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This publication includes lecture notes of papers presented at the 2018 GREEN EXPO Turf and Landscape Conference. Publication of these lectures provides a readily available source of information

covering a wide range of topics and includes technical and popular presentations of importance to the turfgrass industry.

This proceedings also includes research papers that contain original research findings and reviews of selected subjects in turfgrass science. These papers are presented primarily to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

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PERFORMANCE OF BENTGRASS CULTIVARS AND SELECTIONS IN NEW JERSEY TURF TRIALS, 2018

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Bentgrass species possess a distinct ability to form very dense, uniform, and fine textured surfaces under an extremely low height of cut. As a result, bentgrasses are often used in specialized, high maintenance areas such as golf course fairways, tees, and putting greens. Three bentgrass species predominantly used for turf are creeping bentgrass (*Agrostis palustris* Huds.; synonym = *A. stolonifera* L.), colonial bentgrass (*A. tenuis* L. or *A. capillaris* L.), and velvet bentgrass (*A. canina* L.). In addition, highland or dryland bentgrasses (*A. castellana* Boiss. & Reut.) can be options for turf in stressful areas, but these tend to be less commonly utilized because they are less attractive than the more common species when a high quality turf is needed. Due to an aggressive growth habit and adaptability to a variety of climates, creeping and velvet bentgrasses are most suitable for the very low cutting heights required for golf course greens in the United States. Colonial bentgrasses respond best to a slightly higher height of cut, therefore these are usually better suited for lower maintenance fairways in temperate areas of the United States.

Creeping bentgrasses are highly stoloniferous and have a prostrate growth habit, which allows for persistence under very low mowing heights. Cutting heights of 1/10 of an inch are not uncommon on many top tier golf courses. This species is highly adapted to both cool, temperate as well as warm, humid regions of the United States, making it the most popular species used on golf course putting greens in temperate areas. Its vigorous spreading growth habit also contributes to its ability to repair damaged areas quickly. In 1954, H. B. Musser released 'Penncross,' the first seeded synthetic variety of creeping bentgrass (Musser, 1959). Since then, breeding efforts have markedly improved creeping

bentgrasses to withstand the increasing demands of the game of golf including the need for better turf quality, darker green color, improved shoot density, improved traffic tolerance and recuperative ability, and increased disease and stress tolerances compared to older varieties.

Creeping bentgrasses are susceptible to a number of pathogens and pests. Dollar spot (caused by the fungus *Clariireedia jacksonii*) is one of the main disease problems of close-cut creeping bentgrass. However, these grasses can also be susceptible to brown patch (*Rhizoctonia solani*), copper spot (*Gloeocercospora sorghi*), anthracnose (*Colletotrichum cereale*), and diseases caused by *Pythium* spp.

Colonial bentgrass, also referred to as browntop, has traditionally been used as a lawn and golf course grass in areas of Northern Europe and New Zealand that have mild (cool and humid) summers. Compared to creeping bentgrasses, colonial bentgrasses have a finer leaf texture, a more upright and less aggressive spreading growth habit, and are generally better adapted for fairway or tee use in the warmer summer climates of the northern United States. Colonial bentgrasses perform best in New Jersey when mowed no lower than 3/8 of an inch and, compared to creeping bentgrasses, typically have a brighter green color and better color retention during cool weather. Although colonial bentgrasses generally have better dollar spot resistance and wear tolerance, they are much more susceptible than creeping bentgrasses to brown patch and do not spread through stolons. While not lethal, the playability of golf courses may be affected if brown patch is not controlled on colonial bentgrass turfs. Current breeding efforts include improving the tolerance of colonial bentgrasses to this disease and improved quality under fairway conditions.

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Velvet bentgrass forms the finest-textured and densest turf of the bentgrasses and can nearly resemble green velvet when managed properly. It spreads mainly through profuse production of erect tillers with short stolons. This grass can tolerate very close mowing, heat, cold, and shade, and is one of the most drought tolerant of the bentgrasses used for turf (Skogley, 1973). Due to the density and vigor of this turf, even under very low mowing conditions, it has been shown to be extremely effective at preventing the encroachment of the most prolific weed on a golf course, *Poa annua*. The spread of velvet bentgrass via stolons is more aggressive than colonial bentgrass, but not as strong as creeping bentgrass.

Velvet bentgrass can form excessive thatch, especially at high fertility rates, increased irrigation, and higher cutting heights, and can thus become problematic if not maintained properly. Years of mismanagement and subsequent poor turf quality has given velvet bentgrass a poor reputation, but recent research showed that when managed properly, velvet bentgrass can create a superior turf (Brilman and Meyer, 2000). Velvet bentgrass can be susceptible to red thread (caused by *Laetisaria fuciformis*) and copper spot, but generally has good resistance to dollar spot and brown patch. Seedlings of velvet bentgrasses are susceptible to Pythium seedling root rot during establishment.

During colder weather, velvet bentgrass will turn a dark purple color and will take longer than the other bentgrass species to “green-up” in the spring. Velvet bentgrass has not been used extensively for high maintenance turf, largely because its range of adaptation has not been well characterized. Selections of velvet bentgrass have persisted for many years in trials under New Jersey growing conditions. Recent research at Rutgers indicates that the species may one day serve as a viable alternative to creeping bentgrass for use on golf course greens in the northeastern United States as long as proper cultural management inputs are implemented. Some of the major breeding objectives for velvet bentgrass include resistance to copper spot and Pythium diseases, and wear tolerance.

The New Jersey Agricultural Experiment Station participates in the National Turfgrass Evaluation Program (NTEP), which evaluates many species of turfgrass including bentgrasses at various locations throughout the United States. The Rutgers turfgrass breeding program conducts extensive field evaluations of collections and new material developed in

the improvement program, many of which are a result of recent collection trips within the United States and throughout Europe and Asia. Collections from the British Isles, Norway, Sweden, Spain, Portugal, France, Finland, Switzerland, Scotland, Italy, Greece, Poland, Holland, Hungary, Bulgaria, Romania, Croatia, China, and the Slovak Republic serve to enhance the genetic diversity of the germplasm used in this breeding program. The Rutgers turfgrass breeding program focuses on improving turfgrasses for overall quality, color, density, uniformity, texture, disease resistance, salt tolerance, traffic tolerance, and many other traits that improve the usefulness of turfgrasses throughout the world.

PROCEDURES

Bentgrass evaluation trials were established at the Rutgers Horticultural Research Farm II in North Brunswick, NJ in the fall of 2014 (Tables 1 to 3), 2015 (Tables 4 to 6), 2016 (Tables 7 to 8) and 2017 (Tables 9 to 11). Trials were established on a modified Nixon loam. Plot size was 3 x 5 ft for all trials except for the NTEP Greens Trial (Table 1), where plot size was 4 x 6 ft, and the NTEP Fairway Trial (Table 2), where plot size was 8 x 6 ft. Plots were hand-seeded at a rate of approximately 1.0 lb per 1000 ft². All tests were arranged in a randomized complete block design with three replications.

All sites were well drained and openly exposed to both sunlight and air circulation. The annual rate of nitrogen applied, mowing height, cultivation/topdressing practices, and pesticide applications for each test are presented in Table 12. The putting green tests were mowed five to six times per week during periods of active growth with a triplex or walk-behind reel mower equipped to collect clippings. The fairway tests were mowed three times per week with a triplex reel mower and clippings were removed during periods of active growth. Soil pH was maintained in the range of 5.4 to 6.8 with agricultural limestone. Most tests were irrigated to 50 to 70% ET replacement during the growing season to avoid drought stress.

Plots were evaluated frequently during the growing season for overall turf quality (i.e., turf density, texture, uniformity, color, growth habit) and presence of disease, insect, or herbicide damage. Turf quality (Tables 1 through 11), establishment (Tables 9 to 11), spring green-up (Tables 2, 4, 7, 9, and 10), turf density, leaf texture, and genetic color (Tables 1 and 2), scalp injury (Table 6), and disease were rated on a

1 to 9 scale, where 9 represented the most desirable turf characteristic. Disease ratings included dollar spot (Tables 2, 3, 5, 7 to 9, and 11), brown patch (Tables 2, 6, 7 to 9, and 11), copper spot (Tables 3 to 5), and root Pythium (Tables 7 and 10). All data were subjected to analysis of variance. Means were separated using Fisher's protected least significant difference (LSD) means separation test.

RESULTS AND DISCUSSION

Turf Quality Evaluations

Entries in Tables 1 through 8 are ranked according to their overall multi-year quality average. Tables 9 to 11 are ranked by the average turf quality for 2018 only. Throughout all of the years that turf quality was assessed, a few varieties in each bentgrass species stood out as better performing entries.

For creeping bentgrasses maintained at a putting green height of cut (Tables 1, 3, 4, 7, and 9), L-93XD, Piranha, 777, Match Play, and the experimental selections DLFPS-AP/3018, 4738-7-12, KAC Comp, MMM Comp, MGH Comp, DSF Comp, EGC Comp, GMM Comp, and BEF Comp all performed very well, while Penncross, Southshore, L-93, SR 1119, Mariner, Putter, Alpha, Focus, and SR1119 were consistently among the poorest performers. At fairway height (Tables 2, 6, 8, and 11), Piranha, Match Play, Chinook, Coho, TourPro, L-93XD, and the experimental selections MMM Comp, MGH Comp, PSF Comp, GMM Comp, and BEF Comp had excellent turf quality, while the lowest scoring cultivars consisted of Penncross, Southshore, SR 1119, PinUp, Focus, Tyee, Penn A-4, and Kingpin.

Overall turf quality for velvet bentgrasses was evaluated in 2014, 2015, 2016, and 2017 trials (Tables 3, 5, 7, and 10) under greens height of cut. In all trials, the selections that offered top acceptable turf quality were experimental entries such as LVP Comp, SFV Comp, EVP Comp, CCV Comp, SCL Comp, SSL Comp, MLC Comp, DEM Comp, DMS Comp, and CMV Comp, which outperformed named cultivars such as SR 7200 and Villa, which displayed poor quality in these trials under these greens-type management conditions.

As mentioned previously, colonial bentgrasses perform better at fairway cutting height and typically have poorer performance under putting green conditions. Nevertheless, there were several ex-

perimental colonials in putting green trials (Tables 4 and 9) where many creeping bentgrasses performed favorably, exhibiting excellent turf quality at greens height. These included Puritan, EDC Comp, AT 12 B (Table 4) and SLC Comp, EUC Comp, and EFC Comp (Table 9). Under fairway conditions, however (Tables 2, 6, 8, and 11), Puritan and the experimental selections DLFPS-AT/3026, AT 12 M2, ECS Comp, CCD Comp, LCC Comp, DHS Comp, EFC Comp, EUC Comp, SLC Comp, and LDC Comp were the best performing colonial bentgrasses, while Glory, Tiger 2, SR 1150, SR 7150, and Aberroyal generally exhibited the poorest performance under fairway cutting heights when included in trials

Dollar Spot

Clariireedia jacksonii, the causal agent of this widespread turfgrass disease, causes silver-dollar shaped spots of dead turf that can converge to form larger damaged areas (Belanger et al., 2005). While potentially one of the more damaging turf diseases on golf courses in the northeast, dollar spot can be easily controlled with the use of fungicides; however this can be expensive due to the prevalence of the fungus. Also becoming more prevalent is the pathogen's resistance to fungicides, particularly DMI fungicides (Smiley et al., 2005). In addition, increased fungicide use is not beneficial to the environment.

Breeding for dollar spot resistance in bentgrass is an important objective of the Rutgers breeding program. Typically, velvet and colonial bentgrasses have better resistance to dollar spot than creeping bentgrasses, however the results from recent trials (Tables 2, 3, 7 to 9, and 11) indicate that significant improvements in creeping bentgrass have been made, and that creeping bentgrasses may perform comparably to colonial bentgrasses, as seen in Tables 2 and 9. More recent cultivars such as Coho and Chinook offer strong resistance or tolerance (comparable to older cultivars such as Declaration, V-8, and Memorial), and experimental entries 4738-7-12, 4739-7-12, 4741-8,10,12, MGH Comp, EFB Comp, MGS Comp, LSG Comp, EF2 Comp, and GMM Comp showed improved tolerance to dollar spot, while Ninety-Six Two, Southshore, Pure Distinction, Mariner, Armor, PST-0RBS, PC2.0, and Crenshaw were very susceptible to this disease.

Brown Patch

Velvet bentgrass typically exhibits the greatest tolerance to brown patch among the bentgrass spe-

cies used for turf, while colonial bentgrass is the most susceptible. In recent years, dramatic improvements have been made in breeding colonial and creeping bentgrasses for improved brown patch resistance. Brown patch data is reported in Tables 2, 6 to 9, and 11. In 2018, creeping bentgrasses generally displayed acceptable tolerance to this disease, exhibiting little significant separation among entries (Tables 2, 6, and 9). In Table 7, however, significant differences among the creeping bentgrasses were observed, in which cultivars like PC2.0, Kingpin, PLC Comp, Penn A-1, Alpha, and L-93XD exhibited less than acceptable brown patch disease levels compared to other creeping bentgrass cultivars.

Over the past few years, significant research has been spent on improving brown patch resistance in colonial bentgrass. In the 2014 NTEP, 2015, 2016, and 2017 fairway trials (Tables 2, 6, 8, and 11), enhanced disease tolerance is evident. The cultivar Puritan and the experimental selections AT 12 B, AT 12 M2, ESC Comp, MDF Comp, CCD Comp, FDH Comp, and SLC Comp exhibited significantly improved brown patch resistance compared to older entries such as Glory, SR 7150, and Tiger 2.

Copper Spot

This disease is becoming an increasing concern in the Northeast during the summer when DMI fungicides are of limited use during warm, wet conditions. The causal agent of this disease, *Gloeocercospora sorghi*, is a fungus that produces 1- to 3-inch, salmon-copper colored patches on the turf (Smiley et al., 2005). Currently, one of the major drawbacks in the use of velvet bentgrass continues to be the high susceptibility of this species to infection by this fungus. Therefore, selection of velvet bentgrass for resistance to copper spot is a major goal of the Rutgers Turfgrass Breeding Program.

During the 2018 growing season, copper spot was assessed on the 2014 and 2015 greens trials (Tables 3 to 5). When differences within the velvet bentgrass selections were evident (Table 5), LVP Comp stood out as highly tolerant to this disease when compared to experimentals such as CCV Comp and PST-VR01, which were consistently poorer.

When considering in general how the creeping bentgrass selections fared, most offered an acceptable level of tolerance to copper spot (Tables 3 and 4). However, cultivars such as Pure Distinction, Pure Se-

lect, Pure Eclipse, PC2.0, Shark, Mackenzie, and SR 1119, and the experimental entries MGC Comp and WFC Comp were more susceptible to this disease.

Spring Green-Up

Spring green-up data was collected on trials from 2014 (Table 2), 2015 (Table 4), 2016 (Table 7), and 2017 (Tables 9 and 10). In general, velvet bentgrass typically has the poorest spring green-up compared to colonial and creeping bentgrass and can even exhibit a purplish color during cold winter months and into the spring. In 2018, velvet bentgrass was assessed for green up in the 2017 velvet greens trial (Table 10). The experimental entries MSV Comp, DSM Comp, DMD Comp, and the cultivar Vesper outperformed several older cultivars such as Villa, Villa 2, and SR 7200.

Creeping bentgrasses (Tables 2, 4, 7, and 9) showed a wide range of variability in spring green-up, with entries such as Luminary, Piranha, Chinook, Match Play, and the experimental entries MMM Comp, MGH Comp, MGS Comp, BEF Comp, and EF2 Comp receiving the highest ratings for for this trait. Alternatively, Penncross, Memorial, Alpha, Center Cut, Armor, Nightlife, Kingdom, Southshore, and Mariner were among the slowest to green up.

There were fewer differences among colonial bentgrasses in 2018. Under greens conditions (Table 4), no entry displayed acceptable spring green-up, although the cultivar Arrowtown was the earliest colonial to green up. While no statistical differences were observed in the NTEP Fairway trial (Table 2), in the 2017 putting green trial (Table 9), colonial selections Tiger 2 and FT12 were some of the poorest entries to green up, while the cultivar Puritan and experimental entries EFC Comp, and EUC Comp were fastest to green up.

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Table 1. Performance of creeping bentgrass cultivars in a putting green trial established in September 2014 at North Brunswick, NJ. Includes all entries from the 2014 National Bentgrass Greens Test (NTEP).

Cultivar or Selection	-----Turf Quality ¹ -----					Turf Density ² Oct. 2018	Leaf Texture ³ Oct. 2018	Genetic Color ⁴ Oct. 2018
	2015-2018 Avg.	2015 Avg.	2016 Avg.	2017 Avg.	2018 Avg.			
1 L-93XD	6.9	7.6	7.1	6.7	6.3	7.7	8.0	6.7
2 Piranha	6.9	6.9	6.5	6.7	7.5	7.7	7.0	7.0
3 DLFPS-AP/3018	6.5	6.7	6.2	6.2	7.0	6.7	7.3	7.3
4 777	6.5	7.6	6.2	5.3	6.7	7.0	7.7	7.3
5 Luminary	6.0	6.0	6.1	6.0	5.9	6.0	6.3	7.3
6 DLFPS-AP/3056	5.9	6.3	5.7	5.1	6.3	5.3	6.7	5.3
7 DLFPS-AP/3058	5.8	6.8	6.0	4.8	5.7	5.7	6.3	4.7
8 TourPro	5.6	6.5	5.9	4.9	5.3	6.7	6.7	5.7
9 V-8	5.6	6.0	5.7	5.8	4.9	4.7	6.3	4.3
10 Pure Eclipse	5.6	6.6	5.9	4.9	4.9	5.0	6.7	3.3
11 Pure Select	5.5	6.0	5.8	4.6	5.7	5.3	6.3	4.7
12 Barracuda	5.5	5.6	5.8	5.0	5.8	4.7	7.0	4.3
13 Shark	5.5	6.2	5.7	4.5	5.4	5.3	6.0	5.0
14 Declaration	5.4	4.7	4.6	6.2	6.2	6.0	6.3	6.3
15 Kingdom	5.3	5.6	4.4	4.8	6.2	6.0	5.7	6.3
16 Nightlife	5.1	5.7	4.3	5.1	5.3	5.0	5.7	6.0
17 DLFPS-AP/3059	4.9	4.9	4.5	5.1	5.2	5.0	6.0	4.7
18 Armor	4.5	4.9	4.1	3.9	5.2	6.0	6.3	6.3
19 Penn A-1	3.9	4.0	4.1	3.6	3.8	3.0	4.7	3.7
20 Penncross	1.6	2.2	1.1	1.4	1.7	1.0	3.0	2.0

(Continued)

Table 1. Creeping bentgrass putting green trial, 2014 (NTEP) (continued).

Cultivar or Selection	-----Turf Quality ¹ -----					Turf Density ² Oct. 2018	Leaf Texture ³ Oct. 2018	Genetic Color ⁴ Oct. 2018
	2015-2018 Avg.	2015 Avg.	2016 Avg.	2017 Avg.	2018 Avg.			
LSD at 5% =	0.6	0.8	0.7	1.0	1.5	1.7	1.2	1.6

¹9 = best turf quality

²9 = highest shoot density

³9 = finest leaf texture

⁴9 = darkest green color

Table 2. Performance of bentgrass cultivars in a fairway trial established in September 2014 at North Brunswick, NJ. Includes all entries from the 2014 National Bentgrass Fairway Test (NTEP).

Selection	-----Turf Quality ¹ -----					Spring	Brown	Dollar	Turf	Leaf	Genetic
	2015- 2018 Avg.	2015 Avg.	2016 Avg.	2017 Avg.	2018 Avg.	Green-up ² April 2018	Patch ³ July 2018	Spot ⁴ 2018 Avg.	Density ⁵ Oct. 2018	Texture ⁶ Oct. 2018	Color ⁷ Nov. 2018
CREeping BENTGRASS											
1 Piranha	7.7	7.6	8.1	7.7	7.5	7.3	9.0	6.3	7.0	7.3	7.7
2 Chinook	7.0	6.1	7.3	7.2	7.5	6.7	9.0	7.7	7.7	7.3	8.0
3 L-93XD	6.9	7.1	7.5	6.2	6.9	5.3	9.0	7.2	7.7	7.3	7.3
4 OO7	6.8	6.9	7.0	6.4	7.0	6.3	9.0	7.5	6.7	6.7	7.0
5 V-8	6.5	6.1	6.9	6.6	6.5	4.7	8.7	6.8	6.7	7.0	6.7
6 Barracuda	6.3	6.4	6.5	6.5	6.1	6.3	9.0	6.0	7.0	6.3	7.3
7 Shark	6.0	5.8	6.5	6.4	5.4	6.7	9.0	2.8	4.7	5.7	6.0
8 Luminary	5.7	6.3	5.8	5.3	5.5	6.7	8.7	5.2	6.3	6.0	6.7
9 Crystal BlueLinks	5.2	5.5	5.6	5.3	4.4	5.7	8.3	5.0	5.0	4.3	6.3
10 Declaration	5.0	5.5	5.4	4.7	4.7	5.3	8.0	7.2	5.7	6.0	6.3
11 Nightlife	5.0	5.4	5.5	4.4	4.5	2.5	9.0	4.0	3.5	4.5	5.5
12 PC2.0	4.7	5.4	5.3	4.3	4.0	5.0	8.7	3.5	3.7	4.3	4.7
13 PST-ORBS	4.7	5.1	5.4	4.2	3.5	4.5	8.5	3.3	3.5	4.0	4.5
14 Kingdom	4.4	4.6	4.4	4.2	4.2	2.0	8.3	4.2	4.7	5.0	5.3
15 Armor	4.1	4.3	4.5	3.7	3.9	3.0	9.0	1.5	3.5	4.5	5.0
16 Penncross	3.1	3.0	2.6	3.5	4.4	5.0	8.0	4.5	2.0	3.0	5.0
COLONIAL BENTGRASS											
1 Puritan	6.6	6.0	6.8	6.7	6.9	3.0	7.3	6.8	7.0	7.3	6.0
2 DLFPS-AT/3026	6.4	5.8	6.2	6.6	7.1	3.3	5.0	8.5	6.3	7.7	6.7
3 Musket	5.9	5.0	5.5	6.4	6.5	3.0	7.7	7.0	7.0	8.0	5.7
4 Greentime	4.8	4.7	4.8	5.1	4.8	2.7	5.3	6.2	4.7	6.3	4.3

(Continued)

Table 2. Creeping bentgrass fairway trial, 2014 (NTEP) (continued).

Selection	-----Turf Quality ¹ -----					Spring Green-up ²	Brown Patch ³	Dollar Spot ⁴	Turf Density ⁵	Leaf Texture ⁶	Genetic Color ⁷
	2015- 2018 Avg.	2015 Avg.	2016 Avg.	2017 Avg.	2018 Avg.	April 2018	July 2018	2018 Avg.	Oct. 2018	Oct. 2018	Nov. 2018
LSD at 5% =	0.8	0.8	1.1	1.1	1.0	1.3	0.7	1.4	1.3	1.2	1.3

¹9 = best turf quality

²9 = earliest spring green-up

³9 = least brown patch

⁴9 = least dollar spot; data is an average of two rating dates

⁵9 = highest shoot density

⁶9 = finest leaf texture

⁷9 = darkest green color

Table 3. Performance of creeping and velvet bentgrass cultivars and selections in a putting green trial established in September 2014 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----					Dollar Spot ² 2018 Avg.	Copper Spot ³ July 2018
	2015- 2018 Avg.	2015 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
CREEPING BENTGRASS							
1 4738-7-12	6.9	6.9	6.3	6.7	7.5	7.8	6.3
2 KAC Comp	6.6	5.6	6.2	7.3	7.3	7.3	6.0
3 4759-7,8,10,12	6.5	7.0	6.6	5.8	6.9	7.5	5.7
4 GSM Comp	6.4	6.6	6.4	5.7	6.9	7.1	5.7
5 LSC Comp	6.4	6.1	5.9	6.4	7.2	7.0	6.0
6 TLP Comp	6.3	5.7	5.7	6.4	7.5	6.3	6.7
7 4741-8,10,12	6.3	6.0	5.6	6.6	7.3	7.9	7.0
8 PYR Comp	6.3	6.1	5.8	6.5	7.0	7.2	6.7
9 4733-7-9,11	6.2	5.8	6.0	6.5	6.7	7.9	7.0
10 Coho	6.1	6.3	5.9	5.7	6.5	8.0	5.0
11 4749-7-10,12	6.0	5.9	5.6	6.1	6.5	7.0	7.3
12 4739-7-12	6.0	6.1	6.0	5.9	6.3	7.9	5.7
13 Piranha	6.0	6.0	5.4	6.2	6.3	6.1	6.7
14 FGL Comp	6.0	4.6	6.2	6.3	6.9	7.6	5.3
15 PDM Comp	5.9	5.7	5.9	6.3	5.9	6.1	5.3
16 4726-1-4	5.9	5.6	5.6	5.6	6.9	7.3	6.3
17 4740-1-6	5.9	6.5	5.9	4.5	6.7	8.0	5.3
18 4757-8-12	5.9	6.2	6.4	4.6	6.4	7.1	6.0
19 4779-1-6	5.9	5.5	5.3	6.6	6.1	5.2	4.7
20 4756-7-9,12	5.8	5.8	6.1	5.5	5.9	7.1	4.7

10

(Continued)

Table 3. Creeping and velvet bentgrass putting green trial, 2014 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----					Dollar Spot ² 2018 Avg.	Copper Spot ³ July 2018
	2015- 2018 Avg.	2015 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
CREEPING BENTGRASS (continued)							
21 4782-3-6	5.8	5.5	5.1	6.4	6.1	5.6	7.3
22 777	5.6	6.4	5.0	5.5	5.6	5.5	4.0
23 4760-1-6	5.6	5.7	6.1	4.7	6.0	7.5	6.0
24 4767-2-6	5.6	5.7	5.3	5.7	5.7	5.1	6.7
25 4744-1-6	5.5	5.0	5.0	5.7	6.3	6.5	6.3
26 4787-4-6	5.5	5.8	4.9	5.4	6.0	4.9	8.0
27 AP-18	5.5	6.3	4.9	5.6	5.3	5.6	4.7
28 Flagstick	5.5	5.4	5.3	5.8	5.3	6.8	6.0
29 4764-1-5	5.4	5.6	5.5	4.8	5.9	7.6	5.0
30 OO7	5.4	5.4	5.1	6.2	5.1	4.9	5.0
31 Pin-Up	5.3	6.1	4.7	5.5	4.7	4.6	3.7
32 Pure Distinction	5.3	5.3	3.7	6.8	5.2	4.0	4.7
33 Luminary	5.2	5.7	5.0	4.7	5.5	4.9	6.0
34 Pin-Up 2	5.2	5.3	4.1	5.1	6.2	6.1	7.7
35 Barracuda	5.2	5.3	4.7	5.0	5.6	6.2	5.3
36 DSC Comp	5.1	4.7	4.6	4.9	6.0	7.2	6.7
37 Pure Eclipse	5.0	5.9	4.4	5.0	4.7	4.4	5.7
38 Focus	5.0	5.0	5.1	5.1	4.6	4.7	4.3
39 Pure Select	4.9	5.6	4.5	5.0	4.7	4.5	5.3
40 Proclamation	4.9	5.9	4.2	4.6	4.7	6.3	5.7

(Continued)

Table 3. Creeping and velvet bentgrass putting green trial, 2014 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----					Dollar Spot ² 2018 Avg.	Copper Spot ³ July 2018
	2015- 2018 Avg.	2015 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
CREEPING BENTGRASS (continued)							
41 Centercut 3	4.6	4.8	4.7	4.1	4.7	5.9	5.3
42 V-8	4.5	5.1	4.3	4.0	4.5	5.7	4.0
43 Declaration	4.5	4.9	4.0	4.4	4.5	6.7	5.3
44 Pureformance	4.5	5.2	3.2	5.0	4.5	3.4	5.3
45 Memorial	4.4	4.9	4.6	3.6	4.6	7.0	5.7
46 Authority	4.4	4.8	3.9	4.7	4.3	4.6	5.3
47 Shark	4.4	5.3	4.1	4.2	4.1	4.2	5.0
48 RH 93	4.4	4.8	4.2	4.0	4.5	5.4	3.7
49 Benchmark DSR	4.2	4.2	3.7	4.7	4.4	5.2	5.3
50 Cobra 2	4.2	4.0	4.1	4.5	4.2	4.7	3.3
51 A-1/A-4	4.1	4.7	3.7	4.2	4.0	4.1	4.3
52 PST-0RBS	4.1	4.6	3.3	4.5	4.0	3.8	5.3
53 Independence	4.0	4.9	3.0	4.5	3.9	4.3	6.3
54 King Pin	4.0	3.8	3.6	3.9	4.5	5.3	5.7
55 Penn A-4	3.9	4.5	3.3	4.2	3.5	4.3	4.0
56 13M	3.9	4.0	3.8	3.4	4.2	6.4	6.7
57 CY-2	3.9	3.6	4.1	4.0	3.7	5.0	6.7
58 Tyee	3.8	3.9	3.4	4.2	3.8	4.2	5.3
59 Crystal BlueLinks	3.7	3.9	3.1	3.9	4.0	4.8	6.0
60 SR 1150	3.7	3.6	3.8	4.1	3.5	4.5	5.0

12

(Continued)

Table 3. Creeping and velvet bentgrass putting green trial, 2014 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----					Dollar Spot ² 2018 Avg.	Copper Spot ³ July 2018
	2015- 2018 Avg.	2015 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
CREEPING BENTGRASS (continued)							
61 Ninety-Six Two	3.6	3.8	3.1	4.2	3.3	2.9	7.3
62 Mackenzie	3.5	3.9	2.9	3.3	3.7	4.3	3.3
63 T-1	3.4	3.8	2.9	3.0	4.1	4.4	4.7
64 PC2.0	3.4	4.0	2.8	3.5	3.5	3.6	4.3
65 PST-Syn-0CBX	3.4	4.2	2.7	3.4	3.3	3.3	5.7
66 SR 1119	3.4	3.0	3.0	4.0	3.7	4.7	3.3
67 Mariner	3.4	1.9	3.3	4.8	3.5	3.9	6.3
68 Alpha	3.1	3.1	2.8	2.9	3.9	4.3	5.3
69 L-93	2.9	2.7	2.8	2.5	3.7	5.3	6.7
70 Southshore	2.8	2.7	2.1	3.4	3.1	3.6	6.0
71 Crenshaw	2.8	2.7	2.0	3.1	3.5	4.5	7.0
72 Penncross	2.5	2.2	1.9	2.8	3.2	4.7	5.3
VELVET BENTGRASS							
1 PPG-AC 101	4.8	6.0	4.9	4.1	4.1	7.8	5.0
2 PST-Syn-VH9	4.5	4.7	4.5	4.3	4.4	8.0	4.0
3 Greenwich	3.9	4.0	4.1	3.7	3.7	7.1	4.7
4 Legendary	3.7	4.5	3.7	3.3	3.2	7.2	4.3
5 Villa	3.7	4.6	3.8	3.0	3.5	7.2	3.7
6 PST-VR01	3.4	3.5	3.9	2.9	3.3	6.4	3.3
7 SR 7200	2.4	2.6	2.1	2.3	2.5	6.2	3.7

13

(Continued)

Table 3. Creeping and velvet bentgrass putting green trial, 2014 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----					Dollar Spot ² 2018 Avg.	Copper Spot ³ July 2018
	2015-2018 Avg.	2015 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
LSD at 5% =	0.6	0.9	0.8	1.1	1.0	1.4	2.4

¹9 = best turf quality

²9 = least dollar spot; data is an average of three rating dates

³9 = least copper spot

Table 4. Performance of creeping and colonial bentgrass cultivars and selections in a putting green trial established in September 2015 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----				Spring Green-up ² April 2018	Copper Spot ³ July 2018
	2016-2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
CREEPING BENTGRASS						
1 777	6.4	6.5	5.5	7.3	4.3	7.3
2 AP 18	6.3	6.6	5.7	6.9	7.0	6.3
3 MMM Comp	6.3	6.4	6.5	6.1	6.7	5.3
4 Piranha	6.1	6.3	5.6	6.2	6.0	7.3
5 WFC Comp	6.0	5.5	6.1	6.4	7.3	4.7
6 Match Play	6.0	6.2	5.3	6.4	4.3	5.7
7 MSP Comp	6.0	6.0	5.6	6.2	5.0	5.0
8 Chinook	5.9	6.0	5.8	6.0	5.7	5.3
9 CBP Comp	5.9	6.0	5.4	6.1	5.0	5.7
10 RH 93	5.8	5.7	5.9	5.8	7.3	7.0
11 PST-Syn-R0PR	5.6	5.6	4.2	7.0	6.0	5.3
12 MGC Comp	5.6	6.1	4.3	6.2	3.7	4.3
13 Pure Distinction	5.6	6.0	4.4	6.2	4.7	3.3
14 TourPro	5.5	5.3	5.2	6.0	5.0	5.7
15 MFC Comp	5.5	4.9	5.4	6.4	5.0	5.0
16 OO7	5.4	5.4	5.4	5.4	5.0	5.3
17 Pure Distinction	5.3	5.9	4.4	5.8	3.0	4.3
18 LFW Comp	5.3	4.7	5.0	6.2	6.3	6.3
19 Barracuda	5.1	5.4	4.8	5.3	5.3	6.3
20 Pure Eclipse	5.1	5.8	3.8	5.7	5.7	3.0

15

(Continued)

Table 4. Creeping and colonial bentgrass putting green trial, 2015 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----				Spring Green-up ² April 2018	Copper Spot ³ July 2018
	2016-2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
CREEPING BENTGRASS (continued)						
21 Flagstick	5.1	4.4	6.1	4.9	7.3	7.0
22 Pin Up	5.1	5.6	5.1	4.5	6.3	5.0
23 Shark	4.9	5.1	4.4	5.3	5.0	3.7
24 EBC Comp	4.9	4.6	4.5	5.6	6.0	6.0
25 Centercut 2	4.8	5.0	4.4	5.1	5.7	5.7
26 Luminary	4.8	4.9	4.2	5.3	7.0	6.0
27 Cobra 2	4.5	4.5	4.8	4.2	4.0	5.0
28 PC2.0	4.4	4.7	3.9	4.8	5.3	4.3
29 Pure Select	4.4	4.8	3.5	4.9	5.0	4.0
30 CY-2	4.4	4.0	4.6	4.5	4.0	6.0
31 PST-0RBS	4.3	4.3	3.8	4.7	3.0	5.7
32 Centercut 3	4.2	4.5	3.8	4.4	5.7	6.7
33 SR 1150	4.0	3.8	3.9	4.4	4.0	7.3
34 Penn A1	3.9	3.7	3.7	4.2	3.3	6.7
35 Ninety-Six Two	3.9	4.0	3.5	4.0	6.3	7.0
36 Memorial	3.8	4.3	3.6	3.6	2.3	6.7
37 Mackenzie	3.7	4.3	3.4	3.5	4.0	7.0
38 Kingpin	3.6	3.5	3.5	3.7	7.0	6.0
39 Crystal BlueLinks	3.6	3.8	3.5	3.3	5.7	6.3
40 Centercut	3.5	4.0	3.2	3.3	3.3	7.0

16

(Continued)

Table 4. Creeping and colonial bentgrass putting green trial, 2015 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----				Spring Green-up ² April 2018	Copper Spot ³ July 2018
	2016-2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
CREEPING BENTGRASS (continued)						
41 13M	3.4	3.9	3.1	3.3	4.3	6.7
42 Tyee	3.4	3.2	2.8	4.1	5.0	6.7
43 Focus	2.5	2.3	2.8	2.4	5.0	8.0
44 SR 1119	2.5	3.0	2.3	2.3	3.3	7.7
45 Penncross	2.2	2.1	2.1	2.3	3.3	6.7
46 Mariner	2.1	2.6	2.1	1.7	2.7	7.0
COLONIAL BENTGRASS						
1 EDC Comp	5.7	5.6	6.4	5.1	2.7	9.0
2 Puritan	5.7	6.1	5.8	5.1	2.7	9.0
3 AT 12 B	5.7	5.6	6.2	5.2	1.0	9.0
4 ELC Comp	5.6	5.9	5.6	5.4	1.3	9.0
5 SHC Comp	5.5	5.2	6.0	5.2	1.3	9.0
6 ECS Comp	5.4	5.6	5.3	5.2	1.3	9.0
7 MDF Comp	5.3	5.2	6.1	4.6	1.7	8.7
8 DDS Comp	5.1	5.3	5.5	4.6	2.0	9.0
9 AT 14	5.0	5.6	4.7	4.6	1.0	9.0
10 AT 10	4.9	5.6	4.9	4.3	1.0	9.0
11 HLT Comp	4.9	5.0	5.3	4.3	1.7	8.7
12 BPT Comp	4.6	4.5	5.5	3.8	1.7	9.0
13 LSF Comp	4.6	5.0	4.8	3.9	1.0	9.0
14 Arrowtown	3.7	4.2	4.2	2.8	4.0	9.0
15 Greentime	3.6	4.7	3.5	2.7	1.0	9.0

(Continued)

Table 4. Creeping and colonial bentgrass putting green trial, 2015 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----				Spring Green-up ² April 2018	Copper Spot ³ July 2018
	2016-2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
COLONIAL BENTGRASS (continued)						
16 SR 7100	2.4	2.6	2.5	2.1	2.0	9.0
17 Aberroyal	2.3	3.3	2.1	1.6	3.3	9.0
18 SR 7150	1.6	1.3	2.0	1.6	1.7	9.0
LSD at 5% =	0.8	0.9	1.2	1.0	1.8	2.0

18

¹9 = best turf quality

²9 = earliest spring green-up

³9 = least disease

Table 5. Performance of velvet bentgrass cultivars and selections in a putting green trial established in September 2015 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----				Copper Spot ² Aug. 2018	Dollar Spot ² Aug. 2018
	2016- 2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
1 LVP Comp	6.5	6.6	6.6	6.4	5.7	6.7
2 EVP Comp	6.1	6.2	6.2	6.2	5.0	8.0
3 SFV Comp	5.8	6.2	5.5	5.8	5.0	6.7
4 CCV Comp	5.8	6.1	5.9	5.4	3.3	7.7
5 WBV Comp	5.7	6.0	5.6	5.5	4.0	6.7
6 LCT Comp	5.7	5.7	5.8	5.5	4.3	6.3
7 EVU Comp	5.6	5.2	5.8	5.9	4.0	8.0
8 WSE Comp	5.2	4.4	5.4	5.8	4.0	7.3
9 Villa	3.6	3.2	3.8	3.8	4.0	6.3
10 PST-VR01	3.3	2.9	3.3	3.6	3.3	6.3
11 SR 7200	2.3	2.0	2.3	2.7	4.7	6.0
LSD at 5% =	0.8	1.0	1.0	0.8	1.9	1.2

¹9 = best turf quality

²9 = least disease

Table 6. Performance of creeping and colonial bentgrass cultivars and selections in a fairway trial established in September 2015 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----				Brown Patch ² 2018 Avg.	Scalp Injury ³ July 2018
	2016- 2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
CREEPING BENTGRASS						
1 MMM Comp	6.8	6.4	7.1	6.1	7.3	6.0
2 Match Play	6.7	6.4	7.0	6.7	7.0	5.3
3 MGC Comp	6.7	6.2	7.2	5.9	6.0	4.7
4 MSP Comp	6.6	6.2	7.0	6.8	6.0	6.0
5 LFW Comp	6.5	6.6	6.3	5.8	7.0	6.3
6 WFC Comp	6.4	6.0	6.9	5.7	7.3	4.0
7 Piranha	6.4	6.4	6.5	5.9	5.3	5.3
8 MFC Comp	6.3	5.9	6.6	5.9	7.0	6.0
9 777	6.2	6.5	5.9	5.1	6.7	3.0
10 Chinook	6.1	5.8	6.5	5.8	7.3	4.7
11 TourPro	6.1	5.9	6.3	5.9	7.0	5.7
12 AP 18	5.8	5.4	6.2	5.5	4.7	4.0
13 CBP Comp	5.6	5.3	5.8	5.6	6.0	4.3
14 OO7	5.3	4.9	5.8	5.1	6.0	8.0
15 Pure Distinction	5.2	5.2	5.2	4.3	5.0	3.0
16 Cobra 2	5.1	5.2	5.2	4.6	5.0	5.7
17 RH 93	5.1	4.9	5.4	5.7	7.0	7.3
18 EBC Comp	5.1	4.7	5.6	6.0	7.7	7.3
19 Flagstick	5.0	4.6	5.5	5.5	5.3	4.3
20 Pin Up	4.8	4.6	4.9	4.4	5.0	5.7

20

(Continued)

Table 6. Creeping and colonial bentgrass fairway trial, 2015 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----				Brown Patch ² 2018 Avg.	Scalp Injury ³ July 2018
	2016- 2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
CREEPING BENTGRASS (continued)						
21 Barracuda	4.6	4.6	4.7	4.5	7.0	7.3
22 Pure Eclipse	4.1	4.5	3.7	3.7	6.0	3.7
23 CY-2	4.1	4.1	4.1	4.2	5.7	7.7
24 Shark	4.0	4.2	3.8	3.5	6.7	6.7
25 Pure Select	3.8	3.8	3.9	4.2	5.7	7.0
26 PST-0RBS	3.7	3.9	3.6	3.8	6.0	6.7
27 PST-Syn-R0PR	3.7	3.6	3.8	4.5	7.3	7.3
28 Ninety-Six Two	3.6	3.7	3.5	3.6	5.3	5.7
29 Penn A1	3.6	3.7	3.5	3.4	5.7	6.3
30 Crystal BlueLinks	3.5	3.7	3.3	3.8	7.0	6.7
31 PC2.0	3.4	3.8	3.0	3.0	5.0	7.7
32 Mackenzie	3.3	3.3	3.3	3.1	6.0	5.0
33 Penncross	3.1	2.7	3.4	3.3	6.0	5.3
34 SR 1119	3.0	3.2	2.7	2.7	5.7	5.3
35 Tyee	2.9	2.9	3.0	3.1	5.0	6.0
36 Kingpin	2.9	2.6	3.1	3.6	7.0	7.0
37 Focus	2.5	2.5	2.5	2.5	4.7	6.0
38 Mariner	2.0	2.1	1.9	1.9	5.0	5.3

21

(Continued)

Table 6. Creeping and colonial bentgrass fairway trial, 2015 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----				Brown Patch ² 2018 Avg.	Scalp Injury ³ July 2018
	2016- 2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
COLONIAL BENTGRASS						
1 AT 12 B	6.5	6.6	6.4	5.5	7.7	.
2 HLT Comp	6.0	6.0	6.1	5.2	5.5	.
3 ECS Comp	6.0	6.5	5.6	4.9	6.5	.
4 SHC Comp	6.0	5.8	6.1	5.5	5.3	.
5 Puritan	6.0	6.5	5.5	4.9	5.3	.
6 EDC Comp	5.9	6.5	5.3	5.9	6.0	.
7 DDS Comp	5.8	5.9	5.8	5.0	5.8	.
8 MDF Comp	5.8	6.1	5.4	5.5	6.5	.
9 BPT Comp	5.6	5.8	5.4	5.5	5.0	.
10 DML	5.5	5.6	5.4	4.7	4.7	.
11 LSF Comp	5.3	5.3	5.3	5.0	6.2	.
12 Capri	5.2	5.0	5.4	4.8	4.8	.
13 Heritage	5.2	5.4	5.0	4.7	5.2	.
14 ELC Comp	5.1	5.3	4.8	4.3	4.8	.
15 AT 10	4.9	5.5	4.5	3.8	5.3	.
16 Musket	4.9	5.5	4.3	4.4	5.5	.
17 FT12	4.7	4.8	4.5	4.3	5.5	.
18 Greentime	4.7	5.3	4.1	3.9	4.8	.
19 AT 14	4.7	5.4	4.0	4.3	6.2	.
20 SR 7100	3.9	3.8	3.9	3.6	4.7	.

22

(Continued)

Table 6. Creeping and colonial bentgrass fairway trial, 2015 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----				Brown Patch ² 2018 Avg.	Scalp Injury ³ July 2018
	2016- 2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.		
COLONIAL BENTGRASS (continued)						
21 SR 7150	3.8	3.5	4.1	4.1	5.0	.
22 Arrowtown	3.8	4.2	3.3	2.7	4.5	.
23 Aberroyal	3.5	3.7	3.4	2.5	4.5	.
24 SR 1150	3.5	3.6	3.4	3.1	5.0	.
25 Tiger 2	3.3	3.4	3.4	3.4	2.8	.
26 Glory	3.3	3.3	3.2	2.7	3.7	.
LSD at 5% =	0.8	1.1	1.1	1.0	3.3	2.5

¹9 = best turf quality

²9 = least brown patch; data is an average of two rating dates

³9 = greatest tolerance to scalping injury; data collected on creeping bentgrass entries only

Table 7. Performance of creeping and velvet bentgrass cultivars and selections in a putting green trial established in September 2016 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----			Spring Green-up ² April 2018	Root Pythium ³ June 2018	Brown Patch ⁴ 2018 Avg.	Dollar Spot ³ Sept. 2018
	2017- 2018 Avg.	2017 Avg.	2018 Avg.				
CREEPING BENTGRASS							
1 MGH Comp	7.3	7.9	6.7	7.0	7.0	5.2	8.7
2 LSG Comp	7.1	7.2	7.0	6.0	5.0	6.3	8.7
3 MGS Comp	7.1	7.0	7.2	7.7	5.7	6.5	9.0
4 Coho	6.8	6.8	6.7	7.0	7.7	7.8	7.3
5 EFB Comp	6.7	6.6	6.8	7.0	6.0	5.2	9.0
6 DSF Comp	6.7	6.9	6.5	6.7	6.3	4.8	8.3
7 Piranha	6.5	6.7	6.3	7.0	6.0	6.5	7.0
8 Match Play	6.5	6.4	6.7	6.7	6.3	6.8	7.3
9 777	6.5	6.6	6.4	6.3	5.3	6.7	5.7
10 LFC Comp	6.5	6.8	6.1	7.0	4.0	5.3	8.0
11 PLC Comp	6.4	7.1	5.7	7.0	4.7	4.2	8.0
12 Chinook	6.2	6.2	6.1	6.7	6.3	4.8	8.0
13 L-93XD	6.0	6.6	5.4	4.3	5.7	4.7	7.3
14 AP 18	5.9	6.5	5.2	6.3	2.7	7.3	8.3
15 Pin Up 2	5.8	5.8	5.7	5.3	5.3	6.7	8.3
16 Pure Distinction	5.4	6.1	4.7	5.3	3.3	5.3	5.0
17 All Pro Fwy Blend X	5.4	5.4	5.3	4.3	7.0	6.5	6.7
18 TourPro	5.3	5.5	5.1	5.3	3.3	6.8	8.0
19 RH 93	5.2	5.4	5.1	3.7	5.3	7.8	7.0
20 Barracuda	5.2	5.4	5.0	4.7	4.7	7.7	5.7

Table 7. Creeping and velvet bentgrass putting green trial, 2016 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----			Spring Green-up ² April 2018	Root Pythium ³ June 2018	Brown Patch ⁴ 2018 Avg.	Dollar Spot ³ Sept. 2018
	2017- 2018 Avg.	2017 Avg.	2018 Avg.				
CREEPING BENTGRASS (continued)							
21 Luminary	5.2	5.4	5.0	5.3	6.7	7.8	6.3
22 Declaration	5.1	5.1	5.2	5.3	6.0	6.0	7.7
23 Flagstick	4.9	4.9	4.9	5.3	6.0	7.8	7.0
24 Independence	4.9	5.0	4.7	3.3	5.3	6.8	6.0
25 Pure Select	4.7	5.3	4.1	4.0	2.0	7.0	7.0
26 Center Cut 2	4.7	4.6	4.8	5.0	5.0	7.0	6.7
27 Shark	4.6	4.6	4.7	4.3	5.7	5.7	6.0
28 Proclamation	4.5	4.7	4.3	3.3	5.0	5.7	7.0
29 Pin Up	4.4	4.4	4.4	4.7	5.3	5.7	7.3
30 PC2.0	4.3	4.4	4.2	4.0	5.0	3.3	7.3
31 Benchmark DSR	4.2	4.1	4.3	3.0	4.3	5.7	8.3
32 Focus	4.0	3.8	4.2	2.7	3.3	5.5	7.7
33 CY-2	3.9	3.3	4.4	4.3	7.7	5.3	7.7
34 Center Cut 3	3.8	3.4	4.1	4.0	5.7	5.8	8.0
35 Penn A-1	3.3	3.5	3.1	2.7	1.7	4.7	8.0
36 V-8	3.3	3.0	3.5	3.0	4.7	5.7	8.3
37 Crystal BlueLinks	3.2	3.1	3.4	2.7	4.3	4.8	8.0
38 Memorial	3.2	3.3	3.1	2.7	4.0	6.5	8.7
39 13M	3.1	3.0	3.2	3.0	5.3	6.7	7.7
40 T-1	3.1	3.3	2.9	3.7	6.0	6.7	8.0

25

(Continued)

Table 7. Creeping and velvet bentgrass putting green trial, 2016 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----			Spring Green-up ² April 2018	Root Pythium ³ June 2018	Brown Patch ⁴ 2018 Avg.	Dollar Spot ³ Sept. 2018
	2017- 2018 Avg.	2017 Avg.	2018 Avg.				
CREEPING BENTGRASS (continued)							
41 Center Cut	3.1	2.8	3.3	2.7	4.3	7.5	8.7
42 Century	3.0	2.9	3.1	3.0	5.7	6.8	5.0
43 Kingpin	2.8	2.8	2.8	3.3	4.7	4.2	8.0
44 L-93	2.6	2.2	2.9	3.3	5.3	6.0	6.7
45 Penn A-4	2.6	2.0	3.0	3.0	3.7	6.3	7.0
46 Alpha	2.5	2.5	2.5	2.3	6.0	4.7	7.3
47 Putter	2.5	2.5	2.4	2.7	5.3	5.3	7.3
48 Southshore	1.9	1.6	2.2	2.3	4.3	5.3	7.7
49 Penncross	1.4	1.1	1.7	2.7	4.7	6.0	7.7
VELVET BENTGRASS							
1 SCL Comp	6.5	7.0	6.0	.	5.3	7.7	9.0
2 SSL Comp	6.4	6.9	6.0	.	5.0	7.2	9.0
3 MLC Comp	6.3	6.4	6.2	.	5.3	7.7	9.0
4 SCE Comp	6.0	6.6	5.5	.	4.0	7.5	9.0
5 SCM Comp	5.9	6.6	5.3	.	4.0	8.8	9.0
6 Greenwich	4.4	3.9	5.0	.	7.0	6.8	9.0
7 Legendary	4.4	4.3	4.6	.	4.3	7.8	9.0
8 Villa	3.6	3.1	4.1	.	5.7	7.5	9.0
9 SR 7200	1.7	1.5	1.9	.	3.7	5.8	9.0

26

(Continued)

Table 7. Creeping and velvet bentgrass putting green trial, 2016 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----			Spring Green-up ² April 2018	Root Pythium ³ June 2018	Brown Patch ⁴ 2018 Avg.	Dollar Spot ³ Sept. 2018
	2017- 2018 Avg.	2017 Avg.	2018 Avg.				
LSD at 5% =	0.9	1.0	1.0	1.5	2.4	2.0	2.2

¹9 = best turf quality

²9 = earliest spring green-up; data collected on creeping bentgrass entries only

³9 = least disease

⁴9 = least brown patch; data is an average of two rating dates

Table 8. Performance of creeping and colonial bentgrass cultivars and selections in a fairway trial established in September 2016 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----			Dollar Spot ² 2018 Avg.	Brown Patch ³ 2018 Avg.
	2017- 2018 Avg.	2017 Avg.	2018 Avg.		
CREEPING BENTGRASS					
1 MGH Comp	7.8	7.8	7.9	7.8	.
2 DSF Comp	7.5	7.3	7.8	7.9	.
3 MGS Comp	7.4	7.2	7.6	8.2	.
4 LSG Comp	7.4	6.8	7.9	8.2	.
5 LFC Comp	7.3	6.7	7.8	7.9	.
6 Match Play	7.2	6.8	7.6	7.9	.
7 TourPro	7.1	6.8	7.4	5.9	.
8 EFB Comp	7.1	6.5	7.7	8.4	.
9 Coho	7.0	6.3	7.7	8.3	.
10 L-93XD	6.6	6.3	6.9	7.8	.
11 Chinook	6.4	6.5	6.4	7.1	.
12 PLC Comp	6.4	6.8	5.9	5.9	.
13 777	6.3	6.7	5.9	6.3	.
14 Piranha	5.9	6.0	5.8	6.1	.
15 Barracuda	5.8	5.7	6.0	6.7	.
16 Declaration	5.3	5.2	5.3	6.9	.
17 Runner	5.1	5.8	4.5	4.8	.
18 All Pro Fwy Blend X	5.1	5.7	4.6	5.4	.
19 OO7	5.1	4.9	5.2	6.0	.
20 Pin Up	5.1	5.3	4.9	7.1	.
21 Shark	5.0	4.9	5.1	5.2	.
22 Luminary	4.9	5.1	4.8	6.4	.
23 Flagstick	4.9	4.9	4.9	6.1	.
24 Pure Distinction	4.7	5.9	3.5	3.4	.
25 Focus	4.6	4.7	4.5	7.2	.
26 Pure Select	4.6	5.2	3.9	5.1	.
27 RH 93	4.5	4.6	4.4	5.9	.
28 Proclamation	4.4	4.4	4.3	4.7	.
29 Cobra 2	4.2	3.9	4.6	6.1	.
30 Penn A-1	4.1	4.4	3.9	5.0	.
31 CY-2	4.1	3.9	4.3	6.2	.
32 PC2.0	4.0	4.7	3.3	3.8	.
33 Benchmark DSR	3.8	2.9	4.7	5.8	.
34 13M	3.8	3.4	4.2	6.6	.
35 Memorial	3.7	3.2	4.3	6.8	.

(Continued)

Table 8. Creeping and colonial bentgrass fairway trial, 2016 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----			Dollar Spot ² 2018 Avg.	Brown Patch ³ 2018 Avg.
	2017- 2018 Avg.	2017 Avg.	2018 Avg.		
CREEPING BENTGRASS (continued)					
36 Independence	3.7	4.1	3.2	3.6	.
37 Ninety-Six Two	3.6	4.5	2.8	3.8	.
38 Crystal BlueLinks	3.5	4.1	3.0	5.7	.
39 Mackenzie	3.5	3.6	3.5	5.3	.
40 Tye	3.4	3.8	3.0	4.1	.
41 V-8	3.3	3.3	3.3	5.1	.
42 Alpha	3.2	3.7	2.8	3.4	.
43 Kingpin	3.2	3.1	3.3	4.4	.
44 L-93	3.0	2.9	3.1	4.8	.
45 T-1	3.0	3.0	2.9	5.8	.
46 Century	2.9	3.4	2.4	4.4	.
47 SR 1150	2.8	2.7	2.9	5.5	.
48 Putter	2.7	3.1	2.3	4.0	.
49 Penncross	2.7	2.8	2.7	5.2	.
50 Southshore	2.6	2.8	2.4	4.1	.
51 Mariner	2.5	2.8	2.2	3.5	.
52 SR 1119	2.3	2.8	1.9	4.3	.
53 Penn A-4	2.1	1.9	2.2	4.8	.
COLONIAL BENTGRASS					
1 CCD Comp	6.7	7.0	6.4	.	7.0
2 AT 12 M2	6.7	6.5	6.9	.	7.7
3 LCC Comp	6.4	6.4	6.4	.	6.0
4 DHS Comp	6.3	6.5	6.2	.	6.2
5 SFC Comp	6.0	6.3	5.7	.	6.2
6 Puritan	5.8	6.1	5.6	.	6.9
7 AT 15	5.8	6.2	5.4	.	5.8
8 MTC Comp	5.8	6.0	5.6	.	7.0
9 PDM Comp	5.5	5.9	5.2	.	6.2
10 FDH Comp	5.4	6.0	4.9	.	7.5
11 LMF Comp	5.4	5.6	5.2	.	4.2
12 DEC Comp	5.3	5.9	4.8	.	6.1
13 Musket	5.2	5.8	4.5	.	4.9
14 FT12	5.0	5.4	4.6	.	4.5
15 Heritage	4.9	5.3	4.4	.	5.7

(Continued)

Table 8. Creeping and colonial bentgrass fairway trial, 2016 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----			Dollar Spot ² 2018 Avg.	Brown Patch ³ 2018 Avg.
	2017- 2018 Avg.	2017 Avg.	2018 Avg.		
COLONIAL BENTGRASS (continued)					
16 AT 10	4.7	4.9	4.5	.	5.1
17 Capri	4.6	4.8	4.3	.	5.2
18 Greentime	4.3	4.4	4.2	.	5.4
19 Tiger 2	4.1	4.1	4.1	.	5.2
20 SR 7100	3.6	3.2	4.1	.	5.5
21 Glory	3.5	3.7	3.2	.	3.3
22 SR 7150	2.5	2.7	2.2	.	4.2
23 Highland	2.4	1.8	2.9	.	5.4
LSD at 5% =	0.8	0.9	1.1	1.7	1.7

¹9 = best turf quality

²9 = least dollar spot; data collected on creeping bentgrass entries only; data is an average of three rating dates

³9 = least brown patch; data collected on colonial bentgrass entries only; data is an average of three rating dates

Table 9. Performance of creeping and colonial bentgrass cultivars and selections in a putting green trial established in September 2017 at North Brunswick, NJ.

Cultivar or Selection	Turf Quality ¹ 2018 Avg.	Turf Establishment ² Oct. 2017	Spring Green-up ³ April 2018	Brown Patch ⁴ Aug. 2018	Dollar Spot ⁵ 2018 Avg.
CREEPING BENTGRASS					
1 EGC Comp	7.9	6.7	6.3	8.7	7.0
2 GMM Comp	7.6	4.0	6.7	8.0	7.0
3 BEF Comp	7.6	4.7	7.7	9.0	6.2
4 EF2 Comp	7.3	6.0	7.0	7.3	7.5
5 MFC Comp	7.1	5.3	7.0	8.3	6.2
6 Coho	7.1	7.0	5.3	8.0	8.2
7 DLG Comp	7.1	3.3	4.3	6.7	7.2
8 Match Play	6.9	6.7	7.3	8.3	5.8
9 L-93XD	6.9	7.3	4.3	8.0	4.8
10 TourPro	6.8	7.7	5.3	8.0	5.3
11 Pure Eclipse	6.7	6.3	5.3	8.7	4.0
12 LTNS Bent Blend 1	6.7	6.0	6.0	6.7	5.0
13 Chinook	6.4	6.0	5.3	9.0	6.2
14 Piranha	6.3	6.0	7.0	8.7	4.5
15 AP 18	6.2	8.3	6.7	7.3	4.8
16 Luminary	6.2	6.3	6.7	7.3	4.8
17 RH 93	6.2	6.3	5.7	7.0	3.8
18 All Pro Fwy Blend X	6.1	6.0	5.3	7.7	4.0
19 777	6.0	7.7	5.3	7.7	4.5
20 OO7	5.8	6.7	3.3	6.3	4.5
21 Proclamation	5.5	7.3	4.3	6.3	4.3
22 CenterCut 3	5.4	6.0	5.7	7.0	6.0
23 Pure Distinction	5.3	6.7	7.0	8.7	2.5
24 Barracuda	5.3	8.0	4.3	8.0	4.5
25 PST-0RBS	5.2	5.7	3.7	8.0	2.3
26 PST-0CV6	5.1	6.3	6.0	3.7	2.7
27 Declaration	5.1	6.7	5.7	5.3	5.3
28 Shark	4.9	5.7	5.0	7.0	3.0
29 Pure Select	4.9	5.7	6.7	8.0	3.3
30 CenterCut 2	4.9	4.3	5.0	7.3	4.8
31 Crystal BlueLinks	4.7	7.0	4.3	5.7	3.5
32 T-1	4.6	5.0	3.7	5.7	3.0
33 A-1	4.5	7.3	4.3	5.7	4.2
34 CenterCut	4.5	6.0	5.0	6.7	6.7
35 Focus	4.5	7.3	4.0	6.7	3.8

(Continued)

Table 9. Creeping and colonial bentgrass putting green trial, 2017 (continued).

Cultivar or Selection	Turf Quality ¹ 2018 Avg.	Turf Establishment ² Oct. 2017	Spring Green-up ³ April 2018	Brown Patch ⁴ Aug. 2018	Dollar Spot ⁵ 2018 Avg.
CREEPING BENTGRASS (continued)					
36 Flagstick	4.4	6.0	5.0	6.0	4.7
37 A-4	4.1	6.0	5.0	6.3	2.8
38 PST-0COL	4.1	5.0	1.7	2.7	5.5
39 Ninety-Six Two	4.0	6.3	4.7	6.0	2.2
40 Memorial	4.0	4.7	2.3	6.0	7.7
41 V-8	4.0	7.3	3.0	5.0	3.8
42 L-93	3.9	7.3	2.7	6.3	4.3
43 Alpha	3.9	7.7	2.3	6.0	3.3
44 Kingpin	3.7	6.3	4.3	5.7	4.8
45 Putter	3.6	7.3	2.3	5.7	3.0
46 Tye	3.6	7.0	4.3	5.7	2.8
47 Mackenzie	3.5	5.7	4.0	6.7	3.0
48 CY-2	3.5	2.7	2.3	6.3	4.5
49 SR 1150	3.5	8.3	3.3	7.0	3.7
50 SR 1119	3.2	7.0	5.0	5.7	3.5
51 Southshore	3.0	6.0	3.7	5.7	2.8
52 Seaside II	2.8	5.7	2.7	7.3	5.2
53 Penncross	2.2	3.7	2.7	5.7	4.0
54 PinUp	1.0	1.3	1.0	6.3	6.0
COLONIAL BENTGRASS					
1 SLC Comp	6.6	5.0	4.7	8.7	7.3
2 EUC Comp	6.6	5.7	5.0	4.7	8.3
3 EFC Comp	6.5	6.0	5.3	5.7	8.2
4 Musket	5.5	6.3	4.0	5.7	8.2
5 LLS Comp	5.5	4.7	4.0	7.3	8.2
6 Puritan	5.4	5.7	5.3	4.0	7.5
7 DGM Comp	5.0	3.3	4.3	7.3	8.3
8 FT12	5.0	5.0	3.3	5.7	8.0
9 LDC Comp	4.9	4.0	4.3	6.0	8.2
10 Capri	4.4	5.3	4.7	3.0	8.2
11 Tiger 2	3.2	4.3	2.0	4.0	6.8
12 Glory	3.2	6.7	3.7	5.0	7.8

(Continued)

Table 9. Creeping and colonial bentgrass putting green trial, 2017 (continued).

Cultivar or Selection	Turf Quality ¹ 2018 Avg.	Turf Establishment ² Oct. 2017	Spring Green-up ³ April 2018	Brown Patch ⁴ Aug. 2018	Dollar Spot ⁵ 2018 Avg.
LSD at 5% =	0.7	1.4	1.5	2.6	1.2

¹9 = best turf quality

²9 = earliest establishment

³9 = earliest spring green-up

⁴9 = least brown patch

⁵9 = least dollar spot; data is an average of two rating dates

Table 10. Performance of velvet bentgrass cultivars and selections in a putting green trial established in September 2017 at North Brunswick, NJ.

Cultivar or Selection	Turf Quality ¹ 2018 Avg.	Turf Establishment ² Oct. 2017	Spring Green-up ³ April 2018	Root Pythium ⁴ Oct. 2018
1 DEM Comp	6.9	6.7	5.7	7.0
2 DMS Comp	6.8	6.7	5.3	6.7
3 CMV Comp	6.8	6.0	5.3	5.3
4 MSV Comp	6.7	5.3	6.3	8.0
5 LSV Comp	6.5	5.0	5.0	7.7
6 DMD Comp	6.5	7.0	5.7	4.3
7 Greenwich	5.4	7.3	3.7	2.0
8 Vitagreen	5.4	7.3	5.3	2.7
9 Vesper	5.2	7.0	6.0	4.0
10 Legendary	4.2	5.0	5.0	2.3
11 Villa 2	2.8	1.0	2.0	2.0
12 Villa	2.2	1.0	2.3	2.0
13 SR 7200	2.1	1.0	3.0	2.0
LSD at 5% =	0.5	1.5	1.7	1.4

¹9 = best turf quality

²9 = earliest establishment

³9 = earliest spring green-up

⁴9 = least disease

Table 11. Performance of creeping and colonial bentgrass cultivars and selections in a fairway trial established in September 2017 at North Brunswick, NJ.

Selection	Turf Quality ¹	Turf Establishment ²	Brown Patch ³	Dollar Spot ⁴	Dollar Spot ⁵	Brown Patch ⁶
	2018 Avg.	Oct. 2017	Aug. 2018	Oct. 2018	2018 Avg.	2018 Avg.
CREEPING BENTGRASS						
1 GMM Comp	7.6	5.0	7.7	.	6.7	.
2 BEF Comp	7.4	5.3	7.0	.	6.3	.
3 MFC Comp	7.3	5.0	8.0	.	4.2	.
4 DLG Comp	7.0	4.0	8.0	.	5.5	.
5 EGC Comp	7.0	7.0	8.0	.	5.8	.
6 EF2 Comp	6.8	7.0	6.7	.	6.8	.
7 Piranha	6.6	6.7	7.7	.	4.3	.
8 Coho	6.5	7.7	6.7	.	7.0	.
9 Pure Eclipse	6.5	6.0	6.0	.	2.5	.
10 Chinook	6.1	6.3	7.3	.	5.8	.
11 TourPro	6.1	7.3	5.0	.	6.3	.
12 Barracuda	5.9	8.3	5.3	.	5.3	.
13 Pure Select	5.9	7.3	7.0	.	3.7	.
14 777	5.9	8.0	5.0	.	3.7	.
15 L-93XD	5.8	6.3	5.3	.	4.3	.
16 PST-0CV6	5.6	5.7	4.3	.	1.8	.
17 Luminary	5.5	6.7	6.3	.	3.8	.
18 All Pro Fwy Blend X	5.5	6.7	6.0	.	4.2	.
19 Proclamation	5.4	7.7	6.7	.	4.8	.
20 Focus	5.3	7.3	2.0	.	5.2	.

35

(Continued)

Table 11. Creeping and colonial bentgrass fairway trial, 2017 (continued).

Selection		Turf Quality ¹ 2018 Avg.	Turf Establishment ² Oct. 2017	Brown Patch ³ Aug. 2018	Dollar Spot ⁴ Oct. 2018	Dollar Spot ⁵ 2018 Avg.	Brown Patch ⁶ 2018 Avg.
CREEPING BENTGRASS (continued)							
21	PST-0RBS	5.2	5.3	5.7	.	2.2	.
22	Pure Distinction	5.2	7.3	4.7	.	2.0	.
23	A-4	5.1	6.0	4.3	.	2.8	.
24	Crystal BlueLinks	5.0	7.0	3.3	.	5.2	.
25	A-1	5.0	7.7	2.3	.	5.3	.
26	Shark	5.0	5.7	4.0	.	3.7	.
27	Declaration	4.8	7.0	5.3	.	7.7	.
28	OO7	4.7	7.3	5.3	.	4.8	.
29	PST-0COL	4.7	5.0	1.3	.	8.3	.
30	Alpha	4.5	7.0	3.7	.	3.0	.
31	T-1	4.3	5.0	3.3	.	2.8	.
32	L-93	4.0	6.3	5.7	.	3.5	.
33	Kingpin	4.0	5.0	3.7	.	5.3	.
34	V8	3.9	6.3	3.3	.	5.0	.
35	Penncross	3.2	3.0	5.7	.	1.8	.
36	Seaside II	3.0	6.3	2.0	.	5.3	.
37	Southshore	3.0	6.0	4.0	.	3.5	.
38	PinUp	1.5	2.3	2.7	.	5.5	.

36

(Continued)

Table 11. Creeping and colonial bentgrass fairway trial, 2017 (continued).

Selection		Turf Quality ¹ 2018 Avg.	Turf Establishment ² Oct. 2017	Brown Patch ³ Aug. 2018	Dollar Spot ⁴ Oct. 2018	Dollar Spot ⁵ 2018 Avg.	Brown Patch ⁶ 2018 Avg.
COLONIAL BENTGRASS							
1	EFC Comp	7.8	7.7	.	8.7	.	5.2
2	EUC Comp	7.4	7.7	.	9.0	.	4.2
3	SLC Comp	7.3	5.7	.	8.0	.	6.2
4	LDC Comp	6.9	4.0	.	9.0	.	4.8
5	LLS Comp	6.8	4.7	.	9.0	.	4.0
6	DGM Comp	6.6	4.0	.	8.7	.	4.7
7	FT12	6.4	5.3	.	8.3	.	3.3
8	AT 12 M2	6.3	7.3	.	8.7	.	5.0
9	Puritan	6.3	5.3	.	8.0	.	5.5
10	Musket	6.2	8.0	.	9.0	.	3.2
11	Capri	6.2	7.0	.	8.7	.	4.5
12	PGGW-12	6.1	7.0	.	8.0	.	4.3
13	PGGW-11	6.0	4.7	.	8.7	.	4.0
14	PGGW-13	5.9	5.3	.	8.3	.	4.7
15	PGGW-15	5.7	7.7	.	9.0	.	4.7
16	PGGW-14	5.6	7.0	.	9.0	.	4.7
17	PGGW-18	5.6	6.7	.	8.0	.	3.3
18	PGGW-16	5.3	7.0	.	8.3	.	4.3
19	Greentime	5.0	6.3	.	8.0	.	4.7
20	PGGW-17	4.9	8.7	.	8.0	.	4.8
21	Tiger 2	4.4	5.0	.	7.7	.	3.0
22	Glory	4.0	7.7	.	7.7	.	2.0
23	SR 7150	3.9	2.7	.	8.0	.	2.5

(Continued)

Table 11. Creeping and colonial bentgrass fairway trial, 2017 (continued).

Selection	Turf Quality ¹ 2018 Avg.	Turf Establishment ² Oct. 2017	Brown Patch ³ Aug. 2018	Dollar Spot ⁴ Oct. 2018	Dollar Spot ⁵ 2018 Avg.	Brown Patch ⁶ 2018 Avg.
LSD at 5% =	1.0	1.6	2.5	1.2	1.4	2.3

¹9 = best turf quality

²9 = earliest establishment

³9 = least brown patch; data collected once on creeping bentgrass only

⁴9 = least dollar spot; data collected once on colonial bentgrass only

⁵9 = least dollar spot; data collected on creeping bentgrass only; data is an average of three rating dates

⁶9 = least brown patch; data collected on colonial bentgrass only; data is an average of two rating dates

Table 12. Maintenance practices performed in 2018 on bentgrass trials at North Brunswick, NJ.

Table	Test	Fertility ¹	Mowing Height (inches)	Cultivation/Top Dress	Fungicides	Insecticides	Herbicides
1	2014 Greens (NTEP)	3.2 N; 0 lb P ₂ O ₅ ; 0.4 lb K ₂ O; 22.6 fl oz Mg Chelate 5%; 2 fl oz Sugar Cal 10%	0.110	April–Tricure AD (wetting agent) May to Aug.–topdressed	April, May–Banner MAXX May–Heritage TL June–Segway Nov.–Secure	June, July–Talstar P (sod webworm)	June, July–Quick-Silver (moss)
2	2014 Fairway (NTEP)	1.9 N; 0 lb P ₂ O ₅ ; 0.29 lb K ₂ O	0.375	July–Tricure AD (wetting agent)	June–Secure; Segway July–Daconil Ultrex; Briskway + Daconil Ultrex Aug.–Tekken Sept.–Daconil Action Oct.–Signature + Daconil Ultrex Nov.–Tartan + Interface	July–Talstar P (sod webworm)	None
3	2014 Greens (NTEP)	1.6 N; 0 lb P ₂ O ₅ ; 0 lb K ₂ O	0.110	May to Aug.–topdressed May–Tricure AD (wetting agent)	Aug.–Daconil Ultrex	July–Talstar P (sod webworm)	None

Table 12. Bentgrass maintenance practices, 2018 (continued).

Table	Test	Fertility ¹	Mowing Height (inches)	Cultivation/Top Dress	Fungicides	Insecticides	Herbicides
4	2015 Greens	3.7 N; 0 lb P ₂ O ₅ ; 0.4 lb K ₂ O; 2 fl oz Sugar Cal 10%	0.110	May to Aug.–topdressed April–Tricure AD (wetting agent)	Aug.–Daconil Ultrex	July–Talstar P (sod webworm)	June, July–QuickSilver (moss)
5	2015 Velvet Greens	3.5 N; 0 lb P ₂ O ₅ ; 0.3 lb K ₂ O	0.110	May to Aug.–topdressed April–Tricure AD (wetting agent)	Aug.–Daconil Ultrex	July–Talstar P (sod webworm)	None
6	2015 Fairway	3.5 N; 0 lb P ₂ O ₅ ; 0.54 lb K ₂ O	0.375	May, July–Tricure AD (wetting agent) July–Limestone F	July–Segway Aug–Daconil Action; Insignia SC	July–Talstar P (sod webworm)	April–Bensumec 4FL (pre-emergence) July–Horsepower (post-emergence) Sept.–Acclaim Extra (post-emergence crabgrass)
7	2016 Greens	4.1 N; 0 lb P ₂ O ₅ ; 0.4 lb K ₂ O; 2 fl oz Sugar Cal 10%	0.110	May to July–topdressed April, May, July–Tricure AD (wetting agent) July–Limestone F	June–Segway July–Segway; Segway + Formec 80 Aug.–Heritage TL	July–Talstar P (sod webworm)	July–QuickSilver (moss)

40

(Continued)

Table 12. Bentgrass maintenance practices, 2018 (continued).

Table	Test	Fertility ¹	Mowing Height (inches)	Cultivation/Top Dress	Fungicides	Insecticides	Herbicides
8	2016 Fairway	4.0 N; 0 lb P ₂ O ₅ ; 0.5 lb K ₂ O	0.375	May, July, Sept.–Tricure AD (wetting agent) July, Sept.–Limestone F	July–Segway; Segway + Formec 80 Aug.–Daconil Action; Insignia SC	July–Talstar P (sod webworm)	April–Bensumec 4FL (pre-emergence) June–Lontrel (post-emergence)
9	2017 Greens	3.5 N; 0 lb P ₂ O ₅ ; 0.4 lb K ₂ O; 2 fl oz Sugar Cal 10%	0.110	April to Aug.–topdressed April–Tricure AD (wetting agent)	June–Segway	June, July–Talstar P (sod webworm)	None
10	2017 Velvet Greens	3.3 N; 0 lb P ₂ O ₅ ; 0.4 lb K ₂ O	0.110	April to Aug.–topdressed April–Tricure AD (wetting agent)	June–Segway	June, July–Talstar P (sod webworm)	None
11	2017 Fairway	1.8 N; 0 lb P ₂ O ₅ ; 0.2 lb K ₂ O; 2 fl oz Harrell's Max Minors	0.375	April–Tricure AD (wetting agent) July–Limestone F	Aug.–Daconil Action; Insignia SC	July–Talstar P (sod webworm)	Sept.–Acclaim Extra (post-emergence crabgrass)

¹Annual nitrogen applied (lb/1000 ft²). Additional fertilizers as noted (per 1000 ft²)