RESULTS AND DISCUSSION

1. The Relationship between the Sowing Dates, Varieties of Maize and the Rates of Infestation by the Three Corn Borers :

1.1. Effect of Sowing Date :

1.1.1. Sowing date of 15 May :

Data in Table (3) indicate that the rate of infestation by corn borers for the 15th of May sowing date was less in 1985 than in 1986. The percentage of plants containing larvae or pupae ranged between 2.70 and 22.85 % in the first season, while, it ranged between 3.05 and 25.25 % for the second season (Tables 3 and 4) and (Figs. 1 and 2). The lowest number of corn borers was recorded for plants sown on the 15th May through out their life span, as compared with other sowing dates, Ismail et al., (1974) came up with the same results. Percentages of infested plants fluctuated through the life span of the plants, showing the following pattern; a gradual increase of infested plants up to the 42 sampling date followed by a decrease at 63 days and a flare-up at 84 days old. This pattern coincides with population dynamics of borers, or so to speak. To expalin, the May 15 plantation could possibly be attacked by both the late first and the early second generations of Sesamia cretica in June and in August the plants are liable to another attack by the second brood of Chilo agamemnon. At the same time-in August- the first brood of Osternia nubilalis has a role in the occurred infestation. These are in agreement with the results obtained by El-Sherif (1965).

Table (3) : Effect of sowing dates on the infestation percentage by the three corn borers at different growth stages.

No. of days from sowing	Sowing Dates					
	May 15	May 30	June 14	June 29	July 14	July 29
			(a) First season			
21	2.70	4.75	6.15	8.50	4.70	1.00
42	5.50	8.35	15.45	23.70	4.60	6.25
63	4.50	31.70	25.85	4.75	21.30	15.70
84	22.85	11.20	8.00	22.65	9.10	7.85
105	7.30	1.20	5.50	11.25	35.30	47.30
			(b) Second season			
21	3.05	4.80	7.00	8.90	4.85	1.00
42	6.05	9.20	17.10	25.00	5.10	7.10
63	4.70	33.95	29.10	5.10	23.10	17.00
84	25.25	12.00	8.90	24.00	9.95	8.00
105	7.95	1.40	5.90	12.00	38.00	51.85

Table (4) : Effect of sowing date of May 15 and maize varieties on the infestation percentage by the three corn borers.

Sample Date	Age of plant in days	A. Early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season				
5/6/1985	21	3.25	3.00	2.25	2.00	3.00	2.70
26/6/1985	42	8.00	5.50	4.75	4.50	4.75	5.50
17/7/1985	63	5.75	4.75	3.75	3.75	4.50	4.50
7/8/1985	84	28.25	24.00	20.00	19.25	22.75	22.85
28/8/1985	105	8.75	8.00	6.25	6.00	7.50	7.30
			(b) Second season				
5/6/1986	21	3.75	3.00	3.00	2.50	3.00	3.05
26/6/1986	42	8.75	6.25	5.00	4.50	5.75	6.05
17/7/1986	63	6.00	4.75	4.00	4.00	4.75	4.70
7/8/1986	84	31.00	26.50	22.25	21.25	25.25	25.25
28/8/1986	105	9.75	8.50	6.75	6.75	8.00	7.95

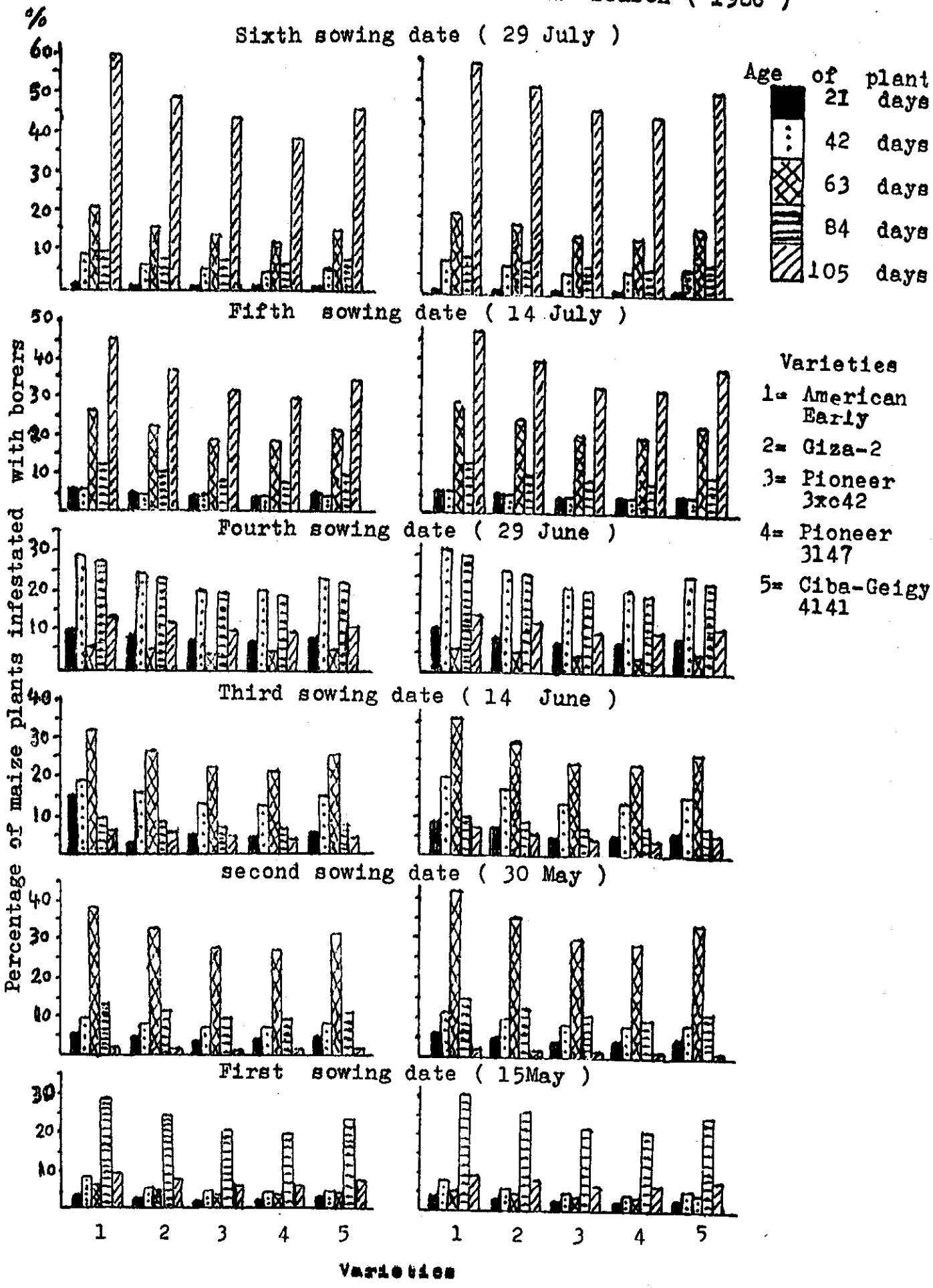
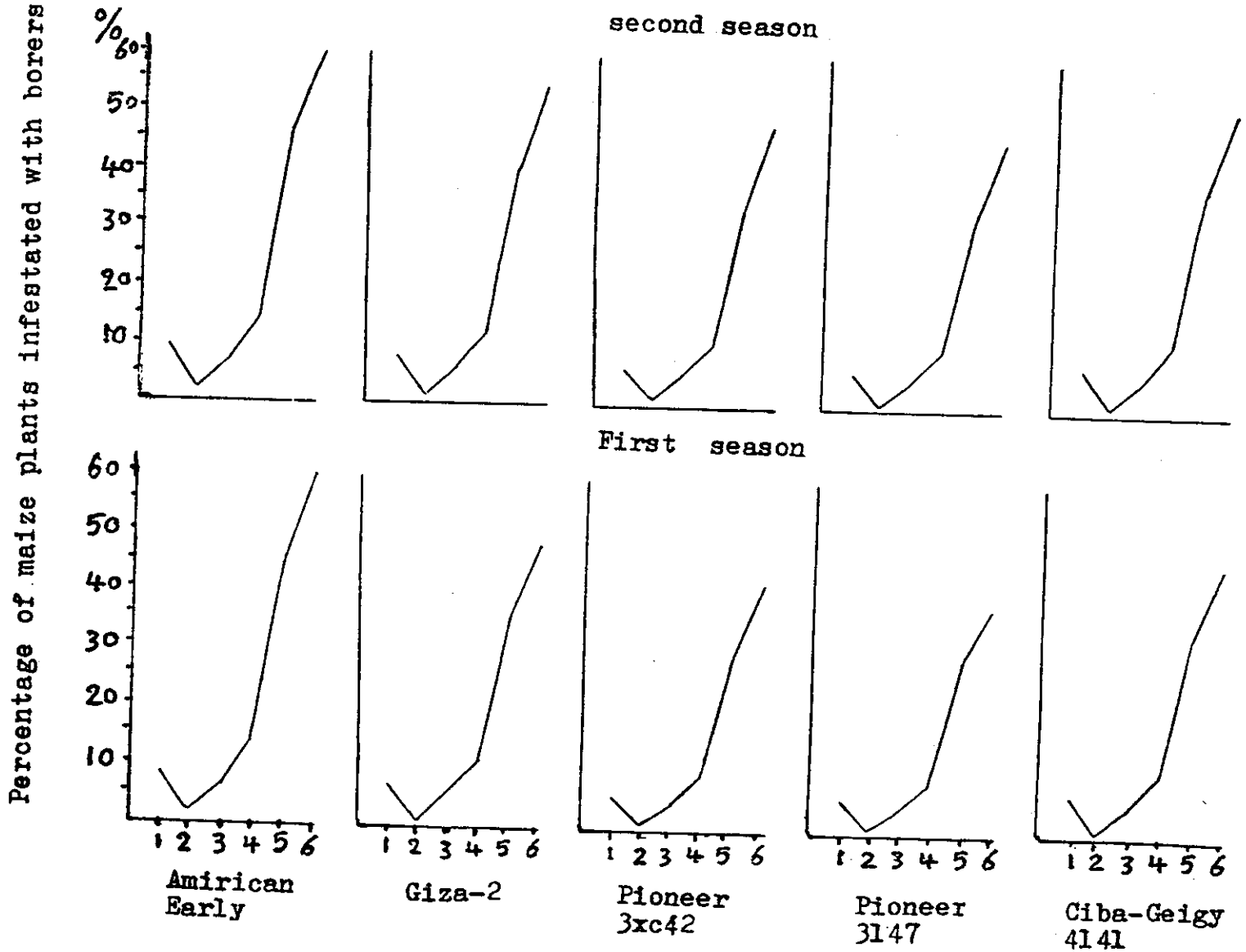


Figure (1) : Percentage of infestation by borers in different varieties up to 105 days after sowing.



Sowing dates

1 = 15 May
2 = 30 May
3 = 14 June
4 = 29 June
5 = 14 July
6 = 29 July

Figure (2) : Percentages of infestation by borers in different varieties at 105 days after sowing.

1.1.2. Sowing date of 30 May :

Infestation rate by corn borers to the 30th of May plantation show the same trend in 1985 and 1986. However the plants received more corn borers 57.20 than those grown from May 15 plantation (42.85).

Tables (3 and 5) and Figs. (1 and 2) show that during both seasons, the infestation with the three borers began to occur when the plants were about three weeks old. By the end of July, when the plants were 63 days, the plants showed the maximum infestation, and this was followed by a drop in percent infestation about mid-September when plant were 105 days-old and that is naturally because plants got older. It could be concluded that maximum percentage of infestation for maize plants sown on May 30 was occurred three weeks earlier than that for plants sown on May 15. These results mean that 15 May plantation could be attack by the second generation of S. cretica at the end of June and continue in July. In July and August the plants are, also liable to attack by both the second brood of C. agamemnon and the second brood of O. nubilalis. El-Sherif (1965) came to the same conclusion.

1.1.3. Sowing date of 14 June :

The rate of infestation for the 14th of June plantation in both seasons behaved similarly to that of the previous date of sowing. But the plants contained more number of corn borers than the previous one, Table (3) and Figs. (1 and 2). Percentages of infestation by the three borers increased until it reached a maximum when

Table (5) : Effect of sowing date of May 30 and maize varieties on the infestation percentage by the three corn borers.

Sample Date	Age of plant in days	A. Early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season				
20/6/1985	21	6.00	5.00	4.00	4.00	4.75	4.75
11/7/1985	42	10.00	8.75	7.50	7.25	8.25	8.35
1/8/1985	63	38.75	33.00	28.00	27.25	31.50	31.70
22/8/1985	84	13.75	11.75	10.00	9.25	11.25	11.20
12/9/1985	105	1.50	1.25	1.25	0.75	1.25	1.20
			(b) Second season				
20/6/1986	21	6.00	5.00	4.00	4.00	5.00	4.80
11/7/1986	42	11.25	9.50	8.25	8.00	9.00	9.20
1/8/1986	63	41.75	35.50	29.75	29.00	33.75	33.95
22/8/1986	84	14.75	12.50	10.75	10.00	12.00	12.00
12/9/1986	105	2.00	1.50	1.25	1.00	1.25	1.40

Table (6): Effect of sowing date of June 14 and maize varieties on the infestation percentage by the three corn borers.

Sample Date	Age of plant in days	A. Early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First Season				
5/7/1985	21	7.75	6.50	5.50	5.00	6.00	6.15
26/7/1985	42	19.00	16.00	13.50	13.25	15.50	15.45
16/8/1985	63	32.00	26.75	22.75	21.75	26.00	25.85
6/9/1985	84	9.50	8.50	7.00	7.00	8.00	8.00
27/9/1985	105	6.25	6.25	4.75	4.75	5.50	5.50
			(b) Second season				
5/7/1986	21	8.75	7.25	6.00	6.00	7.00	7.00
26/7/1986	42	21.00	18.00	15.00	14.50	17.00	17.10
16/8/1986	63	36.25	30.25	25.50	24.75	28.75	29.10
6/9/1986	84	10.50	9.25	8.00	7.50	9.25	8.90
27/9/1986	105	7.00	6.25	5.25	5.00	6.00	5.90

the plants were 63 days old (25.85 and 29.10 %); dropped to 8.0 and 8.9 % when the plants were 84 days old and afterward, the rate of infestation declined to 5.50 and 5.90 % when the age of plants reached 105 days in the two successive seasons, respectively (Table 6). These results could be explained in a similar way to what has been previously observed in 15 May plantations.

1.1.4. Sowing date of 29 June :

Data in Table (3) show that the infestation rate by corn borers to the 29th June plantation was less in 1985 season than in 1986. The numbers of borers in plants were more than those in plants in each of the previous three sowing dates.

Results in Table (7) and (Figs. 1 and 2) indicate clearly that in both seasons of this study the infestation by borers began to occur a few days after the plants exceeded the age of 21 days. When the plants became 42 days old maximum percentages of infestation were observed. With the development of the plants, infestation percentages decreased until it reached a minimum when the plants were 63 days old by the end of August. After three weeks, when the plants were 84 days old, the percentages of infestation tended to increase again, thus giving rise to a secondary infestation. After that, the infestation rates declined steadily until harvest. These results were true in the two successive seasons.

It is evident from the above results that the 29th June plantations were liable to be attacked by the third generation of

Table (7) : Effect of sowing date of June 29 and maize varieties on the infestation percentage by the three corn borers.

Sample Date	Age of plant in days	A. Early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season				
20/7/1985	21	10.50	9.00	7.50	7.00	8.50	8.50
10/8/1985	42	29.00	24.50	20.75	20.50	23.75	23.70
31/8/1985	63	5.75	5.00	4.25	4.00	4.75	4.75
21/9/1985	84	28.00	23.50	20.00	19.00	22.75	22.65
11/10/1986	105	14.00	12.00	9.75	9.25	11.25	11.25
			(b) Second season				
20/7/1986	21	11.00	9.00	8.00	7.50	9.00	8.90
10/8/1986	42	30.75	26.25	21.75	21.50	24.75	25.00
31/8/1986	63	6.25	5.50	4.50	4.00	5.25	5.10
21/9/1986	84	29.75	24.75	21.25	20.50	23.75	24.00
11/10/1986	105	14.50	12.50	10.50	10.25	12.25	12.00

S. cretica through the end of July and the begining of August and also the fourth generation of the same insect in September. Also it could be said that, in August; the second and the third brood of C. agamemnon can participate in the attack the plants. The third brood of O. nubilalis, which occurs in August and the fourth brood of the same pest which appears in August-September played a role for increasing the percentages of the infestation in plants of this plantations. This result is in agreement with that obtained by El-Sherif (1965).

1.1.5. Sowing date of 14 July :

The rate of infestation by corn borers in 1985 and 1986 are in line with those found in the previous sowing dates. However, the plants sown on 14th July contained more corn borers than those grown on the previous sowing dates. This trend is in agreement with that obtained by Ismail et al., (1974).

Data presented in Table (8) show that the infestation percentages of the three borers ranged between 4.30 and 35.30 % in the first season. While, it ranged between 4.85 and 38.00 % in the second season. Percentages of infestation with the three borers increased gradually until about mid-September, then it declined when the plants were 84-day old. After three weeks, however, these percentages started to re-increase. The maximum percentages of borers occurred about the end of October when the plants were 105 days old in the two successive seasons.

The above results could be explained as the plant were perfernce to the third and fourth generation of S. cretica, second and third brood of C. agamemnon and the third and the fourth brood of O. nubilalis. El-Sherif (1965) reported the same results.

1.1.6. Sowing date of 29 July :

The rate of infestation by corn borers in both seasons has the same trend as that occurring with the previous sowing dates. The plants of this sowing date received the highest number of corn borers when compared with those in each of all the previous sowing date. Ismail et al., (1974) and Metwally (1976) stated the same conclusion.

Tables (3 and 9) and Figs. (1 and 2) show that in both seasons of this study the infestation by the three borers began to occur after the plants exceeded the age of 42 days. With the development of the plants, the percentage of infestation increased until it reached a maximum when the plants were 105-day old about mid-November. Comparing the infestation rates found in the plants at the age of 105 days in the July 29 plantations with the percentages of infestation in the previous five plantations, i.e., (May 15, 30, June 14, June 29, and July 14) at the same plant age, it could be observed that July 29 sowing date contained relatively greater percentages of infestation than any of them.

The cause of thus severity of infestation is that, the plants in this sowing date could be attacked by the fourth generation of

Table (9) : Effect of sowing date of July 29 and maize varieties on the infestation percentage by the three corn borers.

Sample Date	Age of plant in days	A. Early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season				
19/8/1985	21	1.00	1.00	1.00	1.00	1.00	1.00
9/9/1985	42	8.75	6.50	5.50	4.50	6.00	6.25
30/9/1985	63	21.00	16.00	13.75	12.25	15.50	15.70
20/10/1985	84	9.50	8.00	7.25	6.75	7.75	7.85
10/11/1985	105	59.75	48.75	42.75	38.50	46.75	47.30
			(b) Second season				
19/8/1986	21	1.00	1.00	1.00	1.00	1.00	1.00
9/9/1986	42	8.75	7.50	6.25	6.00	7.00	7.10
30/9/1986	63	21.00	17.50	15.00	14.50	17.00	17.00
20/10/1986	84	9.50	8.50	7.25	6.75	8.00	8.00
10/11/1986	105	59.75	54.00	47.50	46.00	52.00	51.85

S. cretica in September, third and fourth brood of C. agamemnon in September and October and the fourth brood of O. nubilalis. El-Sherif (1965) stated the same results and added that the fifth generation of O. nubilalis may also attack the 1st of August sowing dates.

Finally, the obtained data indicate clearly that the rate of infestation with the three borers increased gradually with delaying the sowing date from May 15 up to the July 29. The highest rates of infestation by the borers occurred in the May 30 sowing date the "early summer sowing date" and wherease the same occurred in June 29 sowing date "late summer sowing date". From the (June 29) date onwards, that rate of infestation continues to increase reaching the maximum in the "Neely" plantation in July 29 in the both seasons.

The summer plantations could be classified according to the mean infestation by borers into three groups. The first group included the "June 29" plantation which harboured a higher infestation than those of the other three plantation. The second group showed evidence of a relatively moderate or mild infestation. This included both the "June 14 and May 30" plantations the means of which being different from each other. The third group included the poorly infested group that is at May 15 plantation in which the mean infestation was lower than those of the other three plantations, namely, May 30, June 14 and June 29. The two Neely sowing dates (14 July and 29 July) could fall into the first group which received the highest number of the pests.

The activity of these corn borers is influenced by the appearnce of the adults in the field, which depends on climatic conditions.

It could be concluded that in general the infestation percentages increased gradually as the sowing date was delayed. The infestation by the three corn borers together was very low for sowing dates occurring May. On the other hand, heavy infestation was recorded when maize was sown during July. Rates of infestation were 47.30 and 51.85 % for July 29 at 105-day sampling date in the first and second seasons, respectively. On the contrary, the lowest counted infestation with borers was 1.2 and 1.4 % when maize was sown on May 30 at 105 days in both seasons, respectively.

The previous results indicate that the rate of infestation with the three borers was influenced by the sowing dates. The infestation of the Neely (July 14 and July 29) sowing dates began to occur at relatively older ages of the plant (105 days from sowing) as compared with their occurence on the early "Summer" plantations, i.e., May 15 and May 30 (84 and 63 days from sowing) and late "Summer", namely, June 14 and June 29 plantations (63 and 42 days from sowing). This relatively late occurrence of infestation to Neely sowing dates could be explained in view of the fact that these plantations are subject to milder weather conditions, also the absence of some species of corn borers. Accordingly, sowing dates of July 14 and July 29 hinder the growth rate of maize plants. Henceforth, the plants require longer periods to reach the stage of growth (or height) preferred for the occurrence of the infestation.

Each corn borer favours a different age, height or growth-stage of maize plant. Sowing date influences the growth rate of maize plants and thus either accelerates or inhibits plants from reaching the stage of growth (or height) favourable to the borers.

it could be pointed out from the relationships between sowing dates of maize and the rate of infestation by the three corn borers, that sowing dates of maize during "Summer" plantation (May 15, May 30 and June 14) are likely to harbour the least infestations with borers. Therefore, these dates could be recommended for Moshtohor.

The relationship between sowing date of maize and the rate of infestation by borers was studied by many investigators. Ahmed and Kira (1960), El-Sherif (1965), Ismail et al., (1974) and Metwally (1976) reported that early-sown maize suffered from S. cretica attack in May which increased until it reached its maximum in July 20. In addition, Metwally (1976) found that low infestation with C. agamemnon was recorded for May sowing dates. The heavy infestation was found for June and July dates. Moreover, El-Sherif (1965) and Metwally (1976) reported that the lowest infestation with O. nubilalis was counted when maize was sown during May 20, while, the percentage increased rapidly when maize was sown during the beginning of June until August 20. Metwally (1976) also reported that the three corn borers together caused great damage to maize plants sown during June and July.

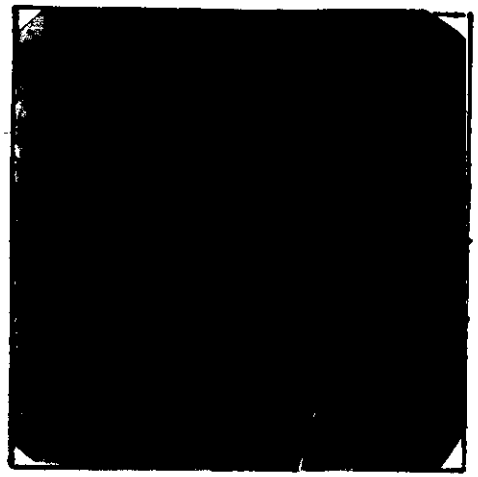
1.2. Effect of Varieties :

Stem epidermal thickness of the utilized maize varieties was measured. The thickness was determined at two intervals the first was at 21 days after sowing and the second after 42 days. Data in Table (10) and (Plates 1, 2, 3 and 4) show that the epidermis thickness was affected by both age of maize plant and season. It increased as the age of plants increased. Also, the season of sowing had a noticeable effect, it was higher in 1986 than in 1985. This may be due to the prevailling weather conditions, which may activate or inhibite the rate of growth of the plants.

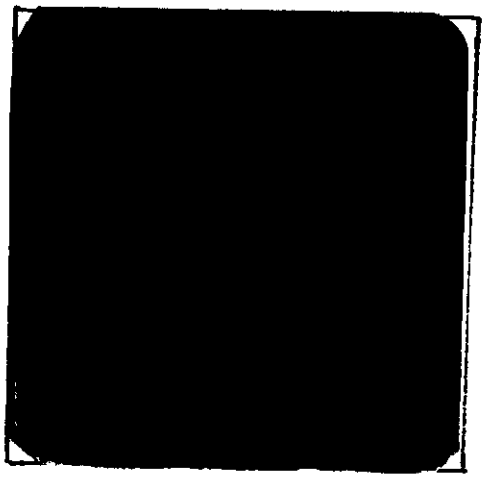
Also, it could be noticed that the varieties differed in their thickness of the epidermis, Pioneer 3147 has the thickest epidermis, whereas , the A. Early has the thinnest epidermis. The thickness of the epidermis of the varieties could be arranged in descending order as follows: A. Early, Giza 2, Ciba-Geigy 4141, Pioneer 3 x C 42 and Pioneer 3147.

Results presented in Tables (4, 5, 6, 7 and 8) show that varieties differed in the rate of infestation by borers. A. Early variety was the most susceptible of all the tested varieties to corn borers. Variety of Giza 2 came second. The two varieties, namely, Pioneer 3 x C 42 and Ciba-Geigy 4141 were less susceptible than the previous ones. Whereas, Pioneer 3147 was the most resistant of all. The rate of infestation by borers could be arranged in descending order as follows: A. Early, Giza 2, Ciba-Geigy 4141, Pioneer 3 x C 42 and Pioneer 3147. These result were true in the two successive seasons.

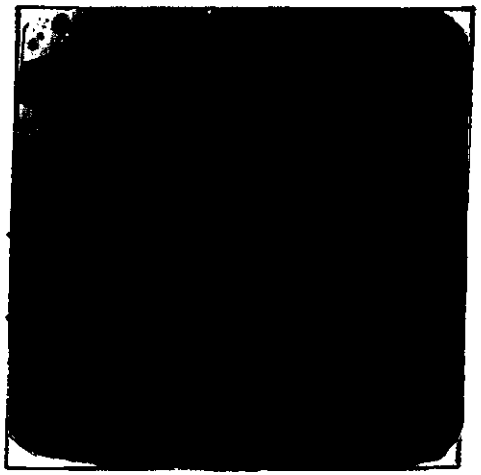
First season



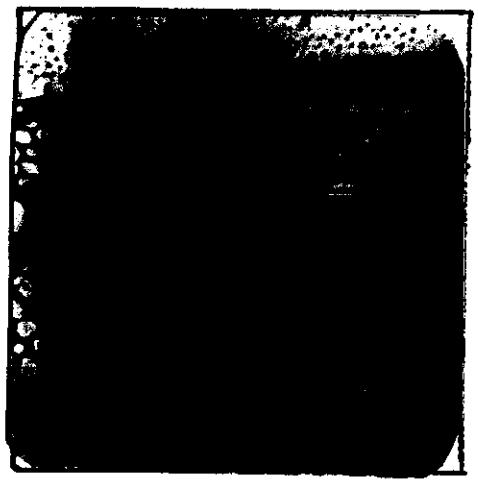
Amirican
Early



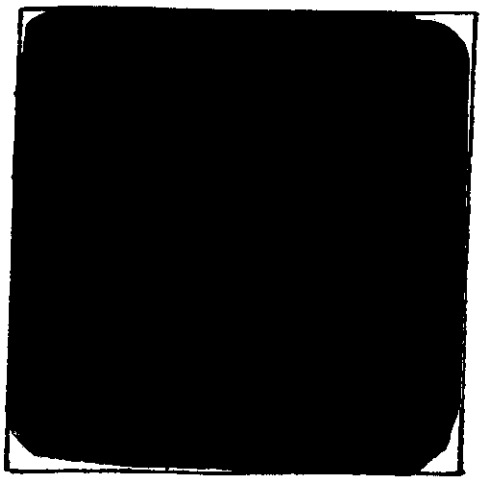
Pioneer
3xc42



Pioneer
3147



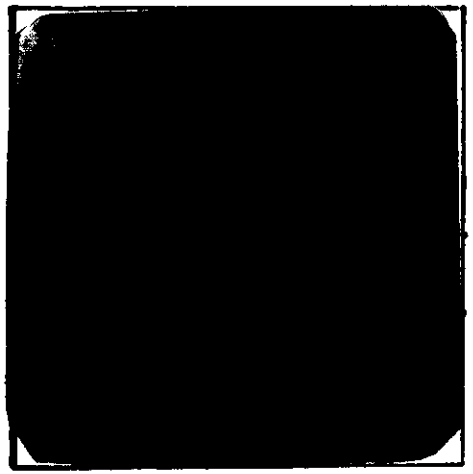
Giza-2



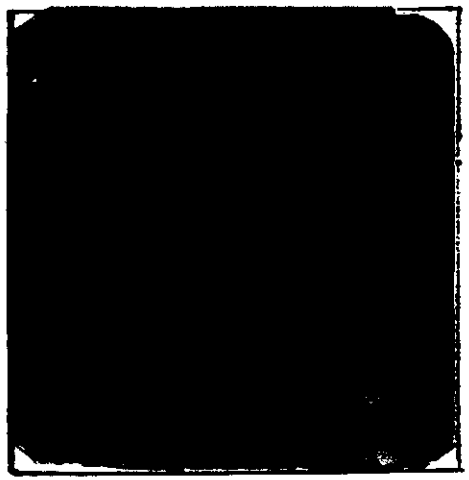
Ciba-Geigy
4141

Plate (1) : Transverse sections showing epidermis thickness in maize stem of different varieties at 21 days after sowing (x. = 6.3 x 3.2).

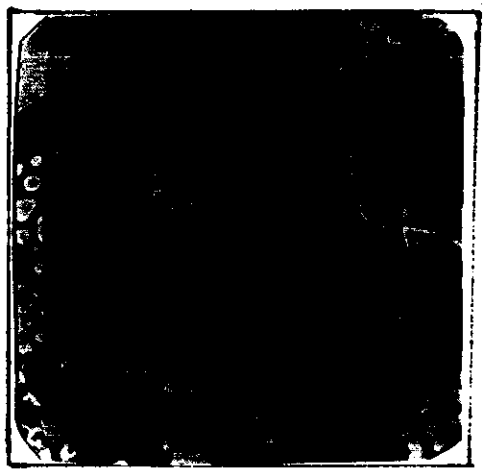
First season



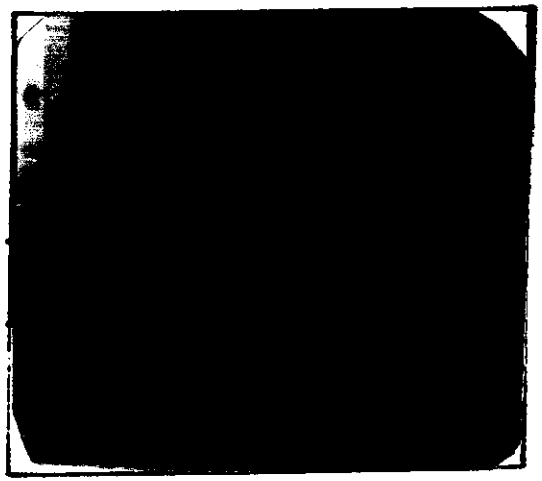
Amirican
Early



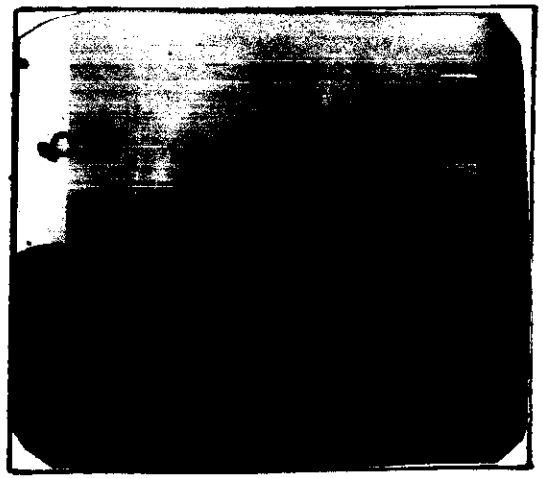
Giza-2



Pioneer
3xc42



Pioneer
3147



Ci ba-Geigy
41 41

Plate (2) : Transverse sections showing epidermis thickness in maize stem of different varieties at 42 days after sowing (x. = 6.3 x 3.2).

It is apparent therefrom that the two hybrids, i.e., Pioneer 3 x C 42 and Pioneer 3147 were the most resistant to corn borers compared with the open-pollinated variety (A. Early) and the composite variety (Giza 2).

These results are expected since the thickness of the epidermis is not the same in all varieties, as shown before. Results in Table (10) indicate clearly the correlation between the rate of infestation with borers and the thickness of the epidermis of maize stems were highly significantly and negative. Similar results were obtained by Isa (1959). On the other hand, Ismail et al., (1974) reported that there were no significant differences between the levels of infestation by corn borers among A. Early and double cross 67 in all the plantations.

2. Effect of Sowing Dates and Varieties on the Flowering Date of Maize Plants :

Data on the flowering dates of maize plants as influenced by sowing dates and varieties are shown in Tables (11 and 12).

2.1. Tasseling Date :

2.1.1. Effect of Sowing Dates :

Results in Table (11) indicate clearly that sowing dates showed significant effect on the tasseling date of maize in the two successive seasons. It is clear that maize plants reached tasseling earlier as planting date was delayed. Number of days to 50 % tasseling decreased by 11.10 and 10.60 days as planting was delayed from May 15 to July 29 in the first and second seasons, respectively.

Table (11) : Effect of sowing dates and varieties on the average number of days to 50 % tasseling.

Varieties / Sowing dates	American Early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	64.50	64.75	66.50	65.00	63.25	64.80
30/5/1985	62.25	62.25	64.50	63.00	61.50	62.70
14/6/1985	57.50	58.50	62.25	61.50	55.75	59.10
29/6/1985	56.00	56.00	60.25	58.00	55.00	57.05
14/7/1985	55.00	55.25	59.50	56.50	54.00	56.05
29/7/1985	53.25	53.75	57.50	54.25	49.75	53.70
Mean	58.08	58.42	61.75	59.71	56.54	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.507		0.702	
L.S.D. for varieties			0.658		0.923	
L.S.D. for interaction			1.435		1.908	
			(b) Second season			
15/5/1986	65.00	65.50	66.75	66.25	64.50	65.60
30/5/1986	63.00	63.25	64.75	64.25	62.75	63.60
14/6/1986	58.75	60.25	63.00	62.00	57.50	60.30
29/6/1986	57.50	58.00	61.00	59.50	56.00	58.40
14/7/1986	55.25	57.00	59.75	57.50	54.25	56.75
29/7/1986	53.75	55.75	58.00	56.00	51.50	55.00
Mean	58.88	59.96	62.21	60.92	57.75	
			at 5 %		at 1 %	
L.S.D. for Sowing dates			0.596		0.824	
L.S.D. for Varieties			0.450		0.631	
L.S.D. for interaction			1.468		1.952	

Obviously, delayed planting helped in shortening the vegetative growth period and thus to the acceleration of flowering. These results are in harmony with those obtained by Hoque and Worzella (1966), Zuber (1968), Hamada (1972), Bisher (1973) and Ba-Momen (1981).

2.1.2. Effect of Varieties :

Maize varieties differed significantly in the tasseling dates in the both seasons. It is apparent that Ciba-Geigy 4141 was the earliest in tasseling than the other varieties and Pioneer 3xC42 was the latest one. Varieties could be arranged according to tasseling date in a descending order as follows: Pioneer 3 x C 42, Pioneer 3147, Giza 2, A. Early and Ciba-Geigy 4141 in the two successive seasons (Table 11).

The effect of varieties on tasseling date of maize plants was studied by many investigators. Hussein (1958), Yousef (1968) and Abd El-Raouf (1973) who reported that tasseling dates for the open-pollinated varieties were later than those of the hybrid vaieties. While, El-Hattab et al., (1986) and Mourad et al., (1986) found that Giza 2 was the earliest variety compared to Cairo 1 and Pioneer 514.

2.1.3. Effect of the Interaction :

Data presented in Table (11) show that the effect of the interaction of variety and sowing dates was significant on tasseling date in both seasons. The highest number of days from planting to tasseling date was obtained with Pioneer 3 x C 42 when sown on

May 15th, and the lowest one was obtained with Ciba-Geigy 4141 when sown on July 29th. this was true for the two growing seasons.

2.2. Silking Date :

2.2.1. Effect of Sowing Dates :

Number of days from planting to 50 % silking was significantly affected by planting dates in the two successive seasons (Table 12). Generally, the number of days to 50 % silking decreased gradually as the planting was delayed beyond May 15 in 1985 and 1986 seasons. Number of days needed for plants to reach 50 % silking for May 15 planting date was more than that required for July 29 date. This may well attributed to ecological variation such as variation in air and soil temperatures, light duration and intensity at concomitant with various planting dates (Table 2). These climatic factors affect flowering time through their effect on photosynthesis, carbohydrates accumulation and florigen production in maize plants during the vegetative growth.

These findings found ample support in those obtained by Hoque and Worzella (1966), Hamada (1972), Bisher (1973), Ba-Momen (1981) and Aly (1983), who reported that the time required by plants to reach the silking stage decreased gradually as the planting date was delayed.

2.2.2. Effect of Varieties :

Results in Table (12) show that the response of this character to varieties was very similar to that of the previous character.

Table (12) : Effect of sowing dates and varieties on the average number of days to 50 % silking.

Varieties / Sowing dates	American Early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	69.25	70.00	72.25	71.00	68.50	70.20
30/5/1985	66.25	67.75	69.75	68.25	64.75	67.35
14/6/1985	64.25	66.75	67.25	67.00	64.00	65.85
29/6/1985	63.00	65.75	66.50	66.00	63.00	64.85
14/7/1985	62.25	64.75	66.00	65.50	61.25	63.95
29/7/1985	60.75	63.25	65.00	63.75	60.00	62.55
Mean	64.29	66.38	67.79	66.92	63.58	
			at 5 %		at 1 %	
L.S.D. for Sowing dates			0.697		0.964	
L.S.D. for Varieties			0.551		0.773	
L.S.D. for interaction			1.225		1.629	
			(b) Second season			
15/5/1986	70.00	70.75	73.50	72.25	69.25	71.15
30/5/1986	67.50	68.50	70.00	69.50	65.00	68.10
14/6/1986	65.50	67.50	68.50	68.25	64.25	66.80
29/6/1986	64.25	66.00	67.75	67.25	63.00	65.65
14/7/1986	63.50	65.00	66.50	65.75	62.25	64.60
29/7/1986	62.00	63.50	65.25	64.00	61.00	63.15
Mean	65.46	66.88	68.58	67.83	64.13	
			at 5 %		at 1 %	
L.S.D. for Sowing dates			0.688		0.951	
L.S.D. for Varieties			0.761		1.068	
L.S.D. for interaction			1.465		1.949	

Differences in the time of silking among varieties were highly significant in the two season (Table 12). By this criterion Ciba-Geigy 4141 was the earliest variety if compared with the other varieties. On the other hand, Pioneer 3 x C 42 was the later varieties in silk emergence. Also, maize varieties could be arranged in a descending order according to the number of days required for plant to 50 % silking as follows : Pioneer 3 x C 42, Pioneer 3147, Giza 2, A. Early and Ciba-Geigy 4141 in the two successive seasons. Otherwise investigators obtained similar results by Mahmoud (1967), Hamza (1969), Abd El-Raouf (1973), Gouda and Bisher (1976), Gaskel (1980) and Gaskel and Pearce (1981).

2.2.3. Effect of the Interaction :

In both seasons, number of days from planting to 50% silking was significantly affected with the interaction of planting date and variety. Maize varieties differed significantly in silking time and this was very clear with delayed planting dates. Nevertheless, this effect was decreased with earlier planting dates (Table 12). In 1985 season, Ciba-Geigy 4141 reached silking 3.75 and 5.00 days earlier than those of Pioneer 3 x C 42 at the first and later sowing date. This was also true in the second season.

3. Effect of Sowing Dates and Varieties on the Growth Characters of Maize Plants :

Data on growth characters of maize plants as influenced by sowing dates and varieties are shown in Tables (13, 14, 15, 16, 17, 18 and 19).

3.1. Plant Height :

3.1.1. Effect of Sowing Dates :

Planting dates showed a significant effect on height of maize plants in the two seasons (Table 13). Plant height decreased remarkably and consistently when the time of planting was delayed. Earlier planting of May 15 gave taller plants than the later plantings in the two successive seasons. The superior plant height in early planting might be atttributed to longer growth period, favourable climatic conditions during the growth period of maize plants or the photoperiod (Table 2). Late planting for example shortenes the period of vegetative growth and hastens the ripening period and that in turn hinders plant growth and causes the plants to be shorter. These results are in harmony with those obtained by Abou-Khadrah (1968), Hamada (1972), Bisher (1973), Ba-Momen (1981) and Aly (1983).

3.1.2. Effect of Varieties :

Data presented in Table (13) indicate that maize varieties showed highly significant differences in plant height in the two successive seasons. It is clear that A. Early significantly surpassed the other varieties except Giza 2 in the first season only. While, Pioneer 3147 was the shortest one in the two successive seasons. The difference observed in plant height among varieties could be in part to difference in the genetical make-up. Similar results were obtained by Mahmoud (1967), Moursi et al., (1970), El-Hattab et al., (1979), Kamel et al., (1979), Faisal (1983) and El-Hattab et al., (1986), who found to illustrate open-pollinated varieties surpassed the hybrids significantly in plant

Table (13) : Effect of sowing dates and varieties on the average plant height (cm).

Varieties / Sowing dates	American Early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	313.13	307.00	279.98	265.03	293.28	291.68
30/5/1985	299.88	293.38	275.05	257.53	279.65	281.10
14/6/1985	281.95	279.20	256.60	248.23	273.70	267.94
29/6/1985	261.43	256.23	228.05	224.70	247.23	243.53
14/7/1985	236.03	233.48	210.38	204.30	218.40	220.52
29/7/1985	213.23	213.18	198.28	192.60	199.63	203.38
Mean	267.60	263.74	241.39	232.06	251.98	
			at 5 %		at 1 %	
L.S.D. for Sowing dates			4.660		6.444	
L.S.D. for Varieties			4.690		6.576	
L.S.D. for interaction			9.977		13.270	
			(b) Second season			
15/5/1986	303.10	281.25	253.65	248.03	272.48	271.70
30/5/1986	286.20	271.90	242.60	238.43	263.10	260.45
14/6/1986	272.85	263.28	234.05	232.10	252.33	250.92
29/6/1986	258.55	236.93	222.65	221.78	234.38	234.86
14/7/1986	246.35	211.05	181.95	181.18	201.95	204.50
29/7/1986	214.33	193.98	166.43	158.40	169.28	180.48
Mean	263.56	243.06	216.89	213.32	232.25	
			at 5 %		at 1 %	
L.S.D. for Sowing dates			4.873		6.739	
L.S.D. for Varieties			4.804		6.735	
L.S.D. for interaction			10.081		13.408	

height. On the other hand, Hussein et al., (1980 and 1981) and Gouda (1982) reported that varietal crosses were taller than double crosses and the open-pollinated varieties.

3.1.3. Effect of the Interaction :

The effect of the interaction between sowing dates and maize varieties on plant height of maize plants was significant in the two successive seasons (Table 13). The effect of varieties on plant height was influenced by the planting dates. The highest values of plant height was obtained from sowing A. Early on May 15th, whereas, the lowest values were obtained for Pioneer 3147 sown on July 29th in the two successive seasons.

3.2. Ear Position :

3.2.1. Effect of Sowing Dates :

Results in Table (14) indicate that sowing dates had a significant effect on ear position in both seasons. Generally, ear tended to be set lower on the stalk as planting date was delayed. A lower ear position was obtained from the late plantings of July 29 in the two successive seasons. These findinges are in harmony with those of Yousef (1968), Ba-Momen (1981) and Aly (1983). However, Zuber (1968) reported contradictorly results, showing an increase in ear height with delayed sowings.

3.2.2. Effect of Varieties :

The response of ear position to maize varieties took a very similar trend to that of plant height. Varieties exerted a

Table (14) : Effect of sowing dates and varieties on the average ear position (cm).

Varieties / Sowing dates	American Early	Giza 2	Pioneer 3xC42	ioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	163.30	154.70	144.73	124.20	145.53	146.49
30/5/1985	150.25	142.50	134.13	120.95	135.05	136.58
14/6/1985	141.93	135.85	127.20	113.58	127.78	129.27
29/6/1985	133.60	127.58	114.95	103.18	118.70	119.60
14/7/1985	117.98	116.28	097.93	091.15	101.15	104.90
29/7/1985	100.75	099.30	083.35	082.08	088.88	090.87
Mean	134.63	129.37	117.05	105.85	119.51	
			at 5 %		at 1 %	
L.S.D. for sowing dates			4.512		6.240	
L.S.D. for varieties			2.820		3.954	
L.S.D. for interaction			6.893		9.168	
			(b) Second season			
15/5/1986	155.50	130.73	111.68	102.15	122.18	124.45
30/5/1986	131.95	122.05	107.28	097.48	115.90	114.93
14/6/1986	121.43	115.28	099.08	095.00	109.30	108.02
29/6/1986	118.53	103.90	094.43	086.73	102.05	101.13
14/7/1986	113.40	088.40	074.43	071.48	087.05	086.95
29/7/1986	098.45	079.75	063.98	063.78	067.68	074.73
Mean	123.21	106.68	091.81	086.10	100.69	
			at 5 %		at 1 %	
L.S.D. for sowing dates			2.088		2.888	
L.S.D. for varieties			3.268		4.581	
L.S.D. for interaction			5.115		6.803	

marked effect on the ear position in the two successive seasons (Table 14). It is clar that A. Early significantly surpassed the other varieties and was followed by Giza 2. The superiority of the open-pollinated vareties over hybrids in ear position was reported by Ewies (1980), Ba-Momen(1981), Salwau (1985) and El-Hattab et al., (1986). Whereas, Raghip (1979) reported that maize varieties, i.e., Shadwan, varietal cross 80 and D.C. 355 showed no significant differences in ear position.

3.2.3. Effect of the Interaction :

The effect of the interaction between sowing dates and varieties of maize plants on ear position was significant in the two growing seasons (Table 14). The effect of varieties on the ear position was pronounced at the first date of planting (May 15th). Nevertheless, as the planting date was delayed, the effect of maize varieties had been dinimished.

3.3. Stem Diameter :

3.3.1. Effect of Sowing Dates :

Data presented in Table (15) show that sowing dates had a significant effect on stem diameter in 1985 and 1986 seasons. Stem diameter of maize plants decreased significantly with delaying sowing date in the two seasons. The last planting date at July 29, produced significantly thinner stalks than the other sowing dates.

These results might be attributed to the reduction in the vegetative phase of growth at late sowing dates. Similar results

Table (15) : Effect of sowing dates and varieties on the average stem diameter (mm).

Varieties / Sowing dates	Ameircan Early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	18.58	18.75	20.13	20.33	19.10	19.38
30/5/1985	17.65	18.00	19.13	19.65	18.18	18.52
14/6/1985	17.00	17.13	18.78	19.35	17.75	18.00
29/6/1985	16.63	16.70	18.43	19.23	17.43	17.68
14/7/1985	16.33	16.43	17.58	18.73	16.90	17.19
29/7/1985	15.58	15.78	16.75	17.58	16.13	16.36
Mean	16.96	17.13	18.46	19.14	17.58	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.238		0.329	
L.S.D. for varieties			0.203		0.284	
L.S.D. for interaction			0.460		0.612	
			(b) Second season			
15/5/1986	16.76	16.89	18.20	19.16	17.93	17.79
30/5/1986	16.20	16.39	17.38	18.19	17.30	17.09
14/6/1986	15.80	15.93	16.80	17.45	16.55	16.50
29/6/1986	14.88	15.24	16.18	16.76	15.98	15.81
14/7/1986	14.15	14.28	15.38	15.55	14.70	14.81
29/7/1986	13.60	13.75	14.23	14.26	13.77	13.92
Mean	15.23	15.41	16.36	16.89	16.04	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.249		0.345	
L.S.D. for varieties			0.186		0.260	
L.S.D. for interaction			0.528		0.703	

were obtained by Mahmoud (1967), Osafo and Milbourn (1975), Ba-Momen (1981) and Aly (1983).

3.3.2. Effect of Varieties :

Differences between varieties in stem diameter was significantly confirmed in the two successive seasons (Table 15). A. Early produced thinner stalks than the other varieties. While, Pioneer 3147 plants were of significantly thicker diameter than those of other varieties. These results were true in both seasons and agree with those previously obtained by Aly (1981), Ba-Momen (1981), Gouda (1982), Salwau (1985) and El-Hattab et al., (1986). On the other hand, Salem et al., (1983) found that A. Early and Shadwan varieties surpassed hybrids significantly in stem diameter.

3.3.3. Effect of the Interaction :

The effect of the interaction between sowing dates and varieties on stem diameter was significant in the two successive seasons (Table 15). The highest values for the stem diameter resulted from Pioneer 3147 sown on May 15th, while the lowest one was obtained from A. Early planting on July 29th.

3.4. Leaf Area :

3.4.1. Effect of Sowing Dates :

Results in Table (16) indicate clearly that sowing dates showed significant effect on leaf area of the topmost ear in the two successive seasons. The first sowing date May 15th gave the

Table (16) : Effect of sowing dates and varieties on the average leaf area (cm^2).

Varieties / Sowing dates	American Early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	769.20	783.48	786.38	697.35	726.38	752.56
30/5/1985	695.55	696.73	704.28	658.70	668.13	684.68
14/6/1985	602.23	609.80	657.20	578.88	593.20	608.26
29/6/1985	560.58	566.50	636.40	516.33	536.55	563.27
14/7/1985	522.20	525.88	541.20	496.83	501.38	517.50
29/7/1985	461.73	463.43	476.85	437.10	448.30	457.48
Mean	601.91	607.63	633.72	564.20	578.99	
			at 5 %		at 1 %	
L.S.D. for sowing dates			9.814		13.572	
L.S.D. for varieties			10.126		14.196	
L.S.D. for interaction			19.667		26.157	
			(b) Second season			
15/5/1986	601.16	649.28	652.38	560.99	581.17	608.99
30/5/1986	516.24	539.10	596.26	507.13	514.58	534.66
14/6/1986	468.29	478.99	499.95	454.45	460.48	472.43
29/6/1986	438.86	446.75	461.85	400.33	424.48	434.45
14/7/1986	409.17	414.76	423.74	381.25	392.33	404.25
29/7/1986	379.48	382.77	385.63	362.17	372.22	376.45
Mean	468.86	485.27	503.30	444.39	457.54	
			at 5 %		at 1 %	
L.S.D. for sowing dates			18.982		26.251	
L.S.D. for varieties			7.971		11.175	
L.S.D. for interaction			18.033		23.984	

highest values of leaf area (752.56 and 608.99 cm^2 in the first and second seasons, respectively). On the other hand, the latest sowing date of July 29th produced lower values of LA (457.48 and 376.45 cm^2) in 1985 and 1986 seasons, respectively when compared with other sowing dates. The increase in means of LA of early planting may be due to more favourable temperature and day length than in late ones (Table 2), and consequently better growth, as indicated by taller and sturdier plants with more leaves. Results were in agreement with those of Hamada (1972), Bisher (1973), Ba-Momen (1981) and Aly (1983). In addition, Diakemu (1962), El-Shafey (1965) and Mahmoud (1967) reported that maize late - sown had both shorter and narrower leaves.

3.4.2. Effect of Varieties :

It is evident from Table (16) that maize varieties differed significantly in LA in the two successive seasons. Pioneer 3147 produced the lowest values. The superiority of Pioneer 3 x C 42 may be due to higher efficiency of leaves in metabolism than Pioneer 3147.

The effect of maize varieties was studied by many investigators. Yakout (1977) and El-Hattab et al., (1986), found that hybrids surpassed Nab El-Gamal and A. Early in LA. While, Raghip (1979), Hussein et al., (1980) and Gouda (1982) reported that varietal crosses were the highest in LA followed by the open-pollinated varieties and double crosses. Moreover, Mourad et al., (1986) found that S.C.9 produced the largest LA followed by D.C. 202, Cairo 1 and Giza 2. On the contrary, El-Nomany (1978) found that the A. Early surpassed

significantly D.C. 19, the synthetic variety 105 and the White Sabeini in LA. Moreover, Salem, et al., (1983) found that local varieties, i.e., A. Early and Shadwan surpassed the hybrids significantly in LA.

3.4.3. Effect of the Interaction :

Leaf area of topmost ear was significantly affected by the interaction (Table 16). The effect of varieties on LA was very clear with earlier sowing dates and the reverse was true with delayed sowing dates. This result was true in the two successive seasons.

3.5. Percentage of Lodged Plants :

3.5.1. Effect of Sowing Dates :

Results in Table (17) show that sowing dates influenced the percentage of lodged plants in the two successive seasons. Obviously the percentage of lodged plants tended to increase progressively and significantly by delaying planting date, and this is clear on individual varietal basis and overall means. Because early planting encourages better growth in general, it is logical to expect that plants of early plantings develop better root system that can withstand wind, and other mechanical hazards that cause lodging. Similar results were obtained by El-Shafey (1965), Mahmoud (1967) and Zuber (1968).

3.5.2. Effect of Varieties :

In both seasons, the percentage of lodged plants was significantly variable with varieties (Table 17). A. Early show the

Table (17) : Effect of sowing dates and varieties on the average percentage of Lodged Plants.

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	4.54	1.58	0.20	0.19	1.18	1.54
30/5/1985	7.15	2.57	0.39	0.19	1.58	2.38
14/6/1985	10.70	4.08	0.79	0.19	2.36	3.62
29/6/1985	14.30	4.60	0.79	0.79	2.97	4.69
14/7/1985	16.85	7.00	2.43	1.00	5.73	6.60
29/7/1985	18.80	13.13	3.40	1.25	9.12	9.14
Mean	12.05	5.49	1.33	0.60	3.82	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.677		0.936	
L.S.D. for varieties			0.988		1.386	
L.S.D. for interaction			2.096		2.788	
			(b) Secons season			
15/5/1986	4.76	2.21	0.42	0.21	1.74	1.87
30/5/1986	7.72	3.13	0.67	0.40	2.23	2.83
14/6/1986	11.32	4.20	1.15	0.68	3.07	4.08
29/6/1986	14.79	6.36	1.20	0.96	3.56	5.37
14/7/1986	16.90	7.96	3.02	1.20	6.97	7.21
29/7/1986	19.32	14.01	4.03	1.35	9.91	9.73
Mean	12.46	6.31	1.75	0.80	4.58	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.688		0.951	
L.S.D. for varieties			0.747		1.047	
L.S.D. for interaction			2.251		2.993	

highest percentage of lodged plants in comparison with its counterparts; while Pioneer 3147 and Pioneer 3 x C 42 showed the lowest percentages with no substantial differences between them. Differences in percentage of lodged plants among varieties are in part due to the way these varieties are formulated. For example, most hybrids are more resistant to lodging than open-pollinated varieties, because in the development of inbred lines; a major process in the breeding of hybrids, resistance to lodging is always an important basis for selection in as much as differences in lodging are easily observed. Dzah (1974) came up with the same conclusion. Who found that open-pollinated varieties gave the highest percentages of lodging than hybrids.

3.5.3. Effect of the Interaction :

Results in Table (17) show that the interaction of sowing date and varieties has significant effect on percent lodged plants in both seasons. However, the difference in response of varieties was in the degree but not in the direction. For example, the two hybrids of Pioneer are less affected by this interaction than the open-pollinated variety of A. Early.

3.6. Percentage of Broken Plants :

3.6.1. Effect of Sowing Dates :

Differences among sowing dates in the percentage of broken plants were highly significant in both seasons (Table 18) Also, these showed percentages tended to increase as planting date was delayed, for instance, planting on July 29th gave the highest percentage of broken stalks in the two successive seasons. These

Table (18) : Effect of sowing dates and varieties on the average percentage of broken plants.

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	4.74	1.77	0.39	0.20	1.37	1.69
30/ 5/1985	4.90	2.37	0.59	0.39	1.78	2.01
14/6/1985	8.61	5.31	0.98	0.59	2.77	3.65
29/6/1985	10.57	6.49	1.78	1.57	4.56	4.99
14/7/1985	16.59	9.03	2.43	1.99	6.11	7.23
29/7/1985	21.95	12.21	4.98	3.56	8.71	10.28
Mean	11.23	6.20	1.86	1.38	4.21	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.635		0.879	
L.S.D. for varieties			0.551		0.772	
L.S.D. for interaction			2.139		2.845	
			(b) Second season			
15/5/1986	5.47	2.01	0.60	0.41	1.74	2.05
30/5/1986	5.86	2.45	0.89	0.68	2.01	2.38
14/6/1986	10.29	6.05	1.43	0.89	2.97	4.32
29/6/1986	12.31	7.67	2.23	1.90	5.28	5.88
14/7/1986	19.15	10.60	3.25	2.02	7.07	8.42
29/7/1986	22.21	14.31	5.52	3.86	8.96	10.97
Mean	12.55	7.18	2.32	1.62	4.67	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.731		1.011	
L.S.D. for varieties			0.914		1.281	
L.S.D. for interaction			2.016		2.681	

results indicate that delayed planting could result in brittle stalks with decreased stem diameter and other mechanical defects that will not enable corn plants to stand up against the buffeting of wind and other vagaries of the environment. These results are in agreement with those obtained by El-Shafey (1965), Mahmoud (1967) and Zuber (1968). They reported that late plantings were associated with higher percentages of broken plants.

3.6.2. Effect of Varieties :

Data in Table (18) indicate that the percentage of broken plants was influenced by varietal characteristics. The differences among varieties were constant over the two experimental seasons and varieties could be arranged in ascending order with respect to percentage of broken stalks as follows: Pioneer, 3147, Pioneer 3 x C 42, Ciba-Geigy 4141, Giza 2 and A. Early. Again, hybrids in general and Pioneer 3147 mainfest the lowest percentage of broken plants in comparison with the open-pollinated variety of A. Early that showed the highest values of broken stalks percentage. The synthetic variety Giza 2 is intermediate. Again, the reason why hybrids show the lowest percentages of broken stalks, in rating inbreds and hybrids for lodging resistances they are commonly scored for stalk breakge and selection is done accordingly. Dzah (1974) found that percentage of broken plants differed significantly among open-pollinated varieties and hybrids, the latter showed lower values than then open-pollinated counterparts.

3.6.3. Effect of the Interaction :

The effect of the interaction between planting dates and varieties was significant in the both seasons (Table 18). The effect of varieties on the percentage of broken stalks was very clear where sowing dates was delayed and this the same with all dates whithin varieties indicating that the effect of interaction was toward increasing the percentage of broken stalks, however, in different amounts depending on the variety.

3.7. Percentage of Barren Plants :

3.7.1. Effect of Sowing Dates :

Data in Table (19) reveal that the effect of sowing dates on the percentages of barren plants was significant in the two seasons. Early planting dates resulted in a lower percentage of barren plants than late ones. The high percentage of barreness associated with late plantings may be attributed firstly to; stalk and root diseases, and secondly to infestation with borers that usually flare up with elevated temperature and higher relative humidity during the period of vegetative growth in late plantings (Tables 2 and 9). Import to insects and diseases high temperature and relative humidity have their direct effect on vialbility of pollen grains and silks. Therefore impair the fertility of maize plants. Similar results were obtained by Bisher (1967), El-Mankabaty (1967), Ba-Momen (1981) and Aly (1983).

3.7.2. Effect of Varieties :

With reference to Table (19) data show that percentage

of barren stalks differed significantly among genotypes. A. Early exhibited the greatest percentage of barren stalks than hybrid and synthetic varieties. The hybrid Pioneer 3 x C 42 gave the lowest percentage of barren stalks and Pioneer 3147 ranked second and Ciba-Geigy 4141 ranked thired in this respect. In hybrids breeding, a major criteria used for selection is the criterion of prolificaey, and thereupon poor yielding plants are discarded. This may explain the loss value of barreness withened with hybrids. These results are in general agreement with those obtained by Moursi et al., (1970), Ba-Momen (1981) and Salem et al., (1983). They reported that open-pollinated varieties, namely, A. Early exhibited greater percentage of barren stalks than hybrids.

3.7.3. Effect of the Interaction :

Percentage of barren stalks was significantly affected with the interaction between sowing dates and varieties in the two successive seasons (Table 19). Data suggest that all varieties responded unfavourably to late planting, however, the magnitude of response differed from one genotype to another. To explain, hybrids were less affected than both A. Early and the synthetic variety of Giza 2 by the delay sowing dates.

4. Effect of Sowing Dates and Varieties on Yield Components of Maize Plants :

Data on yield components of maize plants as influenced by sowing dates and varieties are shown in Tables (20, 21, 22, 23, 24, 25, 26, 27, 28, 29 and 30).

4.1. Number of Ears per Plant :

4.1.1. Effect of Sowing Dates :

Data presented in Table (20) show that differences in number of ears/plant were significant in both seasons. It is apparent that the number of ears/plant decreased significantly with delayed sowing dates. The increment in the number of ears for early planting may be attributed to better conditions. While, late planting usually rush the plant to prematurely end its life cycle. Similar results were obtained by Kassem (1964), Mahmoud (1967), Abou-Khadrah (1968), Yousef (1968), Ba-Momen (1981) and Aly (1983). Moreover, Singh and Singh (1971) and Ibrahim (1977) found that planting maize in June resulted in an increase in the number of double-eared plants.

4.1.2. Effect of Varieties :

With regared to varieties, the results in Table (20) indicate clearly the presence of a significant varietal effect on the number of ears/plant in 1985 and 1986 seasons. Hybrids in general gave more ear/plant than composite and open-pollinated varieties. Pioneer 3 x C 42 produced the highest number of ears/plant, whereas, A. Early gave the lowest number of ears/plant and thus was true for both seasons. This might have been due to that hybrids are bred for prolificay, i.e., two ears/plant, addition to intense selection against barren stalks. These results agree with those obtained by Hussein et al., (1980), Ba-Momen (1981), Hussein et al., (1981), Kamel et al., (1983), Salem et al., (1983), El-Agamy et al., (1986) and Mourad et al., (1986). However, Salwau (1985) and El-Rassas et al., (1988)

Table (20) : Effect of sowing dates and varieties on the average number of ears per plant.

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC 42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	1.012	1.044	1.187	1.089	1.074	1.081
30/5/1985	0.959	1.008	1.144	1.062	1.043	1.043
14/6/1985	0.846	0.951	1.079	1.012	0.976	0.973
29/6/1985	0.778	0.893	1.012	0.945	0.921	0.910
14/7/1985	0.693	0.831	0.925	0.895	0.852	0.839
29/7/1985	0.622	0.800	0.883	0.852	0.808	0.793
Mean	0.818	0.921	1.038	0.976	0.946	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.008		0.011	
L.S.D. for varieties			0.013		0.018	
L.S.D. for interaction			0.019		0.026	
			(b) Second season			
15/5/1986	0.996	1.035	1.173	1.067	1.059	1.066
30/5/1986	0.927	0.985	1.133	1.037	1.015	1.019
14/6/1986	0.792	0.923	1.071	0.987	0.947	0.944
29/6/1986	0.718	0.862	0.976	0.912	0.884	0.870
14/7/1986	0.660	0.802	0.895	0.863	0.814	0.807
29/7/1986	0.613	0.751	0.846	0.822	0.759	0.758
Mean	0.784	0.893	1.016	0.948	0.913	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.015		0.020	
L.S.D. for varieties			0.014		0.019	
L.S.D. for interaction			0.022		0.030	

reported the contrary that number of ears/plant was not significantly affected by the varieties.

4.1.3. Effect of the Interaction :

The effect of the interaction of variety and sowing dates was significant on the number of ears/plant in both seasons (Table 20). All varieties follow the same pattern, that is, as planting date was delayed a progressive reduction in number of ears/plant could be observed. However, the reduction did not occure among varieties with the same intensity. Hybrids show better tolerance to late planting than their counterparts.

4.2. Ear Length :

4.2.1. Effect of Sowing Dates :

Differences in ear length due to sowing dates were significant in the two seasons. May 15th planting surpassed other sowing dates significantly in ear length in both seasons. Such effect might in general be due to better growth of corn plants that normally early plantings accompany and this better growth manifests itself in taller and thicker plant with higher number of large green leaves. Similar results were obtained by Ibrahim (1977), Bedeer (1979), Ba-Momen (1981) and Aly (1983).

4.2.2. Effect of Varieties :

Results in Table (21) show that differences among varieties in ear length were significantly confirmed in both seasons. Pioneer 3147 surpassed the other varieties in this respect, and A. Early produced

Table (21) : Effect of sowing dates and varieties on the average ear length (cm).

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	19.00	20.25	19.48	20.98	20.08	19.96
30/5/1985	17.60	18.70	17.88	19.48	18.03	18.34
14/6/1985	17.20	18.30	17.43	18.35	17.45	17.75
29/6/1985	16.40	17.40	16.50	17.68	17.05	17.01
14/7/1985	15.55	16.55	15.73	17.15	16.23	16.24
29/7/1985	14.50	15.33	14.53	16.83	15.30	15.30
Mean	16.71	17.75	16.92	18.41	17.35	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.207		0.287	
L.S.D. for varieties			0.243		0.340	
L.S.D. for interaction			0.710		0.944	
			(b) Second season			
15/5/1986	17.05	18.24	17.64	19.30	17.83	18.01
30/5/1986	16.29	17.11	16.28	18.25	16.41	16.87
14/6/1986	15.29	15.77	15.43	17.41	15.68	15.91
29/6/1986	14.66	15.13	14.73	16.68	14.75	15.19
14/7/1986	13.44	14.55	13.79	15.63	13.90	14.26
29/7/1986	12.08	13.35	12.40	13.58	12.60	12.80
Mean	14.80	15.69	15.04	16.81	15.19	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.288		0.399	
L.S.D. for varieties			0.198		0.278	
L.S.D. for interaction			0.416		0.554	

the lowest values in the two seasons. Varietal differences in the ear length was studied by many investigators. Otherwise results were reported by Yakout (1977), Raghip (1979) and Hussein et al., (1980).

4.2.3. Effect of the Interaction :

In both seasons, ear length was significantly affected with the interaction. Varieties showed tangible reductions in ear length and this was very clear with delayed planting. However, the magnitude of reductions within dates vary with the genotype. For example, Pioneer 3147 showed the highest amount of reduction in ear length, between the first and the last dates of planting, than other varieties (Table 21).

4.3. Ear Diameter :

4.3.1. Effect of Sowing Dates :

In both seasons, sowing date showed a significant effect on the diameter of ear. Early sowing dates produced ears with higher diameter than the late plantings. Similar results were obtained by Ibrahim (1977), Bedeer (1979), Ba-Momen (1981) and Aly (1983). They reported that ear diameter tended to decrease remarkably and consistently by delaying the time of planting.

4.3.2. Effect of Varieties :

Results in Table (22) show that there were significant differences in ear diameter among varieties. A. Early produced thinner, whereas, ears of Pioneer 3 x C 42 were significantly thicker than

Table (22) : Effect of sowing dates and varieties on the average ear diameter (mm).

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	48.45	49.45	54.15	51.48	52.13	51.13
30/5/1985	46.98	48.38	53.05	50.30	51.20	49.98
14/6/1985	45.48	47.00	51.63	49.18	50.10	48.68
29/6/1985	44.90	46.15	50.40	47.28	48.53	47.45
14/7/1985	43.70	44.69	47.50	45.10	45.55	45.31
29/7/1985	41.98	42.95	45.40	43.76	43.81	43.58
Mean	45.25	46.44	50.35	47.85	48.55	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.678		0.937	
L.S.D. for varieties			0.320		0.449	
L.S.D. for interaction			0.687		0.913	
			(b) Second season			
15/5/1986	47.23	48.35	51.15	49.43	50.36	49.30
30/5/1986	46.51	46.98	49.65	46.98	48.43	47.71
14/6/1986	45.78	46.18	48.68	46.40	47.63	46.93
29/6/1986	44.77	45.55	48.28	45.80	46.68	46.21
14/7/1986	33.63	34.03	37.20	34.95	35.68	35.10
29/7/1986	31.78	32.50	35.68	33.40	35.08	33.69
Mean	41.61	42.26	45.10	42.83	43.97	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.657		0.909	
L.S.D. for varieties			0.314		0.441	
L.S.D. for interaction			0.584		0.777	

those of the other varieties over the two seasons of this study. Similar results were obtained by Salem et al., (1983), who reported that hybrids surpassed significantly open-pollinated varieties, i.e., A. Early and Shadwan in ear diameter. On the contrary, Abd El-Raouf (1973) and El-Hattab et al., (1979) found that A. Early was greater in ear diameter than hybrids. Whereas, Yakout (1977), Raghip (1979) and Hussein et al. , (1980) reported insignificant differences in ear diameter between open-pollinated varieties and hybrids.

4.3.3. Effect of the Interaction :

The effect of the interaction between sowing dates and maize varieties on ear diameter was significant in both seasons (Table 22). The effect of varieties on ear diameter was affected by the sowing dates. The highest values of ear diameter were obtained from planting Pioneer 3 x C 42 on May 15th, while, the lowest values were obtained for A. Early sown on July 29th in the two successive seasons.

4.4. Number of Rows per Ear :

4.4.1. Effect of Sowing Dates :

Data presented in Table (23) indicate clearly that sowing dates had significant effect on the number of rows/ear in the two successive seasons. Generally, the number of rows/ear tended to get lower as planting date was delayed. The lowest number of rows/ear was obtained from the last planting date of July 29th in both seasons. These findings are in harmony with those of Ba-Momen (1981), who found that May plantings had greater number of rows/ear as compared

Table (23) : Effect of sowing dates and varieties on the average number of rows per ear.

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	15.23	15.90	17.73	17.80	16.83	16.70
30/5/1985	14.40	15.25	16.70	17.20	16.38	15.99
14/6/1985	14.23	14.83	16.25	16.83	16.18	15.66
29/6/1985	13.98	14.43	15.73	16.20	15.70	15.21
14/7/1985	13.78	14.20	15.43	15.73	15.30	14.89
29/7/1985	13.38	13.60	15.03	15.15	14.20	14.27
Mean	14.16	14.70	16.14	16.48	15.76	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.181		0.250	
L.S.D. for varieties			0.158		0.222	
L.S.D. for interaction			0.354		0.471	
			(b) Second season			
15/5/1986	14.08	15.13	16.09	16.88	15.92	15.62
30/5/1986	13.40	14.23	15.08	16.03	14.75	14.70
14/6/1986	13.13	13.70	14.78	15.65	13.90	14.23
29/6/1986	12.50	12.93	14.53	15.30	13.65	13.78
14/7/1986	11.68	12.65	14.23	14.60	13.33	13.30
29/7/1986	11.37	12.20	13.40	13.85	12.68	12.70
Mean	12.69	13.47	14.68	15.38	14.04	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.270		0.373	
L.S.D. for varieties			0.110		0.155	
L.S.D. for interaction			0.347		0.461	

to June or July plantings.

4.4.2. Effect of varieties :

There was a highly significant difference in the number of rows/ear among maize varieties in the two successive seasons (Table 23). One of hybrids, Pioneer 3147, exhibited greater number of rows/ear than the other varieties. A. Early, in comparison with hybrids had lower number of rows/ear. Because the number of rows depends to some extent of ear diameter, hybrid varieties surpssed A. Early significantly in diameter of ear, the result is thus logical. Similar results were obtained by Hussein et al., (1980 and 1981), Gouda (1982), Salem et al., (1983) and El-Hattab et al., (1986). They reported that varietal crosses exceeded the other varieties in this trait. On the contrary, Mahmoud (1967), Abd El-Raouf (1973) and Ibrahim (1977) found that A. Early had higher rows/ear than the double crosses.

4.4.3. Effect of the Interaction :

The effect of the interaction between planting dates and varieties on the number of rows/ear was significant in the two successive seasons (Table 23). The highest values for the number of rows/ear came from Pioneer 3147 sown on May 15th, while the lowest ones were obtained from A. Early planted on July 29th. These results held true in both seasons.

4.5. Number of Grains per Row :

4.5.1. Effect of Sowing Dates :

As presented in Table (24), sowing dates had a significant

effect on the number of grains/ear in the two successive seasons. Generally, there was a decline in the number of grains/row as sowing date was delayed. The lower number of grains/row was obtained from the last date of planting of July 29th. in both seasons. On the other hand, the number of grains/row increased significantly with the earliest planting date. Similar conclusions are in accordance with those obtained by Mahmoud (1967), Abou-Kadrah (1968), Yousef (1968) and Ba-Momen (1981).

4.5.2. Effect of Varieties :

Maize varieties showed highly significant effect on the number of grains/row in the two successive seasons (Table 24). Evidently, the variety of Ciba-Geigy 4141 had significantly higher number of grains/row, whereas, A. Early gave the lowest number of grains/row. These result are in harmony with those obtained by Abd El-Gawad et al., (1974), Gouda (1982) and Salem et al., (1983). While, Mourad et al., (1986) reported that D.C. 202 always had the highet number of grains/row followed by S.C. 9 and Cairo-1, whereas, Giza 2 had the lowest values. In contrast, Abd El-Raouf (1973) and Bedeer (1984) found that the open-pollinated varieties had higher number of grains/row than the hybrid varieties.

4.5.3. Effect of the Interaction :

In both seasons, the number of grains/row was significantly affected by the interaction between planting dates and varieties (Table 24). The effect of the interaction was very clear in, that all varieties responded well to earlier planting and the reverse was

true with delayed planting dates. Though they differed in the magnitude of their response.

4.6. Number of Grains per Ear :

4.6.1. Effect of Planting Dates :

Sowing dates had a significant effect on the number of grains/ear in the two successive seasons. Early sowing of May 15th produced higher number of grains/ear as compared with other dates of sowing. The last date of planting at July 29th, gave the lowest number of grains/ear (Table 25). Similar results were obtained by Mahmoud (1967), Abou-Kadrah (1968), Yousef (1968) and Ba-Momen (1981).

4.6.2. Effect of Varieties :

With regarded to the effect of varieties data in Table (25) show that varieties had highly significant effect on the number of grains/ear in the two successive seasons. The hybrid, Pioneer 3147 produced significantly higher number of grains/ear than its corn counterparts. Nevertheless, A. Early produced significantly a lower number of grains/ear than hybrids in both seasons. These results were expected since A. Early had a lower number of rows/ear as well as number of grains/row. Similar conclusions were obtained by Abd El-Gawad et al., (1974), Gouda (1982) and Salem et al., (1983). On the other hand, Abd El-Raouf (1973) and El-Hattab et al., (1986) reported that open-pollinated varieties had higher number of grains/ear than hybrid varieties.

Table (25) : Effect of sowing dates and varieties on the average number of grains per ear.

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	629.36	683.42	751.03	791.71	762.32	723.57
30/5/1985	559.79	612.40	656.06	711.27	683.27	644.56
14/6/1985	485.07	573.34	596.88	659.19	637.31	590.36
29/6/1985	462.60	523.26	551.16	598.08	590.30	545.08
14/7/1985	423.97	469.55	503.62	523.73	546.97	493.56
29/7/1985	358.81	412.82	440.41	476.83	449.24	427.62
Mean	486.60	545.80	583.19	626.80	611.57	
			at 5 %		at 1 %	
L.S.D. for sowing dates			16.267		22.496	
L.S.D. for varieties			12.864		18.035	
L.S.D. for interaction			25.522		33.944	
			(b) Second season			
15/5/1986	517.36	588.02	595.58	670.86	634.95	601.36
30/5/1986	467.55	504.76	528.80	574.67	540.14	523.18
14/6/1986	417.74	456.75	487.25	523.53	467.98	470.65
29/6/1986	382.02	404.89	445.21	485.03	437.17	430.86
14/7/1986	335.13	383.64	419.66	446.82	416.08	400.26
29/7/1986	279.57	325.75	352.64	379.31	350.07	337.47
Mean	399.89	443.97	471.52	513.37	474.40	
			at 5 %		at 1 %	
L.S.D. for sowing dates			23.390		32.346	
L.S.D. for varieties			6.448		9.040	
L.S.D. for interaction			15.801		21.015	

4.6.3. Effect of the Interaction :

Data presented in Table (25) indicate clearly that the number of grains/ear was significantly affected by the interaction between planting dates and maize varieties. The highest values for the number of grains/ear resulted from Pioneer 3147 sown on May 15th, while the lowest one was obtained from A. Early planting on July 29th. This result was true in the two growing seasons.

4.7. Ear Weight :

4.7.1. Effect of Sowing Dates :

Evidently, the weight of ear was significantly affected by sowing dates in the two successive seasons (Table 26). However, the ear weight decreased considerably and consistently with delaying the date of planting. The lowest ear weight was obtained from last planting of July 29th in both seasons. Sowing dates seem to have a considerable effect on accumulation of dry matter in plant. Accumulation of more dry matter in plants of early planting could be attributed to longer growing season and more favourable environmental conditions which prevail during the growth of maize plants, such as temperature, relative humidity, light duration and intensity. These results are in agreement with Mahmoud (1967), Abou-Kadrah (1968), Yousef (1968), Ba-Momen (1981) and Aly (1983). Moreover, Shah and Sharma (1970) concluded that the date of planting had much effect on ear weight than ear number/plant.

Table (26) : Effect of sowing dates and varieties on the average ear weight (gm).

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	236.20	299.95	315.11	284.85	356.36	298.49
30/5/1985	200.03	261.57	272.77	249.78	309.60	258.75
14/6/1985	175.01	238.95	248.23	233.63	292.46	237.66
29/6/1985	164.79	216.69	225.74	205.66	257.52	214.08
14/7/1985	145.99	185.26	192.99	175.91	220.22	184.07
29/7/1985	118.87	150.93	157.23	143.22	179.74	150.00
Mean	173.48	225.56	235.34	215.51	269.32	
			at 5 %		at 1 %	
L.S.D. for sowing dates			6.961		9.626	
L.S.D. for varieties			4.061		5.693	
L.S.D. for interaction			10.217		13.588	
			(b) Second season			
15/5/1986	194.39	250.42	250.65	233.19	296.63	245.05
30/5/1986	167.38	215.69	222.11	202.34	244.48	210.40
14/6/1986	150.57	190.16	204.01	185.47	214.25	188.89
29/6/1986	135.80	168.24	182.81	166.20	190.93	168.80
14/7/1986	115.50	151.41	161.71	146.47	168.09	148.63
29/7/1986	093.05	118.90	127.18	118.40	140.68	119.64
Mean	142.78	182.47	191.41	175.34	209.18	
			at 5 %		at 1 %	
L.S.D. for sowing dates			9.173		12.686	
L.S.D. for varieties			3.342		4.685	
L.S.D. for interaction			7.558		10.052	

4.7.2. Effect of Varieties :

The obtained data in Table (26) show that ear weight was affected by varietal characteristics in that the differences in ear weight were significant in the two successive seasons. In general, hybrid varieties, namely, Ciba-Geigy 4141 and Pioneer 3 x C 42 surpassed significantly A. Early and the composite Giza 2 in weight of ear. This finding agrees with those obtained by Hussein et al., 1980), Ba-Momen (1981), Kamel et al., (1983) and Salem et al., (1983).

4.7.3. Effect of the Interaction :

The effect of the interaction between sowing dates and varieties on ear weight was significant in the two successive seasons (Table 26). All varieties were affected by this interaction in different degrees, though in the same manner. Ciba-Geigy 4141 showed the highest reductions in comparison with other genotypes and A. Early showed thd least reductions than hybrids. In general, open-pollinated varieties are more likely to show this trend because they are more plastic.

4.8. Weight of Grains per Ear :

4.8.1. Effect of Sowing Dates :

Results show that the weight of grains/ear was significan-.ly affected by sowing dates in the two successive seasons (Table 27). Generally, weight of grains/ear decreased as sowing dates was delayed. The last planting date gave the lowest weight of grains/ear than the other dates. These results are in general agreement with

Table (27) : Effect of sowing dates and varieties on the average grain weight per ear (gm).

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	187.78	242.60	238.35	230.28	297.73	239.35
30/5/1985	158.00	208.86	203.10	198.64	257.36	205.19
14/6/1985	134.05	189.55	181.94	180.89	239.99	185.28
29/6/1985	125.91	170.86	164.57	158.67	209.96	165.99
14/7/1985	110.63	144.66	135.72	135.52	176.98	140.70
29/7/1985	083.39	116.71	109.96	101.26	144.08	111.08
Mean	133.29	178.87	172.27	167.54	221.02	
			at 5 %		at 1 %	
L.S.D. for sowing dates			5.440		7.523	
L.S.D. for varieties			3.243		4.547	
L.S.D. for interaction			8.080		10.746	
			(b) Second season			
15/5/1986	153.90	202.50	188.80	188.53	247.29	196.20
30/5/1986	131.76	171.87	163.41	160.18	202.99	166.04
14/6/1986	115.04	150.52	148.12	143.24	175.64	146.51
29/6/1986	103.40	132.54	132.16	127.98	154.64	130.14
14/7/1986	087.31	118.01	112.89	112.40	134.40	113.00
29/7/1986	064.82	091.83	087.89	080.41	112.02	087.39
Mean	109.37	144.54	138.88	135.45	171.16	
			at 5 %		at 1 %	
L.S.D. for sowing dates			6.757		9.345	
L.S.D. for varieties			2.751		3.856	
L.S.D. for interaction			5.507		7.324	

t hose obtained by Mahmoud (1967), Abou-Kadrah (1968), Yousef (1968), Ba-Momen (1981) and Aly (1983).

4.8.2. Effect of Varieties :

Weight of grains/ear was affected by varietial characteristics. The differences among varieties in grains weight/ear were significantly confirmed in 1985 and 1986 seasons (Table 27). In both seasons, Ciba-Geigy 4141 produced heavier grains/ear than the other varieties. On the other hand, A. Early variety produced the lowest values. Differences among varieties are due to difference in the number of grains/row, ear weight as well as the shelling percentage. Similar results were obtained by Raghip (1979), Hussein et al., (1980 and 1981), Ba-Momen (1981), Kamel et al., (1983) and Salem et al., (1983). On the contrary, Abou-Kadrah (1968), Abd El-Raouf (1973) and El-Hattab et al., (1986) found that the open-pollinated varieties had higher grain weight/ear than double crosses.

4.8.3. Effect of the Interaction :

Results in Table (27) indicate clearly that the effect of the interaction between sowing dates and varieties of maize on weight of grains/ear was significant in the both seasons (Table 27). The effect of varieties on this character was pronounced at the first planting date (May 15th). On the other hand, as the sowing date was delayed, the effect of maize varieties had been minimized.

4.9. Weight of 100-Grain :

4.9.1. Effect of Sowing Dates :

Results in Table (28) indicate clearly that sowing dates had a significant effect on weight of 100 grains. In general, weight of 100-grain decreased progressively as sowing date was delayed until July 29th. Early planting seem to have a considerable effect on building a suitable leaf area early in the season and consequently more accumulation of dry matter takes place in grains. Accumulation of more dry matter in grains of early planting could be attributed to more favourable environmental conditions during the growth and development of maize plants. Similar conclusions were reported by Singh and Singh (1971), Ibrahim (1977), Bedeer (1979), Ba-Momen (1981) and Aly (1983).

4.9.2. Effect of Varieties :

In both seasons, varieties had significant effect on the weight of 100-grain (Table 28). The hybrid Ciba-Geigy 4141 produced the greatest weight of 100-grain, whereas, the other hybrid Pioneer 3147 gave the lowest values. Ciba-Geigy 4141 outweighed the other varieties in this respect. Varietal effect on the weight of 100 grains was studied extensively. El-Hattab et al., (1979), Hussein et al., (1980), Gouda (1982) and El-Hattab et al., (1986) indicated that composite varieties outweighed the other open-pollinated and double crosses. On the contrary, Awad (1976) and Hussein et al., (1981) reported that the weight of 100-grain was higher for double crosses than the open-pollinated varieties. Nevertheless, Hussein (1958) and Raghip (1979) reported no significant differences between hybrids and open-pollinated varieties in this concern.

Table (28) : Effect of sowing dates and varieties on the average weight of 100 - grain (gm).

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	29.84	35.51	31.75	29.09	39.06	33.05
30/5/1985	28.23	34.11	30.96	27.93	37.67	31.78
14/6/1985	27.64	33.06	30.50	27.45	37.66	31.26
29/6/1985	27.22	32.66	29.86	26.54	35.57	30.37
14/7/1985	26.10	30.82	26.95	25.88	32.36	28.42
29/7/1985	23.25	28.28	24.97	21.24	32.09	25.97
Mean	27.05	32.41	29.17	26.36	35.74	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.261		0.361	
L.S.D. for varieties			0.223		0.312	
L.S.D. for interaction			0.459		0.610	
			(b) Second season			
15/5/1986	29.76	34.45	31.70	28.11	38.95	32.59
30/5/1986	28.18	34.05	30.90	27.88	37.60	31.72
14/6/1986	27.54	32.95	30.39	27.36	37.53	31.15
29/6/1986	27.07	32.73	29.69	26.39	35.37	30.25
14/7/1986	26.05	30.76	26.90	25.16	32.30	28.23
29/7/1986	23.18	28.20	24.90	21.18	32.00	25.89
Mean	26.96	32.19	29.08	26.01	35.63	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.203		0.280	
L.S.D. for varieties			0.232		0.325	
L.S.D. for interaction			0.575		0.765	

4.9.3. Effect of the Interaction :

The effect of the interaction between sowing dates and varieties on 100-grain weight was significant in the two successive seasons (Table 28). The highest values for the weight of 100 grains resulted from Ciba-Geigy 4141 sown on May 15th., while the lowest one was obtained from Pioneer 3147 planting on July 29th.

4.10. Shelling Percentage :

4.10.1. Effect of Sowing Dates :

Data persented in Table (29) show that dates had a significant effect on the shelling percentage in the two successive seasons. It is apparent that the shelling percentage decreased with delaying sowing date. Similarly, Mahmoud (1967), Abou-Kadrah (1968), Yousef (1968) and Ibrahim (1977) found that shelling percentage tended to be higher in early plantings than late ones.

4.10.2. Effect of Varieties :

Results in Table (29) show that differences between varieties in shelling percentage were significantly confirmed in the two seasons. Varieties could be arranged in an ascending order for both seasons as follows: Pioneer 3 x C 42, A. Early, Pioneer 3147, Giza 2 and Ciba-Geigy 4141. It is clear that Ciba-Geigy 4141 ranked first and Pioneer 3 x C 42 ranked last in their effect on the shelling percentage.

Many investigators studied the effect of maize varieties on shelling percentage. El-Sayed (1966), Mahmoud (1967), Ibrahim

Table (29) : Effect of sowing dates and varieties on the average shelling percentage.

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	79.50	80.89	75.66	80.89	83.55	80.15
30/5/1985	78.99	79.89	74.46	79.53	83.13	79.26
14/6/1985	76.62	79.33	73.34	77.42	82.06	77.82
29/6/1985	76.40	78.89	72.90	77.18	81.55	77.45
14/7/1985	75.80	78.10	70.34	77.06	80.39	76.40
29/7/1985	70.22	77.30	69.95	70.74	80.20	73.80
Mean	76.30	79.08	72.80	77.20	81.83	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.131		0.181	
L.S.D. for varieties			0.140		0.196	
L.S.D. for interaction			0.345		0.459	
			(b) Second season			
15/5/1986	79.18	80.89	75.33	80.86	83.38	79.99
30/5/1986	78.73	79.72	73.59	79.15	83.03	78.92
14/6/1986	76.40	79.15	72.60	77.23	81.98	77.56
29/6/1986	76.16	78.79	72.32	77.00	81.00	77.12
14/7/1986	75.59	77.96	69.82	76.75	79.95	76.09
29/7/1986	69.65	77.23	69.10	70.04	79.66	73.26
Mean	76.00	78.98	72.14	76.92	81.53	
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.100		0.138	
L.S.D. for varieties			0.104		0.145	
L.S.D. for interaction			0.329		0.438	

(1977), Yakout (1977), Awad (1979) and Hussein et al., (1980 and 1981) reported higher shelling percentage for double crosses than open-pollinated varieties. While, El-Hattab et al., (1986) found that Giza exceed both Cairo 1 and Pioneer 514. Whereas, Salem et al., (1983) reported that Pioneer 514 surpassed open-pollinated varieties of Shadwan and A. Early significantly in shelling percentage. Moreover, El-Hattab et al., (1979) and Gouda (1982), mentioned that the composites and the D.C. 19 varieties were better than the other varieties in this concern.

4.10.3. Effect of the Interaction :

Results in Table (29) show that shelling percentages were significantly affected by the interaction between sowing dates and maize varieties in the two successive seasons. The highest values for the shelling percentage resulted from Ciba-Geigy 4141 sown on May 15th, while the lowest one was obtained from Pioneer 3 x C 42 planting on July 29th.

4.11. Weight of Grains per Plant :

4.11.1. Effect of Sowing Dates :

Evidently, the weight of grains/plant was significantly affected by sowing dates in the two successive seasons (Table 30). However, the grains weight/plant decreased considerably and consistently with delaying the date of planting. The weight of grains/plant decreased when planting date was delayed beyond May 15 in the two seasons.

Table (30) : Effect of sowing dates and varieties on the average grain weight per plant (gm).

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
(a) First season						
15/5/1985	190.03	253.27	282.92	250.77	319.76	259.35
30/5/1985	151.52	210.53	232.35	210.96	268.43	214.76
14/6/1985	113.41	180.26	196.31	183.06	234.23	181.45
29/6/1985	97.96	152.58	166.54	149.94	193.37	152.08
14/7/1985	76.67	120.21	125.54	121.29	150.79	118.90
29/7/1985	51.87	93.37	97.09	86.27	116.42	89.00
Mean	113.58	168.37	183.46	167.05	213.83	
			at 5 %		at 1 %	
L.S.D. for sowing dates			4.626		6.398	
L.S.D. for varieties			4.023		5.640	
L.S.D. for interaction			7.697		10.237	
(b) Second season						
15/5/1986	153.28	209.59	221.46	201.16	261.88	209.48
30/5/1986	122.14	169.29	185.14	166.11	206.03	169.74
14/6/1986	91.11	138.93	158.64	141.38	166.33	139.28
29/6/1986	74.24	114.25	128.99	116.72	136.70	114.18
14/7/1986	57.62	94.64	101.04	97.00	109.40	91.94
29/7/1986	39.73	68.96	74.35	66.10	85.02	66.84
Mean	89.69	132.61	144.94	131.41	160.90	
			at 5 %		at 1 %	
L.S.D. for sowing dates			10.057		13.909	
L.S.D. for varieties			5.166		7.243	
L.S.D. for interaction			14.855		19.757	

In 1985 season, planting of May 15th increased the weight of grains/plant by 25.43, 33.73, 62.69, 85.28 and 107.88 g as compared with planting on May 30, June 14, June 29, July 14 and July 29, respectively.

Similarly, in the second season, early planting on May 15 surpassed the planting dates of May 30, June 14, June 29, July 14 and July 29 by 16, 30, 44, 58 and 72 %, respectively.

The differences among dates might be attributed to the effect of sowing dates on the number of ears/plant and characteristics, i.e., ear weight, ear length, ear diameter, number of rows/ear and number of grains/ear. These results are in general agreement with those obtained by El-Shafey (1965), Bisher (1973), Bedeer (1979), Ba-Momen (1981) and Aly (1983). Nevertheless, Samra et al., (1966). found that summer-sown corn was not accompanied by an appreciable increase in weight of grains/plant. As an explanation, they suggested that the sum of prevailing environmental conditions at different plantings was more important in determining the yield/plant than any other single factor.

4.11.2. Effect of Varieties :

Data presented in Table (30) indicate clearly that the weight of grains/plant was remarkably influenced by varietal characteristics.

In the first season, Ciba-Geigy 4141 surpassed Pioneer 3xC42, Pioneer 3147, Giza 2 and A. Early in the weight of grains/plant

by 10.88, 19.53, 27.24 and 59.91 g, respectively.

In the second season, it is worthmentioning that the varieties showed the same trend and they could be arranged as follows: Ciba-Geigy 4141 > Pioneer 3 x C 42 > Pioneer 3147 > Giza 2 A. Early. Therefore, in both seasons, Ciba-Geigy 4141 ranked first and A. Early came the last. The superiority of Ciba-Geigy 4141 might have been due to more ear weight, weight of grains/ear and shelling percentage. Similar results were obtained by Yakout (1977), Sharma (1978), Raghip (1979), Hussein et al., (1980 and 1981), Gouda (1982) and Salem et al., (1983). On the other hand, El-Hattab et al., (1986) found that Giza 2 significantly outyielded Cairo 1 and Pioneer 514. While, Kamel et al., (1983) recorded no difference between V.C. 80 and Sids 2 varieties.

4.11.3. Effect of the Interaction :

Results in Table (30) show that the effect of the interaction between sowing dates and maize varieties was significant on the weight of grains/plant. This result was true in the two successive seasons ,that the effect of varieties was influenced by the sowing dates. And this effect was more pronounced at the first date of planting (May 15th). The effect of varieties but diminished progressively as the planting date was delayed. The highest values of weight of grains/plant were obtained from planting Ciba-Geigy 4141 on May 15th, whereas, the lowest values were obtained for A. Early sown on July 29th in the two growing seasons.

5. Effect of Sowing Dates and Varieties on the Number of Plants per Feddan at Harvest :

5.1. Effect of Sowing Date :

Results in Table (31) indicate clearly that planting dates showed a significant effect on the number of plants/fed. in the two successive seasons. Generally, the number of plants/fed. at harvest tended to decrease as sowing date was delayed. The lowest number was obtained from the latest planting of July 29 in both seasons. These results are expected since the percentage of infestation with borers tended to increase by delaying planting dates (Table 3) and Figs. (1 and 2). The results revealed negative and highly significant correlation between the number of plants/fed. at harvest and the percentage of infestation with borers at 105 days from sowing (Tables 37 and 38). This negative relationship is primarily due to that infestation of corn with borers tends to reduce the number of harvested plants.

5.2. Effect of Varieties :

Data reported in Table (31) show that there was a significant difference in the number of plants/fed. at harvest among maize varieties. In both season, Pioneer 3147 surpassed significantly the other varieties in number of plants/fed. Varieties could be arranged as follows: A. Early < Giza 2 < Ciba-Geigy 4141 < Pioneer 3xC42 and < Pioneer 3147 hybrids. It could be observed that hybrids had better stands than open-pollinated varieties. Similar results were obtained by Bisher (1967), Mahmoud (1967) and Ibrahim (1977).

Table (31) : Effect of sowing dates and varieties on the average number of plants per fed. at harvest.

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	19500	19500	19900	19900	19600	19680
30/5/1985	18800	19450	19750	19850	19500	19470
14/6/1985	18300	18850	19600	19600	19400	19150
29/6/1985	16600	18350	19450	19600	19450	18690
14/7/1985	16000	17050	18950	19350	18900	18050
29/7/1985	11600	13300	17000	18400	16850	15430
Mean	16800	17750	19108	19450	18950	18412
			at 5 %		at 1 %	
L.S.D. for sowing dates			978		1353	
L.S.D. for varieties			570		799	
L.S.D. for interaction			1971		2622	
			(b) Second season			
15/5/1986	16850	17250	18750	19500	17750	18020
30/5/1986	16400	17200	17400	17800	17250	17210
14/6/1986	16050	16550	16800	17400	16600	16680
29/6/1986	11400	14550	15950	16150	15250	14660
14/7/1986	10500	12000	14100	15600	12850	13010
29/7/1986	8100	11900	13500	14150	12800	12090
Mean	13217	14908	16083	16767	15417	15278
			at 5 %		at 1 %	
L.S.D. for sowing dates			1384		1913	
L.S.D. for varieties			1027		1440	
L.S.D. for interaction			2337		3109	

On the other hand, Abd El-Raouf (1973) as well as Hussein et al., (1980 and 1981) found that open-pollinated varieties had higher number of plants at harvest. Whereas, Abou-Khadrah (1968), Kamel et al., (1983) and El-Hattab et al., (1986) reported that differences among varieties in number of harvested plants were insignificant. The varieties, also, show the same previous order as to percent of infestation with borers, though the trend is same with all of them (Figs. 1 and 2).

5.3. Effect of the Interaction :

Number of plants/fed. at harvesting stage was significantly affected with the interaction between sowing dates and maize varieties (Table 31). The highest number of plants was obtained with two Pioneer varieties when sown on May 15th and the lowest one was obtained with A. Early when sown on July 29th. This was true for the two successive seasons.

6. Effect of Sowing Dates and Varieties on the Harvest Index (H.I.):

6.1. Effect of Sowing Dates :

Results in Table (32) show that sowing dates had a significant effect on the H.I. of maize plants in the two successive seasons. Generally, there was declining trend for the H.I. as planting date was delayed. The lowest H.I. was obtained from the last sowing of July 29 in both seasons. On the other hand, the early sowing date increased significantly the H.I. significantly in the two seasons. These results could be attributed to the relatively high grain yield than straw yield.

Table (32) : Effect of sowing dates and varieties on the average harvest index.

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	48.54	40.32	46.95	48.31	49.75	46.77
30/5/1985	43.86	37.74	43.29	45.45	46.08	43.28
14/6/1985	43.99	39.52	45.43	46.80	44.60	44.07
29/6/1985	36.10	33.67	39.40	40.65	40.49	38.06
14/7/1985	33.11	30.86	35.34	36.63	36.90	34.57
29/7/1985	28.33	28.01	31.65	32.51	33.11	30.72
Mean	38.99	35.02	40.34	41.73	41.82	39.58
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.358		0.496	
L.S.D. for varieties			0.089		0.125	
L.S.D. for interaction			0.863		1.148	
			(b) Second season			
15/5/1986	44.64	40.16	45.66	48.08	48.31	45.37
30/5/1986	43.10	37.31	42.92	43.86	45.66	42.57
14/6/1986	36.76	34.13	38.91	40.82	43.10	38.74
29/6/1986	32.26	33.44	36.63	37.31	38.17	35.56
14/7/1986	27.86	28.99	33.44	36.50	33.44	32.05
29/7/1986	25.97	25.38	30.67	32.47	31.25	29.15
Mean	35.10	33.24	38.04	39.84	39.99	37.24
			at 5 %		at 1 %	
L.S.D. for sowing dates			0.347		0.479	
L.S.D. for varieties			0.470		0.659	
L.S.D. for interaction			0.793		1.055	

6.2. Effect of Varieties :

Harvest index was significantly affected by maize varieties in the two successive seasons (Table 32). Ciba-Geigy 4141 and Pioneer 3147 surpassed both Giza 2 and A. Early significantly. The harvest index amounted to 41.82, 41.73, 40.34, 38.99 and 35.02 in the first season and 39.99, 39.84, 38.04, 35.10 and 33.24 in the second season for Ciba-Geigy 4141, Pioneer 3147, Pioneer 3 x C 42, A. Early and Giza 2, respectively (Table 32). Similar results were obtained by Awad (1979), who found that H.I. was significantly affected by different genotypes. The double cross 355 exceeded Hard Endosperm (Opaque 2) and Tuxpeno x Laposta (Opaque 2) varieties.

Moreover, El-Hattab et al., (1986) reported that Pioneer 514 significantly surpassed Giza 2 and Cairo 1 varieties. On the contrary, Moursi et al., (1983b)found a slight difference in the harvest index between V.C. 80 and D.C. 19 varieties.

6.3. Effect of the Interaction :

Data presented in Table (32) indicate that the harvest index was significantly affected by the interaction of sowing dates and maize varieties. The effect of the varieties was more clear with delayed dates of sowing. This result was true in the two growing seasons.

7. Effect of Sowing Dates and Varieties on the Yields of Maize per Feddan :

Data on the yields per feddan as influenced by sowing dates and varieties are shown in Tables (33, 34 and 35).

7.1. Grain Yield :

7.1.1. Effect of Sowing Dates :

Results in Table (33) show sign differences in the yield of grain/fed. as affected by sowing date in the two successive seasons. Early planting of May 15 gave the highest grain yield/fed. compared to the other planting dates.

In 1985 season, early sowing gave 661, 877, 1630, 2218 and 2805 Kg/fed. for the grain yield more than May 30, June 14, June 29, July 14 and July 29, respectively.

Likeweise, in the second season, the relative grain yields/fed. were 100, 84, 70, 56, 41 and 41 % for planting maize at May 15, May 30, June 14, June 29, July 14 and July 29, respectively.

It could be concluded that the grain yield/fed. tended to be decreased remarkably and consistently by delaying the time of planting. These results are expected since early planting provides more favourable circumstances for growth and development of plants such as building a better leaf area, efficient plant canopy that favours well utilization of light and thus a better relationship between source and sink. Nevertheless, delaying sowing date caused a rapid conversion of plants from the vegetative to the reproductive phase which accounts much for the early cessation of the increase in the dry matter content of different parts of maize plants. Moreover, in this study previous data on yield components (Tables 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 and 30) showed that early sowing increased significantly the

Table (33) : Effect of sowing dates and varieties on the average grain yield per feddan (k.g).

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean	Rel.
			(a) First season				
15/5/1985	2832	3781	4310	3846	4776	3909	100
30/5/1985	2208	3132	3535	3355	4010	3248	83
14/6/1985	1900	2996	3468	3190	3607	3032	78
29/6/1985	1245	2159	2670	2450	2872	2279	58
14/7/1985	0938	1567	1948	1831	2175	1692	43
29/7/1985	0463	1047	1305	1214	1492	1104	28
Mean	1598	2447	2873	2648	3155		
Rel.	100	153	180	166	197		
			at 5 %		at 1 %		
L.S.D. for sowing dates			120		166		
L.S.D. for varieties			105		147		
L.S.D. for interaction			200		266		
			(b) Second season				
15/5/1986	2606	3779	4186	3819	4649	3808	100
30/5/1986	2174	3098	3511	3201	3978	3192	84
14/6/1986	1588	2591	2944	2750	3493	2673	70
29/6/1986	1111	2141	2478	2248	2709	2137	56
14/7/1986	0788	1473	1846	1824	1971	1580	41
29/7/1986	0424	0948	1266	1211	1407	1551	41
Mean	1449	2338	2705	2509	3034		
Rel.	100	161	187	173	209		
			at 5 %		at 1 %		
L.S.D. for sowing dates			262		362		
L.S.D. for varieties			134		188		
L.S.D. for interaction			386		514		

number of ears/plant, ear weight, ear diameter, weight of grains/ear, shelling percentage, 100-grain weight, grain weight/plant as well as number of plants/fed. at harvesting stage, but decreased percentage of barren plants compared to late planting date and this also account for the increament of yield in early plantings.

Consequently one can draw a conclusion that the environmental conditions prevailing during the various stages of growth and development of maize plant affect the final grain yield. A close-relationship between temperature, relative humidity plus efficient sunshine hours and final grain yield was reported by (Samra et al., 1966).

Similar results were also reported by El-Shafey (1965), El-Mankabaty (1967), Yousef (1968), Singh and Singh (1971), Ibrahim (1977), Ba-Momen (1981) and Aly (1983).

7.1.2. Effect of Varieties :

Results in Table (33) show that all differences between the varieties in grain yield/fed. were significant in the two successive seasons.

In 1985 season, Ciba-Geigy 4141 surpassed the other varieties in grain yield/fed., whereas, A. Early variety produced the lowest values. The following is an ascending order of varieties according to the amount reaped from each, A. Early, Giza 2, Pioneer 3147, Pioneer 3 x C 42 and Ciba-Geigy 4141. Where the relative grain yields of maize were 100, 153, 166, 180 and 197, respectively.

In 1986 season, the variety of Ciba-Geigy 4141 was significantly superior, whereas, A. Early was significantly inferior to all other maize varieties (Table 33). Maize varieties could be arranged in descending order according to their effect on the grain yields of maize as follows; Ciba-Geigy 4141, Pioneer 3 x C 42, Pioneer 3147, Giza 2 and A. Early. The relative yields were 209, 187, 173, 161 and 100.

It could be concluded that Ciba-Geigy 4141 variety was superior and A. Early was the inferior in their effect on grain yield/fed. This result was true in the two successive seasons. The superiority of Ciba-Geigy 4141 might have been due to; more number of rows/ear (Table 23), higher number of grains/ear (Table 24), better ear weight (Table 26), higher shelling percentage (Table 29), heavier weight of grains/ear as well as per plant (Tables 27 and 30). These results agree with the findings of Moursi et al., (1970), Kamel et al., (1979), Raghip (1979), Hussein et al., (1980 and 1981), Gouda (1982), Kamel et al., (1983), Moursi et al., (1983 b), Salem et al., (1983), El-Agamy et al., (1986) and Aly (1988). They reported that hybrids outyielded the open-pollinated varieties. Moreover, El-Rassas et al., (1988) reported that Ciba-Geigy 4141 and three way cross hybrid 309 outyielded Giza 2 significantly. Nevertheless, El-Hattab et al., (1986) found that Giza 2 produced the highest grain yield/fed. followed by Pioneer 514 and Cairo 1 in a descending order.

7.1.3. Effect of the Interaction :

Results in Table (33) show that grain yield of maize

Table (34) : Relative response of grain yield to varieties as affected by sowing dates. (Yield at May 15 = 100).

Planting Dates	American Early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141
		(a) First season			
15/5/1985	100	100	100	100	100
30/5/1985	78	82	82	87	84
14/6/1985	67	79	80	83	76
29/6/1985	44	57	62	64	60
14/7/1985	33	41	45	48	46
29/7/1988	16	27	30	32	31
		(b) Second season			
15/5/1986	100	100	100	100	100
30/5/1986	83	82	84	83	86
14/6/1986	61	69	70	72	75
29/6/1986	43	57	59	59	58
14/7/1986	30	39	44	48	42
29/7/1986	16	25	30	32	30

plants was significantly affected by the interaction between planting dates and varieties in both seasons. However, the response of varieties to delaying sowing dates varied significantly according to their genotypes. To explain the relative grain yield decreased by 84, 73, 70, 69 and 68 for A. Early, Giza 2, Pioneer 3 x C 42, Ciba-Geigy 4141 and Pioneer 3147 when sowing dates was put-off from May 15 to July 29 in the first season, respectively. Similarly, the relative grain yield decreased by 84, 75, 70, 70 and 68 for the previous varieties in the same orders in the second season, respectively (Table 34). It is evident then that A. Early and Giza 2 were more sensitive to the delay of sowing dates than the hybrid varieties, namely, Pioneer 3 x C 42, Ciba-Geigy 4141 and Pioneer 3147.

7.2. Straw Yield :

7.2.1. Effect of Sowing Dates :

Straw yield/fed. was significantly affected by sowing dates in the two successive seasons (Table 35). Generally, straw yield decreased as sowing dates were delayed. The late sowing date gave significantly the lowest straw yield in comparison with the other dates. Such effect was mainly due to the effect of sowing dates on the plant height, stem diameter and number of leaves/plant. Previous data on these characters showed that plants of late plantings were less taller, thinner, with less number of leaves than their counterparts of earlier plantings and this could explain the reduction occured in the amount of straw/yield. The same trend of results were also recorded by El-Shafey (1965). He found that maize plants sown in

Table (35) : Effect of sowing dates and varieties on the average straw yield per feddan (kg).

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 41 41	Mean
			(a) First season			
15/5/1985	3002	5596	4871	4115	4824	4481
30/5/1985	2826	5168	4631	4025	4692	4269
14/6/1985	2419	4586	4165	3626	4481	3855
29/6/1985	2203	4253	4105	3577	4222	3672
14/7/1985	1895	3511	3565	3167	3720	3172
29/7/1985	1172	2691	2818	2514	3014	2442
Mean	2253	4301	4026	3504	4159	
			at 5 %		at 1 %	
L.S.D. for sowing dates			195		270	
L.S.D. for varieties			161		225	
L.S.D. for interaction			368		490	
			(b) Second season			
15/5/1986	3231	5630	4981	4125	4974	4588
30/5/1986	2869	5204	4669	4097	4734	4315
14/6/1986	2732	5001	4622	3988	4610	4191
29/6/1986	2333	4261	4286	3777	4388	3809
14/7/1986	2042	3609	3673	3174	3922	3284
29/7/1986	1209	2786	2862	2520	3096	2495
Mean	2403	4415	4182	3613	4288	
			at 5 %		at 1 %	
L.S.D. for sowing dates			404		558	
L.S.D. for varieties			254		356	
L.S.D. for interaction			616		819	

May were taller, more vigorous with wider leaves than those of June sowing which in turn exceeded those of the July planting in the same parameters. Moreover, Tanaka and Hara (1971) reported that the late sowing shortened the period of vegetative growth and hastened the ripening period and thus reduced the yield of straw.

7.2.2. Effect of Varieties :

Data presented in Table (35) show that varieties exhibited significant effects on straw yield for the two growing seasons.

The variety Giza 2 was superior and A. Early was inferior in their effect on straw yield in the both seasons. The differences between varieties may be attributed to differences in various plant parameter such as height, stem diameter, number of leaves/plant and length and width of leaves. These result do not agree with those obtained by Aly (1981) and Salwau (1985), who found that hybrids surpassed significantly open-pollinated varieties in straw yield/fed.

7.2.3. Effect of the Interaction :

Yield of straw was significantly affected by the interaction between sowing dates and maize varieties in the two successive seasons (Table 35). The effect of varieties on straw yield was very clear with delayed palnting dates and the reverse was true with earlier planting dates.

7.3. Biological Yield :

7.3.1. Effect of Sowing Dates :

The data presented in Table (36) indicate that planting

Table (36) : Effect of sowing dates and varieties on the average biological yield. (kg).

Varieties / Sowing dates	American early	Giza 2	Pioneer 3xC42	Pioneer 3147	Ciba-Geigy 4141	Mean
			(a) First season			
15/5/1985	5833	9377	9181	7961	9600	8391
30/5/1985	5033	8300	8167	7380	8703	7517
14/6/1985	4320	7581	7632	6816	8088	6887
29/6/1985	3448	6412	6775	6027	7094	5951
14/7/1985	2833	5079	5512	4998	5895	4863
29/7/1985	1636	3738	4123	3735	4506	3547
Mean	3851	6748	6898	6153	7314	6193
			at 5 %		at 1 %	
L.S.D. for sowing dates			313		433	
L.S.D. for varieties			264		370	
L.S.D. for interaction			562		748	
			(b) Second season			
15/5/1986	5837	9409	9167	7944	9623	8396
30/5/1986	5043	8302	8180	7298	8712	7507
14/6/1986	4321	7592	7565	6738	8103	6864
29/6/1986	3444	6402	6764	6025	7097	5947
14/7/1986	2830	5081	5519	4999	5893	4865
29/7/1986	1634	3734	4128	3731	4503	3546
Mean	3851	6754	6887	6122	7322	6187
			at 5 %		at 1 %	
L.S.D. for sowing dates			662		915	
L.S.D. for varieties			343		481	
L.S.D. for interaction			1009		1343	

dates had a significant effect on the biological yield. In both seasons this character decreased significantly as sowing was delayed. The late sowing date of July 29, produced significantly lower biological yields than the other sowing dates. These reults are logical because both grain yield and straw yield - the two components of biological yield - appeared to vary with dates (Tables 33 and 35).

7.3.2. Effect of Varieties :

With regarded to the effect of varieties, data presented in Table (36) show that there was a significant effect on the biological yield in the two growing seasons. Ciba-Geigy 4141 variety produced the greatest biological yields whereas, A. Early, gave the lowest ones in the two growing seasons. These results may be attributed to the significant effect of varieties on the yields of grain and straw. Similar results were obtained by Aly (1981) and Salwau (1985).

7.3.3. Effect of the Interaction :

Results in Table (36) show that the biological yield was significantly affected by the interaction between planting dates and varieties of maize. The effect of varieties on biological yield was more pronounced at the last sowing date of July 29 and this quite logical, because the biological yield is of cumulative nature, but is apparently the least.

8. Relationships between the Rates of Infestation and Some Characterist of Maize Plants:

Correlation coefficients in Tables (37 and 38) show the relationships between the infestation percentage with borers and

Table (37) : Simple correlation coefficients between percentage of infestation and stem diameter, number of plants/fed. at harvest and grain yield for 1985 season.
(N = 30 pairs).

Percentage of infestation / Varieties	Stem diameter	Number of plants/fed. at harvest	Grain yield/fed.
American Early	-0.798**	-0.914**	-0.848**
Giza-2	-0.795**	-0.939**	-0.895**
Pioneer 3 X C 42	-0.886**	-0.917**	-0.906**
Pioneer 3147	-0.883**	-0.902**	-0.921**
Ciba-Geigy 4141	-0.846**	-0.885**	-0.887**

Table (38) : Simple correlation coefficients between percentage of infestation and stem diameter, number of plants/fed. at harvest and grain yield for 1986 season.
(N = 30 pairs).

Percentage of infestation / Varieties	Stem diameter	Number of plants at harvest	Grain yield/fed.
American Early	-0.901**	-0.900**	-0.834**
Giza - 2	-0.920**	-0.938**	-0.874**
Pioneer 3 X C 42	-0.905**	-0.897**	-0.873**
Pioneer 3147	-0.913**	-0.839**	-0.865**
Ciba-Geigy 4141	-0.929**	-0.931**	-0.889**

some characters studied.

8.1. Stem Diameter :

The results showed negative and highly significant correlation coofficient between stem diameter of maize plants and the rates of infestation with borers (Tables 37 and 38).

This result indicate that maize varieties with thicker stalks were more resistant to infestation with borers.

8.2. Thickness of the Epidermis :

Data presented in Table (10) show that the relationship between the percentage of infestation and thickness of the epidermis at 21 and 42 days from sowing was negative (Table 10). In otherwords, the increased thickness of the epidermis helped significantly in decreasing the rate of infestation with borers.

In respect to selection for more resistance to borers, it is of interest to report that, stem diameter and thickness of the epidermis might have the highest importance in this respect.

8.3. Number of Plants per Feddan :

Results in Tables (37 and 38) indicate clearly that negative and highly significant correlation between the number of plants/ fed. at harvest and the percentage of infestation with borers at 105 days from sowing. This negative relationship is primarily due to that infestation of corn with borers tends to reduce the number of harvested plants.

8.4. Grain Yield per Feddan :

The results revealed highly significant negative association between infestation percentages with borers in the first and second, seasons (Tables 37 and 38).

It could be concluded that stem diameter, thickness of the epidermis, number of plants/fed. as well as grain yield/fed. were negatively correlated with the rate of infestation with borers. On the other hand, grain yield was positively correlated with stem diameter, thickness of the epidermis and number of plants/fed.