academicJournals

Vol. 8(7), pp. 64-71, July 2016
DOI: 10.5897/JVMAH2015.0430
Article Number: 8454F0F59136
ISSN 2141-2529

http://www.academicjournals.org/JVMAH

Journal of Veterinary Medicine and Animal Health

Full Length Research Paper

Prevalence of bovine trypanosomosis and its vector apparent density in Chora District of Illuababora Western Oromia, Ethiopia

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Received 20 October, 2015; Accepted 23 May, 2016

Bovine trypanosomosis is transmitted by tsetse and other biting flies which cause the most serious veterinary and animal production problem in sub-Saharan Africa. Cross sectional study was conducted from September to December, 2013 in Chora district, Western Oromia to assess the prevalence of trypanosomosis and apparent density of its vector. The methods employed during the study were deploying trap for the collection of tsetse flies and buffy coat technique for parasitological study. About 45 monopyramidal baited traps were deployed for 48 h for collection of tsetse fly. In the study area tsetse flies *Glossina pallidepes* and *Glossina tachnoides* and other biting flies were trapped. *G. pallidepes* was caught at altitude of about 2000 m a.s.l. The overall apparent density of the tsetse flies was 2.63 flies/trap/day. Blood samples collected from 384 cattle were centrifuged and examined under microscope. It revealed that *Trypanosoma congolense* 46(12.0%), *Trypanosoma vivax* 3(0.8%), no infection of *Trypanosoma brucei* and mixed infection 3(0.8%) of the two trypanosomes species were the causes of bovine trypanosomosis in the study area. The overall prevalence of bovine trypanosomosis was 13.6%. The female cattle were infected with the prevalence of 35(9.2%) than male cattle 17(4.4%) and this association was insignificant (P > 0.05). The prevalence of trypanosomosis in adult and poor body condition cattle were 49(12.8%) and 20(5.2%), respectively and significantly associated (P < 0.05) with prevalence of trypanosomosis. The red colour cattle were mostly affected 22(5.7%) and insignificantly associated (P > 0.05). Aneamic and non-aneamic cattle have trypanosomes infection rate of 43(11.2%) and 9(2.34%), respectively. Aneamic cattle were significantly associated (P < 0.005) with the prevalence of trypanosomosis, but non-aneamic cattle were insignificantly associated (P > 0.05). Generally, the study concludes that tsetse flies were an important vector for the epidemiology of bovine trypanosomosis in Chora district. Therefore, disease and its vector control and prevention methods and further studies on the trypanosomal drug resistance should be undertaken to improve livestock production and productivity in the study area.

Key words: Prevalence, trypanosomosis, apparent density, tsetse flies, cattle, Chora district.

INTRODUCTION

Bovine trypanosomosis is transmitted by tsetse and other biting flies which cause the most serious veterinary and animal production problem in sub-Saharan Africa and prevents the keeping of ruminants and equines on over 10 millions of square kilometers of potentially productive land. This study is the road map and contribution to the

Pan African Tsetse and Trypanosomosis Eradication Campaign (PATTEC) Agenda (Pan African Tsetse and Trypanosomosis Eradication Campaign (PATTEC), 2001). Tsetse flies in Ethiopia are confined to southwestern and northwestern regions between longitude 33° and 38°E and latitude 5° and 12°N covers an area of 220,000 km². Tsetse infested areas lie in the lowlands and also in the river valleys of Abay (Blue Nile), Baro, Akobo, Didessa, Ghibe, and Omo (National Tsetse and Trypanosomosis Investigation and Control Center, 2004). Consequently, new areas are being invaded and settled communities are being continually expelled by the advancing tsetse. Five species of *Glossina* (*G. m. submorsitans, G. pallidipes, G. tachinoides, G. f. fuscipes and G. longipennis*) have been recorded in Ethiopia (Langridge, 1976).

Bovine trypanosomosis is one of the diseases that are caused by flagellated protozoan parasites which belong to the genus *Trypanosoma*. *Trypanosoma* is a unicellular parasite found in the blood and other tissues of vertebrates including livestock, wild life and people (Uilenberg, 1998). The species of trypanosomes are known to exist in Ethiopia, which are pathogenic to cattle, are *Trypanosoma congolense, Trypanosoma vivax* and *Trypanosoma brucei*. They are distributed mainly in tsetse belt region of the Ethiopia. However, *T. vivax* is also found in areas outside of the tsetse belt, where it can possibly be transmitted by mechanical vectors of biting flies (Langridge, 1976; Abebe and Jobre, 1996). According to National Tsetse and Trypanosomosis Investigation and Control Center (National Tsetse and Trypanosomosis Investigation and Control Center, 2004), tsetse transmitted animal trypanosomosis still remain as one of the largest cause of livestock production losses in Ethiopia. In Chora district, trypanosomosis was found to be one of the factors that hinder livestock rearing in most of its peasant associations. However, hard evidence on the occurrence of tsetse and trypanosomosis in the area is lacking (Cecchi et al., 2015; Cecchi et al., 2014).

Therefore, the objectives of the present study were to assess the prevalence of bovine trypanosomosis and its vector apparent density in Chora district of Western Oromia, Ethiopia.

MATERIALS AND METHODS

Study area, population and Sample size determination

The study was conducted from September to December, 2013 in Chora district, Western Oromia, which is situated at 500 km West of Addis Ababa in Ilu Aba Bora Zone. The mean annual rainfall in Chora district ranges from 1000 to 1500 mm. The annual temperature ranges from 15 to 31°C. The altitude of the area ranges from 1,000 to 2060 m a.s.l. The Geba forest which is registered on the United Nations Educational, Scientific, and Cultural Organization (UNESCO) for its natural habitats is located in the study area. The area has a number of wild animals, such as African buffaloes, Bush pigs, warthog, bush buck, kudu, hippopotamus, crocodiles, hyena, antelopes and snakes which are claimed to serve as sources of food for the vector of trypanosomes.

The cattle in the district are local breeds that are kept under traditional extensive husbandry systems with communal herding. Agriculture is the main livelihood of the society with mixed farming system and livestock play an integral role for agriculture. The district has 20 peasant associations. The animal population of the district is estimated to be 105,500 cattle, 38,100 sheep, 22,987 goats, 6,881 Horses, 2,295 Mule and 1,735 donkeys in 2012. Sample size was determined using 95% confidence level, 50% expected prevalence and 0.05 desired absolute precision using the formula described by Thrusfield (Thrusfield, 1995). Therefore, a total of 384 cattle were randomly examined for bovine trypanosomosis.

Study design and protocol

Chora district was selected purposely based on the extent of the existing problems, the complaints of farmers and the level of medium to high tsetse challenge in the area from the report of the field veterinarian in the district. A cross-sectional study design was engaged and three peasant associations were selected based on the veterinary reports of the trypanosomosis and tsetse infestation in the district. The cattle age was categorized as good, medium and poor. Body condition score was categorized as young (< 3 years old), adult (3 to 9 years old) and old (> 9 years old) according to Nicholson and Butterworth (Nicholson and Butterworth, 1986).

Sample collection for assessment the prevalence of bovine trypanosomosis

Buffy coat technique was used for the determination of bovine trypanosomosis prevalence. Blood sample collection was performed by piercing the marginal ear vein with a sterile lancet and blood was drawn by a heparinized capillary tube. Then one end (the heparanized end) of capillary tubes were sealed with crystal sealant and centrifuged at 12,000 rpm for five minutes to separate the blood cells and to concentrate trypanosomes using centrifugal forces. Then the packed cell volume (PCV) was determined by packed cell volume reader and recorded. The PCV value ≥ 25 and < 25 were considered as non-aneamic and aneamic, respectively. The capillary tubes were then broken just below buffy coat using diamond pencil and expressed on microscopic slide and covered with a cover slip. It was examined under 40× objective of microscope to identify and detect the presence of the parasites (Murray et al., 1977).

Entomological survey

For the entomological survey a total of 45 monopyramidal baited traps were deployed along Geba river and its tributaries as well in the savannah, about 2000 m a.s.l. altitude to assess the apparent density, distributions and species of tsetse flies and other biting flies involved in transmission of trypanosomosis. All traps were baited with acetone, Octenol (1-3-Octane) and cow urine filled in

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separated bottles and labeled and deployed at an interval of 200 to 250 m. After 48 h of trap deployment, the cages were collected and captured flies were identified and sexed according to morphological characteristics, and counted. The tsetse flies were identified as species level and the other biting flies as the genus level. The apparent density was determined based on the mean catches of flies in traps deployed and expressed as the number of fly catch/trap/day (Leak, 1999).

Data management and analysis

Raw data were entered into a Microsoft Excel spreadsheet and descriptive statistics were used to summarize the data. The prevalence was calculated for all data as the number of infected individuals divided by the number of individuals examined and multiplied by 100. The association between the prevalence of trypanosome infection and risk factors were assessed by chi-square, whereas the student's *t*-test was used to assess the difference in mean PCV between trypanosome positive, negative and overall examined animals. All statistical analyses were conducted using SPSS version 20.0 software. The test result was considered significant when the calculated *p*-value was less than 0.05. The apparent density of fly population was calculated by dividing the number of flies caught by the number of traps deployed and the number of days of deployment and expressed as fly/trap/day (FTD).

RESULTS

Trypanosomosis survey result

Buffy coat collected from 384 cattle were centrifuged and examined under microscope. Bovine trypanosomosis in the study area was caused by *T. congolense* 46(12.0%), *T. vivax* 3(0.8%), no infection of *T. brucei* and mixed infection 3(0.8%) of the two trypanosomes species. The female cattle were infected with the prevalence of 35(9.2%) than male cattle 17(4.4%) and insignificantly associated ($P > 0.05$). The prevalence of trypanosomosis in adult and poor body condition cattle were 49(12.8%) and 20(5.2%), respectively and significantly associated ($P < 0.05$) with prevalence of it. The red colour cattle were mostly affected 22(5.7%) and insignificantly associated ($P > 0.05$) (Table 1). Aneamic and non-aneamic cattle had trypanosomes infection rate of 43(11.2%) and 9(2.34%), respectively. Infection rate of *T. congolense* in aneamic and non-aneamic cattle were 37(9.6%) and 9(2.34%), respectively. Aneamic cattle were highly significantly associated ($P < 0.005$) with the prevalence of trypanosomosis, but non-aneamic cattle were insignificantly associated ($P > 0.05$) (Table 2).

Heamatological result

Blood samples collected from cattle were centrifuged by heamatocrit centrifuge and its PCV was read by PCV reader. Mean of overall, parasitic and aparasitic PCV were 23.92±5.591, 19.02±5.425 and 24.68±5.224, respectively and significantly associated $P < 0.05$ (Table 3).

Entomological survey result

In the study area, tsetse flies *G. pallidepes* and *G. tachnoides* and other biting flies Tabanus, Stomoxys and Heamatopota were trapped. *G. pallidepes* was caught at altitude about 2000 m a.s.l. (Tables 4 and 6). The overall apparent density was 2.63 flies/trap/day of the tsetse flies in Chora district. The Peasant Associations Sololo, Chirache and Hawayember tsetse flies apparent density was 6.47, 1.2, 0.23 flies/trap/day, respectively Table 5 to 7. Sex identification was performed on 237 tsetse flies caught in the study area and counted. The male and female sex was 113 and 124, respectively. Apparent density in flies/trap/day of biting flies Stomoxys, Heamatopota and Tabanus was 2.51, 0.08 and 0.02, respectively (Table 7).

DISCUSSION

This study indicated that from 45 monopyramidal baited traps deployed in the study area for 48 h, the *G. pallidepes* (183) and *G. tachnoides* (54) and other biting flies were trapped. Hence, *G. pallidepes* was caught at altitude of about 2000 m a.s.l. It shows that *G. pallidepes* moves for the search of food to the high altitudes. The overall 2.63 flies/trap/day apparent density of the tsetse flies was recorded in Chora district. This finding is lower than the previous report 19.14 flies/trap/day in Daramallo District by Ayele et al. (2012) and 14.97 flies/trap/day report in selected villages of Arbaminch by Wondewosen et al. (2012). This difference could be attributed to environmental conditions, agro ecological differences and during the study the season was dry in the study area. Among the Peasant Associations, Sololo peasant association was severely affected with tsetse flies of apparent density 6.47 flies/trap/day. Sex identification was performed on 237 tsetse flies caught in the study area and counted. The female tsetse flies (124) were dominantly caught than male ones (113). This indicates that female tsetse flies are playing important role in the cyclical transmission of Trypanosomosis than male tsetse due to the fact that female tsetse demands more blood when pregnant to feed their larva (Urquhart et al., 2006). Apparent density of biting flies in flies/trap/day of Stomoxys, Heamatopota and Tabanus was 2.51, 0.08 and 0.02, respectively. It shows that other biting flies are playing important role in the non-cyclical transmission of trypanosomosis in the study area.

Blood samples collected from 384 cattle were centrifuged and examined under microscope. Bovine trypanosomosis in the study area was caused by *T. congolense* 46(12.0%), *T. vivax* 3(0.8%), no infection of *T. brucei* and mixed infection 3(0.8%) of the two

Table 1. Risk factors with the prevalence of Trypanosomosis.

Risk factors		Non infected Cattle (%)	Prevalence of trypanosomosis				X^2-value	df	P-value
			Mixed Infection (%)	T.C. (%)	T.V. (%)	Total (%)			
Sex	Female	181(47.1)	3(0.8)	29(7.6)	3(0.8)	35(9.2)	5.934[a]	3	0.115
	Male	151(39.3)	0(0.0)	17(4.4)	0(0.0)	17(4.4)			
	Total	332(86.4)	3(0.8)	46(12.0)	3(0.8)	52(13.6)			
Age	Adult	241(62.8)	3(0.8)	44(11.5)	2(0.5)	49(12.8)	54.368[a]	6	0.000
	Old	2(0.5)	0(0.0)	0(0.0)	1(0.3)	1(0.3)			
	Young	89(23.2)	0(0.0)	2(0.5)	0(0.0)	2(0.5)			
	Total	332(86.4)	3(0.8)	46(12.0)	3(0.8)	52(13.6)			
BSC	Good	140(36.5)	0(0.0)	15(3.9)	1(0.3)	16(4.2)	22.358[a]	6	0.001
	Medium	137(35.7)	3(0.8)	13(3.4)	0(0.0)	16(4.2)			
	Poor	55(14.3)	0(0.0)	18(4.7)	2(0.5)	20(5.2)			
	Total	332(86.5)	3(0.8)	46(12.0)	3(0.8)	52(13.6)			
Colour	Black	21(5.5)	0(0.0)	5(1.3)	0(0.0)	5(1.3)	24.323[a]	15	0.060
	Brown	44(11.5)	0(0.0)	5(1.3)	0(0.0)	5(1.3)			
	White and black	31(8.1)	0(0.0)	6(1.6)	0(0.0)	6(1.6)			
	Grey	58(15.1)	3(0.8)	7(1.8)	1(0.3)	11(2.9)			
	Red	174(45.3)	0(0.0)	20(5.2)	2(0.5)	22(5.7)			
	White	4(1.0)	0(0.0)	3(0.8)	0(0.0)	3(0.8)			
	Total	332(86.5)	3(0.8)	46(12.0)	3(0.8)	52(13.6)			

BSC = Body condition score, T.V. = *Trypanosoma vivax*, T.C. = *Trypanosoma congolense,* df = Degree of freedom, Mixed infection = *Trypanosoma vivax* and *Trypanosoma congolense*. X^2 = Chi-square.

Table 2. Prevalence of trypanosomosis in aneamic or non-aneamic cattle.

Parameter	Non-infected (%)	Prevalence of Trypanosomosis				X^2-value	df	P-value
		Mixed infection (%)	T.C. (%)	T.V. (%)	Total (%)			
Aneamic PCV<25	148(38.5)	3(0.8)	37(9.6)	3(0.8)	43(11.2)	108.973[a]	42	0.000
Non-aneamic PCV≥25	184(47.9)	0(0.00)	9(2.34)	0(0.00)	9(2.34)	19.375[a]	15	0.197
Total	332(86.5)	3(0.8)	46(12.0)	3(0.8)	52(13.6)	-	-	-

PCV = Packed Cell Volume, T.V. = *Trypanosoma vivax*, T.C. = *Trypanosoma congolense,* df = Degree of freedom, Mixed infection = *Trypanosoma vivax* and *Trypanosoma congolense, X^2* = Chi-square.

Table 3. Mean of packed cell volume (PCV) of overall, aparasitic and parasitic cattle.

Parameter	Sample size	Mean	Standard deviation	Std. error mean	t	df	P-value	Mean difference	95% confidence interval of the difference	
									Lower	Upper
Overall PCV	384	23.92	5.591	0.285	83.851	383	0.000	23.924	23.36	24.49
Parasitic	52	19.02	5.425	0.752	25.281	51	0.000	19.019	17.51	20.53
Aparasitic	331	24.68	5.224	0.287	85.950	330	0.000	24.680	24.11	25.24

Table 4. Trap deployed in sololo peasant association and tsetse flies caught.

Longitude	Latitude	Altitude in meter	*G.tachnoides*		*G.pallidipes*		stomoxys	Tabanus
			F	M	F	M		
E036°00.058’	N08°24.256’	1371	4	3		2	50	
E036°00.011’	N08°24.280’	1372						
E035°59.989’	N08°24.337’	1380			24	44		
E036°00.069’	N08°24.282’	1388	2	9	2	1		1
E036°00.096’	N08°24.296’	1422			1		3	
E036°00.101’	N08°24.317’	1405	6	24	5	7		
E036°00.759’	N08°24.425’	1559			18	6	20	1
E036°00.699’	N08°24.406’	1488			20	4		
E036°07.319’	N08°21.614’	2014			5	2		
E036°01.543’	N08°24.952’	1657				1	20	
E036°01.920’	N08°24.963’	1668			1		40	
E036°01.894’	N08°24.965’	1665						
E036°01.869’	N08°24.978’	1654					50	
E036°01.873’	N08°24.987’	1642					5	
E036°01.865’	N08°25.014’	1658			3			

Table 5. Trap deployed in chirache peasant association and tsetse flies caught.

Longitude	Latitude	Altitude in meter	G.tachnoides		G.pallidipes		stomoxys	Tabanus	Heamatopota
			F	M	F	M			
E036°02.904’	N08°26.425’	1579	2	4					3
E036°02.949’	N08°26.411’	1607			2				
E036°02.959’	N08°26.367’	1624			2	3			
E036°02.907’	N08°26.360’	1588							1
E036°02.876’	N08°26.324’	1586				1			1
E036°02.864’	N08°26.270’	1593							
E036°02.892’	N08°26.265’	1596			2	4	2		
E036°02.906’	N08°26.304’	1617				3			1
E036°02.931’	N08°26.506’	1591			5	2			
E036°02.945’	N08°26.611’	1626			1				
E036°02.948’	N08°26.568’	1610			3	1			
E036°02.942’	N08°26.534’	1606							
E036°02.955’	N08°26.699’	1616				1			
E036°02.974’	N08°26.695’	1619							
E036°03.052’	N08°26.687’	1631					2		1

trypanosomes species. The previous results reported by Tewelde et al. 2004 at Kone and Village I settlement areas of West Ethiopia, Woldeyes and Aboset (Woldeyes and Aboset, 1997) at Arbaminch zuria districts and

Table 6. Trap deployed in hawa yember peasant association and tsetse flies caught

Longitude	Latitude	Altitude in meter	G.tachnoides		G.pallidipes		Stomoxys	Tabanus
			F	M	F	M		
E036°04.227'	N08°19.941'	1745				1	5	
E036°04.354'	N08°19.958'	1763			2			
E036°04.427'	N08°20.002'	1788				1		
E036°04.589'	N08°20.123'	1808						
E036°04.761'	N08°20.073'	1815					2	
E036°04.589'	N08°20.365'	1826						
E036°04.842'	N08°20.405'	1831						
E036°04.862'	N08°20.507'	1840					6	
E036°05.319'	N08°21.614'	2014			1		3	
E036°05.543'	N08°21.952'	1657			1		5	
E036°05.920'	N08°21.963'	1667						
E036°05.894'	N08°21.965'	1665			1		10	
E036°05.869'	N08°21.978'	1654					2	
E036°05.873'	N08°21.987'	1642						
E036°05.865'	N08°21.014'	1658					1	

Table 7. Apparent density of flies in the district according to peasant association.

Peasant association	Tsetse flies caught						Other biting flies					
	G. tachnoides		*G. pallidipes*		Apparent density		Stomoxys		Tabanus		Heamatopota	
	M	F	M	F	T	FTD	T	FTD	T	FTD	T	FTD
Sololo	12	36	79	67	194	6.47	188	6.27	2	0.07	0	0
Chirache	2	4	15	15	36	1.2	4	0.13	0	0	7	0.23
Hawa yember	0	0	5	2	7	0.23	34	1.13	0	0	0	
Total	14	40	99	84	237	2.63	226	2.51	2	0.02	7	0.08

G. tachnoides = *Glossina tachnoides, G. pallidipes* = *Glossina pallidipes,* M = male, F= female, FTD = flies/trap/day, T = total.

Rowland et al. (1993) in Ghibe valley, south West Ethiopia showed the dominancy of *T. congolense* infection in agreement with present study. The predominance of *T. congolense* infection in cattle may be due to the high number of serodems of *T. congolense* as compared to *T. vivax* and the development of better immune response to *T. vivax* by the infected animal (Leak, 1999).

The prevalence of bovine trypanosomosis was assessed between sexes of cattle and among 52 trypanosome positive animals; female and male cattle were 35(9.2%) and 17(4.4%), respectively. This specified that the female cattle harbor more infection than male cattle 17(4.4%) and insignificantly associated ($P > 0.05$) with trypanosomosis prevalence. This finding is divergent from the previous reports by Getachew (1993), Tefera (1994), Daya and Abebe (2008), Adane (1995), Wondewosen et al. (2012) and Wellde et al. (1979) that shows both male and female cattle were equally susceptible to trypanosomosis infection.

The prevalence of trypanosomosis in adult cattle 49(12.8%) were the most, followed by young 2(0.5%) and old cattle 1(0.3%) and significantly associated ($P < 0.05$) with prevalence of trypanosomosis. This is due to adult cattle movement through tsetse infested areas for the purpose of ploughing, marketing and grazing. The occurrence of trypanosomosis in three different body condition scores (poor, good and medium) animals shows the highest prevalence in poor body condition 20(5.2%) followed by medium 16(4.2%) and good body condition 16(4.2%) and significantly associated ($P < 0.05$) with prevalence of trypanosomosis. This result is similar with the report by Wondewosen et al. (2012) which stated that highest prevalence of trypanosomosis occurred in poor body condition cattle. It was due to the fact that poor body condition animals are highly susceptible to diseases.

Comparison conducted between the different skin color of cattle indicated that slightly highest frequency was observed in cattle having red skin color 22(5.7%) followed by 11(2.9%) in grey, 6(1.6%) in white and black, 5(1.3%) in black, 5(1.3%) in brown and 3(0.8%) in white skin color and insignificantly associated ($P > 0.05$). Tsetse flies by nature are attracted toward a black color but in animals having black skin color there was low prevalence of trypanosomosis recorded in this study,

area. The possible suggestion for the low prevalence in black skin color cattle in the current study may be the low number of samples taken from black skin color animals.

Aneamic cattle which are those with PCV < 25 have trypanosomes infection rate of 43(11.2%), but non-aneamic cattle which have PCV ≥ 25 have trypanosomes infection rate of 9(2.34%). This study revealed that anaemia is the principal sign of trypanosomosis in livestock (Gardiner, 1989). Infection rate of *T. congolense* was higher in aneamic cattle 37(9.6%) than non-aneamic cattle 9(2.34%). Aneamic cattle were significantly associated ($P < 0.005$) with the prevalence of trypanosomosis, but non-aneamic cattle were insignificantly associated ($P > 0.05$).

Blood samples collected from cattle were centrifuged by heamatocrit centrifuge and its PCV was read by PCV reader. Mean of overall, parasitic and aparasitic PCV were 23.92±5.591, 19.02±5.425 and 24.68±5.224, respectively and significantly associated $P < 0.05$. However, trypanosomosis infection and mean PCV values obtained in this study of parasitic and aparasitic cattle were in agreement with the report of Rowlands et al. (1993) in Ghibe valley at South Western Ethiopia, in which was stated that the average PCV of parasitologically negative animals was significantly higher than the average PCV of parasitological positive animals.

In the total cattle populations sampled during study period, 49.74% of cattle populations have PCV < 25. Almost 77.5% of cattle having PCV < 25 reacted negatively for trypanosomosis infection and this may have occurred due to the inadequacy of the detection method used (Murray et al., 1977) or delayed recovery of anemic situations after recent treatment with trypanocidal drugs or may be due to the compound effect of poor nutrition and hematophagous helminth infection, such as haemonchosis and bunostomiasis (Afework, 1998). However, PCV values can be affected by many factors other than trypanosomosis. These factors are likely to affect both trypanosomosis negative and positive animals (Van den Bossche and Rowlands, 2001).

The present study also revealed that almost 4.66% of the cattle have a PCV value in the normal range (PCV ≥ 25) but they react positively to trypanosomosis infection and this may have occurred due to recent infection with trypanosomosis. This result agrees with the previous result of Garoma (2009) who concluded that cattle having PCV value of normal range were shown to be infected with trypanosome parasite.

CONCLUSION AND RECOMMENDATIONS

Trypanosomosis is the disease transmitted mainly by tsetse flies. This study revealed that *G. pallidepes* and *G. tachnoides* were dominant in the area with the 2.63 flies/trap/day overall apparent density and *G. pallidepes* was trapped about 2,000 m a.s.l. in the study area. Blood samples collected from 384 cattle were examined for trypanosomosis which shows that *T. congolense* and *T. vivax* were the causes of bovine trypanosomosis in the study area and aneamia is the cardinal sign of the trypanosomosis. The overall prevalence of trypanosomosis was 13.6%. Bovine trypanosomosis is an important disease and a potential threat affecting the health and productivity of cattle in the district.

Therefore, regular and continuous control and prevention of the vector and disease should be undertaken. Further studies should be conducted on the area of Trypanosomosis drug resistance.

Conflict of Interests

The authors have not declared any conflict of interests.

ACKNOWLEDGEMENT

We are indebted for technical support of Bedelle Regional Veterinary Laboratory Center staffs.

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