EARLY DEVELOPMENT AND PHOTOSYNTHETIC CAPACITY AFFECTS SEEDLING VIGOR OF COTTON

Melissa Remley
Shengjun Liu
University of Missouri
Columbia, MO
Robert Nichols
Cotton Incorporated
Cary, NC
Andrea Phillips Jones
Delta Center
Portageville, MO
Felix Fritschi
University of Missouri
Columbia, MO

Abstract

Seedling emergence and early season growth are critical for cotton stand establishment. Early vigor, resulting in greater and more rapid seedling growth, allows plants to better tolerate detrimental effects from biotic and abiotic stresses, setting the stage for healthy reproductive growth and a successful cotton crop. However, very little is known about the genetics and the physiological mechanisms determining early vigor in cotton. As an initial step, we evaluated seedling vigor among 144 cotton genotypes, including modern cultivars, advanced breeding lines, and plant introductions from the national germplasm collection. Significant variation in seedling vigor, as measured by seedling biomass and leaf area development, was identified in both field and greenhouse conditions. Among 144 genotypes, differences greater than 1.75X in total plant dry weight and total leaf area were found in greenhouse conditions. In field conditions, greater than 1.5X differences in total plant dry weight and total leaf area were found among 48 advanced lines. Further evaluations of selected genotypes have indicated differences in root development, cotyledon expansion, individual leaf development, and leaf photosynthetic rates among genotypes of differing seedling vigor.

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