



ZOYSIAGRASS HERBICIDE TOLERANCE

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IMPACT STATEMENT

A series of studies were conducted to determine the tolerance of zoysiagrass to common, post-emergence herbicides. Up to five weekly applications of MSMA were found to be safely applied to 'El Toro' and 'Meyer' zoysiagrass. Metsulfuron caused temporary injury to zoysiagrasses but the grass recovered quickly if applied after green-up was complete. Zoysiagrass recovered quickly from diquat applied during spring green-up. Recovery from glyphosate and metsulfuron applied during spring transition was very slow. The safest timing and rate for applying glyphosate to actively growing zoysiagrass for tufted lovegrass control was 0.031 lb active ingredient/acre (a.i./acre) applied in early July.

BACKGROUND

Arkansas is one of the most prolific producers of zoysiagrass sod in the United States due to limitations of nematodes to the south and a short growing season to the north. Increased demand for zoysiagrass on golf courses in the transition zone has made zoysiagrass an even more important product for Arkansas sod farmers. Golfers like the playability of zoysiagrass sod and turf managers welcome its superior cold tolerance. While zoysiagrass takes more time to produce, profit potential in sod production is greater due to a limited supply. 'Meyer' is by far the most commonly grown zoysiagrass cultivar in Arkansas. Its popularity is due to excellent performance and its status as a public cultivar with no royalty payments assessed at its sale. Proprietary cultivars such as 'El Toro' from the University of California-Riverside, and 'Cavalier' from Texas A&M University, are now produced to a limited extent in Arkansas. Because zoysiagrass is not as widely grown as bermudagrass, there is a limited amount of

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weed control research data available. This lack of information prompted us to initiate a series of studies to evaluate the ability of zoysiagrass to recover from injury caused by typical herbicides used in sod production. Herbicide tolerance in zoysiagrass is similar to bermudagrass but significant differences exist. Due to its slower growth rate, zoysiagrass may lack the ability to recover from MSMA applications that are common to bermudagrass. Because MSMA is the only selective herbicide available for dallisgrass control, knowledge of zoysiagrass MSMA tolerance is important.

The ability of zoysiagrass to withstand the triazine herbicides is also less than that of bermudagrass. An additional problem that has evolved in the Arkansas zoysiagrass industry in the invasion of tufted lovegrass (*Eragrostis pectinacea*) as a serious weed problem. MSMA, fluazifop-butyl, or fenoxaprop do not control this weed, which is rarely a problem in other sod crops. Preemergence control is limited because the commonly-used grass herbicides are root growth inhibitors which are problematic to sod farmers striving for rapid grow-in. Oxadiazon provides fair lovegrass control but is not used due to cost limitations. Triazine herbicides are an option but there is concern among sod farmers that repeated atrazine or simazine applications will reduce sod strength. Zoysiagrasses are particularly sensitive to metribuzin (Sencor). Non-selective herbicides such as glyphosate, diquat, and glufosinate are an important tool for winter weed control in dormant bermudagrass. Zoysiagrass, however, does not become completely dormant in the winter. This lack of dormancy led to the need to develop strategies for the use of non-selective herbicides with minimal injury to the zoysiagrass.

RESEARCH DESCRIPTION

Studies were conducted in central Arkansas on Winrock Sod Farm and Chenal Country Club, Little Rock, and at the Lonoke Extension and Research Center in Lonoke. All studies were conducted on either 'Meyer' or 'El Toro' zoysiagrass. Treatments were applied in a randomized block design with either three or four replications. Plot size varied from 6 by 12 ft to 10 by 30 ft. Herbicides were applied with a carbon dioxide (CO₂) - pressurized backpack sprayer. The carrier volume for all treatments was 20 gallons per acre (GPA). Spraying Systems 110-03XR flat fan tips located on 20-in. spacing were used. All evaluations were done visually using a rating scale of 0 to 100 where 0 = normal healthy turfgrass and 100 = dead or completely brown turfgrass.

FINDINGS

NONSELECTIVE HERBICIDES

In 1995, we applied glyphosate rates up to 1.5 lb a.i./acre to semidormant zoysiagrass on (cv. Meyer) 31 January. At green-up, 90 days after treatment (DAT), no injury was visible in any of the glyphosate treatments. In the same trial, glufosinate at 0.75 lb a.i./acre caused no injury. Previous reports of injury by glyphosate on dormant zoysiagrass were possibly due to high carrier volumes (80 to 100 GPA during application) or applying during green up in the spring. Since zoysiagrass rarely goes completely dormant, high carrier volumes would penetrate the canopy and possibly contact active tissues.

In the spring of 1998, we applied diquat and glyphosate to 'El Toro' and 'Meyer' zoysiagrasses that were at the 30% green-up stage (18 March) and to 'El Toro' which was in the 40% green-up stage of growth (27 March). 'Meyer' treated on 18 March with 0.5 lb a.i./ acre diquat completely recovered by 19 DAT while 'El Toro' treated on the same day required 33 days for recovery. 'El Toro', treated on 27 March, needed 57 days to grow out of the injury produced by 0.5 lb a.i./acre diquat. In the same study, the number of days needed for recovery from 0.75 lb a.i./acre glyphosate were 18 March application to 'Meyer'-57 days, 18 March 'El Toro' 33- days, 27 March 'El Toro'-47 days. On 7 July 1998, 0.19, 0.25, 0.31 lb a.i./acre glyphosate applied to 'Meyer' zoysiagrass produced no visual injury symptoms at 21 DAT. The two highest rates of glyphosate provided 90 to 100% control of tufted lovegrass.

MSMA

Two studies were conducted in 1997 to evaluate zoysiagrass response to multiple applications of MSMA at 2.0 lb a.i./acre. The first treatment was applied on 7 July 1997 and the final application on 4 August. 'Meyer' zoysiagrass recovered from five applications of MSMA applied at five-day intervals within 25 days of the final treatment. Recovery from four applications required the same amount of time. Injury was minimal and recovery rapid from three or fewer applications of MSMA 5 days apart.

METSULFURON

Metsulfuron is a postemergence, sulfonylurea herbicide that controls a broad spectrum of broadleaf weeds and 'Pensacola' bahiagrass. It is also very effective for aiding the transition of overseeded ryegrass to bermudagrass in the spring. This product has excellent safety in bermudagrass but injury to zoysiagrass has been reported. We conducted two studies in the spring and summer of 1997 to evaluate 'El Toro' and 'Meyer' tolerance during transition and after complete green-up. The transition treatments were applied 2 April and the complete green-up applications were made on 3 June. Metsulfuron rates were 0.075, 0.038, 0.019, 0.009 lb a.i./acre. 'El Toro' sprayed during transition returned to normal 68 DAT but recovered in 30 days when treated after complete green-up. 'Meyer', treated in transition, recovered from all but the highest rate within 48 DAT. Recovery from the highest rate required 68 days. Actively growing 'Meyer' grew out of the metsulfuron injury from all rates within 22 DAT.