Correcting Herbicide Misapplications with an Activated Carbon Product

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Introduction

Misapplication of turfgrass herbicides, through incorrect rate or incorrect location, are not a common mistake in turfgrass management. In the rare event of an herbicide misapplication, use of an activated carbon product has been reported to counteract long-term effects such as turf injury due to over-application or seed germination inhibition due to a wrongly applied preemergence herbicide. Activated carbon products also can be used for soil decontamination due to oil and gas spills. These products are referred to by a few terms (activated charcoal, biochar, etc.) in the popular media. These terms are usually interchangeable. For agriculture applications, these products often are made from bituminous or lignite coal. Activated carbon is a highly porous substance that attracts and holds organic chemicals due to its high amounts of surface area/unit weight, often thousands of square ft/ounce. Activated carbon works by absorbing the unwanted chemical. Chemicals adhere to the surface of the activated carbon and are inhibited from reacting with soil colloids or plant surfaces.

The objective of this trial was to evaluate the effects of different herbicide damage recovery treatments, which included the use of Impound Select, an activated carbon product in liquid form made by Prime Source. This trial was to serve as a demonstration for field-day attendees.

Materials and Methods

This trial was conducted at the Iowa State University Horticulture Research Station, Ames, Iowa, on a mature stand of Kentucky bluegrass (*Poa pratensis*). Prior to trial initiation, turf was cut twice/week at a 3-in. height, using a riding rotary mower. Irrigation was applied as necessary to prevent wilting, fertility was applied at 0.5 lb nitrogen/1,000 ft^2 each growing month using a granular slow-release fertilizer, and herbicides were not applied in this location prior to the experiment. Herbicide treatments, rates, and timings are presented in Table 1. Recovery treatments are presented in Table 2. Experimental units were 5 ft x 5 ft and were arranged in a non-replicated strip-strip demonstration design (Figure 1). Treatments were applied using a CO_2-pressurized backpack sprayer with TeeJet XR8010 nozzles calibrated to apply three gallons water carrier/1,000 ft^2. Annual ryegrass (*Lolium multiflorum*) overseeding treatments were applied using a drop spreader at rates and timings indicated in Table 1. Annual ryegrass was chosen due to its quick ability to germinate. Intended for a field day demonstration, formal data was not collected but general trends were evident. Application techniques also were assessed.

Results and Discussion

The activated carbon product, while a liquid, was very hard to spray due to its high viscosity and sedimentation. Constant agitation is necessary for uniform sprayability. Additional water was necessary for the activated carbon treatments to wash the material off the plant, and to better distribute the product and move it past the canopy into the soil. Large-opening spray nozzles are necessary and in-line filters need to be

removed, as these will clog quickly. These issues are not unique to Impound Select, since most activated carbon products are similar in composition. The right spray equipment may mitigate some of the issues mentioned.

Herbicide damage was not evident in the 10X Dimension 2EW plots, most likely due to its mechanism of preemergent activity. This treatment did greatly inhibit annual ryegrass germination. Activated carbon application at both same-day and 6-days-post timings in the 10X Dimension 2EW did not reverse the preemergent herbicide effect.

Herbicide damage (turf chlorosis) was evident in the 10X plots of Chaser Turf and the 1X plots of Finale. Although in these cases application of Impound Select did reduce the visible turf damage, especially when applied at the same-day timing. No damage was observed with the 10X 3-D treatment, most likely because it did not contain triclopyr, and this product did not inhibit annual ryegrass germination.

Application of a water drench at the same-day timing had visually similar turf chlorosis mitigation as the application of Impound Select at the same timing.

Overall, it would be recommended to have an activated carbon product on-hand as the product performs best when applied soon after the herbicide misapplication. Activated carbon product application through standard spray equipment could be difficult, but if able to highly dilute the product (6+ gallons water carrier/1,000 ft^2), it is feasible.

Acknowledgements

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Table 1. Herbicide misapplication treatment descriptions for correcting herbicide misapplications with an activated carbon product trial, ISU Horticulture Research Station, Ames, IA.

Number	Product	Rate[1]	Rate (oz/A)	Active ingredient(s)
1	Dimension 2EW	1X	16	dithiopyr
2	Dimension 2EW	10X	160	dithiopyr
3	Chaser turf	1X	64	2,4-D, triclopyr
4	Chaser turf	10X	640	2,4-D, triclopyr
5	3-D	10X	640	2,4-D, mecoprop, dicamba
6	Finale	1X	label	glufosinate
7	Untreated control	---	---	---

[1]Rates were either 1X or 10X label rate.

Table 2. Recovery treatment descriptions for correcting herbicide misapplications with an activated carbon product trial, ISU Horticulture Research Station, Ames, IA.

Number[1]	Product	Timing	Rate
1	Impound Select	Same day	2 gal/150 ft^2
2	Impound Select + annual ryegrass	Same day	2 gal/150 ft^2, 10 lb/1,000 ft^2
3	Impound Select	6 days post	2 gal/150 ft^2
4	Water drench	Same day	1 in. of water
5	Annual ryegrass	6 days post	10 lb/1,000 ft^2
6	Untreated control	---	---

[1]Every recovery treatment was applied to every herbicide misapplication treatment in Table 1.

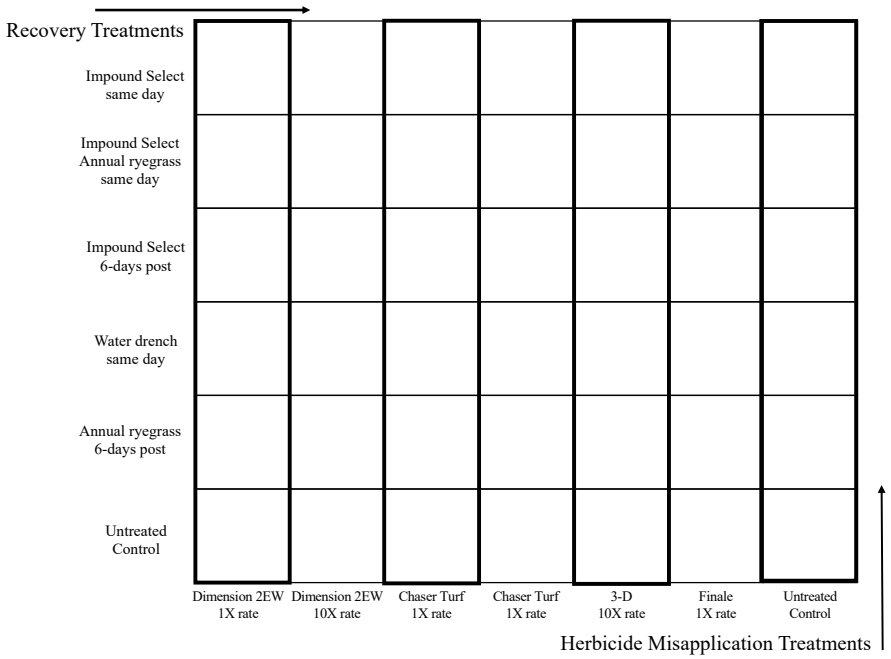

Figure 1. Recovery treatments and herbicide misapplication treatments layout for correcting herbicide misapplications with an activated carbon product trial, ISU Horticulture Research Station, Ames, IA.