

Prevention of Discolouration of Creeping Bentgrass Following Application of the Herbicide Velocity SP

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Introduction

The product, Velocity SP Herbicide (active ingredient bispyribac-sodium), has been licensed for use in Canada to remove annual bluegrass (*Poa annua*) from creeping bentgrass that is mowed higher than 9mm. Unfortunately, the majority of bentgrass grown in western Canada is for use on golf course putting greens, which is typically mowed at a height of 3-5mm.

An accompanying study showed that applications of the herbicide Velocity SP was very effective for reducing annual bluegrass in creeping bentgrass when mowed at putting green height. However, in order for this product to be widely accepted for use the issue of turf discolouration must be dealt with. Recently researchers at Rutgers University tested various rates of application of nitrogen prior to the application of the herbicide, Velocity SP. Their study found that there was a reduction in discolouration when nitrogen was applied prior to product application.

This tested was developed to determine whether discolouration of turfgrass due to the application of the herbicide Velocity SP could be reduced with the application of iron and/or nitrogen fertilizer.

Methodology

During the summer of 2009 a test was conducted at the Prairie Turfgrass Research Centre (Olds College, Olds, Alberta) to determine whether discolouration of creeping bentgrass due to the application of Velocity SP Herbicide could be reduced with the application of iron or nitrogen fertilizer. This test was conducted on a Penncross creeping bentgrass putting green, built to USGA specifications and mowed at a height of 4.8mm (0.185"). Plot sizes were 0.5 X 0.5 meters and were replicated four times in a split-split-plot design. The main plots were two rates of application of the Velocity SP Herbicide, while the sub-plots were iron chelate applications (11% iron), and the sub-sub-plots were applications of urea nitrogen (46-0-0). Weekly applications of the herbicide, iron and urea were made for six weeks beginning on July 13 with a compressed air sprayer equipped with one Teejet 8002 even flat fan nozzle that was calibrated to spray 3L/100m². The herbicide was applied one day prior to the application of iron and the urea, to avoid potential negative reactions between the herbicide and the other products.

Table 1 – Treatments applied to creeping bentgrass.

Product & rate

Main Plots

1. Velocity 1X 0.31g/100m²
2. Velocity 2X 0.62g/100m²

Sub-plots - 11% iron chelate

1. None
2. 11g/100m²
3. 22.5/100m²

Sub-sub-plots - Soluble Urea 46-0-0

1. None
2. 22.5g N/100m²
3. 45g N/100m²

Discolouration of the creeping bentgrass, which is an indication of toxicity to the plant from the herbicide, was determined using a 0-5 scale (Table 2). Plots were rated weekly beginning on the first application date and then for an additional six weeks.

Table 2 - Rating scale for discolouration of bentgrass following product applications.

Value	Visible signs observed
0	No turf discolouration evident.
1	Negligible discoloration, distortion and/or stunted growth not evident.
2	Slight discoloration, distortion and/or stunted growth clearly evident.
3	Moderate discoloration and damage, marked distortion and/or stunted growth, recovery expected.
4	Substantial discoloration and damage, substantial distortion and/or stunted growth, some damage irreversible.
5	Majority of plants discoloured and damaged, considerable distortion and/or stunted growth, some plant mortality (<40%).

Results

The application rate, 0.31g/100m², is considered to be a normal rate for gradual removal of annual bluegrass, whereas the 0.62g/100m² rate is considered to be a double rate. Both application rates of Velocity SP produced some discolouration of the turf (Table 3). On six of the 10 rating dates, the higher rate of Velocity created significantly greater discolouration than did the lower rate.

Table 3 - Turf discoloration following applications of Velocity SP Herbicide.

Velocity Rate	Week 1	Week 2	Week 3	Week 4	Week 5
	1 – 5 scale				
Velocity 0.31g/100m ²	0.3a	0.8a	0.8a	0.8a	1.5a
Velocity 0.62g/100m ²	0.7b	0.8a	1.3a	1.3a	1.8a

Velocity Rate	Week 6	Week 7	Week 8	Week 9	Week 10
	1 – 5 scale				
Velocity 0.31g/100m ²	1.3a	1.1a	0.3a	0.4a	0.1a
Velocity 0.62g/100m ²	1.8b	1.8b	0.9b	1.2b	0.7b

Neither rate of iron chelate reduced discolouration on any of the rating dates (Table 4).

Table 4 - Turf discoloration following applications of iron chelate.

Iron Chelate Rate	Week 1	Week 2	Week 3	Week 4	Week 5
	1 – 5 scale				
None	0.6a	0.8a	1.2a	1.2a	1.7a
Fe chelate 11g/100m ²	0.4a	0.9a	0.9a	0.9a	1.8a
Fe chelate 22.5g/100m ²	0.6a	0.7a	0.9a	0.9a	1.5a

Iron Chelate Rate	Week 6	Week 7	Week 8	Week 9	Week 10
	1 – 5 scale				
None	1.6a	1.4a	0.3a	0.7a	0.3a
Fe chelate 11g/100m ²	1.7a	1.5a	0.5a	0.8a	0.3a
Fe chelate 22.5g/100m ²	1.5a	1.4a	0.5a	1.0a	0.3a

The urea nitrogen did not help to reduce the discolouration created by applications of Velocity SP Herbicide (Table 4).

Table 4 - Turf discoloration following applications of urea nitrogen.

Soluble Urea Rate	Week 1	Week 2	Week 3	Week 4	Week 5
	1 – 5 scale				
None	0.6a	0.8a	0.9a	0.9a	1.7a
Urea 22.5g N/100m ²	0.5a	0.9a	1.1a	1.1a	1.7a
Urea 45g N/100m ²	0.5a	0.7a	1.0a	1.0a	1.6a

Soluble Urea Rate	Week 6	Week 7	Week 8	Week 9	Week 10
	1 – 5 scale				
None	1.6a	1.5a	0.5a	1.0a	0.3a
Urea 22.5g N/100m ²	1.6a	1.3a	0.4a	0.7a	0.3a
Urea 45g N/100m ²	1.5a	1.4a	0.4a	0.7a	0.3a

Discussion

In the accompanying study that was conducted on a bentgrass putting green at the Carstairs Community Golf Course, discolouration was much greater than at any time during this study. As the application rates were lower, there must have been a difference between the two sites. Factors that could have contributed to the reduced discolouration may have been mowing height and the fact that the test area in Olds was did not receive any traffic. This test should be repeated on a green that receives traffic to see if there is any benefit to applying either the iron chelate or the urea nitrogen.