Annals of Agric. Sci., Moshtohor **ISSN 1110-0419**
Vol. 51(3) (2013), 277- 284 **http://annagricmoshj.com**

Effect of six cotton varieties and genotypes on natural mortality percentage of diapaused larvae of pink bollworm *pectinophora gossypiella* (Saund.) in subsequent of cotton and rate of infestation in the subsequent year

Somaa, H.M.H.
Plant Protection Research Institute, Agric. Res. Center, Egypt.

Abstract

The experiments were carried out during the cotton seasons of 2011 and 2012 in Sakha Agricultural Research Station, Kafr El-Sheikh Governorate to evaluate the effect of six cotton varieties and genotypes on percentage of natural mortality of diapaused larvae of pink bollworm, *Pectinophora gossypiella* (Saund.). Results during the five inspection dates (November, December, January, February and March) of both seasons of 2011 and 2012 were estimated. The percent reduction of diapaused pink bollworm larvae increased when the inspection date to be late of all six cotton varieties and genotypes. Also, the highest means of percent reduction were recorded in the Giza 86 x 10/229 and Giza 86 in the two seasons, while the lowest means percent reduction were recorded in the Giza 94 and Pima 56 x Giza 77. The differences of means percent reduction may be due to the differences of gossypol % in wall and wall thickness of green boll. The data over both seasons of PBW percent reduction were (29.17, 23.97, 23.52, 22.93, 20.97 and 17.51%) for Giza 86 x 10/229, Giza 86, Giza 92, Giza 88, Pima S6 x Giza 77 and Giza 94, respectively. The combined data over both seasons of gossypol % in green boll wall were (1.74, 1.15, 1.43, 1.77, 1.32 and 0.90%) and those of green boll's of wall thickness were (3.04, 2.79, 2.06, 2.76, 2.37 and 2.82 mm) for the six cotton varieties and genotypes, respectively. There were highly significant differences between data from the cotton varieties and genotypes in every character were studied.

Key words: Cotton, varieteis, genotypes, Pink Bollworm, Diapaused Larvae, Natural Mortality,

Introduction

Pink bollworm *Pectinophora gossypiella* (Saund.) (Lepidoptera: Gelechiidae) is a well known pest of cotton in many countries, where it also attacks other cultivated crops. Pink bollworm is a major and serious cotton pest and it causes serious losses of both quantity and quality of lint and seeds. The diapaused pink bollworm larvae in the cotton bolls at the end of cotton season are considered the main source of infestation the cotton plants during next seasons. Hussain and Kostandy (2002) found a positive correlation between the average numbers of pink bollworm larvae in green cotton bolls at the end of the cotton season and the average numbers of moths emerged from diapaused larvae in the following spring. Integrated pest management (IPM) included the cultivation of the insect resistant cotton varieties, could reduce the application of chemical pesticides, which may be detrimental to the beneficial insects and the environment. Baloch *et al*. (1982) and El-Mezayyen (2004) found certain cotton varieties are more resistant than other cotton varieties. Objective of this work was to study the effect of six cotton varieties and genotypes on natural mortality percentage of diapaused larvae of pink bollworm, which reduce correspondently early infestation of cotton receptors in the next year.

Materials and methods

Close and infested cotton bolls were collected at the end of two tested experimental seasons, 2011 and 2012. These infested cotton bolls were taken from six cotton varieties (Giza 86, Pima S6 x Giza 77, Giza 94, Giza 88, Giza 92 and Giza 86 x 10/229) which were planted at Sakha Agric. Research Station, Kafr El-Sheikh, Egypt. The plants received normal agricultural practices and recommended insecticides, for bollworms and cotton leafworm according to the recommendations of the Egyptian Ministry of Agric. Infested cotton bolls by pink bollworm (diapaused larvae) were left in open place in the field from October 1st until first of March to be exposed to natural enemies and weather factors. Samples of dried infested bolls by PBW (diapaused larvae) were prepared (100 bolls/replicate), 15 replicates for each cotton variety and genotype. Three inspections or samples of each cotton variety were picked at the first week of November, December, January, February and March and kept in tightly closed polyethylene bags, then dissected and examined in the laboratory of Plant Protection Research Institute at Sakha, Kafr El-Sheikh, for determining the number of surviving and dead larvae of PBW. Also, the developed pupae were counted in each replicate. Effect of each cotton variety and genotype was evaluated according to the effectiveness in reducing the number of surviving pink bollworm larvae

$$\%\,\text{Reduction} = \frac{\text{No. of dead larvae}}{\text{Total No. of larvae (surviving and dead larvae)}} x100$$

So, cotton yield g/m^2 of each variety and genotype was weighed. 40 samples for estimating gossypol

percentage in green bolls wall were done in the chemical laboratory of Chemical Research Department, Cotton Research Institute at Giza. The actual measurement of boll wall thickness in millimeters was done as the distance across the fertile lemma and palea at the widest point [IRRI Stand, 1996]. The statistical analysis was conducted using the software programme MSTATC.

Results and Discussion

Monthly percent reduction of diapaused larvae of PBW:

Inspection of 2011 season:

Data in Table (1) show the means of percent reduction of PBW larvae per 100 bolls of 6 cotton varieties and genotypes throughout five inspections of five months (Nov., Dec., Jan., Feb. and Mar.) in 2011 season. Reduction percentage were (0.0, 18.1, 25.0, 31.8 and 33.3%), (8.3, 13.3, 21.0, 27.5 and 32.3%), (3.8, 19.2, 20.0, 23.5 and 25.0%), (0.0, 15.7, 25.0, 30.4 and 39.3%), (7.1, 15.7, 21.7, 29.1 and 37.5%) and (0.0, 25.0, 35.8, 35.4 and 39.2%) in five inspection dates, for G.86, Pima S6 x G.77, G.94, G.88, G.92 and G.86 x 10/229, respectively. General means of percent reduction were (21.64, 20.48, 18.30, 22.06, 22.22 and 27.08%) for the same varieties and genotypes, respectively. The highest average mean of percent reduction during this season was estimated in G.86 x 10/229 and G.92 (27.08 and 22.22%), respectively. While the lowest was in G.94 and Pima S6 x G.77 (18.30 and 20.48%), respectively, in the same season.

Inspection of 2012 season:

Data in Table (2), show the means of percent reduction of PBW larvae per 100 bolls of the same cotton varieties and genotypes throughout the same five inspections. Reduction percentage were (8.3, 22.2, 24.0, 35.3 and 41.7%), (2.4, 13.2, 20.0, 30.0 and 41.7%), (8.5, 10.7, 16.1, 23.3 and 25.0%), (1.7, 20.5, 22.6, 33.3 and 40.9%), (16.0, 16.7, 21.4, 33.3 and 36.7%) and (20.7, 31.5, 33.3, 27.3 and 37.5%) in five inspection dates, for the same varieties and genotypes of cotton, respectively. The overall means of percent reduction were (26.30, 21.46, 16.72, 23.80, 24.82 and 31.26%), for these above varieties and genotypes of cotton, respectively. The highest average mean of percent reduction during this season was estimated in G.86 x 10/229 and G.86 (31.26 and 26.30%, respectively). While the lowest was in Pima S6 x G.77 and G.94 (21.46 and 16.72%, respectively), in same season.

Table 1. Monthly percent reduction of diapaused larvae of pink bollworm, *P. gossypiella* in 6 varieties and genotypes cotton bolls in 2011 season at Sakha, Kafr El-Sheikh Governorate.

Cotton varieties and genotypes	Months					Mean reduction%
	Nov.	Dec.	Jan.	Feb.	Mar.	
G.86	0.0	18.1	25.0	31.8	33.3	21.64
Pima S6 x G.77	8.3	13.3	21.0	27.5	32.3	20.48
G. 94	3.8	19.2	20.0	23.5	25.0	18.30
G. 88	0.0	15.7	25.0	30.4	39.2	22.06
G.92	7.1	15.7	21.7	29.1	37.5	22.22
G.86 x 10/229	0	25.0	35.8	35.4	39.2	27.08

Table 2. Monthly percent reduction of diapaused larvae of *P. gossypiella* in 6 varieties and genotypes cotton bolls in 2012 season at Sakha Kafr El-Sheikh Governorate.

Cotton varieties and genotypes	Months					Mean reduction%
	Nov.	Dec.	Jan.	Feb.	Mar.	
G.86	8.3	22.2	24.0	35.3	41.7	26.30
Pima S6 x G.77	2.4	13.2	20.0	30.0	41.7	21.46
G. 94	8.5	10.7	16.1	23.3	25.0	16.72
G. 88	1.7	20.5	22.6	33.3	40.9	23.80
G.92	16.0	16.7	21.4	33.3	36.7	24.82
G.86 x 10/229	26.7	31.5	33.3	27.3	37.5	31.26

Percent reduction from average data over both seasons:

In both seasons 2011 and 2012, the reduction percentages from average data in Table (3) were (23.97, 20.97, 17.51, 22.93, 23.52 and 29.17%) for G.86, Pima S6 x G.77, G.94, G.88, G.92 and G.86 x 10/229, respectively. The highest and lowest average means of percent reduction from average data over both seasons, were (29.17 and 23.97%) and (20.97 and 17.51%) for (G.86 x 10/229 and G.86) and (Pima S6 x G.77 and G.94), respectively. Statistical analysis of data in Table (4) showed the significant differences between varieties and genotypes and non-significant differences between years (1.562^{NS}). While, between varieties and years there was significant differences.

Infestation by PBW:
Inspection of 2011 season:

Results in Table (3) show the means of infestation by PBW larvae per 100 bolls of 6 cotton varieties and genotypes. Percentges of infestation were (4.89, 6.33, 5.44, 6.44, 5.44 and 4.23%) for G.86, Pima S6 x G.77, G.94, G.88, G.92 and G.86 x 10/229, respectively. The highest average mean of infestation% during this season was estimated in G.88 and Pima S6 x G.77 (6.44 and 6.33%, respectively). While, the lowest was in G.86 x 10/229 and G.86 (4.23 and 4.89%, respectively).

Inspection of 2012 season:

The data presented in Table (3) indicated that the means of infestation % by PBW larvae in 2012 season, were (5.57, 6.07, 6.57, 7.21, 7.21 and 3.93%) for same varieties and genotypes, respectively. The highest average mean of infestation % during this season was estimated in G.88 and G.92 (7.21 and 7.21%, respectively). While, the lowest was in G.86 x 10/229 and G.86 (3.93 and 5.57%, respectively).

Percentages of infestation from mean data over both seasons:

In both seasons (2011 and 2012), data in Table (3) showed the percentage of infestation from mean data were (5.23, 6.20, 6.00, 6.82, 6.32 and 4.08%). The highest and lowest average means of infestation % from mean data over both seasons (6.82 and 6.32%) and (4.08 and 5.23%) for (G.88 and G.92) and (G.86 x 10/229 and G.88), respectively.

Data in Table (4) showed that the differences between means of infestation of varieties were significant. It was, also, significant between years, and between varieties and years. Statistical analysis of data in Table (5) showed non-significantly negative correlation between percent reduction and infestation %. Hussain and Kostandy (2002) found a positive correlation between the average numbers of pink bollworm in green cotton bolls at the end of the cotton season and the average number of moths emerged from diapaused larvae in the following spring. In this respect, Shawer (2000) and El-Mezayyen (2004) indicated that G.45 (late bloomer variety) were the highestmost susceptible variety, while G.89 (early bloomer variety) was the highest resistant one to PBW, while Al-Ameer *et al*. (2010) found karshensky2 and G.70 (late bloomer) were more susceptible varieties and genotypes, while (Pima S6 x G.89) and Seuvin (early bloomer variety) were the highest resistant during 2007 and 2008 seasons at Kafr El-Sheikh region.

Gossypol concentration in green boll wall:
Inspection 2011 season:

Results in Table (3) show the means of gossypol% in green boll wall of 6 varieties and genotypes of cotton were (1.78, 1.33, 0.88, 1.16, 1.44 and 1.75%) for G.86, Prima 56 x g.77, G.94, G.88, G.92 and G.86 x 10/229, respectively. The highest average mean of gossypol % during 2011 season was estimated in G.86 and G.86 x 10/229 (1.78 and 1.75%), respectively. While, the lowest was in G.94 and G.88 (0.88 and 1.16%), respectively in same season.

Inspection 2012 season:

The data presented in Table (3) indicated that the means of gossypol % in green boll wall in 2012 season, were (1.76, 1.31, 0.93, 1.15, 1.43 and 1.74%) for same varieties and genotypes of cotton, respectively. The highest average mean of gossypol % during this season was estimated in G.86 and G.86 x 10/229 (1.76 and 1.74%), respectively. While, the lowest was in G. 94 and G.88 (0.93 and 1.15%), respectively.

Gossypol% from mean data over both seasons:

In both seasons (2011 and 2012) the gossypol % from mean data were (1.77, 1.32, 0.90, 1.15, 1.43 and 1.74%). The highest and lowest average means of gossypol % from mean data over both seasons, (1.77 and 1.74%) and (0.90 and 1.15%) from (G.86 and G.86 x 10/229) and (G.94 and G.88), respectively. Previous results in percent reduction, infestation % and gossypol % showed that the highest varieties and genotypes of gossypol % bolls cotton wall was lowest in infestation% by PBW larvae and highest percent reduction of diapause larvae of PBW. While the lowest varieties and genotypes of gossypol % boll wall cotton was highest infestation% and lowest percent reduction.

Results in Table (4) showed significant differences between varieties, but it was no significant between years and also between (varieties and years) was (0.001^{NS}). Data in Table (5) showed non-significant negative correlation between infestation% and concentration of gossypol, but, it was non-significant positive between percent reduction and gossypol %. These results agree with Al-Ameer *et al*. (2010) who found the value of correlation between concentration of gossypol and insect infestation was no significantly negative. Also, Abou-Tour (1989) showed that the correlation was negative and significant between resistance to bollworms infestation and number of glands/cm^2 of boll and total gossypol contents. According to Bottger (1964), gossypol is toxic to cotton bollworms, further more Shaver and Lukefahr (1969) showed the effect of gossypol (concentration) on bollworms and budworms. Also, Vilkova (1989) reported that even though high gossypol lines had weight when compared to those on low gossypol lines, the larvae from the high gossypol lines that survived had a higher pupal weight because of their apparent resistance to gossypol, but fecundity of these survivors was significantly reduced. Also, Abd El-Hamid and Helw (1973) and Meisner *et al*. (1977) suggested that gossypol content may be one of the factors associated with resistance to cotton leaf worm, so these genotypes can be used as a stock in breeding programs or using in the direct and general agriculture.

Table 3. Mean performance of varieties and genotypes of cotton under two successive years and their combined data for six traits**.**

	Percent reduction			Infestation%			Weight of bolls (g)			Boll wall thickness (mm)			Gossypol%			Yield (g)		
	2011	2012	Mean	2011	2012	Mean	2011	2012	Mean	2011	2012	Mean	2011	2012	Mean	2011	2012	Mean
G.86	21.64	26.30	23.97	4.89	5.57	5.23	13.46	13.81	13.63	2.74	2.77	2.76	1.78	1.76	1.77	1280	825	1052.50
Pima S6 x G.77	20.48	21.46	20.97	6.33	6.07	6.20	13.28	13.66	13.47	2.37	2.33	2.35	1.33	1.31	1.32	795	460	627.50
G. 94	18.30	16.72	17.51	5.44	6.57	6.00	15.30	15.59	15.44	2.83	2.81	2.82	0.88	0.93	0.90	600	800	700.00
G. 88	22.06	23.80	22.93	6.44	7.21	6.82	12.53	12.87	12.70	2.82	2.76	2.79	1.16	1.15	1.15	1080	675	877.50
G.92	22.22	24.82	23.52	5.44	7.21	6.32	14.07	14.07	14.07	2.08	2.04	2.06	1.44	1.43	1.43	910	910	910.00
G.86 x 10/229	27.08	31.26	29.17	4.23	3.93	4.08	17.51	17.50	17.50	3.01	3.06	3.04	1.75	1.74	1.74	1060	920	990.00
Grand mean	21.96	24.06	23.01	5.46	6.09	5.77	14.36	14.58	14.47	2.97	2.97	2.97	1.39	1.38	1.38	954.16	765	859.58
LSD 0.05	4.61	3.66	2.76	0.32	0.39	0.24	0.83	0.98	0.60	0.42	0.29	0.24	0.11	0.16	0.09	120.74	122.72	80.65

Table 4. Mean squares of years, varieties and genotypes of cotton and their interaction for six traits.

S.O.V.	d.f		Percent reduction			Infestation%			Weight of bolls (g)			Boll wall thickness (mm)			Gossypol%			Yield (g)		
	Single	Comb.	2011	2012	Comb	2011	2012	Comb	2011	2012	Comb	2011	2012	Comb	2011	2012	Comb	2011	2012	Comb
Years (y)	-	1	-	-	1.562	-	-	3.591**	-	-	0.444	-	-	0.0005	-	-	0.0001	-	-	322056.2**
Error (a)	-	4	-	-	0.616	-	-	0.015	-	-	0.583	-	-	0.035	-	-	0.008	-	-	8920.83
Varieties (v)	5	5	145.218**	111.535**	122.562**	2.134**	4.605**	5.770**	9.711**	8.502**	18.164**	1.055**	1.093**	2.146**	0.360**	0.325**	0.684**	171552.5**	90600.0**	163701.2**
(V x Y)	-	5	-	-	18.016*	-	-	0.969**	-	-	0.049	-	-	0.002	-	-	0.001	-	-	98451.2**
Error (b)	10	20	6.495	4.085	5.290	0.033	0.048	0.040	0.212	0.298	0.255	0.054	0.026	0.040	0.004	0.008	0.006	4437.5	4584.1	4510.8
C.V.			10.87	8.78	9.90	3.32	3.58	3.47	3.21	3.74	3.49	7.8	5.38	6.70	4.76	6.27	5.57	6.98	8.85	7.81

*, ** significant at 0.05 and 0.01 levels of probability, respectively

Green boll wall thickness (mm)
Inspection of 2011 season:

Results in Table (3) show that the means of green boll wall thickness of 6 varieties and genotypes of cotton, were (2.74, 2.37, 2.83, 2.82, 2.08 and 3.01 mm) for G.86, Pima S6 x G.77, G.94, G.88, G.92 and G.86 x 10/229, respectively. The highest average means of green boll wall thickness during this season were estimated in G.86 x 10/229 and G.94 (3.01 and 2.83 mm, respectively). While, the lowest was in G.92 and Pima S6 x G.77 (2.08 and 2.37 mm, respectively).

Inspection of 2012 season:

The data presented in Table (3) indicated that the means of green boll wall thickness in 2012 season were (2.77, 2.33, 2.81, 2.76, 2.04 and 3.06 mm) for same varieties and genotypes of cotton, respectively. The highest average means of green boll wall thickness during this season were estimated in G.86 x 10/229 and G.94 (3.06 and 2.81 mm, respectively). While, the lowest was the G.92 and Pima S6 x G.77 (2.04 and 2.33 mm, respectively).

Green boll wall thickness from mean data over both seasons:

In both seasons (2011 and 2012), the green boll wall thickness from mean data (Table 3) were (2.76, 2.37, 2.82, 2.79, 2.06 and 3.04 mm). The highest and lowest average means of green boll wall thickness from mean data over both seasons were (3.04 and 2.82 mm) and (2.06 and 2.37 mm) from (G.86 x 10/229 and G.94) and (G.92 and Pima S6 x G.77), respectively. Results in Table (4) revealed that the differences between varieties were significant, while those were non significant between years and between (varieties and years). Also, data in Table (5) showed no significantly positive correlation between percent reduction and green boll wall thickness, also, it was positively no insignificant between infestation % and green boll wall thickness.

Boll weight (g):
Inspection of 2011 season:

Results in Table (3) show the means of boll weight of 6 varieties and genotypes of cotton were (13.46, 13.28, 15.30, 12.53, 14.07 and 17.51 g) for G.86, Pima S6 x G.77, G.94, G.88, G.92 and G.86 x 10/229, respectively. The highest means of boll weight during this season were estimated in G.86 x 10/229 and G.94 (17.51 and 15.30 g, respectively). While, the lowest were in G.88 and Pima S6 x G.77 (12.53 and 13.28 g, respectively).

Inspection of 2012 season:

The data presented in Table (3) indicated that the means of boll weight in 2012 season, were (13.81, 13.66, 15.59, 12.87, 14.07 and 17.50 g) for some varieties and genotypes of cotton, respectively. The highest average of means of boll weight during this season were estimated in G.86 x 10/229 and G.94 (17.50 and 15.59 g), respectively. While, the lowest were in G.88 and Pima S6 x G.77 (12.87 and 13.66 g), respectively.

Boll weight from mean data over both seasons:

In both seasons (2011 and 2012 alltogether), the boll weight from mean data (Table 3) were (13.63, 13.47, 15.44, 12.70, 14.07 and 17.50 g). The highest and lowest average means of boll weight from mean data over both seasons were (17.50 and 15.44 g) and (12.70 and 13.47 g) for (G.86 x 10/229 and G.94) and (G.88 and Pima S6 x G.77), respectively. The results presented in Table (4) showed significant differences between varieties, but those were no significant between years, and between years and varieties. Previous results in Table (5) showed positive insignificant correlation between percent reduction and boll weight, but it was negative significant between infestation% and boll weight. Probably, the heaviest bolls were more attractive to the females insect to lay their eggs.

Yield/m^2 of cotton varieties and genotypes:
Inspection of 2011 season:

Results in Table (3) show the means of yield of 6 varieties and genotypes of cotton being (1280, 795, 600, 1080, 910 and 1060 g) for G.86, Pima S6 x G.77, G.94, G.88, G.92 and G.86 10/229, respectively. The highest average mean of yield during this season was estimated in G.86 and G.88 (1280 and 1080 g, respectively). While, the lowest was in G.94 and Pima S6 x G.77 (600 and 795 g, respectively).

Inspection of 2012 season:

The data presented in Table (3) indicated that the means of yield in 2012 season, were (825, 460, 800, 675, 910 and 920 g) for the same varieties and genotypes cotton, respectively. The highest average means of yield during this season were estimated in G.86 x 10/229 and G.92 (920 and 910 g, respectively). While, the lowest were in Pima S6 x G.77 and G.88 (460 and 695 g, respectively).

Yield/m^2 of cotton varieties and genotypes from mean data over both seasons:

In both seasons (2011 and 2012), the yield/m^2 from combined data (Table 3) and Fig. (4) were (1052.50, 627.50, 700.00, 877.50, 910.00 and 990.00 g/m^2). The highest and lowest average means of yield/m^2 from mean data over both seasons were (1052.50 and 990.00 g/m^2) and (627.50 and 700.00 g/m^2) for (G.86 and G.86 x 10/229) and (Pima S6 x G.77 and G.94), respectively. Data in Table (5) showed positively significant correlation between percent reduction and yield/m^2, but, it was negatively no significant between infestation% and yield/m^2, but Al-Ameer *et al*. (2010) found that the value of correlation was negatively significant between infestation and lint yield/m^2. Somaa (2006) studied the the effect of winter crops and their agricultural

practices on infestation PBW in the next season, the highest means of diapaused PBW larvae in cotton bolls fall in the soil of mortality % were recorded in the sugar beet and faba bean crops (63.8 and 62.4%, respectively) with slight differences between each other, and the lowest averages of mortality% were recorded by the wheat and Egyptian clover crops (37.8 and 33.4%, respectively), with slight difference between them.

Cultivate to resistant cotton variety and genotype to infestation of PBW in the season cotton (G.86 x 10/229 or G.86). And cultivate to the sugar beet or faba bean after cotton crop to be the highest percent reduction of infestation% of PBW in the next crop cotton.

Table 5. The correlation coefficients values among all studied characters

Traits	Percent reduction	Infestation %	Weight of Bolls (g)	Boll wall thickness (mm)	Gossypol %	Yield (g)
Percent reduction		-0.498	0.313	-0.61	0.675	0.840*
Infestation %			-0.816*	-0.108	-0.708	-0.512
Weight of bolls (g)				0.284	0.256	0.180
Boll wall thickness (mm)					-0.493	-0.620
Gossypol %						0.760
Yield (g)						

References

Abdel-Hamid, A.M. and M.R. Helw (1973). Cotton leafworm on different genotypes of cotton. Cott. Gr. Rew., 50(4): 338.

Abou-Tour, H.B. (1986). Genetical studies on resistance to insects in Egyptian cotton. Ph.D. Thesis, Faculty of Agric., Tanta Univ.

Al-Ameer, M.A.; M.A. Abd El-Salam; W.M.B. Yehia and I.A.I. Saad (2010). Evaluation of some cotton genotypes for ability to infestation tolerance to bollworms for improving of some important economical characters. J. Agric. Res. Kafr El-Sheikh Univ., 36(2): 2010.

Baloch, A.A.; B.A. Soomro and G.H. Mallah (1982). Evaluation of some cotton varieties with known genetic markers for their resistance against sucking and bollworm complex. Cotton Res. Inst., Sakrand, Pakistan, (C.F. Rev. of Appl. Entomology, 70(12): 7180).

Bottger, G.T. (1964). Relation of gossypol content of cotton plants to insect resistance. J. Econ. Entomol., 57: 283-285.

El-Mezayyen, G.A. (2004). Evaluation of some Egyptian cotton varieties to infestation of piercing sucking insects, cotton leafworm and bollworms at Kafr El-Sheikh region. J. Agric. Sci. Mansoura Univ., 29(1): 433-441.

Hussein, Nagwa, M. and S.N. Kostandy (2002). Monitoring of cotton pink bollworm population at different cotton growth stages in Egypt. Egyptian J. of Agric. Res., 80(3): 1077-1085.

IRRI (1996). Standard evaluation system for rice. INGER Prog. International Rice Research Institute July edition p. 12, 13, 43, 47.

Meisner, J.; M. Zur; E. Kabonci and K.R.S. Ascher (1977). Influence of gossypol content of leaves of different cotton strains on the development of *Spodoptera littoralis* Larvae. J. Econ. Entomol. 70(6): 714-716.

Shaver, T.N. and M.J. Lukefahr (1969). Effects of flavonoids pigments and gossypol on growth and development of the bollworm, tobacco budworm, and pink bollworm. J. Econ. Entomol., 62: 643-646.

Shawer, D.M.B. (2000). Ecological studies on some insect pests infesting cotton plants. M.Sc. Thesis, Fac. Agric., Kafr El-Sheikh, Tanta Univ.

Somaa, H.M.H. (2006). Ecological studies on certain cotton insect pests and their control at Kafr El-Sheikh governorate. Ph.D. Thesis, Fac. Agric., Al-Azhar Univ.

Vilkova, N.A. (1989). Effect of cotton cultivars with high content of gossypol on development of the cotton bollworm *Heliothis armigera* (Hbn) (Lepidoptera: Noctuidae). J. Econ. Entomol. Rev., 68: 129-137.

White, W.H.; J.C. IR. McCarty; D.H. Gollum; and P.A. Hedin (1982). Strains and within season variability of various allelochemics within a diverse group of cottons, *Gossypium hirsutum* L. Crop Sci., 22(6): 1235-1238.

تأثير ستة أصناف وطرز من القطن على نسب الموت الطبيعية ليرقات دودة اللوز القرنفلية *Pectinophora gossypiella* (Saund.) الساكنة فى لوز القطن والإصابة بها فى العام التالى

حسن محمد حسن صومع

معهد بحوث وقاية النباتات . مركز البحوث الزراعية . الدقى . مصر

أجريت هذه التجارب خلال موسم ى زراعة القطن فى عامى 2011 ، 2012 فى مزرعة محطة البحوث الزراعية بسخا . محافظة كفرالشيخ ، بهدف دراسة تاثير ستة أصناف وطرز من القطن على نسب الموت الطبيعية بين اليرقات الساكنة لدودة اللوز القرنفلية فى لوز القطن والإصابة بها فى العام التالى ، وقد تم إستخدام ستة أصناف من القطن وهى جيزة 86 ، بيما س6 × جيزة 77 ، جيز 94 ، جيزة 88 ، جيزة92 ، جيزة 86 × 229/10 ، حيث تم جمع خمسة عشر مكررة من كل صنف ، كل مكرره عبارة عن مائة لوزة بها يرقات ساكنة لدودة اللوز القرنفلية ، وتم وضع هذه المكررات فى مكان مفتوح للتعرض للأعداء الطبيعية والعوامل الحيوية ، ثم تم فحص ثلاث مكررات من كل صنف خلال خمس فحصات (نوفمبر ، ديسمبر ، يناير ، فبراير ، مارس) وتقدير نسبة الخفض لليرقات الموجودة ، وأشارت النتائج إلى زيادة نسبة الخفض لهذه اليرقات فى كل أصناف القطن ، لكن أعلى متوسطات فى نسبة الخفض سجلت فى صنف جيزة 86 × 229/10 وجيزة 86 فى الموسمين وأقل متوسطات نسبة الخفض سجلت فى صنفى بيما س6 × جيزة 77 وجيزة 94 ، وقد عزيت هذه الإختلافات بين الأصناف نتيجة الإختلافات فى نسبة مادة الجوسيبول فى جدار لوز القطن وكذلك سمك جدار لوز القطن وكانت متوسطات الخفض بين يرقات دودة اللوز القرنفلية للعامين معا (29.17% ، 23.97% ، 23.52% ، 22.93% ، 20.97% ، 17.51% لأصناف جيزة 86 × 229/10 ، جيز 86 ، جيزة 92 ، جيز 88 ، بيما س6 × جيزة 77 ، جيزة 94 ، بالترتيب ونسبة الجوسيبول فى جدار لوز القطن فى العامين (1.74% ، 1.15% ، 1.43% ، 1.77% ، 1.32% ، 0.90%) لنفس الأصناف السابقة بالترتيب ، وسمك جدار اللوز فى العامين (3.04 ، 2.97 ، 2.06 ، 2.76 ، 2.37 ، 2.82 مم) للأصناف السابقة مع وجود إختلافات معنوية بين الأصناف فى جميع الصفات المدروسة.