SEED RESEARCH OF OREGON
The germination of ideas

IDEAS IN PLAY

Velvet Bentgrass Management

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WITHOUT QUESTION, the most important challenge facing the golf-turf industry is the reduction of golf's impact on the environment.

The primary goal of today's turf management research focuses upon "reduced input" of all facets of cultural management with particular emphasis on pesticides, fertilizers and irrigation. In fact, over the past 15 years the largest percentage of grant moneys have been awarded to turfgrass research programs involved in chemical fate studies (within a managed turfgrass ecosystem), the development of improved cultural practices (with emphasis on reduced pesticide and fertilizer usage), and turfgrass breeding programs.

Turfgrass breeding programs have made tremendous progress in the development and release of pest resistant and stress tolerant varieties of our most utilized turfgrass species such as creeping bentgrass, perennial ryegrass and Kentucky bluegrass, etc. The use of environmentally improved species and varieties coupled with the use of "reduced input" management techniques form the backbone of Integrated Pest Management (IPM) programs. The primary goal of any IPM program is to greatly reduce pesticide usage as well as those management practices that negatively impact the golf course environment.

Turfgrass breeders have long recognized that grasses can provide an extremely wide range of genetic material available for use in the turf industry, especially in IPM programs. Today's research into "reduced input management" is currently emphasizing the use of this wide range of genetic variability, however, orthodox thinking and a general misunderstanding of certain grass species by turf managers and golf course superintendents have left many grasses underutilized.

Velvet bentgrass, in particular, is one species that fell out of favor with turf managers nearly 50 years ago when management programs began their heavy reliance on petroleum-based fertilizers and pesticides. These higher maintenance inputs favored the creeping bentgrasses, and as such, golf course superintendents simply managed the velvet to death. Mismanagement coupled with poor seed production and a general disinterest by the major seed companies put velvet bentgrasses into obscurity.

Velvet bentgrass has the finest leaf texture, highest shoot density and smoothest playing surface of all turfgrasses, including the creeping and colonial bentgrasses. Velvets possess exceptional drought, shade and disease tolerance and while requiring very low levels of nitrogen fertility. Velvets also have good wear stress tolerance and, according to some researchers, better heat tolerance than was once considered.

Some superintendents know all of this, particularly those that have had the pleasure of managing velvet bentgrass greens. But virtually all basic turfgrass management textbooks give only passing notice and only marginal acceptance to the use of velvet bentgrasses. Curiously, all of the recent breeding accomplishments in creeping bents have served to only make them imitate the inherent characteristics of velvets (fine, upright growth, low fertility requirements and extensive disease resistance).

MANAGEMENT

Overall Turf and Putting Surface Quality: It has long been known that velvet bentgrasses are the most visually striking turfgrasses having the "most luxurious, green velvet" surface of all the turf-type grasses. Further, velvet greens are most often the smoothest, truest, fastest putting surfaces a golfer will face in a lifetime of play.

1999 Rutgers Turfgrass Proceedings
Performance in bentgrass putting green test

Variety	*1998-1999*
SR 7200	**7.6**
G-2	6.4
L-93	5.2
SR 1119	**5.1**
LSD	*0.6*

Density: Velvet bentgrasses have the finest texture of all the turfgrasses leading to extremely high numbers of shoots per unit area. The density of velvet bentgrass is much greater than creeping bentgrasses and higher than equivalent stands of *Poa annua*. In a recent study at STRI at Bingley, SR 7200 had both the highest shoot density and the finest leaf texture of all commercially available bentgrasses.

1998 STRI Report to Turfgrass Producers
Shoot density May 1997
(Closer Mowing – 5mm)

Variety	*Shoots/M²*
SR 7200	**245,756**
G-2	127,378
A-1	115,104
A-2	101,739
Providence	**87,828**

Color: There is much diversity of color within the velvet bentgrasses ranging from very light to a bright, lime green and often darker. SR 7200 possesses a striking dark green color that makes for an excellent contrast with fairways and roughs.

1998 STRI Report to Turfgrass Breeders
Fineness of leaf (mm)

Variety	*Shoots/M²*
SR 7200	**0.52**
A-1	0.70
G-2	0.71
A-2	0.72
Providence	**0.73**

Tolerances: Velvets have a very high drought tolerance compared to creeping bentgrasses. Where once considered poor performers, research at Rutgers University indicates a high degree of wear tolerance exists within this species especially in the SR 7200. Of all of the bentgrasses, velvets routinely show the highest tolerance to shady conditions. Also, velvet bentgrasses have a high degree of low temperature tolerance. High temperature tolerance has always been considered velvet's major limitation. There is a significant body of evidence that indicates a much higher degree of high temperature tolerance than was previously thought. Much of this research has been documented in the comparatively warm, humid regions of New Jersey compared with the cooler, moist regions of New England and the Pacific Northwest. As such, velvet bentgrasses may have a much broader region of usage than previously considered.

Disease Resistance: Velvet bentgrasses generally have high resistance to most turfgrass diseases. SR 7200 has been shown to have excellent resistance to dollar spot and brown patch (which is significant for a low-fertility bentgrass turf). It has shown good resistance to Fusarium patch. Mature turf is highly resistance to *Pythium sp*. diseases but is susceptible at the seedling stage (Damping Off). Late-season seeding or using seed treated with Allegiance or Apron will generally resist these seedling *Pythium sp*.

1999 Rutgers Turfgrass Proceedings		
Variety	*Brown Patch*	*Dollar Spot*
SR 7200	**6.7**	**8.7**
Penn G-2	5.0	7.1
L-93	4.7	7.8
SR 1119	**5.3**	**5.5**
Penn A-4	4.3	6.3
Providence	**4.3**	**7.3**
LSD	*1.5*	*1.2*

Copper spot has been the disease most associated with the velvets, however SR 7200 has shown significantly less copper spot than most of the creeping bentgrasses.

Fertility: Velvet bentgrasses are well-adapted to low nitrogen fertility programs and will not perform well if maintained at levels considered necessary for creeping bentgrasses. Most successful velvet management programs survive on less that 2 pounds of actual nitrogen per 1000 ft^2 per year (10 grams/$meter^2$), although sand-based greens may take upwards of 4 pounds of nitrogen per year. These nitrogen applications are generally in an ammoniacal form of nitrogen in a very small particle size granule (< SGN 100) or as a foliar-applied, soluble fertilizer. Organic nitrogen sources are invaluable to successful velvet bentgrass management due to their lower salt indexes and capacity to nourish soil biota.

Soil pH Levels: Although velvet bentgrasses are adapted to relatively low soil pH levels (5.0-5.5), they persist and perform well at slightly acidic levels of 6.0-6.5. In neutral soils (6.5-7.5) acidifying fertilizers like ammonium sulfate can improve velvet's performance.

Mowing Heights: Velvet bentgrasses are much more accommodating of low mowing heights than what was once thought. Heights as low as 0.120" (3.00 mm) are fairly common for tournament-grade velvet bentgrass greens. Similarly, velvet bentgrasses can be mown a comparatively higher heights of cut while retaining extremely smooth putting surfaces (0.156" or 4.00mm). Similarly, velvets perform very well at fairway heights to 0.560" (14.00 mm).

Thatch Management: Left unmanaged, the thatch produced by velvet bentgrasses can become problematic. Frequent, light topdressing coupled with light vertical mowing will help maintain a firm, smooth surface. Aggressive, deep verticutting may be needed once a year to remove hydrophobic thatch, and deep-tine aerification may be necessary to relieve compaction on native soil greens. Topdressing materials should be tested for particle sizing before application to prevent poor water infiltration issues.

It is apparent when comparing the positive to negative aspects that velvet bentgrasses have a decided advantage over creeping bentgrasses when considering low-input or IPM management programs. There has also been numerous reports, although not scientifically reported, that velvet bentgrasses compete very successfully with *Poa annua*, especially when managed at reduced irrigation frequencies, low fertility and low profile pH values. In fact, soil pH levels can be reduced using ammonium fertilizers (ammonium sulfate) to levels that actually inhibit *Poa annua* germination, while at the same time promoting velvet bentgrass. For those who wish to eliminate *Poa annua* infestations, velvet bentgrass may be a logical choice, particularly under shaded areas that suppress creeping bentgrass. The extremely high shoot density of velvet bentgrass makes it nearly impossible for any significant *Poa annua* infestation. Excessive nitrogen fertilization and/or core cultivation may, however, result in increased *Poa annua* populations.

A time-honored dictum of science is "never say never". But who would have thought we would now be cultivating *Poa annua* and even breeding new varieties of it for golf course use. Who would have thought we would be down at the mowing heights below 1/8", or that we would be using growth regulators, double mowing and rolling greens to get a more "perfect surface"? Who would have thought that we would be willing to accept grossly off-color turf to achieve extreme putting speeds?

And, who would have thought colonial bentgrasses and velvet bentgrasses would eventually become environmentally and economically significant choices for golf courses.....we would of course!