Meet the Team

- Geoff Rinehart – Professor
- Max Sturges
- Bryson Spaulding
- Jason Wildt
- Ryan Geils
- Clayton Young
- Tyler Johnson
Agronomic Plan Benefits

- Ground work for establishing a standard for turfgrass management
- Organizing and budgeting each step in the process
- Providing a uniform and consistent playing surface throughout the season
Overseeding and Spot Seeding

Three different types of blends:

- Seed Mix 1: Newsom Trio Mix (80% Tall Fescue, 10% Perennial Ryegrass, 10% Kentucky Bluegrass) $75.00 per 50 lb. bag

- Seed Mix 2: Newsom Tall Fescue Blend (100% Tall Fescue) $69.00 per 50 lb. bag

- Seed Mix 3: Newsom Premium Mix (90% Tall Fescue, 10% Perennial Ryegrass) $68.00 per 50 lb. bag
# Overseeding Cost Analysis

<table>
<thead>
<tr>
<th>OPTION</th>
<th>DATE</th>
<th>PRODUCT</th>
<th>RATE LB/M</th>
<th>RATE LB/A</th>
<th>WT. PER UNIT</th>
<th>COST PER UNIT</th>
<th>COST/UNIT (LB.)</th>
<th>COST/M</th>
<th>COST/A</th>
<th>COST FOR 170 ACRES OF FIELDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>21-Aug</td>
<td>Newsom Trio Mix</td>
<td>6</td>
<td>264</td>
<td>50 LB.</td>
<td>$75.00</td>
<td>$1.50</td>
<td>$9.00</td>
<td>$392.04</td>
<td>$66,646.80</td>
</tr>
<tr>
<td>2</td>
<td>21-Aug</td>
<td>Newsom Tall Fescue Blend</td>
<td>7</td>
<td>308</td>
<td>50 LB.</td>
<td>$69.00</td>
<td>$1.38</td>
<td>$9.66</td>
<td>$420.79</td>
<td>$71,534.23</td>
</tr>
<tr>
<td>3</td>
<td>21-Aug</td>
<td>Newsom Premium Mix</td>
<td>6</td>
<td>264</td>
<td>50 LB.</td>
<td>$68.00</td>
<td>$1.36</td>
<td>$8.16</td>
<td>$355.45</td>
<td>$60,426.43</td>
</tr>
</tbody>
</table>

*WE DO NOT RECOMMEND SEEDING ALL FIELDS*
Aerification: Deep-tining, Verti-Quake

- Compaction
- Drainage
- Air/gas exchange
- Potential to be contracted out
Mowing Practices

- Drop of mowing height
  - increased tillering
  - increased density

- Routinely switch mowing directions

- Drop in mowing height attainable?
Recommendations

Seeding
- Seed Mix 1: Newsom Trio Mix (80% Tall Fescue, 10% Perennial Ryegrass, 10% Kentucky Bluegrass) $75.00 per 50 lb. bag
- Mixed stand promotes less disease, less insects, less problems

Aerification
- Deep-tining by way of rented tractor attachments, or contracted out
- Relieves soil compaction by fracturing the soil profile, allowing more oxygen for the roots as well as creating drainage channels

Mowing
- Change the mowing height to 2 - 2.25 inches, with a twice weekly mowing schedule
Fertilization

Three major nutrients

- Nitrogen
  - Growth Nutrient

- Phosphorus
  - Root Nutrient
  - 2011 Maryland Fertilizer Use Act

- Potassium
  - Plant Hardiness Nutrient
# Fertilization Cost Analysis: Spring

## SPRING FERTILIZATION PROGRAM

<table>
<thead>
<tr>
<th>OPTION #</th>
<th>DATE</th>
<th>PRODUCT</th>
<th>RATE LB/M</th>
<th>RATE LB/A</th>
<th>LB A/A HERB.</th>
<th>LB A/A INSECT.</th>
<th>N ANALYSIS</th>
<th>P ANALYSIS</th>
<th>K ANALYSIS</th>
<th>N RATE/M</th>
<th>P RATE/M</th>
<th>K RATE/M</th>
<th>FERT. WT.</th>
<th>COST PER UNIT</th>
<th>COST/UNIT (LB.)</th>
<th>COST/M</th>
<th>COST/A</th>
<th>COST FOR 170 ACRES OF FIELD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EARLY MAY</td>
<td>Andersons 30-0-10 Fertilizer with Dimension and Aceleron</td>
<td>3.44</td>
<td>150</td>
<td>0.33</td>
<td>0.1</td>
<td>0.3</td>
<td>0.1</td>
<td>1.032</td>
<td>0</td>
<td>0.344</td>
<td>50 LB</td>
<td>$81.70</td>
<td>$1.63</td>
<td>$5.62</td>
<td>$244.85</td>
<td>$1,624.33</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>EARLY MAY</td>
<td>Lebanon ProScape 17-0-5, 30% PCU, MOP, 0.167 Dimension and</td>
<td>3.44</td>
<td>150</td>
<td>0.25</td>
<td>0.1</td>
<td>0.17</td>
<td>0.5848</td>
<td>0</td>
<td>0.172</td>
<td>50 LB</td>
<td>$56.00</td>
<td>$1.12</td>
<td>$3.85</td>
<td>$167.38</td>
<td>$28,530.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.067 Aceleron</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>EARLY MAY</td>
<td>Lebanon ProScape 33-0-5, 50% MESA, 100% EXPO, 0.167 Dimension and</td>
<td>3.44</td>
<td>150</td>
<td>0.25</td>
<td>0.1</td>
<td>0.33</td>
<td>0.05</td>
<td>0.4472</td>
<td>0</td>
<td>0.172</td>
<td>50 LB</td>
<td>$58.50</td>
<td>$1.17</td>
<td>$4.02</td>
<td>$175.32</td>
<td>$29,804.45</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.067 Aceleron</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>EARLY MAY</td>
<td>Lebanon ProScape 25-0-5, 51% MESA, 100% EXPO, 0.167 Dimension and</td>
<td>3.44</td>
<td>150</td>
<td>0.25</td>
<td>0.1</td>
<td>0.25</td>
<td>0.05</td>
<td>0.86</td>
<td>0</td>
<td>0.172</td>
<td>50 LB</td>
<td>$65.50</td>
<td>$1.31</td>
<td>$4.55</td>
<td>$196.30</td>
<td>$33,370.79</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.067 Aceleron</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>EARLY MAY</td>
<td>17-0-5 Shaw's Turf Food with 0.067 Aceleron and 0.167</td>
<td>3.44</td>
<td>150</td>
<td>0.25</td>
<td>0.1</td>
<td>0.37</td>
<td>0.05</td>
<td>0.5848</td>
<td>0</td>
<td>0.172</td>
<td>50 LB</td>
<td>$59.49</td>
<td>$1.19</td>
<td>$4.09</td>
<td>$178.29</td>
<td>$30,308.63</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dimension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>EARLY MAY</td>
<td>36-0-6 Shaw's Turf Food with 0.067 Aceleron and 0.167</td>
<td>3.44</td>
<td>150</td>
<td>0.25</td>
<td>0.1</td>
<td>0.36</td>
<td>0.06</td>
<td>1.2384</td>
<td>0</td>
<td>0.2064</td>
<td>50 LB</td>
<td>$82.15</td>
<td>$1.64</td>
<td>$5.65</td>
<td>$246.20</td>
<td>$41,853.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dimension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>EARLY MAY</td>
<td>19-0-5 Shaw's Dimension 0.100</td>
<td>4</td>
<td>174</td>
<td>0.2</td>
<td>0</td>
<td>0.19</td>
<td>0.05</td>
<td>0.76</td>
<td>0</td>
<td>0.2</td>
<td>50 LB</td>
<td>$11.58</td>
<td>$0.43</td>
<td>$1.73</td>
<td>$75.20</td>
<td>$12,784.34</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>EARLY MAY</td>
<td>20-0-4 Shaw's Dimension 0.130</td>
<td>4</td>
<td>174</td>
<td>0.2</td>
<td>0</td>
<td>0.2</td>
<td>0.04</td>
<td>0.8</td>
<td>0</td>
<td>0.16</td>
<td>50 LB</td>
<td>$23.05</td>
<td>$0.46</td>
<td>$1.84</td>
<td>$80.32</td>
<td>$13,655.19</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Andersons Professional Turf Products Fertilizer with Dimension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Turf Herbicide 18-9-7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>EARLY MAY</td>
<td>The Andersons Professional Turf Products Fertilizer with Dimension</td>
<td>4</td>
<td>174</td>
<td>0.2</td>
<td>0</td>
<td>0.18</td>
<td>0.03</td>
<td>0.07</td>
<td>0.72</td>
<td>0.12</td>
<td>50 LB</td>
<td>$23.00</td>
<td>$0.46</td>
<td>$1.84</td>
<td>$80.15</td>
<td>$13,825.57</td>
<td></td>
</tr>
</tbody>
</table>


## Fertilization Cost Analysis: Fall

### FALL FERTILIZATION PROGRAM

<table>
<thead>
<tr>
<th>OPTION #</th>
<th>DATE</th>
<th>PRODUCT</th>
<th>RATE LB/M</th>
<th>RATE LB/A</th>
<th>LB. AI/A HERB.</th>
<th>LB. AI/A INSECT.</th>
<th>N ANALYSIS</th>
<th>P ANALYSIS</th>
<th>K ANALYSIS</th>
<th>N RATE/M</th>
<th>P RATE/M</th>
<th>K RATE/M</th>
<th>FERT. WT.</th>
<th>COST PER UNIT</th>
<th>COST/UNIT (LB.)</th>
<th>COST/M</th>
<th>COST/A</th>
<th>COST FOR 170 ACRES OF FIELDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MID OCT.</td>
<td>24-0-5 Shaw's Turf Food</td>
<td>4.17</td>
<td>181.5</td>
<td></td>
<td></td>
<td>0.24</td>
<td>0</td>
<td>0.05</td>
<td>1.0008</td>
<td>0</td>
<td>0.2065</td>
<td>0</td>
<td>$16.72</td>
<td>$0.33</td>
<td>$0.39</td>
<td>$60.74</td>
<td>$10,326.17</td>
</tr>
<tr>
<td>2</td>
<td>MID OCT.</td>
<td>24-0-12 Shaw's Turf Food</td>
<td>4.17</td>
<td>181.5</td>
<td></td>
<td></td>
<td>0.24</td>
<td>0</td>
<td>0.12</td>
<td>1.0008</td>
<td>0</td>
<td>0.5004</td>
<td>0</td>
<td>$21.63</td>
<td>$0.43</td>
<td>$0.80</td>
<td>$78.58</td>
<td>$13,358.55</td>
</tr>
<tr>
<td>3</td>
<td>MID OCT.</td>
<td>30-0-30 Shaw's Turf Food</td>
<td>3.3</td>
<td>145.2</td>
<td></td>
<td></td>
<td>0.3</td>
<td>0</td>
<td>0.1</td>
<td>0.99</td>
<td>0</td>
<td>0.33</td>
<td>0</td>
<td>$21.80</td>
<td>$0.44</td>
<td>$1.44</td>
<td>$62.67</td>
<td>$10,654.60</td>
</tr>
<tr>
<td>4</td>
<td>MID OCT.</td>
<td>34-0-30 Shaw's Turf Food</td>
<td>2.94</td>
<td>128.12</td>
<td></td>
<td></td>
<td>0.34</td>
<td>0</td>
<td>0.1</td>
<td>0.9996</td>
<td>0</td>
<td>0.294</td>
<td>0</td>
<td>$22.35</td>
<td>$0.45</td>
<td>$1.31</td>
<td>$57.25</td>
<td>$9,731.77</td>
</tr>
<tr>
<td>5</td>
<td>MID OCT.</td>
<td>Lebanon Country Club 19-0-9</td>
<td>5.26</td>
<td>229.26</td>
<td></td>
<td></td>
<td>0.19</td>
<td>0</td>
<td>0.09</td>
<td>0.9994</td>
<td>0</td>
<td>0.4734</td>
<td>0</td>
<td>$32.69</td>
<td>$0.65</td>
<td>$3.44</td>
<td>$149.80</td>
<td>$25,666.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>55% Mesh 5% Fe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>MID OCT.</td>
<td>Lebanon Country Club 29-0-9</td>
<td>3.45</td>
<td>150.21</td>
<td></td>
<td></td>
<td>0.29</td>
<td>0</td>
<td>0.09</td>
<td>1.0005</td>
<td>0</td>
<td>0.305</td>
<td>0</td>
<td>$25.77</td>
<td>$0.52</td>
<td>$1.78</td>
<td>$77.46</td>
<td>$13,167.41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>38% MESA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>MID OCT.</td>
<td>Lebanon Country Club 22-0-12</td>
<td>4.55</td>
<td>198</td>
<td></td>
<td></td>
<td>0.22</td>
<td>0</td>
<td>0.12</td>
<td>1.001</td>
<td>0</td>
<td>0.546</td>
<td>0</td>
<td>$29.23</td>
<td>$0.58</td>
<td>$2.66</td>
<td>$115.87</td>
<td>$19,697.31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50% Mesh-Ex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Basics of an Effective IPM Strategy

- Most effective means with the least amount of input
- Noxious weeds and invasive species can outcompete turfgrass
- Establishing healthy turfgrass is the best start for IPM
Weed Pressure

- Crabgrass and Goosegrass are the two biggest pressures in the area
- Too much competition!
- Key is to stop them before they become a issue

Lampman, 2015
Stopping Weeds at the Source

Control: pre-emergent herbicide (Dimension)

- Creates a barrier
- Halts meristematic growth at the roots
- Will not be able to grow past juvenile stage

Biczo, 2018
Fungicides: Where Do We Use Them?

- Dollar spot and brown patch are the two key diseases and can be managed through a strong fertility program.

- Turf that has not previously been treated should not be treated.

- As with humans and medicine, turfgrass will develop a dependency.

- Prices outweigh practicality.
Fungal Endophytes of Turfgrass

- Certain endophytes have a symbiotic relationship with turf.
- Ward off surface feeding insects such as sod webworms and chinch bugs.
- Does not do anything for root feeding insects.

**TURFGRASS SPECIES**

1. Tall fescue
2. Ryegrass
3. Fine fescue
Grub Control

- Grubs are the larval form of beetles
- Feed on the roots
- Control: Acelepryn

Main, 2005
Conclusion

In the creation of this plan we took into account

- Budget limitations
- Time constraints
- Practicality

We’ve worked to create the most cost efficient, most effective plan

By following each step, the end product will be a denser, safer playing surface
Questions?

Environmetal Turf Management 2016
References


