Evaluation of some promising flax strains in relation to growth, yield and quality

Amna Hafiz Hassan El-Sweify

Flax (Linum usitatissimum L.) crop is grown in Egypt as a dual purpose type tI fiber and seeds", andits yield and quality are affected by many factors such as varieties, microelements and seeding rates.Therefore, this study was carriedinvestigate the effect of those factors on yield and quality of fibers in flax.out to growth, Two field experiments were carried out at El- Gemmeiza AgricUltural Research Station, ARC in 1989/90 and 1990/91 seasons, to evaluate two promising flaxstrains, S.(19/31), "released as Giza 7", and S.(2419/1); grown under different microelement treatmentsand different seeding rates in relation to growth, yield and yield components, in addition to anatomicaland quality characters.A split-split plot design with four replicationswas carried out in both seasons, the main plots weredevoted for the two strains. The sub-plots wereassigned to the three microelement treatments i.e.,zinc, cupper at 250 ppm concentration and untreatedcontrol and the sub-sub plots for the six seeding ratesi.e., 750, 1000, 1250, 1500, 1750 and 2000 seeds/m2•The main findings of the present investigationcould be summarized as follows:A : Growth characters1. 51 (19/31) plants were taller than 52 (2419/1)plants, particularly at the later stages ofgrowth. Also, 51 plants had higher technical stemlength compared with 52 ones.No significant difference was detected withregard to dry weight per plant between the twostrains. However, plants insignificantlyoutweighed 51 plants at all stages of growth.Wi th regard to percentage of different plantorgans to total dry weight it was observed that 51plants had higher stem dry weight percentage atfourth stage of growth, whereas 52 plants recordedhigher leaves dry weight percentage, but nosignificant difference was detected in roots dryweight percentage.Also $2 plants had higher number of upperbranches and number of capsules per plant comparedwith 51 plants.2. Zinc application significantly increased plantheight at all growth stages, stem dry weightpercentage (at early stages of growth). Cupperapplication increased leaves dry weight percentageat early and later stages of growth.Microelements had no significant effects ontechnical stem length, dry weight per plant, rootsdry weight per plant, number of upper branches perplant and number of capsules per plant.3. Increasing seeding rate significantly increasedplant height at all growth stages, technical stemlength, stem dry weight percentage andsignificantly reduced dry weight per plant, leavesdry weight percentage, roots dry weight percentageat all growth stages, upper branches number perplant and number of capsules per plant.4. Most of the interactions between the threeexperimental factors had no significant effects ongrowth characters. Exceptions were observed forthe following interactions:strains x microelements on dry weight per plantafter 75 days from planting, leaves dry weightpercentage after 75 days and dry weight per plantafter 115 days from planting in both seasons.strains x seeding rates on roots dry weightpercentage after 115 days in the first season.Microelements x seeding rate on technical stemlength after 95 and 115 days from planting in bothseasons.B. Yield and yield componentsI Straw yield and its related characters1.51 (19/31) plants were significantly superior to 52(2419/1) plants with regard to technical stemlength; and produced greater number of basalbranches per plant and higher straw yield perplant and per feddan, whereas 52 plants werehigher in length of top capsules zone and stemdiameter. 51 outyielded 52 in straw yield perfeddan by 4.14 and 12.16% in the first and secondseason, respectively.2. Zinc application insignificantly increasedtechnical stem length. Also, Zn and eu in generaland Zn in particular insignificantly increasedlength of top capsule zone, stem diameter, numberof basal branches per plant, straw yield per plantand per feddan.3. Increasing seeding rate significantly increasedtechnical stem length and straw yield per feddan,but significantly decreased length of top capsulezone, stem diameter, number of basal branches andstraw yield per plant.4. The effect of interactions between theexperimental factors was only significant between:strain x microelements on straw yield per feddanin the first season and among strains xmicroelements x seeding rates on straw yield perplant in both seasons.II Seed yield and its related characters1. S2 (2419/1) plants were significantly superior toSl (19/31) with regard to number of capsules perplant, number of seeds per capsules and per plant,number of upper branches per plant, seed YfeJd;plantand per feddan, and seed index.Such results indicate the superiority of 52 inseed production where it outyielded Sl by 2.40 and2.47% in the first and second season,respectively.2. Microelements application had no significanteffect on all seed yield components. However,slight and insignificant increases in seed yieldand its components were observed due to Zn and euapplication.3. Increasing seeding rates significantly reducedseed yield components. On the other hand, seedyield per feddan significantly increased as aresult of increasing seeding rate. The seed yieldper feddan was increased by about 58 kg per feddandue to increasing seeding rate from 750 to 2000seeds/m2 in the two seasons.4. The effect of the interaction between strains andseeding rates was only significant on number ofcapsules per plant in 1989/90 season.Also, the second order interaction significantlyaffected number of capsules per plant (in thefirst season), number of seeds per plant (in thefirst season) and number of upper branches perplant in both seasons.III Technological characters1.51 (19/31) plants were significantly superior to 52(2419/1) plants in fiber yield per plant and perfeddan, fiber length, long fiber percentage aswell as fiber fineness. On the other hand, 52plants were significantly superior to 51 plantswith regard to oil percentage as well as oil yieldper feddan.51 outyielded 52 in fiber yield per feddan by 24and 29%, respectively, in the first and secondseason, whereas 52 outyielded 51 in oil yield by7.5 and 7.8%, respectively in 1989/90 and 1990/91seasons.2. Zinc and cupper application significantlyincreased fiber yield per feddan, fiber length,long fiber percentage, fiber fineness and oilyield per feddan. On the other hand, fiber yieldper plant was significantly decreased withincreasing seeding rate.4. The second order interaction among strains,microelements and seeding rates had a significanteffect on long fiber percentage in both seasons.did not significantly affecttechnological characters.C. Anatomical studies1. 51 (19/31) had higherfiber ratio, fiber/xylem%,per cross section and(2419/1) .values of fiber area,number of fiber cellsfiber index than 522. Microelements (Zn andanatomical charactersuntreated ones. eu) of favourably increasedplants compared with3. Increasing seeding rates to 1500 or 2000 seeds/m 2recorded the highest means of fiber areapercentage, number of fiber cells per bundle andper cross section, fiber/xylem percentage andfiber index in both seasons.