PLANTING DATE IN RELATION TO INSECT AND ANIMAL PESTS ATTACKING CUCUMBER PLANTS UNDER PROTECTED CULTIVATION AT GIZA GOVERNORATE

SHALABY, F.F.[1], F.A. ALI[2], A.A. HAFEZ[1] and HAYAM M. SAAD[2]

1. *Plant Protection Dept., Faculty of Agriculture, Benha University*
2. *Plant Protection Research Institute, ARC, Dokki, Giza*

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Abstract

Cucumber plants were cultivated in greenhouses in autumn and spring seasons, while autumn is the main season to provide markets with cucumber fruits in cold weather. The main pests of this season are *Bemisia tabaci* (Genn.), *Aphis gossypii* Glover and *Tetranychus urticae* (Koch) under plastic greenhouses were studied during two successive autumn season in (2008-2009) and (2009-2010) at El-Dokki location, Giza governorate. Cucumber plants in the early planting date were attacked by the highest population of *B. tabaci* while the highest populations of *A. gossypii*, and *T. urticae* were recorded in late planting date. This study also evaluated the potency of some control approaches to face the severe infestation of *T.urticae* on cucumber plants under greenhouse during summer season by using eight acaricides. The obtained results showed that the reduction percentages of *T.urticae* mobile individuals, 24 hours after treatments ranged between 96% by Agromec and 57.6% by Bio-fly, while after 7 days, all the tested acaricides were very effective against *T.* urticae. It was concluded that using any of the tested acaricides could be considered selectivity and safety.

INTRODUCTION

Cucumber crop (*Cucumis sativus* L.) is one of the most important vegetable crops planted under greenhouses and open fields in Egypt. Cucumber plants cultivated in greenhouses in autumn and spring seasons were attacked by many harmful and destructive sap sucking insect and animal pests, which cause qualitative and quantitative reduction in yield (El-Khayat *et al.*, 2010). From these pests, whitefly, *Bemisia tabaci* (Genn.), aphid, *Aphis gossypii* Glover and the two spotted spider mite, *Tetranychus urticae* (Koch) which feed on the plant sap through cucumber leaves causing serious damage according to rates of infestation and the most abundant species on leaves of plants under greenhouse (Baiomy, 2008). Whitefly and aphids, also, excrete honey dew which hamper photosynthesis and fruits become unmarketable, and they are serious vectors for transmission of plant viruses (Mohamed, 2011). The two spotted mite, n*T.urticae* causes also a lot of damage

leading to reduction in plant growth (Abdel-Wahed, 2003). Due to the seriousness of these pests, many growers become obligated for the excessive use of insecticides and/or acaricides which leads to environmental problems such as reduction of beneficial biocontrolling insects and increasing pesticidal pollution. For this reason, the present investigation was carried out to find out the relationship between the planting date of cucumber plants and the rate of infestation by these pests hoping to select the date in which the pests infestation is the lowest. Accordingly this method may be fairly considered as a new approach towards controlling these pests under greenhouse conditions.

MATERIALS AND METHODS

This investigation was carried out at El-Dokki protected cultivation center, Giza governorate during two years (2008/2009 and 2009/2010).

The main objective of this investigation to study the effect of three planting dates on the level infestation of cucumber plants with major insect and animal pests, *B. tabaci*, *A. gossypii* and *T. urticae* in greenhouses. Four greenhouses were specified for this experiment, three cucumber greenhouses for the three planting dates in the autumn season, while the fourth was planted for control the two spotted spider mite with acaricides. The area for each greenhouse of the three planting dates was 540 m^2 with 60 m long and 9 m wide and 3.25 m height covered with plastic (Ali, 1993). Each greenhouse contained five rows, each of 1 m wide and 60 m long, and the distance between two seedlings in the row was 50 cm.

Samples of 25 leaves for each were picked weekly at random from cucumber plants (5 leaves from each row) representing the three plant levels (upper, middle and lower) from each greenhouse.

Three greenhouses were cultivated with cucumber variety (Dp 162) in three different planting dates in autumn season as follow:

A- Early planting date (mid-September)

B- Common planting date (end September)

C- Late planting date (mid-October)

During two successive autumn seasons in (2008/09 and 2009/10).

Leaves of each sample were placed in plastic bags and transported to the laboratory where those were thoroughly inspected. Inspection of the first sample took place after two weeks of seedlings' cultivation .

Efficiency of untraditional acaricides against the two spotted spider mite *T. urticae* infesting cucumber plants under green house:

This experiment was carried out to evaluate some untraditional bio–acaricides to be compared with chemical acaricides against two–spotted spider mite on cucumber plants under protected cultivation in spring season (2012) because the population of the tested pest indicated that the spider mite gave high numbers and cause severe damage on cucumber plants in spring season (Saad, 2002).

Ten treatments were tested in this experiment under multispan greenhouse (four spans) included 20 rows of cucumber plants cultivated on the two sides of each row provided with drip irrigation systems.

The greenhouse was cultivated with seedlings of cucumber (hybrid, 466), which were planted on February, 25th 2012 in spring season. Treatments and replicates (3/treatment) were arranged in a complete randomized blocks, while the control treatment was selected without spray. Spraying was applied on June, 20th, 2012 by using a knapsack motor sprayer with 10 liters tank for each plot. Cucumber plants of a row received the acaricides spray of a treatment, while the neighbouring row was left without spraying as a barrier to prevent acaricides drift that may interfere with the other treatments.

Samples of leaves (15 leaves/treatment) were, randomly, picked as 5 leaves/plot just before spraying and 1, 3, 5, 7, 10, 12 and 15 days after spraying. Leaves of each sample were placed in a plastic bag and transport to the laboratory where each leaf was, thoroughly examined from both surfaces under a binocular sterio–microscope. Mobile individuals of *Tetranychus urticae* stages were counted (larvae, nymphs and adults) and recorded.

Recommendations of the chosen acaricides were dependent upon:

a- 80% reduction by chemical acaricides and **b**- 70% reduction by bio – acaricides.

List of the acaricides assayed for their efficacy against *T. urticae* infesting cucumber plants under greenhouse at Giza governorate, and rates of application.

Trade name	Common name	Type of compound	Rate / 100 L. water
1- Acari-stop 50%SC	Clofentazine	Chemical	40 CC
2- Milbeknock 1% EC	Milbemectin	Biological	50 CC
3- Prev. AM 6% SL	Orange oil	Plant extract	400 CC
4- Bio- larve 5% EC	Emamectin benzeate	Biological	30 CC
5- Bio-fly (3×10^6units)	*Beauvaria bassiana*	Biological	50 CC
6- Agromec 1.8% EC	Abamectin	Biological	50 CC
7- Bio- larve 5% EC	Emamectin benzoate	Biological	15 CC
8- Pyricide 24% EC	Chlorfenapyr	Chemical	75 CC
9- Citroguard 15% EC	Pyridaben	Chemical	200 CC

The percentages of reduction for the population after spraying were calculated according to the equation of Henderson and Tiltons (1955).

RESULTS AND DISCUSSION

I. Population fluctuation of:

1. *Bemisia tabaci* (Genn.) adults in the greenhouse:

Data presented in Table (1)show the adult numbers of *B.tabaci* counted on leaves of autumn cucumber plants during three planting dates under plastic greenhouses .Regarding the total population of adults counted throughout the whole season, those were, slightly, higher on the three planting dates of 2008/2009 year (1025, 729 and 530 adults, respectively) than those counted throughout 2009/2010 (964, 663 and 499 adults). Also, plants of the earliest planting date (September, 15th) harboured the highest total count of *B. tabaci* adults (1025 and 964 in 2008/09 and 2009/10, respectively). Seasonal count of the common planting date (Sept., 30th) came the next (729 and 663 adults), while, plants of the late autumn planting date (October, 15th) manifested the lowest seasonal number of adults in the two years, being 530 and 499 adults, respectively (Table, 1).

Concerning the population of adults which were counted during the successive weeks, it is clear from Table (1) that adults population started with low number (9, 2 and 1 adult/25 cucumber leaves of the three planting dates, respectively in year 2008/09, opposed to 5, 2 and 1 adult, respectively in year (2009/10). With all

planting dates of the two years, these numbers increased successively during the successive weeks until reach the first (highest) peak of population abundance showing 205 adults on November, 13th, 128 on November, 20th and 102 adults on December, 4th 2008, opposed to 190 and 116 adults on November, 27th for the early, common and late palnting dates of the subsequent year (2009), respectively. After this peak, the population abundance decreased for 1-3 weeks, then reincreased again to from the second peak of abundance showing 110 adults/25 leaves on December, 4th, 77 adults on December,18th and 75 adults on December, 25th 2008 opposed to 70 and 71 adults on December, 18th and 81 adults on December, 11th 2009 for plants of the early, common and late planting dates, respectively (Table, 1). After the second peak, the population density of whitefly adults decreased successively towards the end of the season.

Statistical analysis between seasonal total numbers of *B. tabaci* adults in the three planting dates revealed significant differences in the two years of the study (Calculated LSD' s were 33.06 and 23.23, respectively (Table, 1).

Table 1. Bemisia tabaci adult counts/ 25 leaves of autumn cucumber plants of three planting dates during two successive years.

Date of Inspections	No. of *B. tabaci* adults / 25 leavess					
	2008-2009			2009-2010		
	Early Sept., 15	common Sept, 30	Late Oct., 15	Early Sept., 15	common Sept, 30	Late Oct., 15
Sept.30	9			5		
Oct. ,7	11			9		
Oct.,14	14	2		37	2	
Oct,.21	23	5		29	3	
Oct.,.30	45	16	1	41	18	1
Nov., 6	172	28	4	72	37	3
Nov.,13	205	51	10	168	45	19
Nov.,20	160	128	17	190	116	32
Nov.,27	81	95	45	121	99	98
Dec.,4	110	82	102	95	85	67
Dec.,11	59	63	83	62	60	81
Dec.,18	63	77	61	70	71	55
Dec.,25	42	48	75	38	38	49
Jan.,1	31	56	40	27	29	28
Jan.,8		42	31		42	36
Jan.,15		36	18		18	14
Jan.,22			26			11
Jan.,29			17			5
Total	1025	729	530	964	663	499
Mean	73.2	52.1	37.9	68.9	47.4	35.6
LSD	33.06			23.23		

These results agree with those obtained in similar studies carried out in Egypt by Ali (1993), El-Khayat *et al*. (1994), Baiomy (2001), Zaki *et al*. (2002), Mohamed (2004), Baiomy (2008) and Esmail (2013). They mentioned that the infestation by *B. tabaci* occurred on autumn cucumber under greenhouses in September then increased to reach the high level of population in November and December, then declined towards the end of cucumber growing season.

On contrary, the present results disagree with Mohamed (2011) who found that heaviest population of *B. tabaci* on squash was recorded on plants of the latest planting, while the lowest infestation occurred in the 1st planting date. The difference between results compared to those of the present investigation may be attributed to differences in the environmental condition between locations of experiments.

2. The cotton aphid, *Aphis gossypii* Glover

As presented in Table (2) the total number of *A. gossypii* individuals counted throughout the first year (1037 aphid individuals) was higher than recorded in year 2009/ 2010 (734 individuals). It could be also noticed that highest seasonal count of aphids was associated with the latest planting date of both years (574 and 393 aphid individuals in 2008/ 2009 and 2009/ 2010, respectively). That was followed by infestation to plants of the common planting date (September, 30th) showing 368 and 266 individuals, respectively. While, the least seasonal infestation rate occurred on plants of the earliest planting date (September, 15th), being 95 and 75 individuals in 2008/ 2009 and 2009/ 2010, respectively (Table, 2).

In both years of study and with all of the three planting dates, the first two samples were completely free from any *A. gossypii* infestation. Aphids infestation started to appear in the third samples, which showed counts by few numbers of aphids that ranged from one to 5 individuals/25 cucumber leaves. Thereafter, the subsequent 4 to 6 samples showed low rates of infestation, although the aphid counts fluctuated from one week to the other. Generally, higher rates of infestation to cucumber leaves by *A. gossypii* occurred, with all of the three planting dates, during December and January. The peaks of aphids abundance occurred on December 18th 2008 and 25th 2009 during plants growth of the 1st planting date (26 and 21 individuals/ 25 leaves, respectively). These peaks were represented by 120 individuals on January, 8th 2009 and by 102 individuals on January, 15th 2010 in the common planting date, opposed to 180 and 172 *A. gossypii* individuals on January, 22nd 2009 and January, 29th 2010, respectively in the latest planting date (Table, 2).

Presented results of this study showed that the autumn cucumbers plants which were planted in the late planting date (October, 15th) harboured the highest

infestation rate with *A. gossypii*, while on contrary those planted in the early planting date harbored the lowest individuals rate.

These results agree with the previous studies which were carried out by Ali (1993), Zaki *et al. (*2002), Saad (2002) and Baiomy (2008) who mentioned that the high population of whitefly was recorded in mid- December, and January, during autumn plantation. While, other studies of Mohamed (2004) and Esmail (2013) in Egypt recorded the highest population of *A. gossypii* on cucumber leaves in November under greenhouse conditions.

Table 2. Effect of planting dates on weakly counts of *Aphis gossypii*/ 25 leaves autumn cucumber plants during two successive years

Date of Inspections	2008-2009			2009-2010		
	Early Sept., 15	Normal Sept, 30	Late Oct., 15	Early Sept., 15	Normal Sept, 30	Late Oct., 15
Sept.30	0			0		
Oct. ,7	0			0		
Oct.,14	1	0		1	0	
Oct,.21	1	0		1	0	
Oct.,.30	2	3	0	1	1	0
Nov., 6	3	6	0	3	3	0
Nov.,13	1	8	4	1	4	5
Nov.,20	1	4	2	5	11	1
Nov.,27	8	1	1	1	7	3
Dec.,4	11	2	9	7	1	7
Dec.,11	7	15	4	15	22	2
Dec.,18	26	37	35	6	19	27
Dec.,25	13	28	21	21	28	16
Jan.,1	21	56	44	13	51	41
Jan.,8		120	38		17	18
Jan.,15		88	71		102	34
Jan.,22			180			67
Jan.,29			165			172
Total	95	368	574	75	266	393
Mean	6.8	26.3	41	5.4	19	28.1
LSD	NS			NS		

3. The two spotted spider mite, *Tetranychus urticae* (Koch.):

Data concerning the infestation rates by *T. urticae* on leaves of cucumber planted in three planting dates during 2008/ 2009 and 2009/ 2010 years are shown in Table (3). The recorded data showed that with all of the three planting dates, the first 4 samples were free of any red spider mites, infestation, which. started on cucumber leaves with the 5th sample of October, 30th, November, 13th and November, 27th for the

three planting dates, respectively during the two years of study. Infestation started in few numbers (1- 6/ 25 cucumber leaves). The subsequent samples showed increases in *T. urticae* counts until reached the first lower peak of population abundance showing 59 individuals on December 11th 2008 and 15 individuals in November, 27th 2009 for the early planting date. On plants of the second planting date, the 1st peak measured 79 and 85 individuals /25 leaves December, 25th in both years. While, plants of the 3rd (late) planting date harboured 87 and 270 individuals on December, 25th 2008 and January, 15th 2010, respectively indicating the 1st peak of *T. urticae* population abundance. The second peak of abundance was the higher which, mostly, occurred during January. On cucumber plants of the 1st planting date this peak was represented by 122 individuals on January, 1st 2009 and 73 individuals on December, 25th 2009. The second peak on plants of the common (2nd) planting date was represented by 290 and 170 *T. urticae* individuals occurred on January, 15th of both years of study. While, on plants of the 3rd planting date, the second peak of red spider mite abundance showed the highest count which were measured by 310 individuals on January, 22nd 2009 and 320 individuals/ 25 cucumber leaves on January, 29th 2010 (Table, 3).

As shown in Table (3) the rate infestation of *T. urticae* increased as the plants grew older. Rates of infestation started low, then increased until became high during December, then reached the highest population abundance during January. It could be also, observed that highest infestation rates occurred on plants of the latest planting date (October, 15th), while on contrary, lowest infestation rates were recorded in both years, on plants of the earliest planting date (September, 15th) . Plants of the common planting date (September, 30th) ranked as intermediately infested as the population densities of *T. urticae* were intermediate between those of the early and the late planting dates. It could be also noticed from date in Table (3) that higher seasonal infestation rates by *T. urticae* occurred to plants of the year 2008/ 2009 (total of 2078 individuals) that these totally counted during the subsequent year (1714 individuals, Table, 3).

Differences in the rates of infestation to cucumber plants grown from different planting dates and between the two years of study may be attributed to the variation of environmental conditions among planting dates and the two successive years.

The obtained results can be considered on line with Abd-El Gawad (2004) who reported that *T. urticae* appeared during the period from October until February. Baiomy (2008) recorded the highest infestation by the spider mites on cucumber leaves under greenhouse was found from November, 27 th to Jan., 8 th. In agreement with El-khayat *et al*. (2010) they revealed that the numbers of different stages of *T. urticae* were increased by delaying the planting date. In other investigation, Mohamed

(2004) found that the population of spider mites in the greenhouse were low during September, October and November, then the spider mites disappear after this period until reappeared in April, this result may be due to the differences in planting dates of crops.

Table 3. Effect of planting dates on rates of infestation by *T. urticae*/ 25 leaves of autumn cucumber plants during two successive years

Date of Inspections	2008-2009			2009-2010		
	Early Sept., 15	Common Sept, 30	Late Oct., 15	Early Sept.,15	Common Sept, 30	Late Oct., 15
Sept.30	0			0		
Oct. ,7	0			0		
Oct.,14	0	0		0	0	
Oct,.21	0	0		0	0	
Oct.,.30	1	0	0	1	0	0
Nov., 6	2	0	0	1	0	0
Nov.,13	4	1	0	3	1	0
Nov.,20	7	4	0	9	2	0
Nov.,27	19	18	6	15	5	1
Dec.,4	32	11	16	11	19	4
Dec.,11	59	46	43	27	22	23
Dec.,18	25	38	72	38	31	7
Dec.,25	93	79	87	73	85	19
Jan.,1	122	66	46	61	71	63
Jan.,8		168	105		110	92
Jan.,15		290	111		170	270
Jan.,22			310			160
Jan.,29			197			320
Total	364	721	993	239	516	959
Mean	26	51.5	70.9	17.1	36.9	68.9
LSD	NS			NS		

II. Efficacy of untraditional acaricides against the two spotted spider mite, *Tetranychus urticae* (Koch) on cucumber plants under greenhouse:

This experiment was designed to evaluate the efficacy of nine acaricides (chemical and biological) against *T. urticae* infesting cucumber plants in the greenhouse in spring season at Giza governorate.

A. Reduction after 24 hours (Initial Kill):

Data in Table (4&5) cleared that the reduction percentages of nine treatments were ranged between 96.33% resulted 24/ hours after Agromec 1.8% EC treated and 57.61% obtained after Bio–Fly (3×10^6 unit) treatment.

Chemical acaricide gave over 80% reduction were: Pyricide 24% EC gave 94.81%, Citroguard 15% EC gave 93.18% reduction , while bio–acaricides gave over 70% reduction were: Agromec 1.8% EC gave 96.33% Perv- AM 6% SL gave 88.58%, Bio–larve 5% EC (rate 15 CC) gave 85%, Bio larve 5% EC (rate 30 CC) gave 81.89%.

B. Mean of the reduction after 7 days (residual effect):

Table (5) indicated that the average of the reduction of mobile skeges of spider mites related with chemical compounds gave over 80% reduction were Pyricide 24% EC (94.98%), Acari–stope 50% SC (93.7%) and Citroguard15% EC (81.9%), while the bio- acaricides gave over 70% reduction were: Agromec 1.8% EC (93.69%), Bio–larve 5% EC (30 cc) 89.31%), prev–AM 6% SL (87.84), Milbeknock 1% EC (81.11%) Bio–larva (15 cc) (79.3%) and Bio–fly (3×10^6 units) (74.4%) reduction .

Generally, it could be recommended that the chemical and bio- acaricides could be used to control *T. urticae* on cucumber plants. The tested compounds gave result of initial kill (after 24 hours) except Acari–stop (chemical acaricide) and Bio–fly (bio- acaricide) gave low reduction of *T. urticae* in different group levels.

On the other hand, on changes of reduction of residual effect between different groups of acaricides after 7 days and there are could be using any compounds which were considered selectivity, safety and effective to give best control against the two spotted spider mites on cucumber plants under protected cultivation.

These results agree with, Szwejda (1994) who reported that abamectin gave excellent control of spider mites on cucumber under greenhouse in Poland and caused more than 98% mortality. Nakamura and Sasak (2004) tested twelve acaricides and found that the milbemectin achieved good control (100% mortality 48 h after spray) on both females and eggs of *T. urticae*,Peric *et al* (2009) found that the efficacy of abamectin against *T. urticae* on cucumber was 92.2%. Abdel-Wali *et al*. (2012) found the mortality of abamectin, milbemectin and chlorafenapyr on the two spotted spider mites under plastic greenhouses was 92.9% after one day of application. Dutta *et al*. (2012) recorded that the abamectin provided high reduction of mite population (83.4%). Seyed *et al*. (2012) mentioned that the fungus *Beauveria bassiana* was effected on the larval stage of *T. urticae* .

Table 4. Efficacy of some Acaricides against two spotted spider mites on cucumber plants under plastic greenhouse at protected cultivation center on summer seasons 2012.

Acaricides	Rate per 100L water	No. mobile individuals pre. spray	initial kill		Residual Effect											
			24 hr.		3 days		5 days		7 days		10 days		12 days		15 days	
			No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Acari-stop 50%SC	40 CC	703	689	59.54	153	92.42	127	92.58	83	95.93	98	96.15	36	97.99	5	99.70
Milbeknock 1% EC	50 CC	514	340	72.69	388	73.71	255	79.61	154	89.67	160	91.40	65	95.05	54	95.64
Prev. AM 6% SL	400 CC	347	96	88.58	121	87.86	111	86.82	114	88.68	129	89.73	62	93.00	31	96.29
Bio- larve 5% EC	30 CC	317	93	81.89	72	92.09	106	86.26	100	89.13	110	90.41	74	90.86	59	92.28
Bio-fly (3×10^6units)	50 CC	337	346	57.61	316	67.35	248	69.76	144	85.27	166	86.39	78	90.94	67	91.75
Agromec 1.8% EC	50 CC	562	50	96.33	81	94.98	108	92.10	102	93.74	121	94.05	90	93.73	98	92.76
Bio- larve 5% EC	15 CC	552	194	85.49	295	81.39	308	77.07	333	79.21	338	83.08	148	89.50	164	87.67
Pyricide 24% EC	75 CC	374	47	94.81	62	94.23	52	94.29	40	96.31	90	93.35	59	93.82	51	94.34
Citroguard 15% EC	200 CC	351	58	93.18	158	84.33	179	79.04	184	81.93	216	83.00	114	87.28	105	87.58
Control	Without Treatment	547	1325	-	1571	-	1331	-	1587	-	1980	-	1397	-	1318	-

Table 5. Reduction percentages of *T. urticae* population after treatments with some acaricides on cucumber plants under greenhouse during 2012.

Acaricides	Rate / 100 L water	No. mobile individuals pre. Spray	initial kill (24 hr)		Residual Effect (7days)	
			No.	%	No.	%
Acari-stop 50%SC	40 CC	703	689	59.54	363	93.7
Milbeknock 1% EC	50 CC	514	340	72.69	797	81.11
Prev. AM 6% SL	400 CC	347	96	88.58	346	87.84
Bio- larve 5% EC	30 CC	317	93	81.89	278	89.31
Bio- fly (3×10^6units)	50 CC	337	346	57.61	708	74.4
Agromec 1.8% EC	50 CC	562	50	96.33	291	93.69
Bio-larve 5% EC	15 CC	552	194	85.49	936	79.3
Pyricide 24% EC	75 CC	374	47	94.81	154	94.98
Citroguard 15% EC	200 CC	351	58	93.18	521	81.9
Control	Without Treatment	547	1325	-	4489	-

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موعد الزراعة وعلاقته بالآفات الحشرية والحيوانية التى تصيب نباتات الخيار تحت الزراعات المحمية فى محافظة الجيزة

فوزى فائق شلبى[١] ، فتحى عبد العزيز على[٢]، عادل عبد الحميد حافظ [١]، هيام مصطفى سعد [٢]

١- *قسم وقاية النباتات – كلية الزراعة – جامعة بنها*
٢- *معهد بحوث وقاية النباتات – مركز البحوث الزراعية – الدقى – الجيزة.*

تزرع نباتات الخيار فى الصوب الزراعية فى الموسم الخريفى والربيعى من كل عام. ويعتبر الموسم الخريفى هو الأهم فى إمداد الأسواق بثمار الخيار فى أوقات الجو البارد. والأفات الرئيسية التى يتعرض لها الخيار هى الذبابة البيضاء والمن والعنكبوت الأحمر.

تمت دراسة تعداد هذه الأفات على نباتات الخيار المنزرعة فى ثلاثة مواعيد مختلفة داخل الصوب البلاستيكية في موسمين خريفيين متعاقبين خلال عامى (٢٠٠٨/٠٩) ، (٢٠٠٩/ ١٠) . أوضحت النتائج أن ميعاد الزراعة المبكر سجل أعلى تعداد لحشرة الذبابة البيضاء خلال موسمى الدراسة بينما سجل ميعاد الزراعة المتأخر أعلى تعداد لحشرة المن والعنكبوت الأحمر مما أوضح أن لميعاد الزراعة دورا" كبيرا" على الإصابة بالآفات الثلاثة.

كما تم أيضا تقييم بعض المبيدات الأكاروسية غير التقليدية مثل أكارى ستوب (٥٠% SC) ميلبكنوك (١% EC) وبريف ايه ام (٦% SL) بيوفلاى ، اجروميك (١,٨ %EC) بيولارف (٥% EC) بيريسايد (٢٤% EC) ستروجارد (١٥% EC) فى خفض تعداد العنكبوت الأحمر على نباتات الخيار تحت الصوبة خلال صيف ٢٠١٢. أوضحت النتائج أن جميع المعاملات السابقة أدت إلى خفض تعداد العنكبوت الأحمر بدرجات مختلفة بعد ٢٤ ساعة من المعاملة، وتراوحت نسب الخفض من ٩٦% لمركب الأجروميك و٥٧,٦ لمركب بيوفلاى . كما ثبت أن جميع المعاملات كان لها تأثير فعال فى خفض تعداد الأفة بعد ٧ أيام من الرش مما أثبت أنه من الممكن استخدام أى مبيد منها بأمان.