Harrell's Spring Aeration Recovery Trial

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Introduction

This trial is a continuation of similar experiments that were cut short in the fall of 2018 due to unseasonably cold and snowy weather. The 2018 experiments began with Recovery Plus 4 applied at 0, 4, and 8 oz/1,000 ft^2. These rates caused extreme chlorosis on the research plots. Rates then were reduced to 0, 1, and 2 oz/1,000 ft^2, resulting in less, but still unacceptable, levels of chlorosis. In a third run of the trial, rates were further reduced to 0, 0.25, and 0.5 oz/1,000 ft^2, but applications were not begun until October 27, thus prematurely ending the trial shortly thereafter due to dormant turf caused by extreme cold weather. While last year's trials had application dates seven days prior to, at, and seven days post aeration, the 2019 trial had applications at only seven days pre- and post-aeration. In addition, treatments were added that involved Amino Pro V.

The objective of the 2019 trial was to evaluate the effects of different rates and mixes of Harrell's Recovery Plus 4 and Amino Pro V nutrient products, applied as a liquid foliar spray, on the recovery timeframe of core aerification holes on a creeping bentgrass (*Agrostis stolonifera* L.) golf green. A secondary objective was to evaluate turfgrass color and turfgrass injury (chlorosis) as the trial progressed.

Materials and Methods

This trial was conducted at the Iowa State University Horticulture Research Station, Ames, Iowa, on a native soil creeping bentgrass putting green. Turf was cut five days/week (SMWFS) at 0.140-in. height using a riding reel mower. Irrigation was applied as necessary to facilitate optimal growing conditions. Aerification was not performed in the trial area in 2018, but light verticutting and topdressing occurred monthly. Treatments, rates, and 2019 application dates for this trial are presented in Table 1. Experimental units were 4 ft x 8 ft. Hollow tine core cultivation was performed using a Toro ProCore 648 on 2 in. x 2 in. spacing at 3-in. depth with 0.5-in. diameter tines. Treatments were applied using a CO_2-pressurized backpack sprayer with TeeJet 8004XR nozzles calibrated to apply two gallons water carrier/1,000 ft^2. Treatment application was seven days prior to aerification and seven days post aerification. Treatments were arranged as a randomized complete block design with four replications. Recovery ratings (percent turf cover) and dark green color index (DGCI) were taken weekly for four weeks after aerification (WAA). Turfgrass quality and chlorosis were rated on the same timeframe.

Results and Discussion

Percent cover (recovery, Table 2) differences were only present at 1 WAA. The high rate of Recovery Plus 4 had lower percent cover than both treatments containing Amino Pro V.

Dark green color index (Table 3) for all treatments was not different from the control on any rating date.

Turfgrass quality differences were present at 3 and 4 WAA (Table 4). At 3 WAA, the high rate of Recovery Plus 4 + Amino Pro V had higher quality than the high rate of Recovery Plus 4 alone. At 4 WAA, both the Amino Plus V treatment and the aerified control had higher quality than the Recovery Plus 4 alone treatment.

No chlorosis was observed with any treatments. At most points, it was difficult to pick out the untreated aerified control from the treated experimental units. This could be due to eliminating the treatment application at aerification timing. While chlorosis was eliminated, so was any noticeable effects of the products. Perhaps 0.25 and 0.5 oz/1,000 ft^2 of Recovery Plus 4 is too low to see any effects; although unacceptable chlorosis at 1 and 2 oz/1,000 ft^2 was seen with previous trials (with three applications) in 2018. An application rate of 0.6-0.8 oz/1,000 ft^2 with three applications may provide a "middle ground" between the two rates used. The addition of Amino Pro V seemed to have a minimal positive effect on turfgrass quality. Further investigation into Amino Pro V rates and combinations with Recovery Plus 4 could be necessary to identify rates/combinations for maximum recovery enhancement without chlorosis.

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Table 1. Treatment descriptions and timings for Harrell's spring aerification recovery trial on a creeping bentgrass putting green at the ISU Horticulture Research Station, Ames, IA.

Treatment number	Treatment product(s)	Treatment rate[a]	Application dates
1	Aerified Control	0.0	April 24
2	Recovery Plus 4	0.25	April 17 and May 1
3	Recovery Plus 4	0.50	April 17 and May 1
4	Amino Pro V	2.0	April 17 and May 1
5	Recovery Plus 4 + Amino Pro V	0.5 + 2.0	April 17 and May 1

[a]Rates are in fluid oz/1,000 ft^2.

Table 2. Summary of percent cover data, Harrell's spring aeration recovery trial ISU Horticulture Research Station, Ames, IA.

Treatment	1WAA[a]	2WAA	3WAA	4WAA
Aerified Control	78.8	87.3	93.9	97.8
Recovery Plus 4	82.4	88.1	95.0	95.7
Recovery Plus 4	74.7	86.6	93.3	92.9
Amino Pro V	84.1	88.5	95.9	96.1
Recovery Plus 4 + Amino Pro V	84.7	89.8	95.4	95.3
LSD at P ≤ 0.05	8.4	ns[b]	ns	ns

[a]WAA = weeks after aeration.
[b]ns = not significant.

Table 3. Summary of dark green color index data, Harrell's spring aeration recovery trial, at the ISU Horticulture Research Station, Ames, IA.

Treatment	1 WAA[a]	2 WAA	3 WAA	4 WAA
Aerified Control	.78	.77	.75	.82
Recovery Plus 4	.77	.77	.74	.84
Recovery Plus 4	.72	.72	.71	.82
Amino Pro V	.75	.78	.74	.80
Recovery Plus 4 + Amino Pro V	.74	.75	.75	.82
LSD at P ≤ 0.05	ns[b]	ns	ns	ns

[a]WAA = weeks after aeration.
[b]ns = not significant.

Table 4. Summary of quality data, Harrell's spring aeration recovery trial, at the ISU Horticulture Research Station, Ames, IA.

Treatment	1 WAA[a]	2 WAA	3 WAA	4 WAA
Aerified Control	6.2	5.9	6.0	6.1
Recovery Plus 4	6.1	6.2	6.2	5.6
Recovery Plus 4	5.4	5.6	5.9	5.1
Amino Pro V	5.9	6.3	6.1	6.3
Recovery Plus 4 + Amino Pro V	5.8	6.3	6.7	5.6
LSD at P ≤ 0.05	ns[b]	ns	0.7	0.9

[a]WAA = weeks after aeration.
[b]ns = not significant.