AGRONOMIC EFFECTS OF VARIOUS SMALL GRAIN COVER CROPS ON DRYLAND COTTON PRODUCTION IN OKLAHOMA

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Abstract

Dryland cotton production in Oklahoma has many challenges including limited rainfall, increased winds and high temperatures that can affect soil erosion, soil moisture storage, and plant stands. Biomass production through the use of small grain cover crops can reduce soil erosion and increase soil moisture storage by providing ground cover through the winter. Small grains have a reduced seed cost, reduced management issues and increased producer familiarity as many small grains are utilized in Oklahoma as cash crops.

An experiment was conducted in 2019 and 2020 in Fort Cobb, OK to evaluate effects of termination timing on various small grains cover crops, as well as determining agronomic effects of differing levels of biomass in a dryland cotton production system. Plots were planted in a strip-block design where cover species acted as the blocked factor, termination timing and cotton variety were randomized within. Cover plots including barley (*Hordeum vulgare* L.) and wheat (*Triticum aestivum* L.) were planted on 13 Nov 2020. Termination of both species was conducted using CO^2 backpack sprayer at 140 L/ha and a speed of 4.5 kph utilizing glyphosate at 252 g ai/ha. Early termination of both species was applied at boot stage 35 days prior to planting (DPP) and late termination was applied when cover species headed out (12 DPP). Cotton was planted on 21 May 2020, 8-row plots .9 m rows by 9 m in length with four replications. Two cotton cultivars utilized including Phytogen 400 W3FE and Phytogen 480 W3FE at 92,500 seed/ha. Data collection of cover crops consisted of biomass collection at day of termination and at cotton planting (.09 m^2). Soil moisture was collected at depth of 0 - 1.2 m in at cotton planting, first bloom, and at harvest to determine volumetric water content. Cotton stand counts were collected 14 days after planting, and boll counts on 3 m of row were collected at 60% open boll as well as height, FFB, total nodes, NACB, and NUHB on 7 plants per plot. Cotton lint yields and turnout were collected at harvest. Subsamples sent for HVI quality analysis. Data were subjected to analysis of variance using the PROC MIXED procedure using SAS v. 9.4. Means were separated using Fishers Protected LSD at alpha = 0.05.

At day of cover crop termination and at cotton planting, wheat had significantly greater residue compared to barley at both timings. Barley (11%) and wheat (8%) had significantly lower volumetric water content (VWC) at planting compared to the no cover (16%) at a depth of 0.6 to 0.9 m. Cotton plant stands were significantly greater in the no cover compared to both cover species and termination timings. Cotton lint yield was increased in the no cover treatment, early terminated barley and wheat. Cotton lint yield was decreased in the late termination of both cover species.