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Effect of Tomato Varieties on the Tomato Borer *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) 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. K-186, G.S and MARRWA tomato varieties to determine the effect of different tomato varieties on the population abundance of the tomato borer *Tuta absoluta* (Meyrick) in February plantation during the two successive seasons 2016 and 2017. K-186 tomato variety attracted the highest average number of eggs and larvae of *T. absoluta* during the first season and represented by 265.1±45.4 eggs and 171.7±41.8 larvae, respectively. While G.S variety ranked the second category and represented by 238.9±40.9 eggs and 169±41.1 larvae, respectively. On the other hand, MARRWA variety came in the last category and represented by 183.6±45.4 eggs and 106.9±28.6 larvae, respectively. While during the second season G.S variety attracted the highest average number of eggs of *T. absoluta* followed by K-186 and MARRWA and represented by 281±50.7, 213.5±55.7 and 189.6±52.6 eggs, respectively. Meanwhile, G.S variety attracted the highest average number of larvae of *T. absoluta* followed by MARRWA variety and K -186 variety came in the last category and represented by 165±46.6, 111.4±27.8 and 98±21.4 larvae, respectively. Statistical analysis revealed that a significantly differences between the tomato varieties and *T. absoluta* eggs and larvae during the two successive seasons.

Keywords: The tomato borer *Tuta absoluta* (Meyrick) , tomato varieties

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).

Tomato crops are attacked by a lot of insect pests where all parts of the plant are a habitat, food and breeding place for many insects. The most important of these insect pests that attack tomatoes in their different stages of development are sucking piercing insects such as cotton aphid, *Aphis gossypii Glov.*, *Thrips tabaci*, whiteflies and jassid , Which leads to many problems, including weakness and wilt and yellowing of plants, In addition to the secretion of some of these insects honey due causing the growth of the pathogens such as fungi and molds, and it hinders breathing and affects the photosynthesis (Awadalla, 1980; Elsayed, 2000 and Khuhro, 2014).

The tomato borer *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) is one of the most important and most dangerous tomato pests, which larvae feed all parts of the plant leaves, fruits, branches, stems and flowers so this destruction resulting in loss of yield, which reaches 100%.(Ramireze *et al. 2010* and Lazgeen *et al*. 2013).Tomato borer *Tuta absoluta* consider the main insect that attacking tomato crops (Youssef, 2015).

The different varieties affect on tomatoes infestation with different insect pests where varieties vary in its sensitivity, resistance and tolerance to infestation (Abou-Ghadir, 2015 and Ata and Megahed , 2014).

Therefore, the current experiments were carried out to study the Effect of tomato varieties on the tomato borer *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) 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. K-186, G.S and MARRWA tomato varieties to determine the effect of different tomato varieties on the population abundance of the tomato borer *Tuta absoluta (Meyr.)* in February plantation during the two successive seasons 2016 and 2017.

The K-186, G.S and MARRWA tomato varieties were planted in (beginning of February) during the two successive seasons 2016/17 and 2017/18. An area of about 624 m^2 was divided into 12 replicates, each of variety planted in four replicates and arranged in completely randomized design. The normal agriculture practices were used without any insecticidal treatments during the two successive seasons.

To estimate the population abundance of *T. absoluta* (eggs and larvae), weekly leaf samples of 25 leaves which representing the upper , middle and lower levels of the plants where chosen randomly from each replicate (100 leaves from each tomato variety). The collected samples were transferred into plastic bags to the laboratory for examination. The number of insects 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. *T. absoluta* (eggs and larvae) were recorded and counting for each tomato variety.

The results obtained were analyzed using one-way ANOVA, and to compare means (α =0.05) using Duncan' s Multiple Range Test. Costat application program was used to analysis (Costat 2004).

RESULTS AND DISCUSSION

Data illustrated in Table (1) showed that that the population abundance of *T. absoluta* in three tomato varieties during the first season 2016. Showed that, K-186 variety recorded the highest peak of eggs and larvae in first week of April and last week of May and represented by 546 eggs and 473 larvae, respectively. While G.S variety recorded the highest peak of eggs and

larvae in the last week of May and represented by 493 eggs and 442 larvae, respectively. Moreover, MARRWA variety recorded the highest peak of eggs and larvae in the last week of May and represented by 598 eggs and 311 larvae, respectively.

Table 1. Effect of different tomato varieties on the population abundance of *T. absoluta* eggs and larvae during the first season 2016/17 at Kafr-El battikh region.

Sampling dates	Eggs			Larvae		
	K-186	G.S	MARRWA	K-186	G.S	MARRWA
February,29	0	12	0	3	16	0
March,7	20	18	12	40	40	25
14	47	40	16	42	11	36
21	222	123	29	112	113	37
28	281	285	184	122	125	131
April,4	546	271	191	98	97	73
11	298	297	223	84	86	76
18	292	290	147	72	73	114
25	178	173	136	90	91	42
May,2	224	224	165	370	374	67
09	270	276	153	328	329	186
16	370	371	256	144	143	191
23	472	472	460	426	426	208
30	491	493	598	473	442	311
Total	3711	3345	2570	2404	2366	1497
Mean±SE	265.1±45.4 a	238.9±40.9 a	183.6±45.4 b	171.7±41.8 a	169±41.1 a	106.9±28.6 b

Means followed by the same letters for each stage are not significantly differences at 0.05level (Duncan's Multiple Range Test).

Data illustrated in Table (2) showed that that the population abundance of *T. absoluta* in three tomato varieties during the second season 2017.showed that, K-186 tomato variety recorded the highest peak of eggs and larvae in the last week of May and represented by 726 eggs and 252 larvae, respectively. While G.S variety recorded the highest peak of eggs in the first week of May and the highest peak of larvae in the last week of May and represented by 585 eggs and 470 larvae, respectively. Moreover, MARRWA variety recorded the highest peak of eggs and larvae in the last week of May and represented by 643eggs and 329 larvae, respectively.

As a conclusion, data arranged in Tables (1 and 2) indicated that, K-186 tomato variety attracted the highest average number of eggs and larvae of *T. absoluta* during the first season and represented by 265.1±45.4 eggs and 171.7±41.8 larvae, respectively. While G.S variety ranked the second category and represented by 238.9±40.9 eggs and 169±41.1 and larvae, respectively. On the other hand, MARRWA variety came in the last category and represented by 183.6±45.4 eggs and 106.9±28.6 larvae, respectively. While during the second season G.S variety attracted the highest average number of eggs of *T. absoluta* followed by K-186 and MARRWA and represented by 281±50.7, 213.5±55.7 and 189.6±52.6 eggs, respectively. Meanwhile, G.S variety attracted the highest average number of larvae of *T. absoluta* followed by MARRWA variety and K -186 variety came in the last category and represented by 165±46.6, 111.4±27.8 and 98±21.4 larvae, respectively. Statistical analysis revealed that a significantly differences between the tomato varieties and *T. absoluta* during the two successive seasons.

Table 2. Effect of different tomato varieties on the population abundance of *T. absoluta* eggs and larvae *during* the second season 2017/18 at Kafr-El battikh region.

Sampling dates	Eggs			Larvae		
	K-186	G.S	MARRWA	K-186	G.S	MARRWA
February,29	0	0	0	16	13	14
March,7	0	11	13	26	25	34
14	20	32	25	32	32	38
21	67	297	37	34	18	47
28	320	263	153	120	137	109
April,4	258	271	240	64	92	76
11	252	138	198	82	63	43
18	104	287	67	38	53	32
25	164	364	107	44	57	36
May,2	174	585	193	74	136	83
09	146	223	181	176	344	223
16	204	467	216	202	418	243
23	554	483	582	212	452	253
30	726	513	643	252	470	329
Total	2989	3934	2655	1372	2310	1560
Mean±SE	213.5±55.7 ab	281±50.7 a	189.6±52.6 b	98±21.4 b	165±46.6 a	111.4±27.8 b

Means followed by the same letters for each stage are not significantly differences at 0.05level (Duncan's Multiple Range Test).

These results are in agreement with those of Ata and Megahed (2014) in Egypt, showed significant differences in number of mines/leaf and number of larvae/leaf on the two tomato varieties. The mean number of *T. absoluta* larvae/leaf was 3.3 and 2.8 in Alisa and H.S.S varieties respectively. While the general mean numbers of *T. absoluta* mines/leaf was 5.5 and 4.0 in Alisa and H.S.S varieties, respectively.Abou-Ghadir (2015) in Egypt, showed that *T. absoluta* recorded different states of preference towards the investigated tomato host plants. The tomato "TH99806" was more favorable than "TH99807" on the winter season, whilst E448 was the favorite on summer season over Super Jakal, all over the observed period of 2012 and 2013. Shehata *et al.* (2016) in Egypt, showed that the native strain was more susceptible to infestation with *T. absoluta*, where the total number of eggs around the rotation was 5.93±5.5eggs/leaf being significantly higher as compared to GS and super hybrid, while the total number of eggs around the cycle or the rotation in both GS and super hybrid was 8.03±1.5 and 8.62±3.4 eggs/leaf, respectively. Also they showed that the native strain is more susceptible to infestation with larvae where the total number of larvae around the rotation was 16.78±5.7 larvae/leaf compared to 5.73±1.9 and 8.5±2 larvae/leaf in both GS and super hybrid, respectively.

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تأثير أصناف الطماطم على حافرة أنفاق الطماطم (توتا أبسلوتا) كآفة رئيسية تهاجم نباتات الطماطم فى محافظة دمياط

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أجريت الدراسات الحالية فى حقل في منطقة كفر البطيخ بمحافظة دمياط .حيث تمت زراعة أصناف الطماطم K-186 و G.S و MARRWAلتحديد تأثير أصناف الطماطم المختلفة على وفرة التعداد من حافرة أنفاق أوراق الطماطم (توتا أبسلوتا (فى عروة فبراير خلال الموسمين المتتاليين 2016 و .2017 الصنف K-186 جذب أعلى متوسط من أعداد بيض ويرقات *T. absoluta* خلال الموسم الأول بمعدل45.4±265.1 بيضة و 41.8±171.7 يرقة على التوالى .بينما جاء الصنفG.S فى الترتيب الثاني يمثله 40.9±238.9بيضة و 41.1±169 يرقة على التوالى. من ناحية أخري جاء الصنف MARRWAفى الترتيب الأخير بمعدل 45.4±183.6بيضة و 28.6±106.9يرقة على التوالى .بينما خلال الموسم الثاني الصنف G.S جذب أعلى متوسط من عدد البيض تبعه الصنف K-186 ثمMARRWA يمثلهم 50.7±281 و 55.7±213.5 و 52.6±189.6 بيضة أما بالنسبة لمتوسط عدد اليرقات جذب الصنف G.S أعلى متوسط تبعه الصنفMARRWA ثم K-186 يمثلهم 46.6±165 و 27.8±111.4 و 21.4±98يرقة على التوالى . وأوضحت النتائج وجود فروق معنوية بين أصناف الطماطم و *Tuta absoluta* خلال الموسمين المتتابين .