How Do The New Bentgrasses Stack Up?

Declaration, Kingpin, Authority, 007, Memorial and T-1 deserve some consideration

By Cale A. Bigelow

Several studies throughout the United States document the performance of the most recent generation of bentgrass that arrived on the scene in the 1990s. One study in central North Carolina evaluated 20 cultivars at two locations (Durham and Pinehurst) and reported that all cultivars tested provided appearance or quality equal or better than Penncross (Bruneau et al., 2001).

At the Pinehurst location on a restricted air movement putting green, the effects of mowing heights of 5/32-inch versus 1/8-inch and fungicide (whether to go with or without) were monitored closely.

The results showed that in the restricted air movement environment four cultivars — A-1, Crenshaw, G-6 and L-93 — were generally superior to Penncross, but varied slightly depending upon the specific management regime examined.

In this era of decreasing maintenance budgets and increasing labor and fuel costs, one area that might be prone to a reduction in spending would be the area of pesticides. Thus, a primary interest for many golf course managers has been cultivar disease resistance. Previous studies have shown significant differences among cultivars.

In a Northern location in Wisconsin, Penncross, Penn G-2 and Penn A-4 were evaluated. In that study the cultivars ranked Penncross better than G-2 and A-4 for dollar spot resistance. The researchers suggested the higher shoot density of the G-2 and A-4 may have contributed to increased spread of the dollar spot fungus from leaf to leaf. In the North Carolina study, several cultivars had good dollar spot resistance including A-1, A-4, Cato, Dominant Blend, G-2, G-6, L-93, Penncross, Pennlinks, Providence and Mariner.

It was interesting to note that no cultivar had better dollar spot resistance than Penncross, which was more resistant than Backspin, Century, Crenshaw, Imperial and 18th Green. In addition, several cultivars were noted for good brown patch resistance at both mowing heights studied. These included Cato, L-93 and Providence.

Some may ask if it isn't broke, then why try and fix it? We have grasses like the Penn A and G series and other cultivars like L-93 with very good dollar spot resistance, so why change?

Even today, more than 15 years after its introduction, many respected golf course managers and agronomists still recommend A-4 or the A-1/A-4 blend for new putting greens and "gas and grass" renovations. Perhaps people are comfortable with it just because of its track record and the fact that these cultivars are proven performers at some of the most well-recognized golf courses. But that philosophy has never satisfied turfgrass scientists and breeders as we are constantly striving to improve conditions and provide practical solutions to modern management challenges.

How cultivars rate

Today there are even more choices in bentgrasses. Based on my experience and that of some other turfgrass scientists, many of these cultivars appear to have much narrower regions of adaptation. Some cultivars perform very well in certain regions while they are poor performers in other locations.

Additionally, there seems to be some reluctance to adopting the most recent generation of high shoot density bentgrasses due to a perceived increase in maintenance requirements. This has resulted in some breeders marketing their bentgrasses as the ones that provide "championship conditions without the championship maintenance needs" compared to "the forgiving bents."

Regardless, some improvements have been made. What follows is a short discussion on my observations regarding these advancements.

Our recent cultivar evaluations for putting green use have been associated with our participation in the 2003 National Turfgrass Evaluation Program putting green trial in which we also included several "industry standards" of local interest. Our trial is located on a clay-based native soil push-up research putting green that has accumulated approximately 3 inches of a sand topdressing mixture. It is located in full sun, receives about 3 pounds of nitrogen per 1,000 square feet per year, irrigation to supple-

Continued on page 60

TABLE 1

Visual quality, shoot density and canopy smoothness ratings of 26 creeping bentgrass cultivars grown on a native soil research putting green at Purdue University, West Lafayette, Ind.

Cultivar	Mean Annual Quality 2004-2006	Mean Summer Quality 2004-2006	Shoot Density Aug. 2005	Canopy Smoothness Aug. 2005
	visual ratings (1-9 scale)			
Benchmark	7.6	7.7	8.0	6.7
Declaration	7.6	7.6	7.0	7.7
Kingpin	7.5	7.5	8.7	7.0
Penn A1	7.5	7.5	7.7	8.0
Authority	7.4	7.4	8.3	8.3
IS-AP9	7.4	7.4	8.0	7.7
007	7.4	7.4	8.3	7.7
Memorial	7.4	7.4	7.3	8.3
T-1	7.3	7.3	8.0	7.7
Mackenzie	7.2	7.3	8.8	6.0
Shark	7.2	7.2	8.3	8.0
Penn A4	7.1	7.1	7.8	8.3
CY-2	7.1	7.1	7.3	8.0
Tyee	7.1	7.1	8.7	5.7
Bengal	7.0	7.0	7.7	7.3
13-M	7.0	7.0	7.0	8.0
LS44	7.0	7.0	7.3	8.3
Alpha	7.0	7.0	8.0	8.0
Independence	6.8	6.8	8.3	7.7
L93	6.5	6.5	7.3	8.7
Pennlinks II	6.4	6.4	5.7	8.3
Backspin	6.4	6.4	6.0	8.7
Pennlinks	6.2	6.2	5.0	8.7
Crenshaw	5.9	5.9	6.7	9.0
Providence	5.8	5.8	5.3	9.0
Penncross	5.7	5.7	5.0	9.0
LSD (0.05)	0.4	0.4	1.0	1.0

Quality was rated on a 1-9 scale where 9= optimum greenness, density and uniformity values > 6 equal acceptable putting green turf. Shoot density was rated on a 1-9 scale where 9=densest turf. Canopy smoothness was rated on a 1-9 scale where 9=smoothest canopy following one full day of active growth.

To determine statistical differences among cultivars, subtract one cultivar's mean from another cultivar. Statistical differences occur when this value is larger than the corresponding LSD value (LSD 0.05).

Continued from page 59

ment natural rainfall and is mowed daily during the growing season at 0.140 inches with a triplex mower, core cultivated twice annually and supplementally topdressed with a moderate amount of sand on two other occasions during periods of active growth.

Fungicides are applied primarily to control dollar spot on a curative basis. These soil and moderate maintenance intensity programs are fairly common throughout our region.

Following three consecutive years of evaluations, I have broken the bentgrasses out into three tiers. The first tier includes 10 cultivars (Benchmark, Declaration, Kingpin, Penn A1, Authority, 007, Memorial, T-1, MacKenzie and an experimental IS-AP9) that have shown consistently high overall appearance. This attributed primarily to very high shoot density, fine leaf texture and consistent seasonal color as well as good to excellent dollar spot resistance (Table 1). Many of these cultivars, eight of the 10, are relatively new to the market.

The second tier includes 13 cultivars that have also generally performed well, but do not rate with the best of the best.

The third tier is a group of cultivars with poor performance relative to the best and surprisingly includes many widely planted cultivars (Penncross, Providence, Pennlinks, Pennlinks II, Backspin and Crenshaw). These cultivars do not rate as highly because they possess coarser leaves, less shoot density or a noticeable loss in summer shoot density, and in some cases, they are very prone to dollar spot. In general, those cultivars in the third tier can perform adequately for some lower-end golf courses with lower expectations. However, better cultivar choices are available for this portion of the cool-humid region and should be strongly considered.

This trial is an excellent one in which to observe genetic improvement, particularly among the Penn cultivars. There are several generations represented, and a one-time industry standard, Penncross, is among one of the poorest performers. This should be no surprise as it is more than 50 years old. Only slightly better than Penncross is Pennlinks, which is no different than Pennlinks II. Both of these, however, are inferior to Penn A-4, which is only barely similar to the most superior Penn A-1, which has the highest numerical value/ranking. In our trial, the major difference associated with the higher value of Penn A-1 versus A-4 is the severe susceptibility of A-4 to dollar spot in our study location.

Now the real question, which I frequently get: If I were asked to recommend a cultivar for putting greens from the Penn family, I would probably lean toward A-1 rather than A-4.

I would also strongly encourage someone to consider Declaration, Kingpin, Authority, 007, Memorial and T-1. These cultivars from my data have shown that they all maintain a high level of late-summer shoot density; the

Continued on page 62

Continued from page 60

canopies do not become excessively puffy or unsmooth and also possess moderate to high levels of dollar spot resistance. If dollar spot resistance is your primary focus in cultivar selection and you plan to use few fungicides for disease prevention, I would generally avoid Crenshaw, Penn A-4, Independence, Providence and Backspin, all of which have shown poor resistance relative to the other cultivars (Table 2).

It is important to keep in mind that these aforementioned categories are based on my personal observations during the past three years. In some cases, some statistical overlap among cultivars might exist. For example, T-1 is not statistically different than A-4. Additionally these categories are most appropriate for the cool-humid region where the trial has been conducted and differences in other climates such as the Southeast or arid Southwest might yield different results. Do not forget that management practices such as mowing height, intended use (putting green versus a tee or fairway) will result in different recommendations. I personally still think Penncross is an excellent fairway grass due to its aggressive nature and moderate disease resistance.

The last thing to consider in this era of niche cultivars is the concept of cultivar blends. Blending improves the genetic diversity of the turf stand. But when considering the components of a blend, it is important to only combine cultivars with similar genetic color, leaf textures and growth habits. Otherwise a patchy turf can result.

More information on this study and cultivar performance information for other regions can be accessed at the National Turfgrass Evaluation Program's Web site located at http://www.ntep.org. Another option is to visit some of these cultivars at their test locations during turfgrass field days, or better yet put out your own test plots on your course where you can evaluate these cultivars under your management programs in your unique growing environment.

Most importantly, do not be afraid to be the guinea pig when it comes to these new cultivars. There really does seem to be a difference.

TABLE 2

Dollar spot severity of 26 creeping bentgrass cultivars grown on a native soil research putting green at Purdue University, West Lafayette, Ind.

Cultivar	27 Oct. 2005	12 Aug. 2006
	----- infection centers per plot ------	
CY-2	0	0
Memorial	0	1
Declaration	1	1
Shark	9	1
Kingpin	2	1
13-M	0	2
Pennlinks	0	3
Benchmark	0	3
IS-AP9	0	3
L93	1	4
Pennlinks II	2	4
Penn A1	2	4
Bengal	12	4
Authority	8	5
007	2	6
LS44	1	7
Tyee	8	7
Mackenzie	5	10
Alpha	4	10
Backspin	28	11
Penncross	7	13
Providence	18	13
T-1	9	14
Penn A4	22	22
Independence	18	27
Crenshaw	47	40
LSD (0.05)	17	19

Dollar spot was rated as the number of infection centers in each plot.

To determine statistical differences among cultivars, subtract one cultivar's mean from another cultivar. Statistical differences occur when this value is larger than the corresponding LSD value (LSD 0.05).

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