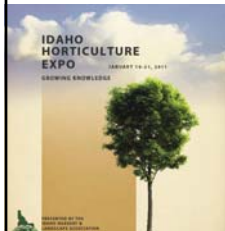


What's New From Buff to Blue: Grasses for a Green Environment

Roch Gaussoin, PhD
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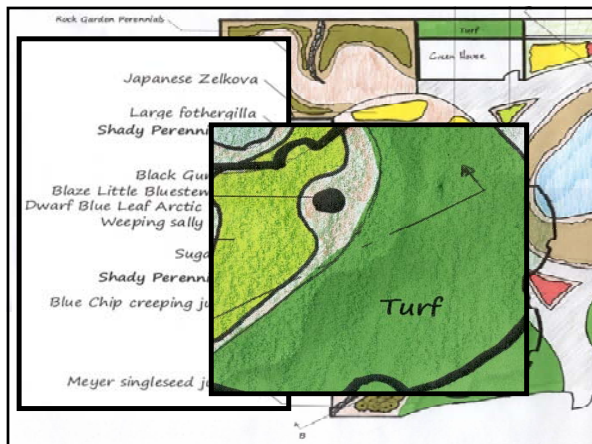


Nebraska's turf breeding program has focused on.....

- Buffalograss, Blue Grama
 - Warm season, native to Great Plains region
- Kentucky bluegrass (more recently)
 - Cool season, native to Europe
 - Why Kentucky bluegrass????
 - Why turfgrass???

So why does turf get a bad reputation?

- Bad installations
- Bad information
- Limited resources
- Labor issues
- *Others??*





All grasses commonly propagated as turf.....

- Tolerate close and frequent mowing
- The similarities stop at bullet one.....
- or do they?

Kentucky Bluegrass

Poa pratensis L.

Kentucky Bluegrass

- Rhizomes
- Fine Leafed
- Dormancy
- Fair Shade Tolerance, Good Recuperative Potential
- Many Cultivars
- Shallow Rooted
- Thatchy
- Drought Resistant



Kentucky Bluegrass Management

- 1-3.5 inch MH
 - Depending on use
- 2-6 lbs. N/M ft²
 - Depending on use
- Irrigation needed to maintain summer color
- Summer dormancy
- Thatch management

Tall Fescue

Festuca arundinacea Shreb.

Tall Fescue

- Bunchgrass
- Good Wear & Shade Tolerance
- Coarse Texture??
- Many New Cultivars
- Deep Rooted
- Drought Resistant

Tall Fescue Pest Problems

- Disease
 - Brown patch
 - Crown rust
 - Pythium
- Insect
 - Sod webworm
 - Fall armyworm

Tall Fescue Management

- 2-3.5" MH
- 1-4 lbs. N/M ft²
- Irrigation under high maintenance or problem soils
- Core cultivation
- Interseeding

Buffalograss

Buchloe dactyloides (Nutt.) Engelm

Buffalograss

- Stolons
- Poor Wear & Shade Tolerance
- Blue-green color
- Improved Cultivars
- Deep Rooted
- Drought & Heat Tolerant

Supra-optimal (High) Temperature Tolerance

- **Buffalograss**
- **Bermudagrass**
- **Zoysiagrass**
- **Tall Fescue**
- **Ky. Bluegrass**
- **Perennial Ryegrass**
- **Fine Fescues**
- **Creeping Bentgrass**
- **Poa Trivialis**
- **Annual Bluegrass**

Best

Poorest

Buffalograss Pest Problems

- Disease
 - Slime Mold
 - Dollar Spot
 - Leaf Spot
- Insect
 - Mealy Bug
 - Chinch Bug

Buffalograss Management

- 1/2" - Unmowed
 - Vegetative cultivars perform better than seeded at lower mowing heights
- 0-3 lbs. per 1000 ft²
- Irrigate to prevent stress

Drought Response

- Buffalograss
- Zoysiagrass
- Fine Fescue(s)
- Tall Fescue
- Ky. Bluegrass


Best

Worst

Drought Stress Events

- **Long-Term**
- **Seasonal**
- **Random**

Drought Resistance




- Tolerance
- Avoidance
- Escape

J. Levitt, 1980

Drought Escape

- Plant completes its life cycle prior to the onset of drought


Example: Downy Brome, annual bluegrass



Drought Tolerance

- Increased tolerance of dehydration
- Osmotic adjustment
 - Na⁺, K⁺, Cl⁻
- Recycling of CO₂
- Ability to recover


Example: Kentucky bluegrass



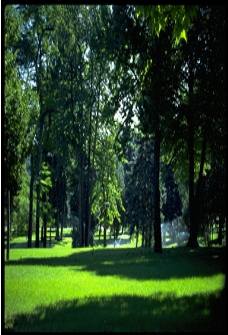
Drought Avoidance Mechanisms

- Deep, Extensive Root System
- Root Plasticity
- High Root:Shoot

Example: Tall Fescue



Turfgrass water use



Total amount of water used for growth plus that lost by transpiration and evaporation from plant and soil surfaces.

J. B. Beard, 1973


May or may not be related to drought resistance

Turfgrass ET Classification

Relative Ranking	ET mm day ⁻¹
Very low	< 4.0
Low	4.0-4.9
Medium-low	5.0-5.9
Medium	6.0-6.9
Medium-high	7.0-7.9
High	8.0-8.9
Very high	>9.0

→ Tall fescue

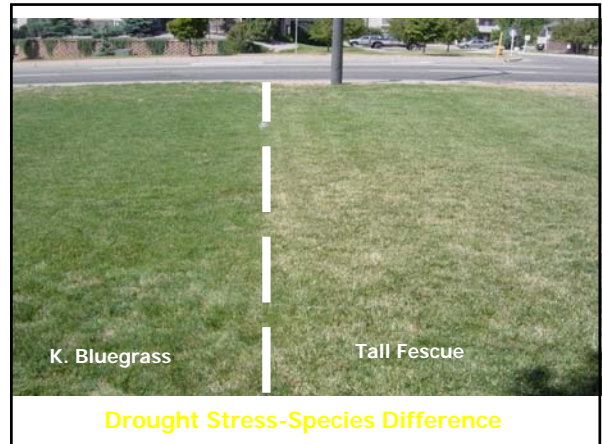
→ Kentucky bluegrass, buffalograss



Reported range of turfgrass ET by species:

Common Name	Scientific Name	ET* (mm/day ¹)	Inch/wk
Tall Fescue	<i>Festuca arundinacea</i>	7-13	2.0-3.8
Perennial Ryegrass	<i>Lolium perenne</i>	7-11	1.8-3.1
St. Augustinegrass	<i>Stenotaphrum secundatum</i>	6-11	
Seashore Paspalum	<i>Paspalum vaginatum</i>	6-8	
Bahiagrass	<i>Paspalum notatum</i>	6-8	
Kikuyugrass	<i>Pennisetum clandestinum</i>	6-9	
Creeping Bentgrass	<i>Agrostis Palustris</i>	6-10	
Centipedegrass	<i>Eremochloa ophiuroides</i>	5-9	
Bermudagrass	<i>Cynodon spp.</i>	4-9	
Zoysiagrass	<i>Zoysia spp.</i>	5-8	
Kentucky Bluegrass	<i>Poa pratensis</i>	4-7	1.1-1.8
Buffalograss	<i>Buchloe dactyloides</i>	3-6	1.5-2.0

*Field grown under high evaporative demand conditions



Turfgrass Drought Resistance

	Overall	Avoidance	Tolerance	Recovery
Buffalograss	Excellent	Excellent	Excellent	Excellent
KY Bluegrass	Very Good	Fair	Very Good	Excellent



Bella Kentucky Bluegrass

- ❖ Dark Green
- ❖ Low Growing
 - 4.0 inch maximum canopy height
 - 41% less vertical growth than Midnight
- ❖ 0.5 to 3.0 inch mowing height



Bella Kentucky Bluegrass



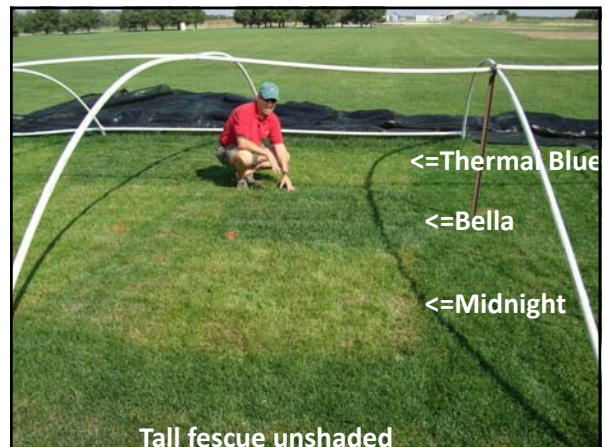
- ❖ Licensed to Todd Valley Sod Farms in 2006
- ❖ Patent pending as a vegetative cultivar
- ❖ Marketed as sod, plantlets or plugs only



Bella Kentucky Bluegrass

...outperformed 22 KB cultivars for 3 consecutive years after the establishment year:

- Heat tolerance
- Drought resistance (60% ET)
- Cold tolerance (spring density)
- Shade tolerance (vs Thermal Blue and Midnight)
- Leaf spot resistant
- **Midnight**





USGA PROJECT (ON-GOING)
Buffalograss Breeding, Improvement, and Management for Turfgrass Use



Breeding Program Objectives:

- Breed, select, and evaluate seeded and vegetative genotypes with improved turfgrass quality, pest resistance, and stress tolerance.
- Improve our basic knowledge of buffalograss genetics through molecular approaches

Breeding Program Objectives:


- Expand our understanding and use of efficient management practices for improved buffalograss performance
- Develop approaches for buffalograss seed and vegetative establishment

Cultivars currently available from UNL program

- Vegetative
 - Legacy
 - Prestige
 - 609
- Seeded
 - Cody
 - Bowie

Go to www.ntep.org to see performance data

BUFFALOGRASS



Improvements

- Turfgrass quality
- Low mowing tolerance
- Seed yield potential
- Insect resistance

Concerns

- Sprig establishment
- Seed treatment
- Winter dormancy
- Fall and spring color



Experimental Line & Cultivar Evaluation


Arizona	New Mexico	<u>Seeded entries:</u>		
Colorado	Utah	NE-07-01	NE-07-02	NE-07-03
Kansas	Virginia	NE-07-04	NE-07-08	Bison
Nebraska	Washington	Bowie	Cody	Texoka

Vegetative entries:

NE-07-09	NE-07-10	NE-07-11
NE-07-12	NE-07-13	Legacy
Prestige	609	


Management:

- 2" mowing height
- 1 lb N m⁻² season⁻¹
- 50-60% ETp



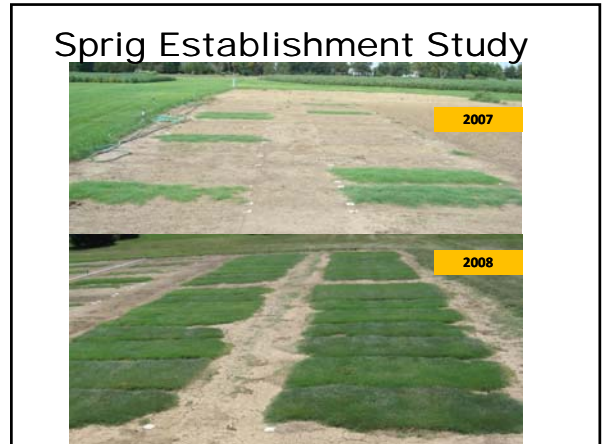
Experimental Line & Cultivar Evaluation

Early test results indicate significant difference in turfgrass density, quality and color among the genotypes.



Some vegetative and seeded experimental lines performed as well or better than standard cultivars.

As would be expected, responses differed by location.



Sprig Establishment Study


Sprigging Buffalograss

Growing Degree-day Influence on Sprig Establishment

Growing Degree Days of Harvested Sprigs
Legacy versus Prestige

GDD can be used to determine best sprig harvest date

Sprigging prior to 1050 GDD is recommended




Buffalograss Overseeding Trials



The UNL program is projected to release 2-3 new cultivars in the next several years

Go to <http://turf.unl.edu> for more information

