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Assessment of Lactation Performance of Dairy Cows in and around Gondar Town, North Gondar, Ethiopia

Assefa Adane and Mulugeta Ayalew*

University of Gondar, College of Veterinary Medicine and Animal Sciences, Department of Animal production and extension, Pobox 196, Gondar, Ethiopia

**Corresponding author*

Abstract

This study was conducted in Gondar town and nearby kebeles aiming to assess the overall lactation performances of local and crossbred dairy cows in Gondar town and nearby kebeles and to estimate, lactation yield, daily milk yield, and lactation length of local and cross bred cows. Both exploratory and diagnostic surveys were used to generate qualitative and quantitative data for the study. Moreover, a rapid survey technique with key informant interview method was used and then after taking inventory of all dairying activities, by using random and purposive sampling technique, 28 households were randomly selected from four kebeles namely, (8,16,18 and 20) those were selected purposively for formal survey (multipurpose single visit survey method), and the selected members were interviewed using standardized questionnaire. Details on animals were gathered from owner's interview based on the prepared and pretested questionnaires. The data were analyzed using ms excel the overall average milk yield per lactation in the study area was estimated to be 1365.6 liters per lactation out of 781.2 liters per lactation (n=46) for local cows and 1950 liters per lactation (n=54) for crossbred cows. In the study area considering average lactation length and average lactation yield of local cows, the average estimated daily yield milk off take was 2.8 liters per day for local cows (n=46) and 5.2 per day for crossbred cows (n=54) respectively. Lactation length of local cows (n=46) 9.9 months and 12.15 months for crossbred dairy cows were founded as a result of this study. In conclusion, in the study area intervention measures mainly in the areas of small scale dairy production and milk processing activities have to be given due consideration to fill the gaps and to attain maximum potential of production and productivity.

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Keywords

Crossbred Cows; Lactation Performance; Lactation length, and Lactation yield

Introduction

Ethiopia is believed to have the largest livestock population in Africa. The total livestock population for the country is estimated to be about 56.71 millions of cattle, 29.11 million goats, 29.33 million sheep and 0.92 million camels (CSA, 2015). Out of 56.71 million the female cattle constitute about 55.45 percent and the

remaining 44.55 percent are male cattle. From the total cattle in the country, 98.66 percent are local breeds and the remaining 1.19 percent and 0.14 percent are hybrid and exotic breeds, respectively (CSA, 2015). Livestock sector contributes about 12-16% of the total GDP, and 47% of total agricultural GDP values for draught power, transport and manure (IGAD, 2010) and contributes to the livelihoods of about 60-70% of the Ethiopian

population (Azage *et al.*, 2013). Currently the demand for dairy products in the country exceeds supply, which is expected to induce rapid growth in dairy sector (Hearse *et al.*, 2007). In Ethiopia about 300,000 crossbred or upgraded cows are used for milk production under relatively improved management conditions in urban and peri-urban areas. The total milk production per year from cattle is 0.8 million tons out of 1.0 million tons from all the species put together in Ethiopia (Azage *et al.*, 2000). Milk production potential of indigenous cattle of Boran, Horro, Barca, Arsi and Fogera is low, ranging from 494 to 809 kg per lactation. It has also been well documented that, in breeding schemes, the raise in milk production through selection is about 1% per year or 3-4 Kgs per lactation (Zelalem, 2000). Demand for milk and milk products are highly increasing through time. However, the supply for these demandable products is not sufficient this is the results of inadequacy of production inputs like, feed, land, capital and production skills, poor extension service and poor management. This study was mainly intended to assess over all lactation performance of dairy cows in Gondar town and nearby kebeles under the influence of genetic group.

Materials and Methods

Description of study area and data sources

Both qualitative and quantitative data used for the study were generated using exploratory and diagnostic survey. The data that were generated by exploratory survey and secondary information includes. The primary data used for the study were collected using diagnostic survey, which includes the following major data groups; Data categories, functional parameters and performance indicators for the assessment of the production to consumption sub-systems (Table 1).

By defining the location of a dairy shed based on the information collected during the informal diagnostic survey, the geographical distribution of these sampling units within the dairy shed were established. It was anticipated that much of the information required for assessment of performance were gathered through primary data collection at the household level.

Sampling and data collection methods

The methodology utilized was multipurpose single visit survey method a formal survey of a representative sample of dairy production units within the dairy shed. The sample size proposed was in the range 100 to 150

units Rey *et al.*, (1999). Total of 100 dairy cows were randomly selected from 28 small scale dairy producers (households) and two large scale dairy farms (Bridge from Israel and University of Gondar dairy farms) were considered adequate from four kebeles (kebele 8, 16, 18 and 20) for the formal survey interview. Both exploratory and diagnostic surveys were used to generate qualitative and quantitative data for the study. Before starting the actual formal survey, developed questionnaires were pre-tested for the suitability of the study. Field observation was taken of respondent farmers in the sampling area. Details on animals were gathered from owner's interview. Critical problems and constraints were identified.

Data analysis

Statistical analysis used in study can vary depending on the type of variables and information obtained. However, the quantitative data were analyzed using descriptive statistics (percentage, mean, median, mode and standard deviation). Computer software like, Ms-excel used for data analysis and tables, graphs and chart were used for data presentation.

Results and Discussions

Characteristics of household

From the total of respondents the average family size of the households was 6 (ranging from 1-8). Majority of the household heads in the study area were married and the male family can be participating in dairy farming activity. While the age (31-40) of the respondent 66.67 % and they participated in dairy production practices. The major occupations of households in the study area were found as dairy production, trade, livestock and crop respectively. The educational statues of the respondents were, (1-4), (5-8), (9-12) and above 13.3, 20, 46.67, 20% respectively. The respondent whose educational level (9-12) highly participating in dairy production (Table 2).

Lactation performance of dairy cows

Lactation Yield (LY)

The first and most important purpose of dairy cattle production is to produce milk for family use and for commercial purpose or income generation. Table 3 - Lactation performance of dairy cows in the study area

The overall average estimated lactation yield of local and cross bred cows was found to be 1365.6 litres of which 781.2 litres (n=46) were for local cows and the average lactation yield of cross bred in study area was 1950 litres per lactation (n=54) respectively. The milk yield of dairy cows in study area was found to be very high compared to result of study conducted in Chacha town which were 457.8 litres for local cow and 1511.5 litres for cross bred cows as reported by Mulugeta and Belayneh, 2013. The result of the present study was better than result of study conducted by Gashaw, (1992) that annual milk yield of cross breed cows in Selale is 1291.8 liters. (Kberu, 2000), has reported an overall mean annual milk yield of 1581 kg for crossbred cows kept in Agarfa.

Lactation length (LL)

The overall lactation length of both local cows and crossbred cows in Gondar town and nearby kebeles was 10.27 months as farmer’s statements. The estimated average lactation length for local cows was 9.9 months and the average lactation length of cross bred dairy cow in Gondar town was 12.15 months, (refer table 3). The obtained result in this study was relatively proximate to the lactation length of study conducted in Lima town which was 9.13 months according to (Belay, 2012) and 10.1 months and 11.1 months (Yilma, 1999).

Table.1 Functional parameters

Data Category	Functional Parameters
Lactation performance	With respect to the number of cows milked & daily milk yield, cow genotype, amount of milk production, lactation length, average milk yield.
Constraints face while engaged in this area of production	The issues to increase production priority problems in different social, environmental and economical, management aspects, knowledge and skills related.

Table.2 Characteristics of the households

Variables	Categories	Respondents	%
Sex	Male	24	80
	Female	6	20
Age	20-30	9	30
	31-40	20	66.67
	Above	1	3.33
Educational level	1-4	4	13.3
	5-8 (elementary)	6	20
	9-12 (secondary)	14	46.67
	Higher education	6	20
Source of income	Livestock	12	40
	Crop and livestock	8	26.67
	Trade	7	23.3
	Other	3	10

Table.3 Lactation Yield (LY)

Parameters	Local breed (n=46)	Crossbreed (n=54)	average (n=100)
Daily milk yield(DMY) in Litres	2.8	5.2	4
Lactation length(LL) in Months	9.9	12.15	10.27
Lactation yield/LY/ in litres	781.2	1950	1365.6

Daily milk yield (DMY)

In Gondar town considering average lactation yield and lactation length of both local cows and cross bred dairy cows the overall average estimated milk off-take from both local and cross bred cows was found to be 4 litres per day per cow out of this the resulted average daily milk yield of local cows was 2.8 litres per day per cow and 5.2 litres per day per cow for crossbred dairy cows. This result was better in contrast to reports by Degena Aredo and Adugna (1999) in Lemi have reported national average of 1.09 litres per day per cow. In another way, the estimated daily milk yield of local cows in agreement with (Yitaye, 1999) who reported amount of 1.5 litres ranging from of 0.5 to 2 litres of daily milk yield for local cows and 1.5 to 2 litres over a 150-180 days lactation period for Ethiopian local cows according to (FAO, 1993). As conclude, from this result crossbred dairy cows were better than local cows in terms of daily milk yield. Furthermore, the daily milk yield of crossbred cows of study area was lower than the result of study undertaken in Yerer watershed 5.97 litres per day per cow according to (Mulugeta, 2005).

Major constraints of dairy production in the study area

Constraints are the circumstances or the causes which prohibit the dairy farmers from adoption of the improved management practices most of these constraints in the study area were land scarcity 43% as per respondents statement was the major hindering factor which retards the involvement of individuals as well as groups in this areas of production. Feed shortage, some of the farmers have reported that there is about 34% of feed shortage as reported non availability of forage round the year followed by high cost of feeds. Seasonal demand for milk and milk products was identified as one of the problems (23%) as pointed out by dairy farmer followed by low price of milk. There was no strong market chain between the producers and consumers. Milk market related problems were also reported as one of the constraints in Ethiopian dairy sector (Yilma *et al.*, 2011). For the seasonality in demand for milk and milk products, processing technologies which could extend the shelf-life of dairy products may remedy the problem.

Conclusion and recommendations are as follows:

Most of the herd genetic group or germplasm in the study area was local breed which is very low in lactation performance as compared to cross breeds available in the

area. The overall performance of dairy cows in the study area was to some extent high beyond the expected as compared to other study results. The main farming system used in the study area was semi- intensive and the dairy animals are provided for feed other needs while kept in their backyard (house). Dashen brewery by product which is the most at hand feed source in the area. One cross bred cow was approximately equivalent to twice local cows in terms of daily milk yield. However, the overall result of lactation performances made from the study area was low beyond expected to achieve since most of the producers have semi- intensive management system. This may be due to lack of quantity and quality feed, lack of credit, lack of extension service, animal cannot produce more particularly local cows, lack of improved cows and breeding problems.

Based on the above conclusion the following recommendations are forwarded

Introduction of exotic breed in to the area with appropriate management system will be the most predominant option for improvement.

Integrated type of development program for genetic improvement, forage development and feeding strategies will be most important.

Promotion of input and output supply of dairying will be very important.

Provision of timely and adequate extension service will be essential.

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