

A SURVEY OF THE TRYPANOSOMIASIS SITUATION AMONG DONKEYS
IN THE LOWER SABI AREA (EAST BANK) 1956-7

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1. Introduction.

Following the severe outbreaks in the early 1940's of trypanosomiasis among Chief Mahenyas cattle in 1946 all cattle were removed from the area between the Sabi River and the border of Portuguese East Africa south of a line running approximately from Chisumbanje to Beacon 103 on the border. Donkeys were not included in the removal order and quite a large number have been kept within known limits of tsetse since 1946. Many die from trypanosomiasis but the numbers are maintained by the buying of donkeys from outside the tsetse area.

In most of the area in the Lower Sabi infected by the tsetse *G.morsitans* and *G.pallidipes* the population density of the flies is low, fairly high numbers of *G.morsitans* being found only in the area of the Makossa Hills close to the Portuguese border. Previous to 1956 the only anti tsetse measures in the area were game destruction by means of native hunters and an attempted control of the carriage of tsetse by establishing fly gates across the roads at which vehicles, cyclists and pedestrians could be examined. As there was no indication that these measures were actively reclaiming any ground from the tsetse a fairly extensive bush clearing programme was initiated in 1956 on the Rupembi River system. In November 1956 it was decided to undertake a survey of the trypanosomiasis situation in donkeys in the Lower Sabi area to see what degree of infection was present and to obtain data which may be used at a future date to show the effect of the bush clearing operations in this area. The findings of this survey are presented and discussed in this report.

2. Methods.

Diagnosis of the disease was by means of blood smears taken from the ear veins of the donkeys. These smears were submitted to the Veterinary Department at Chipinga for examination.

3. Localities.

Blood smears were collected from donkeys in five fairly distinct localities of native settlement, four of which were within the known limits of tsetse distribution in the Sabi area. The four localities within the tsetse area were -

- (a) The Murongwezi and Nyamakamba Rivers area
- (b) The Mabce School area
- (c) The Makoho School area
- (d) The Chisuma R., Maaswe R. and Hippo Mine area

the fifth locality -

- (e) Mwangazi, Mariya, Zamchiya was outside the known limits of tsetse distribution but in an area where trypanosomiasis sometimes occurs amongst the cattle.

These areas are shown in the map, Appendix 1.

(a) The Murongwezi - Nyamakamba Rivers Area.

This area, which is close to the Murongwezi River and the border of Portuguese East Africa, is thought to be close to the northern limit of tsetse distribution in the Sabi Area. No tsetse have been taken in this area but several have been taken at the

Nyamakamba Fly gate - mainly on traffic coming from the vicinity of Portuguese border. Working in conjunction with Mr. Boyt of the Veterinary Department, Chipinga, blood smears were taken from 108 donkeys resident in this area on December 12th 1956. Of these 108 donkeys 5 were found to be suffering from trypanosomiasis, the infections were as follows -

T.congolense 3
T.brucci 2

Percentage of animals infected - 5%

Three of the infected animals came from the same kraal, near the Portuguese border.

(b) Mabee School Area.

The Mabee area lies approximately six miles south of the centre of the Murongwezi - Nyamakamba area. Tsetse have been caught on the Portuguese border within a short distance of this area and are caught regularly at the Makoho Fly Gate near Maroka's store where the donkeys were gathered for inspection. On November 12th 1956 blood smears were taken from 76 donkeys resident in this area. Of these 76 donkeys 16 were found to be suffering from trypanosomiasis. One donkey had a double infection of T.congolense and T.vivax. The infections were as follows -

T.congolense 8
T.vivax 3
T.brucci 6

Percentage of animals infected 21%

The owners were questioned as to the length of time the animals had been in the area. The infections of the different residential age groups are shown in Table 1 below:

| | Time Resident in the Area (Months) | | | |
|-------------------|------------------------------------|--------|---------|--------------|
| | Less than 3 | 3 to 6 | 6 to 12 | More than 12 |
| Number of Donkeys | 29 | 8 | 2 | 37 |
| T.congolense | 5 | - | - | 3 |
| T.vivax | 2 | - | - | 1 |
| T.brucci | 1 | 1 | - | 4 |
| % infected | 27.6 | 12.5 | - | 21.6 |

TABLE 1. Incidence of trypanosomiasis in Donkeys in the Mabee School Area.

(c) Makoho School Area.

During January 1957 enquiries were made concerning the

were about sixty donkeys in the area belonging to Chief Mpungu's people but it was not until March 1957 that the area was visited to take blood smears. In the meantime there has been a very high mortality amongst donkeys in the area, only 18 donkeys remaining and these latter were about to be moved out to the Mabee area. The seven owners of these 18 donkeys had originally owned 61 donkeys between them but of these 43 had died within the last four months as far as ascertainable. Many of these remaining 18 donkeys were in poor condition and examined of the blood smears revealed 7 cases of trypanosomiasis. One donkey had a double infection of *T.vivax* and *T.brucei*. The infections were as follows -

| | |
|-----------------|---|
| <i>T.brucei</i> | 6 |
| <i>T.vivax</i> | 2 |

Percentage of animals infected - 39%

A male *G.morsitans* was caught on one of the donkeys while they were being examined.

(d) Chisuma R. - Msaswe R. - Hippo Mine area.

To complete the examination of donkeys within the tsetse area on March 20th 1957 blood smears were taken from 37 donkeys resident in the area around the Chisuma River Lower Msaswe River and Hippo Mine. Tsetse are known to be resident on the Chisuma River and are regularly caught at the Msaswe Fly gate close to where the road from Makoho crosses the Msaswe River. The resident fly population is however thought to be low in this area and it is hoped that the bush clearing on the Chisuma River (a tributary of the Rupombi River) will reduce it yet further. Of these 37 donkeys 4 were found to be infected with trypanosomiasis. The infections were as follows -

| | |
|---------------------|---|
| <i>T.brucei</i> | 2 |
| <i>T.congolense</i> | 2 |

Percentage of animals infected 11%

(e) Mwangazi-Mariya-Zamchiya Area.

As an extension of this work in the Lower Sabi the Veterinary Department undertook the examination of donkeys in the Mwangazi-Mariya-Zamchiya area further to the north where cattle are also present. Out of 238 blood smears examined no positive cases of trypanosomiasis were found.

After the initial findings in the Mabee School area were reported it was suggested (vet. Dep. Rep for November 1956) that the results may be misleading as "the extent of journeys into or near known fly areas in Portuguese East Africa and further south and west in Rhodesia is unknown". This difficulty was realised at the outset but the impression was gained that few journeys were made in a southerly direction into fly and that most of the donkeys were not taken far from the area in which they lived except in the northerly and north-easterly direction. When results were known from the other areas it was found that the different percentages of animals infected in the different areas agreed very well with what is known of the fly distribution and density, the highest rates of infection being where fly is known to be quite common and the lowest rates where tsetse are found only very rarely. Indeed after the results from the Murongwezi-Nyanakamba and Mabee School areas were known it was found possible to prophesy the percentage of infection in the other areas with moderate accuracy from a knowledge of the comparative density of tsetse in these other areas. The results obtained in the different areas are summarised below in Table 2.

| Area | Number of Smears | % of animals infected | T. brucei | T. congolense | T. vivax | T. congolense & T. vivax | T. brucei & T. vivax |
|---------------------------|------------------|-----------------------|-----------|---------------|----------|--------------------------|----------------------|
| Murongwezi-Nyamakamba R. | 108 | 5% | 2 | 3 | - | - | - |
| Mabce School | 76 | 21% | 6 | 7 | 2 | 1 | - |
| Makoho School | 18 | 39% | 5 | - | 1 | - | 1 |
| Chisuma-Msaswe-Hippo Mine | 37 | 11% | 2 | 2 | - | - | - |
| Mwangazi-Zamchiya | 238 | nil | - | - | - | - | - |
| | | | 15 | 12 | 3 | 1 | 1 |

TABLE 2

4. The Infections.

| | Total Number | % of total infections. |
|---------------|--------------|------------------------|
| T. brucei | 16 | 47% |
| T. congolense | 13 | 38% |
| T. vivax | 5 | 15% |

TABLE 3 The infections.

Although the numbers of infections found are too small for a detailed analysis some interesting matters are brought to mind on Examining Tables 1 to 3 above, namely -

1. Infections of T. brucei and T. congolense apparently occur with about the same frequency but infections of T. vivax are much fewer.

This difference may be more apparent than real because it is known that there may be a paucity of T. vivax in the peripheral circulation of an animal suffering from a chronic infection and for this reason diagnosis by blood smears is less efficient in the case of T. vivax than in the other two infections. Examination of lymph gland smears is judged to be more reliable for the diagnosis of the disease due to T. vivax. I have no information as to the relative efficiency of diagnosis by blood smears of T. brucei and T. congolense. According to various sources the diseases placed in order of decreasing virulence in the donkey are T. brucei, T. congolense and T. vivax but there appears to be considerable vari-

2. Nothing is known about the infection rates of the tsetse in the area in which the donkeys were examined and their rarity would make any investigation very difficult. However Rennison (1956) quotes the following figures -

| | % T.vivax | T.congolense | T.brucei |
|--|-----------|--------------|----------|
| Duke 1923 G.m.morsitans | 6.5 | 1.9 | 0.13 |
| Lloyd & Johnson 1924 G. m.submorsitans | 18.8 | 8.2 | 0.4 |
| Vanderplank 1947 G.pallidipes & G. swynnertonii. | 2.1 | 2.2 | 0.1 |

Figures for other species of Glossina are also quoted and in all these estimates the percentages of T.brucei are always much lower than those of the other two infections. Infections of T.vivax are usually much the commonest.

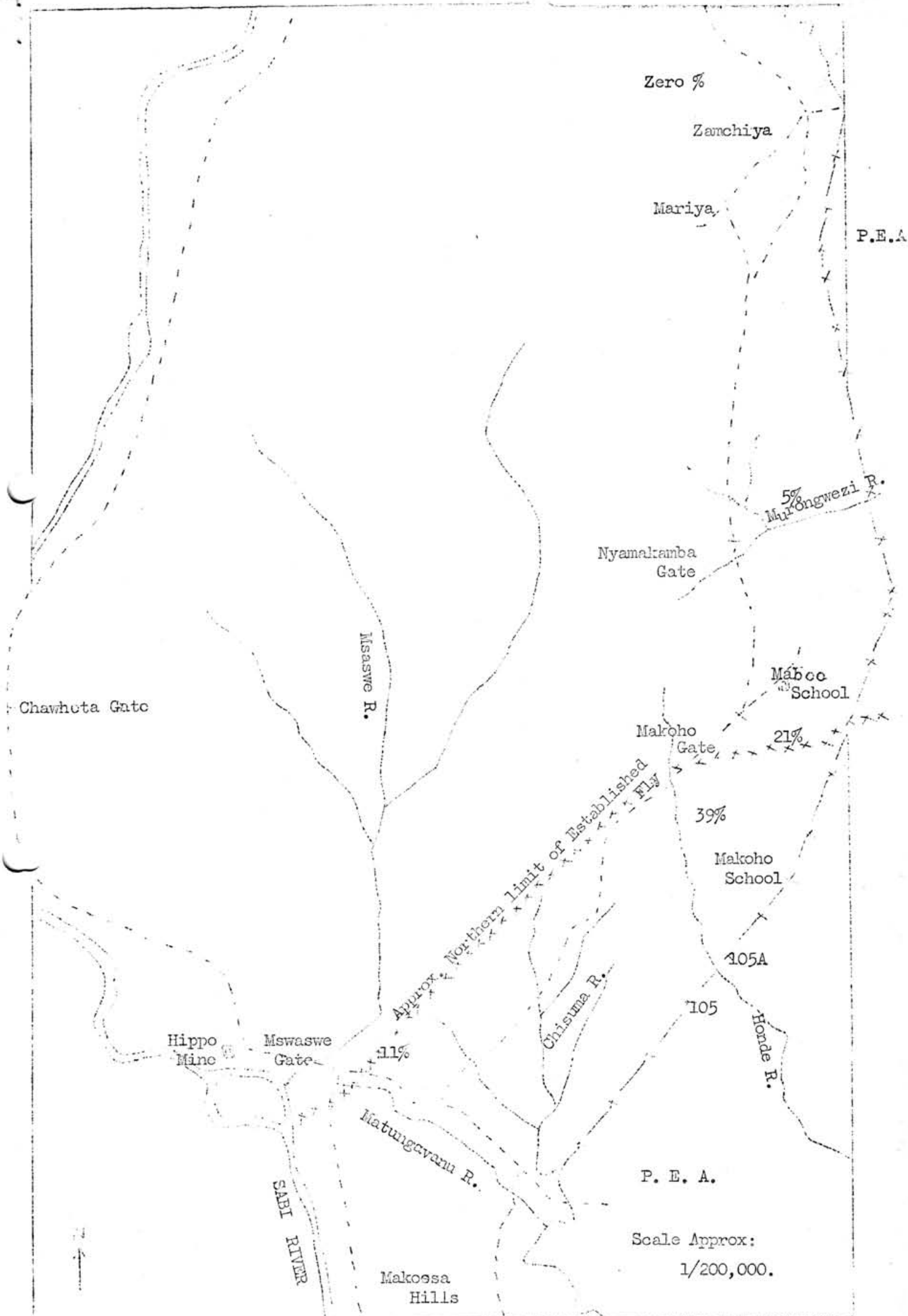
If therefore, in the absence of local information, we presume that the infection rates of the tsetse in the Sabi are not totally dissimilar to elsewhere we have a complete reversal of the percentages of the various infections in donkeys compared with that in the tsetse and another interesting point arises - if the susceptibility of donkeys to the three infections is T.brucei, more than T.congolense more than T.vivax as is indicated superficially by the figures obtained then if healthy donkeys are introduced into an area of very low fly density in which the order of infections of the tsetse are T.vivax more numerous than T.congolense which is much more numerous than T.brucei then one would expect that in the donkeys having been a short time in the area T.vivax and T.congolense infections would predominate while in the donkeys which had been in the area for a longer period T.brucei infections would dominate. That this may be true at least in the case of T.congolense and T.brucei is suggested by Table 1, although the small numbers involved do not allow of too great a certainty. The small number of T.vivax infections may be due to other reasons as mentioned above.

3. In these circumstances it is perhaps a little surprising that mixed infections are not more common. This may perhaps be due to competition or antagonism between the different species of Trypanosome as mentioned by Hoare (1956) but much further work would have to be done to demonstrate this with any certainty.

I should like to thank Mr. R.M. Mowbray and Mr. J. Janke for their help in this work and special thanks are due to the staff of the Veterinary Department at Chipinga on whom fell all the labour of examining the blood smears.

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Zero %

Zanchiya

Mariya

P.E.A.

5%
Mabungwezi R.

Nyamakranba
Gate

Maboco
School

Chawheta Gate

Mswaswe R.

Makoho
Gate

21%

Approx. Northern Limit of Established
Fly

39%

Makoho
School

105A

Hippo
Mine

Mswaswe
Gate

11%

Chisuma R.

105

Horde R.

Matungavana R.

P. E. A.



SABI RIVER

Makoesa
Hills

Scale Approx:
1/200,000.