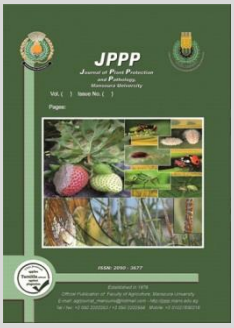
Journal of Plant Protection and Pathology

Journal homepage & Available online at: www.jppp.journals.ekb.eg

Influence of Different Sowing Dates on The White Fly, *Bemisia tabaci* (Genn.) Infesting Cantaloupe Plants under open field conditions in Damietta Governorate

Awadalla, S. S.[1]; T. E. Ata[2] and Shams . E.E. Shehab El-deen[1*]

[1] Plant Economic Entomology Department, Faculty of Agriculture, Mansoura University, Egypt.
[2] Plant Protection Department, Faculty of Agriculture, Damietta University, Egypt.



ABSTRACT

The experiments were conducted to study the influence of different sowing dates on the population density of the tomato white fly, *Bemisia tabaci* on cantaloupe plants under open field conditions during two successive years 2021and 2022 at Kafr-Saad region, Damietta Governorate. In the first year, the results showed that *B. tabaci* eggs recorded one and two peaks of infestation during the first and second sowing dates respectively, while in the second year, the egg stage recorded two peaks during each of the two sowing dates with, the highest populations were in May and September of 2022. On the other hand, nymphs of *B. tabaci* recorded three peaks during the first sowing date and one peak during the second sowing date in the first year, The highest peaks observed in June and October 2021, while in the second year the nymphs recorded one and two peaks during the first and second sowing dates, respectively. The total numbers of different stages in the first year recorded two and three peaks during the first and second sowing dates ,respectively. While in the second year, these numbers showed one and two peaks during the first and second sowing dates ,respectively. The highest peaks of *B. tabaci* stages were recorded in June and September during the two years of investigation. The temperature and relative humidity of both sowing periods. varied in their effect on the population density of *B. tabaci*.

***Keywords*:** Bemisia tabaci , Population density, developmental stages, Weather Factors.

INTRODUCTION

Cantaloupe (*Cucumis melo* L.) is one of the most important vegetable crops belonging to genus Cucumis and family Cucurbitaceae and it can grow at different weather conditions. (Thakur *et al*., 2019). It can grow under both open field and greenhouse conditions. (Glala *et al*. 2010). According to the report of the Economic Affairs Sector, Egyptian Ministry of Agriculture in 2022, the cultivated area of cantaloupe was 61802 feddan in the three different plantation dates (nili, summer and winter) and the total production was about 639548 tons with an average of 10.348 tons per feddan. The cultivated area, total production, and average yield per feddan during summer plantation of 2022 in Damietta was 1046 feddan, 12878 tons, and 12.312 tons, respectively. (Ministry of Agriculture and land reclamation, Egypt 2022).

One of the most dangerous pests affecting cantaloupe is the whitefly *Bemisia tabaci* (Gennadius) (Hemiptera: Aleyrodidae), which cause serious damages both directly and indirectly to the plant and significantly reduce plant yield (Abd Allah *et al*., 2022).

By depleting phloem nutrients and introducing harmful enzymes into the saliva, nymphs and adults directly harm plants, lowering agricultural output and quality (Inbar and Gerling, 2008). The growth of sooty mold fungus on honey-dew excreted by whiteflies on leaves cause indirect damage by obstructing respiration and photosynthesis and causing the development of ailments such as silver leaf and irregular fruit ripening (Oliveira *et al*., 2001 and Byrne *et al*., 2003). Furthermore, more than 100 different virus species are spread by *B. tabaci* (Jones, 2003).

Under the current changes in climate worldwide, monitoring populations of *B. tabaci* and oher insect species needs to update in response to various sowing dates, as a way to choose the more suitable plantation date that hosting fewer numbers of insect species.

Therefore, the goal of the current research is to study the influence of different sowing dates on the population density of the white fly, *B. tabaci* on cantaloupe plants in Damietta Governorate.

MATERIALS AND METHODS

The present study was conducted in a private Cantaloupe farm located at Kafr-Saad region of Damietta Governorate, Egypt during the two successive years (2021 and 2022). The tested plants did not receive any chemical treatments during the period of study, whereas the normal agriculture treatments of land preparation, irrigation and fertilizer were considered.

Sampling method and assessment:

The experimental area was 320 m^2 for each sowing date which divided to four equal plots, each plot was 80 m^2 and considered as a replicate. Plant Spaces between plants were 0.5 m apart. Cantaloupe, *Cucumis melo* (L.) variety:, Cory, was chosen and sown in two different annually sowing dates as follows: The first sowing date started date from June 3th until July 29th, 2021 and the second sowing date started from September 19th until November 14th, 2021. Whereas during the second year the first plantation date started from

* **Corresponding author.**
E-mail address: shamsshehab468@gmail.com
DOI: 10.21608/jppp.2024.340926.1289

May 16th until July 11th, 2022 and the second plantation date started from September 18th until November 13th, 2022.

To monitor the population density of the whitefly, *B. tabaci*, immature stages, a sample of 40 leaves were picked up weekly in plastic bags and transferred directly to the laboratory to examination in the same day using a stereoscopic microscope. From each plant leaf, one square inch was chosen to determine population of *B. tabaci*. The samples were continued until the end of the growing season.

Meteorological data:

To examine the influence of weather factors, daily means of temperature and relative humidity on the population density of the whitefly, *B. tabaci*, the required data were obtained from: https://www.msn.com/en-us/weather/records?ocid . As shown in Table (1) and Table (2),for Kafr-Saad region of Damietta Governorate, Egypt.

Table 1. The daily means of temperature and relative humidity at Kafr-Saad region, Damietta Governorate, during the first year (2021).

Date		temperature (°C)	Relative Humidity R.H %
First plantation date.	3-Jun-21	24.9	59.9
	10-Jun-21	24	59.9
	17-Jun-21	25.1	64.3
	24-Jun-21	24.9	62.2
	1-Jul-21	28.2	66.8
	8-Jul-21	28.4	61.5
	15-Jul-21	28.1	69.5
	22-Jul-21	28.5	67.0
	29-Jul-21	28.6	64.8
Second plantation date.	19-Sep-21	27.3	60.0
	26-Sep-21	26.9	59.1
	3-Oct-21	25.7	64.0
	10-Oct-21	24.5	62.9
	17-Oct-21	25.5	67.1
	24-Oct-21	23.5	58.9
	31-Oct-21	23.8	67.7
	7-Nov-21	23.9	67.0
	14-Nov-21	23.9	65.3

Table 2. The daily means of temperature and relative humidity at Kafr-Saad region, Damietta Governorate, during the second year (2022).

Date		temperature (°C)	Relative Humidity R.H %
First plantation date	16-May-22	21.6	62.2
	23-May-22	22.6	64.3
	30-May-22	24.2	66.2
	6-Jun-22	25.3	68.4
	13-Jun-22	26.6	63.7
	20-Jun-22	25.6	66.7
	27-Jun-22	26.7	63.1
	4-Jul-22	26.8	67.5
	11-Jul-22	27.4	66.5
Second plantation date	18-Sep-22	27.2	62.2
	25-Sep-22	26.4	60.7
	2-Oct-22	27.9	65.0
	9-Oct-22	26.0	60.2
	16-Oct-22	24.6	58.7
	23-Oct-22	23.6	64.8
	30-Oct-22	23.6	69.8
	6-Nov-22	22.1	67.5
	13-Nov-22	21.4	62.0

Statistical analysis:

One-way ANOVA and regression analyses using Minitab 15 software program were applied on the obtained data and in case of significant, means were separated using Duncan's Multiple Range Test at 0.05 probability level.

RESULTS AND DISCUSSION

Population density of the tomato white fly, *B. tabaci* on cantaloupe plant.

Data arranged in Figure (1) showed the population density of *B. tabaci* attacking cantaloupe plant at the 1st plantation date during the first year 2021.

The whitefly *B. tabaci* eggs at the 1st plantation date recorded one peak that occurred on 17th of June 2021 with 1354 Eggs/40 sq. inches, where the daily means of temperature and relative humidity were 25.1C° and 64.3%, respectively.

whereas, the nymphs recorded three peaks of infestation, the first peak was occurred on 10th of June 2021 (346 nymphs/40 sq. inches) with daily means of temperature and relative humidity were 24C° and 59.9% respectively, the second peak was on 24th of June 2021 (346 nymphs/40 sq. inches) with daily means of temperature and relative humidity were 24.9 C° and 62.2% respectively, the third and lowest peak was occurred on 15th of July 2021 (156

nymphs/40 sq. inches) with daily means of temperature and relative humidity were 28.1C° and 69.5% respectively.

The total numbers of *B. tabaci* immature stages recorded two peaks of infestation, the highest peak of abundance was occurred on 17th of June 2021 with 1520 individuals /40 sq. inches where the daily means of temperature and relative humidity were 25.1C° and 64.3%, respectively.

Data arranged in Figure (2) showed the population density of *B. tabaci* attacking cantaloupe plant at the 2nd plantation date during the first year 2021.

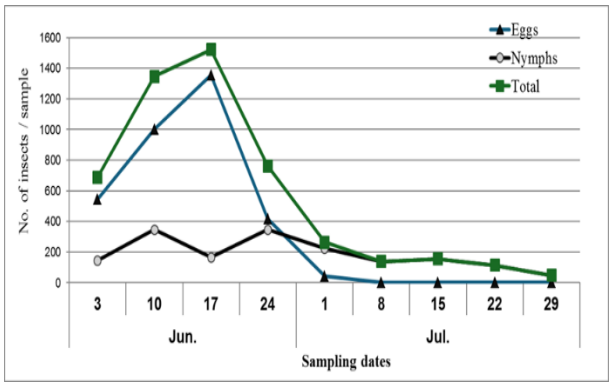


Fig. 1. Population density of *B. tabaci* attacking cantaloupe plant at the first plantation date (June plantation date) during the first year 2021 at Damietta Governorate.

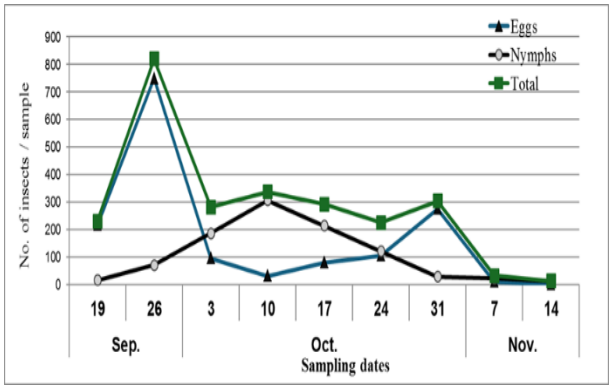


Fig. 2. Population density of *B. tabaci* attacking cantaloupe plant at the second plantation date (September plantation date) during the first year 2021 at Damietta Governorate.

The whitefly *B. tabaci* eggs in 2nd plantation date recorded two peaks, the highest peak was occurred on 26th of September 2021 with 749 eggs/40 sq. inches, where daily means of temperature and relative humidity were 26.9C° and 59.1% respectively.

The nymphs of *B. tabaci* recorded one peak occurred on 10th of October 2021 with 306 nymphs /40 sq. inches where the daily means of temperature and relative humidity were 24.5C° and 62.9% respectively.

The total numbers of *B. tabaci* immature stages recorded three peaks of infestation; the highest peak was occurred on 26th of September 2021 with 819 individuals /40 sq. inches, where daily means of temperature and relative humidity were 26.9 and 59.1% respectively.

Data arranged in Figure (3) showed the population density of *B. tabaci* attacking cantaloupe plant at the 1st plantation date during the second year 2022.

The whitefly *B. tabaci* eggs at the 1st plantation date date recorded two peaks , the highest peak of abundance was occurred on 30th of May 2022 with 458 eggs/40 sq. inches, where daily means of temperature and relative humidity were 24.2C° and 66.2 % respectively.

whereas, the nymphs recorded one peak occurred on 13th of Jun 2022 with 314 Eggs/40 sq. inches, where the daily means of temperature and relative humidity were 26.6C° and 63.7%, respectively.

The total numbers of *B. tabaci* immature stages recorded one peak occurred 6th of June 2021 with 570 individuals /40 sq. inches, where the daily means of temperature and relative humidity were 25.3C° and 68.4%, respectively.

Data arranged in Figure (4) showed the population density of *B. tabaci* attacking cantaloupe plant at the 2nd plantation date during the second year 2022.

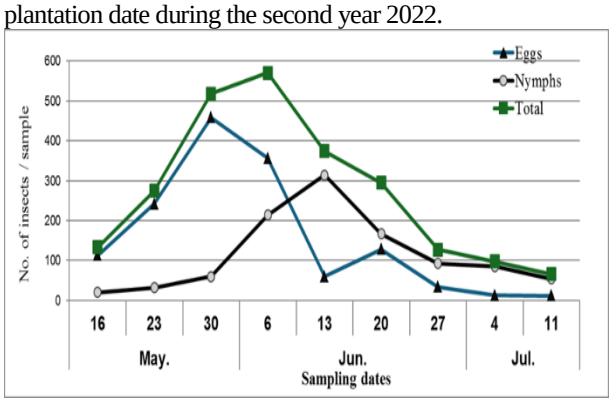


Fig. 3. Population density of *B. tabaci* attacking cantaloupe plant at the first plantation date (May plantation date) during the first year 2021 at Damietta Governorate.

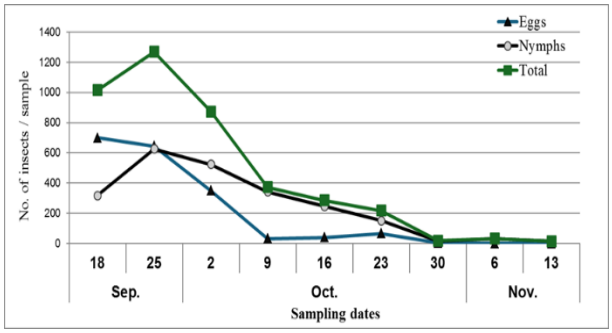


Fig. 4. Population density of *B. tabaci* attacking cantaloupe plant at the second plantation date (September plantation date) during the second year 2022 at Damietta Governorate.

The whitefly *B. tabaci* eggs at 2nd plantation date recorded two peaks, the highest peak of abundance was occurred on 18th of September 2022 with 699 eggs/40 sq. inches, where daily means of temperature and relative humidity, were 27.2C° and 62.2 % respectively.

Two peaks were recorded for nymphs, the highest peak of abundance was occurred on 25th of September 2022 with 625 eggs/40 sq. inches, where daily means of temperature and relative humidity. were 26.4C° and 60.7 % respectively.

The total numbers of *B. tabaci* immature stages recorded two peaks the highest peak of abundance was

occurred on 25th of September 2022 with 1269 individuals /40 sq. inches.

Seasonal average of the tomato white fly, *B. tabaci* cantaloupe plants

Data represented in (Fig. 5) showed the general average number the tomato white fly, *B. tabaci* on cantaloupe plants, the data showed that the Average numbers were higher in the first year 2021 than the second year 2022, with general average number of 840.8 and 727.9 individuals / sample.

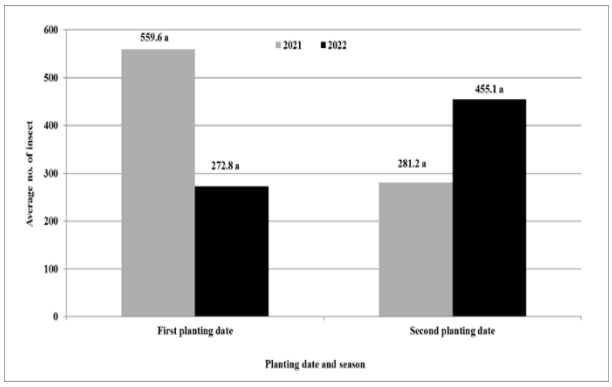


Fig. 5. Seasonal average numbers of the tomato white fly, *B. tabaci* immature stages per 40 sq. inches on cantaloupe leaves during 2021and 2022 at Kafr-Saad region Damietta Governorate. (LSD 0.05 = 426.9 and 360.6 for 1st and 2nd years respectively insects).

The average numbers of *B. tabaci* immature stages during the 1st plantation date was higher in the 1st year than the 2nd year and represented with 559.6 and 272.8 individuals/ sample respectively.

In the case of the 2nd plantation date the average numbers of *B. tabaci* immature stages was higher in the 2nd year than the 1st year and represented with 455.1 and 281.2 individuals/ sample respectively.

Effect of weather factors on the population density of *B. tabaci* on cantaloupe plants**.**

Table (3) shows the relation between population densities of *B. tabaci* on cantaloupe plants and the corresponding tested factors; the daily mean of temperature and daily mean of relative humidity % during different plantation date dates.

Simple correlation showed that the daily mean of temperature. showed significant relation with population density of *B. tabaci* during 1st plantation date of the 1st year and 2nd plantation date of the 2nd year (r = -0.895 and 0.847). the daily mean of R.H. were non-significant effect on the population density of *B. tabaci* during each of plantation dates of the two years

The findings of the partial regression values showed the precise impact of the various investigated climatic conditions. The "F" values in these partial regression results were significant.

The statistical analysis revealed that the aforementioned factors are responsible for the population densities of *B. tabaci,* with about 82.3% and 39.8% in the 1st and 2nd plantation date respectively of the variability in the population in 1st year, while it was with about 25.8% and 73.5% in the 1st and 2nd plantation date in the 2nd year.

Table 3. Simple correlation coefficient, partial regression values and explained variance (E.V.) between tested weather factors and the weekly mean numbers of the *B. tabaci* on cantaloupe crop during 2021and 2022.

Season	Simple correlation analysis			Partial regression analysis				
	W. Factor	r.	P.	b.	p.	"F"	Prob.>F	E.V.
1st Plan. 2021	Temperature.	-0.895	0.001 **	-249.80	0.005 **	13.9	0.006 **	82.3%
	R.H.	-0.502	0.168	33.59	0.421			
2nd Plan. 2021	Temperature.	0.579	0.102	73.96	0.250	1.99	0.218	39.8%
	R.H.	-0.486	0.185	-18.63	0.458			
1st Plan. 2022	Temperature.	-0.174	0.654	-36.04	0.347	1.04	0.408	25.8%
	R.H.	0.360	0.341	45.07	0.223			
2nd Plan. 2022	Temperature.	0.847	0.004 **	168.66	0.011 *	8.3	0.019 *	73.5%
	R.H.	-0.389	0.301	-18.44	0.548			

The influence of predatory insects on the population density of *B. tabaci*:

The data presented in (Table 4) showed the relationship between *B. tabaci* and associated predatory insects, where there are five predators that feed on immature stages (eggs and nymphs) of *B. tabaci* these predators were *C. undecimpunctata, Orius sp., Syrphus sp., A. aphidimyza* and *C. carnea*.

Statistical analysis in 1st planation of the 1st year 2021 showed the relationship between the average numbers of *B. tabaci* and *Orius* sp was positive and significant, with correlation coefficient values r. = 0.757 this means that the *Orius* sp. prefer to feed on this insect. The influence of *Orius* sp. predator on *B. tabaci* population could be seen by the results of partial regression values in (Table 4) these results showed that there are significant positive relation. While 1st plantation date of the 2nd year 2022 showed the relationship between the average numbers of *B. tabaci* and *A. aphidomiza* was significantly negative relation, with correlation coefficient values r. = -0.709 respectively . in 2nd plantation date of the 2022 the data showed the relationship between the average numbers of *B. tabaci* and *Syrphus* sp. was positive and high significant, with correlation coefficient values r. = 0.901.

The influence of different predators on *B. tabaci* population could be seen by the results of partial regression values in (Table 4) these results showed that there are significant relation between *B. tabaci* and *Orius* sp. , *Syrphus* sp. , *A. aphidomiza* and *C. carnea* . This means that the decline in *B. tabaci* numbers may be due to the increase in numbers of predatory insects that feed on eggs and nymphs of this insect. On the other hand non-significant relation was found with *C. undecimpunctata.*

F. value was significant during 1st plantation date of the 1st year 2021 and 2nd plantation date of the 2nd year 2022 . It could be observed also from (Table 4) that the explained variance of predatory insects affecting *B. tabaci* population activity was 86.8% , 74.9% , 67.9% and 98.3% from the effect of all factors affecting the population.

Table 4. Simple correlation coefficient, partial regression values and explained variance (E.V.) between the weekly mean numbers of *B. tabaci* and the predatory insects on cantaloupe plants during 2021 and 2022.

Date	Predator	Simple correlation analysis		Multiple Partial regression analysis				
		r.	P.	b.	p.	"F"	Prob.>F	E.V.
1st Plantation date 2021	*C. undecimpunctata*	-0.246	0.523	185.2	0.182	6.58	0.048	86.8%
	Orius sp.	0.757	0.018	61.4	0.038			
	Syrphus sp.	—	—	—	—			
	A. aphidomiza	-0.319	0.403	-271.7	0.087			
	C. carnea	0.354	0.350	103.8	0.266			
2nd Plantation date 2021	*C. undecimpunctata*	0.047	0.904	84.2	0.226	1.79	0.336	74.9%
	Orius sp.	-0.647	0.060	-70.2	0.072			
	Syrphus sp.	-0.131	0.737	-25.9	0.222			
	A. aphidomiza	-0.015	0.969	-11.8	0.202			
	C. carnea	-0.309	0.418	34.1	0.372			
1st Plantation date 2022	*C. undecimpunctata*	0.601	0.087	21.9	0.402	2.11	0.243	67.9%
	Orius sp.	0.318	0.404	1.7	0.509			
	Syrphus sp.	—	—	—	—			
	A. aphidomiza	-0.709	0.032	-10.0	0.134			
	C. carnea	-0.210	0.588	4.2	0.934			
2nd Plantation date 2022	*C. undecimpunctata*	-0.244	0.526	-21.6	0.250	34.74	0.007	98.3%
	Orius sp.	0.207	0.592	-46.7	0.030			
	Syrphus sp.	0.901	0.001	187.4	0.002			
	A. aphidomiza	0.123	0.752	47.3	0.035			
	C. carnea	0.241	0.532	-217.3	0.052			

The whitefly, *B. tabaci*, was most prevalent on squash plants in August of the 2014 and 2015 growing seasons, followed by June and March growing seasons, Awadalla *et al*. (2018). In cucumbers in 2014 and 2015, the autumn plantation date had a larger *B. tabaci* population than the summer plantation date Saleh *et al*. (2017). In Egypt, the cotton whitefly *B. tabaci* favored cucumber and cantaloupe for oviposition and feeding of juvenile stages, and cotton and tomato for adult feeding Foda (2000). In October, *B. tabaci* population density on cucumber plants was greater in Egypt Abdel Hady *et al*. (2014). The *B. tabaci* infection has considerably risen as a result of the planting date being postponed Devi and Ram (2018). The population of *B. tabaci* showed a positive relation with the maximum temperature (Soni and Dhakad, 2017). According to Selvaraj and Ramesh (2012), the development of *B. tabaci* was positively and significantly impacted by the maximum and minimum temperatures, whereas the nighttime relative humidity had a negative and major impact. In a study conducted in Egypt, Abdel-Rahman *et al*. (2018) found that whereas relative humidity had a highly negative and significant link with *B. tabaci* infestation of cotton, maximum and minimum temperatures showed non-significant positive responses. Due to its ability to withstand high temperatures (Wolfe *et al*. 1998, Salvucci 2000), *B. tabaci* is a species with a wide geographic range. High temperatures also shorten its life cycle, which promotes population breakouts and reproduction (Butler *et al*. 1983, Yang and Chi 2006). According to Abd Allah *et al*. (2022) in Egypt, during the three cantaloupe plant sowing dates, maximum and minimum temperatures generally responded favorably to *B. tabaci* nymphal activity. However, the population of *B. tabaci* was negatively impacted by relative humidity.

Even though hundreds of predators have been known to attack *B. tabaci*, the most frequent ones are as follows: lacewings *(C. carnea and C. pallens), bugs (Orius laevigatus, Macrolophus caliginosus, and Nesidiocoris tenuis), and mites (Amblyseius swirskii* and *Euseius ovalis)* Al-Zyoud (2014). Compared to parasitoids and diseases, predators have a greater potential to manage *B. tabaci* and are crucial in managing pest populations (Jazzar and Hammad, 2004 and Gerling *et al*., 2001). It has been documented that *B. tabaci* is a prey item for hundreds of predators. The most frequent predators of *B. tabaci* are lacewings (Neuroptera: Chrysopidae) (Khan and Wan, 2008a,b), ladybird beetles (Coleoptera: Coccinellidae) (Heinz and Parrella, 1994; Sharma and Joshi, 2010), and mites (Acarina: Phytoseiidae) (Nomikou *et al*., 2003). However, in many impacted cropping systems around the world, the potential of the biological control of *B. tabaci* by predators represents a critical tactic that has largely gone unmet (Naranjo, 2001). Gerling *et al*. (2001) cataloged 114 arthropod predators from 9 orders and 31 families based on lists that had been published. As the research has advanced, the list has expanded. Predation by sucking predators, such as bugs, and chewing predators, such as beetles, accounted for approximately 36% and 31% of all *B. tabaci* juvenile mortality, respectively, according to data from 14 cohorts studied over a three-year period in cotton fields (Naranjo, 2001). Every year, *Syrphus ribesii* produces two generations. The larvae overwinter as fully fed among decaying leaves, and in May, they pupate. Nectar and pollen are the adult food sources (Sundby 1967).

REFERENCES

Abd Allah, Y. N. M., Metwally, S. A. G., Refaei, B. M., & El Sawaf, B. M. (2022). Leaf morphological characters can be a factor for intra-varietal preference of whitefly *Bemisia tabaci* (Hemiptera: Aleyrodidae) among certain cantaloupe cultivars. Egypt. J. Plant Prot. Res. Inst. (2022), 5 (1): 78–93.

Abd Allah, Y. N. M., Refaei, B. M., Metwally, S. A. G., Ibrahim, S. A., & El Sawaf, B. M. (2022). Interaction between certain weather factors and plant age of cantaloupe on *Bemisia tabaci* (Hemiptera: Aleyrodidae) infestation over different sowing dates. Egypt. J. Plant Prot. Res. Inst. (2022), 5 (1): 1–18.

Abd El-Hady, A. A; F. A. shaheen; S.E. Negm; 1. II. M. Heikal and D.F.A. El.Asharm (2014). Efficacy of natural compound on the whitefly, *Bemisia tabaci* biotype "b" (hemiptera: aleyrodidae) and its natural enemies of cucumber crop. J. Plant Prot. and Path., Mansoura Univ., 5 (12): 1161-1176.

Al-Zyoud, F.A. (2014). The most common predators of *Bemisia tabaci* (Genn.): Biology, predation, preferences, releases, alternative food resources, combined use, current efforts and future perspectives. Journal of Biological Control, 28(1), 1-16.

Awadalla, S. S.; El-Serafi, Hala A. K.; El-Naggar, M. E. And El-Mesawy, Marwa G.(2018) Effect of planting dates on the main pests attacking squash plants in mansoura region. J. Plant Prot. And Path. Mansoura Univ. 9 (6): 335-338.

Bulletin of the agriculture Statistics part (2), (2022). Economic affairs sector. Dept., Ministry of Agriculture and land reclamation., Egypt. https://www.agri.gov.eg/library/25

Butler Jr, G., T. Henneberry, and T. Clayton. 1983. *Bemisia tabaci* (Homoptera: Aleyrodidae): development, oviposition, and longevity in relation to tem- perature. Ann. Entomol. Soc. Am. 76: 310–313.

Byrne, F.J.; Castle, S.; Prabhaker, N. and Toscano, N.C. (2003): Biochemical study of resistance to imidacloprid in B biotype *Bemisia tabaci* from Guatemala. Pest Management Science, 59:347-352.

Devi, S. and Ram, P. (2018): Effect of dates of sowing on population of sucking insect pests in desi cotton (Gossypium arboreum L.). Journal of Entomology and Zoology Studies, 6 (1): 1041- 1044.

Foda, M. E. (2000) Population dynamics, host preference and seasonal distribution patterns of whitelly, *Bemisia tabaci* (Genn.) in middle Egypt. Proceedings Beltwide Cotton Conferences, San Antonio, USA, 4-8 January, 2000: Volume 2.; 2000. :1380-1382.

Gerling, D., Alomar, O. and Arno, J. (2001). Biological control of *Bemisia tabaci* using predators and parasitoids. Crop Prot. 20: 779-799.

Glala AA, Saleh SA, Sawaan OM, Omar NM (2010) Developing new promising galia Melon F1 hybrids utilizing some Egyptian Melon genetic resources. Acta Horticulturae 871:157–164

Heinz, K.M. and Parrella, M.P. (1994). Poinsettia (*Euphorbia pulcherrima* Willd. Ex Koltz.) cultivar-mediated differences in performance of five natural enemies of *Bemisia argentifolii* Bellows and Perring, n. sp. (Hom., Aleyrodidae). Biol. Cont. 4: 305-318.

Inbar, M. and Gerling, D. (2008): Plant-mediated interactions between whiteflies, herbivores, and natural enemies. Annual Review of Entomology, 53: 431-448.

Jazzar, C., Hammad, E.A.F. (2004). Efficacy of multiple biocontrol agents against the sweetpotato whitefly, *Bemisia tabaci* (Genn.) (Hom., Aleyrodidae) on tomato. J. Appl. Entomol. 128: 188-194.

Jones, D. (2003): Plant viruses transmitted by whiteflies. European Journal of Plant Protection Pathology, 109:197-221.

Khan, I.A. and Wan, F.0.H. (2008a). Life history of *Chrysopa pallens* (Rambur) (Neur., Chrysopidae) on *Bemisia tabaci* (Genn.) (Hom., Aleyrodidae) biotype B prey. Sarhad J. Agric. 24: 635-640.

Khan, I.A. and Wan, F.0.H. (2008b). Prey consumption by *Chrysopa pallens* of un-parasitized and *Encarsia formosa* parasitized *Bemisia tabaci* biotype B prey. Sarhad J. Agric. 24: 641-648.

Naranjo, S.E. (2001). Conservation and evaluation of natural enemies in IPM systems for *Bemisia tabaci* . Crop Prot. 20: 835-852.

Nomikou, M., Janssen, A. and Sabelis, M.W. (2003). Phytoseiid predator of whitefly feeds on plant tissue. Exp. Appl. Acarol. 31: 27-36.

Oliveira, M.R.V.; Henneberry, T.J. and Anderson, P. (2001).: History, current status, and collaborative research projects for *Bemisia tabaci* . Crop Protection, 20 (9) :709-723.

Saleh, A. A. A.; El-Sharkawy, H. M.; El-Santel, F. S. and Abd El-Salam, Rehab A. (2017). Seasonal Abundance of Certain Piercing Sucking Pests on Cucumber plants In Egypt. Egypt Acad. J. Biolog. Sci., 10 (7): 65-79.

Selvaraj, S. and Ramesh, V. (2012): Seasonal abundance of whitefly, *Bemisia tabaci* Gennadius and their relation to weather parameters in cotton. International Journal of Food, Agriculture and Veterinary Sciences, 2 (3) : 57-63.

Sharma, P.K. and Joshi, P.C. (2010). New records of coccinellid beetles (Coccinellidae: Coleoptera) from District Dehradun, (Uttarakhand). Indian New York Sci J. 3: 112-118.

Soni, R. and Dhakad, N.K. (2017): Seasonal dynamics of whitefly, *Bemisia tabaci* (Gennadius) on transgenic Bt cotton and their correlation with abiotic factors. International Journal of Entomology Research, 2 (1): 24-26.

Sundby, R.A. (1967). A comparative study of the efficiency of three predatory Insects, *Coccinella sep temperatureunctata* L. (Coleoptera, Coccinellidae), *Chrysopa carnea* St. (Neuroptera, Chrysopidae) and *Syrphus ribesii* L. (Diptera, Syrphidae) at two different temperatures. Entomophaga, 11: (4) 395-404.

Thakur, H.; Sharma, S.; Thakur, M. Recent trends in muskmelon (*Cucumis melo* L.) research: An overview. Journal of Horticulture Sciences Biotechnology. 2019, 94, 533–547.

Yang, T. C., and H. Chi. 2006. Life tables and development of *Bemisia argentifolii* (Homoptera: Aleyrodidae) at different temperatures. J. Econ. Entomol. 99: 691–698.

تأثير مواعيد الزراعة المختلفة على حشرة الذبابة البيضاء التى تصيب نبات الكنتالوب تحت ظروف الحقل المفتوح فى محافظة دمياط

سمير صالح عوض الله[1] ، طارق السيد عطا[2] و شمس الحسينى الحسينى شهاب الدين[1]

[1] قسم الحشرات الاقتصادية - كلية الزراعة - جامعة المنصورة
[2] قسم وقاية النبات - كلية الزراعة - جامعة دمياط

الملخص

تم دراسة تأثير مواعيد الزراعة المختلفة على الكثافة العددية لذبابة الطماطم البيضاء *B. tabaci* على نبات الكنتالوب تحت ظروف الحقل المفتوح خلال عامين متتاليين٢٠٢١و ٢٠٢٢ في منطقة كفر سعد محافظه دمياط. أظهرت النتائج في السنة الاولي أن بيض ذبابة الطماطم البيضاء *B. tabaci* سجل قمة واحدة وقمتين للإصابة خلال موسمي الزراعة الأول والثاني على التوالي ، بينما في السنة الثانية سجل البيض لذبابة الطماطم البيضاء *B. tabaci* قمتين خلال كلا من موسمي الزراعة مع أعلى تعداد في شهري مايو وسبتمبر من عام ٢٠٢٢، ومن ناحية أخرى سجلت حوريات ذبابة الطماطم البيضاء *B. tabaci* ثلاث قمم خلال موعد الزراعة الأول وقمة واحدة خلال موعد الزراعة الثاني في السنة الأولي ، ولوحظت أعلى قمة للإصابة في شهري يونيو واكتوبر ٢٠٢١ بينما في السنة الثانية سجلت حوريات ذبابة الطماطم البيضاء *B. tabaci* قمة واحدة وقمتين خلال موسمي الزراعة الاول والثاني على التوالي. سجل اجمالي أعداد الأطوار المختلفة للحشرة في السنة الأولى قمتين وثلاث قمم خلال موسمي الزراعة الأول والثاني على التوالي ، بينما في السنة الثانية أظهرت هذه الأعداد قمة واحدة وقمتين للإصابة خلال موسمي الزراعة الأول والثاني على التوالي، وسجلت أعلي قمة لمراحل *B. tabaci* في شهري يونيو وسبتمبر خلال عامي الدراسة. اختلف تأثير العوامل البيئية المدروسة الحرارة والرطوبة النسبية على الكثافة العددية لحشرة الذبابة البيضاء طبقا لمواعيد الزراعة المختلفة.