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WALIED FAWZY MOHAMED ALY GALOO

SUMMARY

The present study was carried out at the experimental Station Farm, Faculty of Agriculture, Kafrelshiekh University, Egypt, during the two successive winter seasons of 2013/2014 and 2014/2015 to find out the effect of nitrogen fertilizer levels and times of foliar spraying with potassium fertilizer on the growth, yield and its components as well as technological characters of some flax genotypes.

The experiment was carried out in a split-split plot design with four replications. Where, the main-plots were assigned to flax genotypes as follows:

1. Two genotypes of the dual purpose flax (Sakha 1 and Strain 402/1).
2. Two genotypes of oil flax (Sakha 5 and Strain 541/C/1).
3. Two genotypes of fiber flax (Sakha 3 and Strain 620/3/5).

The sub-plots were allocated to three nitrogen fertilizer levels as follows:

1. 30 kg N/fed.
2. 45 kg N/fed.
3. 60 kg N/fed.

The sub-sub-plots were occupied with the following times of foliar spraying with potassium:

1. Spraying with potassium after 50 days from sowing (DFS).
2. Spraying with potassium after 70 days from sowing (DFS).
3. Spraying with potassium after 50 and 70 days from sowing (DFS).

STUDIED CHARACTERS*:*

I- Growth characters:

Three samples were taken during the growth period (60, 81, 102 and 123 days from sowing "DFS"), where five guarded plants were chosen from each sub-sub plot to determine the following growth characters:

1. Dry weight of plant (g).
2. Plant height (cm).

II- Yields and its components:

At full maturity, ten guarded plants were taken at random from each sub-sub plot to be used in recording the flax yields and its components.

A. Straw yield and its components:

1. Total plant height (cm).
2. Technical length (cm).
3. Stem diameter (mm).
4. Straw yield (g/plant).
5. Straw yield (t/fed).
6. Fiber yield (g/plant).
7. Fiber yield (kg/fed).

B. Seed yield and its components:

1. Length of fruiting zone (cm).
2. Number of capsules/plant.
3. Number of seeds/capsule.
4. 1000-seed weight (g).
5. Number of seeds/plant.

6. Seed yield (g/plant).

7. Seed yield (kg/fed).

III- Technological characters:

1. Fiber length (cm/plant).

2. Total fiber percentage (%).

3. Fiber fineness (N.m.).

4. Seed oil content (%).

- ***The most important results obtained from this investigation can be summarized as follows:***

1- GENOTYPES PERFORMANCE:

From obtained results it could be noticed that there were significant differences in growth characters after 60, 81, 102 and 123 DFS (dry weight of plant and plant height), straw yield and its components (total plant height, technical length, stem diameter, straw yield "g/plant", straw yield "t/fed", fiber yield "g/plant" and fiber yield "kg/fed"), seed yield and its components (length of fruiting zone, number of capsules/plant, number of seeds/capsule, 1000-seed weight, number of seeds/plant, seed yield "g/plant" and seed yield "kg/fed") and technological characters (fiber length/plant, total fiber percentage, fiber fineness and seed oil content) among studied flax genotypes *i.e.* dual purpose flax (Sakha 1 and Strain 402/1), oil flax (Sakha 5 and Strain 541/C/1) and fiber flax (Sakha 3 and Strain 620/3/5) in the two growing seasons.

Under conditions of this study, Sakha 1 cultivar produced the highest values of stem diameter and 1000-seed weight of flax at harvesting in both seasons. Meanwhile, Strain 402/1 significantly surpassed other studied genotypes and resulted in the highest values of dry weight of flax plant

after 60 and 123 (DFS) in both seasons and seed yield (g/plant) in the second season. However, Sakha 5 produced the highest values of length of fruiting zone, number of capsules/plant, number of seeds/capsule, number of seeds/plant, seed yield per plant (in the first season), seed yield per feddan and seed oil content of flax at harvesting in both seasons. While, Sakha 3 cultivar resulted in the highest means of total plant height, technical length, straw yield/plant (in the first season), straw yield/fed, fiber length (cm/plant), total fiber percentage and fiber fineness in both seasons. Strain 620/3/5 produced the highest values of dry weight of plant after 81 and 102 DFS, plant height of flax after 60, 81, 102 and 123 DFS, straw yield/plant (in the second season), fiber yield per plant and per feddan during 2013/2014 and 2014/2015 seasons.

2. EFFECT OF NITROGEN FERTILIZER LEVELS:

With respect to the effect of nitrogen fertilizer levels on all studied characters *i.e.* growth characters after 60, 81, 102 and 123 DFS (dry weight of plant and plant height), straw yield and its components (total plant height, technical length, stem diameter, straw yield “g/plant”, straw yield “t/fed”, fiber yield “g/plant” and fiber yield “kg/fed”), seed yield and its components (length of fruiting zone, number of capsules/plant, number of seeds/capsule, 1000-seed weight, number of seeds/plant, seed yield “g/plant” and seed yield “kg/fed”) and technological characters (fiber length/plant, total fiber percentage, fiber fineness and seed oil content), it was significant in the two growing seasons of this study.

All studied characters of flax gradually increased as a result of increasing nitrogen fertilizer levels from 30 to 45 and 60 kg N/fed in both seasons. It was evident that, under the environmental conditions of this study, flax plants still responded to more levels of nitrogen fertilizer up to 60 kg N/fed. Generally, maximum means of all studied characters were

produced from fertilizing flax plants with 60 kg N/fed in the first and second seasons. On the contrary, the lowest values of these characters were obtained from plots that received lowest nitrogen fertilizer levels (30 kg N/fed).

3. EFFECT OF TIMES OF FOLIAR SPRAYING WITH POTASSIUM:

Times of foliar spraying with potassium (50 DFS, 70 DFS and 50 and 70 DFS) were associated significant effect on growth characters after 60, 81, 102 and 123 DFS (dry weight of plant and plant height), straw yield and its components (total plant height, technical length, stem diameter, straw yield “g/plant”, straw yield “t/fed”, fiber yield “g/plant” and fiber yield “kg/fed”), seed yield and its components (length of fruiting zone, number of capsules/plant, number of seeds/capsule, 1000-seed weight, number of seeds/plant, seed yield “g/plant” and seed yield “kg/fed”) and technological characters (fiber length/plant, total fiber percentage, fiber fineness and seed oil content) in both seasons, except dry weight of flax roots after 102 and 123 DFS in the first season.

Foliar spraying flax plants twice with potassium fertilizer in the form of commercial compound contains 50 % potassium (K_2O) at the rate of 1 Liter/fed after 50 and 70 DFS significantly exceeded other studied times of foliar spraying with potassium and produced the highest values of all studied characters in the first and the second seasons of this study. This treatment was followed by foliar spraying with potassium one time after 70 DFS concerning all studied characters in the two growing seasons. Whereas, the lowest values of all studied characters were resulted from foliar spraying with potassium one time after 50 DFS in both seasons.

4. EFFECT OF INTERACTIONS:

The obtained results indicate that there was significant effect due to the interaction between flax genotypes × nitrogen fertilizer levels on total plant height at harvesting, fiber yield per plant, length of fruiting zone, number of seeds/capsule and fiber fineness (in the first season), seed oil content (in the second season) and dry weight of plant and plant height after 60, 81, 102 and 123 DFS, technical length, straw yield per plant and per feddan, fiber yield per feddan, number of capsules/plant, 1000-seed weight, number of seeds/plant, seed yield per plant and per feddan, Fiber length/plant and total fiber percentage (in both seasons).

Respecting the effect of the interaction between genotypes × times of foliar spraying with potassium, it showed significant effect on dry weight of plant after 102 DFS, plant height of flax after 81 DFS, total plant height at harvesting, fiber yield per feddan and seed oil content (in the first season), straw yield per feddan, seed yield per feddan and total fiber percentage (in the second season) and dry weight of plant after 81 DFS, plant height of flax after 102 and 123 DFS, technical length, straw yield per plant, length of fruiting zone, number of capsules/plant, number of seeds/plant and fiber length/plant (in both seasons).

The interaction between nitrogen fertilizer levels × times of foliar spraying with potassium exhibited significant effect on stem diameter, 1000-seed weight and seed yield per plant, (in the first season), dry weight of plant after 81 and 102 DFS, plant height of flax after 81 and 102 DFS, number of seeds/plant, seed yield per feddan and fiber fineness (in the second season) and dry weight of plant after 123 DFS, total plant height at harvesting, technical length, fiber yield per plant and per feddan, length of fruiting zone, number of capsules/plant, number of seeds/capsule, fiber length/plant, total fiber percentage and seed oil content (in both seasons).

As regards the interaction among genotypes × nitrogen fertilizer levels × times of foliar spraying with potassium, it revealed that significant effect on plant height of flax after 81 DFS, straw yield per plant, 1000-seed weight, number of seeds/plant, total fiber percentage and fiber fineness (in the first season), dry weight of plant after 81 and 123 DFS, total plant height at harvesting, technical length, straw yield per feddan, fiber length/plant and seed oil content (in the second season) and dry weight of plant after 102 DFS, plant height of flax after 102 DFS, fiber yield per plant and per feddan and seed yield per plant and per feddan (in both seasons).

CONCLUSION

Form obtained data in this study, it can be recommended that mineral fertilizing Sakha 3 cultivar, Strain 620/3/5 and Sakha 5 with 60 kg N/fed and foliar spraying twice with potassium fertilizer after 50 and 70 days from sowing in order to maximizing straw, fiber and seed yields, respectively under the environmental conditions of Kafrelshiekh governorate, Egypt.