Factors affecting milk production of Kenana and Butana cows in the Gezira State, Sudan

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Summary

The present study involved three herds located in Wad Medani Gezira State, two governmental farms (ElShukaba and ElNisheasiba) and ElBashaer private farm. The objective was to evaluate the effect of breed, herd, parity and calving season on lactation yield, lactation length, dry period and calving interval. Data on 43 Kenana and 27 Butana cows were extracted from the herds record books during 1970/1998 and analysed using the computer SPSS program.The overall mean milk yield was 1330.5±48.6kg in 278.6±7.11 days, the dry period and calving interval were 200.0±12.2 and 487.3±15.5 days respectively.

Although the two breeds were statistically similar in the studied traits, but Butana cows were found to secure a significantly shorter dry period.

The yield inEl Bashaer herd was significantly higher than that of the other herds, the milking duration was longer and thedry period and calving interval were shorter.A progressive increase in milk yield concomitant with a systematic decresingtrendin dry period and calving interval was observed as parities advanced from the first to the third.

A better production performance was however, achieved by Butana compared with Kenana cows and by ElBashaer herd (a private sector vensure) compared with the Public ownership herds.

Introduction

Among cattle population in the Sudan are two important ecotypes, Kenana and Butana which show a considerable milk production potential. Nowadays the demand for liquid milk has increased with the rise in human population. Therefore, improvement of dairy production has become of paramount importance. In tropical countries several trials for this improvement have been attempted, with limited results due to many constraints among which poor genotype of tropical breeds imposes limits on the productivity which has also hindered the adoption of the new innovations and technologies for improved productivity (Fad El Moula, 1994). Several trials in the Sudan, Fad El Moula (1994) and in Bangladish, Ahamad *et al*. (2011) proven the superiority of crossbred cows over the indigenous ones.

The objectives of this study was to obtain estimates of productivity of the two main dairy ecotypes in the Gezira, and to investigate the effect of breed, herd, parity and calving season on some production traits namely, milk yield, lactation length, dry period and calving interval of these ecotypes.

Materials and Methods

Location:

Data was collected from El Shukaba Research Station, El Bashaer private farm south of Wad Medani and El Nisheashiba, University of the Gezira Farm Northof Wad Medani.

Data collection and manipulation:

Milk production records of 43 Kenana and 27 Butana cows completed their first lactation were chosen during (1970/1998). Traits investigated were total milk yield, lactation length, dry period and calving interval.

For the purposes of this study the year was divided into three seasons namely, dry summer (March – June), wet summer (July – October) and winter (November – February).

Management:

Cows were maintained in earth-bedded yards under corrugated iron roofs with open sides. Grazing was the principal method of feeding during the rainy season. Some green forages (legumes and grasses) were occasionally fed during the winter season. Preserved by-products (Agricultural and industrial) were offered during hot summer. Concentrate supplements were fed during milking time. Cows were milked twice daily with their calves present, and the calves were fed colostrums 3days following parturition and fed on liquid milk up to weaning at 3months old.

Statistical analysis and methods of calculations:

The data were analysed using the statistical Package for Social Sciences, SPSS (1983). Duncan's Multiple Range Test (Duncan, 1955) was used to separate means.
The following statistical model was fitted to estimate the effect of breed, herd, parity and calving season on milk yield, lactation length, dry period and calving interval.

$$Yijkl = U + B_i + H_j + P_k + S_L + E_{ijkl}$$

Where:

Yijkl = The individual observations on the trait studied (Milk yield, lactation length, dry period or calving interval)

B_i = Breed effect: 1= Kenana, 2= Butana.
H_j = Herd effect: 1= El Shukaba, 2= El Bashaer, 3= El Nisheashiba.
P_k = Parity effect: (k=1,..,3).
S_L = Season of calving (L= 1,..,3): 1= Dry summer, 2= Wet summer, 3= Winter.
E_{ijkl} = The random error term.

Results

The overall mean milk yield presented in **Table 1** is 1380.5±48.6kg in 278.0±7.1 days. The highest yield and the longest milking duration were achieved by Butana cows (1446.5±78.0kgin 285.1±11.2 days. The herd with the highest yield was El Bashaer (1720.8±92.4kg in 300.4±13.2 days) A significant (P>0.05) progressive increase in milk yield with advanced parities was observed. The respective values in the three parities were 1297.3±80.9; 1416.9±83.7 and 1430.3±89.4kg. This increase in yield was concomitant with a significant (P>0.05) systematic downwards trend in lactation length with parity order.

Season affected lactation length significantly (P<0.05) with the highest yield (P>0.05) observed in wet summer (1438.5±78.9kg) in a short duration of 262.7±11.3 days.

The overall mean of dry period and calving interval was 200.0±12.2 and 487.3±15.5 days respectively (**Table 2**).

The effect of breed on dry period was significant (P<0.05) (220.2±15.4 and 176.2±19.5 days for Kenana and Butsana, respectively)and its effect on calving interval was also significant (P<0.05) (499.7±19.5 and 472.9± 24.8± days, respectively) Herd and season of calving affected both traits (P<0.05), where cows in El Nisheashiba herd had the longest dry period and calving interval of 276.0±19.3 and 580.0±24.3 days, respectively. Dry summer calvers also displayed the longest dry period and calving interval of 210.1±23.3 and 502.5±29.6 days, respectively. Parity order did not have a significant effect (P>0.05) on either trait despite the presence of a systematic downwards trend in both traits.

Table 1. Least-squares means and standard errors for total milk yield (kg) and lactation length (days) by breed, herd, parity and calving season of Kenana and Butana cows in the Gezira State.

Items	No. of cows	Milk yield		Lactation length	
		LSM	SE	LSM	SE
Overall					
Breed:	70	1380.5	48.6	278.6	7.1
Kenana	43	1324.3	61.4	273.0	8.8
Butana	27	1446.5	78.0	285.1	11.2
Herd:					
Shukaba	25	1102.0^{c}	84.0	245.1^{b}	12.0
Bashaer	20	1720.8^{a}	92.4	300.4^{a}	13.2
Nisheashiba	25	1302.8^{b}	76.4	288.2^{b}	10.9
Parity:					
First	70	1297.3	80.9	291.2	11.6
Second	68	1416.9	83.7	274.5	12.0
Third	50	1430.3	89.4	269.8	12.8
Calving season:					
Dry summer	67	1298.6	93.0	293.1^{a}	13.3
Wet summer	64	1438.5	78.9	262.7^{b}	11.3
Winter	78	1429.1	82.7	281.5^{a}	11.8

LSM = Least-squares means
SE = Standard errors
Means with different superscripts differs significantly at (P<0.05).

Table 2. Least-squares means and standard errors for dry period (days) and calving interval (days) by breed, herd, parity and calving season of Kenana and Butana cows in the Gezira State.

Items	No. of cows	Dry period (days)		Calving interval (days)	
		LSM	SE	LSM	SE
Overall					
Breed:	70	200.0	12.2	487.3	15.5
Kenana	43	220.2[a]	15.4	499.7	19.5
Butana	27	176.2[b]	19.5	472.9	24.8
Herd:					
Shukaba	25	175.6[b]	21.1	443.9[b]	26.7
Bashaer	20	146.9[b]	23.2	435.6[b]	29.4
Nisheashiba	25	276.0[a]	19.3	580.0[a]	24.3
Parity:					
First	70	212.8	20.3	493.0	25.7
Second	68	205.6	21.0	488.6	26.6
Third	50	180.4	22.4	480.0	28.4
Calving season:					
Dry summer	67	210.1[a]	23.3	502.5[a]	29.6
Wet summer	64	192.7[b]	19.8	469.3[b]	25.1
Winter	78	198.5[ab]	20.7	491.7[a]	26.3

LSM= Least-squares means
SE= Standard errors
Means with different superscripts differs significantly at ($P<0.05$).

Discussion

The overall mean milk yield **Table 1** was higher than the estimate of yield by indigenous cows in the Gezira State reported by Mohamed *et al*. (1991). However, the estimate of lactation length was shorter than the recommended length of 305 days proposed by cow calendar (Patil and Prasad, 1970).

The higher El Bashaer yield (private sector vensure) in a longer milking duration ($P<0.05$) might be a result of the better management practices in this privately owned farm and the economic constraints associated with the public ownership farms. The table shows the superiority of Butana cows over Kenana ($P>0.05$) in milk yield although the difference was not significant. the production of the two breeds reported here is less than the estimates reported by Musa (2001) and Osman (1981).The inconsistency may be explained by differences in lactation length and/or levels of management. Milk yield in this study tended to increase steadily with parity order. Ishag (2000).and Fad ElMula (1994) in a study of Sudanese crossbred cows records attributed this increase to the increased body size and udder development during recurring pregnancies. The insignificant parity effect on the length of lactation was supported by the findings of Vasconcelos (1986).

Despite the fact that the effect of season on milk yield was not significant, wet summer calversgave the highest yield. These results were in line with the findings of Abate *et al*. (2010) Ko*et al*. (1989) who claimed that milk yield tended to be better in certain seasons due to favourable climate.

Sharma *et al*., (1982) reported a significant parity effect on the dry period contrary to the results of the present study **Table 2.** Singh and Tumor (1991) supported the view

that season influences the dry period and that the shortest duration was exhibitedby the wet summer calvers in agreement with the results of the present study. However, Fad El Moula (1994) did not find a significant effect of calving season on dry period in a study on crossbred cows records.

The mean calving interval **Table 2** was longer than the optimal interval of between 12-14 months as stated by Johansson and Hansson, (1940).The interval showed significant variation between breeds ($P<0.05$) and herds ($P<0.05$). Nisheashiba herd and Kenana cows demonstrated the longest calving intervals, the latter of which was close to an estimate on Kenana cows reported by Wilson *et al*. (1987). No parity effect on calving interval was found in this study nor in the results of Fengaly (1980), Musa (2001), and Khalafalla (1977). The sequence of calvings had no significant effect ($P>0.05$) on the length of the caving interval. The longest interval was found after the first parity **Table 2** which is similar to the findings of Bath *et al*. (1985) who stated that the cause might be the lactation stress in young growing animals and the ability of the older ones to gain weight and condition quickly after calving. The shortest calving interval ($P<0.05$)was obtained by the wet summer calvers **Table 2** in agreement with results from a study on Egyptian Friesian cows records claimed by Hammound *et al*. (2010).

Conclusion

The difference in yield between the two breeds (Kenana and Butana) was not signicant although the Butana breed exhibited higher production.

The private herd (El Bashaer) achieved better milk yield in a longer milking duration than the two governmental herds, with a shorter dry period and calving interval.

The dry period and calving interval in all three herds were not in accordance with the recommended length. This is probably an indication of poor management practices.

Adoption of better management practices especially feeding that promote milk production.

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