



Genotypic variability for root/shoot parameters under water stress in some advanced lines of cotton (*Gossypium hirsutum* L.)

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ABSTRACT. Research pertaining to genetic variability parameters, heritability, and genotypic, phenotypic, simple, and environmental correlations for various seedling traits in five elite advanced cotton (*Gossypium hirsutum* L.) lines (FH-113, FH-114, FH-941, FH-942, and FH-2015) and one check (CIM-496) was carried out during October and November 2010 under greenhouse conditions at the Cotton Research Institute (Faisalabad, Pakistan). Material was raised in plastic tubes with a randomized complete block design replicated three times. Three drought shocks were applied by withholding water from the tube-sown plants for 8-, 10-, and 12-day intervals. After 60 days of sowing, data on root/shoot traits like root length (cm), shoot length (cm), root weight (g), shoot fresh weight (g), lateral root number, root dry weight (g) shoot dry weight (g), and total plant weight (g) were recorded. Considerable genotypic variations existed between genotypes for all seedling characters. Higher broad-sense heritability estimates were found for all traits studied. Maximum broad-

sense heritability coupled with high genetic advance in root length (0.99, 17.34), lateral root number (0.91, 2.89), and shoot length (0.90, 4.35) suggested a potential for genetic improvement through breeding and selection. The correlation coefficients among root length, shoot length, root dry weight, fresh shoot weight, and total plant weight were positively and significantly correlated; thus, they can be selected simultaneously as drought tolerance selection indexes owing to the absence of undesired relationships. Genotypes FH-942 and FH-113 had the lowest excised leaf water loss during the first 4 h and also for the next 4 h. Therefore, these two advanced lines (FH-942 and FH-113) with high initial water content and lower excised leaf water loss had better adaptation to water stress.

Key words: Cotton; Drought; Root; Shoot; Heritability; Correlation coefficients