield was highest immediately after calving and thereafter it declined in correspondence to loss of girth circumference and body condition score. Changes in girth circumference, body condition score and mean milk yield/cow per day during the postpartum period were as shown in Fig. 5. Postpartum BCS loss and resumption of ovarian activity were as illustrated in Fig. 6; cows with BCS loss >1 point exhibited the longest time interval of from calving to onset of ovarian activity.

Discussion

The occurrence of peak calving between April and July implies that most conceptions took place between July and October of the previous year. This is the period of the year when temperatures in the study area are

relatively cool, some natural grass for grazing is still available from the preceding rainy season and animals have access to crop residues after harvesting. The animals have therefore been adequately fed for a number of months, providing sufficient to maintain their energy status. It would be interesting to determine the specific biological and environmental conditions that are so favourable that most conceptions occur at this time of the year. In previous studies, Knopf and colleagues (2000) with Ndama cattle in central Guinea Savannah (V-Baoulé) of Côte d'Ivoire and Madibela and colleagues (2001) working with Tswana and Simmental X Tswana crosses in Botswana reported a bimodal calving pattern during the year. A similar unimodal peak calving in a Tanzanian dairy herd has been reported previously by Kanuya and colleagues (1997). This seasonal pattern of conception and calving could be an adaptive physiological mechanism by the indigenous animals developed over many years so that calving occurs at a time of plentiful nutrition including easy availability of drinking water (Fig. 2). However, such a seasonal calving pattern leads to uneven milk availability over the year. Since liquid milk is the most desirable product for household food security in the study area, an even supply over the year is preferable.

Low reproductive performance of indigenous Zebu cows kept in the traditional agro-pastoral system was revealed by the low percentage of pregnant cows observed in the herds throughout the year (Fig. 1). The end result is a low yearly calving rate, leading to low

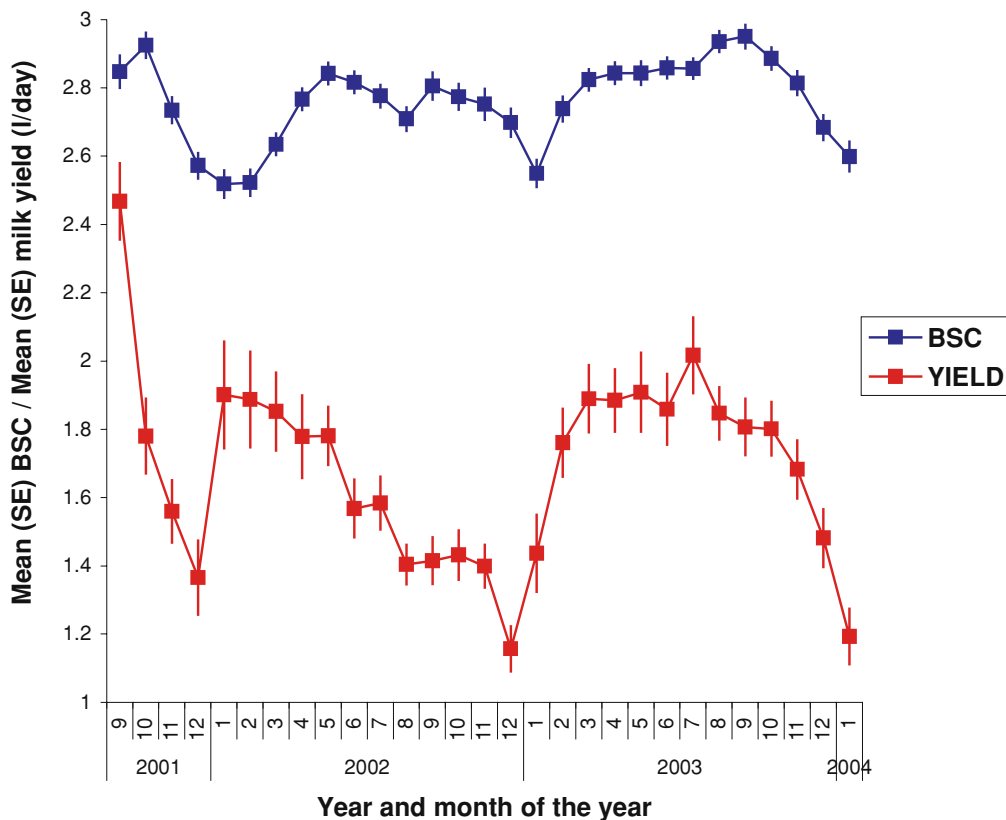


Fig. 4 Changes in mean (SE) BCS and milk yield related to year and month of the year (September 2001 to January 2004)

cattle productivity in terms of milk and calf crop. The percentage pregnancy was lowest around August, just after the peak calving season, when most cows would therefore be expected to be non-pregnant. The range of percentage pregnancy in the present study is similar that reported for indigenous cattle (41.9%) in Nigeria by Voh and Otchere (1989) and for beef cattle herds (<50%) reported by Plasse (1987) in Honduras but is lower than the pregnancy rate in dual-purpose cattle (51.2%) in Mexico reported by Osorio-Arce and Segura-Correa (2002) and the birth rate in beef cattle (53%) in Colombia (Stonaker *et al.*, 1976). It is recommended that for optimal reproductive performance at least 60–70% of cows in a herd should be pregnant at any one time (Gaines, 1989).

The pattern and magnitude of changes in the productive parameters, i.e. heart-girth circumference, body condition score and milk yield (Figs. 3 and 4), and reproductive performance, i.e. percentage pregnant (Fig. 1), emphasize the close association between nutrition and reproduction in the agro-pastoral production

system. There is therefore considerable potential for enhancing the productivity of indigenous Zebu cows in terms of both productive and reproductive performance through the improvement of their nutritional status over the different seasons of the year. Fertility is commonly correlated to body weight, body weight change and body condition (McClure, 1994). These are manifestations of the nutritional state and are influenced by partitioning of nutrients and differential demands for muscle and fat anabolism, pregnancy and lactation. However, further research will be needed to determine a cut-off value for predicting reproductive performance from condition score data in individual cows.

The long postpartum period of anoestrus of more than 150 days (Fig. 6) contributes significantly to the poor reproductive performance of indigenous Zebu cows in the traditional agro-pastoral herds because it prolongs the calving to conception interval. This is in agreement with a previous report on beef cattle (Short *et al.*, 1990) but contrary to findings on dual-purpose

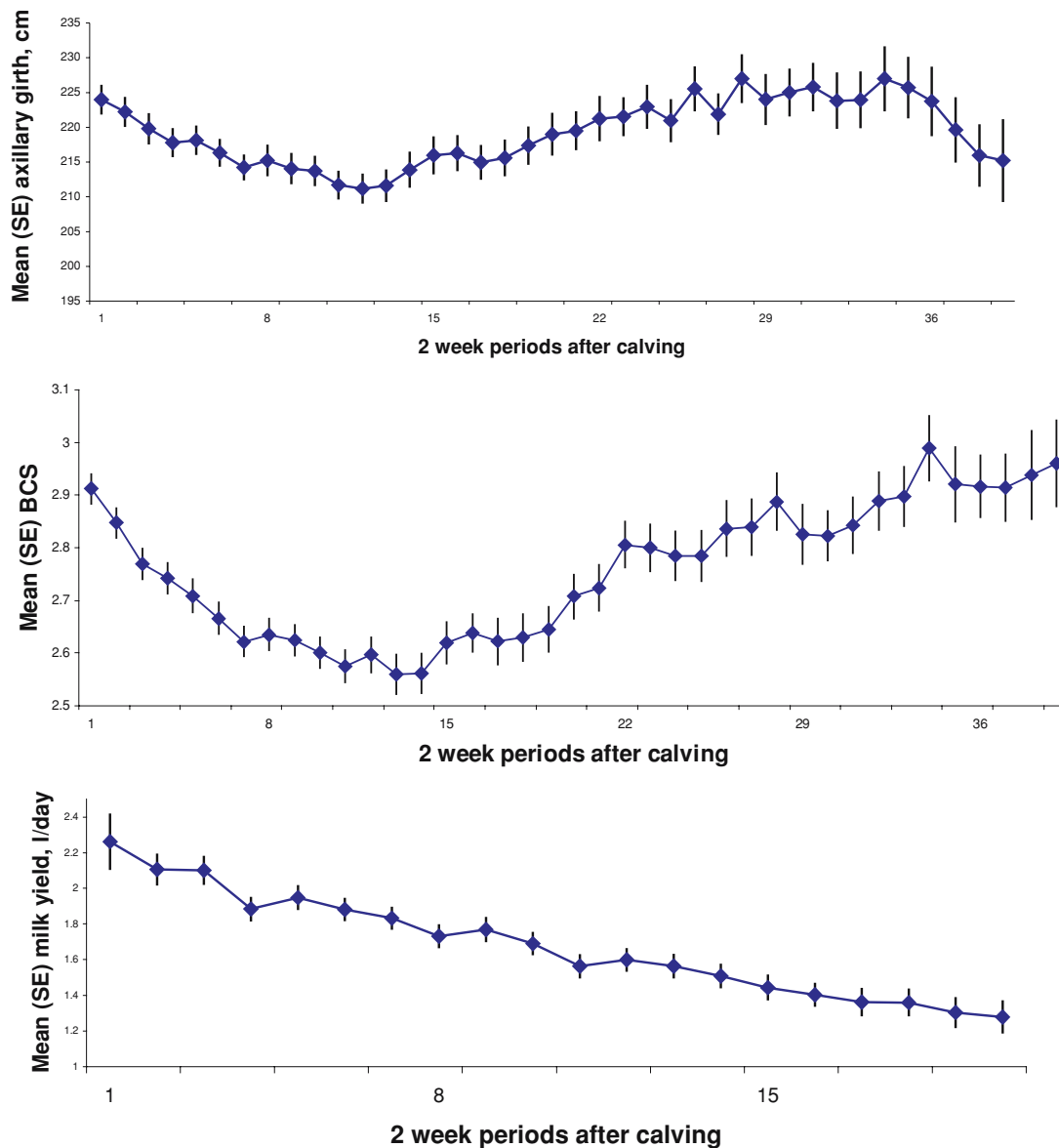
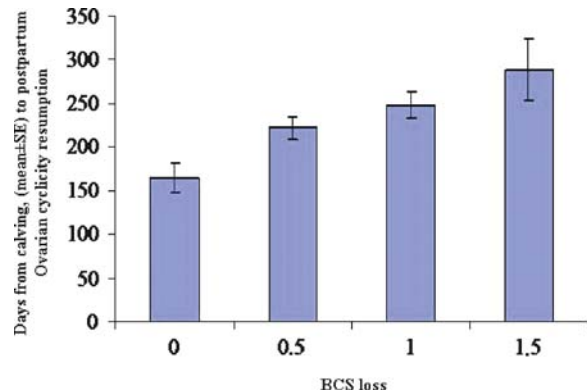


Fig. 5 Changes in mean (SE) axillary girth (cm), body condition score and milk yield at two-week periods after calving

cattle by Rubio and colleagues (1999), who reported that the magnitude of decline in BCS from parturition to the end of the first month post partum was not associated with any of the measures of reproductive performance. Prominent among the factors previously reported to affect postpartum resumption of ovarian activity in cattle are suckling (Saiduddin *et al.*, 1968; Eduvie, 1985), nutrition (Wiltbank *et al.*, 1962), and season and parity of the dam (Buch *et al.*, 1955). The period of true anoestrus or acyclicity is often prolonged in postpartum suckling beef cows (Oxenreider,

1968; Inskip and Lishman, 1981). Several authors have commented that seasonal effects on anoestrus may be related purely to differences in nutrition and management (Boyd, 1977; De Kruif, 1978; Tucker, 1982). As the postpartum period of anoestrus in the present study was longest in cows that lost >1 point in body condition score, this duration may be reduced by provision of adequate dietary energy (Wiltbank *et al.*, 1964; Dunn *et al.*, 1969). Management decisions aimed at ensuring high fertility of cows and an increased availability of milk for household consumption and surplus for

Fig. 6 Relationship between BCS loss and resumption of ovarian activity in postpartum Zebu cows under an agro-pastoral management system, Gairo Tanzania, 2001–2004



sale in the agro-pastoral system must include a component of strategic feed supplementation during periods of shortage of natural pastures so as to even out feed supply over the year.

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References

- Baishya, N., Morant, S.U., Pope, G.S. and Leaver, J.D., 1982. Rearing dairy cattle. 8. Relationships of dietary energy intake, changes in live weight, body condition and fertility. *Animal Production*, **34**, 63
- Boyd, H., 1977. Anoestrus in cattle. *Veterinary Record*, **100**, 150–153
- Buch, N.C., Tyler, W.J. and Casida, L.E., 1955. Post-partum oestrus and involution of the uterus in an experimental herd of Holstein Friesian cows. *Journal of Dairy Science*, **38**, 73–79
- De Kruijff, A., 1978. Factors influencing fertility of a cattle population. *Journal of Reproduction and Fertility*, **54**, 507–518
- Ducker, M.J. and Morant, S.V., 1984. Observations on the relationships between the nutrition, milk yield, live weight and reproductive performance of dairy cows. *Animal Production*, **38**, 9
- Ducker, M.J., Morant, S.V., Fisher, W.J. and Hagget, R.A., 1985. Nutrition and reproductive performance of dairy cattle. 2. Prediction of reproductive performance in first lactation dairy heifers subjected to controlled nutritional regimens. *Animal Production*, **41**, 13–22
- Dunn, T.G., Ingalls, J.E., Zimmerman, D.R. and Wiltbank, J.N., 1969. Reproductive performance of 2-year-old Hereford and Angus heifers as influenced by pre- and post-calving energy intake. *Journal of Animal Science*, **29**, 719–726
- Eduvie, L.E., 1985. Factors affecting postpartum ovarian activity and uterine involution in zebu cattle indigenous to Nigeria. *Animal Reproduction Science*, **8**, 123–128
- Gaines, J.D., 1989. The role of record analysis in evaluating sub fertile dairy herds. *Veterinary Medicine*, **84**, 532–543
- Inskeep, E.K. and Lishman, A.W., 1981. Factors affecting post-partum anoestrus in beef cattle. *Animal Reproduction (Barcelona Symposium 3)*, 277–289
- Johansson, I. and Hildermann, S.E., 1954. The relationship between body measurements and live and slaughter weight in cattle. *Animal Breeding Abstracts*, **22**, 1–17
- Kanuya, N.L., Agger, J.F. and Pedersen, K.M., 1997. Assessing the reproductive performance of a Tanzanian dairy herd: the importance of proper record keeping. *Tanzania Veterinary Journal*, **17**, 63–71
- Kanuya, N.L., Matiko, M.K., Kessy, B.M., Mgongo, F.O., Ropstad, E. and Reksen, O., 2005. A study on the reproductive performance of zebu cows and related factors in a semi-arid area of Tanzania, (submitted).
- Knopf, L., Komoin, C., Betschart, B., Gottstein, B. and Zinsstag J., 2000. Productivity parameters of N'dama village cattle in relation to parasitism in the Guinea savannah of Côte d'Ivoire, (Unpublished report, Swiss Tropical Institute)
- Madibela, O.R., Boitumelo, W.S. and Kiflewahid, B., 2001. Reproductive performance of Tswana and Simmental X Tswana crosses in smallholder farms in Botswana. *Livestock Research for Rural Development*, **13**, 1–12
- McClure, T.J., 1994. Cattle nutrition. In: *Nutritional and Metabolic Infertility in the Cow*, (CAB International, Wallingford, Oxon)
- MAFS, Ministry of Agriculture and Food Security, 2002. *Basic Data – Agriculture Sector 1994/95 to 2000/2001*, (Statistics Unit, MAFS, Dar es Salaam, Tanzania), 72
- Mukasa-Mugerwa, E., 1989. Measures of reproductive performance. In: *A Review of Reproductive Performance of Female Bos indicus (zebu) cattle*, (ILCA Monograph 6; ILCA, Addis Ababa, Ethiopia), 59–86
- Nicholson, M.J. and Butterworth, M.H., 1986. *A Guide to Condition Scoring of Zebu Cattle*, (International Livestock Centre for Africa, Addis Ababa, Ethiopia), 29
- Osorio-Arce, M. and Segura-Correa, J., 2002. Reproductive performance of dual purpose cows in Yucatan, México. *Livestock Research for Rural Development*, **14**, 1–9
- Oxenreider, S.L., 1968. Effects of suckling and ovarian function on post-partum reproductive activity in beef cows. *American Journal of Veterinary Research*, **29**, 2099–2102

- Plasse, D., 1987. Factores que influyen en la eficiencia reproductiva de los bovinos de carne en América Latina tropical y estrategias para mejorarla. *Seminario Centroamericano sobre reproducción y mejoramiento bovino*, Tegucigalpa, Honduras, 93
- Richards, M.W., Sptzer, J.C. and Warner, M.B., 1986. Effect of varying levels of post-partum nutrition and body condition at calving on subsequent reproductive performance in beef cattle. *Journal of Animal Science*, **62**, 300
- Rubio, I., Corro, M. Castillo, E., Galindo, L., Aluja, A., Galina, C.S. and Murcia, C., 1999. Factors related to the onset of postpartum ovarian activity in dual purpose cattle in the tropics. *Revista Facultad Agronomy (LUZ)*, **6**, 37–50
- Saiduddin, S., Riesen, J.W., Tyler, W.J. and Casida, L.E., 1968. Relation of post-partum interval to pituitary gonadotropin, ovarian follicular development and fertility in dairy cows. *Research Bulletin*, 270, (University of Wisconsin, Madison, WI), 15–22
- Salisbury, G.W., Van Dermark, N.L. and Lodge, J.R., 1978. *Physiology of Reproduction and Artificial Insemination of Cattle*, (W.H. Freeman, San Francisco)
- Short, R.E., Belows, R.A., Staigmiller, R.B., Bernardelli, J.G. and Custer, E.E., 1990. Physiological mechanisms controlling anoestrus and infertility in postpartum beef cattle. *Journal of Animal Science*, **68**, 799–816
- Stonaker, H.H., Villa J., Osorio, G. and Salazar, J., 1976. Differences among cattle and farms as related to beef cow reproduction in the eastern plains of Colombia. *Tropical Animal Health and Production*, **8**, 147–154
- Tucker, H.A., 1982. Seasonality in cattle. *Theriogenology*, **17**, 53–59
- van Niekerk, A., 1982. The effect of body condition as influenced by winter nutrition, on the reproductive performance of the beef cow. *South African Journal of Animal Science*, **12**, 383–387
- Voh, A.A., and Otchere E.O., 1989. Reproductive performance of zebu cattle under traditional agro pastoral management in northern Nigeria. *Animal Reproduction Science*, **19**, 191–203
- Wiltbank, J.N., Rowden, W.W., Ingalls, J.E., Gregory, K.E. and Kock, R.M., 1962. Effect of energy level on reproductive phenomena of mature Hereford cows. *Journal of Animal Science*, **21**, 2119–2225
- Wiltbank, J.N., Rowden, W.W., Ingalls, J.E. and Zimmerman, D.R., 1964. Influence of post-partum energy level on reproductive performance of Hereford cows restricted in energy intake prior to calving. *Journal of Animal Science*, **23**, 1049–1053

Changements saisonniers dans l'état nutritionnel et les performances reproductrices de vaches Zébu gardées sous un système agropastoral traditionnel en Tanzanie

Résumé – Les objectifs de la présente étude ont été d'évaluer les changements de l'état nutritionnel/score de la condition corporelle, du pourcentage de grossesses, du taux de vêlage de

vaches Zébu et d'établir la relation entre la perte du score de la condition corporelle et l'intervalle de post-partum jusqu'au retour de l'activité ovarienne. Un total de 198 vaches et génisses post-pubertaires appartenant à la race de Zébus tanzaniens dits Shorthorn, élevées sous un système de gestion traditionnel, ont été sélectionnées au hasard dans 200 troupeaux de petits propriétaires. Les facteurs examinés durant les visites bi-hebdomadaires ont inclus le score de la condition corporelle (BCS), la circonférence du tour de cœur, la production de lait et le statut de la reproduction des animaux: grossesse/non-grossesse et cyclicité/non-cyclicité. Les conditions météorologiques locales et les dates d'occurrence d'autres événements de la reproduction tels que le vêlage ont également été enregistrées. Les vêlages se sont produit tout le long de l'année mais avec une forte distribution saisonnière caractérisée par des pics annuels observés entre avril et juillet. Le profil du vêlage annuel a été associé de près aux chutes de pluie, avec les précipitations les plus fortes se produisant quelques mois avant le pic du vêlage. Le pourcentage global des grossesses a varié de 30 à 50% durant l'année. Les vaches post-partum ont présenté des circonférences de cœur et des BCS moyens minimaux 12 à 14 semaines après le vêlage et l'intervalle de temps entre le vêlage jusqu'au début de l'activité ovarienne a été le plus long pour les vaches ayant une perte de BCS > 1.

Cambios estacionales en el estado nutricional y rendimiento reproductivo de las vacas cebú mantenidas en un sistema agrícola-pastoral tradicional en Tanzania

Resumen – Los objetivos de este estudio fueron evaluar los cambios en el estado nutricional y en la puntuación de la condición corporal, el porcentaje de embarazos, y la tasa de nacimientos de becerros en las vacas cebú para así establecer la relación entre la pérdida de la puntuación de la condición corporal y el intervalo post-parto hasta la reanudación de la actividad ovárica. Se seleccionaron al azar un total de 198 vacas y vaquillas que habían alcanzado la pubertad, de entre 200 manadas de ganado cebú Shorthorn de Tanzania de pequeños propietarios, mantenidas bajo un sistema de manejo tradicional. Los factores que se investigaron durante las visitas bi-semanales incluyen la puntuación de la condición corporal (PCC), la circunferencia del perímetro del corazón, la producción de leche, y el estado reproductor de los animales, es decir embarazo o no embarazo, y ciclicidad o no ciclicidad. Las condiciones climatológicas locales y las fechas de presentación de otros sucesos reproductivos como el nacimiento de becerros también se registraron. El nacimiento de becerros ocurría durante todo el año, pero tenía una fuerte distribución estacional caracterizada por picos anuales observados entre abril y julio. El patrón de nacimientos anuales estaba estrechamente relacionado con las lluvias, habiendo precipitaciones máximas unos meses antes del nacimiento máximo de becerros. El porcentaje total de preñez variaba de 30 a 50% durante todo el año. Las vacas post-parto exhibían unos valores mínimos de la PCC media y de la circunferencia del perímetro del corazón de las 12 a las 14 semanas después del parto, y las vacas con pérdida de la PCC > 1 punto exhibían el intervalo de tiempo más largo desde el parto al inicio de la actividad ovárica.