SUMMARY

EVALUATION OF SOME NEW PROMISING FLAX STRAINS UNDER SOIL SALINITY CONDITION

Experiments were conducted in Sakha, Kafr El-Sheikh Governorate during 1992/1993 and 1993/1994 seasons.

A; FIRST EXPERIMENT (POT EXPERIMENTS):

TOLERANCE OF SOME PROMISING FLAX GENOTYPES TO SALINITY UNDER POT CONDITIONS

The aim of this investigation was to study the tolerance of six promising flax genotypes namely (S. 355, S. 341, Giza 7, Giza 8, S. 2419 and S. 297) to salinity of irrigation water which was added as a 1:1 mixture of sodium chloride and calcium chloride at concentrations of 0, 1500, 3000 and 4500 ppm.

The recommended cultural practices for growing flax were followed. A spilt plot design with four replications in each season was used, whereas the main plots involved the genotypes and the salinity treatments in the sub-plots.

Results could be summarized as follows:

I. Straw yield and its related characters:

1- Genotypes differed significantly in all characters.

S. 341 plants were significantly superior to all other genotypes with regard to technical stem length, stem diameter, straw yield per plant and fiber yield per plant.

S. 297 was the least tolerant genotype, where the increase in salt concentration to 4500 ppm seriously reduced all characters studied.

2- There was a consistent and progressive depression in all characters studied due to the increase in the level of salinity.

3- The significant interaction between genotypes and salinity indicated that growing S. 341 is recommended for producing high straw yield under salinity condition.

II. Seed yield and its related characters:

1- Genotypes differed significantly in all characters.

Giza 8 was at the top of all genotypes and was significantly superir to the five other genotypes with regard to upper branching zone length, number of seeds per capsule, number of seeds per plant and seed yield per plant, while for number of capsules per plant, the three genotypes Giza 7, Giza 8 and S. 341 were superior compared with the other genotypes.

2- There was a progressive and consistent depression in all characters due to the increase of salt concentration, but seed index increased with the increase of salinity up to 1500 ppm level and decreased again with the rise of salinity level up to 3000 ppm.

3- The significant interaction between genotypes and salinity indicated that growing Giza 8, S. 341 are recommended for producing high seed yield under salinity conditions.

III. Technological characters:

1- Genotypes differed significantly in all characters.

S. 341 was significantly superior to all other genotypes with regard to fiber length and fiber fineness and Giza 8 was superior to all other genotypes with regard to oil percentage.

2- There was a consistent and progressive depression in all characters studied with the increase in salinity level.

3- The significant interaction between genotypes and salinity indicated that S. 341 was the first genotype in fiber length and fiber fineness and Giza 8 ranked first with regard to oil percentage.

B: SECOND EXPERIMENT: (FIELD EXPERIMENTS):

EFFECT OF SALINITY AND SEEDING RATE ON YIELD AND ITS COMPONENTS OF FLAX UNDER SALINE SOIL CONDITIONS

This investigation was carried out to study the effect of salinity and seeding rate on yield and its components of the same previous six promising flax genotypes under field condition grown in saline soil. Three seeding rates were used, they were 50, 60 and 70 kg per fed. during 1992/1993 season and 60, 70 and 80 kg per fed. during 1993/1994 season. The electrical conductivity (E.C.) of the soil was 4.5 mmhos/cm in the first season and 6.5 mmhos/cm in the second season (at a depth of 20-40 cm).

The recommended cultural practices for growing flax were followed. Each experiment was analyzed as 6 x 3 strip plot design with four replications.

Results could be summerized as follows:

I. Straw yield and its related characters:

1- Genotypes differed significantly in all characters studied.

S. 341 plants were significantly superior to all other genotypes with regard to technical stem length, straw yield per plant, straw yield per feddan and stem diameter. Also, S. 341 was superior to all other genotypes in the second season with regard to fiber yield per plant, fiber yield per feddan and fiber percentage, while the commercial variety Giza 7 was superior to

all other genotypes in the first season due to the lower soil salinity (E.C. = 4.5 mmhos/cm.).

2- There was a progressive and consistent depression in all characters studied due to the increase of soil salinity from 4.5 mmhos/cm. in the first season to 6.5 mmhos/cm. in the second one.

3- There was a gradual increase in technical stem length, straw yield per plant, straw yield per feddan, fiber yield per plant, fiber yield per feddan and fiber percentage with increasing plant population density as a result of increasing seeding rate from 50 to 60 and 70 kg/fed. in the first season and from 60 to 70 and 80 kg/fed in the second season.

4- There was a gradual decrease in stem diameter with increasing seeding rate.

5- The significant interaction between genotypes and seeding rates under soil salinity conditions indicated that growing S. 341 and Giza 7 at 80 kg/fed. seeding rate are recommended for producing high fiber yield with high quality.

II. Seed yield and its related characters:

1- Genotypes differed significantly in all characters studied.

The commercial variety Giza 7 was at the top of all genotypes and was significantly superior to the five other genotypes with regard to upper branching zone length in the first season, while S. 297 was the best genotype in the second one.

The commercial variety Giza 8 was significantly superior to all other genotypes with regard to number of capsules per plant, number seeds per plant and seed yield per plant in the first season, and S. 341 was significantly superior to all other genotypes in the second one due to its tolerance to salinity.

The commercial variety Giza 8 was significantly superior to all other genotypes with regard to seed yield per feddan in the first season, and S. 355 was significantly superior to all other genotypes in the second one. Also S. 2419 was the first genotypes in seed index.

2- The increase in seeding rates significantly reduced upper branching zone length, number of capsules per plant, number of seeds per plant, seed yield per plant and seed index.

3- The increase in seeding rates significantly increased seed yield per fed.

4- All genotypes showed marked reduction in all characters in the second season compared with the first one due the increase in soil salinity from 4.5 to 6.5 mmhos/cm (E.C.).

5- The significant interaction between genotypes and seeding rates under soil salinity conditions indicated that growing S. 341 and S. 355 could be recommended to produce a highe seed yield per fed. under the stress conditions of the higher level of salinity.

III. Technological characters:

1- Genotypes differed significantly in all characters studied.

The commercial variety Giza 7 was significantly superior to all other genotypes with regard to fiber length and fiber fineness in the first season, but S. 341 was superior to all other genotypes in the second one.

2- S. 2419 was the best genotype for oil percentage in the first season, and S. 297 was the best genotype in the second one. Also, S. 341 and S. 355 were more tolerant to salinity showing a reduction in oil percentage of only 0.1 and 1.5% respectively.

3- The commercial variety Giza 8 was the best genotype for iodine value in the first season, and S. 341 was the best genotype in the second one.

4- The increase in seeding rate significantly increased fiber length, fiber fineness and iodine value in both season, and oil percentage in the second season only. In the first season, no relevance was found between seeding rates and oil percentage.

5- The significant interaction between genotypes and seeding rates under soil salinity conditions indicated that growing S. 341 at a seeding rate of 80 kg/fed is recommended for producing high technological characters.

V. Anatomical studies:

1- S. 341 plants were superior to all other genotypes when sown by the highest seeding rate (80 kg per feddan) under soil salinity conditions with regard to fiber area, total cross section area, xylem area/c.s., and fiber index.

2- Giza 7 plants were superior to all other genotypes under soil salinity conditions with regard to cortex ratio, fiber area and number of cells per bundle.

3- Giza 8 plants ranked first in relation to fiber bundle area.

4- S.355 ranked first in relation to cortex ratio and number of fiber bundles/c.s.

5- Increasing seeding rates recorded the highest means of fiber area percentage, number of fiber cells per bundle and per cross section and fiber index.

6- The newly releaved Giza 7 flax variety is still considered as the poupular variety for the growers and manufactures for its fiber quantity and quality when seeded at the rate of 80 kg seeds per fed.