Population Fluctuation of Some Phytophagous Mites and Their Predators on Cotton Plants, as well as Sensitivity of Tetranychus Urticae Koch to Some Insecticides

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ABSTRACT: Cotton plants are liable to many pests specially, mites which causing reduction in cotton production. Thus, field experiments were conducted at the Sakha Agriculture Research Station during the seasons 2021 and 2022 to survey and monitor population fluctuations of three mite species and *Amblyseius gossypii* El-Badry (Barasitiforme: phytoseiidae) on cotton. Also, toxicity of imidacloprid and acetamiprid were examined on the two-spotted spider mite, *Tetranychus urticae* (Acari: Tetranychidae). Twelve species of mites found associated with cotton plants were belonging to 4 families which included mites and its associated predators. *T. urticae* and *A. gossypii* had the highest mite frequency rate. In these studies, the infestation of *T. urticae* formed two peaks that appeared in mid-Aug. and Sep. in the first and second seasons, respectively. Two peaks of *A. gossypii* were also appeared in Sep. and Oct. during the two studied seasons. The combined impact of climatic factors on population fluctuation of both *T. urticae* and *Tetranychus cinnabarinus* (Boisduval) (Acariformes: Tetranychidae) was insignificant over the two seasons, according to the results. It was highly significant relationships between *Tetranychus cucurbitacearum* Sayed (Acariformes: Tetranychidae) and RH% during the two seasons and highly significant relationships with *A. gossypii* during 2022. The combined impact of climatic factors and *A. gossypii* explained 78.9, 80.1 and 58.5% of the variance (EV) for *T. urticae*, *T. cucurbitacearum*, and *T. cinnabarinus*, respectively, in the first season. In the second season combined impact EV% was 71.5, 82.9 and 61.3 % for the three mites, respectively. Imidacloprid (seed treatment) was the least toxic with total mean reduction percentages of 30.3 and 42.6 % in 2021 and 2022, respectively. While acetamiprid was the most effective on sprayed plants, with a reduction percentage of 96.72 and 97.78% during the first and second seasons, respectively. These data revealed that the correlation between mites, predators, and climatic factors was conflicting, and imidacloprid and acetamiprid can significantly minimize the infestation of *T. urticae* on cotton plants and be used in IPM programs.

Keywords: *Tetranychus urticae*, population fluctuation, weather factors, insecticides.

INTRODUCTION

Cotton, *Gossypium* spp., (Malvaceae) is one of the most important and widely produced agricultural and industrial crops in the world. It is grown in more than 100 countries on about 2.5 % of the world's arable land, making it one of most significant crop in terms of land use after food grains and soybeans (Townsend and Liewellyn 2007). The two-spotted spider mite, *T. urticae* is one of the most important pests in many cropping systems worldwide. *T. urticae* infests cotton fields nearly every year in Egypt and can be considered an important cause of lost revenue for cotton producers (Ibrahim *et al*. 2015). This may be due to its high reproductive potential and short generation time. The feeding damage of spider mites, concentrated primarily on the lower surface of the leaves. Under heavy infestation, severe defoliation occurs and leaves become entirely gray, curl, turn brown, and drop off. This decreases the photosynthetic capacity of plants (Taha *et al*. 1990). *T. urticae* prefers to feed by penetrating plant tissue on the lower leaf surface (Attia *et al*. 2013). Thus, Dhawan *et al.* (2007) reported that the two-spotted spider mite caused damage by sucking the cell sap and plants becoming stunted. Also studied were the population densities of the two spotted *T. cucurbitacearum*, *T. cinnabarinus*, and *A. gossypii* a predaceous mite. Therefore, growers are seeking alternatives that are effective against

the mite, safe for the environment, and compatible with IPM. In this study, a new type of insecticide that originated from the natural agents of the targeted pastes could be useful as an alternative to conventional insecticides (Pineda *et al.,* 2007; El-Zahi, 2013). The toxic and deterrent effects of acetamiprid on insects and mites were investigated on insects and mites. Farag and Abd EL-Rahman (2021) discovered that pesticides reduced the total number of adults in the immature stage, particularly the number of eggs laid per female by *T. urticae*. According to Abd El-Rhman *et al*. (2021), chemical pesticides are the most commonly used method and are toxic to *T. urticae* mites. However, the control of mites is delayed due to their rapid resistance and the frequent to reduce resistance, one type of insecticide, which must be combined with another (Jeppson *et al*., 2020) and Shukla (2020). Kavya *et al.* (2015) found that spiromesifen incidence was significantly higher than any other acaricide. Chlorantraniliprole was superior with *T. urticae*, followed by flubendiamide and emamectin benzoate. Therefore, the present study examined the population dynamics and evaluates the effectiveness of imidacloprid and acetamiprid against the target mite.

MATERIALS AND METHODS

Insecticides used:

- Imidacloprid (Gaucho 70% WS) as a seed treatment, Bayer Crop Science Company, Garmany a at rate 7g/Kg seeds.
- Acetamiprid (Atamen 20% SP), Jinan Leadar Chemical Co. Ltd., China and was applied at 25gm/100 L.

Experiment layout:

The experiments were conducted at the Sakha Agricultural Research Station farm, Kafr El-Sheikh Governorate, during two successive seasons of 2021 and 2022 at an area of 2100 m^2. The cotton seeds variety Giza 94 was obtained from the Cotton Research Institute in Sakha. In the survey experiments, an area of 1050 m^2 untreated with pesticides, was divided into four plots of 262 m^2, and each untreated plot was selected to be sown with cotton seeds on April 15 during the two seasons. for survey of mites and population dynamics of phytophagous and predacious mites associated with cotton plants. Cotton plant samples were collected at random every two weeks. Twenty plants were randomly collected from each plot from 9 a.m. to 11 a.m. the sampled leaves were taken from the three plant levels (upper, middle, and lower parts) from four sites for each replication. All the samples were collected in polyethylene bags, tightly closed, and transferred to the laboratory for later examination of the moving stages of *T. urticae* by stereoscopic microscopy. Individual mites were counted and then mounted singly in Hoyer's medium for the identification process. Labels containing all necessary information were registered on each slide; mounted slides were kept for 24 h in an electric oven at 35-50 ° C. Mite identification was in the mite identification unit, plant production research institute (ARC). An area of 1050 m^2 was divided into eight plots for insecticide evaluation trials: four plots for seed treatment and four plots for spraying plants. Cotton seeds were treated with imidacloprid (7 g / kg seed). The experiment was arranged in a complete random block design, and eight replications were made for both the experience of seed treatment and the experience of the spray pesticide, including the untreated check. To calculate the population of *T. urticae, a* weekly sample of 20 seedlings from each plot was chosen at random and continued for 6 weeks. Reduction percentages were corrected for mortality using Abbott's formula (1925). To evaluate the effect of foliar insecticide (acetamprid) on mite populations, the treatment is sprayed with acetamprid 60 days after planting to increase the mite populations. Irrigation water was used to dilute the pesticide at the field-recommended rate, and a knapsack sprayer with a single nozzle (mode CP3) was used. Before treatment, 20 leaves from each replicate were selected, as well as after 1, 3, 7, and 10 days of treatment. After treatments, samples were placed in polyethylene bags and transferred to the laboratory for examination under an electron microscope. The number of mites per leaf was examined directly in the field and recorded by a magnifying hand lens.

Statistical analysis

The mortality results were corrected using the formula of Abbott (1925). Reduction was calculated according to Henderson and Tilton equation (1955). SPSS was used to determine significant differences ($P<0.05$), correlation and multiple regression coefficients between the mean number of mites and climatic factors.

RESULTS AND DISCUSSION

The population dynamics of phytophagous and predacious mites associated with cotton plants and their relationship to weather factors and the field recommended rate of imidacloprid were the experience of seed treatment and acetamiprid was the experience of the spray on cotton plants under field conditions against this pest.

Survey and population dynamic of the mites

Incidence of mites associated with cotton plants was carried out at the Sakha, Agricultural Research Station farm during the two seasons of 2021 and 2022 from May to October. The results recorded in Table (1) revealed the of 12 mite species inhabiting cotton plants. Four species are phytophagous belonging to two genera and two families (Tetranychidae and Tydeidae). The Tetranychidae family was represented by three

species: *T. uritca*e, *T. cucurbitacearum* and *T. cinnabarinus*. *Tyedeus californicus* Banks was the only specie; in the Tydeidae family. One species of Stigmaeidae mite, *Agistemus exsertus* Gonzalez, was recorded as inhabiting four cotton plants. Seven species of Phytoseiidae mites were recorded. These mites are the most important predators found in association with phytophagous mites occurring on cotton plants.

Table 1: Incidence of different mites inhabiting cotton plant, at Kafr El- Sheikh Governorate during successive seasons 2021-2022.

Mite species	Feeding Behavior	Population
Order : Acariformes .		
I- Suborder:Actinedida.		
Family: Tetranychidae Donnadieu		
Tetranychus urticae Koch	Phytophagous	Great numbers
T. cucurbitacearum Sayed	Phytophagous	Great numbers
T. cinnabarinus (Boisduval)	Phytophagous	Great numbers
Family: Tydeidae Kramer		
Tyedeus californicus Banks	Phytophagous	Few numbers
II- Suborder:Oribatida.		
Family: Stigmaeidae Oudemans		
Agistemus exsertus Gonzalez	Predaceous	Moderate numbers
Order :Barasitiforme		
Suborder: Gamasida.		
Family: phytoseiidae Berlese		
Amblyseius swirsikii Athias&Henriot)	Predaceous	Moderate numbers
Amblyseius cucumaris (Oudemans)	Predaceous	Few numbers
Amblyseius yousefi Zaher & El-Brollosy	Predaceous	Great numbers
Amblyseius gossypii El-Badry	Predaceous	Few numbers
Euseius scutalis (Athias-Henriot)	Predaceous	Moderate numbers
Typhlodromus californicus McGregor	Predaceous	Few numbers
Typhlodromus zaheri Denmark	Predaceous	Few numbers

Few numbers <4), moderate numbers (4-8), Great numbers (>9).

These species were A. swirskii, Athias-Henriot, and Euseius scutalis (Athias-Henriot), were found in moderate numbers. Amblyseius cucumaris (Oudemans), Amblyseius yousefi Zaher & El-Brollosy, Typhlodromus californicus McGregor, Typhlodromus zaheri Denmark, and A. gossypii were found in small numbers. According to El-Shamy (2016), a given species' dominance can be classified as few numbers (<4), moderate numbers (4-8), or great numbers (>9).

Impact of some weather factors and the predator, Amblyseius gossypii on the population dynamics of mites

Phytophagous and predaceous mites population dynamics found on cotton plants over two seasons (2021 and 2022) were studied It is clearly evident from the data presented in Table (2) that the three species of mites started with low numbers at the beginning of the season, then gradually increased until reaching their peak in mid-August, and the average numbers were 5.75, 4.50, and 3.50 individuals/ 20 leaves for both T. uritcae, T. cucurbitacearum, and T. cinnabarinus, respectively. While the predacious mite, A. gossypii, is mite-synchronous and peaks in mid-September, it with 4.75 individ. /20 leaves The total mean numbers of phytophagous and predaceous mites on cotton plants during season 2021 were 19.75, 19.00, 14.55, and 17.50 individuals per 20 leaves for both, T. uritcae, T. cucurbitacearum, T. cinnabarinus, and A. gossypii, respectively. The population density of mites and the predator, A. gossypii, in the first season was found in a few numbers. During the second season (2022), the data presented in Table 3, indicated that during mid-August, the population peak was 3.75, 5.50, and 3.50 individ. /20 leaves for T. uritcae, T. cucurbitacearum, and T. cinnabarinus, respectively. The predator, A. gossypii was 5.75 individ. / 20 leave when it reached its peak in mid-September. The total populations of collected mites were 18.25, 25.00, 15.75, and 22.50 individ. /20 leaves per 20 leaves for T. urticae, T. cucurbitacearum, T. cinnabarinus, and predaceous mite A. gossypii, respectively, at maximum, minimum, and % RH of 33.81, 25.35, and 73.17 %, respectively. Generally the highest population was noticed for all collected mites in August. The lowest numbers of phytophagous mite populations were observed during May and June. In general, the mean population of mite species and the predator, A. gossypii, in the second season was higher than in the first season. According to the

results, the population of phytophagous mites was negligible in May and that of predatory mites was negligible in May and June, but the spider mite T. urticae reached a peak in August.

Table 2: Populations of the phytophagus and predatory mites/20 leaves on cotton Plants, during season 2021 at Kafr El- Sheikh Governorate.

Dates of examination	Average numbers of the mobile stages/20 leaves				Temperature		Mean ° C	R.H.%
	T.urticae	*T. cucurbitacearum*	*T. cinnabarinus*	*A. gossypii*	Max.	Min.		
1/5	0.00	0.00	0.00	0.00	30.58	22.27	26.42	56.43
15/5	0.00	0.00	0.25	0.00	33.30	25.81	29.55	53.21
1/6	0.25	0.25	0.50	0.00	31.49	23.38	27.43	63.39
15/6	0.50	0.75	0.75	0.00	30.55	24.65	27.60	61.60
1/7	0.50	4.00	3.30	1.00	33.08	25.87	29.47	66.67
15/7	2.25	3.75	2.50	0.75	34.78	28.52	31.65	66.17
1/8	4.00	3.50	1.50	0.75	34.02	27.34	30.68	69.00
15/8	5.75	4.50	3.50	0.50	36.87	28.69	32.78	67.25
1/9	2.50	1.00	1.00	2.25	34.55	28.12	31.33	66.67
15/9	1.75	0.75	0.50	4.75	33.12	26.18	29.65	66.17
1/10	1.25	0.25	0.25	4.25	32.02	24.3	37.79	66.82
15/10	1.00	0.25	0.50	3.25	29.57	22.12	25.85	68.67
Total	19.75	19.00	14.55	17.50	-	-	-	-
Mean	1.64	1.58	1.21	1.45	32.82	25.60	30.01	65.08

Table 3: Populations of the phytophagus and predatory mites/20 leaves on cotton plants, during season 2022 at Kafr El- Sheikh Governorate.

Dates of examination	Average numbers of the mobile stages/40 leaves				Temperature		Mean° C	R.H. %
	T. urticae	*T. .cucurbitacearum*	*T. cinnabarinus*	*A. gossypii*	Max.	Min.		
1/5	0.00	0.00	0.00	0.00	27.88	20.39	24.13	
15/5	0.00	0.00	0.50	0.00	27.68	21.00	24.34	59.75
1/6	0.50	0.00	0.75	0.00	31.07	22.09	26.58	63.67
15/6	0.25	0.50	1.00	0.00	33.72	25.47	29.60	65.50
1/7	0.75	4.00	3.25	1.25	32.60	25.73	29.16	67.28
15/7	2.75	4.75	3.00	1.00	32.83	26.37	29.60	69.60
1/8	3.00	5.25	2.00	1.00	33.77	25.37	29.57	71.71
15/8	3.75	5.50	3.50	1.25	33.81	25.35	29.58	73.17
1/9	3.00	2.00	0.75	3.25	34.98	25.88	30.43	71.46
15/9	2.50	1.25	0.25	5.75	32.99	26.76	29.87	70.17
1/10	1.00	1.25	0.50	4.75	32.45	25.12	28.78	68.75
15/10	0.75	0.50	0.25	4.75	30.47	21.96	26.21	73.82
Total	18.25	25.00	15.75	22.50	-	-	-	-
Mean	1.52	2.08	1.31	1.87	32.02	24.29	28.15	67.97

The mites, *T. cucurbitacearum* and *T. cinnabarinus* were harvested in July and August, respectively. Also, the peak was recorded in October for the predatory mite. Considering the abundance of phytophagous and predatory mites on cotton plants all over the inspection periods. The correlation and partial regression values between maximum & minimum temperature and the mean number of *T. urticae, T. cucurbitacearum,* and *T. cinnabarinus* were positive but non-significant in Table (4), while they were positive but non-significant between % RH and *T. urticae* and *T. cinnabarinus* and negative significant with *A. gossypii*. The relationship was positive and highly significant between the number of *T. cucurbitacearum* and % RH (r = + 0.750** and b = + 0.230**) and negative and significant with *A. gossypi*i (r = -0.675* and b = -0.488*).

Table 4: Values of correlation (r), regression (b) and explained variance (E.V. %) between some phytophagous mites and climatic factors and the predatory mite *Amblyseius gossypi*i El-Badry

Factor	*T. urticae*			*T. cucurbitacearum*			*T. cinnabarinus*		
	r	b	% EV	r	b	% EV	r	b	% EV
				Season 2021					
T. max.	+ 0.586	+ 0.524		+ 0.325	+ 0.235		+ 0.002	+ 0.001	
T. min.	+ 0.077	+ 0.051	%	+ 0.284	+ 0.182	%	+ 0.291	+ 0.169	%
RH%	+ 0.692	+ 0.206	78.9	+ 0.750**	+ 0.230**	80.1	+ 0.566	+ 0.126	58.5
A. gossypii	- 0.176	- 0.101		- 0.675*	- 0.488*		- 0.258	- 0.299	
				Season 2022					
T. max.	- 0.101	- 0.076		- 0.537	- 0.589		- 0.274	- 0.198	
T. min.	+ 0.393	+ 0.302	%	+ 0.708*	+ 0.872*	%	+ 0.527	+ 0.406	%
RH%	+ 0.622	+ 0.236	71.5	+ 0.820**	+ 0.524**	82.9	+ 0.50	+ 0.159	61.3
A. gossypii	- 0.386	- 0.196		- 0.822**	- 0.834**		- 0.699*	- 0.425*	

* Significant- ** high significant

The explained variance values (EV %) between the number of mites and weather factors and the predator, A. gossypii, on the other hand, were calculated, and the results showed that the combination had no significant impact on mite density. The EV % values for the weather factors and predator mite were 78.9, 80.1 and 58.5 for *T. urticae*, *T. cucurbitacearum* and *T. cinnabarinus*, respectively. While the correlation and regression values between maximum temperature and the population of each *T. urticae* (r = - 0.101 and b = - 0.076), *T. cucurbitacearum* (r = - 0.53 and b = - 0.589), and *T. cinnabarinus* (r = - 0.27 and b = - 0.198) were negative and not significant in the second season, it was positive and not significant between min. temperature and *T. urticae* and *T. cinnabarinus* and positive significant with *T. cucurbitacearum*. While it was positive but not significant between % RH and *T. urticae* and *T. cinnabarinus* and positive and highly significant with *T. cucurbitacearum* (r = + 0.820** and b = + 0.524**). The relationship between the number of *T. urticae* and *A. gossypii* was negative but not significant, negative but highly significant with *T. cucurbitacearum* (r = - 0.822** and b = - 0.834**), and negative but significant with *T. cinnabarinus*. Data indicated that population fluctuations of mites were not significant by combination; the EV % values for the weather factors and predator mites were 71.5, 82.9 and 61.3 for *T. urticae*, *T. cucurbitacearum* and *T. cinnabarinus*, respectively. Nassef *et al*. (2000) found that one to three peaks of *T. cucurbitacearum* and the predatory mite, i.e., *A. gossypii*, were recorded on the different tested host plants during July, August, and September throughout the 1999 season in Kafr El-Sheikh. Also, these results are in agreement with those conducted by Mohamed *et al*. (2021) recorded that the population of the two-spotted spider mite, *T. urticae*, was appeared with few numbers in mid-May; after that, the population gradually increased to reach its peak in mid-August as 80.3 and 95.1 individuals per 40 leaves. Maximum and minimum temperatures of 36.38 & 25.77 in the first season, respectively, and 36.00 & 25.43oC in the second season, respectively; 51.85 & 53.93% RH in the first and second season, respectively. After that, the population gradually decreased until the end of the season. Dosoky *et al.* (2021) found a significant negative relationship between *T. urticae* and *A. gossypii* during the two seasons was in agreement with Hendawy *et al*. (2011) and Anbar *et al. (2020*).

2- Effect of some insecticides on the population density of *T. urticae*

The toxicity of some formulations using the recommended rate against the red spider mite was studies. The toxicological evaluations of imidacloprid and acetamiprid were carried out against moving stages of the two spotted spider mite. The data illustrated in Tables (5) showed that imidacloprid was the least toxic using the seed treatment method, it caused reduction percentage, but the toxic effect was high at the beginning of the season and decline gradually until the end of the examination and where it was 74.4 % in the first examination and 21.7 in the last. While the reduction values in the second season were 80.0 and 33.8 in the first and final examinations, respectively, the general mean reductions in the first and second seasons were 30.3 and 42.6%.

Table 5: Effect of imidacloprid on population density of *T. urticae* by seed treatments

Dates examination	Mean no. of *T. urticae*/ 20 leaves		% reduction	Average º C	Average R.H.
	Control	Treatment			
		2021			
10 May	3.01	0.77	74.4	35.06	54.21
17May	3.75	1.50	60.0	27.04	59.92
24 May	23.45	10.76	54.1	26.38	64.21
31 May	24.42	12.21	50.0	29.08	61.92
7 Jun	26.56	16.12	39.4	28.07	60.06
14 Jun	30.57	20.78	32.1	28.42	65.99
21 Jun	21.43	16.78	21.7	28.41	62.92
Total	113.19	78.92	30.3	-	-
Mean	16.17	9.88	-	-	-
		2022			
10 May	2.50	0.50	80.0	23.47	58.28
17 May	3.25	0.75	77.0	25.21	58.28
24 May	3.50	1.75	50.0	25.95	64.28
31 May	19.00	10.00	47.4	27.21	71.42
7 Jun.	20.50	12.25	40.3	28.58	76.78
14 Jun.	22.25	13.50	39.4	30.61	63.21
21 Jun	23.00	15.24	33.8	28.13	68.92
Total	94.00	53.99	42.6	-	-
Mean	13.42	7.71	-	-	-

While acetamiprid exerts excellent efficacy against *T. urticae* using the plant spray method, it causes a high reduction percentage. In the first season, reductions values were 94.24, 99.00, 99.13, and 94.48 % after 1, 3, 7, and 15 days post treatment, respectively.

In the second season, the reduction values were 95.71, 97.42, 99.93, and 97.56 % after 1, 3, 7, and 15 days of treatment, respectively, and the general mean of reductions were 96.72 and 97.78 %. The higher toxicity of acetamiprid in the mite spray case compares to that of imidaclorid in seed treatment in Tables (6). The effect of temperature on red spider mite populations on cotton plants is given in Table (5). This table shows that the least efficacious temperature was 23.47 º C in May month during the second season, which reduced mite populations on cotton plants to 2.50 individ. and increased mite numbers to 30.57 and 22.25 individ. in the first and second seasons, respectively. However, we can demonstrate that the temperature was higher than 28.42 and 30.61 º C, which would have an impact on spider mite populations. This may be due to the impact of temperature on the mites. Thus, we found a relation between climatic factors and mite populations. Alina *et al*. (2022) discovered that imidacloprid caused 100 percent mortality of *T. urticae* motile stages within 48 hours, and the toxicity test on eggs was more significant, causing 65 percent mortality. According to Badawy *et al*. (2022), abamectin was the most effective for adults (LC50 = 5.39) after 24 hours of treatment, followed by chlorfenapyr (LC50 = 106.5 mg), and pyridaben was low toxic (LC50 = 690.23 mg).

Table 6: Effect of acetamiprid on population density of *T. urticae*

Treatment	Rate mg/100 L.	No. before treat.	No. of *T. urtecae* after treat. /20 leaves								Mean of % R
			1 Day		3 Days		7 Days		15 Days		
			No.	R%	No.	R%	No.	R%	No.	R%	
					2021						
Acetamiprid	25 g.	13.56	0.89	94.28	0.13	99.00	0.12	99.13	0.37	94.48	96.72
Control	-	18.20	21.00	-	18.72	-	18.44	-	9.00	-	-
					2022						
Acetamiprid	25 g.	23.26	1.16	95.71	0.42	97.92	0.06	99.93	0.16	97.56	97.78
Control	-	40.40	46.76	-	35.04	-	16.72	-	11.40	-	-

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الملخص العربي

التغيرات العددية لبعض الأكاروسات النباتيه ومفترساتها وحساسية العنكبوت الأحمر لبعض المبيدات الحشرية على نباتات القطن

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تعتبر الأكاروسات النباتية من الأفات الهامة على نباتات القطن التى تسبب أضرار خطيره تؤدى إلى إنخفاض انتاجية المحصول، وعلى ذلك أجريت التجارب الحقلية فى محطة البحوث الزراعية بسخا خلال موسمي2021 و2022م لدراسة التغيرات العددية لبعض الأفات الأكاروسية والمفترسات المرتبطة بها على نباتات القطن , وتأثير بعض المبيدات الحشرية على الأطوار المتحركة للعنكبوت الأحمر ذو البقعتين، وعلى ذلك تم حصر وتسجيل 12 نوعا من الاكاروس تنتمى إلى اربع عائلات أفات ومفترسات . سجل أعلى تعداد للعنكبوت الأحمر ذو البقعتين ذروتين الاولي في منتصف اغسطس والثانية فى سبتمبر وأيضا ذروتين للمفترس الأكاروسى فى سبتمبر واكتوبر خلال موسمى الدراسة. كما أوضحت النتائج أن العوامل الجوية لها تأثير على تعداد الأكاروس خلال موسمى الدراسة ولكن بنسبة ضئيلة عن تأثير المبيدات ووجد تأثير معنوى عالى بين الرطوبة النسبية والأفات الأكاروسية والمفترس خلال الموسم الثانى من الدراسة 2022م. كما أظهرت النتائج فى الموسم الأول التأثير المشترك للعوامل المناخية والمفترس على ثلاثة أنواع من الاكاروسات النباتية و نسبة التباين بينهم سجلت 58.5, 78.9,80.1 % لكل من *T. urticae*, *T. cucurbitacearum* and *T. cinnabarinus* على التوالى بينما، وجد فى الموسم الثانى 71.8 و82.9 و61.3 % للثلاث أفات أكاروسية *T. urticae*, *T. cucurbitacearum* and *T. cinnabarinus* على التوالى .كما أظهرت النتائج تأثير بعض المبيدات الحشرية على أعداد العنكبوت الأحمر ذو البقعتين ووجد مركب اميداكلوبراید (معاملة البذرة) هو الأقل سمية بنسبة إنخفاض 30.3 و42.6% خلال الموسمين محل الدراسة على التوالى, بينما وجد الأسيتامبريد أكثر سمية على العنكبوت الاحمر بنسبة إنخفاض 98.67 و 97.78% خلال موسمى محل الدراسة على التوالى. وأوضحت النتائج أن هناك علاقة عكسية بين الأكاروسات والمفترس والعوامل الجوية وعند إستخدام المبيدات أوضحت النتائج أن المبيدات تؤثر بشكل كبير على الأفات الأكاروسية وتلعب دورا كبيرا فى التقليل من تعداد الأكاروسات عند إستخدامها فى برامج المكافحة المتكاملة.