SUMMARY

Two field experiments were conducted at the Research and Experimental Station of Faculty of Agriculture, Moshtohor, Kalubia Governorate, during 82/1983 and 83/1984 seasons to investigate the effect of plant density, N-and P-fertilizers on growth and yield of safflower (Carthamus tinctorius L.) variety Giza 1.

The soil of the experiments was loam clay in texture having a pH 7.85, organic matter content of 2.50 %, available nitrogen of 50 ppm and 40 ppm available phosphorus.

This study included 18 treatment which were the combination of three plant density (28000, 35000 and 46000 plants/fed), three N-levels (0, 45 and 90 kg N/fed) and two rates of phosphour (0 and 22.5 kg P_2O_5/fed).

The experimental design was split-split-plot with four replications, where the plant density were arranged at random in main plots, the levels of phosphours were assigned at random within the sub-plots, while the N-levels were randomly distributed in the sub-sub-plots. The sub-sub-plot area was 21 m^2?

Results could be summarized as follows:-

1. **Effect of plant density:**

1.1. In general, increasing plant density increased plant height the length of basic three internodes height of first branch and leaf area index (L.A.I.) of safflower plants. On the other hand, plant density did not show significant effect on the number of internodes/main stem of safflower plants.

1.2. High population due to narrowing spacing between hills was of adverse effect on stem diameter, number of branches/plant, number of leaves/ plant, dry weight of different parts/plant and specific leaf weight (S.L.W.).

1.3. Number of heads/plant, head diameter, number of seeds/head, weight of 1000-seed and weight of seeds/plant were greatly affected by the plant population and were inversely correlated with the number of plants/fed.

1.4. Yields of seed, straw and biological per feddan seems to have been directly correlated with plant population. Decreasing number of plants from 46000 to 35000 or 28000 plants/fed. decreased the seed yield by 5 and 11 % in the first season and by 8 and 13 % in the second season, respectively.

1.5. The oil percentage as well as protein percentage of safflower oil were not significantly influenced by plant population, but the oil yield and protein yield were significantly increased by increasing plant density.

1.6. Plant density had no significant effect on oil characters of safflower seeds/namely, Refractive-Index, Acid-Value, Iodine-value and Sapon-value.

2. **Effect of nitrogen fertilizer:**

2.1. Application of nitrogen showed significant effects on growth characters of safflower at different growth stages in the two successive season. Plant height, length of basic three internode, number of internodes/main

stem, diameter of stem, number of branches/plant, number of leaves/ plant, dry weight of different parts/plant, L.A.I. and S.L.W. increased significantly as the N level increased up to the rate of 90 kg N/fed.

2.2. Number of heads/plant, head diameter, number of seeds/head, weight of 1000-seed as well as weight of seeds/plant increased significantly by the application of N up to the rate of 90 kg N/fed. in the two successive seasons.

2.3. Seed yield, straw yield and biological yield increased significantly as N-level increased up to 90 kg N/fed. Percentage increases of seed yield were 23 and 36 % and 26 and 37 % in the both seasons, for 45 and 90 kg N/fed., respectively.

2.4. Application of 90 kg N/fed. increased significantly seed protein content, oil content, protein yield as well as oil yield/fed in the two successive seasons.

2.5. Nitrogen showed significant effect on Acid value and Iodine value of safflower oil. Acid value as well as Iodine value increased as the N levels increased up to 90 kg/fed. in 1983/84 season.

3. **Effect of phosphours fertilizer**:-

3.1. Phosph ours showed a possitive effect on all growth characters under this study safflower plants in the two successive seasons. Growth characters increased significantly as P-level increased up to 22.5 kg P_2O_5/fed.

3.2. Application of 22.5 kg P_2O_5/fed. significantly increased number of heads/plant, head diameter, number of seeds/head. weight of 1000-seed and weight of seeds/plant.

3.3. Phosphorus fertilizer showed significant effect on seed yield, straw yield and biological yield/fed. Seed yield significantly increased as P-level increased up to 22.5 kg P_2O_5/fed. percentage of increases were 9.7 and 9 % in the two successive seasons for 22.5 kg P_2O_5/fed. compared with unfertilized plots, respectively.

3.4. P-fertilizer significantly increased oil %, oil yield as well as protein yield/fed.

3.5. Phosphorus significantly increased acid value, iodien value as well as sapon value.

4. **Effect of interactions:**

4.1. The interaction between plant density and nitrogen fertilizer increased plant height, number of branches/plant, height of first branches, weight of leaves/plant, weight of stem/plant, L.A.I., S.L.W., number of heads/plant, head diameter, seed yield/plant and weight of 1000-seed significantly.

4.2. The combined effect of plant density and application of phosphorus were significant effect on plant height, length of basic internodes, stem diameter, number of internodes, number of leaves/plant, number of branches/plant, dry weight of stem/plant, dry weight of roots/plant, L.A.I., S.L.W., number of heads/plant, weight of seeds/plant, weight of 1000-seed, seed yield/fed. acid value and sapon value.

4.3. The interaction between N-and P-fertilizers were significant on length of basic internodes, number of internodes/stem, number of leaves/plant, dry weight of safflower plant, L.A.I., S.L.W., head diameter, seed yield

and acid value.

4.4. The interaction between plant density, N-fertilizer and P-fertilizer increased stem diameter,height of first branches, L.A.I., head diameter, weight of 1000-seed significantly.