

**Department of Crop and Soil Sciences**

**Technical Report 04-4**

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**Eastern Washington**

**Weed Control Report**

Washington State University

Department of Crop and Soil Sciences

**2004 Eastern Washington Weed Control Report**

Technical Report

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INTRODUCTION

The information that is enclosed in this report is a summary of herbicide weed control trials that were conducted as a part of the Cooperative Extension Weed Management Project in the dryland cropping region of eastern Washington. The results of each individual trial are considered preliminary and are accompanied by a brief discussion. Because these trials include experimental herbicides, herbicides not currently labeled on the crop, and rates differing from the herbicide label, you need to consult the herbicide label for approved uses, labeled rates, and precautions.

**Because these are preliminary research results, the results in this report are not to serve as herbicide recommendations. The author, Washington State University, nor WSU Cooperative Extension attest or affirm that this information is presently appropriate for field application. Application or use of any information included herein shall be the sole responsibility of the grower.**

These trials were made possible through the efforts, cooperation, and support of many individuals and organizations. I would like to express my appreciation and acknowledge their support. Financial support was provided from the following commodity commissions and private industries.

Washington and Idaho Pea and Lentil Commissions  
Washington State Pesticide Registration Commission  
Washington Wheat Commission  
Washington Barley Commission

CHEMICAL COMPANIES:

BASF  
Bayer  
DuPont  
Monsanto  
Syngenta  
Wilbur-Ellis

The cooperation of Washington’s growers was also critical in the success of these trials, and I especially want to thank the effort and generosity of the following cooperators:

Derek Appel-Manager USDA /ARS	Art Lenz	Roland Schirman -WSU Extension Columbia Co.
Al Anderberg	Rhod MacIntosh	Silzel Farms
Art Schultheis	Dan McKinley Broughton Land Co.	Rob DeWald
John Burns-WSU Extension	Bruce Sauer-WSU-Lind	Mark Whitmore
Brian Fode-WSU Lind	Pat Schweiger	Zakarison Partnership
Marcus Jacobson		

Tania Ostrander, Laylah Scarnecchia and Jonquil Rood also significantly aided the successful completion and summation of these trials.

### **A Comment on Statistics and LSDs**

Statistical analysis is performed on each set of data to determine if the differences between control rating, yields, etc. are likely due to real effects from the herbicide or just chance variation. Variation can result from non-uniform soil conditions; differences in weed densities across the experiment, errors from using a small plot combine, etc. To reduce variation, each herbicide treatment is replicated or repeated so that its performance can be measured a number of times in the trial. The numbers that appear in the data tables for each measurement, such as yield or weed control are the average of the replications. At the bottom of each table is a row titled LSD (0.05) and includes a number under each column of data. When comparing two herbicide treatments, the control ratings or yields must differ by more than the LSD value, to be “significantly different”. The number 0.05 gives the amount of uncertainty that is associated with the analysis. In this case, there is a 5% chance that there would not be a difference if the trial were repeated and 95% confidence that the difference is real. Some experiments include letters to the side of the data. These letters serve the same purpose as the LSD number. Data with the same letter are not significantly different from each other, but data followed by different letters are different with 95% certainty.

### **RESEARCH RESULTS ARE NOT RECOMMENDATIONS**

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## Herbicide Reference

Herbicides used in these trials listed as both common and trade names:

<u>Common Name</u>	<u>Trade Name</u>
2, 4-D amine	several
2, 4-D ester	several
2, 4-DB	Butyrac 200
Ammonium sulfate	AMS 20/10
Bentazon	Basagran
Bromoxynil	Buctril
Bromoxynil + MCPA	Bronate
Carfentrazone	Aim
Clethodim	Select
Clodinafop	Discover
Clopyralid	Stinger (Curtail, Transline...)
Clopyralid	Curtail
Dicamba + 24D Amine	WeedMaster
Dicamba	Clarity
Dicamba	Banvel
Diclofop	Hoelon
Dimethenamid	Outlook
Dimethenamid	Frontier
Dimethylamine	Saber
Diuron	Karmex
Diuron + Paraquat	Surefire
Ethametsulfuron	Muster
Exit-adjuvant	none
Fenoxaprop	Puma
Flucarbazone	Everest
Flufenacet	Define
Flufenacet +metribuzin	Axiom
Flumiclorac	Resource
Flumioxazin	Valor
Fluroxypyr	Starane
Fluroxypyr + MCPA	Starane + Sword
Glufosinate	Liberty
Glyphosate	Round-up Original
Glyphosate	Round-up Ultra
Glyphosate	Touchdown
Glyphosate acid	Engame
Imazamethabenz	Assert
Imazamox	Beyond
Imazethapyr	Pursuit
Isoxaflutole	Balance
MCPA	Several
MCPA-Amine	(Chiptox) Several
Mesosulfuron	Osprey
Methylated Seed Oil	MSO
Metribuzin	Sencor

Metsulfuron	Ally
Monocarbamide dihydrogen sulfate	Engame
Paraquat + Diuron	Surefire
Pendimethalin	Prowl
Propoxycarbazone	Olympus
Prosulfuron-urea	Peak
Pyridate	Tough
Quizalofop	Assure II
Sulfentrazone	Spartan
Sulfentrazone	Authority
Sulfosulfuron	Maverick
Thifensulfuron	Canvas
Thifensulfuron	Harmony GT
Thifensulfuron + tribenuron	Harmony Extra
Tralkoxydim	Achieve
Urea-ammonium nitrate solution 28% or 32%	UAN

### Weed Reference

Weeds within these trials are listed below both as common and scientific names:

<b><u>Common Name</u></b>	<b><u>Bayer Code</u></b>	<b><u>Scientific Name</u></b>
Bedstraw, catchweed	GALAP	<i>Galium aparine</i>
Bindweed, field	CONAR	<i>Convolvulus arvensis</i>
Brome, downy	BROTE	<i>Bromus tectorum</i>
Buckwheat	POLCO	<i>Polygonum convolvulus</i>
Canola, volunteer	BRSRC	<i>Brassica rapa</i>
Chamomile, mayweed	ANTCO	<i>Anthemis cotula</i>
Fiddleneck, (Tarweed)	AMSLY	<i>Amsinckia intermedia</i>
Goatgrass, jointed	AEGCY	<i>Aegilops cylindrica</i>
Henbit	LAMAM	<i>Lamium amplexicaul</i>
Lambsquarters, common	CHEAL	<i>Chenopodium album</i>
Lentil, volunteer	LENCU	<i>Luns culinaris</i>
Lettuce, prickly	LACSE	<i>Lactuca serriola</i>
Mustard, wild	SINAR	<i>Brassica kaber</i>
Oat, wild	AVEFA	<i>Avena fatua</i>
Pepperweed	LEPBO	<i>Lepidium bonariense</i>
Pigweed, Redroot	AMARE	<i>Amaranthus retroflexus</i>
Puncturevine	TRBTT	<i>Tribulus terrestris</i>
Ryegrass, Italian	LOLMU	<i>Lolium multiflorum</i>
Salsify, western (Yellow)	TRODM	<i>Tragopogon dubius</i>
Thistle, Russian	SASKR	<i>Salsola iberica</i>
Vetch, Hairy	VICVI	<i>Vicia villosa</i>
Wheat, volunteer	TRZA(S) TRAZ(W)	<i>Triticum aestivum</i>
Yarrow, western	ACHLA	<i>Achillea lanulosa</i>

## **03JPY040 & 03JPY041 - Rattail Fescue Control in Clearfield Winter Wheat – Dayton & Pullman, WA**

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This study was part of a multi-state project to determine methods of controlling rattail fescue in direct seed systems. The States involved included Idaho, Oregon and Washington.

The study involved various preemergence, Fall postemergence, and Spring post emergence herbicide applications. Unfortunately, the Dayton location had very little rattail fescue present and weed control differences, although statistically different, lacked precision because numbers were so low. No differences were observed for crop injury, yield and test weights at the Dayton location.

Rattail fescue populations at Pullman were greater and weed control ratings were more accurate. No crop injury was noted from any treatments and winter wheat yields and test weights were also not different.

Flufenacet (Define) provided more activity than Pendimethalin (Prowl) applied preemergence along or in sequential application with postemergence herbicides. Weed controls were mixed with postemergence herbicides.

**03JPY040 - Rattail Fescue Control in Clearfield Winter Wheat – Dayton, WA**

<b>Crop 1:</b> Winter Wheat	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Dayton, WA	Planting Date: 10/09/03	Type:
	Row Spacing: 12 inches	Organic Matter:
<b>Cooperator:</b> Dan McKinley	Seeding Rate: 90 lbs/a	pH:
	Variety: Clearfirst	

**Application Information**

	PREE	LPREE	EPOST
Timing	PREE	LPREE	EPOST
Date	10/16/03	10/16/03	3/29/04
Air Temperature	50° F	50° F	71° F
Rel. Humidity	100 %	100 %	21 %
Wind Velocity			5 mph
Soil Temperature	50° F	50° F	55° F
Soil Moisture	Moist	Moist	Dry
Gal/Acre	10 GPA	10 GPA	10 GPA
Pressure	35 psi	35 psi	35 psi
Nozzles	Teejet XR8001	Teejet XR8001	Teejet XR8001
Crop Growth Stage	Pre-emergence	Pre-emergence	Seedling
<i>Height</i>	n/a	n/a	3-4 inches
Weed Stage			
<i>Rattail Fescue</i>	n/a	n/a	2 leaf
<i>Downy Brome</i>	n/a	n/a	2 leaf

**03JPY040 - Rattail Fescue Control in Clearfield Winter Wheat – Dayton, WA**

Treatment	Rate <sup>a</sup>	Timing	Rattail Fescue Control	Winter Wheat
			4/09/04	Yield
Nontreated			----%----	bu/A
pendimethalin	0.75	PREE	95	83
flufenacet	0.36	PREE	97	87
flufenacet + NIS	0.36 + 0.5%	EPOST	94	87
sulfosulfuron + NIS + 32-0-0	0.031 + 0.5% + 2.5%	EPOST	94	85
AE F13006000 WG75 A1 + NIS + 32-0-0	0.013 + 0.5% + 2.5%	EPOST	97	88
diuron	1	EPOST	97	82
imazamox + NIS + 32-0-0	0.047 + 0.5% + 2.5%	EPOST	96	84
flufenacet + sulfosulfuron + NIS + 32-0-0	0.36 + 0.031 + 0.5% + 2.5%	PREE EPOST	95	93
flufenacet + AE F13006000 WG75 A1 + NIS + 32-0-0	0.36 + 0.013 + 0.5% + 2.5%	PREE EPOST	97	87
flufenacet + diuron	0.36 + 1	PREE EPOST	94	86
flufenacet + imazamox + NIS + 32-0-0	0.36 + 0.047 + 0.5% + 2.5%	PREE EPOST	97	78
pendimethalin + flufenacet + NIS	0.75 + 0.36 + 0.5%	PREE EPOST	97	84
pendimethalin + sulfosulfuron + NIS + 32- 0-0	0.75 + 0.031 + 0.5% + 2.5%	PREE EPOST	92	87
pendimethalin + AE F13006000 WG75 A1 + NIS + 32-0-0	0.75 + 0.013 + 0.5% + 2.5%	PREE EPOST	95	91
pendimethalin + diuron	0.75 + 1	PREE EPOST	95	84
pendimethalin + imazamox + NIS + 32-0-0	0.75 + 0.047 + 0.5% + 2.5%	PREE EPOST	95	83
LSD (p=0.05)			4	NS

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

**03JPY041 - Rattail Fescue Control in Clearfield Winter Wheat – Pullman, WA**

<b>Crop 1: Winter Wheat</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Pullman, WA	Planting Date: 09/26/03	Type: Palouse Silt-Loam
	Row Spacing: 10 inches	Organic Matter: 4.23%
<b>Cooperator:</b> USDA	Seeding Rate: 100 lbs/a	pH: 5.2
	Variety: Clearfirst	

**Application Information**

Timing	PREE	LPREE	EPOST
Date	10/02/03	10/17/03	04/19/04
Air Temperature	74° F	64° F	59° F
Rel. Humidity	16 %	48 %	38 %
Wind Velocity	7 mph	7 mph	2 mph
Soil Temperature	53° F	50° F	52° F
Soil Moisture	Dry	Wet	Moist
Gal/Acre	10 GPA	10 GPA	10 GPA
Pressure	35 psi	35 psi	32 psi
Nozzles	Teejet XR8001	Teejet XR8001	Teejet XR8001
Crop Growth Stage	Pre-emergence	Spike	
<i>Height</i>	n/a	2 inches	6 inches
Weed Stage			
<i>Rattail Fescue</i>	n/a	n/a	1.5 inches
<i>Mayweed Chamomile</i>	n/a	n/a	4 leaf/2 inch rosette
<i>Prickly Lettuce</i>	n/a	n/a	1-2 leaf
<i>Grass</i>	n/a	n/a	2 leaf
<i>Broadleaf</i>	n/a	n/a	1-2 leaf
<i>Catchweed</i>	n/a	n/a	2-3 Inches
<i>Henbit</i>	n/a	n/a	0.5 inch

### 03JPY041 - Rattail Fescue Control in Clearfield Winter Wheat – Pullman, WA

Treatment	Rate <sup>a</sup>	Timing	Rattail Fescue Control			Winter Wheat
			5/12/04	6/14/04	8/02/04	Yield bu/A
Nontreated			0	0	0	53.6
pendimethalin	0.75	PREE	71	45	60	54.9
flufenacet	0.36	PREE	93	94	88	51.5
flufenacet + NIS	0.36 + 0.5%	EPOST	50	65	70	53.6
sulfosulfuron + NIS + 32-0-0	0.031 + 0.5%	EPOST	18	30	18	51.3
	+ 2.5%					
AE F13006000 WG75 A1 + NIS + 32-0-0	0.013 + 0.5%	EPOST	11	10	19	45.3
	+ 2.5%					
diuron	1	EPOST	34	20	39	52.4
imazamox + NIS + 32-0-0	0.047 + 0.5%	EPOST	51	60	60	53.4
	+ 2.5%					
flufenacet + sulfosulfuron + NIS + 32-0-0	0.36 + 0.031 + 0.5% + 2.5%	PREE EPOST	95	90	91	52.2
flufenacet + AE F13006000 WG75 A1 + NIS + 32-0-0	0.36 + 0.013 + 0.5% + 2.5%	PREE EPOST	95	94	89	60.4
flufenacet + diuron	0.36 + 1	PREE EPOST	95	94	90	53.1
flufenacet + imazamox + NIS + 32-0-0	0.36 + 0.047 + 0.5%	PREE EPOST	95	97	93	50.9
pendimethalin + flufenacet + NIS	0.75 + 0.36 + 0.5%	PREE EPOST	73	86	71	57.6
pendimethalin + sulfosulfuron + NIS + 32-0-0	0.75 + 0.031 + 0.5% + 2.5%	PREE EPOST	83	75	73	62.8
pendimethalin + AE F13006000 WG75 + NIS + 32-0-0	0.75 + 0.013 + 0.5% + 2.5%	PREE EPOST	85	74	75	51.5
pendimethalin + diuron	0.75 + 1	PREE EPOST	84	74	93	50.8
pendimethalin + imazamox + NIS + 32-0-0	0.75 + 0.047 + 0.5% + 2.5%	PREE EPOST	79	95	88	52.6
LSD (p=0.05)			25	24	21	NS

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## 03JPY042 & 03JPY047 - Chemical Fallow– Lind & Pullman, WA.

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Research was conducted near Lind and Pullman, WA in the low and high rainfall production zones, respectively, to determine the efficacy of various herbicides in a chemical fallow system.

Predominant weed species at Lind and Pullman were Russian thistle and mayweed chamomile, respectively. Weed density and biomass were measured on July 15 and August 4 at the same respective locations.

At Lind, broadleaf weed populations and biomass tended to be greatest with glyphosate (Roundup) regardless of number or timing of applications. The lowest weed density and biomass were with 0.064 lbs. Isoxaflutole (Balance) plus 0.141 lbs. Sulfentrazone (Spartan)/acre applied March 10 followed by 0.375 lbs glyphosate/acre applied April 12. Isoxaflutole plus sulfentrazone reduced broadleaf density and biomass 97 and 91%, respectively, better than any glyphosate tank-mixed application. Treatments with weed density or biomass greater than isoxaflutole plus sulfentrazone included 0.188 and 0.141 lbs sulfentrazone/acre, 0.064 lbs Flumioxazin (Valor)/acre, 0.080 lbs isoxaflutole/acre, and 0.064 lbs flumioxazin plus 0.141 lbs sulfentrazone/acre. None of the treatments containing Dicamba (Weedmaster), Metribuzin (Sencor), or Paraquat plus Diuron (Surefire) differed from glyphosate treatments for weed density or biomass.

At Pullman, greatest weed density and biomass tended to be with glyphosate only treatments applied April 28 or earlier. However, an additional glyphosate application made June 22 reduced plant density and biomass 97 and 100%, respectively, as compared to earlier glyphosate applications. Tank mix combination of 0.064 lbs flumioxazin plus 0.141 lbs sulfentrazone/acre and 0.064 lbs isoxaflutole plus 0.141 lbs sulfentrazone/acre and sequential applications of 0.5 lbs paraquat plus 0.25 lbs diuron/acre also reduced weed density and biomass 90% or better compared to early applied glyphosate.

The efficacy of treatments varied between locations due to different weed species. While glyphosate remains a critical component of chemical fallow systems, it is possible to achieve good weed control with fewer glyphosate applications when combined with residual herbicides.

**03JPY042 - Chemical Fallow – STEEP Project – Lind, WA**

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<b>Crop 1:</b> Chemical Fallow	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Lind, WA	Planting Date: N/A	Type:
	Row Spacing:	Organic Matter:
<b>Cooperator:</b> John/Rob DeWald	Seeding Rate:	pH:
	Variety:	

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**Application Information**

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	FALL	ESPRING	LSPRING
Timing	FALL	ESPRING	LSPRING
Date	12/15/03	03/10/04	04/12/04
Air Temperature	37° F	51° F	75° F
Rel. Humidity	70 %	29 %	27 %
Wind Velocity	10 mph	5 mph	4 mph
Soil Temperature	30° F	45° F	64° F
Soil Moisture	Moist	Moist	Dry
Gal/Acre	10 GPA	10 GPA	10 GPA
Pressure	35 psi	35 psi	30 psi
Nozzles	Teejet XR8001	Teejet XR8001	Teejet XR8001
Crop Growth Stage	n/a	n/a	n/a
<i>Height</i>			
Weed Stage	n/a	n/a	n/a

**03JPY042 - Chemical Fallow – STEEP Project – Lind, WA**

Table 2. Weed density, fresh weight, and dry weight at Lind, WA July 15, 2004.

Treatment	Rate	Application Date	Total Weed					
			Density		Fresh Weight		Dry Weight	
			Plants/A		Lbs/A		Lbs/A	
Glyphosate	0.375	04/12/04	2,580	abc	970	ab	260	ab
Glyphosate; glyphosate	0.375; 0.375	12/15/03; 04/12/04	2,900	abc	1,810	ab	610	ab
Glyphosate; glyphosate	0.375; 0.375	03/10/04; 04/12/04	3,510	ab	880	ab	230	ab
Glyphosate; glyphosate; glyphosate	0.375; 0.375; 0.375	03/10/04; 04/12/04; 06/23/04	2,790	a-d	580	ab	180	ab
Sulfentrazone; glyphosate	0.188; 0.375	03/10/04; 04/12/04	390	gh	120	d	50	cd
Sulfentrazone; glyphosate	0.141; 0.375	03/10/04; 04/12/04	320	fgh	180	bcd	40	bcd
Flumioxazin; glyphosate	0.080; 0.375	03/10/04; 04/12/04	820	d-g	370	ab	100	abc
Flumioxazin; glyphosate	0.064; 0.375	03/10/04; 04/12/04	790	d-g	320	a-d	130	a-d
Isoxaflutole; glyphosate	0.080; 0.375	03/10/04; 04/12/04	750	d-g	310	abc	120	a-d
Isoxaflutole; glyphosate	0.064; 0.375	03/10/04; 04/12/04	2,440	a-d	1,150	ab	450	a
Flumioxazin; sulfentrazone; glyphosate	0.064; 0.141; 0.375	03/10/04; 03/10/04; 04/12/04	390	e-h	60	cd	10	d
Isoxaflutole; sulfentrazone; glyphosate	0.064; 0.141; 0.375	03/10/04; 03/10/04; 04/12/04	70	h	50	d	10	cd
Dicamba; glyphosate	0.5; 0.375	04/12/04; 04/12/04	720	d-g	570	ab	200	ab
Dicamba; glyphosate	0.375; 0.375	04/12/04; 04/12/04	1,400	a-d	330	ab	110	ab
Dicamba; glyphosate	0.25; 0.375	04/12/04; 04/12/04	2,080	cde	640	a-d	130	a-d
Dicamba; glyphosate	0.125; 0.375	04/12/04; 04/12/04	1,720	a-d	720	ab	160	ab
Metribuzin; glyphosate	0.5; 0.375	04/12/04; 04/12/04	1,470	b-e	580	abc	150	abc
Metribuzin; glyphosate	0.375; 0.375	04/12/04; 04/12/04	1,790	a-d	630	ab	260	ab
Metribuzin; glyphosate	0.25; 0.375	04/12/04; 04/12/04	3,900	a	1,880	a	450	a
Paraquat + diuron	0.5 + 0.25	04/12/04	1,040	c-g	550	ab	120	ab
Paraquat + diuron; Paraquat + diuron	0.5 + 0.25; 0.5 + 0.25	03/10/04; 04/12/04	1,360	c-f	660	ab	130	ab

Means followed by the same letter do not significantly differ (p=0.05 LSD) for Log + 1 transformed data. Data shown are not transformed. <sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

**03JPY047 - Chemical Fallow – STEEP Project – Pullman, WA**

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<b>Crop 1:</b> Chemical Fallow	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Pullman, WA	Planting Date: N/A	Type: Palouse Silt-Loam
	Row Spacing:	Organic Matter: 3 %
<b>Cooperator:</b> Zakarison Partnership	Seeding Rate:	pH: 5.8
	Variety:	

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**Application Information**

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	FALL	ESPRING	LSPRING
Timing	FALL	ESPRING	LSPRING
Date	10/18/03	03/30/04	04/28/04
Air Temperature	65° F	68° F	55.5° F
Rel. Humidity	58 %	23 %	33 %
Wind Velocity	0 mph	5 mph	5 mph
Soil Temperature	60° F	51° F	50° F
Soil Moisture	Dry	Wet	Dry
Gal/Acre	10 GPA	10 GPA	10 GPA
Pressure	35 psi	35 psi	35 psi
Nozzles	Teejet XR8001	Teejet XR8001	Teejet XR8001
Crop Growth Stage	n/a	n/a	n/a
<i>Height</i>	n/a	n/a	n/a
Weed Stage	n/a	n/a	n/a

**03JPY047 - Chemical Fallow – STEEP Project – Pullman, WA**

Table 1. Weed density, fresh weight, and dry weight at Pullman, WA August 1, 2004.

Treatment	Rate	Application Date	Total Weed		
			Density	Fresh Weight	Dry Weight
			Plants/A	Lbs/A	Lbs/A
Glyphosate	0.375	04/28/04	4870 a	840 ab	200 ab
Glyphosate; glyphosate	0.375; 0.375	03/30/04; 04/28/04	6450 ab	1360 ab	380 ab
Glyphosate; glyphosate; glyphosate	0.375; 0.375; 0.375	03/30/04; 04/28/04; 06/22/04	110 h	0 g	0 f
Sulfentrazone; glyphosate	0.188; 0.375	03/30/04; 04/28/04	1580 b-f	300 a-d	70 abc
Sulfentrazone; glyphosate	0.141; 0.375	03/30/04; 04/28/04	3940 a-e	980 abc	320 abc
Flumioxazin; glyphosate	0.080; 0.375	03/30/04; 04/28/04	1150 d-h	150 c-f	40 c-f
Flumioxazin; glyphosate	0.064; 0.375	03/30/04; 04/28/04	2900 b-g	940 b-f	300 b-e
Isoxaflutole; glyphosate	0.080; 0.375	03/30/04; 04/28/04	1540 c-h	180 b-f	50 b-e
Isoxaflutole; glyphosate	0.064; 0.375	03/30/04; 04/28/04	2260 a-e	180 a-e	50 b-e
Flumioxazin; sulfentrazone; glyphosate	0.064; 0.141; 0.375	03/30/04; 03/30/04; 04/28/04	570 e-h	30 d-g	10 def
Isoxaflutole; sulfentrazone; glyphosate	0.064; 0.141; 0.375	03/30/04; 03/30/04; 04/28/04	250 fgh	30 efg	10 def
Dicamba; glyphosate	0.5; 0.375	04/28/04; 04/28/04	3150 ab	550 ab	130 ab
Dicamba; glyphosate	0.375; 0.375	04/28/04; 04/28/04	3940 ab	430 abc	110 ab
Dicamba; glyphosate	0.25; 0.375	04/28/04; 04/28/04	3330 abc	490 abc	130 abc
Dicamba; glyphosate	0.125; 0.375	04/28/04; 04/28/04	2110 a-d	450 abc	120 abc
Metribuzin; glyphosate	0.5; 0.375	04/28/04; 04/28/04	570 c-h	490 a-d	40 bcd
Metribuzin; glyphosate	0.375; 0.375	04/28/04; 04/28/04	1110 b-g	350 abc	100 abc
Metribuzin; glyphosate	0.25; 0.375	04/28/04; 04/28/04	3190 abc	1070 a	340 a
Paraquat + diuron	0.5 + 0.25	04/28/04	900 c-h	220 a-e	70 b-e
Paraquat + diuron; Paraquat + diuron	0.5 + 0.25; 0.5 + 0.25	03/30/04; 04/28/04	250 gh	60 fg	20 ef

Means followed by the same letter do not significantly differ (p=0.05 LSD) for Log + 1 transformed data. Data shown are not transformed. Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

### **03JPY043 - Grass Control in Clearfield Winter Wheat – Lind, WA**

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The study was conducted to evaluate various herbicides for grass control. Grass populations were very light which is indicated in part by the very high LSD values for grass control ratings and by no differences in winter wheat yield even between the non-treated and the treatments with best control. None of the herbicide treatment had significant injury. Downy brome control was generally quite good by seasons end, but populations were very light. Control of Jointed Goatgrass was more variable, but most consistent control was with Imazamox (Beyond) treatments.

**03JPY043 - Grass Control in Clearfield Winter Wheat – Lind, WA**

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<b>Crop 1: Winter Wheat</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Lind, WA	Planting Date: 9/12/03	Type: Ritzville silt-loam
	Row Spacing: 16 inches	Organic Matter: 2.1%
<b>Cooperator:</b> Dryland Research Station	Seeding Rate: 40 lbs/a	pH: 7.4
	Variety: Clearfield	

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**Application Information**

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Timing	FALL	SPRING
Date	12/03/03	03/29/04
Air Temperature	44° F	71° F
Rel. Humidity	80 %	22 %
Wind Velocity	7 mph	5 mph
Soil Temperature	41° F	54° F
Soil Moisture	Moist	Dry
Gal/Acre	10 GPA	10 GPA
Pressure	35 psi	35 psi
Nozzles	Teejet XR8001	Teejet XR8001
Crop Growth Stage	3-4 leaf	Seedling
<i>Height</i>	3 inches	2-3 inches
Weed Stage		
<i>Volunteer Wheat</i>	3 inches	n/a
<i>Downy Brome</i>	n/a	2 leaf
<i>Mustard</i>	n/a	0.5 inches

03JPY043 - Grass Control in Clearfield Winter Wheat – Lind, WA			Weed Control			Winter Wheat
Treatment	Rate <sup>a</sup>	Timing	Jointed Goatgrass			Yield
			4/29/2004	7/22/2004	7/22/2004	
Nontreated			0	0	0	bu/A 23.6
flucarbazone + NIS	0.0267 + 0.25%	FALL	66	84	64	22.8
flucarbazone + chlorsulfuron + NIS	0.0267 + 0.014 + 0.25%	FALL	64	93	70	30.1
flucarbazone + chlorsulfuron + 2,4D + NIS	0.0267 + 0.014 + 0.063 + 0.25%	FALL	88	88	76	25.0
flucarbazone + chlorsulfuron + NIS	0.0175 + 0.0094 + 0.25%	FALL	57	89	51	26.3
flucarbazone + chlorsulfuron + 2,4D ester + NIS	0.0175 + 0.0094 + 0.063 + 0.25%	FALL	54	93	55	24.2
flucarbazone + chlorsulfuron + NIS	0.0144 + 0.0155 + 0.25%	FALL	53	88	71	25.1
flucarbazone + chlorsulfuron + 2,4D ester + NIS	0.0219 + 0.0 234	FALL	67	93	74	24.6
flucarbazone + chlorsulfuron + 2,4D amine + NIS	0.0144 + 0.0155 + 0.063 + 0.25%	FALL	71	94	74	19.5
flucarbazone + chlorsulfuron + NIS	0.0219 + 0.0 234 + 0.25%	FALL	88	93	93	22.6
flucarbazone + chlorsulfuron + 2,4D ester + NIS	0.0219 + 0.0 234 + 0.063 + 0.25%	FALL	89	94	90	24.3
flucarbazone + chlorsulfuron + metsulfuron + NIS	0.0267 + 0.012 + 0.002 + 0.25%	FALL	71	94	80	26.7
flucarbazone + chlorsulfuron + metsulfuron + 2, 4D ester + NIS	0.0267 + 0.012 + 0.002 + 0.063 + 0.25%	FALL	90	89	88	24.7
flucarbazone + chlorsulfuron + metsulfuron + NIS	0.0175 + 0.0078 + 0.0015 + 0.25%	FALL	86	93	94	26.2
flucarbazone + chlorsulfuron + metsulfuron + 2, 4D ester + NIS	0.0175 + 0.0078 + 0.0015 + 0.063 + 0.25%	FALL	95	94	80	23.1
flucarbazone + chlorsulfuron + metsulfuron + 2,4D amine + NIS	0.0175 + 0.0078 + 0.0015 + 0.063 + 0.25%	FALL	74	93	81	21.0
propoxycarbazone + NIS	0.0394 + 0.5%	FALL	97	94	88	27.0
propoxycarbazone + NIS & propoxycarbazone + metribuzin + NIS	0.0263 + 0.5% & 0.0263 + 0.1875 + 0.25%	FALL SPRING	81	93	74	26.2
propoxycarbazone + NIS & propoxycarbazone + metribuzin + NIS	0.0263 + 0.5% & 0.0263 + 0.2813 + 0.25%	FALL SPRING	81	85	74	22.8
propoxycarbazone + metribuzin + NIS	0.0394 + 0.1875 + 0.25%	SPRING	94	93	93	31.0
imazamox + NIS + 32-0-0	0.03 + 0.25% + 2.5%	SPRING	93	91	81	29.1
imazamox + NIS + 32-0-0	0.03 + 0.25% + 3 gal/A	SPRING	77	94	79	32.1
mesosulfuron + NIS + 32-0-0	0.0134 + 0.5% + 2.5%	SPRING	79	94	70	32.8
imazamox + NIS + AMS	0.03 + 0.25% + 15 lb/100 gal	SPRING	91	90	94	27.4
sulfosulfuron + NIS	0.0314 + 0.5%	SPRING	74	86	70	27.3
imazamox + 2,4D + NIS + 32-0-0	0.03 + 0.25 + 0.25% + 2.5%	SPRING	91	86	81	26.7
imazamox + 2,4D + NIS + 32-0-0	0.03 + 0.25 + 0.25% + 3 gal/A	SPRING	97	94	93	26.6
imazamox + 2,4D + NIS + 32-0-0	0.03 + 0.25 + 0.25% + 15 lb/100 gal	SPRING	90	85	95	25.3
sulfosulfuron + 2,4D + NIS	0.0314 + 0.25 + 0.5%	SPRING	83	89	70	29.2
mesosulfuron + metribuzin + NIS	0.0134 + 0.1875 + 0.25%	SPRING	91	94	94	29.6
LSD (p=0.05)			34	9	38	NS

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## 03JPY046 - Weed Control with Clearfield Wheat – Pullman, WA

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The study was designed to look at several grass herbicides and their control of Italian ryegrass and jointed goatgrass. Treatments included individual products alone and in combination with Axiom or Define herbicides applied preemergence to the crop and the weeds.

Generally, Italian ryegrass control was good across the study including treatments of Clodinafop (Discover) and Tralkoxydim (Achieve). This indicates that ACCase herbicide resistant biotypes of Italian ryegrass were not present in detectable amounts. Flufenacet (Define) plus Metribuzin (Sencor) applied preemergence did add to the control of Italian ryegrass when followed by several postemergence herbicide treatments. Again, control of jointed goatgrass was most consistent with Imazamox, but jointed goatgrass control with Mesosulfuron (Osprey) was increased when applied in sequence with Flufenacet.

**03JPY046 - Weed Control with Clearfield Wheat – Pullman, WA**

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<b>Crop 1: Winter Wheat</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Pullman, WA	Planting Date: 10/24/03	Type: Palouse Silt-Loam
	Row Spacing: 10 inches	Organic Matter: 4.23%
<b>Cooperator:</b> USDA/PCFS	Seeding Rate: 93 lbs/a	pH: 5.2
	Variety: ORCF 101	

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**Application Information**

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Timing	PREE	SPOST
Date	10/31/03	04/19/04
Air Temperature	37° F	58° F
Rel. Humidity	31 %	32 %
Wind Velocity	0 mph	2.5 mph
Soil Temperature	35° F	52° F
Soil Moisture	Moist	Moist
Gal/Acre	10 GPA	10 GPA
Pressure	35 psi	32 psi
Nozzles	Teejet XR8001	Teejet XR8001
Crop Growth Stage		
<i>Height</i>	n/a	6 inches
Weed Stage		
<i>Broadleaf</i>	n/a	3 leaf
<i>Rattail Fescue</i>	n/a	1.5-2 inches
<i>Prickly Lettuce</i>	n/a	4 leaf

**03JPY046 - Weed Control with Clearfield Wheat – Pullman, WA**

Treatment	Rate <sup>a</sup>	Timing	Weed Control				Wheat Yield buA
			Italian ryegrass		Jointed goatgrass		
			6/14/2004	8/2/2004	6/14/2004	8/2/2004	
			-----%-----				
Nontreated			0	0	0	0	72
imazamox + NIS + UAN	0.03 + 0.25% + 5%	SPOST	91	90	97	93	82
imazamox + MCPA + NIS + UAN	0.03 + 0.28 + 0.25% + 5%	SPOST	91	93	97	88	76
imazamox + MCPA + NIS + UAN	0.04 + 0.35 + 0.25% + 5%	SPOST	96	95	97	97	79
flufenacet + metribuzin & imazamox + NIS + UAN	0.34 + 0.085 & 0.03 + 0.25% + 2.5%	PREE SPOST	97	97	97	97	79
flufenacet + metribuzin & imazamox + NIS + UAN	0.34 + 0.085 & 0.03 + 0.25% + 2.5%	PREE SPOST	97	97	97	93	75
flufenacet + metribuzin & imazamox + NIS + AMS	0.34 + 0.085 & 0.03 + 0.25% + 1.25	PREE SPOST	97	97	97	97	71
flufenacet + metribuzin & mesosulfuron + NIS + UAN	0.034 + 0.085 & 0.009 + 0.25% + 1.25	PREE SPOST	95	95	88	76	74
mesosulfuron + NIS + UAN	0.009 + 0.25% + 1.25	SPOST	48	91	28	20	78
clodinafop + Score	0.06 + 0.25%	SPOST	91	84	18	20	74
tralkoxydim + Supercharge + AMS	0.25 + 0.5% + 15 lbs/100gal	SPOST	81	95	11	8	73
flufenacet + metribuzin & flucarbazone + NIS	0.034 + 0.085 & 0.03 + 0.25%	PREE SPOST	97	94	76	54	78
flucarbazone + NIS	0.03 + 0.25%	SPOST	79	92	39	28	77
flufenacet + metribuzin	0.34 + 0.085	PREE	89	90	73	79	77
flufenacet + metribuzin & mesosulfuron + NIS + UAN	0.34 + 0.085 & 0.0133 + 0.25% + 3 gal	PREE SPOST	96	97	84	76	72
flufenacet & mesosulfuron + NIS + UAN	0.3 + 0.0133 & 0.25% + 3 gal	PREE SPOST	97	97	74	90	75
mesosulfuron + NIS + UAN	0.0133 + 0.25% + 3 gal	SPOST	82	89	74	54	80
flufenacet	0.3	PREE	84	95	60	45	83
Nontreated			0	0	0	0	81
LSD (p=0.05)			17	7	22	25	NS

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

### 03JPY048 - Downy Brome Control in Winter Wheat – Lind, WA

This study was designed to evaluate various herbicides for grass control in winter wheat in the low rainfall areas of eastern Washington. Downy brome population was very light at this location. None of the herbicide treatments resulted in significant crop injury. Yields did not differ due to variable weed control or crop injury.

**03JPY048 - Downy Brome Control in Winter Wheat – Lind, WA**

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<b>Crop 1: Winter Wheat</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Lind, WA	Planting Date:	Type: Ritzville silt-loam
	Row Spacing:	Organic Matter: 2.1%
<b>Cooperator:</b> Dryland Research Station	Seeding Rate:	pH: 7.4
	Variety:	

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**Application Information**

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Timing	FALL	SPRING
Date	12/03/03	03/29/04
Air Temperature	44° F	62.5° F
Rel. Humidity	80 %	32 %
Wind Velocity	7 mph	4 mph
Soil Temperature	41° F	54° F
Soil Moisture	Moist	Dry
Gal/Acre	10 GPA	10 GPA
Pressure	35 psi	35 psi
Nozzles	Teejet XR8001	Teejet XR8001
Crop Growth Stage	3-4 leaf	Seedling
<i>Height</i>	3 inches	3-4 inches
Weed Stage		
<i>Volunteer Wheat</i>	3 inches	n/a
<i>Mustard</i>	n/a	0.25 inches
<i>Downy Brome</i>	n/a	2-3 leaf / 0.5-0.75 inches

**03JPY048 - Downy Brome Control in Winter Wheat – Lind, WA**

Treatment	Rate <sup>a</sup>	Timing	Downy Brome Control	Winter Wheat
			7/22/2004	Yield
			---%---	Bu/A
Nontreated			0	29.8
flucarbazone + NIS	0.027 + 0.25%	FALL	83	30.3
flucarbazone + chlorsulfuron + NIS	0.027 + 0.014 + 0.25%	FALL	71	16.8
flucarbazone + chlorsulfuron + NIS	0.018 + 0.009 + 0.25%	FALL	94	23.5
flucarbazone + chlorsulfuron + NIS	0.014 + 0.015 + 0.25%	FALL	79	23.1
flucarbazone + chlorsulfuron + NIS	0.022 + 0.023 + 0.25%	FALL	83	26.8
flucarbazone + chlorsulfuron + metsulfuron + NIS	0.027 + 0.012 + 0.002 + 0.25%	FALL	91	20.9
flucarbazone + chlorsulfuron + metsulfuron + NIS	0.018 + 0.016 + 0.003 + 0.25%	FALL	83	14.2
propoxycarbazone + NIS	0.039 + 0.5%	FALL	84	22.1
propoxycarbazone + NIS & propoxycarbazone + metribuzin + NIS	0.026 + 0.5% & 0.026 + 0.19 + 0.25%	FALL SPRING	95	29.3
propoxycarbazone + NIS & propoxycarbazone + metribuzin + NIS	0.026 + 0.5% & 0.026 + 0.28 + 0.25%	FALL SPRING	95	27.5
propoxycarbazone + metribuzin + NIS	0.039 + 0.19 + 0.25%	SPRING	88	25.6
mesosulfuron + NIS + UAN	0.013 + 0.5% + 2 qt	SPRING	94	24.3
sulfosulfuron + NIS	0.031 + 0.5%	SPRING	95	27.6
mesosulfuron + metribuzin + NIS + UAN	0.013 + 0.19 + 0.5% + 2 qt	SPRING	94	25.0
Nontreated			0	29.5
LSD (p=0.05)			16	NS

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## **03JPY049 - Annual Grass Control in Winter Wheat – Pullman, WA**

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The study was conducted to evaluate various graminicides for Wild oat and Italian ryegrass control. Grass weed populations were fairly light and only season ending ratings are shown. Wild oat control was generally very good and the same was true of most treatments for Italian ryegrass control.

The site was suspected to contain ACCase herbicide resistant biotypes of Italian ryegrass and poor control with Clodinafop (Discover) and Tralkoxydim (Achieve) provide evidence for that suspicion. A slight amount of injury was noted among some Imazamox (Beyond) treatments but did not exceed 9% for any treatment. However, some of the treatments with significant injury ratings did appear to have slightly lowered yields compared to the top yielding plots. Grass control was generally very good given the extremely competitive stand of spring wheat.

**03JPY049 - Annual Grass Control in Winter Wheat – Pullman, WA**

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<b>Crop 1: Winter Wheat</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Pullman, WA	Planting Date: 10/24/03	Type: Palouse Silt-Loam
	Row Spacing: 7 inches	Organic Matter: 3%
<b>Cooperator:</b> WSU Cunningham Farm	Seeding Rate: 88 lbs/a	pH: 5.8
	Variety: ORCF 101	

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**Application Information**

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Timing	PREE	POST
Date	11/12/03	04/23/04
Air Temperature	47° F	66° F
Rel. Humidity	60 %	57 %
Wind Velocity	6 mph	6 mph
Soil Temperature	35° F	54° F
Soil Moisture	Moist	Moist
Gal/Acre	10 GPA	10 GPA
Pressure	35 psi	32 psi
Nozzles	Teejet XR8001	Teejet XR8001
Crop Growth Stage	n/a	1 <sup>st</sup> Joint
<i>Height</i>	n/a	4-5 inches
Weed Stage		
<i>Grass</i>	n/a	2 inches
<i>Prickly Lettuce</i>	n/a	2-4 leaf
<i>Henbit</i>	n/a	0.5 inches
<i>Mayweed Chamomile</i>	n/a	1 inch

### 03JPY049 - Annual Grass Control in Winter Wheat – Pullman, WA

Treatment	Rate <sup>a</sup>	Timing	Italian	Wild	Winter Wheat	
			Ryegrass	Oat	Injury	Yield
			8/5/04	8/5/04	5/13/04	
			-----%-----			bu/A
Nontreated			0	0	0	73
flufenacet + metribuzin	0.34 + 0.085	PREE	87	74	0	88
flufenacet	0.36	PREE	81	79	1	82
flufenacet + metribuzin & imazamox + NIS + UAN	0.34 + 0.085 & 0.039 + 0.25% + 2.5%	PREE POST	91	97	9	72
flufenacet + metribuzin & mesosulfuron + MSO + UAN	0.34 + 0.085 & 0.0089 + 24 oz + 2 qt.	PREE POST	95	94	1	91
flufenacet & imazamox + NIS + UAN	0.36 & 0.039 + 0.25% + 2.5%	PREE POST	87	97	7	79
flufenacet & mesosulfuron + MSO + UAN	0.36 & 0.0089 + 24 oz + 2 qt.	PREE POST	97	97	1	86
mesosulfuron + MSO	0.0089 + 24 oz	POST	92	91	1	84
mesosulfuron + MSO + UAN	0.0089 + 24 oz + 2 qt.	POST	95	95	0	96
mesosulfuron + MVO	0.0089 + 1.5%	POST	92	97	0	93
mesosulfuron + MVO + UAN	0.0089 + 1.5% + 2.5%	POST	94	95	1	93
mesosulfuron + NIS	0.0089 + 0.25%	POST	91	95	0	85
mesosulfuron + NIS + UAN	0.0089 + 0.25% + 2.5%	POST	83	97	0	98
clodinafop + Score	0.0625 + 0.25%	POST	65	95	0	90
imazamox + NIS + UAN	0.031 + 0.25% + 2.5%	POST	75	95	3	80
imazamox + NIS + UAN	0.039 + 0.25% + 2.5%	POST	85	97	5	84
flufenacet + metribuzin & flucarbazone + NIS	0.34 + 0.085 & 0.026 + 0.25%	PREE POST	90	95	0	91
flucarbazone + NIS	0.026 + 0.25%	POST	85	97	0	98
tralkoxydim + Supercharge + AMS	0.25 + 0.5% + 15 lbs/100 gal	POST	77	87	1	92
Nontreated			0	0	0	84
LSD (p=0.05)			14	8	3	14

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## **04JPY001 & 04JPY002-Rattail Fescue Control in Chemical Fallow-Colfax & Pullman, WA**

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These studies were part of a larger tri-state research project in cooperation with the University of Idaho and Oregon State University.

Rattail fescue control at both locations was better than previous experience and farmer testimonials. Nevertheless, the lower rates in this study represent a standard to a high rate of Glyphosate (Roundup) for most farmers in the area. Generally, the lowest rates of glyphosate did not provide effective control of rattail fescue. Early applications of glyphosate provided better control than the later timing and split early plus late applications were most effective.

The complete project report is available on-line at;  
[http://pnwsteep.wsu.edu/annualreports/2004/2004\\_ball.pdf](http://pnwsteep.wsu.edu/annualreports/2004/2004_ball.pdf)

**04JPY001 - Rattail Fescue Control in Chemical Fallow – Colfax, WA**

<b>Crop 1: Chemical Fallow</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Colfax, WA	Planting Date:	Type:
	Row Spacing:	Organic Matter:
<b>Cooperator:</b> Rhod McIntosh	Seeding Rate:	pH:
	Variety:	

<b>Application Information</b>		
Timing	EPOST	LPOST
Date	03/31/04	04/26/04
Air Temperature	45° F	79° F
Rel. Humidity	49 %	22 %
Wind Velocity	8 mph	5 mph
Soil Temperature	52° F	56° F
Soil Moisture	Moist	Dry
Gal/Acre	10 GPA	10 GPA
Pressure	35 psi	35 psi
Nozzles	Teejet XR8001	Teejet XR8001
Crop Growth Stage	n/a	n/a
<i>Height</i>	n/a	n/a
Weed Stage		
<i>Rattail Fescue</i>	2 inches	4-5 inches
<i>Downy Brome</i>	2 inches	2 leaf
<i>Volunteer Wheat</i>	2-3 inches	2 <sup>nd</sup> Joint / 6 inches
<i>Prickly Lettuce</i>	3-5 leaf	2-3 leaf
<i>Jointed Goatgrass</i>	n/a	2-3 leaf

**04JPY001 - Rattail Fescue Control in Chemical Fallow – Colfax, WA**

Treatment	Rate <sup>a</sup>	Timing	Rattail Fescue Control		
			4/28/2004	5/14/2004	6/6/2004
			-----%-----		
Nontreated			0	0	0
glyphosate + AMS	0.375 + 8.5 lbs/100 gal	EPOST	66	68	48
glyphosate + AMS	0.562 + 8.5 lbs/100 gal	EPOST	93	82	93
glyphosate + AMS	0.75 + 8.5 lbs/100 gal	EPOST	95	95	97
glyphosate + AMS	0.937 + 8.5 lbs/100 gal	EPOST	97	95	89
paraquat + diuron + NIS		EPOST	96	92	88
glyphosate + AMS	0.375 + 8.5 lbs/100 gal	LPOST		54	54
glyphosate + AMS	0.562 + 8.5 lbs/100 gal	LPOST		60	74
glyphosate + AMS	0.75 + 8.5 lbs/100 gal	LPOST		87	91
glyphosate + AMS	0.937 + 8.5 lbs/100 gal	LPOST		83	89
paraquat + diuron + NIS		LPOST		79	69
glyphosate + AMS + glyphosate + AMS	0.375 + 8.5 lbs/100 gal + 0.375 + 8.5 lbs/100 gal	EPOST LPOST	91	97	94
glyphosate + AMS + glyphosate + AMS	0.562 + 8.5 lbs/100 gal + 0.375 + 8.5 lbs/100 gal	EPOST LPOST	95	97	97
glyphosate + AMS + glyphosate + AMS	0.375 + 8.5 lbs/100 gal + 0.562 + 8.5 lbs/100 gal	EPOST LPOST	91	97	97
glyphosate + AMS + glyphosate + AMS	0.562 + 8.5 lbs/100 gal + 0.562 + 8.5 lbs/100 gal	EPOST LPOST	94	95	73
glyphosate + AMS + glyphosate + AMS	0.562 + 8.5 lbs/100 gal + 0.75 + 8.5 lbs/100 gal	EPOST LPOST	94	97	97
glyphosate + AMS + paraquat + diuron + NIS	0.375 + 8.5 lbs/100 gal + 0.56 + 0.19 + 0.25%	EPOST LPOST	96	95	97
paraquat + diuron + NIS + glyphosate + AMS	0.56 + 0.19 + 0.25% + 0.375 + 8.5 lbs/100 gal	EPOST LPOST	96	97	97
Nontreated			0	0	0
LSD (p=0.05)			17	26	25

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

**04JPY002 - Rattail Fescue Control in Chemical Fallow – Pullman, WA**

<b>Crop 1: Chemical Fallow</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Pullman, WA	Planting Date: N/A	Type: Palouse Silt-Loam
	Row Spacing:	Organic Matter: 4.23%
<b>Cooperator:</b> USDA	Seeding Rate:	pH: 5.2
	Variety:	

**Application Information**

Timing	EPOST	LPOST
Date	04/07/04	04/26/04
Air Temperature	51° F	77.5° F
Rel. Humidity	58 %	25 %
Wind Velocity	0 mph	1-3 mph
Soil Temperature	45° F	50° F
Soil Moisture	Dry	Dry
Gal/Acre	10 GPA	10 GPA
Pressure	32 psi	32 psi
Nozzles	Teejet XR8001	Teejet XR8001
Crop Growth Stage	n/a	n/a
<i>Height</i>	n/a	n/a
Weed Stage		
<i>Rattail Fescue</i>	1.5-2.5 inches	3-4 inches
<i>Prickly Lettuce</i>	1 inch rosette	3 leaf
<i>Mustard</i>	0.25-0.75 inch rosette	n/a
<i>Tarweed</i>	0.75 inch rosette	4 inches
<i>Downy Brome</i>	3-5 leaf	2 leaf
<i>Canada Thistle</i>	n/a	6 inch rosette
<i>Broadleaf</i>	n/a	3 leaf

**04JPY002 - Rattail Fescue Control in Chemical Fallow – Pullman, WA**

Treatment	Rate <sup>a</sup>	Timing	Rattail Fescue Control	
			4/28/04	5/14/04
			-----%-----	
Nontreated			0	0
glyphosate + AMS	0.375 + 8.5 lbs/100 gal	EPOST	94	84
glyphosate + AMS	0.562 + 8.5 lbs/100 gal	EPOST	92	89
glyphosate + AMS	0.75 + 8.5 lbs/100 gal	EPOST	97	87
glyphosate + AMS	0.937 + 8.5 lbs/100 gal	EPOST	98	93
paraquat + diuron + NIS		EPOST	94	75
glyphosate + AMS	0.375 + 8.5 lbs/100 gal	LPOST		59
glyphosate + AMS	0.562 + 8.5 lbs/100 gal	LPOST		71
glyphosate + AMS	0.75 + 8.5 lbs/100 gal	LPOST		70
glyphosate + AMS	0.937 + 8.5 lbs/100 gal	LPOST		66
paraquat + diuron + NIS		LPOST		64
glyphosate + AMS +	0.375 + 8.5 lbs/100 gal +	EPOST	87	87
glyphosate + AMS	0.375 + 8.5 lbs/100 gal	LPOST		
glyphosate + AMS +	0.562 + 8.5 lbs/100 gal +	EPOST	95	94
glyphosate + AMS	0.375 + 8.5 lbs/100 gal	LPOST		
glyphosate + AMS +	0.375 + 8.5 lbs/100 gal +	EPOST	93	93
glyphosate + AMS	0.562 + 8.5 lbs/100 gal	LPOST		
glyphosate + AMS +	0.562 + 8.5 lbs/100 gal +	EPOST	95	97
glyphosate + AMS	0.562 + 8.5 lbs/100 gal	LPOST		
glyphosate + AMS +	0.562 + 8.5 lbs/100 gal +	EPOST	94	94
glyphosate + AMS	0.75 + 8.5 lbs/100 gal	LPOST		
glyphosate + AMS +	0.375 + 8.5 lbs/100 gal +	EPOST	87	93
paraquat + diuron + NIS	0.56 + 0.19 + 0.25%	LPOST		
paraquat + diuron + NIS + glyphosate + AMS	0.56 + 0.19 + 0.25% + 0.375 + 8.5 lbs/100 gal	EPOST LPOST	92	89
Nontreated			0	0
LSD (p=0.05)			5.3	16.2

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## **04JPY003 - Russian thistle Control in Spring Wheat – Lind, WA**

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The study was conducted to evaluate crop injury and Russian thistle control in spring wheat with Sulfentrazone (Spartan) and other residual herbicides. Essentially all sulfentrazone treatments provided excellent control of Russian thistle with no observed crop injury and no influence on yield.

There was no positive influence on spring wheat yield.

**04JPY003 - Russian Thistle Control in Spring Wheat – Lind, WA**

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<b>Crop 1: Spring Wheat</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Lind, WA	Planting Date: 04/01/04	Type: Ritzville silt-loam
	Row Spacing: 8 inches	Organic Matter: 2.1%
<b>Cooperator:</b> Dryland Research Station	Seeding Rate: 60 lbs/a	pH: 7.4
	Variety: Alpowa	

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**Application Information**

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Timing	EPREE	LPREE	POST
Date	03/01/04	04/05/04	
Air Temperature	48° F	66° F	
Rel. Humidity	50 %	34 %	
Wind Velocity	6 mph	1 mph	
Soil Temperature	40° F	58° F	
Soil Moisture	Moist	Dry	
Gal/Acre	10 GPA	10 GPA	
Pressure	35 psi	35 psi	
Nozzles	Teejet XR8001	Teejet XR8001	
Crop Growth Stage	Pre-emergence	Pre-emergence	
<i>Height</i>	n/a	n/a	
Weed Stage			
<i>Volunteer Wheat</i>	Seedling / 1 inch	n/a	

**04JPY003 - Russian thistle Control in Spring Wheat – Lind, WA**

Treatment	Rate <sup>a</sup>	Timing	Russian Thistle Control	Spring Wheat Yield
			5/28/04	
			-----%-----	bu/A
Nontreated			0	15.6
sulfentrazone	0.09	EPREE	85	13.5
sulfentrazone	0.14	EPREE	93	14.7
sulfentrazone	0.19	EPREE	97	15.7
isoxaflutole	0.094	EPREE	97	15.6
flumioxazin	0.094	EPREE	97	15.0
sulfentrazone	0.09	LPREE	97	16.7
sulfentrazone	0.14	LPREE	97	13.6
sulfentrazone	0.19	LPREE	97	17.0
isoxaflutole	0.094	LPREE	97	14.7
flumioxazin	0.094	LPREE	73	15.2
carfentrazone + 2, 4-D amine + NIS + UAN	0.333 + 0.5 + 0.25% + 2.5%	SPOST	49	18.4
2, 4-D Amine	0.5	SPOST	24	14.8
bromoxynil + MCPA	0.375 + 0.375	SPOST	24	13.8
LSD (p=0.05)			41	NS

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

**04JPY004 & 04JPY005- Wild Oat Control in Seedling Kentucky bluegrass – Colton & Fairfield, WA.**

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The studies were conducted to evaluate wild oat control in seedling (establishing) Kentucky bluegrass for seed with Flucarbazone (Everest). Wild oat control with flucarbazone was good to excellent and crop injury was not significantly different than the control at the September or October rating date for any rate and surfactant combination. Injury did tend to be greater with earlier applications of flucarbazone, but again little to no injury was observed with these treatments in September or October. No herbicide treatments other than flucarbazone provided acceptable wild oat control with little to no crop injury.

**04JPY004 - Wild Oat Control in Seedling Kentucky Bluegrass – Colton, WA**

<b>Crop 1: Bluegrass</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Colton, WA	Planting Date: N/A	Type:
	Row Spacing: N/A	Organic Matter:
<b>Cooperator:</b> Art Schultheis	Seeding Rate: N/A	pH:
	Variety: N/A	

**Application Information**

Timing	EPOST	LPOST
Date	05/12/04	06/02/04
Air Temperature	51° F	74° F
Rel. Humidity	41 %	32 %
Wind Velocity	2 mph	2 mph
Soil Temperature	52° F	68° F
Soil Moisture	Wet	Dry
Gal/Acre	10 gpa	10 gpa
Pressure	35 psi	35 psi
Nozzles	Teejet XR8001	Teejet XR8001
Crop Growth Stage	Seedling	Seedling
<i>Height</i>	0.5-0.75 inches	1-2 inches
Weed Stage		
<i>Mayweed Chamomile</i>	1 inch	8 inches
<i>Lambsquarter</i>	2-4 leaf	3-4 inches
<i>Wild Oats</i>	4 leaf	1 <sup>st</sup> Joint
<i>Mustard</i>	n/a	Rosette
<i>Buckwheat</i>	n/a	2-4 leaf
<i>Henbit</i>	n/a	0.5 inches
<i>Broadleaf</i>	n/a	2 leaf

**04JPY004 - Wild Oat Control in Seedling Kentucky bluegrass – Colton, WA**

Treatment	Rate <sup>a</sup>	Timing	Wild Oat Control		Kentucky Bluegrass Injury			
			6/3/04	7/21/04	6/3/04	6/17/04	7/21/04	9/28/04
-----%-----								
Nontreated			0	0	0	0	0	0
flucarbazone + NIS	0.018 + 0.25%	EPOST	97	84	8	2	20	0
diclofop + COC	0.375 + 1pt	EPOST	94	89	28	33	40	35
imazamethabenz + difenzoquat + NIS	0.23 + 0.25 + 0.25%	EPOST	95	88	77	93	93	94
flucarbazone + NIS	0.03 + 0.25%	EPOST	94	87	20	11	39	9
flucarbazone + NIS + UAN	0.03 + 0.25% + 2.5%	EPOST	93	95	13	8	26	3
flucarbazone + COC	0.03 + 1pt	EPOST	94	96	15	9	23	3
flucarbazone + COC + UAN	0.03 + 1pt + 2.5%	EPOST	96	96	14	9	29	3
flucarbazone + MSO	0.03 + 1%	EPOST	97	95	21	9	35	4
flucarbazone + MSO + UAN	0.03 + 1% + 2.5%	EPOST	93	93	30	13	48	3
flucarbazone + MCPA + NIS	0.03 + 0.5 + 0.25%	EPOST	95	95	21	13	30	5
flucarbazone + MCPA + NIS	0.03 + 0.5 + 0.25%	EPOST	93	95	18	6	33	3
flucarbazone + NIS	0.03 + 0.25%	LPOST		89		3	0	0
diclofop + COC	0.75 + 1pt	LPOST		77		0	5	0
imazamethabenz + difenzoquat + NIS	0.23 + 0.5 + 0.25%	LPOST		67		6	28	0
flucarbazone + NIS	0.03 + 0.25%	LPOST		61		3	5	0
flucarbazone + NIS + UAN	0.03 + 0.25% + 2.5%	LPOST		88		0	0	0
flucarbazone + COC	0.03 + 1pt	LPOST		88		3	3	0
flucarbazone + COC + UAN	0.03 + 1pt + 2.5%	LPOST		87		2	5	0
flucarbazone + MSO	0.03 + 1%	LPOST		86		1	0	0
flucarbazone + MSO + UAN	0.03 + 1% + 2.5%	LPOST		93		2	15	0
flucarbazone + MCPA + NIS	0.03 + 0.5 + 0.25%	LPOST		84		1	0	0
flucarbazone + MCPA + NIS	0.03 + 0.5 + 0.25%	LPOST		77		4	0	0
Nontreated			0	0	0	0	0	0
LSD (p=0.05)			4	19	18	11	20	10

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

**04JPY005 - Wild Oat Control in Seedling Kentucky Bluegrass – Spokane Co., WA**

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<b>Crop 1: Bluegrass</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Spokane, Co	Planting Date: 30 March 04	Type:
	Row Spacing: 7.5 inches	Organic Matter:
<b>Cooperator:</b> Al Anderberg	Seeding Rate: 5.1 Lb/A	pH:
	Variety: Fortuna	

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**Application Information**

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Timing	EPOST	LPOST
Date	05/13/04	06/03/04
Air Temperature	65° F	74° F
Rel. Humidity	40 %	34 %
Wind Velocity	3-6 mph	4 mph
Soil Temperature	55° F	65° F
Soil Moisture	Moist	Dry
Gal/Acre	10 GPA	10 GPA
Pressure	35 psi	35 psi
Nozzles	Teejet XR8001	Teejet XR8001
Crop Growth Stage	Seedling	Seedling
<i>Height</i>	0.5-1 inch	1-3 inches
Weed Stage		
<i>Wild Oats</i>	4-6 leaf / 1 <sup>st</sup> Joint	6 inches
<i>Mayweed Chamomile</i>	0.5 inch	n/a
<i>Lambsquarter</i>	4-6 leaf	6 inches
<i>Henbit</i>	0.5 inches	0.5 inches
<i>Mustard</i>	1 inch	Rosette

**04JPY005 - Wild Oat Control in Seedling Kentucky Bluegrass – Spokane Co., WA**

Treatment	Rate <sup>a</sup>	Timing	Wild Oat		Kentucky Bluegrass			
			Control		Injury			
			6/4/04	7/30/04	6/4/04	6/18/04	7/30/04	10/1/04
			-----%-----					
Nontreated	0.018 + 0.25%	EPOST	0	0	0	0	0	0
flucarbazone + NIS	0.375 + 1pt	EPOST	97	69	17	6	5	0
diclofop + COC	0.23 + 0.25 + 0.25%	EPOST	97	69	38	69	56	49
imazamethabenz + difenzoquat + NIS	0.03 + 0.25%	EPOST	87	41	58	84	71	51
flucarbazone + NIS	0.03 + 0.25% + 2.5%	EPOST	94	81	18	18	8	0
flucarbazone + NIS + UAN	0.03 + 1pt	EPOST	95	93	18	21	3	0
flucarbazone + COC	0.03 + 1pt + 2.5%	EPOST	95	70	19	26	11	0
flucarbazone + COC + UAN	0.03 + 1%	EPOST	95	89	18	16	3	0
flucarbazone + MSO	0.03 + 1% + 2.5%	EPOST	95	81	9	18	9	0
flucarbazone + MSO + UAN	0.03 + 0.5 + 0.25%	EPOST	95	89	25	28	8	0
flucarbazone + MCPA + NIS	0.03 + 0.5 + 0.25%	EPOST	95	79	9	15	6	0
flucarbazone + MCPA + NIS	0.03 + 0.25%	LPOST	95	85	13	11	3	0
flucarbazone + NIS	0.75 + 1pt	LPOST		88		1	0	0
diclofop + COC	0.23 + 0.5 + 0.25%	LPOST		68		0	1	0
imazamethabenz + difenzoquat + NIS	0.03 + 0.25%	LPOST		25		0	0	0
flucarbazone + NIS	0.03 + 0.25% + 2.5%	LPOST		65		1	5	0
flucarbazone + NIS + UAN	0.03 + 1pt	LPOST		73		0	1	0
flucarbazone + COC	0.03 + 1pt + 2.5%	LPOST		79		5	3	0
flucarbazone + COC + UAN	0.03 + 1%	LPOST		70		3	0	0
flucarbazone + MSO	0.03 + 1% + 2.5%	LPOST		63		0	1	0
flucarbazone + MSO + UAN	0.03 + 0.5 + 0.25%	LPOST		79		4	1	0
flucarbazone + MCPA + NIS	0.03 + 0.5 + 0.25%	LPOST		83		3	3	3
flucarbazone + MCPA + NIS				83		5	1	0
Nontreated			0	0	0	0	0	0
LSD (p=0.05)			7	21	19	19	13	12

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## 04JPY009 - Weed Control in Conventionally Tilled Peas – Pullman, WA

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The study was part of the continued study to control annual broadleaf weeds in dry peas.

Control of common lambsquarters was good to excellent with most herbicides except Imazethapyr (Pursuit), Flufenacet + Metribuzin (Axiom), and Metribuzin (Sencor). Control with imazethapyr may have been reduced due to poor incorporation.

Mayweed chamomile control was good to excellent with preemergence treatments of Sulfentrazone (Spartan), Flumioxazin (Valor), Isoxaflutole (Balance), or metribuzin and with postemergence applications of Imazamox (Beyond) + Bentazon (Basagran), metribuzin, bentazon, and MCPA-amine.

Crop injury with all treatments was not different than the non-treated at the pre-harvest rating for all treatments except the late applications of 2, 4-DB and Imazamox + bentazon. Yields generally were better with preemergence than postemergence applications. Greatest yields were with 0.031 lbs/A flumioxazin applied preemergence. Greatest yields among postemergence applications were with imazamox + bentazon, metribuzin, and bentazon + Quizalofop (Assure II). Later post emergence applications tended to yield less than earlier applications due to greater crop injury or longer duration of weed competition.

**04JPY009 - Weed Control in Conventionally Tilled Peas – Pullman, WA**

<b>Crop 1: Peas</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Pullman, WA	Planting Date: 04/07/04	Type: Palouse Silt-Loam
	Row Spacing: 7 inches	Organic Matter: 3%
<b>Cooperator:</b> WSU Cunningham Farm	Seeding Rate: 230 lbs/a	pH: 5.8
	Variety: Ariel	

**Application Information**

Timing	PPI	PREE	EPOST	LPOST
Date	04/07/04	04/09/04	05/12/04	06/02/04
Air Temperature	54° F	53° F	63° F	76° F
Rel. Humidity	44 %	52 %	35 %	31 %
Wind Velocity	10 mph	2 mph	0 mph	0 mph
Soil Temperature	52° F	48° F	49° F	65° F
Soil Moisture	Dry	Dry	Wet	Moist
Gal/Acre	10 GPA	10 GPA	10 GPA	10 GPA
Pressure	35 psi	35 psi	35 psi	35 psi
Nozzles	Teejet XR8001	Teejet XR8001	Teejet XR8001	Teejet XR8001
Crop Growth Stage	Pre-emergence	Pre-emergence	4 leaf	
<i>Height</i>	n/a	n/a	4 inches	12 inches
Weed Stage				
<i>Lambsquarter</i>	n/a	n/a	2-7 leaf / 3 inch	2-3 inches
<i>Mayweed</i>	n/a	n/a	0.5-1 inch	3-4 inches
<i>Chamomile</i>				
<i>Volunteer Wheat</i>	n/a	n/a	2-3 leaf	8-10 inches
<i>Henbit</i>	n/a	n/a	0.5 inch	n/a

**04JPY009 - Weed Control in Conventionally Tilled Peas – Pullman, WA**

Treatment	Rate <sup>a</sup>	Timing	Weed Control		Peas		Yield
			C.		Injury		
			Lambsq.	M. cham.	8/5/04	6/16/04	
			-----%-----				Lbs/A
Nontreated			0	0	0	0	1795
imazethapyr	0.047	PPI	43	71	1	0	1630
sulfentrazone	0.19	PREE	81	95	0	0	1665
sulfentrazone	0.25	PREE	89	97	3	0	1825
flufenacet + metribuzin	0.4 + 0.1	PREE	73	71	2	0	1865
flumioxazin	0.031	PREE	85	95	1	0	1995
flumioxazin	0.047	PREE	95	97	1	0	1825
isoxaflutole	0.015	PREE	69	95	0	0	1875
isoxaflutole	0.032	PREE	89	97	0	1	1860
metribuzin	0.25	PREE	68	91	0	0	1780
imazamox + bentazon + UAN + NIS	0.031 + 0.25 + 2.5% + 0.25%	EPOST	97	97	11	0	1890
metribuzin	0.25	EPOST	97	97	3	0	1825
bentazon + quizalofop + Exit	0.5 + 0.055 + 0.5%	EPOST	95	97	6	0	1825
2,4-DB + NIS	0.175 + 0.5%	EPOST	97	63	6	0	1470
2,4-DB + NIS	0.23 + 0.5%	EPOST	97	50	6	0	1845
imazamox + bentazon + UAN + NIS	0.031 + 0.25 + 2.5% + 0.25%	LPOST	95	97	5	7	1080
bentazon + quizalofop + Exit	0.5 + 0.055 + 0.5%	LPOST	94	95	7	0	1540
MCPA-Amine	0.25	LPOST	97	97	4	0	1545
2,4-DB + NIS	0.175 + 0.5%	LPOST	97	52	5	13	545
2,4-DB + NIS	0.23 + 0.5%	LPOST	97	57	6	13	585
Nontreated			0	0	0	0	1510
LSD (p=0.05)			15	26	4	2	275

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## **04JPY010 - Weed Control in Conventionally Tilled Lentils – Pullman, WA**

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The study was part of an on-going study for weed control in lentils.

Little to no lentil injury was noted with most treatments. The highest injury ratings were with Sulfentrazone (Spartan) applied preemergence, but these treatments were some of the highest yielding. Generally, Sulfentrazone, Flumioxazin (Valor), and Metribuzin (Sencor) had the best weed control and crop yield among preemergence treatments. Metribuzin applied postemergence had good weed control and the greatest yield among postemergence treatment. Early postemergence treatments of 2, 4-DB had good control of common lambsquarters, poorer control of mayweed chamomile, no noticeable crop injury and acceptable comparative yield to metribuzin. However, later treatments of 2, 4-DB had reduced yield due to the duration of the weed competition or due to crop injury that was not noted in the injury ratings.

**04JPY010 - Weed Control in Conventionally Tilled Lentils – Pullman, WA**

<b>Crop 1: Lentils</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Pullman, WA	Planting Date: 04/07/04	Type: Palouse Silt-Loam
	Row Spacing: 7 inches	Organic Matter: 3%
<b>Cooperator:</b> WSU Cunningham Farm	Seeding Rate: 72 lbs/a	pH: 5.8
	Variety: Brewer	

**Application Information**

Timing	PPI	PREE	EPOST	LPOST
Date	04/07/04	04/09/04	05/12/04	06/02/04
Air Temperature	54° F	53° F	63° F	70° F
Rel. Humidity	44 %	52 %	35 %	31 %
Wind Velocity	10 mph	2 mph	0 mph	0 mph
Soil Temperature	52° F	48° F	49° F	65° F
Soil Moisture	Dry	Dry	Wet	Moist
Gal/Acre	10 GPA	10 GPA	10 GPA	10 GPA
Pressure	35 psi	35 psi	35 psi	35 psi
Nozzles	Teejet XR8001	Teejet XR8001	Teejet XR8001	Teejet XR8001
Crop Growth Stage	Pre-emergence	Pre-emergence		
<i>Height</i>	n/a	n/a	3-4 inches	4-7 inches
Weed Stage				
<i>Lambsquarter</i>	n/a	n/a	4 inch	6 inches
<i>Henbit</i>	n/a	n/a	0.5-1 inch	0.5-1 inch
<i>Volunteer Wheat</i>	n/a	n/a	2 leaf	12 inches
<i>Mayweed</i>	n/a	n/a	0.5 inch	2 inches
<i>Chamomile</i>				

**04JPY010 - Weed Control in Conventionally Tilled Lentils – Pullman, WA**

Treatment	Rate <sup>a</sup>	Timing	Weed Control				Lentils		Yield
			Common Lambsquarter		Mayweed		Injury		
			6/16/2004	7/9/2004	8/11/2004	7/9/2004		6/16/2004	
			-----%-----					Lbs/A	
Nontreated			0	0	0	0	0	537	
imazethapyr	0.047	PPI	20	36	23	25	0	1017	
imazethapyr + dimethenamid	0.047 + 0.32	PREE	56	28	45	64	0	870	
imazethapyr + dimethenamid	0.047 + 0.64	PREE	72	50	62	73	3	938	
sulfentrazone	0.19	PREE	97	83	75	91	7	1109	
sulfentrazone	0.25	PREE	97	81	75	95	8	1291	
flufenacet + metribuzin	0.4 + 0.1	PREE	30	23	18	53	0	902	
flumioxazin	0.031	PREE	64	23	43	50	3	833	
flumioxazin	0.047	PREE	82	60	53	71	4	1107	
metribuzin	0.25	PREE	52	38	35	50	1	1044	
2,4-DB + NIS	0.175 + 0.5%	EPOST	80	94	81	10	0	1068	
2,4-DB + NIS	0.23 + 0.5%	EPOST	97	96	94	23	1	1126	
metribuzin	0.25	EPOST	96	93	89	85	4	1208	
2,4-DB + NIS	0.175 + 0.5%	LPOST	74	71	97	49	1	590	
2,4-DB + NIS	0.23 + 0.5%	LPOST	94	95	91	23	1	590	
Nontreated			0	0	0	0	0	958	
LSD (p=0.05)			31	30	23	34	4	347	

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## **04JPY011 - Weed Control in Conventionally Tilled Chickpea – Pullman, WA**

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The study is part of on-going studies to evaluate weed control in chickpeas.

Most preemergence applications had good weed control and acceptable yield. Most postemergence treatments were ineffective at controlling weeds or excessively injured the crop.

Part of the ongoing efforts was to develop a postemergence herbicide to replace Pyridate (Tough). Unfortunately, no other herbicide matched the weed control and crop yield provided by Pyridate. All other postemergence herbicides had excessive crop injury or poor weed control.

**04JPY011 - Weed Control in Conventionally Tilled Chickpea – Pullman, WA**

<b>Crop 1:</b> Chickpea	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Pullman, WA	Planting Date: 04/08/04	Type: Palouse Silt-Loam
	Row Spacing: 7 inches	Organic Matter: 3%
<b>Cooperator:</b> WSU Cunningham Farm	Seeding Rate: 200 lbs/a	pH: 5.8
	Variety: Kabouli	

**Application Information**

Timing	PPI	PREE	EPOST	LPOST
Date	04/07/04	04/09/04	05/12/04	06/03/04
Air Temperature	54° F	53° F	63° F	83° F
Rel. Humidity	44 %	52 %	35 %	32 %
Wind Velocity	10 mph	2 mph	0 mph	1 mph
Soil Temperature	52° F	48° F	49° F	65° F
Soil Moisture	Dry	Dry	Wet	Moist
Gal/Acre	10 GPA	10 GPA	10 GPA	10 GPA
Pressure	35 psi	35 psi	35 psi	35 psi
Nozzles	Teejet XR8001	Teejet XR8001	Teejet XR8001	Teejet XR8001
Crop Growth Stage	Pre-emergence	Pre-emergence		Vegetative
<i>Height</i>	n/a	n/a	4-6 inches	6-8 inches
Weed Stage				
<i>Lambsquarter</i>	n/a	n/a	.5-4 inch	6 inches
<i>Volunteer Wheat</i>	n/a	n/a	2 leaf	2 <sup>nd</sup> Joint
<i>Mayweed</i>	n/a	n/a	n/a	6-8 inches
<i>Chamomile</i>				
<i>Buckwheat</i>	n/a	n/a	n/a	2 inches

**04JPY011 - Weed Control in Conventionally Tilled Chickpea – Pullman, WA**

Treatment	Rate <sup>a</sup>	Timing	Common Lambsquarter Control		Chickpea	
			6/16/2004	9/2/2004	Injury	Yield
			-----%-----			
Nontreated			0	0	0	1093
imazethapyr	0.047	PPI	97	53	0	1313
imazethapyr + pendimethalin	0.047 + 0.63	PREE	97	64	4	1292
imazethapyr + dimethenamid	0.047 + 0.64	PREE	97	71	0	1141
sulfentrazone	0.19	PREE	97	66	3	1114
sulfentrazone	0.25	PREE	97	82	0	1484
metribuzin	0.25	PREE	97	35	1	1196
flumioxazin	0.063	PREE	97	76	9	1351
flumioxazin	0.078	PREE	97	69	6	1506
isoxaflutole	0.031	PREE	97	81	0	1195
isoxaflutole	0.047	PREE	97	79	0	1120
2,4-DB	0.175	EPOST	97	44	8	984
2,4-DB	0.25	EPOST	95	50	11	1142
pyridate	0.94	EPOST	97	97	0	1619
carfentrazone + NIS + UAN	0.008 + 0.25% + 2.5%	LPOST	97	70	44	856
thifensulfuron + NIS	0.02 + 0.25%	LPOST	97	89	69	128
flumiclorac + lactofen + COC	0.12 + 1pt	LPOST	97	49	68	455
2,4-DB	0.25	LPOST	97	93	33	539
LSD (p=0.05)			1	29	12	595

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## **04JPY012 - Everest and Adjuvant Trial in Spring Wheat – Pullman, WA**

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The study was designed to determine if the addition of In-Place™ adjuvant had an influence on the effectiveness of Flucarbazone (Everest) for Wild oat control. Wild oat control was very good with flucarbazone and addition of In-Place™ did not provide significantly greater Wild oat control even though there was a trend for greater wild oat control.

**04JPY012 - Everest and Adjuvant Trial in Spring Wheat – Whitman Co., WA**

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<b>Crop 1: Spring Wheat</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Whitman Co.	Planting Date: 03/04/04	Type:
	Row Spacing: 7 inches	Organic Matter:
<b>Cooperator:</b> Jack Silzel	Seeding Rate: 100 lbs/a	pH:
	Variety: Alpowa	

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**Application Information**

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Timing	POST
Date	05/19/04
Air Temperature	64° F
Rel. Humidity	42 %
Wind Velocity	0 mph
Soil Temperature	62° F
Soil Moisture	Wet
Gal/Acre	10 GPA
Pressure	35 psi
Nozzles	Teejet XR8001
Crop Growth Stage	Jointed
<i>Height</i>	6-8 inches
Weed Stage	
<i>Wild Oats</i>	Jointed
<i>Mayweed Chamomile</i>	4-5 inches
<i>Lambsquarter</i>	2-4 leaf
<i>Henbit</i>	5-6 leaf
<i>Broadleaf</i>	6-8 leaf
<i>Prickly Lettuce</i>	2-5 leaf
<i>Buckwheat</i>	4 leaf

**04JPY012 - Everest and Adjuvant Trial in Spring Wheat – Pullman, WA**

Treatment	Rate <sup>a</sup>	Timing	Wild Oat Control	Spring Wheat Yield
			9/2/2004	
			-----%-----	Bu/A
Nontreated			0	64
flucarbazone + R-11®	0.018 + 0.25%	POST	84	63
flucarbazone + Cayuse® Plus	0.018 + 0.75%	POST	88	63
flucarbazone + Syl-Tac®	0.018 + 0.25%	POST	88	67
flucarbazone + Renegade®	0.018 + 1%	POST	92	70
flucarbazone + Hasten®	0.018 + 1pt	POST	86	61
flucarbazone + In-Place™ + R-11®	0.018 + 2oz + 0.25%	POST	95	68
flucarbazone + In-Place™ + Cayuse® Plus	0.018 + 2oz + 0.75%	POST	84	65
flucarbazone + In-Place™ + Syl-Tac®	0.018 + 2oz + 0.75%	POST	91	70
flucarbazone + In-Place™ + Renegade®	0.018 + 2oz + 1%	POST	89	66
flucarbazone + In-Place™ + Hasten®	0.018 + 2oz + 1%	POST	87	65
LSD (p=0.05)			14	NS

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## **04JPY013 - BAS 777 H / Tankmix Partners / Spring Wheat – Pullman, WA**

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The study evaluated an Imazamox/MCPA pre-pack herbicide with various tank-mix partners in Clearfield spring wheat.

Generally, the spring wheat crop was so dense that there was very little weed pressure, from either grass or broadleaf weeds. Crop injury was the primary information provided by this study. Injury ratings 21 days after application indicated no significant injury from BAS-777 or any other treatments. Pre-harvest injury, primarily stunting, was greatest with higher rates of 2, 4-D or MCPA particularly in combination with BAS-777, which has a high percentage component of MCPA. This noted crop injury did not result in reduced yield as yield results and test weights were not significantly affected by the treatments.

**04JPY013 - Bas 777 H / Tankmix Partners / Spring Wheat – Pullman, WA**

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<b>Crop 1: Spring Wheat</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Pullman, WA	Planting Date: 04/07/04	Type: Palouse Silt-Loam
	Row Spacing: 7 inches	Organic Matter: 3%
<b>Cooperator:</b> WSU Cunningham Farm	Seeding Rate: 69 lbs/a	pH: 5.8
	Variety:	

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**Application Information**

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Timing	POST
Date	05/12/04
Air Temperature	63° F
Rel. Humidity	35 %
Wind Velocity	1-3 mph
Soil Temperature	49 F
Soil Moisture	Wet
Gal/Acre	10 GPA
Pressure	35 psi
Nozzles	Teejet XR8001
Crop Growth Stage	Tiller
<i>Height</i>	4-6 inch
Weed Stage	
<i>Lambsquarter</i>	4 inches
<i>Mayweed Chamomile</i>	0.5-1 inch
<i>Henbit</i>	0.25-0.5 inches

**04JPY013 - Bas 777 H / Tankmix Partners / Spring Wheat – Pullman, WA**

Treatment	Rate <sup>a</sup>	Timing	Spring Wheat	
			Injury 8/1/04	Yield bu/A
Nontreated			---%---	
imazamox + MCPA + NIS + UAN	0.03 + 0.25 + 0.25% + 2.5%	POST	0	46
imazamox + MCPA + NIS + UAN	0.06 + 0.50 + 0.25% + 2.5%	POST	1	47
imazamox + NIS + UAN	0.03 + 0.25% + 2.5%	POST	0	47
imazamox + MCPA + dicamba + NIS + UAN	0.03 + 0.25 + 0.063 + 0.25% + 2.5%	POST	2	43
imazamox + MCPA + dicamba + NIS + UAN	0.03 + 0.25 + 0.125 + 0.25% + 2.5%	POST	4	43
imazamox + MCPA + fluroxypyr + NIS + UAN	0.03 + 0.25 + 0.047 + 0.25% + 2.5%	POST	0	46
imazamox + MCPA + fluroxypyr + NIS + UAN	0.03 + 0.25 + 0.094 + 0.25% + 2.5%	POST	0	46
imazamox + MCPA + bromoxynil + MCPA ester + NIS + UAN	0.03 + 0.25 + 0.375 + 0.375 + 0.25% + 2.5%	POST	1	47
imazamox + MCPA + bromoxynil + NIS + UAN	0.03 + 0.25 + 0.25 + 0.25% + 2.5%	POST	0	47
imazamox + MCPA + 2-4D Amine + NIS + UAN	0.03 + 0.25 + 0.25 + 0.25% + 2.5%	POST	9	40
imazamox + MCPA + 2-4D Ester + NIS + UAN	0.03 + 0.25 + 0.25 + 0.25% + 2.5%	POST	4	48
imazamox + MCPA + clopyralid + 2-4D amine + NIS + UAN	0.03 + 0.25 + 0.048 + 0.25 + 0.25% + 2.5%	POST	9	45
imazamox + MCPA + clopyralid + 2-4D amine + NIS + UAN	0.28 + 0.095 + 0.50 + 0.25% + 2.5%	POST	10	44
imazamox + MCPA + carfentrazone + NIS + UAN	0.03 + 0.25 + 0.008 + 0.25% + 2.5%	POST	0	47
imazamox + MCPA + thifensulfuron + tribenuron + NIS + UAN	0.03 + 0.25 + 0.014 + 0.007 + 0.25% + 2.5%	POST	3	48
fenoxyprop	0.083	POST	1	46
Nontreated			0	48
LSD (p=0.05)			3	NS

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## 04JPY014 - BAS 777 H / Competitive Standards/ Spring Wheat – Pullman, WA

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The study was conducted to look at several different grass herbicides for weed control in spring wheat. Wild oat control did vary with Mesosulfuron (Osprey), Flucarbazone (Everest), Fenoxypop (Puma), and Imazamox plus MCPA providing the greatest level of wild oat control. However, mesosulfuron did injure wheat nearly 16 % which was not unexpected since the mesosulfuron formulation used was designed with a safety package for winter wheat only. Significant injury was also observed with the Tralkoxydim (Achieve) treatment, but injury was probably due to high rates of Bromoxynil (Bronate) rather than the tralkoxydim. Test weights were not different and the previously mentioned treatments, which injured the spring wheat, had reduced yields compared to the best treatments.

**04JPY014 - Bas 777 H / Competitive Standards/ Spring Wheat – Pullman, WA**

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<b>Crop 1: Spring Wheat</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Pullman, WA	Planting Date: 04/13/04	Type: Palouse Silt-Loam
	Row Spacing: 10 inches	Organic Matter: 4.23%
<b>Cooperator:</b> USDA	Seeding Rate: 77 lbs/a	pH: 5.2
	Variety: Clearfield	

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**Application Information**

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Timing	POST
Date	06/02/04
Air Temperature	75° F
Rel. Humidity	31 %
Wind Velocity	3 mph
Soil Temperature	65° F
Soil Moisture	Dry
Gal/Acre	10 GPA
Pressure	35 psi
Nozzles	Teejet XR8001
Crop Growth Stage	2 <sup>nd</sup> Joint
<i>Height</i>	10 inches
Weed Stage	
<i>Prickly Lettuce</i>	6 inches
<i>Willow weed</i>	1 inch
<i>Lambsquarter</i>	5 inches
<i>Mayweed Chamomile</i>	3-4 leaf
<i>Broadleaf</i>	1 inch

**04JPY014 - Bas 777 H / Competitive Standards/ Spring Wheat – Pullman, WA**

Treatment	Rate <sup>a</sup>	Timing	Wild Oat	Spring Wheat	
			Control	Injury	Yield
			8/13/04	6/14/04	Bu/ A
			-----%-----		
Nontreated			0	0	36
imazamox + bromoxynil + MCPA + NIS + UAN	0.03 + 0.25 + 0.25 + 0.25% + 2.5%	POST	93	1	41
imazamox + MCPA + bromoxynil + NIS + UAN	0.03 + 0.25 + 0.5 + 0.25% + 2.5%	POST	97	1	39
fenoxypop + bromoxynil + MCPA + thifensulfuron + tribenuron + NIS	0.08 + 0.25 + 0.25 + 0.009 + 0.0045 + 0.25% + 2.5%	POST	97	0	40
clodinafop + bromoxynil + thifensulfuron	0.05 + 0.5 + 0.023	POST	94	1	35
tralkoxydim + Achieve conditioner® + bromoxynil + MCPA + thifensulfuron	0.18 + 1.4oz + 0.75 + 0.25 + 0.014	POST	89	5	31
flucarbazone + bromoxynil + MCPA + NIS	0.0175 + 0.25 + 0.25 + 0.25%	POST	97	1	36
mesosulfuron + bromoxynil + MCPA + NIS + UAN	0.009 + 0.25 + 0.25 + 0.5% + 2%	POST	97	16	23
LSD (p=0.05)			7	3	8

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

**04JPY016 - Cimarron/Chlorsulfuron Combinations for Toadflax Control in Pastures, Rangeland, or CRP – Spokane Co., WA**

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The study was designed to exam the control of Dalmation toadflax in a non-crop setting. Several treatments, particularly combinations of Chlorsulfuron (Telar), Metsulfuron (Ally), 2, 4-D- amine, and Dicamba (Weedmaster) had control exceeding 90% two months after treatments with little to no observed flowering. However, by seasons end a substantial amount of re-growth occurred and best control observed about 150 days after treatment was just over 50%. While several of the treatments show promise, the timing of our applications may not be optimum for the long-term control of Dalmation toadflax.

**04JPY016 - Cimarron/Chlorsulfuron Combinations for Toadflax Control in Pastures, Rangeland, or CRP – Spokane Co., WA**

<b>WEED 1: Dalmation Toadflax</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Spokane Co.	Planting Date: N/A	Type:
	Row Spacing: N/A	Organic Matter:
<b>Cooperator:</b> Art Lenz	Seeding Rate: N/A	pH:
	Variety: N/A	

<b>Application Information</b>	
Timing	POST
Date	05/06/04
Air Temperature	59° F
Rel. Humidity	34 %
Wind Velocity	3-4 mph
Soil Temperature	60° F
Soil Moisture	Dry
Gal/Acre	10 GPA
Pressure	35 psi
Nozzles	Teejet XR8001
Crop Growth Stage	Vegetative – Bolted
<i>Height</i>	12-18 inches
Weed Stage	
<i>Downy Brome</i>	6 inches – seed
<i>Puncture Vine</i>	Bloom / 3-4 inches
<i>Tarweed</i>	Rosette / 2 inches
<i>Broadleaf</i>	2-5 leaf
<i>Vetch</i>	6-8 inches
<i>Salsify</i>	6-8 inches
<i>Bindweed</i>	3-8 inches
<i>Yarrow</i>	6-8 inches

**04JPY016 - Cimarron/Chlorsulfuron Combinations for Toadflax Control in Pastures, Rangeland, or CRP – Spokane Co., WA**

Treatment	Rate <sup>a</sup>	Timing	Toadflax Control			
			5/21/04	6/4/04	6/29/04	10/1/04
			-----%-----			
metsulfuron + 2,4-D amine + dicamba + COC	0.006 + 0.36 + 0.125 + 1qt	POST	28	31	20	8
metsulfuron + 2,4-D amine + dicamba + COC	0.011 + 0.72 + 0.25 + 1qt	POST	28	30	40	28
metsulfuron + 2,4-D amine + dicamba + COC	0.023 + 1.44 + 0.5 + 1qt	POST	43	53	60	13
metsulfuron + chlorsulfuron 2,4-D amine + dicamba + COC	0.006 + 0.009 + 0.36 + 0.125 + 1qt	POST	20	44	58	13
metsulfuron + chlorsulfuron 2,4-D amine + dicamba + COC	0.011 + 0.018 + 0.72 + 0.25 + 1qt	POST	39	60	83	28
metsulfuron + chlorsulfuron 2,4-D amine + dicamba + COC	0.023 + 0.035 + 1.44 + 0.5 + 1qt	POST	38	58	88	55
metsulfuron + chlorsulfuron 2,4-D amine + dicamba + COC	0.011 + 0.009 + 1.44 + 0.5 + 1qt	POST	40	68	76	23
metsulfuron + chlorsulfuron 2,4-D amine + dicamba + COC	0.006 + 0.018 + 0.36 + 0.125 + 1qt	POST	33	55	80	31
metsulfuron + chlorsulfuron 2,4-D amine + dicamba + COC	0.023 + 0.018 + 0.72 + 0.25 + 1qt	POST	36	49	88	33
metsulfuron + chlorsulfuron 2,4-D amine + dicamba + COC	0.011 + 0.035 + 1.44 + 0.5 + 1qt	POST	40	63	91	18
chlorsulfuron + 2,4-D amine + dicamba + COC	0.009 + 1.44 + 0.5 + 1qt	POST	44	39	53	5
chlorsulfuron + 2,4-D amine + dicamba + COC	0.018 + 1.44 + 0.5 + 1qt	POST	49	61	84	23
chlorsulfuron + 2,4-D amine + dicamba + COC	0.035 + 1.44 + 0.5 + 1qt	POST	41	65	91	71
picloram	0.25	POST	11	15	14	48
LSD (p=0.05)			11	20	20	37

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## **04JPY017 - Wild Oat Control with Discover and Achieve – Whitman Co., WA**

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The study was designed to evaluate various wild oat herbicides with a primary focus on Clodinafop (Discover) and Tralkoxydim (Achieve). Generally, clodinafop alone and in tank-mix provided good to excellent Wild oat and Italian ryegrass control. Fenoxaprop (Puma) provided good control of Wild oat, but little to no Italian ryegrass control. Tralkoxydim and flucarbazone had good to excellent control in early season evaluations, but control broke down somewhat by season's end.

Greatest yields tended to be with clodinafop treatments. There were no differences in test weights for the various treatments.

**04JPY017 - Wild Oat Control with Discover and Achieve – Whitman Co., WA**

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<b>Crop 1: Spring Wheat</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Whitman, Co.	Planting Date:	Type:
	Row Spacing:	Organic Matter:
<b>Cooperator:</b> Mark Whitmore	Seeding Rate:	pH:
	Variety:	

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**Application Information**

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Timing	POST
Date	05/20/04
Air Temperature	55° F
Rel. Humidity	73 %
Wind Velocity	4.5 mph
Soil Temperature	58° F
Soil Moisture	Wet
Gal/Acre	10 GPA
Pressure	35 psi
Nozzles	Teejet XR8001
Crop Growth Stage	1 <sup>st</sup> Joint
<i>Height</i>	10-12 inches
Weed Stage	
<i>Lambsquarter</i>	2-6 leaf
<i>Mayweed Chamomile</i>	6 inches
<i>Wild Oats</i>	1-2 jointed
<i>Henbit</i>	10 leaf
<i>Prickly Lettuce</i>	2-3 leaf
<i>Broadleaf</i>	2-4 leaf

**04JPY017 - Wild Oat Control with Discover and Achieve –Whitman Co., WA**

Treatment	Rate <sup>a</sup>	Timing	Weed Control					Spring Wheat Yield
			Wild Oat			Italian Ryegrass		
			6/15/04	6/28/04	8/16/04	6/28/04	8/16/04	
			-----%-----					Bu/A
Nontreated			0	0	0	0	0	69
clodinafop	0.05	POST	93	95	89	93	88	92
clodinafop	0.063	POST	97	97	97	95	97	88
clodinafop + prosulfuron	0.05 + 0.018	POST	94	97	93	97	95	89
clodinafop + thifensulfuron	0.05 + 0.02	POST	93	97	97	92	90	98
clodinafop + prosulfuron + Rhino	0.05 + 0.018 + 0.3	POST	92	97	97	97	97	92
clodinafop + thifensulfuron + Rhino	0.05 + 0.02 + 0.3	POST	90	92	88	90	91	86
clodinafop + prosulfuron + MCPA Amine	0.05 + 0.018 + 0.375	POST	96	97	97	91	97	94
clodinafop + thifensulfuron + MCPA Amine	0.05 + 0.02 + 0.375	POST	94	97	97	97	97	98
clodinafop + prosulfuron + Rhino	0.05 + 0.018 + 0.5	POST	97	97	97	95	95	89
clodinafop + thifensulfuron + Rhino	0.05 + 0.02 + 0.5	POST	92	97	97	94	97	92
fenoxypyr + thifensulfuron + tribenuron + bromoxynil + MCPA + NIS	0.08 + 0.014 + 0.5 + 0.25%	POST	96	97	97	0	32	92
flucarbazone + thifensulfuron + tribenuron + bromoxynil + MCPA + NIS	0.02 + 0.014 + 0.5 + 0.25%	POST	93	97	64	94	79	77
tralkoxydim + Supercharge® + Achieve conditioner®	0.18 + 0.5% + 0.04	POST	81	69	50	94	60	76
tralkoxydim + Supercharge® + Achieve conditioner®	0.24 + 0.5% + 0.06	POST	87	85	73	86	89	85
tralkoxydim + fluroxypyr + thifensulfuron + Supercharge® + Achieve conditioner®	0.18 + 0.165 + 0.014 + 0.5% + 0.04	POST	89	84	58	82	76	72
tralkoxydim + fluroxypyr + thifensulfuron + Supercharge® + Achieve conditioner®	0.24 + 0.165 + 0.014 + 0.5% + 0.06	POST	93	92	83	84	87	80
clodinafop + clopylarid + fluroxypyr	0.05 + 0.5	POST	94	97	97	94	97	85
LSD (p=0.05)			9	6	16	10	23	14

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## **04JPY018 - Rush Skeletonweed Control in Rangeland – Lacrosse, WA**

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The study was designed to determine Rush Skeletonweed control using Metsulfuron (Ally) combinations. Year-end control ratings were generally good with combinations of metsulfuron and 2, 4-D ester providing slightly better control than metsulfuron plus 2, 4-D amine, Dicamba (Weedmaster), and Chlorsulfuron (Telar).

**04JPY018 - Rush Skeletonweed Control in Rangeland – Lacrosse, WA**

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<b>Weed 1: Rush Skeletonweed</b>	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Lacrosse, WA	Planting Date: N/A	Type:
	Row Spacing: N/A	Organic Matter:
<b>Cooperator:</b> Pat Schweiger	Seeding Rate: N/A	pH:
	Variety: N/A	

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**Application Information**

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Timing	POST
Date	04/29/04
Air Temperature	71° F
Rel. Humidity	20 %
Wind Velocity	4.5-5 mph
Soil Temperature	47° F
Soil Moisture	Dry
Gal/Acre	10 GPA
Pressure	35 psi
Nozzles	Teejet XR8001
Crop Growth Stage	n/a
<i>Height</i>	n/a
Weed Stage	
<i>Rush Skeleton</i>	Rosette / 2-6 inches
<i>Grass</i>	Matted
<i>Yarrow</i>	4 inches

**04JPY018 - Rush Skeletonweed Control in Rangeland – Lacrosse, WA**

Treatment	Rate <sup>a</sup>	Timing	Rush Skeletonweed Control		
			5/14/04	6/4/04	7/22/04
			-----%-----		
metsulfuron + 2,4-D ester + COC	0.006 + 0.23 + 1qt	POST	36	73	59
metsulfuron + 2,4-D ester + COC	0.01 + 0.23 + 1qt	POST	31	71	92
metsulfuron + 2,4-D ester + COC	0.02 + 0.23 + 1qt	POST	21	69	85
metsulfuron + chlorsulfuron + 2,4-D ester + COC	0.006 + 0.018 + 0.23 + 1qt	POST	38	71	84
metsulfuron + chlorsulfuron + 2,4-D ester + COC	0.01 + 0.018 + 0.23 + 1qt	POST	34	75	85
metsulfuron + chlorsulfuron + 2,4-D ester + COC	0.02 + 0.018 + 0.23 + 1qt	POST	43	78	87
metsulfuron + chlorsulfuron + 2,4-D ester + COC	0.02 + 0.04 + 0.23 + 1qt	POST	36	69	77
metsulfuron + chlorsulfuron + 2,4-D ester + COC	0.01 + 0.009 + 0.23 + 1qt	POST	23	50	49
metsulfuron + chlorsulfuron + 2,4-D ester + COC	0.006 + 0.018 + 0.23 + 1qt	POST	28	63	73
metsulfuron + 2,4-D amine + dicamba + COC	0.006 + 0.36 + 1.25 + 1qt	POST	49	74	82
metsulfuron + 2,4-D amine + dicamba + COC	0.01 + 0.72 + 0.25 + 1qt	POST	54	83	92
metsulfuron + 2,4-D amine + dicamba + COC	0.02 + 1.44 + 0.5 + 1qt	POST	61	90	81
LSD (p=0.05)			15	13	30

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

## **04JPY019 - Diuron/Linuron Safety and Efficacy in Winter Wheat – Whitman Co., WA**

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The study was designed to evaluate Linuron and Diuron (Karmex) as alternative chemistries for controlling hard to kill weeds in winter wheat. Included were different formulations of Linuron. Prickly lettuce was the primary broadleaf weed. Prickly lettuce populations were variable and resulted in variable data. Crop injury was not statistically significant. Prickly lettuce control with Diuron alone was not as effective as when tank-mixed. Control with Linuron was better. Linuron applied as Linex was among the better treatments. There were no differences for yield among the various treatments.

**04JPY019 - Diuron/Linuron Safety and Efficacy in Winter Wheat – Whitman Co., WA**

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<b>Crop 1:</b> Winter Wheat	<b>Crop Information</b>	<b>Soil Information</b>
<b>Location:</b> Whitman Co.	Planting Date:	Type:
	Row Spacing:	Organic Matter:
<b>Cooperator:</b> Marcus Jacobson	Seeding Rate:	pH:
	Variety:	

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**Application Information**

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Timing	POST
Date	04/28/04
Air Temperature	44° F
Rel. Humidity	68 %
Wind Velocity	3 mph
Soil Temperature	46° F
Soil Moisture	Wet
Gal/Acre	10 GPA
Pressure	35 psi
Nozzles	Teejet XR8001
Crop Growth Stage	1 <sup>st</sup> Joint
<i>Height</i>	6-7 inches
Weed Stage	
<i>Prickly Lettuce</i>	4-5 leaf
<i>Mayweed Chamomile</i>	1-2 inches
<i>Willow weed</i>	3-4 inches
<i>Lambsquarter</i>	8 leaf / 1.5 inches
<i>Downy Brome</i>	3 inches
<i>Jointed Goatgrass</i>	3 inches

**04JPY019 - Diuron/Linuron Safety and Efficacy in Winter Wheat – Whitman Co., WA**

Treatment	Rate <sup>a</sup>	Timing	Prickly Lettuce Control				Winter Wheat
			5/6/04	5/13/04	6/3/04	8/8/04	Yield
			-----%-----				bu/A
Nontreated			0	0	0	0	116
diuron	1	POST	35	41	28	44	106
diuron	0.75	POST	46	58	55	44	115
diuron + NIS	0.75 + 0.25%	POST	54	51	68	48	107
diuron + Optima®	0.75 + 0.125%	POST	31	33	58	58	107
diuron + Optima® + DPXM6316-252 + DPXL5300-236	0.75 + 0.125% + 0.008 + 0.002	POST	48	50	83	60	112
diuron + DPXM6316-252 + DPXL5300-236	0.75 + 0.008 + 0.002	POST	54	73	92	78	120
DPXM6316-252 + DPXL5300-236	0.008 + 0.002	POST	50	55	61	68	110
DPXM6316-252 + DPXL5300-236 + MCPA Ester	0.008 + 0.002 + 0.375	POST	51	86	92	93	112
DPXM6316-252 + DPXL5300-236 + MCPA Ester + diuron	0.008 + 0.002 + 0.375 + 0.75	POST	68	79	97	95	119
DPXM6316-252 + DPXL5300-236 + MCPA Ester + diuron + Optima®	0.008 + 0.002 + 0.375 + 0.75 + 0.125%	POST	78	87	97	95	111
Linex	0.625	POST	61	91	97	95	100
Linex + DPXM6316-252 + DPXL5300-236	0.625 + 0.008 + 0.002	POST	61	95	93	90	110
Direx	0.625	POST	41	45	40	69	107
Direx + DPXM6316-252 + DPXL5300-236	0.625 + 0.008 + 0.002	POST	54	53	43	83	99
LSD (p=0.05)			31	22	29	26	NS

<sup>a</sup>Rate is expressed as amount of lbs/a herbicide active ingredient or acid equivalent per acre, surfactants expressed as percentage volume of the final spray mix. Other additives expressed as volume per acre.

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