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International Journal of Livestock Production (IJLP) (ISSN 2141-2448) is monthly (one volume per year) by Academic Journals.

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International Journal of Livestock Production

ARTICLES

Full Length Research Paper

Meat quality and morphology to meet the patency of Menz sheep (*Ovis aries*) in North Shewa Zone, Ethiopia

Said Mohammed[1*], Tewodros Kelemu[1] and Getachew Kassa[2]

[1]Biology Department, College of Natural and Computational Sciences, Debre Berhan University, Debre Berhan, Ethiopia.
[2]Animal Science Department, College of Agriculture and Natural Resources, Debre Berhan University, Debre Berhan, Ethiopia.

The study was conducted to characterize meat quality and morphology of sheep in North Shewa Zone, and to generate baseline information on the patency of Menz sheep. A total of 720 sheep were purposely selected for morphological study. The result showed that age at first kidding, age at sexual maturity, weight, height, length, hair length, tail length and age at disposal were with a mean of 5.58 months, 4.55 months, 36.62 kg, 60.44, 82.49 and 4.42 cm and above 1 year, respectively. The result revealed that all sheep in the study areas were local pure breed, most of them were hornless with smooth hair and white coat color traits. The analytical result ranges from 5.68 to 6.25 (pH), 64.06 to 74.18 (moisture), 18.26 to 25.12 (protein), 3.80 to 13.71 (fat) and 1.02 to 1.46 (ash) contents of meat. Menz district sheep showed significant change in the parameters aforementioned. Menz sheep were the best in all traits/parameters, and a need of patent right to improve Menz sheep appropriately is our recommendation.

Key words: Meat quality, Menz sheep, morphology.

INTRODUCTION

Small ruminant production contributes significantly to the national and household economy in many countries. These are particular resources for their owners; because they require small investment, have shorter production cycle, faster growth rate and greater environmental adaptability than cattle (Anon, 2005).

Ethiopia has 24,000,000 heads of sheep and 23,000,000 goats (CSA, 2004). Ethiopia, with over all 42 million heads has the third largest numbers of sheep and goats among Africa nation, and ranks eighth in the world (CSA, 2008). The diversified topography and climatic conditions of Ethiopia had considerable contribution in the diversification of its livestock genetic resources (Beyne and Beruk, 1992; DAGRIS, 2006). An array of morphological and phenotypic traits has been evaluated to classify different breeds of animals into various categories. Among these are skull morphology and size, body length, wither height, ear and tail length, lumbar width, coat color etc (Solomon, 2002; Markos et al., 2004; Vargas et al., 2007; Gizaw, 2009). Studies made on indigenous sheep breeds revealed that between and within breed variation for growth is significant and

indicated feasibility for productivity improvement through genetic means (Solomon, 2002; Ermias et al., 2002; Markos, 2006).

In Ethiopia, sheep are purchased for various purposes at different occasions. Though the criteria used for selecting sheep from a diverse population at traditional markets may vary with the purpose for which the animal is purchased, weight determination is a major concern for almost all the sheep buyers, which often is judged only by visual observation and/or palpating various body parts of the animals.

However, information on the different types of criteria used for marketing sheep, and whether these market criteria have significant association with the buying price and purpose for which they are assessed is lacking. Such information provides firsthand idea for sheep breeders so as to improve production according to market demand. It also gives indications about the market (bargaining) price of sheep to the consumers.

Traditionally, people know that Menz sheep has an excellent meat quality in a sensory test. Even merchants sell other sheep saying that this are from Menz to get more money. Therefore, to avoid this problem the recent findings gave recommendations for Menz people, the customers and other stakeholders.

The study intends to have direct market chain from Menz Districts to the customers to avoid any biases. Therefore, based on this information, the authors would like to test the quality of Menz sheep meat in comparison with four other potential sheep production areas. This study focused on traits most considered by sheep consumers/breeders during marketing, and the association of these with the price and purpose for which the animals were purchased. The researchers wish to know the meat quality and morphological characterization of Menz sheep in comparison with sheep from other selected Districts of North Shewa Zone, Ethiopia.

MATERIALS AND METHODS

Description of the study area

The research was conducted in North Shewa Zone ("North Shewa") which is one of 10 zones in the Amhara National Regional State, Ethiopia. The study area was located in 130 km North of Addis Ababa, the capital city of Ethiopia.

Procedure for sampling area selection

Menz sheep is well known for its meat quality. Four Menz Districts (Menz Mama, Menz Keya, Menz Lalo and Menz Gera) and other 4 district regions (Moret ena Jiru, Tarmaber, Efrata ena Gidim and Kewot) were selected since these districts are also potential areas in sheep production.

Method of data collection

Morphological data collection

Both quantitative and qualitative variables were recorded. A total of

720 sheep were selected with equal proportion from the study areas, and purposive sampling technique (taking the same age category from all districts) was used to characterize the sheep morphology. Both age and sex were considered in each experimental group, and have equal proportion for the study. The morphological data were collected through the parameters of coat color, weight, height/year; horn type, hair hardness, hair thickness, hair length, tail length and length/year were common. Theses parameters were used to see the characters of sheep based on age and sex.

Sensory analysis and nutritional composition of meat samples

The sensory quality of meat was determined by assessing the color, taste, odor and texture of meat by using 9-point hedonic scale as described by Sidel and Herbert (1993). One sheep from each district, which were age at maturity were selected for sensory test. Fifty persons having experience in sensory test from animal science fields of study were chosen purposively.

Nutritional composition of meat

Moisture, crude protein, fat, ash and mineral contents were analyzed according to standard procedures (AOAC International, 2007).

Data analysis

The qualitative and quantitative data sets were code and entered into statistical package for social science (SPSS version16) computer program for analysis. Descriptive statistical tools were used to analyze the quantitative data, and statistical measures were used to summarize and categorize the data.

RESULTS AND DISCUSSION

Sensory test

As indicated in Table 1 from the total of 50 respondents, 32.5% like the meat color moderately, whereas, 37.75, 47.25 and 35.5% of them like very much the meat color, taste and texture, respectively. The highest number of respondents (72%) who like very much the taste of the meat was from Menz Lalo. Whereas, around half of the respondents (46%) liked very much the color of meat from Menz Mama. 46% of odor and 54% of texture were recorded from Menz Mama, Menz Lalo and Menz Keya, respectively (Table 1). The results from the sensory test clearly show that Menz sheep are excellent in color, taste and texture and the difference from the other sheep categories were significant (P < 0.05).

Analytical test

Analytical result showed that the potential of hydrogen (pH) was near to neutral (5.68 to 6.25) for sheep from all the studied districts. The highest moisture content was observed in the meat of Menz Lalo (69.21), and the least

Table 1. The number of respondents for sensory test.

Districts	Parameter	Sensory score								
		1 = Dislike extremely (%)	2 = Dislike very much (%)	3 = Dislike moderately (%)	4 = Dislike slightly (%)	5 = Neither like nor dislike (%)	6 = Like slightly (%)	7 = Like moderately (%)	8 = Like very much (%)	9 = Like extremely (%)
Menz Gera	Colour	0	0	0	0	0	22	30	24	24
	Taste	0	0	0	0	0	8	44	24	24
	Odor	0	0	0	0	0	24	38	30	8
	Texture	0	0	0	0	0	24	24	38	14
Menz Mama	Colour	0	0	0	0	8	0	38	46	8
	Taste	0	0	0	0	8	0	16	68	8
	Odor	0	0	0	0	0	8	38	46	8
	Texture	0	0	0	0	8	16	8	54	14
Menz Keya	Colour	0	0	0	0	6	8	36	42	8
	Taste	0	0	0	0	6	8	14	62	8
	Odor	0	0	0	0	0	8	38	46	8
	Texture	0	0	0	0	6	18	8	54	14
Menz Lalo	Colour	0	0	0	0	8	0	38	42	12
	Taste	0	0	0	0	0	0	18	72	10
	Odor	0	0	0	0	0	8	38	46	8
	Texture	0	0	0	0	6	18	8	54	14
Moret ena Jiru	Colour	0	0	0	0	12	24	24	24	14
	Taste	0	0	0	0	18	8	24	42	6
	Odor	0	0	0	0	12	14	24	42	8
	Texture	0	0	0	0	12	12	42	10	24
Tarmaber	Colour	0	0	0	0	0	8	38	30	24
	Taste	0	0	0	0	8	30	30	24	8
	Odor	0	0	0	0	14	24	38	16	8
	Texture	0	0	0	0	14	8	24	54	8
Efrata ena Gidim	Colour	0	0	0	8	2	32	32	18	10
	Taste	0	0	0	6	0	12	32	40	10
	Odor	0	0	0	0	0	24	30	38	8
	Texture	0	0	0	6	8	8	42	12	24
Kewot	Colour	0	0	0	6	0	32	24	24	14
	Taste	0	0	0	6	0	8	30	46	6

Table 2. Contd.

Odor	0	0	0	0	0	24	30	38	8
Texture	0	0	6	0	8	8	46	8	24

Table 2. pH, moisture, protein, fat and ash content of meat samples.

S/N	Sample type	pH	Moisture (g/100 g)	Protein (g/100 g) (in wet basis)	Fat (g/100 g) (in wet basis)	Ash (g/100 g) (in wet basis)
1	Menz Mama	5.68±0.03	66.73±0.33	25.12±0.01	5.61±0.10	1.10±0.10
2	Menz Gera	6.25±0.02	68.24±0.33	25.38±0.06	5.51±0.21	1.03±0.02
3	Menz Lalo	6.20±0.02	69.21±0.32	25.26±0.07	5.49±0.19	1.02±0.03
4	Menz Keya	5.78±0.03	66.03±0.31	26.08±0.01	5.71±0.12	1.09±0.10
5	Moret ena Jiru	5.88±0.02	66.98±1.41	24.59±0.16	7.80±0.05	1.46±0.02
6	Tarmaber	5.89±0.02	67.18±1.39	25.64±0.18	5.82±0.04	1.45±0.01
7	Kewot	5.71±0.02	64.06±1.27	25.12±0.32	9.37±0.21	1.38±0.01
8	Efrata EnaGidim	5.71±0.02	64.06±1.29	23.99±0.29	8.39±0.23	1.39±0.02

was from Kewot (64.06) and EfratanaGidim (64.06).

In addition, protein, fat and ash content of the meat were observed. So, the highest protein content was found in the sheep from Menz Keya (26.08) and the least was from EfratanaGidim (23.99). The highest fat content was observed in Sheep from Kewot (9.37) and the least was from Menz Lalo (5.49), sheep from MoretenaJiru showed the highest (1.46) ash content and the least was from Menz Lalo (1.02) (Table 2).

Based on the analytical test and sensory test, sheep from Menz are more preferable due to good result in taste, odor, texture and color of the meat. It may be due to the feeding habit of Menz sheep (*Thymus schimperi*) having good result in sensory test.

According to Quasem et al. (2009), proximate analysis such as percentage of carbohydrate, fat, protein, ash, moisture and pH of aforementioned local sausages were 4.3, 16.7, 12.76, 2.27, 63.9429 and 6.34, respectively. Whereas, according to Hozza et al. (2014), the moisture content of meat cuts was found between 74.46 and 76.78%. The crude protein content was observed from 22.78 to 24.20%. The crude fat content ranged from 5.70 to 9.76%. The ash content was 1.77 to 1.98%. The pH content was observed as 5.80 to 5.90%. The current study also correlated with the aforementioned findings. The result in Table 3 indicated that the amounts of minerals varied along districts. For example, the content of Mg in Menz Mama, Menz Gera, Tarmaber, Kewot, Enwari, Menz Lalo, Menz Keya and Efratta Ena Gidim were 7.79±0.21, 7.19±0.01, 6.22±0.16, 8.22±0.00, 6.20±0.18, 7.18±0.02,

7.19±0.03 and 8.21±0.03, respectively, and the highest and lowest content of Fe was also recorded in Menz mama (2.40±0.29) and Tarmaber (1.20±0.08) (Table 3).

Humans and other vertebrates need large amounts of calcium for construction and maintenance of bone and normal function of nerves and muscles. Red blood cells cannot function properly without iron in hemoglobin, the oxygen-carrying pigment of red blood cells. Iron is also an important component of the cytochromes that function in cellular respiration. Magnesium, copper, zinc, iron and manganese are important co-factors found in the structure of certain enzymes, and are indispensable in numerous biochemical pathways (Soetan et al., 2010). Similarly, the current study showed that the amount of minerals were highest in Menz

Table 3. Most minerals content in meat samples.

S/N	Sample type	Fe (mg/100 g)	Zn (mg/100 g)	Ca (mg/100 g)	Mg (mg/100 g)	Cu (mg/100 g)	Mn (mg/100 g)
1	Menz Mama	2.40±0.29	4.27±1.26	4.62±1.20	7.79±0.21	0.16±0.10	0.20±0.08
2	Menz Gera	1.72±0.02	5.83±0.35	4.95±0.00	7.19±0.01	0.09±0.00	0.07±0.00
3	Tarmaber	1.20±0.08	4.42±1.06	4.51±0.23	6.22±0.16	0.09±0.01	0.13±0.04
4	Kewot	1.74±0.00	5.40±0.00	3.13±0.00	8.22±0.00	0.24±0.00	0.10±0.00
5	Enwari	1.19±0.09	4.40±1.08	4.49±0.25	6.20±0.18	0.08±0.02	0.11±0.06
6	MenzLalo	1.71±0.03	5.81±0.32	3.93±0.01	7.18±0.02	0.09±0.00	0.08±0.00
7	MenzKeya	1.69±0.04	5.80±0.33	3.94±0.02	7.19±0.03	0.09±0.01	0.09±0.02
8	EfrattaEnaGidim	1.72±0.02	5.38±0.01	3.14±0.00	8.21±0.03	0.22±0.00	0.11±0.01

sheep compared with sheep from other districts.

Morphological characterization of sheep

From a total of 720 samples, the highest was observed in Menz Gera District with the mean of 5.68 months and the least was in Tarmaber District with a mean of 5.38 months. The highest characteristics showed in Efrata Ena Gidm with a mean of 4.63 months and the least was in Tarmaber with a mean of 4.46 months. Besides, the highest weight of sheep, height of sheep, length of sheep, hair length of sheep and tail length of sheep were observed in Kewet, Menz Keya, Menz Mama, Menz Keya and Kewet, with a mean of 41.97 kg, 72.27, 94.20, 7.40 and 23.20 cm, respectively (Table 4).

The morphological levels are particularly affected by environmental condition of the area in which sheep were grown, and hot climatic condition can enhance the growth rate (Traoré et al., 2009). Sheep biodiversity have been described using morphological measurements (Gizaw et al., 2007; Carneiro et al., 2010). The phenotypic variation in a population arises due to genotypic and environmental effects, and the magnitude of phenotypic variability differs under different environmental conditions.

According to Gizaw et al. (2007), morphological description is an essential component of breed characterization that can be used to physically identify, describe, and recognize a breed, and also to classify livestock breeds into broad categories. Dossa et al. (2007) reported that morphological measurements such as heart girth, height at withers and body length can be used for rapid selection of large size individuals in the field to enable the establishment of elite flocks. Weight determination is a major concern for almost all sheep buyers.

Sensory test showed that sheep from Menz were more preferable due to good result in taste, odor, texture and color of the meat. Also, Menz sheep had relatively white coat color. For horn type, the highest result was scored in Kewet that is 90 in number with hornless and the least was in Menz Keya.

On other hand, for white coat color of the sheep the highest result was scored in Menz Keya with 57 in number. In addition, hair hardness of the sheep was observed and the highest result was scored in Menz Gera, Efrata ena Gidm and Tarmaber with smooth, medium and hard hair type respectively.

Season is the main reason for market fluctuation, and from 120 respondents about 56 did not participate in animal fattening course and the rest 64 farmers participated. All local breeds got the first disease resistance for the selected 8 districts. The second and third types were cross and exotic, respectively. Half of the respondents said the first productive breed is exotic and cross type of breed is the second productive groups. The rest breed type is the third. The first, second and third factor to meat taste were feeding habit, sheep status and environment, respectively.

Conclusion

Menz District sheep has better meat quality in sensory (taste, odor and texture) and analytical tests (crude protein, fat, mineral and ash) contents. The environment where Menz sheep grow plays a major role in the quality of meat. Menz sheep feed on a plant species named *T. schimperi,* and the study believes that this plant contribute to meat quality of Menz sheep. Further researches are needed to give clarification on genetics and molecular aspects of the species studied.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

Table 4. Number of cases, mean, standard deviation and variance of different parameters.

District	Parameter	Age at first lambing	Age at maturity	Weight (kg)	Height (cm)	Length (cm)	Hair length (cm)	Tail length (cm)
Kewet	Mean	5.58	4.58	41.97	64.61	90.31	2.45	23.22
	Std. deviation	0.37	0.43	12.79	16.30	20.37	1.29	6.83
	Variance	0.14	0.18	163.54	265.72	415.03	1.67	46.62
Efrata ena Gidm	Mean	5.46	4.63	34.19	58.20	60.32	3.48	22.60
	Std. deviation	0.43	0.40	16.35	5.42	4.63	0.33	1.38
	Variance	0.19	0.16	267.21	29.35	21.41	0.11	1.91
Tarmaber	Mean	5.38	4.46	30.87	48.87	73.67	1.75	17.63
	Std. deviation	0.48	0.48	12.47	9.64	11.23	0.63	5.08
	Variance	0.23	0.23	155.44	92.95	126.16	0.40	25.79
Menz Mama	Mean	5.61	4.51	41.08	57.47	94.24	5.25	16.93
	Std. deviation	0.46	0.45	4.34	5.89	8.51	2.18	3.38
	Variance	0.21	0.20	18.81	34.68	72.41	4.77	11.43
Menz Lalo	N	90.00	90.00	90.00	90.00	90.00	90.00	90.00
	Mean	5.63	4.60	40.47	53.84	92.13	5.27	16.06
	Std. deviation	0.47	0.44	4.90	4.30	6.75	2.01	4.54
	Variance	0.22	0.19	24.00	18.49	45.58	4.04	20.57
Menz Keya	Mean	5.67	4.53	33.63	72.27	82.40	7.40	13.77
	Std. deviation	0.44	0.45	3.56	11.63	5.13	1.88	1.51
	Variance	0.19	0.20	12.71	135.30	26.33	3.55	2.27
Menz Gera	Mean	5.68	4.58	33.46	67.80	78.24	5.31	15.12
	Std. deviation	0.45	0.42	8.36	9.21	9.76	1.99	5.81
	Variance	0.20	0.17	69.87	84.79	95.18	3.94	33.70
Enwari	Mean	5.62	4.51	37.26	60.46	88.60	4.49	14.99
	Std. deviation	0.46	0.46	4.79	3.86	6.38	1.98	1.87
	Variance	0.21	0.21	22.92	14.90	40.65	3.92	3.49
Total	Mean	5.58	4.55	36.62	60.44	82.49	4.42	17.54
	Std. deviation	0.45	0.44	10.30	11.58	14.80	2.38	5.38
	Variance	0.21	0.19	106.14	134.11	219.10	5.65	28.94

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Full Length Research Paper

Assessment of the problems associated with artificial insemination practices in Essera Woreda, Dawuro zone, Southern Ethiopia

Fentaye Kassa[1*] and Wubshet Wuletaw[2]

[1]School of Veterinary Medicine, Wolaita Sodo University, P. O. Box 138, Ethiopia.
[2]Agriculture Office, Essera Woreda, Dawuro Zone, Ethiopia.

This study was conducted to assess the problems associated with the artificial insemination service in Essera woreda of Dawuro zone, southern Ethiopia from December, 2016 to August, 2017. The study was conducted using questionnaire survey and records in targeted human and dairy cow's population, respectively. There was no statistically significant association (P>0.05) in the conception and delivery of cows with different risk factors. But the management of the cows showed significant association (P<0.05) with their conception and delivery. There was no statistically significant difference (P>0.05) in weekends artificial insemination service among studied kebeles. However, there was a statistically significant difference among the studied kebeles in shortage of artificial insemination technician and inputs (P<0.05). The major animal health problem identified by dairy cow owners was conception failure (39.1%) followed by mastitis (23.4%) and mixed (mastitis and calving problem) (20.3%). A total of 58 (90.6%) of the respondents were not satisfied with the overall artificial insemination service. In addition, equal percentage of non-satisfaction levels of respondents were recorded in Ofa and Guza kebeles (93.8%). The result of the present study indicated that dairy cow owners were not satisfied with artificial insemination service and the service is not doing well in all kebeles of the of study site. Therefore, an immediate action is required to change the problem facing artificial insemination service in the study area and to achieve maximum benefit from the sector.

Key words: Essera woreda, artificial insemination, assessment, households.

INTRODUCTION

Artificial insemination recognized as the best biotechnological technique increasing reproductive capacity in farm animal its widely applicable in dairy farming enterprise (Mugerwa, 1989). The use of artificial insemination plays an important role to increase the yielding capacity of cows hence; it is the most appropriate and cheapest way of genetic improvement (Malafosse, 1990). Poor countries like Ethiopia also provide adequate AI service to improve productive efficiency over the last 30 years (Webb, 2003), hence, economically benefit from

the dairy enterprise IAEA (2007).But, poor heat detection skill by the owner of the animal, inconsistent service, and incorrect timing of insemination are some of the factors that limit the success of artificial insemination program (Wold et al., 2011). Wrong selection of AI bulls, poor motivations and skills of inseminators are also factors that limit success rate artificial insemination service (Samre et al., 2015). Artificial insemination service has been under progressive implementation in Essera woreda of Dawuro zone, over the last decades. Nonetheless, scientific studies have not been undertaken so far to assess the efficiency of AI services and key challenges influencing its success in small holder dairy cows managed under natural extensive production system. Therefore, the objective of this study is to assess major AI service constraints in the Essera Woreda; to in sight the conception and delivery of cows after AI using record data and to generate base line data for Essera woreda animal and fishery development office about artificial insemination service.

MATERIALS AND METHODS

Study area

The study was carried out in Essera Woreda of Dawuro zone, which is located between 6.7 to 7.02^0 latitudes and 36.7 to 37.1° longitudes. Essera woreda with its capital at Bale town is situated 536 km south of the capital city, Addis Ababa. The Woreda has a total area of 1043.1 km^2 and is divided into 29 kebeles. The altitude of the district ranges from 501 to 2500 meters above sea level. The area receives an average annual rainfall of about 1600.5 mm and the annual average ranges from 17.6 to 27.5°C. Mixed farming system is the main economic activity practiced in Essera Woreda as indicted by EWARDO (2013).

Study population

Artificial insemination technicians (AITs), animal health professional and dairy cattle owners from four randomly selected kebeles were represented in the human study population. While, secondary data from dairy cows record in the selected study sites were also incorporated as animal study population.

Study design

The study was conducted using both cross-sectional and retrospective type of study. The cross- sectional types of study was conducted using questionnaire survey on human study population. A total of 64 randomly selected respondents (16 from each kebele) were included in this assessment study. The retrospective part of study was conducted using records from selected AI center in four kebeles of Essera woreda. Seventy four dairy cow's records (20 cows from Ofa kebele and 18 cows from the remaining kebeles) were considered.

Study methodology and methods of data collection

Structured questionnaire were prepared to interview dairy cattle owners and AITs to collect primary data in the assessment AI service and constraints in the study area. In due processes, briefing and explanation of the objective of the study were made to every respondent before presenting and asking the actual question. Then, the questionnaires were presented to each respondent. In addition, secondary data from records of AI service center were made on 74 dairy cows in selected Kebeles about the conception and delivery information by considering district, age, breed, body condition and management of the cows. The AI services in the study area were accompanied by public servants (government civil servants) and dairy cow owners' got the AI service in the service station (clinics) after brought their cows. The management of the animals was classified as poor (extensive), medium (semi intensive) and good (intensive) feeding systems as described by Mureda and Zeleke (2008). Dairy cows were grouped into poor, medium and good body condition based on their corresponding body condition score of 1 to 2 (poor), 3 (medium) and 4 to 5 (good), respectively as indicated by Dawod et al. (2014).

Data management and statistical analysis

The collected data were entered into Microsoft (Ms) excel spread sheet, coded for analysis and imported into statistical package for social science (SPSS) ver. 20 (Chicago, IL, USA). The data were summarized using descriptive statistical analysis such as percentages and tables. Categorical statistically significant association were evaluated using chi square and p-value

RESULTS

Data were collected from a total of 64 dairy cows' owner respondents using questionnaire survey in the Essera woreda. The associations of conceivability and delivery the cow with different parameter like kebeles of the cow comes to AI service, breed, age, body conditions and management practice were also presented in Table 1. All the parameter included in this particular study showed a variation in the conceivability and delivery the cow but, the association is not statistically significant difference (P>0.005) with the exception of management practice of the animal. The management of the animal showed a statistically significant variation (P<0.05), in which the higher conceiver and delivery of cows obtained in good management followed by medium management practice.

To see the status of AI service in different kebele's of Essera woreda, 16 respondents from each kebele that is, Bale, Ofa, Hagele and Guza were taken into consideration. Among a total of 64 respondents in four kebeles, 12 (18.8 %) were receive AI service regularly without interruption. While, majority of respondents could not get AI service regularly (52; 81.25%) due to lack of IA service in the weekend (8; 12.5%), shortage of AITs (16; 25.0%) and shortage of inputs 28; 43.8%). In addition, shortage of AITs and inputs showed a statistically significant difference between different kebele's (P<0.05). But, lack of respondents during the weekend didn't show a significant difference (P>0.005) in four study Kebele's as presented in Table 2.

The major animal health problems associated with AI identified in the study area were conception failure,

Table 1. Different risk factors and their association with conception and delivery of cows in the study area.

Parameter	No. of cows observed	No. of cows conceived	Percentage (%)	P- value	No. of cows delivered	Percentage (%)	P- value
Kebeles							
Bale	18	6	33.3	0.697	5	27.8	0.808
Ofa	20	6	30.3	-	4	20	-
Hagele	18	3	16.7	-	3	16.7	-
Guza	18	5	27.8	-	5	29.8	-
Breed							
Local	69	18	26.1	0.499	16	23.2	0.87
Cross	5	2	40	-	1	20	-
Age of the animal							
$\leq$ 4 years	32	9	28.1	0.668	7	21.9	0.77
5-7 years	30	9	30.3	-	8	26.7	-
$\geq$ 8 years	12	2	16.2	-	2	16.7	-
BCs							
Poor	8	1	12.5	0.619	1	12.5	0.756
Medium	45	13	28.9	-	11	24.4	-
Good	21	6	28.6	-	5	23.8	-
Managements							
Poor	7	0	0	0.000*	0	0	0.00*
Medium	45	5	11.1	-	4	8.9	-
Good	22	15	68.2	-	13	59.2	-

BCs = body conditions, * = statistically significant association.

Table 2. Status of AI service in different kebele's of Essera woreda.

Kebeles	No. of respondents	Receive AI service regularly without interruption (%)	Could not get AI service regularly due to the following reasons		
			Lack of AI service in the weekend (%)	Shortage of AITs (%)	Shortage of inputs
Bale	16	4 (25.0)	2 (12.5)	0 (0.0)	10 (62.5)
Ofa	16	4 (25.0)	1 (6.2)	0 (0.0)	11 (68.8)
Hagele	16	3 (18.8)	2 (12.5)	8 (50.0)	3 (18.8)
Guza	16	1 (6.2)	3 (18.8)	8 (50.0)	4 (25.0)
Total	64	12 (18.8)	8 (12.5)	16 (25.0)	28 (43.8)
χ^2	-	-	1.14	21.33	12.69
p-value	-	-	0.767	0.000*	0.005*

*= Significant association, χ^2 = chi square, % = percentage.

mastitis, and mixed calving and mastitis problem. Among these conception failure was higher in the percentage (25; 39.1%) causing health problems as summarized in Table 3. The satisfaction level of dairy cattle owners was also assessed in this study.

Hence, only 6 (9.4%) of the respondents were satisfied with the overall AI service. But, 58 (90.6%) of the respondents were not satisfied with the overall AI service in Assera woreda. In Bale and Hagele kebeles, equal numbers of respondents were satisfied with AI service (2; 12.5%). Similarly, equal satisfaction was recorded in Ofa and Guza kebeles (1; 6.2%) as illustrated in Table 4.

DISCUSSION

Assessments of the constraints of artificial insemination in Essera woreda of Dawuro zone was conducted in 64 dairy cow owners and AITs with the help of questionnaire survey, and 74 dairy cows record in four selected kebeles of Essera woreda. The research result showed that from 64 dairy cow owners and AITs only, 6 (9.4%) of the respondents were satisfied with overall service. While, 58 (90.6%) respondent were not satisfied with AI service, this findings is in agreement with the report of Baheriw et al. (2013). This higher percentage of non-satisfaction

Table 3. Major animal health problems identified by cow owners in the study area.

Animal health problems	Frequency	Percentage
Conception failure	25	39.10
mastitis	15	23.40
problem of calving	11	17.20
mastitis and calving problem	13	20.30

Table 4. Dairy cow owner's satisfaction assessment in the study area.

Satisfaction level	Kebeles				
	Bale (%)	Ofa (%)	Hagele (%)	Guza (%)	Total (%)
Satisfied	2 (12.5)	1 (6.2)	2 (12.5)	1 (6.2)	6 (9.4)
None satisfied	14 (87.5)	15 (93.8)	14 (87.5)	15 (93.8)	58 (90.6)
Total	**16 (100)**	**16 (100)**	**16(100)**	**16 (100)**	**64 (100)**

% = percentage.

among dairy cow owners might be due to lack of service in the weekend, shortage of AITs and shortage of inputs for the service.

In all study, kebeles of Essera woreda, shortage of AITs and AI service in puts showed statistically significant association (P<0.05), this finding agree with the reports of Baheriw et al. (2013) at west Gojjam, Juneyid et al. (2017) at west Hararghe and Woretaw et al. (2015) at south Gonder which is loacted in different localites of Ethiopia. This might be due to the number of cattle population and lack of well-trained AITs in the Essera woreda. Among the studied kebeles, Guza kebele was the least regular AI service users without interruption which accounts for 6.2% users while, Bale and Ofa kebeles were the maximum regular AI service users (25%), which could be due to their close proximity to the center of the Dawuro zone (Bale town).

The conceivability and delivery of cows in the study area and the association with risk factors like breed of the animal, age, body conditions and management practice were also evaluated using recorded data. The management practice of the cow showed statistically significant association (P<0.05) with conceivability and delivery of cows in which, higher percentage of conceivability (68.2%) and delivery (59.2%) of cows in a good management when compared with lower reproduction in medium management condition and no conceivability and delivery of cows in poor management practice.

This higher conceivability and reproduction in good management might be associated with farmers in good management condition feed their cow with some amounts of concentrate, since complementary feeding with concentrate feed staff is related with good reproduction as reported by Ali et al. (2015) and Tesfaye et al. (2015).

On the other hand, no conceivability and delivery in poor management condition of dairy cows, might be due to extensive management accompanied with insufficient feeding without supplementary, and since insufficient feed and feeds without concentrate feed staff in extensively grazed dairy cows affect their reproductive performance as described by Domecq et al. (1997) and Obese et al. (1999).

The major animal health problem associated with artificial insemination as identified by dairy cow owners were conception failure, mastitis, calving problem (death or dystocia) and mixed problems. The most important constraint associated with AI service was conception failure which accounts for 39.1%. Similar higher frequency and percentage of conception failure problems also reported by Woretaw et al. (2015) and Juneyid et al. (2017) in different districts of Ethiopia. This might be due to lack of will trained and inadequate AITs, not timely inseminated after estrus as depicted by Gizaw and Dima (2016).

CONCLUSION AND RECOMMENDATION

Most of the respondents to questioners' survey were not satisfied with AI service and only small number get regular AI service without interruption. Majority of the respondents didn't get AI service because of lack of service in the weekend, shortage of input and AITs. In the record study of conceivability and delivery of cows, management practice of dairy cow has significant contribution to the reproduction of the animal. In general, AI service in Essera woreda of Dawuro zone was not given great attention and emphasis yet. Therefore, the government and other stalk holder should give training to

the farmers, AITs and supply all necessarily input to the AI service delivery

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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