Fertilizing Turf: Getting it Right the First Time
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Why Fertilize?
• Plants are living organisms and they require proper nutrition.
  – The building blocks of nutrition for plants comes in the form of fertilizer.
• A properly fertilized lawn is the best defense against plant pests.
• A properly fertilized lawn provides protection from storm water runoff.
• “Proper” nutrition does not mean over-fertilization!

Two Ways That Fertilizers Can Pollute
1. Leaching through soil profile – this is what nitrogen will do in soils – especially sandy soils.

Two Ways That Fertilizers Can Pollute
2. Surface water run-off – this is what nitrogen and phosphorus can do.
Objectives

• Learn how to calculate the size of the area we are going to fertilize.
• Learn about fertilizers available to the consumer.
• Learn how to determine the quantity of fertilizer needed for an area of a given size.
• Learn how to properly apply the product.

OBJECTIVE #1:
LEARN HOW TO CALCULATE THE SIZE OF THE AREA WE ARE GOING TO FERTILIZE.

Geometric method

- Rectangle
- Trapezoid
- Circle
- Triangle
- Oval
Segmenting Larger Shapes into Smaller Shapes

1 rectangle
1 trapezoid
1 triangle

Rectangle

Parallellogram with four right angles.

Area of a rectangle = Length (l) X Width (w)

Example 1.1 Determine the area of a rectangle where the length is 100 ft and the width is 50 ft.

Area = (l) (w)
Area = (100 ft) (50 ft)
Area = 5,000 ft²

Trapezoid

Quadrilateral with only two parallel sides.

Area of a trapezoid = \([\frac{(A + B)}{2}] (h)\)

Example 1.2 Determine the area of a trapezoid where the A is 300 ft, B is 200 ft and the height is 50 ft.

Area = \([\frac{(A + B)}{2}] (h)\)
Area = \([\frac{(300 ft + 200 ft)}{2}] (50 ft)\)
Area = (250 ft) (50 ft)
Area = 12,500 ft²

Triangle

A polygon with 3 sides.

Area of a triangle = \(\frac{1}{2}\) base (b) X height (h)

Example 1.3 Determine the area of a triangle where the base is 200 ft and the height is 100 ft.

Area = \([\frac{(b)}{2}] (h)\)
Area = \([\frac{(200 ft)}{2}] (100 ft)\)
Area = 20,000 ft²
Area = 10,000 ft²
OBJECTIVE #2:
LEARN ABOUT FERTILIZERS AVAILABLE TO THE CONSUMER.

What’s in the bag?
• Numbers refer to percent nitrogen, phosphorus, and potassium in the bag.
  \[ \text{N – } P_2O_5 – \text{K}_2O \]
• Example: 8-8-25
  – 8% N
  – 8% \( P_2O_5 \)
  – 25% \( K_2O \)
• Nutrient sources are also listed.

The Big Three (N, P, & K)
• Nitrogen (N) in the plant:
  – Amino acids – building blocks for proteins.
  – Proteins
  – Chlorophyll – photosynthesis
  – Hormones - auxins, cytokinins, and ethylene.
  – Nucleic Acids - DNA, RNA

The Big Three (N, P, & K)
• Phosphorus (P) in the plant:
  – Energy molecules ATP and ADP.
    • These compounds serve to store and transfer available energy within the plant.
  – Structural constituent
    • Phospholipids
    • Phosphoproteins
    • Nucleic acids
    • Sugar phosphates
    • Nucleotides
    • Coenzymes

The Big Three (N, P, & K)
• Potassium (K) in the plant:
  – This element is like a vitamin for turf – it imparts stress tolerance:
    • Winter cold tolerance and spring green-up
    • Drought tolerance
    • Disease pressure may be reduced

What Fertilizer Should I Use?
• Quick Release (Water Soluble) N Sources:
  – Commonly used by professional lawn care companies and on commercial turf.
  – Very effective fertilizer.
  – Provide quick green-up (days) and growth surge but response is short term (< 30 days).
  – Can leach if over-applied or followed by excess irrigation or rainfall.
  – Less expensive.
Quick Release (soluble) Nitrogen

- Inorganic Carriers:
  - Ammonium Nitrate (33-0-0)
  - Ammonium Sulfate (21-0-0)
  - Potassium Nitrate (13-44-0)
- Organic Carriers:
  - Urea (45-0-0)

What Fertilizer Should I Use?

- Slow Release (Insoluble) N Sources:
  - Releases nitrogen slowly over time.
  - Release rate tied to technology.
  - Response may range from 30-180 days.
  - Less growth surge and green-up after application
    - Sometimes homeowners get discouraged and re-apply when they don’t see a response.
  - More expensive.
  - Products may be prone to runoff.

Slow Release (Insoluble) Nitrogen

- Natural Organics
- Methylene Ureas
- IBDU
- Coated Materials
  - Sulfur
  - Resin
  - Polymer
  - Plastic

What Fertilizer Should I Use?

- Most retail products are a blend of QRN and SRN.

What Fertilizer Should I Use?

- Look for something with 30 – 50% of the N in slow release form.
- < 2% Phosphorus
- Balanced K to N (e.g. 15-0-15).
- Micros in small amounts if soil test indicates.

Liquid vs Granular?
What about “Weed-n-Feed” Products

- The most highly scientific answer I can give is: **IT DEPENDS**.

Development of Statewide Fertilizer Rule

- Began in 2007 through Department of Agriculture and Consumer Services (FDACS)
  - Agency that regulates fertilizer labels and sales
- Affects what labels can say on any fertilizer sold for use on lawns or urban turf.
  - Targets “specialty fertilizer bags” — those that are 49 lbs. or less.
- Primary target is the homeowner.

Statewide Fertilizer Rule

- Limits nitrogen to 1 lb per 1,000 ft² maximum application rate or 0.7 lb per 1,000 ft² for QRN.
- Limits phosphorus to 1/4 lb P₂O₅ per 1,000 ft² per application and 1/2 lb P₂O₅ per 1,000 ft² annually.
- Annual N rates follow UF recommendations.
- Requires professional industry to follow Best Management Practices.

BMP Manuals

Other Provisions of the Fertilizer Rule

- Retailers had until July 1, 2009 to sell existing stock.
- Rule only applies to the lawn portion of a landscape.
- Additions to label:
  - Square footage covered by bag
  - Environmental caution statement

Exceptions to the Rule

- Establishing lawns:
  - Up to 12 months after planting (seeding, sodding, sprigging, plugging) a starter fertilizer with higher P may be applied.
  - Allow for application of higher rates of P.
  - Limit P application on a one-time basis to 1 lb. P₂O₅ per 1,000 ft² within this time frame.
- Phosphorus soil or tissue deficiencies:
  - With a valid soil or tissue test, higher rates of P may be applied.
OBJECTIVE #3:
LEARN HOW TO DETERMINE THE QUANTITY OF FERTILIZER NEEDED FOR AN AREA OF A GIVEN SIZE.

Application Amount
• Depends on percentage of slow-release N
  – ≤ 0.7 lb. N 1000 ft² if QRN
  – ≤ 1.0 lb. N 1000 ft² if SRN
• Spoon-feed: Better to apply smaller amounts more frequently for optimal physiological functioning of turf.

Fertilizer Calculations
• Assume 13-13-13 with 50% SRN.
• Assume area to cover is 2,516 square feet
• How many pounds of product do we want to apply per 1,000 square feet?
  – 1 lb of slow-release N

Fertilizer Calculations
• Milorganite (6-2-0) 6% SRN
  – 1 lb N 1,000 ft²
  – 100/6 = 16.6 – pounds of this fertilizer to cover 1,000 ft².
  – To cover 2,516 square feet: 16.6 x 2.516 = 41.9 pounds of fertilizer
Fertilizer Calculations

- Sulfur Coated Urea (38-0-0) SRN
  - 1.0 lb N 1,000 ft\(^2\)
  - \(\frac{100}{38} = 2.63\) – pounds of this fertilizer to cover 1,000 square feet.
  - To cover 2,516 square feet: \(2.63 \times 2.516 = 6.62\) pounds of fertilizer.

Current UF/IFAS Fertility Recommendations (lbs. N 1000 ft\(^2\) yr\(^{-1}\))

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<th>Grass Type</th>
<th>Low Input</th>
<th>Moderate Input</th>
<th>High Input</th>
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<tr>
<td>Bahiagrass</td>
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<tr>
<td>Centipedegrass</td>
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<td>1.5</td>
<td>2.0</td>
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<tr>
<td>St. Augustinegrass</td>
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<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Zoysiagrass</td>
<td>2.0</td>
<td>2.5</td>
<td>3.0</td>
</tr>
</tbody>
</table>

When to Fertilize?

- 2-4 times a year for most homeowners:
  - Spring – NOT before April 15th!
    - Pay your taxes – Fertilize your lawn.
  - Summer –
    - If growth is sufficient but color is off, apply iron rather than a nitrogen fertilizer.
  - Fall – potassium beneficial

OBJECTIVE #4:
LEARN HOW TO PROPERLY APPLY THE PRODUCT.

Turfgrass Fertilizer BMPs

- Keep fertilizer off impervious surfaces.
- Maintain a buffer zone around water bodies.
- Apply only the correct amount.
- Soil test – know your pH and nutrient concentration.
- Only fertilize during the growing season.
  - April 15th through September 15th.
- Irrigate fertilizer in with about ¼” of water.
- Do not fertilize new lawns established from sod for at least 30 days.

Research has shown conclusively that ~ 0.2% of applied nitrogen can leach from a turfed area and virtually no runoff occurs!

The problem comes from mis-application of fertilizers to impervious surfaces such as streets and sidewalks.
How To Properly Apply Fertilizer

- Use a deflector shield when fertilizing near water bodies or impervious surfaces.

Fertilizing Around Water

“Ring of Responsibility”

Drop Spreader

Misapplication using a drop spreader.

WARM-SEASON GRASSES

ROOTS SHOOTS

Period of Highest Nutrient Need
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