SUMMARY

Two field experiments were carried out during 1987 and 1988 seasons at the Demonstration Fields of Meet Ghamr, Dakhlia Governorate. The aim of this study was to investigate the effect of N levels and time of nitrogen application on growth and yield of sunflower plants.

The soil type of the experiments was clay loamy alluvial with a pH of 8.0 and organic matter content of 2.0 % .

Each experiment included 24 treatments which were the combination of four levels of nitrogen and six treatments of application time of nitrogen. Factors under study were :

I. Nitrogen levels were :

a. Control, without N. (No).

b. 20 Kg N/fed. (N_1).

c. 40 Kg N/fed. (N_2).

d. 60 Kg N/fed. (N_3).

II. Time of nitrogen application :

a. Nitrogen was added in single application before sowing.(T_1).

b. Nitrogen was added in single application before the first irrigation. (T_2)

c. Nitrogen was added in single aplication before the second irrigation. (T_3).

d. Nitrogen was added in 2-split dressings, 50 % before sowing + 50 % before the 1st irrigation. (T_4).

e. Nitrogen was added in 2-split dressings, 50 % before sowing + 50 % before the 2nd irrigation. (T_5).

f. Nitrogen was added in 2-split dressings, 50 % before the 1st irrigation + 50 % before the 2nd irrigation. (T_6)

The design of the experiments was randomized complete block with four replications. The plot size was 21 m^2 ($\frac{1}{200}$ fed.).

Results could be summarized as follows :

1. Nitrogen levels showed significant effect on flowering date in 1987, while in 1988 this effect was not significant. Number of days from planting to floweirng decreased as the N levels increased up to 20 kg/fed.

   Application time of nitrogen had no significant effect on the flowering date of sunflower in the two successive seasons.

2. Nitrogen fertilizer had significant effect on plant height in the first season only. The height of sunflower plants increased significantly as the N level increased up to 60 kg/fed. (N_3).

   Similarly, the effect of application time of N exhibited significant effect on height of sunflower planting in 1987 only. Application of N in 2-split dressings, 50 % before sowing + 50 % before the 2nd irrigation (T_5) tended to increase plant height than the other treatments.

3. Nitrogen had significant effect on the number of green leaves/plant in the two seasons, where the number of green leaves/plant increased significantly as the N level increased up to the rate of 20 kg/fed.

On the other hand, number of green leaves/plant was not significantly affected by the time of N application.

4. Nitrogen fertilization significantly reduced the number of dry leaves/plant in the two successive seasons. The application of 20 kg N/fed. decreased significantly the number of dry leaves/plant as compared with the control treatment.

Nevertheless, time of N application had no significant influence on the number of dry leaves/plant.

5. Number of leaves/plant was not significantly affected by N levels as well as time of N application in the two successive seasons.

6. Nitrogen levels showed significant effect on stem diameter of sunflower plants in the two successive seasons. The stem diameter significantly increased as the N level increased up to the rate of 20 kg/fed.

Application time of N had significant effect on stem diameter in the first season only. Application of N in 2-split dressings 50 % at sowing + 50 % before the 2nd irrigation (T_5) or 50 % before 1st irrigation + 50 % before 2nd irrigation (T_6) produced thicker stalks than other treatments.

7. Leaf area of the fourth leaf increased significantly as the N level increased up to the rate of 60 kg/fed. in the two successive seasons.

On the contrary, time of N application had no significant effect on leaf area in both seasons.

8. Nitrogen level increased the percentage of lodging significantly in the two seasons. Higher lodging percentages were produced from application of 40 and 60 kg N/fed. in 1987 and 1988 seasons, respectively.

On the other hand, application time of N had no significant effect on the percentage of lodging of sunflower plants in the two successive seasons.

9. Nitrogen level had significant effect on the percentage of broken sunflower plants in the second season only. The percentage of broken plants increased significantly as the N level increased to 20 kg/fed.

On the other hand, application time of nitrogen had no significant effect on the percentage of broken plants in the two seasons.

10. Nitrogen fertilizer showed significant effect on head diameter of sunflower plants. Application of 20 and 40 kg N/fed. increased head diameter of sunflower plants significantly in the first and second seasons, respectively.

Whereas, head diameter of sunflower plants was not significantly affected with time of N application in the two successive.

11. Weight of head as well as weight of seeds/head increased significantly with increasing N levels up to 20 kg in the first season and 40 kg in the second season.

While, application time of N had no significant effect on the head weight and weight of seeds/head of sunflower plants in the two seasons.

12. Nitrogen level increased significantly the weight of 100 seeds in the two seasons. Maximum significant increase in the weight of 100-seed was obtained by application of 20 kg/fed.

On the contrary, time of N application had no significant effect on the weight of 100 seeds in the two successive seasons.

13. Shelling percnetage was not significantly affected by the nitrogen levels in the both seasons.

Time of N application had no significant effect on shelling percentage of sunflower plants in the two successive seasons.

14. Weight of seeds/plant was greatly influenced by application of nitrogen in 1987 and 1988 seasons. Application of 20 and 40 kg N/fed. increased significantly the weight of seeds/plant in the first and second seasons, respectively.

Weight of seeds/plant was not significantly affected by the

time of N application in the two successive seasons.

15. Nitrogen level showed significant effect in increasing the seed yield of sunflower. The highest seed yield was obtained by application of the rate of 20 and 40 kg/fed. in 1987 and 1988 seasons.

In the first season, application of 20, 40 and 60 kg N/fed. increased the seed yield significantly by 43, 49 and 47 % over the control.

In the second season, seed yield was increased significantly by 23, 35 and 27 % over the control due to the application of 20, 40 and 60 kg N/fed., respectively.

Whereas, seed yield of sunflower plants was not significantly affected by the application time of N fertilizer in the two successive seasons.

16. Nitrogen level showed significant effect on the yields of straw and biological/fed. in the two successive season. Straw as well as biological yields of sunflower increased significantly as the N level increased up to 20 and 40 kg/fed. in 1987 and 1988 seasons, respectively.

Application time of N had a significant effect on straw and biological yield in the first seasons only. Application of N in 2-split dressings, i.e., 50 % before sowing and the remainder before the 2nd irrigation (T_5) gave higher yields than when N was applied in otherwise dressings.

17. Nitrogen fertilizer had significant effect on the harvest index in sunflower plants. Harvest index decreased as N-level increased in the two successive seasons.

    Harvest index was not significantly affected with the application time of N in both seasons.

18. Seed oil content of sunflower seeds decreased significantly by increasing N-level up to 20 kg/fed.

    On the other hand, application time of N had no significant effect on oil content of sunflower seeds.

19. Protein content of sunflower seeds increased significantly as the N level increased up to the rate of 40 kg/fed.

    Nevertheless, application time had no significant effect on the protein content of sunflower seeds.

20. Oil characters, namely, acidity value and saponification value were not significantly affected by N level as well as application time of N.

21. There was highly significant positive correlations between seed yield/fed. and leaf area, stem diameter, head diameter, head weight, weight of seeds/head as well as weight of 100-seed.