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Original Article

Some Productive and Reproductive Traits of Kenana × Friesian Cattle in Sudan

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ABSTRACT

The present study was conducted to investigate the performance of 50% Friesian ×50% Kenana crossbred dairy cattle. 194 records of F1 crossbred (progeny of Kenana ×Friesian) and 48 records of F1×F1 crossbred were analyzed. Traits studied were milk yield (Kg), calving interval (days), conception rate and gestation period (days). Obtained results showed that overall least square means of traits studied were 2444±164 kg, 514±0.53 days, 1.4±0.02 and 281±1.02 days respectively. Results showed that the mode of inducing the exotic blood (Kenana× Freisian or F1 ×F1), lactation number and age at first calving significantly (P≤0.05) affected milk yield, F1 cows, and cows in late lactations and young cows at first calving being superior. On the other hand, Blood groups and lactation number adversely affected calving intervals (P≤0.05). Also results showed that blood group differences, lactation number and age at first calving significantly (P≤0.05) affected the number of services per calving. Finally, blood groups, lactation numbers and age at first calving had no significant (P≤0.05) effects on gestation length. It is concluded that, performance of F1×F1 crossbred Kenana Cattle was lower than that of F1 Kenana cattle in studied traits.

KEY WORDS: Calving interval, Conception rate, Gestation, Lactation, Nile

INTRODUCTION

Sudan is a vast agricultural country. The population of cattle was estimated around 38.325 million heads (Medani, 2003). Kenana and Butana cattle ecotypes are the most promising indigenous milk breeds in Sudan, they can produce in research stations under improved feeding and management more than 1500 kg milk per lactation (Saeed et al., 1987, El-Habeeb, 1991 and Musa et al., 2005).

Local breeds of cattle play a vital role in relevant and sustainable livestock production in most Eastern African compared with exotic breeds, they are well adapted to survive and reproduce under the region's harsh environments (Okomo-Adhiambo, 2002). It is a common practise to upgrade local breeds with exotic high milk yielding breeds as a response to the raising demand for milk in urban areas (Musa et al., 2006). It is noted that crosses of local and exotic breeds produce and reproduce better than local type (McDowell, 1985). The objective of the present study is to investigate some productive and reproductive traits in two types of 50% Friesian ×50% Kenana crosses.

MATERIAL AND METHODS

Study area

Data was obtained from Nisheishiba dairy farm. This farm was established 1959 to study Kenana cattle. Nisheishiba is located on the western bank of Blue Nile ,about two km from Wad Medani, 184 km from Khartoum and at latitude 14° -24' N a longitude 33°-29' E and altitude 407 meters above sea level, in a heavy clay soil.

Herd Management

The main fodder crops cultivated were Lubia (*Dolicus lablab*), Sudan Grass, Clitoria and Abu 70 (Sorghum bicolor) representing the major animal feeds. Milking and late pregnant cows were independently grazed in an already scheduled, paddock after the morning and evening milking in addition to some fresh and conserved forage at mid-day. Concentrates that are composed of crushed dura grains, oil seed cakes, molasses, wheat bran and normal salt were given according to productivity. Late pregnant cows were also supplied with some concentrates according to their previous

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scores of milk production. Minerals were available in form of salt licks. Milking was practiced twice daily without calve sat 12 hours intervals.

Data Collection

Total sample of 242 records from El-Nisheishiba dairy farm was taken. Traits intended were: milk yield, calving interval, services per calving and gestation periods. Data studied represent the period 1977-2007.

Statistical Analysis

Data extracted from record sheets were coded for statistical analysis using SPSS and Harvey programs. The general model used:

Yijk= U+Bi+Gj+eijk

Where:

Yijk = Trait studied of the nth cow of i^{th} blood level group and K^{th} lactation.

U = the overall mean of the trait

Bi = The effect of i^{th} blood level group (I= 1 and 2)

1 = 50% F (F1)

2 = 50% F (F1×F1)

Gj = The effect of J^{th} age groups at first calving (J= 1….4) where:

1= age equal to or less than 30 month

2 = age 31-35 month

3 = age 36- 40 month

4 = age 41 month and older

Hk = the effect of the K^{th} lactation number (K= 1….4) where:

1= first lactation

2 = second lactation

3 = third lactation

4 = forth lactation

Eijk = the random error

RESUTS AND DISSCUION

Table 1 revealed that the overall least square mean of milk yield was 2443.99±164.17 kg. Results obtained for F1 (2588.20±136.76) is in agreement with Mohammed (1995) and Fadlelmoula et al. (2007). This estimate was lower than life time milk yield reported by Aynalem Haile (2001) for the Ethiopian Boran Cattle (2630 kg). Results showed that blood group, lactation number and age at first calving significantly (P≤0.05) affected in milk yield.

Milk yield was highest in the cross of pure breeds than the cross of F1×F1.This trait also increased as cows progress in lactations but it decreased as age at first calf increased. Comparison between F1 and F1×F1 crosses showed that there is deterioration in milk production at an average of (473 Kg i.e. 22%). This result is in accordance to Syrstad (1989), Bhatnagar et al. (1981), Parmer et al. (1980). The variation in milk yield between the two blood level groups may be attributed to the effect of gene segregation and hybrid vigor.

Table1. Least square means of milk yield (kg): Overall and effects of blood level, lactation number, and age at first calving in Kenana cattle

Factor	NO.	Means± SE
Overall	242	2443±164
Blood Groups		
Group 1	194	2588a±137
Group 2	48	2115b±439
Lactation numbers		
1st	61	2186c±348
2nd	61	2308b±237
3rd	63	2571ab±341
4th	57	2781a±345
Age at first calving		
≤30 month	68	2569ab±204
31-35	48	2489ab±242
36-40	22	2678a±471
41 month	104	2323b±167

Means with the same letter were not significantly different (P≤0.05). Different letters denote significant difference at (P≤0.05). Group 1= F1(100% Friesian ×100% Kenana). Group 2 = F1×F1

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Table 2 showed the mode of inducing the exotic blood (Kenana× Freisian or F1 ×F1) and lactation number on calving intervals. The overall square mean of the trait was 513.60±0.53 days. This is lower than the estimate reported by Wilson et al. (1987) for Kenana cattle (530) and Azizunnesa et al. (2008) who reported 635±223 days but higher the range reported by Ahmed (2007) for 368±21 days for the 75%Freisian × 25% Kenana, 395±16 days for the 50% Freisian × 50% Kenana Mondal et al., (2005) for different genotypes (458±94.1) and Mulindwa (2006) for Uganda cattle (453 days) . For F1 group result obtained for the trait is close to that reported by Magzoub (1993) but higher than results depicted by Zaman (1983) and Mohammed (1995).

Calving interval is shorter in the progeny of F1×F1 and late lactating cows than in the progeny of pure breeds and early lactating cows. This may be attributed to nutritional effects caused by high milk yield of these cows. For F1 group result obtained for the trait is close to that reported by Magzoub (1993) but higher than results depicted by Zaman (1983) and Mohammed (1995). The mode of inducing the exotic blood (Kenana× Freisian or F1 ×F1) and lactation number adversely affected calving intervals (P≤0.05); the interval was 597±0.42 versus 471±1.36 days for blood groups and 534±.92 versus 459±0.92days in early and late lactation number. Results were comparable with many others reported by researchers (Trial et al., 1984, Ouda et al., 2001, Rege et al., 2006) for Other local breeds (Boran in Ethiopia, Horro, Begait, Fogera, Boran in Kenya).

Table 2. Least square means of calving interval (days): Overall and effects of effects of blood level, lactation number in Kenana cattle

Factor	NO.	Means± SE
Overall	189	514±0.53
Blood Groups		
Group 1	150	597b±0.42
Group 2	39	471a±1.36
Lactation numbers		
2nd	63	534a±.92
3rd	63	468b±0.92
4th	63	459b±0.92

Means with the same letter were not significantly different (P≤0.05). Different letters denote significant difference at (P≤0.05). Group 1= F1(100% Friesian ×100% Kenana). Group 2 = F1×F1

Table 3 depicts the effects of mode of inducing the exotic blood (Kenana × Freisian or F1 ×F1), lactation number and age at first calving on number of services per calving. The overall least square mean of number of services per calving was 1.4±0.02. Blood groups differences, lactation number and age at first calving significantly (P≤0.05) affected the number of services per calving. For blood groups, the progeny of the pure breeds exhibited better result compared to the progeny F1×F1 (1.3±0.05 versus 1.5±0.16). On the other hand, as for lactation number and age at first calving, cows that are at early lactation and that calved at younger age also need less number of services to conceive.

The overall square mean for number of services per conception (1.4) is higher than the result reported by Talukde et al. (2001) who found 1.04 but lower than results obtained by Mondal et al. (2005) for different genotypes (1.62±0.62), Rahman and Rahman (2006) who found 1.88 – 1.48 Azizunnesa (2008) who reported 1.88±1.09 and Aynalem Haile (2011) for Boran cattle in Ethiopia (2.44- 2.14). Variations in number of services per conception in this study between the progeny of Freisian× Kenana and F1×F1 and F1×F1 is in accordance with Mohammed (1995) and this variation is thought to be due to non – genetic factors (Khalfalla ana Khalifa, 1979).

Table 3. Least square means for number of services per calving: Overall and effects of blood level, lactation number, and age at first calving in Kenana cattle

Factor	NO.	Means± SE
Overall	245	1.4±0.02
Blood Groups		
Group 1	194	1.3a±0.05
Group 2	151	1.5b±0.16
Lactation numbers		
1st	62	1.15b±0.12
2nd	62	1.45a±0.12
3rd	62	1.37a±0.12
4th	62	1.31ab±0.12
Age at first calving		
≤30 month	64	1.13b±0.08
31-35	48	1.35ab±0.09
36-40	24	1.60a±0.16
41 month	109	1.37ab±0.06

Means with the same letter were not significantly different (P≤0.05). Different letters denote significant difference at (P≤0.05). Group 1= F1(100% Friesian ×100% Kenana). Group 2 = F1×F1

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Table 4 showed that the least square mean for gestation length in Kenana cattle was 280.5±1.02 days this is close to the result reported by Mohammed (1995), Rahman and Rahman (2006) and Yazdi (2009). Obtained result is higher than result reported by Olson et al. (2009) for pure Friesian cattle (277 days), Azizunnesa (2008) who reported 273±8 days, Talukde et al. (2001), who found 276±13 days and by Mondal et al., (2005) in different genotypes (275±4 days). The mode of inducing the exotic blood (Kenana× Freisian or F1 ×F1), lactation numbers and age at first calving had no significant (P≤0.05) effects on this trait.

Table 3. Least square means of gestation periods (days): Overall and effects of blood level, lactation number, and age at first calving in Kenana cattle

Factor	NO.	Means± SE
Overall	189	289±1.02
Blood Groups		
Group 1	150	281a±0.80
Group 2	39	281a±2.62
Lactation numbers		
1st	63	280a±1.77
2nd	63	280a±1.77
3rd	63	281a±1.77
4th	63	280a±1.77
Age at first calving		
≤30 month	51	280a±1.22
31-35	36	281a±1.45
36-40	18	280a±2.75
41 month	84	280a±0.96

Means with the same letter were not significantly different (P≤0.05). Different letters denote significant difference at (P≤0.05). Group 1= F1(100% Friesian ×100% Kenana). Group 2 = F1×F1

CONCLUSION

There is a considerable discrepancy in productive and reproductive traits between Kenana crossbred cattle. Cows 50% Kenana and 50% Friesian resulting from the cross of pure breeds is superior to that resulted from crossing F1 males with F1 females.

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