Low Input Lawns

SAM BAUER, EXTENSION EDUCATOR- TURFGRASS SCIENCE
MASTER GARDENER CONFERENCE 7.26.15
What Type of Lawn do You Desire?

High input

Low input
Living Laboratory

LOW-MAINTENANCE TURFGRASS

Reducing the amount of water and fertilizer needed to maintain a pleasing and functional campus.

italladdsup.umn.edu/livinglab

University of Minnesota
Science to Discover
BIG THREE OF LOW INPUT LAWN CARE

- Soil management
- Turf selection
- Proper culture
A healthy low input lawn requires the proper practices to be applied at the correct time to reduce the reliance on pesticides and improve the environmental impact of the lawn.

90% of issues I encounter can’t be solved by simply applying something from a jug.
Turfgrass selection
TURFGRASS SPECIES THAT MEET PUBLIC ACCEPTANCE IN MINNESOTA

- Kentucky bluegrass
- Perennial ryegrass
- Fine fescue species
  - Strong creeping red, slender creeping red, chewings, hard, sheeps
- Tall fescue
- Bentgrasses
  - Creeping, colonial, velvet
LOW-INPUT CHARACTERISTICS

- Disease resistance
- Insect resistance
- Drought tolerance
- Slow vertical growth
- Low fertility needs

Photo credit: S. Andersen, SDSU
FINE FESCUES (*FESTUCA SP.*)

- A group of fescue species with similar characteristics:
  - Strong and slender creeping red, hard, Chewings, sheep
- Uses: home lawns, parks, golf course fairways

**Positives**
- Low fertility needs
- Slow-growing
- Shade or sun
- Drought tolerance

**Negatives**
- Disease under wear
- Snow mold
NO MOW MIXTURES

Mix of fine fescues

Reasonable to only mow 1x per year

No ryegrass
THE MAJOR COOL SEASON LAWN GRASSES

- Fine fescues (*Festuca* spp.)
  - A group in the fescue genus known for their fine leaf texture
  - Great for shaded areas
  - Lower nitrogen and water requirements
  - Very low to medium care

Kentucky bluegrass

Perennial ryegrass

Hard fescue

Photo: Andrew Hollman, U of MN
TALL FESCUE  
FESTUCA ARUNDINACEA

- Uses: Home lawns, athletic fields, roughs, parks

- **Positives**
  - Drought avoidant
  - Wear tolerant
  - Disease resistant

- **Negatives**
  - Not winter hardy under ice cover
  - Spring seeding
  - Some varieties have a coarse leaf texture
NON-TRADITIONAL TURFGRASS SPECIES (NATIVE)

- Buffalograss
- Blue grama
- Texas bluegrass
- Tufted hairgrass
- Prairie junegrass

Currently have not gained public acceptance, costly, lower density
BUFFALOGRASS TRIAL
CONVERSION TO LOW INPUT SPECIES
STEPS FOR CONVERSION

1. Soil test
2. Control existing vegetation
   - Solarization
   - Clear plastic
   - Roundup (glyphosate), 1-2 applications
3. Mechanical disruption?
   - Mower, slit-seeder, vertical mower, etc.
4. Starter fertilizer (high in phosphorus)
5. Seeding and seed incorporation
6. Irrigation (multiple times per day)

Other considerations: herbicides, mowing, fertility, cultivation, other pest pressures
CONVERSION TO LOW INPUT SPECIES

- 4 mixtures:
  - Fine fescue
  - Tall fescue
  - Standard
  - Prairie shortgrass

- 4 methods:
  - Scalp
  - Slit-seed
  - Vertical mow
  - No disruption
Similar relative performance in St. Paul
Fine fescue- Scalp

Tall fescue- Scalp
Similar performance in St. Paul (vertical = best, but not statistically different than no disruption)
ARBORETUM: JUNE 13, 2013

Fine fescue- Slit-seed
Fine fescue- No Disruption
CONCLUSIONS

- Species
  - Fine fescue mixtures provided the best final quality and cover
  - Tall fescue germinates and establishes rapidly, but must be seeded in the spring
  - The standard mixture is slow to establish, but ultimately fills in if weed pressure is low
  - Prairie shortgrass mixtures must be seeded at a higher rate

- Method
  - There was no statistical difference between methods tested
  - When inadequate irrigation is available, incorporation into the soil will likely be very important

- Site
  - Better soils improved the final stand, less weed pressure
CONSUMER SEED MIXTURES

Are the right species mixtures available to you on the marketplace?

Yes and no
# STANDARD MINNESOTA MIXTURE

## 4 Midwest Mix

The Scotts Company

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Species</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jump Start</td>
<td>Kentucky Bluegrass</td>
<td>9.48</td>
</tr>
<tr>
<td>Wendy Jean</td>
<td>Creeping Red Fescue</td>
<td>8.50</td>
</tr>
<tr>
<td>Right</td>
<td>Kentucky Bluegrass</td>
<td>7.71</td>
</tr>
<tr>
<td>Silver Dollar</td>
<td>Perennial Ryegrass</td>
<td>7.55</td>
</tr>
<tr>
<td>Defender</td>
<td>Perennial Ryegrass</td>
<td>6.83</td>
</tr>
<tr>
<td>Treasure II</td>
<td>Chewing's Fescue</td>
<td>4.87</td>
</tr>
<tr>
<td>Midnight II</td>
<td>Kentucky Bluegrass</td>
<td>3.00</td>
</tr>
</tbody>
</table>

Other Super Absorbent Coating 50.00

<table>
<thead>
<tr>
<th>Product / 1000ft²</th>
<th>Seed / 1000ft²</th>
<th>$ / 1000 ft²</th>
<th>$ / lb. of seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.31 lbs</td>
<td>1.10 lbs</td>
<td>$11.53</td>
<td>$10.39</td>
</tr>
</tbody>
</table>

© 2014 Regents of the University of Minnesota. All rights reserved.
TALL FESCUE BLENDS ARE BECOMING MORE COMMON

### Tall Fescue

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Species</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic II</td>
<td>Tall Fescue</td>
<td>17.08</td>
</tr>
<tr>
<td>Gazelle II</td>
<td>Tall Fescue</td>
<td>17.00</td>
</tr>
<tr>
<td>Faith</td>
<td>Tall Fescue</td>
<td>14.88</td>
</tr>
</tbody>
</table>

| Other                      | Super Absorbent Coating | 50.00  |

<table>
<thead>
<tr>
<th>Product / 1000ft²</th>
<th>Seed / 1000ft²</th>
<th>$ / 1000 ft²</th>
<th>$ / lb. of seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00 lbs</td>
<td>1.96 lbs</td>
<td>$10.29</td>
<td>$5.25</td>
</tr>
</tbody>
</table>
## Low Grow

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Species</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>V.N.S.</td>
<td>Sheep Fescue</td>
<td>20.00</td>
</tr>
<tr>
<td>Minatour</td>
<td>Hard Fescue</td>
<td>20.00</td>
</tr>
<tr>
<td>Intrigue</td>
<td>Chewing's Fescue</td>
<td>25.00</td>
</tr>
<tr>
<td>Celestial</td>
<td>Red Fescue</td>
<td>25.00</td>
</tr>
<tr>
<td>V.N.S.</td>
<td>Annual Ryegrass</td>
<td>10.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Product / 1000ft²</th>
<th>Seed / 1000ft²</th>
<th>$ / 1000 ft²</th>
<th>$ / lb. of seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>6.67 lbs</td>
<td>6.67 lbs</td>
<td>$46.66</td>
<td>$6.99</td>
</tr>
</tbody>
</table>

© 2014 Regents of the University of Minnesota. All rights reserved.
COATED SEED

- **Advantages:**
  - Moisture retention?
  - Nutrients, fungicides
  - Color
  - Easier to handle

- **Disadvantages:**
  - Paying for only 50% seed
  - Seed at 2x rate
  - May not improve seedling establishment

Your money is better spent on buying grass seed without these coated products
PURCHASING GRASS SEED

- You get what you pay for
  - A small increase in cost will usually pay off in the long run
- Make sure you are paying for grass seed
- Look for variety names
  - Avoid ‘VNS’
- Avoid the bad varieties
  - ‘Linn’ and ‘Nui’ perennial ryegrass,
    ‘Kentucky-31’ and ‘Fawn’ tall fescue,
    common creeper, annual ryegrass
WHERE TO PURCHASE SEED?

http://turf.umn.edu/purchasing-turfgrass-seed/

- Professional distributors
- Online sources
- Local garden centers- specifically ask what you are looking for
- Big box stores- look at the fine print
Soil management
SOIL IS THE FOUNDATION FOR LAWNS

- Moisture holding
- Nutrient retention
- Aeration
- Stability
- Rooting
- Biological activity

healthy soil = healthy lawn
Always determine the causes of a poor lawn.
SOIL TEST

- pH: 5.5-8.0
- Organic matter: 3-15%
- Soil texture: medium to coarse
- Phosphorus: 25ppm+(Bray), 15ppm+(Olsen)
- Potassium: 100ppm+

Basic soil tests are $17.00 from the U of M Soil Testing Lab: http://soiltest.cfans.umn.edu/
**SOIL TEST REPORT**

**Lawn and Garden**

**Sample/Field Number**: 1330

**Estimated Soil Texture**: Coarse

<table>
<thead>
<tr>
<th>Organic Matter %</th>
<th>Soluble Salts mmhos/cm</th>
<th>pH</th>
<th>Buffer Index</th>
<th>Nitrate NO3-N ppm</th>
<th>Olsen Phosphorus P ppm</th>
<th>Bray 1 Phosphorus ppm</th>
<th>Potassium ppm K</th>
<th>Sulfur SO4-S ppm</th>
<th>Zinc ppm</th>
<th>Iron ppm</th>
<th>Manganese ppm</th>
<th>Copper ppm</th>
<th>Boron ppm</th>
<th>Calcium ppm</th>
<th>Magnesium ppm</th>
<th>Lead ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>0.3</td>
<td>7.6</td>
<td></td>
<td>5</td>
<td>6</td>
<td>132</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Interpretation of Soil Test Results**

- **Phosphorus (P)**
  - 5: Low
  - 10: Medium
  - 15: High
  - 20: V. High

- **Potassium (K)**
  - 25: Low
  - 75: Medium
  - 125: High
  - 175: V. High
  - 225: ***

**Soluble Salts**

- 0: Acid
- 1.0: Optimum
- 2.0: Satisfactory
- 3.0: Possible Problem
- 4.0: Excessive Salts

**Recommended For**: Home Lawn

- Grass watered
- Clippings not removed

**Lime Recommendation**: 0 LBS/1,000 SQ.FT.

**Total Amount of Each Nutrient to Apply Per Year**: *

- **Nitrogen**: 2 LBS/1,000 SQ.FT.
- **Phosphate**: 1 LBS/1,000 SQ.FT.
- **Potash**: 1 LBS/1,000 SQ.FT.

**The Approximate Ratio or Proportion of These Nutrients Is**: 20-10-10

Use a fertilizer with the percentage of nutrients closest to the above ratio. Apply according to the instructions on the fertilizer bag or container, or determine the amount required from the instructions given on the back side of this report. Since meeting the exact amount required for each nutrient will not be possible in most cases, it is more important to apply the amount of nitrogen required and compromise some for phosphate and potash.

*CAUTION! Do not apply more than 1 lb. nitrogen per 1000 sq. ft. in one application to avoid burning the grass, unless a slow release form or organic fertilizer is used. It is recommended that up to 50 percent of the nitrogen be of the slow release form.

- Apply 1/2 of the above total late spring.  
- Apply the other 1/2 of the above total late summer.

Grass clippings left on the lawn is a sound practice. They recycle nutrients and conserve moisture. The above recommendations reflect this contribution.

County: HENNEPIN. Additional information on the website [http://soiltest.cfans.umn.edu/intro.htm](http://soiltest.cfans.umn.edu/intro.htm) or call Yard & Garden Desk 952-443-1426
MINNESOTA PHOSPHORUS FERTILIZER LAWS

A person may not apply fertilizer containing phosphorus to turf unless:

1. A tissue or soil test performed within the last three years indicates a deficiency of P
2. Establishing turfgrass via seed or sod (first year)
3. Sod is being grown on a sod farm for sale
SOIL AERIFICATION

Why?

– Soil compaction*
– Soil layering*
– Thatch buildup*
– Prepare for renovation

*These conditions can interfere with adequate water movement into the soil, drainage of water through the soil profile, adequate oxygen in the soil, and root growth
THATCH MANAGEMENT
Lawn Culture
# Characteristics of Various Lawn Maintenance Programs

<table>
<thead>
<tr>
<th>Levels of Maintenance</th>
<th>Watering Practices</th>
<th>Mowing Heights</th>
<th># of Fertilizer Applications</th>
<th>Weed Control</th>
<th>Best Adapted</th>
</tr>
</thead>
<tbody>
<tr>
<td>V.Low</td>
<td>none</td>
<td>3”+</td>
<td>0</td>
<td>None</td>
<td>Fescues</td>
</tr>
<tr>
<td>Low</td>
<td>little to none</td>
<td>3”+</td>
<td>1</td>
<td>Only as needed</td>
<td>Fescues, Common KBG</td>
</tr>
<tr>
<td>Medium</td>
<td>some</td>
<td>2.5-3.5”</td>
<td>2</td>
<td>Only as needed</td>
<td>Fescues, Ryegrass, Imp. KBG*</td>
</tr>
<tr>
<td>High</td>
<td>regularly</td>
<td>2-3”</td>
<td>3+</td>
<td>Controlled</td>
<td>Perennial Ryegrass, Imp. KBG*</td>
</tr>
</tbody>
</table>

Adapted from: [www.sustland.umn.edu](http://www.sustland.umn.edu)
LAWN FERTILITY PROGRAMS

- All fertility programs are based on nitrogen
- Additional nutrients are supplied based on a soil test
# Annual Nitrogen Needs for Cool Season Species

<table>
<thead>
<tr>
<th>Grass Type</th>
<th>Nitrogen Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kentucky bluegrass</td>
<td>2.0 – 5.0 lbs. N/1000 ft.²</td>
</tr>
<tr>
<td>Perennial ryegrass</td>
<td>3.0 – 5.0 lbs. N/1000 ft.²</td>
</tr>
<tr>
<td>Fine fescue</td>
<td>1.0 – 3.0 lbs. N/1000 ft.²</td>
</tr>
<tr>
<td>Tall fescue</td>
<td>1.0 – 3.0 lbs. N/1000 ft.²</td>
</tr>
<tr>
<td>Colonial bentgrass</td>
<td>1.0 – 2.0 lbs. N/1000 ft.²</td>
</tr>
<tr>
<td>Prairie junegrass</td>
<td>0.0 - 1.0 lbs. N/1000 ft.²</td>
</tr>
</tbody>
</table>
10 = 10%, for 1lb nitrogen we need 10lb of product
Example: Low-Input lawn nitrogen program

Program

- Total yearly nitrogen required = 2lbs N / 1000ft²
- Clippings returned = 0.5 – 1.0lb N credit
- Amount to apply yearly = 1.0 – 1.5lbs N

- **Application #1**- Labor Day (1lb N, 50% slow release)
- **Application #2**- Memorial Day (0.5lb N, 50% slow release)  
  *not a required application

N recommendation would increase with: low organic matter, coarse soil texture, adequate irrigation, clippings removed
IRRIGATION

- How much water do lawns actually need? (1”/week, 1.5”/week, 2”/week)

  - Answer: It depends
  - Variables to consider: grass species, soil type, environmental conditions, desired lawn quality
Irrigation

spring & fall: (deep & infrequent)

summer: (shallow & frequent; but not soaking wet)

Root Conditioning
IRRIGATION TIMING

- Irrigate in early morning if possible
  - Mid-day irrigation is less efficient
    - Evaporation losses
    - Wind deflection
  - Night time or evening irrigation increases incidence of certain pathogens and weeds that are favored by constant moisture
STRATEGIES TO REDUCE WATER USE

- Drought tolerant species and varieties
- Raise mowing heights
- Reduce mowing frequency
- Soil aerification
- Maintain balanced fertility levels
- Install rain sensors on automated systems, or turn it off
DROUGHT RESISTANCE OF TURFGRASSES

High

Tall fescue
Fine fescue

Low

Kentucky bluegrass
Perennial ryegrass
Bentgrasses

Best recommendation for balancing low maintenance with average expectations

Turgeon, 2005
DROUGHT RESISTANCE

Drought resistance = avoidance + tolerance

1. Drought avoidance
   - Deep/extensive root system, thick cuticle, small stomata openings, dormancy, escape
   - Tall fescue (deep roots), Kentucky bluegrass (dormancy)

2. Drought tolerance
   - Ability to tolerate drought and survive desiccation, low water users
   - Fine fescues (low water use)
Proper Mowing as Part of Good Lawn Maintenance

Height: 2.5 to 3.0 inches
Mow high as possible in shade
Frequency: 1/3 guideline
Return clippings to lawn
Keep blades sharp
Consider no-mow options
AS MOWING HEIGHT DECREASES

Depth of Rooting Decreases and Maintenance Increases
ADDITIONAL INFORMATION

- UMN Turfgrass Science Website: www.turf.umn.edu
- UMN Extension Turfgrass Management Website: www.extension.umn.edu/turfgrass
- Sustainable Urban Landscape Information Series: www.sustland.umn.edu

Yard and Garden Info:
- Facebook: “University of Minnesota Yard and Garden”
- Twitter: @urbanturfmn and @UMNyardgarden
- Blog: http://blog.lib.umn.edu/efans/ygnews/

Smart Gardens Radio Show WCCO AM830, Saturdays 8-9am

Sam contact: 763-767-3518, sjbauer@umn.edu, twitter = @urbanturfmn