## This research represents the first instance of a weed species having glyphosate resistance in bermudagrass turf.

## bluegrass biotypes.

Alternative modes of action need to be used in regular rotation to guard against resistance development. This will involve using different chemistries at both preand postemergent timings. A list of herbicidal modes of action with activity against annual bluegrass is presented in Table 1 (pg. 40). In addition to rotating herbicides annually, tank-mixing active ingredients varying in mode of action can help mitigate the onset of herbicide resistance. However, modes of action included in these tank mixtures should also be rotated regularly.

Weed management programs focused on preventing the onset of herbicide resistance may be more costly than historical maintenance practices of applying the same product year after year. However, the investment in a rotation program will pay off in the long

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run as weed management costs have been shown to increase dramatically in crop production due to the evolution of herbicide-resistant weeds (Norsworthy et al. 2012).

Future research will evaluate programs for managing herbicidesusceptible annual bluegrass and other weeds in turf with alternative chemistries in rotation to prevent the evolution of new herbicide-resistant biotypes.

James T. Brosnan, Ph.D., is an assistant professor and Gregory K. Breeden is a research associate in the Department of Plant Sciences at the University of Tennessee. Brosnan can be reached at jbrosnan@utk.edu.

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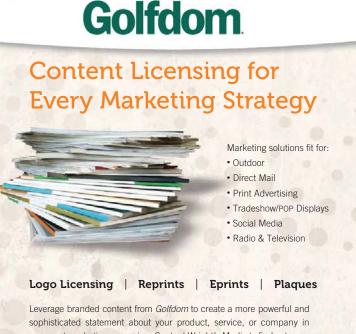
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