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Study on Bovine Trypanosomosis and Tsetse Identification in South Ari Woreda of Southern Nation, Nationalities and People Regional State (SNNPRS)

Zerihune Teshome*
Woilta Zone Livestock Department of Livestock and Fishery Resource

Mulugeta Biamesh
Haramaya University Faculty of Veterinary Medicine

Abstract
The study was conducted from December 2009 to March 2010 in South Ari Woreda of SNNP Regional State to determine the prevalence of bovine trypanosomosis and to assess the apparent densities and distributions of tsetse flies. Blood samples were taken from a total of 384 indigenous cattle managed under small holder mixed crop livestock production. Blood Buffy coat dark ground phase contrast Microscopic technique was used for detection of the trypanosome parasites in the blood samples, NGU traps were used for tsetse fly survey and Packed cell volume (PCV) to determine the degree of anemia caused by trypanosomosis. The overall prevalence of 13.54% bovine trypanosomosis was recorded in the study area . The predominant species of trypanosome encountered during the study period were *T. congolonce* with relative prevalence of (63.5%) followed by *T. vivax* (36.5%) but there was no mixed infection observed. PCV evaluation showed that the mean PCV of parasitemic animals (25.5%) was significantly lower than that of (30.5%) aparasitemic animals indicating the importance of bovine trypanosomosis in causing anemia. Assessment of tsetse flies indicated that *Glossina pallidipes* is the major biological vector for bovine trypanosomosis in the study area with apparent density of 27.5 fly/trap/day. Other biting flies (tabanids and stmoxys) were also collected indicating the possibility of mechanical transmission.
Keywords: Bovine, Trypanosomosis, Prevalence, Tsetse fly, apparent density, South Ari/S
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1. INTRODUCTION

Ethiopia estimated livestock population is often said to the largest in Africa it is estimated to be over 150 million in 2007/2008. Excluding Afar and Somali Region there were approximately 47.5 million head cattle, 26.1 million sheep, 21.7 million Goats, 2.1 million Horse and mules, 5.6 million Donkeys, 1 million Camels and 39.6 million Poultry (CSA, 2009).

Trypanosomosis is a group of parasitic disease caused by unicellular parasite (trypanosome) found in the blood and other fluids of vertebrates including Livestock, wild life and people. Bovine trypanosomosis caused a significant loss in animal production and it greatly hampers human settlement in a considerable part of the word (Uilenberg, 1998).

Tsetse transmitted animal trypanosomosis is one of the major constraints to the socioeconomic development in Africa. Tsetse flies (*Glossina spp*.) infest approximately 10 million km^2 of the continent affecting 38 countries which constitute about 37% of the continent considered that 7 million km^2 of this area would otherwise be suitable for livestock or/and mixed agricultural development were it is not for trypanosomosis. These areas could theoretical support additional 140 Million cattle as well as equivalent number of sheep, Goat and relieve pressure on peripheral fragile areas (ILCA, 1988). About 30% the 150 Million cattle in countries are affected by tsetse are exposed to the disease (Holmes, 1991).

In Ethiopia, trypanosomosis is one of the most important disease limiting livestock productivity and agricultural development. It can be transmitted between the hosts mainly by tsetse flies cyclically, by other biting flies mechanically and by other means of transmission (Awoke, 2000; Uilenberg, 1998). Trypanosomosis of cattle (locally known as "Gende") can be found in many provinces of Ethiopia where it has greatly hindered development. The most important trypanosome species affecting livestock in Ethiopia are *Trypanosoma congolense, T.vivax and T. brucei* in cattle, sheep and Goats, *T. evansi* in camels and *T. equiperdem* in horses (Getachew, 2005).

In 1962, the cattle survey in southern Ethiopia, by the livestock division, established the bovine trypanosomosis had become a major cattle disease in the Omo valley. It was stated that the problem of trypanosomosis is the main cause of decline in number of cattle and particularly drought oxen (Abebe and Jober, 1996).

Trypanosoma vivax, T. congolonse, T.brucei brucei and T. simiae are the four main species responsible for African trypanosome cases affecting virtually all domestic mammals *T.vivax* and *T.congolense* are the main pathogens of cattle. The four species are member of the saliverian group of trypanosomes and are transmitted

cyclically via the Mouth parts of tsetse flies, hence the name saliverian trypanosomes. *T. Vivax* usually numerous in bovine blood and can be identified by its very fast movment in wet films, in stained smears it is a long slender with long free flagellum. *T.congolonse* is smaller, sluggish in wet films in stained smears; it is short and no free flagellum (Radostitis, 2007).

The Epidemiology of trypanosomosis depends on the distribution of the vectors, the virulence of the parasite and the response of the host of the three groups of *Glossina*, the savanah and the reverian are the most important vectors since they inhibit areas suitable for grazing and watering. Tsetse flies in Ethiopia are confined to the Southern and western regions between longitude 33^0E and 38^0E and latitude 5^0N and 12^0N. They infest areas which together amount to 220,000 Km^2 tsetse infested areas Lie in the low lands and also in the river valley of Abay (Blue Nile), Baro, Akobo, Diddesa, Ghibe and Omo (Langridge, 1976).

The vector, tsetse fly, can be classified in the order *dipteria* (the two winged flies), family *Glosindae*, and within the genus, *Glosina.* There are about 23 species and 8 sub species of *Glossina* identified so far (Moloo, 1993; Leak, 1999). From Morphological point of view tsetse flies are elongated and robust of varies shades of brown ranging from yellowish to grayish to dark or blackish brown in color and about 6 to 16mm long excluding the proboscis. Males are smaller than the females (Itard, 1989).

The General distribution of tsetse flies; determined principally by climate and influenced by altitude, vegetation and the presence of suitable host animals has been known for a long time (Leak, 1999). Each of these factors may directly affect the birth, death or migration rates of the vector and thus the population size (Hay *et al.,* 1996). The limit of distribution is closely correlated with the tropical savannah (summer rain) climate, which follows the 508mm annual rain fall. Altitude influence tsetse distribution through its effect on climate, particularly temperature (Leak, 1999). In Ethiopia, 1600 M.a.s.l. was considered the upper altitudinal limit to tsetse distribution according to (Langridge, 1976). Subsequently however, *G. Pallidipes* was found at altitude up to 2200M (Tikubet and Gemech, 1984).

There is also a difference in host susceptibility to trypanosomes, which is best examplified by the small East African breeds of cattle such as N'dama and West Africa short horn. These animals are less susceptible to the disease than zebu or the Europian breeds and are commonly found in endemic areas of trypanosomosis. They are refered to as 'trypanotolerant' breeds (Morrison *et al.,* 1981).

In the pathogenesis of infected tsetse inoculate metacyclic trypanosomes in to the skin of animals where the trypanosomes grow for few days and cause localized swelling (chancre). They enter the lymph nodes, then the blood stream, where they divided rapidly by binary fission in *T. congolonse* infection. The organisms attach to the endothilial cells and localize in capillaries and small blood vessels, *T.brucei* species and *T.vivax* invade tissue and cause damage in several organs. The Immune response is vigorous and immune complexes cause inflamation, which contributites to the signs and lesion of the disease Antibodies against the surface-coat glycoproteins kill the trypanosomes. However trypanosomes have multiple genes that code for different surface–coat glycoproteins that are not vulnerable to the immune response (Cynthia and Scott, 2005).

The diagnosis is important both in clinical medicine and epidemiological investigation. The disease shows a variety of clinical Manifestations, which are also common to other disease. The disease may run an acute, chronic or subclinical course and fever can be observed which can be intermittent due to the variation of parasitemia, and the animal survives, the disease become chronic and there is development of anemia and Emaciation (Blood *et. al.* 1989). Anemia, fever and loss of condition are important parameters; which are routinely used for the tentative diagnosis of trypanosomosis in areas where the disease is endemic and laboratory services are not available. However clinical signs of trypanosomosis are not pathogenic to the disease and diagnosis is safely attained by parasitalogical methods live dark ground phase contrast Buffy coat technique (Murray *et al.,* 1977). Which can be used under field condition to detect the presence or absence of trypanosomes and trypanosome species are identified from thin or thick smears of positive samples (Uilenberg, 1998).

Treatment against trypanosomosis in order to be effective should be given early in the initial phase of fluctuating parasitemia. As no new drugs have been withdrawn because of resistance; treatment is now essential limited to two compounds, diminazine aceturate and homidium salts (either chloride or bromide) (Andrew *et al.,* 1993; Afework *et al.,* 2000; Tewolde *et al.,* 2004).

Control is aimed at interrupting the cycle of development of the protozoan, either with in the Mammalian host or the insect vector. Control of trypanosomosis except for dourine can be based on: control of the parasite trypnosomes; control of vectors tsetse or biting flies; use of trypano tolerant animals and integrated approach combining other methods (Uilenberg, 1998). Vector control is the most reliable means of disease control since it removes the treat of trypanosomosis on a permanent basis. many vector control methods including woody vegetation clearance to remove tsetse shelter, and large scale application of insecticides by air and ground spraying and large wild life elimination could be applied, one of the latest methods of control is the sterile insects technique (SIT) involving continuous release of sterile insects among the indigenous insect population at rates sufficient to result in a reduction in biotic potential of the target population. The mating of released sterile male insects with indigenous fertile female insects cause infertility in the target population (SIT, 1996).

Thus the objectives of this study are:

- To study the prevalence of bovine trypanosomosis in south Ari
- To assess the apparent density and distribution of tsetse and other biting flies in the study area

2. MATERIALS AND METHOD

2.1. Study area

The present study on the prevalence of bovine trypanosomosis and identification of tsetse was conducted in five selected peasant associations of the south Air woreda.

South Air is one of the south Omo zone woredas situated about 585km from Hawasa and 767km from south of Addis Ababa. It is located in the Great Rift Valley at 0^0 – 48^0N latitude and 33^0 – 36^0S longitude. The altitude of the study area ranges from 1500-3418 m.a.s.l. South Air and its surrounding is characterized by subtropical weather with minimum and maximum Temperature ranging from 10.01^0C – 27.5^0C and the mean annual rain fall is 600-1600mm. (South Air OWA).

The local human population is principally engaged in livestock crop (Mixed) farming system. Cattle, goats, sheep. Equine and poultry are often kept in the study PAs. South Ari has livestock population of 355,227 from this cattle, 99,168, sheep 64,807, Goat, 31,386, Equine, 12, 594 and poultry 147, 272. The major crops grown in south Air are corn, wheat, barley, navy beans, and coffee. Because of bordering with Mago National Park there are a number of wild animals living in the forests like hyena, cheetah, lion, zebra, warthog, large and small apes, antelopes and other wild animals which serve as host for tsetse and trypanosome reservoir (South Ari OWA).

2.2. Study Population

Cross- sectional study was conducted from December 2009 – March 2010 on 384 Indigenous cattle managed under small holder mixed crop-livestock farming system and semi pastoralist community. Local indigenous zebu cattle were considered in this study.

2.3. Study design

2.3.1. Sampling method and sample size determination

The sampling method applied in the present study was a simple random sampling; from the study population of 77 animals from each four peasant associations and 76 animals from remain one peasant association of south Ari. The sample size was calculated by using Thrustfield formula (Thrustfield, 2005) using 95% CI and expected prevalence of 50%

$$N = \frac{1.96^2 \times Pexp\ (1-Pexp)}{d^2}$$

Where:

N= required sample size
Pexp = Expected prevalence = 50%
d = Desired absolute precision = 0.05
CI = Confidense Interval = 95%

$$N = \frac{1.96^2\ X\ 0.5\ X\ (1-0.5)}{(0.05)^2}$$

$$N = 384$$

2.3.2. Data Management and analysis

Data collected from vector fly and trypanosome infection survey entered into MS Excel Spreadsheet program to create database. Statistical analysis was employed with Stata 7.0 soft ware for data management and analysis. The tested hypotheses were prevalence of trypanosomosis, PCV value the relation between tsetse aparent density and prevalence of trypanosomosis, the relation between PCV value and prevalence of trypanosomosis were tested. Kinds of descriptive statistics which were used are confidence Interval, Mean, and chi square methods

2.4. Methodology

2.4.1. Parasitological Survey

Blood samples were collected after properly restraining the animal and aseptically preparing the area around the veins. It was collected from the ear vein by using sterile blood lancet and capillary tubes. A pair of heparinized capillary tubes were filed with blood from animals to ¾ of their height and sealed at one end with crystal sealant. The capillary tubes were loaded on the Micro hematocrit centrifuge symmetrically and centrifuged at 1200 rpm for 5 minutes (Murray *et al.,* 1977). Packed cell volume (PCV) was determined using hematocrit reader (Woo, 1969). After the PVC was read, capillary tubes were Brocken 1mm below the Buffy coat to include the red blood cells layer and the content were expressed on Microscopic slide and mixed and covered with a 22 X 22mm cover slip ground Buffy coat technique (Murray *et al.,* 1977) From positive samples thin blood smears were made fixed

with methanol for 5 minutes and stained with Giemsa solution for 30 minutes and examined using oil immersion under X100 objective to detect the species of trypanosomes.

2.4.2. Entomological Survey

To assess the apparent densities, distribution and species of tsetse flies and other biting flies survey conducted. NGU traps baited with acetone and three-week old cow urine (Bright well *et al*., 1991) was used for assessing the fly density. Site selection was done to include suitable tsetse habitats live savannah area, rift valleys, live stock greathing areas and watering points and vicinity to assumed wild game reserve areas.

In all study sites a total of 12 NGU traps, six traps in Bytsemal Neri river and the other six in kure passure land were deployed early in the morning and maintained for 24 hours perceive flies the tsetse density. Traps were sited preferably in shade with good visibility and at suitable intervals depending on the ecology of the target species. *Glossina pallidipes* can detect odors from about 50-100 meters. So the traps were spaced at about 200m intervals.

During trapping Acetone dispended from open vials while cow urine from open bottles in to the open bottle of cow urine a piece of tissue paper was included to facilitate odor diffusion. All odors were placed on the ground about 30cm up wind of the trap. The trap poles were greased to exclude insect predators like ants (Brightwell *et al.,* 1991).

The different flies cached in each trap were counted, identified and analyzed. The species of tsetse fly was identified based on the characteristic Morphology (Ford *et al.,* 1976; Langridge,1979; Leak *et al.,* 1993) other biting flies were spread according to their Morphological characteristics such as size, color, wing venation. Structure and probes at the genus level (Wall and shearer, 1997).

Sexing was done just by observing the posterior end of the ventral aspect of the abdomen by Microscopic lenses as a result male flies easily identified by enlarged hypopygium in the posterior ventral part of the abdomen. The fly apparent density is the Mean catch in traps deloyed, expressed as the number of fly catch per trap per day (Leak *et al.,* 1987).

3. RESULTS

3.1. Parasitological Survey

A cross sectional study was conducted on 384 randomly selected cattle to determine the prevalence of bovine trypanosomosis and evaluate associated risk factors. The result of the survey showed that an overall prevalence of 13.54% (95% CI = 10.10 – 16.97). On PAs basis kure has high prevalence 29.87% followed by Geza 14.3% and 13.15%, 10.38% in Bytsemal and Bukkamer respectively. There was no trypanosome positive animal found in Kaysa peasant association.

Table. 1. Prevalence of trypanosomosis on basis of localities

PA	No. of cattle Examined	Total positive	Trypanosome prevalence rate (%)
Bukkamer	77	8	10.38
Bytsemal	76	10	13.15
Geza	77	11	14.3
Kaysa	77	0	0
Kure	77	23	23.87
Total	384	52	13.54

3.1.1. Distribution of trypanosome species

The species of trypanosome identified by Buffy coat technique and thin smear showed that *T.congolense* is the most prevalent with relative prevalence of 63.5% where as *T.vivax* 36.5% but there was no mixed infection.

Table .2. Species of Trypanosome involved in disease process in each peasant associations

PA	No. of cattle Examined	Rate of infections of Trypanasome species		Prevalence (%)
		T.congallase	*T.vivax*	
Bukkamer	77	4	4	10.38
Bytsemal	76	6	4	13.15
Geza	77	8	3	14.3
Kaysa	77	0	0	0
Kure	77	15	8	29.87
Total	384	33	19	13.54

3.2. Prevalence of Trypanosome infection in both sexes

During the present survey, from a total of 384 cattle examined 193 were females and 191 of them were male animals, from the female examined 13.98% were positive for trypanosome infection while 13.08% of the male animals were found infected in (table 3). The trypanosome infection in both sexes were almost similar and

statistically there is no significant difference in the infection rate between male and female animals (chi square = 0.796, p> 0.05).

Table 3. Prevalence of Trypanosome infection in both sexes

Sex	Number of cattle Examined	Number of cattle infected	Prevalence (%)
Female	193	27	13.9%
Male	191	25	13.08

3.3. Prevalence of Trypanosome infection in different age groups

The animals examined were categorized in different age groups as calf (less than 1 year), the young (1-3 years) and adults (>3 years). The prevalence of trypanosomosis on different age groups was 11.5%, 18.2% and 12.2% in calves, young and adult respectively. Different in infection rate among the different age groups was not statistically significant (chi square = 0.348, p> 0.05).

Table 4. Prevalence of trypanosome in different age

Age group	Number of cattle examined	Number of cattle infected	Trypanosome prevalence
Calf (L1 year)	26	3	11.5
Young (1-3 year)	88	16	18.2
Adult (> 3 year)	270	33	12.2

3.4. Hematological Finding

To assess the relationship between trypanosome infection and PCV value, PVC Determination Was done by using Hematocrit Method and the Mean PCV of parasitemic and aparasitemic animals were calculated. The mean PCV of parasitemic animals is 25.5% which fall on the range of anemia and for those aparasitemic animals mean PCV is 30.5% which is normal PCV value. From a total of 384, 24.2% of animal were found to be anemic and 75.8% were normal. There is statistically significant difference in the mean PCV value between the infected and non-infected animals (chi square 18.6534, P< 0.05).

Table 5. PCV evaluation result in each peasant association

Pas	Number of cattle Examined	Mean PVC (%)	Cattle with PCV (%) <26	Cattle with PCV (%) >26
Bukkamer	77	21.5	27.3	62.7
Bytsemal	76	22.5	21	79
Geza	77	30.5	22	78
Kaysa	77	29.5	11.6	87.1
Kure	77	24	48.1	51.9
Total	384	26	24.2	75.8

3.5. Entomological Survey

3.5.1. Fly Collection

During entomological survey only one species of tsetse fly was identified this was *Glossina pallidipes*. A total of 333 tsetse flies were caught and identified at Bystemas (Nare river side) and kure (Pasture land area). The Mean catch of *G.Panidipes* at Bytsemal (Nare river side) was 15.33 flies /trap/ day where as 40.1 flies /trap/ day at kure (pasture land areas) and an overall apparent density of 27.75 flies /trap/day. A total of 350 flies were captured out of which 95.1% belong to tsetse, 1.4% *tabanus* and 3.4% *stomaxy*. The tabanid fly group comprises *tabanus, Haematopota* and *chrysops* while the *Muscid* group belongs to *stomoxys.* From tsetse fly traped female occupied large ratio out of total 333 flies captured 64.5% flies were females and the 35.5%comprises male.

Table.6. Tsetse density and species of *Glossina*

Site of deployment	No. of traps	Altitude	Types of flies				Flies /Trap/ day
			Species	Sex		Total	
				M	F		
Byssemal (Nare river side)	6	1383	G. pasidipes	27	65	92	15.33
			Stomoxys	-	-	6	1
			Tabanus	-	-	-	-
Kure (Pasture land)	6	1333	G.Palidipes	91	150	241	40.1
			stomoxys	-	-	6	1
			Tapanus	-	-	5	0.83

4. DISCUSSION

According to the present parasitological survey a total of 384 local zebu cattle were collected by using simple random sampling method to determine the prevalence of bovine trypanosomosis and associating factors in South Ari woreda of SNNP Region. During the present study an overall prevalence of 13.54 %(95%CI=10.10-16.97) was resulted .The result of the present study (13.54%) similar to the result of the previous work (12.79%) by Terfe (1994) in Arbaminch district and with the (12.7%) by Isak (1990) in North Omo Administration region. The present finding lower than that registered by Shimelise *et al.,* (2006) epidemiology of bovine trypanosmosis in the Ghib valley 40.3% in late rainy and 19.01% in dry season, Wondoson (1986) in Bunno 18% and Abiy (2002) in Goro district 19.01%. This may occur due to the difference in agro ecological of the study area, prophylactic measure and difference in season.

In the present study *trypanosome congolonse* is predominant species in the study area as compared to the other species of trypanosomes .The predominance of *T.congolonse* infection in cattle may be due to the high number of serdoms of *T.congolonse* as compared to *T.vivax* and the development of better immune response to *T.vivax* by the infected animal (Leak *et al*.,1999; Maclennan,1970) The dominancy of *T.congolonse* (63.5%) in the present study is in agreement with the previous result of Getachew and Jobre (1996) for tsetse infested areas of Ethiopia (66.1%), Afework (2001) at Pawe north west Ethiopia (60.9%), and Terzu (2004) in selected sites of southern region (63.4%).

Moreover the result of Tewelde (2004) at Kone (75%) and village I (93%) setlment area of Ethiopia, Woldyes and Aboset (1997) at Arbaminch zuria districts (85.2%) and Rowland *et al.,* (1993) in Ghibe valley, South West of Ethiopia (84%) had shown higher result of *T.congolonse* than the present finding. These high ratios of T.*congolonse* suggest that the major cyclical vector or *Glosina* species are more efficient transmitors of *T.congolonse* than *T.vivax* in East Africa (Langridge, 1976).

Prevalence of bovine trypanosomosis was studied between sex of animals and among 52 Trypanosome positive animals 27 of them were female and 25 were male animals where as there was no statistically significant difference observed during the present study (P>0.05) in infection rates between male and female animals which consides with the result of Getachew (1993), Tefera (1994), Adane (1995), Who obtained no significant difference in susceptibility between the two sexes .This show that both male and female cattle were equally susceptible to the disease and equal exposure to the vector of the parasite.

The population studied based on their age in to less than one-year-old, 1-3 years and greater than three years old to observe whether they have any influence on the disease prevalence. In the calf group the prevalence was less which happened to be as a result of low exposure to the vector challenge. Conversely in the adult and older age groups of animals the prevalence of trypanosome infection was higher due to the routine contact existing with the tsetse fly in the field, statistically no significant difference was observed (P>0.05) in the prevalence rate of the disease between age groups. This result supports the result of the previous work by Alekaw (2003) who conclude that there is no significant difference in infection rate between age groups.

In the present study the prevalence of trypanosomosis in different sites of study has different status which may happened due to that some sites of the study area share the border with Mago park which is favorable for tsetse distribution and has different types of wild animals which are important for the disease to act as a host. The prevalence of the disease in study peasant associations were 10.38% in Bukkamer, 13.5% in Bytsemal ,14.3 in Geza ,0% in Kaysa and 23.87% in kure. The difference was statistically significant (P<0.05).

During the study period cattle with PCV value less than 26% was considered anemic (Tewelde, 2004; Rowlands *et al.,* 2001) which is the principal sign for trypanosomosis in the livestock. In the present study, from the total of 384 animals examined 52 of them were parasitemic and there mean PCV value was 25.5% and 332 of them were aparasitemic with mean PCV value of 30.5% there were significant difference observed between parasitemic and aparasitemic animals (P<0.05). This result agrees with the result of the previous work of Alekaw (2003) and Haile (1996) who reported that the mean PCV value of parasitemic animals were significantly lower than that of aparasitemic animals.

The appearance of trypanosome negative animals with mean PCV values of less than 26% may be due to inadequate of detection method used (Murray *et al*., 1977) or delayed recovery of anemic situation after resent treatment with trypanosidal drugs or may be due to compound effects of poor nutrition and haematophagus heilmenth infection such as heimoncosis and bunostomosis (Afework *et al*., 2000). However, PCV values can be affected by many factors other than trypanosomosis. These factors are likely to affect both trypanosomosis positive and negative animals (Van den Bassche and Rowlands; 2001).

On the present entomological survey *G.pallidipes* was the only species of tsetse detected in the study area with the apparent density of 27.75 flies/trap/day .This result show greater apparent density than earlier report. The report that the Great Rift Valley was infested with *G.pallidipes* with apparent density of 2.4 flies/trap/day and 0.64 fly/trap/day in wet and dry season (Msangi, 1993). Similarly the mean fly catches of *G.pallidipes* was 1.42 and for *G.fuscipes* 0.29 in Ghibe valley (Leak *et al*., 1983). The variation in flies densities may be due to the area of fly catch which favored trapping of ample amount of flies from vicinities of specially Mago National park which has

favorable condition for tsetse breeding and reproduction, indicated by (Vreysen *et al.,* 1994) that temperature bellow 15ºc tsetse flies are in active and about 35ºc they seek refuge in rot-holes in the trees and animal burrow and deep tissue in the bark, where they remain inactive. Humidity is also important factor both for pupal and adult fly development. Cumulative effect of long rainy season or dry season is thought to influence advance and recession in tsetse population (Leak, 1999).

The presence of wide different types of host animals is essential component of tsetse fly distribution. The distribution and abundance of some species of tsetse flies such as *G.morsitans* and *G.pallidipes* which are often known as game tsetse flies are closely related to the number and habits of certain wild animals and also described that the highest densities of certain tsetse fly species are reported from areas with very high densities of wild animals and low human population areas (Leak, 1999).

During the study period, for tsetse flies collected the sex ratio was assessed, Greater ratio of female to male (2:1) was recorded and similar results reported by other workers (Mohammed Ahmed and Dairri, 1987; Msangi, 1999) in Somalia and Southern Ethiopia respectively. Leak (1999) reported that in un biased sample female would comprise 70-80% of the mean populations .The higher population of female may be attributed to the fact that they live longer (mean female fly span being 8 weeks than male about 4 weeks).So that more female could be caught.

5. CONCLUSION AND RECOMMENDATIONS

The study was conducted on the prevalence of bovine trypanosomosis and tsetse identification in South Ari woreda of SNNP Region, the result of the present study revealed that trypanosomosis is the most important problem for agricultural activity and animal production in the study area. From the species of tsetse flies *G.pallidipes* is considered to be the main vector of the pathogenic trypanosome in the study area and biting flies such as *tabanids* and *musids* were also caught and these are also considered very important for the possible mechanical transmission of disease. Among the species *T.congolonse* was found to be most prevalent trypanosome species in the area. The lower PCV values in parasitemic animals indicated that the typical pathogenesis is observed in the study area.
Based on the above conclusion the following recommendations are forwarded:

- Control strategies of trypanosomosis focusing on strong sustainable and Community based approach should be designed and implemented
- Awareness creation about the disease and control methods as well as the risk of trypanocidal drug resistance is required in study area
- Further epidemiological studies should be carried out and appropriate, feasible control of trypanosomosis and/or vector should be implemented.

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