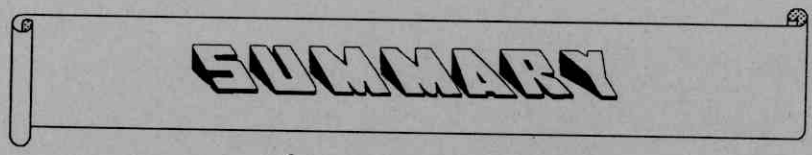
SUMMARY

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Maize (*Zea mays*, L.) is one of the most important cereal crops in Egypt. It is used mainly in animal and poultry feeding, either as a green fodder or as a main component of dry fed. Maize crop is subjected to attack by a large number of insect pests during it's growth in the field such as the greater sugar cane *Sesamia cretica* Led., European corn borer *Ostrinia nubilalis* and *Rice stalk* borer *Chilo agamemnon*, which caused considerable damage resulting in yield reduction.

Also during storage, cereal crops had been attacked by stored grain pests such as *Sitophilus oryzae, Rhyzopertha dominica* and *Sitotroga cereallela.*

Field experiments were carried out during 1997-1998-1999 seasons, at the Research and Experimental Station of the Faculty of Agricultural at Moshtohor, Kalubia Governorate. Also laboratory experiment were carried out at the plant protection department of the same faculty. The aim of this study was to evaluate some maize varieties to infestation with corn borers and its effect on the yield corn (*Zea mays*, L.).

In the experiment six maize varieties (G2, SC_9, SC_{10}, TWC_{310}, TWC_{320} and L.V.) at two sowing dates [early (May) and Late (July)] were tested. A complete block randomized design with three replicates was used during the various seasons. The obtained results expect for the infestation by the borers were statistically analyzed according to **Snedecor and Cochran (1967).** The treatment means were compared according to L.S.D

as prescribed by **Stell and Torrie (1980).** The results could be summarized as follows.

Part I:

1. Botanical characters:

1.1. Plant height and stem diameter:

The results showed that there were significant differences between varieties for plant height and stem diameter at all samples. Local variety gave the highest values in both season followed by SC_{10}. However, SC_9 gave the lowest one.

1.2. Third leaf angle

Concerning the third leaf angle, Local variety, TWC_{310} and G2 gave the lowest values of leaf angle. However, SC_{10} following SC_9 and TWC_{320} gave the highest values.

1.3. Leaf chlorophyll content:

The results revealed significant differences in the chlorophyll content of the leaves of the various tested corn varieties,, SC_{10} had the highest mean values followed by SC_9 and G2 over both seasons. However Local variety gave the lowest one.

1.4. Husk length:

During the three seasons, hybrid of SC_{10} had the highest values in husk length followed by TWC_{320}. However, TWC_{310} gave the lowest one.

1.5. Percentage of not covered ears:

Concerning the results of not covered ears %, the hybrids TWC_{310} followed by SC_9 gave the highest value in comparison to other genotypes ones in early and late sowing dates.

1.6. Moisture content of corn grains:

In both sowing dates (early and late), the hybrid SC_{10} had the lowest moisture content. However TWC_{310} gave the highest one.

Also, the TWC_{310} gave the highest infestation percentage of ears followed by SC_9 by store insects. This result may be due to high percentage of not covered ears.

2. Yield and its components:

2.1. Effect of season:

Effect of season on ear length, stem diameter, no. of row per ear, no. of grain per row, weight for 100 grain and ear weight) was significant in the first season followed by the second season.

2.2. Effect of olanting dates:

Concerning the effect of planting dates on the previous traits, all mean values in the early planting date were higher than the corresponding ones in the late planting date.

2.3. Varietal performance:

Varietal performance showed that, hybrid variety SC_{10} gave higher mean values for all characters followed by SC_9, except no. of rows per ear. However, local variety gave the lowest one.

2.4. Interaction between planting dates and seasons:

Interaction between planting dates and season was significant for ear length no. of rows per ear, 100 kernel weight and ear weight. However, insignificant effect for other characters.

3. Susceptibility of varieties to some store insects:

High no. of *S. orizae, R. dominica* were recorded on local variety, followed by TWC_{320} and TWC_{310} for *S. orizae* and *R. dominica*, respectively. While SC10 showed the lowest number, while lower no. of *S. cerealella* was recorded on SC_{10}. However, the highest no. was recorded on TWC_{320}.

Part II:

Evaluation of certain corn genotypes for infestatin with stem borers:

1. The effect of corn planting date on the infestation level with *Sesamia cretica*:

1.1. Dead heart symptoms (D.H.):

The results of the different seasons showed that, the D.H. were ranged between (17.6 and 30.9) in early plantation for (SC_9 and TWC_{310}) variety. While it decreased to a minimum of 10.0 to a maximum of 20.0% in late plantation for variety of SC_9 and TWC_{310}, respectively. The differences among these averages for the varieties were significant. The recorded data for infestation and D.H. plants for various genotypes were divided to the following categories.

1- Highly susceptible are L.V., TWC_{310} and SC_{10}.

2- Moderately susceptible is CO_2.

3- Less susceptible are SC_9 and TWC_{320}.

1.2. Mean percentage of pink borers infestation:

The results showed that, the infestation level during the three successive seasons was in early plantation slightly higher than in late plantation .for all genotypes. It ranged between a minimum 19.8% (TWC_{320}) at 18 plant from sowing to 52.9% (TWC_{310}) at 32 plant old in early plantation, while in late plantation (Nily season), it ranged between 13.33% (TWC_{320}) at 18 days old to 38.9% (L.V) at 39 days.

1.3. Relationship between different plant height and *S. cretica* infestation level.

Plant height showed moderately correlation between plant height and mean percentage of infestation by *S. cretica* in early plantation, (r = 0.62). On the other hand, the infestation was correlated with plant height in late plantation than in early one.

1.4. Relationship between stem diameter and *S. cretica* infestation level:

It appears that the percentage of *S. cretica* infestation was not correlated with plant stem diameter of different varieties in early plantation. (r = -0.8 to 0.25). While in late plantation this correlation was a significant at 32 plant days old (r = 0.68). Also it was noticed that the stem diameter of plants decreased significantly with delaying planting date than the early sowing date.

1.5. Effect of *S. cretica* infestation on different maize variety at 50% flowering dates.:

The effect of *S. cretica* infestation on number of days to reach the 50% tasseling and silking was negative and significant

one, in early (r = -0.59) and late plantation (- 0.61), respectively. On the other hand, the same trend was noticed in case of late plantation (r = -0.60 and -0.66, respectively).

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

Data showed that, third leaf angle had highly negative affect on the percentage of infestation of different varieties, specially at 32 plant days age in early plantation. Also this effect was highly significant at different days in the late plantation, but it was less than the early one.

1.7. Relationship between leaf character and *S. cretica* infestation at 32 days old.

Leaf characters of maize plants, namely leaf thickness and distance layer showed positive significant effect on the percentage of plant infestation with *S. cretica* in early and late plantation (r = 0.71, 0.93) in early (r = 0.93, 0.51). While the effect of epiderms thickness on *S. cretica* infestation was negative and highly significant (r = - 0.83) in early plantation. On the other hand, it was negative, and not significant r (- 0.40) in late plantation. Effect of stem thickness of different maize genotypes was negative and highly significant ones; r = - 0.77 and – 0.75 for early and late plantation, respectively.

1.8. Effect of leaf chlorophyll content on percentage of dead heart caused by *S. cretica*:

Leaf chlorophyll content, ranged between 35.72 (L.V) and 41.96 (SC_{10}) in early plantation, and was between 28.44 (L.V) and 34.81 (SC_{10}) in late plantation. This result revealed that the

leaf cholorophyll content was lesser in late plantation than the early one.

Hence the data of leaf cholorophyll content and of the D.H revealed, that there was negative and highly significant correlation between early and late plantation r = - 0.65 and – 0.82, respectively.

2. Effect of corn planting date on the degree of infestation level with *O. nubilalis* and *C. agamemnon*:

2.1. Relative susceptibility of certain genotypes of maize to natural infestation with *O. nubilalis* and *Chilo agamemnon* in early and late plantation.

Infestation percentages of different maize genotypes with *O. nubilalis* and *Chilo·agamemnon* were significantly affected by sowing dates. Percentages of infestation were lower in early plantation compared with the late one. TWC_{320} and SC_9 showed the lowet one (13.33, 14.44) in early and (15.6, 14.44) in late. While TWC_{310} was the highest percentage of infestation in early plantation (23.7) and L.V revealed also the highest one in late plantation (27.8).

2.2. Relationship between mean percentage of infestation with *O. nubilalis, C. agamemnon* and plant height, plant diameter at 75 days old.

In early sowing date, both height and diameter plants did not show significant difference on infestation with *O. nubilalis* and *C. agamemnon* (r = 0.23, 0.10 for various maize genotypes). In late sowing date, both height and diameter plants showed significant heigher and negative effect on the percentage of infestation with the two borers. (r = -0.89 between height,

infestation), (r = -0.65 between diameter, infestation). Local variety was the most susceptible of all the tested genotypes. But SC_9 and TWC_{320} were less susceptible one.

3. Effect of different genotypes to borers infestation at harvest time:

3.1. Relationship between plant height and some phenomenons at harvest time:

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

The results revealed that, the lest susceptible genotypes were (SC_9, TWC_{320}) with on infestation average of (41.9% and 43.3%) and (72.8 and 73.9%) plants in late plantation. In other hand, the highest susceptible one was TWC_{310} with on 65.2% infestation rate in early plantation, while in late plantation, L.V. and TWC_{310} showed (86.1 and 85.6%) values.

The effect of plant height on the percentage of plant infestation was positive and significant in early and late plantation (r = 0.6, 0.7), respectively.

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

Results of the three seasons showed that the average number of infested joints per 100 infested plants were 186 for TWC_{320} and 329 for TWC_{310} in early plantation, and 231 for SC_9 and 429 for TWC_{310} in late plantation. The differences among these averages during 3 seasons were significant. The effect of height plants on the average of infested joints per 100 infested

plants was positive and significant in early and late plantation (r = 0.62 and 0.60), respectively.

3.1.3. Correlation between plant height and number of holes per 100 infested plants:

The results revealed that L.V and TWC_{310}, genotypes showed the highest number of holes per 100 infested plants (429 and 446) in early plantation and (819 and 780) in late plantation. On the other hand the genotypes TWC_{320} was the least one (262) in early plantation and the minimum number of holes was detected for SC_9 (361 holes) in late plantation.

The effect of plant height on the number of holes per 100 infested plants for the different genotypes was positive and highly significant in early and late plantation (r = 0.73, 0.70) respectively.

3.1.4. Correlation between plant height and percentage of infested joints:

The result showed that the percentage of infested joints was range from 6.0 for TWC_{320} to 15.3 for TWC_{310} variety in early plantation. While it ranged between 12.7 for SC_9 to 26.1 for TWC_{310} in late plantation.

Concerning the effect of plant height on the percentage of infested joints, this effect was positive and significant in early and late plantation (r = 0.57, 0.67), respectively.

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

The effect of plant height on the number of holes per 100 joints was positive and significant in early plantation (r = 0.65).

on the other hand, there was positive and highly effect in late plantation r = 0.73.

3.2. Relationship between stalk diameter and some phenomenon of plant infestation:

The results showed that, stalk diameter had no significant effect on (percentage of infested plants-number, infested joints per 100 infested plants-number of holes per 100 infested plants, percentage of infested joints and number of holes per 100 infested joints) in early plantation (r = 0.16, 0.34, 0.46, 0.27 and 0.07) respectively. On the other hand, in late plantation, the effect of stalk diameter on all of th0 them was positive and significant, (r = 0.54, 0.59, 0.61, 0.57 and 0.63), respectively.

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

It appears that the varieties (SC_9 and TWC_{320}) and SC_{10} were the least susceptible hybrids, while TWC_{310} followed by L.V. were the most susceptible varieties and G2 was moderately susceptible in early and late plantation and there was negative relationship between infestation with borers and ear weight at harvest time in early and late plantation r = -0.6, -0.7, respectively.

1- Effect of plant infestation on weight of ears was negative and highly significant in both planting time early and late (r = -0.6 and -0.7) respectively.

2- Concerning the effect of number of infested joints per 100 infested plants on the mean of weight ears, a negative and significant effect in early and late plantation r = (-0.7, -0.5), was recorded.

3- A negative and significant effect for the number of holes per 100 infested plants on the weight of ear in early and late plantation (r = -0.6, -0.5), was also recorded.

4- Also there was a negative and highly significant effect for percentage of infested joints on mean of weight ear in early (r = -0.7) and late plantation time, (r = -06).

5- A negative and highly significant effect was shown in early plantation for number of holes per 100 infested joints on mean weight of ears (r = -0.67), while in late plantation the effect was negative (r = - 0.62).

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.

Highly significant differences between the genotypes of maize for number of *S. cretica* larvae per 100 infested plants, were appeared, these ranged between a maximum of 34.8 (L.V) and decreased to a minimum of 16.2 (TWC_{320}) in early plantation. While in late plantation, there was no significant differences between the tested maize genotypes.

3.4.2. Number of *O. nubilalis* larvae per 100 infested plants:

The number of *O. nubilalis* larvae per 100 infested plants averaged 93.3 larvae for L.V compared with 52.0 larvae for TWC_{320} in early plantation. While it ranged between 267.6 for L.V to 97.5 larvae for TWC_{320} in late plantation. The differences

among these values were significant in both early and late plantation.

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

Concerning the number of *C. agamemnon* larvae its density was increased from 12.0 (SC_9) to 20.9 (TWC_{310}) larvae per 100 infested plants, revealing significant differences between maize genotypes in early plantation. While no-significant differences was noticed in the late plantation.

3.4.4. Number of the borers larvae per 100 plants at harvest time

The results had shown highly significant differences between genotypes of the tested maize in number of *S. cretica* larvae per 100 plants in early plantation, which ranged between 6.7 (TWC_{320}) to a maximum 19.3 (L.V). While there was no-significant differences between maize genotypes in late plantation. The same result was observed in case of *C. agamemnon* larvae per 100 plants.

Concerning the results of *O. nubilalis* larvae noticed highly significant differences between different maize genotypes with both early and late plantation were noticed these differences ranged between (25.2 to 57.4) and 72.2 to 231), respectively.

3.4.5. Number of larvae per 100 joints :

The mean number of *S. cretica, O. nubilalis* and C. *agamemnon* ranged between (0.47 to 1.40), (1.80 to 4.21) and (0.34 to 0.91) respectively, and a highly significant differences between different genotypes in early plantation was observed.

On the other hand, there was highly significant differences between number of *O. nubilalis* larvae in genotypes plants in late plantation, while the number of *S. cretica* and *C. agamemnon* larvae did not show no significant differences between the various genotypes .

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

The effect of number of *S. cretica* and *O. nubilalis* larvae per 100 joints on ear weight were negative and highly significant (r = -0.66 and -0.75). Mean while *C. agamemnon* larvae had shown significant negative effect (r = -0.45) in early plantation. On the other hand, in late plantation, there was negative and highly significant effect from *O. nubilalis* r = (-0.87) on ear weight, while *S. cretica* and *C. agamemnon* had shown moderately negative effect (- 0.45, - 0.38).

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

The results showed that TWC_{310}, TWC_{320} and the local variety were more susceptible to infestation with *Sitotroga cerealella, Sitophilus oryzae* and *Rhizopertha dominica* than the other tested genotypes, with except of TWC_{320} which was susceptible to infestation with *R. dominica*. This could be due to differences in the moisture content of the kernels of the various corn varieties.