

# ROLLER VS. HERBICIDES: AN ALTERNATIVE KILL METHOD FOR COVER CROPS

D.L. Ashford<sup>1</sup>, D.W. Reeves<sup>2</sup>, M.G. Patterson<sup>3</sup>, G.R. Wehtje<sup>3</sup>, and M.S. Miller-Goodman<sup>3</sup>

AUTHORS: <sup>1</sup>Auburn University, USDA-ARS NSDL, 411 S. Donahue Dr., Auburn, AL 36832; <sup>2</sup>USDA-ARS National Soil Dynamics Laboratory, Auburn, AL 36832; <sup>3</sup>Agronomy and Soils Dept., Auburn University, Auburn, AL 36849.  
Corresponding author: D.L. Ashford (dashford@acesag.auburn.edu).

## INTERPRETIVE SUMMARY

### Research Question

Growers are always looking for effective and lower cost options to produce their crops. As cover crop use increases, their management becomes an important component of many farming systems. Timing and method of termination are the two most important factors of cover crop management. This research investigates the use of a roller as an alternative cover crop kill method and the optimum growth stage for its use on three cereal cover crops.

### Literature Summary

Cover crop use in the United States is on the rise, especially in conservation tillage systems. Due to this increase, growers are looking for effective ways to manage cover crops, while reducing input costs. Mechanical roller-crimpers have been shown to be effective in southern Brazil and Paraguay in conservation tillage systems. However, in the United States, the use of the roller is a relatively new cover crop kill method. The killing of some cover crops at certain growth stages has been evaluated using herbicides to a certain extent, however, more research is needed, especially related to the roller and the potential to reduce herbicide inputs.

### Study Description

During 1998-1999 at two locations in east-central Alabama, five cover crop kill methods were evaluated on three different cover crops at three growth stages. Cover crop biomass production, kill

method efficacy, and soil water conservation were evaluated.

Soil type: Compass loamy sand and Cahaba sandy loam

Experimental design: Split-split plot design with four replications

Cover crops: rye, wheat, black oat

Growth stages: Feekes stages 8 (flag leaf), 10.51 (anthesis), 11.2 (soft dough)

Kill methods: roller-crimper, two herbicides (paraquat and glyphosate), and two reduced chemical rate (half label rate) combinations with the roller

### Applied Questions

**Is the roller as a cover crop kill method comparable with the use of the traditional herbicide methods?**

When termination occurred as late as soft dough stage (Feekes stage 11.3), the roller was as effective as herbicides. However, this late stage may not provide growers with enough time to plant a cash crop. The early milk stage (Feekes stage 10.54), prior to soft dough, may prove more beneficial since it provides more time for planting, conserves soil water, and provides effective kill. The roller provides additional benefits as it lays residue flat on the soil surface providing maximum soil coverage;

to prevent erosion, decrease soil water losses, provide weed control, and facilitate planting. Economically, the roller and the roller+herbicide (half rate) treatments provided a significant savings (\$5.25/A average) in the cost of cover crop termination.

**Are there any differences between these three cover crops when the roller was used?**

There were no significant differences between the cover crops when the roller was used. Plant height and maturity, (i.e., differences in growth stage) were the main factors determining the roller's effectiveness.

(See Full Paper on Page 64.)