

## SHORT COMMUNICATION

### Seasonal variation in human African trypanosomiasis in Tarangire National Park in Babati District, Tanzania

C. SINDATO<sup>1\*</sup>, I.I. MALELE<sup>2</sup>, C. MWALIMU<sup>3</sup>, H.S. NYINGILILI<sup>2</sup>, S. KABOYA<sup>1</sup>, E. KOMBE<sup>4</sup>, C. MSUMARY<sup>3</sup> and A. MANOZA<sup>4</sup>

<sup>1</sup>National Institute for Medical Research, P.O. Box 482, Tabora, Tanzania

<sup>2</sup>Tsetse & Trypanosomiasis Research Institute, P.O. Box 1026, Tanga, Tanzania

<sup>3</sup>Ministry of Health and Social Welfare, P.O. Box 9083, Dar es Salaam, Tanzania

<sup>4</sup>Manyara Regional Health Office, P.O. Box 310, Babati, Tanzania

**Abstract:** A survey was carried out to determine seasonal epidemiological variation of human African trypanosomiasis (HAT) in Tarangire National Park and villages around it in Babati District, Tanzania. Concentration and Field's stain techniques were employed to examine the presence of trypanosomes in human blood samples. Tsetse flies were collected using traps and dissected under light microscope to examine for presence of trypanosomes. Retrospective data on HAT were sought from health facilities. Blood samples were collected from a total 509 individuals (306 during the dry and 203 during wet seasons). None of the individuals was infected with trypanosomes in the area. A total of 766 tsetse flies were collected. Of these, *Glossina swynnertoni* accounted for 94.6% and *G. pallidipes* for 5.4% of the total collection. The largest proportion (63.8%) of the tsetse flies was collected during the wet season. *Glossina swynnertoni* was most abundant tsetse species during both wet and dry seasons. Salivary gland examination revealed the presence of *Trypanosoma brucei* type of infection in 3.2% of tsetse flies collected. All infective trypanosomes were found during the dry season. This study concludes that the transmission and prevalence of HAT among human population in Tarangire National Park and its surrounding villages is low despite the recent reports on tourists acquiring the infection during their visits to the Park. However, disease surveillance needs to be strengthened to monitor any impending epidemic.

**Key words:** trypanosomiasis, tsetse flies, season, Tanzania

Human African trypanosomiasis (HAT) or sleeping sickness is one of the most important but equally most neglected tropical infections. The disease had been successfully controlled by a combination of approaches, including treatment of patients, active case finding, and vector control (WHO, 1998). HAT exists in two forms with different clinical presentations and epidemiology caused by morphologically indistinguishable subspecies of *Trypanosoma brucei*. The two forms are West African sleeping sickness, caused by *T. brucei gambiense* and East African sleeping sickness, caused by *T. brucei rhodesiense*.

In Tanzania HAT is one of the major public health problems and was first recorded in 1922 in Maswa district south of Lake Victoria. Currently the disease is endemic in about 10% of the districts in Tanzania with 4-5 million people at risk (Malele *et al.* 2006). National Parks in Tanzania have long been considered to be at low risk for African trypanosomiasis. However, in recent years there have been reports of HAT among travellers visiting national parks in northern Tanzania (Jelinek *et al.*, 2002;

Moore *et al.*, 2002). These reports have brought this disease to the attention of the international medical community, highlighting its importance not only as a public health problem among the people in endemic areas but also as a threat to travellers in Africa (Ripamonti *et al.*, 2002; Jelinek *et al.*, 2002). In June 2005, there were reports of some American tourists who contracted the disease during their visit of the National Parks in northern Tanzania (<http://www.fit-for-travel.de/en/reiseziele/10154.htm>). This survey was therefore carried out in order to determine transmission and prevalence of the disease in wet and dry seasons Tarangire National Park and its surroundings in Babati district, northern Tanzania.

The study was carried out Tarangire National Park and villages surrounding it in Babati District, northern Tanzania. Tarangire National Park, with an area of 2600 km<sup>2</sup>, is located between 3°40' and 5°35' South and 35°45' and 37°0' East. The dry and wet season HAT surveys were carried out in September 2005 and June 2006, respectively.

\*Correspondence: Dr. Calvin Sindato; E-mail: [kndato@yahoo.co.uk](mailto:kndato@yahoo.co.uk)

Blood samples were collected aseptically from the finger tips of the willing individuals using microhaematocrit tubes. A drop of blood was applied on a clean slide to make thick blood smear that was air dried and stained by Field stain and examined for the presence of trypanosomes using light microscope at the magnification of x100. Blood collected in the tubes was centrifuged and then examined for the presence of trypanosomes, by direct examination of the buffy coat/plasma junction using light microscope.

Tsetse flies were collected from Sangaiwe

flies were sorted out into species and dissected under light microscope and examined for presence of trypanosomes in the midguts and salivary glands.

Data collected were entered in Epi Info version 6.04d databases. Descriptive statistics were then computed for different variables.

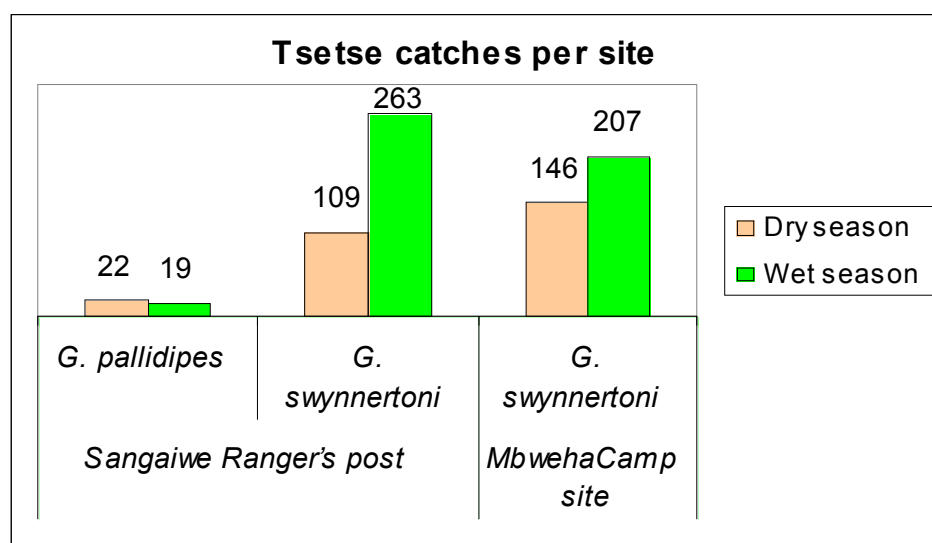
A total 509 individuals were screened for trypanosome infection. Of these, 306 and 203 individuals were examined during the dry and wet seasons, respectively. Females were 262 (51.5%) and males were 247 (48.5%). The overall

**Table 1: Number of peoples, by sex, screened and infected during wet or dry season**

Population screened	Dry season		Wet season		Total	No. infected
	Females	Males	Females	Males		
Within the park	86	87	31	24	228	0
Outside the park	75	58	70	78	281	0
Total	161	145	101	102	509	0

Rangers' post and Mbweha Camp Sites. Flies were trapped using biconical, monopyrnidal and mobile traps mounted on a vehicle. Stationary traps were emptied every morning for three consecutive days. The traps were baited with acetone and phenol to increase catches. Trapped

mean age was 24.9 years (range=1-67years) and 25.9 years (range=1-84) during the dry and wet seasons, respectively. None of the individuals screened was found infected with tyranosome (Table 1).



**Figure 1: Number and species of tsetse caught during dry and wet season**

A total of 766 tsetse flies were collected. Of these, *Glossina swynnertoni* accounted for 94.6% and *G. pallidipes* for 5.4% of the total collection. The largest proportion (63.8%) of the tsetse flies was collected during the wet season (Figure 1). Salivary gland examination, revealed the presence of *Trypanosoma brucei* type of infection in 4 tsetse flies (4.5% at Mbweha Camp Site and 1.7% at Sangaiwe Ranger's Post) (Table 2). The overall infectivity rate in tsetse fly was 3.2% (4/125). All infective trypanosomes were found during the dry season. Immature stages of *T. brucei* were also detected in 6.2% of the dissected tsetse flies.

Review of health facility records indicated absence of HAT cases within and outside the Park during the two surveys. The last case of HAT was reported and treated successfully at Magugu Health Centre in 1996 and was a visitor from Kigoma. During rainy / wet season, animals were found scattered and there was poor visibility of tsetse to target due to long grasses.

and the communities surrounding the park.

Although no mature brucei type of infection that was recorded during the wet season, the probability of the observed immature developing into mature stage is high. The observation that, there was no brucei type of infection recorded at Mbweha camp site during the wet season as opposed to dry season could be due to poor visibility of tsetse to targets during the wet season because of taller grasses and bushes. There was absence of infection in human during the study, however, control targets need to be deployed on strategic sites at the beginning of dry season to maximize tsetse - target contact. Strategic sites such as Mbweha and Sangaiwe should be given a high priority when planning for tsetse control because the Park workers and tourists occupy these sites more frequently. There is also a need for regular active and passive disease surveillance to monitor the trypanosomiasis in the area. The influx of people from the surrounding communities into the Park should be minimized bearing in mind that these

**Table 2: Trypanosome infection rate in the tsetse flies per site**

Site	No. Dissected		No. Infected			
	Dry Season	Wet Season	Dry Season		Wet Season	
			Salivary gland	Midgut	Salivary gland	Midgut
Mbweha Camp Site	65	91	3(4.6%) <i>Brucei</i> type	4 (6.2%) <i>Brucei</i> type	0	0
Sangaiwe Ranger's Post	60	121	1(1.7%) <i>Brucei</i> type	3(5.0%) <i>Congolense</i> type	0	3 (2.5%) <i>Brucei</i> type
Total	125	212	4	7	0	3

Although there were no active or passive HAT cases detected in this study during the dry and wet seasons, still the threat of the disease can not be ignored because there was a higher population of vectors mainly *G. swynnertoni* during the wet season. The brucei type of infection found in tsetse flies was most likely the human-infective type, and therefore poses a risk to human population exposed to the infected tsetse flies. The fact that, Brucei type of infection in tsetse was found in areas where there was a high concentration of wild animals, which are likely to be reservoirs of the infection ((Swynnerton, 1923; Jackson, 1955) also poses a risk to humans. The risk of epidemic can be high due to close interaction, first between human beings in the park, wild life and tsetse flies and secondly between the park community

communities are nomadic and may pose a risk not only to themselves but may also create new foci of infection as they move with their animals searching for pasture and water.

In conclusion the transmission and prevalence of HAT among human population, in Tarangire National Park and its surrounding villages is low. However, disease and vector surveillances need to be strengthened to morning any build up of the disease in the area.

#### Acknowledgements

We acknowledge the technical and logistic support from the National Institute for Medical Research and Tsetse and Trypanosomiasis Research Institute. We are grateful to the management of

Tarangire National Park and Tanzania National Parks Authority for facilitating the study. This study received financial support from the World Health Organization and Ministry of Health and Social Welfare, Tanzania.

## References

- Jackson, C.N.H. (1955) The natural reservoir of *Trypanosoma rhodesiense*. *Transactions of the Royal Society of Tropical Medicine and Hygiene* **49**, 528-587.
- Jelinek, T., Bisoffi, Z., Bonazzi, L., van Thiel, P., Bronner, U., de Frey, A., Gundersen, S.G., McWhinney, P. & Ripamonti, D. (2002). Cluster of African trypanosomiasis in travellers to Tanzanian National Parks. *Emerging Infectious Diseases* **8**, 634-635.
- Malele, I.I., Kibona, S.N., Matemba, L.E., Sahani, J., Swilla, J., Mwalimu, C.D., Mayala, B.K., Kimaro, E., Msumary, C. & Kalinga, R.B. (2006) Human African trypanosomiasis and challenges to its control in Urambo, Kasulu and Kibondo Districts, western Tanzania. *Tanzania Health Research Bulletin* **8**, 80-85.
- Moore, D.A.J., Edwards, M., Escombe, R., Agranoff, D., Wendi Bailey, J., Bertel Squire, S. & Chiodini, P.L. (2002) African Trypanosomiasis in travellers returning to the United Kingdom. *Emerging Infectious Diseases* **8**, 74-76.
- Ripamonti, D., Massari, M., Arici, C., Gabbi, E., Farina, C. & Brini, M. (2002) African sleeping sickness in tourists returning from Tanzania: the first 2 Italian cases from a small outbreak among European travelers. *Clinical and Infectious Disease* **34**, E18-E22.
- Swynerton, C.F.M. (1923) The entomological aspects of an outbreak of sleeping sickness near Mwanza, Tanganyika territory. *Bulletin of Entomological Research* **13**, 317-372.
- WHO (1998) *Control and Surveillance of African trypanosomiasis*. WHO technical report Series 881. World Health Organization, Geneva.