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IV. RESULTS AND DISCUSSION

Part I:

1. Botanical characters:

1.1. Plant height and stem diameter:

Data in Tables (1 and 2) show plant height for six varieties in both seasons (1997 and 1998) at different stages (18, 25, 32, 39 and 75 days from sowing in early and late planting dates, respectively. Results in data revealed that the differences between varieties were significant for this trait at all samples. Local variety gave the highest values in both seasons as well as the combined data followed by SC₁₀. However, SC₉ gave the lowest one. Also, the highest values were detected in early sowing when compared with late planting. Results were in agreement with the previous results obtained of Bisher (1967), Nawar et al. (1992) and Cardoso et al. (2000)

Data in Table (3 and 4) show stem diameter at different stages (18, 25, 32, 39 and 75 days from sowing in early and late planting dates, respectively. Results over both sowing dates and different stages revealed that the differences between varieties were significant at all samples. The highest mean values were obtained by local variety followed by SC₁₀. However the lowest mean value was detected by SC₉ in both sowing dates and over both seasons. The latest sowing dates at July produced stalks signifisantly thinner than the early planting date, these resualts are harmony with these obtained by Mahmoud (1967), Yousef (1968), Ba-Momen, (1981) and Aly (1983).

Table (1): Mean plant height (cm) of different varieties at successive plant ages in early plantation; 1997-1998 seasons.

5		G ₂			SC,			SC ₁₀			TWC310	310		TWC320	320		LV		
Plant ages	1 st 1997	2 nd 1998	9ge19VA	1 st 1997	2 nd 1998	эветэчА	1 st 1997	2 nd 1998	Average	1 st 1997	2 nd 1998	Average	1 ⁸⁴ 1997	2 nd 1998	эвктэчА	1 st 1997	2 nd 1998	эgслэт∀	Mean
								M	ean pla	Mean plant height (cm)	ht (cm)								
18	63.00	64.30	63.7	53.37	55.73	54.6	65.57	09'29	9.99	64.33	09.59	0.59	61.60	61.87	61.7	73.80	74.77	74.3	64.30
25	85.07	85.53	85.3	77.90	79.37	78.6	88.73	89.57	89.2	85.2	87.07	86.1	83.93	85.63	84.8	100.8	101.43	1.101	87.52
32	108.07	109.00	108.5	100.47	104.30	102.3	114.40	116.40	115.4	111.43	114.67	113.1	106.57	111.00	108.8	126.50	130.23	128.4	112.75
39	146.87	158.17	152.5	138.20	149.07	143.6	150.33	163.63	157.0	149.53	160.23	154.9	142.27	149.67	146.0	175.2	184.37	179.8	155.63
75	262.27	263.00	262.6	253.50	257.47	255.5	272.80	278.27	275.5	268.93	270.53	7.692	260.37	268.37	264.4	283.30	307.80	295.6	270.55
Mean		134.53d	Ų.		126.94f			140.73b			137.75c			133.13e			155.82a		
H H																			
LSD		1.206																	
LSD 0.1		1.594																	

Table (2): Mean plant height (cm) of different varieties at successive plant ages in late plantation, 1997 & 1998 seasons

TWC ₃₂₀ LV	1997 1998 1st 2nd ee 11997 1998 ceera		55.2 56.73 56.0 62.3 65.88 64.1 58.4	78.17 80.53 79.4 91.73 99.93 95.8 83.8	96.37 97.80 97.1 115.77 122.32 119.0 101.5	1115.43 119.52 117.5 139.83 148.40 114.1 124.3	5 219.30 228.30 223.8 263.29 272.23 267.8 235.3	114.74d 138.17a				
TWC310	1 st 2 nd 1997 1998	Mean plant height (cm)	58.7 58.99 58.8	83.03 83.25 83.1	98.27 100.83 99.6	121.7 123.0 122.4	223.75 239.17 231.5	119.07c				
SC ₁₀	2nd 1998 1	Mean plan	60.08 59.7 58	86.01 85.4 8	102.56 101.4 99	129.89 129.0 13	247.50 240.1 2					
	Average 1997		52.9 59.27	76.1 84.77	94.0 100.17	114.4 128.17	214.5 232.79	123.15b				
SC,	1 st 2 nd 1998		52.60 53.29	75.13 77.03	93.33 94.63	112.8 116.07	203.93 225.13	110.40e				
G ₂	1 st 2 nd 1997 1998 Average		58.67 58.79 58.7	82.63 83.40 83.0	97.50 98.17 97.8	117.43 119.26 118.4	221.71 246.13 233.9	118.37c	368.32 C	1.401	1.853	
S	Plant ages		18 58	25 82	32 97	39 11	75 22	Mean 11	II.	LSD 0.5	LSD	

Table (3): Mean stem diameter (cm) of different varieties at successive plant ages in early plantation, 1997 & 98 seasons

		G			SC,			SC10			TWC310	310		TWC_{320}	320		ΓΛ		
Plant ages	1 st 1997	2 nd 1998	Average	1 st , 1997	2 nd 1998	эделэүА	1 st 1997	2 nd 1998	Average	1 st 1997	2 nd 1998	Average	1 [#] 1997	2 nd 1998	Average	1 st 1997	2 nd 1998	Аусгаде	Mean
								M	an ste	Mean stem diameter (cm)	eter (cm	9							
18	0.628	0.644	0.64	0.6000	0.641	0.62	0.677	0.745	0.71	0.615	0.685	99.0	0.677	0.735	0.71	0.691	0.770	0.73	0.675
25	0.986	1.015	1.00	0.957	0.985	0.97	1.160	1.205	1.18	0.913	1.068	0.99	1.132	1.146	1.14	1.259	1.262	1.26	1.088
32	1.534	1.574	1.55	1.376	1.523	1.45	1.786	1.884	1.84	1.506	1.657	1.58	1.718	1.762	1.74	1.910	2.010	1.96	1.687
39	2.043	2.118	2.08	2.006	2.096	2.05	2.195	2.284	2.24	2.136	2.153	2.14	2.169	2.263	2.22	2.240	2.359	2.30	2.172
75	2.445	2.521	2.48	2.410	2.511	2.46	2.620	2.654	2.64	2.513	2.533	2.52	2.605	2.627	2.62	2.719	2.830	2.77	2.582
Mean		1.551cs			1.510d			1.688b			1.578c	ю		1.682c			1.806b		
Ή 	16	54.77***CD	D																
LSD 0.5		0.041																	
LSD 0.1		0.055																	

Table (4): Mean stem diameter (cm) of different varieties at successive plant ages in late plantation, 1997 & 1998 seasons

>	Average		0.58 0.53	0.87 0.77	1.42 1.21	77.1 1.91	2.69 2.50				
LV	2 nd 1998		0.619	0.915	1.478	1.996	2.768	1.493ո			
	1 st 1997		0.545	0.825	1.357	1.814	2.614				
320	эдглэчА		0.53	0.77	1.24	1.80	2.53				
TWC320	1 st 2 nd 1997 · 1998		0.597	0.851	1.301	1.889	2.531	1.371c			
	1 ⁸⁴		0.459	0.682	1.169	1.708	2.524				
310	эдглэүА	n)	0.52	0.72	1.17	1.72	2.48				
TWC310	2 nd 1998	eter (cı	0.576	0.778	1.184	1.807	2.492	1.32d			
	1 st 1997	Mean stem diameter (cm)	0.456	959.0	19171	1.625	2.462				
0	Average	ean ste	0.54	0.80	1.26	1.83	2.58				
SC ₁₀	2 nd 1998	Z	909.0	0.895	1.349	1.900	2.600	1.402b			
	1 st 1997		0.471	0.705	1.173	1.761	2.559				
6	Average		0.48	0.70	1.05	1.62	2.28				
SC	2 nd 1998		0.558	0.771	1.135	1.699	2.326	1.233e			
	1 st 1997		0.411	9.636	0.971	1.594	7.22.7				
	Average		0.52	0.75	1.14	17.1	2.45		P.		
5	2 nd 1998		0.578	0.816	1.191	1.785	2.458	1.315d	368.253***d	0.013	0.017
	1 st 1997		0.465	0.681	1.092	1.637	2.444		£		
	Plant ages		18	25	32	39	75	Mean	F ==	LSD 0.5	LSD 0.1

1.2. Third leaf angle:

Results in Table (5) showed significant differences in leaf angle at both samples (18 and 35 days from sowing and the combined over them. It is clear that TWC₃₁₀, local variety and Giza 2 gave the lowest values of leaf angle. However, the other three hybrids TWC₃₂₀ followeg SC₉ and then SC₁₀ gave the highest values for leaf angle.

1.3. Leaf chlorophyll content:

Data in Table (6) show chlorophyll content of different varieties in both seasons in early and late planting dates at from sowing. Results in Table (6) revealed that the differences between varieties were significant, SC₁₀ had the highest mean values followed by SC₉ and Giza 2 over both seasons in early and late sowing dates. However local variety gave the lowest one.

1.4. Husk length:

Results in Table (7) showed significant differences among varieties in husk length in early and late sowing dates over the three seasons. It is clear that SC₁₀ hybrid had the highest values in the three seasons as well as the combined analysis in both planting dates followed by TWC₃₂₀ However, TWC₃₁₀ gave the lowest one.

Many investigators reported variability in husk length in maize genotypes.

1.5. Not covered ears %:

Results in Table (8) showed significant differences in percentage of not covered ears by husk among genotypes in the

Table (5): Mean value for third leaf angles of genotypes at 18 and 35 days from sowing, 1998 seasons.

	After 18 days (O)	After 35 days (O)	Mean (O)
G2	19.17 с	35.90 b	27.53 e
SC ₉	26.27 a	41.27 ab	33.77 ab
SC ₁₀	22.83 b	42.10 a	32.47 b
TWC ₃₁₀	16.60 d	34.00 b	25.30 c
TWC ₃₂₀	27.53 4	44.60 a	36.05 a
LV	19.43 с	35.17 b	27.25 c
. at $0.05 = 2.5$	602		

Table (6): Leaf chlorophyll content of different varieties (SPAD value).

Date		Early			Late	
Season Variety	1 st 1997	2 nd 1998	Mean	1 st 1997	2 nd 1998	Mean
G2	36.89	40.23	38.56 bc	30.87	34.54	32.71 bc
SC ₉	37.13	41.23	39.28 b	31.94	34.91	33.43 b
SC ₁₀	40.52	43.39	41.955 a	33.35	36.28	34.81 a
TWC ₃₁₀	36.68	39.11	37.89 bc	30.66	32.39	31.53 cd
TWC ₃₂₀	35.82	38.41	37.11 с	29.97	31.04	30.50 d
L.V	35.09	36.34	35.72 d	28.04	29.64	28.84 e
L.S.D. at 0.	05	1.322			1.185	
at 0.0		1.797			1.611	

Table (7): Mean values of husk length (cm) in the three seasons in early and late sowing dates.

	Mean		9.44 b	9.67 b	П.49 а	7.40 c	П.13 а	9.84 b	
te	3rd 1999		9.2	10.2	11.0	6.7	10.9	9.5	
Late	2 nd 1998		10.3	8.7	11.8	7.0	11.2	10.5	0.914
	1 st 1997	usk length (cm)	8.9	10.1	11.6	8.5	11.3	9.6	
	Mean	Mean values of husk length (cm)	9.79 c	9.79 c	11.99 а	8.27 d	11.37 ab	10.53 bc	
rly	3 rd 1999		6.7	10.1	11.6	8.6	113	10.9	
Early	2 nd 1998		11.3	10.1	12.4	8.7	11.8	10.9	0.823
	1 st 1997		9.4	9.2	11.9	7.6	11.0	8.6	
Date	Season Variety		G2	SC,	SC ₁₀	TWC310	TWC320	L.V.	$LSD_{0.05} =$

1.226

1.131

 $LSD_{0.01} =$

Table (8): Mean values (%) of not covered ears in the three seasons and both planting dates.

Date		Ea	Early			La	Late	
Season Variety	1 st 1997	2 nd 1998	3 rd 1999	Mean	. 1 st 1997	2 nd 1998	3 rd 1999	Mean
				Percentage me	Percentage mean values (%)			
G2	30	30	20	26.7 b	23.3	26.7	23.3	24.3 b
SC,	2.99	2.99	0.09	64.5 a	56.7	40.0	26.7	51.3 b
SC ₁₀	46.7	26.7	20	31.13 b	16.7	16.7	13.3	15.7 c
TWC ₃₁₀	73.3	66.7	70	70.0 а	0.09	50.0	50.0	53.3 а
TWC ₃₂₀	40.0	20.0	26.7	28.9 b	26.7	33.3	20.0	26.7 b
LV.	30.0	26.7	20	25.6 b	20.0	10.0	26.7	18.9 c
$LSD_{0.05} =$		7.9				5.4	A CONTRACTOR OF THE PARTY OF TH	N. C.
$LSD_{0.01} =$		10.6				7.3		

three seasons as well as the combined analysis at early and late sowing dates.

In the early sowing date, the local variety, Giza 2, TWC₃₂₀ and SC₁₀ gave the lowest values of percentage for not covered ears. However, the hybrid. TWC₃₁₀ followed by SC₉ gave the highest percentages of not covered ears. High not covered ears % increased infection of store insects.

In the late sowing date, the hybrid SC₁₀ followed by local variety, Giza 2 and then by TWC₃₂₀ gave the lowest percentage of not covered ears in the three seasons and the combined over them. However, TWC₃₁₀ followed by SC₉ gave the highest percentage of not covered ears. Several investigators reported that maize genotypes varied greatly in not covered ears percentage.

1.6. Moisture percentage:

Significant differences in grains moisture percentage at harvest were detected among evaluated maize genotypes in the three seasons in separate sowing dates (Table, 9). In both sowing dates (early and late), the hybrid SC₁₀ had the lowest moisture percentage, revealing that early maturity date. However, TWC₃₁₀ gave the highest one in the three seasons as well as the combined over them in separate planting dates.

2. Yield and yield components:

2.1. Effect of season:

The effect of season is presented in Table (10). Results show that the seasonal effects were existent for yield (ear weight) and some of its components. Significant high mean values for all

Table (9): Mean values of grain moisture content (%) during the three seasons at in both planting dates.

Date		Early	rły			Late	ıte	
Season Variety	1,1997	2 nd 1998	3 rd 1999	Mean	184 1997	2 nd 1998	3 rd 1999	Mean
			4	Mean values of grain moisture (%)	ain moisture (%	(
25	14.57	13.87	13.67	14.04 d	15.70	15.43	15.13	15,42 c
SC,	16.67	14.83	14.17	15.22 b	16.53	15.90	15.43	15,96 b
SC ₁₀	13.33	13.13	1310	13.19 f	14.83	13.53	13.50	13.89 е
TWC310	17.37	15.37	14.93	15.89 а	16.77	16.43	16.13	16.44 a
TWC320	14.13	13.50	13.37	13.67 e	15.17	14.57	14.57	14.77 d
L.V.	15.50	14.30	13.83	14.54 c	16.20	15.10	14.90	15.40
LSD _{0.05} =		0.184				0.166		
$LSD_{0.01} =$		0.247				0.223		

Table (10): The average values of seasonal effect on certain maize growth parameters during 1997, 1998 and 1999 seasons

Season	Ear length (cm)	Ear diameter Cm/10 ears	No. of rows/ear	No. of grains/row	Weight of 100 grains (gm)	Ear weight (gm)
1997	20.958 a	47.050 a	13.017 а	41.742 a	36.534 a	236.331 a
1998	20.364 b	47.889 b	12.603 b	40.722 b	35.628 b	229.778 b
1999	19.675 c	46.389 b	12.356 c	40.231 b	34.213 c	226.456 c

characters were shown in the first season followed by the second season. It could be concluded that the yield increase in the first season may be due to the significance increase in most yield components. Also, the increase yield and its components in the first season may be due to effect of previous crop (*Vicia faba*).

2.2. Effect of planting dates:

Results in Table (11) present the effect of planting dates on the studied traits. It is clear that all mean values for early planting were higher than the corresponding ones at late planting. Frey and Maloado (1967) defiened the stress environment as the one in which mean performance for certain attribute is low. Therefore, early planting seemed to be the non stress environment while late planting could be considered as the stress environment. Similar trend was obtained before by Jonhson and Frey (1967), Ba-Momen (1981) and Aly (1983).

2.3. Varietal performance:

The differences among varieties regarding the ear length, ear diameter, no. of rows/ear, no. of grains per row, weight of 100-kernel and ear weight reached the significant levels (Table 12). The hybrid variety SC₁₀ gave the highest mean values for all characters followed by SC₉ except no. of rows/ear. However, land variety gave the lowest one. The high grain yield in single crosses (SC₁₀ and SC₉) are expected which gave high heteratic effects in SC. This finding agrees with previous obtained by Salem *et al.* (1983), Nawar *et al.* (1992) and Parag-Agarwal *et al.* (2000), they found hybrid varieties gave high yield and its components.

Table (11): The average values of maize yield and yield components as affected by planting dates (combined data of the three seasons).

Ear weight (gm)	240.748 a	220.961 b	* * * *
Weight of 100 grain (gm)	37,373 а	33.544 b	**
No. of grains/row	41.787	40.009	0
No. of rows/ear	12.881	12.435	
Ear diameter Cm/10 ears	47.352 a	46.500 b	n.s
Ear length (cm)	21.096 а	19.569 b	* *
Planting dates	Early	Late	

Table (12): The genotypes yield mean value, its components in the combined analysis over the three seasons.

				D: Dates	S: Season	V: Variety	LV.: Local variety
	n.s	n.s	n.s		n.s		VxSxD
-	*	n.s	* * *	-	n.s		VxD
	n.s	n.s	n.s		n.s		VxS
	196.273 f	31.729 f	33.806 f	11.950	43.11	17.811	LV.
	238.172 c	36.244 с	42.000 c	13.083	47.33	20.956	TWC ₃₂₀
	230.906 d	34.980 d	40.028 d	12.528	46.11	20.589	TWC310
	263.900 a	38.909 а	. 46.050 а	13.361	51.22	22.361	SC ₁₀
	243.889 b	37.034 b	44.240 b	12.800	48.89	21.033	SC,
	211.989 е	33.853 е	37.267 е	12.228	45.11	19.245	62
	Ear weight (gm)	Weight of 100 grains (gm)	No. of grains/row	No. of rows/ear	Ear diameter Cm/10 ears	Ear length (cm)	Variety
	0.00						

2.4. Interaction between planting dates and season.

Table (11) show that the effect of interaction between planting dates and seasons was significant for ear length, no. rows/ear, 100-kernel weight and ear weight. However, insignificant effect of interaction between planting dates and seasons was detected for other characters.

3. Store insects:

Data in Table (13) show percentage of ears infestation by store insects in early and late sowing dates in the three seasons and over them. Results in Table (13) indicate that significant differences between varieties were found. The best variety was SC_{10} and followed by TWC_{320} . This result may be due to low percentages of ears not covered of both varieties (SC_{10} followed by TWC_{320}). However the TWC_{310} gave the highest infestation percentage of ears followed by SC_9 by store insects over planting dates or over planting dates and seasons. This result may be due to high percentage of ears not covered and height moisture content of the grains.

Table (13): Percentages of ears infestation by store insects in early and late planting dates in the three seasons.

Season		Ea	Early			Ľ	Late	
Variety	1 1997	2 nd 1998	3 rd 1999	Mean	181 1997	2 nd 1998	3 rd 1999	Mean
				Mean percentage of infested ears	e of infested ears			
G2	56.7	53.3	43.3	51.11 b	50.0	20.0	40.0	46.67 c
SC,	7.97	73.3	66.7	72.22 a	0.09	26.7	53.3	56.67 b
SC ₁₀	36.7	26.7	23.3	28.89 c	23.3	20.0	16.7	20.0 d
TWC310	90.0	80.0	66.7	78.89 a	70.0	2.99	0.09	65.56 а
TWC320	36.7	33.3	30.0	33.33 с	30.0	26.7	26.7	27.78 d
L.V.	70.0	0.09	43.3	57.78 b	40.0	40.0	36.7	38.89 c
LSD V x S				7.7				8.2
L.V.: Local variety		V: Variety	S: Season					

Part II:

Evaluation of certain corn genotypes for infestation by stem borers.

1. The effect of planting date on the degree of infestation with Sesamia cretica:

Corn is sown in Egypt during a relatively long period from mid April till early July, it is recommended by the ministry of Agriculture that corn should be sown between mid-May and mid-June, it is considered optimal. It had been found necessary. Therefore, the relationship between corn planting date and the degree of infestation by stem borers was studied.

1.1 Dead heart symptoms:

The data obtained are presented in Table (14) it has shown that in the early planting date mean percentage of dead heart ranged between 17.6% (for SC₉) and 30.9% (for TWC₃₁₀), it can be categorized the corn hybrids as a moderate infestation in case of SC₉, Giza 2 and SC₁₀ which ranged between 17.6 to 20.0% and highly susceptible hybrids ranged between 24.7% (TWC₃₂₀) to 30.9% (TWC₃₁₀). The results reveal that, dead heart percentage in late season generally less than in the early season which ranged between 10.0 to 20.0% dead heart as a moderately susceptible of hybrids infestation. The results indicate that the infestations of G2, SC₉ and SC₁₀ were less than in TWC₃₂₀, TWC₃₁₀ and local variety, respectively.

Statistical analysis of the planting date has shown that there were significant differences between (G2, SC₉ and SC₁₀)

Table (14): Mean percentage of dead heart (D.H.) in the three seasons (1997-1999) of both planting dates.

Season		Ea	Early				Late	
Variety	14 1997	2 nd 1998	3 rd 1999	Mean	14 1997	2 nd 1998	3 rd 1999	Mean
				Dead ho	Dead heart (%)			Company and compan
G2	13.33	26.67	16.67	18.9 c	10.00	10.00	10.00	10.00 b
SC,	9.33	23.33	20.0	17.6 с	10.00	10.00	10.00	10.00 b
SC ₁₀	13.33	23.33	23.33	20.0 с	10.00	13.73	10.00	11.1 b
TWC310	22.67	36.67	33.33	30.9 а	16.67	23.33	20.0	20.0 a
TWC320	17.33	30.0	26.67	24.7 b	13.33	20.0	16.67	16.7 a
LV.	18.67	36.67	30.0	28.4 ab	16.67	23.33	20.0	20.0 а
1.8D0.05 = 4.33	5 = 4 33	SI	T CD0 05 - 3 909					NOT THE OWNER OF THE OWNER, ON THE OWNER,

- 69 -

and (TWC₃₁₀, TWC₃₂₀ and local variety) in two planting dates, but they were significant differences between two groups.

1.2. Mean percentage of pink borers infestation

1.2.1. Early plantation:

The data obtained are presented in Table (15), indicate that the tendency of infestation to increase till 32 days of plant old for all genotypes. The infestation rates averaged from 23.8% to 44.9% (for G2), from 22.4% to 36.7% (for SC₉), from 25.1 to 43.6% (for SC₁₀), from 31.3 to 52.9% (for TWC₃₁₀), from 18.9 to 35.8% (for TWC₃₂₀) and from 25.6 to 49.1% (for local variety).

Statistical analysis of the data revealed that there were significant differences between genotype (TWC₃₁₀) and each of two group of genotypes (G2, SC_{10} and L.V) and (SC_{9} and TWC_{320}), respectively. The difference between G2, SC_{10} and L.V. was not significant. On the other hand, the same trend was observed for SC_{9} and TWC_{320} .

1.2.2. Late plantation

The estimates of the percentage of infested genotypes under natural infestation in case of late sowing planting during the three successive seasons are presented in Table (15). The results indicated that the tendency of the infestation to increase with a rise of plant age (39 days old), which were ranged from 20 to 30% (for G2), from 14.4 to 25.5% (for SC₉), from 23.3 to 33.3 (for SC₁₀), from 23.4 to 35.6% (for TWC₃₁₀), from 13.3 to 24.4% (for TWC₃₂₀) and from 21.1 to 38.9% for local variety. According the statistical analysis of the data, the tested genotypes of maize could be divided to three categories:

Table (15): Effect of sowing date early May and late July and maize varieties on the infestation (%) by S. cretica in three seasons 1997-1999.

	-	S				Ü				S				TWC310	310			TWC_{320}	320			LV.		
Plant	[*	5	ī.	Ą	T.	S.	T.	Ą	표	S.	T.	Ą.	ī.	s.	T.	Ą	E.	si.	T.	A.	Е.	s.	T.	A
age		1									E	Early												
9	31.3	23.33	792	23.8	17.3	26.7	23.3	22.4	18.7	26.7	30.0	25.1	30.7	30.0	33.33	313	16.0	23.3	20.0	8.61	26.7	30.0	20.0	25.6
23 23	+	_		28.0	20.0	1	30.0	27.8		26.67	43.33	30.4	30.0	33.33	40.0	34.4	22.67	26.67	26.67	25.4	28.0	30.0	30.0	29.3
32	_	53.33	46.7	44.9	26.7	33.33	50.0	36.7	30.7	40.0	0.09	43.6	45.3	5.6.7	26.7	52.9	24.0	20.0	33.33	35.8	37.3	46.7	63.3	49.1
30				_	22.67	20.0	30.0	24.2	26.67	30.0	43.33	33.3	29.33	33.33	40.0	34.2	17.33	26.67	26.67	23.6	28.0	30.0	30.0	29.3
				_		28.333 d	3 d			33.944 bc	t pc			38.778 a	8 8			26.389 d	p 69			34.722 b	2 b	
		5										Late												
2	167	20.0	23.3	20.0	13.3	10.0	20.0	14.4	16.7	23.3	30.0	23.3	16.7	26.7	26.7	23.4	13.3	10.0	16.7	13.3	13.3	23.3	26.7	21.1
25	16.7	23.3		22.2	1	13.3	26.7	18.9	20.0	23.3	33.3	25.5	20.0	30.0	30.0	26.7	16.7	13.3	23.3	17.8	23.3	26.7	30.0	26.7
32	20.0	23.3		22.2	13.33	16.67	23.33	17.8	20.0	23.33	33.3	25.5	16.67	20.0	30.0	22.2	20.0	16.67	16.67	17.8	20.0	26.67	30.0	25.6
39	30.0			30.0	20.0	23.33	33.33	25.5	30.0	30.0	40.0	25.5	33.33	36.67	36.7	35.6	23.33	26.67	23.33 24.4	24.4	36.7	40.0	40.0	38.9
		23.611 h	4			19.167	57 c			26.944 a33.3	a33.3			26.974 a	74 a			18.3	18.333 с			28.056 a	86 a	

LSD0.05 = 2.585 LSD = 3.415

LSD0.05 = 2.585
LSD = 3.415
LSD = 3.415
E: first season, S.: second season, T.: third season and A. average, respectively.

- L.V., TWC₃₁₀ and SC₁₀ are highly susceptible.

- nend

4 1

- G2 was a moderately susceptible.
- SC₉ and TWC₃₂₀ are Less susceptible.

Also, the obtained results indicated clearly that the highest rate of infestation with *S. cretica* and dead heart were recorded in the early plantation. These results are in agreement with the findings obtained by Willcocks (1925) Shahoudah (1964), Kira *et al.* (1974), Mohamed (1997), and Ahmed (2000).

1.3. Relationship between different plant height and degree of *S. cretica* infestation:

1.3.1. Early plantation:

Samples were taken at 18, 25, 32 and 39 plant ages (Table, 16). The results indicate that, moderately correlation between plant height (32 days old) and mean percentage of infestation by S. cretica; r = 0.62 was observed. On the other hand, no significant correlation between plant height and mean percentages of infestation at 25 days of plant age r = 0.21 and less than moderately effect in case of 18 and 25 days of plant age, r = 0.4 and 0.42, respectively, was observed.

1.3.2. Late plantation:

The obtained results are presented in Table (17), statistical analysis of the data showed that the effect of plant height on the percentage of infestation was positive and significant in the different plant ages which r = 0.71, 0.76, 0.71 and 0.85 in 18, 25, 32 and 39 days old, respectively. It could be concluded that the infestation of *S. cretica* was correlated with plant height in late

Table (16): Relationship between different plant height at early plantation and degree of S. cretica infestation (%).

			-				
Infestation at 39 days old (%)	28.89	24.22	33.33	34.22	23.56	29.33	0,42
Plant height at 32 days old (cm)	152.52	143.64	156.98	154.88	145.97	179.79	0.
Infestation at 32 days old (%)	44.91	36.68	43.57	52.90	35.78	49.10	21
Plant height at 32 days old (cm)	108.54	102.39	115.40	113.05	108.79	128.37	0.621
Infestation at 25 days old (%)	28.0	27.78	30.44	34.44	22.67	29.33	90
Plant height at 25 days old (cm)	. 85.3	78.64	89.15	86.14	84.78	101.12	0.206
Infestation at 18 days old (%)	23.78	22.43	25.13	31.34	19.77	25.57	40
Plant height at 18 days old (cm)	63.65	54.55	68-39	64.97	61.74	74.29	0.40
Variety	G2	SC,	SC10	TWC310	TWC320	LV.	L

Table (17): Relationship between different plant height at late plantation and degree of S. cretica infestation (%).

tion ays 6)							
Infestation at 39 days old (%)	30.0	25.5	33.3	35.3	24.0	38.0	0.85
Plant height at 32 days old (cm)	118.35	114.44	129.03	122.35	117.48	144.12	0.8
Infestation at 32 days old (%)	22,20	17.78	25.54	22.22	17.78	25.56	1.1
Plant height at 32 days old (cm)	97.84	93.98	101.37	99.55	97.09	119.05	0.71
Infestation at 25 days old (%)	22.23	18.9	25.53	26.67	17.76	26.67	9,
Plant height at 25 days old (cm)	83.02	76.08	85.39	83.14	79.35	95.83	0.76
Infestation at 18 days old (%)	20.00	14.43	23.33	23.37	13.33	21.10	7.1
Plant height at 18 days old (cm)	58.73	52.95	59.68	58.85	55.97	64.09	0.71
Variety	G2	sc,	SC ₁₀	TWC310	TWC ₃₂₀	LV.	L

plantation than in early one. Also, the plant height exhibited positive correlation and significant effect at 32 days old, in the early plantation date (r = 0.62) and at 39 days plant age in the late one (r = 0.85) Table (16 & 17). This trend is in agreement with that obtained by Ahmed and Kira (1960), Ismail (1968), and Atiyeh (1996).

1.4. Relationship between plant stem diameter and mean percentages of infestation

1.4.1. Early plantation:

The obtained data are presented in Table (18). Results show low correlation values between stem diameter and percentage of *S. cretica* infestation at different plant ages and it (r) ranged between (-0.08 to 0.25) for early planting date.

1.4.2. Late plantation:

The results presented in Table (19) indicated moderately correlation between the rate of infestation by *S. cretica* and stalk diameter at late plantation at 18 days after planting (r = 0.43). Positive and significant correlation was observed at 32 days old of plant (r = 0.68). It can be noticed that stem diameter of plants decreased significantly with delaying planting date than the early sowing date. These results might be attributed to the reduction in the vegetative phase of growth at late planting dates. Similar results were obtained by Mahmoud (1967), Ba-Momen (1981) and Aly (1983).

Table (18): Relationship between different plant stem diameter at early plantation and S. cretica infestation level (%).

39 days old old (cm) (%)	2.081 28.89	2.052 24.22	2,240 33.33	2,145 34.20	2.216 23.56	2.30 29.33	0.25
at 32 days dis	44.91	36.68	43.57	52.90	35.78	49.10	4
diameter at 32 days old (cm)	1,554	1.540	1.835	1.582	1.740	1.960	0.24
at 25 days old (%)	28.0	27.78	30.44	34.44	22.67	29.33	-0.18
Stem diameter at 25 days old (cm)	1.001	0.971	1.183	0.991	1.139	1.261	-0-
Infestation at 18 days old (%)	23.78	22.43	25.13	31.34	19.77	25.57	-0.082
Stem diameter at 18 days old (cm)	0.636	0.621	0.711	0.650	0.701	0.731	-0.0
Variety	G2	sC,	SC_{10}	TWC310	TWC ₃₂₀	LV.	

Table (19): Relationship between different plant stem diameter at late plantation and S. cretica infestation levels (%).

100							T	
Infestation	old (%)	30.0	25.50	33.33	35.5	24.4	38.9	0.50
Stem	39 days old	1.711	1.647	1.831	1.716	1.799	1.905	0
Infestation	at 32 days old (%)	22.2	17.78	25.54	22.22	17.78	25.56	0.67
Stem	32 days old	1.142	1.053	1.261	1.173	1.235	1.418	0
Infestation	at 25 days old	22.23	18.90	25.53	26.67	17.76	26.67	0.46
Stem	diameter at 25 days old	0.749	0.704	08.0	0.717	0.767	0.870	0.
Infestation	at 18 days old	20.0	14.43	23.33	23.37	13.33	21.10	43
Stem	diameter at	(cm) 0.522	0.485	0.539	0.516	0.528	0.582	0.43
	Variety	G2	SC,	SC ₁₀	TWC310	TWC ₃₂₀	LV.	L

- 1.5. Effect of *S. cretica* infestation on different maize genotypes at 50% flowering date.
- 1.5.1. Correlation between mean percentage of *S. cretice* infestation and number of days to 50% tasseling:

1.5.1.1. Early plantation:

Correlation between mean percentage of *S. cretica* infestation and no. of days to 50% tasseling are presented in Table (20), which indicate that different maize genotypes had reached tasseling earlier as planting date was delayed. As regard to the percentage of *S. cretica* infestation, the least susceptible genotypes were TWC_{320} (26.4%) and SC_9 (28.3%), while the most susceptible was hybrid TWC_{310} (38.8%).

Statical analysis of data revealed that the effect of S. cretica infestation rates on number of days to 50% tasseling was negative and significant; r = -0.59.

1.5.1.2- Late plantation:

In the same Table, the results revealed that the same trend was shown, of correlation between percentage infestation and number of days from sowing to 50% tasseling in different maize genotypes in late plantion was negative and significant; r = -0.56.

1.5.2. Correlation between mean percentage of *S. cretice* infestation and no. of days to 50% silking:

The relationship between days to 50% silking and infestation by S. cretica showed a negative correlation and it was highly significant, r = 0.60 and -0.66 in both early and late plantation. This result is in agreement with that obtained by

Table (20): Correlation between mean percentage of S. cretica infestation and average no. of days to 50% tasseling

Variety	% infestation at early	50% days to tasseling	% infestation at late	50% days to tasseling
G2	31.667	65.2	23.611	51.1
SC ₉	28.333	71.8	19.167	57.2
SC ₁₀	33.944	69.9	26.944	56.2
TWC ₃₁₀	38.778	65.8	26.944	54.3
TWC ₃₂₀	26.389	69.3	18.333	56.2
L.V	34.722	63.2	28.056	50.2
r	-0.5	59	-0.:	56

Table (21): Correlation between mean percentage of S. cretica infestation and average no. of days to 50% silking.

Variety	% infestation at early	50% days to silking	% infestation at late	50% days to silking
G2	31.667	71.7	23.611	55.8
SC ₉	28.333	77.3	19.167	60.4
SC ₁₀	33.944	75.7	26.944	59.2
TWC ₃₁₀	38.778	72.1	26.944	57.2
TWC ₃₂₀	26.389	75.4	18.333	59.4
L.V	34.722	69.7	28.056	54.7
r	-0.0	50	-0.0	66

Bisher (1973), Ba-Momen (1981), Aly (1983), El-hattab *et al.* (1986) Nawar *et al.* (1992) and Parag-Agarwal *et al.* (2000).

1.6. Effect of the third leaf angle of genotypes on percentage of *S. cretica* infestation rates:

1.6.1. Early plantation:

The results given in Table (22) revealed that, leaf angle at 18 days old of plants for the six genotypes were differed, the hybrid TWC_{310} showed the narrowest leaf angle (16.6°), at 18 days old while the TWC_{320} had the widest leaf angle (27.5°) followed by hybrid SC_{9} .(26.3°).

The correlation coefficient between third leaf angle at 18 or 32 days from sowing and percentage of *S. cretica* infestation was negative and highly significant, indicating that low value of leaf angle increased infestation percentage of *S. cretica*.

1.6.2. Late plantation:

The results shown in Table (23) indicate that mean infestation percentages of *S. cretica* at 18 days old were ranged from 13.3% (TWC₃₂₀ hybrid) to 23.4% (TWC₃₁₀ hybrid) and leaf angles were ranged between 16.6° (TWC₃₁₀ hybrid) to 27.5° (TWC₃₂₀ hybrid).

Statistical analysis of the data revealed that the effect of the third leaf angle at 18 day from sowing and/or 39 days on the percentages of infestation were negative and highly significant; r = -0.81. This result revealed that the increasing angle leaf decreased the percentage of *S. cretica* infestation. This result is agreement with that obtained by Metawlly (1996) and Mohamed (1997).

Table (22): Effect of the third leaf angle of genotypes on percentage of S. cretica infestation at early plantation.

	Third leaf	Infestation	Infestation	Infestation	Infestation	Mean	Third loaf	Infestation
Variety	angle (O) at 18 days old	at 18 days old (%)	at 25 days old (%)	at 32 days old (%)	at 39 dasy old (%)	Infestation (%)	angle (O) at 35 days old	at 39 days
G2	19.17	23.77	28.0	44.91	28.89	31.67	35.90	28.89
SC,	26.27	22.43	27.78	36.68	24.22	28.33	41.77	24.22
SC ₁₀	22.83	25.13	30.44	43.57	33.33	33.94	42.10	33.33
TWC310	16.60	31.34	34.44	52.90	34.22	38.78	34.00	34.22
TWC320	27.50	19.77	25.34	35.78	23.56	26.39	44.60	23.56
LV.	19.43	25.57	29.33	49.1	29.33	34.72	35.17	29.33
L	-0.86	98	-0.60	-0.97	-0.79	-0.90	-0.58	88

Table (23): Effect of the third leaf angle of genotypes on percentage of S. cretica infestation at late plantation

	Third leaf	Infestation	Infestation	Infestation	Infestation	Mean	Third leaf	Infestation
Variety	angle (O) at 18 days old	at 18 days old (%)	at 25 days old (%)	at 32 days old (%)	at 39 days old (%)	Infestation (%)	angle (O) at 35 days old	at 39 days old (%)
G2	19.17	20.0	22.23	22.20	30.0	23.61	35.90	30.00
SC,	26.27	14.43	18.90	17.78	25.55	19.17	41.77	25.55
SC_{10}	22.83	23.33	25.53	25.54	33.33	26.94	42.10	33.33
TWC310	16.60	23.37	26.67	22.22	35.56	26.94	34.00	35.56
TWC_{320}	27.53	13,33	17.71	17.78	24.44	18.33	44.60	24.44
LV.	19.43	21.10	26.67	25.56	38.90	28.06	35.17	38.90
ŗ	-0-	-0.84	-0.84	-0.65	-0.81	-0.82	-0.75	75

- 1.7. Relationship between leaf characters and S. cretica infestation at 32 days old:
- 1.7.1. Early plantation:
- 1.7.1.1. Correlation between leaf thickness and S. cretica infestation at 32 days plant old:

Leaf thickness of the utilized maize genotypes was measured, the thickness was determined at 32 days after sowing. Data in Table (24) shows the thickness of the leaf of maize genotypes could be arranged in ascending order as follows: SC₉, TWC₃₂₀, TWC₃₁₀, G2, SC₁₀ and L.V. Results show that genotypes differed in the rate of infestation by *S. cretica*, TWC₃₁₀ hybrid was the most susceptible followed by L.V., G2 and SC₁₀ hybrid. The low hybrids, namely TWC₃₂₀ and SC₉ were less susceptible than the previous ones.

Statistical analysis of the data has shown the effect of leaf thickness on the percentage of infested plants was positive and significant, r = 0.71.

1.7.1.2. Correlation between epidermis thickness and S. cretica infestation at 32 days plant old:

The data obtained are presented in Table (24), indicated that thickness of the epidermis of genotypes ranged between 10.67 μ (L.V.) to 14.67 μ (SC₁₀). Statistical; analysis of data has shown that the effect of epidermis thickness on S. cretical infestation was negative and highly significant, r=0.83.

Table (24): Relationship between some leaf characters and S. cretica infestation at 32 days old in early plantation.

ion of % infestation of 39 S. cretica at 39 days old		24.2	33.3	34.2	23.6	29.3	
% infestation of S. cretica at 32 days old	44.9 b	36.7 c	43.6 b	52.9 a	35.8 c	49.1 b	
Distance between upper surface and vascular bundle (μ)	536.3 b	320.8 с	632.5 а	550.0 b	499.5 b	563.8 ab	-0.63
Distance between lower surface and vascular bundle (μ)	270.5 ab	123.8 с	192.5 bc	302.5 а	151.3 c	316.3 а	3 0.93
Epidermis thickness (µ)	15.1 b	18.6 a	19.5 a	14.2 b	19.1 a	14.2 b	-0.83
Leaf thickness (μ)	1187.0 а	829.5 c	1260.5 a	1168.8 а	1040.5 b	1265.0 a	0.71
Variety	G2	SC,	SC ₁₀	TWC310	TWC320	LV.	= = 1

1.7.1.3. Correlation between the distance from lower, upper surface and vascular bundle and S. cretica infestation at 32 days plant old:

The results presented in the previous table reveal that the distance of layer affected on percentage of infestation caused by S. cretica, statistical analysis revealed that the effect of lower surface and vascular bundle distance on S. cretica infestation was positive and highly significant, r = 0.93, on the other hand, the effect of distance in case upper surface was negative and highly significant effect r = -0.63.

1.7.2. Late infestation:

1.7.2.1. Correlation between leaf thickness and S. cretica infestation at 32 days old:

Leaf thickness of maize genotypes planted in early date was observed in Table (25). The results indicated that leaf thickness of different maize genotypes was in ranged from 65.67 M for SC₉ hybrid and 77.3 3M for local variety. The correlation coefficient between leaf thickness and *S. cretica* infestation was positive and highly significant, r = 0.93.

1.7.2.2. Correlation between thickness of epidermis and S. cretica infestation at 32 days old:

The results presented in Table (25) revealed that, the thickness of leaf epidermis in delayed plantation affected weakly on the infestation by *S. cretica* and correlation coefficient was negative and non significant.

Table (25): Relationship between some leaf characters and S. cretica infestation at 32 days old in late plantation.

38.9	25.6 a	435.5		15.9 c -0.40 -	1063.3 a 0.93	LV.
38.9	25.6 а	435.5	284.2 а	15.9 c	1063.3 в	LV.
24.4	17.8 c	412.5	183.3 d	19.5 a	912.0 с	TWC320
35.3	22.2 a	398.8	265.3 b	16.9 bc	930.5 bc	TWC310
33.3	25.5 a	449.2	169.5 de	19.9 а	1045.0 ab	SC10
25.6	17.9 c	357.5	. 160.5 e	19.1 а	902.9 с	SC,
30.0	22.0 b	412.5	206.3 c	17.3 b	957.9 abc	G2
% infestation of S. cretica at 39 days old	% infestation of S. cretica at 32 days old	Distance between upper surface and vascular bundle (μ)	Distance between lower surface and vascular bundle (μ)	Epidermis thickness (μ)	Leaf thickness (µ)	Variety

1.7.2.3. Correlation between the distance from lower, upper surface and vascular bundle and S. cretica infestation:

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In the same Table it was observed that the distance layer ranged between 160.5 for SC_9 hybrid and 284.2 U for local variety and correlation coefficient was positive and significant, r = 0.5, whill the distance between upper surface and vascular bundle were 357.5 from SC_9 and 449.2 SC_{10} and correlation coefficient was negative and significant r = -0.42.

1.7.2.4. Correlation between stem epidermis thickness and dead heart symptom caused by *S. cretica* infestation:

The results in Table (26) indicated that the effect of stem epidermis thickness of different maize genotypes on dead heart, the correlation between stem epidermis thickness and dead heart were negative and highly significant; r = 0.77 and - 0.75 in case of early and late sowing, respectively.

1.8. Effect of leaf chlorophyll content on the percentages of dead heart caused by S. cretica:

The results presented in Table (27) reveal that the mean values of chlorophyll content ranged between 35.72 in local variety and 41.96 in SC₁₀ hybrid followed by 39.28 for SC₉ hybrid, in case of plants which sowing in early time. In the same table, the differences between chlorophyll contents of different maize genotypes ranged from 28.84 (local variety) to 34.81 for hybrid SC₁₀, in case of plants which sowing in late one.

The correlation coefficient between chlorophyll contents and infested S. cretica was negative and high significant in both

Table (26): Relationship between stem epidermis thikness and dead heart caused by S. cretica infestation

	Earl	ly	Late	;
Variety	Stem epidermis thickness (µ)	D.H. (%)	Stem epidermis thickness (µ)	D.H. (%)
G2	10.64 a	18.9c	13.30 ab	10.0b
SC ₉	10.20 a	17.6c	14.19 a	10.0b
SC ₁₀	11.08 a	20.0c	14.63 a	11.1b
TWC ₃₁₀	8.42 b	30.9a	8.87 d	20.0a
TWC ₃₂₀	10.64 a	24.7b	12.41 bc	16.67a
LV	9.75 ab	28.4ab	11.53 с	20.0a
r	-0.77	7	-0.75	

D.H.: dead heart

Table (27): Relationship between chlorophyll content on the percentages of dead heart caused by S. cretica infestation

Variety	Chlorophyll content (SPAD values)	D.H. (%)	Chlorophyll content (SPAD values)	D.H. (%)
G2	38.56	18.9	32.71	10.0
SC ₉	39.28	17.6	33.43	10.0
SC ₁₀	41.96	20.0	34.81	11.1
TWC ₃₁₀	37.89	30.9	31.53	20.0
TWC ₃₂₀	37.11	24.7	30.50	16.7
LV	35.72	28.4	28.84	20.0
r	-0.65		-0.82	

early and late plantations which (r) equal - 0.65 and - 0.82, respectively.

- 2. The effect of corn planting date on the degree of infestation with *O. nubilalis* and *Chilo agamemnon*.
- 2.1. Relative susceptibility of certain genotypes of maize to natural infestation with O. nubilalis and Chilo agamemnon

2.1.1 - Early plantation:

On the basis of plant damage symptoms, the mean percentage throw three successive early seasons of *Ostrinia nubilalis* and *Chilo agamemnon* infestation was considerably different from one genotype to another. At 75 days after sowing (TWC₃₁₀ hybrid) was the highest infested genotype showing percentage 23.67%, the genotypes (SC₉) and (TWC₃₂₀) had the lowest damage showed the least mean percentage of infestation recording 14.4 and 13.3%, respectively. The remaining genotypes; variety G2, hybrid (SC₁₀) and local variety were moderately infested recording values ranging between 17.56 to 18.3%, Table (28).

2.1.2. Late plantation:

The data obtained are presented in Table (28). It has shown that, in the late plantation throw three successive seasons of O. nubilalis and C. agamemnon infestation, the highest mean percentage of infestation was observed in local variety, 27.78% and the lowest one was 14.44% for (SC₉) and 15.56% for (TWC₃₂₀ hybrid). On the other hand, the same trend was observed

Table (28): Effect of sowing date during early May and late July and maize varieties on the infestation by O. nubilalis and C. Agamemnon (means percentage of plant infestations).

Plant		3			Ş			Š			JAM			JML			ΛI	
ages		5			Ś			21)			150	0	-	1 1 52			•	
	표.	s,	ij	또	'n	T.	ъ.	Ś	T.		Š	T.	F.	Š	÷.	굓	s.	Τ.
									Early	rły								
89	10.67	20.0	16.7	9.33	16.67	13.3	9.33	20.0	23.3	10.67	30.0	23.3	6.67	16.7	13.3	9.33	23.3	16.7
75	14.7	23.3	20.0	10.67	15.67	16.7	10.67	23.3	23.3	14.7	30.0	30.0	6.67	16.7	16.7	10.67	23.3	20.0
Mean		17.56 bc			14.44 cd	1		18.32 b			23.67 a			13.33 d			18.32 b	
	F) =1								La	Late								
89	13.33	20.0	20.0	20.0 13.33	13.33	10.0	16.67	13.3	20.0 16.67	16.67	20.0	23.3	13.3	16.67	13.3	13.3	20.0	20.0
75	26.67	26.67	30.0	13.33	16.67	20.0	20.0	20.0	26.67	26.67	33.33 23.33	23.33	16.67	16.67	16.67	36.67	36.67	40.0
Mean		22.78 b			14.44 d			19.44 с		163	23.89 b			15.56 d			27.78 a	

LSD0.05 = 2.67 LSD0.05 = 3.30 LSD0.01 = 3.52 LSD0.01 = 4.38

F.: first season, S.: second season and T.: thid season, respectively.

as a lowest infestation in case of hybrids SC₉ (14.4, 14.44) and TWC₃₂₀, (13.3-, 15.56) and SC₁₀ (18.32, 19.44%) which were the lowest and the moderately one with early and late plantation, respectively. The results indicated that the late plantation were subjected to higher rate of infestation than the early plantation date. These results agreement with El-Sherif (1965), Farghaly (1969), Metwally (1976), Emara (1997) and Ahmed (2000)

2.2. Relationship between mean percentage of infestation, plant height and stem diameters at 75 days from sowing:

2.2.1 - Early plantation:

Planting dates showed a significant effect on height of maize plants. Plant height decreased remarkably when the time of planting was delayed, Table (29) shows the infestation percentage of the O. nubilalis and C. agamemnon ranged between 13.36% (for TWC₃₂₀) and 24.9% (for TWC₃₁₀) in plants which sowing at early planting date. Statistical analysis of the data has shown that in the early sowing date, both height and diameter plants had non-significant effect on the percentage of infestation; r = 0.24 and 0.10, respectively.

2.2.2. Late plantation:

Results presented in Table (29) show that, the genotypes differed in the rate of infestation by two borers. Local variety was the most susceptible of all the tested genotypes. G2 variety and (TWC₃₁₀ hybrid), (27.78%, both), (SC₉ and TWC₃₂₀ hybrids) were less susceptible; (16.67 both). Correlation between the rate of infestation and plant height and stem diameter were highly significant and positive; r equal 0.89 arid 0.65, respectively.

Table (29): Relationship between mean percentage of infestation (O. nubilalis and C. agamenon), plant height and stem diamter at 75 days old.

Variety		Early plantation			Late plantation	
	Plant height at 75 days old (cm)	Stem diameter at 75 days old (cm)	Infestation at 75 days old (%)	Plant height at 75 days old (cm)	Stem diameter at 75 days old (cm)	Infestation at 75
G2	262.635	2.483	19.33	233.92	2.451	27.78
SC,	225.485	2.461	14.67	214.53	2.277	16.67
SC10	275.535	2.637	19.09	240.145	2.580	22.22
TWC310	269.730	2.523	24.9	231.46	2.477	27.78
TWC ₃₂₀	264.370	2.616	13.36	223.80	2.528	16.67
LV.	295.55	2.775	17.99	267.76	2.691	37.73
ı	0.24	0.10		0.89	0.65	

These results agreement with obtained with El-Sherif(1965) and disagreement with Viereck (1983) and Shalaby (1996).

- 3. Effect of three borers infestation on different genotypes at harvest Time.
- 3.1. Relationship between plant height and phenomenons of infestation at harvest time
- 3.1.1. Early plantation:
- 3.1.1.1. Correlation between plant height and the percentage of plant infestation:

The results of infestation of maize by *S. cretica*, *C. agamemnon* and *O. mubilalis* are presented in Table (30). The results indicate that, the percentage of infestation ranged between 41.9% to 65.2%, in (SC₉) hybrid and TWC_{310} , respectively. The least susceptible genotypes (SC₉ & TWC_{320}) hybrids had averages 41.9% and 43.3% infested plants. The highest one (TWC_{310}) hybrid had 65.2% infested plants. Statistical analysis of the data has shown that the effect of plant height on the percentage of plant infestation was positive and significant; r = 0.55.

3.1.1.2. Correlation between plant height and infested joints per 100 infested plants:

The results presented in Table (30) reveal that, the percentage of infested internodes per infested plants ranged between 186 to 329 in case of (TWC₃₂₀) hybrid and (TWC₃₁₀) hybrid, respectively.

Table (30): Relationship between plant height at early plantation and phenomenons of infestation at harvest time.

Ear weight (gm)	226.9	253.3	266.9	237.0	246.1	215.6	-0.46
No. of holes/100 joints	13.7	8.6	11.3	19.2	8.7	18.1	0.65
Percentage of infested joints (%)	9.6	6.2	6.9	15.3	0.9	14.0	0.57
No. of holes/100 infested plant	349	772	358	429	262	446	0.73
Infested joints/100 infested plants	242	193	212	329	186	322	0.62
Percentage of infested plants (%)	51.4	41.9	47.0	65.2	43.3	56.7	0.55
Plant height at 75 days old (cm)	262.6	225.5	275.5	269.7	264.4	295.6	
Variety	G2	SC,	SC ₁₀	TWC310	TWC ₃₂₀	LV.	I

Statistical analysis of the data has shown that the effect of plant height on the percentage of infested internodes/infested plants was positive and significant; r = 0.62.

3.1.1.3. Correlation between plant height and number of holes per 100 infested plants at harvest time:

The results in the same Table (30), they indicate that the percentage of number holes per infested plants was highest in case of Local variety and TWC_{310} hybrid, which had 446 and 429 holes, respectively. On the other hand, the lowest one was TWC_{320} (262 holes).

Statistical analysis of the data has shown that the effect of plant height on the percentage of holes per infested plants was positive and-highly significant, r = 0.73.

3.1.1.4. Correlation between plant height and percentage of infested joints at harvest time:

The results are presented in Table (30) reveal that, less mean percentage of infested internodes were mostly decreased in TWC₃₂₀, SC₉ and SC₁₀ hybrids, which equal 6.0, 6.2 and 6.9%, respectively. And those of infested joints were increased to 15.3% with TWC₃₁₀ hybrid.

The correlation coefficients between plant height and the percentage of infested internodes was positive and significant, r = 0.57, indicating that increasing plant height increased percentage of infested internodes.

3.1.1.5. Correlation between plant height and number of holes per 100 joints:

The results obtained are presented in Table (30) has shown that the effect of plant height on the percentage of holes number per 100 joints was positive and significant, r = 0.65.

3.1.2. Late plantation:

3.1.2.1. Correlation between plant height and the percentage of plant infestation:

The results of plant infestation of maize caused by borers are present in Table (31). The results indicate that, the percent of infestation ranged between 72.8 (SC₉ hybrid) and 86.1% (L.V.). The least susceptible genotypes were (SC₉, TWC₃₂₀) and SC₁₀ hybrid, which are (72.8, 73.9) and 76.7%, respectively. The percent of stalk infestation was raised to 85.6 and 86.1% in case of TWC₃₁₀ and local variety, respectively.

The correlation coefficient between of plant height and percentage of plant infestation was positive and highly significant, r = 0.72.

3.1.2.2. Correlation between plant height and infested joints per 100 infested plants:

The results obtained are presented in Table (31). The results indicate the tendency of infested joints increased from 231 (SC₉) to 429 (TWC₃₁₀). Statistical analysis has shown that the effect of plant height on number of infested joints per infested plants was positive and significant, r = 0.6.

Table (31): Relationship between plant height at late plantation and phenomenons of infestation at harvest time.

3.1.2.3. Correlation between plant height and number of holes per 100 infested plants at harvest time:

The results presented in the previous Table (31), reveal that the minimum number of holes was detected in (SC₉) hybrid; 361 holes and the maximum one was detected in TWC₃₁₀ hybrid, 819 holes. Statistical analysis shown the effect of plant height on the percentage of holes per infested plants was positive and highly significant correlation value (r = 0.7).

3.1.2.4. Correlation between plant height and the percentage of infested joints:

Infestation of maize plants with three borers as expressed as percentage of infested joints, Table (31) reveal that in general, the percentage of infested joint on (TWC_{310}) hybrid, (26.1) was higher than that on other genotypes and the least percentage of infested joint was observed on SC_9 (12.7%). Statistical analysis showed that the effect of plant height on percentage infested joints was positive and highly significant (r = 0.67).

3.1.2.5. Correlation between plant height and number of holes per 100 joints:

Number of holes per 100 joints were ranged from 19.6 for (SC₉) to 50.9 holes on Local variety Table (31). Statistical analysis showed that the effect of plant height on number of holes per 100 joints was positive and highly significant (r = 0.73).

- 3.2. Relationship between stalk diameter and some phenomenons of infestations at harvest time
- 3.2.1. Early plantation:
- 3.2.1.1. Correlation between stalk diameter and percentage of infested plants:

The results obtained are presented in Table (32). They indicate that the hybrid (SC_9) was the least susceptible genotype (mean infestation 41.9%), followed by (TWC_{320}) and (SC_{10}), (mean infestations 43.3 and 47.0%, respectively) (TWC_{310}) was the most susceptible genotype (65.2%) followed by L.V. variety (56.7%). Statistical analysis showed that the effect of stalk diameter **on** the percentage of plant infestation was positive and non significant (r = 0.16).

3.2.1.2. Correlation between stalk diameter and percentage of infested joints:

The results obtained are presented in Table (32). The results revealed that the hybrids (TWC₃₂₀, SC₉ and SC₁₀) were least susceptible genotypes (mean infested joints were 6.0, 6.2 and 6.9%, respectively). Statistical analysis of showed that the effect of stalk diameter on the percentage of infested joints was positive and non significant (r = 0.27).

3.2.1.3. Correlation between stalk diameter and number of infested joints per 100 infested plants:

The results obtained are presented in Table (32). The results indicated that the (TWC_{320}) was the least susceptible genotype (mean infested joints 186), followed by hybrid SC_9 (infested joints = 193), TWC_{310} was the most susceptible (infested

Table (32): Relationship between stalk stem diameter at early plantation and some phenomenons of infestation at harvest time.

- 10	T	T		T	T			
Ear weight (gm)	226.9	253.3	266.9	237.0	246.1	215.6	-0.29	
No. hols/100 joints	13.7	8.6	11.3	19.2	8.7	18.1	0.31	-0.67
Percentage of infested joints (%)	9.6	6.2	6.9	15.3	6.0	14.0	0.27	-0.70
No. of hols/100 infested plants	349	277	358	429	262	446	0.46	-0.56
No. of infested joints/100 infested plants	242	193	212	329	186	322	0.34	-0.69
Percentage of infested plants (%)	51.4	41.9	47.0	65.2	43.3	56.7	0.16	-0.56
Stem diameter at 75 days old (cm)	2.483	2.461	2.637	2.523	2.616	2.775		
Variety	G2 ,	SC,	SC10	TWC310	TWC320	LV.	ь	Sec.

joints = 329) followed by local variety (infested joints = 322). Statistical analysis showed that the effect of stalk diameter on the percentage of infested joints was positive and weak significant (r = 0.34).

3.2.1.4. Correlation between stalk diameter and number of holes per 100 infested plants:

The obtained results in Table (32) reveal that the number of holes per 100 infested plants ranged from 262 to 446 holes. The highly susceptible genotypes were Local variety (446 holes) and hybrid TWC_{310} (429 holes) followed by the least susceptible ones; TWC_{320} and SC_9 , (262 and 277 holes/100 infested plant), respectively. Statistical analysis showed that the effect of stalk diameter on the percentage of holes was positive and non-significant (r = 0.46).

3.2.1.5. Correlation between stalk diameter and number of holes per 100 joints:

Results presented in Table (32) indicate the performance of maize genotypes ranged from 8.6 to 18.1 holes per 100 joints. The susceptible hybrid was L.V, 18.1 holes.

Statistical analysis showed that the effect of stalk diameter on the percentage of infested joints was positive and non significant (r = 0.31).

3.2.2. Late plantation:

3.2.2.1. Correlation between stalk diameter and percentage of infested plants:

The results obtained are presented in Table (33). They indicate that the (SC_9), (TWC_{320}) and (SC_{10}) are the least susceptible

Table (33): Relationship between stalk stem diameter at late plantation and some phenomenons of infestation at harvest time.

Ear weight (gm)	198.7	234.47	260.89	224.84	230.22	176.97	-0.34	
No. hols/100 joints	36.0	19.6	29.3	49.8	24.4	50.9	0.59	-0.62
Percentage of infested joints (%)	19.4	12.7	15.8	26.1	16.2	25.7	0.57	-0.63
No. of hols/100 infested plants	576	361	555	819	451	780	0.61	-0.49
No. of infested joints/100 infested plants	309	231	296	429	300	393	0.59	-0.46
Percentage of infested plants (%)	81.1	72.8	7.97	85.6	73.9	86.1		99.0-
Stem diameter at 75 days old (cm)	2.451	2.277	2.580	2.477	2.528	2.691		
Variety	G2	SC,	SC10	TWC ₃₁₀	TWC ₃₂₀	LV.	ı	

genotypes (mean infestation; 72.8, 73.9 and 76.7%, respectively). TWC_{310} hybrid and L.V. were most susceptible (Mean infestation; 85.6 and 86.1%), respectively. The correlation between stalk diameter and percentage of infested plants was positive and significant (r = 0.54), revealing that increasing stalk diameter increased percentage of infested plants.

3.2.2.2. Correlation between stalk diameter and percentage of infested joints:

The results obtained are presented in Table (33). The results indicate that the SC_9 and SC_{10} were the least susceptible genotypes (mean percentage of infested joints are 12.7 and 15.8%, respectively), the highly susceptible genotypes were Local variety (25.7) and TWC_{310} (26.1%). The correlation between stalk diameter and percentage of infested joints was positive and significant (r = 0.57).

3.2.2.3. Correlation between stalk diameter and number of infested joints per 100 infested plants:

The results are presented in the previous Table (33). The result indicate that the SC_9 was the least susceptible (mean infested joints was 231/100 infested plants), TWC_{310} was the most susceptible one (429 infested joints per 100 infested plants). The correlation coefficient between stalk diameter and the percentage of infested joints was positive and significant (r = 0.59).

3.2.2.4. Correlation between stalk diameter and number of holes per 100 infested plants:

The results are presented in Table (33), indicate that the number of holes per 100 infested plants ranged from 361 to 819 holes. The highly susceptible genotypes were TWC_{310} (819 holes) and local variety (780 holes/100 infested plants). The least susceptible was SC_9 (361 holes).

Statistical analysis showed that the effect of stalk diameter on percentage of holes per 100 infested plants was positive and highly significant (r = 0.61).

3.2.2.5. Correlation between stalk diameter and number of holes per 100 joints:

Results presented in Table (33) indicate that number of holes ranged from 19.6 (SC₉) to 50.9 holes in case of Local variety.

Statistical analysis indicated that the effect of stalk diameter on the percentage of holes per 100 joints was positive and highly significant (r = 0.59).

3.3. Relationship between borers infested levels and weight of ears at harvest time:

3.3.1. Effect of infested plants (%) on weight of ears:

3.3.1.1. Early plantation:

The obtained results are presented in Table (32), which indicate that the varieties (SC_9 and TWC_{320}) and (SC_{10}) were the least susceptible hybrids (mean infestation, 41.9, 43.3 and 47.0%) on the other hand TWC_{310} followed by L.V. (65.2-56.7%) were the most susceptible varieties. Statistical analysis of the data has shown that the differences between genotypes is

highly significant and no significant differences between (L.V.) and (G2) and between (SC₉, SC₁₀ and TWC₃₂₀).

The results in the same table reveal significant differences between the different varieties. Detected ear weight which were ranged between 215.6 g (L.V.) and 266.9 g (SC₁₀). Correlation between percentage of infestation and weight of ear was in between; (r = -0.56).

3.3.1.2. Late plantation:

Borers attacks maize plants in late season causing serious damage to both stems and ears. The obtained results are shown in Table (34) which indicate that, there were any significants difference between early and late plantation for ear weights but the infestation was increased significantly in late planting dates than early one. Infestation rate were divided to three categories:

- 1- (SC₉, SC₁₀) and (TWC₃₂₀) were less susceptible hybrids (mean infestation ranged between 72.8-76.7%).
- 2- (G2) variety is moderately susceptible, 81.1%.
- 3- (TWC₃₁₀ hybrid and local variety were the most susceptible genotypes (mean infestation were 85.6 and 86.1%, respectively. Also, there were strong correlation between mean percentages of infestation and ear weights, (r = -0.66). Finaly, the obtained data indicate that there was a negative relationship between the infestation with borers and ear weight at harvest time this result is in agreement with the findings of El-Saadany (1969), Ismail et al. (1974), Calvin et al. (1988), Bigler (1990), Cagan and Grencik (1990), Sherif and Lutfallah (1991) and Metwally (1995).

3.3.2. Correlation between number of infested joints per 100 infested plants and weight of ears:

The results presented in Table (32 & 33), indicate that the effect of number of infested joints on the mean of ear weight was negative and significant, (r = -0.7 and -0.5 in early and late plantation, respectively).

3.3.3. Correlation between number of holes per 100 infested plants and mean weight of ears:

Results of Tables (32 & 33), indicate that the same trend was noticed in both early and late plantation. The least number of holes was 277 and 361 holes for SC₉ and the highest one was 429 and 819 holes for TWC₃₁₀ in early and late plantations, respectively. The correlation values between number of holes per 100 infested plants and weight of ear was a negative and significant for both early and late plantation which equal -0.6 and -0.5, respectively.

3.3.4-Correlation between infested joints and mean of weight ears:

The results presented in Table (32 & 33), reveale that the percentages of infested plants in early plantation ranged between 6.0 to 14% and 12.7 to 26.1% in early and late plantation, respectively. The correlation coefficient between infested joints and mean weight of ears was negative and highly significant, r = -0.7 and -0.6 in early and late of planting, respectively.

3.3.5. Correlation between number of holes per 100 joints and mean weight of ears:

Results in the same Tables, indicated that the number of holes per 100 joints ranged between 8.6 to 18.1 holes in early plantation and between 19.6 to 50.9 holes in late one.

Statistical analysis revealed that the effect of number of holes per 100 joints was a negative and highly significant (r = -0.67**) in early plantation and it was also negative and significant (r = -0.62*) in late one.

- 3.4. Field evaluation of maize genotypes at harvest time for susceptibility to S. cretica, O. nubilalis and C. agamemnon under natural infestation
- 3.4.1. Number of S. cretica larvae per 100 infested plants at harvest time:

Results presented in Table (34) showed that number of S. cretica larval population varied with different maize genotypes. The maximum larval population averaged 34.8 larvae/100 infested plants for the Local variety, while larval population decreased to 16.2 larvae/100 infested plants for TWC₃₂₀ hybrid, at harvest time with maize was planting in early plantation. Statistical analysis of the data showed that there were highly significant differences between genotypes of maize. In case of late plantation no-significant differences between tested maize genotypes was recorded.

Table (34): Field evaluation of maize genotypes at harvest time for their susceptability to three borers under natural infestation.

No. larvae/100							Early									L	Late				
12.2 30.4 7.0 0.91 2.27 0.52 25.2 55.8 14.0 226.9 16.1 133.3 15.6 1.25 10.29 1.18 19.7 164.3 19.8 10.7 34.4 6.7 0.72 2.33 0.47 2.38 66.2 16.1 266.9 13.3 85.6 1.14 10.54 1.25 1.25 1.05 1.14 10.54 1.15 1.15 1.15 1.15 10.3 57.4 9.6 1.40 4.21 0.70 34.8 93.3 17.1 215.6 13.3 13.1 16.7 1.01 17.54 1.25 15.4 267.6 36.0 10.6 7. 2.6 0.73 0.66 0.75 0.45 0.71 0.71 0.84 0.04 0.45 0.41 0.71 0.84 0.04 0.045 0.41 0.71 0.84 0.04 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.85 0.15 0.85 0.71 10.8 3.9 3	Von	Ž	o, larva plant	e/100	N _o	larvae,	/100	N in	. larvae	/100 ants	Mean	S.	· larvae	100	Š	larvae	100	S.	. larvae/	100	Mean
12.2 30.4 7.0 0.91 2.27 0.52 25.2 25.8 14.0 226.9 16.1 133.3 15.6 1.25 10.29 1.18 19.7 164.3 19.8 8.6 25.2 4.8 0.69 1.81 0.34 23.4 53.8 12.0 253.3 9.4 79.4 16.1 0.73 5.86 1.14 12.9 10.86 21.5 10.7 34.4 6.7 0.72 2.33 0.47 23.8 66.6 16.1 266.9 13.3 85.6 15.6 0.91 5.86 1.07 17.6 111.2 20.1 18.1 45.6 13.3 1.25 3.14 0.91 28.5 66.2 20.9 237.0 16.1 148.9 20.0 1.14 10.54 1.42 18.6 173.6 23.4 6.7 25.6 5.9 0.47 1.80 0.42 16.2 52.0 14.5 246.1 7.8 72.2 17.2 0.56 5.21 1.23 10.5 97.5 23.4 19.3 57.4 9.6 1.40 4.21 0.70 34.8 93.3 17.1 215.6 13.3 231.1 16.7 1.01 17.54 1.25 15.4 267.6 36.0 -0.64 -0.73 -0.39 -0.66 -0.75 -0.45 -0.78 -0.41 -0.31 0.84 0.04 -0.45 -0.45 -0.38 0.15 -0.85 -0.71 -0.64 -0.73 -0.39 -0.66 -0.75 -0.45 -0.70 -0.78 -0.71 -0.31 0.84 0.04 -0.45 -0.45 -0.38 0.15 -0.85 -0.71 -0.64 -0.73 -0.86 -0.75 -0.45 -0.70 -0.78 -0.71 -0.31 0.84 0.04 -0.45 -0.45 -0.45 -0.71 -0.85 -0.71 -0.64 -0.73 -0.86 -0.75 -0.45 -0.70 -0.38 0.15 -0.85 -0.71 -0.64 -0.73 -0.86 -0.75 -0.85 -0.71 -0.85 -0.85 -0.71 -0.85 -0.85 -0.85 -0.71 -0.85 -0.85 -0.71 -0.85 -0.85 -0.85 -0.85 -0.85 -0.	۸	S.			ņ	os.	Ch.	s.	os.	Ch.	(E)	ŝ	Os.	Ch	or.	Os	5		osted pla	ants	weight
8.6 25.2 4.8 0.69 1.81 0.34 23.4 53.8 12.0 253.3 9.4 79.4 16.1 0.73 5.86 1.14 12.9 108.6 21.5 10.7 34.4 6.7 0.72 2.33 0.47 23.8 66.6 16.1 266.9 13.3 85.6 15.6 0.91 5.86 1.07 17.6 111.2 20.1 18.1 45.6 13.3 1.25 3.14 0.91 28.5 66.2 20.9 237.0 16.1 148.9 20.0 1.14 10.54 142 18.6 173.6 23.4 6.7 25.6 5.9 237.0 16.1 148.9 20.0 1.14 10.54 12.9 173.6 23.4 19.3 57.4 9.6 1.40 4.21 0.70 34.8 93.3 17.1 215.6 13.3 231.1 16.7 10.54 1.25 15.4 267.6 36.0 10.54<	G2	12.2	1	7.0	0.91	2.27	0.52	25.2	55.8	14.0	226.9	16.1	133.3	15.6	1 25	10.20	31.1		5 5		(mg)
10.7 34.4 6.7 0.72 2.33 0.47 23.8 66.6 16.1 266.9 13.3 85.6 15.6 0.91 5.86 1.07 17.6 111.2 20.1 18.1 45.6 13.3 1.25 3.14 0.91 28.5 66.2 20.9 237.0 16.1 148.9 20.0 1.14 10.54 1.42 18.6 173.6 23.4 6.7 25.6 5.9 0.47 1.80 0.42 16.2 52.0 14.5 246.1 7.8 72.2 17.2 0.56 5.21 12.3 10.5 97.5 23.4 19.3 57.4 9.6 1.40 4.21 0.70 34.8 93.3 17.1 215.6 13.3 231.1 16.7 1.01 17.54 1.25 15.4 267.6 36.0 -0.64 -0.73 -0.36 -0.75 -0.45 -0.78 -0.45 -0.45 -0.45 -0.87 -0.71	SC,	9.8	25.2	4.8	69.0	1.81	0.34	23.4	53.8	12.0	253.3	9.4	79.4	16.1	0.73	286	114	12.0	108 6	19.0	198.3/
18.1 45.6 13.3 1.25 3.14 0.91 28.5 66.2 20.9 237.0 16.1 148.9 20.0 1.14 10.54 1.42 18.6 173.6 23.4 6.7 25.6 5.9 0.47 1.80 0.42 16.2 52.0 14.5 246.1 7.8 72.2 17.2 0.56 5.21 1.23 10.5 97.5 23.4 19.3 57.4 9.6 1.40 4.21 0.70 34.8 93.3 17.1 215.6 13.3 231.1 16.7 1.01 17.54 1.25 15.4 267.6 36.0	SC ₁₀	10.7	-	6.7	0.72	2.33	0.47	23.8	9.99	16.1	266.9	13.3	85.6	15.6	0.91	5.86	1.07	17.6	111 2	20.1	750.80
6.7 25.6 5.9 0.47 1.80 0.42 16.2 52.0 14.5 246.1 7.8 72.2 17.2 0.56 5.21 1.23 10.5 97.5 23.4 19.3 57.4 9.6 1.40 4.21 0.70 34.8 93.3 17.1 215.6 13.3 231.1 16.7 1.01 17.54 1.25 15.4 267.6 36.0	IWC310		-	-	1.25	3.14	0.91	28.5	66.2	20.9	237.0	16.1	148.9	20.0	41.1	10.54	1.42	186	1736	33.4	234.64
19.3 57.4 9.6 1.40 4.21 0.70 34.8 93.3 17.1 215.6 13.3 231.1 16.7 1.01 17.54 1.25 15.4 267.6 36.0 -0.64 -0.73 -0.39 -0.66 -0.75 -0.45 -0.78 -0.41 -0.31 -0.84 0.04 -0.45 -0.87 -0.38 0.15 -0.85 -0.71	FWC320	1	-	5.9	0.47	1.80	0.42	16.2	52.0	14.5	246.1	7.8	72.2	17.2	950	5.21	1 23	10.5	0.0.0	1.5	10.477
-0.39 -0.66 -0.75 -0.45 -0.70 -0.78 -0.41 -0.31 -0.84 0.04 -0.45 -0.87 -0.38 0.15 -0.85 -0.71	LV.	19.3		9.6	1.40	4.21	0.70	34.8	93.3	17.1	215.6	13.3	231.1	167	101	17.54	1 25	2 7	5.76	4.67	77.057
-0.39 -0.66 -0.75 -0.45 -0.70 -0.78 -0.41 -0.31 -0.84 0.04 -0.45 -0.87 -0.38 0.15 -0.85	Children	-	-					-					1		-	-	-	13.4	0./02	36.0	176.97
De: Orteinia ambilais	'n	-0.64	-0.73	-0.39	-0.66	-0.75			-0.78	-0.41		-0.31									
	S. Se	Samia	cretica		ق	Octrinia	hiloi		ξ	77.17							20.00		-0.03	-0./1	

-108

3.4.2. Number of *O. nubilalis* larvae per 100 infested plants at a harvest time:

Results presented in Table (34) demonstrate that mean number of *O. mubilalis* larvae per 100 infested plants in early cultivar averaged 93.3 Larvae compared with 52.0 larvae per 100 infested plants (TWC₃₂₀) in early planting date, while in late planting date were 267.6 and 97.5 larvae per 100 infested plants of Local variety and TWC₃₂₀ hybrid, respectively. Statistical analysis of the data exhibited that there are highly significant differences between maize genotypes in both early and late plantations.

3.4.3. Number of C. agamemnon larvae per 100 infested plants:

Results in the same Table reveal that the mean population density of larvae increased from 12 to 20.9% in hybrids (SC₉) and (TWC₃₁₀), respectively, with early cultivar plants. Statistical analysis of the data exhibited that there are significant differences between maize genotypes. While no-significant difference was noticed in late plantation.

3.4.4. Number of three borers larvae per 100 plants:

results presented in Table (34) show the mean percentage for number of *S. cretica* larvae per 100 plants in different maize genotypes found at harvest, it ranged from 6.7% (hybrid TWC₃₂₀) to 19.3% (local variety), in early planting date. Analysis of the data showed that there were highly significant differences between genotypes of tested maize. On the other hand, no significant differences between maize genotypes were observed in late plantation. The same result was observed in case of *C. agamemnon*. In the same Table was noticed highly

significant differences between mean number of *O. nubilalis* larvae in different maize genotypes with both early and late plantation, number of larvae per 100 plants ranged between 25.2 (SC₉ hybrid) to 57.4 (L.V.) in early plantation and ranged between 79.4 (SC₉) to 231.1 (L.V.) larvae per 100 plants in late plantation.

3.4.5. Number of larvae per 100 joints:

The number of internodes are' different among the studied maize genotypes, it was appropriate to compare between those genotypes according to number of larvae per 100 joints. The mean number of *S. cretica* larvae present at harvest date reveal that, it ranged from 0.47 to 1.4% in early sowing (Table 34). In the same Table it was show that, the mean number of *O. nubilalis* and *C. agamemnon* ranged from 1.80 to 4.21% and from 0.34 to 0.91% larvae, respectively in early sowing date.

Statistical analysis of the data show that there were significant differences between genotypes with both insects. In case of late planting significant differences between mean number of *O. nubilalis* larvae and insignificant differences was noticed between number of *C. agamemnon* larvae in different genotypes.

3.5. Relationship between number of borers larvae and ear weight at harvest time:

3.5.1. Early plantation;

The relationship between each number of S. cretica and O. nubilalis larvae per 100 jointed and ear weight, showed a negative and highly significant (r = -0.66 & -0.75) are shown in Table (34). Meanwhile, a significant negative correlation

RESULTS & DISCUSSION

between number of C. agamemnon larvae and ear weight was obtained for the studied maize genotypes, r = -0.45.

On the other hand, correlation coefficient between the number of borers larvae per 100 infested plants and ear weight of different maize genotypes at harvest were a negative and highly significant (r = -0.7 and -0.78; for: Sesamia and Ostrinia larvae, respectively). Meanwhile a negative and significant for Chilo larvae (r = -0.41) was detected (Table, 35).

3.5.2. Late plantation:

The data obtained are presented in Table (34). They indicate that the effect of *Ostrinia* and *Chilo* larvae per 100 infested plants on ear weight were negative and highly significant, r = -0.85 &-0.71, respectively. On the other hand the effect of *Sesamia* larvae on ear weight was non significant, r = 0.15.

4. Susceptibility of maize grains to infestation with some storgae insects:

The susceptibility of maize grains of the various tested genotypes to infestation with the Angoumois grain moth, Sitotroga cerealella (Oliv.), the rice weevil Sitophilus oryzae (L.) and the lesser grain borer Rhizopertha dominica (Fab.) were studied in the laboratory at 27±1°C and 65±5% R.H.

The obtained results are given in Table (35). The results indicate the following:

Table (35): Susceptibility of the maize grains of various genotypes to infestation with Sitotroga cerealellae (Oliv.), (Sitophilus oryzae L.) and (Rhizopertha dominica Fl.).

Test insect	Maize genotype	No. of deposited egg	Mean of D.P. (days) (T)	No. emerged adults	Survival rate %	Develop- mental index	Suscept- ibility index
	G2	100	42	38.75	38.75	0.92	3.78
lla	SC ₉	100	43	42.75	42.75	0.99	3.79
eak	SC ₁₀	100	44.5	35.00	35.00	0.79	3.47
S. cerealella	TWC ₃₁₀	100	39.5	68.5	68.50	1.73	4.65
-	TWC ₃₂₀	100	39.0	87.75	87.75	2.25	4.98
	LV.	100	40.0	78.75	78.75	1.97	4.74
	G2	300	37.0	209.50	69.83	1.89	4.98
9	SC ₉	300	36.5	185.0	61.67	1.69	4.90
S. oryzae	SC ₁₀	300	37.5	148.5	49.50	1.32	4.525
5.0	TWC ₃₁₀	300	35.0	219.25	73.08	2.09	5.333
	TWC ₃₂₀	300	33.5	236.25	78.75	2.35	5.67
	LV.	300	33.5	259.00	86.33	2.58	5.78
	G2	180	36.5	115.50	64.17	1.76	4.95
ica	SC ₉	180	36.5	116.75	64.86	1.78	4.96
mim	SC ₁₀	180	38.5	92.25	51.25	1.33	4.44
R. dominica	TWC ₃₁₀	180	35.5	123.00	68.33	1.92	5.17
~	TWC ₃₂₀	180	38.0	94.50	52.50	1.38	4.53
	LV.	180	36.0	136.50	75.83	2.11	5.22

D,P.: Developmental periods

Index of susceptibility = $\frac{\text{Log S}}{T} \times 100$

Where:

S = the percentage of insects reaching the adult stage.

T = The average duration of development.

4.1. Sitotroga crealella:

The mean number of *S. cerealella* moths emerged from 100 egg was range from 35.0 to 87.75 moths for the various maize genotypes, while it was 78.75 moths for the local maize variety.

The lowest developmental index (D.I.) value was recorded for SC_{10} (0.79) while it was 1.97 for the local variety.

The susceptibility index was ranged from 3.47 to 4.98 for the various varieties. The lowest value was recorded with SC_{10} .

Also, the susceptibility index was slightly lower in case of G2, SC_9 and SC_{10} compared with the other tested varieties. This result indicate that G2, SC_9 and SC_{10} were less susceptible to infestation with S. cerealella than the other tested maize genotypes including the local variety.

4.2. Sitotroga oryzae.

The mean number of *S.oryzaea* adults emerged from 300 eggs was range from 148.5 to 259 adults for the various tested varieties. The lowest value was recorded for the SC₁₀, while it was 259 adults for the local variety.

The D.I. was from 1.32 to 2.35 for the tested genotypes, while it was 2.58 for the local variety.

The susceptibility index was slightly lower for SC_{10} , SC_{9} and G2 and was ranged from 4.52 to 4.98 while it was 5.76 for the local variety. This result indicate clearly that TWC_{310} , TWC_{320} and the local variety were more susceptible to infestation with S. oryzae than the other tested maize genotypes.

4.3. Rhizopertha dominica

The mean number of *R. dominica* adults emerged from 180 eggs was ranged from 92.25 to 123 adults for the tested maize genotypes, while it reached to 136.5 adults for the Local variety.

The D.I. was from 1.33 to 1.92 for the tested genotypes, while it was 2.11 for the local variety.

Concerning the susceptibility index, the result indicates that TWC_{310} and the local variety had shown higher values compared with the other genotypes, indicating that TWC_{310} and the local variety were more susceptible to infestation with R. dominica than the other tested genotypes.

In general TWC₃₁₀, TWC₃₂₀ and the local variety were more susceptible to infestation with S. cerealella, S. oryzae and R. dominica than the other tested genotypes with the exception of TWC₃₂₀ which was least susceptible to infestation with R. dominica. This could be due to the moisture content of the kernels. The obtained results were agreement with the findings of by Dobie (1974), Tigar (1994) and Rahmen et al. (2000).