

Yield and quality of flax as affected by variety and some environmental factors

Saber Hussein Ahmed Mostafa

SUMMARY YIELD AND QUALITY OF FLAX AS AFFECTED BY VARIETY AND SOME ENVIRONMENTAL FACTORS

Flax (*Linum usitatissimum* L.) ranked second in relation to fiber crops in Egypt after cotton where it is grown as a dual purpose crop (fiber and seed). Efforts are made to increase flax production through increasing the yield rather than through extending flax area. Also, the agricultural policy is intending to improve the technological properties of fibers and seeds through the introduction and breeding of new varieties, characterized by high yielding potentiality. That the productivity of any variety is the result or outcome of the interaction between the genetic constitution and environmental conditions. For that, flax should be grown under suitable environmental conditions to achieve maximum yield and best quality. Therefore, six field experiments were conducted during 1990/91 and 1991/92 seasons at three different regions i.e., Kafr El-Sheikh governorate representing North Delta (Sakha Agricultural Research Station.), El-Gharbia governorate representing Middle Delta (Germiza Agricultural Research Station.) and El-Giza governorate representing North Upper Egypt (Giza Agricultural Research Station.) to evaluate twelve flax genotypes including the four commercial varieties namely, Giza 7, Giza 5, S.119/2, S. 3/4, S.282/37114/8, 5.402/3/3/5, Giza 8, Giza 6, 5.2465/1, S.2651/2, S.281120912/2 and 5.329/5/3.120 The recommended cultural practices for growing flax were followed. A complete randomized blocks design with four replications in each region was used. An analysis of variance for each season in each environment was followed and a combined analysis over the three regions as well as over both seasons was done. Results could be summarized as follows:

1. Results indicated that all genotypes under study significantly differed in relation to straw yield and its related characters. Giza 7 variety was significantly superior over the other genotypes regarding total length, technical length, straw yield per plant, straw yield per faddan as well as fiber yield per faddan. While, 2465/1 significantly surpassed the other genotypes in main stem diameter.
2. The three locations differed significantly concerning straw yield and its components. Kafr-El-Sheikh governorate favourably affected straw yield and its components as compared with El-Ombia and El-Giza governorates. Also, El-Gharbia was better than El-Giza for seed and fiber yields.
3. Results revealed that the climatic conditions during the first season (1990/91) were more favourable than those in the second one (1991/92) in affecting all characters under study. The differences were significant between the two seasons in all characters.
4. Results showed that genotype X environment had significant effect on total stem length, technical length, stem diameter, straw yield/plant, straw yield/fad. and fiber yield/fad. Also genotype X season, significantly affected technical length, stem diameter, straw yield/plant and fiber yield/fad. Environment and season interaction significantly affected technical length, stem diameter, straw yield/plant, straw yield/fad. and fiber yield/fad. The second order interaction significantly affected technical length, stem diameter and straw yield/plant.
5. There were significant differences among genotypes under study in relation to seed yield and its related characters. Giza 8 variety ranked first regarding number of capsules/plant, seed yield/plant, seed index, seed yield/fad. and oilyield/fad., followed by Giza 7 variety with the same characters except seed index where, S.329/5/3 ranked second after Giza 8 variety.
6. Results indicated significant differences among the three locations in relation to seed yield and its related characters. Sakha location in Kafr-El-Sheikh governorate ranked first for seed yield and its related characters. While El-Gemmiza location in El-Gharbia governorate ranked second in relation to seed yield/plant and seed

index and El-Giza governorateranked second cone ruing number of capsules/plant and seedyield per fad.7. The climatic condi ons during 1990/91 season were moresuitable than those' 1991/92 season in affecting seed yieldand its componen s. The differences between the twoseasons were signifi ant in all characters except seed index.8. The interaction etween genotype and environmentsignificantly affect number of capsules per plant, seedyield per plant, se d yield per faddan and oil yield perfaddan.Also, geno e X season significantly affected seedyield per plant.Environment X season had a significant effect onnumber of capsules per plant, seed yield per faddan and oilyield per faddan.The second order interaction significantly affectedseed yield per fad, hereas other seed characters were notsignificantlyaffecte9. Genotypes under s dy significantly differed with regard totechnological chara ters. Giza 7 variety was significantlysuperior to the ot er genotypes in each of long fiberpercentage, fiber le gth, fiber strength and fiber fineness.While, Giza 8 v iety ranked first in relation to oilpercentage. On the other hand, Giza 6 variety ranked firstfor iodine value foll wed by Giza 5 and Giza 8 .10. Sakha location in afr-El-Sheikh governorate ranked firstconcerning long fib percentage, fiber length, oil percentageand iodine value. hereas El-Gemmiza location in El-Gharbia governorateranked first for fiber strength.11. Results indicated at the climatic conditions of the firstseason (1990/91) ere more favourable than those in thesecond one (1991/9) in affecting technological charactersunder study except ber strength where the second seasonconditionsfavourabl12. The interaction be een genotype and environment as wellas environment d season significantly affected alltechnological charac ers, namely, long fiber percentage.fiberlength, fiber , fiber fineness, oil percentage andiodinevalue.Genotype X se on significantly affected fiber length,fiber fineness and oil percentage.Length, strength, fineness of fiber as well as oilpercentage were si .ficantly affected by the second orderinteraction.13. Genotypes S.24651, Giza 8, Giza 7, S.2465/l,8.281/209/2/2, S.119 2, Giza 7 ranked first in relation tototal cross section, c rtex, fiber, xylem, pith, fiber bundleareas and fiber index, espectively.14. Genotypes Giza 8, 7, 5.2465/1 and Giza 8 weresignificantly superior over the rest genotypes concerningcortex percentage of ortex 1 cross section, percentage offiber 1 cross sect on, percentage of xylem lcrosssection.percentage of ith / cross section, respectively.15. Results indicated that Giza 7 variety ranked first regardingnumber of fiber bundles / cross section, number of fiber cells/ bundle, whereas S.2465/l ranked first with regard to fibercell area.16. from the foregoing esults it could be concluded that forproducing the highest yield of straw with the best quality offibers, it is recomm nded to grow Giza 7 flax variety inKafr-El-Sheikh gove orate and the neighboring regions andto grow Giza 8 flax ariety to get the highest yield of seedand oil in the same re ions.