

**EFFECT OF NITROGENOUS FERTILIZERS ON
SOIL ACARI CONCOMITANTED WITH WHEAT IN
QUALUBIA GOVERNORATE**

BY

Rady, G.H. El-Khayat, E.F. and Hafez A.A.
Dep. of Plant Protection, Fac. of Agric.,
Moshtohor, Zagazig Univ., Benha Branch

ABSTRACT

The effect of nitrogenous fertilizers ammonium nitrate and urea on the population dynamics of soil acari associated with wheat were studied at Moshtohor, Qualubia Governorate; Egypt in 1992-1993. Nitrogenous fertilizers increments the population density of different soil acari groups. The rate of 90 kg/fed ammonium nitrate flourished the mite population density, but at a higher level of 120 kg/fed, acari groups tended to decrease in numbers. The rate of 60 kg/Fed. urea increased the mite population density, while recommended level of 90 kg/ Fed. decreased acari groups population. In treatments of nitrogenous fertilizers ammonium nitrate and urea Prostigmata were occurred in great abundance (60,58%) followed by Cryptostigmata (22.4,24.9%), Heterostigmata (7.8,8.2%), Mesostigmata (7.5, 8.1%) and Astigmata (2.3,0.7%) in descending order, respectively.

INTRODUCTION

In Egypt, little work has been done on the effect of fertilizers on population density of soil acari. Abd-Allah (1974), found that fertilization caused a positive effect on population growth of arthropods. Abo-Korah et al. (1982), reported that increasing the level of nitrogen means increasing mite population density on tomato plants, but to certain N level. He recorded also that there was a positive correlation between nitrogen level and population density of each acari groups except Astigmata in cotton field. Abo-korah et al. (1985) found that nitrogenous fertilizers in Okra field had significant effect in increasing the population density of different soil acari groups.

Therefore, it was found necessary in the present study to add more information about the effect of fertilization on soil acari associated with wheat in Qualubia Governorate during the period from November 1992 to May 1993.

MATERIALS AND METHODS

The experimental area located at the experimental station of the Faculty of Agriculture, Moshtohor, Qualubia Governorate was

cultivated with wheat (*Triticum aestivum* var. Giza 157) and treated with nitrogenous fertilizer ammonium nitrate (33%N) (0,60, 90 and 120 kg/Fed.) and Urea (46%N) (0,60,90 and 120kg/Fed.)

All treatments were arranged in complete random plot design and replicated three times. Textural class of the experimental area was clay contained 6.29 fine sand, 18.84 coarse sand, 22.22 silt and clay, 52.62% , pH was 7.6 and organic matter was 2.6%.

Soil samples were taken periodically every two weeks from November 1992 to May 1993 by using iron sampler volume 1000 cc. Samples including soil and roots of wheat plant after cutting the plant over the soil surface with fine scissor. Each soil core was put alone in poly-ethylene bag which was marked by a label denoting date, host and treatment. Mites were extracted by using modified Tullgren funnel for three days, kept in 70% ethyl alcohol. The extracted specimens were then identified and counted according to Krantz (1978) and Krczal (1959).

RESULTS AND DISCUSSION

Table (1) shows that nitrogenous fertilizer ammonium nitrate (NH_4NO_3 (33%N) in wheat field

had effect in increasing the population density of different soil acari groups in comparison with the check. According to the response of soil acari groups to different nitrogen level, mite groups could be arranged in the following descending order: Prostigmata contributed 60% in numbers of all acari collected, followed by Cryptostigmata (22.4%), Heterostigmata (7.8%), Mesostigmata (7.5%) and Astigmata (2.3%). Our results are in agreement with those of Abd-Allah (1974), Abo-Korah et al. (1982 & 1985), Hill et al. (1975), and Muller (1957), who found that nitrogenous fertilizers increase mite population in agricultural soils.

It was evident that the recommended rate of 90 Kg/Fed. highly increased the mite population density. Generally, the average number of the mites obtained from fertilized treatment (90 Kg/Fed.) nearly twice the average number of the check. This is in agreement with Hill et al. (1975) who found that fertilizers, such as ammonium sulfate and ammonium nitrate, which make the soil more acid, tend to increase fungal growth and will consequently increase fungal feeding mites.

At the higher nitrogen level of 120 kg/Fed., acari groups tended to decrease in number, and this may be due to the toxic effect of ammonia on

mites. These results are in agreement with Franz (1957), Moursi (1962) and Abo-Korah et al. (1985).

Statistical analysis showed highly significant difference between Prostigmata and each of Cryptostigmata, Heterostigmata, Mesostigmata and Astigmata, also shows that no significant differences existing between treatments of nitrogenous fertilizer ammonium nitrate (33% N) 0,60,90, 120 kg/Fed.

Data found in Table (2) show that nitrogenous fertilizer urea co $(\text{NH}_2)_2$ (46% N) in wheat field flourished soil acari groups in number in comparison with the check. Prostigmata occurred in great abundance (58.0%), followed by Cryptostigmata (24.9%), Heterostigmata (8.2%), Mesostigmata (8.1%) and Astigmata (0.7%). These results are harmony with those obtained by Ronde (1960) who reported that urea increased most soil animal groups, and stimulates total population the short term, but individual species behave differently.

It was obvious that the population density of soil acari highly increased with the rate of urea 60 kg/Fed except Astigmata, while the population density decreased with the recommended rate of 90 kg/Fed. These results are in agreement with Behan

of
Table(1). Effect of ammonium nitrate (33%N) on population density of soil acari associated with wheat.

NH ₄ NO ₃ (33% N) (kg./Fed.)	0	60K/F	90K/F	120K/F	Total	Mean	%
Mite groups	Average number of mites/1000 cc soil						
Cryptostigmata	135	175	249	158	717	179.3	22.4
Astigmata	8	26	31	8	73	18.3	2.3
Heterostigmata	29	93	62	65	249	62.3	7.8
Prostigmata	246	569	840	268	1923	480.8	60.0
Mesostigmata	61	67	71	42	241	60.3	7.5
Total	479	930	1253	541	3203		
Mean	95.8	186	250.6	108.2			

L.S.D. Between acari groups at 5% = 163.6

at 1% = 229.3

Table(2). Effect of Urea Co (NH₂)₂ (46% N) on soil acari concomitant with wheat.

CO(NH ₂) ₂ kg/fed	0	60k/F	90k/F	120k/F	total	Mean	%
M. groups	Average number of mites / 1000 cc soil						
Cryptostigmata	135	357	97	119	708	177	24.9
Astigmata	8	8	1	2	19	4.8	0.7
Heterostigmata	29	100	44	61	234	58.5	8.2
Prostigmata	246	449	269	683	1647	411.8	58.0
Mesostigmata	61	138	1	31	231	57.8	8.1
Total	479	1052	412	896	2839		
Mean	95.8	210.4	82.4	179.2			

L.S.D. Between acari groups at 5% = 138.5

at 1% = 194.2

et al.(1978), Behan (1972), and Ronde (1960) who reported that after application of urea with low rate population increased, but population decreased with high rate of urea.

Statistical analysis showed significant difference between Prostigmata and each of Cryptostigmata, Heterostigmata Mesostigmata and Astigmata also showed that no significant differences existing between treatments of urea (46%N.) 0,60,90 and 120 kg/Fed.

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تأثير التسميد النتروجيني على حلم التربة

للمصاحب لنباتات التمع في محافظة القليوبية

د. جاد حمده راضي

د. عزت فرج الخياط د. عادل عبد الحميد حافظ

لقد اجريت هذه الدراسة بمزرعة كلية الزراعة بمشهور- طوخ قليوبية خلال عامي ١٩٩٢، ١٩٩٣ وقد اسفرت النتائج عن الآتي :

- ١- تنتمي الاكاروسات التي تم جمعها الى خمسة مجاميع تقسيمية كبيره هي خافية الثنور، امامية الثنور ، خلطية الثنور ، متوسطة الثنور و عديمة الثنور
- ٢- كان تأثير التسميد بالسماذ النتروجيني نترات نشادر (٢٢٪ ن) بمعدل ٩٠ ك/ فدان بأرض التمع موجبا و معنويا في زيادة اعداد الاكاروسات بينما انخفضت كثافة الاكاروسات انخفاضا ملحوظا . بزيادة معدل التسميد الى ١٢٠ ك/ فدان وقد يرجع ذلك الى سمية التسميد بزيادة اعداد
- ٣- وكان تأثير التسميد باليوريا (٤٦٪ ن) أيضا موجب و معنويا بمعدل ٩٠ ك/ ف في زيادة الكثافة العددية للأكاروسات الأرضية بينما انخفضت الكثافة العددية بزيادة معدل التسميد (٩٠ ك/ ف) علما بان هذا المعدل هو الموصى به في التسميد