IV. RESULTS AND DISCUSSION

In this study the effects of population densities, nitrogen fertilizer levels, different methods of weed control and their interactions on the growth, yield, yield components , N P K concentrations of maize grains and associated weeds were investigated. The results are presented here in the following order:

A- Effect of plant density.

B- Effect of nitrogen fertilizer levels.

C- Effect of weed control treatments.

D- Interaction effects.

A- Effect of plant density:

a. Growth measurements of maize:

Results of the effect of population density on some growth measurements of maize plants in 1983 and 1984 seasons are shown in Table (4).

1. Plant height:

Results of both seasons showed that there was no relevance between plant height and density of maize plants. In general, observed plant height was slightly depressed with increasing plant density.

Results of this study agree with those previously reported by Moursi et al. (1970), Monged (1971), Amer (1980), Salem et al, (1983) and Salwau (1985) who showed that plant height of maize was insignificantly affected

Table (4): Effect of plant population densities on some growth measurements of maize, in 1983 and 1984 seasons.

Population plants/fad	Plant height (cm.)	Stem diameter (cm.)	No.of green Leaves/ plant	Leaf area (dm^2)	No. of days to; 50 % tasseling	50 % Silking
		1983, Season				
20,000	350.2 a*	2.42 b	14.5 a	7.40a	----	----
24,000	348.8 a	2.33ab	13.8 a	7.39a	----	----
30,000	348.4 a	2.25 a	14.2 a	7.01a	----	----
		1984, Season				
20,000	281.2 a	1.99ab	11.9 a	6,25b	65.9 a	72.1 a
24,000	282.2 a	2.05 b	11.8 a	6.34b	67.0 a	73.0 a
30,000	274.4 a	1.91 a	11.4 a	5.87a	66.8 a	73.7 a

* Means in column within year followed by the same letters are not significantly different (P = 0.05).

by plant density.

2. Stem diameter:

Results in Table (4) indicate that stem diameter of maize plants was significantly affected by plant density. Data of 1983 season show clearly that there was a consistent depression in stem diameter resulting from each increment in plant density.

Both medium and highest densities reduced stem diameter by 0.09 and 0.17 cm, respectively, as compared with lowest density. However, the difference between the lowest density and the highest one was the only significant difference.

In 1984 season, the maximum stem diameter (2.05 cm.) was obtained by the medium density and was significantly higher than that of the highest one (1.91 cm.).

The present result is mainly due to the high competition between maize plants for light, water and nutrients by increasing the plant density. Results reported by Anber (1979), Salem et al. (1983) and Salwau (1985) showed similar trend.

3- Number of green leaves per plant:

Results in Table (4) indicate **that** number of green leaves/plant was not significantly influenced by plant density in both seasons.

It seems that number of leaves/plant is mainly an inherent character that is not greatly affected by increasing plant population density. These results are in good agreement with those obtained by Moursi et al. (1970), Awad (1979), Salem et al. (1983), Khalifa et al. (1984) and Salwau (1985).

4- Leaf area:

Data reported in Table (4) show that the leaf area was significantly decreased by increasing the plant density up to 30,000 plants/fad. in the second season only.

The higher leaf area (6.34 **dm2**) was obtained from the medium density (24,000 plants/fad.) and the lowest one (5.87) was obtained from the highest plant density (30,000 plants/fad.) in the second season.

The observed reduction in leaf area under the highest plant density could be a reult of an increased intraspecific competition among maize plants for environmental factors, and consequently **dimensions** of maize **blades** were affected.

Results reported by Moursi *et al* .(1970), Awad(1979), Salem *et al*.(1983) and Salwau (1985) showed also similar trend.

5- Number of days to 50% tasseling and silking :

Results on tasseling and silking dates in 1984 season indicate no significant effect for plant density on these two characters, Table (4).

Increasing the plant density from 20,000 to 24,000 and 30.000 plants/fad. increased days to mid-tasseling by 1.1 and 0.9 days and mid-silking by 0.9 and 1.6 days, respectively.

The delayed tasseling and silking is mainly due to the increase in intraspecific competition among maize plants.

These results are in good agreement with those reported by Awad (1979), Amer (1980), Khalifa *et al*. (1984) and Salwau (1985).

b- Yield and yield components:

Results of the effect of population density on yield components as well as grain and straw yields in 1983 and 1984 seasons are presented in Table (5).

Table 5: Effect of plant population densities on yield and yield components of maize, in 1983 and 1984 seasons.

Plant density plants/fad	Stand at harvest (%)	Ear Length (cm)	Ear diameter (cm)	No. of rows/ ear	No.of kernels/ row	Ear weight (g.)	Shelling (%)	Weight of grains/ear (g.)	100-grain weight (g.)	Hectoliter weight (g.)	Grain Yield Ton/fad	Grain Yield Relative	Straw Yield Ton/fad
1983, Season													
20,000	88.2 a*	17.4 b	4.85 a	14.3 a	42.8 b	251.4 b	82.9 a	208.3 b	36.8 a	774.5 a	3.422 a	100.00	5.292 a
24,000	88.8 a	16.9ab	4.83 a	14.2 a	41.0 a	238.4 a	83.1 a	198.1 a	36.8 a	774.1 a	3.476 a	101.58	5.292 a
30,000	79.2 a	16.6 a	4.77 a	14.1 a	41.2 a	228.7 a	84.0 a	192.2 a	36.0 a	771.1 a	3.657 a	106.87	5.698 a
1984, Season													
20,000	91.1 b	15.0 a	4.63 a	13.5 a	36.9 a	183.9 a	83.5 a	153.6 a	33.2 a	774.6 a	2.330 a	107.97	3.257 a
24,000	91.3 b	14.4 a	4.58 a	13.5 a	35.5 a	174.1 a	82.5 a	143.7 a	32.8 a	775.6 a	2.158 a	100.00	3.299 a
30,000	85.5 a	13.9 a	4.54 a	13.6 a	34.4 a	183.9 a	83.4 a	137.7 a	32.2 a	775.0 a	2.168 a	100.46	3.424 a

* Means in column within year followed by the same letters are not significantly different (P = 0.05).

1. <u>Stand at harvest:</u>

The effect of plant densities on maize stand at harvest was significant in the second season only.

A significant effect in 1984 season was detected as to the effect of plant density on the percentage of surviving plants at harvest. Increasing the density to 30,000 plants/fad. significantly decreased the stand as compared with the two lower densities.

The highest density (30,000 plants/fad.) could remain 85.5% survived plants against 91.1 and 91.3% under 20,000 and 24,000 plants/fad., respectively. The reduction in the stand associated with the dense population was a result of the high competition among maize plants for environmental factors, leading to the destruction of some excessive plants under the conditions of this experiment.

It could be concluded that the ideal stand for Giza 2 cultivar is 24,000 plants/fad. of which the highest percentage of surviving plants was obtained in both seasons.

These results are in good harmony with those obtained by Norden (1966), Ismail (1978), Amer (1980) and Gomaa(1985). Whereas Salwau (1985) reported that, no significant effect on the numbers of survival plants as result of different densities.

2. Ear length:

Results in Table (5) show that ear length of maize plants was significantly affected by plant desity in the first season only.

Increasing plant density to 30,000 plants/fad. reduced significantly ear length by 0.8 cm. as compared with a density of 20,000 plants/fad.

The reduction in ear length reflects the increase in the intraspecific competition among maize plants as a result of increase in plant population density.

Results reported by Moursi et al, (1970), Awad (1979), Amer (1980), Salem et al,(1983), and Salwa (1985) showed that ear length of maize plant was reduced significantly by increasing plant density.

3. Ear diameter:

The increase in plant population density caused an insignificant reduction in ear diameter in both seasons.

Results reported by Moursi et al. (1970), Amer (1980), Salem et al.(1983), Khalifa et al.(1984) and Salwau (1985) showed also the same trend.

4. Number of rows per ear:

Results Showed no relevance between plant density and number of rows/ear in both seasons of study.

Apparently, this trait is an inherent character which is not influenced by environmental condition or cultural treat ments.

Similar results were also reported by Khalifa et al. (1984)

5. Number of Kernels per row:

Results in Table (5) show that number of kernels/row was significantly affected by plant density in the first season only. Reducing plant density to 20,000 plants/fad. gave a signfidicant increase in the number of kernels/row as compared with 24,000 and 30,000 plants/fad.

It could be concluded that under dense population, ear characters such as number of kernels/row may be affected as a result of increased intraspecific competition among maize plants.

Similar results were obtained by Salwau (1985).

6- Ear weight:

Results in Table (5) show also that increasing plant density reduced significantly the average ear weight in 1983 season only.

Increasing plant density from 20,000 to 24,000 and 30,00 plants/fad. reduced the average ear weight by 13,0 and 22.7 g., respectively.

These results are in good agreement with those obtained by Anber (1979), Amer (1980), Salem et al. (1983) and Gomaa (1985).

7- Shelling percentage:

In both seasons, shelling percentage was not significantly influenced by the plant density of maize (Table 5).

The present result indicates that this trait is mainly an inherent character that is rarely influenced by cultural treatments and environmental factors.

Similar results were also reported by Moursi et al. (1970), Amer (1980), Salem et al.(1983),Khalifa et al.(1984) and Salwau (1985).

8- Weight of grains per ear:

Results in Table (5) show also a significant effect of plant density on weight of grains/ear in the first season only.

Increasing number of plants/fad. from 20,000 to 24,000 or 30,000 decreased the weight of grains/ear by significant amounts of 10,2 and 16,1 g., respectively.

In the second season, some differences were also noticed among the three different densities projecting higher grain weight for the higher densities, the differences were nevertheless insignificant.

The present result is mainly due to the effect of plant density on ear length, number of kernels/row and ear weight.

Reductions in these yield components at higher densities led, as a consequence, to a reduction in the weight of grains/ear.

Similar results were also reported by Moursi *et al*. (1970), Amer (1980), Salem *et al*. and Salwau (1985).

9- Weight of 100-grain:

Data in Table (5) show that no significant effect was recorded for plant population density on 100-grain weight in both seasons.

It seems that this trait is mainly governed by the genetical constitution of the variety and is rarely affected by environmental conditions.

Similar results were also reported by Awad (1979), Amer (1980) and Khalifa et al, (1984).

10- Hectoliter weight:

Results presented in Table (5) showed clearly no relevance between plant density and the hectoliter weight of maize grain in both seasons.

In general, it could be concluded that some ear characters of maize such as number of rows per ear, shelling percentage and hectoliter weight are less influenced by cultural treatments as they are mainly controlled by the genotype of the maize variety.

Similar results were also reported by salwau (1985).

11- Grain yield per faddan:

Results in Table(5) show evidently that plant density had no significant effect on the grain yield of maize in both seasons.

The results of the yield components in Table (5) show clearly that at dense population, some yield components such as ear length, ear weight and weight of grain/ear were reduced. On the other hand, at thin population i.e. 20.000 plants/fad., higher values were recorded for most of these components, and consequently compensating for the reduction in population.

The end result was a similar yield of grains at the three different population densities. To say this in other words, at higher densities a higher precentage of plants were lost, whereas at lighter density more plants survived. leading in turn to a compensation in the stand. The grain yield though showed some slight differences but a clear trend could not be infered.

Results reported by Norden (1966). Moursi et al.(1970) and Salwau (1985) showed that a higher population density was recomended for maize. Other investigators showed no significant effect on maize grain yield due to different population densities (Monged 1971, Ismail 1978, Amer 1980 and Salem et al. 1983) . While, Awad (1979) found that grain yield was maximized by planting a medium stand of

24,000 plants/fad.

It could be concluded that under the conditions of the experiment, growing Giza 2 maize cultivar with a density of 20-30 thousand plants/fad. Produces about the same yield.

12- <u>Straw yield per faddan</u>:

Results in Table (5) show no significant effect of plant density on the straw yield of maize in both seasons. The increase in plant density increased straw yield very slightly.

This result is expected since the stand plants at harvest and grain yield were also not affected by plant density.

Similar results were reported by Anber (1979), Gomaa (1985) and Salwau (1985).

C- <u>N, P and K concentrations of maize grain:</u>

Results of the chemical analysis of the grain as affected by plant density are shown in Table (6).

Results in Table (6) show no significant effect of plant density on N, P and K concentrations of maize grain in both seasons.

Table 6: Effect of plant population densities on N, P and K. concentrations of maize grain, in 1983 and 1984 Seasons.

Plant density Plants/fad.	N %	P %	K%
	1983, Season		
20,000	1.652 a	0.136 a	0.470 a
24,000	1.808 a	0.146 a	0.435 a
30,000	1.751 a	0.140 a	0.433 a
	1984, Season		
20,000	1.241 a	0.132 a	0.360 a
24,000	1.440 a	0.135 a	0.341 a
30,000	1.245 a	0.127 a	0.344 a

* Means in column within year followed by the same letters are not significantly different (P = 0.05).

The present result agrees with those reported by Salwau (1985) and indicates that N, P and K concentrations is mainly governed by the genotype of the variety and may by affected by the nutrition supply of the plant.

d- Dry weight of weeds:

The dominant weed species encountered in the experimental plots in both seasons included broad-leaved weeds such as *Xanthium brasilicum* Vellozo; *Chenopodium album* L.; *Convolvulus arvensis* L.; *Portulaca oleraceae* L.; *Corchorus olitorius* L.; *Hibiscus trionum* L.; *Seda alba* L. and *Euphorbia prunifolia* Jack.

While infested narrow-leaved weeds were *Cynodon dactylon* (L.) Pers.; *Echinochloa colonum* (L.) Link.; *Sorghum virgatum* (Hack.) Stapf; *Dinebra retroflexa* (forsk.) Panz. and *Cyperus rotundus* L. .

Data on dry weight of weeds at the two sampling dates are presented in Table (7).

Results indicate that at 40 days from planting, density had no significant effect on dry weight of annual broad-leaved weeds. This result was true in both seasons of the experimentation.

With regard to narrow-leaved weeds, results of 1983 season show that population density affected weed density.

Table 7: Effect of plant population densities on dry weight of both broad-and narrow-leaved weeds as well as total weeds at 40 and 60 days from sowing, in 1983 and 1984 seasons.

Plant density plants/fad.	Dry weight			(g./m²)		
	at 40 days from sowing.			at 60 days from sowing		
	Broad-leaved	narrow -leaved	total	broad-leaved	narrow-leaved	total
		1983 Season				
20,000	4.9 a*	7.5 b	9.7 a	5.4 a	8.0 a	10.4 a
24,000	4.5 a	7.6 b	9.2 a	6.1 a	8.7 a	11.1 a
30,000	4.3 a	5.4 a	7.4 a	4.5 a	6.9 a	8.8 a
		1984 Season				
20,000	6.3 a	5.5 a	9.5 a	7.2 a	6.8 a	11.6 a
24,000	5.9 a	3.9 a	7.9 a	7.4 a	5.3 a	10.6 a
30,000	7.1 a	4.8 a	9.6 a	7.8 a	6.6 a	12.3 a

* Means in column within year followed by the same letters are not significantly different (P = 0.05).

It was evident that, increasing plant density to 30,000 plants/fad. reduced dry weight of narrow-leaved weeds significantly as compared with the two other desnities.

In the second season (1984), the higher densities reduced also the dry weight of narrow-leaved weeds as compared with the lowest density, but the differences were not significant.

Regarding the total weeds, it was observed that no significant differences were found due to population density in spite of marked differences in favour of the higher densities. At the second sampling date (60 days from sowing) the results indicate that no significant effect was detected as a result of density on the dry weight of different weed groups and their total as well. However, the slight differences observed show that weed density was slightly reduced as maize plant density increased.

This slightly reduced infestation was a result of increasing competition between plants and weeds. A higher plant density will increase the smothering effect of maize plant and consequently will increase the competition between maize plants and growing weeds.

Monged (1971) reported that the effect of maize population density did not show any regular trend for both broad-and narrow-leaved weeds. On the other hand, Ismail (1978) and Amer (1980) found no significant effect of population density on weed infestation.

B- Effect of nitrogen fertilizer levels:

a- Growth measurements of maize:

Results in Table (8) show the effect of N-levels on some growth measurements of maize in 1983 and 1984 seasons.

1- Plant height:

Data in Table (8) show that the differences in plant height were significant as influenced by N-levels in the second season only. The tallest plants (281.9 cm.) were obtained by the level of 90 Kg N/fad., while the shortest ones (274.2 cm.) were produced from the lowest nitrogen fertilizer level (45 Kg/fad.).

Similar results were reported by Ali (1978), Anber (1979), Awad (1979), Baza (1981), Walburg *et al*.(1982), Salem *et al*.(1983) and Gomaa (1985).

2- Stem diameter:

Results in Table (8) indicate also that stem daimeter was not significantly affected by N-levels in 1983 season. Meanwhile, increasing N-level from 45 to 90 and 135 Kg/fad. increased stem diameter by 0.3 and 0.1 mm, respectively. Whereas, data obtained from the second season showed a significant increase in stem diameter accompanying the increase of N-level.

Table 8: Effect of N. fertilizer levels on some growth measurements of maize, in 1983 and 1984 seasons.

N-levels Kg./fad.	Plant height (cm.)	Stem diameter (cm.)	No.of green leves/ plant	Leaf area (dm^2)	No. of days to 50 % tasseling	No. of days to 50 % silking
			1983 Season			
45	350.0 a*	2.32 a	13.6 a	7.15 a	----	----
90	347.9 a	2.35 a	14.2 b	7.39 a	----	----
135	349.4 a	2.33 a	14.7 c	7.27 a	----	----
			1984 Season			
45	274.2 a	1.92 a	10.2 a	5.98 a	66.9 a	73.8 b
90	281.9 b	2.02 b	12.2 b	6.26 a	66.2 a	72.6 a
135	281.6 b	2.02 b	12.7 c	6.23 a	66.6 a	72.4 a

* Means in column within year followed by the same letters are not significantly different (P = 0.05).

In general, stem diameter was increased by increasing N-level up to 90 Kg/fad., but the last increment (135 Kg/fad.) did not affect this trait.

These results are in a good agreement with those obtained by Anber (1979), Baza (1981), Salem et al.(1983), Tantawy (1983) and Salwau (1985).

3- Number of green leaves per plant:

Table (8) shows the effect of nitrogen fertilizer levels on the number of green leaves/plant over the two seasons of study.

Data of both seasons exhibited a consistently significant increase in number of green leaves/plant as nitrogen fertilizer level increased up to the highest level i.e. 135 Kg/fad.

This result might be due to that nitrogen is one of the most important components of chlorophyle **compound** also for its importance in photothensis and vegetative growth.

These results are in harmony with those reported by Ali (1978) and Awad (1979). On the other hand, Baza (1981) and Salem et al. (1983) reported that nitrogen fertilizer level had no significant effect on the number of leaves per plant. This result could be attributed to the status of soil fertility because the preceding crop was field bean in their experiments.

Table 9: Effect of N. Fertilizer levels on yield and yield components of maize, in 1983 and 1984 seasons.

N-levels Kg./fad.	Stand at harvest (%)	Ear Length (cm.)	Ear diameter (cm.)	No.of rows/ ear	No.of Kernels/ row	Ear weight (g.)	Shelling %	Weight of grain/ear (g.)	100-grain weight (g.)	Hectoliter weight (g.)	Grain Yield Ton/fad	Grain Yield Relative	Straw yield Ton/fad.
							1983 season						
45	87.8 a	16.6 a	4.79 a	14.3 a	41.0 a	233.5 a	83.5 ab	194.9 a	36.1 a	775.2 a	3.507 a	102.75	5.583 a
90	84.1 a	17.1 b	4.82 a	14.1 a	41.9 a	240.6 a	82.7 a	199.0 a	36.6 a	771.3 a	3.413 a	100.00	5.323 a
135	84.3 a	17.2 b	4.84 a	14.2 a	42.0 a	244.4 a	83.8 b	204.6 a	36.8 a	773.3 a	3.636 a	106.53	5.385 a
							1984 season						
45	88.8 a	13.2 a	4.50 a	13.4 a	32.7 a	153.6 a	83.3 a	128.1 a	32.0 a	773.4 a	1.796 a	100.00	3.257 a
90	90.3 a	14.8 b	4.61 b	13.5 a	36.8 b	180.4 b	83.2 a	150.1 b	32.9 b	776.0 a	2.400 b	133.63	3.319 a
135	88.8 a	15.2 b	4.64 b	13.6 a	37.3 b	189.3 b	82.9 a	156.7 b	33.3 b	775.9 a	2.460 b	136.97	3.403 a

* Means in column within year follwed by the same letters are not significantly different (P = 0.05).

3- Ear diameter:

Results show that the increase in N-level increased ear diameter. This increase reached the level of significance only in the second season.

The effect of N-levels on ear diameter shows clearly the role of N in increasing yield of grain, through building up plant organs, increasing both synthetic activity, protoplasm building and cell division.

Similar results were also obtained by Awad (1979), Baza (1981), Salem et al. (1983) and Tantawy (1983).

4- Number of rows per ear :

Results show that no relevance was detected between N-level and number of rows per ear in both seasons.

It seems that the trait is associated with genetic potential of the plant and is seldom influenced by nutritive supply and environmental factors.

Similar results were also reported by Baza (1981), Tantawy (1983) and Salwau (1985).

5- Number of kernels per row:

The increase in N-level increased number of kernels per row in both seasons . This increase reached the level of significance only in the second season.

Results in Table (9) show that increasing N level from 45 to 90 and 135 Kg/fad. increased number of kernels/row by 0.9, 1.0 in 1983 season and by 4.1, 4.6 in 1984 season for the respoective N-levels.

This result is mainly due to the effect of N on ear length and is a good indicator for the vital role of N in ear building and formation.

Similar results were also obtained by Ali (1978), Baza (1981) and Tantawy (1983).

6- Ear weight:

Data in Table (9) show that increasing N-level increased significantly ear weight in the second season only. Increasing N-level from 45 to 90 and 135 Kg/fad. caused an increase in ear weight by 26.8 and 35.7 g. for the respective N-levels in 1984 season.

This result is mainly due to the effect of N on ear length , ear diameter and number of Kernels/row. Such result is a good illustration for the important role of N on ear formation in maize plant.

Similar results were also reported by Baza (1981), Salem et al.(1983)and Salwau (1985).

7- Shelling percentage:

The differences in shelling precentage as affected by N-levels were significant in the first season only (Table 9). Whereas results of the second season indicate no clear trend for the effect of N-level on the same trait.

Results reported by many investigators showed also different trends for the N-level effect on this trait. While, some investigators reported that N-level affected significantly shelling percentage (Ali, 1978), on the other hand, Awad (1979), Baza (1981), Salem et al. (1983) and Tantawy (1983) reported that no significant effect of N-level was recorded on this character.

8- Weight of grain per ear:

Results in Table (9) show that weight of grain per ear followed a similar pattern as ear size, number of kernels/row and ear weight, it means that the differences in this trait due to N-levels effect were significant in second season only. Increasing N-level from 45 to 90 and 135 Kg/fad. increased weight of grain/ear by 22.0 and 28.6 g. in 1984 season.

The present results are in accordance with those reported by Ali (1978), Baza (1981), Tantawy (1983) and Salwau (1985).

9- Weight of 100 grains:

The increase in N-level increased 100-grain weight, but these increases reached the 5% level of significance only in the second season. Where, raising N-level from 45. to 90 and 135 Kg/fad. caused an increase of 100-grain weight by 0.9 and 1.3 g., respectively.

This result is a good indicator for the role of N in increasing yield components of maize.

Similar results were also obtained by Anber (1979), Abedel-Gawad et al.(1983) and Tantawy (1983).

10- Hectoliter weight:

Results in Table (9) show that hectoliter weight was not significantly affected by N-levels in both seasons. Such result show clearly that this character is rarely influenced by cultural treatments.

Similar results were also obtained by Salwau (1985).

11- Grain yield (ton/fad.):

The results in Table (9) show that, only in the second season, the effect of N-level on grain yield/fad. was significant. Increasing N-level from 45 to 90 and 135kg/ fad-increased significantly grain yield by 33.6 and 37.0% , respectively. The result of the second season shows clearly the influence of N and suggests that a level of 90 Kg. N/fad. is an appropriate level for Giza 2 maize cultivar. The incrase in maize grain yield/fad. is a result of the effect of the higher N-levels on the different yield components such as ear length, ear diameter,ear weight and weight of grains/ear.

The effect of N-levels on grain yield of maize was also reported by many investigators. Ali (1978), Baza , (1981), Walburg et al., (1982) and Tantawy (1983) reported that grain yield of maize was significantly increased with the increase of applied nitrogen up to a medium levels of 60 or 90 Kg/fad. While Awad (1979), Abdel-Gawad et al. (1983) and Gomaa (1985) found that N-level caused significant increase in grain yield up to a level of 120 Kg/fad. On the other hand, Salwau (1985) did not record any significant effect of N-levels on grain yield (ton/fad.).

12- Straw yield:

In both seasons, no significant effect was detected for N-level on straw yield (ton/fad.). There were some slight differences in the straw yield of the second season showing an increase due to raising N-level.

Anber (1979), Walburg et al. (1982) and Gomaa (1985) reported that, N-level significantly increased straw yierld of maize.

C- N P K concentrations of maize grain:

Results of the chemical analysis of maize grain as influenced by N-level are shown in Table (10). Data of both seasons show no significant effect of N-level on N, p and K% in maize grain. This result indicates that these traits are mainly controlled by the genotype of variety.

The present result agrees with that reported by Salwau (1985).

d- Dry weight of weeds:

It was clearly noticed from Table (11) that, in general, dry weight of both broad-and narrow- leaved weeds as well as their total during 1983 and 1984 seasons were increased as maize plants advanced in age.

Table 10: Effect of N. fertilizer levels on N,P and K concentrations of maize grain, in 1983 and 1984 seasons.

N-levels Kg./fad	N %	P %	K %
	1983, season		
45	1.737 a*	0.140 a	0.448 a
90	1.767 a	0.141 a	0.449 a
135	1.708 a	0.141 a	0.441 a
	1984, Season		
45	1.356 a	0.138 a	0.359 a
90	1.264 a	0.128 a	0.343 a
135	1.307 a	0.128 a	0.343 a

* Means in column within year followed by the same letters are not significantly different (P = .05).

Table 11: Effect of N-fertilizer levels on dry weight of both broad- and narrow-leaved weeds as well as total weeds at 40 and 60 days from sowing in 1983 and 1984 seasons.

N-Levels Kg./fad.	Dry weight			($g./m^2$)		
	at 40 days from sowing			at 60 days from sowing		
	Broad-leaved	narrow-leaved	total	broad-leaved	narrow-leaved	total
		1983 season				
45	4.7 a*	6.3 a	8.3 a	5.3 a	8.0 a	10.1 a
90	4.8 a	7.5 b	9.7 a	5.4 a	7.8 a	10.2 a
135	4.1 a	6.7 a	8.3 a	5.3 a	7.8 a	10.0 a
		1984 Season				
45	6.2 a	4.9 a	9.0 a	8.2 a	6.3 a	12.3 a
90	6.3 a	4.5 a	8.7 a	6.7 a	6.8 a	11.0 a
135	6.8 a	4.7 a	9.3 a	7.6 a	5.6 a	11.3 a

* Means in column within year followed by the same letters are not significantly different (P = 0.05).

C- Effect of weed control treatments:

a. Growth measurements of maize:

Results in Table(12) show the effect of hand hoeing, Gesaprim and Laddok as weed control treatments compared with unweeded one on some growth measurements of maize palnt in 1983 and 1984 seasons.

In general, there was clearly significant effect of weed control treatments on all studied maize growth characters over the two seasons of study.

1- Plant height:

The present results in Table(12) indicate that the mechanical weed control by using hand hoeing produced the tallest maize plants follwed by applying Gesaprim. However the differences between them were insignificant in both seasons.

Laddok significantly increased plant height over the check treatment in the second season, but this increase was below the 5% level of significance in the first season.

Similar results were reported by Sary et al. (1977), Amer (1980), Barhoma (1982) , Tantawy (1983) and Gab-Alla et al.(1985).

2- Stem diameter:

Results in Table (12) show that significant effect in stem diameter was observed due to different weed control treatments in both seasons.

Data show increments in stem diameter of 0.15, 0.12 and 0.02 cm. as a result of using hand-hoeing, applying both Gesaprim and Laddok, respectively.

However the differences in stem diameter between hand-hoeing and Gesaprim were not significant.

In the second season, a significant response was noticed in stem diameter due to the mechanical and chemical weed control treatments. The hand-hoed plots also gave the highest stem diameter (2.13 cm) followed by Laddok (2.05 cm.) and Gesaprim (2.04 cm.).

Similar results were also reported by Amer (1980), Tantawy (1983) and Gab-Alla et al, (1985)

3- Number of green leaves per plant:

Data of both seasons show evidently significant effect of hand-hoeing practice and herbicidal treatments on the number of green leaves/plant. In 1983 season, Gesaprim progressed the other two treatments to increase this trait, however the differences between the three weed control treatments were insignificant.

Also, in the second season, there were clearly significant differences in the data of green leaves number per plant as influenced by the different weed control treatments. It was noticed also, that mechanical weed control surpassed the other two chemical treatments.

Ismail (1978) and Tantawy (1983) reported similar results.

4. Leaf area:

The effect of weed control treatments on the leaf area is shown in Table (12). In general, there was an evidently significant effect on this character as a result on weed control practices .

Data of the first season show that hand hoeing excelled both Gesaprim and Laddok in enhancing the leaf area.

The mechanical weed control produced a leaf area of 7.81 dm^2 and the differences between weed control treaments were significant. In 1984 season, hand-hoeing effect also took the same first place for widening leaf area , on the other hand Laddok surpassed Gesaprim in this season without significant differences. It was also observed that the check (treatment) minimized leaf area to 5.00 dm^2 followed by 6.28 dm^2 for Gesaprim.

Similar results were reported by Ismail (1978), Amer (1980) and Gab-Alla et al, (1985).

5- Number of days to 50% tasseling and silking:

Results in Table (12) show the effect of various weed control treatments on the mid-tasseling and silking in 1984 season.

Results show that weed control treatments had significant effect on the number of days to 50% tasseling and silking. Using mechanical and chemical weed control treatments caused an early of tasseling amounted to 3.6, 3.2 and 2.5 days for Gesaprim, hand-hoeing and Laddok, respectively, compared with untreated one.

Obtained differences between hand hoeing and Gesaprim and between hand hoeing and Laddok, however, were not significant. Also it was noticed from the same table significant effect of hand-hoeing and weedicidal treatments on mid-silking. Whereas Gesaprim Caused an earliness in silking date and surpassed the unweeded treatment by 5.4 days. The differences among the three weed control treatments were not significant.

Similar results were obtained by Amer (1980). These results obtained from Table(12) are considered as good indicators for the active effect of mechanical and chemical weed control treatments in improving maize plant growth. This result is mainly due to a good weed control effect of these treatments and reduction of competition between weeds and maize plants.

b- Yield and yield components:

Results in Table (13) show the effect of various weed control treatments on yield and yield components in 1983 and 1984 seasons.

In general, a Significant response of all studied characters was observed as a result of weed control treatments.

1- Stand at harvest:

The effect of weed control treatments on maize stand at harvest was significant in the two seasons of study(Table 13).

In 1983 season, a mechanical treatment could remain 88.5% from sown population until harvest, while by untreated one only 79.7% of the total plants were remained.

No significant differences were observed between the three treatments of weed control concerning this trait, all methods were significantly superior in increasing maize stand at harvest over the unweeded treatment.

Table 13: Effect of weed control treatments on yield and yield componts of maize, in 1983 and 1984 seasons.

Weed Control treatments	Stand at harvest %	Ear length (cm.)	Ear diameter(cm.)	No. of rows/ ear	No.of Kernels/ row	Ear weight (g.)	Shelling (%)	Weight of grain/ ear(g.)	100-grain weight (g.)	Hectoliter weight (g.)	Grain yield		Straw yield Ton/fad.
											Ton/fad	Relative	
						1983, season							
Untreated	79.7 a*	16.4 a	4.75 a	13.9a	40.6 a	226.0 a	83.0 a	187.7 a	36.0 a	774.2 a	2.987 a	100.00	4.782 a
Hand-hoeing	88.5 b	17.5 b	4.84 b	14.2b	42.6 b	246.3 b	83.3 a	205.0 b	36.6 a	770.7 a	3.794 b	127.02	5.986 c
Gesaprim	88.3 b	17.2 b	4.85 b	14.4b	42.6 b	246.7 b	83.5 a	205.7 b	36.7 a	773.1 a	3.721 b	124.57	5.500 b
Laddok	85.1 b	16.7 a	4.83 b	14.3b	40.7 a	239.0 b	83.6 a	199.8 b	36.8 a	775.0 a	3.572 b	119.58	5.444 b
						1984, season							
Untreated	86.8 a	11.9 a	4.36 a	12.8a	29.8 a	125.7 a	83.2 a	104.6 a	30.6 a	774.2 a	1.309 a	100.00	2.157 a
Hand-hoeing	91.2 b	15.9 c	4.70 c	13.9c	38.5 c	203.5 d	83.1 a	168.9 d	34.1 c	779,0 a	2.683 c	204.97	3.926 c
Gesaprim	91.4 b	15.2 b	4.68 c	13.7bc	37.1 b	190.9 c	83.2 a	159.0 c	33.9 c	775.3 a	2.561 c	195.65	3.676 bc
Laddok	88.0 a	14.8 b	4.59 b	13.5b	37.1 b	177.4 b	83.1 a	147.4 b	32.2 b	771.9 a	2.322 b	177.39	3.546 b

* Means in column within year followed by the same letters are not significantly different (P = 0.05).

Data of 1984 season show also that significant effect of the three weed control treatments was noticed on stand at harvest. In this season, in untreated plots, the percentage of survived plants was reduced to 86.8%, while other treatments gave higher percentages of survivals at harvest. In this concern, Gesaprim was the best (Table 13)., Hand hoeing was as equal as Gesaprim treatment in maintaining high percentage of survived plants at harvest.

Similar results also reported by Ismail (1978) and Barhoma(1982).

2- Ear length:

Results in Table (13) show a significant increase of ear length due to both mechanical and chemical weed control compared with unweeded maize over the two seasons of study.

No significant differences were observed between applying Gesaprim and hand heing in 1983 season or between Gesaprim and Laddok in 1984 season.

Similar results were reported by El-Debaby *et al*.(1977)., Sary *et al*.(1977).Amer (1980), Barhoma (1982) and Gab-Alla *et al*.(1985).

3- Ear diameter:

Data in the same table show also a significant effect of all treatments on ear diameter during 1983 and 1984 seasons. In the first season, using Gesaprim produced maximum ear diameter (4.85 cm.) with no significant differences compared with the mechanical weed control or Laddok application.

While in 1984 season, mechanical treatment surpassed chemical treatments but the difference between hand-hoeing and Gesaprim was below the level of significance. On the other hand untreated maize caused a depression in ear diameter amounted to 3.4 mm compared with hand hoeing .

Results reported by Sary et al. (1977)Amer (1980),and Barhoma (1982) showed that mechanical and hcmeical weed control by using atrazine alone or in mixtures increased significantly ear size.

4- Number of rows per ear:

Results in Table (13) show that the effect of various weed control treatments on number of rows/ear was significant over the two seasons of experimentation.

In 1983 season, the differences between chemical and mecanical weed control methods failed to reach the 5% level of significance whereas the differences were significant between the different treatments in the second season. A best result was obtained by hand hoeing followed by Gesaprim and then Laddok.

Similar results were also reported by Ismail(1978).

5- Number of Kernels per row:

It was evident from the results in table (13) that all weed control treatments used had a significant effect on number of Kernels/row in 1983 and 1984 seasons.

In the first season, both hand-hoeing and Gesaprim application assisted in increasing the number of kernels/ row by 2.0 compared with untreated maize. While the effect of Laddok did not significantly differ from the check treatment .

Data of 1984 season show clearly a significant increase in the number of kernels/row due to weed control practices, where these treatments caused an increase in this character amounted to 8.7, 7.3 and 7.3 compared with unweeded treatment for hand-hoeing, Gesaprim and Laddok, respectively.

These results are in agreement with those reported by Amer (1980) and Tantawy (1983).

6- Ear weight:

Similarly the differences in ear weight due to hand-hoeing practice and using the two weed killers as compared with the untreated maize were significant.

In 1983 season, Gesaprim surpassed the check treatment by 20.7 g. However the differences between the three weed control treatments were below the level of significance. Whereas, in the second season, there was a significant increase in ear weight reaching 77.8, 65,2 and 51.7 g. due to using hand-hoeing, Gesaprim and Laddok, respectively as compared with weedy check.

Similar results were also obtained by Amer (1980) Barhoma (1982) , Tantawy(1983) and Gab-Alla *et al*.(1985)

7- Shelling percentage:

Results in table (13) show no significant effect on the shelling % attributed to weed control treatments in maize in both seasons of study.

It seems that such trait is associated with the genetic potential of the varity and is rarely affected by cultural treatments.

8- Weight of grain per ear:

In the same table this trait behaved like the most of previous ear characters, this means that there was a marked effect on weight of grain/ear due to using weed control treatments in both seasons.

In 1983 season, Gesaprim application caused an increase in this trait amounted to 18.0 g. followed by 17.3 g. for laddok as compared with unweeded maize but the differeneces between the three weed control treatments were insignificant.

While in the second season, significant differenceces between all treatments were evident. Best results were sdobtained by hand hoeing followed by Gesaprim and then Laddok.

These results agree with those reported by Amer (1980), Barhoma (1982) and Tantawy (1983).

9- Weight of 100 hernels:

The effect of weed control treatments on 100-grain weight was insignificant in spite of slight differences found in 1983 season, While , these differences were clearly significant in the second season showing positive effect of weed control treatments on this trait.

Similar results were also obtained by Ismail (1978) and Amer (1980).

10- Hectoliter weight:

Data from Table (13) indicate that no significant effect was recorded on this character as a result of weed control treatments over the two seasons of study.

It seems that this trait is mainly associated with the genetic potential of maize variety and is seldom affected by cultural operations.

In general, these previous results for yield components clearly indicate the importance of weed control practices in improving maize yield compoents.

This result is mainly due to improve the previous maize growth caracters as a result of the effect of weed control treatments.

It was noticed from table (13), That in the first season, both chemical and mechanical treatments were significantly similar in their effect on all studied yield components.

Whereas in the second season, it was observed that the mechanical weed control almost significantly progressed over chemical weed control treatments on most of these traits.

These results discussed here led to the conclusion that the yield of weedy treated maize will significantly surpass the yield of unweeded maize.

11- <u>Grain yield ton/faddan:</u>

Data in Tabel (13) indicate that grain yield /fad. was significantly affected by the weed control treatments as compared with untreated maize in both seasons.

In the first season the increases in grain yield amounted to 27.0, 24.6 and 19.6%, while in the second season the increases were 105, 96 and 77% as compared with untreated treatment for hand hoeing, Gesaprin and Laddok, respectively.

Results in 1984 season were more evident where the weed control treatments almost doubled the grain yield. The differences between hand hoeing and Gesaprin were not significant in their effect on grain yield during the two experimental seasons. These results are mainly due to the favourable effects of weed control treatments on growth measurements and yield components of maize.

Similar results were obtained by El Debaby <u>et al</u>.(1977), Sary <u>et al</u>.(1977), Ismail (1978), Amer (1980), Barhoma(1982), Sjoberg (1982), Tantawy (1983) and Gab-Alla <u>et al</u>.(1985).

12- Straw yield per faddan:

Results in Table (13) also indicate significant effect of the various treatments of weed control on the straw yield of maize in both seasons.

Controlling weeds either mechanically or chemically increased significantly straw yield in both seasons.

This result is anticipated since grain yield was also markedly affected by weed control treatments.

It was observed also that this result took the same preceding trend for grain yield with the same treatments.

Similar results were also reported by Tantawy(1983).

C- N, P and K contents of maize grain:

Results of chemical contents of the grain as affected by weed control treatments are shown in Table (14).

Results indicate that, no significant effects of chemcial and mechanical weed control treatments were observed on N, P and K % in maize grain over both seasons of experimentation.

These results mean that such traits are mainly affected by the nutrition supply or by the genetical make-up of the plant.

Table 14: Effect of weed control treatments on N, p and K concentrations of maize grain, in 1983 and 1984 seasons.

Weed control treatments	N %	P %	K %
Untreated	1.688 a	0.150 a	0.439 a
Hand-hoeing	1.626 a	0.140 a	0.460 a
Gesaprim	1.738 a	0.138 a	0.447 a
Laddok	1.898 a	0.134 a	0.439 a
	1984 Season		
Untreated	1.295 a	0.132 a	0.348 a
Hand-hoeing	1.431 a	0.132 a	0.350 a
Gesafrim	1.276 a	0.132 a	0.348 a
Laddok	1.235 a	0.130 a	0.348 a

* Means in Column within year followed by the same letters are not significantly different (P = 0.05).

The presnt results agree with those reported by Barhoma (1982).

d- Dry weight of weeds:

The present results in Table (15) show clearly significant effect of the weed control treatments on the dry weight of broad-and narrow-leaved weeds as well as their total at 40 and 60 days from sowing experimental in both seasons.

In general, a mechanical weed control treatment almost significantly surpassed the other two chemical ones in its effect on controlling weeds over the two seasons.

Whereas applying Gesaprim (80% W.P.) almost significantly progressed in affecting the dry weight of narrow-leaved and total weeds in both seasons of study.

On the other hand, Laddok herbicide caused significant reduction in the dry weight of broad-leaved weeds, compared with Gesaprim in the second season.

The efficancy of laddok is mainly due to its composition of two herbicides, Bentazone and Atrazine which complete each other well in their mode of action. Bentazone is taken up manily by the green parts of weeds, whereas Atrazine boradens Bentazone weed spectrum and prevents late germination of weed seeds because of its activity in the soil.

Table 15 : Effect of weed control treatments on dry weight of both broad- and narrow-leaved weeds as well as total weeds at 40 and 60 days from sowing, in 1983 and 1984 seasons.

Weed control treatments	Dry weight (g./m^2)					
	at 40 days from sowing			at 60 days from sowing		
	Broad-leaved	narrow-leaved	total	broad-leaved	narrow-leaved	total
			1983 Season			
Untreated	9.6 b*	9.4 c	14.0 d	9.8 b	9.9 c	14.7 d
Hand-hoeing	2.5 a	2.1 a	3.3 a	3.7 a	3.3 a	5.2 a
Gesaprim	3.3 a	5.0 b	6.5 b	3.9 a	7.2 b	8.6 b
Laddok	2.8 a	10.9 d	11.3 c	3.9 a	11.1 c	11.9 c
			1984 Season			
Untreated	14.2 c	5.2 b	16.1 c	16.9 c	5.0 b	18.4 c
Hand-hoeing	2.4 a	1.8 a	3.0 a	3.4 a	2.5 a	4.7 a
Gesaprim	7.1 b	3.9 b	8.5 b	7.7 b	5.9 b	11.2 b
Laddok	2.1 a	8.0 c	8.4 b	2.0 a	11.5 c	11.7 b

* Means in column within year followed by the same letters are not significantly different (P = 0.05).

It was clear that hand hoeing was more effective in controlling narrow-leaved weeds than Gesaprim (Table 16).

Laddok proved to be very effective in controlling broad-leaved weeds, but completely failed to control narrow-leaved weeds.

Regarding the control of total weeds, hand hoeing controlled 76% and 65% at 40 and 60 days from planting, respectively in 1983 season while Gesaprim application reduced 54% and 41% of total weeds at the same sampling dates and seasons.

In 1984, Gesaprim reduced 47% and 39% of the total weeds at the two respective dates of weed sampling.

The effect of Laddok in controlling total weeds was not satisfactory, particularly in 1983 season, where the reduction in dry weight of total weeds was only 19% for both two sampling dates. Whereas in the second season, it controlled 48% and 36% of the total weeds at the two respective sampling dates.

Under the conidtions of this experimentation, these results are good indicators to evaluate hand hoeing for controlling weeds in maize fields as the best method followed by using Gesaprim (80% W.P.), while Laddok was effective for controlling broad-leaved weeds only. The results explain

Table 16: Effect of weed control treatments on dry weight of different weed groups as percentages from control in 1983 and 1984 seasons.

Weed control treatments	At 40 days from planting			At 60 days from planting		
	Broad-leved	narrow-leved	total	broad-leved	narrow-leaved	total
			1983 season			
Untreated	00.00	00.00	00.00	00.00	00.00	00.00
Hand hoeing	74 %	78 %	76 %	62 %	67 %	65 %
Gesaprim	66 %	47 %	54 %	60 %	27 %	41 %
Laddok	71 %	-----	19 %	60 %	-----	19 %
			1984 season			
Untreated	00.00	00.00	00.00	00.00	00.00	00.00
Hand hoeing	83 %	65 %	81 %	80 %	50 %	74 %
Gesaprim	50 %	25 %	47 %	54 %	-----	39 %
Laddok	85 %	-----	48 %	88 %	-----	36 %

clearly the superiority of weedy treated maize over the unweeded one. The present results are in agreement with those reported by El-Debaby et al. (1977), Sary et al.(1977) Ismail (1978), Amer (1980) Barhoma(1982), Sjoberg (1982), Tantawy (1983) Zwick (1984). and Gab-Alla et al.(1985).

D- Interactions effect:

1- Effect of the interaction between plant density and N-levels:

The interaction between plant density and N-levels had significant effect on P% in maize grain in 1983 season. Other characters were not significantly affected by this interaction, Table (17).

Phosphorus percentage in maize grain responded differently to N-levels according to the population densities. At the lowest density (20,000 plants/fad.) the highest P% (0.143%) was recorded with the highest N-level (135 Kg/fad.), whereas, at the highest density, the greatest P% (0.157%) was recorded with the lowest N-level(45 Kg/fad.). In general, the highest P% (0.163%) was recorded at the medium treatments of both plant density and N-level. Whereas, the lowest one (0.127%) was produced by the same N-level and the highest population density. It could be concluded that the response of maize to N-level depended on the population density in affecting grain P content.

2 - Effect of the interaction between N - levels and weed control treatments:

The interaction of N-level and weed control treatments had significant effect on plant height in 1984, Table (18). Results show that the increasing of N-level over 45 Kg/fad.

Table 17: Effect of the interaction between plant density and N-levels on P concentration of maize grain, in 1983 season.

Population Plants/fad.	N . fertilizer levels		
	45	90	135
		P %	
20,000	0.133 ab*	0.131 a	0.143 ac
24,000	0.132 a	0.163 c	0.143 ac
30,000	0.157 bc	0.127 a	0.136 ab

* Means in both columns and rows followed by the same letters are not significantly different(P = 0.05).

Table 18: Effect of the interaction between N. levels and weed control treatments on plant height, in 1984 season.

Treatments	Untreated	Hand-hoeing	Gesaprim	Laddok
N,Kg./fad.	Plant height (cm.)			
45	242.7 a*	288.9 de	286.9 de	278.4 cd
90	259.9 b	293.3 e	291.0 e	283.3 de
135	269.5bc	294.3 e	285.1 de	277.6 cd

* Means in both columns and rows followed by the same letters are not significantly different (P=0.05).

did not induce any significant increase in plant height of maize which was hand-hoed or treated with herbicides. On the other hand, the untreated maize showed significant response to N-levels.

The tallest maize plants (294.3 cm.) were produced from hand hoeing treatment and fertilized with 135 Kg. N/fad. where as the shortest ones (242.7cm.) were resulted from untreated maize supplied with the lowest N-level.

Similar results were reported by Tantawy (1983).

3-Effect of the interaction between plant density, N-levels and weed control treatments:

Only two characters were significantly affected by the second order interaction. The first was ear weight of maize in 1983 season followed by the weight of narrow-leaved weeds at 60 days from planting in 1984 season, Tables (19) and (20).

Results in Table (19) show that the highest value of ear weight (275.8 g.) was produced by using 135Kg.N/fad. with 20,000 plants/fad. and treated with Gesaprim. Whereas the lowest one (196.9g.) was recorded for plants grown under the medium density (24,000 plants/fad.) supplied by the lowest level of N and without weed control.

Table 19: Effect of interaction between plant density, N levels and weed control treatments on ear weight, in 1983 season.

Treatments	Plants/fad.								
	20,000			24,000			30,000		
	N. Kg./fad.			N, Kg./fad.			N, Kg./fad.		
	45	90	135	45	90	135	45	90	135
				Ear weight(g.)					
Weed control treat.									
Untreated	235.8 b-g*	228.6 a-e	238.1 b-g	196.9 a	212.0 ab	253.3 c-h	233.4 a-g	225.5 a-d	210.8 ab
Hand-hoeing	246.4 b-h	270.0 gh	268.1 f-h	251.3 c-h	246.4 b-h	248.1 b-h	235.6 b-g	213.5 a-c	237.4 b-g
Gesaprim	241.1 b-h	264.6 e-h	275.8 h	230.9 a-f	257.0 c-h	241.1 b-h	241.1 b-h	237.3 b-g	231.0 a-f
Laddok	242.4 b-h	258.1 c-h	247.5 b-h	234.0 b-g	229.8 a-e	260.0 d-h	213.1 ab	244.8 b-h	221.4 a-c

* Means in both columns and rows followed by the same letters are not significantly different (P = 0.05).

Table (20) indicates that the greatest infestation of narrow-leaved weeds (12.9 g/m^2) was recorded in maize plots treated with Laddok and grown at a density of 20,000 plants/fad. and fertilized with the lowest amount of N-fertilizer. while, the lowest dry weight of this weed group (1.0 g/m^2) was recorded by hand hoeing treatment supplied with the highest N-level under the thin density (20,000 plants/fad.), as well as recorded from untreated maize plots which were grown at the medium density (24,000 plants/fad.) and fertilized with the same N-level.

Table (20):Effect of interaction between plant density, N levels and weed control treatments on dry weight of narrow-leved weeds, in 1984 season (at 60 days from sowing).

Treatments	Plants/fad.								
	20,000			24,000			30,000		
	N.Kg./fad.			N. Kg./fad.			N. Kg./fad.		
	45	90	135	45	90	135	45	90	135
	Dry weight (g./m^2)								
Weed control treat.									
Untreated	7.3 b-f *	4.5 a-d	7.5 b-f	2.1 a	7.3 b-f	1.0 a	4.5 a-d	5.5 a-e	5.3 a-d
Hand-hoeing	2.6 a	3.4 a-c	1.0 a	1.8 a	1.9 a	1.0 a	3.0 ab	3.1 ab	4.7 a-d
Gesaprim	8.0 c-g	4.1 a-c	7.3 b-f	4.0 a-c	7.6 b-f	4.5 a-d	5.5 a-e	9.0 d-h	3.3 ab
Laddok	12.9 h	12.5 gh	10.3 f-h	12.4 gh	10.4 f-h	9.9 e-h	11.1 f-h	12.6 h	11.6 f-h

* **Means** in both columns and rows followed by the same letters are not significantly different (P = 0.05).