The Effects of Irrigation Frequency on Three Turfgrass Species
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Crop and Soil Sciences

What is the best irrigation strategy for home lawns? The vast majority of university
turfgrass specialists recommend deep infrequent irrigation. Deep infrequent irrigation
(also known as heavy infrequent or weekly irrigation) is believed to stimulate root growth
by forcing the roots to grow to the depth of the water. Therefore, if deep root growth is
enhanced by infrequent irrigation then the plant could potentially have improved drought
tolerance if water becomes limiting. Up until the mid 1980's Michigan State University
advocated the deep infrequent irrigation recommendation for home lawns

Toward the end of the 1980's Dr. Joe Vargas Jr. and his MSU turfgrass staff found that
light frequent irrigation reduced the symptoms of necrotic ring spot (NRS). Cultural
control of NRS was achieved with a combination of light daily irrigations around 2:00
p.m. and application of slow release nitrogen fertilizer. Since NRS is the most
destructive home lawn turfgrass disease, MSU began advocating light frequent irrigation
(also called daily irrigation) for the homeowner. Despite the research results from MSU,
to this day the common recommendation for home lawn irrigation is deep infrequent.

Research was initiated in the fall of 1997 to analyze the effects of irrigation frequency,
turfgrass species, and nitrogen rate on turfgrass quality. The three irrigation regimes are
non-irrigated, watered once a week in the early a.m. with 0.7 inch, and watered daily at 2
p.m. with 0.1 inch. The turfgrass species are perennial ryegrass and turf-type tall fescue,
established from seed, and Kentucky bluegrass that was sodded on the site.

Broadleaf weed counts were taken in September of 1999 and August of 2000 (Table 1).
In 1999 there were more broadleaf weeds on the daily and weekly-irrigated plots than on
the non-irrigated plots. The trend was reversed by August of 2000 as the daily-irrigated
plots had fewer weeds than the weekly and non-irrigated plots. These results can be
explained by the fact that 1999 was an extremely dry year and the non-irrigated plots
were often dormant. The lack of soil moisture in the non-irrigated plots resulted in little
broadleaf weed competition. Given adequate moisture (such as was the case in the
summer of 2000) the daily irrigated plots had over 50% fewer broadleaf weeds compared
to the non-irrigated plots and the weekly irrigated plots. The broadleaf data from the two
seasons implies that light frequent irrigation creates a denser turfgrass canopy as
compared to the weekly irrigation schedule.

Grassy weed competition (mostly from Poa annua, some bentgrass, and crabgrass) was
more severe in perennial ryegrass than tall fescue and Kentucky bluegrass (Table 2).
Also, the greater the irrigation frequency the greater the grassy weed infestation in the
ryegrass plots. Given that over 80% of the grassy weeds were Poa annua the data is
easily explained. *Poa annua* thrives when temperatures are cool and moisture is plentiful. Perennial ryegrass is a fine bladed bunch type grass that is very susceptible to red thread and rust under cool moist environmental conditions. The environmental conditions in Mid-Michigan in 2000 were conducive for the thinning out of the ryegrass and thus the infestation and germination of the *Poa annua*.

Other points of interest include the fact that during the summer of 1999 surface temperatures were often 20° F lower on the daily irrigated plots than the weekly irrigated plots. On the weekly irrigated plots the tall fescue displayed greater drought resistance compared to the other turfgrass species under similar irrigation.

Table 1. Broadleaf weed counts in 1999 and 2000.

Table 2. Percent grassy weeds on 4 August 2000 in Kentucky bluegrass, perennial ryegrass, and tall fescue.
MOWING-HEIGHT COMPARISONS ON KENTUCKY BLUEGRASS
David Gilstrap
Crop and Soil Sciences

In this study, twenty-four plots represent a range of mowing heights on Kentucky bluegrass with each plot being mowed by the one-third rule. Accordingly, different plots may be mowed on different days. However, this week all plots were mown on Monday, two days before Field Day.

Each plot is 26 ft x 6 ft (156 ft²), and adjacent plots are 4 ft from each other so that mowing directions and wheel tracks can be varied. A rotary-type mower is used with clippings returned. The area between plots is cut at a lower height than any of the treatments to limit clippings deposition from one plot to another. Irrigation rate and frequency is 1/3 inch per night, three times per week. In 1998 and 1999, the plots were maintained with a low-N regimen of 2 pounds N as urea per 1000 ft² in split applications that occurred in the late spring and late fall. This season the amount of N addition has been doubled with added early and late summer applications.

Each tour participant will be asked to assign each plot with one of the following designations:

- S - mowing height too short
- OK - good height of cut
- T - mowing height too tall.

The results of this survey will be analyzed to determine the mowing height(s) preferred by professional turf managers compared to a similar survey taken here two years ago.
Due to the increasing awareness of player safety, there has been a major transition occurring in the athletic field industry. Many of the fields that had previously converted into artificial grass surfaces in the 1960's and 70's have reconverted into natural grass surfaces. The primary reason for the change is that the consensus of professional football players not only feel that natural grass provides a better playing surface, but that it is less likely to cause a career threatening injury (Survey, 1994). These concerns have filtered down to colleges and high schools as well. With the resurgence of the natural grass field comes the goal of constructing the athletic field that will endure the rigors of athletic competition during all weather conditions.

The key to constructing the “perfect field” lies in the choice of the root zone material. Traditional fields developed on native soil with high silt and clay content will provide excellent stability but drain poorly, and the quality of the playing surface quickly diminishes in unfavorable weather conditions and with heavy use. Sand root zones typically drain very well, but often times are unstable. Many newly constructed fields have failed because of this instability of the root zone. Since the instability of sand has been diagnosed as a problem, there have been many products developed to stabilize the sand root zone. For the purpose of our study, we have selected currently available products, which have been shown, to at least some degree, to provide stability while maintaining adequate drainage. The treatments are listed below in no particular order:

1. GrassMaster™
2. Sportgrass™
3. Hummer Supertiles™
4. Motz Grass™
5. ReFlex™ Mesh Elements
6. Ventway Stabilizers™
7. Sportgrids 360™
8. Profile™
9. ZeoPro™
10. Sand-Soil mix (7% silt + clay)
11. Sand-Soil mix (10% silt + clay)
12. Sand-Soil mix (17% silt + clay)
13. Common Bermudagrass (10% silt + clay)
14. Topdressing Sand (TDS 2150)
15. Tri-Turf Soils #28 Sand
Plant Growth Regulators for Your Customers: Does It Ever Pay Off?
R. N. Calhoun and A. D. Hathaway
Crop and Soil Sciences

For years, lawn care operators and homeowners alike have searched for a plant growth regulator [PGR] that would allow them to skip several mowings each season. These pie-in-the-sky expectations have, for the most part, yielded disappointing results. It is also difficult to justify the cost of a PGR application on a per lawn basis.

During the spring growth flush, many lawn care operators find it necessary to double-mow, bag, or rake, which reduces overall efficiency. For instance, an LCO that could mow 125 accounts in the summer can only take on 60-75 accounts in the spring due to these additional necessary steps. Although this flush lasts only 3-5 weeks it can limit the number of clients. Mowing is often used as a tool to get a foot in the door. Clients are more likely to purchase secondary services, such as gutter maintenance, snow removal, and holiday lighting, from a familiar name or face. More clients means more potential sales.

This study was designed to examine the ability of PGRs to reduce the spring growth flush to a more manageable level, whereby double-mowing and the like would be unnecessary. It is possible that the upfront cost of a PGR application will not be recovered by mowing alone. However, sales of secondary services to a larger client base could more than offset this cost.

In this study PGR treatments were made after the third mowing in the spring on May 9. Clipping production and turfgrass quality were measured weekly during the entire season.
Behind the Label: How Do Consumer RTUs Measure Up  
R. N. Calhoun, S. A. Dysinger and A. D. Hathaway  
Crop and Soil Sciences

You’ve been at work all day and need to stop at Meijer on the way home and pick up a replacement burner for the barbeque. It takes a while to find a spot large enough to accommodate your truck and then you walk a half-mile into the store. After selecting the universal burner unit that fits your grill you’re walking to the checkout when catch a whiff of that too-familiar scent…Mmmmm…2,4-D…..definitely amine. After further investigation, you find yourself in the middle of the pest control aisle. This collection of pest control products could make your head spin. Curiosity takes over, “What the heck do they sell to homeowners anyway.” Twenty minutes later, after reading nearly every label, you begin to wonder how well these products really work…

- Will 0.96 % glyphosate in 99.04 % water kill anything?
- Why does brush killer cost more than weed killer?
- How much would that cost per acre?
- I’ve never heard of that active ingredient.
- How would this compare to the commercial version?

Well, I broke out the credit card and raided Home Depot and Frank’s while I was at it. The following treatment lists were generated to include a cross section of products offered on the consumer market as compared to some standard commercial products and combinations.

### Non-Selective Burndown Herbicides

<table>
<thead>
<tr>
<th>Untreated</th>
<th>Active</th>
<th>Fl. Oz/M</th>
<th>Cost/gallon</th>
<th>Cost/M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid Edger</td>
<td>diquat</td>
<td>100</td>
<td>$4.85</td>
<td>$3.78</td>
</tr>
<tr>
<td>Grass &amp; Weed Killer</td>
<td>diquat + fluazifop</td>
<td>17</td>
<td>$51.00</td>
<td>$6.90</td>
</tr>
<tr>
<td>Roundup (RTU)</td>
<td>glyphosate</td>
<td>92</td>
<td>$58.00</td>
<td>$14.46</td>
</tr>
<tr>
<td>Total Vegetation</td>
<td>prometon</td>
<td>160</td>
<td>$30.00</td>
<td>$37.40</td>
</tr>
<tr>
<td>Triox</td>
<td>glyphosate + imazapyr</td>
<td>427</td>
<td>$32.00</td>
<td>$106.40</td>
</tr>
<tr>
<td>Grass B Gon</td>
<td>fluazifop</td>
<td>92</td>
<td>$26.45</td>
<td>$19.08</td>
</tr>
<tr>
<td>Finale</td>
<td>glufosinate</td>
<td>4</td>
<td>$99.87</td>
<td>$3.37</td>
</tr>
<tr>
<td>Roundup Pro</td>
<td>glyphosate</td>
<td>3</td>
<td>$58.00</td>
<td>$1.33</td>
</tr>
<tr>
<td>Reward</td>
<td>diquat</td>
<td>1.5</td>
<td>$125.00</td>
<td>$1.41</td>
</tr>
<tr>
<td>Scythe</td>
<td>pelargonic acid</td>
<td>10</td>
<td>$31.10</td>
<td>$1.23</td>
</tr>
<tr>
<td>Touchdown</td>
<td>glyphosate</td>
<td>3</td>
<td>$58.00</td>
<td>$1.33</td>
</tr>
<tr>
<td>Roundup Pro + Reward</td>
<td>glyphosate + diquat</td>
<td>3 + 1.5</td>
<td>$183.00</td>
<td>$2.74</td>
</tr>
<tr>
<td>Roundup Pro + Fusilade</td>
<td>glyphosate + fluazifop</td>
<td>3 + 1</td>
<td>$266.00</td>
<td>$2.63</td>
</tr>
</tbody>
</table>
## Postemergence Broadleaf Herbicides

<table>
<thead>
<tr>
<th>Description</th>
<th>Active</th>
<th>Fl. Oz/M</th>
<th>Cost/gallon</th>
<th>Cost/M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weed B Gon 2</td>
<td>2,4-D + MCPP + dicamba</td>
<td>2.5</td>
<td>$36.96</td>
<td>$0.78</td>
</tr>
<tr>
<td>Weed Stop</td>
<td>2,4-D + MCPP + dicamba</td>
<td>2</td>
<td>$19.10</td>
<td>$0.30</td>
</tr>
<tr>
<td>Lawn Weed Killer</td>
<td>2,4-D + MCPP + dicamba</td>
<td>4</td>
<td>$23.96</td>
<td>$0.75</td>
</tr>
<tr>
<td>Green Sweep (Hose End)</td>
<td>2,4-D + MCPP + 2,4-DP</td>
<td>6.4</td>
<td>$39.96</td>
<td>$2.00</td>
</tr>
<tr>
<td>Weed B Gon (RTU)</td>
<td>2,4-D + MCPP</td>
<td>183</td>
<td>$26.51</td>
<td>$37.94</td>
</tr>
<tr>
<td>Weed B Gon - Purple</td>
<td>triclopyr</td>
<td>5</td>
<td>$55.76</td>
<td>$2.18</td>
</tr>
<tr>
<td>Formula 40</td>
<td>2,4-D</td>
<td>0.7</td>
<td>$25.00</td>
<td>$0.14</td>
</tr>
<tr>
<td>Trimec Classic</td>
<td>2,4-D + MCPP + dicamba</td>
<td>1.5</td>
<td>$27.00</td>
<td>$0.31</td>
</tr>
<tr>
<td>Confront</td>
<td>triclopyr + clopyralid</td>
<td>0.7</td>
<td>$110.00</td>
<td>$0.63</td>
</tr>
<tr>
<td>Millenium Ultra</td>
<td>2,4-D + clopyralid + dicamba</td>
<td>1.1</td>
<td>$41.00</td>
<td>$0.35</td>
</tr>
<tr>
<td>Momentum</td>
<td>2,4-D + triclopyr + clopyralid</td>
<td>1.1</td>
<td>$90.00</td>
<td>$0.54</td>
</tr>
<tr>
<td>Trimec Classic + Drive</td>
<td>2,4-D + MCPP + dicamba + quinclorac</td>
<td>1.5</td>
<td>$29.90 + $85.00 / lb</td>
<td>$2.31</td>
</tr>
<tr>
<td>Momentum + Drive</td>
<td>2,4-D + triclopyr + clopyralid + quinclorac</td>
<td>1.1</td>
<td>$90.00 + $85.00 / lb</td>
<td>$2.54</td>
</tr>
</tbody>
</table>
A study has begun at the Hancock Turfgrass Research Center on the campus of Michigan State University to investigate the possibilities of maintaining a high quality athletic field while operating within a low budget. This study is being conducted to provide information to budget decision makers as to how resources relate to improved athletic field quality. The motivation for this study comes from the number of athletic injuries induced by poor field conditions (Harper et al., 1984). Because of the fixed budget high schools are often forced to operate within, it is thought that they cannot afford the machinery, products, and staff required for a high maintenance field and it is questioned where to invest their resources. As a result, it is assumed that they are incapable of maintaining a high quality, safe athletic field. However, as we have seen so many times in the past, more is not always better. Therefore, Michigan State University is conducting a study to discover the potential of minimum inputs combined in such a way so as to maintain a quality athletic field while still operating within a low budget.

The objectives of this study are to demonstrate the differences in field quality based on cultural inputs and to relate the inputs to maximizing events. The study is a three factor design with mowing, fertility, and cultivation as variables. It is being conducted on both a sand-based rootzone and a native soil field. Fertilizer will be applied at levels of 4 lb N/1000 ft² four times per year, 4 lb N/1000 ft² eight times per year, or 6 lb N/1000ft² six times per year. Mowing will be done once or twice per week and cultivation will be done none or twice per year. Different combinations of each treatment will be applied. In addition, half of the treatments will receive a traffic application of approximately twenty-five games per year. Establishment of the plots was begun in the spring of 1999. Treatments were begun in the fall of 1999 and are expected to continue through the summer of 2001.