EVALUATION OF SOME GRAIN SORGHUM LINES FOR RESISTANCE TO *SESAMIA CRETICA* LED. AND YIELD POTENTIAL

EL – RAWY , A. M.[1] , A. E. A. A. MOURAD [2] and A. M. EL – KADY [2]

1. Plant Protection Research Institute, ARC, Dokki, Giza, Egypt.
2. Sorghum Department, Field Crops Research Institute, ARC, Giza, Egypt.

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Abstract

Pink stem borer Sesamia cretica is considered the most serious sorghum insects in Egypt. The aim of the present study is to evaluate seven restorer and nine maintainer sorghum lines compared with the commercial check variety "Dorado" for resistance to Sesamia cretica and yield potential . A field experiment is carried out at Nubaria Agricultural Research Station , under two conditions , first is under optimum natural infestation of S. cretica during the growing seasons 2011 and 2012 and the second under artificial infestation with newly hatched larvae of the insect during 2012 season . Three traits expressing resistance to S. cretica were recorded, i.e. percentage of infested plants , percentage of plants with dead hearts and intensity of damage. Results showed that restorer line ICSR–91022 display high resistance degree of the three resistance criteria under both natural and artificial infestation conditions (17.50%, 5.74% and 1.85)and (23.12%, 6.72% and 2.11), respectively with high yielding potential under natural infestation condition (19.75 ard./fad.). The restorer line ICSR-94006 manifested moderate resistance under natural infestation (34.74%, 12.73% and 2.52, respectively) and had relatively high yield potentiality (18.07 ard./fad.). The tallest restorer line was ICSR-94006 (235.83 cm), while earliness maintainer lines flowering were GZB-9-1, BTX-807 and BTX-623 (65.67, 66.83 and 67 days, respectively). The heaviest grains were obtained from restorer lines ICSR-89028, ICSR-89053 and ICSR-91022 (29.86, 27.80 and 27.32 g, respectively). The restorer line ICSR–91022 was highly resistance to S. cretica and give high yield potential. On the other hand, restorer line ICSR-94006 showed moderate resistance and relatively high yield potential.

INTRODUTION

Grain sorghum (*Sorghum bicolor* L. Moench) is an important cereal crop in the semi-arid tropics (SAT) where it has been a vital source of food for millions of people through the ages. More than half of the worlds sorghum grow in the SAT. It is used for animals feed as well as an industrial raw material and sometimes used as a building material source in addition to complementing other cereals as a primary food grain.

Sorghum plants in Egypt are severely attacked by different species of *Lepidopteron* insects. The most prevalent and serious one is the pink stem borer, *Sesamia cretica* Led. This insect attacks sorghum plants after emergence, devours the whorl leaves and may kill the growing meristemic tissue, causing dead hearts (complete death of small sorghum plants). It is also capable of damaging older plants and excavating tunnels into the stem. In fact, yield reduction due to this insect depends on many factors, including the environmental conditions, the stage of plant development when infested, and the insect population available for infestation. Losses are mainly attributed to decreased number of plants per fad., increasing plant lodging and head drops and by predisposing plants to disease organisms as a result of highly infestation of *S. cretica* as a main primary factor. The resistance crop plants to insects has three interrelated components : non-preference, tolerance and antibiosis (Jennings *et al*. 1974 and Kogan and Ortman, 1978). Each mechanism can work independently or complementary to the mechanism in effecting resistance. Resistant varieties offer distinct advantages over insect control done exclusively by chemicals and cultural methods, but it must not be viewed as a panacea in host-pest relationships (Jennings *et al*., 1974). An integrated program of all control types should be most effective and efficient.

Host-plant resistance restrict or eliminates damage caused by the insect. It does not increase cost, does not require special equipments and does not cause environmental pollution. In addition, the efficiency of this method is compatible with other chemical and biological control methods (Scott *et. al*., 1977). Breeding methods used to develop crop cultivars resistant to the insects are determined by two factors ; mode of reproduction to the crop species and kind of gene action that conditions resistance in host plants to the insects (Russell, 1972). Mihm (1985) mentioned that the resistant plants can not identified unless the plants are subjected to and interact with the insect and the interaction may be affected at any given time, or over time, by variability of evolutionary changes in the insect population.

The present research aims to evaluate seven restorer and nine maintainer lines and the check variety Dorado for their resistance to *S.cretica* under both natural and artificial infestations and for yield and its components.

MATERIALS AND METHODS

Field experiments were conducted at Nubaria Agricultural Research Station, El-Beheira Governorate during two successive growing seasons (2011 and 2012).

Seven restorer and nine maintainer sorghum lines as well as Dorado as check variety were obtained from Sorghum Research Department, Field Crops Research Institute (FCRI), ARC and of this research, the origin of the lines are shown in (Table 1).

Table 1 . Name, pedigree and origin of the tested genotypes .

Entry No.	Name and pedigree		Grain color	Glume color	Origin
1	BTX-14	Maintainer lines	White	Orange	Texas (USA)
2	BTX-407		White	Orange	Texas (USA)
3	BTX-623		White	Red	Texas (USA)
4	BTX-807		Red	Red	Texas (USA)
5	GZB-6-1		White	Orange	ARC *(Egypt)
6	GZB-9-1		White	Orange	ARC (Egypt)
7	GZB-11-2		White	Orange	ARC (Egypt)
8	GZB-16-2		White	Orange	ARC (Egypt)
9	GZB-34-2		White	Orange	ARC (Egypt)
10	ICSR-89028	Restorer lines	White	Orange	ICRISAT **(India)
11	ICSR-89039		White	Orange	ICRISAT (India)
12	ICSR-89053		White	Orange	ICRISAT (India)
13	ICSR-91022		White	Orange	ICRISAT (India)
14	ICSR-93003		White	Red	ICRISAT (India)
15	ICSR-94005		White	Red	ICRISAT (India)
16	ICSR-94006		White	Red	ICRISAT (India)
17	Dorado(check variety)		White	Orange	Nebraska (USA)

*Agriculture Research Center.

**International Crops Research Institute for the Semi-Arid Tropics.

Two field evaluation experiments were carried out, first was conducted under natural infestation of the pink stem borer *S. cretica* during two successive seasons (2011 and 2012) and the second was carried out under artificial infestation conditions during 2012. The two experiments were planted on 28-6-2011 and 1-7-2012 for natural infestation and on 28-5-2012 for artificial infestation conditions. The experimental design was randomized complete blocks design (RCBD) with three replications, four rows with 6 m long and 60 cm abart, 20 cm between hills and two plants were remained per hill. No pest control was carried out in both seasons.

Ten plants from each plot were artificially infested with newly hatched larvae of *S. cretica* produced from Corn Borer Research Lab (CBRL), Maize Research Section,

ARC, Giza, Egypt. Each plant received 8 neonate larvae of this insect which were mixed with maize cob grits and placed into the whorl of the plants (20 days from planting date) using the Bazooka as mechanical dispenser (according to Mihm, 1983). Two shots of Bazooka were used on each plants; each shot delivered 4 larvae.

Data recorded :

a. In the field under natural infestation

The following traits were measured after 30 and 45 days from planting date.

1- Percentage of infested plants (IP%) as follows

$$IP\% = \frac{\text{No. of infested plants / plot}}{\text{Total No. of plants / plot}} \times 100$$

Lines were classified according to their mean IP% into: resistance (less than 35%), moderately resistance (from 35% to less than 70%) and susceptible (70% or above) according to Al-Naggar *et al*.(2000b).

2- Percentage of dead hearts (DH%) as follows

$$DH\ \% = \frac{\text{No. of plants with dead hearts / plot}}{\text{Total No. of plants / plot}} \times 100$$

Lines were classified according to their mean DH% into : resistance (less than 7%), moderately resistance (from 7% to less than 15%) and susceptible (15% or more) according to Al-Naggar *et al*. (2000b).

3- Intensity of damage (ID) as follows

Six class rating scale according to Al-Naggar *et al*.(2000b) was used for evaluating the amount of plant injury in maize caused by *S. cretica* larvae attack. The description of this scale was as follows :

Class 1 : No visible injury on plants (no symptoms) .

Class 2 : Plants with holes less than 0.5 mm in diameter across partially or fully unfolded whorl leaves.

Class 3 : Several folded and unfolded whorl leaves with relatively wider round holes .

Class 4 : Several folded and unfolded whorl leaves with relatively larger round and / or elongated holes accompanied with small yellowish-green pillets of frass aggregated in the whorl.

Class 5 : Plants with relatively larger round and / or elongated irregular holes, evident distortion of the leaves (most leaves have long holes), withering of whorl and accumulation of comparatively large sized pillets of frass in the whorl or on the ground around the stem.

Class 6 : Plants with dead hearts.

The intensity of damage (ID) value for each plot was calculated as follows :

$$ID = \frac{ID1 + ID2 + \text{-------} + IDn}{N}$$

Where ID1, ID2, --------- IDn denote intensity of damage of the tested infested plant No.1, No.2, -------- No.n and N = number of plants / plot. Lines were classified according to their ID into: resistance (0 to less than 1.7 ID), moderately resistance (1.7 to less than 2.7 ID) and susceptibile (2.7 ID or above) according to Al-Naggar *et al*. (2000b)..

b. In the field under artificial infestation

The following traits were measured after 15 days from artificial infestation.

1- Percentage of infested plants (IP%) as follows

$$IP\% = \frac{\text{No. of infested plants / plot}}{\text{No. of artificially infested plants / plot}} \times 100$$

Lines were classified according to their mean IP% as the same ranks mentioned before, according to Al-Naggar *et al*. (2000a).

2- Percentage of dead hearts (DH%) as follows

$$DH\% = \frac{\text{No. of plants with dead hearts / plot}}{\text{No. of artificially infested plants / plot}} \times 100$$

Lines were classified according to their mean DH% as mentioned before, according to Al-Naggar *et al* (2000a).

3- Intensity of damage (ID) as follows

$$ID = \frac{ID1 + ID2 + \text{-------} + IDn}{N}$$

Where ID1, ID2, --------- IDn denote intensity of damage of the tested infested plant No.1 , No. 2, ------No.n and N= number of artificially infested plants. Lines were classified according to their mean ID as mentioned before according to Al-Naggar *et al*.(2000a).

Agronomic data recorded in the tow growing seasons under natural infestation condition were: plant height (cm), days to 50% flowering, 1000-grain weight (g) and grain yield (ard./fad.). The collected data were statistically analyzed according to Steel *et al*.(1997) and the treatment means were compared by Least Significant Difference (L.S.D.) at 5 % level.

RESULTS AND DISCUSSION

1- Field evaluation of sorghum lines resistance to *S. cretica* under natural infestation

The obtained results for each of the seven restorer and nine maintainer lines and Dorado as check variety under natural infestation during 2011and 2012 seasons are presented in Table (2).

a - Infested plants (IP)

The mean data across the two seasons indicated that, six resistance lines were detected (ICSR-91022, ICSR-94005, ICSR-93003, ICSR-89039, GZB-34-2 and ICSR-94006) with an average of 17.50, 29.14, 29.55, 31.92, 34.18 and 34.74 %, respectively and ten moderately resistant lines (GZB-9-1, BTX-14, GZB-11-2, GZB-16-2, ICSR-89053, BTX-407, ICSR-89028, GZB-6-1, BTX-807 and BTX-623) with an average of 36.88, 39.41, 40.66, 44.39, 45.95, 46.21, 46.41, 55.85, 55.94 and 69.48 %, respectively and also, the variety Dorado was moderately resistant with an average of 39.13 %.

b – Dead hearts (DH)

DH average across the two seasons in the same table ranged from 5.74 % for ICSR-91022 to 29.01 % for BTX-623. Mean data showed also that, restorer line ICSR-91022 with an average of 5.74 % was considered as resistant to *S. cretica*. Besides, twelve lines were moderately resistant (BTX-407, GZB-34-2, GZB-9-1, BTX-14, ICSR-93003, ICSR-94005, ICSR-94006, GZB-11-2, ICSR-89039, ICSR-89053, GZB-16-2 and ICSR-89028) with an average of 10.50, 10.65, 11.06, 12.05, 12.42, 12.49, 12.73, 13.34, 13.36, 13.77, 13.97 and 14.84 %, respectively , three lines and Dorado variety were susceptible (BTX-807, Dorado, GZB-6-1 and BTX-623) with dead hearts average of 16.44, 16.87, 23.24 and 29.01 %, respectively. Thus, as for the check variety, it reflected a moderately resistance performance using the first criterion while it showed a susceptible reaction to DH criterion. In other word, no one criterion can judge the resistance and / or susceptibility of a genotype.

c – Intensity damage (ID)

Data mean across the two seasons showed that, ten lines were moderately resistance (ICSR-91022, ICSR-89039, ICSR-93003, ICSR-94005, GZB-34-2, BTX-14, GZB-9-1, ICSR-94006, GZB-11-2 and GZB-16-2) with an average of 1.85, 2.26, 2.27, 2.28, 2.35, 2.43, 2.49, 2.52, 2.64 and 2.66, respectively and six lines and Dorado variety were susceptible (BTX-407, Dorado, ICSR-89053, ICSR-89028, GZB-6-1, BTX-807 and BTX-623) with an average of 2.72, 2.72, 2.79, 2.99, 3.12, 3.13 and 4.00, respectively. Several researches were carried out to study genotypic difference in sorghum resistance to pink stem borer *S. cretica* (Tantawi *et al*., 1984, Tantawi *et al*., 1991, El-Serwy and Saba, 1993, Mourad and El-Rawy, 2012 and Sabra, 2012).

2- Field evaluation of sorghum lines resistant to infestation by *S. cretica* under artificial infestation

The obtained results for each of the seven restorer and nine sterile maintainer sorghum lines and Dorado (check variety) under artificial infestation during 2012 season are presented in Table (3).

a – Infested plants (IP)

One resistant line (ICSR-91022) with an average of 23.12 % infested plants, ten moderately resistant lines (ICSR-89039, ICSR-94005, ICSR-93003, ICSR-94006, GZB-34-2, BTX-14, GZB-9-1, GZB-11-2, BTX-407 and GZB-16-2) with an average of 37.09, 41.68, 44.32, 44.71, 47.11, 49.84, 55.79, 56.67, 64.90 and 67.38 %, respectively and five lines and Dorado variety were susceptible (ICSR-89053, Dorado, GZB-6-1, ICSR-89028, BTX-807 and BTX-623) with an average of 72.71, 73.12, 73.27, 74.74, 81.04 and 87.69 %,respectively.

b – Dead hearts (DH)

Also, the line (ICSR-91022) was the only resistant one based on DH criterion with an average of 6.72 %, two moderately resistant lines (ICSR-89039 and GZB-34-2) with an average of 10.48 and 14.57 %, respectively and thirteen lines and Dorado variety were susceptible (BTX-407, GZB-11-2, ICSR-94005, BTX-14, GZB-9-1,GZB-16-2, ICSR-93003, ICSR-89053, ICSR-94006, ICSR-89028, Dorado, BTX-807, GZB-6-1 and BTX-623) with an average of 15.62, 15.92, 16.47, 16.97, 17.46, 18.81, 19.34, 20.03, 20.30, 21.61, 24.02, 24.97, 27.52 and 36.85 %, respectively.

c – Intensity damage (ID)

Data in the same table showed that, three lines were moderately resistant (ICSR-91022, ICSR-89039 and ICSR-93003) with an average of 2.11, 2.47 and 2.69, respectively and thirteen lines and Dorado variety were susceptible (ICSR-94005, ICSR-94006, GZB-34-2, BTX-14, GZB-9-1, GZB-11-2, BTX-407, Dorado, GZB-16-2, ICSR-89053, GZB-6-1, ICSR-89028, BTX-807 and BTX-623) with an average of 2.71, 2.76,

Table 2. Average of infested plants and plants with dead hearts percentages and intensity of damage under natural infestation with *S. cretica* during two successive growing seasons (2011-12).

Entry No.	Genotypes		Infested plant						Plants with dead hearts						Intensity of damage					
			2011		2012		Mean		2011		2012		Mean		2011		2012		Mean	
			IP %	Reaction	IP %	Reaction	IP %	Reaction	DH %	Reaction	DH%	Reaction	DH%	Reaction	ID	Reaction	ID	Reaction	ID	Reaction
1	BTX-14	Maintainer lines	36.67	M	42.15	M	39.41	M	11.18	M	12.91	M	12.05	M	2.34	M	2.52	M	2.43	M
2	BTX-407		44.08	M	48.35	M	46.21	M	10.30	M	10.69	M	10.50	M	2.66	M	2.79	S	2.72	S
3	BTX-623		68.62	M	70.33	S	69.48	M	28.38	S	29.63	S	29.01	S	3.94	S	4.06	S	4.00	S
4	BTX-807		51.40	M	60.48	M	55.94	M	15.46	S	17.42	S	16.44	S	3.04	S	3.21	S	3.13	S
5	GZB-6-1		49.98	M	61.71	M	55.85	M	21.03	S	25.46	S	23.24	S	3.05	S	3.18	S	3.12	S
6	GZB-9-1		35.29	M	38.47	M	36.88	M	10.25	M	11.87	M	11.06	M	2.41	M	2.56	M	2.49	M
7	GZB-11-2		37.52	M	43.80	M	40.66	M	12.64	M	14.03	M	13.34	M	2.53	M	2.76	S	2.64	M
8	GZB-16-2		41.81	M	46.97	M	44.39	M	13.25	M	14.69	M	13.97	M	2.65	M	2.67	M	2.66	M
9	GZB-34-2		30.49	R	37.88	M	34.18	R	9.60	M	11.70	M	10.65	M	2.16	M	2.54	M	2.35	M
10	ICSR-89028	Restorer lines	43.04	M	49.77	M	46.41	M	13.42	M	16.27	S	14.84	M	2.84	S	3.14	S	2.99	S
11	ICSR-89039		30.55	R	33.30	R	31.92	R	11.94	M	14.77	M	13.36	M	2.25	M	2.27	M	2.26	M
12	ICSR-89053		42.57	M	49.33	M	45.95	M	12.52	M	15.01	S	13.77	M	2.69	M	2.88	S	2.79	S
13	ICSR-91022		15.25	R	19.75	R	17.50	R	5.14	R	6.33	R	5.74	R	1.72	M	1.97	M	1.85	M
14	ICSR-93003		28.79	R	30.30	R	29.55	R	11.08	M	13.76	M	12.42	M	2.11	M	2.43	M	2.27	M
15	ICSR-94005		26.95	R	31.32	R	29.14	R	10.90	M	14.07	M	12.49	M	2.10	M	2.47	M	2.28	M
16	ICSR-94006		35.23	M	34.25	R	34.74	R	13.64	M	11.83	M	12.73	M	2.42	M	2.62	M	2.52	M
17	Dorado (check variety)		36.93	M	41.33	M	39.13	M	14.84	M	18.90	S	16.87	S	2.63	M	2.81	S	2.72	S
LSD 0.05 %			16.11	-	16.81	-	11.42	-	8.04	-	9.41	-	6.07	-	0.66	-	0.61	-	0.78	-

R= resistant M= moderate S= susceptible

Means followed by the same letter (s) in each column within each treatment are not significant.

2.85, 2.94, 3.28, 3.30, 3.45, 3.61, 3.66, 3.86, 3.88, 4.07, 4.21 and 4.78, respectively. Mourad and El-Rawy, 2012 recorded also that the sorghum line (ICSR-92003) was resistant to *S.cretica* but their observation was under artificial infestation only.

Table 3. Average infested plants and plants with dead hearts percentages and intensity of damage for sixteen sorghum lines and Dorado as a check variety under artificial infestation with S. cretica in 2012 season.

Entry No	Genotypes		Infested plants		Plant with dead hearts		Intensity of damage	
			IP %	Reaction	DH %	Reaction	ID	Reaction
1	BTX-14	Maintainer lines	49.84	M	16.97	S	2.94	S
2	BTX-407		64.90	M	15.62	S	3.45	S
3	BTX-623		87.69	S	36.85	S	4.78	S
4	BTX-807		81.04	S	24.97	S	4.21	S
5	GZB-6-1		73.27	S	27.52	S	3.88	S
6	GZB-9-1		55.79	M	17.46	S	3.28	S
7	GZB-11-2		56.67	M	15.92	S	3.30	S
8	GZB-16-2		67.38	M	18.81	S	3.66	S
9	GZB-34-2		47.11	M	14.57	M	2.85	S
10	ICSR-89028	Restorer lines	74.74	S	21.61	S	4.07	S
11	ICSR-89039		37.09	M	10.48	M	2.47	M
12	ICSR-89053		72.71	S	20.03	S	3.86	S
13	ICSR-91022		23.12	R	6.72	R	2.11	M
14	ICSR-93003		44.32	M	19.34	S	2.69	M
15	ICSR-94005		41.68	M	16.47	S	2.71	S
16	ICSR-94006		44.71	M	20.30	S	2.76	S
17	Dorado(check variety)		73.12	S	24.02	S	3.61	S
LSD 0.05 %			28.24	-	10.27	-	1.08	-

R= resistant M= moderate S= susceptible

Means followed by the same letter (s) in each column within each treatment are not significant.

3 – Yield and yield components

The performance of the lines which were evaluated in the two successive growing seasons and the mean analysis are presented in Table (4). There were significant differences among the lines in all studied traits.

The tallest restorer line was ICSR-94006 (235.83 cm) followed by ICSR-89039 (222.50 cm). While the, earliest flowering maintainer line was GZB-9-1(65.67 days), followed by BTX-807 (66.83 days) and BTX-623 (67 days). For 1000-grain weight restorer lines ICSR-89028, ICSR-89053 and ICSR-91022 were 29.86, 27.80 and 27.32 g, respectively. These lines produced significantly heavier grains compared with the check variety (24.61 g). The results of grain yield showed that the resistant restorer lines (ICSR-91022, ICSR-94006 and ICSR-89039) had the highest grain yield (19.75, 18.07 and 16.96 ard. / fad., respectively), while the check variety produced 15.50 ard. / fad. These results are in agreement with those obtained by Mourad *et al.*(1999) under abiotic stress condition (i.e., salinity), Mahmoud *et al.*(2007) under water stress, Mourad and Anton (2007) under water and soil stresses and Mourad and El-Rawy (2012).

Generally, restorer line ICSR-91022 is consider a high resistance line to *S. cretica* with high grain yield (19.75 ard. / fad.) while ICSR-94006 was of moderate resistance to this insect but showed a relatively high grain yield (18.07 ard. / fad.).

Table 4. Performance of seventeen sorghum lines during two successive seasons under natural infestation condition (2011-12)

Entry No.	Genotypes		Plant height (cm)			Days to 50 % flowering			1000 – grain weight (g)			Yield (ard. / fad.)		
			2011	2012	Mean	2011	2012	Mean	2011	2012	Mean	2011	2012	Mean
1	BTX-14	Maintainer lines	221.67	206.67	214.17	68.67	70.67	69.67	26.03	26.92	26.48	13.36	13.62	13.49
2	BTX-407		158.33	131.67	145.00	66.33	69.33	67.83	22.77	23.28	23.03	12.53	12.98	12.76
3	BTX-623		131.67	125.00	128.23	65.33	68.67	67.00	22.97	23.58	23.28	11.61	12.32	11.74
4	BTX-807		136.67	130.00	133.33	65.00	68.67	66.83	24.50	25.90	25.20	10.91	11.77	11.34
5	GZB-6-1		208.33	195.00	201.67	68.00	71.00	69.50	24.44	22.88	23.66	15.60	15.14	15.37
6	GZB-9-1		141.67	135.00	138.33	64.00	67.33	65.67	22.20	23.77	22.99	12.68	13.81	13.25
7	GZB-11-2		155.00	160.00	157.50	65.00	69.67	67.33	22.60	24.80	23.70	9.63	11.00	10.31
8	GZB-16-2		145.00	133.33	139.17	66.33	70.00	68.17	24.37	25.47	24.92	10.42	11.89	11.57
9	GZB-34-2		146.67	138.33	142.50	68.00	72.00	70.00	21.90	24.18	23.04	12.73	13.45	13.09
10	ICSR-89028	Restorer lines	168.33	165.00	166.67	70.67	72.67	71.67	29.23	30.48	29.86	12.68	14.21	13.44
11	ICSR-89039		226.67	218.33	222.50	66.67	70.67	68.67	21.79	23.06	22.43	16.79	17.12	16.96
12	ICSR-89053		210.00	208.33	209.17	71.33	74.00	72.67	26.55	29.04	27.80	15.38	16.52	15.95
13	ICSR-91022		216.67	206.67	211.67	67.33	71.00	69.17	27.39	27.24	27.32	20.33	19.16	19.75
14	ICSR-93003		188.33	175.00	181.67	69.00	73.00	71.00	23.78	24.68	24.23	15.06	15.96	15.50
15	ICSR-94005		158.33	148.33	153.33	68.00	72.00	70.00	23.88	24.81	24.35	15.51	16.42	15.97
16	ICSR-94006		243.33	228.33	235.83	70.33	71.67	71.00	25.89	26.58	26.24	17.78	18.35	18.07
17	Dorado(check variety)		147.67	131.67	139.67	72.67	75.67	74.17	23.68	25.53	24.61	14.82	16.19	15.50
LSD 0.05 %			16.33	12.69	10.14	2.49	3.00	1.91	2.17	2.58	1.94	4.22	3.92	2.83

Means followed by the same letter (s) in each column within each treatment are not significant.

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تقييم بعض سلالات ذرة الحبوب الرفيعة للمقاومة للإصابة بحشرة دودة القصب الكبيرة ولكمية المحصول العالي

عادل محمد الراوي [1]، أحمد الرفاعى عبد العظيم أحمد مراد [2]،

عزمي مصطفي القاضي [2]

1 – معهد بحوث وقاية النباتات – مركز البحوث الزراعية – الدقى – جيزة – مصر .

2 – قسم بحوث الذرة الرفيعة – معهد بحوث المحاصيل الحقلية – مركز البحوث الزراعية – جيزة – مصر.

تعتبر دودة القصب الكبيرة من أخطر الحشرات التى تصيب الذرة الرفيعة فى مصر. وتهدف الدراسة الحالية الى تقييم سبعة سلالات معيدة للخصوبة وتسعة سلالات محافظة على السلالات العقيمة لذرة الحبوب الرفيعة مع استخدام الصنف " دورادو" للمقارنة من حيث مقاومتها لحشرة دودة القصب الكبيرة ولكمية المحصول العالي .زرعت السلالات في تجربتين حقليتين بمحطة البحوث الزراعية بالنوبارية فكانت التجربة الأولى تحت الظروف المثلى للإصابة الطبيعية بدودة القصب الكبيرة خلال موسمي 2011 ، 2012 والتجربة الثانية تحت ظروف العدوى الصناعية باليرقات حديثة الفقس خلال موسم 2012. تم تقدير ثلاث صفات تعبر عن المقاومة لدودة القصب الكبيرة مثل النسبة المئوية للنباتات المصابة ، النسبة المئوية للنباتات ذات القلوب الميتة ، شدة الإصابة.

أوضحت النتائج المتحصل عليها أن السلالة ICSR-91022 أظهرت درجة عالية من المقاومة بالنسبة للصفات الثلاث التي تعبر عن المقاومة تحت ظروف العدوى الطبيعية والصناعية (17.50 % ، 5.74 % ، 1.85 بالترتيب) و (23.12 % ، 6.72 % ، 2.11 بالترتيب) وكذلك تفوقت من حيث كمية المحصول (19.75 أردب / فدان) ، فى حين أظهرت السلالة ICSR-94006 مقاومة متوسطة تحت ظروف العدوى الطبيعية (34.74 % ، 12.73 % ، 2.52 بالترتيب) مع تفوقها نسبيا في محصول الحبوب (18.07 أردب / فدان).

أما من حيث الصفات المحصولية فقد أظهرت السلالة ICSR-94006 تفوقا في الطول (235.83 سم) بينما كانت السلالات GZB-9-1 ، BTX-807 ، BTX- 623 مبكرة في التزهير (65.67 ، 66.83 ، 67 يوم بالترتيب) في حين أظهرت السلالات ICSR-89028 ،ICSR-89053، ICSR-91022 أعلى وزن للألف حبه(29.86 ، 27.80 ، 27.32 جرام بالترتيب).

وهنا تجدر الإشارة إلى أن السلالة ICSR-91022 أظهرت مقاومة عالية لحشرة دودة القصب الكبيرة وكذلك أعطت أعلى محصولا فى حين أظهرت السلالة ICSR-94006 مقاومة متوسطة لهذه الحشرة وأعطت محصولا عاليا نسبيا .