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SUMMARY

This study was carried out during growing season of 2014 and 2015 at Gemmeiza Agriculture Research stations. Egypt. The main objective of this study was to estimate the effect of humic acid treatments and nitrogen fertilizer rates as well as their interactions on growth, grain yield and its components of white maize cultivar single cross 131(Sk. 13 x Sk. 9). Sowing was done on June 3rd in 2014 season, and June 9th in 2015 season. Nitrogen fertilization was added as the form of urea (46.6% N) and humic acid treatments was applied during the preparation of land. Three grains were hand sown in each hill. Thinning to one plant per hill was done before the first irrigation. Hoeing twice was done for controlling weeds before the first and second irrigations. Nitrogen fertilization and humic acid treatments was applied in three equal doses during sowing and before the first and the second irrigations, respectively, recommended pest control was applied when necessary.

A- Physiological characteristics

B- Growth Parameters

C- Yield and yield components

A- Physiological characteristics

A-1 Effect of nitrogen fertilizer rates:

- 1- The data revealed that, level 45 kg N/fad., recorded the highest values for leaf area index at 45 days in both seasons and at 60 days in first season, while the same level of nitrogen recorded the significant highest values for net assimilation rate, relative growth rate and crop growth rate only in the second season.
- 2- Data showed that, the highest nitrogen level recorded the significant highest values for leaf area index at 60 days in the second season, net assimilation rate and crop growth rate only in the first season.

A-2- Effect of humic acid treatments:

- 1- Data showed that, adding humic acid recorded highly significant effect on leaf area index at 45 and 60 days in the second season, net assimilation rate, relative growth rate and crop growth rate in both seasons.
- 2- The level of 2 kg HA/fad recognized the significant highest values of net assimilation rate, relative growth rate and crop growth rate in the first season.
- 3- Data indicated that, the level of 3 kg HA/fad. as well as the control treatment, had the highest values for net assimilation rate, relative growth rate. Moreover, the highest level of humic acid recorded the highest values of crop growth rate in the second season.

A-3- Effect of interactions between nitrogen fertilizer rates and humic acid treatments on growth characters:

- 1- Data showed that, the highest values of leaf area index at 45 days was found due to the interaction between 45 kg N/fad and adding one kg humic acid .
- 2- The highest level of nitrogen (135 kg N/fad.) recorded the highest leaf area index at 60 days with adding humic acid levels Of 2 or 3 kg /fad. in the second season.
- 3- The interaction between 135 kg N x 2 kg humic acid/fad. recorded the highest values for net assimilation rate, relative growth rate and crop growth rate in the first season.

B- Growth characters.

B-1- Effect of nitrogen fertilizer rates:

- 1- The data revealed that, the earliest number of days to 50% tasseling and days to 50% silking were found with all nitrogen levels compared with the control, which there were no significant difference between them, in both seasons.
- 2- Increasing nitrogen levels up to 135 kg N/fad. increased plant height (235.31 and 234.69 cm), ear height (126.88 and 128.13 cm), ear length (23.75 and 22.42 cm) and ear diameter (4.84 and 4.86 cm) in the first and the second seasons, respectively.
- 3- On the other hand, the lowest values of plant height were found with 45 Kg N and 0 Kg N/fad. in the first and the second season, while, the lowest values of ear height (110.63 and 111.25 cm) were found with the second level of nitrogen 45 kg N/fad in both seasons.

B-2- Effect of humic acid treatments:

- 1- The data indicated that, increased humic levels up to 3 kg/fad. recorded highly significant values of days to 50 % tasseling in the first season and 50 % silking in both seasons, the highest values of plant height in the first season, ear height and ear length in the first season.
- 2- On the other hand, adding 1 or 3 kg humic acid/fad recorded the highest ear diameter in the second season which there were no significant differences between them .

B-3- Effect of interactions between nitrogen fertilizer rates and humic acid treatments for growth characters:

- 1- The lowest values of days to 50% tasseling and silking in the two seasons were produced from the interaction between 135 kg N/fad with 0 kg humic acid. with no significant difference between this interaction and 45 kg N x 2 kg HA, 45 kg N x 3 kg HA and 135 kg N x 1 kg HA/fad. interactions for the traits in question.
- 2- The highest values of ear height were recorded with the interactions of 135 kg N and 3 kg HA in both seasons, with no significant difference between the last interaction and 135 kg N x 2 kg HA/fad. interaction in this respect .
- 3- The lowest values of plant height were found with the interaction of 45 kg N/fad. and 1 kg H/fad. (113.75 cm) in the first season.

C-YIELD AND ITS ATTRIBUTES:

C-1- Effect of nitrogen fertilizer rates:

- 1- Increasing nitrogen levels up to 135 kg N/fad. increased all yield and yield components in both seasons.
- 2- The lowest values for yield and its components were found with the control (0 kg N/fad.) in both seasons. However, the highest value of nitrogen fertilizer 135 kg N/fad did not significantly differ than the nitrogen level of 90 kg N/fad. for , No. of rows/ear and No. of grains/row in both seasons.
- 3- Increasing nitrogen levels up to 135 Kg N/fad. increased significantly biological yield (1812.97 and 9561.938 kg/fad.) and straw yield (5342.563 and 5137.5 kg/fad.) compared with the control, which recorded the lowest values and decreased harvest index (51.053 and 46.493) in the first and the second seasons, respectively.

C-2- Effect of humic acid treatments:

- 1- Increasing humic acid levels recorded highly significant increased for 100 - grain weight (g), grain yield/fad. and biological and straw yields /fad in both seasons, while, for harvest index, the increase of humic acid levels led to significantly decreased in both seasons.
- 2- The decrease of harvest index with the increase of humic acid as well as nitrogen fertilizer rates may be attributed to the increase of plant vigorous by the rate faster than the increase of grain weight which reflected on the decrease of harvest index and No. of grains/row in the first season.

C-3- Effect of interactions between nitrogen fertilizer rates and humic acid treatments for yield and its components:

- 1- The interaction between nitrogen and humic acid was significant difference for traits; 100 - grain weight (gm) and grain yield (ard)/fad. While the interaction between humic acid and nitrogen levels recorded insignificant differences for No. of rows/ear and No. of grains/row in both season.
- 2- The highest values of 100- grain weight and grain yield/fad were detected as affected by the interaction between nitrogen fertilizer and humic acid a result of adding 135 Kg N/fad. when interacted with 3 kg HA/fad. in both seasons.
- 3- The interaction of 135 Kg N/fad. and 0 kg HA/fad. in the first season and with 2 kg HA/fad. in the second one did not significantly differ than the first interaction for 100- grain weight, while the same interaction did not significantly differ than the interaction between 135 Kg N/fad. and 2 kg HA/fad. for grain yield /fad. in both seasons.
- 4- The highest values of straw yield/fad. were detected a result of the interaction between 135 Kg N/fad and 3 kg HA/fad in the first season and as the interaction between 90 Kg N/fad. and 3 kg HA/fad. in the second season .