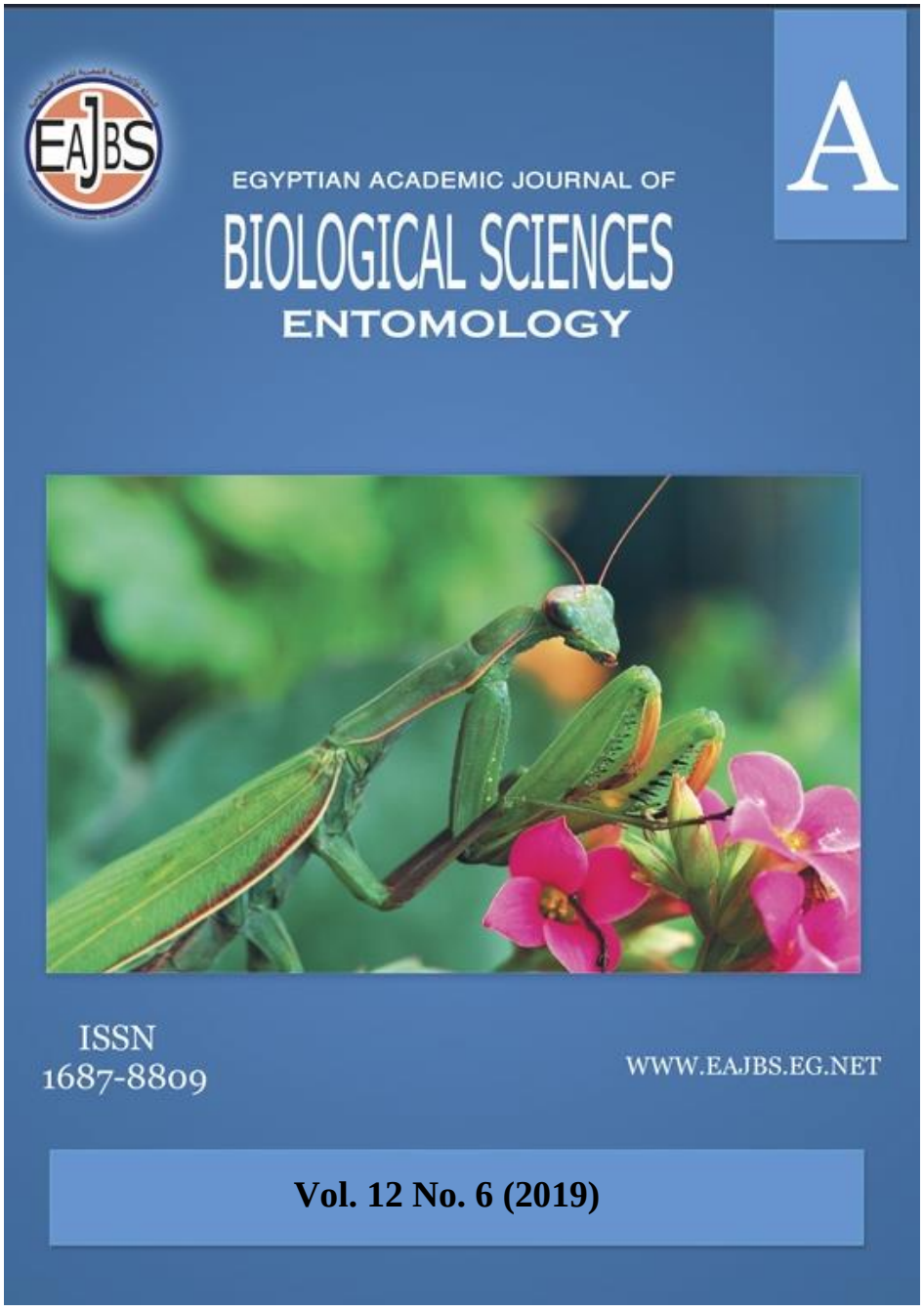


Egyptian Academic Journal of Biological Sciences is the official English language journal of the Egyptian Society for Biological Sciences, Department of Entomology, Faculty of Sciences Ain Shams University.

Entomology Journal publishes original research papers and reviews from any entomological discipline or from directly allied fields in ecology, behavioral biology, physiology, biochemistry, development, genetics, systematics, morphology, evolution, control of insects, arachnids, and general entomology.

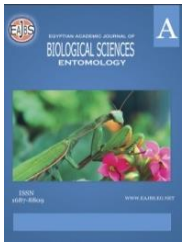
www.eajbs.eg.net

Citation: *Egypt. Acad. J. Biolog. Sci. (A. Entomology) Vol. 12(6) pp: 53-64(2019)*

Egypt. Acad. J. Biolog. Sci., 12(6):53-64 (2019)

Egyptian Academic Journal of Biological Sciences
A. Entomology

ISSN 1687- 8809
http://eajbsa.journals.ekb.eg/



Richness and Fluctuation of *Chrysoperla carnea* and *Coccinella septempunctata* on Alfalfa, *Medicago sativa* L. in Baharyia and Farafra Oases -Western Desert, Egypt.

Usama M. Abu El-Ghiet[1&2]

1. Plant Protection Department, Desert Research Center, Mataria, Cairo, Egypt.
2. Biology Department. Faculty of science , Jazan University, K. S. A.

Email: usama778@yahoo.com

ARTICLE INFO

Article History
Received:1/11/2019
Accepted:2/12/2019

Keywords:
Natural enemies, predator insects, species richness, distribution, fluctuation.

ABSTRACT

The population dynamics and distribution of *Chrysoperla carnea* and *Coccinella septempunctata* collected monthly from eight alfalfa (*Medicago sativa* L.) fields in two oases of Western Desert, Egypt was studied during two successive years. *Chrysoperla carnea* was collected by a net and represented 5652 individuals including 3021 and 2631 from Farafra and Baharyia Oases respectively. In Farafra Oasis in Shimenara location was richer than the other site and recorded 35.91% of collected individuals and the Grad was found to be a poor location and represented by 13.7 %. Baharyia Oasis site Kasaa 3 was high in richness and contained 32.12% of collected individuals, Al-Gafara location was the poor location and represented 14.63 %. The fluctuation of *C. carnea* was amplified in autumn, spring and sharply declined during winter and summer. A total number of 3672 *C. septempunctata* was collected, including 1986 from Farafra Oasis and 1686 from Baharyia Oasis and represented by 54.1% and 45.9%, respectively. The insect population showed a clear variation in number in both the locations, we found that the count increased in the second year representing 64% of the total insects collected. At the same time, in the first year Farafra Oasis was richer while Bahariya Oasis increased slightly in the second year. The increase of *C. septempunctata* in autumn was repeated in spring and sharply decreased during winter and summer months. The maximum numbers were collected in the months of February, March, and April and the highest count of both the years (2013 and 2014) was in March.

INTRODUCTION

The Egyptian Western Desert is divided in two regions The northern section includes the coastal plain, the northern plateau, and the Great Depletion, Natroun Valley, Baharyia Oasis and Siwa Oasis in the extreme west, and the southern section that includes Farafra, Dakhla, Kharga and Baris oases, in addition to Owainat in the extreme south-west. Oases have vigorous vegetation by desert standards which mainly depend on local groundwater where it receives less than 2 mm/year of rainfall (Kröpelin 2006).

Alfalfa *Medicago sativa* Linnaeus is often called “Queen of the Forages”, is one of the most important legumes used in agriculture. It is widely grown throughout the world as a feed for all classes of livestock, and is most often harvested as hay and also grazed, made into silage or food for cattle and camel. It has the highest feeding value of all common hay crops, being less frequently used as pasture. It is well known for its ability to improve soil structure,

and as a legume, as an effective source of biological nitrogen (Hanson & Barnes 1988; Parker & Parker 2003). Alfalfa is a high-quality forage and green manure crop; varieties are available and are being bred that are well-adapted to reclaimed agricultural lands in Egypt. Currently there are 80-120 hectares of alfalfa plantation in Egypt and hectarage is rising each year (Shebl *et al.* 2008). Alfalfa is harvested 9-11 times a year in most of Egypt, every 35-40 days. It may be fed on-farm to livestock, or sold on the market. In Alfarfra oasis, a large percentage of the alfalfa is sold on the market, whereas in Bahariya regions, most are used on-farm.

Studying entomo-fauna of alfalfa is important for developing integrated pest management programs for alfalfa and neighboring places. Alfalfa is a source of incredible insect diversity, which includes many valuable 'beneficial' insects (Abu EL-Ghiet *et al.* 2014; Gadallah *et al*. 2015). These, in turn, help control many other types of insect and mite pests in alfalfa and other crops. Researchers from California have identified over 1000 arthropod species (insects, spiders, mites, and other relatives) that inhabit alfalfa fields. A small percentage (less than 1%) of these arthropods inflicts damage to alfalfa and causes concern to alfalfa growers (Flanders & Radcliffe 2000). Several of these insects act as predators and parasites. Alfalfa fields are known as insectaries because of the high number of beneficial insects residing within them. It has a long stand life, approaching five years or sometimes longer in some areas of the world, that afford ample time for the establishment and development of a diverse community structure by an abundance of organisms. While most of alfalfa's inhabitants have little or no impact on it as a crop, a few are capable of causing extensive damage. These pests are attacked by many natural enemies including predators and parasites.

The ladybird beetle (*Coccinella septempunctata* L.) Coleoptera: Coccinellidae) is an important polyphagous coccinellid species associated with alfalfa throughout the world. It feeds on diverse pest species including aphids, thrips, whiteflies, mites and lepidopteran eggs (Omkar 2004). Although the predator originated in Japan, Korea, Formosa, China and other parts of Asia (Chapin 1965) due to high efficiency, it has been imported to many other countries of the world like France, USA, Greece, Egypt and Syria (Abdel-Salam *et al*. 1997) Also in Algeria, Morocco and Libya.

The study of two foremost predators is of significance for the assessment of diversity in a given area because of their role in the regulation of insect population. One of the most supportive insects also happens to be one of the friendliest-looking: the ladybird beetle. *C. septempunctata* possesses one of the more appealing appearances in the insect world. Within the colonies of such plant-eating pests, they will lay hundreds of eggs, and when these hatches, the larvae will commence feeding immediately (Abassi, *et al*. 2001; Peterson *et al*. 2005; Riddick *et al*. 2009).

Green lacewing, *Chrysoperla carnea* (Stephens) commonly known as "aphid lion" is predominately important and widely distributed in other parts of the world (Geetha & Swamiappan 1998). It is considered a prominent general predator that feeds on a variety of insect pests of field crops, fruit orchards, and vegetables. Because of its voracious feeding on soft-bodied insects like aphids, caterpillars, leafhoppers, psyllids, mealybugs, whiteflies, thrips, insect eggs, spiders and mites, it is considered as an important component of IPM program (Rashid *et al.* 2012).

The sweep net method is suitable for sampling the population of predators on alfalfa than direct count method is well established. Alfalfa is a perennial crop and good source of biocontrol agents; therefore, it can be grown in strips near major field crops and can be exploited for the control of pests through predatios (Rab Dino *et al.* 2002).

Efficient sampling methods are necessary for making an accurate and timely evaluation of the insect population levels. For the production of high yielding, high-quality alfalfa, the

crop should be checked at intervals. Therefore, it is very important to check the insect fauna of an alfalfa agroecosytem for improving IPM programs and for improving the Alfalfa cultivation in Egypt. Additionally, because of the change in nature of the oases with the advent of cultivation and irrigation, resulting in the replacement of their natural habitats with crops and their associated flora. No such studies were done previously in Baharyia and Farafra Oases, Western Desert so the present work aimed to record the richness, distribution, and fluctuation of *Chrysoperla carnea* and *Coccinella septempunctata* on alfalfa in Baharyia and Farafra.

MATERIALS AND METHODS

Study Area:

Field studies were conducted in 8 sites of both Bahariah and Farafrah oases, Western Desert (Table 1):

a.Baharyia Oasis: An oval-shaped depression in the western desert, 360 km southwest of Cairo and 180 km west of the Nile Valley (27°48′00″ and 28°35′00″ N 28°35′00″ and 29°10′00″ E). Agriculture is concentrated in the northern part of the depression where the main villages and former springs are located.

b.Farafra Oasis: A triangular-shaped depression in the western desert, about 550 km southwest of Cairo, 200 km southwest of Baharyia Oasis (26°18′00″ and 27°20′ 00″N, 27°20′00″ and 28°59′00″E).

The total area of cultivated Alfalfa in the New Valley is more than 50,000 feddan, of which 12,000 feddan was cultivated in Farafra oasis (unpublished data).

Collection and Identification:

Coccinella septempunctata (Fam. Coccinellidae) and *Chrysoperla carnea* (Fam. Chrysopidae) were regularly collected every month during the period from October 2012 to September 2014 around alfalfa fields from eight sites in both Baharia and Farafra oases (Western Desert). The collection was done using sweep net. During each trip, 25 double beats were carried out. The samples were put in plastic bags containing killing material for 1 h then the collected samples were transported to the laboratory in paper bags for spreading, drying examination and identification.

Table 1. The position and description of the location studied alfalfa (*Medicago sativa* L.) during the period from October 2012 to September 2014.

	Site name	Latitude (N)	Longitude (E)	Description
Location	AL-Quser- Beir abo eagela	28°20´881″	28°47´227″	Healthy plants 2 years old, Adjacent to palm trees
	Kasaa 3	28°25´891″	28°57´202″	Healthy plants 3 years old, Adjacent to palm trees
	Mandisha- Ghaba	28°21´ 909″	28°55´063″	Healthy plants 3 years old, Adjacent to palm trees
	Al-Gafara	28°18´073″	28°56´212″	Healthy plants 3 years old, Adjacent to palm trees
Farafra Oasis	Gelgam	27°05´444″	27°58´830″	Unhealthy plants 3 years old, Adjacent to different fruit trees.
	Beir 5	27°03´814″	27°55´470″	Healthy plants 4 years old, Adjacent to annual plants
	Grad	27°03´160″	27°58´078″	Healthy plants 3 years old, Adjacent to palm trees
	Shimenara	27°01´378″	27°56´642″	Unhealthy plants 4 years old, Adjacent to different fruit trees.

RESULTS

Distribution and Fluctuation of *Chrysoperla carnea* :

Adult green lacewings are pale green with long antennae and glossy, golden, compound eyes. They have a delicate appearance and are from 12 to 20 mm long with large, membranous, pale green wings that they fold tent-wise above their abdomens.

During two successive years, the adults and larvae were collected by the net in the morning. In the first year the total number of *C. carnea* was collected by net represented 3052 individuals, including 1702 from Farafra Oasis and represented by 56% and 1350 specimens were collected from Baharyia Oasis and represented by 44 %. In the second year during the period from October 2013 to September 2014, the total number of *C. carnea* collected was 2600 individuals, including 1319 from Farafra Oasis that represented 51% and Baharyia Oasis 1281 that represented 49 %.

As shown in Table 2 and Fig. 1, difference in number of C. *carnea* collected from two studied oases in the first year showed more variation than the second year, with a fewer specimens.

Table 2. A total number of *C. carnea* was collected from 8 sites of both Bahariah and Farafrah oases (Western Desert) during the period from October 2012 to September 2014.

Site	Farafra Oasis								Baharyia Oases							
	Gelgam		Beir 5		Grad		Shimenara		AL-Quser		Mandisha		Al-Gafara		kasaa 3	
Month	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year
October	70	72	43	45	41	45	70	77	98	106	75	80	39	43	120	155
November	122	34	75	68	44	24	28	126	48	82	80	50	45	25	50	135
December	54	31	94	18	23	15	34	164	25	90	60	23	53	20	15	34
January	0	2	16	17	7	36	36	39	51	30	46	14	23	4	36	30
February	7	58	40	30	35	22	12	2	33	13	15	36	13	5	15	28
March	46	23	75	44	29	25	46	5	50	26	7	40	43	30	33	75
April	128	115	12	4	23	3	301	105	134	9	9	10	15	12	63	7
May	1	0	0	2	1	0	5	9	1	0	1	0	1	2	1	0
June	16	0	2	2	0	0	9	0	0	0	1	0	0	1	0	0
July	23	2	0	0	12	0	4	2	1	0	1	0	2	0	0	0
August	60	0	10	2	0	0	3	1	1	4	1	0	1	0	18	2
September	27	25	2	5	14	15	2	5	2	25	10	13	3	5	11	17
Total	554	362	369	237	229	185	550	535	444	385	306	266	238	147	362	483

The Richness of *Chrysoperla carnea*:

Gelgam and Shimenara of the station of Farafra a showed higher number and represented by 554 and 550 individuals; respectively in the first year. So these two locations richer than other sites and recorded about 66% of collected individuals and the Grad location is a poor location and represented by 229 individuals; 14% approximately. In the subsequent year, the same trend was observed. Gard location was poor and was represented by 185 individuals; around 14%. In the interim, Shimenara location was high in richness.

In Baharyia Oasis there was low variation between the study sites as in the first year. Where the places were taken over by 32%, 23%, 17%, 28% in sites AL-Quser- Beir Abo Eagela, Mandisha- Ghaba, Al-Gafara and Kasaa 3; respectively. In the second year, a clear variation between locations was observed. Al-Gafara location was the lowest and represented by 147 individuals; around 12%. In the intervening time, kasaa 3 location was highly rich and represented by 483 individuals; 38% of the total insect in the Baharyia Oases site.

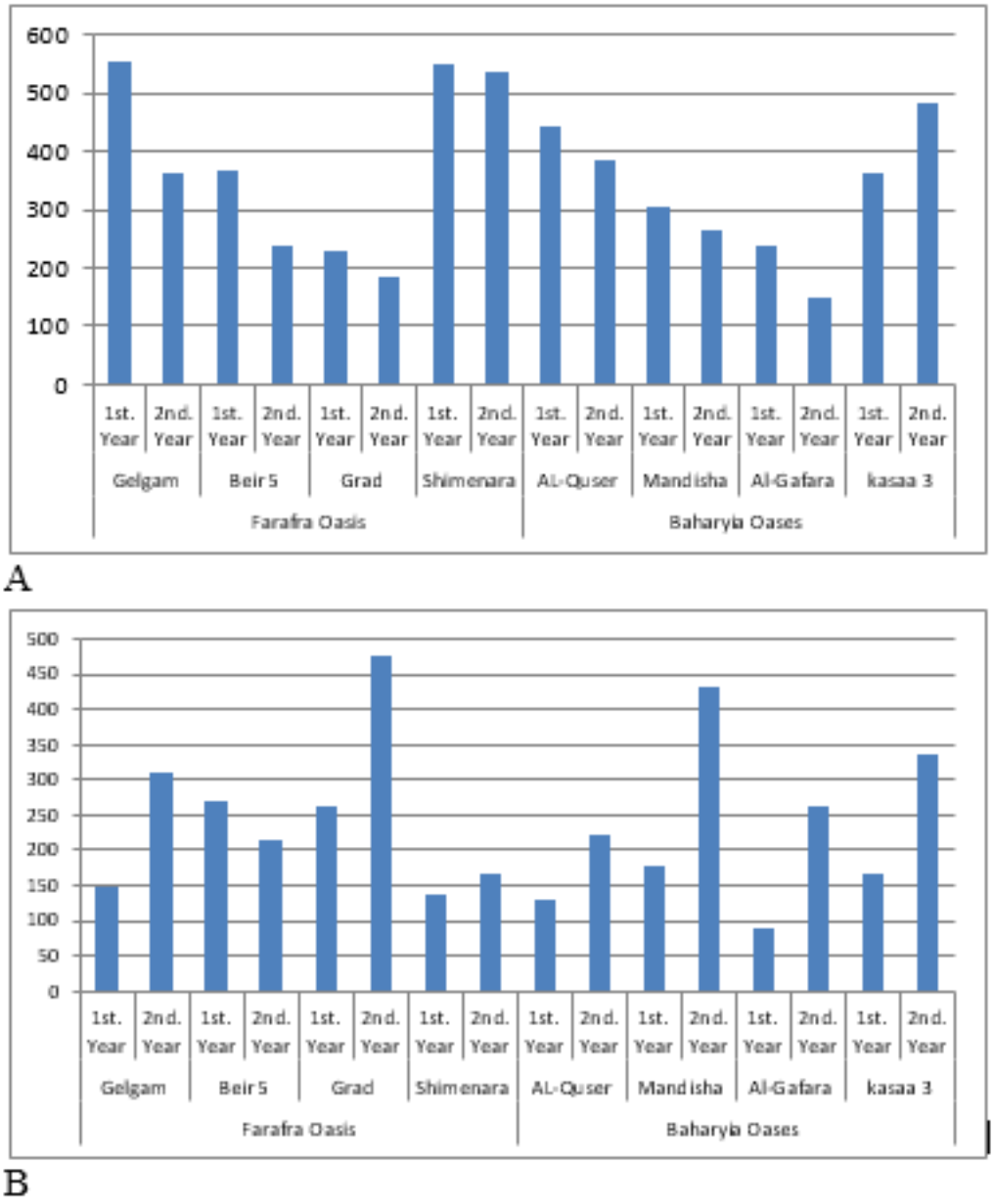


Fig.1. Distribution of insects collected by net during two successive years 2012-2014
A- *Chrysoperla carnea*; B- *Coccinella septempunctata*

Fluctuation of *Chrysoperla carnea:*

In general view, during the first year, the total number of *C. carnea* collected by net was higher in autumn and spring and sharply decreased during winter and summer. The highest number of *C. carnea* was caught in October and November and started to decrease in December subsequently with a sharp drop off in January and February associated with low temperature both the studied locations. Improved weather conditions with high temperatures in the spring months resulted in increase in the sps. The collected numbers started to rise up to the second peak in April and then decreased in numbers with the scorching summer in the studied oases.

As shown in Fig. 2, two peaks were detected, the highest in April and represented by 464 and 221 for Farafra and Baharyia Oases, respectively. The second one was detected in

November and October and represented by 269 and 332 for Farafra and Baharyia Oases, respectively.

The fluctuation of *C. carnea* during the second year was observed, the same trend was observed with decrease in the number of total collected insects. The highest number was recorded in autumn and spring; in October (represented by 239 and 384 individuals) and March (represented by 268 and 171 individuals) for Farafra and Baharyia Oases, respectively. Finally, of the *C. carnea* was collected during two successive years, very clear decline was observed in the second year in Bahariya Oasis areas than areas of Farafra in the summer months.

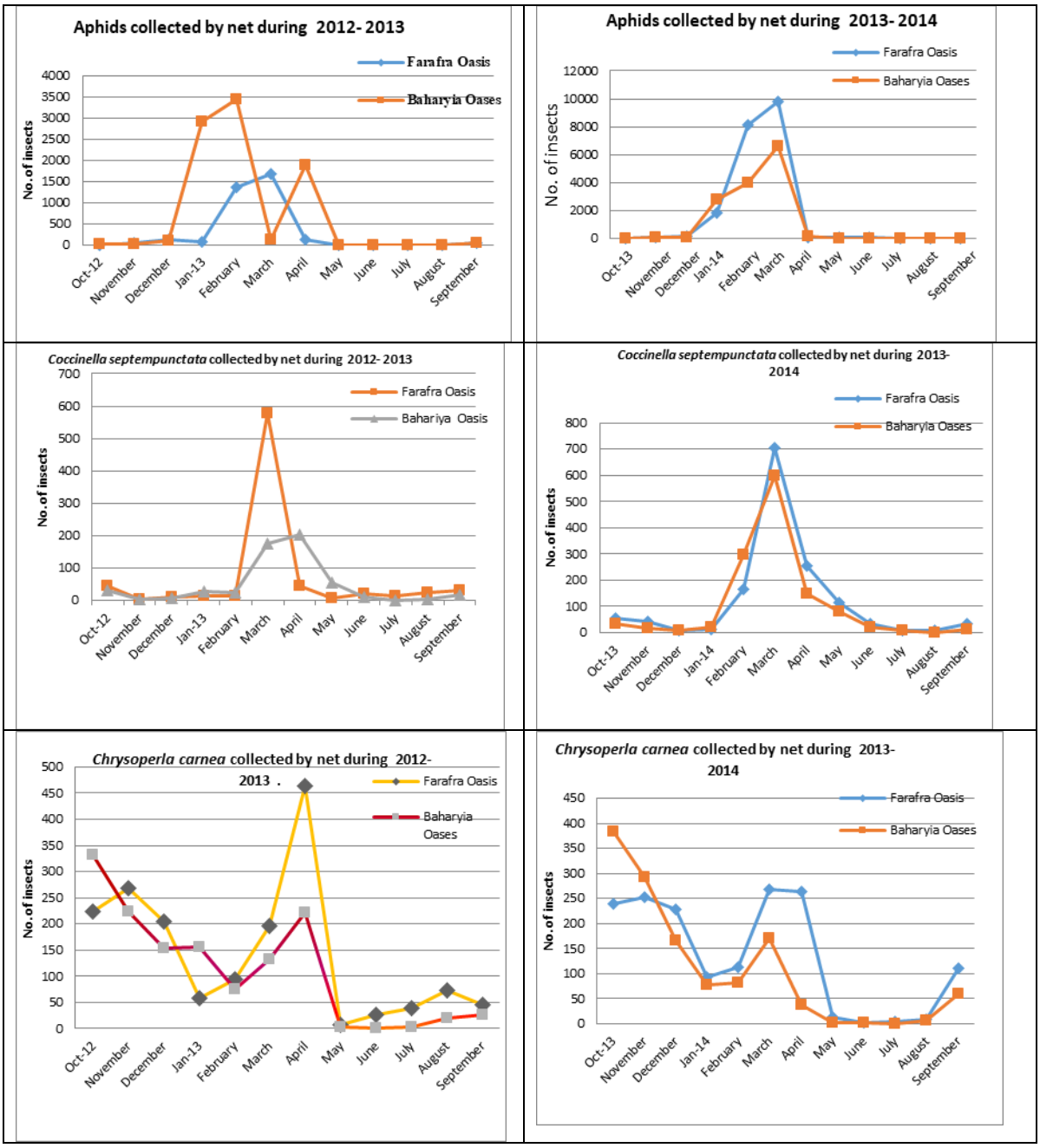


Fig.2. The fluctuation of *C. septempunctata*, *C. carnea* and aphids collected from Bahariah and Farafrah oases during the period from October 2012 to September 2014

Distribution and Fluctuation of *Coccinella septempunctata* (Table 3) :

Distribution of *Coccinella septempunctata* :

During two years of observation, the adult and larvae of *C. septempunctata* were collected by net in the morning. The total number of 1383 individuals of *C. septempunctata* was collected during the period from October 2012 to September 2013, including 816 from Farafra Oasis which represented 59% and 567 from Baharyia Oasis which represented 41%. Meanwhile, *C. septempunctata* collected in the second year amounted to 2420 individuals, including 1170 from Farafra Oasis which represented by 49% and Baharyia Oasis 1250 which represented 51%.

The distribution of the insect showed a clear difference in both the Oases as well as the number of individuals. We found the second year to have more individuals and represented 64% of the total insects collected. At the same time, the first year Farafra Oasis was richer while in the second year the number in Bahariya Oasis increased slightly.

Table 3. A total number of *C. septempunctata* collected from 8 sites of both Bahariah and Farafrah oases (Western Desert) during the period from October 2012 to September 2014.

Site	Farafra oasis								Baharyia oases							
	Gelgam		Beir 5		Grad		Shimenara		AL-Quser		Mandisha		Al-Gafara		kasaa 3	
Month	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year
October	13	15	14	18	8	8	12	14	8	9	18	20	4	5	0	0
November	3	1	2	22	0	5	0	16	1	1	1	10	0	2	2	5
December	0	0	6	3	3	4	3	2	3	1	0	6	3	1	2	0
January	2	0	12	5	1	6	0	1	14	10	4	3	0	5	11	3
February	1	50	2	16	9	66	4	32	4	34	12	68	10	22	0	174
March	114	220	201	90	186	350	75	44	10	142	103	250	40	121	23	86
April	4	16	11	35	19	13	11	40	85	11	14	37	7	60	97	41
May	0	3	1	15	2	5	5	11	3	11	20	28	2	17	32	23
June	3	2	4	3	4	6	11	2	2	0	4	5	5	13	0	3
July	2	1	5	1	4	1	3	0	1	2	0	2	1	2	0	1
August	5	1	4	1	10	3	5	1	0	1	1	0	3	1	0	0
September	1	2	9	7	15	9	7	4	0	0	1	1	15	12	1	1
Total	148	311	271	216	261	476	136	167	131	222	178	430	90	261	168	337

The Richness of *Coccinella septempunctata*:

During the first year, as shown in Fig. 1-B, the highest numbers collected from Farafra were caught from Beir 5 and Grad which was represented by 271 and 261 individuals, respectively. So that these two locations were richer than other sites and included about 65% of collected individuals, on the other hand, the Shimenara location was a weak location and represented by 136 individuals; 17% approximately.

The same trend was observed in the second year also. Gard location was the rich location and represented by 476 individuals, around 41%. In the meantime, Shimenara location was poorly represented by 167 individuals and represented only14%.

The total collected number of *C. septempunctata* in Bahariya Oasis was 567 individuals during the first year. Mandisha and Kasaa 3 contained the same average of collected insects and were represented by 30%. Al-Gafara has recorded the lowest richness value and represented by 16% of the total collected number**.** During the period from October 2013 to September 2014, total collected number in Bahariya Oasis was 1250 individuals. The numbers caught were more than double the collection in the first year. Mandisha- Ghaba location was the most in richness and abundance of the individuals' that contained 34% by 430 individual while AL-Quser- Beir Abo Eagela was a poor site, contained 18% with a count of 222 individuals.

The Fluctuation of *Coccinella septempunctata:*

As mentioned before, *C. septempunctata* collected during two successive years from Farafra area were clearly less in density than Bahariya Oasis area in 2012-2013, meanwhile in 2013-2014 Farafra areas are a close similarity to the Bahariya Oasis. The total number of *C. septempunctata* collected by net during the two successive years was higher in autumn and repeated in spring and sharply decreased during winter and summer months. As observed from the results, taking into account the doubling of the numbers collected in the second year at the time of study, being most numbers were collected in the months of February, March, and April and the highest point was in March of both the years. Data illustrated in Fig.2 showed that two peaks were detected, the main in March (576 individual for Farafra) and in April (203 individual for Baharyia Oases). The second one was smallest crest and detected in October and represented by 47 and 30 for Farafra and Baharyia Oases, respectively. The fluctuation of *C. septempunctata* during the second year was calculated and same trend observed with duplication in the number of collected insects. The highest number was recorded in March and represented by 704 and 599 individuals for Farafra and Baharyia Oases, respectively.

DISCUSSION

The results obtained indicate that the insect population is influenced by ambient air temperature, we can find a clear reduction in the numbers of obtained all insects studied during the late spring and summer months with very high temperatures until end of September. At the same time, months with the very low temperatures in the evening months of December and January and February also, a clear reduction in the number of insects was observed. When looking at the number of aphids that fed upon by the studied predators, the aphids represented only at the beginning of winter and started to increase significantly until it reaches the peak in February and March and subsequently completely decreased in April and disappeared in May. Data obtained indicate the correlation between the peak of the numbers of *C. septempunctata* and the collected aphid. The two insects were also identical in their absence during the summer months due to high temperatures. Dhaka *et al*. (2007) recorded a positive and significant effect of maximum and minimum temperature on spider and negative significant effect on population of chrysoperla and coccinellids and evening RH exerted positive significant effect on spider and significant negative effect on coccinellids. The results obtained are consistent with XIA *et al*. (1999) found temperature and food quantity are 2 major factors affecting in population dynamics of *C. septempunctata.* The foraging activities of the predators depended on environmental variables, including air temperature. Khan (2010) found a strong relationship between two important factors of functional response "instantaneous attack rate" (a′) and "prey handling time" (T_h) with respect to temperature changes. The temperature range for the foraging activities falls between 10ºC-40ºC. However, maximum predation rates were observed between 20-23 ºC and 23 ºC-25 ºC. Temperature is an important environmental factor that greatly affects the biological characteristics of aphidophagous coccinellids as well as the dynamics of predator-prey relationships (Obrycki & Tauber 1981; Michels & Behle 1991; Miller 1992).

According to the conditions of the study oases, the Alfalfa plant growth rate was faster in the summer than the winter and the plant seed formation which affects the freshness and vitality, spring and autumn produced new shoots at their best. Along with with the above an increase in the types and numbers of piercing sucking insects and different kinds of aphid was also observed. The presence of *C. carnea* in the fields was longer than predator *C. septempunctata* indicated their ability to adapt to the conditions of two study oases, explaining the increasing numbers of *C. septempunctata* in February to reach the maximum in March and then begins to decline in April and goes down very remainder of the year. In

the intervening time, Aphid lion was represented by two peaks in the autumn and spring and less in the winter and nearly disappears in the summer. The impact of temperature on biological and life table parameters of *C. carnea* (Stephens) fed on cabbage aphid, *Brevicoryne brassicae* L. showed that they can develop and reproduce at temperatures within the range 21–33 ^{0}C (Saljoqi *et al.* 2015). Laboratory studies showed that relative humidity, photoperiod, and temperature was important in mass rearing of *C. carnea***.** Several authors had given different data about optimal temperature values for rearing *C. carnea* larvae. Orešek (2003) reared green lacewings larvae at average temperature of 28.6 °C, Milevoj (1999) from 23 to 27 °C, and Duelli (1981) at 25 ± 2 °C. Chiaki & Masashi (1999) reported that the shortest developmental period of one generation of *C. carnea* was at 25 °C. At this temperature the larval development was high and the need for food was greater. In our research the optimal temperature for development of green lacewings was 25 °C, with the larvae were very active and cannibalism at the peak. Michel (2005) discussed the seasonal adaptations of green lacewings (Neuroptera: Chrysopidae) and their role in the control of aphid populations. Most green lacewings are facultatively multivoltine, with the succession of generations most often regulated by photomediated diapause. The timing and impact of the spring resumption in aphid consumption depends on their overwintering strategy. As far as is known, chrysopids are intolerant to freezing, but their super cooling points are low enough to enable them to endure hard frost. Artificial chambers proposed for overwintering adults of common green lacewings to offer them protection during diapause and enhance their predatory efficiency in spring. Results showed aphids existed in abundance in the winter months from the beginning of September to reach the maximum in February and March and disappeared completely in the summer months during the study period. Aphid numbers collected in the second year, the lower than the first year. The size of the sample *C. septempunctata* collected in the second year was twice the amount collected in the first year. Meanwhile, in *C. carnea* slight difference can be seen between the first and second year study. At the end of the study, it is concluded that the Farafra Oasis was more abundant in the collected numbers of *C. carnea*, as it was the site of Shimenara richer than other sites which contained about 35.91% of collected individuals, inversely the Grad location was poor and represented by 13.70%, which is very old and completely isolated.

Coccinella septempunctata collected that were less than *C. carnea* and represented by percentage of 39.38% of the grand total of two studied insects. Comparing of Farafra Oases and Baharyia Oases were represented by 54.1% and 45.9%, respectively. At the same time, the first year Farafra Oasis was richer while the second year Bahariya Oasis increased slightly. Of the eight study sites, Grad location was the highest in the richness of *C. septempunctata* and the lowest one was Shimenara location.

Conclusion:

During two successive years, the population dynamics and distribution of *Chrysoperla carnea* and *Coccinella septempunctata* collected monthly from eight alfalfa (*Medicago sativa* L.) fields in two oases of theWestern Desert, Egypt were studied. *Chrysoperla carnea* was represented richer in Farafra than Baharyia Oases. In Farafra Oasis in Shimenara location was richer than other sites and in the Baharyia Oasis site, Kasaa 3 was high in richness. The fluctuation of *C. carnea* was amplified in autumn, spring and sharply declined during winter and summer. A total number of *C. septempunctata* was collected represented by 54.1% and 45.9% for Farafra and Baharyia oasis, respectively. The insect population showed a clear variation in number in both the locations, the count increased in the second year representing 64% of the total insects collected. At the same time, in the first year Farafra Oasis was richer while the second year Bahariya Oasis increased slightly. The increase of *C. septempunctata* in autumn was repeated in spring and sharply decreased during winter and summer months. The maximum numbers were collected in the months of February, March, and April.

Acknowledgments:

The author would like to thank Dr.Mohammed Khaled for joining me in the sampling trips and field studies. I also thank Dr. Maqbool Thaikkottathil (Faculty of Science, Jazan University) for his valuable review and comments on the manuscript.

Ethics approval and consent to participate: Not applicable.

Consent for publication: Not applicable.

Competing interests: The author declares that he has no competing interests.

REFERENCES

Abassi, S.M., Birkett, J., Petersson, J., Pickett, L., Wadhams, C. & Woodcock, C.M. 2001. Response of the ladybird parasite *Dinocampus coccinellae* to toxic alkaloids from the seven-spot ladybird, *Coccinella septempunctata*. *Journal of Chemical Ecology, 21: 33-43.*

Abdel-Salam, A.H., Ellington, J.J., El-Adl, M.A., Abou El- Naga, A.M. & Ghanim, A.A. 1997. Longevity and fecundity of *Harmonia axyridis* adults reared on an artificial diet and pink bollworm eggs. 1st National Conference, Mansoura, Egypt; 1:50-57.

Abu El-Ghiet, U.M., Edmardash, Y.A. & Gadallah, N.S. 2014. Braconidae diversity (Hymenoptera: Ichneumonoidea) in alfalfa fields, *Medicago sativa* L. of some Western Desert Oases, Egypt. *Journal of Crop Protection,* 3 (4): 543-556.

Chapin, E.A. 1965. Coleoptera: Coccinellidae. *Insects of Micronesia*, 16:189-245.

Chiaki, F. & Masashi, N. 1999. Effects of photoperiod and temperature on larval development of *Chrysoperla carnea* Stephens (Neuroptera: Chrysopidae). *Japanese Journal of Applied Entomology and Zoology*, 43: 175-179.

Dhaka, S.R. & Pareek, B.L. 2007. Seasonal incidence of natural enemies of key insect pests of cotton and their relationship with weather parameters. *Journal of Plant Protection Research*, 47: 4, 417-423.

Duelli, P. 1981. Is larval cannibalism in lacewings adaptive (Neuroptera: Chrysopidae). *Researches on population Ecology*, 23: 193-209.

Flanders, K.L., & Radcliffe, E.B. 2000. Phenology of the alfalfa weevil and its associated parasitoids in Minnesota. *Journal of Entomological Science* 35: 227-238.

Gadallah, N.S., Yefremova, Z.A., Yegorenkova, E.N., Soliman, A.M., Abu El-Ghiet, U.M. & Edmardash, Y.A. 2015. A review of the family Eulophidae (Hymenoptera: Chalcidoidea) of Egypt, with thirty-three new records, *Zootaxa* 4058 (1): 066–080.

Geetha, B. & Swamiappan, M. 1998. Improved adult rearing cages for the predator, *Chrysoperla carnea*. *Madras Agricultural Journal* 85:333-334.

Hanson, C.H. & Barnes, D.K. 1988. Alfalfa. Pp. 136-147 in Health, M.E., Metcalf, D.S. & Barnes, R.F. (Eds) Forages, the science of grassland agriculture. 3rd ed. 755 pp. The Iowwa State University press/Ames, Iowa, USA.

Khan, M.R. 2010. The Relationship between temperature and the functional response of *Coccinella septempunctata* (L.) (Coleoptera:Coccinellidae). *Pakistan Journal of Zoology* 42(4), 461-466.

Kröpelin, R.K. 2006. Climate-controlled *Holocene occupation* in the Sahara: Moto of Africa's evolution. science.1130989, 803-806.

Michel, C. 2005. Seasonal adaptations of green lacewings (Neuroptera: Chrysopidae) *European Journal of Entomology* 102: 317–324.

Michels, G.J. & Behle, R.W. 1991. A comparison of *Coccinella septempunctata* and *Hippodamia convergens* larval development on green bugs at constant temperatures. *Southwestern Entomologist* 16: 73–80.

Milevoj, L. 1999. Rearing of the common green lacewing, *Chrysoperla carnea* Stephens, in

the laboratory. *Ljubljana, Kmet., 73*: 65-70.

Miller, J.C. 1992. Temperature-dependent development of the convergent lady beetle (Coleoptera: Coccinellidae). *Environmental Entomology* 21: 197–201.

Obrycki, J.J. & Tauber, M.J. 1981. Phenology of three coccinellid species: thermal requirements for development. *Annals of the Entomological Society of America* 74: 31–36.

Omkar, P. A. 2014. Predaceous coccinellids in India: Predator-prey catalogue. *Oriental Insects* 38:27-61.

Orešek, E. 2003. *Razširjenost tenčičaric* (Chrysopidae) v intenzivnem sadovnjaku in prehranske zahteve vrst *Chrysoperla carnea* (Stephens) (Neuroptera, Chrysopidae). Magistrsko delo. Ljubl., Bioteh. fak., Oddel. agron.: 85 p.

Parker, J.N. & Parker, P.M. 2003. *Alfalfa- A Medical Dictionary, Biography, and Annotated Research Guide to Internet References.* ICON Group International Inc., Las Vegas, NV, U.S.A. 192 pp.

Peterson, J., Ninkovic, V. Glinwood, R. Birkett, M. & Pickett. J. 2005. Foraging in a complex environment- semiochemicals support searching behavior of the seven spot ladybird. *European Journal of Entomology* 105: 365-370.

Rab Dino Khuhro, Imtiaz A. Nizamani & Muzaffar A. Talpur 2002. Population Abundance of predators in alfalfa and cotton fields at tandojam. *Pakistan Journal of Applied Sciences* 2(3): 300-303.

Rashid, M.M., Khattak, M.K., Abdullah, K., Amir, M., Tariq, M. & Nawaz, S., 2012. Feeding potential of *Chrysoperla carnea* and *Cryptolaemus montrouzieri* on cotton mealybug, *Phenacoccus solenopsis*. *Journal of Animal and Plant Sciences* 22: 639-643.

Riddick, E., Cottrell, T. & Kidd, K. 2009. Natural enemies of the Coccinellidae: parasites, pathogens and parasitoids. *Biological Control* 51: 306-312.

Saljoqi, A.R., Asad, N., Khan, J., Haq, E., Rehman, Z., Huma, Z., Gul Saeed, M. Nadeem, M. Salim, M. Bashir, A. & Zada, H. 2015. The impact of temperature on biological and life table parameters of *Chrysoperla carnea* Stephens (Neuroptera: Chrysopidae) fed on cabbage aphid, *Brevicoryne brassicae Journal of Entomology and Zoology Studies*. 3 (2): 238-242

Shebl, M.A., Soliman, M.K., Abu Hashesh, T.A. & Osman, M.A. 2008. The most common insect species in alfalfa fields in Egypt. *Academic Journal of Entomology*, 1 (2): 27-31.

Xia,J. Y., W. Van Der Werf, & Rabbinge, R.1999. Temperature and Prey Density on Bionomics of *Coccinella septempunctata* (Coleoptera: Coccinellidae) Feeding on *Aphis gossypii* (Homoptera: Aphididae) on Cotton. *Environmental Entomology* 28(2): 307-314.

ARABIC SUMMARY

وفرة وتذبذب أسد المن وابوالعيد ذي سبع نقاط على البرسيم الحجازي في الواحات البحرية والفرافرة - الصحراء الغربية، مصر.

أسامة محمد حسن أبو الغيط [2&1]
1- قسم وقاية النبات ، مركز بحوث الصحراء ، المطرية ، القاهرة ، مصر.
2- قسم الأحياء. كلية العلوم ، جامعة جازان ،السعودية.
البريد الإلكتروني usama778@yahoo.com

تمت دراسة الديناميات العددية وإنتشار أسد المن وابي العيد 7نقاط شهريًا علي مدار عامين متتالين في ثمانية حقول من البرسيم الحجازي في واحتين من الصحراء الغربية المصرية . تم جمع أسد المن بواسطة الشبكة الكانسة ومثل ب 5652 فردًا من بينهم 3021 و 2631 من الفرافرة والواحات البحرية على التوالي. في واحة الفرافرة كان شمنارة الموقع الاكثر ثراء من المواقع الآخري حيث استحوز علي 35.91 ٪ من الأفراد المجمعة ، وجد ان موقع الجراد أفقرموقع وتمثلها نسبة 13.7 ٪ من العشيرة المجمعة.في الواحات البحرية كان موقع قصعة 3 غنيًا بالمحتوى ، حيث احتوى على 32.12٪ من الأفراد التي تم جمعها ، وكان موقع الجفارة هو الموقع الفقير وكان يمثل 14.63٪. كان هناك زياده ملحوظة في التذبذب الموسمي لاسد المن في الخريف والربيع وانخفض بشكل حاد خلال الشتاء والصيف. 3672 فرد هو ماتم جمعة حشرة ابو العيد ، منها 1986 من واحة الفرافرة و 1686 من الواحات البحرية وتمثلها نسبة 54.1 ٪ و 45.9 ٪ على التوالي. أظهر تعداد الحشرات تباين واضح في العدد في كلا الموقعين ، وجدنا أن العدد زاد في السنة الثانية حيث مثل بنسبة 64 ٪ من إجمالي الحشرات التي تم جمعها. في نفس الوقت ، في السنة الأولى كانت واحة الفرافرة أكثر ثراءً بينما زادت الواحات البحرية قليلاً في السنة الثانية.زادت اعداد الحشرات المسجلة في فصل الخريف وتضاعفت في فصل الربيع وانخفضت بشكل حاد خلال أشهر الشتاء والصيف. تم رصد الحد الأقصى للحشرات في شهري فبراير ومارس وأبريل وأكبر عدد من العامين (2013 و 2014) كان في شهر مارس.