



Turfgrass Science

University of Missouri-Columbia

2006 Turfgrass Evaluations



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Disclaimer

The information contained within this document is a synopsis of the research conducted from March 15, 2006 to October 15, 2006. This material is meant for informational purposes only and does not reflect the opinion of the turfgrass program at the University of Missouri. Trade names are often used for the ease of understanding. However, the use of trade names is not an endorsement for any products evaluated.

Cooperators

Research Grants in Aid

- **BASF**
 - <http://www.turffacts.com/>
- **Bayer Environmental Sciences**
 - <http://www.bayerprocentral.com/green/>
- **College of Agriculture, Food, and Natural Resources**
 - <http://cafnr.missouri.edu/>
- **DuPont**
 - http://www2.dupont.com/Turf_and_Ornamental_Green/en_US/
- **Gateway Chapter (STMA)**
 - http://www.sportsturfmanager.org/Chapters/CHP_GTW/
- **ISK Biosciences**
 - <http://goliath.ecnext.com/coms2/product-compint-0000642168-page.html>
- **MO-KAN (STMA)**
 - <http://www.mokanstma.org/>
- **Monsanto**
 - <http://www.monsanto.com>
- **Missouri Valley Turfgrass Association**
 - <http://muconf.missouri.edu/mvta/about.html>
- **NTEP**
 - <http://ntep.org/>
- **Ocean Organics-** (207) 832-4305
- **PLCAMA Foundation**
- **Scotts Company**
 - <http://www.scottsproseed.com/products/blends.cfm>
- **Syngenta**
 - <http://www.syngentaprofessionalproducts.com/>
- **The Lawn Company-** (573) 442-8733

Gifts as Product or Support

- Advanced Drainage Systems
- Agrigro
- Agrotain Fertilizers
- A.L. Gustin Golf Club
- Bootheel GCSA
- Capital Sand
- Columbia Country Club
- Commercial Turf and Tractor
- Country Club of Missouri
- Dow AgroSciences
- Dubs Dread Golf Course
- Earth Works Natural Organic Products
- Emerald View Turf Farms
- Evergreen Sod
- Forest Keeling Nursery
- Heart of America GCSA
- Hydrologic
- Johnston Seed Company
- Laser Turf Leveling
- Lebanon Turf
- Lesco
- Lock Lloyd Country Club
- Mississippi Valley GCSA
- MJM Services
- MU Intercollegiate Athletics
- Munie Outdoor Services
- Ozark Turf Association
- PBI Gordon
- Pick Seed
- Profile
- ProSource One
- Seasons Ridge Golf Club
- Supreme Turf Products
- TPEC
- Tri-State Company
- Turf and Golf Technology
- Valent USA
- Van Diest Supply Company
- Williams Lawn Seed

Weather Data (South Farm)

MONTH	DAY	YEAR	TOTAL PRECIP INCHES	MAX AIR TEMP F	MIN AIR TEMP F	AVG TEMP F	MAX WIND SPEED MPH
3	1	2006	0.00	76.9	49.2	62.5	37.8
3	2	2006	0.00	56.6	31.0	44.4	32.7
3	3	2006	0.00	49.1	22.7	35.6	12.9
3	4	2006	0.00	44.0	29.9	37.6	16.6
3	5	2006	0.17	52.4	36.4	43.1	21.3
3	6	2006	0.00	55.5	27.9	41.9	23.3
3	7	2006	0.00	58.7	27.5	43.2	28.6
3	8	2006	0.16	68.5	47.3	57.5	21.8
3	9	2006	0.72	61.4	41.9	48.8	21.5
3	10	2006	0.00	62.6	36.5	50.8	21.5
3	11	2006	0.96	78.1	51.6	61.2	32.7
3	12	2006	0.00	74.5	44.9	60.7	37.2
3	13	2006	0.46	66.9	31.9	45.0	37.4
3	14	2006	0.00	50.5	26.5	38.0	19.9
3	15	2006	0.00	61.9	31.7	48.2	20.6
3	16	2006	0.00	62.3	38.5	50.5	30.6
3	17	2006	0.00	43.6	34.7	38.2	19.0
3	18	2006	0.00	46.7	33.7	40.4	16.3
3	19	2006	0.00	43.8	37.8	41.0	18.6
3	20	2006	0.19	44.3	32.0	39.4	28.5
3	21	2006	0.00	32.5	29.1	30.9	19.0
3	22	2006	0.09	45.3	23.8	33.5	13.1
3	23	2006	0.00	47.1	28.7	36.8	17.4
3	24	2006	0.00	39.5	28.2	34.9	16.3
3	25	2006	0.00	49.3	29.8	39.2	24.0
3	26	2006	0.00	55.7	30.1	44.0	19.1
3	27	2006	0.47	60.4	38.5	46.3	30.8
3	28	2006	0.00	45.4	40.9	43.3	20.8
3	29	2006	0.00	65.7	33.0	50.3	16.3
3	30	2006	0.51	78.2	52.3	63.0	40.8
3	31	2006	0.00	66.3	52.1	58.7	33.6
4	1	2006	0.00	70.8	42.9	56.9	15.9
4	2	2006	0.33	79.7	51.7	64.8	48.7
4	3	2006	0.00	58.2	41.8	49.9	34.4
4	4	2006	0.00	63.1	32.3	49.3	12.3
4	5	2006	0.27	75.1	45.2	60.9	31.1
4	6	2006	0.00	76.1	55.5	65.0	28.8
4	7	2006	0.00	78.7	43.6	64.1	28.6
4	8	2006	0.00	54.4	34.0	43.4	26.8
4	9	2006	0.00	63.3	35.8	49.6	15.7
4	10	2006	0.00	74.6	44.4	60.1	20.9
4	11	2006	0.00	75.7	53.2	66.5	28.8
4	12	2006	0.00	78.2	54.5	67.8	24.9
4	13	2006	0.00	87.0	52.9	73.0	25.8
4	14	2006	0.00	87.5	67.0	76.5	25.9
4	15	2006	0.00	79.1	60.9	72.8	26.5
4	16	2006	0.00	79.0	59.8	71.0	28.3
4	17	2006	0.00	60.9	54.7	57.5	16.5
4	18	2006	0.24	83.9	54.1	67.2	25.2
4	19	2006	0.00	72.4	49.1	60.1	23.8
4	20	2006	0.00	75.3	46.1	60.8	19.1
4	21	2006	0.00	74.4	47.6	61.9	17.2
4	22	2006	0.00	78.2	48.6	65.2	18.3
4	23	2006	0.03	76.1	53.2	64.0	10.9
4	24	2006	0.01	74.4	58.0	66.4	14.7
4	25	2006	0.00	63.2	43.9	52.4	19.7
4	26	2006	0.00	62.7	43.0	50.1	14.0

MONTH	DAY	YEAR	TOTAL PRECIP INCHES	MAX AIR TEMP F	MIN AIR TEMP F	AVG TEMP F	MAX WIND SPEED MPH
4	27	2006	0.00	69.7	38.4	54.9	13.2
4	28	2006	0.17	65.7	48.9	56.6	21.8
4	29	2006	1.33	59.5	52.5	56.0	31.5
4	30	2006	0.02	69.7	53.3	60.8	27.6
5	1	2006	0.01	70.6	47.3	58.8	12.9
5	2	2006	0.00	75.2	43.7	62.4	13.8
5	3	2006	0.52	75.8	59.1	64.8	24.0
5	4	2006	0.00	63.9	51.1	57.8	13.6
5	5	2006	0.00	62.6	48.2	54.7	17.7
5	6	2006	0.00	62.6	43.0	52.5	10.9
5	7	2006	0.00	68.3	48.2	58.6	12.7
5	8	2006	0.00	69.2	52.1	60.2	18.4
5	9	2006	0.17	77.3	56.8	65.4	17.9
5	10	2006	0.02	68.5	54.5	60.9	24.3
5	11	2006	0.11	57.8	47.6	51.8	27.9
5	12	2006	0.00	66.9	43.6	54.5	29.3
5	13	2006	0.00	58.8	41.1	52.1	21.8
5	14	2006	0.00	57.7	43.2	50.9	21.7
5	15	2006	0.02	64.4	49.4	56.1	20.0
5	16	2006	0.05	67.5	47.7	57.2	20.9
5	17	2006	0.01	73.9	49.7	63.7	20.4
5	18	2006	0.00	72.2	47.9	61.5	22.5
5	19	2006	0.00	85.7	52.4	70.4	12.2
5	20	2006	0.00	75.0	55.6	64.5	14.3
5	21	2006	0.00	80.9	53.8	68.2	12.5
5	22	2006	0.00	75.4	57.0	65.8	15.4
5	23	2006	0.00	78.7	57.5	68.2	17.2
5	24	2006	0.08	87.4	66.8	75.9	23.4
5	25	2006	0.00	88.1	66.4	77.7	27.9
5	26	2006	0.00	87.9	59.7	74.5	13.8
5	27	2006	0.00	91.0	70.1	80.4	26.3
5	28	2006	0.00	91.2	68.9	80.5	22.4
5	29	2006	0.15	91.0	66.2	76.6	20.2
5	30	2006	0.01	84.9	65.8	74.1	20.2
5	31	2006	1.31	83.5	65.8	72.8	21.1
6	1	2006	0.33	74.0	60.5	67.7	20.6
6	2	2006	0.00	81.8	57.3	70.3	17.7
6	3	2006	0.00	85.2	58.4	73.0	17.5
6	4	2006	0.00	80.8	61.8	70.2	12.5
6	5	2006	0.00	80.9	61.1	71.2	19.7
6	6	2006	0.01	83.4	63.3	74.0	17.5
6	7	2006	0.00	85.4	64.4	75.5	17.5
6	8	2006	0.00	87.7	62.0	75.5	10.7
6	9	2006	0.00	89.4	67.6	78.4	13.2
6	10	2006	2.17	91.1	65.7	75.6	43.3
6	11	2006	1.03	78.1	61.1	67.4	27.4
6	12	2006	0.00	72.6	59.0	64.9	14.8
6	13	2006	0.00	78.9	55.1	68.3	11.6
6	14	2006	0.00	84.0	58.1	72.6	13.8
6	15	2006	0.00	87.5	65.7	77.3	18.6
6	16	2006	0.00	89.6	69.7	80.0	21.7
6	17	2006	0.26	83.1	64.2	74.6	27.6
6	18	2006	0.00	81.9	62.6	71.7	16.5
6	19	2006	0.00	88.2	63.1	77.4	13.4
6	20	2006	0.00	88.9	68.6	79.9	15.7
6	21	2006	0.00	90.1	73.0	81.1	26.3
6	22	2006	0.21	82.1	66.2	72.4	25.6
6	23	2006	0.00	82.6	62.3	73.1	12.9

MONTH	DAY	YEAR	TOTAL PRECIP INCHES	MAX AIR TEMP F	MIN AIR TEMP F	AVG TEMP F	MAX WIND SPEED MPH
6	24	2006	0.00	84.6	63.1	75.0	14.0
6	25	2006	0.00	82.0	63.7	72.4	16.8
6	26	2006	0.00	72.9	58.9	64.9	22.7
6	27	2006	0.03	80.5	55.4	68.2	18.1
6	28	2006	0.04	85.2	57.9	72.7	14.3
6	29	2006	0.03	91.3	64.2	77.1	27.6
6	30	2006	0.00	83.6	70.6	76.4	14.1
7	1	2006	0.00	92.5	66.2	80.0	18.3
7	2	2006	0.00	94.3	69.8	82.0	16.6
7	3	2006	0.00	94.1	70.5	81.6	26.1
7	4	2006	0.28	83.8	67.7	74.2	20.9
7	5	2006	0.00	80.9	61.3	71.3	16.3
7	6	2006	0.00	81.5	61.0	71.2	15.0
7	7	2006	0.00	81.9	56.8	71.3	14.8
7	8	2006	0.00	86.7	62.3	75.2	13.6
7	9	2006	0.01	85.9	67.6	75.3	16.5
7	10	2006	0.17	77.6	66.6	72.2	17.0
7	11	2006	0.23	88.2	68.9	77.5	15.6
7	12	2006	0.57	88.8	70.0	79.3	17.9
7	13	2006	1.03	94.3	67.8	80.4	33.6
7	14	2006	0.06	88.6	66.8	76.4	19.1
7	15	2006	0.00	94.7	70.5	82.1	9.7
7	16	2006	0.00	95.1	73.9	84.3	13.4
7	17	2006	0.00	96.4	75.1	85.2	14.1
7	18	2006	0.00	94.8	75.3	84.8	11.3
7	19	2006	0.00	99.9	76.6	86.1	32.6
7	20	2006	0.00	99.4	74.0	86.4	19.5
7	21	2006	0.01	82.4	64.8	73.8	24.2
7	22	2006	0.00	80.6	62.4	70.9	16.3
7	23	2006	0.00	87.4	62.2	74.7	13.1
7	24	2006	0.00	91.8	62.8	78.6	15.7
7	25	2006	0.00	95.3	68.5	82.2	16.6
7	26	2006	0.00	96.5	75.8	84.2	21.1
7	27	2006	0.00	90.3	74.6	80.8	19.3
7	28	2006	0.00	94.9	69.2	82.5	11.8
7	29	2006	0.00	99.7	73.7	84.3	18.3
7	30	2006	0.00	101.2	75.9	87.9	22.9
7	31	2006	0.00	101.9	78.4	89.5	21.1
8	1	2006	0.00	101.3	77.4	89.1	23.1
8	2	2006	0.00	102.3	78.2	87.2	27.4
8	3	2006	0.00	86.6	70.9	77.0	16.1
8	4	2006	0.00	91.7	62.9	78.0	16.5
8	5	2006	0.00	94.8	65.2	80.6	15.7
8	6	2006	0.00	102.2	72.8	85.9	17.2
8	7	2006	0.34	96.9	73.0	83.2	23.4
8	8	2006	0.00	93.9	73.7	82.2	14.1
8	9	2006	0.00	101.6	72.8	86.6	16.8
8	10	2006	0.02	88.9	74.2	81.0	18.8
8	11	2006	0.00	89.6	70.5	78.6	17.9
8	12	2006	0.00	89.5	68.5	76.5	13.2
8	13	2006	0.01	96.5	68.2	81.3	24.2
8	14	2006	0.35	82.3	64.5	73.8	22.9
8	15	2006	0.00	87.2	58.3	73.9	15.7
8	16	2006	0.00	91.2	63.7	77.8	15.0
8	17	2006	0.00	95.5	69.0	81.4	16.6
8	18	2006	1.24	98.5	67.3	83.1	44.9
8	19	2006	0.00	88.7	71.8	78.0	15.9
8	20	2006	0.00	82.6	68.4	74.5	12.5
8	21	2006	0.00	85.8	67.2	75.6	12.0

MONTH	DAY	YEAR	TOTAL PRECIP INCHES	MAX AIR TEMP F	MIN AIR TEMP F	AVG TEMP F	MAX WIND SPEED MPH
8	22	2006	0.00	86.6	65.1	75.7	14.7
8	23	2006	0.00	92.4	65.0	78.4	16.3
8	24	2006	0.00	92.9	63.6	78.9	17.9
8	25	2006	0.27	85.3	70.2	75.7	19.9
8	26	2006	2.27	86.7	69.0	76.7	29.7
8	27	2006	0.11	81.9	70.2	74.9	14.0
8	28	2006	0.06	82.8	64.9	73.6	19.0
8	29	2006	0.02	75.5	61.4	66.2	17.4
8	30	2006	0.00	75.7	57.7	67.2	15.2
8	31	2006	0.00	79.2	59.4	68.7	14.8
9	1	2006	0.00	78.1	59.5	69.0	13.2
9	2	2006	0.00	78.1	62.0	69.7	12.7
9	3	2006	0.00	76.6	58.2	66.0	11.1
9	4	2006	0.00	78.7	57.7	66.7	18.3
9	5	2006	0.00	74.7	54.5	64.3	18.1
9	6	2006	0.00	83.0	55.1	68.5	11.6
9	7	2006	0.00	83.7	55.5	70.2	12.9
9	8	2006	0.00	84.1	60.3	71.9	12.9
9	9	2006	0.00	78.2	57.1	69.5	15.9
9	10	2006	0.00	84.7	63.6	73.4	12.7
9	11	2006	0.14	84.3	65.5	71.3	16.1
9	12	2006	0.06	67.6	54.5	61.1	20.6
9	13	2006	0.00	74.2	52.4	62.3	17.9
9	14	2006	0.00	77.8	54.0	65.4	12.3
9	15	2006	0.00	80.3	56.1	68.2	19.5
9	16	2006	0.00	87.2	62.2	74.4	25.2
9	17	2006	0.16	75.3	60.0	68.6	20.4
9	18	2006	0.00	73.2	48.7	61.3	26.1
9	19	2006	0.00	61.7	44.2	52.6	19.9
9	20	2006	0.00	67.7	41.2	55.0	12.2
9	21	2006	0.00	68.9	52.8	60.9	31.1
9	22	2006	0.00	85.4	58.0	71.2	22.4
9	23	2006	0.01	76.4	56.2	64.7	25.4
9	24	2006	0.00	66.9	47.7	58.0	19.0
9	25	2006	0.00	76.6	43.0	59.8	20.8
9	26	2006	0.00	80.3	46.5	63.9	15.2
9	27	2006	0.00	71.8	53.9	62.3	17.7
9	28	2006	0.06	62.9	44.5	53.1	21.7
9	29	2006	0.00	72.2	41.0	55.6	22.2
9	30	2006	0.00	75.6	53.8	64.1	14.5
10	1	2006	0.00	88.5	52.5	71.3	24.0
10	2	2006	0.00	93.4	66.9	79.1	29.9
10	3	2006	0.00	94.3	66.5	80.3	24.5
10	4	2006	0.00	81.0	57.8	69.6	22.5
10	5	2006	0.00	71.9	51.4	60.9	17.4
10	6	2006	0.00	71.0	43.5	56.6	15.2
10	7	2006	0.00	75.3	44.6	59.5	16.6
10	8	2006	0.00	78.1	45.6	61.3	12.5
10	9	2006	0.00	77.6	43.9	61.9	11.6
10	10	2006	0.58	60.9	53.2	56.0	12.9
10	11	2006	0.03	58.4	32.9	48.0	27.4
Total:			20.79				
Avg:				77.7	55.8	66.5	20.0

Trial Names

BAYER ENVIRONMENTAL SCIENCES

- HEO6NARMQG = BAY06-01 = USA/06432/Revolver/Clumpy rye/Nitrogen
- FE06NARDSV = BAY06-02 = USA06124/Lynx Green/Turfgrass/Efficacy/Quality
- FE06NARDSA = TUR06-02 = Disease Control on Bentgrass Greens
- SYN06-02 = Disease Control on Lawn Turf with Headway, Heritage, Armada, and Insignia Fungicides

BASF

- TUR06-01 = Crabgrass and White Clover Control in Tall Fescue
- TUR06-02 = Disease Control on Bentgrass Greens
- SYN06-02 = Disease Control on Lawn Turf with Headway, Heritage, Armada, and Insignia Fungicides

DUPONT

- PR06-12-1155 = DUP06-01 = E2Y45 Southern Masked Chafer Larval Control in Turfgrass

ISK BIOSCIENCES

- 06-US-H-TU39 = ISK06-01 = Flazasulfuron for Clumpy Perennial Ryegrass Control
- 06-US-H-TU74 = ISK06-02 = Flazasulfuron/Bermudagrass/Transition in Fairways

MONSANTO

- 2006-01-A7-08= MON06-01= Tall Fescue Control in Kentucky Bluegrass with Certainty Herbicide
- 2006-01-A7-21= MON06-02= Yellow Nutsedge Control with Certainty in Mixed Cool Season Turf- Broadcast (Seasons Ridge)
- 2006-01-A7-22= MON06-03= Yellow Nutsedge Control with Certainty in Mixed Cool Season Turf- Spray to Wet (Seasons Ridge)
- 2006-01-A7-21= MON06-04= Yellow Nutsedge Control with Certainty in Mixed Cool Season Turf- Broadcast (South Farm)
- 2006-01-A7-22= MON06-05= Yellow Nutsedge Control with Certainty in Mixed Cool Season Turf- Spray to Wet (South Farm)

SYNGENTA

- HMS853A4-2006US = SYN06-01 = Tall Fescue: Crabgrass and White Clover Control- Pre Clover
- HMS853A4-2006US = SYN06-03 = Tall Fescue: Crabgrass and White Clover Control- Post Clover
- P06.msg.Tx13 = SYN06-02 = Disease Control on Lawn Turf with Headway, Heritage, Armada, and Insignia Fungicides

Fungicides

University of Missouri-Columbia

USA06124 / Lynx Green / Turfgrass / Efficacy / Quality
BES0102

Trial ID: BAY06-02 (FE06NARDSV) Protocol ID: BAY06-02
Location: South Farm Study Director: Brad Fresenburg and Travis Teuton
Investigator: Travis Teuton

General Trial Information

Study Director: Travis Teuton **Title:** Assistant Professor
Affiliation: University of Missouri-Columbia
Postal Code: 65211 **E-mail:** teutont@missouri.edu
Investigator: Travis Teuton **Title:** Assistant Professor
Affiliation: University of Missouri-Columbia
Postal Code: 65211 **E-mail:** teutont@missouri.edu

Trial Location

City: Columbia **Trial Status:** ONE-YEAR/FINAL
State/Prov.: MO **Trial Reliability:** Excellent
Postal Code: 65211 **Initiation Date:** 6-3-06
Country: USA
Directions:

Green by creek at the Turf Research Center at the South Farm

Official Trial Code: FE06NARDSV

Objectives:

Determine the effectiveness and safety of Lynx Green fungicide for disease control on creeping bentgrass greens.

Conclusions:

Lynx green was an excellent fungicide (>95% disease control) that I would recommend to anyone. It controlled anthracnose completely and was better than 26 GT which is a standard treatment for anthracnose in our area. It also did a great job controlling dollarspot. Lynx green appeared to have excellent turfgrass safety. Impressive turf fungicide.

Cooperator/Landowner

Cooperator: Ann Thurston **Country:** USA
Organization: Bayer Environmental Science **Phone No:** 972-633-9176
Address 1: 5017 Andover Drive
City: Plano
State/Prov: TX
Postal Code: 75023-5008 **E-mail:** ann.thurston@bayercropscience.com

Crop Description

Crop 1: AGSPL Agrostis palustris Bent grass
Variety: Penncross **Description:** Green
BBCH Scale: BGRM

Pest Description

Pest 1 Type: D **Code:** COLLGR Colletotrichum graminicola
 Common Name: Anthracnose of cereals

Pest 2 Type: D **Code:** SCLEHO Sclerotinia homoeocarpa
 Common Name: Dollar spot of grasses

Site and Design

Plot Width, Unit: 5 FT **Site Type:** TURF - GOLF COURSE GREEN
Plot Length, Unit: 10 FT **Tillage Type:** NO-TILL
Replications: 4 **Study Design:** Randomized Complete Block
% Slope: 1.0 **Soil Drainage:** G Good

Comment: Mowed every Mon, Tues, Thursday, and Friday at 0.135 inches.

Soil Description

Description Name: Disease Green
% Sand: 82 **% OM:** 15 **Texture:** SAND
% Silt: 2 **pH:** 6.4 **Soil Name:** USGA Greens Mix
% Clay: 1 **Fert. Level:** FAIR

Moisture Conditions

Overall Moisture Conditions: NORMAL

University of Missouri-Columbia

Application Description

	A	B	C	D	E
Application Date:	6-3-06	6-20-06	7-1-06	7-15-06	7-30-06
Time of Day:	8:30	11:00	8:00	9:00	1:00
Application Method:	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY
Application Timing:	POSTPOST	POSTPOST	POSTPOST	POSTPOST	POSTPOST
Application Placement:	BROFOL	BROFOL	BROFOL	BROFOL	BROFOL
Applied By:	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton
Air Temperature, Unit:	78 F	90 F	75 F	86 F	95 F
% Relative Humidity:	50	60	50	30	50
Wind Velocity, Unit:	0 MPH	0 MPH	2 MPH	0 MPH	0 MPH
Wind Direction:			SW		
Dew Presence (Y/N):	Y	N	Y	Y	N
Soil Temperature, Unit:	68 F	80 F	71 F	78 F	90 F
Soil Moisture:	ADEQUATE	ADEQUATE	ADEQUATE	ADEQUATE	ADEQUATE
% Cloud Cover:	0	5	0	0	0

Crop Stage At Each Application

	A	B	C	D	E
Crop 1 Code, BBCH Scale:	AGSPL BGRM	AGSPL BGRM	AGSPL BGRM	AGSPL BGRM	AGSPL BGRM
Stage Scale Used:	BBCH	BBCH	BBCH	BBCH	BBCH
Stage Majority, Percent:	Mature	Mature	Mature	Mature	Mature
Stage Minimum, Percent:	100%	100%	100%	100%	100%
Height, Unit:	0.135 IN	0.135 IN	0.135 IN	0.135 IN	0.135 IN

Pest Stage At Each Application

	A	B	C	D	E
Pest 1 Code, Disc., Scale:	COLLGR D	COLLGR D	COLLGR D	COLLGR D	COLLGR D
Stage Majority, Percent:	MIXED	MIXED	MIXED	MIXED	MIXED
Coverage, Unit:	0 %	10 %	40 %	20 %	60 %
Pest 2 Code, Disc., Scale:	SCLEHO D	SCLEHO D	SCLEHO D	SCLEHO D	SCLEHO D
Density, Unit:	1 FT2	2 FT2	5 FT2	25 FT2	1 FT2

Application Equipment

	A	B	C	D
Appl. Equipment:	Backpack	Backpack	Backpack	Backpack
Operating Pressure, Unit:	60 PSI	60 PSI	60 PSI	60 PSI
Nozzle Type:	Flat Fan	Flat Fan	Flat Fan	Flat Fan
Nozzle Size:	8006	8006	8006	8006
Nozzle Spacing, Unit:	14.5 In	14.5 In	14.5 In	14.5 In
Nozzle Calibration, Unit:	60 GPA	60 GPA	60 GPA	60 GPA
Boom Length, Unit:	3.75 FT	3.75 FT	3.75 FT	3.75 FT
Boom Height, Unit:	1.5 FT	1.5 FT	1.5 FT	1.5 FT
Ground Speed, Unit:	3 MPH	3 MPH	3 MPH	3 MPH
Incorporation Equip.:	NA	NA	NA	NA
Carrier:	Water	Water	Water	Water
Spray Volume, Unit:	60 GAL/AC	60 GAL/AC	60 GAL/AC	60 GAL/AC
Mix Size, Unit:	1.5 Liters	1.5 Liters	1.5 Liters	1.5 Liters
Propellant:	CO2	CO2	CO2	CO2
Tank Mix (Y/N):	N	N	N	N

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	E
Appl. Equipment:	Backpack
Operating Pressure, Unit:	60 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8006
Nozzle Spacing, Unit:	14.5 In
Nozzle Calibration, Unit:	60 GPA
Boom Length, Unit:	3.75 FT
Boom Height, Unit:	1.5 FT
Ground Speed, Unit:	3 MPH
Incorporation Equip.:	NA
Carrier:	Water
Spray Volume, Unit:	60 GAL/AC
Mix Size, Unit:	1.5 Liters
Propellant:	CO2
Tank Mix (Y/N):	N

Data

10-12-06 (BAY06-02 Disease Control with Lynx Green)

AOV Means Table

University of Missouri-Columbia

USA06124 / Lynx Green / Turfgrass / Efficacy / Quality
BES0102

Trial ID: BAY06-02
Location: South Farm

Protocol ID: BAY06-02
Study Director: Brad Fresenburg and Travis Teuton
Investigator: Travis Teuton

Pest Type	D Disease	D Disease		D Disease
Pest Code	SCLEHO	COLLGR		SCLEHO
Pest Name	Dollar spot of grasses	Anthracnose of cereals		Dollar spot of grasses
Crop Code	AGSPL	AGSPL	AGSPL	AGSPL
BBCH Scale	BGRM	BGRM	BGRM	BGRM
Crop Name	Bent grass	Bent grass	Bent grass	Bent grass
Crop Variety	Penncross	Penncross	Penncross	Penncross
Description	Green	Green	Green	Green
Part Rated	LEAF P	LEAF P	LEAF C	LEAF P
Rating Date	6-26-06	6-26-06	6-26-06	7-8-06
Rating Data Type	number	%	quality	number
Days After First/Last Applic.	23 6	23 6	23 6	35 7
Trt-Eval Interval	23 DA-A	23 DA-A	23 DA-A	35 DA-A
Trt No.	Treatment Name	Rate	Unit	
1	Untreated			
		102 a		237 a
2	Lynx Green	0.25 OZ A/1000 FT2		0 b
3	Lynx Green	0.377 OZ A/1000 FT2		0 b
4	Lynx Green	0.5 OZ A/1000 FT2		0 b
5	Lynx Green	0.25 OZ A/1000 FT2		0 b
	Chipco Alliete Signat.	3.2 OZ A/1000 FT2		0 b
6	Lynx	0.377 OZ A/1000 FT2		0 b
7	26 GT	1 OZ A/1000 FT2		0 b
LSD (P=.05)		44.9		51.0
Standard Deviation		30.2		34.3
CV		207.91		101.31
Grand Mean		14.54		33.86
Bartlett's X2		25.676		0.0
P(Bartlett's X2)		0.001*		.
Friedman's X2		9.402		9.0
P(Friedman's X2)		0.152		0.174

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type	D Disease		D Disease	D Disease	
Pest Code	COLLGR		SCLEHO	COLLGR	
Pest Name	Anthracnose of cereals		Dollar spot of grasses	Anthracnose of cereals	
Crop Code	AGSPL	AGSPL	AGSPL	AGSPL	AGSPL
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM
Crop Name	Bent grass	Bent grass	Bent grass	Bent grass	Bent grass
Crop Variety	Penncross	Penncross	Penncross	Penncross	Penncross
Description	Green	Green	Green	Green	Green
Part Rated	LEAF P	LEAF C	LEAF P	LEAF P	LEAF C
Rating Date	7-8-06	7-8-06	7-24-06	7-24-06	7-24-06
Rating Data Type	%	quality	number	%	quality
Days After First/Last Applic.	35 7	35 7	51 9	51 9	51 9
Trt-Eval Interval	35 DA-A	35 DA-A	51 DA-A	51 DA-A	51 DA-A
Trt Treatment	Rate				
No.	Name	Rate	Unit		
1	Untreated			40 a	4 b
2	Lynx Green	0.25 OZ A/1000 FT2		0 b	8 a
3	Lynx Green	0.377 OZ A/1000 FT2		3 b	8 a
4	Lynx Green	0.5 OZ A/1000 FT2		0 b	8 a
5	Lynx Green	0.25 OZ A/1000 FT2		0 b	8 a
	Chipco Alliete Signat.	3.2 OZ A/1000 FT2			
6	Lynx	0.377 OZ A/1000 FT2		3 b	8 a
7	26 GT	1 OZ A/1000 FT2		0 b	7 a
LSD (P=.05)		5.4	0.7	21.6	5.1
Standard Deviation		3.6	0.5	14.6	3.4
CV		56.29	6.57	95.32	119.24
Grand Mean		6.43	7.16	15.29	2.86
Bartlett's X2		2.823	0.263	0.0	3.619
P(Bartlett's X2)		0.244	0.992	.	0.057
Friedman's X2		10.554	12.295	9.0	9.402
P(Friedman's X2)		0.103	0.056	0.174	0.152

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type	D Disease	D Disease		D Disease
Pest Code	SACLEHO	COLLGR		SACLEHO
Pest Name	Dollar spot of grasses	Anthrachnose of cereals		Dollar spot of grasses
Crop Code	AGSPL	AGSPL	AGSPL	AGSPL
BBCH Scale	BGRM	BGRM	BGRM	BGRM
Crop Name	Bent grass	Bent grass	Bent grass	Bent grass
Crop Variety	Penncross	Penncross	Penncross	Penncross
Description	Green	Green	Green	Green
Part Rated	LEAF P	LEAF P	LEAF C	LEAF P
Rating Date	7-30-06	7-30-06	7-30-06	8-5-06
Rating Data Type	number	%	quality	number
Days After First/Last Applic.	57 0	57 0	57 0	63 6
Trt-Eval Interval	57 DA-A	57 DA-A	57 DA-A	63 DA-A
Trt Treatment	Rate			
No. Name	Rate	Unit		
1 Untreated				
		234 a	65 a	3 c
2 Lynx Green	0.25 OZ A/1000 FT2	0 b	5 b	7 ab
3 Lynx Green	0.377 OZ A/1000 FT2	0 b	6 b	7 ab
4 Lynx Green	0.5 OZ A/1000 FT2	0 b	0 b	8 a
5 Lynx Green	0.25 OZ A/1000 FT2	0 b	8 b	7 ab
Chipco Alliete Signat.	3.2 OZ A/1000 FT2			
6 Lynx	0.377 OZ A/1000 FT2	0 b	5 b	7 ab
7 26 GT	1 OZ A/1000 FT2	0 b	20 b	6 b
LSD (P=.05)		60.0	13.4	1.1
Standard Deviation		40.4	9.0	0.8
CV		121.17	57.88	11.72
Grand Mean		33.36	15.54	6.54
Bartlett's X2		0.0	3.419	0.198
P(Bartlett's X2)		.	0.636	0.995
Friedman's X2		9.0	13.741	14.679
P(Friedman's X2)		0.174	0.033	0.023

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type	D Disease		D Disease	D Disease	
Pest Code	COLLGR		SCLEHO	COLLGR	
Pest Name	Anthracnose of cereals		Dollar spot of grasses	Anthracnose of cereals	
Crop Code	AGSPL	AGSPL	AGSPL	AGSPL	AGSPL
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM
Crop Name	Bent grass	Bent grass	Bent grass	Bent grass	Bent grass
Crop Variety	Penncross	Penncross	Penncross	Penncross	Penncross
Description	Green	Green	Green	Green	Green
Part Rated	LEAF P	LEAF C	LEAF P	LEAF P	LEAF C
Rating Date	8-5-06	8-5-06	8-12-06	8-12-06	8-12-06
Rating Data Type	%	quality	number	%	quality
Days After First/Last Applic.	63 6	63 6	70 13	70 13	70 13
Trt-Eval Interval	63 DA-A	63 DA-A	70 DA-A	70 DA-A	70 DA-A
Trt Treatment	Rate				
No. Name	Rate Unit				
1 Untreated		40 a	4 b	120 a	15 a 5 b
2 Lynx Green	0.25 OZ A/1000 FT2	0 b	8 a	0 b	0 a 8 a
3 Lynx Green	0.377 OZ A/1000 FT2	0 b	8 a	0 b	0 a 8 a
4 Lynx Green	0.5 OZ A/1000 FT2	0 b	8 a	0 b	0 a 8 a
5 Lynx Green	0.25 OZ A/1000 FT2	0 b	8 a	0 b	0 a 8 a
Chipco Alliete Signat.	3.2 OZ A/1000 FT2				
6 Lynx	0.377 OZ A/1000 FT2	0 b	8 a	34 b	5 a 7 ab
7 26 GT	1 OZ A/1000 FT2	5 b	7 a	0 b	9 a 8 a
LSD (P=.05)		7.7	1.0	63.5	14.9 1.8
Standard Deviation		5.2	0.7	42.8	10.0 1.2
CV		80.81	9.28	195.02	243.6 16.21
Grand Mean		6.43	7.21	21.93	4.11 7.32
Bartlett's X2		0.12	4.324	0.088	0.829 1.413
P(Bartlett's X2)		0.729	0.115	0.767	0.661 0.493
Friedman's X2		9.402	9.643	5.063	3.589 6.455
P(Friedman's X2)		0.152	0.141	0.536	0.732 0.374

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

University of Missouri-Columbia

Application Description

	A	B	C	D	E	F
Application Date:	6-8-06	6-24-06	7-1-06	7-8-06	7-22-06	8-4-06
Time of Day:	3:30 PM	2:00 PM	8:00 AM	9:45 AM	9:00 AM	9:30 AM
Application Method:	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY
Application Timing:	POSPRE	POSPRE	POSPRE	POSPRE	POSPRE	POSPRE
Application Placement:	BROFOL	BROFOL	BROFOL	BROFOL	BROFOL	BROFOL
Applied By:	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton
Air Temperature, Unit:	89 F	84 F	75 F	75 F	82 F	85 F
% Relative Humidity:	50	50	50	30	50	60
Wind Velocity, Unit:	2 mph	0 mph	2 mph	3 mph	3 mph	2 mph
Wind Direction:	SW		SW	S	S	S
Dew Presence (Y/N):	n	n	n	n	n	n
Water Hardness:	na	na	na	na	na	na
Soil Temperature, Unit:	82 F	82 F	71 F	71 F	86 F	85 F
Soil Moisture:	ADEQUATE	ADEQUATE	ADEQUATE	ADEQUATE	ADEQUATE	ADEQUATE
% Cloud Cover:	20	0	0	0	0	0

Crop Stage At Each Application

	A	B	C	D	E	F
Crop 1 Code, BBCH Scale:	FESAR BGRM	FESAR BGRM	FESAR BGRM	FESAR BGRM	FESAR BGRM	FESAR BGRM

Pest Stage At Each Application

	A	B	C	D	E	F
Pest 1 Code, Disc., Scale:	RHIZSP D	RHIZSP D	RHIZSP D	RHIZSP D	RHIZSP D	RHIZSP D
Pest 2 Code, Disc., Scale:	PYTHSP D	PYTHSP D	PYTHSP D	PYTHSP D	PYTHSP D	PYTHSP D

Application Equipment

	A	B	C	D
Appl. Equipment:	Backpack	Backpack	Backpack	Backpack
Operating Pressure, Unit:	30 PSI	30 PSI	30 PSI	30 PSI
Nozzle Type:	Flat Fan	Flat Fan	Flat Fan	Flat Fan
Nozzle Size:	8002	8002	8002	8002
Nozzle Spacing, Unit:	14.5 In	14.5 In	14.5 In	14.5 In
Nozzle Calibration, Unit:	22 GPA	22 GPA	22 GPA	22 GPA
Boom Length, Unit:	3.75 FT	3.75 FT	3.75 FT	3.75 FT
Boom Height, Unit:	1.5 FT	1.5 FT	1.5 FT	1.5 FT
Ground Speed, Unit:	3 MPH	3 MPH	3 MPH	3 MPH
Incorporation Equip.:	NA	NA	NA	NA
Carrier:	Water	Water	Water	Water
Spray Volume, Unit:	22 GAL/AC	22 GAL/AC	22 GAL/AC	22 GAL/AC
Mix Size, Unit:	0.5 Liters	0.5 Liters	0.5 Liters	0.5 Liters
Propellant:	CO2	CO2	CO2	CO2
Tank Mix (Y/N):	N	N	N	N

	E	F
Appl. Equipment:	Backpack	Backpack
Operating Pressure, Unit:	30 PSI	30 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	8002	8002
Nozzle Spacing, Unit:	14.5 In	14.5 In
Nozzle Calibration, Unit:	22 GPA	22 GPA
Boom Length, Unit:	3.75 FT	3.75 FT
Boom Height, Unit:	1.5 FT	1.5 FT
Ground Speed, Unit:	3 MPH	3 MPH
Incorporation Equip.:	NA	NA
Carrier:	Water	Water
Spray Volume, Unit:	22 GAL/AC	22 GAL/AC
Mix Size, Unit:	0.5 Liters	0.5 Liters
Propellant:	CO2	CO2
Tank Mix (Y/N):	N	N

University of Missouri-Columbia

Disease Control on Lawn Turf with Headway, Heritage, Armada, and Insignia Fungicides

Trial ID: SYN06-02
Location: South Farm

Protocol ID: SYN06-02
Study Director: Travis Teuton
Investigator: Travis Teuton

Pest Type	D Disease	D Disease		D Disease		D Disease		D Disease			
Pest Code	RHIZSO	RHIZSO		RHIZSO		RHIZSO		PYTHSP			
Pest Name	Brown Patch	Brown Patch		Brown Patch		Brown Patch		Pythium sp.			
Crop Code	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR			
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM			
Crop Name	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue			
Description	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type			
Part Rated	LEAF C	LEAF C	LEAF C	LEAF C	LEAF C	LEAF C	LEAF C	LEAF C			
Rating Date	6-17-06	7-8-06	7-8-06	7-25-06	7-25-06	8-5-06	8-5-06	8-5-06			
Rating Data Type	PRESSU	PRESSU	Quality	PRESSU	Quality	PRESSU	Quality	PRESSU			
Rating Unit	%	%	1-9	%	1-9	%	1-9	%			
Crop Stage	Mature	Mature	Mature	Mature	Mature	Mature	Mature	Mature			
Crop Density, Unit	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %			
Days After First/Last Applic.	9 9	30 0	30 0	47 3	47 3	58 1	58 1	58 1			
Trt-Eval Interval	9 DA-A	30 DA-A	30 DA-A	47 DA-A	47 DA-A	58 DA-A	58 DA-A	58 DA-A			
Trt No.	Treatment Name	Rate	Unit								
1	Untreated			30 a	50 a	5 c	50 a	4 c	33 a	3 b	48 a
2	Headway	0.332 LB A/A		3 b	0 b	8 a	6 b	6 ab	0 b	3 b	38 ab
3	Headway	0.664 LB A/A		5 b	0 b	8 a	53 a	4 c	0 b	3 b	38 ab
4	Headway	1.33 LB A/A		6 b	0 b	8 a	0 b	8 a	0 b	7 a	4 c
5	Heritage TL	0.545 LB A/A		8 b	0 b	8 a	0 b	8 a	0 b	6 a	10 c
6	Armada	0.82 LB A/A		3 b	5 b	8 a	30 a	5 bc	0 b	3 b	43 ab
7	Armada	1.23 LB A/A		3 b	8 b	7 ab	53 a	4 c	0 b	3 b	50 a
8	Armada	1.63 LB A/A		3 b	10 b	7 b	38 a	5 bc	0 b	3 b	43 ab
9	Insignia	0.34 LB A/A		4 b	0 b	8 a	3 b	8 a	0 b	6 a	13 c
10	Insignia	0.476 LB A/A		4 b	0 b	8 a	48 a	4 bc	0 b	3 b	55 a
11	Insignia	0.61 LB A/A		4 b	0 b	8 a	3 b	8 a	0 b	6 ab	18 bc
LSD (P=.05)				7.5	7.1	0.7	16.4	1.6	4.2	1.9	18.6
Standard Deviation				5.2	4.9	0.5	11.3	1.1	2.9	1.3	12.9
CV				81.84	74.47	6.32	44.3	19.62	97.71	30.87	39.78
Grand Mean				6.36	6.59	7.47	25.57	5.57	2.95	4.16	32.39
Bartlett's X2				4.777	2.27	2.082	24.011	11.405	0.0	5.883	10.507
P(Bartlett's X2)				0.853	0.518	0.353	0.002*	0.18	.	0.825	0.397
Friedman's X2				11.636	18.614	18.614	33.636	30.352	10.0	23.682	26.67
P(Friedman's X2)				0.31	0.045	0.045	0.001	0.001	0.44	0.008	0.003

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

University of Missouri-Columbia

Disease Control in Creeping Bentgrass Greens

Trial ID: TUR06-02
Location: South Farm

Protocol ID: TUR06-02
Study Director: Travis Teuton and Brad Fresenburg
Investigator: Travis Teuton

General Trial Information

Study Director: Travis Teuton **Title:** Assistant Professor
Affiliation: University of Missouri-Columbia
Postal Code: 65211 **E-mail:** teutont@missouri.edu
Investigator: Travis Teuton **Title:** Assistant Professor
Affiliation: University of Missouri-Columbia
Postal Code: 65211 **E-mail:** teutont@missouri.edu

Trial Location

City: Columbia **Trial Status:** ONE-YEAR/FINAL
State/Prov.: MO **Trial Reliability:** Excellent
Postal Code: 65211 **Initiation Date:** 5-27-06
Country: USA
Directions:
Disease Green at South Farm

Objectives:

Determine the effectiveness of commonly used fungicides for control of anthracnose and dollarspot

Crop Description

Crop 1: AGSPL Agrostis palustris **Bent grass**
Variety: Penncross **Description:** Turf-Green
BBCH Scale: BGRM

Pest Description

Pest 1 Type: D **Code:** SCLEHO Sclerotinia homoeocarpa
Common Name: Dollar spot of grasses
Pest 2 Type: D **Code:** COLLGR Colletotrichum graminicola
Common Name: Anthracnose of cereals

Site and Design

Plot Width, Unit: 5 FT **Site Type:** TURF - GOLF COURSE GREEN
Plot Length, Unit: 5 FT **Tillage Type:** NO-TILL
Replications: 4 **Study Design:** Randomized Complete Block
% Slope: 1.0

Comment: Mowed Mon, Tues, Thurs, and Fri at 0.135 inches. Water twice weekly and kept wet to encourage disease development.

Soil Description

Description Name: Disease Green
% Sand: 82 **% OM:** 15 **Texture:** SAND
% Silt: 2 **pH:** 6.4 **Soil Name:** USGA Greens Mix
% Clay: 1 **Fert. Level:** FAIR

Moisture Conditions

Overall Moisture Conditions: SLIGHTLY WET

Application Description

	A	B	C	D
Application Date:	5-27-06	6-8-06	6-24-06	7-8-06
Time of Day:	9:00	3:00	2:00	10:15
Application Method:	SPRAY	SPRAY	SPRAY	SPRAY
Application Timing:	POSPRE	POSPOS	POSPOS	POSPOS
Application Placement:	BROFOL	BROFOL	BROFOL	BROFOL
Applied By:	T. TEUTON	T. TEUTON	T. TEUTON	T. TEUTON
Air Temperature, Unit:	83 F	88 F	85 F	76 F
% Relative Humidity:	65	60	50	30
Wind Velocity, Unit:	3 MPH	2 MPH	0 MPH	3 MPH
Dew Presence (Y/N):	Y	N	N	N
Soil Temperature, Unit:	78 F	82 F	82 F	76 f
Soil Moisture:	ADEQUATE	ADEQUATE	ADEQUATE	ADEQUATE
% Cloud Cover:	0	10	0	0

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Crop Stage At Each Application

	A	B	C	D
Crop 1 Code, BBCH Scale:	AGSPL BGRM	AGSPL BGRM	AGSPL BGRM	AGSPL BGRM
Stage Scale Used:	Mature	Mature	Mature	Mature
Height, Unit:	0.135 IN	0.135 IN	0.135 IN	0.135 IN

Pest Stage At Each Application

	A	B	C	D
Pest 1 Code, Disc., Scale:	SCLEHO D	SCLEHO D	SCLEHO D	SCLEHO D
Stage Majority, Percent:	MIXED 100	MIXED 100	MIXED 100	MIXED 100
Stage Minimum, Percent:	FRTBOD 5			
Stage Maximum, Percent:	PREINF 95			
Pest 2 Code, Disc., Scale:	COLLGR D	COLLGR D	COLLGR D	COLLGR D
Stage Majority, Percent:	PRINFC 100	MIXED 100	MIXED 100	MIXED 100

Application Equipment

	A	B	C	D
Appl. Equipment:	Backpack	Backpack	Backpack	Backpack
Operating Pressure, Unit:	60 PSI	60 PSI	60 PSI	60 PSI
Nozzle Type:	Flat Fan	Flat Fan	Flat Fan	Flat Fan
Nozzle Size:	8006	8006	8006	8006
Nozzle Spacing, Unit:	14.5 In	14.5 In	14.5 In	14.5 In
Nozzle Calibration, Unit:	60 GPA	60 GPA	60 GPA	60 GPA
Boom Length, Unit:	3.75 FT	3.75 FT	3.75 FT	3.75 FT
Boom Height, Unit:	1.5 FT	1.5 FT	1.5 FT	1.5 FT
Ground Speed, Unit:	3 MPH	3 MPH	3 MPH	3 MPH
Incorporation Equip.:	NA	NA	NA	NA
Carrier:	Water	Water	Water	Water
Spray Volume, Unit:	60 GAL/AC	60 GAL/AC	60 GAL/AC	60 GAL/AC
Mix Size, Unit:	1.5 Liters	1.5 Liters	1.5 Liters	1.5 Liters
Propellant:	CO2	CO2	CO2	CO2
Tank Mix (Y/N):	N	N	N	N

University of Missouri-Columbia

Disease Control in Creeping Bentgrass Greens

Trial ID: TUR06-02
Location: South Farm

Protocol ID: TUR06-02
Study Director: Travis Teuton and Brad Fresenburg
Investigator: Travis Teuton

Pest Type	D Disease	D Disease		D Disease	D Disease			
Pest Code	COLLGR	SCLEHO		SCLEHO	COLLGR			
Pest Name	Anthracnose of cereals	Dollar spot of grasses		Dollar spot of grasses	Anthracnose of cereals			
Crop Code	AGSPL	AGSPL	AGSPL	AGSPL	AGSPL			
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM			
Crop Name	Bent grass	Bent grass	Bent grass	Bent grass	Bent grass			
Crop Variety	Penncross	Penncross	Penncross	Penncross	Penncross			
Description	Green	Green	Green	Green	Green			
Part Rated	Leaf P	Leaf P	Leaf C	Leaf P	Leaf P			
Rating Date	6-17-06	6-26-06	6-26-06	7-8-06	7-8-06			
Rating Data Type	Control	COUDIS	Quality	COUDIS	Control			
Rating Unit	%	NUMBER	1-9	NUMBER	%			
Sample Size		50		50				
Sample Size Unit		FT2		FT2				
Crop Stage	Mature	Mature	Mature	Mature	Mature			
Crop Density, Unit	100 %	100 %	100 %	100 %	100 %			
Days After First/Last Applic.	21 9	30 2	30 2	42 0	42 0			
Trt-Eval Interval	21 DA-A	30 DA-A	30 DA-A	42 DA-A	42 DA-A			
Trt No.	Treatment Name	Rate	Unit					
1	Untreated			0 b	39 b	6 cd	72 b	14 a
2	Daconil Ultrex	8.06 KG A/HA		86 a	66 a	6 d	239 a	14 a
	Chipco Signature	9.8 KG A/HA						
3	Daconil Ultrex	8.06 KG A/HA		90 a	50 ab	6 bcd	288 a	13 a
4	Bayleton	0.427 KG A/HA		95 a	1 c	7 ab	0 b	1 a
5	Eagle	0.64 KG A/HA		95 a	0 c	7 ab	0 b	1 a
6	Eagle	1.53 KG A/HA		99 a	0 c	7 abc	0 b	5 a
7	Banner Maxx	0.745 KG A/HA		94 a	1 c	7 abc	0 b	1 a
8	Emerald	0.278 KG A/HA		99 a	0 c	8 a	0 b	0 a
9	Emerald	0.384 KG A/HA		100 a	0 c	7 ab	0 b	5 a
10	Headway	0.8 KG A/HA		92 a	0 c	7 abc	12 b	9 a
11	Headway	1.6 KG A/HA		100 a	0 c	7 a	0 b	0 a
12	3336	6.1 KG A/HA		98 a	0 c	7 ab	0 b	1 a
13	26 GT	3.06 KG A/HA		99 a	7 c	7 a	0 b	1 a
LSD (P=.05)				7.9	21.3	0.7	107.5	10.3
Standard Deviation				5.5	14.9	0.5	75.2	7.2
CV				6.29	118.93	7.2	160.32	146.99
Grand Mean				88.02	12.54	6.9	46.92	4.88
Bartlett's X2				38.896	49.246	14.752	11.783	39.35
P(Bartlett's X2)				0.001*	0.001*	0.255	0.008*	0.001*
Friedman's X2				23.481	26.555	26.085	17.992	21.33
P(Friedman's X2)				0.024	0.009	0.01	0.116	0.046

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type		D Disease	D Disease	D Disease	D Disease		
Pest Code		SACLEHO	COLLGR	SACLEHO	SACLEHO		
Pest Name		Dollar spot of grasses	Anthracnose of cereals	Dollar spot of grasses	Dollar spot of grasses		
Crop Code	AGSPL	AGSPL	AGSPL	AGSPL	AGSPL		
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM		
Crop Name	Bent grass	Bent grass	Bent grass	Bent grass	Bent grass		
Crop Variety	Pennncross	Pennncross	Pennncross	Pennncross	Pennncross		
Description	Green	Green	Green	Green	Green		
Part Rated	Leaf C	Leaf P	Leaf P	Leaf C	Leaf P		
Rating Date	7-8-06	7-24-06	7-24-06	7-24-06	7-30-06		
Rating Data Type	Quality	COUDIS	Control	Quality	COUDIS		
Rating Unit	1-9	NUMBER	%	1-9	NUMBER		
Sample Size		50			50		
Sample Size Unit		FT2			FT2		
Crop Stage	Mature	Mature	Mature	Mature	Mature		
Crop Density, Unit	100 %	100 %	100 %	100 %	100 %		
Days After First/Last Applic.	42 0	58 16	58 16	58 16	64 22		
Trt-Eval Interval	42 DA-A	58 DA-A	58 DA-A	58 DA-A	64 DA-A		
Trt	Treatment						
No.	Name	Rate	Unit				
1	Untreated		5 bc	18 a	21 a	5 b	56 a
2	Daconil Ultrex	8.06 KG A/HA	4 c	3 b	3 a	7 a	1 b
	Chipco Signature	9.8 KG A/HA					
3	Daconil Ultrex	8.06 KG A/HA	4 c	8 b	4 a	6 ab	6 b
4	Bayleton	0.427 KG A/HA	8 a	0 b	10 a	7 a	0 b
5	Eagle	0.64 KG A/HA	7 a	0 b	3 a	7 a	0 b
6	Eagle	1.53 KG A/HA	7 ab	0 b	6 a	7 a	0 b
7	Banner Maxx	0.745 KG A/HA	7 ab	0 b	8 a	7 ab	0 b
8	Emerald	0.278 KG A/HA	8 a	0 b	1 a	7 a	0 b
9	Emerald	0.384 KG A/HA	7 ab	0 b	11 a	7 ab	0 b
10	Headway	0.8 KG A/HA	6 abc	0 b	10 a	7 ab	0 b
11	Headway	1.6 KG A/HA	8 a	0 b	0 a	8 a	0 b
12	3336	6.1 KG A/HA	8 a	0 b	0 a	8 a	0 b
13	26 GT	3.06 KG A/HA	8 a	0 b	1 a	8 a	0 b
LSD (P=.05)			1.4	7.2	12.1	1.1	5.3
Standard Deviation			1.0	5.0	8.5	0.8	3.7
CV			15.09	229.86	142.05	11.12	76.8
Grand Mean			6.52	2.19	5.96	6.98	4.83
Bartlett's X2			16.927	4.16	23.096	4.072	9.615
P(Bartlett's X2)			0.152	0.125	0.01*	0.944	0.008*
Friedman's X2			26.81	10.879	13.962	22.096	12.915
P(Friedman's X2)			0.008	0.539	0.303	0.036	0.375

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Pest Type	D Disease		D Disease		D Disease			
Pest Code	COLLGR		SACLEHO		COLLGR			
Pest Name	Anthracnose of cereals		Dollar spot of grasses		Anthracnose of cereals			
Crop Code	AGSPL	AGSPL	AGSPL	AGSPL	AGSPL	AGSPL		
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM		
Crop Name	Bent grass		Bent grass		Bent grass			
Crop Variety	Penncross		Penncross		Penncross			
Description	Green		Green		Green			
Part Rated	Leaf P	Leaf C	Leaf P	Leaf P	Leaf P	Leaf C		
Rating Date	7-30-06		7-30-06		8-5-06			
Rating Data Type	Control		Quality		Control			
Rating Unit	%		1-9		%			
Sample Size			50					
Sample Size Unit			FT2					
Crop Stage	Mature		Mature		Mature			
Crop Density, Unit	100 %		100 %		100 %			
Days After First/Last Applic.	64 22		64 22		70 28			
Trt-Eval Interval	64 DA-A		64 DA-A		70 DA-A			
Trt No.	Treatment Name	Rate	Unit					
1	Untreated			48 a	4 b	34 a	9 a	4 b
2	Daconil Ultrex	8.06 KG A/HA		4 cd	7 ab	0 b	0 b	8 a
	Chipco Signature	9.8 KG A/HA						
3	Daconil Ultrex	8.06 KG A/HA		14 bcd	6 ab	1 b	0 b	7 a
4	Bayleton	0.427 KG A/HA		25 a-d	6 ab	0 b	0 b	7 a
5	Eagle	0.64 KG A/HA		18 bcd	6 ab	0 b	1 b	7 a
6	Eagle	1.53 KG A/HA		20 a-d	6 ab	0 b	1 b	8 a
7	Banner Maxx	0.745 KG A/HA		43 ab	5 ab	0 b	1 b	7 a
8	Emerald	0.278 KG A/HA		5 cd	8 a	0 b	0 b	8 a
9	Emerald	0.384 KG A/HA		14 bcd	5 ab	0 b	3 b	7 a
10	Headway	0.8 KG A/HA		35 abc	5 ab	1 b	0 b	8 a
11	Headway	1.6 KG A/HA		8 cd	7 ab	0 b	0 b	8 a
12	3336	6.1 KG A/HA		0 d	8 a	0 b	0 b	6 ab
13	26 GT	3.06 KG A/HA		5 cd	7 a	0 b	0 b	8 a
LSD (P=.05)				19.6	2.0	6.1	4.3	1.8
Standard Deviation				13.7	1.4	4.3	3.0	1.3
CV				75.5	22.76	150.31	259.63	18.01
Grand Mean				18.17	6.08	2.85	1.15	7.1
Bartlett's X2				10.571	18.786	25.053	7.906	31.012
P(Bartlett's X2)				0.48	0.094	0.001*	0.095	0.001*
Friedman's X2				28.871	23.893	11.621	7.121	16.022
P(Friedman's X2)				0.004	0.021	0.477	0.85	0.19

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Pest Type		D Disease	D Disease	
Pest Code		SCLEHO	COLLGR	
Pest Name		Dollar spot of grasses	Anthracnose of cereals	
Crop Code		AGSPL	AGSPL	AGSPL
BBCH Scale		BGRM	BGRM	BGRM
Crop Name		Bent grass	Bent grass	Bent grass
Crop Variety		Penncross	Penncross	Penncross
Description		Green	Green	Green
Part Rated		Leaf P	Leaf P	Leaf C
Rating Date		8-12-06	8-12-06	8-12-06
Rating Data Type		COUDIS	Control	Quality
Rating Unit		NUMBER	%	1-9
Sample Size		50		
Sample Size Unit		FT2		
Crop Stage		Mature	Mature	Mature
Crop Density, Unit		100 %	100 %	100 %
Days After First/Last Applic.		77 35	77 35	77 35
Trt-Eval Interval		77 DA-A	77 DA-A	77 DA-A
Trt No.	Treatment Name	Rate		
		Rate Unit		
1	Untreated		86 a	15 a
2	Daconil Ultrex	8.06 KG A/HA	52 b	0 a
	Chipco Signature	9.8 KG A/HA		5 ab
3	Daconil Ultrex	8.06 KG A/HA	51 b	1 a
4	Bayleton	0.427 KG A/HA	0 c	0 a
5	Eagle	0.64 KG A/HA	5 c	0 a
6	Eagle	1.53 KG A/HA	0 c	0 a
7	Banner Maxx	0.745 KG A/HA	0 c	0 a
8	Emerald	0.278 KG A/HA	0 c	8 a
9	Emerald	0.384 KG A/HA	0 c	3 a
10	Headway	0.8 KG A/HA	2 c	2 a
11	Headway	1.6 KG A/HA	0 c	0 a
12	3336	6.1 KG A/HA	0 c	0 a
13	26 GT	3.06 KG A/HA	0 c	0 a
LSD (P=.05)			16.2	9.0
Standard Deviation			11.3	6.3
CV			75.51	294.41
Grand Mean			15.0	2.13
Bartlett's X2			11.12	15.189
P(Bartlett's X2)			0.025*	0.004*
Friedman's X2			26.168	4.063
P(Friedman's X2)			0.01	0.982

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Herbicides

University of Missouri-Columbia

USA/06432/Revolver/Clumpy rye/Nitrogen
StB-P0211

Trial ID: BAY06-01
Location: South Farm

Protocol ID: BAY06-01
Study Director: Travis Teuton
Investigator: Travis Teuton

General Trial Information

Study Director: Travis Teuton **Title:** Assistant Professor
Affiliation: University of Missouri-Columbia
Postal Code: 65211 **E-mail:** teutont@missouri.edu
Investigator: Travis Teuton **Title:** Assistant Professor
Affiliation: University of Missouri-Columbia
Postal Code: 65211 **E-mail:** teutont@missouri.edu

Trial Location

City: Columbia
State/Prov.: MO **Trial Reliability:** Excellent
Postal Code: 65211
Country: USA
Directions:
South Farm

Objectives:

Technical Questions

--What is the effect of AMS and/or MSO on the efficacy of Revolver on clumpy ryegrass control?

Compare the .4 and .6 rates of Revolver.

Would you recommend the addition of AMS or additional MSO to Revolver?

Which rates of AMS or MSO would you recommend?

Do you see any other applications for AMS or MSO re: Revolver?

Conclusions:

Revolver efficacy was increased with the addition of AMS or MSO. The best treatments for controlling clumpy ryegrass were 6 and 9 which both had the higher rate of Revolver (0.6 oz/1000 ft²) and MSO (1% V/V). The addition of AMS and/or MSO to Revolver at 0.4 oz/1000 ft² increased perennial ryegrass control. All other weeds were controlled about the same with all treatments.

Cooperator/Landowner

Cooperator: Ann Thurston **Country:** USA
Organization: Bayer Environmental Science **Phone No:** 972-633-9176
Address 1: 5017 Andover Drive
City: Plano
State/Prov: TX
Postal Code: 75023-5008 **E-mail:** ann.thurston@bayercropscience.com

Crop Description

Crop 1: CYNDA Cynodon dactylon Bermudagrass
BBCH Scale: BGRM

Pest Description

Pest 1 Type: W **Code:** LOLMU Lolium multiflorum
Common Name: Italian ryegrass

Site and Design

Plot Width, Unit: 5 FT
Plot Length, Unit: 10 FT
Replications: 4 **Study Design:** Randomized Complete Block

University of Missouri-Columbia

Application Description

	A
Application Date:	4-5-06
Time of Day:	10:00 am
Application Method:	SPRAY
Application Timing:	POSPOS
Application Placement:	BROFOL
Applied By:	T. Teuton
Air Temperature, Unit:	65 F
% Relative Humidity:	50
Wind Velocity, Unit:	3 MPH
Wind Direction:	SW
Dew Presence (Y/N):	N
Water Hardness:	N
Soil Temperature, Unit:	55 F
Soil Moisture:	ADEQUATE
% Cloud Cover:	5

Crop Stage At Each Application

	A
Crop 1 Code, BBCH Scale:	CYNDA BGRM

Pest Stage At Each Application

	A
Pest 1 Code, Disc., Scale:	LOLMU W

University of Missouri-Columbia

Pest Type	W Weed		W Weed	W Weed	W Weed
Pest Code	STEME		LOLPE	TRFRE	STEME
Pest Name	Common chickweed		Perennial ryegrass	White clover	Common chickweed
Crop Code	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM
Crop Name	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass
Crop Variety	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand
Description	Football Field	Football Field	Football Field	Football Field	Football Field
Part Rated	LEAF P	LEAF C	LEAF P	LEAF P	LEAF P
Rating Date	5-10-06	5-10-06	5-18-06	5-18-06	5-18-06
Rating Data Type	Control	Injury	Control	Control	Control
Rating Unit	%	%	%	%	%
Crop Stage	Dormant	Dormant	Dormant	Dormant	Dormant
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH
Pest Stage	Mature	Mature	Mature	Mature	Mature
Days After First/Last Applic.	35 35	35 35	43 43	43 43	43 43
Trt-Eval Interval	35 DA-A	35 DA-A	43 DA-A	43 DA-A	43 DA-A
Trt No.	Treatment Name	Rate	Unit		
1	UTC				
		0 b	0 a	0 d	0 c
2	Revolver	0.0256 LB A/A	100 a	0 a	44 c
					63 b
3	Revolver	0.0256 LB A/A	100 a	0 a	89 ab
	Ammonium Sulfate	1.48 LB A/A			96 a
4	Revolver	0.0384 LB A/A	100 a	0 a	96 ab
	Ammonium Sulfate	1.48 LB A/A			99 a
5	Revolver	0.0256 LB A/A	100 a	0 a	96 ab
	Ammonium Sulfate	1.48 LB A/A			99 a
	MSO	1 % V/V			
6	Revolver	0.0384 LB A/A	100 a	0 a	99 a
	Ammonium Sulfate	1.48 LB A/A			99 a
	MSO	1.67 LB A/A			
7	Revolver	0.0256 LB A/A	100 a	0 a	89 ab
	MSO	1 % V/V			96 a
8	Ammonium Sulfate	1.48 LB A/A	0 b	0 a	0 d
					0 c
9	Revolver	0.0384 LB A/A	100 a	0 a	97 ab
	MSO	1 % V/V			98 a
10	Revolver	0.0384 LB A/A	100 a	0 a	80 b
					96 a
LSD (P=.05)		0.0	0.0	12.2	11.4
Standard Deviation		0.0	0.0	8.4	7.9
CV		0.0	0.0	12.16	10.57
Grand Mean		80.0	0.0	68.93	74.5
Bartlett's X2		0.0	0.0	25.659	43.769
P(Bartlett's X2)		.	.	0.001*	0.001*
Friedman's X2		17.455	0.0	30.927	26.236
P(Friedman's X2)		0.042	1.00	0.001	0.002

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type		W Weed	W Weed	W Weed	
Pest Code		LOLPE	TRFRE	STEME	
Pest Name		Perennial ryegrass	White clover	Common chickweed	
Crop Code	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM
Crop Name	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass
Crop Variety	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand
Description	Football Field	Football Field	Football Field	Football Field	Football Field
Part Rated	LEAF C	LEAF P	LEAF P	LEAF P	LEAF C
Rating Date	5-18-06	5-24-06	5-24-06	5-24-06	5-24-06
Rating Data Type	Injury	Control	Control	Control	Injury
Rating Unit	%	%	%	%	%
Crop Stage	Dormant	Dormant	Dormant	Dormant	Dormant
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH
Pest Stage	Mature	Mature	Mature	Mature	Mature
Days After First/Last Applic.	43 43	49 49	49 49	49 49	49 49
Trt-Eval Interval	43 DA-A	49 DA-A	49 DA-A	49 DA-A	49 DA-A
Trt No.	Treatment Name	Rate	Unit		
1	UTC	0 a	0 d	0 b	0 a
2	Revolver	0.0256 LB A/A	0 a	69 c	100 a
3	Revolver	0.0256 LB A/A	0 a	85 abc	100 a
	Ammonium Sulfate	1.48 LB A/A			
4	Revolver	0.0384 LB A/A	0 a	95 ab	100 a
	Ammonium Sulfate	1.48 LB A/A			
5	Revolver	0.0256 LB A/A	0 a	94 ab	100 a
	Ammonium Sulfate	1.48 LB A/A			
	MSO	1 % V/V			
6	Revolver	0.0384 LB A/A	0 a	100 a	100 a
	Ammonium Sulfate	1.48 LB A/A			
	MSO	1.67 LB A/A			
7	Revolver	0.0256 LB A/A	0 a	78 abc	100 a
	MSO	1 % V/V			
8	Ammonium Sulfate	1.48 LB A/A	0 a	0 d	0 b
9	Revolver	0.0384 LB A/A	0 a	97 ab	100 a
	MSO	1 % V/V			
10	Revolver	0.0384 LB A/A	0 a	73 bc	100 a
LSD (P=.05)		0.0	17.0	0.0	0.0
Standard Deviation		0.0	11.7	0.0	0.0
CV		0.0	17.01	0.0	0.0
Grand Mean		0.0	68.88	80.0	80.0
Bartlett's X2		0.0	32.242	0.0	0.0
P(Bartlett's X2)		.	0.001*	.	.
Friedman's X2		0.0	28.2	17.455	17.455
P(Friedman's X2)		1.00	0.001	0.042	0.042

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
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Application Description

	A
Application Date:	5-18-06
Time of Day:	10:00 am
Application Method:	SPRAY
Application Timing:	POST
Application Placement:	BROFOL
Applied By:	Travis
Air Temperature, Unit:	71.1 F
% Relative Humidity:	50
Wind Velocity, Unit:	3 MPH
Wind Direction:	NE
Dew Presence (Y/N):	N
Water Hardness:	NA
Soil Temperature, Unit:	61.8 F
Soil Moisture:	ADEQUATE
% Cloud Cover:	50

Crop Stage At Each Application

	A
Crop 1 Code, BECH Scale:	CYNDA BGRM
Stage Scale Used:	DESC
Stage Majority, Percent:	30 50
Height, Unit:	1 IN

Pest Stage At Each Application

	A
Pest 1 Code, Disc., Scale:	LOLPE W
Stage Majority, Percent:	19
Diameter, Unit:	3 IN
Height, Unit:	1 IN
Density, Unit:	2 FT2

Application Equipment

	A
Appl. Equipment:	Backpack
Operating Pressure, Unit:	30 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8002
Nozzle Spacing, Unit:	14.5 In
Nozzle Calibration, Unit:	22 GPA
Boom Length, Unit:	3.75 FT
Boom Height, Unit:	1.5 FT
Ground Speed, Unit:	3 MPH
Incorporation Equip.:	NA
Carrier:	Water
Spray Volume, Unit:	22 GAL/AC
Mix Size, Unit:	0.5 Liters
Propellant:	CO2
Tank Mix (Y/N):	N

University of Missouri-Columbia

Flazasulfuron for Clumpy Perennial Ryegrass Control

Trial ID: ISK 06-01
Location: Football Field

Protocol ID: ISK 06-01
Study Director: Travis Teuton
Investigator: Travis Teuton

Pest Type	W Weed	W Weed	W Weed			W Weed
Pest Code	LOLPE	LAMPU	POLAV			LOLPE
Pest Name	Perennial ryegrass	Purple deadnettle	Prostrate knotweed			Perennial ryegrass
Crop Code	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM
Crop Name	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass
Crop Variety	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand
Description	Football Field	Football Field	Football Field	Football Field	Football Field	Football Field
Part Rated	LEAF P	LEAF P	LEAF P	LEAF C	LEAF C	LEAF P
Rating Date	5-24-06	5-24-06	5-24-06	5-24-06	5-24-06	6-5-06
Rating Data Type	Control	Control	Control	Injury	Quality	Control
Rating Unit	%	%	%	%	%	%
Crop Stage	Dormant	Dormant	Dormant	Dormant	Dormant	Dormant
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
Pest Stage	Mature	Mature	Mature	Mature	Mature	Mature
Days After First/Last Applic.	6 6	6 6	6 6	6 6	6 6	18 18
Trt-Eval Interval	6 DA-A	6 DA-A	6 DA-A	6 DA-A	6 DA-A	18 DA-A
Trt No.	Treatment	Rate				
	Name	Rate	Unit			
1	Untreated Check	0 b		0 a	0 a	0 b
2	Flazasulfuron Induce	11 a		0 a	0 a	92 a
3	Flazasulfuron Induce	10 a		0 a	0 a	93 a
4	Flazasulfuron Induce	11 a		0 a	0 a	93 a
5	Flazasulfuron Induce	12 a		0 a	0 a	94 a
LSD (P=.05)		1.7		0.0	0.0	4.8
Standard Deviation		1.1		0.0	0.0	3.1
CV		12.72		0.0	0.0	4.21
Grand Mean		8.7		0.0	0.0	74.2
Bartlett's X2		0.557		0.0	0.0	1.201
P(Bartlett's X2)		0.757		.	.	0.753
Friedman's X2		9.55		0.0	0.0	8.65
P(Friedman's X2)		0.049		1.00	1.00	0.07

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Pest Type	W Weed	W Weed			W Weed	W Weed
Pest Code	LAMPU	POLAV			LOLPE	LAMPU
Pest Name	Purple deadnettle	Prostrate knotweed			Perennial ryegrass	Purple deadnettle
Crop Code	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM
Crop Name	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass
Crop Variety	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand
Description	Football Field	Football Field	Football Field	Football Field	Football Field	Football Field
Part Rated	LEAF P	LEAF P	LEAF C	LEAF C	LEAF P	LEAF P
Rating Date	6-5-06	6-5-06	6-5-06	6-5-06	6-17-06	6-17-06
Rating Data Type	Control	Control	Injury	Quality	Control	Control
Rating Unit	%	%	%	%	%	%
Crop Stage	Dormant	Dormant	Dormant	Dormant	Dormant	Dormant
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
Pest Stage	Mature	Mature	Mature	Mature	Mature	Mature
Days After First/Last Applic.	18 18	18 18	18 18	18 18	30 30	30 30
Trt-Eval Interval	18 DA-A	18 DA-A	18 DA-A	18 DA-A	30 DA-A	30 DA-A
Trt No.	Treatment Name	Rate	Unit			
1	Untreated Check	0 a		0 a	7 a	100 a
2	Flazasulfuron Induce	5 a		0 a	6 a	100 a
3	Flazasulfuron Induce	13 a		0 a	6 a	100 a
4	Flazasulfuron Induce	38 a		0 a	6 a	100 a
5	Flazasulfuron Induce	30 a		0 a	6 a	100 a
LSD (P=.05)	26.2	10.2	0.0	0.4	1.7	0.0
Standard Deviation	17.0	6.6	0.0	0.3	1.1	0.0
CV	100.03	66.46	0.0	4.3	1.4	0.0
Grand Mean	17.0	10.0	0.0	6.28	79.75	100.0
Bartlett's X2	4.306	1.454	0.0	2.299	0.0	0.0
P(Bartlett's X2)	0.23	0.693	.	0.681	.	.
Friedman's X2	8.5	10.95	0.0	6.9	8.3	0.0
P(Friedman's X2)	0.075	0.027	1.00	0.141	0.081	1.00

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Pest Type	W Weed			W Weed	W Weed	W Weed	
Pest Code	POLAV			LOLPE	LAMPU	POLAV	
Pest Name	Prostrate knotweed			Perennial ryegrass	Purple deadnettle	Prostrate knotweed	
Crop Code	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA	
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	
Crop Name	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	
Crop Variety	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand	
Description	Football Field	Football Field	Football Field	Football Field	Football Field	Football Field	
Part Rated	LEAF P	LEAF C	LEAF C	LEAF P	LEAF P	LEAF P	
Rating Date	6-17-06	6-17-06	6-17-06	6-26-06	6-26-06	6-26-06	
Rating Data Type	Control	Injury	Quality	Control	Control	Control	
Rating Unit	%	%	%	%	%	%	
Crop Stage	Dormant	Dormant	Dormant	Dormant	Dormant	Dormant	
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	
Pest Stage	Mature	Mature	Mature	Mature	Mature	Mature	
Days After First/Last Applic.	30 30	30 30	30 30	39 39	39 39	39 39	
Trt-Eval Interval	30 DA-A	30 DA-A	30 DA-A	39 DA-A	39 DA-A	39 DA-A	
Trt No.	Treatment Name						
	Rate						
	Unit						
1	Untreated Check	0 a	0 a	5 a	0 b	100 a	0 a
2	Flazasulfuron Induce	0 a	0 a	5 a	100 a	100 a	0 a
3	Flazasulfuron Induce	0 a	0 a	5 a	100 a	100 a	0 a
4	Flazasulfuron Induce	0 a	0 a	5 a	100 a	100 a	0 a
5	Flazasulfuron Induce	0 a	0 a	5 a	100 a	100 a	0 a
LSD (P=.05)		0.0	0.0	0.6	0.0	0.0	0.0
Standard Deviation		0.0	0.0	0.4	0.0	0.0	0.0
CV		0.0	0.0	7.57	0.0	0.0	0.0
Grand Mean		0.0	0.0	5.15	80.0	100.0	0.0
Bartlett's X2		0.0	0.0	2.375	0.0	0.0	0.0
P(Bartlett's X2)		.	.	0.667	.	.	.
Friedman's X2		0.0	0.0	3.75	8.0	0.0	0.0
P(Friedman's X2)		1.00	1.00	0.441	0.092	1.00	1.00

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Pest Type			W Weed LOLPE	W Weed LAMPU	W Weed POLAV	
Pest Code			Perennial ryegrass	Purple deadnettle	Prostrate knotweed	
Pest Name						
Crop Code	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM
Crop Name	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass
Crop Variety	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand
Description	Football Field	Football Field	Football Field	Football Field	Football Field	Football Field
Part Rated	LEAF C	LEAF C	LEAF P	LEAF P	LEAF P	LEAF C
Rating Date	6-26-06	6-26-06	6-30-06	6-30-06	6-30-06	6-30-06
Rating Data Type	Injury	Quality	Control	Control	Control	Injury
Rating Unit	%	%	%	%	%	%
Crop Stage	Dormant	Dormant	Dormant	Dormant	Dormant	Dormant
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
Pest Stage	Mature	Mature	Mature	Mature	Mature	Mature
Days After First/Last Applic.	39 39	39 39	43 43	43 43	43 43	43 43
Trt-Eval Interval	39 DA-A	39 DA-A	43 DA-A	43 DA-A	43 DA-A	43 DA-A
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate
		Unit	Unit	Unit	Unit	Unit
1	Untreated Check	0 a	5 b	0 b	100 a	0 a
2	Flazasulfuron Induce	0 a	6 a	100 a	100 a	0 a
3	Flazasulfuron Induce	0 a	6 a	100 a	100 a	0 a
4	Flazasulfuron Induce	0 a	6 a	100 a	100 a	0 a
5	Flazasulfuron Induce	0 a	6 a	100 a	100 a	0 a
LSD (P=.05)	0.0	0.3	0.0	0.0	0.0	0.0
Standard Deviation	0.0	0.2	0.0	0.0	0.0	0.0
CV	0.0	2.86	0.0	0.0	0.0	0.0
Grand Mean	0.0	5.75	80.0	100.0	0.0	0.0
Bartlett's X2	0.0	2.208	0.0	0.0	0.0	0.0
P(Bartlett's X2)	.	0.697	.	.	.	.
Friedman's X2	0.0	8.3	8.0	0.0	0.0	0.0
P(Friedman's X2)	1.00	0.081	0.092	1.00	1.00	1.00

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type		W Weed LOLPE	W Weed LAMPU	W Weed POLAV		
Pest Code		Perennial ryegrass	Purple deadnettle	Prostrate knotweed		
Pest Name						
Crop Code	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM
Crop Name	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass
Crop Variety	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand
Description	Football Field	Football Field	Football Field	Football Field	Football Field	Football Field
Part Rated	LEAF C	LEAF P	LEAF P	LEAF P	LEAF C	LEAF C
Rating Date	6-30-06	7-14-06	7-14-06	7-14-06	7-14-06	7-14-06
Rating Data Type	Quality	Control	Control	Control	Injury	Quality
Rating Unit	%	%	%	%	%	%
Crop Stage	Dormant	Dormant	Dormant	Dormant	Dormant	Dormant
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
Pest Stage	Mature	Mature	Mature	Mature	Mature	Mature
Days After First/Last Applic.	43 43	57 57	57 57	57 57	57 57	57 57
Trt-Eval Interval	43 DA-A	57 DA-A	57 DA-A	57 DA-A	57 DA-A	57 DA-A
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate
		Unit	Unit	Unit	Unit	Unit
1	Untreated Check	6 a	0 b	100 a	0 a	0 a
2	Flazasulfuron Induce	6 a	100 a	100 a	0 a	0 a
3	Flazasulfuron Induce	5 a	100 a	100 a	0 a	0 a
4	Flazasulfuron Induce	5 a	100 a	100 a	0 a	0 a
5	Flazasulfuron Induce	5 a	100 a	100 a	0 a	0 a
LSD (P=.05)		0.7	0.0	0.0	0.0	0.0
Standard Deviation		0.4	0.0	0.0	0.0	0.0
CV		8.24	0.0	0.0	0.0	0.0
Grand Mean		5.4	80.0	100.0	0.0	0.0
Bartlett's X2		3.192	0.0	0.0	0.0	0.0
P(Bartlett's X2)		0.526	.	.	.	.
Friedman's X2		7.6	8.0	0.0	0.0	0.0
P(Friedman's X2)		0.107	0.092	1.00	1.00	1.00

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

University of Missouri-Columbia

Application Description

	A
Application Date:	5-18-06
Time of Day:	10:00 am
Application Method:	SPRAY
Application Timing:	POST
Application Placement:	BROFOL
Applied By:	Travis
Air Temperature, Unit:	71.1 F
% Relative Humidity:	50
Wind Velocity, Unit:	3 MPH
Wind Direction:	NE
Dew Presence (Y/N):	N
Water Hardness:	NA
Soil Temperature, Unit:	61.8 F
Soil Moisture:	ADEQUATE
% Cloud Cover:	50

Crop Stage At Each Application

	A
Crop 1 Code, BECH Scale:	CYNDA BGRM
Stage Scale Used:	DESC
Stage Majority, Percent:	30 50
Height, Unit:	1 IN

Pest Stage At Each Application

	A
Pest 1 Code, Disc., Scale:	LOLPE W
Stage Majority, Percent:	19
Diameter, Unit:	3 IN
Height, Unit:	1 IN
Density, Unit:	2 FT2

Application Equipment

	A
Appl. Equipment:	Backpack
Operating Pressure, Unit:	30 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8002
Nozzle Spacing, Unit:	14.5 In
Nozzle Calibration, Unit:	22 GPA
Boom Length, Unit:	3.75 FT
Boom Height, Unit:	1.5 FT
Ground Speed, Unit:	3 MPH
Incorporation Equip.:	NA
Carrier:	Water
Spray Volume, Unit:	22 GAL/AC
Mix Size, Unit:	0.5 Liters
Propellant:	CO2
Tank Mix (Y/N):	N

University of Missouri-Columbia

Flazasulfuron/Bermudagrass/Transition Fairways

Trial ID: ISK06-02

Protocol ID: ISK06-02

Location: Football Fields

Study Director: Travis Teuton

Investigator: Travis Teuton

	W Weed			W Weed		
Pest Type	LOLPE			LOLPE		
Pest Code	Perennial ryegrass			Perennial ryegrass		
Pest Name	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA
Crop Code	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM
BBCH Scale	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass
Crop Name	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand
Crop Variety	Football Field	Football Field	Football Field	Football Field	Football Field	Football Field
Description	LEAF P	LEAF C	LEAF C	LEAF P	LEAF C	LEAF C
Part Rated	5-24-06	5-24-06	5-24-06	6-5-06	6-5-06	6-5-06
Rating Date	Control	Greenup	Quality	Control	Greenup	Quality
Rating Data Type	%	%	%	%	%	%
Rating Unit	Dormant	Dormant	Dormant	Dormant	Dormant	Dormant
Crop Stage	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
Crop Stage Scale	Mature	Mature	Mature	Mature	Mature	Mature
Pest Stage	6 6	6 6	6 6	18 18	18 18	18 18
Days After First/Last Applic.	6 DA-A	6 DA-A	6 DA-A	18 DA-A	18 DA-A	18 DA-A
Trt-Eval Interval						
Trt No.	Treatment	Rate				
	Name	Rate	Unit			
1	Untreated	0 b	63 a	7 a	0 c	66 a
2	Flazasulfuron NIS	15 a	66 a	7 a	74 b	71 a
3	Flazasulfuron NIS	12 a	69 a	7 a	86 ab	70 a
4	Flazasulfuron NIS	16 a	68 a	7 a	85 ab	70 a
5	Flazasulfuron NIS	16 a	69 a	7 a	91 a	65 a
6	Flazasulfuron NIS	18 a	68 a	7 a	93 a	66 a
LSD (P=.05)	5.4	6.6	0.6	10.8	9.4	0.4
Standard Deviation	3.6	4.4	0.4	7.2	6.2	0.3
CV	28.28	6.53	5.72	10.03	9.11	4.33
Grand Mean	12.75	66.88	6.71	71.46	68.13	6.67
Bartlett's X2	4.263	10.998	0.957	11.409	1.21	1.239
P(Bartlett's X2)	0.234	0.051	0.966	0.022*	0.944	0.941
Friedman's X2	10.0	2.607	6.821	15.286	2.786	8.429
P(Friedman's X2)	0.075	0.76	0.234	0.009	0.733	0.134

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type	W Weed			W Weed			
Pest Code	LOLPE			LOLPE			
Pest Name	Perennial ryegrass			Perennial ryegrass			
Crop Code	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA	
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	
Crop Name	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	
Crop Variety	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand	
Description	Football Field	Football Field	Football Field	Football Field	Football Field	Football Field	
Part Rated	LEAF P	LEAF C	LEAF C	LEAF P	LEAF C	LEAF C	
Rating Date	6-17-06	6-17-06	6-17-06	6-26-06	6-26-06	6-26-06	
Rating Data Type	Control	Greenup	Quality	Control	Greenup	Quality	
Rating Unit	%	%	%	%	%	%	
Crop Stage	Dormant	Dormant	Dormant	Dormant	Dormant	Dormant	
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	
Pest Stage	Mature	Mature	Mature	Mature	Mature	Mature	
Days After First/Last Applic.	30 30	30 30	30 30	39 39	39 39	39 39	
Trt-Eval Interval	30 DA-A	30 DA-A	30 DA-A	39 DA-A	39 DA-A	39 DA-A	
Trt No.	Treatment Name	Rate	Unit				
1	Untreated	0 c	60 a	7 a	0 c	56 b	7 a
2	Flazasulfuron NIS	69 b	68 a	7 a	91 b	84 a	7 a
3	Flazasulfuron NIS	78 ab	69 a	7 a	96 ab	83 a	7 a
4	Flazasulfuron NIS	76 ab	69 a	6 a	97 a	76 a	6 a
5	Flazasulfuron NIS	85 a	69 a	6 a	95 ab	76 a	7 a
6	Flazasulfuron NIS	90 a	65 a	6 a	98 a	73 a	6 a
LSD (P=.05)	11.5	8.7	0.4	3.9	10.9	0.6	
Standard Deviation	7.6	5.7	0.3	2.6	7.2	0.4	
CV	11.53	8.64	4.32	3.24	9.66	6.57	
Grand Mean	66.25	66.46	6.46	79.46	74.58	6.42	
Bartlett's X2	4.246	5.13	2.456	2.319	2.51	3.984	
P(Bartlett's X2)	0.374	0.40	0.783	0.677	0.775	0.552	
Friedman's X2	14.393	4.75	4.929	13.5	11.0	8.107	
P(Friedman's X2)	0.013	0.447	0.425	0.019	0.051	0.15	

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type	W Weed			W Weed		
Pest Code	LOLPE			LOLPE		
Pest Name	Perennial ryegrass			Perennial ryegrass		
Crop Code	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA	CYNDA
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM
Crop Name	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass	Bermuda grass
Crop Variety	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand	Quickstand
Description	Football Field	Football Field	Football Field	Football Field	Football Field	Football Field
Part Rated	LEAF P	LEAF C	LEAF C	LEAF P	LEAF C	LEAF C
Rating Date	6-30-06	6-30-06	6-30-06	7-14-066	7-14-06	7-14-06
Rating Data Type	Control	Greenup	Quality	Control	Greenup	Quality
Rating Unit	%	%	%	%	%	%
Crop Stage	Dormant	Dormant	Dormant	Dormant	Dormant	Dormant
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
Pest Stage	Mature	Mature	Mature	Mature	Mature	Mature
Days After First/Last Applic.	43 43	43 43	43 43	57 57	57 57	57 57
Trt-Eval Interval	43 DA-A	43 DA-A	43 DA-A	57 DA-A	57 DA-A	57 DA-A
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate
1	Untreated	2 c	55 b	7 a	0 c	69 b
2	Flazasulfuron NIS	91 b	81 a	6 ab	90 b	94 a
3	Flazasulfuron NIS	94 ab	76 a	6 b	97 a	92 a
4	Flazasulfuron NIS	94 ab	80 a	6 b	96 a	96 a
5	Flazasulfuron NIS	97 ab	81 a	6 ab	99 a	97 a
6	Flazasulfuron NIS	99 a	76 a	6 b	99 a	98 a
LSD (P=.05)	4.9	10.0	0.6	4.8	8.7	1.1
Standard Deviation	3.3	6.7	0.4	3.2	5.8	0.7
CV	4.1	8.89	6.45	3.99	6.33	11.31
Grand Mean	79.46	75.0	5.94	80.04	91.04	6.25
Bartlett's X2	2.17	5.77	2.22	0.687	9.511	2.198
P(Bartlett's X2)	0.705	0.329	0.528	0.709	0.09	0.699
Friedman's X2	14.893	10.25	9.857	12.571	9.357	9.5
P(Friedman's X2)	0.011	0.068	0.079	0.028	0.096	0.091

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Application Description

	A	B
Application Date:	5-28-06	6-21-06
Time of Day:	12:00	1:00
Application Method:	SPRAY	SPRAY
Application Timing:	POSPOS	POSPOS
Application Placement:	BROFOL	BROFOL
Applied By:	T. Teuton	T. Teuton
Air Temperature, Unit:	88 F	95 F
% Relative Humidity:	50	50
Wind Velocity, Unit:	4 MPH	4 MPH
Wind Direction:	S	S
Dew Presence (Y/N):	n	n
Soil Temperature, Unit:	78 F	83 F
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	0	0

Crop Stage At Each Application

	A	B
Crop 1 Code, BBCH Scale:	POAPR BGRM	POAPR BGRM
Stage Scale Used:	BBCH	
Height, Unit:	1 IN	1 IN

Pest Stage At Each Application

	A	B
Pest 1 Code, Disc., Scale:	FESAR W DESC	FESAR W
Stage Majority, Percent:	19	19
Diameter, Unit:	6 IN	6 IN
Height, Unit:	1 IN	1 IN
Density, Unit:	3 M2	3 M2

Application Equipment

	A	B
Appl. Equipment:	Backpack	Backpack
Operating Pressure, Unit:	30 PSI	30 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	8002	8002
Nozzle Spacing, Unit:	14.5 In	14.5 In
Nozzle Calibration, Unit:	22 GPA	22 GPA
Boom Length, Unit:	3.75 FT	3.75 FT
Boom Height, Unit:	1.5 FT	1.5 FT
Ground Speed, Unit:	3 MPH	3 MPH
Incorporation Equip.:	NA	NA
Carrier:	Water	Water
Spray Volume, Unit:	22 GAL/AC	22 GAL/AC
Mix Size, Unit:	0.5 Liters	0.5 Liters
Propellant:	CO2	CO2
Tank Mix (Y/N):	N	N

University of Missouri-Columbia

Tall Fescue Control in Kentucky Bluegrass with Certainty Herbicide

Trial ID: MON06-01
 Location: South Farm

Protocol ID: MON06-01
 Study Director: Travis Teuton
 Investigator: Travis Teuton

Pest Type		W Weed	W Weed		W Weed		
Pest Code		FESAR	TAROF		FESAR		
Pest Name		Tall fescue	Common dandelion		Tall fescue		
Crop Code	POAPR	POAPR	POAPR	POAPR	POAPR		
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM		
Crop Name	Kentucky bluegrass	Kentucky bluegrass	Kentucky bluegrass	Kentucky bluegrass	Kentucky bluegrass		
Description	Mature	Mature	Mature	Mature	Mature		
Part Rated	LEAF C	LEAF P	LEAF P	LEAF C	LEAF P		
Rating Date	6-6-06	6-6-06	6-6-06	6-17-06	6-17-06		
Rating Data Type	Injury	Control	Control	Injury	Control		
Rating Unit	%	%	%	%	%		
Crop Stage	Mature	Mature	Mature	Mature	Mature		
Pest Stage	Mature	Mature	Mature	Mature	Mature		
Days After First/Last Applic.	9 9	9 9	9 9	20 20	20 20		
Trt-Eval Interval	9 DA-A	9 DA-A	9 DA-A	20 DA-A	20 DA-A		
Trt No.	Treatment Name	Rate	Rate	Rate	Rate		
		Unit	Unit	Unit	Unit		
1	Certainty NIS	0.035 LB A/A 0.25 % V/V	0 a	15 a	8 a	3 a	60 a
	Certainty NIS	0.035 LB A/A 0.25 % V/V					
2	Certainty NIS	0.047 LB A/A 0.25 % V/V	0 a	11 a	13 a	5 a	63 a
	Certainty NIS	0.047 LB A/A 0.25 % V/V					
3	Untreated		0 a	0 b	0 b	0 a	0 b
LSD (P=.05)		0.0	0.0	8.5	6.4	8.7	12.6
Standard Deviation		0.0	0.0	4.9	3.7	5.0	7.3
CV		0.0	0.0	56.34	55.9	200.0	17.79
Grand Mean		0.0	0.0	8.75	6.67	2.5	40.83
Bartlett's X2		0.0	0.0	1.425	0.0	0.059	0.072
P(Bartlett's X2)		.	.	0.233	0.001*	0.809	0.789
Friedman's X2		0.0	0.0	4.875	5.375	1.125	6.0
P(Friedman's X2)		1.00	1.00	0.087	0.068	0.57	0.05

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type	W Weed		W Weed	W Weed
Pest Code	TAROF		FESAR	TAROF
Pest Name	Common dandelion		Tall fescue	Common dandelion
Crop Code	POAPR	POAPR	POAPR	POAPR
BBCH Scale	BGRM	BGRM	BGRM	BGRM
Crop Name	Kentucky bluegrass	Kentucky bluegrass	Kentucky bluegrass	Kentucky bluegrass
Description	Mature	Mature	Mature	Mature
Part Rated	LEAF P	LEAF C	LEAF P	LEAF P
Rating Date	6-17-06	8-30-06	8-30-06	8-30-06
Rating Data Type	Control	Injury	Control	Control
Rating Unit	%	%	%	%
Crop Stage	Mature	Mature	Mature	Mature
Pest Stage	Mature	Mature	Mature	Mature
Days After First/Last Applic.	20 20	94 70	94 70	94 70
Trt-Eval Interval	20 DA-A	94 DA-A	94 DA-A	94 DA-A
Trt No.	Treatment Name	Rate	Rate	Rate
		Unit	Unit	Unit
1	Certainty	0.035 LB A/A	48 a	0 a
	NIS	0.25 % V/V		
	Certainty	0.035 LB A/A		
	NIS	0.25 % V/V		
2	Certainty	0.047 LB A/A	45 a	0 a
	NIS	0.25 % V/V		
	Certainty	0.047 LB A/A		
	NIS	0.25 % V/V		
3	Untreated		0 b	0 a
LSD (P=.05)		8.7	0.0	0.0
Standard Deviation		5.0	0.0	0.0
CV		16.22	0.0	0.0
Grand Mean		30.83	0.0	66.67
Bartlett's X2		0.059	0.0	0.0
P(Bartlett's X2)		0.809	.	.
Friedman's X2		6.125	0.0	6.0
P(Friedman's X2)		0.047	1.00	0.05

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Crop Stage At Each Application

	A	B
Crop 1 Code, BBCH Scale:	POAPR BGRM	POAPR BGRM
Stage Scale Used:	BBCH	
Height, Unit:	2 IN	2 IN

Pest Stage At Each Application

	A		B	
Pest 1 Code, Disc., Scale:	LOLPE	W DESC	LOLPE	W
Stage Majority, Percent:	19		19	
Diameter, Unit:	6	IN	6	IN
Height, Unit:	1	IN	1	IN
Density, Unit:	3	M2	3	M2
Pest 2 Code, Disc., Scale:	CYPES	W	CYPES	W
Stage Majority, Percent:	13	90	13	90
Density, Unit:	10	M2	10	M2
Coverage, Unit:	10	%	10	%

Application Equipment

	A	B
Appl. Equipment:	Backpack	Backpack
Operating Pressure, Unit:	30 PSI	30 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	8002	8002
Nozzle Spacing, Unit:	14.5 In	14.5 In
Nozzle Calibration, Unit:	22 GPA	22 GPA
Boom Length, Unit:	3.75 FT	3.75 FT
Boom Height, Unit:	1.5 FT	1.5 FT
Ground Speed, Unit:	3 MPH	3 MPH
Incorporation Equip.:	NA	NA
Carrier:	Water	Water
Spray Volume, Unit:	22 GAL/AC	22 GAL/AC
Mix Size, Unit:	0.5 Liters	0.5 Liters
Propellant:	CO2	CO2
Tank Mix (Y/N):	N	N

University of Missouri-Columbia

Yellow Nutsedge Control with Certainty in Mixed Cool Season Turf-Broadcast (Seasons Ridge)

Trial ID: MON06-02
Location: Seasons Ridge

Protocol ID: MON06-02
Study Director: Travis Teuton
Investigator: Travis Teuton

Pest Type			W Weed				
Pest Code			CYPES				
Pest Name			Yellow Nutsedge				
Crop Code	POAPR	LOLPE	POAPR	POAPR	LOLPE		
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM		
Crop Name	Kentucky bluegrass	Perennial ryegrass	Kentucky bluegrass	Kentucky bluegrass	Perennial ryegrass		
Description	Mature	Mature	Mature	Mature	Mature		
Part Rated	LEAF C	LEAF P	LEAF P	LEAF C	LEAF P		
Rating Date	7-7-06	7-7-06	7-7-06	7-20-06	7-20-06		
Rating Data Type	Injury	Control	Control	Injury	Control		
Rating Unit	%	%	%	%	%		
Crop Stage	Mature	Mature	Mature	Mature	Mature		
Pest Stage	Mature	Mature	Mature	Mature	Mature		
Days After First/Last Applic.	14 14	14 14	14 14	27 0	27 0		
Trt-Eval Interval	14 DA-A	14 DA-A	14 DA-A	27 DA-A	27 DA-A		
Trt No.	Treatment Name	Rate	Rate	Rate	Rate		
		Unit	Unit	Unit	Unit		
1	Certainty NIS	0.0117 LB A/A 0.25 % V/V	0 a	43 a	59 a	0 a	50 b
2	Certainty NIS	0.0234 LB A/A 0.25 % V/V	0 a	48 a	50 a	0 a	81 a
3	Certainty NIS	0.035 LB A/A 0.25 % V/V	0 a	45 a	60 a	0 a	88 a
4	Certainty NIS	0.047 LB A/A 0.25 % V/V	0 a	45 a	61 a	3 a	80 a
5	Certainty NIS	0.0117 LB A/A 0.25 % V/V	0 a	45 a	53 a	0 a	40 b
6	Certainty NIS	0.0234 LB A/A 0.25 % V/V	0 a	53 a	51 a	0 a	78 a
7	Certainty NIS	0.035 LB A/A 0.25 % V/V	0 a	45 a	58 a	3 a	92 a
8	Manage NIS	0.0625 LB A/A 0.25 % V/V	0 a	0 b	66 a	0 a	0 c
9	Manage NIS	0.0625 LB A/A 0.25 % V/V	0 a	0 b	64 a	0 a	0 c
10	Untreated		0 a	0 b	0 b	0 a	0 c
LSD (P=.05)		0.0	13.8	12.4	3.3	15.9	
Standard Deviation		0.0	9.5	8.5	2.3	10.9	
CV		0.0	29.46	16.33	455.42	21.53	
Grand Mean		0.0	32.25	52.13	0.5	50.83	
Bartlett's X2		0.0	4.513	6.797	0.0	5.57	
P(Bartlett's X2)		.	0.608	0.559	0.001*	0.35	
Friedman's X2		0.0	24.573	17.741	1.091	30.736	
P(Friedman's X2)		1.00	0.003	0.038	0.999	0.001	

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type	W Weed			W Weed			
Pest Code	CYPES			CYPES			
Pest Name	Yellow Nutsedge			Yellow Nutsedge			
Crop Code	POAPR	POAPR	LOLPE	POAPR	POAPR		
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM		
Crop Name	Kentucky bluegrass	Kentucky bluegrass	Perennial ryegrass	Kentucky bluegrass	Kentucky bluegrass		
Description	Mature	Mature	Mature	Mature	Mature		
Part Rated	LEAF P	LEAF C	LEAF P	LEAF P	LEAF C		
Rating Date	7-20-06	8-25-06	8-25-06	8-25-06	10-3-06		
Rating Data Type	Control	Injury	Control	Control	Injury		
Rating Unit	%	%	%	%	%		
Crop Stage	Mature	Mature	Mature	Mature	Mature		
Pest Stage	Mature	Mature	Mature	Mature	Mature		
Days After First/Last Applic.	27 0	63 36	63 36	63 36	102 75		
Trt-Eval Interval	27 DA-A	63 DA-A	63 DA-A	63 DA-A	102 DA-A		
Trt No.	Treatment Name	Rate	Rate	Rate	Rate		
		Unit	Unit	Unit	Unit		
1	Certainty NIS	0.0117 LB A/A 0.25 % V/V	80 a	0 b	8 c	15 c	13 c
2	Certainty NIS	0.0234 LB A/A 0.25 % V/V	91 a	0 b	8 c	8 c	8 c
3	Certainty NIS	0.035 LB A/A 0.25 % V/V	91 a	0 b	0 c	10 c	0 c
4	Certainty NIS	0.047 LB A/A 0.25 % V/V	93 a	0 b	0 c	43 b	18 c
5	Certainty NIS	0.0117 LB A/A 0.25 % V/V	78 a	15 b	25 c	85 a	60 b
6	Certainty NIS	0.0234 LB A/A 0.25 % V/V	89 a	20 b	55 b	89 a	78 ab
7	Certainty NIS	0.035 LB A/A 0.25 % V/V	89 a	93 a	85 a	90 a	88 a
8	Manage NIS	0.0625 LB A/A 0.25 % V/V	70 a	0 b	0 c	8 c	0 c
9	Manage NIS	0.0625 LB A/A 0.25 % V/V	91 a	0 b	0 c	83 a	0 c
10	Untreated		0 b	0 b	0 c	0 c	0 c
LSD (P=.05)			21.1	15.0	24.3	17.6	21.7
Standard Deviation			14.5	10.3	16.8	12.1	14.9
CV			18.84	81.11	93.15	28.27	56.92
Grand Mean			77.13	12.75	18.0	42.88	26.25
Bartlett's X2			48.992	0.769	3.441	11.626	3.353
P(Bartlett's X2)			0.001*	0.681	0.487	0.114	0.646
Friedman's X2			20.659	13.255	19.923	29.55	25.882
P(Friedman's X2)			0.014	0.151	0.018	0.001	0.002

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
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Pest Type		W Weed
Pest Code		CYPES
Pest Name		Yellow Nutsedge
Crop Code	LOLPE	POAPR
BBCH Scale	BGRM	BGRM
Crop Name	Perennial ryegrass	Kentucky bluegrass
Description	Mature	Mature
Part Rated	LEAF P	LEAF P
Rating Date	10-3-06	10-3-06
Rating Data Type	Control	Control
Rating Unit	%	%
Crop Stage	Mature	Mature
Pest Stage	Mature	Mature
Days After First/Last Applic.	102 75	102 75
Trt-Eval Interval	102 DA-A	102 DA-A
Trt No.	Treatment Name	Rate Unit
1	Certainty NIS	0.0117 LB A/A 0.25 % V/V
		0 d
		0 b
2	Certainty NIS	0.0234 LB A/A 0.25 % V/V
		0 d
		0 b
3	Certainty NIS	0.035 LB A/A 0.25 % V/V
		0 d
		8 b
4	Certainty NIS	0.047 LB A/A 0.25 % V/V
		0 d
		8 b
5	Certainty NIS	0.0117 LB A/A 0.25 % V/V
		40 c
		83 a
6	Certainty NIS	0.0234 LB A/A 0.25 % V/V
		50 b
		78 a
7	Certainty NIS	0.035 LB A/A 0.25 % V/V
		91 a
		88 a
8	Manage NIS	0.0625 LB A/A 0.25 % V/V
		0 d
		13 b
9	Manage NIS	0.0625 LB A/A 0.25 % V/V
		0 d
		78 a
10	Untreated	
		0 d
		0 b
LSD (P=.05)		9.5
Standard Deviation		6.5
CV		35.96
Grand Mean		18.13
Bartlett's X2		0.884
P(Bartlett's X2)		0.643
Friedman's X2		23.577
P(Friedman's X2)		0.005

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Crop Stage At Each Application

	A	B
Crop 1 Code, BBCH Scale:	POAPR BGRM	POAPR BGRM
Stage Scale Used:	BBCH	
Height, Unit:	2 IN	2 IN

Pest Stage At Each Application

	A		B	
Pest 1 Code, Disc., Scale:	LOLPE	W DESC	LOLPE	W
Stage Majority, Percent:	19		19	
Diameter, Unit:	6	IN	6	IN
Height, Unit:	1	IN	1	IN
Density, Unit:	3	M2	3	M2
Pest 2 Code, Disc., Scale:	CYPES	W	CYPES	W
Stage Majority, Percent:	13	90	13	90
Density, Unit:	10	M2	10	M2
Coverage, Unit:	10	%	10	%

Application Equipment

	A		B	
Appl. Equipment:	Backpack		Backpack	
Operating Pressure, Unit:	30	PSI	30	PSI
Nozzle Type:	Flat Fan		Flat Fan	
Nozzle Size:	8003		8003	
Nozzle Spacing, Unit:	0	In	0	In
Nozzle Calibration, Unit:	40	GPA	40	GPA
Boom Length, Unit:	0	FT	0	FT
Boom Height, Unit:	1.5	FT	1.5	FT
Ground Speed, Unit:	0.85 MPH		0.85 MPH	
Incorporation Equip.:	NA		NA	
Carrier:	Water		Water	
Spray Volume, Unit:	40	GAL/AC	40	GAL/AC
Mix Size, Unit:	2	Liters	2	Liters
Propellant:	CO2		CO2	
Tank Mix (Y/N):	N		N	

University of Missouri-Columbia

Yellow Nutsedge Control with Certainty in Mixed Cool Season Turf-Spray to Wet (Seasons Ridge)

Trial ID: MON06-03
Location: Seasons Ridge

Protocol ID: MON06-03
Study Director: Travis Teuton
Investigator: Travis Teuton

Pest Type				W Weed					
Pest Code				CYPES					
Pest Name				Yellow Nutsedge					
Crop Code	POAPR	LOLPE	FESAR	POAPR	POAPR	LOLPE			
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM			
Crop Name	Kentucky bluegrass	Perennial ryegrass	Tall fescue	Kentucky bluegrass	Kentucky bluegrass	Perennial ryegrass			
Description	Mature	Mature	Mature	Mature	Mature	Mature			
Part Rated	LEAF C	LEAF P	LEAF P	LEAF P	LEAF C	LEAF P			
Rating Date	7-7-06	7-7-06	7-7-06	7-7-06	7-20-06	7-20-06			
Rating Data Type	Injury	Control	Control	Control	Injury	Control			
Rating Unit	%	%	%	%	%	%			
Crop Stage	Mature	Mature	Mature	Mature	Mature	Mature			
Pest Stage	Mature	Mature	Mature	Mature	Mature	Mature			
Days After First/Last Applic.	14 14	14 14	14 14	14 14	27 0	27 0			
Trt-Eval Interval	14 DA-A	14 DA-A	14 DA-A	14 DA-A	27 DA-A	27 DA-A			
Trt No.	Treatment Name	Rate	Rate Unit						
1	Certainty NIS	0.0117 LB A/A 0.25 % V/V		0 a	40 a	38 a	40 a	0 a	30 b
2	Certainty NIS	0.0234 LB A/A 0.25 % V/V		0 a	43 a	45 a	43 a	0 a	55 a
3	Certainty NIS	0.035 LB A/A 0.25 % V/V		0 a	50 a	48 a	50 a	0 a	68 a
4	Certainty NIS	0.0117 LB A/A 0.25 % V/V		0 a	40 a	45 a	38 a	0 a	30 b
5	Certainty NIS	0.0234 LB A/A 0.25 % V/V		0 a	43 a	48 a	48 a	0 a	45 ab
6	Certainty NIS	0.035 LB A/A 0.25 % V/V		0 a	50 a	50 a	45 a	0 a	61 a
7	Manage NIS	0.0625 LB A/A 0.25 % V/V		0 a	0 b	0 b	59 a	0 a	0 c
8	Manage NIS	0.0625 LB A/A 0.25 % V/V		0 a	0 b	0 b	58 a	0 a	0 c
9	Untreated			0 a	0 b	0 b	0 b	0 a	0 c
LSD (P=.05)		0.0		0.0	8.3	14.2	13.4	0.0	17.6
Standard Deviation		0.0		0.0	5.7	9.7	9.2	0.0	12.1
CV		0.0		0.0	19.4	32.06	21.84	0.0	37.65
Grand Mean		0.0		0.0	29.44	30.28	42.08	0.0	32.08
Bartlett's X2		0.0		0.0	1.139	1.707	3.028	0.0	2.648
P(Bartlett's X2)		.		.	0.951	0.789	0.805	.	0.449
Friedman's X2		0.0		0.0	24.017	22.467	17.917	0.0	27.583
P(Friedman's X2)		1.00		1.00	0.002	0.004	0.022	1.00	0.001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

University of Missouri-Columbia

Pest Type		W Weed			W Weed			
Pest Code		CYPES			CYPES			
Pest Name		Yellow Nutsedge			Yellow Nutsedge			
Crop Code	FESAR	POAPR	POAPR	LOLPE	POAPR			
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM			
Crop Name	Tall fescue	Kentucky bluegrass	Kentucky bluegrass	Perennial ryegrass	Kentucky bluegrass			
Description	Mature	Mature	Mature	Mature	Mature			
Part Rated	LEAF P	LEAF P	LEAF C	LEAF P	LEAF P			
Rating Date	7-20-06	7-20-06	8-25-06	8-25-06	8-25-06			
Rating Data Type	Control	Control	Injury	Control	Control			
Rating Unit	%	%	%	%	%			
Crop Stage	Mature	Mature	Mature	Mature	Mature			
Pest Stage	Mature	Mature	Mature	Mature	Mature			
Days After First/Last Applic.	27 0	27 0	63 36	63 36	63 36			
Trt-Eval Interval	27 DA-A	27 DA-A	63 DA-A	63 DA-A	63 DA-A			
Trt No.	Treatment Name	Rate	Unit					
1	Certainty NIS	0.0117 0.25 % V/V	LB A/A	30 b	55 c	20 b	8 b	0 c
2	Certainty NIS	0.0234 0.25 % V/V	LB A/A	55 a	85 ab	18 b	8 b	8 c
3	Certainty NIS	0.035 0.25 % V/V	LB A/A	68 a	92 a	8 b	8 b	55 b
4	Certainty NIS	0.0117 0.25 % V/V	LB A/A	30 b	53 c	68 a	30 b	53 b
5	Certainty NIS	0.0234 0.25 % V/V	LB A/A	45 ab	75 b	85 a	85 a	75 ab
6	Certainty NIS	0.035 0.25 % V/V	LB A/A	64 a	83 ab	90 a	83 a	88 a
7	Manage NIS	0.0625 0.25 % V/V	LB A/A	0 c	93 a	0 b	0 b	53 b
8	Manage NIS	0.0625 0.25 % V/V	LB A/A	0 c	95 a	0 b	0 b	15 c
9	Untreated			0 c	0 d	0 b	0 b	0 c
LSD (P=.05)		17.2		17.2	10.8	23.5	20.9	18.1
Standard Deviation		11.8		11.8	7.4	16.1	14.3	12.4
CV		36.34		36.34	10.61	50.43	58.52	32.39
Grand Mean		32.36		32.36	69.97	31.94	24.44	38.33
Bartlett's X2		3.138		3.138	10.784	2.549	1.178	5.942
P(Bartlett's X2)		0.371		0.371	0.095	0.769	0.947	0.43
Friedman's X2		27.95		27.95	26.467	23.617	21.717	28.25
P(Friedman's X2)		0.001		0.001	0.001	0.003	0.005	0.001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

University of Missouri-Columbia

Pest Type				W Weed
Pest Code				CYPES
Pest Name				Yellow Nutsedge
Crop Code	POAPR	LOLPE	FESAR	POAPR
BBCH Scale	BGRM	BGRM	BGRM	BGRM
Crop Name	Kentucky bluegrass	Perennial ryegrass	Tall fescue	Kentucky bluegrass
Description	Mature	Mature	Mature	Mature
Part Rated	LEAF C	LEAF P	LEAF P	LEAF P
Rating Date	10-3-06	10-3-06	10-3-06	10-3-06
Rating Data Type	Injury	Control	Control	Control
Rating Unit	%	%	%	%
Crop Stage	Mature	Mature	Mature	Mature
Pest Stage	Mature	Mature	Mature	Mature
Days After First/Last Applic.	102 75	102 75	102 75	102 75
Trt-Eval Interval	102 DA-A	102 DA-A	102 DA-A	102 DA-A
Trt No.	Treatment Name	Rate	Unit	
1	Certainty NIS	0.0117 0.25 % V/V	LB A/A	33 b
				15 c
				75 a
				0 c
2	Certainty NIS	0.0234 0.25 % V/V	LB A/A	30 b
				25 bc
				100 a
				8 c
3	Certainty NIS	0.035 0.25 % V/V	LB A/A	88 a
				55 ab
				100 a
				13 c
4	Certainty NIS	0.0117 0.25 % V/V	LB A/A	81 a
	Certainty NIS	0.0117 0.25 % V/V	LB A/A	
				73 a
				100 a
				25 c
5	Certainty NIS	0.0234 0.25 % V/V	LB A/A	96 a
	Certainty NIS	0.0234 0.25 % V/V	LB A/A	
				88 a
				100 a
				85 a
6	Certainty NIS	0.035 0.25 % V/V	LB A/A	90 a
	Certainty NIS	0.035 0.25 % V/V	LB A/A	
				78 a
				90 a
				91 a
7	Manage NIS	0.0625 0.25 % V/V	LB A/A	0 b
	Manage NIS	0.0625 0.25 % V/V	LB A/A	
				0 c
				0 b
				53 b
8	Manage NIS	0.0625 0.25 % V/V	LB A/A	0 b
				0 c
				0 b
				15 c
9	Untreated			0 b
				0 c
				0 b
				0 c
LSD (P=.05)		30.8		32.7
Standard Deviation		21.1		22.4
CV		45.44		60.71
Grand Mean		46.39		36.94
Bartlett's X2		9.227		4.475
P(Bartlett's X2)		0.10		0.483
Friedman's X2		23.15		21.517
P(Friedman's X2)		0.003		0.006
				25.0
				17.2
				27.33
				62.78
				2.189
				0.139
				20.567
				0.008
				20.6
				14.1
				44.09
				32.06
				6.122
				0.41
				23.9
				0.002

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University of Missouri-Columbia

Yellow Nutsedge Control with Certainty in Mixed Cool Season Turf-Broadcast (South Farm)

Trial ID: MON06-04	Protocol ID: MON06-02
Location: South Farm	Study Director: Travis Teuton
	Investigator: Travis Teuton

General Trial Information

Study Director: Travis Teuton	Title: Assistant Professor
Affiliation: University of Missouri-Columbia	
Postal Code: 65211	E-mail: teutont@missouri.edu
Investigator: Travis Teuton	Title: Assistant Professor
Affiliation: University of Missouri-Columbia	
Postal Code: 65211	E-mail: teutont@missouri.edu

Trial Location

City: Columbia
State/Prov.: MO
Postal Code: 65211
Country: USA

Official Trial Code: 2006-01-A7-21

Cooperator/Landowner

Cooperator: Domingo Riego	Country: USA
Organization: Monsanto	Phone No: 317-575-8769
Address 1: 1307 Cottonwood Court	Fax No: 317-574-9157
City: Carmel	
State/Prov: IN	
Postal Code: 46033	E-mail: domingo.c.riego@monsanto.com

Crop Description

Crop 1: POAPR Poa pratensis Kentucky bluegrass
BBCH Scale: BGRM

Pest Description

Pest 1 Type: W **Code:** LOLPE Lolium perenne
Common Name: Perennial ryegrass
Description: Unknown

Pest 2 Type: W **Code:** CYPES Cyperus esculentus
Common Name: Yellow Nutsedge

Site and Design

Plot Width, Unit: 5 FT **Site Type:** TURF - RESEARCH
Plot Length, Unit: 10 FT **Tillage Type:** NO-TILL
Replications: 4 **Study Design:** Randomized Complete Block
% Slope: 4.0 **Soil Drainage:** G Good

Comment: Mowed Weekly at 2 inches

Moisture Conditions

Overall Moisture Conditions: DRY

Application Description

	A	B
Application Date:	6-28-06	8-4-06
Time of Day:	5:00 pm	12:00
Application Method:	SPRAY	SPRAY
Application Timing:	POSPOS	POSPOS
Application Placement:	BROFOL	BROFOL
Applied By:	T. Teuton	T. Teuton
Air Temperature, Unit:	85 F	93 F
% Relative Humidity:	50	50
Wind Velocity, Unit:	0 MPH	2 MPH
Wind Direction:		S
Dew Presence (Y/N):	n	n
Soil Temperature, Unit:	82 F	83 F
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	0	0

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Crop Stage At Each Application

	A	B
Crop 1 Code, BBCH Scale:	POAPR BGRM	POAPR BGRM
Stage Scale Used:	BBCH	
Height, Unit:	2 IN	2 IN

Pest Stage At Each Application

	A		B	
Pest 1 Code, Disc., Scale:	LOLPE	W DESC	LOLPE	W
Stage Majority, Percent:	19		19	
Diameter, Unit:	6	IN	6	IN
Height, Unit:	1	IN	1	IN
Density, Unit:	3	M2	3	M2
Pest 2 Code, Disc., Scale:	CYPES	W	CYPES	W
Stage Majority, Percent:	13	90	13	90
Density, Unit:	10	M2	10	M2
Coverage, Unit:	10	%	10	%

Application Equipment

	A	B
Appl. Equipment:	Backpack	Backpack
Operating Pressure, Unit:	30 PSI	30 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	8002	8002
Nozzle Spacing, Unit:	14.5 In	14.5 In
Nozzle Calibration, Unit:	22 GPA	22 GPA
Boom Length, Unit:	3.75 FT	3.75 FT
Boom Height, Unit:	1.5 FT	1.5 FT
Ground Speed, Unit:	3 MPH	3 MPH
Incorporation Equip.:	NA	NA
Carrier:	Water	Water
Spray Volume, Unit:	22 GAL/AC	22 GAL/AC
Mix Size, Unit:	0.5 Liters	0.5 Liters
Propellant:	CO2	CO2
Tank Mix (Y/N):	N	N

University of Missouri-Columbia

Yellow Nutsedge Control with Certainty in Mixed Cool Season Turf-Broadcast

Trial ID: MON06-04
Location: South Farm

Protocol ID: MON06-02
Study Director: Travis Teuton
Investigator: Travis Teuton

Pest Type			W Weed CYPES Yellow Nutsedge			W Weed CYPES Yellow Nutsedge	
Pest Code							
Pest Name							
Crop Code	POAPR	FESAR		POAPR	FESAR		
BBCH Scale	BGRM	BGRM		BGRM	BGRM		
Crop Name	Kentucky bluegrass	Tall fescue		Kentucky bluegrass	Tall fescue		
Description	Mature	Mature	Mature	Mature	Mature	Mature	
Part Rated	LEAF C	LEAF C	LEAF P	LEAF C	LEAF C	LEAF P	
Rating Date	7-15-06	7-15-06	7-15-06	8-5-06	8-5-06	8-5-06	
Rating Data Type	Injury	Injury	Control	Injury	Injury	Control	
Rating Unit	%	%	%	%	%	%	
Crop Stage	Mature	Mature	Mature	Mature	Mature	Mature	
Pest Stage	Mature	Mature	Mature	Mature	Mature	Mature	
Days After First/Last Applic.	17 17	17 17	17 17	38 1	38 1	38 1	
Trt-Eval Interval	17 DA-A	17 DA-A	17 DA-A	38 DA-A	38 DA-A	38 DA-A	
Trt Treatment							
No. Name	Rate	Rate	Rate	Rate	Rate	Rate	
	Unit	Unit	Unit	Unit	Unit	Unit	
1 Certainty	0.0117 LB A/A	0 a	45 a	86 a	0 a	66 b	63 b
NIS	0.25 % V/V						
2 Certainty	0.0234 LB A/A	0 a	50 a	88 a	0 a	86 a	83 a
NIS	0.25 % V/V						
3 Certainty	0.035 LB A/A	0 a	60 a	90 a	0 a	93 a	91 a
NIS	0.25 % V/V						
4 Certainty	0.047 LB A/A	0 a	63 a	89 a	0 a	94 a	94 a
NIS	0.25 % V/V						
5 Certainty	0.0117 LB A/A	0 a	60 a	88 a	0 a	93 a	89 a
NIS	0.25 % V/V						
Certainty	0.0117 LB A/A						
NIS	0.25 % V/V						
6 Certainty	0.0234 LB A/A	0 a	53 a	81 a	0 a	80 ab	88 a
NIS	0.25 % V/V						
Certainty	0.0234 LB A/A						
NIS	0.25 % V/V						
7 Certainty	0.035 LB A/A	0 a	53 a	90 a	0 a	79 ab	89 a
NIS	0.25 % V/V						
Certainty	0.035 LB A/A						
NIS	0.25 % V/V						
8 Manage	0.0625 LB A/A	0 a	13 b	83 a	0 a	0 c	91 a
NIS	0.25 % V/V						
9 Manage	0.0625 LB A/A	0 a	0 b	83 a	0 a	0 c	91 a
NIS	0.25 % V/V						
Manage	0.0625 LB A/A						
NIS	0.25 % V/V						
10 Untreated		0 a	0 b	0 b	0 a	0 c	0 c
LSD (P=.05)		0.0	13.9	10.4	0.0	13.2	13.8
Standard Deviation		0.0	9.6	7.2	0.0	9.1	9.5
CV		0.0	24.21	9.22	0.0	15.47	12.2
Grand Mean		0.0	39.5	77.63	0.0	59.0	77.75
Bartlett's X2		0.0	9.01	8.913	0.0	22.582	27.856
P(Bartlett's X2)		.	0.109	0.259	.	0.001*	0.001*
Friedman's X2		0.0	28.309	12.573	0.0	29.236	17.823
P(Friedman's X2)		1.00	0.001	0.183	1.00	0.001	0.037

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

University of Missouri-Columbia

Pest Type			W Weed
Pest Code			CYPES
Pest Name			Yellow Nutsedge
Crop Code	POAPR	FESAR	
BBCH Scale	BGRM	BGRM	
Crop Name	Kentucky bluegrass	Tall fescue	
Description	Mature	Mature	Mature
Part Rated	LEAF C	LEAF C	LEAF P
Rating Date	8-30-06	8-30-06	8-30-06
Rating Data Type	Injury	Injury	Control
Rating Unit	%	%	%
Crop Stage	Mature	Mature	Mature
Pest Stage	Mature	Mature	Mature
Days After First/Last Applic.	63 26	63 26	63 26
Trt-Eval Interval	63 DA-A	63 DA-A	63 DA-A
Trt No.	Treatment Name	Rate	Unit
1	Certainty NIS	0.0117 LB A/A 0.25 % V/V	0 c
2	Certainty NIS	0.0234 LB A/A 0.25 % V/V	15 c
3	Certainty NIS	0.035 LB A/A 0.25 % V/V	25 c
4	Certainty NIS	0.047 LB A/A 0.25 % V/V	45 b
5	Certainty NIS	0.0117 LB A/A 0.25 % V/V	100 a
6	Certainty NIS	0.0234 LB A/A 0.25 % V/V	93 a
7	Certainty NIS	0.035 LB A/A 0.25 % V/V	90 a
8	Manage NIS	0.0625 LB A/A 0.25 % V/V	0 c
9	Manage NIS	0.0625 LB A/A 0.25 % V/V	0 c
10	Untreated		0 c
LSD (P=.05)		16.7	9.7
Standard Deviation		11.5	6.7
CV		31.39	13.0
Grand Mean		36.75	51.38
Bartlett's X2		9.35	1.968
P(Bartlett's X2)		0.053	0.854
Friedman's X2		28.773	34.295
P(Friedman's X2)		0.001	0.001

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Crop Stage At Each Application

	A	B
Crop 1 Code, BBCH Scale:	POAPR BGRM	POAPR BGRM
Stage Scale Used:	BBCH	
Height, Unit:	2 IN	2 IN

Pest Stage At Each Application

	A		B	
Pest 1 Code, Disc., Scale:	LOLPE	W DESC	LOLPE	W
Stage Majority, Percent:	19		19	
Diameter, Unit:	6	IN	6	IN
Height, Unit:	1	IN	1	IN
Density, Unit:	3	M2	3	M2
Pest 2 Code, Disc., Scale:	CYPES	W	CYPES	W
Stage Majority, Percent:	13	90	13	90
Density, Unit:	10	M2	10	M2
Coverage, Unit:	10	%	10	%

Application Equipment

	A	B
Appl. Equipment:	Backpack	Backpack
Operating Pressure, Unit:	30 PSI	30 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	0 In	0 In
Nozzle Calibration, Unit:	40 GPA	40 GPA
Boom Length, Unit:	0 FT	0 FT
Boom Height, Unit:	1.5 FT	1.5 FT
Ground Speed, Unit:	0.85 MPH	0.85 MPH
Incorporation Equip.:	NA	NA
Carrier:	Water	Water
Spray Volume, Unit:	40 GAL/AC	40 GAL/AC
Mix Size, Unit:	2 Liters	2 Liters
Propellant:	CO2	CO2
Tank Mix (Y/N):	N	N

Equipment Comment: This is a single nozzle boom calibrated to deliver 40 GPA.

University of Missouri-Columbia

Yellow Nutsedge Control with Certainty in Mixed Cool Season Turf-Spray to Wet

Trial ID: MON06-05
Location: South Farm

Protocol ID: MON06-03
Study Director: Travis Teuton
Investigator: Travis Teuton

Pest Type			W Weed CYPES Yellow Nutsedge			W Weed CYPES Yellow Nutsedge			
Pest Code									
Pest Name									
Crop Code	POAPR	FESAR		POAPR	FESAR				
BBCH Scale	BGRM	BGRM		BGRM	BGRM				
Crop Name	Kentucky bluegrass	Tall fescue		Kentucky bluegrass	Tall fescue				
Description	Mature	Mature	Mature	Mature	Mature	Mature			
Part Rated	LEAF C	LEAF C	LEAF P	LEAF C	LEAF C	LEAF P			
Rating Date	7-15-06	7-15-06	7-15-06	8-5-06	8-5-06	8-5-06			
Rating Data Type	Injury	Control	Control	Injury	Control	Control			
Rating Unit	%	%	%	%	%	%			
Crop Stage	Mature	Mature	Mature	Mature	Mature	Mature			
Pest Stage	Mature	Mature	Mature	Mature	Mature	Mature			
Days After First/Last Applic.	17 17	17 17	17 17	38 1	38 1	38 1			
Trt-Eval Interval	17 DA-A	17 DA-A	17 DA-A	38 DA-A	38 DA-A	38 DA-A			
Trt No.	Treatment Name	Rate	Unit						
1	Certainty NIS	0.0117 LB A/A 0.25 % V/V	A/A	0 a	50 ab	70 a	0 a	68 b	74 a
2	Certainty NIS	0.0234 LB A/A 0.25 % V/V	A/A	0 a	58 ab	70 a	0 a	69 b	80 a
3	Certainty NIS	0.035 LB A/A 0.25 % V/V	A/A	0 a	60 a	70 a	0 a	74 ab	84 a
4	Certainty NIS	0.0117 LB A/A 0.25 % V/V	A/A	0 a	48 b	70 a	0 a	63 b	65 a
5	Certainty NIS	0.0234 LB A/A 0.25 % V/V	A/A	0 a	55 ab	70 a	0 a	63 b	65 a
6	Certainty NIS	0.035 LB A/A 0.25 % V/V	A/A	0 a	58 ab	70 a	0 a	84 a	90 a
7	Manage NIS	0.0625 LB A/A 0.25 % V/V	A/A	0 a	0 c	73 a	0 a	0 c	91 a
8	Manage NIS	0.0625 LB A/A 0.25 % V/V	A/A	0 a	0 c	73 a	0 a	0 c	90 a
9	Untreated			0 a	0 c	0 b	0 a	0 c	0 b
LSD (P=.05)		0.0		0.0	7.9	3.2	0.0	11.0	19.1
Standard Deviation		0.0		0.0	5.4	2.2	0.0	7.6	13.1
CV		0.0		0.0	14.78	3.51	0.0	16.26	18.41
Grand Mean		0.0		0.0	36.39	62.78	0.0	46.53	70.97
Bartlett's X2		0.0		0.0	2.631	0.0	0.0	5.891	8.646
P(Bartlett's X2)		.		.	0.621	0.001*	.	0.317	0.124
Friedman's X2		0.0		0.0	24.75	10.4	0.0	25.083	16.05
P(Friedman's X2)		1.00		1.00	0.002	0.238	1.00	0.002	0.042

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University of Missouri-Columbia

Pest Type			W Weed
Pest Code			CYPES
Pest Name			Yellow Nutsedge
Crop Code	POAPR	FESAR	
BBCH Scale	BGRM	BGRM	
Crop Name	Kentucky bluegrass	Tall fescue	
Description	Mature	Mature	Mature
Part Rated	LEAF C	LEAF C	LEAF P
Rating Date	8-31-06	8-31-06	8-31-06
Rating Data Type	Injury	Control	Control
Rating Unit	%	%	%
Crop Stage	Mature	Mature	Mature
Pest Stage	Mature	Mature	Mature
Days After First/Last Applic.	64 27	64 27	64 27
Trt-Eval Interval	64 DA-A	64 DA-A	64 DA-A
Trt No.	Treatment Name	Rate	Unit
1	Certainty NIS	0.0117 LB A/A 0.25 % V/V	8 cd
2	Certainty NIS	0.0234 LB A/A 0.25 % V/V	15 cd
3	Certainty NIS	0.035 LB A/A 0.25 % V/V	23 c
4	Certainty NIS Certainty NIS	0.0117 LB A/A 0.25 % V/V 0.0117 LB A/A 0.25 % V/V	25 c
5	Certainty NIS Certainty NIS	0.0234 LB A/A 0.25 % V/V 0.0234 LB A/A 0.25 % V/V	58 b
6	Certainty NIS Certainty NIS	0.035 LB A/A 0.25 % V/V 0.035 LB A/A 0.25 % V/V	83 a
7	Manage NIS Manage NIS	0.0625 LB A/A 0.25 % V/V 0.0625 LB A/A 0.25 % V/V	0 d
8	Manage NIS	0.0625 LB A/A 0.25 % V/V	0 d
9	Untreated		0 d
LSD (P=.05)		14.6	10.0
Standard Deviation		10.0	6.8
CV		42.96	15.71
Grand Mean		23.33	43.47
Bartlett's X2		3.251	6.569
P(Bartlett's X2)		0.661	0.255
Friedman's X2		23.183	29.95
P(Friedman's X2)		0.003	0.001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

University of Missouri-Columbia

Crop Stage At Each Application

	A		B	
Crop 1 Code, BBCH Scale:	FESAR	BGRM	FESAR	BGRM
Stage Scale Used:	BBCH		BBCH	
Stage Majority, Percent:	29	100	29	100
Height, Unit:	1.5	IN	1.5	IN

Pest Stage At Each Application

	A		B	
Pest 1 Code, Disc., Scale:	DIGSA	W BBCH	DIGSA	W
Stage Majority, Percent:	00	100	00	100
Diameter, Unit:	0		0	
Height, Unit:	0		0	
Height Minimum, Maximum:	0		0	
Pest 2 Code, Disc., Scale:	TRFRE	W	TRFRE	W
Stage Majority, Percent:	00	100	11	
Diameter, Unit:			1	CM
Height, Unit:			1.5	IN
Density, Unit:			100	M2
Coverage, Unit:			100	%

Application Equipment

	A	B
Appl. Equipment:	Shaker Bottl	Shaker Bottl

Equipment Comment: Shaker bottle used with holes drilled in the bottom.

University of Missouri-Columbia

Tall Fescue: Crabgrass and White Clover Control

Trial ID: SYN06-01
Location: South Farm

Protocol ID: SYN06-01
Study Director: Travis Teuton
Investigator: Travis Teuton

Pest Type		W Weed	W Weed		W Weed	W Weed
Pest Code		DIGSA	TRFRE		DIGSA	TRFRE
Pest Name		Large crabgrass	Dutch clover		Large crabgrass	Dutch clover
Crop Code	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM
Crop Name	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue
Description	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type
Part Rated	LEAF C	LEAF P	LEAF P	LEAF C	LEAF P	LEAF P
Rating Date	4-19-06	4-26-06	4-26-06	4-26-06	5-2-06	5-2-06
Rating Data Type	Injury	Control	Control	Injury	Control	Control
Rating Unit	%	%	%	%	%	%
Crop Stage	Mature	Mature	Mature	Mature	Mature	Mature
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
Crop Density, Unit	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT
Assessed By	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton
Days After First/Last Applic.	8 8	15 15	15 15	15 15	21 21	21 21
Trt-Eval Interval	7 DAIT	21 DA-A	21 DA-A	21 DA-A	21 DA-A	21 DA-A
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate
		Unit	Unit	Unit	Unit	Unit
1	EXC853	280 G A/HA	0 a	100 a	100 a	95 a
2	A14843	600 G A/HA	0 a	100 a	100 a	100 a
3	EXC856	840 G A/HA	0 a	100 a	100 a	100 a
4	EXC916	1800 G A/HA	0 a	100 a	100 a	94 a
5	EXC917	286 G A/HA	0 a	100 a	100 a	100 a
6	EXC853	280 G A/HA	0 a	100 a	100 a	100 a
7	A14843	600 G A/HA	0 a	100 a	100 a	100 a
8	EXC856	840 G A/HA	0 a	100 a	100 a	100 a
9	EXC916	1800 G A/HA	0 a	100 a	100 a	100 a
10	EXC917	286 G A/HA	0 a	100 a	100 a	75 a
11	EXC853	280 G A/HA	0 a	100 a	100 a	0 b
12	EXC915	2550 G A/HA	0 a	100 a	100 a	0 b
13	UNTREATED		0 a	100 a	100 a	0 b
LSD (P=.05)		0.0	0.0	0.0	0.0	20.7
Standard Deviation		0.0	0.0	0.0	0.0	14.5
CV		0.0	0.0	0.0	0.0	19.49
Grand Mean		0.0	100.0	100.0	0.0	74.13
Bartlett's X2		0.0	0.0	0.0	0.0	8.765
P(Bartlett's X2)		.	.	.	.	0.012*
Friedman's X2		0.0	0.0	0.0	0.0	25.549
P(Friedman's X2)		0.001	0.001	0.001	0.001	0.012

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type		W Weed	W Weed		W Weed	W Weed	
Pest Code		DIGSA	TRFRE		DIGSA	TRFRE	
Pest Name		Large crabgrass	Dutch clover		Large crabgrass	Dutch clover	
Crop Code	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	
Crop Name	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	
Description	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	
Part Rated	LEAF C	LEAF P	LEAF P	LEAF C	LEAF P	LEAF P	
Rating Date	5-2-06	5-8-06	5-8-06	5-8-06	5-25-06	5-25-06	
Rating Data Type	Injury	Control	Control	Injury	Control	Control	
Rating Unit	%	%	%	%	%	%	
Crop Stage	Mature	Mature	Mature	Mature	Mature	Mature	
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	
Crop Density, Unit	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	
Assessed By	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	
Days After First/Last Applic.	21 21	27 27	27 27	27 27	44 44	44 44	
Trt-Eval Interval	21 DA-A	27 DA-A	27 DA-A	27 DA-A	44 DA-A	44 DA-A	
Trt Treatment	Rate						
No. Name	Rate Unit						
1 EXC853	280 G A/HA	3 a	100 a	98 a	0 a	100 a	99 a
2 A14843	600 G A/HA	0 a	100 a	65 b	0 a	100 a	99 a
3 EXC856	840 G A/HA	1 a	100 a	93 a	0 a	100 a	99 a
4 EXC916	1800 G A/HA	1 a	100 a	98 a	0 a	100 a	91 a
5 EXC917	286 G A/HA	0 a	100 a	90 a	0 a	100 a	93 a
6 EXC853	280 G A/HA	3 a	100 a	100 a	0 a	100 a	99 a
EXC853	280 G A/HA						
7 A14843	600 G A/HA	0 a	100 a	93 a	0 a	100 a	99 a
EXC853	280 G A/HA						
8 EXC856	840 G A/HA	4 a	100 a	93 a	0 a	100 a	99 a
EXC853	280 G A/HA						
9 EXC916	1800 G A/HA	0 a	100 a	98 a	0 a	100 a	99 a
EXC915	2550 G A/HA						
10 EXC917	286 G A/HA	0 a	100 a	100 a	0 a	100 a	98 a
EXC915	2550 G A/HA						
11 EXC853	280 G A/HA	0 a	100 a	0 c	0 a	100 a	0 b
12 EXC915	2550 G A/HA	1 a	100 a	0 c	0 a	100 a	0 b
13 UNTREATED		0 a	100 a	0 c	0 a	100 a	0 b
LSD (P=.05)	2.3	0.0	12.5	0.0	0.0	8.1	
Standard Deviation	1.6	0.0	8.7	0.0	0.0	5.7	
CV	166.53	0.0	12.27	0.0	0.0	7.59	
Grand Mean	0.96	100.0	71.15	0.0	100.0	74.81	
Bartlett's X2	0.162	0.0	9.018	0.0	0.0	32.245	
P(Bartlett's X2)	0.999	.	0.251	.	.	0.001*	
Friedman's X2	8.571	0.0	31.516	0.0	0.0	26.588	
P(Friedman's X2)	0.739	0.001	0.002	0.001	0.001	0.009	

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

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Pest Type		W Weed	W Weed		W Weed	W Weed	
Pest Code		DIGSA	TRFRE		DIGSA	TRFRE	
Pest Name		Large crabgrass	Dutch clover		Large crabgrass	Dutch clover	
Crop Code	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	
Crop Name	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	
Description	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	
Part Rated	LEAF C	LEAF P	LEAF P	LEAF C	LEAF P	LEAF P	
Rating Date	6-6-06	6-6-06	6-6-06	6-17-06	6-17-06	6-17-06	
Rating Data Type	Injury	Control	Control	Injury	Control	Control	
Rating Unit	%	%	%	%	%	%	
Crop Stage	Mature	Mature	Mature	Mature	Mature	Mature	
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	
Crop Density, Unit	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	
Assessed By	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	
Days After First/Last Applic.	56 9	56 9	56 9	67 20	67 20	67 20	
Trt-Eval Interval	56 DA-A	56 DA-A	56 DA-A	67 DA-A	67 DA-A	67 DA-A	
Trt Treatment	Rate						
No. Name	Rate Unit						
1 EXC853	280 G A/HA	0 a	100 a	85 a	0 a	100 a	70 bc
2 A14843	600 G A/HA	0 a	100 a	74 a	0 a	100 a	69 bc
3 EXC856	840 G A/HA	0 a	100 a	75 a	0 a	100 a	78 ab
4 EXC916	1800 G A/HA	0 a	100 a	73 a	0 a	100 a	60 c
5 EXC917	286 G A/HA	0 a	100 a	83 a	0 a	100 a	85 ab
6 EXC853	280 G A/HA	0 a	100 a	91 a	0 a	100 a	93 a
	EXC853						
7 A14843	600 G A/HA	0 a	100 a	83 a	0 a	100 a	91 a
	EXC853						
8 EXC856	840 G A/HA	0 a	100 a	89 a	0 a	100 a	94 a
	EXC853						
9 EXC916	1800 G A/HA	0 a	100 a	85 a	0 a	100 a	84 ab
	EXC915						
10 EXC917	286 G A/HA	0 a	100 a	95 a	0 a	100 a	93 a
	EXC915						
11 EXC853	280 G A/HA	0 a	100 a	28 b	0 a	100 a	43 d
12 EXC915	2550 G A/HA	0 a	100 a	5 c	0 a	100 a	5 e
13 UNTREATED		0 a	100 a	0 c	0 a	100 a	0 e
LSD (P=.05)		0.0	0.0	15.5	0.0	0.0	11.6
Standard Deviation		0.0	0.0	10.8	0.0	0.0	8.1
CV		0.0	0.0	16.28	0.0	0.0	12.21
Grand Mean		0.0	100.0	66.44	0.0	100.0	66.35
Bartlett's X2		0.0	0.0	13.341	0.0	0.0	20.154
P(Bartlett's X2)		.	.	0.272	.	.	0.043*
Friedman's X2		0.0	0.0	33.47	0.0	0.0	42.758
P(Friedman's X2)		0.001	0.001	0.001	0.001	0.001	0.001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type		W Weed	W Weed
Pest Code		DIGSA	TRFRE
Pest Name		Large crabgrass	Dutch clover
Crop Code	FESAR	FESAR	FESAR
BBCH Scale	BGRM	BGRM	BGRM
Crop Name	Tall fescue	Tall fescue	Tall fescue
Description	Turf Type	Turf Type	Turf Type
Part Rated	LEAF C	LEAF P	LEAF P
Rating Date	7-1-06	7-1-06	7-1-06
Rating Data Type	Injury	Control	Control
Rating Unit	%	%	%
Crop Stage	Mature	Mature	Mature
Crop Stage Scale	BBCH	BBCH	BBCH
Crop Density, Unit	100 PERCENT	100 PERCENT	100 PERCENT
Assessed By	T. Teuton	T. Teuton	T. Teuton
Days After First/Last Applic.	81 34	81 34	81 34
Trt-Eval Interval	81 DA-A	81 DA-A	81 DA-A
Trt No.	Treatment Name	Rate	Unit
1	EXC853	280 G	A/HA
2	A14843	600 G	A/HA
3	EXC856	840 G	A/HA
4	EXC916	1800 G	A/HA
5	EXC917	286 G	A/HA
6	EXC853	280 G	A/HA
7	A14843	600 G	A/HA
8	EXC856	840 G	A/HA
9	EXC916	1800 G	A/HA
10	EXC917	286 G	A/HA
11	EXC853	280 G	A/HA
12	EXC915	2550 G	A/HA
13	UNTREATED		
LSD (P=.05)	0.0	0.0	16.8
Standard Deviation	0.0	0.0	11.7
CV	0.0	0.0	26.18
Grand Mean	0.0	100.0	44.81
Bartlett's X2	0.0	0.0	3.632
P(Bartlett's X2)	.	.	0.934
Friedman's X2	0.0	0.0	42.354
P(Friedman's X2)	0.001	0.001	0.001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

University of Missouri-Columbia

Tall Fescue: Crabgrass and White Clover Control

Trial ID: SYN06-03
Location: South Farm

Protocol ID: SYN06-01
Study Director: Travis Teuton
Investigator: Travis Teuton

General Trial Information

Study Director: Travis Teuton **Title:** Assistant Professor
Affiliation: University of Missouri-Columbia
Postal Code: 65211 **E-mail:** teutont@missouri.edu
Investigator: Travis Teuton **Title:** Assistant Professor
Affiliation: University of Missouri-Columbia
Postal Code: 65211 **E-mail:** teutont@missouri.edu

Trial Location

City: Columbia **Trial Status:** ESTABLISHED
State/Prov.: MO **Trial Reliability:** Good
Postal Code: 65211 **Initiation Date:** 4-11-06
Country: USA

Cooperator/Landowner

Cooperator: Jackie Driver **Country:** USA
Organization: Syngenta **Phone No:** 254-848-5650
Fax No: 254-723-4825
E-mail: jackie.driver@syngenta.com

Crop Description

Crop 1: FESAR Festuca arundinacea **Tall fescue**
Description: Lawn Height
BBCH Scale: BGRM
Planting Method: Seeded **Rate, Unit:** 10 LB/1000FT2
Depth, Unit: 0.25 IN **Perennial Age, Unit:** 1 YR
Seed Bed: SMOOTH

Pest Description

Pest 1 Type: W **Code:** DIGSA **Digitaria sanguinalis**
Common Name: Large crabgrass
Description: Planted 4-10-06 2 lb/1000ft2
Pest 2 Type: W **Code:** TRFRE **Trifolium repens**
Common Name: Dutch clover
Description: Planted 4-10-06 2 lb/1000ft

Site and Design

Plot Width, Unit: 5 FT **Site Type:** TURF - RESEARCH
Plot Length, Unit: 10 FT **Tillage Type:** NO-TILL
Replications: 4 **Study Design:** Randomized Complete Block
% Slope: 1.0 **Soil Drainage:** G Good

Moisture Conditions

Overall Moisture Conditions: SLIGHTLY DRY
Closest Weather Station: South Farm **Distance:** 0.5 **Unit:** MI

Application Description

	A	B
Application Date:	4-22-06	6-3-06
Time of Day:	8:00 am	9:00 am
Application Method:	IMPREG	IMPREG
Application Timing:	POSPRE	POSPRE
Application Placement:	SURFAC	SURFAC
Applied By:	T. Teuton	T. Teuton
Air Temperature, Unit:	65 F	78 F
% Relative Humidity:	60	40
Wind Velocity, Unit:	1 MPH	1 MPH
Wind Direction:	S	S
Dew Presence (Y/N):	Y	Y
Water Hardness:	NA	NA
Soil Temperature, Unit:	60 F	68 F
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	15	15

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Crop Stage At Each Application

	A	B
Crop 1 Code, BBCH Scale:	FESAR BGRM	FESAR BGRM
Stage Scale Used:	BBCH	BBCH
Stage Majority, Percent:	29 100	29 100
Height, Unit:	1.5 IN	1.5 IN

Pest Stage At Each Application

	A	B
Pest 1 Code, Disc., Scale:	DIGSA W BBCH	DIGSA W
Stage Majority, Percent:	00 100	00 100
Diameter, Unit:	0	0
Height, Unit:	0	0
Height Minimum, Maximum:	0	0
Pest 2 Code, Disc., Scale:	TRFRE W	TRFRE W
Stage Majority, Percent:	00 100	11
Diameter, Unit:		1 CM
Height, Unit:		1.5 IN
Density, Unit:		100 M2
Coverage, Unit:		100 %

Application Equipment

	A	B
Appl. Equipment:	Shaker Bottl	Shaker Bottl

Equipment Comment: Shaker bottle used with holes drilled in the bottom.

University of Missouri-Columbia

Tall Fescue: Crabgrass and White Clover Control

Trial ID: SYN06-03
Location: South Farm

Protocol ID: SYN06-01
Study Director: Travis Teuton
Investigator: Travis Teuton

Pest Type	W Weed	W Weed		W Weed	W Weed	
Pest Code	DIGSA	TRFRE		DIGSA	TRFRE	
Pest Name	Large crabgrass	Dutch clover		Large crabgrass	Dutch clover	
Crop Code	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM
Crop Name	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue
Description	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type
Part Rated	LEAF P	LEAF P	LEAF C	LEAF P	LEAF P	LEAF C
Rating Date	5-2-06	5-2-06	5-2-06	5-8-06	5-8-06	5-8-06
Rating Data Type	Control	Control	Injury	Control	Control	Injury
Rating Unit	%	%	%	%	%	%
Crop Stage	Mature	Mature	Mature	Mature	Mature	Mature
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
Crop Density, Unit	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT
Assessed By	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton
Days After First/Last Applic.	10 10	10 10	10 10	16 16	16 16	16 16
Trt-Eval Interval	10 DA-A	10 DA-A	10 DA-A	16 DA-A	16 DA-A	16 DA-A
Trt Treatment	Rate					
No. Name	Rate Unit					
1 EXC853	280 G A/HA	100 a	10 a	0 a	100 a	53 a
2 A14843	600 G A/HA	100 a	0 a	0 a	100 a	0 c
3 EXC856	840 G A/HA	100 a	15 a	1 a	100 a	40 b
4 EXC916	1800 G A/HA	100 a	0 a	0 a	100 a	0 c
5 EXC917	286 G A/HA	100 a	0 a	0 a	100 a	0 c
6 EXC853	280 G A/HA	100 a	10 a	0 a	100 a	43 b
7 A14843	600 G A/HA	100 a	5 a	1 a	100 a	0 c
8 EXC856	840 G A/HA	100 a	15 a	0 a	100 a	58 a
9 EXC916	1800 G A/HA	100 a	5 a	0 a	100 a	0 c
10 EXC917	286 G A/HA	100 a	0 a	0 a	100 a	0 c
11 EXC853	280 G A/HA	100 a	5 a	0 a	100 a	0 c
12 EXC915	2550 G A/HA	100 a	0 a	0 a	100 a	0 c
13 UNTREATED		100 a	0 a	0 a	100 a	0 c
LSD (P=.05)		0.0	11.4	1.4	0.0	9.9
Standard Deviation		0.0	8.0	1.0	0.0	6.9
CV		0.0	159.06	516.94	0.0	46.77
Grand Mean		100.0	5.0	0.19	100.0	14.81
Bartlett's X2		0.0	0.174	0.0	0.0	2.849
P(Bartlett's X2)		.	1.00	1.00	.	0.415
Friedman's X2		0.0	11.143	1.179	0.0	31.212
P(Friedman's X2)		0.001	0.517	1.00	0.001	0.002

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type	W Weed	W Weed		W Weed	W Weed		
Pest Code	DIGSA	TRFRE		DIGSA	TRFRE		
Pest Name	Large crabgrass	Dutch clover		Large crabgrass	Dutch clover		
Crop Code	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	
Crop Name	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	
Description	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	
Part Rated	LEAF P	LEAF P	LEAF C	LEAF P	LEAF P	LEAF C	
Rating Date	5-19-06	5-19-06	5-19-06	6-6-06	6-6-06	6-6-06	
Rating Data Type	Control	Control	Injury	Control	Control	Injury	
Rating Unit	%	%	%	%	%	%	
Crop Stage	Mature	Mature	Mature	Mature	Mature	Mature	
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	
Crop Density, Unit	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	
Assessed By	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	
Days After First/Last Applic.	27 27	27 27	27 27	45 3	45 3	45 3	
Trt-Eval Interval	27 DA-A	27 DA-A	27 DA-A	45 DA-A	45 DA-A	45 DA-A	
Trt Treatment	Rate						
No. Name	Rate Unit						
1 EXC853	280 G A/HA	100 a	86 a	0 a	100 a	85 a	0 a
2 A14843	600 G A/HA	100 a	0 c	0 a	100 a	0 d	0 a
3 EXC856	840 G A/HA	100 a	94 a	0 a	100 a	95 a	0 a
4 EXC916	1800 G A/HA	100 a	0 c	0 a	100 a	3 d	0 a
5 EXC917	286 G A/HA	100 a	0 c	0 a	100 a	3 d	0 a
6 EXC853	280 G A/HA	100 a	53 b	0 a	100 a	61 b	0 a
	EXC853						
7 A14843	600 G A/HA	100 a	8 c	0 a	100 a	23 cd	0 a
	EXC853						
8 EXC856	840 G A/HA	100 a	88 a	0 a	100 a	90 a	0 a
	EXC853						
9 EXC916	1800 G A/HA	100 a	0 c	0 a	100 a	38 c	0 a
	EXC915						
10 EXC917	286 G A/HA	100 a	0 c	0 a	100 a	30 c	0 a
	EXC915						
11 EXC853	280 G A/HA	100 a	0 c	0 a	100 a	0 d	0 a
12 EXC915	2550 G A/HA	100 a	0 c	0 a	100 a	18 cd	0 a
13 UNTREATED		100 a	0 c	0 a	100 a	0 d	0 a
LSD (P=.05)		0.0	8.6	0.0	0.0	16.4	0.0
Standard Deviation		0.0	6.0	0.0	0.0	11.5	0.0
CV		0.0	23.81	0.0	0.0	33.66	0.0
Grand Mean		100.0	25.19	0.0	100.0	34.13	0.0
Bartlett's X2		0.0	8.917	0.0	0.0	15.969	0.0
P(Bartlett's X2)		.	0.063	.	.	0.068	.
Friedman's X2		0.0	32.019	0.0	0.0	39.602	0.0
P(Friedman's X2)		0.001	0.001	0.001	0.001	0.001	0.001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type	W Weed	W Weed		W Weed	W Weed		
Pest Code	DIGSA	TRFRE		DIGSA	TRFRE		
Pest Name	Large crabgrass	Dutch clover		Large crabgrass	Dutch clover		
Crop Code	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	
Crop Name	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	
Description	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	
Part Rated	LEAF P	LEAF P	LEAF C	LEAF P	LEAF P	LEAF C	
Rating Date	6-17-06	6-17-06	6-17-06	7-1-06	7-1-06	7-1-06	
Rating Data Type	Control	Control	Injury	Control	Control	Injury	
Rating Unit	%	%	%	%	%	%	
Crop Stage	Mature	Mature	Mature	Mature	Mature	Mature	
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	
Crop Density, Unit	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	
Assessed By	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	
Days After First/Last Applic.	56 14	56 14	56 14	70 28	70 28	70 28	
Trt-Eval Interval	56 DA-A	56 DA-A	56 DA-A	70 DA-A	70 DA-A	70 DA-A	
Trt Treatment	Rate						
No. Name	Rate Unit						
1 EXC853	280 G A/HA	100 a	65 b	0 a	53 b	65 a-d	0 a
2 A14843	600 G A/HA	100 a	0 d	0 a	91 a	0 f	0 a
3 EXC856	840 G A/HA	100 a	85 a	0 a	98 a	78 abc	0 a
4 EXC916	1800 G A/HA	100 a	0 d	0 a	93 a	43 de	0 a
5 EXC917	286 G A/HA	100 a	0 d	0 a	99 a	33 e	0 a
6 EXC853	280 G A/HA	100 a	88 a	0 a	96 a	93 a	0 a
EXC853	280 G A/HA						
7 A14843	600 G A/HA	100 a	60 b	0 a	98 a	70 a-d	0 a
EXC853	280 G A/HA						
8 EXC856	840 G A/HA	100 a	90 a	1 a	99 a	79 ab	0 a
EXC853	280 G A/HA						
9 EXC916	1800 G A/HA	100 a	65 b	0 a	96 a	56 b-e	0 a
EXC915	2550 G A/HA						
10 EXC917	286 G A/HA	100 a	85 a	0 a	95 a	85 a	0 a
EXC915	2550 G A/HA						
11 EXC853	280 G A/HA	100 a	48 c	0 a	99 a	50 cde	0 a
12 EXC915	2550 G A/HA	100 a	63 b	0 a	0 c	51 b-e	0 a
13 UNTREATED		100 a	0 d	0 a	0 c	0 f	0 a
LSD (P=.05)		0.0	11.4	1.0	11.2	18.5	0.0
Standard Deviation		0.0	8.0	0.7	7.8	13.0	0.0
CV		0.0	16.07	721.11	10.01	24.01	0.0
Grand Mean		100.0	49.81	0.1	78.08	53.94	0.0
Bartlett's X2		0.0	8.716	0.0	43.462	16.039	0.0
P(Bartlett's X2)		.	0.367	.	0.001*	0.099	.
Friedman's X2		0.0	42.527	0.643	30.511	38.209	0.0
P(Friedman's X2)		0.001	0.001	1.00	0.002	0.001	0.001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
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Pest Type	W Weed	W Weed			W Weed	W Weed	
Pest Code	DIGSA	TRFRE			DIGSA	TRFRE	
Pest Name	Large crabgrass	Dutch clover			Large crabgrass	Dutch clover	
Crop Code	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	
Crop Name	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	
Description	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	Turf Type	
Part Rated	LEAF P	LEAF P	LEAF C	LEAF C	LEAF P	LEAF P	
Rating Date	7-8-06	7-8-06	7-8-06	7-8-06	8-30-06	8-30-06	
Rating Data Type	Control	Control	Injury	Quality	Control	Control	
Rating Unit	%	%	%	1-9	%	%	
Crop Stage	Mature	Mature	Mature	Mature	Mature	Mature	
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	
Crop Density, Unit	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	100 PERCENT	
Assessed By	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	T. Teuton	
Days After First/Last Applic.	77 35	77 35	77 35	77 35	130 88	130 88	
Trt-Eval Interval	77 DA-A	77 DA-A	77 DA-A	77 DA-A	77 DA-A	77 DA-A	
Trt Treatment	Rate						
No. Name	Rate Unit						
1 EXC853	280 G A/HA	40 b	53 c	0 a	5 bc	20 c	43 bcd
2 A14843	600 G A/HA	94 a	0 d	0 a	5 bc	69 ab	0 e
3 EXC856	840 G A/HA	94 a	86 ab	0 a	7 a	70 ab	18 de
4 EXC916	1800 G A/HA	88 a	0 d	0 a	6 b	68 ab	0 e
5 EXC917	286 G A/HA	96 a	8 d	0 a	6 b	86 a	0 e
6 EXC853	280 G A/HA	91 a	94 a	0 a	7 a	53 b	75 ab
	EXC853	280 G A/HA					
7 A14843	600 G A/HA	96 a	75 abc	0 a	7 a	81 ab	35 cd
	EXC853	280 G A/HA					
8 EXC856	840 G A/HA	97 a	83 ab	0 a	7 a	90 a	70 ab
	EXC853	280 G A/HA					
9 EXC916	1800 G A/HA	86 a	69 bc	0 a	7 a	54 b	50 abc
	EXC915	2550 G A/HA					
10 EXC917	286 G A/HA	93 a	80 ab	0 a	7 a	68 ab	84 a
	EXC915	2550 G A/HA					
11 EXC853	280 G A/HA	81 a	53 c	0 a	6 b	25 c	73 ab
12 EXC915	2550 G A/HA	0 c	58 c	0 a	5 cd	0 c	65 abc
13 UNTREATED		0 c	0 d	0 a	4 d	0 c	0 e
LSD (P=.05)		15.1	16.1	0.0	0.6	19.4	22.9
Standard Deviation		10.6	11.3	0.0	0.4	13.6	16.0
CV		14.39	22.31	0.0	7.31	25.89	40.72
Grand Mean		73.48	50.44	0.0	5.93	52.5	39.33
Bartlett's X2		46.316	7.562	0.0	5.389	9.593	3.294
P(Bartlett's X2)		0.001*	0.579	.	0.864	0.477	0.915
Friedman's X2		32.81	41.662	0.0	40.846	39.363	38.695
P(Friedman's X2)		0.001	0.001	0.001	0.001	0.001	0.001

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Pest Type		
Pest Code		
Pest Name		
Crop Code		FESAR
BBCH Scale		BGRM
Crop Name		Tall fescue
Description		Turf Type
Part Rated		LEAF C
Rating Date		8-30-06
Rating Data Type		Injury
Rating Unit		%
Crop Stage		Mature
Crop Stage Scale		BBCH
Crop Density, Unit		100 PERCENT
Assessed By		T. Teuton
Days After First/Last Applic.		130 88
Trt-Eval Interval		77 DA-A
Trt Treatment	Rate	
No. Name	Unit	
1 EXC853	280 G A/HA	0 a
2 A14843	600 G A/HA	0 a
3 EXC856	840 G A/HA	0 a
4 EXC916	1800 G A/HA	0 a
5 EXC917	286 G A/HA	0 a
6 EXC853	280 G A/HA	0 a
EXC853	280 G A/HA	
7 A14843	600 G A/HA	0 a
EXC853	280 G A/HA	
8 EXC856	840 G A/HA	0 a
EXC853	280 G A/HA	
9 EXC916	1800 G A/HA	0 a
EXC915	2550 G A/HA	
10 EXC917	286 G A/HA	0 a
EXC915	2550 G A/HA	
11 EXC853	280 G A/HA	0 a
12 EXC915	2550 G A/HA	0 a
13 UNTREATED		0 a
LSD (P=.05)		0.0
Standard Deviation		0.0
CV		0.0
Grand Mean		0.0
Bartlett's X2		0.0
P(Bartlett's X2)		.
Friedman's X2		0.0
P(Friedman's X2)		0.001

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MOISTURE CONDITIONS

	Date	Amount	Unit	Type
1.	4-23-06	0.03	"	Rainfall
2.	4-24-06	0.01	"	Rainfall
3.	4-28-06	0.17	"	Rainfall
4.	4-29-06	1.33	"	Rainfall
5.	4-30-06	0.02	"	Rainfall
6.	5-1-06	0.01	"	Rainfall
7.	5-3-06	0.52	"	Rainfall
8.	5-9-06	0.17	"	Rainfall
9.	5-10-06	0.02	"	Rainfall
10.	5-11-06	0.11	"	Rainfall
11.	5-15-06	0.02	"	Rainfall
12.	5-16-06	0.05	"	Rainfall
13.	5-17-06	0.01	"	Rainfall
14.	5-20-06	0.50	"	Irrigation
15.	5-24-06	0.08	"	Rainfall
16.	5-29-06	0.15	"	Rainfall
17.	5-30-06	0.01	"	Rainfall
18.	5-31-06	1.31	"	Rainfall
19.	6-1-06	0.33	"	Rainfall
20.	6-6-06	0.01	"	Rainfall
21.	6-10-06	2.17	"	Rainfall
22.	6-11-06	1.03	"	Rainfall
23.	6-17-06	0.26	"	Rainfall
24.	6-22-06	0.21	"	Rainfall
25.	6-27-06	0.03	"	Rainfall
26.	6-28-06	0.04	"	Rainfall
27.	6-29-06	0.03	"	Rainfall
28.	7-1-06	0.50	"	Irrigation
29.	7-4-06	0.28	"	Rainfall
30.	7-10-06	0.17	"	Rainfall
31.	7-11-06	0.23	"	Rainfall
32.	7-12-06	0.57	"	Rainfall
33.	7-13-06	1.03	"	Rainfall

Application Description

	A	B
Application Date:	4-21-06	6-16-06
Time of Day:	7:00 am	6:30 am
Application Method:	Brdcst	Brdcst
Application Timing:	Pre/Post	8 week
Air Temp., Unit:	55 F	74 F
% Relative Humidity:	63	85
Wind Velocity, Unit:	1 mph	3 mph
Dew Presence (Y/N):	Y	Y
Soil Temp., Unit:	54 F	68 F
Soil Moisture:	Dry	Moist
% Cloud Cover:	10	40

CROP STAGE AT EACH APPLICATION

	A	B
Crop 1 Code, Stage:	FESAR	FESAR
Stage Scale:	Mature	Mature
Height, Unit:	3 inch	3 inch

WEED STAGE AT EACH APPLICATION

	A	B
Weed 1 Code, Stage:	TRIRE	TRIRE
Stage Scale:	Pre/Post	Pre/Post
Weed 2 Code, Stage:	DIGSA	DIGSA
Stage Scale:	Pre	Pre

University of Missouri-Columbia

Evaluate Mesotrione Alone and in Combination with Herbicides for Clover Control

Trial ID: HMS850C4-2006US
Location: Columbia, Mo

Study Dir.:
Investigator: Brad S. Fresenburg

Weed Code	TRIRE	TRIRE	TRIRE	TRIRE	TRIRE	TRIRE	DIGSA	TRIRE	TRIRE	DIGSA	
Crop Code	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	
Rating Data Type	%Burndn	%Burndn	%Burndn	%Control	%Burndn	%Control	%Control	%Burndn	%Control	%Control	
Rating Unit	0-100%	0-100%	0-100%	0-100%	0-100%	0-100%	0-100%	0-100%	0-100%	0-100%	
Rating Date	4-28-06	5-8-06	5-15-06	5-15-06	6-23-06	6-23-06	6-23-06	6-30-06	6-30-06	6-30-06	
Trt-Eval Interval	7 days	14 days	21 days	21 days	7 days	7 days	7 days	14 days	14 days	14 days	
Trt Treatment	Rate										
No. Name	Rate Unit										
01 EXC878	0.144 GR 173 LB/A	8 ab	55 ab	98 a	80 ab	95 a	100 a	100 a	91 a	100 a	100 a
EXC878	0.144 GR 173 LB/A										
02 EXC892	0.202 GR 173 LB/A	19 a	34 bc	73 a	67 b	99 a	100 a	100 a	95 a	100 a	100 a
EXC892	0.202 GR 173 LB/A										
03 EXC888	0.722 GR 173 LB/A	18 a	44 abc	78 a	91 ab	95 a	100 a	100 a	93 a	100 a	100 a
EXC888	0.722 GR 173 LB/A										
04 EXC890	0.157 GR 173 LB/A	13 ab	21 cd	35 b	77 ab	97 a	100 a	100 a	92 a	100 a	100 a
EXC890	0.157 GR 173 LB/A										
05 EXC889	0.288 GR 173 LB/A	8 ab	53 ab	80 a	95 ab	97 a	100 a	100 a	97 a	100 a	100 a
EXC889	0.288 GR 173 LB/A										
06 EXC881	0.433 GR 173 LB/A	11 ab	63 ab	80 a	85 ab	97 a	100 a	100 a	95 a	100 a	100 a
EXC881	0.433 GR 173 LB/A										
07 EXC886	0.722 GR 173 LB/A	0 b	0 d	0 c	0 c	0 b	0 b	0 b	0 b	0 b	0 b
EXC886	0.722 GR 173 LB/A										
08 EXC887	0.433 GR 173 LB/A	15 a	68 a	98 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a
EXC887	0.433 GR 173 LB/A										
09 EXC891	0.866 GR 173 LB/A	16 a	55 ab	90 a	99 a	99 a	100 a	100 a	100 a	100 a	100 a
EXC891	0.866 GR 173 LB/A										
10 Untreated Check		0 b	0 d	0 c	0 c	0 b	0 b	0 b	0 b	0 b	0 b
LSD (P=.05)		8.7	20.8	28.4	20.1	5.0	0.0	0.0	6.0	0.0	0.0
Standard Deviation		6.0	14.3	19.6	13.8	3.5	0.0	0.0	4.2	0.0	0.0
CV		56.68	36.68	31.09	19.93	4.45	0.0	0.0	5.46	0.0	0.0
Grand Mean		10.63	39.13	63.0	69.38	77.78	80.0	80.0	76.28	80.0	80.0
Bartlett's X2		7.241	7.54	18.481	34.428	11.041	0.0	0.0	6.078	0.0	0.0
P(Bartlett's X2)		0.404	0.375	0.01*	0.001*	0.087	.	.	0.299	.	.
Friedman's X2		23.591	27.736	24.518	24.682	22.786	17.455	17.455	29.55	17.455	17.455
P(Friedman's X2)		0.005	0.001	0.004	0.003	0.007	0.042	0.042	0.001	0.042	0.042

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Weed Code	TRIRE	TRIRE	DIGSA	TRIRE	DIGSA
Crop Code	FESAR	FESAR	FESAR	FESAR	FESAR
Rating Data Type	%Burndn	%Control	%Control	%Control	%Control
Rating Unit	0-100%	0-100%	0-100%	0-100%	0-100%
Rating Date	7-7-06	7-7-06	7-7-06	8-22-06	8-22-06
Trt-Eval Interval	21 days	21days	21 days	67 days	67 days
Trt No.	Treatment Name	Rate	Unit		
01	EXC878	0.144 GR	173 LB/A	93 a	100 a
	EXC878	0.144 GR	173 LB/A	100 a	5 c
	EXC878	0.144 GR	173 LB/A		87 a
02	EXC892	0.202 GR	173 LB/A	70 a	100 a
	EXC892	0.202 GR	173 LB/A	100 a	3 c
	EXC892	0.202 GR	173 LB/A		92 a
03	EXC888	0.722 GR	173 LB/A	91 a	100 a
	EXC888	0.722 GR	173 LB/A	100 a	8 c
	EXC888	0.722 GR	173 LB/A		93 a
04	EXC890	0.157 GR	173 LB/A	90 a	100 a
	EXC890	0.157 GR	173 LB/A	100 a	13 c
	EXC890	0.157 GR	173 LB/A		90 a
05	EXC889	0.288 GR	173 LB/A	97 a	100 a
	EXC889	0.288 GR	173 LB/A	100 a	92 a
	EXC889	0.288 GR	173 LB/A		92 a
06	EXC881	0.433 GR	173 LB/A	96 a	100 a
	EXC881	0.433 GR	173 LB/A	100 a	99 a
	EXC881	0.433 GR	173 LB/A		92 a
07	EXC886	0.722 GR	173 LB/A	0 b	0 b
	EXC886	0.722 GR	173 LB/A	0 b	0 c
	EXC886	0.722 GR	173 LB/A		0 b
08	EXC887	0.433 GR	173 LB/A	100 a	100 a
	EXC887	0.433 GR	173 LB/A	100 a	94 a
	EXC887	0.433 GR	173 LB/A		98 a
09	EXC891	0.866 GR	173 LB/A	100 a	100 a
	EXC891	0.866 GR	173 LB/A	100 a	75 b
	EXC891	0.866 GR	173 LB/A		98 a
10	Untreated Check			0 b	0 b
				0 b	0 c
					0 b
LSD (P=.05)	23.5	0.0	0.0	15.2	10.3
Standard Deviation	16.2	0.0	0.0	10.5	7.1
CV	21.96	0.0	0.0	27.08	9.57
Grand Mean	73.75	80.0	80.0	38.78	74.08
Bartlett's X2	26.12	0.0	0.0	16.211	9.198
P(Bartlett's X2)	0.001*	.	.	0.023*	0.239
Friedman's X2	27.232	17.455	17.455	28.527	22.909
P(Friedman's X2)	0.001	0.042	0.042	0.001	0.006

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

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University of Missouri-Columbia

Crabgrass Control in Tall Fescue

Trial ID: TUR06-01
Location: South Farm

Protocol ID: TUR06-01
Study Director: Travis Teuton
Investigator: Travis Teuton

General Trial Information

Study Director: Travis Teuton **Title:** Assistant Professor
Affiliation: University of Missouri-Columbia
Postal Code: 65211 **E-mail:** teutont@missouri.edu
Investigator: Travis Teuton **Title:** Assistant Professor
Affiliation: University of Missouri-Columbia
Postal Code: 65211 **E-mail:** teutont@missouri.edu

Trial Location

City: Columbia **Trial Status:** ONE-YEAR/FINAL
State/Prov.: MO **Trial Reliability:** Good
Postal Code: 65211 **Initiation Date:** 4-11-06
Country: USA

Objectives:

Determine the best crabgrass and broadleaf control program.

Crop Description

Crop 1: FESAR Festuca arundinacea Tall fescue
Description: Turf-Home Lawn Mature
BBCH Scale: BGRM

Pest Description

Pest 1 Type: W **Code:** DIGSA *Digitaria sanguinalis*
Common Name: Large crabgrass
Pest 2 Type: W **Code:** TRFRE *Trifolium repens*
Common Name: Dutch clover
Description: White Clover

Site and Design

Plot Width, Unit: 5 FT **Site Type:** Turf-Home Lawn
Plot Length, Unit: 10 FT **Tillage Type:** NO-TILL
Replications: 4 **Study Design:** Randomized Complete Block
% Slope: 1.0 **Soil Drainage:** G Good

Comment: Mowed weekly at 3 inches. Watered as needed all summer.

Moisture Conditions

Overall Moisture Conditions: SLIGHTLY DRY

Application Description

	A	B	C
Application Date:	4-11-06	4-11-06	4-11-06
Time of Day:	9:45	4:00	2:00
Application Method:	Spray	Spray	Spray
Application Timing:	PREPRE	PREPRE	PREPRE
Application Placement:	BROFOL	BROFOL	BROFOL
Applied By:	T.Teuton	T.Teuton	T.Teuton
Air Temperature, Unit:	70 F	89 F	85 F
% Relative Humidity:	40	50	50
Wind Velocity, Unit:	5 MPH	2 MPH	0 MPH
Dew Presence (Y/N):	N	N	N
Soil Temperature, Unit:	58 F	83 F	82 F
Soil Moisture:	ADEQUATE	ADEQUATE	ADEQUATE
% Cloud Cover:	0	10	0

Crop Stage At Each Application

	A	B	C
Crop 1 Code, BBCH Scale:	FESAR BGRM	FESAR BGRM	FESAR BGRM
Stage Scale Used:	DESC	DESC	DESC
Stage Majority, Percent:	19 100	19 100	19 100
Height, Unit:	3 IN	3 IN	3 IN

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Pest Stage At Each Application

	A		B		C	
Pest 1 Code, Disc., Scale:	DIGSA	W	DIGSA	W	DIGSA	W
Stage Majority, Percent:	00	100	10	100	15	100
Height, Unit:	0	IN	0.5	IN	3	IN
Density, Unit:	0	FT2	3	FT2	3	FT2
Pest 2 Code, Disc., Scale:	TRFRE	W	TRFRE	W	TRFRE	W
Stage Majority, Percent:	60	100	63	100	65	100
Height, Unit:	3	IN	3	IN	3	IN
Density, Unit:	3	FT2	3	FT2	3	FT2
Coverage, Unit:	10	%	10	%	10	%

Application Equipment

	A		B		C	
Appl. Equipment:	Backpack		Backpack		Backpack	
Operating Pressure, Unit:	30	PSI	30	PSI	30	PSI
Nozzle Type:	Flat Fan		Flat Fan		Flat Fan	
Nozzle Size:	8002		8002		8002	
Nozzle Spacing, Unit:	14.5 In		14.5 In		14.5 In	
Nozzle Calibration, Unit:	22	GPA	22	GPA	22	GPA
Boom Length, Unit:	3.75 FT		3.75 FT		3.75 FT	
Boom Height, Unit:	1.5 FT		1.5 FT		1.5 FT	
Ground Speed, Unit:	3	MPH	3	MPH	3	MPH
Incorporation Equip.:	NA		NA		NA	
Carrier:	Water		Water		Water	
Spray Volume, Unit:	22	GAL/AC	22	GAL/AC	22	GAL/AC
Mix Size, Unit:	0.5	Liters	0.5	Liters	0.5	Liters
Propellant:	CO2		CO2		CO2	
Tank Mix (Y/N):	N		N		N	

University of Missouri-Columbia

Crabgrass Control in Tall Fescue

Trial ID: TUR06-01
Location: South Farm

Protocol ID: TUR06-01
Study Director: Travis Teuton
Investigator: Travis Teuton

Pest Type		W Weed	W Weed		W Weed	W Weed				
Pest Code		DIGSA	TRFRE		DIGSA	TRFRE				
Pest Name		Large crabgrass	Dutch clover		Large crabgrass	Dutch clover				
Crop Code	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR	FESAR			
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM			
Crop Name	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue	Tall fescue			
Description	Lawn Type	Lawn Type	Lawn Type	Lawn Type	Lawn Type	Lawn Type	Lawn Type			
Part Rated	LEAF C	LEAF P	LEAF P	LEAF C	LEAF P	LEAF P	LEAF C			
Rating Date	6-17-06	6-17-06	6-17-06	8-1-06	8-1-06	8-1-06	8-30-06			
Rating Data Type	Injury	Control	Control	Injury	Control	Control	Injury			
Rating Unit	%	%	%	%	%	%	%			
Days After First/Last Applic.	67 67	67 67	67 67	112 112	112 112	112 112	141 141			
Trt-Eval Interval	67 DA-A	67 DA-A	67 DA-A	112 DA-A	112 DA-A	112 DA-A	141 DA-A			
Trt No.	Treatment Name	Rate	Unit							
1	Untreated			0 a	100 a	0 d	0 b	0 c	0 c	0 a
2	Pendulum Aquacap	1.78 LB	A/A	0 a	100 a	0 d	0 b	99 a	0 c	0 a
3	Pendulum Aquacap	1.31 LB	A/A	0 a	100 a	0 d	0 b	100 a	0 c	0 a
	Pendulum Aquacap	1.31 LB	A/A							
4	Barricade	0.865 LB	A/A	0 a	100 a	0 d	0 b	100 a	0 c	0 a
5	Barricade	0.434 LB	A/A	0 a	100 a	0 d	0 b	100 a	0 c	0 a
	Barricade	0.434 LB	A/A							
6	Dimension	0.223 LB	A/A	0 a	100 a	0 d	0 b	100 a	0 c	0 a
7	Dimension	0.446 LB	A/A	0 a	100 a	0 d	0 b	100 a	0 c	0 a
8	Dimension	0.446 LB	A/A	0 a	100 a	0 d	0 b	100 a	0 c	0 a
	NIS	0.25 %	V/V							
9	Ronstar	3.57 LB	A/A	0 a	100 a	0 d	0 b	100 a	0 c	0 a
10	Ronstar	1.78 LB	A/A	0 a	100 a	0 d	0 b	100 a	0 c	0 a
	Ronstar	1.78 LB	A/A							
11	Drive	0.67 LB	A/A	0 a	100 a	28 cd	0 b	98 a	100 a	0 a
	NIS	0.25 %	V/V							
12	Drive	0.335 LB	A/A	0 a	100 a	40 bc	0 b	99 a	99 a	0 a
	NIS	0.25 %	V/V							
	Drive	0.335 LB	A/A							
	NIS	0.25 %	V/V							
13	Q4	1.34 LB	A/A	0 a	100 a	60 ab	0 b	100 a	100 a	0 a
14	Q4	1.17 LB	A/A	0 a	100 a	63 ab	0 b	100 a	100 a	0 a
	Q4	1.17 LB	A/A							
15	MSMA	1.85 LB	A/A	0 a	100 a	73 a	23 a	95 a	43 b	0 a
	NIS	0.25 %	V/V							
	MSMS	1.85 LB	A/A							
	NIS	0.25 %	V/V							
16	Trimec Plus	2.23 LB	A/A	0 a	100 a	60 ab	0 b	53 b	100 a	0 a
	Trimec Plus	2.23 LB	A/A							
17	Mesotrione	0.112 LB	A/A	0 a	100 a	40 bc	0 b	100 a	40 b	0 a
	Mesotrione	0.112 LB	A/A							
LSD (P=.05)		0.0		0.0		18.6	1.7	8.1	5.2	0.0
Standard Deviation		0.0		0.0		13.0	1.2	5.7	3.6	0.0
CV		0.0		0.0		61.02	91.62	6.23	10.58	0.0
Grand Mean		0.0		100.0		21.32	1.32	90.74	34.19	0.0
Bartlett's X2		0.0		0.0		5.298	0.0	17.666	7.917	0.0
P(Bartlett's X2)		.		.		0.506	.	0.001*	0.019*	.
Friedman's X2		0.0		0.0		43.627	10.667	21.701	49.461	0.0
P(Friedman's X2)		1.00		1.00		0.001	0.83	0.153	0.001	1.00

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Pest Type		W Weed	W Weed
Pest Code		DIGSA	TRFRE
Pest Name		Large crabgrass	Dutch clover
Crop Code		FESAR	FESAR
BBCH Scale		BGRM	BGRM
Crop Name		Tall fescue	Tall fescue
Description			
Part Rated		LEAF P	LEAF P
Rating Date		8-30-06	8-30-06
Rating Data Type		Control	Control
Rating Unit		%	%
Days After First/Last Applic.		141 141	141 141
Trt-Eval Interval		141 DA-A	141 DA-A
Trt	Treatment	Rate	
No.	Name	Rate Unit	
1	Untreated	0 f	0 c
2	Pendulum Aquacap	1.78 LB A/A	20 ef
3	Pendulum Aquacap	1.31 LB A/A	55 bcd
	Pendulum Aquacap	1.31 LB A/A	0 c
4	Barricade	0.865 LB A/A	99 a
5	Barricade	0.434 LB A/A	100 a
	Barricade	0.434 LB A/A	0 c
6	Dimension	0.223 LB A/A	25 ef
7	Dimension	0.446 LB A/A	63 bc
8	Dimension	0.446 LB A/A	35 cde
	NIS	0.25 % V/V	0 c
9	Ronstar	3.57 LB A/A	94 a
10	Ronstar	1.78 LB A/A	79 ab
	Ronstar	1.78 LB A/A	0 c
11	Drive	0.67 LB A/A	8 ef
	NIS	0.25 % V/V	100 a
12	Drive	0.335 LB A/A	55 bcd
	NIS	0.25 % V/V	100 a
	Drive	0.335 LB A/A	
	NIS	0.25 % V/V	
13	Q4	1.34 LB A/A	20 ef
14	Q4	1.17 LB A/A	33 de
	Q4	1.17 LB A/A	100 a
15	MSMA	1.85 LB A/A	18 ef
	NIS	0.25 % V/V	40 b
	MSMS	1.85 LB A/A	
	NIS	0.25 % V/V	
16	Trimec Plus	2.23 LB A/A	5 ef
	Trimec Plus	2.23 LB A/A	100 a
17	Mesotrione	0.112 LB A/A	38 cde
	Mesotrione	0.112 LB A/A	0 c
LSD (P=.05)		20.4	4.9
Standard Deviation		14.3	3.4
CV		32.58	10.8
Grand Mean		43.75	31.76
Bartlett's X2		13.874	0.0
P(Bartlett's X2)		0.459	.
Friedman's X2		54.275	45.176
P(Friedman's X2)		0.001	0.001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

University of Missouri-Columbia

Postemergence Crabgrass During Creeping Bentgrass Greens Establishment

Trial ID: TUR06-04	Protocol ID: TUR06-04
Location: South Farm	Study Director: Travis Teuton
	Investigator: Travis Teuton

General Trial Information

Study Director: Travis Teuton	Title: Assistant Professor
Affiliation: University of Missouri-Columbia	
Postal Code: 65211	E-mail: teutont@missouri.edu
Investigator: Travis Teuton	Title: Assistant Professor
Affiliation: University of Missouri-Columbia	
Postal Code: 65211	E-mail: teutont@missouri.edu

Trial Location

City: Columbia	Trial Status: ONE-YEAR/FINAL
State/Prov.: MO	Trial Reliability: Good
Postal Code: 65211	Initiation Date: 6-24-06
Country: USA	
Directions: Large A-4 Green by shop.	

Crop Description

Crop 1: AGSPL <i>Agrostis palustris</i>	Bent grass
Variety: Penn A4	Description: Green
BBCH Scale: BGRM	Planting Date: 4-12-06
Planting Method: Broadcast	Rate, Unit: 2 LB/1000FT2
Depth, Unit: 0.12 IN	
Seed Bed: SMOOTH	
Soil Moisture: NORMAL	

Pest Description

Pest 1 Type: W	Code: DIGSA	<i>Digitaria sanguinalis</i>
Common Name: Large crabgrass		

Site and Design

Plot Width, Unit: 5 FT	Site Type: TURF - GOLF COURSE GREEN
Plot Length, Unit: 10 FT	Tillage Type: NO-TILL
Replications: 4	Study Design: Randomized Complete Block
% Slope: 1.0	

Comment: Mowed every Mon, Tues, Thurs, and Fri at 0.230 inches. Water as needed to maintain a healthy turf.

Soil Description

Description Name: USGA MIX	Texture: SAND
% Sand: 90	% OM: 10
pH: 6.4	Soil Name: USGA Greens Mix
	Fert. Level: GOOD

Application Description

	A	B
Application Date:	6-24-06	7-8-06
Time of Day:	10:30	11:00
Application Method:	Spray	Spray
Application Timing:	POSPOS	POSPOS
Application Placement:	BROFOL	BROFOL
Applied By:	T. Teuton	T. Teuton
Air Temperature, Unit:	79 F	78 F
% Relative Humidity:	60	30
Wind Velocity, Unit:	0 MPH	3 MPH
Dew Presence (Y/N):	N	N
Soil Temperature, Unit:	81 F	77 F
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	0	0

Crop Stage At Each Application

	A	B
Crop 1 Code, BBCH Scale:	AGSPL BGRM	AGSPL BGRM
Height, Unit:	0.230 IN	0.230 IN

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Pest Stage At Each Application

	A		B	
Pest 1 Code, Disc., Scale:	DIGSA	W	DIGSA	W
Stage Majority, Percent:	24	100	24	100
Height, Unit:	0.230	IN	0.230	IN
Density, Unit:	1	FT2	1	FT2
Coverage, Unit:	10	%	10	%

Application Equipment

	A		B	
Appl. Equipment:	Backpack		Backpack	
Operating Pressure, Unit:	30	PSI	30	PSI
Nozzle Type:	Flat Fan		Flat Fan	
Nozzle Size:	8002		8002	
Nozzle Spacing, Unit:	14.5 In		14.5 In	
Nozzle Calibration, Unit:	22	GPA	22	GPA
Boom Length, Unit:	3.75	FT	3.75	FT
Boom Height, Unit:	1.5	FT	1.5	FT
Ground Speed, Unit:	3	MPH	3	MPH
Incorporation Equip.:	NA		NA	
Carrier:	Water		Water	
Spray Volume, Unit:	22	GAL/AC	22	GAL/AC
Mix Size, Unit:	0.5	Liters	0.5	Liters
Propellant:	CO2		CO2	
Tank Mix (Y/N):	N		N	

University of Missouri-Columbia

Postemergence Crabgrass During Creeping Bentgrass Greens Establishment

Trial ID: TUR06-04
Location: South Farm

Protocol ID: TUR06-04
Study Director: Travis Teuton
Investigator: Travis Teuton

Pest Type		W Weed		W Weed		W Weed	
Pest Code		POATR		POATR		POATR	
Pest Name		Rough-stalk bluegrass		Rough-stalk bluegrass		Rough-stalk bluegrass	
Crop Code	AGSPL	AGSPL	AGSPL	AGSPL	AGSPL	AGSPL	
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	
Crop Name	Bent grass	Bent grass	Bent grass	Bent grass	Bent grass	Bent grass	
Crop Variety	Penn A4	Penn A4	Penn A4	Penn A4	Penn A4	Penn A4	
Description	Green	Green	Green	Green	Green	Green	
Part Rated	Leaf C	Leaf P	Leaf C	Leaf P	Leaf C	Leaf P	
Rating Date	7-7-06	7-7-06	7-24-06	7-24-06	7-24-06	7-24-06	
Rating Data Type	Injury	Control	Injury	Control	Quality	Control	
Rating Unit	%	%	%	%	1-9	%	
Days After First/Last Applic.	13 13	13 13	30 16	30 16	30 16	30 16	
Trt-Eval Interval	13 DA-A	13 DA-A	30 DA-A	30 DA-A	30 DA-A	30 DA-A	
Plant-Eval Interval	86 DP-1	86 DP-1	103 DP-1	103 DP-1	103 DP-1	103 DP-1	
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate	
		Unit	Unit	Unit	Unit	Unit	
1	Untreated	1 a	0 c	0 b	0 b	4 b	0 a
2	MSMA NIS MSMA NIS	1.24 LB A/A 0.46 LB A/A 1.24 LB A/A 0.46 LB A/A	2 a 40 b	3 ab	85 a	6 a	0 a
3	MSMA NIS MSMA NIS	1.65 LB A/A 0.46 LB A/A 1.65 LB A/A 0.46 LB A/A	3 a 44 b	1 ab	96 a	6 a	0 a
4	Drive MSO Drive MSO	0.33 LB A/A 0.187 LB A/A 0.33 LB A/A 0.187 LB A/A	2 a 75 a	2 ab	95 a	6 a	0 a
5	Drive MSO Drive MSO	0.5 LB A/A 0.187 LB A/A 0.5 LB A/A 0.187 LB A/A	3 a 79 a	5 a	95 a	6 a	0 a
6	Drive MSMA MSO Drive MSMA MSO	0.33 LB A/A 1.24 LB A/A 0.187 LB A/A 0.33 LB A/A 1.24 LB A/A 0.187 LB A/A	3 a 81 a	4 ab	97 a	6 a	0 a
LSD (P=.05)		1.7	14.2	2.8	10.1	0.4	0.0
Standard Deviation		1.1	9.4	1.9	6.7	0.3	0.0
CV		53.37	17.71	78.03	8.62	5.06	0.0
Grand Mean		2.13	53.13	2.42	77.71	5.77	0.0
Bartlett's X2		3.413	6.536	0.102	13.278	2.974	0.0
P(Bartlett's X2)		0.332	0.163	0.992	0.01*	0.562	.
Friedman's X2		8.5	17.536	7.214	13.607	10.429	0.0
P(Friedman's X2)		0.131	0.004	0.205	0.018	0.064	1.00

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

University of Missouri-Columbia

Control of Crab, Clover, and Rye with Mustard Seeds Meal

Trial ID: DAN06-01
Location: Greenhouse

Protocol ID: DAN06-01
Study Director: Daniel Earlywine
Investigator: Travis Teuton

General Trial Information

Study Director: Daniel Earlywine
Investigator: Travis Teuton **Title:** Assistant Professor
Affiliation: University of Missouri-Columbia
Postal Code: 65211 **E-mail:** teutont@missouri.edu

Site and Design

Plot Width, Unit: 1 FT
Plot Length, Unit: 2 FT
Replications: 4 **Study Design:** Randomized Complete Block

University of Missouri-Columbia

Control of Crab, Clover, and Rye with Mustard Seeds Meal

Trial ID: DAN06-01
Location: Greenhouse

Protocol ID: DAN06-01
Study Director: Daniel Earlywine
Investigator: Travis Teuton

Pest Type		W Weed	W Weed	W Weed
Pest Code		DIGSA		LOLPE
Pest Name		Large crabgrass	Dutch Clover	Perennial ryegrass
Part Rated		SHOOT P	SHOOT P	SHOOT P
Rating Date		7-3-06	7-3-06	7-3-06
Rating Data Type		Control	Control	Control
Rating Unit		Count	Count	Count
Trt No.	Treatment Name	Rate	Unit	
1	Untreated/Tarped			
		11 a	7 b	9 ab
2	MSM	300 LB/A		
		6 a	0 b	4 ab
3	MSM	600 LB/A		
		10 a	1 b	6 ab
4	MSM	900 LB/A		
		7 a	0 b	9 ab
5	MSM	1200 LB/A		
		8 a	1 b	7 ab
6	MSM	1500 LB/A		
		7 a	0 b	3 b
7	MSM	1800 LB/A		
		8 a	0 b	2 b
8	Untreated/No-Tarp			
		6 a	17 a	14 a
LSD (P=.05)		3.8	7.5	6.5
Standard Deviation		2.6	5.1	4.4
CV		33.96	155.85	65.8
Grand Mean		7.61	3.29	6.73
Bartlett's X2		5.264	70.889	21.802
P(Bartlett's X2)		0.628	0.001*	0.003*
Friedman's X2		8.875	22.104	15.583
P(Friedman's X2)		0.262	0.002	0.029

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Insecticides

University of Missouri-Columbia

E2Y45 Southern Masked Chafer Larval Control in Turfgrass

Trial ID: DUP06-01	Protocol ID: DUP06-01
Location: South Farm	Study Director: Travis Teuton
	Investigator: Travis Teuton

General Trial Information

Study Director: Travis Teuton	Title: Assistant Professor
Affiliation: University of Missouri-Columbia	
Postal Code: 65211	E-mail: teutont@missouri.edu
Investigator: Travis Teuton	Title: Assistant Professor
Affiliation: University of Missouri-Columbia	
Postal Code: 65211	E-mail: teutont@missouri.edu

Objectives:

Determine the effectiveness of EY245 for controlling Southern masked chafer beetles.

Conclusions:

We put out three locations. Two that were in areas known to have grubs, one at a local golf course and one at a soccer complex. One was in an area that previously did not have grubs. However, we trapped beetles using black lights and released them to encourage grub pressure. We also put out halogen lights in the plot to attract them. The only location with grub pressure was the one at the soccer park. The pressure there was spotty and we missed the area with the most pressure by about 50 feet. At the location where we had the lights we had grub damage about 100 feet from that trial. All locations were watered as needed to maintain good soil moisture.

Cooperator/Landowner

Cooperator: Charles Silcox	Country: USA
Organization: DuPont Professional Products	Phone No: 302-999-5953
Address 1: P.O. Box 80705	Fax No: 302-351-6646
City: Wilmington	
State/Prov: DE	
Postal Code: 19880-0705	E-mail: charles.a.silcox@usa.dupont.com

Crop Description

Crop 1: POAPR Poa pratensis	Kentucky bluegrass
	Description: Soccer Field
BBCH Scale: BGRM	

Pest Description

Pest 1 Type: I	Code: CYCCIM	Southern masked chafer
Common Name: Southern masked chafer		

Site and Design

Plot Width, Unit: 5 FT	Site Type: Soccer Field
Plot Length, Unit: 10 FT	Tillage Type: NO-TILL
Replications: 6	Study Design: Randomized Complete Block

Trial Initiation Comments:

Trial was placed where there has traditionally been good white grub pressure.

Comment: Mowed Twice weekly at 1.5 inches.

Soil Description

Texture:	LOAMY SAND
Fert. Level:	GOOD

Moisture Conditions

Overall Moisture Conditions: NORMAL

University of Missouri-Columbia

Application Description

A	
Application Date:	5-17-06
Time of Day:	12:00
Application Method:	Spray
Application Timing:	POSTPRE
Application Placement:	BROFOL
Applied By:	T. Teuton
Air Temperature, Unit:	73 F
% Relative Humidity:	35
Wind Velocity, Unit:	4 MPH
Wind Direction:	E
Dew Presence (Y/N):	N
Soil Temperature, Unit:	63 F
Soil Moisture:	ADEQUATE
% Cloud Cover:	40

Crop Stage At Each Application

A	
Crop 1 Code, BBCH Scale:	POAPR BGRM
Stage Scale Used:	BBCH
Stage Majority, Percent:	Mature
Height, Unit:	1.5 In

Pest Stage At Each Application

A	
Pest 1 Code, Disc., Scale:	CYCCIM I

Application Equipment

A	
Appl. Equipment:	Backpack
Operating Pressure, Unit:	30 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8002
Nozzle Spacing, Unit:	14.5 In
Nozzle Calibration, Unit:	22 GPA
Boom Length, Unit:	3.75 FT
Boom Height, Unit:	1.5 FT
Ground Speed, Unit:	3 MPH
Incorporation Equip.:	NA
Hours to Incorp.:	8
Incorp. Depth, Unit:	0.5 H2O
Carrier:	Water
Spray Volume, Unit:	22 GAL/AC
Mix Size, Unit:	0.5 Liters
Propellant:	CO2
Tank Mix (Y/N):	N

Trt No Treatment Application Comment

Treatments watered in 8 hours after treatments with 0.5 inches of water.

Data

10-12-06 (DUP06-01 White Grub Control)

AOV Means Table

University of Missouri-Columbia

E2Y45 Southern Masked Chafer Larval Control in Turfgrass

Trial ID: DUP06-01
Location: South Farm

Protocol ID: DUP06-01
Study Director: Travis Teuton
Investigator: Travis Teuton

Pest Type	I Insect	I Insect	I Insect	I Insect
Pest Code	CYCCIM	CYCCIM	CYCCIM	CYCCIM
Pest Name	Southern masked chafer	Southern masked chafer	Southern masked chafer	Southern masked chafer
Crop Code	POAPR	FESAR	POAPR	POAPR
BBCH Scale	BGRM	BGRM	BGRM	BGRM
Crop Name	Kentucky bluegrass	Tall fescue	Kentucky bluegrass	Kentucky bluegrass
Crop Variety		KY31		
Description	Soccer Field	South Farm	Golf Course	Soccer Field
Part Rated	LEAF	LEAF	LEAF	LEAF
Rating Date	5-24-06	5-24-06	5-24-06	9-22-06
Rating Data Type	Injury	Injury	Injury	Grub
Rating Unit	%	%	%	Count
Days After First/Last Applic.	7 7	7 7	7 7	128 128
Trt-Eval Interval	7 DA-A	7 DA-A	7 DA-A	128 DA-A
Trt No.				
Treatment Name				
Rate				
Unit				
1 DPX E2Y45	0 a	0 a	0 a	3 a
2 DPX E2Y45	0 a	0 a	0 a	1 a
3 DPX E2Y45	0 a	0 a	0 a	0 a
4 Merit	0 a	0 a	0 a	1 a
5 Untreated	0 a	0 a	0 a	2 a
LSD (P=.05)	0.0	0.0	0.0	4.2
Standard Deviation	0.0	0.0	0.0	3.5
CV	0.0	0.0	0.0	280.09
Grand Mean	0.0	0.0	0.0	1.23
Bartlett's X2	0.0	0.0	0.0	14.467
P(Bartlett's X2)	.	.	.	0.002*
Friedman's X2	0.0	0.0	0.0	1.667
P(Friedman's X2)	1.00	1.00	1.00	0.797

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.