Double-Crop Corn Weed Control in Virginia

Steven R. King

ABSTRACT

Double-crop production of corn (Zea mays L.) for grain following the harvest of small grain is not currently practiced in Virginia. Historical precipitation and evapotransportation data indicate that delayed corn planting could result in a higher probability of moisture during critical periods of crop development. Double-crop corn may also reduce economic risk as two crops would be harvested in the same year. Field experiments were conducted in three Virginia locations in 1998 and 1999 to determine the herbicide inputs required for double-crop corn production relative to those required in full-season no-till corn production. Experiments were conducted in a split-plot, randomized complete block design with cropping system as the main plot and herbicide treatment as the subplot. Herbicide treatments included combinations of nonselective herbicides for no-till establishment and/or preemergence residual herbicides and/or selective postemergence herbicides in both production systems. Glyphosate-tolerant corn was planted in all experiments and postemergence glyphosate treatments were also evaluated. In each experiment, dependent variables included weed control by species evaluated throughout the season, as well as weed biomass and corn yield evaluated at the end of the growing season. Generally, nonselective herbicides were not required in the double-crop system where atrazine was applied as a preemergence treatment, or where selective postemergence treatments were applied. Where a significant proportion of the infestation was comprised of perennial species, however, atrazine treatments were not
sufficient in the double-crop system. Postemergence glyphosate treatments provided excellent broad-spectrum weed control in this situation. In heavy annual grass infestations, postemergence glyphosate treatments provided superior weed control to preemergence treatments alone, and equivalent weed control to treatments in which both preemergence and postemergence herbicides were applied. Corn yield response to weed control and cropping system variables varied significantly between the 1998 and 1999 growing seasons. Where adequate late-season rainfall was received, economic return from small grain and corn crops in the double-crop system was higher than the return in the full-season system, particularly in infestations where the double-crop system allowed significant reduction in herbicide input.
Acknowledgements

I cannot begin to express how grateful I am for the guidance provided by my major advisor, Dr. E. Scott Hagood. He has provided me with encouragement, moral and financial support, and a friendship that I will carry with me long after graduate school is in the rear view mirror. I sincerely thank my other committee members, Dr. Henry Wilson and Dr. Daniel Brann for their efforts and guidance on this project. I would like to thank my fellow graduate students and especially Kevin Bradley for putting up with me for three years and all the trips to eastern Virginia. I would also like to thank Ivan Morozov for his help preparing this thesis and the good times at home football games. I thank Claude Kenley for his help and patience throughout the duration of this project. I would also like to thank my cooperators for providing the land to do this project. I thank Rueben Blanton for his time and understanding when I showed up at his farm with a couple bags of seed corn and not a thing to plant it with. Finally, I would like to thank my family for their support, love, and patience and the opportunities they have given me throughout life.