

Effect of Planting Dates on the Cotton Mealybug *Phenacoccus solenopsis* (Tinsly) as a Main Insect Pest Attacking Tomato Plants in Damietta Governorate.

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ABSTRACT

The current studies were conducted on the field at kafr El-battikh reigon, Damietta Governorate. The K-186 tomato variety planted in two planting dates first of February and last of September during the two successive seasons 2016/17 and 2017/18 to determine the population abundance of the cotton mealybugs *Phenacoccus solenopsis* (Tinsly). The highest peaks of abundance of *P. solenopsis* recorded in the February plantation during the two successive seasons 2016/17 and 2017/18 in the second week of April 2016 and the first week of April 2017 and represented by 279 and 351 indiv. /100 leaves, respectively. Meanwhile September plantation recorded the highest peaks of abundance during the two seasons in the first week of November 2016 and the last week of October 2017 and represented by 119 and 140 indiv. /100 leaves, respectively. The cotton mealybug *P. solenopsis* showed a significantly differences in the two plantations during the two successive seasons.

Keywords: The cotton mealybugs *Phenacoccus solenopsis* (Tinsly), planting dates, Tomato plants.

INTRODUCTION

Tomato (*Lycopersicon esculentum* L.), which have been turned from a fearful fruit that mankind though a toxicity to an important and indispensable component of its food. Tomatoes are one of the most important vegetable crops grown all over the world and Egypt in particular. (WPTC, 2011 and Shehata *et al.*, 2016).

The cotton mealybug, *Phenacoccus solenopsis* (Tinsly) is a main pest of cotton limiting the production and quality of fibre and lint. It is a polyphagous insect and multiplies on different hosts like field crops, horticultural, fruit, vegetable and ornamental plants (Joshi *et al.*, 2010; Arif *et al.*, 2009). They suck a large amount of sap from leaves and stems depriving plants of essential nutrients showing the symptoms like retarded growth, late opening of bolls and total drying of the plant. The yield losses due to the pest are estimated upto 50 per cent. Mealy bugs are cottony in appearance, small, oval, soft-bodied sucking insects covered with white mealy wax, which makes them difficult to eradicate. An individual mealy bug survived for 25-38 days. *p. solenopsis* recorded for the first time in Egypt during the summer season 2014 on tomato plants in the Qalyoubia governorate.

The mealybugs become anew pests on tomato plants as (Ibrahim *et al.*, 2015) showed. Different planation dates have a significant impact on tomato susceptibility to insects, where affecting on the population abundance of the main insects. (Kassem, 1990; Nonita *et al.*, 2007).

Therefore, the current experiments were carried out to study the effect of planting dates on the cotton mealybug *P. solenopsis* (Tinsly) as a main insect pest attacking tomato plants in Damietta Governorate.

MATERIALS AND METHODS

The current studies were conducted at the field of kafr El-battikh reigon, Damietta Governorate. The K-186 tomato variety planted in two planting dates first of February and last of September during the two successive seasons 2016/17 and 2017/18.to determine the population abundance of the cotton mealybugs *Phenacoccus solenopsis* (Tinsly). The population abundance of the cotton mealybug *P. solenopsis* was investigated. The K-186 tomato variety was planted in two planting dates (beginning of February) and (end of September) during the

two successive seasons 2016/17 and 2017/18. An area of about 208 m² was divided into four replicates (each replicate ca. 52 m²). The normal agriculture practices were used without any insecticidal treatments during the two successive seasons.

To estimate the population abundance of the cotton mealybug *P. solenopsis* (nymphs and adults) ; weekly leaf samples of 25 leaves which representing the upper , middle and lower levels of the plants where chosen randomly from each replicate. These samples were transferred into plastic bags to the laboratory for examination. The number of the cotton mealybug *P. solenopsis* was recorded by aid of lens 4x and a stereo microscope. Samples were taken after about three to four weeks from transplantation and extended until the harvest time. The results obtained were analyzed using one-way ANOVA, and to compare means ($\alpha=0.05$).

RESULTS AND DISCUSSION

Data obtained in Fig.(1) Showed the population abundance of *Phenacoccus solenopsis* (Tinsly)in February plantation during the first season 2016/17. Data revealed that, the population abundance of *P. solenopsis* increased gradually to reaching the highest peak of abundance in the second week of April and represented by 279 indiv./100 leaves . Afterwards, the population decreased until the end of the season.

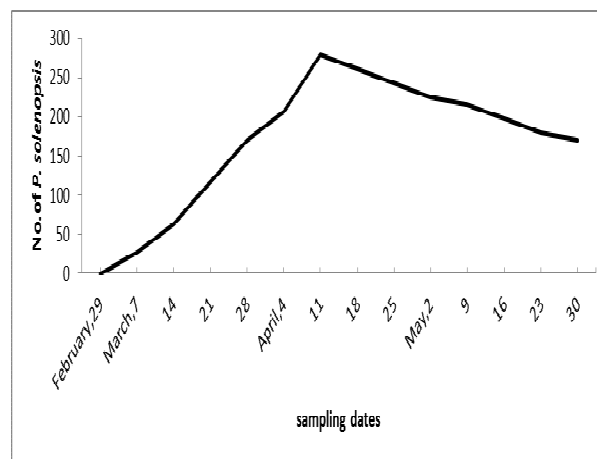


Fig. 1. Population abundance of *P. solenopsis* in February plantation during the first season 2016/17 at Kafr-El battikh region.

Data obtained in Fig.(2) Showed that, population abundance of *P. solenopsis* in September plantation during the first season 2016/17. Data revealed that, the population abundance of *P. solenopsis* increased gradually to reaching the highest peak of abundance in the first week of November and represented by 119 indiv./100 leaves. Afterwards, the population decreased until the end of the season.

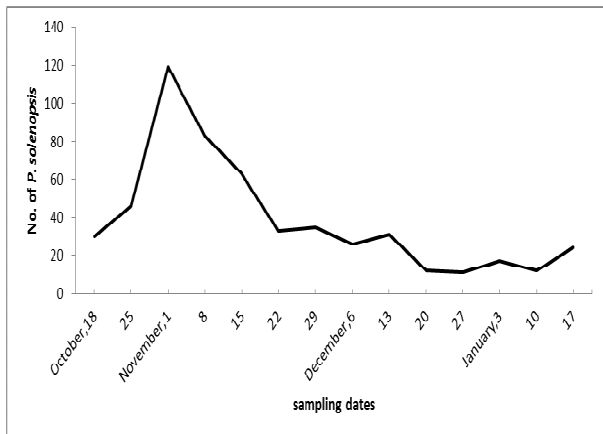


Fig. 2. Population abundance of *P. solenopsis* in September plantation during the first season 2016/17 at Kafr-El battikh region.

The obtained results in Fig.(3) Showed that, population abundance of *P. solenopsis* in February plantation during the second season 2017/18. Data revealed that, the population abundance of *P. solenopsis* increased gradually to reaching the highest peak of abundance in the first week of April and represented by 351 indiv./100 leaves . Afterwards, the population decreased until the end of the season.

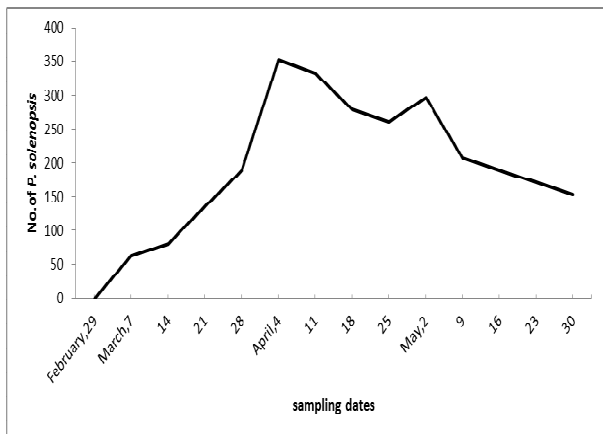


Fig. 3. Population abundance of *P. solenopsis* in February plantation during the second season 2017/18 at Kafr-El battikh region.

The obtained results in Fig.(4) Showed that, population abundance of *P. solenopsis* in September plantation during the second season 2017/18. Data revealed that, the population abundance of *P. solenopsis* increased gradually to reaching the highest peak of abundance in the last week of October and represented by 140 indiv./100 leaves . Afterwards, the population decreased until the end of the season.

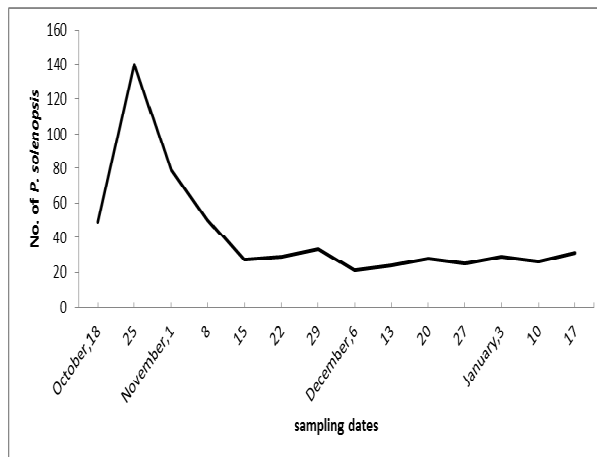


Fig. 4. Population abundance of *P. solenopsis* in September plantation during the second season 2017/18 at Kafr-El battikh region.

As a conclusion, data showed in Figs. (1, 2, 3 and 4) indicated that, the highest peaks of abundance of *P. solenopsis* recorded in the February plantation during the two successive years 2016/17 and 2017/18 in the second week of April 2016 and the first week of April 2017 and represented by 279 and 351 indiv. /100 leaves, respectively. Meanwhile September plantation recorded the highest peaks of abundance during the two years in the first week of November 2016 and the last week of October 2017 and represented by 119 and 140 indiv. /100 leaves, respectively.

Table 1. The average number of the cotton mealybug *P. solenopsis* in the two plantations during the two successive seasons 2016/17 and 2017/18 at Kafr-El battikh region.

Seasons	Plantations	
	February	September
The first season 2016/17	168.4 ±23.0 a	38.7 ±8.2 b
The second season 2017/18	193.5 ±27.7 a	42.2 ±8.6 b

Means followed by the same letters in rows are not significantly different (ANOVA, α= 0.05).

Data arranged in Table(1)showed the average number of the cotton mealybug *P. solenopsis* during the two successive seasons 2016/17 and 2017/18 at Kafr-El battikh region. It can be noticed that, February plantation during the two seasons attractive the highest average number of the cotton mealybug *P. solenopsis*. While, September plantation attractive the lowest average number of the insect pest during the two seasons. Statistical analysis revealed that, a significant difference between the two plantations during the two seasons.

The obtained results are in agreement with those of The obtained results are in agreement with those of Khuhro (2011) and Singh and Kumar (2012) recorded the peak period of *P. solenopsis* population in September, it was found most abundant on cotton, followed by china rose, *Abutilon indicum*, okra, eggplant, tomato and hollyhock. And they Showed that the highest mealybug population in the month of October on and Okra. While maximum population of

mealybugs was seen in the month of February on Tomato and Potato host plants.

Shah *et al.* (2015) in Pakistan showed that the highest Cotton Mealy bug mean population of 99.8 ± 7.8 per plant twig was observed from Shadadpur. Throughout the cotton growing season, highest Cotton Mealy bug mean population of 222.3 ± 22.8 was seen in second fortnight visit of September. While Abd El-Wareth (2016) in Egypt, showed that tomato plants affected with a high numbers *P. solenopsis* by mean 15.3 and 15.4 individuals/ plant and has one peak in the first week of August by mean 35 and 39 individuals/plant, for Fayoum and Itsa districts, respectively.

REFERENCES

- Abd El-Wareth, H. M. (2016): The First Record of the Cotton Mealybug, *Phenacoccus solenopsis* Tinsley (Hemiptera: pseudococcidae) as A new Insect Pest on Tomato, Peper, Eggplant, Maize Plants and Population Density at Fayoum Governorate in Egypt. Egypt. Acad. J. Biolog. Sci., 9(3): 41–48.
- Arif, M. I. ; M. Rafiq and A. Ghaffar (2009): Host plants of cotton mealybug (*Phenacoccus solenopsis*): a new menace to cotton agroecosystem of Punjab, Pakistan. Int. J. Agric. Biol, 11(2), 163-167.
- Ibrahim, Samah S. ; Fatma A. Moharum ; Nesreen M. Abd El- hany(2015): The cotton mealybug *Phenacoccus solenopsis* Tinsley (Hemiptera: Pseudococcidae) as a new insect pest on tomato plants in Egypt. J. Plant Prot. Res. 55 (1)48-51.
- Joshi, M.D. ; P.G. Butani ; V.N. Patel and P. Jeyakumar (2010): Cotton Mealy Bug, *Phenacoccus Solenopsis* Tinsley – A Review. Agric. Rev., 31 (2) : 113 – 119.

- Kassem, S. E. E.(1990): Studies on insect pests of some solanaceous vegetables. Unpublished M.Sc. Thesis, Kafr El-Sheikh University.
- Khuhro, S. N.; A. M. Kalroo and R. Mahmood (2011): Present status of mealybug *Phenacoccus solenopsis* (Tinsley) on cotton and other plants in Sindh (Pakistan). In Book of Papers. World Cotton Research Conference–5, Mumbai, pp. 07-11.
- Nonita, M. ; P. Bijaya and T. K. Singh (2007): Effect of abiotic and biotic factors on the abundance of *Aphis gossypii* infecting Brinjal. Indian J. Entomol. 69(2): 149-153.
- Shah, T. N.; A. M. Ahmed; N. Memon (2015): Population dynamics of cotton mealybug, *Phenacoccus solepnosis* Tinsely in three talukas of district Sanghar (Sindh). J. Entomol. and Zool. Studies, 3(5): 162-167.
- Shehata I.; I. Ebada ; I. A. Ismail ; M. Fouda and H. S. Salama (2016): On the Population Dynamics of the Tomato Leaf Miner *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) in Egypt. Ecologia Balkanica, 8(2): 65-75.
- Singh, A. and D. Kumar (2012): Population dynamics, biology of mealybug *Phenacoccus solenopsis* (Tinsley) and its natural enemies in Vadodara, Gujarat . Recent Research in Science and Technology 2012, 4(11): 22-27.
- WPTC. (2011): Report of World Processing Tomato Council. 10 pp.

تأثير مواعيد الزراعة على بق القطن الدقيقي كافة رئيسية تهاجم نباتات الطماطم في محافظة دمياط. هاجر سمير صالح عوض الله ، حافظ عبدالرحمن القاضي و مي محمد عبدالوهاب عيسى قسم الحشرات الإقتصادية – كلية الزراعة - جامعة دمياط

أجريت الدراسات الحالية في حقل في منطقة كفر البطيخ بمحافظة دمياط. حيث تمت زراعة صنف الطماطم ١٨٦ - k في عروتين الأولى أوائل فبراير والثانية أواخر سبتمبر خلال الموسمين المتتاليين ٢٠١٦ / ١٧ و ٢٠١٧ / ١٨ لتحديد وفرة التعداد من بق القطن الدقيقي *Phenacoccus solepnosis*. سجلت أعلى قمة في عروة فبراير خلال الموسمين ١٧/٢٠١٦ و ١٨/٢٠١٧ في الأسبوع الثاني من شهر أبريل للعام ٢٠١٦ وفي الأسبوع الأول من نفس الشهر للعام ٢٠١٧ بمعدل ٢٧٩ و ٣٥١ فردا / ١٠٠/ ورقة على التوالي. في حين سجلت أعلى قمة لها في عروة سبتمبر خلال سنوات الدراسة في الأسبوع الأول من نوفمبر ٢٠١٦ والأسبوع الأخير من أكتوبر ٢٠١٧ بمعدل ١١٩ و ١٤٠ فردا / ١٠٠/ ورقة على التوالي. التحليل الإحصائي لمتوسط أعداد بق القطن الدقيقي للعروتين (فبراير وسبتمبر) للموسمين المتتاليين أظهر وجود فروق معنوية بين متوسط الأعداد للعروتين للموسمين المتتاليين.