

# SURVEY AND POPULATION FLUCTUATIONS OF COMMON INSECT PESTS AND THEIR PREDATORS ON TWO MEDICINAL PLANT SPECIES AT FAYOUM GOVERNORATE, EGYPT.

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## ABSTRACT

Thirteen species of insect pests belong to eight families and five orders were recorded on Calendula plants. *Nesidocoris tenuis* Reut. While twelve insect pests belong to nine Families under six orders were recorded On chamomile plants. The chrysanthemum fly, *Trupanea stellata* (F.) was the highest in population followed by *Lygus gomellatus* H. S. and *Nysius graminicolus* K.

Concerning the population fluctuations for the dominant insects pests, it found that *N. tenuis* had six peaks per season. The highest peaks were recorded at the 2<sup>nd</sup> week of April and the end of March for 1<sup>st</sup> and 2<sup>nd</sup> seasons, respectively. For *Empoasca decipiens* Paoli, detected four peaks in the 1<sup>st</sup> season and five peaks in the 2<sup>nd</sup> season. The highest peaks were recorded individuals/50 double sweep net strokes in the 2<sup>nd</sup> week of April and in the 3<sup>rd</sup> week of March. for 1<sup>st</sup> and 2<sup>nd</sup> seasons respectively. On chamomile, *Lygus gomellatus* had 5 peaks in the 1<sup>st</sup> season and only four peaks in the 2<sup>nd</sup> season. *N. graminicolus*, showed six peaks in the 1<sup>st</sup> season and 5 peaks in the 2<sup>nd</sup> season. The highest peaks were at the 1<sup>st</sup> week of Dec. and the 2<sup>nd</sup> week of Dec. for 1<sup>st</sup> and 2<sup>nd</sup> seasons. Aphids had four peaks in both study seasons, the highest peaks found in the last week of March and 3<sup>rd</sup> week of Feb. for 1<sup>st</sup> and 2<sup>nd</sup> seasons, respectively. Also, population density of *T. stellata* recorded five peaks for each.

On the other hand, five species of predatory insects belong to four orders (Coleoptera, Hemiptera, Neuroptera and Diptera), were recorded in the first and 2<sup>nd</sup> seasons on chamomile and calendula plants, respectively. Population density of predators showed that, *Orius* spp. was the most dominant predator, while the dipterous predators showed the lowest population.

**Keywords:** *Calendula officinalis*, *Matricaria recutita*; insect pests; *Nesidocoris tenuis* ; *Nysius graminicolus* ; *Trupanea stellata* Population dynamics

## INTRODUCTION

### The economic importance of Calendula and Chamomile plants:

Marigold plants, *Calendula* and Chamomile (German chamomile) *Matricaria recutata* L., are a perennial or annual plants that belong to family Asteraceae. As medicinal plants, *Calendula* flowers (*Calendula officinalis* L.), were considered beneficial for reducing inflammation, wound healing and as an antiseptic. It was used to treat various skin diseases, ranging from skin ulcerations to eczema. Internally, the soothing effects of *Calendula* have been used for stomach ulcers and inflammation. The chamomile has been traditionally considered to be antispasmodics, carminatives, diaphoretics, sedatives and stomachic. These plants have been used as a folk remedy against asthma, colic, fevers, inflammations and cancer (Foster *et al.*, 1980;

Gardiner, 1999). The herb was used to treat insomnia, back pain, neuralgia, rheumatism, skin conditions, indigestion, flatulence, headaches, and gout (Berry, 1995).

**The insect pests and predators associated with Calendula and Chamomile plants:**

These plants are attacked by several insect pests. In Egypt, El-Dessoki *et al.* (1976) reported that the tomato bug, *Nesidocoris tenuis* (Reut.) attacks many ornamental plants including *C. officinalis*. El-Gendi (1988) in Egypt, recorded 14 insect species on *C. officinalis*. The most common species as pests were *N. tenuis*, *Nysius cymoides* Schill., *Myzus persicae* (Sulzer) and *Balclutha hortensis* (Lindberg). Also she recorded 15 insects included seven sap-suckers, seven predators and one parasites on German chamomile, where the common insect pests were *M. persicae*, *N. cymoides*, *L. gomellatus* and *N. tenuis*. Chamomile plants are known to harbor many species of insects and mites including *M. persicae*, *Aphis gossypii* (Glover), *E. decipiens*, and *N. cymoides* (Etman *et al.*, 1990; Rahil, 2005). In Italy, at least 26 insect pests belonging to 13 families and five orders are associated with common chamomile. The majority of the pests result in feeding damage on reproductive or vegetative organs (those under Thysanoptera and Heteroptera, including the Thripidae, Miridae, Pentatomidae and Pseudococcidae families), whereas others cause erosion or tunnels on heads (Noctuidae), leaves (beetles) or roots (Elateridae) (Conti, 2003). Yarmand *et al.* (2006) in Iran, mentioned that the aphids have been the main pests associated with medicinal plants such chamomile, marigold and artichoke. In Hungary, True bugs, *Nysius senecionis* (Schilling) and *Lygus* spp. occurred on chamomile in high relative dominance. All other species of true bugs occurred only in very small number. El-Gendi (2007) in Egypt, recorded eighteen insect species on marjoram and chamomile. *N. cymoides*, *Nezara viridula* L., *L. gomellatus*, *N. tenuis*, *B. hortensis*, *E. decipiens*, *Trupanea stellata* Fuessly, *M. persicae* and *A. gossypii* were the main insect pests on chamomile. The seed bug species *Metopoplax origami* Kol., and *plagiognathus chrysanthemi* Wolff, are oligophagous species specialized on asteraceans in Hungary. Chamomile is the most one of all investigated medicinal and aromatic plants on which the damage by true bugs seems to be most important. (Redei, 2007). The present work aims to study the survey and population fluctuations of common insect pests and their predators associated on Calendula and Chamomile plants:

## **MATERIALS AND METHODS**

The study was carried out in a private Calendula and chamomile fields ( each about one feddan= 4200m<sup>2</sup>) located at yousef El-Seddek district, Fayoum governorate, Egypt for two successive seasons 2012/13 and 2013/14. No insecticides were applied in these fields throughout the study period. The surrounding adjacent habitats of Calendula and chamomile plantations were represented by winter crops (as alfalfa wheat). After one month of transplanting sweeping net sampling technique was applied for

surveying the insect pests. Fifty double strokes were randomly taken in an axial manner. Samples were collected in a polyethylene bags and transferred to laboratory. To kill insects, piece of cotton moistened with chloroform put in each sample and left for 15 minutes. The sample was emptied in petri dish (12cm in diameter) and cleaned from plant residues. Then it was examined under stereomicroscope to separate and count the major insect pests. This process was performed at weekly intervals throughout the entire period of investigation.

#### **Statistical analysis**

Simple correlation and regression values between the number of individuals of each species and the weekly means of the tested weather factors (temperature and % RH) were obtained according to correlation and regression analysis SPSS 2000, version 11.

## **RESULTS AND DISCUSSION**

### **I- *Calendula officinalis***

#### **1- Survey**

Results of survey of insect pests on *Calendula officinalis* plants were summarized in Table (1). Data revealed that 13 insect pests were recorded on *C. officinalis* plants. These pests belong to eight families and five orders. Also, they included seven species as piercing sucking insects and five species as foliage and flower feeders. *N. tenuis* was the most abundant (1679 and 2038 individuals) followed by *E. decipiens* (471 and 501 individuals) during 1<sup>st</sup> and 2<sup>nd</sup> seasons, respectively.

#### **2- Population fluctuations of economically important species:**

##### **a- The tomato bug, *N. tenuis***

In the first season, as shown in Table (2), this insect pest started appearance in samples from the 4<sup>th</sup> week of Nov. and lasted to the third week of April. It had six peaks per season; by the 4<sup>th</sup> week of Dec, the 1<sup>st</sup> week of Jan., the 3<sup>rd</sup> week of Jan., the 2<sup>nd</sup> week of Feb., the 2<sup>nd</sup> week of March and the 1<sup>st</sup> week of April with population densities of 95, 120, 125, 72, 114 and 248 individuals / 50 double sweep net strokes. Concerning the second season, the pest took the same trend, where it showed six peaks.

**Table (1): survey of insect pests infesting Calendula plants at Fayoum Gvernorate, Egypt. during 2012/13 and 2013/14 seasons.**

Order	Family	Common name	Scientific name	Total no. of individuals	
				1 <sup>st</sup> season	2 <sup>nd</sup> season
Hemiptera	Miridae	Tomato bug	<i>Nesidocoris tenuis</i> Reut.	1679.0	2038.0
		Mirid bug	<i>Lygus gomellatus</i> H. S	178.0	75.0
	Lygaeidae	Plant bug	<i>Pseudatomoscelis seriatus</i> Reuter	14.0	23.0
		Marigold bug	<i>Nysius graminicolus</i> K.	35.0	41.0
	Pentatomidae	Stink bug	<i>Nezara viridula</i> L.	1.0	0.0
Homoptera	Cicadellidae	Cotton leafhopper	<i>Empoasca decipiens</i> Poali	471.0	501.0
		Sesame hopper.	<i>Orosius albicinctus</i> Distant	3.0	15.0
Lepidoptera	Noctuidae	Bollworm	<i>Heliothis paltigera</i> (D&S)	3.0	12.0
		Cotton leaf worm	<i>Spodoptera littoralis</i> Boisduval	2.0	2.0
Diptera	Liriomyzidae	Alfafa leafminer	<i>Liriomyza trifolii</i> Burgess	33.0	30.0
	Tephritidae	Chamomile fly	<i>Trupanea stellata</i> F.	40.0	3.0
Orthoptera	Acrididae	Rice grasshopper	<i>Aiolopus stripins</i> Latreille	4.0	0.0

The first peak was found in the beginning of Dec. with 38 individuals / 50 double sweep net strokes, while the second peak (68 individuals / 50 double sweep net strokes) was in the 4<sup>th</sup> week of Dec. The 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> peaks were recorded in the 3<sup>rd</sup> week of Jan. in the 3<sup>rd</sup> week of Feb., in the 3<sup>rd</sup> week of March, respectively. The last and highest peak was found at the beginning of April with 483 individuals / 50 double sweep net strokes. El-Gendi (1988) stated that *N. tenuis* had three broods during the period from late march to mid May. Statistical analysis showed that the simple correlation was insignificant positive between mean temperature and population density of *N. tenuis* in the both study years (  $r = 0.332$  and  $0.188$ ), while it was insignificant negative with mean relative humidity in the 1<sup>st</sup> and 2<sup>nd</sup> years ( $r = -0.185$  and  $-0.401$ ).

#### **b- The potato leafhopper, *E. decipiens*.**

Data in Table (2) indicated that this insect pest increased gradually to record four peaks through the first season of study. The 1<sup>st</sup> peak in the 3<sup>rd</sup> week of Dec., in the 2<sup>nd</sup>, in the 1<sup>st</sup> week of Jan., in the 3<sup>rd</sup> in the 1<sup>st</sup> week of March, and the 4<sup>th</sup> in the 2<sup>nd</sup> week of April with population density of 24, 36, 55 and 77 individuals/50 double sweep net strokes, respectively. Then the population decreased gradually until the end of crop in mid of April. In the second season, as shown in Table 2, the pest appeared in the end of Nov., and population of the pest showed five peaks. The 1<sup>st</sup> peak in the beginning of Dec., the 2<sup>nd</sup> in the end of Dec., the 3<sup>rd</sup> in the end of Jan., the 4<sup>th</sup> in the 4<sup>th</sup> week of Feb., and the 5<sup>th</sup> in the 2<sup>nd</sup> week of April with 6.0, 19.0, 8.0, 221 and 29 individuals/50 double sweep net strokes, respectively. Statistically, the effect of mean weather factors (mean temperature and % RH ) on population density of *E. decipiens* was insignificant negative in the both study seasons, except with mean temperature in the 1<sup>st</sup> season where it was significant positive (  $r = 0.0421$ ).

Table 2. Population fluctuations of *N. tenuis* and *E. decipiens* on *Calendula officinalis* at Fayoum Governorate, during 2012/2013 and 2013/2014 seasons.

Date of inspection	2012/2013				2013/2014				
	No. of individuals/50 double strokes		Weather factors		Date of inspection	No. of individuals/50 double strokes		Weather factors	
	<i>N. tenuis</i>	<i>E. decipiens</i>	Mean temp. °C	%RH		<i>N. tenuis</i>	<i>E. decipiens</i>	Mean temp. °C	%RH
19/11/012	0.0	4.0	17.4	56.0	18/11/013	0.0	0.0	23.7	55.0
26/11	6.0	5.0	17.6	55.0	25/11	13.0	5.0	22.9	57.0
3/12	9.0	7.0	16.7	54.0	2/12	38.0	6.0	21.4	52.0
10/12	43.0	15.0	15.5	54.0	9/12	15.0	0.0	21.2	52.0
17/12	61.0	24.0	15.0	49.0	16/12	26.0	5.0	14.8	49.0
24/12	95.0	11.0	15.1	53.0	23/12	68.0	3.0	15.3	56.0
31/12	72.0	8.0	16.3	58.0	30/12	61.0	19.0	16.8	54.0
7/1/013	120.0	36.0	15.2	57.0	6/1/014	50.0	3.0	14.7	58.0
14/1	68.0	11.0	15.1	54.0	13/1	36.0	0.0	14.1	57.0
21/1	125.0	2.0	14.6	52.0	20/1	71.0	5.0	13.3	62.0
28/1	52.0	6.0	13.4	53.0	27/1	28.0	8.0	14.0	51.0
4/2	20.0	1.0	14.7	48.0	3/2	2.0	1.0	16.8	51.0
11/2	72.0	15.0	13.0	45.0	10/2	55.0	6.0	16.5	57.0
18/2	47.0	18.0	19.5	49.0	17/2	67.0	6.0	14.5	50.0
25/2	59.0	35.0	17.8	50.0	24/2	40.0	10.0	16.5	45.0
4/3	84.0	55.0	16.9	53.0	3/3	37.0	3.0	15.5	49.0
11/3	114.0	50.0	22.9	49.0	10/3	59.0	114.0	17.2	49.0
18/3	96.0	9.0	21.1	52.0	17/3	121.0	221.0	16.3	51.0
25/3	60.0	6.0	16.9	51.0	24/3	54.0	35.0	18.8	50.0
1/4	82.0	36.0	18.5	48.0	31/3	483.0	5.0	18.2	49.0
8/4	248	77.0	22.3	49.0	7/4	48.0	29.0	20.2	49.0
15/4	68.0	33.0	22.1	46.0	14/4	119.0	17.0	18.4	45.0
22/4	78.0	7.0	24.5	45.0	21/4	547.0	0.0	21.7	44.0
Total	1679.0	471.0	-	-	Total	2038.0	501.0	-	-

## II- Chamomile

### 1-Survey

Data in table 3 showed that twelve species of insect pests were found on chamomile plants. These pests, namely *Lygus gomellatus* H. S., *Nysius graminicolus* K., *Pseudotomoscelis seriatus* Reuter; *Nezara viridula* L.; *Empoasca decipiens* paoli; *Exitanus capicola* Stal.; *Aphis gossypii* Glover; *Myzus persicae* Sulzer; *Trichoplosia ni*; *Heliothis armegera* F.; *Thrips tabaci* Lind; *Trupanea stellata* (F.) belong to nine Families in six Orders. The chrysanthemum fly was the highest in population followed by the *L. gomellatus* and *N. graminicolus*.

## 2- Population fluctuations

### a- Green bug, *Lygus gomellatus*:

Data in Table (4) indicated that, this pest started to appear during the 4<sup>rd</sup> week of Nov. The population showed five peaks of abundance in the first year of study, the 1<sup>st</sup> peak in the beginning of Dec., the 2<sup>nd</sup> in the end of December, the 3<sup>rd</sup> in the 4<sup>th</sup> week of Jan., the 4<sup>th</sup> on 25<sup>th</sup> Feb., and the 5<sup>th</sup> in the 2<sup>nd</sup> week of March with population density of 19.0, 28.0, 17.0, 103.0 and 318.0 individuals/ 50 double sweep net strokes, respectively. In the second season of investigation, data in Table (4), illustrated the population density of these insects was lower than that of the first season. The pest had only four peaks in the 2<sup>nd</sup> week of Dec., 3<sup>rd</sup> week of Feb., and the beginning & ending of March, with population densities 11.0, 17.0, 24 and 53 individuals /50 double sweep net strokes.

Statistical analysis showed that the simple correlation was highly significant positive between mean temperature and population density of *L. gomellatus* in the 1<sup>st</sup> year ( $r= 0.778$ ), while it was significant negative with mean relative humidity in the 2<sup>nd</sup> year ( $r = - 0.464$ ).

**Table 3. Insect pests recorded on chamomile plants during 2012/13 and 2013/14 seasons at yousef El-Seddik district , Fayoum Governorate, Egypt.**

Order	Family	Common name	Scientific name	Total no. of individuals	
				1 <sup>st</sup> season	2 <sup>nd</sup> season
Hemiptera	Miridae	Green bug	<i>Lygus gomellatus</i> H. S.	1188.0	219.0
	Lygaeidae	Cotton fleahopper	<i>Nysius graminicolus</i> K.	577.0	241.0
			<i>Pseudatomoscelis seriatus</i> Reuter	89.0	116.0
	Pentatomidae	Green sting bug	<i>Nezara viridula</i> L.	2.0	1.0
Homoptera	Cicadellidae	Potato leafhopper	<i>Empoasca decipiens</i> Paoli	176.0	22.0
		Sesame Leafhopper	<i>Orosius albicinctus</i> Distant	7	13
			<i>Exitanus capicola</i> Stal.	5.0	3.0
	Aphidide	Cotton aphids & peach green aphids	<i>Aphis gossypii</i> Glover & <i>Myzus persicae</i> Sulser	256.0	622.0
diptera	Tephritidae	chrysanthemum fly	<i>Trupanea stellata</i> (F.)	1426.0	705.0
Lepidoptera	Noctuidae	Alfalfa semilooper	<i>Trichoplusia ni</i> Hubner	4.0	0.0
		Cotton bollworm	<i>Heliothis armigera</i> F.	6.0	3.0
Coleoptera	Dermistidae	Cloth beetle	<i>Attagenus fasciatus</i> Thunberg	26	40
Thysanoptera	Thripidae	Onion thrips	<i>Thrips tabaci</i> Lind.	15.0	23.0

### b- *Nysius graminicolus*

As shown in Table (4), the pest in the first season started to appeared in samples from the 3<sup>rd</sup> week of Nov. and lasted to the end of crop. It had six peaks; at the 1<sup>st</sup> week of Dec, the 4<sup>th</sup> week of Dec.; the 1<sup>st</sup> week of Jan; the

end of Jan.; the 3<sup>rd</sup> week of Feb. and the 2<sup>nd</sup> week of March with 85.0, 48.0, 76.0, 12.0, 26.0 and 74.0 individuals/ 50 double strokes, respectively. In the second season, data in Table (4) revealed that the population density of *N. graminicolus* was much lower than those of the first season. It had five peaks. The first peak was found at the 4<sup>th</sup> week of Nov. with 42.0 individuals / 50 double strokes. The second peak (highest) was in the 2<sup>nd</sup> week of Dec. with 54.0 individuals / 50 double strokes. The 3<sup>rd</sup> and 4<sup>th</sup> peaks (22 and 14 individuals) recorded during 4<sup>th</sup> week of Dec. and 1<sup>st</sup> week of Jan., respectively. The 5<sup>th</sup> peak (lowest) was found in the 3<sup>rd</sup> week of March with 5.0 individuals / 50 double strokes. El-Gendi (1988) mentioned that *N. cymoides* recorded three broods from late May to mid-July.

Statistically, the effect of mean weather factors on population density was insignificant positive in the both study seasons, except with %RH in the 2<sup>nd</sup> season where it was highly significant positive ( $r = 0.668$ ).

#### **c- Aphids (*Aphis gossypii* & *Myzus persicae*)**

Data in Table (4) revealed that these pest had four peaks per season. In the first season, peaks recorded in the 3<sup>rd</sup> week of Jan., in the 1<sup>st</sup> week of Feb., in the 1<sup>st</sup> week of March, and in the last week of March, recording the highest peak (93 individuals / 50 double strokes) when the means of weather factors were 16.9 °C and 51.0 % RH. Concerning the second season, population was higher and showed four peaks. The first peak was in the last week of Nov., the 2<sup>nd</sup> in the 1<sup>st</sup> week of Jan., the 3<sup>rd</sup> in 3<sup>rd</sup> week of Feb., and the 4<sup>th</sup> in the 1<sup>st</sup> week of March with population of 66, 12, 159 and 133 individuals / 50 double sweep net strokes respectively. El-Gendi (2007) found that *A. gossypii* had one peak in the first season and three peaks in the 2<sup>nd</sup> season in mid Jan., mid Feb., and mid-April.

Statistical analysis showed that the relationship between population density of *Aphis* sp. and mean weather factors was insignificant negative in the both study seasons except with mean temperature in the 1<sup>st</sup> season where it was insignificant positive ( $r = 0.149$ ).

#### **d- Chrysanthemum fly, *Trupanea stellata* (F.)**

Data obtained in Table (4) demonstrated that, in the first season, the chrysanthemum fly appeared in chamomile samples from the 3<sup>rd</sup> week of Nov. and continued to the beginning of April. It had five peaks per season. The first peak in the beginning of Dec, the 2<sup>nd</sup> in the 1<sup>st</sup> week of Jan. the 3<sup>rd</sup> and highest peak was in the 1<sup>st</sup> week of Feb, the 4<sup>th</sup> and 5<sup>th</sup> peaks were recorded by end of Feb., and the end of March with population densities of 58, 244, 73, 78 and 123, respectively. In the second season, the population densities of chrysanthemum fly showed the same trend of the first season, where it had five peaks. The first peak was found by the last week of Nov. with 43 flies / 50 double sweep net strokes, while the highest peak was in the last week of March with 61 flies / 50 double sweep net strokes.

Concerning statistical analysis, the effect of mean temperature and % RH on population density of *T. stellata*, was insignificantly negative except with the mean relative humidity in the 1<sup>st</sup> season where the simple correlation was insignificantly positive ( $r = 0.482$ ). El-Gendi (2007) stated that the correlation between the population densities and weather factors was

insignificantly negative in the 1<sup>st</sup> season and insignificantly positive in the 2<sup>nd</sup> season.

### III- predators

#### 1-Survey of predatory species associated with chamomile and calendula crops:

As shown in Table (5), five species of predatory insects belong to four orders with a total number of 452 and 10 individuals in the first season, and 382 and 29 in the 2<sup>nd</sup> season on chamomile and calendula crops, respectively. On chamomile plants, *Orius* sp. was the most dominant predator in the two seasons of the study where it represented (44.24 %) in the first season and (72.77 %) in the 2<sup>nd</sup> season. *Syrphus* sp. was the lowest predator in the population of both seasons and crops.

**Table 4. Population fluctuations of some insect pests infesting chamomile plants in the field at Fayoum Governorate during 2012/2013 and 2013/2014 seasons.**

Date of inspection	2012/2013						2013/2014						
	No. of individuals/50 double strokes				Weather factors		No. of individuals/50 double strokes				Weather factors		
	<i>L. gomellatus</i>	<i>N. graminicolus</i>	Aphids	<i>T. stellata</i>	Mean temp. °C	%RH	<i>L. gomellatus</i>	<i>N. graminicolus</i>	Aphids	<i>T. stellata</i>	Mean temp. °C	%RH	
19/11	12.0	10.0	0.0	3.0	17.4	56.0	18/11	0.0	22.0	0.0	12.0	23.7	55.0
26/11	4.0	25.0	0.0	16.0	17.6	55.0	25/11	4.0	42.0	66.0	43.0	22.9	57.0
3/12	19.0	85.0	2.0	58.0	16.7	54.0	2/12	7.0	27.0	28.0	30.0	21.4	52.0
10/12	11.0	54.0	3.0	51.0	15.5	54.0	9/12	11.0	54.0	5.0	26.0	21.2	52.0
17/12	10.0	30.0	2.0	25.0	15.0	49.0	16/12	1.0	5.0	1.0	35.0	14.8	49.0
24/12	22.0	48.0	0.0	132.0	15.1	53.0	23/12	0.0	22.0	9.0	28.0	15.3	56.0
31/12	28.0	35.0	2.0	135.0	16.3	58.0	30/12	0.0	11.0	6.0	25.0	16.8	54.0
7/1/013	25.0	76.0	3.0	244.0	15.2	57.0	6/1/2014	1.0	14.0	12.0	53.0	14.7	58.0
14/1	20.0	25.0	6.0	88.0	15.1	54.0	13/1	0.0	8.0	8.0	20.0	14.1	57.0
21/1	8.0	1.0	18.0	75.0	14.6	52.0	20/1	0.0	6.0	4.0	10.0	13.3	62.0
28/1	17.0	12.0	10.0	54.0	13.4	53.0	27/1	6.0	2.0	0.0	34.0	14.0	51.0
4/2	9.0	7.0	12.0	73.0	14.7	48.0	3/2	13.0	0.0	7.0	39.0	16.8	51.0
11/2	8.0	3.0	8.0	6.0	13.0	45.0	10/2	14.0	1.0	14.0	46.0	16.5	57.0
18/2	76.0	26.0	4.0	29.0	19.5	49.0	17/2	17.0	2.0	159.0	31.0	14.5	50.0
25/2	103.0	12.0	9.0	78.0	17.8	50.0	24/2	5.0	2.0	79.0	38.0	16.5	45.0
4/3	97.0	17.0	35.0	68.0	16.9	53.0	3/3	24.0	0.0	133.0	40.0	15.5	49.0
11/3	318.0	74.0	19.0	56.0	22.9	49.0	10/3	15.0	1.0	63.0	44.0	17.2	49.0
18/3	94.0	16.0	25.0	107.0	21.1	52.0	17/3	9.0	5.0	21.0	58.0	16.3	51.0
25/3	131.0	8.0	93.0	123.0	16.9	51.0	24/3	39.0	2.0	3.0	61.0	18.8	50.0
1/4	176.0	13.0	5.0	5.0	18.5	48.0	31/3	53.0	15.0	4.0	32.0	18.2	49.0
Total	1188.0	577.0	256.0	1426.0	-	-	-	210.0	191.0	622.0	705	-	-

**Table 5. Natural enemies inhaping chamomile and calendula plants during 2012/13 and 2013/14 seasons at yousef El-Seddik district , Fayoum governorate, Egypt.**

Order	Family	Common name	Scientific name	No. of predators			
				1 <sup>st</sup> season		2 <sup>nd</sup> season	
				Chamomile	Calendula	Chamomile	Calendula
Coleopteran	Coccinellidae	Lady beetles	<i>Coccinella undecimpunctata</i> Linnaeus	51.0	0.0	41.0	6.0
Hemiptera	-	-	<i>Orius</i> sp.	200.0	4.0	281.0	23.0
Neuroptera	chrysopidae	Green lacewing	<i>Chrysopa carnea</i> Stephen	196.0	0.0	37.0	0.0
Diptera	Syrphidae	Hoverflies	<i>Syrphus</i> sp.	5.0	6.0	23.0	0.0
Total	-	-	-	452.0	10.0	382.0	29.0

**2-Population density of the major predatory insects inhaping chamomile crop:**

The population fluctuations of predators associated with chamomile plants were illustrated in Table (6).

**a- *Orius* spp.**

In the 1<sup>st</sup> season, three peaks of *Orius* sp. were recorded at 1<sup>st</sup> week of December, the 1<sup>st</sup> week of February and the 3<sup>rd</sup> week of March. The 2<sup>nd</sup> peak was the highest (25 individuals / 50 double net strokes. In the second season, population density recorded four peaks at early-December, the 4<sup>th</sup> week of December, 2<sup>nd</sup> week of Jan and the 3<sup>rd</sup> week of March. The 4<sup>th</sup> peak was the highest (51 individuals / 50 double strokes.

**b- *Coccinella undecimpunctata* L. :**

Two peaks of *C. undecimpunctata* were recorded at 3<sup>rd</sup> week of December and 2<sup>nd</sup> week of January in the first season with 14.0 and 7.0 individuals /50 double net strokes, respectively. In the 2<sup>nd</sup> season, date of peaks was early-December and the 3<sup>rd</sup> week of February.

**c- *Chrysopa carnea* (Steph.):**

Numbers of *C. carnea* were generally low in the winter. the population density was high in the 1<sup>st</sup> season compared with that of the 2<sup>nd</sup> season. this predator had 3 peaks in the 1<sup>st</sup> season in the third week of Jan., 3<sup>rd</sup> week of February and the 2<sup>nd</sup> week of of March. In the second season, it had only one peak in the 4<sup>th</sup> week of February with 10 individuals / 50 double net strokes. El-Gendi (2007) mentioned that *C. carnea* was the dominant predator in the first season with one peak, while the dominant predator in the 2<sup>nd</sup> season was *C. undecimpunctata* where it recorded two peaks, the 1<sup>st</sup> one in the end of Jan., and the 2<sup>nd</sup> in mid-April.

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**Table 6. Population fluctuations of predators inhabiting chamomile plants in the field at Fayoum Governorate during 2012/2013 and 2013/2014 seasons.**

Date of inspection	2012/2013					Date of inspection	2013/2014				
	No. of individuals/50 double strokes			Weather factors			No. of individuals/50 double strokes			Weather factors	
	<i>Orius sp.</i>	<i>C. undecimpunctata</i>	<i>C. carnea</i>	Mean temp. °C	%RH		<i>Orius sp.</i>	<i>C. undecimpunctata</i>	<i>C. carnea</i>	Mean temp. °C	%RH
19/11/012	0.0	0.0	1.0	17.4	56.0	18/11/013	0.0	2.0	0.0	23.7	55.0
26/11	0.0	2.0	7.0	17.6	55.0	25/11	13.0	3.0	2.0	22.9	57.0
3/12	10.0	2.0	2.0	16.7	54.0	2/12	23.0	12.0	3.0	21.4	52.0
10/12	4.0	6.0	2.0	15.5	54.0	9/12	0.0	0.0	0.0	21.2	52.0
17/12	8.0	14.0	3.0	15.0	49.0	16/12	7.0	0.0	1.0	14.8	49.0
24/12	5.0	4.0	4.0	15.1	53.0	23/12	27.0	5.0	3.0	15.3	56.0
31/12	1.0	3.0	6.0	16.3	58.0	30/12	10.0	2.0	0.0	16.8	54.0
7/1/013	9.0	2.0	4.0	15.2	57.0	6/1/014	7.0	1.0	1.0	14.7	58.0
14/1	9.0	7.0	5.0	15.1	54.0	13/1	28.0	1.0	3.0	14.1	57.0
21/1	11.0	4.0	22.0	14.6	52.0	20/1	15.0	0.0	0.0	13.3	62.0
28/1	13.0	2.0	2.0	13.4	53.0	27/1	8.0	0.0	2.0	14.0	51.0
4/2	25.0	0.0	4.0	14.7	48.0	3/2	0.0	0.0	0.0	16.8	51.0
11/2	19.0	0.0	12.0	13.0	45.0	10/2	6.0	4.0	2.0	16.5	57.0
18/2	19.0	0.0	29.0	19.5	49.0	17/2	9.0	5.0	6.0	14.5	50.0
25/2	14.0	0.0	24.0	17.8	50.0	24/2	11.0	1.0	10.0	16.5	45.0
4/3	11.0	3.0	25.0	16.9	53.0	3/3	19.0	4.0	1.0	15.5	49.0
11/3	9.0	2.0	33.0	22.9	49.0	10/3	22.0	0.0	0.0	17.2	49.0
18/3	17.0	0.0	9.0	21.1	52.0	17/3	51.0	2.0	0.0	16.3	51.0
25/3	11.0	0.0	2.0	16.9	51.0	24/3	25.0	2.0	0.0	18.8	50.0
1/4	5.0	0.0	0.0	18.5	48.0	31/3	0.0	0.0	3.0	18.2	49.0
Total	175.0	51.0	196.0	-	-	-	28.01	41.0	37.0	-	-

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حصر و تذبذب التعداد للأفات الحشرية والمفترسات الشائعة على نوعين من  
النباتات الطبية في محافظة الفيوم - مصر  
ربيع حسن عوض سليمان  
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أظهرت نتائج الحصر تسجيل ١٣ آفة حشرية تنتمي إلى ٨ فصائل تتبع خمس رتب والتي سجلت على نباتات الأقحوان . كانت بقعة الطماطم الأكثر تواجداً من تلك الحشرات. كما سجل على نباتات الشيح البابونج ١٢ آفة حشرية تنتمي لتسع عائلات تابعة لست رتب . كانت ذبابة الكريزانثم الأعلى في التعداد يليها بقعة *Nysius graminicolus* K و *Lygus gomellatus* H. S.

أما بالنسبة لتذبذب التعداد للحشرات السائدة فقد وجد أن حشرة بقعة الطماطم لها ستة ذروات للموسم كانت أعلى الذروات ٢٤٨ ، ٤٨٣ فرد / ٥٠ ضربة شبكة مزدوجة في الأسبوع الثاني من أبريل و نهاية مارس لكل من الموسم الأول و الثاني على التوالي . ولقد وجد لحشرة نطاظ أوراق البطاطس *Empoasca decipiens* أربعة ذروات في الموسم الأول و خمسة في الموسم الثاني . كانت أعلى الذروات ٧٧ ، ٢٢١ فرد / ٥٠ ضربة شبكة مزدوجة في الإسيوع الثاني من ابريل والإسيوع الثالث من مارس لكل من الموسم الأول و الثاني على التوالي .

على الشيح البابونج سجلت حشرة *Lygus gomellatus* خمسة ذروات في الموسم الأول وأربعة فقط في الموسم الثاني . أظهرت حشرة *Nysius graminicolus* ستة ذروات في الموسم الأول و خمسة في الموسم الثاني . كانت الذروات الأعلى ٨٥ ، ٥٤ فرد / ٥٠ ضربة شبكة مزدوجة سجلت خلال الإسيوع الأول من ديسمبر و الثاني من ديسمبر للموسمين الأول و الثاني على التوالي . أما بالنسبة لحشرة المن فقد كان لها أربعة ذروات في كل من موسمي الدراسة بأعلى القمم في الإسيوع الأخير من مارس والأسيوع الثالث من فبراير بتعداد ٩٣ ، ١٥٩ فرد / ٥٠ ضربة مزدوجة للموسمين الأول و الثاني على التوالي. أيضاً سجلت كثافة التعداد لذبابة الكريزانثم خمسة ذروات لكل موسم .

من ناحية أخرى تم تسجيل خمسة أنواع من حشرات مفترسة تنتمي إلى أربع رتب بتعداد كلي ٤٥٢ ، ١٠ أفراد في الموسم الأول و ٣٧١ ، ٢٩ فرد في الموسم الثاني على كل من الشيح البابونج و الأقحوان على التوالي . وكان مفترس *Orius spp* أكثر المفترسات تواجداً بينما مفترسات ذات الجناحين أظهرت التعداد الأقل .