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## Prevalence of domestic animal trypanosomiasis in the Fontem sleeping sickness focus, Cameroon

ASONGANYI (T.), SUH (S.), TETUH (M. D.). Prévalence des trypanosomoses des animaux domestiques dans le foyer de la maladie du sommeil de Fontem au Cameroun. *Revue Élev. Méd. vét. Pays trop.*, 1990, 43 (1) : 69-74.

Les auteurs ont examiné, dans le foyer de la maladie du sommeil de Fontem (Cameroun), 304 animaux domestiques dont 114 chèvres, 93 moutons, 67 chiens et 30 porcs, pour la détection de la trypanosomose, à l'aide des tests parasitologiques et sérologiques. Le sous-genre *Nannomonas* a été le seul détecté chez les animaux, avec une prévalence de 28,3 p. 100. Le test d'agglutination sur carte (Testryp CATT) a montré un taux de positivité de 38,2 p. 100, ce qui a permis une meilleure estimation de la trypanosomose animale. L'absence des trypanosomes du sous-genre *Trypanozoon* indique probablement que la trypanosomose humaine africaine n'est pas une zoonose dans ce foyer de la maladie du sommeil. *Mots clés* : Trypanosomose - Animal domestique - Technique immunologique - Cameroun.

and other vertebrates (1); naturally transmitted between vertebrate animals and man (2, 5). Because experiments conducted in the past to prove natural transmission of *T. b. rhodesiense* between Vertebrate animals and man (6, 8, 15, 16) are now considered unethical, the evidence presented above for *T. b. gambiense* is now generally considered sufficient to class it as a zoonosis.

There have been a few studies in Cameroon to assess the epidemiological role played by domestic animals in the transmission of *T. b. gambiense* (1, 2, 4). The present work reports an extension of these studies to the Fontem sleeping sickness focus.

### INTRODUCTION

Gambian sleeping sickness is endemic over a vast territory of West and Central Africa, and remains a serious threat to human health. There are several endemic zones in Cameroon, the most active of which are Fontem and Bafia. It is now known that beside man, domestic and wild animals can also serve as reservoir hosts for *T. b. gambiense*, the causative agent of Gambian sleeping sickness (12).

Trypanosome isolates genetically identical to *T. b. gambiense* have been obtained from domestic pigs, sheep, dogs and cattle (7, 9, 10, 14, 17, 19). However, genetic similarity between isolates from different hosts does not necessarily imply cross-infection.

VAN HOOF (18) reported the successful cyclical transmission of *T. b. gambiense* from a congolese patient to a goat, and later successive cyclical transmission from the goat to other goats, to pigs and dogs. Further, cyclical development of *T. b. gambiense* from cattle and goats in Glossina has been reported (11). Zoonoses are infections that are : common to man

### MATERIALS AND METHODS

#### Study area

The Fontem trypanosomiasis focus remains one of the most active in Cameroon with prevalences of 1.3 and 3.7 % recorded for 1986 and 1987, respectively. It is located in Fontem Sub-Division of Manyu Division, South West Province. This region has a much varied topography with many hills and valleys through and several high speed rivers. With a surface area of 598 km<sup>2</sup> and an estimated population of 93,056, the population density of 156 inh/km<sup>2</sup> is one of the highest in Cameroon. This dense human population, domestic animals and tsetse flies are scattered in the preforest/forest vegetation of the valleys and hills of Fontem.

The economy of the region is dominated by coffee which is farmed up to an altitude of 1 000 m in the South and by oil palm in the North. Cocoa has just recently been introduced. The dry season is very short, lasting barely 4 months (November-February). Maximum rainfall occurs between July and September.

#### Domestic animals

Goats, sheep, swine, cattle and chicken are the main domestic animals kept by the people of Fontem mainly to meet their dietary and ceremonial needs. Cattle is

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reared mainly above 1 200 m altitude. Most of these animals are left free in the surrounding bushes. Although the pigs also move around freely, most of them are kept in pens. Dogs and cats are kept as pets.

This study involved 304 animals including 114 goats, 93 sheep, 67 dogs and 30 pigs from the villages indicated in figure 1 and tables I and II. Villagers were informed of the survey programme at least 3 weeks before the start of the survey which lasted from January 19 to February 5, 1989. The team visited each village on the evening before the prospection day to ask the villagers to restrain their animals which normally retire to their respective restplaces at night.

## Parasitological/immunological examinations

Each animal was bled from the ear, leg or neck vein and the blood immediately treated as follows :

1. Two drops of blood were used to make two thick smears which were air-dried and transported back to the laboratory for Giemsa staining and examination.
2. One drop was used to make a wet smear film for direct examination under a field microscope.
3. A heparinised capillary tube was filled with some of the blood for performance of the Testryp CATT.
4. Some of the blood was mixed with an anticoagulant (3.14 % trisodium citrate in distilled water) and injected into the peritoneum of young white rats.

## Rat inoculations

Either of the following samples was injected into a rat :

1. 2 ml of parasite positive blood ;
2. 2 ml of a mixture of 2-10 CATT+/T- blood from animals of the same species.
3. 2 ml of a mixture of 2-10 CATT-/T- blood from pigs and dogs.

Blood from animals of different species was never mixed. A total of 70 rats were injected with blood from a total of 239 animals. Tail blood from the rats was examined with the wet smear from day 20 after inoculation, at least twice a week.

## Testryp CATT (Smith Kline-Rit s.a. Rixensart, Belgium)

The test was done according to the instructions of the manufacturers using antigen lot L1500 exp. 01-90. In the field, the test was done on whole animal blood while in the laboratory it was a qualitative test using sera from trypanosome infected rats. Serum was collected from rats at least 6 weeks from the date of injection with primary isolate.

## Classification of trypanosomes

Thick blood smears from domestic animals and thin or thick smears from positive rats were Giemsa stained and used to determine the species of the trypanosomes.

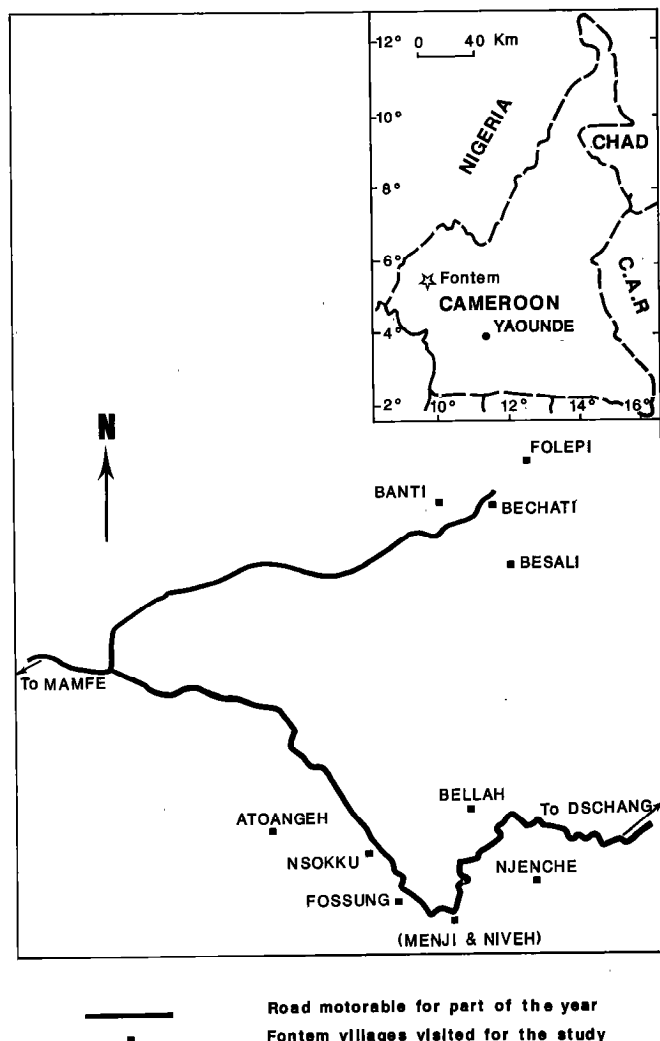


Fig. 1 : The Fontem area.

TABLE I Domestic animal trypanosomiasis in villages of the Fontem trypanosomiasis focus.

Villages	Dogs		Goats		Sheep		Pigs		Total	
	Number	T <sup>+</sup>	Number	T <sup>+</sup>	Number	T <sup>+</sup>	Number	T <sup>+</sup>	Number	T <sup>+</sup>
Bechati	16	5	36	14	0	0	4	1	56	20
Folepi	9	0	19	6	10	3	4	2	42	11
Banti	1	0	0	0	1	0	1	1	3	1
Besali	8	0	4	2	24	12	4	3	40	17
Nssuko	5	0	15	4	0	0	0	0	20	4
Atoangeh	1	0	0	0	7	0	1	0	9	0
Fossung	14	1	14	3	0	0	4	1	32	5
Menji/Nveh	5	0	19	4	33	12	3	1	60	17
Njenche	6	0	3	1	0	0	9	2	18	3
Bellah	2	1	4	0	18	7	0	0	24	8
Total	67	7	114	34	93	34	30	11	304	86
Percent.	10.4		29.8		36.6		36.7		28.1	

T<sup>+</sup> : animals with *Nanmononas* infections.

TABLE II Immunodiagnosis of domestic animal trypanosomiasis in villages of the Fontem trypanosomiasis focus.

Villages	Dogs		Goats		Sheep		Pigs		Total	
	Number	CATT <sup>+</sup>	Number	CATT <sup>+</sup>	Number	CATT <sup>+</sup>	Number	CATT <sup>+</sup>	Number	CATT <sup>+</sup>
Bechati	16	3	36	17	0	0	4	0	56	20
Folepi	9	0	19	8	10	5	4	3	42	16
Banti	1	0	0	0	1	1	1	0	3	11
Besali	8	0	4	2	24	8	4	1	40	9
Nssuko	5	0	15	9	0	0	0	0	20	9
Atoangeh	1	1	0	0	7	1	1	0	9	2
Fossung	14	3	14	9	0	0	4	1	32	13
Menji/Nveh	5	0	19	6	33	22	3	2	60	30
Njenche	6	4	3	2	0	0	9	3	18	9
Bellah	2	1	4	1	18	3	0	0	24	5
Total	67	12	114	54	93	40	30	10	304	116
Percent.	17.9		47.4		43.0		33.3		38.2	

## RESULTS

### Parasitology

Among 304 animals, 86 (28.1 %) were infected with *T. (N) congolense* (Table I). No *Trypanozoon* or *Dutonella* type trypanosomes were found. A total of 36 infected animals was detected by direct microscopy in the field while the rest was diagnosed with the thick smear or by rat infection. Sheep (34 of 93 : 36.6 %) and pigs (11 of 30 : 36.7 %) were the most frequently infected,

followed by goats (34 of 114 : 29.8 %) and dogs (7 of 67 : 10.8 %). Animals were uniformly infected in all the villages surveyed (Table I).

### Immunodiagnosis

A total of 116 out of the 304 animals (38.2 %) was CATT positive with goats (54 of 114 : 47.4 %) and sheep (40 of 93 : 43 %) having the highest positive rates, followed by pigs (10 of 30 : 33.3 %) and dogs (12 of 67 : 18 %) (Table II). Animals were also uniformly

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CATT+ throughout all the villages studied. The 30 animals that were CATT-/T+ (Table III) could be a result of recent infections detected before the development of antibodies. Since the animals were not rechecked to verify this, rats injected in the field which eventually developed parasitemia were bled and their sera tested for the presence of anti-trypanosome antibodies using the CATT. None of the 27 rat sera tested was CATT positive.

### Concordance of immunoparasitological results

The concordance of the immunoparasitological results for the animals studied was 69.4 % (Table III). This concordance between the CATT and the presence or absence of parasite was statistically significant ( $K_i^2 = 32$ ,  $df = 1$ ). The most concordant results were obtained in dogs, though they were not statistically significant ( $K_i^2 = 2.9$ ,  $df = 1$ ). Sixty-three animals were CATT+ but no parasites were detected in them reflecting perhaps the insensitivity of the parasitological tests used (Table III).

## DISCUSSION

It is known that Gambian sleeping sickness is a zoonosis since *T. b. gambiense*-like trypanosomes have been isolated from pigs, dogs, sheep and cattle (7, 9, 10, 14, 17, 19). Several surveys of the domestic animal population in different sleeping sickness foci in Cameroon have been reported (1, 2, 3, 4). In none of these studies, have trypanosomes of the sub-genus

*Trypanozoon* been reported in domestic animals. In 1986, we reported the isolation of two trypanosome stocks from domestic animals that were human serum resistant in the blood incubation infectivity test (BIIT), and therefore, probably *T. b. gambiense* (1). Later morphological and genetic studies did not confirm this since the stocks were shown to be of the *Nannomonas* sub-genus (ASONGANYI and JENNI, unpublished observation).

This report presents the results of a domestic animal survey in the Fontem sleeping sickness focus. Of the 304 animals examined, 86 were infected with *T. congolense*-like trypanosomes. No *Trypanozoon* type trypanosomes were detected. This repeated failure to find *Trypanozoon* infections in domestic animals in Cameroon suggests that *T. b. gambiense* is either absent from domestic animals in Cameroon, or present at very low parasitemia. Interestingly, examination of sera from 49 domestic animals from Mbetta, 15 km S.W. of Fontem for lytic antibodies to *T. b. gambiense* gave negative results (3), indicating the absence of *T. b. gambiense* from these animals. Considering this apparent absence of *T. b. gambiense*-type trypanosomes in domestic animals in Cameroon, it is doubtful that domestic animals play an important epidemiological role in the transmission of *T. b. gambiense* in Cameroon.

The Testryp CATT has been shown to be sensitive in the detection of trypanosome infections in pigs, sheep, goats and dogs (1, 13, 14). None of the sera collected from 27 rats at least 6 weeks after infection with *T. (N.) congolense* parasites was CATT+. Since sera from rats infected with primary isolates from CATT+ animals were also CATT-, it is possible that the Testryp CATT is not a suitable test for detecting trypanosome infections in rats.

TABLE III Concordance of immunoparasitological results in different domestic animals.

Concordance		Dogs	Goats	Sheep	Pigs	Total
	CATT+/T+ CATT-/T-	2 53	25 51	22 41	4 13	53 158
Sub Total	55 (82 %)	76 (66.7 %)	63 (67.7 %)	17 (56.7 %)	211 (64.4 %)	
Discordance	CATT+/T- CATT-/T+	10 2	29 9	18 12	6 7	63 30
	Sub Total	12 (18 %)	38 (33.3 %)	30 (32.3 %)	13 (43.3 %)	93 (30.6 %)
		$\chi^2 = 2.9$ NS	$\chi^2 = 13.3$ S	$\chi^2 = 10.3$ S	$\chi^2 = .07$ NS	$\chi^2 = 32$ S

S: significant; NS: not significant.

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ASONGANYI (T.), SUH (S.), TETUH (M.D.). Prevalence of domestic animal trypanosomiasis in the Fontem sleeping sickness focus, Cameroon. *Revue Élev. Méd. vét. Pays trop.*, 1990, 43 (1) : 69-74.

Three hundred-fourteen domestic animals : 114 goats, 93 sheep, 67 dogs and 30 pigs in the Fontem sleeping sickness focus (Cameroon) were screened for infection with trypanosomes using parasitological and serological tests. *Nannomonas* was the only sub-genus detected in the animals with a prevalence of 28.3%. The card agglutination test (Testryp CATT) for trypanosomiasis showed a positivity rate of 38.2%, indicating that it allowed a better estimation of animal trypanosomiasis. The absence of trypanosomes of the sub-genus *Trypanozoon* seems to indicate that human African trypanosomiasis is not a zoonosis in this sleeping sickness focus. *Key words* : Trypanosomiasis - Domestic animals - Immunological test - Cameroon.

ASONGANYI (T.), SUH (S.), TETUH (M.D.). Prevalencia de la tripanosomiasis de animales domésticos en el foco de la enfermedad del sueño de Fontem, en Camerún. *Revue Élev. Méd. vét. Pays trop.*, 1990, 43 (1) : 69-74.

Mediante tests serológicos y parasitológicos, los autores examinaron 304 animales domésticos, de los cuales 114 cabras, 93 ovejas, 67 perros y 30 cerdos, con el fin de detectar tripanosomiasis, en el foco de la enfermedad del sueño de Fontem (Camerún). El único sub-género detectado en los animales fue *Nannomonas*, con una prevalencia de 28,3 p. 100. El test de aglutinación en tarjeta (Testryp Catt) demostró una tasa de positividad de 38,2 p. 100, lo cual permitió una mayor estimación de la tripanosomiasis animal. La ausencia de tripanosomas del sub-género *Trypanozoon*, indica que probablemente la tripanosomiasis humana africana no representa una zoonosis en este foco de la enfermedad del sueño. *Palabras claves* : Tripanosomiasis - Animal doméstico - Test inmunológico - Camerún.

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