RESULTS AND DISCUSSION

I. Effect of planting dates, N-levels and suckers on silking date of maize:

1. Effect of planting dates:

Data presented in Tables (2 and 3) indicated that planting date had a significant effect on silking date of maize in both seasons. Maize plants reached silking earlier as planting date was delayed. Obviously, delayed planting shortened the vegetative growth period resulted in the acceleration of flowering. This could be attributed to variation in air and soil temperatures light duration and intensity at various planting dates (Table 1). These climatic factors affect flowering time through their effect on photosynthesis carbohydrate accumulation and florigen production in maize plants during the vegetative growth.

Such conclusions are in accordance with those obtained by Hoque and Worzella (1966), Hamada (1972), Bisher (1973) and Ba-Momen (1981), who reported that the time required to reach the silking stage decreased gradually as the planting date was delayed.

2. Effect of N-levels:

Nitrogen showed a significant influence on silking date of maize plants (Tables 2 and 3). Plants reached 50% silking date significantly earlier as N-rate was

Table (2): Mean number of days from planting to 50% silking, in 1981 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	with	71.00	70.33	67.00	64.33	68.17
	without	70.00	69.67	66.33	63.33	67.33
	Mean	70.50	70.00	66.66	63.83	67.75
45	with	71.00	69.67	66.33	63.33	67.58
	without	69.00	69.67	65.67	64.00	67.08
	Mean	70.00	69.67	66.00	63.66	67.33
90	with	68.67	67.67	65.33	63.33	66.25
	without	68.33	67.33	64.67	63.33	65.91
	Mean	68.50	67.50	65.00	63.33	66.08
135	with	67.67	66.67	65.00	63.00	65.58
	without	67.67	66.33	64.33	62.67	65.25
	Mean	67.67	66.50	64.66	62.83	65.41
Over all mean	with	69.59	68.59	65.92	63.50	66.90
	without	68.75	68.25	65.25	63.33	66.39
	Mean	69.17	68.42	65.58	63.41	66.64

L.S.D.	5%	1%	L.S.D.	5%	1%
P. dates	0.56	0.85	P. dates x N	0.90	1.23
N-levels	0.45	0.61	P. dates x S	N.S.	N.S.
Suckers	0.30	0.41	N x S	N.S.	N.S.
			P. datesxNxS	N.S.	N.S.

Table (3): Mean number of days from planting to 50% silking in 1982 season.

N-levels kg/fad.	Suckers	Planting date				Mean
		June 1	June 15	June 30	July 15	
0	With	72.50	71.75	68.75	64.75	69.44
	without	72.50	72.50	68.75	65.25	69.75
	Mean	72.50	72.12	68.75	65.00	69.59
45	with	71.50	71.75	68.00	65.00	69.06
	without	71.50	71.00	67.50	64.50	68.62
	Mean	71.50	71.37	67.75	64.75	68.84
90	with	71.50	69.75	66.75	64.00	68.00
	without	71.50	69.25	65.50	64.25	67.62
	Mean	71.50	69.50	66.12	64.12	67.81
135	with	67.50	68.25	64.75	63.25	65.94
	without	67.75	68.50	64.50	62.50	65.81
	Mean	67.62	68.37	64.62	62.87	65.87
Over all mean	with	70.75	70.37	67.06	64.25	68.11
	without	70.81	70.31	66.56	64.12	67.95
	Mean	70.78	70.34	66.81	64.18	68.03

L.S.D.	5%	1%	L.S.D.	5%	1%
P. dates	0.20	0.28	P. dates x N	0.79	1.03
N. levels	0.44	0.59	P. dates x S	N.S.	N.S.
Suckers	N.S.	N.S.	N x S	N.S.	N.S.
			P. datesxNxS	N.S.	N.S.

increased up to 135 kg/fad. These results might be due to the effect of N in increasing the meristemic activity of maize plants. Similar results were obtained by Mikhail (1971), Shukla (1973) and Al-Rudha and Al-Younis (1978).

3. Effect of suckers:

Suckers showed significant effect on the silking date of maize in the first season, while in the second season no significant effect was observed (Tables 2 and 3). Sucker removal decreased the number of days to 50% silking. The difference obtained was significant. The same trend was also noted in 1982 season, yet the difference was not significant. These results were also recorded by many investigators, Dungan (1931), and Earley et al. (1971).

4. Effect of interaction:

In both seasons, the interaction of the studied factors on silking dates was not significant except for the interaction of planting dates and N-levels. Results showed clearly that the number of days from planting to 50% silking was the highest when planting took place in June the 1st and no nitrogen was applied. Nevertheless, the number of days from planting to 50% silking was the lowest when planting occurred in July 15th and with application of 135 kg N/fad. in both seasons (Tables 2 & 3).

II. Effect of planting dates, N-levels and suckers on growth characters of maize:

1. Plant height:

1.1. Effect of planting dates:

Planting dates showed a significant effect on height of maize plants in the two seasons (Tables 4 and 5). Plant height decreased remarkably and consistently when the time of planting was delayed after 15th June. The superiority of plant height in early planting might be attributed to more favourable climatic conditions during the growth period of maize plants (Table 1). These results are in harmony with those obtained by Abo-Khadrah (1968), Hamada (1972), Bisher (1973) and Ba-Momen (1981).

1.2. Effect of N-levels:

Nitrogen showed a significant effect on the height of maize plants in both seasons. The height of plants in both seasons. The height of plants increased significantly as N level increased up to 90 kg/fad. The higher level of nitrogen did not result in any further significant increase (Tables 4 and 5). These results might be attributed to the effect of N on accelerating early vegetative growth (Rai, 1961), increasing the number of internodes (Bucher, 1953) and increasing the length of the lowest five internodes of maize plant (Moursi et al. 1970). Moreover, Specht (1957) found that protein

Table (4): Mean plant height (cm), in 1981 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	with	276.00	261.07	253.00	236.33	256.60
	without	280.33	262.00	268.00	251.33	265.41
	Mean	278.16	261.53	260.50	243.83	261.00
45	with	282.67	263.00	264.00	263.33	268.25
	without	295.33	285.00	275.33	230.33	271.50
	Mean	289.00	274.00	269.66	246.83	269.87
90	with	288.33	280.33	275.33	241.33	271.33
	without	292.00	291.00	276.67	266.00	281.42
	Mean	290.16	285.66	276.00	253.66	276.37
135	with	294.00	291.33	270.67	252.00	277.00
	without	292.00	293.33	288.00	263.33	284.16
	Mean	293.00	292.33	279.33	257.66	280.58
Over all mean	with	285.25	273.93	265.75	248.25	268.29
	without	289.91	282.83	277.00	252.75	275.62
	Mean	287.58	278.38	271.37	250.50	271.96

L.S.D.	5%	1%	L.S.D.	5%	1%
P. dates	10.57	16.01	P. dates x N	N.S.	N.S.
N-levels	6.31	8.55	P. dates x S	N.S.	N.S.
Suckers	3.55	4.77	N x S	N.S.	N.S.
			P. dates x N x S	14.22	19.09

Table (5): Mean plant height (cm) in 1982 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	with	273.00	263.50	226.75	228.00	247.81
	without	284.00	269.00	242.00	239.25	258.56
	Mean	278.50	266.25	234.37	233.62	253.18
45	with	273.00	259.00	232.75	242.50	251.81
	without	291.00	275.00	239.25	243.50	262.19
	Mean	282.00	267.00	236.00	243.00	257.00
90	with	283.00	269.50	253.75	241.75	262.00
	without	286.00	273.00	248.50	244.50	263.00
	Mean	284.50	271.25	251.12	243.12	262.50
135	with	286.50	270.50	247.00	242.00	261.50
	without	290.50	277.00	248.75	246.00	265.56
	Mean	288.50	273.75	247.87	244.00	263.53
Over all mean	with	278.87	265.62	240.06	238.56	255.78
	without	287.87	273.50	244.62	243.31	262.32
	Mean	283.37	269.56	242.34	240.93	259.05

L.S.D.	5%	1%	L.S.D.	5%
P. dates	7.57	10.88	P. dates x N	N.S.
N-levels	5.58	7.46	P. dates x S	N.S.
Suckers	3.36	4.49	N x S	N.S.
			P. dates x N x S	N.S.

formation depends on N, therefore, any deficiency could hinder plant growth and causes the plants to stunt. These results are in agreement with those obtained by Hussein et al. (1974), Shafshak et al. (1981) and Salem et al. (1983).

1.3. Effect of suckers:

Data presented in Tables (4 and 5) revealed that removing suckers from maize plants affected plant height in both seasons. In 1981 season, removing the suckers induced an increase in plant height.

The same result was also noticeable in 1982 season, These results are in agreement with those of Koedzhikov and Bozhidarevich (1964).

1.4. Effect of interaction:

In 1981 season, the second order interaction of planting dates * N * suckers had a significant effect on plant height. In that season, the mean plant height obtained from first June planting, application of 45 kg N/fad. and with removal of suckers was the highest. On the contrary, mid July planting, no N added and with left-in suckers gave shorter plants. Results of the second season showed that all types of interaction between the experimental factors had no significant effect on plant height of maize plant (Tables 4 and 5).

2. Ear position:

2.1. Effect of planting dates:

Results in Tables (6 and 7) indicated that planting dates had a significant effect on ear position in both seasons. Generally, ear position tended to be lower as sowing date was delayed. Lower ear position was obtained from later plantings of July 15 in both seasons. These findings are in harmony with those of Yousef (1968) and Ba-Momen (1981). However, Zuber (1968) reported contradictory results, showing an increase in ear height with delayed sowings.

2.2. Effect of N-levels:

Nitrogen affected ear position in both seasons. Ear position increased significantly as N level increased up to 90 kg/fad. The increase in ear position due to the application of the higher N level i.e., 135 kg/fad. was not significant. These results are expected since the height of maize plant was increased by the addition of N. Similar results were obtained by Shafshak et al. (1981) and Salem et al. (1983).

2.3. Effect of suckers:

Suckers removal showed a significant effect on ear position (Tables 6 and 7). The increment in ear placement was significant in 1981 season, while in 1982 season the increment was not significant. These results agreed

Table (6): Mean Ear position (cm), in 1981 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	with	167.33	159.33	167.00	124.33	154.50
	without	172.67	165.33	151.33	148.00	159.33
	Mean	170.00	162.33	159.16	136.16	156.91
45	with	171.33	167.33	171.67	131.67	160.50
	without	174.00	176.00	180.00	143.33	168.33
	Mean	172.66	171.66	175.83	137.50	164.41
90	with	175.33	167.33	182.33	140.67	166.41
	without	190.67	170.67	186.00	145.00	173.08
	Mean	183.00	169.00	184.16	142.83	169.75
135	with	170.67	168.00	153.00	136.33	157.00
	without	177.33	180.67	185.67	154.33	174.50
	Mean	174.00	174.33	169.33	145.33	165.75
Over all mean	with	171.16	165.50	168.50	133.25	159.60
	without	178.67	173.17	175.75	147.66	168.81
	Mean	174.91	169.33	172.12	140.45	164.20

L.S.D.	5%	1%	L.S.D.	5%	1%
P. dates	9.33	14.13	P. dates x N	N.S.	N.S.
N-levels	6.44	8.7	P. dates x S	N.S.	N.S.
Suckers	3.58	4.8	N x S	7.15	9.6
			P.dates x N x S	N.S.	N.S.

Table (7): Mean ear position (cm) in 1982 season.

N-levels kg/fad.	Suckers	Planting dates: June 1	June 15	June 30	July 15	Mean
0	with	156.00	152.00	131.50	141.00	145.12
	without	157.00	163.00	141.75	142.00	150.94
	Mean	156.50	157.50	136.62	141.50	148.03
45	with	165.00	157.00	144.25	140.25	151.62
	without	168.50	157.50	145.75	141.75	153.37
	Mean	166.75	157.25	145.00	141.00	152.50
90	with	168.50	164.00	145.00	142.50	155.00
	without	171.00	164.00	144.50	141.50	155.25
	Mean	169.75	164.00	144.75	142.00	155.12
135	with	172.25	163.00	141.25	145.00	155.37
	without	172.00	169.00	146.00	148.25	158.81
	Mean	172.12	166.00	143.62	146.62	157.09
Over all mean	with	165.44	159.00	140.50	142.19	151.78
	without	167.12	163.37	144.50	143.37	154.59
	Mean	166.28	161.19	142.50	142.78	153.19

L.S.D.	5%	1%	L.S.D.	5%	1%
P. dates	5.8	7.7	P. dates x N	N.S.	N.S
N-levels	5.3	6.33	P. dates x S	N.S.	N.S.
Suckers	N.S.	N.S.	N x S	N.S.	N.S.
			P. dates x N x S	N.S.	N.S.

with what was reported by Earley et al. (1971) and Downey (1972).

2.4. Effect of interaction:

The first order interaction of N * suckers, had a significant effect on ear position in 1981, while, in 1982 the effect was not significant.

3. Stem diameter:

3.1. Effect of planting dates:

Planting dates had a significant effect on stem diameter in both seasons (Tables 8 and 9), stem diameter increased in early plantings and decreased as planting date was delayed. Similar results were obtained by Mahmoud (1967), Osafo and Milbourn (1975) and Ba-Momen (1981). They reported that stem diameter decreased as planting date was delayed.

3.2. Effect of N-levels:

It is clear that stem diameter increased with increasing N rate up to 135 kg/fad. in both seasons. Exceptional was the result of the 90 kg/fad. rate which showed a slight reduction in stem diameter in comparison with 45 kg/fad. These results are expected since N increase the vegetative growth, and dry weight of maize plants. Similar results were obtained by Hussein et al.

Table (8) : Mean stem diameter (mm), in 1981 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	23.67	23.60	21.87	21.27	22.60
	Without	24.47	24.47	22.23	23.33	23.62
	Mean	24.07	24.03	22.05	22.30	23.11
45	With	24.33	25.47	22.83	22.53	23.79
	Without	24.47	25.87	23.47	21.63	23.86
	Mean	24.40	25.67	23.15	22.08	23.82
90	With	23.13	24.47	23.23	23.13	23.49
	Without	25.20	25.13	22.93	23.00	24.06
	Mean	24.16	24.80	23.08	23.06	23.77
135	With	24.00	25.63	23.53	22.90	24.01
	Without	26.60	25.93	23.47	23.07	24.77
	Mean	25.30	25.78	23.50	22.98	24.39
Over all mean	With	23.78	24.79	22.86	22.46	23.47
	Without	25.18	25.35	23.02	22.76	24.08
	Mean	24.48	25.07	22.94	22.61	23.77

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	0.47	0.72	P-dates x N	N.S	N.S
N-levels	0.34	0.47	P-dates x S	0.59	0.79
Suckers	0.29	0.39	N x S	N.S	N.S
			P-dates x N x S	1.17	1.57

Table (9): Mean stem diameter (mm) in 1982 season.

N-levels kg/fad	Suckers	Planting dates June 1	June 15	June 30	July 15	Mean
0	With	23.85	20.85	20.20	20.93	21.46
	Without	25.05	22.85	21.93	21.53	22.84
	Mean	24.45	21.85	21.06	21.23	22.15
45	With	24.40	23.20	20.78	20.93	22.33
	Without	25.50	22.65	22.90	20.68	22.93
	Mean	24.95	22.92	21.84	20.80	22.63
90	With	24.40	23.25	21.83	22.25	22.93
	Without	24.65	22.75	22.25	21.98	22.91
	Mean	24.52	23.00	22.04	22.11	22.92
135	With	23.80	23.15	21.18	22.25	22.59
	Without	25.15	24.45	22.80	21.88	23.57
	Mean	24.47	23.80	21.99	22.06	23.08
Over all mean	With	24.11	22.61	20.99	21.59	22.32
	Without	25.09	23.17	22.47	21.52	23.06
	Mean	24.60	22.89	21.73	21.55	22.69

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	0.99	1.42	P-dates x N	N.S.	N.S.
N-levels	N.S.	N.S.	P-dates x S	N.S.	N.S.
Suckers	0.44	0.58	N x S	N.S.	N.S.
			P-dates x N x S	N.S.	N.S.

(1974) and Awad (1976), while Sharma et al. (1969), Assey (1972), Shafshak et al. (1981) found that nitrogen had no significant effect on stem diameter of maize plant.

3.3. Effect of suckers:

Data of the two seasons showed that removing suckers resulted in a significant increment in stem diameter in the both seasons. However, in 1981, stem diameter was highly significant increased by 0.61 mm when suckers were removed. In 1982 season, a difference of 0.73 mm in stem diameter was obtained which was highly significant. Similar results were obtained by Dungan (1931) and Rosenquist (1941).

3.4. Effect of interaction:

The first order interaction of planting dates * suckers and the three way interaction of planting dates * nitrogen * suckers, were significant and affected stem diameter of maize plants in a positive manner only in one season. Tables (8 and 9).

4. Number of green leaves/plant:

4.1. Effect of planting dates:

Results in Tables (10 and 11) showed that differences in number of green leaves/plant between planting dates

Table (10): Mean number of green leaves/plant in 1981 season.

N-levels Kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	14.60	14.67	14.07	12.53	13.97
	Without	15.07	14.40	13.47	12.60	13.88
	Mean	14.83	14.53	13.77	12.56	13.92
45	With	14.40	14.53	14.00	13.13	14.01
	Without	15.20	15.20	14.27	13.10	14.44
	Mean	14.80	14.86	14.13	13.10	14.22
90	With	15.27	15.20	14.47	13.63	14.64
	Without	14.53	13.93	14.20	13.73	14.10
	Mean	14.90	14.56	14.33	13.68	14.37
135	With	15.67	14.93	14.40	13.33	14.58
	Without	14.53	15.53	14.93	14.53	14.88
	Mean	15.10	15.23	14.66	13.93	14.73
Over all mean	With	14.98	14.83	14.23	13.15	14.30
	Without	14.83	14.76	14.22	13.49	14.32
	Mean	14.91	14.79	14.22	13.32	14.31

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	0.15	0.23	P-dates x N	N.S.	N.S.
N-levels	0.38	0.52	P-dates x S	N.S.	N.S.
Suckers	N.S.	N.S.	N x S	0.33	0.44
			P-dates x N x S	0.66	0.88

Table (11): Mean numbers of green leaves/plant, in 1982 season.

N-levels kg/fad.	Suckers	Planting dates: June 1	June 15	June 30	July 15	Mean
0	With	14.30	13.45	13.80	12.90	13.61
	Without	14.20	13.90	13.45	12.60	13.54
	Mean	14.25	13.67	13.62	12.75	13.57
45	With	14,60	13.80	13.80	13.40	13.90
	Without	14.60	12.85	14.05	13.65	14.04
	Mean	14.60	13.82	13.93	13.52	13.97
90	With	14.45	13.65	14.10	13.00	13.80
	Without	14.90	14.10	14.05	13.70	14.19
	Mean	14.67	13.87	14.07	13.35	13.99
135	With	15.10	13.75	13.45	13.55	13.96
	Without	15.05	14.35	14.40	13.27	14.27
	Mean	15.07	14.05	13.92	13.42	14.11
Over all mean	With	14.61	13.66	13.79	13.21	13.82
	Without	14.69	14.05	13.99	13.30	14.01
	Mean	14.65	13.85	13.89	13.26	13.91

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	0.35	0.51	P-dates x N	N.S.	N.S.
N-levels	0.23	0.31	P-dates x S	N.S.	N.S.
Suckers	N.S.	N.S.	N. x S	N.S.	N.S.
			P-dates x N x S	N.S.	N.S.

at mid silking were significant in both seasons. Early planting of June 1 and June 15 gave the highest number of green leaves/plant as compared to the other planting dates. The decline in number of green leaves in late plantings may be due to the premature senescence of the older leaves. These results are in harmony with those obtained by Bisner (1973), Bedeer (1979) and Ba-Momen (1981).

4.2. Effect of N-levels:

Nitrogen levels influenced the number of green leaves/plant at mid silking stage in the both seasons. The highest effect was observed when N rate was raised from nill to 135 kg/fad. This result might be attributed to the effect of N in increasing vegetative growth and meristemic activity of maize plants, and is in agreement with that obtained by Salem (1977).

4.3. Effect of suckers:

Suckers removal did not show any significant effect on the number of green leaves/plant in both seasons. The present results agree with those obtained by Earley et al. (1971) and Downey (1972).

4.4. Effect of interaction:

The two types of interaction of nitrogen * suckers and planting dates * nitrogen * suckers, had significant

effect on the number of green leaves/plant in 1981, while in 1982 they were not significant (Tables 10 and 11).

5. Leaf area:

5.1. Effect of planting dates:

Planting dates showed significant influence on leaf area of the topmost ear in both seasons (Tables 12 and 13). The first planting date Jyly 1st gave the highest values of leaf area, nevertheless, the latest planting date of 15th July produced lower values of leaf area when compared with other planting dates. The increase in values of leaf area of early plantings may be due to more favourable temperature and day length than in late ones,and consequently better growth, in terms of taller and Sturdier plants with more leaves was obtained. Similar results were obtained by Diakenu (1962), Hamada (1972), Bisher (1973) and Ba-Momen (1981) who recorded that corn leaves of plants sown at late time were both shorter and narrower.

5.2. Effect of N-levels:

Data showed that leaf area of the topmost ear was affected by N fertilizer in both seasons. Data revealed that leaf area was increased progressively with increasing the rate of N from zero to 135 kg/fad. Generally, leaf area is affected by several factors such as water supply,

Table (12): Mean leaf area (cm^2) in 1981 season.

N-levels kg/fad.	Suckers	Planting dates: June 1	June 15	June 30	July 15	Mean
0	With	633.40	591.04	605.08	446.97	569.12
	Without	631.21	602.83	630.38	486.67	587.77
	Mean	632.30	596.93	617.73	466.82	578.44
45	With	658.09	609.95	598.09	495.43	590.39
	Without	680.38	647.30	616.07	475.86	604.90
	Mean	669.23	628.62	607.08	485.64	597.64
90	With	667.91	638.59	576.79	492.25	593.88
	Without	672.85	616.39	662.11	514.89	616.56
	Mean	670.38	627.49	619.45	503.57	605.22
135	With	667.02	634.18	656.58	522.79	620.14
	Without	681.83	707.54	638.94	535.55	640.96
	Mean	674.42	670.86	647.76	529.17	630.55
Over all mean	With	656.60	618.44	609.13	489.36	593.38
	Without	666.57	643.51	636.87	503.24	612.55
	Mean	661.58	630.97	623.00	496.30	602.96

L.S.D.	5%	1%
P-dates	21.72	32.91
N-levels	20.83	28.23
Suckers	16.34	22.51

L.S.D.	5%	1%
P-dates x N	N.S	N.S
P-dates x S	N.S	N.S
N x S	N.S	N.S
P-dates x N x S	N.S	N.S

Table (13): Mean leaf area (cm^2), in 1982 season.

N-levels Kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	553.14	535.22	450. 67	493.54	508.14
	Without	582.15	523.50	503.40	506.81	528.96
	Mean	567.64	529.36	477.03	500.17	518.55
45	With	571.16	555.20	514.80	524.58	541.43
	Without	584.32	553.60	534.07	520.27	548.06
	Mean	577.74	554.40	524.43	522.42	544.75
90	With	590.64	564.09	514.39	463.78	533.22
	Without	590.55	554.67	524.40	500.38	542.50
	Mean	590.59	559.38	519.39	482.08	537.86
135	With	599.00	564.64	544.69	554.96	565.82
	Without	597.24	564.43	558.20	558.04	569.48
	Mean	598.12	564.53	551.44	556.50	567.65
Over all mean	With	578.48	554.79	506.14	509.21	537.15
	Without	588.56	549.05	530.01	521.37	547.25
	Mean	583.52	551.92	518.07	515.29	542.20

L.S.D.	5%	1%
P-dates	36.89	53.00
N-levels	22.27	29.79
Suckers	N.S	N.S

L.S.D.	5%	1%
P-dates x N	N.S	N.S
P-dates x S	N.S	N.S
N x S	N.S	N.S
P-dates x N x S	N.S	N.S

average day temperature and amount of nutrients available. In particular N supply, plays a crucial role in building-up a suitable leaf area and thus the yielding capacity of corn plants is determined earlier in the season. Similar results were obtained by Niopek (1960), Crossmann (1966), Shafshak et al. (1981) and Salem et al. (1983).

5.3. Effect of suckers:

Data showed that the removal of suckers from maize plants resulted in an increase in the leaf area of the topmost ear. The differences obtained in 1981 were significant, while those of 1982 were not significant (Tables 12 and 13).

5.4. Effect of interaction:

In both seasons, all types of interaction between the experimental factors did not affect the leaf area of topmost ear significantly.

III. Effect of planting dates, N-levels and suckers on percentage of wilted plants:

1. Effect of planting dates:

The material used in this investigation was the Double Cross Pioneer 514 which is considered resistant to late wilt disease. Interestingly, the results obtained showed that planting dates influenced to some

extent the percentage of wilted plants. Results obtained in 1981 season were significant (P = 0.05). In contrast 1982 the results were not significant. The percentage of wilted plants tended to increase by delaying planting dates(Tables 14 and 15). The explanation given by Samra et al. (1966) interprets the results reported herein. They mentioned that infection with stalk rot is usually lower in summer-sown crop (April, May and June) than in Nile one (July and August).

2. Effect of N-levels:

The results obtained from both seasons showed that the rate of N fertilizer did not affect percentage of wilted plants (Tables 14 and 15). These results might be attributed to the fact that the infection of maize plants by rot pathogens occures earlier at the germination stages. Therefore, it should be expected that N level would not affect the percentage of wilted plants. Otherwise, the results obtained reflect an inherent ability of Pioneer 514 to resist stalk rot. In this respect, it should be noted that resistance to late wilt is mainly conditioned by the genetic constitution of the plant (El-Gresi, 1978).

3. Effect of suckers:

Suckers removal did not significantly affect the percentage of wilted plants. Generally, a negligible

Table (14): Mean percentage of diseased plants, in 1981 season.

N-levels Kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	8.37	10.83	11.23	8.23	9.66
	Without	7.80	8.43	11.13	8.73	9.02
	Mean	8.08	9.63	11.18	8.48	9.34
45	With	8.49	10.17	9.17	12.03	9.96
	Without	8.47	7.10	8.43	11.77	8.94
	Mean	8.48	8.63	8.80	11.90	9.45
90	With	7.80	7.27	10.77	7.43	8.32
	Without	7.30	6.30	9.80	10.07	8.37
	Mean	7.55	6.78	10.28	8.75	8.34
135	With	9.00	8.33	8.10	9.43	8.71
	Without	7.20	6.43	7.23	10.23	7.77
	Mean	8.10	7.38	7.66	9.83	8.24
Over all mean	With	8.41	9.15	9.82	9.28	9.16
	Without	7.69	7.06	9.15	10.20	8.52
	Mean	8.05	8.10	9.48	7.74	8.84

L.S.D.	5%	1%
P-dates	1.06	1.60
N-levels	N.S	N.S
Suckers	N.S	N.S

L.S.D.	5%	1%
P-dates x N	N.S	N.S
P-dates x S	N.S	N.S
N x S	N.S	N.S
P-dates x N x S	N.S	N.S

Table (15): Mean percentage of diseased plants, in 1982 season.

N-levels kg/fad	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	8.69	8.80	10.40	9.95	9.46
	Without	7.08	7.00	8.56	7.90	7.63
	Mean	7.88	7.90	9.48	8.93	8.54
45	With	10.95	8.29	8.45	7.19	8.72
	Without	7.65	9.17	6.32	10.16	8.32
	Mean	9.30	8.73	7.38	8.67	8.52
90	With	7.46	6.86	6.97	8.75	7.51
	Without	4.72	6.49	10.17	9.19	7.64
	Mean	6.09	6.67	8.57	8.97	7.57
135	With	8.17	8.36	8.65	6.93	8.03
	Without	5.42	6.77	8.75	8.65	7.40
	Mean	6.80	7.56	8.70	7.79	7.72
Over all mean	With	8.82	8.08	8.62	8.21	8.43
	Without	6.22	7.36	8.45	8.97	7.75
	Mean	7.52	7.72	8.53	8.59	8.09

L.S.D.	5%	1%
P-dates	N.S	N.S
N-levels	N.S	N.S
Suckers	N.S	N.S

L.S.D.	5%	1%
P-dates x N	N.S	N.S
P-dates x S	N.S	N.S
N x S	N.S	N.S
P-dates x N x S	N.S	N.S

increase in wilted plants was found when suckers were left in. This result might be attributed to the fact that late-wilt pathogens infect the plants of maize earlier at the germination stage.

4. Effect of interaction:

All types of interaction of N-levels, planting dates and sucker removal showed no significant effect on percentage of wilted plants in both seasons. This result indicates that each factor acted separately in affecting this character.

IV. Effect of planting dates, N-levels and suckers on yield components:

1. Percentage of barren plants:

1.1. Effect of planting dates:

Data reveal that the effect of planting dates on the percentage of barren plants was significant (Tables 16 and 17). Early planting dates yielded a lower percentage of barren plants than late ones. The high percentage of barrens associated with late plantings may be attributed to stalk and root diseases, and plantings borers infestation with increased temperature and higher relative humidity during the period of vegetative growth of late sowings. In most areas of corn production, such pests damage stalks and may impair the

Table (16): Mean percentage of barren plants, in 1981 season.

N-levels kg/fad.	Suchers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	2.12	0.87	8.55	8.26	4.95
	Without	2.19	3.59	3.09	11.03	4.97
	Mean	2.15	2.23	5.82	9.64	4.96
45	With	2.20	2.97	3.98	6.71	3.96
	Without	1.68	3.09	7.31	10.61	5.67
	Mean	1.94	3.03	5.64	8.66	4.82
90	With	0.44	2.86	5.42	8.08	4.20
	Without	1.25	2.69	6.51	7.26	4.43
	Mean	0.84	2.77	5.96	7.67	4.31
135	With	2.60	1.43	7.60	8.15	4.94
	Without	0.76	1.75	2.46	1.43	1.60
	Mean	1.68	1.59	5.03	4.79	3.27
Over all mean	With	1.84	2.03	6.39	7.80	4.51
	Without	1.47	2.78	4.84	7.58	4.17
	Mean	1.65	2.40	5.61	7.69	4.34

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	2.19	3.33	P-dates x N	1.40	1.80
N-levels	0.22	0.30	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

Table (17): Mean percentage of barren plants, in 1982 season.

N-levels kg/fad	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	4.97	2.67	4.52	7.35	4.88
	Without	2.36	3.50	6.37	9.38	5.40
	Mean	3.66	3.08	5.44	8.36	5.14
45	With	4.00	4.05	7.17	5.02	5.06
	Without	4.74	1.72	3.75	9.90	5.03
	Mean	4.37	2.88	5.46	7.46	5.04
90	With	0.82	3.20	4.02	6.07	3.53
	Without	1.07	2.00	3.85	6.30	3.30
	Mean	0.94	2.60	3.93	6.18	3.41
135	With	0.00	2.00	2.02	5.28	2.32
	Without	2.20	1.83	2.50	1.47	2.00
	Mean	1.10	1.91	2.26	3.37	2.16
Over all mean	With	2.45	2.98	4.43	5.93	3.95
	Without	2.59	2.26	4.12	6.76	3.93
	Mean	2.52	2.62	4.27	6.34	3.94

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	2.08	2.99	P-dates x N	N.S	N.S
N-levels	1.38	1.85	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

lowest percentage of barren plants was obtained by planting maize in June 1 and with the application of 90 kg N/fad. On the contrary the highest percentage of barren plants was obtained by planting in July 15th and with no nitrogen applied. In 1982 season, the interaction of planting dates * N did not have a significant effect on percentage of barreness.

2. Number of ears/plant:

2.1. Effect of planting dates:

Differences in number of ears/plant due to planting dates were significant in both seasons (Tables 18 and 19). It is apparent that ear number/plant diclined with delayed planting dates. Such trend may be a result of better conditions that accompany the early planting. Similar results were obtained by Kassem (1964), Hamada (1972), Bisher (1973) and Ba-Momen (1981).

2.2. Effect of N-levels:

Number of ears/plant increased significantly as a result of N application. This might be attributed to the effect of N in increasing both meristematic activity and fertility of maize plants. Such result indicates that N has a major role in promoting ear production in maize. Similar results were obtained by Shafshak et al. (1981), Salem et al. (1982) and (1983).

Table (18): Mean number of ears/plant, in 1981 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	1.02	0.99	0.91	0.94	0.965
	Without	1.03	1.00	0.95	0.89	0.967
	Mean	1.025	0.995	0.93	0.915	0.966
45	With	1.05	1.00	0.92	0.92	0.972
	Without	1.01	0.98	0.91	0.93	0.957
	Mean	1.03	0.99	0.915	0.925	0.965
90	With	1.04	1.01	0.94	0.95	0.985
	Without	1.06	1.00	0.94	0.89	0.972
	Mean	1.05	1.005	0.94	0.92	0.979
135	With	1.04	1.02	0.96	0.92	0.985
	Without	1.11	1.01	0.97	0.98	1.017
	Mean	1.075	1.015	0.965	0.95	1.001
Over all Mean	With	1.037	1.005	0.932	0.932	0.977
	Without	1.052	0.997	0.942	0.922	0.978
	Mean	1.044	1.001	0.937	0.927	0.977

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	0.029	0.045	P-dates x N	N.S	N.S
N-levels	0.020	0.028	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	0.019	0.025
			P-dates x N x S	0.038	0.051

Table (19): Mean number of ears/plant, in 1982 season.

N-levels Kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	1.01	0.99	0.94	0.93	0.967
	Without	1.04	0.99	0.93	0.95	0.977
	Mean	1.025	0.99	0.935	0.94	0.972
45	With	1.02	0.99	0.97	0.96	0.985
	Without	1.03	0.98	0.94	0.94	0.972
	Mean	1.025	0.985	0.955	0.95	0.979
90	With	1.07	1.01	0.97	0.96	1.003
	Without	1.09	1.01	0.96	0.97	1.007
	Mean	1.08	1.01	0.965	0.965	1.005
135	With	1.19	1.06	0.99	0.99	1.057
	Without	1.16	1.10	0.99	0.98	1.057
	Mean	1.175	1.08	0.99	0.985	1.057
Over all Mean	With	1.072	1.012	0.967	0.96	1.003
	Without	1.080	1.020	0.955	0.96	1.004
	Mean	1.076	1.016	0.961	0.96	1.003

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	0.048	0.068	P-dates x N	N.S	N.S
N-levels	0.029	0.039	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

2.3. Effect of suckers:

Suckers did not show any significant differences on the number of ears/plant in both seasons (Tables 18 and 19). Similar results were obtained by Earley et al. (1971).

2.4. Effect of interaction:

In both seasons, all types of interaction between the studied factors did not show any significant effect on number of ears/plant (Tables 18 and 19).

3. Percentage of double-eared plants:

3.1. Effect of planting dates:

Planting date showed a significant effect on the percentage of double-eared plants (Tables 20 and 21). Early planting dates produced a higher percentage of double-eared plants than the late plantings in both seasons. Similar results were obtained by Mohmoud (1967), Abo-Khadrah (1968), Singh and Singh (1971), Ibrahim (1976), and Bedeer (1979).

3.2. Effect of N-levels:

Nitrogen increased the percentage of double-eared/plant significantly in both seasons. These results could be due to the role of nitrogen in enhancing meristematic activity and fertility of maize plants and agree with those obtained by Assey (1972).

Table (20): Mean percentage of double-eared plants, in 1981 season.

N-levels Kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	4.32	1.78	0.88	0.00	1.74
	Without	5.12	1.27	0.00	0.87	1.81
	Mean	4.72	1.52	0.44	0.43	1.78
45	With	5.18	1.80	0.88	1.34	2.30
	Without	3.10	3.13	0.50	0.93	1.91
	Mean	4.14	2.46	0.69	1.13	2.10
90	With	6.57	1.30	0.47	0.90	2.31
	Without	7.22	1.27	0.95	0.00	2.36
	Mean	6.89	1.28	0.71	0.45	2.33
135	With	6.00	2.59	2.26	1.30	3.04
	Without	11.33	4.96	1.67	0.93	4.72
	Mean	8.66	3.77	1.96	1.11	3.88
Over all mean	With	5.52	1.87	1.12	0.88	2.35
	Without	6.69	2.66	0.78	0.68	2.70
	Mean	6.10	2.26	0.95	0.78	2.52

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	1.94	2.95	P-dates x N	N.S	N.S
N-levels	1.37	1.86	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	1.10	1.48
			P-dates x N x S	2.20	2.96

Table (21): Mean percentage of double-eared plants, in 1982 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	2.90	3.50	1.72	1.12	2.31
	Without	3.05	1.15	1.79	1.80	1.95
	Mean	2.97	2.32	1.75	1.46	2.13
45	With	3.02	2.97	3.20	1.88	2.77
	Without	3.69	1.47	1.15	1.45	1.94
	Mean	3.35	2.22	2.17	1.66	2.35
90	With	3.36	3.37	4.70	2.50	3.48
	Without	5.25	4.75	2.55	2.62	3.79
	Mean	4.30	4.06	3.62	2.56	3.63
135	With	9.32	8.20	3.32	2.81	5.91
	Without	9.27	9.45	4.10	2.59	6.35
	Mean	9.29	8.82	3.71	2.70	6.13
Over all mean	With	4.65	4.51	3.23	2.08	3.62
	Without	5.31	4.20	2.40	2.11	3.51
	Mean	4.98	4.35	2.81	2.09	3.56

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	0.74	1.07	P-dates x N	N.S	N.S
N-levels	1.40	1.90	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

3.3. Effect of suckers:

Suckers did not affect the percentage of double-ear plants in a significant manner in both seasons. Many investigators studied the effect of suckers on corn yield. Dungan (1931) showed a very slight superiority in yield in favor of the plants with suckers. Similarly, Earley et al. (1971) did not find differences in yield of plants with suckers and those without them.

3.4. Effect of interaction:

The effect of various interactions between the studied factors on the percentage of plants bearing more than one ear was not significant in both seasons.

4. Ear length and diameter:

4.1. Effect of planting dates:

Data presented in Tables (22, 23, 24 and 25) indicated that planting dates had a significant effect on ear length and ear diameter. Ear length and ear diameter tended to be taller and thicker at early plantings. The two measurements tended to decrease as planting date was delayed. Such effect might in general be due to better growth of early plantings, that manifest itself in taller and thicker plant with higher number of large green leaves. This was in agreement with the results obtained by Ibrahim (1976), Bedeer (1979) and Ba-Momen (1981).

Table (22): Mean Ear length (cm), in 1981 season.

N-levels Kg/fad.	Suckers	Planting dates June 1	June 15	June 30	July 15	Mean
0	With	15.20	15.80	13.20	11.87	14.02
	Without	15.50	15.33	13.47	11.93	14.06
	Mean	15.35	15.56	13.34	11.90	14.04
45	With	15.67	16.00	13.40	11.53	14.15
	Without	16.40	16.67	14.00	12.33	14.85
	Mean	16.03	16.33	13.70	11.93	14.50
90	With	15.13	16.73	13.87	12.40	14.53
	Without	16.47	17.60	14.10	12.40	15.14
	Mean	15.80	17.16	13.98	12.40	14.83
135	With	16.87	18.33	14.57	12.33	15.52
	Without	17.20	18.67	14.13	12.80	15.70
	Mean	17.03	18.50	14.35	12.56	15.61
Over all mean	With	15.72	16.71	13.76	12.03	14.55
	Without	16.39	17.07	13.92	12.36	14.94
	Mean	16.05	16.89	13.84	12.19	14.74

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	0.46	0.69	P-dates x N	N.S	N.S
N-levels	0.61	0.83	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

Table (23): Mean Ear length (cm), in 1982 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	14.10	14.36	12.37	12.32	13.29
	Without	14.43	14.31	13.44	12.05	13.56
	Mean	14.26	14.33	12.90	12.18	13.42
45	With	15.70	15.62	13.40	12.45	14.29
	Without	16.20	15.34	13.39	12.02	14.24
	Mean	15.95	15.48	13.39	12.23	14.26
90	With	15.92	14.94	14.22	13.60	14.67
	Without	16.40	15.97	14.07	13.65	15.02
	Mean	16.16	15.45	14.14	13.62	14.84
135	With	16.47	16.77	14.04	13.12	15.10
	Without	16.45	16.79	14.40	13.75	15.35
	Mean	16.46	16.78	14.22	13.43	15.22
Over all mean	With	15.55	15.42	13.51	12.87	14.34
	Without	15.87	15.60	13.82	12.87	14.54
	Mean	15.71	15.51	13.66	12.87	14.44

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	0.89	1.28	P-dates x N	N.S	N.S
N-levels	0.53	0.71	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

Table (24): Mean Ear diameter (mm) in 1981 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	47.93	52.87	47.00	48.80	49.15
	Without	49.67	52.13	47.73	48.00	49.38
	Mean	48.80	52.50	47.36	48.40	49.26
45	With	49.53	51.93	48.93	46.07	49.11
	Without	49.73	50.07	48.87	47.47	49.03
	Mean	49.63	51.00	48.90	46.77	49.07
90	With	49.60	52.00	47.27	48.00	49.22
	Without	49.93	49.67	48.27	45.20	48.27
	Mean	49.76	50.83	47.77	46.60	48.74
135	With	50.53	52.93	46.93	47.80	49.55
	Without	49.00	51.60	47.40	48.27	49.07
	Mean	49.77	52.26	47.16	48.04	49.31
Over all mean	With	49.40	52.43	47.53	47.67	49.26
	Without	49.58	50.87	48.07	47.23	48.94
	Mean	49.49	51.65	47.80	47.45	49.10

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	1.63	2.46	P-dates x N	N.S	N.S
N-levels	N.S	N.S	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

Table (25): Mean Ear diameter (mm) in 1982 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	47.32	48.12	42.32	42.65	45.10
	Without	47.40	49.15	43.92	41.72	45.55
	Mean	47.36	48.63	43.12	42.18	45.32
45	With	48.80	46.52	43.62	42.85	45.45
	Without	48.87	49.60	44.17	43.02	46.41
	Mean	48.83	48.06	43.89	42.93	45.93
90	With	47.90	47.32	42.52	42.47	45.05
	Without	48.30	48.92	45.47	42.67	46.34
	Mean	48.10	48.12	43.99	42.57	45.59
135	With	49.47	49.50	42.50	43.42	46.22
	Without	49.87	49.55	46.92	44.45	47.70
	Mean	49.67	49.52	44.71	43.93	46.96
Over all mean	With	48.37	47.86	42.74	42.85	45.45
	Without	48.61	49.30	45.12	42.96	46.50
	Mean	48.49	48.58	43.93	42.90	45.97

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	1.72	2.47	P-dates x N	N.S	N.S
N-levels	0.67	0.89	P-dates x S	N.S	N.S
Suckers	0.86	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

4.2. Effect of N-levels:

Ear length increased significantly as N level increased up to 135 kg/fad. in 1981 and up to 90 kg/fad. in 1982 season. These results might be attributed to the effect of N in increasing the vegetative growth and meristematic activity of maize plants. Similar results were obtained by Hussein et al. (1977), Abdel Messih (1978) and Salem et al. (1982).

In regard to ear diameter, nitrogen showed a significant effect in one season only, while in the other season the differences in ear diameter were not significant. In 1982, the ear diameter increased significantly as the nitrogen level increased to 135 kg/fad. The effect of N on ear diameter of maize plants has been studied by many investigators. Abdel Messih (1978) and Shafshak et al. (1981), found that ear diameter did not increase significantly in N-treated plots. On the other hand, Hussein et al. (1977) and Salem et al. (1983) found that ear diameter increased significantly by the application of N fertilizer.

4.3. Effect of suckers:

The slight effect of suckers removal on reducing ear length and ear diameter was not significant for both seasons (Tables 22, 23, 24 and 25). These results are

in agreement with Lyon (1905), Montgomery (1909), and Earley et al. (1971). They reported that removing suckers from corn plants resulted in a significant reduction in yield of grain/acre.

4.4. Effect of interaction:

In both seasons, all types of interactions between the studied factors had no significant effect on ear length and ear diameter. This result indicates that planting dates, N-levels and suckers acted separately in affecting the two characters.

5. Weight of ear and of kernels/ear:

5.1. Effect of planting dates:

Differences in weight of ear and of kernels/ear due to planting dates were significant in both seasons. June 1 planting surpassed significantly other planting dates in weight of ears and of kernels/ear in both seasons. Similar results were obtained by Kassem (1964),Yousef (1968), Bisher (1973) and Ba-Momen (1981), who found a decline in weight of ear and of kernels/ear as planting date was delayed.

5.2. Effect of N-levels:

Ear weight and kernels weight/ear increased significantly by the application of N up to the rate of 135 kg/fad. in 1981 season and up to 90 kg/fad. in 1982

season (Tables 26, 27, 28 and 29). This increase is due to the increase in ear length and ear diameter because of N application. Similar results were also obtained by Hussein et al. (1977), Shafshak et al. (1981), Salem et al. (1982) and Salem et al. (1983).

5.3. Effect of suckers:

Data presented in Tables (26, 27, 28 and 29) indicated that suckers had no significant effect on ear weight and weight of grain/ear. The present results agree with those obtained by Downey (1972) who reported that removal of suckers had no effect on grain yield. He explained his results on the basis that the main stems grew larger to compensated for the removed suckers.

5.4. Effect of interaction:

In both seasons, all types of interaction had no significant effects on weight of ear and weight of kernels/ear, interaction of planting dates x suckers had a significant effect on both characters in one season - i.e, 1982 season. In this season, high values of ear weight and kernels/ear were obtained from June 1st planting of plants without suckers. Nevertheless, the lowest means were obtained from July 15th from plants with left-in suckers.

Table (26): Mean ear weight (g), in 1981 season.

N-level kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	212.64	199.69	185.04	169.76	191.78
	Without	223.47	196.50	181.01	170.99	192.99
	Mean	218.05	198.09	183.02	170.37	192.38
45	With	230.18	214.57	192.53	174.53	202.95
	Without	234.30	217.06	177.19	180.88	202.36
	Mean	232.24	215.81	184.86	177.70	202.65
90	With	234.25	218.90	186.42	180.30	204.97
	Without	225.03	219.62	174.34	186.87	201.46
	Mean	229.64	219.26	180.38	183.58	203.21
135	With	233.91	240.01	199.33	181.28	213.63
	Without	235.64	236.41	197.77	190.38	215.05
	Mean	234.77	238.21	198.55	185.83	214.34
Over all mean	With	227.74	218.29	190.83	176.47	203.33
	Without	229.61	217.40	182.58	182.28	202.97
	Mean	228.67	217.84	186.70	179.37	203.15

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	7.16	10.85	P-dates x N	N.S	N.S
N-levels	9.37	12.69	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

Table (27): Mean ear weight (g), in 1982 season.

N-levels Kg/fad	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	257.72	255.30	193.72	171.04	219.44
	Without	247.39	219.63	219.51	216.95	225.87
	Mean	252.55	237.46	206.61	193.99	222.65
45	With	264.49	260.73	218.09	213.50	239.20
	Without	270.70	240.89	227.22	212.07	237.72
	Mean	267.59	250.81	222.65	212.78	238.46
90	With	267.49	277.07	238.22	219.39	250.54
	Without	273.24	233.35	241.27	252.55	250.10
	Mean	270.36	255.21	239.74	235.97	250.32
135	With	275.92	277.35	249.12	217.38	254.94
	Without	284.33	274.00	230.14	244.27	258.18
	Mean	280.12	275.67	239.63	230.82	256.56
Over all mean	With	266.40	267.61	224.79	205.33	241.03
	Without	268.91	241.97	229.53	231.46	242.97
	Mean	267.65	254.79	227.16	218.39	242.00

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	18.60	26.70	P-dates x N	N.S	N.S
N-levels	17.04	22.79	P-dates x S	46.18	61.59
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

Table (28): Mean weight of kernels/ear (g), in 1981 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	208.01	171.43	151.64	143.31	168.60
	Without	198.74	168.91	150.85	140.09	164.65
	Mean	203.37	170.17	151.24	141.70	166.62
45	With	200.87	209.02	167.78	145.09	180.69
	Without	214.25	207.34	145.94	147.73	178.81
	Mean	207.56	208.18	156.86	146.41	179.75
90	With	214.94	211.75	157.39	147.96	183.01
	Without	213.51	201.59	135.70	156.90	176.92
	Mean	214.22	206.67	146.54	152.43	179.96
135	With	217.53	219.53	175.21	152.71	191.24
	Without	215.70	213.80	166.93	155.10	187.88
	Mean	216.61	216.66	171.07	153.91	189.56
Over all mean	With	210.34	202.93	163.00	147.27	180.88
	Without	210.55	197.91	149.85	149.95	177.06
	Mean	210.44	200.42	156.43	148.61	178.97

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	9.38	14.22	P-dates x N	N.S	
N-levels	10.44	14.14	P-dates x S	N.S	
Suckers	N.S		N x S	N.S	
			P-dates x N x S	N.S	

Table (29): Mean weight of kernels/ear (g), in 1982 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	209.13	218.74	145.46	134.86	177.05
	Without	185.82	171.90	169.43	164.71	172.96
	Mean	197.47	195.32	157.44	149.78	175.00
45	With	216.26	207.09	164.94	163.33	187.90
	Without	222.06	187.06	164.04	163.58	184.18
	Mean	219.16	197.07	164.49	163.45	186.04
90	With	225.23	225.77	179.12	161.01	197.78
	Without	217.57	187.47	184.47	184.52	193.51
	Mean	221.40	206.62	181.79	172.76	195.64
135	With	229.12	203.87	192.05	165.38	197.60
	Without	217.88	205.40	175.81	188.13	196.80
	Mean	223.50	204.63	183.93	176.75	197.20
Over all mean	With	219.93	213.87	170.39	156.14	190.08
	Without	210.83	187.96	173.44	175.23	186.86
	Mean	215.38	200.91	171.91	165.68	188.47

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	13.17	18.92	P-dates x N	N.S	N.S
N-levels	13.75	18.40	P-dates x S	15.77	21.03
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

6. Weight of 100 kernels:

6.1. Effect of planting dates:

Results in Tables (30 and 31) showed that planting dates had a significant effect on weight of 100 kernels. In general, weight of 100 kernels decreased progressively as planting was delayed until July 15th. Early planting seemed to have a considerable effect on increasing leaf area early in the season and consequently more accumulation of dry matter in grains. Accumulation of more dry matter in grains of early planting could be atrributed to more favourable environmental conditions during the growth and development of maize plants. Similar conclusions were reported by Singh and Singh (1971), Ibrahim (1976), Bedeer (1979) and Ba-Momen (1981) who mentioned that 100 kernel weight of early plantings tended to be higher than late ones.

6.2. Effect of N-levels:

Data revealed that N showed a significant effect on the weight of 100 kernels. The high significant increase in the weight of 100 kernels was obtained by applying 135 kg and 90 kg N/fad. in 1981 and 1982, respectively. The effect of nitrogen on the weight of 100 kernels was studied by many investigators. Assey (1972) and Salem et al. (1983), found that weight of

Table(30): Mean weight of 100 kernel (g), in 1981 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	34.98	34.98	29.96	30.06	32.49
	Without	35.63	34.98	31.87	30.56	33.26
	Mean	35.30	34.98	30.91	30.31	32.87
45	With	36.29	36.61	31.87	30.38	33.79
	Without	36.62	36.94	29.90	31.01	33.62
	Mean	36.45	36.77	30.88	30.69	33.70
90	With	36.13	37.13	31.05	30.71	33.75
	Without	39.07	36.94	30.56	31.03	34.40
	Mean	37.60	37.03	30.80	30.87	34.07
135	With	37.76	37.27	31.38	31.87	34.57
	Without	37.24	38.58	31.05	30.86	34.43
	Mean	37.50	37.92	31.21	31.36	34.50
Over all mean	With	36.29	36.50	31.06	30.75	33.65
	Without	37.14	36.80	30.84	30.86	33.93
	Mean	36.71	36.68	30.95	30.81	33.79

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	1.09	1.65	P. dates x N	N.S	N.S
N-levels	1.01	1.36	P. dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

Mean	37.31	36.56	32.73	31.46	34.57

L.S.D.	5%	1%	L.S.D.	5%	1%

Table (31): Mean weight of 100 kernel (g), in 1982 season.

N-levels Kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	36.64	32.67	31.65	29.68	32.66
	Without	34.31	34.35	31.11	31.67	32.86
	Mean	35.47	33.51	31.38	30.67	32.76
45	With	36.61	34.71	32.87	30.49	33.67
	Without	38.10	34.80	33.19	31.90	34.50
	Mean	37.35	34.75	33.03	31.91	34.08
90	With	38.36	37.41	32.03	31.84	34.91
	Without	38.73	38.91	32.72	31.51	35.47
	Mean	38.54	38.16	32.37	31.67	35.19
135	With	38.52	40.63	33.10	32.37	36.15
	Without	38.87	39.00	35.23	32.27	36.34
	Mean	38.69	39.81	34.16	32.32	36.24
Over all mean	With	37.53	36.35	32.41	31.09	34.35
	Without	37.50	36.76	33.06	31.84	34.79
	Mean	37.51	36.56	32.73	31.46	34.57

L.S.D.	5%	1%
P-dates	1.21	1.74
N-levels	1.37	1.83
Suckers	N.S	N.S

L.S.D.	5%	1%
P-dates x N	N.S	N.S
P-dates x S	N.S	N.S
N x S	N.S	N.S
P-dates x N x S	N.S	N.S

100 kernels of maize increased significantly by the application of N, whereas Khalifa (1970) and Abdel Messih (1978) found that differences in 100 kernels weight due to various nitrogen rates were not significant.

6.3. Effect of suckers:

Though the weight of 100 kernel was slightly higher in plants of which suckers were removed; the effect was not significant. Similar results were also obtained by Dungan (1931) who found that removal of suckers from maize plants did not significantly affect grain yield.

6.4. Effect of interaction:

In both seasons, all types of interactions between the studied factors did not show significant effects on the weight of 100 kernels.

7. Grain yield per plant:

7.1. Effect of planting dates:

Grain yield/plant was significantly affected by planting dates in both seasons. Grain yield/plant decreased when planting date was delayed beyond June 1 in both seasons. These results might be attributed to the effect of planting dates on ear length, ear diameter, number of ears/plant and ear weight. These results are in general agreement with those obtained by El-Shafey

Table (32): Mean grain yield per plant (g) in 1981 season.

N-level kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	131.67	118.75	107.92	94.58	113.23
	Without	158.25	115.00	107.50	97.50	119.56
	Mean	144.96	116.87	107.71	96.04	116.39
45	With	141.25	143.75	113.75	97.08	123.96
	Without	160.83	151.25	105.83	108.75	131.66
	Mean	151.04	147.50	109.79	102.91	127.81
90	With	151.25	149.58	114.58	103.75	129.79
	Without	160.92	145.00	101.25	110.83	129.50
	Mean	156.08	147.29	107.91	107.29	129.64
135	With	156.25	152.08	127.50	106.25	135.52
	Without	157.08	152.92	124.17	110.42	136.15
	Mean	156.66	152.50	125.83	108.33	135.83
Over all mean	With	145.10	141.04	115.94	100.41	125.62
	Without	159.27	141.04	109.69	106.87	129.22
	Mean	152.18	141.04	112.81	103.64	127.42

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	18.77	28.44	P-dates x N	N.S	N.S
N-levels	7.44	10.09	P-dates x S	8.69	11.66
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

Table (33): Mean Grain Yield per plant (g), in 1982 season.

N-levels Kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	171.62	155.80	156.05	136.43	154.97
	Without	172.68	175.30	151.11	154.63	163.43
	Mean	172.15	165.55	153.58	145.53	159.20
45	With	188.30	179.06	158.87	145.19	167.85
	Without	179.30	162.24	154.46	167.16	165.79
	Mean	183.80	170.65	156.66	156.17	166.82
90	With	185.88	178.25	166.46	170.43	175.25
	Without	185.67	173.23	164.04	166.30	172.31
	Mean	185.77	175.74	165.25	168.36	173.78
135	With	190.63	192.48	193.28	167.71	186.02
	Without	180.53	178.20	164.78	176.76	175.07
	Mean	185.58	185.34	179.03	172.23	180.54
Over all mean	With	184.11	176.40	168.66	154.94	171.03
	Without	179.54	172.24	158.60	166.21	169.15
	Mean	181.82	174.32	163.63	160.57	170.09

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	11.39	16.36	P-dates x N	N.S	N.S
N-levels	11.25	15.05	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

(1965), Bisher (1973), Bedeer (1979) and Ba-Momen (1981), who found that July planting gave a lower yield of grain/plant than other planting dates.

7.2. Effect of N-levels:

It was found in both seasons that grain yield/plant was affected by N levels. The weight of grain/plant increased significantly as N level increased up to 45 kg/fad. in the first season and 90 kg/fad. in the second season. In 1981 season, the difference between 45 and 90 kg N/fad. was insignificant. Though, the data of 1982 season did not show any significant difference between 90 and 135 kg N/fad., yet the effect of N on grain yield/plant could still be detected. These results might be attributed to the significant role of nitrogen fertilizer in affecting ear length, ear diameter, ear weight and number of ears/plant. In support of such results Gouda (1982) and Salem et al. (1982) reported that grain yield/plant increased when N levels were increased.

7.3. Effect of suckers:

Suckers showed a nonsignificant effect on weight of grain/plant in the two successive seasons. Many investigators studied the effect of suckers on grain yield. Dungan (1931) and Downey (1972) reported that

removing suckers from corn plants resulted in a non-significant reduction in grain yield. Montgomery (1909), Koedzdikov and Bozhidarevich (1964) and Earley et al. (1971) reported that removing suckers from corn plants resulted in a slight to significant reductions in grain yield.

7.4. Effect of interaction:

In 1981 season, the interaction of various factors had no significant effect on the weight of grain/plant except that between planting dates and suckers. Data show that the highest value of grain yield/plant was obtained from June 1 planting with removal of suckers. On the other hand,the lowest value was obtained by planting in July 15 of with suckers left in (Tables 32 and 33). While, in 1982 different interactions of the three studied factors showed no significant effect on grain yield/plant.

V. Effect of planting dates, N-levels and suckers on yield of maize:

1. Grain yield per faddan:

1.1. Effect of planting dates:

Grain yield/fad. has been considerably affected by planting dates. Planting on June 1 provided the highest grain yield in both seasons. However, the

yield of grain/fad. tended to decrease 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 an efficient plant canopy,and thus a better source - sink relationship. Moreover, early plantings decrease percentage of barren plants and percentage of wilted plants compared to late planting date.

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 (Bates, 1955; Eugeniusz, 1956 and Samra et al., 1966).

Similar results were also reported by El-Shafey(1965), Abo-Khadrah (1968), Singh and Singh (1971), Alessi and Power (1975), Ibrahim (1976), Bedeer (1979) and Ba-Momen (1981).

1.2. Effect of N-levels:

The grain yield of maize increased significantly as N level increased till the rate of 135 kg N/fad. The highest rate of 135 kg/fad. did not result in a

further significant increase in grain yield. The application of 45, 90 and 135 kg N/fad. increased the grain yield by 9, 12 and 17% in 1981 season and by 8, 12 and 15% in the second season, respectively. These results are expected since the addition of nitrogen has a favourable effect on all parameters determining small Yield container,source capacity and plus a reducing effect on the percentage of barren plants. Generally, these results are in a good agreement with the findings of Hussein et al. (1974), Shafshak et al. (1981), Salem et al. (1982) and (1983).

1.3. Effect of suckers:

Generally, suckers had no significantly effect on grain yield/fad. of both seasons. The increases in grain yield occurred by removing suckers in both seasons were not significant (Tables 34 and 35). These results are expected since suckers removal showed no significant effect on the number of ears/plant, ear length, ear weight, weight of grain/ear weight of 100 kernels and grain yield/plant. These results are in good agreement with Dungan (1931) Earley et al. (1971). They reported a very slight superiority in yield in favour of the plants with suckers over those without suckers.

Table (34): Mean grain yield/fad. (kg), in 1981 season.

N-levels kg/fad.	Suckers	Planting dates: June 1	June 15	June 30	July 15	Mean	Relative
0	With	2106.67	1900.00	1726.67	1513.33	1811.67	
	Without	2533.33	1840.00	1720.00	1560.00	1913.33	
	Mean	2320.00	1870.00	1723.33	1536.66	1862.50	100
45	With	2260.00	2300.00	1833.33	1553.33	1986.66	
	Without	2573.33	2420.00	1620.00	1740.00	2088.33	
	Mean	2416.66	2360.00	1726.66	1646.66	2037.50	109
90	With	2420.00	2393.33	1820.00	1660.00	2073.33	
	Without	2573.33	2320.00	1693.33	1773.33	2090.00	
	Mean	2496.66	2356.66	1756.66	1716.66	2081.66	112
135	With	2500.00	2433.33	2040.00	1700.00	2168.33	
	Without	2513.33	2446.67	1986.67	1766.67	2178.33	
	Mean	2506.66	2440.00	2013.33	1733.33	2173.33	117
Over all mean	With	2321.67	2256.66	1855.00	1606.66	2010.00	
	Without	2548.33	2256.67	1755.00	1710.00	2067.50	
	Mean	2435.00	2256.66	1805.00	1658.33	2038.75	
	Relative	100	93	74	68		

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	300.10	454.60	P-dates x N	N.S	N.S
N-levels	119.20	161.50	P-dates x S	141.0	189.20
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

Table (35): Mean grain yield/fad. kg, in 1982 season.

N-levels kg/fad.	Suckers	Planting dates June 1	June 15	June 30	July 15	Mean	Relative
0	With	2402.50	2297.50	2177.50	1902.50	2195.00	
	Without	2412.50	2367.50	2190.00	2160.00	2282.50	
	Mean	2407.50	2332.50	2183.75	2031.25	2238.75	100
45	With	2627.50	2532.50	2300.00	2137.50	2399.37	
	Without	2502.50	2610.00	2272.00	2327.50	2428.00	
	Mean	2565.00	2571.25	2286.00	2232.50	2413.69	108
90	With	2637.50	2750.00	2327.50	2280.00	2498.75	
	Without	2635.00	2732.50	2407.50	2320.00	2523.75	
	Mean	2636.25	2741.25	2367.50	2300.00	2511.25	112
135	With	2757.50	2742.50	2477.50	2295.50	2568.25	
	Without	2840.00	2622.50	2470.00	2360.00	2573.12	
	Mean	2798.75	2682.50	2473.75	2327.75	2570.69	115
Over all mean	With	2606.25	2580.62	2320.62	2153.87	2415.34	
	Without	2597.50	2583.12	2334.87	2291.87	2451.84	
	Mean	2601.87	2581.87	2327.75	2222.87	2433.59	
	Relative	100	99	89	85		

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	122.30	175.70	P-dates x N	N.S	N.S
N-levels	101.01	135.10	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

1.4. Effect of interaction:

In 1981, different types of interaction of studied factors did not have significant effect on grain yield/fad. except that of planting dates and suckers. The highest grain yield/fad. was obtained by planting in June 1st for and with removal of suckers. Nevertheless, the lowest value was obtained by planting in July 15 and with left-in suckers.

2. Yield of crude protein:

2.1. Effect of planting dates:

Results obtained indicated that delaying planting date after June 15 decreased the yield of crude protein significantly in both seasons.(Tables 36, 37, 38 and 39). The decrease in protein yield resulted mainly from the reduction in grain yield/fad.

2.2. Effect of N-levels:

In the two seasons, protein yield increased significantly as N level increased up to 135 kg/fad. The application of 45, 90 and 135 kg N/fad. increased the yield of protein significantly by 13, 14 and 27% and by 27, 27 and 39% over the control in 1981 and 1982 seasons, respectively. Apparently, increasing N level enhanced grain yield as well as crude protein content in grains. Such result reveals the important role of N

Table (36): Mean percentage of caured protein in grain, in 1981 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	9.34	8.90	8.94	8.38	8.89
	Without	9.46	8.73	9.11	9.09	9.10
	Mean	9.40	8.81	9.02	8.73	8.99
45	With	9.84	9.05	8.47	8.79	9.04
	Without	9.63	9.01	9.88	8.74	9.31
	Mean	9.73	9.03	9.17	8.76	9.17
90	With	9.69	8.98	9.40	9.14	9.30
	Without	9.84	9.36	9.26	8.82	9.32
	Mean	9.76	9.17	9.33	8.98	9.31
135	With	9.69	9.05	11.16	9.05	9.74
	Without	9.95	9.49	10.94	9.14	9.88
	Mean	9.82	9.27	11.05	9.09	9.81
Over all mean	With	9.64	8.99	9.49	8.84	9.24
	Without	9.72	9.15	9.80	8.95	9.40
	Mean	9.68	9.07	9.64	8.89	9.32

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	N.S	N.S	P-dates x N	N.S	N.S
N-level	0.58	0.79	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

Table (37): Mean percentage caured protein in grain, in 1982 season.

N-levels kg/fad.	Suckers	Planting dates				Mean
		June 1	June 15	June 30	July 15	
0	With	10.15	9.87	7.21	7.97	8.80
	Without	11.96	10.25	7.40	8.82	9.61
	Mean	11.05	10.06	7.31	8.39	9.20
45	With	12.91	11.39	8.16	9.87	10.58
	Without	11.77	11.39	8.73	10.25	10.53
	Mean	12.34	11.39	8.44	10.06	10.56
90	With	11.77	11.58	8.16	9.87	10.34
	Without	11.96	11.77	9.39	10.63	10.94
	Mean	11.86	11.67	8.77	10.25	10.64
135	With	12.34	11.58	10.06	11.39	11.34
	Without	13.29	12.09	10.25	9.87	11.37
	Mean	12.81	11.83	10.15	10.63	11.35
Over all mean	With	11.79	11.11	8.40	9.77	10.27
	Without	12.24	11.37	8.94	9.89	10.61
	Mean	12.01	11.24	8.67	9.83	10.44

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	N.S	N.S	P-dates x N	N.S	N.S
N-levels	1.03	1.39	P-dates x S	N.S	N.S
Suckers	N.S	N.S	P-dates x N x S	N.S	N.S

Table (38): Mean crop protein yield per faddan (kg), in 1981 season.

N-levels kg/fad.	Suckers	Planting dates: June 1	June 15	June 30	July 15	Mean	Relative
0	With	197.77	168.13	152.50	129.03	161.86	
	Without	240.15	160.13	155.50	143.87	174.91	
	Mean	218.96	164.13	154.00	136.45	168.38	100
45	With	237.88	208.00	156.00	137.50	184.84	
	Without	248.57	216.93	167.77	149.57	195.71	
	Mean	243.22	212.46	161.88	143.53	190.27	113
90	With	216.96	214.60	172.97	152.67	189.30	
	Without	254.27	216.53	150.90	155.53	194.31	
	Mean	235.61	215.56	161.93	154.10	191.80	114
135	With	240.70	221.23	234.20	155.53	212.92	
	Without	251.80	231.87	219.40	162.60	216.42	
	Mean	246.25	226.55	226.80	159.06	214.67	127
Over all mean	With	223.33	202.99	178.92	143.68	187.23	
	Without	248.70	206.36	173.39	152.89	195.33	
	Mean	236.01	204.67	176.15	148.28	191.28	100
	Relative	100	87	75	63		

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	38.74	58.68	P-dates x N	N.S	N.S
N-levels	18.28	24.77	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

Table (39): Mean crop protein yield per faddan (kg), in 1982 season.

N-levels kg/fad	Suckers	Planting dates: June 1	June 15	June 30	July 15	Mean	Relative
0	With	271.22	228.47	158.65	142.74	200.27	
	Without	269.03	245.25	153.51	185.51	213.32	
	Mean	270.12	236.86	156.08	164.12	206.79	100
45	With	343.79	310.89	182.88	232.40	267.49	
	Without	308.07	277.09	195.29	242.44	255.72	
	Mean	325.93	293.99	189.08	237.42	261.60	127
90	With	318.10	325.15	183.66	206.58	258.37	
	Without	299.13	316.65	214.22	241.75	267.94	
	Mean	308.61	320.90	198.94	224.16	263.15	127
135	With	330.23	310.19	257.77	257.23	288.85	
	Without	373.15	303.87	232.93	233.88	285.96	
	Mean	351.69	307.03	245.35	245.55	287.41	139
Over all mean	With	315.83	293.67	195.74	209.74	253.74	
	Without	312.34	285.71	198.99	225.89	255.73	
	Mean	314.09	289.69	197.36	217.81	254.74	
	Relative	100	92	63	69		

L.S.D.	5%	1%	L.S.D.	5%	1%
P-dates	58.11	N.S	P-dates x N	N.S	N.S
N-levels	25.07	33.97	P-dates x S	N.S	N.S
Suckers	N.S	N.S	N x S	N.S	N.S
			P-dates x N x S	N.S	N.S

on protein content of grain crops and agrees with those obtained by Deckard et al. (1973), Sterikov (1973) and Salem et al. (1982).

2.3. Effect of suckers:

Suckers removal did not show a significant effect on yield of crude protein in both seasons. The results were expected since the removal of suckers did not show any significant effect on grain yield/fad. or crude protein content in grain as well.

2.4. Effect of interaction:

In both seasons, all types of interaction had no significant effect on protein yield/fad. Perhaps the planting date and nitrogen added in a separate manner on that character.

VI. Suckers formation:

A. Effect of planting date, N-levels on the number of suckers per plant:

A.1. Effect of planting dates:

With delaying the planting date of maize the number of suckers diminished as indicated by the all over means, (Table 40). This result is also consistent over all nitrogen levels and seasons. Delaying the time of planting beyond the 30th of June decreased the number of suckers by almost one half of that of the two preceding dates. Results are also significant (P 0.05). Many investigations have shown a positive relationship between tillering in grasses and temperature. Friends, (1966) showed that tillering capacity of wheat was enhanced by lowering temperature. Similarly, Steven and Goodman (1972) made the same observation from a study on some 250 maize races. They utilized temperature regimes ranging from 10/6 up to 34/30 with a difference of more than 20°C between the lowest and the highest regimes. Because differences in temperature between June and July months in Egypt never reaches that amount (Table 1), temperature could not be the factor responsible of more suckering associated with the early planting dates. Instead, day length might be the cause. In early plantings of June days are rather longer than those of July. Short days

of July perhaps triggers the flowering mechanism and consequently inhibits suckers formation.

A.2. Effect of nitrogen levels:

Evidently, the number of suckers per plant increased as nitrogen level was increased and that was consistent over all planting dates and seasons. However rates above 45 kg/fad. produced more suckers and the differences are significant at P 0.05 (Table 40). The role of nitrogen in promoting meristimatic activities could account for such results.

B. Effect of planting dates and N-levels on suckers height:

B.1. Effect of planting dates:

Data in Table 41 show that the effect of planting dates on the height of suckers was more pronounced than the effect of nitrogen levels. Early planting dates yielded higher suckers than late ones, with suckers of the last planting date being the shortest. Differences in heights reflect differences in time of suckers initiation ages. Intiutively, early-emerged suckers of early planting dates grown taller than late-emerging ones. Data obtained show that differences in suckers heights are highly significant in both seasons (P 0.01).

Table (41): Tiller height (cm)

N-levels / Date of planting	1981 Nill	1981 45 kg	1981 90 kg	1981 135 kg	1981 Mean	1982 Nill	1982 45 kg	1982 90 kg	1982 135 kg	1982 Mean
1 - 6	149.33	159.20	154.33	166.83	157.42	134.25	153.75	153.00	164.13	151.28
15 - 6	142.67	158.67	160.00	159.67	155.25	137.75	161.25	167.75	164.00	157.69
30 - 6	141.67	128.33	156.67	161.67	147.08	136.00	130.50	159.25	165.75	147.87
15 - 7	93.33	93.33	98.73	106.50	97.97	88.50	94.50	108.25	126.25	104.37
Mean	131.75	134.88	142.43	148.67	139.43	124.12	135.00	147.06	155.03	140.30

L.S.D.	1981 5%	1981 1%	1982 5%	1982 1%
D	14.63	22.16	17.75	25.50
N	N.S	N.S	12.05	16.12
D * N	N.S	N.S	N.S	N.S

B.2. Effect of N-levels:

Results in (Table 41) show that nitrogen was not responsible for increasing the height of suckers. The differences were not significant except for the 1982 season. Nitrogen rates above 45 kg/fad. yielded significant increases in suckers' height of treated plots than those of the untreated check.

C. Effect of planting dates and N-levels on sucker diameter:

C.1. Effect of planting dates:

Data in (Table 42) show that suckers associated with early planting dates were of larger diameter than those of late sowing dates. Differences from the control are also highly significant (P 0.01) in both seasons. Apparently, with a longer growing season, suckers get taller and thicker than their counterpasts of late planting dates.

C.2. Effect of N-levels:

Data in (Table 42) show that suckers diameter increased by increasing nitrogen level. Rates of nitrogen higher than 40 kg/fad. encouraged growth of the diameter of suckers. Difference obtained with 90 kg/fad. and 135 kg/fad. are highly significant (P 0.01) in both seasons.

Table (42): Tiller Diameter (mm)

N-levels / Dates of planting	1981 Nill	45 kg	90 kg	135 kg	Mean	1982 Nill	45 kg	90 kg	135 kg	Mean
1 - 6	12.60	12.74	13.93	14.47	13.43	10.73	12.33	13.80	14.07	12.73
15 - 6	12.02	13.50	14.27	14.28	13.52	11.43	12.75	13.47	14.82	13.12
30 - 6	10.80	11.40	12.73	13.23	12.04	10.35	11.37	12.60	13.42	11.93
15 - 7	9.40	10.00	10.30	10.40	10.02	9.75	9.55	10.95	11.77	10.50
Mean	11.20	11.91	12.81	13.09	12.25	10.56	11.50	12.70	13.52	12.07

L.S.D.	5%	1%	5%	1%
D	0.95	1.44	1.36	1.95
N	1.25	1.69	1.01	1.36
D * N	N.S.	N.S.	N.S.	N.S.