Some Productive and Reproductive Traits of Cross-bred Dairy Cows in North Darfur

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Abstract

The present study was conducted in North Darfur (Elfashir) during the period from March 2006 to April 2008 to assess the milk production and some reproductive traits of cross-bred dairy cows with Friesian (foreign inheritance over 50%) under tropical conditions in North Darfur (Elfashir). Records of 123 cross-bred cows were studied in addition to some productive and reproductive traits for 30 lactating cows were also studied in three selected dairy farms: (farm-1, farm-2 and farm-3). It was found that the total herd size was 153 head structured as; 47.7%, 16.34%, 17%, 15.7% and 3.18% lactating cows, dry cows, heifers, calves and bulls respectively. The farms were visited weekly for recording daily milk production, and daily observations. The study revealed that the mean milk production per cow per day was 10.4±7, 11.85±8 and 10.2±9kg in farm-1, farm-2 and farm-3 respectively, with an overall average of 10.82±8 kg, with no significant differences (p<0.05)(ANOVA) and the age at 1st calving was 31.4±3, 29.3±2.3 and 31.7±3.2 months in farm-1, farm-2 and farm-3 respectively, with overall average 30.8±3.23 months with non-significant differences in one way ANOVA table and there was high correlation between milk production and age at 1st calving (p<0.05). Whereas the open period and period were 76±18, 74.2±16 and 89±22 days as for open period and 75.6±6, 84.3±9 and 86±4 days for dry period in farm-1, farm-2 and farm-3 respectively, with overall average 80±16 days as open period and 82±8 days as dry period. The persistency was ranging between 4th to 9th week, 3th to 10th week and 4th to 9th week in farm-1, farm-2 and farm-3 respectively.

Key words: Transhumant pastoralism, Lactation Curve, Persistency, Open

Introduction

According to FAO (2005) Sudan owned a population of 128.7 livestock distributed as 38.3, 47.3, 39.9 and 3.2 million heads for cattle, sheep, goats and camels respectively. Ajeeb et al., (2010) found that livestock production in Sudan in general and in Darfur in particular is based on transhumant pastoralism and communal grazing, but according to Basher (1990) there were many attempts of crossing between local breeds (Kenana and Butana). In the study of Kenana dairy herds structures Attaia (1986) reported 35% as average of lactating cows and Abelmagid (1987) reported 35% of the herd are lactating cows in Kuku dairy project. Makawey and Ahmed (2005) reported that the average of milk production is about 2.9
kg per day in both Kenana and Butana cattle, but Ahmed (2004) reported 7.5 kg per day in Kenana Cattle. As for Age at 1st calving which is the period from the date of birth to the date of first calving, Abdalla (2002) stated that Friesian heifers calved at age less than 30 months and Habeeballa (1996) reported that the age at 1st first calving ranged from 36 to 40 months for local breeds (Kenana, Butana and Baggara cows) but Alim (1960) gave 38.4 months for Kenana cows. For the calving interval is 395 days for Kenana Cows as stated by Alim (1960) compared with 360 days for Friesian cows under Sudan environment as mentioned by Basheer (1990). Whereas the open period and dry period, Rahmattalla (1999) stated that the average open days is 86.6 days in Friesian cross-bred cows, whereas Ageed (1978) mentioned 139.6 days in Sahiwal and Sahiwal crossed with Holstein Friesian. For the dry period Heinrichs and Ken (2005) stated that milk yield usually reduced when the dry period is less than 25 to 60 days. Another pattern of lactating cows is the persistency, which means according to Makawey and Ahmed (2005) the capability of the cow to keep peak yield as long as possible. Rahamattalla (2002) reported that the persistency does not extent for more than ten weeks from calving date in best dairy breeds on average.

Despite the large numbers of livestock in Sudan but the lack of raw milk and milk products remained sharply that due to the weakness of productive potentiality of local breeds, compared with foreign breeds. Hence Important of the this study that the best alternative for milk supply to overcome the lack of milk in Darfur in general and Elfashir in particular are the attempts of crossing between local breeds (Kenana and Butana) with the exotic dairy breeds as e.g. Holstein-Friesian which have a higher milk production potential, in order to improve the genetic potential of Sudanese dairy cattle, while keeping, a degree of adaptability to local environment. So this study aimed to assess the milk production and some reproductive pattern that affect milk yield and to high light the economic importance in cross-bred cows in North Darfur.

Materials and Methods

Study area: The study was conducted in North Darfur state (Elfashir) in the period from March 2006 to April 2008

The Study Animals: The study was conducted on 153 crossbred dairy cows with 50 cross bred dairy cows (Kenana/Butana x Holstein-Friesian) with over 50% foreign inheritance and from three farms in Elfashir (in which proper record were available); (Nahar farm-1, Dr. Haneen-2 farm and Military farm-3)

Type of Study Designing: comparative case study

Data collection Methods: The obtained data was collected from:
- Experiment included 30 lactating cows in rate of 10 cow from each farm of three investigated farms,
- The experiment designed in Randomized complete block design
- Record for three to five previous years from 2003 to 2008) for 123 heads of Crossbred cattle were studied in the three farms.
- The data collected included herd size and structure, age at first calving, milk yield, open days, dry period and number of, lactation season, and lactation curve.

Data Analysis: Data analyzed by (SPSS, 2009) through descriptive statistics (frequencies) for nominal variables in Table 2 and compared means and one-way ANOVA for numerical variables to calculate averages, S.E. mean and significant differences as in (Table 2)
Results and Discussion

Herd size and structure of cross-bred dairy cows in North Darfur

Herd size: From Table (1) It was found that the herd size at the three farms was 49, 73 and 31 heads in Farm-1 (Dr. Nahar dairy farm), Farm-2 (Dr. Haneen dairy farm) and Farm-3 (Military dairy farm) respectively. The biggest herd was in Farm-1 and the smallest in Farm-3 and the total size of study herd was 153 heads.

Herd structure: Table (1) showed that the overall percentages of herd size were 32.03%, 47.7% and 20.26% in farm-1, farm-2 and farm-3 respectively. The average of Lactating cows in the investigated farms were, 46.6%, 50.7% and 41.9% in farm-1, farm-2 and farm-3 respectively, with total average about 47.7%

Table 1: Herd size and structure of cross-bred dairy cows in North Darfur

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Farm1</th>
<th>Farm2</th>
<th>Farm3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage</td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>Herd Size</td>
<td>49</td>
<td>32.03</td>
<td>73</td>
<td>47.7</td>
</tr>
<tr>
<td>Lactating cows</td>
<td>23</td>
<td>49.96</td>
<td>37</td>
<td>50.7</td>
</tr>
<tr>
<td>Dry cows</td>
<td>8</td>
<td>16.33</td>
<td>11</td>
<td>15.07</td>
</tr>
<tr>
<td>Heifers</td>
<td>10</td>
<td>20.4</td>
<td>11</td>
<td>15.07</td>
</tr>
<tr>
<td>Calves</td>
<td>6</td>
<td>12.24</td>
<td>12</td>
<td>16.4</td>
</tr>
<tr>
<td>Bulls</td>
<td>2</td>
<td>4.1</td>
<td>2</td>
<td>2.74</td>
</tr>
</tbody>
</table>

These percentages are slightly higher than that mentioned by Attia (1986) and Abelmagid (1987) who reported 33.6% lactating cows from Kenana herd and 35% lactating cows in Kuku dairy project respectively. That because the owners used to send some of dry cows out of farms to graze on natural pastures especially in farm1. Dry cows, heifers, calves and bulls represent 17.13%, 17.4%, 16.01% and 2.8% of the total herd size respectively. The percentages of herd structure in the investigated herd were also a bit different than that stated by Abdalla (2002) who reported 11.77%, 21.69%, 32.03% and 1.77%, dry cows, heifers, calves and bulls respectively. The highest percentage of lactating cows was 50.7% in Farm-2 (Dr. Haneen Farm); this indicated that a proper management system was followed according to the veterinary background of the manager and the lowest percentage was 41.9% in Farm-3 (Military farm).

Some production and reproduction traits of cross-bred dairy cows

Milk yield (kg): The average of milk yield per cow (Table 2), in the three investigated farms, were 10.4±7, 11.85±8 and 10.2±9 kg, per day, in Farm-1, farm-2 and Farm-3 respectively. While the total average of milk yield of the investigated farms was 10.82±8kg per day with non-significant differences (p<0.05) between the concern farms and highly correlated to age at first calving (appendix-1) theses values were higher than that stated by Makawey and Ahmed (2005) who reported and 2.9 kg per day as average milk yield for Kenana and Butana cows and higher than that mentioned by Abdelmagid (1987) and Ahmed (2004) who gave 5.6 kg and 7.5 kg as milk yield average per cow per day respectively for local cows Kenana and Butana. The total milk production for three farms was 2256.74 kg per season per cow; this value was less than that reported by Makawey and Ahmed (2005) who reported 5500 to 6500 kg milk yield for Friesian cows per season.
Age at first calving: Table (2) showed that the age at first calving ranged between 27 to 36 months, with an overall average of 30, 8±3 months. There was a significant correlation between the age at first calving and lactation season (p>0.05) (Appendex 1). This average of age at 1st calving in this study were slightly lower than that stated by Habeeballa (1996) who reported 36-40 months for Kenana and Butana and Alim (1960) who reported 38,4 months for Kenana cows.

The differences between age at first calving in the current study and that reported by Habeeballa (1996) and Alim (1960) might be related to inheritances factors due to crossing with Friesian breeds. The range of age at first calving from 24 month's to 36 months in this study was higher than that reported by Habeeballa (1996) who reported 36-40 months in cross-bred and 24 months in pure Friesian cows and these results agreed with that reported by Abdalla (2002) who stated that Friesian heifers calved at age less than 30 months.

Open period (service period): Table (2) showed that the open period in the investigated farms ranged between 61-125 days, with overall average 80±16.7 days. These results were in line with that reported by Rahmatalla (1999) who reported 84.6 days in Friesian cross-bred. The open period in this study was also lower than that stated by Ageed (1978) who found that the service period was 139.6 days in Sahiwal and Sahiwal × Holstein.

Dry period: The overall average of dry period, in the investigated farms (Table-2) was 82.8±8 days. The average is longer than that reported by Heinrichs and Ken (2005) who stated that milk yield in lactating cows usually reduced when the dry period is less than 25 to 60. Dry period more than 60 days always resulting in shortening of lactation

Table 2: Some Productive and Reproductive Traits of Cross-bred Dairy Cows in North Darfur

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Farm1</th>
<th>Farm2</th>
<th>Farm3</th>
<th>Average</th>
<th>Total*kg/season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of milk yield/cow/day in kg</td>
<td>10.4±7a</td>
<td>11.85±8a</td>
<td>10.2±9a</td>
<td>10.82±8*</td>
<td>2256.74</td>
</tr>
<tr>
<td>Minimum</td>
<td>5.9</td>
<td>6.57</td>
<td>4.73</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Maximum</td>
<td>9.4</td>
<td>10.52</td>
<td>9.2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Age at first calving'months</td>
<td>31.4±3a</td>
<td>29.3±2.3a</td>
<td>31.7±3.2a</td>
<td>30.8±3.2*</td>
<td>-</td>
</tr>
<tr>
<td>Minimum</td>
<td>27</td>
<td>24</td>
<td>27</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Maximum</td>
<td>36</td>
<td>33</td>
<td>36</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Open period'days</td>
<td>76±18a</td>
<td>74.2±16b</td>
<td>89±22a</td>
<td>80±16.7</td>
<td>-</td>
</tr>
<tr>
<td>Minimum</td>
<td>60</td>
<td>53</td>
<td>61</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Maximum</td>
<td>115a</td>
<td>105b</td>
<td>125a</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dry period'days</td>
<td>75.6±6</td>
<td>84.3±4</td>
<td>86±14</td>
<td>82±8</td>
<td>-</td>
</tr>
<tr>
<td>Minimum</td>
<td>28</td>
<td>35</td>
<td>62</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Maximum</td>
<td>136</td>
<td>120</td>
<td>125</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

a: no significant differences (in one way ANOVA table)
b: significant difference (in one way ANOVA table)
* Correlation to (p<0.05)

Persistency: The persistency in the investigated farms (Figure 1) was ranging between the 4th week to 9th week, from 3rd to 10th week and from 4th to 9th week in farm1, farm2 and farm3 respectively. Farm (2) showed the longest persistency in comparison with other two farms which ranged from 4 to 10 weeks with average of 7 weeks. These values agreed with Rahmatalla (2002), who reported that, the rising in milk phase doesn't extend more than 10 weeks from calving.
Conclusion
The performance of the cross-bred dairy cows in investigated farms varies from one to another and the average daily milk production in general is lower than what is expected due to improper hygienic measurements, associated with high temperatures and poor system of management.

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بعض الخصائص الإنتاجية والتناسلية لأبقار اللبن الهججين في شمال دارفور

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المستخلص:

أجرت هذه الدراسة في شمال دارفور(الفاشر) لتقدير إنتاج اللبن وبعض الخصائص التناسلية لأبقار اللبن الهججين ذات النم الإنجليزي أكثر من 50% في شمال دارفور (الفاشر). تم دراسة عدد 123 سجل لابقار الهججين بالإضافة إلى 30 بقرا حليب في ثلاثة من مزارع الألبان (المزرعة 1، المزرعة 2 والمزرعة 3). كنرت الزائرة أسبوعيًا للتسجيل إنتاج اللبن اليومي والملاحظات وجد أن العدد الكلي للقطع هو 153.

ران بيركلي كما يلي: 34.16%، 17.15%، 7.18% من أبقار جلوب وأبقار عجلات عشار، عجل وفحل على التوالي. أوضح الدراسة أن متوسط انتاج اللبن اليومي للبقرة كان 4.41 و 8 و 13.65 لترًا في المزرعة 1، المزرعة 2 والمزرعة 3 على التوالي. مع متوسط انتاج كلي يبلغ 4.10 و 13.65 لترًا في اليوم دون فروقات معنوية (p<0.05) في جدول تحليل النتائج والعمر عند أول ولادة كان 31.32±9.2 سمًا في المزرعة 1، المزرعة 2 والمزرعة 3 على التوالي مع متوسط كلي يبلغ 3.22±0.30 شهابًا. ولا يوجد فروقات معنوية (p<0.05) في جدول تحليل النتائج إحدى الأنواع.

وقد وجدت الدراسة أن هناك ارتباط بين انتاج اللبن والعمر عند أول ولادة. أما الفترة المفتوحة وفترة التحفيز كانت 18±6.76 يومًا، 74.2±1.8 يومًا، 86.4±2.2 يومًا. البقرة تتروج بين الأسبوع الرابع والثامن، الأسبوع الثالث والعشة الأسبوع الرابع والثامن في المزرعة 1، المزرعة 2 والمزرعة 3 على التوالي.