

A MESOFAUNAL INVESTIGATION OF THE SOIL IN A
THORN-TREE (ACACIA KARROO) BIOTOPE

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1. INTRODUCTION

The soil is an outstanding example of the result of the organism and the environment acting as a reciprocating system. It is well known that there is a close correlation between the physical properties of the soil and the animals which live there. Among the soil arthropods some species, for example, are psammophilous whereas others only occur in heavy soils. The movement of these animals is mostly related to soil-particle size and water content. Analyses of the animal populations of different soils have shown that the water regime is the most important single factor influencing the composition of the soil biocoenose. This relationship was demonstrated by Franz (1950) when the fauna of regions having hot, dry summers was compared with that of a humid region with no seasonal period of dryness. Less than 50% of the species of Acari found in those parts of Austria having a dry summer, occur commonly in the wet regions of the eastern Alps.

The water economy of the soil is closely related to the plant cover. The climate is much more stable beneath a tree cover and this has a very important influence on the composition of the soil animal population. This fact is also borne out by the results of the present investigation carried out in a heterogeneous habitat. Where woodland is cleared, for instance, the number of species of soil animals diminishes rapidly, and the fauna which develops is never as rich and varied as that which normally occurs in natural steppe and even poor grassland on rocky terrain.

The nature and distribution of organic material in the soil is also of particular interest to the soil zoologist and should be given special attention. Living agents aid in the breakdown of the parent rock material, take part in

the vertical mixing and the horizontal distribution of soil substance, and add organic matter to the soil. The by-products of animals and plants, and their own bodies when they die, are the only source of organic compounds for the soil. These organic substances provide the necessary soil components, modify the soil into many different types, and make possible the growth of a varied fauna and flora that would not otherwise be able to exist. The organic matter contributed to the soil contains a larger amount of energy than the inorganic substances from which they were formed. Living organisms therefore provide both potential and kinetic energy as well as materials in helping to build the soil.

Soils are, however, far more than piles of material delivered from rocks and biological sources. Soils have organization. Structure, layering and other aspects of soil arrangement are influenced by the animals and plants present, and, reciprocally, the activities of the soil organisms are frequently controlled by the organization of the soil material. One way in which animal life and vegetation affect soil organization is through their contribution to the colloidal complex. The partially decomposed organic matter (humus) added to the soil by living components combines with the finest clay particles to form the colloidal complex. It is very unlikely that a humus classification can be established on the basis of an exact chemical analysis. One approach to this problem is to try to characterize the different directions of decomposition of organic matter, both within and on the surface of the soil, by the particular organisms dominating the process, but such an approach requires a joint attack by the microbiologist and soil zoologist.

Even in natural homogeneous habitats animal popula-

tions are known not to be distributed at random but rather show patterns of aggregated distribution. These aggregations have been observed in various animal groups living in the soil. A thorough investigation of this situation has become necessary both for the study of population dynamics and for routine work where parametric tests are to be used, as these tests cannot be applied to non-randomly distributed populations (Nef, 1962).

The present study is mainly concerned with the nature, seasonal fluctuations in numbers and biomass, and the horizontal distribution of the micro-arthropods inhabiting the upper 5 cm of virgin soil in a thorn-tree (Acacia karroo Hayne) biotope. This type of soil is known to be most suitable for the cultivation of crops such as maize and groundnuts, and could be regarded as representing a typical "control" for comparison with cultivated soils in the Potchefstroom area. From an ecological point of view it is important that adequate samples of all major natural communities be preserved undisturbed for study. Since man establishes his civilization and his food chains by modifying natural ecosystems, it is important that we have these samples of unmodified communities because only with such "controls" can the effects of man's modification be properly judged, and unwise practices avoided. No laboratory scientist would think of undertaking an experiment without an adequate control, yet the field ecologist is often called on to evaluate the effects of man's experiments without a control being available. The present investigation is a contribution to the basic study of such a natural control.

2. ENVIRONMENT

2.1 SAMPLING AREA

Potchefstroom (lat. $26^{\circ}44'$ S, long. $27^{\circ}05'$ E; mean

height above sea level 4430 ft.) is situated on the banks of the Mooi River in the Western Transvaal which forms part of the inland plateau. This area is characterised by fairly shallow undulating plains.

According to Baier (1963) Potchefstroom lies just in the boundary area between the semi-arid climates or middle latitude steppes and the humid mesothermal climates with dry winters and hot summers. Observations made at the Potchefstroom Weather Station from 1906 - 1955 (Baier, 1963) show that daily fluctuations in air temperature of approximately 19°C in winter and 14°C in summer occur. During the year the monthly average maximum air temperatures range from 19.1°C to 29.5°C and the minimum temperatures from -0.6°C to 15.3°C .

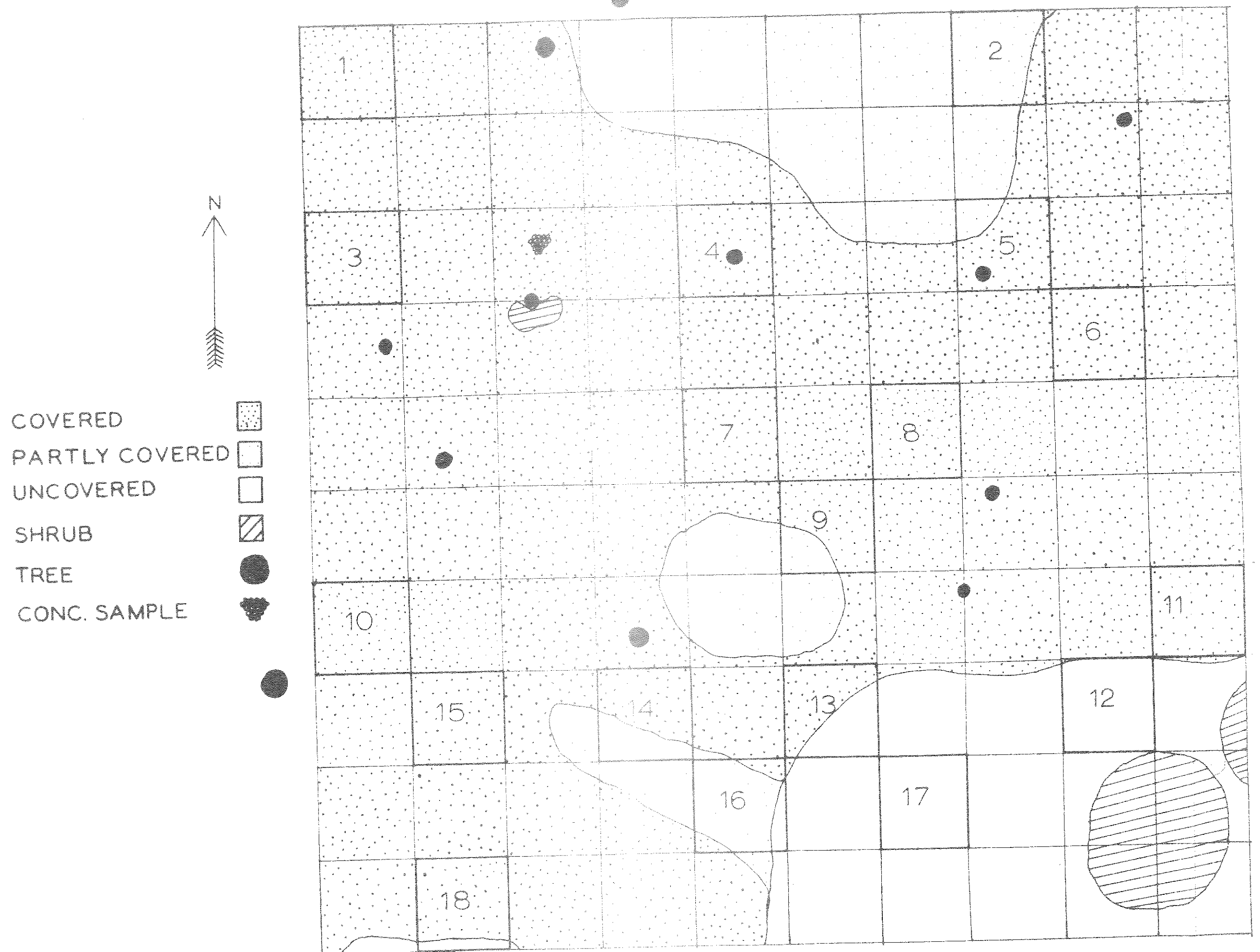
The mean soil temperatures at a depth of 1 - 4 inches range from approximately 11.4°C - 11.8°C in June to 27.1°C - 28.3°C in January and February. Potchefstroom enjoys eight to nine hours of daily sunshine throughout the year and the average monthly rainfall increases from 7.4 mm in June to 107 mm in January. The monthly rainfall exceeds 100 mm during December, January and February but remains below 10 mm during June, July and August. October can be regarded as the beginning and March as the close of the summer rainfall season. During this period 523.1 mm or 84% of the mean annual total (621.0 mm) was recorded.

For further information regarding the climate of the Potchefstroom area the reader is referred to Baier (1963) and Olivier & Ryke (in press).

2.2 SAMPLING PLOT

The sampling plot (fig. 1) is situated on the farm "Roopoorstjie 19", 11 miles from the campus of the Potchef-

FIG. 1: SAMPLING PLOT.



PLATES 1 - 3:

SAMPLING PLOT SHOWING ACACIA TREES AND COVERED
AND BARE PATCHES OF THE SOIL.

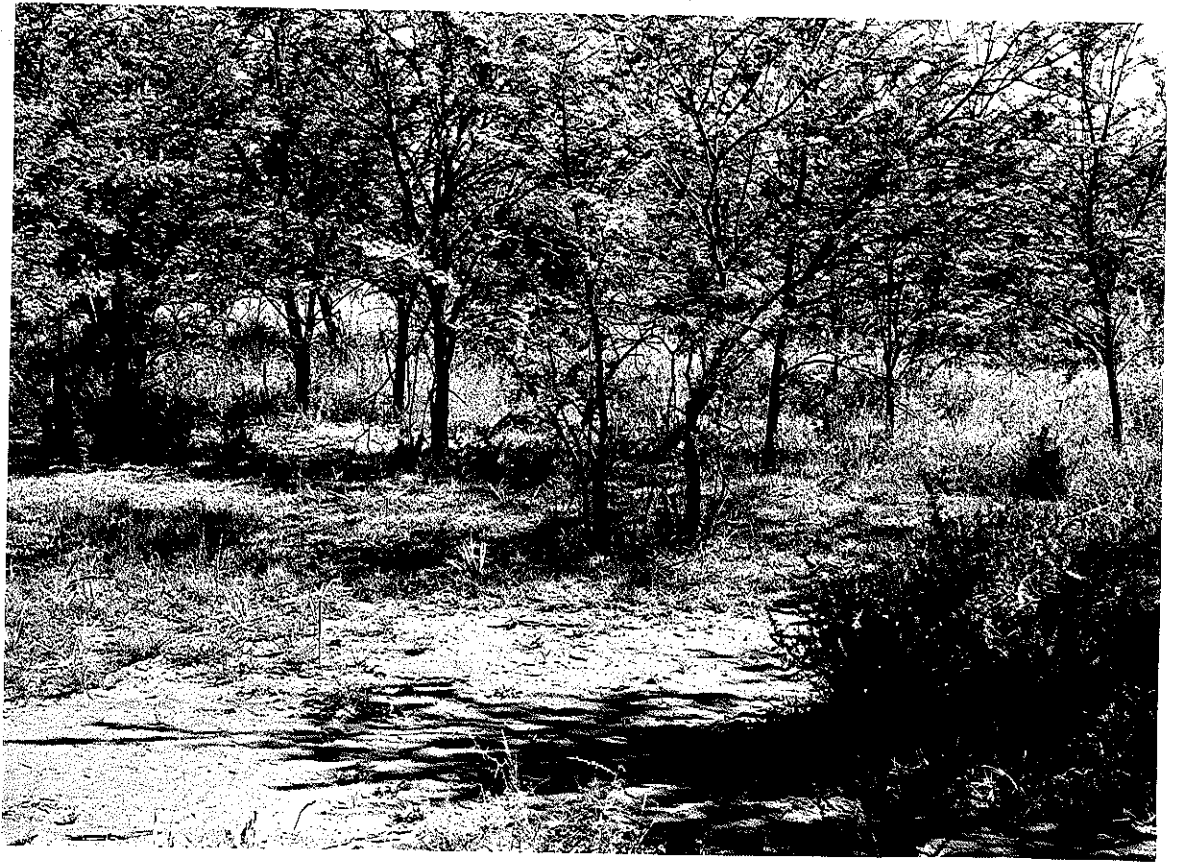


Plate 1

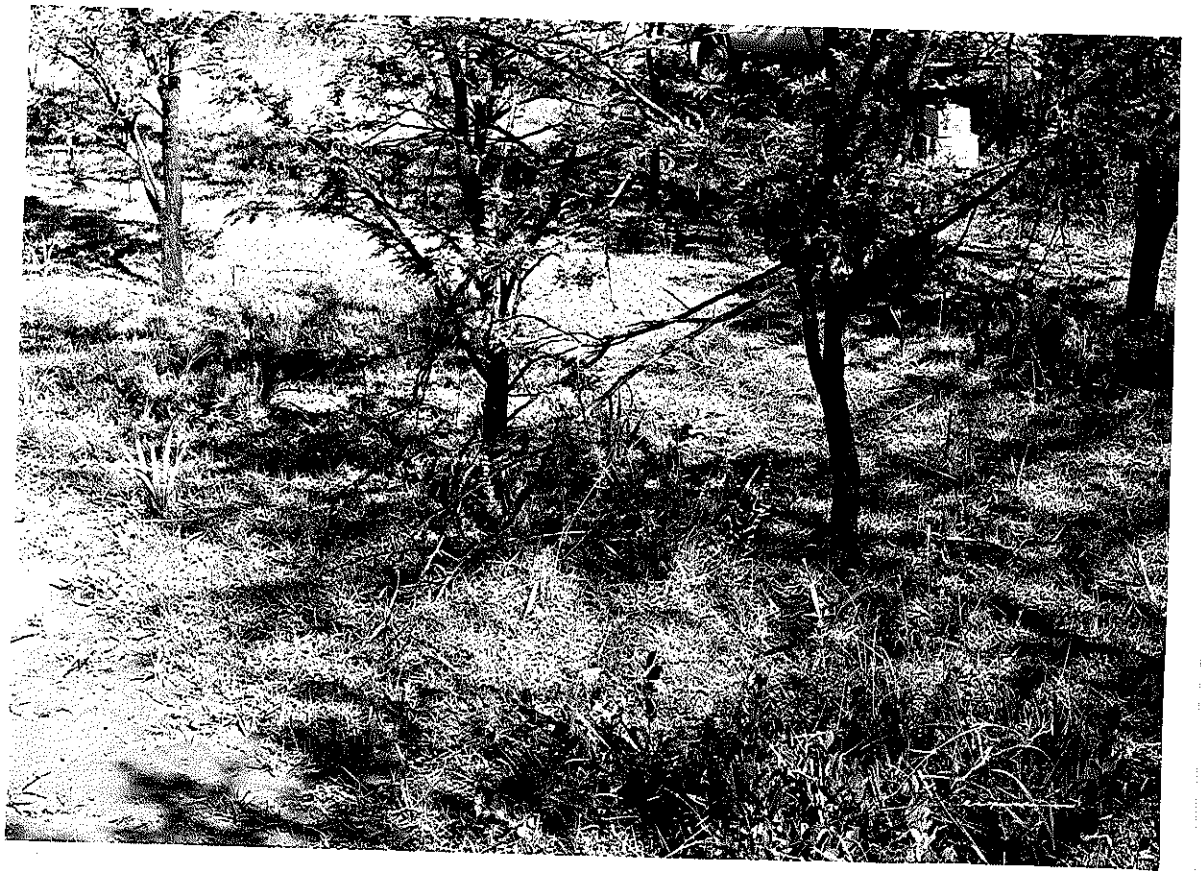


Plate 2.



Plate 3

stroom University and approximately 5 miles from the plot under kikuyu grass investigated by Olivier & Ryke (in press).

Approximately 82% of the sampling plot is covered by vegetation. From fig. 1 and plates 1-3 it is evident that some parts are partly covered while a small part is devoid of vegetation. The following list gives the different kinds of plants present on the plot which represented 19 genera and 21 species:

Acacia karroo Hayne,
Brachystelma barberiae Harv.,
Asclepias eminens Schltr.,
Teucrium capense Thunt.,
Conyza podocephala DC,
Kalanchoe rotundifolia Haw.,
Solanum sp.,
Zizyphus zeieriana Sond.,
Lippia scaberrima Sond.,
Aster muricatus Less,
Hypoxis argentea Harv.,
Gramineae spp. (3 different species),
Eragrostis lehmanniana Nees,
Hybiscus sp.,
Dichondra repens Frost,
Pituranthos burchellii (Sond.) Drude,
Bulbine narcissifolia Salm Dyck.,
Funaria sp.,
Asparagus suaveolens Burch.

Ten trees (Acacia karroo) are present, mostly concentrated on the northern half of the sampling plot (fig. 1). Their contribution to the organic material of the soil is poor although a litter layer is formed around each tree which gives shelter for small cryptic arthropods. Acacia karroo

(sweet-thorn) is the dominant species of the vegetation as far as biomass is concerned. According to Palmer & Pitman (1961) the sweet-thorn is the most widely distributed tree in South Africa, growing usually where there is sub-soil moisture or a good rainfall. In the arid regions it is found mainly along rivers. Sometimes it is inclined to assume a shrub-like habit and encroaches rapidly on surrounding vegetation. Usually it grows from 10 to 25 ft high and only on river banks or in other very favourable situations does it become a very large tree. The foliage, although dense, is usually so fine that it throws a light, dappled shadow (plates 1-3). The tree is sometimes evergreen but during a drought or in very dry or cold localities (such as Potchefstroom during winter) it loses its leaves. The thorns are a peculiar feature of the tree. They grow in pairs from $\frac{1}{2}$ inch up to 7 inches in length and are more numerous on the lower branches within reach of roaming animals. The sweet-thorn is an important fodder tree because the young foliage, the pods and old flowers, are all eaten by stock. Growing as it does in regions often otherwise bare of trees, as in the Karroo and the Highveld (e.g. Potchefstroom), it provides valuable shade and shelter.

Shrubs occur at low frequencies. Three shrubs (Asparagus suaveolens Burch.) cover approximately 1 m² of soil (fig. 1) and contribute some organic material to the soil but this is mostly confined to the areas immediately underneath them. The soil of the sampling plot is mainly covered by three different species of grass (Gramineae spp.) which are shown in plates 1, 2 and 3. The rest of the above-mentioned plants occur at low frequencies although some are more abundant than others.

The soil of the sampling plot can be described as a

hard, uniformly reddish-brown sandy loam. The depth of the soil was not measured but it is at least 30 cm deep (Aucamp & Ryke, 1965) without loose stones. The chemical properties of the soil can briefly be summarized as follows:

Covered soil: K - conduction, 240; pH (H_2O -method), 6.2; pH (KCl-method), 5.6; organic matter, 4.5%; P_2O_5 (p.p.m.), 24; K_2O (p.p.m.), 260; CaO (p.p.m.), 1350; Na (p.p.m.), 32. Partly covered soil: K-conduction, 110; pH (H_2O -method), 5.5; pH (KCl-method), 4.6; organic matter, 2.5%; P_2O_5 (p.p.m.), 20; K_2O (p.p.m.), 180; CaO (p.p.m.), 990; Na (p.p.m.), 32.

Uncovered soil: K-conduction, 90; pH (H_2O -method), 5.6; pH (KCl-method), 4.7; organic matter, 1.5%; P_2O_5 (p.p.m.), 42; K_2O (p.p.m.), 215; CaO (p.p.m.), 1070; Na (p.p.m.), 30.

From this data it is evident that there is a slight but nevertheless noteworthy difference between the covered, partly covered and uncovered soil, especially concerning the organic matter contents.

2.3 CLIMATOLOGICAL FACTORS

The soil temperatures referred to in the text, are those recorded by Olivier & Ryke on soil under kikuyu grass but these data can also be regarded as representative for the Acacia sampling plot. The mean soil temperatures are graphically represented in fig. 3. The minimum temperature recorded was $4^{\circ}C$ (during July) and the maximum $40^{\circ}C$ (during December). The air temperatures, also recorded by Olivier & Ryke, range from a maximum of $35^{\circ}C$ during October 1962 to a minimum of $4^{\circ}C$ during July 1963. The influence of air temperatures on the fluctuations of soil animals depends largely on air humidity, a factor which was not recorded during this investigation.

The daily rainfall values for the period September 1962-September 1963 are given in table 1, in which the sampling dates are also indicated (SD). Three-daily rainfall totals in mm for the sampling period are presented as histograms in fig. 3. The monthly rainfall values range from nil in September 1962, and August and September 1963, to 191.4 mm in November 1962. The latter value is considerably higher than either the value of 134 mm recorded for November 1962 by Loots & Ryke (in press) on different pasture soils (situated approximately 15 miles from the sampling plot) or the value of 145 mm recorded on the plot under kikuyu grass (5 miles distant) by Olivier & Ryke. The latter authors also recorded a rainfall of 25 mm for September 1963. The rainfall values for the sampling plot for the summer months correspond more or less with the figures recorded by Olivier & Ryke on the plot under kikuyu grass and the different pasture soils investigated by Loots & Ryke. Since the rainfall values for the autumn and early winter months were considerably higher than the annual average for the corresponding periods of previous years, the sampling period - September 1962 to September 1963 - should be regarded as "abnormal". The rainfall which was recorded half a mile from the sampling plot, reached the total of 701.6 mm for the sampling period which is approximately 80 mm more than the annual average (621 mm) for the general sampling area.

The soil moisture influences the nature of both the vegetation and the soil as well as that of the soil organisms. The latter play an important role in the decomposition of organic matter. The resulting humus assists conservation of moisture. The soil moisture or soil humidity values are given in table 2. These were recorded on the sampling dates

TABLE 1
DAILY RAINFALL VALUES(MM) FOR SEPT. 1962 - SEPT. 1963
IN SAMPLING AREA.

SD = SAMPLING DATE.

	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						10.0					2.5		
2						12.5							
3								25.0					
4		17.5						25.0					
5					7.5			12.5				SD	
6			25.0										
7				6.3	5.0								
8					5.0			10.0			SD		
9									12.5				
10									6.3	SD			
11					32.5		20.0		2.5				
12				25.0			30.0	12.5	31.3	12.5			
13									SD				
14			41.3	10.0									
15						12.5							
16			91.3	8.8				SD					SD
17				10.0			27.5						
18				SD		SD	SD						
19			SD										
20					12.5								
21		17.5	1.3		32.5								
22		SD		12.5									
23			2.5		SD								
24	SD		30.0		17.5								
25					7.5								
26					7.5								
27					5.0						15.0		
28													
29							10.0						
30													
31													
Total -		35.0	191.4	52.6	132.5	35.0	87.5	85.0	52.6	27.5	2.5	-	-

TABLE 2

Soil humidity values of sampling plot (% of dry weight of soil)

Sample	24 Sep. 1962	22 Oct. 1962	19 Nov. 1962	17 Dec. 1962	23 Jan. 1963	18 Feb. 1963	18 Mar. 1963	16 Apr. 1963	13 May 1963	10 Jun. 1963	8 Jul. 1963	5 Aug. 1963	16 Sep. 1963
1U	.87	11.31	6.88	10.57	12.17	10.23	15.50	6.54	13.61	4.22	8.34	4.46	3.67
2C	4.06	18.98	18.63	11.83	19.00	17.47	18.59	19.35	22.19	8.03	15.80	7.29	6.16
3C	1.36	16.54	14.16	11.75	16.95	11.29	17.06	12.95	19.46	7.29	8.82	4.98	5.80
4C	2.33	18.86	16.48	11.55	17.60	13.29	17.51	13.03	19.80	7.51	14.44	7.23	5.99
Mean	2.16	16.42	14.04	11.43	16.43	13.07	17.17	12.97	18.77	6.76	11.85	5.99	5.41

U = Uncovered soil

C = Covered soil

only and therefore the "mean" values do not reflect the true fluctuations in the mean soil humidity. The highest "mean" soil moisture value of 18.77% was recorded in May 1963 whereas the lowest (2.16%) was recorded in September 1962. The soil moisture values for the sampling plot were much higher than the corresponding values for the pasture soil plots (Loots & Ryke) but much lower than those recorded for soil under kikuyu grass (Olivier & Ryke). This phenomenon can be attributed to the differences in and distribution of the vegetation as well as differences in soil types.

3. TECHNIQUES

3.1 SAMPLING

A quadrat of 100 m² was selected as a sampling plot. The sub-plots (1 m²) were determined at random and labelled 1 - 18 (fig. 1). During the period September 1962 - September 1963 14 monthly samples were taken, each consisting of 18 subsamples. During April 1963, however, two samples (A and B) were taken simultaneously, the subsamples being contiguous to each other. The subsamples were taken on each subplot in the numerical order as shown in fig. 2. Sample cores were taken in 6.5 x 5 cm brass rings, the surface area being 32.59 cm². The sampling dates are indicated in table 1.

3.2 EXTRACTION

For a detailed account of the extraction methods employed the reader is referred to Aucamp, Loots & Ryke (1964) and Olivier & Ryke.

The cores were placed in a natural position on the funnel sieves (1.5 mm mesh) in the extractor. The extractor used for this investigation is the modified high-gradient

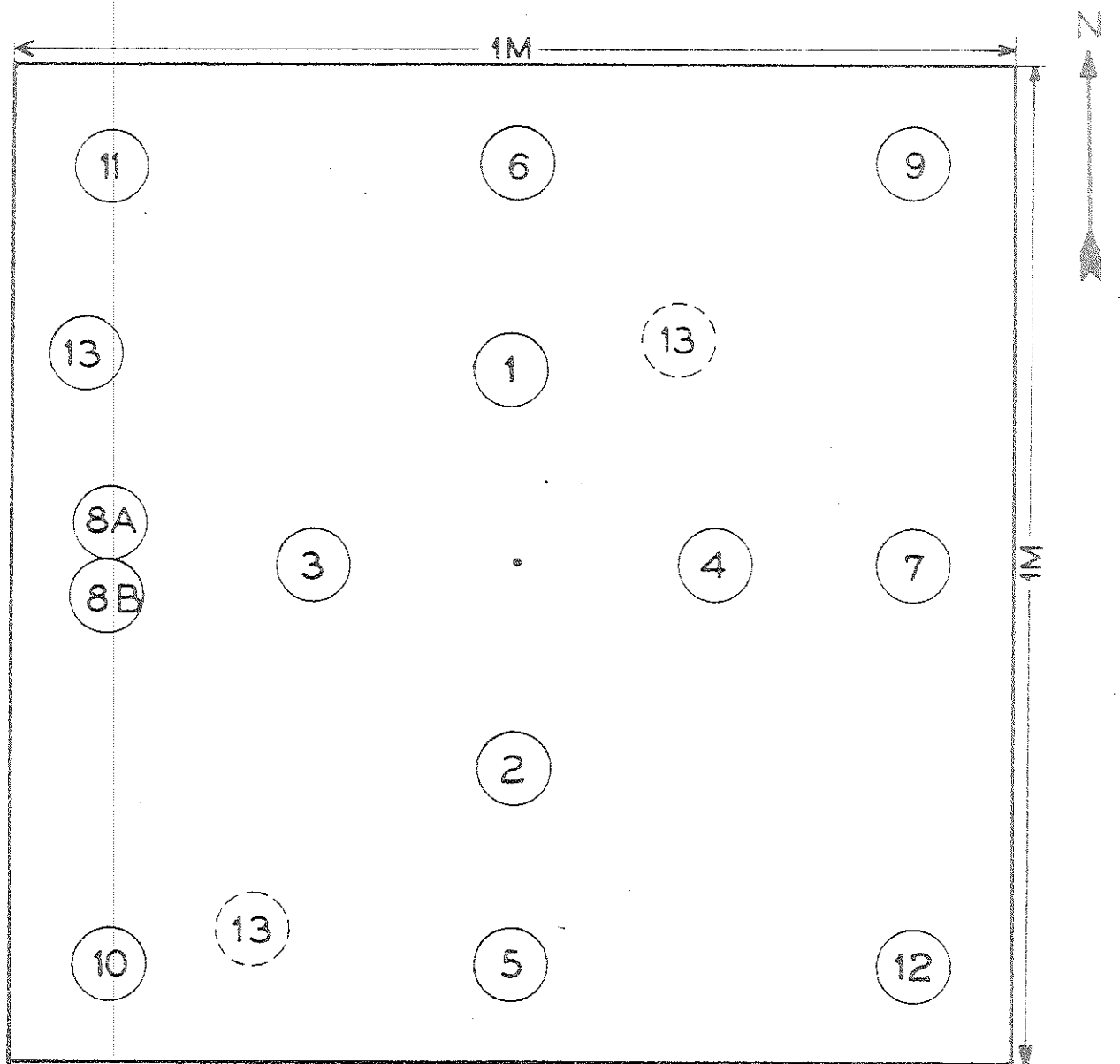


FIG. 2 SUB-SAMPLE 1-13
SAMPLING SUB-PLOT.



extractor described by Aucamp et al. (1964). The organisms were collected in vials containing 70% alcohol (as a preservative) in which carbolic acid crystals were dissolved to prevent fungus growth.

Approximately the same temperatures were measured above the cores as those measured by Aucamp et al. (1964) i.e. 1st day, 28°C; 2nd and 3rd day, 32°C; 4th and 5th day, 36°C; 6th and 7th day, 40 - 43°C. These temperatures are much higher than those used under European conditions, but it should be mentioned that temperatures as high as 40°C are normally recorded in Potchefstroom during the summer months. It follows logically that extraction temperatures should be adjusted accordingly.

3.3 BIOMASS ESTIMATION

Approximate biomass figures have been obtained for each species by weighing the specimens on a Sartorius balance (Olivier & Ryke). These figures in addition to those obtained by Loots & Ryke were used to estimate the biomass per m² for the sampling plot (tables 24-55). Since the methods used to determine the biomass still have their limitations, it should be borne in mind that all biomass data are only approximate, but they may nevertheless be useful to indicate the flow of energy in the soil.

4. ANALYSIS OF THE MESOFAUNA

According to Murphy (1955) the fauna of the soil can be divided into three groups viz. microfauna, meiofauna or mesofauna, and macrofauna. These highly arbitrary groupings are based partly on size and partly on methods used for assessment and study. The microfauna includes such organisms as Protozoa, smaller Turbellaria, Rotifera,

Nematoda and Tardigrada. The mesofauna with a size range of about 100 microns to 1 cm, embraces the Enchytraeidae, most Arachnida, some Myriapoda and the smaller insects. The macrofauna includes Mollusca, Lumbricidae and the larger arthropods. The mesofauna ^{is} ~~are~~ the main concern of this investigation.

According to Kühnelt (1961) ^{p.53.} it is extremely difficult to attain the same degree of accuracy of identification with all animal groups which have to be considered in a mesofaunal investigation such as this. Therefore an analysis, even carried out in close co-operation with specialists, does not always lead to a satisfactory result for all groups. It is therefore necessary to have a thorough taxonomic background when an ecological study is undertaken.

Owing to our limited knowledge of the South African soil fauna the present study could not comply with all the taxonomic requirements. This study should therefore be regarded as an introduction to the overall composition and nature of the micro-arthropod population in South African soils with emphasis on the seasonal fluctuations in numbers. Abiotic as well as biotic environmental factors should be taken into account as a causal explanation for the fluctuations. Very little is, however, known about the role played by these factors, especially the biotic factors and therefore the differences in population trends and densities are correlated with factors such as soil temperature and moisture, rainfall and the known properties of the soil.

4.1 MESOFAUNA IN TOTO

The following major groups were collected from the soil of the sampling plot: Acari, Collembola, other insects, **Pseudoscorpionida and Araneida. The numbers per m² of these** groups, calculated from the totals recovered from each sample,

are presented in table 3.

The Acari constituted by far the greatest number of individuals among the micro-arthropod fauna. Of the insects the Collembola were most abundantly represented, but the other insects, considered as a single unit, were present in larger numbers. The Araneida and Pseudoscorpionida were not abundant. Specimens of Nematoda, Tardigrada and Isopoda occurred very rarely. The former two groups are not reflected in the graphs of the mesofauna (= micro-arthropods). One specimen of the ticks (Metastigmata) was collected.

The differences between the numbers of the mesofauna extracted from the April samples A and B were non-significant/ (t-value, 0.684; d.f.34). For this reason the means of the numbers of each specific group (i.e. order, family, genus or species) present in the two samples, are used to indicate the seasonal fluctuations (figs. 3-30) of these groups for this month. The seasonal fluctuations in the numbers of the mesofauna in toto as well as its main components the Acari, Collembola and other insects are shown in fig. 3.

As is evident from this figure the lowest number of micro-arthropods (= mesofauna) was collected in September 1963 (4,498 per m²) whereas the highest number (117,095 per m²) was collected in June 1963. This extraordinary high number is entirely due to the presence of a single aggregation of 4,512 specimens of Tydeus sp.b in the subsample which was taken on subplot 5 (see figs. 1 and 2). From September 1962 the mesofaunal population increased sharply from 10,501 per m² to 36,969 per m², whereas the soil moisture content increased from 2.16% to 16.42% in October and decreased slightly to 14.04% in November 1962. It seems likely that the increase in the population density of the soil is related

TABLE 3
NUMBERS AND BIOMASS(mg) OF ORGANISMS PER m²

Date	Mesostigmata		Trombidiformes		Oribatei		Acaridia		Collembola	
	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass
24 Sep..62	256	4.54	6,733	68.92	256	3.40	1,926	26.97	307	7.73
22 Oct..62	954	18.32	13,807	154.48	1,994	26.52	205	2.86	1,312	33.07
19 Nov..62	3,153	61.05	12,340	134.84	3,358	44.66	7,602	106.43	2,710	68.29
17 Dec..62	358	3.77	3,630	35.10	3,034	40.35	34	0.48	716	18.04
23 Jan..63	1,960	28.89	13,175	141.02	5,028	66.87	409	5.73	3,255	82.04
18 Feb..63	2,608	32.12	30,714	216.16	13,789	183.39	1,739	24.34	2,096	52.83
18 Mar..63	2,284	28.24	18,101	139.01	10,176	135.34	580	8.11	3,170	79.89
16 Apr..63A	2,369	34.85	16,278	146.38	3,034	40.48	562	7.87	5,352	134.87
16 Apr..63B	2,267	36.43	21,749	159.73	5,540	73.68	443	6.20	3,051	76.88
16 Apr..63C	2,313	35.51	19,013	152.57	4,287	57.01	503	7.04	4,201	105.87
13 May..63	1,329	19.69	18,510	128.59	2,932	38.99	375	5.25	2,676	67.43
10 Jun..63	1,244	15.62	109,357	1,206.04	3,852	51.23	648	9.07	2,852	21.48
8 Jul..63	648	10.06	26,811	167.80	4,125	54.86	460	6.44	2,403	60.56
5 Aug..63	324	5.13	12,903	100.03	1,142	15.19	528	7.40	358	9.02
16 Sep..63	102	1.69	3,016	32.45	290	3.85	136	1.91	68	1.72

A = Extraction figures of apparatus A (Macfadyen apparatus)
B = Extraction figures of apparatus B (Aucamp et al. Modified high-gradient extractor)
C = Average of extraction figures of A and B

TABLE 3 (continued)

Other Insects		Araneida		Pseudoscorpionida		Acari in toto		Mesofauna in toto	
Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass
972	393.12	17	12.89	34	23.54	9,171	103.83	10,501	541.41
6,051	2,448.11	34	25.54	17	12.03	16,960	202.18	24,374	2,720.93
7,602	3,075.72	102	76.62	102	71.51	26,453	346.98	36,969	3,639.12
1,670	675.77	119	89.51	51	35.87	7,056	79.70	9,612	898.89
1,636	661.99	-	-	51	35.87	20,572	242.51	25,514	1,022.41
4,568	1,848.19	-	-	85	59.70	48,850	456.01	55,599	2,416.73
3,664	1,482.62	-	-	68	47.60	31,141	310.70	38,043	1,920.81
2,949	1,193.03	17	12.89	51	35.87	22,243	229.58	30,612	1,606.24
3,937	1,592.98	17	12.89	34	23.84	29,999	276.04	37,038	1,982.63
3,443	1,393.00	17	12.89	43	29.85	26,121	252.13	33,825	1,793.74
2,557	1,034.39	-	-	34	23.54	23,146	192.52	28,413	1,318.18
1,091	441.41	-	-	51	35.87	115,101	1,281.96	117,095	1,780.72
938	379.35	17	12.89	-	-	32,044	239.16	35,402	691.96
426	172.42	-	-	17	12.03	14,897	127.75	15,698	321.22
852	344.84	-	-	34	23.84	3,544	39.90	4,498	410.30

0

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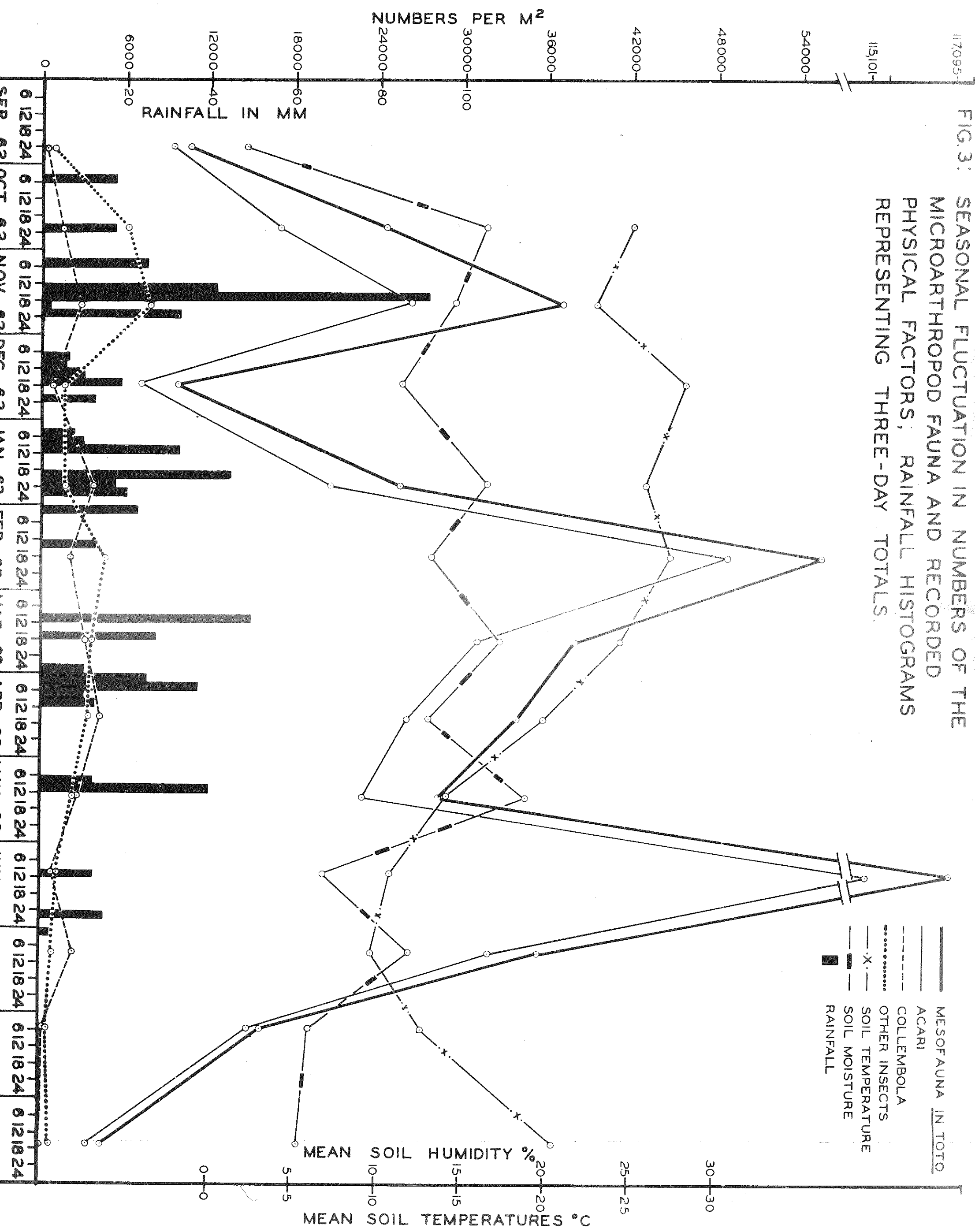
A

J

8 Feb

16 June

FIG. 3: SEASONAL FLUCTUATION IN NUMBERS OF THE MICROARTHROPOD FAUNA AND RECORDED PHYSICAL FACTORS, RAINFALL HISTOGRAMS REPRESENTING THREE-DAY TOTALS.



to the increase in soil moisture content. It must be borne in mind that the figures for soil moisture content are those taken on sampling dates only and that these figures are therefore less indicative than the daily rainfall figures. The latter figures are more indicative of the actual amount of moisture present in the soil during the periods between the sampling dates. The figures in table 1 show that no rain fell during September 1962 and the "mean" soil moisture content was 2.16% in the upper 5 cm-layer. The number of micro-arthropods was relatively low (10,501 per m²). The increase in numbers during October 1962 can be attributed to the rain that fell (35 mm) during this month. The increase in numbers might have been partly due to an upward migration of the soil organisms rather than by means of reproduction only.

During the period 22 October - 19 November, the rise in numbers is of approximately the same magnitude as that during the September - October period. This rise was accompanied by a drop in both the mean soil temperature and moisture content. The drop in soil temperature can be related to the large amount of rain (157.6 mm) which fell during this period. The decrease in mean soil moisture content can be attributed to the fact that although a substantial amount of rain fell during the two three-day periods before the sample was taken, no rain was recorded on the two days preceding the sampling date. The October sample, on the other hand, was collected shortly after some rain fell on the sampling plot.

The relatively large number of micro-arthropods extracted during this month can also be attributed to the occurrence of an extraordinary large number of organisms present in subsample 10 (table 26; figs. 1 & 2) which was

taken from an ant nest. The actual number collected from this subsample was 1059 which included 305 ants.

During the period November - December 1962 the number of organisms decreased tremendously to a level (9,612 per m^2) even lower than that recorded in September 1962. This decrease is accompanied by a rise in temperature of $5^{\circ}C$ and a drop in mean soil moisture content of 2.6%. This decline in numbers cannot be explained by means of the known environmental factors. The mean soil moisture content was lower than that recorded on 19 November 1962. In fact this value should have been higher as the result of the 18.8 mm rain that fell on the day preceding the sampling date. As a high soil moisture content is usually responsible for poor extraction, the low numbers might have been the result of this phenomenon (Ryke, personal communication). Whether the rise in soil temperature alone is responsible for the low number of organisms is open to doubt, but it is possible, because it was the highest temperature ($28.2^{\circ}C$) recorded during the entire sampling period. It is also probable that biological factors might have played a role in the decrease in numbers.

The number of micro-arthropods increased to 25,514 m^2 during the period December 1962 - January 1963. The soil moisture content increased by 5% to 16.43% whereas the soil temperature dropped to $25.8^{\circ}C$. The rainfall value for this period was 107.5 mm, 45 mm of which fell on the 20th and 21st January 1963. This rainfall is most probably responsible for the rise in soil moisture content. The soil temperature probably was more favourable for the soil organisms and might have induced upward migration to the upper soil layer.

A very pronounced increase in numbers during the Jan.-Feb. period resulted in the micro-arthropods reaching their second highest peak during the sampling period. This increase

can be attributed to a more favourable soil moisture content for extraction purposes (13.07%), due to the lower rainfall (72.5 mm) recorded during this period; 12.5 mm fell three days previous to the sampling date. Whether the rise in soil temperature (1.5°C) played a role in the increase in numbers is open to doubt. By these factors the micro-arthropods might have been induced to migrate to the top layers of the soil. It is also probable that reproduction is reflected in this increase in numbers.

The numbers of micro-arthropods decreased gradually during the period 18 February - 13 May 1963. This decline was accompanied by a decrease in the soil temperature from 27.3°C to 14.1°C . The mean soil moisture content values for these months were 17.17%, 12.96% and 18.77% respectively. Although these conditions might have been favourable, the numbers decreased and this phenomenon can be attributed to normal mortality. The fact that the soil moisture content was relatively high can be attributed to the amount of rain which fell during the period (March, 87.5 mm; April, 85 mm and May, up to sampling date, 52.6 mm) and to low evaporation due to low soil temperatures (table 1; fig. 3).

The period 13 May - 10 June is marked by a tremendous increase in numbers (117,095 per m^2). This increase is due to the presence in high numbers of the trombidiform mite Tydeus sp. b (actual number collected was 4,512 specimens). This number of mites occurred in the subsample taken next to a tree on subplot 5 (figs. 1 & 2). To harbour such an aggregation of organisms, humidity and temperature in the litter layer around this tree must have been optimal. Tydeus sp. b occurred at a rate of 79,870 per m^2 . Excluding this aggregation of Tydeus sp. b the number of micro-arthropods still reached the total of 40,361 per m^2 , which is an increase on

the number recorded the previous month. Low temperature (10.8°C) and a moderate soil humidity as the result of the rainfall during this period (table 1) might have contributed to favourable conditions in the upper 5 cm of the soil.

The presence of the large number (35,402 per m^2) of organisms in the July sample can also be attributed to the same conditions which were recorded during June. The mean soil temperature was rather low (9.8°C) whereas the soil humidity was relatively high (11.85%). These factors might have induced the organisms to seek favourable conditions in the upper soil layer. From July 1963 the numbers of micro-arthropods decreased gradually to a total of 4,498 per m^2 in Sept. 1963. During this period no rainfall fell and the soil temperature rose from 9.8°C in June to 20.5° in Sept. 1963. The winds blowing during that period of the year would certainly have desiccated the upper layers of the soil. This is reflected in the decrease in soil humidity (table 2). The combined effect of all these factors, in addition to normal mortality, must have attributed to the drop in the numbers of the organisms in the upper soil layer.

Other soils:

Comparative analyses of the communities in different South African soils reveal that the mesofauna in soil under kikuyu grass (Olivier & Ryke) and in different pasture soils (Loots & Ryke) is composed of more or less the same sub-groups as those in soil under Acacia karroo. Paupoda and Chilopoda were collected from soil under kikuyu grass, but neither of these were collected from pasture soils, Chilopoda only being present in the Acacia soil.

Graham (1956) investigated the micro-arthropod population composition in pineapple fields in the Bathurst district of the Eastern Cape Province and compared them with

soil samples from the natural grassland which was prepared for pineapple cultivation. He came to the conclusion that the fauna in the different fields were quantitatively the same at the higher levels of classification regardless of the vegetation from which they were cleared. The fauna consisted of Chilopoda, Diplopoda, Pauropoda, Symphyla, Collembola, other insects, Palpigrada, Pseudoscorpionida, Araneida and Acari. The Acari and Collembola were numerically the dominant groups and in the natural grassland the collemboles were present in relatively higher numbers than in the pineapple fields.

It is rather difficult to compare the numbers obtained in the present investigation with those determined by other authors. Various extraction techniques as well as sampling to different depths prevent the comparison of obtained figures. Olivier & Ryke (in press) recorded a maximum of 69,846 microarthropods per m^2 during July 1963 from the upper 5 cm in kikuyu soil; Loots & Ryke (in press) recorded a maximum of 63,027 per m^2 from the top 5 cm layer whereas a maximum of 117,095 per m^2 from the same layer was found in the present investigation. The latter number includes the aggregation of Tydeus sp. b.

Salt (1952), who investigated the population density of the soil in an East African pasture, extracted 54,565 microarthropods per m^2 from the top 6 inches. In another investigation of the soil under elephant grass in Uganda the same author (Salt, 1955) recorded 73,517 microarthropods per m^2 from the upper 6 inches. Graham (1956) recorded 50,000 - 97,000 individuals per m^2 from virgin soils in the Bathurst district of the Eastern Cape Province.

The figures obtained in the present investigation as well as those recorded by Loots & Ryke and Olivier & Ryke could at least be doubled to compensate for the numbers recovered from the upper 30 cm of soil under Acacia karroo

investigated by Aucamp & Ryke (in press). These figures, however, still fall short of the numbers obtained by authors who investigated European soils. Salt et al. (1948) collected 263,658 micro-arthropods per m^2 from the top 12 inches of pasture soil in England. The figures obtained in that investigation from the top 6 inches were 187,575 and the 6 - 12 inches 76,082 per m^2 for the same sample. Murphy (1953) collected a maximum number of 569,700 organisms per m^2 from the top 11 $\frac{3}{8}$ inches of natural heathland and 834,500 per m^2 from the top 11 $\frac{3}{8}$ inches of cultivated heathland (England) with trees. Van der Drift (1951) recovered from beech mor (Netherlands) 336,500 organisms (mesofauna and macrofauna) per m^2 . Macfadyen (1952) extracted 132,100 micro-arthropods per m^2 from the upper 5 cm soil layer of the Cothill Molinia fen (England).

From the literature it is evident that under European conditions the micro-arthropod population undergoes seasonal fluctuations. The minima ^{are} ~~is~~ reached during the summer and maxima during the winter (Evans et al. 1962; Ford, 1938 and Macfadyen, 1952). Olivier & Ryke found that the micro-arthropod population reached its minimum during October 1962 and its maximum during July 1963. These authors attributed that maximum to the extraordinary amount of rain which fell during the autumn and the slow evaporation of water as the result of low temperatures. Loots & Ryke found that the micro-arthropod population reached its minimum during Sept. 1962 and its maximum in early February 1963. These authors suggest that the normal maximum should occur in late summer when the rain season usually ends, and the normal minimum during late winter and early spring when the dry season sets in. They are of opinion that high rainfall and low temperatures create "European" conditions which are most favourable for an increase in micro-arthropod numbers. Belfield (1956),

who investigated the vertical distribution of the Arthropoda in West African pasture soil, observed an increase in numbers as the season became wetter with a maximum in May, the month with the highest rainfall value (p. 68¹). The present investigation showed a minimum during Sept. 1963 and a maximum during June 1963. The two minima reached in Sept. 1962 and Sept. 1963 represent normal minima but the minimum reached in December 1962 can be regarded as "abnormal". The maximum during June 1963 can be attributed to optimal conditions which prevailed in the soil.

Biomass:

The estimated biomass figures per m² of the soil micro-arthropods for the period Sept. 1962 - Sept. 1963 are presented in table 3, while the numbers are plotted against the biomass in fig. 4, indicating the relative values of the different groups. The mean biomass per individual for these groups are: Collembola, 0.0252 mg; other Insects, 0.4046 mg; Araneida, 0.7500 mg; Pseudoscorpionida, 0.7000 mg. The values for the Acari are given in tables 24 - 55. It is evident from fig. 4 that the fluctuations in biomass are not always in accordance with the fluctuations in numbers. Both curves seem in principle to be identical, except in Sept. 1963 when a rise in biomass and a decrease in numbers ~~were~~ ^{is} recorded. The mean biomass per m² reached its highest peak in Nov. 1962 whereas the maximum numbers were recorded during June 1963. These phenomena are elucidated in the histograms of fig. 4. The insects (excluding Collembola) are the dominant group as far as weight is concerned except during June 1963 when the aggregation of Tydeus sp. b dominated the mean biomass figures. The Araneida and Pseudoscorpionida have a higher mean biomass per individual but because of their low numbers these two groups are of little importance. The

TABLE 3
NUMBERS AND BIOMASS(mg) OF ORGANISMS PER m²

Date	Mesostigmata		Trombidiformes		Oribatei		Acarididae		Collembola	
	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass
24 Sep..62	256	4.54	6,733	68.92	256	3.40	1,926	26.97	307	7.73
22 Oct..62	954	18.32	13,807	154.48	1,994	26.52	205	2.86	1,312	33.07
19 Nov..62	3,153	61.05	12,340	134.84	3,358	44.66	7,602	106.43	2,710	68.29
17 Dec..62	358	3.77	3,630	35.10	3,034	40.35	34	0.48	716	18.04
23 Jan..63	1,960	28.89	13,175	141.02	5,028	66.87	409	5.73	3,255	82.04
18 Feb..63	2,608	32.12	30,714	216.16	13,789	183.39	1,739	24.34	2,096	52.83
18 Mar..63	2,284	28.24	18,101	139.01	10,176	135.34	580	8.11	3,170	79.89
16 Apr..63 ^A	2,369	34.85	16,278	146.38	3,034	40.48	562	7.87	5,352	134.87
16 Apr..63 ^B	2,267	36.43	21,749	159.73	5,540	73.68	443	6.20	3,051	76.88
16 Apr..63 ^C	2,313	35.51	19,013	152.57	4,287	57.01	503	7.04	4,201	105.87
13 May..63	1,329	19.69	18,510	128.59	2,932	38.99	375	5.25	2,676	67.43
10 Jun..63	1,244	15.62	109,357	1,206.04	3,852	51.23	648	9.07	2,852	21.48
8 Jul..63	1,648	10.06	26,811	167.80	4,125	54.86	460	6.44	2,403	60.56
5 Aug..63	324	5.13	12,903	100.03	1,142	15.19	528	7.40	358	9.02
16 Sep..63	102	1.69	3,016	32.45	290	3.85	136	1.91	68	1.72

A = Extraction figures of apparatus A (Macfadyen apparatus)
B = Extraction figures of apparatus B (Aucamp et al. Modified high-gradient extractor)
C = Average of extraction figures of A and B

TABLE 3 (continued)

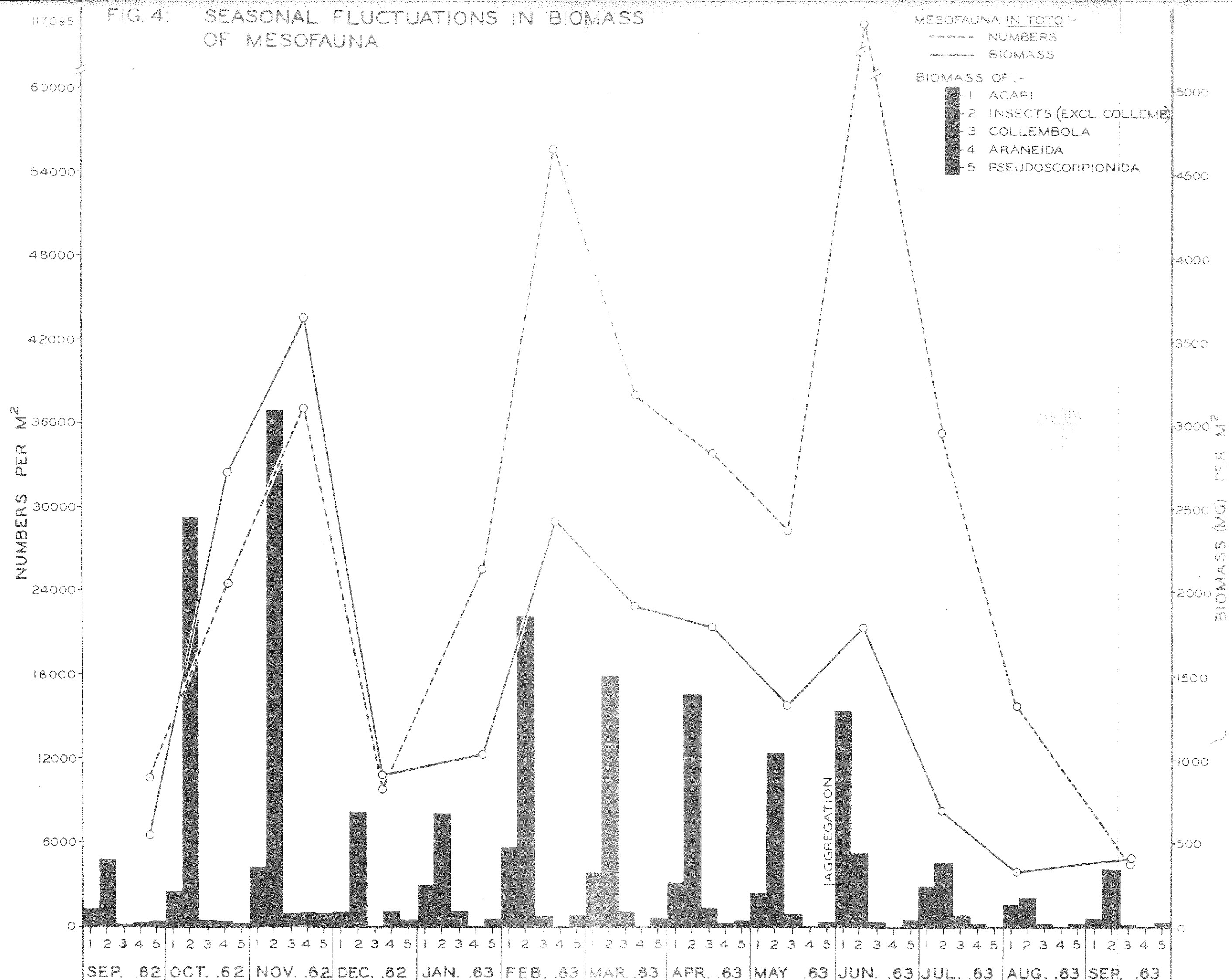
Other Insects		Araneida		Pseudoscorpionida		Acari in toto		Mesofauna in toto	
Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass
972	393.12	17	12.89	34	23.84	9,171	103.83	10,501	541.41
6,051	2,448.11	34	25.54	17	12.03	16,960	202.18	24,374	2,720.93
7,602	3,075.72	102	76.62	102	71.51	26,453	346.98	36,969	3,639.12
1,670	675.77	119	89.51	51	35.87	7,056	79.70	9,612	898.89
1,636	661.99	-	-	51	35.87	20,572	242.51	25,514	1,022.41
4,568	1,848.19	-	-	85	59.70	48,850	456.01	55,599	2,416.73
3,664	1,482.62	-	-	68	47.60	31,141	310.70	38,045	1,920.81
2,949	1,193.03	17	12.89	51	35.87	22,243	229.58	30,612	1,606.24
3,937	1,592.98	17	12.89	34	23.84	29,999	276.04	37,038	1,982.63
3,443	1,393.00	17	12.89	43	29.85	26,121	252.13	33,825	1,793.74
2,557	1,034.39	-	-	34	23.84	23,146	192.52	28,413	1,318.18
1,091	441.41	-	-	51	35.87	115,101	1,281.96	117,095	1,780.72
938	379.35	17	12.89	-	-	32,044	239.16	35,402	691.96
426	172.42	-	-	17	12.03	14,897	127.75	15,698	321.22
852	344.84	-	-	34	23.84	3,544	39.90	4,498	410.30

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FIG. 4: SEASONAL FLUCTUATIONS IN BIOMASS OF MESOFAUNA.



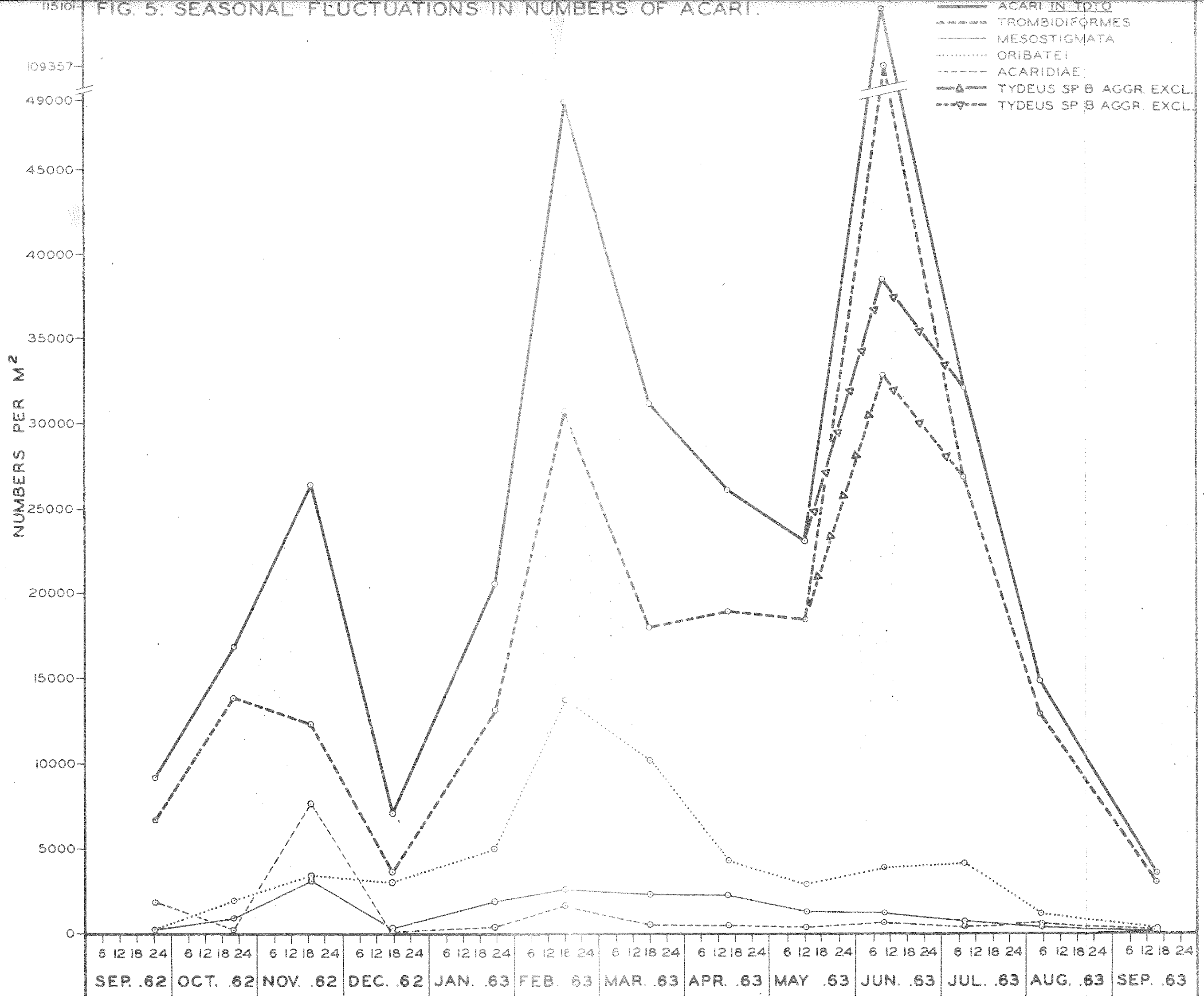
Acari reached their highest mean biomass in June 1963.

Otherwise, they were the subdominant group as far as weight is concerned (fig. 4) except during Dec. 1962 when the Araneida also exceeded the Acari in weight. The Collembola reached their highest peak in both numbers and biomass per m^2 during April 1963.

4.2 ACARI

The mites were represented by the orders Trombidiformes, Mesostigmata, Acaridiae and Oribatei. Only one specimen of the Metastigmata was collected during April 1963. The numbers per m^2 of these orders are given in table 3, whereas the fluctuations in numbers are graphically represented in fig. 5. It is evident from this figure that the Trombidiformes were the dominant group of the Acari during the entire sampling period. The Oribatei were the subdominant group from Dec. 1962 to Sept. 1963. The Mesostigmata constituted only a small part of the acarofauna whereas the Acaridiae made the smallest contribution. During Nov. 1962 the Acaridiae outnumbered the Mesostigmata and Oribatei whereas the Mesostigmata were outnumbered only by the former group during Aug. 1963. It is also evident from fig. 5 that the Trombidiformes determined to a large extent the levels of curves of the Acari and for that matter also of the microarthropods in toto (fig. 3). This close resemblance between the trombidiform and acarine graphs is especially noticeable in May, June, July and Sept. 1963. This also applies to the decline in population density of the mites as a group during Dec. 1962 whereas Oribatei, although showing a small decrease, were still present in approximately the same numbers as during Nov. 1962. As the result of a considerable rainfall preceding the December sampling date the smaller Trombidiformes might have migrated downwards whereas Oribatei, who can endure

FIG. 5: SEASONAL FLUCTUATIONS IN NUMBERS OF ACARI.

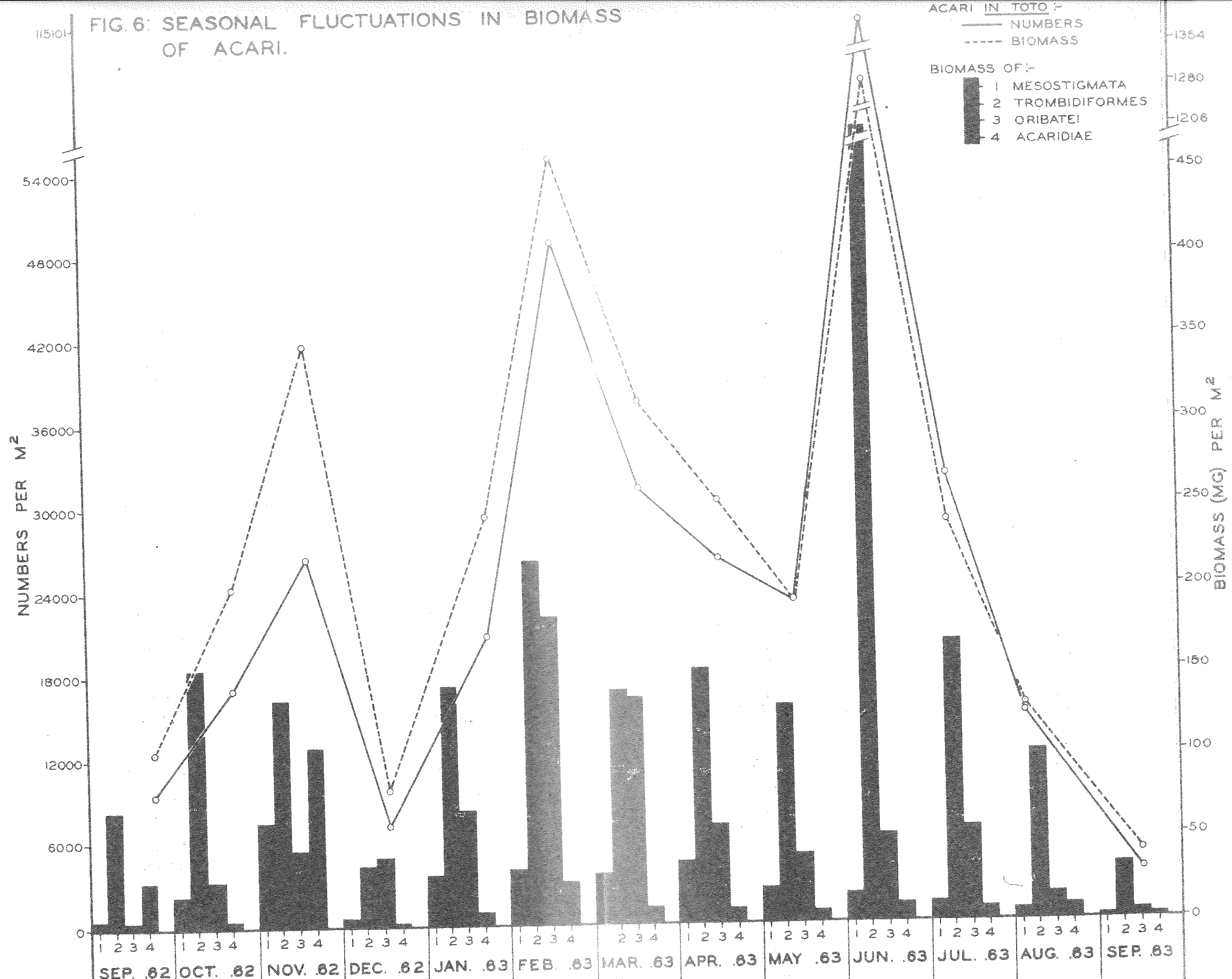


these adverse conditions better, probably stayed in the upper 5 cm layer. The latter group reached their maximum numbers (13,789 per m²) during February, a period during which the Trombidiformes rose to their second highest peak. All the mite orders registered declines in numbers during the Feb.-March period. The Mesostigmata increased gradually from Sept. 1962, reached their maximum during November and then registered a pronounced decline during December. This is followed by a steady increase during January and February 1963 and a steady decline from March to September 1963. The Oribatei increased in numbers during the Sept. - Nov. 1962 period which was followed by a small decrease during December. A steady increase during January and February lead to the Oribatei reaching their maximum numbers in the latter month which is followed by a gradual decline during the March-May period and a minor increase to July. During August and September 1963 the numbers of Oribatei diminished to about the same level of Sept. 1962. The Acaridiae occurred in rather low numbers except during Nov. 1962 when they constituted a considerable portion of the number of Acari. Loots & Ryke and Olivier & Ryke also recorded low numbers of Acaridiae on pasture and kikuyu soil respectively.

According to Loots & Ryke one must, in interpreting all the fluctuations, bear in mind that they might be explained as being related, not only to migration or normal seasonal variation at those times of the year, but also to deficiencies in the extraction process.

The biomass figures for the Acari in toto and for the different orders are given in table 3 whereas the fluctuations in numbers and biomass are compared and analysed in fig. 6. The Trombidiformes which were numerically the dominant group also dominated the biomass except during December 1962 when they

FIG. 6: SEASONAL FLUCTUATIONS IN BIOMASS OF ACARI.



were surpassed by the Oribatei. The highest biomass figure of the Acari was registered in June 1963 and the lowest during September 1963. The June peak is due to the presence of an aggregation of Tydeus sp. b. When this aggregation is excluded, the highest biomass peak was recorded in February 1963. During March the Oribatei rivalled the Trombidiformes in weight. Neither the Acaridiae nor the Mesostigmata reached very high biomass figures but the biomass values of Mesostigmata were always higher. The Oribatei reached their maximum biomass during February 1963 and their lowest during September 1962 and September 1963.

4.21 TROMBIDIFORMES

Fifty-four different species belonging to twenty-eight families constituted the trombidiform population of the soil in the present investigation (tables 24-38). The Tydeidae, Tarsonemidae, Eupodidae and Nanorchestidae were, in this order, the four numerically dominant families. The Tydeidae were represented by Coccotydeus sp., Tydeus sp. a and Tydeus sp. b. The Tarsonemidae were represented by a single species of the genus Tarsonemus. Two species of Eupodes represented the Eupodidae viz. Eupodes parafusifer Meyer & Ryke and Eupodes sp. whereas the Nanorchestidae were comprised by Nanorchestes sp. and Speleorchestes sp. .

In addition to the above-mentioned families representatives of the following families were collected from almost every sample but were less abundant: Tetranychidae (Bryobia borealis, Eotetranychus sp., Monoceronychus sp., Oligonychus sp., Schizotetranychus sp. and Tetranychus sp.); Bdellidae (Bdella sp., Spinibdella cronini, and Cyta sp.); Cunaxidae (Cunaxa taurus, Cunaxa sp. and Cunaxoides sp.); Scutacaridae (Scutacarus sp.); Pachygnathidae (Pachygnathus

sp. and Bimichaelia sp.); Alicorhagiidae (Alicorhagia sp.); Pyemotidae (Pygmephorus sp.); Pseudocheylidae (Pseudocheylus sp.); Stigmaeidae (Apostigmaeus navicella, Ledermulleria sp., Stigmaeus sp. and Agistemus africanus); Erythraeidae (Abrolophus bipilus, Hauptmannia sp., Bochartia sp., Erythraeus sp. and Leptus sp.).

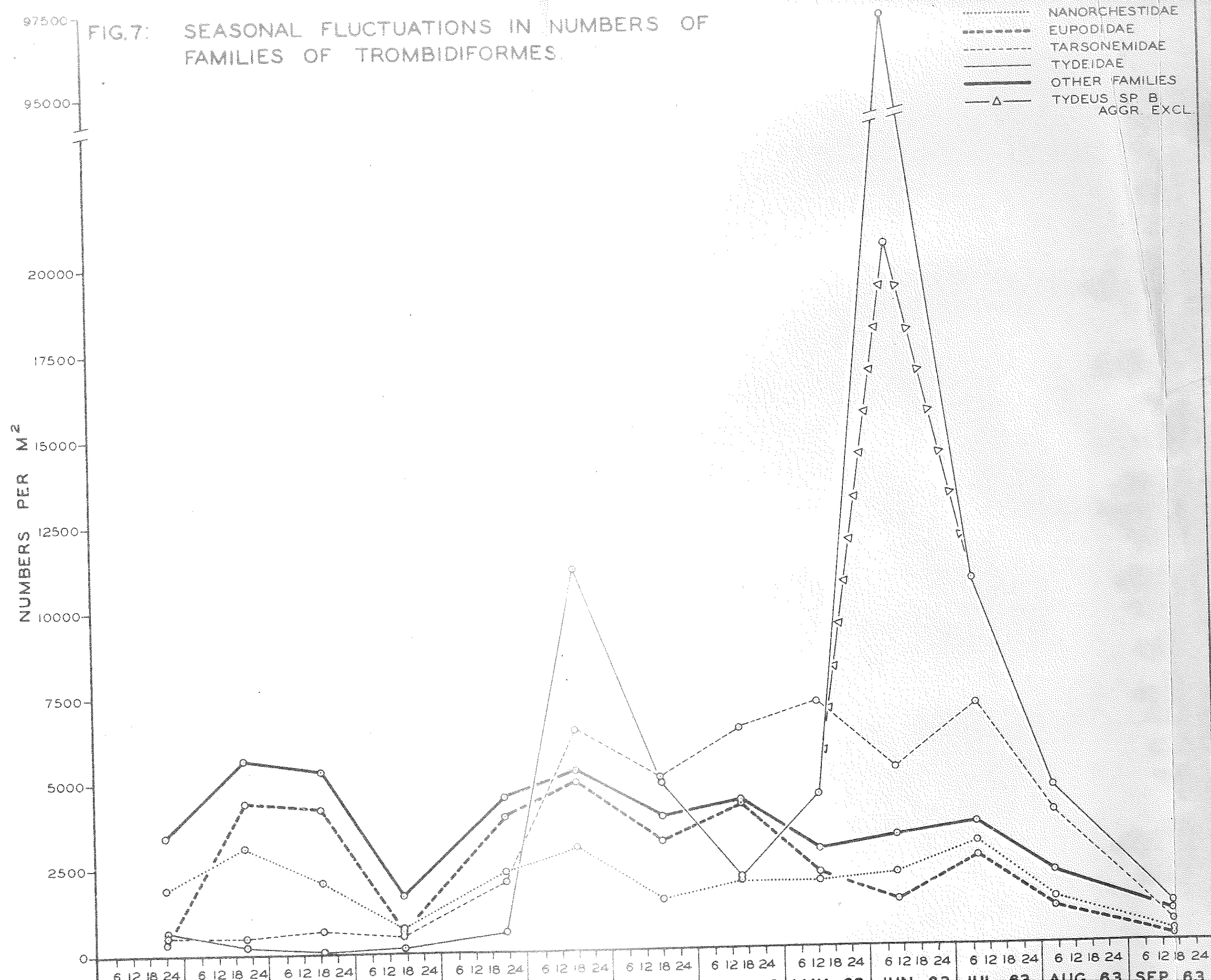
The families Tenuipalpidae (Brevipalpus obovatus and Dolichotetranychus sp.), Paratydeidae (Scolotydeus sp.), Anystidae (Adamystus sp., Bechsteinia sp. and Anandia sp.) occurred relatively frequently in the samples. The representatives of the following families, however, were rarely encountered: Tuckerellidae (Tuckerella ornata), Linotetranidae (Linotetransus sp.), Lordalychidae (Lordalychus sp.), Caligonellidae (Neophyllobius sp.), Eupalopsellidae (Eupalopsellus sp.), Raphignathidae (Raphignathus sp.), Teneriffiidae (1 species, probably new to science), Trombidiidae (Etmulleria sp. and Microtrombidium sp.), Eriophyidae (genus indet.) and Cheyletidae (genus indet.).

In tables 24 - 38 the numbers of individuals of all species of Trombidiformes collected from each subsample during the sampling period are given. The mean number per subsample for each species as well as for each family, and the mean number per m^2 calculated from the 13 samples, are also furnished. Other data summarized in these tables are the mean biomass per individual for each species, the estimated mean biomass per individual for each family, and the biomass per m^2 for each species and each family. Table 4 gives an analysis of the number per m^2 of the four numerically dominant families as well as the remaining trombidiform families considered together. The seasonal fluctuations in numbers are illustrated by the curves in fig. 7.

The phenomenon that the numbers of the Nanorchestidae,

TABLE 4
NUMBERS AND BIOMASS(mg) OF TROMBIDIFORMES PER m²

Date	Tydeidae		Tarsonemidae		Eupodidae		Nanorchestidae		Other Families	
	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass
24 Sep..62	682	8.59	494	1.98	307	4.30	1875	5.62	3375	48.44
22 Oct..62	205	2.15	477	1.91	4363	61.09	3085	8.02	5677	81.31
19 Nov..62	68	0.72	665	2.66	4210	58.94	2079	5.20	5318	67.32
17 Dec..62	136	1.23	477	1.91	614	8.59	733	1.98	1670	21.40
23 Jan..63	511	5.47	1977	7.91	3920	54.88	2284	5.48	4483	67.28
18 Feb..63	11147	47.93	6426	25.70	4926	68.96	2983	7.46	5232	66.10
18 Mar..63	4670	22.42	4977	19.91	3136	43.91	1449	3.77	3869	49.02
16 Apr..63 A	699	4.54	5795	23.18	3034	42.48	1687	4.39	5063	71.79
16 Apr..63 B	3443	12.39	6988	27.95	5386	75.41	2267	5.21	3665	38.76
16 Apr..63 C	2071	8.49	6392	25.57	4218	59.06	1977	4.74	4355	54.71
13 May .63	4449	32.03	7159	28.63	2165	30.31	1909	4.58	2828	30.03
10 Jun..63	97256	1128.17	5198	20.79	1551	21.72	2130	4.90	3222	30.47
8 Jul..63	10687	59.85	7022	28.09	2557	35.79	2983	6.56	3562	37.51
5 Aug..63	4585	39.89	3835	15.34	1074	15.03	1312	3.15	2097	26.62
16 Sep..63	1142	12.56	562	2.25	136	1.91	273	0.82	904	14.92



the least dominant family, usually were high when those of the Tydeidae were relatively low and vice versa was noted by Olivier & Ryke and confirmed by Loots & Ryke. A comparison between the curves of these two families (fig. 7) shows to a certain extent the same tendency. The Nanorchestidae reached their highest peaks during October, February and July whereas the Tydeidae reached their's during February and June. The lowest levels were reached by the tydeids during the Sept. - Jan. period when the numbers of Nanorchestidae were relatively high.

According to Loots & Ryke it seems reasonable to assume that the relatively wet autumn and early winter months created conditions which were especially favourable for the tydeids. This is clearly shown by the abnormal peak reached by the Trombidiformes (and the Acari in toto) during June 1963 due to the aggregation of Tydeus sp. b which was numerically the dominant species. The Tarsonemidae, which reached their maxima during May and July, constituted the subdominant family. The third dominant family, the Eupodidae, were most abundant during February and least abundant during Sept. 1963.

In fig. 8 the seasonal fluctuations in the numbers of the species of the tydeids are illustrated graphically whereas table 5 gives an analysis of the numbers and biomass per m². Although present in low numbers throughout the sampling period, the numbers of Tydeus sp. b recovered from the June sample made them the largest contributors to the numbers of the Tydeidae. The subdominant Coccotydeus sp., however, was usually the numerically dominant species. Tydeus sp. a occurred in relatively high numbers throughout the sampling period but it constituted the least dominant species of the tydeids. The three species occurred in different numbers (Tydeus sp. a, 614 per m²; Tydeus sp. b,

FIG. 8: SEASONAL FLUCTUATIONS IN NUMBERS OF SPECIES OF TYDEIDAE.

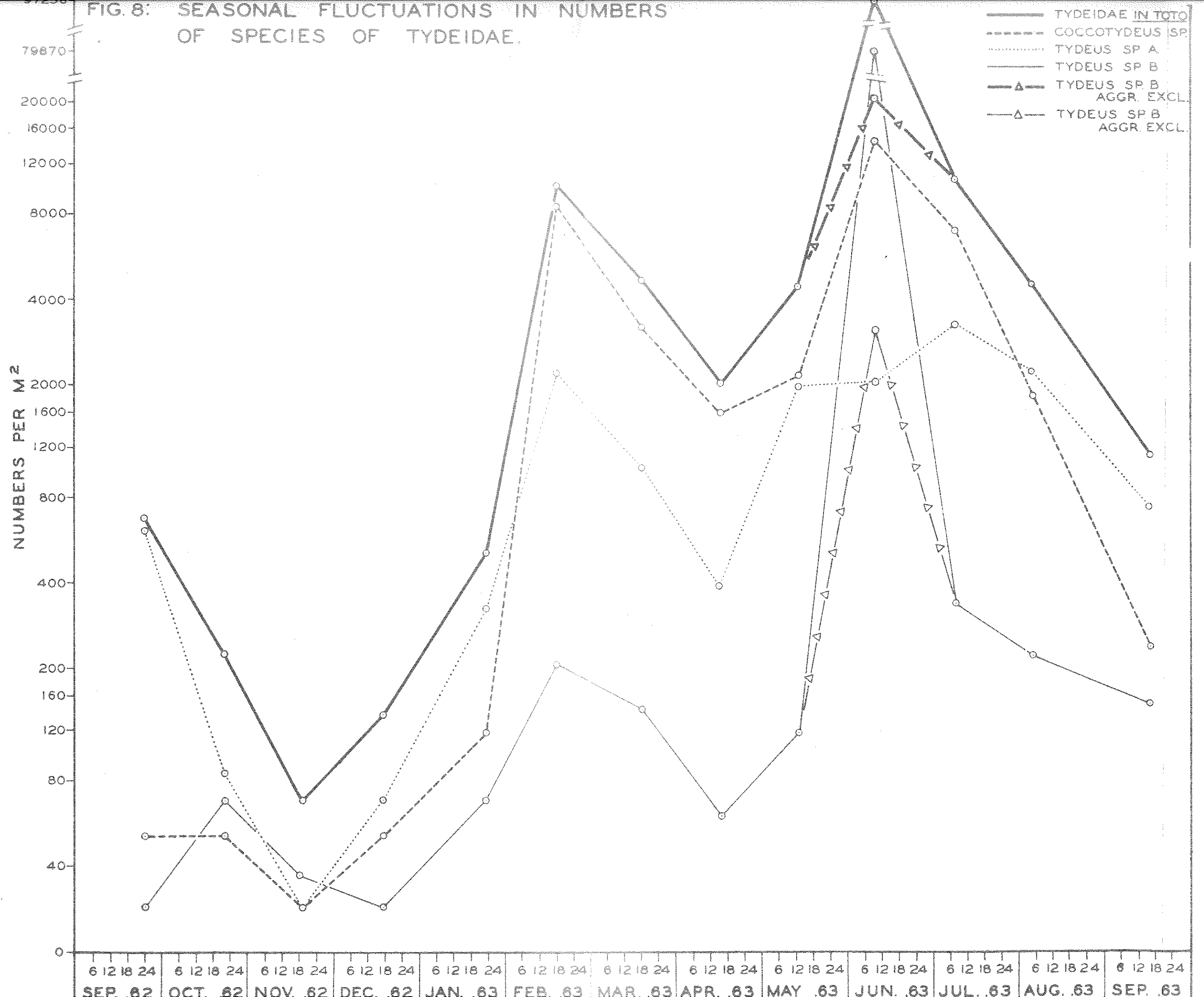


TABLE 5

NUMBERS AND BIOMASS(mg) OF TYDEIDAE PER m²

Date	Tydeidae		Coccotydus sp.		Tydeus sp. a		Tydeus sp. b	
	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass
24 Sep..62	682	8.59	51	0.08	614	8.28	17	0.23
22 Oct..62	205	2.15	51	0.08	85	1.15	68	0.92
19 Nov..62	68	0.72	17	0.03	17	0.23	34	0.46
17 Dec..62	136	1.23	51	0.08	68	0.92	17	0.23
23 Jan..63	511	5.47	119	0.18	324	4.37	68	0.92
18 Feb..63	11,147	47.93	8,539	12.81	2,403	32.44	205	2.76
18 Mar..63	4,670	22.42	3,392	5.09	1,108	14.96	171	2.30
16 Apr..63 A	699	4.54	409	0.61	239	3.22	51	0.69
16 Apr..63 B	3,443	12.39	2,829	4.24	545	7.36	68	0.92
16 Apr..63 C	2,071	8.49	1,619	2.43	392	5.29	60	0.80
13 May .63	4,449	32.03	2,352	3.53	1,977	26.69	119	1.61
10 Jun..63	97,256	1,28.17	15,272	22.91	2,114	28.53	79,870	1,078.25
8 Jul..63	10,687	59.85	7,022	10.53	3,324	44.87	341	4.60
5 Aug..63	4,585	39.89	1,841	2.76	2,523	34.05	222	2.99
16 Sep..63	1,142	12.56	1,239	0.36	750	10.12	153	2.07

TABLE 6
NUMBERS AND BIOMASS(mg) OF EUPODIDAE PER m²

Date	Eupodidae		Eupodes sp.		Eupodes parafusifer	
	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass
24 Sep..62	307	4.30	85	1.19	222	3.10
22 Oct..62	4,363	61.09	3,937	55.12	426	5.97
19 Nov..62	4,210	58.94	3,085	43.19	1,125	15.75
17 Dec..62	614	8.59	375	5.25	239	3.34
23 Jan..63	3,920	54.88	2,915	40.80	1,006	14.08
18 Feb..63	4,926	68.96	4,074	57.03	1,852	11.93
18 Mar..63	3,136	43.91	2,437	34.12	699	9.78
16 Apr..63	3,034	42.48	2,506	35.08	528	7.40
16 Apr..63	5,386	75.41	5,147	72.06	239	3.34
16 Apr..63	4,219	59.06	3,835	53.69	384	5.37
13 May .63	2,165	30.31	1,858	26.01	307	4.30
10 Jun..63	1,551	21.72	1,415	19.81	136	1.91
8 Jul..63	2,557	35.79	2,506	35.08	51	0.72
5 Aug..63	1,074	15.63	1,040	14.56	34	0.48
16 Sep..63	136	1.91	68	0.95	68	0.95

17 per m² and Coccotydeus sp., 51 per m²) during Sept. 1962, and decreased to their lowest level in Nov. 1962, followed by an increase in numbers which led to their second highest peak in Feb. 1963. A gradual decrease in numbers was registered for all three species during the March-April period followed by a tremendous increase to the maxima of Coccotydeus sp. and Tydeus sp. b during June and of Tydeus sp. a during July. During the July-Sept. 1963 period all species decreased in numbers.

As the Tarsonemidae were represented by one species only, the seasonal fluctuations in numbers and biomass per m² for this species can be observed from the illustrations in fig. 7 and the data given in table 4.

Table 6 gives an analysis of the numbers per m² of the species of Eupodidae whereas the curves in fig. 9 illustrate the seasonal fluctuations of these two species. Although Eupodes sp. occurred in considerably larger numbers than Eupodes parafusifer both show a peak during the spring (Eupodes sp. in Oct., 3,937 per m²; Eupodes parafusifer in Nov., 1,125 per m²), a decline to a low level in December, followed by an increase during Jan. 1963 when E. parafusifer reached 1,006 per m² whereas E. sp. reaches its maximum during February (4,074 per m²). Another high recording for E. sp. occurred during April (3,835 per m²), whereas the numbers of E. parafusifer diminished steadily. During the April-June period a decrease for both species was registered, which is continued for E. parafusifer to August but followed by an increase in the numbers of E. sp. during July. Whereas the numbers of E. sp. decreased during Aug. and Sept. 1963, those of E. parafusifer increased to some extent.

In table 7 the numbers per m² of the species of Nanorchestidae are given whereas the seasonal fluctuations

FIG. 9: SEASONAL FLUCTUATIONS IN NUMBERS
OF SPECIES OF EUPODIDAE.

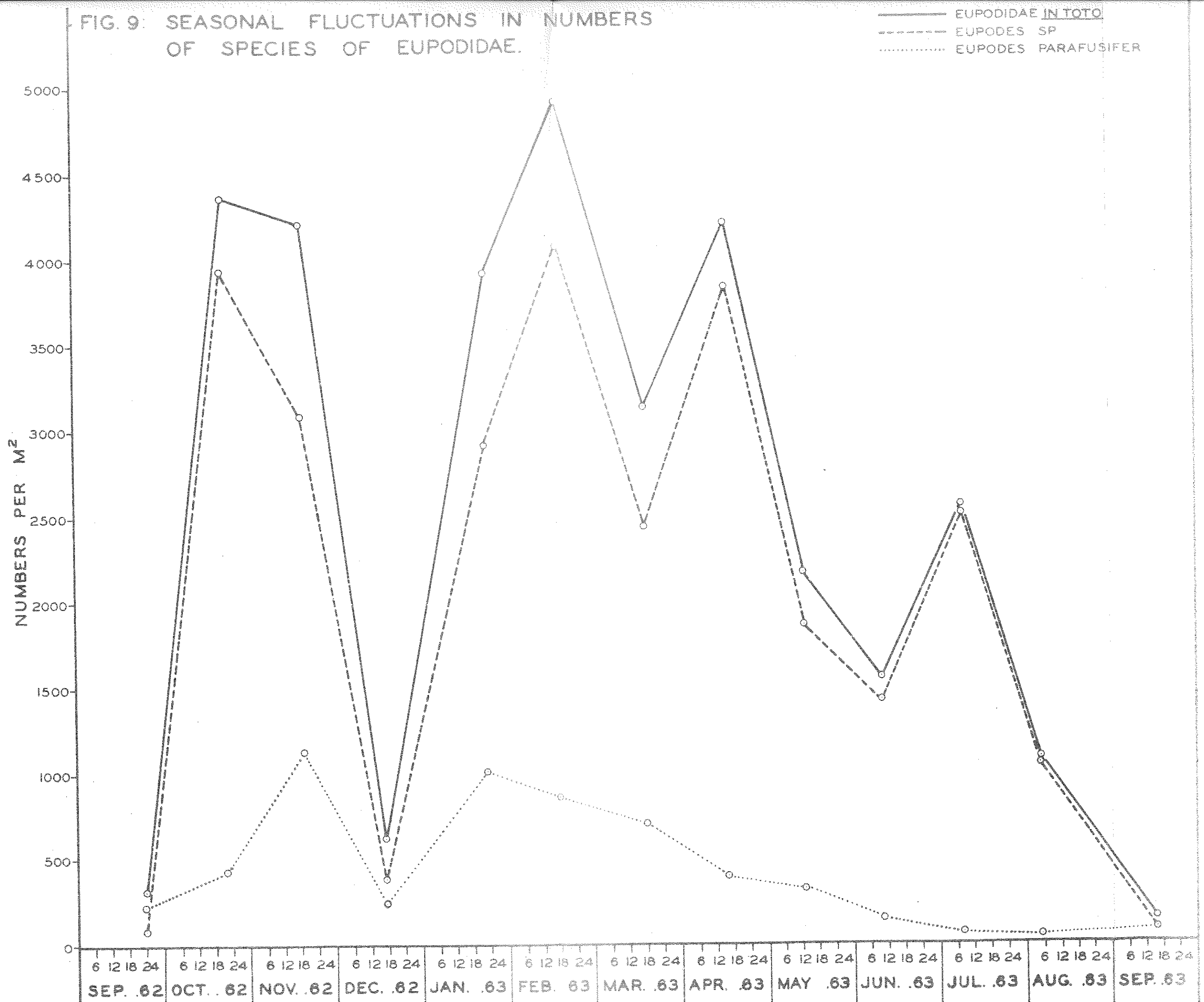
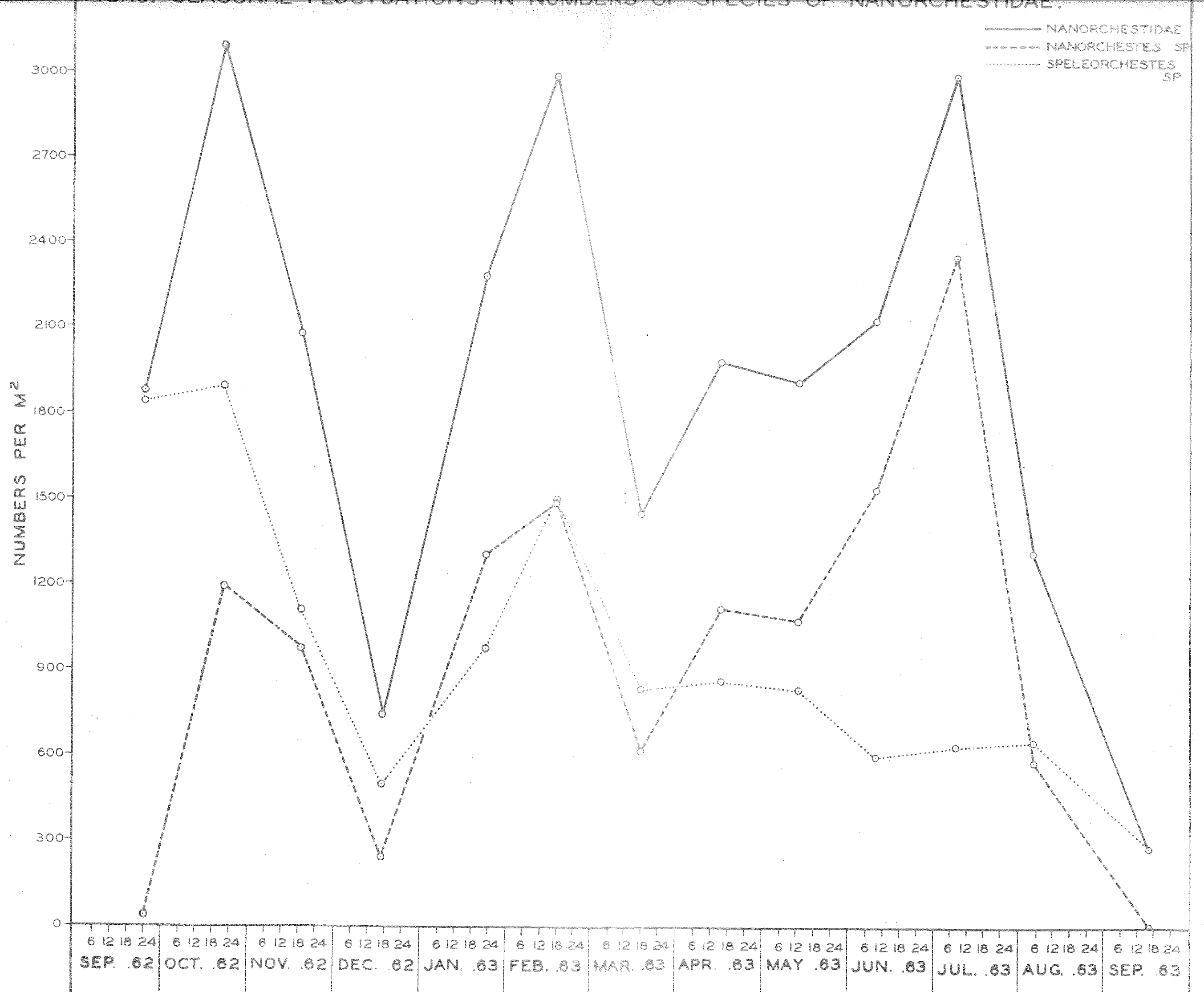


TABLE 7
NUMBERS AND BIOMASS(mg) OF NANORCHESTIDAE PER m²

Date	Nanorchestidae		Nanorchestes sp.		Speleorchestes sp.	
	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass
24 Sep..62	1,875	5.62	34	0.07	1,841	5.52
22 Oct..62	3,085	8.02	1,193	2.39	1,892	5.68
19 Nov..62	2,079	5.20	972	1.94	1,108	3.32
17 Dec..62	733	1.98	239	0.48	494	1.48
23 Jan..63	2,284	5.48	1,312	2.63	972	1.94
18 Feb..63	2,983	7.46	1,483	2.97	1,500	4.50
18 Mar..63	1,449	3.77	614	1.23	835	2.51
16 Apr..63 A	1,687	4.39	733	1.47	954	2.86
16 Apr..63 B	2,267	5.21	1,500	3.00	767	2.30
16 Apr..63 C	1,977	4.74	1,116	2.23	859	2.58
13 May .63	1,909	4.58	1,074	2.15	835	2.51
10 Jun..63	2,130	4.90	1,534	3.07	596	1.79
8 Jul..63	2,983	6.56	2,352	4.70	631	1.89
5 Aug..63	1,312	3.15	580	1.16	648	1.94
16 Sep..63	273	0.82			273	0.82

in numbers per m^2 are graphically represented in fig. 10. From this figure it is evident that when the numbers of Nanorchestes sp. were low the numbers of Speleorchestes sp. were relatively high and vice versa. During the early spring when dry spells prevailed Speleorchestes sp. occurred in relatively large numbers (Sept. 1962, 1,841 per m^2) whereas Nanorchestes sp. were present in very low numbers. After the rainfall in early October (see fig. 3; table 1) the numbers of Nanorchestes sp. increased tremendously whereas the numbers of Speleorchestes sp. decreased to some extent. During November, when rainfall values were high, the numbers of Speleorchestes sp. declined sharply whereas the numbers of Nanorchestes sp. decreased only a little. During the wet December period the numbers of both species dropped sharply but during January 1963 the numbers of Nanorchestes sp. rose more than those of Speleorchestes sp. The numbers of both species were approximately the same during the relatively dry February-March period. During the abnormal wet autumn and early winter period Nanorchestes sp. maintained high numbers whereas those of Speleorchestes sp. decreased steadily till September 1963. Nanorchestes sp. reached their maximum during July when temperatures were low and evaporation of soil moisture was slow. The numbers of Nanorchestes sp. diminished to nil in September 1963. This period is marked by drought and strong winds. While Speleorchestes sp. was still present in considerable numbers (273 per m^2) during this period no specimens of Nanorchestes sp. were collected. The same phenomenon was noticed each month in the different subsamples taken on the sampling plot. The subsamples from the subplots covered by vegetation yielded more specimens of Nanorchestes sp. than Speleorchestes sp., whereas those taken on partly or uncovered subplots yielded more Speleorchestes sp. than Nanorchestes sp. (tables 24-39).



It seems, therefore, reasonable to assume that when the soil moisture content is high (on covered soils) Nanorchestes sp. is numerically dominant to Speleorchestes sp. whereas in dry soils (usually without vegetation) Speleorchestes sp. dominate Nanorchestes sp. (See also table 21, Horizontal distribution.)

The ten dominant families of the "other families", which are each represented by specimens in almost every sample, will be briefly mentioned. These families are: Cunaxidae, Pseudocheylidae, Scutacaridae, Pyemotidae, Alicorhagiidae, Tetranychidae, Pachygnathidae, Bdellidae, Stigmaeidae and Erythraeidae, in this order of numerical importance. The seasonal fluctuations in numbers per m^2 of the first five of the above-mentioned families are graphically illustrated in fig. 11 whereas those of the last five families are depicted in fig. 12. Tables 24-38 give analyses of the number per m^2 of these families.

A comparison between the numbers of Trombidiformes per m^2 of different soils, i.e. kikuyu soil, pasture soil and Acacia soil, for the period September 1962 to September 1963, is graphically represented in fig. 13. Although the differences can be observed at first glance, a detailed observation reveals a general trend. An increase in numbers from September 1962 to the peaks between 22 October and 19 November is followed by a general decrease occurring during late December and early January 1963. Another peak is reached during February whereas a decrease in numbers was recorded during the period late February to the end of April. During May a general increase occurred, reaching peaks in either June or July, followed by a general decline during August and September 1963.

A comparison between the composition of the trom-

FIG. II. SEASONAL FLUCTUATIONS IN NUMBERS OF CUNAXIDAE, PSEUDOCHEYLIDAE, SCUTACARIDAE, PYEMOTIDAE & ALICORHAGIIDAE.

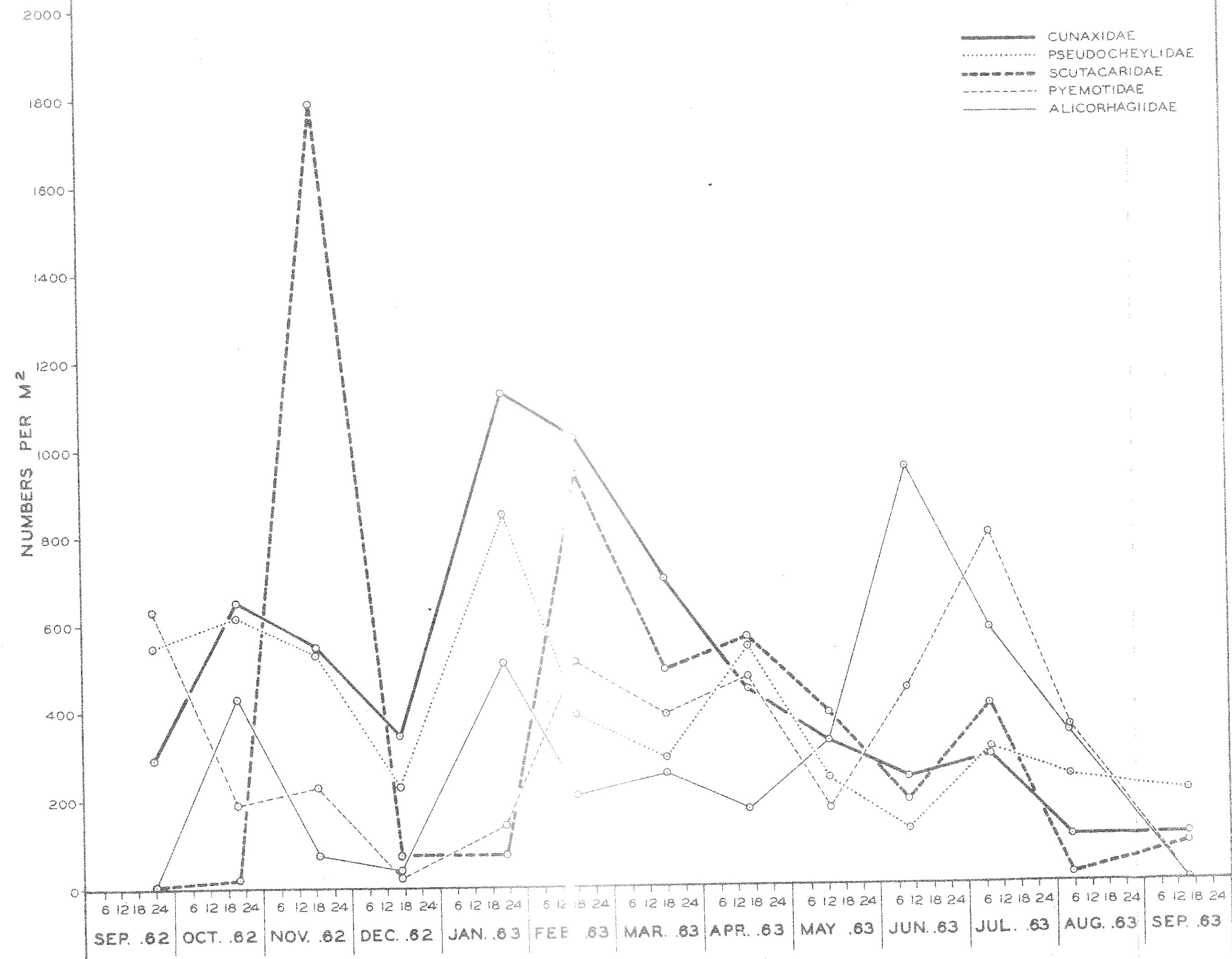


FIG. 12. SEASONAL FLUCTUATIONS IN NUMBERS OF TETRANYCHIDAE, BDELLIDAE, STIGMAEIDAE & ERYTHRAEIDAE.

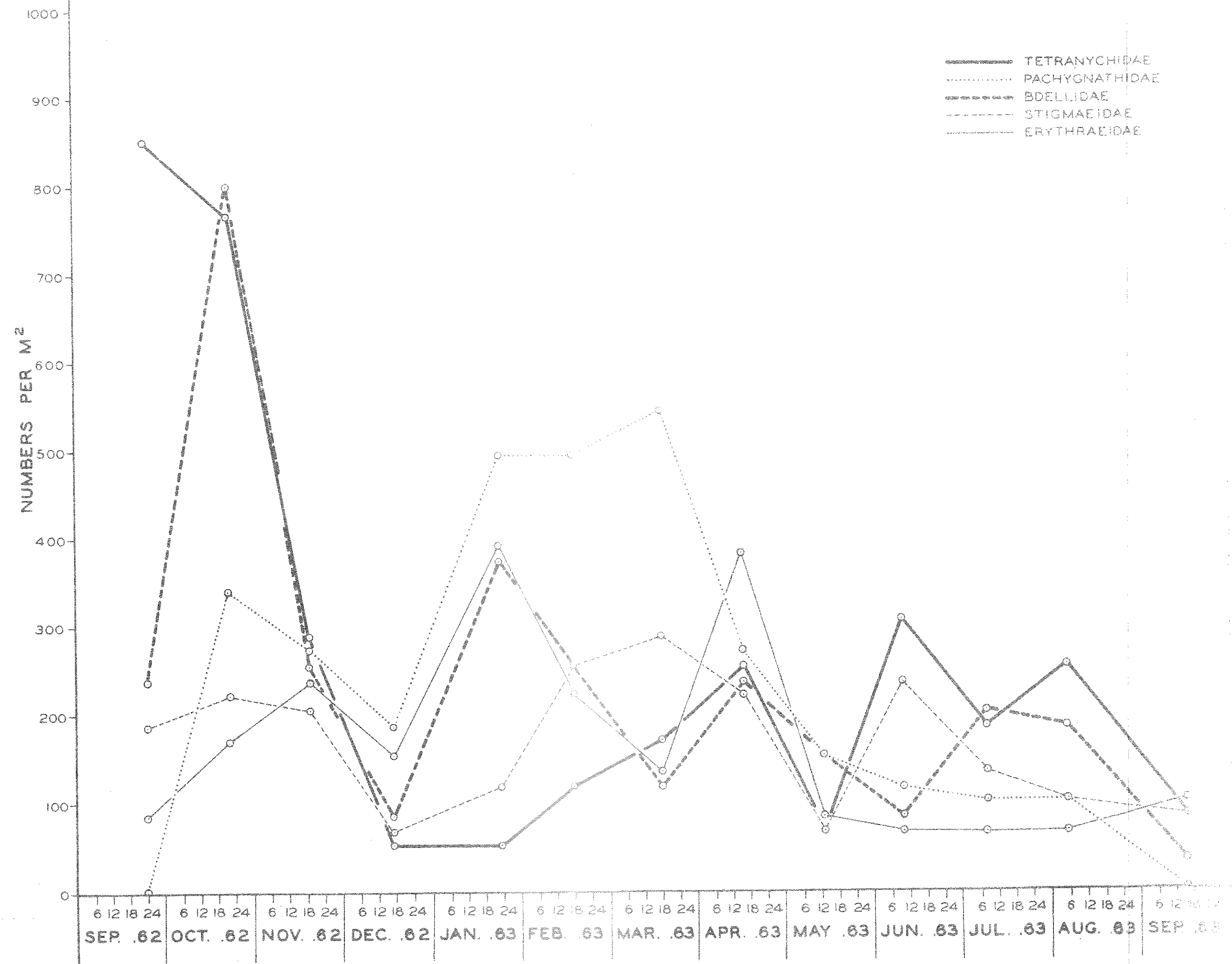
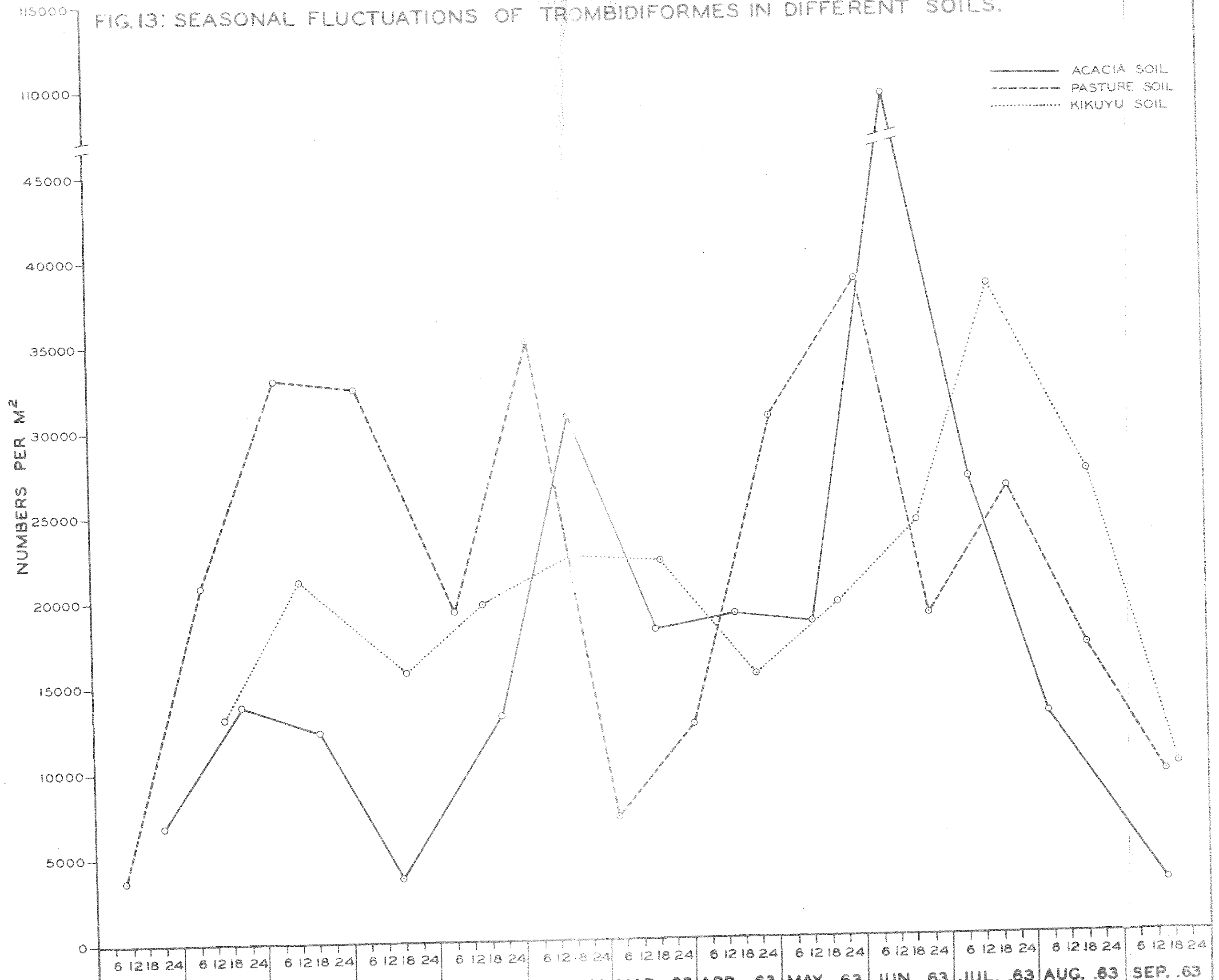


FIG.13: SEASONAL FLUCTUATIONS OF TROMBIDIFORMES IN DIFFERENT SOILS.



bidiform population of the present investigation and that of the kikuyu and pasture soils reveals that the Acacia soil harboured a greater variety of species than the other soils. Loots & Ryke recorded that six of the families which were collected from pasture soil were absent in soil under kikuyu grass. These families are the Caeculidae, Cryptognathidae, Eriophyidae, Tuckerellidae, Anystidae and Pseudocheylidae of which only the former two were absent in Acacia soil. The families Alicorhagiidae, Eupalopsellidae and Teneriffiidae were present in Acacia soil but absent in kikuyu and pasture soil. Another notable difference is the presence of three different species of Eupodes in the kikuyu soil and a single species in pasture soil compared with the two species in Acacia soil. The following species were present in pasture (Themeda) soil but absent in kikuyu soil: Dolichotetranychus sp., Ledermulleriopsis sp., Lorryia sp., Pronematus sp., Paratydeus sp. and a new species belonging to the Paratydeidae. Of these species only Dolichotetranychus sp. occurred in Acacia soil. On the other hand, the following species occurred in kikuyu soil but were absent in pasture soil: Cheylostigmaeus sp., Stigmaeus sp., Scolotydeus sp., Cunaxoides sp., Bimichaelia sp., Petralychus sp., and Bdella sp.. All these species except Cheylostigmaeus sp. and Petralychus sp. were found in Acacia soil. Species absent in both pasture and kikuyu soil but present in Acacia soil were: Bryobia borealis, Eotetranychus sp., Tetranychus sp., Cyta sp., Cunaxa taurus, Alicorhagia sp., Neophyllobius sp., Eupalopsellus sp., Adamystus sp., Anandia sp., Bochartia sp., Hauptmannia sp., Erythraeus sp. and Leptus sp.✓

The fact that Acacia soil harboured a greater variety of species than the other soils can be attributed to the varying degree of soil covering and the heterogeneity of the vegetation which created different types of micro-habitats

for the soil fauna.

The Tydeidae, Eupodidae, Tarsonemidae and Nanorchestidae are the dominant families of the Trombidiformes in the local soils. The Tetranychidae were more abundant on the pasture soil plot than on the kikuyu or the Acacia plots. On the pasture soil plot they were fourth in the order of numerical importance, on the Acacia plot tenth, and on the kikuyu plot occurred in very low frequencies.

Similar conditions obtain in steppe soil and soil covered by a xerophilous plant association in Chile (di Castri, 1963). According to di Castri, however, the Tarsonemini were absent in the steppe soil. In European soils the numbers of Trombidiformes are usually low. Evans (1951) investigated the micro-arthropod fauna of the soil of six different forests and found that 24.3% of the acarofauna consisted of Trombidiformes. Sheals (1957) states that only 1.1% of the Acari extracted from uncultivated grassland in Glasgow were represented by the Trombidiformes. Table 8 gives the figures of Acari collected from different habitats described in literature which are quoted by Macfadyen (1952). Except for the 45,200 Trombidiformes per m² recorded by Forsslund (table 8) from Vaccinium heath, it seems that this group forms an inconspicuous part of the European soil fauna. Dhillon & Gibson (1961), however, who investigated the soil of an old meadow near Leeds found that 63.7% of the Acari extracted consisted of Trombidiformes, 50.4% being Cocceupodes sp. and 13.3% Pygmephorus sp.

Biomass:

The seasonal fluctuations in biomass and numbers per m² of the Trombidiformes, and a biomass analysis of the four numerically dominant families as well as the other families

TABLE 8

Habitat	Grass-plain (Weiss-Fogh)	Beech-wood (v.d. Drift)	<u>Vaccinium</u> heath (<u>Forsslund</u>)	Cothill <u>Molinia</u> fen (Macfadyen) <u>Molinia</u> Deschampsia Juncus
Oribatei	11.0	2.1	68.1	120.7 71.2 16.1
Parasitiformes	2.0	0.2	2.6	7.4 6.6 3.1
Trombidiformes	4.8	0.4	45.2	3.5 1.4 1.1
Acaridiae	0.8	0.1	0.3	0.5 0.8 0.4
Total Mites	18.5	3.3	116.2	132.1 80.0 20.7
Collembola	8.5	0.7	15.0	25.0 24.0 7.2

(Numbers of individuals x 1000 per m²)

Table 8. Total numbers of micro-arthropods from different habitats (quoted by Macfadyen, 1952)

considered as a unit are given in fig. 14 and table 4.

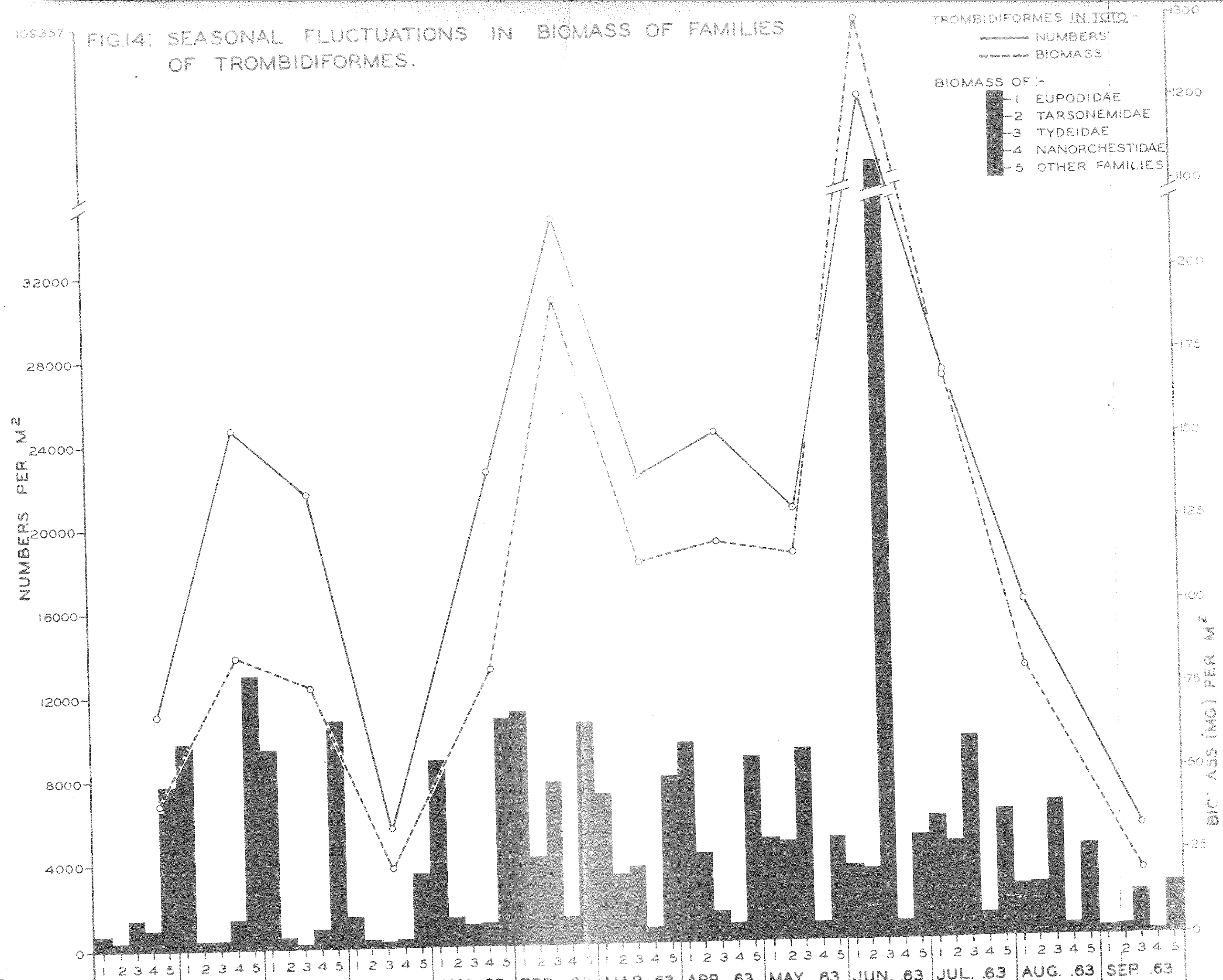
From this figure it is evident that during the first five months of the sampling period and during May and July the "other families" dominated the biomass. The highest biomass was recorded for the latter group during October 1962 and the lowest during September 1963. During February and April 1963 the Eupodidae dominated the biomass of the Trombidiformes whereas during the May-August period the Tydeidae outweighed all the other families. The highest biomass recorded (1,128 mg per m²) for one sample was that for the Tydeidae in June 1963 (fig. 14). The Nanorchestidae contributed little to the biomass of the Trombidiformes, their highest contribution being 8.02 mg per m² in October 1962. The relatively high biomass figures of the Tydeidae (as compared with the Nanorchestidae) are largely due to the presence of Tydeus sp. a and b. The mean biomass value per individual for these two species is much higher than that of the Nanorchestidae (tables 24-39).

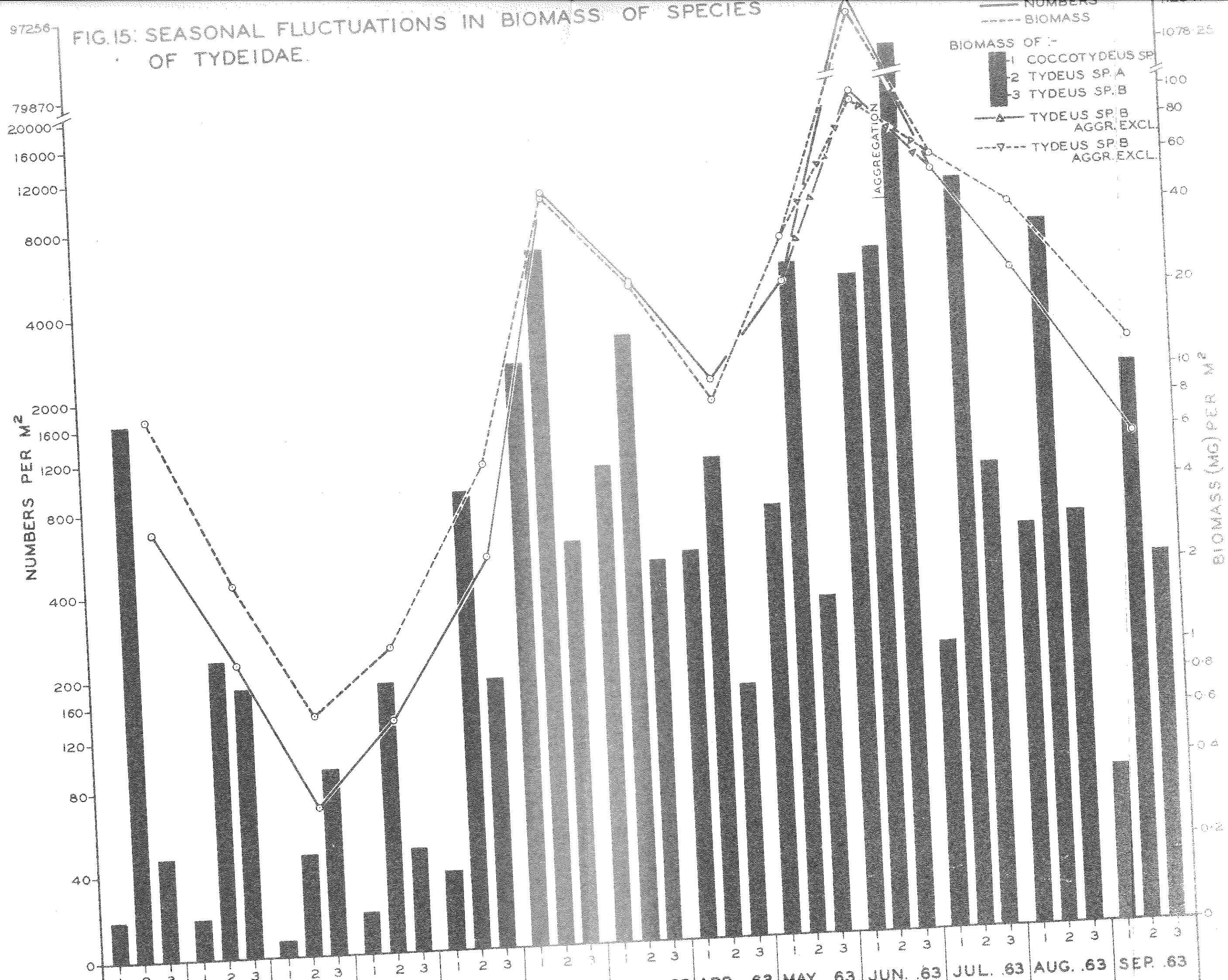
The highest biomass value recorded for the Trombidiformes was 1,206 mg per m² in June, whereas the second highest value was registered in February 1963. Loots & Ryke found the highest biomass peak to be during November 1962 whereas Olivier & Ryke recorded it during August 1963. The Tetranychidae were the largest contributors to the biomass of the Trombidiformes on the pasture soil plot, the Tydeidae on the Acacia plot and the Eupodidae on the kikuyu plot.

In table 5 an analysis is given of the numbers and biomass per m² of the species of the Tydeidae whereas in fig. 15 the seasonal fluctuations in biomass per m² are graphically illustrated. From this figure it is evident that Tydeus sp. a was the largest contributor to the biomass during almost the entire sampling period. In November 1962 and June 1963

109357

FIG.14: SEASONAL FLUCTUATIONS IN BIOMASS OF FAMILIES OF TROMBIDIFORMES.





T.sp.b was the dominant group concerning weight.

Coccotydeus sp. was the smallest contributor to the biomass of the Tydeidae during the September 1962-January 1963 period and the June-September 1963 period. This species was the second most important contributor during the February-May period. Tydeus sp.b, although present in low numbers in 12 of 13 samples, was the largest contributor to the weight of the Tydeidae. With the aggregation of June excluded, however, it is the second highest contributor.

The reader is referred to fig. 14 for a graphical illustration of the seasonal fluctuation of the single representative of the Tarsonemidae viz. Tarsonemus sp.

Table 6 gives an analysis of, and fig. 16 shows, the seasonal fluctuations in numbers and biomass (mg) per m² of Eupodes sp. and E.parafusifer (Eupodidae). Except in September 1962 and September 1963, E.sp. was the highest contributor to the biomass of the Eupodidae. Eupodes sp. reached its highest biomass value in February 1963 and E.parafusifer in November 1962.

In fig. 17 and table 7 the seasonal fluctuations in biomass and numbers per m² of the family Nanorchestidae and its two representatives, Nanorchestes sp. and Speleorchestes sp., are given. The rise in biomass of the family during October 1962 and January and April 1963 was due to the presence of much higher numbers of Nanorchestes sp. than Speleorchestes sp. During the other months of the sampling period Speleorchestes sp. dominated the biomass.

In figs. 18 and 19 the seasonal fluctuations in biomass of the five numerically important families of the "other families" and those of the next five families are respectively illustrated. The Tetranychidae and Bdellidae were the highest contributors to the biomass during the September-October 1962

FIG. 16: SEASONAL FLUCTUATIONS IN BIOMASS OF SPECIES OF EUPODIDAE

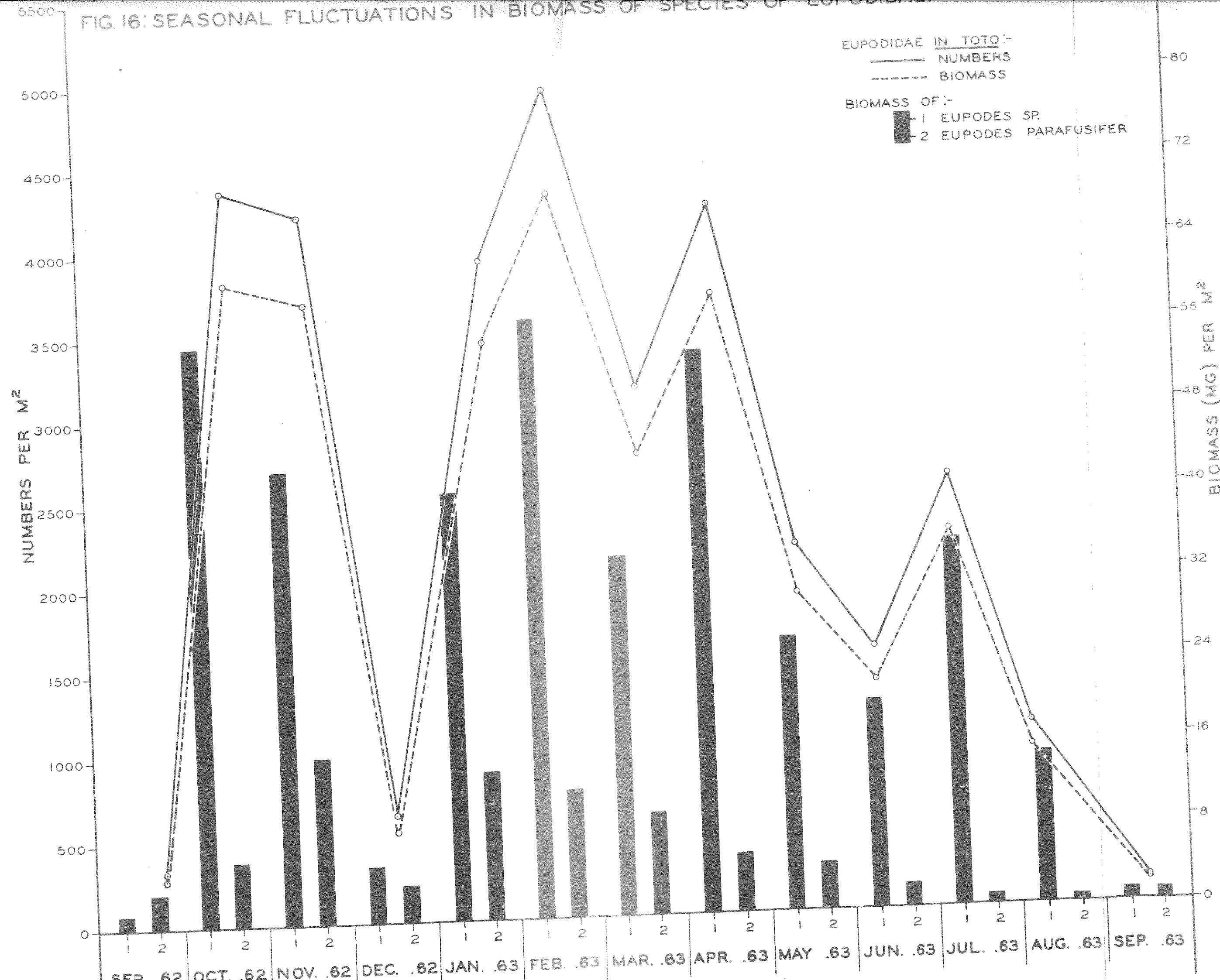


FIG.17: SEASONAL FLUCTUATIONS IN BIOMASS OF SPECIES OF NANORCHESTIDAE.

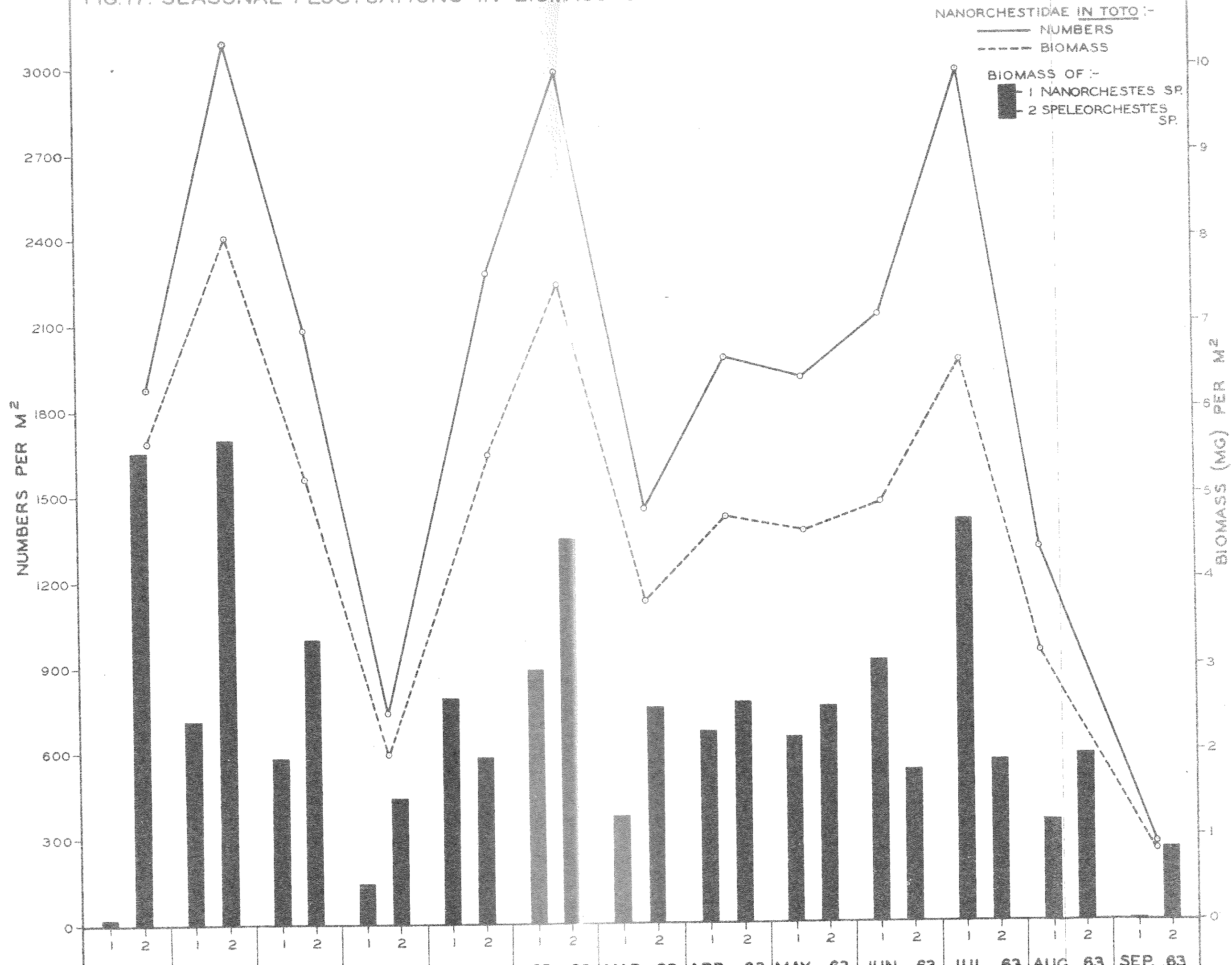


FIG.18: SEASONAL FLUCTUATIONS IN BIOMASS OF CUNAXIDAE, PSEUDOCHEYLIDAE, SCUTACARIDAE, PYEMOTIDAE & ALICORHAGIIDAE.

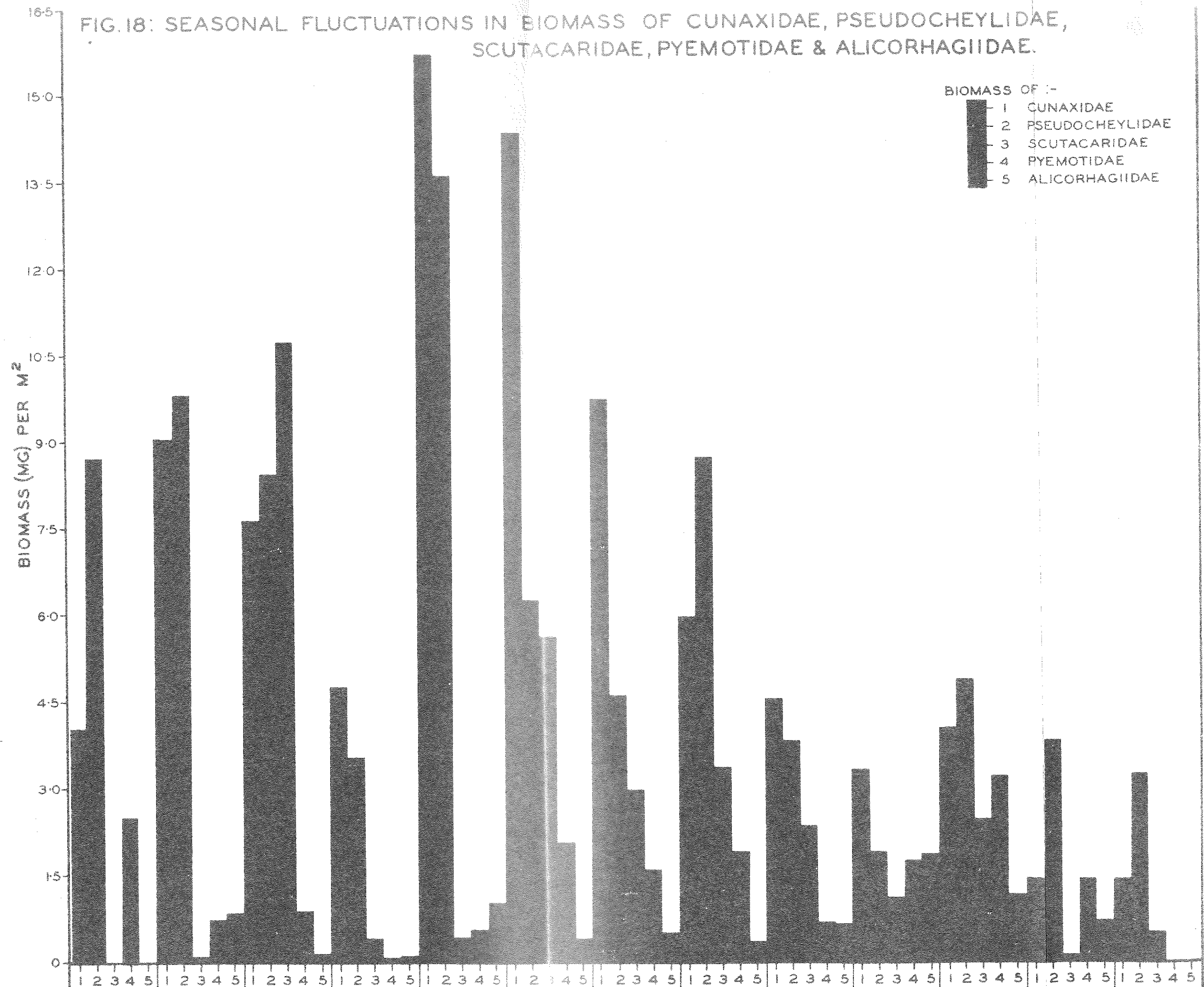
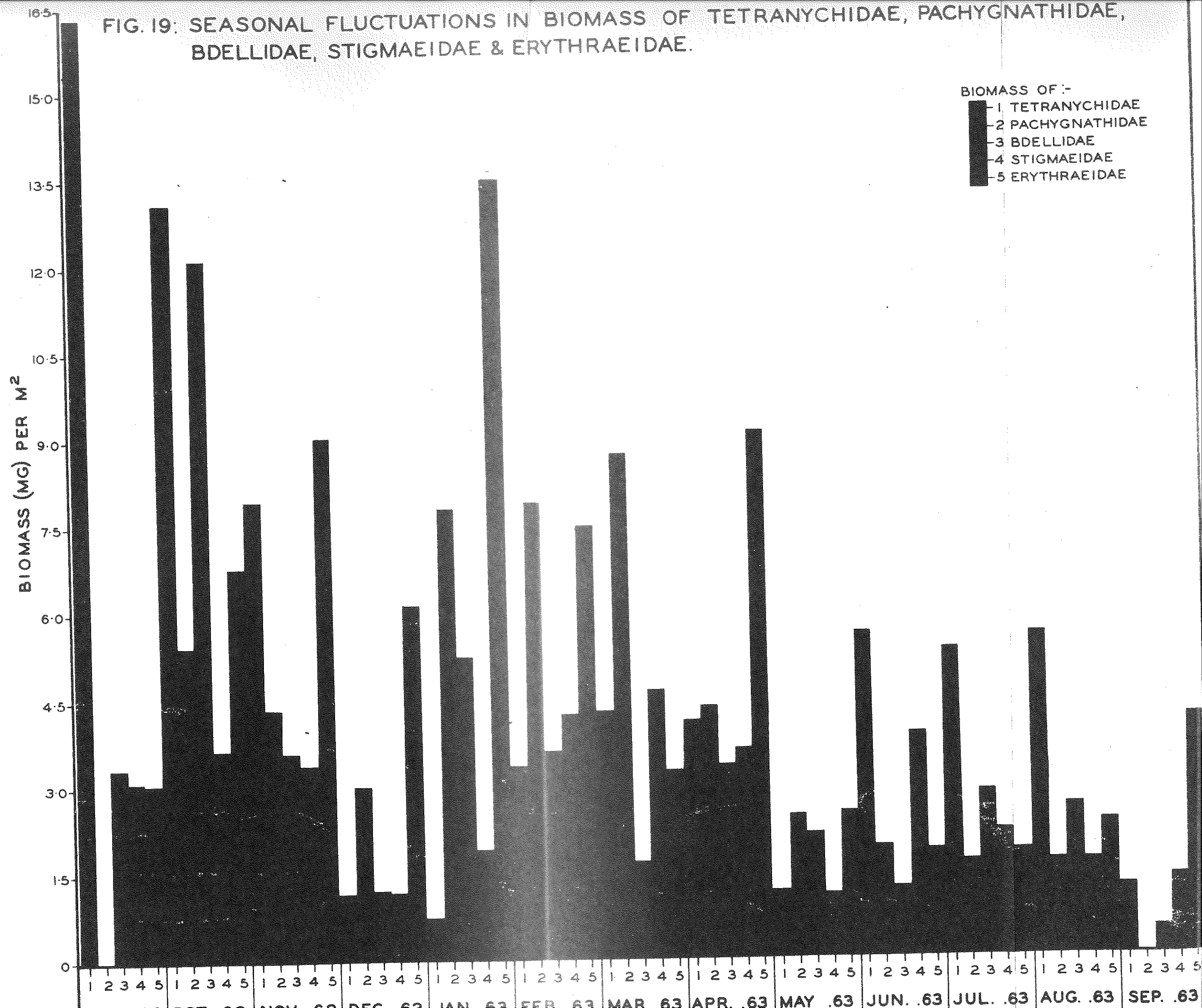


FIG. 19. SEASONAL FLUCTUATIONS IN BIOMASS OF TETRANYCHIDAE, PACHYGNATHIDAE, BDELLIDAE, STIGMAEIDAE & ERYTHRAEIDAE.



period. During November 1962 the Scutacaridae and Erythraeidae outweighed the others of the ten families. The Cunaxidae, Pseudocheylidae and Pachygnathidae dominated the biomass during December 1962, whereas the former two and the Erythraeidae were superior in January 1962. The Cunaxidae and Pachygnathidae provided the bulk of the biomass during February and March, while the Pseudocheylidae and Erythraeidae were dominant in April. The latter family and the Cunaxidae registered the highest weight in May. During June, July and August the Tetranychidae provided the bulk of the biomass while in September 1963 the Erythraeidae were dominant. The Cunaxidae, the largest contributors to the biomass of the "other families", provided 88.14 mg during the entire sampling period whereas the Pseudocheylidae, Erythraeidae and Tetranychidae contributed 81.54 mg, 70.92 mg and 69.87 mg, respectively.

From figs. 14-17 it is evident that the biomass of the Trombidiformes show pronounced fluctuations throughout the sampling period. This can be attributed to differences in biomass per individual and the numbers extracted which, in turn, depend on the heterogeneity and uneven distribution of the vegetation.

4.22 MESOSTIGMATA.

Twenty-eight different species belonging to eight families constituted the mesostigmatid population of the soil under Acacia trees (tables 40-54). The Rhodacaridae were represented by the following species: Rhodacarellus sublapideus Ryke, Digamasellus badenhorsti Ryke, a new species of Gamasellus (sp.a), Saprolaelaps sp. and a new species of Gamasellopsis. The Aceosejidae included Asca spinosa Ryke, A. aethiopica Ryke, Gamasellodes seminudus

(Ryke), Protogamasellus sp.a, P.sp.b (closely related to P. primitivus Karg), P.sp.c (all Protogamasellus species being new), Lasioseius sp.a, and Proctolaelaps sp./

Seven different species belonging to five genera represented the Laelaptidae. The genus Gaeolaelaps is represented by G. sp.a (only one specimen), G.sp.b (probably a new sub-species of G.praesternalis Willman), and G. paracasalis (Ryke). The other species are Cosmolaelaps sp. (probably new), Laelaspis sp., Leptolaelaps elegans Berlese, and one specimen of the new genus Laelaspisella. Both the families Pachylaelaptidae (Pachylaelaps) and Ameroseiidae (Kleemannia) were represented by one species only. The family Phytoseiidae included the genera Amblyseius (spp. a & b) and Typhlodromus (Neoseiulus) (one species). The Parasitidae were represented by only four nymphal specimens of an unidentified genus. Only two specimens of an unidentified genus of the Uropodoidea were collected during the entire sampling period.

When the fauna compositions of the pasture, kikuyu and Acacia soils are compared it is evident that the fauna of the Acacia soil correspond with that of the pasture soil. The fauna composition of kikuyu soil is quite different from the other two soil types (see Olivier & Ryke, in press, and Loots & Ryke, in press) especially on the lower level of classification. Olivier & Ryke collected 17 species belonging to 6 mesostigmatid families whereas Loots & Ryke collected 26 species belonging to seven families.

It should be pointed out that the genera Asca and Antennoseius were formerly placed in the Rhodacaridae (see Olivier & Ryke) but they are now included in the Aceosejidae. Furthermore, the species mentioned by these authors under the name Rhodacarellus sp. is actually a member of the genus

Protogamasellus.

Whereas the Parasitidae, Veigaiaidae and Zerconidae usually are the dominant families of the Mesostigmata extracted from European soils, only four specimens of the former family were collected from Acacia soil.

In tables 40-54 the actual number of each species of the Mesostigmata extracted from each subsample is given. In Table 9 an analysis is given of the numbers per m^2 of the four dominant families. The seasonal fluctuations of these families as well as the Mesostigmata in toto are graphically represented in fig. 20.

The largest number of Mesostigmata (3,153 per m^2) was extracted from the November sample, the February sample also yielding another high figure (2,608 per m^2). Except for the **low numbers in December the Mesostigmata occurred in larger numbers during the summer and autumn than during the winter and spring.** The five numerically dominant families were the Laelaptidae, Rhodacaridae, Aceosejidae, Pachylaelaptidae and Phytoseiidae, in this order of importance. The largest number of Laelaptidae (1,858 per m^2) was extracted in November 1962. This number is mainly responsible for the peak shown by the Mesostigmata during this month. The lowest number recorded for this family was during September 1963. The Rhodacaridae reached the maximum of 1,278 individuals per m^2 during February and was responsible for the high numbers recorded for the Mesostigmata during this month. The minimum numbers of Rhodacaridae were extracted in September 1963. The Aceosejidae were most abundant (1,006 per m^2) during March 1963 and least abundant during September 1963. A steady increase for this family is shown from December to March, followed by a steady decrease from March to September 1963. The Pachylaelaptidae were most abundant in the May sample (102 per m^2). The Phytoseiidae, which reached their maximum numbers

TABLE 9
NUMBERS AND BIOMASS(mg) OF MESOSTIGMATA PER m²

Date	Rhodacaridae		Acoosejidae		Phytoseiidae		Laelaptidae		Pachylaelaptidae		Other families	
	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass
24 Sep..62	17	0.38	68	0.41	17	0.14	153	3.07	34	0.82	17	0.69
22 Oct..62	324	3.56	85	1.00	34	0.27	494	11.86			51	2.05
19 Nov..62	528	6.39	682	4.02	17	0.14	1,858	48.31				
17 Dec..62	68	0.75	187	0.94			85	1.94				
23 Jan..63	409	5.28	733	6.45	34	0.27	750	15.52	51	1.23	17	0.41
18 Feb..63	1,278	14.96	801	5.45			477	11.03			17	0.41
18 Mar..63	596	7.81	1,006	6.03			614	12.76	68	1.63		
16 Apr..63A	665	8.91	835	7.60	51	0.41	733	15.61	68	1.63	17	0.69
16 Apr..63B	631	9.21	648	3.76	34	0.27	920	22.09	17	0.41	17	0.69
16 Apr..63C	648	9.07	742	5.71	43	0.34	827	18.68	43	1.02	17	0.69
13 May .63	375	5.44	477	2.77			375	9.04	102	2.45		
10 Jun..63	767	8.82	222	1.93	85	0.68	102	2.55	68	1.63		
8 Jul..63	239	3.77	187	0.66	34	0.27	171	4.95				
5 Aug..63	171	2.25	85	1.01			68	1.87				
16 Sep..63			51	0.66			51	1.02			17	0.41

FIG. 20. SEASONAL FLUCTUATIONS IN NUMBERS OF FAMILIES OF MESOSTIGMATA.

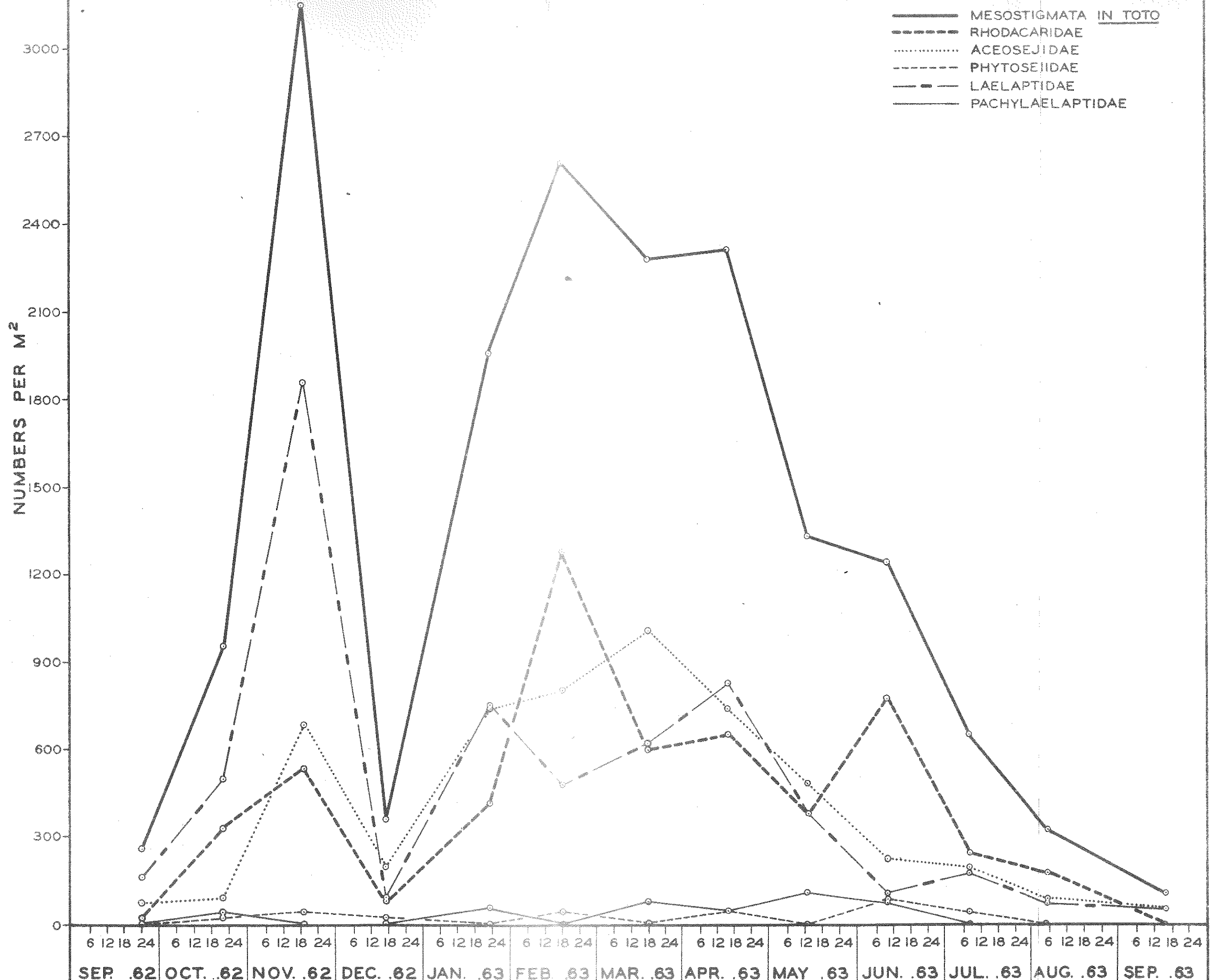


FIG. 21: SEASONAL FLUCTUATIONS IN NUMBERS OF SPECIES OF LAELAPTIDAE.

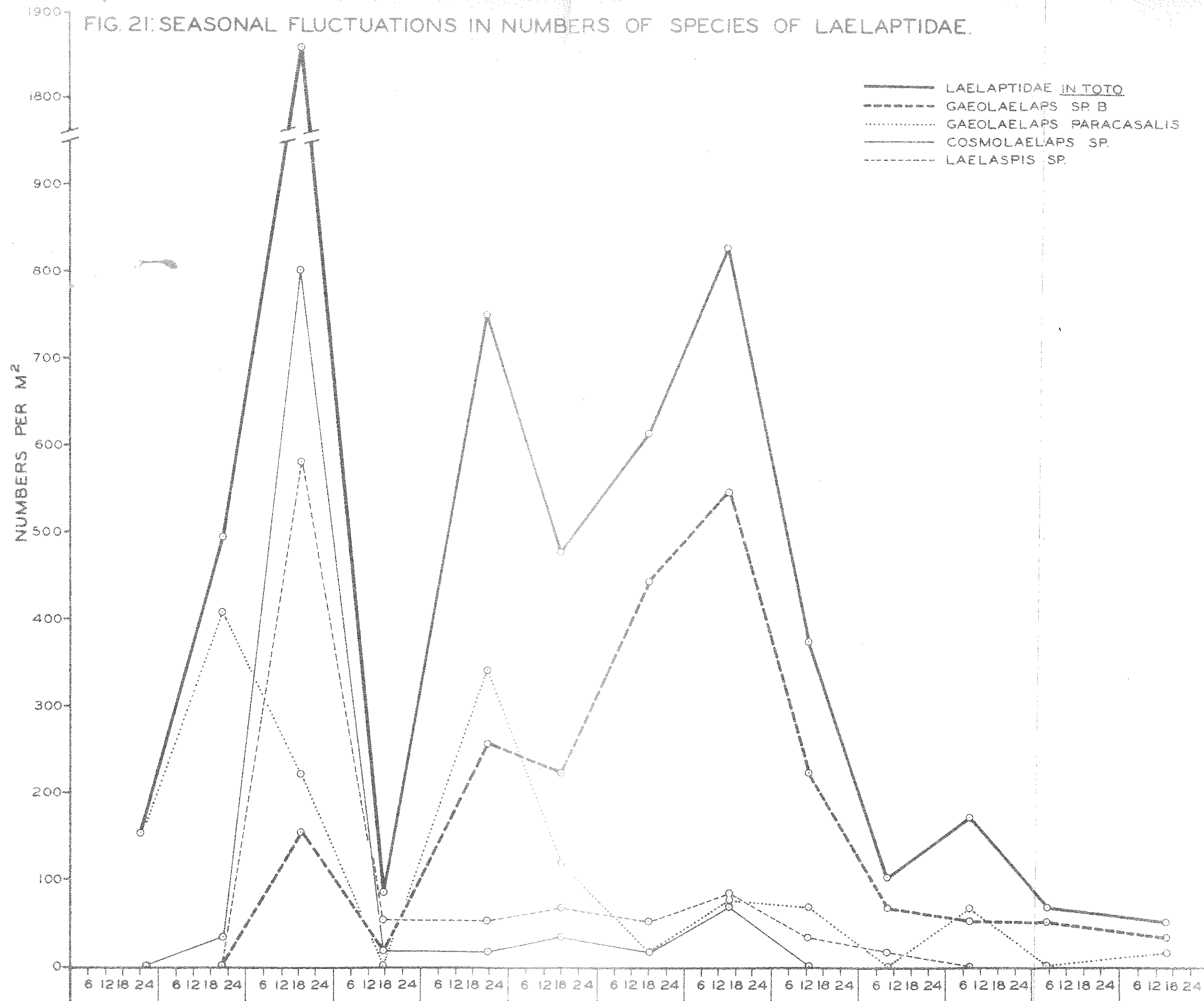


TABLE 10
NUMBERS AND BIOMASS(mg) OF LAELAPTIDAE PER m²

Date	Laelaptidae		Gaeolaelaps sp. b		Gaeolaelaps paracasalis		Cosmolaelaps sp.	
	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass
24 Sep...62	153	3.07	153	3.07	153	3.07	34	1.16
22 Oct...62	494	11.86	17	0.34	409	8.18	801	27.24
19 Nov...62	1,858	48.31	256	5.11	222	4.43	17	0.58
17 Dec...62	85	1.94	222	4.43	341	6.82	17	0.58
23 Jan...63	750	15.52	443	8.86	119	2.39	34	1.16
18 Feb...63	477	11.03	562	11.25	17	0.34	17	0.58
18 Mar...63	614	12.76	528	10.57	136	2.72	68	2.32
16 Apr...63 A	733	15.61	545	10.91	77	1.53	68	2.32
16 Apr...63 B	920	22.09	222	4.43	68	1.36	68	2.32
16 Apr...63 C	827	18.68	68	1.36	68	1.36		
13 May .63	375	9.04	51	1.02				
10 Jun...63	102	2.55	51	1.02				
8 Jul...63	171	4.95	34	0.68				
5 Aug...63	68	1.87						
16 Sep...63	51	1.02						

TABLE 10 (continued)

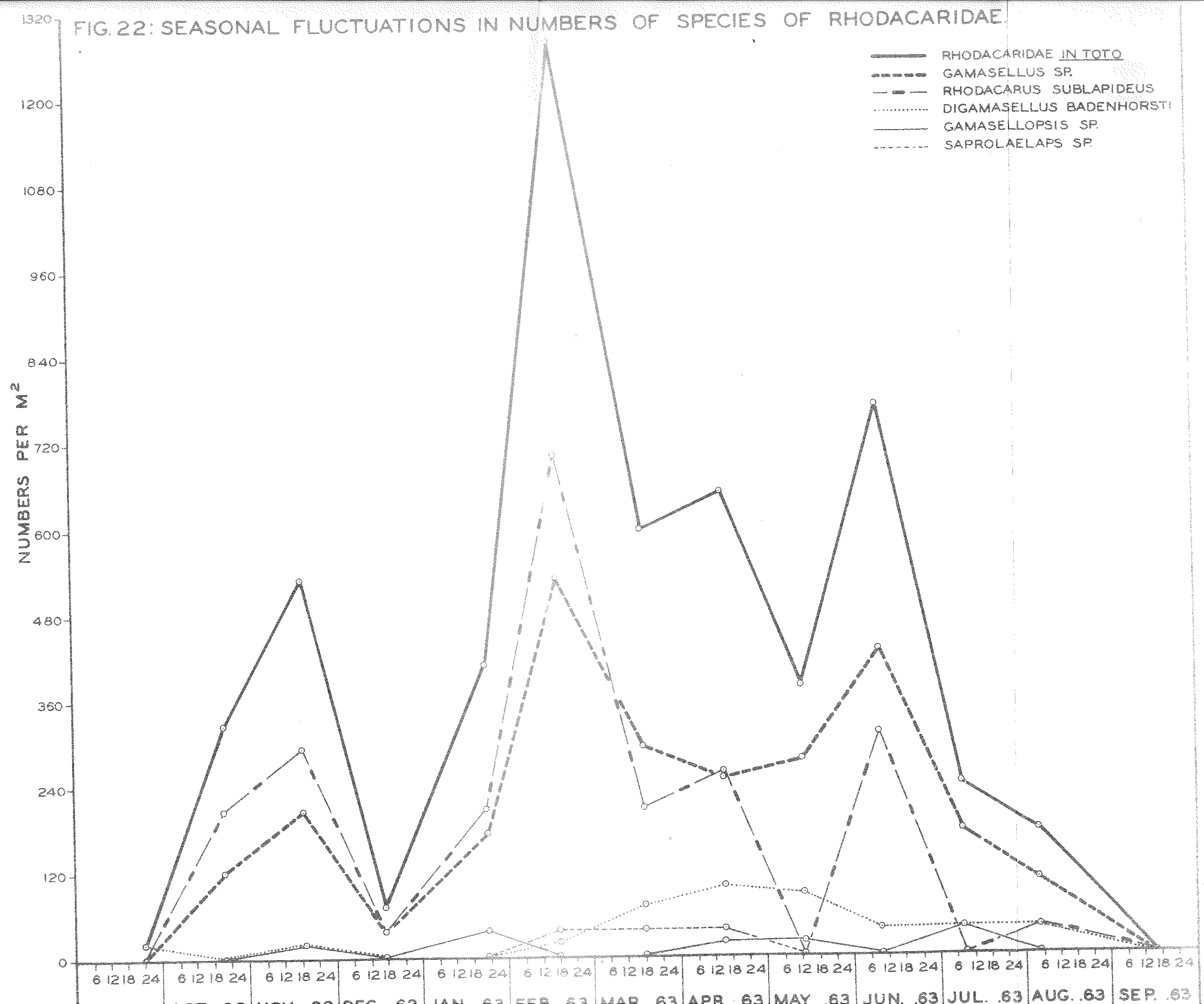
<u>Laelaspis</u> sp.		<u>Leptolaelaps</u> <u>elegans</u>		<u>Laelaptidae</u> <u>Larvae</u>	
Numbers	Biomass	Numbers	Biomass	Numbers	Biomass
580	11.59	51	2.56	68	0.34
51	1.02	34	1.70		
51	1.02			51	0.26
68	1.36	34	1.70		
51	1.02	34	1.70	51	0.26
68	1.36				
102	2.04	68	3.41		
85	1.71	34	1.70		
34	0.68	51	2.56		
17	0.34	17	0.86		
		51	2.56		
		17	0.86		

The seasonal fluctuations in numbers of the five species of the Rhodacaridae are illustrated by the curves in fig. 22. The numbers per m^2 of this family and representative species are analysed in table 11. The dominant species, Gamasellus sp., reached maximum numbers during February but they were outnumbered by Rhodacarus sublapideus Ryke, the subdominant species, which also reached its peak during this month. It is interesting to note that during the first six months of the sampling period Rhodacarus sublapideus was the largest contributor to the numbers of the Rhodacaridae with Gamasellus sp. in the second place, while during the last seven months the latter species was superior to Rhodacarus sublapideus.

The species Digamasellus badenhorsti occurred occasionally, fluctuating between nil and 94 per m^2 , the peak being in April 1963. Saprolaelaps sp. and Gamasellopsis sp. occurred in numbers not exceeding 34 per m^2 .

Table 12 gives an analysis of the numbers per m^2 of the family Aceosejidae and its species, whereas the seasonal fluctuations in numbers are graphically represented in fig. 23. Protogamasellus sp.a, the dominant species, reached three high figures during November, February and April, the latter being the maximum (332 per m^2). Protogamasellus sp.b also registered a peak during November 1962 but its maximum in March 1963 (443 per m^2). This is followed by a very steady decrease to September 1963. Protogamasellus sp.c occurred in low numbers except in March when they were most abundant (136 per m^2). Gamasellodes seminudus formed a relatively small portion of the Rhodacaridae but during January, when they reached their maximum (256 per m^2), they were the largest contributors. During March Lasioseius sp. reached their highest peak (119 per m^2).

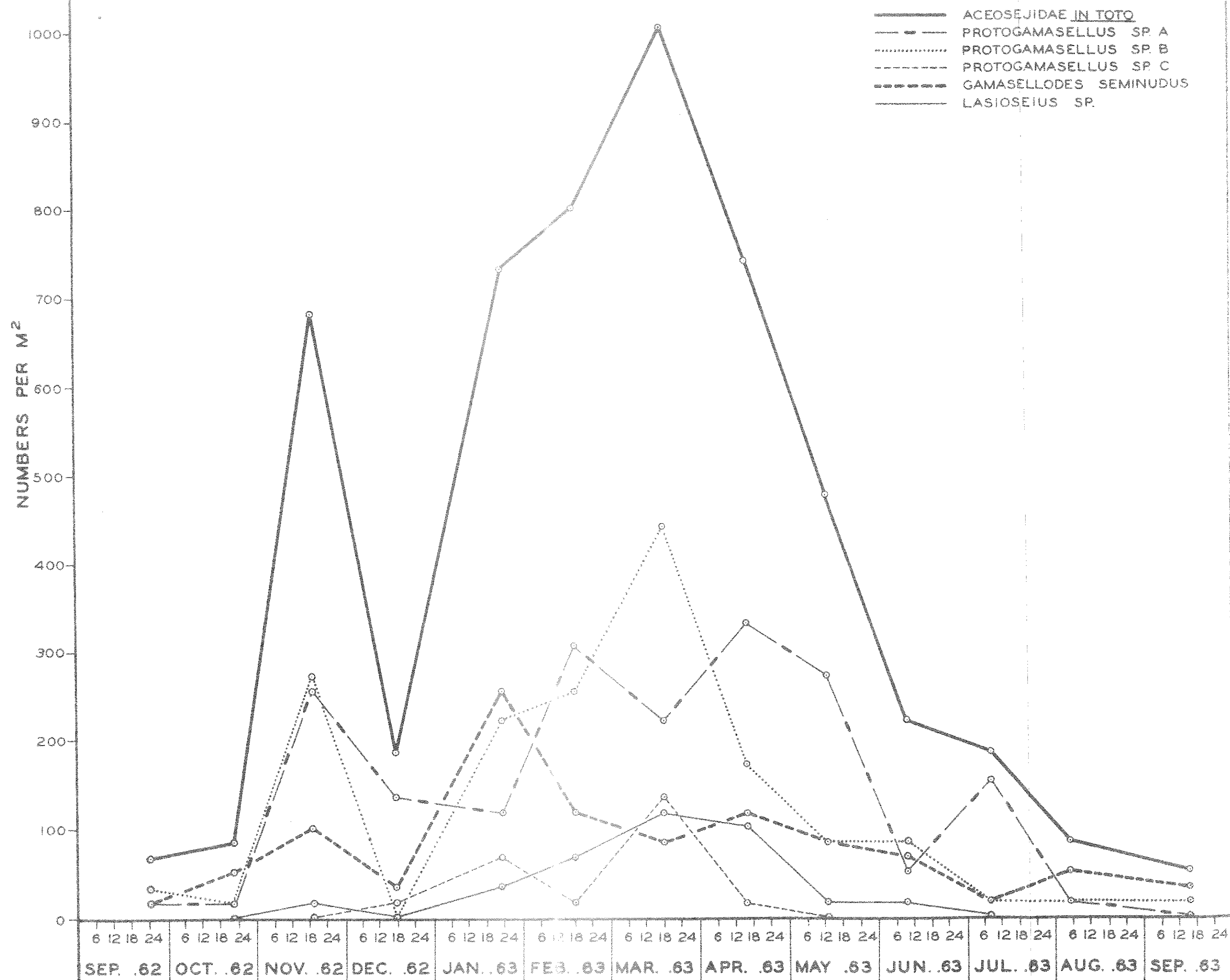
FIG. 22: SEASONAL FLUCTUATIONS IN NUMBERS OF SPECIES OF RHODACARIDAE



UNITED STATES AND BIOMASS (mg) OF RHODACARIDAE PER m²

[illegible]

FIG. 23: SEASONAL FLUCTUATIONS IN NUMBERS OF SPECIES OF ACEOSEJIDAE.



The reader is referred to fig. 20 for the graphical illustration of the seasonal fluctuations of Pachylaelaps sp., which was the only representative of the family Pachylaelaptidae.

The seasonal fluctuations of the species of the Phytoseiidae (fig. 24; table 13), which occurred irregularly, show a peculiar pattern. This might be attributed to the fact that the species of this family are not true soil dwellers but predators on mites, eggs and larvae of insects which occur on the vegetation. They are fast-running mites and it is reasonable to assume that they were present on the lower parts of the vegetation and cannot be regarded as true soil forms. An analysis of the numbers per m^2 of the Phytoseiidae is given in table 13. A glance at this table gives an impression of the irregularity of occurrence of the different species. Amblyseius sp.b, the dominant species, reached its maximum (85 per m^2 during June, the period during which the Tydeidae were most abundant. The other two species, Amblyseius sp. a and Typhlodromus (Neoseiulus) sp., did not exceed 17 individuals per m^2 .

Figure 2⁵ shows the seasonal fluctuations in numbers per m^2 of the Mesostigmata in pasture, kikuyu and Acacia soils. This group was most abundant in kikuyu soil and maintained a high level throughout the sampling period (October 1962-September 1963). The numbers of Mesostigmata in Acacia soil were, for the entire sampling period, slightly higher than those of pasture soil. In kikuyu soil the Mesostigmata reached their highest peak during January, while in pasture soil they were most abundant during December. The numbers of the Mesostigmata in pasture soil decreased considerably during February, a tendency which continued during late summer and early autumn, whereas those of the Acacia soil showed a gradual decrease approximately two months later, i.e. during autumn and early winter.

FIG. 24: SEASONAL FLUCTUATIONS IN NUMBERS OF SPECIES OF PHYTOSEIIDAE.

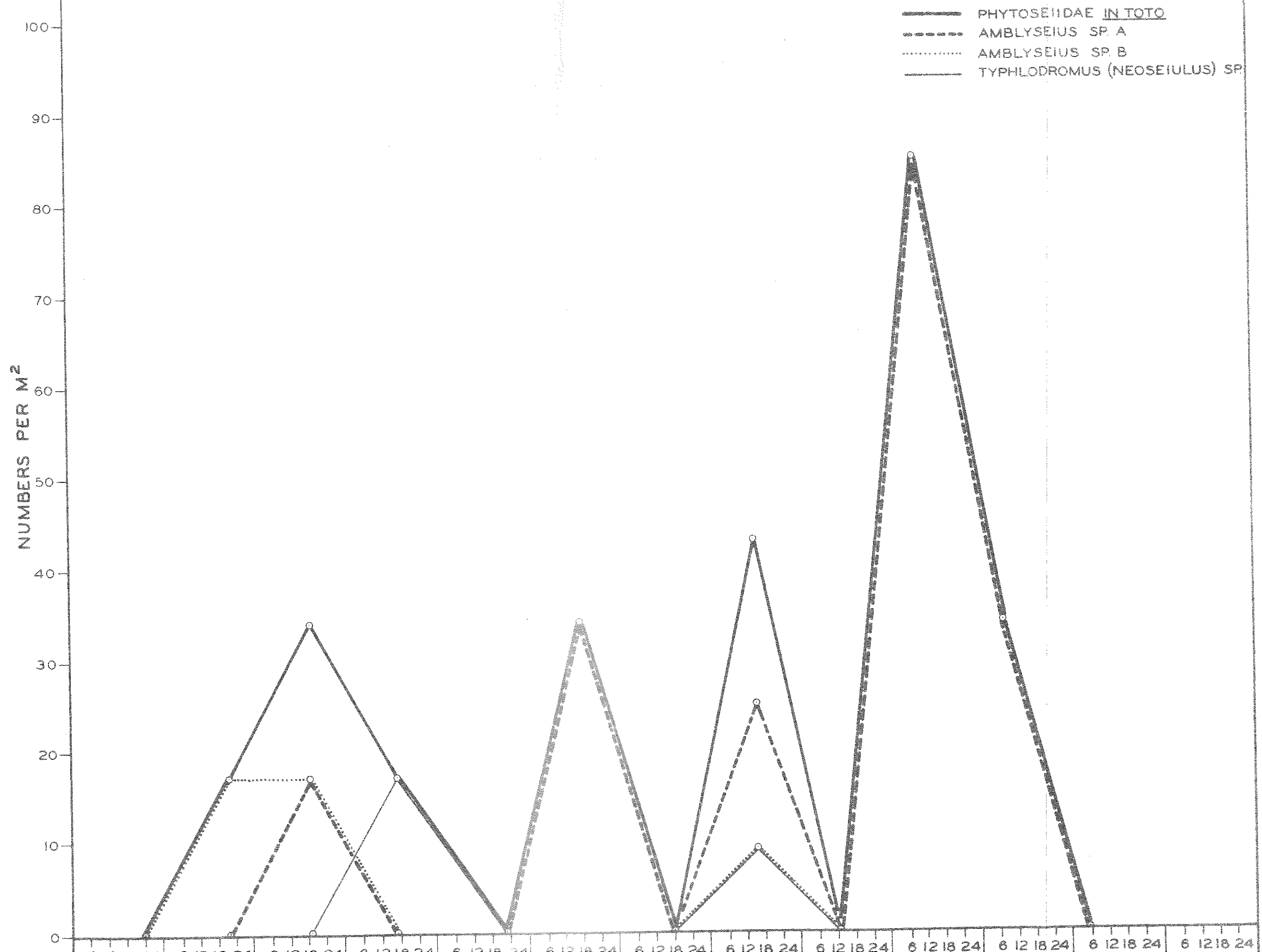
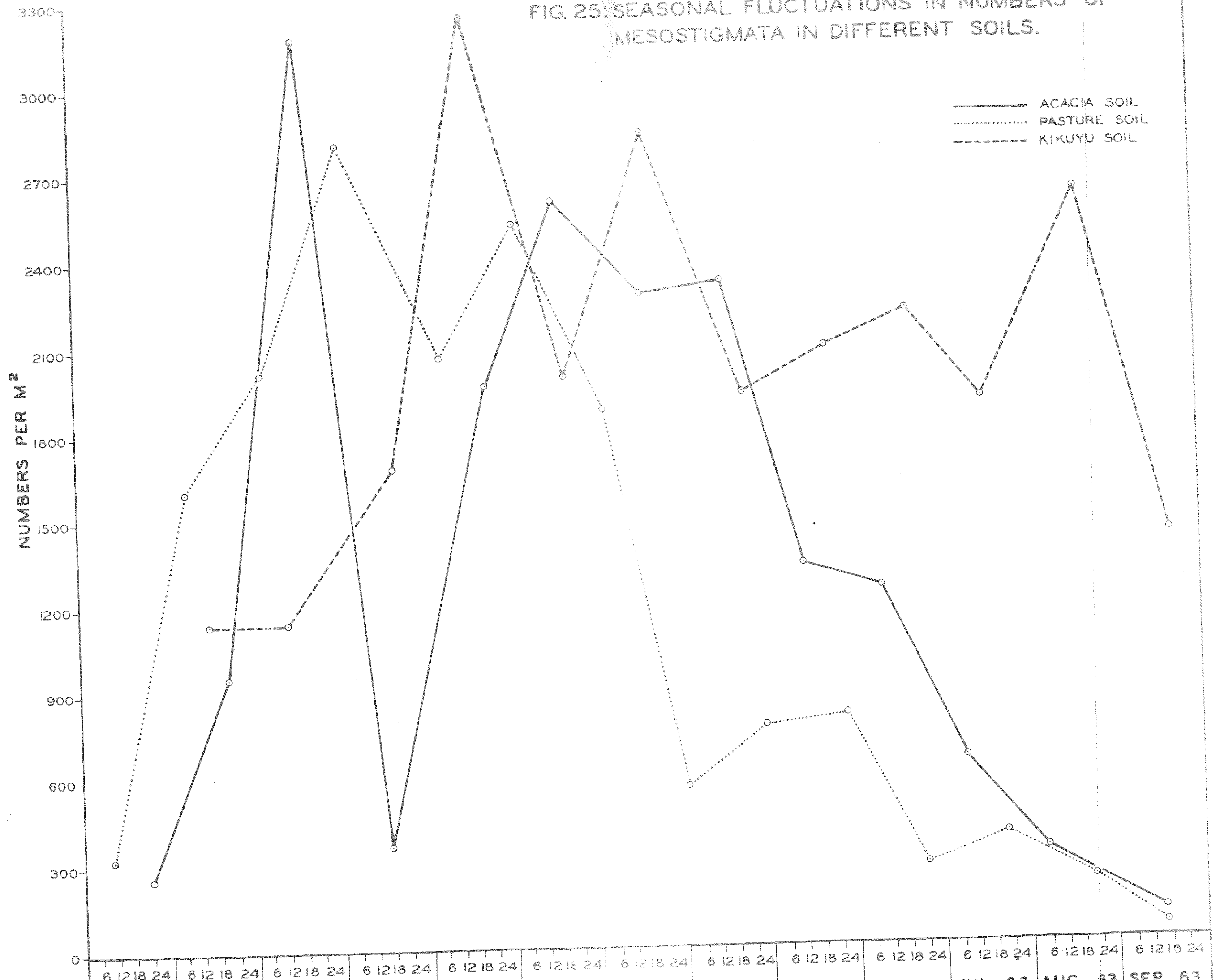


TABLE 13
NUMBERS AND BIOMASS(mg) OF PHYTOSEIIDAE PER m²

Date	Phytoseiidae		Amblyseius sp. a		Amblyseius sp. b		Typhlodromus (Neoseiulus) sp.	
	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass	Numbers	Biomass
24 Sep..62	17	0.14	17	0.14	17	0.14	17	0.14
22 Oct..62	34	0.27	17	0.14				
19 Nov..62	17	0.14						
17 Dec..62								
23 Jan..63	34	0.27			34	0.27		
18 Feb..63								
18 Mar..63								
16 Apr..63 A	51	0.41	17	0.14	17	0.14	17	0.14
16 Apr..63 B	34	0.27			34	0.27		
16 Apr..63 C	43	0.34	9	0.07	25	0.20	9	0.07
13 May .63								
10 Jun..63	85	0.68			85	0.68		
8 Jul..63	34	0.27			34	0.27		
5 Aug..63								
16 Sep..63								

FIG. 25: SEASONAL FLUCTUATIONS IN NUMBERS OF MESOSTIGMATA IN DIFFERENT SOILS.



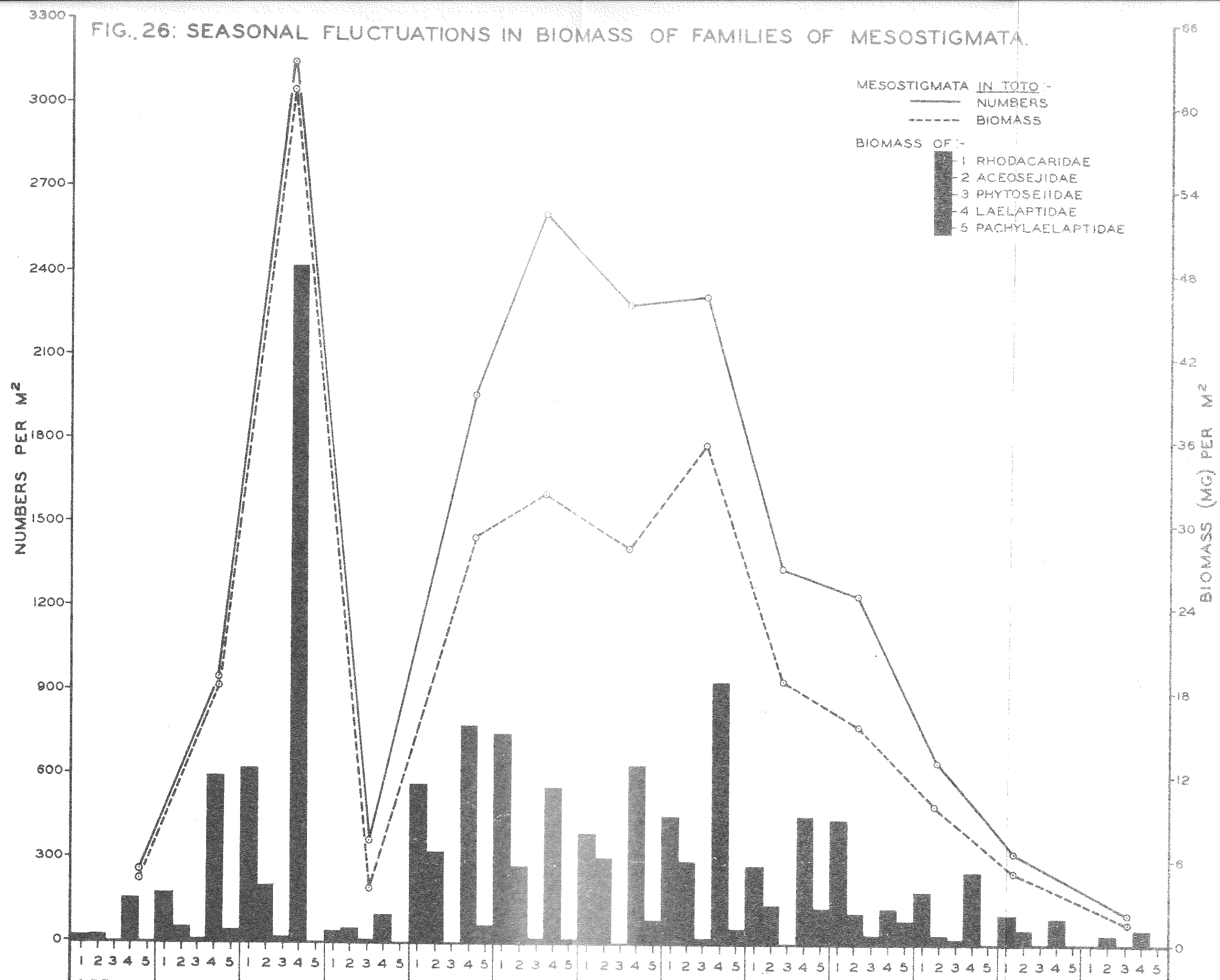
Judging from the figures quoted by Macfadyen (1952) (table 8) the Mesostigmata usually occur in larger numbers in European soils. This author collected from a Molinia fen even more Mesostigmata (7,400 per m²) than Trombidiformes (3,500 per m²). In the Acacia soil the Mesostigmate constituted 4.67% and the Trombidiformes 76.81% of the acarofauna. In pasture soil the percentages for Mesostigmata and Trombidiformes were 3.7 and 64.9 respectively and in kikuyu soil 4.2 and 43.2. It is evident from these figures that the percentages of Mesostigmata and Trombidiformes in Acacia soil constituted a higher portion of the Acari than those of the other two soil types.

Di Castri (1963) who investigated different soils in Chile found that the Mesostigmata from steppe soil constituted 7.6% and those from savannah soil and xerophilous plant associations 17.96% and 8.53% respectively. Salt et al. (1948) collected 16.2% Mesostigmata and no Trombidiformes from their May 1943 sample, and from the November 1943 sample 24.1% and 3.3% respectively. The absence of Trombidiformes in the May sample is attributed by these authors to the deficiency in the extraction process. Dhillon & Gibson (1961) found that the Mesostigmata constituted 32.9% and the Trombidiformes 63.7% of the Acari collected from agricultural soils in England.

Biomass:

The seasonal fluctuations in biomass and numbers of the Mesostigmata in toto and an analysis of the five dominant families are given in fig. 26 and table 9. The mean biomass values per individual are given in tables 40-55. In 10 of the 13 samples the Laelaptidae provided the bulk of the biomass whereas during February, June and August 1963 the Rhodacaridae were dominant. The curves for

FIG. 26: SEASONAL FLUCTUATIONS IN BIOMASS OF FAMILIES OF MESOSTIGMATA.



numbers and biomass of the Mesostigmata are basically similar. During February, March and April, however, the biomass curve is on a lower level than that of the numbers. This can be attributed to the presence in high numbers of individuals with a low biomass value.

Figures 27-30 illustrate the seasonal fluctuations of the biomass and numbers of the Laelaptidae in toto, Rhodacaridae in toto, Aceosejidae in toto and Phytoseiidae in toto respectively, as well as the fluctuations in biomass of the species of these families.

Seasonal fluctuations in biomass of the Pachylaelaptidae and its only representative, Pachylaelaps sp., is illustrated in fig. 26 while an analysis of the figures is given in table 9.

Analyses of the biomass and numbers of the species of these families are given in tables 10-13. It is evident from these figures that the curves of the biomass values and the numbers are basically similar.

Of the Laelaptidae Gaeolaelaps sp.b was dominant in biomass in seven of the thirteen samples, Gaeolaelaps paracasalis in three, and Cosmolaelaps sp., Laelaspis sp. and Leptolaelaps elegans were each superior in one sample. The highest contributor to the biomass of the Rhodacaridae was Gamasellus sp. with Rhodacarus sublapideus second although each species dominated the biomass in 5 of the 13 samples. The species Gamasellodes seminudus was the most important contributor to the biomass of the Aceosejidae and only twice during the sampling period did the biomass of Lasioseius sp.a exceed the weight of G.seminudus. Although superior in numbers, Protogamasellus sp.a and P. sp.b contributed only a small portion to the total weight of the Aceosejidae. Amblyseius sp.b, the numerically dominant species of the

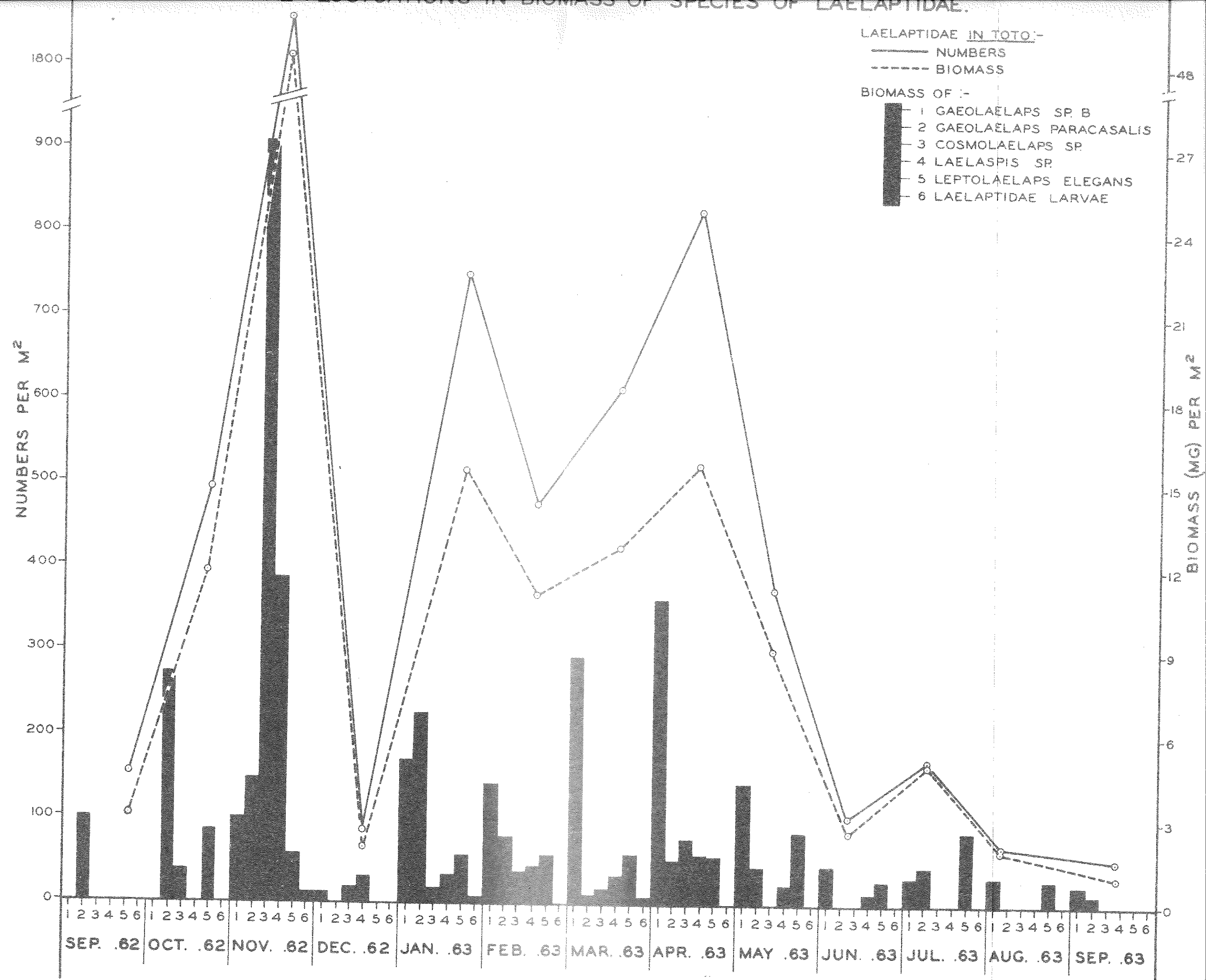


FIG. 28: SEASONAL FLUCTUATIONS IN BIOMASS OF SPECIES OF RHODACARIDAE.

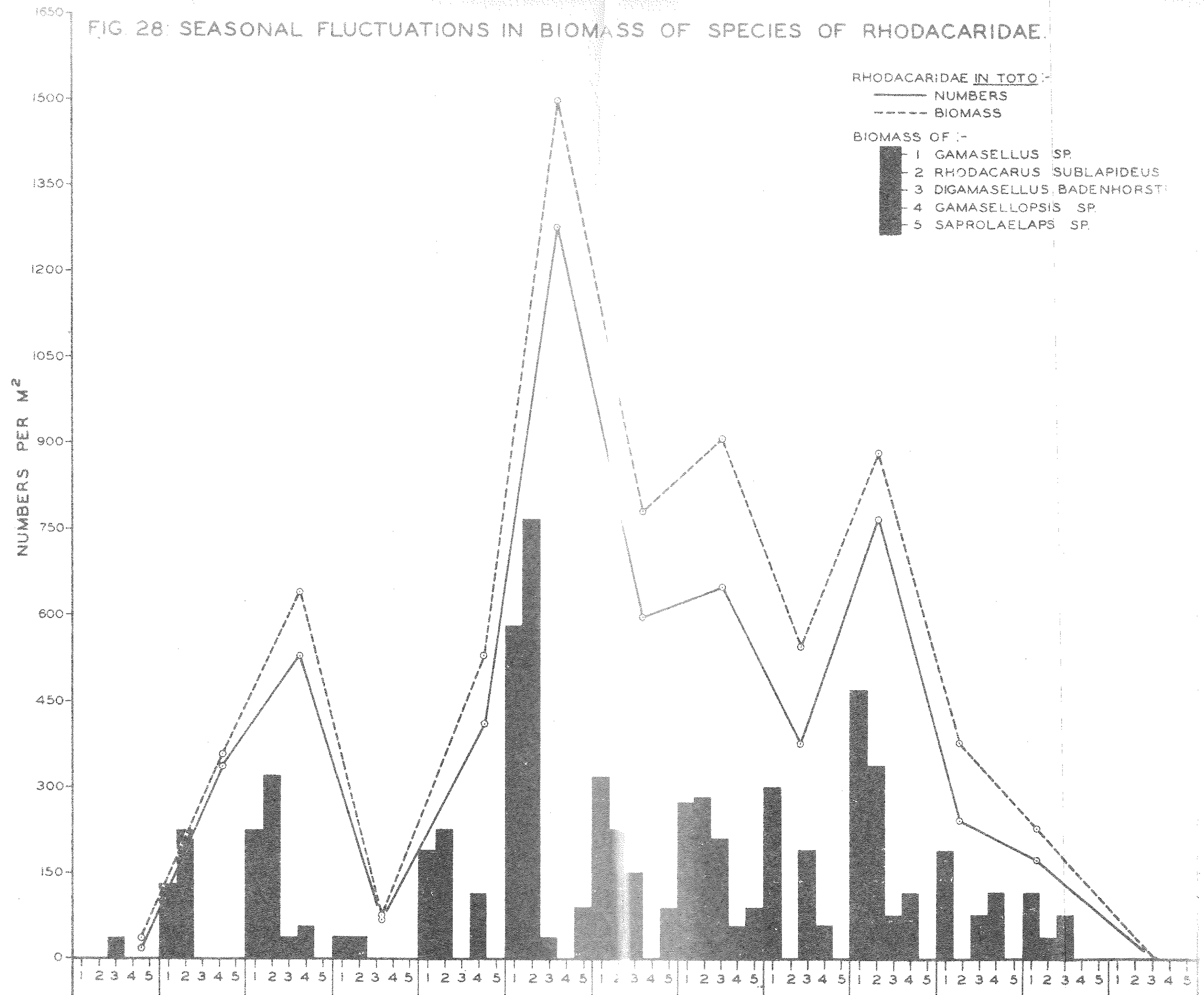


FIG. 29: SEASONAL FLUCTUATIONS IN BIOMASS OF SPECIES OF ACEOSEJIDAE.

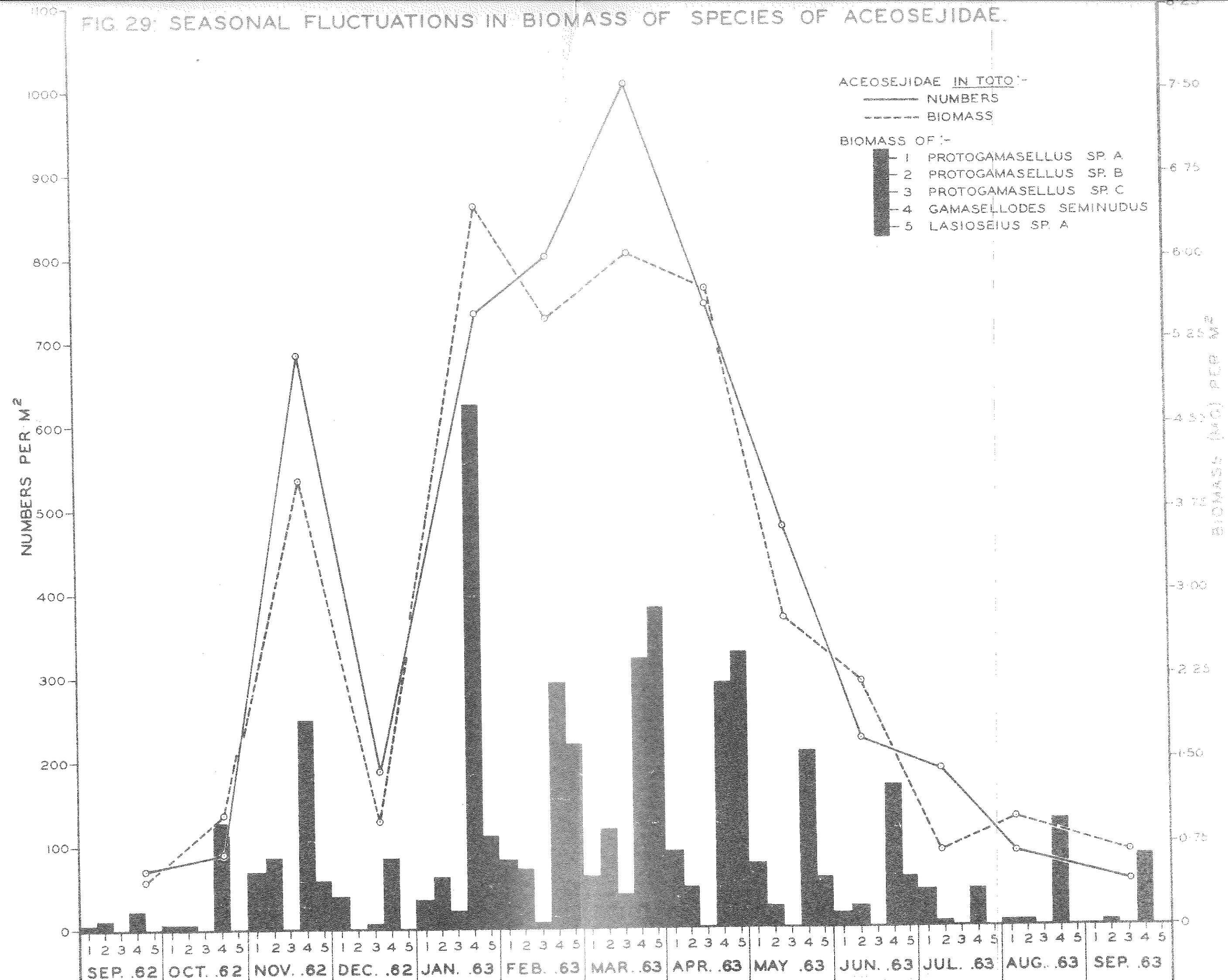
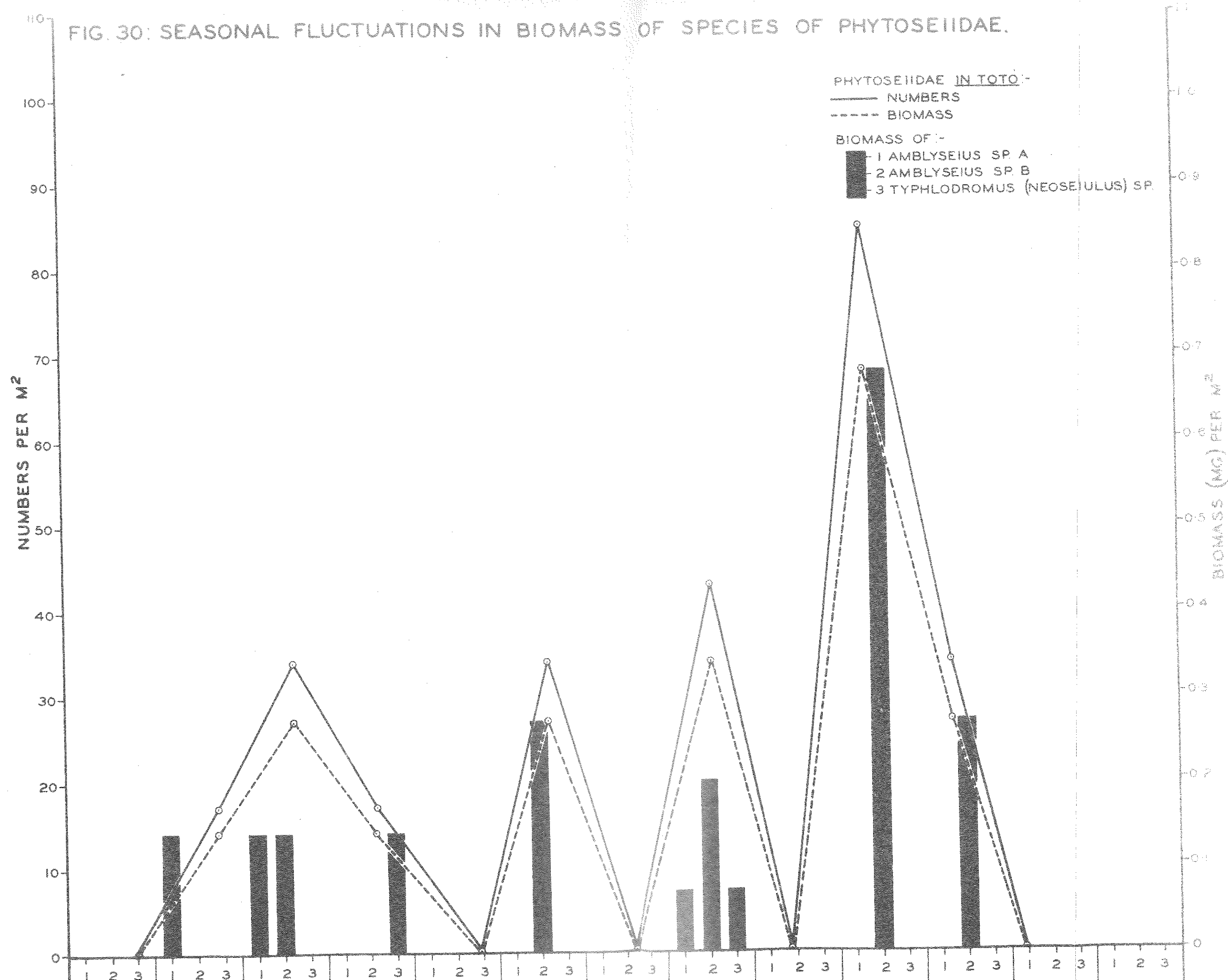


FIG. 30: SEASONAL FLUCTUATIONS IN BIOMASS OF SPECIES OF PHYTOSEIIDAE.



Phytoseiidae, is also dominant in weight with A.sp. a second and Typhlodromus (Neoseiulus) sp. third.

A comparison between the biomass values of the families of the Mesostigmata recorded from Acacia, kikuyu and pasture soils reveals that Laelaptidae were dominant in biomass in the first two soils whereas the Aceosejidae were dominant in the third. The Rhodacaridae occupied the second position in all the above-mentioned soils whereas the Aceosejidae were in the third position in Acacia and kikuyu soils.

4.23 ORIBATEI

The Oribatei constituted the subdominant order of the Acari in the Acacia soil investigated for the present study (table 3; figs. 5 & 6).

The numerically important species extracted were Liochthonius sp. (dominant), Allodamaeus sp., Scheloribates sp., Tectocephus sp., Zetomitrachus sp., Cosmochthonius emmae, Oppia sp., and one unknown species of each of the families Galumnidae and Eremobelbidae.

The Oribatei were considered as a group and their numbers recovered from the samples are presented in tables 56-70. During the spring and early summer a steady build-up in numbers was recorded for the Oribatei which reached its maximum during February 1963 and gradually decreased in numbers during the autumn. The numbers fluctuated between 3,000 and 4,000 per m² during the winter months, followed by a steady decrease in numbers to a minimum in September 1963.

A comparison between the numbers of Oribatei collected from Acacia, kikuyu and pasture soils shows that the highest numbers were found in kikuyu soil and the lowest in Acacia soil. In Acacia, kikuyu and pasture soils the Oribatei

constituted 14.5%, 31.5% and 25.3% of the Acari, respectively.

Di Castri (1963) found that the Oribatei from steppe soil constituted 31.4% of the acarofauna whereas those from savannah soil and xerophilous plant associations constituted 37.4% and 42.8% respectively. In European soils, however, the oribatids are usually the numerically dominant group of the acarofauna. Evans (1951) extracted 1,434,000 Acari from the soils of six different forests in England, 71.3% of which were Oribatei. Salt et al. (1948) recorded that 60.3% of the acarofauna of pasture soil in England, was represented by the Oribatei. Sheals (1957) who investigated the soil of uncultivated grassland in Glasgow found that the Oribatei constituted 57.1% of the Acari. The figures of Oribatei recorded by other authors who investigated European soils, quoted by Macfadyen (1952), are given in table 8. From these figures it is evident that the Oribatei are the dominant group of mites in European soils. This can be attributed to the fact that European soils are subject to relatively moist and cold climatic conditions. In the local soils, which are subjected to dry conditions and relatively high temperatures, the Oribatei are exceeded in numbers by the Trombidiformes. Loots & Ryke found that a marked correlation exists between the ratio Oribatei:Trombidiformes and the organic matter content of the soil. They came to this conclusion by analyzing data recorded by European as well as South African investigators. The ratio Oribatei:Trombidiformes (0.188) of the present investigation correlated with the organic matter content of the Acacia soil (2.81%) supports the theory of these authors. They are of opinion that, if an increase in the ratio Oribatei:Trombidiformes corresponds with an increase in the percentage of organic matter content of the soil, this phenomenon might serve as an explanation

for the major differences between the composition of the soil acarofauna in local and European soils.

It is a known fact that most Oribatei are feeders on fungi and algae and since these are more abundant in soils with a high organic matter content, it is evident that such soils can support large populations. About the feeding habits of the soil-dwelling Trombidiformes practically no information exists. From their ratios it does appear as if competition for the same food exists between the numbers of these two orders (Loots & Ryke).

Hammer (1944) is of opinion that the differences in faunas which inhabit wet and dry biotopes are directly effected by the soil moisture. According to Loots & Ryke it would appear as if wetness or dryness of a biotope indirectly, rather than directly, exerts an influence upon the soil fauna because these factors also determine the type and density of the vegetation which in turn largely contributes towards the amount of soil organic matter.

Biomass:

The mean biomass per individual of the Oribatei was estimated to be approximately 0.0133 mg. The seasonal fluctuations in biomass are given in table 3 and graphically illustrated in fig. 6. Olivier & Ryke found that in kikuyu soil the Oribatei constituted the dominant group of the Acari as far as weight was concerned. In pasture soil Loots & Ryke recorded only during December 1962-April 1963 a dominance in weight by the Oribatei whereas in Acacia soil the Oribatei dominated the other Acari during December 1962 only.

4.24 ACARIDIAE

The Acaridiae, considered as a group, constituted

4.03% of the soil acarofauna. The species were not determined. Figures 5 & 6 graphically illustrate the seasonal fluctuations in numbers and biomass per m^2 whereas an analysis of the figures is given in table 3. The Acaridiae reached their highest number during November 1962. Approximately 97.5% of this number, however, was encountered in subsample 10 (table 58) which was taken from an ant nest. These mites probably used the ants as a means of transport because the majority of them were hypopi which attach themselves to these insects. Another high number was extracted during February. It is interesting to note that the increase in numbers of the Acaridiae during November and February correspond with those of the Scutacaridae during these months.

A comparison of the numbers of Acaridiae in different soils reveals that in kikuyu soil they occurred in lower numbers than in pasture soil (2.25% of the Acari). In Acacia soil they constituted 4.03% of the acarofauna. These numbers even exceeded those given by Macfadyen (1952) for European soils. In Chile di Castri (1963) found that the Acaridiae constituted 26.3% of the acarofauna in steppe soil, 15.5% in savannah soil and 2.6% from xerophilous plant associations.

4.3 COLLEMBOLA

The seasonal fluctuations in numbers per m^2 are graphically represented in fig. 3 and the analysis of the figures is given in table 3. The seasonal biomass fluctuations are illustrated by means of histograms in fig. 4. The numbers collected per subsample and per m^2 are given in tables 56-70. From these figures it is evident that the Collembola occurred in low numbers. They did not contribute much to the biomass of the mesofauna. The highest number (4,201 per m^2) was extracted during April 1963.

The numbers per m^2 of the Collembola collected from

kikuyu soil are much higher than those recovered from Acacia soil. The numbers of Collembola from Acacia soil, however, were higher than those collected from pasture soil.

The ratio Collembola:Acari for Acacia soil was 1:15.5 whereas those for kikuyu and pasture soil were 1:5 and 1:526 respectively. Di Castri (1963) recorded that the Collembola constituted 5.3% of the mesofauna collected from steppe soil, 20.6% of those from savannah soil and 5.3% from xerophilous plant associations. Macfadyen (1952) quoted figures of Collembola extracted from different soils by several European investigators. These figures are given in table 8, from which it is evident that the collembolans are an important group of the mesofauna in European soils. Salt et al. (1948) found that the Collembola in a pasture soil (in England) constituted approximately 37.5% of the mesofauna whereas those collected by Sheals (1957) from the soil of grassland in Glasgow were 39.4% of the total number of micro-arthropods collected.

4.4 INSECTA (EXCLUDING COLLEMBOLA)

This group was mainly represented by Corrodentia, Thysanoptera, Homoptera, Hymenoptera and Diptera. The few specimens of Chilopoda extracted were also counted as "Insects". The numerical data regarding the Insecta, considered as a group, are given in tables 56-70 while the seasonal fluctuations are illustrated in fig. 3. Their numbers formed an inconspicuous part of those of the mesofauna but they were more numerous than the Collembola. The numbers per m^2 were exceeded by those of the Collembola during January, April, May and July 1963. Although the numbers per m^2 were relatively low their contribution to the biomass per m^2 of the mesofauna surpassed that of any other group in all the samples. This is due to the high mean biomass value per individual which was estimated to be

approximately 0.4046 mg. In pasture and kikuyu soils the numbers per m² of the Insecta (excl. Collembola) were inferior to those collected from the Acacia soil.

5. HORIZONTAL DISTRIBUTION

Individuals in a population may be distributed according to three broad patterns namely random, uniform (more regular than random), and aggregate (irregular, non-random). Random distribution of fauna is relatively rare in nature, occurring where the environment is very uniform and there is no tendency to aggregate. Uniform distribution may occur where competition between individuals is severe or where there is positive antagonism which promotes even spacing. Aggregation of varying degree represents by far the commonest pattern, almost the rule, when individuals are considered. Determination of the type of distribution, of the degree of aggregation, and of the size and permanence of groups are necessary if a real understanding of the nature of a population is to be obtained, and especially if density is to be correctly measured. Such observations regarding the aggregation of soil animals were made and discussed by Overgaard Nielsen (1948, Nematoda; 1954, Enchytraeidae), Satchell (1955, Lumbricidae), Edwards (1955, Symphyla), Glasgow (1939, Collembola), Hughes (1962, Collembola), and Neff (1962, Acari).

In the absence either of dependable knowledge of the mode of distribution of the fauna to be studied or of recognizable factors known to affect their distribution, an investigation must begin with methods which are generalized in every respect, including strictly random methods of sample placement. Use of the method of random sampling is predicated on the assumption that the population from which the sample is being drawn is homogeneous, i.e., that the variations within

it are those due to chance. The populations of the soil fauna are, however, neither uniform nor constant and their quantity, quality and distribution vary widely both in space and in time. Rapid changes occur, some irregularly, others more or less regularly such as daily, seasonal and developmental changes. Horizontal (and vertical) variations occur in response to differences in either the occurrence or growth of food, or in other environmental factors. In addition to such variations, and those due to aggregation there are many variations which are more or less accidental, such as the numerous progeny of individual parents which form temporary concentrations. The intensity and duration of these depend upon the mobility of the species. This whole question of the distribution of the components of the soil fauna is basic to the use of valid quantitative methods. On the other hand, it is not sound to exaggerate the statistical aspect out of all proportion to other phases of the study, nor will biometrical manipulation, however intricate, ever provide a suitable substitute for sound biological judgment (King, 1939).

In the study of the Acacia soil the patchiness of the distribution of the mesofauna was only of incidental interest but additional samples taken after the actual sampling period provided a basis for comparing the horizontal distribution patterns of the mesofauna in the Acacia biotope with those in pasture and kikuyu soil.

The data concerning the horizontal distribution of the mesofauna was collected from quantitative investigations of the organisms of the upper 5 cm of kikuyu, pasture and Acacia soil. For detailed accounts of the sampling techniques employed the reader is referred to Aucamp, Loots & Ryke (1964), Olivier & Ryke (in press) and Loots & Ryke

(in press).

As a central starting point for the following discussion of horizontal distribution of certain components of the mesofauna, a concentrated collection of 18 subsamples taken on 3 December 1963 on Acacia soil, is used (see fig. 1 and tables 39, 55 & 71). This will be compared with data obtained from the 13 samples taken during the sampling period.

5.1 DISTRIBUTION OF THE MESOFAUNA IN TOTO

The plot overgrown by kikuyu grass gave the impression of a homogeneous habitat while the Acacia sampling plot was more heterogeneous than the pasture soil plot. It could therefore be expected that the numbers of the mesofauna extracted from the monthly subsamples of the kikuyu plot would show the smallest coefficients of variability whereas that of the Acacia soil would show the highest. The uneven distribution in the latter soil is shown by the figures given in table 72. In this table the numbers of micro-arthropods collected from each subplot during the sampling period are recorded. It is evident that the covered subplots (fig. 1) yielded higher numbers than those partly covered. Subplot No. 5 is an exception because the highest number of micro-arthropods was extracted from the subsamples of this subplot. The uncovered subplots, Nos. 12 and 17, yielded the lowest numbers. The Acari constituted the dominant group in every subplot.

The coefficients of variability (C.V.) of the total mesofauna for every month, of the three soil types, calculated from data collected from each subsample, is given in table 14. The values for the Acacia soil vary between 43.87 in July 1963 and 284.79 in June 1963. The latter value is due to the large aggregation of Tydeus sp.b which occurred in subsample

TABLE 14

Coefficients of variability of the mesofauna in toto from three soil types

	<u>Acacia</u>	<u>Pennisetum</u>	<u>Themeda</u>
Sep. 62	87.70		100.95
Oct. 62	89.77	52.63	43.36
Nov. 62	198.83	167.59	55.54
Dec. 62	94.92	142.46	43.85
Jan. 63	52.31	122.46	68.12
Feb. 63	96.33	239.79	35.37
Mar. 63	104.71	89.32	106.92
Apr. 63	73.07	35.54	72.98
Apr. 63			100.94
May 63	68.14	146.55	80.96
Jun. 63	284.79	161.00	61.78
Jul. 63	43.87	146.94	61.83
Aug. 63	93.99	144.21	180.61
Sept. 63	137.42	212.11	53.45

TABLE 15

Coefficients of variability of five selected species in Acacia - soil calculated from data of (a) the 18 concentrated subsamples, (b) the means of random subsamples taken during Nov. 1962, Dec. 1962 and Jan. 1963 and (c) the means of random monthly samples for the entire sampling period.

Species	Concentrated	Nov. '62-Jan. '63	Sep. '62-Sep. '63
<u>Coccotydeus</u> sp.	61.90	404.40	72.59
<u>Eupodes</u> sp.	64.50	91.40	81.39
<u>Nanorchestes</u> sp.	47.90	85.30	59.74
<u>Tarsonemus</u> sp.	60.70	92.20	97.83
<u>Tydeus</u> sp.	61.90	199.70	91.62

5 of the June sample. The values for the kikuyu soil vary between 35.54 (April 1963) and 239.79 (February 1963) whereas those of pasture soil range from 35.37 (February 1963) and 180.61 (August 1963). It is evident that a wider range of variation was shown in the numbers of the mesofauna of the kikuyu soil than in those of the less homogeneous pasture soil. The high coefficients of variability cannot be attributed to the variety within a certain soil type only, but it indicates the presence of aggregations within certain microhabitats.

5.2 HORIZONTAL DISTRIBUTION OF SELECTED SPECIES

Population studies of the soil fauna make great demands in the taxonomic precision because a large range of related species is encountered and distinctions between them are often critically important in detecting changes in the community composition. Whereas the above-mentioned coefficients of variability of the mesofauna in toto give indications of aggregations, the different species might give more detailed data. The following five numerically dominant species (all Trombidiformes) of Acacia soil were selected for this purpose and their numbers of the concentrated sample collection were compared with those of the distributed random samples: Coccotydeus sp., Eupodes sp., Nanorchestes sp., Tarsonemus sp. and Tydeus sp. a. All these mites are eu-edaphic. The numbers of the concentrated sample, which was taken in December, are compared with those of the random samples of November, December 1962 and January 1963 as well as with those of the entire sampling period; C.V.'s are given in table 15.

5.21 COCCOTYDEUS SP.

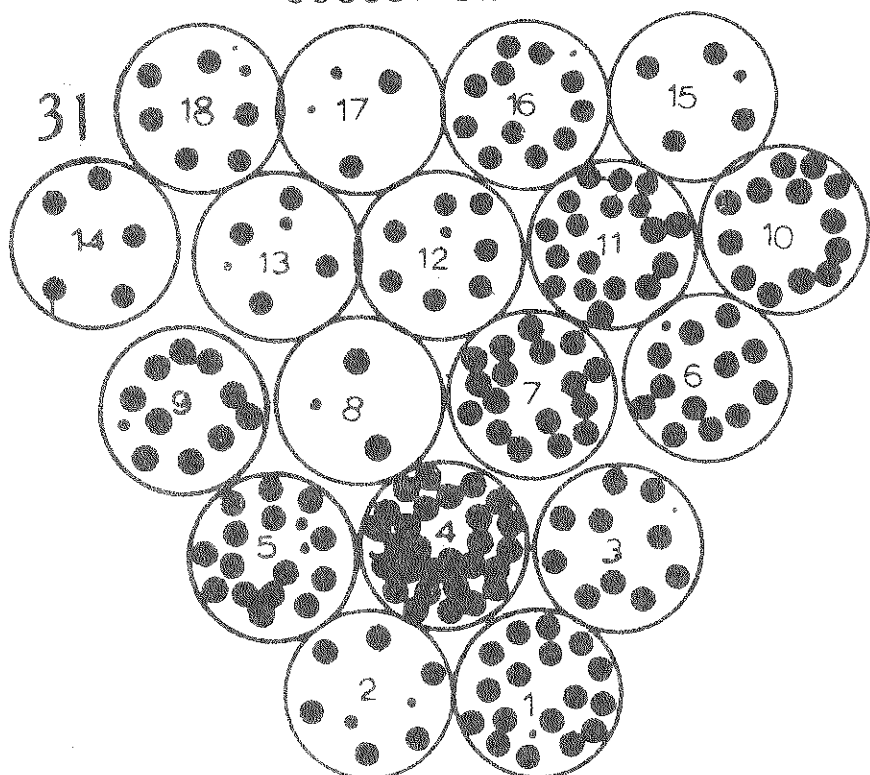
The concentrated sample (18 subsamples) was taken

as shown in figs. 31-35. In these figures the numbers of the species present in each subsample are represented by means of black dots. From fig. 31 it is evident that Coccydeus, even in the restricted area in which the subsamples were taken, was not distributed at random but rather showed a pattern of aggregated distribution. Subsample 4 showed the largest aggregation while the numbers in Nos. 1, 5, 7 and 11 were also high. In Nos. 8 and 17 the numbers were very low. It is a striking feature that No. 8, which harboured the least specimens was situated next to No. 4. Bearing in mind the seemingly homogeneity of the soil in the concentrated sample, the C.V. for the occurrence of Coccydeus sp. in the entire sample is $\frac{1}{2}$ rather high (61.9).

Since the surface area of one subsample is 32.59 cm^2 , it is difficult to assess the actual size of the aggregation by using the available data. Although the highest number of this species was found in No. 4, it cannot be assumed that it represented only one aggregation. It is also striking that this subsample also contained high numbers of the other species (figs. 32-35). On the other hand, the aggregation might have been larger than the surface area of the subsample because it is not known whether an aggregation is halved during the sampling operation. To determine the exact size of an aggregation smaller samples should be taken or, otherwise, the soil should be investigated by means of sections.

A comparison between the numbers of the concentrated sample and the mean numbers of the three months (November 1962-January 1963) during which random subsamples were taken as indicated in fig. 1, shows the following points of importance: The C.V. for Coccydeus is 404.40 (table 15) i.e. $6\frac{1}{2}$ times higher than in the concentrated sample. As

COCCOTYDEUS



●.....10 IND.

●.....5 IND.

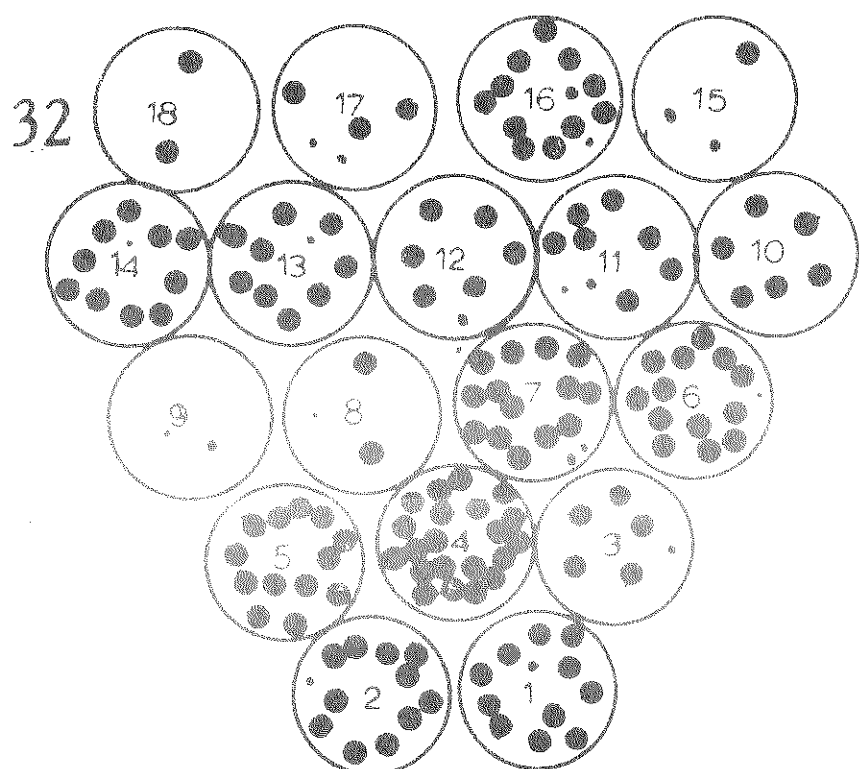
●.....4 IND.

●.....3 IND.

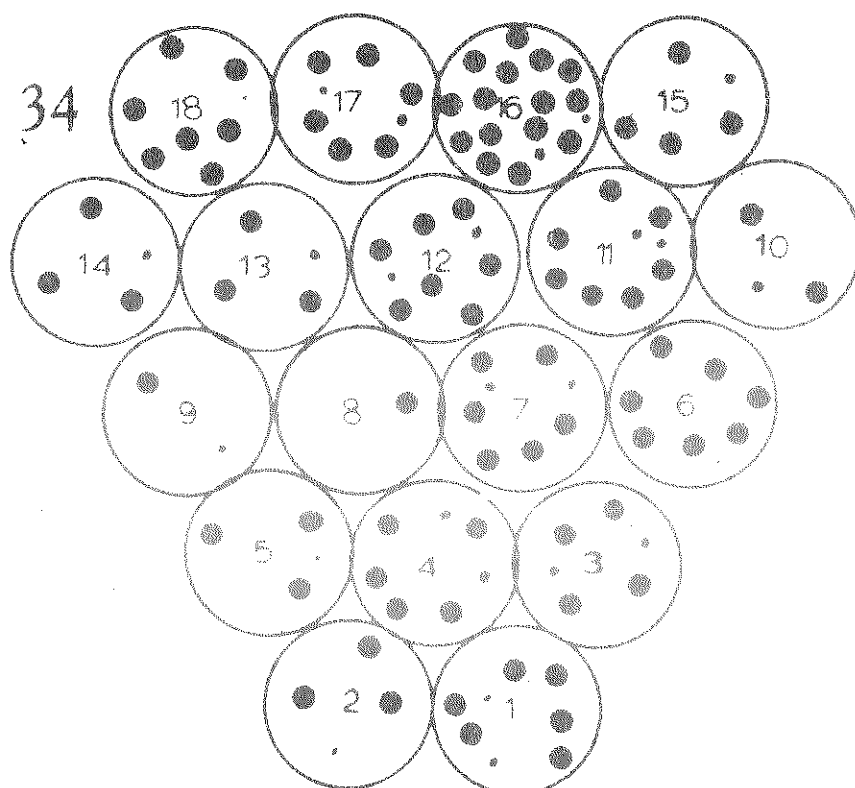
●.....2 IND.

●.....1 IND.

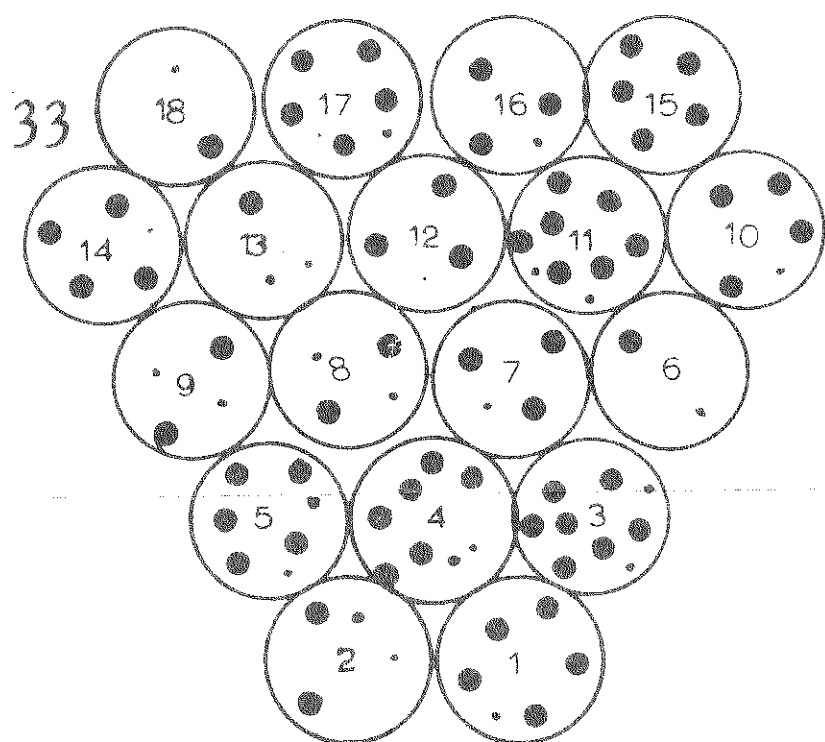
EUPODES



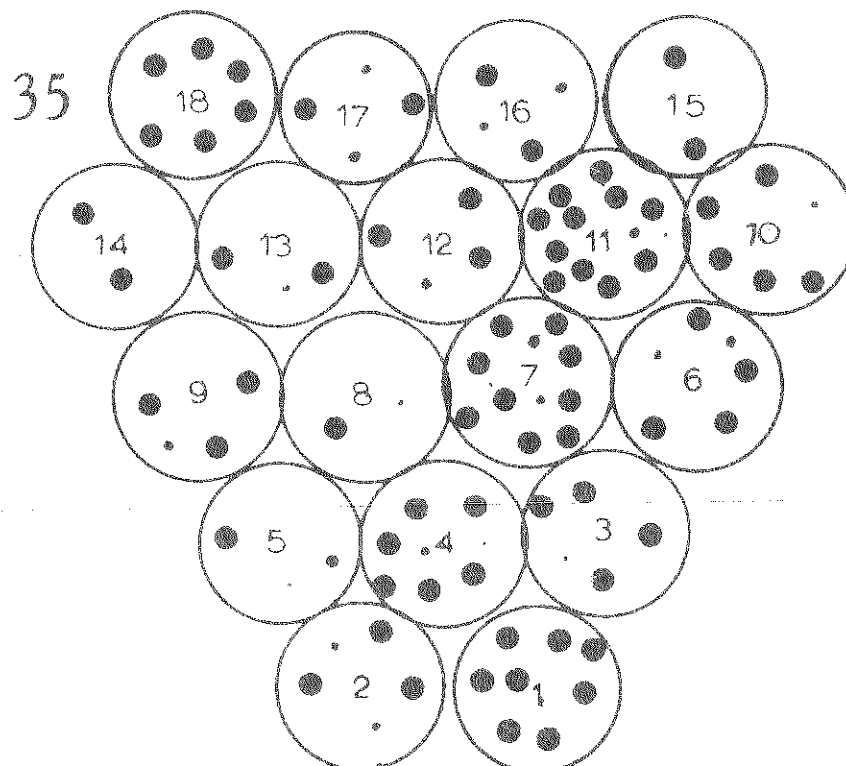
TARSONEMUS



NANORCHESTES



TYDEUS



FIGS. 31-35.

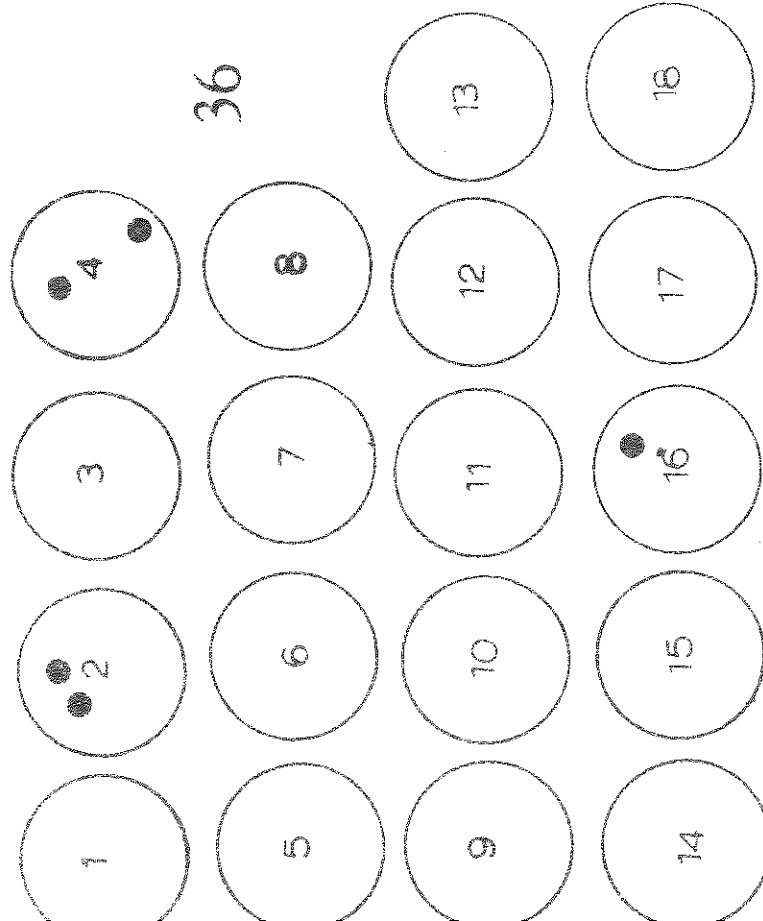
NUMBERS OF SELECTED SPECIES IN CONCENTRATED SAMPLE.

is evident from fig. 36, this high value should be attributed to the small numbers in which this species was present during the three months, since only subsamples from subplots 2, 4 and 16 contained any specimens. This is also a clear indication that the 18 subsamples which were distributed over an area of 100 m^2 are inadequate. In the concentrated sample an area of 586.62 cm^2 which, for practical purposes, constituted a unit, was investigated whereas the 18 random subsamples covered the same surface area in a plot of 1 million cm^2 . The results, furthermore, also show the danger of making conclusions which are based on data obtained during a short sampling period.

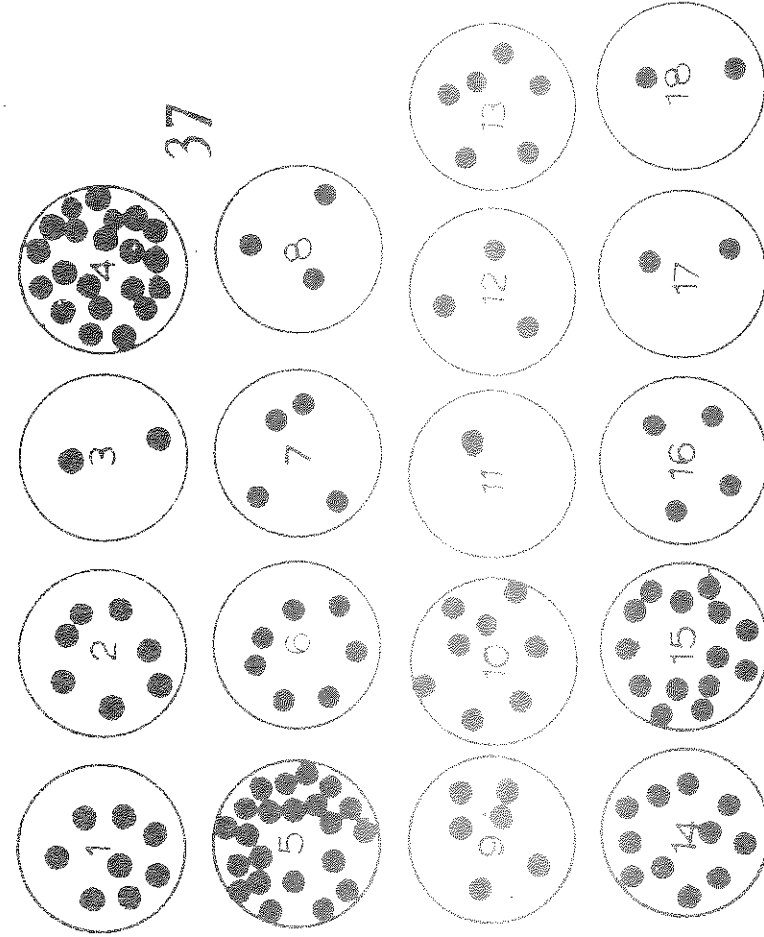
Table 16 gives a statistical analysis of the numbers of the five species in the 18 subsamples of both the concentrated and random (3 months) samples. From these figures it is evident that a highly significant difference exists between the numbers obtained by means of the two methods. This can be explained by the fact that the concentrated sample was taken in a relatively homogeneous habitat whereas the random samples were collected over an area which included three main regions. Since subplots 1, 3, 4, 6, 7, 8, 10, 11 & 15 were entirely covered by vegetation they are possibly more comparable to the concentrated sample. These 9 subsamples were therefore analysed statistically (table 17) but even here the numbers were still highly significantly lower than in the concentrated sample. In table 18 the data of the nine covered subplots are compared to those of the other nine which were either partly covered or uncovered. As far as Coccotydeus is concerned no significant difference between the numbers of the two groups could be found.

Since the above-mentioned comparisons between the numbers in the concentrated sample (December 1963) and the

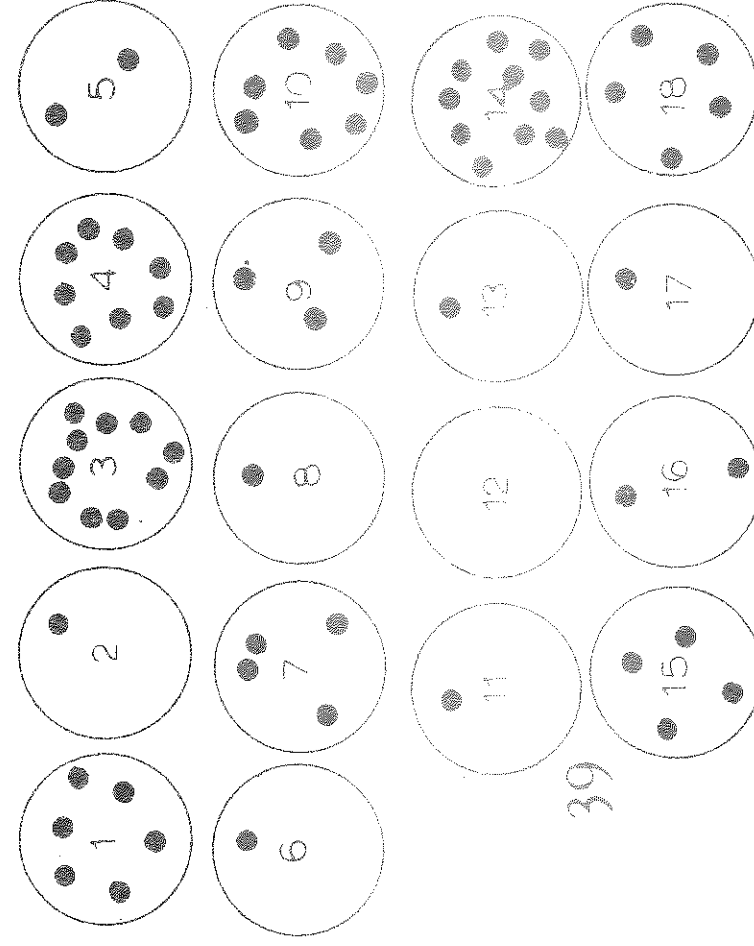
CULICOIDES



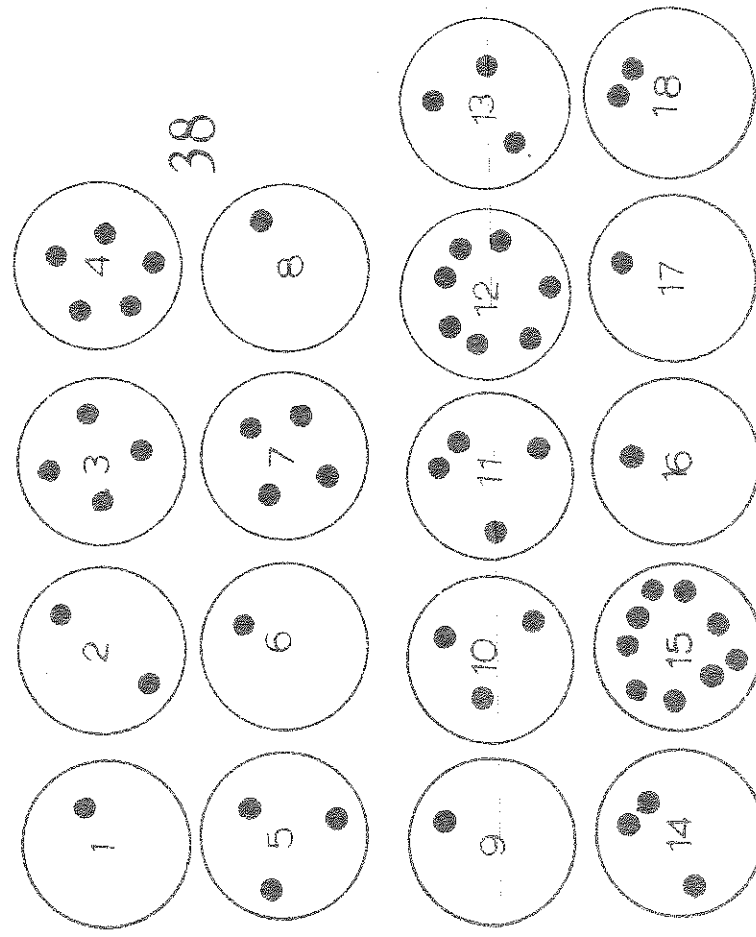
EUPODES



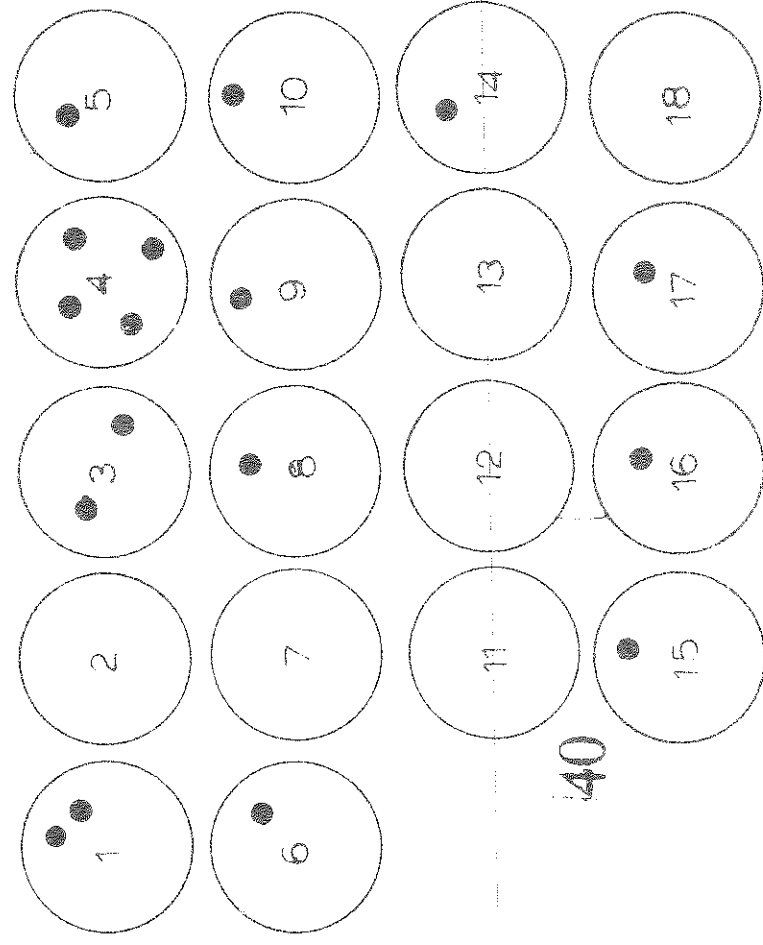
TARSONEMUS



NANORCHESTES



TYDEUS



FIGS. 36-40. NUMBERS OF SELECTED SPECIES IN RANDOM SAMPLES (3 MONTHS).

TABLE 16

Comparison between concentrated sample (A) and means of random samples of Nov. '62, Dec. '62 and Jan. 1963 (B)

Species	n	$\bar{x}$	$n-1 Sx^2$	df	t	P		Differences between means	
						one-sided	two-sided	one-sided	two-sided
<u>Coccotydeus</u> sp.	A 18	107.78	75735.00	34	6.84	<.0005	<.001	Highly significant	Highly significant
	B 18	0.14	5.45						
<u>Eupodes</u> sp.	A 18	84.72	50796.00	34	6.00	<.0005	.001	Highly significant	Highly significant
	B 18	6.94	684.08						
<u>Nanorchestes</u> sp.	A 18	43.06	6946.20	34	8.41	<.0005	<.001	Highly significant	Highly significant
	B 18	2.74	92.75						
<u>Tarsonemus</u> sp.	A 18	55.78	19499.00	34	6.53	<.0005	<.001	Highly significant	Highly significant
	B 18	3.39	169.76						
<u>Tydeus</u> sp.	A 18	45.78	13654.40	34	6.79	<.0005	<.001	Highly significant	Highly significant
	B 18	0.43	12.54						

TABLE 17

Comparison between concentrated sample (A) and means of random samples of covered subplots for the
period Nov. 1962 - Jan. 1963 (C)

Species		n	$\bar{x}$	n-1 Sx^2	df	t	P			Differences between means	
							one-sided	two-sided		one-sided	two-sided
<u>Coccotydeus</u> sp.	A	18	107.78	75735.00	25	4.79	<.0005	<.001		Highly significant	Highly significant
	C	9	0.22	2.23							
<u>Eupodes</u> sp.	A	18	34.72	50796.00	25	4.20	<.0005	<.001		Highly significant	Highly significant
	C	9	7.20	316.72							
<u>Nanorchestes</u> sp.	A	18	43.06	6946.00	25	5.8	<.0005	<.001		Highly significant	Highly significant
	C	9	3.20	58.10							
<u>Tarsonemus</u> sp.	A	18	55.78	19499.00	25	4.50	<.0005	<.001		Highly significant	Highly significant
	C	9	4.40	76.72							
<u>Tydeus</u> sp.	A	18	45.78	13554.40	25	4.71	<.0005	<.001		Highly significant	Highly significant
	C	9	0.80	9.89							

Comparison between means of random sample for the period Nov. 1962 - Jan. 1963 taken on covered subplots (C)
and partly and uncovered subplots (D)

Species	n	$\bar{x}$	n-1 Sx ²	df	t	P		Differences between means	
						one-sided	two-sided	one-sided	two-sided
<u>Coccotydeus</u> sp.	C	9	2.23	16	0.176	.45-.40	.9-.8	non-significant	non-significant
	D	9	1.50						
<u>Eupodes</u> sp.	C	9	346.72	16	0.175	.45-.40	.9-.8	non-significant	non-significant
	D	9	336.00						
<u>Nanorchestes</u> sp.	C	9	58.10	16	0.847	.25-.20	.5-.4	non-significant	non-significant
	D	9	30.45						
<u>Tarsonemus</u> sp.	C	9	76.72	16	1.423	.10-.05	.2-.1	inclination to significant	non-significant
	D	9	68.26						
<u>Tydeus</u> sp.	C	9	9.89	16	1.955	.05-.025	.05-.02	significant	significant
	D	9	0.14						

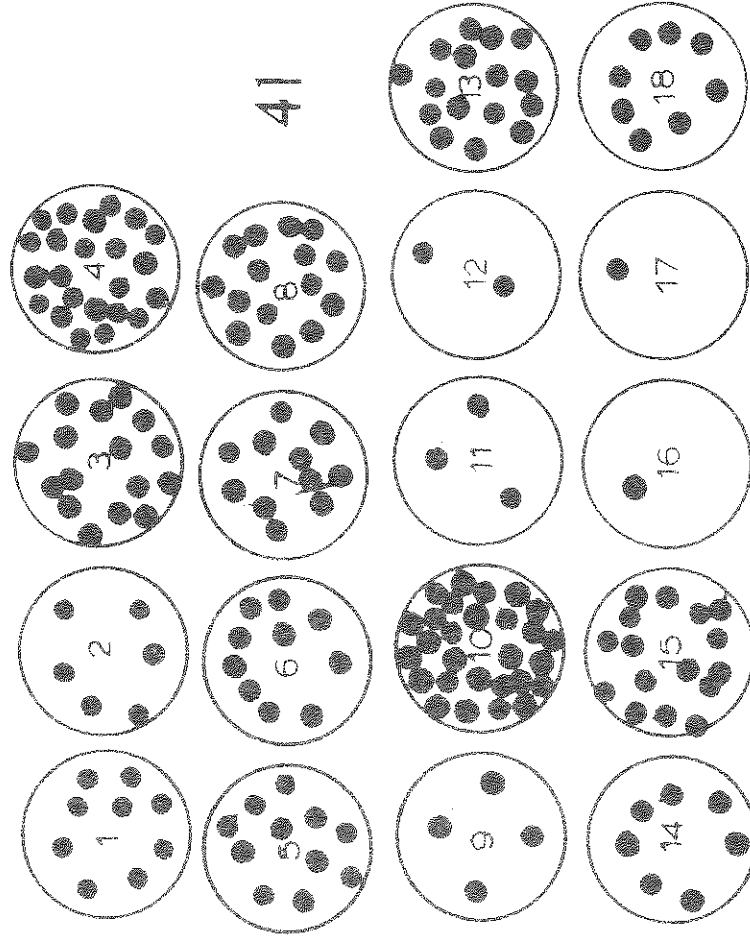
means of the three months (November 1962-January 1963) did not yield satisfactory results the former was also compared to the mean numbers of each of the 5 species collected during the entire sampling period. For Coccotydeus the C.V. for the samples of the latter period is 72.59 (table 15), a value which approaches that of the concentrated sample. This should be attributed to the higher numbers of this species which were present in the upper 5 cm layer of the soil during the winter months. The mean numbers taken over the period of a year were highly significantly more than the means calculated from the collections during the selected three months (table 22). The differences between the concentrated collection and the random collection during the year (table 19) and between the concentrated collection and the numbers of the nine covered subplots are still highly significant. There was, however, a significant difference between the numbers in the subsamples of the nine covered and the nine partly or uncovered subplots (table 21).

A comparison between figs. 36 and 41 shows clearly that the data, which were collected over a long period, gives a better reflection of the horizontal distribution of Coccotydeus, particularly since this species is readily influenced by environmental changes during the different seasons of the year. But even this is not satisfactory, and although the distribution pattern is nearer to reality, the nature and range of aggregations can by no means be determined reliably. There is no doubt that Coccotydeus has a random distribution but the actual horizontal distribution pattern cannot be established without intensive collection.

5.22 EUPODES SP.

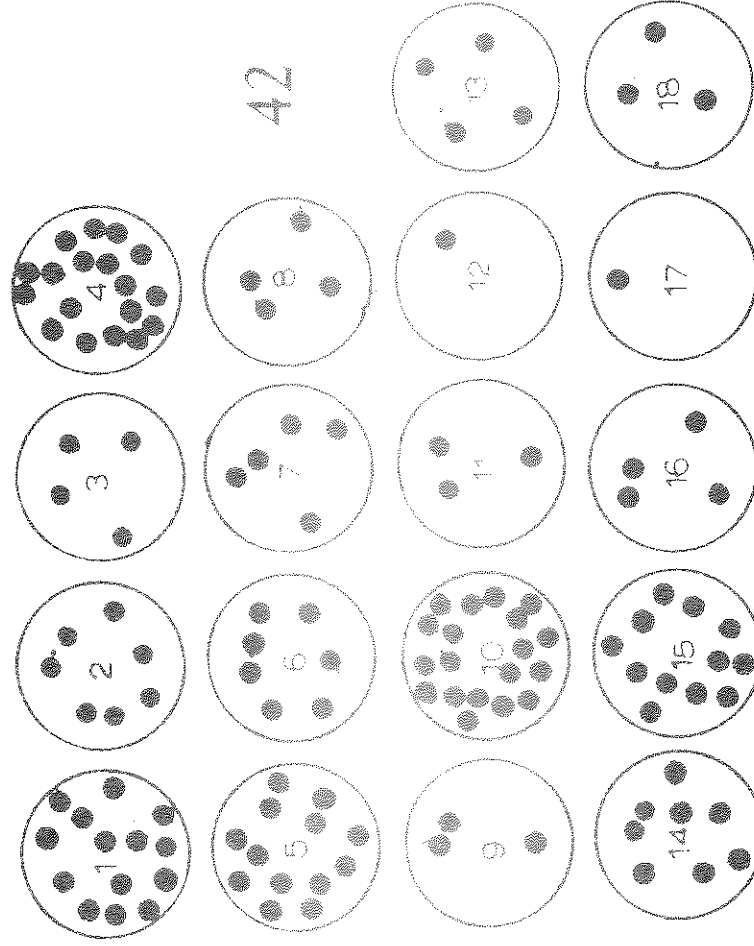
In fig. 32 a representation of the horizontal distribu-

COCCOTYDEUS



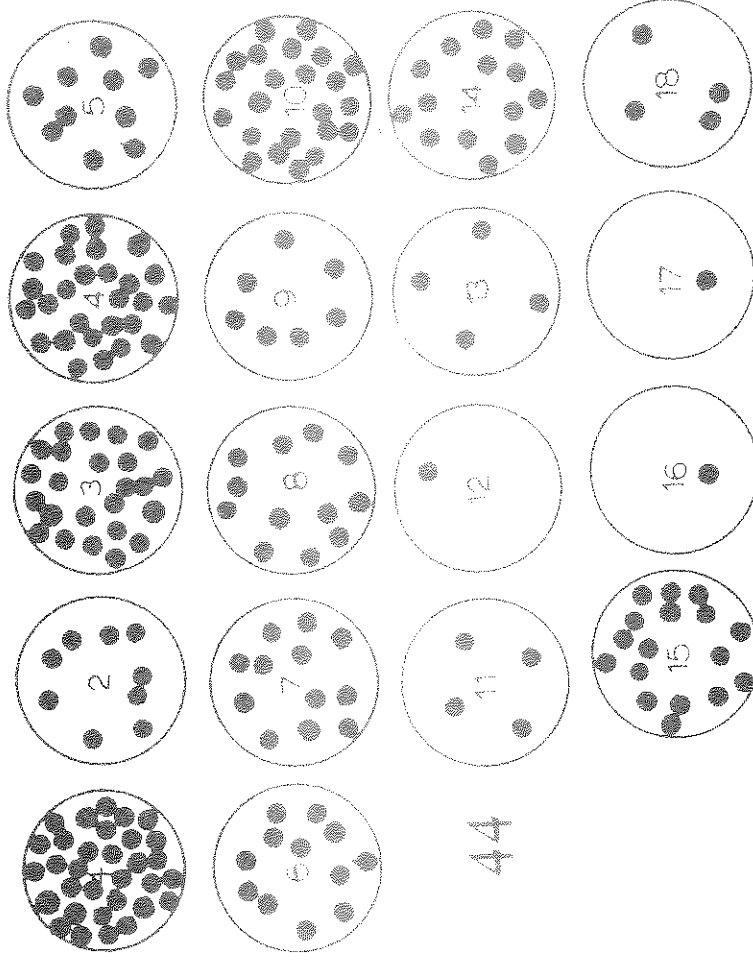
41

EUPODES



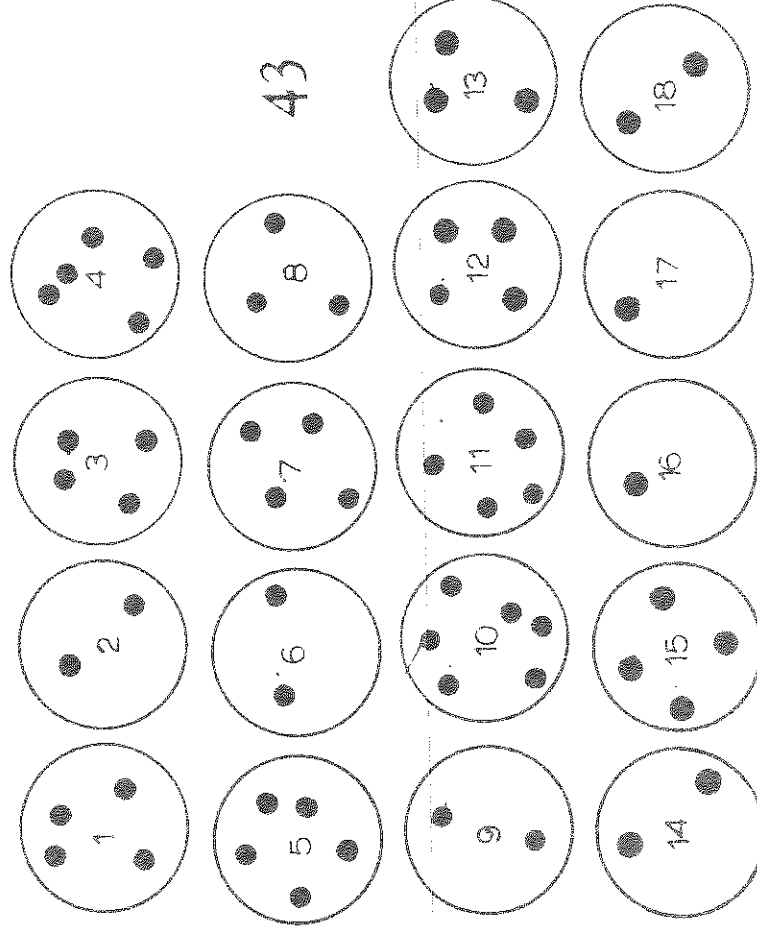
42

TARSONEMUS



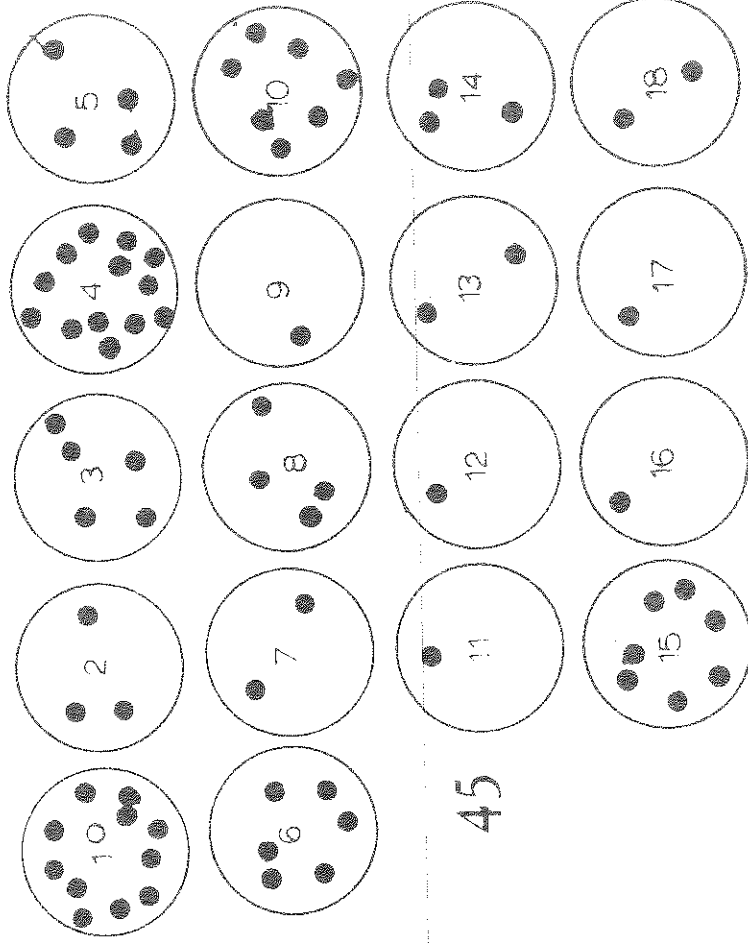
44

NANORCHESTES



43

TYDEUS



45

FIGS. 41-45.
NUMBERS OF SELECTED SPECIES IN RANDOM SAMPLES (1 YEAR).

Comparison between concentrated sample (A) and means of random samples for entire

sampling period (E)

tion of Eupodes sp. in the concentrated sample, is given. It is peculiar that the highest number of this species was also found in subsample No. 4 whereas the smallest number was collected from No. 9. It is also conspicuous that a low number of this species was extracted from No. 8 while all the subsamples surrounding it had higher numbers. Although Eupodes generally occurred in smaller numbers, considerably more individuals of this species than Coccotydeus were present in Nos. 2, 13 & 14. The C.V. of 64.50 (table 15), which was higher than that of Coccotydeus, indicates a distinct aggregation.

A comparison between data of the concentrated sample and the mean values of the means of the random samples (3 months) shows that in the latter collection Eupodes occurred in considerably higher numbers than Coccotydeus. Eupodes sp. ^{was} ~~were~~, contrary to Coccotydeus, present in all subsamples (fig. 37). The high C.V. of 91.4 gives adequate evidence of irregular distribution of this species.

As in the case of Coccydeus, the statistical analysis of the figures of Eupodes in the concentrated and random subsamples (means of three months) also show highly significantly higher numbers in the former sample (table 16). The numbers of the samples of the 9 covered subplots also are still highly significantly lower than those of the concentrated sample (table 17). Table 18 also indicates that no significant difference exists as far as this species is concerned with regard to the numbers of the nine covered and the nine partly covered and bare subplots.

The C.V. of 81.39 for the random samples taken during the entire sampling period is a value which approaches that for the 3-months period instead of that for the concentrated collection. From table 22 it is evident that the diffe-

rences between the mean numbers for the two periods are non-significant. The numbers of Eupodes in the concentrated sample were highly significantly higher than those in both the entire series (one year) of 18 subsamples (table 19) and the 9 subsamples which were taken on the covered subplots during that period (table 20). When the entire sampling period is considered this species showed a strong inclination to occur in higher numbers in the 9 covered subplots than in the 9 partly covered and bare subplots.

From a comparison between figs. 37 and 42 it is evident that the mean distribution pattern of Eupodes during the three-months period did not differ much from that during the entire sampling period. A possible conclusion could be drawn that this species is not as readily influenced by environmental changes during the different seasons of the year as is Coccotydeus. It is possible, however, that quite different factors were responsible for the particular results.

5.23 NANORCHESTES SP.

Of the five selected species Nanorchestes sp. occurred in the smallest numbers but showed the most even distribution (fig. 33). This is also evident from the C.V. of 47.90, which was lower than that of any of the other four species (table 15). Subsample No. 4 was one of the subsamples which contained the highest number of specimens of Nanorchestes sp. but was surpassed by the numbers collected from Nos. 3 and 11. Although this species does not aggregate to such an extent as the other species, random distribution is still out of the question.

The same character of a more even horizontal distribution is also evident from data of the random samples of the three-month period (fig. 38), of which the C.V. of 85.30

TABLE 20

Comparison between concentrated sample (A) and means of random samples for entire sampling period taken on covered subplots (F)

Species		n	$\bar{x}$	$n-1 Sx^2$	df	t	P		Differences between means		R
							one-sided	two-sided	one-sided	two-sided	
<u>Coccotydeus</u> sp.	A	18	107.78	75735.00	25	4.151	<.0005	<.001	Highly significant	Highly significant	
	F	9	14.22	443.22							
<u>Eupodes</u> sp.	A	18	84.72	50796.00	25	4.086	.0005-.005	.001-.01	Highly significant	Highly significant	
	F	9	9.28	321.38							
<u>Nanorchestes</u> sp.	A	18	43.06	6946.20	25	5.697	<.0005	<.001	Highly significant	Highly significant	
	F	9	4.21	26.13							
<u>Tarsonemus</u> sp.	A	18	55.78	19499.00	25	2.849	.0005-.005	.001-.01	Highly significant	Highly significant	
	F	9	17.67	617.96							
<u>Tydeus</u> sp.	A	18	45.78	13654.40	25	4.137	<.0005	<.001	Highly significant	Highly significant	
	F	9	6.12	127.66							

TABLE 21

Comparison between means of random sample taken on covered subplots for entire sampling

period (F) and partly and uncovered subplots (G)

Species		n	$\bar{x}$	n-1 s_x^2	df	t	P		Differences between means	
							one-sided	two-sided	one-sided	two-sided
<u>Coccotydeus</u> sp.	F	9	14.22	443.22	16	2.792	0.005-0.01	0.01-0.02	Significant	Significant
	G	9	6.13	191.00						
<u>Eupodes</u> sp.	F	9	9.28	321.38	16	1.895	0.025-0.05	0.05-0.10	Significant	inclination to significant
	G	9	4.59	120.05						
<u>Nanorchestes</u> sp.	F	9	4.21	26.13	16	2.967	0.005-0.0005	0.01-0.001	Highly significant	Highly significant
	G	9	2.04	12.22						
<u>Tarsonemus</u> sp.	F	9	17.67	617.96	16	3.943	0.005-0.0005	0.01-0.001	Highly significant	Highly significant
	G	9	3.52	308.19						
<u>Tydeus</u> sp.	F	9	6.12	127.66	16	3.200	0.005-0.0005	0.01-0.001	Highly significant	Highly significant
	G	9	1.76	7.52						
<u>Speleorchestes</u> sp.	F	9	4.50	41.52	16	3.39	0.005-0.0005	0.01-0.001	Highly significant	Highly significant
	G	9	1.77	5.38						

TABLE 22

Comparison between means of random samples for entire sampling period (E) and the period Nov. '62-Jan.1963 (B)

Species		n	$\bar{x}$	n-1 Sx^2	df	t	P		Differences between means	
							one-sided	two-sided	one-sided	two-sided
<u>Coecotydeus</u> sp.	E	18	10.18	928.71	34	5.748	<.0005	<.001	Highly significant	Highly significant
	B	18	0.14	5.45						
<u>Eupodes</u> sp.	B	18	6.94	684.08	34	0.005	.5-.45	1-.9	non-significant	non-significant
	E	18	6.93	540.43						
<u>Nanorchestes</u> sp.	E	18	3.13	59.50	34	0.551	.30-.25	.6-.5	non-significant	non-significant
	B	18	2.74	92.75						
<u>Tarsonemus</u> sp.	E	18	10.59	1826.48	34	2.816	.005-.0005	.01-.001	Highly significant	Highly significant
	B	18	3.39	169.76						
<u>Tydeus</u> sp.	E	18	3.94	221.00	34	4.019	<.0005	<.001	Highly significant	Highly significant
	B	18	0.43	12.54						

(table 15) was the lowest of the five species. As in the case of the other discussed species, Nanorchestes sp. also occurred in highly significantly higher numbers in the concentrated sample than in both the mean of the 18 subsamples of the three-month period (table 16) as well as those of the 9 covered subplots (table 17). The differences between the numbers of the 9 covered subplots and those of the nine partly covered and bare subplots are also non-significant.

The mean numbers of this species collected from the subplots during the entire sampling period also showed a more even distribution. This is evident from the C.V. of 59.74 (table 15) which is lower than that of any other species. The differences in numbers of Nanorchestes sp. of the random samples over 3 months and those of the entire sampling period were non-significant (table 22). There was, however, a highly significant difference between the numbers which occurred in the 9 covered subplots and those of the nine partly covered and bare subplots.

5.24 TARSONEMUS SP.

The largest number of this species occurred in subsample No. 16 of the concentrated sample, a number which is twice that of any other subsample (fig. 34). The lowest number was collected from No. 8. The C.V. of 60.70 indicates the existence of aggregates (table 15). This is, furthermore, supported by the C.V. of 92.2 which was calculated from the numbers of the three-month period. Tarsonemus sp. occurred in highly significantly higher numbers in the concentrated sample than in both the 18 subsamples of the three-month period (table 16) as well as in the nine covered subplots (table 17). Here however, existed a tendency of the species (oft) occur in higher numbers in the nine covered subplots than in

the nine partly covered and bare subplots (table 18).

The C.V. of 97.83 of Tarsonemus, based on the data of the entire sampling period, is higher than that based on the three-month period (table 15) and for that reason Tarsonemus is an exception when compared with the other 5 species. This is also evident when figs. 39 & 44 are compared. Apparently this species is also readily influenced by environmental changes during the different seasons of the year because highly significantly more individuals occurred in the random samples of the entire sampling period than in those of the three-month period (table 22).

As in the case of the former species, Tarsonemus occurred in highly significantly higher numbers in the concentrated sample (tables 19 & 20). This species is distinguished from the others in being present in highly significantly higher numbers in the covered subplots than in the partly covered and bare subplots. It seems justifiable to assume that the grass cover and its accompanying litter layer play an important role in the horizontal distribution of Tarsonemus sp.

5.25 TYDEUS SP.A

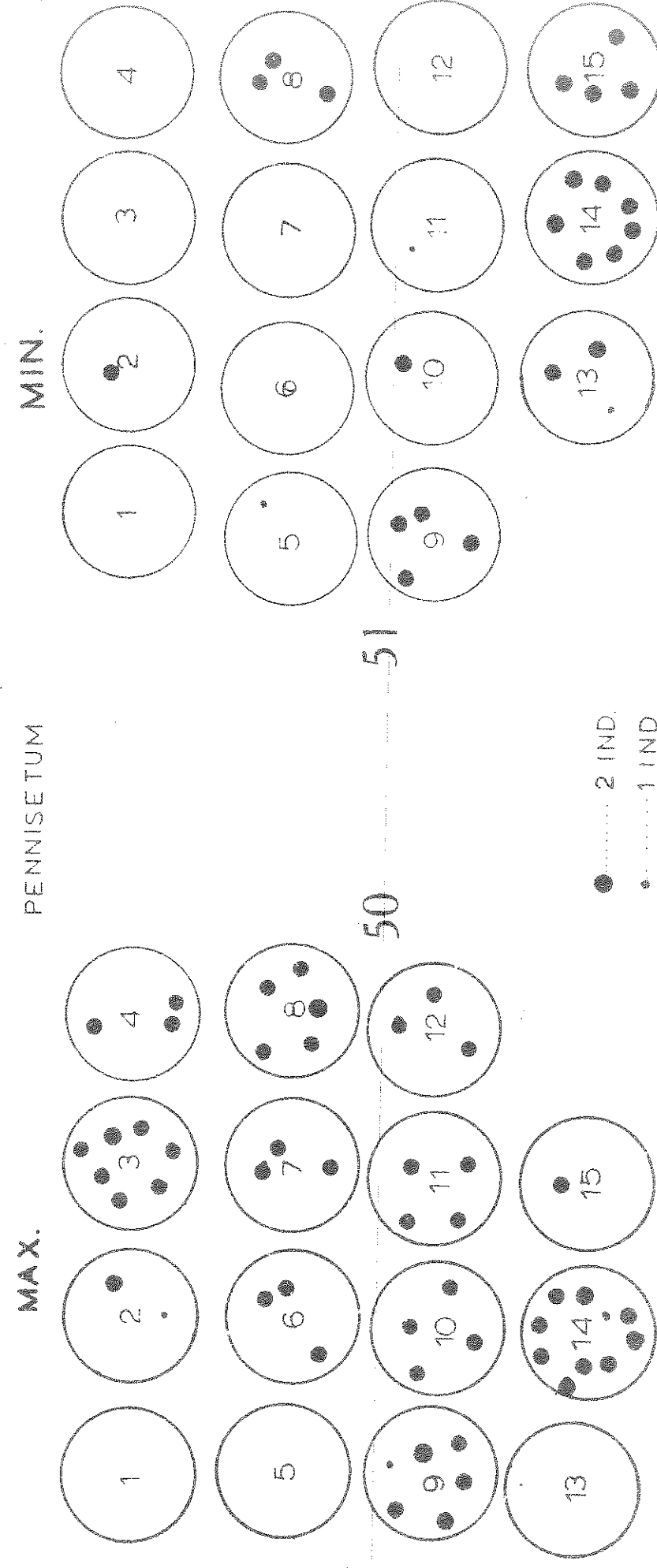
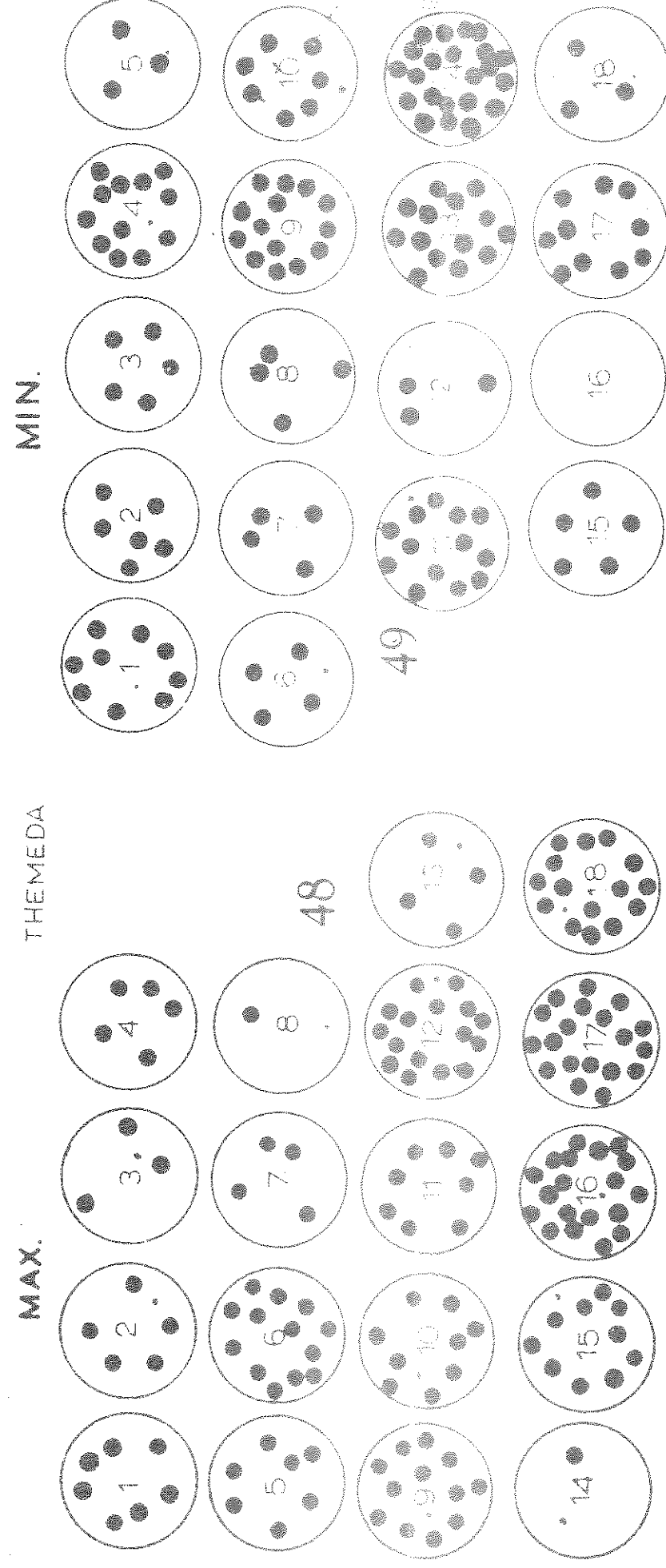
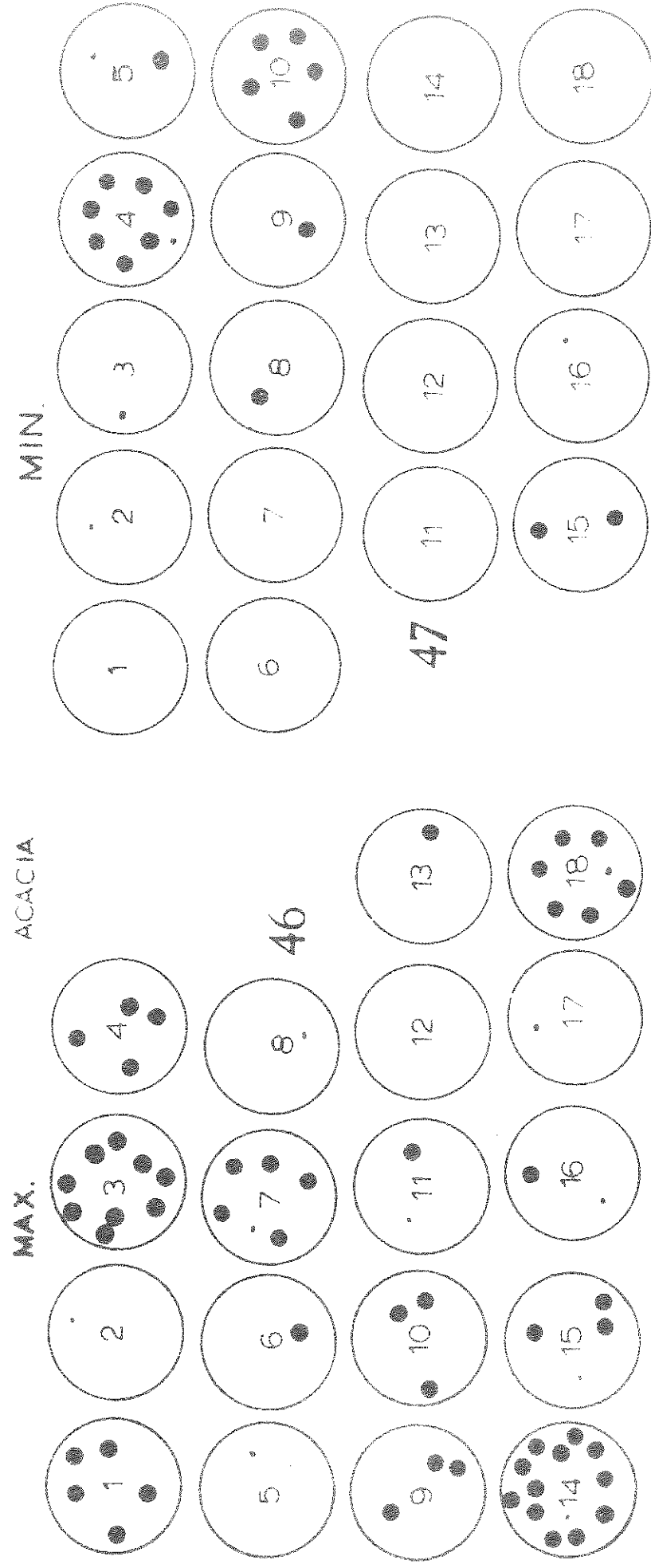
Fig. 35 portrays the distribution of Tydeus sp. a in the concentrated collection, with the highest number in subsample No. 11 and the lowest in No. 8. The C.V. of 61.9 indicates an intense aggregation of this species (table 15). In the random samples of the three-month period (fig. 40) the numbers were rather low and from six of the subplots not a single individual was collected during this period. These low numbers were responsible for the high C.V. of 199.7 and therefore a highly significantly higher number of this species occurred in the concentrated sample than in both the random 18 subsamples of the three-month period (table 16) and in the 9

covered subplots (table 17) for the same period. From table 18 it can be concluded that the numbers of this species which were present in the subsamples of the covered subplots were significantly higher than those in the subsamples from the partly covered and bare subplots. The actual numbers collected were very low and therefore the differences cannot be properly valued.

The C.V. of 91.62 for this species, based on data collected during the entire sampling period, approaches that of the concentrated sample (61.9) rather than the extraordinary high C.V. of 199.7 for the three-month period. A comparison between figs. 40 and 45 shows that a more even distribution is obtained when the means are calculated from data collected over the entire sampling period than when it is restricted to the three-month period.

5.3 DISCUSSION

The first striking feature in connection with the concentrated collection is the presence of extraordinary high numbers, compared with those of the random samples of the entire sampling period. This however, cannot be attributed to a high soil moisture content because for the period 15 November 1963 to 3 December 1963 the rainfall value was 48.2 mm compared with 125 mm of the corresponding period during 1962. Although the concentrated sample was taken from a completely covered subplot with a reasonable litter layer, the other subplots, on which samples were taken regularly, showed the same superficial characteristics. Everything, however, points to the inadequate methods normally employed in collection of soil samples. This is clearly illustrated by figs. 46-51 in which the maxima and minima of the numbers of Tarsonemus sp. collected from the three biotopes



●..... 2 IND.
 1 IND.

FIGS. 46-51.
 MAXIMA AND MINIMA OF SELECTED SPECIES IN THREE SOIL TYPES DURING
 NOV 1962 - JAN 1964

during November 1962-January 1963 are compared. The minimum numbers of this species collected from natural pasture soil (Themeda) exceeded the maximum numbers of both kikuyu (Pennisetum) and Acacia soil. From experience it is evident that it cannot be concluded that those numbers were the actual numbers present in the soil during that period.

The factors which cause soil organisms to aggregate are still unknown. Generally speaking, such a distribution might be explained by the following factors e.g. the grouping of eggs deposited by one or more adults during the reproductive period; the choice of microhabitats which are particularly suitable as the result of local conditions such as microclimate, food, etc., and the direct attraction between individuals. There is no doubt that some parts of the habitat are more suitable for organisms than others - even for a variety of species. This is clearly illustrated by subsamples Nos. 4 and 8 of the concentrated sample (figs. 31-35). Two of the five selected species (Coccotydeus and Eupodes) occurred in their highest numbers in No. 4 whereas the numbers of the other three species in this subsample were also high. Subsample No. 8, on the other hand, yielded the fewest individuals of the three species Coccotydeus, Tarsonemus and Tydeus whereas the numbers of the other two species were also low. It seems justifiable to assume that conditions in No. 4 were optimal for the organisms to aggregate whereas in No. 8 this was not the case. These two subsamples, however, were taken next to each other. Another extreme case of aggregation was that recorded for the June 1963 sample when 4,512 individuals of Tydeus sp. b were extracted from one subsample while the numbers of this species in the other subsamples ranged from 1 to 144 (table 35).

From the above-mentioned it is evident that the

methods of sampling employed seldom give a clear picture of the horizontal distribution of the organisms. Smaller samples should be taken in higher quantities and more frequently. The samples, on the other hand, should be large enough to include the rarer species. In population studies it is not always the abundant species which are useful indicators of faunal groupings and therefore rare species also have to be considered. Macfadyen (1963) is of opinion that any effort to a complete analysis of the soil community should involve either parallel sampling with units of different sizes or the collection of higher quantities of samples to include rare species also. It is not clear yet how to solve this problem without increasing the time-consuming processes of counting and identifying the collected animals. The grease film extraction technique described by Aucamp & Ryke (1964, 1965), however, might play an important role in determining the horizontal distribution pattern of the soil fauna.

6. VERTICAL DISTRIBUTION

It is generally accepted that the micro-arthropods are more abundant in the upper 5 cm of the soil. This feature is common in European soils. Murphy (1955), for instance, found that 96% of the arthropod population in natural heathland (England) was confined to the upper $2\frac{1}{4}$ inches (5.6 cm) of the soil. This condition, however, is not common in South African soils.

Aucamp & Ryke (1965) investigated the stratification of the soil micro-arthropods on the same plot as the present investigation by means of both the grease film and funnel extractors. Their study was carried out with a soil sample measuring 6.4 cm in diameter and 30 cm in vertical length. The sample consisted of 10 subsamples, each representing a

3 cm deep in vertical order (figs. 52-55 after Ryke).

As regards the Trombidiformes the numbers recovered fluctuate very much in the upper 21 cm of the sample

. Even at the 27 and 30 cm levels the sample yielded mites respectively which equals densities of 4,424 mites per m^2 . As regards the vertical distribution of *batei* (fig. 53) these authors found that the numbers steadily from the surface downwards and the population of 21,630 per m^2 was the highest in the deepest 30 cm). It is also surprising that the results of investigation showed that the largest number of Mesochorus (3,830 per m^2) were also present in the deepest

54). Only a few specimens of the Acaridiae were

. The distribution pattern (fig. 55) shows that all found below the 12 cm level. The largest number of *embola* (3,932 per m^2) from the upper 12 cm of the sample was found in the first 3 cm whereas the same number was found in the lower 15 cm at the 24 cm level (fig. 56).

It is interesting to note that no collembolids were found between the 12 and 15 cm levels. The species in the upper half of the sample were quite distinct from those in the lower half.

The picture of the vertical distribution patterns of the micro-arthropods only serves as an indication of what might be expected in a full scale stratification study. The preliminary results obtained by these authors were substantiated by other test-samples and it can be concluded that, at least during certain periods of the year, the density of the soil micro-arthropod population in the Acacia biotope is higher in the lower layers, the upper 5 cm forming the apex of the ecological pyramid of numbers.

According to Belfield (1956), who studied the Arthropoda

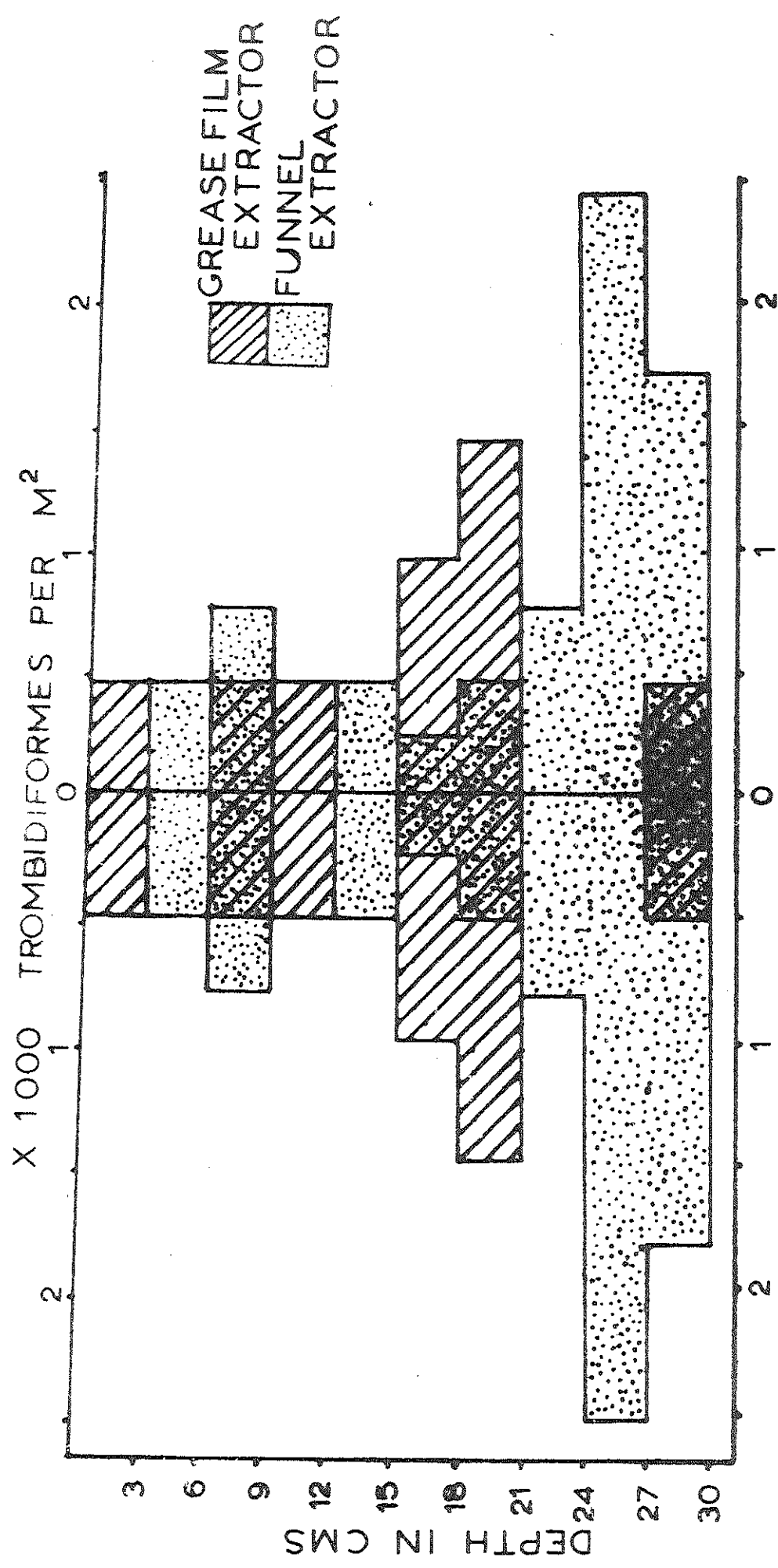


FIG. 52.

VERTICAL DISTRIBUTION PATTERN OF TROMBIDIFORMES IN ACACIA
BIOTOPE.

X1000 ORIBATEI PER M²

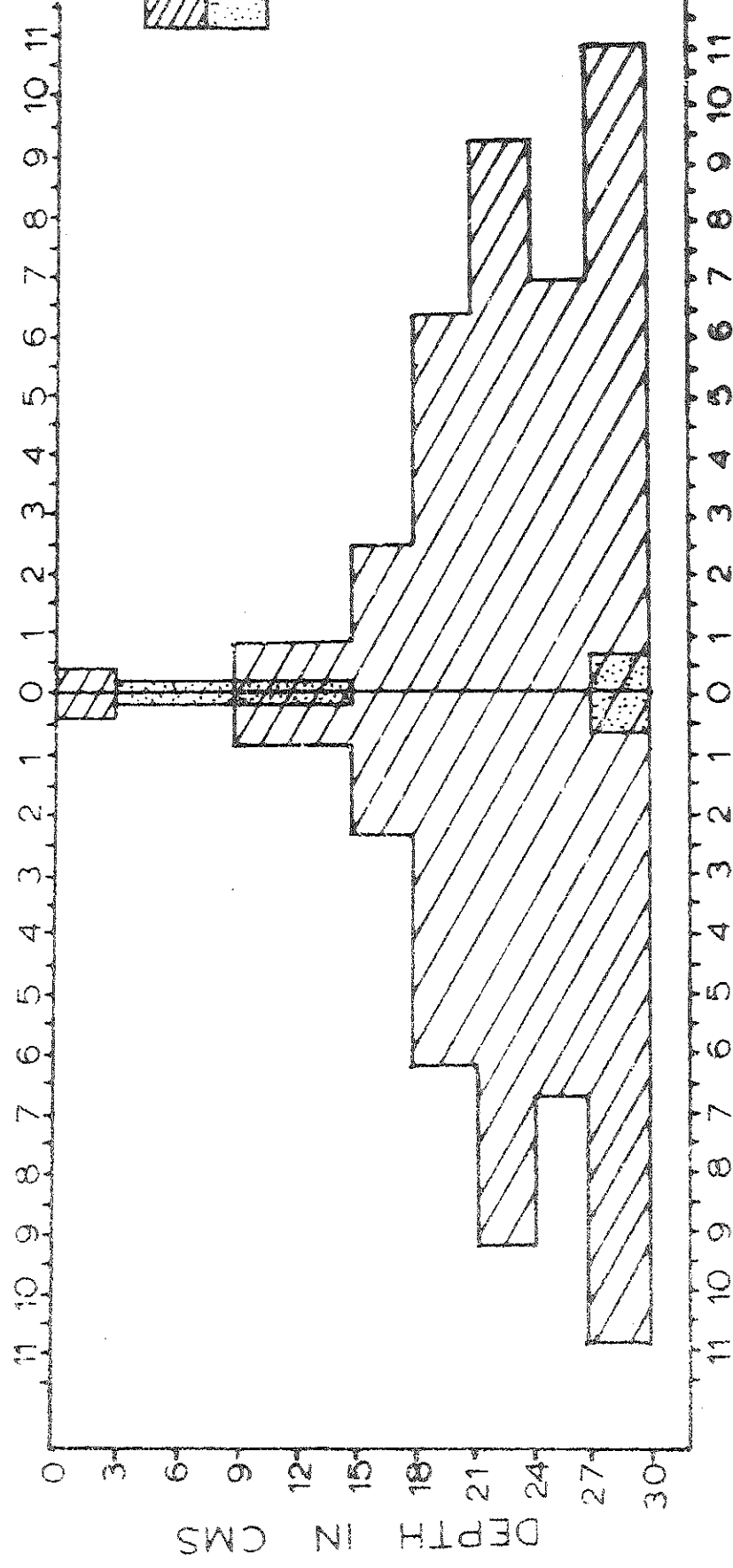


FIG. 53.
VERTICAL DISTRIBUTION PATTERN OF ORIBATEI IN ACACIA BIOTOPE.

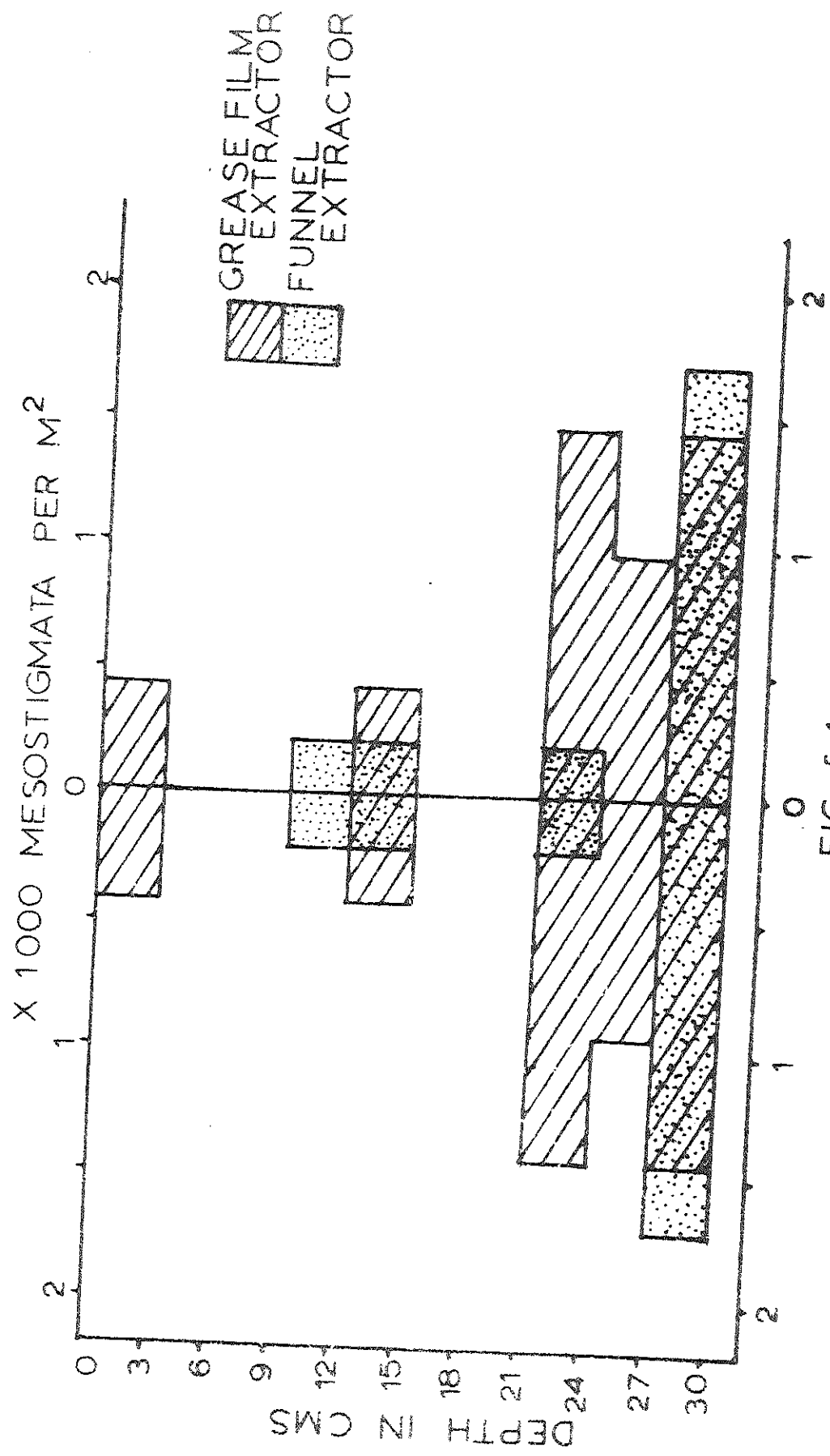


FIG. 54.
VERTICAL DISTRIBUTION PATTERN OF MESOSTIGMATA IN ACACIA BIOTOPE.

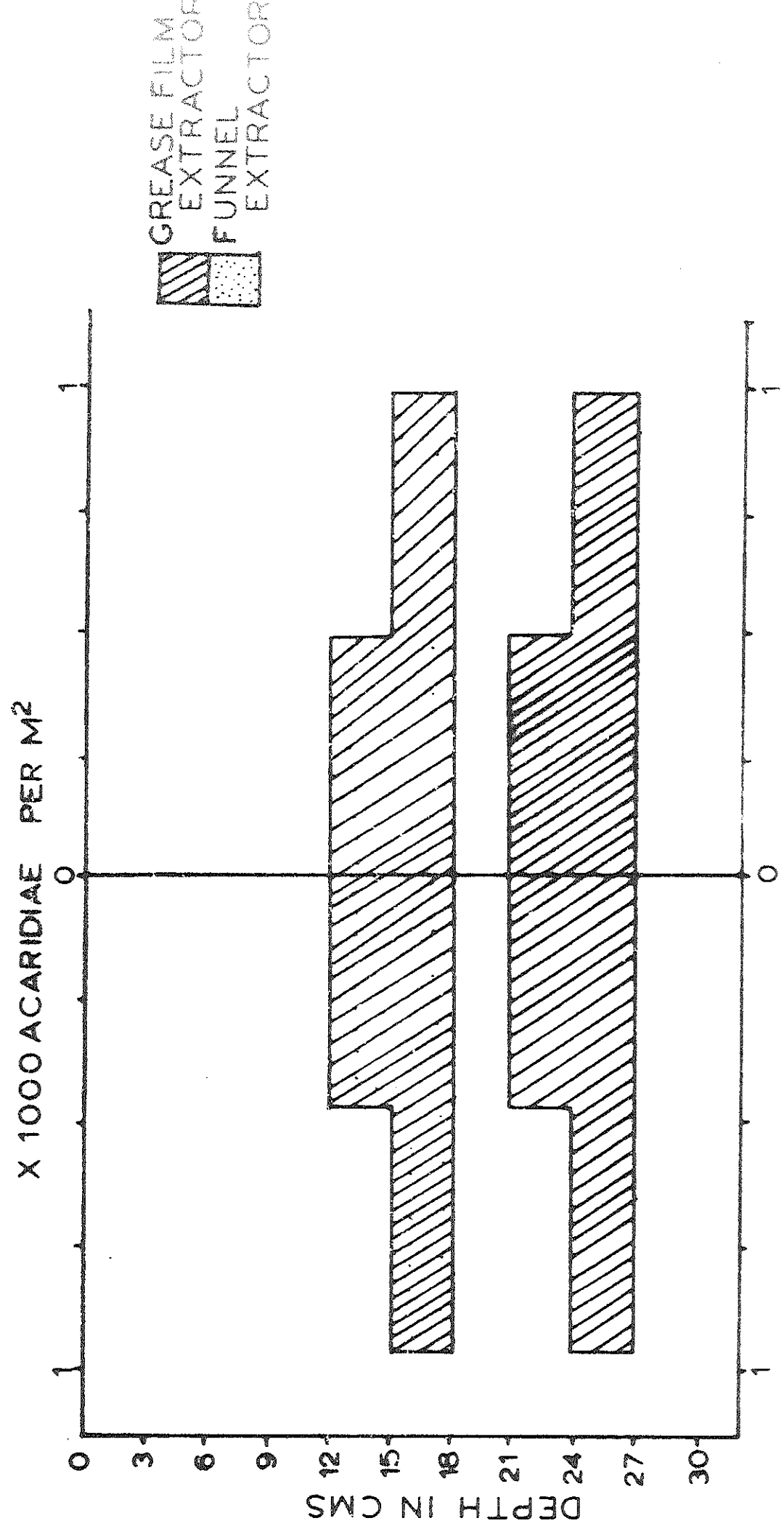


FIG. 55.
VERTICAL DISTRIBUTION PATTERN OF ACARIDIAE IN ACACIA
BIOTOPE.

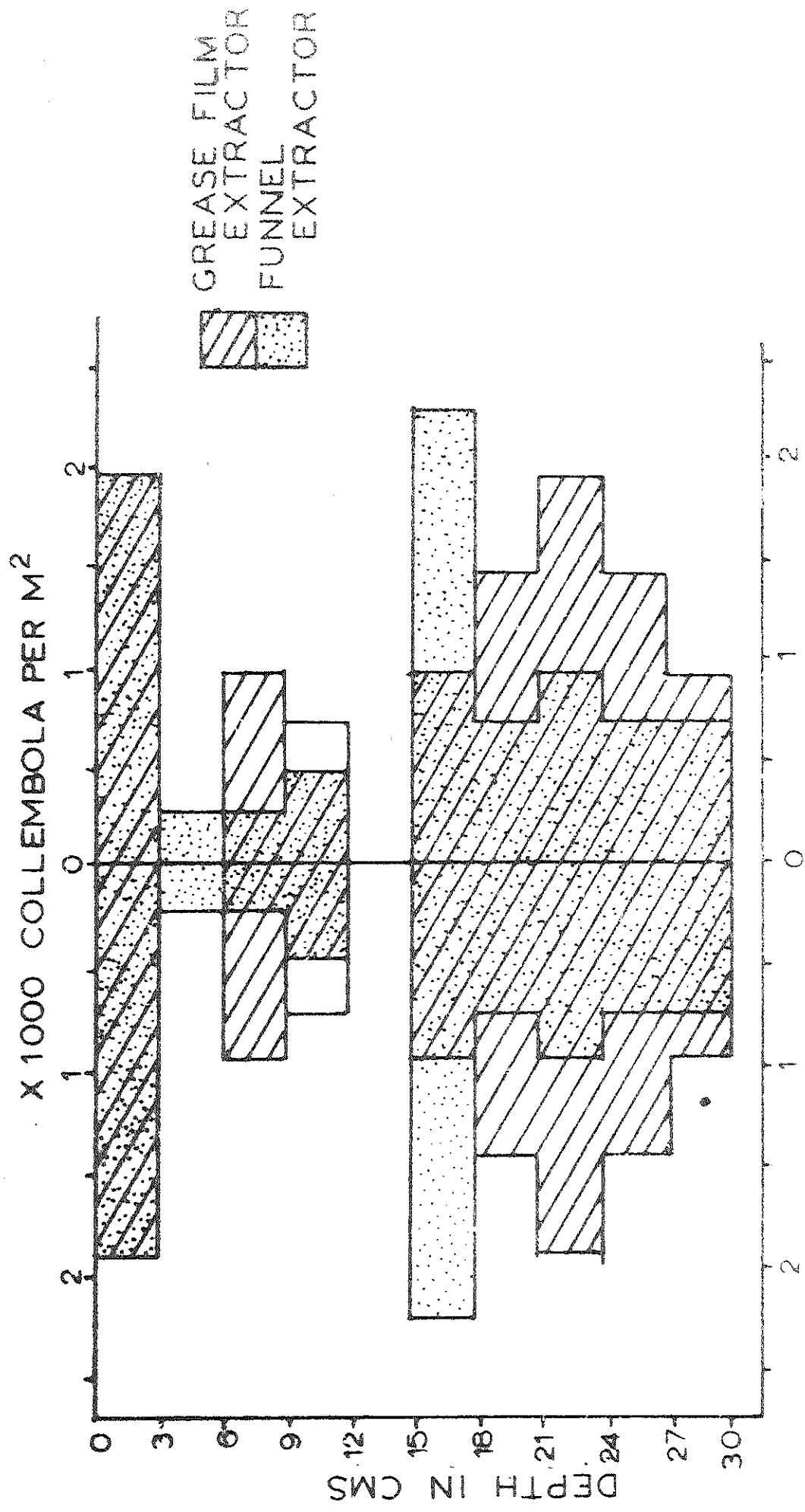


FIG. 56.
VERTICAL DISTRIBUTION PATTERN OF COLLEMBOLA IN ACACIA BIOTOPE.

TABLE 23
TOTAL NUMBERS AND NUMBERS OF ACARI AND COLLEMBOLA FOUND BY BELFIELD (1956)
IN A WEST AFRICAN PASTURE

Date	0" - 2" Top 2 inches	2" - 6" 2-6 inches	0"-6"	3 x 2"	$\frac{3}{2}$ x 2" - 6"	6"-12"	12"-18"	Total
Total numbers*								
Dec. 1953	56	66	122	168	99	156	68	346
Jan. 1954	73	88	161	219	132	169	144	474
Feb. 1954	152	202	354	456	303	213	101	668
Mar. 1954	250	260	510	750	390	235	131	876
Apr. 1954	305	271	576	915	406	258	91	925
May 1954	431	316	747	1293	474	203	95	1045
Total	1267	1203	2470	3801	1804	1234	630	4334
Acari								
Dec. 1953	39	27	66	117	41	64	29	158
Jan. 1954	49	53	102	147	80	52	44	198
Feb. 1954	76	80	156	228	120	89	38	283
Mar. 1954	150	140	290	450	210	90	49	429
Apr. 1954	146	98	244	438	147	79	25	348
May 1954	233	135	368	699	203	85	38	491
Total	693	533	1226	2079	801	458	223	1907
Collembola								
Dec. 1953	3	27	30	9	41	44	13	87
Jan. 1954	5	16	21	15	24	43	27	91
Feb. 1954	39	60	99	117	90	38	12	149
Mar. 1954	51	75	126	153	113	42	29	197
Apr. 1954	124	88	212	372	132	81	21	314
May 1954	175	95	270	525	143	41	15	326
Total	397	361	758	1191	543	289	117	1164

* Includes: Diplura, Corrodentia (Psocoptera), Thysanoptera, Hemiptera, Coleoptera, Mymaridae, Diptera, Chelonethi, Palpigradi, Chilopoda, Diplopoda, Pauropoda, Symphyla, Acari and Collembola.

of the soil in a West African pasture, the vertical and seasonal distribution of this group in the top 18 inches (45 cm) (table 23) shows an increase in density as the season becomes wetter. (The rainfall values during the sampling period were: December 1953, 0.25 mm; January 1954, 20.0 mm; February 1954, 119.25 mm; March 1954, 91.25 mm; April 1954, 137.75 mm, and May, 182.75 mm. The mean soil temperatures recorded by Belfield gradually decreased from 31.3°C to 28.9°C . This increase in density is the result of a steep rise in the numbers in the top 2 inches and a moderate increase in the 2-6 inch layer of the soil. This author found that densities below 6 inches hardly changed as the season became wetter. He suggested that the increase was mainly due to a decrease in the possibilities of desiccation in the top layer of the soil. From the figures in table 23 it is evident that during the dry season the vertical distribution pattern of the microarthropods in the West African pasture soil approaches the conditions in the Acacia biotope. According to van Jaarsveld (personal communication) similar conditions obtain in cultivated soils in the Potchefstroom area.

It can, therefore, readily be assumed that the density of the micro-arthropod population per m^2 might be several times higher than that suggested by the numbers recovered from the upper 5 cm of the soil in the present investigation.

7. SUMMARY

1. The heterogeneity of the sampling plot is evident in the physical characteristics as well as flora and fauna compositions. Acacia karroo Hayne (thorn-tree) is the dominant plant species on the sampling plot.

2. The rainfall figures for the autumn and early winter months during the sampling period, were considerably higher than the annual average for the corresponding periods of previous years.
3. During the period September 1962-September 1963 13 soil samples, each consisting of 18 subsamples, were taken.
4. The highest number of micro-arthropods (117,095 per m²) was recorded on 10 June 1963 and the lowest (4,498 per m²) on 16 September 1963. These figures fall short of the numbers occurring in European soils.
5. The fluctuations in biomass of the micro-arthropods were usually in accordance with the fluctuations in numbers. The highest biomass value was recorded during November 1962, the insects (excluding Collembola) being the dominant group.
6. The Trombidiformes were numerically the dominant group of the Acari during the entire sampling period. Only during December 1962 the biomass of the Oribatei exceeded that of the Trombidiformes.
7. Fifty-four different species belonging to twenty-eight families constituted the trombidiform population in Acacia soil, the Tydeidae, Tarsonemidae, Eupodidae and Nanorchestidae being the dominant families. Tydeus sp.b, Tarsonemus sp., Coccotydeus sp., Eupodes sp. and Nanorchestes sp. constituted the numerically dominant species of the Trombidiformes.
8. The Nanorchestidae reached their highest peaks in October 1962, February and July 1963 whereas maxima of the Tydeidae were registered during February and June 1963. The Tydeidae were numerically the dominant family, the Tarsonemidae (with its highest peak in May 1963) were subdominant, and the Nanorchestidae were the least abundant of the four

families. The biomass figures of the Eupodidae were the highest in 7 of the 13 samples while those of the Tydeidae were superior in the remaining 6 samples.

9. Twenty-eight different species belonging to eight families constituted the mesostigmatid population in Acacia soil, the Laelaptidae, Rhodacaridae, Aceosejidae, Pachylaelaptidae and Phytoseiidae being the dominant families. Gamasellus sp., Rhodacarus sublapideus, Gaeolaelaps sp. b, Proto-gamasellus sp. a and P. sp. b constituted the numerically dominant species of the Mesostigmata. The Mesostigmata reached their highest peak during November 1962 with a second peak in February 1963 and a minimum in September 1963. The Laelaptidae were superior in biomass in 10 of the 13 samples whereas the Rhodacaridae were superior in the February, June and August samples.
10. The Oribatei, which were considered as a group, constituted the subdominant order of the Acari, Liochthonius sp. being the numerically dominant species. The highest number occurred during February 1963 and the lowest during September 1962.
11. The Acarididae, considered as a group, constituted a small portion of the acarofauna in the soil. The highest number occurred in November 1962.
12. The Collembola occurred in low numbers during the entire sampling period. The highest number was extracted during April 1963. The ratio Collembola:Acari for Acacia soil was 1:15.5
13. The numbers of insects (excluding Collembola), considered as a group, formed an inconspicuous portion of those of the mesofauna. The biomass of the insects, on the other hand, dominated that of any other group except during June 1963.

14. The numbers of the five dominant species in a concentrated sample (18 subsamples), taken on 3 December 1963, were considerably higher than the means of the same species extracted from the random samples of the entire sampling period. From the obtained data of the concentrated sample it is also evident that aggregation of micro-arthropods occurs in Acacia soil and it is concluded that the present sampling methods employed are inefficient.
15. The results of stratification studies of the micro-arthropods of Acacia soil indicate that, at least during certain periods of the year, the population density is higher in the lower layers.
16. It seems reasonable to conclude that wetness or dryness of a biotope indirectly, rather than directly, exerts an influence upon the soil fauna because these factors determine the type and density of the vegetation which in turn largely contributes towards the amount of soil organic matter.

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ABSTRACT OF:

A MESOFAUNAL INVESTIGATION OF THE SOIL IN A THORN-TREE

(ACACIA KARROO) BIOTOPE.

This investigation is part of a research project on the faunal compositions of soils under different vegetation in the Potchefstroom area (Transvaal, South Africa). The different types of vegetation included sweet thorn-trees (Acacia karroo), kikuyu grass (Pennisetum clandestinum), "rooigras" (Themeda triandra) and eragrostis grass (Eragrostis curvula).

This study comprised the determination of the faunal and floral composition, temperature, humidity, physical and chemical properties of the soil as well as biomass estimation of the fauna. Thirteen monthly samples, each consisting of 18 random subsamples, were taken during September 1962-September 1963.

The following main groups were collected: Acari, Collembola, Insects (excluding Collembola), Araneida and Pseudoscorpionida. The Acari, the numerically dominant group, were represented by the Trombidiformes, Oribatei, Mesostigmata and Acarididae, in this order of numerical importance.

Fifty-four different species belonging to twenty-eight families constituted the trombidiform population, the Tydeidae, Tarsonemidae, Eupodidae and Nanorchestidae being the numerically dominant families and Tydeus sp.b, Tarsonemus sp., Coccotydeus sp., Eupodes sp. and Nanorchestes sp. the dominant species. Twenty-eight different species belonging to eight families constituted the mesostigmatid population, the Laelaptidae, Rhodacaridae, Aceosejidae, Pachylaelaptidae and

Phytoseiidae being the numerically dominant families and Gamasellus sp., Rhodacarus sublapideus, Gaeolaelaps sp.b, Protogamasellus sp.a and P.sp.b the dominant species. The Oribatei and Acaridiae were each considered as a group, Liochthonius sp. being the dominant oribatid species. Of the Acari the Trombidiformes were superior in their contribution to the biomass while the Oribatei occupied second and the Mesostigmata third position. Collembola and Insecta (excluding Collembola) occurred in low numbers but in spite of this the insects contributed more to the biomass of the micro-arthropods than any other group.

The numbers of the five numerically dominant species (Coccotydeus sp., Eupodes sp., Nanorchestes sp., Tarsonemus sp. and Tydeus sp.a) extracted from a concentrated sample taken on 3 December 1963, were considerably higher than the mean numbers of the same species extracted from the random samples of the entire sampling period. From the data obtained from the concentrated sample it is evident that aggregation of micro-arthropods occurs. It is also concluded that present sampling methods employed are inefficient.

The results of stratification studies of the fauna of Acacia soil indicate that, at least during certain periods of the year, population density is higher in the lower layers.

It seems reasonable to conclude that wetness or dryness of a biotope indirectly, rather than directly, exerts an influence upon the soil fauna because these factors determine the type and density of the vegetation which, in turn, largely contributes towards the amount of soil organic matter.

TABLE 24

NUMBERS OF TROMBIDIFORMES PER SUBSAMPLE FOR 24th SEPTEMBER 1962

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m	Mean biomass per individual mg	Biomass per m ² mg
TETRANYCHIDAE intoto		1	1	11			5	6	1	10	1		1	8	1	4			2.778	852.290	0.0192	16.3640
Bryobia borealis			1				2									2			0.278	85.290	0.0140	1.1941
Eotetranychus sp.				4			1	3		10	1		1	4		2			1.444	443.011	0.0140	6.2022
Monoceronychus sp.				1				3	1					3	1				0.500	153.400	0.0400	6.1360
Oligonychus sp.				1										1					0.111	34.055	0.0260	0.8854
Schizotetranychus sp.				1															0.056	17.181	0.0140	0.2405
Tetranychus sp.		1		4			2												0.389	119.345	0.0140	1.6708
TENUIPALPIDAE intoto									1	10	1		1						0.722	221.510	0.0120	2.6581
Drevipalpus obovatus									1	9	1		1						0.667	204.636	0.0120	2.4556
Dolichotetranychus sp.										1									0.056	17.181	0.0120	.2062
LINOTETRANIDAE intoto								2		1	1			3					0.389	119.345	0.0120	1.4321
Linotetranus sp.								2		1	1			3					0.389	119.345	0.0120	1.4321
BDELLIDAE intoto			1	10							1			2					0.778	238.690	0.0140	3.3417
Bdella sp.			1																0.056	17.181	0.0140	0.2405
Spinibdella cronini				10							1			2					0.722	221.510	0.0140	3.1011
Cyta sp.														1					0.944	289.619	0.0140	4.0547
CUNAXIDAE intoto			1	13			2							1					0.056	17.181	0.0140	0.2405
Cunaxa taurus																						
Cunaxa sp.																						
Cunaxoides sp.			1	13			2												0.889	272.745	0.0140	3.8184
NANORCHESTIDAE intoto		3	1	6	17		3	6	4	3	5	17	17		4	17	7		6.111	1874.855	0.0030	5.6246
Nanorchestes sp.							1									1			0.111	34.055	0.0020	0.0680
Spelorchestes sp.		3	1	6	17		2	6	4	3	5	17	17		4	16	7		6.000	1840.800	0.0030	5.5224
TARSONEMIDAE intoto	1		6	6			1		8					5	2				1.611	494.255	0.0040	1.9770
Tarsonemus sp.	1		6	6			1		8					5	2				1.611	494.255	0.0040	1.9770
PYEMOTIDAE intoto				2			1				1			33					2.056	630.781	0.0040	2.5231
Pygmephorus sp.				2			1				1			33					2.056	630.781	0.0040	2.5231
TYDEIDAE intoto				8	2	1	1	1	3		1	2	1	15	1	2	2		2.222	681.710	0.0126	8.5895
Coccotydeus sp.									2			1							0.167	51.236	0.0015	0.0769
Tydeus sp. a				8	2	1	1	1	1		1	1	1	15	1	2	1		2.000	613.600	0.0135	8.2836
Tydeus sp. b																	1		0.056	17.181	0.0135	0.2319
PARATYDEIDAE intoto				1	1									5		1			0.444	136.219	0.0120	1.6346
Scolotydeus sp.				1	1									5		1			0.444	136.219	0.0120	1.6346
STIGMAEIDAE intoto	1			2					1		2		1	4					0.611	187.455	0.0165	3.0930
Apostigmaeus navicella	1			2					1		2		1	1					0.444	136.219	0.0160	2.1795
Stigmaeus sp.														3					0.167	51.236	0.0180	0.9222
PSEUDOCHEYLIDAE intoto			1		4	2	1	6		1				11	6				1.778	545.490	0.0160	8.7278
Pseudocheylys sp.			1		4	2	1	6		1				11	6				1.778	545.490	0.0160	8.7278
ANYSTIDAE intoto											1					1			0.111	34.055	0.0300	1.0217
Anandia sp.											1								0.111	34.055	0.0300	1.0217
TENERIFFIIDAE intoto					1														0.056	17.181	0.0160	0.2749
EUPODIDAE intoto	2		1	8						1	1			3	2				1.000	306.800	0.0140	4.2952
Eupodes sp.	2		1	1							1								0.278	85.290	0.0140	1.1941
Eupodes parafusifer				7						1				3	2				0.722	221.510	0.0140	3.1011
RHAGIDIIDAE intoto							1												0.056	17.181	0.0140	0.2405
Rhagidia sp.							1												0.056	17.181	0.0140	0.2405
ERYTHRAEIDAE intoto			3					1							1				0.278	85.290	0.0360	3.0704
Abrolophus bipilus			1					1							1				0.167	51.236	0.0400	2.0494
Bechartia sp.			1																0.056	17.181	0.0200	0.3436
Leptus sp.			1																0.056	17.181	0.0400	0.6872
TOTAL	4	4	15	67	25	3	15	22	18	26	15	19	21	90	17	25	9	0	21.944	6732.726	0.0102	68.9229

TABLE 25

NUMBERS OF TROMBIDIFORMES PER SUBSAMPLE FOR 22nd OCTOBER 1962

Subsample.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Numbers per m ²	Mean biomass per individual mg	Biomass per m ² mg
TETRANYCHIDAE intoto	1		3	2		3	2			6			2	10	6	2		8	2.500	767.000	0.0171	13.1157
<i>Bryobia borealis</i>	1		1	1		1							2	4				8	.556	170.581	0.0140	2.3881
<i>Eotetranychus</i> sp.															2	2			.667	204.636	0.0140	2.8649
<i>Monoceronychus</i> sp.															4				.222	68.110	0.0400	2.7244
<i>Oligonychus</i> sp.			2			1								6					.167	51.236	0.0260	1.3321
<i>Tetranychus</i> sp.				1		1	2			6	11	1	3					5	.889	272.745	0.0140	3.8184
TENUIPALPIDAE intoto										32	11	1	3					5	2.889	886.345	0.0120	10.6361
<i>Brevipalpus obovatus</i>										32	11	1	3					5	1.778	545.490	0.0120	6.5459
<i>Dolichotetranychus</i> sp.											1								0.056	17.181	0.0120	0.2062
TUCKERELLIDAE intoto											1								0.056	17.181	0.0120	0.2062
<i>Tuckerella ornata</i>															1				0.056	17.181	0.0120	0.2062
LINOTETRANDAE intoto																		3	2.611	801.055	0.0140	12.1477
<i>Linotetrans</i> sp.										15			2	5	1				0.278	85.290	0.0140	1.1941
BDELLIDAE intoto	1	3	1	3	10	1	2											3	2.333	715.764	0.0140	10.0207
<i>Bdella</i> sp.			1		1	1	2			15			2	5	1			1	2.111	647.655	0.0140	9.0671
<i>Spinibdella cronini</i>	1	3		3	9					3			2	3	1			1	1.389	426.145	0.0140	5.9660
CUNAXIDAE intoto	7	3	1	3	5		1		7	3			2	3	1			1	0.389	119.345	0.0140	1.6708
<i>Cunaxa taurus</i>	1	1	1	1	3		1		6	3									0.333	102.164	0.0140	1.4302
<i>Cunaxa</i> sp.	6			1					1										10.056	3085.181	0.0026	8.0215
<i>Cunaxoides</i> sp.		2		1	2					16	6	5	9	19	13	4	8	12	3.889	1193.145	0.0020	2.3863
NANORCHESTIDAE intoto	2	21	2		11	4	14	3	32	13			1	6	4	3	3	6	6.167	1892.036	0.0030	5.6761
<i>Nanorchestes</i> sp.	2	3	2		6	1	7		13	13			8	13	9	1	5	6	1.111	340.855	0.0160	5.4537
<i>Speleorchestes</i> sp.		18			5	3	7	3	19	3	6	5		1					1.111	340.855	0.0160	5.4537
PACHYGNATHIDAE intoto	6	3			2		2		4	2									0.167	51.236	0.0020	0.1025
<i>Pachygnathus</i> sp.	6	3			2		2		4	2									0.167	51.236	0.0020	0.1025
LORDALYCHIDAE intoto	2				1														1.389	426.145	0.0020	0.8523
<i>Lordalychus</i> sp.	2				1								8	8		7	1	1	1.389	426.145	0.0020	0.8523
ALICORHAGIIDAE intoto													8	8		7	1	1	0.056	17.181	0.0060	0.1031
<i>Alicorhagia</i> sp.									1										0.056	17.181	0.0060	0.1031
SCUTACARIDAE intoto																			1.556	477.381	0.0040	1.9095
<i>Scutacarus</i> sp.									1	6			2	4					1.556	477.381	0.0040	1.9095
TARSONEMIDAE intoto	6	1	1	5				1	1	6			2	4				1	0.611	187.455	0.0040	0.7498
<i>Tarsonemus</i> sp.	6	1	1					1	1	6								1	0.611	187.455	0.0040	0.7498
PYGMOPHORIDAE intoto	2			2	3					2									0.667	204.636	0.0105	2.1487
<i>Pygmephorus</i> sp.	2			2	3		1		1	1	1			1				1	0.167	51.236	0.0015	0.0769
TYDEIDAE intoto				3															0.278	85.290	0.0135	1.1514
<i>Coccotydeus</i> sp.					1														0.222	68.110	0.0135	0.9195
<i>Tydeus</i> sp. a				2	1														0.556	170.581	0.0120	2.0470
<i>Tydeus</i> sp. b				1	1	1				1				1	1				0.556	170.581	0.0120	2.0470
PARATYDEIDAE intoto			1				2		4				1						0.722	221.510	0.0165	3.6549
<i>Scolotydeus</i> sp.			1				2		4				1						0.444	136.219	0.0160	2.1795
STIGMAEIDAE intoto	4	1		3	3	1													0.111	34.055	0.0160	0.5449
<i>Apostigmaeus navicella</i>	2			3	2		1												0.056	17.181	0.0180	0.3093
<i>Ledermulleria</i> sp.					1														0.111	34.055	0.0180	0.6130
<i>Stigmaeus</i> sp.		1																	0.056	17.181	0.0160	0.2749
<i>Agistemus africanus</i>	2														1				0.056	17.181	0.0160	0.2749
EUPALOPSELLIDAE intoto																			2.000	613.600	0.0160	9.8176
<i>Eupalopsellus</i> sp.						1	3		3	4			1			4			2.000	613.600	0.0160	9.8176
PSEUDOCHEYLIDAE intoto			20			1	3		3	4									0.667	204.636	0.0160	3.2742
<i>Pseudocheylus</i> sp.			20			1							7	1			1	2				
ANYSTIDAE intoto																			0.056	17.181	0.0165	0.2835
<i>Anadidia</i> sp.						1							7	1			1	2	0.611	187.455	0.0160	2.9993
<i>Becksteinia</i> sp.																						
<i>Adamystus</i> sp.																						
TENERIFFIIDAE intoto																			14.222	4363.310	0.0140	61.0863
<i>Eupodidae</i> sp.	34	35	4	8	40	3	14	1	4	56	5		11	19	11	3		8	12.833	3937.164	0.0140	55.1203
EUPODIDAE intoto	32	35	4	6	32	3	14	1	4	48			11	17	10			2	1.389	426.145	0.0140	5.9660
<i>Eupodes</i> sp.	2			2	8					8					2				0.333	102.164	0.0140	1.4303
<i>Eupodes parafusifer</i>	2	1	1													3			0.333	102.164	0.0140	1.4303
RHAGIDIIDAE intoto	2		1																0.555	170.274	0.0400	6.8110
<i>Rhagidia</i> sp.	2		1										2	1					0.500	153.400	0.0400	6.1360
		2					2	2					2	1					0.056	17.181	0.0400	0.6872

TABLE 26

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Numbers per m ²	Mean biomass per individual mg	Biomass per m ² mg
TETRANYCHIDAE intoto				3		4		2	1	3		1			3				0.944	289.619	0.0275	7.9645
Bryobia borealis															1				0.056	17.181	0.0140	0.2405
Eotetranychus sp.				2						1						2			0.167	51.236	0.0140	0.7173
Monoceramythus sp.						3		2											0.389	119.345	0.0400	4.7738
Oligonychus sp.				1		1			1	1		1							0.222	68.110	0.0260	1.7709
Tetranychus sp.										1									0.111	34.055	0.0140	0.4768
TENUIPALPIDAE intoto										2									0.111	34.055	0.0120	0.4087
Brevipalpus obovatus										2									0.111	34.055	0.0120	0.4087
TUCKERELLIDAE intoto																			0.167	51.236	0.0120	0.6148
Tuckerella ornata																			0.167	51.236	0.0120	0.6148
LINOTETRANIDAE intoto																			0.056	17.181	0.0120	0.2062
Linotetranus sp.																			0.056	17.181	0.0120	0.2062
BDELLIDAE intoto																			0.833	255.564	0.0140	3.5779
Bdella sp.																			0.111	34.055	0.0140	0.4768
Spinibdella cronini																			0.722	221.510	0.0140	3.1011
CUNAXIDAE intoto																			1.778	545.490	0.0140	7.6369
Cunaxa taurus																			0.944	289.619	0.0140	4.0547
Cunaxa sp.																			0.056	17.181	0.0140	0.2405
Cunaxoides sp.																			0.056	17.181	0.0140	0.2405
NANORCHESTIDAE intoto																			0.778	238.690	0.0140	3.3417
Nanorchestes sp.																			6.778	2079.490	0.0025	5.1987
Speleorchestes sp.																			3.167	971.636	0.0020	1.9432
PACHYGNATHIDAE intoto																			3.611	1107.855	0.0030	3.3236
Pachygnathus sp.																			0.889	272.745	0.0160	4.3639
LORDALYCHIDAE intoto																			0.889	272.745	0.0160	4.3639
Lordalychus sp.																			0.278	85.290	0.0020	0.1706
ALICORHAGIIDAE intoto																			0.278	85.290	0.0020	0.1706
Alicorhagia sp.																			0.222	68.110	0.0020	0.1362
SCUTACARIDAE intoto																			0.222	68.110	0.0020	0.1362
Scutacarus sp.																			5.833	1789.564	0.0060	10.7374
TARSONEMIDAE intoto																			5.833	1789.564	0.0060	10.7374
Tarsonemus sp.																			2.167	664.836	0.0040	2.6593
PYEMOTIDAE intoto																			2.167	664.836	0.0040	2.6593
Pygmephorus sp.																			0.722	221.510	0.0040	0.8860
TYDEIDAE intoto																			0.722	221.510	0.0040	0.8860
Coccotydeus sp.																			0.222	68.110	0.0105	0.7152
Tydeus sp. a																			0.056	17.181	0.0015	0.0258
Tydeus sp. b																			0.056	17.181	0.0135	0.2319
PARATYDEIDAE intoto																			0.111	34.055	0.0135	0.4597
Scolotydeus sp.																			0.833	255.564	0.0120	3.0668
STIGMAEIDAE intoto																			0.833	255.564	0.0120	3.0668
Apostigmaeus navicella																			0.667	204.636	0.0165	3.3765
Ledermulleria sp.																			0.389	119.345	0.0160	1.9095
Stigmaeus sp.																			0.111	34.055	0.0160	0.5449
RAPHIGNATHIDAE intoto																			0.167	51.236	0.0180	0.9222
Raphignathus sp.																			0.056	17.181	0.0020	0.0344
PSEUDOCHEYTIDAE intoto																			0.056	17.181	0.0020	0.0344
Pseudocheylus sp.																			1.722	528.310	0.0160	8.4530
ANYSTIDAE intoto																			1.722	528.310	0.0160	8.4530
Adamystus sp.																			0.667	204.636	0.0160	3.2742
TENERIFFIIDAE intoto																			0.667	204.636	0.0160	3.2742
EUPODIDAE intoto																			0.333	102.164	0.0160	1.6346
Eupodes sp.																			13.722	4209.910	0.0140	58.9387
Eupodes parafusifer																			10.056	3085.181	0.0140	43.1925
RHAGIDIIDAE intoto																			3.667	1125.036	0.0140	15.7505
Rhagidia sp.																			0.389	119.345	0.0140	1.6708
ERYTHRAEIDAE intoto																			0.389	119.345	0.0140	1.6708
Abrolophus bipilus																			0.778	238.690	0.0381	9.0941
Hauptmannia sp.																			0.667	204.636	0.0400	8.1654
Leptus sp.																			0.056	17.181	0.0140	0.2405
ERIOPHYIIDAE intoto																			0.056	17.181	0.0400	0.6872
																			0.056	17.181	0.0010	0.0172
																			0.056	17.181	0.0010	0.0172
																			0.222	68.110	0.0109	134.8366

TABLE 27

NUMBERS OF TROMBIDIFORMES PER SUBSAMPLE FOR 17th DECEMBER 1962

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Numbers per m ²	Mean biomass per individual mg	Biomass per m ² mg
TETRANYCHIDAE intoto			1			2													0.167	51.236	0.0227	1.1631
Monoceronychus sp.						1													0.056	17.181	0.0400	0.6872
Tetranychus sp.			1			1													0.111	34.055	0.0140	0.4768
TENUIPALPTIDAE intoto								1											0.056	17.181	0.0120	0.2062
Brevipalpus obovatus								1											0.056	17.181	0.0120	0.2062
BDELLIDAE intoto					5														0.278	85.290	0.0140	1.1941
Spinibdella cronini					5														0.278	85.290	0.0140	1.1941
CUNAXIDAE intoto	7	1	4	2					1	1				2	2				1.111	340.855	0.0140	4.7720
Cunaxa taurus	5	1	4	1					1	1				1	2				0.889	272.745	0.0140	3.8184
Cunaxa sp.	1																		0.056	17.181	0.0140	0.2405
Cunaxoides sp.	1			1										1					0.167	51.236	0.0140	0.7173
NANORCHESTIDAE intoto	1	5	3	4	2				1	1	4	7	2	3	4	3	1	2	2.389	732.945	0.0027	1.9790
Nanorchestes sp.	1		2	4	1				1	1					3			1	0.778	238.690	0.0020	0.4774
Speleorchestes sp.		5	1		1						4	7	2	3	1	3	1	1	1.611	494.255	0.0030	1.4828
PACHYGNATHIDAE intoto					8									3					0.611	187.455	0.0160	2.9993
Pachygnathus sp.					8									3					0.611	187.455	0.0160	2.9993
ALICORHAGIIDAE intoto		1														1			0.111	34.055	0.0020	0.0681
Alicorhagia sp.		1														1			0.111	34.055	0.0020	0.0681
SCUTACARIDAE intoto				1									1	2					0.222	68.110	0.0060	0.4087
Scutacarus sp.				1									1	2					0.222	68.110	0.0060	0.4087
TARSONEMIDAE intoto	6		9	1	1	1				3				6	1				1.556	477.381	0.0040	1.9095
Tarsonemus sp.	6		9	1	1	1				3				6	1				1.556	477.381	0.0040	1.9095
PYEMOTIDAE intoto														1					0.056	17.181	0.0040	0.0687
Pygmephorus sp.														1					0.056	17.181	0.0040	0.0687
TYDEIDAE intoto	2	2	1	1				1											0.444	136.219	0.0090	1.2260
Coccotydeus sp.		2		1															0.167	51.236	0.0015	0.0769
Tydeus sp. a	2		1											1					0.222	68.110	0.0135	0.9195
Tydeus sp. b									1										0.056	17.181	0.0135	0.2319
PARATYDEIDAE intoto		1	2		1	1				1					2				0.444	136.219	0.0120	1.6356
Scolotydeus sp.		1	2		1	1				1					2				0.444	136.219	0.0120	1.6356
STIGMAEIDAE intoto				1	1							1						1	0.222	68.110	0.0170	1.1579
Apostigmaeus navicella				1	1							1							0.111	34.055	0.0160	0.5449
Stigmaeus sp.												1		1	4				0.111	34.055	0.0180	0.3130
PSEUDOCHEYLIDAE intoto		1				3		1				3		1	4				0.722	221.510	0.0160	3.5442
Pseudocheylus sp.		1				3		1				3		1	4				0.722	221.510	0.0160	3.5442
ANYSTIDAE intoto				2	1						2	3					1	1	0.556	170.581	0.0202	3.4457
Anandia sp.				2	1												1	1	0.167	51.236	0.0300	1.5371
Adamystus sp.											2	3							0.389	119.345	0.0160	1.9095
EUPODIDAE intoto	11	1	3	1	5	2		2	1	2				2	4		2		2.000	613.600	0.0140	8.5904
Eupodes sp.	3	1	3	1	4	2		1	1	2				1	1		2		1.222	374.910	0.0140	5.2487
Eupodes parafusifer	8				1			1						1	3				0.778	238.690	0.0140	3.3417
RHAGIIDAE intoto					1													1	0.111	34.055	0.0140	0.4768
Rhagidia sp.					1													1	0.111	34.055	0.0140	0.4768
ERYTHRAEIDAE intoto	1		4		2							1			1				0.500	153.400	0.0400	6.1360
Abrolophus bipilus	1		4									1			1				0.389	119.345	0.0400	4.7738
Leptus sp.					2														0.111	34.055	0.0400	1.3622
TROMBIDIDAE intoto		1			2			1		1									0.278	85.290	0.0030	0.2559
Etmulleria sp.		1			2			1		1									0.278	85.290	0.0030	0.2559
TOTAL	28	13	27	13	29	9	-	6	4	8	6	15	3	21	18	5	5	3	11.833	3630.364	0.0097	35.1002

TABLE 28

NUMBERS OF TROMBIDIFORMES PER SUBSAMPLE FOR 23rd JANUARY 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Numbers per m ²	Mean Biomass per individual mg	Biomass per m ² mg
TETRANYCHIDAE intoto										2			1						0.167	51.236	0.0140	0.7173
Eotetranychus sp.									1	2			1					2	0.167	51.236	0.0140	0.7173
TENUIPALPIDAE intoto									1	2			2					2	0.278	85.290	0.0120	1.0235
Brevipalpus obovatus													2					2	0.278	85.290	0.0120	1.0235
TUCKERELLIDAE intoto		1													1				0.111	34.055	0.0120	0.4087
Tuckerella ornata		1													1				0.111	34.055	0.0120	0.4087
LINOTETRANIDAE intoto																			0.056	17.181	0.0120	0.2062
Linotetrans sp.																			0.056	17.181	0.0120	0.2062
BDELLIDAE intoto	1		7	4	1		3	2					1	1	1	1			1.222	374.910	0.0140	5.2487
Bdella sp.			2					1					1	1	1	1			0.167	51.236	0.0140	0.7173
Spinibdella cronini	1		5	4	1		3	1					1	1	1	1		1	1.056	323.981	0.0140	4.5357
CUNAXIDAE intoto	7	4	3	17	8		12	1		1		3	2	2	5				3.667	1125.036	0.0140	15.7505
Cunaxa taurus	4	3	3	12	6		11	1		1		2	1	1	4				2.667	818.236	0.0140	11.4553
Cunaxoides sp.	3	1	3	5	2		1					1	2	1	1			1	1.000	306.800	0.0140	4.2952
NANORCHESTIDAE intoto	2	7	8	11	8	8	6	1	4	10	1	24	5	6	5	4	22	2	7.444	2283.819	0.0024	5.4812
Nanorchestes sp.		5	8	6	4	1	6	1	1	6	1	20	4	5	5	1	1	2	4.278	1312.490	0.0020	2.6250
Speleorchestes sp.	2	2		5	4	7			3	4		4	1	1		3	21		3.167	971.636	0.0030	1.9433
PACHYGNATHIDAE intoto		1	4	3	2	1	3		5	2	3			2	2			1	1.611	494.255	0.0160	7.9081
Pachygnathus sp.		1												2	2			1	1.611	494.255	0.0160	7.9081
ALICORHAGIDAE intoto													1						1.667	511.436	0.0020	1.0229
Alicorhagia sp.													1						1.667	511.436	0.0020	1.0229
SCUTACARIDAE intoto								2	1			1							0.222	68.110	0.0060	0.4087
Scutacarus sp.								2	1			1							0.222	68.110	0.0060	0.4087
TARSONEMIDAE intoto	10	1	18	8	1	2	11	1	6	6	3		2	23	7	3	1	13	6.444	1977.019	0.0040	7.9081
Tarsonemus	10	1	18	8	1	2	11	1	6	6	3		2	23	7	3	1	13	6.444	1977.019	0.0040	7.9081
PYEMOTIDAE intoto			1	3						1	1	2							0.444	136.219	0.0040	0.5449
Pygmephorus sp.			1	3						1	1	2							0.444	136.219	0.0040	0.5449
TYDEIDAE intoto	2	2	4	14	1	1			1	2					1	2			1.667	511.436	0.0107	5.4724
Coccotydeus sp.		2		4															0.389	119.345	0.0015	0.1790
Tydeus sp. a	2		4	9		1			1	1					1	1			1.056	323.981	0.0135	4.3737
Tydeus sp. b				1															0.222	68.110	0.0135	0.9195
PARATYDEIDAE intoto																			0.056	17.181	0.0120	0.2062
Scolotydeus sp.																			0.056	17.181	0.0120	0.2062
STIGMAEIDAE intoto	1		3		1				1			1							0.389	119.345	0.0160	1.9095
Apostigmaeus navicella			2																0.278	85.290	0.0160	1.3646
Ledermulleria sp.	1		1			1	4	1	1	2	7			28	5			1	0.111	34.055	0.0160	0.5449
PSEUDOCHEYLIDAE intoto						1	4	1	1	2	7								2.778	852.290	0.0160	13.6366
Pseudocheylus sp.													5	1					2.778	852.290	0.0160	13.6366
ANYSTIDAE intoto													5	1					0.333	102.164	0.0160	1.6346
Adamystus sp.													5	1					0.333	102.164	0.0160	1.6346
EUPODIDAE intoto	5	13	14	49	32	5	8	8	11	12	2	6	14	25	16	9		1	12.778	3920.290	0.0140	54.8841
Eupodes sp.	4	13		36	27	5	5	3	10	10	1	6	14	17	11	9			9.500	2914.600	0.0140	40.8044
Eupodes parafusifer	1		14	13	5		3	5	1	2	1			8	5				3.278	1005.690	0.0140	14.0797
RHAGIDIIDAE intoto	1		1																0.111	34.055	0.0140	0.4768
Rhagidia sp.	1		1																0.111	34.055	0.0140	0.4768
ERYTHRAEIDAE intoto		6	4				1	3	2	1			2	2		1		1	1.278	392.090	0.0343	13.4487
Abrolophus bipilus		6	3				1	3	1	1			1	2		1			1.000	306.800	0.0400	12.2720
Hauptmannia sp.			1																0.278	85.290	0.0140	1.1941
TROMBIDIDAE intoto					1		1			2									0.222	68.110	0.0400	2.7244
Microtrombidium sp.					1		1			2									0.222	68.110	0.0400	2.7244
TOTAL	29	35	67	110	55	22	47	20	33	46	10	44	31	87	44	48	23	22	42.944	13,175.219	0.0107	141.0221

TABLE 29

NUMBER OF TROMBIDIFORMES PER SUBSAMPLE FOR 18th FEBRUARY 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
TETRANYCHIDAE intoto		1						1						1	2	2			0.389	119.345	0.0280	3.3417
Monoceronychus sp.															1				0.056	17.181	0.0400	0.6872
Oligonychus sp.														1	1	2			0.222	68.110	0.0260	1.7709
Tetranychus sp.		1						1											0.111	34.055	0.0260	0.8854
TENUIPALPIDAE intoto		2					1								1			1	0.278	85.290	0.0120	1.0235
Brevipalpus obovatus		2					1								1			1	0.278	85.290	0.0120	1.0235
TUCKERELLIDAE intoto										1									0.056	17.181	0.0120	0.2062
Tuckerella ornata										1									0.056	17.181	0.0120	0.2062
LINOTETRANIDAE intoto				1		1													0.111	34.055	0.0120	0.4087
Linotetranus sp.				1		1													0.111	34.055	0.0120	0.4087
BDELLIDAE intoto	2		2	6						4							1		0.833	255.564	0.0140	3.5779
Spinibdella cronini	2		2	6						4							1		0.833	255.564	0.0140	3.5779
CUNAXIDAE intoto	6	2	10	8	8		3	3	1	7				1	9			2	3.333	1022.564	0.0140	14.3159
Cunaxa taurus	1	2	8	4	8		1	1		7				1	7				2.222	681.710	0.0140	9.5439
Cunaxoides sp.	5		2	4			2	2	1						2			2	1.111	340.885	0.0140	4.7724
NANORCHESTIDAE intoto	4	3	10	37	14	7	1	6	2	7	4	39	11	6	6	6	4	8	9.722	2982.710	0.0025	7.4568
Nanorchestes sp.	3	2	9	37	9	5		1	1	6	1	2	2	2	6			1	4.833	1482.764	0.0020	2.9655
Speleorchestes sp.	1	1	1		5	2	1	5	1	1	3	37	9	4		6	4	7	4.889	1499.945	0.0030	4.4998
PACHYGNATHIDAE intoto	2	4	6	3	4		2			3		1	1	1	1			1	1.611	494.255	0.0160	7.9081
Pachygnathus sp.	2	4	6	2	4		2			2		1	1	1	1			1	1.500	460.200	0.0160	7.3632
Bimichaelia sp.				1						1									0.111	34.055	0.0160	0.5439
LORDALYCHIDAE intoto	1											1		2					0.222	68.110	0.0020	0.1362
Lordalychus sp.	1											1		2					0.222	68.110	0.0020	0.1362
ALICORHAGIDAE intoto								1			1		1	3	1	3		2	0.667	204.636	0.0020	0.4093
Alicorhagia								1			1		1	3	1	3		2	0.667	204.636	0.0020	0.4093
SCUTACARIDAE intoto					44			10						1					3.056	937.581	0.0060	5.6255
Scutacarus sp.					44			10						1					3.056	937.581	0.0060	5.6255
TARSONEMIDAE intoto	57	11	99	47	11	8	9	33	5	46	5	4		3	37	1	1		20.944	6425.619	0.0040	25.7025
Tarsonemus sp.	57	11	99	47	11	8	9	33	5	46	5	4		3	37	1	1		20.944	6425.619	0.0040	25.7025
PYGMOTIDAE intoto	1	1	5	11	11		1												1.667	511.436	0.0040	2.0457
Pygmephorus sp.	1	1	5	11	11		1												1.667	511.436	0.0040	2.0457
TYDEIDAE intoto	77	6	51	74	54	6	16	95	5	125	2	10	4	24	44	5		56	36.333	11,146.696	0.0043	47.9308
Coccotydeus sp.	6		25	66	50	4	15	94	5	105	2	10	3	19	36	5		56	27.833	8539.164	0.0015	12.8087
Tydeus sp. a	71	4	26	4	4	1		1		19			1	2	8				7.833	2403.164	0.0135	32.4427
Tydeus sp. b		2		4		1	1			1				3					0.667	204.636	0.0135	2.7626
PARATYDEIDAE intoto		1	4											2				1	0.444	136.219	0.0120	1.6346
Scolotydeus sp.		1	4											2				1	0.444	136.219	0.0120	1.6346
STIGMAEIDAE intoto	4		5	4											2				0.833	255.564	0.0166	4.2424
Apostigmaeus navicella	2		4	1											1				0.444	136.219	0.0160	2.1795
Lederermulleria sp.				1											1				0.111	34.055	0.0160	0.5449
Stigmaeus sp.	2		1	2															0.278	85.290	0.0180	1.3646
PSEUDOCHEYLIDAE intoto		1	1		7	3	1	1	1		1			1	5			1	1.278	392.090	0.0160	6.2734
Pseudocheylus sp.		1	1		7	3	1	1	1		1			1	5			1	1.278	392.090	0.0160	6.2734
ANYSTIDAE intoto												13	1						0.778	238.690	0.0160	3.8190
Adamystus sp.												13	1						0.778	238.690	0.0160	3.8190
TENERIFFIIDAE intoto												1	2						0.167	51.236	0.0160	0.8198
EUPODIDAE intoto	43	4	21	72	12	4	8	13	2	33	7	4	2	8	50	5		1	16.056	4925.981	0.0140	38.9637
Eupodes sp.	33	4	14	69	10	4	6	11	2	26	6	4	2	6	38	3		1	13.278	4073.690	0.0140	57.0377
Eupodes parafusifer	10		7	3	2		2	2		7	1			2	12	2			2.778	852.290	0.0140	11.9321
RHAGIDIDAE intoto	4			2	1							1		1					0.500	153.400	0.0140	2.1476
Rhagidia sp.	4			2	1							1		1					0.500	153.400	0.0140	2.1476
ERYTHRAEIDAE intoto	1	2	1			1		3		1				1	1	2			0.722	221.510	0.0337	7.4549
Abrolophus bipilus	1	2	1			1		3		1				1		1			0.611	187.455	0.0400	7.4982
Hauptmannia sp.															1	1			0.111	34.055	0.0140	0.4768
TROMBIDIDAE intoto			1																0.056	17.181	0.0400	0.6872
Microtrombidium sp.			1																0.056	17.181	0.0400	0.6872
ERTOPHYDAE intoto								1											0.056	17.181	0.0010	0.0172
Genus indet.								1											0.056	17.181	0.0010	0.0172
TOTAL	202	38	216	265	166	30	42	167	16	227	20	74	22	55	159	25	5	73	100.111	30,714.055	0.0070	216.1586

TABLE 30

NUMBER OF TROMBIDIFORMES PER SUBSAMPLE FOR 18th MARCH 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean Biomass per individual mg	Biomass per m ² mg
TETRANYCHIDAE intoto	1			2	2		1		1						3				0.556	170.581	0.0252	4.2986
Bryobia borealis							1								1				0.111	34.055	0.0140	0.4768
Eotetranychus sp.	1																		0.056	17.181	0.0140	0.2405
Monoceronychus				2															0.111	34.055	0.0400	1.3622
Oligonychus sp.					2				1						2				0.278	85.290	0.0260	2.2175
TUCKERELLIDAE intoto											1								0.056	17.181	0.0120	0.2062
Tuckerella ornata											1								0.056	17.181	0.0120	0.2062
LINOTETRANIDAE intoto				1				1							1				0.167	51.236	0.0120	0.6148
Linotetrans sp.				1				1							1				0.167	51.236	0.0120	0.6148
BDELLIDAE intoto				6				1											0.389	119.345	0.0140	1.6708
Bdella sp.								1											0.056	17.181	0.0140	0.2405
Spinibdella cronini				6															0.333	102.164	0.0140	1.4303
CUNAXIDAE intoto	2			20	2		5			1			3	5	1			2	2.278	698.890	0.0140	9.7845
Cunaxa taurus	2			16	2		1						1					2	1.333	408.964	0.0140	5.7255
Cunaxoides sp.				4			4			1			2	5	1				0.944	289.619	0.0140	4.0547
NANORCHESTIDAE intoto		9	7		10	3	5	4	2	7	1	5	8	5	2	11	5	1	4.722	1448.710	0.0026	3.7666
Nanorchestes sp.		4	5		7	2	3	2	2	2		1	4	2	1	1			2.000	613.600	0.0020	1.2272
Speleorchestes sp.		5	2		3	1	2	2		5	1	4	4	3	1	10	5	1	2.722	835.110	0.0030	2.5053
PACHYGNATHIDAE intoto		2	2	3	12	1	1	3	1	3	2				2				1.778	545.490	0.0160	8.7278
Pachygnathus sp.		2	2	2	11	1	1	3		3	1				2				1.556	477.381	0.0160	7.6381
Bimichaelia				1	1				1		1								0.222	68.110	0.0160	1.0898
LORDALYCHIDAE intoto				3	1														0.222	68.110	0.0020	0.1362
Lordalychus sp.				3	1														0.222	68.111	0.0020	0.1362
ALICORHAGIDAE intoto		2	1									1	3			4		4	0.833	255.564	0.0020	0.5111
Alicorhagia sp.		2	1									1	3			4		4	0.833	255.564	0.0020	0.5111
SCUTACARIDAE intoto			1		1		2	2	7	1				15					1.611	494.255	0.0060	2.9655
Scutacarus sp.			1		1		2	2	7	1				15					1.611	494.255	0.0060	2.9655
TARSONEMIDAE intoto	79	15	18	12	29	19	29	21	7	13	8			4	34	1		3	16.222	4976.910	0.0040	19.9076
Tarsonemus sp.	79	15	18	12	29	19	29	21	7	13	8			4	34	1		3	16.222	4976.910	0.0040	19.9076
PYGMOPHORIDAE intoto	3	1	1	1	1			1		1			1	13					1.278	392.090	0.0040	1.5684
Pygmephorus sp.	3	1	1	1	1			1		1			1	13					1.278	392.090	0.0040	1.5684
TYDEIDAE intoto	57	36	35	60	18	1	17	10	2	11	1	3	6	5	8	2		2	15.222	4670.011	0.0048	22.4161
Coccotydeus sp.	12	34	33	48	14	1	14	6	1	10	1	3	6	5	7	2		2	11.056	3391.981	0.0015	5.0880
Tydeus sp. a	44	2	2	8	3		2	2		1					1				3.611	1107.855	0.0135	14.9560
Tydeus sp. b	1			4	1		1	2	1										0.556	170.581	0.0135	2.3028
PARATYDEIDAE intoto		2	1		2		1	1		1				3		1			0.667	204.636	0.0120	2.4556
Scolotydeus sp.		2	1		2		1	1		1				3		1			0.667	204.636	0.0120	2.4556
STIGMAEIDAE intoto	1			13				2		1									0.944	289.619	0.0161	4.6629
Apostigmaeus navicella	1			11				2											0.778	238.690	0.0160	3.8190
Ledermulleria sp.				2															0.111	34.055	0.0160	0.5449
Stigmaeus sp.										1									0.056	17.181	0.0180	0.3093
EUPALOPSELLIDAE intoto				1															0.056	17.181	0.0160	0.2749
Eupalopsellus sp.				1															0.056	17.181	0.0160	0.2749
PSEUDOCHEYLIDAE intoto				1		3				3	3	2		2	2		1		0.944	289.619	0.0160	4.6339
Pseudocheylus sp.				1		3				3	3	2		2	2		1		0.944	289.619	0.0160	4.6339
ANYSTIDAE intoto				1															0.056	17.181	0.0165	0.2835
Becksteinia sp.				1															0.056	17.181	0.0165	0.2835
EUPODIDAE intoto	43	5	4	15	21	11	11	8	1	21	6	1	1	4	21	1		10	10.222	3136.110	0.0140	43.9055
Eupodes sp.	35	4	3	14	11	10	7	8	1	16	5	1	1	4	15	1		7	7.944	2437.219	0.0140	34.1211
Eupodes parafusifer	8	1	1	1	10	1	4			5	1				6			3	2.278	698.890	0.0140	9.7845
RHAGIDIIDAE intoto										1									0.056	17.181	0.0140	0.2405
Rhagidia sp.										1									0.056	17.181	0.0140	0.2405
ERYTHRAEIDAE intoto		1	1			1	1		2	1					1				0.444	136.219	0.0238	3.2419
Abrolophus bipilus							1			1					1				0.167	51.236	0.0400	2.0494
Hauptmannia sp.		1	1			1			2										0.278	85.290	0.0140	1.1941
TROMBIDIIDAE intoto	2							1		1									0.222	68.110	0.0400	2.7244
Microtrombidium sp.	2							1		1									0.222	68.110	0.0400	2.7244
ERYTHROPHYIDAE intoto														1					0.056	17.181	0.0010	0.0172
Genus indef														1					0.056	17.181	0.0010	0.0172
TOTAL	199	72	71	120	99	39	74	54	23	66	22	12	22	57	75	20	6	22	59.000	18101.200	0.0077	139.0111

TABLE 31

NUMBER OF TROMBIDIFORMES PER SUBSAMPLE FOR 16th APRIL 1963
APPARATUS A

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean Biomass per individual mg	Biomass per m ² mg
TETRANYCHIDAE intoto	8			4				1		1				3	2		7		1.444	443.019	0.0158	6.9997
Bryobia borealis	8			4						1					2		7		1.222	374.010	0.0140	5.2361
Oligonychus sp.								1						3					0.222	68.110	0.0260	1.7709
TENUIPALPIDAE intoto			1					1						3				3	0.444	136.219	0.0120	1.6346
Brevipalpus obovatus			1					1						3				3	0.444	136.219	0.0120	1.6346
LINOTETRANDAE intoto				1						1		35							2.056	630.781	0.0120	7.5694
Linotetrans sp.				1						1		35							2.056	630.781	0.0120	7.5694
BDELLIDAE intoto	1				2		9			4			1	2	1				1.111	340.855	0.0140	4.7608
Bdella sp.					1		9												0.056	170.581	0.0140	2.3881
Spinibdella cronini	1				1								1	2	1				0.333	102.164	0.0140	1.4303
Cyta sp.										4									0.222	68.110	0.0140	0.9535
CUNAXIDAE intoto	2			1	4		4	1		6			1	3	4				1.444	443.019	0.0140	6.2023
Cunaxa taurus	2				3		2			3			1	1	2				0.778	238.690	0.0140	3.3417
Cunaxa sp.															1				0.056	17.181	0.0140	0.2405
Cunaxoides sp.				1	1		2	1		3				2	1				0.611	187.455	0.0140	2.6244
NANORCHESTIDAE intoto	1	2	1	3	13	5	8	9	1	12	1	6	11	1	2	16	6	1	5.500	1687.400	0.0026	4.3872
Nanorchestes sp.	1	1		3	8	2	7	8		8	1	1	2		1				2.389	732.945	0.0020	1.4659
Speleorchestes sp.		1	1		5	3	1	1	1	4		5	9	1	1	16	6	1	3.111	954.455	0.0030	2.8634
PACHYGNATHIDAE intoto		1		3	1		2		1	1				3	2				0.778	238.690	0.0160	3.8190
Pachygnathus sp.		1		2			2		1	1				3	2				0.667	204.636	0.0160	3.2742
Bimichaelia sp.				1	1														0.111	34.055	0.0160	0.5449
LORDALYCHIDAE intoto					2														0.111	34.055	0.0020	0.0681
Lordalychus sp.					2														0.111	34.055	0.0020	0.0681
ALICORHAGIIDAE intoto											1		7			1	3		0.667	204.636	0.0020	0.4093
Alicorhagia											1		7			1	3		0.667	204.636	0.0020	0.4093
SCUTACARIDAE intoto	1			3		1		3			5			4				1	1.000	306.800	0.0060	1.8408
Scutacarus sp.	1			3		1		3			5			4				1	1.000	306.800	0.0060	1.8408
TARSONEMIDAE intoto	25	7	15	45	9	5	22	17	20	32	8	1	3	73	46			12	18.889	5795.145	0.0040	23.1806
Tarsonemus sp.	25	7	15	45	9	5	22	17	20	32	8	1	3	73	46			12	18.889	5795.145	0.0040	23.1806
PYGMOTIDAE intoto			4	4			5		1										0.778	238.690	0.0040	0.9576
Pygmephorus sp.			4	4			5		1										0.778	238.690	0.0040	0.9576
TYDEIDAE intoto	1		2	4	2	3	1	3		6		1	2	5	11				2.278	698.890	0.0065	4.5428
Coccotydeus sp.	1		1	2	2	2	1	2		2		1	1	1	8				1.333	408.964	0.0015	0.6134
Tydeus sp. a			1	1						4			1	4	3				0.778	238.690	0.0135	3.2223
Tydeus sp. b				1		1		1											0.167	51.236	0.0135	0.6917
PARATYDEIDAE intoto		2			3									1		1			0.389	119.345	0.0120	1.4321
Scolotydeus sp.		2			3									1		1			0.389	119.345	0.0120	1.4321
STIGMAEIDAE intoto	3			1	1				1		1	1		2					0.556	170.581	0.0132	2.7634
Apostigmaeus navicella	2			1	1				1		1	1		2					0.500	153.400	0.0150	2.4544
PSEUDOCHEYLIDAE intoto		2	5	12	9	2				7		2	1	1	4				2.500	767.000	0.0160	12.2720
Pseudochylus sp.		2	5	12	9	2				7		2	1	1	4				2.500	767.000	0.0160	12.2720
TENERIFFIIDAE intoto												2				1			0.167	51.236	0.0160	0.8198
EUPODIDAE intoto	25	3	5	20	16	11	8	7	2	15			4	29	22	2	5	4	9.889	3033.945	0.0140	42.4752
Eupodes sp.	24	3	5	20	15	11	7	4	2	11			4	15	15	2	5	4	8.167	2505.636	0.0140	35.0789
Eupodes parafusifer	1				1		1	3		4				14	7				1.722	528.310	0.0140	7.3963
RHAGIDIIDAE intoto				2	1		2	1			1	1	1	1	1				0.611	187.455	0.0140	2.6244
Rhagidia sp.				2	1		2	1			1	1	1	1	1				0.611	187.455	0.0140	2.6244
ERYTHRAEIDAE intoto	1		2		1	1	1			1		1	1	25	7			2	2.389	732.945	0.0231	16.9310
Abrolophus bipilus	1		2		1	1	1			1					7			1	0.833	255.564	0.0400	10.2226
Hauptmannia sp.												1	1	25				1	1.556	477.381	0.0140	6.6833
TROMBIDITIDAE intoto											1								0.056	17.181	0.0400	0.6872
Microtrombidium											1								0.056	17.181	0.0400	0.6872
TOTAL	68	17	35	103	64	28	62	43	26	86	18	50	32	156	102	21	21	23	53.056	16,277.581	0.0090	146.3773

TABLE 32

NUMBER OF TROMBIDIFORMES PER SUBSAMPLE FOR 16th APRIL 1963
APPARATUS B

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean Biomass per individual mg	Biomass ² per m ² mg
TETRANYCHIDAE intoto			1		1			1									1		0.222	68.110	0.0170	1.1579
Bryobia borealis								1									1		0.111	34.055	0.0140	0.4768
Eotetranychus sp.					1														0.056	17.181	0.0140	0.2405
Oligonychus sp.			1																0.056	17.181	0.0260	0.4467
TENUIPALPIDAE intoto			2		1										1				0.222	68.110	0.0120	0.8173
Brevipalpus obovatus			2		1										1				0.222	68.110	0.0120	0.8173
LINOTETRAMIDAE intoto								1		1									0.111	34.055	0.0120	0.4087
Linotetrans sp.								1		1									0.111	34.055	0.0120	0.4087
BDELLIDAE intoto	1			1	1		2			2									0.389	119.345	0.0140	1.6708
Bdella sp.							2			1									0.167	51.236	0.0140	0.7173
Spinibdella cronini				1						1									0.111	34.055	0.0140	0.4768
Cyta sp.	1				1														0.111	34.055	0.0140	0.4768
CUNAXIDAE intoto	2		1			4	5		2	5	2					3			1.333	408.964	0.0140	5.7255
Cunaxa taurus			1			3	2		2	3	1					1			0.722	221.510	0.0140	3.7011
Cunaxa sp.						1													0.056	17.181	0.0140	0.2405
Cunaxoides sp.	2						3			2	1				2				0.556	170.581	0.0140	2.3881
NANORCHESTIDAE intoto	3	5	3	29	23	3	11		14	6	7	9	4	2	4	8	2		7.389	2266.945	0.0023	5.2140
Nanorchestes sp.	3	1	2	29	15	3	9		10	2	6		2	2	4				4.889	1499.945	0.0020	2.9999
Speleorchestes sp.		4	1		8		2		4	4	1	9	2			8	2		2.500	767.000	0.0030	2.3910
PACHYGNATHIDAE intoto		4	1	2		3	1	1		5					1				1.000	306.800	0.0160	4.9088
Pachygnathus sp.		4	1	2		3	1	1		5					1				1.000	306.800	0.0160	4.9088
LORDALYCHIDAE intoto				1												1			0.111	34.055	0.0020	0.0681
Lordalychus sp.				1												1			0.111	34.055	0.0020	0.0681
ALICORHAGIDAE intoto											1					5	2		0.444	136.219	0.0020	0.2724
Alicorhagia sp.											1					5	2		0.444	136.219	0.0020	0.2724
SCUTACARIDAE intoto	1				7		1	3		6	19	1	5	4				1	2.667	818.236	0.0060	4.9094
Scutacarus sp.	1				7		1	3		6	19	1	5	4				1	2.667	818.236	0.0060	4.9094
TARSONEMIDAE intoto	44	1	29	58	26	18	48	6	4	44	8		15	46	52		1	10	22.778	6988.290	0.0040	27.9532
Tarsonemus sp.	44	1	29	58	26	18	48	6	4	44	8		15	46	52		1	10	22.778	6988.290	0.0040	27.9532
PYGMEPHORIDAE intoto			4	5	3		25			1			1	3					2.333	715.764	0.0040	2.8631
Pygmephorus sp.			4	5	3		25			1			1	3					2.333	715.764	0.0040	2.8631
TYDEIDAE intoto	28	2	1	29	64	7	7	1	2	35	1	3	4	4	10	3	1		11.222	3442.910	0.0036	12.3945
Coccotydeus sp.	21	1	1	23	64	5	6	1		27	1	1	4	3	6	2			9.222	2829.310	0.0015	4.2440
Tydeus sp. a	7	1		6					1	8		2		1	4	1	1		1.778	545.490	0.0135	7.3641
Tydeus sp. b						2	1		1										0.222	68.110	0.0135	0.9195
PARATYDEIDAE intoto			2									1				2			0.278	85.290	0.0120	1.0235
Spilotydeus sp.			2									1				2			0.278	85.290	0.0120	1.0235
STIGMAEIDAE intoto	3	2	1	3		1	2			1			1	1			1		0.889	272.745	0.0165	4.5003
Apostigmaeus navicella		2	1	1		1	2			1			1	1			1		0.611	187.455	0.0160	2.9993
Lederermulleria sp.				1															0.056	17.181	0.0160	0.2749
Stigmaeus sp.	3			1															0.222	68.110	0.0180	1.2260
EUPALOPSELLIDAE intoto									1										0.056	17.181	0.0160	0.2749
Eupalopsellus sp.									1										0.056	17.181	0.0160	0.2749
PSEUDOCHEYLIDAE intoto		1	1	4	1	4		1							7				1.056	323.981	0.0160	5.1837
Pseudocheylus sp.		1	1	4	1	4		1							7				1.056	323.981	0.0160	5.1837
EUPODIDAE intoto	37	5	6	26	30	19	7	7	8	113	10		10	11	20	2	3	2	17.556	5386.181	0.0140	75.4065
Eupodes sp.	37	5	6	26	30	19	7	7	8	106	10		10	9	15	2	3	2	16.778	5147.490	0.0140	72.0649
Eupodes parafusifer										7				2	5				0.778	238.690	0.0140	3.3417
RHAGIDIDAE intoto				4			1		1				1		1				0.444	136.219	0.0140	1.9071
Rhagidia sp.				4			1		1				1		1				0.444	136.219	0.0140	1.9071
ERYTHRAETIDAE intoto			1			1										1	1		0.222	68.110	0.0400	2.7244
Abrolaphus bipilus			1			1										1	1		0.222	68.110	0.0400	2.7244
ERTOPHYIDAE intoto										1				1					0.111	34.055	0.0010	0.0341
Genus indet.										1				1					0.111	34.055	0.0010	0.0341
CALIGONELLIDAE intoto		1																	0.056	17.181	0.0180	0.3093
Neophyllobius sp.		1																	0.056	17.181	0.0180	0.3093
TOTAL	119	21	53	162	157	60	110	21	32	220	48	14	41	72	99	22	12	13	70.889	21,748.745	0.0073	159.7275

TABLE 33

NUMBER OF TROMBIDIFORMES PER SUBSAMPLE FOR 16th APRIL 1963
AVERAGE OF A AND B

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
TETRANYCHIDAE intoto	4.0		0.5	2.0	0.5			1.0		0.5				1.5	1.0		4.0		0.833	255.564	0.0160	4.0890
Eyobia borealis	4.0			2.0				0.5		0.5					1.0		4.0		0.667	204.636	0.0140	2.8649
Eotetranychus sp.					0.5									1.5					0.028	8.590	0.0140	0.1203
Oligonychus sp.			0.5					0.5						1.5					0.139	42.645	0.0260	1.1088
TENUIPALPIDAE intoto			1.5		0.5			0.5						1.5	0.5		1.5		0.333	102.164	0.0120	1.2260
Bravipalpus obovatus			1.5		0.5			0.5						1.5	0.5		1.5		0.333	102.164	0.0120	1.2260
LINOTETRANIDAE intoto				0.5				0.5		1.0		17.5							1.083	332.264	0.0120	3.9872
Linotetrans sp.				0.5				0.5		1.0		17.5							1.083	332.264	0.0120	3.9872
BDELLIDAE intoto	1.0			0.5	1.5		5.5			3.5			0.5	1.0	0.5				0.778	238.690	0.0140	3.3417
Bdella sp.					0.5		5.5			0.5									0.361	110.755	0.0140	1.5506
Spinibdella cronini	0.5			0.5	0.5					0.5			0.5	1.0	0.5				0.222	68.110	0.0140	0.9535
Cyta sp.	0.5				0.5					2.5									0.194	59.519	0.0140	0.8333
CUNAXIDAE intoto	2.0		0.5	0.5	2.0	2.0	4.5	0.5	1.0	5.5	1.0		0.5	1.5	3.5				1.389	426.145	0.0140	5.9660
Cunaxa taurus	1.0		0.5		1.5	1.5	2.0		1.0	3.0	0.5		0.5	0.5	1.5				0.750	230.100	0.0140	3.2214
Cunaxa sp.						0.5									0.5				0.056	17.181	0.0140	0.2405
Cunaxoides sp.	1.0			0.5	0.5		2.5	0.5		2.5	0.5			1.0	1.5				0.583	178.864	0.0140	2.5041
NANORCHESTIDAE intoto	2.0	3.5	2.0	16.0	18.0	4.0	9.5	4.5	7.5	9.0	4.0	7.5	7.5	1.5	3.0	12.0	4.0	0.5	6.444	1977.019	0.0024	4.7448
Nanorchestes sp.	2.0	1.0	1.0	16.0	11.5	2.5	8.0	4.0	5.0	5.0	3.5	0.5	2.0	1.0	2.5				3.639	1116.445	0.0020	2.2329
Speleorchestes sp.		2.5	1.0		6.5	1.5	1.5	0.5	2.5	4.0	0.5	7.0	5.5	0.5	0.5	12.0	4.0	0.5	2.801	859.347	0.0030	2.5780
PACHYGNATHIDAE intoto		2.5	0.5	2.5	0.5	1.5	1.5	0.5	0.5	3.0				1.5	1.5				0.889	272.745	0.0160	4.3639
Pachygnathus sp.		2.5	0.5	2.0		1.5	1.5	0.5	0.5	3.0				1.5	1.5				0.833	255.564	0.0160	4.0890
Bimichaelia sp.				0.5	0.5														0.056	17.181	0.0160	0.2749
LORDALYCHIDAE intoto				0.5	1.0											0.5			0.111	34.055	0.0020	0.0681
Lordalychus sp.				0.5	1.0											0.5			0.111	34.055	0.0020	0.0681
ALTCORHAGIDAE intoto											1.0		3.5			3.0	2.5		0.556	170.581	0.0020	0.3412
Alicorhagia sp.											1.0		3.5			3.0	2.5		0.556	170.581	0.0020	0.3412
SCUTACARIDAE intoto	1.0			1.5	3.5	0.5	0.5	3.0		3.0	12.0	0.5	2.5	4.0				1.0	1.833	562.364	0.0060	3.3742
Scutacarus sp.	1.0			1.5	3.5	0.5	0.5	3.0		3.0	12.0	0.5	2.5	4.0				1.0	1.833	562.364	0.0060	3.3742
TARSONEMIDAE intoto	34.5	4.0	22.0	51.5	17.5	11.5	35.0	11.5	12.0	38.0	8.0	0.5	9.0	59.5	49.0		0.5	11.0	20.833	6391.564	0.0040	25.5663
Tarsonemus sp.	34.5	4.0	22.0	51.5	17.5	11.5	35.0	11.5	12.0	38.0	8.0	0.5	9.0	59.5	49.0		0.5	11.0	20.833	6391.564	0.0040	25.5663
PYEMOTIDAE intoto			4.0	4.5	1.5		15.0		0.5	0.5			0.5	1.5					1.556	477.381	0.0040	1.9095
Pygmephorus sp.			4.0	4.5	1.5		15.0		0.5	0.5			0.5	1.5					1.556	477.381	0.0040	1.9095
TYDEIDAE intoto	14.5	1.0	1.5	16.5	33.0	5.0	4.0	2.0	1.0	20.5	0.5	2.0	3.0	4.5	10.5	1.5	0.5		6.750	2070.900	0.0041	8.4907
Coccotydeus sp.	11.0	0.5	1.0	12.5	33.0	3.5	3.5	1.5		14.5	0.5	1.0	2.5	2.0	7.0	1.0			5.278	1619.290	0.0015	2.4289
Tydeus sp. a	3.5	0.5	0.5	3.5					0.5	6.0		1.0	0.5	2.5	3.5	0.5	0.5		1.278	392.090	0.0135	5.2932
Tydeus sp. b				0.5		1.5	0.5	0.5	0.5										0.194	59.519	0.0135	0.8035
PARATYDEIDAE intoto		1.0	1.0		1.5							0.5		0.5		1.5			0.333	102.164	0.0120	1.2260
Scolotydeus sp.		1.0	1.0		1.5							0.5		0.5		1.5			0.333	102.164	0.0120	1.2260
STIGMAEIDAE intoto	3.0	1.0	0.5	2.0	0.5	0.5	1.0		0.5	0.5	0.5	0.5	0.5	1.5			0.5		0.722	221.510	0.0164	3.6328
Apostigmaeus navicella	1.0	1.0	0.5	1.0	0.5	0.5	1.0		0.5	0.5	0.5	0.5	0.5	1.5			0.5		0.556	170.581	0.0160	2.7293
Ledermaueria sp.				0.5															0.028	8.590	0.0160	0.1374
Stigmaeus sp.	2.0			0.5															0.139	42.645	0.0180	0.7676
EUPALOPSELLIDAE intoto									0.5										0.028	8.590	0.0160	0.1374
Eupalopsellus sp.									0.5										0.028	8.590	0.0160	0.1374
PSEUDOCHEYLIDAE intoto		1.5	3.0	8.0	5.0	3.0		0.5		3.5		1.0	0.5	0.5	5.5				1.778	545.490	0.0160	8.7278
Pseudocheylus sp.		1.5	3.0	8.0	5.0	3.0		0.5		3.5		1.0	0.5	0.5	5.5				1.778	545.490	0.0160	8.7278
TENERIFFITIDAE intoto												1.0				0.5			0.083	25.464	0.0160	0.4074
EUPODIDAE intoto	31.0	4.5	5.5	23.0	23.0	15.0	7.5	7.0	5.0	64.0	5.0		7.0	20.0	21.0	2.0	4.0	3.0	13.750	4218.500	0.0140	59.0590
Eupodes sp.	30.5	4.5	5.5	23.0	22.5	15.0	7.0	5.5	5.0	58.5	5.0		7.0	12.0	15.0	2.0	4.0	3.0	12.500	3834.000	0.0140	53.6900
Eupodes parafusifer	0.5				0.5		0.5	1.5		5.5				8.0	6.0				1.250	383.500	0.0140	5.3690
RHAGIDIIDAE intoto				3.0	0.5		1.5	0.5	0.5		0.5	0.5	1.0	0.5	1.0				0.528	161.990	0.0140	2.2679
Rhagidia sp.				3.0	0.5		1.5	0.5	0.5		0.5	0.5	1.0	0.5	1.0				0.528	161.990	0.0140	2.2679
ERYTHRAEIDAE intoto	0.5		0.5		0.5	1.0	0.5			0.5			0.5	0.5	12.5	3.5	0.5	1.0	1.250	383.500	0.0238	9.1273
Abrolophus bipilus	0.5		0.5		0.5	1.0	0.5			0.5					3.5	0.5	0.5	1.0	0.472	144.810	0.0400	5.7924
Hauptmannia sp.												0.5	0.5	12.5				0.5	0.778	238.690	0.0140	3.3417
TROMBIDIDAE intoto											0.5								0.028	8.590	0.0400	0.3436
Microtrombidium sp.											0.5				0.5				0.056	17.181	0.0010	0.0172
ERTOPHYIDAE intoto															0.5				0.056	17.181	0.0010	0.0172
Genus indet.																			0.028	8.590	0.0180	0.1546
CALIGONELLIDAE intoto		0.5																	0.028	8.590	0.0180	0.1546

TABLE 34

NUMBER OF TROMBIDIFORMES PER SUBSAMPLE FOR 13th MAY 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
TETRANYCHIDAE intoto					2					1					1				0.222	68.110	0.0170	1.1579
Bryobia borealis										1									0.056	17.181	0.0140	0.2405
Oligonychus sp.															1				0.056	17.181	0.0260	0.4487
Tetranychus sp.					2														0.111	34.055	0.0140	0.4768
TENUIPALPIDAE intoto		1							1	2									0.222	68.110	0.0120	0.8173
Brevipalpus obovatus		1							1	2									0.222	68.110	0.0120	0.8173
TUCKERELLIDAE intoto											1								0.056	17.181	0.0120	0.2062
Tuckerella ornata											1								0.056	17.181	0.0120	0.2062
BDELLIDAE intoto					1	8													0.500	153.400	0.0140	2.1476
Bdella sp.						4													0.222	68.110	0.0140	0.9535
Spinibdella cronini					1	4													0.278	85.290	0.0140	1.1941
CUNAXIDAE intoto			1	8	2		2		1	2		1		1				1	1.056	323.981	0.0140	4.5357
Cunaxa taurus			1							2		1		1					0.278	85.290	0.0140	1.1941
Cunaxoides sp.				8	2		1											1	0.778	238.690	0.0140	3.3417
NANORCHESTIDAE intoto	5	1	2	9	7	3	6	4		9	5	35	4	3	5	7	2	5	6.222	1908.910	0.0024	4.5814
Nanorchestes sp.	5		2	4	4		3	2		8	4	20	1	1	3	2		4	3.500	1073.800	0.0020	2.1476
Speleorchestes sp.		1		5	3	3	3	2		1	1	15	3	2	2	5	2	1	2.722	835.110	0.0030	2.5053
PACHYGNATHIDAE intoto			1	2	3	1				2									0.500	153.400	0.0160	2.4544
Pachygnathus sp.			1	2	3	1				2									0.500	153.400	0.0160	2.4544
ALICORHAGIDAE intoto											1					13		5	1.056	323.981	0.0020	0.6480
Alicorhagia sp.											1					13		5	1.056	323.981	0.0020	0.6480
SCUTACARTIDAE intoto				1	2								3	17					1.278	392.090	0.0060	2.3525
Scutacarus sp.				1	2								3	17					1.278	392.090	0.0060	2.3525
TARSONEMIDAE intoto	60	23	73	29	27	35	10	39	5	49	8		6	29	25	1		1	23.333	7158.564	0.0040	28.6343
Tarsonemus sp.	60	23	73	29	27	35	10	39	5	49	8		6	29	25	1		1	23.333	7158.564	0.0040	28.6343
PYGMOTIDAE intoto	1	2		1	2				1		1		1	1					0.556	170.581	0.0040	0.6823
Pygmephorus sp.	1	2		1	2				1		1		1	1					0.556	170.581	0.0040	0.6823
TYDEIDAE intoto	8	6	26	59	6	36	4	19	11	28	7	5	5	20	7	2		12	14.500	4448.600	0.0072	32.0299
Coccotydeus sp.	2	2	19	34	1	10		7	5	26	2	1	3	14	3			9	7.667	2352.236	0.0015	3.5284
Tydeus sp. a	6	4	7	25	5	26	4	12	6		5	2		5	4	2		3	6.444	1977.019	0.0135	26.6898
Tydeus sp. b										2		2	2	1					0.389	119.345	0.0135	1.6112
PARATYDEIDAE intoto											1	1			2				0.222	68.110	0.0120	0.8173
Scototydeus sp.											1	1			2				0.222	68.110	0.0120	0.8173
STIGMAEIDAE intoto					1	1					1				1				0.222	68.110	0.0160	1.0898
Apostigmaeus navicella					1	1					1				1				0.222	68.110	0.0160	1.0898
PSEUDOCHEYLIDAE intoto				2		1								9	2				0.778	238.690	0.0160	3.8190
Pseudocheylylus sp.				2		1								9	2				0.778	238.690	0.0160	3.8190
EUPODIDAE intoto	9	4	4	25	3	15	3	4	3	20	5		2	14	9	7			7.056	2164.781	0.0140	30.3069
Eupodes sp.	8	4	1	23	3	13	3	4	3	15	5		2	9	9	7			6.056	1857.981	0.0140	26.0117
Eupodes parafusifer	1		3	2		2				5				5					1.000	306.800	0.0140	4.2952
RHAGIDIIDAE intoto	1		7	25	4	1				1		2							2.278	698.890	0.0140	9.7845
Rhagidia sp.	1		7	25	4	1				1		2							2.278	698.890	0.0140	9.7845
ERYTHRAEIDAE intoto				1	1	1	1							1					0.278	85.290	0.0296	2.5246
Abrolophus bipilus						1	1							1					0.167	51.236	0.0400	2.0494
Hauptmannia sp.				1	1														0.111	34.055	0.0140	0.4768
TOTAL	84	37	114	162	61	102	26	66	22	114	30	44	21	95	52	30	2	24	60.333	18,510.164	0.0069	128.5896

TABLE 35

NUMBER OF TROMBIDIFORMES PER SUBSAMPLE FOR 10th JUNE 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Numbers per m ²	Mean Biomass per individual mg	Biomass per m ² mg
ETRANYCHIDAE intoto					10								1		4	2		1	1.000	306.800	0.0183	5.6144
Bryobia borealis					1								1		1	2		1	0.333	102.164	0.0140	1.4303
Eotetranychus sp.					9														0.500	153.400	0.0140	2.1476
Monoceronychus sp.															3				0.167	51.236	0.0400	2.0494
INOTETRANIDAE intoto										1									0.056	17.181	0.0120	0.2062
Linotetranus sp.										1									0.056	17.181	0.0120	0.2062
BDELLIDAE intoto				2	2					1									0.278	85.290	0.0140	1.1941
Bdella sp.																						
Spinibdella cronini				2	2														0.222	68.110	0.0140	0.9535
Cyta sp.										1									0.056	17.181	0.0140	0.2405
CUNAXIDAE intoto	1			1	4				1	6	1								0.778	238.690	0.0140	3.3417
Cunaxa taurus	1				2				1	3									0.389	119.345	0.0140	1.6708
Cunaxa sp.										1									0.056	17.181	0.0140	0.2405
Cunaxoides sp.				1	2					2	1								0.333	102.164	0.0140	1.4303
NANORCHESTIDAE intoto	8		3	37	11	12	4	4	2	17	2		12	1	3			3	6.944	2130.419	0.0023	4.9000
Nanorchestes sp.	6		3	37	11	8	1	2	1	15	4		1		1				5.000	1534.000	0.0020	3.0680
Speleorchestes sp.	2					4	3	2	1	2	4		11	1	2			3	1.944	595.419	0.0030	1.7893
PACHYGNATHIDAE intoto					5		1			1									0.389	119.345	0.0160	1.9095
Pachygnathus sp.					2		1			1									0.222	68.110	0.0160	1.0898
Bimichaella sp.					3														0.167	51.236	0.0160	.8198
ALICORHAGIDAE intoto											1		40	3		8		4	3.111	954.455	0.0020	1.9089
Alicorhagia											1		40	3		8		4	3.111	954.455	0.0020	1.9089
SCUTACARTIDAE intoto					2	3	1	4				1							0.611	187.455	0.0060	1.1247
Scutacarus sp.					2	3	1	4				1							0.611	187.455	0.0060	1.1247
TARSONEMIDAE intoto	27	17	12	56	10	39	18	6	27	43	9	1	15		24		1		16.944	5198.419	0.0040	20.7937
Tarsonemus sp.	27	17	12	56	10	39	18	6	27	43	9	1	15		24		1		16.944	5198.419	0.0040	20.7937
PYEMOTIDAE intoto	4			15			1	2		1				3					1.444	443.019	0.0040	1.7721
Pygmephorus sp.	4			15			1	2		1				3					1.444	443.019	0.0040	1.7721
TYDEIDAE intoto	37	14	91	94		234	95	33	29	192	12	6	157	29	153	6	1		317.000	97,255.600	0.0116	1128.1650
Coccotydeus	35	10	86	66	7	79	85	28	28	156	12	4	147	29	123		1		49.778	15,271.890	0.0015	22.9078
Tydeus sp. a	2	4	4	4	4	11	8	4	1	35		2	10		29	6			6.889	2,113.545	0.0135	28.5329
Tydeus sp. b			1	24		144	2	1		1					1				260.333	79,870.164	0.0135	1078.2472
PARATYDEIDAE intoto		1	2				3		1					2	4		1		0.778	238.690	0.0120	2.8643
Scolotydeus sp.		1	2				3		1					2	4		1		0.778	238.690	0.0120	2.8643
STIGMAEIDAE intoto				1	6		1			2	1		1		1	1			0.778	238.690	0.0161	3.8429
Apostigmaeus navicella					2		1				1		1		1				0.389	119.345	0.0160	1.9095
Lederermulleria sp.				1	1					2									0.222	68.110	0.0160	1.0898
Stigmaeus sp.					1														0.056	17.181	0.0180	0.3093
Agistemus africanus					2														0.111	34.055	0.0160	0.5449
PSEUDOCHEYLIDAE intoto		2													5				0.389	119.345	0.0160	1.9095
Pseudocheylus sp.		2													5				0.389	119.345	0.0160	1.9095
ANYSTIDAE intoto																1			0.056	17.181	0.0300	0.5154
Anandia sp.																1			0.056	17.181	0.0300	0.5154
EUPODIDAE intoto	4	1	1	6	13	14		2	2	45	2				1				5.056	1,551.181	0.0140	21.7165
Eupodes sp.	4	1	1	6	10	10		2	2	45	2								4.611	1,414.655	0.0140	19.8052
Eupodes parafusifer					3	4									1				0.444	136.219	0.0140	1.9071
RHAGIDIIDAE intoto	1		3	1	2	2			1										0.556	170.581	0.0140	2.3881
Rhagidia sp.	1		3	1	2	2			1										0.556	170.581	0.0140	2.3881
ERYTHRAEIDAE intoto		1		1					1								1		0.222	68.110	0.0270	1.8390
Abrolophus bipilus		1															1		0.111	34.055	0.0400	1.3622
Hauptmannia sp.				1															0.056	17.181	0.0140	0.2405
Erythraeus sp.									1										0.056	17.181	0.0140	0.2405
CHEYLETIDAE intoto											1								0.056	17.181	0.0020	0.0344
Genus indef											1								0.056	17.181	0.0020	0.0344
TOTAL	82	36	112	214	4588	304	124	51	64	309	35	8	226	38	195	18	2	10	356.444	109,357.013	0.0110	1206.0404

TABLE 36

NUMBER OF TROMBIDIFORMES PER SUBSAMPLE FOR 8th JULY 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
ETRANYCHIDAE intoto								4	2	2	1	1					1		0.611	187.455	0.0282	5.2862
Bryobia borealis										2	1	1					1		0.278	85.290	0.0140	1.1941
Monoceronychus sp.								4	2										0.333	102.164	0.0400	4.0866
ENUIPALPIDAE intoto										1									0.056	17.181	0.0120	0.2062
Brevipalpus obovatus										1									0.056	17.181	0.0120	0.2062
TUCKERELLIDAE intoto		1						1		1									0.167	51.236	0.0120	0.6148
Tuckerella ornata		1						1		1									0.167	51.236	0.0120	0.6148
LINOTETRANIDAE intoto																	1		0.056	17.181	0.0120	0.2062
Linotetrans sp.																	1		0.056	17.181	0.0120	0.2062
BDELLIDAE intoto			1				10							1					0.667	204.636	0.0140	2.8649
Bdella sp.							10							1					0.611	187.455	0.0140	2.6244
Spinibdella cronini			1																0.056	17.181	0.0140	0.2405
CUNAXIDAE intoto	2	2		2	1	3	2			2	1			2					0.944	289.619	0.0140	4.0547
Cunaxa taurus	2	2				1					1								0.333	102.164	0.0140	1.4303
Cunaxoides sp.				2	1	2	2			2				2					0.611	187.455	0.0140	2.6244
NANORCHESTIDAE intoto	30	4			3	7	12	26	3	6	37	6	23		2	8	5	3	9.722	2982.710	0.0022	6.5620
Nanorchestes sp.	30	1			3	5	12	24	3	2	34		13		1	7		3	7.667	2352.236	0.0020	4.7045
Speleorchestes sp.		3				2		2		4	3	6	10		1	1	5		2.056	630.781	0.0030	1.8923
PACHYGNATHIDAE intoto			1	1			2			1						1			0.333	102.164	0.0160	1.6346
Pachygnathus sp.			1	1			2			1						1			0.333	102.164	0.0160	1.6346
LORDALYCHIDAE intoto					2														0.111	34.055	0.0020	0.0681
Lordalychus sp.					2														0.111	34.055	0.0020	0.0681
ALICORHAGIDAE intoto											1		12			16	5		1.889	579.545	0.0020	1.1591
Alicorhagia sp.											1		12			16	5		1.889	579.545	0.0020	1.1591
SCUTACARIDAE intoto							1	2	14					1	1	5			1.333	408.964	0.0060	2.4538
Scutacarus sp.							1	2	14					1	1	5			1.333	408.964	0.0060	2.4538
TARSONEMIDAE intoto	81	15	34	50	2	32	32	29	13	30	11	1	13	34	15	2	2	16	22.889	7022.345	0.0040	28.0894
Tarsonemus sp.	81	15	34	50	2	32	32	29	13	30	11	1	13	34	15	2	2	16	22.889	7022.345	0.0040	28.0894
PYGMEPHORIDAE intoto				20		14	2	1			1				3	5		1	2.611	801.055	0.0040	3.2042
Pygmephorus sp.				20		14	2	1			1				3	5		1	2.611	801.055	0.0040	3.2042
TYDEIDAE intoto	31	44	28	81	40	63	27	57	18	32	18	4	51	20	40	8	19	46	34.833	10,686.764	0.0056	59.8459
Coccotydeus sp.	25	30	14	36	28	29	24	48	11	23	12	3	43	11	26	5	12	32	22.889	7,022.345	0.0015	10.5335
Tydeus sp. a	6	13	8	44	12	34	3	9	7	7	5	1	8	2	13	3	7	13	10.833	3,323.564	0.0135	44.8681
Tydeus sp. b		1	6	1						2	1			7	1			1	1.111	340.855	0.0135	4.6015
PARATYDEIDAE intoto		3	2					1					1						0.389	119.345	0.0120	1.4321
Scolotydeus sp.		3	2					1					1						0.389	119.345	0.0120	1.4321
STIGMAEIDAE intoto	1			1	1			1			1			2			1		0.444	136.219	0.0160	2.1795
Apostigmaeus navicella				1	1			1						1			1		0.278	85.290	0.0160	1.3646
Ledermulleria sp.	1										1			1					0.167	51.236	0.0160	.8198
EUPALOPSELLIDAE intoto	2			2	1												1		0.333	102.164	0.0160	1.6346
Eupalopsellus sp.	2			2	1												1		0.333	102.164	0.0160	1.6346
PSEUDOCHEYLIDAE intoto		2	1		2	3		8							2				1.000	306.800	0.0160	4.9088
Pseudocheylus sp.		2	1		2	3		8							2				1.000	306.800	0.0160	4.9088
EUPODIDAE intoto	13	8	2	16	9	7	6	12	2	8	3		8	21	9	13	1	12	8.333	2556.564	0.0140	35.7919
Eupodes sp.	12	8	2	16	9	7	6	12	2	8	3		8	21	9	13	1	10	8.167	2505.636	0.0140	35.0789
Eupodes parafusifer	1																	2	0.167	51.236	0.0140	0.7173
RHAGIDIDAE intoto	1		1			1	1	1	1	1							1		0.444	136.219	0.0140	1.9071
Rhagidia sp.	1		1			1	1	1	1	1							1		0.444	136.219	0.0140	1.9071
ERYTHRAEIDAE intoto		2								2									0.222	68.110	0.0270	1.8390
Abrolophus bipilus		2																	0.111	34.055	0.0400	1.3622
Hauptmannia sp.										2									0.111	34.055	0.0140	0.4768
TOTAL	161	81	70	173	61	130	95	143	53	86	74	12	108	81	72	58	35	80	87.389	26,810.945	0.0063	167.7989

TABLE 37

NUMBER OF TROMBIDIFORMES PER SUBSAMPLE FOR 5th AUGUST 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
TETRANYCHIDAE intoto	8	1	1	1				2				1						1	0.833	255.564	0.0218	5.5713
Bryobia borealis	8	1	1																0.556	170.581	0.0140	2.3881
Eotetranychus sp.																						
Monoceronychus sp.				1				1				1						1	0.222	68.110	0.0400	2.7244
Oligonychus sp.								1											0.056	17.181	0.0260	0.4467
LINOTETRANDAE intoto												1							0.056	17.181	0.0120	0.2062
Linotetransus sp.												1							0.056	17.181	0.0120	0.2062
BDELLIDAE intoto				8					2						1				0.611	187.455	0.0140	2.6244
Bdella sp.																						
Spinibdella cronini				8					2										0.556	170.581	0.0140	2.3881
Cyta sp.															1				0.056	17.181	0.0140	0.2405
CUNAXIDAE intoto				5											1				0.333	102.164	0.0140	1.4303
Cunaxa taurus				5															0.278	85.290	0.0140	1.1941
Cunaxoides sp.															1				0.056	17.181	0.0140	0.2405
NANORCHESTIDAE intoto	2	1	16			2	6	2	5	14	5	10		1	6	1		1	4.000	1312.490	0.0024	3.1500
Nanorchestes sp.	2	1	15			2	1	2		10					1				1.889	579.545	0.0020	1.1591
Speleorchestes sp.			1				5		5	4	5	10		1	5	1		1	2.111	647.655	0.0030	1.9430
PACHYGNATHIDAE intoto								1		5									0.333	102.164	0.0160	1.6346
Pachygnathus sp.								1		5									0.333	102.164	0.0160	1.6346
LORDALYCHIDAE intoto												1							0.056	17.181	0.0020	0.0344
Lordalychus sp.												1							0.056	17.181	0.0020	0.0344
ALICORHAGIDAE intoto								1		1	1	3		8				6	1.111	340.855	0.0020	0.6817
Alicorhagia sp.								1		1	1	3		8				6	1.111	340.855	0.0020	0.6817
SCUTACARIDAE intoto								1											0.056	17.181	0.0060	0.1031
Scutacarus sp.								1											0.056	17.181	0.0060	0.1031
TARSONEMIDAE intoto	38	21	27	40	20		1	7	2	46				1	20			2	12.500	3835.000	0.0040	15.3400
Tarsonemus sp.	38	21	27	40	20		1	7	2	46				1	20			2	12.500	3835.000	0.0040	15.3400
PYEMOTIDAE intoto					20			1											1.167	358.036	0.0040	1.4321
Pygmephorus sp.					20			1											1.167	358.036	0.0040	1.4321
TYDEIDAE intoto	47	7	33	41	21	5	1	23		43	3	8		2	32	1		2	14.944	4584.819	0.0087	39.8879
Coccotydeus sp.	27		22	20	6	5		3		20					4			1	6.000	1840.800	0.0015	2.7612
Tydeus sp. a	20	7	10	20	14		1	15		23	3	5		1	27	1		1	8.222	2522.510	0.0135	34.0539
Tydeus sp. b			1	1	1			5				3		1	1				0.722	221.510	0.0135	2.9904
PARATYDEIDAE intoto			2				2		2		1			1				2	0.556	170.581	0.0120	2.0470
Scolotydeus sp.			2				2		2		1			1				2	0.556	170.581	0.0120	2.0470
STIGMAEIDAE intoto	1		1						1			1		1				1	0.333	102.164	0.0160	1.6346
Apostigmaeus navicella	1		1						1			1		1					0.278	85.290	0.0160	1.3646
Ledermulleria sp.																		1	0.056	17.181	0.0160	0.2749
PSEUDOCHEYLIDAE intoto					3			1		2		1			6	1			0.778	238.690	0.0160	3.8190
Pseudochelylus sp.					3			1		2		1			6	1			0.778	238.690	0.0160	3.8190
TENNERIFFIIDAE intoto													1						0.056	17.181	0.0160	0.2749
EUPODIDAE intoto	1	10	11	10	1	2	5	3		7					10	2		1	3.500	1073.800	0.0140	15.0332
Eupodes sp.	1	10	11	10	1	2	5	3		6					9	2		1	3.389	1039.745	0.0140	14.5564
Eupodes parafusifer										1					1				0.111	34.055	0.0140	0.4768
RHAGIDIIDAE intoto	1			3		1	1								2	1			0.500	153.400	0.0140	2.1476
Rhagidia sp.	1			3		1	1								2	1			0.500	153.400	0.0140	2.1476
ERYTHRAEIDAE intoto										3					1				0.222	68.110	0.0336	2.2885
Abrolophus bipilus										2					1				0.167	51.236	0.0400	2.0494
Erythraeidae larvae										1									0.056	17.181	0.0140	0.2405
TROMBIDIIDAE intoto											1								0.056	17.181	0.0400	0.6872
Microtrombidium sp.											1								0.056	17.181	0.0400	0.6872
CHEYLETIDAE intoto			1																0.056	17.181	0.0020	0.0344
Genus indet			1																0.056	17.181	0.0020	0.0344
TOTAL	98	40	92	108	65	10	16	42	12	121	11	26	1	14	79	6	-	16	42.056	12,092.781	0.0078	100.0624

NUMBERS OF TROMBIDIFORMES PER SUBSAMPLE FOR 16th SEPTEMBER 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
ANYCHIDAE intoto								3								2			0.278	85.290	0.0140	1.1941
yobia borealis								3								2			0.278	85.290	0.0140	1.1941
IPALPIDAE intoto		1																	0.056	17.181	0.0120	0.2062
evipalpus obovatus		1																	0.056	17.181	0.0120	0.2062
TETRANIDAE intoto		1												1			1		0.167	51.236	0.0120	0.6148
notetrans sp.		1												1			1		0.167	51.236	0.0120	0.6148
LIDAE intoto				1				1											0.111	34.055	0.0140	0.4768
vinibdella cronini				1				1											0.111	34.055	0.0140	0.4768
XIDAE intoto		1		5															0.333	102.164	0.0140	1.4303
maxa taurus				4															0.222	68.110	0.0140	0.9535
maxoides sp.		1		1															0.111	34.055	0.0140	0.4768
IRCHESTIDAE intoto			2	2								5	2	1			4		0.889	272.745	0.0030	0.8182
eleorchestes sp.			2	2								5	2	1			4		0.889	272.745	0.0030	0.8182
ACARIDAE intoto				5															0.278	85.290	0.0060	0.5117
cutacarus sp.				5															0.278	85.290	0.0060	0.5117
ONEMIDAE intoto	1		1	17										11	3				1.833	562.364	0.0040	2.2495
ersonemus sp.	1		1	17										11	3				1.833	562.364	0.0040	2.2495
IDAE intoto	1		3	40	1	1	2				1			15	1	1	1		3.722	1141.910	0.0110	12.5610
ocotydeus sp.				6							1			7					0.778	238.690	0.0015	0.3580
deus sp. a			2	31	1		2							6	1		1		2.444	749.819	0.0135	10.1226
deus sp. b	1		1	3		1								2		1			0.500	153.400	0.0135	2.0709
TYDEIDAE intoto		1									1								0.111	34.055	0.0120	0.4087
ototydeus sp.		1									1								0.111	34.055	0.0120	0.4087
MAEIDAE intoto				3					1						1				0.278	85.290	0.0160	1.3646
ostigmaeus navicella				2					1						1				0.222	68.110	0.0160	1.0898
edermulleria sp.				1															0.056	17.181	0.0160	0.2749
IGNATHIDAE intoto												1							0.056	17.181	0.0020	0.0344
aphignathus sp.												1							0.056	17.181	0.0020	0.0344
DOCHEYLIDAE intoto			1		1	1				2				5	2				0.667	204.636	0.0160	3.2742
seudocheylus sp.			1		1	1				2				5	2				0.667	204.636	0.0160	3.2742
STIDAE intoto														2					0.111	34.055	0.0185	0.5619
echsteinia sp.														2					0.111	34.055	0.0185	0.5619
ERIFFIDAE intoto																	1		0.056	17.181	0.0160	0.2749
ODIDAE intoto			2	3		1							1		1				0.444	136.219	0.0140	1.9071
upodes sp.			2	1		1													0.222	68.110	0.0140	0.9535
upodes parafusifer				2									1		1				0.222	68.110	0.0140	0.9535
GIDIIDAE intoto				1												1			0.111	34.055	0.0140	0.4768
hagidia				1												1			0.111	34.055	0.0140	0.4768
THRAETIDAE intoto	1				1				1		1			1	1				0.333	102.164	0.0400	4.0866
brolophus bipilus	1				1				1		1			1	1				0.333	102.164	0.0400	4.0866
TOTAL	3	4	9	77	3	3	2	4	2	2	3	6	3	36	9	4	7	-	9.833	3016.764	0.0108	32.4518

NUMBERS OF TROMBIDIFORMES PER SUBSAMPLE FOR 3rd DECEMBER 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
ANYCHIDAE intoto	10		1									1		1				1	0.778	238.690	0.0251	5.9911
yobia borealis												1							0.056	17.181	0.0140	0.2405
igonychus sp.	10		1											1				1	0.722	221.510	0.0260	5.7593
IPALPIDAE intoto											5							2	0.389	119.345	0.0120	1.4321
evipalpus obovatus											5							2	0.389	119.345	0.0120	1.4321
LIDAE intoto	16	3	2		3	3	2	2	6	6	9	7	2	3	3	1	2	1	3.944	1,210.019	0.0140	16.9403
ella sp.	11	2	1		3	1	1	1	3		8		2	2	1		1	1	2.111	647.655	0.0140	9.0672
inibdella cronini	5	1	1			2	1	1	3	6	1	7		1	2	1	1		1.833	562.364	0.0140	7.8731
XIDAE intoto	7	3	1	9	1	2	3	8	2	12	4	3	4	6	2	3	8	5	4.611	1,414.655	0.0140	19.8052
naxa taurus	5	3	1	9	1		2	6		11	3	2	2	6	2	2	8	5	3.778	1,159.090	0.0140	16.2273
naxa sp.											1	1	1			1			0.222	68.110	0.0140	0.9535
maxoides sp.	2					2	1	2	2	1			1						0.611	187.455	0.0140	2.6244
ORCHESTIDAE intoto	53	27	80	69	59	16	34	28	26	43	77	31	19	41	50	56	53	14	43.111	13,226.455	0.0020	26.4529
orchestes sp.	53	27	79	69	59	16	34	28	26	43	77	31	19	41	50	56	53	14	43.056	13,209.581	0.0020	26.4192
eleorchestes sp.			1																0.056	17.181	0.0030	0.0515
YGNATHIDAE intoto			2	1	1	5			2	3		2	6	6	6	4			2.111	647.655	0.0160	10.3625
ichygnathus sp.			2		1	5			2	1			5	6	6	3			1.722	528.310	0.0160	8.4530
michaelia sp.				1						2		2	1			1			0.389	119.345	0.0160	1.9095
ALYCHIDAE intoto				1			1												0.111	34.055	0.0020	0.0681
rdalychus sp.				1			1												0.111	34.055	0.0020	0.0681
ORRHAGIDAE intoto								1	3			2							0.333	102.164	0.0020	0.2043
icorhagia sp.								1	3			2							0.333	102.164	0.0020	0.2043
ACARTIDAE intoto				5															0.278	85.290	0.0060	0.5117
utacarus sp.				5															0.278	85.290	0.0060	0.5117
ONEMIDAE intoto	68	33	48	59	32	71	67	10	15	26	78	79	35	33	45	158	76	71	55.778	17,112.690	0.0040	68.4508
ersonemus sp.	68	33	48	59	32	71	67	10	15	26	78	79	35	33	45	158	76	71	55.778	17,112.690	0.0040	68.4508
OTIDAE intoto		16	7	4	20	5	5	3						6					3.667	1,125.036	0.0040	4.5001
gmephorus sp.		16	7	4	20	5	5	3						6					3.667	1,125.036	0.0040	4.5001
IDAE intoto	254	107	144	348	175	170	269	34	138	156	296	108	72	70	66	141	58	127	151.833	46,582.364	0.0051	237.5701
ccotydeus sp.	174	69	102	282	159	123	170	23	103	103	180	73	48	50	46	112	29	67	106.278	32,606.090	0.0015	48.9091
deus sp. a	80	38	41	66	16	47	99	10	35	51	115	35	24	20	20	29	24	59	44.944	13,788.819	0.0135	186.1491
deus sp. b			1					1		2	1						5	1	0.611	187.455	0.0135	2.5306
MAETIDAE intoto	7	2	5	16	2	2	13			1	2	1	3	12	3	9	4	4	4.778	1465.890	0.0163	23.8940
ostigmaeus navicella	7	2	2	15	2	2	10				1	1	1	11	2	3	3	1	3.500	1073.800	0.0160	17.1808
edermulleria sp.			1	1			1							1		3		3	0.556	170.581	0.0160	2.7293
igmaeus sp.			2				2			1	1		2		1	3	1		0.722	221.510	0.0180	3.9872
LOPSELLIDAE intoto	1																		0.056	17.181	0.0160	0.2749
palopsellus sp.	1																		0.056	17.181	0.0160	0.2749
DOCHEYLIDAE intoto								1	1							1			0.167	51.236	0.0160	0.8198
seudocheylus sp.								1	1							1			0.167	51.236	0.0160	0.8198
IDIDAE intoto	116	119	54	210	130	131	154	21	6	60	78	67	94	103	18	119	36	20	85.333	26,180.164	0.0140	366.5223
ipodes sp.	116	115	53	210	130	131	149	21	6	60	78	66	94	103	18	119	36	20	84.722	25,992.710	0.0140	363.8979
ipodes parafusifer		4	1				5					1							0.611	187.455	0.0140	2.6244
IDIIDAE intoto	1	2	4	2	1		1			1			1			1			0.778	238.690	0.0140	3.3417
agidia sp.	1	2	4	2	1		1			1			1						0.778	238.690	0.0140	3.3417
THRAETIDAE intoto	1					1	1					1		1		9		1	0.833	255.564	0.0192	4.9068
rololphus bipilus												1						1	0.111	34.055	0.0400	1.3622
rythraeidae larvae	1					1	1									9			0.667	204.636	0.0140	2.8649
eptus sp.												2		1					0.056	17.181	0.0400	0.6872
MBIDIDAE intoto												2			1				0.167	51.236	0.0174	0.8915
tmulleria sp.												2							0.111	34.055	0.0030	0.1022
icrotrombidium sp.															1				0.056	17.181	0.0400	0.7894
OPHYTIDAE intoto	1		1	1		1		5		6		5							1.111	340.855	0.0010	3.4086
enus indet	1		1	1		1		5		6		5							1.111	340.855	0.0010	3.4086
RIDAE intoto	1			1		2													0.222	68.110	0.0400	2.7244
maris sp.	1			1		2													0.222	68.110	0.0400	2.7244
TOTAL	536	312	349	726	424	409	551	115	196	314	549	309	286	282	194	502	240	243	360.389	110,567.345	0.0072	799.0732

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 24th SEPTEMBER 1962

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
HODACARIDAE intoto	1																		0.056	17.181	0.0220	0.3780
Rhodacarus sublapideus																						
Digamasellus badenhorsti	1																		0.056	17.181	0.0220	0.3780
Gamasellus sp.																						
Saprolaelaps sp.																						
Gamasellopsis sp.																						
CEOSEJIDAE intoto													2			2			0.222	68.110	0.0060	0.4087
Asca spinosa																						
Asca aethiopica																						
Gamasellodes seminudus																1			0.056	17.181	0.0183	0.3144
Protogamasellus sp. a																1			0.056	17.181	0.0020	0.0344
Protogamasellus sp. b													2						0.111	34.055	0.0020	0.0681
Protogamasellus sp. c																						
Lasioseius sp. a																						
Proctolaelaps sp.																						
ELAPTIDAE intoto	3			4			1			1									0.500	153.4	0.0200	3.068
Gaeolaelaps paracasalis	3			4			1			1									0.500	153.4	0.0200	3.068
Gaeolaelaps sp. a																						
Gaeolaelaps sp. b																						
Cosmolaelaps sp.																						
Leptolaelaps elegans																						
Laelaspis sp.																						
Gen. nov. spec. nov.																						
Laelaptidae larvae																						
CHYLAEAPTIDAE in toto																						
Pachylaelaps sp.																						
HYROSEIIDAE intoto																						
Amblyseius sp. a																						
Amblyseius sp. b																						
Typhlodromus (Neoseiulus) sp.																						
RASITIDAE intoto																	1		0.056	17.181	0.0400	0.6872
EROSEIIDAE intoto																						
Kleemannia sp.																						
POPODIDEA intoto																						
TOTAL	4	-	-	4	-	-	1	-	-	1	-	-	2	-	-	2	-	1	0.833	255.564	0.0177	4.5419

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
DACARIDAE intoto				3	7					7				1		1			1.056	323.981	0.0110	3.5638
Phodacarus sublapideus				3	4					4				1					0.667	204.636	0.0110	2.2510
Gigamasellus badenhorsti																						
Gamasellus sp.					3					3						1			0.389	119.345	0.0110	1.3128
Aprolaelaps sp.																						
Gamasellopsis sp.																						
OSEJIDAE intoto				1						1					1		2		0.278	85.290	0.0117	0.9979
Sca spinosa																						
Sca aethiopica																						
Gamasellodes seminudus															1		2		0.167	51.236	0.0183	0.9376
Rotogamasellus sp. a										1									0.056	17.181	0.0020	0.0344
Rotogamasellus sp. b				1															0.056	17.181	0.0020	0.0344
Rotogamasellus sp. c																						
Asioseius sp. a																						
Asioseius sp. b																						
Roctolaelaps sp.																						
LAPTIDAE intoto	10			3	4					7	1			2	2				1.611	494.255	0.0240	11.8621
Aeolaelaps paracasalis	7			3	4					7	1			2					1.333	408.964	0.0200	8.1793
Aeolaelaps sp. a																						
Aeolaelaps sp. b																						
Osmolaelaps sp.															2				0.111	34.055	0.0340	1.1579
Eptolaelaps elegans	3																		0.167	51.236	0.0500	2.5618
Aelaspis sp.																						
en. nov. spec. nov.																						
Aelaptidae larvae																						
HYLAELAPTIDAE intoto	1									1									0.111	34.055	0.0240	0.8173
Achylaelaps sp.	1									1									0.111	34.055	0.0240	0.8173
TOSEIIDAE intoto	1																		0.056	17.181	0.0080	0.1374
Mblyseius sp. a	1																		0.056	17.181	0.0080	0.1374
Mblyseius sp. b																						
Mblyseius sp. c																						
Mblyseius sp. d																						
Yphlodromus (Neoseiulus) sp.																						
ASITIDAE intoto																						
ROSEIIDAE intoto																						
Leemannia sp.																						
PODOIDEA intoto																						
TOTAL	12	-	-	7	11	-	-	-	-	16	1	-	-	3	3	1	-	2	3.111	954.455	0.0191	18.3161

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Numbers per m ²	Mean biomass per individual mg	Biomass per m ² mg
DACARIDAE intoto	2			4	5		1	2		2	1		1	6	7				1.722	528.310	0.0121	6.3926
hodacarus sublapeus				4	4		1	2			1			1	4				0.944	289.619	0.0110	3.1858
igamasellus badenhorsti	1																		0.056	17.181	0.0220	0.3780
amasellus sp.	1				1					1			1	5	3				0.667	204.636	0.0110	2.2510
aprolaelaps sp.										1									0.056	17.181	0.0333	0.5721
amasellopsis sp.																						
OSEIIDAE intoto	3	2	2	3	2			4	2	11				5	3	1	2		2.222	681.710	0.0059	4.0221
sca spinosa								1											0.056	17.181	0.0220	0.3780
sca aethiopica								1		2					2	1			0.333	102.164	0.0183	1.8696
amasellodes seminudus															1				0.833	255.564	0.0020	0.5111
rotogamasellus sp. a				3					2	5				4	1				0.889	272.745	0.0020	0.5455
rotogamasellus sp. b	2	2	2		2			1		4				1			2					
rotogamasellus sp. c								1											0.056	17.181	0.0240	0.4123
asioseius sp. a																						
asioseius sp. b	1																		0.056	17.181	0.0200	0.3436
roctolaelaps sp.																						
LAPTIDAE intoto	1	1	1	2	2	2		4	1	89	1			2	3				6.056	1,857.981	0.0260	48.3075
laelaelaps paracasalis					1	1				8	1				2				0.722	221.510	0.0200	4.4302
laelaelaps sp. a																						
laelaelaps sp. b		1	1			1		3						2	1				0.500	153.400	0.0200	3.0680
osmolaelaps sp.										47									2.611	801.055	0.0340	27.2359
eptolaelaps elegans				2															0.111	34.055	0.0500	1.7028
aelaspis sp.										34									1.889	579.545	0.0200	11.5909
lenus nov. spec. nov.																						
aelaptidae larvae	1				1			1	1										0.222	68.110	0.0050	0.3406
HYLAELAPTIDAE intoto																						
'achylaelaps sp.																						
TOSEIIDAE intoto					1					1									0.111	34.055	0.0080	0.2724
mblyseius sp. a					1														0.056	17.181	0.0080	0.1374
mblyseius sp. b										1									0.056	17.181	0.0080	0.1374
mblyseius sp. c																						
mblyseius sp. d																						
typhlodromus (Neoseiulus) sp.									2													
ASITIDAE intoto					1														0.167	51.236	0.0400	2.0494
ROSEIIDAE intoto																						
leemannia sp.																						
PODOIDEA intoto																						
TOTAL	6	3	3	9	11	2	1	10	5	103	2	-	1	13	13	1	2	-	10.278	3153.290	0.0194	61.0456

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 17th DECEMBER 1962

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Numbers per m ²	Mean biomass per individual mg	Biomass ² per m mg
DACARIDAE intoto				2	1	1													0.222	68.110	0.0110	0.7492
<i>Dodacarus sublapideus</i>				1	1														0.111	34.055	0.0110	0.3746
<i>igamasellus badenhorsti</i>																						
<i>amasellus</i> sp.				1		1													0.111	34.055	0.0110	0.3746
<i>aprolaelaps</i> sp.																						
<i>amasellopsis</i> sp.																						
SEIJDAE intoto	1	1	4											1	3			1	0.611	187.455	0.0050	0.9373
<i>sca spinosa</i>																						
<i>sca aethiopica</i>																						
<i>amasellodes seminudus</i>														1	1				0.111	34.055	0.0183	0.6232
<i>otogamasellus</i> sp. a	1	1	4												1			1	0.444	136.219	0.0020	0.2724
<i>otogamasellus</i> sp. b																						
<i>otogamasellus</i> sp. c															1				0.056	17.181	0.0020	0.0344
<i>isioseius</i> sp. a																						
<i>isioseius</i> sp. b																						
<i>octolaelaps</i> sp.																						
LAPTIDAE intoto	1									3								1	0.278	85.290	0.0228	1.9446
<i>leolaelaps paracasalis</i>																						
<i>leolaelaps</i> sp. a																						
<i>leolaelaps</i> sp. b																	1		0.056	17.181	0.0200	0.3436
<i>ismolaelaps</i> sp.	1																		0.056	17.181	0.0340	0.5842
<i>ptolaelaps elegans</i>																						
<i>elaspis</i> sp.										3									0.167	51.236	0.0200	1.0247
<i>n. nov. spec. nov.</i>																						
<i>elaptidae</i> larvae																						
LYLAELAPTIDAE intoto																						
<i>ichylaelaps</i> sp.																						
OSEIIDAE intoto																	1		0.056	17.181	0.0080	0.1374
<i>blyseius</i> sp. a																						
<i>blyseius</i> sp. b																						
<i>blyseius</i> sp. c																						
<i>blyseius</i> sp. d																						
<i>phlodromus (Neoseiulus)</i> sp.																1		0.056	17.181	0.0080	0.1374	
SITIDAE intoto																						
OSEIIDAE intoto																						
<i>seemannia</i> sp.																						
ODOIDEA intoto																						
TOTAL	2	1	4	2	1	1				3				1	3	-	-	3	1.167	358.036	0.0105	3.7685

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 23rd JANUARY 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
ACARIDAE intoto			1	4	2	1	1	2		1		2		4	4	2			1.333	408.964	0.0129	5.2756
Dacarus sublapideus				2		1	1	1		1				3	2	1			0.667	204.536	0.0110	2.2510
amasellus badenhorsti																						
amasellus sp.			1	2				1				2		1	2	1			0.556	170.581	0.0110	1.8763
ctolaelaps sp.																						
masellopsis sp.					2														0.111	34.055	0.0333	1.1340
HEJIDAE intoto	2	2	2	3	15	2	4	2	1	7				2		1			2.389	732.945	0.0088	6.4499
a spinosa																						
a aethiopica		1			1														0.111	34.055	0.0050	0.1703
asellodes seminudus					8		1	2		3						1			0.833	255.564	0.0183	4.6768
togamasellus sp. a			1	2	2					1				1					0.389	119.345	0.0020	0.2387
togamasellus sp. b	2	1	1	1	2		2		1	2				1					0.722	221.510	0.0020	0.4430
togamasellus sp. c						2	1			1									0.222	68.110	0.0020	0.1362
ioseius sp. a					2														0.111	34.055	0.0240	0.8174
ioseius sp. b																						
ctolaelaps sp.																						
PTIDAE intoto	3	5	3		2	2	4		3	6	2	1	1	7	3	2			2.444	749.819	0.0207	15.5213
olaelaps paracasalis	2	4			1	1	3		2					6	1				1.111	340.855	0.0200	6.8171
olaelaps sp. a																						
olaelaps sp. b	1						1			6	2		1		2	2			0.833	255.564	0.0200	5.1113
molaelaps sp.									1										0.056	17.181	0.0340	0.5842
tolaelaps elegans			1									1							0.111	34.055	0.0500	1.7028
laspis sp.		1	1											1					0.167	51.236	0.0200	1.0247
nov. spec. nov.																						
laptidae larvae			1		1	1													0.167	51.236	0.0050	0.2562
LAELAPTIDAE intoto			1		1		1												0.167	51.236	0.0240	1.2297
hylaelaps sp.			1		1		1												0.167	51.236	0.0240	1.2297
SEIIDAE intoto																						
lyseius sp. a																						
lyseius sp. b																						
lyseius sp. c																						
lyseius sp. d																						
hlodromus (Neoseiulus) sp.																						
ITIDAE intoto																						
SEIIDAE intoto	1																		0.056	17.181	0.0240	0.4123
amannia sp.	1																		0.056	17.181	0.0240	0.4123
DOIDEA intoto																						
TOTAL	6	7	7	7	20	5	10	4	4	14	2	3	1	13	7	5	-	-	6.389	1960.145	0.0147	28.8888

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 18th FEBRUARY 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
DACARIDAE intoto		1	9	18	3	1	1	19		7	1	1	2	1	11				4.167	1278.436	0.0117	14.9577
nodacarus sublapideus			3	13	3	1		12		5	1				3				2.278	698.890	0.0110	7.6878
igamasellus badenhorsti								1											0.056	17.181	0.0220	0.3780
amasellus sp.		1	4	5			1	6		2		1	2	1	8				1.722	528.310	0.0110	5.8114
aprolaelaps sp.			2																0.111	34.055	0.0260	0.8854
amasellopsis sp.																						
OSEIIDAE intoto			12	6	1	1		13	2	2					9		1		2.611	801.055	0.0068	5.4472
sca spinosa					1														0.056	17.181	0.0220	0.3780
sca aethiopica										1									0.056	17.181	0.0050	0.0859
amasellodes seminudus			1					2	2						2				0.389	119.345	0.0183	2.1840
rotogamasellus sp. a			4	5				8									1		1.000	306.800	0.0020	0.6136
rotogamasellus sp. b			6	1				3		1					4				0.833	255.564	0.0020	0.5111
rotogamasellus sp. c						1													0.056	17.181	0.0020	0.0344
asioseius sp. a			1												3				0.222	68.110	0.0240	1.6346
asioseius sp. b																						
roctolaelaps sp.																						
APTIDAE intoto	3	1	6	3	1		1		1	3	1			4	4				1.556	477.381	0.0231	11.0275
aeolaelaps paracasalis	1		2	2					1	1									0.389	119.345	0.0200	2.3869
aeolaelaps sp. a																						
aeolaelaps sp. b		1	2		1		1							4	4				0.722	221.510	0.0200	4.4302
asmolaelaps sp.										1	1								0.111	34.055	0.0340	1.1579
aptolaelaps elegans	2																		0.111	34.055	0.0500	1.7028
aelaspis sp.			2	1						1									0.222	68.110	0.0200	1.3622
an. nov. spec. nov.																						
aelaptidae larvae																						
HYLAELAPTIDAE intoto																						
achylaelaps sp.																						
ROSEIIDAE intoto					2														0.111	34.055	0.0080	0.2724
nblyseius sp. a																						
nblyseius sp. b					2														0.111	34.055	0.0080	0.2724
nblyseius sp. c																						
nblyseius sp. d																						
phlodromus (Neoseiulus) sp.																						
ASITIDAE intoto																						
ROSEUDAE intoto			1																0.056	17.181	0.0240	0.4123
leemannia sp.			1																0.056	17.181	0.0240	0.4123
PODOIDEA intoto																						
TOTAL	3	2	28	27	7	2	2	32	3	12	2	1	2	5	24	-	1	-	8.500	2607.800	0.0123	32.1171

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 18th MARCH 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
ACARIDAE intoto	6		1	9	2		2	3	1	4			1	5	1				1.944	596.419	0.0131	7.8131
odacarus sublapideus				7	1		1	1		1					1				0.667	204.636	0.0110	2.2510
gamasellus badenhorsti	4																		0.222	68.110	0.0220	1.4984
masellus sp.			1	2	1		1	2	1	3			1	5					0.944	289.619	0.0110	3.1858
prolaelaps sp.	2																		0.111	34.055	0.0260	0.8854
masellopsis sp.																						
SEJIDAE intoto	5	6	2	12	9	1	5	3	3	1	4		2	1	4			1	3.278	1005.690	0.0060	6.0341
ca spinosa																						
ca aethiopica																						
masellodes seminudus						1		2	1						1				0.278	85.290	0.0183	2.4137
otogamasellus sp. a	2	2		3	4		1			1									0.722	221.510	0.0020	0.4430
otogamasellus sp. b	3	4	1	5	2		2	1	1		2		2		3				1.444	443.019	0.0020	0.8860
otogamasellus sp. c			1	4					1		1			1					0.444	136.219	0.0020	0.2724
isioseius sp. a					3		2				1							1	0.389	119.345	0.0240	2.8643
isioseius sp. b																						
roctolaelaps sp.																						
APTIDAE intoto	5	2	2	1	3	2	4	2		2	1				9			3	2.000	613.600	0.0208	12.7629
aeolaelaps paracasalis	1																		0.056	17.181	0.0200	0.3436
aeolaelaps sp. a																						
aeolaelaps sp. b	1	2	1	1	1	2	4	1			1				9			3	1.444	443.019	0.0200	8.8604
asmolaelaps sp.			1																0.056	17.181	0.0340	0.5842
aptolaelaps elegans	2																		0.111	34.055	0.0500	1.7028
aelaspis sp.	1				1					1									0.167	51.236	0.0200	1.0247
en. nov. spec. nov.																						
aelaptidae larvae					1			1		1									0.167	51.236	0.0050	0.2562
HYLAELAPTIDAE intoto					1	1	1			1									0.222	68.110	0.0240	1.6346
achylaelaps sp.					1	1	1			1									0.222	68.110	0.0240	1.6346
TOSEIIDAE intoto																						
mblyseius sp. a																						
mblyseius sp. b																						
mblyseius sp. c																						
mblyseius sp. d																						
yphlodromus (Neoseiulus) sp.																						
IASITIDAE intoto																						
ROSEIIDAE intoto																						
leemannia sp.																						
PODOIDEA intoto																						
TOTAL	16	8	5	22	15	4	12	8	4	8	5	-	3	6	14	-	-	4	7.444	2283.819	0.0124	28.2447

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 16th APRIL 1963
APPARATUS A

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
ACARIDAE intoto	1		1	2	2	4	11	6	2	3	1		2	4					2.167	664.836	0.0134	8.9088
<i>Oodacarus sublapideus</i>				2	1	4	3	4		1				1					0.889	272.745	0.0110	3.0002
<i>Gamasellus badenhorsti</i>	1																		0.056	17.181	0.0220	0.3780
<i>Gamasellus</i> sp.			1		1		4	2	2	2	1		2	2					0.944	289.619	0.0110	3.1850
<i>Proctolaelaps</i> sp.							4												0.222	68.110	0.0260	1.7709
<i>Gamasellopsis</i> sp.														1					0.056	17.181	0.0333	0.5721
SEJIDAE intoto	6	1	4	4		4	2	1	6	1	3			12	4			1	2.722	835.110	0.0091	7.5995
<i>O. spinosa</i>																						
<i>O. aethiopica</i>																						
<i>Gamasellodes seminudus</i>						1				1				7	2			1	0.667	204.636	0.0183	3.7448
<i>Otogamasellus</i> sp. a	6	1	3	3		1			3		1			2	1				1.167	358.036	0.0020	0.7161
<i>Otogamasellus</i> sp. b			1	1		2	1		2					1					0.444	136.219	0.0020	0.2724
<i>Otogamasellus</i> sp. c							1												0.056	17.181	0.0020	0.0344
<i>Sioseius</i> sp. a								1	1		2			2	1				0.389	119.345	0.0240	2.8643
<i>Sioseius</i> sp. b																						
<i>Octolaelaps</i> sp.																						
APTIDAE intoto			6	1	1	1	5	3	3	2				10	6			5	2.389	732.945	0.0213	15.6117
<i>Leolaelaps paracasalis</i>					1														0.056	17.181	0.0200	0.3436
<i>Leolaelaps</i> sp. a															1				0.056	17.181	0.0200	0.3436
<i>Leolaelaps</i> sp. b			6			1	4	3	2	1				10	4			2	1.833	562.364	0.0200	11.2473
<i>Leptolaelaps elegans</i>																						
<i>Leaspis</i> sp.				1					1						1			1	0.222	68.110	0.0200	1.3622
<i>n. nov. spec. nov.</i>																						
<i>Leaptidae</i> larvae																						
<i>Smolaelaps</i> sp.							1			1								2	0.222	68.110	0.0340	2.3157
LYLAELAPTIDAE intoto							1							2	1				0.222	68.110	0.0240	1.6346
<i>Ichylaelaps</i> sp.							1							2	1				0.222	68.110	0.0240	1.6346
NOSEIIDAE intoto														1				2	0.167	51.236	0.0080	0.4099
<i>Ablyseius</i> sp. a	1																		0.056	17.181	0.0080	0.1374
<i>Ablyseius</i> sp. b														1					0.056	17.181	0.0080	0.1374
<i>Ablyseius</i> sp. c																						
<i>Ablyseius</i> sp. d																						
<i>Phlodromus</i> (<i>Neoseiulus</i>) sp.																		1	0.056	17.181	0.0080	0.1374
SITIDAE intoto																						
ROSEIIDAE intoto																						
<i>Leemannia</i> sp.																						
ODOIDEA intoto			1																0.056	17.181	0.0400	0.6872
TOTAL	8	1	12	7	3	9	19	10	11	6	4	-	2	29	11	-	-	7	7.722	2369.110	0.0147	34.8517

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 16th APRIL 1963
APPARATUS B

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
ACARIDAE intoto	1			7	1	4			4	12			1	1	5	1			2.056	630.781	0.0146	9.2094
odacarus sublapideus				7	1	3			1	2			1	1	5	1			0.778	238.690	0.0110	2.6256
gamasellus badenhorsti	1								1	8									0.556	170.581	0.0220	3.7528
masellus sp.						1			2	2			1	1	4	1			0.667	204.636	0.0110	2.2510
prolaelaps sp.																						
nasellopsis																						
SEJIDAE intoto															1				0.056	17.181	0.0333	0.5721
sa spinosa	5	3	3	1		4	4	1	1	8	2			1	3			2	2.111	647.655	0.0058	3.7564
sa aethiopica																						
nasellopsis seminudus																						
togamasellus sp. a	3	2	2	1		4	2		1	2	1							1	0.111	34.055	0.0183	0.6232
togamasellus sp. b	2	1						1		4	1			1	1			1	1.000	306.800	0.0020	0.6136
togamasellus sp. c																			0.667	204.636	0.0020	0.4093
ioseius sp. a			1					1											0.056	17.181	0.0020	0.0344
ioseius sp. b										1					2				0.278	85.290	0.0240	2.0470
ctolaelaps sp.																						
PTIDAE intoto	5			7	6	1	2		1	8	1		3	10	5	1		4	3.000	920.400	0.0240	22.0896
olaelaps paracasalis	4									4									0.444	136.219	0.0200	2.7244
olaelaps sp. a																						
olaelaps sp. b				3	1	1	2		1	1	1		3	10	3	1		4	1.722	528.310	0.0200	10.5662
olaelaps sp.					2					2									0.222	68.110	0.0340	2.3157
olaelaps elegans	1			3															0.222	68.110	0.0500	3.4055
laspis sp.				1	2					1									0.333	102.164	0.0200	2.0433
nov. spec. nov.					1										2				0.056	17.181	0.0400	0.6872
laptidae larvae																						
AELAPTIDAE intoto																						
ylaelaps sp.							1												0.056	17.181	0.0240	0.4123
							1												0.056	17.181	0.0240	0.4123
EIIDAE intoto																						
yseius sp. a						1								1					0.111	34.055	0.0080	0.2724
yseius sp. b																						
yseius sp. c						1								1					0.111	34.055	0.0080	0.2724
yseius sp. d																						
lodromus (Neoseiulus) sp.																						
TIDAE intoto																						
EIIDAE intoto																						
mannia sp.																						
IDEA INTOTO																						
										1												
																			0.056	17.181	0.0400	0.6872
TOTAL	11	3	3	15	7	10	7	1	6	29	3	-	4	13	13	2	-	6	7.389	2266.945	0.0161	35.4273

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 16th APRIL 1963
AVERAGE OF A AND B

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
CARIDAE intoto	1.0		0.5	4.5	1.5	4.0	5.5	3.0	3.0	7.5	0.5		1.5	2.5	2.5	0.5			2.111	647.655	0.0140	9.0671
dacarus sublapideus				4.5	1.0	3.5	1.5	2.0	0.5	1.5				0.5					0.833	255.564	0.0110	2.8112
amasellus badenhorsti	1.0								0.5	4.0									0.306	93.881	0.0220	2.0654
asellus sp.			0.5		0.5	0.5	2.0	1.0	2.0	2.0	0.5		1.5	1.5	2.0	0.5			0.806	247.281	0.0110	2.7201
rolaelaps sp.							2.0												0.111	34.055	0.0260	0.8854
asellopsis sp.														0.5	0.5				0.056	17.181	0.0330	0.5670
EJIDAE intoto	5.5	2.0	3.5	2.5		4.0	3.0	1.0	3.5	4.5	2.5			6.5	3.5			1.5	2.417	741.536	0.0077	5.7098
a spinosa																						
a aethiopica																						
asellodes seminudus						0.5				1.0	0.5			3.5	1.0			0.5	0.389	119.345	0.0183	2.1840
togamasellus sp. a	4.5	1.5	2.5	2.0		2.5	1.0		2.0	1.0	0.5			1.0	0.5			0.5	1.083	332.264	0.0020	0.6645
togamasellus sp. b	1.0	0.5	0.5	0.5		1.0	0.5	0.5	1.0	2.0	0.5			1.0	0.5			0.5	0.556	170.581	0.0020	0.3412
togamasellus sp. c							1.0												0.056	17.181	0.0020	0.0344
ioseius sp. a			0.5				0.5	0.5	0.5	0.5	1.0			1.0	1.5				0.333	102.164	0.0240	2.4519
ioseius sp. b																						
ictolaelaps sp.																						
PTIDAE intoto	2.5		3.0	4.0	3.5	1.0	3.5	1.5	2.0	5.0	0.5		1.5	10.0	5.5	0.5		4.5	2.694	826.519	0.0226	18.6793
olaelaps paracasalis	2.0				0.5					2.0									0.250	76.700	0.0200	1.5340
olaelaps sp. a															0.5				0.028	8.590	0.0200	0.1718
olaelaps sp. b			3.0	1.5	0.5	1.0	3.0	1.5	1.5	1.0	0.5		1.5	10.0	3.5	0.5		3.0	1.778	545.490	0.0200	10.9098
olaelaps sp.					1.0		0.5			1.5								1.0	0.222	68.110	0.0340	2.3157
olaelaps elegans	0.5			1.5															0.111	34.055	0.0500	1.7028
laspis sp.			1.0	1.0					0.5	0.5					1.5			0.5	0.278	85.290	0.0200	1.7058
l. nov. spec. nov.					0.5														0.028	8.590	0.0400	0.3436
ilaptidae larvae																						
LAELAPTIDAE intoto							1.0							1.0	0.5				0.139	42.645	0.0240	1.0235
hylaelaps sp.							1.0							1.0	0.5				0.139	42.645	0.0240	1.0235
ISEIIDAE intoto	0.5					0.5								1.0				0.5	0.139	42.645	0.0080	0.3412
lyseius sp. a	0.5																		0.028	8.590	0.0080	0.0687
lyseius sp. b						0.5								1.0					0.083	25.464	0.0080	0.2037
lyseius sp. c																						
lyseius sp. d																						
hidromus (Neoseiulus) sp.																		0.5	0.028	8.590	0.0080	0.0687
ITIDAE intoto																						
ISEIIDAE intoto																						
emannia sp.																						
ODOIDEA intoto			0.5							0.5									0.056	17.181	0.0400	0.8872
TOTAL	9.5	2.0	7.5	11.0	5.0	9.5	13.0	5.5	8.5	17.5	3.5		3.0	21.0	12.0	1.0		6.5	7.556	2318.181	0.0153	35.5081

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 13th MAY 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
DACARIDAE intoto	3		6		1					4	1	3		3		1			1.222	374.910	0.0145	5.4362
Rhodacarus sublapideus																						
Digamasellus badenhorsti	2		3																0.278	85.290	0.0220	1.8763
Damasellus sp.	1		3		1					4	1	2		3		1			0.889	272.745	0.0110	3.0001
Aporetolaelaps sp.																						
Damasellopsis												1							0.056	17.181	0.0333	0.5721
EOSEIIDAE intoto			1	4	4	1		1			4			6	5			2	1.556	477.381	0.0058	2.7688
Asca spinosa																						
Asca aethiopica															1				0.056	17.181	0.0050	0.0859
Damasellodes seminudus					1						3			1					0.278	85.290	0.0183	1.5608
Protogamasellus sp. a				2	3	1								5	3			2	0.889	272.745	0.0020	0.5454
Protogamasellus sp. b		1	1					1			1				1				0.278	85.290	0.0020	0.1706
Protogamasellus sp. c																						
Lasioseius sp. a				1															0.056	17.181	0.0240	0.4123
Lasioseius sp. b																						
Proctolaelaps sp.																						
ELAPTIDAE intoto	3		1	1	1	3	1		3	5				2	1			1	1.222	374.910	0.0241	9.0353
Daeolaelaps paracasalis	1					1				2									0.222	68.110	0.0200	1.3622
Daeolaelaps sp. a																						
Daeolaelaps sp. b				1	1		1		3	3				2	1			1	0.722	221.510	0.0200	4.4301
Cosmolaelaps sp.																						
Leptolaelaps elegans	2		1																0.167	51.236	0.0500	2.5618
Laelaspis sp.						2													0.111	34.055	0.0200	0.6811
Gen. nov. spec. nov.																						
Laelaptidae larvae																						
CHYLAEAPTIDAE intoto					1			3		2									0.333	102.164	0.0240	2.4519
Pachylaelaps sp.					1			3		2									0.333	102.164	0.0240	2.4519
YTOSEIIDAE intoto																						
Amblyseius sp. a																						
Amblyseius sp. b																						
Amblyseius sp. c																						
Amblyseius sp. d																						
Typhlodromus (Neoseiulus) sp.																						
RASITIDAE intoto																						
EROSEIIDAE intoto																						
Kleemannia sp.																						
OPODOIDEA intoto																						
TOTAL	6	-	8	5	7	4	1	4	3	11	5	3	-	11	6	1	-	3	4.333	1329.364	0.0148	19.6922

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 10th JUNE 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Numbers per m ²	Mean biomass per individual mg	Biomass per m ² mg
ODACARIDAE intoto					20	1	1			17	5		1						2.500	767.000	0.0115	8.8205
Rhodacarus sublapideus					15					3									1.000	306.800	0.0110	3.3748
Digamasellus badenhorsti										2									0.111	34.055	0.0220	0.7492
Digamasellus sp.					5	1	1			12	5		1						1.389	426.145	0.0110	4.6876
Caprolaelaps sp.																						
Digamellopsis sp.																						
ROSEIIDAE intoto		1		2	2		3			1			2		2				0.722	221.510	0.0087	1.9271
Isca spinosa																						
Isca aethiopica																						
Digamellodes seminudus		1					1						2						0.222	68.110	0.0183	1.2464
Protopogamasellus sp. a				2			1												0.167	51.236	0.0020	0.1025
Protopogamasellus sp. b					2		1								2				0.278	85.290	0.0020	0.1706
Protopogamasellus sp. c																						
Asioseius sp. a										1									0.056	17.181	0.0240	0.4123
Asioseius sp. b																						
Proctolaelaps sp.																						
LAPTIDAE intoto				2	2	1				1									0.333	102.164	0.0250	2.5541
Laelaelaps paracasalis																						
Laelaelaps sp. a																						
Laelaelaps sp. b				1	1	1				1									0.222	68.110	0.0200	1.3622
Osmodaelaps sp.																						
Leptolaelaps elegans					1														0.056	17.181	0.0500	0.8591
Laelaspis sp.				1															0.056	17.181	0.0500	0.3436
Genus nov. spec. nov.																						
Laelaptidae larvae																						
HYLAELAPTIDAE intoto					3					1									0.222	68.110	0.0240	1.6346
Achylaelaps sp.					3					1									0.222	68.110	0.0240	1.6346
TOSEIIDAE intoto				1	2	1							1						0.278	85.290	0.0080	0.6823
mblyseius sp. a																						
mblyseius sp. b				1	2	1							1						0.278	85.290	0.0080	0.6823
mblyseius sp. c																						
mblyseius sp. d																						
Opilodromus (Neoseiulus) sp.																						
ASITIDAE intoto																						
ROSEIIDAE intoto																						
Teemannia sp.																						
PODOIDEA intoto																						
TOTAL		1		5	29	3	4			20	5		4		2				4.056	1244.381	0.0126	15.6186

TABLE 52

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 8th JULY 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
RHODACARIDAE intoto	2		1		1		1	2	1				1	3	2				0.778	238.690	0.0158	3.7713
Rhodacarus sublapideus																						
Digamasellus badenhorsti	2																		0.111	34.055	0.0220	0.7492
Gamasellus sp.					1		1	2	1				1	2	2				0.556	170.581	0.0110	1.8764
Saprotaelaps sp.																						
Gamasellopsis sp.			1											1					0.111	34.055	0.0333	1.1340
ACEOSEJIDAE intoto	2	1	1	1					2	2			1	1					0.611	187.455	0.0035	0.6561
Asca spinosa																						
Asca aethiopica																						
Gamasellodus seminudus										1									0.056	17.181	0.0183	0.3144
Protogamasellus sp. a	2	1		1					2	1			1	1					0.500	153.400	0.0020	0.3068
Protogamasellus sp. b			1																0.056	17.181	0.0020	0.0344
Protogamasellus sp. c																						
Lasioseius sp. a																						
Lasioseius sp. b																						
Proctolaelaps sp.																						
LAELAPTIDAE intoto	1		1	3				2		1				1				1	0.056	170.581	0.0290	4.9468
Gaeolaelaps paracasalis	1			3															0.222	168.110	0.0200	1.3622
Gaeolaelaps sp. a																						
Gaeolaelaps sp. b														1				1	0.167	51.236	0.0200	1.0247
Cosmolaelaps sp.																						
Leptolaelaps elegans			1					2											0.167	51.236	0.0500	2.5618
Laelaspis sp.																						
Genus nov. spec. nov.																						
Laelaptidae larvae																						
PACHYLAELAPTIDAE intoto																						
Pachylaelaps sp.																						
PHYTOSEIIDAE intoto														1				1	0.111	34.055	0.0080	0.2724
Amblyseius sp. a																						
Amblyseius sp. b														1				1	0.111	34.055	0.0080	0.2724
Amblyseius sp. c																						
Amblyseius sp. d																						
Typhlodromus (Neoseiulus) sp.																						
PARASITIDAE intoto																						
AMEROSEIIDAE intoto														1					0.056	17.181	0.0240	0.4123
Kleemannia sp.														1					0.056	17.181	0.0240	0.4123
UROPODOIDEA intoto																						
TOTAL	5	1	3	4	1		1	4	3	3			2	7	2			2	2.111	647.655	0.0155	10.0589

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
ODACARIDAE intoto	2		1	1					1	5									0.556	170.581	0.0132	2.2517
Rhodacarus sublapideus			1							1									0.111	34.055	0.0110	0.3746
Digamasellus badenhorsti	2																		0.111	34.055	0.0220	0.7492
Gamasellus sp.				1					1	4									0.333	102.164	0.0110	1.1238
Saprolaelaps sp.																						
Gamasellopsis sp.																						
NEOSEIIDAE intoto		1	3							1									0.278	85.290	0.0118	1.0064
Asca spinosa																						
Asca aethiopica																						
Gamasellodus seminudus		1	1							1									0.167	51.236	0.0183	0.9376
Protogamasellus sp. a			1																0.056	17.181	0.0020	0.0344
Protogamasellus sp. b			1																0.056	17.181	0.0020	0.0344
Protogamasellus sp. c																						
Lasioseius sp. a																						
Lasioseius sp. b																						
Proctolaelaps sp.																						
ELAPTIDAE intoto	1		1						1	1									0.222	68.110	0.0275	1.8730
Gaeolaelaps paracasalis																						
Gaeolaelaps sp. a																						
Gaeolaelaps sp. b			1						1	1									0.167	51.236	0.0200	1.0247
Cosmolaelaps sp.																						
Leptolaelaps elegans	1																		0.056	17.181	0.0500	0.8591
Laelaspis sp.																						
Gen. nov. spec. nov.																						
Laelaptidae larvae																						
CHYLAEAPTIDAE intoto																						
Pachylaelaps sp.																						
HYTOSEIIDAE intoto																						
Amblyseius sp. a																						
Amblyseius sp. b																						
Amblyseius sp. c																						
Amblyseius sp. d																						
Typhlodromus (Neoseiulus) sp.																						
RASITIDAE intoto																						
TEROSEIIDAE intoto																						
Kleemannia sp.																						
POPOCIDEA intoto																						
TOTAL	3	1	5	1					2	7									1.056	323.981	0.0158	5.1311

TABLE 54

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 16th SEPTEMBER 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Number per m ²	Mean biomass per individual mg	Biomass per m ² mg
RHODACARIDAE intoto																						
Rhodacarus sublapideus																						
Digamasellus badenhorsti																						
Gamasellus sp.																						
Proctolaelaps sp.																						
Gamasellopsis sp.																						
ACEOSEIIDAE intoto											1			2					0.167	51.236	0.0129	0.6609
Asca spinosa																						
Asca aethiopica																						
Gamasellodes seminudus														2					0.111	34.055	0.0183	0.6232
Protogamasellus sp. a																						
Protogamasellus sp. b											1								0.056	17.181	0.0020	0.0344
Protogamasellus sp. c																						
Lasioseius sp. a																						
Lasioseius sp. b																						
Proctolaelaps sp.																						
LAELAPTIDAE intoto	1									2									0.167	51.236	0.0200	1.0247
Gaeolaelaps paracasalis	1																		0.056	17.181	0.0200	0.3436
Gaeolaelaps sp. a																						
Gaeolaelaps sp. b										2									0.111	34.055	0.0200	0.6811
Cosmolaelaps sp.																						
Leptolaelaps elegans																						
Laelaspis sp.																						
Gen. nov. spec. nov.																						
Laelaptidae larvae																						
PACHYLAELAPTIDAE intoto																						
Pachylaelaps sp.																						
PHYTOSEIIDAE intoto																						
Amblyseius sp. a																						
Amblyseius sp. b																						
Amblyseius sp. c																						
Amblyseius sp. d																						
Typhlodromus (Neoseiulus) sp.																						
PARASITIDAE intoto																						
AMEROSEIIDAE intoto																						
Kleemannia sp.																						
UROPODOIDEA intoto																						
TOTAL	1									2	1			2					0.333	102.164	0.0165	1.6856

NUMBERS OF MESOSTIGMATA PER SUBSAMPLE FOR 3rd DECEMBER 1963

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean number per subsample	Numbers per m ²	Mean biomass per individual mg	Biomass per m ² mg
DACARIDAE intoto	4		1	2	2	4	1	1	1	3	6	6	12	2	9	11	1	10	4.222	1295.310	0.0178	23.0565
<i>hodacarus sublapideus</i>	2		1	1	2	3		1			2	2	3	1	5	4		4	1.722	528.310	0.0110	5.8114
<i>igamasellus badenhorsti</i>							1			3	4	4	9	1	4	7	1	6	2.222	681.710	0.0220	14.9976
<i>amasellus</i> sp.																						
<i>aprolaelaps</i> sp.	2			1		1			1										0.278	85.290	0.0260	2.2175
<i>amasellopsis</i> sp.																						
JOSEIIDAE intoto	5	1		3		1	6		1		8	3	2			7		1	2.111	647.655	0.0055	3.5621
<i>sca spinosa</i>																						
<i>sca aethiopica</i>																						
<i>amasellodes seminudus</i>																						
<i>rotogamasellus</i> sp. a	1			1		1					1	2	1			1		1	0.500	153.400	0.0020	0.3068
<i>rotogamasellus</i> sp. b	2			1			6		1		7					6			1.278	392.090	0.0020	0.7842
<i>rotogamasellus</i> sp. c																						
<i>asioseius</i> sp. a				1															0.056	17.181	0.0240	0.4123
<i>asioseius</i> sp. b	2	1										1	1						0.278	85.29	0.0240	2.0470
<i>roctolaelaps</i> sp.																						
LAPTIDAE intoto	8	2	8	4	2	3	1	3		6	3	5	2	1		8	2	6	3.611	1107.855	0.0212	23.4865
<i>aeolaelaps paracasalis</i>	6	1	7			2	1	2		2		2	1			3	1	4	1.778	545.490	0.0200	10.9098
<i>aeolaelaps</i> sp. a																						
<i>aeolaelaps</i> sp. b	2	1	1	4	2	1		1		4	3	3	1	1		4	1		1.611	494.255	0.0200	9.8851
<i>jsmolaelaps</i> sp.																						
<i>eptolaelaps elegans</i>																1		2	0.167	51.236	0.0500	2.5618
<i>aelaspis</i> sp.																						
<i>enus nov. spec. nov.</i>																						
<i>aelaptidae</i> larvae			1																0.056	17.181	0.0050	0.0859
HYLAELAPTIDAE intoto																						
<i>achylaelaps</i> sp.																						
TOSEIIDAE intoto		3		1				3		1			1		1	1		1	0.667	204.636	0.0080	1.6371
<i>nblyseius</i> sp. a		2						1		1			1						0.278	85.290	0.0080	0.6823
<i>nblyseius</i> sp. b				1				1								1		1	0.222	68.110	0.0080	0.5449
<i>nblyseius</i> sp. c		1													1				0.111	34.055	0.0080	0.2724
<i>nblyseius</i> sp. d								1											0.056	17.181	0.0080	0.1374
<i>rphiodromus</i> (<i>Neoseiulus</i>) sp.																						
SITIDAE intoto										1									0.056	17.181	0.0400	0.6872
ROSEIIDAE intoto																						
<i>leemannia</i> sp.																						
PODOIDEA intoto																						
TOTAL	17	6	10	10	4	8	8	7	2	11	17	14	17	3	10	27	3	18	10.667	3272.636	0.0160	52.4294

TABLE 56.
NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
24th SEPTEMBER 1962

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1		2				6
2		1	4			4
3	4	1	1		1	5
4	2	29	4			11
5				1		9
6						5
7	1	4	2			3
8						4
9						1
10	1	37				1
11		15				2
12	2					
13	1					1
14	2	4		1		1
15	1	12	4			
16	1	1	3			1
17		4				2
18		3				1
Total	15	113	18	2	1	57
Mean	0.833	6.278	1.000	0.111	0.056	3.167
Numbers/m ²	255.564	1926.090	306.800	34.055	17.181	971.636

TABLE 57
NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
22nd OCTOBER 1962

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	31		11			81
2	2		6			1
3	1		6			1
4	2	2	12			11
5	30		5		2	1
6	3	1	1			3
7			6			
8			2			30
9	2	2	1			152
10	32		12			43
11			1			6
12						
13	1	2	3			4
14	2		2			5
15	4		3	1		1
16	1					
17						
18	6	5	6			16
Total	117	12	77	1	2	355
Mean	6.500	.667	4.278	0.056	0.111	19.722
Numbers/m ²	1994.200	204.636	1312.490	17.181	34.055	6050.710

TABLE 58
NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
19th NOVEMBER 1962

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	7		2			6
2	2	1	3	1		1
3	3	1	3			8
4	26		11		4	23
5	52	2	19	1		7
6	8		8			4
7	3		19	1	1	1
8	3		8	1	1	2
9	4	1	11			1
10	33	433	28			310
11		6	9			69
12	2					3
13			4			1
14	19	1	13			7
15	9		16	2		3
16		1				
17	25		1			
18	1		4			
Total	197	446	159	6	6	446
Mean	10.944	24.778	8.833	.333	.333	24.778
Numbers/m ²	3357.762	7601.890	2709.964	102.164	102.164	7601.890

TABLE 59
NUMBERS OF OTHER MICROARTHOPODS PER SUBSAMPLE FOR
17th DECEMBER 1962

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	60		1		1	9
2	1		2			2
3	38					3
4	2		1	1	3	23
5	9		4		2	37
6	1					5
7						
8			6			4
9	2					2
10	27		3			4
11			1	1		
12	2			1	1	
13	1	2	3			
14	10		3			3
15	18		12			3
16	3		1			1
17			1			
18	4		4			2
Total	178	2	42	3	7	98
Mean	9.889	0.111	2.333	0.167	0.389	5.444
Numbers/m ²	3033.945	34.055	715.764	51.236	119.345	1670.219

TABLE 60
 NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
 23rd JANUARY 1963

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	19	2	13	1		13
2	17	2	16			5
3	43	1	26			20
4	22	1	6			11
5	15		23			5
6	9	1	21			9
7	22	4	15			6
8	5	4	6	1		1
9	3	2	9			4
10	21	2	5			2
11	2	1	2			7
12	16		1			1
13	29	1	5	1		2
14	46	2	12			1
15	13		18			5
16	4		6			2
17	5					
18	4	1	7			2
Total	295	24	191	3	-	96
Mean	16.389	1.333	10.611	0.167	-	5.333
Numbers/m ²	5028.145	408.964	3255.454	51.236	-	1636.164

TABLE 61
NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
18th FEBRUARY 1963

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	345		13			15
2	6	13	1			13
3	148	9	28			26
4	54	39	24	1		57
5	27		12			16
6	5	6	9			6
7		13	2	1		4
8	21	1	4	1		
9			1			3
10	95	2	2			6
11	1	1	1			12
12	23		1			1
13	6	3	3			
14	8	6	6	1		5
15	55	4	13	1		15
16	10	2				87
17	2	2	2			1
18	3	1	1			1
Total	809	102	123	5	-	268
Mean	44.944	5.667	6.833	0.278	-	14.889
Numbers/m ²	13788.819	1738.636	2096.364	85.290	-	4567.945

TABLE 62
NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
18th MARCH 1963

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	270		21	1		42
2	5	1	4			4
3	44		9			6
4	99	3	21	2		45
5	54		17			7
6	24		3			7
7	22	3	17			30
8	3	1	17	1		9
9		2	4			1
10	47	2	8			7
11		5	15			10
12		1	1			
13	2	4	1			
14	1	1	13			30
15	21	6	17			11
16	3					1
17		2				
18	2	3	18			5
Total	597	34	186	4	-	215
Mean	33.167	1.889	10.333	0.222	-	11.944
Numbers/m ²	10175.636	579.545	3170.164	68.110	-	3664.419

APPARATUS A

TABLE 63

NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
16th APRIL 1963

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	25	4	40			40
2	1	2	2			
3	4	4	26	1		1
4	5	5	27			29
5	10		6	1		6
6	6	1	10			5
7	11	5	21			10
8	12	1	13		1	10
9	1	3	14			4
10	16	3	19			9
11	6	1	27			10
12	1	1	1			3
13	1	2	20			1
14	36		37			18
15	35		28			23
16			1			
17	1					2
18	7	1	22	1		2
Total	178	33	314	3	1	173
Mean	9.889	1.833	17.444	0.167	0.056	9.611
Numbers/m ²	3033.945	562.364	5351.819	51.236	17.181	2948.655

APPARATUS B TABLE 64
 NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
 16th APRIL 1964

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	141	1	22			50
2	4	2	10			3
3	8	1	9			4
4	15	1	7	1	1	23
5	23	11	6			27
6	8		9			9
7	8	1	4			4
8			7			8
9	4	1	8			1
10	57	5	26			44
11	14	1	13			19
12	1	1				2
13	1		8			2
14	12	1	20			25
15	17		9			10
16	5		1	1		
17	3					
18	4		20			
Total	325	26	179	2	1	231.
Mean	18.056	1.444	9.944	0.111	0.056	12.833
Numbers/m ²	5539.581	443.019	3050.819	34.055	17.181	3937.164

TABLE 65

AVERAGE NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
16th APRIL 1963

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	83	2.5	31			45
2	2.5	2	6			1.5
3	6	2.5	17.5	0.5		2.5
4	10	3	17	0.5	0.5	26
5	16.5	5.5	6	0.5		16.5
6	7	0.5	9.5			7
7	9.5	3	12.5			7
8	6	0.5	10		0.5	9
9	2.5	2	11			2.5
10	36.5	4	22.5			26.5
11	10	1	20			14.5
12	1	1	0.5			2.5
13	1	1	14			1.5
14	24	0.5	28.5			21.5
15	26		18.5			16.5
16	2.5		1	0.5		
17	2					1
18	5.5	0.5	21	0.5		1
Total	251.5	29.5	246.5	2.5	1	202
Mean	13.972	1.639	13.694	0.139	0.056	11.222
Numbers/m ²	4286.610	502.845	4201.319	42.645	17.181	3442.910

TABLE 66
NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
13th MAY 1963

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	26		11			1
2	2	1	2			13
3	45		2			16
4	24	4	16			11
5	5		30			12
6	8		9			
7	4	2	7			6
8	10	1	5			4
9	2	2	5			2
10	15	2	9			35
11	3	2	2			25
12	1	2	1	1		1
13			7	1		4
14	5	1	39			8
15	18	2	3			9
16	1		2			
17		1				
18	3	2	7			3
Total	172	22	157	2		150
Mean	9.556	1.222	8.722	0.111		8.333
Numbers/m ²	2931.781	374.910	2675.910	34.055		2556.564

TABLE 67
NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
10th JUNE 1963

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	19					2
2						
3	5	2	7			
4	14	2				2
5	42	4	21			24
6	26	1				3
7		1	1			1
8		1				
9	1		2			1
10	85	6	4			19
11		1	1			2
12	1	1				
13	27	16	1	2		2
14	2		8	1		2
15		1	4			2
16	1					
17		2	1			3
18	3					1
Total	226	38	50	3	-	64
Mean	12.556	2.111	2.778	0.167	-	3.556
Numbers/m ²	3852.181	647.655	852.290	51.236	-	1090.981

TABLE 68

NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
8th JULY 1963

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	37	9	7			14
2	5		3			2
3	31	1	26			2
4	16		2			2
5	7		2			1
6	14	9	3			3
7	31		11			8
8	11		20			4
9	4	1	9			
10	7		4		1	1
11	7	1	2			2
12						1
13	18	1	8			1
14	26	1	6			10
15	14	1	30			
16	7		2			1
17	1		1			
18	6	3	5			3
Total	242	27	141	-	1	55
Mean	13.444	1.500	7.833	-	0.056	3.056
Numbers/m ²	4124.619	460.2	2403.164	-	17.181	937.581

TABLE 69
NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
5th AUGUST 1963

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	21					1
2	8	6	6			1
3	6	2				3
4	3	5	3			2
5	1	2				2
6	2	1				
7			1			2
8	2		1			
9						
10	11	4				3
11	5					1
12	2	1	1			
13						
14		2				2
15	5		6			1
16			3			2
17						
18	1			1		5
Total	67	23	21	1	-	25
Mean	3.722	1.722	1.167	0.056	-	1.389
Numbers/m ²	1141.910	528.310	358.036	17.181	-	426.145

TABLE 70
NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
16th SEPTEMBER 1963

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1		5				1
2			1			
3				1		
4	1		1			4
5	6					
6						3
7						27
8						5
9	1					1
10						
11			1			2
12		2				
13						2
14	5	1	1			2
15				1		2
16	2					1
17						
18	2					
Total	17	8	4	2	-	50
Mean	0.944	0.444	0.222	0.111	-	2.778
Numbers/m ²	289.619	136.219	68.110	34.055	-	852.290

TABLE 71
NUMBERS OF OTHER MICROARTHROPODS PER SUBSAMPLE FOR
3rd DECEMBER 1963

Subsample	Oribatei	Acaridiae	Collembola	Pseudoscorpionida	Araneida	Other Insects
1	32	15	10	1	2	65
2	41	3	35			31
3	72	20	8			72
4	121	8	15	2		44
5	56	1	3			24
6	77	1	6	1		19
7	106	3	9	2		11
8	12	1	13	1		19
9	34	12	8		2	20
10	126	5	16			25
11	169	19	4	1		17
12	56	1	4	2		26
13	18		8	2		41
14	53	2	2	1		27
15	102	4	4			23
16	118	11	12			22
17	82	7	5			24
18	76	7	56			22
Total	1351	120	218	13	4	532
Mean	75.056	6.667	12.111	0.722	0.222	29.556
Numbers/m ²	23027.181	2045.436	3715.655	221.510	68.110	9067.781

TABLE 72

NUMBERS AND PERCENTAGES OF MICROARTHROPODS COLLECTED FROM EACH SUBPLOT IN SAMPLING PERIOD

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total
ROMBIDIFORMES																			
TETRANYCHIDAE intoto ...	14	3	6.5	21	14.5	9	8	19	5	24.5	2	3	5	20.5	21	12	5	10	203
<i>Bryobia borealis</i>	13	1	3	3	1	1	3	3.5		3.5	1	1	3	4	4	6	5	1	57
<i>Eotetranychus</i> sp.	1			6	9.5		1	3		13	1		2	4	2	4			54.5
<i>Monoceronychus</i> sp.				4		4		10	3			1		3	11			1	37
<i>Oligonychus</i> sp.			2.5	2	2	2		1.5	2	1				3.5	4	2			22.5
<i>Schizotetranychus</i> sp.				1															1
<i>Tetranychus</i> sp.		2	1	5	2	2	4	1		7		1		6					31
NUIPALPIDAE intoto ...		4	1.5		0.5		1	1.5	3	47	12	1	6	1.5	1.5			9.5	90
<i>Brevipalpus obovatus</i> .		4	1.5		0.5		1	1.5	3	14	12	1	6	1.5	1.5			9.5	57
<i>Dolichotetranychus</i> sp.										33									33
TUCKERELLIDAE intoto ...		2					1			1	5				1				10
<i>Tuckerella ornata</i>		2					1			1	5				1				10
NOTETRANIDAE intoto ..		1		2.5		1	1	3.5		3	1	19.5		4	2		2		40.5
<i>Linotetranus</i> sp.		1		2.5		1	1	3.5		3	1	19.5		4	2		2		40.5
DELLIDAE intoto	5	4	13	41.5	21.5	9	23.5	3	2	27.5	1		3.5	11	3.5	2	1	6	178
<i>Bdella</i> sp.			4		1.5	5	20.5	1		0.5				1					33.5
<i>Spinibdella cronini</i> ..	4.5	4	9	41.5	19.5	4	3	2	2	23.5	1		3.5	10	2.5	2	1	6	139
<i>Cyta</i> sp.	0.5				0.5					3.5					1				5.5
NAXIDAE intoto	34	13	21.5	96.5	34	7	32.5	4.5	12	34.5	3	5	7.5	23.5	25.5	1	1	8	364
<i>Cunaxa taurus</i>	17	9	18.5	52	22.5	2.5	16	2	9	22	1.5	3	3.5	11.5	16.5	1		4	211.5
<i>Cunaxa</i> sp.	7			4		1.5				1					.5				14
<i>Cunaxoides</i> sp.	10	4	3	40.5	11.5	3	16.5	2.5	3.0	11.5	1.5	2	4	12	8.5		1	4	138.5
NORCHESTIDAE intoto ..	56	61.5	57	128	110	52	73.5	61.5	65.5	102	96	168.5	111.5	56.5	74	85	64	43.5	1466.0
<i>Nanorchestes</i> sp.	51	18	48	109	60.5	27.5	46	39	27	70	56.5	44.5	31	19	46.5	16	6	18	733.5
<i>Speleorchestes</i> sp.	5	43.5	9	19	49.5	24.5	27.5	22.5	38.5	32	39.5	124	80.5	37.5	27.5	69	58	25.5	732.5
CHYGNATHIDAE intoto ..	8	15.5	15.5	15.5	37.5	5.5	14.5	7.5	11.5	22	5	1	1	9.5	8.5	1		2	181
<i>Pachygnathus</i> sp.	8	15.5	15.5	13	33	5.5	14.5	7.5	10.5	21	4	1	1	9.5	8.5	1		2	171
<i>Bimichaelia</i> sp.				2.5	4.5				1	1	1								10
RDALYCHIDAE intoto ...	3			5.5	8							2		2		0.5			21
<i>Lordalychus</i> sp.	3			5.5	8							2		2		0.5			21
ICORHAGIIDAE intoto ..		3	1				2			1	7	4	68.5	22	1	87	8.5	22	227
<i>Alicorhagia</i> sp.		3	1				2			1	7	4	68.5	22	1	87	8.5	22	227
UTACARIDAE intoto	1		1	8.5	52.5	3.5	4.5	25	24	91	16	2.5	6.5	51	2	5		1	295
<i>Scutacarus</i> sp.	1		1	8.5	52.5	3.5	4.5	25	24	91	16	2.5	6.5	51	2	5		1	295
ARSONEMIDAE intoto	400.5	109	321	337.5	121.5	147.5	147	150.5	88	290	52	6.5	47	179.5	221	9	5.5	46	2679
<i>Larsonemus</i> sp.	400.5	109	321	337.5	121.5	147.5	147	150.5	88	290	52	6.5	47	179.5	221	9	5.5	46	2679
EMOTIDAE intoto	11	4	11	61.5	42.5	15	20	5	2.5	7.5	4	2	2.5	54.5	3	6		3	255
<i>Pygmephorus</i> sp.	11	4	11	61.5	42.5	15	20	5	2.5	7.5	4	2	2.5	54.5	3	6		3	255
DEIDAE intoto	276.5	118	273.5	494.5	4702	354	167	241	71	454.5	46.5	40	227	136.5	297.5	30.5	24.5	119	8073.5
<i>Coccotydeus</i> sp.	118	80.5	200	294.5	140	131.5	141.5	187.5	53	354.5	30.5	23	204.5	87	206	14	13	101	2380
<i>Lydeus</i> sp. a	156.5	34.5	64.5	159.5	46	74	21	44	15.5	92	15	12.5	20.5	35.5	88.5	15.5	9.5	17	921
<i>Lydeus</i> sp. b	2	3	9	40.5	4516	148.5	4.5	9.5	2.5	8	1	5	2	14	3	1	2	1	4772.5
RATYDEIDAE intoto		10	17	1	6.5	3	10	2	8	1	3	3.5	3	16.5	10	3.5		7	105
<i>Scolotydeus</i> sp.		10	17	1	6.5	3	10	2	8	1	3	3.5	3	16.5	10	3.5		7	105

TABLE 72 (CONTINUED 1)

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total
LIGONELLIDAE <u>intoto</u> ..		0.5																	0.5
<u>Neophyllobius</u> sp.		0.5																	0.5
IGMAEIDAE <u>intoto</u>	16	3	9.5	37	13.5	2.5	2	5	3.5	3.5	5.5	3.5	2.5	10.5	6	2	0.5	3	129
<u>Apostigmaeus navicella</u>	8	1	7.5	26	8.5	1.5	2	4	3.5	0.5	4.5	2.5	2.5	6.5	5	2	0.5	1	87
<u>Ledermulleria</u> sp.	2		1	7.5	2	1				2	1			1	1			1	19.5
<u>Stigmaeus</u> sp.	4	2	1	3.5	1			1		1		1		3				1	18.5
<u>Agistemus africanus</u> .	2				2														4
PALOPSELLIDAE <u>intoto</u>	2			3	1				0.5					1				1	8.5
<u>Eupalopsellus</u> sp.	2			3	1				0.5					1				1	8.5
PHIGNATHIDAE <u>intoto</u>												1	1						2
<u>Raphignathus</u> sp.												1	1						2
EUDOCHEYLIDAE <u>intoto</u>		7.5	27	11	30	29	6	22.5	4	27.5	5	8	0.5	61.5	52.5	2	1	3	298
<u>Pseudocheylus</u> sp.		7.5	27	11	30	29	6	22.5	4	27.5	5	8	0.5	61.5	52.5	2	1	3	298
YSTIDAE <u>intoto</u>				3	2				2		5	24	9	3		4	7	1	60
<u>Anandia</u> sp.				2	1						1					2			6
<u>Bechsteinia</u> sp.				1	1									2					4
<u>Adanystus</u> sp.									2		4	2.4	9	1		2	7	1	50
NERIFFIIDAE <u>intoto</u> ..					1							2	3			0.5	7		13.5
PODIDAE <u>intoto</u>	213	90.5	74.5	274	204	96	69.5	64	36	300	38	12	50	134	197	45	10	39	1946.5
<u>Eupodes</u> sp.	180.5	89.5	48.5	232	164.5	84	58	54.5	35	245.5	35	12	49	102	147	43	10	31	1621
<u>Eupodes parafusifer</u> .	32.5	1	26	42	39.5	12	11.5	9.5	1	54.5	3		1	32	50	2		8	325.5
AGIDIIDAE <u>intoto</u>	11	1	13	37	9.5	6	4.5	2.5	2.5	3	0.5	3.5	1	1.5	6	2	2		106.5
<u>Rhagidia</u> sp.	11	1	13	37	9.5	6	4.5	2.5	2.5	3	0.5	3.5	1	1.5	6	2	2		106.5
YTHRAEIDAE <u>intoto</u> ...	3.5	14	14.5	2	6.5	9	5.5	12	7	8.5	2	3.5	4.5	17.5	10.5	2.5	0.5	4	127.5
<u>Abrolophus bipilus</u> ..	3.5	13	9.5		3.5	8	5.5	12	2	5.5	2	2	2	5.0	9.5	1.5	0.5	2.5	87.5
<u>Bochartia</u> sp.			1																1
<u>Hauptmannia</u> sp.		1	3	2	1	1			3	2		1.5	2.5	12.5	1	1		0.5	32
<u>Erythraeus</u> sp.									1									1	2
<u>Erythraeidae</u> larvae .										1									1
<u>Leptus</u> sp.			1		2				1										4
OMBIDIIDAE <u>intoto</u> ...	3	1	2	1	2		1	2		4	1.5								17.5
<u>Etmulleria</u> sp.		1			2			1		1									5
<u>Microtrombidium</u> sp. .	3		2	1			1	1		3	1.5								12.5
IOPHYIDAE <u>intoto</u>								1		0.5				1.5	1				4
<u>Genus indet</u>								1		0.5				1.5	1				4
EYLETIDAE <u>intoto</u>			1								1								2
<u>Genus indet</u>			1								1								2
OMBIDIFORMES <u>intoto</u>	1057.5	465.5	881	1581.5	5420.5	749	591	636	348	1453.5	312	316	560.5	819	944.5	300.5	139.5	328	16903.5
SOSTIGMATA																			
ODACARIDAE <u>intoto</u> ...	17	1	19.5	45.5	431	8	12.5	31	6	54.5	8.5	6	7.5	25.5	27.5	4.5			318
<u>Rhodacarus sublapideus</u>			4	34.5	29	5.5	4.5	18	0.5	16.5	2			5.5	10	1			131
<u>Digamasellus badenhor-</u>																			23.5
<u>sti</u>	13		3					1	0.5	6									
<u>amasellus</u> sp.	2	1	9.5	11	12.5	2.5	6	12	5	31	6.5	5	7.5	18.5	17	3.5			150.5
<u>Saprolaelaps</u> sp.	2		2				2												6

TABLE 72 (CONTINUED 2)

Subsample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total
EOSEIIDAE <u>intoto</u> ...	18.5	16	30.5	34.5	33	9	15	24	13.5	30.5	11.5		7	24.5	30.5	4	3	7½	312.5
<u>Asca spinosa</u>					1			1											2
<u>Asca aethiopica</u>		1			1					1					1				4
<u>Gamasellodes seminudus</u>		2	2		9	1.5	2	7	3	8	3.5		2	7.5	8	3		2.5	61
<u>Protogamasellus</u> sp. a	9.5	5.5	12.5	20	9	3.5	3	8	6	10	0.5		1	12	5.5	1	1	3.5	111.5
<u>Protogamasellus</u> sp. b	8	7.5	13.5	9.5	8	1	5.5	6.5	3	9	4.5		4	3	10.5		2	0.5	96
<u>Protogamasellus</u> sp. c			1	4		3	2		1	1	1			1	1				15
<u>Lasioseius</u> sp. a ...			1.5	1	5		2.5	1.5	0.5	1.5	2			1	4.5			1	22
<u>Proctolaelaps</u> sp. ..	1																		1
ELAPTIDAE <u>intoto</u> ...	34.5	9	18	22	18.5	11	14.5	9.5	11	126	6.5	1	2.5	28	27.5	2.5		10.5	352.5
<u>Gaeolaelaps paracasa-</u>																			
<u>lis</u>	19	4	2	12	6.5	3	4		3	21	2			8	3				87.5
<u>Gaeolaelaps</u> sp. a ..															0.5				0.5
<u>Gaeolaelaps</u> sp. b ..	2	4	8	4.5	4.5	5	10	5.5	5.5	15	3.5		2.5	19	20.5	2.5		9	121
<u>Cosmolaelaps</u> sp. ...	1		1		1		0.5		1	49.5	1				2			1	58
<u>Leptolaelaps elegans</u>	10.5		3	2.5	1			2				1							20
<u>Laelaspis</u> sp.	1	1	3	3	2	2			0.5	39.5				1	1.5			0.5	55
Gen. nov. spec. nov.					0.5														0.5
<u>Laelaptidae</u> larvae	1		1		3	1		2	1	1									10
CHYLAEELAPTIDAE <u>intoto</u>	1		1		6	1	3	3		5				1	0.5				21.5
<u>Pachylaelaps</u> sp.	1		1		6	1	3	3		5				1	0.5				21.5
YTOSEIIDAE <u>intoto</u> ..	1.5			1	5	1.5				1			1	2				2.5	15.5
<u>Amblyseius</u> sp. a ...	1.5				1														2.5
<u>Amblyseius</u> sp. b ...				1	4	1.5				1			1	2				1	11.5
<u>Typhlodromus</u>																			
(<u>Neoseiulus</u>) sp. ..																		1.5	1.5
RASITIDAE <u>intoto</u> ...					1				2									1	4
EROSEIIDAE <u>intoto</u> ..	1		1											1					3
<u>Kleemannia</u> sp.	1		1											1					3
OPODOIDEA <u>intoto</u> ...			0.5							0.5									1
SOSTIGMATA <u>intoto</u> ..	73.5	26	70.5	103	107	30.5	45.0	67.5	32.5	217.5	26.5	7	18	82	86	11	3	21.5	1028
IBATEI <u>intoto</u>	918	50.5	374	275	264.5	108	91.5	61	21.5	410.5	28	50	86	150	184	35.5	35	40.5	3183.5
ARIDAE <u>intoto</u>	20.5	27	19.5	88	13.5	19.5	30	8.5	12	492	33	8	30	19.5	26	4	11	18.5	880.5
ARI <u>intoto</u>	2069.5	569	1345	2047.5	2005.5	907	757.5	773	414	2573.5	399.5	381	694.5	1070.5	1240.5	351	188.5	408.5	21995.5
LEMBOLA <u>intoto</u>	110	54	125.5	118	139	63.5	93.5	172	53	97.5	55	5.5	49	131.5	144.5	18	6	73	1508.5
IER INSECTS <u>intoto</u> .	236	47.5	92.5	228	137.5	55	95	72	170.5	457.5	152.5	9.5	18.5	97.5	68	96	7	40	2080.5
EUDOSCORPIONADA <u>intoto</u>	1	1	1.5	3.5	2.5		2	4			1	2	4	3	5	0.5		1.5	32.5
ANEIDA <u>intoto</u>	1		1	7.5	4		1	1.5		1		1							18
PRO-ARTHROPODS <u>intoto</u>	2417.5	671.5	1565.5	2404.5	6088.5	1025.5	949	1022.5	637.5	3129.5	608	399	766	1302.5	1458	465.5	201.5	523	25635
PERCENTAGES	9.43	2.62	6.11	9.38	23.75	4.00	3.70	3.99	2.49	12.21	2.37	1.56	2.99	5.08	5.69	1.82	0.79	2.04	