

FIELD STUDIES ON THE INSECT SPECIES ON TWO FORAGE CROPS, THE EGYPTIAN CLOVER IN EGYPT AND ALFALFA IN LIBYA

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Abstract

Results indicated that the Egyptian clover harbored 13, 8 and 6 species of pests, beneficial and visitor insects, belong to 22 families and 8 orders at Kafr El-Sheikh, Egypt. Alfalfa was found to harbor 14, 11 and 5 species in 26 families belong to 11 orders. Diversity indices as measured for each species and summed in relation to crop system were 2.28 and 3.10 for the clover and alfalfa at Kafr El-Sheikh and Sebha, respectively. The relative abundance of species in each crop system had an effect on diversity index values. In clover, *Hypera brunneipennis* (Boh.), *Paederus alferii* (Koch.) and *Apis mellifera* L. were the dominant species at Kafr El-Sheikh. Each insect population represented by 80.90, 85.32 and 65.62% of pests, beneficial and visitor insects, respectively. In alfalfa, aphids (different species) and *Coccinella* spp. accounted for 48.56 and 80.82% for pests and beneficial species, respectively, at Sebha. It could be stated that each crop has dominant and subdominant species which differently affected population diversity.

INTRODUCTION

The Egyptian clover, *Trifolium alexandrinum* L. and alfalfa, *Medicago sativa* L. are cultivating in Egypt and Libya, as green forage crops, respectively for feeding farm animals and provide hay and silage as well as grazing pasture in many temperate and tropical countries in Africa and Asia. Clover plants are characterized by affording a good habitat for arthropod fauna. The total number of pest species, predators and parasitoids, differ among crops and proportions of species also varied (El-Hawary *et al.*, 1995). The relationship between species diversity and ecological processes can change quantitatively and qualitatively with environmental context (Cardinale & Nelson, 1999). Survey of insect pests, beneficial and visitor insects associated with clover and alfalfa were reported by Mohamed and Ismail, 1974, Abdel-Fattah and El-Saadany, 1978, El-Hawary *et al.*, 1995, El-Dakhkhni *et al.*, 1995 and El-Mezayyen, 1998.

The present investigation aims to survey insect pests, beneficial and visitor insects on two crop systems at Kafr El-Sheikh, Egypt and Sebha, Libya. Insect species di-

versity as related to crop agroecosystems was also considered throughout the present investigation.

MATERIALS AND METHODS

The study was conducted at two locations, the first one was done at Sakha Agricultural Experimental Station, Kafr El-Sheikh, Egypt. The second experimental Farm at the Faculty of Agriculture, Sebha, Libya. Experiments were started Nov. 1998 and extended to June, 2000. An area of one feddan was cultivated with clover, *T. alexandrinum* L. on October, 5th, 1999 in Kafr El-Sheikh. In Sebha, *M. sativa* L. was cultivated since 1996. Normal agricultural practices were done with no pesticidal treatments throughout both growing seasons at the two locations of study. Clover was cultivated adjacent clover and faba bean at Kafr EL-Sheikh, while of Sebha, it was beside alfalfa field and certain wild weeds in desert.

Weekly samples were collected randomly at 11 a.m. Each sample was represented by 50 pendular sweeps. Collected insect were exposed to chloroform on spot, examined, counted and recorded. Most identifications were done by the staff of the Classification Research Department, Plant Protection Research Institute, Agricultural Research Center, Ministry of Agriculture, Egypt.

Shannon-Weaner diversity index (S.W.I.) was used to measure diversity of arthropod pest species as it is the one most commonly used (Price, 1984). The index was calculated for species and families in each crop system. The Shannon-Weaner index according to the following equation:

$$H_s = \sum_{i=1}^S P_i \log_e P_i$$

Where:

H_s = The symbol for the amount of diversity in a group of S species; in this case the category of classification used in the species (hence the subscript S) but other categories could be used as well it may be applicable to families, orders, etc.

S = Number of species within sample.

P_i = The proportion of the i^{th} species in the total sample, it measures the relative abundance and ranges between 0.00 to 1.00.

\log_e = Natural logarithm, the negative sign is added to make the come out positive value = 2.718.

This function was derived independently by Shannon and Weaver and is sometimes mislabeled as the Shannon-Weaver function in the ecological literature (Krebs, 1978).

RESULTS AND DISCUSSION

I. Survey of insect species in the two tested crops

I.1. Insect pests: Results in Tables 1 & 2 revealed the presence of 13 species of insect pest species in 9 families and 5 orders from the Egyptian clover in Kafr El-Sheikh, compared with 14 insect pests in 10 families and 5 orders from alfalfa in Sebha, Libya. In Egypt, Coleoptera was the most dominant order included Curculionidae, Bruchidae and Scarabaeidae families. Curculionidae was represented by *Hypera brunneipennis* (Boh.) and *Sitona lividipes* (Fab.), showing 80.90 and 8.20% as total, respectively. Bruchids was represented by only *Bruchidius trifolii* (Mats) and accounted for 0.16% as total. The least recorded coleopterous family was Scarabaeidae, represented by *Tropinota squalida* (Scope.) and comprised 0.02% as total.

Homoptera was the second order represented by the family Aphididae which included aphids (different species) only (5.36% as total). Cicadellidae was the second one and represented by leafhoppers (different species) (4.63% as total).

Hemiptera was represented by Pentatomidae and included *Carpocoris* spp. and the green stink bug; *Nezara viridula* (L.) composing 0.03 and 0.45% of the total insect pests, respectively. Order Lepidoptera was the fourth and represented by two families, Lycanidae [*Cosmolyce baeticus* (L.) reaching 0.05%] and Noctuidae (*Autographa* spp. 0.17%). The two army worms; the cotton leaf worm, *Spodoptera littoralis* (Boisd.) 0.01% and the lesser cotton leaf worm, *S. exigua* (Hb.) 0.01% as total.

Order Orthoptera was the least abundant as *Thisocetrus littoralis* (Ramb.) composed 0.01% of the total insect pests.

At Sebha region, data in Table 2 indicated that Homoptera was dominant represented by two families, Aphididae which included different aphid species (48.56% as total). *Empoasca* sp. belongs to leafhoppers were found in 6.00% as total.

Table 1. Total numbers of insect pests, beneficial and visitor insects sampled from the Egyptian clover during 1999/2000 season at Kafr El-Sheikh, Egypt.

Order	Family	% group	Species	Total No.	% group
I. Insect pests					
Coleoptera	Curculionidae	89.10	<i>Hypera brunneipennis</i> (Boh.)	7772	80.90
			<i>Sitona lividipes</i> (Fab.)	788	8.20
	Bruchidae	0.16	<i>Bruchidius trifolii</i> (Mats)	15	0.16
	Scarabaeidae	0.02	<i>Tropinota squalida</i> (Scop.)	2	0.02
Hemiptera	Pentatomidae	0.48	<i>Carpocoris</i> spp.	3	0.03
			<i>Nezara viridula</i> (L.)	43	0.45
Homoptera	Aphididae	5.36	Aphids (different species)	515	5.36
	Cicadellidae	4.63	<i>Empoasca</i> spp.	445	4.63
Lepidoptera	Lycanidae	0.05	<i>Cosmolyce baeticus</i> (L.)	5	0.05
	Noctuidae	0.19	<i>Autographa</i> spp.	16	0.17
			<i>Spodoptera littoralis</i> (Boisd.)	1	0.01
			<i>S. exigua</i> (Hb.)	1	0.01
Orthoptera	Acrididae	0.01	<i>Thisocetrus littoralis</i> (Ramb.)	1	0.01
Total pests		100		9607	100
II. Beneficial insects					
Coleoptera	Coccinellidae	3.75	<i>Coccinella undecimpunctata</i> (R.)	44	3.59
			<i>Scymnus syriacus</i> (Mars)	2	0.16
	Staphylinidae	85.32	<i>Paederus alfieri</i> (Koch.)	1046	85.32
Diptera	Syrphidae	0.33	<i>Metasyrphus corollae</i> (F.)	4	0.33
Hemiptera	Anthocoridae	3.18	<i>Orius</i> spp.	39	3.18
Hymenoptera	Braconidae	0.24	<i>Chelonus oculatus</i> (Pz)	3	0.24
Neuroptera	Chrysopidae	2.86	<i>Chrysoperla carnea</i> (Steph.)	35	2.86
Odonata	Aeschnidae	0.08	<i>Hemianex ephippiger</i> (Selys)	1	0.08
True spiders		4.24		52	4.24
Total beneficials		100		1226	100
III. visitor insects					
Coleoptera	Anthicidae	6.25	<i>Anthicus crinitus</i> (Laf.)	2	6.25
	Chrysomelidae	3.13	<i>Cassida vittata</i> (Vill)	1	3.13
Hemiptera	Coreidae	3.13	<i>Coriomeris affinis</i> (Herrich & Schaeffer) var. <i>aegyptius</i> (K. Schmidt)	1	3.13
Hymenoptera	Andrenidae	9.37	<i>Andrena</i> spp.	3	9.37
	Apidae	65.62	<i>Apis mellifera</i> (L.)	21	65.62
Orthoptera	Tettigonidae	12.50	<i>Conocephalus mandibularis</i>	4	12.50
Total visitors		100		32	100

Table 2. Total numbers of insect pests, beneficial and visitor insects sampled from alfalfa plants during 1998/99 season at Sebha, Libya.

Order	Family	% group	Species	Total No.	% group
I. Insect pests					
Coleoptera	Curculionidae	28.39	<i>Hypera brunneipennis</i> (Boh.)	196	20.29
			<i>Sitona lividipes</i> (Fab.)	78	8.10
Hemiptera	Pentatomidae	5.07	<i>Eurydema festivum</i> (L.)	5	0.52
			<i>Nezara viridula</i> (L.)	44	4.55
Homoptera	Aphididae	48.56	Aphids (different species)	469	48.56
	Cicadellidae	6.00	<i>Empoasca</i> spp.	58	6.00
Lepidoptera	Agrotidae	0.10	<i>Earias insulana</i> (Bois.)	1	0.10
	Lycanidae	0.10	<i>Cosmolyce baeticus</i> (L.)	1	0.10
	Pieridae	0.10	<i>Pieris rapae</i> (L.)	1	0.10
	Noctuidae	11.39	<i>Autographa</i> spp.	98	10.15
			<i>Spodoptera exigua</i> (Hb.)	5	0.52
			<i>S. littoralis</i> (Boisd.)	7	0.72
	Nymphalidae	0.21	<i>Vanessa cardui</i> (L.)	2	0.21
Orthoptera	Acrididae	0.10	<i>Aiolopus strepens</i> (Latr)	1	0.10
Total pests		100		966	100
II. Beneficial insects					
Coleoptera	Cicindelidae	0.06	<i>Cicindela</i> sp.	1	0.06
	Coccinellidae	81.06	<i>Coccinella</i> spp.	1340	80.82
			<i>Scymnus</i> spp.	4	0.24
Dictyoptera	Mantidae	0.06	<i>Mantis religiosa</i> (L.)	1	0.06
Diptera	Syrphidae	0.84	<i>Metasyrphus corollae</i> (F.)	14	0.84
Hemiptera	Anthocoridae	2.90	<i>Orius</i> spp.	48	2.90
	Reduviidae	0.66	<i>Oncocephalus</i> spp.	11	0.66
Hymenoptera	Braconidae	3.31	<i>Apanteles</i> sp.	10	0.60
				45	2.71
	Ichneumonidae	0.48		8	0.48
	Vespidae	0.06	<i>Polistes gallica</i> (L.)	1	0.06
Neuroptera	Chrysopidae	7.60	<i>Chrysoperla carnea</i> (Steph.)	126	7.60
Odonata	Coenagrionidae	0.12	<i>Ischnura senegalensis</i> (Ramb.)	2	0.12
True spiders				47	2.84
Total beneficials		100		1658	100
III. visitor insects					
Coleoptera	Calliphoridae	31.03	<i>Chrysomia</i> spp.	18	31.03
	Tabaenidae	24.14	<i>Tabanus taeniola</i> (Pal. B)	14	24.14
Hymenoptera	Halictidae	18.97	<i>Halictus</i> sp.	11	18.97
	Xylocopidae	1.72	<i>Xylocopa aestuans</i> L.	1	1.72
Orthoptera	Tettigionidae	24.14	<i>Conocephalus</i> sp.	14	24.14
Total visitors		100		58	100
Total				2682	

Only one coleopterous family was recorded being Curculionidae, in two species of weevils; *H. brunneipennis* (Boh.) and *S. lividipes* (Fab.) as 20.29 and 8.10% of the total insect pests, respectively. Lepidoptera ranked the third with five families, i.e. Noctuidae, Nymphalidae, Agrotidae, Lycanidae and Pieridae. Three species belonging to Noctuidae were recorded; *Autographa* spp., *S. littoralis* (Boisd.) and *S. exigua* (Hb.) reaching 10.15%, 0.72 and 0.52% as total. The other four families was represented by one species each, being *Vanessa cardui* (L.), *Earias insulana* (Bois.), *C. baeticus* (L.) and *P. rapae* (L.) as 0.21, 0.10, 0.10 and 0.10% of the total insect pests in the same order, respectively.

Hemiptera ranked the fourth in one only, family Pentatomidae, represented by *N. viridula* (L.) and *Eurydema festivum* (L.); 4.55 and 0.52% of the total.

Orthoptera was the least counted order in one family only being Acrididae, *Aiolopus strepens* (Latr.) (0.10% as total).

It is noticeable that pests were higher in Kafr El-Sheikh than Sebha composing 88.42% of the total catch, compared with pests 36.02% at Sebha. Several investigators recorded many insect pests associated with clover and alfalfa plants, Mohamed and Ismail (1974) recorded thirteen insect pest species at Giza Governorate. Abdel-Fattah and El-Saadany (1978) recorded twenty one insect pests at Shebin El-Kom, Menoufia Governorate. Boraie *et al.* (1993) recorded 28 insect pests in clover fields at four locations; Sakha, Sidi-Salem, Disouk and Biala at Kafr El-Sheikh, while El-Hawary *et al.* (1995) recorded 24 insect pest species on clover plants at the same governorate. Variation in the recorded insect pests among investigators may be due to location differences and annual weather fluctuations and probably some unknown factors.

1.2. Beneficial insects: Data in Table 1 & 2 show the presence of 8 species of beneficial insects in 7 families and 6 orders at Kafr El-Sheikh, compared with 11 species of beneficial insects in 11 families and 7 orders at Sebha. At Kafr El-Sheikh, Coleoptera was the dominated, included two families; Staphylinidae and Coccinellidae. Staphylinidae is represented by *Paederus affierii* (Koch.) reached 85.32% of the total beneficial insects population. The least recorded dominant family was Coccinellidae, represented by the lady bird beetle; *Coccinella undecimpunctata* (R.) and *Scymnus syriacus* (Mars) in 3.59 and 0.16% as total, respectively.

Hemiptera was the second largest group and contained only one family, being Anthocoridae, represented by *Orius* spp. (3.18% as total). Order Neuroptera ranked the third and represented by family; Chrysopidae only represented *Chrysoperla carnea*

(Steph.) comprising 2.86% of the total beneficial insects. Diptera was represented by *Metasyrphus corollae* (F.) Syrphidae as 0.33 of the total.

Order Hymenoptera was represented by *Chelonus oculatus* (PZ) Braconidae (0.24%).

Order Odonata was the least recorded order represented by *Hemianex ephippiger* (Selys) (0.08%). True spiders comprised 4.24 and 2.83% in clover and alfalfa at Kafr El-Sheikh and Sebha, respectively.

In Sebha, Coleoptera was the largest group, represented by two families, Coccinellidae as *Coccinella* spp. which was considered as the most dominant species (80.82%) and *Scymnus* spp. (0.24%). Cicindellidae represented by *Cicindela* sp. reaching 0.06% as total. Order Neuroptera was the second group represented by Chrysopidae family as *C. carnea* (Steph.) composing 7.60% as total.

Order Hymenoptera ranked the third in three families. Braconidae was dominant as *Apanteles* sp. and another Unidentified species reaching 3.31% as total. Ichneumonidae represented an Unidentified species by 0.50%. Order Hemiptera was the fourth and included two families, Anthocoridae and Reduviidae predaceous bugs which represented by *Orius* spp. comprised 2.90% and *Oncocephalus* spp. reaching 0.66% as total, respectively. Diptera ranked the fifth, represented by Syrphidae which included *Metasyrphus corollae* (F.) species (0.84%).

Order Odonata and Dictyoptera were the least abundant and represented by Coenagrionidae which included *Ischnura senegalensis* (Ramb.) (0.12%) and Mantidae represented by *Mantis religiosa* (L.) (0.06%). Several investigators recorded many beneficial species associated with clover and alfalfa plants, i.e. Mohamed and Ismail (1974), Abdel-Fattah and El-Saadany (1978), Moursi and Youssef (1986), Boraie *et al.* (1993) and El-Dakhkhni *et al.* (1995). In the current study, the number of beneficial insects from the Egyptian clover and alfalfa plants were 8 and 11 species at Kafr El-Sheikh and Sebha, respectively. Differences may be due to variation in the agroecosystem in both localities, species composition, crop duration and toxic applications of pesticides (El-Mezayyen, 1998).

1.3. Visitor insects: Data in Table 1 & 2 revealed the presence of 6 species of visitor belonging to 6 families and 4 orders at Kafr El-Sheikh compared with 5 species of visitor insects in 5 families and 3 orders at Sebha. In Egypt, Hymenoptera was the major represented by two families, Apidae as *Apis mellifera* (L.) (65.62% as total).

Andrenidae was included, *Andrena* spp. only (9.37%). Orthoptera ranked second and represented by only one family being Tettigonidae in one species namely *Conocephalus mandibularis* (12.50%).

Coleoptera ranked the third including two families; Anthicidae and Chrysomelidae. Each family was represented by only one species *Anthicus crinitus* (Laf.) and *Cassida vittata* (Vill), respectively. They accounted for 6.25 and 3.13% of the total visitor insects.

Hemiptera was the minor order including only one family being Coreidae which represented by *Coriomeris affinis* var. *aegyptius* (K. Schmidt) (3.13%).

At Sebha, order Diptera was the dominant represented by two families being Caliphoridae and Tabanidae. Each family was represented by one species being *Chrysomya* spp. and *Tabanus taeniola* (Pal. B) composing 31.03 and 24.14% as total.

Orthoptera was the second and included one family, Tettigonidae represented by *Concephalus* sp. (24.14%).

Hymenoptera was the least recorded order represented by two families, Halictidae and Xylocopidae. Only one species was recorded of each family being *Halictus* sp. and *Xylocopa aestuans* L. They accounted for 18.97 and 1.72%, respectively. Mohamed and Ismail (1974) recorded 4 species of true insect pollinators in alfalfa and clover fields at Giza region, Egypt. Abdel-Fattah and El-Saadany (1978) recorded 18 species of true insect pollinators in clover fields at Shebin El-Kom district, Egypt.

II. Shannon-Weaner diversity index (S.W.) for species and families in the two tested crops

Data in Tables 3 & 4 presented the computed values of the Shannon-Weaner diversity indices in relation to crops in which samples were taken. The S.W. diversity index for pests, beneficial and visitors species in the sampled crops was the highest in alfalfa at Sebha, being 1.6641, 0.6129 and 0.8222, while in the Egyptian clover at Kafr El-Sheikh, it was the lowest, being 0.6154, 0.5152 and 1.1480, respectively. Similar trend was also noticed for families in alfalfa and clover, being 3.1145 and 2.1117, in Sebha and Kafr El-Sheikh, respectively. It was anticipated that crop duration in the field may affect species diversity. Values of S.W. support such suggestion. By far, alfalfa is a perennial crop which cultivated for several years comparing with the Egyptian clover cultivated for several months in the field. This may invalidate the hypothesis that crop system with longer duration may harbor larger number of species than crop systems

with relatively shorter duration (El-Hawary *et al.*, 1995). In another words, crop system renders the microhabitats for pest complex and their beneficial insects differentially (El-Dakhakhni *et al.*, 1995).

Table 3. Species of pests, beneficial and visitor insects in relation to clover and alfalfa at Kafr El-Sheikh and Sebha, respectively.

Crop	Pests species			Beneficial species			Visitor species			Total		
	Total No.	No.	S.W.	Total No.	No.	S.W.	Total No.	No.	S.W.	Total No.	No.	S.W.
The Egyptian clover	9607	13	0.6154	1226	8	0.5152	32	6	1.1480	10865	27	2.2786
Alfalfa	998	14	1.6641	1658	11	0.6129	26	5	0.8222	2682	30	3.0992

Table 4. Shannon-Weaner diversity index as computed from data related families in the Egyptian clover at Kafr El-Sheikh and alfalfa at Sebha, respectively.

Crop	Families for							
	Pests		Beneficials		Visitors		Total	
	Number	S.W.	Number	S.W.	Number	S.W.	Number	S.W.
The Egyptian clover	9	0.4551	7	0.5086	6	1.1480	22	2.1117
Alfalfa	10	1.4436	11	0.7021	5	0.9688	26	3.1145

Similar results were obtained by El-Dakhakhni *et al.* (1995) who reported that clover had the highest number of beneficial insect species, 22, while cotton and soybean had the lowest count, 12, for each one. The S.W. for natural enemy species in the sampled crops was the highest in clover, being 2.52, while in maize it was the lowest being 1.81. As for cotton and soybean, it was 2.08 and 2.41, respectively. On the other hand, El-Hawary *et al.* (1995) indicated that clover harbored 24 species, but the diversity index of pest species in it was 1.4281. Similar trend was also noticed for families in cotton and clover, being 1.4602 and 0.9372, respectively.

It could be concluded that Sebha is a vergin region and has not been affected yet by insecticides in comparison to Kafr El-Sheikh. This procedure help in arthropods species establishment, consequently increasing species diversity.

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Year	1957		1958		1959		1960	
	Area (ha)	Yield (kg/ha)	Area (ha)	Yield (kg/ha)	Area (ha)	Yield (kg/ha)	Area (ha)	Yield (kg/ha)
1957	100	1000	100	1000	100	1000	100	1000
1958	100	1000	100	1000	100	1000	100	1000
1959	100	1000	100	1000	100	1000	100	1000
1960	100	1000	100	1000	100	1000	100	1000

Year	1957		1958		1959		1960	
	Area (ha)	Yield (kg/ha)	Area (ha)	Yield (kg/ha)	Area (ha)	Yield (kg/ha)	Area (ha)	Yield (kg/ha)
1957	100	1000	100	1000	100	1000	100	1000
1958	100	1000	100	1000	100	1000	100	1000
1959	100	1000	100	1000	100	1000	100	1000
1960	100	1000	100	1000	100	1000	100	1000

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دراسة حقلية عن الأنواع الحشرية التي تتواجد في البرسيم البلدى بمصر والبرسيم الحجازى بليبيا

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أجريت هذه الدراسة بمزرعة كلية الزراعة - جامعة سيها - ليبيا على البرسيم الحجازى خلال موسم ١٩٩٨/١٩٩٩م وكذلك فى مزرعة محطة البحوث الزراعية بسخا - كفر الشيخ - جمهورية مصر العربية خلال موسم ١٩٩٩/٢٠٠٠م.

أوضحت الدراسة وجود عدد ١٣، ٨، ٦ نوعا من الآفات والحشرات النافعة والزائرات على التوالي فى حقول البرسيم البلدى فى كفر الشيخ بينما بلغ تعدادها ١٤، ١١، ٥ نوعا على التوالي فى حقول البرسيم الحجازى فى سيها.

كانت قيم دلائل التنوع ٢,٢٨ و ٢,١٠ بالنسبة للبرسيم البلدى والبرسيم الحجازى فى كفر

الشيخ وسيها على التوالي.

اتفقت قيم دليل التنوع مع الأعداد فى كل محصول فى منطقتى الدراسة حيث يبدو أن أعداد الأنواع لها تأثير كبير على قيم دليل التنوع. يبدو أيضا أن بعض الأنواع الحشرية ذات سيادة أكثر من غيرها فى كل محصول حيث بلغت سيادة ثلاثة أنواع فى البرسيم البلدى ٨٥,٣٢ و ٨٠,٩٠ و ٦٢,٦٥٪ وهى الحشرة الروافة وسوسة ورق البرسيم ونحل العسل على الترتيب من جملة الأنواع المتحصل عليها بالنسبة للآفات والحشرات النافعة والزائرات فى كفر الشيخ، بينما فى سيها بلغت سيادة نوعين فى البرسيم الحجازى ٨٠,٨٢ و ٤٨,٥٦٪ وهما خنفساء أبو العيد وحشرة المن على الترتيب من جملة الأنواع المتحصل عليها بالنسبة للآفات والحشرات النافعة.

أوضحت الدراسة أن تعداد الآفات كان الأكثر فى كفر الشيخ وشكل نسبة أكبر ٨٨,٤٢٪ مقارنة بسيها حيث بلغت ٢٦,٠٢٪، بينما حدث العكس بالنسبة للمفترسات حيث كان تعدادها الأكثر فى سيها وبلغت نسبتها ٦١,٨٢٪ مقارنة بكفر الشيخ حيث بلغت ١١,٢٨٪ من جملة الأعداد، وربما يشير ذلك إلى أهميه عدم الإفراط فى استخدام المبيدات كما هو الحال فى جمهورية مصر العربية مقارنة بليبيا.