ECOLOGICL STUDIES ON SOME PREDATORY INSECTS INHABITING COWPEA PLANTS AT MANSOURA DISTRICT.

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ABSTRACT

Experiments were carried out at the farm of Agriculture Research Center of the Faculty Agriculture, Mansoura University during the two successive seasons 2012 and 2013. The obtained results revealed that, six predatory insects inhabiting cowpea plants, these insects namely *Coccinella undecimpunctata L., Cydonia vicina nilotica Muls, Cydonia vicina isis Muls*, *Chrysoperla carnea (Steph.), Metasyrphus corella* (F.) and Sphodramantes *bioculata (Burm).*

The result revealed that, *C.undicimpunctata* had two peaks in the first planting date, three peaks in the second planting date and three peaks in the third planting date during the first season of study. While in the second season of study, this predators recorded four peaks in the first planting date, one peaks in the second planting date and two peaks in the third planting date.

Cydonia vicina isis had two peaks occurred in the first planting date, while in the second planting date had three peaks and the third planting date had three peaks. In The second season of study, *C. vicina isis* had three peaks in the first planting date, four peaks in the second planting date and three peaks occurred in the third planting date.

Cydonia vicina nilotica recorded two peaks in the first and second planting date respectively. While, four peaks in the third planting date during 2012. Three peaks; four peaks and three peaks during the first; second and third planting date respectively. *Chrysopela carnea* had two peaks in the first planting date and three peaks in the second planting date and three peaks in the third planting date during the first season of study. On the other hand, three peaks in the first planting date; four peaks in the second planting date and three peaks in the third planting date.

The obtained results cleared that, *M.corella* had two peaks in the first and second planting dates, respectively during the two seasons of study, while the third planting date had three peaks during the two season of study.

Sphadromantis bioculata had two peaks in the first planting date, had three peaks in the second planting date and three peaks in the third planting date during the first season of study. While, in the second season of study had three peaks in the first planting date, three in the second planting date and two peaks in the third planting date.

The effect of the temperature and relative humidity on the population density of the predatory insect inhabiting cowpea plants indicated that combined effect of these factors exerted negative or positive significant correlation in the two seasons of study .The results cleared that temperature and relative humidity affected greatly on the population density predatory insect inhabiting cowpea plants.

Keywords: cowpea plants, predatory insects, weather factors

INTRODUCTION

Cowpea (*Vigna unguiculata* L.) is one of the most important food legumes all over the world. It plays a food role in various industries and nutritional aspects for people. It is an excellent alternative source of protein. The area under cultivation in Egypt steadily expended about 73022(According to General administration for statistic 1977)the most serious insects attacking cowpea plants are the white fly *Bemisia spp.* aphid species, green stink bug*, Nezara viridula L.,Cosmlyce boeticus* L.; *Empoasca lybica* Berg and *Thrips tabaci* Linderman (Hesham *et al.,*2009; Shukla *et al.,*2009 and Nagamallikadevi *et al.,* 2013).Today, biological control is an important component of integrated pest management (IPM) programs for Agriculture as well as for urban environment. Therefore, Techniques for mass production of some predators may be relatively help in solving the problem of insect pests on cowpea plants and reduce the hazard of pesticides to human and environment in world (Symondson *et al.,* 2002). Generalist insect predators are frequently abundance in annual crops including vegetable crops and have been identified as important in suppression populations of damaging insects (Rosenheim *et al.,* 1995). Several studies drew attention to the importance of the beneficial insects and their population densities in different parts of the world (Al-Eryan *et al.,* 2001; Clarie et al 2004; Jian *et al.,* 2004; Taleb and Sader 2007) The effect of some weather factors on certain beneficial insects were studied by several investigators in different parts of the world (Abdl El-Salam *et al.*, 2002 and Jian *et al.*, 2004). Therefore, the objective of the current study were to investigate the main predatory insects inhabiting cowpea plants, the effect of some weather factors on the population density of these insects

MATRIALS AND METHODS

Survey and population density of the main predatory insects inhabiting cowpea plants:-

The experiments were carried out at the farm of Agriculture Research Center of the Faculty Agriculture, Mansoura University. Cowpea verity kream7 was sown during a period of two successive seasons, the samples date started from March 29th to Jun 14th in the first planting date, from April 14th to June 16 in the second planting date and from April 28th to July 7th during 2012 and 2013 seasons respectively. The experimental area was about half feddan divided into four replicated. The normal agriculture treatment of land preparation, Irrigation, mechanical were done. Two methods were used for estimating the population abundance. The first method was sweep net (30, cm diameter, 50cm deep) was used for collecting flying insects from cowpea plants, 40 double stokes were taken across the two diagonals.of the field at weekly intervals. The second method was direct counting, twenty random cowpea leaves per plots were examined weekly intervals after ten days from plantation and placed in plastic bags for inspection in the laboratory. The immature stages of predatory insects were

reared containing fresh food and kept under laboratory conditions till emergence of adult for identification. Collected specimens were preserved in 70% alcohol for classification and identification. Samples were identified by the classification Research Department at the Plant Protection Research Institute.

Influence of some weather factors on the activity of the predatory insects:-

The meteorological data (temperature as well as the relative humidity) were recorded at each inspection date. Records were obtained from the Meteorological station at Mansoura. The weekly figures of these weather factors were calculated simple correlation coefficients related with the weekly catch of the predatory insects were done to study the possible influence of these weather variables on the population density of the main predatory insects habiting cowpea plants.

Subjected for one way analysis variance (ANOVA) and the mean were calculated using Dancan's Multiple Range test (Cohort softwere2004)

RESULTS AND DISCUSSION

Survey the main predatory insects inhabiting on cowpea plants by using sweep net:

As shown as in Table (1) the predator *C.undicempunctata* recorded the highest seasonal abundant during the first season 2012 and represented by 31(24.6%), 89 (23.4%) and 110 individuals (23.7%) in the first planting date, in the second planting date and in the third planting date, respectively. Meanwhile, *C.carnea* came in the second category 30(23.8%), 72 (19.4%) and 106 individuals (22.9%) in the three planting dates respectively.

Table (1) Numbers and percentages of the predators inhabiting cowpea by sweep net during season 2012 and 2013 at Mansoura district

seasons / Predatory insects	2012						2013					
	First planting date		Second planting date		Third Planting date		First Planting date		Second planting date		Third planting date	
	No.	%	No.	%	No.	%	No.	%	No,	%	No	%
C.undicempunctata	31	24.6	89	23.4	110	23.7	34	25	40	19.6	93	22.8
C.Vicina isis	14	11.1	50	12.8	59	12.7	13	9.6	27	13.2	48	11.8
C,Vicina nilotica	22	17.5	53	14.5	62	13.4	20	14.7	32	15.7	44	10.8
C. carnea	30	23.8	72	19.4	106	22.9	36	26.5	46	22.5	95	23.3
M. corella	15	11.9	62	12.8	50	10.8	19	14	25	12.2	47	11.6
S.bioculata	14	11.1	53	17.1	76	16.5	14	10.3	25	16.7	80	19.7
Total	126	100	351	100	463	100	136	100	240	100	407	100

Data obtained in Table (2) the predator *C.carnea* recorded the highest seasonal abundant during the first season 2012 and represented by 36(26.5%), 46 (22.5%) and 95 individuals (23.3%) in the first planting date, in

the second planting date and in the third planting date, respectively. Meanwhile, *C.undicempunctata* came in the second category 34 (25.0%), 40 (19.6%) and 93 individuals (22.8%) in the three planting dates respectively.

Seasonal abundance of certain predatory insects inhabiting cowpea plants:

Data presented in Fig. (1) revealed that, the population density of *C.uncimpunctata* caught by sweep net in the three planting dates during the first season 2012. In the first planting date two peaks were occurred in the second week of April and in the second week of May, in the second planting date had three peaks occurred in the second week of April; in the last week of April and in the second week of June. In the third planting date three peaks had occurred in the last week of May; in the second week of June and in the last week of June, during the first season of study,
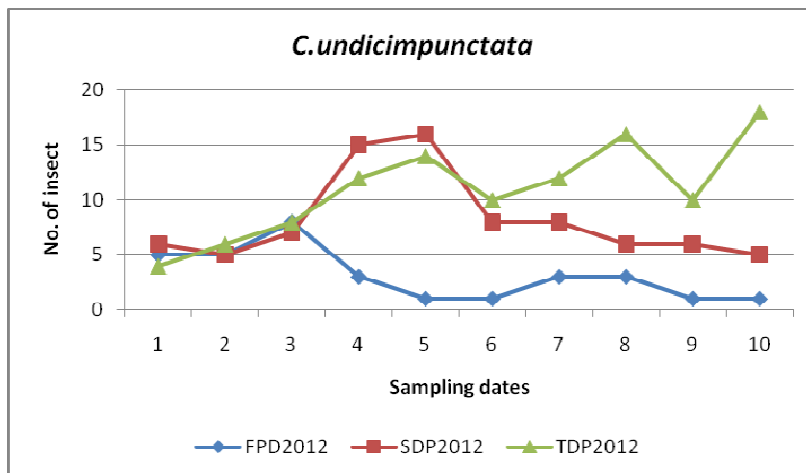
Fig.(1) **Population density of *C. undicimpunctata* inhabiting cowpea plants(three planting dates) caught by sweep net during the first season of study   at Mansoura district**

Data obtained in Fig. (2) indicated that, three peaks had occurred in the last week of March; in the second week of April and in the second week of May in the first planting date. While, one peak was occurred in the third week of May; in the third planting date two peaks were occurred in the last week of May and the second week of June in the second season of study. Data presented in Fig. (3) revealed that, the population density of *C. vicina isis* caught by sweep net during the first season of study. Two peaks were occurred in the last week of April and the second week of May in the first planting date. On the other hand, three peaks in the second planting date occurred in the third week of Aril; in the second week of May and in the second week of June. In the third planting date, three peaks were occurred in the first week of May; in the last week of May and in the last week of June, during the second season of study.
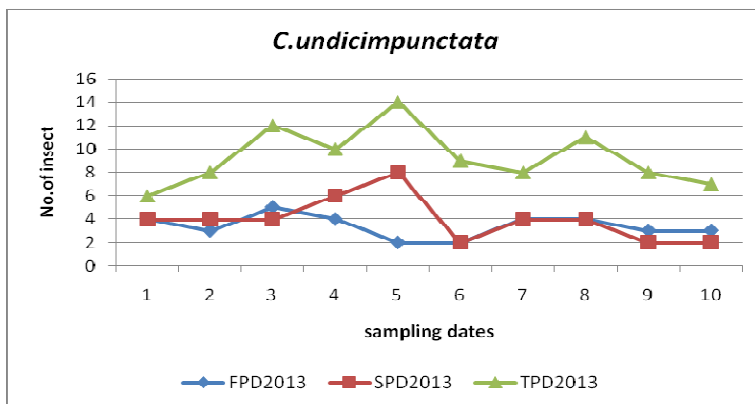
Fig.(2) Population density of *C.undicimpunctata* inhabiting cowpea plants(three planting dates) caught by sweep net during the second season of study   at Mansoura district
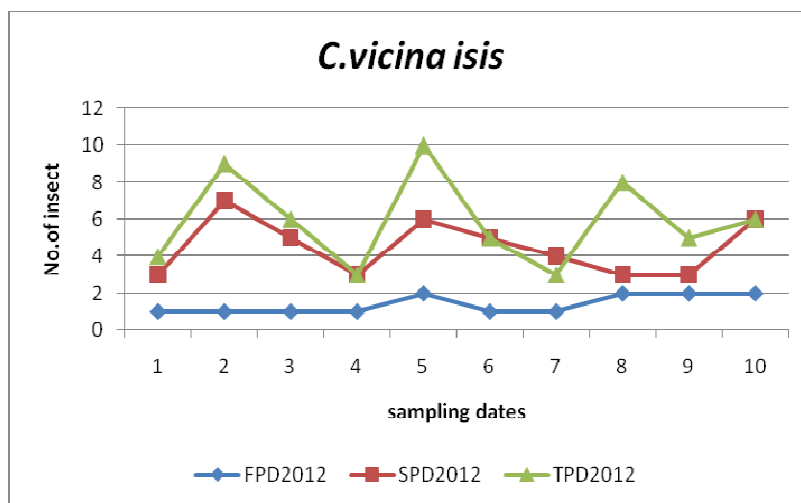

Fig.(3) Population density of *C. vicina isis* inhabiting   cowpea plants(three planting dates) caught by sweep net during the first season of study at Mansoura district

Data illustrated in Fig. (4) indicated that, three peaks were occurred in the first week of April; in the last week of April and in the second week of May. While in the second planting date, four peaks were occurred in the second and the last week of April; in the third week of May and the first week of June. in the third planting date three peaks were occurred in the second week of May; in the first week of June and in the third week of June.
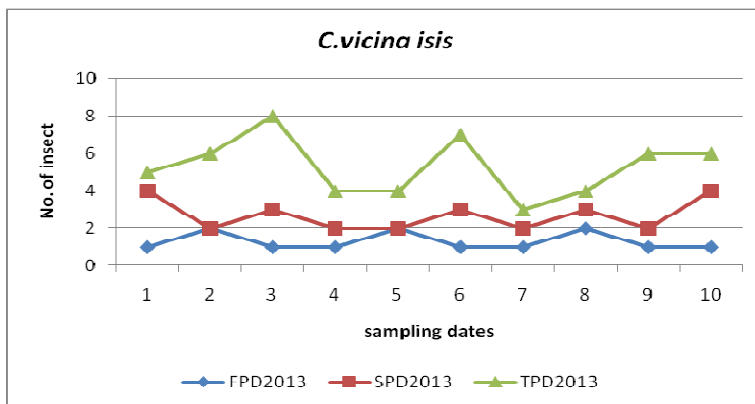
Fig.(4) **Population density of** *C. vicina isis* **inhabiting cowpea plants(three planting dates) caught by sweep net during the second season of study at Mansoura district**
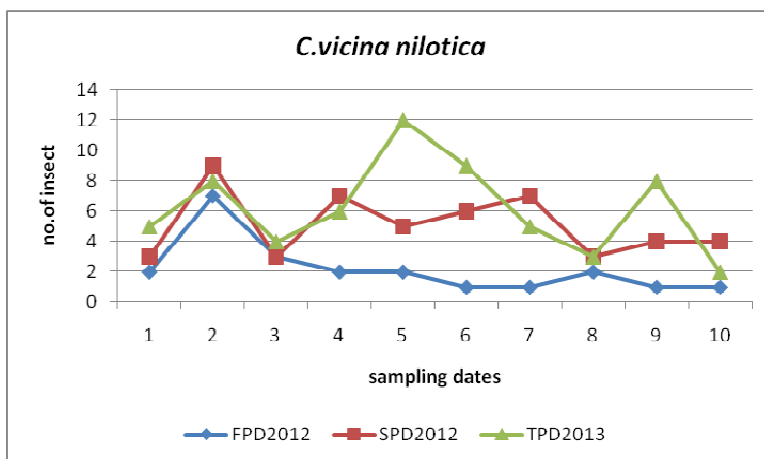

Fig.(5) **Population density of** *C. vicina nilotica* **inhabiting cowpea plants(three planting dates) caught by sweep net during the first season of study at Mansoura district**

Data presented in Fig. (5) indicated that, the population density of *C. vicina nilotica* caught by sweep net during the first season of study, two peaks were found in the first week of April and in the second week of May during in the first planting date. In the second planting date, three peaks were occurred in the third week of April; in the first week of May and the last week of May. In the third planting date, three peaks were occurred in the first week of May; in the last week of May and in the third week of June.
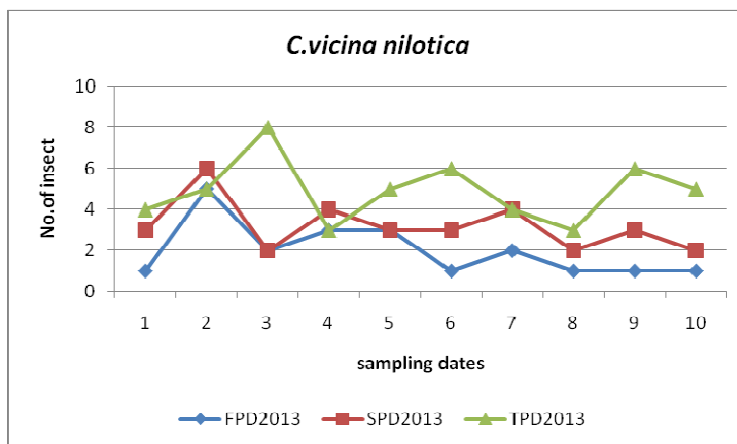
Fig. (6) Population density of *C. vicina nilotica* **inhabiting cowpea plants (three planting dates) caught by sweep net during the second season of study at Mansoura district**

Data presented in Fig (6) indicated that, the population density of *C. vicina nilotica* caught by sweep net during the second season of study. In the first planting date three peaks were occurred in the first week of April; in the third week of April and in the second week of May. While the second planting date, four peaks were occurred in the third week of April; in the first week of May; in the last week of May and in the second week of June. in the third planting date, three peaks were occurred in the second week of May; in the first and in the third week of June.
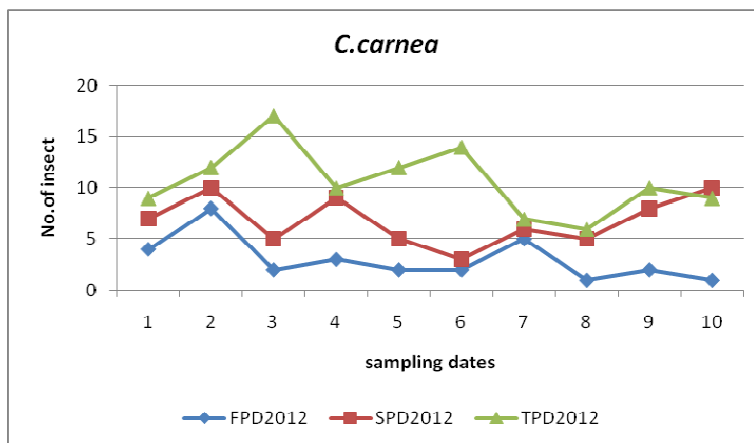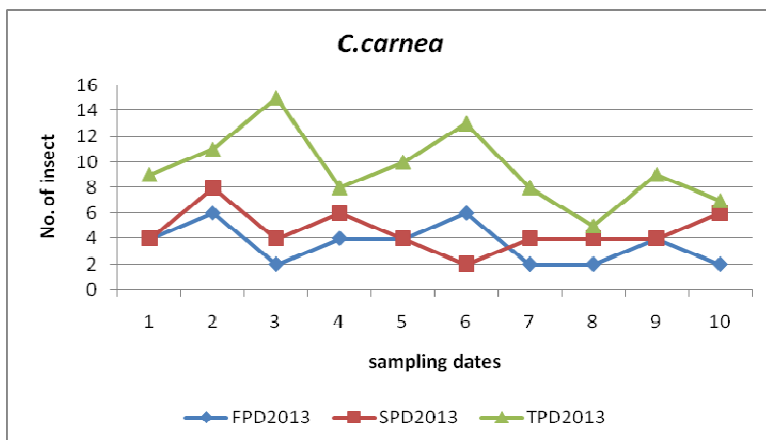

Fig.(7) Population density of *C. carnea* **inhabiting cowpea plants (three planting dates) caught by sweep net during the first season of study at Mansoura district**

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Data presented in Fig. (7) revealed that, the population density of *C.carnea* caught by sweep net during the first season of study, in the first planting date four peaks were occurred in the first week of April; in The third week of April; in the second week of May and in the last week of May. While the second planting date, four peaks were occurred in the third week of April; the first week of May; the last week of May and the second week of June. in the third planting date, three peaks were occurred in the second week of May; the first week of June; the third week of June.

Fig.(8) Population density of *C. carnea* inhabiting cowpea plants(three planting dates) caught by sweep net during the second season of study at Mansoura district
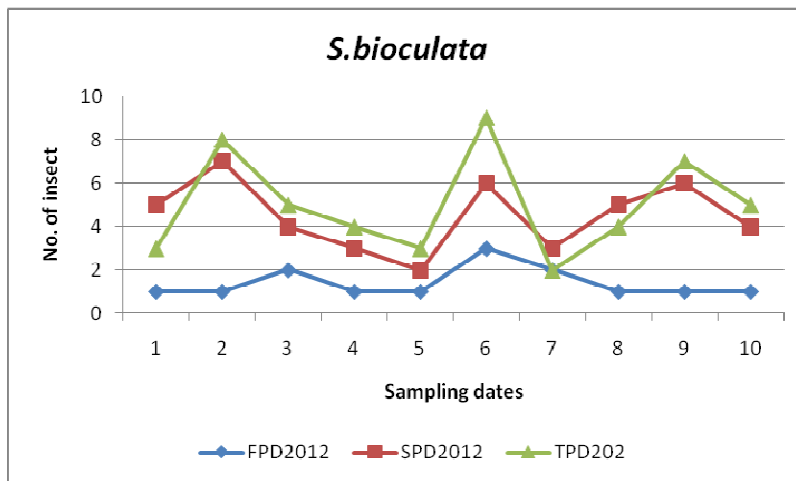
Data obtained results in Fig. (8) revealed that, the population density of *C.carnea* caught by sweep net during the second season of study. In the first planting date, three peaks were occurred in the first week of April; the last week of April and the last week of May. While the second planting date, three peaks were occurred in the third week of April; in the first week of May and in the second week of June. In the third planting date, three peaks were occurred in the second week of May; in the first week of June and in the third week of June.

Data obtained results in Fig. (9) revealed that, the population density of *S.bioculata* caught by sweep net during the first season of the study. In the first planting date, two peaks were occurred in the second week of April and in the first week of May. In the second planting dates, three peaks occurred in the third week of April; in the third week of May and in the second week of June. In the third planting date, three peaks occurred in the first week of May; in the first week of June and in the third week June.

Date illustrated in Fig. (10) showed that, the population density of revealed that, the population of density *S.bioculata* caught by sweep net during the second season of the study. Three peaks were occurred in the last week of March; in the third week of April and in the first week of May, in

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the first planting date. While the second planting date, three peaks were occurred in the third week of April; the third week of May and the first week of first week of June. in the third planting date, two peaks were occurred in the first week of May and the third week of June.

Fig.(9) Population density of *S. bioculata* **inhabiting cowpea plants(three planting dates) caught by sweep net during the first season of study at Mansoura district**
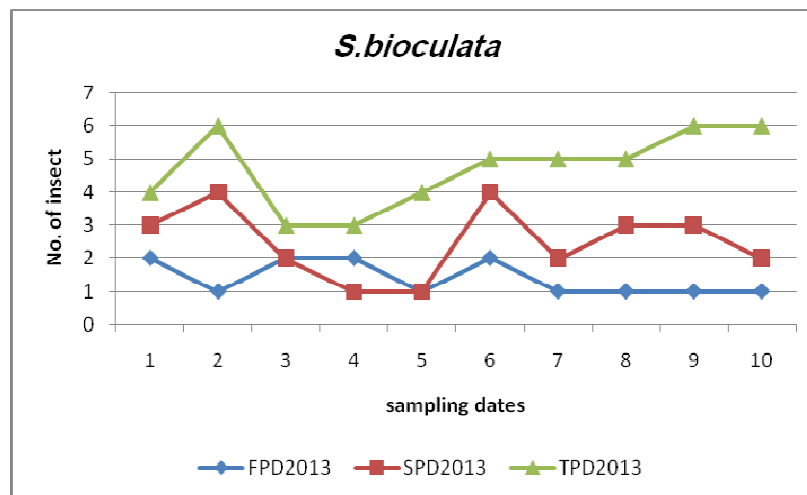
Fig.(10) Population density of *S.bioculata* **inhabiting cowpea plants(three planting dates)   caught by sweep net during the second season of study at Mansoura district**

Fig.(11) **Population density of *M. corella* inhabiting cowpea plants(three planting dates) caught by sweep net during the first season seasons of the at Mansoura district**

Data obtained results in Fig. (11) indicated that, the population density of *M.corella* caught by sweep net in the first season of study. In the first planting date, two peaks were occurred in the last week of March and the second week of April. In the second planting date, two peaks were occurred in the first week of May and the last week of May. In the third planting date, three peaks were occurred in the last week of April; in the second week of May and in the second week of May.

Fig. (12) **Population density of *M. corella* inhabiting cowpea plants (three planting dates) caught by sweep net during the second season of study at Mansoura district**
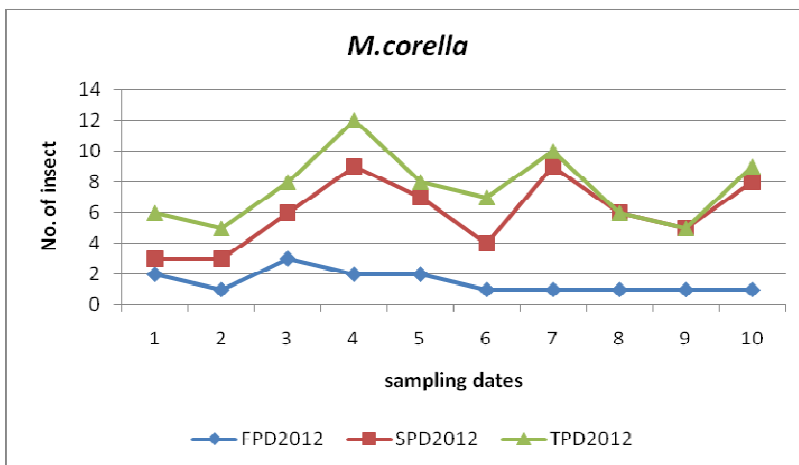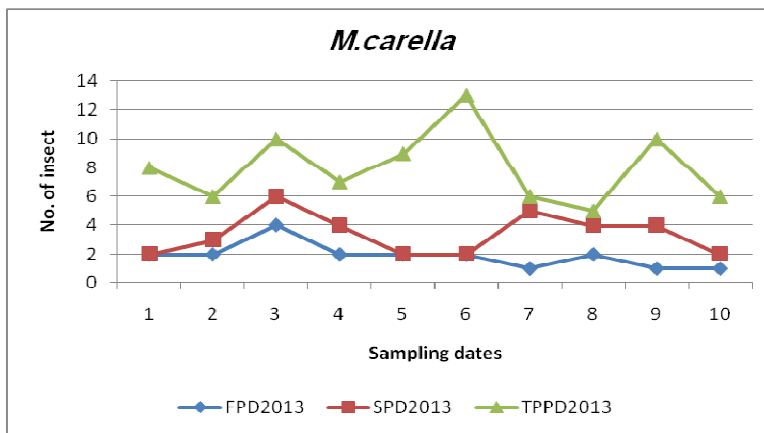
Data presented in Fig. (12) revealed that, the population density of *M.corella* caught by sweep net in the second season of study. In the first planting date, two peaks were occurred in the second week of April and in the third week of May. In the second planting date two peaks were occurred in the last week of April and in the last week of May. On the other hand the third planting date, four peaks were occurred in the last week of April; in the second week of May; in the first week of May and in the third week of June.

Effect of certain weather factor on the population density of the main predatory insects inhabiting cowpea plants.

The date summarized in Table (2,3,4) cleared that, the relationship between the weekly numbers of some predatory insects and the temperature and relative humidity components , the obtained results revealed that both temperature and relative humidity exerted positive or negative effect varying from slight to significant on the population density of these insect species.

Table (2) simple correlation coefficient the catch numbers of some predatory insects inhabiting cowpea plants and the temperature and relative humidity during the first planting date.

seasons	٢٠١٢				٢٠١٣			
Weather factors / Predatory insect	T.max	T. min	T. avr	Mean RH%	T. max	T. min.	T. avr.	Mean RH%
C.undcimpunctata	0.149	0.2039	-0.1175	-0.304	-0.186	-0.0838	-0.1931	0.5232
C.vicina sis	-0.470	-0.314	-0.0114	0.5061	-0.195	0.07637	-0.2127	0.0947
C.vicinanilotica	-0.200	-0.269	0.56189	0.0313	-0.251	0.02712	-0.3971	0.2360
m.corella	0.1757	0.0868	-0.2863	-0.018	-0.199	0.14000	-0.3606	-0.3796
C.carnea	0.1954	0.2146	0.07581	-0.650*	-0.533	-0.325	-0.48329	0.17362
S..bioculata	0.4079	0.1769	0.10412	-0.281	-0.429	-0.4298	-0.56124	0.17646

Table (3): Simple correlation coefficients between the catch numbers of some predatory insects inhabiting cowpea plants, and the temperature and relative humidity during the second planting date by sweep net.

Seasons	2012				2013			
weather Factors / predatory insects	tmax	Tmin	Tvar	RH% var	Tmax	Tmin	Tvar	mean RH%
C.undcimpunctata	0.1213	-0.2378	-0.4607426	0.225268	-0.2386	-0.3492	-0.2567	-0.1052
C.vicinaisis	-0.3771	-0.1331	0.3313682	-0.232	0.1963	0.17616	-0.0498	0.3906
C.vicinanilotica	-0.0238	-0.0238	-0.07377	0.126146	-0.5976	-0.5449	-0.4107	-0.0527
C.carnea	-0.5019	-0.106	0.007426	-0.19038	-0.4104	-0.3447	-0.3447	0.0962
M.corella	-0.378	-0.186	0.3584711	-0.218549	0.1406	-0.0076	-0.0076	0.45497
S.bioculata	0.2484	0.115	-0.5407	0.402873	-0.2799	-0.2310	-0.0275	-0.0760

   Coccinella undicimpunctata showed that no significant effect on the population density of this insect with relative humidity parameter and temperature parameter during 2012 and 2013 caught by sweep net during the first and the second planting dates, while the third planting date had significant effect on the population density of this insect with relative humidity. *Cydonia vicina isis* had no significant effect on population density of this insect with relative humidity parameter and temperature parameter during 2012 and 2013 caught by sweep net

   Cydonia vicina nilotica had no significant effect on population density on this insect with temperature parameter and relative humidity parameters during 2012 and 2013 three planting dates caught by sweep net.

Table(4): Simple correlation coefficients between the catch numbers of the main predatory insects inhabiting cowpea plants, and the temperature and relative humidity during the third planting date by sweep net

seasons / Weather Factors / Predatory insects	2012				2013			
	Tmax	T.min	Tvar	RH%var	T.max	Tmin	Tvar	RH%var
C.undcimpunctata	0.3665	0.1762	0.2543447	-0.257	0.21492	-0.0279	0.1444	0.6754*
C.vicinaisis	-0.1073	0.1134	-0.145470	0.1731	0.17005	-0.0360	0.1700	-0.232
C.vicinanilotica	-0.0140	0.31270	0.0328154	0.0487	0.17005	-0.0360	-0.2905	-0.232
Ch.carnea	-0.2825	0.0502	-0.08524	0.2057	0.24281	-0.2602	-0.3257	0.1163
M. corella	-0.4121	-0.3684	-0.136759	0.4357	0.27128	0.4941	0.18418	-0.4317
S.bioculata	0.4141	0.2848	0.29442	-0.362	0.327979	0.12197	0.09913	0.06371

   Chrysopela.carnea had no significant effect on population density of this insect with temperature parameter and relative humidity parameters during 2012and 2013 three planting dates caught by sweep net.

   Metasyphus corella had no significant effect on population density of this insect with temperature parameter and relative humidity parameters during 2012 and 2013 three planting dates caught by sweep net.

   Sphadromantis bioculata had no significant effect on population density of this insect with temperature parameter and relative humidity parameters during 2012 and 2013 three planting dates caught by sweep net.

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دراسـات ايكولوجيـة علـى اهـم المفترسـات الحشـرية الموجـودة علـى نبـات اللوبيـا بمنطقة المنصورة

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أجريت تجارب حقلية خلال موسمين متتالين ٢٠١٢ و٢٠١٣ فى مزرعة مركز التجارب والبحوث الزراعية ــ كلية الزراعة ـ جامعة المنصورة, اظهرت النتائج أن أهم المفترسـات الحشـرية المصاحبة للأفات الحشرية على نبـات اللوبيـا خلال موسمى الدراسـة كالتـالي أبـو العيـد ذو الأحـدى عشر نقطة , أبو العيد الأسود, أبو العيد السمنى ,أسد المن , ذبابـة السـرفس , فرس النبى الكبير ذو البقعتين . *Coccinella undecimpunctata L.* كان لـه ذروتين خلال ميعاد الزراعة الأول , وثلاثه خلال الميعاد الزراعى الثانى, اما اليعاد الثالث فكان لـه تـلاث ذروات فى موسم الدراسة الأول . بينما موسم الزراعة الثانى فكان له تلاته فى ميعاد الزراعة الأول , وواحد فى ميعاد الزراعة الثانى واثنين فى ميعاد الزراعة الثالث.

Cydonia vicina nilotica Muls فى موسم الزراعة الأول كـان لـه ذروتين خلال ميعاد الزراعة الأول وثلاث ذروات خلال الميعاد الزراعة الثانى والثالث. امـا فى موسم الزراعة الثانى فكان لة ثلاث ذروات فى ميعاد الزراعة الاول والثالث بينما كـان لـه أربعة قمم خلال ميعاد الزراعة الثانى.

Cydonia vicina isis Muls.. كـان لـه ذروتين خلال الميعـاد الزراعـة الأول والثانى بينمـا كـان لـه أربعة ذروات فى ميعاد الزراعة الثانى خلال الموسم الاول . بينمـا كـان فى الموسم الثانى كان لـه ثلاث ذروات خلال ميعاد الزراعة الأول والثالث وذروتين فى ميعاد الزراعة الثانى.

Chrysoperla carnea (Steph.) فى موسم الدراسة الأول كان لـه أربعة قمم فى ميعاد الزراعة الأول والثانى وثلاث قمم فى ميعاد الزراعة الثالث .وفى موسم الدراسة الثـانى كان لـه ثلاث قمم خلال التلات مواعيد للزراعة .

امـا*Metasyrphus corella* (.F)   فكـان لـه ذروتين خلال ميعـاد الزراعـة الأول والثانى اما الميعاد الثالث فكان له ثلاث ذروات فى ميعـاد الزراعة الثانى فى موسم الزراعـة الاول. اما الموسم الثانى فكان لـه ذروتين خلال ميعاد الزراعة الأول والثانى واربعة خلال الميعاد الثالث فى موسم الزراعة الثانى.

Sphodramantes bioculata (Burm). فكـان لـه ذروتين فى ميعـاد الزراعـة الأول , وثلاث ذروات فى ميعاد الزراعة الثانى والثالث فى موسم الدراسـة الاول . بينمـا فى موسـم الدراسـة الثـانى فكـان لـه ثـلاث ذروات فى ميعـاد الزراعـة الأولـو الثـانى ,وذروتين كـان فى ميعـاد الزراعة الثالث.

اكدت نتـائج التحليـل الاحصـائى أن معامـل الإرتبـاط بـين دراجـات الحـرارة والرطويـة والتعداد الأسبوعى للمفترسـات الحشرية كـان لـه تـأثير معنويـا امـا سـالباً أو موجيـاً علـى تعداد هذة الحشـرات, وأوضـحت النتـائج أن درجـات الحـرارة والرطوبـه كانـت لهـا تـأثير كبيـر علـى تعداد المفترسـات الحشـرية علـى نبـات اللوبيا .