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(TSETSE AND TRYPANOSOMIASIS CONTROL BRANCH).

Trypanosome infections in *G. morsitans*.

A summary of data collected during 1961 and 1962.

Collections were made during 1961 and 1962 of the heads of *G. morsitans* from various areas of Rhodesia to record the extent to which they carried infections of trypanosomes.

Infections were determined by the presence of trypanosomes in stained preparations of the labra.

It was found to be far more practical in making collections to remove the heads of the tsetse flies, preserve them in 75% methyl alcohol, and to despatch them to Salisbury for examination of the mouthparts than to examine them fresh in the field.

It was necessary to compare the mean infection rate of the fresh and the preserved heads in order to determine the extent of bias introduced by this treatment.

1. Infections from freshly killed flies and from severed and preserved heads.

Material was collected in June, 1961 from Chitaki and Chikwira, Urungwe District.

Infections are expressed as percentages and <sup>an</sup> arcsin transformation has been used to derive means and deviations of limits.

|        |                    |       |        |          |
|--------|--------------------|-------|--------|----------|
| Means. | Fresh material     | 19.2% | + 0.7% | p = 0.05 |
|        | Preserved material | 16.5% | + 0.9% | p = 0.05 |

For the difference between means ( $t = 0.77$ , not significant at  $p = 0.1$  level)

Fresh material gave a higher means infection rate than preserved heads, but the difference between means was not significant.

For subsequent investigations preserved heads were used exclusively.

2. Samples were collected over several months from various areas, and the percentage proboscis infections recorded. The following table gives the means and deviations of limits :-

| Source              | Mean                      | Period                        |
|---------------------|---------------------------|-------------------------------|
| Kenyandavu          | 16,1% $\pm$ 0,3% p = 0,05 | Nov. 1961 to Nov. 1962 n = 11 |
| Malimasimbi         | 16,5% $\pm$ 0,3% p = 0,05 | Nov. 1961 to Nov. 1962 n = 9  |
| Sefula Gate         | 8,5% $\pm$ 1,8% p = 0,05  | Nov. 1961 to Nov. 1962 n = 10 |
| Lusulu              | 12,6% $\pm$ 0,5% p = 0,05 | Nov. 1961 to Jun. 1962 n = 7  |
| Sanyati             | 11,8% $\pm$ 0,3% p = 0,05 | Jan. 1962 to Dec. 1962 n = 10 |
| Urungwe North       | 19,0% $\pm$ 0,3% p = 0,05 | Oct. 1961 to Nov. 1962 n = 10 |
| Inyanga North/Mtoko | 11,8% $\pm$ 0,6% p = 0,05 | Oct. 1961 to Oct. 1962 n = 9  |

For the period under investigation, samples collected from Urungwe North showed a higher infection rate than those from Sanyati, ( $p > 0.02$ ) and from Inyanga North/Mtoko, ( $p > 0.05$ ).

Samples from Kenyandavu and Malimasimbi combined showed a higher infection rate than those from Sanyati, ( $p > 0,05$ ).

3. (a) Captures of G. morsitans males and females were made at Lusulu during mornings and afternoons of June, 1961.

Proboscis infection rates. (Arcsin transformation)

|         | A.M.  | P.M.  | TOTALS |
|---------|-------|-------|--------|
| Males   | 22,8° | 25,7° | 48,5°  |
| Females | 21,4° | 26,6° | 48,0°  |
| TOTALS  | 44,2° | 52,3° | 96,5°  |

$\chi^2 = 0,001$  not significant at 0,1 level.

There was no significant difference between the proboscis infection rates of males and females caught either in the morning or the afternoon.

(b) Male G. morsitans were caught during the mornings and during the afternoons of June, 1961 at Rekomitjie, and the proboscis infections recorded.

The percentage infections were :-

|      |       |                      |
|------|-------|----------------------|
| A.M. | 16,0% | Transforms to 23,6°. |
| P.M. | 20,0% | Transforms to 26,6°. |

$\chi^2 = 0,09$ . There was no significant difference between the infection rates of male G. morsitans caught in the mornings and afternoons.

4. (a) The proboscis infection rates of male and female G. morsitans were recorded separately in some months during 1962, in Sebungwe and Urungwe. The total in each

category were used in these contingency tables :-

Sebungwe

|        | Infected | Clean | Totals |
|--------|----------|-------|--------|
| Male   | 96       | 423   | 519    |
| Female | 20       | 157   | 177    |
| Totals | 116      | 580   | 696    |

$$x^2 = 4,42, \quad p > 0,05.$$

Males showed a higher proboscis infection rate (18,5%) than females (11,3%)  
 $p > 0,05$ .

Urungwe. North

|        | Infected | Clean | Totals |
|--------|----------|-------|--------|
| Male   | 364      | 1619  | 1983   |
| Female | 26       | 211   | 237    |
| Totals | 390      | 1830  | 2220   |

$$x^2 = 7,47 \quad p > 0.01$$

Males (18,4%) showed a significantly higher proboscis infection rate than females (11,0%),  $p > 0.01$ .

(b) The mean monthly infection rates of males and females were compared for corresponding months. In Urungwe North, infections were recorded for flies caught from August to November, 1962, inclusive.

The means of the mean monthly infection rate, (using an arcsin transformation) were :

|               |                         |            |
|---------------|-------------------------|------------|
| Urungwe North | Males 16,7% $\pm$ 2,4%  | $p = 0,05$ |
|               | Females 8,6% $\pm$ 3,6% | $p = 0,05$ |

Males showed a higher mean infection rate per month, but there were too few observations to detect a difference at the  $p = 0,05$  level.

Similar observations from Sebungwe for May to August, and October 1962 gave :-

|          |                        |            |
|----------|------------------------|------------|
| Sebungwe | Males 18,4% $\pm$ 0,7% | $p = 0,05$ |
|----------|------------------------|------------|

Females 11,0%  $\pm$  0,4% p = 0,05

Males showed a higher infection rate than females, the difference being significant at the p = 0,01 level ( $t = 3,57$ ).

5. Seasonal fluctuation in infection rate.

The percentage of infected flies of the totals examined each month for all areas are shown in Fig. 1.

Infections in G. morsitans appear to rise to a maximum during the cool dry season. The low infection rate in July seems anomalous in this context. At this distance from the event, no explanation can be offered.

6. The relative incidence of Trypanosoma spp. in proboscis infections

It was asserted by the investigators who examined the mouthparts of tsetse that the species of trypanosomes present could be reliably identified. The recent publication (1972) of Hoare's definitive work on the classification of trypanosomes would suggest that in 1961 and 1962 the identification of epimastigote forms from the mouthparts of tsetse was uncertain except by serious trypanosome taxonomists. However, the following analysis is based on the data provided in the records.

Total identified infections 335, of which 18,8% were recorded as T. congolense and 81,2% as T. vivax. Infections were predominantly recorded as T. vivax ( $\chi^2 = 65,2$  p > 0,001).

Of 58 identified infections in male G. morsitans, 8,6% were recorded as T. congolense and 91,4% as T. vivax.

Of 8 infections identified in female G. morsitans 12,5% were recorded as T. congolense and 87,5% as T. vivax.

7. A collection of 52 G. morsitans from Mateswa River area, Sabi/Lundi in September 1960 yielded a 46,1% infection rate, and one of 130 from the same area in August, 1961 gave 44,6% infection.

These fragmentary and somewhat vague results of what was a lengthy and arduous investigation emphasize the futility of haphazard collections of data in the hope that one day they might produce reliable information. The collections of scientific data should be organised in a way that is conducive to analysis by reliable statistical methods, and should be carried out systematically and consistently for the period of the investigation. There should be a minimum of delay between the compilation of the data and the analysis of the results. Moreover, the technique of measurement and recording must be reliable and beyond reproach. After well over 5 000 flies had been measured under a microscope and the thoracic area recorded over a period of 26 months, the following observation appeared in the Laboratory Report for January 1963: "It must be noted that a recalibration of the eyepiece micrometer has resulted in estimates of size which are smaller than those recorded in previous months. An adjustment to previous estimates of size will be submitted next month".

Before the adjustment was made, the technician left Government Service. Consequently all previous measurements are highly suspect, and do not warrant critical examination.

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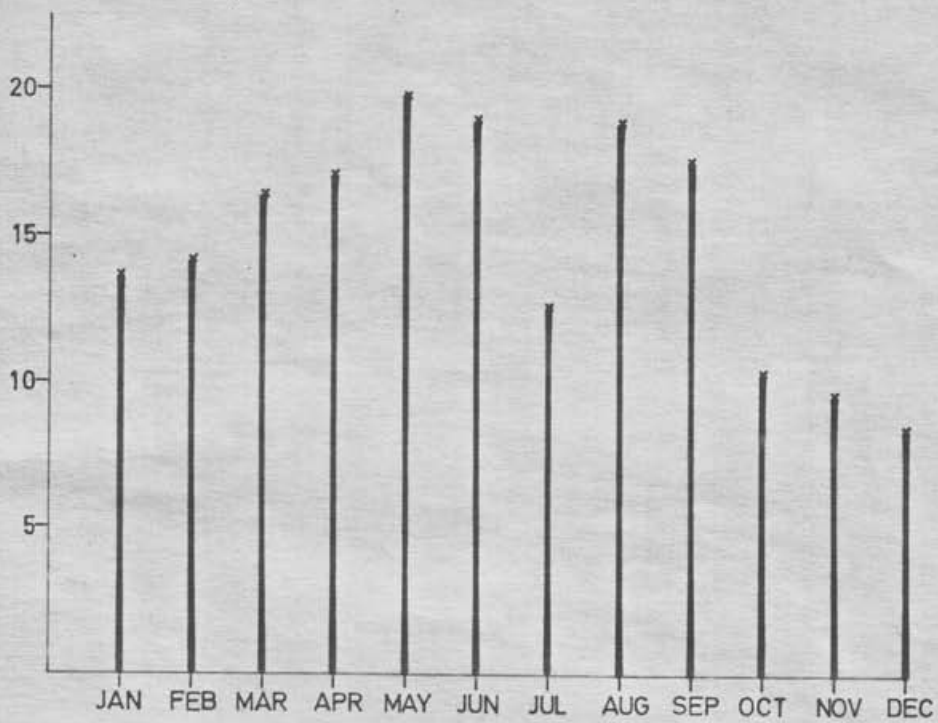


Fig 1. Percentage proboscis infections in *G. morsitans* from several areas of Rhodesia, 1961-1962.