2007 WSU Turfgrass Research Highlights

2008 THIRD ANNUAL
JCC LTD WINTER SEMINAR
JANUARY 8, 2008

“A DAY OF DISCOVERY”

Matthew W. Williams, William J. Johnston,
Charles T. Golob, Katie Dodson, Chris
Proctor, and Jeff Rutan
Washington State University
Overview

- Herbicides
- NTEP
- Fertilizers
- Wetting Agents
- Cultivar Development
- Fungicides
- Black Sand
- Puyallup-Organic Fertilizer
Projects in 2007-‘Tenacity’

- ‘Tenacity’ 4SC at planting of a 3-way mix
- ‘Tenacity’ impregnated fertilizer at planting
- Tenacity 4SC cultivar/species differences (bentgrass/fine leaf fescue)
- Tenacity 4SC pre-plant (greenhouse)
Projects in 2007
Roundup formulation demo

- Use of experimental $K^+$-salt formulations
  - Applied to fineleaf fescue
  - Killed fineleaf fescue
• 2003 Bentgrass  
  – 28 cultivars, MH=0.375”

• 2003 Fineleaf fescue  
  – 53 cultivars, MH=1.5”

• 2004 Perennial ryegrass  
  – 120 cultivars, MH=1.0”

• 2005 Kentucky bluegrass  
  – 110 cultivars, MH=1.0”
Projects in 2007

Steady-delivery N soluble fertilizers

Notamin fertilizers

– Trials on 1.0” and 0.5” Kentucky bluegrass
Projects in 2007
N Fertilizers

- Lawn trial on Perennial ryegrass mowed at 1.5”
- Putting green trial on ‘T-1’ creeping bentgrass mowed at 0.140”
- Fairway trial on Kentucky bluegrass mowed at 0.5”
Projects in 2007
Kentucky bluegrass cultivar development

• Kentucky bluegrass seed production without field burning
  – Evaluate seed yield and turfgrass quality
  – 50 entries

– Turf & Field trials
Projects in 2007

Fungicides for snow mold control

- Evaluate new formulations, compounds, and product combinations
  - Sites include Pullman, WA; McCall, ID; Chewelah, WA
  - Bayer, Cleary’s, Lesco, and Syngenta
Projects in 2007

Black sand during green establishment

• Evaluated the rate of establishment
  – Different kinds/rates of sand/covers
Highlighted Projects - Pullman

• Georgia Pacific fairway fertilizers

• Lesco greens fertilizers

• Black Sand
Georgia Pacific Fairway Ferts

• Treatments included:
  – Nitamin Nfusion (25-0-0)
  – Nitamin Nfusion + Urea (50% N blend)
  – Polyon (43-0-0)
  – Unfertilized check

• Treatments applied at 2 & 4 lbs N/M

• Parameters included:
  – Chlorophyll index, clipping dry weight, visual color, and visual quality
Chlorophyll Index (2 lbs N/M)

Chlorophyll meter reading

- Nitamin 2 lbs/M
- Nit + Urea 2 lbs/M
- Polyon 2 lbs/M
- CHECK
Clipping Dry Weight (2 lbs N/M)

- Nit in 2 lbs/M
- Nit + Urea 2 lbs/M
- Polyon 2 lbs/M
- CHECK

Graph showing the Clipping Dry Weight (g/1 ft²) from June 11 to August 27.
Visual Color (2 lbs N/M)

![Graph showing visual color ratings over time for different treatments. The graph includes a legend for Nitamin 2 lbs/M, Nit + Urea 2 lbs/M, Polyon 2 lbs/M, and CHECK.]
Visual Quality (2 lbs N/M)

Visual quality (rated 1-9)

- Vitamin 2 lbs/M
- Nit + Urea 2 lbs/M
- Polyon 2 lbs/M
- CHECK
Conclusions

• Prolonged response using Polyon

• Addition of Urea to Nitamin gave initial increases in chlorophyll and color

• Nitamin alone similar response to Polyon initially (0-4 WAT)
Lesco Greens Fertilizer

- **Treatments included:**
  - Lesco homogenous 20% N
  - Lesco homogenous 18% N
  - Nutralene MU 40% N
  - GP Nitamin 42% N
  - Lesco Poly Plus SCU 29% N
  - Urea 46% N
  - Check

- **Applied at 1 & 2 lbs N/M**
Visual Quality (1 lb N/M)

LESCO Greens Fertilizer (1 lb N/1000 ft²) Trial 2007

- LESCO Homogenous 20%N
- Nutralene MU 40%N
- GP Nitamin 42%N
- LESCO Poly Plus SCU 29%N
- Urea 46%N
- CHECK

Turfgrass quality (rated 1-9)
Density (1 lb N/M)

LESCO Greens Fertilizer (1 lb N/1000ft²) Trial 2007

Density (rated 1-9)

LESCO Homogenous 20%N
Nutralene MU 40%N
GP Nitamin 42%N
LESCO Poly Plus SCU 29%N
Urea 46%N
CHECK
Phytotoxicity (1 lb N/M)

LESCO Greens Fertilizer (1 lb N/1000 ft²) Trial 2007

Phytotoxicity (rated 0-10)

- LESCO Homogenous 20%N
- LESCO Homogenous 18%N
- Nutralene MU 40%N
- GP Nitamin 42%N
- LESCO Poly Plus SCU 29%N
- Urea 46%N
- CHECK
LESCO Greens Fertilizer (1 lb N/1000ft^2) Trial 2007

Color (1 lb N/M)

Visual color (rated 1-9)

- LESCO Homogenous 20%N
- Nutralene MU 40%N
- GP Nitamin 42%N
- LESCO Poly Plus SCU 29%N
- Urea 46%N
- CHECK

Dates:
- 5/26
- 6/2
- 6/9
- 6/16
- 6/23
- 6/30
- 7/7
- 7/14
- 7/21
- 7/28
- 8/4
- 8/11
Conclusions

• Urea performed well, but with phyto

• GP Nitamin also performed well, no phyto

• All other treatments performed similarly

• Turf response similar using urea or slow-release fertilizers
Black Sand

#17 Green – Palouse Ridge Golf Club at WSU
1 week after planting
Black Sand

• Treatments included:
  – Black sand @ 200 and 400 lbs/M
  – Atlas sand @ 200 and 400 lbs/M
  – Reemay cover @ 1.5 oz/yd²
  – Check

• Parameters
  – Soil temperature
  – Germination of ‘T-1’ bentgrass (Visual & Count)
Soil Temperature
Oct 22-Nov 14, 2007
Soil Temperature Difference
Oct 22 – Nov 14, 2007
Seedling Count
Nov 9, 2007 – 6 WAP

Seedling Count (Number/1 ft²)

- Black sand 200 lbs/M
- Black sand 400 lbs/M
- Atlas sand 200 lbs/M
- Atlas sand 400 lbs/M
- Reemay cover (1.5 oz/yd²)
- CHECK

Bar chart showing seedling counts with various treatments.
Check
Conclusions

• Black Sand @ 400 lbs/M = higher soil temp & more germination

• Reemay, Black sand @ 200 lbs/M, & Atlas sand @ 400 lbs/M had equal germination

• Sand topdressing less labor than covers
The WSU Pullman Turf Team

- Dr. William Johnston
- Charles Golob
- Matthew Williams
- Katie Dodson
- Chris Proctor
Chicken Pieces, Dead Fish, Ground Bones, and Flushables

For Your Fairways?

Eric Miltner, Randi Luchterhand, and Jeff Rutan
Washington State University - Puyallup
Natural organic fertilizers – derived from animal or plant by-products
   Examples: Nature Safe, Nature’s Intent, Milorganite

Synthetic organic fertilizers – coated ureas (PCU, PCSCU), methylene urea (MU), ureaformaldehyde (UF), IBDU, and others
» Lots of products
» Many different nutrient source materials
» Many unknowns

» Need to identify commonalities and/or differences
Why Use Natural Organics?

» Slow release nitrogen
» Low leaching potential
» Temperature-based nutrient release (coincides with plant growth)
» Make use of a valuable resource / waste product
Why Not?

- High phosphorus (P)
- No or little potassium (K)
- Release rates dependent upon soil moisture and temperature
- Unknown or unfamiliar release characteristics (we like to stick with what we know)
Pelletized Slow-Release Natural Organic

SOUNDGRO™

FERTILIZER
Biosolids

» Pierce County / Northwest Biosolids Management Association – SoundGro biosolid-based fertilizer

» Manufactured at the Chambers Creek Regional Wastewater Treatment Plant

» Produced from solid residual by-products (biosolids) in the wastewater treatment process

» A Class “A” product

» http://piercecountywa.org
Pierce County / NBMA - SoundGro

» SoundGro, Milorganite, PCSCU (60% slow release), ammonium sulfate, unfertilized

» Seasonal application timings (March, May, July, September, November)

» Characterize turf response (golf turf, parks and lawns)

Visual ratings
Tissue N content 4, 8, 12, 16 wks
N Mineralization Rates
No fertilizer added

![Graph showing the concentration of nitrogen in soil over weeks. The graph shows a linear increase in concentration of both ammonium (NH4) and nitrate (NO3) with time.](image-url)
% leaf N, July application*

<table>
<thead>
<tr>
<th>Source</th>
<th>4</th>
<th>8</th>
<th>12</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check</td>
<td>3.7</td>
<td>4.0</td>
<td>4.0</td>
<td>3.3</td>
</tr>
<tr>
<td>AmS</td>
<td>4.4</td>
<td>4.0</td>
<td>4.1</td>
<td>3.4</td>
</tr>
<tr>
<td>PCSCU</td>
<td>4.1</td>
<td>3.8</td>
<td>3.8</td>
<td>3.2</td>
</tr>
<tr>
<td>Milorg</td>
<td>4.1</td>
<td>4.3</td>
<td>3.9</td>
<td>3.3</td>
</tr>
<tr>
<td>SG</td>
<td>4.0</td>
<td>3.9</td>
<td>3.9</td>
<td>3.2</td>
</tr>
</tbody>
</table>

*Calculated raw data
% leaf N, Nov application*

<table>
<thead>
<tr>
<th>Source</th>
<th>4</th>
<th>8</th>
<th>12</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check</td>
<td>3.1</td>
<td>2.6</td>
<td>2.4</td>
<td>3.0</td>
</tr>
<tr>
<td>AmS</td>
<td>4.1</td>
<td>3.7</td>
<td>3.3</td>
<td>4.3</td>
</tr>
<tr>
<td>PCSCU</td>
<td>4.2</td>
<td>3.7</td>
<td>3.3</td>
<td>4.0</td>
</tr>
<tr>
<td>Milorg</td>
<td>3.7</td>
<td>3.4</td>
<td>3.0</td>
<td>3.5</td>
</tr>
<tr>
<td>SG</td>
<td>3.8</td>
<td>3.5</td>
<td>3.1</td>
<td>3.3</td>
</tr>
</tbody>
</table>

*Calculated raw data
Conclusions...

» Little consistency with regards to source materials and mineralization rates except

» Biosolids appear to release N at a slower rate

» Leaf tissue N content alone might not be enough to measure N uptake – need clipping weights also

» All sources appear to increase tissue N % during winter months
WSDA Study

- 5 organic fertilizers
- 4 others
- Applied Apr, June, Sept, Nov
Apparent Nitrogen Recovery (ANR)

- Grass cut only 4x / yr (prior to fert application)
- Total yield (clipping wt.) measured
- % N measured
- Weed populations
- Calculate total N uptake
- Adjust by subtracting out unfertilized check
» Milorganite 6 – 2 – 0
   Biosolids
» Nature’s Intent 9 – 3 – 4
   Feather meal, steamed bone meal
» Richlawn 5 – 3 – 2
   Dried poultry manure
» Ringer Lawn Restore
   Hydrolyzed poultry feather meal, nitrate of soda, bone meal, soybean meal
» Whitney Farms 8 – 2 – 4
   Blood meal, dried poultry waste, feather meal, bone meal
» Best Turf K 24 – 3 – 10 PCSCU 67% slow
» Ammonium sulfate, calcium nitrate
## Cumulative N recovered in leaf tissue (ANR)

<table>
<thead>
<tr>
<th>Source</th>
<th>Lb N / M</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>AmS</td>
<td>2.4</td>
<td>59</td>
</tr>
<tr>
<td>Cal Nit</td>
<td>2.8</td>
<td>71</td>
</tr>
<tr>
<td>PCSCU</td>
<td>2.5</td>
<td>62</td>
</tr>
<tr>
<td>Milorg</td>
<td>1.9</td>
<td>48</td>
</tr>
<tr>
<td>Ringer</td>
<td>2.1</td>
<td>52</td>
</tr>
<tr>
<td>WF</td>
<td>1.6</td>
<td>40</td>
</tr>
<tr>
<td>NI</td>
<td>1.9</td>
<td>47</td>
</tr>
<tr>
<td>RL</td>
<td>2.3</td>
<td>58</td>
</tr>
</tbody>
</table>
In the end...

» Total N uptake from natural organic fertilizers was approx. 75% of the uptake from inorganic products and PCSCU.

» Natural organic fertilizers were similar, except for WF, which resulted in about 20% less uptake compared to others.

» If changing to organic fertilizers, you may need to apply slightly higher rates during the first year (or two?) to compensate.