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PREVALENCE OF BOVINE TRYPANOSOMOSIS IN SELECTED DISTRICT OF BENCHI MAJI, SOUTH ETHIOPIA.

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ABSTARCT

A cross sectional study was being conducted at Bench Maji zone, south Bench woreda from March 2016 to May 2016 to determine and estimate the prevalence of trypanosomiasis in study animals. The study was conducted at south Bench woreda, PAS (peasant association), namely zozo. Ayenamba, Keberta, Morita Janchuta which are selected purposively based on the extent of the existing problems, the complaints of the farmers and the level of medium to high tsetse challenge in the areas. The study animals was selected by using simple random sampling method by taking age, sex, body conditions in to account according to and all the animal in the selected areas had equal chance to be selected for this study. Trypanosome infection were found in all study areas. Of 384 cattle examined 27(7.03%) were positive. Prevalence rates were different by study areas with the lowest 5% in zozo, and the highest, 14% in keberta. The prevalence rates in female were 5.85% and males 8.4%.The prevalence rates were also significantly higher in the age between 4-5 years was 8.8%. An infection rate in cattle with good body condition (6.4%) was lower than the rate in animals with poor body condition (7.9%). According to trypanosome species 15(3.95%) were infected with T.conglense, 10(2.63%) were infected with T.vivax and 1(0.26%) were infected with mixed and T.brucci. Farmer in the study area aware of the presence and impact of the disease but have little knowledge on means of transmission (fly vector). Moreover there is unsupervised use of trypancidal drug often from illegal source and administered commonly by the farmer of themselves. Training the livestock owners on situation of trypanosomiasis and means of transmission in the study area is important. Moreover awareness creation on the risk of trypanocidal and drug handling is essential.

Key word- Trypanosomiasis, Cattle, Prevalence, South bench, Ethiopia

1. INTRODUCTION

Agriculture is the most economics sector in many African countries including COMESSA (common market for Eastern and Southern Africa) member state in east Africa including Ethiopia, kenya, Burundi, Djibouti, Rwanda, Sudan and Uganda. Its contribution to GDP is significant and helps to sustain livelihoods through the provision of employments to majority of the rural population (FOA, 2005) Production is a major agricultural activity with a huge economic impact in Ethiopia. Livestock production in Ethiopia contributes about 30-33% of agricultural gross domestic product (GDP) and more than 85% of the farm cash income mainly through meat, milk, eggs, wool, hides and skins (Befkadu and Berhanu, 2000, ESPA, 2003).Large ruminants are important domestic animals in tropical livestock production systems (Eslami, 1999).The economic gains from these animals remain insignificant when it is compared to their huge number. This low productivity is a reflection of disease, limited genetic potential and husbandry standard (Gorski *et al*., 2004). Animal trypanosomiasis is a devastating disease caused by protozoan parasite of the different species of genus trypanosome that inhabits the blood and other tissues of vertebrates, including livestock, wildlife and human (Uilenberg, 1998; Adam *et al*., 2003; Gupta., 2009 Bal *et al., 2014*). It is a vector born disease that is transmitted biologically by tsetse flies and mechanically by other biting flies(FOA,2002;OIE,2009).It is a major constraint contributing to the direct and indirect economic losses to crop and livestock production(Abebe,2005).and has a significant negative impact on economic growth in many parts of the world (Taylor *et a*l.,2007;Sharma *et al.,2013*),particularly in Sub-Saharan Africa(Cecchi *et a*l.,2008).

Trypanosomosis is one of the major impediments to livestock development and agricultural production, with negatively affect the overall development in agriculture in in general, and to food self-reliance efforts of the nation in particular. While tsetse born trypanosomosis is excluding some 180,000 to 200,000 km^2 agriculturally suitable land in west and southwest of the country ,14 million heads of cattle, an equivalent number of small ruminants, nearly 7million equines and 1.8 million camels are at risk of contracting trypanosomosis at any time Rowlands,G.S.,2000]. The most important trypanosome species affecting livestock in Ethiopia are trypanosoma conglense, trypanosome vivax and trypanosome bruce in cattle, sheep, and goats, trypanosome evans in camels and trypanosome equiperdium in horses (Zecharias, A and Zeryehun, 2012).

Tsetse flies in Ethiopia are confined to southern and Western regions between a longitude of 33°and 38°E,and latitude of 5° and 12°N.Tsetse infested areas lie in the lowlands and in river valley of Abay(Blue Nile),Baro, Akobo, Didesa ,Ghibe and Omo. Out of the nine regions of Ethiopia five (Oromia, SNNPR, Amhara, Beninshangul Gumiz and Gambella) are infested with

more than one species of tsetse flies. Consequently, new areas are being invaded and settled communitiesarebeingtroubled.Glossina(G.msubmorsinas,G.pallidipes,G.tachinoides,G.f.fuscipes, and G.longpennis) have been recorded in Ethiopia (Zecharias,A and Zeryehun, 2012).

According to NTTICC tsetse transmitted animal trypanosomiasis is still remain as one of the largest causes of livestock production losses generally in Ethiopia particularly in the study areas. Therefore, the objectives of the present study will be:-

- To determine and estimate the prevalence rate of trypanosomosis
- To identify trypanosomosis species which cause disease to the bovine in study area.

2. MATERIALS AND METHODS

2.1. Description of the study Area

The study has been conducted at Bench Maji zone, south Bench woreda. Which is located in between 900m and 2250m above sea level. Due to medium altitudinal range, the area is characterized by diverse agro-climatic distribution and vegetation cover. This District is divided into three agro-ecological zones, namely, Dega & weynadega and Kola, which account for about 18 and 80% of the total areas respectively. The annual rainfall distribution in the woreda varies between 900mm to 1600mm.The minimum temperature in the woreda from 20 to 30 degree centigrade, while the maximum temperature is in the range 18 to 28 degree centigrade. Farmers in the woreda have an estimated total 46,083 head of cattle, 22,048 head of sheep, 11,045 head of goats,425 horses, 1,463 mules, 58,565 poultry of all species, and 4,308 bee hives.

2.2 Study population

Animals involved in the study were indigenous breeds of cattle of all age and sexes reared under traditional management system. The study animals were classified into three different age groups such as 1-3 years, 4-5 years and greater than 5 years. The study animal will be local cattle of all age group and the cattle involved in study will be maintained under traditional management (extensive) system.

2.3 Study Design

A cross sectional study was being conducted from March 2016 to June 2016 to determine the prevalence of trypanosomiasis in study animals.

2.4 Sample size Determination

The sample size was determined by considering with no previous study in the area and by taking 50% expected prevalence. The sample size for the study was calculated using (Thrusfield 1995) formula accordingly a sample size of 384 cattle was considered for the study.

2.5. Sampling strategy

The study was conducted at south Bench wereda, PAS (peasant assciation), namely zozo. Ayenamba, Keberta, Morita Janchuta which are selected purposively based on the extent of the existing problems, the complaints of the farmers and the level of medium to high tsetse challenge in the areas. The study animals was selected by using simple radom sampling method by taking age, sex, body conditions in to account according to and all the animal in the selected areas had equal chance to be selected for this study.

2.6. Study method and procedures

2.6.1 Parasitological studies

Blood sample was collected from the marginal ear vein by using sterile blood lancet and capillary tubes. Capillary tubes were filled with blood from animals to ¾ of their height centrifuge symmetrically and centrifuged at 12000rpm for three minutes and packed cell volume (PCV) is determined. After the PCV reading, capillary tube were broken 1mm below the Buffy coat include the red blood cells layer and the content expressed in the microscopic slide and the mixed and covered with 22x22mm cover slip. The content examined under 40x objective using dark ground Buffy coat technique. From positive thin blood smears will be made, fixed with methanol for 5 minutes and stained with Giemisa solution for 30 minutes and examined using oil immersion under 100x objective to detect the species of trypanosomosis.

2.7. Data Analysis

The prevalence of trypanosome infection is calculated as the number of positive animals as examined by Buffy coat divided by the total number of animal was examined at a particular time

multiplied by 100. For further analysis data collected were entered into Microsoft Excel 2007 program. Descriptive statistics was used to determine the prevalence of bovine trypanosomiasis in the study area.

3 .RESULTS

Trypanosome infection were found in all study areas. Of 384 cattle examined 27(7.03%) were positive. Prevalence rates were different by study areas with the lowest 5% in zozo, and the highest, 14% in keberta. The prevalence rates in female were 5.85% and males 8.4%.The prevalence rates were also significantly higher in the age between 4-5 years was 8.8%. An infection rate in cattle with good body condition (6.4%) was lower than the rate in animals with poor body condition (7.9%).According to trypanosome species 15(3.95%) were infected with T.conglense, 10(2.63%) were infected with T.vivax and 1(0.26%) were infected with mixed and T.brucci (table.1)

Table 1: prevalence of trypanosomiasis site basis

Risk factors	Total sample	Positive%	P value	Mean pcv
District				
Janchuta	30	0		26.6
Ayenamba	79	4(5.06%)	0.0305	23.6
Morita	75	4(5.06%)		24.5
Zozo	100	5(5%)		23.8
Keberta	100	14(14%)		23.6

Table 2: prevalence of trypanosomiasis on sex basis

Risk factors	Total sample	Positive%	P value	Mean pcv
sex				
Female	190	11(5.85%)	0.346	24.2
male	194	16(8.4%)		23.9

Table 3: prevalence of trypanosomiasis on the basis of body condition

Risk factors	Total sample	Positive%	P value	Mean pcv

Body condition score			0.027	
Poor	239	19(7.9%)		23.8
Moderat	111	6(5.5%)		25.2
Good	34	2(6.4%)		24.5

Table 4: prevalence of trypanosomiasis on the basis of age

Risk factor	Total sample	Positive%	P value	Mean pcv
Age			0.279	
1-3 year	100	5(5.1%)		24.3
4-5 year	149	13(8.8%)		23.6
>5 year	135	9(6.8%)		24.7

Table 5: prevalence of trypanosomiasis based on species

Risk factors	Total sample	Positive%	Mean pcv
Types of tryps			
T.conglense	15	15(3.95%)	23.2
T.vivax	10	10(2.63%)	21.8
T.brucci	1	1(0.26%)	22.7
Mixed	1	1(0.26%)	23.1

Table 5: Over all prevalence of trypanosomiasis in number of animal

Risk factors	Total sample	Mean pcv
Sample examined		
Positive	27	27(7.03%)
Negative	357	357(92.9%)
Total	384	

Table 6. Overall Result of Trypanosomosis prevalence

Origion	altitude	spp	Sample size	Mean pcv	Trypanosomiasis revealed				Total prevalence in%	Remark
					T.v	T.b	T. c	Mixed		
Zozo	1840	Bov	100	23.8	1	0	4	0	5(5%)	
aAyenamba	1866		79	23.6	4	0	0	0	4(5.06%)	
Keberta	1812		100	23.6	4	0	9	1	14(14%)	
Morta	1996		75	24.5	1	1	2	0	4(5.06%)	
Janchuta	1956		30	26.4	0	0	0	0	0(0%)	
	Total	Bov	384	121.9	10	1	15	1	27(7.03%)	

4. DISCUTION

In the current study the species of trypanosome, the higher（2.6%） T.Congolense and lower（1.1%） T.vivax was recorded. This is relatively in agreement with (sinshaw *et al.*,2006) indicated a prevalence of trypanosomosis rangeing from 4% to9.6% due to T.vivax in three high land districts bordering Lake Tana. This prevalence of T.congolense infection in cattle be due to high number of serodemes (serological variatin) of T.congolense as compared with T.vivax and the development of better immenue response to T.vivax by infected animal (sinshaw *et al.*,2006). Moreover Muturi *et al.*(1999) who reported 66.6%T.congolense and 20.75%T.vivax infection,respectively.Furethermore,T.congolense was dominant species with proportion

of(69.7%) and followed by T.vivax(19.2%),T.brucei(9.1%) and T.vivax and T.congolense mixed infection (2.0%) in western Ethiopia(Siyum *et al*.,2014).

The present results showed that most of parasitc animals 13(96.4%) were found to be anemic with (pcv<25%) compared with a parasitic animals (3.6%) with (pcv>25%). This finding was agrees with the work of Yibrah, (2012 who reported lower pcv of (>20.2%±3.0) in infected animals as compared to non-infected animals (>26.5%±5.1) from Humbo districts of Southern Ethiopia. Likewise (Thrusfield, 1995) stated that average pcv of parasitologically (>20.2%±3.0) (>20.2%±3.0) negative animals was significantly higher than those of parasitologically positive animals. Therefore, trypanosomiasis may adversely lowering pcv value of infected animals even though other diseases such ashelminthosis, tick borne diseases and nutritional imbalance contribute to the low PCV values. During the study period, the prevalence of trypanosomosis was assessed between sexes of animals and among 27 trypanosome positive animals,11(5.85%) of them were females and 16(8.4%) of them were male animals; but not significance difference and the possible suggestion an increases of prevalence in male in this finding could be that male animals used for ploughing purposes, travel long distance to an area of tsetse challenge for grazing thus, stressed by tsetse flies and by other biting flies and because of shortage of feed, male animals in study area were allowed to graze together with females. AS a result, the risk of contracting trypanosomosis is high. This result is agreed with previous results of (Mturi, 1999; Leak., 1999; Adane., 1995; Daya and Abebe., 2008) who obtained no significant difference in susceptibility between the two sexes.

Therefore, they have equal chance of coming in contact with flies and eventually with the disease. In contrast (Muturi, 1999) reported that males had a significant higher prevalence of trypanosomosis than females.

During the study the prevalence trypanosomosis was assessed in three different body conditions (poor, moderate and good). Animals' shows the highest prevalence in poor body condition (7.9%) followed by moderate (5.5%) and good body condition (6.4%). Due to poor body condition; animals are highly susceptible to diseases. This result is slightly consistent with the report made by (Basazinew *et al.*,2012) in which they reported 55.7%,6.7% and 0 prevalence in poor, medium and good body condition score respectively. The animals examined were categorized in to three age groups as 1-3 year, 4-5 year and >5 year. The trypanosome infection prevalence was found to be 5(5.1%) in 1-3 year, 13(8.8%) in 4-5 year and 9(6.8%) as indicated

in (Table 3). However, statistically there is no significant difference in infection rate among the different age groups (p>0.05).These result agree with that of (Dagnachew and Shibeshi, 2006) as a higher prevalence was observed in adult animal (4-5years) and lower in animals 1-3 years of age. This could be associated with the different body conditions, age, sex and distance travel for grazing as well as for draught in area of tsetse challenge. This is in agreement with Fimment *et al*., (1992) who stated that calves and young animals have low prevalence. In this study there is no marked variation in tsetse density between sampled PAS. From the study of Leak *et al*., (1987) it is known that the variation in tsetse density appeared to be the main factor for variation in the prevalence of trypanosomiasis. The possible reasons for this may be the prophylactic treatment of cattle by southern rift valley tsetse eradication project (STEP).Regarding the sex composition of the flies, female flies constitute 66.6% and male flies constitute only 33.3% so, this was in agreement with (syum *et al.*, 2014; Msangi, 1999 and Teka *et al.*, 2012) who reported female flies to comprise majority of the population.

The results of the present study inform that trypanosomosis is a major diseases of cattle in south bench woreda with an overall infection rate of 7.03%.T.congolense, T.vivax and T.brucei were trypanosome species infecting cattle in the study areas.

The infection rate animals with poor body condition were higher than that of animals with good body condition. The result is agreement with the estimate reported by (Mussa, 2002). Age between4-5 years of olds are more susceptible to infections compared with other age groups.

The higher number of parasitemic animals have registered PCV value lower than 24% compared to a parasitemic cattle whereas the proportion of anemic animals lower for the a parasitemic animals. Similar finding were reported by (Getachew, 1993). The result suggest even though that anemia is a characteristic feature of trypanosomosis, some animals may keep their PCV with in the normal range for a certain period of time, So while diagnosing trypanosomosis on the basis of PCV, one should take various anemia causing agents in to consideration.

5. CONCLUSION AND RECOMNDATIONS

Trypanosomosis continues to be the most neglected disease of the animal in the study area. From this study it is possible to conclude that trypanosomiasis is an important disease and a potential threat affecting the health and productivity of cattle in the study areas were T.congolense followed by T.vivax. The prevalence of the disease varies from area to area. Infection with

trypanosomosis negatively affects PCV and body condition. Farmer in the study area aware of the presence and impact of the disease but have little knowledge on means of transmission (fly vector). Moreover there is unsupervised use of trypancidal drug often from illegal source and administered commonly by the farmer of themselves.

Therefore in the view of above conclusions the following major points are recommended for further consideration by all concerned bodies.

- Legislative reinforcement by way of elaborating a national drug use policy is required to address the indiscriminate drug usage around the study area
- Training the livestock owners on situation of trypanoaomiasis and means of transmission in the study area is important. Moreover awareness creation on the risk of trypanocidal and drug handling is essential.
- Veterinary supervision is inadequate so that improvement of the sector is important to alleviate the disease and to avoid or reduce the illegal use of drug.

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