

# **WSU TURFGRASS**

## **FIELD DAY**

**JUNE 10, 2014**

**PULLMAN, WA**



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# **WSU Turfgrass Field Day**

**June 10, 2014**

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# WSU Turfgrass and Agronomy Research Facility

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**WSU TURFGRASS and AGRONOMY RESEARCH FACILITY**  
 Pullman, WA  
 2014

Plot #	Current Research Projects
1	Fairway blend of KBG used at the Palouse Ridge Golf Course
2	Fallow - Future 2014 National Bentgrass Fairway/Tee Test (NTEP)
3	Fallow - Future 2014 National Fineleaf Fescue Test (NTEP)
4	Fallow
5	Fallow
6	California sand-based green with 'T-1' creeping bentgrass
7	USGA sand-based green with 'T-1' creeping bentgrass
8	'NuDestiny' Kentucky bluegrass
9	Seed increase noburn Kentucky bluegrass PI 368241 (heads/area selection)
10	Seed increase noburn Kentucky bluegrass PI 368241
11	Lower $\frac{1}{2}$ plot: 'Gallery' perennial ryegrass. Upper $\frac{1}{2}$ plot: 'Treasure' chewings Fescue
12	Seed increase noburn Kentucky bluegrass PI 371775 (seed/head selection). Fall applied PoaCure to control <i>Poa annua</i> in Kentucky bluegrass seed production.
13	Seed increase noburn Kentucky bluegrass Kenblue (seed/head selection)
14	Lower $\frac{1}{2}$ plot: 'Gly-Rye' roundup tolerant perennial ryegrass. Upper $\frac{1}{2}$ plot 'Top Gun II' perennial ryegrass
15	2011 National Kentucky Bluegrass Test (NTEP)
16	'NuDestiny' Kentucky bluegrass
17	Perennial ryegrass/Kentucky bluegrass

# Efficacy of 'Tenacity' in Late Spring to Eliminate *Poa annua* in Kentucky Bluegrass Fairways

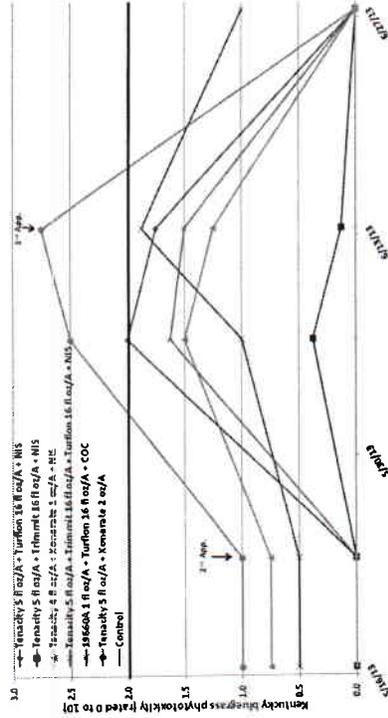
W.J. Johnston and C.T. Golob  
Crop and Soil Sciences, Washington State University, Pullman, WA

## OBJECTIVE

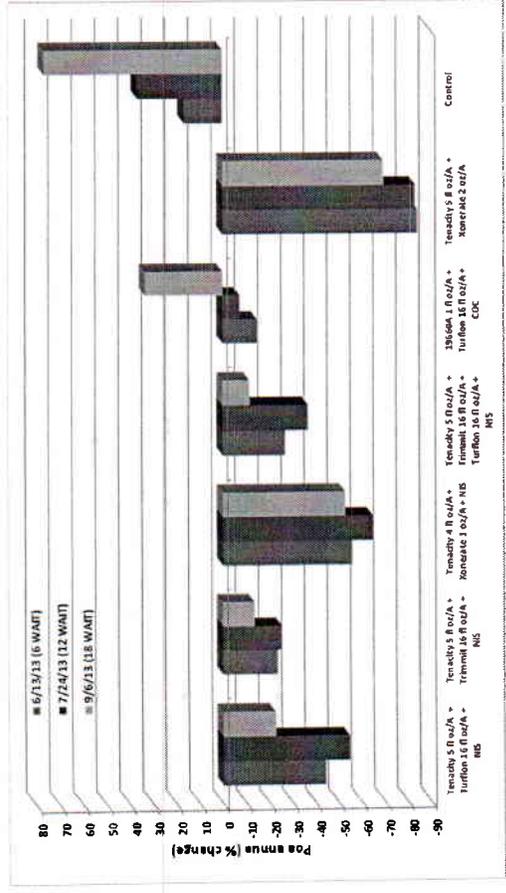
Determine the efficacy of Tenacity 4SC combined with several herbicides to eliminate *Poa annua* from Kentucky bluegrass fairways.

## MATERIALS & METHODS

Research was conducted on a Kentucky bluegrass fairway infested with *P. annua* at the Palouse Ridge Golf Club in Pullman, WA. Treatments were: Tenacity 5 fl oz/A + Xonerate 2 oz/A, Tenacity 4 fl oz/A + Xonerate 1 oz/A, Tenacity 5 fl oz/A + Turflon 16 fl oz/A, 19660A 1 fl oz/A + Turflon 16 fl oz/A, Tenacity 5 fl oz/A + Trifluralin 16 fl oz/A, and Tenacity 5 fl oz/A + Trifluralin 16 fl oz/A. Repeat treatments were made on May 2, May 23, and June 13, 2013. Applications in 2014 are currently ongoing.



Kentucky bluegrass phytotoxicity.



Percent change in *Poa annua* in the fairway 6, 12, and 18 weeks after initial treatment

## RESULTS

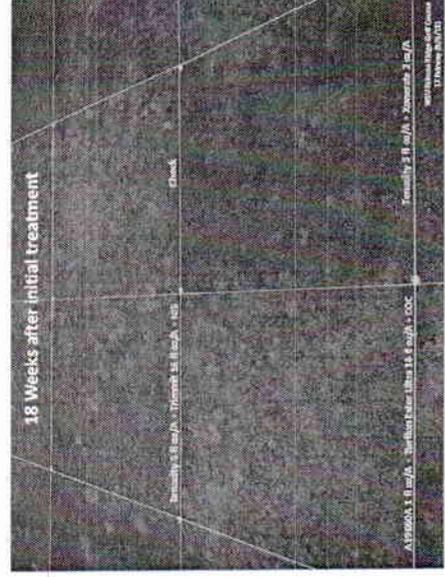
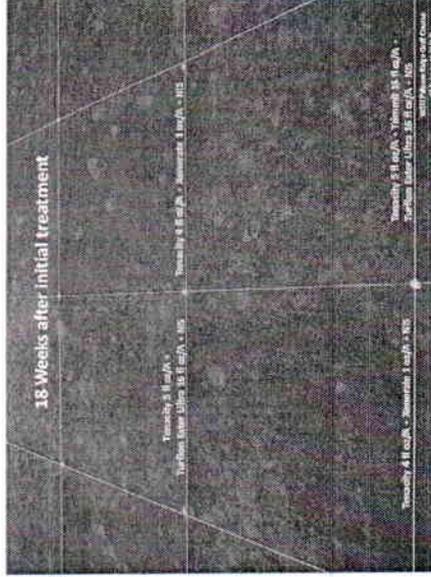
Tenacity 5 fl oz/A + Xonerate 2 oz/A and Tenacity 4 fl oz/A + Xonerate 1 oz/A resulted in the greatest reduction of *P. annua*; however, associated with the Tenacity 5 fl oz/A + Xonerate 2 oz/A treatment was a high level of *P. annua* phytotoxicity and at times an unacceptable phytotoxicity on Kentucky bluegrass. In addition, open depressed areas in the fairway where the *P. annua* had died could present undesirable playing conditions during peak summer play. Tenacity 4 fl oz/A + Xonerate 1 oz/A also resulted in a high level of *P. annua* phytotoxicity for several weeks, but a low level of Kentucky bluegrass phytotoxicity and did not cause *P. annua* to quickly disappear creating open areas and depressions in the fairway.

## CONCLUSIONS

Tenacity 4 fl oz/A + Xonerate 1 oz/A may be the most desirable *P. annua* control option to consider in terms of playability. Complete *P. annua* control was not achieved with any treatment; therefore, a multi-year program may be needed to achieve this goal. To determine the efficacy of multi-year applications, the trial is currently receiving repeat treatments during Spring 2014.

## 2013 Applications:

- May 2 +
- May 23 +
- June 13



# Multi-year Fall Applied Methiozolin for *Poa annua* Control on Golf Greens

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## INTRODUCTION

Creeping bentgrass (*Agrostis stolonifera* L.) golf greens infested with annual bluegrass (*Poa annua* L.) can be hard to manage, unattractive, and have reduced playability. Methiozolin ('PoaCure') is a new isoxazolin herbicide that has shown selective *P. annua* control in golf greens (Han and Kaminski, 2012; Hart, 2012; Hoyle et al., 2012; Koo et al., 2013).

## OBJECTIVE

Evaluate multi-year, single Fall applications of methiozolin to control low populations of *P. annua* in bentgrass greens.

## MATERIALS & METHODS

Research was conducted on 'T-1' creeping bentgrass, sand-based greens (< 5% *P. annua*) at the Palouse Ridge Golf Club in Pullman, WA. A single application of methiozolin was applied at 3 L ha<sup>-1</sup> or 6 L ha<sup>-1</sup> in late September, mid October, or early November in 2010 and reapplied to the same plots in 2011. The study was repeated on a separate green in 2011-2013. Experimental design was a randomized complete block with four replications. Plant counts (two random 0.09 m<sup>2</sup> counts per plot) were made at initial application in September and subsequently monthly during the following two growing seasons during late Spring and Summer.

## RESULTS

In the non-treated control, *P. annua* increased by 80% during the 2010-2012 study (Fig. 1) and by 120% in the 2011-2013 study (Fig. 2). In general, *P. annua* control increased with methiozolin application rate and late applications in the Fall. There was no bentgrass phytotoxicity observed at any time during either study. All treatments (except for the late September methiozolin application at 3 L ha<sup>-1</sup> during 2010-2012) reduced *P. annua* compared to the non-treated control. A single application of 6 L ha<sup>-1</sup> in early November of 2010 and 2011 completely eliminate *P. annua* by Summer 2012. In the repeat study (2011-2013), a single application of 6 L ha<sup>-1</sup> on 2 Nov. 2011 reduced the *P. annua* population by 66% the first year and by 83% after two years.

## CONCLUSIONS

Multi-year (2 yr), single Fall applications of methiozolin provided excellent control of *P. annua* in bentgrass greens having an initial low *P. annua* population. In general control increased with methiozolin rate and late timing of applications. Methiozolin has the potential to become a management tool to mitigate the infestation of newly established bentgrass greens with *P. annua* or for *P. annua* control in bentgrass greens where a low population currently exists.

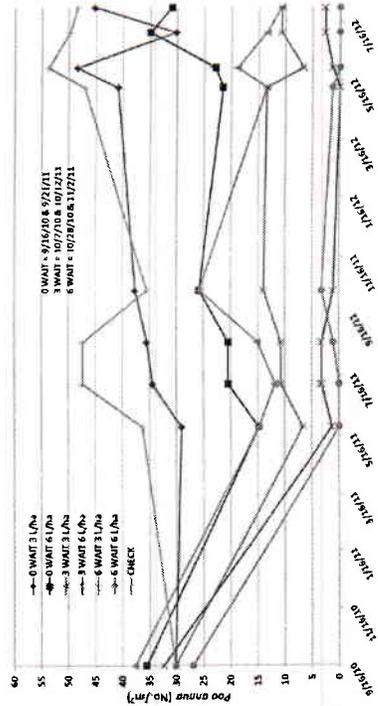


Fig. 1. *Poa annua* control with multi-year (2010 and 2011), single Fall applications of methiozolin at Pullman, WA.

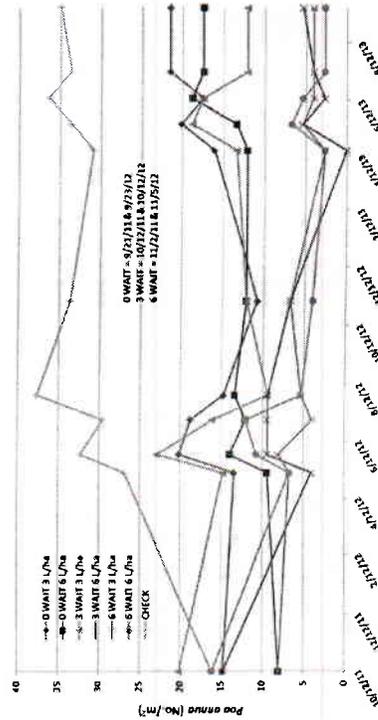


Fig. 2. *Poa annua* control with multi-year (2011 and 2012), single Fall applications of methiozolin at Pullman, WA.

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 2013 ASA-CSSA-SSSA - Tampa, FL

# Mesotrione-Impregnated Fertilizer Use During Establishment Of Cool-Season Turfgrasses

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## INTRODUCTION

Herbicides labeled for weed control at time of seeding of cool-season turfgrasses are limited. Sidoron can be applied at establishment; however, it does not control broadleaf weeds. Quinclorac also has limited use during establishment due to minimal broadleaf weed control. Carfentrazone use is limited by its lack of grass weed activity and potential seedling injury and no fineleaf fescue information is on the label. A herbicide that can be combined with a fertilizer in a single-application product to improve control of broadleaf weeds in cool-season turfgrass at seeding is needed, especially for the non-professional, home owner turfgrass market.

## OBJECTIVE

Evaluate mesotrione impregnated on a granular fertilizer for the control of broadleaf and grass weeds in three cool-season turfgrasses during establishment.

## MATERIALS & METHODS

Field studies were conducted at the Washington State University Turfgrass and Agronomy Research Facility at Pullman, WA during summer 2006 and 2007 on a Palouse silt loam soil. Three cool-season turfgrasses were included in the study: 'Treasure' Chewings fescue (*Festuca rubra* L. ssp. *commutata* Gaudin) (CF), 'Gallery' perennial ryegrass (*Lolium perenne* L.) (PRG), and 'NuDestiny' Kentucky bluegrass (*Poa pratensis* L.) (KBG).

Mesotrione impregnated on a Scotts® 20-27-5 starter fertilizer (The Scotts Company, Marysville, OH) was applied at seeding and 6 wk after seeding. Mesotrione was applied as mesotrione-impregnated fertilizer (MIF) at 0 (fertilized, untreated control (UTC)), 161, 282, 343, or 565 g a.i. of mesotrione ha<sup>-1</sup>. Sidoron, impregnated on an 18-23-4 fertilizer, was applied at 6700 g a.i. ha<sup>-1</sup>. The MIF treatments were specifically formulated products for each mesotrione rate; therefore, each mesotrione treatment received the same quantity of N fertilizer.

Predominant broadleaf weeds that occurred were: common lambsquarter (*Chenopodium album* L.), common mallow (*Malva neglecta* Waltr.), henbit (*Lamium amplexicaule* L.), pigweed (*Amaranthus* spp.), prickly lettuce (*Lactuca scariola* L.), and shepherd's-purse (*Capsella bursa-pastoris* (L.) Medic.). Grass weed were: barmyardgrass (*Echinochloa crus-galli* (L.) Beauv.) and witchgrass (*Panicum capillare* L.).

Phytotoxicity was visually rated on a scale of 0 to 9; with 0 = healthy turfgrass, 9 = dead turfgrass, and values ≤ 2 considered to be acceptable turfgrass quality. Weed counts were taken by randomly placing a 0.3 × 0.6-m quadrat in each experimental unit and counting the number of broadleaf or grass weeds within the quadrat. Turfgrass cover was visually rated as a percentage of the individual plot area occupied by the seeded turfgrass species.

For each grass species, treatments were arranged in a randomized complete-block design with three replications. Individual plots (experimental units) were 1.8 × 3.6 m in all trials. When AOV for year × treatment interactions were non-significant, data from 2006 and 2007 were combined for analysis. Mean separations were performed using Fisher's protected Least Significant Difference (LSD) ( $P = 0.05$ ). All analyses were performed using Statistix 9.0 (Analytical Software, Tallahassee, FL).

## RESULTS AND DISCUSSION

Mesotrione-impregnated fertilizer was not safe to apply during establishment to a pure stand of CF, although excellent weed control was achieved (Tables 1 and 2). Phytotoxicity on CF was observed at all mesotrione rates, which does not support the work of Reicher and Weisenberger (2006) who showed safety of mesotrione applications on CF at < 282 g a.i. ha<sup>-1</sup>. This may be due to differences in phytotoxicity among species and cultivars of fineleaf fescue, which has previously been observed (Williams et al., 2009). Also, the granular formulation of mesotrione may be more active than the liquid formulation. Further research comparing mesotrione granular and liquid formulation is warranted. Turfgrass cover of CF was markedly reduced by applications of MIF.

Perennial ryegrass injury by MIF applications was minor. Others have reported PRG tolerance to mesotrione at ≤ 282 g a.i. ha<sup>-1</sup> (Reicher and Weisenberger, 2005). Broadleaf and grass weed control was achieved with all MIF treatments in 2007 (Table 3). Turfgrass cover was reduced only by mesotrione applied twice at ≥ 565 g a.i. ha<sup>-1</sup> in 2007, which is three times the label rate for a single application and twice the yearly limit. Broadleaf weed control with siduron in our study was most likely due to the rapid germination and highly competitive nature of PRG, and not to herbicidal activity of siduron on broadleaf weeds.

Mesotrione-impregnated fertilizer was safe to apply to KBG and was effective at controlling grass and broadleaf weeds (Table 4), with the exception of redstem filaree (*Erodium cicutarium* (L.) L'Hér. ex Ait.) and witchgrass, which were injured but not controlled.

## CONCLUSIONS

Mesotrione-impregnated fertilizer applied twice (at seeding and 6 wk later) at any mesotrione rate ranging from 161 to 565 g a.i. ha<sup>-1</sup> provided adequate broadleaf and grass weed control in CF, PRG, and KBG; however, all mesotrione rates were phytotoxic on CF and also reduced CF cover. Lower rates of mesotrione used in these studies should prove to be more cost effective and allow for split- or repeat-applications, as the maximum annual use rate of mesotrione is 560 g a.i. ha<sup>-1</sup> yr<sup>-1</sup> (Anonymous, 2010).

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Table 1. Effect of mesotrione or siduron impregnated fertilizer applied during establishment on phytotoxicity on *Festuca rubra* spp. *commutata* at Pullman, WA.

Herbicide	Rate <sup>a</sup>	Year	Weeks after first treatment					Treatment mean
			2	4	6	8	10	
	g a.i. ha <sup>-1</sup>		Phytotoxicity <sup>b</sup>					
Mesotrione	161	2006	2.7	0.0	0.7	0.0	0.0	0.7 e <sup>d</sup>
Mesotrione	282		6.0	0.0	2.3	0.0	0.0	1.7 cd
Mesotrione	343		5.3	0.0	2.0	0.0	0.0	1.5 d
Mesotrione	565		7.0	0.0	3.0	0.0	0.0	2.0 b
Sidoron	6700		0.0	0.0	0.0	0.0	0.0	0.0 f
UTC	0		0.0	0.0	0.0	0.0	0.0	0.0 f
Week mean			3.5 <sup>a</sup>	0.0 f	1.3 cd	0.0 f	0.0 f	
Mesotrione	161	2007	1.3	1.0	0.0	1.0	0.3	0.7 e
Mesotrione	282		4.3	1.3	0.0	3.0	1.3	2.0 b
Mesotrione	343		4.3	1.3	0.0	2.7	1.0	1.9 bc
Mesotrione	565		6.3	1.7	0.0	3.3	2.3	2.7 a
Sidoron	6700		0.0	0.0	0.0	0.0	0.0	0.0 f
UTC	0		0.0	0.0	0.0	0.0	0.0	0.0 f
Week mean			2.7 b	0.9 de	0.0 f	1.7 c	0.8 e	

<sup>a</sup>Treatments applied at seeding (8 June 2006 or 30 May 2007) and again 6 wk following seeding.

<sup>b</sup>Phytotoxicity rated on a scale of 0 to 9, 9 = plant death, ≤ 2 = acceptable plant injury.

<sup>c</sup>Treatment or week means followed by the same letter are not significantly different according to Fisher's protected LSD test ( $P \leq 0.05$ ).

Table 3. Effect of mesotrione or siduron impregnated fertilizer applied during establishment on broadleaf weed number, grass weed number, and percentage of *Lolium perenne* cover at Pullman, WA.

Herbicide	Rate <sup>a</sup>	Broadleaf weeds		Grass weeds		Turfgrass cover	
		2006	2007	2006 + 2007	2006 + 2007	2006	2007
	g a.i. ha <sup>-1</sup>	no. 0.18 m <sup>-2</sup>		no. 0.18 m <sup>-2</sup>		%	
Mesotrione	161	0.1 c <sup>b</sup>	0.9 c	1.4 b	79.4 a	73.6 ab	
Mesotrione	282	0.1 c	1.0 c	0.3 bc	79.7 a	73.1 b	
Mesotrione	343	0.1 c	0.4 c	1.0 bc	72.5 a	74.9 ab	
Mesotrione	565	0.1 c	0.3 c	0.1 c	68.7 c	72.9 b	
Sidoron	6700	0.4 c	19.9 b	1.1 bc	74.3 ab	70.7 b	
UTC	0	2.4 c	27.9 a	6.2 a	72.8 b	74.3 ab	

<sup>a</sup>Treatments applied at seeding (8 June 2006 or 30 May 2007) and again 6 wk following seeding.

<sup>b</sup>Means within an evaluation parameter (data collected 2, 4, 6, 8, and 10 WAF) followed by the same letter are not significantly different according to Fisher's protected LSD test ( $P \leq 0.05$ ).

Table 2. Effect of mesotrione or siduron impregnated fertilizer applied during establishment on broadleaf weed number, grass weed number, and percentage of *Festuca rubra* spp. *commutata* cover at Pullman, WA.

Herbicide	Rate <sup>a</sup>	Broadleaf weeds		Grass weeds		Turfgrass cover	
		2006	2007	2006 + 2007	2006 + 2007	%	
	g a.i. ha <sup>-1</sup>	no. 0.18 m <sup>-2</sup>		no. 0.18 m <sup>-2</sup>		%	
Mesotrione	161	0.0 d <sup>b</sup>	0.5 cd	1.5 b		59.7 c	
Mesotrione	282	0.1 d	0.3 d	1.4 b		46.7 e	
Mesotrione	343	0.0 d	0.2 d	0.3 b		49.2 d	
Mesotrione	565	0.1 d	0.1 d	1.3 b		26.6 f	
Sidoron	6700	1.7 cd	22.9 b	1.2 b		73.1 a	
UTC	0	5.0 c	45.5 a	6.0 a		67.6 b	

<sup>a</sup>Treatments applied at seeding (8 June 2006 or 30 May 2007) and again 6 wk following seeding.

<sup>b</sup>Means within an evaluation parameter (data collected 2, 4, 6, 8, and 10 WAF) followed by the same letter are not significantly different according to Fisher's protected LSD test ( $P \leq 0.05$ ).

Table 4. Effect of mesotrione or siduron impregnated fertilizer applied during establishment on broadleaf weed number, grass weed number, and percentage of *Poa pratensis* cover at Pullman, WA.

Herbicide	Rate <sup>a</sup>	Broadleaf weeds		Grass weeds		Turfgrass cover	
		2006	2007	2006	2007	2006	2007
	g a.i. ha <sup>-1</sup>	no. 0.18 m <sup>-2</sup>		no. 0.18 m <sup>-2</sup>		%	
Mesotrione	161	0.2 c <sup>b</sup>	2.1 c	5.2 c	6.5 c	47.0 bc	61.6 a
Mesotrione	282	0.1 c	1.1 c	0.4 c	2.3 c	46.3 bc	65.0 a
Mesotrione	343	0.0 c	1.5 c	1.6 c	1.6 c	51.0 b	61.2 a
Mesotrione	565	0.0 c	1.9 c	0.5 c	1.7 c	35.8 e	62.9 a
Sidoron	6700	2.9 c	26.6 b	0.3 c	19.1 b	38.1 de	62.5 a
UTC	0	4.4 c	77.1 a	5.5 c	27.8 a	41.7 cd	60.9 a

<sup>a</sup>Treatments applied at seeding (8 June 2006 or 30 May 2007) and again 6 wk following seeding.

<sup>b</sup>Means within an evaluation parameter (data collected 2, 4, 6, 8, and 10 WAF) followed by the same letter are not significantly different according to Fisher's protected LSD test ( $P \leq 0.05$ ).

## Kentucky Bluegrass Germplasm for Turf and Seed Production

W.J. Johnston<sup>1</sup>, R.C. Johnson<sup>2</sup>, and C.T. Golob<sup>1</sup>

<sup>1</sup>Dept. of Crop and Soil Sciences and <sup>2</sup>Western Regional Plant Introduction Station, WSU

The objective of the study was to develop bluegrasses that have sustainable seed yield without post-harvest field burning and still maintain acceptable turfgrass quality. This long-term study consisted of 10 Kentucky bluegrass entries; eight are USDA/ARS Plant Introduction (PI) accessions and two are commercial cultivars ('Kenblue' and 'Midnight'). All entries in previous research had expressed high seed yield without burning of post-harvest residue and good turfgrass quality. Several agronomic yield parameters were evaluated over a 2-year period and individual plants were reselected within each accession, or check, with the highest seed weight, highest seeds/head, highest heads/area, and highest seed yield. Turfgrass plots were established in 2006 and seed production plots (irrigated and non-irrigated) were established in 2007 at Pullman, WA. The turfgrass trials were evaluated according to NTEP (National Turfgrass Evaluation Program) protocol. Seed production plots were harvested (2008-2011) and seed increase plots established in 2011 were harvested in 2012 and 2013.

Results indicate that PI 368241, selection heads/area, showed the most promise of being able to provide long-term turfgrass seed yield without field burning in both non-irrigated and irrigated seed production (Table 1). Kenblue, selection seed/head, had good seed yield and fair turfgrass quality. PI 371775, selection seed/head, had good turfgrass quality while maintaining good seed yield with irrigation. These three selections are currently in seed increase plots at Pullman. In the PNW, bluegrass seed yields in 2013 were considerable below average. It will be interesting to see if the yields in the dryland seed increase plots were following the regional trend in 2013, or will rebound in seed yield in 2014.

Table 1. Kentucky bluegrass germplasm turfgrass quality and seed yield.

Cultivar or PI#	Selection parameter	Turfgrass quality <sup>1</sup>	Seed yield (lbs/A)		Seed increase plots	
		5-yr mean Pullman	4-yr mean Dryland	4-yr mean Irrigated	Seed yield (lbs/A)	
					2012	2013
Midnight	Elite-type check	7.1 a <sup>2</sup>	136 c	243 d		
Kenblue	Common-type check	5.3 c	398 b	608 c		
Kenblue	Seeds/head	5.4 c	795 a	995 ab	1207 <sup>3</sup>	911 <sup>3</sup>
371775	Seeds/head	6.1 b	404 b	800 bc	729 <sup>4</sup>	913 <sup>4</sup>
368241	Heads/area	5.1 d	893 a	1102 a	934 <sup>3</sup>	673 <sup>3</sup>

<sup>1</sup>Turfgrass quality rated 1 to 9; 9 = excellent.

<sup>2</sup>Means within columns followed by the same letter are not significantly different. LSD  $P = 0.05$ .

<sup>3</sup>Dryland

<sup>4</sup>Irrigated



WSU CAHNRS

Department of Crop and Soil Sciences, Pullman Campus

# Turf Management

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## Preparing students...

who wish to specialize in golf course supervision, grounds maintenance, sod production, and similar recreation positions involving turfgrass management techniques and personnel relations.



Students gain hands-on experience at the [WSU Turf Research farm](#) and the new [18-hole, championship golf course](#) near campus. Internships place students at quality golf courses and sports fields across the country, giving them invaluable work experience prior to graduating.

Students will be pleased to know that turfgrass management has now been formalized as a major in the [Department of Crop and Soil Sciences](#).

## Degrees offered:

- B.S. in Integrated Plant Sciences, with a major in Turfgrass Management (or minor in Crop Science)
- M.S. degree in Crop Science
- Ph.D. degree in Crop Science

## Turf Senior Selected for USGA Green Section Internship

Marcus Harness, a recent WSU turfgrass management alum, was one of 15 students selected from a nationwide pool to participate in the 12th annual United States Golf Association (USGA) Green Section Internship Program. [Read More.](#)

## Rebuilding New Orleans

### Turf Students Work on Floors, Too



WSU turf management program recent alums Jerry Langreder (center) and Nick Magnuson (right) traded golf clubs for hammers while volunteering for Habitat for Humanity in hurricane-devastated New Orleans in 2009. For one day, Langreder and Magnuson



WSU CAHNRS

Department of Crop and Soil Sciences, Pullman Campus

# Turf Management

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## Research



### Turfgrass and Agronomy Research Center

A new turfgrass research facility in Pullman was completed in 2005. It includes a USGA experimental green, 15 turfgrass plots (80' x 80'), an office/shop, and a storage building. Charles Golob, Research Supervisor, manages the research facility.

#### Research Facility Diagram

#### Current Research Emphasis

Current emphasis is on comparison of different fungicides for snow mold disease control, evaluation of different grass species for the National Turfgrass Evaluation Program (NTEP), evaluation of methiozolin ('PoaCure') for *Poa annua* control in cool-season grasses, development of Kentucky bluegrass for seed production without post-harvest field burning, and *Poa annua* control in irrigated Kentucky bluegrass seed production.

In addition to these projects, information on older projects such as controlling leaf spot on golf course fairways, *Poa annua* seedhead suppression on bentgrass/annual bluegrass golf greens, quantifying post-harvest emissions from bluegrass seed production field burning, development of a rapid and non-destructive method for separating grass clipping from topdressing sand, correlation of field and controlled-environment studies of pink snow mold resistance of PNW greens-type *Poa annua*, regional climatic characterization of PNW greens-type *Poa annua*, nitrogen leaching from a sand-based green, and the use of mesotrione ('Tenacity') for weed control in cool-season grasses can be found below.

*list of projects*

### PROJECTS

(note these are pdf files)

#### Roundup Formulations

[Efficacy of a New Potassium Salt Formulation of Glyphosate \(Roundup PROMAX\) Compared to other Formulations of Glyphosate](#)

#### Fertility Projects

- [Georgia-Pacific's Nitamin® 30L \(30-0-0\) and Blends of Nfusion® \(25-0-0\) 'Steady-Delivery'® Nitrogen Soluble Fertilizer Compared to Urea \(46-0-0\) on a 'T-1' Creeping Bentgrass Green](#)
- [Georgia-Pacific's Nitamin Nfusion \(25-0-0\) 'Steady-Delivery' Nitrogen Soluble Fertilizer Compared to Simplot's Best Polyon \(43-0-0\) Controlled-Release Fertilizer on a Fairway Cut Kentucky Bluegrass Turf](#)
- [Georgia-Pacific's Nitamin® 30L \(30-0-0\) and Blends of Nfusion® \(25-0-0\) 'Steady-Delivery'® Nitrogen Soluble Fertilizer Compared to UMAXX® \(47-0-0\) Stabilized Nitrogen™ Fertilizer on a Perennial Ryegrass Lawn](#)
- [LESCO Fairway Fertilizer Study 2007](#)

- [LESCO Lawn Fertilizer Study 2007](#)

#### Snow Mold Control

- [Evaluation of AMVAC Fungicides for Snow Mold Control on Fairways 2012-13](#)
- [Evaluation of AMVAC Fungicides for Snow Mold Control on Greens 2012-13](#)
- [Evaluation of Bayer Fungicides for Snow Mold Control on Fairways 2012-13](#)
- [Evaluation of Bayer Fungicides for Snow Mold Control on Greens 2012-13](#)
- [Evaluation of Syngenta Fungicides for Snow Mold Control on Fairways 2012-13](#)
- [Evaluation of Syngenta Fungicides for Snow Mold Control on Greens 2012-13](#)
- [Evaluation of Syngenta Fungicides for Snow Mold Control on Greens 2011-12](#)
- [Evaluation of Bayer Fungicides for Snow Mold Control on Fairways 2011-12](#)
- [Evaluation of Civitas plus Harmonizer for Snow Mold Control on Greens 2011-12](#)
- [Evaluation of Syngenta and Bayer Fungicides for Snow Mold Control on Fairways 2010-11](#)
- [Evaluation of Bayer Fungicides for Control of Pink and Gray Snow Mold 2010-11](#)
- [Civitas for Snow Mold Control 2009-2010](#)
- [Fungicide for Control of Pink and Gray Snow Mold 2009-10](#)
- [Evaluation of Bayer Fungicides for Control of Pink and Gray Snow Mold 2008-2009](#)
- [Evaluation of Syngenta Fungicides for Control of Pink and Gray Snow Mold 2008-2009](#)
- [Evaluation of Syngenta Fungicides for Control of Pink and Gray Snow Mold 2007-2008](#)
- [Evaluation of Bayer Fungicides for Control of Pink and Gray Snow Mold 2007-2008](#)
- [Evaluation of Bayer Fungicides for Control of Pink and Gray Snow Mold 2006-2007](#)
- [Evaluation of Cleary's Fungicides for Control of Pink and Gray Snow Mold 2006-2007](#)
- [Evaluation of LESCO's Fungicides for Control of Pink and Gray Snow Mold 2006-2007](#)
- [Evaluation of Syngenta Fungicides for Control of Pink and Gray Snow Mold 2006-2007](#)
- [Evaluation of LESCO's Fungicides for Control of Pink and Gray Snow Mold in Idaho, Montana and Washington 2004-2005](#)
- [Evaluation of Syngenta and Bayer Fungicides for Control of Pink and Gray Snow Mold 2004-2005](#)
- [Evaluation of Cleary's Fungicides for Control of Pink and Gray Snow Mold in Idaho, Montana and Washington 2004-2005](#)
- [Evaluation of Syngenta products to control of pink and gray snow mold 2003-2004](#)
- [Efficacy of Signature to control pink and gray snow mold 2003-2004](#)

#### Tenacity (Mesotrione) Herbicide

- [Multiple Spring Applications of Tenacity with Xonerate or Tenacity with Other Herbicides to Control \*Poa annua\* in Kentucky Bluegrass Fairways 2013](#)
- [Two Consecutive Years of Multiple Fall Applications of Tenacity and Other Grass Herbicides to Control \*Poa annua\* in Kentucky Bluegrass Fairways 2009-2011](#)
- [Development of Tenacity 45C for Weed Control Recommendations with Spray Adjuvants 2011](#)
- [Fall Program Using Tenacity, Prograss, and/or Velocity for Selective Removal of \*Poa annua\* Post-emergence in Kentucky Bluegrass Fairways 2010](#)
- [Fall Program Using Tenacity, Prograss, and/or Velocity for Selective Removal of \*Poa annua\* Post-emergence in Kentucky Bluegrass Fairways 2009](#)

- [Tenacity Impregnated Fertilizer for Broadleaf Weed Control in Home Lawns 2010](#)
- [The Effect of Roundup/Tenacity used in a Late Fall Renovation on Subsequent \*Poa annua\* Re-establishment in a Golf Course Fairway 2008-2009](#)
- [Spring Applied Tenacity 4FL Alone or with Grass Weed Herbicides to Control Annual Bluegrass 2009](#)
- [Comparing the Safety of Tenacity 45C Formulation to a New 25C Formulation on Fineleaf Fescue at Seeding](#)
- [Comparing the Safety of Tenacity 45C Formulation to a New 25C Formulation on Perennial Ryegrass at Seeding](#)
- [Mesotrione: Program for Bentgrass Removal and Overseeding \(Fall Timing 2007\) and Early Summer 2008](#)
- [Mesotrione: Program for Bentgrass Removal and Overseeding \(Fall Timing\) 2007](#)
- [Bentgrass and fineleaf fescue cultivar and species differences in phytotoxicity to mesotrione](#)
- [Mesotrione Impregnated on fertilizer for weed control at seeding](#)
- [Mesotrione Safety at Seeding of Turfgrass Mixtures](#)
- [The Effect of Water Stress on the Efficacy of Mesotrione to Control Weeds in Cool-season Turfgrass Stands](#)
- [Mesotrione: Program for Bentgrass Removal and Overseeding \(Fall Timing\)](#)
- [Safety of Mesotrione 45C when Applied to Sensitive Turf Species Grown in Mixtures](#)
- [Safety of Mesotrione 45C when Applied as a Spray at Planting and at First Mowing of a 3-way Mixture of Cool-Season Turfgrasses](#)

#### Methiozolin Herbicide

- [Evaluation of a New Herbicide, Methiozolin, for Selective \*Poa annua\* Control Post-emergence on Creeping Bentgrass Putting Greens 2010-11](#)

#### National Turfgrass Evaluation Program (NTEP)

- [2003 National Bentgrass Fairway/Tee Test \(2004-2007 Summary\)](#)
- [2003 National Fineleaf Fescue Test \(2004-2007 Summary\)](#)
- [2004 National Perennial Ryegrass Test \(2005-2008 Summary\)](#)
- [2005 National Kentucky Bluegrass Variety Test \(2006-2009 Summary\)](#)
- [2000 National Kentucky Bluegrass Test \(schedule B: medium input\), 2001-2004 data](#)
- [2001 National Tall Fescue Test \(schedule A: medium-high input\), 2002-2004 data](#)

#### Spokane Reuse Water Project

- [Golf Course Reuse Water Pilot Study Phase I Report 2008](#)
- [Golf Course Reuse Water Pilot Study Phase II Report 2009](#)
- [Golf Course Reuse Water Pilot Study Phase III Report 2010](#)

#### Black Sand

- [The Use of Black Sand to Accelerate Creeping Bentgrass Seed Germination and Emergence on a Late Fall Planted Putting Green](#)

#### Suppression of *Poa annua* Seedheads

- [Suppression of \*Poa annua\* Seedheads on Bentgrass/Annual Bluegrass Putting Greens Comparing NB31150 with Embark and Primo/Proxy 2004](#)

#### Controlling Leaf spot on Golf Fairways

- [Control of Helminthosporium Leaf Spot in Cool-season Turf with Medallion 2004](#)

#### Pink Snow Mold Resistance in PNW *Poa annua*

- [Correlating Field and Controlled-environment Studies of Pink Snow Mold Resistance in PNW Greens-type \*Poa annua\*](#)

#### Characterization of PNW *Poa annua*

- [Regional Climatic Characterization of PNW Green-type \*Poa annua\*](#)

#### N Leaching from Sand-based Green

- [Nitrogen Leaching from a Sand-based Green \(Coeur d'Alene Floating Green\)](#)

#### Inclined Vibrating Deck

- [Rapid, Non-destructive Method for Separating Turfgrass Clippings from Topdressing Sand using an Inclined Vibrating Deck](#)

#### Kentucky Bluegrass Seed Production

- [No-burn Kentucky Bluegrass Seed Production, Puvallup Field Day 2011](#)
- [No-burn Kentucky Bluegrass Seed Production DOE 2009-2011 Final Report](#)
- [Development of Kentucky bluegrass for non-burn seed production- Proceedings of the International Herbage Seed Conference, Giennestad, Norway, June 17-20, 2007](#)
- [Development of High Yielding Kentucky Bluegrass for Non-thermal Seed Production-Final Progress Report 2006](#)
- [Development of High Yielding Kentucky Bluegrass for Non-thermal Seed Production 2005](#)

#### Post-harvest Emissions

- [Quantifying Post-harvest Emissions from Bluegrass Seed Production Field Burning \(Final Report March 2004\)](#)

#### PRESENTATIONS

##### Snow Mold Control

- [Evaluating Fungicides for Snow Mold Control on Putting Greens and Fairways in the Intermountain West 2010-2011 Results](#)
- [Snow Mold Control on Putting Greens in the Intermountain West with Prolonged Snow Cover 2010](#)
- [Snow Mold Control on Putting Greens in the Intermountain West 2007](#)

##### Mesotrione (Tenacity)

- [Multi-year \(2 consecutive\) Fall Tenacity Plus Program for Selective Post-emergence \*Poa annua\* Suppression in Kentucky Bluegrass Fairways](#)
- [Selective Bentgrass Removal from Perennial Ryegrass with Mesotrione \(Tenacity\)](#)
- [Tenacity: A New Herbicide for Turfgrass Establishment](#)
- [Tenacity for Bentgrass Removal](#)
- [Tenacity for Bentgrass and \*Poa annua\* Control](#)

##### Methiozolin Herbicide

- [Selective \*Poa annua\* Removal from Creeping Bentgrass Putting Greens with a New Herbicide Methiozolin 2010-2011](#)

##### Spokane Reuse Water Project

- [Pilot Reuse Water Project 2009](#)

##### High Yielding Kentucky Bluegrass Germplasm

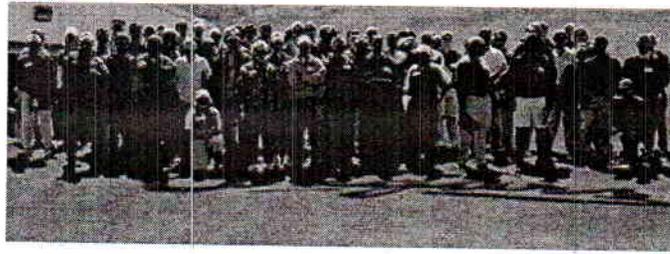
- [Ag Burning Taskforce Presentation 2009](#)

##### Overviews

- [2007 WSU-Pullman Turfgrass Research Overview](#)

##### FIELD DAY REPORTS

- 2008 Field Day Research Reports



[Turf Management](#), PO Box 646420, Washington State University, Pullman WA 99164-6420, [509-335-3475](#), [Contact Us](#)

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2012 WSU Turfgrass Field Day

# Turfgrass Management

## Washington State University

### Graduating with a Turfgrass Management major allows you to pursue a career in:

- ◆ Golf course management
- ◆ Sports field management
- ◆ Landscape industry
- ◆ Sod and nursery industries
- ◆ Or further your education with a M.S. or Ph.D. to pursue opportunities in: education, university extension, corporate research, or business



### Turfgrass majors at WSU have:

- ◆ **Involvement:** interact with peers; 20 undergraduate turf majors
- ◆ **Jobs:** turf students have had 100% turf industry job placement at graduation for the past 10 years. 2013 Golf Course Superintendent \$82,500, Asst. \$40,000 (GCSAA, 2013).
- ◆ **Work/study:** during the academic year work opportunities at the WSU golf course, athletics, grounds, etc.
- ◆ **Internships:** nation-wide opportunities
- ◆ **Hands-on-learning:** work with faculty on field and laboratory research projects
- ◆ **Scholarships:** \$15,000 in turfgrass scholarships were awarded for 2013-2014; the College awarded an additional \$400,000 in scholarships
- ◆ **Turf Club activities:** guest speakers, golf tournament, spring turf tour, team competition at GCSAA and STMA,

Do you recognize any of these past WSU turf club members now working in the Pacific Northwest?

### Contact WSU:

- ◆ Bill Johnston, Ph.D. -- Turf Professor and Undergraduate Advisor
  - [wjohnston@wsu.edu](mailto:wjohnston@wsu.edu)
  - (509) 335-3620

### For more information:

- ◆ Turfgrass Management Program (Teaching, Research, and Extension)
  - <http://turf.wsu.edu>
- ◆ Department of Crop and Soil Sciences
  - <http://css.wsu.edu>

# **WSU-Pullman 2014 Turfgrass Field Day**

**Missed something? Check our website:  
[turf.wsu.edu](http://turf.wsu.edu)**

## **Notes**