

GENETIC VARIABILITY FOR EARLY SEASON ROOT SYSTEM DEVELOPMENT

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Abstract

The growth of the root system of cotton (*Gossypium hirsutum* L.) is under genetic control but may be modified by the environment. The early development of a vigorous root system is critical for obtaining an adequate stand for improved productivity. However, in many cases the soil temperatures at planting may be lower than optimum for adequate root system development. Therefore studies have been initiated to determine genetic variability for root system development at low soil temperature which may eventually lead to varieties with improved stand establishment. Seed was obtained of some 60 cotton race stocks from the National Germplasm Collection for evaluation. The germplasm was initially evaluated using a screening procedure that determined root development at low temperature (18C) for a period of seven days. Seed of selected germplasm was then planted in the greenhouse under warm (37/32C) and cool (28/20C) conditions and seed was collected for re-evaluation using the low temperature screening procedure. The results indicated that there was significant variability for root development at low temperatures. There were also differences however, in the response of the seed of the same genotypes collected from the germplasm grown under the warm and cool greenhouse conditions. These differences may be due to a number of factors such as changes in seed coat permeability, lipid production, dormancy, etc. The results thusfar, strongly suggest that the environmental conditions under which seed are developed significantly influenced the response of subsequent generations and that these conditions should be documented in the process of screening germplasm for low temperature response.