SUMMARY

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Two field experiments were conducted at the Agricultural Research and Experiment Center of the Faculty of Agriculture, Moshtohor, Zagazig University during 1992/93 and 1993/94 seasons to study the effect of some preceding crops and nitrogen fertilizer on growth and yield of wheat.

Each experiment included 20 treatments which were the combinations of five preceding summer crops (cotton, soybean, sesame, maize and sorghum) and four levels of nitrogen fertilizer (0,30, 60 and 90 kg N/fed.),. The design of the experiments was split plot with four replications. The main plots were assigned for the preceding crop treatments and the sub plots were devoted for N-levels. Nitrogen was applied in the form of ammonium nitrate (33.5%N) to wheat in split application, one half before the first irrigation and the second before the second one. Wheat (Triticum aestivum, L.) variety Sakha 69 was used in both seasons. Data on soil analysis, growth characteristics, yield components, biological yield and grain yield/feddan as well as protein percentage in wheat grains and protein yield/feddan were collected and subjected to the appropriate statistical analysis.

The result could be summarized as follows:

I- Effect of preceding crops on some physical and chemical properties of the soil.

1- Soil porosity percentage was affected by preceding crops. Growing wheat after soybean, sesame or maize increased the soil porosity compared with that after cotton.

2- pH of the soil was not affected by preceding crops.

3- Organic matter content of the soil was affected by preceding crops. Cotton and sorghum as preceding crops increased the organic matter content of the soil.

4- Total nitrogen content was affected by preceding crops. Total N increased by growing wheat after soybean, cotton and sesame. Both maize and sorghum reduced total nitrogen content at the deep layer of the soil.

5- Total phosphorus was affected by preceding crops. Soybean and sorghum increased the phosphorus content of the soil at the surface layer whereas sorghum, sesame and maize increased it at the deep one.

6- Total potassium was not affected by preceding crops.

II- Effect of preceding crops on growth yield and yield components of wheat:

1- Preceding crops showed no significant effect on plant height, flag leaf area, number of leaves/stem fresh and dry weight of plant.

2- Heading and flowering date of wheat were not significantly affected by preceding crops.

3- Preceding crops had no significant effect on number of tillers or spikes/m^2.

4- Spike length and weight were not significantly affected by preceding crops.

5- Grain weight/spike was significantly affected by preceding crops. Sesame, soybean and cotton favourably affected grain weight/spike, whereas maize and sorghum reduced it.

6- Number of grains/spike was significantly affected by preceding crops. Growing wheat after sesame, soybean or cotton increased number of grains/spike than that after maize or sorghum.

7- Preceding crops had no significant effect on number of spikelets/spike as well as number of grains per spikelet.

8- 1000-grain weight was significantly affected by preceding crops in the second season. Wheat following sesame, soybean or cotton in the rotation produced heavier grains than that following maize or sorghum.

9- Biological yield of wheat was significantly affected by preceding crops. Cotton, soybean and sesame produced higher biological yield compared with maize and sorghum. The highest biological yield was obtained from wheat was grown after cotton and the lowest one was after sorghum.

10- Preceding crops had significant effect on grain yield of wheat. The preceding crops could be arranged according to their effect on grain yield in the descending order as follows: Cotton, soybean, sesame, maize and sorghum.

11- Protein content of wheat grains as well as protein yield was significantly affected by preceding crops. Cotton, soybean and sesame favourably affected protein content and yield in wheat grains. The highest percentage and yield of protein was obtained in grains from wheat grown after soybean followed by that after sesames, maize and cotton in the first season, but the highest values were obtained after cotton followed by soybean sesame and maize in the second season. The lowest protein and yield were obtained after sorghum.

III- Effect of N-levels on growth, yield and yield components:

1- Plant height at heading stage and at harvest, flag leaf area, number of leaves/stem, fresh and dry weight of plant at heading stage were significantly increased by increasing nitrogen levels from zero up to 90 kg N/feddan.

2- The increase in N application level significantly delayed heading and flowering dates in one season out of two.

3- Number of tillers and spikes/square meter was significantly increased by increasing N level up to 90 kg/feddan in both seasons, whereas no significant difference was recorded between 30 and 60 kg N/fed.

4- Spike length, spike weight, grain weight/spike and 1000-grain weight were significantly affected by N levels in both seasons. While number of grains/spike, number of spikelets/spike and number of grains/spikelet were significantly increased by increasing N level in one season out of two. On the other hand, no significant difference between 60 and 90 kg N/fed. was recorded in the above characters.

5- Nitrogen levels had a significant effect on biological yield per feddan in both seasons. The application of 30, 60 and 90 kg N/feddan increased the biological yield by 27.74%, 37.69% and 44.05%, respectively over the control in the first season. The corresponding increases in biological yield in the second season were 106.76%, 148.65% and 164.53%, respectively.

6- Grain yield per feddan was significantly increased by increasing N level up to 90 kg N/fed. in both seasons. In 1992/93 seasons, applying N at a rate of 30, 60 and 90 kg/feddan increased grain yield per feddan over the check treatment by 12.1%, 19.25% and 22.71, respectively. While in 1993/94 season, the same N levels increased grain yield by 49.39%, 62.80% and 76.83%, respectively over the control treatment.

7- Protein content in wheat grain and protein yield/feddan were significantly affected by N level in both seasons. The highest protein percentage was obtained from 90 kg N/fed. in the first season, 30 kg N/fed. in the second season without significant difference between 60 and 90 kg N/fed. in protein percentage in both seasons. Also the

maximum protein yield/feddan was obtained from 90 kg N/feddan in both seasons.

V- Interaction effect:

The effect of preceding crops and N-levels interaction was significant on biological and grain yield/feddan, protein percentage of wheat grains and protein yield per feddan. Whereas the other characters under study were not significantly affected by the interaction between preceding crops and N-level.

The maximum biological and grain yield per feddan were obtained from growing wheat after cotton or sesame with the application of 90 kg N/feddan. While the minimum values were produced from growing wheat after sorghum without nitrogen fertilizers.