The Grass Roots

Vol. XXII, No. 5
September/October 1994

The Grass Roots is a bi-monthly publication of the Wisconsin Golf Course Superintendents Association, printed in Madison, Wisconsin by Kramer Printing. No part of *The Grass Roots* may be reprinted without expressed written permission by the Editor.

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About the Cover:

The cover honors both the New York Audubon Society and its Sanctuary Program, and Ozaukee Country Club's accomplishment as Wisconsin's first golf course to receive certification from NYAS. Be sure to read Phil Bailey's account of how he got the job done at Ozaukee.

Cover artwork by graphic designer and artist Jennifer Eberhardt.

"A haze on the far horizon
The infinite, tender sky,
The ripe rich tint of the cornfields,
And the wild geese flying high –
And all over upland and lowland
The charm of the golden rod –
Some of us call it autumn
And others call it God".

– William Herbert Carruth
From "Each in His Own Tongue"

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(Left to Right) Scott Schaller, Mike Handrich, Tom Schwab, Bruce Worzella, Bill Knight, Mark Kienert, Mike Semler, Joe Kuta and Pat Norton.

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WINDING DOWN?

By Michael Semler

The first smells of autumn arose this morning when I arrived at the golf course. I had been waiting for this for quite some time. A cool, crisp breeze was blowing and I thought I could hear a few poplar leaves rustling in the trees. It also made me think about all the things we needed to get done before the season ends. I know there are two solid months of work remaining on the course, but if history is a good indication, September and October will go by as fast as the summer did.

It is probably one of the most remarkable things about our business, golf course management, that these subtle changes in the seasons can bring about such a change in the heart of a person. If you remember, I was the one who said that the spring season was the most exciting and enthusiastic time of the year and the summer season was one to forget. Now, I must admit, fall is my favorite season. Spring is alright, and summer is not as bad as I had made it out to be. But autumn is best.

You must also remember that I was one who said that the allure and the prize of this profession was the change in seasons and the "New Year" that each one of them brings.

By now, most of us have aerified our courses, put some of the last of the topdressing materials down, prepared our budgets and have bid goodbye to the summer staff. It seems like just a few short weeks ago that I hired many of them. We are now preparing for the final assault on winter preparations.

In my estimation, this is the most challenging time on the golf course. Yes, you're right, I have changed my mind again. July and August are not the most difficult.

In addition to all of the winter preparations and extra work loads from incomplete projects, we have lost much of our staff and the grass doesn't have the sense to slow its growth to meet our decreasing work force. And yet, we must continue to meet the high standards we set for ourselves back in the summer.

Every year it's the same thing—a decreased work force and too much grass to cut. Oh well, in a few weeks it will slow down enough for us to catch up to it. Thank God for late fall and cooler temperatures.

But I think what I really like most about the fall is the anticipation of truly slowing down to a reasonable work pace. In addition, it is also a time of football, pumpkins, leaf drop, farmers markets and all the other wonderful signs of peaceful days and cool nights. I am now beginning to think of who the Badgers' opponent in the Rose Bowl will be this year?

My suspicion is that fall will be here and gone before we know it and we'll be in the planning and preparation phase of our year. A forlorn feeling may come to some of us because of the cold winter months that are to come. I hope that everyone takes a moment to breathe a sigh of relief and look back upon the past year and all that was accomplished.

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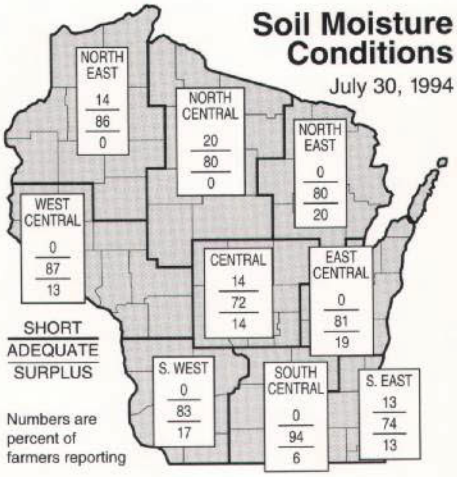
NOW THAT WAS A SUMMER!

By Monroe S. Miller

The summer of 1994 won't be remembered, by me at least, for any one thing; you know—the flood of 1993, the drought of 1988, the politics of 1992. No, this was a summer that had a little of everything for Wisconsin golf courses.

We had the brutal heat of June and the drought of May. If you are Ric Lange or Mike Handrich, the drought was more extended than that. Some areas—more frequently found in southeastern Wisconsin—had 7 inches and more of rain in July. We had cutworms—two or three generations—and brown patch. Smoke from the forest fires in Washington and Oregon and Montana covered the Wisconsin sun with a haze for days on end. We had September in the last week of July. The Poa seeded all summer, and grass roots in general got shallow. The challenges were endless, but the rewards were there, too.

And the courses were busy. Full schedules of invitationals, pro/ams and member/guest days fit around regular play. Equipment and supplies salesmen were smiling most of the time. Business was good and with the onset of the budget process, it looked to get better. That's good for the turf manufacturers that call Wisconsin home.



Tom Harrison and I celebrated July 28th, the day the average daily high started to decline, if only by one degree. Mark Kienert enjoyed that same emotion on July 26th in the Rapids. The days are shorter and the nights are longer and cooler. Happy days aren't far away!

The season got off to a good start in most places in April; let's hope it ends as well in November.

The moisture status record for sections of Wisconsin for June, July and August are included here for your information, from the Wisconsin Agricultural Statistics Service.

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In case you were curious, Phil Pellitteri said there were more insects around than usual this summer. The favorable weather produced three generations of some species. It doesn't seem possible that this personable and popular UW-Madison staff member has run the insect lab in the Entomology Department for 17 years already. From that perspective, Phil offers this list of our state's most pesky insects: mosquitoes, earwigs, yellow jackets, caddis flies, black flies, deer flies, deer ticks, house centipedes, lake flies and aphids.

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In case you haven't opened your mail for a month or two, or perchance you haven't seen Bruce Worzella for six months, here's a reminder about the 11th annual WGCSA Autumn Extravaganza (aka dinner dance).

The 1994 event is scheduled for Friday and Saturday, October 7th and 8th at the Mead Inn in Wisconsin Rapids. Mark and Karen Kienert are the hosts, and the golf event will be played at the Bull's Eye Country Club.

If you have any questions, call Bruce Worzella at 414-338-0540 anytime, day or night!

•

This summer, which was one of the hottest summers ever in Europe, a Swedish shrink advised Europeans to take things easy and slow down and "be mindful that thinking starts to become difficult at 75 degrees. Above 81 degrees, it's difficult to concentrate on anything at all."

Boy, if that's true, we are all dead ducks. And I was worried that my age, somewhere down the line, might have something to do with concentration! Maybe it has something to do with Stockholm, which makes me glad that I've got some Norwegian blood!

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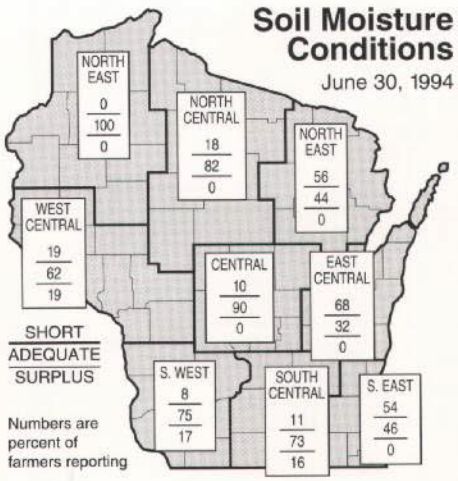

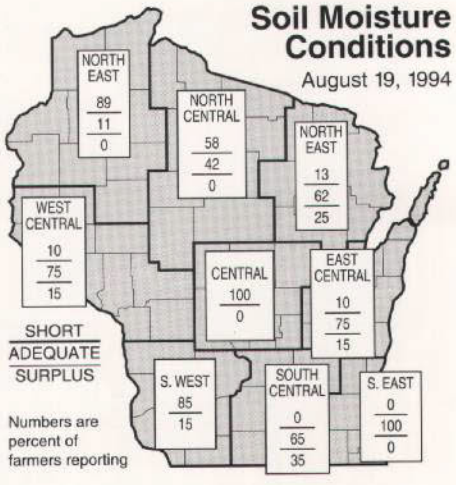

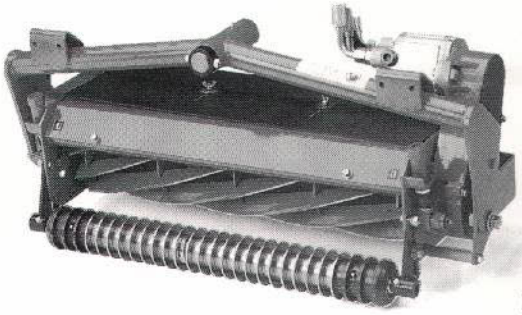

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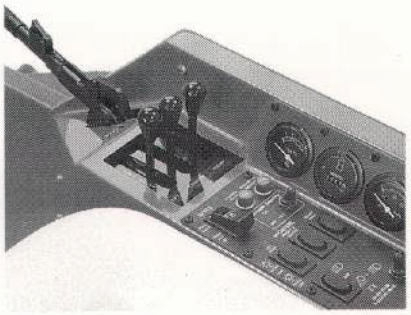

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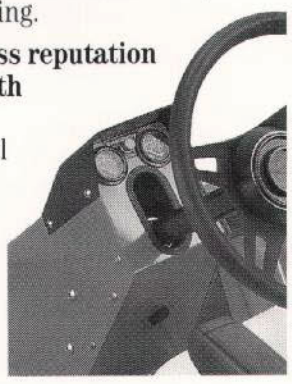

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(Continued from page 5)
There is never a shortage of bad news anymore—gypsy moths from Michigan, Slick Willie's health care fiasco, ozone depletion and only God knows what else.

The latest worry for golf course superintendents like me is the zebra mussel. Our golf course is irrigated with water from an inland lake and these beasts are going to be trouble.

Zebra mussel larvae have been found in Okauchee Lake in Waukesha County near Oconomowoc, the first time this miserable invader mollusk has been found in one of our inland Wisconsin lakes.

The DNR and the Wisconsin Sea Grant Institute found 500-1000 larvae per CUBIC METER in July. They claim that is only a moderate infestation, but no fluke.

The mussels are a Eurasian mollusk that entered the Great Lakes eight years ago in the ballast of a freighter.

Once they are established in one inland lake, they will be in them all eventually, travelling on the boats and trailers of fishermen and water skiers and others who recreate on the waters of our state.

Zebra mussels use tough, fiberous tendrils to latch onto hard surfaces—rocks, clams, irrigations system intake pipes and filtering baskets. They filter algae and nutrients out of the water, clarifying it and disrupting the ecological balance of the lake.

One zebra mussel can produce 40,000 young in one season. Each larvae is about the size of the dot over this i, and it will grow into fingernail-sized adult mussels in about a month.

Professor Stephen Carpenter of the UW-Madison Limnology Center has confirmed my worst fears—the mussels will be in Lake Mendota in a relatively short period of time. I can only guess what they will do to the filter system in the pumphouse or the sprinkler heads on the golf course.

It is for sure they will do no good.

•

If it's not BTA larvae or zebra mussels, then look for verticillum wilt to attack your maples, not unlike DED did the elms in the 1960s and 1970s.

The disease is spread by insects to sugar, red and Norway maples. The vascular system gets plugged, the leaves wilt, shrivel and die. And of course there is no cure. No magic fungicide. About the best you can do is offer a sound water and fertility program for affected trees.

•

A final note that will make you want to go home on time each day, take a summer vacation and disappear from work on the weekends.

Medical researchers are reminding Type A personalities among us that the trait which can lead to success can also put you in a coronary care unit.

Those highly driven people among us are candidates for heart disorders and sudden death at a rate high than the population in general. Type A personalities tend to be in charge and are the ones likely to run their golf course like a tight ship (my palms are sweating already). Type A people are 'time-urgent' (sound familiar yet?), are always on the run, are ambitions, impatient and strive to be the best.

If you recognize yourself here, better ease up, slow down and smile a little bit. What's that old saying—it's only a game?

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That's all folks. WGCSA members will soon be seeing more of one another, as the season winds down—Field Day, Symposium, annual tournament, and before any of us knows it, San Francisco.

Boron Deficiency In Putting Greens?

By Forrest D. Dean

Editor's Note: *Forrest Dean is a May, 1994 graduate of the University. of Wisconsin Turf and Grounds Management Program. His home is Plum Lake, WI, where he acquired his first experience in golf course maintenance. While at the UW and during the summer of 1993, he worked at the Nakoma Golf Club. Forrest is the new Assistant Superintendent at the Old Hickory Golf Club in Beaver Dam. This study was conducted under the direction of his faculty advisor, Dr. Wayne R. Kussow.*

INTRODUCTION

Analyses of clippings removed in October, 1993, from 15 putting greens at the Nakoma Golf Club suggested that the turfgrass from 14 of the greens was boron deficient. According to the interpretative standards developed by Jones (1980), all other essential plant nutrients were within their sufficiency ranges.

This observation came as a surprise, if for no other reason than the fact that no one talks about boron deficiency in turfgrass. Several questions obviously needed to be asked. Are the properties of putting greens conducive to boron deficiency? Was this a unique situation in which the apparent boron deficiency was very transitory? For example, could it be a case in which boron uptake, like that of phosphorus, is greatly reduced when turfgrass growth is slowed due to cold weather (Hall and Miller, 1974)? Did the excessive rainfall in 1993 cause enough leaching loss of boron to induce a temporary deficiency? How reliable are the interpretative standards for boron concentrations in turfgrass clippings?

The purpose of this study was to search the literature for answers to some of the above questions and to verify through experimentation the interpretative standards for boron in creeping bentgrass.

LITERATURE REVIEW

Among the 17 elements considered essential for plant growth, boron is one of the most puzzling from the standpoint of its functions in plants. It has been linked to sugar translocation, protein synthesis, cell wall development, plant reproduction, water balance in plants, and calcium and phosphorus metabolism (Mengel and Kirkby, 1987). Boron is immobile in plants. This is the reason why deficiency symptoms always appear first in the younger plant parts and why severe deficiency results in stunting of the growing points. The deficiency symptoms for turfgrass are initial stunting, enlarged internodes, and a rosetting appearance of individual plants. Formation of streaks of interveinal chlorosis follow (Love, 1964). Clearly, such symptoms would be very difficult to detect in closely mowed turfgrass.

The boron naturally occurring in soil is derived primarily from the mineral tourmaline. Boron deficiency most commonly occurs in crops grown on sandy soils with low organic matter contents. The reason for this is that plant available boron in soil occurs primarily as the boric acid molecule adsorbed on surfaces of clays, iron and aluminum oxides and organic matter. When the boron adsorption capacity of soil is low, the nutrient leaches and deficiencies can result. Deficiencies can also result from high soil pH. When soil pH rises above about 7.0, there is a marked increase in the ability of boron to be strongly adsorbed by organic matter. This can reduce the solution concentration of boron to such low levels that deficiency results. For reasons not fully understood, temporary boron deficiency often occurs during periods of low rainfall and extensive soil drying (Tisdale, et al, 1985).

From this brief literature review, we can see that failure of people to report boron deficiency on turfgrass could be due in part to the fact that it is next to impossible to detect the symptoms in closely mowed turf and on putting greens in particular. It is easy to see where sandy putting green soils may be conducive to boron deficiency. Boron levels are likely to be naturally low unless the sand used during construction or for topdressing contained tourmaline. The new USGA specifications call for 1 to 5 percent organic matter in the rootzone mix (USGA Green Section Staff,1993). Combine low inherent boron content in the sand with ample organic matter and a soil pH at 7.0 or above and the conditions are right for boron deficiency.

EXPERIMENTAL METHODS

The creeping bentgrass cultivar 'Penncross' was grown in solution cul-

FIGURE 1
Creeping bentgrass growth response to increasing boron supply.

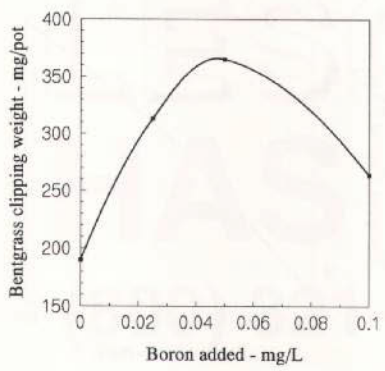
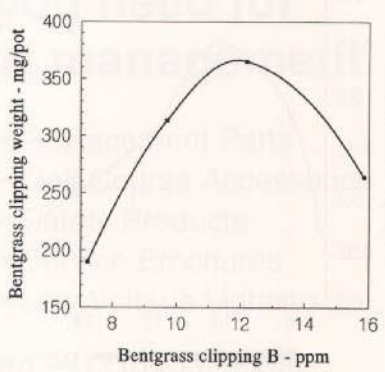


FIGURE 2
Relationship between bentgrass clipping boron concentrations and yield.



tures according to the methods of Iyer and Kussow (1985). Once established, the bentgrass was clipped every week at a height of 3/4 inch. Four treatments were used: 0, 0.025, 0.05 and 0.1 mg/L (ppm) boron in 2.5 liters of nutrient solution. The solutions were changed every two weeks.

It was not until after 6 weeks of growth that growth rates at the 0 and 0.1 ppm boron levels appeared to be somewhat less than at the 0.025 and 0.05 ppm boron concentrations. At that time, the pots were clipped and the bentgrass allowed to re-grow for 2 weeks to provide enough tissue for analysis. The bentgrass was then clipped, the clippings dried and weighed, ground, and sent to the State Soil and Plant Analysis for determination of nutrient content.

OBSERVATIONS

The only visual signs of nutrient stress were in the 0 boron treatment. In this treatment, the grass blades were very narrow and slightly darker in color than in the pots with boron. No other symptoms were evident

Bentgrass clipping weights revealed optimum growth in the 0.05 ppm boron treatment (Fig. 1). Growth was strongly curtailed in the 0 boron treatment and there was some reduction in growth when 0.1 ppm boron was added.

The relationship between clippings boron concentration and clipping weight was the same as for the relationship between the amount of boron added and clipping weight. Optimum growth occurred at a tissue boron concentration of 12 ppm (Fig. 2). In the 0 boron treatment, where some visual signs of nutrient stress were seen, the clippings contained 7.2 ppm B. Growth was also suppressed at the 0.1 ppm boron level, where the clippings contained 15.8 ppm B.

Examination of the clipping analyses revealed that only the tissue concentrations of phosphorus varied substantially from one boron treatment to another. Phosphorus concentrations peaked at a boron concentration of about 12 ppm (Fig. 3). At the highest and lowest boron concentrations, clipping P concentrations were 0.37 percent. While considered sufficient by Jones (1980), these concentrations are at the lower end of the sufficiency range. The reason for this relationship between clipping boron and phosphorus concentrations is unknown, as is its practical significance.

A great deal of care must be taken when applying boron to crops. The quantities generally required are very small, typically in the range of 0.01 to 0.06 lb/M, and over application can result in toxicity (Tisdale, et al, 1985). The reason for this is that plants appear to exert little control over boron uptake. This is apparent in figure 4, where clipping concentration of boron is seen to be directly related to the concentration in the nutrient solution.

CONCLUSIONS

The results of this study support the suggestion that turfgrass that contains less than about 10 ppm B will respond to applications of the nutrient. Jones (1980), based primarily on the research of Oertli, et al (1961), suggests concentrations above 60 ppm as being excessive. The present study indicates that, at least for creeping bentgrass, the upper limit of boron sufficiency could be much lower — somewhere in the range of 15 to 20 ppm. More research is definitely needed to verify these numbers and to examine in greater detail the relationship observed between bentgrass tissue phosphorus and boron concentrations.

Indications are that the turfgrass in 14 of the 15 putting greens sampled at the Nakoma Golf Club were boron deficient when sampled last October. Without knowledge of the effects of cool weather on boron uptake, it seems reasonable to say that at that time of year more than 5 ppm boron in the clippings may have been adequate. Even with this criteria, five of the 15 greens have inadequate boron levels.

Anyone contemplating boron application on putting greens should exercise caution. The range in boron concentrations in clippings between deficiency and excess appears to be very small. Error should be on the safe side; the boron application rate should not exceed about 0.01 lb B/M. This means that the boron carrier has to be blended with another material if applied in a dry form. Perhaps a better approach is to purchase water-soluble 'Solubor' and apply the boron as a carefully calibrated spray that is watered in after application.

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FIGURE 3
Relationship between bentgrass clipping boron and phosphorus concentrations.

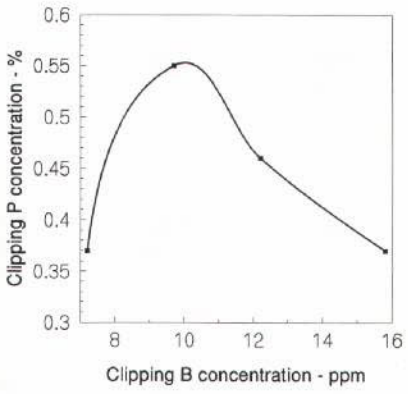

FIGURE 4
Relationship between boron supply and the boron concentration in bentgrass clippings.