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Clinical survey on major ruminant diseases in Kola Tembein and Tanqua Abergelle Districts, Central Zone of Tigray, Northern Ethiopia

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Diseases are the major detriment in ruminant production and productivity in the study districts. A cross sectional study was conducted to assess the major animal health constraints of ruminants. 461 species of sick ruminants were examined and diagnosed tentatively. Similarly, samples were collected and identified in the laboratory for confirmation of the cases. Of the clinically identified ruminant diseases, sheep and goat pox (11.93%), abortion (8.24%), pasteurellosis (8.46%), lice infestation (9.98%), tick infestation (5.86%), and flea infestation (5.21%) accounted for higher values. The proportion of infectious, non-infectious, ectoparasitic infestation, and reproductive diseases among clinically sick ruminants was 51.63, 9.97, 26.25, and 12.15%, respectively. The higher ectoparasitic infestation in the study district was lice infestation (38.02%) followed by tick (22.31%), flea (19.83%), mange mite (11.57%), and leech infestation (8.26%). The reproductive problems encountered were abortion (67.86%), retained placenta (25%), and dystocia (7.14%). The most prevalent infectious diseases encountered were sheep and goat pox (23.11), pastuerellosis (16.39), gastrointestinal tract parasitism (13.03), and anthrax (6.30). The most encountered non-infectious diseases were abscess (28.26) and bloat (17.39). In conclusion, infectious diseases and external parasites cause serious economic loss in the study districts. So, regular surveillance of animal disease coupled with vaccination of animals with available vaccines, regular spraying of acaricides and more importantly, public awareness in prevention and control of major livestock diseases in the districts is recommended.

Key words: Clinical survey, Kola Tembien, ruminants, Tanqua Abergelle.

INTRODUCTION

Ethiopia has the largest livestock population in Africa which is estimated to be 54 million cattle, 29.33 million sheep, 24.06 million goats, 1.78 million horses, 5.57 million donkeys, 380 thousand mules, 1 million camels,

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39.6 million chicken, and 4.7 million beehives (Central Statistical Agency (CSA), 2015). The majority of the livestock populations are local breeds, which are found in rural areas under subsistence type of farming system and the remaining are hybrid and exotic breeds (CSA, 2015). The livestock subsector has an enormous contribution to Ethiopian national economy and livelihoods of many Ethiopians. It contributes about 16.5% of national gross domestic product (GDP) and 35.6% of the agricultural GDP. It also contributes 15% export earnings and 30% of agricultural employment (Leta and Mesele, 2014). Despite huge livestock population and existing favorable environmental conditions, the current livestock output of the country is little. This is associated with a number of factors. Of these factors, disease is a major challenge in the livestock production and productivity (Negassa et al., 2011). In Ethiopia, the aggregate annual economic losses from animal diseases through direct mortality and reduced productive and reproductive performance were estimated at US$150 million (Berhanu, 2002).

The study district favors the development and propagation of infectious agents which makes it difficult to resist the annoying effect of these parasites on the host and makes the control of disease difficult (Singla 1995; Singh et al., 2000). However, as the major predisposing factors and enormous economic losses caused by disease, detailed studies on their prevalence and distribution is required. So far limited efforts have been made to investigate an overall situation of ruminant disease in Aberegele Research Center mandate areas. Therefore, the objective of this study was to have baseline information on ruminant disease and to determine the prevalence of major ruminant diseases.

MATERIALS AND METHODS

Description of the study areas

The study was conducted in Kola Tembien and Tanqua Abergele districts for disease investigation and sample collection.

The study districts were categorized as hot to warm sub-moist lowlands (SM1-4) sub-agro ecological zone of the region with an altitude of 1300 to 1500 m above sea level and the mean annual rainfall ranging from 400 to 600 mm which is characterized by low, erratic, and variable rainfall. The annual temperature ranges from 28 to 42°C (Bureau of Agricultural and Rural Development of Woreda Tanqua Abergelle and Woreda Kola Tembien, 2015) (Figure 1).

Clinical disease survey

Throughout the research period, any ruminant disease either in a form of outbreak or individual cases was vigorously investigated so as to arrive at tentative disease diagnosis.

Study design and animals

A cross-sectional study design was conducted from July 2012 to June 2013 on the survey of major ruminant disease on 461 heads of ruminants consisting of different age groups, sex, breed, body condition scoring, and production systems. The animals include those coming to veterinary open air clinics, animals belonging to small holder dairy farms, and animals in the field. Tentative diagnosis was made based on history of illness and clinical examination. Samples were also taken to Abergelle Agricultural Research Center Laboratory and were examined immediately. For this study, a total of 461 clinical cases coming to veterinary clinics were thoroughly and purposively investigated for cause of abnormalities or dysfunction.

Data analysis

All data recorded were entered into Microsoft Excel and subsequently analyzed using Stata version 11 computer program. Descriptive statistics was used to know the frequency of the disease in the study area.

RESULTS

Various age group, breed and species of animals were brought to clinics seeking for veterinary service. Thirty ruminant diseases were identified in districts of Tanqua Abergelle and Kola Tembien from 461 clinical sick animals which were presented to Yechila and Abi Adi veterinary open air clinics. All these clinical cases were examined based on the history of the patient and general and systemic clinical examination, and laboratory examination protocols so as to arrive at tentative diagnosis. Table 1 shows the percentile and relative frequencies of these diseases.

Of the 30 clinically identified ruminant diseases, sheep and goat pox, abortion, pasturellosis, lice infestation, tick infestation and flea infestation accounted for the higher values in both districts with relative percentile of 11.93, 8.24, 8.46, 9.98, 5.86, and 5.21%, respectively.

Proportion of disease categories in Tanqua Abergele and Kola Tembien

Based on the nature and cause of illness, the diseases were categorized as infectious, non-infectious, ectoparasitic infestation, and reproductive diseases. Diseases such as anthrax, black leg, sheep and goat pox, contagious ecthyma (Orf), actinobacillosis, actinomycosis, colibacillosis, mastitis, pasturelosis, parasitic bronchitis, gastrointestinal tract parasitism, Peste desPetitis Ruminants, foot root, and kerato conjuctivitis were grouped as infectious. Tick infestation, lice infestation, flea infestation, mange mite infestation and leech infestation were grouped as ectoparasitic infestation. Bloat, milk fever, trauma of eye, fracture of limbs and horn, wart, abscess and incisional hernia were grouped under disease category of non-infectious whereas abortion, retained placenta and dystocia were also grouped under reproductive problems category.

The proportion of infectious, non-infectious,

Table 1. The prevalence of major ruminant diseases in Tanqua Abergelle and Kola Tembien districts.

Tentative diagnosis	Frequency	Percent
GIT Parasitism	31	6.72
PPR	5	1.08
Abortion	38	8.24
Abscess	13	2.82
Actinobacillosis	8	1.74
Actinomycosis	9	1.95
Anthrax	15	3.25
Black leg	8	1.74
Bloat	8	1.74
Colibacillosis	7	1.52
Dystocia	4	0.87
Flea infestation	24	5.21
Foot rot	3	0.65
Fracture of horn	1	0.22
Fracture of limb	4	0.87
Incisional hernia	4	0.87
Keratoconjunctivitis	15	3.25
Leech infestation	10	2.17
Lice infestation	46	9.98
Mange mite infection	14	3.04
Mastitis	11	2.39
Milk fever	3	0.65
Orf	17	3.69
Parasitic bronchitis	15	3.25
Pastuerellosis	39	8.46
Sheep and goat pox	55	11.93
Retained placenta	14	3.04
Tick infestation	27	5.86
Trauma of eye	7	1.52
Wart	6	1.30

ectoparasitic infestation and reproductive diseases in both district were 51.63, 9.97, 26.25, and 12.15%, respectively. Of these, infectious and ectoparasitic infestation accounted for higher proportion as compared to reproductive and non-infectious diseases.

The status of external parasite infestation in the study districts

The overall prevalence of ectoparasite infestation in the study districts was 26.25% (121/461). The ectoparasite infestation disease category includes lice, tick, flea, mange mite, and leech infestation and their prevalence is shown in Table 2.

Higher infestation was found in lice (38.02%) and followed by tick (22.31%), flea (19.83%), mange mite (11.57%) and leech infestation (8.26%) in the study districts.

The status of reproductive problems in the study districts

The overall prevalence of reproductive problem categories in districts of Tanqua Abergelle and Kola Tembien was 12.15%. The reproductive problem category comprises of abortion, retained placenta and dystocia with their prevalence of 67.86, 25, and 7.14%, respectively. The higher proportions of reproductive diseases were abortion (Table 3).

The prevalence of infectious diseases in the study districts

The overall prevalence of infectious disease categories in

Table 2. The status of external parasite infestation in the districts of Tanqua Abergele and Kola Tembein.

Type of parasite	Frequency	Percent
Lice infestation	46	38.02
Tick infestation	27	22.31
Flea infestation	24	19.83
Mange mite infestation	14	11.57
Leech infestation	10	8.26

Table 3. The prevalence of reproductive disease in the study area.

Disease category	Tanqua Abergelle (%)	Kola Tembien (%)	Total (%)
Retained placenta	17.86	7.14	25
Abortion	66.07	1.79	67.86
Dystocia	5.36	1.79	7.14
Total	89.29	10.71	100

Table 4. The status of prevalence of infectious disease in districts of Tanqua Abergele and Kola Tembien.

Infectious disease	Frequency	Percent
Anthrax	15	6.30
Black leg	8	3.36
Actinomycosis	9	3.78
Actinobacilosis	8	3.36
Mastitis	11	4.62
GIT parasitism	31	13.03
Sheep and goat pox	55	23.11
Orf	17	7.14
Colibacillosis	7	2.94
Kerato conjunctivitis	15	6.30
Foot rot	3	1.26
PPR	5	2.10
Pasturellosis	39	16.39
Parasitic bronchitis	15	6.30
Total	238	100.00

the study districts were 51.63% which is the leading among the disease category and exerts major effect on the livestock industry. Pasturellosis, gastrointestinal parasitism, parasitic bronchitis and sheep and goat pox was the leading prevailing infectious disease among the infectious disease category in the study districts (Table 4).

The prevalence of non-infectious disease in the study districts

The overall prevalence of non-infectious disease in both districts is 9.97% which is the least among disease category. Of all the non-infectious disease in the study districts, bloat has higher percentage followed by trauma of eye due to whip lash (Table 5).

DISCUSSION

The study reveals that sheep and goat pox, abortion, pasteurellosis, lice infestation, tick infestation and flea infestation were the major animal health constraints of ruminants in the study districts. This study agrees with the finding of Haftu et al. (2014) in which pasteurellosis and ectoparasite infestation were the major health constraints in Ganta Afeshum district.

Table 5. The status of non-infectious diseases in the study districts.

List of abnormalities	Frequency	Percent
Bloat	8	17.39
Trauma of eye	7	15.22
Fracture of horn	1	2.17
Incisional hernia	4	8.70
Wart	6	13.04
Milk fever	3	6.52
Abscess	13	28.26
Fracture of limbs	4	8.70
Total	46	100

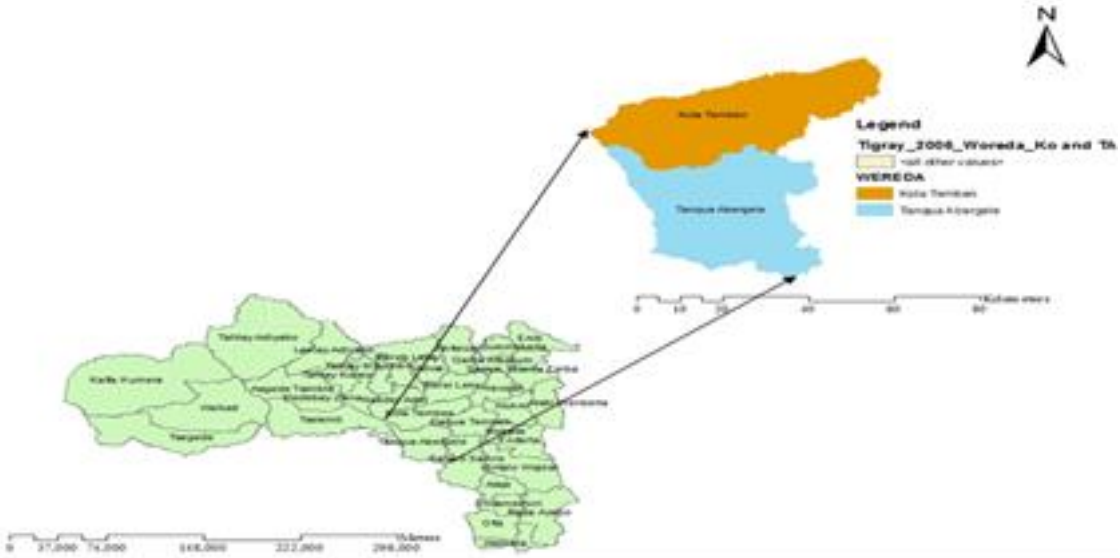

Figure 1. Topographic map of Tanqua Abergele and Kola Tembien.

The overall prevalence of ectoparasites in the study districts was 26.25%. However, it is higher than the study conducted in Ganta Afeshum district (15.4%) reported by Haftu et al. (2014) and it is lower than the study conducted in Gondar (78.38%) reported by Fentahun et al. (2012). These variations might be due to different management practice of the animals, agro ecology, and ectoparasite control practices in the different study districts.

The major infectious diseases of small ruminants identified in this study were pastuerellosis, gastrointestinal tract parasitism, parasitic bronchitis and sheep and goat pox. These diseases were also identified in different areas of the country like Urgessa et al. (2012) who reported the existence of these diseases in Ilu Abba Bora Zone of Oromia Regional State, in Ganta Afeshum district of Eastern Zone of Tigray (Haftu et al., 2014).

The major reproductive problems identified in these study districts were abortion (67.8%), retained placenta (25%), and dystocia (7.14%). The present findings revealed the existence of small ruminant abortion and retained placenta at a high prevalence. The present finding with regards to abortion was higher than the report in Dire Dawa (51.02%) by Negash et al. (2012). This report was also higher than the report by Fentahun and Fresebehat, (2012) in Gonder areas (15%). The present finding also revealed higher prevalence of retained placenta and dystocia. This report also disagrees with those of Feleke (2008) who reported higher prevalence (25%) of retained fetal membrane and very low prevalence of dystocia (0.3%) was reported in Bure districts. In the present study, the higher prevalence of abortion, retained placenta and dystocia might be associated with infectious and non-infectious causes. Similarly, this may also be due to different management factors and agro ecology (Juyal et al., 2011). Most researches on reproductive problems especially abortion put as a serious constraint small ruminant production,

because this causes high mortality amongst kids and lambs and it has a high zoonotic potential (Gizaw et al., 1995; Gojam et al., 1995; Solomon and Gemeda, 2000; Tibbo, 2006).

The overall investigated infectious diseases in ruminants in the study districts were anthrax (6.3%), blackleg (3.36%), actinomycosis (3.78%), actinobacillosis (3.36%), mastitis (4.62%), gastrointestinal tract parasitism (13.03%), sheep and goat pox (23.11%), Orf (7.14%), colibacillosis (2.94%), keratoconjunctivitis (6.3%), foot rot (11.26%), and pastuerellosis (16.39%). Different reports were described about infectious diseases of ruminants in different parts of Ethiopia; in Ganta Afeshum reported by Haftu et al. (2014) for anthrax (6.8%), blackleg (5.8%), pastuerellosis (15.9%), and gastrointestinal tract parasitism (16.1%). Amsalu (2007), Mekonnen (2007), Yohannes (2007) and Abraha (2007) also reported the importance of anthrax and blackleg.

The present study showed that pasteurellosis was the most serious economically important bacterial infectious disease of ruminants in the study districts. This result is in agreement with the findings of Haftu et al. (2014) who reported the prevalence in Ganta Afeshum to be 15.9%. Pasteurellosis being commensally of the upper respiratory tract selectively proliferate and colonize the lower part of the respiratory tract. This occurs during the times of ill-defined factors of which inclement weather is one example (Radostits et al., 2006). Similarly, the high occurrence of the diseases in the study districts may be due to stress factors.

Sheep/goat poxviruses in the present study were found to be frequently occurring viral infectious diseases in the districts. Factors predisposing for poxvirus infection include climate, housing, and shortage of feed during the long dry season. Similar, study was reported by Haffize (2001) in Central Ethiopia. This finding is also in agreement with the finding of Feleke (2008) who studied major animal health problems of market oriented livestock development in Bure district and reported the prevalence of sheep and goat pox in Bure woreda to be 18.35 and 31.25%, respectively.

In the study districts, different non infectious diseases were investigated. Among these non-infectious diseases, bloat was at higher prevalence rate (17.39%). The present finding was different from the report of Haftu et al. (2014) who reported that the prevalence was 4.7%; this may be due to agro ecology and management difference. In addition to this, Feleke (2008) also reported that eye trauma was investigated; although it was in a low prevalence (0.3%).

CONCLUSIONS AND RECOMMENDATION

In the study districts, health problems such as sheep and goat pox, abortion, pasturellosis, lice infestation, tick infestation and flea infestation were the major identified health problem of ruminants. Other diseases of economic importance included black leg, mastitis; peste des petits ruminants (PPR) and anthrax were also identified. Based on these findings, the following recommendations are made:

(1) Provision of adequate budget for procurement of drugs and veterinary equipment may be made.
(2) Identification of strains of different diseases in the district is needed.
(3) Provision of regular in-service training to animal health workers in the district is required.
(4) Training farmers and extension agents in prevention and control of major livestock diseases in the district may be stressed.
(5) Provision of regular vaccinations and treatment of major livestock diseases in the district is recommended.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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