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New Jersey Agricultural Experiment Station

Tall fescue for sports fields & grounds

Bradley S. Park
Rutgers University

Sports Field Management Association (SFMA) Conference
Salt Lake City, UT
January 17, 2023

1

Sports fields and grounds

2

Tall Fescue (Schedonorus arundinaceus)

- Bunch-type growth habit (slow spreading)
- Capable of developing a deep root system
- Rapid establishment when seeded at the right time
- Good drought, heat, and insect tolerance
- *NOT susceptible to summer patch disease*
- *Susceptible to brown patch disease*
- *Gray leaf spot: Emerging disease problem*

Mix with Kentucky bluegrass

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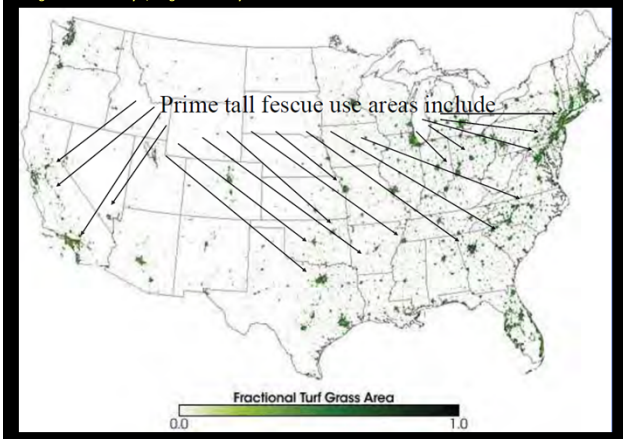
Image: Dr. William Meyer, Rutgers University



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Mowing Height & Turfgrass Species

High Mowing Height

Cool Season Grasses
Tall fescue (2.5 – 4.0 inches)
Hard fescue (3.0 – 4.0 inches)
Chewings fescue (2.5 – 3.0 inches)
Strong creeping red fescue (2.5 – 3.0 inches)
Perennial ryegrass (1.0 – 2.5 inches)*
Kentucky bluegrass (1.0 – 2.5 inches)**
Colonial bentgrass
Creeping bentgrass
Velvet bentgrass

Low Mowing Height

*, dependent on intensity of other management factors
**, dependent on management intensity and cultivar

5

Acreage

6


October 14, 2011
'Rembrandt' Tall Fescue: Seeded September 2006
3.0-inch mowing height
No irrigation applied in 2011
0.9 lbs N per 1000 sq ft applied in 2011

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Poor soil conditions compromise tall fescue rooting potential

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Tall fescue: Low-input sports fields and grounds
• Reduced irrigation, fertilization, pesticide, and mowing inputs

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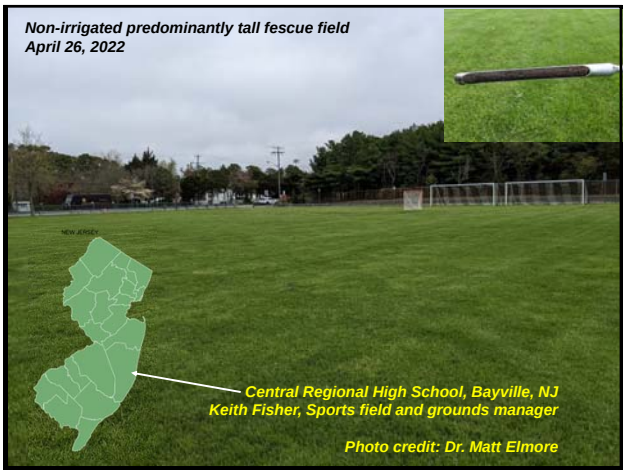
Non-irrigated predominantly tall fescue field
April 26, 2022
Central Regional High School, Bayville, NJ
Keith Fisher, Sports field and grounds manager
Photo credit: Dr. Matt Elmore

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Non-irrigated predominantly tall fescue field
October 19, 2022
Central Regional High School, Bayville, NJ
Photo credit: Keith Fisher, Sports field and grounds manager

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Tall fescue

Improved varieties of tall fescue maintained at ≥ 2.5 inches

Weed encroachment implications:

- Competitive turf: Less weed encroachment (fewer herbicide inputs)

White grub implications

- Potential for deep root system provides white grub 'tolerance' White grub implications

Endophyte-enhancement

- Surface feeding insect tolerance (chinch bugs, sod webworm, billbugs)

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Image: Dr. William Meyer, Rutgers University

Tall fescue

Kentucky – 31 tall fescue was derived from an ecotype growing before 1890 on a Menifee County farm in Kentucky. Dr. E.N. Fergus collected seed from this farm during 1931. After evaluations at the University of Kentucky, Kentucky – 31 was released as a cultivar in 1943.

Large amounts of Kentucky – 31 are still produced and sold to annually overseed tall fescue lawns in transition zone climates.

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Image: Dr. William Meyer, Rutgers University

The first "turf-type" tall fescue variety was named Rebel and was commercially released in 1980 from Rutgers University under the direction of Dr. C. Reed Funk.

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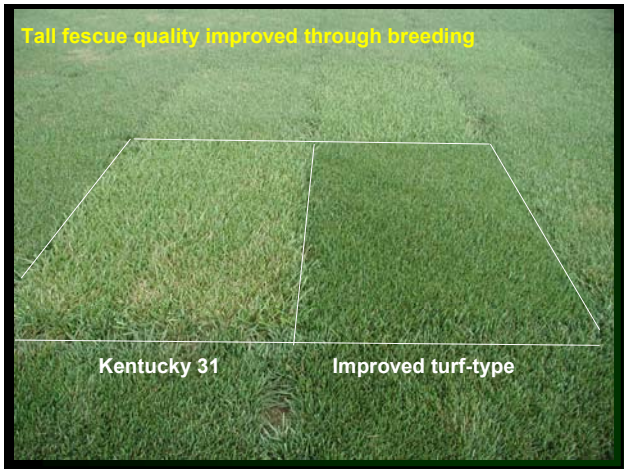

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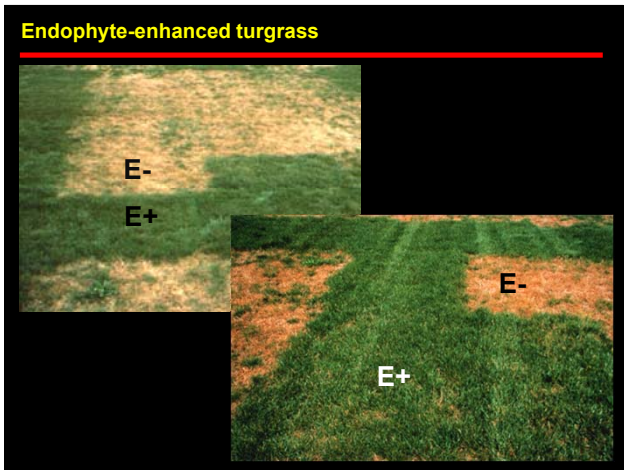

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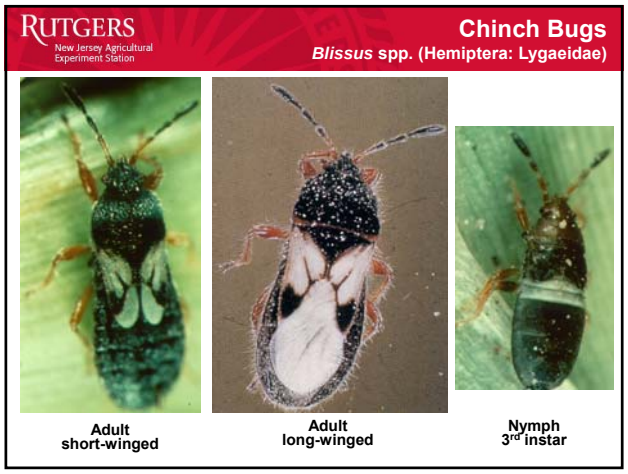

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Sod webworm

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Endophyte-enhanced turfgrasses

Endophytes

- Endophytes (beneficial symbiotic fungus within turfgrass)
- *The most commercially successful & effective biocontrol of foliar feeding insect pests*
- Endophytes are toxic to insects including: Sod webworm, billbugs, and chinch bugs
- Endophytes are confined to:
  - Perennial ryegrass
  - Tall fescue
  - Fine fescue
- No help for grubs
- Buy fresh seed. Seed stored longer than 9-12 months will lose endophyte viability.

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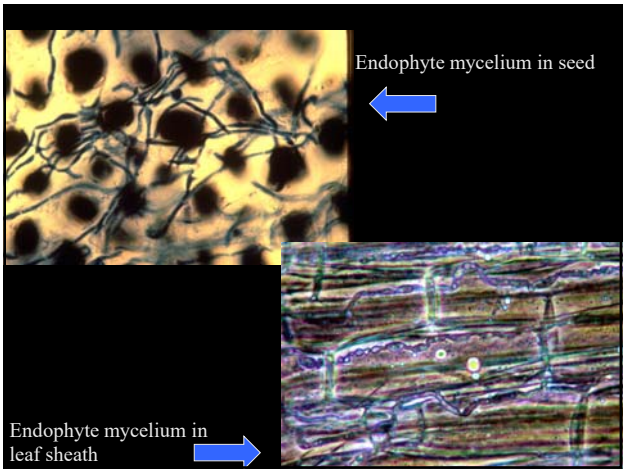

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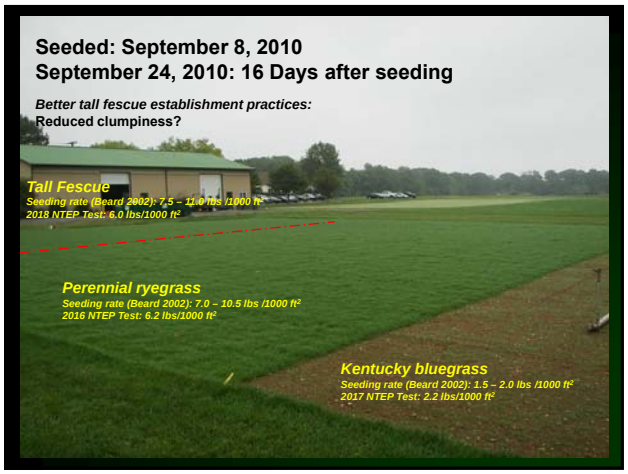

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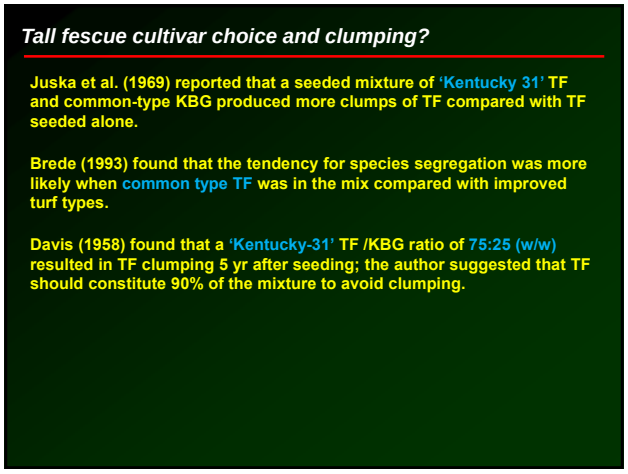

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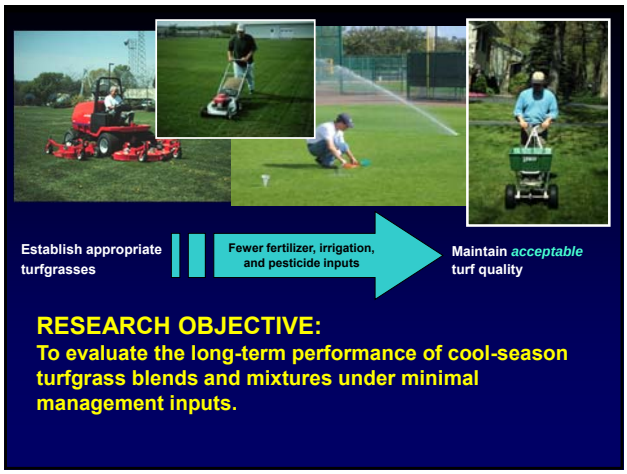

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Cool-season turf seed selection

- Kentucky bluegrass
- Tall fescue
- Perennial ryegrass
- Hard Fescue
- Chewings Fescue
- Strong Creeping Red Fescue
- Slender Creeping Red Fescue
- Creeping Bentgrass
- Colonial Bentgrass
- Velvet Bentgrass

- Seed Blends and Mixtures

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Materials and methods

Nitrogen (N) fertilization
2011: 0.5 lbs/1000 ft² (at seeding)
2012: 1.8 lbs/1000 ft² (Aug.: 1.0 lb/1000 ft²)
2013: 1.7 lbs/1000 ft² (March: 0.9 lbs/1000 ft²; Aug. 0.9 lbs/1000 ft²)
2014: 2.0 lbs/1000 ft² (April: 1.0 lb/1000 ft²; Sep. 1.0 lb/1000 ft²)
2015: 1.8 lbs/1000 ft² (March: 0.8 lb/1000 ft²; Sep. 1.0 lb/1000 ft²)

Mowing
- Once per week during periods of active growth
- 2.5-inch cutting height during 2013-2014
- Mowing withheld during drought stress

Irrigation
- One event in 2012 (July; 1.0-inch water)
- One event in 2013 (July; 1.0-inch water)
- No irrigation applied in 2014
- Irrigation withheld until September 22, 2015

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Materials and methods

Trial Management: Pesticide applications

2012
April: Preemergence herbicide; DCPA (Dacthal)
September: Postemergence broadleaf; Triclopyr (Turflon)

2013
August: Postemergence crabgrass; Fenoxaprop (Acclaim)
September: Postemergence broadleaf; 2,4-D + triclopyr

2014
None

2015
None

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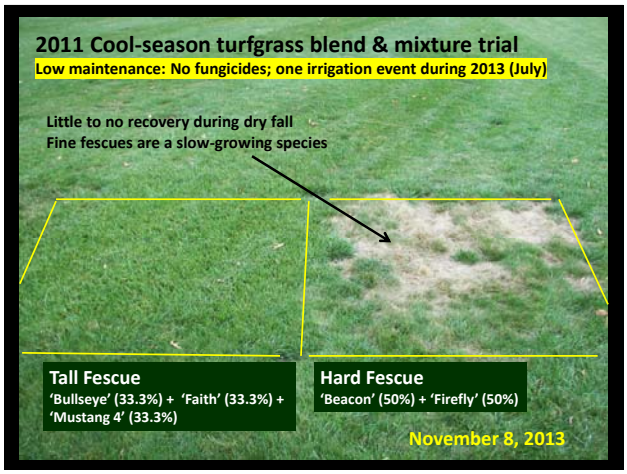
2011 Cool-season turfgrass blend & mixture trial

Low maintenance: No fungicides; one irrigation event during 2013 (July)



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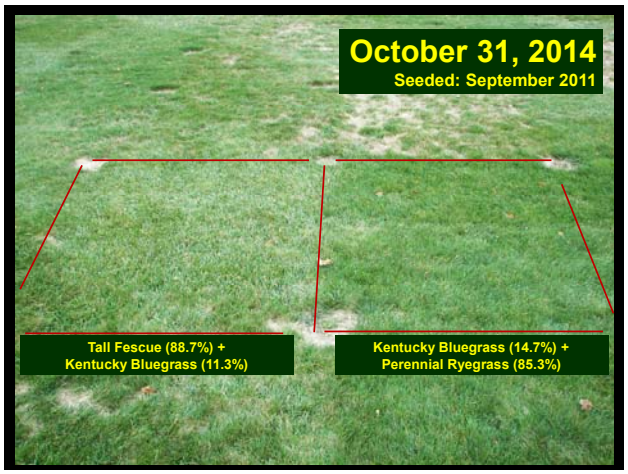

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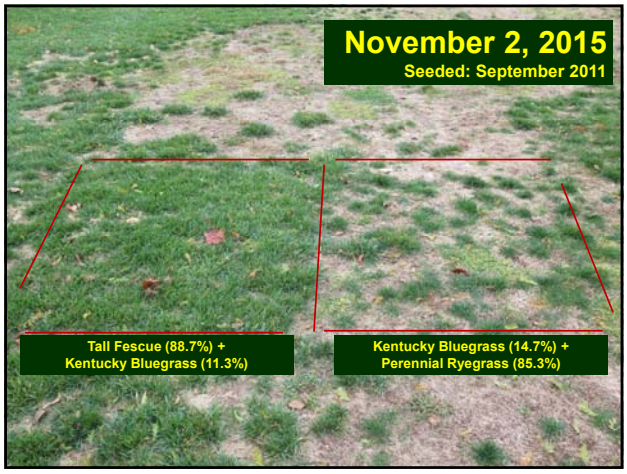

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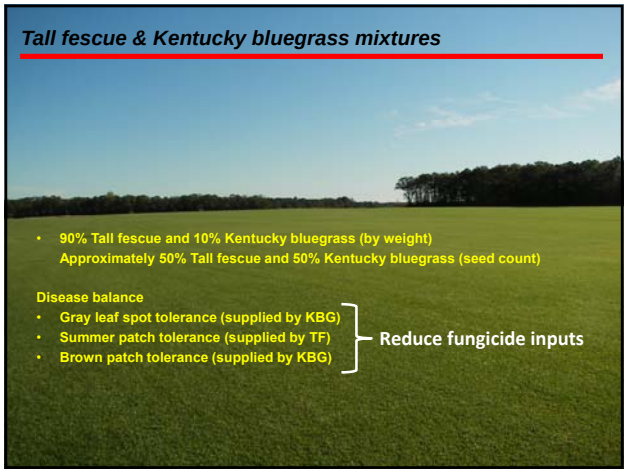

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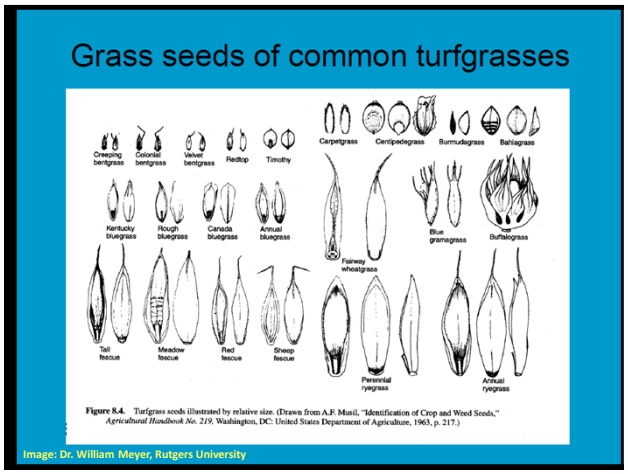

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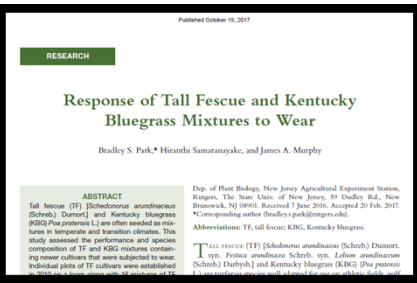

Published October 19, 2017

RESEARCH

Response of Tall Fescue and Kentucky Bluegrass Mixtures to Wear

Bradley S. Park,* Hiranthi Samaranayake, and James A. Murphy

ABSTRACT

Tall fescue (TF) [*Schedonorus arundinaceus* (Schreb.) Dumort.] and Kentucky bluegrass (KBG) [*Poa pratensis* L.] are often seeded as mixtures in temperate and transition climates. This study assessed the performance and species composition of TF and KBG mixtures containing newer cultivars that were subjected to wear. Individual plots of TF cultivars were established

Dep. of Plant Biology, New Jersey Agricultural Experiment Station, Rutgers, The State Univ. of New Jersey, 59 Dudley Rd., New Brunswick, NJ 08901. Received 7 June 2016. Accepted 20 Feb. 2017. *Corresponding author (bradley.s.park@rutgers.edu).

Abbreviations: TF, tall fescue; KBG, Kentucky bluegrass.

TALL FESCUE (TF) [*Schedonorus arundinaceus* (Schreb.) Dumort. syn. *Festuca arundinacea* Schreb. syn. *Lolium arundinaceum* (Schreb.) Darbysh.] and Kentucky bluegrass (KBG) (*Poa pratensis*

Park, B.S., H. Samaranayake, and J.A. Murphy. 2017. Response of tall fescue and Kentucky bluegrass mixtures to wear. Int. Turf. Res. J. 13:346-352.

Research Objective:

To assess the performance and species composition of tall fescue and Kentucky bluegrass mixtures containing newer cultivars and subjected to autumn wear

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Materials and methods: Tall fescue & Kentucky bluegrass mixtures

Test area seeded in September 2010

- Four tall fescue varieties
  - Falcon V, Mustang 4, Justice, Greenkeeper
- Two Kentucky bluegrass varieties
  - Midnight II (Midnight Type) and Blue Note (America Type)

  Two Kentucky bluegrass experimental selections
  - A05-344 (Shamrock Type), A05-361 (Mid-Atlantic Type)
- Seeding rate goal: 2000 seeds/1.0 ft^2
  - Kentucky bluegrass ~ 2,177,000 seeds/1.0 pound (Beard, 2002)
    - 0.9 lbs/1000 ft^2
  - Tall fescue ~ 227,000 seeds/1.0 pound (Beard, 2002)
    - 8.8 lbs/1000 ft^2
  - Mixtures: 90% Tall fescue & 10% Kentucky bluegrass by weight
    Kentucky bluegrass ~ 1000 seeds/1.0 ft^2 (0.5 lbs/1000 sq ft^2)
    Tall fescue ~ 1000 seeds/1.0 ft^2 (4.4 lbs/1000 ft^2)
- Rutgers Wear Simulator: Autumn 2011 (14 passes); Autumn 2012 (14 passes); Autumn 2013 (14 passes)
- 2011: 3.7 lbs N/1000 ft^2; 2012: 2.3 lbs N/1000 ft^2; 2013: 3.1 lbs N/1000 ft^2
- Mowing height: 1.5-inch
- Irrigation with temporary pipe or water reel

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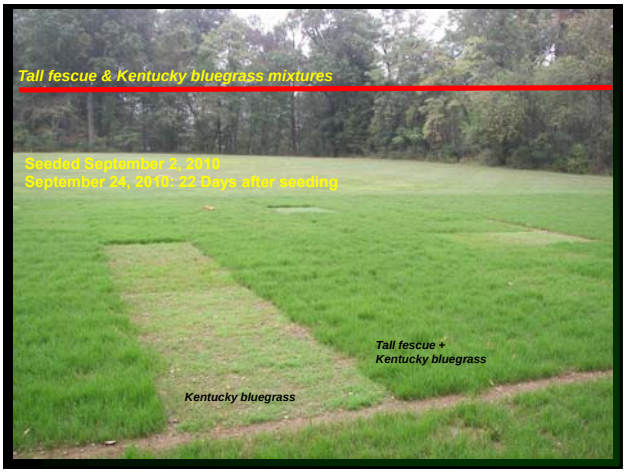

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Species population assessments

Twenty-four selected leaves from each plot were visually identified in July 2012, August 2013 and 2014.

Plots were divided into 1/3rd sections and a device equipped with eight vertically-movable tines was positioned in each 1/3rd section.

Tines were lowered to identify leaves.

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Tall fescue populations of species mixtures as affected by tall fescue, Kentucky bluegrass, and wear in 2012, 2013 and 2014.

Main Effects	July 2012	August 2013	August 2014
	---------- % ----------		
TALL FESCUE (TF)			
Falcon V + KBG	71	66 a	71 a
Mustang 4 + KBG	70	65 a	66 ab
Justice + KBG	71	67 a	70 a
Greenkeeper + KBG	65	58 b	61 b
KENTUCKY BLUEGRASS (KBG)			
None	100 a	100 a	100 a
Midnight II + TF	48 c	36 d	37 c
Blue Note + TF	50 c	46 c	44 c
A05-361 + TF	72 b	69 b	75 b
A05-344 + TF	75 b	69 b	79 b
WEAR			
No Wear	70	65	69
Wear	68	63	65

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Table 7. Brown patch severity as affected by the interaction of tall fescue and Kentucky bluegrass in July 2013.

Kentucky bluegrass	Tall fescue			
	Falcon V	Mustang 4	Justice	Greenkeeper
	1–9 scale†			
None	5.7bA‡	5.2cA	2.8cB	2.3dB
Midnight II	8.0aA	7.3aA	7.5aA	8.3aA
Blue Note	6.2bA	7.0abA	7.7aA	7.2abA
A05–361	5.8bAB	4.8cB	4.8bB	6.5bA
A05–344	5.7bA	5.5bcAB	4.8bAB	4.0cB

† Visual rating, where 9 represents no observed brown patch disease.

‡ Means followed by the same letter (lowercase: columns; uppercase: rows) within a sampling date are not significantly different.

Park, B.S., H. Samaranayake, and J.A. Murphy. 2017. Response of tall fescue and Kentucky bluegrass mixtures to wear. Int. Turf. Res. J. 13:346-352.

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Table 4. Turfgrass quality at the end of the autumn wear periods in 2012 and 2013 as affected by the interaction of tall fescue and Kentucky bluegrass.

Kentucky bluegrass	Tall fescue (Nov. 2012)				Tall fescue (Oct. 2013)			
	Falcon V	Mustang 4	Justice	Greenkeeper	Falcon V	Mustang 4	Justice	Greenkeeper
	1–9 scale†							
None (tall fescue alone)	6.7aA‡	5.8abB	5.7abB	4.3bC	8.2aA	7.7aAB	7.3abB	6.2bcC
Midnight II	6.7aA	6.3aA	6.3aA	6.0aA	7.5aA	7.5aA	8.0aA	8.0aA
Blue Note	6.0aA	5.5bAB	5.2bB	5.3aAB	8.0aA	7.5aAB	7.2bB	7.5aAB
A05–361	6.0aA	5.8abA	5.5bA	4.3bB	7.8aA	7.7aAB	7.0bBC	6.7bC
A05–344	6.2aA	5.5bAB	5.3bB	4.3bC	7.8aA	7.5aA	7.5abA	5.7cB

† Visual rating, where 9 represents the most complete, uniform turf cover; 6 represents acceptable turfgrass quality.

‡ Means followed by the same letter (lowercase: columns; uppercase: rows) within a sampling date are not significantly different.

Park, B.S., H. Samaranayake, and J.A. Murphy. 2017. Response of tall fescue and Kentucky bluegrass mixtures to wear. Int. Turf. Res. J. 13:346-352.

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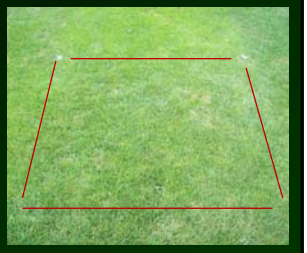
Mitigating summer patch damage:
Tall fescue & Kentucky bluegrass mixtures

August 14, 2013

Kentucky bluegrass:
A05-361



Tall fescue & Kentucky bluegrass:
Falcon V & A05-361

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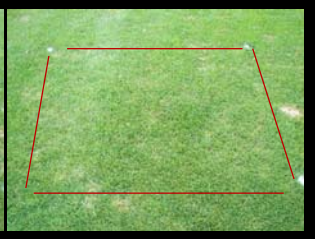
Mitigating summer patch damage:
Tall fescue & Kentucky bluegrass mixtures

August 14, 2013

Kentucky bluegrass:
A05-344



Tall fescue & Kentucky bluegrass:
Justice & A05-344

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Conclusions: Tall fescue & Kentucky bluegrass mixtures

Wear

Autumn wear had no effect on species composition in our study.

Kentucky bluegrass and tall fescue selection

Previous studies of management effects on species composition of TF and KBG mixtures have led to different conclusions.

- Hall (1980) found that mowing height and N fertilization affected TF population
- Hunt and Dunn (1993) reported that N and mowing height had little effect

Brede (1993), Reynolds et al. (2005), and Park et al. (2017) found that TF and KBG species composition in mixtures are affected by cultivars of TF and KBG.

Park et al. (2017)

- Kentucky bluegrass cultivar selection had a much greater influence on species composition in mixtures compared with tall fescue selection.
- Kentucky bluegrass cultivars capable of producing very high turf quality (e.g. Midnight II and Blue Note) can reduce tall fescue composition of mixes and can reduce stand susceptibly to brown patch when mixed with TF.

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National Turfgrass Evaluation Program

- Turfgrass variety evaluations for major cool and warm season varieties
- Check test results on line at NTEP.ORG

National Turfgrass Evaluation Program

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Tall fescue variety selection

Turfgrass quality
Brown patch *& gray leaf spot susceptibility*
Wear/traffic tolerance
Endophyte enhancement

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National Turfgrass Evaluation Program (NTEP); www.ntep.org

TABLE 5. MEAN TURFGRASS QUALITY RATINGS OF TALL FESCUE CULTIVARS GROWN AT FOUR LOCATIONS 1/ IN THE TRANSITION REGION 2021 DATA

TURFGRASS QUALITY RATINGS 1-9; 9=IDEAL TURF 2/

NAME	DE1	KS1	MD1	MO1	NC1	OK1	TN1	VA1	MEAN
TITANIUM G-LS (PPG-TF 255)	7.3	4.4	7.3	5.8	6.3	5.7	7.2	6.8	6.3
DAYBREAK (AM2)	7.7	4.5	7.3	5.9	5.8	5.6	7.2	6.4	6.3
PPG-TF 262	7.4	4.7	7.3	5.8	5.8	5.5	7.2	6.6	6.3
TITAN GLX (TF445)	7.3	5.1	6.6	5.0	6.2	5.5	7.3	7.2	6.3
SERENADE (PPG-TF 320)	7.1	4.5	7.0	5.8	5.8	5.6	7.1	6.9	6.2
GO-RH20	7.3	4.2	6.8	6.1	6.1	5.6	7.0	6.6	6.2
CAPITAN (DLFPS-321/3705)	7.3	4.5	7.0	5.0	6.8	5.5	7.3	6.3	6.2
TD2	7.5	4.5	6.9	5.1	5.8	5.6	7.0	7.2	6.2
K18-RS6	7.3	4.9	7.0	5.5	5.9	5.2	7.2	6.2	6.2
PPG-TF 337	7.4	4.3	7.2	5.8	5.2	5.5	7.1	6.6	6.1
TANK (PPG-TF 338)	7.0	4.5	6.7	6.0	5.7	5.4	7.3	6.4	6.1
RHL2	7.2	4.7	7.2	5.3	5.4	5.2	7.4	6.7	6.1
XANADU (JT 268)	7.4	4.7	7.0	6.1	5.7	5.6	6.4	6.1	6.1
SPYDER 2LS (ZRC1)	7.2	4.6	7.1	5.8	5.3	5.3	7.2	6.5	6.1
RH1	6.9	4.8	6.6	5.0	6.5	5.4	7.3	6.6	6.1
DYNAMITE G-LS (PPG-TF 254)	7.2	4.7	7.0	5.5	5.3	5.8	7.0	6.5	6.1
BONFIRE (JS DTT)	7.1	4.4	7.0	5.4	6.0	5.7	7.1	6.4	6.1
AVENGER III (PPG-TF 308)	7.3	4.0	7.0	5.6	5.5	5.7	7.4	6.4	6.1
TRIAD (PPG-TF 323)	7.3	4.6	6.8	5.5	5.7	5.4	7.0	6.5	6.1
ZION (BAR TF 134)	7.1	4.6	7.2	4.7	5.9	5.5	7.4	6.4	6.1
FASTLANE (BY-TF-169)	7.4	4.5	7.3	5.9	4.4	5.8	6.8	6.7	6.1
FIRECRACKER G-LS (PPG-TF 315)	7.1	4.0	7.1	5.6	5.3	5.7	7.3	6.6	6.1
PPG-TF 267	7.2	4.6	7.0	5.3	5.6	5.6	6.8	6.4	6.1
GALLARDO (DLFPS-TF/3550)	7.3	4.5	6.3	5.7	5.7	5.8	6.3	6.8	6.1
PPG-TF 316	7.2	4.5	7.0	5.8	5.3	5.6	6.7	6.5	6.1
FIRENZA II (PPG-TF 244)	6.8	3.8	6.7	5.2	6.5	5.9	6.8	6.7	6.1
TITAN MAX (TF456)	7.2	4.2	6.5	5.5	6.2	5.4	6.9	6.6	6.1
K18-WB1	7.1	4.2	6.8	5.6	5.7	5.3	7.3	6.3	6.0
DLFPS-321/3707	7.1	4.0	6.8	5.2	6.4	5.3	7.1	6.6	6.0
DLFPS-321/3708	7.3	3.3	6.7	5.1	5.7	5.9	7.4	6.8	6.0
TEACHER (PPG-TF 313)	7.4	4.1	7.0	6.3	4.7	5.2	7.2	6.4	6.0
RS1	7.1	4.5	6.6	5.4	5.3	5.5	7.2	6.6	6.0
AM1	7.2	3.5	6.7	5.9	6.3	5.8	6.9	6.0	6.0
SYMPHONY (PPG-TF 305)	7.2	4.1	6.9	5.9	5.1	5.8	6.4	6.7	6.0
DLFPS-321/3706	7.0	3.8	7.0	5.3	5.2	5.7	7.4	6.7	6.0
RAPTOR LS (PPG-TF 336)	7.3	4.1	7.4	5.4	4.8	5.2	7.2	6.6	6.0

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National Turfgrass Evaluation Program (NTEP); www.ntep.org

TABLE 4. MEAN TURFGRASS QUALITY RATINGS OF TALL FESCUE CULTIVARS GROWN AT FOUR LOCATIONS 1/ IN THE NORTHEAST REGION 2021 DATA

TURFGRASS QUALITY RATINGS 1-9; 9=IDEAL TURF 2/

NAME	CT1	NJ1	NJ2	PA2	MEAN
AM1	6.9	7.3	7.0	7.1	7.1
DAYBREAK (AM2)	7.0	6.0	7.7	7.1	7.0
PPG-TF 262	6.9	7.1	6.2	6.9	6.8
RAPTOR LS (PPG-TF 336)	6.3	7.0	6.7	6.9	6.7
COL-TF-148	6.2	6.8	6.9	6.7	6.7
RDC	6.6	6.9	6.3	6.9	6.7
K18-NSE	6.5	7.7	5.9	6.6	6.7
OKEEFE (LTP-TF-122)	6.6	7.0	5.9	7.1	6.7
ZION (BAR TF 134)	6.6	6.7	6.7	6.6	6.7
RH3	6.3	7.2	6.3	6.7	6.6
SPYDER 2LS (ZRC1)	6.4	6.8	6.8	6.6	6.6
DLFPS-321/3707	6.4	7.0	6.3	6.9	6.6
K18-RS6	6.7	6.2	7.0	6.7	6.6
ESSENTIAL 2 (DLFPS-TF/3552)	6.4	7.0	6.2	7.0	6.6
DLFPS-321/3693	7.0	6.6	5.9	6.9	6.6
SLSS	6.7	7.3	6.1	6.3	6.6
GALLARDO (DLFPS-TF/3550)	6.3	6.9	6.3	7.0	6.6
RHL2	6.5	7.2	6.2	6.5	6.6
RC4	6.1	7.3	6.1	6.9	6.6
TITAN GLX (TF445)	6.5	6.4	6.7	6.7	6.6
FIRENZA II (PPG-TF 244)	6.7	6.3	6.4	7.0	6.6
HOUNDOG NINE (DLFPS-321/3702)	6.0	8.0	5.4	6.9	6.6
CAPITAN (DLFPS-321/3705)	6.6	6.1	7.0	6.5	6.6
GO-RH20	6.7	6.4	6.2	6.9	6.6
PPG-TF 312	6.8	6.9	6.3	6.2	6.5
SERENADE (PPG-TF 320)	6.6	6.4	6.3	6.8	6.5
PPG-TF 316	6.0	6.8	6.2	7.1	6.5
K18-WB1	6.4	6.9	6.0	6.7	6.5
TD2	6.7	6.2	6.2	6.8	6.5
GALACTIC (SESCR1)	6.4	6.0	6.6	7.0	6.5
RHF	6.7	5.8	6.3	7.1	6.5
DLFPS-TF/3553	6.4	7.1	5.4	7.0	6.5
FIRECRACKER G-LS (PPG-TF 315)	6.1	6.9	6.0	6.8	6.5
RS1	6.4	6.4	6.4	6.6	6.5
TANK (PPG-TF 338)	6.2	7.4	5.3	6.9	6.4
DYNAMITE G-LS (PPG-TF 254)	6.0	7.0	6.2	6.6	6.4
TEACHER (PPG-TF 313)	6.5	6.5	6.0	6.8	6.4
NAI-RO54	6.0	6.5	6.2	7.0	6.4
DLFPS-321/3695	6.4	6.7	5.8	7.0	6.4
DLFPS-321/3708	6.4	6.7	5.8	6.9	6.4
AVENGER III (PPG-TF 308)	6.6	6.6	5.9	6.6	6.4
PPG-TF 267	6.5	7.3	5.3	6.6	6.4
BULLSEYE LTJ	6.2	6.8	5.6	7.0	6.4
ROVER (PPG-TF 306)	6.3	7.0	5.6	6.7	6.4

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RUTGERS
New Jersey Agricultural Experiment Station

2018 National Turfgrass Evaluation Program (NTEP) Tall Fescue Test at Rutgers Hort. Farm No. 2, North Brunswick, NJ

Traffic Test

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Wear / Traffic machines used at Rutgers University

Rutgers Wear Simulator (RWS) - WEAR

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Wear / Traffic machines used at Rutgers University

Cady Traffic Simulator (CTS) - TRAMPLING

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2018 NTEP Tall Fescue Test

Traffic results - 2022

Continuous traffic during 13 May to 26 September 2022 (2 passes wk^{-1} with each machine for 21 consecutive weeks) allows use of Area Under (x) Progress Curve calculation. This quantifies the cumulative effects of traffic by integrating multiple ratings over time into a single value.

$$\mathrm{AU(x)PC} = \sum_{i=0}^{n_i-1} \frac{(Y_i + Y_{i+1})}{2}(t_{i+1} - t_i)$$

i = 0, 1, 2…n-1, n_i = number of observations made, Y_i = measurement of turf characteristic of interest, and t_i = time interval between observations in days for the ith rating.

Rating Dates (2022): June 23 (+28 passes), Aug. 10 (+56 passes), Sep. 30 (+84 passes)

- **Uniformity of Turf Cover** (Visual; 1 to 9 scale; 9=best)
- **Fullness of Turf Canopy** (Visual; 0 to 100% scale; 100% = full canopy)
- **Green cover** (Digital image analysis; 0 to 100%; 100% = complete green cover)

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2018 NTEP Tall Fescue Test

Traffic results - 2022

Area under the uniformity of turf cover, fullness of turf canopy, and green cover progress curve as affected by traffic and tall fescue entry during 2022.

	Area Under the Progress Curve[1]		
	Uniformity of Turf Cover[2]	Fullness of Turf Canopy[3]	Green Cover[4]
Level of Traffic[5]			
NO TRAFFIC	855	9176	9166
TRAFFIC	539	5612	9023
Source of Variation			
TRAFFIC	**	**	ns
ENTRY	***	***	ns
TRAFFIC x ENTRY	ns	*	ns

[1] AU(x)PC = Area under the uniformity of turf cover, fullness of turf canopy, and green cover progress curves calculated using ratings taken after 28, 56, and 84 traffic passes on 23 June, 10 August, and 30 September 2022, respectively.
[2] Visual rating using 1 to 9 scale; 9 = most dense, uniform canopy
[3] Visual rating using 0 to 100% scale; 100% = full canopy
[4] Measured by digital image analysis; 100% = complete green cover
[5] Traffic applied as a strip across entries using a combination of the Rutgers Wear Simulator and Cady Traffic Simulator during 13 May to 26 September 2022 (84 total machine passes).
ns, ·,*, **, *** nonsignificant and significant at the 0.05, 0.01 and 0.001 level

Significant interaction

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2018 NTEP Tall Fescue Test

Traffic results - 2022

Area under the fullness of turfgrass canopy progress curve as affected by the interaction of TRAFFIC (No Traffic and Traffic) and ENTRY (132 entries) during 2022.

Top statistical group (Traffic)

PPG-TF-267
RH3
Bullseye LTZ
PPG-TF-249
GLX ACED (PST-5DART)
Rover (PPG-TF-306)
Endgame (3N1)
Spyder 2LS (ZRC1)
K18-RS6
JT 233
Raptor III
GO-RH20
Titan MAX (TF456)
PPG-TF-231
PST-5GQ
ProGold
SETFM2
Titan GLX (TF445)
Tank (PPG-TF-338)

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2018 NTEP Tall Fescue Test

Traffic results - 2022

Area under the fullness of turfgrass canopy progress curve as affected by the interaction of TRAFFIC (No Traffic and Traffic) and ENTRY (132 entries) during 2022.

Second statistical group (Traffic)

Firenza II (PPG-TF 244)
Fairfield (SETF104)
RH1
Gallardo (DLFPS-TF/3550)
AST8118LM
BGR-TF3
PST-5THM
PPG-TF-337
Firecracker G-LS (PPG-TF-315)
Fayette
PST-5TRN
RHL2
RDC
PPG-TF-318
Essential 2 (DLFPS-TF/3552)
TD2
NAI-ROS4
RAD-TF0.0
A-TF31
Paramount
Estrena
Bravo 2
Raptor LS (PPG-TF-336)
Daybreak (AH2)
PPG-TF 316
Houndog Nine (DLFPS-321/3702)
K18-WB1
Hemi
DLFPS-321/3708
3B2
Bullseye
PST-5DC24
DLFPS-321/3707
O'Keefe (DLTP-TF-122)
Raceway (DLFPS-321/3696)
Triad (PPG-TF-323)
DLFPS-321/3703
PPG-TF-257
5LSS
Tango
Titanium G-LS (PPG-TF-255)
Monument (PST-5SQB)
Copious TF
PST-5MCMO
Serenade (PPG-TF-320)
Stealth (PPG-TF-238)
Padre 2
Moondance GLX
Palomar
GO-AOMK
PST-5E6
Birmingham
Grand Prix (FC15-01P)
Gro-Pro (SE5302)
Grande 3
Avenger III (PPG-TF-308)
JT-517
Kizzle (K18-ROE)
Escalade
PPG-TF-262
DLFPS-TF/3553
Degas (LTP-TF-111)
PST-5BYOB
PST-5DZM
COL-TF-148
Lifeguard
SETFM3
Xanadu (JT 268)
Bandit
Teacher (PPG-TF-313)
Symphony (PPG-TF 305)
DLFPS-321/3693
PPG-TF-312
Rowdier (DLFPS-321/3699)
RAD--TF105
Bonfire (JS-DTT)
Bentley (DLFPS-321/3679)
RS1
RC4
NAI-FQZ-17
Naturally Green
PST-5GLBS
Capitan (DLFPS-321/3705)
AH1
Firehawk SLT
Talladega II (NAI-3N2)

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2018 NTEP Tall Fescue Test

Traffic results - 2022

Area under the fullness of turfgrass canopy progress curve as affected by the interaction of TRAFFIC (No Traffic and Traffic) and ENTRY (132 entries) during 2022.

Bottom statistical group (Traffic)

Kentucky-31

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