

FIELD OBSERVATIONS ON LIZARDS  
(SCINCIDAE : MABUYA)  
IN THE  
KALAHARI GEMSBOK NATIONAL PARK

by

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INTRODUCTION

Among the commonest and most conspicuous reptiles in the Kalahari Gemsbok National Park are the skinks, found in large numbers on *Acacia* trees in the Auob and Nossob River courses. When a survey of reptile life in the Park was made in 1956 by Dr. FitzSimons and the writer (1958), these skinks were classified as *Mabuya striata*, but it was noted with interest that two distinct forms occurred side by side, one predominantly black (Figure 1), the other clearly striped (Figure 2). In some places, both kinds of skink occupied the same trees, utilising precisely the same ecological niche.

In the course of two visits to the Kalahari Gemsbok National Park during May 1959 and September 1960, special attention was given to the skink populations. A long series of specimens was collected from selected localities which, it was hoped, would throw light on the taxonomic relationship between the two forms, the black and the striped. Specimens were taken at regular intervals along the road between Vanzylsrus and Askham, also along the Nossob River for 60 miles above its junction with the Auob, as well as along the Auob course between Twee Rivieren and Mata Mata. A total of 187 specimens was obtained and these have been examined critically by Dr. D. G. Broadley who concludes that two sympatric species are involved: *Mabuya striata sparsa*, the black skink; *Mabuya spilogaster*, the striped one.

In the course of collecting these specimens, body temperature measurements were taken on as many lizards as possible. A short while previously, the writer had assisted Professor R. C. Stebbins with body temperature measurements on various species of lizards in the Kalahari Gemsbok National Park. Results were published in Koedoe (Stebbins, 1961) and included data on a sample of 82 skinks of the *Mabuya striata* group. In the present study, measurements were taken on a further 83 *M. s. sparsa* and 12 *M. spilogaster* skinks. Results will be discussed shortly.

It was very noticeable that most of the skinks live on *Acacia* trees in small groups and that they descend to the ground to feed, but return immediately to their trees when disturbed. One of the objectives of the present study was to investigate the structure of the social groups, each of which occupied a tree, and to try to determine whether there was territorial defence of the feeding ground surrounding the tree's base.

## MEASUREMENTS OF BODY TEMPERATURE

Body temperatures of the skinks were measured rectally, using a quick-recording Schulteis thermometer of the kind designed by Dr. C. M. Bogert. Such measurements were made immediately after the lizards were killed with .22 dustshot. If, for some reason, a delay occurred in the removal of a lizard from a tree, the body temperature was no longer considered valid.

Measurements were made on 83 specimens of *M. striata sparsa* of which 16 were sub-adult (for the purposes of this study, a sub-adult lizard is defined as one with a snout-vent length of less than 60 mm.). Figures for this sample are listed in Tables 1(a) and (b).

Temperature measurements were taken on only 12 individuals of *M. spilogaster* (Table 2) as these lizards were far less common than the other species in the study area.

Considering records for *M. striata sparsa* first, the mean activity temperature for 16 sub-adult specimens was 33.5°C, which for 67 adult lizards it was 33.8°C. For the total sample of 83 individuals the mean activity temperature is 33.7°C, the observed range of temperatures being plotted in Figure 3. This mean figure of 33.7°C is slightly lower than the one obtained by Stebbins (1961) on 82 lizards of the same species at Twee Rivieren. However by combining the data for the two samples, a mean figure of 34.5°C results, based on 165 lizards all from the Twee Rivieren area. This very probably gives a valid indication of the preferred activity temperature for *M. striata sparsa* under the current conditions in the southern Kalahari. It is appreciably lower than the figures quoted by Stebbins (1961) for sand-living lacertids in the same area:

<i>Scaptira suborbitalis</i> (18 specimens) .....	38.8°C
<i>Eremias lineo-ocellata</i> (16 specimens) .....	38.4°C
<i>Eremias namaquensis</i> (10 specimens) .....	38.5°C

The mean figure of 32.8°C for 12 specimens of *M. spilogaster* suggests that this species may select a slightly lower preferred activity temperature than *M. striata sparsa* does. However a larger sample is required before the suggestion can be substantiated.

## STUDIES ON GROUP STRUCTURE OF *MABUYA STRIATA SPARSA*

In the Kalahari Gemsbok National Park, most of the *M. striata* skinks live on trees, particularly the large *Acacia giraffae* which are concentrated in the dry courses of the Auob and Nossob Rivers (see Figure 4). Smaller numbers of skinks may be found on stone walls, buildings and fallen logs.

Field observations on the lizards living in the trees close to Auob-Nossob confluence showed that these skinks take refuge in holes in the trunks and under the bark, but that they forage for food on the ground over an area with a radius of perhaps 20-30 yards from the base of the tree. Observations suggested that, when disturbed, the lizards invariably returned to the same tree, perhaps even to the same part of it, and that the tree did in fact probably constitute the centre of their territory.

Initial observation gave the impression that one tree was occupied by a pair of adult skinks, and a number of sub-adults. It seemed likely that the adult male, in breeding condition, was defending the tree territorially against other intruding males. To test the theory, use was made of a series of skinks collected by Prof. Stebbins and the writer in February, 1959. At that time four trees were selected, all of them in the broad confluence of the Auob and Nossob Rivers. Over a period of four days, repeated visits were made to the trees and, on each occasion, every visible lizard was collected with .22 dustshot. After the end of the second day, no more skinks were to be seen during any of the ensuing inspections. Each specimen was measured and sexed, while the condition of the gonads was noted. Males were said to be in 'Breeding condition' if the testes were appreciably enlarged; females if they contained well-developed ova or embryos. Results are given in Table 3.

It was immediately apparent that the situation was far more complicated than originally anticipated. Tree 1, initially thought to house perhaps a breeding pair and various juveniles, was found to shelter 15 skinks, including 2 breeding males and 3 breeding females. Tree 2, a comparatively small *Acacia*, yielded 7 skinks, including 3 males and 2 females in breeding condition. The situation was even more confused in the case of Trees 3 and 4, both old and spreading *Acacias* containing social weaver nests. A large branch of Tree 3 had collapsed under the weight of a nest and this proved to be a suitable refuge, the whole tree yielding 28 lizards. Tree 4 produced a total of 23.

The sex and size structure of the four groups of skinks is shown diagrammatically in Figure 5. It will be seen that no clear pattern emerges, except that there was a variety of adult lizards on each tree, either in breeding or non-breeding condition, accompanied by sub-adults not yet sexually mature. At this stage it is not clear whether the groups from each tree do, in fact, form valid social entities, or whether they are a

heterogeneous collection of separate individuals thrown together through their necessity for shelter.

The question of social organisation of *Mabuya* groups making use of *Acacia* trees in the Kalahari Gemsbok National Park, warrants further study. Direct observation on the live lizards, once they have been captured and suitably marked, should produce some interesting results.

#### ACKNOWLEDGEMENTS

I am much indebted to the authorities of the National Parks Board for allowing this work to be done in the Kalahari Gemsbok National Park and to Mr. C. F. le Riche for his kind co-operation at Twee Rivieren. I would like to express my appreciation to Dr. V. FitzSimons, Prof. R. C. Stebbins, and Dr. R. F. Ewer for help and encouragement in the field; to Dr. D. G. Broadley for his taxonomic analysis of the material collected and to Mr. W. D. Haacke for kindly providing photographs.

#### REFERENCES

- FITZSIMONS, V. and BRAIN, C. K. 1958. A short account of the reptiles of the Kalahari Gemsbok National Park. *Koedoe* 1 : 99-104.
- STEBBINS, R. C. 1961. Body temperature studies in South African lizards. *Koedoe* 4 : 54-67.

TABLE 1(a)

<i>Field No.</i>	<i>Date</i>	<i>Time</i>	<i>Body Temp. °C</i>
85	1.5.59	10.50 a.m.	29.2
86	1.5.59	10.53 a.m.	30.7
87	1.5.59	10.56 a.m.	31.6
90	1.5.59	11.24 a.m.	26.8
508	13.9.60	2.26 p.m.	37.2
533	14.9.60	3.00 p.m.	35.8
534	14.9.60	3.07 p.m.	34.2
542	14.9.60	3.35 p.m.	36.3
543	14.9.60	3.35 p.m.	35.5
547	14.9.60	3.50 p.m.	35.4
550	15.9.60	11.54 a.m.	33.2
551	15.9.60	11.54 a.m.	33.0
554	15.9.60	12.15 p.m.	33.9
564	15.9.60	3.21 p.m.	35.2
565	15.9.60	3.34 p.m.	34.5
569	15.9.60	3.48 p.m.	33.8

TABLE 1(b)

Field No.	Date	Time	Body Temp. °C	Field No.	Date	Time	Body Temp. °C
80	30.4.59	4.00 p.m.	28.4	521	13.9.60	4.43 p.m.	35.8
82	1.5.59	10.40 a.m.	31.2	522	13.9.60	4.43 p.m.	36.0
83	1.5.59	10.43 a.m.	26.2	536	14.9.60	3.20 p.m.	37.4
88	1.5.59	11.15 a.m.	34.0	537	14.9.60	3.20 p.m.	36.6
89	1.5.59	11.17 a.m.	30.6	541	14.9.60	3.28 p.m.	36.3
91	1.5.59	11.30 a.m.	29.6	545	14.9.60	3.42 p.m.	36.9
92	1.5.59	12.55 p.m.	36.4	547	14.9.60	3.50 p.m.	33.9
93	1.5.59	1.00 p.m.	33.1	548	15.9.60	11.30 a.m.	34.2
94	1.5.59	1.17 p.m.	32.8	549	15.9.60	11.50 a.m.	35.2
97	1.5.59	1.43 p.m.	31.0	553	15.9.60	12.11 p.m.	37.2
98	1.5.59	2.30 p.m.	31.9	556	15.9.60	12.25 p.m.	36.2
102	2.5.59	4.17 p.m.	29.4	557	15.9.60	12.33 p.m.	35.3
103	2.5.59	4.35 p.m.	30.5	560	15.9.60	3.07 p.m.	35.6
104	2.5.59	4.40 p.m.	29.4	561	15.9.60	3.07 p.m.	36.0
105	2.5.59	4.45 p.m.	28.1	566	15.9.60	3.38 p.m.	34.5
106	2.5.59	4.55 p.m.	27.2	567	15.9.60	3.45 p.m.	34.0
329	27.5.59	12.37 p.m.	32.8	568	15.9.60	3.45 p.m.	32.4
489	13.9.60	11.20 a.m.	34.9	—	17.9.60	11.33 a.m.	35.2
490	13.9.60	11.25 a.m.	35.2	—	17.9.60	11.40 a.m.	32.5
491	13.9.60	11.34 a.m.	35.5	—	17.9.60	11.45 a.m.	29.5
493	13.9.60	11.50 a.m.	35.8	—	17.9.60	11.56 a.m.	35.4
494	13.9.60	11.55 a.m.	35.2	—	17.9.60	12 noon	31.9
497	13.9.60	12.10 p.m.	35.6	—	17.9.60	12.15 p.m.	33.4
498	13.9.60	12.23 p.m.	34.0	—	17.9.60	1.53 p.m.	36.8
501	13.9.60	1.07 p.m.	34.8	—	17.9.60	2.13 p.m.	34.9
503	13.9.60	1.26 p.m.	35.4	—	17.9.60	2.20 p.m.	34.5
509	13.9.60	2.46 p.m.	37.2	—	20.9.60	9.40 a.m.	29.5
510	13.9.60	2.50 p.m.	37.5	—	20.9.60	9.45 a.m.	33.6
511	13.9.60	2.57 p.m.	37.8	—	20.9.60	11.07 a.m.	33.1
513	13.9.60	3.05 p.m.	37.0	—	20.9.60	11.17 a.m.	32.6
514	13.9.60	3.07 p.m.	35.2	—	20.9.60	11.22 a.m.	33.8
518	13.9.60	4.13 p.m.	36.2	—	20.9.60	11.27 a.m.	32.1
519	13.9.60	4.30 p.m.	36.2	—	20.9.60	11.46 a.m.	33.1
520	13.9.60	4.37 p.m.	34.5				

TABLE 2

Field No.	Date	Time	Body Temp. °C
<b>SUB-ADULTS</b>			
484	13.9.60	9.11 a.m.	31.5
486	13.9.60	10.00 a.m.	32.2
487	13.9.60	10.09 a.m.	30.4
500	13.9.60	12.55 p.m.	36.5
<b>ADULTS</b>			
485	13.9.60	9.30 a.m.	33.6
492	13.9.60	11.43 a.m.	35.3
499	13.9.60	12.50 p.m.	34.4
—	20.9.60	11.00 a.m.	31.8
—	20.9.60	11.11 a.m.	30.4
—	20.9.60	11.20 a.m.	32.8
—	20.9.60	11.37 a.m.	32.6
—	20.9.60	11.43 a.m.	31.5



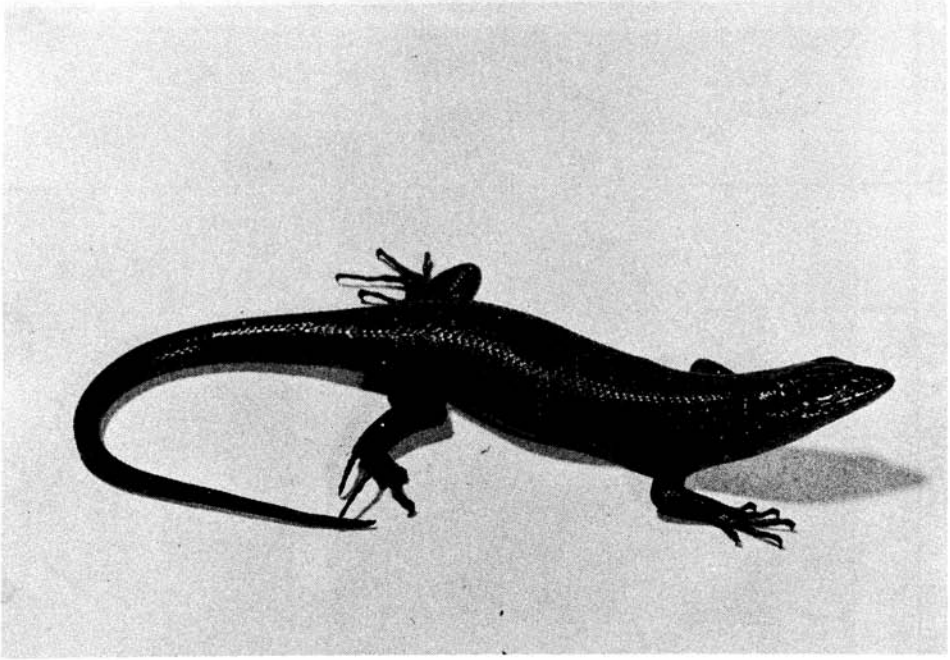


Fig. 1: *Mabuya striata sparsa* from Twee Rivieren. Dorsally these skinks are dark brown or black, speckled with white. Photo: W. D. Haacke.

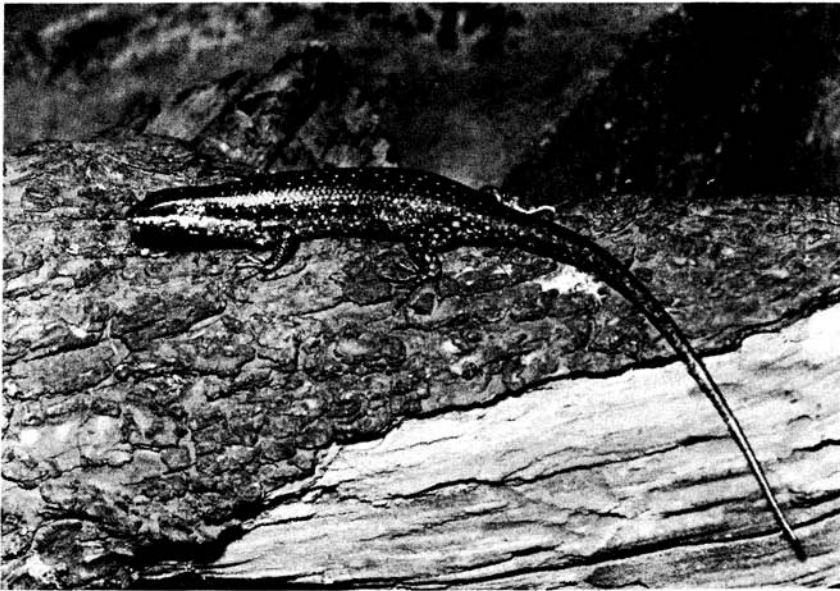


Fig. 2: *Mabuya spilogaster*. The pale dorso-lateral stripe is characteristic of the population in the Kalahari Gemsbok National Park. Photo: W. D. Haacke.



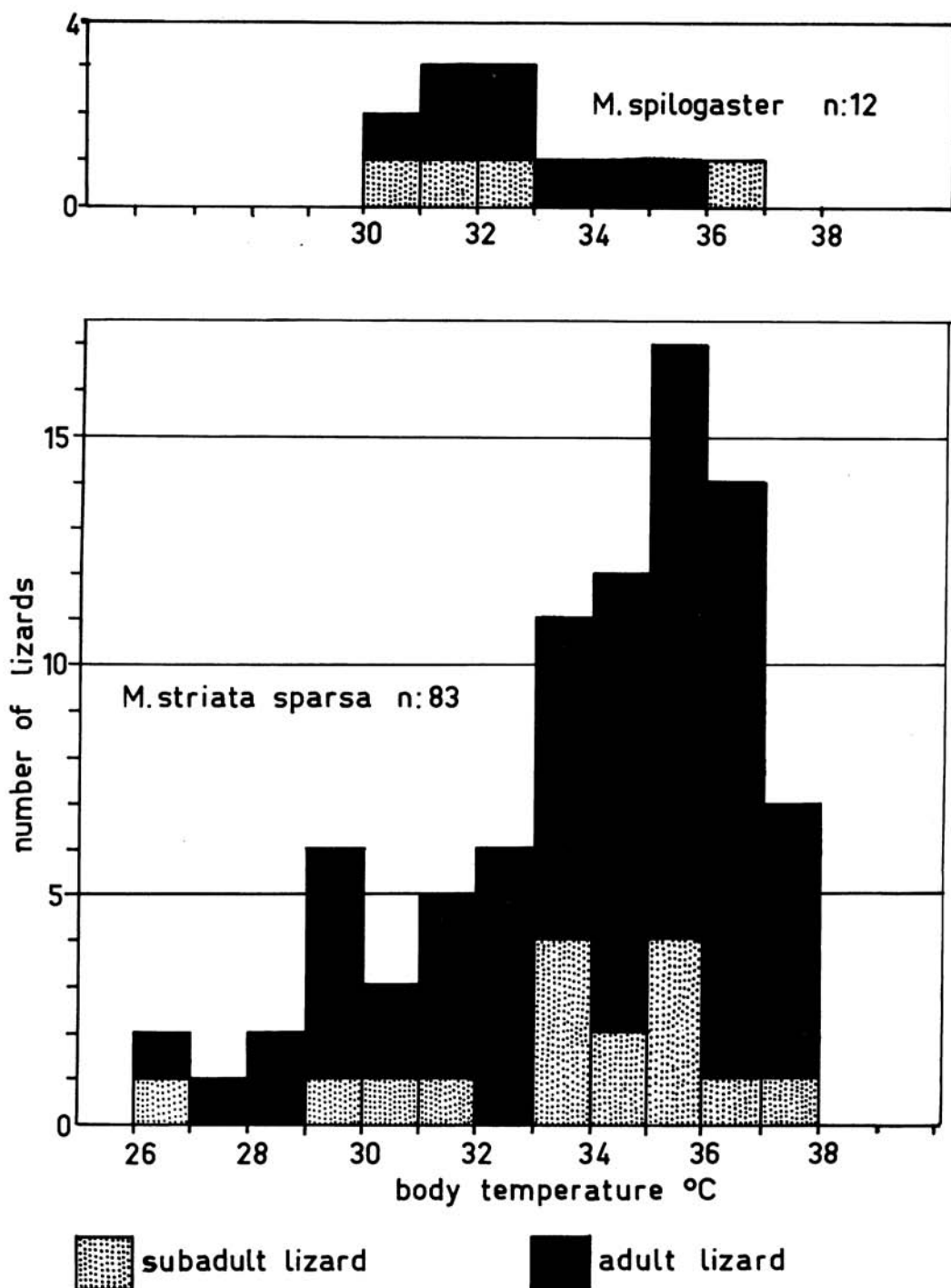


Fig. 3: Histogram showing the observed body temperatures of 12 *M. spilogaster* lizards (mean 32.8°C) and 83 *M. striata sparsa* specimens (mean 33.7°C) in the Kalahari Gemsbok National Park.





Fig. 4: A general view of the dry Nossob River bed in the Kalahari Gemsbok National Park. Low vegetation in the foreground is growing on dune sand, while the larger *Acacia giraffae* trees, used by the skins in this study, are concentrated in the river course itself.

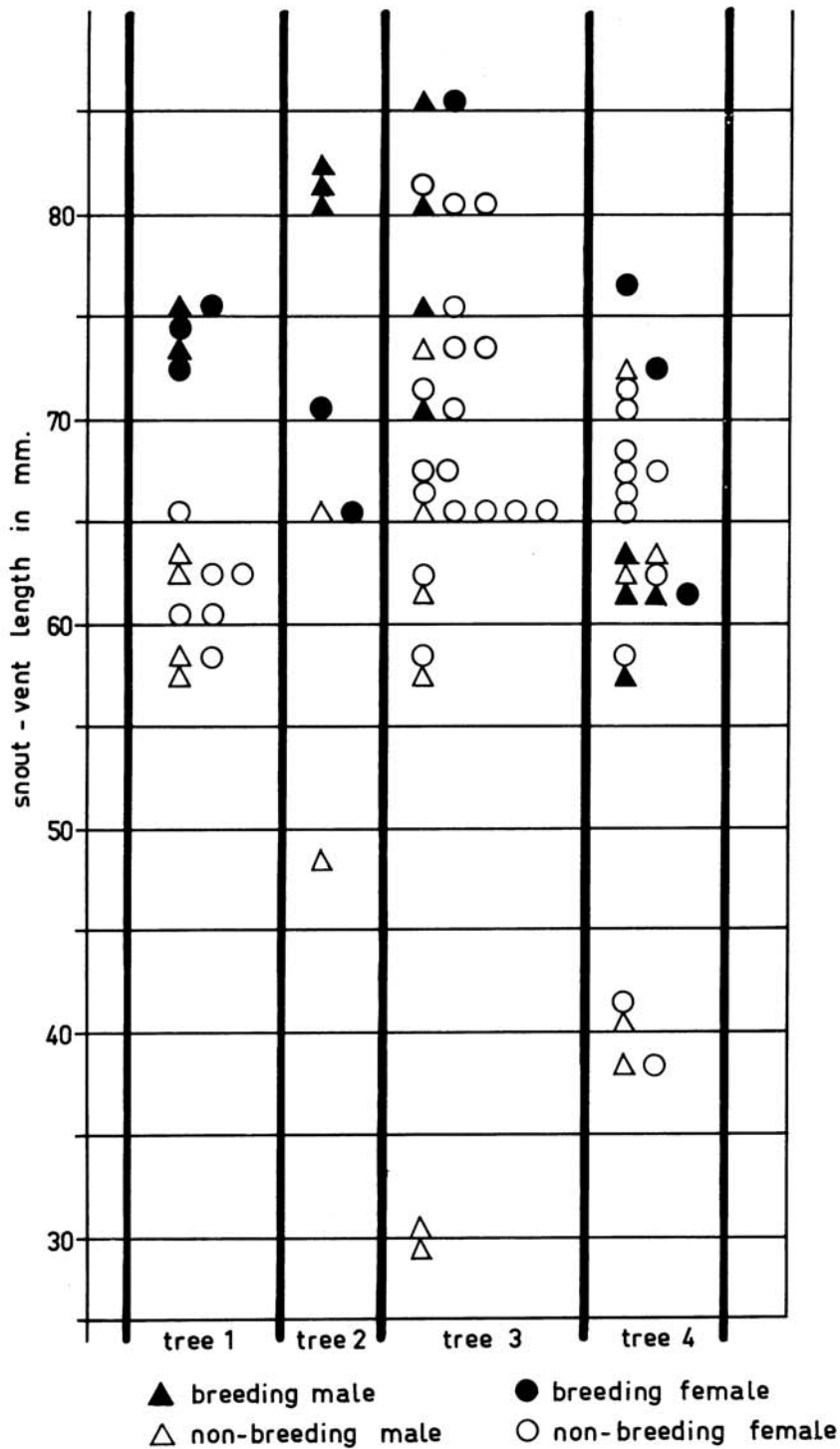


Fig. 5: Diagrammatic representation of sex and size structure of four *Mabuya striata* groups found on *Acacia* trees near Twee Rivieren.