THE IMPACT OF SEED CHARACTERISTICS ON SEEDLING VIGOR AND LINT YIELD ACROSS FIVE YIELD ENVIRONMENTS IN SOUTHERN GEORGIA

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Abstract

Seed mass and oil content of the quiescent cotton seed are positively associated with seedling vigor. Seed mass has been negatively associated with lint yield due to selection for varieties with greater lint percent. However, these relationships must undoubtedly be environment-dependent as yield is impacted by yield components other than lint percent alone. The current study addressed the hypothesis that seed size and total oil + protein calorie content would be strongly predictive of seedling vigor across most field conditions and that the impact of seed traits on yield would be dependent upon yield environment. When considered in each yield environment, seedling fresh weight at the 2 to 3 leaf stage was positively related to seed size and to the total protein + oil calorie content of the quiescent seed (which is affected by seed mass and the percentage of seed mass accounted for by protein and oil) in 4 of the 5 environments tested. Conversely, seed mass and protein + oil (kcal seed⁻¹) were not related to lint yield in 4 of the 5 environments tested. When cultivar means across all five yield environments tested, the protein + oil energy content of the quiescent seed was a strong predictor of post-emergence measurements of seedling vigor for the 11 commercially-available cultivars tested. Seed characteristics indicative of seedling vigor did not necessarily limit yield in most environments.