2003 BELTWIDE COTTON CONFERENCES, NASHVILLE, TN – JANUARY 6-10

EFFECTS OF INTERSEEDED SMALL GRAINS ON DRYLAND COTTON PERFORMANCE

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Abstract

Several thousand acres of seedling cotton are damaged or destroyed annually from high winds and blowing sand. This injury may result in one or all of the following: stand loss, replanting, delayed maturity, lower yields, and possibly complete loss of a cotton crop. The use of a cover crop can potentially alleviate this damage. However, these systems have been most successful in higher rainfall areas or under irrigation. The concern with cover crops in semi-arid, dryland cotton production areas is the loss of soil moisture from the soil profile during the winter and spring fallow period. However, varying the planting pattern of cover crops could maintain adequate soil moisture for cotton production, and at the same time protect cotton seedlings from high winds and blowing sand. Therefore, the objectives of this research are to: determine the optimum planting pattern of a small grain cover crop to minimize soil moisture loss and maintain cotton yields, the best adapted small grain species, and the effects of cover crop termination timing on cotton yields.

Experiments were established during the 2000, 2001, and 2002 growing seasons in the Rolling Plains (Chillicothe) and High Plains (Lubbock) of Texas. The experimental design was a split-split plot with four replications. Paired rows of wheat or rye were planted in standing cotton prior to harvest or in standing cotton stalks after harvest the previous fall each year. Planting patterns included two rows of wheat or rye in every cotton row middle, alternate rows, one of every 4 rows, and one of every 8 rows. The check treatment had no wheat or rye planted in the cotton row middles. Two small grain cover crop termination timings were evaluated: boot stage or the 50% heading stage, prior to cotton planting. The small grains cover crop was terminated at each timing with glyphosate at 1.0 lb ai/A. Cotton tillage at Chillicothe included planting with a strip-tillage system, while a no-till system was used at Lubbock. The exception was the no-cover crop treatments at Lubbock, which was a conventional tillage system. A Roundup-Ready variety was planted at each location, and traditional dryland cotton production practices were used throughout each season. Cotton yields were determined for each treatment.

There were no significant interactions among any of the treatments: planting pattern, small grain species, or termination timing. Therefore, data were combined and only the main effects are presented. Rye provided better cover than wheat all three years at Chillicothe and in 2000 at Lubbock. The choice of small grains cover crop species (rye or wheat) and termination timing (boot or 50% heading) did not affect cotton lint yield at either location in any of the three years. Even though termination timing did not effect yield, delayed termination especially beyond the 50% heading stage could potentially be detrimental. Planting pattern did not affect cotton lint yield at Chillicothe but did affect cotton lint yield at Lubbock in 2001 and 2002. Yields were lower with the every row and every-other row pattern when compared with no cover crop in both 2001 and 2002. While extremely dry growing conditions occurred at all locations, it is particularly noteworthy that even under these severe environmental conditions cover crops did not limit yield in 4 of the 6 experiments. The authors would like to thank the Texas State Support Committee and Cotton Incorporated for sponsoring this research.