Population Fluctuations of Mites Inhabiting Three Kinds of Animals' Manure in Two Locations in Egypt

El-Shazly, M. M. Y.[1]; A.M. Zaki[2]; E. H. M. Tayeb[1]; and S.A. Ahmed[1]

ABSTRACT

Monthly population fluctuations of mites inhabiting cattle manure, sheep manure and poultry manure in Abees and Abo-Hommous representing Alexandria and Beheira Governorates respectively in Egypt were studied.

Population densities of the four mite suborders fluctuated from a month to another all year round in the three types of manure concerning the two locations of study and occurred in this descending order; Acaridida, Gamasida Oribatida and Actinedida in cattle manure in both locations. On the other hand, they were in the descending order; Acaridida, Actinedida, Gamasida and Oribatida in sheep and poultry manures, in both locations.

There were significant differences among the mean numbers of mites in certain months of inspections in all the suborders in the different manure types and locations except suborder Actinedida in cattle and sheep manures in Abo-Hommous.

No significant correlation was found between mean mite numbers of any two suborders in the three manure types and the two locations except strong positive correlations only between oribatid mites and gamasid mites moreover, between Actinedid mites and acaridid mites in cattle manure in Abees.

No significant correlation was found between mean mite numbers of any suborder in the three manure types of the two locations and air temperature, relative humidity or percentages of manure moisture content.

Key words: Cattle, sheep, poultry manures' inhabiting mites.

INTRODUCTION

The acari exhibit various associations with other organisms, phytophagy; predation and parasitism to intricate commensal and phoritic relationships (Evans *et al.*, 1961).

In Egypt, the farmers add manure to soil for fertilization. Manure improves the chemical and the physical properties of soil (Pizzeghello *et al.* 2011).

Manure is regarded as a suitable media for certain insects and mites. Mites have colonized almost every terrestrial, marine and fresh water habitat known to man (Krantz, 1978).

The knowledge of distribution and abundance of manure fauna as part of the structure of an ecosystem is very important in order to understand the dynamics of any ecosystem. Manure mites are of a great biological importance both in natural and in cultivated soils. Much attention has been paid to soil fauna.

The factors causing manure mites to aggregate are still unknown. Generally, such a distribution might be explained by several factors, e.g. the clustering of eggs, the choice of microhabitats which are particularly suitable as a result of local conditions, such as the soil type and quality, vegetation cover, soil temperature and moisture, seasonal and monthly average temperatures, relative humidity and rain fall (Edwards and Lofty, 1971; Butecher *et al.*, 1971; Usher, 1976 and Zaki, 1983).

Therefore, the aim of the present study is to survey the commonly known four mite suborders (Gamasida, Actenidida, Oribatida and Acaridida) inhabiting cattle, sheep and poultry manures in two governorates; Alexandria and Beheira. Besides, studying the effect of prevailing air temperature, relative humidity and manure moisture on the beneficial and harmful populations of inspected mites existed in the above-mentioned manures.

MATERIALS AND METHODS

1- Field studies:

Field studies were carried out under the prevailing conditions in two different locations; Abees and Abo-Hommous representing Alexandria and Beheira Governorates respectively. The survey extended through out the elapsed period from January up to December 2008.

The experiments were conducted to survey certain mite species inhabiting three different types of farm manure, i.e. cattle manure, sheep manure and poultry manure. Furthermore, the influences of some environmental factors on the distribution and abundance of manure mite populations associated with these manure types at the two localities were explored and studied.

[1]Plant Prot. Dept., Fac. of Agric. (Saba Basha), Alexandria Univ., Egypt.
[2]Ent. & Zool. Dept., Fac. of Agric., El-Monufia Univ., Egypt.
Received October 02, 2011, Accepted November 03, 2011

Three Manure samples (replicates) of about one Kg. for each were picked up at 0-20 cm depth at monthly intervals from each of the selected manure types; cattle manure, sheep manure and poultry manure.

The collected samples were placed in plastic bags, each was marked by a label denoting the date, the location, thetype of manure and miscellaneous observations. A total of eighteen monthly samples of manure representing the three types of manure in both localities under consideration were collected and taken immediately to laboratory of Plant Protection Dept., Faculty of Agriculture (Saba Basha), Alexandria University for mites extraction all - year - round.

2- Data of environmental factors:

During the ecological studies, data of meteorological factors mainly, air temperature(°C) and relative humidity (R.H.%), were obtained from the Meteorological Stations at Alexandria and El-Beheira provinces (Table 1). Identification of mite species was made at the laboratory of Economic Entomology & Agricultural Zoology Dept., Faculty of Agriculture, Shebin El-Kom, Menoufia University.

In addition, about 100 g. of manure samples from each inspected manure type in both localities were monthly collected to determine the manure moisture content during the whole year of investigation (Table 1).

Moisture content (%)= [Wet weight– Dry weight ⁄ Wet weight] × 100.

3- Laboratory studies:

Extracted individuals of the four mite suborders (Gamasida, Actinedida, Oribatida and Acaridida) were counted and isolated from the extracted mixture that contains different arthropods. Then, mites were transferred to small pots using a very fine camel hair brush (000). Transferred mite individuals were covered with drops of lactic acid then, lift for a period of 1 – 2 weeks to be cleared up. Permanent mounted specimens were dried at 50° C for 3– 4 weeks then, they were ready for identification under microscope. Preparations were made according to Grandjean (1949) and applied by Zaki (1983),

More than 1000 specimens from different manure types and locations under consideration were mounted and identified using the taxonomy keys of Mahunka (1972), Krantz (1978), Balogh and Mahunka (1983) and Zaher (1986).

4- Statistical analysis:

Data were subjected to the analysis of variance test (ANOVA) with mean separation at the 5% levels of significance. Computer Programs Costat and Duncan's multiple range tests were used to compare the average numbers of mites in the twelve months of inspection.

Statistical correlation analyses between mite numbers and environmental factors(air temperature, relative humidity and manure moisture) were calculated and discussed.

RESULTS AND DISCUSSION

1. Population densities

1.1. Mites inhabiting cattle manure

Data presented in Table 2 indicate the calculated mean numbers of each mite suborder inhabiting cattle manure as a monthly record.

1.1.1. In Abees, Alexandria

Population densities of gamasid mites increased in two months, March and November, The higher peak was recorded during spring season in March giving a mean number of 26.33 gamasid individuals. This result agrees with Mahmood and Aldulaimi (1989) who demonstrated the Acari from 96 samples of accumulated cattle and horse manures in Baghdad, Iraq. They found that mites were predominantly Mesostigmata. Moreover, the highest number of species was recorded from cattle manure during winter.

Population density of actinedid mites were the least through the year. These results are with disagreement with Stamatiadis and Dindal (1990) who revealed that Prostigmata was the most abundant suborder in cattle dung.

Population densities of oribatid mites had two peaks in March and January, individuals were absent in certain months. This result agrees with Stamatiadis and Dindal (1990) found that Cryptostigmata was a numerically minor community component in cattle dung. However Roser-Hosch *et al.* (1981) found that the groups Astigmata, Mesostigmata and Prostigmata were relatively abundant and exhibited a characteristic chronological pattern in cattle dung. On the other hand, they encountered few mites of Cryptostigmata.

Acaridid mites inhabiting cattle manure were comparatively the highest among the other inspected suborders. This result disagrees with Stamatiadis and Dindal (1990) who found that Astigmata was a numerically minor community component in cattle dung. High population densities were recorded in January, March, October and November 2008 which gave 69.33, 95.67, 112.33 and 303.33 individuals, respectively.

Table 1. Records of air temperature(°C), air relative humidity(R.H %) and manure moisture content(%) at 0–20 cm depth, during 2008

Month	Mean air temperature °C & R.H. %				Manure moisture (%)					
	Temperature (°C)		R.H.(%)		Cattle		Sheep		Poultry	
	Abees	Abo-Hommous	Abees	Abo-Hommous	Abees	Abo-Hommous	Abees	Abo-Hommous	Abees	Abo-Hommous
January	13.50	11.5	67.0	72.0	20.9	52.33	18.9	10.76	27.6	18.99
February	12.45	12.5	67.0	72.0	56.37	60.69	65.33	4.78	8.57	15.26
March	15.75	15.5	65.0	70.0	97.9	53.86	51.45	1.12	30.79	5.23
April	16.55	24.8	56.0	68.0	34.34	46.90	54.43	8.34	9.78	10.35
May	18.00	22.0	63.0	77.0	9.48	36.11	22.37	6.67	20.4	8.12
June	25.35	26.5	66.0	63.0	42.67	70.56	38.67	9.12	35.68	6.23
July	27.30	28.9	74.0	75.0	31.13	81.01	30.79	17.12	7.89	١١.٦٧
August	27.8	28.0	75.2	72.0	52.56	57.23	59.67	36.57	21.79	12.23
September	28.15	27.0	64.0	70.0	60.33	71.79	19.45	1.98	12.12	6.33
October	22.30	22.0	65.0	65.0	41.78	72.78	27.48	9.23	16.97	4.00
November	23.90	20.0	78.0	71.0	23.23	69.45	58.12	11.67	13.12	17.12
December	19.60	21.0	74.2	68.0	61.57	59.11	64.12	10.45	33.78	22.23

R.H. = Relative Humidity

Table 2. Comparison among the interaction effects of months in the two localities on the population densities of the four mite suborders inhabiting cattle manure during the year of 2008

Month	Mean numbers of mites belonging to four suborders and their significance levels									
	Gamasida		Actinedida		Oribatida		Acaridida		Total	
	Abees	Abo-Hommous	Abees	Abo-Hommous	Abees	Abo-Hommous	Abees	Abo-Hommous	Abees	Abo-Hommous
Jan	05.67b*	11.33bcd	2.00ab	00.67b	05.33 b	09.33a	69.33 b	06.33 a	82.33 b	27.67 a
Feb	00.67b	05.00cd	0.00 b	00.00b	01.67 b	01.33c	02.67 b	47.67 a	5.00 b	54.00 a
Mar	26.33a	14.67bc	0.00 b	00.00b	12.67a	06.33b	95.67 b	39.00 a	134.67 b	60.00 a
Apr	07.33b	09.33bcd	0.00 b	00.33b	00.67 b	01.00c	02.00 b	106.33 a	10.00 b	117.00 a
May	02.67b	00.33d	0.33 b	06.00ab	00.00 b	00.33c	09.00 b	2.00 a	12.00 b	8.67 a
Jun	00.00b	00.67cd	0.00 b	00.00b	00.00 b	00.00c	00.00 b	7.33 a	0.00 b	8.00 a
Jul	02.00b	20.33cd	0.00 b	00.00b	00.00 b	00.00c	01.33 b	83.00 a	3.33 b	103.33 a
Aug	00.33b	00.33d	0.00 b	00.33b	00.00 b	00.00c	00.67 b	0.00 a	1.00 b	0.67 a
Sep	00.67b	02.33cd	1.33ab	02.67ab	01.67 b	00.00c	04.33 b	21.00 a	8.00 b	26.00 a
Oct	04.00b	02.33cd	0.00 b	00.00b	00.00 b	00.00c	112.33 b	12.67 a	116.33 b	15.00 a
Nov	09.33b	01.00cd	4.00 a	00.00b	00.00 b	00.00c	303.33 a	11.00 a	316.67 a	12.00 a
Dec	01.67b	52.33a	2.00ab	06.67a	00.00 b	01.00c	39.67 b	25.00 a	43.33 b	85.00 a
Total	60.67	120.00	9.67	16.67	22.00	19.00	640.33	361.33	732.67	517.33
$LSD_{0.05}$	**8.23**	**12.28**	**2.2**	**5.2**	**5.48**	**1.78**	**125.49**	**97.22**	**125.58**	**104.67**

*Means followed by the same letter(s) are not significantly different.

1.1.2. In Abo-Hommous, Beheira

The total mean number of gamasid mite individuals occupied the second category of occurrence. There were two minor peaks in March and July compared with a high one in December (52.33 individuals).

Actinedida had the least means of mite numbers during the year of study. Oribatid mites occurred in small numbers in cattle manure during 2008. The highest number was recorded in January. Acaridid mites were the most abundant population among the four suborders. The highest population was found in April followed by those of July, February and March which recorded 106.33, 83, 47.67 and 39 individuals, respectively.

1.2. Mites inhabiting sheep manure

Data presented in Table 3 indicate the calculated mean numbers of each mite suborder inhabiting sheep manure as a monthly record.

1.2.1. In Abees, Alexandria

It could be observed that suborder Acaridida had the highest population density among the four suborders. Actinedid mites came in the second rank followed by gamasid mites and oribatid mites which recorded the least population density.

The abundance of gamasid mites in sheep manure was noticed and recorded in low numbers during the year. The population density had three peaks, in January, May and July 2008 ranking the 1st, 3rd and 2nd order, respectively.

The highest peak of actinedid mites population density was recorded in June followed by that of December. On the other hand, the least peak was recorded in October.

The least population density, comparing the four suborders was observed for the oribatid mite.

Acaridid mites population densities had an obvious beak in December.

1.2.2. In Abo-Hommous, Beheira

The abundances of gamasid mite populations inhabiting sheep manure were in a very low numbers during investigation months.

Population densities of actinedid mites had two peaks in January and October. Population densities of oribatid mites occurred during January and February only in very low numbers.

Acaridid mites had relatively high population numbers among the four suborders. It could be observed that there were four peaks of presentation in January, May, August and October.

1.3. Mites inhabiting poultry manure

Data presented in Table 4 indicated the calculated mean numbers of each mite suborder inhibiting poultry manure as a monthly record.

1.3.1. In Abees, Alexandria

Population densities gamasid mites associated with poultry manure had two peaks in February (the higher) and April. Population densities of actinedid mites were found in a high number in September. The least population density was in May which recorded 0.33 individuals. Actinedid mites disappeared in January, February, March, October and December.

Oribatid mites had the least population density in poultry manure. Relatively the population density was high in January. The occurrence of acaridid mites inhibiting poultry manure had the highest population density among the four suborders.

These results agree with Geden and Stoffolano (1987) who found that acaridid mites were the first arthropods to become established poultry manure. Results also agree with Rueda and Axtell (1997) who found that the most common mites in commercial broiler chicken houses were Acaridae. Population densities of acaridid mites were recorded with three peaks in March, May and November with means of 500.7, 208.7 and 358.0 individuals, respectively.

1.3.2.In Abo-Hommous, Beheira

Population densities of gamasid mite individuals had the third values of occurrence with a few numbers. The highest population of gamasid mites was recorded in December.

There were two peaks of abundance for actinedid mites in July and October (the higher).

Population densities of oribatid mites occurred in low numbers all- year- round.

Population densities of acaridid mites were the superior among the four suborders. The highest population was found in March followed by November, January and April which recorded 1025, 477.67, 419.67 and 313.67, individuals respectively.

2. Comparison among the population densities of the four mite suborders inhibiting the three types of manure.

Mean numbers of mites inhabiting the three inspected manure types in Abees and Abo-Hummous were subjected to the analysis of variance test with mean separation at the 5 % level of significance. Computer program Costat and Duncan's multiple range tests were used to compare the averages of population densities (Tables 2,3 and 4).

Table 3. Comparison among the interaction effects of months in the two localities on the population densities of the four mite suborders inhabiting sheep manure during the year of 2008

Month	Mean numbers of mites belonging to four suborders and their significance levels									
	Gamasida		Actinedida		Oribatida		Acaridida		Total	
	Abees	Abo-Hommous	Abees	Abo-Hommous	Abees	Abo-Hommous	Abees	Abo-Hommous	Abees	Abo-Hommous
Jan	21.67 a	0.00 b	0.00 b	12.67 b	0.00 b	3.00 a	13.33 b	26.67 a	35.00 bc	42.33 a
Feb	1.67 b	1.33 b	0.67 b	0.33 b	0.33 b	1.33 b	2.00 b	7.00 a	4.67 c	10.00 a
Mar	0.67 b	0.67 b	0.00 b	0.33 b	1.67 b	0.00 b	64.67 b	24.33 a	67.00 bc	25.33 a
Apr	0.67 b	2.00 b	0.00 b	0.00 b	0.00 b	0.00 b	0.00 b	11.00 a	0.67 c	13.00 a
May	9.67 ab	0.00 b	0.00 b	0.00 b	0.00 b	0.00 b	0.00 b	44.33 a	9.67 c	44.33 a
Jun	7.67 ab	0.00 b	86.67 a	2.00 b	0.00 b	0.00 b	15.33 b	12.00 a	109.67 b	14.00 a
Jul	13.33 ab	2.33 b	3.00 b	0.00 b	10.33 a	0.00 b	1.00 b	2.33 a	27.67 c	4.67 a
Aug	0.00 b	0.00 b	0.67 b	0.00 b	0.00 b	0.00 b	2.67 b	50.33 a	3.33 c	50.33 a
Sep	6.67 b	0.33 b	3.33 b	0.33 b	1.33 b	0.00 b	14.00 b	3.33 a	25.33 c	4.00 a
Oct	1.67 b	1.00 b	7.00 b	27.67 a	0.00 b	0.00 b	3.33 b	30.67 a	12.00 c	59.33 a
Nov	4.00 b	5.00 a	0.00 b	27.67 a	0.00 b	0.00 b	0.33 b	11.67 a	4.33 c	44.33 a
Dec	3.00 b	0.33 b	15.67 b	8.00 b	0.33 b	0.00 b	171.00 a	19.67 a	190.00 a	28.00 a
Total	70.67	13.00	117.00	79.00	14.00	4.33	287.67	243.33	489.33	339.67
$LSD_{0.05}$	**13.34**	**2.62**	**35.13**	**13.09**	**7.69**	**1.17**	**63.25**	**50.37**	**74.07**	**54.64**

*Means followed by the same letter(s) are not significantly different.

Table 4. Comparison among the interaction effects of months in the two locations on the population densities of the four mite suborders inhabiting poultry manure during the year of 2008

Month	Mean numbers of mites belonging to four suborders and their significance levels									
	Gamasida		Actinedida		Oribatida		Acaridida		Total	
	Abees	Abo-Hommous	Abees	Abo-Hommous	Abees	Abo-Hommous	Abees	Abo-Hommous	Abees	Abo-Hommous
Jan	2.00 d	0.33 ab	0.00 d	0.00 d	16.67 a	7.67 a	8.00 b	419.67 b	26.67 b	427.67 b
Feb	91.00a	1.00 ab	0.00 d	0.00 d	0.00 b	0.00 b	185.67 ab	164.00 bc	276.67 ab	165.00 bc
Mar	15.33 c	1.67 ab	0.00 d	7.67 cd	0.00 b	0.67 b	500.67 a	1025.00 a	516.00 a	1035.00 a
Apr	52.67 b	0.67 ab	14.00 bcd	19.33 cd	0.00 b	0.00 b	25.67 b	313.67 bc	92.33 b	333.67 bc
May	11.00 cd	0.67 ab	0.33 d	6.33 d	1.33 b	0.00 b	208.67 ab	8.67 c	221.33 ab	15.67 c
Jun	10.67 cd	1.33 ab	9.33 bcd	7.67 cd	0.00 b	0.00 b	5.67 b	5.33 c	25.67 b	14.00 c
Jul	4.33 cd	0.00 b	20.33 bc	52.00 b	0.33 b	0.00 b	128.67 ab	12.33 c	153.67 ab	64.33 c
Aug	0.00 d	0.33 ab	25.67 b	26.67 c	0.00 b	3.33 b	130.00 ab	34.67 c	155.67 ab	65.00 c
Sep	0.33 d	1.33 ab	131.33 a	0.00 d	0.00 b	0.00 b	0.00 b	2.67 c	131.67 ab	4.00 c
Oct	2.00 d	6.33 ab	0.00 d	82.00 a	0.00 b	0.00 b	8.33 b	53.33 c	10.33 b	141.67 bc
Nov	5.00 cd	1.33 ab	8.33 cd	3.33 d	0.00 b	0.00 b	358.00 ab	477.67 b	371.33 ab	482.33 b
Dec	2.33 d	16.33 a	0.00 d	2.33 d	0.00 b	0.00 b	286.33 ab	227.33 bc	288.67 ab	246.00 bc
Total	196.67	31.33	209.33	207.33	18.33	11.67	1846.00	2744.00	2270	2994.00
$LSD_{0.05}$	**10.73**	**13.97**	**15.55**	**18.05**	**2.01**	**2.95**	**363.65**	**316.54**	**365.77**	**311.61**

Means followed by same letter(s) are not significantly different.

3. Simple correlations between some environmental factors and mite suborders.

Statistical correlation analysis between some environmental factors and the calculated monthly means of mites inhabiting the three types of manure in the two locations are given in (Tables 5 and 6).

3.1.Correlation in Abees region, Alexandria

3.1.1. Correlations between the four mite suborders inhabiting

cattle manure and some environmental factors

Strong positive correlations were found only between oribatid mites and gamasid mites moreover, between actinedid mites and acaridid mites. No significant correlation was found between the other pairs of suborder. No significant correlation was found between any suborder and any environmental factor.

These results disagree with Cicolani (1983) who found a relationship between rearing temperature and duration of development from egg to adult in *Macrocheles subbadius* (Berl.), which was found in horse dung. The results are in agreement with those found by Achiano and Giliomee (2006) who found the predominant predator *Macrocheles muscaedomesticae* (Scopoli) (Acarina: Macrochelidae) in manure at two census sites in the Western Cape Province, South Africa. *M. muscaedomesticae* showed a wide range of temperature tolerance.

3.1.2. Correlations between the four mite suborders inhabiting sheep manure and some environmental factors

Population densities of gamasid mites were not significantly correlated with the population densities of any other suborder. On the other hand, no significant correlation was observed between air temperature and any mite suborder. Relative humidity had negative insignificant correlation with the population densities of actinedid mites. Manure moisture had no significant correlation with the populations of the four mite suborders.

3.1.3. Correlations between the four mite suborders inhabiting Poultry manure and some environmental factors

There was insignificant positive correlation between the population densities of gamasid mites and the population densities of acaridid mites. There were insignificant negative correlations between the population densities of the other pairs of suborders. Moreover, there was no significant correlation between any of the concerned environmental factors and the population densities of any suborder.

Table 5. Correlation coefficient values between the four mite suborders inhabiting cattle, sheep and poultry manures and some environmental factors in Abees, Alexandria during 2008

Manure type	Source of variance	Gamasida	Actinedida	Oribatida	Acaridida
Cattle	Actinedida	0.048 ns			
	Oribatida	0.859**	-0.091 ns		
	Acaridida	0.430 ns	0.741**	0.115 ns	
	Air Temperature ^{o}C	-0.374 ns	0.043 ns	-0.468 ns	0.312 ns
	Relative Humidity%	-0.1484 ns	0.504 ns	-0.219 ns	0.424 ns
	Manure Moisture %	-0.632 ns	-0.062 ns	-0.471 ns	-0.358 ns
Sheep	Actinedida	0.056 ns			
	Oribatida	0.319 ns	-0.119 ns		
	Acaridida	-0.174 ns	0.095 ns	-0.088 ns	
	Air Temperature ^{o}C	0.074 ns-	0.272 ns	0.349 ns	-0.151 ns
	Relative Humidity%	0.043 ns	-0.043 ns	0.271 ns	0.239 ns
	Manure Moisture %	-0.671 ns	-0.021 ns	-0.195 ns	0.392 ns
Poultry	Actinedida	-0.216 ns			
	Oribatida	-0.173 ns	-0.161 ns		
	Acaridida	0.021 ns	-0.346 ns	-0.277 ns	
	Air Temperature ^{o}C	-0.598 ns	0.549 ns	-0.419 ns	-0.241 ns
	Relative Humidity%	-0.387 ns	-0.116 ns	-0.057 ns	0.377 ns
	Manure Moisture %	-0.415 ns	-0.309 ns	0.237 ns	0.201 ns

** = High significant at 1% level, * = Significant at 5% level and ns = Not significant.

Table 6. Correlation coefficient values between the four mite suborders inhabiting cattle, sheep and poultry manures and some environmental factors in Abo-Hommus, Beheira during 2008

Manure type	Source of variance	Gamasida	Actinedida	Oribatida	Acaridida
Cattle	Actinedida	0.507 ns			
	Oribatida	0.150 ns	-0.144 ns		
	Acaridida	0.245 ns	-0.252 ns	-0.072 ns	
	Air Temperature °C	-0.094 ns	0.054 ns	-0.731 ns	0.145 ns
	Relative Humidity%	-0.049 ns	0.247 ns	0.114 ns	0.055 ns
	Manure Moisture %	0.015 ns	-0.425 ns	-0.357 ns	0.055 ns
Sheep	Actinedida	0.488 ns			
	Oribatida	-0.197 ns	0.093 ns		
	Acaridida	-0.452 ns	0.055 ns	0.009 ns	
	Air Temperature °C	0.007 ns	-0.236 ns	-0.717 ns	-0.041 ns
	Relative Humidity%	0.101 ns	-0.294 ns	0.193 ns	0.212 ns
	Manure Moisture %	-0.020 ns	-0.021 ns	-0.080 ns	0.483 ns
Poultry	Actinedida	0.054 ns			
	Oribatida	-0.218 ns	-0.166 ns		
	Acaridida	-0.015 ns	-0.299 ns	0.175 ns	
	Air Temperature °C	-0.050 ns	0.378 ns	-0.404 ns	-0.591 ns
	Relative Humidity%	-0.369 ns	-0.181 ns	0.191 ns	-0.018 ns
	Manure Moisture %	0.384 ns	-0.408 ns	0.373 ns	0.087 ns

** = Highly significant at 1% level, * = Significant at 5% level and ns = Not significant.

3.2.1.Correlations between the four mite suborders inhabiting cattle manure and some environmental factors

There were not significant positive correlations among the populations of gamasid mites and the populations of resting three mite suborders while, there were not significant negative correlations among the populations of the other pairs of suborders.

Air temperature had positive not significant correlations with the populations of actinedid and acaridid mites, but negative not significant correlations with gamasid and oribatid mites.Relative humidity had positive insignificant correlations with the population densities of all mite suborders, except gamasid mites. Percentages of manure moisture were positively insignificantly correlated with the populations of gamasid and the acaridid mites, while they were negatively insignificantly correlated with the population densities of the actinedid and the oribatid mites.

3.2.2. Correlations between the four mite suborders inhabiting sheep manure and some environmental factors

Population densities of the four mite suborders had no significant correlation with each other. On the other hand, there were no significant correlation between the population densities of gamasid, actinedid, oribatid or acaridid mites inhabiting sheep manure and any of the environmental factors.

3.2.3.Correlations between the four mite suborders inhabiting poultry manure and some environmental factors

Positive insignificant correlations were observed between the population densities of gamasid mites and the population densities of actinedid mites. Also, between the population densities of oribatid mites and the population densities of acaridid mites. Negative insignificant correlations were observed between the population densities of the other pairs of mite suborders.

On the other hand, all the concerned environmental factors had no significant correlation with the populations of all mite suborders.

REFERENCES

Achiano, K. A. and J. H. Giliomee (2006). House fly predators in poultry manure and environmental factors affecting them. African Entomol., 14 (2): 349-355.

Balogh, J. and S. Mahunka (1983). The soil mites of the world, primitive oribatids of the palaearctic region. Akademiai Kiado, Budapest, 372 pp.

Butecher, J.; R. Snider and J. Snider (1971). Bioecology of edaphic Collembola and Acarina. Ann. Rev. of Ent., 16: 249-288.

Edwards, C. A. and J. R. Lofty (1971). The influence of temperature on numbers of affecting primary production. Ann. Zool., 18: 546-555.

Evans, G. O. ; J. G. Sheals and D. Macfarlane (1961). The terrestrial Acari of the British Isles. Alden press Oxford, England, 219 pp.

Geden, C. J. and J. G. J. Stoffolano (1988). Dispersion patterns of arthropods associated with poultry manure in enclosed houses in Massachusetts: spatial distribution and effects of manure moisture and accumulation time. J. Entomol. Sci., 23(2): 136-148.

Granjean, F. (1949). Observation et Conservation destres petits arthropods. Bull. Mus. Nat. Hist. , 21: 363-370. C. F. Zaki, A. M. (1983), Ph.D. Budapest, Hungary.

Karntz, G. W. (1978). Amanual of Acarology. Oregon state univ. Book store. Ltd. Corvallis, Oregon, 550 pp.

Mahmood, S. H. and S. I. Al-Dulaimi (1989). Ecological study of new records of Iraqi predator mites developing in animal manure. J. Biol. Sci. Res., 19 (Supplement): 865-876.

Mahunka, S. (1972). Tetüatkák – Tarsonemina Magyarország Állatvilág, XVIII (16):1-215.

Pizzeghello, D. ; A. Berti; S.Nardi and F. Morari (2011):Phosphorus forms and P-sorption properties in three alkaline soils after long-term mineral and manure applications in north-eastern Italy. J. Agric. Ecosystems & Environment., 14 1(1-2) : 58 – 66.

Roser-Hosch, S.; B. Streit; M. Meyer and H. Sticher (1981). Colonisation densities of microarthropods during the composting of cattle dung. Schweizerische Landwirtschaftliche Forschung, 21(1/2): 49-65.

Stamatiadis, S. and D. L. Dindal (1990). Coprophilous mite communities as affected by concentration of plastic and glass particles. Exp. Appl. Acarol., 8 (1,2): 1-12.

Usher, M. B. (1976). Aggregation responses of the soil arthropods in relation to the soil environment. In: Anderson, J. and Macfadyen, A. : The role of terrestrials and aquatic organism in decomposition processes. London, : 16-94. C. F. Zaki, A. M. (1983).

Zaher, M. A. (1986). Survey and ecological studies on phytophagous predaceous and soil mites in Egypt. II: A. predaceous and non- phytophagous mites (Nile vally and Delta). PI. 480 programme USA, project No. EG. ARS. 30, Grant No. FG. EG. 139, 567 pp.

Zaki, Amina M. (1983). Taxonomy and ecology of some Tarsonemina species in Hungary. Ph.D. Thesis Budapest Univ., 153 pp.

الملخص العر

التغ ات العددية للحلم المتواجد ثلاث أنواع من الروث منطقة صر

مد روس يوسف الشاذ ، أمينة مد زكى، السيد حسن مد تايب، صا عبد الستار أ د

دراسة التغ ات العددية الشهرية للحلم المتواجد بكـل مـن روث الماشية والأغنام الدواجن المتواجد نطقـة أبـيس (افظـة الإسكندرية) ومنطقة أبو ص(افظة البحـ ة).

كانت الكثافات العددية للحلم التابع للأربعة ت رتب تـتغ من شهر لآخر على مدار السنة، وذلك الثلاثة أنواع من الروث نطقة الدراسة.

ظهرت الكثافات العددية للحلم بالترتيب التنـاز الـم الأكاريدى، ا اماسيدى، الأرروباتى، الأكتينيدى روث الماشى نطقة الدراسة بينما ظهرت بالترتيب التناز ا لم الأكاريدى، الأكتينيدى، ا اماسيدى، الأروباتى كل مـن روث الأغنـام وروث الدواجن نطقة الدراسة.

تواجدت فروق معنوية بـ المتوسطات العددية الشهرية للحلم التابع للأربعة ت رتب ميع أنواع الروث ـنطق الدراسـة، وذلك بعض شهور السنة، ماعدا ت رتبة أكتينيدى كل من روث الماشية وروث الأغنام نطقة أبو ص.

يوجد ارتباط معنوى بـ متوسطات أعداد ا لم لأى ت رتبة ، وذلك الثلاثة أنواع من الروث نطق الدراسة، فيمـا عدا ارتباط قوى موجب بـ ا لم الأروباتى وا لم ا اماسـيدى، وكذلك بـ ا لم الأكتينيدى و ا لم الأكاريدى بروث الماشـى نطقة أبيس.

يوجد ارتباط معنوى بـ متوسطات أعداد ا لم لأى ـت رتبة، وذلك يع أنواع الروث نطق الدراسة، مـع درجـة حرارة الهواء أو الرطوبة النسبية للهواء أو نسبة المتـوى الرطـو للروث.