

The background of the slide features a large, faint watermark of the Rutgers University seal. The seal is circular and contains the text "RUTGERS UNIVERSITY" around the perimeter and "1773" at the bottom. The seal is centered and slightly offset to the left.

RUTGERS

New Jersey Agricultural
Experiment Station

Variety selection and management of tall fescue for sports fields

**Brad Park, Rutgers University
Sports Turf Managers Association
23rd Annual Conference & Exhibition
Long Beach, CA
January 13, 2012**

Rutgers Hort. Farm II, North Brunswick, NJ



Tall fescue (*Festuca arundinacea* L.)

- Well adapted for use on low maintenance, non-irrigated sites
- Has the ability to develop a deep root system that provides tolerance to droughty conditions
- Turf-type tall fescues have been used to improve the quality and durability of school grounds, sports fields and parks.







Kentucky-31

Improved Turf-Type



Improved Turf-Type

Kentucky-31

1.5-inch mowing height



'Jamboree'

'Kentucky-31'

3.0-inch mowing height



2006 NTEP Tall Fescue Test

06-Walk 



RK 4

28 July 2011

No irrigation applied in 2011

2006 NTEP Tall Fescue Test



Kentucky-31

18 August 2011
No irrigation applied in 2011

2006 NTEP Tall Fescue Test

Kentucky-31

14 October 2011
No irrigation applied in 2011

14 October 2011



'Rembrandt' Tall Fescue: Seeded September 2006; 3.0-inch mowing height

14 October 2011



'Falcon V' Tall Fescue: Seeded September 2010; 1.5-inch mowing height (reel mower)

4 November 2011



'Falcon V' Tall Fescue: Seeded September 2010; 1.5-inch mowing height

Tall fescue establishment from seed ...



Conditions:

- Late summer seeding a possibility
- Field closure
- Automatic irrigation?
- Limited inputs in future









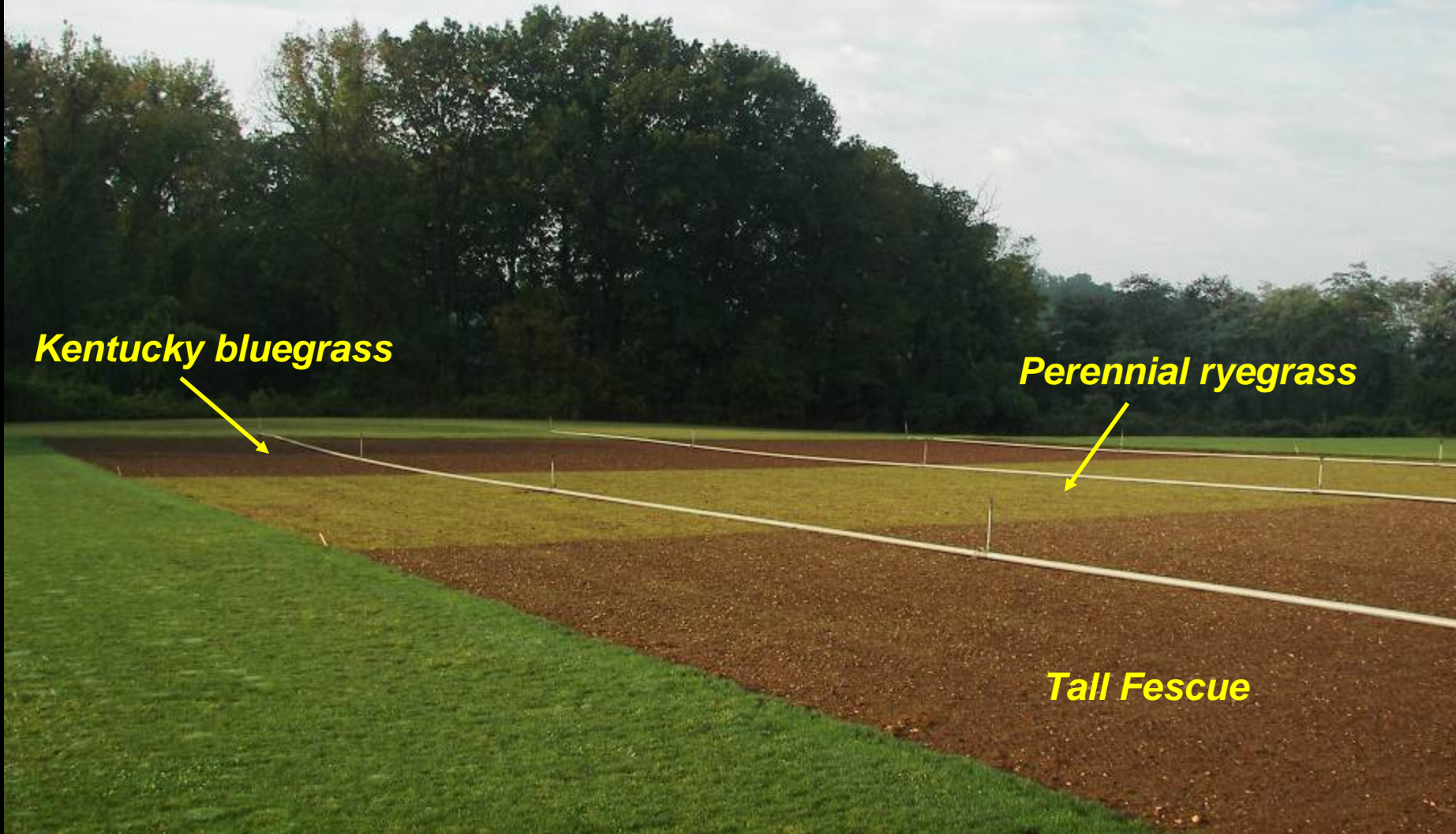
New, large-acreage complexes



Establishment

Seeded 8 September 2010

14 September 2010: 6 days after seeding (DAS)



Kentucky bluegrass

Perennial ryegrass

Tall Fescue

Establishment

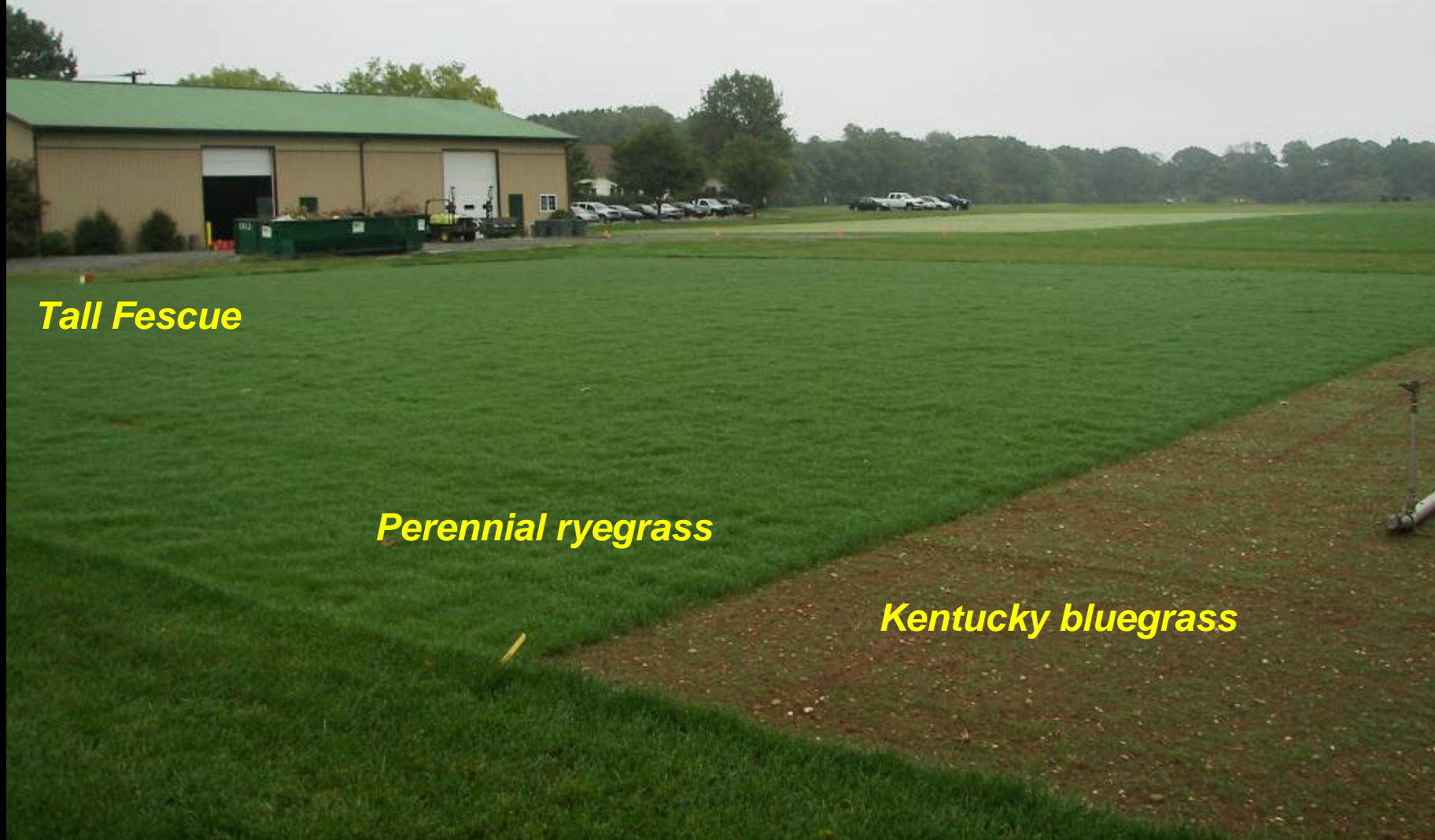
Seeded: 8 September 2010

24 September 2010: 16 DAS

Tall Fescue

Perennial ryegrass

Kentucky bluegrass



Establishment

Seeded 2 September 2010
24 September 2010: 22 DAS

Kentucky bluegrass

Tall Fescue





Endophyte-enhanced turfgrasses

Endophytes

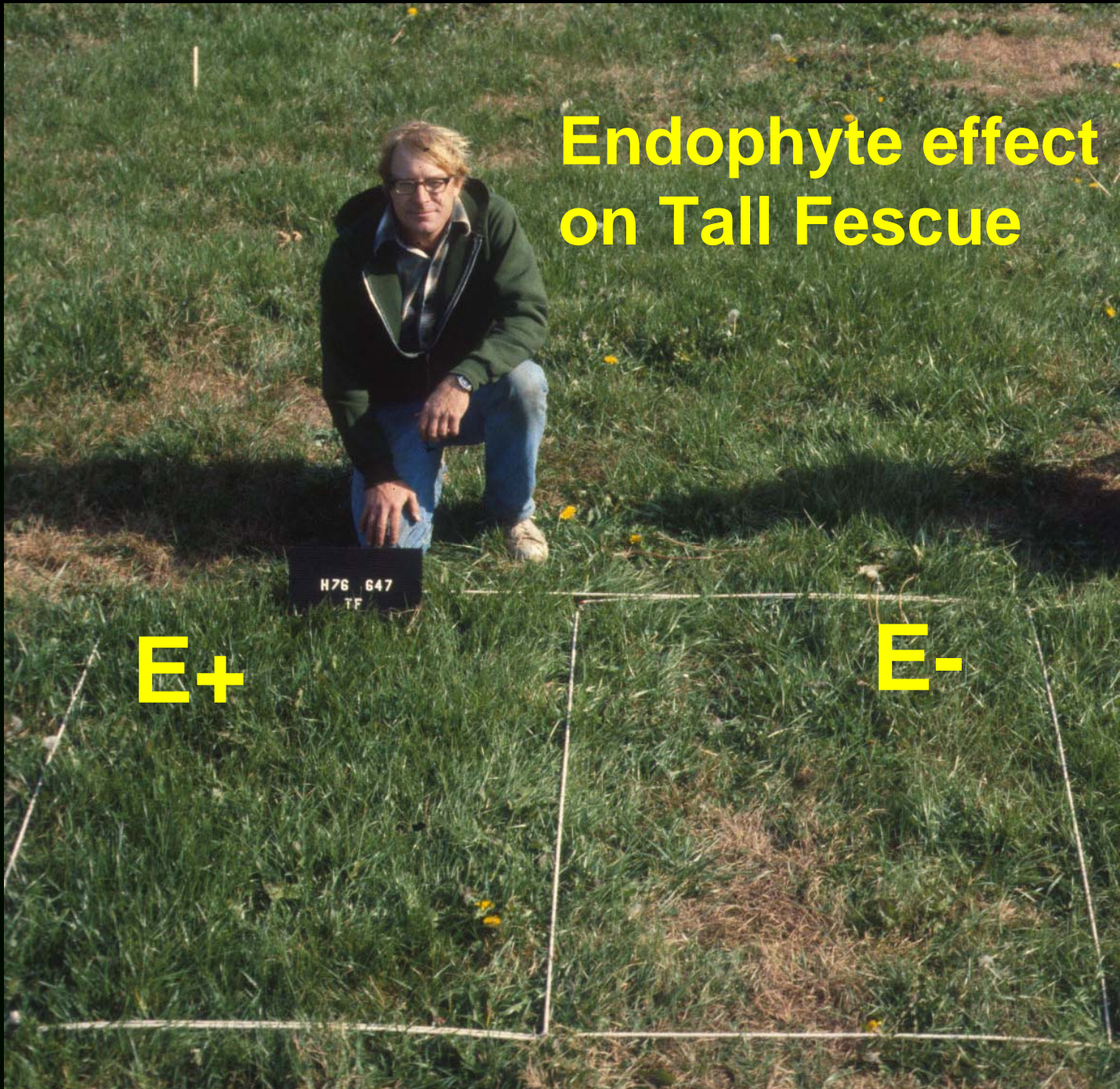
- Fungi which complete their entire life cycle within a plant
- Endophytes are toxic to insects including: Sod webworm, billbugs, and chinch bugs
- Endophytes are confined to:
 - Perennial ryegrass
 - **Tall fescue**
 - Fine fescue
- No help for grubs
- Buy fresh seed. Seed stored longer than 9-12 months will lose endophyte viability.

Endophyte effect on Tall Fescue

H76 647
TF

E+

E-



Traffic

- *Wear*
- *Compaction*
- **Soil displacement**
- **Divoting**



Wear research



Compaction



Tall fescue research

Traffic research



AND



Past traffic stress research

Compaction tolerance: Perennial ryegrass = Kentucky bluegrass > Tall fescue

Carrow, R.N. 1980. Influence of soil compaction on three turfgrass species. Agron . J. 72:1038-1042.

2006 NTEP Tall Fescue Trial

Objective: *To assess the traffic tolerance of tall fescue during spring, summer, and fall*



Materials and methods

2006 NTEP tall fescue test

- One hundred thirteen (113) tall fescue varieties and experimental selections established in fall 2006
- Plots seeded at ~ 6.0 lbs/1000 ft²
- Cultural practices
 - **Mowing ~ 1x/week at 3.0-inch**
 - **4.1 lbs N/1000 ft² in 2009-11**
 - **Minimal irrigation applied to avoid drought stress 2007-10**
 - **No irrigation applied in 2011**
- Traffic treatments:

Fall 2007	Summer 2008	Spring 2009
Fall 2009	Summer 2010	Spring 2011

Materials and methods

2006 NTEP Tall fescue Test: Fall 2007- Spring 2009

Traffic Period	Wear [†]	Compaction [‡]
Fall 2007		
2 - 4 October	24	
10 October		10
Summer 2008		
22 - 23 July	16	
4 August		10
Spring 2009		
29 – 30 April	24	
6 May		10

[†] Operating speed=4.0 km h⁻¹ [2.5 mph]; paddles=250 rpm

[‡] 1362-kg [3000-lb] roller with vibratory function engaged

Materials and methods

2006 NTEP Tall fescue Test: 2009-11

Traffic Period	Wear [†]	Compaction [‡]
Fall 2009		
13 - 15 October	24	
20 October		10
Summer 2010		
20 - 21 July	24	
4 August		10
Spring 2011		
11 – 12 May	24	
17 May		10

[†] Operating speed=2.5 mph; paddles=250 rpm

[‡] 3000-lb roller with vibratory function engaged

Materials and methods

2006 NTEP Tall fescue Test

Fertilizer schedule	Fertilizer analysis	lbs N/1000 sq ft
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2009

25 March	34-0-0	0.4
2 June	34-0-0	0.5
9 September	34-0-0	0.4
22 October	34-0-0	0.6
22 November	34-0-0	0.5
		Total = 2.4

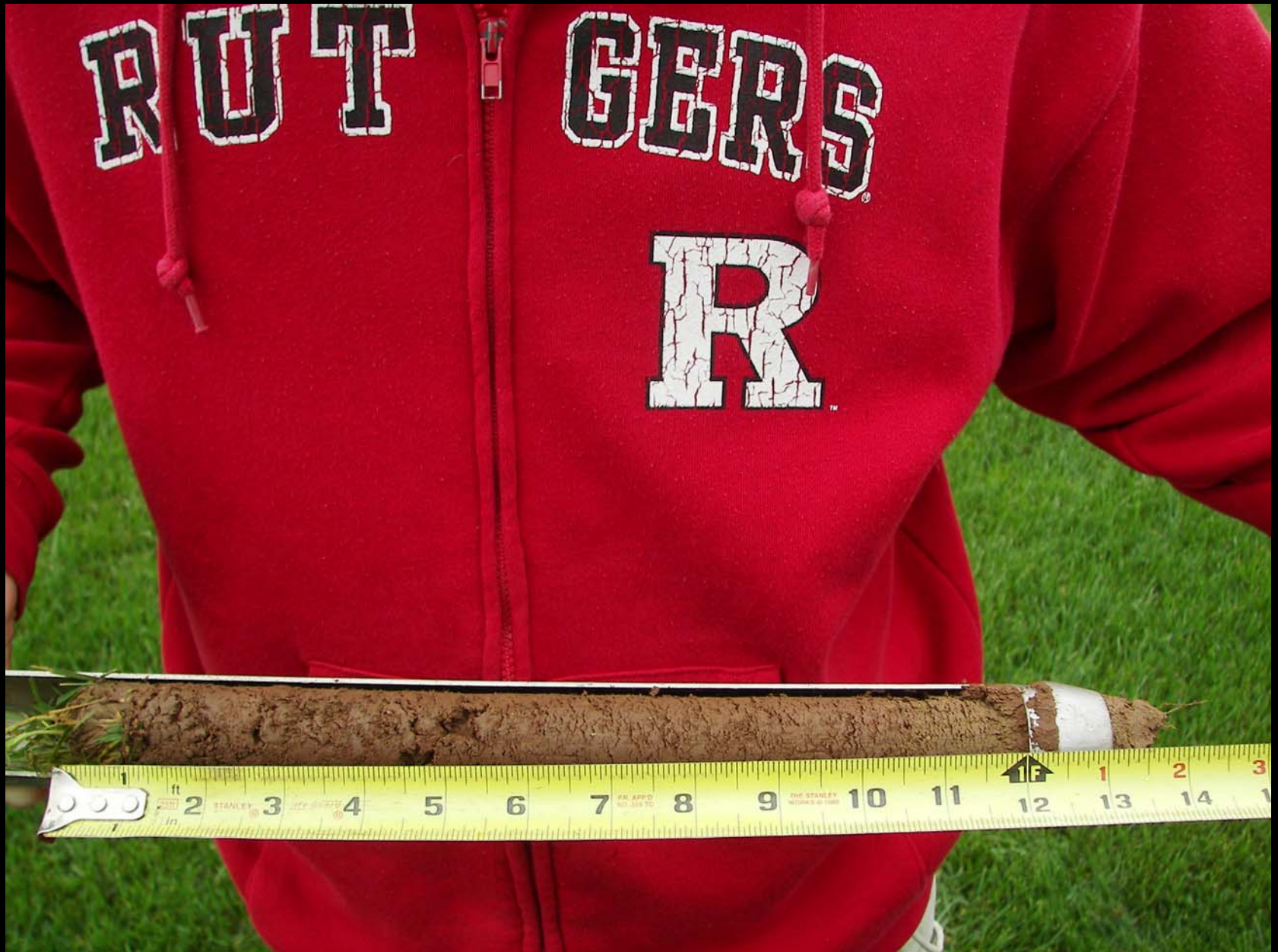
2010

1 June	34-0-0	0.6
16 September	34-0-0	0.6
		Total = 1.2

2011

22 April	16-4-8	0.5
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14 October 2011





C_W = Fullness of turf canopy after wear (0-100%)

Wear Tolerance (1-9 scale; 9=best tolerance)

‘Glenmont’

$C_W = 5\%$

Wear Tolerance=1.0

‘Gladstone’

$C_W = 80\%$

Wear Tolerance=8.0

Table 1. Fullness of turfgrass canopy for tall fescue as affected by traffic applied in Fall 2007 and Spring 2009 for tall fescue established in North Brunswick, NJ in September 2006.

Season-year	C [†]	C _W [‡]	C _T [§]	C _T -C [¶]
		0 to 100% scale		
Fall 2007	86.8	61.2	38.1	-48.7
Spring 2009	67.5	36.7	45.7	-21.8
LSD (0.05)	5.2	3.3	5.0	8.5

Season-year	***	***	*	***
Entry	***	***	***	***
Season-year x Entry	***	**	***	***

* Significant at 0.05 probability level

** Significant at 0.01 probability level

*** Significant at 0.001 probability level

† Fullness of turfgrass canopy before wear; 100%=full canopy

‡ Fullness of turfgrass canopy after wear

§ Fullness of turfgrass canopy after traffic

¶ Loss of turfgrass canopy; more negative number represents greater canopy loss

Table 2. Fullness of turfgrass canopy as affected by Season-year (Fall 2007 and Spring 2009) and Entry for tall fescue established at North Brunswick, NJ in 2006

Entry	C		C _w		C _T		C _T -C	
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
	0 to 100% scale							
Greenbrooks (TG 50-9460)	78.3	91.7	55.0	63.3	63.3	51.7	-15.0	-40.0
Cochise IV (RKCL)	71.7	96.7	58.3	73.3	61.7	51.7	-10.0	-45.0
Falcon NG (CE 1)	80.0	86.7	56.7	66.7	65.0	50.0	-15.0	-36.7
Catelist (NA-BT-1)	78.3	95.0	55.0	68.3	58.3	50.0	-20.0	-45.0
Spyder LS (Z-2000)	63.3	93.3	35.0	75.0	53.3	50.0	-10.0	-43.3
Cannavaro (DP 50-9440)	65.0	95.0	56.7	70.0	58.3	48.3	-6.7	-46.7
Rebel IV	75.0	83.3	43.3	61.7	55.0	48.3	-20.0	-35.0
Traverse SPR (RK-1)	78.3	91.7	56.7	71.7	65.0	46.7	-13.3	-45.0
Firenza	73.3	90.0	48.3	75.0	55.0	46.7	-18.3	-43.3
Wolfpack II (PST-5WMB)	80.0	93.3	45.0	70.0	50.0	46.7	-30.0	-46.7
Finelawn Xpress (RP 2)	71.7	93.3	41.7	71.7	46.7	46.7	-25.0	-46.7
Bullseye	78.3	96.7	55.0	75.0	61.7	45.0	-16.7	-51.7
Hemi	78.3	91.7	55.0	73.3	60.0	45.0	-18.3	-46.7
Turbo	75.0	93.3	53.3	71.7	53.3	45.0	-21.7	-48.3
LS 1200 (SC-1)	73.3	96.7	63.3	81.7	68.3	43.3	-5.0	-53.3
Shenandoah III (SH 3)	81.7	95.0	61.7	78.3	66.7	43.3	-15.0	-51.7
J-140	70.0	91.7	43.3	60.0	55.0	43.3	-15.0	-48.3
Mustang 4 (M4)	80.0	91.7	50.0	70.0	53.3	43.3	-26.7	-48.3
Monet (LTP-610 CL)	73.3	95.0	48.3	73.3	53.3	43.3	-20.0	-51.7
Talladega (RP 3)	65.0	88.3	43.3	71.7	50.0	43.3	-15.0	-45.0
Biltmore	68.3	81.7	31.7	60.0	45.0	43.3	-23.3	-38.3
SR 8650 (STR-8LMM)	71.7	86.7	35.0	65.0	45.0	43.3	-26.7	-43.3
Padre	73.3	86.7	31.7	66.7	43.3	43.3	-30.0	-43.3
Garrison (IS-TF-153)	75.0	86.7	38.3	71.7	43.3	43.3	-31.7	-43.3
Rembrandt	63.3	86.7	26.7	53.3	40.0	43.3	-23.3	-43.3
Umbrella (DP 50-9411)	55.0	90.0	20.0	63.3	31.7	43.3	-23.3	-46.7
Falcon V (ATM)	76.7	98.3	65.0	75.0	70.0	41.7	-6.7	-56.7
Essential (IS-TF-154)	71.7	95.0	58.3	75.0	66.7	41.7	-5.0	-53.3
RK 5	78.3	95.0	51.7	70.0	56.7	41.7	-21.7	-53.3
Shenandoah Elite (RK 6)	63.3	91.7	41.7	73.3	51.7	41.7	-11.7	-50.0
Escalade	71.7	90.0	41.7	58.3	50.0	41.7	-21.7	-48.3

Table 2. Continued

Entry	C		C _w		C _T		C _T -C		
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	
	0 to 100% scale								
STR-8BB5	73.3	88.3	33.3	58.3	48.3	41.7	-25.0	-46.7	
AST1001 (AST-4)	70.0	85.0	30.0	56.7	45.0	41.7	-25.0	-43.3	
JT-41	66.7	86.7	31.7	66.7	38.3	41.7	-28.3	-45.0	
Faith (K06-WA)	70.0	96.7	55.0	73.3	55.0	40.0	-15.0	-56.7	
Honky Tonk (RAD-TF17)	75.0	85.0	46.7	61.7	51.7	40.0	-23.3	-45.0	
Tanzania (IS-TF-159)	60.0	85.0	35.0	70.0	50.0	40.0	-10.0	-45.0	
GE-1	66.7	85.0	35.0	63.3	46.7	40.0	-20.0	-45.0	
Gazelle II (PST-5HP)	65.0	88.3	41.7	63.3	43.3	40.0	-21.7	-48.3	
Falcon IV	71.7	85.0	36.7	65.0	43.3	40.0	-28.3	-45.0	
Darlington (CS-TF1)	56.7	83.3	25.0	53.3	36.7	40.0	-20.0	-43.3	
Einstein	68.3	86.7	30.0	55.0	36.7	40.0	-31.7	-46.7	
Sunset Gold (KZ-2)	50.0	86.7	23.3	56.7	33.3	40.0	-16.7	-46.7	
Hudson (DKS)	61.7	86.7	21.7	55.0	31.7	40.0	-30.0	-46.7	
Firecracker LS (MVS-MST)	70.0	96.7	58.3	78.3	60.0	38.3	-10.0	-58.3	
Pedigree (ATF-1199)	68.3	85.0	45.0	56.7	56.7	38.3	-11.7	-46.7	
PSG-85QR	75.0	83.3	48.3	66.7	55.0	38.3	-20.0	-45.0	
MVS-1107	78.3	83.3	38.3	60.0	53.3	38.3	-25.0	-45.0	
PSG-82BR	71.7	88.3	40.0	66.7	53.3	38.3	-18.3	-50.0	
Van Gogh (LTP-RK2)	71.7	93.3	51.7	66.7	51.7	38.3	-20.0	-55.0	
Speedway (STR-8BPDx)	65.0	90.0	50.0	68.3	48.3	38.3	-16.7	-51.7	
Raptor II (MVS-TF-158)	61.7	90.0	45.0	66.7	46.7	38.3	-15.0	-51.7	
Ninja 3 (ATF 1247)	66.7	85.0	33.3	58.3	43.3	38.3	-23.3	-46.7	
Sidewinder (IS-TF-138)	53.3	90.0	28.3	63.3	43.3	38.3	-10.0	-51.7	
Cezanne Rz (LTP-CRL)	73.3	86.7	36.7	58.3	40.0	38.3	-33.3	-48.3	
Braveheart (DP 50-9407)	65.0	93.3	30.0	61.7	38.3	38.3	-26.7	-55.0	
Plato	63.3	78.3	26.7	48.3	36.7	38.3	-26.7	-40.0	
AST9002 (AST-2)	68.3	86.7	30.0	56.7	36.7	38.3	-31.7	-48.3	
Tahoe II	70.0	83.3	25.0	51.7	35.0	38.3	-35.0	-45.0	
06-DUST	68.3	86.7	31.7	53.3	35.0	38.3	-33.3	-48.3	
3rd Millennium SRP	73.3	90.0	45.0	63.3	51.7	36.7	-21.7	-53.3	
Turbo Rz (Burl-TF8)	71.7	83.3	41.7	58.3	50.0	36.7	-21.7	-46.7	

Table 2. Continued

Entry	C		C _W		C _T		C _{T-C}	
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
	0 to 100% scale							
JT-45	65.0	86.7	36.7	58.3	50.0	36.7	-15.0	-50.0
Rhambler SRP (Rhambler)	68.3	93.3	46.7	73.3	48.3	36.7	-20.0	-56.7
Trio (IS-TF-152)	63.3	90.0	31.7	61.7	43.3	36.7	-20.0	-53.3
PSG-TTST	65.0	80.0	23.3	50.0	38.3	36.7	-26.7	-43.3
AST 7002	66.7	85.0	31.7	55.0	36.7	36.7	-30.0	-48.3
AST9003 (AST-1)	58.3	83.3	25.0	56.7	36.7	36.7	-21.7	-46.7
Lindbergh	65.0	80.0	26.7	60.0	36.7	36.7	-28.3	-43.3
RK 4	83.3	91.7	56.7	73.3	60.0	35.0	-23.3	-56.7
Jamboree (IS-TF-128)	66.7	86.7	45.0	71.7	51.7	35.0	-15.0	-51.7
Magellan	71.7	81.7	35.0	53.3	50.0	35.0	-21.7	-46.7
Skyline	66.7	80.0	33.3	55.0	50.0	35.0	-16.7	-45.0
JT-42	71.7	85.0	38.3	58.3	50.0	35.0	-21.7	-50.0
Rocket (IS-TF-147)	70.0	88.3	38.3	65.0	50.0	35.0	-20.0	-53.3
Integrity (BGR-TF1)	68.3	88.3	35.0	60.0	46.7	35.0	-21.7	-53.3
J-130	65.0	86.7	26.7	61.7	43.3	35.0	-21.7	-51.7
GO-1BFD	71.7	81.7	33.3	53.3	41.7	35.0	-30.0	-46.7
Corona (Col-M)	70.0	86.7	31.7	60.0	40.0	35.0	-30.0	-51.7
RNP	73.3	86.7	30.0	50.0	38.3	35.0	-35.0	-51.7
Compete (LS-06)	61.7	86.7	23.3	55.0	38.3	35.0	-23.3	-51.7
AST7003	68.3	86.7	28.3	56.7	38.3	35.0	-30.0	-51.7
AST9001 (AST-3)	70.0	81.7	23.3	53.3	36.7	35.0	-33.3	-46.7
Silverado	70.0	75.0	28.3	48.3	35.0	35.0	-35.0	-40.0
Xtremegreen (BGR-TF2)	60.0	81.7	28.3	61.7	35.0	35.0	-25.0	-46.7
Aristotle	61.7	75.0	18.3	41.7	31.7	35.0	-30.0	-40.0
AST 7001	56.7	83.3	20.0	51.7	31.7	35.0	-25.0	-48.3
Titanium LS (MVS-BB-1)	80.0	88.3	50.0	71.7	48.3	33.3	-31.7	-55.0
Justice	66.7	85.0	36.7	56.7	45.0	33.3	-21.7	-51.7
Fat Cat (IS-TF-161)	60.0	86.7	30.0	60.0	45.0	33.3	-15.0	-53.3
MVS-341	66.7	83.3	26.7	65.0	45.0	33.3	-21.7	-50.0
Tulsa Time (Tulsa III)	68.3	81.7	30.0	63.3	41.7	33.3	-26.7	-48.3
06-WALK	61.7	81.7	25.0	55.0	40.0	33.3	-21.7	-48.3

Table 2. Continued

Entry	C		C _w		C _T		C _{T-C}	
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
	0 to 100% scale							
Col-1	63.3	81.7	38.3	55.0	38.3	33.3	-25.0	-48.3
Reunion (LS-03)	71.7	90.0	31.7	56.7	38.3	33.3	-33.3	-56.7
PSG-TTRH	65.0	81.7	28.3	58.3	38.3	33.3	-26.7	-48.3
Crossfire 3 (Col-J)	66.7	83.3	25.0	46.7	36.7	33.3	-30.0	-50.0
Toccoa (IS-TF-151)	43.3	86.7	26.7	65.0	40.0	31.7	-3.3	-55.0
Stetson II (NA-SS)	63.3	81.7	25.0	58.3	38.3	31.7	-25.0	-50.0
Terrier (IS-TF-135)	50.0	88.3	23.3	63.3	36.7	31.7	-13.3	-56.7
GWTF	58.3	81.7	30.0	58.3	35.0	31.7	-23.3	-50.0
STR-8GRQR	63.3	81.7	28.3	55.0	33.3	31.7	-30.0	-50.0
LS 1010 (ATF 1328)	56.7	86.7	20.0	55.0	31.7	31.7	-25.0	-55.0
BAR Fa 6253	73.3	85.0	38.3	55.0	51.7	30.0	-21.7	-55.0
JT-33	55.0	85.0	28.3	51.7	50.0	30.0	-5.0	-55.0
JT-36	58.3	83.3	26.7	56.7	41.7	30.0	-16.7	-53.3
Gold Medallion (KZ-1)	66.7	88.3	30.0	55.0	36.7	30.0	-30.0	-58.3
PSG-RNDR	53.3	78.3	25.0	45.0	35.0	30.0	-18.3	-48.3
0312	51.7	86.7	30.0	48.3	38.3	28.3	-13.3	-58.3
Renovate (LS-11)	58.3	88.3	21.7	50.0	36.7	28.3	-21.7	-60.0
Hunter	60.0	83.3	28.3	53.3	36.7	28.3	-23.3	-55.0
BAR Fa 6363	68.3	80.0	26.7	38.3	38.3	26.7	-30.0	-53.3
Kentucky 31	55.0	51.7	5.0	13.3	20.0	21.7	-35.0	-30.0
LSD (0.05)	10.4		11.9		11.4		12.2	

† Fullness of turfgrass canopy before wear; 100%=full canopy

‡ Fullness of turfgrass canopy after wear

§ Fullness of turfgrass canopy after traffic

¶ Loss of turfgrass canopy; more negative number represents greater canopy loss

Table 3. ANOVA table of fullness of turfgrass canopy and turfgrass quality after traffic applied in Summer 2008 for tall fescue established in North Brunswick, NJ in September 2006.

	C^{\dagger}	C_W^{\ddagger}	C_T^{\S}	$C_T - C^{\P}$
Entry	***	***	*	ns

ns, nonsignificant

* Significant at 0.05 probability level

*** Significant at 0.001 probability level

\dagger Fullness of turfgrass canopy before wear; 100%=full canopy

\ddagger Fullness of turfgrass canopy after wear

\S Fullness of turfgrass canopy after traffic

\P Loss of turfgrass canopy; more negative number

Table 4. Fullness of turfgrass canopy before and after traffic stresses applied in Summer 2008 for tall fescue established at North Brunswick, NJ in 2006

Entry	C [†]	C _W [‡]	C _T [§]	C _T -C [†]
	21-Jul-08	23-Jul-08	13-Aug-08	
	0 to 100% scale			
Wolfpack II (PST-5WMB)	86.7	70.0	58.3	-28.3
Shenandoah Elite (RK 6)	88.3	73.3	56.7	-31.7
Falcon NG (CE 1)	81.7	66.7	56.7	-25.0
SR 8650 (STR-8LMM)	80.0	65.0	56.7	-23.3
Shenandoah III (SH 3)	85.0	76.7	53.3	-31.7
RK 5	86.7	68.3	51.7	-35.0
Raptor II (MVS-TF-158)	85.0	66.7	51.7	-33.3
Greenbrooks (TG 50-9460)	86.7	65.0	51.7	-35.0
PSG-85QR	80.0	65.0	51.7	-28.3
JT-42	71.7	61.7	51.7	-20.0
MVS-1107	81.7	55.0	51.7	-30.0
Falcon V (ATM)	91.7	80.0	50.0	-41.7
Speedway (STR-8BPDX)	85.0	68.3	50.0	-35.0
Finelawn Xpress (RP 2)	83.3	68.3	50.0	-33.3
Sidewinder (IS-TF-138)	80.0	66.7	50.0	-30.0
Integrity (BGR-TF1)	76.7	63.3	50.0	-26.7
Hemi	90.0	73.3	48.3	-41.7
Talladega (RP 3)	85.0	73.3	48.3	-36.7
Jamboree (IS-TF-128)	81.7	70.0	48.3	-33.3
Garrison (IS-TF-153)	81.7	68.3	48.3	-33.3
Mustang 4 (M4)	75.0	63.3	48.3	-26.7
Monet (LTP-610 CL)	81.7	61.7	48.3	-33.3
3rd Millennium SRP	81.7	55.0	48.3	-33.3
Titanium LS (MVS-BB-1)	76.7	53.3	48.3	-28.3
Escalade	76.7	51.7	48.3	-28.3
Catelist (NA-BT-1)	95.0	73.3	46.7	-48.3
Bullseye	81.7	68.3	46.7	-35.0
Rebel IV	83.3	61.7	46.7	-36.7
Tanzania (IS-TF-159)	76.7	60.0	46.7	-30.0
Honky Tonk (RAD-TF17)	78.3	58.3	46.7	-31.7

Table 4. Continued.

Entry	C^{\dagger}	C_W^{\ddagger}	C_T^{\S}	$C_T - C^{\natural}$
	21-Jul-08	23-Jul-08	13-Aug-08	
	0 to 100% scale			
RK 4	85.0	65.0	45.0	-40.0
Cannavaro (DP 50-9440)	85.0	65.0	45.0	-40.0
Firenza	80.0	61.7	45.0	-35.0
Skyline	78.3	60.0	45.0	-33.3
Trio (IS-TF-152)	71.7	56.7	45.0	-26.7
PSG-82BR	76.7	55.0	45.0	-31.7
Biltmore	71.7	55.0	45.0	-26.7
Gazelle II (PST-5HP)	71.7	53.3	45.0	-26.7
JT-45	71.7	48.3	45.0	-26.7
LS 1200 (SC-1)	76.7	71.7	43.3	-33.3
Faith (K06-WA)	80.0	68.3	43.3	-36.7
Turbo	80.0	68.3	43.3	-36.7
Essential (IS-TF-154)	78.3	65.0	43.3	-35.0
Traverse SPR (RK-1)	80.0	65.0	43.3	-36.7
Rocket (IS-TF-147)	76.7	55.0	43.3	-33.3
JT-36	75.0	51.7	43.3	-31.7
Tahoe II	73.3	51.7	43.3	-30.0
JT-33	71.7	50.0	43.3	-28.3
Cochise IV (RKCL)	80.0	61.7	41.7	-38.3
Cezanne Rz (LTP-CRL)	73.3	60.0	41.7	-31.7
J-140	78.3	58.3	41.7	-36.7
MVS-341	78.3	53.3	41.7	-36.7
Renovate (LS-11)	75.0	50.0	41.7	-33.3
Lindbergh	63.3	48.3	41.7	-21.7
Braveheart (DP 50-9407)	81.7	61.7	40.0	-41.7
STR-8BB5	76.7	53.3	40.0	-36.7
JT-41	71.7	46.7	40.0	-31.7
STR-8GRQR	70.0	45.0	40.0	-30.0
Van Gogh (LTP-RK2)	81.7	63.3	38.3	-43.3
Toccoa (IS-TF-151)	70.0	60.0	38.3	-31.7

Table 4. Continued.

Entry	C [†]	C _W [‡]	C _T [§]	C _T -C [¶]
	21-Jul-08	23-Jul-08	13-Aug-08	
	0 to 100% scale			
Rhambler SRP (Rhambler)	81.7	60.0	38.3	-43.3
Firecracker LS (MVS-MST)	78.3	60.0	38.3	-40.0
Spyder LS (Z-2000)	83.3	58.3	38.3	-45.0
Stetson II (NA-SS)	73.3	58.3	38.3	-35.0
Justice	76.7	53.3	38.3	-38.3
Fat Cat (IS-TF-161)	70.0	53.3	38.3	-31.7
AST9001 (AST-3)	76.7	51.7	38.3	-38.3
AST 7002	71.7	48.3	38.3	-33.3
06-DUST	70.0	48.3	38.3	-31.7
Xtremegreen (BGR-TF2)	70.0	46.7	38.3	-31.7
GO-1BFD	68.3	41.7	38.3	-30.0
Corona (Col-M)	70.0	53.3	36.7	-33.3
Gold Medallion (KZ-1)	70.0	51.7	36.7	-33.3
Col-1	71.7	50.0	36.7	-35.0
PSG-TTRH	70.0	50.0	36.7	-33.3
Reunion (LS-03)	68.3	50.0	36.7	-31.7
Compete (LS-06)	70.0	48.3	36.7	-33.3
GE-1	66.7	46.7	36.7	-30.0
Magellan	71.7	45.0	36.7	-35.0
0312	66.7	45.0	36.7	-30.0
Falcon IV	70.0	43.3	36.7	-33.3
Rembrandt	71.7	38.3	36.7	-35.0
Pedigree (ATF-1199)	71.7	50.0	35.0	-36.7
06-WALK	61.7	46.7	35.0	-26.7
RNP	68.3	43.3	35.0	-33.3
PSG-RNDR	68.3	41.7	35.0	-33.3
Plato	58.3	40.0	35.0	-23.3
Turbo Rz (Burl-TF8)	76.7	56.7	33.3	-43.3
BAR Fa 6253	71.7	56.7	33.3	-38.3
Darlington (CS-TF1)	75.0	48.3	33.3	-41.7

Table 4. Continued.

Entry	C [†]	C _W [‡]	C _T [§]	C _T -C [†]
	21-Jul-08	23-Jul-08	13-Aug-08	
	0 to 100% scale			
Umbrella (DP 50-9411)	63.3	46.7	33.3	-30.0
Padre	75.0	43.3	33.3	-41.7
Ninja 3 (ATF 1247)	66.7	40.0	33.3	-33.3
AST7003	71.7	40.0	33.3	-38.3
Crossfire 3 (Col-J)	63.3	40.0	33.3	-30.0
Hunter	65.0	38.3	33.3	-31.7
Aristotle	61.7	36.7	33.3	-28.3
Terrier (IS-TF-135)	70.0	48.3	31.7	-38.3
BAR Fa 6363	63.3	46.7	31.7	-31.7
AST1001 (AST-4)	73.3	43.3	31.7	-41.7
Sunset Gold (KZ-2)	63.3	43.3	31.7	-31.7
Hudson (DKS)	65.0	41.7	31.7	-33.3
Silverado	60.0	40.0	31.7	-28.3
Einstein	68.3	43.3	30.0	-38.3
Tulsa Time (Tulsa III)	68.3	41.7	30.0	-38.3
AST 7001	63.3	40.0	30.0	-33.3
AST9002 (AST-2)	61.7	40.0	30.0	-31.7
AST9003 (AST-1)	63.3	36.7	30.0	-33.3
PSG-TTST	65.0	35.0	30.0	-35.0
J-130	68.3	38.3	28.3	-40.0
LS 1010 (ATF 1328)	63.3	33.3	28.3	-35.0
GWTF	66.7	41.7	26.7	-40.0
Kentucky 31	53.3	16.7	25.0	-28.3
LSD (0.05)	12.6	19.5	18.2	---

[†] Fullness of turfgrass canopy before wear; 100%=full canopy

[‡] Fullness of turfgrass canopy after wear

[§] Fullness of turfgrass canopy after traffic

[¶] Loss of turfgrass canopy; more negative number represents greater canopy loss

Table 5. Fullness of turfgrass canopy and traffic tolerance as affected by wear and compaction applied in Fall 2009, and Summer 2010, Spring 2011 for tall fescue established at North Brunswick, NJ in September 2006.

Season-year	C [†]	C _W ^{††}	C _T [‡]	C _T -C [§]
		0 to 100% scale		
Fall 2009	84.1	36.9	31.1	-53.1
Summer 2010	80.9	48.1	47.0	-33.9
Spring 2011	81.7	48.6	42.2	-39.6
LSD (0.05)	---	8.0	6.1	7.2
Season-year	ns	*	**	**
Entry	***	***	***	***
Season-year x Entry	*	***	**	*

ns, nonsignificant

* Significant at 0.05 probability level

** Significant at 0.01 probability level

*** Significant at 0.001 probability level

† Fullness of turfgrass canopy before wear; 100%=full canopy

†† Fullness of turfgrass canopy after wear; 100%=full canopy

‡ Fullness of turfgrass canopy after traffic

§ Loss of turfgrass canopy; more negative number represents greater canopy loss

Table 6. Fullness of turfgrass canopy as affected by Season-year (Fall 2009, Summer 2010, and Spring 2011) and Entry for tall fescue established at North Brunswick, NJ in 2006

Name	C [†]			C _T [‡]			C _T -C [§]		
	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall
	0 to 100% scale								
LS 1200 (SC-1)	91.7	91.7	88.3	66.7	56.7	60.0	-25.0	-35.0	-28.3
Jamboree (IS-TF-128)	95.0	91.7	95.0	56.7	58.3	56.7	-38.3	-33.3	-38.3
Falcon V (ATM)	100.0	85.0	93.3	61.7	65.0	55.0	-38.3	-20.0	-38.3
Traverse SPR (RK-1)	96.7	83.3	91.7	73.3	55.0	53.3	-23.3	-28.3	-38.3
Cochise IV (RKCL)	95.0	83.3	95.0	50.0	53.3	53.3	-45.0	-30.0	-41.7
Bullseye	95.0	83.3	96.7	61.7	55.0	51.7	-33.3	-28.3	-45.0
Garrison (IS-TF-153)	85.0	90.0	93.3	51.7	53.3	51.7	-33.3	-36.7	-41.7
Spyder LS (Z-2000)	83.3	81.7	93.3	66.7	50.0	51.7	-16.7	-31.7	-41.7
RK 5	91.7	90.0	95.0	58.3	56.7	50.0	-33.3	-33.3	-45.0
Cannavaro (DP 50-9440)	95.0	90.0	91.7	53.3	55.0	50.0	-41.7	-35.0	-41.7
Firecracker LS (MVS-MST)	98.3	93.3	98.3	65.0	55.0	48.3	-33.3	-38.3	-50.0
Turbo	91.7	85.0	95.0	53.3	38.3	48.3	-38.3	-46.7	-46.7
Faith (K06-WA)	93.3	90.0	91.7	65.0	53.3	46.7	-28.3	-36.7	-45.0
Wolfpack II (PST-5WMB)	88.3	86.7	90.0	50.0	53.3	46.7	-38.3	-33.3	-43.3
Greenbrooks (TG 50-9460)	88.3	80.0	86.7	50.0	51.7	46.7	-38.3	-28.3	-40.0
Rocket (IS-TF-147)	85.0	80.0	91.7	45.0	51.7	46.7	-40.0	-28.3	-45.0
Essential (IS-TF-154)	96.7	90.0	95.0	56.7	50.0	46.7	-40.0	-40.0	-48.3
Catylst (NA-BT-1)	96.7	93.3	96.7	56.7	61.7	45.0	-40.0	-31.7	-51.7
RK 4	91.7	90.0	93.3	61.7	53.3	45.0	-30.0	-36.7	-48.3
Monet (LTP-610 CL)	83.3	88.3	90.0	36.7	51.7	45.0	-46.7	-36.7	-45.0
Van Gogh (LTP-RK2)	96.7	86.7	88.3	46.7	61.7	43.3	-50.0	-25.0	-45.0
Tanzana (IS-TF-159)	91.7	85.0	90.0	56.7	55.0	43.3	-35.0	-30.0	-46.7
Rhambler SRP (Rhambler)	85.0	85.0	90.0	51.7	51.7	43.3	-33.3	-33.3	-46.7
Speedway (STR-8BPDx)	88.3	85.0	91.7	50.0	51.7	43.3	-38.3	-33.3	-48.3
Shenandoah III (SH 3)	95.0	86.7	91.7	51.7	50.0	43.3	-43.3	-36.7	-48.3
Finelawn Xpress (RP 2)	98.3	86.7	90.0	65.0	61.7	41.7	-33.3	-25.0	-48.3
Falcon NG (CE 1)	85.0	85.0	88.3	51.7	61.7	41.7	-33.3	-23.3	-46.7
Justice	86.7	80.0	83.3	38.3	56.7	40.0	-48.3	-23.3	-43.3
Shenandoah Elite (RK 6)	91.7	91.7	90.0	58.3	55.0	40.0	-33.3	-36.7	-50.0
PSG-82BR	88.3	91.7	90.0	45.0	51.7	40.0	-43.3	-40.0	-50.0

Table 6.Continued.

Name	C [†]			C _T [‡]			C _T -C [§]		
	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall
	0 to 100% scale								
Mustang 4 (M4)	90.0	81.7	93.3	50.0	48.3	40.0	-40.0	-33.3	-53.3
Rebel IV	88.3	80.0	83.3	46.7	51.7	38.3	-41.7	-28.3	-45.0
Firenza	91.7	90.0	96.7	25.0	48.3	38.3	-66.7	-41.7	-58.3
Pedigree (ATF-1199)	90.0	83.3	86.7	45.0	55.0	36.7	-45.0	-28.3	-50.0
Hemi	85.0	85.0	93.3	51.7	46.7	36.7	-33.3	-38.3	-56.7
Sidewinder (IS-TF-138)	78.3	78.3	90.0	53.3	43.3	36.7	-25.0	-35.0	-53.3
Cezanne Rz (LTP-CRL)	81.7	76.7	86.7	40.0	53.3	35.0	-41.7	-23.3	-51.7
Escalade	85.0	80.0	83.3	53.3	50.0	35.0	-31.7	-30.0	-48.3
SR 8650 (STR-8LMM)	76.7	83.3	86.7	40.0	50.0	35.0	-36.7	-33.3	-51.7
Gazelle II (PST-5HP)	86.7	83.3	88.3	51.7	45.0	35.0	-35.0	-38.3	-53.3
STR-8BB5	86.7	93.3	90.0	41.7	63.3	33.3	-45.0	-30.0	-56.7
MVS-1107	86.7	88.3	88.3	53.3	60.0	33.3	-33.3	-28.3	-55.0
Talladega (RP 3)	83.3	86.7	91.7	51.7	56.7	33.3	-31.7	-30.0	-58.3
GE-1	76.7	80.0	86.7	40.0	53.3	33.3	-36.7	-26.7	-53.3
JT-45	85.0	80.0	85.0	35.0	48.3	33.3	-50.0	-31.7	-51.7
Trio (IS-TF-152)	81.7	78.3	88.3	55.0	45.0	33.3	-26.7	-33.3	-55.0
J-140	88.3	85.0	91.7	51.7	43.3	33.3	-36.7	-41.7	-58.3
Titanium LS (MVS-BB-1)	83.3	91.7	90.0	31.7	60.0	31.7	-51.7	-31.7	-58.3
Col-1	85.0	83.3	80.0	31.7	53.3	31.7	-53.3	-30.0	-48.3
Integrity (BGR-TF1)	76.7	78.3	83.3	36.7	43.3	31.7	-40.0	-35.0	-51.7
Honky Tonk (RAD-TF17)	80.0	78.3	78.3	46.7	41.7	31.7	-33.3	-36.7	-46.7
Braveheart (DP 50-9407)	78.3	81.7	85.0	41.7	36.7	31.7	-36.7	-45.0	-53.3
PSG-85QR	88.3	86.7	88.3	48.3	56.7	30.0	-40.0	-30.0	-58.3
Tulsa Time (Tulsa III)	85.0	93.3	80.0	33.3	55.0	30.0	-51.7	-38.3	-50.0
Raptor II (MVS-TF-158)	81.7	81.7	93.3	50.0	48.3	30.0	-31.7	-33.3	-63.3
3rd Millennium SRP	83.3	80.0	90.0	41.7	43.3	30.0	-41.7	-36.7	-60.0
Corona (Col-M)	78.3	83.3	83.3	35.0	41.7	30.0	-43.3	-41.7	-53.3
Umbrella (DP 50-9411)	81.7	68.3	90.0	33.3	40.0	30.0	-48.3	-28.3	-60.0
JT-42	83.3	78.3	85.0	41.7	51.7	28.3	-41.7	-26.7	-56.7
Crossfire 3 (Col-J)	73.3	76.7	78.3	33.3	48.3	28.3	-40.0	-28.3	-50.0

Table 6. Continued

Name	C [†]			C _T [‡]			C _T -C [§]		
	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall
	0 to 100% scale								
Turbo Rz (Burl-TF8)	81.7	76.7	81.7	45.0	43.3	28.3	-36.7	-33.3	-53.3
Toccoa (IS-TF-151)	81.7	85.0	90.0	41.7	56.7	26.7	-40.0	-28.3	-63.3
JT-41	80.0	83.3	88.3	43.3	50.0	26.7	-36.7	-33.3	-61.7
STR-8GRQR	80.0	78.3	75.0	38.3	50.0	26.7	-41.7	-28.3	-48.3
GO-1BFD	78.3	75.0	80.0	30.0	46.7	26.7	-48.3	-28.3	-53.3
Padre	76.7	80.0	78.3	26.7	46.7	26.7	-50.0	-33.3	-51.7
J-130	86.7	80.0	81.7	40.0	51.7	25.0	-46.7	-28.3	-56.7
Falcon IV	83.3	81.7	88.3	40.0	50.0	25.0	-43.3	-31.7	-63.3
06-DUST	76.7	78.3	76.7	38.3	50.0	25.0	-38.3	-28.3	-51.7
Rembrandt	73.3	73.3	78.3	36.7	50.0	25.0	-36.7	-23.3	-53.3
Xtremergreen (BGR-TF2)	78.3	76.7	81.7	40.0	46.7	25.0	-38.3	-30.0	-56.7
Biltmore	73.3	78.3	76.7	30.0	43.3	25.0	-43.3	-35.0	-51.7
Fat Cat (IS-TF-161)	81.7	80.0	81.7	65.0	38.3	25.0	-16.7	-41.7	-56.7
Reunion (LS-03)	71.7	80.0	81.7	30.0	35.0	25.0	-41.7	-45.0	-56.7
Skyline	80.0	80.0	85.0	40.0	53.3	23.3	-40.0	-26.7	-61.7
Hunter	76.7	78.3	75.0	25.0	50.0	23.3	-51.7	-28.3	-51.7
BAR Fa 6253	85.0	80.0	78.3	40.0	45.0	23.3	-45.0	-35.0	-55.0
Ninja 3 (ATF 1247)	78.3	78.3	83.3	28.3	40.0	23.3	-50.0	-38.3	-60.0
Stetson II (NA-SS)	71.7	75.0	68.3	38.3	35.0	23.3	-33.3	-40.0	-45.0
Darlington (CS-TF1)	73.3	76.7	73.3	36.7	45.0	21.7	-36.7	-31.7	-51.7
JT-33	73.3	75.0	78.3	35.0	45.0	21.7	-38.3	-30.0	-56.7
PSG-TTRH	76.7	81.7	75.0	28.3	41.7	21.7	-48.3	-40.0	-53.3
AST7003	76.7	78.3	78.3	31.7	40.0	21.7	-45.0	-38.3	-56.7
AST9001 (AST-3)	78.3	75.0	85.0	28.3	40.0	21.7	-50.0	-35.0	-63.3
Hudson (DKS)	68.3	80.0	78.3	35.0	38.3	21.7	-33.3	-41.7	-56.7
0312	73.3	70.0	65.0	30.0	38.3	21.7	-43.3	-31.7	-43.3
Terrier (IS-TF-135)	76.7	81.7	91.7	40.0	36.7	21.7	-36.7	-45.0	-70.0
Plato	66.7	70.0	71.7	40.0	35.0	21.7	-26.7	-35.0	-50.0
Sunset Gold (KZ-2)	75.0	76.7	80.0	41.7	45.0	20.0	-33.3	-31.7	-60.0
PSG-RNDR	81.7	80.0	70.0	26.7	43.3	20.0	-55.0	-36.7	-50.0

Table 6.Continued.

Name	C [†]			C _T [‡]			C _T -C [§]		
	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall
	0 to 100% scale								
RNP	71.7	78.3	78.3	35.0	41.7	20.0	-36.7	-36.7	-58.3
Renovate (LS-11)	71.7	76.7	83.3	25.0	38.3	20.0	-46.7	-38.3	-63.3
AST9002 (AST-2)	80.0	76.7	76.7	33.3	33.3	20.0	-46.7	-43.3	-56.7
Magellan	78.3	73.3	78.3	31.7	45.0	18.3	-46.7	-28.3	-60.0
PSG-TTST	75.0	71.7	80.0	43.3	43.3	18.3	-31.7	-28.3	-61.7
GWTF	81.7	81.7	81.7	33.3	43.3	18.3	-48.3	-38.3	-63.3
JT-36	80.0	78.3	81.7	53.3	40.0	18.3	-26.7	-38.3	-63.3
Lindbergh	65.0	76.7	71.7	35.0	40.0	18.3	-30.0	-36.7	-53.3
LS 1010 (ATF 1328)	76.7	73.3	78.3	35.0	35.0	18.3	-41.7	-38.3	-60.0
AST 7002	76.7	71.7	78.3	30.0	35.0	18.3	-46.7	-36.7	-60.0
Einstein	65.0	71.7	75.0	30.0	30.0	18.3	-35.0	-41.7	-56.7
Tahoe II	76.7	75.0	78.3	40.0	46.7	16.7	-36.7	-28.3	-61.7
Compete (LS-06)	71.7	83.3	85.0	26.7	45.0	16.7	-45.0	-38.3	-68.3
Gold Medallion (KZ-1)	80.0	75.0	78.3	33.3	38.3	16.7	-46.7	-36.7	-61.7
BAR Fa 6363	78.3	70.0	68.3	33.3	38.3	16.7	-45.0	-31.7	-51.7
AST9003 (AST-1)	78.3	78.3	88.3	23.3	38.3	16.7	-55.0	-40.0	-71.7
MVS-341	76.7	76.7	83.3	41.7	36.7	16.7	-35.0	-40.0	-66.7
AST1001 (AST-4)	76.7	80.0	81.7	31.7	41.7	15.0	-45.0	-38.3	-66.7
Silverado	63.3	68.3	66.7	25.0	33.3	15.0	-38.3	-35.0	-51.7
Aristotle	55.0	63.3	61.7	25.0	26.7	15.0	-30.0	-36.7	-46.7
06-WALK	73.3	76.7	73.3	25.0	38.3	13.3	-48.3	-38.3	-60.0
AST 7001	71.7	78.3	78.3	26.7	35.0	10.0	-45.0	-43.3	-68.3
Kentucky 31	50.0	53.3	51.7	11.7	18.3	8.3	-38.3	-35.0	-43.3
LSD (0.05)		9.3			14.6			16.2	

[†] Fullness of turfgrass canopy before wear; 100%=full canopy

[‡] Fullness of turfgrass canopy after traffic

[§] Loss of turfgrass canopy; more negative number represents greater canopy loss

Results

2006 NTEP Tall fescue Test

Entries with the greatest C_T after Spring 2009 or 2011 traffic

Greenbrooks

Traverse SPR †

Shenandoah III

Falcon V

Spyder LS

Fat Cat

Cochise IV

Hemi

Essential

Firecracker LS

Faith

Falcon NG

Bullseye

LS 1200

RK 4

Finelawn Xpress

† Entries italicized and shaded in blue had the greatest C_T after Spring 2009 *AND* 2011 traffic

Results

2006 NTEP Tall fescue Test

Entries with the greatest C_T after Summer 2008 or 2010 traffic

Wolfpack II †

SR 8650

Greenbrooks

PSG-85QR

Speedway

Integrity

Jamboree

Garrison

Titanium LS

Tanzania

RK 4

Gazelle II

Trio

JT-36

Traverse SPR

JT-33

J-140

Lindbergh

Firecracker LS

Justice

GE-1

Toccoa

Shenandoah Elite

Shenandoah III

MVS-1107

JT-42

Finelawn Xpress

Monet

Mustang 4

Escalade

Catelist

Honky Tonk

Firenza

Biltmore

Cannavaro

Faith

Turbo

Rocket

Cezanne Rz

Cochise IV

Van Gogh

Pedigree

Col-1

J-130

Falcon NG

Raptor II

RK 5

Falcon V

Sidewinder

Hemi

Talladega

3rd Millennium SRP

Rebel IV

Bullseye

PSG-82BR

Skyline

JT-45

Essential

Tahoe II

LS 1200

Renovate

MVS-341

Rhambler SRP

STR 8BB5

Tulsa Time

† Entries italicized and shaded in blue had the greatest C_T after Summer 2008 AND 2010 traffic

Results

2006 NTEP Tall fescue Test

Entries with the greatest C_T after Fall 2007 or 2009 traffic

<i>Greenbrooks</i> †	<i>Cochise IV</i>	Falcon NG
Catelist	<i>Spyder LS</i>	<i>Cannavaro</i>
Rebel IV	<i>Traverse SPR</i>	Firenza
<i>Wolfpack II</i>	Finelawn Xpress	<i>Bullseye</i>
Hemi	<i>Turbo</i>	<i>LS 1200</i>
Shenandoah III	J-140	Mustang 4
Monet	Talladega	Biltmore
SR 8650	Padre	Rembrandt
Umbrella	<i>Garrison</i>	<i>Falcon V</i>
<i>Essential</i>	<i>RK 5</i>	Shenandoah Elite
Escalade	STR-8BB5	JT-41
Jamboree	Firecracker LS	Faith
Rocket	AST1001	

† Entries italicized and shaded in blue had the greatest C_T after Fall 2007 *AND* 2009 traffic



2010 Tall fescue & Kentucky bluegrass mixture trial
Objective: To assess the performance of tall fescue & Kentucky bluegrass mixtures

Kentucky bluegrass

Brown patch in tall fescue

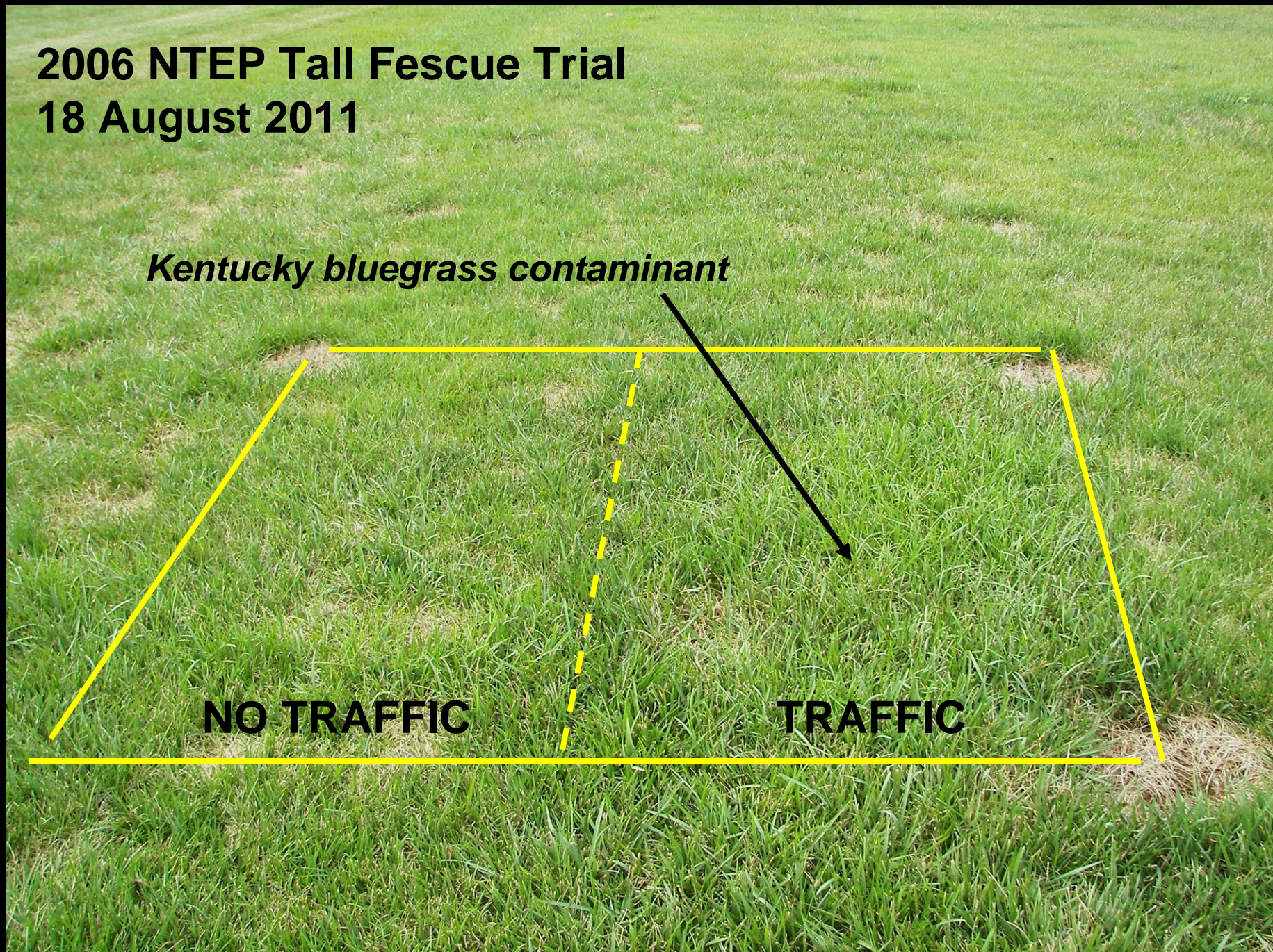
2006 NTEP Tall Fescue Trial
18 August 2011

Kentucky bluegrass contaminant



NO TRAFFIC

TRAFFIC



Materials and methods

2010 Tall fescue & Kentucky bluegrass mixture trial

- **Four tall fescue varieties**
 - **Falcon V, Mustang 4, Justice, Greenkeeper**
- **Two Kentucky bluegrass varieties; two Kentucky bluegrass experimental selections**
 - **Midnight II (Compact-Midnight Type, BlueNote (Compact-America Type))**
 - **A05-344 (Shamrock Type), A05-361 (Mid-Atlantic Ecotype)**
- **Seeding rates**

GOAL: Each plot receives ~ 2000 seeds/1.0 sq ft

- **Kentucky bluegrass ~ 2,177,000 seeds/1.0 pound (Beard, 2002)**
 - **0.92 lbs per 1000 sq ft**
- **Tall fescue ~ 227,000 seeds/1.0 pound (Beard, 2002)**
 - **8.8 lbs per 1000 sq ft**
- **Mixtures: 90% Tall fescue & 10% Kentucky bluegrass by weight**
Kentucky bluegrass ~ 1000 seeds/1.0 sq ft (0.46 lbs/1000 sq ft)
Tall fescue ~ 1000 seeds/1.0 sq ft (4.4 lbs/1000 sq ft)

Materials and methods

2010 Tall fescue & Kentucky bluegrass mixture trial

- Seeded on 2 September 2010
- Cultural practices
 - **Mowing ~ 2x/week at 1.5-inch**
 - **Brown patch inoculation: 6 July 2011**
 - **2011 Fertilization**

17 May 2011	0.4 lbs N/1000 sq ft as 22-0-10
10 June 2011	0.8 lbs N/1000 sq ft as 22-0-10
22 June 2011	0.7 lbs N/1000 sq ft as 16-4-8
6 July 2011	0.5 lbs N/1000 sq ft as 16-4-8
2 Sept. 2011	0.9 lbs N/1000 sq ft as 43-0-0 (polymer coated)
TOTAL:	3.3 lbs N/1000 sq ft
 - **Irrigation minimally applied to avoid drought stress**

Materials and methods

2010 Tall fescue & Kentucky bluegrass mixture trial

- **2011 Wear schedule (*FALL ONLY*)**

All wear applied with Rutgers Wear Simulator

Week of 26 Sept. 2011 4 passes

Week of 3 Oct. 2011 4 passes

Week of 10 Oct. 2011 2 passes

Week of 17 Oct. 2011 2 passes

Week of 24 Oct. 2011 2 passes

***TOTAL* 14 passes**





**2010 Tall Fescue & Kentucky Bluegrass
Mixture Trial**

**14 October 2011
+ 10 passes**

**2010 Tall Fescue & Kentucky Bluegrass
Mixture Trial - 14 October 2011**

A05-344

Kentucky bluegrass – Shamrock Type

Wear (10 passes)

No wear

Table 1. Performance of Kentucky bluegrass, tall fescue and mixtures in a turf trial seeded in September 2010 at North Brunswick, NJ.

Name	Fullness of	Wear	Name	Fullness of	Wear
	Turf Canopy	Tolerance		Turf Canopy	Tolerance
	26-Oct-211	26-Oct-11		26-Oct-211	26-Oct-11
	0 to 100% scale	1 to 9 scale		0 to 100% scale	1 to 9 scale
Midnight II (KBG)	56.7	7.0	Mustang 4 + Blue Note	36.7	5.0
Justice + Midnight II	55.0	6.3	Falcon V (TF)	36.7	3.7
Falcon V + Midnight II	55.0	5.7	Mustang 4 + A05-361	36.7	3.3
Falcon V + Blue Note	50.0	5.0	Greenkeeper + A05-361	36.7	2.7
Greenkeeper + Midnight II	48.3	5.0	Falcon V + A05-344	35.0	4.0
Justice + Blue Note	46.7	6.0	Greenkeeper + A05-344	30.0	3.0
Greenkeeper + Blue Note	43.3	5.0	Greenkeeper (TF)	28.3	3.0
Falcon V + A05-361	41.7	4.7	Justice (TF)	28.3	2.3
Mustang 4 + Midnight II	41.7	4.0	Mustang 4 (TF)	26.7	2.0
Justice + A05-344	40.0	4.7	A05-361 (KBG)	25.0	2.7
Justice + A05-361	40.0	4.0	A05-344 (KBG)	13.3	1.3
Mustang 4 + A05-344	38.3	4.3			
Blue Note (KBG)	36.7	5.0	LSD @ 0.05	14.2	2.1

Table 3. Performance of Kentucky bluegrass, tall fescue and mixtures in a turf trial seeded in September 2010 at North Brunswick, NJ

Name	Brown Patch ¹	Name	Brown Patch
	3-Aug-11		3-Aug-11
	1 to 9 scale		1 to 9 scale
Midnight II (KBG)	9.0	Mustang 4 + Blue Note	4.0
Blue Note (KBG)	9.0	Falcon V (TF)	4.0
A05-361 (KBG)	9.0	Falcon V + A05-344	3.7
A05-344 (KBG)	9.0	Greenkeeper + Blue Note	3.7
Falcon V + Midnight II	6.0	Mustang 4 + A05-361	3.0
Greenkeeper + Midnight II	5.3	Falcon V + A05-361	3.0
Greenkeeper + A05-344	5.3	Justice (TF)	3.0
Mustang 4 + Midnight II	4.3	Mustang 4 (TF)	3.0
Justice + Blue Note	4.0	Greenkeeper (TF)	3.0
Justice + Midnight II	4.0	Greenkeeper + A05-361	2.7
Falcon V + Blue Note	4.0	Justice + A05-361	2.3
Justice + A05-344	4.0		
Mustang 4 + A05-344	4.0		
		LSD @ 0.05	2.3

¹ 9=least disease

Kentucky bluegrass: Declining summer performance at 5 years after establishment



2005 NTEP Kentucky Bluegrass Test
110 entries
2 September 2010



Tall fescue: More consistent summer performance at 4 years after establishment

**2006 NTEP Tall Fescue Test
113 entries
2 September 2010**

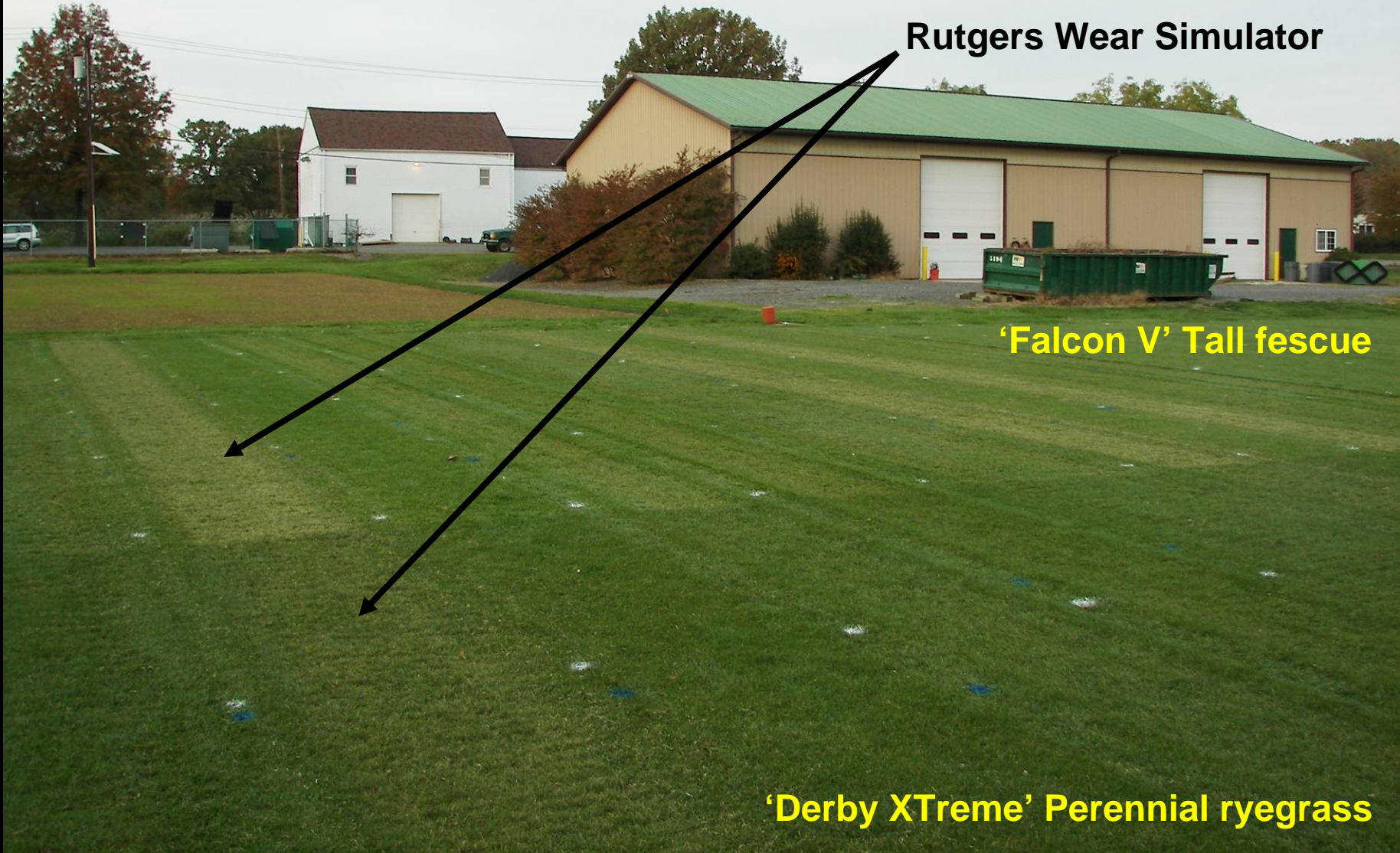
**Brown patch (flutolanil) & *Pythium* (cyazofamid) control: 25 June 2010
Brown Patch (azoxystrobin) control: 8 July 2010**

Tall fescue as a species for fall sports?
Wear & Traffic Simulator Comparison
3 November 2011

Rutgers Wear Simulator

'Falcon V' Tall fescue

'Derby XTreme' Perennial ryegrass



Other criteria to examine when selecting tall fescue cultivars



Brown Patch – Cultivars with least disease

**2006 NTEP tall fescue test – North Brunswick, NJ
Brown Patch (1-9; 9=no disease) – July 8, 2008**

Cultivars with least disease (Disease rating \geq 7.0)

**Mustang 4 (M4)
Wolfpack II (PST-5WMB)
RK 5
Falcon V (ATM)
SR 8650 (STR-8LMM)
Speedway (STR-8BPDX)
Greenbrooks (TG 50-9460)
Turbo
IS-TF-159
Catelyst (NA-BT-1)
Falcon NG (CE 1)
Talladega (RP 3)
BGR-TF1**

**Rhambler SRP (Rhambler)
Firenza
Cochise IV (RKCL)
Turbo Rz (Burl-TF8)
Bullseye
Aggressor (IS-TF-153)
Tahoe II
3rd Millennium SRP
Water Saver
Braveheart (DP 50-9407)
Monet (LTP-610 CL)
Jamboree (IS-TF-128)
Firecracker LS (MVS-MST)**

**Shenandoah Elite (RK 6)
BAR Fa 6253
PSG-85QR
JT-42
Hemi
Raptor II (MVS-TF-158)
PSG-TTRH
Gazelle II (PST-5HP)
Pedigree (ATF-1199)
Titanium
ATE**

Brown Patch – Cultivars with least disease

2006 NTEP tall fescue test - Brown Patch (1-9; 9=no disease); Mean Brown Patch across four locations ≥ 7.0 (2008 NTEP data)

NAME	AR1	IN1	NC1	NJ2	MEAN
RHAMBLER SRP (RHAMBLER)	8.7	8.0	6.3	7.3	7.6
TALLADEGA (RP 3)	8.3	8.0	6.7	6.7	7.4
GE-1	8.3	9.0	6.3	6.0	7.4
PSG-RNDR	9.0	7.7	7.0	6.0	7.4
SHENANDOAH III (SH 3)	8.3	7.7	7.0	6.3	7.3
SPEEDWAY (STR-8BPDX)	8.7	7.7	6.7	6.3	7.3
RK 5	8.0	8.3	6.7	6.0	7.3
LS 1200 (SC-1)	8.3	8.0	7.0	5.7	7.3
IS-TF-159	7.3	7.7	7.0	7.0	7.3
JUSTICE	7.7	8.0	7.0	6.3	7.3
PEDIGREE (ATF-1199)	7.7	7.3	7.7	6.3	7.3
BRAVEHEART (DP 50-9407)	7.7	8.0	7.0	6.0	7.2
JAMBOREE (IS-TF-128)	8.3	7.7	6.7	6.0	7.2
WOLFPACK II (PST-5WMB)	7.7	8.3	6.3	6.3	7.2
J-140	8.0	7.7	6.7	6.0	7.1
MUSTANG 4 (M4)	8.7	7.3	6.3	6.0	7.1
TRAVERSE SRP (RK-1)	7.3	7.7	6.3	7.0	7.1
FAITH (K06-WA)	8.3	8.0	5.7	6.0	7.0
BGR-TF2	7.7	7.3	6.7	6.3	7.0
GWTF	8.3	8.0	6.3	5.3	7.0
RAPTOR II (MVS-TF-158)	7.7	7.0	7.3	6.0	7.0
SHENANDOAH ELITE (RK 6)	7.3	8.3	6.0	6.3	7.0

AR1=Fayetteville, AR; IN1=West Lafayette, IN; NC1=Raleigh, NC; NJ2=Adelphia, NJ

Brown Patch – Cultivars with least disease

**2006 NTEP tall fescue test - Brown Patch (1-9; 9=no disease)
Top statistical performers across three NTEP locations in 2010.**

NAME	IN1	NJ2	VA4	MEAN
HEMI	7.7	6.0	7.7	7.1
MUSTANG 4 (M4)	7.3	6.3	7.7	7.1
3RD MILLENNIUM SRP	7.3	5.7	8.0	7.0
PSG-85QR	7.0	6.0	8.0	7.0
TITANIUM LS (MVS-BB-1)	7.0	6.3	7.7	7.0
WOLFPACK II (PST-5WMB)	7.0	5.7	8.3	7.0
BULLSEYE	7.7	6.0	7.0	6.9
JT-36	7.3	5.7	7.7	6.9
TALLADEGA (RP 3)	7.7	5.0	8.0	6.9
CATALYST (NA-BT-1)	7.7	5.7	7.0	6.8
SIDEWINDER (IS-TF-138)	7.0	5.7	7.7	6.8
RK 4	6.3	6.0	8.0	6.8
TURBO	6.3	6.7	7.3	6.8
CANNAVARO (DP 50-9440)	6.7	6.0	7.3	6.7
COCHISE IV (RKCL)	6.0	6.7	7.3	6.7
RK 5	6.0	6.0	8.0	6.7
STR-8BB5	7.7	5.3	7.0	6.7

Brown Patch – Cultivars with least disease

2006 NTEP tall fescue test - Brown Patch (1-9; 9=no disease) Top statistical performers across three NTEP locations in 2010 (continued).

NAME	IN1	NJ2	VA4	MEAN
TANZANIA (IS-TF-159)	7.3	5.7	7.0	6.7
TRAVERSE SRP (RK-1)	6.3	6.0	7.7	6.7
BRAVEHEART (DP 50-9407)	6.7	6.0	7.0	6.6
DARLINGTON (CS-TF1)	6.0	5.7	8.0	6.6
FAITH (K06-WA)	6.7	6.0	7.0	6.6
FIRECRACKER LS (MVS-MST)	6.7	5.3	7.7	6.6
GAZELLE II (PST-5HP)	7.0	5.0	7.7	6.6
REBEL IV	7.7	5.3	6.7	6.6
LS 1200 (SC-1)	6.3	7.0	6.3	6.6
PEDIGREE (ATF-1199)	7.3	5.0	7.3	6.6
SPEEDWAY (STR-8BPDx)	7.0	5.3	7.3	6.6
JAMBOREE (IS-TF-128)	7.0	6.7	5.7	6.4
JT-41	5.7	6.0	7.7	6.4
JUSTICE	7.0	4.7	7.7	6.4
AST 7001	6.3	6.0	7.0	6.4

Brown Patch – Cultivars with least disease


**2006 NTEP tall fescue test - Brown Patch (1-9; 9=no disease)
Top statistical performers across three NTEP locations in 2010
(continued).**

NAME	IN1	NJ2	VA4	MEAN
CEZANNE RZ (LTP-CRL)	6.3	5.7	7.3	6.4
FIRENZA	7.3	5.3	6.7	6.4
MVS-1107	6.7	6.3	6.3	6.4
RAPTOR II (MVS-TF-158)	7.3	5.7	6.3	6.4
GE-1	6.7	6.0	6.3	6.3
HONKY TONK (RAD-TF17)	6.7	5.7	6.7	6.3
JT-45	7.3	5.0	6.7	6.3
MONET (LTP-610 CL)	6.7	5.7	6.7	6.3
MVS-341	6.7	4.7	7.7	6.3
LSD VALUE	1.4	1.6	1.2	0.8

IN1 = West Lafayette, IN

NJ2 = Adelphia, Monmouth Co., NJ

VA4 = Virginia Beach, VA



Should I establish 100% tall fescue or 90% tall fescue and 10% Kentucky bluegrass mixture?

- Can tolerate some brown patch and have limited summer traffic: **Tall fescue – choose a quality tall fescue (look at brown patch data)**
- Preventative fungicide program: **Tall Fescue**
- No fungicide program and intense summer traffic: **Mixture – choose a quality Kentucky bluegrass**
- Intense traffic into late fall: **Mixture – choose a quality Kentucky bluegrass**
- Monostand desired; cannot tolerate potential clumpiness associated with mixed stands: **100% Tall fescue or 100% Kentucky bluegrass**

Tall fescue cultivar selection

Turfgrass quality

Brown patch susceptibility

Wear/traffic tolerance

Endophyte enhancement



RUTGERS

New Jersey Agricultural
Experiment Station



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