

TSETSE AND TRYPANOSOMIASIS CONTROL BRANCH,
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GFC/VED

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(TSETSE AND TRYPANOSOMIASIS CONTROL).

Noted
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VARIATIONS IN THE THORACIC AREA OF *G. MORSITANS*.

A SUMMARY OF DATA COMPILED DURING 1960, 1961 AND 1962.

Between November 1960 and November 1962 collections were made of male and female *G. morsitans* from several areas of Rhodesia, preserved in either van Emden's fluid or 75% methyl alcohol and submitted to Salisbury for measurement of the "thoracic area" as defined by Bursell, (1960). He had established that a close linear relationship existed between the residual dry weight of dry, pinned *G. morsitans* ($r = 0.9671$ for females and 0.8815 for males) and the area represented by the product of the distance between the points of insertion of the largest of the lateral pronotal spines and of the distance between the base of the scutellar spines and the mesonotal suture". These dimensions were measured under a low power objective, with a micrometer eyepiece.

These data are unfortunately, seriously prejudiced. The investigation continued for 25 months, and well over 5 000 flies were examined, after which it was discovered that the micrometer eyepiece needed to be recalibrated and that all measurements had been overestimated, presumably by some small ~~mm~~ but, probably, constant factor.

The data relate to measurements taken from flies that had been preserved for one or two months. No attempt was made to estimate the effects of preservation on the thoracic area, and it is possible that the relationship between thoracic area and residual dry weight is not the same as for dry material.

Furthermore, the data have not been obtained in a consistent manner. Only in the case of collections of male flies from Urungwe North has there been a complete 12 month period represented. Nevertheless, an attempt has been made to analyse the data as it exists, while the absolute sizes of the thoracic areas are in error, comparisons and relative sizes may well be valid.

1. The relative sizes of male and female *G. morsitans*

The general mean for the thoracic area of all female *G. morsitans* measured (the mean of all monthly means) was $7.49 \text{ mm}^2 \pm 0.17 \text{ mm}^2$, $p = 0.05$, and for males, $6.27 \text{ mm}^2 \pm 0.15 \text{ mm}^2$, $p = 0.05$. The difference between means was significant at the 0.1% level. The mean thoracic area for females was 19.5% larger than for males, Bursell, (1960) states that "females are about 13% bigger than males of the same residual dry weight".

2. Seasonal variation

Gaps in the seasonal records from one area have been overlapped by records from others so that some indication of seasonal variation in size may be obtained, Fig. 1.

<u>Season</u>	<u>Thoracic area</u> (p = 0.05)	
	<u>Male</u>	<u>Female</u>
Wet (Dec. - Feb.)	5.69 ± 0.16 mm ²	6.80 ± 0.27 mm ²
Early dry (Mar. - May)	6.43 ± 0.19 mm ²	7.67 ± 0.27 mm ²
Cool (Jun. - Aug.)	6.89 ± 0.30 mm ²	7.88 ± 0.38 mm ²
Hot (Sep. - Nov.)	6.11 ± 0.28 mm ²	7.36 ± 0.33 mm ²

The increase in thoracic area between the Wet and Cool seasons was 21,1% for males and 15,9% for females.

The differences between means for the different seasons have been compared :-

t values of the differences between means

* = p = 0.05

** = p = 0.01

*** = p = 0.001

Males

	Wet	Early dry	Cool
Early dry	*** 6.06	Early dry	
Cool	*** 7.09	** 2,55	Cool ***
Hot	** 2.70	1.89	3.83

Males were smallest in the wet season, ~~probably~~ smaller in the early dry season than in the cool season, and smaller in the hot season than in the cool.

Females

	Wet	Early dry	Cool
Early dry	*** 4.63	Early dry	
Cool	*** 4.03	0.87	Cool *
Hot	2.32	1.43	2.113

Females were smaller in the wet season than in the early dry season and

cool season and were probably also smaller than in the hot season. They were probably smaller in the hot season than in the cool.

Bursell, (loc. cit) states that the relation between thoracic area and weight of the newly emerged fly is affected by the temperature at which the pupal stage is passed; above approximately 25°C the surface area of flies of any given residual dry weight decreases quite sharply, so that puparia of a given weight produce smaller but relatively heavier flies at 30° C than at 25°C. The appearance of larger flies in the cool season, might thus be expected.

3. Relative sizes of flies from various areas

Sizes of flies from various areas have been compared, subject to the objection that samples from these areas do not always refer to corresponding months and therefore do not consistently reflect seasonal changes.

Thoracic area of *G. morsitans* (p = 0.05)

<u>Males</u>		<u>Females</u>	
Sanyati	6.63 ± 0.34	Sebungwe	7.79 ± 0.32
Sebungwe	6.45 ± 0.24	Sanyati	7.63 ± 0.48
Urungwe	6.26 ± 0.34	Urungwe	7.50 ± 0.48
Inyanga North	6.0 ± 0.29	Inyanga North	7.16 ± 0.50
Rekomitjie	5.85 ± 0.26	Rekomitjie	7.00 ± 0.32

There were too few samples from Sabi Lundi to warrant inclusion

Comparison of means : t values

<u>Males</u>				
	Sanyati	Sebungwe	Urungwe	Inyanga North
Sebungwe	0.72 **			
Urungwe	2.76 **	1.32		
Inyanga North	3.20 ***	1.96 **	1.04	
Rekomitjie	4.09	2.69 **	1.67	0.80 Rekomitjie

<u>Females</u>				
	Sanyati	Sebungwe	Urungwe	Inyanga North
Sebungwe	0.47			
Urungwe	0.38	1.04		
Inyanga North	1.56 *	2.04 *	1.05	
Rekomitjie	2.59 *	2.86 **	1.77	0.61 Rekomitjie

The largest males came from Sanyati and were significantly larger than those from Urungwe, Inyanga North and Rekomitjie, which were the smallest. (The few samples from Sabi Lundi were actually smallest). Males from Sebungwe were significantly larger than those from Rekomitjie.

The largest females came from Sebungwe. Females from Sanyati were significantly larger than those from Rekomitjie, and females from Sebungwe were significantly larger than those from Inyanga North and Rekomitjie. The few samples from Sabi Lundi were the smallest.

4. Seasonal variation in Size

The only unbroken 12-month series of samples was composed of male flies from Urungwe North, Fig. 2.

The thoracic area increased in size from January to June and declined steadily to November. The small sizes recorded in July appear anomalous.

For what it is worth, since few records were made in some months, the mean sizes for each month are shown in Fig. 3.

Reference

- Bursell, E. (1960) The measurement of size in tsetse flies (*Glossina*)
Bull. ent. Res. 51 33-37.

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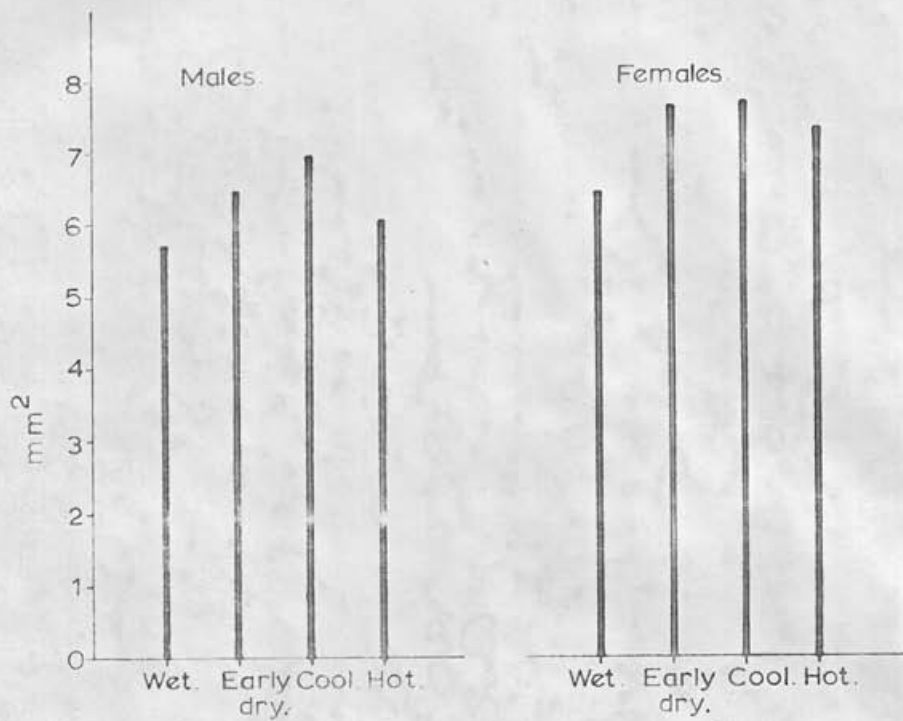


Fig.1 Seasonal mean thoracic area of male and female *G. morsitans* 1961-1962.

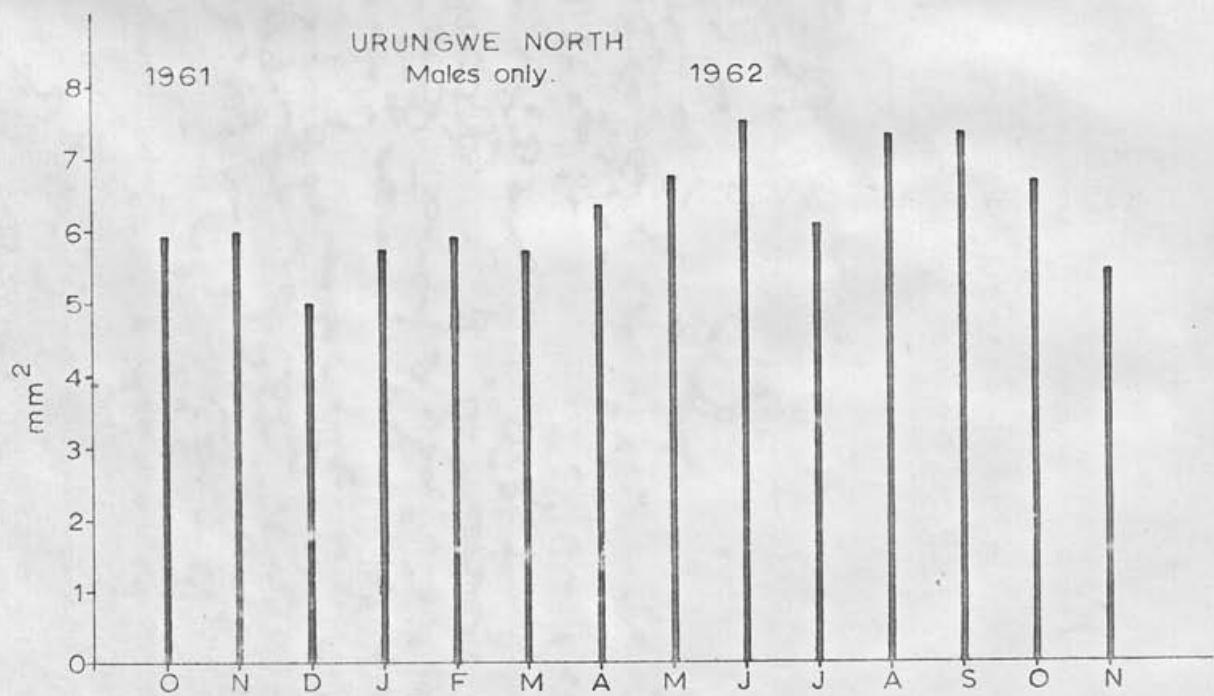


Fig.2 Monthly mean thoracic area of male *G. morsitans* from Urungwe North, 1961-1962.

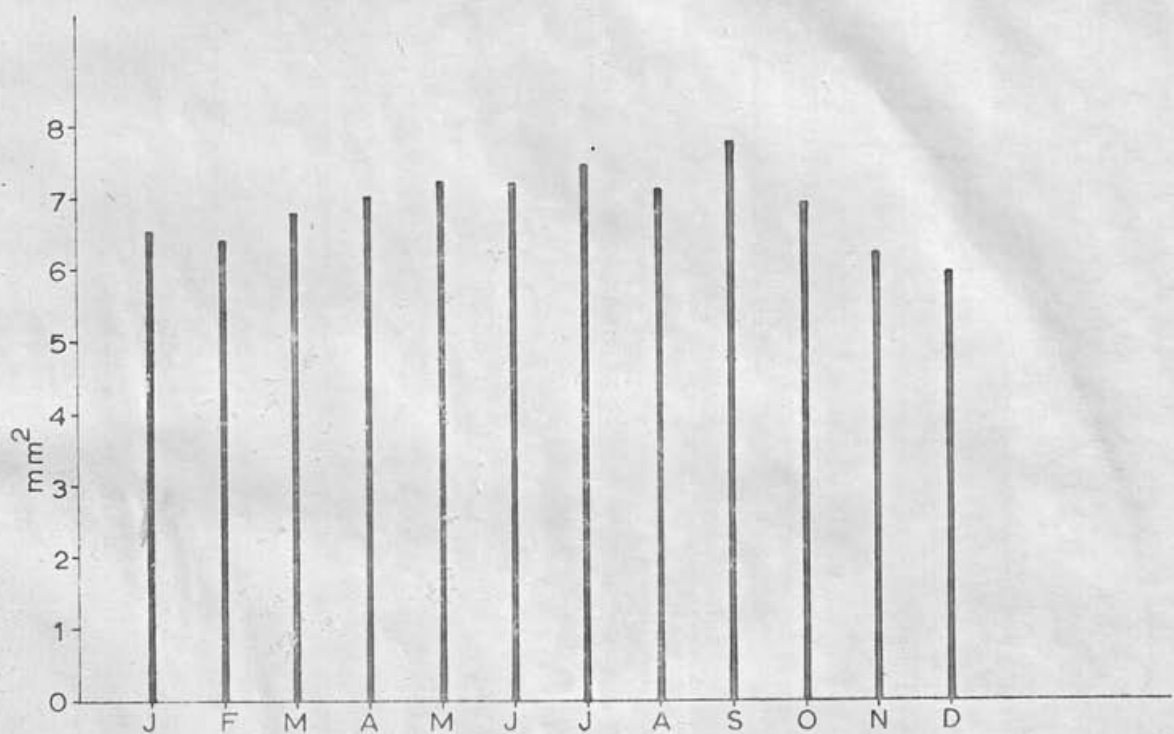


Fig.3 Monthly mean of thoracic area, male and female *G. morsitans* from all areas, 1960 - 1962.