



## Short Communication

### Zootiological Survey of *Trypanosoma vivax* in the Blue Nile State Sudan

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#### **Abstract**

A survey was conducted to determine the prevalence of *Trypanosoma vivax* infection in cattle in the Blue Nile State. A total of 1096 blood samples were collected during dry season (March to June 2003) and 694 samples during rainy season (July to December 2003). For identification of the parasite hematocrit centrifugation technique, wet blood film, thin and thick blood stained smears were applied. The prevalence during the dry season ranged between 6.5 to 2.2% compared with 6.3 to 1.4 % during the rainy season. In conclusion, the transmission of the parasite can be by the insect vectors existing in the study area also they increased in dry season.

**Keywords:** Survy , T.vivax , cattle, Blue Nile State .

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#### **Introduction**

Trypanosomosis is a parasitic disease caused by spp. of flagellate protozoa belonging to the genus *Trypanosome* which inhabit the blood, body tissues and fluids. The disease has direct impacts on livestock production and, livestock management and human settlement (Swallow, 2000). Trypanosome was reported in Sudan early as 1904 (Karib, 1961). *T. vivax* was found to be predominant outside tsetse infested belt, while *T. brucei* and *T. congolense* were confined to tsetse infested area. The predominance of *T. vivax* in cattle had been reported in previous studies by Hall *et al.* (1984) in southern Darfur, (A/Rahman *et al.*, (1991), Suliman (1992),

Homeida (1993), Abdalla (1996); Fadl *et al.* (2000) and A/Rahman (2002)). Trypanosomosis at different localities of central Sudan and the blue Nile State. In Africa most pathogenic spp. to man and animals are transmitted cyclically by tsetse flies and/ or mechanically by other haematophagus insects mainly Tabanids. Other transmitters incriminated include Muscids and Stomoxys spp. (Ford, 1970). Non-tsetse transmitted trypanosomosis due to *T. vivax* and *T. evansi* occurs in various forms in South America, Africa and Asia including China and is a potential risk for 500 million buffaloes and 12 million camels (Woo, 1977, Pregrine; 1994; Tourateir, 2000) . The natural home of *T. vivax* is tropical Africa, where it is

prevalent outside the tsetse infested belt. It occurs in most of West, Central, East and South Africa. The vivax represents a remarkable instance of tsetse borne trypanosome that had spread far beyond its natural home to distinct countries (Hoare, 1972).

Trypanosomiasis is quite prevalent or enzootic in many African countries. In Nigeria, the prevalence of ruminant's trypanosomiasis in Kano State was double during the rainy season in comparison with average rate during the dry season (Kalu and Lawani, 1996).

Griffin and Allonby (1979) studied the epizootiology of trypanosomiasis in sheep and goats in tsetse infested areas. They observed a significant correlation between tsetse numbers in Kenya and rainfall followed by an increase in prevalence of trypanosomiasis in animals.

The epizootiology of *T. vivax* in the Republic of Central Africa was studied and the hypothesis is that stable flies could be good vectors as they are quite abundant in cattle resting sites, particularly during the rainy season. There also was a good correlation between stable fly densities at resting sites and *T. vivax* infection in cattle (D'Amico *et al*, 1996). Transmission of trypanosomes depends on their subgenera and species and mainly by cyclic and mechanical transmission by insect vectors. Most species are transmitted by more than one route but when insect vectors are involved they usually play the major role. The mechanical transmission of *T. vivax* in Africa has been thought to be responsible for its spread from the tsetse infested fly belts. The evidence for mechanical transmission was reviewed by Wells (1972).

The objective of this study was to represent the mechanical transmission of *T. vivax* in the Blue Nile state of Sudan.

## Materials and Methods:

### Study area

The surveys were conducted in certain areas of the Blue Nile State :Umbenain, Singa, Wad ElNaeal, Abu Neama, Abuhagar, Eldamazine, Elrosaris and the surrounding environments. Cross-sectional surveys were conducted in such areas, which have previous history of bovine trypanosomiasis. In spite of the absence of tsetse flies, the areas hold many sedentary cattle herds and of large irrigated agricultural schemes.

### Collection of samples

Blood samples were collected from 1096 cattle during dry season (March to June 2003). These examined animals were found mostly at watering points. Blood samples were taken from jugular vein were obtained using a vacutainer containing EDTA. Diagnosis was made by microscopic examination of wet smear, thin and thick blood films in addition to the buffy coat.

### Results

Examination of 1096 sedentary and migratory cattle during the dry season revealed that *T. vivax* was the only species available. Thirteen animals were infected giving an overall infection rate of 1.2%. The infection rate was highest at Abuhagar 6.5% followed by Eldamazine 4.1% Alrosaris 2.8% and Singa 2.2%. There were no positive cases at the other sites (Table 1).

During the rainy season, 694 samples revealed that 12 were infected giving an overall infection rate of 1.7%. The rates at Singa, Aboneama and Eldamazine were 6.4%, 6.3% and 1.4% (Table 2). No Positive cases were encountered in other places.

**Table: Infection rate of *T. vivax* infected cattle during the dry season in Blue Nile State**

Location	No. examined ex	<i>T. vivax</i> .	Infection rate%
Abohgar	62	4	6.5
Aldamazin	122	5	4.1
Alroseris	72	2	2.8
Singa	313	7	2.2
Alsuki	154	0	0
Al sukar	155	0	0
Wadal Nayal	41	0	0
Wad taktuk	136	0	0
Wadal Abass	41	0	0
<b>Total</b>	1096	0	1.2

**Table 2: Infection rates of cattle Trypanosomosis during the rainy season in Blue Nile State**

Location	examined	<i>T. vivax</i>	Infection rate
<b>Aldamazin</b>	48	3	6.3
<b>Abo Neamma</b>	63	4	6.4
<b>Singa</b>	491	5	1.4
<b>Alsuki</b>	34	-	0
<b>Abo hoagar</b>	16	-	0
<b>Total</b>	694	12	1.7

### Discussion

This trypanosomosis was conducted in an area where trypanosomosis is known to be enzootic (Aballa, 1996 and A/Rahman, 2002) away from the known tsetse infested belts of the Sudan. The survey was conducted both during the dry and rainy season. The ecology of this area is described by A/Rahman (2002) who also conducted entomological surveys in the area. He stated that although the area is tsetse free, yet, biting flies were abundant and may play a major role in the

mechanical transmission of the trypanosomes. The only encountered trypanosome species infecting cattle during this survey was *T. vivax*. The wide distribution of *T. vivax* infection in tsetse free areas of Sudan was reported by Ulienburg (1998) who diagnosed *T. vivax* in sedentary cattle herds all along the White Nile from Malakal in southern Sudan up to the Khartoum Province, thousands of kilometers from any known tsetse-infested belt in the Sudan. In recent years and following the development that

occurred in the animal production sector especially in dairy farming the problem of bovine trypanosomosis due to *T. vivax* is representing a real difficult ( A/Rahman, 2002 ).

The results here in reported, indicate that *T. vivax* varied between 2.20 to 6.5% with a mean of 1.2% during the dry season (March-June). These findings are similar to that obtained by Abdalla (1996) from Singa (in the same study area). This indicates that bovine trypanosomosis is in enzootic ally stability. The survey conducted during the rainy season (July – December) at the same sites that were further the dry season showed infection rate that varied between 1.43% and 6.35 with a total infection rate of 1.7% which is twice the infection rate at the dry season. The similar findings were reported by Kalu and Lawani (1996) from Kano State, Nigeria. They observed that the infection rates of trypanosomosis were twice during the rainy season comparing with the dry season. The increase of infection rate during the rainy season is highly likely due to the increase in biting flies densities as result of heavy rains and flooding. Karib (1961) reported that heavy rains and flooding of the year 1946 resulted in 50% deaths among Shilluk cattle sedentary along the White Nile far from tsetse infestation. A/ Rahman (2002) reported high prevalence of bovine trypanosomosis in Singa area following heavy rainfall of the year 1993.

During the current study the trypanosomes were diagnosed by conventional parasitological methods which are not sensitive enough to detect low parastaemic. Most of the infected animals in the field showed low parasitaemias, this might be the reason for the low trypanosomes infection rates reported during this survey.

Entomological surveys conducted during this study revealed that Tabanid flies were aggregate at high densities Suliman (1992), Abdalla (1996) and A/Rahman (2002) reported similar results in the carried study.Latein the rainy season nomads move from tsetse infested at KhorYabus avoiding the biting flies. Usually reaching the study area (Singa, Sinnar) by September (A/Rahman, 2002). They get mixed with sedentary cattle till they leave again towards the south in November, when it starts to get dry and some of them remain till December to graze the post-harvest agricultural products of the agricultural projects (Abdalla, 1996) . A/Rahman (2002) stated that the presence of tabanids and stomoxys flies at their peak of abundance, together with the nomadic cattle among which some are harboring, trypanosomes provide optimum conditions for mechanical transmission to take place between migratory and sedentary herds. The auther concluded that all cattle rearing areas of biting flies are playing a major role in the mechanical transmission of the trypanosomosis in these areas.

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## مسح الحيوانات للمثقبينات النشيطة في ولاية النيل الأزرق - السودان

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### المستخلص

تم إجراء مسح لتحديد مدى انتشار عدوى المثقبينات النشيطة في الأبقار في ولاية النيل الأزرق. تم جمع 1096 عينة دم خلال موسم الجفاف (مارس إلى يونيو 2003) و 694 عينة خلال موسم الأمطار (يوليو إلى ديسمبر 2003) لمعرفة الطفيل تم استخدام تقنية الطرد المركزي لمكداس الدم ، فلم الدم المبلل ، مسحات الدم الرقيقة والكثيفة. تراوح معدل الانتشار خلال موسم الجفاف ما بين 6.5 إلى 2.2% مقارنة بـ 6.3 إلى 1.4% خلال موسم الأمطار . و في الختام ان انتقال الطفيل قد يحدث بالحشرات الناقلة الموجودة في منطقة الدراسة و هي تزداد في فصل اكثر من فصل الخريف.