

A QUANTITATIVE-ECOLOGICAL STUDY OF THE
SEASONAL FLUCTUATIONS IN THE SOIL MESO-
FAUNA ASSOCIATED WITH KIKUYU GRASS.

by

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I : INTRODUCTION

The question as to what extent a qualitative and quantitative appraisal of the soil fauna can be used as an indicator of soil conditions is very pertinent and various authors have expressed their views on this matter. Changes in environment wrought by human agency are very soon apparent in the changes of animal communities. Since a large number of the properties that determine the fertility of the soil are also favourable to the development of soil animals, a certain paralellism exists between them so that, in general, a bad soil is less densely colonised by animals than a good one. Our knowledge of details is, however, far from sufficient and the majority of the relevant questions still remain to be investigated. A too hasty appraisal of results could therefore be dangerous.

The South African soil fauna is practically unknown and although this situation was somewhat augmented during the last few years vast territories in the country are still unexplored. This state of affairs also prevails in the temperate regions of the Southern Hemisphere as well as in all the tropical and subtropical regions. Until recently the majority of soil zoological publications referred to northern and central Europe but at present a considerable upstart of the science of soil zoology is witnessed in other parts of the world.

Of the different kinds of animals constituting the soil mesofauna the most important are the arthropods. Because it is very difficult to attain the same degree of accuracy of identification with all animal groups

which are collected, detailed identification of the total material collected during the present investigation was not attempted. The majority of the Mesostigmata and Trombidiformes were determined down to the generic or specific level whereas similar groups of the Oribatei were interpreted as a "species" and manipulated under a particular number. The unidentified species of mites are probably all new to science and will be described in separate papers.

The investigation of the soil under kikuyu grass forms part of a large project in the Potchefstroom area which includes studies of the mesofauna of pasture soils, soils under Eragrostis grass and Acacia trees, and soils in a crop rotation system. These data are, however, not yet available for comparison but the results obtained should furnish a basis for subsequent investigations.

2 : SAMPLING AREA

The sampling plot for this investigation was selected on the farm of the Potchefstroom Agricultural Research Institute. 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 with an altitude varying between 4,000 and 5,000 ft.

The soil types vary in different parts of the district, but gravelly and shallow sandy clay loams prevail. Patches of sandy loam and black or brown turf are, how-

ever, also found. The soils of the Agricultural Research Institute consist mainly of reddish brown sandy clay loam and partly of dark brown clay types.

The high altitude and the latitude position largely determine the climate of Potchefstroom. Like the greater part of the South African sub-continent, the Potchefstroom area lies in the belt of the permanent South East Trade Winds. As the axis of this belt shifts north and south seasonally with the sun, relatively low atmospheric pressure occurs over the interior in the summer and high atmospheric pressure in the winter. Warm, moist, equatorial air moves southwards along the east side of a low pressure system and causes predominantly north westerly winds and summer rains over the Western Transvaal. Due to the high pressure system in the winter, the weather is fine, dry and cold at night. 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.

According to observations made at the Potchefstroom Weather Station from 1906 - 1955 (Baier, 1963) wide daily fluctuations in air temperatures 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 highest maximum ever recorded was 39.2°C and the lowest minimum -10.2°C . The monthly means show a rapid increase of 4.0°C from August to September, and a drop of 4.0°C from April to May.

The frost-free period, as recorded at 2 inches

above grass extends from October 10 to April 25, i.e. over 209 days. The soil temperatures at depths from 1" to 4" range from 11.4°C to 11.8°C in June to 27.1°C to 28.3°C in January and February. From October to March the average temperatures are highest near the soil surface and decrease with depth. In winter the temperatures are approximately the same between 1" and 8", but they increase considerably from 1 ft to 6 ft. It appears that soil temperatures are closer related to sunshine duration than to air temperatures, because the fluctuations of the former from year to year are also fairly small under the local conditions.

The average atmospheric pressure is highest in July and lowest in January, the annual average being 872.6 mb. Like other places situated in the belt of high atmospheric pressure, and at a similar elevation, Potchefstroom enjoys 8 to 9 hours of daily sunshine throughout the year. The extremely low relative humidity at 2 p.m. (as recorded at the weather station) is a distinct feature of this area. The monthly averages range from 26 percent in September and October to 48 percent in February, but the daily readings at 2 p.m. frequently remain below 10 percent in winter.

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, and remains below 10 mm during June, July and August. Because the mean monthly totals increase from 16.5 mm in September to 49.6 mm in October and drop from 84.2 mm in March to 38.8 mm in April, 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 percent of the mean annual total (621.0 mm) fall on the average, a distribution which is typical for the summer rainfall area. Periodic droughts, however, particularly in January and February occur almost every season. This is demonstrated by the occurrence of dry spells, those of 7 - 10 days duration being most frequent during the summer rainfall period. Dry spells may extend over 16 - 20 days in summer and over one to five months in winter. The probability of dry spells of 7 - 10 days duration is approximately 60 percent in each month from October to March. From April onwards the probability for spells of more than 26 days increases and exceeds 60 percent from June to August.

3 : SAMPLING PLOT

Approximately 95% of the sampling plot is covered with Kikuyu grass (Pennisetum clandestinum), the other 5% being occupied by Verbena bonariensis and Themeda triandra. Kikuyu grass is a perennial creeping extensively by means of rhizomes and stolons. It may reach a height of more than 120 cm but usually it is less than 60 cm high. The grass is native to east tropical Africa but is now cultivated in many parts of the world. In South Africa it is valued as a nutritious palatable fodder plant, and produces a good quality pasture in high rainfall areas. It is also grown extensively for lawns and sports turf, forming a dense, hardy rather coarse sward that grows and spreads rapidly and seldom permits the invasion of weeds. The kikuyu grass on the

sampling plot invaded natural pasture more than ten years ago; the original vegetation probably consisted mainly of the above mentioned Themeda and Verbena species.

3.1 THE SOIL.

The soil of the sampling plot can be divided into two main layers namely an upper greyish, granular loam layer with an average thickness of 12 inches, and a lower hardy black turf layer. The waterholding capacity of the soil can be described as moderate. The amount of pore-space was not determined but it is probably not favourably for larger ^{animal} species to inhabit this soil. The physico - chemical composition of the soil as well as the influence of the kikuyu grass with its extensive rooting contributed to the fact that it may be regarded as a "mull" type.

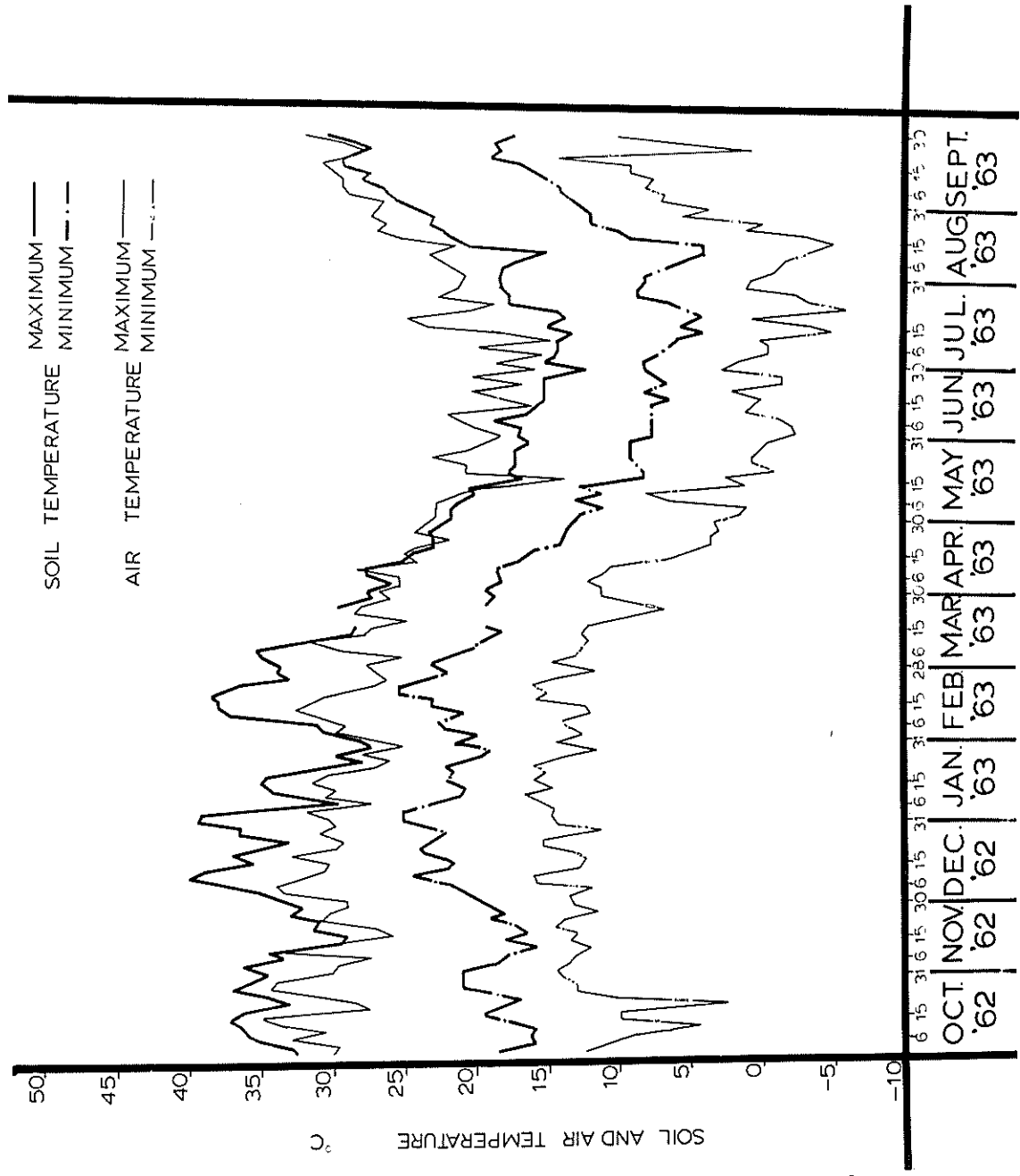
The mean values of the different analyses of the soil are as follows: pH (H_2O - method), 7.05; pH (KCl - method), 6.03; P_2O_5 (p.p.m.), 468; K_2O (p.p.m.), 4037; CaO (p.p.m.), 2625; Na (p.p.m.), 75; Organic material (%), 11.3.

3.2 TEMPERATURE.

As temperature variability is extremely important ecologically, the maxima and minima of the air temperatures (table 42) as well as the soil temperatures (table 43) recorded at the sampling plot are given; these data are presented graphically in fig. 1.

An analysis of the temperature data reveals that during the period October 1962 - September 1963 the air temperatures ranged from $-6.1^{\circ}C$ (July 24th) to

Fig. I : Maxima and minima of air and soil temperatures recorded at sampling plot.



34.8°C (October 16th). The soil temperatures reached an absolute minimum of 4°C (July 14, 15, 24th) and an absolute maximum of 40°C (December 10th). As can be expected the air temperatures are much more variable than the soil temperatures. The maxima of the air temperatures were lower than those of the soil during the period October - April, but generally higher during the other months. The minimum temperatures of the soil were always higher than those of the air. The conspicuous drop in temperatures during November and January was caused by the cooling effect of the rains. The two-hourly values of the soil temperatures recorded 2.5 cm underneath the kikuyu grass are given in tables 44-55. The mean monthly temperatures of the air and the soil are presented in fig. 3.

3.3 RAINFALL

The daily rainfall figures (in mm) for the sampling period given in table 1 show that the monthly totals ranged from nil mm in August to 114.8 mm in November and 111.5 mm in January. In comparison with the average monthly figures, the period April to July presents a striking difference. As stated above, the period from October to March can be regarded as the summer rainfall season during which 84% of the mean annual total fall; the long-term average figures for April, May, June and July are 35.8, 19.8, 7.4 and 8.8 mm respectively. During the sampling period, however, the figures for these months were 81.5, 38.5, 41.9 and 29.0 mm which represent almost 30% of the rainfall total for the period. These winter rains decidedly influenced the soil community. The rainfall figures are also shown

Table 1 : Daily values of rainfall in mm taken at the Agricultural Research Institute, Potchefstroom. Oct. 1962 - Sept. 1963.

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	1.0	3.7			13.4					12.0		
2	0.9	2.9				2.3	29.9					
3	3.0	0.8										
4												
5			2.6	12.0			22.5					
6		8.0										
7		16.5				0.9						
8		17.1		2.5			18.8					
9		21.4		0.9				13.4		17.0		
10												
11		1.3		9.1		4.1		3.6	8.4			
12		6.6		1.1		31.2	9.4		11.8			
13		5.73					0.9					
14		7.7	7.9									
15		7.5		6.2	4.5					S. D.		
16	S. D.	12.9	20.5	S. D.		7.7						
17						2.5						
18		1.1										
19									S. D.		S. D. S. D.	
20		2.8	S. D.	30.0	0.9	S. D.						
21	20.0		19	26.3	S. D.							
22			19.5	0.3	23.7			S. D.				
23		21.6		0.1			S. D.					
24		1.0		2.3								25.0
25				10.5		0.9						
26				9.6								
27								21.7	12.9			
28		4.6				10.5			9.8			
29	0.1					0.0						
30												
31	0.3			0.6								
TOTAL	25.3	144.8	52.4	111.5	42.5	60.7	81.5	38.5	41.9	29.0	—	25.0

S.D. = Sampling date.

as 14-day totals (fig. 3) and three-day totals (fig. 4) in the form of histograms.

3.4 MOISTURE.

Moisture and temperature are so important in the soil environment and so closely interacting that they are usually considered to be the most important part of the climate. The interaction of these two factors depends on the relative as well as the absolute values of each. Temperature, therefore, exerts a more severe limiting effect on organisms when moisture conditions are extreme, that is, either very high or very low, than when such conditions are moderate. Likewise, moisture plays a more critical role in the extremes of temperature.

The mean of the soil moisture in the sampling plot was 29.832%, a figure which, however, does not represent the actual average moisture content of the soil during the sampling period (table 56). The percentages given in the table and in fig. 3 only reflect the moisture content of the soil at the time when the sample was taken. In comparison with European soils our soils exhibit more fluctuations in moisture content, especially in the top 5 cm during periods when high temperatures prevail. According to Thamdrup (1939) a moisture content of 30 per cent in European soil is regarded as a condition of "severe drought". This author, however, also ascertained that in some instances a soil moisture content of 10 - 20% may correspond to a relative humidity of 75 - 90% in the cavities.

4 : METHODS

4.1 SAMPLING.

A quadrature of 100 ft^2 (9.2903 m^2) on the farm of the Potchefstroom Agricultural Research Institute was selected as the sampling plot. The fenced in plot was bordered on two sides by a narrow road; a ditch and an open veld area were situated on its other two sides (fig. 2; plates I and 2)

For random selection of smaller plots within the quadrature, the area was divided into a hundred subplots each measuring 1 ft^2 (929.03 cm^2). By means of drawing lots 15 subplots were determined and measured out on the quadrature. Short poles were driven into the centre of each subplot so as to indicate its correct position for sampling. Of the 100 subplots Nos. 4, 11, 16, 19, 25, 26, 38, 43, 44, 53, 54, 59, 90, 93 and 99 were selected. A subsample was taken from each of these 15 subplots on the 16th October 1962, 13th November 1962, 20th December 1962, 17th January 1963, 21st February 1963, 20th March 1963, 23rd April 1963, 22nd May 1963, 20th June 1963, 16th July 1963, 20th August 1963 and 20th September 1963 (table 1).

For sampling 15 brass rings were used, each with an inner diameter of 5.18 cm and a height of 5 cm. The surface area of the cylinder, therefore, was 21.074099 cm^2 and its volume 105.3708 cm^3 . To determine the number of animals per m^2 the mean for the totals of 15 subsamples was multiplied by the factor 474.5. As the soil in the sampling area may be very hard during certain periods of the year, brass rings which could be forced

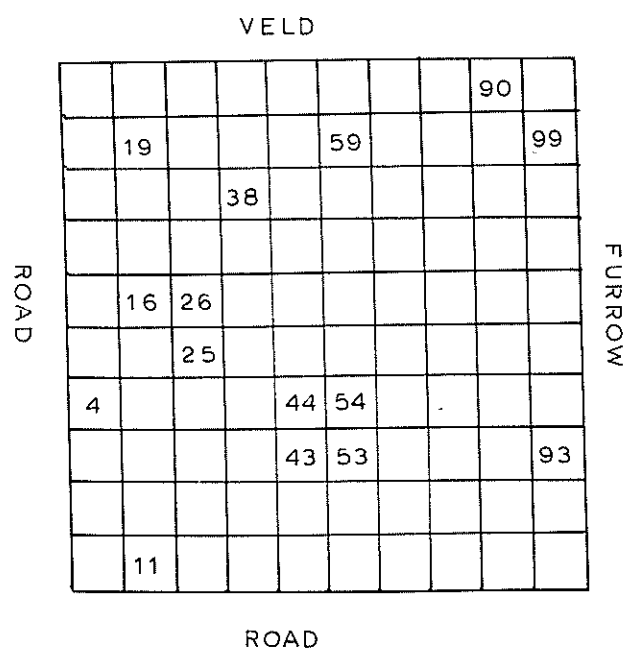


Fig. 2. Selected subplots on Sampling plot.



Plate I : Kikuyu grass plot.

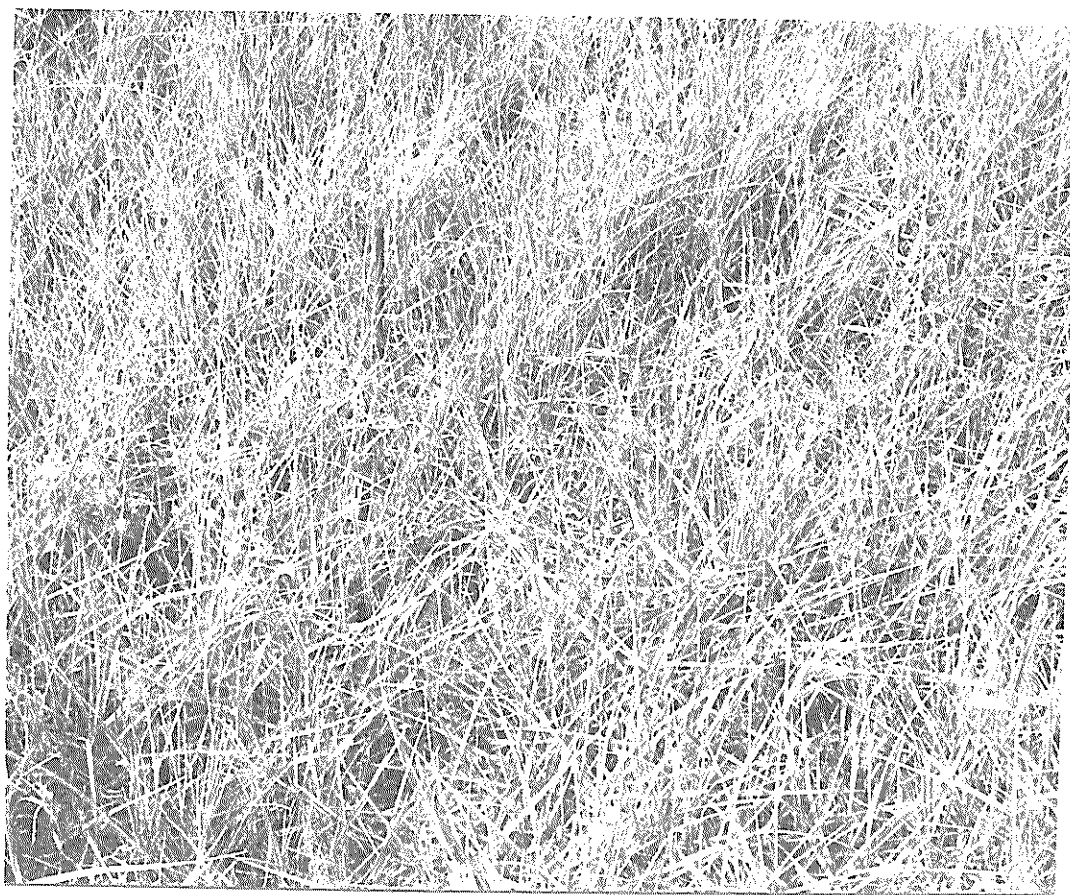


Plate 2 : Close up of kikuyu grass.

into the soil were used. The sharp cutting edge of these rings gave minimum resistance during sampling. With the aid of a wooden block and a hammer each sampler was driven into the upper 5 cm of soil on the selected subplots. This was done very cautiously, so as not to disturb the soil of the subsample because special care had to be exercised to penetrate through the extensive root system of the kikuyu grass. By means of a light garden trowel, the sampler containing the subsample was removed from the soil and immediately covered up on both sides of the cylinder with two tin plates (3" by 3"); the latter were secured by means of rubber rings. The subsamples were subsequently provided with the relevant data and conveyed directly to the laboratory for extraction.

4.2 EXTRACTION.

The extraction apparatus employed in the course of the present study was a model designed after the description given by Auerbach & Crossley (1960). This extractor consists basically of a perspex box containing removable trays which accommodate 15 sample containers and 15 funnels. The sample holders are arranged in three five-unit banks separated by perspex partitions. The heat source is provided by means of nichrome wire with a reflector, separate heaters being placed over each bank. The removable trays keep the sets of sample containers in position approximately one inch below the reflectors. Each sample container is held by a perspex insert with a flange which fits into an opening on the tray; the length of the insert is such that the upper

half of the sample containers is visible above the tray. The bottom of the perspex insert accomodates a removable circular piece of screen with a one *mm.* diameter mesh size. Immediately below the sample containers a second set of trays holds the small plastic funnels. The collecting vessels stand on sliding trays on the floor of the apparatus. During operation air is fed into the apparatus, by means of a fan, at the lower back wall and it emerges at the upper front. This air circulation prevents condensation in the funnels.

The collecting bottles were filled with 70% alcohol to which a few cristals of phenol, which prevented contamination by fungi or bacteria, were added.

After removal of the tin plates the brass rings containing the subsamples were placed in an inverted position on the funnel's sieve in the extractor to cause the least disturbance of the sample material; the fact that the sampler rings were used as sample containers also contributed to lessen disturbance of the soil. Some authors prefer to use plastic instead of metal rings because the former is a non-conductor and therefore should produce a higher temperature gradient. Aucamp et al (1964), however, determined the gradient in both plastic and brass rings by means of a thermocouple galvanometer but could not find any significant difference. During operation of the extractor, temperatures were regulated in such a manner that an initially low temperature (28°C) was gradually increased over the entire extraction period of five days, to reach a maximum of 40°C on the last day. After the collec-

ting bottles were removed from the apparatus the soil particles adhering to the funnels were carefully washed out in containers labelled with numbers corresponding with the bottles; in some instances it was found that numerous mites (especially the smaller specimens) were trapped in the funnels. Although counting the fauna of the sample units was most time-consuming the numbers given in the tables represent absolute counts. Because the mesofauna in our soils was practically unknown when the present investigation started this procedure was found to be necessary.

4.3 BIOMASS ESTIMATION.

Approximate biomass figures have been obtained for each species by weighing the specimens on a Sartorius balance. Coverglasses with a diameter of $\frac{1}{2}$ " were used as weighing discs. These were thoroughly cleaned, dried over an alcohol flame and weighed. Specimens of each species were transferred onto the coverglass, which was placed on a slide, and observed under a research microscope, using the 10X oculars and objectives. Live specimens were used for the majority of the species.

The animals were collected in water to remove all traces of soil adhering to them and also to prevent them from drying out during extraction. The microscope light served as a heat source to dry off the excessive moisture from the surfaces of the specimens. Particular care was taken not to desiccate the animals. This was controlled by observing the state of the animals through the microscope and switching off the microscope

light as soon as enough moisture had evaporated. The coverglass and the specimens were then transferred to the balance and weighed. According to their size different species were weighed in groups consisting of 40, 20, 15, 10 or 5 individuals. After subtracting the weight of the coverglass the answer was divided by the number of specimens weighed to determine the mean weight of one individual of the particular species. These figures are limited to those species of the mesofauna which penetrated through the 1 mm diameter mesh of the extractor. In an attempt to get an indication of the size and nature of the macrofauna, the Moczarski - Winkler extraction apparatus was used.

4.4 RECORDING OF PHYSICAL FACTORS.

Temperatures of air and soil, soil moisture and daily rainfall were recorded during the sampling period. Air temperatures and daily rainfall figures were obtained from the weather station of the Agricultural Research Institute which is situated approximately a $\frac{3}{4}$ mile from the sampling plot. The soil temperatures were recorded at a depth of 2.5 cm underneath the kikuyu grass by means of a soil thermograph. To determine the soil moisture, three additional soil samples were taken each month. These were dried in an oven at 100°C and the percentage moisture was calculated from the weights obtained before and after drying.

5 : NUMERICAL FLUCTUATIONS

The seasonal quantitative differences in the soil fauna may be attributed partly to differences in the activities of the animals (e.g. migration) and partly to real frequency fluctuations (e.g. reproduction). For a causal explanation of fluctuations in the numbers of the soil mesofauna it is therefore necessary to have a knowledge of their reproduction, developmental periods, life spans and the influence of biotic and abiotic environmental factors. Very little is, however, known of the ecology of the different species. It is therefore only possible to try and correlate these fluctuations with physical factors such as temperature, water content and rainfall.

It is evident from the graphs in fig. 3 that there was a marked difference in the size of the acarine and collembolan faunas at different times during the sampling period. It is, however, doubtful whether the same picture would be repeated every year. To facilitate the recognition of correlations with temperature, soil moisture and rainfall, these factors are represented by the graphs and histograms in the figure. The mean monthly numbers of Acari and Collembola per m^2 are plotted against the mean monthly air and soil temperatures as well as the monthly values of the soil moisture content; the rainfall totals for the 14-day period before each sample was taken, are depicted in the form of histograms.

When making deductions from the data given in fig. 3

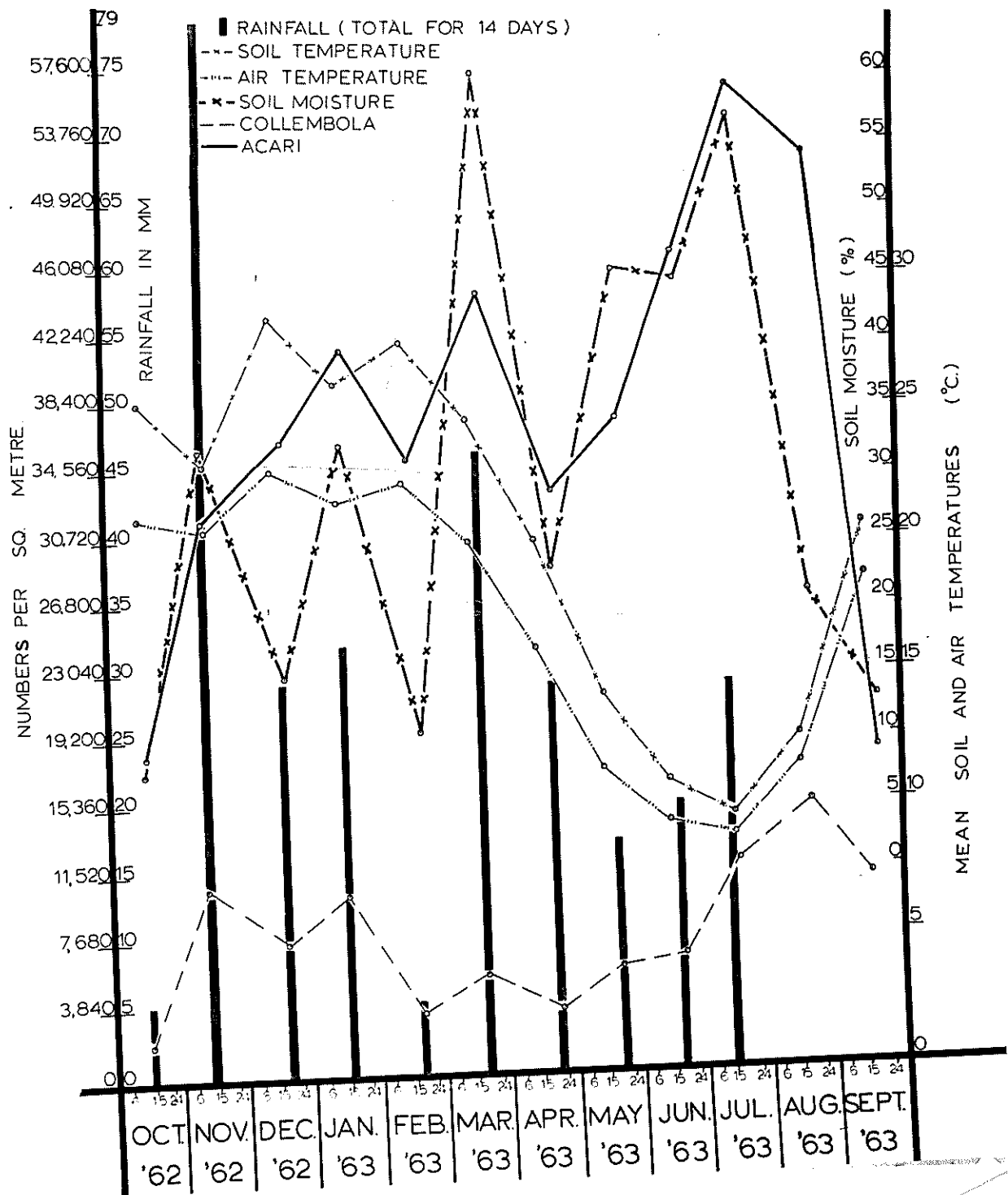


Fig. 3 : Seasonal fluctuations in numbers of the microarthropod fauna (Acari + Collembola) and recorded physical factors. Rainfall histograms representing the 14-day totals before each sampling date.

it should be borne in mind that only the upper 5 cm of the soil was investigated. In European soils it is generally the case that the majority of the microarthropods inhabit this layer. A number of supplementary samples extending from 6-10 cm, however, indicated that the lower layers may accommodate more animals, especially when the surface layer becomes dessicated and parched by the sun. This condition probably results in a downward migration of some organisms.

From the temperature curves in figure 3 it is evident that the mean monthly soil temperatures were always higher than those of the air temperatures, a phenomenon which was probably unfavourable for the populations during summer but advantageous during the winter. The relatively high mean soil temperatures of October (25°C) decreased to 22.8°C in November with the onset of the rainfall season, but increased sharply to 28.5°C during December. January shows a drop in temperatures and February a rise; this was followed by a steady decrease to 9.5°C , in July with a subsequent sharp rise during August and September.

5.1 ACARI AND COLLEMBOLA IN GENERAL.

During October 1962 the density of the Collembola ($1,866 \text{ per m}^2$) was very low which was probably the result of dessication. The temperatures were relatively high and the soil moisture content was extremely low (7.2%). These conditions also reflected their influence in the numbers of Acari (18,157) present in the sample. The 4.9 mm rain which fell approximately 14 days before the first sample was taken would have evaporated quickly

and could have had little or no effect in creating favourable conditions for an increase in the soil populations.

As a result of the rain (79,0 mm) which fell during the 14-day period before the November sampling date, coupled with the drop in temperatures, the numbers of Collembola (10,914) and Acari (32,076) increased rapidly. These increases in the upper layer cannot be attributed merely to development of new individuals since an upward migration of animals, which withdrew into the lower layers during the period of drought, could have made a substantial contribution.

The decrease in the population densities of the Collembola during December (7,560) should be attributed to the high temperatures which affected the soil moisture content. The mite total nevertheless still shows an upward tendency, a phenomenon which is mainly due to an increase in the numbers of the more drought-resisting forms. The collembolids are known to be very sensitive to changes in the amount of moisture in the soil, whereas certain mite species may have a wider range of tolerance for this factor. The life expectancies of mites are usually longer than those of springtails, but on the other hand these insects have the ability to multiply rapidly under optimum conditions.

The January sample shows an increase in the numbers of both Collembola (10,344) and Acari (41,503). This can possibly be attributed to the decrease in mean temperatures and the amount of soil moisture present on the sampling date.

The low numbers of both Collembola (3,352) and Acari

(35,334) in the February sample could have been expected. From the histograms in fig. 3 it will be noted that, with accompanying high temperatures, only 5 mm rain fell during the 14-day pre-sampling period, with the result that the percentage of soil moisture approached that of October. Downward migration of certain mite species probably also played its role.

The high rainfall figure and the increase in soil moisture content during March which caused a drop in temperatures were partly responsible for the substantial increase in mite numbers (45,227). The collemboles also increased slightly to reach 5,314 per m².

In the April sample a reduction in the numbers of both Collembola (3,385) and Acari (33,246) was recorded; during the preceding period the mean temperatures were relatively low, the rainfall was adequate and the soil moisture content was relatively high. It is therefore rather difficult to explain this reduction in population numbers on the basis of the available data.

During May, June and July both the Acari and the Collembola increased rapidly. The mites reached their maximum numbers (56,876) during July and the Collembola had their highest peak in August (15,089). Whether these winter maxima are characteristic of conditions in this geographic area is open to doubt. It seems reasonable to suggest that these peaks were produced by the extraordinary amount of rain which fell during these months. It could also be correlated with the high moisture content of the soil, the low temperatures and the resultant slow evaporation of water. These presented conditions which were optimal for the mesofauna.

The insulating function of the kikuyu grass blanket was probably responsible for the fact that the Collembola reached their maximum during August even though no rain fell during a 42-day period before this sample was taken (table 1). Even the numbers of the mites were still very high (52,827).

As a result of the sharp increase in temperatures and the low soil moisture content (12.996%), the September sample shows a dramatic decline in the numbers of the mesofauna. The Acari (18,094) reached the same level as during October 1962, whereas the Collembola (7,307) were still present in high numbers. Bearing in mind the fact that not a drop of rain fell during a period of more than 70 days before the September sample was taken, the numbers of Collembola are remarkable.

5.2 ANALYSIS OF THE ACARI.

The population densities of the Trombidiforms (Prostigmata), Mesostigmata and Oribatei (Cryptostigmata) are graphically represented in fig. 4 and plotted against the soil temperature and rainfall; the rainfall histogram consists of three-day units. For purposes of comparison the curves representing the Collembola and the Acari as a group are also given.

It is clear that the population increases and decreases of the mite suborders during the sampling period show the same general tendency as the group as a whole. In the October sample the numbers were low for all three suborders, followed by a general increase during November. An interesting phenomenon, however, occurs between the November and December

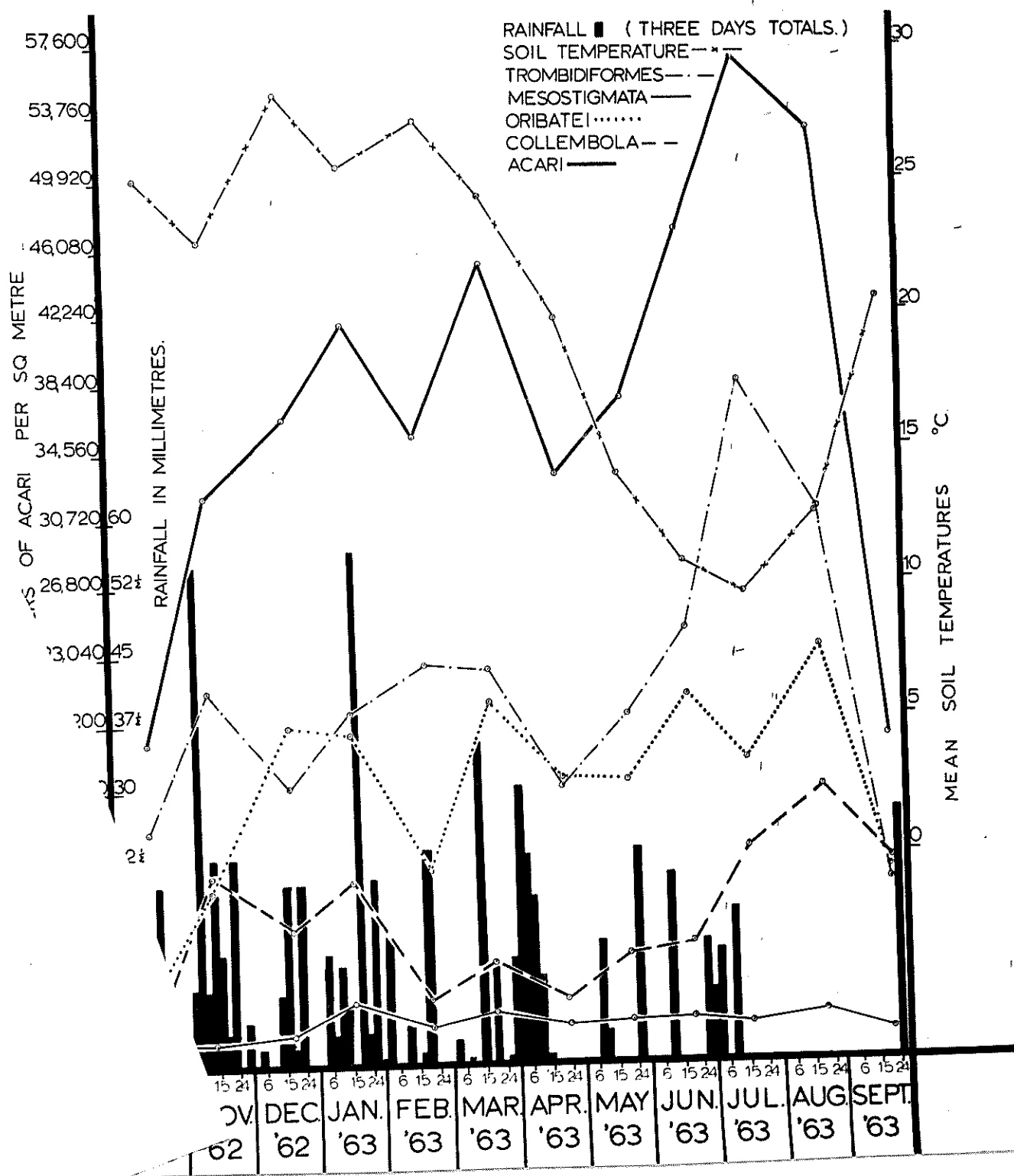


Fig. 4. Seasonal fluctuations in numbers of the Acarine fauna. Rainfall histograms representing three-day totals.

sampling dates. The rise in numbers of the Acari during this period is entirely due to the sharp increase in population density of the Oribatei (from 9,838 to 18,948). The Mesostigmata made a small contribution (1,139 to 1,676) but the Trombidiformes decreased from 21,099 to 15,722 per m². The decline in numbers of the latter group might be the result of a downward migration of some species caused by the exceptionally high soil temperatures (reaching 40°C, fig. 2) and the low soil moisture content. The Mesostigmata and especially the Oribatei were probably better equipped to survive this warm dry period in the upper layer of the soil and could therefore maintain the increase in their numbers.

During the December - January period the numbers of all groups, with the exception of the Oribatei, increased. The February sample which showed a general decline of the mites and collembolus, however, contained a larger number of Trombidiformes. This might be attributed to the fact that 1 mm rain fell during the day preceding the sampling date so that only the superficial layer of the soil became damp; the small trombidiform mites which migrated downwards into the lower layers could possibly have returned to the upper 5 cm.

A comparison between the samples of February and March shows an increase in the numbers of all groups except the Trombidiformes which decreased from 22,491 to 22,175. Since the March sample contained 60% moisture, it is possible that some specimens ^{of the delicate species} were trapped in the funnels. The lower numbers of trombidiforms may

therefore be a reflection of poor extraction. The sharp decrease in numbers of all groups between the March and April sampling dates cannot, as was previously noted, be explained on the basis of the known physical factors. The obvious causes of the general rise in numbers from April to July were discussed earlier on.

The Trombidiformes reached their highest density during July (38,118) whereas the Oribatei, and even the Mesostigmata occurred in higher numbers in the August sample. The decline of the numbers of Oribatei during July cannot be attributed to any known factors. The decrease in trombidiform population density in the August sample might be partially due to downward migration. The period from August to September was characterized by a sharp decrease in the numbers of all groups, a phenomenon which could probably mainly be attributed to climatological factors.

5.21 TROMBIDIFORMES.

A comparison between the population increase and decrease of the two most important (with reference to numbers) families namely the Tydeidae and the Nanorchestidae (fig. 5) leads to the following interesting observations and deductions. The numbers of the Nanorchestidae were already relatively high during October (4,334), but showed a substantial increase to 10,597 in November; this was followed by a population decrease reaching 2,056 in April, with a slight flare up during February (4,555). The Tydeidae, on the other hand, started at a relatively low level in October (2,309) and the numbers gradually decreased to

the December minimum (9789); a subsequent rise in their numbers culminated in a first peak during March (9,870) followed by a decline in April (4,081). The populations of both families increased slightly in size during the next two months but, whereas the Tydeidae reached their second and highest peak during July (14,520) the numbers of the Nanorchestidae fell back to a level slightly above that of the May sample. The former family decreased in numbers during August but the Nanorchestidae reached their second highest peak during this month. It is therefore noteworthy that these two families never occurred in high numbers during the same period, a phenomenon which might suggest the existence of a possible negative interspecific relationship between a species of the genus Coccotydeus (Tydeidae) and the genus Nanorchestes (Nanorchestidae).

The Tarsonemidae are numerically the third most important family. As depicted in fig. 5 their numbers rose from 1,170 during October to 4,966 in February (which are higher than those of both the Nanorchestidae and the Tydeidae) reaching a peak of 7,877 during July. Other families which occurred in smaller numbers are the following: Cunaxidae, Bdellidae, Rhagidiidae, Pachygnathidae, Paratydeidae, Trombidiidae, Erythraeidae, Caligonellidae, Rhaphignathidae, Linotetranidae, Tetranychidae, Lordalychidae, Scutacaridae, Stigmaeidae and Pyemotidae. The majority of the members of these families are, however, rather associated with the soil surface or the bases of the kikuyu grass stems than with the soil proper.

5.22 MESOSTIGMATA.

The numbers of this group were the lowest of the three orders but their lack in numbers was balanced by their higher biomass figures. The Mesostigmata totalled 1,139 in both October and November but the species combinations were different (fig. 6). The November total was mainly the result of an increase in the numbers of Laelaptidae (from 285 to 443) and a decrease in the numbers of Rhodacaridae (696 to 475). December showed a general rise which was largely due to an increase in the numbers of the Rhodacaridae (1,012). The Mesostigmata reached a peak during January as a result of the presence of 1392 Rhodacaridae, 759 Laelaptidae, 696 Phytoseiidae and 411 Aceosejidae. The period between January and February exhibited a drop in the numbers of all the families except the Phytoseiidae which remained at a constant level. Both the Rhodacaridae (1,708) and the Laelaptidae (695) however, reached a peak during March, whereas the other two families decreased to under 200 specimens per m². The densities were lower in April but during the following month the Laelaptidae and Aceosejidae increased in numbers. The Rhodacaridae reached a third peak in June (1,518) and a fourth in August (1,740). The numbers of the Laelaptidae also remained relatively high from June to August but showed a subsequent sharp decline during September. The Phytoseiidae and Aceosejidae collected from samples during the period June to September seldom exceeded the 200 mark. The Rhodacaridae therefore were decidedly the dominant family of the Mesostigmata

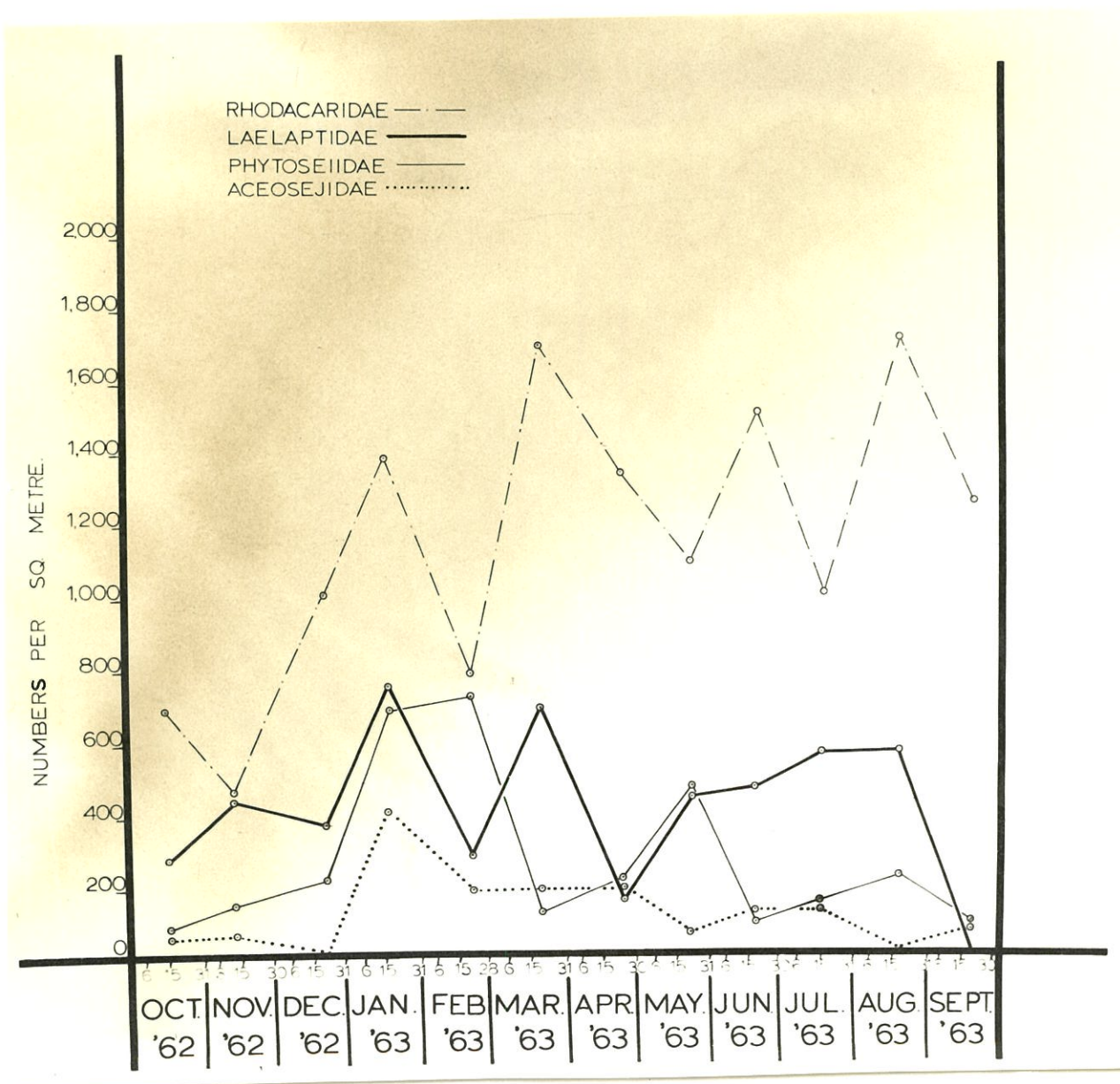


Fig. 6. Seasonal fluctuations in numbers of the families of Mesostigmata.

throughout the year. The only other family which was occasionally collected from the soil is the Macrochelidae. Since the majority of the Mesostigmata are predacious, it can readily be assumed that they play a role in the fluctuations in population densities of other mite groups.

6. BIOMASS

To provide a better conception of the living material in the soil the quantitative characteristics of the populations should be completed by considering the biomass of the mesofauna. Although it is maintained that animal biomass figures give little indication of the functional activity of the organisms within the ecosystem their determination is a necessary first stage in evaluating the quantitative role of the fauna in soil processes. In the present study estimates of the biomass of the different species were obtained directly by weight. In table 2 the average weights of specimens of each of the species or families collected are given.

TABLE 2

ESTIMATES OF BIOMASS OF MESOFAUNAL COMPONENTS.

Organism	Mean biomass per individual (mg)
ACARI	
TROMBIDIFORMES	
Bdellidae: Bdella sp. ...	0.0140
Cheyletidae: Cheyletia sp. ...	0.0020
Cunaxidae: ...	0.0140
Caligonellidae: Molothrognathus sp. ...	0.0180
Erythraeidae: Abrolophus bipilus	0.0400
Eupodidae: Eupodes sp. ...	0.0140
Linotetranidae: Linotetranus sp	0.0120

Organism	Mean: biomass per individual (mg)
Lordalychidae: Lordalychus sp. ...	0.0020
Nanorchestidae: Nanorchestes sp. ..	0.0020
Speleorchestes sp.	0.0020
Pachygnathidae:	0.0160
Paratydeidae: Scolotydeus sp. ...	0.0120
Rhagidiidae: Rhagidia sp. ...	0.0140
Raphignathidae: Raphignathus sp. ..	0.0020
Stigmaeidae: Apostigmaeus navicella	0.0160
Cheylostigmaeus sp. ..	0.0160
Ledermulleria sp. ...	0.0160
Stigmaeus sp.	0.0180
Tarsonemini	0.0015
Trombidiidae	0.0400
Tydeidae: Coccotydeus sp.	0.0015
Tydeus sp.	0.0135
Tetranychidae: Bryobia praetiosa ..	0.0140
ACARIDIAE:	0.0140
ORIBATEI: K. 1. ...	0.0180
K. 2. ...	0.0180
K. 3. ...	0.0050
K. 4. ...	0.0260
K. 5. ...	0.0050
K. 6. ...	0.0050
K. 7. ...	0.0030
K. 8. ...	0.0030
K. 9. ...	0.0300
K.10. ...	0.0050
K.11. ...	0.0050
K.12. ...	0.0200
K.13. ...	0.0220
K.14. ...	0.1000
K.15. ...	0.1000
K.16. ...	0.0200
MESOSTIGMATA:	
Rhodacaridae	
Asca sp.	0.0220
A. spinosa	0.0220
A. aethiopica	0.0050
Antennoseius boskopensis ...	0.0200
Digamasellus badenhorsti ...	0.0180
Gamaselliphis potchefstroomensis	0.0180
Gamasellus sp.	0.0180
Rhodacarellus sp.	0.0020
Aceosejidae	
Lasioseius sp.	0.0240
Phytoseiidae	
Amblyseius sp.	0.0080
Laelaptidae	
Pseudolaelaps sp.	0.0180
Laelaspis sp.	0.0200
Cosmolaelaps sp.	0.0080
Hypoaspis praesternalis	0.0200
Leptolaelaps elegans	0.0500
OTHER ARTHROPODA:	
Collembola	
Entomobryoidea	0.0160
Poduroidea	0.0370
Sminthuridae	0.0040

Organism					Mean biomass per individual (mg)
Coleoptera	...	...	...	...	0.2400
Larva	...	...	...	...	0.1800
Corrodentia	..	...	...	...	0.0100
Diptera: Cecidomiidae	...	...	...	...	0.2500
larva	...	...	...	...	0.2600
pupa	...	...	...	...	0.3500
Hemiptera	...	...	...	...	0.4000
Homoptera : Pseudococcinae	...	...	...	...	0.0155
Hymenoptera : Formicidae	.	...	...	...	0.6340
Thysanoptera	.	...	...	...	0.4000
Thysanura larva	...	...	...	...	0.1000
ARACHNIDA					
Araneida	...	...	...	...	0.7500
CHILOPODA : Geophillidae	...	...	...	...	1.9500
PAUROPODA : Pauropidae	...	...	...	...	0.0180
CRUSTACEA : Oniscidae : Oniscus	..	...	...	...	3.3500

6.1 FLUCTUATIONS IN BIOMASS

The data presented in fig. 7 and table 3 illustrate the fluctuations of the biomass of the mesofauna as compared with fluctuations in numbers. The biomass figure reached its highest value during February when the numbers of the mesofauna were relatively low (44,761 per m²). During July and August (69,846 & 69,656) the maximum number of animals were collected but during this period the biomass figures were low. This is due to the fact that a large proportion of the fauna consisted of small mites.

TABLE 3
NUMBERS AND BIOMASS FIGURES OF THE MESOFAUNA

Month	Numbers per sample	Biomass per sample	Numbers per m ²
Oct. '62	684	0.0224186 g.	21,637 200
Nov. '62	1406	0.0339090 "	44,476 465
Dec. '62	1510	0.0718122 "	47,766 633
Jan. '63	1721	0.0598235 "	54,400 965
Feb. '63	1415	0.0878476 "	44,761 165
Mar. '63	1708	0.0797261 "	54,029 730
Apr. '63	1275	0.0528311 "	40,332 500
May '63	1476	0.0669360 "	46,690 800
Jun. '63	1747	0.0506860 "	55,252 886
Jul. '63	2208	0.0381175 "	69,846 400
Aug. '63	2202	0.0501175 "	69,656 600
Sept. '63	855	0.0294951 "	27,046 500

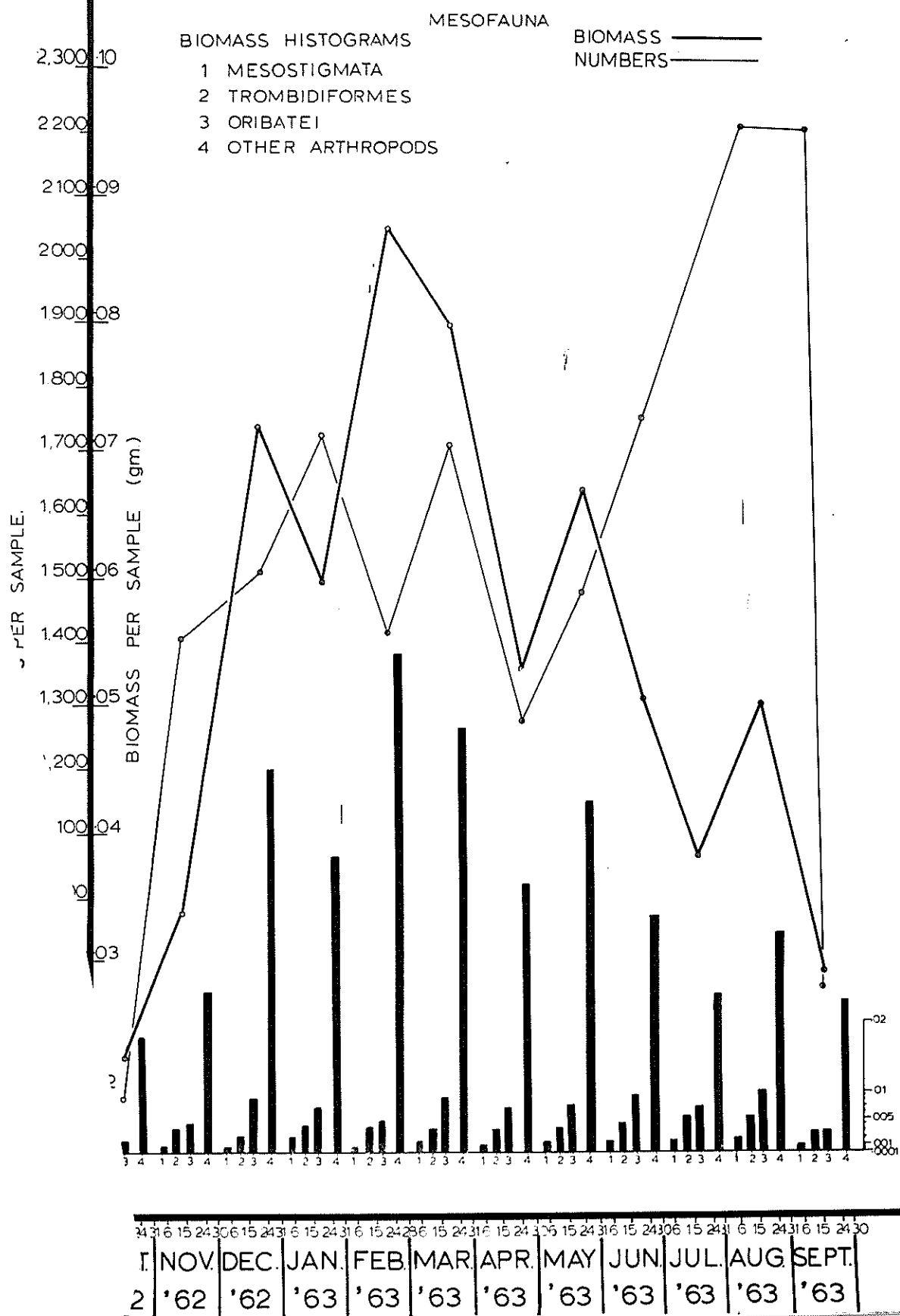


Fig. 7 : Seasonal fluctuations in biomass of the mesofauna.

From the graphs given in fig. 8 it is clear that the seasonal fluctuations in biomass of the Acari more or less closely follow those of the numbers. The rise in numbers during the period between the June and July sampling dates, however, was not accompanied by an increase in biomass. The numbers rose from 1488 to a peak of 1798 while the biomass decreased from 0.0141755 to 0.0134125 g per sample (table 4). The highest figures for biomass were reached in August (0.0158595 g), a phenomenon which is the result of the number of Oribatei present at that time (fig. 9; table 7).

A comparison between the relative positions of the main microarthropod groups with regard to numbers and to biomass (fig. 9; tables 5-8) reveals the following: Both in respect of numbers and biomass the Mesostigmata (table 5) were the smallest group of the three main-sub-orders of the mites. The Trombidiformes (table 6) were the most abundant group but they occupied the second lowest position in the biomass graph.

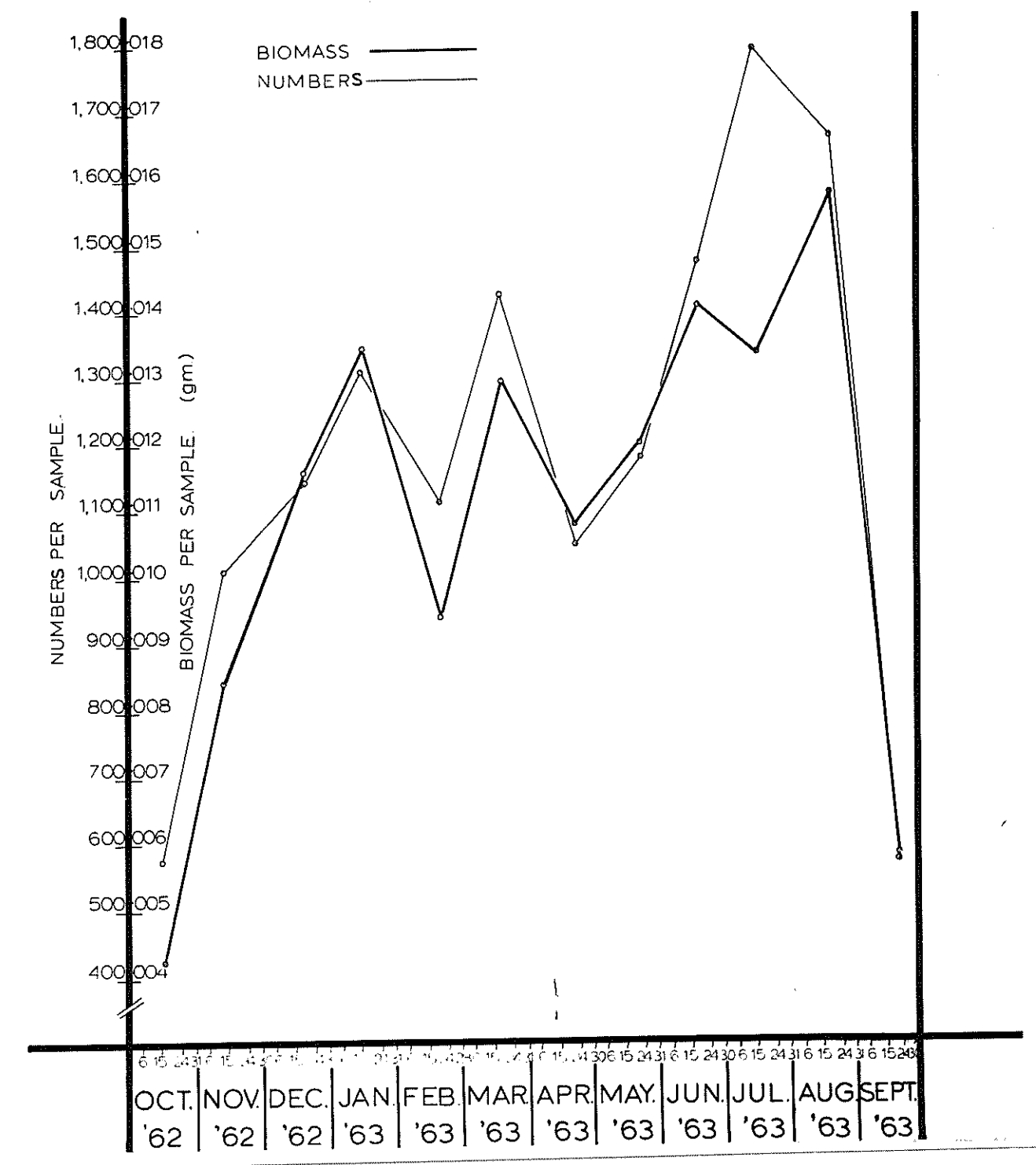


Fig. 8: Seasonal fluctuations in numbers and biomass of the Acari.

TABLE 4

NUMBERS AND BIOMASS FIGURES OF THE ACARI

Month	Numbers per sample	Biomass per sample	Numbers per m^2
Oct. '62	574	.0042786	18,157.216
Nov. '62	1014	.0084875	32,075.725
Dec. '62	1149	.0116242	36,346.224
Jan. '63	1312	.0135040	41,502.617
Feb. '63	1117	.0094341	35,334.117
Mar. '63	1431	.0130711	45,266.825
Apr. '63	1051	.0108376	33,246.317
May '63	1185	.0120895	37,485.025
Jun. '63	1488	.0141775	47,069.451
Jul. '63	1798	.0134125	56,876.416
Aug. '63	1670	.0158595	52,827.033
Sept. '63	572	.0058581	18,094.108

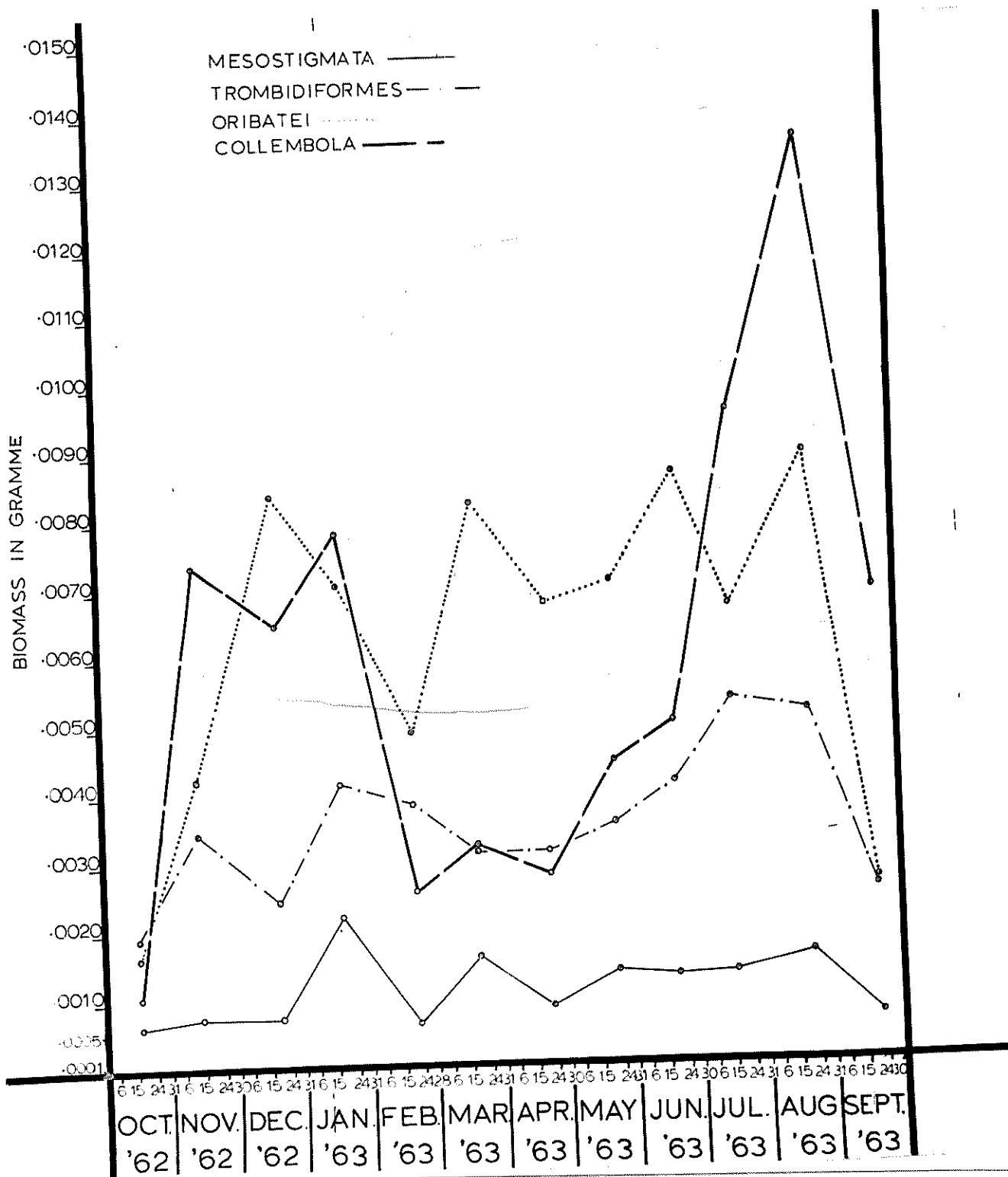


Fig. 9 : Seasonal fluctuations in biomass of the mite orders and the collembolles.

TABLE 5
NUMBERS AND BIOMASS FIGURES OF THE MESOSTIGMATA

Month	Numbers per sample	Biomass per sample	Numbers per m ²
Oct. '62	36	0.0006226 g.	01,138.800
Nov. '62	36	0.0007880 "	01,138.800
Dec. '62	53	0.0007242 "	01,676.408
Jan. '63	103	0.0022190 "	03,257.917
Feb. '63	63	0.0006476 "	01,992.900
Mar. '63	87	0.0016180 "	02,087.800
Apr. '63	61	0.0008446 "	01,929.317
May '63	66	0.0013740 "	02,087.800
Jun. '63	70	0.0012980 "	02,214.017
Jul. '63	60	0.0013200 "	01,898.000
Aug. '63	83	0.0015840 "	02,625.408
Sept. '63	45	0.0006506 "	01,423.500

TABLE 6
NUMBERS AND BIOMASS FIGURES OF THE TROMBIDIFORMES

Month	Numbers per sample	Biomass per sample	Numbers per m ²
Oct. '62	413	0.0019510 g.	13,064.408
Nov. '62	667	0.0034755 "	21,099.117
Dec. '62	497	0.0024650 "	15,721.608
Jan. '63	624	0.0041620 "	19,739.200
Feb. '63	711	0.0038385 "	22,491.300
Mar. '63	701	0.0031371 "	22,174.808
Apr. '63	489	0.0031380 "	15,468.700
May '63	619	0.0035195 "	19,580.717
Jun. '63	769	0.0041135 "	24,325.717
Jul. '63	1205	0.0053285 "	38,118.008
Aug. '63	857	0.0051855 "	27,109.608
Sept. '63	312	0.0025405 "	09,869.600

TABLE 7
NUMBERS AND BIOMASS FIGURES OF THE ORIBATEI

Month	Numbers per sample	Biomass per sample	Numbers per m ²
Oct. '62	125	0.0016750 g.	03,954.008
Nov. '62	311	0.0042240 "	09,837.808
Dec. '62	599	0.0084350 "	18,948.208
Jan. '63	585	0.0071230 "	18,505.500
Feb. '63	343	0.0049480 "	10,849.917
Mar. '63	643	0.0083160 "	20,339.917
Apr. '63	501	0.0068550 "	15,848.300
May '63	500	0.0071960 "	15,816.508
Jun. '63	649	0.0087660 "	20,529.717
Jul. '63	533	0.0067640 "	16,860.408
Aug. '63	730	0.0090900 "	23,092.017
Sept. '63	215	0.0026670 "	06,801.008

TABLE 8
NUMBERS AND BIOMASS FIGURES OF THE COLLEMBOLA

Month	Numbers per sample	Biomass per sample	Numbers per m ²
Oct. '62	59	0.0011080 g.	01,866.208
Nov. '62	345	0.0074060 "	10,913.500
Dec. '62	239	0.0065430 "	07,560.208
Jan. '63	327	0.0078930 "	10,344.100
Feb. '63	106	0.0025780 "	03,352.817
Mar. '63	168	0.0032280 "	05,314.400
Apr. '63	107	0.0027930 "	03,384.608
May '63	189	0.0044440 "	05,978.700
Jun. '63	208	0.0050080 "	06,579.417
Jul. '63	373	0.0096260 "	11,798.917
Aug. '63	477	0.0137460 "	15,089.100
Sept. '63	231	0.0069720 "	07,307.300

With reference to weight the Oribatei (table 7) were undoubtedly the dominant group of mites. In this respect they were, however, surpassed by the Collembola (table 8) during the months of November, January, July, August and September. The fact that during certain periods the numbers of the different groups rose whereas the biomass dropped, is the result of an increase in the numbers of the smaller species and a decrease in those of the larger ones.

When the values of biomass and numbers of the families of the Trombidiformes are compared (fig. 10; tables 9-12) it becomes clear that the positions of the numerically important Tydeidae (table 9), Nanorchestidae (table 10) and Tarsonemidae (table 11) were very much lower than that of the other families lumped together (table 12). The numbers of the Tydeidae, for instance, were higher than those of these "Other families" during March and July (fig. 10). In respect of biomass figures, however, the values for the "other families" were twice as high during March and five times higher during July.

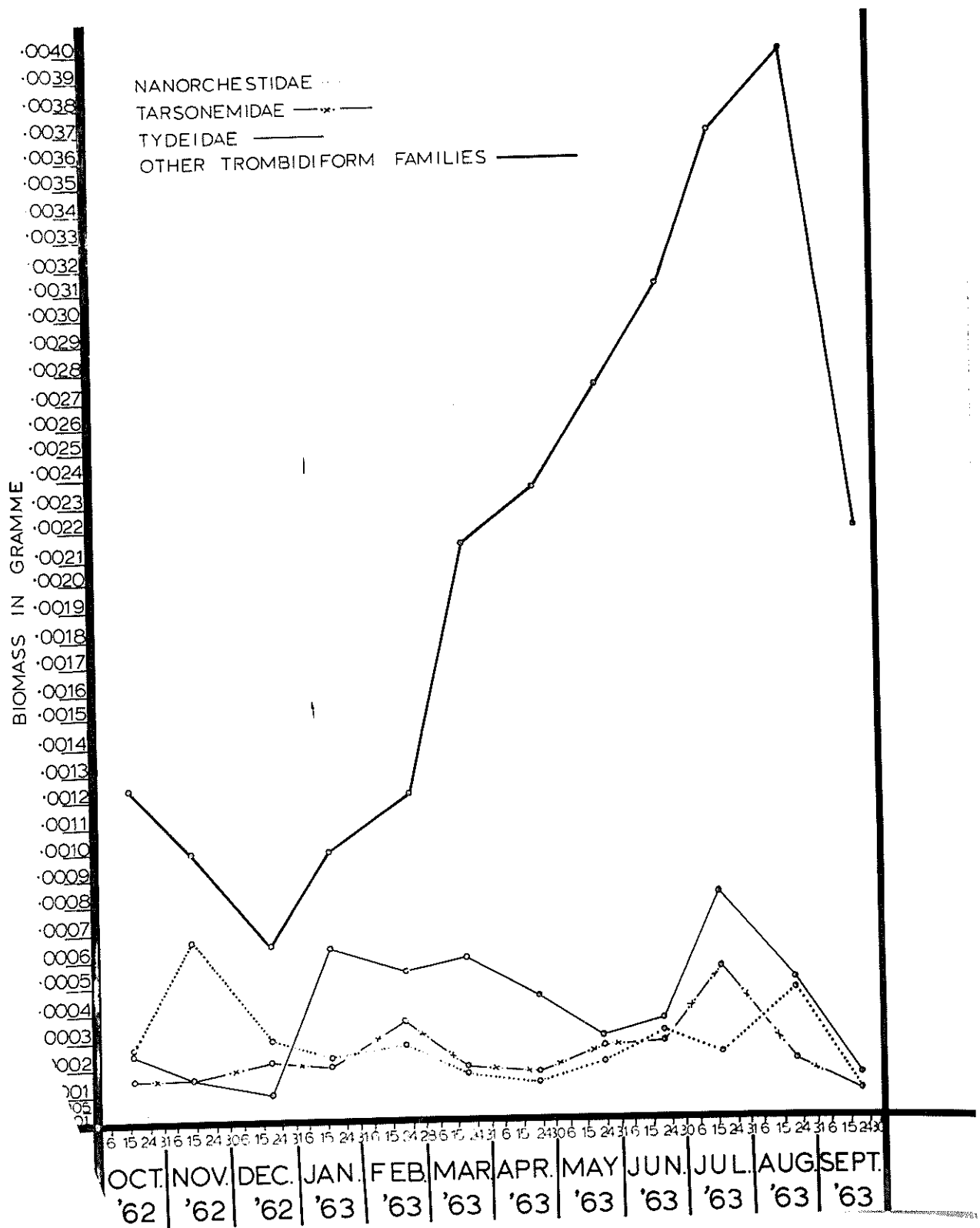


Fig. 10 : Seasonal fluctuations in Biomass of the families of Trombidiformes.

TABLE 9
NUMBERS AND BIOMASS FIGURES OF THE TYDEIDAE

Month	Numbers per sample	Biomass per sample	Numbers per m ²
Oct. '62	73	0.0002655 g.	02,308.917
Nov. '62	40	0.0001670 "	01,265.017
Dec. '62	24	0.0000960 "	759.200
Jan. '63	113	0.0006495 "	03,574.408
Feb. '63	138	0.0005670 "	04,365.400
Mar. '63	312	0.0006000 "	09,869.600
Apr. '63	129	0.0004695 "	04,080.700
May '63	140	0.0003060 "	04,428.508
Jun. '63	190	0.0003660 "	06,010.017
Jul. '63	459	0.0008325 "	14,519.700
Aug. '63	196	0.0005100 "	06,199.817
Sept. '63	53	0.0001575 "	01,676.408

TABLE 10
NUMBERS AND BIOMASS FIGURES OF THE NANORCHESTIDAE

Month	Numbers per sample	Biomass per sample	Numbers per m ²
Oct. '62	137	0.0002740 g.	04,333.608
Nov. '62	335	0.0006700 "	10,597.008
Dec. '62	156	0.0003120 "	04,934.800
Jan. '63	116	0.0002320 "	03,669.308
Feb. '63	144	0.0002880 "	04,555.200
Mar. '63	86	0.0001720 "	02,720.308
Apr. '63	65	0.0001300 "	02,056.008
May '63	109	0.0002180 "	03,447.717
Jun. '63	163	0.0003260 "	05,155.917
Jul. '63	116	0.0002320 "	03,669.308
Aug. '63	235	0.0004700 "	07,433.517
Sept. '63	44	0.0000880 "	01,391.708

TABLE 11

NUMBERS AND BIOMASS FIGURES OF THE TARSONEMIDAE

Month	Numbers per sample	Biomass per sample	Numbers per m^2
Oct. '62	37	0.0001695 g.	01,170.117
Nov. '62	47	0.0001700 "	01,468.608
Dec. '62	99	0.0002430 "	03,131.700
Jan. '63	75	0.0002085 "	02,372.500
Feb. '63	157	0.0003735 "	04,966.117
Mar. '63	64	0.0001965 "	02,024.217
Apr. '63	75	0.0001725 "	02,372.500
May '63	132	0.0002715 "	04,175.600
Jun. '63	128	0.0002835 "	04,048.908
Jul. '63	249	0.0005580 "	07,876.700
Aug. '63	81	0.0002115 "	02,562.300
Sept. '63	38	0.0000810 "	01,201.908

TABLE 12

NUMBERS AND BIOMASS FIGURES OF THE OTHER
TROMBIDIFORM FAMILIES

Month	Numbers per sample	Biomass per sample	Numbers per m^2
Oct. '62	166	0.0012420 g.	05,250.817
Nov. '62	190	0.0010065 "	06,199.817
Dec. '62	200	0.0006510 "	06,326.085
Jan. '63	335	0.0010900 "	10,597.085
Feb. '63	236	0.0012285 "	07,465.085
Mar. '63	214	0.0021686 "	06,769.217
Apr. '63	176	0.0023660 "	05,567.308
May '63	172	0.0027240 "	05,440.617
Jun. '63	237	0.0031380 "	07,497.100
Jul. '63	325	0.0037060 "	10,280.170
Aug. '63	285	0.0039940 "	09,015.500
Sept. '63	145	0.0022140 "	04,586.517

TABLE 13
NUMBERS AND BIOMASS FIGURES OF THE RHODACARIDAE

Month	Numbers per sample	Biomass per sample	Numbers per m^2
Oct. '62	22	0.0003440 g.	695.617
Nov. '62	15	0.0002820 "	474.500
Dec. '62	34	0.0004110 "	01,012.108
Jan. '63	44	0.0007170 "	01,391.708
Feb. '63	25	0.0006960 "	790.517
Mar. '63	54	0.0005480 "	01,708.200
Apr. '63	43	0.0005480 "	01,359.917
May '63	35	0.0005060 "	01,107.800
Jun. '63	48	0.0006820 "	01,518.400
Jul. '63	32	0.0002980 "	01,012.108
Aug. '63	55	0.0007420 "	01,739.517
Sept. '63	40	0.0005720 "	01,265.017

TABLE 14
NUMBERS AND BIOMASS FIGURES OF THE LAELAPTIDAE

Month	Numbers per sample	Biomass per sample	Numbers per m^2
Oct. '62	9	0.0002080 g.	284.700
Nov. '62	14	0.0004180 "	442.708
Dec. '62	12	0.0005080 "	379.600
Jan. '63	24	0.0010180 "	759.200
Feb. '63	9	0.0002700 "	284.700
Mar. '63	22	0.0017260 "	695.617
Apr. '63	5	0.0000960 "	158.008
May '63	14	0.0007000 "	442.708
Jun. '63	15	0.0005000 "	474.500
Jul. '63	18	0.0008680 "	569.400
Aug. '63	18	0.0008680 "	569.400
Sept. '63	-	-	-

TABLE 15
NUMBERS AND BIOMASS FIGURES OF THE ACROSEJIDAE

Month	Numbers per sample	Biomass per sample	Numbers per m ²
Oct. '62	2	0.0000480 g.	63.108
Nov. '62	2	0.0000480 "	63.108
Dec. '62	-	-	-
Jan. '63	13	0.0003120 "	410.917
Feb. '63	6	0.0001440 "	189.800
Mar. '63	6	0.0001440 "	189.800
Apr. '63	6	0.0001440 "	189.800
May '63	2	0.0000480 "	63.108
Jun. '63	4	0.0000960 "	126.217
Jul. '63	4	0.0000960 "	126.217
Aug. '63	1	0.0000240 "	31.317
Sept. '63	2	0.0000480 "	63.108

TABLE 16
NUMBERS AND BIOMASS FIGURES OF THE PHYTOSEIIDAE

Month	Numbers per sample	Biomass per sample	Number per m ²
Oct. '62	3	0.0000240 g.	94.900
Nov. '62	5	0.0000400 "	158.008
Dec. '62	7	0.0000560 "	221.117
Jan. '63	22	0.0001760 "	695.617
Feb. '63	23	0.0001840 "	727.408
Mar. '63	4	0.0000320 "	126.217
Apr. '63	7	0.0000560 "	221.117
May '63	15	0.0001100 "	474.500
Jun. '63	3	0.0000560 "	94.900
Jul. '63	5	0.0000400 "	158.008
Aug. '63	7	0.0000560 "	221.117
Sept. '63	3	0.0000240 "	94.900

TABLE 17
NUMBERS AND BIOMASS FIGURES OF THE MACROCHELIDAE

Month	Number per sample	Biomass per sample	Number per m ²
Mar. '63	1	0.0000200 g.	31.317
Jul. '63	1	0.0000200 "	31.317

When the biomass figures of the families of Mesostigmata are compared with their numbers (tables 13-17) it is evident that the Rhodacaridae (table 13) did not maintain their dominant position; this is largely due to the presence of the relatively heavy specimens of Leptolaelaps elegans which resulted in a sharp rise in biomass of the Laelaptidae (table 14) during January, March and July. In the March sample the biomass figure for the Laelaptidae is almost three times higher than that of the Rhodacaridae. Both in numbers and biomass the Aceosejidae (table 15), Phytosciidae (table 16) and Macrochelidae (table 17) were far below those of the other two families.

From the data in table 18 and fig. 7 it is clear that the biomass of the mesofauna was largely determined by the arthropods other than the mites. These other arthropods were mainly Collembola, but whereas this insect order reached maximum abundance during August the biomass figure for the group as a whole was low. The biomass peak was reached in February when the numbers of the collembolae actually showed a decline.

6.2 BIOMASS RATIOS

The biomass of the soil fauna can be estimated directly by weight or measurement or by using a combination of the two methods. These figures are expressed as either volume or weight per unit volume or unit weight.

Two methods were used to calculate the biomass ratios. The biomass of each monthly sample was divided into the mean monthly dry weight of the soil sample to obtain the mesofauna/soil ratio. A representative soil subsample was taken, dried in an oven at 100°C and

weighed. The subsample weight (84.7 g) was multiplied by 15 to determine the dry weight of a soil sample, and this figure of 1270.5 g was divided by the biomass of each sample (table 19). The mean ratio of the 12 months of the sampling period was one part of living matter: 28,638 parts of soil.

TABLE 19

Month	Weight	Ratio of living matter to soil weight
Oct. '62	$\frac{1270.50}{.02}$ g. g.	1 : 63,525
Nov. '62	$\frac{1270.50}{.03}$ g. g.	1 : 42,316
Dec. '62	$\frac{1270.50}{.07}$ g. g.	1 : 18,170
Jan. '63	$\frac{1270.50}{.06}$ g. g.	1 : 21,175
Feb. '63	$\frac{1270.50}{.09}$ g. g.	1 : 14,116
Mar. '63	$\frac{1270.50}{.08}$ g. g.	1 : 15,881
Apr. '63	$\frac{1270.50}{.05}$ g. g.	1 : 25,410
May '63	$\frac{1270.50}{.07}$ g. g.	1 : 18,170
Jun. '63	$\frac{1270.50}{.05}$ g. g.	1 : 25,410
Jul. '63	$\frac{1270.50}{.04}$ g. g.	1 : 31,762
Aug. '63	$\frac{1270.50}{.05}$ g. g.	1 : 25,410
Sept. '63	$\frac{1270.50}{.03}$ g. g.	1 : 42,316

Mean: $\frac{343,661}{12} = 28,638.$

In table 20 the mean numbers and biomass per volume unit of the mesofauna (A) and the Acari & Collembola (B) are given. One cc soil contained 0.035 mg living material, 28,000 cc of soil harboured one cc of living material (assuming the specific gravity of the soil to be one). From the table it is evident that the biomass of the Acari and Collembola contributed more than 45% to the mesofaunal weight, giving a ratio of 1 : 67,000. When these figures are compared with those given by Murphy (1955) it can be seen that the kikuyu grassland (upper 5 cm) is inhabited by less microarthropods than in European grasslands. This is also the case in the soils investigated by Ulrich (1933) and Macfadyen (1952).

TABLE 20

A = Mesofauna;

B = Acari and Collembola

Sample depth	Total collected	Mean number per subsample	Mean number per cm ³	Subsample volume (cm ³)	Biomass per cm ³ (mg)
5 cm.	A:18,207	A:101.15	A:0.96	105	A:0.035
	B:17,190	B: 96.8	B:0.92		B:0.0149

6.3 SOIL METABOLISM.

To study the soil fauna in liberating energy and nutrients from dead plant matter Macfadyen (1963) attempted measuring the metabolism of the different groups. For this purpose he analysed nine soil habitats by biomass and metabolism, presenting the total annual metabolism in kilocalories per square metre.

Using the figures given by Macfadyen for the different numbers of trophic groups the data of the Mesostigmata (predators) and the Oribatei and Collembola (small decomposers) are given in tables 21-23. The Trombidiformes were, however, not included in his analysis. Although the results of the calculations are very approximate they give some indications of the energy flow in the soil.

TABLE 21
WEIGHT AND CALORIES USED
MESOSTIGMATA

Month	Weight (g)	g/m ²	cal/g/day	Tot. cal. used per month/m ²
Oct. '62	0.0006526	0.3096587	300	2,781.000
Nov. '62	0.0007880	0.3739060	"	3,357.000
Dec. '62	0.0007242	0.3436329	"	3,087.000
Jan. '63	0.0022190	1.0529155	"	9,468.000
Feb. '63	0.0006476	0.3072862	"	2,763.000
Mar. '63	0.0016180	0.7667410	"	6,894.000
Apr. '63	0.0008446	0.4007627	"	3,600.000
May '63	0.0013740	0.6519630	"	5,741.280
Jun. '63	0.0012980	0.6159010	"	5,535.000
Jul. '63	0.0013200	0.6263400	"	5,634.000
Aug. '63	0.0015840	0.7516080	"	6,754.000
Sept. '63	0.0005606	0.2660047	"	2,394.000

TABLE 22
WEIGHT AND CALORIES USED
ORIBATEI

Month	Weight (g)	g/m	cal/g/day	Tot. cal. used per month/m ²
Oct. '62	0.0016750	0.7947875	24	571.680
Nov. '62	0.0042240	2.0042880	"	1,442.880
Dec. '62	0.0084350	4.0024075	"	2,881.440
Jan. '63	0.0071230	3.3798635	"	2,432.880
Feb. '63	0.0049480	2.3478260	"	1,689.840
Mar. '63	0.0083160	3.9459420	"	2,840.400
Apr. '63	0.0068550	3.2526975	"	2,341.440
May '63	0.0071960	3.4145020	"	2,458.080
Jun. '63	0.0078660	4.1594670	"	2,994.480
Jul. '63	0.0067640	3.2095180	"	2,310.480
Aug. '63	0.0090900	4.3132050	"	3,105.360
Sept. '63	0.0026670	1.2654915	"	910.800

TABLE 23

WEIGHT AND CALORIES USED

COLEMBOLA

Month	Weight (g)	g/m ²	cal/g/ day	Tot. cal. used per month/m ²
Oct. '62	0.0015320	.7269340	144	3,136.620
Nov. '62	0.0075540	3.5843730	"	15,482.880
Dec. '62	0.0065510	3.1084495	"	13,426.560
Jan. '63	0.0079890	3.9707805	"	16,372.800
Feb. '63	0.0025780	1.2232610	"	5,283.360
Mar. '63	0.0032580	1.5459210	"	6,647.400
Apr. '63	0.0028010	1.3290745	"	5,741.280
May. '63	0.0044720	2.1219640	"	9,162.720
Jun. '63	0.0050080	2.3762960	"	10,264.320
Jul. '63	0.0096460	4.5770270	"	19,772.640
Aug. '63	0.0137640	6.5310800	"	28,213.920
Sept. '63	0.0069720	3.3082000	"	14,290.560

7.: COMPOSITION OF THE MESOFAUNA

For the purposes of this investigation the mesofauna can be defined as those animals collected by the funnel method of extraction (1 mm diameter mesh) and include the Arachnida, Myriapoda, Insecta and other members of the Arthropoda. The quantitative survey undertaken for this study revealed that the Acari contributed approximately 79% to the numbers and 30% to the biomass of the fauna collected during the sampling period, the other arthropods constituting the remaining 21% and 70% respectively. The numerical contribution of the Acari was composed of 43.2% from the Trombidiformes, 31.5% from the Oribatei and 4.2% from the Mesostigmata, the biomass being 9%, 18% and 3% respectively. The contribution of the Acaridiae to both numbers and biomass of the mites is negligible. The curves for the total numbers and the biomass of the mesofauna as well as histograms of the biomass of the mite groups and other arthropods for each month are presented in fig. 7.

The Collembola constituted 15.5% of the 21% of "other arthropods" and their average numbers per m^2 were 7,457 compared with 37,857 of the Acari. The ratio Acari/Collembola, therefore, is 5:1 which is more or less the same as the proportion found by Macfadyen (1952) in Fenland. The total mesofaunal arthropoda collected in the present study averaged 47,996 per m^2 .

7.1 TROMBIDIFORMES.

In table 24 the numbers of the different Trombidiformes belonging to 20 families collected from each sample are given. The total numbers of each family

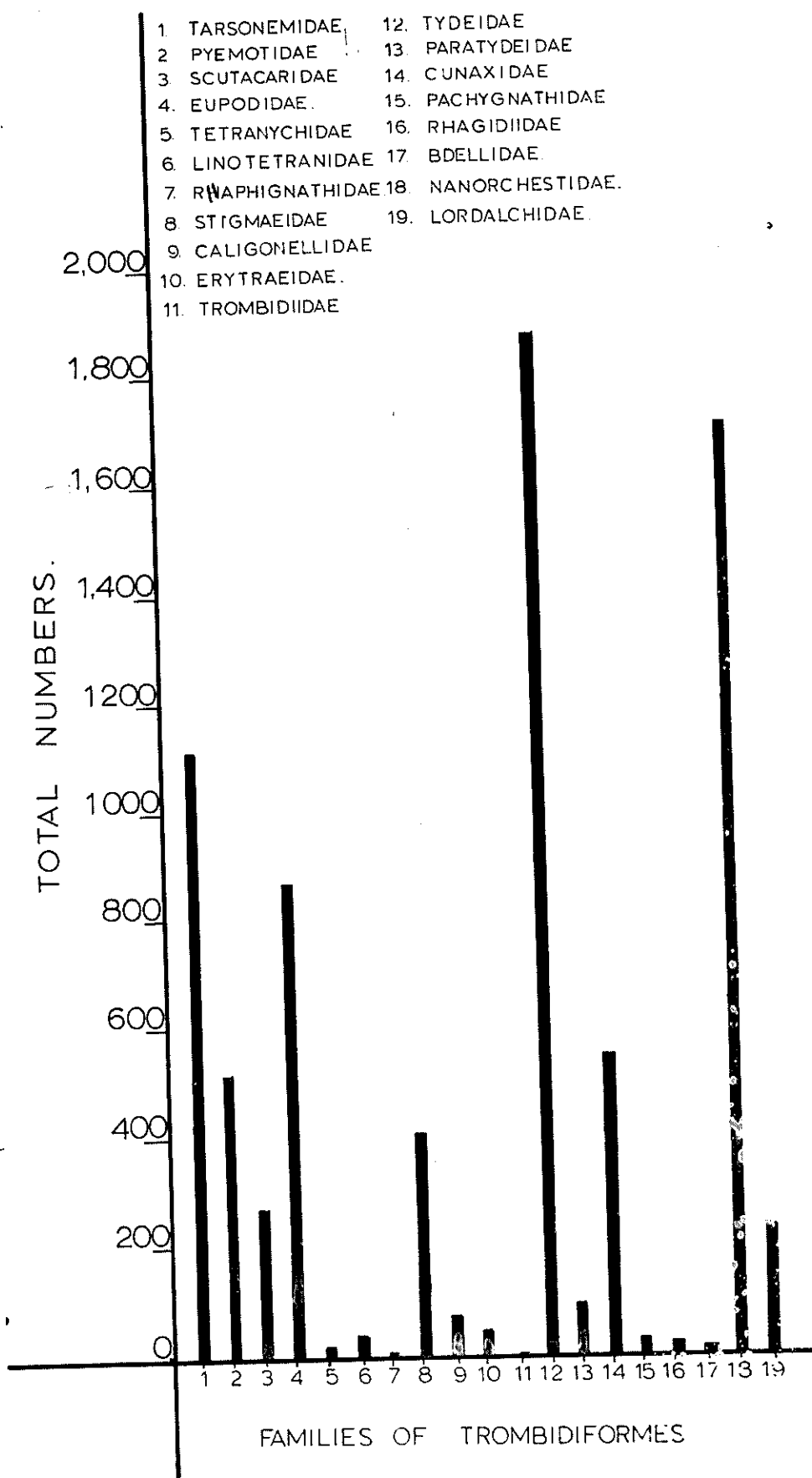


Fig. 11 : Total numbers of the families of Trombidiformes.

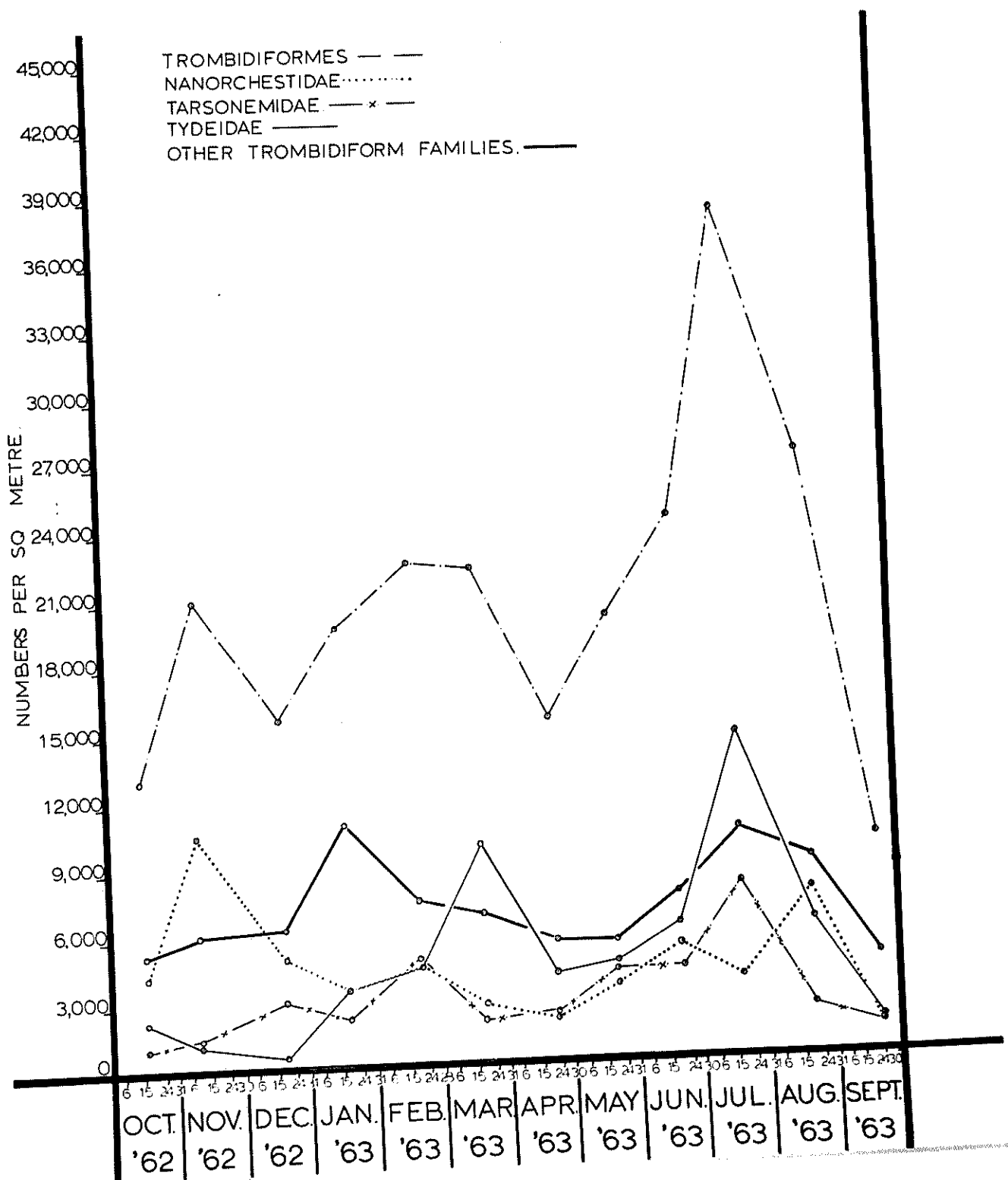


Fig. 5. Seasonal fluctuation in numbers of the families of Trombidiformes.

TABLE 24

NUMBERS PER SAMPLE AND PERCENTAGES OF TOTAL MESOFAUNAL NUMBERS AND BIOMASS OF TROMBIDIFORMES															
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Tot.	Numbers %	Biomass %
Tarsonemidae	37	47	99	75	157	64	75	132	128	249	81	38	1182	6.492	
Pyemotidae	43	66	39	56	74	29	12	28	146	92	16	14	515	2.828	
Scutacaridae	33	60	24	8	18	38	28	27	15	31	44	2	262	1.439	
Eupodidae: Eupodes sp.	10	8	28	50	11	19	29	37	26	57	25	28	350	1.922	
E. variegatus	14		13	26	25	20	20	7	46	46	56	19	330	1.812	
larva			3		4	5	2	7	9	24	13	1	34	.186	
nymph				4	6		6	5	10	1	5	8	72	.395	2.6350
parafusifer				5		3	1	12	1	1	31	3	78	.428	
larva	3	4											2	.010	
Tetranychidae: Bryobia p.					4	1			1	1	2	1	16	.087	.0407
Linotetranychidae: Linotetranychus sp.	5	3		2	11			1	2	5	3	3	31	.170	.0790
Phytotipalpidae: Brevipalpus sp.													2	.010	.0008
Raphignathidae: Raphignathus sp.		1							2			2	3	.016	.0012
Stigmaeidae: Apostigmaeus n.	6		14	13	28	20	30	33	24	36	33	23	260	1.428	.9281
larva							2	4	2	1	3		12	.065	
nymph								13	1	1	18	6	1	.005	
Ledermlulleria sp.	1	4	1	4	6	2	9		17	17			98	.538	
larva							1	4	1	4			2	.010	
Cheylestigmaeus sp.	2		2	2	2	1	2	1	3	3	1	1	17	.093	.0577
Stigmaeus sp.			1	6				1	1		1		1	.093	
larva													1	.005	
Calignonellidae: Molothrogna sp.	13	8	7	4	3	2	5	2	2	4	8	2	60	.329	.2486
larva	1				1				1				2	.010	
nymph					2								3	.016	
Erythraeidae				1	2		1		1				3	.027	.3229
Abrolophus bipilus		1			4			5	3		6	5	31	.170	
larva								1					2	.010	
Trombididae				1	1								5	.027	.0424
Tydeidae Tydeus sp.	13	8	5	40	28	10	23	2	7	12	16	1	167	.917	
larva		1											1	.005	.5220
nymph					2	1		6	2		2	1	14	.076	
Coccotydeus sp.	60	31	19	73	108	301	106	132	181	447	178	49	1685	9.254	.5370
Paratydeidae: Scolotydeus sp.	7	2	2	20	13	18	7	7	11	11	10	4	112	.615	.2855
Lordalychidae: Lordalychus sp.	1	13	24	50	11	21	24	14	17	12	23	19	229	1.257	.0973
Cunaxidae: Cunaxa sp.	24	51	45	39	31	33	30	16	23	14	16	23	345	1.894	
larva		13	4	20	3	2	3	1		2	3		51	.280	
nymph		6	1	3	3	2				2	3		20	.109	1.4785
Cunaxoides sp.	1		6	3	6	11	5	4	10	9	16	7	78	.428	
nymph						2	1		1				3	.016	
Cheyletidae: Cheyletia sp.	1					2	1		2				2	.010	.0008
Pachygnathidae: Bimichaelia sp.				1		2		6	1	3	5	2	21	.115	.0985
larva								1	1	1	1	1	6	.032	
Petrachus sp.						4	1	1	2	2	1	2	2	.010	
Rhagidiidae: Rhagidia sp.	1	1	2		2	1	1	2	2		3	2	21	.115	.0624
Bdellidae: Bdella sp.	1							2			1		9	.049	.0267
Nanorchestidae: Nanorchestes sp.	136	335	156	116	87	67	36	80	122	61	176	38	1410	7.744	
Spelorchestes	1				57	19	29	29	41	55	59	6	296	1.625	.7250
	413	667	497	624	711	701	489	619	769	1205	857	312	7864	43.205	9.1608

are shown by means of histograms in fig. 11. A further analysis of the numbers and percentages of the animals recovered from each of the subsamples taken during the sampling period, is presented in tables 30 - 41.

The Tarsonemidae, Pyemotidae and Scutacaridae were not identified below family level. The species collected probably belong to the genera Tarsonemus, Steneotarsonemus, Pygmephorus and Scutacarus. These Tarsonemini constituted 10.761% of the total numbers of the mesofauna but owing to their minute size their biomass figure is merely 0.6244%.

The Eupodidae were represented by three species of the genus Eupodes, two of which (E. variegatus Koch, E. parafusifer Ryke & Meyer) are known to science. As far as biomass is concerned this family was superior to all the other families of Trombidiformes. Their numbers were 4.757% and their biomass 2.6357% of those of the mesofauna totals.

The Linotetranidae (Linotetranus), Raphignathidae (Raphignathus), Tetranychidae (Bryobia praetiosa Koch) Trombidiidae, Rhagidiidae (Rhagidia), Bdellidae (Bdella) and Cheyletidae (Cheyletia) were each represented by one species only and the number of specimens collected during the entire sampling period varied between 2 and 31. Of these families the greatest biomass (0.0790 g.) and highest numbers were provided by the Linotetranidae. The Pachygnathidae were also present in small numbers (29) but they were represented by two genera namely Binichaelia and Petralycus. The Erythracidae with 38 specimens were comprised of more than one species, Abrolophus bipilus Meyer & Ryke being known to science.

Sixty five specimens of Molothrognathus sp., the sole representative of the family Caligonellidae, were collected but these represented only 0.357% of the total numbers and 0.2486% of the biomass. The family Paratydeidae (Scolotydeus) exceeded one hundred specimens but their numbers were still well under one percent of the mesofaunal total. The Lordalychidae (Lordalychus) reached a total of 229 and the Cunaxidae, represented by the genera Cunaxa and Cunaxoides, were 497 in number; the former of these two genera was the most abundant. The numbers of the Stigmaeidae (408) were less than those of the Cunaxidae but four different species representing four genera could be distinguished namely Apostigmaeus navicella Grandjean, Ledermülleria sp., Cheylostigmaeus sp. and Stigmaeus sp.

The Nanorchestidae were present in numbers exceeding 1700 which were 9.372% of the total but represented a biomass of only 0.725%. Although two species were found the main contribution came from the genus Nanorchestes, those specimens belonging to Speleorchestes being present in insignificant numbers. The family Tydeidae was the dominant family in numbers (10.257%) and the genera Tydeus and Coccotydeus contributed to a biomass of 1.0470%; the bulk of these specimens belonged to the latter genus, the size of which is very much smaller than those of the genus Tydeus. Both Nanorchestidae and the Tydeidae had a lower biomass than either the Eupodidae, Stigmaeidae or Cunaxidae.

7.2 MESOSTIGMATA.

The data of table 25 (and the analyses in tables 30-41) show that the Mesostigmata were represented by 17 different species belonging to five gamasid families and the Uropodoidea. The number of species of the different gamasid families collected from the samples are compared in fig. 12). Numerically the Rhodacaridae were the dominant family with representatives of the genera Asca, Antennoseius, Rhodacarellus, Gamasellus, Digamasellus and Gamaselliphis. Digamasellus badenhorsti Ryke and Rhodacarellus sp. were the most numerous, the former being by far the largest contributor to biomass.

The Laelaptidae included the genera Pseudolaelaps, Laelaspis, Hypoaspis, Cosmolaelaps and Leptolaelaps. The relatively high biomass figure for Leptolaelaps elegans Berlese made a substantial contribution to the total of 1.2908% for the Laelaptidae.

Although the numbers of the Rhodacaridae (447) were almost three times higher than those of the Laelaptidae (160) the total weight of the former family amounted to only 1.2661%.

The Phytoseiidae and Aceosejidae were each represented by one species only belonging to the genera Amblyseius and Lasioseius respectively. The former species were twice as abundant as the latter but its biomass was less. Only two specimens of the Macrochelidae (Macrochelea sp.) and two of the Uropodoidea were collected during the entire sampling period.

TABLE 25

NUMBERS PER SAMPLE AND PERCENTAGES OF TOTAL MESOFAUNAL NUMBERS AND BIOMASS OF MESOSTIGMATA

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Tot.	Numbers %	Biomass %
Macrochelidae: Macrocheles sp.													2	.010	.0084
Aceosejidae: Lasioseius sp. nymph	2	1		12	6	6	6	2	2	3	1	1	42	.230	
		1		1					2	1		1	6	.032	
	2	2	-	13	6	6	6	2	4	4	1	2	48	.263	.2447
Phytoseiidae: Amblyseius sp. larva	2	1	3	7	16	4	4	11	2	2	7	2	61	.335	
nymph	1	3	4	4	2		3	1	1	3		1	8	.043	
	3	5	7	22	23	4	7	15	3	5	7	3	35	.192	
Rhodacaridae: Asca sp.													104	.571	.1767
	1	2	2	5	1	4	3	5	3	2	2	3	23	.126	.3225
A. spinosa nymph	5	1	3	5	1		7		10	1			46	.252	
A. aethiopica	1												3	.016	.0140
Antennoseius boskopenensis			1	1	1		2		2	2			9	.049	.0095
Rhodacarellus sp	4		10	6	14	18	13	9	13	17	16	9	129	.005	.0042
nymph	1		3	1	1	1	2		5		1	1	12	.708	.0614
Digamasellus badenhorsti	1	6	7	9	2	7	4	5	5	1	2	2	57	.065	
nymph	7		7	16	5	16	12	16	15	7	8	24	157	.313	.8185
Gamaselliphis potcheistroomensis	1		1	1		4						1	8	.862	.0055
Gamasellus sp.														.010	.0305
	22	15	34	44	25	54	43	35	48	32	50	40	447	.043	1.2661
Laelaptidae: Pseudolaelaps sp.														2.455	
nymph	1		1	1		6	2		2	1	2		16	.087	.0650
Laelaspis sp.	1				1	1							2	.005	
Hypoaspis praesternalis	4	6		4	5	2	2		2				25	.010	.0084
nymph	2	2	2	1		3	1				1		12	.137	.1572
Cosmolaelaps sp.		1											4	.065	
nymph	1	4		11	2	9		8	7	12	11		72	.021	.0084
Leptolaelaps elegans		1	7	7	1	1		6	1	5	3		27	.005	
nymph	9	14	12	24	9	22	5	14	15	18	18	-	160	.395	1.0518
														.148	1.2908
Uropodoidea											2		2	.879	
														.010	.0055
	36	36	53	103	63	87	61	66	70	60	83	45	763	4.191	2.9919

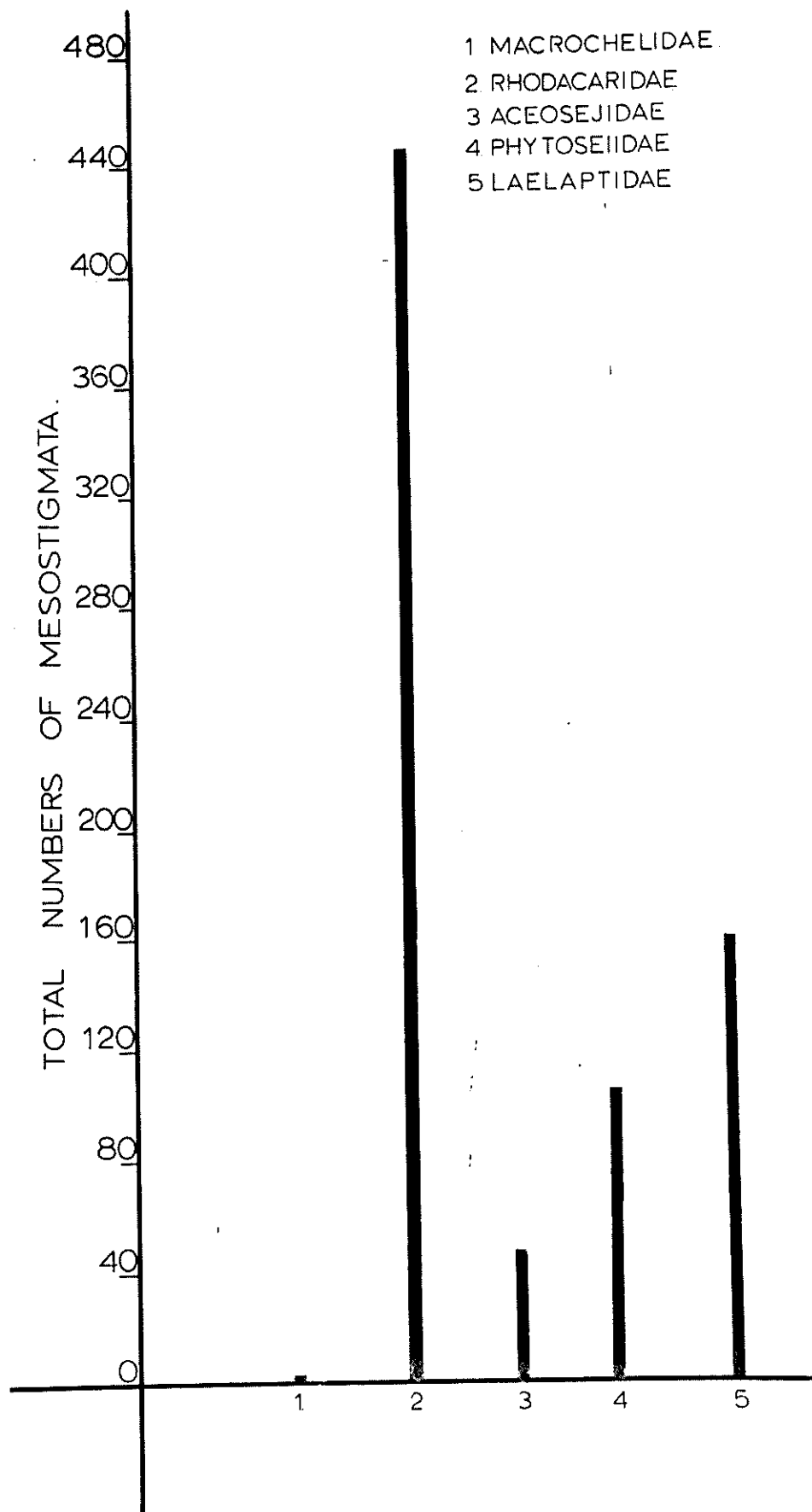


Fig. 12. : Total numbers of families of Mesostigmata.

7.3 ORIBATEI.

Although the Oribatei were treated as a group without identification of families or genera, the different species were counted separately. Sixteen species (numbered K 1 - K 16) were recognised (fig. 13; table 26), Nos. 1,2,3,5, and 8 being the most abundant forms. As far as biomass was concerned Nos. 1,2,3,14 and 15 made the best contribution. Number 1 had the highest figure for both numbers and biomass. Tables 30-41 present the data of the numbers of each of the different species of Oribatei collected from the subsamples.

7.4 ACARIDIAE (ASTIGMATA).

Only five specimens of astigmatid mites were collected two of these were recovered from the October sample and one each from the January, June and July samples.

7.5 OTHER ARTHROPODA.

The arthropods other than the mites constituted approximately 21% of the numbers and 70% of the biomass of the mesofauna. They were considered as a group but the data of the different orders are presented in tables 30-41. The numbers collected during each month as well as the percentages of numbers and biomass are given in table 27,; the relative abundances of the different groups are illustrated by means of histograms in fig. 14.

The Collembola were the most numerous of the "other arthropoda" during every month of the year. They constituted more than 15% of both numbers and biomass. The

TABLE 26

NUMBERS PER SAMPLE AND PERCENTAGE OF TOTAL MESOFAUNAL NUMBERS AND BIOMASS OF ORIBATEI

No.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEPT.	TOT.	NUMBERS %	BIOMASS %
K.1.	51	115	186	157	156	207	209	195	267	125	327	84	2,079	11.421	7.9517
K.2.	19	72	165	73	41	70	54	30	24	42	36	19	645	3.543	2.4670
K.3.	30	93	173	104	51	227	115	63	116	95	148	31	1,246	6.845	1.3238
K.4.	2	-	35	1	4	10	10	1	1	3	3	4	74	.406	.4088
K.5.	1	15	7	-	17	35	25	40	19	27	34	10	230	1.263	.2443
K.6.	4	-	5	19	5	-	-	13	-	-	-	-	46	.252	.0488
K.7.	2	-	1	-	-	2	1	4	-	-	-	-	10	.054	.0063
K.8.	1	10	8	31	4	48	55	112	171	189	135	39	803	4.411	.5118
K.9.	-	-	3	-	4	10	1	22	8	6	1	2	57	.313	.3633
K.10.	11	-	9	7	25	14	11	-	6	19	24	18	144	.791	.1529
K.11.	-	-	2	50	3	8	-	-	-	-	1	1	65	.357	.0690
K.12.	-	1	1	41	-	-	-	-	-	-	-	-	43	.236	.1827
K.13.	1	3	4	4	18	12	14	6	20	5	14	6	107	.587	.5002
K.14.	1	2	-	-	-	-	6	12	13	19	6	1	60	.329	1.2749
K.15.	-	-	-	97	15	-	-	-	-	-	-	-	112	.615	2.3798
K.16.	-	-	-	-	-	-	-	2	3	2	1	-	8	.043	.0339
	123	311	599	584	343	643	501	500	648	532	730	215	5,729	31.466	17.9192

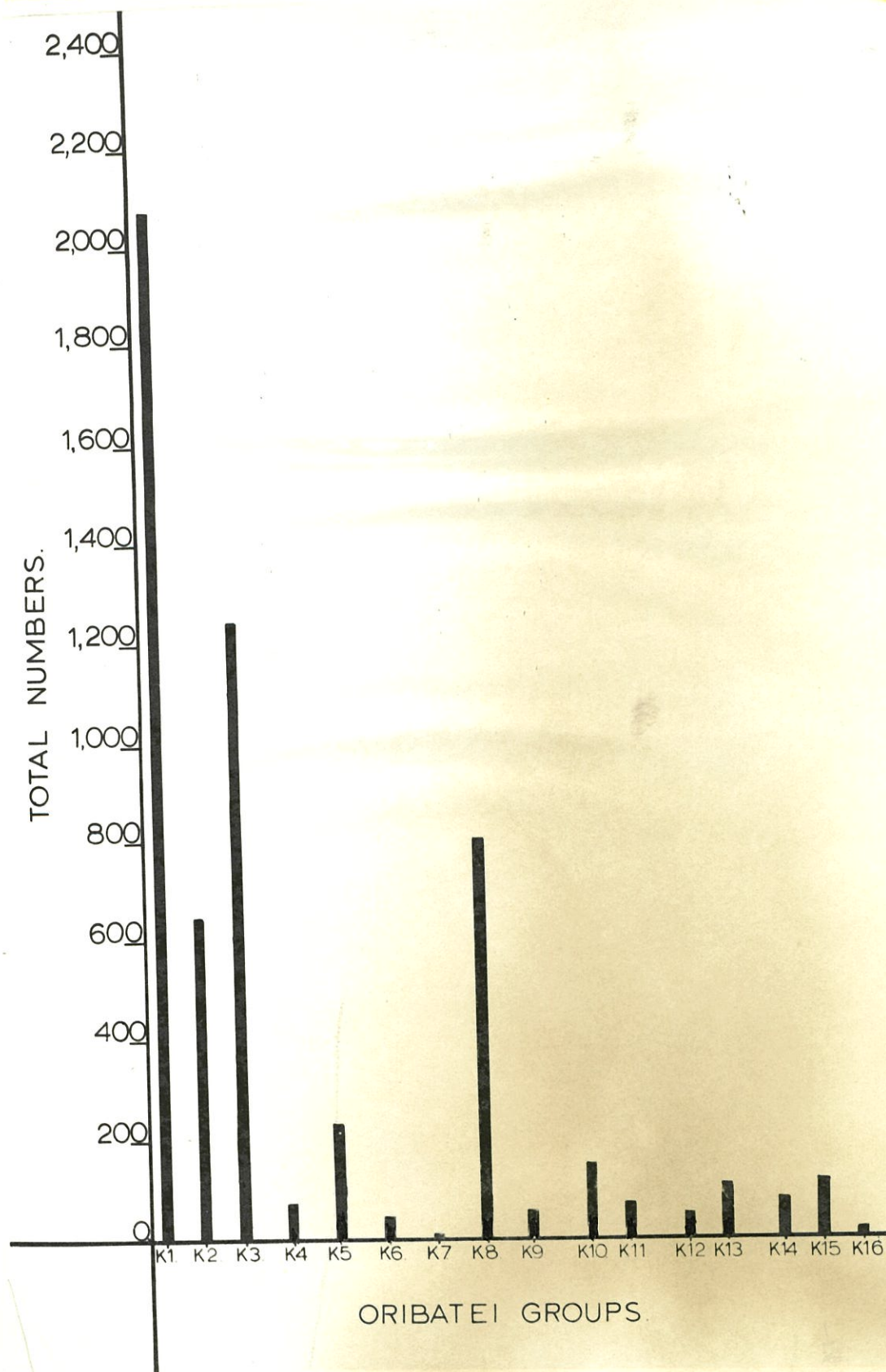


Fig. 13 : Total numbers of "species" of Oribatei.

vast majority of the collemboles were Arthropleona and they were more or less equally divided between the superfamilies Poduroidea (7.284%) and Entomobryoidea (7.806%) but the former contributed 10.4251% and the latter only 4.8311% to the biomass total. The numbers of the Symphypleona were low (0.45%) and their biomass reached 0.0696%.

Only a few larval forms of the Thysanura (11) and Orthoptera (2) and a single specimen of the Anoplura were extracted. The Corrodentia and Hemiptera were each represented by 50 specimens but whereas the former had a negligible weight of 0.08% the latter contributed 3.9098% to the mesofaunal biomass. A relatively high number (122) of Homoptera, represented by ^{the} Pseudococcinae, were collected. Although only 65 specimens of the Thysanoptera were found their contribution of 5.5% to the biomass was higher than any other order of the pterygote insects. The Diptera (53) and Coleoptera (41) were represented by both adult and immature stages and their biomasses were 3.1873% and 1.6701% respectively. Three hundred and sixty four ants (Hymenoptera) made a contribution of approximately 5% to the biomass of the mesofauna.

The mites and insects together constituted nearly 99% of the numbers of the mesofauna but their biomass total were only 65.6%. The remaining 34.4% of the weight was provided by the Chilopoda, Pauropoda, Araneida and Crustacea. The Chilopoda (73), which were all members of the family Geophilidae, made the substantial contribution of 30% to the mesofaunal biomass. Only one specimen of the Crustacea was collected.

TABLE 27

NUMBERS PER SAMPLE AND PERCENTAGES OF TOTAL MESOFAUNAL NUMBERS AND BIOMASS OF MICROARTHRO-
PODS (EXCLUDING ACARI)

	Oct.	Nov.	Dec.	Jan.	Febr.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Tot.	Nos. Percen- tages	Biomass Percentages
Collembola	59	345	239	327	106	168	107	189	208	373	477	231	2829	15.540	15.3258
Thysanura		2	4	4		1			1			1	11	.060	.2337
Orthoptera						11	3	1	1	1	1		2	.010	.1912
Corrodentia			5	1									40	.219	.0849
Anoplura													1	.005	.0004
Hemiptera	4			8	2	7	5	13	4	2	1	2	46	.252	3.9098
Homoptera		1		7	21	6	31	11	3	2		1	122	.670	.4018
Thysanoptera		3		6	2	2	11	14	7	9	3		65	.357	5.5247
Diptera		4		2		2	20	3	3	4	13	3	53	.291	3.1873
Coleoptera	1	4		3	2	2	3	5	3	5	4		41	.225	1.6701
Hymenoptera	20	20	40	46	94	48	24	38	8	3	2	21	364	1.999	4.9037
Chilopoda	1	12	11	1	5	15	5	4	9	3	6	1	73	.401	30.2479
Pauropoda	4	1	1	2	22	12	11	9	9	7	14	11	103	.565	.3939
Araneida			3		5	2	1	3	3	1	1		19	.104	3.0279
Crustacea								1					1	.005	.7118
	110	392	361	409	298	277	224	291	259	410	532	283	3846	20.712	69.8158

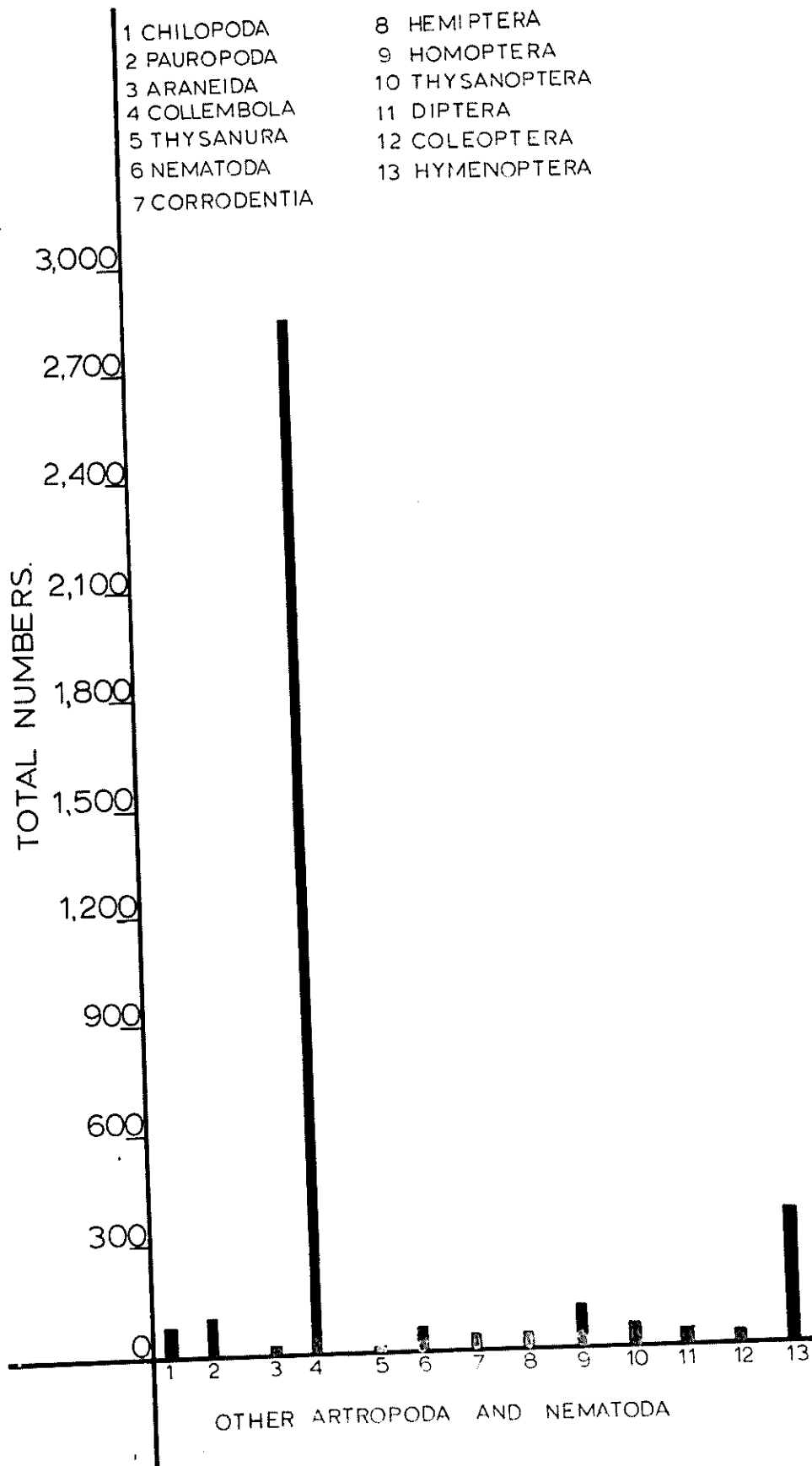


Fig. 14 : Total numbers of components of microarthropods (excluding Acari).

The non-arthropods were confined to 76 nematodes which constituted 0.417% of the numbers and 0.0968 of the biomass of the mesofauna collected by means of the funnels.

7.6 THE MACROFAUNA.

The above-mentioned mesofauna penetrated through a 1.0 mm mesh. In an attempt to determine the nature of the macrofauna, material from the litter layer was collected for extraction by means of the Moczarski-Winkler apparatus. The animals collected included surface dwelling Lepidoptera larva~~s~~ adult Diptera and Hymenoptera, numerous soil inhabiting Coleoptera with measurements up to 12.0 mm x 6.0 mm, and Hemiptera measuring up to 18.0 x 4.0 mm. Less frequent animals were forms such as Araneida (11.0 x 5.0 mm) and the crustacean Oniscus (6.0 x 2.0 mm).

Interesting to note is that not a single earthworm was found in the soil, whereas in European soils they make out a large proportion of the animal biomass. Bornebush (1930), for instance, recorded a total faunal biomass of 70.8 g, 53.0 g consisting of earthworms. The absence of earthworms is not due to the extraction process used because several earthworms were extracted from swamp soil by means of funnel batteries.

8 : HORIZONTAL DISTRIBUTION OF MESOFAUNA

In table 28 the figures of the number of animals collected from each subsample during every month of the sampling period are presented. An analysis of these figures reveals that the mesofauna was more or less evenly distributed over the sampling plot. This can largely be attributed to the relatively even growth of the kikuyu grass over the entire quadrat. Subplot no. 90 yielded the lowest percentage (4.51%) and no. 93 (11.31%) the highest. On subplots nos. 4, 19, 25, 26, 54, 59 and 90 the grass covering was less dense and this probably contributed to the fact that their percentages were the lowest. Subplots nos. 11, 43, 53 and 93 had a richer grass covering and the softer loam soil and higher percentage of organic material were possibly responsible for denser populations occurring on them. The other subplots (16, 38, 44 and 99) were in an intermediate position.

The coefficients of variation for each month calculated from the data of the 15 subplots are presented in table 29. Ford (1938) found that the beginning of the season, with low population numbers was accompanied by a decrease in the variability but an increase in population numbers was accompanied by a decrease in the variability. This phenomenon he attributed to the uneven distribution of the vegetation and the rapid evaporation of moisture from the bare patches during the dry season. The more dense grass areas retained more moisture and could accommodate larger populations of the mesofauna. From the figures in table 29,

TABLE 28

NUMBERS AND PERCENTAGES OF ANIMALS COLLECTED FROM EACH SUBPLOT

Sub sam- ple no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Sub plot no.	4	11	16	19	25	26	38	43	44	53	54	59	90	93	99	
Month																
Oct. '62	28	84	38	70	36	55	23	88	47	51	46	31	8	71	8	684
Nov. '62	81	81	136	25	70	81	38	159	72	95	86	23	138	214	107	1,406
Dec. '62	50	205	81	47	54	27	143	77	101	111	139	116	104	149	106	1,510
Jan. '63	95	154	95	70	97	114	100	73	84	185	106	106	67	223	152	1,721
Feb. '63	70	216	44	29	88	39	69	78	137	52	59	87	78	305	64	1,415
Mar. '63	99	105	89	97	74	93	113	207	138	90	123	80	141	127	132	1,708
Apr. '63	130	113	96	35	72	78	79	97	89	131	78	39	36	119	83	1,275
May, '63	31	157	101	75	88	76	132	146	161	132	45	62	72	165	33	1,476
Jun. '63	78	130	108	139	70	110	57	174	103	278	99	86	62	200	53	1,747
Jul. '63	142	231	154	121	192	101	177	308	113	117	94	70	60	85	243	2,208
Aug. '63	120	226	106	152	75	221	104	219	168	165	50	222	49	249	76	2,202
Sept. '63	18	54	82	85	55	37	77	100	59	69	12	13	7	153	34	855
	942	1,756	1,130	945	971	1,032	1,112	1,726	1,272	1,476	937	935	822	2,060	1,091	18,207
Percent- tages:	5.1738	9.6446	6.2064	5.1903	5.3331	5.6680	6.1075	9.4798	6.9863	8.1067	5.1463	5.1353	4.5147	11.3143	5.9922	

however, it is evident that during the dry month of October 1962 (7% soil moisture) the C.V. was low, which is just the opposite of Ford's observations under European conditions. This could readily be explained because all the populations were much depleted.

TABLE 29
DISTRIBUTION OF FAUNA ON PLOT : COEFFICIENTS
OF VARIATION

Month	Max.	Min.	$\bar{X}$	S.D.	C.V.
Oct. '62	88	8	45.60	24.0	52.631
Nov. '62	214	23	93.80	157.2	167.590
Dec. '62	205	27	100.66	143.4	142.459
Jan. '63	223	67	114.73	140.5	122.461
Feb. '63	305	29	94.33	226.2	239.790
Mar. '63	207	74	113.86	101.7	89.315
Apr. '63	130	35	85.00	30.2	35.541
May '63	165	31	98.40	144.2	146.545
Jun. '63	278	53	116.46	187.5	160.999
Jul. '63	308	60	147.20	216.3	146.942
Aug. '63	249	49	146.80	211.7	144.209
Sept. '63	153	7	57.00	120.9	212.105

The great diversity in the coefficients of variation might have been due to aggregation because the low C.V.'s cannot always be correlated with decreases in population density. Differences in the soil moisture content of the different subplots certainly would have contributed to variability. The efficiency of the extraction process for recovering the small specimens, especially from wet

samples, was probably also a factor which played a role in this connection. The new grease film technique developed by Aucamp & Ryke (1964, 1965) might prove to overcome this problem.

9 : DISCUSSION

The variation in seasonal abundance of the soil mesofauna has been the subject of several investigations in Europe. In these northern temperate regions the microarthropod population undergoes a marked seasonal fluctuation which usually involves minima during the summer month and maxima during the autumn and winter (Evans et al., 1961). In the present study it was found that the mite population fell to a minimum during the September - October (spring) period with a subsequent rise in density which resulted in a first peak during February and March (late summer) and a maximum during the winter (June-July). It can readily be assumed that this winter peak was to a large extent due to the unusual amount of rain which fell during the autumn and winter months. The long-term average total for the four months April-July is 71.8 mm, 16.2 mm of which being the amount for June and July together. During the sampling period, however, 70.9 mm of rain fell during June and July and this phenomenon must have had a great influence on the fauna of the upper 5 cm. of soil. Whether the mite population would reach a peak under "normal" conditions is open to doubt.

From the results obtained during this investigation it can therefore be deduced that the low temperature and relatively high moisture content of the soil, created optimum conditions for the mites and collemboles. (It is, of course, well known that under European climatic conditions the microarthropods are generally so insensitive to low temperatures that they can be frozen in the soil and after thawing out re-assume their activity again).

Evans et al. (1961), Macfadyen (1952) and Sheals (1957) came to the conclusion that the Oribatei are much more subjected to seasonal fluctuations than the Mesostigmata. The first mentioned authors reported that the Prostigmata follow the same general trend as that of the Oribatei and they are of the opinion that the fluctuations, especially those of the cryptostigmatid populations, are closely connected with the reproductive cycles of the mites. Haarlov (1960) however, maintains that these fluctuations are mainly due to changes in ecological conditions. From the available data it seems reasonable to suggest that ecological factors play an important role in determining population densities in our soils.

The present study of the composition and seasonal changes in the soil mesofauna is the first full scale investigation of the conditions in African soils. No data are available of studies which were undertaken in soils with similar climatic conditions. The only soil samples which were

collected in Africa to determine the number of arthropods are those collected by Salt (1953, 1955) in Kenya, Tanganyika and Uganda. According to this author these investigations were exploratory in nature and few samples could be thoroughly studied in the time available. Unfortunately he does not give an analysis of the composition of the Acari but treated them as a group. In Uganda Salt (1955) took six samples of soil under elephant grass (Pennisetum purpureum) and (with the flotation process) extracted approximately 23,200 mites and a total of 73,517 arthropods per m^2 from the top 6 in. of soil; the numbers in adjacent cultivated ground were much lower. The samples collected from soils in Kenya and Tanganyika (1953) under different grasses yielded less numerous arthropods (38,417 per m^2) than those in Uganda.

In the Potchefstroom samples the numbers of the mites in the kikuyu plot fluctuated between a minimum of 18,157 per m^2 during October 1962 to a maximum of 56,876 during July 1963. These figures are possibly not comparable with those of Salt since he probably would have lost a large percentage of the smaller mites (especially Trombidiformes) in the flotation process. When these figures from African soils are compared with those from European grasslands they are much lower since some authors collected even hundreds of thousands per m^2 (Salt et al., 1948; Macfadyen, 1952; Murphy, 1953; Haarlov, 1960 a.o.).

The Oribatei are, almost without exception, the dominant group of mites in European soils. Hughes (1959) maintains that this is the case in all soils. The above~~mentioned~~ data show that numerically the Trombidiformes were the superior group during all the seasons. In forest soils in the United Kingdom the Trombidiformes are in second position and the Mesostigmata in the third position but in grassland and other soils the numbers of the former group are usually much lower than those of the other two main orders (Evans et al., 1961).

Mainly because of taxonomic difficulties both the Mesostigmata and the Trombidiformes have not been studied to the same extent as the Oribatei. Available data suggest that the soil Mesostigmata usually possess a high degree of ecological plasticity because similar communities occur in a large variety of soil types. With the exception of Rhodacarellus and Digamasellus this group is hemiedaphic in nature.

The mesostigmatid fauna of the local soil differs from that in Europe in that the Rhodacaridae are the dominant group and not the Parasitidae, Veigaiaidae or Iaelaptidae.

The Trombidiformes are the least known of all the soil mites and they are very difficult to extract successfully. The majority of the genera which occur in European soils were also found in the kikuyu soil. Evans (1951) for example recorded extremely large numbers of Nanorchestes arboriger (Berl.) from the

floor of a Sitka spruce forest in the United Kingdom. No evidence could, however, be found in the literature that the Prostigmata were numerically in a dominant position in the Northern Hemisphere as is the case in this soil. Di Castri (1963), however, presents data from steppe soils in Chile in which the Prostigmata are more abundant than any other group of mites. A striking difference from our local soils is the absence of the Tarsonemini.

The ratio of 1:5 between Collembola and Acari in the kikuyu soil is similar to conditions encountered in European soils. Haarlov (1960) gives a summary of figures extracted from recent publications and the ratios in six grasslands range between 1:1.5 and 1:5.5. The present material suggests that the ratio of Oribatei and Collembola would differ from the European conditions because the former group is not the dominant group in our soils. The accounts of these ratios in the literature are contradictory and Haarlov notes that this situation is not surprising since in the various studies different species of these comprehensive systematic groups are involved.

The part played by all the above-mentioned microarthropods in the soil processes is extremely difficult to assess. At first glance, the results in the present paper may appear to be interesting only to the specialist. It should, however, be borne in mind that the purpose of soil biology, together with soil science and climatology, is to indicate the correct and natural way of utilizing the soil and so to acquire practical importance (Kühnelt, 1961).

TABLE 30. A.

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[illegible]

TABLE 31. A.

SAMPLE NO		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL
PLOT NO		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
NUMBERS AND PERCENTAGES OF ORGANISMS PER SAMPLING UNIT FOR NOVEMBER 1962.																	
AJAR																	
Trematodes																	
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197	5	03-773	6	02-105	2	01-162	8
<i>Tricladium</i>	02-489	2	01-076	58-000	7	01-428	1	19-753	16	13-197</							

TABLE 31. B.

NUMBERS AND PERCENTAGE OF ORGANISMS PER SAMPLING UNIT FOR NOVEMBER 1957

SAMPLING NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
ACARI (continued)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

TABLE 32. A.

NUMBERS AND SEQUENCES IN CASES OF COMPARISON									
CASE NO.	1		2		3		4		5
	Case	Seq	Case	Seq	Case	Seq	Case	Seq	
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12	12
13	13	13	13	13	13	13	13	13	13
14	14	14	14	14	14	14	14	14	14
15	15	15	15	15	15	15	15	15	15
16	16	16	16	16	16	16	16	16	16
17	17	17	17	17	17	17	17	17	17
18	18	18	18	18	18	18	18	18	18
19	19	19	19	19	19	19	19	19	19
20	20	20	20	20	20	20	20	20	20
21	21	21	21	21	21	21	21	21	21
22	22	22	22	22	22	22	22	22	22
23	23	23	23	23	23	23	23	23	23
24	24	24	24	24	24	24	24	24	24
25	25	25	25	25	25	25	25	25	25
26	26	26	26	26	26	26	26	26	26
27	27	27	27	27	27	27	27	27	27
28	28	28	28	28	28	28	28	28	28
29	29	29	29	29	29	29	29	29	29
30	30	30	30	30	30	30	30	30	30
31	31	31	31	31	31	31	31	31	31
32	32	32	32	32	32	32	32	32	32
33	33	33	33	33	33	33	33	33	33
34	34	34	34	34	34	34	34	34	34
35	35	35	35	35	35	35	35	35	35
36	36	36	36	36	36	36	36	36	36
37	37	37	37	37	37	37	37	37	37
38	38	38	38	38	38	38	38	38	38
39	39	39	39	39	39	39	39	39	39
40	40	40	40	40	40	40	40	40	40
41	41	41	41	41	41	41	41	41	41
42	42	42	42	42	42	42	42	42	42
43	43	43	43	43	43	43	43	43	43
44	44	44	44	44	44	44	44	44	44
45	45	45	45	45	45	45	45	45	45
46	46	46	46	46	46	46	46	46	46
47	47	47	47	47	47	47	47	47	47
48	48	48	48	48	48	48	48	48	48
49	49	49	49	49	49	49	49	49	49
50	50	50	50	50	50	50	50	50	50
51	51	51	51	51	51	51	51	51	51
52	52	52	52	52	52	52	52	52	52
53	53	53	53	53	53	53	53	53	53
54	54	54	54	54	54	54	54	54	54
55	55	55	55	55	55	55	55	55	55
56	56	56	56	56	56	56	56	56	56
57	57	57	57	57	57	57	57	57	57
58	58	58	58	58	58	58	58	58	58
59	59	59	59	59	59	59	59	59	59
60	60	60	60	60	60	60	60	60	60
61	61	61	61	61	61	61	61	61	61
62	62	62	62	62	62	62	62	62	62
63	63	63	63	63	63	63	63	63	63
64	64	64	64	64	64	64	64	64	64
65	65	65	65	65	65	65	65	65	65
66	66	66	66	66	66	66	66	66	66
67	67	67	67	67	67	67	67	67	67
68	68	68	68	68	68	68	68	68	68
69	69	69	69	69	69	69	69	69	69
70	70	70	70	70	70	70	70	70	70
71	71	71	71	71	71	71	71	71	71
72	72	72	72	72	72	72	72	72	72
73	73	73	73	73	73	73	73	73	73
74	74	74	74	74	74	74	74	74	74
75	75	75	75	75	75	75	75	75	75
76	76	76	76	76	76	76	76	76	76
77	77	77	77	77	77	77	77	77	77
78	78	78	78	78	78	78	78	78	78
79	79	79	79	79	79	79	79	79	79
80	80	80	80	80	80	80	80	80	80
81	81	81	81	81	81	81	81	81	81
82	82	82	82	82	82	82	82	82	82
83	83	83	83	83	83	83	83	83	83
84	84	84	84	84	84	84	84	84	84
85	85	85	85	85	85	85	85	85	85
86	86	86	86	86	86	86	86	86	86
87	87	87	87	87	87	87	87	87	87
88	88	88	88	88	88	88	88	88	88
89	89	89	89	89	89	89	89	89	89
90	90	90	90	90	90	90	90	90	90
91	91	91	91	91	91	91	91	91	91
92	92	92	92	92	92	92	92	92	92
93	93	93	93	93	93	93	93	93	93
94	94	94	94	94	94	94	94	94	94
95	95	95	95	95	95	95	95	95	95
96	96	96	96	96	96	96	96	96	96
97	97	97	97	97	97	97	97	97	97
98	98	98	98	98	98	98	98	98	98
99	99	99	99	99	99	99	99	99	99
100	100	100	100	100	100	100	100	100	100

TABLE 32. B.

[illegible]

TABLE 33. A.

NUMBERS AND PERCENTAGES OF ORGANISMS PER SAMPLING UNIT FOR JANUARY 1963

SAMPLE NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691
------------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

TABLE 33. B.

NUMBERS AND PERCENTAGES OF ORGANISMS PER SAMPLING UNIT FOR JANUARY 1963

SAMPLING 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TABLE 34.B.

[illegible]

NUMBERS AND PERCENTAGES OF ORGANISMS PER SAMPLING UNIT FOR MARCH 1963

SAMPLE 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TABLE 36. A.

NUMBER OF SPECIES OF ORGANISMS PER SAMPLE UNIT FOR APRIL 1963

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TABLE 38. A.

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TABLE 38. B.

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TABLE 39. B.

NUMBERS AND PERCENTAGE OF ORGANISMS PER SAMPLING UNIT FOR JULY 1963

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TABLE 40. B.

NUMBERS AND PERCENTAGES OF ORGANISMS PER SAMPLING UNIT FOR AUGUST 1963

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TABLE 41. B.

NUMBER AND PERCENTAGE OF ORGANISMS PER SAMPLING UNIT FOR SEPTEMBER 1963.

ACARI (continued)	ACARIDAE	ACARIDAE	Sample No.		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		TOTAL																				
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Table 42.

DAILY VALUES OF AIR TEMPERATURES TAKEN AT THE AGRICULTURAL RESEARCH INSTITUTE
POTCHEFSTROOM. OCT 1962 — SEPT 1963

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
	max	max	max	max	max	max	max	max	max	max	max	max
	min	min	min	min	min	min	min	min	min	min	min	min
1	30.0	12.5	30.2	14.4	29.6	14.1	30.4	16.4	22.7	14.0	34.0	13.0
2	29.5	14.5	26.8	16.1	29.0	13.4	27.7	14.7	27.0	12.5	32.5	14.5
3	28.0	15.5	25.6	16.2	28.3	16.1	29.2	15.9	26.6	13.1	32.2	17.6
4	29.6	10.3	27.1	13.5	30.5	12.1	31.7	14.6	26.2	15.6	29.3	17.0
5	26.3	15.2	25.6	14.5	32.4	15.3	31.5	16.8	29.5	13.4	29.2	14.4
6	29.1	10.5	28.6	14.5	29.9	14.5	29.5	16.0	29.4	15.6	30.7	12.8
7	32.2	13.1	27.4	13.9	34.0	15.8	24.3	16.6	28.4	13.0	31.7	12.5
8	33.1	9.0	26.1	13.2	30.9	17.7	27.0	15.5	27.6	15.6	25.2	17.0
9	23.0	10.5	16.7	13.0	31.8	17.2	21.5	18.3	25.0	14.2	24.8	13.1
10	23.6	4.4	28.0	11.9	32.4	16.5	28.6	16.7	28.3	14.3	24.8	11.8
11	25.1	7.1	30.7	14.7	31.5	16.6	30.5	15.9	30.4	12.0	26.6	12.2
12	30.4	8.5	33.1	16.1	30.0	16.1	23.8	16.6	30.6	14.3	27.6	13.8
13	33.2	11.1	30.0	17.7	30.6	12.7	25.0	14.7	31.6	12.3	25.4	12.5
14	34.1	13.0	22.6	15.7	30.6	15.1	29.7	14.4	32.2	15.0	20.7	13.5
15	32.6	10.0	18.6	13.4	26.7	15.0	29.0	16.9	32.5	16.0	27.0	12.8
16	34.8	13.9	25.9	14.7	28.6	14.0	25.5	15.0	30.7	17.0	27.8	15.0
17	34.2	10.0	22.2	14.0	28.5	14.4	29.0	16.3	29.4	15.8	26.5	13.5
18	22.5	11.0	20.2	12.8	30.3	12.3	31.3	15.8	29.4	16.5	26.5	12.0
19	26.2	2.5	25.3	15.0	33.0	13.6	30.4	16.7	29.6	17.5	23.0	14.2
20	26.8	10.6	24.8	14.5	33.0	13.2	29.5	15.9	37.1	16.4	23.5	11.4
21	27.6	14.0	27.0	12.9	32.1	18.8	30.4	15.1	31.6	17.1	24.6	9.5
22	25.2	13.2	30.8	13.7	28.4	16.9	26.6	16.1	32.6	16.6	28.0	12.6
23	28.5	12.7	28.3	15.2	29.9	15.3	25.4	16.0	29.0	17.0	28.3	10.6
24	29.7	10.2	25.3	14.2	29.7	16.6	27.0	17.4	29.2	13.7	22.5	6.8
25	28.0	13.4	27.5	12.6	28.8	16.7	25.9	15.4	23.9	17.5	25.6	7.4
26	30.9	13.2	30.3	11.5	27.0	17.6	19.4	14.2	24.9	16.8	28.9	9.2
27	31.5	14.7	28.0	12.0	24.0	15.2	18.2	14.2	25.6	15.0	28.2	11.5
28	33.3	16.0	28.2	14.0	27.2	12.6	25.1	12.8	29.5	11.2	19.9	16.4
29	34.4	13.2	25.6	16.2	29.4	13.7	26.6	11.5	24.1	14.0	23.9	3.3
30	33.5	14.1	27.0	13.2	31.2	11.4	27.7	14.7	25.6	11.0	23.0	7.1
31	34.0	14.0	25.8	14.2	25.0	14.6	27.1	10.4	19.0	10.6	2.1	10.269
TOTAL	220.9	36.2	79.5	64.5	3.90	2.464	78.43	44.82	68.12	5.414	1.8288	34.2
MEAN	29.7	1.8	26.5	14.2	30.0	5.0	27.1	15.5	28.3	14.8	26.7	12.7

Table 43.

DAILY VALUES OF SOIL TEMPERATURES TAKEN AT THE AGRICULTURAL RESEARCH INSTITUTE
POTCHEFSTROOM. OCT 1962—SEPT 1963

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
	max	min	max	min	max	min	max	min	max	min	max	min
1	32.5	18.4	34.0	21.8	38.0	25.1	24.2	22.0	32.8	22.8	26.5	19.8
2	31.5	18.4	31.8	21.0	39.5	25.1	27.3	19.8	33.5	23.0	27.7	19.2
3	25.8	19.0	24.0	21.0	39.5	25.2	27.9	20.5	32.6	23.1	24.5	19.8
4	32.8	16.3	36.5	18.5	34.4	21.0	38.5	25.0	25.4	21.2	33.4	22.4
5	26.0	18.9	33.9	18.8	35.0	22.7	38.9	26.1	30.4	21.9	34.8	22.3
6	31.5	16.0	30.8	19.8	34.9	20.0	29.0	23.9	30.8	22.4	34.0	22.4
7	33.8	18.0	33.0	17.9	36.0	22.2	26.8	23.0	29.9	22.9	35.2	22.0
8	32.9	16.4	30.0	17.4	36.0	24.0	29.4	21.8	30.0	22.4	29.2	25.5
9	34.9	18.8	21.3	17.8	37.2	23.8	26.0	23.8	31.6	22.1	30.5	20.1
10	31.5	16.1	31.5	15.8	40.0	24.4	31.5	21.2	36.8	20.9	31.0	20.2
11	32.0	16.5	32.8	18.0	40.0	25.2	31.1	22.2	35.5	24.0	29.0	19.5
12	36.0	16.9	34.5	19.2	37.0	24.9	27.4	22.0	37.8	24.3	28.0	18.2
13	36.5	18.0	29.5	20.5	39.0	22.1	28.0	20.8	37.8	24.3	28.0	18.2
14	35.4	20.0	24.9	20.0	38.5	24.2	33.5	20.8	38.0	25.8	28.0	18.0
15	36.4	19.2	20.8	18.0	30.1	23.0	33.8	23.5	36.9	24.1	27.5	18.0
16	37.0	20.0	28.8	18.5	31.8	21.5	27.9	22.9	38.0	23.2	26.8	18.5
17	36.4	19.8	23.0	18.5	33.3	20.9	32.5	21.7	36.8	25.0	25.1	20.2
18	37.2	19.5	19.5	16.6	36.4	25.0	35.0	21.8	37.8	25.2	23.5	16.0
19	35.8	19.4	28.0	17.1	36.5	24.2	34.9	23.8	36.5	25.3	22.8	15.2
20	35.0	18.2	29.8	19.8	37.0	23.4	31.9	23.9	37.8	26.0	22.0	14.0
21	34.0	19.2	31.4	18.0	34.5	23.3	32.9	21.5	36.5	25.3	20.9	14.0
22	28.0	17.8	29.9	18.9	35.0	24.0	27.3	21.8	32.5	23.8	22.1	14.0
23	33.0	18.0	30.5	19.3	34.9	26.7	29.1	22.4	33.8	22.9	22.4	13.9
24	33.0	17.3	26.2	18.8	34.2	24.0	30.0	23.0	32.5	24.0	22.8	13.8
25	32.8	19.0	29.9	16.8	33.1	23.0	27.9	22.0	33.1	23.3	22.0	14.0
26	33.8	18.9	32.9	17.8	32.8	24.2	21.5	20.8	32.9	22.0	29.0	18.8
27	32.0	20.7	32.9	18.4	25.0	23.4	21.5	19.9	30.4	22.8	27.5	20.1
28	33.5	21.4	30.5	20.5	33.0	22.0	28.8	19.0	33.8	22.0	23.0	21.8
29	37.0	21.0	28.0	19.8	34.9	22.5	29.8	19.3	26.8	20.1	22.0	13.8
30	34.0	21.0	32.0	19.0	36.5	22.0	28.8	21.7	27.2	18.5	21.9	14.0
31	35.5	21.2	36.5	23.4	27.0	21.7	27.5	18.0	16.0	9.0	17.5	8.5

Totals Totale	633.5	599.6	579.8	625.8	799.1	969.5	1037.8	899.3	792.1	722.2	675.3	9312.1	775.997
Means	20.435	19.341	18.703	20.187	25.777	31.274	33.477	28.964	25.551	23.296	21.783	300.39	25.032

TABLE 45.

CP-12004-1004-000

TWO — Hourly Values of SOIL TEMPERATURE at 400 MILLIMETERS DEPTH at INDIANOPOLIS, INDIANA

No. 5. Month NOVEMBER, Year 1962.
Uurlikse Waardes van Maand Jaar

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Totals, Totale.	Means, Gem.	
1.....	23.5			22.5	21.5			23.0		25.0		31.8		34.0		33.2		30.0		27.0		26.0		24.5	321.3	26.775	
2.....	23.0			22.0	21.0			21.8		26.0		30.6		31.8		31.8		26.5		24.5		23.0		22.2	300.2	25.016	
3.....	22.0			21.8	21.2			21.0		21.3		22.0		24.0		30.0		23.0		21.5		20.8		19.5	262.1	21.841	
4.....	19.0			17.5	18.5			19.9		25.0		32.3		35.5		31.0		21.0		21.8		23.5		21.5	300.7	25.058	
5.....	20.8			19.8	18.8			20.3		30.8		32.8		33.8		23.8		25.0		25.0		23.0		21.8	309.0	25.750	
6.....	21.0			20.0	19.8			23.7		30.8		30.7		32.3		22.5		21.7		21.7		19.3		18.5	274.3	22.858	
7.....	18.0			17.9	18.0			20.5		25.5		30.3		33.0		22.8		19.8		19.8		19.2		18.3	272.1	22.675	
8.....	18.0			17.5	17.4			19.7		24.4		30.0		33.0		26.0		23.4		23.4		21.9		21.0	279.1	23.258	
9.....	20.5			19.5	18.5			17.8		17.5		17.8		21.3		19.8		18.2		18.2		17.2		16.5	225.4	18.783	
10.....	16.0			16.0	15.8			18.0		23.2		22.5		30.8		26.5		23.3		23.3		21.6		20.4	265.3	22.108	
11.....	19.5			18.5	18.0			20.2		26.7		31.7		32.8		26.5		23.3		23.3		22.3		21.5	291.0	24.250	
12.....	20.9			20.0	19.2			21.0		23.5		34.4		34.8		25.5		23.5		23.5		22.3		21.5	294.3	24.525	
13.....	20.9			20.7	20.5			20.9		23.2		27.0		23.0		27.8		22.8		22.8		21.8		21.0	285.1	23.578	
14.....	20.8			20.4	20.0			21.8		24.5		24.9		24.5		21.5		20.1		20.1		19.1		18.8	258.4	21.533	
15.....	18.5			18.2	18.0			18.4		19.8		20.2		20.8		20.8		20.0		20.0		19.5		19.0	234.3	19.525	
16.....	19.0			18.9	18.5			19.5		20.8		26.8		28.3		26.0		23.3		23.3		22.0		20.4	271.5	22.625	
17.....	19.5			18.5	18.5			19.0		21.5		22.5		24.8		22.3		19.8		19.8		18.3		17.8	245.5	20.458	
18.....	17.4			17.0	16.5			16.6		17.8		18.8		18.0		19.0		18.5		18.5		18.2		17.8	216.4	18.033	
19.....	17.3			17.2	17.1			17.6		22.8		24.8		26.0		24.0		22.0		22.0		21.3		21.0	260.7	21.725	
20.....	20.0			19.9	19.8			20.2		22.9		28.5		29.8		25.0		22.0		22.0		20.9		20.4	277.9	23.158	
21.....	19.5			18.5	18.0			20.5		21.5		30.4		31.4		25.0		22.5		22.5		20.8		19.8	277.4	23.116	
22.....	19.0			18.9	19.0			20.4		25.0		28.9		29.0		24.4		24.5		24.5		21.5		20.5	278.8	23.233	
23.....	20.0			19.8	19.3			21.2		23.4		28.0		30.5		25.6		22.8		22.8		21.8		19.9	282.1	23.508	
24.....	19.8			19.0	18.8			19.5		21.0		23.3		26.2		23.8		21.5		21.5		19.9		18.9	255.7	21.308	
25.....	18.0			17.3	16.8			18.7		22.0		27.0		23.3		27.0		23.6		23.6		21.8		20.6	272.6	22.716	
26.....	19.5			18.7	17.8			18.2		27.0		31.9		32.3		27.0		24.5		24.5		22.8		21.4	292.0	24.333	
27.....	20.2			19.3	18.4			20.3		25.5		30.8		32.9		27.3		24.8		24.8		22.5		21.5	297.4	24.783	
28.....	21.2			20.8	20.5			21.8		25.0		30.5		30.0		26.8		16.5		16.5		19.3		20.0	280.4	23.366	
29.....	20.0			19.9	19.8			21.2		24.3		28.0		24.9		21.5		20.0		20.0		19.5		19.0	261.1	21.758	
30.....	19.5			19.0	19.6			23.5		28.4		32.0		23.0		22.5		21.8		21.8		21.0		20.0	281.3	23.441	
31.....																											

Totals Totale	592.3			552.5	564.9			606.2		716.1		831.2		887.3		746.2		664.0		664.0		632.1		605.0	8223.4	285.094	
Means	19.743			18.416	18.830			20.206		23.870		27.706		28.910		24.873		22.133		22.133		21.070		20.166	274.113	22.836	

Table 46.

STATION 102000

Two — Hourly Values of

515-700-1000

at GARDNER RESEARCH

No. 6.

Month

DECEMBER.

Year 1962

Uurlikse Waardes van

te 001170-1000000 ROOM.

Maand

Jaar

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Totals. Totale.	Means. Gem.
1.....																										
2.....																										
3.....																										
4.....		22.5		21.8	21.0	22.8	22.8	26.0	30.2	34.4	31.4	27.9	26.4	25.3	326.1	27.175										
5.....		24.2		23.4	22.7	24.0	24.0	27.5	32.5	33.0	30.2	27.3	25.1	24.3	329.2	27.433										
6.....		23.1		22.0	21.5	23.0	23.0	26.4	31.5	34.4	32.0	28.0	26.0	24.8	328.1	27.341										
7.....		23.6		22.8	22.2	23.5	23.5	26.5	31.6	33.3	33.0	29.8	27.8	26.0	339.3	28.275										
8.....		25.0		24.1	23.5	24.0	24.0	27.0	32.2	33.0	33.5	30.0	27.8	26.4	345.4	28.783										
9.....		25.2		24.3	23.8	24.8	24.8	21.8	32.5	33.0	35.0	31.0	28.0	26.5	347.1	28.925										
10.....		25.7		25.2	24.4	24.7	24.7	31.0	37.4	41.2	35.0	31.8	29.7	28.3	373.6	31.133										
11.....		26.8		25.9	25.2	27.0	27.0	30.8	37.0	41.5	31.8	29.8	28.6	27.0	364.4	30.366										
12.....		26.5		25.5	24.9	26.4	26.4	29.3	35.0	39.2	28.0	26.3	24.9	24.8	328.4	27.366										
13.....		24.0		22.8	22.1	23.8	23.8	25.5	34.3	37.0	35.8	31.8	29.0	27.3	354.3	29.525										
14.....		26.0		25.0	24.2	25.3	25.3	29.0	35.0	38.2	36.5	32.4	29.8	28.0	357.9	29.825										
15.....		26.8		25.8	23.5	23.0	23.0	24.5	27.2	29.8	28.8	26.0	24.0	23.0	312.3	26.025										
16.....		22.0		21.5	21.2	22.0	22.0	26.2	29.4	31.5	28.5	26.8	25.0	23.4	307.6	25.633										
17.....		22.5		21.8	20.9	21.8	21.8	27.8	33.2	33.0	31.0	29.0	27.8	26.6	328.7	27.391										
18.....		25.5		25.0	25.1	27.8	27.8	32.7	32.3	33.3	31.4	29.6	28.0	26.5	353.6	29.466										
19.....		24.8		24.2	25.0	27.7	27.7	31.8	34.2	33.0	32.0	29.0	27.3	26.0	354.2	29.516										
20.....		24.9		23.4	23.6	26.8	26.8	30.4	34.4	35.0	32.4	30.3	27.8	26.5	352.5	29.375										
21.....		25.0		24.5	23.3	23.5	23.5	25.2	29.0	34.3	33.8	31.8	29.2	27.5	341.3	28.441										
22.....		25.8		25.0	24.0	24.1	24.1	26.0	29.3	35.0	35.0	32.1	30.0	28.5	348.8	29.066										
23.....		27.6		27.2	26.7	26.9	26.9	27.9	29.8	34.3	33.5	31.0	29.0	28.0	355.2	29.600										
24.....		26.5		25.5	24.0	24.5	24.5	28.6	32.2	33.2	30.6	28.2	26.1	25.0	338.5	28.208										
25.....		24.0		23.5	23.0	23.8	23.8	27.1	31.0	33.1	31.0	28.2	22.0	26.1	325.8	27.150										
26.....		25.5		24.9	24.2	25.1	25.1	27.1	29.3	32.0	30.0	27.6	26.5	25.5	331.0	27.853										
27.....		24.8		24.0	23.4	24.4	24.4	26.2	27.3	29.3	28.0	26.5	25.1	24.1	311.5	25.958										
28.....		23.5		22.9	22.0	23.0	23.0	26.0	30.3	33.0	31.0	28.2	26.5	25.0	324.7	27.058										
29.....		24.0		23.1	22.5	23.8	23.8	26.8	31.3	34.3	33.0	29.7	27.0	25.5	335.9	27.991										
30.....		23.9		22.9	22.0	23.2	23.2	26.8	31.2	36.3	33.5	30.4	28.0	26.5	340.5	28.375										
31.....		25.5		24.3	23.4	24.0	24.0	30.0	34.8	34.3	32.0	29.9	28.0	27.0	349.3	29.108										
Totals Totale	695.2	672.3	653.3	684.7	771.9	771.9	684.7	684.7	771.9	903.2	916	970.6	897.5	820.4	760.4	729.4	9505.2	792.361								
Means Gem.	24.828	24.010	23.332	24.453	27.567	27.567	24.453	24.453	27.567	32.257	34.560	34.564	32.053	29.300	27.157	26.050	339.471	28.298								

TABLE 47.

1963-1964-2064

Hourly Values of
Uurlikse Waardes van

SOIL TEMPERATURE
at AGRICULTURAL RESEARCH
INSTITUTE, T. CHEPSTROM, M.
te

Month
Maand

Year
Jaar

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Totals. Totale.	Means. Gem.	
1.....		26.2		25.5		25.1		26.6		30.9		36.8		38.0		36.8		33.6		30.8		29.0		28.1		367.4	30.616
2.....		27.4		26.0		25.1		26.7		31.0		37.0		39.5		38.1		35.0		31.6		29.5		28.0		374.9	31.241
3.....		26.8		25.9		25.2		26.7		30.7		36.5		39.3		38.5		35.2		31.5		29.4		28.0		373.9	31.158
4.....		26.8		25.8		25.0		26.2		30.0		35.4		38.4		38.5		35.8		32.0		30.2		28.7		372.8	31.066
5.....		27.5		27.0		26.1		27.2		30.9		36.8		38.9		38.8		35.0		31.0		28.0		26.5		373.7	31.141
6.....		25.3		24.5		23.9		24.8		27.5		28.1		29.3		29.9		27.3		25.8		24.9		23.8		314.8	26.233
7.....		23.8		23.4		23.0		23.0		24.0		25.2		27.0		28.3		27.0		25.5		24.2		23.8		298.7	24.891
8.....		23.0		22.2		21.8		22.8		25.0		29.9		29.8		29.4		28.5		26.2		25.2		24.8		308.6	25.716
9.....		24.4		24.0		23.7		23.8		24.9		24.3		25.7		26.0		25.4		24.1		23.2		22.6		292.1	24.341
10.....		21.9		21.7		21.2		21.9		24.5		27.2		30.5		31.5		30.0		27.0		25.4		24.4		307.2	25.600
11.....		23.5		22.9		22.2		23.3		25.9		29.9		31.1		31.0		28.0		25.5		24.5		23.8		311.6	25.966
12.....		23.2		22.4		22.0		22.1		23.8		26.1		27.0		27.4		25.5		24.0		23.4		22.8		289.7	24.141
13.....		22.3		21.5		20.8		20.9		22.8		26.5		27.8		28.0		27.1		25.5		24.0		22.9		290.1	24.175
14.....		22.0		21.3		20.8		20.9		28.0		31.5		33.5		31.5		29.2		27.1		26.0		25.0		316.8	26.400
15.....		24.1		23.8		23.5		24.9		27.8		32.0		33.8		29.8		28.2		26.8		25.0		24.0		314.7	26.225
16.....		23.5		23.1		22.9		23.4		24.8		25.1		27.9		27.8		26.8		25.1		23.9		23.2		297.5	24.791
17.....		22.5		21.8		21.7		22.1		25.8		30.7		32.5		29.5		27.2		25.8		24.5		23.5		307.6	25.633
18.....		22.8		22.2		21.8		23.0		26.9		32.0		35.0		34.8		31.7		28.5		27.0		26.1		308.8	25.733
19.....		25.0		24.0		23.8		24.7		27.5		32.7		34.3		34.0		32.5		29.6		27.7		26.4		342.8	28.566
20.....		25.4		24.5		23.9		24.8		27.9		31.9		29.9		21.8		24.4		24.2		23.7		22.9		305.3	25.441
21.....		22.4		21.8		21.5		21.7		26.6		30.1		32.8		32.9		29.9		28.0		26.8		26.2		320.7	26.725
22.....		25.4		23.8		22.1		21.8		22.0		23.9		25.5		27.3		26.8		25.0		23.8		22.9		290.3	24.191
23.....		22.5		22.5		22.4		22.9		24.8		27.0		29.0		29.1		27.0		25.8		25.0		24.1		302.1	25.175
24.....		23.7		23.2		23.0		23.2		24.2		27.2		24.0		30.1		29.0		26.0		24.3		23.4		306.3	25.525
25.....		22.9		22.8		22.0		22.0		23.0		26.8		27.9		27.6		24.8		23.1		22.8		22.4		288.1	24.008
26.....		22.1		21.7		21.0		20.8		20.9		21.1		21.5		21.6		21.8		21.7		21.2		20.8		256.2	21.350
27.....		20.5		20.2		20.1		19.9		20.0		20.1		20.5		21.5		21.9		21.6		20.8		20.5		247.6	20.633
28.....		20.4		19.9		19.5		19.0		24.2		27.8		28.8		28.0		25.8		23.8		22.2		21.2		280.6	23.383
29.....		20.2		19.8		19.3		20.3		24.1		27.8		29.8		28.8		26.7		24.4		23.1		22.4		286.7	23.891
30.....		22.1		22.0		21.7		21.8		23.8		27.0		28.8		28.8		26.9		25.0		23.9		23.0		294.8	24.566
31.....		22.3		22.0		21.7		22.2		24.3		24.7		27.0		26.8		25.5		24.5		23.7		23.3		288.0	24.000
Totals Totale		731.9		713.2		697.8		715.4		798.5		909.1		950.3		934.4		879.5		816.5		776.3		749.5		9630.4	302.521
Means Gem		23.609		23.006		22.509		23.077		25.758		29.325		30.654		30.141		28.370		26.338		25.041		24.177		310.658	25.887

TABLE 48.

W.S. 126764-1955-6-500.

Hourly Values of
Uurlikse Waardes van

at AGRICULTURAL RESEARCH
INSTITUTE. POTCHERSTROOM.

te

No. 8.
Month
Maand

Year 1963.
Jaar

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Totals. Totale.	Means. Gem.
1.....		22.7		22.2		22.0		22.0		22.3		23.8		23.8		24.0		24.0		22.7		21.8		20.4	271.9	22.658
2.....		20.4		20.0		19.8		20.0		22.5		26.0		28.2		27.0		26.3		24.5		22.7		21.8	279.5	23.291
3.....		20.9		20.5		20.5		20.8		22.8		26.5		26.8		27.0		26.8		24.7		23.7		22.8	283.9	23.658
4.....		22.3		21.8		21.2		23.8		25.6		27.4		29.5		29.0		27.8		26.0		24.9		23.9	303.6	25.300
5.....		22.9		22.3		21.9		22.1		24.7		28.5		30.4		30.0		28.6		26.6		25.2		24.3	307.5	25.625
6.....		23.8		23.3		22.8		23.0		24.9		28.0		30.4		30.0		28.4		26.8		25.8		25.0	312.4	26.033
7.....		24.0		23.2		22.4		22.6		24.3		27.9		30.8		30.0		28.2		26.4		25.2		24.2	309.9	25.825
8.....		23.8		23.6		22.9		22.9		23.8		26.5		29.5		29.0		28.2		26.3		25.2		24.2	306.8	25.566
9.....		23.8		23.4		22.5		22.4		24.0		26.4		28.8		30.0		29.0		26.8		24.8		23.0	304.9	25.408
10.....		23.0		22.7		22.2		22.1		23.8		27.5		29.8		31.0		30.3		27.8		25.5		23.8	310.1	25.841
11.....		22.8		21.8		20.9		23.3		26.6		31.5		34.8		34.0		36.8		28.8		27.4		26.3	335.7	27.975
12.....		25.3		24.6		23.7		24.0		27.0		32.2		35.6		35.0		33.0		29.5		27.5		26.0	343.8	28.650
13.....		25.0		23.9		23.1		23.8		28.2		33.5		36.9		37.0		34.0		30.6		28.2		26.9	351.1	29.258
14.....		25.9		25.0		24.3		25.0		28.8		33.9		37.8		37.0		35.4		31.9		29.8		27.8	363.4	30.283
15.....		27.1		26.5		25.6		25.8		29.5		34.4		38.0		37.0		34.5		29.5		27.8		26.7	362.4	30.200
16.....		25.7		25.2		24.1		24.5		27.7		32.5		36.9		35.0		30.0		27.5		25.6		24.5	338.4	28.200
17.....		23.1		23.0		23.2		25.2		29.4		33.6		38.0		36.2		32.5		38.5		27.0		24.0	353.7	29.475
18.....		23.0		24.0		25.0		25.2		29.8		35.0		36.8		36.0		32.6		29.2		28.0		27.3	321.9	26.825
19.....		26.7		26.0		25.2		25.2		29.0		34.2		37.8		37.2		34.5		36.0		29.1		28.0	368.9	30.741
20.....		27.0		26.1		25.3		25.8		29.5		34.5		38.5		38.5		35.3		31.8		30.2		28.8	371.3	30.941
21.....		27.8		27.2		26.1		26.0		28.9		33.5		37.0		37.0		34.8		31.2		29.2		27.8	367.3	30.608
22.....		26.8		25.8		25.3		25.5		28.5		33.5		35.5		36.5		26.5		26.0		25.9		25.5	341.3	28.441
23.....		25.0		24.2		23.8		23.8		26.5		30.8		32.5		32.0		31.0		28.4		27.0		26.3	331.6	27.633
24.....		25.0		23.9		22.9		22.9		26.0		30.8		33.0		33.8		36.8		28.4		26.4		25.3	335.2	27.933
25.....		24.6		24.2		24.0		25.0		26.5		30.5		32.0		32.5		30.0		28.1		27.0		25.8	330.2	27.516
26.....		24.8		23.8		23.5		23.3		25.8		30.0		33.0		33.0		30.9		27.8		25.9		24.8	326.7	27.225
27.....		23.7		22.7		22.1		22.0		25.0		30.0		32.9		32.9		31.0		27.9		26.1		24.8	321.1	26.758
28.....		23.8		22.8		22.0		22.0		24.9		29.8		33.2		33.8		31.5		28.8		26.5		25.1	324.2	27.016
29.....																										
30.....																										
31.....																										

Totals Totale	680.7		663.7	648.3	660.0	736.3	852.7	927.4	928.7	868.7	798.5	739.4	705	19178.7	764.883
Means Gem.....	24.316	23.703	23.153	23.571	26.296	30.453	33.121	33.117	31.025	28.517	26.407	25	182	327.8	27.317

TABLE 49.

G.P.S.128764-1955-6-500.

TWO — Hourly Values of SOIL TEMPERATURE
Uurlikse Waardes van

at AGRICULTURAL RESEARCH
INSTITUTE, PO CHIEFSTROOM.

No. 9.

Month
Maand

MARCH.

Year 1963.
Jaar

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Totals. Totale.	Means. Gem.	
1.....		24.5		23.5		23.0		22.8		25.5		30.5		32.8		32.8		31.9		28.4		21.8		20.6	318.1	26.508	
2.....		24.8		23.8		23.2		23.0		25.2		29.8		32.8		33.5		30.5		28.5		26.4		25.2	326.7	27.225	
3.....		24.8		23.8		23.2		23.1		24.0		26.5		31.0		32.6		31.4		28.4		25.9		24.8	319.5	26.625	
4.....		23.9		23.0		22.4		22.0		25.9		31.0		33.8		33.4		30.0		27.5		26.4		25.3	324.6	27.050	
5.....		24.0		23.0		22.3		22.6		25.9		31.0		34.8		34.8		31.2		28.2		26.5		25.0	329.3	27.441	
6.....		24.6		23.8		22.8		22.9		26.5		31.7		34.0		34.0		31.9		28.5		26.8		25.7	333.2	27.766	
7.....		24.6		23.7		22.8		22.0		26.5		31.8		35.0		35.2		33.0		30.0		28.9		28.0	341.5	28.458	
8.....		27.5		26.6		25.9		25.5		27.0		29.0		29.2		27.0		25.5		24.0		23.0		22.4	312.6	26.050	
9.....		21.8		20.9		20.2		20.1		22.2		27.0		30.5		30.4		27.8		24.9		23.2		22.0	291.0	24.250	
10.....		21.2		20.2		24.8		24.7		21.8		26.2		30.0		31.0		29.0		25.5		23.6		22.4	300.4	25.033	
11.....		21.6		20.8		20.2		19.5		23.5		28.5		29.0		29.0		27.0		24.0		23.1		22.4	289.6	24.133	
12.....		21.5		20.4		19.8		19.9		22.9		27.3		29.3		29.2		26.0		24.0		22.9		22.3	285.5	23.791	
13.....		17.0		18.2		18.2		18.8		21.9		26.0		28.0		27.8		26.2		24.0		21.3		19.2	266.6	22.216	
14.....		18.4		18.0		18.1		19.2		21.8		26.5		28.0		27.5		25.0		23.2		20.4		18.8	264.9	22.075	
15.....		18.0		18.0		18.1		18.3		19.0		23.0		26.8		27.5		25.5		24.8		21.8		20.5	261.3	21.775	
16.....		20.0		19.4		19.4		18.9		19.6		23.0		26.8		26.6		25.0		23.5		22.0		20.8	265.0	22.083	
17.....		20.4		20.2		20.2		19.3		20.8		24.5		25.1		23.0		22.8		22.0		21.8		20.9	261.0	21.750	
18.....																											
19.....																											
20.....																											
21.....																											
22.....																											
23.....																											
24.....																											
25.....																											
26.....		20.3		19.5		18.8		19.3		23.0		26.8		29.0		8.9		27.5		25.2		24.2		22.7	285.2	23.766	
27.....		21.8		20.9		20.2		20.1		22.5		25.4		27.1		7.5		26.0		24.5		23.5		23.0	282.5	23.541	
28.....		22.8		22.3		22.0		21.8		22.9		23.0		23.2		3.0		22.8		22.2		21.9		21.8	269.7	22.475	
29.....		21.1		20.1		20.1		20.1		21.3		23.8		25.5		6.8		25.5		23.0		21.8		20.5	269.6	22.466	
30.....		19.8		19.0		18.5		18.5		21.7		25.3		27.2		7.0		25.6		23.0		21.2		20.1	266.9	22.241	
31.....		19.4		18.8		18.0		18.2		21.0		24.8		27.3		7.5		26.2		24.5		22.6		22.0	270.3	22.525	
Totals Totale		503.8		487.9		482.2		480.6		532.4		622.4		649.4		616.0		633.3		582.8		541.0		516.4	6735.0	561.241	

P. S. 128764-1955-6-500.

Hourly Values of										Soil Temperature										No.										Month		Year	
Uurlikse Waardes van										at AGRICULTURAL RESEARCH INSTITUTE, POTCHESBROOM										10.										APRIL		1963.	
										te																				Maand		Jaar	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Totals. Totale.	Means. Gem.							
1.....		21.6		20.8		20.0		19.8		22.8		25.8		26.5		25.7		23.8		22.9		22.3		22.0	274.0	22.833							
2.....		21.0		19.9		19.2		20.0		23.7		27.2		27.7		27.0		24.5		22.5		21.5		20.8	275.0	22.916							
3.....		20.2		20.0		20.0		19.8		21.0		23.0		24.5		24.1		23.0		22.0		19.8		19.8	257.5	21.458							
4.....		19.4		18.8		18.9		18.4		18.2		21.5		24.0		23.3		21.8		20.5		20.0		19.9	245.2	20.433							
5.....		18.5		18.5		18.5		19.5		21.6		23.7		24.0		24.0		22.3		21.2		20.5		20.0	252.4	21.033							
6.....		19.5		18.8		18.4		19.3		22.4		25.2		25.7		25.0		23.4		21.8		21.2		20.7	261.4	21.783							
7.....		20.1		19.2		18.4		19.5		23.5		26.9		27.0		25.3		23.8		22.5		21.9		21.5	270.1	22.508							
8.....		21.0		20.9		20.5		20.8		22.0		24.7		25.4		25.0		23.2		20.0		19.9		19.5	262.9	21.908							
9.....		19.5		19.5		19.0		19.4		22.5		26.5		27.6		27.0		24.0		22.0		20.8		20.0	267.8	22.316							
10.....		19.4		18.8		18.4		19.0		23.0		26.7		27.5		26.0		24.0		23.0		22.0		21.5	269.3	22.441							
11.....		21.0		20.9		20.4		21.0		23.8		26.8		26.4		25.0		23.9		23.4		22.8		22.5	277.9	23.158							
12.....		22.0		21.4		20.8		21.4		24.0		26.0		26.6		25.3		24.4		23.7		23.0		22.5	281.4	23.450							
13.....		22.0		21.8		21.0		21.3		22.8		25.0		25.0		23.3		22.4		21.4		20.4		19.4	265.8	22.150							
14.....		18.4		17.8		16.8		17.8		21.5		24.0		25.2		24.0		21.5		19.9		18.7		17.8	243.4	20.283							
15.....		17.0		16.4		15.8		16.8		19.8		23.7		24.9		24.1		22.0		20.0		19.0		18.2	237.7	19.808							
16.....		17.5		16.8		16.4		16.9		20.0		23.4		24.3		23.5		21.6		19.9		18.9		17.0	236.2	19.683							
17.....		17.5		16.4		16.0		16.8		20.5		23.2		24.3		23.3		21.3		19.8		18.5		17.8	235.9	19.658							
18.....		17.0		16.5		16.0		17.0		20.4		22.8		23.5		23.0		20.5		19.0		18.0		17.2	230.9	19.241							
19.....		16.4		15.8		15.2		16.0		19.8		22.8		22.8		22.1		20.0		18.8		18.0		17.5	225.2	18.766							
20.....		16.8		16.0		15.8		16.9		18.9		21.2		22.0		21.0		19.2		17.7		16.7		15.8	218.5	18.208							
21.....		14.9		14.0		13.5		14.0		16.8		19.2		20.9		20.2		17.8		16.0		15.5		14.9	197.7	16.475							
22.....		14.5		14.2		14.0		15.0		17.8		20.8		22.1		21.3		19.0		17.4		16.4		15.5	208.3	17.358							
23.....		14.9		14.2		13.9		14.9		17.8		21.0		22.4		22.0		19.2		17.5		16.4		15.4	209.6	17.466							
24.....		14.8		14.0		13.8		14.7		18.7		21.0		22.8		21.3		19.0		17.6		16.3		15.4	210.0	17.500							
25.....		14.8		14.2		13.8		14.8		18.8		21.9		23.0		22.0		19.3		17.8		16.8		15.8	213.0	17.750							
26.....		14.9		14.2		14.0		14.9		18.8		21.2		22.0		21.0		18.9		17.2		16.0		15.2	208.5	17.375							
27.....		14.5		13.9		13.5		14.3		18.0		21.0		22.1		21.0		18.8		17.0		15.7		14.7	204.7	17.058							
28.....		14.0		13.5		13.0		14.0		18.0		21.0		22.2		21.0		18.3		16.8		15.4		14.5	202.0	16.833							
29.....		13.7		13.2		12.6		13.0		15.5		19.5		21.8		21.0		19.3		17.8		16.5		15.2	199.3	16.608							
30.....		14.8		14.0		14.0		14.0		16.2		19.5		21.9		21.0		19.8		17.5		16.3		15.5	205.3	17.108							
31.....																																	
Totals Totale		531.6		514.4		501.6		521.0		608.6		696.2		126.1		704.0		640.0		594.6		565.2		543.5	7146.9	595.565							

TABLE 51.

C.P.S. 128761-1955-6-500.

Two—Hourly Values of SOIL TEMPERATURE
Uurlikse Waardes van

at AGRICULTURAL RESEARCH
INSTITUTE, POT HERTROOM.
te

No. . 11. . Month
Maand

MAY.

Year 1963.

Jaar

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Totals. Totale.	Means. Gem.
1.....	14.8			14.2	13.8	13.8		13.8		16.5	20.5	20.5	22.3	22.1		22.1	19.9	22.5	22.5	21.4	20.5	222.3	18.525			
2.....	14.5			14.0	13.5	13.5		13.2		16.5	19.5	19.5	21.5	21.2		21.2	19.0	17.0	17.0	15.4	14.9	200.2	16.683			
3.....	14.0			13.4	12.8	12.8		12.5		15.5	18.8	18.8	21.2	21.4		21.4	19.3	16.8	16.8	15.5	14.8	196.0	16.333			
4.....	13.8			13.0	12.5	12.5		12.8		15.5	19.0	19.0	21.0	21.0		21.0	19.0	16.4	16.4	14.7	13.7	192.4	16.033			
5.....	13.0			12.1	11.5	11.5		11.4		14.5	18.5	18.5	20.6	20.7		20.7	18.4	16.0	16.0	14.5	13.7	184.9	15.408			
6.....	12.8			12.0	11.5	11.5		11.2		16.4	20.0	20.0	21.5	21.0		21.0	18.1	16.4	16.4	15.5	14.9	191.3	15.941			
7.....	14.5			13.5	12.8	12.8		13.7		16.5	19.5	19.5	21.0	20.5		20.5	18.0	16.5	16.5	16.0	15.2	197.7	16.475			
8.....	14.6			13.7	13.6	13.6		14.2		17.0	18.2	18.2	18.9	18.5		18.5	17.2	16.0	16.0	15.5	15.0	192.4	16.033			
9.....	15.0			14.8	14.1	14.1		14.8		16.0	16.9	16.9	16.9	16.8		16.8	15.9	15.8	15.8	15.7	15.5	188.2	15.683			
10.....	15.4			15.2	14.5	14.5		14.8		16.8	18.7	18.7	19.0	18.5		18.5	17.5	16.7	16.7	16.0	14.9	198.0	16.500			
11.....	14.8			14.7	14.0	14.0		14.2		16.0	19.3	19.3	19.8	19.8		19.8	18.0	16.6	16.6	16.0	15.9	199.1	16.591			
12.....	11.0			12.8	13.3	13.3		14.0		16.0	18.5	18.5	19.0	18.4		18.4	16.8	15.8	15.8	15.0	14.8	185.4	15.450			
13.....	13.9			13.2	13.3	13.3		15.3		18.9	20.3	20.3	20.4	20.2		20.2	18.0	16.2	16.2	15.0	14.2	198.9	16.575			
14.....	13.5			12.8	12.3	12.3		12.4		15.0	18.5	18.5	19.9	19.5		19.5	17.2	16.0	16.0	15.2	14.2	186.5	15.451			
15.....	13.5			13.2	13.1	13.1		13.5		15.0	16.6	16.6	18.0	17.7		17.7	15.8	14.4	14.4	13.5	12.8	177.1	14.758			
16.....	12.3			11.8	11.5	11.5		12.0		13.8	15.8	15.8	16.5	15.9		15.9	14.0	12.7	12.7	11.7	10.8	158.8	13.233			
17.....	9.9			9.8	8.9	8.9		8.9		12.5	15.0	15.0	16.2	15.8		15.8	13.5	12.0	12.0	10.8	10.0	143.3	11.941			
18.....	9.4			8.8	8.2	8.2		8.4		11.6	14.5	14.5	15.8	15.4		15.4	13.3	11.5	11.5	10.5	9.8	137.2	11.433			
19.....	9.0			8.8	8.2	8.2		8.8		12.0	15.0	15.0	16.7	16.0		16.0	13.8	12.4	12.4	11.0	10.2	141.9	11.825			
20.....	9.9			9.1	8.7	8.7		9.0		12.5	16.0	16.0	17.5	17.0		17.0	14.1	12.6	12.6	11.6	10.8	148.8	12.400			
21.....	10.1			9.7	9.1	9.1		9.2		13.0	16.0	16.0	17.6	17.0		17.0	14.2	12.8	12.8	11.7	10.8	151.2	12.600			
22.....	10.1			9.7	9.0	9.0		9.2		13.0	15.9	15.9	17.0	16.2		16.2	13.9	12.4	12.4	11.4	10.7	148.5	12.375			
23.....	10.0			9.5	8.9	8.9		9.1		12.7	15.4	15.4	16.6	16.0		16.0	13.4	12.9	12.9	11.0	10.0	145.5	12.125			
24.....	9.5			8.9	8.5	8.5		8.9		12.0	15.5	15.5	16.8	16.1		16.1	13.8	12.2	12.2	11.3	10.5	144.0	12.000			
25.....	9.9			9.5	9.0	9.0		9.2		12.3	15.5	15.5	17.2	16.8		16.8	13.9	12.3	12.3	11.3	11.6	148.5	12.375			
26.....	9.9			9.4	9.1	9.1		9.4		12.8	15.8	15.8	16.9	16.3		16.3	14.2	12.8	12.8	12.8	12.5	151.9	12.658			
27.....	12.1			11.2	10.4	10.4		10.8		12.6	15.0	15.0	17.0	16.9		16.9	15.0	13.0	13.0	11.9	11.0	156.9	13.075			
28.....	10.1			9.8	9.2	9.2		9.0		10.8	14.2	14.2	16.8	16.9		16.9	15.0	13.1	13.1	12.4	11.5	148.8	12.400			
29.....	10.7			10.2	9.9	9.9		9.5		11.4	15.0	15.0	17.0	17.1		17.1	14.9	13.0	13.0	11.8	11.0	151.5	12.625			
30.....	10.2			9.8	9.2	9.2		9.0		11.3	15.0	15.0	16.8	16.8		16.8	14.4	12.6	12.6	11.6	10.8	147.5	12.291			
31.....	10.0			9.8	9.0	9.0		8.9		11.0	14.8	14.8	16.0	15.9		15.9	14.5	12.7	12.7	11.4	10.5	144.5	12.041			
Totals Totale	372.2			358.4	343.4	343.4		351.1		424.9	527.2	527.2	569.4	559.4		559.4	508.4	450.1	450.1	419.1	397.5	5279.2	440.106			
Means Gem	12.006			11.561	11.077	11.077		11.325		13.706	17.006	17.006	18.367	18.045		18.045	16.400	14.519	14.519	13.519	12.822	170.296	14.196			

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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Totals. Totale.	Means. Gem.
1.....		9.8		9.2		8.9		8.8		11.0		14.4		16.0		15.3		14.0		12.0		11.9		9.8	141.7	11.808
2.....		9.2		8.8		8.0		7.9		10.6		13.8		15.4		16.2		13.3		11.1		11.0		9.2	135.5	11.291
3.....		8.5		7.8		7.4		7.8		10.8		14.0		15.2		16.0		12.5		10.9		9.9		9.0	128.8	10.733
4.....		8.7		8.0		7.5		7.5		10.8		14.7		16.0		15.2		12.5		10.9		10.0		9.2	131.0	10.916
5.....		8.8		8.0		7.7		7.8		11.6		14.8		16.0		15.1		12.8		11.4		10.4		10.0	134.4	11.200
6.....		9.4		9.0		8.5		8.8		12.2		15.0		16.0		15.4		12.9		11.6		10.5		9.8	139.1	11.591
7.....		9.0		8.4		8.0		8.3		11.8		15.0		16.1		15.5		17.9		11.4		10.4		9.4	141.3	11.775
8.....		9.0		8.4		8.1		8.3		11.8		15.0		16.2		15.5		12.7		11.0		9.9		9.0	134.9	11.241
9.....		8.7		7.9		7.4		7.8		11.0		14.0		15.5		15.0		12.3		10.8		9.7		9.0	129.1	10.758
10.....		8.4		7.8		7.4		7.8		11.0		14.4		15.9		15.0		13.0		11.8		11.2		11.0	134.7	11.225
11.....		10.7		10.2		10.0		10.2		9.8		12.8		14.7		14.7		13.2		11.8		10.8		10.0	138.9	11.575
12.....		9.9		10.0		9.9		9.8		9.8		10.2		10.4		10.3		10.0		10.0		10.0		10.0	120.3	10.025
13.....		10.0		9.7		8.8		8.8		11.5		12.8		14.8		14.0		11.8		10.2		9.4		8.8	130.6	10.883
14.....		8.1		7.8		7.6		7.8		10.8		14.0		15.4		14.9		12.7		11.0		10.0		9.5	129.6	10.800
15.....		8.9		8.3		7.8		7.9		10.9		14.0		15.5		14.9		12.5		10.7		9.8		8.9	130.1	10.841
16.....		8.1		7.8		7.2		7.3		10.0		13.5		14.9		14.6		11.8		10.0		9.1		8.3	122.6	10.216
17.....		7.8		7.1		6.5		6.4		8.5		11.9		13.4		13.2		11.0		9.5		8.5		8.0	111.8	9.316
18.....		7.5		7.0		6.8		6.4		9.0		12.5		13.9		14.2		11.0		10.0		10.0		10.0	118.3	9.858
19.....		10.0		10.0		9.9		9.9		11.8		15.0		15.0		14.9		12.8		11.4		10.8		10.0	141.5	11.791
20.....		9.5		9.0		8.3		8.2		11.5		14.5		14.7		14.3		13.0		12.5		10.8		9.8	136.1	11.341
21.....		9.0		8.5		8.0		8.8		10.8		13.4		14.5		14.2		12.8		11.4		10.0		9.7	131.1	10.925
22.....		9.0		7.9		7.1		7.0		10.0		13.0		14.8		14.4		11.8		10.0		9.0		8.1	122.1	10.175
23.....		7.6		7.0		6.5		6.6		9.5		12.8		14.0		13.5		11.5		10.2		9.3		8.8	117.3	9.775
24.....		8.4		7.8		7.2		7.9		9.9		11.7		13.6		13.4		11.8		10.8		10.0		9.0	121.5	10.125
25.....		8.9		7.9		7.3		7.2		9.0		13.0		14.8		14.7		12.0		10.8		9.8		8.9	124.3	10.358
26.....		8.4		6.9		6.5		6.7		10.5		13.7		14.9		14.8		12.4		11.0		10.0		9.8	125.6	10.466
27.....		9.0		9.0		8.9		9.2		11.0		14.4		14.7		13.8		12.8		12.2		12.0		11.8	138.8	11.566
28.....		11.1		11.0		11.0		10.9		10.9		11.5		11.5		11.4		11.0		10.0		9.4		8.8	128.5	10.708
29.....		8.0		8.1		8.0		8.7		11.0		11.8		12.0		12.0		11.7		10.4		9.8		8.9	120.4	10.033
30.....		8.0		8.0		7.9		8.1		10.0		11.9		12.0		11.9		11.0		10.5		10.1		9.9	119.3	9.941
31.....																										
Totals Totals	267.4	252.3	240.1	244.6	307.0	388.5	438.8	327.9	372.5	327.3	303.5	282.5	3879.2	3323.256												
Means	8.913	8.410	8.003	8.153	10.233	12.950	14.626	11.263	12.416	10.910	10.116	9.416	129.306	10.773												

TABLE 53.

C.P.S.128764-1955-6-500.

Two-Hourly Values of
Uurlikse Waardes van

SOIL TEMPERATURE
at AGRICULTURAL RESEARCH
INSTITUTE. POE-HEFSTROOM.

No. 13.
Month
Maand

Year 1963.
Jaar

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Totals. Totale.	Means. Gem.
1.....		9.2		9.2		9.2	10.0		12.5	14.8	14.9	13.8	12.7	11.7	10.8	9.7	138.5	11.541								
2.....		8.9		8.4		8.0	8.8		10.3	11.0	10.9	10.1	9.6	8.9	8.8	8.4	112.1	9.341								
3.....		8.0		8.0		8.0	9.0		12.0	14.5	14.6	12.8	11.3	10.0	9.3	9.0	126.5	10.541								
4.....		8.5		7.8		7.4	8.9		11.0	12.8	13.0	11.9	11.4	10.8	10.2	9.5	123.2	10.266								
5.....		8.9		8.7		8.7	9.4		12.0	14.0	14.0	12.9	11.8	10.9	9.7	8.7	129.7	10.808								
6.....		7.9		7.4		7.0	8.9		12.5	14.2	14.3	12.5	11.5	9.9	8.9	8.0	123.0	10.250								
7.....		7.5		7.0		7.0	9.0		12.0	13.8	14.0	12.0	10.0	9.0	8.0	7.5	116.8	9.733								
8.....		7.0		6.5		6.0	6.5		8.5	12.0	14.0	13.9	12.0	10.8	9.5	8.5	115.2	9.600								
9.....		8.0		8.0		8.0	7.8		8.9	10.9	12.8	13.0	12.0	11.0	10.5	10.0	120.9	10.075								
10.....		10.0		10.0		9.2	9.3		11.0	13.0	13.9	13.0	11.3	9.8	9.0	8.2	127.7	10.641								
11.....		7.9		7.8		7.7	7.3		9.0	11.5	13.1	13.1	11.1	9.8	8.5	7.5	114.3	9.525								
12.....		6.9		6.1		5.8	5.6		9.0	12.0	13.7	13.6	11.0	9.4	8.2	7.2	108.5	9.041								
13.....		6.2		5.6		5.0	4.9		7.7	10.5	12.0	11.9	10.0	8.2	7.0	6.0	95.0	7.916								
14.....		5.2		4.8		4.2	4.0		6.8	10.4	12.4	12.2	10.0	8.0	7.0	6.1	91.1	7.951								
15.....		5.5		5.0		4.5	4.0		6.8	11.1	13.0	12.6	9.8	8.0	7.0	6.0	93.3	7.775								
16.....		5.5		5.0		4.8	4.8		7.9	11.5	13.5	12.9	9.9	8.1	7.1	6.2	97.2	8.100								
17.....		5.7		5.2		4.8	5.0		8.5	12.0	13.9	13.0	10.0	8.8	7.8	6.8	101.5	8.458								
18.....		6.2		5.8		5.2	5.8		9.0	12.8	14.0	13.8	10.8	9.2	8.1	7.4	108.1	9.008								
19.....		6.8		6.2		5.7	6.4		9.6	13.0	14.8	14.2	11.5	10.0	9.0	8.0	115.2	9.600								
20.....		7.5		7.0		6.5	7.0		10.0	13.0	14.2	12.9	12.0	12.0	11.0	10.0	123.1	10.258								
21.....		9.9		9.5		9.0	9.4		11.0	13.5	14.5	14.0	12.5	11.5	11.0	10.9	136.7	11.391								
22.....		10.8		10.1		9.9	9.0		10.6	11.4	12.0	11.0	9.9	8.8	7.8	6.8	118.1	9.841								
23.....		5.9		5.4		4.9	4.9		7.9	11.0	12.8	12.2	10.0	8.4	7.1	6.1	96.6	8.050								
24.....		5.2		4.9		4.0	4.3		7.9	11.8	13.5	13.2	10.0	8.5	7.4	6.8	97.5	8.125								
25.....		6.0		5.5		5.0	5.4		8.9	12.0	13.5	13.0	10.1	8.9	7.9	6.9	103.1	8.591								
26.....		6.1		5.7		5.0	5.3		8.8	12.5	14.1	13.7	10.8	9.0	8.0	7.2	106.2	8.850								
27.....		7.0		6.8		6.1	7.0		10.0	12.8	14.1	13.9	11.1	9.9	8.9	7.9	115.5	9.625								
28.....		7.0		6.6		6.3	6.7		9.8	13.0	14.9	14.2	11.4	9.9	8.9	8.0	116.7	9.725								
29.....		7.5		7.0		6.6	7.6		10.0	13.5	15.9	15.5	13.9	12.8	11.9	10.9	133.1	11.091								
30.....		10.2		10.1		9.3	9.4		12.0	16.0	17.5	17.0	14.4	12.5	11.5	10.5	150.4	12.533								
31.....		9.9		9.0		8.5	8.6		12.0	15.9	17.5	17.0	13.8	12.0	10.9	10.0	145.1	12.091								
Totals Totale		232.8		220.1		207.3	220.0		303.9	392.2	431.3	410.8	347.6	306.5	276.7	250.7	3599.9	299.981								
Means		7.500		7.100		6.687	7.096		9.803	12.651	11.912	11.251	11.212	9.887	8.925	8.087	116.125	9.676								

TABLE 54.

CP-141-1-1000-100

Hourly Values of
Uurlikse Waardes van

COIL TEMPERATURE
af AGRICULTURALE B. GRAAN
INCUBATOR, 1000-1000.

No. 14.

Month
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1963.
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Totals. Totale.	Means. Gem.
1.....		9.2		9.2		9.0		9.5		12.4		15.9		17.5		17.5		14.0		12.4		11.4		10.5	148.2	12.350
2.....		10.0		9.4		9.0		9.2		12.0		15.9		17.6		17.6		14.0		12.4		11.2		10.2	148.1	12.341
3.....		9.8		9.4		8.5		8.8		12.0		15.5		17.0		17.0		13.9		11.9		10.9		9.9	144.1	12.008
4.....		9.0		8.3		7.8		7.9		11.6		15.0		17.0		17.0		13.5		11.4		10.0		9.2	137.5	11.458
5.....		8.5		7.9		7.3		8.0		11.7		15.5		17.5		17.5		14.0		12.0		10.9		9.9	140.2	11.683
6.....		9.0		8.9		8.1		8.7		12.0		16.0		18.0		18.0		14.5		12.5		11.4		10.4	147.1	12.258
7.....		9.9		9.2		8.9		9.5		12.5		16.5		18.2		18.2		15.0		13.1		12.0		11.0	153.7	12.808
8.....		10.8		10.0		10.0		10.8		12.9		15.5		16.5		16.5		13.6		12.0		11.9		10.0	150.0	12.500
9.....		9.8		9.0		8.0		8.5		11.0		14.0		15.9		15.9		13.1		11.2		10.5		10.0	136.0	11.333
10.....		9.9		9.9		9.9		10.0		11.0		13.0		15.8		15.8		13.2		11.4		10.0		9.0	138.6	11.550
11.....		8.0		8.5		7.0		7.5		11.0		15.5		17.9		17.9		14.0		11.9		10.8		9.8	139.1	11.591
12.....		8.9		8.2		7.9		6.5		10.5		14.5		16.0		16.0		11.8		10.0		9.0		8.0	126.2	10.516
13.....		7.8		7.0		6.2		7.0		11.0		15.0		16.5		16.5		12.3		10.2		8.9		7.9	125.3	10.441
14.....		6.9		6.0		5.2		6.5		10.5		14.4		15.8		15.8		11.5		9.4		8.0		7.0	115.9	9.658
15.....		6.1		6.0		5.1		6.0		9.5		12.8		14.0		14.0		10.5		9.0		7.2		6.4	105.6	8.800
16.....		6.4		4.8		4.0		5.0		9.0		13.0		14.9		14.9		10.5		8.6		7.1		6.1	103.5	8.625
17.....		5.5		5.0		4.5		5.5		9.5		12.5		14.0		14.0		11.0		9.5		8.1		7.2	105.8	8.816
18.....		6.5		5.5		4.9		5.5		9.4		12.5		14.0		14.0		10.6		8.1		6.9		6.0	103.5	8.625
19.....		5.1		4.5		4.0		6.5		11.8		16.0		18.4		18.4		14.1		12.0		10.9		9.9	131.2	10.933
20.....		9.0		8.2		7.9		8.6		13.0		16.9		19.8		19.8		15.2		13.0		11.9		10.9	153.4	12.783
21.....		10.2		9.5		9.0		9.5		14.5		18.5		19.9		19.9		15.5		13.5		12.0		11.1	162.2	13.516
22.....		10.5		9.9		9.1		10.0		15.0		19.2		21.0		21.0		16.5		14.5		13.0		11.9	170.7	14.225
23.....		11.0		10.2		9.8		10.3		15.0		19.5		21.5		21.5		17.5		14.5		13.2		12.5	175.9	14.658
24.....		11.9		12.0		11.8		12.0		15.4		18.9		20.6		20.6		17.2		16.8		14.5		13.5	184.6	15.383
25.....		13.0		12.0		11.8		12.3		15.6		18.9		20.9		20.9		17.9		15.1		13.5		12.3	183.8	15.316
26.....		11.2		10.2		9.5		10.0		14.4		19.2		21.5		21.5		17.5		14.7		12.9		12.0	174.0	14.500
27.....		11.0		10.2		10.0		10.9		15.0		19.7		21.8		21.8		18.2		15.9		14.6		13.9	182.4	15.200
28.....		13.3		12.8		11.8		12.8		17.0		21.2		23.0		23.0		19.0		16.5		15.2		14.3	199.3	16.608
29.....		13.6		12.8		12.1		12.9		17.0		21.5		23.2		23.2		19.1		17.1		15.8		14.6	202.2	16.850
30.....		13.8		13.2		12.4		13.3		17.5		21.8		23.0		23.0		19.9		17.2		15.6		14.5	204.7	17.058
31.....		13.2		12.8		11.8		12.5		16.8		20.9		22.9		22.9		19.5		17.0		15.3		14.3	199.6	16.633

Totals Totale	299.0	280.1	262.3	262.3	262.0	262.0	397.5	515.2	571.8	571.8	571.8	571.8	571.8	571.8	571.8	571.8	571.8	458.1	394.8	354.6	354.6	354.6	324.2	4692.4	391.024
Means Gem.	9.645	9.035	8.461	8.461	9.096	9.096	12.822	16.619	18.445	18.445	18.445	18.445	18.445	18.445	18.445	18.445	18.445	14.777	12.735	11.438	11.438	11.438	10.458	151.367	12.613

TABLE 55.

Hourly Values of
Uurlikse Waardes van

at
te

No. 15.
Maand

Year 1963.
Jaar

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Totals. Totale.	Means. Gem.
1.....	13.7	13.7	13.2	13.2	13.0	13.0	13.8	13.8	17.0	17.0	21.0	21.0	24.6	24.6	23.0	20.2	18.0	16.5	16.0	209.0	17.416					
2.....	15.4	14.9	14.9	14.4	14.4	14.4	14.9	14.9	18.5	18.5	22.3	22.3	23.9	23.9	23.0	20.8	18.3	17.1	16.3	220.3	18.358					
3.....	15.0	14.4	14.4	13.9	13.9	13.9	14.9	14.9	19.0	19.0	23.4	23.4	26.1	26.1	24.2	21.0	18.8	17.6	16.0	223.3	18.608					
4.....	15.0	14.6	14.6	13.8	13.8	13.8	14.8	14.8	18.5	18.5	23.0	23.0	25.6	25.6	23.0	21.9	19.0	17.5	16.4	225.0	18.750					
5.....	15.1	14.6	14.6	13.9	13.9	13.9	14.5	14.5	18.5	18.5	23.0	23.0	25.8	25.8	23.0	22.1	19.0	17.5	16.6	225.6	18.800					
6.....	15.5	14.9	14.9	14.2	14.2	14.2	14.9	14.9	18.5	18.5	23.0	23.0	25.9	25.9	23.0	23.0	19.8	17.9	16.9	230.4	19.200					
7.....	15.0	14.0	14.0	14.6	14.6	14.6	14.8	14.8	18.8	18.8	23.2	23.2	26.1	26.1	23.0	23.0	20.0	18.5	17.2	231.1	19.258					
8.....	16.1	15.2	15.2	14.7	14.7	14.7	14.8	14.8	18.5	18.5	23.0	23.0	26.1	26.1	23.0	24.6	20.4	18.8	18.0	236.4	19.700					
9.....	17.5	16.1	16.1	15.1	15.1	15.1	16.0	16.0	20.0	20.0	24.8	24.8	27.6	27.6	23.0	22.0	19.8	18.4	17.4	238.9	19.908					
10.....	16.5	16.0	16.0	15.1	15.1	15.1	16.4	16.4	20.2	20.2	24.8	24.8	26.7	26.7	23.0	22.4	19.9	18.2	17.5	239.6	19.966					
11.....	16.5	15.8	15.8	15.0	15.0	15.0	16.8	16.8	21.2	21.2	25.8	25.8	27.7	27.7	23.0	22.8	20.7	19.0	18.0	245.3	20.441					
12.....	17.0	16.5	16.5	16.0	16.0	16.0	17.2	17.2	21.2	21.2	26.5	26.5	28.6	28.6	23.0	22.9	21.0	19.5	18.4	249.0	20.750					
13.....	17.2	16.2	16.2	15.5	15.5	15.5	17.2	17.2	21.2	21.2	25.2	25.2	27.0	27.0	23.0	24.4	21.8	20.2	19.0	251.8	20.983					
14.....	18.8	18.2	18.2	17.8	17.8	17.8	17.9	17.9	20.5	20.5	24.4	24.4	26.9	26.9	23.0	23.5	20.9	19.8	18.4	250.5	20.875					
15.....	17.3	16.7	16.7	15.9	15.9	15.9	16.4	16.4	19.8	19.8	18.9	18.9	26.9	26.9	23.0	24.5	21.3	20.0	18.9	242.9	20.241					
16.....	17.9	16.9	16.9	16.6	16.6	16.6	16.9	16.9	21.8	21.8	26.0	26.0	28.0	28.0	23.0	23.8	21.2	19.9	18.9	254.9	21.241					
17.....	17.9	17.2	17.2	16.8	16.8	16.8	18.0	18.0	22.8	22.8	27.0	27.0	28.9	28.9	23.0	24.5	22.0	21.8	19.8	264.7	22.058					
18.....	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	22.1	22.1	27.0	27.0	29.0	29.0	23.0	24.5	23.0	22.8	21.6	273.6	22.800					
19.....	20.8	20.0	20.0	19.8	19.8	19.8	20.4	20.4	24.0	24.0	27.8	27.8	29.0	29.0	23.0	24.7	22.4	21.0	19.9	277.8	23.150					
20.....	19.8	19.2	19.2	18.9	18.9	18.9	20.0	20.0	23.0	23.0	26.0	26.0	26.1	26.1	23.0	23.5	22.5	21.5	20.4	266.2	22.183					
21.....	19.9	19.9	19.9	18.9	18.9	18.9	19.8	19.8	24.0	24.0	26.0	26.0	27.0	27.0	23.0	21.8	19.5	17.2	16.0	255.0	21.250					
22.....	14.9	13.9	13.9	13.0	13.0	13.0	15.0	15.0	20.0	20.0	25.0	25.0	27.0	27.0	23.0	22.0	19.4	18.0	16.9	231.1	19.258					
23.....	15.2	14.8	14.8	14.0	14.0	14.0	15.8	15.8	20.0	20.0	24.8	24.8	26.7	26.7	23.0	21.8	28.8	17.0	15.9	230.0	19.166					
24.....	14.9	13.9	13.9	13.0	13.0	13.0	14.4	14.4	20.0	20.0	24.9	24.9	26.9	26.9	23.0	22.3	19.5	17.5	16.3	229.6	19.133					
25.....	15.0	14.1	14.1	13.4	13.4	13.4	15.4	15.4	20.7	20.7	25.0	25.0	27.0	27.0	23.0	22.5	19.8	18.0	16.7	234.1	19.508					
26.....	15.8	15.2	15.2	15.0	15.0	15.0	17.0	17.0	21.4	21.4	25.5	25.5	27.9	27.9	23.0	23.5	21.0	19.5	19.2	247.9	20.658					
27.....	18.9	18.4	18.4	17.8	17.8	17.8	18.9	18.9	22.8	22.8	26.7	26.7	26.9	26.9	23.0	25.0	22.0	20.3	19.2	267.1	22.258					
28.....	18.2	17.5	17.5	17.0	17.0	17.0	18.7	18.7	22.8	22.8	27.8	27.8	30.0	30.0	23.0	26.0	23.0	21.0	19.5	271.4	22.616					
29.....	18.5	17.5	17.5	16.8	16.8	16.8	18.4	18.4	22.9	22.9	27.1	27.1	30.0	30.0	23.0	26.0	22.8	21.1	20.2	271.0	22.583					
30.....	19.5	18.6	18.6	17.5	17.5	17.5	18.6	18.6	22.8	22.8	27.0	27.0	30.0	30.0	23.0	25.8	22.1	20.7	19.8	271.8	22.650					
31.....																										

Totals Totale	507.7	487.3	470.3	501.5	622.5	745.9	810.7	789.8	696.8	617.7	573.8	546.3	7365.3	613.867
Means Gem	16.923	16.243	15.676	16.716	20.750	24.863	27.023	26.386	23.226	20.950	19.126	18.210	245.510	20.462

TABLE 56

PERCENTAGES OF SOIL MOISTURE IN UPPER 5 cm OF SAMPLING PLOT

OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEPT.
07.837	24.768	16.719	35.208	07.856	57.411	16.194	58.610	56.534	54.673	32.188	11.306
08.913	28.406	12.284	34.902	16.925	62.110	33.067	54.857	41.339	55.665	13.571	16.313
04.952	40.616		25.901	06.980	59.866	18.939	21.896	35.185	59.312	18.801	11.313
Mean % 07.234	31.263	14.501	32.003	10.587	59.795	22.733	45.121	44.352	56.550	20.853	12.996

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11 : REFERENCES

- AUCAMP, J.L., LOOTS, G.C., & RYKE, P.A.J. 1964. Notes of the efficiency of funnel batteries for the extraction of soil microarthropods. Tydskr. Natuurw. 4:105-126.
- AUCAMP, J.L., & RYKE, P.A.J. 1965. The efficiency of an improved grease film extractor in stratification studies of the soil microarthropods. *S. Afr. J. of Sci. (in press)*
- AUERBACH, S.I. & CROSSLEY, D.A. 1960. A sampling device for soil microarthropods. *Acarologia* 2, 279-288.
- BAIER, W.B. 1963. Studies on macroclimates and microclimates and their influence on crops. Unpublished thesis, University of Pretoria.
- BORNEBUSCH, C.H., 1930. The fauna of Forest soil Forstl. Forsøgsv. Danm., 11, 1-224.
- DI CASTRI LIVIERO, F. 1963. Etat de nos connaissances sur le biocoenoses edaphiques du Chili. In Doeksen, J. & van der Drift, J. Soil Organisms. p. 375-385. Amsterdam. North - Holland Publishing Company.
- EVANS, G.O. 1951. Investigations on the fauna of Forest humus layers. Rep. Forest Res. Lond., 1950, pp. 110-113.
- EVANS, G.O., SHEALS, J.G. & MACFARLANE, D. 1961. The terrestrial Acari of the British Isles. An introduction and classification. Vol. I. Introduction and Biology. London. British Museum (Nat. Hist.).
- FORD, J. 1938. Fluctuations in natural populations of Collembola and Acarina, J. Anim. Ecol. 7 : 350 - 369.
- HAARLOV, N. 1960. Microarthropods from Danish soils. Ecology, phenology, Oikos, suppl. 3; 1 - 176.
- HUGHES, T.E. 1959. Mites, or the Acari. London, Athlone Press, University of London.
- KUHNELT, W. 1961. Soil Biology. London. Faber and Faber.
- MACFADYEN, A. 1952. Small arthropods of a Molinea fern. J. Anim. Ecol. 21 : 87-117.
- MACFADYEN, A. 1963. The contribution of the microfauna to the total soil metabolism. In Doeksen, J. & van der Drift, J. Soil Organisms. p. 3 - 17. Amsterdam. North-Holland Publishing Company.

- MURPHY, P.W. 1953 The biology of forest soils with special reference to the mesofauna or meiofauna. J. Soil Sci. 4, 2: 155 - 193.
- MURPHY, P.W. 1955 Ecology of fauna of forest soils. In Kevan, D.K. Soil Zoology. p. 99 - 123. London. Butterworths Scientific Publications.
- SALT, G. et al. 1948 The arthropod population of pasture soil. J. Anim. Ecol. 17 : 139 - 150.
- SALT, G. 1952 The arthropod population of the soil in some East African pastures. Bull. Ent. Res. 43 : 203 - 220.
- SALT, G. 1955 The arthropod population of the soil under elephant grass in Uganda. Bull. Ent. Res. 46 : 539 - 545.
- SHEALS, J.G. 1957 The Collembola and Acarina of uncultivated soil. J. Anim. Ecol. 26 : 125 - 134.
- THAMDRUP, H.M. 1939 Studier over jydsk Heders Økologi. I. Hedebundens fugtighedsforhold. Acta Jutland, 11 Suppl. : 1 - 82.
- THOMPSON, M. 1924 Soil population. An investigation of the biology of the soil in certain districts of Aberystwyth. Ann. App. Biol. 11 : 349 - 394.
- ULRICH, A.T. 1933 Die Makrofauna der Waldstreu. Quantitative Untersuchungen in Beständen mit guter und schlechter Zersetzung des Bestandesabfalles. Mitt. Fortswiss. 4, 283 - 323.
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