

Amended Topdressing for Aerification Recovery

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Introduction

Core aerification is an effective cultivation practice utilized by most golf courses for thatch management and soil compaction reduction. Timely recovery of aerification cultural practices is an important management consideration for golf course superintendents. Quick recovery periods are preferred by course owners/greens committees to reduce loss of revenue and by golfers/members to reduce loss of fall playing time. Filling aerification holes and sand topdressing after aerification can speed recovery, but it is often still days before the playing surface is returned to optimal condition. Because the many benefits of core aeration outweigh the disruption of playing conditions, cultural practice improvements to decrease recovery time are necessary.

The objective of this trial was to evaluate the effects of a plant growth regulator mixture (PGR mix), a 30-0-0 liquid fertilizer, and a sand/soil topdressing mixture on aerification recovery timeframe of creeping bentgrass maintained at greens height. A secondary objective was to evaluate turfgrass quality and potential chlorosis conditions due to various treatments.

Materials and Methods

This trial was conducted at the Iowa State University Horticulture Research Station north of Ames, Iowa, on a native soil creeping bentgrass putting green. Turf was cut six days/week at 0.125 in. using a riding reel mower. Irrigation was applied as necessary to

facilitate optimal growing conditions. Fertility rate was 0.5 lb N/M/month using foliar urea applications. No other cultural practices (aerification or verticutting) were performed in the trial area during the 2017 growing season. Treatments, rates, and timings for this trial are presented in Table 1. Plots were aerated September 8, 2017, using a Toro ProCore 648. Core spacing was 2 in. x 2 in. at 2.5 in. depth using 0.5 in. diameter tines. Experimental units were 4 ft x 8 ft. Each experimental unit was topdressed with 50 lb of conventional topdressing sand or sand/soil topdressing mixture, depending on treatment. The commercially available PGR mix contained cytokinin, gibberellic acid, and indole-3-butyric acid (Table 1). Treatments were arranged as a randomized complete block design with three replications. Visual recovery ratings were taken weekly for four weeks after aeration. Visual turfgrass quality and chlorosis also were rated as necessary. Rating scales are noted in individual rating parameter tables.

Results and Discussion

The sand/soil topdressing mixture improved aeration hole recovery over all other treatments on three of four rating dates (Table 2). At three weeks after aeration, the PGR mix and PGR mix + 30-0-0 treatments also had improved recovery over the control treatment. Overall turfgrass quality was acceptable for all treatments at one and four weeks after aeration, with the amended sand mixture having the highest overall quality on all dates (Table 3). Quality below an acceptable level of 6 occurred with the PGR mix and PGR mix + 30-0-0 treatments at two and three weeks after aeration, but both recovered by four weeks after aeration to an acceptable level.

Overall turfgrass quality was heavily influenced by turf chlorosis incidence.

Treatments containing PGR mix had significantly more chlorosis than the control at two and three weeks after aeration (Table 4). The sand/soil topdressing mixture greatly improved aeration hole recovery, with nearly 75 percent recovery by one week after aeration, reaching greater than 90 percent recovery one week faster than all other treatments. Second fastest recovery were treatments containing PGR mix, even though the PGR mix seemed to cause chlorosis. Chlorosis may be attributed to warmer than usual weather patterns post aeration.

Additional research is necessary to determine if these results are repeatable in a second year. More research is necessary to determine if the chlorosis of the PGR mix product can be prevented with different watering intervals after application.

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Table 1. Creeping bentgrass aerification recovery evaluation trial treatments, Ames, IA, 2017.

Treatment	Description	Timing	Rate
1	PGR mix ¹	1 wk ² pre and post aerification	0.2 oz/M ³
2	PGR mix + 30-0-0 ⁴	1 wk pre and post aerification	0.2 oz/M+5.0 oz/M
3	30-0-0	1 wk pre and post aerification	5.0 oz/M
4	Sand/soil topdressing mixture	On day of aerification	50 lb/EU ⁵
5	Non-treated control	Conventional sand topdressing only on day of aerification	50 lb/EU

¹PGR mix contained cytokinin, gibberellic acid, and indole-3-butyric acid.

²wk = week.

³M = 1,000 ft².

⁴30-0-0 consisted of a liquid fertilizer.

⁵EU = experimental unit.

Table 2. Visual percent recovery of aeration holes on a creeping bentgrass putting green for aeration recovery trial, Ames, IA, 2017.

Treatment	Description	1 Week ¹	2 Week	3 Week	4 Week
1	PGR mix ²	45.00	62.50	78.75	90.50
2	PGR mix + 30-0-0 ³	42.50	62.50	78.75	94.50
3	30-0-0	45.00	62.50	75.00	96.50
4	Sand/soil topdressing mixture	73.75	80.00	92.50	98.75
5	Non-treated control ⁴	45.00	60.00	67.50	94.75
LSD ⁵		10.25	9.00	9.50	5.25

¹Weeks after aeration.

²PGR mix contained cytokinin, gibberellic acid, and indole-3-butyric acid.

³30-0-0 consisted of a liquid fertilizer.

⁴Non-treated control was treated with sand topdressing only.

⁵LSD = Fisher's least significant difference at P = 0.05.

Table 3. Overall visual quality ratings for aeration recovery trial, Ames, IA, 2017.

Treatment	Description	1 Week ¹	2 Week	3 Week	4 Week
1	PGR mix ²	6.75 ³	5.75	5.00	6.50
2	PGR mix + 30-0-0 ⁴	6.50	5.75	4.75	7.00
3	30-0-0	6.25	6.00	6.25	7.25
4	Sand/soil topdressing mixture	7.00	7.50	7.50	7.75
5	Non-treated control ⁵	6.50	6.00	5.75	7.00
LSD ⁶		0.50	0.60	0.90	0.80

¹Weeks after aeration.

²PGR mix contained cytokinin, gibberellic acid, and indole-3-butyric acid.

³Visual quality rating scale: 1-9, with 1 being low, 6+ being acceptable, and 9 being highest.

⁴30-0-0 consisted of a liquid fertilizer.

⁵Non-treated control was treated with sand topdressing only.

⁶LSD = Fisher's least significant difference at P = 0.05.

Table 4. Visual turf chlorosis ratings for aeration recovery trial, Ames, IA, 2017.

Treatment	Description	1 Week ¹	2 Week	3 Week	4 Week
1	PGR mix ²	1.50 ³	3.50	6.25	1.25
2	PGR mix + 30-0-0 ⁴	1.50	4.75	7.00	1.00
3	30-0-0	2.25	2.00	1.00	1.25
4	Sand/soil topdressing mixture	1.50	1.00	1.00	1.00
5	Non-treated control ⁵	1.25	1.25	1.00	1.00
LSD ⁶		NS ⁷	0.80	0.90	NS

¹Weeks after aeration.

²PGR mix contained cytokinin, gibberellic acid, and indole-3-butyric acid.

³Chlorosis rating scale: 1-9, with 1 being none, 4+ being unacceptable, and 9 being highest.

⁴30-0-0 consisted of a liquid fertilizer.

⁵Non-treated control was treated with sand topdressing only.

⁶LSD = Fisher's least significant difference at P = 0.05.

⁷NS = no significant differences at P = 0.05.