Minia J. of Agric. Res. & Develop.
Vol. (٣٢) No. ٢ pp ٢٧٩-٢٩٦,
٢٠١٢

FACULTY OF AGRICULTURE

POPULATION FLUCTUATIONS OF CEREAL APHIDS AND THEIR ASSOCIATED HYMENOPTEROUS PARASITOIDS IN WHEAT FIELDS

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Received ١٢ April ٢٠١٢ Accepted ١٠ May ٢٠١٢

ABSTRACT

In Egypt, wheat is the most important crop for direct human consumption and for animal feed. The present work was carried out at Abnoub location, Assiut Governorate throughout two successive wheat growing seasons ٢٠١٠ and ٢٠١١. Survey studies of arthropod fauna in wheat fields revealed the presence of ٣٤ insect and mite species belonging to ١٧ families and ٩ orders as well as some unidentified species of true spiders belonged to order Araneida. The number of pests represented ١٣ species belonging to ٨ families and ٥ orders. Maximum numbers of aphids on wheat plants were recorded during the ٣rd week of January and February, respectively in two seasons. On other side, highest numbers of parasitoids (mummies on plants) were recorded during the end of March in ٢٠١٠ season, while in ٢٠١١ recorded during the ٢nd week of March. By using sweep-net method, results indicated that the dominant percentages of parasitoids was higher than those of aphids which represented ٦٥.٦٤ and ٦٠.٣٩ % during ٢٠١٠ and ٢٠١١ seasons, respectively. *Diaeretiella rapae* (McIntosh) was the most dominant and abundant primary parasitoid species represented ٤٠.١٦ and ٣١.٤٨ % during ٢٠١٠ and ٢٠١١, respectively. Maximum parasitism (٩٥.٧) was recorded during the ٢nd week of March in ٢٠١٠ season, while in ٢٠١١ recorded during the ٣rd week of March (٨٧.٧ %). Generally, hymenopterans

parasitoids may be play an important role in controlling the cereal aphids in wheat fields.

INTRODUCTION

Wheat, *Triticum aestivum* L. is one of the most important cereals in Egypt due to its vast areas, total production , and cash value. It is essential for human consumption and industrial purpose.

Cereal aphids are considered to be the most important and economic pests attacking wheat plants in Egypt as well as in several other countries in the world (Ghanim, ١٩٨٤; Ba- Angood, ١٩٨٥; Pons *et al.*, ١٩٨٩; El-Heneidy *et al.*, ١٩٩١; Abdel-Rahman, ١٩٩٧, ٢٠٠١ and ٢٠٠٥; Adly, ٢٠٠٢; Mahmoud, ٢٠٠٥ and Salem, ٢٠٠٧).

The potential role of the aphid parasitoid species as possible regulatory agents of wheat aphids and as an effective imperative in their suppression has been addressed by many investigators (Ibrahim, ١٩٩٠; Ibrahim and Afifi, ١٩٩١; Feng *et al.*, ١٩٩٢; Gabrys *et al.*, ١٩٩٨; Al-Dobai and Praslicka, ١٩٩٩; Abdel- Rahman *et al.*, ٢٠٠٠; El-Heneidy and Abdel-Samad, ٢٠٠١; Abdel-Samad and Gomaa, ٢٠٠٤; Abdel-Rahman, ٢٠٠٥ and Salem, ٢٠٠٧).

The present study aimed to survey the arthropod fauna in wheat plantations and evaluate the population density and fluctuations of the aphids and their associated parasitoid species as well as the effect of weather factors on their abundance.

MATERIALS AND METHODS

The present investigation was carried out at Abnoub location, Assiut Governorate, during two successive wheat growing seasons, ٢٠١٠ and ٢٠١١. An area of about half feddan was divided into ٨ plots of equal size (approximately ٢٥٠ $m^{٢}$) and cultivated with wheat variety Seds ١. Regular conventional agricultural practices were performed without using any insecticides during the study period. Samples were continued from the ١st week of January until the end of March for each growing season.

١- Survey of arthropod fauna inhabiting wheat plantations:

Sweeping net method has been used to study the faunistic composition of arthropod fauna inhabiting wheat plantations. Twenty five net strokes in ٨ replicates (٢٠٠ net strokes) were taken randomly

along a diagonal transect in the field at weekly intervals. Each collected sample was transferred to the laboratory for inspection and counting by using stereoscopic binocular microscope. Identification of unknown collected arthropods was made by specialists of Insect Classification Department, Plant Protection Research Institute, Agriculture Research Center.

Dominance (D) and abundance (A) degrees for the cereal aphid and parasitoid species were calculated according to Facylate (١٩٧١).

D = t / T. ١٠٠, where

t= Total number of each species during the collecting period**.**

T= Total number of all species collected during the collecting period.

A = n / N. ١٠٠, where

n = Total number of samples in which each species appeared.

N = Total number of samples taken all over the season.

٢- Population fluctuations of cereal aphids and their parasitoid species:

Direct count and sweep-net technique were used to study the population fluctuations of cereal aphids and their associated parasitoids.

٢-١- Direct count technique:

Weekly numbers of cereal aphids and their parasitoids (mummies) associated with wheat plantations (in the field) were estimated on ٢٥ wheat plants / replicate (No. of aphids and mummies / tiller) throughout the wheat growing season.

٢-٢- Sweep net technique:

Twenty five net strokes / replicate were used to determine the population fluctuations of aphids and their associated parasitoid species. Specimens were treated by the previously mentioned technique.

Samples were taken periodically at seven days intervals from the beginning of January until the end of March.

The meteorological data (temperature and relative humidity) were recorded at each inspection date. Records were obtained from the Central Laboratory for Agricultural Climate, ARC, MOA at Giza.

Field parasitism was calculated according to Feng *et al*., (١٩٩٢):

Field parasitism % = A / B+A. ١٠٠, where
A =Total number of aphid parasitoid (mummies). **B** =Total number of aphids.

RESULTS AND DISCUSSIONS

١-Survey of arthropod fauna in wheat fields:

Data in Table (١) showed a partial taxonomic list of arthropod fauna recovered from wheat plantations. Data revealed that the presence of ٣٤ insect and mite species belonging to ١٧ families and ٩ orders. Among these species, ١٣ pest species belonging to ٨ families and ٥ orders. On the other side, ١١ species were recorded as predators belonging to ٧ families and ٤ orders, as well as, ٩ species were recorded as parasitoids belonging to family Aphidiidae of order Hymenoptera. Only one species was recovered as a pollinator. True spiders were also estimated as unidentified species belonged to order Araneida.

The present results in Table (١) also indicated that the natural enemies group (predators and parasitoids) were recorded by using sweep-net technique except for the ladybird, *C. undecimpunctata* L. ,the hover fly, *S. corollae* F. and the pollinator, *A. mellifera* L. were recorded using both direct count and sweep-net together. In this approach, Salem (٢٠٠٧) recorded ٢٥ species belonging to ١٢ families and ٦ orders as well as some unidentified species of true spiders belonged to order Araneida. Amongst the identified species ٥ cereal aphids, ١٣ predators, ٤ primary parasitoids and ٣ secondary parasitoid species.

٢- Population fluctuations of cereal aphids and their associated parasitoids (mummies) on plants in relation to weather factors:

Data presented in Table (٢) showed that the population densities and fluctuations of aphids and their associated parasitoids (mummies) in relation to weather factors.

In ٢٠١٠ season, population of cereal aphids occurred throughout the period extended from the ١st week of January until the end of March. It started with low numbers of ٠.٤٨ aphids / tiller and

fluctuated to give two peaks, ١.٠٠ and ٨.٨٨ aphids / tiller by the ٣rd week of January and February , respectively.

Table ١: Partial list of arthropod fauna associated with wheat plantations in Assiut region during two successive seasons (٢٠١٠ and ٢٠١١).

Order	Family	Scientific name	Stage(s)	Remrkes	Methods of survey
Coleoptera	Coccinellidae	*Coccinella undecimpunctata* L.	E, L, P, A AA A	Predator	D , S
		Scymnus interruptus Goeze	A	Predator	S
		Scymnus syracus Mars.	A	Predator	S
		Scymnus pallipediformis Gün.	A	Predator	S
	Staphylinidae	*Paederus alfierii* koch	A	Predator	S
Diptera	Syrphidae	*Syrphus corollae* F.	A	Predator	D , S
Hemiptera	Anthocoridae	*Orius albidipennis* (Reuter)	N, A	Predator	S
		Orius laevigatus (F.)	N, A	Predator	S
	Lygeidae	*Geocoris pallidipennis* (Rossi)	A	Predator	S
	Miridae	*Creontides pallidus* Rambur	N, A	pest	S
		Campylomma impicta (Wan.)	N, A	Pest	S
	Nabidae	*Nabis viridis* Koch	A	Predator	S
	Pentatomidae	*Nezara viridula* L.	N, A	Pest	D , S
Homoptera	Aphididae	*Metopolophium dirhodum* (Walk.)	N, A	Pest	D , S
		Rhopalosiphum maidis (Fitch)	N, A	Pest	D , S
		Rhopalosiphum padi L.	N, A	Pest	D , S
		Schizaphis graminum (Rond.)	N, A	Pest	D , S
		Sitobiom avenae (Fab.)	N, A	Pest	D , S
	Aleyrodidae	*Bemesia tabaci* (Genn.)	A	Pest	D , S
	Jassidae	*Empoasca discipiens* Padi	A	Pest	D , S
Hymenoptera	Aphidiidae	*Alloxysta* sp.	A	Parasitoid	S
		Aphidius colemani Viereck	A	Parasitoid	S
		Aphidius matiricariae Haliday	A	Parasitoid	S
		Chalcids sp.	A	Parasitoid	S
		Dendrocerus sp.	A	Parasitoid	S
		Diaeretiella rapae (McIntosh)	A	Parasitoid	S
		Ephedrus plagiator (Ness)	A	Parasitoid	S
		Praon necans Mackauer	A	Parasitoid	S
		Trioxys sp.	A	Parasitoid	S
	Apidae	*Apis mellifera* L.	A	Pollinator	D , S
Neuroptera	Chrysopidae	*Chrysoperla carnea* Steph.	E, A	Predator	S
Orthoptera	Acrididae	*Eypreponemis aloans* (Charp.)	N, A	Pest	D , S
Thysanoptera	Thripidae	*Frankliniella tritici* (Fitch)	L, A	Pest	S
Acari	Tetranychidae	*Tetranychus* sp.	A	Pest	S
Araneida	families Various	Unidentified species	A	Predator	S

E = Egg **L =** Larvae **N =** Nymph **P =** Pupa **A =** Adul**t**
D = Direct count on plants. **S =** Sweep-net technique.

Table ٢: Weekly numbers of cereal aphids and their associated parasitoids (mummies) on wheat plants (by using direct count method) in relation to weather factors at Assiut region, ٢٠١٠ and ٢٠١١ seasons.

Date of inspection		No. of individuals / tiller									
		٢٠١٠					٢٠١١				
Month	Quarter	Aphids	Mummies	Parasitism (%)	·C	RH (%)	Aphids	Mummies	Parasitism (%)	·C	RH (%)
January	١	٠.٤٨	٠.٠٠	٠	١٣.٧	٤٨	٠.٣٦	٠.٠٠	٠	١٨.٠	٥٤
	٢	٠.٢٨	٠.٠٠	٠	١٦.١	٤٧	١.١٦	٠.٠٠	٠	١٧.٤	٥٧
	٣	١.٠٠	٠.٠٠	٠	١٤.٦	٤٤	١.٠٤	٠.٠٠	٠	١٧.٦	٦٣
	٤	٠.٣٢	٠.١٢	٢٧.٢٧	١٢.٤	٥٣	٠.٠٨	٠.٠٠	٠	١٨.٤	٥١
February	١	١.٠٨	٠.٤٨	٣٠.٧٧	١١.٥	٤٥	٠.٥٢	٠.١٦	٢٣.٥٣	٢١.٦	٥٤
	٢	٣.١٢	١.١٢	٢٦.٤٢	١٥.٥	٤٠	١.٨٨	٠.٢٤	١١.٣٢	١٣.٩	٤٨
	٣	٨.٨٨	١.٤٨	١٤.٢٨	٢٠.٣	٤٤	١.٤٠	٠.٤٤	٢٣.٩١	١٧.٣	٣٩
	٤	٠.٧٠	٠.٨٤	٥٢.٥٠	١٦.١	٤٣	١.٣٦	٠.٥٢	٢٧.٦٦	١٦.٧	٤٢
March	١	٠.٦٠	١.٣٦	٦٩.٣٩	١٧.٤	٤٣	٢.٨٨	٠.٨٨	٢٣.٨٨	١٩.٣	٤٨
	٢	٠.٣٢	٠.١٦	٣٣.٣٣	٢٤.١	٤٥	٠.١٢	١.٦٨	٩٣.٣٣	١٤.٨	٤٢
	٣	٠.١٢	٠.٠٨	٤٠.٠٠	١٦.٤	٤٦	٠.٢٠	٠.٤٠	٦٦.٦٧	٢٠.٥	٤٧
	٤	٠.٠٤	٠.٤٠	٩٠.٩١	١٥.٧	٥١	٠.٥٢	٠.٢٤	٣١.٥٨	١٦.٦	٤٧
Total		١٧.٠٠	٦.٠٤	-	-	-	١١.٥٢	٤.٥٦	-	-	-

After the ٢nd peak, the number of aphids then showed a sharp decrease and approximately vanished from the field during the end of March. On the other side, mortality caused by endogenous parasitoids (mummies) was detected ٣ weeks after the ١st observation of aphids in

the study area. The mummies were recorded throughout the period extended from the ٤th week of January until the end of March. Its numbers were fluctuated to give two main peaks , ١.٤٨ and ١.٣٦ mummies / tiller on the ٣rd week of February and the ١st week of March , respectively . Percentage of parasitism throughout this season ranged from ٢٧.٢٧ % correlated with ٠.٣٢ aphids / tiller during the ٤th week of January to attain maximum parasitism (٩٠.٩١٪) coincided with a very low density of aphids (٠.٠٤ aphids / tiller) during the end of March .

In ٢٠١١ season, the population densities of cereal aphids showed approximately the same trend as the ٢٠١٠ season. The population of aphids appeared with relatively low level of ٠.٣٦ aphid / tiller in the ١st week of January and fluctuated to give three main peaks , ١.١٦ , ١.٨٨ , and ٢.٨٨ aphids / tiller in the ٢nd , ٢nd and the ١st week of January, February and March, respectively. Cereal aphid mummies were appeared on ٤th week later from the aphids. Numbers of mummies increased from the ١st week of February until given the main one peak, ١.٦٨ mummies / tiller on the ٢nd week of March, then the numbers decreased until the end of March. The percentage of parasitism was fluctuated from ١١.٣٢ % to ٩٣.٣٣ % from the ١st week of February to the ٤th week of March. Maximum parasitism (٩٣.٣٣ %) was recorded during the second week of March correlated with ٠.١٢ aphids /tiller and later than one week from the peak of aphids. The present results are in accordance with those results reported by Al-Dobai and Praslicka (١٩٩٩) who found that parasitism of cereal aphids peaked at about ٧-١٠ days after the peak in aphid population density. Cai *et. al.* (٢٠٠٩) stated that the density peak of parasitoid populations was ٩-١٢ days came behind the density peak of the aphid populations.

The present results in Table (٢) also indicated that the numbers of aphids were higher in the first season (٢٠١٠) (١٧.٠٠ aphids / tiller) than that of the second season (٢٠١١) (١١.٥٢ aphids / tiller). The differences in levels of infesting between the two seasons might be attributed to the differences in weather factors (temperature and relative humidity) and / or to the effect of the common parasitoids. The general average of temperature ranged from ١١.٥ ˚C to ٢٤.١ ˚C

and from ١٣.٩ ˚C to ٢١.٦ ˚C and for average of relative humidity ranged from ٤٠.٠٠ to ٥٣.٠٠ % and from ٣٩ to ٦٣ % during the ١st and the ٢nd seasons, respectively. On the other side, the total numbers of mummies were ٦.٠٤ mummies / litter during ٢٠١٠ season, while was ٤.٥٦ mummies / tiller during ٢٠١١ season.

٣- Relative abundance of the different cereal aphid parasitoids in wheat fields:

By using sweep-net method, data presented in Tables (٣ and ٤) showed the numbers of cereal aphid complex, parasitoid species, percentage of parasitism, dominance and abundance degrees throughout wheat growing seasons ٢٠١٠ and ٢٠١١.

In ٢٠١٠ season, Table (٣) showed that the cereal aphid parasitoids were observed during the ١st week of January in relatively higher percentage of parasitism during the ١st and the ٢nd week of January (٥٠ % parasitism). Higher percentage of parasitism in this time from the season attributed to incidence the cereal aphids by a few numbers (٤ aphids / ٢٥ net strokes). After that, percentage of parasitism was fluctuated and ranged from ١٢.٥ to ٩٥.٧ % throughout the whole season. Maximum percentage of parasitism (٩٥.٧ % parasitism) was recorded during the ٢nd week of March correlated with a few numbers of aphid (١٤ aphids / ٢٥ net strokes) and later than the peak of aphids by three weeks. Similar results were obtained by Feng *et. al.* (١٩٩٢); Gabrys *et. al*. (١٩٩٨); Al-Dobai and Praslicka (١٩٩٩) and Salem (٢٠٠٧). They reported that the highest percentage of parasitism coincided with the collapse in aphid populations. Abdel-Rahman (٢٠٠٥) found that the maximum parasitism was recorded during the ٢nd week of March and there was a marked increase in number of mummified aphids at start of aphid decline. The recent results also indicated that from a total of ١٢٤٠ parasitoid species were collected from wheat fields, there were ٧٨٧ and ٤٣٥ parasitoids represented ٦٣.٤٧ and ٣٦.٥٣ % of the total parasitoid for the primary and secondary parasitoids, respectively.

Table (٣) also indicated that, *D. rapae* followed by *A. colemani* and *P. necans* were the most dominant and abundant primary parasitoid species represented ٤٠.١٦ and ١٠٠.٠٠ %, ٥.٨٩ and ٧٥.٠٠

%, and ٥.٥٦ and ٨٣.٣٣, respectively. Meanwhile, *A. matricariae* and *E. plagiator* were moderately occur and represented ٤.٦٠ and ٥٨.٣٣ %, and ٤.٣٥ and ٥٨.٣٣ % for dominance and abundance, respectively. The parasitoid, *Trioxys* sp. was less dominant and abundant which represented ٢.٩٠ and ٥٠.٠٠ %, respectively. *D. rapae* seem to be the most important primary parasitoid species as biological control agent due to their highest value of dominance and abundance degrees followed by *A. colemani* and *P. necans*.

Concerning the secondary parasitoid species, data showed that the ١st observation of these parasitoids were recorded during the ٢nd week of February and continued until the end of the season. The secondary parasitoid, *Alloxysta* sp. was the most dominant species represented ١٧.٩٠ %, followed by *Dendrocerus* sp. and *Chalcids* sp. represented ١٠.٥٦ and ٨.٠٦ %, respectively. These species considered delay agent to biological control due to these species parasitized on the primary parasitoids which seem to be the most important parasitoid species as biological control agent.

In ٢٠١١ season, Table (٤) showed that population trends and rate of parasitism were nearly similar to those observed in ٢٠١٠ season. Primary parasitoids were recorded in wheat fields during the ١st week of January at low level of ٢ mummies / ٢٥ net strokes correlated with a few numbers of aphids (٨ aphids / ٢٥ net strokes). Its numbers increased to reach their peak during the ٢nd week of March by ١١٧ mummies / ٢٥ net strokes correlated with ٨٤ aphids / ٢٥ net strokes , then decreased to attain the lowest levels during the ٤th week of March (٢٥ mummies / ٢٥ net strokes) correlated with ١٣ aphids / ٢٥ net strokes . Among the recorded primary parasitoids genera , the highest dominant and abundant (٣١.٤٨ and ١٠٠.٠٠ % , respectively) was recorded for *D. rapae* , followed by *A. matricariae* (٧.٥٦ and ٥٨.٣٣ %) , *P. necans* (٧.١٤ and ٧٥.٠٠ %) , *A. colemani* (٦.٥١ and ٦٦.٦٦ %) . Lowest dominance and abundance reached ٤.٥١ and ٤١.٦٦ % and ٣.١٥ and ٤١.٦٦ % for both *E. plagiator* and *Trioxys* sp. respectively.

As shown in Table (٤), only *Alloxysta* sp., *Chalcids* sp. and *Dendrocerus* sp. were recorded from the collected samples during ٢٠١١ season. Hyper- parasitoid, *Alloxysta* sp. was the most dominant

and abundant species (٢١.٩٣ and ٦٦.٦٦ %, respectively), followed by *Chalcids* sp. (٩.٦٥ and ٥٨.٣٣ %) and *Dendrocerus* sp. (٨.٠٨ and ٦٦.٦٦ %). Data also indicated that from a total of ٩٥٣ parasitoid species collected from wheat fields, there were ٥٧٥ and ٣٧٨ parasitoids represented ٦٠.٣٤ and ٣٩.٦٦ % of the total parasitoids for the primary and secondary parasitoids , respectively . Maximum parasitism in this season was recorded during the ٣rd week of March (٨٧.٧ %) which recorded after two weeks from the peak of aphids. Alichi *et. al*. (٢٠٠٨) found that peak populations of the aphid parasitoids occurred after the peak of aphid populations by ١-٣ weeks.

The obtained results revealed that generally, regardless of the seasons, there were six species of the primary parasitoid species attacking cereal aphids in wheat fields namely *D. rapae* , *A. colimani* , *P. necans* , *A. matricariae* , *E. plagiator* and *Ttioxys* sp. as well as three species of the secondary parasitoids , *Alloxysta* sp. ,*Chalcids* sp. and *Dendrocerus* sp. The results also clearly indicated that *D. rapae* was the most dominant and abundant primary parasitoid species and may play an important role in controlling the cereal aphids in wheat fields. On the other side, *A. colimani*, *A. matricariae* and *P. necans* which had low dominance and abundance degrees indicated that these species could be of economic importance, if the environmental conditions changed in their favor. Parasitoid species mentioned above recorded on wheat in different parts of the country by several authors (Ibrahim , ١٩٩٠ ; El-Serafy , ١٩٩٩ ; Abdel-Rahman *et. al.*, ٢٠٠٠ ; El-Fatih , ٢٠٠٠ and ٢٠٠٦ ; Ali *et. al*. ٢٠٠١ ; El-Heneidy *et. al*. ٢٠٠١ and ٢٠٠٢ ; Abdel-Samad and Gomaa , ٢٠٠٤ ; Abdel-Rahman , ٢٠٠٥) . In addition, Abou-Attia *et. al.*, (٢٠٠٣); El-Hussieni *et. al.*, (٢٠٠٣) and Salem, (٢٠٠٧) reported that *D. rapae* was the most occurring parasitoid species on cereal aphids.

Generally, we can say that the complex of the different parasitoid species together play an important role in regulating the numbers of cereal aphids in wheat fields.

Table ٣: Seasonal occurrence of cereal aphids and their associated parasitoids recovered from wheat plants (by using sweep net technique) at Assiut region, ٢٠١٠ season.

Month / quarter / Species	No. of individuals / ٢٥ net strokes												Total	Dominance (%)	Abundance (%)
	January				February				March						
	١	٢	٣	٤	١	٢	٣	٤	١	٢	٣	٤			
Pests Total aphids	٤	١٢	٤٩	٢٩	٣٩	١٧١	٢٠٠	٥٣	٣٧	١٤	٢١	٢٠	٦٤٩	٣٤.٣٦	-
Primary parasitoids *D. rapae*	٣	٤	٥	٦	١٢	٣٨	٦٦	٩٢	١١٤	١٢٦	٢٣	٩	٤٩٨	٤٠.١٦	١٠٠.٠٠
A. colemani	٠	١	١	١	٢	١٦	٢٣	١٦	٩	٤	٠	٠	٧٣	٥.٨٩	٧٥.٠٠
P. necans	١	١	١	٣	٤	١٢	٢٥	١٤	٦	٢	٠	٠	٦٩	٥.٥٦	٨٣.٣٣
A. matiricariae	٠	٠	٠	٠	٠	٣	٩	٧	١٠	١٨	٧	٣	٥٧	٤.٦٠	٥٨.٣٣
E. plagiator	٠	٠	٠	٠	٠	٢	٨	٨	٧	١٦	١١	٢	٥٤	٤.٣٥	٥٨.٣٣
Ttioxys sp.	٠	٠	٠	٠	٠	٠	٤	٣	٤	٧	١٤	٤	٣٦	٢.٩٠	٥٠.٠٠
Total	٤	٦	٧	١٠	١٨	٧١	١٣٥	١٤٠	١٥٠	١٧٣	٥٥	١٨	٧٨٧	٦٣.٤٧	-
Secondary parasitoids *Alloxysta* sp.	٠	٠	٠	٠	٠	٤	١٦	٣٧	٥٢	٧٥	٢٦	١٢	٢٢٢	١٧.٩٠	٥٨.٣٣
Chalcids sp.	٠	٠	٠	٠	٠	٣	٨	١٤	٢٣	٣٢	١٤	٦	١٠٠	٨.٠٦	٥٨٣٣
Dendrocerus sp.	٠	٠	٠	٠	٠	٤	١٠	٢١	٣٣	٣٠	٢٣	١٠	١٣١	١٠.٥٦	٥٨.٣٣
Total	٠	٠	٠	٠	٠	١١	٣٤	٧٢	١٠٨	١٣٧	٦٣	٢٨	٤٥٣	٣٦.٥٣	-
Grand total	٤	٦	٧	١٠	١٨	٨٢	١٦٩	٢١٢	٢٥٨	٣١٠	١١٨	٤٦	١٢٤٠	-	-
Parasitism (%)	٥٠.٠	٥٠.٠	١٢.٥	٢٥.٦	٣١.٦	٢٩.١	٤٩.٧	٨٠.٠	٨٧.٥	٩٥.٧	٨٤.٩	٦٩.٧	٦٥.٦	٦٥.٦٤	-
Relative incidence of parasitoids to aphids	١:١	١:٢	١:٧	١:٢.٩	١:٢.٢	١:٢.٤	١:١	١:٠.٣	١:٠.١	١:٠.١	١:٠.٢	١:٠.٤	١:٠.٥	-	-

Table ٤: Seasonal occurrence of cereal aphids and their associated parasitoids recovered from wheat plants (by using sweep net technique) at Assiut region, ٢٠١١ season.

Month / quarter / Species	No. of individuals / ٢٥ net strokes												Total	Dominance (%)	Abundance (%)
	January				February				March						
	١	٢	٣	٤	١	٢	٣	٤	١	٢	٣	٤			
Pests Total aphids	٨	٢٧	٦٩	٢٩	٥٨	٦٢	١٠٠	١١٧	٤٠	٨٤	١٨	١٣	٦٢٥	٣٩.٦١	-
Primary parasitoids *D. rapae*	٢	٣	٣	٢	١١	٢٤	١٩	٤٧	٦٤	٨٢	٢٨	١٥	٣٠٠	٣١.٤٨	١٠٠.٠٠
A. colemani	٠	٠	٢	٣	٥	٩	٢٢	١٣	٦	٢	٠	٠	٦٢	٦.٥١	٦٦.٦٦
P. necans	٠	١	٤	٣	٥	١٢	١٨	١٥	٩	١	٠	٠	٦٨	٧.١٤	٧٥.٠٠
A. matiricariae	٠	٠	٠	٠	٠	٢	٨	٩	١٣	١٧	١٦	٧	٧٢	٧.٥٦	٥٨.٣٣
E. plagiator	٠	٠	٠	٠	٠	٥	٧	١٣	١٥	٣	٠	٠	٤٣	٤.٥١	٤١.٦٦
Ttioxys sp.	٠	٠	٠	٠	٠	٠	٠	٢	٧	١٢	٦	٣	٣٠	٣.١٥	٤١.٦٦
Total	٢	٤	٩	٨	٢١	٥٢	٧٤	٩٩	١١٤	١١٧	٥٠	٢٥	٥٧٥	٦٠.٣٤	-
Secondary parasitoids *Alloxysta* sp.	٠	٠	٠	٠	١	٣	٩	٢٣	٤٦	٦٢	٤٤	٢١	٢٠٩	٢١.٩٣	٦٦.٦٦
Chalcids sp.	٠	٠	٠	٠	٠	١	٤	١٢	٢٠	٢٥	١٧	١٣	٩٢	٩.٦٥	٥٨.٣٣
Dendrocerus sp.	٠	٠	٠	٠	١	١	٥	١١	١٨	١٥	١٧	٩	٧٧	٨.٠٨	٦٦.٦٦
Total	٠	٠	٠	٠	٢	٥	١٨	٤٦	٨٤	١٠٢	٧٨	٤٣	٣٧٨	٣٩.٦٦	-
Grand total	٢	٤	٩	٨	٢٣	٥٧	٩٢	١٤٥	١٩٨	٢١٩	١٢٨	٦٨	٩٥٣	-	-
Parasitism (%)	٥٠.٠	٥٠.٠	٥٠.٠	٥٠.٠	٢٨.٤	٣٢.٨	٤٧.٩	٧٠.١	٨٣.٢	٧٢.٣	٨٧.٧	٨٣.٩	٦٠.٤	٦٠.٣٩	-
Incidence of parasitoids to aphids	١:٤	١:٦.٨	١:٧.٧	١:٣.٦	١:٢.٥	١:٢.١	١:١	١:٠.٤	١:٠.٢	١:٠.٤	١:٠.١	١:٠.٢	١:٠.٧	-	-

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تذبذبات مجاميع حشرات المن و الطفيليات المصاحبة لها فى حقول القمح

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تم تنفيذ هذه الدراسة في منطقة أبنوب بمحافظة أسيوط خلال موسمين متتاليين ٢٠١٠ ، ٢٠١١ بهدف عمل حصر لمفصليات الأرجل المتواجدة على نباتات القمح لمعرفة التغير الذى قد يحدث فى مجاميع الحشرات الموجودة فعليا ، ودراسة الكثافة العددية لكل من حشرات المن و الطفيليات المصاحبة لها و تأثر هذه الحشرات بالظروف الجوية المحيطة من حرارة و رطوبة.

و فيما يلى أهم النتائج المتحصل عليها :

أظهرت نتائج الحصر وجود ٣٤ نوعا من الحشرات والاكاروسات التي تتبع ١٧ عائلة و ٩ رتب ، بالإضافة الي بعض الانواع غير المعرفة من العناكب الحقيقية. وقد وجد من بين هذة الانواع ١٢ نوع من الافات الحشرية الضارة لنباتات القمح والتابعة لـ ٧ عائلات و٤ رتب حشرية. وكانت أهم هذة الافات الحشرية هي المن مصاحبا لها بعض الطفيليات .

أوضحت نتائج العد المباشر علي نباتات القمح في الحقل أن اعلي تعداد لحشرات المن سجل خلال الفترة من الاسبوع الثالث من يناير ممتدا حتى الاسبوع الثالث من فبراير خلال موسمي الدراسة. كذلك وجد أن اعلي تعداد للطفيليات المصاحبة لحشرات المن (مومياوات) سجل في نهاية شهر مارس ٢٠١٠. بينما في موسم ٢٠١١ سجل خلال الاسبوع الثاني من مارس.

وبدراسة الكثافة العددية للمن وأنواع الطفيليات المصاحبة لها باستخدام شبكة جمع الحشرات وجد أن نسبة التطفل كانت عالية جدا على المن حيث بلغت ٦٥.٦٤ ،و ٦٠.٣٩ % خلال موسمي الدراسة على التوالي. وقد سجل الطفيل (*Diaeretiella rapa*e) McIntosh أعلى نسبة تطفل على المن حيث بلغت ٤٠.١٦ ،و ٣١.٤٨ % خلال

موسمي ٢٠١٠ ، ٢٠١١على التوالى. كذلك وجد أن أعلى نسبة تطفل سجلت خلال الاسبوع الثاني من مارس ٢٠١٠ حيث بلغت نسبة التطفل في هذة الفترة ٩٥.٧%. بينما سجلت أعلى نسبة تطفل في موسم ٢٠١١ خلال الاسبوع الثالث من مارس حيث بلغت ٨٧.٧ %. عموما لوحظ أن الطفيليات المصاحبة للمن تلعب دورا هاما في خفض نسبة الاصابة علي محصول القمح.