

Research Article

Population Dynamics of Tsetse flies at Salt Lick B and Guruntun Areas of Yankari National Park Bauchi State Nigeria

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Abstract: Objective: The aim of the research was to identify tsetse species distribution present in salt lick B and Guruntun area of Yankari National Park and to determine the apparent density of the flies, Materials and Methods: Twenty biconical traps were mounted between salt lick B area and Guruntun River side. Coordinates and GPS positions were determined for each trap set. Results: Two dominant species of tsetse flies were found mostly in the two sides, which include *G. tachinoides* and *G. morsitans*. Three thousand and forty seven (3,047) flies were collected during the period, out of which 2,827 were *G. tachinoides* with apparent density of 70.68, while 220 were *G. morsitans* with apparent density of 5.5. Out of the 2,827, *G. tachinoides* 2,415 were females with apparent density of 60.4 while 412 were males with apparent density of 20.6. Conclusion the patterns of fly distribution in the two locations especially the female *GlossinaTachnoides* showed that tsetse fly is still a major hindrance to wild life population in Yankari National Park. There is a need for intervention in order to reduce the fly population in the two areas which serves as a major site during game viewing and research.

Keywords: Tsetse population dynamic yankari

INTRODUCTION

Tsetse flies are confined to sub Saharan Africa where they occupy discontinuous habitat. In Nigeria, the problem created by tsetse and trypanosomiasis are enormous. A total of 0.737 million km² out of 0.928 million km² land mass of Nigeria are infested by tsetse flies (Ohaeri and Eluwa, 2007) and as such unsuitable for livestock production. Nigeria herd is annually exposed to different tsetse species as the animals transverse the various ecological zones in search of food especially during dry season (Hendrickx *et al.*, 1999).

The negative impact of African animal trypanosomiasis on African agriculture and economy does not need to be stressed here. A series of changing macro- and micro economical factors have induced, over the last decade, major changes in the development policy of donor and developing countries. These include a tendency to favor mixed farming systems (i.e., integrating crops and livestock) and to transfer activities from the public to the private sector. Both existing constraints and changing development policies stress the need to identify priority areas where focused efforts towards integrated disease management will

have a maximum impact on the development of those mixed farming systems (Glasgow, 1963).

There are 22 different kinds of tsetse fly species found in Africa today. Some of these species are divided into subspecies, because of certain minor but constant differences in their anatomy (Leak, 1998). The *Palpalis* group is mainly limited to the very humid areas of Africa, the mangrove swamps, the rain forest, the lake shores and the gallery forests along rivers. Members of this group, when they penetrate generally drier areas, do not move far away from free water (rivers and lakes): but in generally more humid areas they may not have to live so close to free water. *Glossinatachinoides* is distributed in a broad belt from Guinea in the west, to the Central African Republic to the east. In addition, much further to the east are smaller isolated belts on the Sudan-Ethiopian border. In Nigeria and Chad this species is able to live further north than either *G. palpalis* or *G. fuscipes*. *Glossinamorsitans* is the most widespread species. Its distribution is not accurately known in all countries. The subspecies *G.M. submorsitans* extends as a very large but broken belt throughout West Africa, into southern Sudan, northern Uganda (Mulligan and Potts, 1970).

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Yankari occupies an area of 2,244 km² at a distance of about 115 km from Bauchi town. The park was first demarcated as a game reserve in 1956 but however did not open to the public until the 1st of December 1962 and was later upgraded to the status of a national park in 1991 through the National Parks Decree No. 36 of 1991. The park is famous for its diverse wildlife population, springs, historical and archaeological sites and plays a crucial role in the development and promotion of tourism in Nigeria. The park has witnessed significant growth in the number of tourists over the years, with an increase from 9,544 visitors in 1998 to 22,648 visitors by 2000. The salt lick B area of the game reserve is located 4.34 km from the camp where most of the animals come to lick salt and potash. The salt lick B area is a savanna like vegetation with sparsely distributed tress and shrubs, while the Guruntun River serves as one of the drinking areas for the animals in the park. It is densely covered by tress and shrubs.

Objective (s):

- To Identity tsetse species distribution present in salt lick B and Guruntunarea of Yankari National Park.
- To determine the apparent density of the flies.
- To contribute to tsetse control and eradication plan for the area.

MATERIALS AND METHODS

The study was conducted at Yankari National Park in February 2013 by a team of research and field officers from the Department of Vector and Parasitology Nigerian Institute for Trypanosomiasis Research Kaduna, Nigeria. Twenty biconical traps were mounted between salt lick B area and Guruntun River side (Challier *et al.*, 1981). Trap 1 was mounted at salt lick B area; about 4.34 km south of the camp at latitude 09° 44 N and Longitude 010° 30 E and elevation of 219 m above sea level, while trap 2 up to 5 were mounted at 0.24, 0.28, 0.31 and 0.36 km, respectively from the first trap at latitude 09° 44 N and Longitude 010° 30 E and elevation of 220 m above sea level. Trap 6 at 0.74 km and 7 at 0.98 km from trap 5 at latitude. 09° 43 N and Longitude 010° 30 E and elevation of 221 m and trap 8 to 10 were mounted at 0.46, 0.65 and 0.87 km, respectively from trap 7 at latitude. 09° 44 N and Longitude 010° 30 E and elevation of 222 m above sea level.

The Guruntun area of the park is located 3.93 km from salt lick B area at latitude 09° 44 N and Longitude 010° 30 E, elevation of 223 m-225 m above sea level while trap 11 to 20 were mounted before the Guruntunriver, at the Guruntunbridge and after the Guruntunbridge at a distance of 0.45 km for traps 11 to17 and 0.78 km for traps 18 to 20 from the preceding trap, all traps were milked daily for 48 h Hendrickx *et al.*, 1990.

Statistical analysis: Data were expressed as percentage using SPSS version14 and the apparent density was calculated using the formula below. The sexes were identified using the conventional identification keys (Challier *et al.*, 1981).

$$\text{Population density} = \frac{\text{Total no of flies caught} \times \text{Total no/ of days}}{\text{Total no of flies}}$$

RESULTS

Two dominant species of tsetse flies were found mostly in the two sides, which include *G. tachinoides* and *G. morsitan*. Three thousand and forty seven (3,047) flies were collected during the period, out of which 2,827 are *G. tachinoides* with apparent density of 70.68, while 220 are *G. morsitans* with apparent density of 5.5. Out of the 2,827, *G. tachinoides* 2,415 were females with apparent density of 60.4 while 412 were males with apparent density of 20.6. The total no of flies caught at the salt lick B area is 1,035 with apparent density of 25.9, while the catches at Guruntun river area was 2,012 with apparent density of 50.3 as seen in Fig. 1 and 2 below. In both sides the population of female flies were higher than the male flies, the mean fly catch per trap was 152.5.

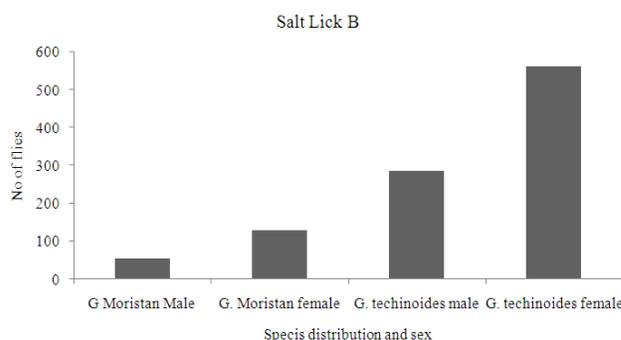


Fig. 1: Tsetse flies distribution along Salt lick B area of Yankari Game Reserve

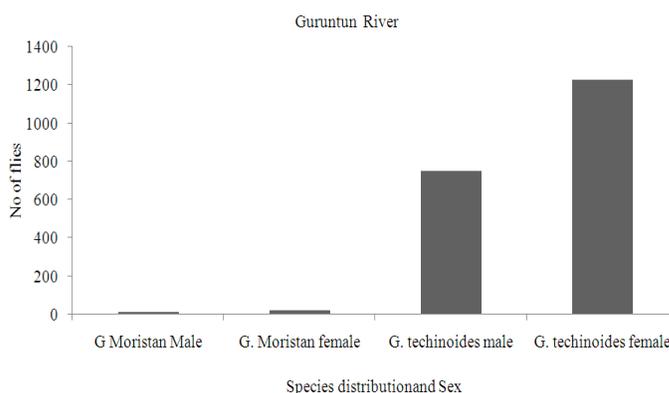


Fig. 2: Tsetse flies distribution along Guruntun River of Yankari Game Reserve

DISCUSSION

This study showed that there were about twice as many *G. tachnoides* population in Yankari National Park along the salt lick B and Gurumtum area, the number of females in both the study sites are also higher than the males, The high number of flies caught at Gurumtum River areas could be associated with availability of host animals probably influenced by the River and due to quite favorable humidity and vegetation cover when compared to the salt lick B area. The observed differences in the gender of *G Morsitans* and *G. Tachnoides* species caught in this study is in agreement Anavhe who all found more female than male tsetse in Abia and Delta states Anavhe, 1998. The higher number of female flies collected could probably be associated with females living longer than males and this has been corroborated by some authors (Jaenson, 1979). This uneven occurrences of tsetse species in different locations may perhaps be due to livestock density or dispersal of tsetse in search of host to feed.

CONCLUSION

The patterns of flies distribution in the two location especially the female *GlossinaTachnoides* showed that tsetse flies is a still a major hindrance to wild life population in Yankari National Park. There is a need for intervention in other to reduce the fly population in the two areas which serves as a major site during game viewing and research.

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REFERENCES

- Anavhe, A.O. 1998. Comparative analysis of bioconical traps catches of *Glossinapalpalispalpalis* (Robineau-Desvoidy) (DipteraGlossunadae) from riverine forest and Savanna woodland. ESN Occasional. Pub., 31: 109-116
- Challier, A., M. Eyraud, A. Lafaye and C. Laveissière, 1981 .Amélioration du rendement du piègebiconique pour Glossines (Diptera, Glossinidae) par l'emploi d'un côneinférieur bleu. Cah ORSTOM serEntomol med Parasitol, 15: 283-286.
- Glasgow, J., 1963. The Distribution and Abundance of Tsetse. Pergamon Press, Oxford.
- Hendrickx, G., A. Napala, D. Rogers, P. Bastiaensen and J. Slingenbergh, 1999. Can remotely sensed meteorological data significantly contribute to reduce costs of tsetse surveys? Mem. Inst. Oswaldo Cruz., 94(2): 273-276.
- Hendrickx, G., A. Napala, D. Batawui, R. De Deken, A. Vermeilen and J.H.W. Slingenbergh, 1990. A systematic approach to area-wide tsetse distribution and abundance maps. Bull. Entomol. Res., 89: 231-244.
- Jaenson, T.G.T., 1979. Mating behaviour of males of *Glossinapallidipes* Austen (Diptera: Glossinidae). Bull. Entomol. Res., 69: 573-588.
- Leak, S., 1998. Tsetse Biology and Ecology: Their role in the Epidemiology and Control of Trypanosomiasis. CABI Publishing, New York.
- Mulligan, H. and W. Potts, 1970. The African Trypanosomiasis. George Allen and Unwin, Ltd., London, UK.
- Ohaeri, C.C and M.C. Eluwa, 2007. The population structure and physiological status of tsetse flies in Abia State, Nigeria. J. Animal vet. Adv., 6(4): 513-516.