DRYLAND COTTON PRODUCTION USING COVER CROPS AND CROP ROTATIONS ON THE

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Abstract

Upland cotton (Gossypium hirsutum L.) production is the most important economic crop for the Southern Texas High Plains. Increased adoption of conservation tillage combined with cover crops and crop rotations with winter wheat (Triticum aestivum L.) or grain sorghum (Sorghum bicolor L.) may offer economic and soil benefits. In this semi-arid region, cover crops using stored soil moisture can have negative impacts on dryland cotton yields. The objective of this research is to 1) determine the effect that different cover crop species and termination timings has on cotton lint yield compared to conventional tillage; and 2) determine the impacts of different cropping systems and tillage regimes to determine effective methods in dryland systems. Two field studies were implemented at the Texas A&M AgriLife Research and Extension Center near Lubbock, Texas. The first study was conducted in 2018 to 2021, compared wheat, cereal rye (Secale cereale L.), and triticale (x Triticosecale Wittm.). Each species was planted at 34 kg ha⁻¹ and terminated at three timings, ranging from 6 to 2 weeks before cotton planting. Biomass amounts ranged from 600-2000 lbs/A. The rye produced the greatest amounts of biomass. Plant populations were greater in the cover treatments compared to the conventional tillage, but all treatments were acceptable. No differences in yield were observed between any treatments other than the rye at the third termination date had the greatest yields. The second study was established in 2019 and compared four dryland cropping systems: continuous cotton-conventional tillage, continuous cotton-no tillage wheat cover crop, sorghum-cotton rotation (conventional and no-till), and winter wheat-cotton rotation (conventional and no-till). Cotton stand establishment ranged from 16-36 thousand plants per acre. Greatest stand establishment occurred in the three no-tillage treatments due to protection from inclement weather early in the season. However, when compared to the conventional tillage, no differences were observed in cotton lint yield with the exception of the no-till cotton-wheat rotation which had the greatest yields.