Can You Say Expansion?

By Scott A. Mackintosh

What a fantastic time it is to be a member of the Wisconsin Turfgrass Association. Members can participate in a great field day, a top shelf winter conference and enjoy a first class facility which supports pertinent turfgrass research.

As we all know, the O.J. Noer Turfgrass Research and Education Facility was opened for business in August 1991. The maintenance area consisted of a turf truck, a couple of John Deere mowers and a handful of research experiments. Today the Facility supports over 35 research experiments and has a maintenance area packed full of turf equipment. After this year's fall harvest, the Facility will expand by over 20 acres! Not only will the Facility expand in acreage but it will also expand its administrative role within the WTA.

What am I talking about? In April, the board members of the WTA provided funding for a part-time Program Assistant at the Facility. The primary responsibilities of the Program Assistant are to help run the Association and help make the Facility the central focus for the WTA.

Audra Anderson

The Program Assistant position was filled by Audra Anderson on May 9, 1994. Like many of the employees in the turfgrass industry, Audra grew up on a dairy farm helping her parents farm 150 acres and milk 45 Holsteins in Blue Mounds, Wisconsin. For the past six years Audra, her husband Scott and four-year old daughter Amanda, farm 140 acres and milk 50 Holsteins just outside of Madison. In addition to her responsibilities at the O.J. Noer Facility and farming, Audra is also a Customer Service Specialist for The Pleasant Company in the evenings.

She will be the first to admit she doesn't know anyone in the WTA, but has been impressed with Association for some time now. Since Audra lives close to the Facility she was able to watch it being constructed. Now actually working in the Facility and observing how it operates, she knows first hand just how dedicated and hard working the WTA is in supporting turfgrass research in Wisconsin. As an added benefit with her position, she hopes to learn a lot about different types of grasses and weeds that in turn may help her and her husband grow better alfalfa, corn and oats.

Audra is looking forward to meeting and working with the members of the WTA. Currently, she is busy preparing the mailing list for the upcoming Field Day and Winter Expo-95. For information about turfgrass research and administrative information such as membership dues, upcoming WTA events and registration, call (608) 845-6536.

Rained Out At Abbey Springs

By Kris Pinkerton

The April meeting of the WGCSA was held at Abbey Springs Golf Course in Fontana. Eighty-seven members showed up as host golf course superintendent Dave Smith presented a beautifully conditioned golf course. Unfortunately, thunderstorms and heavy rains stole the show and most golfers were forced to the clubhouse after only nine holes.

The luncheon speaker was Gary Griggs, vice president of the GCSAA. He spoke on the topic of "Issues Concerning the GCSAA." Tackling prepared questions from our membership, Grigg provided information about some of the GCSAA "financial fiascoes" like Hall Kimbrell Self Audit, Golf Business Today, the Singapore Pacific Rim Office, Headquarters building addition, and the inability to rent or lease the old headquarters building.

While commenting on questions about the Mortality Study and how it was handled, Grigg admitted that it may have been named improperly and no one had planned for the bad news.

There was a feeling of gratitude among our members for Grigg's trip. He is a busy person, but recognized the need to answer first hand many of the questions about the GCSAA and its activities these past couple of years. Thanks to Gary for his time.

Flag event winners for the day were:

Closest to the pin on # 16........................Ken Robers
Longest drive on #9 ....Chuck Wollner

GCSAA vice president Gary Grigg came to Wisconsin from Naples, Florida, to answer questions about GCSAA activities of late.

Abbey Springs in the springtime —it's becoming a WGCSA tradition!

The always affable golf course superintendent at Abbey Springs — Dave Smith.

Badger Turf and Grounds Club

THE NEED FOR MICRONUTRIENTS IN PUTTING GREEN ROOTZONE MIXES

By Bret M. Lynch

Editor's Note: *Bret Lynch is a May 1994 graduate of the University of Wisconsin Turf and Grounds Management Program. While in school, he worked at the Cherokee and Bishop's Bay country clubs. He has accepted employment as Spray Technician at the Pinehurst Resort and Country Club and is looking forward to helping prepare the number 2 course for the US Senior Open Tournament in June. Dr. Wayne R. Kussow was his advisor and supervised this project.*

Micronutrient deficiencies in turfgrasses grown in Wisconsin are vary rare. Yet, fertilizer companies offer fertilizers with micronutrients and sell micronutrient packages for use in all stages of turfgrass development. The incorporation of a micronutrient package into sand putting green mixes has become a fairly standard practice.

The objectives of this study were to determine if this is really necessary, if there is a bentgrass growth response, the nutrient or nutrients responsible, and if the growth response depends on the type of organic amendment used.

EXPERIMENTAL METHODS

Six organic amendments were used to prepare 80:20 (v/v) rootzone mixes. The amendments and their total sulfur and micronutrient contents are shown in Table 1. Four pots were prepared with each mix; two received a micronutrient package and two did not. The micronutrient package added was Scott's Trace Element Package (STEP). STEP was added at the recommended rate of 0.62 lb/cu. yd. of rootzone mix. This provides approximately 15.8 ppm Ca, 5.8 ppm Mg, 28.5 ppm S, 1.3 ppm Cu, 23.4 ppm Fe, 6.8 ppm Mn, 0.07 ppm Mo, and 3.4 ppm Zn in the rootzone mix.

The pots were seeded to 'Penncross' creeping bentgrass at a 3.0 lb/M rate after adding 1.0 lb N/M as 19-25-5 starter fertilizer. Starting 2 weeks after seeding, the pots were clipped every 4 to 6 days at 0.5 inch for 4 weeks. The clippings were oven-dried, weighed and ground for chemical analysis. The last four successive cuttings were combined to provide the amount of tissue needed for analysis by the State Soil and Plant Analysis Laboratory.

OBSERVATIONS

Bentgrass growth response to the micronutrient package became evident approximately 2 weeks after emergence. However, at no time during the study were there any decided differences in visual appearances of the bentgrass growing in pots receiving STEP and those which did not.

Increases in total clipping weights attributable to the application of STEP ranged from -3% for the fermented rice hulls to +52% for the Wisconsin peat (Table 2). Overall, application of STEP increased the bentgrass clipping weights by 38%.

Clipping weights from the pots not treated with STEP were correlated with the analyses of the organic amendments to see if there was any possible influence of organic amendment S or micronutrient content on bentgrass growth. The only significant relationship found was for boron. The evidence was that the 10.9 ppm boron in the Dakota reed sedge had an adverse effect on bentgrass growth (Fig. 1).

Concentrations of S and micronutrients found in the creeping bentgrass clippings are presented in Table 3. The

(Continued on page 45)

FIGURE 1

Influence of the boron in six rootzone organic amendments the clipping weight of creeping bentgrass during establishment.

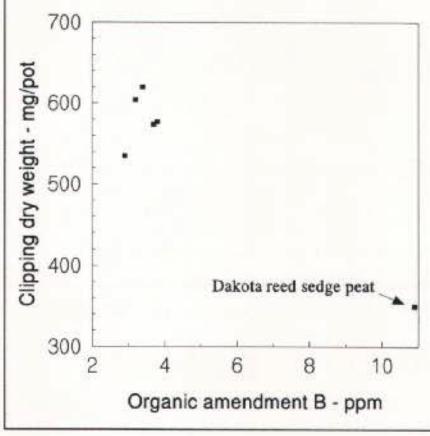


FIGURE 2

Relationship between creeping bentgrass clipping sulfur concentrations and dry weights.

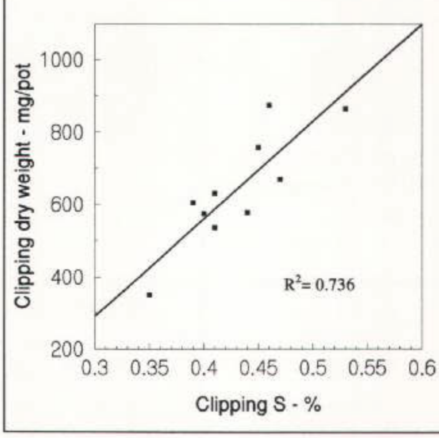
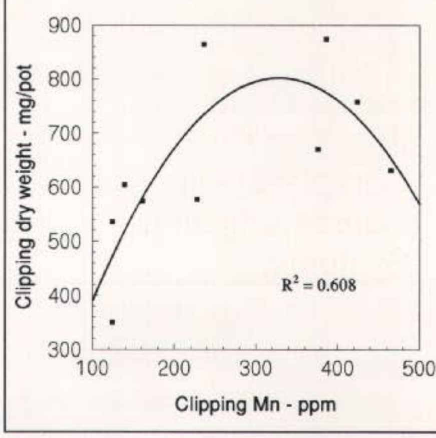
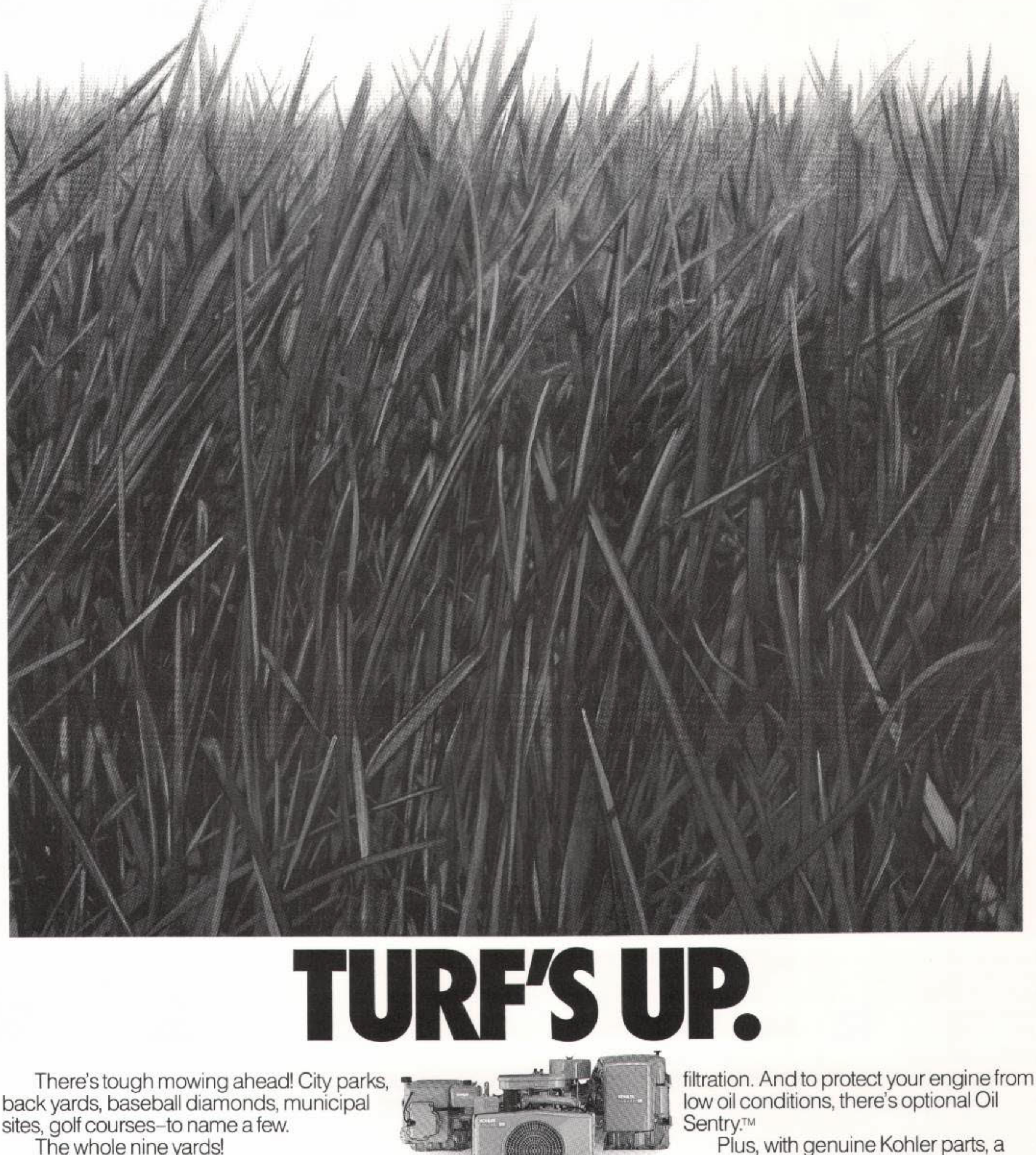


FIGURE 3

Relationship between creeping bentgrass clipping manganese concentrations and dry weights.





TURF'S UP.

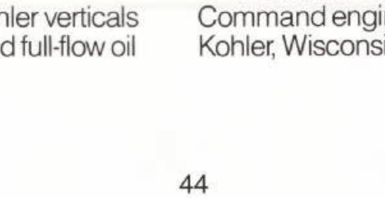


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TABLE 1. Total sulfur and micronutrient concentrations in rootzone amendments.

Amendment	Nutrient concentration S	B	Cu	Fe	Mn	Zn
	ppm					
Canadian peat	959	3.2	7.0	346	19.3	7.8
Michigan peat	938	2.9	8.5	945	18.1	17.0
Wisconsin peat	1085	3.7	10.3	2010	83.3	25.5
Reed sedge peat	2890	10.9	9.8	3790	69.0	10.4
Fermented rice hulls	376	3.4	9.1	83	149.0	17.3
Humate	4850	3.8	24.1	5590	26.1	7.0

(Continued from page 43)
interpretative standards available for turfgrass tissue concentrations of essential plant nutrients indicate the following:

Sulfur concentrations were all sufficient whether STEP was added or not and STEP brought all S concentrations to the upper limit of the sufficiency range.

Boron concentrations were sufficient for all treatments even though STEP does not contain this micronutrient.

Copper levels were at the upper end of the sufficiency range (20 ppm) in all treatments.

Iron concentrations were consistently at the upper end of the sufficiency range (100 ppm) when STEP was not applied. This concentration of Fe was exceeded when STEP was applied to the Michigan and Wisconsin peat treatments. However, application of STEP did not significantly increase clipping Fe concentrations.

Manganese concentrations in the absence of STEP were sufficient or exceed the upper limit of 150 ppm. With the addition of STEP, tissue Mn levels exceed the 150 ppm concentration by 57 to 210%.

Zinc concentrations were all sufficient without the addition of STEP; five of the six organic amendment treatments exceed the sufficiency range when STEP was added.

The clipping weights of the creeping bentgrass were regressed on tissue concentrations of S and the micronutrients to see which of these nutrients appeared to be responsible for the observed increases in growth observed when STEP was applied. Since there was no growth response to STEP in the fermented rice hulls treatment, data from this treatment were not included in the regression analysis.

TABLE 2. Creeping bentgrass growth response to STEP applied to rootzone mixes with different organic amendments.

Organic amendment	Bentgrass clippings weight* -STEP	+STEP	Change
	mg/pot		%
Canadian peat	604	758	+25
Michigan peat	535	670	+25
Wisconsin peat	574	874	+52
Reed sedge peat	350	631	+80
Fermented rice hulls	620	602	-3
Humate	577	864	+50

Duncan's LSD (p=0.05)
Among amendments = 76 mg
Among STEP treatments = 93 mg

* Sum of four mowings.

The regression analyses, which examine the strength of the relationship between clipping weight and nutrient concentration, revealed that only the tissue concentrations of S and Mn were significantly related to bentgrass growth. The relationship was particularly strong for sulfur (Fig. 2). In fact, the R2 value obtained indicates that nearly 74% of the observed variation in clipping weights could be attributed to differences in tissue concentrations of S. The higher the tissue concentration of S, the higher the bentgrass clipping weight, even though tissue S concentrations in all treatments were sufficient without the addition of STEP.

The relationship between clipping weights and tissue Mn concentrations was very different from that for S. Indications were that in four of the ten treatments Mn actually depressed bentgrass growth (Fig. 3). The optimum clipping Mn concentration was around 350 ppm. Hence, this may be the point where Mn toxicity begins to occur in 'Penncross' creeping bentgrass. This concentration of Mn occurred when STEP was applied to the all but the fermented rice hull and humate treatments.

Multiple regression, in which the additive influences of S and Mn tissue concentrations on clipping weights were examined, showed that the two nutrients accounted for 80% of the variation in clipping weights. But clearly, the primary factor involved was clipping S concentration.

CONCLUSIONS

This greenhouse study indicates that, while addition of sulfur and micronutrients to sand putting green rootzone mixes can significantly increase creeping bentgrass growth rates during establishment, indiscriminant use of a micronutrient package is not warranted and can actually elevate the levels of some nutrients to toxic levels. For the six organic amendments studied, addition of sulfur alone would likely have been more beneficial overall than application of the micronutrient package. Further research is needed to devise the means and standards necessary to judge in advance which nutrients other than N, P, and K need to be added during the blending of sand-based putting green rootzone mixes.

TABLE 3. Sulfur and micronutrient concentrations in clippings from creeping bentgrass grown in 80:20 rootzone mixes with and without STEP.

Rootzone mix amendment	STEP added?	S	B	Cu	Fe	Mn	Zn
Canadian peat	No	0.39	15	60	91	139	52
	Yes	0.45	15	57	116	424	120
Michigan peat	No	0.41	12	30	177	124	48
	Yes	0.47	15	41	134	376	98
Wisconsin peat	No	0.40	13	31	143	161	45
	Yes	0.46	14	41	132	386	101
Reed sedge peat	No	0.35	17	27	106	124	43
	Yes	0.41	18	35	122	465	121
Fermented rice hulls	No	0.38	13	38	87	88	46
	Yes	0.46	14	81	88	344	106
Humate	No	0.44	9	21	97	228	29
	Yes	0.53	11	26	91	236	54
Duncan's LSD (p=0.05)							
Among amendments		0.01	NS*	11	20	36	10
Among STEP treatments		0.04	NS	6	NS	18	6

* NS = not significant.

Green Clean Sweep

Keeping Our Side of the Street Clean...

By Dr. Frank S. Rossi
Department of Horticulture
University of Wisconsin-Madison

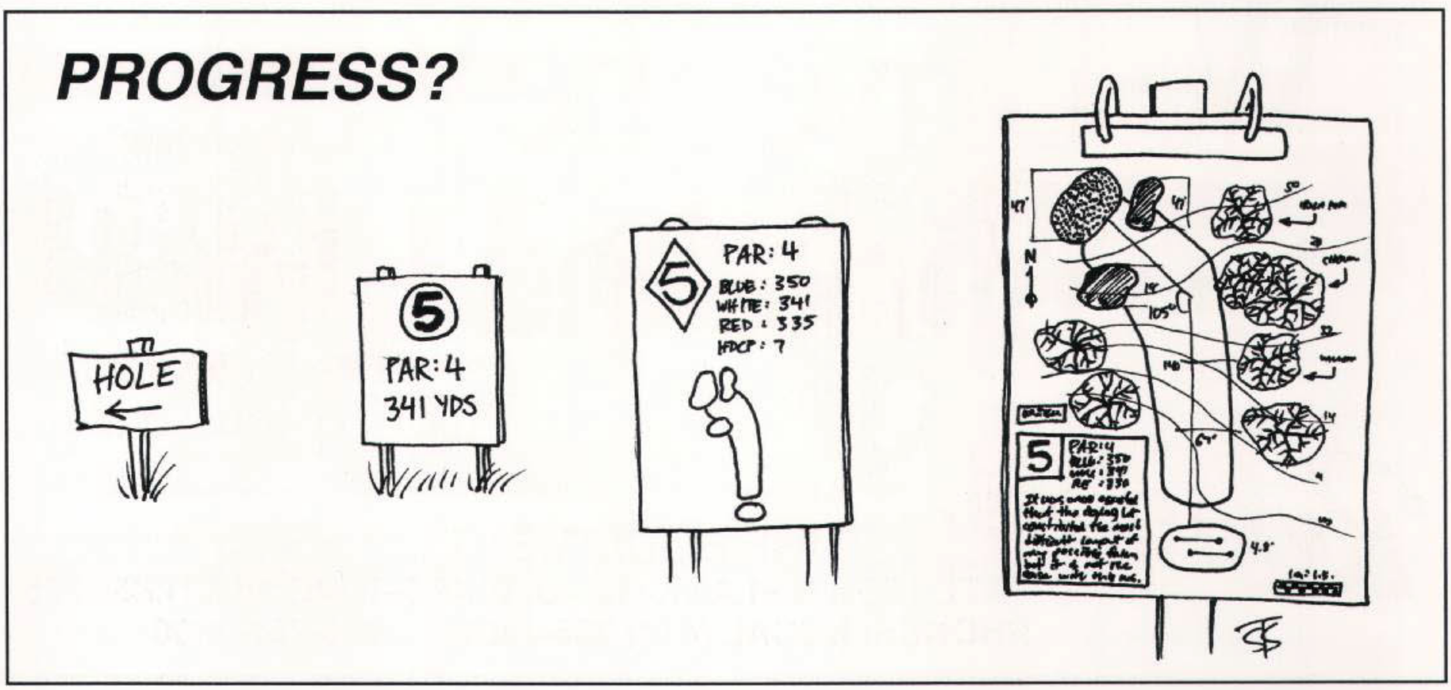
As you know, I have used a fair amount of space in *THE GRASS ROOTS* discussing environmental issues. My approach in the articles is typically of a philosophical nature; challenging you and myself to ponder our role as agronomists, biologists and human beings. I believe that this is a caring profession filled with individuals who want what is best for the environment. When I present my Environmental Risk Management seminar, I talk about focusing on keeping our side of the street clean—here's your chance.

On Saturday August 20, 1994 in cooperation with county officials, the UW-Extension-Waukesha office and the UW-Turfgrass Program are providing an opportunity for professionals in the Green Industry in Waukesha County to dispose of unwanted, outdated, banned and non-usable pesticides. Historically, this service has been funded by the federal, state and local government exclusively for persons who produce an agricultural commodity. This is a pilot effort for our industry and will be held in conjunction with the Agricultural Clean Sweep for private applicators.

Currently, we are coordinating with county officials to develop surveys, establish a fee structure, offer satellite locations to reduce traveling distance and outline collection site responsibilities. The golf course superintendents and other green industry representatives in the vicinity of the collection sites will be asked for some volunteer assistance. Our hope is to develop a protocol that can be used for future clean sweeps.

I am looking forward to helping this industry reduce pesticide inventories, especially, pesticides that are no longer legal to use. We need to take this proactive step as an industry to demonstrate our commitment to "cleaning our side of the street". You will be hearing more about the details of this effort as the summer progresses. However, if you are in the Waukesha County area and would like to be involved in the effort, please FAX me a brief note with your name, affiliation and phone number—my FAX number is (608) 262-4743.

This event is the first of many that the UW-Turfgrass Program will be offering through the Integrated Turfgrass and Environmental Management (ITEM) program. Future events will include seminars on Designing Pesticide Containment Facilities, Environmental Communication, Developing an Integrated Pest Management program and the UW-School of Turfgrass Management. There will be an ITEM series of publications that address environmental regulations and compliance in Wisconsin. Finally, we are in the midst of overhauling the Pesticide Applicator Training program for Turfgrass and Ornamentals, in order to enhance the quality of education offered to pesticide applicators.



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Badger Turf and Grounds Club

Creeping Bentgrass Response To New Nitrogen Carriers

By Richard A. Schmelzer

Editor's Note: *Rick Schmelzer is a May, 1994 graduate of the University of Wisconsin Turf and Grounds Management Program. Rick entered the program late in his academic studies and graduated with only one season of golf course experience. Thus, he has elected to spend the summer of 1994 as an intern at the Cordillera Resort Golf Club in Vail, Colorado.*

Turf fertilizer manufacturers are continually developing new products. Two that came onto the market this year are Scott's new methtylene urea formulation, "Triaform", and "Hou-Actinite", a dried activated sewage sludge product produced in Houston.

In order to use new fertilizers successfully, turf managers need to know how turfgrass responds to the new products in relation to fertilizers with which they are already familiar. The purpose of this study was to compare bentgrass uptake from Triaform and Hou-Actinite with fertilizers that have been in use for some time.

EXPERIMENTAL METHODS

This was a greenhouse study in which several fertilizers were applied at the rate of 1.0 lb N/M to pots of 'Penncross' creeping bentgrass established in an 87:13 rootzone mix blended from Greensmix sand and Dakota reed sedge peat. A total of 4 sets of clippings were removed over the 34 days following fertilizer application. The clippings were oven-dried, weighed, ground and analyzed for their N concentration. A control treatment, one with no fertilizer N applied, was included in the study so that N uptake from the fertilized pots could be corrected for any N that may have come from the rootzone mix or the starter fertilizer applied when the bentgrass was seeded.

OBSERVATIONS

Scott's Triaform, which is high in short-chain dimethyltriurea, produced the most clippings among the 9 fertilizers tested (Table 1). It out-yielded the older Scott's methylene urea formulation by nearly 20% and Nutralene by 33%. Bentgrass growth response to Hou-Actinite was intermediate that of Milorganite and Sustane. On average, the synthetic N carriers produced 22% more clippings than did the natural organic fertilizers.

As expected, fertilizer N uptake was pretty much in accord with the amounts of clippings produced (Table 1). Fertilizer N uptake was essentially the same from urea and Triaform and higher than for any other N carriers. The lowest N uptake was from Milorganite, but this was not statistically different from the amounts of N taken up from IBDU, Nutralene, Hou-Actinite, or Sustane.

The N fertilizer recovery values ranged from 33.1 to 56.8% (Table 1). The latter value is high for such a short-term study. This probably reflects the near ideal growing conditions under which the study was conducted and the fact that no leaching loss of N was allowed. Nitrogen N recovery from the three natural organic fertilizers was similar and averaged 37%. In comparison, N recovery from the synthetic N carriers averaged 49%. Effective use of different N carriers requires some knowledge of how rapidly their N is made available to turfgrass. In this study, urea and Triaform were inseparable with regard to the pattern of N uptake by the creep-

FIGURE 1
Bentgrass N uptake from various types of N carriers.

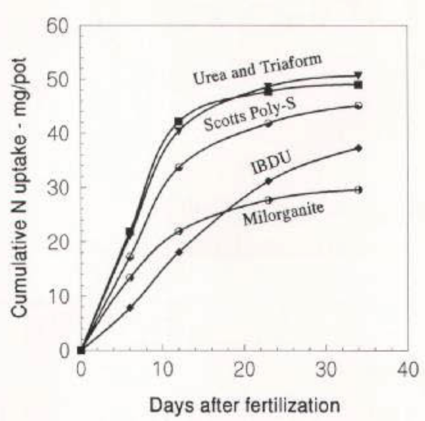


FIGURE 2
Bentgrass N uptake from three different methylene urea N carriers.

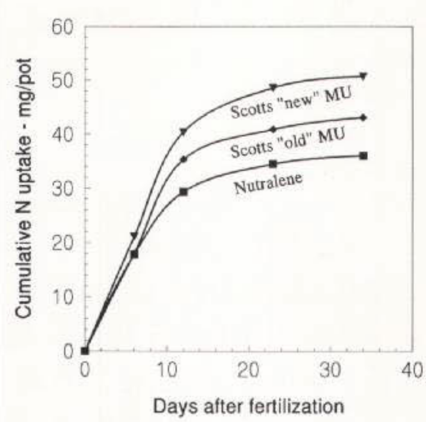
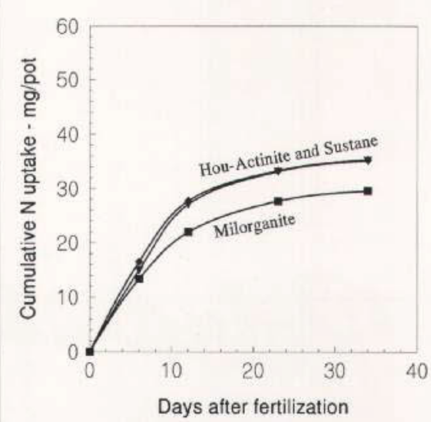


FIGURE 3
Bentgrass N uptake from three natural organic N carriers.



ing bentgrass (Fig. 1). Scott's Poly-S released N at a slightly lower rate. Initially, the slowest N release rate was from IBDU. But after about 15 days, IBDU began to release N at a faster rate than did Milorganite, but considerably slower than from urea, Triaform or Poly-S.

The comparative N release patterns for the three methylene urea products tested are shown in figure 2. All released the same amount of N during the first 6 days after fertilization, but pronounced differences showed up after that. From then on, the amounts of N released followed the order Scott's "new" MU (Triaform) > Scott's "old" MU (applied as 32-3-10) > Nutralene.

Among the three natural organic N carriers, the patterns of N uptake were the same for Hou-Actinite and Sustane (Fig. 3). Starting about 6 days after fertilizer application, N was released at a somewhat slower rate from Milorganite than from Hou-Actinite and Sustane.

CONCLUSIONS

Scott's Triaform clearly has higher activity than its older methylene urea formulation, which is much like their Poly-S product in terms of the rate of N release. Thus, Triaform should perform better at cooler times during the season. During periods of warm weather, it may prove necessary to apply Triaform at somewhat lower rates than the older methylene urea products or Poly-S to minimize surges in turfgrass growth.

In this study, Hou-Actinite behaved very much like Sustane. Its N release was a bit faster than from Milorganite, but the difference between the two may be difficult to detect under field conditions.

Table 1. Creeping bentgrass responses to various N carriers during 34 days of growth in the greenhouse

N Carrier	Total clipping weight	Fertilizer N uptake	Fertilizer N recovery
	mg/pot	mg/pot	percent
IBDU	842	37.2	41.7
Nutralene	714	36.0	40.4
Scott's "old" meth. urea	794	43.0	48.2
Scott's "new" meth. urea (Triaform)	950	50.7	56.8
Scott's Poly-S	884	45.1	50.7
Milorganite	621	29.5	33.1
Hou-Actinite	708	35.3	39.6
Sustane	731	35.1	39.3
Urea	882	49.0	54.9
Duncan's LSD (p=.05)	189	8.1	7.2