CONTRIBUTIONS OF THE FIRST TRUE LEAF TO SEEDLING VIGOR UNDER FIELD CONDITIONS

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Abstract

Rapid development of the first true leaf has been suggested as a reliable indicator of seedling vigor in cotton, yet studies demonstrating a relationship between the photosynthetic response of the first true and early season seedling growth are limited. A study was conducted to evaluate the contributions of the first true leaf to cotton seedling vigor under different field conditions. Two Upland and one Pima cultivars were planted in Mid-April, early May and early June to generate different field conditions, especially differences in temperature conditions. Plant samples from 2-m sections within each plot were destructively harvested and general crop growth analysis (number of plants, plant height, number of nodes, first true leaf area (FTLA) and total dry weight of plants) and physiological processes (net and gross photosynthesis, dark respiration, electron transport rate (ETR)) of first true leaf at 21 and 35 DAP were assessed. Initial data analysis results showed differences in seedling growth parameters with planting dates. Overall, cotton planted in early May showed the maximum crop growth and seedling vigor as indicated by high crop growth parameters. The first true leaf of cultivars planted in mid-April exhibited higher gross and net photosynthesis as compared to the cultivars planted in early-June. The study suggests that field conditions were more favorable for high first true leaf area which promoted seedling vigor. Interestingly, cultivar differences in seedling vigor (plant dry weight) on earlier planting dates were associated with greater FTLA, but not photosynthetic activity (on dates where photosynthetic data were available). This study will contribute to our understanding of the importance of the first true leaf in determining early season growth and allow for a more detailed understanding of the underlying component processes contributing to early season vigor in cotton.