

SUSCEPTIBILITY OF SOME SUNFLOWER CULTIVARS FOR PIERCING SUCKING PESTS IN SOHAG GOVERNORATE

AZZA A. MOHAMED and SAFAA M. ABD EL-AZIZ

Plant Protection Research Institute, ARC, Dokki, Giza

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Abstract

This study was carried out to evaluate the susceptibility of certain cultivars of sunflower crop (Giza 102, Pioneer6480, Sakha 53 and Miak) to certain piercing sucking pests' infestation under field conditions for two successive seasons (2010 & 2011) in Sohag governorate, Egypt.

Data revealed that the tested sunflower cultivars have marked variation in their susceptibility to pest infestation. Giza102 & Sakha 53 cultivars were the most susceptible for *E. decipiens* nymphs and *M. persicae* pests infestation as it showed a mean number of 18.07 & 18.4 nymphs/15 leaflet & 4.89, 2.07 individual/15 sunflower leaflet followed by, Miak & pioneer6480 during 2010 season, a similar trend was obtained for two pests in 2011. On the other hand, the resistant cultivars to the whitefly infestation could be arranged in ascending as follow: Sakha 53, Giza 102, Miak and Pioneer6480 &. The corresponding infestation rates averaged 49.07, 51.59, 66.52 and 70.96 & 53.67, 55.26, 62.11, 69.78 nymph/15 leafletlets, during 2010 and 2011 seasons, respectively.

Concerning susceptibility of sunflower cultivars to , *Eutetranychus arabicus* infestation statistical analysis revealed that Miak was highly significantl while Giza 102 was less significantly infested in both seasons, meanwhile in *T. urticae*, the cultivar Pioneer6480 proved to be susceptible than all cultivars with average 91.78 and 96.56 individuals/ 15 sunflower leaflets in 2010 and 2011 seasons, respectively; while, Sakha 53 cultivar harboured significantly a lower infestation with average numbers of 46.19 and 57.81 individuals/ 15 sunflower leaflets in 2010 and 2011 seasons, respectively. Regarding to predator mite, *Euseius hutu* Giza 102 was the most susceptible in two seasons.

INTRODUCTION

Sunflower plant is widely cultivated in many parts of the world as major and strategy oil crop.

Sunflower crop (*Helianthus annus*) is considered an important host to a huge number of insect pests (Charlet and Brewer, 1998); however there is a considerable variation in the respective importance of the different pests in different countries. In the meantime, productivity is rather limited due to many factors i.e. variety, agricultural practices and their consequent influence in the pest complex in the field.

On the other hand, several reports showed that agricultural practices, natural enemies, and varieties resistance, proved to be effective factors in decreasing the population of such pests and their damage to crops (Charlet and Knodel, 2003). The main pests attacking legume vegetables have been reported to include *Empoasca decipiens* (Paoli) (Cicadellidae: Homoptera), *Bemisia tabaci* (Genn.) (Aleyrodidae: Homoptera), *Myzus persicae* (Sulz.) (Aphididae: Homoptera).

So, the present study was conducted to investigate the following points:

1. The population densities of certain piercing and sucking pests attacking this crop.
2. The population densities of the predators associated with piercing sucking pests attacking sunflower crop.
3. The relationship between the piercing sucking pests and their associated predators.
4. The relative susceptibility of some sunflower crop varieties to certain piercing sucking pests' infestation.
5. Effect of certain climatic factors on the population densities of piercing and sucking pests.

MATERIALS AND METHODS

The present study was conducted at the farm of Shandweel Agricultural Research Station, Sohag governorate, Egypt, during the two successive seasons (2010) and (2011). An area of about 1/4 Feddan was divided into plots of equal size (1/100 feddan) and arranged in completely randomized blocks with three replicates.

Throughout the summer season sunflower seeds were sowing in the last week of May on one side of the ridge at 20 cm spacing. Four sunflower cultivars were put under investigation, i.e., Giza 102, Pioneer6480, Sakha 53 and Miak.

No pesticides were used in experimental time.

Samples of 15 leaves were randomly selected weekly from upper, middle and lower level of sunflower plants per each plot. Samples started after 15 days from sowing date then continued to harvesting. The selected samples were transferred to the laboratory for inspection with stereomicroscope to determine the number of *Myzus persicae* (Sulz.), *Empoasca decipiens* (Paoli) (nymphs), and *Bemisia tabaci* (Genn.) (nymphs), *Tetranychus urticae* Koch and *Eutetranychus arabicus* (Acari: Tetranychidae).

Data obtained were statistically analyzed using one – way analysis of variance. Mean values were separated by the least significant difference (L.S.D.) procedure at $P = 5\%$. Simple correlation (r) between the number of sucking insect pests and the total number of associated predators was calculated

RESULTS AND DISCUSSION

The relative susceptibility of some sunflower crop varieties (Giza 102, Pioneer6480, Sakha 53 and Miak) to certain piercing sucking pests' infestation in Sohag governorate, Egypt, during the two successive seasons (2010) and (2011) were investigated.

(1): *Emoasca decipiens*

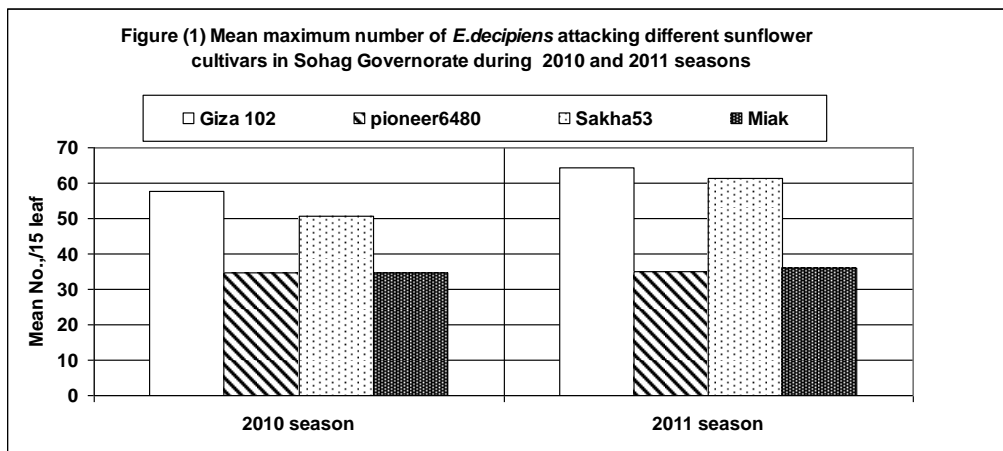
Tables (1) & Fig. (1) present the mean number of nymphs per 15 sunflower leaves in 2010 and 2011 seasons. In 2010 season, the pest nymph individuals were observed from the beginning of inspection period, increased gradually and showed one peak of activity in all cultivars in 7/ July for Giza 102, Sakha 53 and Miak with average number of 57.67, 50.67 and 34.67 nymphs/ 15 sunflower leaflet, respectively, and in 14/ July for Pioneer6480 with average number of 34.67 nymphs/ 15 sunflower leaflets. Then the number decreased gradually to the end of the season.

However, in 2011 season, the first appearance of the pest observed in 16/ June with a highly numbers in Pioneer6480, Sakha 53 and Miak plots then decreased in the next week. Then the numbers increased gradually to form one peak in 7/ July with average numbers of 64.33, 61.33 and 36.00 nymphs/ 15 sunflower leaflets, respectively, and 14/ July for Pioneer6480 with average number of 35.00 nymphs/ 15 sunflower leaflets. Afterthat, the numbers decreased gradually to disappear completely in the last week of inspection period.

For the susceptibility of sunflower cultivar to *E. decipiens* infestation, data showed that cultivars Giza 102 and Sakha 53 received highly significant mean numbers of pest nymphs with mean numbers of 18.07 and 18.74 nymphs/ 15 sunflower leaflets, respectively, while Pioneer6480 and Miak showed significantly lower infestation with mean numbers of 11.93 and 11.11 nymphs/ 15 sunflower leaflets, respectively, in 2010 season. While, In 2011 season, a similar trend was obtained with mean number of 22.33, 13.52, 21.56 and 14.37 nymphs/ 15 sunflowers leaflet, respectively.

Table 1. Mean number of *E. decipiens* nymphs attacking sunflower cultivar, Sohag Governorate, 2010 and 2011 seasons.

Mean No./ 15 leaflet								
Date	2010 season				2011 season			
	Giza 102	Pioneer 6480	Sakha 53	Miak	Giza 102	Pioneer 6480	Sakha 53	Miak
Jun 9	0.67	0.33	1.67	1.67	0.00	0.00	0.00	0.00
16	7.00	3.33	8.00	5.00	6.33	12.00	16.00	16.33
23	11.67	7.33	11.33	8.67	13.67	8.33	12.67	13.33
30	27.00	12.67	28.00	13.33	31.67	17.67	34.33	21.33
Jul 7	57.67	21.33	50.67	34.67	64.33	26.33	61.33	36.00
14	25.00	34.67	35.67	22.00	46.00	35.00	38.33	25.00
21	23.00	15.33	17.33	8.00	30.67	14.67	18.67	11.00
28	10.00	10.00	15.33	5.33	8.33	7.67	12.67	6.33
Aug 4	0.67	2.33	0.67	1.33	0.00	0.00	0.00	0.00
Mean	18.07	11.93	18.74	11.11	22.33	13.52	21.56	14.37
F-value	30.00				57.23			
LSD 0.05	2.38				2.00			

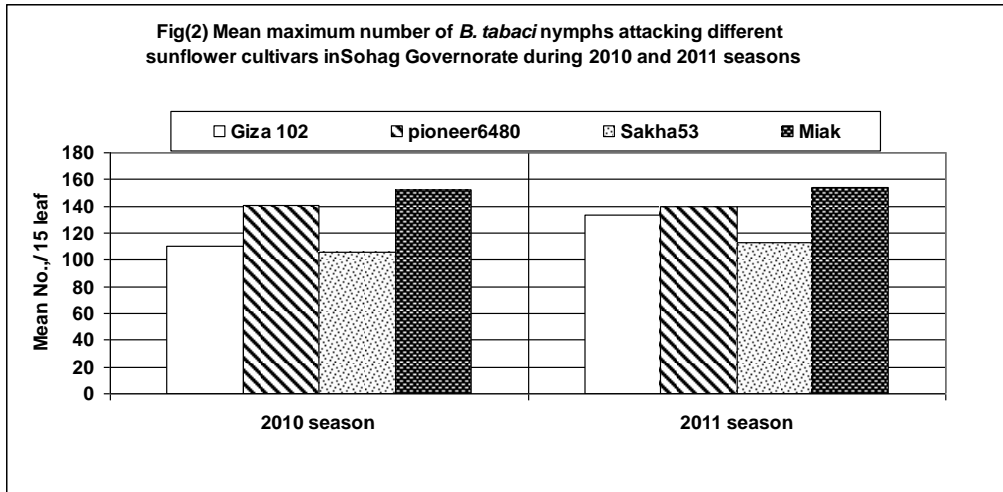


(2): *Bemisia tabaci*:

Data given in Table (2) & Fig. (2) showed the mean number of *B. tabaci* nymphs detected in all sampling dates of the two seasons. The whitefly nymphs appeared with relatively high numbers recorded their peak in 30/ June for Giza 102 and Pioneer6480 with average numbers of 110, 00 and 140.67 nymphs/ 15 sunflower leaflets, respectively, and in 7/ July for Sakha 53 and Miak with average numbers of 106, 00 and 152.33 nymphs/ 15 sunflower leaflets, respectively, then the number decreased gradually to the end of 2010 season. In 2011 season, the pest reached their maximum numbers in 30/ June with average number of 139.67 nymphs/ 15 sunflower leaflets, and in 7/ July for Giza 102, Sakha 53 and Miak with average numbers of 133.00, 113.67 and 153.67 nymphs/ 15 sunflowers leaflets, respectively. From the above data, it's clear that the differences between cultivars were significant in both seasons. Pioneer6480 and Miak cultivars were found to be the most susceptible with average numbers of 70.96 and 66.52 nymphs/ 15 sunflower leaflets, respectively, in 2010 season and 69.78 and 62.11 nymphs/ 15 sunflower leaflets, respectively, in 2011 season. On the other hand, cultivars Giza 102 and Sakha 53 harbored significantly lower infestation in both seasons with average numbers of 51.59 and 49.07 nymphs/ 15 sunflower leaflets, respectively, in 2010 season and 55.26 and 53.67 nymphs/ 15 sunflower leaflets, respectively.

Table 2. Mean number of *B. tabaci* nymphs attacking sunflower cultivar, Sohag Governorate, 2010 and 2011 seasons.

Mean No./ 15 leaflets								
Date	2010 season				2011 season			
	Giza 102	Pioneer 6480	Sakha 53	Miak	Giza 102	Pioneer 6480	Sakha 53	Miak
Jun 9	23.67	33.67	11.33	28.67	18.67	11.33	16.00	10.33
16	57.00	81.67	38.33	59.33	47.33	72.00	33.33	28.33
23	63.67	102.00	73.00	88.67	57.33	97.00	87.00	92.00
30	110.00	140.67	97.67	120.00	89.67	139.67	104.67	116.67
Jul 7	79.00	118.67	106.00	152.33	133.00	123.00	113.00	153.67
14	54.00	65.67	63.67	89.00	61.67	79.67	69.00	93.67
21	43.67	53.67	30.00	38.67	54.00	63.00	35.33	36.67
28	30.67	37.33	17.67	19.33	26.00	38.00	20.33	22.00
Aug 4	2.67	5.33	4.00	2.67	9.67	4.33	4.33	5.67
Mean	51.59	70.96	49.07	66.52	55.26	69.78	53.67	62.11
F-value	31.82				8.24			
LSD 0.05	6.261				8.36			



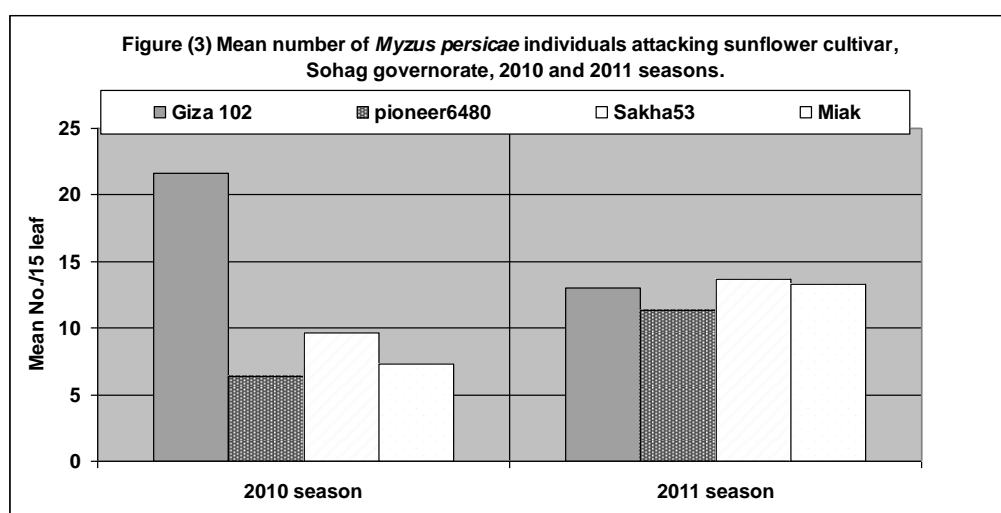
(3): *Myzus. persicae*:

The population density of *M. persicae* individuals is summarized in Table (3) & Fig (3). *M. persicae* started to colonize on sunflower plants in 7/ July in both seasons of the study. One peak of activity was achieved in all cultivars in both seasons. The aphid gave their maximum number in 21/ July for Giza 102, Sakha 53 and Miak with average numbers of 21.67, 9.67 and 7.33 nymphs/ 15 sunflower leaflet, respectively, and in 14/ July for Pioneer6480 with average number of 6.33 nymphs/ 15 sunflower leaflets in the first season. Also, the peak of activity was recorded in 14/ July for all cultivars with average numbers of 13.00, 11.33, 13.67 and 13.33 nymphs/ 15 sunflower leaflets, respectively, in the second season.

Concerning the susceptibility of four sunflower cultivars, Giza 102 was the most susceptible one with average number of 4.89 nymphs/ 15 sunflowers leaflet. while, Giza 102, Sakha 53 and Miak cultivars received 1.74, 2.07 and 1.70 nymphs/ 15 sunflowers leaflet, respectively in 2010 season. However, the obtained data revealed that the differences between cultivars were insignificant in 2011 season, with average numbers of 1.63, 2.56, 3.15 and 2.30 nymphs/ 15 sunflower leaflets, respectively.

Table 3. Mean number of *M. persicae* individuals attacking sunflower cultivar, Sohag Governorate, 2010 and 2011 seasons.

Mean No./ 15 leaves								
Date	2010 season				2011 season			
	Giza 102	Pioneer6480	Sakha 53	Miak	Giza 102	Pioneer6480	Sakha 53	Miak
Jun 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jul 7	1.00	1.00	1.33	0.67	1.67	3.33	7.67	2.33
14	6.00	6.33	5.67	6.67	13.00	11.33	13.67	13.33
21	21.67	4.00	9.67	7.33	0.00	6.33	5.00	4.00
28	10.67	2.33	2.00	0.67	0.00	2.00	2.00	1.00
Aug 4	4.67	2.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean	4.89	1.74	2.07	1.70	1.63	2.56	3.15	2.30
F-value	14.29							
LSD 0.05	1.32							



(4): *Eutetranychus arabicus*

The weekly average number of *Eutetranychus arabicus* population in sunflower plants of 2010 and 2011 seasons was shown in Tables (4) and fig. (4).

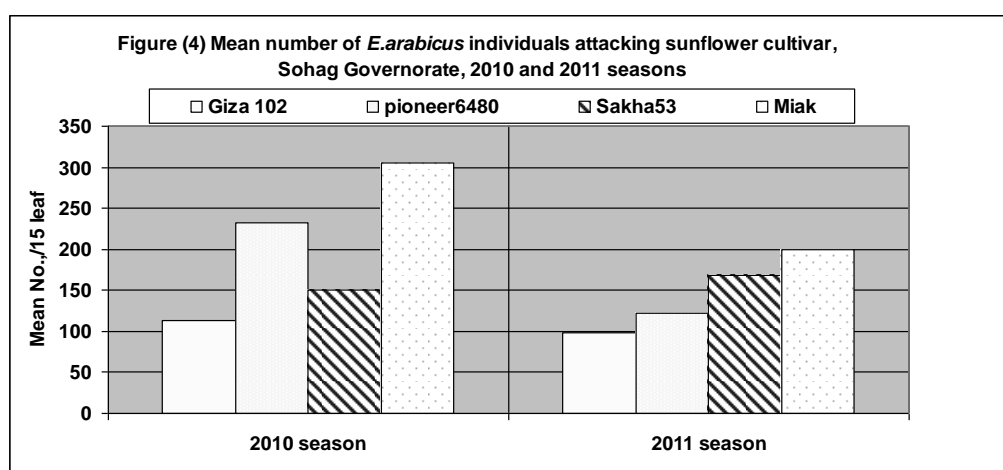
Eutetranychus arabicus individuals were recorded from the first date of inspection period and continued to the end of this inspection period during the two seasons. The numbers of the pest increased gradually to form two peaks on all cultivars in both seasons. In 2010 season, Giza 102 and Pioneer6480 achieved 60.33, 137.00 individuals/ 15 sunflower leaflets, respectively in 23/ July, and 113.00 and 233.00, respectively, in 21/ July. Also, the pest recorded 110.33 and 237.00 individuals/ 15 sunflower leaflets in Sakha 53 and Miak cultivars, respectively, in 30/ June, and 150.33 and 305.33 individuals/ 15 sunflower leaflets in the same cultivars, respectively, in 21/ July.

In 2011 season, the pest recorded 73.67, 129.67, 65.67 and 109.33 individuals/ 15 sunflowers leaflets in 23/ June for Giza 102, Pioneer6480, Sakha 53 and Miak, respectively and 99.00, 122.00, 169.00 and 200.00 individuals/ 15 sunflower leaflets in 21/ July for the same cultivars, respectively.

In regard to susceptibility of sunflower cultivars to *E.arabicus* infestation, the statistical analysis revealed that the cultivar Miak was significantly more infested by the *E. arabicus* than all tested cultivars, however, cultivar Giza 102 was significantly less infested in both seasons. As, Giza 102, Pioneer6480, Sakha 53 and Miak cultivars received 41.22, 82.11, 70.74 and 109.04 individuals/ 15 sunflower leaflets, respectively, in 2010 season, and 51.59, 76.89, 73.63 and 95.93 individuals/ 15 sunflower leaflets, respectively, in 2011 season.

Table 4. Mean number of *Eutetranychus arabicus* individuals attacking sunflower cultivar, Sohag Governorate, 2010 and 2011 seasons.

Mean No./ 15 leaflets								
Date	2010 season				2011 season			
	Giza 102	Pioneer 6480	Sakha 53	Miak	Giza 102	Pioneer 6480	Sakha 53	Miak
Jun 9	5.67	41.33	15.00	23.00	14.33	31.33	16.67	20.33
16	10.33	73.67	42.00	65.00	54.33	85.33	52.00	79.67
23	60.33	137.00	61.67	95.00	73.67	129.67	65.67	109.33
30	24.67	91.33	110.33	237.00	39.33	89.00	52.33	87.67
Jul 7	18.67	55.00	59.67	27.00	24.67	63.67	83.00	88.67
14	41.33	8.67	87.00	19.33	57.67	86.33	111.67	150.67
21	113.00	233.00	150.33	305.33	99.00	122.00	169.00	200.00
28	72.33	72.33	77.00	153.67	86.00	70.67	98.00	103.33
Aug 4	24.67	26.67	33.67	56.00	15.33	14.00	14.33	23.67
Mean	41.22	82.11	70.74	109.04	51.59	76.89	73.63	95.93
F-value	21.999				215.22			
LSD 0.05	19.53				4.04			



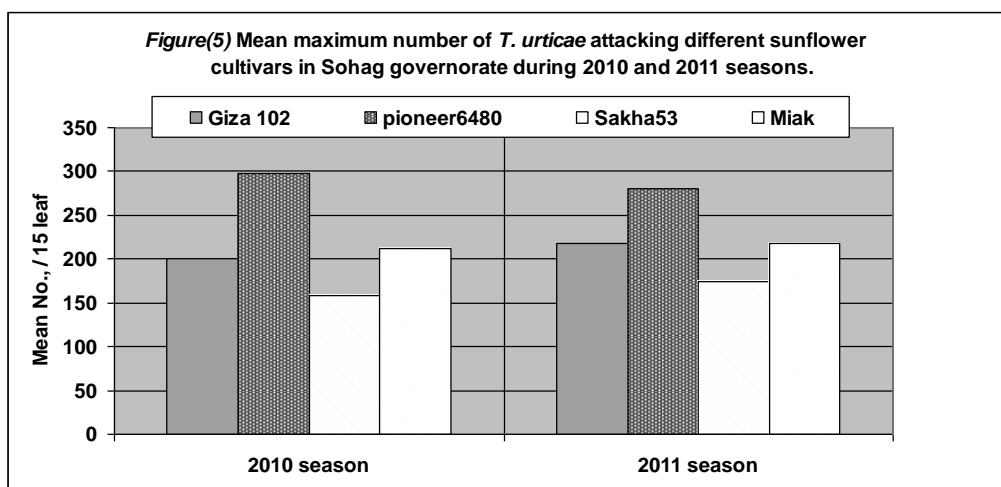
(5): *Tetranychus. urticae*:

T. urticae began to take place in sunflower fields in 16/ June, then the numbers increased gradually to reach their peak in 14/ July for Giza 102 and in 7/ July for the rest cultivars in 2010 season with average numbers of 121.00, 298.00, 158.33 and 211.67 individuals/ 15 sunflower leaflets for Giza 102, Pioneer6480, Sakha 53 and Miak cultivars, respectively. Also, one peak was detected in the second season for all cultivars with average numbers of 218.00, 280.67, 175.00 and 217.67 individuals/ 15 sunflower leaflets for the mentioned cultivars, respectively. (table(5) & Fig. (5))

Generally, the results indicated that cultivar Pioneer6480 proved to be susceptible than all cultivars in the two seasons of the study, because it harboured significantly the highest number of *T. urticae* individuals, 91.78 and 96.56 individuals/ 15 sunflower leaflets in 2010 and 2011 seasons, respectively. In addition, Sakha 53 cultivar harboured significantly a lower infestation than all cultivars in the two years of the study with average numbers of 46.19 and 57.81 individuals/ 15 sunflower leaflets in 2010 and 2011 seasons, respectively.

Table 5. Mean number of *Tetranychus urticae* attacking sunflower cultivar, Sohag Governorate, 2010 and 2011 seasons.

Mean No./ 15 leaflets								
Date	2010 season				2011 season			
	Giza 102	Pioneer 6480	Sakha 53	Miak	Giza 102	Pioneer 6480	Sakha 53	Miak
Jun 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	25.33	20.67	14.33	5.67	7.67	21.33	15.33	11.67
23	50.67	77.33	32.00	31.67	42.67	94.00	37.33	35.67
30	108.33	143.67	59.67	98.67	109.33	135.67	65.67	89.00
Jul 7	201.00	298.00	158.33	211.67	159.33	167.00	96.67	153.33
14	121.00	163.33	75.00	123.00	218.00	280.67	175.00	217.67
21	96.00	83.00	43.33	63.67	119.33	138.33	95.33	90.33
28	60.33	39.33	27.33	27.33	36.00	23.33	21.33	19.67
Aug 4	15.33	0.67	5.67	10.67	5.33	8.67	13.67	5.33
Mean	75.33	91.78	46.19	63.59	77.52	96.56	57.81	69.19
F-value	23.19				51.37			
LSD 0.05	13.02				7.43			

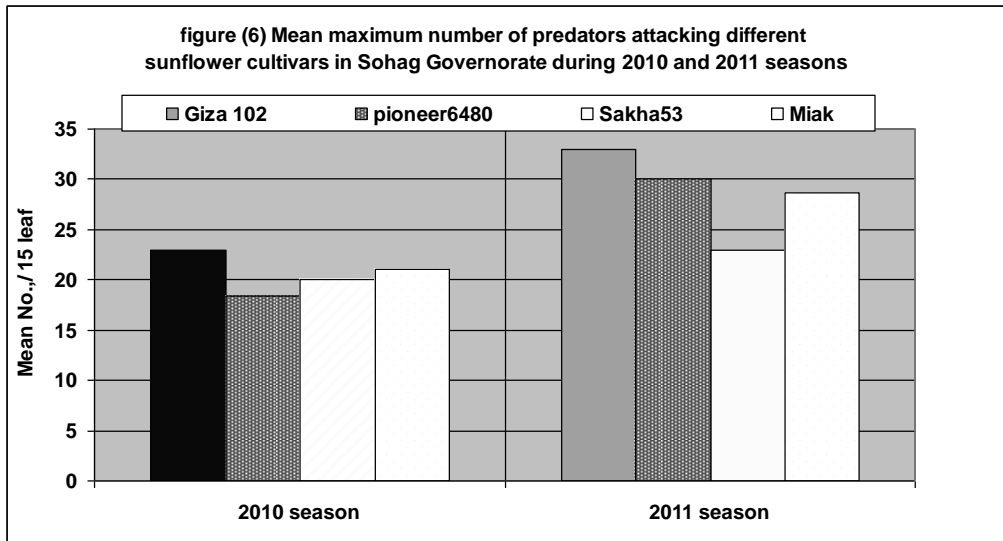


(6): Predator, *Euseius hutu*:

In 2010 season, *E. hutu*. appeared in 16/ June then reached their higher numbers in 14/ July with average numbers of 23.00, 18.33, 20.00 and 21.00 individuals/ 15 sunflower leaflets, respectively. Afterwards, the population disappeared completely in the last two weeks of season Table (6) & Fig (6).

Table 6. Mean number of *Euseius hutu* attacking sunflower cultivar, Sohag Governorate, 2010 and 2011 seasons.

Date	2010 season				2011 season			
	Giza 102	Pioneer6480	Sakha 53	Miak	Giza 102	Pioneer6480	Sakha 53	Miak
Jun 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	2.00	2.67	4.00	3.67	4.33	6.00	1.67	7.33
23	4.00	4.33	6.00	5.00	9.00	10.00	6.67	4.33
30	6.67	6.33	9.00	7.67	16.67	15.33	6.00	13.33
Jul 7	12.33	8.33	13.33	11.00	33.00	30.00	23.00	28.67
14	23.00	18.33	20.00	21.00	20.33	17.33	12.67	16.67
21	2.33	3.00	2.00	2.00	3.33	3.33	1.33	4.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean	5.59	4.78	6.04	5.59	9.63	9.11	5.70	8.26
F-value	2.67				40.51			
LSD 0.05	ns				0.89			



In case of 2011 season, *E. hutu* also took place in sunflower plots from the second week of inspection, increased gradually to form two peaks in Sakha 53 plots in 23/ June and 7/ July with average numbers of 6.67 and 23.00 individuals/ 15 sunflower leaflets, respectively. For Giza 102, Pioneer6480 and Miak, *E. hutu* had one peak of activity in 7/ July with average numbers of 33.00, 30.00 and 28.67 individuals/ 15 sunflower leaflets, respectively.

This variance in infestation rate of piercing and sucking pests to sunflower varieties may be due to the preference of host selection or the tendency of varieties to tolerant (Ekvised *et al.*, 2006). Therefore, numerous factors appear to be contribute this tendency, including, physical and chemical characters of the plants (Ashoub,1985; Abdel-Gawad, *et al.*,1987; Abd El-Maksoud, 2008;_El-Shehaby, *et al.*,1992), environmental effects and genetic resistance (Harvey *et al.* 1996)

Similarly, the literature on sunflower insects and mites and their resistant to different cultivars has been studied by several investigators included Roger (1992), Ahmed (1996), Charlet *et al.* (1997), Charlet and Brewer (1998), Charlet (1999), Jyoti and Brewer. (1999), Aslam and Rehman (2000), Mosa, *et al.* (2001).

Generally, it can be concluded that different peanut genotype varieties could play an important role in integrated pest management program.

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حساسية بعض اصناف دوار الشمس للإصابة بالآفات الثاقبة الماصة فى محافظة سوهاج

عزة عبد الجواد محمد و صفاء محمد عبد العزيز

معهد بحوث وقاية النباتات- مركز البحوث الزراعية - الدقي - الجيزة - مصر

تم تقييم قابلية اربعة اصناف من نبات عباد الشمس الأصابة ببعض الآفات الثاقبة الماصة (العنكبوت الأحمر، بالذبابة البيضاء، المن، نطاطات الأوراق) فى محافظة سوهاج خلال موسمي الدراسة 2010-2011.

الاصناف المختبرة: سخا 53- مياك - جيزة 102- بيونير6480-

دلت النتائج على أن صنف : سخا 53 و جيزة 102 كان أكثر قابلية للأصابة بحشرة المن، نطاطات الأوراق بمتوسط تعداد 18.07 و 18.4 حورية /بوصة المربعة و 4.89، 2.07 فرد/ بوصة المربعة على التوالي ويلية صنف : مياك و بيونير6480 على مدار موسمي الدراسة 2010-2011.

على الصعيد الآخر وجد أن صنف سخا 53 كان أكثر مقاومة للأصابة بالذبابة البيضاء ويلية صنف : مياك - بيونير6480 على مدار موسمي الدراسة 2010-2011.

دلت الدراسة ايضا أن صنف مياك كان أكثر قابلية للأصابة بالأكاروس *E. arabicus* و صنف جيزة 102 كان أقل قابلية للأصابة على مدار موسمي الدراسة 2010-2011. ، بينما وجد أن صنف بيونير6480 كان أكثر قابلية للأصابة العنكبوت الأحمر بمتوسط تعداد 91.7 & 96.56 فرد/ بوصة المربعة، على التوالي و صنف سخا 53 كان أقل قابلية للأصابة بمتوسط تعداد 46.19 & 57.81 فرد /بوصة المربعة على مدار موسمي الدراسة 2010-2011. هذا وقد وجد أن صنف جيزة 102 كان أكثر قابلية للأصابة بالمفترس الأكاروسى *E. hutu* على مدار موسمي الدراسة 2010-2011.