

## V. SUMMARY

Two field experiments were conducted at Nubaria Research Station, Agricultural Research Center, Egypt, during 1995 and 1996 seasons to study the effects of four N levels (0, 35, 90 and 135 kg/fed), two P levels (0 and 30 kg  $P_2O_5$ /fed) and three FYM levels (0, 20 and 40 ton/fed) on the growth, grain yield and its components, and chemical contents of leaves and kernels of S.C. 122.

The soil type was calcareous and sandy clay loam in texture with a  $CaCO_3$  of about 23%.

A split-split plot design with four replications was used, the main plots were devoted for FYM levels, the sub-plot for P levels and the sub-sub-plots for the N levels. Sub-sub-plot area was 21 m<sup>2</sup> (1/300 fed). Planting was done on 19 and 21 June in 1995 and 1996, respectively. The preceding crop was wheat in both seasons. Harvest was undertaken on 20 October in both seasons. The results of the experiments could be summarized as follows:

### I. Effect of N levels

1. The increase in N level from zero to 45, 90 and 135 kg/fed significantly increased plant height, ear height, area of the topmost ear leaf, number of ears/plant, ear length, ear diameter, ear weight, number of rows/ear (in the first season), number of kernels/row, weight of 100 kernels, shelling percentage and grain yield/fed. The highest value of these traits were generally recorded at the highest N level.

2. The increase in N level significantly reduced number of days to 50% tasseling and silking in both seasons. The earliest flowering was reached at the highest N level.
3. The increase in grain yield due to the increase in N level was an indication for the vital role of this nutrient. Maize grain yield was 1.79, 3.38, 3.73 and 4.40 ton/fed in 1995 season at zero, 45, 90 and 135 kg N/fed, respectively. The corresponding values of grain yield in 1996 season were: 1.51, 2.87, 4.19 and 4.54 ton/fed, respectively. The highest N level induced an increase in grain yield of 145 and 200% in the first and second season, respectively compared with the check treatment.
4. The increase in N level significantly increased N, P and K percentages in leaves at 90 days from planting in 1995 season, while the effect of N level on these contents was not significant in 1996 season.
5. The increase in N level significantly affected N% and protein content in grain in both seasons. The highest N and protein % were recorded at the highest N level. The crude protein % increased from 9.06 at the control level to 9.22, 9.87 and 10.37% with the increase in N level to 45, 90 and 135 kg/fed, respectively on the average of both seasons.
6. Increasing N level significantly increased P and K percentages in kernels in 1995.
7. N uptake increased markedly with the increase in N level. On the average of both season, N uptake was 17.15, 34.49, 51.37 and 65.42 kg/fed at the N level of zero, 45, 90 and 135 kg/fed, respectively.

8. Nitrogen sue efficiency has been reduced with the increase in N level on the average of both seasons. N use efficiency valued 29.70, 23.58 and 20.75 kg grain/kg N at the N level of 45, 90 and 135 kg/fed, respectively. This result indicates the efficiency of the highest N level in calcareous soil to produce high grain yield.
9. N recovery has been slightly reduced as the N level increased. On the average of both season, applying 45, 90 and 135 kg N/fed recorded apparent N recovery of 39.20, 37.97 and 35.76%, respectively.

## II. Effect of P levels

1. Applying P at 30 kg  $P_2O_5$ /fed significantly increased plant height (in 1996), ear height, leaf area of topmost ear, number of ears/plant, ear weight (in 1995), shelling percentage (in 1995) and grain yield/fed.
2. P application did not significantly affect ear length, ear diameter, number of rows/ear, number of kernels/row and 100-kernel weight in both seasons.
3. Applying P at 30 kg  $P_2O_5$ /fed significantly increased maize grain yield/fed by 26.68, 10.43 and 18.31% in 1995, 1996 and the combined average, compared with the control, respectively.
4. Applying P at 30 kg  $P_2O_5$ /fed significantly increased N content in leaves (in 1995) and N content in grain (in 1995).
5. P application did not significantly affect P and K contents in leaves as well as in kernels in both seasons.
6. Applying P at 30 kg  $P_2O_5$ /fed markedly increased N uptake in grain where an increase of 19.46% in N uptake was recorded on the average of the four N levels.

7. N use-efficiency increased as a result of P application. On the average of both seasons, P at 30 kg  $P_2O_5$ /fed increased N use efficiency by 10.00, 4.65 and 4.79% at the N level of 45, 90 and 135 kg/fed, respectively.
8. N-recovery was markedly increased by P application. On the average of both seasons, N recovery was increased from 33.34% at the check treatment to 39.94% at 30 kg  $P_2O_5$ /fed level on the average of the three N levels applied.

### III. Effect of FYM

1. Application of FYM significantly increased plant height, ear length (in 1995), area of the topmost ear leaf (in 1996), number of ears/plant, ear diameter (in 1995), ear weight, 100-kernel weight (in 1995), shelling percentage and grain yield/fed.
2. FYM did not significantly affect tasseling and silking dates, ear length, number of rows/ear, and number of kernels/row.
3. Applying 20 ton FYM/fed significantly increased grain yield by 9.88, 23.44 and 32.79% in 1995, 1996 and the combined average, respectively.
4. FYM application significantly increased N% in leaves (in 1995), N% in grain (in 1995), P% in grain (in 1996) and protein content in grain (in 1995).
5. The application of FYM did not significantly affect P and K contents in leaves and K% in grain.

#### IV. Interaction effects

1. The results indicated that N x P had a significant effect on:

- Tasseling date (in 1996).
- Silking date (in 1996).
- Ear length (in 1996).
- Ear weight (in the combined average).
- Shelling percentage (in 1995, 1996 and the combined average).
- Grain yield/fed (in 1995).

The highest values were generally recorded by combining the highest levels of N and P.

2. Significant effects of N x FYM were recorded on the following characters:

- Plant height (in the combined average).
- Leaf area of topmost ear (in 1996).
- Ear length (in 1996).
- Ear diameter (in 1996).
- Ear weight (in 1996).
- Shelling percentage (in 1995 and the combined average).
- Grain yield/fed (in 1996 and the combined average).

The highest values of these traits were recorded by combining 135 kg N/fed and 40 ton FYM/fed. Generally, the response of most of the studied characters to FYM was quite evident where no N was applied, while at the higher N levels, the effect of FYM was greatly reduced.