Study on the Occurrence of External and Gastrointestinal Parasites and Sub-clinical Mastitis on Crossbred Dairy Cows under Different Feeding and Management Conditions in the Central Highlands of Ethiopia

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Abstract: On-farm intervention strategies based on feeding and general management practice including hygiene and sanitation towards on the reduction of occurrence of external and gastrointestinal parasites and sub clinical mastitis on cross breed lactating dairy cows was conducted during the dry season in West Shewa Zone, central Ethiopia. A total of 34 cows in early to mid lactation with an average body weight of 369.29 ± 38.58 kg were selected based on parity, milk yield, days in milk, body weight and health status and assigned in to two groups; 17 cows of one group were maintained as farmers’ usual practice (control diet = T₀), and the rest 17 were supplemented with urea-molasses multi-nutrient block (UMMB) together with a concentrate mixture (55% wheat bran, 43 % linseed cake and 2% salt) in natural pasture hay based diet under stall feeding condition (intervention diet = T₁). Moreover, the udder and associated hygienic condition of cows in T₁ group were implemented by farmers as per the advice and follow up of the researchers and veterinarians. The study showed that, the prevalence of gastrointestinal parasites (41.2%), external parasites (ticks) (47.1%) and sub clinical mastitis (47.1%) in the T₀ group was significantly (P<0.05) higher compared with cows managed under T₁ group. The nematode parasite (strongylus sp) was the only parasite group encountered in both treatment groups.

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Abstract - On-farm intervention strategies based on feeding and general management practice including hygiene and sanitation towards the reduction of occurrence of external and gastrointestinal parasites and sub clinical mastitis on cross breed lactating dairy cows was conducted during the dry season in West Shewa Zone, central Ethiopia. A total of 34 cows in early to mid lactation with an average body weight of 369.29 ±38.58 kg were selected based on parity, milk yield, days in milk, body weight and health status and assigned to two groups; 17 cows of one group were maintained as farmers’ usual practice (control diet = T0), and the rest 17 were supplemented with urea-molasses multi-nutrient block (UMMB) together with a concentrate mixture (55% wheat bran, 43 % linseed cake and 2% salt) in natural pasture hay based diet under stall feeding condition (intervention diet = T1). Moreover, the udder and associated hygienic condition of cows in T1 group were implemented by farmers as per the advice and follow up of the researchers and veterinarians. The study showed that, the prevalence of gastrointestinal parasites (41.2%), external parasites (ticks) (47.1%) and sub clinical mastitis (47.1%) in the T0 group was significantly (P<0.05) higher compared with cows managed under T1 group. The nematode parasite (strongylus sp) was the only parasite group encountered in both treatment groups. The mean EPG count observed under T0 group was 120.8, which is markedly higher (P<0.05) compared to cows managed in T1 group. This study revealed that the prevalence of external and gastrointestinal parasites as well as sub clinical mastitis was higher in cows kept under T0 than the T1 group. Hence, the improved nutritional intervention along with relative good hygienic and feeding management conditions practiced in T1 group significantly reduced the occurrence of external and gastrointestinal parasites as well as sub clinical mastitis.

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I. Introduction

In Ethiopia, from arthropod parasites, ticks are the most important ones and economic loss incurred when they infest livestock particularly, cattle is enormous (Feseha, 1983). They also cause damage to hide and skins and reduce milk and wool production. reduce overall productivity of animals and increase susceptibility to other diseases (De Castro, 1997). About 60 species of ticks belonging to the genus Amblyomma, Boophilus Haemaphysalis and Hyalomma have been recorded in the country (Mekonnen et al., 2001) and of these 33 are known to be most common and important parasites of livestock (Pegram et al., 1981).

In sub-Saharan Africa in general and in Ethiopia in particular, gastrointestinal parasite infections have enormous impact both on small- and large-scale farmers, but their impact is greater due to the availability of a wide range of agro-ecological factors suitable for diversified hosts and parasite species (Fikru et al., 2006). They cause losses through lowered fertility, reduced work capacity, involuntary culling, a reduction in feed intake and lower weight gains, lower milk production, high treatment costs and mortality in heavily parasitized animals (Lebbie et al., 1994). The genera of helminthes parasites involved, species, and the severity of infection also vary considerably depending on local environmental conditions, such as humidity, temperature, rainfall, vegetation, and management practices (Teklye, 1991).

On the other hand, mastitis is also one of the most complex diseases of dairy cows that generally involve interplay between management practices and infectious agents, having different causes, degrees of intensity, and variations in duration and residual effects (Harmon 1994). It causes significant losses to the dairy industry and affects milk hygienic and sanitary features (Singh and Sigh., 1994 and Harmon, 1994). However, information regarding prevention strategies like management and feeding intervention towards different diseases under smallholder dairy farms in peri-urban areas is scarce. Hence, this study was intended to evaluate the intervention strategy towards the control of the occurrence of external and gastrointestinal parasites and sub clinical mastitis on crossbred dairy cattle.
II. Material and Methods

a) Study Areas

On-farm study was conducted in West Shewa Zone of Oromia Region, Ethiopia. The area has bimodal rainfall pattern, with a short rainy period from February to April and a long rainy season from mid June to September. The annual temperature and rainfall ranges from 18°C to 24°C and 1000 to 1100 mm, respectively.

b) Sampling and Treatment Arrangements

A total of 17 household heads each having two lactating crossbred dairy cows were selected. Accordingly a total of 34 cows in early to mid lactation with an average body weight of 369.3 ±38.6 kg were purposively assigned into two feeding management treatment groups (each with 17 cows). This experiment was superimposed on a feeding trial conducted to evaluate the performance of crossbred dairy cows under traditional feeding and improved feeding practices. The feeding management treatments were intervention diet (T1) and the control which is farmers’ feeding practice (T0). The intervention diet consisted of urea-molasses multi-nutrient block (UMMB) prepared from 37% molasses, 25 % wheat bran, 15 % linseed cake, 10 % urea, 5 % cement, 5% lime, and 3 % salt and natural pasture hay as a basal diet. However, the control groups (T0) were fed according to the farmer’s feeding practice with varying proportions of traditional homemade concentrate mixtures in a free grazing condition. Improved health interventions follow up were made only for cows assigned in the intervention diet (T1).

Information on parity, body weight, milk yield, days in milk and health status was gathered before the commencement of the experiment. All animals in the two treatment groups were also initially checked for any external parasite infestation, gastrointestinal parasite and mastitis infection through clinical and laboratory examinations. Animals with positive results were treated before the commencement of the experiment. Data was collected through a pre-designed data recording sheet regarding the health, hygiene and housing condition of the animals. The data were recorded over a period of 171 days with the use of trained enumerators. Field visits were carried out every two weeks to monitor the data collection and overall management of the animals.

c) Tick Collection and Identification

Tick collection and identification were made according to Walker et al. (2003). The entire body surfaces of the cattle were examined every day and the ticks were collected by hand picking. Then, they were placed in a clean glass test tube plugged with cotton wool and brought to the veterinary laboratory of Holetta Agricultural Research Center for identification purpose.

d) Fecal Sample Collection and Examination

Fecal sample collection and examination was performed according to standard techniques and procedures given by Jorgen and Brian (1994). Fecal samples were collected from the rectum of the animal on monthly bases. Each sample was clearly labeled and was packed and dispatched in a cool box for laboratory examination. Simple test tube floatation and sedimentation technique were used for parasites’ eggs separation and McMaster counting technique was employed to determine the number of eggs per gram of feces.

e) Milk Sample Collection

Milk sample from all animals were collected on monthly bases. Prior to quarter sampling, the teat ends were cleaned and rubbed with cotton moistened in 70% alcohol. Initial streams of milk were discarded and approximately 5 ml of milk collected into 10-ml polythene tubes kept in ice. California mastitis test (CMT) was performed according to Quinn et al. (1994). Similarly portion of each quarter milk sample was inspected for clots, discoloration or wateriness before adding the CMT reagent. The CMT reagent (DeLaval, Wroclaw, Poland) method was used along with the physical examinations and the test was carried out as described by Schalm and Noorlander, (1957). Reactions were graded 1, 2, 3, 4, or 5.

f) Statistical Analysis

Data analysis was performed using Statistical Package for Social Sciences (SPSS) Ver. 15.0. T-test was used to compare treatment means.

III. Results

The study revealed that the prevalence of gastrointestinal parasite, external parasites (ticks) and sub clinical mastitis were 41.2%, 47.1% and 47.1% , respectively in the control group (Table 1). On the other hand lower prevalence was observed for cows in the T1 group. There was also significant (P<0.05) difference observed for the mean EPG value between the cows managed under the control (120.8) and intervention diets (17.5).
Among the gastrointestinal parasites, *Strongylus* sp. was the only nematode parasite group encountered in *T*\(_1\) group (16.7%) while 33.3% of them were observed in the control group (Table 2). The highest proportion of *Boophilus* species (41.7%) was observed for cows managed in the control diet. Similarly, about 25% *Amblyomma* species were also noted in the same treatment.

**Table 2 :** Types of parasites encountered and their proportion

<table>
<thead>
<tr>
<th>Parasite name</th>
<th><em>T</em>(_1) group (%)</th>
<th><em>T</em>(_0) group (%)</th>
<th>Ticks species</th>
<th><em>T</em>(_1) group (%)</th>
<th><em>T</em>(_0) group (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Strongylus</em> sp.</td>
<td>16.7</td>
<td>33.3</td>
<td><em>Boophilus</em> sp.</td>
<td>0</td>
<td>41.2</td>
</tr>
<tr>
<td><em>Haemonchus</em> sp.</td>
<td>0</td>
<td>8.3</td>
<td><em>Amblyomma</em> sp.</td>
<td>8.3</td>
<td>25</td>
</tr>
<tr>
<td><em>Ostertagia</em> sp.</td>
<td>0</td>
<td>16.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed (Haemonchus and <em>Cooperia</em>) spp.</td>
<td>0</td>
<td>8.3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*\(T\)_\(_1\) = intervention diet, *T*\(_0\) = control diet*

**IV. DISCUSSION**

In the present study, high prevalence of gastrointestinal parasites in *T*\(_0\) groups might be attributed to the free grazing management which was supposed to be responsible for the re-infection of gastrointestinal parasites. Bliss, *et al.* (1982) indicated that, changes in weather, nutrition, management, immune status of the animals and the extent of exposure of each animal affect the type of parasites present. These factors could also determine the number and type of parasite present in the body of the animal. Moreover, each type of parasite species has different mode of life in the animal body and in the external environment.

Joost *et al.* (2000) reported a prevalence rate of 64% for gastrointestinal nematode on adult dairy cattle, which is higher than the current finding in the control group. The same report also has shown that the recovered nematodes were *Ostertagia* sp. *Trichostrongylus* sp. *Oesophagostomum* sp. *Haemonchus* sp. and *Cooperia* sp. which are in agreement with the current finding particularly for *Haemonchus* sp. and *Cooperia* sp. However, the present finding did not agree with the work of Fikru *et al.* (2006) who reported a prevalence of 69.6% for gastrointestinal parasites in western Oromia, Ethiopia. High prevalence of ticks encountered for cows received *T*\(_0\) diet group might be due to re-infestation during free grazing. A similar report by Abdul *et al.* (2007) indicated about 20.4% ticks prevalence on cattle grazing in the field. Moreover, the contemporary finding for cows received *T*\(_0\) group is in accordance with the work of Belew and Mekonnen (2011), who reported about 45.4% of prevalence of ticks infestation on dairy cattle kept under extensive farming system at Holeta and its surroundings.

High prevalence of sub clinical mastitis in the *T*\(_0\) group might be related to poor follow up, advice and lack of training to farmers on the hygiene and sanitation of the udder. The prevalence rate obtained for cows in *T*\(_0\) groups is in line with the report of Hafiz *et al.* (2005), who obtained 46.7% prevalence of sub clinical mastitis. On the other hand, Workineh *et al.* (2002) cited by Almaw *et al.* (2006) indicated that, the prevalence of clinical and sub clinical mastitis in Ethiopia ranges from 1.2 to 21.5% and 19 to 46.6%, respectively where most of these studies were carried out in Addis Ababa and its surroundings.
V. Conclusion

The prevalence of mastitis and parasites was higher in the control groups than the treatment groups. Improved feeding practice including better management and hygiene condition between the two groups is considered to have positive effect on controlling disease prevalence.

VI. Recommendations

Farmers should be aware of delivering a proper feeding management, housing and health care to their animals. Animal health care extension service should be well organized to support small holder peri-urban dairy farmers.

References Références Referencias


