

North Carolina State University

TOLERANCE OF OVERSEEDED PERENNIAL RYEGRASS TO ANNUAL BLUEGRASS CONTROL TREATMENTS

Trial ID: 04-D08
Location: ECHO FARMS GC

Study Director: TRAVIS GANNON
Investigator: Fred Yelverton

General Trial Information

Study Director: TRAVIS GANNON **Title:** RESEARCH ASSOCIATE
Affiliation: NORTH CAROLINA STATE UNIVERSITY
Postal Code: 27695 **E-mail:** TRAVIS_GANNON@NCSSU.EDU
Investigator: FRED YELVERTON **Title:** PROFESSOR
Affiliation: NORTH CAROLINA STATE UNIVERSITY
Postal Code: 27695 **E-mail:** FRED_YELVERTON@NCSSU.EDU

Trial Location

City: WILMINGTON **Trial Status:** COMPLETED
State/Prov.: NC
Postal Code: 28412 **Initiation Date:** 10-15-03
Country: USA
Directions:

Objectives:

Conclusions:

Cooperator/Landowner

Cooperator: Brian Stackowith **Country:** USA
Organization: Echo Farms Golf Course **Phone No:** 910.791.3393
Address 1: 4114 Echo Farms Blvd
City: Wilmington
State/Prov: NC
Postal Code: 28412

Crop Description

Crop 1: CYNDA Cynodon dactylon Bermuda grass
BBCH Scale: BGRM
Crop 2: LOLPE Lolium perenne Ryegrass, perennial
Variety: Quick Trans
BBCH Scale: BGRM **Planting Date:** 10-15-03
Planting Method: BROADCAST **Rate, Unit:** 12 LB/1000FT2
Seed Bed: MOWED **Soil Temperature, Unit:** 66 F
Soil Moisture: WET

Pest Description

Pest 1 Type: W

Site and Design

Plot Width, Unit: 5 FT **Site Type:** GOLF COURSE DRIVING RANGE
Plot Length, Unit: 8 FT
Replications: 4 **Study Design:** Randomized Complete Block

Trial Initiation Comments:

Field Prep./Maintenance:

Soil Description

% OM: 0.71 **Texture:** MINERAL
pH: 5.8
CEC: 6.4 **Fert. Level:** GOOD

Moisture Conditions

Overall Moisture Conditions: IRRIGATED AS NEEDED

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Application Description

	A	B	C
Application Date:	12-15-03	1-22-04	2-19-04
Time of Day:	12-1:00PM	9-10 AM	11-12NOON
Application Method:	SPRAY	SPRAY	SPRAY
Application Timing:	DEC 15	JAN 22	FEB 19
Application Placement:	FOLIAR	FOLIAR	FOLIAR
Applied By:	T GANNON	T GANNON	T GANNON
Air Temperature, Unit:	53.4 F	43.2 F	63.1 F
% Relative Humidity:	48	64	44
Wind Velocity, Unit:	2.8 MPH	1.8 MPH	0.8 MPH
Dew Presence (Y/N):	N	N	N
Soil Temperature, Unit:	48 F	41 F	42 F
Soil Moisture:	WET	ADEQUATE	WET
% Cloud Cover:	5	10	5

Crop Stage At Each Application

	A	B	C
Crop 1 Code, BBCH Scale:	CYNDA BGRM	CYNDA BGRM	CYNDA BGRM
Stage Scale Used:	MOWED	MOWED	BBCH
Height, Unit:	0.5 IN	0.5 IN	0.5 IN
Height Minimum, Maximum:	0.5 0.5	0.5 0.5	0.5 0.5
Crop 2 Code, BBCH Scale:	LOLPE BGRM	LOLPE BGRM	LOLPE BGRM
Stage Scale Used:	BBCH	BBCH	BBCH
Stage Majority, Percent:	2-3 LF 80	1-3 TILL 85	1-4 TILL 90
Stage Minimum, Percent:	2 LEAF 40	3 LEAF 40	3 LEAF 40
Stage Maximum, Percent:	3 LEAF 40	1 TILLER 40	4 TILLER 50
Height, Unit:	0.5 IN	0.5 IN	0.5 IN
Height Minimum, Maximum:	0.5 0.5	0.5 0.5	0.5 0.5

Pest Stage At Each Application

A	B	C
W	W	W

Application Equipment

	A	B	C
Appl. Equipment:	CO2 SPRAY	CO2 SPRAY	CO2 SPRAY
Operating Pressure:	25	25	25
Pressure Unit:	PSI	PSI	PSI
Nozzle Type:	FLAT FAN	FLAT FAN	FLAT FAN
Nozzle Size:	VS8002XR	VS8002XR	VS8002XR
Nozzle Spacing, Unit:	10 INCH	10 INCH	10 INCH
Nozzles/Row:	4	4	4
Boom Length, Unit:	40 INCH	40 INCH	40 INCH
Boom Height, Unit:	10 INCH	10 INCH	10 INCH
Ground Speed, Unit:	3 MPH	3 MPH	3 MPH
Carrier:	WATER	WATER	WATER
Spray Volume:	32.5	32.5	32.5
Volume Unit:	GPA	GPA	GPA
Propellant:	COMP CO2	COMP CO2	COMP CO2

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BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	
Rating Date	11-12-03	12-2-03	12-15-03	1-5-04	1-22-04	2-3-04	2-19-04	
Rating Data Type	COVER	COVER	COVER	COVER	COVER	COVER	COVER	
Rating Unit	%	%	%	%	%	%	%	
Days After Last Applic.	-33	-13	0	21	0	12	0	
Trt-Eval Interval	-33 DA-A	-13 DA-A	0 DA-A	21 DA-A	38 DA-A	50 DA-A	66 DA-A	
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Other Rate	Other Rate	Growth Stage	Appl Code
1	REVOLVER	0.19	SL	0.05 fl oz/1000 ft2			DEC 15 A	
2	REVOLVER	0.19	SL	0.1 fl oz/1000 ft2			DEC 15 A	
3	REVOLVER	0.19	SL	0.2 fl oz/1000 ft2			DEC 15 A	
4	REVOLVER	0.19	SL	0.05 fl oz/1000 ft2			JAN 22 B	
5	REVOLVER	0.19	SL	0.1 fl oz/1000 ft2			JAN 22 B	
6	REVOLVER	0.19	SL	0.2 fl oz/1000 ft2			JAN 22 B	
7	REVOLVER	0.19	SL	0.05 fl oz/1000 ft2			FEB 19 C	
8	REVOLVER	0.19	SL	0.1 fl oz/1000 ft2			FEB 19 C	
9	REVOLVER	0.19	SL	0.2 fl oz/1000 ft2			FEB 19 C	
10	NONTREATED							
LSD (P=.05)	10.71	5.74	6.47	8.36	7.53	10.78	16.19	
Standard Deviation	7.38	3.96	4.46	5.76	5.19	7.43	11.16	
CV	8.86	5.17	5.92	8.43	8.72	12.78	16.97	
Grand Mean	83.25	76.5	75.38	68.38	59.5	58.13	65.75	
Bartlett's X2	0.0	15.388	11.553	18.414	18.423	22.928	41.961	
P(Bartlett's X2)	1.00	0.081	0.24	0.031*	0.018*	0.002*	0.001*	
Friedman's X2	1.091	8.277	8.809	19.282	24.314	21.695	18.341	
P(Friedman's X2)	0.999	0.506	0.455	0.023	0.004	0.01	0.031	
Replicate F	2.250	4.580	5.563	1.976	4.144	1.462	1.145	
Replicate Prob(F)	0.1053	0.0102	0.0042	0.1414	0.0154	0.2471	0.3488	
Treatment F	1.000	1.225	1.400	3.932	22.794	10.682	6.509	
Treatment Prob(F)	0.4635	0.3212	0.2367	0.0027	0.0001	0.0001	0.0001	

Means followed by same letter do not significantly differ (P=.05, LSD)
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Crop Code	LOLPE	LOLPE	LOLPE	TURF	TURF	TURF	TURF									
BBCH Scale	BGRM	BGRM	BGRM													
Rating Date	3-2-04	3-15-04	3-29-04	11-12-03	12-2-03	12-15-03	1-5-04									
Rating Data Type	COVER	COVER	COVER	QUALITY	QUALITY	QUALITY	QUALITY									
Rating Unit	%	%	%	1-9	1-9	1-9	1-9									
Days After Last Applic.	12	25	39	-33	-13	0	21									
Trt-Eval Interval	78 DA-A	91 DA-A	105 DA-A	-33 DA-A	-13 DA-A	0 DA-A	21 DA-A									
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Other Rate	Other Rate	Growth Unit	Appl Stage	Code							
1	REVOLVER	0.19	SL	0.05 fl oz/1000 ft2			DEC 15	A		68.8 ab	75.0 a	76.3 a	7.0 a	7.0 a	7.1 a	5.9 b
2	REVOLVER	0.19	SL	0.1 fl oz/1000 ft2			DEC 15	A		57.5 b	73.8 a	72.5 a	7.0 a	7.0 a	7.1 a	6.8 a
3	REVOLVER	0.19	SL	0.2 fl oz/1000 ft2			DEC 15	A		20.0 c	46.3 b	51.3 b	7.0 a	7.1 a	7.1 a	5.5 b
4	REVOLVER	0.19	SL	0.05 fl oz/1000 ft2			JAN 22	B		65.0 ab	75.0 a	73.8 a	7.0 a	7.2 a	7.4 a	7.0 a
5	REVOLVER	0.19	SL	0.1 fl oz/1000 ft2			JAN 22	B		63.8 ab	73.8 a	72.5 a	7.0 a	7.0 a	7.3 a	7.0 a
6	REVOLVER	0.19	SL	0.2 fl oz/1000 ft2			JAN 22	B		32.5 c	73.8 a	72.5 a	7.0 a	7.2 a	7.3 a	7.0 a
7	REVOLVER	0.19	SL	0.05 fl oz/1000 ft2			FEB 19	C		71.3 ab	73.3 a	75.0 a	7.0 a	7.1 a	7.1 a	7.0 a
8	REVOLVER	0.19	SL	0.1 fl oz/1000 ft2			FEB 19	C		70.0 ab	70.0 a	72.5 a	7.0 a	7.1 a	7.1 a	7.0 a
9	REVOLVER	0.19	SL	0.2 fl oz/1000 ft2			FEB 19	C		67.5 ab	66.7 a	70.0 a	7.0 a	6.9 a	6.9 a	6.9 a
10	NONTREATED									72.5 a	73.8 a	75.0 a	7.0 a	7.2 a	7.1 a	6.8 a
LSD (P=.05)										14.71	12.73	11.68	0.00	0.26	0.40	0.50
Standard Deviation										10.14	8.74	8.05	0.00	0.18	0.28	0.35
CV										17.22	12.47	11.32	0.0	2.54	3.88	5.19
Grand Mean										58.88	70.13	71.13	7.0	7.08	7.14	6.69
Bartlett's X2										22.682	26.851	20.338	0.0	10.066	5.885	11.363
P(Bartlett's X2)										0.007*	0.001*	0.005*	.	0.26	0.751	0.023*
Friedman's X2										20.427	14.85	6.777	0.0	9.15	4.214	19.514
P(Friedman's X2)										0.015	0.095	0.66	1.00	0.424	0.897	0.021
Replicate F										1.239	0.292	0.035	0.000	6.429	4.456	2.083
Replicate Prob(F)										0.3150	0.8309	0.9909	1.0000	0.0020	0.0115	0.1260
Treatment F										12.563	4.027	3.204	0.000	1.371	0.904	9.356
Treatment Prob(F)										0.0001	0.0028	0.0091	1.0000	0.2492	0.5358	0.0001

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Crop Code			TURF	TURF	TURF	TURF	TURF	TURF	LOLPE	
BBCH Scale									BGRM	
Rating Date			1-22-04	2-3-04	2-19-04	3-2-04	3-15-04	3-29-04	12-2-03	
Rating Data Type			QUALITY	QUALITY	QUALITY	QUALITY	QUALITY	QUALITY	PHYTO	
Rating Unit			1-9	1-9	1-9	1-9	1-9	1-9	%	
Days After Last Applic.			0	12	0	12	25	39	-13	
Trt-Eval Interval			38 DA-A	50 DA-A	66 DA-A	78 DA-A	91 DA-A	105 DA-A	-13 DA-A	
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Other Rate	Other Rate	Growth Unit	Appl Stage	Code	
1	REVOLVER	0.19 SL		0.05 fl oz/1000 ft2			DEC 15 A			
2	REVOLVER	0.19 SL		0.1 fl oz/1000 ft2			DEC 15 A			
3	REVOLVER	0.19 SL		0.2 fl oz/1000 ft2			DEC 15 A			
4	REVOLVER	0.19 SL		0.05 fl oz/1000 ft2			JAN 22 B			
5	REVOLVER	0.19 SL		0.1 fl oz/1000 ft2			JAN 22 B			
6	REVOLVER	0.19 SL		0.2 fl oz/1000 ft2			JAN 22 B			
7	REVOLVER	0.19 SL		0.05 fl oz/1000 ft2			FEB 19 C			
8	REVOLVER	0.19 SL		0.1 fl oz/1000 ft2			FEB 19 C			
9	REVOLVER	0.19 SL		0.2 fl oz/1000 ft2			FEB 19 C			
10	NONTREATED									
LSD (P=.05)				0.78	0.96	0.80	2.47	0.95	0.80	0.00
Standard Deviation				0.54	0.66	0.55	1.70	0.65	0.55	0.00
CV				9.94	12.31	10.1	30.21	9.96	8.17	0.0
Grand Mean				5.43	5.36	5.45	5.64	6.55	6.71	0.0
Bartlett's X2				0.021	0.716	14.066	49.877	21.657	13.482	0.0
P(Bartlett's X2)				0.99	0.699	0.007*	0.001*	0.001*	0.036*	.
Friedman's X2				20.141	17.55	22.173	23.918	19.2	5.414	0.0
P(Friedman's X2)				0.017	0.041	0.008	0.004	0.024	0.797	1.00
Replicate F				1.462	0.703	1.046	1.525	1.031	0.353	0.000
Replicate Prob(F)				0.2471	0.5587	0.3883	0.2305	0.3958	0.7871	1.0000
Treatment F				13.815	11.039	10.927	4.883	4.846	3.143	0.000
Treatment Prob(F)				0.0001	0.0001	0.0001	0.0006	0.0008	0.0101	1.0000

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Crop Code	LOLPE	LOLPE	LOLPE	LOLPE	LOLPE	LOLPE	LOLPE	
BBCH Scale	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	
Rating Date	12-15-03	1-5-04	1-22-04	2-3-04	2-19-04	3-2-04	3-15-04	
Rating Data Type	PHYTO	PHYTO	PHYTO	PHYTO	PHYTO	PHYTO	PHYTO	
Rating Unit	%	%	%	%	%	%	%	
Days After Last Applic.	0	21	0	12	0	12	25	
Trt-Eval Interval	0 DA-A	21 DA-A	38 DA-A	50 DA-A	66 DA-A	78 DA-A	91 DA-A	
Trt No.	Treatment Name	Form Conc	Form Type	Rate Unit	Other Rate	Other Rate	Growth Stage	Appl Code
1	REVOLVER	0.19 SL		0.05 fl oz/1000 ft2			DEC 15 A	
2	REVOLVER	0.19 SL		0.1 fl oz/1000 ft2			DEC 15 A	
3	REVOLVER	0.19 SL		0.2 fl oz/1000 ft2			DEC 15 A	
4	REVOLVER	0.19 SL		0.05 fl oz/1000 ft2			JAN 22 B	
5	REVOLVER	0.19 SL		0.1 fl oz/1000 ft2			JAN 22 B	
6	REVOLVER	0.19 SL		0.2 fl oz/1000 ft2			JAN 22 B	
7	REVOLVER	0.19 SL		0.05 fl oz/1000 ft2			FEB 19 C	
8	REVOLVER	0.19 SL		0.1 fl oz/1000 ft2			FEB 19 C	
9	REVOLVER	0.19 SL		0.2 fl oz/1000 ft2			FEB 19 C	
10	NONTREATED							
LSD (P=.05)	0.00	5.09	19.28	0.00	0.00	11.91	7.81	
Standard Deviation	0.00	3.51	13.29	0.00	0.00	8.21	5.36	
CV	0.0	59.68	114.33	0.0	0.0	74.55	100.51	
Grand Mean	0.0	5.88	11.63	0.0	0.0	11.01	5.33	
Bartlett's X2	0.0	4.307	0.319	0.0	0.0	20.327	9.562	
P(Bartlett's X2)	.	0.116	0.853	.	.	0.001*	0.023*	
Friedman's X2	0.0	23.277	20.141	0.0	0.0	23.959	17.291	
P(Friedman's X2)	1.00	0.006	0.017	1.00	1.00	0.004	0.044	
Replicate F	0.000	1.678	0.824	0.000	0.000	1.808	1.141	
Replicate Prob(F)	1.0000	0.1952	0.4919	1.0000	1.0000	0.1695	0.3519	
Treatment F	0.000	30.740	9.475	0.000	0.000	24.514	11.691	
Treatment Prob(F)	1.0000	0.0001	0.0001	1.0000	1.0000	0.0001	0.0001	

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