Naturalized areas can be a boon to wildlife. Golfers beware!

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Unmowed Rough: Research Update

Native and naturalized unmowed roughs are popular at many established and newly constructed Midwestern golf courses. Superintendents have come to realize that these areas often reduce labor, fuel use and pest-control chemical use compared to mowed areas that receive more intense management. In addition, since these areas use native and naturalized plants that are well-adapted to the locale, potential pest and environmental problems may be reduced. Finally, native and naturalized areas can enhance the golfing experience and increase wildlife habitat and diversity.

During the past years, we have studied native and exotic grasses and forbs to respond to superintendent questions about creating desirable out-of-play roughs. This work began in 1988 when we studied a group of native Midwestern grasses at the University of Illinois Landscape Horticulture Research Center in Urbana, IL (Voigt, 1993). These grasses were selected for their aesthetic appeal and their tolerance to a variety of environmental settings. After three years of evaluation, side-oats grama, blue grama, purple lovegrass, little bluestem and prairie dropseed demonstrated the potential to perform well in some unmowed roughs (Voigt, 1993).

Tall fescue (Festuca arundinacea) creates a tough, sustainable unmowed rough that is coarse-textured and difficult to hit from.

Results of this evaluation were used to develop a planting plan for an unmowed rough area on the south course at Olympia Fields Country Club in suburban Chicago. While mostly successful, this experience exposed several problems with an all-grass design, including weed invasion, planting methods and golfer acceptance (Voigt, 1996). We learned some golfers accustomed to the previous wall-to-wall mowing were displeased by the unkempt nature of the unmowed rough areas. We also learned that golfers often like to see some colorful wildflowers in unmowed areas; the perception of a "grasses only" planting was that they were weedy, while the addition of native flowering plants (forbs) created the perception of a "wildflower garden."

Later, we established a native plant study at three Chicago-area golf courses in full sun or light shade (Voigt, 2001; Voigt, 2000; Voigt, 1999). This research was cosponsored by GCSAA and the Midwest Association of Golf Course Superintendents, was established in 1997 and was designed to improve

(continued on page 8)

golf course superintendents' knowledge and understanding of more than 50 species of native grasses, sedges and forbs for planting in out-of-play roughs. Over two growing seasons, the aesthetic values of these plants were evaluated in unmowed roughs and the long-term performance of the plants was evaluated following three different planting-bed preparations. Nodding wild onion, false sunflower, ironweed, Culver's root, rattlesnake master, yellow coneflower, foxglove digitalis, mountain mint and stiff goldenrod can be valuable because of their attractive flowers (Voigt, 2001; Voigt, 2000; Voigt, 1999).

This previous work, along with continued questions and interest from local superintendents, provided the impetus to establish another study in late summer 2000 in which seeded cool-season and potted warm-season unmowed grasses were evaluated at the University of Illinois Orange Course in Savoy, IL (Voigt and Tallarico, 2004). Seeded cool-season grasses (redtop, orchardgrass, Kentucky 31 tall fescue, Millennium tall fescue, fine fescue blend, Timothy) planted in this study required nearly a year to completely cover the plots at the selected seeding rates. These grasses began flowering in spring 2002 and 2003 (Voigt and Tallarico, 2004).

In this group, the fine fescue foliage was the most ornamental of any of the seeded cool-season grasses each year through midsummer. By late summer, however, this foliage had become matted down and required mowing. Overall, because of their heights, the fine fescue blend and the tall fescues appeared to be the most useful cool-season seeded species in the study. Conversely, the orchardgrass and Timothy were too tall to be used anywhere except in very far roughs; both species have been grown successfully in shaded unmowed roughs at courses in the Chicago area and could be useful in similar settings elsewhere (Voigt and Tallarico, 2004).

Based on grass performance, mowing the cool-season grasses in this study once per year in autumn or once in spring and once in autumn produced the best season-long appearance. This became apparent during the later portions of the 2002 growing season when all the cool-season grasses required mowing because of woody weed invasion and a generally unkempt appearance (Voigt and Tallarico, 2004).

The transplanted grasses planted in this study were side-oats grama, tufted hairgrass, switchgrass and little bluestem. Side-oats grama and little bluestem grasses required tighter spacing than the spacing (one plant per 2.2 square feet) used in this

Blue grama (Bouteloua gracilis) plots at the Landscape Horticulture Research Center in Urbana.

Purple lovegrass (Earagrostis spectabilis) in bloom at the research plot area at the Midwest Golf House.

study; the planting rate was inadequate and allowed excessive weed invasion. However, in two growing seasons, switchgrass planted at the same spacing has covered the plots (Voigt and Tallarico, 2004).

The rust-red little bluestem foliage in autumn was the most ornamental aspect in the entire study. Switchgrass (4-6 feet), little bluestem (3-4 feet) and side-oats grama (3-4 feet) may all be too tall for some unmowed out-of-play areas (Voigt and Tallarico, 2004).

Current Study

In early 2003, Randy Kane, Jonathan S. Jennings, CGCS and I received funding from the Midwest Association of Golf Course Superintendents, the Golf Course Superintendents Association of America and the Illinois Turfgrass Foundation. Our unmowed rough studies began later in 2003 when we developed plantings at the Chicago District Golf Association's Midwest Golf House's Sunshine Course located near Cog Hill Golf Course in Lemont. The Sunshine Course is a three-hole course developed to serve youth and those with disabilities, and accommodate golfer instruction. In addition, this course is readily available to Chicago-area golf personnel and is an outstanding site to present research and field day activities of regional interest. The Midwest Golf House short course is an ideal setting to conduct this project. It has areas that border on wetlands in which we can examine species and mixes that provide a suitable buffer between the highly maintained turf and the natural settings.

A unique feature of this work is that we intended to evaluate and employ native plants from Chicago Golf Club (CGC) in Wheaton. Much of the unmowed rough area at CGC has only been grazed since settlement. The plants growing in the unmowed roughs are certainly sus-

(continued on page 11)

Unmowed rough areas may meet with golfer resistance; adding some colorful wildflowers in these areas can mitigate the perception of such areas as being weedy or unkempt.

tainable, having been onsite at CGC for more than a century. In addition, many of the unmowed rough areas at CGC are playable, that is, the plant growth in the roughs is open, allowing golfers to locate and strike errant shots that end up in these areas.

Thus, the overall goal of this study is to not only identify grasses that can be planted successfully in Midwestern unmowed rough areas, but those that can also create a playable rough from which errant shots can be located and struck. We have established four objectives to reach this overall goal.

An ongoing study launched in 2003 aims to identify grasses best suited for planting in Midwestern naturalized areas that also afford a playable rough.

Study Status

The first objective of this work was to identify the native grasses and forbs extant in the unmowed roughs at Chicago Golf Club. On August 20, 2003, plant taxonomist Ken Robertson, along with Randy Kane, Doug Pool, Lee Miller and I, toured Chicago Golf Club with superintendent Jon Jennings. While some of the grasses present in the roughs were exotic turf species, we identified several natives, including purple lovegrass (*Eragrostis spectabilis*), big bluestem (*Andropogon gerardii*) and old field panic grass (*Dichanthelium acuminatum subsp. lindheimeri*). Of greatest potential utility for playable unmowed roughs is purple lovegrass, a short (to 24″), warm-season species commonly occurring on dry sites. Its short height and attractive red-purple panicles in August make it a suitable grass for unmowed roughs.

Another objective of the work was to develop research plots at the Sunshine Course comprised of various turf, native and naturalized grasses

(continued on page 13)

Fineleaf fescues (Festuca spp.) are attractive, but can mat down after flowering and often perform poorly in heavy, wet, compacted soils.

currently grown in unmowed rough areas at Midwestern golf courses. To that end, several experiments and demonstrations have been planted at Midwest Golf House (Tables 1 and 2). Warm-season grasses, potentially suited to a playable unmowed rough, were planted in June 2003 (Table 1). All of the species in the study germinated, but only the blue grama and plugged purple lovegrasses have performed well. Plots primarily comprised of blue grama appear to be very well-suited to producing playable unmowed roughs and will be the main focus of this continuing project.

In anticipation of this project, in September 2002 we planted two fescues identified by Turf Seed Company to be tolerant of low levels of the nonselective herbicide Roundup. We planted these grasses at several densities with the hopes of periodically using Roundup to reduce weeds in a playable thin stand of turf. The plots were treated with Roundup in the summer of 2003 and 2004, resulting in good weed control and without causing damage to the fescues. Unfortunately, in 2004 when golf balls were thrown into any of these plots, they were difficult to find and would be nearly impossible to hit out due to plant density. This was even the case in plots seeded at the lowest rates.

A third objective of this work was to develop a manual for golf course personnel that describes managing unmowed rough areas. We are presently developing a manual that

(continued on page 14)

The study is generating recommendations on unmowed rough plant selection, establishment and management.

Table 1.
Warm-season grasses planted to determine suitability for planting in unmowed roughs.

Plots	Seeding rate in g/50 ft2	Approximate # of buffalograss burs	Approximate # of blue grama seeds	Approximate # of side-oats grama seeds
100% Buffalograss	45.4	5,600	0	0
100% Blue grama	45.4	0	82,500	0
25% Buffalograss/ 75% Blue grama	11.35/ 34.05	1,400	61,875	0
50% Buffalograss/ 50% Blue grama	22.7/ 22.7	2,800	41,250	0
75% Buffalograss/ 25% Blue grama	34.05/ 11.35	4,200	20,625	0
25% Buffalograss/ 70% Blue grama/ 5% Side-oats grama	11.35/ 31.78/ 2.27	1,400	57,750	955
45% Buffalograss/ 45% Blue grama/ 10% Side-oats grama	20.43/ 20.43/ 4.54	2,520	37,125	1,910
70% Buffalograss/ 25% Blue grama/ 5% Side-oats grama	31.78/ 11.35/ 2.27	3,920	20,625	955
100% Buffalograss + 12 Purple lovegrass	45.4	5,600	0	0
100% Blue grama + 12 Purple lovegrass	45.4	0	82,500	0
50% Buffalograss/ 50% Blue grama + 12 Purple lovegrass	22.7/ 22.7	2,800	41,250	0

provides "cookbook" information about selecting, establishing and managing plants for unmowed roughs. This manual is to be based on this and previous field research, library research and a survey of Chicago-area superintendents currently managing naturalized and native unmowed roughs successfully.

This past winter, we surveyed Chicago-area superintendents to identify plants and establishment and management methods currently employed in their unmowed roughs; 90 surveys were sent to Class A and Class B members of the Midwest Association of Golf Course Superintendents and 54 were returned. We are currently analyzing the survey responses; a copy of the survey and some preliminary responses appear at the end of this article (Table 3).

A fourth objective of this work was to host research field days at Midwest Golf House. In October 2003, approximately 15 turf industry professionals attended an informal open house at Midwest Golf House where research and demonstrations were displayed. On September 16, 2004, we hosted our first research field day at the Midwest Golf House site for interested golf course superintendents and others involved in the golf industry.

We expect that results of this project will benefit Midwestern golf courses in identifying plants suitable for native and naturalized sustainable roughs. It will also provide information about establishing and managing these areas. Additionally, we envision enhanced wildlife environments and more interesting golf. This project will deliver plant selection, establishment and management information for unmowed native and naturalized Midwestern golf course roughs, as well as educational and instructional opportunities generated by the research plots, Web site, field days, and planting manual. Moreover, it is anticipated that the research plots will generate data for additional articles in trade publications.

Table 2.
Roundup tolerance study.

Turfgrass	Seeding rate in g/48 ft.2
Aurora Gold Hard Fescue	10.9 g
Aurora Gold Hard Fescue	21.7 g
Aurora Gold Hard Fescue	43.5 g
Aurora Gold Hard Fescue	87 g
Aurora Gold Hard Fescue	87 g + 43.5 g Annual Ryegrass
Tomahawk RT Tall Fescue	43.5 g
Tomahawk RT Tall Fescue	87 g
Tomahawk RT Tall Fescue	130.5 g
Tomahawk RT Tall Fescue	130.5 g + 43 g Annual Ryegrass

Literature Cited

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Table 3.
Selected responses to 2005 MAGCS-GCSAA unmowed rough survey.

Question	Yes	No	Unsure
Is any part of your facility currently covered with unmowed grassy areas, wildflower plantings, meadows, or prairies?	47	7	0
In the near future, do you intend to expand your unmowed grassy areas, wildflower plantings, meadows, or prairies?	24	22	0
Were these unmowed areas part of your facility's original design?	15	25	5
Would you like to create unmowed grassy areas on your course?	24	9	0
Would you like assistance in creating unmowed grassy areas on your course?	21	14	0
Would you like to incorporate PLAYABLE unmowed grassy areas in your course(s)?	20	20	0
Do you fertilize your facility's unmowed grassy areas?	6	41	0
Do you mow your facility's unmowed grassy areas?	31	15	0

If the unmowed grassy areas were NOT part of your facility's original design, how were these areas established?
- just let the area grow (21)
- planted exotic grassy species (e.g., fine fescues) (3)
- planted native grasses species (e.g., little bluestem) (8)
- planted exotic grassy species and flowering plants (3)
- planted native grasses and flowering plants (15)
- other (3)

What were the biggest challenges you faced in converting to or installing unmowed grassy area(s)?
- weeds (27)
- slow establishment (10)
- golfer resistance (14)
- unkempt appearance (20)
- lack of plant or establishment process knowledge (4)
- other (1)

What are the biggest challenges associated with your unmowed grassy area(s)?
- weeds (35)
- golfer resistance (13)
- nuisance insects/wildlife (1)
- slow play (12)
- unkempt appearance (22)
- other (1)

What weeds most commonly occur in your unmowed grassy area(s)?
- Canada thistle (43)
- quackgrass (8)
- tall fescue (6)
- chicory (5)
- reed canary grass (6)
- unsure (6)
- white or yellow sweet clovers (20)
- giant reed (4)
- other (6)

How do you control weeds in your facility's unmowed grassy areas?
- spot-apply herbicides—please list herbicide(s), rates, and timing (28)
- broadcast-apply herbicides—please list herbicide(s), rates, and timing (8)
- hand pull or mechanically remove (25)
- other (0)

Do you burn your facility's unmowed grassy areas?
- we conduct burns in-house in the autumn (5)
- we contract burns in the autumn (1)
- we conduct burns in-house in the spring (24)
- we contract burns in the spring (0)