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# Bovine trypanosomosis and *Glossina* distribution in selected areas of southern part of Rift Valley, Ethiopia

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ABSTRACT

Cross-sectional study was conducted in 9 selected districts of the southern part the Rift Valley, Ethiopia to estimate the dry period prevalence of bovine trypanosomosis as well as assessment of *Glossina* species. From a total of 1838 cattle examined for trypanosomosis by buffy coat technique 133 (7.2%) were found infected by trypanosome species. From the total positive animals 66.9 and 33.1% of them accounted to *Trypanosoma congolense* and *Trypanosoma vivax*, respectively. Significantly higher prevalence (19.4%., $P<0.05$) was recorded at Arba-Mnch district. Black colored cattle were the most highly affected ($\chi^2 = 79.35$, $P<0.05$) animals. The overall average PCV value for parasitaemic and aparasitaemic animals was 22.2 (95% CI = 21.6–22.7) and 27% (95% CI = 26.8–27.2), respectively. The fly caught per trap per day was 1.4 for *Glossina* species and 2.8 for other biting flies. Two species of *Glossina* identified namely *Glossina pallidipes* and *Glossina fuscipes*.

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## 1. Introduction

Trypanosomosis of domestic livestock has been described as the plague of Africa, as it allows infected cattle to consume fodder and water without being productive, in contrast with some other diseases from which die quickly, leaving resources available (Leak, 1999). Trypanosomes are flagellate protozoan parasites that inhabit the blood plasma, the lymph and various tissues of their hosts. Tsetse-transmitted trypanosomosis is a disease complex caused by several of these species, mainly transmitted cyclically by the genus *Glossina* (tsetse flies), but also mechanically by biting flies. Tsetse infests 10 million km$^2$ and affects 37 countries, mostly in Africa, where the disease is known as "Nagana". The disease infects various species of mammals but, from an economic point of view, tsetse-transmitted trypanosomosis is particularly important in cattle (OIE, 2013). Trypanosomosis and *Glossina* affect crop production due to insufficient animal traction power, abandonment of settlement and massive human mobilization. Animal trypanosomosis is estimated to reduce calving rate and increase calf mortality by 20% and reduce off-take by 50%. Moreover, it is estimated to reduce cattle density by 37–70%. Trypanosomosis constitutes the greatest constraint to the livestock and crop production, and poses a serious threat to the lives and livelihood of entire communities (Swallow, 2000). Trypanosomosis ranks among the top 10 global cattle diseases impacting on the poor (Perry et al., 2002).

Tsetse flies are biological vectors of African trypanosomosis in animals and man. Their distribution and prevalence are most influenced by spatial factors such as climate, vegetation and land utilization (Rogers et al., 1996). In Ethiopia about 200,000 km$^2$ areas in the western and south western parts of the country infested with tsetse flies and thus African animal trypanosomosis (AAT) remains a serious problem (Alemu et al., 2007). In Ethiopia, *Glossina* species confined to the western and south-western regions between longitude 33° and 38°, and latitude 5° and 12°, which is about 97,855 km$^2$ (cited by Abebe, 2005 from Langridge, 1970).

## 2. Materials and methods

### 2.1. Study area and animals

The study covered a total of 9 districts (Kindo-Koysha, Kindo-Didaye, Kucha, Demba-Gofa, Humbo, Damot-Woyde, Duguna-Fango, Abaya and Arba Minch) of southern part of the Rift Valley, Ethiopia (Fig. 1). The study area characterized by wooded

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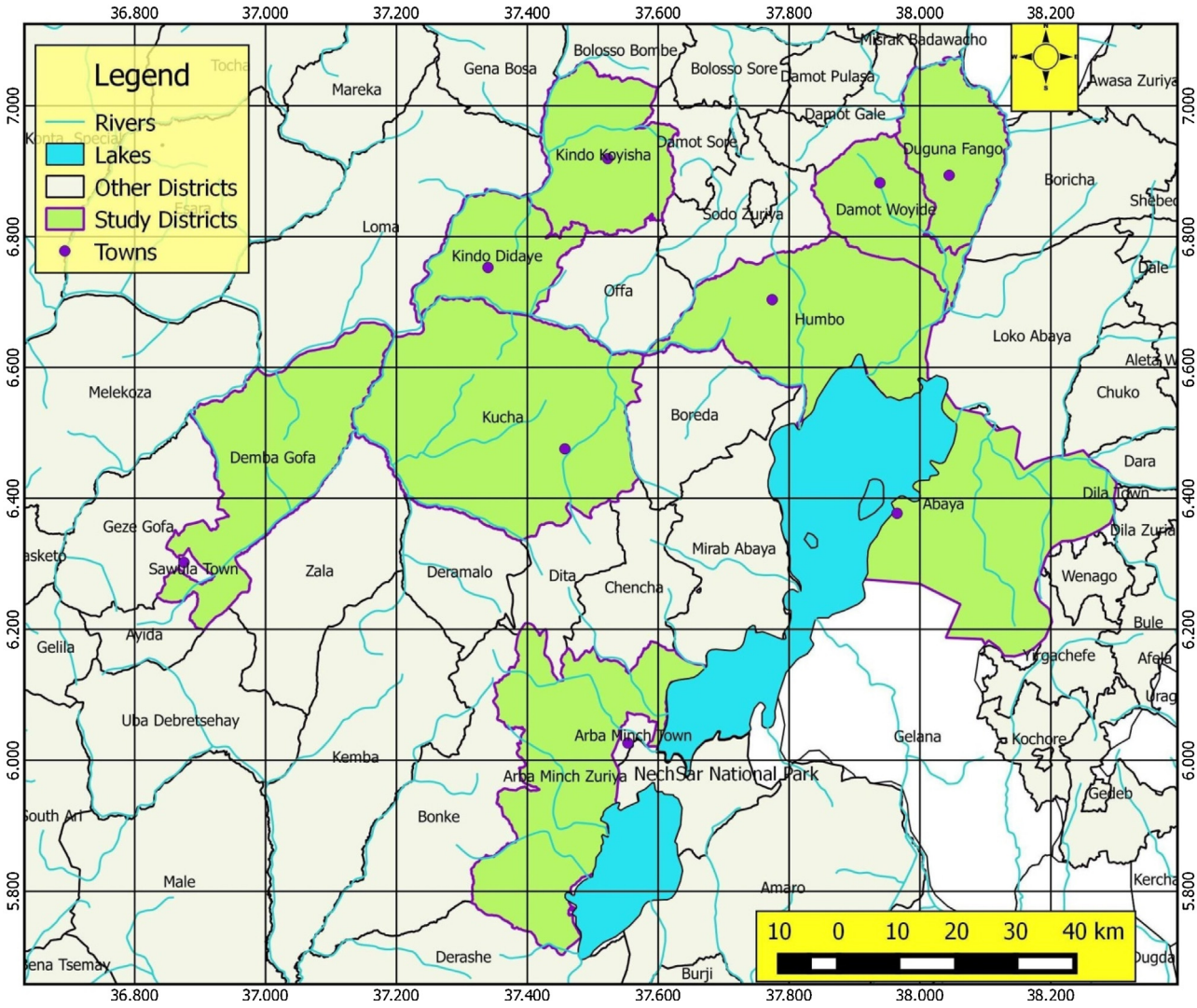


**Fig. 1.** Map of tsetse and trypanosomosis study districts in the southern part of Rift Valley, Ethiopia.

grasslands and riparian vegetation, All the study animals were indigenous cattle breeds that kept under an extensive husbandry system, free grazing, and usually kept mixed with other livestock species in communal grazing areas. A total of 1838 cattle were selected by a systematic random sampling technique (Thrusfield, 2005). For convenience of the study the colour of studied animals grouped as black, red and/or brown and gray and/or white.

### 2.2. Study design and sampling

The study conducted during dry period from November 2013 to April 2014. A cross-sectional study design was used to estimate the prevalence of cattle trypanosomosis in the area. The study considered 95% confidence interval and 5% desired absolute precision.

### 2.3. Trypanosomes survey and PCV

Blood samples were obtained by puncturing the marginal ear-veins with lancet, and then collected using heparinized capillary tubes, which were sealed on one side with Cristaseal (Hawksley Ltd., Lancing, UK). The capillary tubes were then transferred to a haematocrit centrifuge and centrifuged for 5 min at 1200 revolutions per minute. After that packed cell volume (PCV) was measured by using haematocrit reader. It was then cut about 1 mm below the buffy-coat and the contents of the tube expressed onto a microscopic slide, mixed and covered with $22 \times 22$ mm cover slip. It was examined under 40x or 10x objective lens for the presence of motile trypanosomes (Murray et al., 1983; Uilenberg 1998); and trypanosome species were identified according to their movement as described by OIE (2013) and Murray et al. (1983).

### 2.4. Glossina *survey*

The density and diversity of *Glossina* species were assessed using odor-baited NGU and biconical traps deployed in the riverside and wooded grassland areas at 200–250 m intervals, which were commonly visited by animals. The odor baits used were acetone, phenol and aged cow urine. Flies were collected from each trap after 72 h of deployment, and then the sex and species identified as described by Uilenberg (1998) and Pollock (1982).

## 3. Results

### 3.1. *Trypanosomosis prevalence and identified* Trypanosoma *species*

From a total 1838 cattle examined for trypanosomosis by using buffy coat technique 133 (7.2%) were found to be positive for try-