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Prevalence of *Trypanosoma* isolated from cattle farms in the peri-urban area of Bamako

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Abstract

This study carried out between January 2019 and November 2022 in the District of Bamako and its peri-urban area aimed to determine the prevalence of bovine trypanosomiasis. Blood samples took from 419 cattle consisting of 281 females and 138 males examined for trypanosomes using the Buffy coat technique. A total of 124 cattle were positive for bovine trypanosomiasis, representing an overall prevalence of 29.59%. There was a significant difference between the prevalence rates of *Trypanosoma. Congolense* (53.23%), *T. vivax* (39.52%) and *T. brucei* (7.26%). The overall prevalence rates of trypanosomiasis in male and female cattle were 29.71% and 29.54%, respectively. Statistical analysis revealed a significant difference ($p<0.05$) between the prevalence rates of trypanosomiasis in young (43.33%) and adult (4.70%) cattle. However, there was no significant difference ($p>0.05$) between the different sites. The overall prevalence rates of trypanosomosis on the sites are: Baguinéda (31.51%), Dialakorobougou (27.50%), Farabana (29.17%), Kati (29.73%), Sala (26.00%), Samale (33.33%), Sanankoroba (26.97%), Sotuba (26.00%). The study revealed that trypanosomosis is one of the causes of mortality among cattle in the District of Bamako and its peri-urban area.

Keywords: Prevalence; Trypanosomosis; Bamako; Mali

1. Introduction

Mali is one of the major cattle supplying countries in West Africa with a population of 11,758,377 cattle [10.7]. However, trypanosomes constitute a major constraint to the development of livestock in many countries including Mali, causing enormous losses. Trypanosomoses are blood parasitic diseases caused by protozoa belonging to the genus Trypanosoma and the family Trypanomastidae, which multiply in blood plasma, lymph and various tissues, including the heart muscle and the central nervous system of mammals [17]. . Trypanosomes are found in the blood of several animal species in many regions of the world. Certain species of trypanosomes are pathogenic, not only for animals but also for humans.

Entomological surveys carried out at the end of the 1980s revealed the presence of *Glossina palpalis gambiensis* east of Bamako in the classified forests of Tienfala and La Faya. Pathogenic trypanosomes encountered in livestock in areas infested by tsetse flies They are responsible for African animal trypanosomiasis (AAT) in animals, while they cause human African trypanosomiasis (HAT) in humans. Annual losses caused by TAA are estimated at nearly US$5 billion [11,13,18]. In Africa, these species transmitted by various blood-sucking insects, the most important of which are tsetse

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flies, which constitute the true intermediate host of these parasites. Tsetse flies are exclusively African insects [12]. In Mali, the distribution area of tsetse flies cover approximately 200,000 km2 south of the parallel 14° 30' N and west of the meridian 4° 30' W. Four species have been reported: two riparian (*Glossina palpalis gambiensis* and *G. tachinoides*) and two from savannah *(G. morsitans submorsitans and G. longipalpis*) [2]

in Mali are *Trypanosoma congolense*, *T. vivax* and *T. brucei brucei*. The subspecies *T. brucei* evansi affects camels outside the tsetse-infested area and is transmitted by mechanical vectors [9]. Very few studies have been carried out on the prevalence of bovine trypanosomiasis in Mali. The most recent study took place in the Kadiolo circle in 2012[5]. This led us to carry out this study in order to improve our knowledge of the trypanosomiasis situation in the District of Bamako and its peri-urban area.

2. Materials and methods

The study took place in the District of Bamako and its peri-urban area. The research team traveled at the request of breeders from the sites visited. This is why there was no specific choice of sites during this study; moreover, the investigation took place on eight sites: Baguinéda, Dialakorobougou, Farabana, Kati, Sala, Samale, Sanankoroba and Sotuba. 419 blood samples took from cattle in these different locations. Blood collected from the jugular vein of cattle using a sampling needle in vacuum "Vaccutainer" tubes containing the anticoagulant "EDTA". The site code, animal identification number and date of collection were written on each tube. The tubes containing the collected blood placed in a rack then kept in a cooler containing pieces of ice, then sent to the Central Veterinary Laboratory in Bamako.

3. Result

3.1. Global prevalence of bovine trypanosomiasis

124 cattle were positive for bovine trypanosomiasis out of a total of 419 subjects examined in all the sites visited, representing an overall prevalence of 29.59%. The statistical analysis revealed a significant difference (p-value <0.05) between the prevalence rates of *T.congolense*, *T.vivax* and *T.brucei* which are in descending order of: 53.23% for *T.congolense* , 39.52% for *T.vivax* and 7.26% for *T.brucei* (Table 1).

Table 1 Global prevalence of bovine trypanosomiasis

Resultts	**Number**	**Prevalence (%)**	**Statistique**
Negative	295	70,41	X-squared = 137.95, *p-value < 2.2^{e-16}*
Positive	124	29,59	
T.brucei	9	7,26	X-squared = 62.153, *p-value = 3.189^{e-14}*
T.congolense	66	53,23	
T.vivax	49	39,52	
Total	124/419	29,59	-

3.2. Prevalence of bovine trypanosomiasis by sex

The investigation revealed the presence of 281 females and 138 males out of a total of 419 cattle examined. The overall prevalence of trypanosomiasis among females was 29.54%. The statistical analysis revealed a significant difference (p<0.05) between the different species of trypanosomes in female cattle, the prevalence rates of which are respectively 51.81% for *T.congolense*, 43.37% for *T.vivax*. and 4.82% for *T. brucei* (Table 2). The overall prevalence of trypanosomiasis in male cattle was 29.71%. There was a significant difference (p<0.05) between the different species of trypanosomes in male cattle whose prevalence rates were respectively 56, 10% for *T.congolense*, 31.71% for *T.vivax* and 12.20% for *T.brucei* (Table 2).

Table 2 Prevalence of bovine trypanosomiasis by sex

Sex	Results	Number	Prevalence (%)	Statistical
Female	Negative	198	70,46	*X-squared = 92.498, p-value < 2.2^{e-16}*
	Positive	83	29,54	
	Total 1	281		
	T.brucei	4	4,82	X-squared = 46.88, *p-value = 6.611^{e-11}*
	T.congolense	43	51,81	
	T.vivax	36	43,37	
Male	Negative	97	70,29	*X-squared = 43.841, p-value = 3.562^{e-11}*
	Positive	41	29,71	
	Total 2	138		
	T.brucei	5	12,20	X-squared = 17.854, *p-value = 0.0001328*
	T.congolense	23	56,10	
	T.vivax	13	31,71	
Total		124/419	29,59	-

3.3. Prevalence of bovine trypanosomiasis by age

The overall prevalence of trypanosomiasis observed in young cattle was 43.33%. In these young cattle, there was a statistically significant difference ($p<0.05$) between the species *T.congolense*, *T.vivax* and *T.brucei* whose prevalence rates are respectively 52.14% for *T.congolense* , 40.17% for *T.vivax* and 7.69% for *T.brucei* (Table 3).

In adult cattle, the overall prevalence of trypanosomosis was 4.70%. The statistical analysis of the results revealed a significant difference ($p<0.05$) between the different species of trypanosomes *T.congolense, T.vivax* and *T.brucei* whose prevalence rates are respectively 71.43% for T. congolense, 28.57% for *T.vivax* and 0.00% for *T.brucei* (Table 3).

Table 3 Prevalence of bovine trypanosomiasis by age

Age	results	Number	Prevalence (%)	Statistical
young	Negative	153	56,67	*X-squared = 9.0741, p-value = 0.002593*
	Positive	117	43,33	
	Total 1	270		
	T.brucei	9	7,69	*X-squared = 55.692, p-value = 8.064^{e-13}*
	T.congolense	61	52,14	
	T.vivax	47	40,17	
Adults	Negative	142	95,30	*X-squared = 241.02, p-value < 2.2^{e-16}*
	Positive	7	4,70	
	Total 2	149		
	T.brucei	0	0,00	X-squared = 8.1429, *p-value = 0.01705*
	T.congolense	5	71,43	
	T.vivax	2	28,57	
Total		124/419	29,59	

3.4. Prevalence of bovine trypanosomiasis by site

The statistical analysis of the results did not reveal any significant difference (p>0.05) between the different sites. The overall prevalence rates of trypanosomiasis on the sites are: Baguinéda (31.51%), Dialakorobougou (27.50%), Farabana (29.17%), Kati (29.73%), Sala (26.00%), Samale (33.33%), Sanankoroba (26.97%), Sotuba (26.00%).

Table 4 Prevalence of bovine trypanosomiasis by site

Cercle	munipality	Resultts	Number	Prevalence (%)
Bamako	Baguinéda	Negative	50	68,49
		Positive	23	31,51
		S/total 1	73	-
		T.brucei	2	8,70
		T.congolense	11	47,83
		T.vivax	10	43,48
	Dialakorobougou	Negative	29	72,50
		Positive	11	27,50
		S/total 2	40	-
		T.brucei	1	9,09
		T.congolense	3	27,27
		T.vivax	7	63,64
	Farabana	Negative	34	70,83
		Positive	14	29,17
		S/total 3	48	-
		T.brucei	0	0,00
		T.congolense	9	64,29
		T.vivax	5	35,71
	Kati	Negative	26	70,27
		Positive	11	29,73
		S/total 4	37	-
		T.brucei	0	0,00
		T.congolense	9	81,82
		T.vivax	2	18,18
	Sala	Negative	37	74,00
		Positive	13	26,00
		S/total 5	50	-
		T.brucei	1	7,69
		T.congolense	5	38,46
		T.vivax	7	53,85
	Samale	Negative	38	66,67
		Positive	19	33,33

		S/total 6	57	
		T.brucei	4	21,05
		T.congolense	8	42,11
		T.vivax	7	36,84
	Sanankoroba	Negative	64	71,91
		Positive	24	26,97
		S/total 7	89	-
		T.brucei	1	4,17
		T.congolense	17	70,83
		T.vivax	7	29,17
	Sotuba	Negative	17	68,00
		Positive	8	32,00
		S/total 8	25	-
		T.brucei	0	0,00
		T.congolense	4	50,00
		T.vivax	4	50,00
	Total 1		124/419	29,59

4. Discussion

The prevalence of trypanosomosis was 29.59%. This high prevalence rate of bovine trypanosomiasis could be due to the presence of the *Glossina palpalis gambiensis* vector east of Bamako in the classified forests of Tienfala and Faya, and to the high concentration of cattle in the District of Bamako. from several regions of Mali. The poor treatment of sick cattle outside of veterinary assistance could also be the cause of the increase in the prevalence rate of bovine trypanosomiasis in the Bamako District. Our results are similar to those obtained by the authors [15,5,8] who recorded prevalence rates of 28.1%, 30.86% and 25.8% respectively. However, our results are different from those of Ashagrie et al [1] who obtained a prevalence rate of 4.7%.

The prevalence rates of the different species of trypanosomes were 53.23% for *T. congolense*, 39.52% for *T.vivax* and 7.26% for *T.brucei*. This increase in prevalence of different species of trypanosomes is explained by non-compliance with the prophylaxis program recommended by veterinary services to breeders. It may also be due to the use of fake veterinary medicines by certain breeders who prefer to buy these products at low prices from resellers who have no expertise in veterinary matters. The administration of these fake veterinary drugs into the body of cattle has no effect on the life of trypanosomes in the blood of cattle. The high prevalence rate of *Trypanosoma congolence* could be due to its high concentration in the blood of cattle compared to *Trypanosoma vivax* and *Trypanosoma brucei.* Our results are similar to those obtained by Bekele et al. [4] who observed a prevalence rate of 54.17% in T. congolense followed by *T.vivax* (37.5%), and *T.brucei* (8.33%). Our results are different from those of Shimelis et al.[15] who obtained rates of 66.7% for T. congolense, 9.3% for *T. vivax* and 4.6% for *T. brucei*. Our results are also different from those of Bocoum et al.[5] which obtained for the different species of trypanosomes prevalence rates of 9.58% for T. vivax, 89.72% for T. congolense and 0.68% for *T. brucei*. Different results were obtained by DJAKARIDJA et al.[3], with *T. vivax* (6.94%) and *T. brucei* (2.5%). Our results are also different from those of Yéo et al.[14] who observed prevalence rates of 6.94% for T. vivax and 2.50% for *T. brucei*. Different results were also obtained by Boka et al.[5] who recorded a prevalence rate of 6 ± 2% with T. vivax. The overall prevalence of trypanosomiasis observed in male and female cattle is 29.54% and 29.71% respectively. This shows that male and female cattle have the same level of susceptibility to trypanosomiasis. These results are similar to those of Dawit et al[8] who obtained an overall prevalence rate of 26.9% in male cattle and 24.7% in females. Our results are different from those obtained by Sitena[16] who observed overall prevalences of 1.4% and 2.7% in male and female cattle. Different results were obtained by Ashagrie et al. [1] who observed prevalence rates of 4.6% in male cattle and 4.8% in females. Our results are also different from those of Bekele et al. [4] who observed prevalence rates of 3.55% and 7.47% in male and female cattle. The overall prevalence of trypanosomiasis observed in

young and adult cattle was 43.33% and 4.70% respectively. Our results are different from those of Dawit et al[8] who obtained prevalence rates of 54.7% in adult cattle and 5% in young cattle. Different results were obtained by Sitena [16] who observed prevalence rates of 2.7% and 1.4% respectively in adult and young cattle. Different results were also obtained by Yehunie Bishaw, et al. [19] who observed 6% in adults and 2.01% in young people. In general, young cattle aged 0 to 2 years retain their immunity acquired during embryonic development after birth. At this age, they are less exposed to vectors because they remain in the park while adult cattle spend the day in pastures infested with tsetse flies. In our case, the young cattle were between 3 and 4 years old and went out to pasture with the adult cattle. This is why in our study, the high prevalence rate of trypanosomiasis in young cattle could be due to their prolonged contact with vectors on pastures.

5. Conclusion

The present study revealed that Trypanosoma is present on cattle farms in the peri-urban area of Bamako and constitutes one of the causes of cattle mortality.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] Ashagrie T, Zewde D (2021) Epidemiology of bovine trypanosomsis and its risk factors in West Gojam and Awi Zone of Amhara regional State, Ethiopia. J Vet Med Res 8(2): 1207

[2] A. Djiteye, S.K.Moloo, K.Foua Bi, M.Touré, S.Boiré, S.Bengaly, E.Coulibaly, M.Diarra, D.Traoré, I.Ouattara, Z.Coulibaly.(2012) Updating data on the distribution of tsetse flies in Mali. Review Elev. Med. vet. Country too., 1997, 50 (2): 126-132

[3] B. DJAKARIDJA, P. YAO KOUASSI, G. GRAGNON BIEGO, G. ACAPOVI-YAO., J.F. MAVOUNGOU, E. N'GORAN KOUAKOU, (2014). Epidemiological situation of cattle hemoparasites in two livestock breeding areas of Ivory Coast: case of the former Savanes regions and the Bandama valley. Revue Med. Vet., 2014, 165, 9-10 297-303

[4] Bekele Dinsa, Moti Yohannes, Hailu Degefu and Mezene Woyesa (2013). Cross sectional study of bovine trypanosomosis and major clinical signs observed in Diga District, Western

[5] Bocoum Z, Diarra M, Maiga HM, Sanogo Y, Sylla MSM, et al. (2012) Prevalence in the Bovine Trypanosomiasis Kadiolo Circle. J Community Med, Health Educ 2:183. doi:10.4172/2161-0711.1000183

[6] Boka O.M., Boka E.E.J., Yapi G.Y., Traoré S.I., Kouamé K.E., 2019. Epidemiology of African animal trypanosomosis in cattle in Korhogo Department (Ivory Coast). Rev. Elev. Med. Vet. Pays Trop., 72 (2): 83-89, doi: 10.19182/remvt.31748

[7] DNPIA, 2019, Annual report

[8] Dawit Tesfaye and Nuraddis Ibrahim (2017). Prevalence of Bovine Trypanosomosis in Assosa District of Benishangul Gumuz Regional State, Ethiopia. Advan. Biol. Res., 11 (1): 13-17, 2017

[9] DIALL O, 1993. Camzl trypanosomosis in Mali. Contribution to the diagnosis and the epidemiology. Doctor of Science thesis, IMT. Anvers, Belgium, 92 p.

[10] FAOSTAT (2015) FAO Statistics Division.

[11] Geerts S., Holnes P.H., Diall O., Eisler C. (2001). African bovine trypanosomiasis: the problem of drug resistance, Trends in Parasitology, 17: 25-28.

[12] Itard J. (1981). African animal trypanosomoses, Summary of Tropical Veterinary Parasitology (Troncy P.M., Itard J. and Morel P.C.), Ministry of Cooperation and Development, IEMVT, Paris, France, 305-469

[13] Mortelmans J. (1986). Some economic aspects related to veterinary parasitology, Tropicultura, 4: 112-116

[14] Nawolo Yéo, Yahaya Karamoko, Dofara Soro, Zahouli Faustin Abou Joel Landry Okon, Biégo Guillaume Gragnon, (2017). Prevalence of Trypanosoma, Babesia and Anaplasma in cattle reared in the North of Côte d'Ivoire.

International Journal of Biosciences | IJB | ISSN: 2220-6655 (Print), 2222-5234 (Online) http://www.innspub.net Vol. 10, No. 2, p. 21-28, 2017.

[15] Shimelis Mulaw, Mekonnen Addis and Abebe Fromsa, (2011). Study on the Prevalence of Major Trypanosomes Affecting Bovine in Tsetse Infested Asosa District of Benishangul Gumuz Regional State, Western Ethiopia. College of Agriculture and Veterinary Medicine, Jimma University, P.O. Box 307, Ethiopia. Global Veterinaria 7 (4): 330-336, 2011 ISSN 1992-6197 © IDOSI Publications, 2011.

[16] Sitena Kebede Mohammed, (2024). Prevalence of Bovine Trypanosomiasis and Its Risk Factors in and Around Zenzelima, Amhara Region, Ethiopia. EAS J Vet Med Sci; Vol-6, Iss-1 (Mar-Apr, 2024): 19-23

[17] Thomieres C. (1996). The trypanocides market, SANOFI Symposium on trypanosome control, July 2-3, 1996, Bordeaux, France.

[18] Trail J.C.M., Murray M., Sones K., Jibbo J.M.C., Darkin J., Ligth D. (1985). Boran cattle maintained by chemoprophylaxis under trypanosomiasis risk, Journal of Agricultural Science, 105: 147-166..

[19] Yehunie Bishaw, Wudu Temesgen Nuria Yideg,, Sefinew Alemu, (2012). Prevalence of bovine trypanosomosis in Wemberma district of West Gojjam zone, North West Ethiopia. Ethiop. Vet. J., 2012, 16 (2), 41-48