

**ECOLOGICAL STUDIES ON INSECT PESTS AND  
THEIR ASSOCIATED PREDATORS ON THE  
EGYPTIAN CLOVER *TRIFOLIUM  
ALEXANDRINUM* CROP**

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**ABSTRACT:** The study was conducted on the Egyptian clover crop to survey the main insect pests and predators and study the population dynamic of these insects to predict the infestation level on the summer crops which follows the Egyptian clover. The results of the experiment conducted for two years in Ashmoun region (Samadoun district), Menoufeya Governorate cleared that the Egyptian clover *Trifolium alexandrinum* (L.) plants harboured six species of insect pests and four species of predators, belonging to 8 families and 7 orders. The dominant pest species was *Hypera brunneipennis* (Boh.) followed by *Aphis gossypii* (Glov.) and *Spodoptera littoralis* (Boisd), represented by 51.92, 13.70 and 13.12%, respectively. The dominant predator was *Coccinella undecimpunctata* (R.), representing 42.63% followed by *Paederus alfieri* (K.) represented by 37.40% in 2002 season. In 2003 season the results showed that *H. brunneipennis* (Boh.) and *A. gossypii* (Glov.) represented 44.70% and 19.0% and the least was *Nezara viridula* (L.) represented 5.82% whereas, predators results showed the same trend in 2003 season and cleared that *Coccinella undecimpunctata* (R.) and *Paederus alfieri* (K.) presented by 46.62 and 41.62, respectively, followed by *Chrysoperla carnea* (Steph.) and *Syrphus corollae* (F.) comprised 7.12% and 4.64%, respectively. The populations Fluctuations to the insect pests and predators were studied. The daily mean temperature and relative humidity effects on the insect pests populations fluctuations were studied to clarify the relationship between these factors and the insect pests.

**Key words :** Insect pests, insect predators, Egyptian clover, temperature, relative humidity.

## INTRODUCTION

The Egyptian clover *Trifolium alexandrinum* is considered the main forage crop to feed farm animals in Egypt. The Egyptian clover harboured different species of insects and other arthropods. The environmental conditions affect insect species populations on many crops (Cardinale and Nelson, 1999). Many studies also concerning about survey of insect pests and predators associated with clover (Mohamed and Ismail, 1974; Abdel-Fattah and El-Saadany, 1978; Shawer *et al.*, 1989; El-Hawary *et al.*, 1995, El-Dakhakhni *et al.*, 1995 and El-Mezayyen, 1998 and 2001).

The present study aims to investigate insect pests and predators presented on Egyptian clover. The population dynamics of these insects affected by prevailing air temperature and relative humidity was also studied. On the bases on the date of present investigation. Insect infestation and intensity on the summer crops easily predicted. So integrated pest control program could be designed on the crops which followed clover as cotton, maize and vegetables.

## MATERIALS AND METHODS

The experiment was conducted for two successive seasons on the Egyptian clover crop sown in area of about one feddan at Ashmoun region, Menoufeya Governorate. The survey was started in the first week of February to the last week of June in 2002 and 2003. Normal agricultural practices were carried out without chemical application. The samples of collected insects were taken randomly at 3 p.m., and collected by 50 pendular sweeps/feddan from 5 locations and the mean numbers calculated/10 sweeps. The caught (swept) insects were sorted and identified. The identification of insect samples was made when possible by classification Research Department, Plant Protection Institute. The daily mean of temperature and relative humidity were supplied by the meteorological organization, to clarify the role of the selected factors in regulating the insect pests populations, occurring on clover.

## RESULTS AND DISCUSSION

### Survey of Insect Pests and Associated Predators on the Egyptian Clover:

#### 1- Insect pests:

The results clear that the Egyptian clover *T. alexandrinum* harboured six pest species belong to four families of four orders (Table1). In 2002 season, Coleopterous insects were dominant including Curculionids represented by *Hypera brunneipennis* which showed the highest populations averaging 87.36 insects / 10sweeps (51.92%) followed by Lepidopterous insects occupied the second rank and represented by 50.88 insects/10sweeps (30.24%). *Spodoptera littoralis*, *Spodoptera exigua* and *Autographa spp.* averages 22.08, 16.56 and 12.24 insects/10 sweeps were counted for the three species representing 13.12, 9.84 and 7.28%, respectively.

Homoptera was the third order that represented by *Aphis gossypii* showed 13.70% and averaged 23.04 insects/10 sweeps. Hemiptera the last in the order represented by the Pentatomid *N.*

*viridula* composed 4.14% of the total insect catch and averaged 6.96 insects/10sweeps.

In 2003, the results showed the same orders and revealed that Coleoptera (*H. brunneipennis*) averaged 62.64 insects/10 sweeps, and represented 44.70 of the total insect catch Lepidopterous species *Autographa spp.*, *S. littoralis* and *S. exigua* counted the averages were 19.20, 14.16 and 9.36 insects/10sweeps composed 13.70, 10.10 and 6.67% if the total insects count. Homoptera represented by Aphididae and *A. gossypii* averaged 26.64 insects/10sweeps and represented 19.01%. The least abundant order was Hemiptera represented by included *Nezara viridula* which averaged 8.16 insects/10 sweeps and composed 5.82%.

Generally the results showed that the Egyptian clover harboured a higher numbers of insect pests and predators in 2002 season than in 2003 season and this could be attributed to the differences in daily mean of temperature and relative humidity.

The results clear that the represented pest insect species had a different characters in infestation in 2002. (Table2 and Fig.1) *H.*

Table (1): Seasonal mean and occurrence percentage numbers of insect pests and predators during 2002 and 2003 seasons on clover at Ashmoun region, Menoufeya Governorate.

Order	Family	Species	2002 Season		2003 Season	
			Seasonal mean numbers/10 sweeps	Occurrence %	Seasonal mean numbers/10 sweeps	Occurrence %
		I. Insect pests				
Coleoptera	Curculionidae	<i>Hypera brunneipennis</i> (Boh.)	87.36	51.92	62.64	44.70
Lepidoptera	Noctuidae	<i>Spodoptera littoralis</i> (Boisd.)	22.08	13.12	14.16	10.10
		<i>Spodoptera exigua</i> (Hb.)	16.56	9.84	9.36	6.67
		<i>Autographa</i> spp.	12.24	7.28	19.20	13.70
Total			50.88	30.24	42.72	30.47
Homoptera	Aphididae	<i>Aphis gossypii</i> (Glov.)	23.04	13.70	26.64	19.01
Hemiptera	Pentatomidae	<i>Nezara viridula</i> (L.)	6.96	4.14	8.16	5.82
Total			168.24	100%	140.16	100%
<b>Insect predators</b>						
Coleoptera	Coccinellidae	<i>C. undecimpunctata</i> (R.)	34.32	42.63	31.44	46.62
	Staphylinidae	<i>Paederus affierii</i> (K.)	30.16	37.40	28.07	41.62
Total			64.48	80.03	59.51	88.24
Neuroptera	Chrysopidae	<i>Chrysoperla Carnea</i> (Steph.)	10.08	12.52	4.80	7.12
Diptera	Syrphidae	<i>Syrphus corollae</i> (F.)	6.05	7.45	3.13	4.64
Total			80.61	100%	67.44	100%

*brunneipennis* infestation started in 14<sup>th</sup> of February by 4.8/10 sweeps and reach its peak in 27<sup>th</sup> of April by 206.4 insects/10 sweeps and decreased to zero by 22<sup>nd</sup> of June, followed by Lepidopterous insects *S. littoralis*, *S. exigua* and *Autographa spp.* Counted 62.4, 57.6 and 4.8 insects/10 sweeps in 6<sup>th</sup> of February for *S. littoralis* and *S. exigua*, respectively and 7<sup>th</sup> of March for *Autographa spp.*, and its maximum mean numbers were, 72.0, 57.6 and 33.6 insects/10sweeps in 6<sup>th</sup> and 28<sup>th</sup> of February for the first two pests and in 25<sup>th</sup> May for the third pest, then their numbers fluctuated to the last records in 11<sup>th</sup> of May for the first two pests and in 22<sup>nd</sup> of June for the third pest recording 15.4, 4.8 and 24.0 insects /10 sweeps respectively. *A. gossypii* and *N. Viridula* infestation started at the end of April and 18<sup>th</sup> of May respectively. The maximum mean numbers were 76.8 and 43.2 in 15<sup>th</sup> of June and the 1<sup>st</sup> of June respectively then fluctuated to the end of the season in 22<sup>nd</sup> of June.

The infestation pattern of the insect pests cleared in 2003 season (Table 3 and Fig.2) showed that *H. brunneipennis* the highest mean numbers on clover in 28<sup>th</sup> of February (24 insects /10 sweeps)

and reach to the peak in 25<sup>th</sup> of May recording 158.4 and decreased to zero in 8<sup>th</sup> of June. The noctuids *S. littoralis*, *S. exigua* and *Autographa spp.* started infestation in 6<sup>th</sup> February and reached to their peaks (43.2,38.4 and 38.4 insects/10sweeps, respectively), and fluctuated to 27<sup>th</sup> of April, the 4<sup>th</sup> of May and 22<sup>nd</sup> of June for *S. exigua*, *S. littoralis* and *Autographa spp.* receptively. *A. gossypii* and *N. viridula* infestation started in 28<sup>th</sup> of March and in 18<sup>th</sup> of May by 24.0 and 33.6 insects/10 sweeps and the peak of the two insects in 15<sup>th</sup> of June and 18<sup>th</sup> of May respectively.

Many studies recorded clover fauna, for instance, Mohamed and Ismail (1974) and Abdel-Fattah and El-Saadany (1978) recorded thirteen insect pests in Giza, Governorate and twenty one insect pests at Shibin El-Kom, respectively. Boraie *et al.* (1993) recorded 28 insect pest species at different localities in Kafr El-Sheikh Governorate. El-Hawary *et al.* (1995), recorded 24 insect species on Egyptian clover in Kafr El-Sheikh. The different results from the investigations due to the different locations, weather factors and to unknown conditions.

Table (2): Mean numbers of insect pests and predators on the Egyptian clover during 2002 season at Ashmoun region, Menoufeya Governorate, Egypt.

Date	Insect pests						Predators				D.M. of Temp.	D.M. of R.H. %
	<i>S.littoralis</i>	<i>S.exigua</i>	<i>Hypera sp.</i>	<i>Autographa spp.</i>	<i>A.gossypii</i>	<i>N. viridula</i>	<i>Coccinella sp.</i>	<i>P. affierii</i>	<i>C. carnea</i>	<i>S. corollae</i>		
6/2/2002	62.4	57.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.25	73.83
14/1/2	38.4	25.0	4.8	0.0	0.0	0.0	4.8	0.0	0.0	0.0	15.85	73.25
21/1/2	43.2	28.8	9.6	0.0	0.0	0.0	10.6	0.0	0.0	0.0	14.00	65.14
28/1/2	72.0	33.6	19.2	0.0	0.0	0.0	13.4	0.0	0.0	0.0	16.20	64.50
7/1/3	48.0	52.8	33.6	4.8	0.0	0.0	19.2	9.6	0.0	0.0	17.00	70.14
14/1/3	14.4	28.8	96.0	9.6	0.0	0.0	33.6	14.4	4.8	0.0	19.61	61.07
21/1/3	4.8	13.4	48.0	14.4	0.0	0.0	43.2	13.4	9.6	4.8	18.36	69.07
28/1/3	9.6	4.8	105.6	4.8	0.0	0.0	43.2	15.4	12.4	10.6	20.00	61.42
6/1/4	23.0	15.4	67.2	13.4	0.0	0.0	28.8	9.6	2.8	8.6	18.76	61.72
13/1/4	25.0	19.2	168.0	15.4	0.0	0.0	33.6	23.0	19.2	1.0	19.10	60.92
20/1/4	28.8	14.4	177.6	14.4	0.0	0.0	32.6	25.0	24	13.4	23.00	57.78
27/1/4	43.2	23.0	206.4	9.6	33.6	0.0	82.6	43.2	11.6	24	19.80	56.07
4/1/5	13.4	9.6	115.2	19.2	42.2	0.0	33.6	38.4	9.6	3.8	20.55	54.50
11/1/5	15.4	4.8	192.0	18.2	52.8	0.0	38.4	33.6	16.4	1.0	24.00	47.85
18/1/5	0.0	0.0	163.2	1.0	62.4	14.4	67.2	43.2	19.2	19.2	24.58	54.00
25/1/5	0.0	0.0	192.0	33.6	72.0	33.6	48.0	24	13.4	17.2	23.98	53.00
1/6	0.0	0.0	81.6	19.0	34.6	43.2	43.2	43.2	15.4	2.0	26.55	53.07
8/1/6	0.0	0.0	52.8	19.4	52.8	19.2	33.6	94.4	19.2	14.4	25.75	53.85
15/1/6	0.0	0.0	14.4	14.4	76.8	28.8	33.6	72	24	0.0	27.85	55.35
22/1/6	0.0	0.0	0.0	24.0	33.6	0.0	43.2	99.6	0.0	0.0	27.18	56.28
<b>Total</b>	<b>441.6</b>	<b>331.2</b>	<b>1747.2</b>	<b>244.8</b>	<b>460.8</b>	<b>139.2</b>	<b>686.4</b>	<b>602</b>	<b>201.6</b>	<b>120</b>	-	-
<b>Mean</b>	<b>22.08</b>	<b>16.56</b>	<b>87.36</b>	<b>12.24</b>	<b>23.04</b>	<b>6.96</b>	<b>34.32</b>	<b>30.1</b>	<b>10.08</b>	<b>6.0</b>	-	-

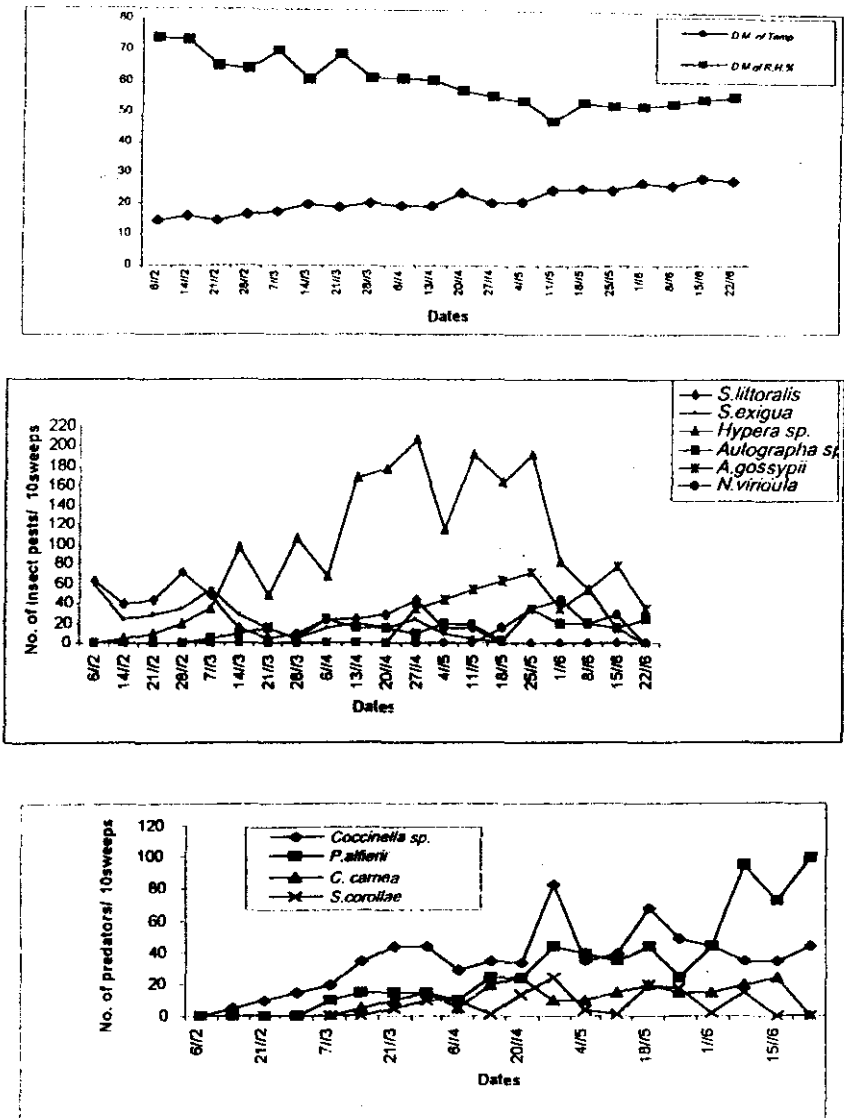


Fig. (1) Seasonal fluctuations in the population densities of insect pests on clover plants with predators and their records of main climatic factors at Ashmoun, Menoufia Governorate during 2002 season.

Table (3): Mean numbers of insect pests and predators on the Egyptian clover during 2003 season at Ashmoun region, Menoufeya Governorate, Egypt.

Date	Insect pests						Predators				D.M. of Temp.	D.M. of R.H.%	
	<i>S.littoralis</i>	<i>S.exigua</i>	<i>Hypera</i> sp.	<i>Autographa</i> spp.	<i>A.gossypii</i>	<i>N.viridula</i>	<i>Coccinella</i> sp.	<i>P.affierii</i>	<i>C. carnea</i>	<i>S.corollae</i>			
6/2/2003	43.2	14.4	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.17	49.41
14/2	14.4	38.4	0.0	9.6	0.0	0.0	9.6	0.0	0.0	0.0	0.0	15.31	58.12
21/2	33.6	28.8	0.0	14.4	0.0	0.0	14.4	0.0	0.0	0.0	0.0	16.67	56.35
28/2	24.0	19.4	24.0	0.0	0.0	0.0	28.8	0.0	0.0	0.0	0.0	12.08	63.71
7/3	19.0	33.8	43.2	19.2	0.0	0.0	33.8	0.0	0.0	0.0	0.0	17.11	56.85
14/3	28.8	14.2	67.2	14.2	0.0	0.0	33.6	0.0	9.6	0.0	0.0	15.77	56.57
21/3	14.2	4.6	52.8	19.6	0.0	0.0	48.0	9.6	3.8	0.0	0.0	16.54	56.07
28/3	14.6	4.8	76.8	14.2	24.0	0.0	67.2	9.6	1.0	4.8	0.0	14.84	62.78
6/4	9.8	4.8	52.8	4.4	0.2	0.0	33.4	14.4	1.4	3.8	0.0	21.93	54.16
13/4	9.6	4.8	139.2	19.2	19.4	0.0	38.4	28.8	1.0	1.0	0.0	19.15	59.57
20/4	24.0	14.8	105.6	24.0	33.4	0.0	28.8	33.8	13.4	17.0	0.0	21.85	54.85
27/4	14.4	4.4	139.2	14.8	24.0	0.0	43.0	24.0	3.4	1.2	0.0	21.55	50.42
4/5	33.8	0.0	67.20	24.0	43.2	0.0	52.8	24.0	14.4	1.4	0.0	22.52	50.78
11/5	0.0	0.0	153.6	33.2	62.4	0.0	33.4	43.2	19.2	1.0	0.0	26.57	48.42
18/5	0.0	0.0	129.6	33.6	52.6	33.6	33.8	91.2	1.0	13.0	0.0	28.47	48.28
25/5	0.0	0.0	158.4	38.4	72.0	33.4	14.6	43.2	18.2	19.3	0.0	27.85	50.78
1/6	0.0	0.0	43.2	24.0	43.2	24.0	52.8	33.4	9.6	0.0	0.0	27.90	50.28
8/6	0.0	0.0	0.0	24.0	33.6	28.8	24.0	59.0	0.0	0.0	0.0	27.68	51.71
15/6	0.0	0.0	0.0	14.4	91.2	19.4	24.0	65.6	0.0	0.0	0.0	28.77	53.00
22/6	0.0	0.0	0.0	24.0	33.6	24.0	14.4	81.6	0.0	0.0	0.0	29.91	52.07
Total	283.2	187.2	1252.8	384	532.8	163.2	628.8	561.4	96.0	62.5	-	-	-
Mean	14.16	9.36	62.64	19.20	26.64	8.16	31.44	28.07	4.8	3.13	-	-	-



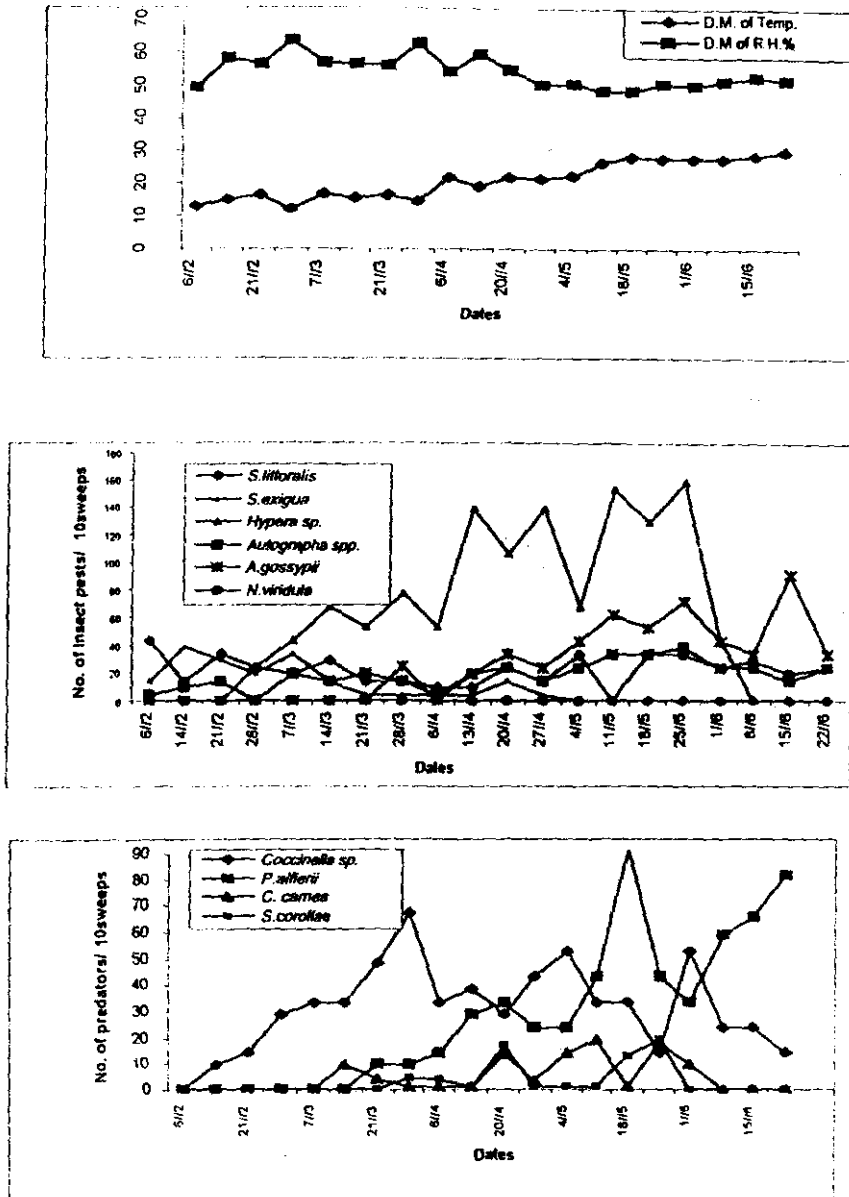


Fig. (2) Seasonal fluctuations in the population densities of insect pests on clover plants with predators and their records of main climatic factors at Ashmoun, Menoufia Governorate during 2003 season.

## 2. Insect predators:

The data reveal that the swept insect predators were four species belong to 4 families and 3 orders (Table 1).

Coleopterous predators were represented by *Coccinella undecimpunctata* (R.) and *Paederus alfieri* (K.). The former represented 42.63 and 46.62% whereas, the later formed 37.40 and 41.62% of the total predators count in 2002 and 2003, respectively. The neuropteran predator *Chrysoperla carnea* (Steph.) came in the third class forming 12.52 and 7.12% in the two seasons, respectively. *Syrphus corollae* was the least abundant predator, representing 7.45 and 4.64% of the total insect predators catch in 2002 and 2003, respectively. Regarding to the seasonal abundance of the main predators (Tables 2,3 and Fig. 1,2), it is obvious that *C. undecimpunctata* started to appear on clover fields around mid February in both seasons. However, this predator manifested 3 peaks of abundant along the season. The three peaks were during the last week of March and April and the third week of May in 2002; during the last week of March and the first week of May and June of 2003 season.

*P. alfieri* was swept in lower numbers during March and early April, however the higher numbers of this predator were swept during June in both seasons. *Chrysoperla carnea* appeared of clover fields on 14<sup>th</sup> of March in the two seasons being more abundant on 2002, counting 10.08 insects compared to 4.8 insects /10 sweeps in 2003.

*Syrphus corollae* appeared later and disappeared earlier and its population in 2002, 6 insects/10sweeps was nearly as twice as that of 2003 that counted 3.13 insects/10sweeps. Its clear from the data (Tables 2 and 3) that the growth of predators population is in parallel with that of their preys. Also *S. littoralis* and *S. exigua* disappeared on clover fields, at the end of April and/or during the first half of May as two pests moved to the more preferable hosts during that period (cotton, vegetables and maize crops).

Several authors recorded and identified the predators which presented in the Egyptian clover such as Mohamed and Ismail (1974), Abdel-Fattah and El-Saadany (1978), Moursi and Youssef (1986), Shawer *et al.* (1989), Boraei *et al.* (1993), El-Dakhkhny *et al.* (1995) and El-Mezayyen (2001).

### The Effect of Prevailing Air Temperature and Relative Humidity on the Occurrence of Clover Insect Pests:

The relationship between prevailing air temperature and relative humidity and insect pests:

Generally, it is clear that the climate during clover season was more humid in 2002 than in 2003. In addition, the daily mean air temperature was relatively higher during the first half of clover season in 2002 than in 2003 while the inverse was true during the 2<sup>nd</sup> half. This climatic condition was accompanied with higher populations of *S. littoralis* and *H. brunneipennis* and the four predator species in 2002 and lower populations of *Autographa spp.*, *A. gossypii* and *N. viridula* insects.

Statistical analysis of data expressed as the simple correlation and partial regression revealed the following:

#### A- In 2002 season:

Results cleared that the simple correlation analysis (Table 4) showed a positive significant relationship between the daily mean of temperature and *Autographa spp.*, *A. gossypii* and

*N. viridula* and positive insignificant to *H. brunneipennis*. Whereas, the relation was negatively significant between this factor and *S. littoralis* and *S. exigua*. The correlation coefficient values ( $r$ ) were 0.42, 0.57, 0.44, 0.11, -0.37 and -0.45, for the above mentioned insects, respectively. The partial regression coefficient values which give the precise relationship, showed that an increase or decrease by one unit of the tested factor would change the mean number of *Autographa spp.*, *A. gossypii*, *N. viridula*, *H. brunneipennis*, *S. littoralis* and *S. exigua* by 0.81, 2.76, 1.8, -10.74, -3.58 and -1.99, respectively.

The relationship between relative humidity and the populations densities of the insect pests showed a negative significant correlation with *H. brunneipennis*, *Autographa spp.*, *A. gossypii* and *N. viridula* and positive significant with *S. littoralis* and *S. exigua*. The correlation coefficient values ( $r$ ) were -0.39, 0.41, -0.57, -0.28, 0.25 and 0.38, respectively. The partial regression showed that the increase or decrease by one unit of the tested factor would change the mean number of *H. brunneipennis*, *Autographa spp.*, *A. gossypii* and *N. viridula*, *S. littoralis* and *S. exigua* by -11.71, -0.43, -1.37, -0.30, -0.38 and 0.42, respectively.

**Table (4): Simple correlation and partial regression analysis on the effect of two main climatic factors daily mean of temperature and daily mean of relative humidity on the variability in the populations fluctuations of insect pests in Egyptian clover during 2002 season in Ashmoun region, Menoufeya Governorate.**

Insect pests	Factors	Simple correlation			Partial regression			
		r	b	P	B	F	P	E.V.
<i>S. littoralis</i>	D.M. of temp.	-0.37	-3.06	0.001**	-3.58	5.23	0.07	%38
	D.M. of R.H.%	0.25	1.56	0.02*	-0.38		0.75	
<i>S. exigua</i>	D.M. of temp.	-0.45	-2.57	0.00***	-1.99	7.73	0.15	%46
	D.M. of R.H.%	0.38	1.52	0.003**	0.42		0.63	
<i>Hypera sp.</i>	D.M. of temp.	0.11	5.11	0.14	-10.74	8.03	0.05*	%48
	D.M. of R.H.%	-0.39	-6.23	0.002**	-11.71		0.002**	
<i>Autographa spp.</i>	D.M. of temp.	0.42	1.39	0.001**	0.81	7.82	0.29	%46
	D.M. of R.H.%	-0.41	-0.88	0.002**	-0.43		0.37	
<i>A. gossypii</i>	D.M. of temp.	0.57	4.52	0.0001***	2.76	15.12	0.13	%62
	D.M. of R.H.%	-0.57	-2.91	0.000***	-1.37		0.23	
<i>N. viridula</i>	D.M. of temp.	0.44	1.90	0.001**	1.80	11.96	0.09	%38
	D.M. of R.H.%	-0.28	-0.96	0.013*	-0.30		0.90	

\*\*Highly significant

\* Significant

P. = Probability

**Table (5): Simple correlation and partial regression analysis on the effect of two main climatic factors daily mean of temperature and daily mean of relative humidity on the variability in the populations fluctuations of insect pests in Egyptian clover during 2003 season in Ashmoun region, Menoufeya Governorate.**

Insect pests	Factors	Simple correlation			Partial regression			
		r	b	P	b	F	P	E.V.
<i>S. littoralis</i>	D.M. of temp.	-0.19	-0.80	0.04*	-1.22	7.92	0.002**	%46
	D.M. of R.H.%	0.09	0.32	0.17	0.61		0.006**	
<i>S. exigua</i>	D.M. of temp.	-0.17	-0.67	0.06	-1.05	7.84	0.005**	%46
	D.M. of R.H.%	0.10	0.31	0.14	0.56		0.63	
<i>Hypera sp.</i>	D.M. of temp.	0.10	2.48	0.15	2.40	1.04	0.21	%10
	D.M. of R.H.%	0.02	0.68	0.51	0.11		0.91	
<i>Autographa spp.</i>	D.M. of temp.	0.62	1.07	0.000***	-1.13	15.95	0.00**	%63
	D.M. of R.H.%	0.04	0.17	0.34	-0.09		0.44	
<i>A. gossypii</i>	D.M. of temp.	0.56	2.80	0.000***	3.32	17.47	0.0001***	%66
	D.M. of R.H.%	0.05	0.034	0.94	-0.74		0.03	
<i>N. viridula</i>	D.M. of temp.	0.47	1.20	0.000***	1.46	13.15	0.000***	%59
	D.M. of R.H.%	-0.05	-0.04	0.86	-0.38		0.033	

\*\*Highly significant

\* Significant

P. = Probability

**B- In 2003 season:**

The relationship between the daily mean of temperature and these insect pests (Table 5) showed the same trend of 2002 season where (r) values were -0.19, -0.17, 0.10, 0.62, 0.56 and 0.47 for *S. littoralis*, *S. exigua*, *H. brunneipennis*, *Autographa spp.*, *A. gossypii* and *N. viridula*, respectively. The partial regression values cleared that the increase or decrease by one unit would change the mean number by -1.22, -1.057, 2.40, 1.13, 3.32 and 1.46 for the swept insect pests, respectively. The simple correlation analysis showed a positive insignificant relationship between the relative humidity and the insect pests populations except negative insignificant relation with *N. viridula* population fluctuation and (r) values were 0.093, 0.10, 0.022, 0.046, 0.05 and -0.05 for *S. littoralis*, *S. exigua*, *H. brunneipennis*, *Autographa spp.*, *A. gossypii* and *N. viridula*. The partial regression relationship showed any increase or decrease in the relative humidity would change the mean numbers by 0.61, 0.56, 0.11, -0.09, -0.74, and -0.38 for *S. littoralis*, *S. exigua*, *H. brunneipennis*, *Autographa sp.*, *A. gossypii* and *N. viridula*,

populations, respectively. The effects of the two main climatic factors were higher in 2003 season than 2002 season except the effects on *H. brunneipennis*. These may be due to the change effect which - in general- was lower in 2002 season. This relationship between the climatic factors and population fluctuation of main insect pests on clover coincided with that of El-Mezayyen (1998) who cleared this relationship.

Its cleared that the tested two factors (Daily mean of temperature and daily mean of relative humidity) and the predators together has a great effect on the regulation of the insect pests populations and the remaining unexplained variance was assumed to be due to the influence of other unrecommended factors (environmental, biological etc.) in addition to the experimental error.

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## دراسات بيئية على الآفات الحشرية والمفترسات المرتبطة بها علي البرسيم المصرى

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أجريت هذه الدراسة فى حقول البرسيم المصرى فى مركز أشمون، محافظة المنوفية خلال عامي ٢٠٠٢، ٢٠٠٣ بغرض حصر أهم الآفات الحشرية والمفترسات الحشرية المرتبطة بها وذلك على نباتات البرسيم مع دراسة تحركات مجاميع هذه الآفات ومفترساتها للتنبؤ بحجم الإصابة بأفات البادرات فى محصول القطن والمحاصيل الصيفية الأخرى التى تزرع أثناء وجود البرسيم أو بعده وحتى يتسنى وضع خطة لمكافحة الآفات التى قد تصيب هذه المحاصيل.

وأوضحت النتائج المتحصل عليها أن البرسيم المصرى قد أصيب بست أنواع من الآفات الحشرية كما وجدت عليه أيضاً أربعة أنواع من المفترسات تنتمى كلها إلى ٨ فصائل، ٧ رتب. وكانت الآفات السائدة هى حشرة سوسة أوراق البرسيم يليها فى الترتيب من القطن ودودة ورق القطن بنسبة ٥١,٩٢%، ١٣,٧٠%، ١٣,١٢% من المجموع الكلى للآفات على التوالي بينما كان المفترس أبو العيد ذو الإحدى عشرة نقطة بنسبة ٤٢,٦٣% يليه الحشرة الرواعة بنسبة ٣٧,٤٠% فى موسم ٢٠٠٢م.

وفى موسم ٢٠٠٣ أظهرت النتائج ان سوسة أوراق البرسيم ومن القطن كانا بنسبة ٤٤.٧٠%، ١٩% على التوالي بينما كان النوع الأكل وجوداً البقعة الخضراء بنسبة ٥,٨٢%، كما أظهرت النتائج أن المفترسات كان لها نفس الترتيب المسجل بموسم ٢٠٠٢ وظهر أن أبو العيد ذو الإحدى عشرة نقطة والحشرة الرواعة كانا بنسبة ٤٦,٦٢%، ٤١,٦٢% على التوالي ثم المفترسان أسد المن وذبابة السيرفس بنسبة ٧,١٢%، ٤,٦٤% على التوالي. العوامل الجوية (المتوسط اليومي لدرجة الحرارة والرطوبة الجوية) قد تم دراسة تأثيرها على التسي أثرت على مجاميع الآفات الحشرية قد تم دراسة تأثيرها على مجاميع الآفات الحشرية التى درست على البرسيم المصرى.