BENTGRASS VARIETY TRIALS

By Pat Zurawski

Planning for the construction or renovation of golf greens and tees or fairways eventually leads to a very key question. What variety of bentgrass should be used? Should I stay with what I now have or do I dare try a newer variety? The reason these questions are so difficult to answer is the fact that bentgrass variety performance can change substantially from one location to another.

The need to renovate the bentgrass nursery at the Blackhawk Country Club created the opportunity to examine the performance of different bentgrass varieties under our conditions. This report covers varietal differences observed just during the period of establishment. Next season we will look for differences in things such as winter injury, percent ground cover, color, growth habit and disease incidence.

Seed of ten bentgrass varieties was graciously provided for us by Chris Wendorf, Olds Seed Company. In addition to bentgrass variety, two other variables were introduced into the study. One was seeding rate. All varieties were seeded at rates of 1, 2 and 3 pounds/100ft². The third variable was seeding practices. These are identified in Table 2.

The layout of the plots is shown in Figure 1. Preparation of the plot area involved stripping off remnants of the old bentgrass nursery and laying down a 2-to-3 inch layer of top dressing mix prior to seeding. The plots were seeded September 11 when the soil temperature was 60°F.

The ten bentgrass varieties planted, their sources, and origins are as follows:

Pennway: This variety was introduced in 1983 by the Tee-2 Green Corporation. It is a blend of 25% certified Penncross, 25% certified Penneagle and 50% uncertified seed.

Penncross: This is first generation seed from random crossing of three clonal bentgrass strains. A Penn State University release, it is the product of breeding work begun by Dr. Burt Musser in the 1930s.

Pennlinks: This is second generation seed originating from breeding work initiated by Dr. J.M. Duich in 1964. Included in its genetic makeup is a South German bentgrass and nine Penn State experimental breeding lines. This variety first became readily available in 1987.

Penneagle: This, too, was developed by Dr. J.M. Duich. Its development began with 156 vegetatively propagated bentgrasses. Penneagle was released after 18 years of crossing and selection followed by five years of field testing.

Putter: This variety is a recent release from the Jacklin Seed Company. It was selected from crosses made over a number of years by Drs. Roy Goss and Stan Braven at Washington State University.

Prominent: This variety was developed and released by Seed Research of Oregon, Inc.

SR1020: This is another release from Seed Research of Oregon. Its development began in 1971 with 93 bentgrass clones collected from southwestern U.S. golf courses by Dr. Robert Kneebone. Five of these clones were selected in 1982 to become the parental clones of SR1020.

Providence (SR1019): Another product of Seed Research of Oregon, this variety was developed from five bentgrass clones selected by Dr. Richard Skogley at the University of Rhode Island.

Carmen: Produced by Van DerHave Oregon, Inc., this is a recent release for which little information is available.

National: Pickseed West, Inc., developed and produces seed of this variety. Its origin is several selections made from Canadian golf courses. Seed is available in the U.S. and Canada but supplies are limited.

OBSERVATIONS

Sufficient color was showing seven days after seeding to allow ranking of the bentgrass varieties at each of the three seeding rates. As shown in Table 1, National had the fastest rate of emergence and was closely followed by Penncross. Prominent was clearly the slowest to emerge. Slow emergence seemed to be a characteristic of all three of the Seed Research of Oregon varieties.

Color development rankings were done within each seeding rate rather than across rates. Thus, seeding rate effects are not reflected in the data in Table 1. The general impression gained from viewing the plots was that the amounts of green showing seven days after seeding was decidedly greater at the two rather than the one pound seeding rate but there was no difference between the two and three pound rates.

TABLE 1.
BENTGRASS STAND RATINGS* FOR EACH SEEDING RATE SEVEN DAYS AFTER SEEDING

BENTGRASS	SEEDING RATE lb/100ft²			AVERAGE
VARIETY	1	2	3	RATING
Pennway	4	3	2	3.0
Penncross	2	2	3	2.3
Pennilinks	7	5	5	5.7
Penneagle	3	4	6	4.3
Putter	5	6	4	5.0
Prominent	10	10	10	10.0
SR1020	9	8	8	8.3
Providence	8	9	7	8.0
Carmen	6	7	9	7.3
National	1	1	1	1.0

*1 = Best, 10 = worst

Seedling counts were made ten days after seeding to assess the effects of seeding practices on bentgrass stand. The first thing to note are the average stand counts for each

bentgrass variety (Table 2). These counts correspond quite well with the averages of the coloration rankings made three days earlier (Figure 2). Thus, for the most part, the emergence rate between days seven and 10 was the same for all varieties. Exceptions to this general rule were Pennlinks and Penneagle. Pennlinks apparently had a greater than average number of seedings emerge in this three-day period while emergence of Penneagle was less than average.

Effects of the seeding practices on seedling populations at ten days showed some varietal specificity (Table 2). For example, the average effect of raking plus rolling of the seedbed after drop seeding of the bentgrass was to increase seedling populations by 80%. However, on an individual variety basis, the effect of raking and rolling on seedling populations ranged from a 14% reduction for Putter to a 967% increase for Providence.

The effects of starter fertilizer (Scotts 19-26-5 at rates of 1.0 and 0.5 lbN) on seedling populations were not nearly as great as the effects of raking and rolling of the seedbed (Table 2). Without raking, starter fertilizer tended to reduce average seedling populations 20%. Raking, on the other hand, led to an average increase in seedling populations of 16%. Average seedling populations were essentially not affected by starter fertilizer rate changes.

Varietal responses to starter fertilizer were extremely variable (Table 2). In the case of Penncross, for example, starter fertilizer reduced seedling populations an average of 66% when not raked and 38% when raked. On the other hand, starter fertilizer fairly consistently increased seedling populations for those varieties having the lowest populations in the study.

On the average, a light application of topdressing mix had little effect on seedling populations when compared to the not raked or rolled treatment (Table 2). It seems rather clear that topdressing is no substitute for raking and rolling when seeding is by way of a drop spreader.

TABLE 2.

EFFECTS OF SEEDING PRACTICES ON BENTGRASS SEEDLING POPULATIONS TEN DAYS AFTER SEEDING

	PENNWAY	PENNCROSS	PENNLINKS	PENNEAGLE	PUTTER	PROMINENT	SR 1020	PROVIDENCE	CARMEN	NATIONAL	Average
	NUMBER OF SEEDLINGS PER SQUARE INCH										
Not Raked or Rolled	21	30	27	12	14	0	5	3	4	31	15
Raked	20	36	35	17	22	0	8	2	4	37	18
Rolled	28	37	33	19	30	1	10	4	7	54	22
Raked and Rolled	60	34	28	5	12	0	16	32	22	64	27
Normal Fert. Not Raked	10	9	20	10	21	0	5	11	14	21	12
Normal Fert. Raked	41	23	33	13	30	0	12	11	27	29	22
½ Normal Fert. Not Raked	8	11	18	13	16	0	7	7	13	26	12
½ Normal Fert. Raked	18	22	30	15	24	0	13	12	26	35	20
Topdressed	20	31	30	12	24	0	11	2	3	22	16
AVERAGE	25	26	28	13	21	◄1	10	9	13	35	

Fig. 1. Plot layout. The bentgrass varieties are seeded side-by-side in strips running from the front to the rear of the plot area. Feeding practices traverse the plot area in the opposite direction.

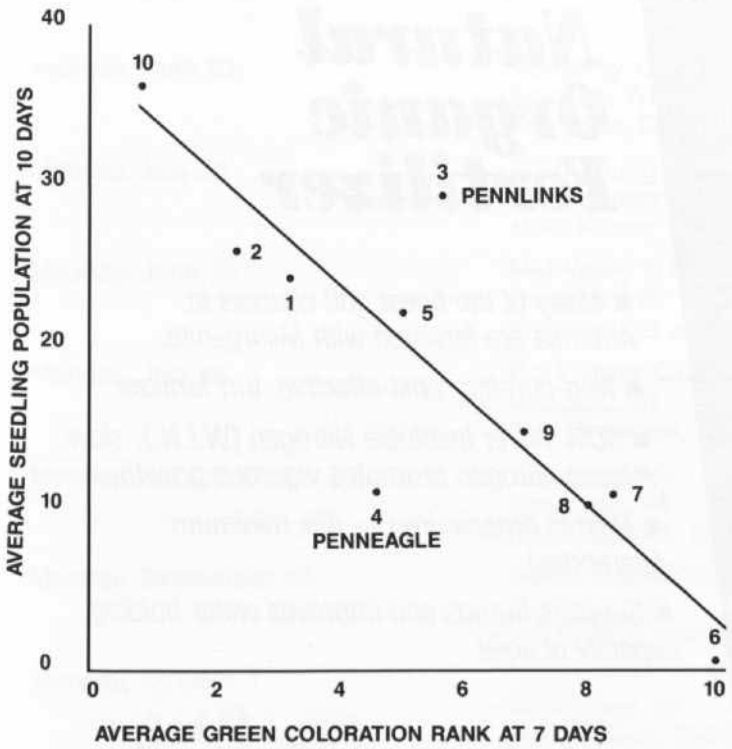

Fig. 2. Relationship between visual greening of the plots and seeding populations.

SUMMARY

The wide range in emergence rates for the ten bentgrass varieties included in this study was much greater than anticipated. It is not known at this time whether these differences are inherent characteristics, unique to the study site, or the result of differences in seed viability. Perhaps some of these differences will be less noticeable next season.

Raking and rolling are clearly the keys to establishment of good stands of bentgrass when the seed is drop spread. Topdressing does not substitute for raking and rolling. The need for starter fertilizer early in the establishment period was not readily evident. This observation may well be different next spring.

Editor's Note: Pat Zurawski is the assistant golf course superintendent at Blackhawk Country Club. This project and report were submitted as requirements for Soil Science 699 and were conducted under the direction of Dr. Wayne R. Kussow.

Thanks are due Chris Wendorf of L.L. Olds Seed for providing the seed used in this trial.

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WGCSA Monthly Programs for 1990

A variety of locations will welcome the 1990 meeting schedule of the Wisconsin Golf Course Superintendents Association. Regardless of where you live and work, at least a couple of the meetings will be close at hand.

The roster of 1990 speakers befits the excellent group of courses we'll be visiting. If you haven't noticed, each of our 1990 speakers is a golf course superintendent.

Danny Quast, Skip Wilms, Bill Roberts, and Gerry Faubel are coming back to Wisconsin to renew old acquaintances and share their experiences since leaving. Tom Harrison, Jerry Kershasky, Red Roskopf and Ted Woehrle are all active in golf course management today. Only Ted is a "foreigner". He is the superintendent of one of America's greatest golf courses, Oakland Hills C.C. in suburban Detroit.

DATE	LOCATION	SPEAKER/TOPIC
Monday, March 12	Spring Business/Educational Meeting Clarion Hotel	Tom Harrison Bill Roberts Jerry Kershasky Red Roscopf "Environmental Issues and Law"
Monday, April 23	Tuckaway C.C. Franklin, WI Pat Shaw, Golf Course Superintendent	Gerald Faubel President, GCSAA 1990's "A New Decade".
Monday, May 21	Koshkonong Mounds Fort Atkinson, WI Mike Kactro, Golf Course Superintendent	Skip Wilms "Crossing The Border".
Monday, June 18	Mid Valley G.C. De Pere, WI Pete Van De Hey, Golf Course Superintendent	NO SPEAKERS FOR SUMMER MONTHS
Monday, July 16	Rock River C.C. Waupun, WI Kris Pinkerton, Golf Course Superintendent	
Monday, August 13	Waupaca C.C. Waupaca, WI Don Peterson, Golf Course Superintendent	
Monday, September 10	Cedar Creek C.C. Onalaska, WI Pat Norton, Golf Course Superintendent	Danny Quast "1990 U.S. Open".
Monday, October 1 Oct 9 WTA	Tripoli C.C. Milwaukee, WI Jim Belfield, Golf Course Superintendent	Ted Woehrle "Restoring the Monster".

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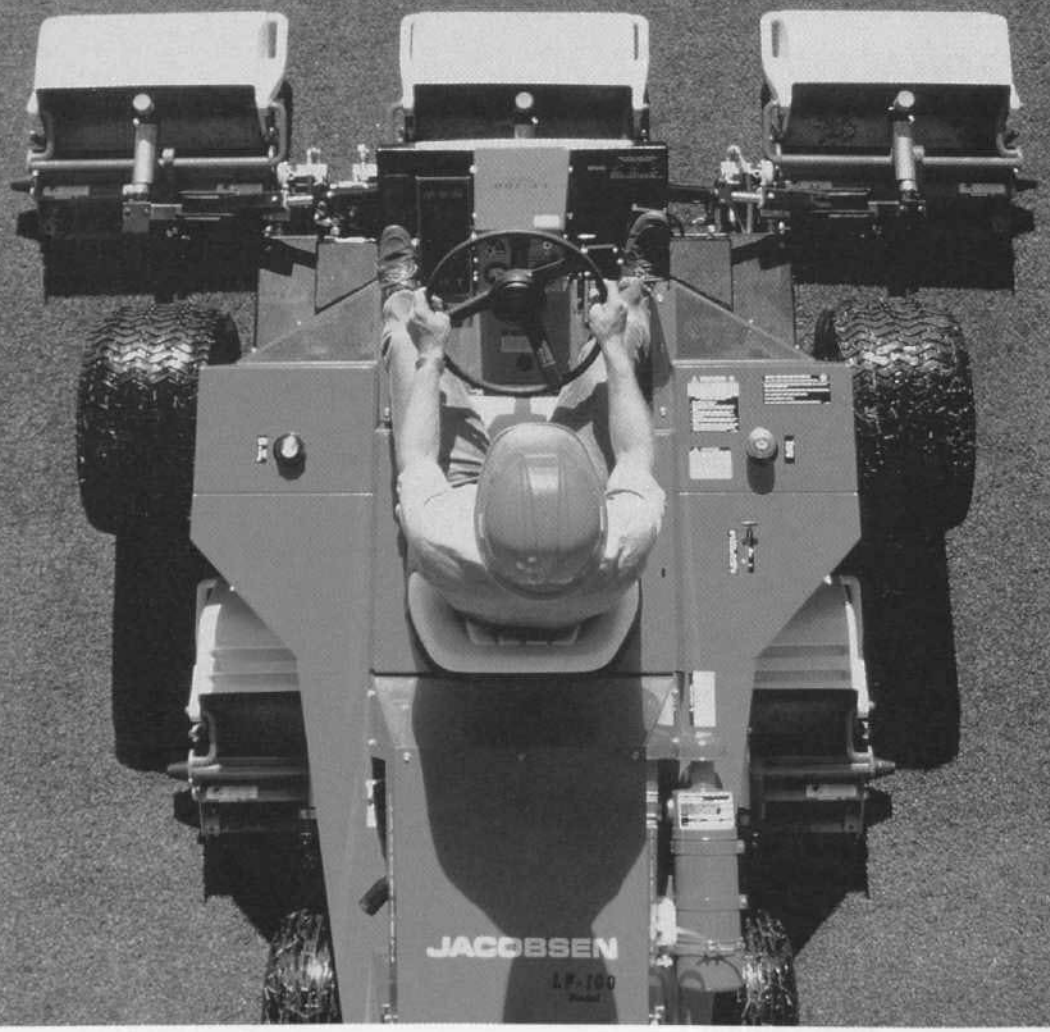

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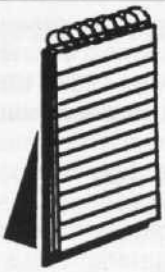

SPRING NEWS

By Monroe S. Miller

Tax time is fast approaching, and the thought of it is gut wrenching and aggravating. There seems to be no end to the greed and misdirected overspending by politicians and bureaucrats. I've been madder than hell in my shop over the $50 per person we paid for three of us to renew our pesticide applicator licenses. My anger rose another notch when we had to send in $150 to DILHR to get a variance to put our fuel storage aboveground, something **they** want us to do. I swore when I saw the bill from the Wisconsin Emergency Response Board for $800. I was furious and called for some explanation; all I got was a rude, overpaid and ignorant public employee. As usual, when I want to know something about government regulation, I spoke to Russ Weisensel and got the straight answer.

Jim Latham is hopping mad, too; his new invoices for the 1990 TAS includes a 5% Wisconsin use tax. The man who serves as our Club's green committee chairman is an attorney for Foley and Lardner; he offered Jim help and advice on the matter. After investigation, he found out it was to no avail. "Pay the 5%," he recommended.

I received a nice pay increase for the new season; I was quite pleased. Then I saw the first bimonthly paycheck. My federal withholding increased by $68, state withholding went up by $30 and the FICA increase was a bit over $20. Double those numbers to see my increased taxes for one month. Dane County raised taxes by 20% and my real estate taxes climbed by $300 in one year.

When will it end?

Despite millions of experiences like mine, some of the slobs who run the state were indignant when, on December 28, MONEY magazine placed Wisconsin among the nation's top 10 "tax hells" because of "skyrocketing state and local taxes." We earned a #8 ranking, a well deserved placement.

Tax hell is a very appropriate and descriptive phrase. I've about had it. Am I alone in this frustration, or is there similar feeling out there?

•

As if we don't have enough worries, it appears that the gypsy moth situation is looming larger and larger. Last summer, thousands of acres of trees in southern Michigan were stripped of foliage, leaving entire forests barren and looking like winter in July.

It was the gypsy moth at work. The insect's ravenous larvae have been eating leaves westward from Massachusetts, where it was introduced by accident from Europe a hundred years ago.

In early December, state entomologists announced the discovery of gypsy moths in large concentrations in Door County and Kewaunee County. Smaller but more widespread infestations were found in a belt from Milwaukee through Waukesha, Jefferson and Dane counties.

A DNR entomologist has said it isn't known yet how much trouble we're in, but added "it could be very serious."

The moths have defoliated entire forests in Vermont, New Hampshire, Maryland, New York and Pennsylvania. The main infestation has reached only as far west as central Ohio. But a second infestation has hit Michigan. It appears the infestations in both southern and northern Wisconsin have come from Michigan. Here's the theory:

"The gypsy moth larvae, a large fluffy caterpillar, travels by eating its way to the top of trees and then floating with the wind. It had to be unusual weather — a strong easterly wind combined with a strong updraft that floated them high into the air and across Lake Michigan to our state."

Julie Nara thinks the gypsy moth should be relatively easy to control up north. The wind generally blows from the west to east, keeping the moths pinned against the lake. Trapping and spot spraying with insecticide might control the infestations. But she's more worried about the Milwaukee-to-Madison outbreak. Even though it's a slight infestation, it is widespread, making it harder to control.

When Julie makes her plea for golf course volunteers in the gypsy moth trapping program, please say yes. It is easy to do and becoming an even more important part of controlling them.

We don't need to have our golf courses defoliated in July. We're having enough trouble with *Poa annua* about then!

•

The city of Madison had another WGCSA member retire recently. Erv Graf locked his office door for the last time on January 2, 1990, ending more than 35 years of work on city golf courses. For the past 15 years he has been the supervisor of golf operations.

Although he's only 60 years old, Erv decided to take advantage of the state's early retirement. He joins Ted Payne and Bud Kelzenberg who did the same thing last year. Retirement will give Erv more time with his hobby of golf club restoration and more opportunities to spend time on golf

courses as a player.

Congratulations and best of luck to a true gentleman of golf.

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There's a place in Pinehurst, North Carolina called the World Golf Hall of Fame. I think I've heard of it, but I haven't paid much attention. I'm a USGA man, and once you've visited the USGA Museum and Library at the headquarters in Far Hills, New Jersey, there seems little reason or need to travel to what are clearly secondary sites.

Couple that with the fact that the USGA's a hundred years old and this outfit was only founded in 1974. And the PGA runs it; we have no involvement. Hardly makes it a hot destination for golf course superintendents.

Some of us may want to stop now, though, thanks to some generous work by the Toro Company.

They were the founding sponsor, to the tune of $160,000, of the new shrine gardens on the grounds at the World Golf Hall of Fame. The garden was created to honor the world's golf course superintendents for contributions and service to the game of golf.

The gardens, covering four acres, are located near the entrance to the shrine building. In addition to the beautiful landscaping, there is a plaque that notes their dedication. The project started in April 1988, was completed in August 1989 and publicly dedicated on November 2, 1989.

Besides the thousands and thousands of seasonal plantings, there is a golf ball topiary, a putterboy topiary and a circular flower logo of the GCSAA.

Sounds great — I hope someday I'll have an opportunity to visit the place. And thanks are due Toro for their generosity.

Now if we could get them to make just a little donation, on behalf of turfgrass research, to the NOER CENTER.

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The question in the minds of a lot of agriculturalists (and some others, too, I suppose) is "will the 1990s be cooler than the sizzling 1980s?

The year 1989 was one of the hottest years of the last century, according to worldwide weather records collected by scientists in the U.S. and England. It appears from the data collected so far that 1989 will be the fifth warmest year since 1880.

This will scare you a bit: the six hottest years of the last 110 years all occurred in the 1980s.

Keep in mind that this is global information and isn't related directly to the weather any one of us might have had on his golf course in the '80s.

Both British and American records indicate that the six warmest years of the past 110 years were 1988, 1987, 1983, 1989, and 1980, in descending order. The average annual temperature worldwide during the two warmest years — 1987 and 1988 — was about 59.6 degrees. The average annual temperature dipped a bit to about 59.3 in 1989.

But there is still debate over whether this worldwide warming trend has been caused by the greenhouse effect. Most meteorologists say it is just too early to say if it is due to natural variations or indeed to the buildup of CO_2. Some say it likely is a combination of the two.

Obviously, I don't have a clue. But I sure hope it is nothing more than normal ups and downs and not because of man's excesses. And I also hope it is over. I am tired of above normal summers AND winters.

•

The GCSAA started construction on their new headquarters building on January 12. As you've read (here), it will be in Lawrence, Kansas where our present structure is and will even be on an Alvamar Golf and Country Club golf course, just like our current one is. This will be a new golf course, however. The new golf course and our new headquarters will both open in 1991.

The 40,000 square foot building will include a state-of-the-art educational facility, an extensive periodical library and advanced audio/visual equipment.

The grounds surrounding our current headquarters have been ridiculed by this reporter (and many others, I might add) for being so poorly maintained. The landscaping is atrocious, which seems somewhat fitting for a lousy maintenance situation. The new building will inspire some more appropriate landscape planning, including fountains along with a wide variety of shrubs and flowers. They've budgeted $300,000 for some professional work in this area. If they remember to budget some money to take care of it, it will be worth $300 grand.

Given our name, location of the building and what our members do, one wouldn't think that a major task!

The artist's drawing here shows what the building will look like when it is completed. Pretty classy.

For $4 million, it ought to be.

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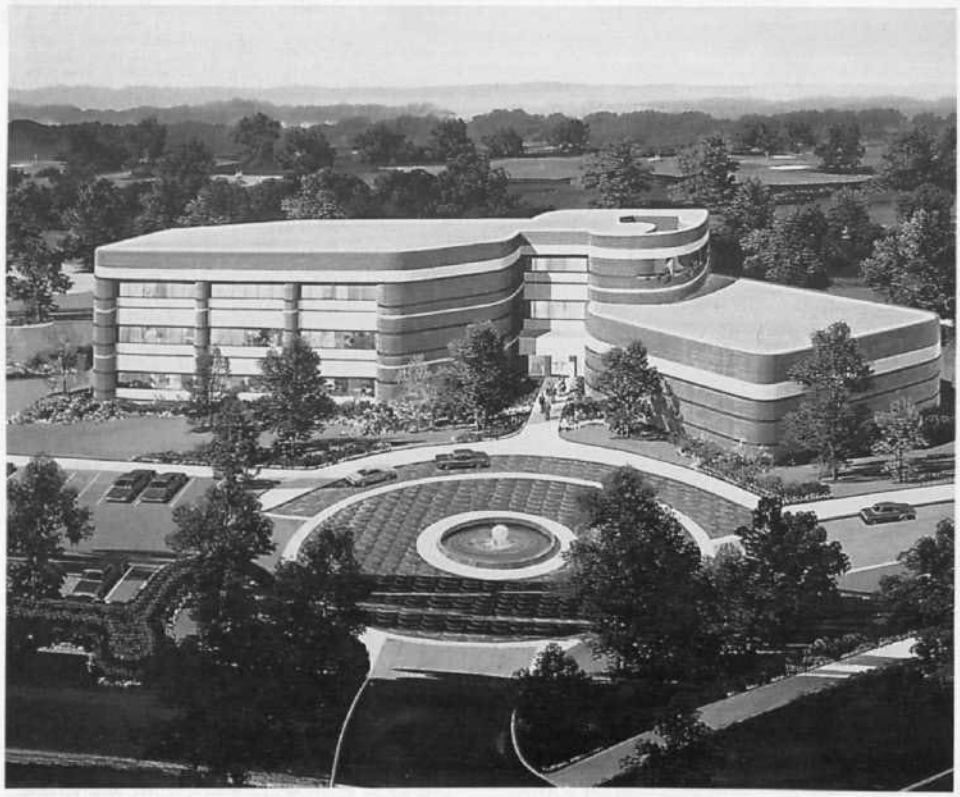

Why Are We Using Walking Greensmowers in 1990??

By Monroe S. Miller

When I attended the first Jacobsen School for College Students in Racine in 1968, we were able to operate a prototype riding triplex greensmower. All of us (students) were very excited and extremely impressed. "What a tremendous advance in golf course management," we commented aloud. The future was right in front of us; barely a handful of golf course superintendents in America had seen this wonderful, riding, wide-cutting machine. Anticipation reigned! The day of the dreaded walking greensmower was setting.

Twenty-two years later, I'm nearly that excited about the newest trend in putting green management — walking greensmowers! One of my employees charged that I was excited, in part at least, simply because I wouldn't have to do any of the walking!

The issue of walking mowers was initiated by our Green Committee last summer when they asked, "what else can we do to improve our putting greens?" We already are using the best fungicides, modest amounts of plant nutrients and lots of hand watering to complement our sparing application of water from the irrigation system. We cut at a height of 0.130 throughout the season, double cut when appropriate for events and tournaments and try for consistency in speed among the greens. Like others, we aerify our greens once a year, removing cores; we topdress when possible and verticut as required.

But there were a few things we hadn't started doing. We only cut a cleanup pass (clear to the green's edge, at least) twice a week. Three days of a week, no cleanup at all is cut. The other two cuttings of the perimeter are done by mowing in 12″ from the edge. Our players have noticed this for years and don't particularly like it. My argument has been "you'd like a triplex ring even less." The next step we were considering was cutting the cleanup with a. . .walker.

We hadn't bought into the turf groomer program. We will do that also in 1990.

Since our golf course is 70 years old, the green surrounds of almost every green are very steep — dangerously steep. Three triplex greensmowers have been rolled from them in my time at the club; no injuries, but safety is a constant concern. These slopes have precluded any cutting of the greens at a right angle to the direction of play. Over time, not having that option does take on some significance.

In addition to severe sloping in the target areas of our golf course, bunkering and a general lack of room create a lot of travel for turning the triplex mowers. The turf in those surrounding areas takes a beating and shows excessive wear, especially in stress periods. Players have noticed this, and commented on it.

Two committee members remarked on something golf course superintendents have seen for years. While looking across a putting surface in late afternoon when the sun is lower in the sky, they were almost always able to see the three separate heights of cut of each cutting unit on the triplex greensmower. No amount of effort, using a micro scale gauge which measures accurately to the thousandths, can eliminate those differences. In reality, three heights of cut exist on each green. Does it matter? Well, if you can see it. . . . Each golf course has to answer the question for its own players. Our committee said, "Yes, it does."

We've been mowing more and more tees on our golf course with walking mowers. Older golf courses, designed for times of significantly less play, traditionally have small tees shaped inconveniently for triplex mowers. Most of ours have the same steep banks our greens have. Many are extremely narrow, further limiting mowing directions. Even those golfers at our club who are only slightly conscious of what's going on around the course have noticed the dramatic improvement handmowing has brought to those tees.

Then, as always, the speed questions came up. We have a "base" speed of 8′6″, and Pat and I work to see we never go below that. Most often, the ball is rolling around 9′. But the decision was made to have us increase the base to 9′. Most in the know will tell you two safe factors to help speed greens up are the turf groomer and the walking greensmower.

I've been fortunate over the years in dodging the hydraulic oil leak bullets on our golf greens. But we had a beauty late last summer. It was healing by mid-fall, but we'll still see it in the spring. The fact that walking greensmowers don't leak hydraulic oil didn't escape our Green Committee Chairman's notice.

The time to start (or return to) using walkers on our golf course was right for another reason. We've lagged behind the other private clubs in our area in adding employees to our staff. We essentially had 10 people in 1989 and wanted to move to 14 for 1990. This labor increase fit nicely with the increased need for man-hours the walkers will bring. A little coincidental good luck never hurts.

I'm looking forward to their use when Memorial Day arrives, not only because of potentially better playing conditions over time, but for several other reasons. I've mentioned oil leaks — walkers have no hydraulics. They are far easier to maintain (even though there are more of them) — no flat tires and no dead batteries. The engines are smaller and less complicated and cheaper to replace.

The safety factor is a big one for me — lessened opportunities for rollovers. Also, since the machine is simpler, training operators should be much easier.

What about costs? Labor increases are significant, but we are doing that anyway. The cost of the machines is significant also. But they have at least a ten year life expectance (in my experience), and will extend the life of our two triplex greensmowers. Since those big machines run about $12 grand a copy these days, the cost of the walkers may actually be a smart investment and not just an extravagance. We are buying six walkers, one fitted with a turf groomer. We're also outfitting one of our triplexes with a set of groomers.

A couple of years ago, I purchased three new walkers — an orange one, a red one and a green one. Dave Noltner and I have watched these three different machines for level of maintenance each requires, number of repairs, dependability, quality of cut, how easy (or difficult) each is to work on, and popularity with operators. The red one cuts nicely but has a lousy, miser-

(Continued on page 41)

(Continued from page 39)
able and undependable engine. It was also poorly assembled — sort of a K-Mart mower. The green one is popular with operators, but is a mechanic's nightmare. The orange one has had the fewest problems, probably because it is essentially unchanged from the ones we used at Nakoma 25 years ago.

All of these machines must have been designed for use by dwarfs or ten-year-old kids. They are uncomfortable for anyone over 6 feet tall. None wins any ease of operation competition. The red company has a new walker coming into the marketplace. We tried it and it seemed fine. But we have been burned too often by new introductions. A tractor, plow and combine company is selling a walking greensmowers, but I refuse to buy a Japanese repaint. So by process of elimination as much as anything else, we decided to buy the orange walking greensmower.

We aren't going to park our triplex greensmowers or relegate them to fairway mowing. We're going to use them before Memorial Day and after Labor Day, when there just aren't enough of us around to operate walking mowers. My guess is that we'll use a triplex for the first couple of mowings after aerification, and I could see using the triplex with groomers for each Monday mowing. And who knows — maybe they'll be used for the first cut on those days when we do double mowings. They are, indeed, a useful labor saving machine that probably will never be absent from any golf course's equipment inventory.

The decision to start using (again) walking greensmowers wasn't based on economic factors, other than the basic "can we afford to do this?" Rather, it was steeped in agronomic issues; the essential question was "what else can we do to improve our putting greens?"

I think it's worth noting that not once did the topic of narrow striping come up. Nary a single member of our committee expressed a thought about the aesthetics the walking greensmower gives a putting surface. That's about how important "cute" is; it isn't worth mentioning when trying to make a deliberate, well thought out decision.

Now that the machines have been delivered, we are casting around to find the employees to operate them. It won't necessarily be easy, but it will be rewarding because of the results. It is going to be just like it was for me 25 years ago.

Back to the future, guys!