# COVER CROPS FOR WEED CONTROL IN NO-TILL COTTON

**D. Wayne Reeves, Mike G. Patterson, and Brian E. Gamble**
**USDA-ARS National Soil Dynamics Laboratory and Department of Agronomy & Soils**
**Auburn University**
**Auburn, AL**

## Abstract

Black oat (*Avena strigosa* Schreb.) is the predominate cover crop on millions of acres of conservation - tilled soybean [*Glycine max* (L.) Merr.] in southern Brazil due in part to its weed suppressive capabilities. We initiated a field study in 1995 on a Dothan fsl (fine-loamy, siliceous, thermic Plinthic Paleudult) in southeastern AL to determine the suitability of black oat as a cover crop for conservation-tilled cotton (*Gossypium hirsutum* L.) using the Brazilian system of managing cover crops. The site had been in conservation tillage for the previous 8 yr and had a high population of Palmer Amaranth (*Amaranthus palmeri* S. Watts.). Cotton was grown in a strip-plot design of four replications. Horizontal plots were winter covers of black oat, rye (*Secale cereale* L.), wheat (*Triticum aestivum* L.) or fallow. The cover crops were terminated with an application of glyphosate (1.0 lb a.i./A) 3 wks prior to planting DPL 5690 cotton in early May each year. Within 3 days following glyphosate application, the covers were rolled with a modified stalk chopper to lay all residue flat on the soil surface. Vertical plots were herbicide input levels: none, low, or high. The low herbicide input level consisted of a preemergence application of pendimethalin (1.0 lb a.i./A) + fluometuron (1.5 lb a.i/A). For the high input level, additional applications of fluometuron (1.0 lb a.i./A) + DSMA (1.5 lb a.i./A) early post-direct and lactofen (0.2 lb a.i./A) + cyanazine (0.75 lb a.i./A) late post-direct were made. In 1995, because the site has a well developed hardpan, the cotton was in-row subsoiled with a narrow parabolic subsoiler equipped with pneumatic tires to close the subsoil channel with minimal disturbance of the residue. In 1996, the area was paratilled 2 wks prior to planting.

In 1995 residue production was similar for all winter cereal covers, averaging 4665 lb dry matter/A. Winter weeds produced 1260 lb dry matter/A in fallow plots. The severe winter of 1996 resulted in differences in residue production by the covers. Dry matter averaged 5580, 3900, 1175, and 780 lb/A for rye, wheat, black oat, and winter fallow, respectively, in 1996. Although there were significant cover X herbicide input level interactions, no cover crop was economically effective in controlling weeds without a herbicide program. Without herbicide, black oat gave more effective weed control (based on visual ratings and weed biomass) than rye (35% control vs. 25% control) in 1995 but in 1996 rye gave greater control than black oat (54% control vs. 18% control) due to severe winter kill of black oat. Weed control following wheat and winter fallow were similar both years, averaging 14% and 19% in 1995 and 1996, respectively. Averaged across winter covers, seed cotton yields were 3449 and 2925 lb/A with the high herbicide input system vs. the low input system in 1995. Without herbicide, there were no harvestable yields. Seed cotton yields with the low input system following black oat (3242 lb/A) were comparable to those following winter fallow (3267 lb/A). In 1996, yields averaged 428, 1475, and 2892 lb seed cotton/A with no, low, and high herbicide input programs, respectively. Winter covers also affected seed cotton yields in 1996, averaging 820, 1292, 1520, and 2759 lb/A for fallow, black oat, wheat, and rye, respectively. Maximum yield occurred with the high herbicide input system and a rye cover crop (3691 lb/A). Within the low herbicide input program, yields averaged 393, 1029, 1380, and 3098 lb seed cotton/A following covers of winter fallow, black oat, wheat, and rye, respectively. Preliminary results indicate: i) rye and black oat are more effective cover crops than wheat for weed control in conservation cotton but inferior cold tolerance of black oat compared to rye may limit its zone of adaptation; ii) a strong yield benefit for planting conservation tilled cotton into rolled high residue producing covers.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 1:628-629 (1997)
National Cotton Council, Memphis TN