

PoaCure™ and Its Performance In Spring Applications To A Bentgrass Green For Annual Bluegrass Control

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PoaCure (common chemical name = methiozolin) is an exciting herbicide under development for annual bluegrass (*Poa annua*) control in creeping bentgrass (*Agrostis stolonifera*) golf greens, tees, collars and fairways. PoaCure is reported to be safe on most warm and cool-season turfgrasses, but may discolor or injure roughstalk bluegrass (*Poa trivialis*). The herbicide can be applied in early spring and late autumn. Creeping bentgrass grown on greens can be temporarily discolored when PoaCure is applied in spring. Late summer preemergence applications of PoaCure, however, can cause objectionable discoloration. Autumn applications normally begin in mid-to-late October to minimize potential discoloration and involve lower rates. Like Velocity™ (i.e., bispyribac-sodium) there are likely to be annual bluegrass biotypes that are not sensitive to the herbicide.

Protocols are being developed to determine the most appropriate rates and timings of PoaCure for use on greens versus tees versus fairways; for high versus low populations of existing annual bluegrass; for spring versus autumn timings; and for pre versus postemergence control. PoaCure will be evaluated extensively in an Experimental Use Permit (EUP) program on golf courses throughout the United States. About eight golf courses in Maryland will participate. Initially, applications were made in autumn 2012 and will be made again in spring 2013 as part of a demonstration program; however, the EUP will be in place during autumn 2013, spring and autumn 2014 and spring 2015. Full registration is anticipated in late 2015.

PoaCure has been under investigation at the University of Maryland since 2011. The focus was on spring applications to greens

height creeping bentgrass with annual bluegrass plants evenly distributed in coring holes. Individual plant populations ranged in size from about 0.5 to 1.5" in diameter. That is, there were no dominant or large patches of annual bluegrass in the study site. The objective of the study was to compare PoaCure and Exonerate™ (i.e., amicarbazone) for their ability to control annual bluegrass postemergence in golf green height creeping bentgrass. Herbicides were applied to the same plots in 2011 and 2012 as described below.

Procedure. This field study was conducted at the University of Maryland Paint Branch Turfgrass Research Facility in College Park. Turf was a mature stand of 'Providence' creeping bentgrass grown on a sand-based rootzone with a pH of 6.5. Turf was mowed five times weekly to a height of 0.150 inches using a triplex mower.

PoaCure was assessed at 0.45 and 0.90 lb ai/A and Exonerate at 0.09 and 0.18 lb ai/A. Two application timings were assessed. The 11 April 2011 and 21 March 2012 applications were timed to coincide with full (i.e., 100%) spring green-up of the creeping bentgrass (i.e., after having been mowed a few times and all winter dormant tissue removed) followed in three weeks by a second application. The second application timing (i.e., + 3 weeks of green-up) was initiated on 2 May 2011 and 11 April 2012 or three weeks after full green-up and a sequential was applied three weeks later. Hence, all treatments were applied twice on a 21 day interval in two timings. The rate of Exonerate was reduced from 0.18 lb ai /A in the first timing to 0.09 lb ai /A in the second timing due to phytotoxicity issues in 2011. In 2012, the first application rate of Exonerate was

0.09 lb ai /A and the sequential was 0.045 lb ai /A. Herbicides were applied with a CO₂ pressurized (35 psi) sprayer equipped with an 8004E flat-fan nozzle and calibrated to deliver 1.1 gal water per 1000 ft² (50 GPA). Exonerate treatments were applied with 0.25% v/v of non-ionic surfactant. Percent of plot area covered with annual bluegrass was assessed visually on a linear 0 to 100% scale where 0 = no annual bluegrass, and 100 = entire plot area covered with annual bluegrass. Treatments were replicated four times and data were subjected to statistical analyses.

2011 Results. Although there was significant injury to annual bluegrass by early May, there was no apparent effect of any herbicide treatment on annual bluegrass levels until 23 May in the first timing (i.e., 11 April start date; 42 days after first application). At this time the high rate of PoaCure

had reduced annual bluegrass cover compared to the control. The low rate of PoaCure applied in the first timing reduced annual bluegrass cover slightly, which was not generally significantly different from the untreated control. The high rate of PoaCure applied in the first green-up timing on 11 April and 2 May had reduced annual bluegrass cover to 3% versus 14% annual bluegrass cover in the untreated control by early June. Annual bluegrass populations naturally began to decline with the advent of a prolonged period of extreme heat stress beginning in mid-June. The percent of annual bluegrass control for the high rate of PoaCure in the first timing between 23 May and 29 June 2011 averaged 74%.

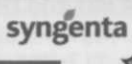
Both rates of Exonerate caused substantial and unacceptable injury to the creeping bentgrass from 13 May until data collection ceased on 1 July. The high rate of



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PoaCure applied in the first timing reduced quality slightly and temporarily (i.e., about 12 days in May), which was within the acceptable risk range. No other PoaCure treatments reduced quality in 2011.

2012 Results: The herbicides again were applied sequentially 21 days apart in two timings as previously described. The same herbicides were applied to the same plots treated in 2011. The second Exonerate spray (i.e., three weeks after green-up) rate was reduced to 0.045 lb ai /A since past experience indicated that later applications when air temperatures are rising can increase phytotoxicity potential with this herbicide.

Spring of 2012 was unseasonably warm and thus green-up was unusually early. The "green-up" treatments were initiated on 21 March 2012. Exonerate-treated plots were injured for about one week in May. PoaCure (except 0.45 lb ai/A rate in the first "green-up" timing) injured the creeping bentgrass for one week in early May, which was elicited by the 11 April application. Injury from PoaCure was mostly in the form of a bluish-purple and reddish-brown foliar discoloration and a less dense appearance in the creeping bentgrass. This injury dissipated in 7 days and turf had completely recovered in about 12 days. Injury did persist in the form of a reduction in quality (i.e., an unthrifty appearance) in plots treated with PoaCure at the high rate in the "+ 3 weeks full green" timing. Injury did not recur among other PoaCure treatments following subsequent applications of the herbicide. Regardless of PoaCure treatment or rating date, color and quality of the creeping bentgrass remained above the acceptable risk threshold on all rating dates.

Annual bluegrass cover data collected 23 March 2012 reflected changes in weed cover during the autumn and winter of 2011. Data showed that annual bluegrass populations recovered in the 2011 study area with no differences in weed cover observed among PoaCure treat-

ments (6 to 11 % annual bluegrass cover) compared to the control (12%). There was, however, a trend for lower annual bluegrass cover ratings (6%) in plots treated in 2011 in the first timing (i.e., at spring green-up) with the high rate (i.e., 0.90 lb ai/A) of PoaCure. Reinfestation of annual bluegrass was due to coring in October 2011 and the mild winter, which would have promoted an extended period of annual bluegrass germination.



The first control rating involving herbicide activity from 2012 treatments was obtained on 4 May (i.e., 33 days after the last application of "green-up" treatments and 22 days since application of the first "+ 3 week after green-up" treatment). All treatments had provided for lower annual bluegrass cover ratings compared to the untreated control at this time. Lowest cover ratings were observed in plots treated with PoaCure applied at 0.90 lb ai/A in the early "green-up" timing. Similar ratings were obtained on 16 May, but there was enough annual bluegrass recovery in Exonerate-treated plots that cover data were now similar to the untreated control. On the final rating date (i.e., 1 June), lowest annual bluegrass cover was observed in plots treated with the high rate of PoaCure (1.2%), regardless of application timing. The low rate of PoaCure also reduced annual bluegrass cover (8-12% cover) compared to the control (26% cover), but control was less in the "+ 3 week" versus the early "green-up" timing.

2011 Summary. Exonerate, at the rates and timings evaluated, was phytotoxic to creeping bentgrass and little or no annual bluegrass control was achieved. It should be noted that June 2011 was marked by a prolonged period of high temperature stress, which may have impacted the performance of Exonerate. PoaCure temporarily reduce quality. PoaCure provided a good level of annual bluegrass control, but only when applied at the high rate in the first timing. The effect of PoaCure was very slow. Affected annual bluegrass plants developed a yellow-green to watersoaked appearance 10 days after the second application. Death of the annual bluegrass was so slow that creeping bentgrass was able to fill voids and there were no bare spots in PoaCure-treated plots at any time. The 74% control of annual bluegrass provided by the high PoaCure rate in the first timing was judged to be very good.

2012 Summary. Exonerate rates were reduced and caused only short-lived discoloration rather than the severe phytotoxicity observed with higher rates in 2011. Exonerate did not significantly reduce annual bluegrass cover. PoaCure caused discoloration and thinning (i.e., reduction in verdure) in creeping bentgrass, particularly in plots treated with the high rate and in the second "+ 3 week" timing. Discoloration (i.e., purplish-reddish-brown foliage and a more open turf) dissipated within a week and creeping bentgrass cover and quality data were equivalent to the untreated control within 7 to 14 days. The high rate of PoaCure in both timings was highly effective (about 95% of the untreated control) in controlling annual bluegrass. As was observed in 2011, death of the annual bluegrass was slow and the creeping bentgrass filled the thinning and dying annual bluegrass areas and no dead spots were evident at any time.

Summary of Key Points:

- ◆ Exonerate had little or no effect in reducing annual bluegrass populations and was phytotoxic to creeping bentgrass at the rates evaluated, especially in 2011.
- ◆ PoaCure provided 74% annual bluegrass control when applied twice at 0.90 lb ai/A on a 21 day interval beginning at spring green-up of the creeping bentgrass in 2011.
- ◆ Annual bluegrass re-colonized all plots during the winter of 2011-2012.
- ◆ PoaCure was applied to the same plots used in 2012 and the high rate (i.e., 0.90 lb ai/A) applied twice in both the "early green-up" and "+ 3 week" timings provided 95% annual bluegrass control.
- ◆ PoaCure slightly reduced bentgrass quality in 2011, but caused objectionable discoloration and loss of verdure in 2012. The injury was short-lived and the bentgrass recovered in 7-14 days.
- ◆ The activity of PoaCure was slow and took about 30 days after the second application to have full effect. The annual bluegrass turned an off-yellow color and faded away while the creeping bentgrass filled voids and no dead spots were observed.
- ◆ Caution should be used with PoaCure where annual bluegrass dominates, which may result in large voids in the absence of sufficient creeping bentgrass populations to spread into dying turf areas.
- ◆ PoaCure is an exciting herbicide, but much more research will be needed to better understand how best to use it safely and effectively, especially for autumn applications to sites with large populations of annual bluegrass.