

WATERWISE SOLUTIONS WITH WARM SEASON GRASS TURF

Kansas Water Symposium

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TURFGRASS

- Est. 50 million acres of maintained turfgrass in U.S.
- Annual economic value of turfgrass is est. \$40 billion
- Documented benefits to the environment and human health
- Critics point out water requirements and pesticide use
- Plants do not conserve water, people do.

BENEFITS OF TURFGRASS

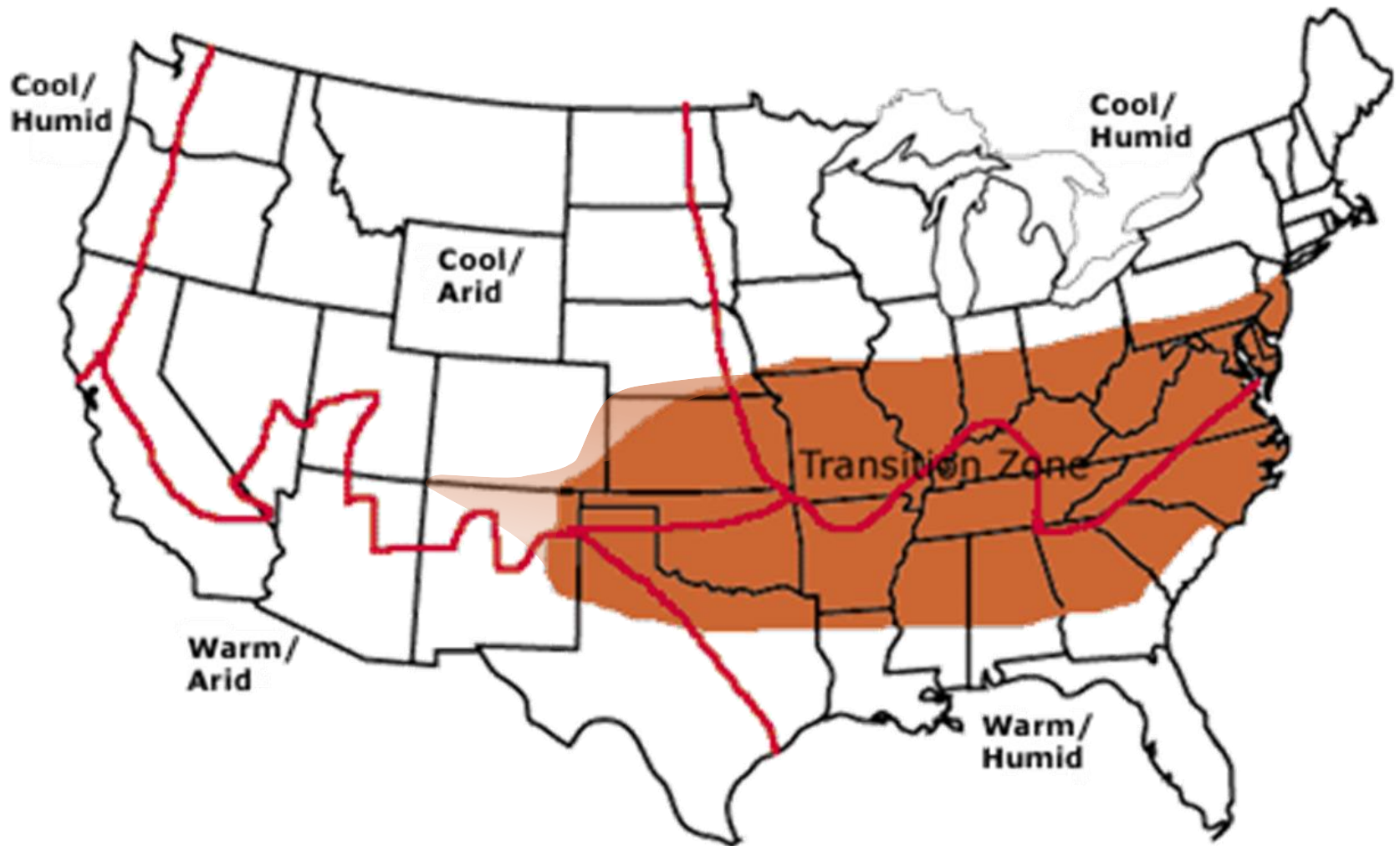
- Aesthetics (+ 15% value)
- Erosion control & reduce water runoff
- Filters water
- Pollution control
- Noise reduction
- Temperature modification
- Psychological benefits

THE FIRST STEP

- Select the correct turfgrass for the climate zone in which it will be grown



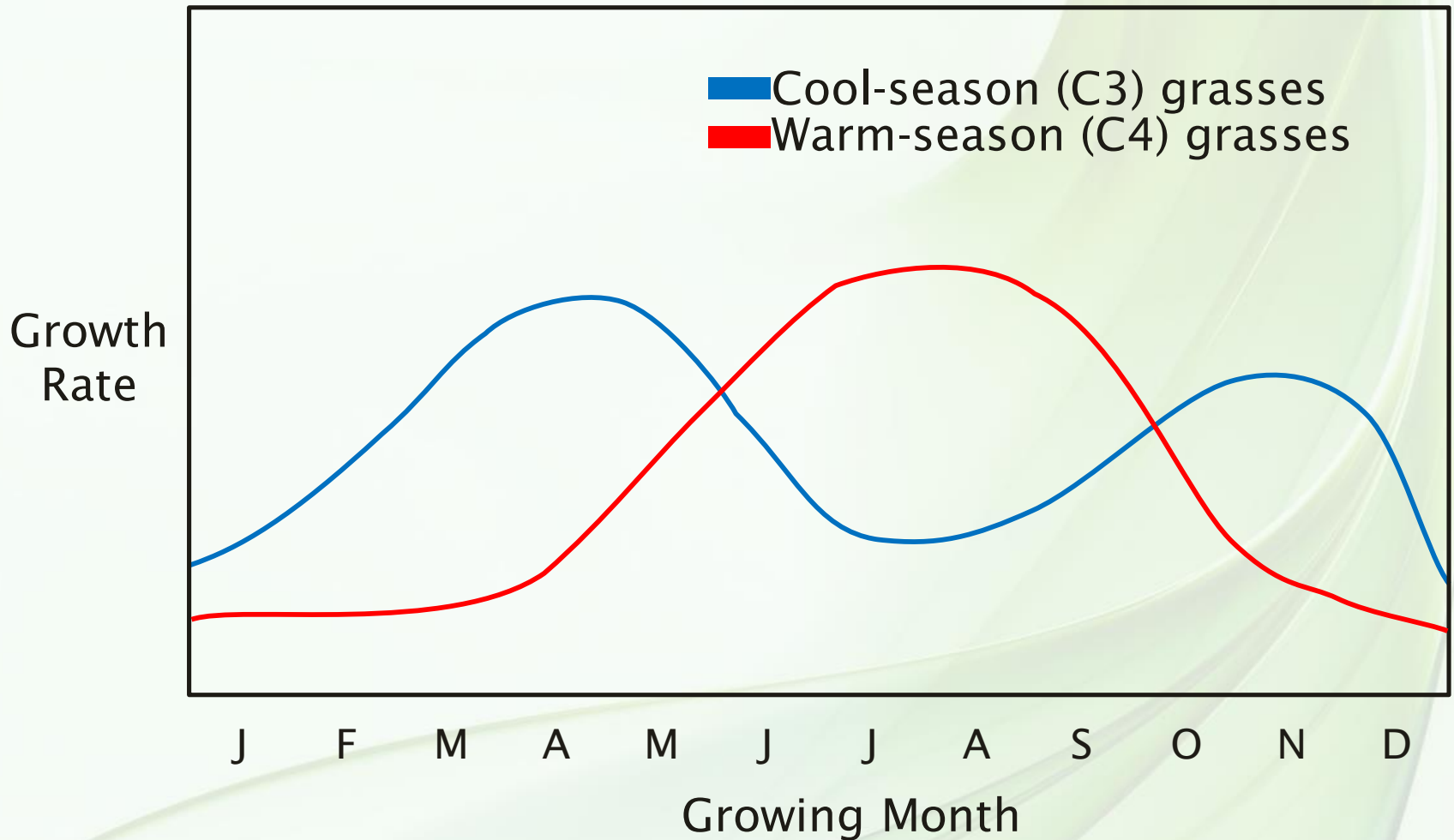
TRANSITION ZONE



COOL-SEASON VS. WARM-SEASON

- Cool-season grass = C3 photosynthesis
- Warm-season grass = C4 photosynthesis
- Therefore,
- Warm-season (C4) grasses have better heat and drought tolerance.

SEASONAL GROWTH PATTERN



TURFGRASS SPECIES

Cool-season (C3)

- Tall fescue
- Kentucky bluegrass
- Perennial ryegrass
- Creeping bentgrass
- Fine fescues
- Annual bluegrass

Warm-season (C4)

- Zoysiagrass
- Bermudagrass
- Buffalograss
- Centipedegrass
- Bahiagrass
- Seashore Paspalum
- St. Augustinegrass
- Carpetgrass
- Kikuyugrass

OPTIMUM

AIR TEMPERATURES

- Cool-season (C3): 60 to 75°F
- Warm-season (C4): 80 to 95°F

SOIL TEMPERATURES

- Cool-season (C3): 50 to 65°F
- Warm-season (C4): 70 to 90°F





Hutchinson 10SW

Station Metadata

Temperature **31 °F**
 Wind Chill **22 °F**
 Dewpoint **4 °F**
 Humidity **32%**
 24-hr Precip **0 inches**
 Wind **NNW at 11 mph**
 SLP **1032.1 mb**
 Last Observed **2:10 PM CST**

Today



High 33 °F
 Partly Sunny

Tonight



Low 18 °F
 Partly Cloudy

forecast provided by NOAA



SOIL TEMPERATURES

(4" DEPTH)

May 1 – October 15 (168 Days)

Year	Max Soil Temperature $\geq 70^{\circ}\text{F}$ (Days)
2010	126 d
2011	130 d
2012	134 d
2013	124 d
2014	133 d

OPTIMUM SOIL TEMPERATURES

- Cool-season (C3): 50 to 65°F
- Warm-season (C4): 70 to 95°F

74 to 80% of the days between May 1 through Oct 15 were above 70°F !!!

MEAN SUMMER WATER RATES

Cool-season (C3)

0.14 to 0.47
inches per day

Warm-season (C4)

0.12 to 0.35
inches per day

***C3 species on average use more water than C4 species during summer!**

WARM VS. COOL SEASON

- + Better heat & drought tolerance
- + Less water requirements
- + Lower fertilizer and pesticide inputs



- Major concern is cold tolerance
- Well-defined dormancy period

ZOYSIAGRASS

Primary Uses:

- Mainly for golf courses and home lawns where a dense, low-cut turf is desired.



ZOYSIAGRASS



Positive attributes:

- Uniform, low, dense,
- Slow growing = less mowing

- Excellent heat and cold tolerance

- Good drought & salinity tolerance

- Shade tolerance (*better than bermudagrass*)

- Excellent traffic/wear tolerance

ZOYSIAGRASS



Negative attributes:

- Slow establishment
- Vegetative establishment required (exception: Zenith)
- Thatch management
- Best quality with “reel mower”

ZOYSIAGRASS CULTIVARS

- **Vegetative varieties:**

- *Meyer* - recommended for most of KS
- *Chisholm* - newer cultivar release from KSU/Texas AM

- **Seeded Varieties:**

- *Zenith*



BERMUDAGRASS

Primary uses:

- Used on athletic fields, parks, home lawns and golf courses.
- Not really recommended for north ½ of KS.



BERMUDAGRASS



Positive attributes:

- Excellent tolerance to:
 - heat, drought, wear, soil compaction, and salt
- Excellent recuperative potential
- Very water-efficient
- Newer hybrid varieties have improvements in cold tolerance and growth rate compared to common-type bermudagrass

BERMUDAGRASS



Negative Attributes:

- Can be a weed in flower beds, shrubs, golf greens.
- Poor shade tolerance
- Common varieties spread aggressively by vegetative parts and by seed.
- Hybrid varieties usually spread slower and seed not such a problem

BERMUDAGRASS CULTIVARS

- **Seeded varieties:**

- *Riviera* and *Yukon*

- **Vegetative varieties:**

- *Mid-Lawn, Mid-Field, Patriot, Latitude 36, Northbridge*
- Sprigged lawn can be established in 6 weeks.



BUFFALOGRASS

Primary uses:

- Low maintenance areas, lawns, golf course roughs, medians, etc.



BUFFALOGRASS

Positive attributes:

- Less mowing, watering, fertilizer requirements
- Excellent heat, drought, and cold tolerance
- Little thatch accumulation
- Few insect and disease problems
- Tolerates dry, clay, and compacted soils





BUFFALOGRASS

Negative attributes:

- Generally not used on high quality turf areas
- Grayish-green color
- Weed invasion
- Seed and sod are expensive

BUFFALOGRASS CULTIVARS

- **Seeded varieties:** *Sundancer, Sharp's Improved II, Texoka, Cody, Tatanka, Bison, Top Gun, Bowie, Plains*
- **Vegetative varieties:** *Legacy, 609, Prestige, Prairie, 378, 315, Buffalawn, UC Verde*



CONVERTING FROM C3 TO C4 GRASS

- Home lawn or low maintenance area? = yes!!!
- Sports field = possibly
 - Playing season; (Spring & Fall – tough on bermudagrass)
 - Timing of establishment (May through July)
 - Vegetative establishment = more cost, but more cold tolerant!
 - Seeded establishment = less cost, less cold tolerance, but could reseed over winter damage areas.
 - Bermudagrass if irrigation is limited and fields are used spring through fall.

<http://ksuturf.org/>

<http://extension.missouri.edu/p/G6770>

STILL MANAGING A COOL-SEASON (C3) GRASS?

- Then be water smart with your cool-season grass!



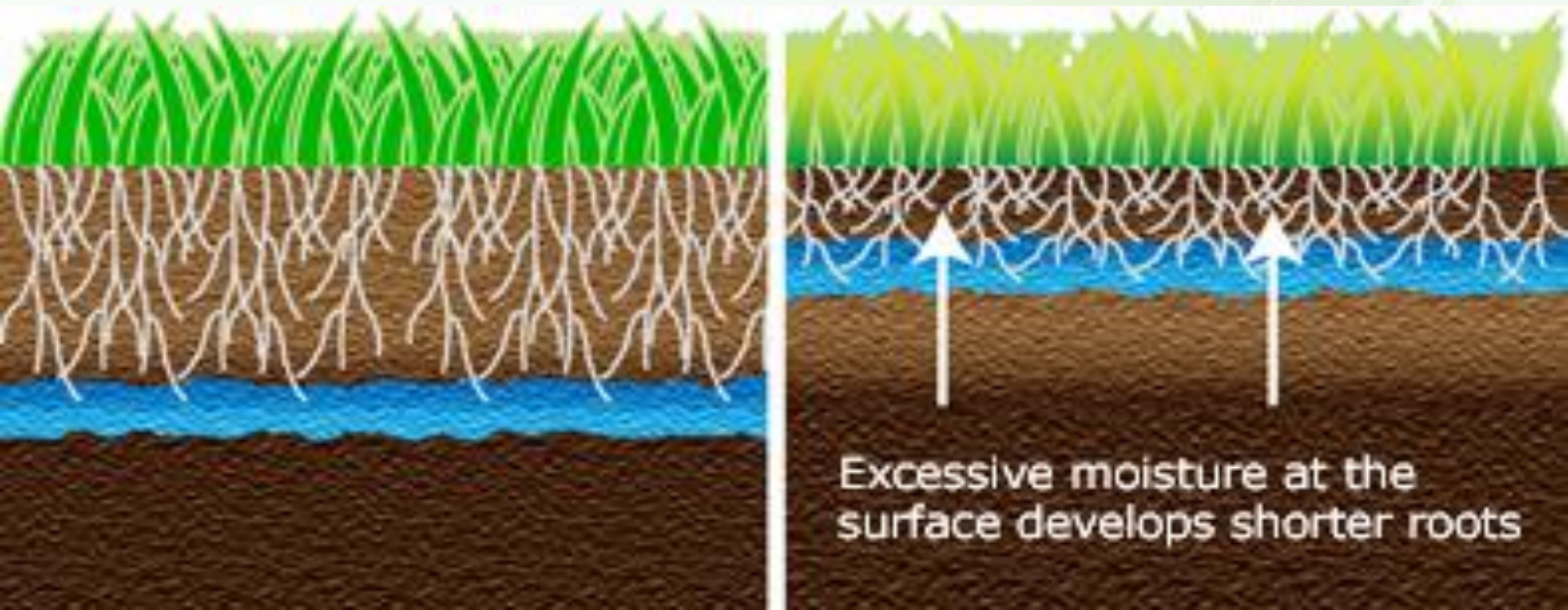
SMARTER IRRIGATION

- Irrigation practices can always improve!
- You can save water if you water correctly



WATER DEEP & INFREQUENTLY

- Deeper roots = healthier turfgrass
- Throughout the entire growing season



IRRIGATION SYSTEM

- **Maintenance**

- Annual irrigation system audits
- Monthly checkup/maintenance
- Weekly or daily changes



IRRIGATION SYSTEM

- Rain sensors
- Adjust irrigation schedule based on weekly weather
- Adjust at least before each season (spring, summer, fall)





K-STATE
TURFGRASS
RESEARCH



EVALUATION OF TURF COLORANTS ON ZOYSIAGRASS AND BUFFALOGRASS

Ross Braun, Drs. Jack Fry, Megan Kennelly, Dale Bremer,
and Jason Griffin





EVALUATION OF THE INFLUENCE OF NITROGEN SOURCE AND APPLICATION TIMING ON LARGE PATCH DEVELOPMENT ON ZOYSIAGRASS

Ross Braun, Drs. Megan Kennelly and Jack Fry





GROWTH AND QUALITY RESPONSES OF ZOYSIA SPECIES GROWN IN SHADE

Drs. Kenton Peterson, Jack Fry, and Dale Bremer





COMPARISON OF TURFGRASS EVAPOTRANSPIRATION MEASUREMENT TECHNIQUES

Drs. Kenton Peterson, Dale Bremer, and Jack Fry





NATIONAL TURFGRASS EVALUATION PROGRAM ZOYSIAGRASS AND BERMUDAGRASS ENTRIES AT KANSAS LOCATIONS

Drs. Cole Thompson, Jack Fry, Jared Hoyle, and Jason Griffin





'CODY' BUFFALOGRASS TOLERANCE TO COMBINATION POSTEMERGENT HERBICIDES

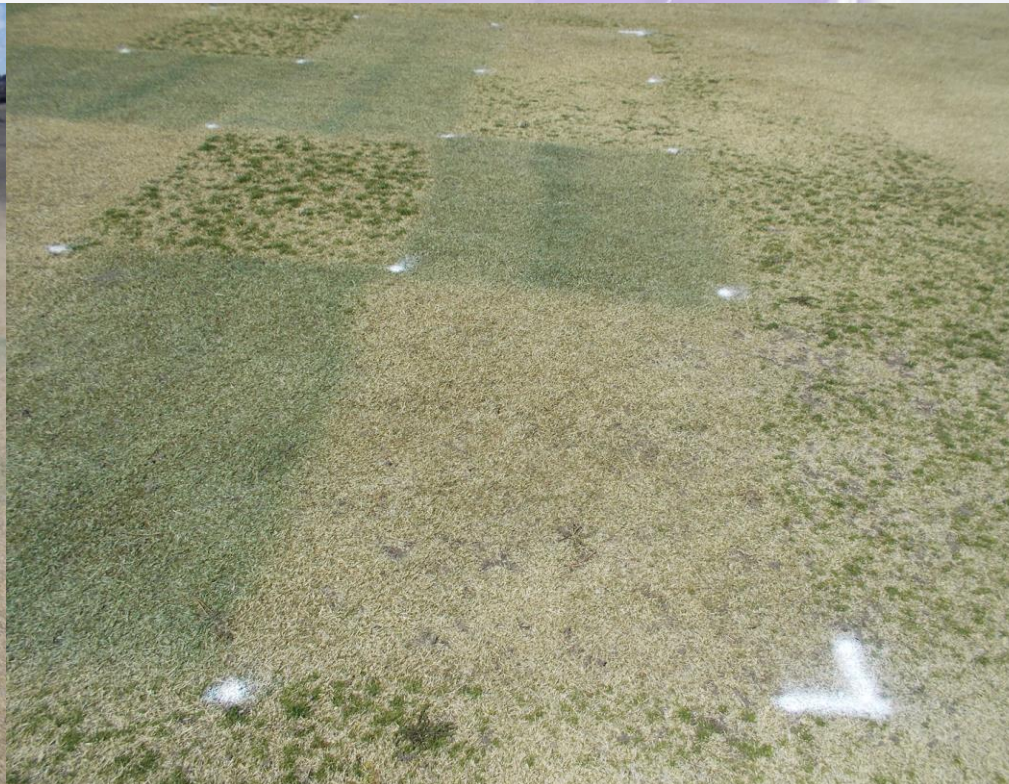
Dr. Jared Hoyle and Jake Reeves





TURF PAINT AND GLYPHOSATE APPLICATION TIMING EFFECTS ON ANNUAL BLUEGRASS AND TALL FESCUE CONTROL IN ZOYSIAGRASS

Dr. Jared Hoyle and Jake Reeves





BEST MANAGEMENT PRACTICES FOR BUFFALOGRASS ESTABLISHMENT IN TALL FESCUE

Jake Reeves and Dr. Jared Hoyle





THE EFFECTS AND RECOVERY OF TRAFFIC ON C4 AND C3 TURFGRASS SPECIES DURING A SIMULATED DROUGHT PERIOD

Ross Braun, Drs. Dale Bremer and Jared Hoyle





NITROUS OXIDE EMISSIONS AND CARBON SEQUESTRATION IN TURFGRASS: EFFECTS OF IRRIGATION AND N FERTILIZATION

Ross Braun and Dr. Dale Bremer



QUESTIONS?

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<http://ksuturf.org/>

<http://extension.missouri.edu/p/G6770>



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