

Evaluation of Native and Traditional Turfgrass Species for Low Maintenance Lawns NAC/ISDA 2010-2

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Date: December 29, 2010

Objectives: The goal of this research is to determine the adaptation potential of several low-maintenance turfgrass species and mixtures to southern Idaho over two years of a low maintenance regime.

Methods

In 2010, the mowing regime included 3 and 4 inch mowing heights and was the same as 2009. These two mowing heights represent medium to high mowing heights that would be expected for a low maintenance regime.

Plots continued to be irrigated at 60 % ET replacement. No fertilizer was applied in 2009. In the late winter of 2010, an application of glyphosate was made to the dormant warm-season grasses to kill perennial weeds that had broken dormancy. Additionally, in the spring of 2010, broadleaf weeds were controlled using a combination broadleaf herbicide, Vessel. Billbugs were controlled with a spring preventative application of clothianidin.

Monthly color and quality ratings were taken in 2010 from April through October.

3rd YEAR RESULTS & DISCUSSION

Traditional Turfgrass Species

Bluegrasses. The KBG blend, ‘Nugget,’ ‘Wildhorse,’ ‘Midnight,’ and ‘Avalanche,’ was similar in color to the hybrid bluegrass on all observation dates except for July 7, when the hybrid was significantly lower than the KBG blend (Table 1). With respect to quality, both the hybrid bluegrass and KBG blend were similar on all observation dates (Table 2). Quality scores were considerably lower in 2010 for the bluegrasses than they were in 2009. It is suspected that the 60% irrigation regime caused these grasses to enter the winter of 2009/2010 in a weak state with lower carbohydrate reserves which continued into 2010. Considerable patches of dormancy were observed in the bluegrasses, resulting in the lower quality scores. This was somewhat of a surprising observation since both bluegrasses performed admirably in 2009. At the height of the summer heat (August 5), the bluegrasses were considerably lower in green color than tall fescue and the warm-season grasses. Quality scores were only somewhat comparable to the drought resistant warm-season grasses on this date. They performed very similarly to the fine fescues in both color and quality.

Tall Fescue. As in 2009, tall fescue performed very well under the low irrigation regime in this trial. Tall fescue had the highest green color in July, August, September, and October, and was similar to the

drought resistance warm-season grasses in the heat of the summer, August 5 (Table 1). Tall fescue also was at or near the top in quality scores and had the highest yearly average quality score (Table 2). Due to the wide leaf blades of tall fescue, relatively poor quality turf can occur at higher mowing heights. Quality was improved at 3 versus 4 inches in this study (Table 4). This improvement in quality is due to the increased density at the lower mowing height, resulting in narrower leaves and therefore and higher quality score. Slightly higher greener color was observed at the higher mowing height due to the additional leaf area, however, the reduction in quality at the higher mowing height offsets the slight advantage gained with the increased higher green color score (Table 3).

Fine Fescues. This spring and early summer, a fair amount of dead thatch was observed on all the fine fescues, especially on creeping red fescue. As with the bluegrasses, it is suspected the drought stress imposed during the 2009 growing season lead to a weakened turf stand going into the winter and resulted in a high level of winter kill which was observed in the spring and early summer of 2010. Whereas in 2009, color frequently reached a score of 7, this year, only chewings fescue, in August, and the fine fescue mix in August and September, attained a score above a 6 (Table1). The fine fescues this year failed to attain acceptable quality scores (Table 2). The low quality scores are attributed to the presence of large, thatchy patches of dead turf throughout the growing season. The slow growth rate of the fine fescues in conjunction with the high lignin content of their leaves, results in a very slow recovery rate. The mix of the four fine fescue species had the highest yearly average quality score of the fine fescues, followed by chewings and hard. Quality and color was significantly improved by mowing the fine fescues at the lower mowing height of 3 inches (Tables 3 and 4). The lower mowing heights results in less thatch and therefore more green leaf surface area resulting in the higher scores. This is a very important observation as lower mowing heights have been shown to improve mowing quality of the fine fescues, but lower mowing heights have not been associated with improved color and quality following induced drought.

Non-traditional Turfgrass Species

Idaho Fescues. The Idaho fescues had very low quality scores throughout the season and their color ratings stayed relatively even due to their dark blue-green leaves (Tables 1 and 2). Their low quality scores are a result of their extremely slow growth rate and tendency to go dormant in mid-summer, allowing adjacent grass species and weeds to easily invade the plots. Most of the Idaho fescue plots were over-run with grasses from adjacent plots, primarily other cool-season grasses. This resulted in very uneven, clumpy stands with various shades of green. Another factor



resulting in the poor quality ratings of Idaho fescue was the large amount of variability in color and summer dormancy. This variability is unacceptable in a turfgrass stand as it results in poor uniformity. However, this high degree of variability is desirable in a breeding/selection program looking to improve the turfgrass characteristics of the species. As a result of this research, the University of Idaho has initiated an Idaho fescue selection program.

Wheatgrasses. As in 2009, the wheatgrasses did not compare to traditional cool-season grasses in terms of color or quality by the July rating date (Tables 1 and 2). The wheatgrasses did green up earlier in the spring than the traditional cool-season grasses as noted by the higher color ratings in April and May (Table 1). The summer dormancy characteristic of these grasses however, resulted in low color ratings by July and August. Green color ratings were significantly improved by the higher mowing height for all the wheatgrasses due to more green leaf tissue (Table 3). In terms of turf quality, however, none of these grasses even approached acceptable quality; an acceptable quality score is considered a 6 or higher.



The highest average quality score was a 3.3 for western wheatgrass (Table 2). In 2009, it was noted that the mixture of western wheatgrass with blue grama, a warm-season grass, provided slightly greener color early in the season than the warm-season grasses alone, suggesting that such a mixture may provide acceptable turfgrass quality in a low-maintenance situation. This year, this grass combination resulted in significantly higher color ratings in July and August, and quality ratings approaching acceptable also in July and August. The warm-season component of this mixture is providing green leaf tissue when the wheatgrass has gone dormant during the summer. As a result of this research, the University of Idaho has initiated a research program evaluating the competition dynamics of blue grama with two other grass species including thickspike wheatgrass.

Blue Grama and Buffalograss. As in 2009, the warm-season grasses were slow to break winter-dormancy. By the June rating date, only very small portions of green color were present with no differences between the treatments (Table 1). By the July rating date, all species had broken dormancy and in August, all the warm-season grasses ranked highest in the entire trial for color, comparable to tall fescue. The warm-season grasses did not attain acceptable quality ratings until August rating date (Table 2). A rating over 5 indicates that at least one replication received a score of 6 or higher. The major quality characteristics preventing the buffalograsses from attaining higher quality scores were reduced uniformity due to the presence of stolons. Density was quite high for the vegetative buffalograsses, especially 'Legacy' which had the highest average annual quality rating of the warm-season grasses. The mixture of buffalograss and blue grama did not improve color or quality over either of the individual components.

Prairie Junegrass and Muttongrass. As in 2009, the junegrass variety ‘Barkoel’, known as “Turtleurf”, performed better than muttongrass with respect to both color and quality (Tables 1 and 2). Several of the muttongrass plots had been overcome with adjacent grass species. Muttongrass produced very clumpy, light green turf resulting very low quality ratings. As with the Idaho fescue, it is possible that improvements can be made with muttongrass. Utah State University has a native bluegrass improvement program in place. Junegrass, however, did produce a dense, uniform turf in some replications resulting in quality scores comparable to the traditional turfgrass species in July, August, September, and October. Although the quality scores were below acceptable standards for home lawns, it is important to note that under the extremely low maintenance regime of this study, junegrass can provide a turf cover that may be more persistent over several years. The characteristics reducing the quality of junegrass was the tendency for leaf shredding upon mowing. As a result, the higher mowing height resulted in a slightly higher quality score in June.

Mowing Effects

As mentioned in the discussion of individual grasses above, mowing regimes had an effect on color and quality for many of the grasses. The thick, dead thatch of the fine fescues was more pronounced at the higher mowing heights due to winter injury and therefore the higher mowing heights for these grasses resulted in lower color and quality ratings (Tables 3 and 4). The wheatgrasses on the other hand saw improvements in color due to the increased green leaf area. The wheatgrasses fast growth rate and low density resulted in the increased leaf area being more visible and therefore resulting in the higher scores at the higher mowing heights.

Unlike 2009, the lower mowing height did not have a pronounced effect in spring green-up for the warm-season grasses. Except for a slight increase in color at 3 inches for ‘Prestige’ buffalograss, the warm-season grasses had similar color ratings at both mowing heights.

Summary Points

- Kentucky bluegrass, hybrid bluegrass and fine fescue will perform well at 60% ET replacement for one year, but will undergo significant summer dormancy the following year at the same regime.
- ‘Thermal Blue’ Hybrid bluegrass did not exhibit any drought resistant characteristics observable at 60% ET replacement.
- Tall fescue maintained good turf color and quality for three years at 70 and 60% ET replacement.
- Mowing height of three inches improved turf quality for tall fescue and fine fescue compared to four inches.
- Idaho fescue varieties ‘Nez Perce’ and ‘Joseph’ did not provide acceptable turfgrass quality at 60% ET replacement due to color variation and substantial summer dormancy.
- Idaho fescue variability may allow for selection of improved varieties for turfgrass use.
- The fine fescues (chewings, hard, creeping red and sheep) provide good quality turf at 70 and 60% ET replacement, but can suffer significant winter kill resulting in dead patches of turf.
- The wheatgrasses did not provide acceptable turfgrass quality at 70 or 60% ET replacement due to severe summer dormancy and leaf shredding upon mowing.
- Streambank and western wheatgrass performed comparably to the more commonly used crested wheatgrass.
- Mixing western wheatgrass with blue grama improved the spring green-up of blue grama alone and the summer color retention of western wheatgrass alone, making for a possible low maintenance turfgrass.
- Vegetative buffalograss varieties ‘Legacy’ and ‘Prestige’ produced thick dense turf stands by the end of the second year, but significant weed control was necessary.
- Blue grama and buffalograss performed very well during all three years during the hottest parts of the year, however, in eastern Idaho, the very short green growing period for these warm-season grasses will limit their use.
- Prairie junegrass may provide a viable option for a low maintenance turf if rate of establishment and mowing quality can be improved.
- All the wheatgrasses produced vigorous seedlings which competed well with downy brome and blue mustard.
- This three year research project has provided excellent insight into possible low maintenance turfgrass species, and should provide 1-3 peer reviewed publications.
- Results from this research has spawned additional turfgrass research including an Idaho fescue selection program and a competition study to evaluate the dynamics of warm-season versus cool-season turfgrass mixtures.

Expenditure Report

The award for this work totaled \$4,950. The majority of this has been used for summer hourly help. Additionally, some has been used for fuel, herbicides and plot marking supplies.

Table 1. Color ratings for grass species during the 2010 growing season at the Aberdeen R&E Center. Color ratings based on a 1-9 scale with 1 = straw brown turf; 9 = deep, dark green turf.

Grass Species	4/7/10	5/5/10	6/9/10	7/7/10	8/5/10	9/10/10	10/20/10	2010 Average
	----- Color (1-9 scale) -----							
Kentucky bluegrass	1.4	2.9	4.8	5.5	5.6	4.9	3.6	4.1
Hybrid bluegrass	1.3	3.1	4.0	4.1	4.9	5.4	4.4	3.9
Tall fescue blend	2.1	3.9	6.6	7.3	8.0	7.5	7.3	6.1
Creeping red fescue	1.5	3.4	4.6	3.6	3.9	6.1	5.3	4.1
Chewings fescue	1.6	3.4	4.5	5.1	6.3	5.9	5.5	4.6
Hard fescue	2.0	4.6	4.8	4.6	5.8	6.3	5.9	4.9
Fine fescue mix	1.8	3.8	5.1	5.4	6.1	6.0	5.1	4.8
Sheep fescue	2.3	4.0	4.4	3.4	3.6	5.5	5.3	4.1
ID fescue 'Joseph'	2.4	4.6	5.1	4.4	4.1	4.3	3.5	4.1
ID fescue 'Nez Perce'	2.1	4.3	4.4	3.4	3.6	4.3	3.7	3.7
Crested wheatgrass	2.5	6.1	5.1	2.9	4.0	3.8	4.0	4.1
Western wheatgrass	1.9	5.0	5.3	3.8	3.5	4.6	3.5	3.9
Crested + western WG	2.6	5.9	5.0	3.6	3.8	3.9	3.5	4.0
Siberian wheatgrass	3.1	4.9	4.4	3.3	2.9	4.9	4.4	4.0
Crested + Siberian	2.8	5.1	4.4	2.9	2.8	4.1	4.0	3.7
Streambank wheatgrass	2.5	4.6	4.9	4.0	4.5	4.0	3.4	4.0
Blue grama	1.0	1.0	1.9	5.4	7.3	4.4	1.0	3.1
Blue grama + western WG	2.1	3.4	6.0	5.9	6.8	4.1	2.3	4.4
Buffalograss 'Top Gun'	1.0	1.3	1.8	5.4	7.5	4.1	1.1	3.2
Buffalo + blue grama	1.0	1.0	1.8	4.6	7.4	3.4	1.0	2.9
Buffalograss 'Legacy'	1.0	1.0	2.0	5.3	7.4	3.6	1.0	3.0
Buffalograss 'Prestige'	1.0	1.0	1.8	5.4	7.5	3.5	1.0	3.0
Prairie Junegrass	2.0	3.9	5.5	4.0	5.5	5.6	4.5	4.4
Muttongrass	2.4	3.7	4.0	3.9	4.9	6.1	4.8	4.3

Table 2. Quality ratings for grass species during the 2010 growing season at the Aberdeen R&E Center. Quality ratings based on a 1-9 score with 1 = very poor, thin, yellow turf; 6 = minimally acceptable turf; 9 = excellent turf with good density, color and uniformity.

Grass Species	5/5/10	6/9/10	7/7/10	8/5/10	9/10/10	10/20/10	2010 Average
	Quality (1-9 score)						
Kentucky bluegrass	3.3	3.9	4.1	4.5	4.1	3.6	3.9
Hybrid bluegrass	3.4	3.4	3.3	4.0	4.5	3.9	3.8
Tall fescue blend	4.1	5.1	5.5	5.3	5.5	5.3	5.1
Creeping red fescue	3.9	3.4	2.9	3.4	4.3	4.8	3.8
Chewings fescue	3.5	3.6	4.0	4.6	4.6	4.5	4.1
Hard fescue	4.0	3.4	3.6	4.3	4.5	4.4	4.0
Fine fescue mix	3.4	4.0	3.5	4.6	5.3	4.6	4.2
Sheep fescue	4.1	3.3	3.1	3.0	4.0	4.1	3.6
ID fescue 'Joseph'	2.5	2.3	1.5	1.3	1.6	1.3	1.8
ID fescue 'Nez Perce'	2.8	2.2	1.4	1.8	1.9	1.3	1.9
Crested wheatgrass	3.8	2.5	2.1	2.4	2.1	2.1	2.5
Western wheatgrass	3.5	3.0	2.1	2.8	2.3	1.9	2.6
Crested + western WG	3.8	3.0	2.3	2.5	2.1	1.8	2.6
Siberian wheatgrass	3.8	2.5	2.1	1.9	2.9	2.4	2.6
Crested + Siberian	3.5	3.0	1.8	1.5	2.0	2.4	2.4
Streambank wheatgrass	3.5	3.4	4.0	3.1	3.4	2.6	3.3
Blue grama	1.0	1.0	2.8	5.5	4.6	2.4	2.9
Blue grama + western WG	2.4	4.5	5.3	5.1	3.4	2.5	3.9
Buffalograss 'Top Gun'	1.0	1.1	3.6	5.3	3.6	2.5	2.9
Buffalo + blue grama	1.0	1.0	3.0	5.5	3.6	1.8	2.7
Buffalograss 'Legacy'	1.0	1.1	5.0	5.8	4.1	2.8	3.3
Buffalograss 'Prestige'	1.0	1.1	4.5	5.5	3.8	2.9	3.1
Prairie Junegrass	3.0	3.8	3.5	4.0	4.5	4.1	3.8
Muttongrass	1.9	1.8	1.3	2.0	1.8	1.5	1.7

Table 3. Color response of grasses to differential mowing regimes on June 9, 2010 in Aberdeen.

Grass Species	3 inches	4 inches
	----- Color Rating (1-9) -----	
Kentucky bluegrass	4.5	5.0
Hybrid bluegrass	4.3	3.8
Tall fescue blend	6.3	7.0
Creeping red fescue	5.3	4.0
Chewings fescue	5.5	3.5
Hard fescue	5.0	4.5
Fine fescue mix	6.3	4.0
Sheep fescue	4.5	4.3
ID fescue 'Joseph'	5.0	5.3
ID fescue 'Nez Perce'	4.0	4.7
Crested wheatgrass	5.0	5.3
Western wheatgrass	5.3	5.3
Crested + western WG	4.8	5.3
Siberian wheatgrass	4.0	4.8
Crested + Siberian	3.8	5.0
Streambank wheatgrass	4.5	5.3
Blue grama	2.0	1.8
Blue grama + western WG	5.8	6.3
Buffalograss 'Top Gun'	1.8	1.8
Buffalo + blue grama	1.8	1.8
Buffalograss 'Legacy'	2.0	2.0
Buffalograss 'Prestige'	2.0	1.5
Prairie Junegrass	5.0	6.0
Muttongrass	4.0	4.0

Table 4. Quality response of grasses to differential mowing regimes at two rating dates during 2010 in Aberdeen, ID.

Grass Species	5/05/10		6/09/10	
	3 inches	4 inches	3 inches	4 inches
	----- Quality Rating (1-9) -----			
Kentucky bluegrass	3.5	3.0	4.0	3.8
Hybrid bluegrass	3.8	3.0	3.5	3.3
Tall fescue blend	4.5	3.8	5.8	4.5
Creeping red fescue	4.5	3.3	3.8	3.0
Chewings fescue	4.3	2.8	4.5	2.8
Hard fescue	4.5	3.5	3.5	3.3
Fine fescue mix	4.3	2.5	4.8	3.3
Sheep fescue	4.5	3.8	3.8	2.8
ID fescue 'Joseph'	2.5	2.5	2.3	2.3
ID fescue 'Nez Perce'	2.8	2.8	2.0	2.3
Crested wheatgrass	4.3	3.3	2.8	2.3
Western wheatgrass	4.3	2.8	3.3	2.8
Crested + western WG	4.3	3.3	3.0	3.0
Siberian wheatgrass	4.3	3.3	2.5	2.5
Crested + Siberian	4.0	3.0	3.0	3.0
Streambank wheatgrass	4.0	3.0	3.3	3.5
Blue grama	1.0	1.0	1.0	1.0
Blue grama + western WG	2.0	2.8	5.0	4.0
Buffalograss 'Top Gun'	1.0	1.0	1.3	1.0
Buffalo + blue grama	1.0	1.0	1.0	1.0
Buffalograss 'Legacy'	1.0	1.0	1.3	1.0
Buffalograss 'Prestige'	1.0	1.0	1.3	1.0
Prairie Junegrass	3.5	2.5	3.5	4.0
Muttongrass	2.0	1.7	1.8	1.8