Turfgrass Management BMP’s

Sussex County Conservation District
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Turfgrass management- “Utilization of grasses while implementing the necessary management practices to control growth in order to achieve a desired surface”
Fertilization

- Adding of nutrients that are not supplied by the soil
- Macro-Secondary – S, Ca, Mg
- Micro- Fe, Mn, B, Cu, Z, Mo, Cl
- Avoid deficiencies with fertilizers
- Soil testing
Nutrients In & Out

NUTRIENT BALANCE SCHEME

Input:
- Fertilization
- Atmospheric deposition
- Deposition of organic residues

Output:
- Clipping removal
- Gaseous loss
- Conversion to unavailable forms
- Leaching loss

PLANT-AVAILABLE NUTRIENT POOL
Clipping Management

- Clippings should always be returned
- Clippings are fertilizer
- Can supply 30%+ of yearly N needs
- Collecting clippings is a waste of nutrients and organic materials
- C sequestration linearly over time
- Organic matter
- Impervious surfaces
Don’t Do This
The 4 R’s Of Fertilization

1. Right place
2. Right rate
3. Right source
4. Right time

- Applying nutrients the plant doesn’t need is wasteful
Spreader

• Always calibrate your spreader when switching products
Right Place

- Apply only to the intended target
- Keep away from water sources
- Clean impervious surfaces
Right Rate

• Apply only what it is needed based on soil test
• Too much or too little can have major consequences
  □ Succulency
  □ Nutrient deficiency
Right Source

- Use of slow-release fertilizers when possible (35%>
- Using reputable companies
- Water soluble use needs precaution
- ALWAYS irrigate after water soluble applications
Right Time

- Pay attention to weather
- Understand the growing season of your turf
- November is too late!!!
Fall Fertilization & N Loss Potential

Cumulative NO$_3$N mass in percolate, kg ha$^{-1}$ yr$^{-1}$

\[ y = 20.5 + 0.13x, \]
where $x$ is days after 15 September.
\[ r^2 = 0.94, p = 0.03. \]

### Applied fall N mass collected in percolate

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Both years</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 Sept.</td>
<td>2.0</td>
<td>29.1</td>
<td>15.5</td>
</tr>
<tr>
<td>15 Oct.</td>
<td>3.1</td>
<td>56.4</td>
<td>29.8</td>
</tr>
<tr>
<td>15 Nov.</td>
<td>1.6</td>
<td>64.2</td>
<td>32.9</td>
</tr>
<tr>
<td>15 Dec.</td>
<td>16.8</td>
<td>66.1</td>
<td>41.4</td>
</tr>
</tbody>
</table>

$\dagger$ Percent lost = (mean N in percolate for treatment – mean N in percolate for control)/(full N applied) $\times$ 100%.
General Growth Cycles

C3-Cool season

C4-Warm season
Turfgrass Growth Potential

Ideal Temperatures
• 65-75 for cool season grasses
• 82+ for warm season grasses
- Growth does not decline as temperatures increase
Organic Soil Amendments

- Decompose over time
- Plant nutrient source
- Mitigate poor quality soils – chemical and physical – urban areas

Grass clippings, composts, manures, wood chips, bio-solids etc.
Benefits Of Compost

Increase
- CEC
- pH
- C & N cycling
- Aeration
- Drainage
- Establishment
- Structure

Decrease
- Bulk density - compaction
Compaction Symptoms

- Turf/plant quality decline
- Nutrient deficiencies
- Easily drought stressed
- Lateral root growth
- Easily ponding of water
- Fast thatch accumulations
General Guide For Compost Quality

- C:N 30:1 or less
- 30-50% moisture content
- OM 30% or greater
- Ash content 70% or less
- Metals – locally/federally mandated ranges
- Soluble salts
- N 0.5-3.0 %
- P 0.2% - lower P is best
## BIOENERGY DEVELOPMENT COMPANY
### STA Compost (TMECC) Analysis Report

**Account No.:** 2421  
**Invoice No.:** 1121261  
**Sample ID:** 01292019  
**Date Received:** 07/28/2020  
**Date Analyzed:** 07/30/2020

#### Results for: 01292019

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Dry Basis</th>
<th>Analysis As Is Basis</th>
<th>Dry Basis</th>
<th>Available First Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organo N, % N</td>
<td>1.99</td>
<td>1.29</td>
<td>39.6</td>
<td>25.8</td>
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<tr>
<td>Ammonium, % N</td>
<td>0.125</td>
<td>0.0800</td>
<td>2.6</td>
<td>1.6</td>
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<tr>
<td>Nitrate, % N</td>
<td>0.025</td>
<td>0.0160</td>
<td>0.6</td>
<td>0.4</td>
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<tr>
<td>Total N, % N</td>
<td>3.14</td>
<td>1.39</td>
<td>42.5</td>
<td>27.8</td>
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<tr>
<td>Phosphorus, % P2O5</td>
<td>2.96</td>
<td>1.93</td>
<td>59.6</td>
<td>38.7</td>
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<tr>
<td>Potassium, % K2O</td>
<td>0.64</td>
<td>0.42</td>
<td>12.8</td>
<td>8.3</td>
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<tr>
<td>Sulfur, % S</td>
<td>0.47</td>
<td>0.31</td>
<td>9.6</td>
<td>6.1</td>
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<tr>
<td>Calcium, % Ca</td>
<td>11.90</td>
<td>7.90</td>
<td>231.3</td>
<td>130.1</td>
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<tr>
<td>Magnesium, % Mg</td>
<td>0.51</td>
<td>0.33</td>
<td>10.3</td>
<td>6.7</td>
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<tr>
<td>Sodium, % Na</td>
<td>0.18</td>
<td>0.12</td>
<td>3.6</td>
<td>2.3</td>
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<tr>
<td>Sodium Adsorption Ratio (SAR)</td>
<td>1.40</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Zinc, ppm Zn</td>
<td>187.0</td>
<td>121.4</td>
<td>0.4</td>
<td>0.2</td>
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<td>Iron, ppm Fe</td>
<td>18378.5</td>
<td>11928.3</td>
<td>36.8</td>
<td>23.9</td>
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<tr>
<td>Manganese, ppm Mn</td>
<td>203.6</td>
<td>170.4</td>
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<td>0.3</td>
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<td>Copper, ppm Cu</td>
<td>50.9</td>
<td>59.0</td>
<td>0.2</td>
<td>0.1</td>
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<tr>
<td>Aluminum, ppm Al</td>
<td>7092.2</td>
<td>4502.8</td>
<td>14.2</td>
<td>9.2</td>
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<td>Boron, ppm B</td>
<td>37.7</td>
<td>24.5</td>
<td>0.1</td>
<td>0.0</td>
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<td>Soluble Salts, (EC 1:5) dSm</td>
<td>3.66</td>
<td></td>
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<td></td>
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<tr>
<td>pH</td>
<td>7.9</td>
<td>7.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moisture, %</td>
<td>35.10</td>
<td>69.0</td>
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<td></td>
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<tr>
<td>Dry Matter (TS), %</td>
<td>64.90</td>
<td>31.0</td>
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<tr>
<td>Ash, %</td>
<td>97.75</td>
<td>37.50</td>
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</tr>
<tr>
<td>Organic Matter LOI 560C, %</td>
<td>42.32</td>
<td>27.40</td>
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<td></td>
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<tr>
<td>Organic Carbon, %</td>
<td>24.40</td>
<td>15.89</td>
<td></td>
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<tr>
<td>Organic C:N Ratio</td>
<td>11.4</td>
<td>34</td>
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<td></td>
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<tr>
<td>Bulk Density, lbs / cubic foot</td>
<td>34</td>
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</table>

**Date:** 08/14/2020  
**Copies:** 1  
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**Total:** 2

**Web site:** [www.agrolab.us](http://www.agrolab.us)  
**Email:** admin@agrolab.us  
**Address:** 101 Clockey Dr, Harrington, DE 19992
Site Preparation

• Soil test prior to establishment
• Rocks, construction materials, and other debris need to be removed
• Add topsoil where needed
  □ 6” of quality soil is the minimum
• Grade soil for proper surface drainage
• Smooth to fill low areas
Compost Application Methods For Established Turf

• Increase surface smoothness
Well, How Much?

<table>
<thead>
<tr>
<th>Unit area in square feet</th>
<th>Inches of compost applied</th>
<th>Surface Application</th>
<th>Tilled into soil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1/4</td>
<td>1/2</td>
</tr>
<tr>
<td>1,000</td>
<td>1*</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5,000</td>
<td>4</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>10,000</td>
<td>8</td>
<td>15</td>
<td>31</td>
</tr>
<tr>
<td>20,000</td>
<td>15</td>
<td>31</td>
<td>62</td>
</tr>
<tr>
<td>30,000</td>
<td>23</td>
<td>43</td>
<td>93</td>
</tr>
<tr>
<td>40,000</td>
<td>31</td>
<td>62</td>
<td>123</td>
</tr>
</tbody>
</table>

* amounts of compost in cubic yards rounded to nearest whole numbers.
Studies have shown that effects can remain for 5 years or more.
Decomposition depends on C:N, temperature, and moisture.
Yearly applications not a BMP.
Water Management

• Supplemental irrigation should be viewed as a way to alleviate drought stress
• Deep and infrequent is a BMP
• Deep and frequent causes anaerobic soils, fungal pathogens, and root dieback
• Shallow and frequent = easy drought stress
Soil Drying

Fig. 4. Root hair development of Kentucky-31 under well-watered conditions (A), after 14 d of dry down (B), and after 28 d of dry down (C) and (D). Arrows indicate root hairs. The horizontal bar in D represents 100 μm.
Signs Of Drought Stress
Average Weekly Water Loss
Precision Irrigation

- Smart controllers
- Soil moisture sensors
- Auditing
Controller Adjustments

- Watering on a “schedule” is a poor management practice
- Don’t set it & forget it!
- Take note of upcoming and previous weather events
- Water just before sunrise
Fall Army Worm

- Loss of acres of turf over the region
- Populations moved with “un-normal” weather patterns
- Do not over winter here
- Multiple generations possible
- Females can lay 1000+ eggs
- 100% tall fescue stands hit the hardest
Life Cycle
FAW IPM

• Scout for egg masses and caterpillars
• Soapy water test
• Threshold of 2-3/sq ft
• Pyrethroids provide excellent knock down control, but must act quickly!!
• Preventative insecticides work best, but this doesn’t mean we need to spray the world to prevent a pest that is once in a generation!!!!
Take Home Message FAW

• Multi-species turf stands faired much better-TF monocultures faired poorly
• Bluegrasses were mostly left alone
• Some bermudagrass damage
• Unsure of zoysia damage