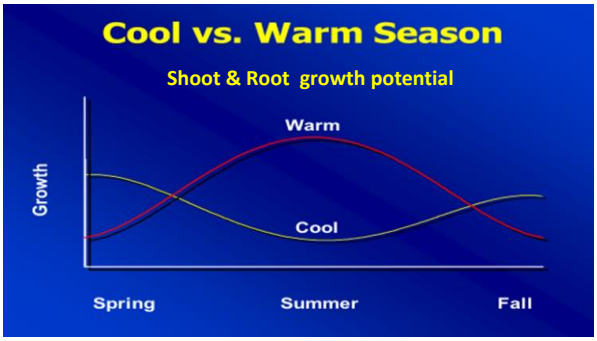
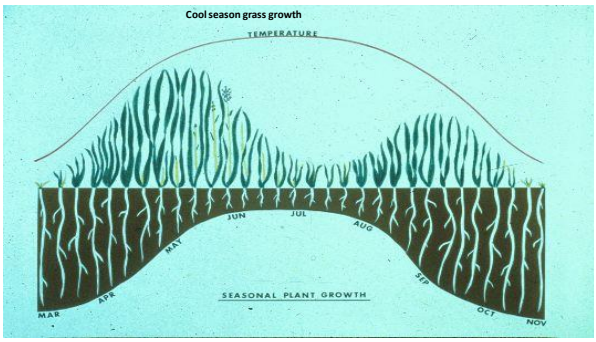
Todays Discussion – Part 1 – Roch
Common Lawn Grass Species

- What's unique about lawn species we recommend in Nebraska?
- Species water needs and root depth.
- Deciding when the lawn needs watering.
- How much water should I apply?
- What are the advantages of a cool-season grass blend or mixture?





Cool vs. Warm Season

Cool Season	Warm Season
• **Kentucky bluegrass**	• **Buffalograss**
• **Tall fescue**	• **Zoysiagrass**
• Perennial ryegrass	• Bermudagrass
• Fine fescues	• St. Augustinegrass
• Bentgrasses	• Centipedegrass
• Annual bluegrass	• Bahiagrass

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 Uses

- Home lawns
- Grounds
- Parks
- Sports turfs

Tall Fescue

Festuca arundinacea Shreb.

Tall Fescue

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

Tall Fescue Uses

- Lawns
- Grounds
- Parks
- Sports Turfs
- Roadsides
- Airfields
- Playgrounds
- Waterways

Buffalograss

Buchloe dactyloides (Nutt.) Engelm

Buffalograss

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

Buffalograss Uses

- Home lawns
- Grounds
- Parks
- Utility turfs
- Roadsides
- Golf course-
  - Fairways
  - Tees
  - Bunker surrounds

Buffalograss Management

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

Drought Response (*how it looks under drought; may be cosmetic*)

Best

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

Worst

Drought Resistance

- Tolerance
- Avoidance
- Escape

J. Levitt, 1980

Drought Escape

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

Examples: ***Downy Brome, Annual Bluegrass***

Drought Tolerance

- Increased tolerance of dehydration
- Osmotic adjustment
  - Na^+, K^+, Cl^-
- Recycling of CO_2
- Ability to recover

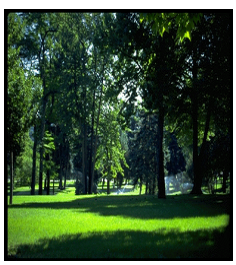
Example: ***Kentucky bluegrass***

Drought Avoidance Mechanisms

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

Example: ***Tall Fescue***

Turfgrass water use (*may or may not be related to drought resistance)*



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

J. B. Beard, 1973

Measured when water is not limited

Turfgass ET Classification

Relative Ranking	ET mm/day
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

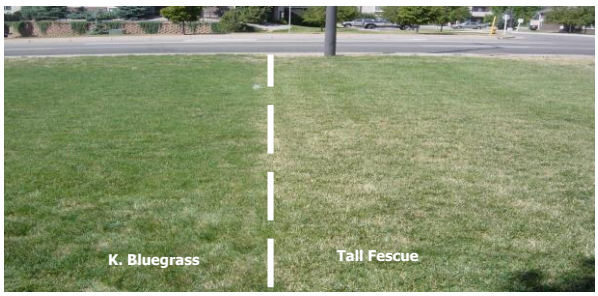
Tall fescue

Kentucky bluegrass, buffalograss

Reported range of turfgrass ET by species:

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

[1] Field grown under high evaporative demand conditions



Drought Stress-Species Difference

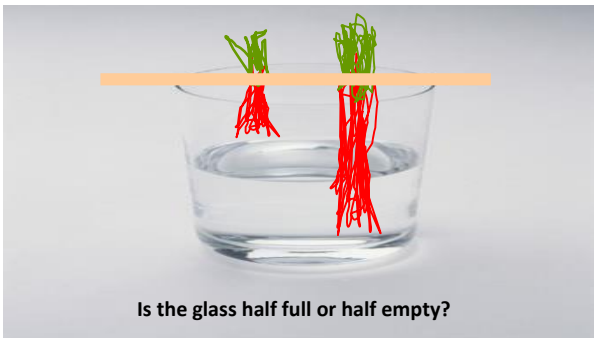
Consumptive* (maximum) water use comparison

- Tall fescue *3.6 mm/day* *100 inches/season*
- K. bluegrass *2.7 mm/day* *56 inches/season*
- Buffalograss *2.3 mm/day* *32 inches/season*
- zoysiagrass *2.2 mm/day* *32 inches/season*

Could come from precipitation, soil bank or irrigation.....

Blends vs mixtures

- Blend
  - 2 or more cultivars of the same species
  - Increases disease tolerance etc.
- Mixture
- 2 or more different species
  - Box store mix
  - KB and PR
  - KB and FF
  - TF and KB



Is the glass half full or half empty?

Relative *Genetic* Rooting Depth

Deep

- **Buffalograss**
- **Zoysiagrass**
- **Tall Fescue**

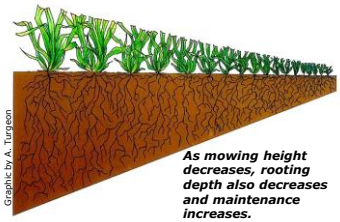
- **Ky. Bluegrass**

Shallow

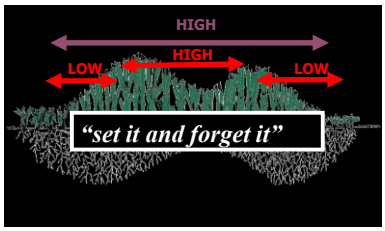
Roots Matter!

- How to water
- When to water
- How much to water

Mowing Height and Rooting Depth



Seasonal Mowing Height



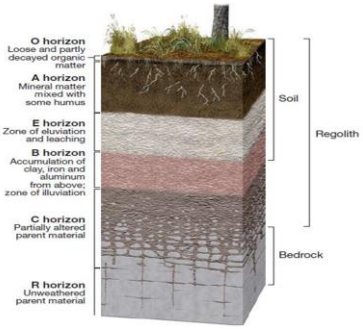
Nutritional Value of Clippings

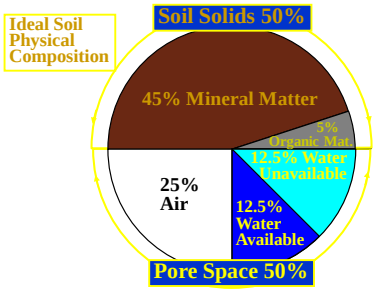
- 6-7% N
- 0.25 – 1% P
- 1 – 4%

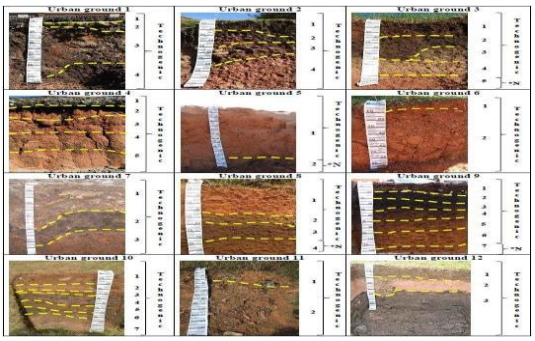
"mow it high and let it lie"

Returning … as much as 25%

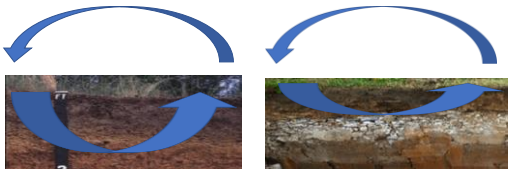
Clippings also act as a temperature and moisture buffer


O horizon
Loose and partly decayed organic matter
A horizon
Mineral matter mixed with some humus
E horizon
Zone of eluviation and leaching
B horizon
Accumulation of clay, iron and aluminum from above; zone of illuviation
C horizon
Partially altered parent material
R horizon
Unweathered parent material
Soil
Regolith
Bedrock


Ideal Soil Physical Composition
Soil Solids 50%
45% Mineral Matter
5% Organic Mat.
12.5% Water Unavailable
25% Air
12.5% Water Available
Pore Space 50%


Urban ground 1
Urban ground 2
Urban ground 3
Urban ground 4
Urban ground 5
Urban ground 6
Urban ground 7
Urban ground 8
Urban ground 9
Urban ground 10
Urban ground 11
Urban ground 12

"To maintain optimal plant growth the entire volume of air to a depth of eight inches must be renewed every hour"

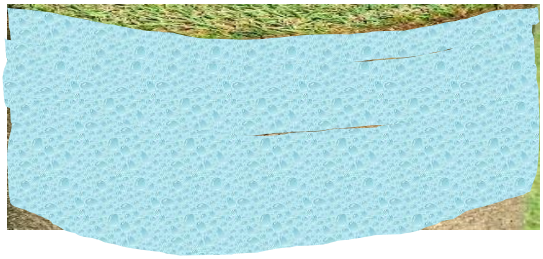


Layering

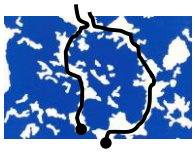
- Water and air movement is non-uniform

NOT a function of drainage

Rather it is the difference in pore size distribution among layers



Soil Infiltration and drainage



Pores must be continuous and open to the surface – layers (*and compaction*) impede this process

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Todays Discussion – Part 2 – John
Efficient Irrigation Practices

- How to operate your irrigation system manually.
- How does soil texture and compaction affect irrigation efficiency?
- How to determine water infiltration rates.
- Effects of aeration on water infiltration.
- Why is overwatering bad for turf?
- Annual irrigation system auditing.