

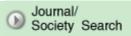
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Plasticity in Taproot Elongation Growth of Several Food Legume Species

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Abstract:

Taproot elongation rates (TRERs) of seedlings were investigated with the slant tube method for 27 genotypes of six food legume species in spring, and six selected genotypes of three species in autumn under irrigated and nonirrigated conditions. Shoot growth was also evaluated for comparison. In these experiments, we aimed to evaluate the plasticity in TRER of the species and their genotypes. In spring, most of the species and their genotypes were significantly different in TRERs. Combined ANOVA across the environments revealed that TRERs significantly responded to the environments, especially growing seasons between which root-zone temperatures were markedly different. Under irrigated conditions, TRERs were generally slower in autumnthan spring-grown plants. However, the significant species (genotypes) xenvironment interactions indicated that the plasticity in TRER differed among species. Comparison between two seasons showed that TRERs of cowpea were more plastic than those of chickpea and lentil, while an opposite trend was evident for shoot growth. TRERs of cowpea, mung bean and black gram (warm-season species) were strongly root-zone temperature dependent, while those of chickpea, grasspea and lentil (cool-season species) were less dependent or independent. Non-irrigated conditions tended to promote shoot growth, but did not affect TRERs of the genotypes of three species. However, the significant genotypexenvironment interaction due to different soil moisture regimes for lentil genotypes showed that genotypic difference also existed in plasticity triggered by soil moisture regimes.

Keywords:

Cicer arietinum L., Lathyrus sativus L., Lens culinaris Medik., Plasticity, Taproot elongation, Vigna mungo (L.) Hepper, Vigna radiate (L.) Wilczek., Vigna unguiculate (L.) Walp

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