

SUSCEPTIBILITY OF SOME COMMERCIAL CORN VARIETIES TO INFESTATION WITH CERTAIN CORN PESTS IN EGYPT

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Abstract

Five commercial corn varieties; D.C. 215, D. C. 204, Giza 2, hybrid 310 and Comp. 45 were tested for their susceptibility to infestation with *Spodoptera exigua* (Hb.), *Spodoptera littoralis* (Boisd.), *Rhagoletis maidis* (Fitch) and *Tetranychus arabis* Attiah. Investigation were carried out under natural infestation conditions at different stages of plant growth.

Results showed that variety D.C. 215 was the most susceptible to infestation by the seedling pest *S. exigua*, followed by variety D.C. 204 Giza 2 and hybrid 310. The variety Comp. 45 was the least susceptible to *S. exigua*.

High infestation with *R. maidis* was recorded in the tasseling stage during the pollination period (70 days after sowing). Variety Comp. 45 appeared to be the most susceptible followed by Giza 2, D.C. 215, Hybrid 310 and D. C. 204.

On all corn varieties, the highest abundance of *S. littoralis* occurred to days after sowing, and infestation was common with no significant differences.

The hybrid 215 was highly susceptible to *T. arabis* while the other varieties (Giza2, Composit 45, Three-way cross 310, Double cross 204) were less susceptible.

INTRODUCTION

In Egypt, maize is liable to attack by numerous pests that affect the yield under certain condition (Isa 1968; Isa *et al.*, 1969; Galal *et al.*, 1980; Awadallah and Hanna 1985; Lutfallah and Sherif 1989). Evaluation of the commercial varieties for

susceptibility to these pests is considered of great importance to both breeders and farmers where efforts are conducted to develop varieties resistant to these pests in order to gain good yield.

The purpose of the present study was to evaluate five commercial corn varieties against infestation with the lesser cotton leafworm *Spodoptera exigua* (Hb.), the cotton leafworm *Spodoptera littoralis* (Boisd.), the leaf aphid *Rhopalosiphum maidis* (Fitch) and the two-spotted spider mite *Tetranychus arabicus* Attiah at different stages of plant growth.

MATERIALS AND METHODS

Two experiments were carried out at Sakha Experimental Station, Kafr El-Sheikh Governorate in 1988 season. Corn Varieties Used in both experiments were the open pollinated variety Giza2, composite 45, Three-way cross 310 and Double cross 215 and 204. A complete randomized block design with four replicates for each variety was used in the two experiments. The plot size was 6x7 meters (1/100 feddan). Corn was planted in rows 6m long and 70 cm in between at a distance of 25 cm between hills. All usual agricultural practices were followed. No insecticidal spraying was applied. All experiments were left for natural infestation conditions.

In the first experiment, the date of sowing was July 3rd. This experiment was conducted to study the susceptibility of the varieties to *S. exigua* and *R. maidis* infestation. For *S. exigua*, different groups of 30 plants were taken at random from each plot and examined at four stages were taken at random from each plot and examined at four stages of plant growth (30, 40, 50 and 60 days after sowing) for their infestation with larvae and leaf feeding symptoms. Sampling was practiced on 3/8, 13/8, 23/8 and 3/9. The number of infested plants was counted and the percentages of infestation were estimated. For *R. maidis*, 40 plants were taken at random from each plot and examined at 60, 70, 80 and 90 days after sowing before, during and after the pollination period. For counting the infested plants and estimating the number of leaf aphids, the simplified technique previously described by Lurfallah and Sherif (1989) was followed. The average number of aphids/plant for each variety was calculated.

In the second experiment, the date of sowing was July 23rd. The experiment

was conducted to study the susceptibility of the same corn varieties to infestation with the cotton leafworm, *S. littoralis* and the two-spotted spider mite, *T. arabis*. Concerning *S. littoralis* infestation, different samples of 30 plants from each plot were examined at four stages of plant growth (30,45,60 and 75 days after sowing), which dated on 24/8, 5/9, 21/9 and 6/10, respectively. The number of infested plants, (plants showing leaf feeding or larvae hanging on) was counted and percentages of infestation were estimated.

To study the varietal susceptibility to the two-spotted spider mite, *T. arabis*, samples of 20 leaves per variety were examined every 7 to 12 days by counting the moving stages of mites in two square inches per leaf onto lower surface.

RESULTS AND DISCUSSION

Susceptibility to *S. exigua*

Data shown in Table 1 indicated that inspection at 30 and 40 days after sowing, revealed that D.C. 215 was the most susceptible variety to *S. exigua* among all tested varieties. The respective percentages of infestation were 19.2 and 33.3%. D.C. 204 variety followed by the infestation rates 10 & 6.6%, Hybrid 310 (7.5 & 12.5%) and Giza 2 (7.5 & 8.3%). Variety Comp. 45 was the least susceptible to infestation (1.7 & 1.7%). During the last two stages of plant growth (50 and 60 days after sowing). The first four varieties showed no significant differences in *S. exigua*

Table 1. *S. exigua* infestation in different corn varieties at four stages of plant growth

Corn Variety	Days after sowing							
	30		40		50		60	
	Total No. of infested plants*	Infestation %	Total No. of infested plants	Infestation %	Total No. of infested plants	Infestation %	Total No. of infested plants	Infestation %
Giza 2	9 a	7.5	10 a	8.3	7 a	5.8	7 a	5.8
Comp. 45	2 c	1.7	2 c	1.7	3 b	2.5	3 b	2.5
3way C. 310	9 a	7.5	15 a	12.5	9 a	7.5	8 A	6.7
D. C. 215	23 b	19.2	40 b	33.3	12 a	10.0	10 a	8.3
D. C. 204	12a	10.0	8 a	6.6	7 a	5.8	7 a	5.8

* Total No. of examined plants = 120 plants at each date of examination.

Numbers followed by the same letters are not significantly different at 0.05 level.

infestation.

Susceptibility to *R. maidis* infestation

As shown in Table 2, the highest numbers of aphids were recorded 70 days after sowing. Infestation at this stage will induce considerable loss in the field since tasseling until complete fertilization takes about 3 weeks. Lutfallah and Sherif (1989) mentioned that the decrease in yield depends on the rate of aphid infestation to the plant tassel which affects the pollination process. However, at 60 days after sowing, variety Comp. 45 was the most susceptible among all varieties where around 78% infested plants were found with an average number of 213.5 aphids/plant, followed by D.C. 204, Giza 2 and D. C. 215 showing average percentages of 74.5, 71.5 and 70.8 aphids/ plant, respectively. Hybrid 310 was the least susceptible variety to this pest where about 25% infested plants were found with an average number of 38.8 aphids/ plant. Seventy days after sowing showed significant differences among varieties. Consequently, Comp. 45 appeared to be the most susceptible to aphids among all tested varieties, followed by Giza 2, D.C. 215, Hybrid 310 then D. C. 204. At 80 days after sowing, aphid population decreased and the rates of infestation showed no significant differences among all varieties.

Table 2. *R. maidis* infestation in different corn varieties at four stages of plant growth (before, during and after pollinated period).

Corn Variety	Days after sowing							
	30		40		50		60	
	Total No. of infested plants*	Infestation %	Total No. of infested plants	Infestation %	Total No. of infested plants	Infestation %	Total No. of infested plants	Infestation %
Giza 2	82	71.5 b	98	699.8 ab	69	300.3	21	24.5
Comp. 45	125	213.5 c	107	834.3 b	51	261.3	9	12.8
3way C. 310	40	38.8 a	85	531.3 a	89	385.5	6	8.0
D. C. 215	101	70.8 b	90	618.8 a	82	330.8	3	6.3
D. C. 204	70	74.5 b	101	476.5 a	66	241.0	6	9.0

* Total No. of examined plants for each variety was 160 plants.

Average No. with Same letters are not significantly different at 0.05 level

Susceptibility to *S. littoralis*

Data summarized in Table 3 indicated that in the first 3 inspections (30, 45 and 60 days after sowing), the two corn varieties, Hybrid 204 and 215 appeared fairly susceptible to infestation with *S. littoralis* than with the other varieties. The hybrid 310 did not show any symptoms of infestation by *S. littoralis*. In the last inspection (75 days after sowing) all varieties were apparently more susceptible to infestation with *S. littoralis* with no significant differences between them. This coincides with the findings of Isa *et al.* (1969) who found that infestation with *S. littoralis* in some local corn varieties and American corn hybrids, was equally common due to migration from dry cotton plants to corn fields causing heavy infestation in some years. It could be therefore suggested that evaluation of corn varietal susceptibility to *S. littoralis* should be conducted at late season on corn plants aging more than 70 days.

Susceptibility to *T. arabis* infestation

As shown in Table 4, high significant differences between maize varieties in their susceptibility to mite infestation was observed.

The variety D.C. 215 was highly susceptible to infestation by *T. arabis* (733 individuals /240 sq. inches of leaves.) All other tested varieties (D.C. 204, three-way C.310, Comp. 45 and Giza 2) were less susceptible to mite infestation as the

Table 3. *S. Littoralis* infestation in different corn varieties at four stages of plant growth.

Corn Variety	Days after sowing							
	30		45		60		75	
	Total No. of infested plants	Infestation %	Total No. of infested plants	Infestation %	Total No. of infested plants	Infestation %	Total No. of infested plants	Infestation %
Giza 2	2	1.3	4	2.5	8	5.0	63	39.4
Comp. 45	4	2.5	5	3.1	4	2.5	40	25.0
3way C. 310	0	0.0	0	0.0	0	0.0	53	33.1
D. C. 215	32	20.0	32	20.0	11	6.9	62	38.8
D. C. 204	16	10.0	11	6.9	6	3.8	47	29.4

Analysis of variance showed no significant differences among different varieties.

Table 4. Population fluctuation of *T. arabicus* on maize varieties along the examination dates of 1988 season.

Corn Variety	No. of mites /40 sq. inch at indicated dates						Total	Mean
	24/8	5/9	13/9	21/9	28/9	8/10		
3-way C.310	11	51	32	32	55	31	212	35.33 a
Comp. 45	12	17	25	40	66	65	216	36.00 a
D.C. 204	12	33	32	16	39	97	229	38.17 a
Giza 2	11	36	29	52	58	77	263	43.83 a
D.C. 215	105	79	111	143	112	183	733	122.17 b

Means with the same letters are not significantly different at 0.01 level.

number of mites/ sq. inches ranged only between 212 and 263 individuals. Sawires (1990) reported positive relationship between mite infestation and both nitrogen and protein maize contents. This relation however was negative with moisture content.

In general, Com. 45 could be comparatively considered the less susceptible variety to *S. exigua* and *T. arabicus* infestations, while it was fairly susceptible to *R. maidis*. In contrary, D. C. 215 was the most susceptible variety to both *S. exigua* and *T. arabicus*.

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قابلية إصابة بعض الأصناف التجارية للذرة الشامية في مصر ببعض آفات الذرة الهامة

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استهدفت الدراسة اختبار خمسة أصناف تجارية من الذرة الشامية وهي : جيزة ٢، هجين مركب ٤٥، هجين ثلاثي ٣١٠، والهجين الزوجي ٢١٥، ٢٠٤ لقابليتها للإصابة بدودة ورق القطن الصفري (الدودة الخضراء) ، دودة ورق القطن ، المن ، والعنكبوت الأحمر ، وتم تقييم الإصابة خلال أربعة مراحل مختلفه من عمر النبات ، وأوضحت الدراسة ما يلي :

١ - تصاب نباتات الذرة بحشرة الدودة الخضراء في الأعمار الأولى (البادرات) أكثر من الأعمار المتقدمة التي تتغلب علي الإصابة . وكان صنف هجين زوجي ٢١٥ أكثر الأصناف قابلية للإصابة يليه هجين زوجي ٢٠٤ ثم جيزة ٢ ثم هجين ثلاثي ٣١٠ بينما كان الصنف هجين مركب ٤٥ أقل الأصناف قابلية للإصابة.

٢ - إصابة المن كانت بأعداد كبيرة في طور التزهير وأثناء فترة التلقيح ، والإصابة أثناء هذه الفترات تؤثر علي انتاجية المحصول. وكان الصنف هجين مركب ٤٥ هو أعلى الأصناف إصابة بأعداد هذه الحشرة يليه الصنف جيزة ٢ ثم هجين زوجي ٢١٥ وكان أقلها في تعداد المن الصنف هجين زوجي ٢٠٤ .

٣ - كانت قمة الإصابة بدودة ورق القطن لجميع الأصناف في الفترة بعد ٧٠ يوما من الزراعة ، ولم تظهر الدراسة أية اختلافات معنوية بين الأصناف المختلفة.

٤ - كان الصنف هجين زوجي ٢١٥ أعلي الأصناف إصابة بالعنكبوت الأحمر بينما كانت بقية الأصناف جيزة ٢ ، هجين مركب ٤٥ ، هجين ثلاثي ٣١٠، والهجين الزوجي ٢٠٤ أقل عرضه للإصابة.