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Prevalence of Bovine Trypanosomiases in Tembaro District, Kembata Tembaro Zone, Southern Ethiopia

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Abstract- A cross-sectional study of bovine Trypanosomiases was conducted in Tembaro district of Kembata tembaro zone, Southern Ethiopia. A total of 800 cattle, 400 in the dry and 400 in the wet seasons were randomly selected and examined for Trypanosomiases. The overall prevalence of the disease was 10.9%. *T. congolense* and *T. vivax* were detected from buffy coat positive samples. Among the total of 87 trypanosome infections detected in both seasons, 79.3% (69) were due to *T. congolense*; 18.4 % (16) were due to *T. vivax* and the rest 2.5% were mixed infections. Age and season of the year were not significantly associated ($P > 0.05$) with the disease. A significant association of the disease was observed ($P < 0.05$) between body condition score and sex. The packed cell volume of trypanosome infected cattle was lower compared with non-infected. According to this study, Bovine Trypanosomiases was the major disease of cattle in the study area. Therefore control of bovine Trypanosomiases should be enhanced systematically to improve livestock production in the area.

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Prevalence of Bovine Trypanosomiases in Tembaro District, Kembata Tembaro Zone, Southern Ethiopia

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Abstract- A cross-sectional study of bovine Trypanosomiases was conducted in Tembaro district of Kembata tembaro zone, Southern Ethiopia. A total of 800 cattle, 400 in the dry and 400 in the wet seasons were randomly selected and examined for Trypanosomiases. The overall prevalence of the disease was 10.9%. *T. congolense* and *T. vivax* were detected from buffy coat positive samples. Among the total of 87 trypanosome infections detected in both seasons, 79.3% (69) were due to *T. congolense*; 18.4 % (16) were due to *T. vivax* and the rest 2.5% were mixed infections. Age and season of the year were not significantly associated ($P>0.05$) with the disease. A significant association of the disease was observed ($P<0.05$) between body condition score and sex. The packed cell volume of trypanosome infected cattle was lower compared with non-infected. According to this study, Bovine Trypanosomiases was the major disease of cattle in the study area. Therefore control of bovine Trypanosomiases should be enhanced systematically to improve livestock production in the area.

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I. INTRODUCTION

Livestock is essential for nutrition, food security, and livelihood of people throughout the world (Nabarro and Wannous, 2014). But animal diseases continue to constrain livestock productivity, agricultural development, human well-being, and poverty alleviation in many regions of the developing country in a variety of ways. Bovine Trypanosomiases is among the recognized constraints to livestock production in Ethiopia since it causes a severe problem in livestock, mainly in the rural community (Tulu, 2019). The disease is transmitted by tsetse flies and is endemic in a part of sub-Saharan Africa called the tsetse fly belt, which occurs approximately between latitudes 10°N and 20-30°S (Spickler, 2018). It is caused by trypanosome species *T. congolense*, *T. vivax* and *T. brucie* spp. (Giordani *et al.*, 2016). The disease epidemiology is influenced by the distribution of the vectors, the virulence of the species, and response of the host (Urquhart *et al.*, 1996). Compared to animals kept in Trypanosomiases free areas, animals kept in areas of moderate risk of Trypanosomiases have lower calving

rates, lower milk yields, higher rates of calf mortality, and require more frequent treatment with preventive and curative doses of trypanocidal drugs. At the herd level, Trypanosomiases reduce milk off-take, live animal off-take, and the work efficiency of oxen used for cultivation (Swallow, 1999). Therefore, the objective of the current study was to determine the prevalence of bovine Trypanosomiases and associated risk factors in Tembaro woreda, Kembata tembaro zone.

II. METHODOLOGY

a) Study area and design

A cross-sectional study was conducted from 2011 to 2013 to determine the prevalence of bovine Trypanosomiases in Tembaro district, Kembata Tembaro zone, Southern Ethiopia in three randomly selected peasant associations (PAs). It is found at 7°N latitude and 37°E longitude and an altitude of 2100 meters above sea level along the Omo belt, southern Ethiopia. It is located further to the south, bordered by the Omo river and Dawro zone in the south west, and by the Hadiya zone in the north. It has a total area of approximately 27,917 km² and has a moderate tropical climate. The mixed agricultural system is practiced whereby crop production and animal husbandry take place side by side.

b) Sampling Method and Sample Size Determination

The sampling method was simple random sampling, and the sample size was determined according to the formula given by Thrusfield (2005) ($n = 1.96^2 \times P \cdot \exp. / d^2$). The sample size (n) was determined considering the expected prevalence ($P \cdot \exp.$) of 50% and absolute desired precision (d) of 5% at a confidence interval of 95%. As a result, a total of 800 cattle were sampled (400 in the dry and 400 in the wet season).

c) Questionnaire Survey

A questionnaire survey was conducted in three kebeles of the study area from a total of 90 farmers to assess the occurrence of the disease.

d) Parasitological and hematological methods

The Buffy coat examination (BCE), the hematocrit centrifugation (HCT) and thin blood film

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methods were used according to the standard procedure described by Murray *et al.*, (1977).

e) Data Analysis

Data was entered to Microsoft excel and transferred to the SPSS software version 20.0 for analysis. Chi-square was employed to determine the association of the prevalence of Trypanosomiasis with different risk factors. P-value ≤ 0.05 was considered statistically significant.

III. RESULT

a) Questionnaire survey

There are different types of livestock in the study area. These are cattle, goats, sheep, equines, and poultry. Cattle are the most predominant livestock in the study area. 95% of the interviewed farmers ranked Trypanosomiasis as a major economically important disease of cattle followed by Anthrax and Blackleg. 99% of respondents said that Trypanosomiasis (local name 'Shulule') had got clinical signs of reduced appetite, weakness, weight loss, low milk yield, reduced drought

power, diarrhea, and tail problem. The common trypanocidal drugs used according to 90% of the respondents in the study area were Diminazene aceturate, followed by Ethidium bromide. According to the survey, 90%, 8% and 2% of sick animals in the study area were treated by owners, smugglers, and veterinary personnel, respectively. About 90% of respondents said that they use one sachet of Diminazene aceturate or one tablet of Ethidium bromide per adult animal. 86% of the interviewed farmers responded that they treat with trypanocidal drugs at least two times/month/cattle especially, in the dry season.

b) Parasitological Survey

The overall prevalence of Trypanosomiasis during the study was 10.9 % (87/800), of which 11.8% is in the dry season and 10% in the wet season (Table 1). There was no significant difference between the ages of the animal and season of the year. However, body condition and sex were found to be significantly associated with trypanosome infection ($p < 0.05$) (Table 1).

Table 1: Prevalence of Trypanosomiasis infection with different potential risk factors

Risk factors	No examined	No positives	Percent	χ^2	P- value
Season					
Dry	400	47	11.8	0.632	0.427
Wet	400	40	10		
Sex					
Male	397	55	13.9	7.215	0.007
Female	403	32	7.9		
BC*					
Good	182	14	7.7	202.66	0.000
Medium	496	15	3		
Poor	122	58	47.5		
Age					
Adult	586	65	11.1	0.107	0.744
Young	214	22	10.3		

*Body condition

Among the total of 87 trypanosome infections detected in both seasons, 79.3% (69) were due to *Trypanosoma congolense*; 18.4 % (16) were due to *Trypanosoma vivax* and the rest 2.5% were mixed

infections. *Trypanosoma congolense* was the dominant species identified in both the dry and the wet seasons (Table 2). The higher number of cattle which have lower PCV were infected animals (parasitaemic)(Table 3).

Table 2: Trypanosome species in dry and wet seasons

Season	Total sample	Positives	Tc		Tv		Tb		Mixed		Prevalence (%)
			No	(%)	No	(%)	No/%	No	(%)		
Dry	400	47	39	83	7	14.9	0	1	2.1	11.8	
Wet	400	40	30	75	9	22.5	0	1	2.5	10	
Total	800	87	69	79.3	16	18.4	0	2	2.3	10.9	

Tc = *T. congolense*, Tv = *T. vivax*, Mixed = *T. congolense* and *T. vivax*

Table 3: PCV of parasitaemic cattle

Season	No of cattle	Parasitaemic PCV < 26 (%)	Parasitaemic PCV > 26 (%)
Dry	400	30(63.8)	17(36.2)
Wet	400	32(80)	8(20)
Total	800	62(71.3)	25(28.7)

IV. DISCUSSION

The overall prevalence of Trypanosomiasis, according to the present study was 10.9%. This result was higher than the result of Bizuayehu *et al.* (2012), which was 6.9% in Chena district, Keffa zone, Southern Ethiopia. The result was lower than the report of Ataro *et al.* (2016) (21.33%) in Konta Special Woreda, Southern Ethiopia.

T. congolense was the species highly detected from infected animals, and *T. vivax* was found in lower prevalence. This result is similar to the reports of Yigzaw *et al.* (2017) in Anderacha district of Sheka zone, Southern Ethiopia. But this result was different from the report of Bishaw *et al.* (2012), which revealed the majority of infections were due to *T. vivax* in Wemberma district of West Gojjam Zone, North West Ethiopia.

Even though the prevalence of Trypanosomiasis was relatively higher in the dry season than the wet season, there was no significant difference between seasons of the year ($P > 0.05$). The prevalence of trypanosomosis was higher in Adults than young ones with no statistically significant difference ($P > 0.05$) among age groups. This result agrees with a study conducted by Yigzaw *et al.* (2017) in Anderacha district of Sheka zone, Bizuayehu *et al.* (2012) in Chena Wereda, and Bishaw *et al.* (2012) at Wembera district of West Gojam. This result is different from a study conducted by Teka *et al.* (2012) at Arbaminch.

There was a significant difference between body condition score in which the high prevalence of the disease was observed in cattle with poor body condition score. It was similarly reported by Bishaw *et al.* (2012) in Wembera district of West Gojam and Yigzaw *et al.* (2017) in Anderacha district of Sheka zone.

V. CONCLUSION

The study revealed that Bovine Trypanosomiasis was the major disease of cattle in the study area. *T. congolense* was the most prevalent species compared to others. Statistically, significant difference was observed in the prevalence of Trypanosomiasis between body condition score and sex. The observed association between the infection and reduction in PCV showed the impact of the disease on the productivity of infected cattle. Further studies should be conducted, including the drug resistance pattern, and Control of bovine Trypanosomiasis should be enhanced systematically to improve livestock production in the area.

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