ON-FARM EVALUATION OF PLANTER DOWNFORCE IN VARYING SOIL TEXTURES FOR IMPROVING COTTON EMERGENCE

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Abstract

Adequate planter downforce during planting is critical for achieving uniform seed depth throughout the field. Inherent soil variability in most agricultural fields across the Southeast US makes it difficult to attain a consistent seeding depth during planting, which affects crop emergence and yield in some cases. On-farm research trials were conducted in different regions across South Georgia to investigate the influence of planter downforce in varying soil textures within grower fields. A total of six fields were planted in cotton in southwest, southcentral and southeast Georgia with four different growers during 2017 to 2019. Soil electrical conductivity (EC) was mapped in each field to delineate areas of varying soil textures. Low, medium and high soil EC zones were classified based on prevalent soil variability within each field. Each trial was planted by utilizing three different downforces implemented in strips traversing across all soil EC zones. Downforce treatments included a grower-preferred downforce with a relatively (at least 50%) lower and higher downforce dependent on prevalent field conditions and downforce system available on the planter. Stand counts were collected at one, two and three weeks after planting to assess crop emergence in each soil EC zone. Results suggested that crop emergence was affected by soil EC in three out of six fields. Soil EC*downforce interaction was significant in one field whereas downforce was determined to be non-significant in all fields. Emergence reductions of 10% or greater were observed in heavy texture soils in one grower field due to lack of sufficient planter downforce. In three out of six fields, planter downforce of 100 lbs. (grower preferred in all fields) was considered inadequate for planting in heavy clay soils. Similar future studies should consider measurement of additional soil properties including soil moisture and soil hardness for better quantification of in-field conditions at planting.