Journal of Plant Protection and Pathology

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

Influence of Sowing Dates on the Aphid Species Attacking Cucumber Crop in Fayoum Governorate

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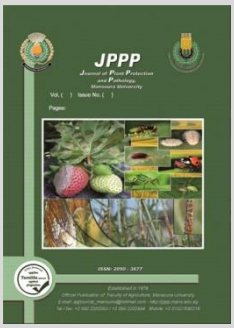

ABSTRACT

The present experiments were conducted in a private cucumber field in Ibshwai, Fayoum governorate during the two successive years (2018 and 2019) to evaluate the influence of sowing dates on the aphid species that attacking cucumber crop in Fayoum governorate. The cotton aphid *Aphis gossypii* reached the highest peak of abundance in March sowing date in the fourth week of April 2018 (916 individuals/sample) and in the first week of May 2019 (1083 individuals/sample). While, in August sowing date, *A. gossypii* reached the highest peak of abundance in the fourth week of October 2018 and 2019 with 671 and 783 individuals/sample, respectively. Moreover, in October sowing date, *A. gossypii* reached the highest peak of abundance in the second week of November 2018 and in the third week of November 2019 and represented by 934 and 1214 individuals/sample, during the two years, respectively. The green peach aphid, *Myzus persicae* recorded the highest peak of abundance in March sowing date in the second week of April 2018 (317 individuals/sample) and in the fourth week of April 2019 (324 individuals/sample). While in August sowing date M. persicae recorded the highest peak of abundance in the second week of October 2018 and in the fourth week of September 2019 and presented by 428 and 302 individuals/sample, respectively. Meanwhile, in October sowing date, *M. persicae* recorded the highest peak of abundance in the second week of November 2018 and 2019 and presented by 183 and 124 individuals/sample, respectively.

Keywords: Cucumber, aphid species, varieties, sowing dates, population abundance

INTRODUCTION

Cucumber (*Cucumis sativus* L.) is one of the cucurbit vegetable crops which consider the most important vegetable crops in Egypt and cultivated in a large area in sandy and reclaimed lands. The piercing-sucking insect pests which attacking cucumber crop such as aphid species, *Aphis gossypii* and *Myzus persicae* (Foda, 2001; Abou- El-Saad, 2006; Abd El-Hady *et al*., 2014; and El-Mesawy, 2018). These insect pests caused economic damage either directly by sucking the juice of plants or indirectly by transmitted the plant viral diseases (Salehi *et al*., 2007; Fereres and Moreno, 2009; Refaei *et al*., 2016).

The different sowing dates considered one of the important agricultural practices which are essential elements for Integrated Pest Management (IPM) for the various insect pests particularly the aphid species (Foda, 2001; Awadalla *et al.* 2018). Cucumber sowing dates depend on the ecological information as the dominant temperature degree, the relative humidity as well as photoperiods and rainfall. Awadalla *et al.* (2018) recorded that *A. gossypii* was the dominant insect pests in March sowing date on squash crop. Therefore, the present experiments aim to study the influence of sowing dates on the aphid species attacking cucumber crop in Fayoum governorate.

MATERIALS AND METHODS

The present experiments were conducted in a private cucumber field in Ibshwai, Fayoum governorate during the two successive years (2018 and 2019) to evaluate the influence of some agricultural practices on the population abundance of the aphid species attacking cucumber crop.

The experimental area was ca 200 m^2 for each sowing date which divided to four equal plots each plot was 50 m^2 and considered as a replicate. Cucumber, *Cucumis sativus* (L.) variety Heyel was chosen and was sown in three different sowing dates as follows: the first week of March (March sowing date), the third week of August (August sowing date), and the first week of October (October sowing date) during the two successive years (2018 and 2019). All the normal agricultural practices were followed through the three sowing dates during the two years except the insecticide treatments were neglected. The daily average temperature and relative humidity were obtained from the Meteorological station belonging to Fayoum governorate from the two years. The sample took place after two weeks from sowing the cucumber plants in the three sowing dates and continued until the end of each sowing date.

A sample of twenty-five leaves was randomly chosen from each plot after two weeks from sowing. A total of 100 leaves were picked weekly for the four replicates and transferred in closed plastic bags with a cotton piece saturated by either to anesthetize the collected insect pest. The bags were transferred in the same day to the laboratory for investigation by a stereo-binocular microscope. The target insect pests estimated by the leaf sample method were the aphids in all stages, the cotton whitefly in immature stages, the cotton thirps in nymphal stage, the cotton mealybug in all stages. The insect pests were identified and counted weekly.

The obtained results were analyzed using one-way ANOVA (CoStata software) and means of the insect pest populations were compared using Duncan's Multiple Range Test (Duncan 1955). Further, the simple correlation coefficient between the population density of the insect pests

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DOI: 10.21608/jppp.2020.133255

and temperature and relative humidity during each season of the two successive seasons were determined.

RESULTS AND DISCUSSION

The obtained results in Fig. (1) show the population abundance of the cotton aphid *A. gossypii* and the green peach aphid *M. persicae* on cucumber crop with different sowing dates during the first year 2018. In March sowing date *A. gossypii* reached the highest peak of abundance in the fourth week of April (20.8 °C and 42.3 RH%) and *M. persicae* in the second week of April (22.0 °C and 36.1 RH%) and presented by 916 and 317 individuals/sample, respectively. Meanwhile, in August sowing date, *A. gossypii* reached the highest peak of abundance in the fourth week of October (25.1 °C and 51.8 RH%) and *M. persicae* in the second week of October (28.5 °C and 44.4 RH%) with 671 and 428 individuals/sample, respectively. In respect to October sowing date, *A. gossypii* and *M. persicae* recorded the highest peak of abundance in the second week of November (20.8 °C and 53.4 RH%) and represented by 934 and 183 individuals/sample, respectively.

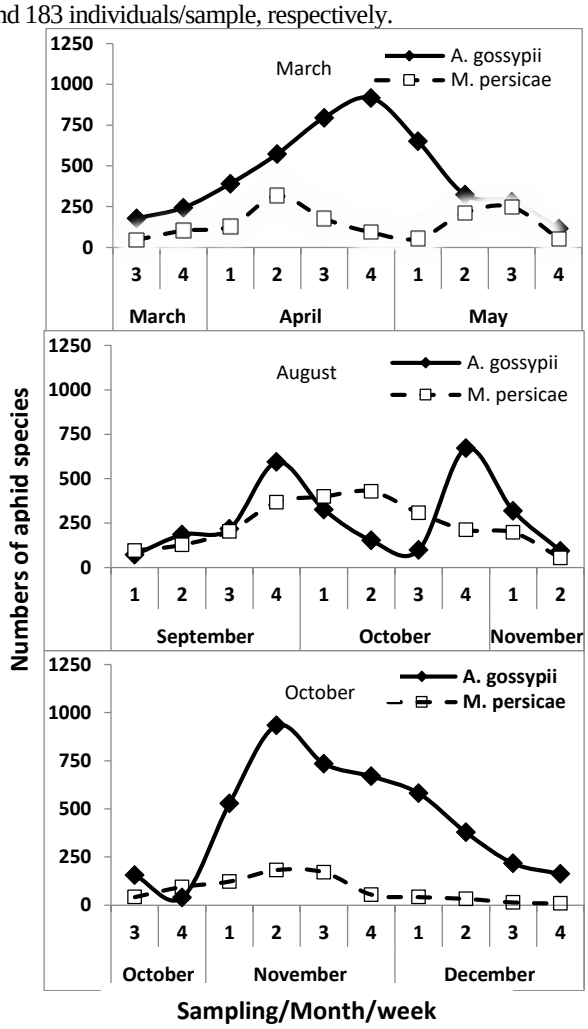

Fig. 1. The population density of *A. gossypii* and *M. persicae* in relation to the different cucumber sowing dates (March, August, and October) during the first year 2018 in Fayoum governorate.

The obtained results in Fig. (2) show the population abundance of the cotton aphid *A. gossypii* and the green peach aphid *M. persicae* on cucumber crop with different sowing dates during the second year 2019. In March sowing date *A. gossypii* reached the highest peak of abundance in the first week of May (19.5 °C and 36.7 RH%) and *M. persicae* in the fourth week of April (19.9 °C and 40.3 RH%) and presented by 1083 and 324 individuals/sample, respectively. Meanwhile, in August sowing date, *A. gossypii* reached the highest peak of abundance in the fourth week of October (24.9 °C and 47.6 RH%) and *M. persicae* in the fourth week of September (27.4 °C and 43.7 RH%) with 783 and 302 individuals/sample, respectively. In respect to October sowing date, *A. gossypii* and *M. persicae* recorded the highest peak of abundance in the third and second weeks of November (23.6 °C and 47.7 RH%; and 23.1 °C and 48.1 RH%) and represented by 1214 and 124 individuals/sample, respectively.

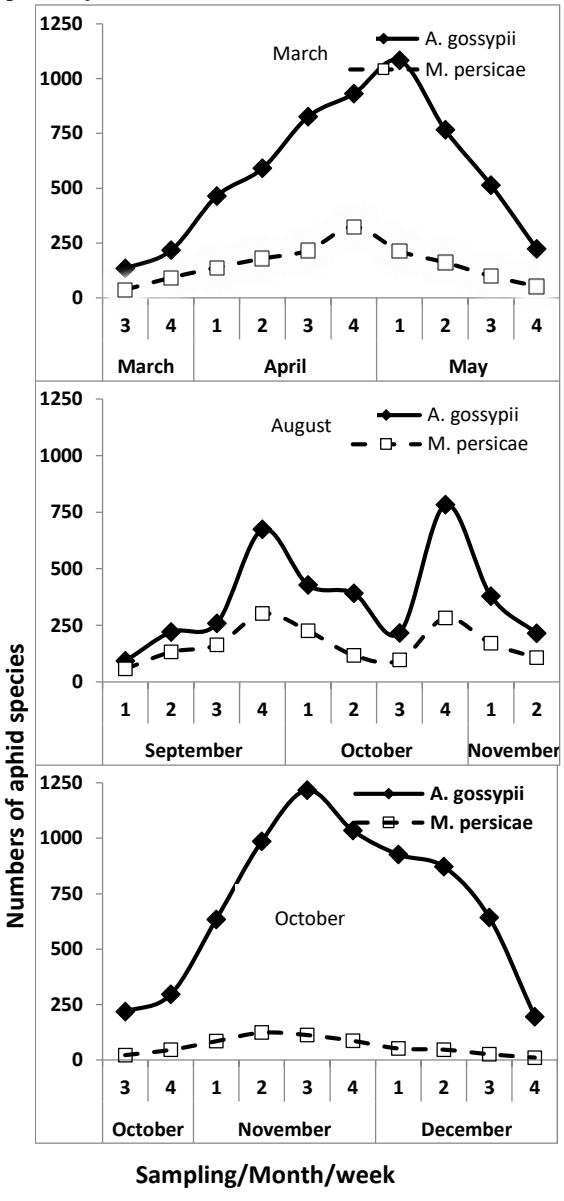

Fig. 2. The population density of *A. gossypii* and *M. persicae* in relation to the different cucumber sowing dates (March, August, and October) during the second year 2019 in Fayoum governorate.

Data illustrated in Fig. (3 A) show the dominance percentage of the cotton aphid *A. gossypii* according to the different cucumber sowing dates during the two years (2018 and 2019). The obtained results revealed that August sowing date recorded the lowest percentage of the insect dominance

during the two years and presented by 23.5 and 20.8%, respectively. Similarity, the obtained data in Fig. (3 B) refer to the dominance percentage of the green peach aphid *M. persicae* in relation to different cucumber sowing dates during the two years (2018 and 2019). It can be noticed that October sowing date hosted the lowest percentage of the insect pest occurrence during the two years with 16.6 and 16.2%, respectively.

Data arranged in Table (1) recorded the seasonal average number of the cotton aphid *A. gossypii* and the green peach aphid *M. persicae* in different sowing dates on cucumber crop during the two successive years (2018 and 2019) in Fayoum governorate. It can be noticed that cucumber crop in October sowing date attracted the highest seasonal average number of the cotton aphid *A. gossypii* during the two years (2018 and 2019) and presented by 439.9 ± 93.31 and 702.1 ± 115.31 individuals/sample followed by March sowing date with 446.7 ± 86.13 and 575.2 ± 102.64 individuals/sample, respectively. Meanwhile, August sowing date attracted the highest seasonal average number of the green peach aphid *M. persicae* during the two years and presented by 239.1 ± 41.35 and 165.9 ± 25.36 individuals/sample followed by March sowing date with 146.2 ± 28.35 and 151.1 ± 27.49 individuals/sample, respectively. Statistical analysis revealed that highly significant differences were reported for the two aphid species in relation to the different sowing dates during the two years in Fayoum governorate.

The simple correlation analyses exhibited no significant values between the weekly number of *A. gossypii* and *M. persicae* in different cucumber sowing dates and the average of temperature and relative humidity during the two successive years (2018 and 2019) in Fayoum governorate (Table 2).

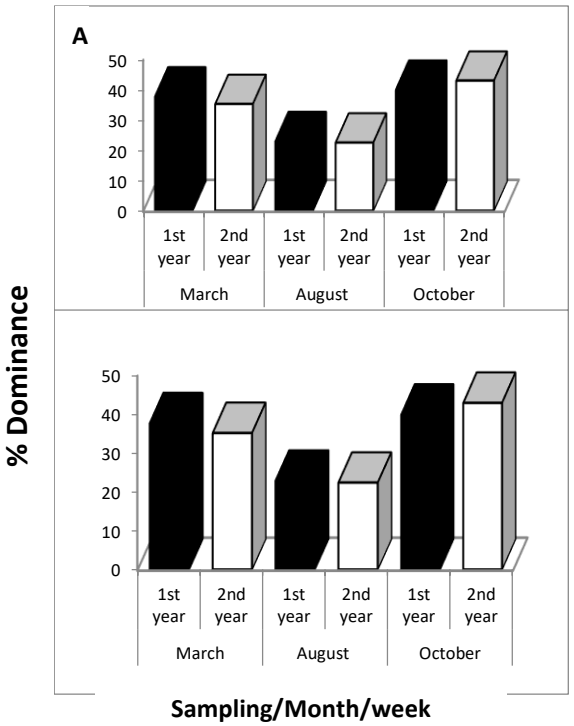

Fig. 3. The seasonal dominance percentage in of *A. gossypii* (A) and *Myzus persicae* (B) in different cucumber sowing dates (March, August, and October) during the first and second years (2018 and 2019) in Fayoum governorate.

Table 1. The seasonal number (Mean ± SE) of *A. gossypii* and *M. persicae* in different sowing dates of cucumber crop during the two successive seasons 2018 and 2019 in Fayoum governorate.

Aphid species	Year	Sowing dates		
		March	August	October
A. gossypii	2018	446.7 ± 86.13 a	272.8 ± 66.25 b	439.9 ± 93.31 a
	2019	575.2 ± 102.64 b	336.1 ± 68.76 c	702.1 ± 115.31 a
M. persicae	2018	146.2 ± 28.35 b	239.1 ± 41.35 a	76.7 ± 19.99 c
	2019	151.1 ± 27.49 b	165.9 ± 25.63 a	61.3 ± 12.33 b

The average numbers followed by the different letters in a raw are significantly different at 0.05 probability level.

Table 2. Simple correlation coefficient (r) between the weekly number of *A. gossypii* and *M. persicae* in different cucumber sowing dates and the average of temperature and relative humidity during the two successive years (2018 and 2019) in Fayoum governorate.

aphid species	Sowing dates	2018		2019	
		Temp.	RH%	Temp.	RH%
A. gossypii	March	-0.13	0.24	0.25	-0.23
	August	-0.04	0.04	-0.26	0.17
	October	0.01	-0.21	-0.02	-0.23
M. persicae	March	-0.11	0.30	0.04	0.004
	August	0.19	-0.14	-0.18	0.18
	October	0.50	-0.43	-0.02	-0.23

All correlation values in the table are not significantly different at 0.05 probability level.

Awadalla *et al*. (2018) suggested that, March plantation haroboured the highest numbers of the cotton aphid *A. gossypii* followed by June plantation and August plantation on squash plants during 2014 and 2015 seasons. Kataria and Kumar (2016) in India suggested that, the population of *A. gossypii* was a positive correlation with the high temperature and recorded a negative correlation with the low temperature. Ibrahim *et al*. (2017) found that, the environmental factors as maximum temperature, minimum temperature and relative humidity were responsible for about 51.75% and 91.62% of the viability in the population of aphids in summer and nili cucumber plantations during 2014, respectively, while they were responsible 78.08 % and 94.65% during 2015, respectively. Saleh *et al*. (2017) stated that, the cotton aphid *A. gossypii* populations were a higher in autumn plantation than in summer plantation in cucumber during the two seasons of the study 2014 and 2015.

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تأثير مواعيد الزراعة علي انواع المنْ التي تصيب محصول الخيار في محافظة الفيوم

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أجريت التجارب الحالية في حقل خيار في مركز أبشواي-محافظة الفيوم وذلك خلال سنتين متتاليتين 2018، 2019 لتقدير تأثير مواعيد الزراعة علي أنواع المن التي تهاجم محصول الخيار في محافظة الفيوم. وجد أن من القطن بلغ أقصي ذروة تعداد في عروة مارس في الأسبوع الرابع من شهر ابريل 2018 (916 فرد/عينة) وفي الأسبوع الأول من شهر مايو 2019 (1083 فرد/عينة)، بينما في عروة أغسطس فقد بلغ من القطن أعلي ذروة تعداد في الأسبوع الرابع من أكتوبر 2018، 2019 وذلك بتعداد 671 و 783 فرد/عينة علي التوالي. علاوة علي ذلك في عروة أكتوبر قد بلغ تعداد من القطن اعلي ذروة تعداد في الأسبوع الثاني من شهر نوفمبر 2018 والأسبوع الثالث من شهر نوفمبر 2019 وقد سجل 934، 1214 فرد/عينة علي التوالي. وجد أن من الخوخ الأخضر قد سجل أعلي ذروة تعداد في عروة مارس في الأسبوع الثاني من ابريل 2018 (317 فرد/عينة) وفي الأسبوع الرابع من شهر ابريل 2019 (324 فرد/عينة). بينما في عروة أغسطس فقد سجل أعلي ذروة تعداد في الأسبوع الثاني من شهر أكتوبر 2018 والأسبوع الرابع من شهر سبتمبر 2019 بتعداد 428 و 302 فرد/عينة علي التوالي. بينما في عروة أكتوبر فقد سجل من الخوخ الأخضر اعلي ذروة تعداد في الأسبوع الثاني من شهر نوفمبر 2018 و 2019 وذلك بتعداد 183 و 124 فرد/عينة علي التوالي.