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# **Turfgrass Proceedings**

***The New Jersey Turfgrass Association***

In Cooperation with  
Rutgers Center for Turfgrass Science  
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# **2019 RUTGERS TURFGRASS PROCEEDINGS**

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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public.

This publication includes lecture notes of papers presented at the 2019 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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Deborah Spinella, Proceedings Layout Editor  
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## PERFORMANCE OF BENTGRASS CULTIVARS AND SELECTIONS IN NEW JERSEY TURF TRIALS, 2019

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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. There are three bentgrass species predominantly used for turf including creeping bentgrass (*Agrostis palustris* Huds.; synonym = *A. stolonifera* L.), colonial bentgrass (*A. tenuis* L. or *A. capillaris* L.), and velvet bentgrass (*A. canina* L.). Additionally, highland or dryland bentgrass (*A. castellana* Boiss. & Reut.) can be options for turf in stressful areas but tend to be less attractive than the more common species when a high quality turf is needed and therefore less commonly utilized. Due to their aggressive growth habits 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 U.S. Colonial bentgrass responds best to a slightly higher height of cut, therefore it is 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 U.S., 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 'Pennncross,' the first seeded synthetic variety of creeping bentgrass (Musser, 1959). Since that time, 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, as well as 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 *Clarireedia jacksonii* (C. Salgado, L.A. Beirn, B.B. Clarke, & J.A. Crouch sp. nov.), is one of the main disease problems of close-cut creeping bentgrass. However, they can also be susceptible to brown patch (*Rhizoctonia solani*), copper spot (*Gloeocercospora sorghi*), anthracnose (*Colletotrichum cereale*), and *Pythium* spp.

Colonial bentgrass, also referred to as brown-top, 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. Colonial bentgrasses have a finer leaf texture and a more upright and less aggressive spreading growth habit than creeping bentgrass. Colonial bentgrass is generally better adapted for fairway or tee use in the warmer summer climates of the northern U.S. Colonial bentgrasses perform best in New Jersey when mowed no lower than 3/8 of an inch. Compared to creeping bentgrass, colonial bentgrass typically has a brighter green color and better color retention during cool weather. Colonial bentgrasses generally have better dollar spot resistance and better wear tolerance than creeping bentgrass. However, colonial bentgrass is much more susceptible to brown patch disease (caused by the fungus *Rhizoctonia solani* Kuhn) and does not spread through stolons. While not lethal, the playability of golf courses may be affected if brown patch is not controlled on colonial bentgrass. Current breeding efforts include improving tolerance of colonial bentgrasses to this disease and improved quality under fairway conditions.

Velvet bentgrass forms the finest-textured and densest turf of the bentgrasses and can nearly

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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 therefore become problematic if not maintained properly. Years of mismanagement and the subsequent poor turf quality has given velvet bentgrass a bad name, but research has shown that when managed properly, velvet bentgrass can create a superior turf (Brilman and Meyer, 2000). Velvet bentgrass can also be susceptible to red thread (*Laetisaria fuciformis* (McAlpine) Burdsall) and copper spot (*Gloeocercospora sorghi* Bain & Edgerton ex Deighton) diseases, but generally has good resistance to dollar spot and brown patch diseases. Seedlings of velvet bentgrasses are susceptible to Pythium (*Pythium* spp.) seedling root rot during establishment.

During colder weather, velvet bentgrass will turn a dark purple color and 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 U.S., as long as proper cultural management inputs are implemented. Some of the major breeding objectives for velvet bentgrass include copper spot resistance, Pythium resistance, 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, and 2), 2015 (Tables 3 and 4), 2016 (Tables 5 and 6), 2017 (Tables 7, 8, and 9), and 2018 (Tables 10, 11, and 12). 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) which was planted to a 4 x 6 ft plot size, and the NTEP Fairway Trial (Table 2), which was planted with an 8 x 6 ft plot size. Plots were hand-seeded at a rate of approximately 1.0 lb/1000 ft<sup>2</sup>. 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 13. 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 50-80% ET replacement during the growing season to avoid drought stress. Wear quality (Table 5) and recovery (Table 6) were evaluated in the 2016 putting green (Table 5) and fairway (Table 6) trials. Wear was simulated on the creeping bentgrass entries by using a novel wear simulator (Bonos et al, 2001) which is an engine-driven device with rotating rubber paddles that repeatedly hit the turf. Sixty-six and eighty-four passes with the Rutgers Wear Simulator were applied between July 11 and August 21, 2019 to the putting green and fairway trials, respectively.

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 12), establishment (Tables 10 and 11), spring green-up (Tables 4, 7, and 8), turf quality under wear simulation (Tables 5 and 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 1, 2, 3, 4, 5, 6, and 7), brown patch (Tables 1, 2, 6, 7, 8, 9, 10, 11, and 12), *Bipolaris* leaf spot (Tables 7 and 8), and copper spot (Tables 8 and 11). 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 9 are ranked according to their overall multi-year quality average. Tables 10, 11, and 12 are ranked by the average turf quality for 2019 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, 5, 7, and 10), Piranha, Macdonald, 777, Match Play, TourPro, Chinook, 007XL, and the experimental selections MMM Comp, DSF Comp, MGS Comp, EGC Comp, GMM Comp, and SGT Comp all performed very well, while Penncross, Penn A-1, Southshore, SR 1119, CenterCut, Focus, and Ninety-Six Two were consistently among the poorest performers. At fairway height (Tables 2, 6, 9, and 12), Piranha, Chinook, Coho, TourPro, 007XL, and the experimental selections DSF Comp, LFC Comp, DLG Comp, PPD Comp, SFT Comp, and POR Comp had excellent turf quality while some of the lowest scoring cultivars at fairway height were Penncross, Southshore, Armor, Kingdom, Penn A-4, Mariner, and SR 1119.

Overall turf quality for velvet bentgrasses was evaluated in 2015, 2016, 2017, and 2018 trials (Tables 4, 5, 8, and 11) under greens height of cut. In all trials, the selections that exhibited acceptable turf quality were experimental entries such as LVP Comp, SFV Comp, EVP Comp, SCL Comp, SSL Comp, MLC Comp, DEM Comp, MSV Comp, CMV Comp, DSM Comp, and FDV Comp. These experimental selections outperformed named cultivars such as SR 7200, Villa, and Legendary that displayed poor quality in these trials.

As mentioned previously, colonial bentgrasses perform better at fairway cutting height and typically have poorer performance under putting green conditions. Nevertheless, there were several experimental colonials in putting green trials (Tables 3 and 7) that performed favorably to many creeping bentgrasses, exhibiting excellent turf quality at greens height including Puritan, EDC Comp, ELC Comp, SHC Comp, and AT 12 B, (Table 3) and Musket, SLC Comp, EUC Comp, and EFC Comp (Table 7). Under fairway conditions however (Tables 2, 6, 9, and 12), Puritan, Musket, and the experimental selections DLFPS-AT/3026, AT 12 M2, CCD Comp, LCC Comp, DHS Comp, EFC Comp, EUC Comp, DGM Comp, SLM Comp, WML Comp, and MEM Comp were the best performing colonial bentgrasses, while Tiger 2, SR 7150, Greentime, and Glory generally exhibited the poorest performance under fairway cutting heights when included in trials.

### Dollar Spot Disease

*Clariireedia jacksonii*, the causal agent of this widespread turfgrass disease, causes silver-dollar shaped spots of dead turf which can converge causing larger damaged areas (Salgado-Salazar et al., 2018). 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 fungus' prevalence. Also becoming more prevalent is the pathogen's resistance to fungicides, particularly DMI fungicides (Smiley et al., 2005). Additionally, 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 bentgrass, however the results from recent trials (Tables 1, 2, 3, 4, 5, 6, and 7) indicate that significant improvements in creeping bentgrass have been made, and some creeping bentgrasses may perform comparably to colonial bentgrasses, as seen in Tables 2, 3, 5, 6, and 7. More recent cultivars such as Coho, TourPro, L93-XD, Piranha, 007XL and Chinook offer strong tolerance to dollar spot that is comparable or surpassing that of older cultivars like Declaration, V-8, and Memorial. Recent experimental entries such as MGS Comp, DSF Comp, LSG Comp, GMM Comp and MMM Comp all show improved tolerance to this disease, while Alpha, Ninety-Six Two, Southshore, Pure Distinction, Mariner, PST-ORBS, and SR 1119 were very susceptible to dollar spot disease.

## Brown Patch Disease

Velvet bentgrass typically exhibits the greatest tolerance to brown patch disease (*Rhizoctonia solani*) among the bentgrass species 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 1, 2, 6, 7, 8, 9, 10, 11 and 12. In 2019, creeping bentgrasses displayed varying levels of acceptable tolerance to this disease. While exhibiting little significant separation between entries in several trials (Tables 2, 6, and 9), in Tables 1, 7, 10, and 12 significant differences among the creeping bentgrasses were observed, in which cultivars Piranha, Luminary, Match Play, and experimental entries like PPD Comp, GSH Comp, and TFT Comp exhibited high brown patch tolerance while Penncross, Mackenzie, CenterCut, Penn A-4, and L-93XD exhibited less than acceptable brown patch disease levels compared to other creeping bentgrass cultivars.

Over the past few years, a significant amount of research has been spent on improving brown patch resistance in colonial bentgrass. In the 2014 NTEP, 2016, 2017, and 2018 fairway trials (Tables 2, 6, 9, and 12), enhanced disease tolerance is evident. When significant differences occur, the cultivar Heritage, and the experimental selections CCD Comp, LCC Comp, SLC Comp, and LLS Comp exhibited significantly improved brown patch resistance over older entries such as Glory, SR 7150, Puritan, and Tiger 2.

## Copper Spot Disease

This disease is becoming an increasing concern in the Northeast during the summer due to the warm wet conditions when limited DMI fungicides are used. The causal agent of this disease, *Gloeocercospora sorghi*, is a fungus that produces 1-3 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 to copper spot disease. Therefore, selection of velvet bentgrass for resistance to copper spot is a major goal of the Rutgers Turfgrass Breeding Program. During the 2019 growing season, copper spot disease was assessed on the 2017 and 2018 velvet greens trials (Tables 8 and 11). When differences within the velvet bentgrass selections were evident (Table 8), Vitagreen, CMV Comp, and

DMD Comp stood out as highly tolerant to disease when compared to cultivars such as Villa, Villa 2, and Greenwich which were consistently susceptible.

## Wear Tolerance

The ability of a turf stand to handle wear is one of the more important traits in maintaining long term quality and playability of the surface. Wear can be applied to turfgrass through a number of ways such as driving machinery on the turf, cultivation procedures, and walking on the turf. In 2019, wear was simulated on the creeping bentgrass entries within the 2016 Trials (Tables 5 and 6) by using a novel wear simulator (Bonos et al, 2001). Plots were then rated for wear quality or recovery, which incorporated density, color and ground cover. In the putting green trial, MGH Comp, EFB Comp, DSF Comp, Coho, 777, AP 23, LFC Comp, Macdonald, MGS Comp, Match Play, Piranha and Chinook had excellent wear tolerance while Proclamation, Penn A-1, V8, 13M, Alpha, Crystal BlueLinks, Putter and Penncross had poor wear tolerance (Table 5). In the fairway trial, TourPro, Piranha, LFC Comp, RH 93, DSF Comp, Chinook, Declaration, LSG Comp, Coho, 777 and Shark exhibited good wear tolerance while Mackenzie, Alpha, Penncross, SR 1119, L-93XD, Cobra 2, Century, Mariner, PC2.0, Putter, and Focus exhibited poor wear tolerance (Table 6). There were several entries that performed well under both greens and fairway height of cut including Piranha, Coho, Chinook, DSF Comp, and LFC Comp. Older creeping bentgrass cultivars typically did not exhibit high quality under wear conditions in either trial.

## Spring Green-Up

Spring green-up data was collected on trials from 2015 (Table 4) and 2017 (Tables 7 and 8). 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 2019, velvet bentgrass was assessed for green up in the 2015 and 2017 velvet greens trials (Tables 4 and 8). The experimental entries LVP Comp, WSE Comp, LSV Comp, MSV Comp, and CMV Comp outperformed several cultivars such as SR 7200, Vitagreen, and Greenwich.

Creeping bentgrasses (Table 7) showed a wide range of variability, with entries like Chinook, Match Play, and experimental entries DLG Comp, GMM Comp, and EF2 Comp receiving the highest ratings for spring green-up while Seaside II, Ninety-Six Two, and T-1 were among the slowest to green up.

There were some differences among colonial bentgrasses in 2019. Under greens conditions (Table 7), several entries displayed early spring green up, including EFC Comp, EUC Comp, and LDC Comp, while colonial cultivars Tiger 2, Glory, and FT12 were some of the slowest entries 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 of the 2014 National Bentgrass Greens Test - NTEP.)

NTEP	Cultivar or Selection	-----Turf Quality <sup>1</sup> -----						Brown Patch <sup>2</sup> Jul 2019	Dollar Spot <sup>3</sup> 2019	Turf Density <sup>4</sup> Oct 2019	Leaf Texture <sup>5</sup> Oct 2019	
		2015-19	2015	2016	2017	2018	2019					
1	16	Piranha	6.9	6.9	6.5	6.7	7.5	6.8	6.7	6.0	5.7	6.0
2	10	L-93XD	6.8	7.6	7.1	6.7	6.3	6.2	3.7	7.5	6.0	6.7
3	3	Macdonald	6.4	6.7	6.2	6.2	7.0	6.0	5.3	6.0	6.3	6.3
4	2	777	6.3	7.6	6.2	5.3	6.7	5.8	5.3	5.5	6.3	7.0
5	1	Luminary	6.0	6.0	6.1	6.0	5.9	6.2	7.7	5.7	5.0	5.0
6	5	DLFPS-AP/3058	5.8	6.8	6.0	4.8	5.7	5.7	5.3	6.2	6.0	6.7
7	15	TourPro	5.7	6.5	5.9	4.9	5.3	5.9	6.0	7.2	5.7	6.3
8	4	DLFPS-AP/3056	5.7	6.3	5.7	5.1	6.3	4.8	4.7	5.2	4.7	5.0
9	19	Barracuda	5.5	5.6	5.8	5.0	5.8	5.3	4.7	5.7	4.0	5.7
10	17	Pure Eclipse	5.4	6.6	5.9	4.9	4.9	4.9	6.7	4.0	6.3	6.7
11	7	Pure Select	5.4	6.0	5.8	4.6	5.7	4.9	5.0	4.0	5.7	6.7
12	20	Declaration	5.4	4.7	4.6	6.2	6.2	5.4	5.3	8.0	5.3	6.0
13	14	V-8	5.4	6.0	5.7	5.8	4.9	4.5	4.7	6.0	4.7	6.0
14	18	Shark	5.3	6.2	5.7	4.5	5.4	4.7	6.3	3.8	5.0	5.7
15	12	Kingdom	5.1	5.6	4.4	4.8	6.2	4.7	7.3	3.3	4.7	5.0
16	13	Nightlife	5.0	5.7	4.3	5.1	5.3	4.6	7.3	4.3	5.3	6.3
17	6	DLFPS-AP/3059	4.8	4.9	4.5	5.1	5.2	4.4	4.0	6.2	4.0	5.7
18	11	Armor	4.4	4.9	4.1	3.9	5.2	3.8	6.3	2.2	4.0	5.7
19	8	Penn A-1	3.9	4.0	4.1	3.6	3.8	3.8	5.0	4.8	3.7	4.3
20	9	Penncross	1.6	2.2	1.1	1.4	1.7	1.5	6.0	5.2	1.0	3.0
LSD at 5%= <sup>5</sup>			.6	0.8	0.7	1.0	1.5	1.0	2.0	0.9	1.0	1.3

<sup>1</sup>Turf Quality rated on a 1-9 scale, where 9 = best overall turf quality

<sup>2</sup>Brown Patch disease rated on a 1 to 9 scale, where 9 = best disease resistance

<sup>3</sup>Dollar Spot disease rated on a 1 to 9 scale, where 9 = best disease resistance, Data is an average of two ratings dates

<sup>4</sup>Turf Density rated on a 1-9 scale, where 9 = highest shoot density

<sup>5</sup>Leaf Texture rated on a 1-9 scale, where 9 = finest leaf texture



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

NTEP	Cultivar Selection	Species	-----Turf Quality <sup>1</sup> -----						%Turf Plot Contam. May 2019	Dollar Spot <sup>2</sup> June 2019	Brown Patch <sup>3</sup> Jun 2019	Turf Density <sup>4</sup> Nov 2019	Leaf Texture <sup>5</sup> Nov 2019
			2015-19	2015	2016	2017	2018	2019					
1	11 Piranha	Creeping	7.6	7.6	8.1	7.7	7.5	7.2	7.0	7.3	8.0	6.0	7.0
2	13 Chinook	Creeping	6.9	6.1	7.3	7.2	7.5	6.4	11.7	7.3	8.7	5.3	6.3
3	6 L-93XD	Creeping	6.9	7.1	7.5	6.2	6.9	6.8	11.7	7.7	8.0	7.0	7.0
4	2 OO7	Creeping	6.6	6.9	7.0	6.4	7.0	5.9	15.0	7.7	8.3	5.3	6.0
5	18 Puritan	Colonial	6.6	6.0	6.8	6.7	6.9	6.5	5.7	4.0	4.7	7.3	7.3
6	1 DLFPS-AT/3026	Colonial	6.4	5.8	6.2	6.6	7.1	6.1	6.7	7.7	4.0	7.0	7.7
7	10 V-8	Creeping	6.3	6.1	6.9	6.6	6.5	5.5	11.7	6.0	7.0	4.3	5.3
8	15 Barracuda	Creeping	6.2	6.4	6.5	6.5	6.1	5.7	18.3	7.0	8.0	4.3	5.3
9	14 Shark	Creeping	5.9	5.8	6.5	6.4	5.4	5.1	16.7	5.3	6.3	4.3	5.3
10	12 Musket	Colonial	5.8	5.0	5.5	6.4	6.5	5.8	13.3	6.7	5.0	6.0	7.3
11	20 Luminary	Creeping	5.7	6.3	5.8	5.3	5.5	5.5	33.3	6.3	6.7	6.7	5.7
12	4 Crystal BlueLinks	Creeping	5.1	5.5	5.6	5.3	4.4	4.3	50.0	6.0	6.5	4.5	5.5
13	19 Declaration	Creeping	5.0	5.5	5.4	4.7	4.7	4.1	45.0	6.0	6.0	7.0	7.0
14	9 Nightlife	Creeping	4.9	5.4	5.5	4.4	4.5	4.0	30.0	5.0	8.0	2.0	5.0
15	5 Greentime	Colonial	4.7	4.7	4.8	5.1	4.8	4.1	23.3	3.3	5.0	5.3	5.7
16	17 PC2.0	Creeping	4.7	5.4	5.3	4.3	4.0	4.3	57.5	5.5	6.5	4.5	5.0
17	16 PST-ORBS	Creeping	4.5	5.1	5.4	4.2	3.5	3.4	55.0	4.0	6.0	4.5	5.5
18	8 Kingdom	Creeping	4.1	4.6	4.4	4.2	4.2	3.3	43.3	5.3	6.7	3.0	4.0
19	7 Armor	Creeping	4.1	4.3	4.5	3.7	3.9	4.0	32.5	3.0	6.5	4.0	5.5
20	3 Penncross	Creeping	3.1	3.0	2.6	3.5	4.4						
LSD at 5%= <sup>5</sup>			0.8	0.8	1.1	1.1	1.0	1.1	18.7	2.3	1.9	1.8	1.5

<sup>1</sup>Turf Quality rated on a 1-9 scale, where 9 = best overall turf quality

<sup>2</sup>Dollar Spot disease rated on a 1 to 9 scale, where 9 = best disease resistance

<sup>3</sup>Brown Patch disease rated on a 1 to 9 scale, where 9 = best disease resistance

<sup>4</sup>Turf Density rated on a 1-9 scale, where 9 = highest shoot density

<sup>5</sup>Leaf Texture rated on a 1-9 scale, where 9 = finest leaf texture

Table 3. 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 <sup>1</sup> -----					Dollar Spot <sup>2</sup>
	2016-19	2016	2017	2018	2019	2019
<b>CREEPING BENTGRASS</b>						
1 MMM Comp	6.6	6.4	6.5	6.1	7.4	7.2
2 Macdonald	6.3	6.6	5.7	6.9	6.1	5.3
3 WFC Comp	6.2	5.5	6.1	6.4	6.6	6.0
4 Match Play	6.1	6.2	5.3	6.4	6.3	5.8
5 777	6.1	6.5	5.5	7.3	4.8	4.5
6 Chinook	6.0	6.0	5.8	6.0	6.3	6.3
7 Piranha	6.0	6.3	5.6	6.2	5.9	5.5
8 MSP Comp	6.0	6.0	5.6	6.2	6.0	5.8
9 CBP Comp	5.8	6.0	5.4	6.1	5.8	5.5
10 MGC Comp	5.7	6.1	4.3	6.2	6.3	6.3
11 MFC Comp	5.7	4.9	5.4	6.4	6.0	6.5
12 RH 93	5.4	5.6	5.6	5.8	4.7	5.7
13 TourPro	5.4	5.3	5.2	6.0	5.1	4.3
14 PST-Syn-R0PR	5.3	5.6	4.2	7.0	4.5	3.5
15 Pure Distinction	5.2	6.0	4.4	6.2	4.2	4.0
16 LFW Comp	5.2	4.7	5.0	6.2	4.9	4.8
17 Flagstick	5.2	4.4	6.1	4.9	5.4	6.7
18 EBC Comp	5.1	4.6	4.5	5.6	5.8	5.5
19 Barracuda	5.1	5.4	4.8	5.3	4.9	4.8
20 007	5.1	5.4	5.4	5.4	4.2	4.5
21 Pin Up	4.9	5.6	5.1	4.5	4.7	4.5
22 Pure Eclipse	4.9	5.8	3.8	5.7	4.5	3.3
23 Luminary	4.8	4.9	4.2	5.3	4.9	4.2
24 Centercut 2	4.8	5.0	4.4	5.1	4.8	4.5
25 Shark	4.6	5.1	4.4	5.3	3.6	3.8
26 Pure Distinction	4.4	5.0	4.0	4.9	3.7	3.2
27 CY-2	4.4	4.0	4.6	4.5	4.4	4.8
28 Cobra 2	4.3	4.5	4.8	4.2	4.0	5.3
29 Pure Select	4.3	4.8	3.5	4.9	4.0	3.8
30 Centercut 3	4.2	4.5	3.8	4.4	4.4	5.0
31 PC2.0	4.1	4.7	3.9	4.8	3.0	3.0
32 PST-0RBS	3.9	4.3	3.8	4.7	2.9	3.0
33 SR 1150	3.9	3.8	3.9	4.4	3.6	5.3
34 Memorial	3.7	4.3	3.6	3.6	3.7	5.7
35 Penn A1	3.7	3.7	3.7	4.2	3.2	3.7

(Continued)

Table 3. 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 <sup>1</sup> -----					Dollar Spot <sup>2</sup>
	2016-19	2016	2017	2018	2019	2019
<b>CREEPING BENTGRASS (continued)</b>						
36 Kingpin	3.6	3.5	3.5	3.7	3.9	5.2
37 Centercut	3.5	4.0	3.2	3.3	3.5	6.0
38 13M	3.5	3.9	3.1	3.3	3.7	6.2
39 Crystal BlueLinks	3.5	3.8	3.5	3.3	3.3	4.5
40 Mackenzie	3.4	4.3	3.4	3.5	2.3	4.8
41 Ninety-Six Two	3.4	4.0	3.5	4.0	1.9	3.8
42 Tye	3.2	3.2	2.8	4.1	2.6	4.3
43 Focus	2.6	2.3	2.8	2.4	2.8	5.0
44 SR 1119	2.5	3.0	2.3	2.3	2.4	5.2
45 Penncross	2.4	1.9	2.1	2.3	3.4	5.7
46 Mariner	2.0	2.6	2.1	1.7	1.6	4.3
LSD at 5%=	0.6	0.9	1.0	1.0	0.9	1.3
<b>COLONIAL BENTGRASS</b>						
1 EDC Comp	5.7	5.6	6.4	5.1	5.8	8.0
2 AT 12 B	5.7	5.6	6.2	5.2	5.7	8.5
3 ELC Comp	5.6	5.9	5.6	5.4	5.5	7.3
4 SHC Comp	5.4	5.2	6.0	5.2	5.2	7.3
5 Puritan	5.4	6.1	5.8	5.1	4.5	6.0
6 ECS Comp	5.3	5.6	5.3	5.2	5.3	7.5
7 DDS Comp	5.1	5.3	5.5	4.6	5.1	8.3
8 MDF Comp	5.0	5.2	6.1	4.6	4.2	8.0
9 HLT Comp	5.0	5.0	5.3	4.3	5.3	8.3
10 AT 10	4.6	5.6	4.9	4.3	3.5	6.8
11 BPT Comp	4.5	4.5	5.5	3.8	4.4	8.2
12 LSF Comp	4.5	5.0	4.8	3.9	4.3	8.7
13 AT 14	4.4	5.6	4.7	4.6	2.8	4.5
14 Arrowtown	3.3	4.2	4.2	2.8	2.0	5.3
15 Greentime	3.2	4.7	3.5	2.7	1.9	6.3

(Continued)

Table 3. 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 <sup>1</sup> -----					Dollar Spot <sup>2</sup>
	2016-19	2016	2017	2018	2019	2019
<b>COLONIAL BENTGRASS (continued)</b>						
16 SR 7100	2.1	2.6	2.5	2.1	1.3	5.5
17 Aberroyal	2.1	3.3	2.1	1.6	1.2	5.7
18 SR 7150	1.5	1.3	2.0	1.6	1.1	5.5
LSD at 5%=	0.8	0.7	1.6	0.9	0.9	1.1

<sup>1</sup>Turf quality rated on a 1 to 9 scale, where 9 = best turf quality

<sup>2</sup>Dollar Spot disease rated on a 1 to 9 scale, where 9 = best disease resistance

Data is an average of two rating dates

Table 4. Performance of velvet bentgrass cultivars and selections in a putting trial seeded in September 2015 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----					Spring	Dollar
	2016-19	2016	2017	2018	2019	Green-Up <sup>2</sup>	Spot <sup>3</sup>
						Jun 2019	Jun 2019
1 LVP Comp	6.1	6.6	6.6	6.4	4.7	7.0	4.3
2 EVP Comp	6.1	6.2	6.2	6.2	5.7	5.0	7.3
3 SFV Comp	5.5	6.2	5.5	5.8	4.3	5.0	4.3
4 CCV Comp	5.4	6.1	5.9	5.4	4.4	5.7	5.0
5 LCT Comp	5.3	5.7	5.8	5.5	4.4	5.0	5.0
6 EVU Comp	5.3	5.2	5.8	5.9	4.3	5.3	5.3
7 WBV Comp	5.2	6.0	5.6	5.5	3.6	5.3	4.0
8 WSE Comp	5.2	4.4	5.4	5.8	5.1	6.0	6.3
9 Villa	3.3	3.2	3.8	3.8	2.4	6.3	5.3
10 PST-VR01	3.1	2.9	3.3	3.6	2.7	4.3	4.7
11 SR 7200	2.1	2.0	2.3	2.7	1.7	3.0	5.7
LSD at 5%=	0.7	1.0	1.0	0.8	0.9	2.0	1.2

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<sup>1</sup>Turf quality rated on a 1 to 9 scale, where 9 = best turf quality

<sup>2</sup>Spring Green-up rated on a 1 to 9 scale, where 9 = earliest spring green up

<sup>3</sup>Dollar Spot disease rated on a 1 to 9 scale, where 9 = best disease resistance

Table 5. Performance of creeping and velvet bentgrass cultivars in a putting green trial established in September 2016 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Dollar Spot <sup>2</sup>	Wear Quality <sup>3</sup>
	2017-19	2017	2018	2019	Jun 2019	Aug 2019
<b>CREEPING BENTGRASS</b>						
1 007XL	7.3	7.9	6.7	7.5	8.0	8.3
2 MGS Comp	7.1	7.0	7.2	7.3	8.3	7.0
3 DSF Comp	7.1	6.9	6.5	7.9	8.3	8.0
4 LSG Comp	7.0	7.2	7.0	6.8	8.0	6.7
5 EFB Comp	7.0	6.6	6.8	7.5	7.7	8.3
6 LFC Comp	6.6	6.8	6.1	6.9	7.3	7.3
7 Coho	6.6	6.8	6.7	6.3	8.3	8.0
8 Match Play	6.5	6.4	6.7	6.4	7.3	7.0
9 Piranha	6.5	6.7	6.3	6.5	7.3	7.0
10 777	6.3	6.6	6.4	5.8	4.0	6.0
11 PLC Comp	6.3	7.1	5.7	6.1	7.7	6.7
12 Chinook	6.2	6.2	6.1	6.2	7.7	7.0
13 Macdonald	6.0	6.5	5.2	6.3	7.0	6.3
14 L-93XD	6.0	6.6	5.4	5.9	6.3	6.3
15 Pin Up 2	5.7	5.8	5.7	5.7	7.0	5.7
16 TourPro	5.5	5.5	5.1	5.8	8.0	5.7
17 All Pro Fwy Blend X	5.3	5.4	5.3	5.3	5.7	5.7
18 Luminary	5.2	5.4	5.0	5.2	6.3	3.0
19 Declaration	5.2	5.1	5.2	5.4	7.3	3.3
20 RH 93	5.2	5.4	5.1	5.1	4.7	3.7
21 Barracuda	5.1	5.4	5.0	4.9	6.3	5.7
22 Pure Distinction	5.1	6.1	4.7	4.4	3.0	3.0
23 Flagstick	4.9	4.9	4.9	4.9	5.3	5.0
24 Center Cut 2	4.8	4.6	4.8	5.1	6.7	4.3
25 Pure Select	4.7	5.3	4.1	4.7	5.3	4.3
26 Shark	4.7	4.6	4.7	4.7	6.3	4.7
27 Independence	4.5	5.0	4.7	3.6	4.7	3.3
28 Pin Up	4.4	4.4	4.4	4.6	6.7	4.0
29 Proclamation	4.4	4.7	4.3	4.2	6.7	2.7
30 Benchmark DSR	4.4	4.1	4.3	4.6	6.0	5.0
31 Center Cut 3	4.2	3.4	4.1	5.1	7.7	4.7
32 CY-2	4.2	3.3	4.4	4.9	4.7	5.0
33 Focus	4.1	3.8	4.2	4.3	4.7	3.3
34 PC2.0	4.0	4.4	4.2	3.5	4.7	4.0
35 Penn A-1	3.5	3.5	3.1	3.8	6.3	2.7

(Continued)

Table 5. Performance of creeping and velvet bentgrass cultivars in a putting green trial established in September 2016 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Dollar Spot <sup>2</sup>	Wear Quality <sup>3</sup>
	2017-19	2017	2018	2019	Jun 2019	Aug 2019
<b>CREEPING BENTGRASS (continued)</b>						
36 Memorial	3.4	3.3	3.1	3.7	7.3	3.0
37 V8	3.4	3.0	3.5	3.6	7.3	2.7
38 13M	3.2	3.0	3.2	3.5	7.0	2.7
39 Crystal BlueLinks	3.2	3.1	3.4	3.3	7.0	2.3
40 T-1	3.1	3.3	2.9	3.2	6.7	3.0
41 Center Cut	3.1	2.8	3.3	3.1	7.7	2.0
42 Kingpin	2.9	2.8	2.8	3.2	7.3	3.7
43 Penn A-4	2.9	2.0	3.0	3.7	4.0	3.7
44 Century	2.9	2.9	3.1	2.7	4.0	3.3
45 L-93	2.8	2.2	2.9	3.2	5.7	3.0
46 Alpha	2.4	2.5	2.5	2.3	3.7	2.7
47 Putter	2.4	2.5	2.4	2.1	5.0	1.7
48 Southshore	2.1	1.6	2.2	2.5	6.0	3.0
49 Penncross	1.6	1.1	1.7	1.9	6.3	1.3
LSD at 5%= <hr/>	0.7	0.9	1.0	0.9	2.1	2.1
<b>VELVET BENTGRASS</b>						
1 SCL Comp	6.3	7.0	6.0	5.8	8.3	
2 SSL Comp	6.2	6.9	6.0	5.7	6.7	
3 MLC Comp	6.1	6.4	6.2	5.6	7.7	
4 SCE Comp	5.7	6.6	5.5	5.0	9.0	
5 SCM Comp	5.7	6.6	5.3	5.2	8.3	
6 Greenwich	4.5	3.9	5.0	4.6	7.0	
7 Legendary	4.3	4.3	4.6	4.1	6.3	
8 Villa	3.8	3.1	4.1	4.3	6.3	
9 SR 7200	1.9	1.5	1.9	2.4	7.0	
LSD at 5%= <hr/>	0.7	1.2	1.2	0.8	2.1	

<sup>1</sup>Turf quality rated on a 1 to 9 scale, where 9 = best turf quality

<sup>2</sup>Dollar Spot disease rated on a 1 to 9 scale, where 9 = best disease resistance

Table 6. Performance of creeping and colonial bentgrass cultivars in a fairway trial established in September 2016 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Brown Patch <sup>2</sup>	Dollar Spot <sup>3</sup>	Wear Quality <sup>4</sup>	Wear Recovery <sup>5</sup>
	2017-19	2017	2018	2019	Jul 2019	Jul 2019	Aug 2019	Sep 2019
<b>CREEPING BENTGRASS</b>								
1 007XL	7.6	7.8	7.9	7.2	9.0	7.0	5.7	6.3
2 DSF Comp	7.6	7.3	7.8	7.7	9.0	9.0	6.3	6.0
3 LFC Comp	7.5	6.7	7.8	8.0	9.0	8.0	7.3	6.3
4 LSG Comp	7.5	6.8	7.9	7.6	9.0	8.7	6.0	6.0
5 TourPro	7.2	6.8	7.4	7.3	9.0	8.7	7.7	8.0
6 MGS Comp	7.2	7.2	7.6	6.8	8.7	8.7	4.0	4.3
7 Match Play	7.2	6.8	7.6	7.1	9.0	8.3	5.7	5.7
8 Coho	7.1	6.3	7.7	7.4	9.0	8.3	6.0	6.3
9 EFB Comp	7.0	6.5	7.7	6.7	9.0	8.3	4.0	4.7
10 L-93XD	6.7	6.3	6.9	6.9	8.7	7.7	3.0	4.0
11 777	6.4	6.7	5.9	6.8	9.0	7.0	6.0	6.7
12 Chinook	6.4	6.5	6.4	6.3	8.7	7.0	6.3	7.0
13 PLC Comp	6.3	6.8	5.9	6.1	8.3	6.3	4.3	5.3
14 Piranha	6.1	6.0	5.8	6.5	9.0	7.0	7.7	7.0
15 Barracuda	6.0	5.7	6.0	6.5	9.0	7.3	5.7	6.0
16 007	5.5	4.9	5.2	6.5	9.0	7.7	5.7	7.0
17 Declaration	5.4	5.2	5.3	5.5	8.7	7.3	6.3	7.3
18 Pin Up	5.1	5.3	4.9	5.3	8.7	7.3	5.0	5.7
19 All Pro Fwy Blend X	5.1	5.7	4.6	5.1	8.3	6.0	5.3	6.3
20 Shark	5.1	4.9	5.1	5.2	9.0	5.7	6.0	7.0
21 Runner	5.0	5.8	4.5	4.9	8.3	5.3	5.0	7.7
22 Flagstick	4.9	4.9	4.9	4.9	9.0	6.0	5.7	6.0
23 Luminary	4.8	5.1	4.8	4.4	8.3	7.0	4.7	4.3

(Continued)



Table 6. Performance of creeping and colonial bentgrass cultivars in a fairway trial established in September 2016 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Brown Patch <sup>2</sup>	Dollar Spot <sup>3</sup>	Wear Quality <sup>4</sup>	Wear Recovery <sup>5</sup>	
	2017-19	2017	2018	2019	Jul 2019	Jul 2019	Aug 2019	Sep 2019	
<b>CREEPING BENTGRASS (continued)</b>									
24	RH 93	4.7	4.6	4.4	5.2	8.7	5.3	6.7	6.3
25	Focus	4.7	4.7	4.5	4.7	7.3	6.0	2.0	3.3
26	Proclamation	4.5	4.4	4.3	4.9	9.0	5.7	5.3	6.3
27	CY-2	4.4	3.9	4.3	5.1	8.7	5.7	5.0	6.0
28	Pure Distinction	4.4	5.9	3.5	3.7	7.7	4.7	4.7	6.3
29	Pure Select	4.3	5.2	3.9	3.7	7.3	5.0	3.7	5.3
30	Benchmark DSR	4.2	2.9	4.7	5.0	8.3	7.0	6.0	6.3
31	Cobra 2	4.1	3.9	4.6	3.7	7.3	4.7	3.0	4.3
32	Penn A-1	4.0	4.4	3.9	3.9	7.7	5.0	4.0	6.0
33	PC2.0	4.0	4.7	3.3	3.9	7.3	4.7	2.7	5.0
34	Memorial	3.9	3.2	4.3	4.2	8.0	6.7	4.7	5.3
35	Independence	3.9	4.1	3.2	4.4	8.7	6.0	4.7	6.7
36	13M	3.8	3.4	4.2	3.8	8.0	6.3	5.0	6.0
37	Ninety-Six Two	3.6	4.5	2.8	3.7	8.3	4.0	3.7	5.3
38	V8	3.5	3.3	3.3	3.9	8.0	5.7	4.3	5.3
39	Mackenzie	3.5	3.6	3.5	3.5	8.3	3.7	3.3	5.3
40	Crystal BlueLinks	3.4	4.1	3.0	3.0	7.3	5.7	3.7	4.3
41	Alpha	3.3	3.7	2.8	3.3	8.3	3.7	3.3	5.3
42	Tyee	3.3	3.8	3.0	3.0	8.3	3.3	4.7	6.3
43	Kingpin	3.3	3.1	3.3	3.3	8.3	6.0	4.7	6.7
44	Century	3.2	3.4	2.4	3.9	8.0	6.0	3.0	4.7
45	L-93	3.2	2.9	3.1	3.5	7.0	6.3	4.7	5.7

(Continued)

Table 6. Performance of creeping and colonial bentgrass cultivars in a fairway trial established in September 2016 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Brown Patch <sup>2</sup>	Dollar Spot <sup>3</sup>	Wear Quality <sup>4</sup>	Wear Recovery <sup>5</sup>
	2017-19	2017	2018	2019	Jul 2019	Jul 2019	Aug 2019	Sep 2019
<b>CREEPING BENTGRASS (continued)</b>								
46 T-1	3.1	3.0	2.9	3.2	7.3	4.7	4.0	5.0
47 Penncross	2.9	2.8	2.7	3.4	8.0	4.3	3.3	4.3
48 SR 1150	2.8	2.7	2.9	2.9	8.0	4.3	3.7	5.7
49 Southshore	2.6	2.8	2.4	2.7	7.3	3.7	3.7	5.7
50 Putter	2.6	3.1	2.3	2.5	7.0	4.0	2.3	4.7
51 SR 1119	2.5	2.8	1.9	2.7	7.7	3.7	3.3	5.7
52 Mariner	2.5	2.8	2.2	2.4	6.7	3.0	3.0	5.0
53 Penn A-4	2.4	1.9	2.2	3.0	7.7	4.7	4.0	4.7
LSD at 5%= <sup>6</sup>	0.8	0.9	1.1	1.2	0.9	2.1	2.3	2.3
<b>COLONIAL BENTGRASS</b>								
1 CCD Comp	6.5	7.0	6.7	5.9	6.3	7.3		
2 AT 12 M2	6.3	6.5	7.0	5.5	3.7	6.0		
3 LCC Comp	6.3	6.4	6.3	6.2	7.0	6.3		
4 DHS Comp	6.1	6.5	6.2	5.6	5.3	6.3		
5 SFC Comp	5.8	6.3	5.8	5.4	5.3	5.3		
6 PDM Comp	5.8	5.9	5.4	6.1	5.0	5.3		
7 MTC Comp	5.6	6.0	5.7	5.2	4.7	6.3		
8 FDH Comp	5.6	6.0	5.3	5.6	5.0	7.3		
9 AT 15	5.5	6.2	5.4	4.7	4.0	5.0		
10 Puritan	5.4	6.1	5.7	4.4	4.0	4.3		

(Continued)

Table 6. Performance of creeping and colonial bentgrass cultivars in a fairway trial established in September 2016 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Brown Patch <sup>2</sup>	Dollar Spot <sup>3</sup>	Wear Quality <sup>4</sup>	Wear Recovery <sup>5</sup>
	2017-19	2017	2018	2019	Jul 2019	Jul 2019	Aug 2019	Sep 2019
<b>COLONIAL BENTGRASS (continued)</b>								
11 DEC Comp	5.4	5.9	5.0	5.3	5.3	5.7		
12 LMF Comp	5.3	5.6	4.9	5.3	5.3	5.3		
13 Musket	5.0	5.8	4.5	4.8	4.7	6.0		
14 Heritage	4.8	5.3	4.7	4.3	5.3	4.7		
15 Capri	4.6	4.8	4.4	4.6	5.0	5.3		
16 FT12	4.6	5.4	4.6	3.8	4.7	6.3		
17 AT 10	4.4	4.9	4.6	3.7	4.0	5.0		
18 Greentime	4.1	4.4	4.4	3.6	3.7	5.0		
19 Tiger 2	4.0	4.1	4.2	3.5	4.0	4.7		
20 SR 7100	3.7	3.2	4.3	3.7	4.7	5.3		
21 Glory	3.4	3.7	3.1	3.3	4.0	4.3		
22 Highland	2.8	1.8	3.3	3.2	6.3	5.0		
23 SR 7150	2.7	2.7	2.5	3.0	4.3	4.0		
LSD at 5%=	0.6	0.8	1.0	0.9	1.7	1.7		

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<sup>1</sup>Turf quality rated on a 1 to 9 scale, where 9 = best turf quality

<sup>2</sup>Brown Patch disease rated on a 1 to 9 scale, where 9 = best disease resistance

<sup>3</sup>Dollar Spot disease rated on a 1 to 9 scale, where 9 = best disease resistance

<sup>4</sup>Turf wear quality rated on a 1 to 9 scale, where 9 = best turf quality observed under simulated wear machine stress  
Wear simulation on creeping bentgrass entries only

<sup>5</sup>Turf wear recovery rated on a 1 to 9 scale, where 9 = best turf quality following simulated wear machine stress

Table 7. Performance of creeping and colonial bentgrass cultivars in a putting green trial established in September 2017 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Spring	Bipolaris	Dollar	Brown
	2018-19	2018	2019	Green-Up <sup>2</sup> Apr 2019	Leaf Spot <sup>3</sup> Apr 2019	Spot <sup>4</sup> Jun 2019	Patch <sup>5</sup> Aug 2019
<b>CREEPING BENTGRASS</b>							
1 EGC Comp	7.5	7.9	7.1	8.0	8.0	7.0	6.3
2 GMM Comp	7.5	7.6	7.3	8.3	8.7	8.0	7.3
3 Coho	7.4	7.1	7.6	5.7	7.7	9.0	8.0
4 BEF Comp	7.2	7.6	6.9	8.7	6.7	7.0	7.7
5 MFC Comp	7.0	7.1	6.9	8.3	8.0	7.7	5.3
6 DLG Comp	7.0	7.1	6.9	9.0	8.7	6.7	7.0
7 EF2 Comp	7.0	7.3	6.7	8.3	8.7	7.3	7.7
8 Match Play	6.6	6.9	6.2	8.3	7.7	7.0	6.7
9 LTNS Bent Blend 1	6.2	6.7	5.8	7.7	6.0	7.3	6.0
10 TourPro	6.2	6.8	5.6	6.7	6.0	6.7	4.7
11 Chinook	6.2	6.4	6.0	9.0	8.3	7.7	6.3
12 L-93XD	6.1	6.9	5.3	6.3	6.0	5.3	6.7
13 PST-ROPS	5.7	6.7	4.7	4.3	5.0	5.7	4.3
14 Piranha	5.7	6.3	5.0	6.7	6.3	5.0	5.3
15 Macdonald	5.7	6.2	5.1	7.0	5.7	5.7	5.0
16 Luminary	5.5	6.2	4.8	7.0	5.3	6.3	5.3
17 All Pro Fwy Blend X	5.4	6.1	4.7	5.3	5.3	5.3	4.0
18 RH 93	5.1	6.2	4.0	5.0	3.0	6.0	5.3
19 CenterCut 3	5.1	5.4	4.7	5.3	4.7	6.3	4.7
20 Declaration	5.1	5.1	5.1	6.0	4.3	7.7	5.7

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(Continued)

Table 7. Performance of creeping and colonial bentgrass cultivars in a putting green trial established in September 2017 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Spring	Bipolaris	Dollar	Brown
	2018-19	2018	2019	Green-Up <sup>2</sup> Apr 2019	Leaf Spot <sup>3</sup> Apr 2019	Spot <sup>4</sup> Jun 2019	Patch <sup>5</sup> Aug 2019
<b>CREEPING BENTGRASS (continued)</b>							
21 777	5.1	6.0	4.1	5.3	4.7	4.0	3.7
22 007	5.0	5.8	4.2	6.7	3.7	4.3	4.3
23 Barracuda	4.8	5.3	4.2	6.0	4.3	4.7	5.0
24 CenterCut 2	4.6	4.9	4.3	7.3	5.3	5.3	4.3
25 Proclamation	4.6	5.5	3.7	5.0	4.0	4.7	4.3
26 Pure Distinction	4.4	5.3	3.4	4.0	3.3	2.7	4.0
27 PST-0RBS	4.4	5.2	3.5	3.0	3.7	3.3	3.7
28 PST-0CV6	4.3	5.1	3.5	4.0	3.3	3.0	5.3
29 CenterCut	4.3	4.5	4.1	4.7	4.3	8.0	2.7
30 Flagstick	4.3	4.4	4.1	5.7	5.0	4.7	4.3
31 Shark	4.2	4.9	3.5	2.7	2.7	5.0	5.3
32 Pure Select	4.1	4.9	3.3	4.0	4.3	3.3	3.0
33 PST-0COL	4.1	4.1	4.2	1.3	8.3	4.3	1.3
34 Memorial	4.1	4.0	4.2	3.3	4.3	7.0	4.0
35 A-1	4.1	4.5	3.7	4.7	4.0	4.3	4.0
36 Crystal BlueLinks	4.0	4.7	3.2	3.7	3.7	4.7	2.3
37 Focus	3.9	4.5	3.3	4.3	3.7	4.0	3.7
38 CY-2	3.9	3.5	4.2	5.3	4.7	3.0	5.3
39 V8	3.8	4.0	3.5	4.3	3.7	3.0	4.0
40 Kingpin	3.6	3.7	3.5	5.0	3.3	5.3	2.7

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(Continued)

Table 7. Performance of creeping and colonial bentgrass cultivars in a putting green trial established in September 2017 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Spring Green-Up <sup>2</sup>	Bipolaris Leaf Spot <sup>3</sup>	Dollar Spot <sup>4</sup>	Brown Patch <sup>5</sup>
	2018-19	2018	2019	Apr 2019	Apr 2019	Jun 2019	Aug 2019
<b>CREEPING BENTGRASS (continued)</b>							
41 T-1	3.6	4.6	2.5	2.3	3.0	4.3	2.0
42 A-4	3.4	4.1	2.7	4.0	1.3	3.0	2.7
43 L-93	3.4	3.9	2.9	3.0	3.7	4.0	2.3
44 SR 1150	3.3	3.5	3.2	3.0	1.7	3.3	3.7
45 Alpha	3.3	3.9	2.7	2.7	3.3	3.0	3.0
46 Tye	3.2	3.6	2.9	3.7	3.3	5.0	2.7
47 Ninety-Six Two	3.2	4.0	2.4	2.0	3.0	2.3	2.7
48 Putter	3.1	3.6	2.5	2.7	3.0	2.0	3.3
49 Mackenzie	3.0	3.5	2.4	3.3	2.3	3.0	1.7
50 SR 1119	2.8	3.2	2.4	3.0	3.7	2.7	1.3
51 Seaside II	2.7	2.8	2.5	1.3	2.7	5.0	1.7
52 Southshore	2.5	3.0	2.1	2.7	2.0	3.0	2.0
53 Penncross	2.1	2.2	1.9	2.7	3.7	3.3	1.0
LSD at 5%=	0.5	0.7	0.7	2.1	1.7	1.7	1.8
<b>COLONIAL BENTGRASS</b>							
1 EUC Comp	6.3	6.6	6.1	6.0	9.0	8.7	6.7
2 SLC Comp	6.2	6.6	5.9	4.7	8.7	8.7	6.0
3 EFC Comp	6.2	6.5	5.8	6.7	8.3	8.7	6.3
4 Musket	5.7	5.5	5.8	5.0	9.0	7.7	5.7
5 DGM Comp	5.4	5.0	5.7	5.7	8.7	8.7	6.7

(Continued)

Table 7. Performance of creeping and colonial bentgrass cultivars in a putting green trial established in September 2017 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Spring Green-Up <sup>2</sup>	Bipolaris Leaf Spot <sup>3</sup>	Dollar Spot <sup>4</sup>	Brown Patch <sup>5</sup>
	2018-19	2018	2019	Apr 2019	Apr 2019	Jun 2019	Aug 2019
<b>COLONIAL BENTGRASS (continued)</b>							
6 LLS Comp	5.0	5.5	4.6	5.0	8.3	8.3	5.0
7 LDC Comp	5.0	4.9	5.1	6.0	9.0	8.0	6.3
8 Puritan	4.9	5.4	4.5	4.0	8.7	7.0	4.3
9 FT12	4.7	5.0	4.4	1.7	8.3	8.0	4.7
10 Capri	4.4	4.4	4.4	4.0	7.7	8.0	3.3
11 Tiger 2	2.9	3.2	2.5	1.0	7.3	7.7	2.0
12 Glory	2.4	3.2	1.7	1.3	7.7	8.3	2.0
LSD at 5%=	0.5	0.7	0.7	1.4	1.0	1.0	1.4

<sup>1</sup>Turf quality rated on a 1 to 9 scale, where 9 = best turf quality

<sup>2</sup>Spring Green-up rated on a 1 to 9 scale, where 9 = earliest spring green up

<sup>3</sup>Bipolaris Leaf Spot disease rated on a 1 to 9 scale, where 9 = best disease resistance

<sup>4</sup>Dollar Spot disease rated on a 1 to 9 scale, where 9 = best disease resistance

<sup>5</sup>Brown Patch disease rated on a 1 to 9 scale, where 9 = best disease resistance

Table 8. Performance of velvet bentgrass cultivars in a putting green trial established in September 2017 at North Brunswick, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Spring Green-Up <sup>2</sup>	Bipolaris Leaf Spot <sup>3</sup>	Brown Patch <sup>4</sup>	Copper Spot <sup>5</sup>
	2018-19	2018	2019	Apr 2019	2019	Aug 2019	Aug 2019
1 DEM Comp	6.7	6.9	6.5	6.3	7.2	8.7	6.3
2 MSV Comp	6.6	6.7	6.4	7.3	6.8	8.0	6.0
3 CMV Comp	6.5	6.8	6.2	7.0	6.2	7.0	8.0
4 LSV Comp	6.5	6.5	6.5	7.3	7.2	8.0	6.0
5 DMS Comp	6.4	6.8	6.0	5.3	5.5	7.3	6.3
6 DMD Comp	6.1	6.5	5.7	5.7	5.2	7.3	8.0
7 Vitagreen	5.0	5.4	4.6	2.7	4.0	5.7	7.3
8 Greenwich	4.5	5.4	3.6	3.3	5.5	5.7	4.0
9 Vesper	4.3	5.2	3.4	5.3	5.0	5.7	7.3
10 Legendary	3.7	4.2	3.2	4.7	5.2	7.0	5.0
11 Villa 2	2.6	2.8	2.5	4.0	4.7	7.7	4.7
12 Villa	2.0	2.2	1.8	3.7	4.7	6.3	3.0
13 SR 7200	2.0	2.1	1.8	3.3	4.3	8.3	5.0
LSD at 5%= <sup>5</sup>	0.6	0.5	1.0	1.7	1.7	2.4	2.4

<sup>1</sup>Turf quality rated on a 1 to 9 scale, where 9 = best turf quality

<sup>2</sup>Spring Green-up rated on a 1 to 9 scale, where 9 = earliest spring green up

<sup>3</sup>Bipolaris Leaf Spot disease rated on a 1 to 9 scale, where 9 = best disease resistance, Data is an average of two rating dates

<sup>4</sup>Brown Patch disease rated on a 1 to 9 scale, where 9 = best disease resistance

<sup>5</sup>Copper Spot disease rated on a 1 to 9 scale, where 9 = best disease resistance



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

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Brown Patch <sup>2</sup>
	2018-19	2018	2019	Jul 2018
<b>CREEPING BENTGRASS</b>				
1 DLG Comp	7.6	7.0	8.2	9.0
2 EGC Comp	7.1	7.0	7.2	9.0
3 GMM Comp	7.0	7.6	6.4	9.0
4 EF2 Comp	6.8	6.8	6.8	9.0
5 Piranha	6.6	6.6	6.6	9.0
6 BEF Comp	6.5	7.4	5.5	9.0
7 Coho	6.4	6.5	6.4	9.0
8 MFC Comp	6.4	7.3	5.6	9.0
9 TourPro	6.0	6.1	5.8	9.0
10 Chinook	5.9	6.1	5.6	9.0
11 Barracuda	5.6	5.9	5.3	9.0
12 777	5.3	5.9	4.8	9.0
13 L-93XD	5.1	5.8	4.4	9.0
14 Luminary	5.0	5.5	4.5	9.0
15 Proclamation	4.9	5.4	4.5	8.7
16 Declaration	4.9	4.8	5.1	9.0
17 All Pro Fwy Blend X	4.9	5.5	4.3	8.7
18 Pure Eclipse	4.7	6.5	2.9	9.0
19 Focus	4.6	5.3	3.9	8.3
20 007	4.6	4.7	4.3	9.0
21 Pure Select	4.5	5.9	3.1	8.3
22 Shark	4.5	5.0	4.0	8.0
23 PST-0COL	4.4	4.7	4.0	3.7
24 Penn A-1	4.3	5.0	3.7	8.3
25 PST-0RBS	4.2	5.2	3.2	8.7
26 PST-0CV6	4.2	5.6	2.8	8.3
27 Crystal BlueLinks	4.0	5.0	3.1	8.0
28 Pure Distinction	4.0	5.2	2.9	9.0
29 Kingpin	4.0	4.0	4.0	7.7
30 A-4	3.9	5.1	2.7	8.0
31 V8	3.6	3.9	3.3	8.0
32 Alpha	3.6	4.5	2.7	8.3
33 L-93	3.5	4.0	2.9	8.0
34 T-1	3.4	4.3	2.6	7.3
35 Penncross	2.8	3.2	2.4	5.3

(Continued)

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

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Brown Patch <sup>2</sup>
	2018-19	2018	2019	Jul 2018
<b>CREEPING BENTGRASS (continued)</b>				
36 Seaside II	2.7	3.0	2.5	7.7
37 Southshore	2.6	3.0	2.2	7.3
LSD at 5%=	0.7	0.9	1.1	0.7
<b>COLONIAL BENTGRASS</b>				
1 EFC Comp	6.9	7.8	6.1	5.3
2 DGM Comp	6.6	6.6	6.6	5.3
3 EUC Comp	6.5	7.4	5.7	5.7
4 AT 12 M2	6.3	6.3	6.3	4.3
5 Puritan	6.3	6.3	6.2	4.0
6 LLS Comp	6.1	6.8	5.3	6.3
7 Capri	6.1	6.2	5.9	5.0
8 LDC Comp	5.9	6.9	4.9	6.0
9 SLC Comp	5.7	7.3	4.0	7.3
10 FT12	5.6	6.4	4.8	4.7
11 Musket	5.4	6.2	4.5	5.3
12 PGGW-15	5.1	5.7	4.5	5.0
13 PGGW-13	5.1	5.9	4.2	4.3
14 PGGW-18	5.0	5.6	4.4	3.7
15 PGGW-12	4.9	6.1	3.6	4.0
16 PGGW-16	4.8	5.3	4.3	3.7
17 PGGW-11	4.8	6.0	3.5	3.0
18 Greentime	4.7	5.0	4.3	6.0
19 PGGW-14	4.5	5.6	3.4	2.7
20 Tiger 2	4.4	4.4	4.4	3.0
21 PGGW-17	4.2	4.9	3.5	1.3
22 Glory	4.1	4.0	4.1	4.0
23 SR 7150	3.8	3.9	3.6	3.7
LSD at 5%=	0.7	0.9	1.3	1.9

<sup>1</sup>Turf quality rated on a 1 to 9 scale, where 9 = best turf quality

<sup>2</sup> Brown Patch disease rated on a 1 to 9 scale, where 9 = best disease resistance

Table 10. Performance of creeping bentgrass cultivars in a putting green trial established in September 2018 at North Brunswick, NJ.

Cultivar or Selection	Turf Quality <sup>1</sup> 2019	Turf Establishment <sup>2</sup> Sep 2018	Brown Patch <sup>3</sup> Jul 2019
1 Macdonald	7.5	6.7	7.3
2 SGT Comp	7.0	5.7	6.7
3 POR Comp	6.9	5.0	6.3
4 PPD Comp	6.8	4.7	8.0
5 777	6.7	7.3	4.7
6 TFT Comp	6.5	5.3	5.3
7 FSC Comp	6.4	5.7	5.7
8 007	6.4	6.7	4.7
9 Runner	6.4	4.0	6.0
10 TGT Comp	6.3	3.3	6.7
11 Pure Eclipse	6.2	5.0	5.0
12 RH 93	6.1	4.3	5.7
13 SFT Comp	6.1	5.3	6.3
14 Barracuda	6.0	6.7	5.3
15 AGT Comp	6.0	4.0	6.7
16 Chinook	6.0	7.0	6.7
17 Tye	6.0	6.0	6.0
18 Cobra 2	5.9	5.0	6.3
19 Match Play	5.8	5.7	7.0
20 Luminary	5.8	5.3	7.0
21 Centercut 3	5.7	7.0	5.3
22 Focus	5.7	5.7	5.0
23 Piranha	5.6	5.3	7.3
24 PST-SYN-RODS	5.6	2.7	8.0
25 CY-2	5.6	5.7	6.0
26 Shark	5.4	4.7	6.3
27 TourPro	5.4	7.0	5.7
28 GSH Comp	5.4	4.3	8.3
29 Flagstick	5.3	5.0	6.0
30 Centercut 2	5.2	5.0	5.3
31 PST-SYN-OCD	5.1	4.0	6.3
32 Pure Select	5.1	5.7	4.0
33 Declaration	4.9	6.0	5.3
34 Proclamation	4.9	7.3	6.0
35 SR 1150	4.9	5.7	5.3

(Continued)

Table 10. Performance of creeping bentgrass cultivars in a putting green trial established in September 2018 at North Brunswick, NJ.

Cultivar or Selection	Turf Quality <sup>1</sup> 2019	Turf Establishment <sup>2</sup> Sep 2018	Brown Patch <sup>3</sup> Jul 2019
36 Ninety-Six Two	4.7	6.7	6.0
37 AU Victory	4.6	5.3	7.7
38 Memorial	4.6	6.3	4.3
39 Mackenzie	4.4	5.7	4.3
40 Centercut	4.3	6.3	4.3
41 Kingpin	3.8	5.3	4.7
42 SR 1119	3.7	6.3	5.0
43 Penncross	2.3	5.3	3.7
LSD at 5%=  	1.0	1.2	2.1

<sup>1</sup>Turf quality rated on a 1 to 9 scale, where 9 = best turf quality

<sup>2</sup>Turf Establishment rated on a 1 to 9 scale, where 9 = earliest establishment

<sup>3</sup>Brown Patch disease rated on a 1 to 9 scale, where 9 = best disease resistance.

Table 11. Performance of velvet bentgrass cultivars in a putting green trial established in August 2018 at North Brunswick, NJ.

Cultivar or Selection	Turf Quality <sup>1</sup> 2019	Turf Establishment <sup>2</sup> Sep 2018	Borwn Patch <sup>3</sup> 2019
1 DSM Comp	6.6	6.0	4.2
2 FDV Comp	6.4	5.7	6.5
3 FDK Comp	6.3	6.3	7.3
4 VCE Comp	6.2	5.7	7.0
5 Greenwich	4.5	7.7	3.5
6 Villa	4.2	8.3	3.5
7 Legendary	3.9	4.0	3.3
LSD at 5%=	0.8	1.4	1.7

<sup>1</sup>Turf quality rated on a 1 to 9 scale, where 9 = best turf quality

<sup>2</sup>Turf Establishment rated on a 1 to 9 scale, where 9 = earliest establishment

<sup>3</sup>Brown Patch disease rated on a 1 to 9 scale, where 9 = best disease resistance. Data is an average of two ratings dates

Table 12. Performance of creeping and colonial bentgrass cultivars in a fairway trial established in October 2018 at North Brunswick, NJ.

Cultivar or Selection	Turf Quality <sup>1</sup> 2019	Brown Patch <sup>2</sup> 2019
<b>CREEPING BENTGRASS</b>		
1 PPD Comp	7.9	8.0
2 SFT Comp	7.9	7.0
3 CenterCut III	7.9	6.3
4 POR Comp	7.9	8.0
5 Piranha	7.7	6.2
6 TFT Comp	7.7	8.7
7 Tour Pro	7.3	5.8
8 AGT Comp	7.3	7.5
9 FSC Comp	7.2	6.2
10 TGT Comp	7.1	7.2
11 SGT Comp	7.0	5.7
12 Chinook	6.9	6.0
13 PST-SYN-OMRN	6.8	7.8
14 Luminary	6.8	5.7
15 CenterCut II	6.8	6.0
16 Proclamation	6.7	5.3
17 Barracuda	6.7	3.8
18 777	6.5	5.0
19 All Pro Fwy Blend X	6.2	4.7
20 Shark	6.1	3.8
21 GSH Comp	6.1	7.5
22 PST-SYN-OCD	6.0	4.3
23 Declaration	5.7	4.3
24 Flagstick	5.7	5.5
25 PST-SYN-RODS	5.7	4.5
26 AU Victory	5.4	5.3
27 Focus	5.3	3.7
28 Memorial	5.1	4.8
29 Penncross	3.2	4.0
LSD at 5%= <hr/>	0.8	1.7

(Continued)

Table 12. Performance of creeping and colonial bentgrass cultivars in a fairway trial established in October 2018 at North Brunswick, NJ.

Cultivar or Selection	Turf Quality <sup>1</sup> 2019	Brown Patch <sup>2</sup> 2019
<b>COLONIAL BENTGRASS</b>		
1 SLM Comp	7.4	6.3
2 WML Comp	7.3	6.0
3 MEM Comp	7.1	5.8
4 ECC Comp	6.5	3.7
5 MGE Comp	6.3	4.0
6 FLS Comp	6.1	4.5
7 Puritan	5.5	3.7
8 Musket	5.4	3.5
9 Capri	5.2	3.0
10 Tiger 2	3.5	1.7
11 SR 7150	1.3	2.8
LSD at 5%= <hr/>	1.1	2.1

<sup>1</sup>Turf quality rated on a 1 to 9 scale, where 9 = best turf quality

<sup>2</sup>Brown Patch disease rated on a 1 to 9 scale, where 9 = best disease resistance. Data is an average of two ratings dates

Table 13. Maintenance practices performed in 2019 bentgrass trials at North Brunswick, NJ.

Test (Table)	Fertility <sup>1</sup>	Mowing Ht (inches)	Cultivation/Top Dress	Fungicides	Insecticides	Herbicides
2014 NTEP Greens (Table 1)	1.95; 0.1 lb P <sub>2</sub> O <sub>5</sub> ; 0.1 K <sub>2</sub> O	0.110	May-Jun – Topdressed Jun-Jul – TriCure (wetting agent)	Jun - Torque + Bayer 26GT Jul – Segway	None	None
2014 NTEP Fwy (Table 2)	1.6; 0.1 lb P <sub>2</sub> O <sub>5</sub> ; 0.2 K <sub>2</sub> O; 2 fl. oz. Harrell's MAX Minors	0.375	None	None	None	Acclaim Extra (post-crabgrass)
2015 Greens (Table 3)	2.3; 0.1 lb P <sub>2</sub> O <sub>5</sub> ; 0.1 K <sub>2</sub> O; 22.6 fl. oz. Magnese Chelate 5%; 2 fl. oz. Harrell's MAX Minors	0.110	May, Jun, Aug – Topdressed Jun, Jul – Tricure AD (wetting agent)	April – Heritage TL May – Torque July – Segway; Daconil Action	None	None
2015 Velvet Greens (Table 4)	0.9; 0.0 lb P <sub>2</sub> O <sub>5</sub> ; 0.0 K <sub>2</sub> O	0.110	May-Jun – Topdressed May – Tricure AD (wetting agent)	Jul – Segway	Jun – Provaunt (turf caterpillars)	None
2016 Greens (Table 5)	2.75; 0.1 lb P <sub>2</sub> O <sub>5</sub> ; 0.6 K <sub>2</sub> O	0.110	Apr – LimestoneF May, Jun – Topdressed Jul – Tricure AD (wetting agent)	Jul – Segway; Formec 80 Aug – Tekken	Jul – Provaunt (turf caterpillars) Sep – Talstar P (sod webworm)	None
2016 Fairway (Table 6)	1.65; 0.1 lb P <sub>2</sub> O <sub>5</sub> ; 0.6 K <sub>2</sub> O; 2 fl. oz. Harrell's MAX Minors	0.375	Apr – LimestoneF Apr, Jul – Tricure AD (wetting agent)	Jul – Segway; Formec 80 Aug – Tekken	Jul – Provaunt (turf caterpillars) Sep – Talstar P (sod webworm)	None



Table 13. Maintenance practices performed in 2019 bentgrass trials at North Brunswick, NJ.

Test (Table)	Fertility <sup>1</sup>	Mowing Ht (inches)	Cultivation/Top Dress	Fungicides	Insecticides	Herbicides
2017 Greens (Table 7)	3.2; 0.1 lb P <sub>2</sub> O <sub>5</sub> ; 0.1 K <sub>2</sub> O; 2 fl. oz. Harrell's MAX Minors	0.110	Apr, Jun – LimestoneF  Apr-Jul – Tricure AD (wetting agent) May-Aug – Topdressed	Jul - Daconil Ultrex; Segway; Daconil Action  Nov - Signature + Daconil Ultrex	Jun - Provaunt (turf caterpillars)	None
2017 Velvet Greens (Table 8)	2.55; 0.1 lb P <sub>2</sub> O <sub>5</sub> ; 0.1 K <sub>2</sub> O	0.110	Apr, Jun - LimestoneF  Apr-Jul – Tricure AD (wetting agent) May-Aug – Topdressed	Jul - Segway  Aug - Tekken	Jun - Provaunt (turf caterpillars)	None
2017 Fairway (Table 9)	3.15; 0.2 lb P <sub>2</sub> O <sub>5</sub> ; 0.7 K <sub>2</sub> O; 5 fl. oz. Harrell's MAX Minors;	0.375	Apr, Jun – LimestoneF  Apr, Jun, Jul – Tricure AD (wetting agent)	Jul - Segway  Aug - Pegasus HPX + Kestrel MEX	None	Jun - Acclaim Extra (post-crabgrass)  Aug - Acclaim Extra + Confront
2018 Greens (Table 10)	4.9; 0.2 lb P <sub>2</sub> O <sub>5</sub> ; 0.7 K <sub>2</sub> O; 10 fl. oz. Harrell's MAX Minors; 2 fl. oz. Sugar Cal 10%	0.110	May-Aug – Topdressed	Jul - Segway  Aug - Heritage Action	Jun - Provaunt (turf caterpillars)  Sep - Talstar P (sod webworm)	May-Jul - Trimmit 2SC (Poa annua control)  Aug - Acclaim Extra (post-crabgrass)
2018 Velvet Greens (Table 11)	3.25; 0.1 lb P <sub>2</sub> O <sub>5</sub> ; 0.1 K <sub>2</sub> O	0.110	May-Aug – Topdressed	Jul - Segway  Aug - Tekken	Jun - Provaunt (turf caterpillars)  Sep - Talstar P (sod webworm)	Aug - Acclaim Extra (post-crabgrass)
2018 Fairway (Table 12)	3.85; 0.1 lb P <sub>2</sub> O <sub>5</sub> ; 0.7 K <sub>2</sub> O; 2 fl. oz. Harrell's MAX Minors	0.375	Apr, Jun – LimestoneF  Apr, Jul – Tricure AD (wetting agent)	Jul - Segway; Torque + Medallion SC	None	Jun - Acclaim Extra (post-crabgrass)

<sup>1</sup>Annual nitrogen applied (lbs per 1000 ft<sup>2</sup>). Additional fertilizers as noted (per 1000 ft<sup>2</sup>).