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### Influence of Different Vegetable Plants on the Population Density of some Piercing-Sucking Insect pests

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ABSTRACT



These studies were carried out in Kafr-Saad district, Damietta Governorate during 2022 season on four vegetable crops, (cucumber, cowpea, tomato and sweet potato). The present study showed that the different vegetables were attacked by seven piercing-sucking insect species i.e.: *Aphis gossypii, Myzus persicae, Bemisia tabaci, Thrips tabaci, Empoasca* sp., *Phenacoccus solenopsis* and *Nezara viridula* belonging to two insect orders: Thysanoptera and Hemiptera. Five insect species were recorded on each of the investigated crops, while the green peach aphid, *Myzus persicae* recorded only on cucumber plants, the cotton thrips, *Thrips tabaci* was not recorded on sweet potato plants. The most attracted host plants for the insect species was cucumber followed by cowpea and tomato, whereas sweet potato ranked the last category and represented by 282.8, 18.6, 10.5 and 5.6 individuals /sample, on cucumber, cowpea, tomato and sweet potato respectively. The cotton aphid, *Aphis gossypii* was the predominant species on cucumber, cowpea and tomato and represented by 890.1, 47.8 and 29.7 Aphids /sample, respectively with significant differences. Meanwhile, the green stink bug, *Nezara viridula* occupied the last category on the three vegetable host plants and represented by 1.8, 3.1 and 3.4 individuals/sample, respectively. On the other hand, the cotton mealybug, *Phenacoccus solenopsis* recorded the highest average number on sweet potato followed by the leafhoppers, *Empoasca* sp. and represented by 7.4 and 4.4 individuals/sample, respectively.

Keywords: Vegetable crops, piercing-sucking insects, host plants.

#### INTRODUCTION

Three hundred and ninety two vegetable plants are grown worldwide, according to the global vegetable census (Kays and Dias, 1995). 10.6% of Egypt's arable land in 2009 was used for cultivating vegetable crops (El-Nahrawy, 2011). Given that only 3% of Egypt's land is arable, this is extremely intensive agriculture (FAO, 2016). Egypt exported vegetables worth \$1.1 billion in 2019 (UN ComTrade Database, 2019). Cucumber crop (Cucumis sativus L.), is one of the most widely consumed fresh vegetables in the world. In Egypt, 52.67 thousand feddan are planted with cucumbers in 2013-2014, yielding approximately 496.81 thousand tons of fresh fruit. (Agriculture Ministry, 2015). Another one of the most significant vegetable crops in Egypt and the rest of the globe is tomato (Lycopersicon esculentum, Mill.). Egypt is one of the world's top tomato producers with 8,625,219 tons produced annually (FAO, 2012). Cowpea, Vigna unguiculata (L.) Walp., is a member of the Fabaceae family and grown as a grain, vegetable, and fodder crop all over the world, particularly in tropical Africa, South America, and Asia. 20.42-34.60% of proteins are found in cowpea seeds (Bdalla et al., 2001). More one important starchy food crop is sweet potatoes, particularly in poor nations where they rank third in terms of production value and fifth in terms of the number of calories they contribute to diets (FAO, 2015).

Unfortunately, during their different growth phases, these crops are attacked by a variety of insect species. Injurious piercing-sucking insect pests seriously affect yield quality and quantity (Jackai, 1995; Ward *et al.*, 2002; Hassan 2013). They cause harm directly to the plants by suckling plant juice, or indirectly by acting as viral carriers.

Vegetable yields are significantly declined by insect pests (Kisha, 1984), and chemical insecticides continue to be the most widely used method of management despite their well-documented detrimental effects on the environment and human health. In actuality, pesticides continue to be the principal tool used to manage pests. According to Shelton et al. (2008), 30% of all insecticides used globally are used to control insects in vegetable crops. According to Mansour et al. (2017), there were still traces of extremely hazardous pesticides in the environment in Egypt since 2017. Although the use of biopesticides is becoming more common in field crops, indoor pesticide use is still common but often poorly regulated (Mansour, 2008). Many insect species have been identified as pests of sweet potatoes; include members of the orders of Thysanoptera, Orthoptera, Hemiptera, Lepidoptera, and spider mites (Kay, 1973; Chalfant, et al. 1990; Ekman and Lovatt, 2015). The cotton thrips, Thrips tabaci L. is a polyphagous insect that seriously damages ornamental and vegetable plants worldwide (Murai, 2000). Nymphs and adults consume the tissue sap of green leaves, directly harming the tissue by damaging the epidermal cells (Koschier et al., 2002).

The host plant has an effective role on the piercingsucking pest populations and their predators, the natural enemies showed differences of their searching characteristics in response to host plant species Abd El-Kareim (2002).

Therefore, the goal of the current research is to studying the influence of different host plants on the population density of some piercing-sucking insect pests that attacking vegetable crops in the open fields.

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#### MATERIALS AND METHODS

#### Study area:

This study was conducted in a private farm located at Kafr-Saad region of Damietta Governorate, Egypt, The farm is located at 31.359427°N 31.686452°E. The experimental area was quarter feddan (=1050 m<sup>2</sup>) and split into four identical plots, each measuring 262.5 m<sup>2</sup>. Each of the four plots was planted with one of the four vegetable crops; i.e. Tomato, (L. esculentum); Cucumber, (C. sativus); Egyptian cowpea, (V. unguiculata); Sweet potato (I. batatas). On April 27th, 2022, during the summer planting season, tomato and cucumber seedlings (about forty-five days old) were transplanted leaving half a meter between each plant and a meter between rows. In case of sweet potato, the area is planted at a rate of 8-12 lines in the two reeds; The cuttings were planted in the presence of water on the upper third of the line at a distance of 25-30 cm. Cowpea seeds were planted 2 inches deep, 3 inches apart, in rows 3 feet apart. Throughout the whole production period, every suggested agricultural practice was followed, with the exception of using pesticides. Fifteen days later of planting, samples were collected from different crops at weekly intervals until the end of harvest. The numbers of insect species were counted and recorded. Five randomly plants of each crop were selected and five leaves were selected from each crops. The collected leaves were placed in paper bags and directly transferred to the lab to be examined using a binocular microscope. Next, the population density of the recorded insect pests was ascertained.

#### Statistical analysis

Using the SPSS software, the effect of host plant on population density of each insect species was performed using one-way analysis of variance (ANOVA). Means were separated using Duncan's Multiple Range Test at 0.05 probability level.

#### **RESULTS AND DISCUSSION**

## **1.** Surveying the piercing-sucking insect pests attacking some vegetable crops.

The data obtained in Table (1), indicate that the four vegetable crops i.e. cucumber, (*C. sativus*), cowpea (*V. unguiculata* L.), tomato, (*L. esculentum* L.) and sweet potato, (*I. batatas* L.), were attacked by many insect species. The insect species that were recorded belonging to two insect orders: Order Thysanoptera [the onion thrips, *T. tabaci* (Family: Thripidae)] and Order Hemiptera [the green peach aphid, *M. persicae* and the cotton aphid, *A. gossypii*; the tomato whitefly, *B. tabaci*; leafhoppers, *Empoasca* spp.; green stink bug, *N. viridula* and the cotton mealybug, *P. solenopsis*.

There were five insect species; *P. solenopsis, A. gossypii, Empoasca* spp., *B. tabaci* and *N. viridula* were recorded on each of the four crops. While, *Myzus persicae* recorded only on cucumber, the cotton thrips, *T. tabaci* was not recorded on sweet potato. Cucumber plant attacked by seven insect species, while, tomato and cowpea were attacked by six insect species, sweet potato attacked by five insect species.

 Table 1. The piercing-sucking insect species recorded on the four vegetable crops at Kafr-Saad district, Damietta Governorate.

Insect	Fomily	Seasonal average no./ 25 leaves						
order	ганшу –	Genus/species	Cucumber	Cowpea	Tomato	Sweet potato		
Thysanoptera	Thripidae	Thrips tabaci	+	+	+	-		
	Pseudococcidae	Phenacoccus solenopsis	+	+	+	+		
	Cicadellidae	Empoasca spp.	+	+	+	+		
Hemintera	Anhididae	Aphis gossypii	+	+	+	+		
петпрета	Aprilaidae	Myzus persicae	+	-	-	-		
	Aleyrodidae	Bemisia tabaci	+	+	+	+		
	Pentatomidae	Nezara viridula	+	+	+	+		

The symbol (+) indicates that the insect recorded on the plant, while the symbol (-) indicates that the insect does not recorded on the plant.

### 2. Host preference of the main piercing-sucking insect species on different vegetable crops.

The obtained results in Table (2) and Figure (1) show the average numbers of the main insect species on the four vegetable plants.

According to the statistical analysis, there were significant variations between the general average numbers of the piercing-sucking insects attacking the four vegetable plants during the growing season. The highest attracted host plant for the insect species was cucumber plants (282.8 individuals /sample) followed by cowpea and tomato plants (18.6 and 10.5 individuals / sample) whereas the less attracted host plant was sweet potato (5.6 individuals / sample).

Aphis spp., (A. gossypii and M. persicae) were the predominant species and recorded the highest average numbers (242.4 individuals / sample) followed by *B. tabaci* (161.4 individuals / sample). Whereas the lowest average numbers were recorded on the four vegetable crops by *N. viridula*. (3.2 bugs / sample).

Table 2. Ger	eral average num	bers of the main	n piercing-suc	king insects attac	king vegetable	e crops at Kaf	r-Saad district,
Da	nietta Governora	te.					

Host plant	A. gossypü	B. tabaci	T. tabaci	Empoasca Sp.	P. solenopsis	N. viridula	Total	LSD (0.05)
Cucumber	890.1±239.0 a	631.2±213.5 a	142.4±56.5 a	6.4 <u>±</u> 0.8 b	24.6±7.3 a	1.8±0.3 b	1696.6±363.9 a	375.9
Cowpea	47.8±6.9 b	5.1±1.1 b	4.4±1.2 b	47.0±6.7 a	4.3±1.0 b	3.1±0.5 ab	111.8±12.9 b	11.3
Tomato	29.7±8.0 b	5.4±0.7 b	11.0±8.0 b	3.9 <u>±</u> 0.9 b	9.9±2.6 b	3.4±0.6 ab	63.3±7.9 b	10.4
Sweet potato	1.9±0.5 b	3.9±0.9 b	0.0	4.7±1.0 b	7.4±1.9 b	4.4±0.7 a	22.3±2.3 b	3.4
Total	969.5	645.6	157.8	62.0	46.2	12.7	1894.0	
Average	242.4±62.5	161.4±53.3	39.5±15.1	15.5±2.1	11.6±2.9	3.2±0.5	473.5±93.0	
LSD (0.05)	340.4	303.7	93.5	9.8	11.4	1.6	5182	

According to Duncan's Multiple Rang Test, there were no significant differences between means that have the same letters in the same column at 5% probability level.



Fig. 1. Seasonal average number of the insect species on the four vegetable crops during 2022 at Kafr-Saad region Damietta Governorate.

# 3. Seasonal abundance of the main piercing-sucking insect species on different vegetable crops:

As shown in Figure (2), the timing of insects appearance and the number of peaks varies depending on the type of host plants; cucumber, cowpea, tomato and sweet potato, *Aphis spp., B. tabaci, T. tabaci* and *Empoasca* sp. appeared on cucumber, cowpea and tomato plants earlier than on sweet potato plants. On the other hand, *P. solenopsis* and *N. viridula* appeared on all tested crops about two and four weeks after the previous insects appear.

The general average number of insects showed two peaks of infestation on the four crops; cucumber, cowpea, tomato and sweet potato. The highest peak, 5336.1 and 171.2 individuals was noticed at 8th of Aug. on cucumber and tomato plants respectively, while on cowpea the highest occurrence 207.6 individuals was noticed at 13th of Jun., the highest occurrence 39.2 individuals was noticed at 6<sup>th</sup> of Jun on sweet potato.



Fig. 2. weekly average numbers of the main piercing-sucking insect species on different host plants (cucumber, cowpea, tomato and sweet potato) at Kafr-Saad region Damietta Governorate during 2022 season.

#### Seasonal abundance of Aphis spp. on different host plants:

As shown in Figure (3), *Aphis* spp. started to visit cucumber, cowpea and tomato plants early on  $16^{th}$  of May, while it appeared later on the  $6^{th}$  of Jun on sweet potato plants. The insect recorded three peaks of infestation on cucumber and

two peaks on the other three tested crops, cowpea, tomato and sweet potato. The highest peak, 4175.7, 139.2 and 9.1 individuals was noticed at 8<sup>th</sup> of Aug. on cucumber, tomato and sweet potato crops respectively, while on cowpea plants the highest occurrence 125.0 individuals was noticed at 13<sup>th</sup> of Jun.



Fig. 3. weekly average numbers of *A. gossypii* (Nymphs + Adults) on different host plants (cucumber, cowpea, tomato and sweet potato) at Kafr-Saad region Damietta Governorate during 2022 season.

#### Seasonal abundance of *B. tabaci* on different host plants:

As shown in Figure (4), *B. tabaci* started to visit cucumber and cowpea plants on  $16^{\text{th}}$  of May, while it appeared later on the  $23^{\text{rd}}$  of May on tomato and sweet potato plants. Four peaks of *B. tabaci* population occurred on tomato, three peaks on cucumber and two peaks on cowpea and sweet potato. The highest peak occurred at  $22^{\text{nd}}$  of Aug.

with average number of 3435.8 individuals/ sample on cucumber plants. While on cowpea and sweet potato the highest peak occurred at the 6<sup>th</sup> of Jun. with average number of 20.5 and 15.8 individuals/ sample respectively, on the case of tomato plants the highest peak was recorded at 29<sup>th</sup> of Aug. with average number of 11.9 individuals/ sample.



Fig. 4. weekly average numbers of *B. tabaci* (Nymphs) on different host plants (cucumber, tomato, cowpea and sweet potato) at Kafr-Saad region Damietta Governorate during 2022 season.

Seasonal abundance of T. tabaci on different host plants:

As shown in Figure (5), *T. tabaci* started to visit cucumber, cowpea and tomato plants on 16th of May, while this insect has not been recorded on sweet potato plants. During the investigation period *T. tabaci* population had two peaks of seasonal abundance occurred on cucumber plant and

one peak on tomato and cowpea. The highest peak of *T. tabaci* population on cucumber was recorded at 30th of May with average number of 983.5 individuals/ sample, while in tomato and cowpea the peak of *T. tabaci* population was occurred on 23rd of May and represented with 46.9 and 18.8 individuals/ sample, respectively.



Fig. 5. weekly average numbers of *T. tabaci* (Nymphs + Adults) on different host plants (Cucumber, Tomato and Cowpea) at Kafr-Saad region Damietta Governorate during 2022 season.

### Seasonal abundance of *Empoasca* spp. on different host plants:

As shown in Figure (6), *Empoasca* spp. started to visit cucumber and cowpea plants on 16<sup>th</sup> of May, while it appeared later on the 23<sup>rd</sup> of May on tomato and sweet potato. During the investigation period *Empoasca* spp. population had three peaks of seasonal abundance occurred on cucumber and cowpea whereas, two peaks were recorded on tomato and

sweet potato. The highest peak of *Empoasca* spp. population on cucumber was recorded at 23<sup>rd</sup> of May with average number of 17.3 individuals/ sample, on cowpea the highest peak of was noticed at 27<sup>th</sup> of Jun. with average number of 103.3 individuals/ sample. While in sweet potato and tomato crops, the highest peak of infection occurred on 6<sup>th</sup> of Jun., with an average number of 18.9 and 15.8 individuals/ sample, respectively.



Fig. 6. weekly average numbers of *Empoasca* spp. (Nymphs + Adults) on different host plants (cucumber, tomato and cowpea) at Kafr-Saad region Damietta Governorate during 2022 season.

Seasonal abundance of *P. solenopsis* on different host plants:

As shown in Figure (7), the last insect to appear on the four crops was the cotton mealybug, as the insect began attacking the four crops late on  $6^{th}$  of June. During the investigation period *P. solenopsis* population had two peaks of seasonal abundance occurred on cucumber plants and one peak on the other three crops tomato, sweet potato and

cowpea. The highest peak on cucumber was noticed at  $22^{nd}$  of Aug. with average number of 106.4 individuals/ sample. While in cowpea, the peak of infestation occurred on  $1^{st}$  of Aug., with an average number of 13.8 individuals/ sample on tomato and sweet potato the peak of infestation was noticed at  $29^{th}$  of Aug. with average number of 32.1 and 24.1 individuals/ sample respectively.



Fig. 7. weekly average numbers of *P. solenopsis*. (Nymphs + Adults) on different host plants (cucumber, tomato, sweet potato and cowpea) at Kafr-Saad region Damietta Governorate during 2022 season.

Seasonal abundance of *N. viridula* on different host plants:

As shown in Figure (8), *N. viridula* started to visit cucumber on 23<sup>rd</sup> of May, while it appeared later on the 30<sup>th</sup> of May on cowpea, tomato and sweet potato. One seasonal

abundance peak for the *N. viridula* population occurred on all crops during the experiment period. The peak of *N. viridula* population was recorded at 18<sup>th</sup> of Jul. with average number of 10.2, 7.9, 7.3 and 3.5 individuals/ sample on sweet potato, tomato, cowpea and cucumber crops respectively.



Fig. 8. weekly average numbers of *N. viridula* (Nymphs + Adults) on different host plants (sweet potato, tomato, cowpea and cucumber) at Kafr-Saad region Damietta Governorate during 2022 season.

#### Discussion

1. Surveying the piercing-sucking insect pests attacking some vegetable crops.

The studies revealed that the different vegetable crops; cucumber, cowpea, tomato and sweet potato were attacked by seven piercing-sucking insect species belonging to two insect orders: Thysanoptera and Hemiptera; *Aphis* gossypii, Myzus persicae, Bemisia tabaci, Thrips tabaci, Empoasca sp., Phenacoccus solenopsis and Nezara viridula.

These results are in accordance with those obtained by Abo-Elmaged et al. (2020) who reported that onion thrips, T. tabaci, whitefly, B. tabaci and cotton aphid, A. gossypii, are considered to be the most important piercingsucking arthropod pests infesting cucumber plants during spring and summer plantations However, Ahmed (2003), Hagrass et al. (2008), Ghallab et al. (2011), Abd El-Wahab et al. (2012) and Metwally et al.(2013) reported that B. tabaci; A. gosspyii; T. tabaci; Empoasca spp. are the most important piercing-sucking insects of cucumber crop. El-Khayat et al. (2017) surveyed the Hemipterous insects; A. craccivora, A. gossypii, E. decipiens, E. decedens, C. chinai and B. tabaci on cowpea crop. The most economically important insect pests substantially reducing yield and fruit quality of vegetable crops are whitefly, aphids, caterpillars, leaf miner, fruit borers, thrips and jassids (Filho et al. 2006, Katroju et al. 2014). A. gossypii, B. tabaci, Jassids, thrips and Liriomyza trifolii are the major insect pests attacking tomato plants Mandloi et al. (2015) and Phenacoccus solenopsis El-Wareth (2016). El-Fakharany et al. (2017) revealed the presence of 26 Arthropods; 16 as pests and 10 as predators on sweet potato crop. B. tabaci was the most occurring followed by Empoasca spp., N. viridula and Eysarcoris ventralis. Nezara viridula is a common polyphagous insect (Ali and Ewiess 1977). First recorded in Egypt as a cotton pest, it is found all across the world and poses a major threat to a variety of economically important crops (Ali and Ewiess, 1977, Kamal 1937). In Egypt N. viridula was found to be harbored on 12 field crops, 10 vegetable crops (okra, eggplant, pepper, tomato, and cowpea) and fourteen weed species according to Khalafallah et al. (2005) and Khattab (2003). (Moraes et al., 1981) stated that cowpea is infested by Empoasca spp. at the seedling stage and that they target the leaves. The two leafhopper species that were most prevalent on cucumber plants were Empoasca decipiens and E. decedens, according to Hashem (2005). The tropical and subtropical regions are home to a large population of *Empoasca* spp. This genus contains multiple species that are significant on cowpea in various geographical areas. Soratur, et al. (2017).

### 2. Host preference of the main piercing-sucking insect species on different vegetable crops.

The obtained results revealed that the highest attracted host plant for the insect species was cucumber followed by cowpea and tomato whereas the less attracted host plant was sweet potato.

These results are in accordance with those obtained by El-Wareth (2016) who reported *P. solenopsis* was initially identified as a novel pest in Egypt and was found to be affecting three significant vegetable crops as well as maize, eggplant, tomato, and pepper, tomato plants were the most attractant crop for *P. solenopsis* insects. El-Kady *et al.*  (2016). Mentioned that different leguminous plants (broad bean, pea, cowpea and bean plants) as host plants affected on the seasonal abundance of the leafhopper and planthopper insects. The leafhopper and planthopper insects specially, *E. decipiens, E. decedens, Cicadulina chinai, Balclutha hortensis, Nephotettix apicalis* and planthoppers, *Sogatelle vibix* and *S. furcifera.* High population abundance for *E. decipiens* occurred on broad bean and pea plants

# **3.** Seasonal abundance of the main piercing-sucking insect species on different vegetable crops:

The obtained results revealed that *Aphis* spp., (*A. gossypii* and *M. persicae*) were the predominant species followed by *B. tabaci*. Whereas the lowest average numbers were recorded by *N. viridula* on the four vegetable crops.

These findings concur with those of Ibrahim et al. (2017) found that Aphis gossypii infestation on cucumbers began 15 days after the date of cucumber plants seeding. Furthermore, these findings agree with those reported by Hegab (2017). The second week of July was when the population density of A. gossypii and M. persicae on cucumber plants peaked, according to records. Conversely, the third week of July was noted as M. persica peak. Hegab-Ola and Hegab (2009) reported that the month of July show the highest number of A. gossypii aphids on cucumber plants. Furthermore, Awadalla et al. (2020). Recorded one peak of population density of A. gossypii and M. persicae. The mean number of *B. tabaci* nymph recorded four peaks on cucumber Ismail et al. (2020). The cotton aphid, A. gossypii recorded one peak and two peaks yearly on cowpea, E. decipiens, E. decedens and B. tabaci recorded two peaks yearly on cowpea plants El-Khayat et al. (2017). Aphis gossypii, Bemisia tabaci, Jassids and thrips recorded two distinct peaks while Liriomyza trifolii recorded three distinct peaks on tomato plants Mandloi et al. (2015). El-Fakharany et al. (2017) showed that the population density of the pests progressively increased to reach peaks during August and September with leafhoppers, whitefly and A. convolcui while Tetranychus spp., N. viridula and E. venteralis were July and August in the two seasons on sweet potato plants. El-Wareth (2016) recorded one peak of P. solenopsis on tomato plants in the first week of August. T. tabaci infestation started on cucumber in April and one peak occurred in the end of May and in mid-September Abd El-Wahab, et al. (2012) and on cowpea in the first week of September Atakan (2008). However, Shah (2015) found that T. tabaci population recorded a single peak of infestation on onions.

These differences may be attributed to locality, crop rotation, agricultural practices and environmental conditions prevailing during execution of these experiments

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### تأثير العوائل النباتية المختلفة على الكثافة العددية لبعض الآفات الحشرية الثاقبة الماصة التي تهاجم محاصيل الخضر

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#### الملخص

أجريت هذه الدر اسات بمنطقة كفر سعد، محلفظة دمياط خلال عام 2022 على أربعة أنواع من محاصيل الخضر (الخيار، اللوبيا، الطماطم والبطاطا الحلوة). أوضحت الدر اسة الحاسني الخضر (الخيار، اللوبيا، الطماطم والبطاطا الحلوة). أوضحت الدر اسة الحاسني الخضر والنبية الطماطم والبطاطا الحلوة). أوضحت الدر اسة فن محاصيل الخضر (الخيار، اللوبيا، الطماطم والبطاطا الحلوة). أوضحت الدر اسة المعاطم والبقاض، نطاطات الأور اق، الوالية أن محاصيل الخضر المختلفة تعرضت للهجوم بسبعة حشرات ثاقبة ماصة وهي حشرة من القطن، من الخوخ الأخضر (الذيابة الطماطم البيضاء، تربس القطن، نطاطات الأور اق، بعق القطن الذقيقي و البقة الخضراء، وهذة الحشرات تنتمي إلى اثنتين من الرتب الحشرية : رتبة نصفية الأجنحة، Hemiptera و رتبة هدية الأجنحة Thysanoptera. سجلت خمس حشرات على حشرات تنتمي إلى التنتين من الرتب الحشرية : رتبة نصفية الأجنحة، الخبلة فل خشرة تربس القطن الم يتم تسجيلها على نبتات البطاطا الحلوة. حشرات على كل محصول من المحاصيل المدروسة، بينما سجلت حشرة من الخوخ الأخضر على نبتات الخيار فقط فإن حشرة تربس القطن لم يتم تسجيلها على نبتات البطاطا الحلوة. كل محصول من المحاصيل المدروسة، بينما سجلت حشرة من الخوخ الأخضر على نبتات الخيال فقط فإن حشرة تربس القطن لم يتم تسجيلها على نبتات البطاطا الحلوة. كل محصول من المحاصيل المدروسة، بينما سجلت حشرة من الخوخ الأخضر على نبتات الخيار فقط فإن حشرة تربس القطن لم يتم تسجيلها على نبتات البطاطا الحلوة. كل محسول من المحمول و قدى أورينة على العوائل النبتية الأخيرة بواقع 2.82 و 2.65 و 2.62 و 2.5 و 2.92 و 2.95 و 2.92 و 2.95 و 2.95 و الخوائي الذيبيان الوبيا والطماطم والخل في المرتبة الأولى على نبتات الخيار، الوبيا والعى 2.80 و 2.85 و 2.45 و 2.95 و ينه الخول الذيوي و 2.95 و داخو تلول الملطم الحلوة الحيرة الى على نبتات الخيل فقع 2.95 و 2.95