THE LAST ANNUAL TURFGRASS MANAGEMENT AND WEED CONTROL UPDATE

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The summer of 1995 will not soon be forgotten by turf managers around the country and Michigan was no exception. Brutally hot conditions combined with high humidity tested the skills and endurance of all turf managers. It was a year that I won't soon forget either, because I decided to return to my home state of Illinois to take a turf position at the University of Illinois. However, in 1995 I continued to receive generous research support from the Michigan Turfgrass Foundation in support of a bentgrass breeding project aimed to improve resistance to dollar spot in creeping bentgrass. The funds from the MTF went to support the graduate assistantship awarded to Scott Warnke during his PhD degree program. Scott finished his PhD degree in June of 1995 and began a postdoctoral position to continue his work on bentgrass disease resistance and the evaluation of bentgrass cultivars under green or fairway conditions.

Our research found that there is a very low level of resistance to dollar spot. This certainly corroborates what is seen each summer in the field. Thirty one varieties of bentgrass were screened for their susceptibility to dollar spot. One hundred clones from each variety were screened. Over 96% of the 3100 plants screened were essentially killed by the dollar spot disease, showing no level of natural resistance. A total of 113 clones out of the 3100 that we screened showed some level of resistance but only 9 clones showed little damage from the disease. Thus while some disease resistance to dollar spot exists in creeping bentgrass, the data collected indicate that it will be very difficult to get high levels of resistance introduced into creeping bentgrass. The resistance shown by these few plants are probably the result of several genes functioning together. Thus, it is difficult to get all of those genes to be passed along to progeny during the breeding process and this accounts for the lack of resistance seen among most bentgrass plants. However, further research will help identify better parent plants and the possibilities for achieving higher levels of disease resistance in creeping bentgrass.

The record heat in 1995 was an ally to an old nemesis, crabgrass. Crabgrass is a species which thrives under hot, humid growing conditions. It comes as no surprise then that crabgrass had a bountiful year throughout the State of Michigan. We conducted three separate trials on crabgrass control in Michigan during 1995.

The first trial was actually initiated in early November of 1994. This application window has some advantages to the lawn care industry and so we wanted to see how the two newest preemergence herbicides perform when applied in the late fall instead of the traditional early spring timing. We applied DIMENSION 1 EC and granular formulations and BARRICADE 65 WG and granular formulations to a mixed stand of Kentucky bluegrass and perennial ryegrass on November 3, 1994. Crabgrass density was quite high during 1995 and we evaluated weed pressure at several times throughout the summer. However, the maximum crabgrass densities were observed on the September 5, 1995 observation date (Table 1). These data are quite interesting showing the strength of Barricade as a preemergence herbicide and the tremendous difference in product performance between Dimension granular versus Dimension EC. By September 5, the control plot was almost completely covered with crabgrass. The Barricade treated plots showed strong preemergence control from either the granular or liquid applications, particularly when applied at the highest label rate. Dithiopyr showed mixed results. When applied as the EC formulation, little control was seen the following season. However, significantly better crabgrass control was seen from the same rate of herbicide when applied as a granule versus the EC formulation. The late fall application would appeal to companies or individuals that are very busy in the spring (who isn't?) and would like to redistribute some of the chores that are normally done in the spring into the fall or late fall window. If you choose this approach remember that only the herbicides with very long soil residuals will work and that rates should be near the upper end of the recommended rate range.

In 1995, we also evaluated traditional spring applications of preemergence herbicides(Table 2). The herbicides were applied on May 3, 1995 and evaluated throughout the summer. The data again shows very high levels of crabgrass pressure with 85% crabgrass cover in the control plot. Pendulum, a new formulation of pendimethalin from American Cyanamid, showed excellent preemergence control at both the 1.5 and 2.0 lb ai/ A. Other products performing well included Barricade 65 WG at 0.65 or 0.5 lbs ai/A, Dimension 1 EC at 0.5 and 0.75 lbs ai/A. Sequential applications of pendimethalin or Dimension also provided excellent full-season grass control. Again, this study displays the dramatic differences in response between the granular and sprayable formulations of dithiopyr (Dimension). The 0.125 lb ai/A rate of Dimension 1 EC gave no preemergence crabgrass control with 93% crabgrass at the 9/5 rating date. The same rate of a granular formulation of dithiopyr, AND 444 at 0.125 lbs ai/A had only 28% crabgrass at the 9/5 rating date. In this trial the differences between granular and sprayable dithiopyr were not as apparent at rates of 0.25 lbs ai/A or higher.

STARTER FERTILIZATION : EFFECTS ON NO_3 LEACHING AND ESTABLISHMENT

Another research area that we've studied for the past two years is the leaching of nitrates from high sand content greens mixes during establishment. This study was initiated in 1994 by a graduate student, Rafael Gonzalez-Carrascosa, and provides some timely information on leaching of nitrates in sandy soils. Many grow-in programs use high rates of soluble nitrogen, as much as 1 lb N/1000 ft^2/ wk, to achieve rapid bentgrass cover. However, the concern of many people is that these high N rates result in excessive nitrate leaching.

Treatments used in 1995 examined the effects of increasing weekly nitrogen application on bentgrass establishment. An initial application of starter fertilizer was followed by weekly applications of fertilizer beginning at 3 weeks after seeding. The results are divided into two sets of figures. The first figures show the nitrate leaching attributable to the starter fertilizer application. The second set of figures shows the nitrate leaching attributable to the weekly applications of fertilizer.

The starter fertilizer data is very interesting and suggests that under these conditions, high sand content and no plant cover, most of the starter fertilizer is lost to leaching (Figure 1). Our data suggests that starter fertilizer is needed; however, more than 1 lb N/M is wasted. Establishment data showed that if starter fertilizer was omitted then poor establishment resulted. However, 1 lb N/M was as good as 2 lbs N/M at seeding. It is possible that even less starter fertilizer could be used and still achieve acceptable results initially.

The grow-in fertilizer applications were also quite interesting (Figure 2). Overall, the level of nitrates detected at the bottom of the sand rootzone were small when compared to the frequency and intensity of fertilization. However, the 1 lb N/M/wk rate used by many grow-in managers appears to be a reasonable rate. Only on two sampling dates, 8 and 16 August, did the nitrate levels exceed the 10 PPM drinking water standard. However, the 1.5 lbs N/M/wk appears to exceed the capacity of the bentgrass root system to take up nitrogen and significant amounts of nitrate are leached from this treatment.

Therefore, this study would indicate that rates of starter fertilizer should not exceed 1 lb N/M and weekly applications of 0.75 or 1 lb N/M beginning at three weeks after seeding and continuing until good turf cover is achieved are reasonable establishment practices. Nitrate leaching from the grow-in fertilizers is not excessive and rapid establishment can be expected. In our studies we have seen little difference in establishment rate between the 0.75 and 1.0 lb N/M/wk treatments. Therefore, using the lower rate will give rapid establishment with slightly less risk to the environment.

Table 1. Late Fall Applications of Preemergence Crabgrass Herbicides

Treatment	Formulation	Rate	Percent Crabgrass		
		Lbs ai/A	7/11/95	8/4/95	9/5/95
Control			53	77	90
Dithiopyr (AND 436)*	0.164G	0.25	8	36	67
Dithiopyr (AND 437)	0.164 G	0.25	3	12	22
Dithiopyr (AND 438)	0.164 G	0.25	4	18	45
Prodiamine (AND 439)	0.287 G	0.55	6	14	21
Prodiamine (AND 440)	0.287 G	0.55	3	14	23
Prodiamine (AND 441)	0.287 G	0.55	2	5	10
Prodiamine (VPX-1-290)	0.275 G	0.51	3	7	11
Prodiamine (VPX-1-290)	0.275 G	0.65	3	7	5
Barricade	65 DF	0.5	2	8	16
Barricade	65 DF	0.65	1	4	5
Dimension	1 EC	0.25	9	35	75
lsd (p=0.05)			12	16	26

* Numbers indicate experimental granular formulations developed by companies other than the manufacturer of the parent herbicide product. Dithiopyr is the active ingredient of Dimension herbicide and prodiamine is the active ingredient in Barricade.

Table 2. 1995 General Preemergence Trial

Treatment	Formulation	Rate	Quality[1]		Percent Crabgrass		
		Lbsai/A	5/11	5/17	7/6	7/28	8/21
Pendulum	60 WDG	1.5	6	5.8	1	0	0
Barricade	65 WG	0.65	6	6.5	1	0	0
Pendulum	60 WDG	2.0	5	5.8	1	0	0
Pendimethalin	1.21 G	1.5+1.5*	7.5	7.5	8	8	1
Dimension	1 EC	0.75	6.2	6.3	1	0	1
Pendulum	60 WDG	1.5+1.5*	5.7	6	1	0	1
Barricade	65 WG	0.5	6.3	5.5	4	1	2
Dimension	1 EC	0.5	5.3	5	2	0	2
Dimension	1 EC	0.25+0.125*	5.5	5.3	1	0	2
Barricade	0.22 G	0.5	8.3	8	2	0	3
Dithiopyr (AND 447)	0.25 G	0.5	7.7	7.7	1	0	3
Dithiopyr (AND 448)	0.42 G	0.75	7.2	7.7	1	0	3
Dithiopyr (AND 445)	0.164 G	0.25	7	7.2	4	0	3
Dimension	1 EC	0.38	5.5	6	1	0	4
Team	1.15 G	2.0	7.8	8	12	0	5
Dithiopyr (AND 446)	0.25 G	0.38	6.8	7.2	2	0	7
Team	1.15 G	1.5+1.5*	7.2	7.7	5	7	9
Dimension	0.11 G	0.25	4.5	5.3	4	0	10
Dimension	1 EC	0.25	6.2	6	1	7	11
Team	1.15 G	1.5	7.3	7.5	8	4	11
Dithiopyr (AND 445+444)	0.164+0.072G	0.25+0.125*	6.8	7.3	7	0	12
Dithiopyr (AND 443)	0.052 G	0.09+0.09*	7.3	7.2	8	1	16
Dithiopyr (AND 442)	0.035 G	0.06+0.06*	7.7	7.7	10	3	17
Dimension	1 EC	0.125+0.125*	5.5	5.8	25	18	18
Dithiopyr (AND 444)	0.072 G	0.125	7.2	7.3	5	3	28
Dithiopyr (AND 444)	0.072 G	0.125+0.125*	7.2	7.2	9	15	28
Dimension	1 EC	0.09+0.09*	5.7	6.2	50	17	35
Dimension	1 EC	0.06+0.06*	5.8	5.5	14	25	71
Control			5.7	5.5	87	81	85

Dimension	1 EC	0.125	6	6.5	87	70	93
lsd (p=0.05)			1.2	1.1	13	15	15

[1] Quality rating taken on a 1-9 scale where 1=dead and 9=excellent.

*Split application 8 weeks after initial treatment.

Figure 1. Nitrate Leaching from Starter Fertilizer. Peak at left is from starter fertilizer. Weekly fertilization began on July 5.

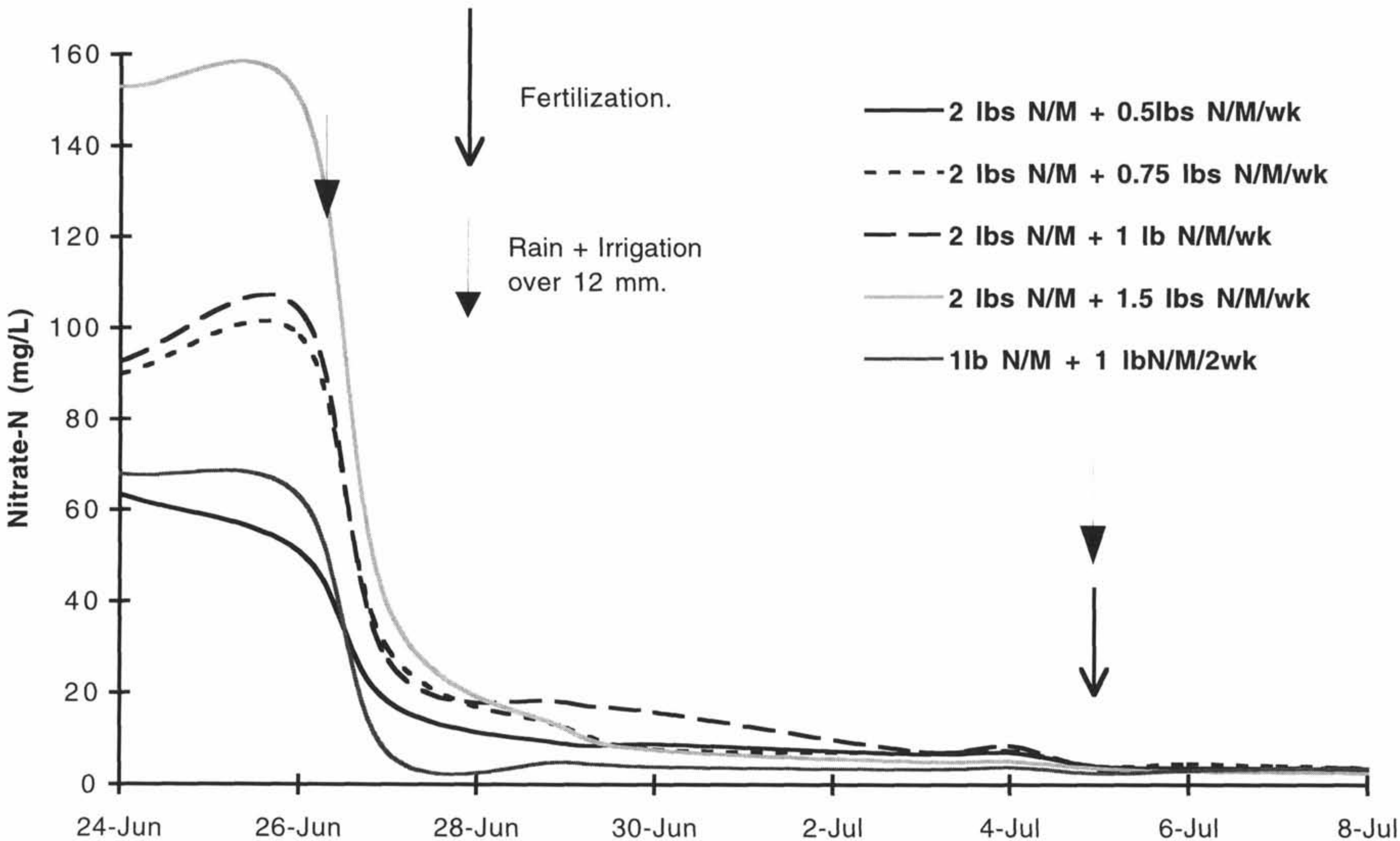

Figure 2. Nitrate leaching from grow-in fertilizer.