

Fall Herbicide Application for Effective Control of Problem Perennial Weeds in Grass Seed Crops

AARI Matching Grants Project #2000M642

Final Report

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ABSTRACT

Grass seed growers need to be able to harvest a clean product without weed seeds in order to market their grass seed. As herbicides are usually needed to manage weeds in established grass seed crops and because spring or early summer herbicide application may not always provide satisfactory weed control, this project investigated the feasibility of fall application of several herbicides on grass seed crops.

Fifty-eight experiments were conducted in southern, central and northern Alberta to investigate the tolerance of eight different grass seed crops to fall applications of pre-emergent and post-emergent herbicides and the weed control provided.

The application of post-emergent herbicides in the fall provides better control of the weeds that are often a problem in established grass seed crops as well as better tolerance to some of the harsher herbicides than spring or early summer application.

Fall applied Ally provided economical and effective weed control without injuring or causing a seed yield reduction in six of the eight grass seed crops. Meadow bromegrass, chewings fescue, hard fescue, creeping red fescue, tall fescue and timothy were not injured by fall applied Ally, even though spring or early summer application of Ally often injures several of these grasses. Ally provides effective control of dandelion, narrow-leaved hawk's-beard, volunteer alsike clover, common plantain, scentless chamomile, rough cinquefoil, shepherd's-purse, flixweed and stork's-bill into the following year when applied in the fall to grass seed crops. This particular treatment is currently being demonstrated in grass seed and timothy hay grower fields in the Peace region of Alberta as well as being studied further to refine optimum application timing.

Other options include fall applied Prestige and Curtail M, especially if Canada thistle and/or perennial sow-thistle are a problem and actively growing in the fall. Prestige and Curtail M did not injure or cause a significant seed yield reduction in any of the eight grass seed crops, including meadow bromegrass, chewings fescue, hard fescue, creeping red fescue, tall fescue, timothy, Kentucky bluegrass and perennial ryegrass. Banvel + 2,4-D can provide effective control of perennial, biennial and winter annual weeds when applied in the fall but this tank mix tends to cause some injury to some of the sensitive grasses. The pre-emergent herbicides Princep Nine-T, Sencor, Goal, Aatrex Nine-0, Karmex, Dual Magnum, Nortron and Beacon did not cause injury or seed yield losses when applied in the fall to several of the grass seed crops but the weed control needs to be investigated further. Princep Nine-T, Sencor + Goal, Aatrex Nine-0 and Nortron look to be the most promising pre-emergent herbicide treatments in this project as some weed control information was obtained from where these herbicides were applied.

These 58 experiments are being submitted to the Canadian Weed Science Society as research reports in order to have the data in the proper format for Minor Use registration applications adding the tolerant grasses to the most effective herbicide labels.

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BACKGROUND

Forage seed production is increasing in Canada and has increasing potential as a diversification alternative for agriculture producers. Production occurs on over 500,000 acres with 50 - 60% of the production exported to the U.S. and Europe. The value is now over \$100 million at a farm gate level with tremendous value-added possibilities in employment, seed processing, handling, marketing and retailing of the seed. The world trade in turf grass seed production alone is estimated at over \$2.5 billion, with Canada annually importing over \$15 million in turf grass seed.

The grass forage and turf seed industry has the potential for expansion in Alberta. Not only is the climate, environment and land base conducive to grass seed production in Alberta, population levels, environmental pressures and competition for high valued crops are forcing the industry out of traditional grass seed producing areas of the U.S. and Europe. Many world forage seed production and marketing firms are looking for new seed production areas around the world. If Western Canada can develop and prove its capabilities in grass seed production before other areas in Australia, South America, Africa and Eastern Europe, it will have a major opportunity to acquire a significant proportion of this lucrative market.

The Western Canadian provinces are co-operating to efficiently develop and disseminate the production technology skills and marketing expertise to capture this grass seed market. Organizations such as the Peace Region Forage Seed Association, Manitoba Forage Seed Association, Saskatchewan Forage Council, Agriculture and Agri-Food Canada and the provincial departments of Agriculture in Alberta, British Columbia, Saskatchewan, and Manitoba have all invested in this co-operative endeavour.

Weeds are one of the major challenges to the production of grass seed crops in Western Canada. Weeds not only severely reduce seed yields and quality, they also determine whether the seed is marketable. International grass seed marketing firms, such as Barenbrug in Holland, have zero tolerance for wild oat or quackgrass seed in grass seed purchased. Alberta Agriculture, Food and Rural Development is not only taking a lead role in developing the necessary weed management tools for successful grass seed production, it has been charged, as part of the Western Canadian co-operative endeavour, with developing the protocols and gathering the information to obtain herbicide registrations on the fine-leaved fescues, tall fescue, meadow bromegrass, timothy, the ryegrasses and Kentucky bluegrass seed crops through the Minor Use Program. Unregistered uses should be avoided, especially with these high value crops.

The perennial weeds Canada thistle, perennial sow-thistle, dandelion, white cockle, volunteer alsike clover, foxtail barley and quackgrass; the biennial weed rough cinquefoil; and the winter annual weeds narrow-leaved hawk's-beard, cleavers, stork's-bill, flixweed and downy brome are major weed problems in grass seed crops in Western Canada and are difficult weeds to control with spring or early summer herbicide application. Year-long control of the annual weed, wild oats, with a residual herbicide would be a valuable tool for the grass seed growers as there is zero tolerance for wild oats seed in the grass seed sold into the European and U.S. markets. Weeds are particularly costly and troublesome to grass seed growers in the Peace region and a fall window of application would provide a welcome alternative.

Nearly all of the tolerance of grass seed crops to herbicide work has been conducted on seedling and established stands at early grass growth stages in the spring. Dr. Lloyd Darwent, retired from Agriculture and Agri-Food Canada, Beaverlodge, conducted trials on the tolerance of creeping red fescue, smooth bromegrass and timothy seed crops to 2,4-D and Banvel at different application timings. He found there were significant creeping red fescue and timothy seed yield reductions when 2,4-D was applied in August, September or October of the year of seeding the grass seed crop. Unfortunately, this corresponds to herbicide application timing for optimal perennial, biennial and winter annual weed control.

The tolerance and weed control information needs to be determined for the new grass seed crops and the currently used herbicides when applied in the fall of the year of seeding and in established stands. Because grass seed is a high value crop and because of the zero tolerance to weed seeds, this is an immediate need that must be addressed.

PROJECT OBJECTIVES

To determine the efficacy and tolerance of fall-applied herbicides to tall fescue, hard fescue, chewings fescue, creeping red fescue, perennial ryegrass, timothy and Kentucky bluegrass (meadow bromegrass added in 2001). If acceptable weed control and crop tolerance, to add these crops at the fall application timing to the herbicide labels through the Minor Use Program.

KEY RESULTS EXPECTED

1. Tolerance of tall fescue, hard fescue, chewings fescue, creeping red fescue, perennial ryegrass, timothy, Kentucky bluegrass and meadow bromegrass to herbicides applied in the fall of the year of seeding.
2. Tolerance of tall fescue, hard fescue, chewings fescue, creeping red fescue, perennial ryegrass, timothy, Kentucky bluegrass and meadow bromegrass to herbicides applied in the fall the year after seeding or subsequent year.
3. Efficacy of herbicides applied in the fall on perennial, biennial, winter annual and annual weeds growing in grass seed crops. The perennial weeds Canada thistle, perennial sow-thistle, dandelion, white cockle, volunteer alsike clover, wild barley and quackgrass; the biennial weed rough cinquefoil; the winter annual weeds narrow-leaved hawk's-beard, cleavers, stork's-bill, flixweed and downy brome; and the annual weed wild oats are the targeted weeds.
4. Addition of fall spraying of grass seed crops to herbicide labels through the Minor Use Program.

MATERIALS AND METHODS

Fifty-eight trials were established at the University of Alberta Experimental Farm (Ellerslie), in the Peace River region and at Crop Diversification Centre-South (Brooks

and Bow Island) in 2000 and 2001. Tolerance data, efficacy data and seed yields were collected in 2001, 2002 and 2003. The trials at Ellerslie, Brooks and Bow Island were mainly conducted as tolerance trials while a number of the trials in the Peace region were conducted as both efficacy and tolerance trials, even though both types of data were collected at all four locations. Tall fescue, chewings fescue, hard fescue, creeping red fescue, perennial ryegrass, timothy and meadow bromegrass were seeded at Ellerslie and tall fescue, perennial ryegrass and Kentucky bluegrass were seeded at Brooks and/or Bow Island in 2000 and 2001 for spraying in the fall of the year of seeding as well as separate blocks for spraying in the fall the year after seeding. Several trials were established in the Peace region in 2000 and 2001 on existing uniform established grass seed stands in producers' fields and newly seeded stands of tall fescue, hard fescue, creeping red fescue, timothy, meadow bromegrass and perennial ryegrass at Agriculture and Agri-Food Canada Research Station at Beaverlodge. Kentucky bluegrass experiments were only established at Brooks and Bow Island as this is the area where this grass seed crop is mainly grown in Alberta. Weed control sites in the Edmonton and Peace River region areas were chosen with heavy, uniform infestations of problem perennial, biennial and/or winter annual weeds.

Post-emergent herbicide treatments were applied in September and pre-emergent type herbicide treatments were applied in October when the grass rate of growth was diminished ("dormant" applications). The herbicide treatments were applied in the Edmonton experiments with a hand held CO₂ sprayer (R & D Sprayers Inc., Opelousas, Louisiana, USA) using 80015 XR nozzles (Spraying Systems Ltd., Calgary, Alberta, Canada) at 138 kPa delivering 100 L of spray solution per hectare in the September applications and at 276 kPa delivering 300 L of spray solution per hectare in the October applications. The nozzles were 45 cm above the vegetation canopy height. Similar equipment and spray application were used at Brooks, Bow Island, Beaverlodge and the other sites in the Peace River region as indicated in the Canadian Weed Science (CWSS) Research Reports provided in the Appendix. The spray dates are provided in table 9 and the growth stages and environmental conditions at the time of spraying for each experiment are included in the individual CWSS Research Reports in the Appendix.

Visual % grass injury and weed control were assessed at approximately 1 week and 3 weeks after the herbicide application as well as the following spring.

In Edmonton, a 1.5 m x 6 m (9m²) area in each plot was straight combined with a Wintersteiger plot combine, the seed dried at 40°C, cleaned with a seed scalper and total harvest dry weight taken. Similar equipment and procedures were used to harvest the grass seed at the other experimental sites.

Research Design*

- RCBD, 4 reps
- mostly 8 treatments x 4 reps = 32 plots of each of tall fescue, chewings fescue, hard fescue, creeping red fescue, perennial ryegrass, timothy, Kentucky bluegrass and meadow bromegrass (dependent on location as outlined above)
- plot size: at least 2 m x 6 m sprayed

- total area of each trial = 16 m x 27 m, with double this area seeded in 2000 and 2001 to accommodate the area needed for the fall spraying of established grass trials the following year.
- harvest area = 1.5 m x 6 m in each plot
- seeding rate: currently recommended seeding rate for seed production (included for each experiment in the Canadian Weed Science Society Research Reports provided in the Appendix)
- row spacing: 30 cm (12")
- seeding depth: varies by soil type, location; generally < 1.25 cm (0.5")
- seeded as early as possible (especially on dry land)
- not seeded with a cover crop
- trials conducted on uniform grass stands
- fertility: minimum 100 kg/ha (90 lb/ac) nitrogen applied in the late fall, or split 1/3:2/3, fall:late fall
- irrigation: only the trials at Brooks and Bow Island were irrigated
- harvest timing: from Dr. Lloyd Darwent's guidelines*
- data analysis with ANOVA and mean separations with Student-Newman-Keuls test.

*from Dr. Lloyd Darwent's "Guidelines for Herbicide Trials in Forage Grasses"

Herbicide Application

- unstarred post-emergent treatments were applied in September (at the appropriate weed stage) after mowing and removing the forage growth and the starred pre-emergent application treatments were applied after October 1.
- unstarred post-emergent treatments were applied at 100 L/ha (40.5 L/ac) and the starred pre-emergent treatments were applied at 300 L/ha (120 L/ac), as recommended on the herbicide labels.
- flat fan nozzles.

Herbicide Treatment List

Table 1. List of Fall Applied Herbicides on Grasses.

Trade Name	Chemical Name	Concentration Formulation	Rate (kg/ha) a. i. ***	Rate (L/ac) Product	Application & Uptake	Approx. \$/ac
Check						
Banvel II + 2,4-D amine	dicamba 2,4-D amine	480 g/L SN 470 g/L SN	0.178-0.290 0.523-0.700	0.150-0.245 0.450-0.600	Post-emergent Foliar	8.50 – 13.00
Prestige	fluroxypyr cropyralid MCPA ester	180 g/L EC 50 g/L EC 280 g/L EC	0.144 0.100 0.560	0.324 0.810	Post-emergent Foliar	14.50
Curtail M	cropyralid MCPA ester	50 g/L EC 280 g/L EC	0.100 0.560	0.810	Post-emergent Foliar	11.00
Curtail M + Accord + Merge	cropyralid MCPA ester quinclorac (surfactant)	50 g/L EC 280 g/L EC 75% DF	0.100 0.560 0.125 1.0% v/v	0.810 0.067 kg/ac 1.0% v/v	Post-emergent Foliar	N/A

Attain	fluroxypyr 2,4-D ester	180 g/L EC 564 g/L EC	0.105 0.560	0.236 0.402	Post-emergent Foliar	9.00
Ally + Agral 90	metsulfuron methyl (surfactant)	60% DF	0.0045 0.2% v/v	0.003 kg/ac 0.2% v/v	Post-emergent Foliar and some soil	6.00
Ally + 2,4-D amine + Agral 90	metsulfuron methyl 2,4-D amine (surfactant)	60% DF 560 SN	0.0045 0.700 0.2% v/v	0.003 kg/ac 0.506 0.2% v/v	Post-emergent Foliar and some soil	9.00
Ally + Accord + Merge	metsulfuron methyl quinclorac (surfactant)	60% DF 75% DF	0.0045 0.125 1.0% v/v	0.003 kg/ac 0.067 kg/ac 1.0% v/v	Post-emergent Foliar and some soil	N/A
Accord + Merge	quinclorac (surfactant)	75% DF	0.10 1.0% v/v	0.054 kg/ac 1.0% v/v	Post-emergent Foliar	N/A
Unity 75WG + Unity 280EC + Agral 90	triasulfuron bromoxynil (surfactant)	75% WDG 280 g/L EC	0.008 0.138 0.25% v/v	0.0043 kg/a 0.200 0.25% v/v	Post-emergent Foliar and some soil	7.00
Beacon + Agral 90	primisulfuron-methyl (surfactant)	75% WDG	0.040 0.25% v/v	0.022 kg/ac 0.25% v/v	Post-emergent Foliar	N/A
Princep Nine-T*	simazine	90% DF	1.00	0.45 kg/ac	Pre-emergent Soil	7.00
Princep Nine-T* + 2,4-D amine*	simazine 2,4-D amine	90% DF 470 g/L SN	1.00 0.523	0.45 kg/ac 0.450	Pre-emergent Soil and foliar	9.50
Sencor 75 DF*	metribuzin	75% DF	0.42-0.56**	0.227-0.302 kg/ac	Pre-emergent Soil and some foliar	10.50 – 14.00
Goal 2XL*	oxyfluorfen	240 g/L EC	0.13	0.220	Pre-emergent Soil and foliar	N/A
Sencor 75 DF* + Goal 2XL*	metribuzin oxyfluorfen	75% DF 240 g/L EC	0.42-0.56** 0.13-0.42**	0.227-0.302 kg/ac 0.220-0.700	Pre-emergent Soil and foliar	N/A
Karmex DF*	diuron	80% DF	0.90 -1.80**	0.45 – 0.91 kg/ac	Pre-emergent Soil and some foliar	8.00 – 16.00
Sundance* + 2,4-D ester*+ Merge*+ pH Balancer*	sulfosulfuron 2,4-D ester (surfactant) (pH balancer)	75% WDG 564 g/L EC	0.020 0.395 0.5% v/v 0.25% v/v	0.011 kg/ac 0.283 0.5% v/v 0.25% v/v	Pre-emergent Foliar and some soil	17.50
Aatrex Nine-0*	atrazine	90% WDG	1.0 – 1.5**	0.44 - 0.68 kg/ac	Pre-emergent Soil and foliar	5.00 – 7.50
Dual II Magnum*	s-metolachlor	915 g/L EC	1.05	0.464	Pre-emergent Soil	17.00
Nortron*	ethofumesate	480 g/L SC	0.84 -2.13**	0.71 – 1.80	Pre-emergent Soil	52.00 – 131.00
Avadex MicroActiv*	triallate	10% GR	1.70	6.90 kg/ac	Pre-emergent Soil	20.00
Treflan QR5*	trifluralin	5% GR	1.40	11.3 kg/ac	Pre-emergent Soil	21.00

*Pre-emergent herbicide. Higher spray solution volume of 120 L/ac (300 L/ha) and applied after October 1 (when grass is more or less dormant). 40.5 L/ac (100 L/ha) and September application for the other treatments (Post-emergent herbicide).

Low rate on sandy and low organic matter soils (Bow Island, Brooks**) and high rate on clays and higher organic matter soils (**Edmonton, Beaverlodge**).

***Refer to Canadian Weed Science Society Research Reports in Appendix for rate used in each experiment.

Experiment List and Dates

Table 2. List of Fall Application Experiments with seeding, spraying and harvest dates.

Expt. No.	Experiment I.D.	Experiment	Seeding Date	Early Fall Spray Date	Late Fall Spray Date	Harvest Date
Kentucky Bluegrass – Herbicides Applied in the Fall the Year of Seeding						
KB1	KBG S00 Fall BI	Bow Island 2000-01	May-17-00	Sept-1-00	Oct-23-00	Jul-19-01
KB2	KBG S00 BK Fall	Brooks 2000-01	May-16-00	Sept-11-00	Oct-23-00	Jul-13-01
KB3	KBG Fall S01 BI	Bow Island 2001-02	May-10-01	Sept-11-01	Oct-30-01	Jul-22-02
KB4	KBG Fall S01 BK	Brooks 2001-02	May-9-01	Sept-11-01	Oct-30-01	Jul-26-02
Kentucky Bluegrass – Herbicides Applied in the Fall the Year After Seeding						
KB5	KBG Fall E00 BI	Bow Island 2001-02	May-17-00	Sept-11-01	Oct-30-01	Jul-25-02
KB6	KBG Fall E00 BK	Brooks 2001-02	May-16-00	Sept-11-01	Oct-30-01	Jul-23-02
KB7	KBG E02 Fall BI	Bow Island 2002-03	May-17-00	Sept-10-02	Nov-5-02	Jul-16-03
KB8	KBG E02 Fall BK	Brooks 2002-03	May-9-01	Sept-10-02	Nov-5-02	Jul-17-03
Meadow Bromegrass – Herbicides Applied in the Fall the Year of Seeding						
MB1	MBrome S01 Fall Edm	Edmonton 2001-02	Jun-1-01	Oct-1-01	Nov-4-01	Aug-1-02
MB2	MBrome S02 Fall Bldg	Beaverlodge 2002-03	May-31-02	Sept-14-02		Aug-1-03
Meadow Bromegrass – Herbicides Applied in the Fall the Year After Seeding						
MB3	M Brome E02 Fall Edm	Edmonton 2002-03	Jun-1-01	Sept-25-02	Oct-16-02	Jul-31-03
Chewings Fescue – Herbicides Applied in the Fall the Year of Seeding						
CF1	Chewing S00 Fall Edm	Edmonton 2000-01	Jun-5-00	Sept-26-00	Oct-11-00	Jul-23-01
CF2	Chew Fes S01 Fall Edm	Edmonton 2001-02	Jun-5-01	Oct-1-01	Nov-4-01	Jul-19-02
Chewings Fescue – Herbicides Applied in the Fall the Year After Seeding						
CF3	Chew Fes E01 Fall Edm	Edmonton 2001-02	Jun-5-00	Oct-1-01	Nov-4-01	Jul-19-02
CF4	Chew Fes E02 Fall Edm	Edmonton 2002-03	Jun-5-01	Sept-25-02	Oct-9-02	Jul-28-03
CF5	Chew Fes E02 Fall SR	Spirit River 2002-03	May-17-01	Sept-14-02		No harvest
Hard Fescue – Herbicides Applied in the Fall the Year of Seeding						
HF1	Hard S00 Fall Edm	Edmonton 2000-01	Jun-5-00	Sept-26-00	Oct-11-00	Jul-12-01
HF2	HardFes S00 Fall Bldg	Beaverlodge 2000-01	May-19-00	Sept-14-00	Oct-27-00	Jul-16-01
HF3	Hard Fes S01 Fall Edm	Edmonton 2001-02	Jun-5-01	Oct-1-01	Nov-4-01	Jul-16-02
Hard Fescue – Herbicides Applied in the Fall the Year After Seeding						
HF4	Hard Fes E01 Fall Edm	Edmonton 2001-02	Jun-2-00	Oct-1-01	Nov-4-01	Jul-16-02
HF5	Hard Fes E01 Fall Bldg	Beaverlodge 2001-02	May-19-00	Sept-20-01	Oct-30-01	Jul-18-02
HF6	Hard Fes E02 Fall Edm	Edmonton 2002-03	Jun-5-01	Sept-25-02	Oct-9-02	Jul-18-03
Creeping Red Fescue - Herbicides Applied in the Fall the Year of Seeding						
CR1	Cr Red S00 Fall Edm	Edmonton 2000-01	Jun-5-00	Sept-26-00	Oct-11-00	Aug-1-01
CR2	CrRedFes S00 Fall Bldg	Beaverlodge 2000-01	May-5-00	Sept-14-00	Oct-27-00	Jul-23-01
CR3	Cr Red Fes S01 Fall Edm	Edmonton 2001-02	Jun-01-01	Oct-1-01	Nov-4-01	Jul-23-02
CR4	CrRedFes S01 Fall SR	Spirit River 2001-02	May-15-01	Aug-16-01		Jul-26-02
CR5	CRF E03Fall Bldg	Beaverlodge 2002-03	May-31-02	Sept-14-02		Jul-21-03
Creeping Red Fescue – Herbicides Applied in the Fall the Year After Seeding						
CR6	CRF Fall Hines Ck	Hines Creek 2000-01	Oct-17-99	Aug-23-00		No harvest
CR7	CRF Fall Falher	Falher 2000-01	Oct-15-99	Sept-14-00		No harvest
CR8	Cr Red Fes E01 Fall Edm	Edmonton 2001-02	Jun-5-00	Oct-1-01	Nov-4-01	Jul-23-02
CR9	Cr Red Fes E01 Fall Bldg	Beaverlodge 2001-02	May-19-00	Sept-20-01	Oct-30-01	Jul-27-02
CR10	Cr Red Fes E02 Fall Edm	Edmonton 2002-03	Jun-1-01	Sept-25-02	Oct-16-02	Jul-28-03
Tall Fescue – Herbicides Applied in the Fall the Year of Seeding						
TF1	TF S00 Fall BK	Brooks 2000-01	May-16-00	Sept-11-00	Oct-23-00	Jul-19-01
TF2	Tall S00 Fall Edm	Edmonton 2000-01	Jun-5-00	Sept-26-00	Oct-11-00	Winter kill

TF3	Tall Fes S00 Fall Bldg	Beaverlodge 2000-01	May-5-00	Sept-14-00	Oct-27-00	Aug-13-01
TF4	Tall Fes Fall S01 BK	Brooks 2001-02	May-9-01	Sept-11-01	Oct-30-01	Jul-26-02
TF5	Tall Fes S01 Fall Edm	Edmonton 2001-02	Jun-1-01	Oct-1-01	Nov-4-01	Aug-21-02
TF6	Tall Fes S01 Fall Bldg	Beaverlodge 2001-02	May-22-01	Sept-20-01	Oct-30-01	Aug-9-02

Tall Fescue – Herbicides Applied in the Fall the Year After Seeding

TF7	Tall Fes Fall E00 BK	Brooks 2001-02	May-16-00	Sept-11-01	Oct-30-01	Jul-26-02
TF8	Tall Fes E01 Fall Edm	Edmonton 2001-02	Jun-5-00	Oct-1-01	Nov-4-01	Aug-23-02
TF9	Tall Fes E01 Fall Bldg	Beaverlodge 2001-02	May-8-00	Sept-20-01	Oct-30-01	Aug-7-02
TF10	TF E02 Fall BK	Brooks 2002-03	May-9-01	Sept-10-02	Nov-5-02	Jul-17-03
TF11	Tall Fes E02 Fall Edm	Edmonton 2002-03	Jun-1-01	Sept-25-02	Oct-16-02	Aug-6-03

Timothy – Herbicides Applied in the Fall the Year of Seeding

TI1	Timothy S00 Fall Edm	Edmonton 2000-01	Jun-5-00	Sept-26-00	Oct-11-00	Aug-9-01
TI2	Tim S00 Fall Bldg	Beaverlodge 2000-01	May-19-00	Sept-14-00	Oct-27-00	Aug-20-01
TI3	Tim S01 Fall Edm	Edmonton 2001-02	Jun-5-01	Oct-1-01	Nov-4-01	Aug-1-02
TI4	Timothy S01 Fall Bldg	Beaverlodge 2001-02	May-17-01	Sept-20-01	Oct-30-01	Aug-12-02

Timothy – Herbicides Applied in the Fall the Year After Seeding

TI5	Tim E01 Fall Edm	Edmonton 2001-02	Jun-5-00	Oct-1-01	Nov-4-01	Aug-1-02
TI6	Timothy E01 Fall Bldg	Beaverlodge 2001-02	May-19-00	Sept-20-01	Oct-30-01	Aug-16-02
TI7	Tim E02 Fall Edm	Edmonton 2002-03	Jun-5-01	Sept-25-02	Oct-9-02	Aug-6-03
TI8	Tim E03 Fall Bldg	Beaverlodge 2002-03	May-17-01	Sept-14-02		Aug-5-03

Perennial Ryegrass – Herbicides Applied in the Fall the Year of Seeding

PR1	PR S00 Fall BK	Brooks 2000-01	May-16-00	Sept-11-00	Oct-23-00	Jul-23-01
PR2	PerRyegrass S00 Fall Edm	Edmonton 2000-01	Jun-5-00	Sept-26-00	Oct-11-00	Winter kill
PR3	PerRye S00 Fall Bldg	Beaverlodge 2000-01	May-19-00	Sept-14-00	Oct-27-00	Aug-13-01
PR4	PR Fall S01 BK	Brooks 2001-02	May-9-01	Sept-11-01	Oct-30-01	Jul-29-02
PR5	Per Rye S01 Fall Edm	Edmonton 2001-02	Jun-8-01	Oct-1-01	Nov-4-01	Aug-26-02
PR6	PerRyegrass S01 Fall Bldg	Beaverlodge 2001-02	May-17-01	Sept-20-01	Oct-30-01	Aug-14-02

Perennial Ryegrass – Herbicides Applied in the Fall the Year After Seeding

PR7	Per Rye E02 Fall Edm	Edmonton 2002-03	Jun-8-01	Sept-25-02	Oct-9-02	Aug-21-03
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RESULTS AND DISCUSSION

Herbicide tolerance data was collected from 58 grass seed experiments established in Alberta in 2000 and 2001 on 8 different grass seed crops and seed yield data was collected from 53 of the 58 experiments. Weed control information was collected from 14 of these experiments.

Tolerance of Grasses to Fall Applied Herbicides

Kentucky Bluegrass

- When applied in the fall, Curtail M and Karmex did not cause a height reduction, stand reduction, visible injury or a seed yield reduction to the relatively sensitive Kentucky bluegrass in any of the 8 experiments. (Tables 3-10, Figures 1 & 2)
- Banvel + 2,4-D and Ally only caused a seed yield reduction when applied in the fall to a first year Kentucky bluegrass stand at Bow Island. (Table 3, Figure 1)
- The fall application of Beacon resulted in a leaf yellowing and a seed yield reduction in two of the four first year stand applications. (Tables 3-6, Figure 1)
- The second year Kentucky bluegrass stands appeared to be more tolerant to the fall applied herbicides, as Banvel + 2,4-D, Ally and Beacon did not cause a seed yield

reduction when applied to second year stands as compared to stands sprayed in the year of seeding. (Tables 7-10, Figure 2)

- The pre-emergent herbicides, Princep Nine-T and Sencor + Goal, caused initial yellowing and a significant seed yield reduction at both locations, at both first year and second year stands. (Tables 3-10, Figures 1 & 2)

Meadow Bromegrass

- Fall applied Banvel + 2,4-D, Prestige, Curtail M + Accord, Ally, Ally + 2,4-D, Princep Nine-T, Dual Magnum, Karmex and Avadex MicroActiv did not result in visible injury or a meadow bromegrass seed yield reduction. (Tables 11-13, Figures 3 & 4)
- Sundance + 2,4-D caused noticeable stunting and thinning of meadow bromegrass as well as a significant seed yield reduction when applied in the year of seeding. (Table 11, Figure 3)

Chewings Fescue

- Only Prestige and Ally did not cause noticeable injury or a seed yield reduction when applied to chewings fescue in the fall in any of the four experiments. (Tables 14-17, Figures 5 & 6)
- Even though Banvel + 2,4-D, Princep Nine-T, Sencor, Aatrex Nine-0 and Karmex did not cause much visible injury to chewings fescue, they all caused a significant seed yield reduction when applied in the fall of 2000 and 2002 under very dry conditions. There were reduced number of seed stalks at harvest time where Sencor, Aatrex Nine-0 and Karmex where applied. (Tables 14-17, Figures 5 & 6)
- There tended to be lower seed yields in the first year fall sprayed stands than in the second year fall sprayed stands. (Tables 14-17, Figures 5 & 6)
- Princep Nine-T only affected seed yield when fall applied to the first year stand that was under very dry conditions, while the more established stands were not affected. (Tables 14-17, Figures 5 & 6)

Hard Fescue

- Hard fescue did not have a significant seed yield reduction when sprayed in the fall, either the year of seeding or the year after seeding, with Banvel + 2,4-D, Prestige, Ally, Ally + Accord, Curtail M + Accord, Unity, Goal, Sencor + Goal, Princep Nine-T or Treflan. (Tables 19-24, Figures 7 & 8)
- Although the Sencor + Goal caused noticeable yellowing of the stand, the hard fescue recovered prior to harvest and this initial injury did not result in a significant seed yield reduction. (Tables 20, 22, 23, 24, Figures 7 & 8)
- Sundance + 2,4-D severely stunted and reduced the number of seed stalks resulting in a significant seed yield reduction in three of the four hard fescue experiments sprayed with this herbicide tank mix. (Tables 19, 20, 22, 23, Figures 7 & 8)
- Dual II Magnum caused a significant seed yield reduction when applied in the fall of the year of seeding at Beaverlodge. (Table 20, Figure 7)

- The seed yields are lower in the experiments where the herbicides were applied in the fall the year of seeding as compared to the fall the year after seeding. (Figures 7 & 8)

Creeping Red Fescue

- Fall applied Banvel + 2,4-D, Prestige, Ally, Ally + Accord, Unity, Princep Nine-T and Goal did not result in a significant creeping red fescue seed yield reduction. (Tables 25-34, Figures 9 & 10)
- Although there was some visible thinning and lower yields of creeping red fescue from fall applied Banvel + 2,4-D and Ally + Accord, there was not a significant seed yield reduction in any of the trials. (Tables 24 & 25, Figures 9 & 10)
- Although there was not noticeable injury, fall application of Curtail M + Accord caused significant reduced seed yields when harvested the following year in two of the eight trials conducted. (Tables 28 & 33, Figures 9 & 10)
- Sencor stunted creeping red fescue the year following application and significantly reduced seed yields in the one trial at Beaverlodge. (Table 26, Figure 9)

Tall Fescue

- Tall fescue was tolerant to fall applied Banvel + 2,4-D, Prestige, Curtail M + Accord, Ally, Princep Nine-T, Karmex, Aatrex Nine-0 and Sencor, when these herbicides were applied in the fall of the year of seeding or in the fall the year after seeding. (Tables 35-45, Figures 11 & 12)
- Although Ally caused stunting of tall fescue in the fall after spraying and in the early spring, there was not a significant seed yield reduction. (Tables 37, 38, 42, Figures 11 & 12)
- Sencor + Goal visibly affected tall fescue and resulted in a significant seed yield reduction in the one trial at Brooks when the Sencor + Goal was applied in the fall of the year of seeding. (Table 35, Figure 11)
- Very few seed heads were produced in the Sundance + 2,4-D treatment, resulting in a significant seed yield loss in all four trials(Figures 11 & 12). There was over a 50% loss of stand at Brooks. (Table 38)

Timothy

- Banvel + 2,4-D, Prestige, Curtail M + Accord, Ally, Ally + Accord, Princep Nine-T, Sencor, Avadex MicroActiv and Sundance + 2,4-D did not cause a significant seed yield reduction when fall applied at Edmonton or Beaverlodge. Some of the treatments had lower yields but the variability most likely accounted for the lack of a significant seed yield loss from the Sundance + 2,4-D ester and Banvel + 2,4-D amine treatments. (Tables 46-53, Figures 13 & 14)
- The timothy sprayed with Princep Nine-T in the fall of the year of seeding at Beaverlodge was noticeably stunted the following spring but no seed was harvested in August due to flood damage. (Table 47)

- Although Sundance + 2,4-D caused stunting and delay of timothy in all three trials where it was fall applied, it did not translate into a significant seed yield loss, with the timothy mainly recovering by harvest time. (Tables 46, 50, 51, Figures 13 & 14)
- Relative to the untreated check plots, the herbicide treatments applied in the fall the year after seeding tended to have higher yields than the treatments applied in the fall of the year of seeding. The younger timothy may be more sensitive to fall herbicide application. (Figures 13 & 14)

Perennial Ryegrass

- Perennial ryegrass was not noticeably damaged or had a significant seed yield reduction when Prestige, Curtail M or Nortron were fall applied. In fact, the one year old perennial ryegrass sprayed with Prestige in the fall at Edmonton had a significant seed yield increase over the check treatment due to the effective weed control. (Tables 54-60, Figures 15 & 16)
- Banvel + 2,4-D and Karmex treatments caused a significant seed yield reduction in one out of six trials conducted. These seed yield reductions were at Beaverlodge for both treatments. (Table 56, Figure 15)
- Princep Nine-T caused a significantly reduced seed yield in two of six trials, both at Brooks. It also caused an initial yellowing of perennial ryegrass in the Edmonton trials. (Tables 54, 57, Figure 15)
- Ally, Sencor + Goal and Aatrex Nine-0 all caused a significant seed yield reduction in three out of four trials. Ally severely stunted the perennial ryegrass while Sencor + Goal and Aatrex Nine-0 reduced the stand density and stunted the perennial ryegrass. (Tables 56-58, Figure 15)

Weed Control with Fall Applied Herbicides

Annual Weeds

- Wild oat was suppressed the following summer by the fall applied pre-emergent herbicides Nortron and Princep Nine-T, through soil uptake, in the 2002-03 perennial ryegrass trial near Edmonton. (Table 74)

Winter Annual Weeds

- Cleavers was controlled in the fall soon after spraying by the post-emergent herbicides Prestige, Curtail M + Accord, Ally + Accord and Unity, through foliar uptake, in the 2000-01 and 2002-03 trials at Spirit River. The post-emergent herbicide tank mix Banvel + 2,4-D provided suppression. (Tables 62 & 65). It may not always pay to spray for cleavers control in the fall as they may not grow in the fall as a winter annual or germinate and grow in the spring as an annual. Several trials were established in fields with high populations of cleavers to find that the cleavers did not grow the following spring, even in the unsprayed check plots.
- Shepherd's-purse was controlled the following spring by the pre-emergent herbicides Sencor + Goal and Aatrex Nine-0, through soil uptake, while two other pre-emergent herbicides, Princep Nine-T and Karmex, provided inconsistent control in trials at

- Edmonton. The fall applied post-emergent herbicides did not affect the growth of shepherd's-purse the following spring or summer. (Tables 68, 72, 74)
- Narrow-leaved hawk's-beard was controlled into the following spring and summer by the fall applied post-emergent herbicides Banvel + 2,4-D, Prestige, Curtail M + Accord, Ally, Ally + Accord and Unity at Spirit River, Falher and Edmonton. However, in two other trials at Edmonton, where there was some winterkill of the grass, the post-emergent herbicides did not control the narrow-leaved hawk's-beard into the following summer as effectively, especially Banvel + 2,4-D. The narrow-leaved hawk's-beard most likely grew from seed again in the spring with the lack of crop competition in these two trials. The pre-emergent herbicides, which mainly work through uptake from the soil, provided some long term control of narrow-leaved hawk's-beard even where there was poor crop competition. Sencor + Goal provided good control while Sundance + 2,4-D, Karmex, Princep Nine-T and Aatrex Nine-0 provided fair to good suppression into July and August. (Tables 65, 66, 69, 72 & 74)

Perennial Weeds

- Dandelion was controlled well into the following summer by the fall applied post-emergent herbicides Banvel + 2,4-D, Prestige, Curtail M + Accord, Ally and Ally + Accord in chewings fescue, hard fescue, creeping red fescue and timothy at Edmonton, Spirit River, Falher and Beaverlodge. However, these herbicides did not provide good long-term control of dandelion in the less competitive stands of tall fescue and perennial ryegrass. Only Ally and Ally + Accord provided good control of dandelion in these trials at Edmonton and Beaverlodge while Banvel + 2,4-D, Prestige and Curtail M + Accord provided suppression into July and August of the following summer. The post-emergent herbicide Unity did not control dandelion as well as the other post-emergent herbicides. The only pre-emergent herbicide that controlled dandelion into the following summer was Sundance + 2,4-D, which has some foliar uptake as well. (Tables 61, 63-68 & 70-74)
- Canada thistle was only controlled well into the following summer at Spirit River (Table 62) and Falher (Table 66) by the post-emergent herbicides Prestige and Curtail M + Accord applied on chewings fescue and creeping red fescue. The other post-emergent herbicides applied in the fall at these two locations only provided suppression at Falher and virtually no control at Spirit River by the following summer. The long-term Canada thistle control was not as good in the two trials conducted at Edmonton in less-competitive tall fescue. Prestige and Curtail M + Accord only provided a small amount of suppression into August in the one trial. The pre-emergent herbicides Princep Nine-T, Sencor + Goal and Karmex did not appear to affect Canada thistle the following summer to any extent. (Tables 62, 66, 68 & 70)
- Alsike clover was controlled very well into the following summer by the post-emergent herbicides Banvel + 2,4-D, Prestige, Curtail M + Accord, Ally and Ally + Accord at Spirit River and three trials at Beaverlodge. Unity only provided suppression into the summer and the only pre-emergent herbicide to provide some suppression of alsike clover into the summer was Sundance + 2,4-D. (Tables 65, 67, 71 & 73)

- Common plantain was only present and evaluated in the one trial at Edmonton (Table 68). The post-emergent herbicides Banvel + 2,4-D, Prestige, Curtail M + Accord and Ally all provided excellent control of common plantain in June of the year following the fall application. The pre-emergent herbicides Princep Nine-T, Sencor + Goal and Karmex did not control common plantain the following summer.

CONCLUSIONS

There are several herbicides that have the potential to be applied in the fall for weed control in grass seed crops grown in Alberta. Post-emergently applied Ally, with some residual weed control, can be sprayed in the fall on meadow bromegrass, chewings fescue, hard fescue, creeping red fescue, tall fescue and timothy to provide control of some of the major weed problems affecting grass seed production. The weeds controlled include dandelion, narrow-leaved hawk's-beard, alsike clover, common plantain and scentless chamomile at an approximate cost of \$6.00 per acre.

The post-emergently applied herbicides Prestige and Curtail M can be sprayed in the fall to control emerged broad-leaved weeds without injuring meadow bromegrass, chewings fescue, hard fescue, creeping red fescue, tall fescue, timothy, Kentucky bluegrass and perennial ryegrass when under good growing conditions. These herbicides can effectively control narrow-leaved hawk's-beard, alsike clover as well as suppress Canada thistle, dandelion, common plantain, scentless chamomile and perennial sow-thistle. Fall application of Prestige or Curtail M has not provided consistent control of Canada thistle in several trials.

Fall post-emergently applied Banvel + 2,4-D controls emerged narrow-leaved hawk's-beard, dandelion, alsike clover and common plantain but this tank mix tends to cause more injury to year of seeding Kentucky bluegrass, chewings fescue, timothy and perennial ryegrass, especially when the crop is under drought stress.

Unfortunately, Accord, a good cleavers controlling herbicide, is no longer available. Unity did not provide as good control of dandelion and alsike clover as Ally, Prestige and Curtail M and soon may no longer be available in western Canada.

The pre-emergent herbicides that were applied in the fall to obtain long term control of weeds into the following season were generally not successful. Although some of them controlled germinating annual weeds the following spring in these trials, annual weeds are usually not a problem in established grass seed crops. They can become a problem in poorly established grass seed stands or when the grass growth has been suppressed by a harsh winter, disease or insect problem. Also, the pre-emergent herbicides tend to have little to no effect on perennial weeds, which often are the main weeds of concern in established grass seed crops.

The pre-emergently applied herbicide Princep Nine-T can be applied late in the fall to suppress the emergence of wild oats, barnyard grass, alsike clover and other germinating weeds the following spring without injuring meadow bromegrass, chewings fescue, hard fescue, creeping red fescue, tall fescue, timothy or one year old perennial ryegrass. The only experiments where Princep Nine-T caused damage to grass seed crops were in southern Alberta (Brooks and Bow Island) with lower organic matter soil. It may be safer to use on grass seed in central and northern Alberta but the weed control may not

be as effective if the higher organic matter ties up the Princep Nine-T. Unfortunately, wild oats did not grow well in the trial areas because of the dry conditions, so it was difficult to assess wild oat control with the pre-emergent herbicides like Princep Nine-T.

The pre-emergently applied tank mix of Sencor + Goal may provide an option for the control of the winter annual weeds shepherd's-purse, stinkweed, flixweed, narrow-leaved hawk's-beard and downy brome in one or two year old hard fescue and two year old tall fescue. However, Sencor + Goal may cause injury and a significant seed yield reduction when fall applied to Kentucky bluegrass, perennial ryegrass and one year old tall fescue.

Pre-emergently applied Aatrex Nine-0 may have potential in controlling germinating shepherd's-purse and other winter annual and annual weeds the following spring in tall fescue.

Pre-emergently applied Karmex does not appear to damage Kentucky bluegrass, meadow bromegrass, tall fescue or second year perennial ryegrass but it did not provide effective control of any of the broad-leaved or grassy weeds in these trials. Fall applied Karmex may have potential in other locations in controlling germinating and emerging weeds.

Fall pre-emergently applied Nortron may have potential for the control of weeds like wild oats, barnyard grass and volunteer cereals in established perennial ryegrass but it is very costly.

The results from these experiments indicate that Sundance + 2,4-D, even when late fall applied to more or less dormant grass seed crops, can be very injurious to these crops and cause significant seed yield losses. This is unfortunate, as Sundance may be one of the more effective herbicides for the control of foxtail barley.

While Ally can be safely fall applied to six of the grass seed crops, it can cause stunting and significant seed yield reductions to Kentucky bluegrass and perennial ryegrass.

Fall application of herbicides in the year after seeding tends to be safer on the crop than fall application in the year of seeding. This is especially evident with the more sensitive grass species, Kentucky bluegrass and perennial ryegrass. Ally, Banvel + 2,4-D and Beacon applied in the fall of the year of seeding Kentucky bluegrass caused a significant seed yield reduction but not when applied in the fall of the year after seeding. Likewise, Banvel + 2,4-D caused a significant seed yield reduction when applied to perennial ryegrass in the fall of the year of seeding as compared to application in the fall of the year after seeding.

Fall spraying is a practical and effective means of managing weeds in grass seed crops. A number of the more difficult to control winter annual, biennial and perennial weeds such as dandelion, narrow-leaved hawk's-beard, volunteer alsike clover, rough cinquefoil, cleavers, stork's-bill, flixweed and downy brome tend to be more susceptible to herbicides in the fall than at other times of the year.

Fall spraying also provides more crop safety than spring or summer spraying of herbicides such as Ally. Spring or summer spraying of Ally on a number of grass seed crops typically stunts the growth of the crop and may cause reduced seed head size, resulting in reduced seed production. Application of Ally in the fall usually does not result in long-term injury or reduced seed yields to grass seed crops such as timothy.

IMPLICATIONS AND RECOMMENDATIONS

Grass seed and timothy hay growers in western Canada are already using this fall spraying information as it provides a safe, effective means of controlling problem weeds in their crops. The fall application of Ally is being demonstrated in the Peace region by Northern Forage and Enterprises Macay on timothy hay being grown for the overseas market as well as by several grass seed growers in Alberta and B.C.

The information developed from this project on the effectiveness of fall applied Ally spawned a successfully funded ACIDF/CARD project on determining and demonstrating the optimum timing for fall application of Ally on established timothy, meadow bromegrass and hybrid bromegrass in central and northern Alberta. This project will be conducted over the next three years and will provide additional data for Minor Use registrations as well as extension of the information developed.

As several of the treatments look promising, the seed yield data collected will be useful in obtaining Minor Use registrations. The Pest Management Regulatory Agency in Ottawa is requiring yield information in the Canadian Weed Science Society (CWSS) Research Report format in order to consider adding a grass seed or forage crop to a herbicide label. The 58 research reports being submitted to CWSS are included in the appendix of this final report. The addition of meadow bromegrass, chewings fescue, hard fescue, creeping red fescue, tall fescue and timothy to the Ally label for fall application is especially of interest to the growers and the data collected in this project will be useful in meeting this objective.

There is also interest in adding all eight of these grasses to the Prestige and Curtail M labels, especially to the growers who have a Canada thistle or perennial sow-thistle problem. If the Canada thistle or perennial sow-thistle is actively growing in the fall, these herbicides can provide long-term control. Prestige also provides management of fall growing cleavers.

Several of the herbicides in this project were only included in a couple of the experiments and are not typically used on grass seed crops in Canada as they are not even available here. They were included because they are used in the U.S. for managing weeds in grass seed crops, where grass seed production tends to be more intensive than in Canada. Weed efficacy information should be investigated further to determine the potential usefulness of the herbicides Princep Nine-T, Sencor, Goal, Aatrex Nine-0, Karmex, Dual Magnum, Nortron and Beacon in grass seed weed management, possibly when seeding a grass seed stand. They are typically pre-emergently applied and control weeds via soil uptake, except for the post-emergently applied Beacon. More weed control information is needed for western Canadian conditions with the use of these herbicides.

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TABLES AND FIGURES

Forage Tolerance with Fall Applied Herbicides

Table 3. Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year of Seeding - Bow Island 2000-01 (Expt. #KB1)

Herbicide	Plant Height cm	Seed Yield	
		kg/ha	% of Check
Check	25	997	100
Banvel + 2,4-D	22	796	80
Curtail M	23	925	93
Ally	22	699	70
Beacon	18	330	33
Princep Nine-T*	22	587	59
Sencor + Goal*	22	628	63
Karmex*	25	922	92
LSD (P=.05)	3.1	122.4	

*Pre-emergent herbicide.

Table 4. Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year of Seeding - Brooks 2000-01 (Expt. #KB2)

Herbicide	Plant Height cm	Seed Yield	
		kg/ha	% of Check
Check	65	1261	100
Banvel + 2,4-D	66	1205	96
Curtail M	61	1264	100
Ally	64	1290	102
Beacon	63	1301	103
Princep Nine-T*	58	736	58
Sencor + Goal*	61	897	71
Karmex*	64	1155	92
LSD (P=.05)	NS	216.3	

*Pre-emergent herbicide.

Table 5. Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year of Seeding - Bow Island 2001-02 (Expt. #KB3)

Herbicide	Stand Density %	Plant Height cm	Seed Yield	
			kg/ha	% of Check
Check	75	75	1436	100
Banvel + 2,4-D	73	75	1332	93
Curtail M	73	72	1348	94
Ally	80	76	1387	97
Beacon	80	69	1028	72
Princep Nine-T*	68	69	880	61
Sencor + Goal*	70	72	1091	76
Karmex*	78	76	1248	87
LSD (P=.05)		NS	118.4	

*Pre-emergent herbicide.

Table 6. Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year of Seeding – Brooks 2001-02 (Expt. #KB4)

Herbicide	Plant Height cm	Seed Yield	
		kg/ha	% of Check
Check	70	782	100
Banvel + 2,4-D	69	930	119
Curtail M	70	829	106
Ally	69	784	100
Beacon	68	770	98
Princep Nine-T*	66	574	73
Sencor + Goal*	65	566	72
Karmex*	70	785	100
LSD (P=.05)	NS	179.9	

*Pre-emergent herbicide.

Table 7. Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year After Seeding - Bow Island 2001-02 (Expt. #KB5)

Herbicide	% Visual Injury Jun-04-02	Plant Height cm	Seed Yield	
			kg/ha	% of Check
Check	0	66	1007	100
Banvel + 2,4-D	0	65	1089	108
Curtail M	0	63	981	97
Ally	0	65	1033	103
Beacon	0	61	980	97
Princep Nine-T*	0	61	714	71
Sencor + Goal*	0	63	877	87
Karmex*	0	67	942	94
LSD (P=.05)		NS	170.2	

*Pre-emergent herbicide.

Table 8. Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year After Seeding - Brooks 2001-02 (Expt. #KB6)

Herbicide	Plant Height cm	Seed Yield	
		kg/ha	% of Check
Check	63	1103	100
Banvel + 2,4-D	65	1030	93
Curtail M	65	1051	95
Ally	63	980	89
Beacon	64	1036	94
Princep Nine-T*	62	838	76
Sencor + Goal*	61	784	71
Karmex*	61	972	88
LSD (P=.05)	NS	182.2	

*Pre-emergent herbicide.

Table 9. Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year After Seeding - Bow Island 2002-03 (Expt. #KB7)

Herbicide	% Visual Injury		Plant Height cm	Seed Yield	
	May-05-03	Jul-16-03		kg/ha	% of Check
Check	0	0	72	1045	100
Banvel + 2,4-D	0	0	70	1079	103
Curtail M	0	0	68	944	90
Ally	0	0	69	1103	106
Beacon	0	0	63	1154	110
Princep Nine-T*	0	20	60	714	68
Sencor + Goal*	40	20	61	691	66
Karmex*	0	0	72	1093	105
LSD (P=.05)			4.7	152.6	

*Pre-emergent herbicide.

Table 10. Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year After Seeding - Brooks 2002-03 (Expt. #KB8)

Herbicide	% Visual Injury			Plant Height cm	Seed Yield	
	May-05-03	May-31-03	Jun-09-03		kg/ha	% of Check
Check	0	0	0	64	1041	100
Banvel + 2,4-D	0	0	0	63	1020	98
Curtail M	0	0	0	60	997	96
Ally	0	0	0	65	939	90
Beacon	0	0	0	63	969	93
Princep Nine-T*	5	5	5	56	648	62
Sencor + Goal*	50	20	5	61	728	70
Karmex*	0	0	5	62	1000	96
LSD (P=.05)				NS	163.1	

*Pre-emergent herbicide.

Table 11. Tolerance of Meadow Bromegrass to Herbicides Applied in the Fall the Year of Seeding – Edmonton 2001-02 (Expt. #MB1)

Herbicide	% Visual Injury		Seed Yield	
	May-31-02	Aug-01-02	kg/ha	% of Check
Check	0	0	1179	100
Banvel + 2,4-D	0	0	1159	98
Prestige	0	0	1117	95
Ally	0	0	1099	93
Princep Nine-T + 2,4-D*	0	0	1063	90
Sundance + 2,4-D*	50	38	615	52
Dual II Magnum*	0	0	1097	93
Karmex*	0	0	1075	91
LSD (P=.05)			121.3	

*Pre-emergent herbicide.

Table 12. Tolerance of Meadow Bromegrass to Herbicides Applied in the Fall the Year of Seeding - Beaverlodge 2002-03 (Expt. #MB2)

Herbicide	% Visual Injury				Forage Yield kg/ha	Seed Yield	
	Oct-30-02	May-13-03	Jun-13-03	Jul-29-03		kg/ha	% of Check
Check	0	0	0	0	6386	872	100
Banvel + 2,4-D	0	0	0	0	7541	853	98
Prestige	0	0	0	0	6499	975	112
Curtail M + Accord	0	0	0	0	6708	868	100
Ally	0	0	0	0	7416	951	109
Ally + 2,4-D amine	0	0	0	0	5625	868	100
Check	0	0	0	0	6833	921	106
Check	0	0	0	0	6583	815	93
LSD (P=.05)					NS	NS	

Table 13. Tolerance of Meadow Bromegrass to Herbicides Applied in the Fall the Year After Seeding – Edmonton 2002-03 (Expt. #MB3)

Herbicide	% Visual Injury		Seed Yield	
	May-14-03	Jul-11-03	kg/ha	% of Check
Check	0	0	1915	100
Banvel + 2,4-D	0	0	1800	94
Prestige	0	0	1731	90
Ally	0	0	1742	91
Princep Nine-T + 2,4-D*	0	0	1862	97
Avadex*	0	0	1831	96
Dual II Magnum*	0	0	1825	95
Karmex*	0	0	1927	101
LSD (P=.05)			NS	

*Pre-emergent herbicide.

Table 14. Tolerance of Chewings Fescue to Herbicides Applied in the Fall the Year of Seeding – Edmonton 2000-01 (Expt. #CF1)

Herbicide	% Visual Injury			Seed Yield	
	Oct-23-00	May-16-01	Jul-07-01	kg/ha	% of Check
Check	0	0	0	203	100
Banvel + 2,4-D	3	0	4	134	66
Prestige	0	0	0	168	83
Ally	5	0	0	195	96
Princep Nine-T + 2,4-D*	1	0	3	139	68
Sencor*	0	0	24	85	42
Aatrex Nine-0*	0	0	18	124	61
Karmex*	0	0	18	104	51
LSD (P=.05)				31.17	

*Pre-emergent herbicide.

Table 15. Tolerance of Chewings Fescue to Herbicides Applied in the Fall the Year of Seeding – Edmonton 2001-02 (Expt. #CF2)

Herbicide	% Visual Injury		Seed Yield	
	May-31-02	Jul-11-02	kg/ha	% of Check
Check	0	0	468	100
Banvel + 2,4-D	0	0	342	73
Prestige	0	0	416	89
Ally	0	0	384	82
Princep Nine-T + 2,4-D*	0	0	401	86
Sencor*	0	0	408	87
Aatrex Nine-0*	0	0	451	96
Karmex*	0	0	433	93
LSD (P=.05)			72.6	

*Pre-emergent herbicide.

Table 16. Tolerance of Chewings Fescue to Herbicides Applied in the Fall the Year After Seeding - Edmonton 2001-02 (Expt. #CF3)

Herbicide	% Visual Injury		Seed Yield	
	May-31-02	Jul-11-02	kg/ha	% of Check
Check	0	0	148	100
Banvel + 2,4-D	0	0	116	78
Prestige	0	0	132	89
Ally	0	0	182	123
Princep Nine-T + 2,4-D*	0	0	156	105
Sencor*	0	0	147	99
Aatrex Nine-0*	0	0	166	112
Karmex*	0	0	199	134
LSD (P=.05)			NS	

*Pre-emergent herbicide.

Table 17. Tolerance of Chewings Fescue to Herbicides Applied in the Fall the Year After Seeding - Edmonton 2002-03 (Expt. #CF4)

Herbicide	% Visual Injury		Seed Yield	
	May-14-03	Jul-11-03	kg/ha	% of Check
Check	0	0	246	100
Banvel + 2,4-D	0	20	146	59
Prestige	0	0	229	93
Ally	0	0	236	96
Princep Nine-T + 2,4-D*	0	0	213	87
Sencor*	15	0	182	74
Aatrex Nine-0*	21	5	168	68
Karmex*	15	3	185	75
LSD (P=.05)			45.8	

*Pre-emergent herbicide.

Table 18. Tolerance of Chewings Fescue to Herbicides Applied in the Fall the Year After Seeding - Spirit River 2002-03 (Expt. #CF5)

Herbicide	% Visual Injury		Seed Yield	
	Oct-5-02	Jun-25-03	kg/ha	% of Check
Check	0	0		Not harvested
Banvel + 2,4-D	0	0		
Prestige	0	0		
Curtail M + Accord	0	0		
Ally	0	0		
Ally + Accord	0	0		
Unity	0	0		
LSD (P=.05)				

Table 19. Tolerance of Hard Fescue to Herbicides Applied in the Fall the Year of Seeding – Edmonton 2000-01 (Expt. #HF1)

Herbicide	% Visual Injury			Seed Yield	
	Oct-23-00	May-16-01	Jul-07-01	kg/ha	% of Check
Check	0	0	0	156	100
Banvel + 2,4-D	0	0	0	150	96
Prestige	0	0	0	144	92
Ally	0	0	0	164	105
Sundance + 2,4-D*	5	0	23	121	78
Dual II Magnum*	0	0	5	143	92
Goal*	0	0	0	159	102
Sencor + Goal*	0	0	0	162	104
LSD (P=.05)					NS

*Pre-emergent herbicide.

Table 20. Tolerance of Hard Fescue to Herbicides Applied in the Fall the Year of Seeding – Beaverlodge 2000-01 (Expt. #HF2)

Herbicide	% Visual Injury			Forage Yield kg/ha	Seed Yield	
	Oct-27-00	May-15-01	Jun-19-01		kg/ha	% of Check
Check	0	0	0	3792	330	100
Banvel + 2,4-D	0	3	0	3625	317	96
Prestige	0	0	0	2958	339	103
Ally	0	4	4	2958	330	100
Sundance + 2,4-D*	65	65	104	14	4	
Dual II Magnum*	34	43	917	163	49	
Goal*	0	0	2813	335	102	
Sencor + Goal*	35	34	2146	339	103	
Curtail M + Accord	0	0	3271	319	97	
Ally + Accord	0	0	3084	304	92	
Unity	0	0	3375	327	99	
Princep Nine-T*	0	0	2563	322	98	
LSD (P=.05)					1153.3	43.5

*Pre-emergent herbicide.

Table 21. Tolerance of Hard Fescue to Herbicides Applied in the Fall the Year of Seeding – Edmonton 2001-02 (Expt. #HF3)

Herbicide	% Visual Injury		Seed Yield	
	May-31-02	Jul-11-02	kg/ha	% of Check
Check	0	0	179	100
Banvel + 2,4-D	0	0	151	84
Prestige	0	0	147	82
Ally	0	0	146	82
Ally + Accord	0	0	159	89
Curtail M + Accord	0	0	142	79
Goal*	0	0	123	69
Princep Nine-T*	0	0	164	92
LSD (P=.05)			NS	

*Pre-emergent herbicide.

Table 22. Tolerance of Hard Fescue to Herbicides Applied in the Fall the Year After Seeding – Edmonton 2001-02 (Expt. #HF4)

Herbicide	% Visual Injury		Seed Yield	
	May-31-02	Jul-11-02	kg/ha	% of Check
Check	0	0	242	100
Banvel + 2,4-D	0	0	268	111
Prestige	0	0	278	115
Ally	0	0	307	127
Sundance + 2,4-D*	80	66	4	2
Dual II Magnum*	0	0	253	105
Goal*	0	0	254	105
Sencor + Goal*	13	6	238	98
LSD (P=.05)			84.1	

*Pre-emergent herbicide.

Table 23. Tolerance of Hard Fescue to Herbicides Applied in the Fall the Year After Seeding - Beaverlodge 2001-02 (Expt. #HF5)

Herbicide	% Visual Injury				Seed Yield	
	Oct-30-01	May-17-02	Jun-10-02	Jul-17-02	kg/ha	% of Check
Check	0	0	0	0	216	100
Banvel + 2,4-D	0	0	0	4	226	105
Prestige	0	0	0	0	289	134
Curtail M + Accord	0	0	0	0	278	129
Ally	0	0	0	0	211	98
Ally + Accord	0	0	0	0	262	121
Unity	0	0	0	0	302	140
Sundance + 2,4-D*		34	60	78	0	0
Dual II Magnum*		0	0	0	297	138
Goal*		6	0	0	262	121
Sencor + Goal*		25	0	0	264	122
Princep Nine-T*		0	0	1	292	135
LSD (P=.05)					102.3	

*Pre-emergent herbicide.

Table 24. Tolerance of Hard Fescue to Herbicides Applied in the Fall the Year After Seeding – Edmonton 2002-03 (Expt. #HF6)

Herbicide	% Visual Injury		Seed Yield	
	May-14-03	Jul-11-03	kg/ha	% of Check
Check	0	0	63	100
Banvel + 2,4-D	0	0	51	81
Prestige	0	0	57	90
Ally	0	0	63	100
Treflan*	0	0	72	114
Dual II Magnum*	0	0	60	95
Goal*	0	0	69	110
Sencor + Goal*	24	0	66	105
LSD (P=.05)			NS	

*Pre-emergent herbicide.

Table 25. Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year of Seeding – Edmonton 2000-01 (Expt. #CR1)

Herbicide	% Visual Injury			Seed Yield	
	Oct-23-00	May-16-01	Jul-07-01	kg/ha	% of Check
Check	0	0	0	531	100
Banvel + 2,4-D	0	20	23	446	84
Prestige	0	0	5	478	90
Curtail M + Accord	0	0	11	477	90
Ally	13	0	0	677	127
Ally + Accord	20	0	20	453	85
Unity	0	0	13	527	99
Princep Nine-T*	0	0	3	630	119
LSD (P=.05)				93.5	

*Pre-emergent herbicide.

Table 26. Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year of Seeding – Beaverlodge 2000-01 (Expt. #CR2)

Herbicide	% Visual Injury			Forage Yield kg/ha	Seed Yield	
	Oct-27-00	May-15-01	Jun-19-01		kg/ha	% of Check
Check	0	0	0	3729	737	100
Banvel + 2,4-D	0	0	0	3313	698	95
Prestige	0	0	0	3854	792	107
Curtail M + Accord	0	0	0	3313	675	92
Ally	0	0	0	3646	772	105
Ally + Accord	0	0	0	3500	729	99
Unity	0	0	0	3729	817	111
Princep Nine-T*	0	0	0	3854	823	112
Sencor*		34	20	2885	544	74
Goal*		0	0	3667	728	99
LSD (P=.05)				NS	109.4	

*Pre-emergent herbicide.

Table 27. Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year of Seeding - Edmonton 2001-02 (Expt. #CR3)

Herbicide	% Visual Injury		Seed Yield	
	May-31-02	Jul-11-02	kg/ha	% of Check
Check	0	0	790	100
Banvel + 2,4-D	0	0	717	91
Prestige	0	0	766	97
Curtail M + Accord	0	0	775	98
Ally	0	0	839	106
Ally + Accord	0	0	709	90
Unity	0	0	835	106
Princep Nine-T*	0	0	873	111
LSD (P=.05)			NS	

*Pre-emergent herbicide.

Table 28. Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year of Seeding - Spirit River 2001-02 (Expt. #CR4)

Herbicide	% Visual Injury			Seed Yield	
	Sep-21-01	May-25-02	Jul-09-02	kg/ha	% of Check
Check	0	0	0	878	100
Prestige	0	0	0	894	102
Curtail M + Accord	0	0	0	708	81
Unity	0	0	0	918	105
LSD (P=.05)				131.5	

Table 29. Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year of Seeding – Beaverlodge 2002-03 (Expt. #CR5)

Herbicide	% Visual Injury				Seed Yield	
	Oct-30-02	May-13-03	Jun-13-03	Jul-21-03	kg/ha	% of Check
Check	0	0	0	0	771	100
Banvel + 2,4-D	0	0	0	0	665	86
Prestige	0	0	0	0	649	84
Curtail M + Accord	0	0	0	0	686	89
Ally	0	0	0	0	657	85
Ally + Accord	0	0	0	0	591	77
Unity	0	0	0	0	669	87
LSD (P=.05)					NS	

Table 30. Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year After Seeding - Hines Creek 2000-01 (Expt. #CR6)

Herbicide	% Visual Injury			Seed Yield	
	May-20-01	Jun-20-01	Jul-24-01	kg/ha	% of Check
Check	0	0	0		Not harvested
Banvel + 2,4-D	0	0	0		
Accord	0	0	0		
Unity	0	0	0		
Attain	0	0	0		
Prestige	0	0	0		
Accord 2x	0	0	0		
Unity 2x	0	0	0		
LSD (P=.05)					

Table 31. Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year After Seeding – Falher 2000-01 (Expt. #CR7)

Herbicide	% Visual Injury			Seed Yield	
	May-20-01	Jun-20-01	kg/ha	% of Check	
Check	0	0		Not harvested	
Banvel + 2,4-D	0	0			
Prestige	0	0			
Curtail M + Accord	0	0			
Ally	0	0			
Ally + Accord	0	0			
Unity	0	0			
LSD (P=.05)					

Table 32. Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year After Seeding – Edmonton 2001-02 (Expt. #CR8)

Herbicide	% Visual Injury			Seed Yield	
	May-31-02	Jul-11-02	kg/ha	% of Check	
Check	0	0	224	100	
Banvel + 2,4-D	0	0	151	67	
Prestige	0	0	194	87	
Curtail M + Accord	0	0	164	73	
Ally	0	0	202	90	
Ally + Accord	0	0	228	102	
Unity	0	0	250	112	
Princep Nine-T*	0	0	202	90	
LSD (P=.05)					

*Pre-emergent herbicide.

Table 33. Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year After Seeding – Beaverlodge 2001-02 (Expt. #CR9)

Herbicide	% Visual Injury			Seed Yield	
	Oct-30-01	May-17-02	Jun-10-02	kg/ha	% of Check
Check	0	0	0	581	100
Banvel + 2,4-D	0	0	0	473	81
Prestige	0	0	0	581	100
Curtail M + Accord	0	0	0	314	54
Ally	0	0	0	550	95
Ally + Accord	0	0	0	485	83
Unity	0	0	0	544	94
Princep Nine-T*		0	0	552	95
Sencor*		0	0	493	85
Goal*		0	0	512	88
LSD (P=.05)				156.6	

*Pre-emergent herbicide.

Table 34. Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year After Seeding – Edmonton 2002-03 (Expt. #CR10)

Herbicide	% Visual Injury		Seed Yield	
	May-14-03	Jul-11-03	kg/ha	% of Check
Check	0	0	669	100
Banvel + 2,4-D	0	0	526	79
Prestige	0	0	768	115
Curtail M + Accord	3	0	545	81
Ally	0	0	601	90
Ally + Accord	0	0	560	84
Unity	0	0	601	90
Princep Nine-T*	0	0	646	97
LSD (P=.05)			NS	

*Pre-emergent herbicide.

Table 35. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year of Seeding - Brooks 2000-01 (Expt. #TF1)

Herbicide	% Visual Injury		Plant Height	Seed Yield	
	Spring '01	cm		kg/ha	% of Check
Check	0	89	778	100	
Banvel + 2,4-D	0	84	768	99	
Prestige	0	90	850	109	
Curtail M + Accord	0	91	804	103	
Ally	0	91	809	104	
Princep Nine-T*	25	85	680	87	
Sencor + Goal*	75	85	343	44	
Karmex*	0	89	770	99	
LSD (P=.05)		NS	138.9		

*Pre-emergent herbicide.

Table 36. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year of Seeding – Edmonton 2000-01 (Expt. #TF2)

Herbicide	% Visual Injury					Seed Yield	
	Oct-23-00	May-16-01	Jun-05-01	Jul-07-01	Aug-09-01	kg/ha	% of Check
Check	0	0	0	0	0		Not harvested due to winter kill
Banvel + 2,4-D	0	0	20	0	14		
Prestige	10	0	0	13	10		
Curtail M + Accord	0	0	0	0	0		
Ally	0	0	0	0	0		
Princep Nine-T*	0	0	0	3	0		
Sencor + Goal*	0	0	20	13	15		
Karmex*	0	0	0	5	9		
LSD (P=.05)							

*Pre-emergent herbicide.

Table 37. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year of Seeding - Beaverlodge 2000-01 (Expt. #TF3)

Herbicide	% Visual Injury				Forage Yield kg/ha	Seed Yield	
	Oct-27-00	May-15-01	Jun-19-01	Aug-09-01		kg/ha	% of Check
Check	0	0	0	0	1875	483	100
Banvel + 2,4-D	0	0	0	0	2146	570	118
Prestige	0	0	0	0	2313	636	132
Curtail M + Accord	0	0	0	0	2567	684	142
Ally	30	0	0	0	2146	575	119
Princep Nine-T*	0	0	0	0	2417	661	137
Sencor + Goal*	0	25	15	2188	577	119	
Karmex*	0	0	0	2438	677	140	
Aatrex Nine-0*	0	0	0	2167	574	119	
Sundance + 2,4-D*	70	85	38	591	98	20	
Sencor*	0	0	0	2000	533	110	
LSD (P=.05)							

*Pre-emergent herbicide.

Table 38. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year of Seeding – Brooks 2001-02 (Expt. #TF4)

Herbicide	% Visual Injury		Plant Height cm	Seed Yield	
	Jun-04-02			kg/ha	% of Check
Check	0	98	1623	100	
Banvel + 2,4-D	0	96	1525	94	
Prestige	0	93	1531	94	
Curtail M + Accord	0	91	1596	98	
Ally	10	97	1514	93	
Princep Nine-T*	0	94	1474	91	
Sundance + 2,4-D*	55	74	864	53	
Karmex*	0	93	1573	97	
LSD (P=.05)		9.57	281.6		

*Pre-emergent herbicide.

Table 39. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year of Seeding – Edmonton 2001-02 (Expt. #TF5)

Herbicide	% Visual Injury		Seed Yield	
	May-31-02	Aug-01-02	kg/ha	% of Check
Check	0	0	316	100
Banvel + 2,4-D	0	0	269	85
Prestige	0	0	282	89
Curtail M + Accord	0	0	345	109
Ally	0	0	345	109
Princep Nine-T*	0	4	302	96
Sundance + 2,4-D*	86	78	80	25
Karmex*	0	0	311	98
LSD (P=.05)			124.3	

*Pre-emergent herbicide.

Table 40. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year of Seeding – Beaverlodge 2001-02 (Expt. #TF6)

Herbicide	% Visual Injury				Seed Yield	
	Oct-30-01	May-17-02	Jun-10-02	Aug-07-02	kg/ha	% of Check
Check	0	0	0	0	1865	100
Banvel + 2,4-D	0	0	0	0	1704	91
Prestige	0	0	0	0	1857	100
Curtail M + Accord	0	0	0	0	1672	90
Ally	0	0	0	0	2012	108
Princep Nine-T*		0	0	0	1741	93
Karmex*		0	0	0	1966	105
Aatrex Nine-0*		0	0	0	1723	92
Sencor*		0	0	0	1684	90
LSD (P=.05)					NS	

*Pre-emergent herbicide.

Table 41. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year After Seeding – Brooks 2001-02 (Expt. #TF7)

Herbicide	Plant Height cm	Seed Yield	
		kg/ha	% of Check
Check	89	1159	100
Banvel + 2,4-D	90	1257	108
Prestige	87	1217	105
Curtail M + Accord	90	1485	128
Ally	88	1257	108
Princep Nine-T*	85	1111	96
Sencor + Goal*	86	1248	108
Karmex*	82	1169	101
LSD (P=.05)	NS	NS	

*Pre-emergent herbicide.

Table 42. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year After Seeding – Edmonton 2001-02 (Expt. #TF8)

Herbicide	% Visual Injury		Seed Yield	
	May-31-02	Aug-07-02	kg/ha	% of Check
Check	0	0	293	100
Banvel + 2,4-D	0	3	366	125
Prestige	0	8	334	114
Curtail M + Accord	0	0	327	112
Ally	10	2	391	133
Princep Nine-T*	0	4	401	137
Sencor + Goal*	0	0	422	144
Karmex*	6	10	340	116
LSD (P=.05)			NS	

*Pre-emergent herbicide.

Table 43. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year After Seeding – Beaverlodge 2001-02 (Expt. #TF9)

Herbicide	% Visual Injury				Seed Yield	
	Oct-30-01	May-17-02	Jun-10-02	Aug-07-02	kg/ha	% of Check
Check	0	0	0	0	607	100
Banvel + 2,4-D	0	0	0	0	676	111
Prestige	0	0	0	0	716	118
Curtail M + Accord	0	0	0	0	671	111
Ally	0	0	0	0	673	111
Princep Nine-T*		0	0	0	663	109
Sencor + Goal*		0	0	0	701	115
Karmex*		0	0	0	640	105
Aatrex Nine-0*		0	0	0	723	119
Sundance + 2,4-D*		47	77	65	443	73
Sencor*		0	0	0	648	107
LSD (P=.05)					101.2	

*Pre-emergent herbicide.

Table 44. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year After Seeding – Brooks 2002-03 (Expt. #TF10)

Herbicide	Plant Height	Seed Yield	
		kg/ha	% of Check
Check	94	1072	100
Banvel + 2,4-D	90	1048	98
Prestige	93	1114	104
Curtail M + Accord	88	1084	101
Ally	94	1085	101
Princep Nine-T*	92	1088	101
Sencor + Goal*	90	1028	96
Karmex*	88	1093	102
LSD (P=.05)	NS	NS	

*Pre-emergent herbicide.

Table 45. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year After Seeding – Edmonton 2002-03 (Expt. #TF11)

Herbicide	% Visual Injury		Seed Yield	
	May-14-03	Jul-11-03	kg/ha	% of Check
Check	0	0	465	100
Banvel + 2,4-D	0	0	668	144
Prestige	0	0	610	131
Curtail M + Accord	0	0	655	141
Ally	0	0	642	138
Princep Nine-T*	0	0	468	101
Sencor + Goal*	0	0	506	109
Karmex*	0	0	470	101
LSD (P=.05)			88.2	

*Pre-emergent herbicide.

Table 46. Tolerance of Timothy to Herbicides Applied in the Fall the Year of Seeding - Edmonton 2000-01 (Expt. #TI11)

Herbicide	% Visual Injury						Seed Yield	
	Oct-11-00	Oct-23-00	May-09-01	May-16-01	Jul-07-01	Aug-09-01	kg/ha	% of Check
Check	0	0	0	0	0	0	516	100
Banvel + 2,4-D	0	0	0	0	9	11	333	65
Prestige	0	0	0	0	0	0	495	96
Curtail M + Accord	0	0	0	0	0	0	496	96
Ally	10	10	0	0	0	0	421	82
Ally + Accord	10	15	0	0	0	0	459	89
Princep Nine-T*	0	0	0	0	0	5	456	88
Sundance + 2,4-D*	0	1	25	20	23	25	294	57
LSD (P=.05)							NS	

*Pre-emergent herbicide.

Table 47. Tolerance of Timothy to Herbicides Applied in the Fall the Year of Seeding - Beaverlodge 2000-01 (Expt. #TI12)

Herbicide	% Visual Injury				Forage Yield kg/ha	Seed Yield	
	Oct-27-00	May-15-01	Jun-19-01	Aug-09-01		kg/ha	% of Check
Check	0	0	0	0	3056	87	100
Banvel + 2,4-D	0	5	0	0	2896	61	70
Prestige	0	3	0	0		Flood damage	
Curtail M + Accord	0	10	0	0	3083	76	87
Ally	0	10	6	0	2583	68	78
Ally + Accord	0	15	0	0	3000	73	84
Princep Nine-T*		29	19			Flood damage	
Sundance + 2,4-D*		73	35			Flood damage	
LSD (P=.05)					NS	NS	

*Pre-emergent herbicide.

Table 48. Tolerance of Timothy to Herbicides Applied in the Fall the Year of Seeding – Edmonton 2001-02 (Expt. #TI3)

Herbicide	% Visual Injury		Seed Yield	
	May-31-02	Aug-01-02	kg/ha	% of Check
Check	0	0	119	100
Banvel + 2,4-D	0	14	96	81
Prestige	0	0	139	117
Curtail M + Accord	0	0	118	99
Ally	0	0	138	116
Ally + Accord	0	0	128	108
Princep Nine-T*	0	0	131	110
Sencor*	0	0	148	124
LSD (P=.05)			NS	

*Pre-emergent herbicide.

Table 49. Tolerance of Timothy to Herbicides Applied in the Fall the Year of Seeding – Beaverlodge 2001-02 (Expt. #TI4)

Herbicide	% Visual Injury			Forage Yield kg/ha	Seed Yield	
	Oct-30-01	Jun-10-02	Aug-07-02		kg/ha	% of Check
Check	0	0	0	5772	451	100
Banvel + 2,4-D	0	0	0	5480	462	102
Prestige	0	0	0	6418	537	119
Curtail M + Accord	0	0	0	5522	424	94
Ally	0	0	0	5751	455	101
Ally + Accord	0	0	0	5710	444	98
Sencor*	0	0	0	5376	443	98
LSD (P=.05)				NS	NS	

*Pre-emergent herbicide.

Table 50. Tolerance of Timothy to Herbicides Applied in the Fall the Year After Seeding – Edmonton 2001-02 (Expt. #TI5)

Herbicide	% Visual Injury		Seed Yield	
	May-31-02	Aug-07-02	kg/ha	% of Check
Check	0	0	287	100
Banvel + 2,4-D	0	0	267	93
Prestige	0	0	304	106
Curtail M + Accord	0	0	304	106
Ally	0	0	322	112
Ally + Accord	0	0	304	106
Princep Nine-T*	0	0	317	110
Sundance + 2,4-D*	39	21	275	96
LSD (P=.05)			NS	

*Pre-emergent herbicide.

Table 51. Tolerance of Timothy to Herbicides Applied in the Fall the Year After Seeding – Beaverlodge 2001-02 (Expt. #TI6)

Herbicide	% Visual Injury				Forage Yield kg/ha	Seed Yield	
	Oct-30-01	May-17-02	Jun-10-02	Aug-07-02		kg/ha	% of Check
Check	0	0	0	0	3605	241	100
Banvel + 2,4-D	0	0	0	0	3542	217	90
Prestige	0	0	0	0	3709	241	100
Curtail M + Accord	0	0	0	0	3396	195	81
Ally	0	0	0	0	3772	250	104
Ally + Accord	0	0	0	0	3772	240	100
Princep Nine-T*		0	0	0	3292	213	88
Sundance + 2,4-D*		38	28	24	3080	224	93
LSD (P=.05)					NS	NS	

*Pre-emergent herbicide.

Table 52. Tolerance of Timothy to Herbicides Applied in the Fall the Year After Seeding – Edmonton 2002-03 (Expt. #TI7)

Herbicide	% Visual Injury		Seed Yield	
	May-14-03	Jul-11-03	kg/ha	% of Check
Check	0	0	395	100
Banvel + 2,4-D	0	0	399	101
Prestige	0	0	422	107
Curtail M + Accord	0	0	429	109
Ally	0	0	407	103
Ally + Accord	0	0	385	97
Princep Nine-T*	0	0	413	105
Avadex*	0	0	433	110
LSD (P=.05)			NS	

*Pre-emergent herbicide.

Table 53. Tolerance of Timothy to Herbicides Applied in the Fall the Year After Seeding – Beaverlodge 2002-03 (Expt. #TI8)

Herbicide	% Visual Injury				Forage Yield kg/ha	Seed Yield	
	Oct-30-02	May-13-03	Jun-13-03	Jul-29-03		kg/ha	% of Check
Check	0	0	0	0	3458	222	100
Banvel + 2,4-D	0	0	0	0	4191	278	125
Prestige	0	0	0	0	4375	258	116
Curtail M + Accord	0	0	0	0	3833	247	111
Ally	0	0	0	0	3792	267	120
Ally + Accord	0	0	0	0	4025	222	100
Check	0	0	0	0	3833	221	100
LSD (P=.05)					NS	NS	

Table 54. Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall the Year of Seeding - Brooks 2000-01 (Expt. #PR1)

Herbicide	% Visual Injury	Stand Density %	Plant Height cm	Seed Yield	
	Spring '01			kg/ha	% of Check
Check	0	91	68	1848	100
Banvel + 2,4-D	0	94	67	1985	107
Prestige	0	95	68	1922	104
Nortron*	0	91	65	1863	101
Princep Nine-T*	0	90	71	1504	81
Sencor + Goal*	95	16	55	263	14
Aatrex Nine-0*	65	5	57	89	5
Karmex*	0	94	67	1840	100
LSD (P=.05)			10.0	289.7	

*Pre-emergent herbicide.

Table 55. Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall the Year of Seeding – Edmonton 2000-01 (Expt. #PR2)

Herbicide	% Visual Injury	Seed Yield	
	Oct-23-00	kg/ha	% of Check
Check	0	Not harvested due	
Banvel + 2,4-D	0	to winter kill	
Prestige	0		
Nortron*	0		
Princep Nine-T*	15		
Sencor + Goal*	15		
Aatrex Nine-0*	0		
Karmex*	0		
LSD (P=.05)			

*Pre-emergent herbicide.

Table 56. Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall the Year of Seeding - Beaverlodge 2000-01 (Expt. #PR3)

Herbicide	% Visual Injury				Forage Yield kg/ha	Seed Yield	
	Oct-27-00	May-15-01	Jun-19-01	Aug-09-01		kg/ha	% of Check
Check	0	0	0	0	2875	534	100
Banvel + 2,4-D	0	0	0	0	3042	416	78
Prestige	0	0	0	0	3229	501	94
Nortron*	0	0	0	0	2854	499	93
Princep Nine-T*	0	0	0	0	2875	501	94
Sencor + Goal*	70	78	58	3167	95	18	
Aatrex Nine-0*	0	0	0	2604	383	72	
Karmex*	0	0	0	2854	298	56	
Curtail M + Accord	0	0	0	2917	471	88	
Ally	0	0	26	29	2771	293	55
LSD (P=.05)					NS	108.4	

*Pre-emergent herbicide.

Table 57. Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall the Year of Seeding - Brooks 2001-02 (Expt. #PR4)

Herbicide	Plant Height cm	Seed Yield	
		kg/ha	% of Check
Check	74	1380	100
Banvel + 2,4-D	65	1402	102
Prestige	72	1453	105
Curtail M + Accord	69	1261	91
Ally	66	1150	83
Nortron*	68	1297	94
Princep Nine-T*	70	1106	80
Karmex*	70	1237	90
LSD (P=.05)	NS	184.3	

*Pre-emergent herbicide.

Table 58. Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall the Year of Seeding - Edmonton 2001-02 (Expt. #PR5)

Herbicide	% Visual Injury		Seed Yield	
	May-31-02	Aug-01-02	kg/ha	% of Check
Check	0	0	229	100
Banvel + 2,4-D	0	0	210	92
Prestige	0	0	206	90
Curtail M + Accord	0	0	208	91
Ally	0	0	92	40
Nortron*	0	0	252	110
Princep Nine-T*	0	0	203	89
Karmex*	0	0	173	76
LSD (P=.05)			76.5	

*Pre-emergent herbicide.

Table 59. Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall the Year of Seeding - Beaverlodge 2001-02 (Expt. #PR6)

Herbicide	% Visual Injury			Seed Yield	
	Oct-30-01	Jun-10-02	Aug-07-02	kg/ha	% of Check
Check	0	0	0	174	100
Banvel + 2,4-D	0	0	0	157	90
Prestige	0	0	0	177	102
Curtail M + Accord	0	0	0	159	91
Ally	0	60	50	101	58
Nortron*		0	0	188	108
Princep Nine-T*		0	0	182	105
Aatrex Nine-0*		0	0	170	98
Karmex*		0	0	163	94
LSD (P=.05)				NS	

*Pre-emergent herbicide.

Table 60. Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall the Year After Seeding – Edmonton 2002-03 (Expt. #PR7)

Herbicide	% Visual Injury	% Stand Red.	Seed Yield	
	May-14-03	Jul-11-03	kg/ha	% of Check
Check	0	0	142	100
Banvel + 2,4-D	0	0	180	127
Prestige	0	0	221	156
Nortron*	0	0	170	120
Princep Nine-T*	0	6	149	105
Sencor + Goal*	0	76	76	54
Aatrex Nine-0*	0	53	80	56
Karmex*	0	48	148	104
LSD (P=.05)			37.8	

*Pre-emergent herbicide.

Weed Control with Fall Applied Herbicides

Table 61. Weed Control in Chewings Fescue Sprayed with Herbicides in the Fall the Year of Seeding - Edmonton 2000-01 (Expt. #CF1)

Herbicide	Dandelion	
	Visual % Control	No. of Plants
	Jun-11-01	#/2x6 m plot
Check	0	6
Banvel + 2,4-D	100	0
Prestige	100	0
Ally	100	0
Princep Nine-T + 2,4-D*	61	2
Sencor*	3	9
Aatrex Nine-0*	0	11
Karmex*	3	8
LSD (P=.05)		4.8

*Pre-emergent herbicide.

Table 62. Weed Control in Chewings Fescue Sprayed with Herbicides in the Fall the Year After Seeding - Spirit River 2002-03 (Expt. #CF5)

Herbicide	Visual % Control			Cleavers Oct-05-02
	Oct-05-02	Jun-25-03	Jul-11-03	
Check	0	0	0	0
Banvel + 2,4-D	75	0	10	68
Prestige	88	100	85	86
Curtail M + Accord	90	98	88	88
Ally	43	15	0	20
Ally + Accord	50	9	0	79
Unity	80	0	15	81

*Pre-emergent herbicide.

Table 63. Weed Control in Hard Fescue Sprayed with Herbicides in the Fall the Year of Seeding – Edmonton 2000-01 (Expt. #HF1)

Herbicide	Dandelion	
	Visual % Control	No. of Plants
	Jun-11-01	#/2x6 m plot
Check	0	6
Banvel + 2,4-D	100	0
Prestige	100	0
Ally	100	0
Sundance + 2,4-D*	96	1
Dual II Magnum*	5	7
Goal*	0	12
Sencor + Goal*	3	8
LSD (P=.05)		4.8

*Pre-emergent herbicide.

Table 64. Weed Control in Creeping Red Fescue Sprayed with Herbicides in the Fall the Year of Seeding – Edmonton 2000-01 (Expt. #CR1)

Herbicide	Dandelion	
	Visual % Control	No. of Plants
	Jun-11-01	#/2x6 m plot
Check	0	4
Banvel + 2,4-D	100	0
Prestige	100	0
Curtail M + Accord	100	0
Ally	100	0
Ally + Accord	100	0
Unity	30	1
Princep Nine-T*	20	2
LSD (P=.05)		1.7

*Pre-emergent herbicide.

Table 65. Weed Control in Creeping Red Fescue Sprayed with Herbicides in the Fall the Year of Seeding - Spirit River 2001-02 (Expt. #CR4)

Herbicide	Visual % Control									
	Alsike Clover			Cleavers		Narrow-leaved Hawk's-beard			Dandelion	
	Sep-12-01	May-25-02	Jul-9-02	Sep-12-01	Sep-12-01	Sep-25-02	May-9-02	Jul-10-02	May-25-02	Jul-9-02
Check	0	0	0	0	0	0	0	0	0	0
Prestige	87	100	100	93	78	100	100	100	100	74
Curtail M + Accord	89	100	100	90	83	100	100	100	100	76
Unity	78	82	61	83	69	100	100	100	68	51

Table 66. Weed Control in Creeping Red Fescue Sprayed with Herbicides in the Fall the Year After Seeding – Falher 2000-01 (Expt. #CR7)

Herbicide	Visual % Control				
	Dandelion		N.L. Hawk's-beard		Canada Thistle
	May-30-01	Jul-15-01	May-30-01	Jul-15-01	Jul-15-01
Check	0	0	0	0	0
Banvel + 2,4-D	90	80	100	100	71
Prestige	95	90	100	100	80
Curtail M + Accord	95	90	100	100	86
Ally	100	100	100	100	70
Ally + Accord	100	100	100	100	77
Unity	85	80	100	100	48

Table 67. Weed Control in Creeping Red Fescue Sprayed with Herbicides in the Fall the Year After Seeding – Beaverlodge 2001-02 (Expt. #CR9)

Herbicide	Visual % Control	
	Dandelion Jun-10-02	Alsike Clover Jun-10-02
Check	0	0
Banvel + 2,4-D	85	100
Prestige	90	99
Curtail M + Accord	95	100
Ally	100	100
Ally + Accord	100	100
Unity	13	35
Princep Nine -T*	0	0
Sencor*	0	0
Goal*	0	0

*Pre-emergent herbicide.

Table 68. Weed Control in Tall Fescue Sprayed with Herbicides in the Fall the Year of Seeding - Edmonton 2000-01 (Expt. #TF2)

Herbicide	Canada Thistle			Dandelion			Common Plantain	Shepherd's-purse
	% Cont. Jun-05-01	No. of Plants #/2x6 m plot	% Cont. Aug-09-01	% Cont. Jun-05-01	No. of Plants #/2x6 m plot	% Cont. Jun-05-01	% Cont. Aug-09-01	
Check	0	6	0	0	14	0	0	0
Banvel + 2,4-D	49	2	5	86	2	100	0	0
Prestige	56	1	6	94	2	100	0	0
Curtail M + Accord	56	1	10	84	2	100	4	
Ally	56	1	0	100	0	98	0	
Princep Nine-T*	23	4	0	0	15	5	64	
Sencor + Goal*	5	7	3	9	14	5	84	
Karmex*	44	2	23	19	13	15	65	
LSD (P=.05)		3.0			4.0			

*Pre-emergent herbicide.

Table 69. Weed Control in Tall Fescue Sprayed with Herbicides in the Fall the Year of Seeding – Edmonton 2001-02 (Expt. #TF5)

Herbicide	Narrow-leaved Hawk's-beard	
	Visual % Control	
	Aug-12-02	
Check	0	
Banvel + 2,4-D	100	
Prestige	100	
Curtail M + Accord	100	
Ally	100	
Princep Nine-T*	48	
Sundance + 2,4-D*	69	
Karmex*	58	

*Pre-emergent herbicide.

Table 70. Weed Control in Tall Fescue Sprayed with Herbicides in the Fall the Year After Seeding - Edmonton 2001-02 (Expt. #TF8)

Herbicide	Visual % Control	
	Dandelion	
	Aug-07-02	Aug-07-02
Check	0	0
Banvel + 2,4-D	64	0
Prestige	64	25
Curtail M + Accord	41	28
Ally	100	0
Princep Nine-T*	18	0
Sencor + Goal*	30	0
Karmex*	23	0

*Pre-emergent herbicide.

Table 71. Weed Control in Tall Fescue Sprayed with Herbicides in the Fall the Year After Seeding - Beaverlodge 2001-02 (Expt. #TF9)

Herbicide	Visual % Control	
	Dandelion	
	Jun-10-02	Jun-10-02
Check	0	0
Banvel + 2,4-D	27	100
Prestige	37	100
Curtail M + Accord	23	100
Ally	100	100
Princep Nine-T*	0	0
Sencor + Goal*	0	0
Karmex*	0	0
Aatrex Nine-0*	0	0
Sundance + 2,4-D*	57	47
Sencor*	0	0

*Pre-emergent herbicide.

Table 72. Weed Control in Tall Fescue Sprayed with Herbicides in the Fall the Year After Seeding – Edmonton 2002-03 (Expt. #TF11)

Herbicide	Visual % Control		
	N.L. Hawk's-beard Jul-11-03	Shepherd's-purse Jul-11-03	Dandelion Jul-11-03
Check	0	0	0
Banvel + 2,4-D	55	3	33
Prestige	76	11	59
Curtail M + Accord	83	25	36
Ally	73	14	89
Princep Nine-T*	30	81	0
Sencor + Goal*	98	100	0
Karmex*	30	88	0

*Pre-emergent herbicide.

Table 73. Weed Control in Timothy Sprayed with Herbicides in the Fall the Year After Seeding - Beaverlodge 2001-02 (Expt. #TI16)

Herbicide	Visual % Control			
	Dandelion		Alsike Clover	
	May-17-02	Jun-10-02	May-17-02	Jun-10-02
Check	0	0	0	0
Banvel + 2,4-D	93	75	100	100
Prestige	86	75	100	100
Curtail M + Accord	86	78	100	100
Ally	89	100	100	100
Ally + Accord	91	93	100	100
Princep Nine-T*	0	0	0	0
Sundance + 2,4-D*	93	68	18	13

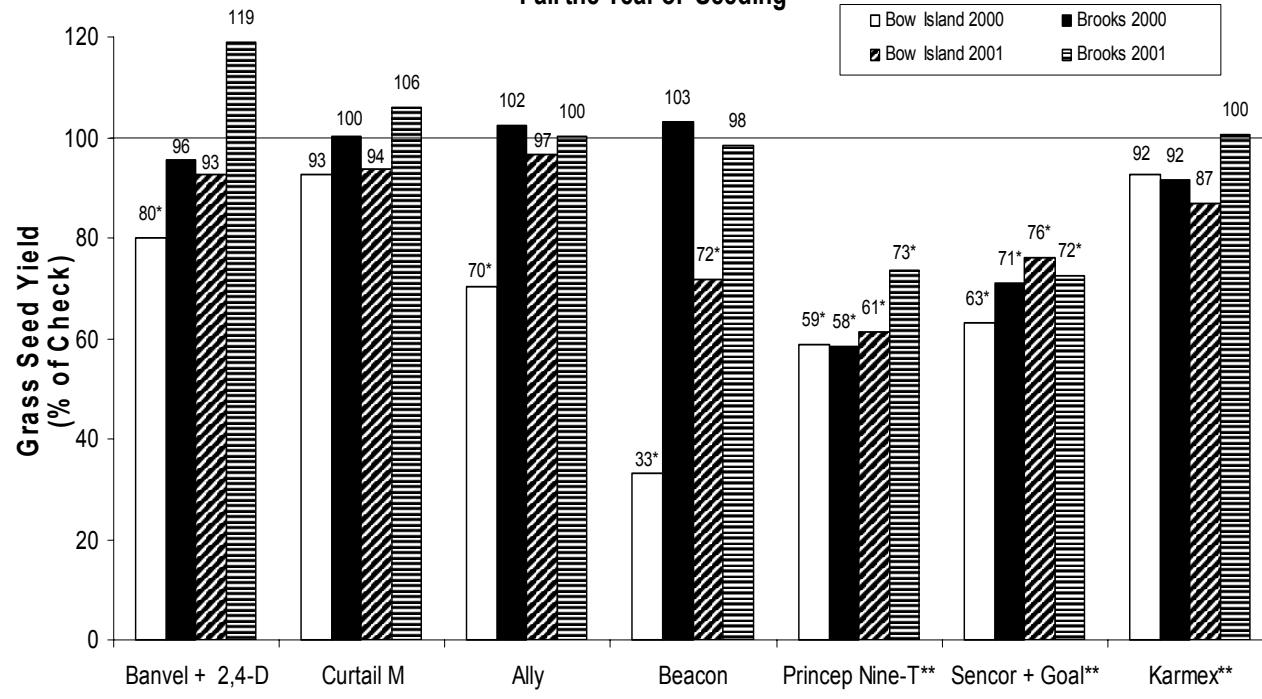
*Pre-emergent herbicide.

Table 74. Weed Control in Perennial Ryegrass Sprayed with Herbicides in the Fall the Year After Seeding - Edmonton 2002-03 (Expt. #PR7)

Herbicide	Visual % Control			
	Wild Oat Jul-23-03	N.L. Hawk's-beard Jul-23-03	Shepherd's-purse Jul-23-03	Dandelion Jul-23-03
Check	0	0	0	0
Banvel + 2,4-D	0	19	6	38
Prestige	0	61	0	34
Nortron*	49	3	54	5
Princep Nine-T*	24	5	63	0
Sencor + Goal*	5	84	100	0
Aatrex Nine-0*	18	40	100	0
Karmex*	0	58	84	0

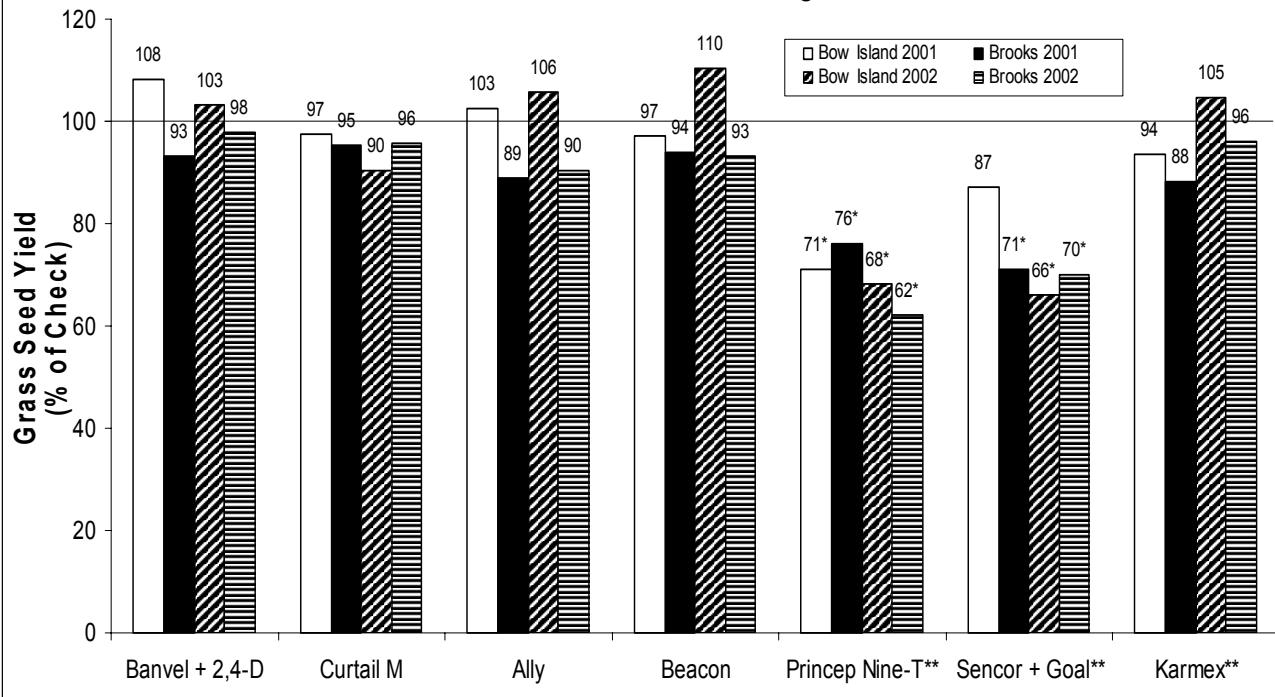
*Pre-emergent herbicide.

Figure 1. Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year of Seeding

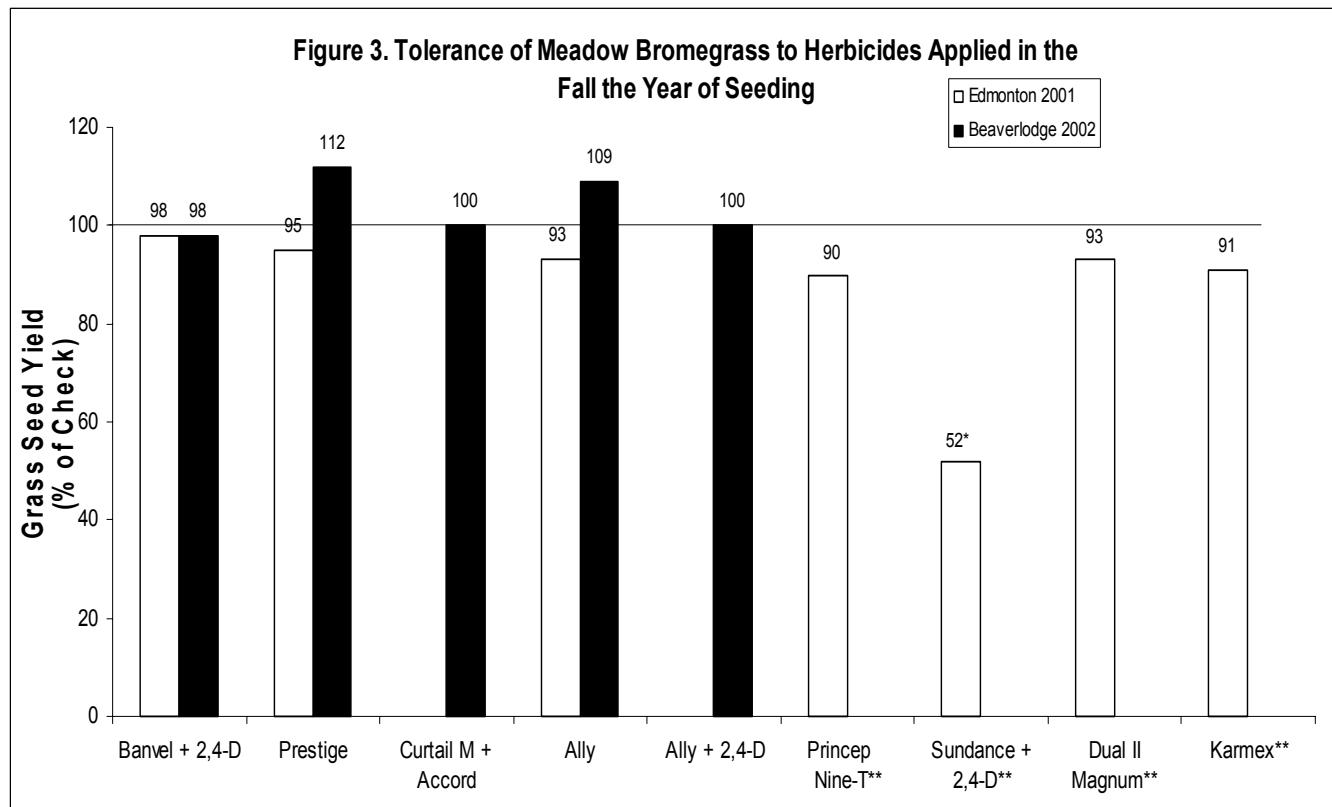


* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

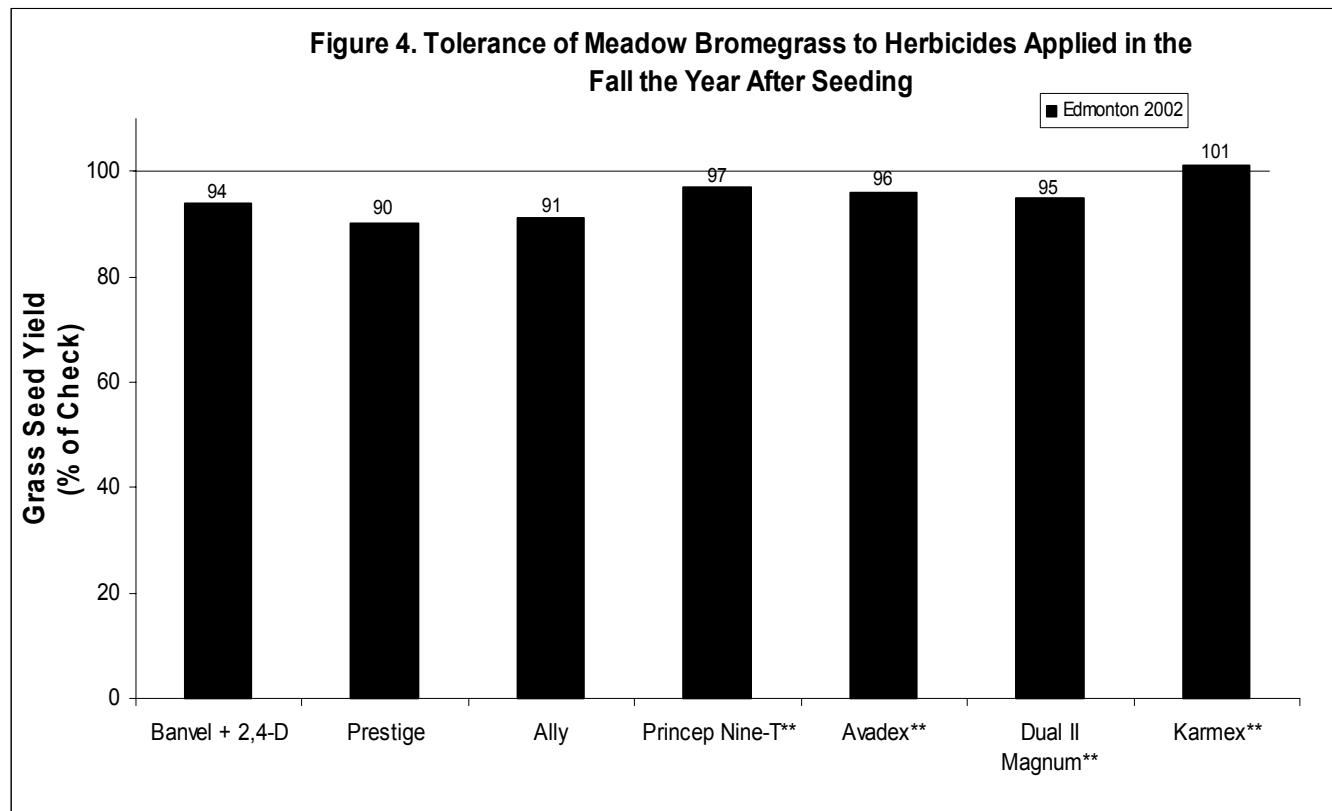
Figure 2. Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year After Seeding



* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

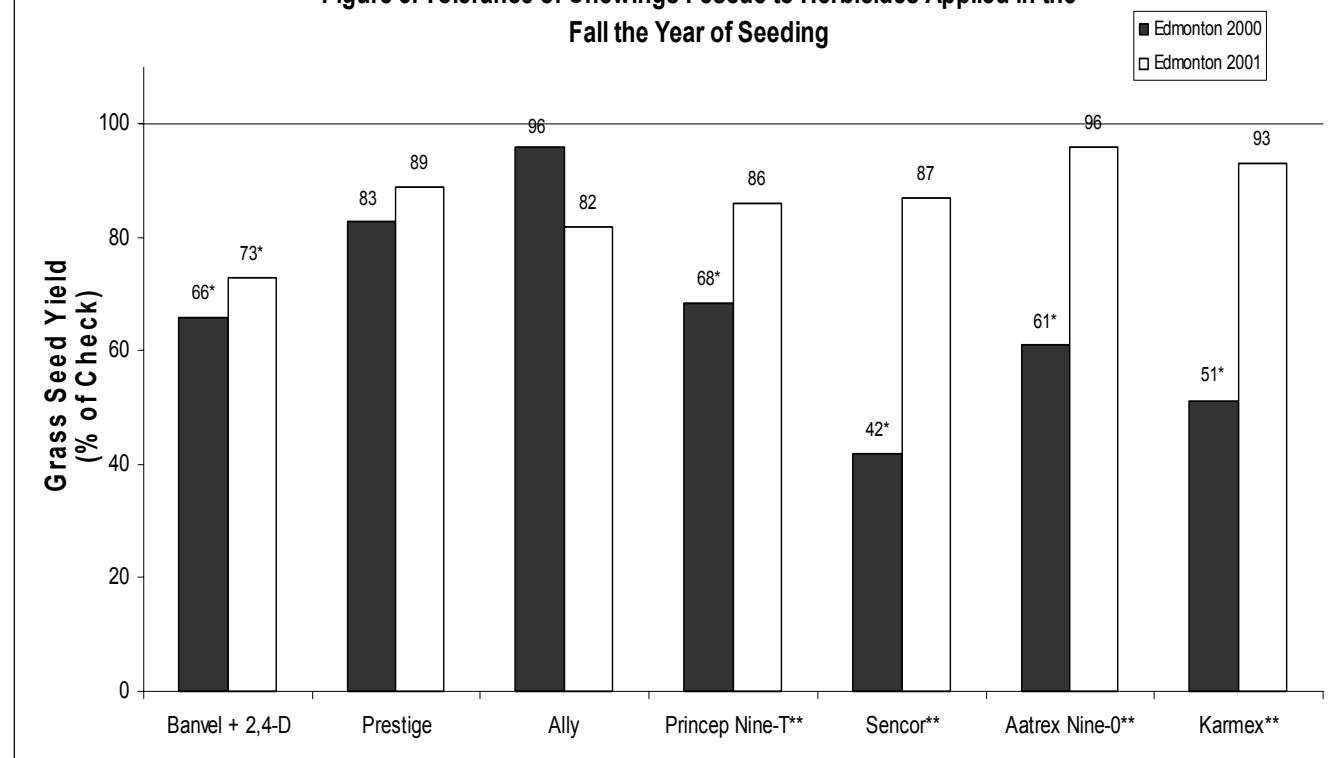


* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.



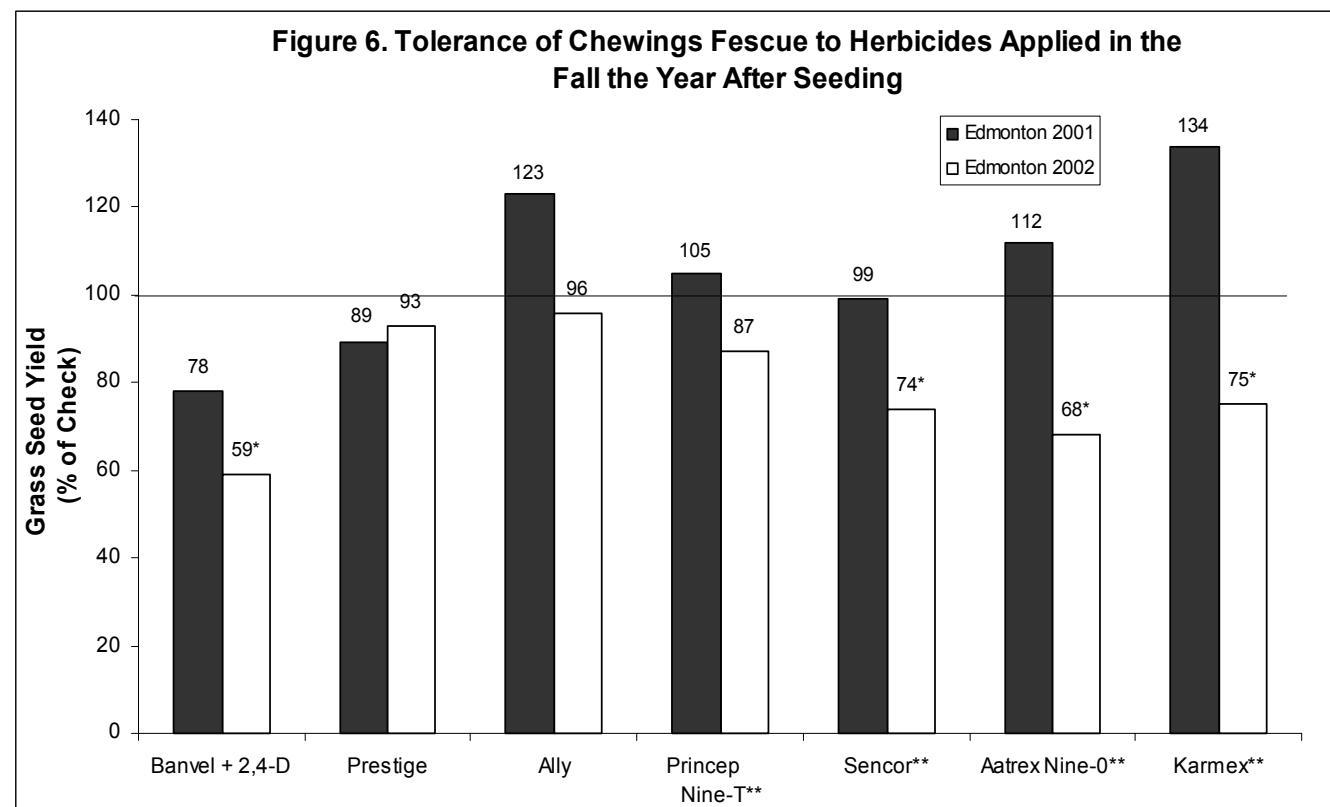
* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

Figure 5. Tolerance of Chewings Fescue to Herbicides Applied in the Fall the Year of Seeding



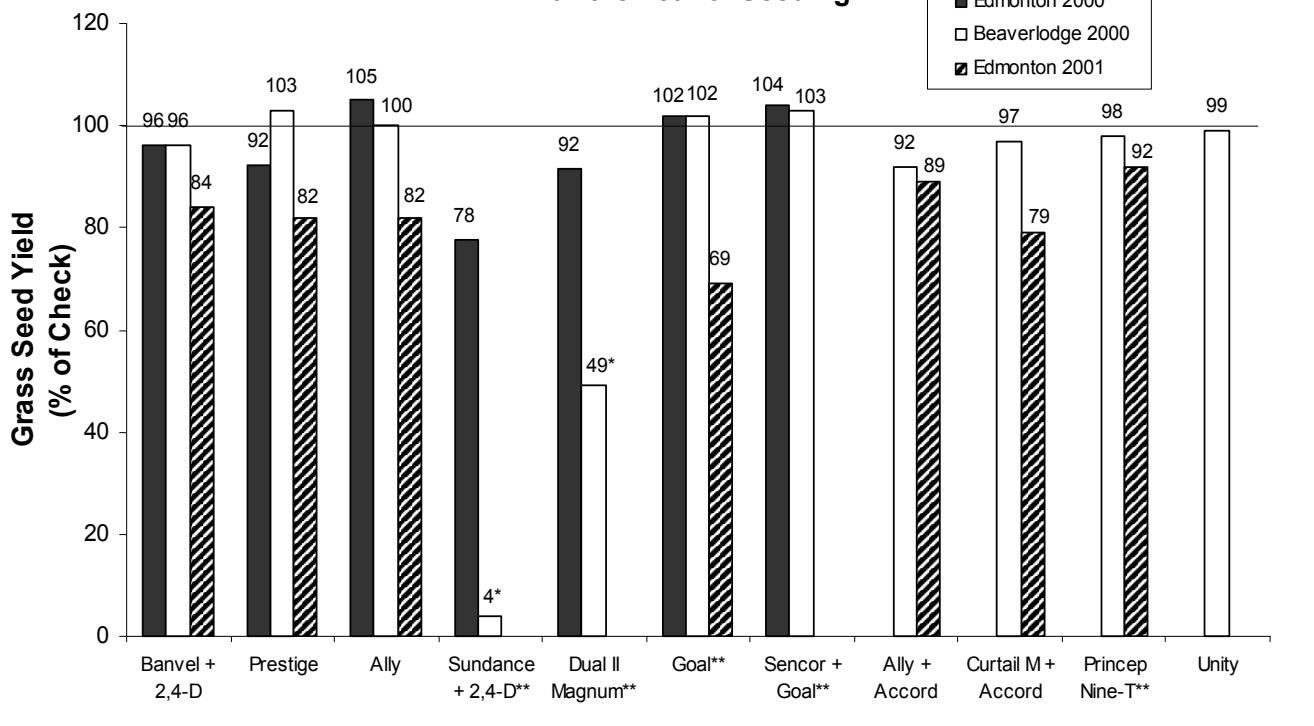
* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

Figure 6. Tolerance of Chewings Fescue to Herbicides Applied in the Fall the Year After Seeding



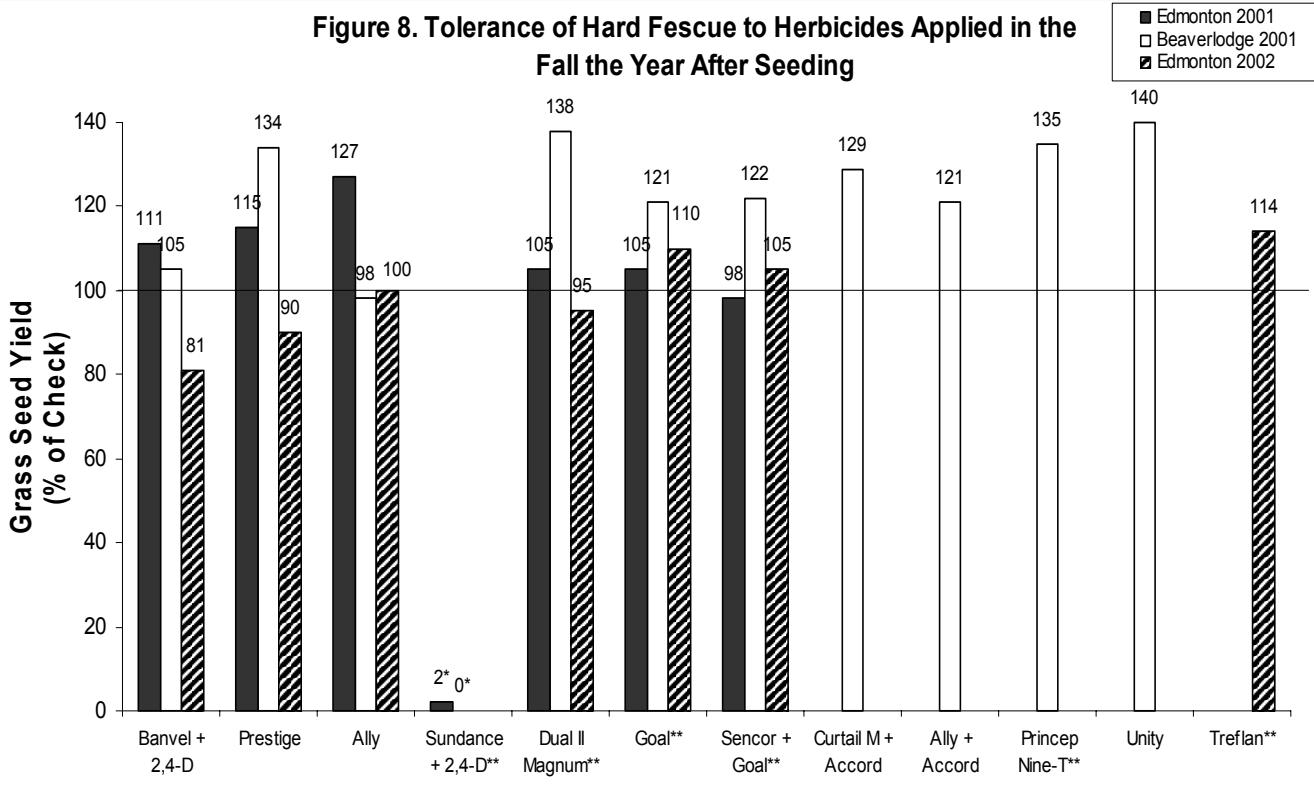
* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

Figure 7. Tolerance of Hard Fescue to Herbicides Applied in the Fall the Year of Seeding



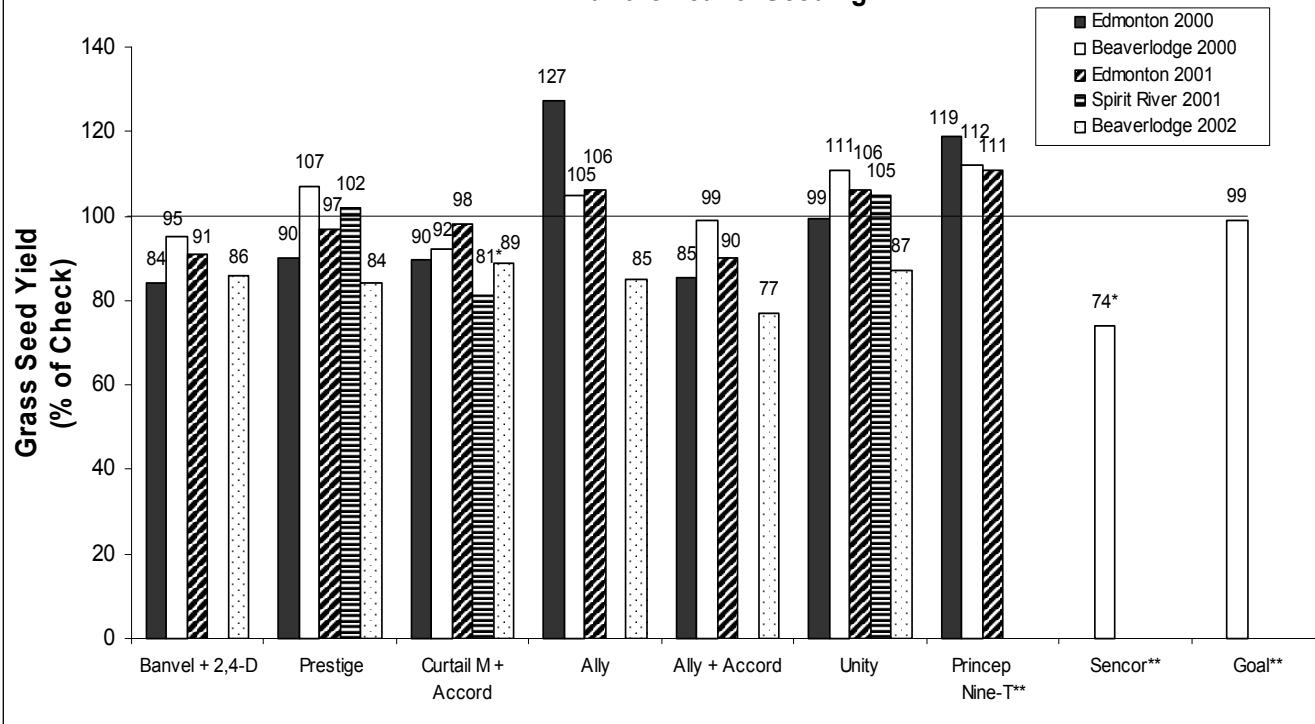
* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

Figure 8. Tolerance of Hard Fescue to Herbicides Applied in the Fall the Year After Seeding



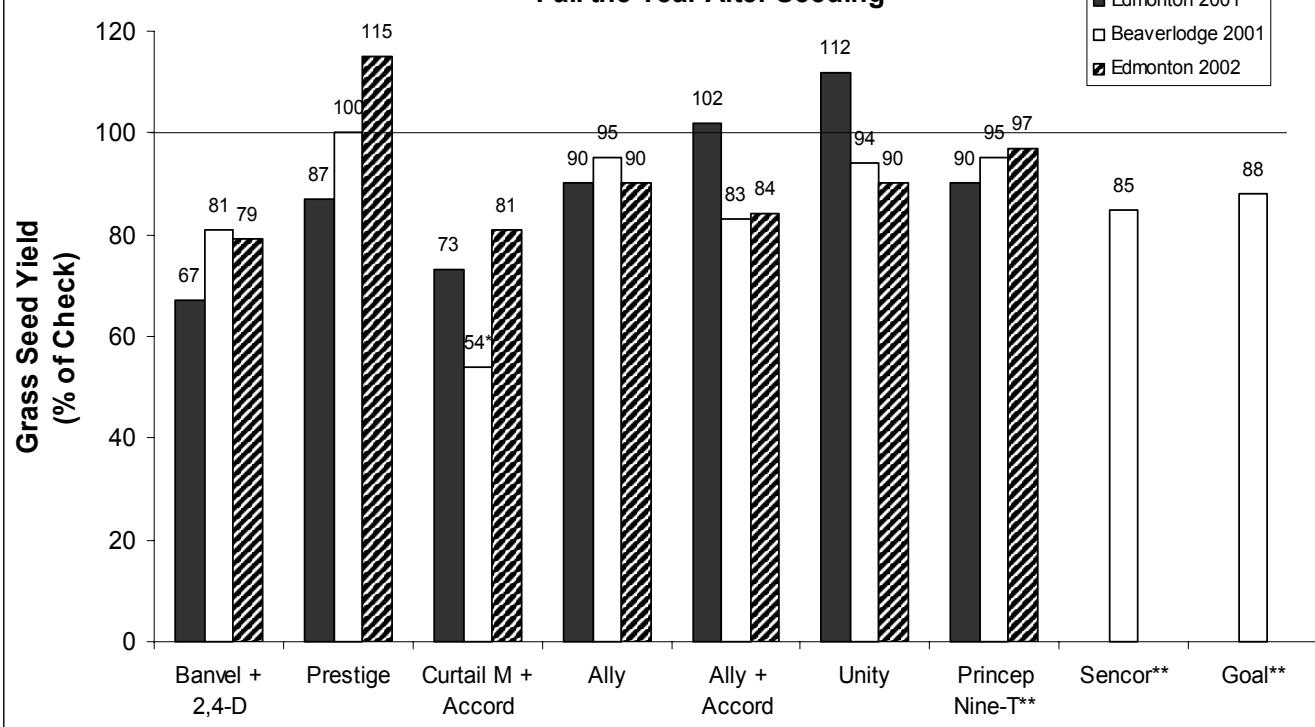
* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

Figure 9. Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year of Seeding



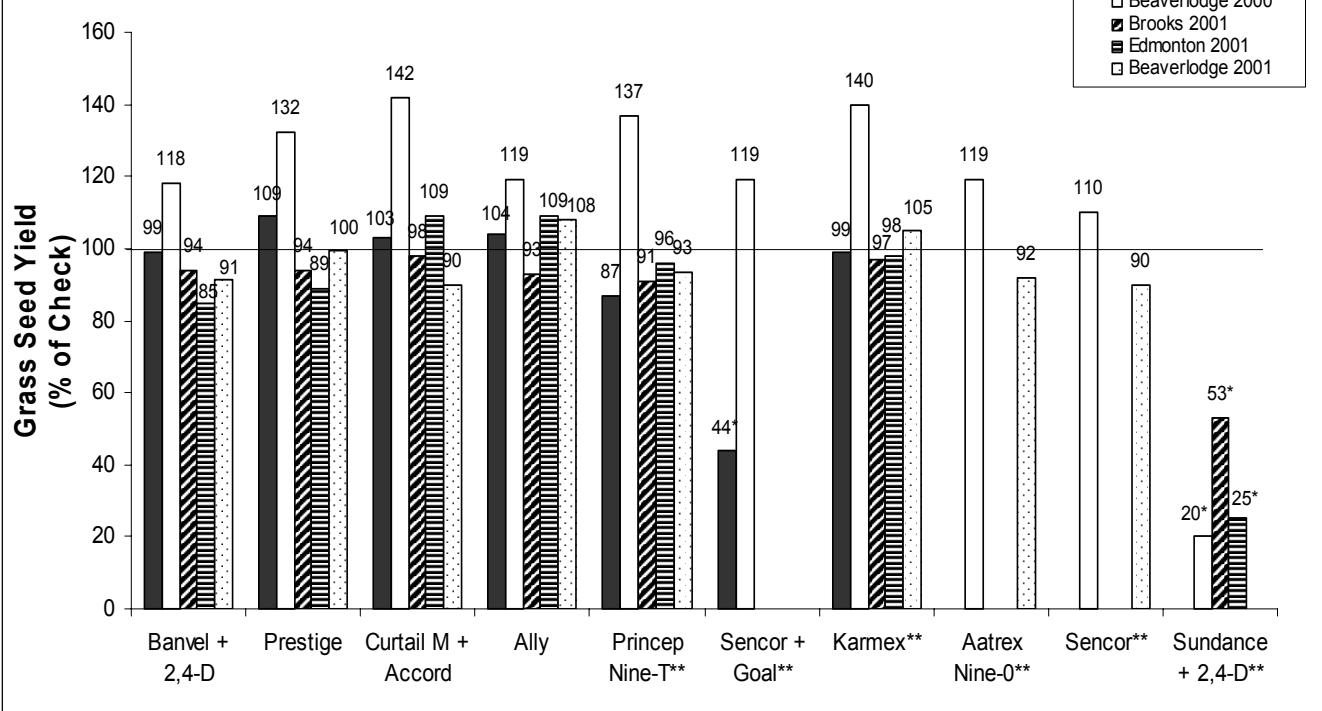
* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

Figure 10. Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year After Seeding



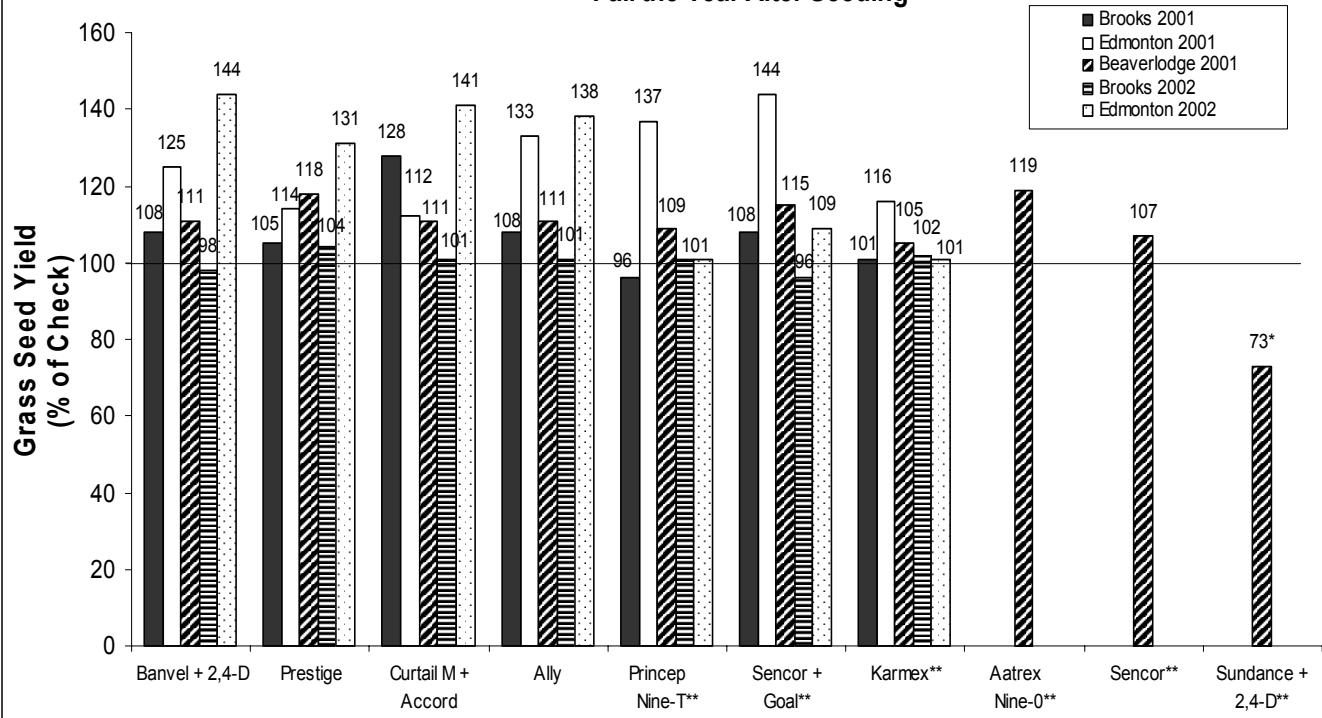
* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

Figure 11. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year of Seeding



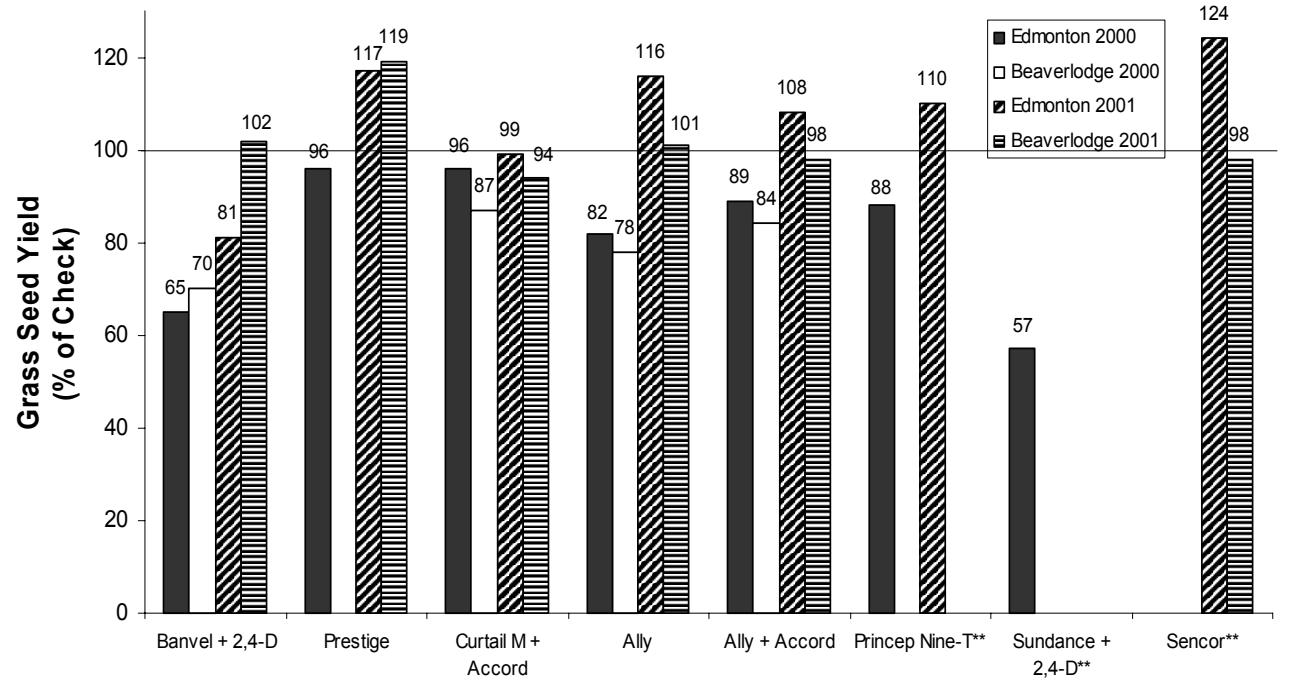
* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

Figure 12. Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year After Seeding



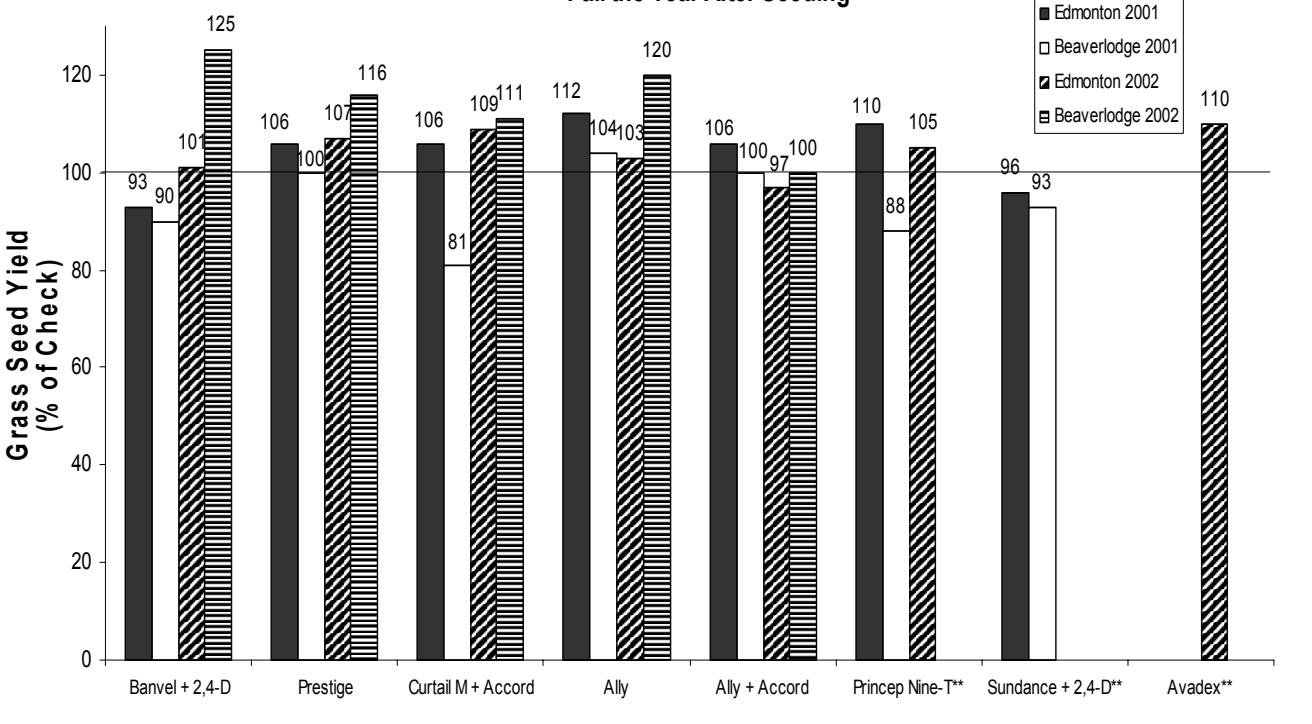
* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

Figure 13. Tolerance of Timothy to Herbicides Applied in the Fall the Year of Seeding



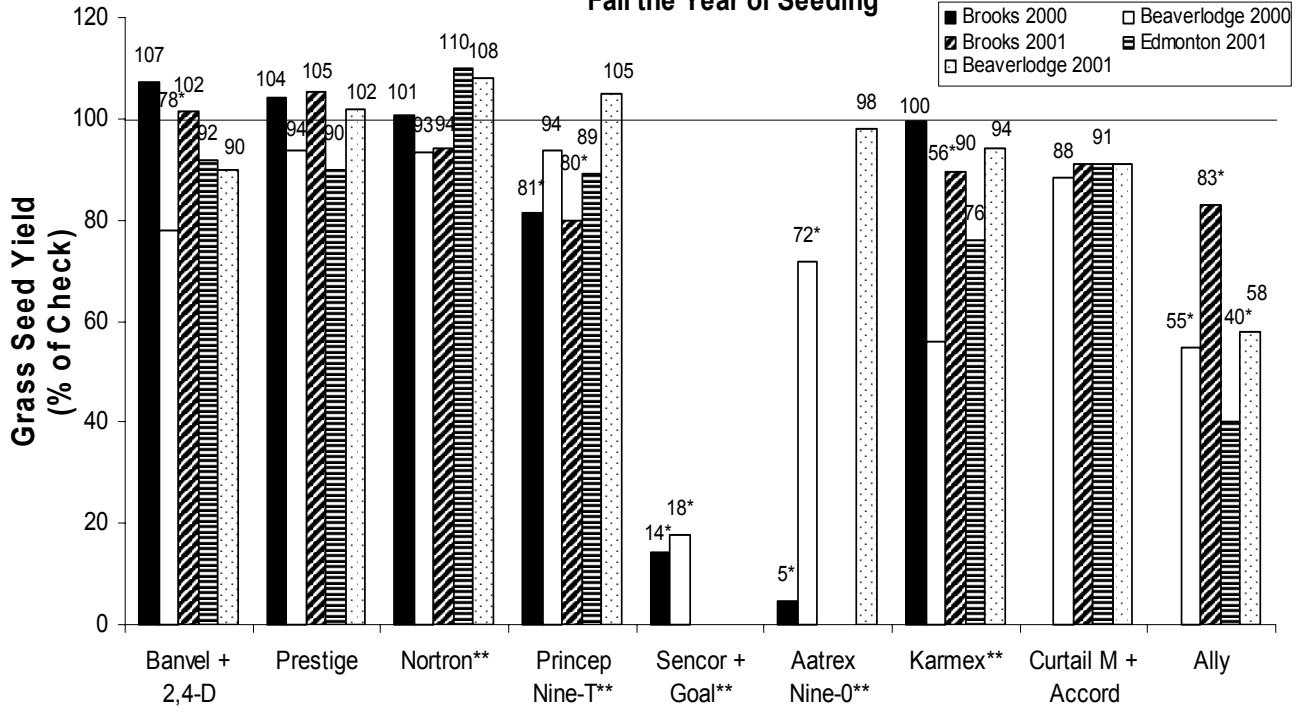
* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

Figure 14. Tolerance of Timothy to Herbicides Applied in the Fall the Year After Seeding



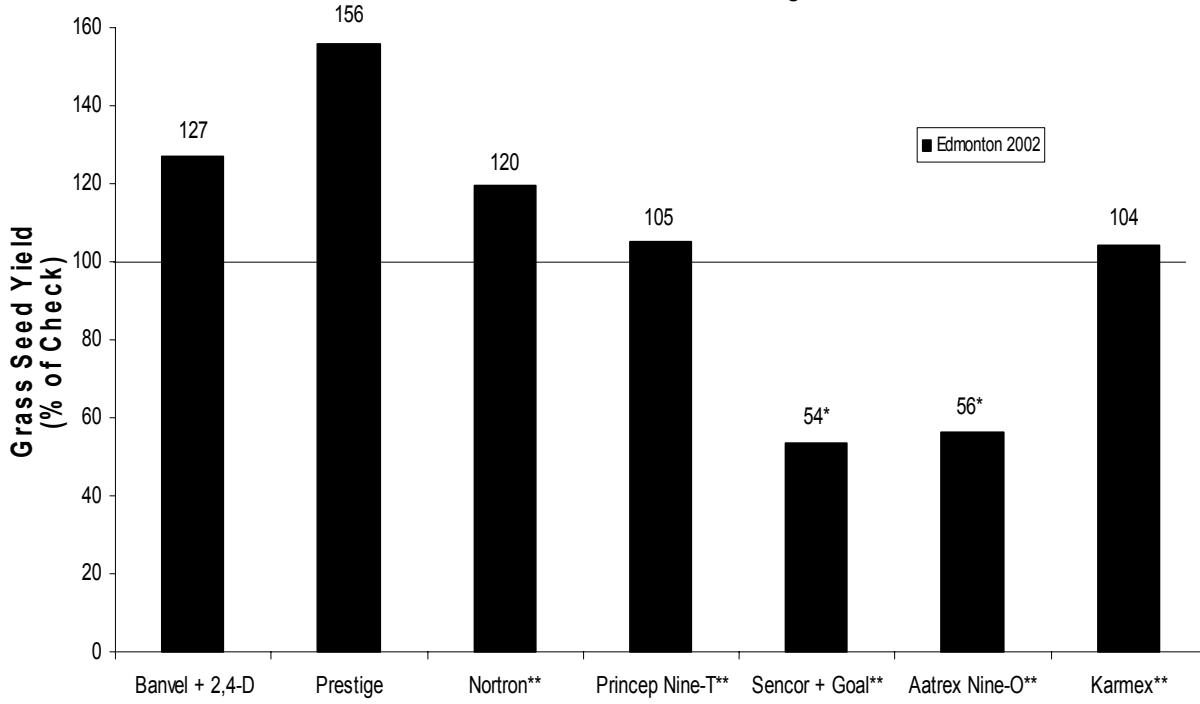
* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

Figure 15. Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall the Year of Seeding



* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

Figure 16. Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall the Year After Seeding



* Significantly different from the check ($P=0.05$). ** Pre-emergent herbicide.

APPENDIX

Canadian Weed Science Society Research Reports

Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall of the Year of Seeding - Bow Island 2000-01 (Expt. #KB1)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
 Crop Diversification Division, Alberta Agriculture, Food and Rural Development
 2000-01 Experiment

Experiment ID: KBG S00 Fall BI

CROP: POAPR, Kentucky Bluegrass (ABBEY). Planted: May-17-2000, 2.75 KG/HA, 0.75 CM Deep, 30 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Oct.31/2000 100 kg/ha N Expt. Location: Bow Island, Alberta.
 Soil Texture: Sandy Clay Loam. %OM: 2 %Sand: 65 %Silt: 21 %Clay: 14 pH: 7.2

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Sep-1-2000	Oct-23-2000	Crop 1 POAPR Kentucky Bluegrass
Time of Day:	11:30 AM	11:30 AM	Height : 12 cm (cutting height)
Method	: SPRAY	SPRAY	
Timing	: POSTHARVEST	POSTHARVEST	
Placement	: SURFACE	SURFACE	
Air Temp.	: 17 C	16 C	
Wind Speed	: 0 KPH	0 KPH	
Equipment	: HANDHELD SPRAYER		
Pressure	: 275 kPa	275 kPa	
Nozzle Type	: TEEJET	TEEJET	
Nozzle Size	: 8001	8003	
Noz. Spacing	: 50 CM	50 CM	
Boom Length	: 1.5 M	1.5 M	
Boom Height	: 45 CM	45 CM	
Carrier	: WATER	WATER	
Appl. Volume	: 100 L/HA	300 L/HA	
Propellant	: CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Oct-23-00, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Harvest area 6.6 m².

Crop Code	POAPR	POAPR	
Part Rated	PLANT	SEED	
Rating Data Type			
Rating Unit			
Rating Date	Jul-19-2001		
Trt-Eval Interval	Jul-19-2001		
Trt Treatment	Form	Form	Appl
No. Name	Conc	Type	Rate
1 Check			Unit
2 dicamba	480	SN	0.237 kg ai/ha
2,4-D amine	470	SN	0.523 kg ai/ha
3 clopyralid	50	EC	0.1 kg ai/ha
MCPCA ester	280	EC	0.56 kg ai/ha
4 metsulfuron methyl	60	DF	0.0045 kg ai/ha
Agral 90			0.2 % v/v
5 primisulfuron-methyl	75	WDG	0.0405 kg ai/ha
Agral 90			0.25 % v/v
6 simazine	90	SG	1.0 kg ai/ha

7 metribuzin	75 DF	0.42 kg ai/ha B	22 ab	628 d
oxyfluorfen	240 EC	0.13 kg ai/ha B		
8 diuron	80 DF	0.89 kg ai/ha B	25 a	922 ab
LSD (P=.05)			3.1	122.4
Standard Deviation			2.1	83.0
CV			9.51	11.28
Bartlett's X2			5.169	10.733
P(Bartlett's X2)			0.639	0.151
Treatment F			3.966	28.391
Treatment Prob(F)			0.0065	0.0001

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

Trial Comments

Beacon caused yellowing of leaves in early spring, showing stress mid June and shorter height (about 5 cm) with less seed heads at harvest. Sencor and Pincep Nine-T caused yellowing of leaves in spring but this was not noticeable at harvest. Banvel + 2,4-D amine and Ally treatments looked as mature as the rest of treatments at harvest but the heads didn't seem to thresh out as easy. All the treatments caused a significant seed yield reduction except Curtail M and Karmex.

Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall of the Year of Seeding - Brooks 2000-01 (Expt. #KB2)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2000-01 Experiment

Experiment ID: KBG S00 Fall BK

CROP: POAPR, Kentucky Bluegrass (ABBEY). Planted: May-16-2000, 2.75 KG/HA, 0.75 CM Deep, 30 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Oct.31/2000 100 kg/ha N Expt. Location: Brooks, Alberta.

Soil Texture: SILT LOAM. %OM: 2 %Sand: 45 %Silt: 35 %Clay: 20 pH: 7.9

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Sep-11-2000 Oct-23-2000	Crop	1 POAPR Kentucky Bluegrass
Time of Day:	9:00 AM 9:00 AM	Height	: 12 cm (cutting height)
Method	: SPRAY SPRAY		
Timing	: POSTHARVEST POSTHARVEST		
Placement	: SURFACE SURFACE		
Air Temp.	: 15 C 16 C		
Wind Speed	: 0 KPH 0 KPH		
Equipment	: HANDHELD SPRAYER		
Pressure	: 275 kPa 275 kPa		
Nozzle Type	: TEEJET TEEJET		
Nozzle Size	: 8001 8003		
Noz. Spacing	: 50 CM 50 CM		
Boom Length	: 1.5 M 1.5 M		
Boom Height	: 45 CM 45 CM		
Carrier	: WATER WATER		
Appl. Volume	: 100 L/HA 300 L/HA		
Propellant	: CO2 CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Oct-23-00, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Harvest area 6.6 m².

Crop Code	POAPR	POAPR
Part Rated	PLANT	SEED
Rating Data Type	HEIGHT	YIELD
Rating Unit	cm	kg/ha
Rating Date	Jul-13-2001	Jul-13-2001
Trt-Eval Interval	263/305 DAA	263/305 DAA

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Unit	Appl Code	
1	Check					65 a	1261 a
2	dicamba	480 SN	kg ai/ha	0.237	A	66 a	1205 a
	2,4-D amine	470 SN	kg ai/ha	0.523	A		
3	clopyralid	50 EC	kg ai/ha	0.1	A	61 a	1264 a
	MCPA ester	280 EC	kg ai/ha	0.56	A		
4	metsulfuron methyl	60 DF	kg ai/ha	0.0045	A	64 a	1290 a
	Agral 90		% v/v	0.2	A		
5	primisulfuron-methyl	75 WDG	kg ai/ha	0.0405	A	63 a	1301 a
	Agral 90		% v/v	0.25	A		
6	simazine	90 SG	kg ai/ha	1.0	B	58 a	736 b
7	metribuzin	75 DF	kg ai/ha	0.42	B	61 a	897 b
	oxyfluorfen	240 EC	kg ai/ha	0.13	B		
8	diuron	80 DF	kg ai/ha	0.89	B	64 a	1155 a
LSD (P=.05)						6.1	216.3
Standard Deviation						4.1	146.2
CV						6.59	12.84
Bartlett's X2						6.812	5.982
P(Bartlett's X2)						0.449	0.542
Treatment F						1.791	8.154
Treatment Prob(F)						0.1478	0.0001

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

Trial Comments

Beacon caused a slight yellowing of leaves at ten days after application but this was not noticeable in the spring. Sencor + Goal caused yellowing of leaves in early spring but this was not noticeable at harvest. Princep Nine-T caused slight yellowing starting the end of May and the Kentucky bluegrass was still yellow at harvest. Both Sencor + Goal and Princep caused a significant seed yield reduction.

Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall of the Year of Seeding - Bow Island 2001-02 (Expt. #KB3)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

Experiment ID: KBG Fall S01 BI

CROP: POAPR, Kentucky Bluegrass (ABBEY). Planted: May-10-2001, 2.75 KG/HA, 0.75 CM Deep, 30 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Nov.8/2001 120 kg/ha N Expt. Location: Bow Island, Alberta.
Soil Texture: CLAY LOAM. %OM: 2 %Sand: 65 %Silt: 21 %Clay: 14 pH: 7.2

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	Sep-11-2001 Oct-30-2001	Crop	1 POAPR Kentucky Bluegrass
Time of Day:	11:30 AM	11:30 AM	Height : 12 cm (cutting height)
Method	SPRAY	SPRAY	
Timing	POSTHARVEST	POSTHARVEST	
Placement	SURFACE	SURFACE	
Air Temp.	20 C	13 C	
Wind Speed	7 KPH	10 KPH	
Equipment	HANDHELD SPRAYER		
Pressure	275 kPa	275 kPa	
Nozzle Type	TEEJET	TEEJET	
Nozzle Size	8001	8003	
Noz. Spacing	50 CM	50 CM	
Boom Length	1.5 M	1.5 M	

Boom Height: 45 CM	45 CM
Carrier : WATER	WATER
Appl. Volume: 100 L/HA	300 L/HA
Propellant : CO2	CO2

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Oct-30-01, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Visual assessments provide % stand of the crop. Harvest area 6.6 m².

Crop Code	POAPR	POAPR	POAPR					
Part Rated	PLANT	PLANT	SEED					
Rating Data Type	STAND	HEIGHT	YIELD					
Rating Unit	percent	cm	kg/ha					
Rating Date	Jul-22-2002	Jul-22-2002						
Trt-Eval Interval	265/314 DAA	265/314 DAA						
# Subsamples, Dec.								
Trt Treatment	Form Conc	Form Type	Rate	Appl Unit	Code			
No. Name								
1 Check						75	75 a	1436 a
2 dicamba	480	SN	0.237	kg ai/ha	A	73	75 a	1332 ab
2,4-D amine	470	SN	0.523	kg ai/ha	A			
3 clopyralid	50	EC	0.100	kg ai/ha	A	73	72 a	1348 ab
MCPA ester	280	EC	0.56	kg ai/ha	A			
4 metsulfuron methyl	60	DF	0.0045	kg ai/ha	A	80	76 a	1387 ab
Agral 90			0.2	% v/v	A			
5 primisulfuron-methyl	75	WDG	0.04	kg ai/ha	A	80	69 a	1028 c
Agral 90			0.25	% v/v	A			
6 simazine	90	SG	1.0	kg ai/ha	B	68	69 a	880 d
7 metribuzin	75	DF	0.42	kg ai/ha	B	70	72 a	1091 c
oxyfluorfen	240	EC	0.13	kg ai/ha	B			
8 diuron	80	DF	0.90	kg ai/ha	B	78	76 a	1248 b
LSD (P=.05)						6.98		118.4
Standard Deviation						4.74		76.1
CV						6.51		6.24
Bartlett's X2						10.028		7.754
P(Bartlett's X2)						0.187		0.355
Treatment F						1.291		27.031
Treatment Prob(F)						0.3021		0.0001

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

Trial Comments

Some plots had poor establishment. There was no visible stand damage caused by the spray treatments. Beacon stunted growth on June 4, 2002 but the Kentucky bluegrass was back to the same height on June 25, 2002, after heavy rains. Beacon, Princep, Sencor + Goal and Karmex all caused a significant seed yield reduction.

Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall of the Year of Seeding - Brooks 2001-02 (Expt. #KB4)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

Experiment ID: KBG Fall S01 BK

CROP: POAPR, Kentucky Bluegrass (ABBEY). Planted: May-9-2001, 2.75 KG/HA, 0.75 CM Deep, 30 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Nov.8/2001 120 kg/ha N Expt. Location: Brooks, Alberta.

Soil Texture: SILT LOAM. %OM: 2 %Sand: 45 %Silt: 35 %Clay: 20 pH: 7.9

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	B	Application: A B
Date	Sep-11-2001	Oct-30-2001	Crop 1 POAPR Kentucky Bluegrass
Time of Day:	9:00 AM	9:00 AM	Height : 12 cm (cutting height)
Method	SPRAY	SPRAY	
Timing	POSTHARVEST	POSTHARVEST	
Placement	SURFACE	SURFACE	
Air Temp.	11 C	11.2 C	
Wind Speed	7 KPH	3 KPH	
Equipment	HANDHELD SPRAYER		
Pressure	275 kPa	275 kPa	
Nozzle Type	TEEJET	TEEJET	
Nozzle Size	8001	8003	
Noz. Spacing	50 CM	50 CM	
Boom Length	1.5 M	1.5 M	
Boom Height	45 CM	45 CM	
Carrier	WATER	WATER	
Appl. Volume	100 L/HA	300 L/HA	
Propellant	CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Oct-30-01, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Harvest area 6.6 m².

Crop Code	POAPR	POAPR					
Part Rated	PLANT	SEED					
Rating Data Type	HEIGHT	YIELD					
Rating Unit	cm	kg/ha					
Rating Date	Jul-26-2002	Jul-26-2002					
Trt-Eval Interval	269/318 DAA	269/318 DAA					
Trt Treatment	Form	Form	Rate	Appl			
No. Name	Conc	Type	Rate	Unit	Code		
1 Check					70 a	782 ab	
2 dicamba	480	SN	0.237 kg	ai/ha	A	69 a	930 a
2,4-D amine	470	SN	0.523 kg	ai/ha	A		
3 clopyralid	50	EC	0.100 kg	ai/ha	A	70 a	829 a
MCPA ester	280	EC	0.56 kg	ai/ha	A		
4 metsulfuron methyl	60	DF	0.0045 kg	ai/ha	A	69 a	784 ab
Agral 90			0.2 % v/v		A		
5 primisulfuron-methyl	75	WDG	0.04 kg	ai/ha	A	68 a	770 ab
Agral 90			0.25 % v/v		A		
6 simazine	90	SG	1.0 kg	ai/ha	B	66 a	574 b
7 metribuzin	75	DF	0.42 kg	ai/ha	B	65 a	566 b
oxyfluorfen	240	EC	0.13 kg	ai/ha	B		
8 diuron	80	DF	0.90 kg	ai/ha	B	70 a	785 ab
LSD (P=.05)						3.94	179.9
Standard Deviation						2.68	122.3
CV						3.94	16.02
Bartlett's X2						9.438	5.881
P(Bartlett's X2)						0.223	0.554
Treatment F						1.877	3.106
Treatment Prob(F)						0.1247	0.0206
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)							

Trial Comments

Sencor caused a slight yellowing of leaves on June 4, 2002 but this was not noticeable at harvest. None of the treatments caused a significant seed yield reduction, although the Princep and Sencor + Goal treatments had the lowest yields.

Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year After Seeding - Bow Island 2001-02 (Expt. #KB5)

CROP: POAPR, Kentucky Bluegrass (ABBEY). Planted: May-17-2000, 2.75 KG/HA, 0.75 CM Deep, 30 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Nov.8/2001 120 kg/ha N Expt. Location: Bow Island, Alberta.

Soil Texture: CLAY LOAM. %OM: 2 %Sand: 65 %Silt: 21 %Clay: 14 pH: 7.2

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date :	Sep-11-2001	Oct-30-2001	Crop 1 POAPR Kentucky Bluegrass
Time of Day:	11:30 AM	11:30 AM	Height : 12 cm (cutting height)
Method :	SPRAY	SPRAY	
Timing :	POSTHARVEST	POSTHARVEST	
Placement :	SURFACE	SURFACE	
Air Temp. :	20 C	13 C	
Wind Speed :	7 KPH	10 KPH	
Equipment :	HANDHELD SPRAYER		
Pressure :	275 kPa	275 kPa	
Nozzle Type:	TEEJET	TEEJET	
Nozzle Size:	8001	8003	
Noz. Spacing:	50 CM	50 CM	
Boom Length:	1.5 M	1.5 M	
Boom Height:	45 CM	45 CM	
Carrier :	WATER	WATER	
Appl. Volume:	100 L/HA	300 L/HA	
Propellant :	CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Oct-30-01, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Harvest area 6.6 m².

Crop Code	POAPR	POAPR	POAPR				
Part Rated	TOPGROW	PLANT	SEED				
Rating Data Type	VISINJ	HEIGHT	YIELD				
Rating Unit	percent	cm	kg/ha				
Rating Date	Jun-04-2002	Jul-25-2002	Jul-25-2002				
Trt-Eval Interval	217/266 DAA	268/317 DAA	268/317 DAA				
Trt Treatment	Form Conc	Form Type	Rate				
No. Name			Unit				
1 Check				Appl Code	0	66 a	1007 a
2 dicamba	480	SN	0.237 kg ai/ha	A	0	65 a	1089 a
2,4-D amine	470	SN	0.523 kg ai/ha	A			
3 clopyralid	50	EC	0.1 kg ai/ha	A	0	63 a	981 a
MCPA ester	280	EC	0.56 kg ai/ha	A			
4 metsulfuron methyl	60	DF	0.0045 kg ai/ha	A	0	65 a	1033 a
Agral 90			0.2 % v/v	A			
5 primisulfuron-methyl	75	WDG	0.04 kg ai/ha	A	0	61 a	980 a
Agral 90			0.25 % v/v	A			
6 simazine	90	SG	1.0 kg ai/ha	B	0	61 a	714 b
7 metribuzin	75	DF	0.42 kg ai/ha	B	0	63 a	877 ab
oxyfluorfen	240	EC	0.13 kg ai/ha	B			
8 diuron	80	DF	0.90 kg ai/ha	B	0	67 a	942 a
LSD (P=.05)					6.48	170.2	
Standard Deviation					4.41	115.7	
CV					6.92	12.14	
Bartlett's X2					6.456	5.392	
P(Bartlett's X2)					0.488	0.612	
Treatment F					1.128	3.933	
Treatment Prob(F)					0.3831	0.0068	

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

Trial Comments

No visual effects noted on any of the treatments. Princep caused a significant seed yield reduction and Sencor + Goal had the next lowest yield.

Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year After Seeding - Brooks 2001-02 (Expt. #KB6)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

Experiment ID: KBG Fall E00 BK

CROP: POAPR, Kentucky Bluegrass (ABBEY). Planted: May-16-2000, 2.75 KG/HA, 0.75 CM Deep, 30 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Nov.8/2001 120 kg/ha N Expt. Location: Brooks, Alberta.

Soil Texture: SILT LOAM. %OM: 2 %Sand: 45 %Silt: 35 %Clay: 20 pH: 7.9

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	B	Application:
Date	Sep-11-2001	Oct-30-2001	Crop 1 POAPR Kentucky Bluegrass
Time of Day:	9:00 AM	9:00 AM	Height : 12 cm (cutting height)
Method	SPRAY	SPRAY	
Timing	POSTHARVEST	POSTHARVEST	
Placement	SURFACE	SURFACE	
Air Temp.	11 C	11.2 C	
Wind Speed	7 KPH	3 KPH	
Equipment	HANDHELD SPRAYER		
Pressure	275 kPa	275 kPa	
Nozzle Type	TEEEJET	TEEEJET	
Nozzle Size	8001	8003	
Noz. Spacing	50 CM	50 CM	
Boom Length	1.5 M	1.5 M	
Boom Height	45 CM	45 CM	
Carrier	WATER	WATER	
Appl. Volume	100 L/HA	300 L/HA	
Propellant	CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Oct-30-01, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Harvest area 6.6 m².

Crop Code	POAPR	POAPR			
Part Rated	PLANT	SEED			
Rating Data Type	HEIGHT	YIELD			
Rating Unit	cm	kg/ha			
Rating Date	Jul-23-2002	Jul-23-2002			
Trt-Eval Interval	266/315 DAA	266/315 DAA			
Trt Treatment	Form	Appl			
No. Name	Form	Rate	Appl		
	Conc	Type	Rate	Unit	Code
1 Check					63 a
2 dicamba	480 SN	0.237 kg ai/ha	A		1103 a
2,4-D amine	470 SN	0.523 kg ai/ha	A		1030 ab
3 clopyralid	50 EC	0.1 kg ai/ha	A		65 a
MCPA ester	280 EC	0.56 kg ai/ha	A		1051 ab
4 metsulfuron methyl	60 DF	0.0045 kg ai/ha	A		63 a
Agral 90		0.2 % v/v	A		980 ab

5 primisulfuron-methyl	75 WDG	0.04 kg ai/ha A	64 a	1036 ab
Agral 90		0.25 % v/v A		
6 simazine	90 SG	1.0 kg ai/ha B	62 a	838 ab
7 metribuzin	75 DF	0.42 kg ai/ha B	61 a	784 b
oxyfluorfen	240 EC	0.13 kg ai/ha B		
8 diuron	80 DF	0.90 kg ai/ha B	61 a	972 ab
LSD (P=.05)			6.14	182.2
Standard Deviation			4.17	123.5
CV			6.63	12.68
Bartlett's X2			9.851	1.334
P(Bartlett's X2)			0.197	0.988
Treatment F			0.573	3.153
Treatment Prob(F)			0.7694	0.0205
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)				

Trial Comments

Sencor caused slight yellowing of leaves on June 4, 2002 but this was not noticeable at harvest. Sencor + Goal caused a significant seed yield reduction from the untreated check.

Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall Two Years After Seeding - Bow Island 2002-03 (Expt. #KB7)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
 Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2002-03 Experiment

Experiment ID: KBG E02 Fall BI

CROP: POAPR, Kentucky Bluegrass (ABBEY). Planted: May-17-2000, 2.75 KG/HA, 0.75 CM Deep, 30 CM Row Width. Planting Method: DRILLED. FIELD Site. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Nov. 7/2002 120 kg/ha N Expt. Location: Bow Island, Alberta.

Soil Texture: Sandy Clay Loam. %OM: 2 %Sand: 65 %Silt: 21 %Clay: 14 pH: 7.2

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Sep-10-2002	Nov-5-2002	Crop 1 POAPR Kentucky Bluegrass
Time of Day:	11:30 AM	11:30 AM	Height : 12 cm (cutting height)
Method	: SPRAY	SPRAY	
Timing	: POSTHARVEST	POSTHARVEST	
Placement	: SURFACE	SURFACE	
Air Temp.	: 18 C	12 C	
Wind Speed	: 0 KPH	0 KPH	
Equipment	: HANDHELD SPRAYER		
Pressure	: 275 kPa	275 kPa	
Nozzle Type	: TEEJET	TEEJET	
Nozzle Size	: 8001	8003	
Noz. Spacing	: 50 CM	50 CM	
Boom Length	: 1.5 M	1.5 M	
Boom Height	: 45 CM	45 CM	
Carrier	: WATER	WATER	
Appl. Volume	: 100 L/HA	300 L/HA	
Propellant	: CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-5-02, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 6.6 m².

Crop Code	POAPR TOPGROW	POAPR TOPGROW	POAPR PLANT	POAPR SEED
Part Rated				

Rating Data Type		VISINJ	VISINJ	HEIGHT	YIELD
Rating Unit		percent	percent	cm	kg/ha
Rating Date		May-5-03	Jul-16-03	Jul-16-2003	Jul-16-2003
Trt-Eval Interval		181/237	253/309	256/312	256/312
Trt Treatment No.	Name	Form Conc	Form Type	Rate Rate	Appl Unit Code
1 Check				0	0
2 dicamba		480	SN	0.237 kg ai/ha	A 0
2,4-D amine		470	SN	0.523 kg ai/ha	A 0
3 clopyralid		50	EC	0.1 kg ai/ha	A 0
MCPA ester		280	EC	0.56 kg ai/ha	A 0
metsulfuron methyl		60	DF	0.0045 kg ai/ha	A 0
Agral 90				0.2 % v/v	A 0
5 primisulfuron-methyl		75	WDG	0.0405 kg ai/ha	A 0
Agral 90				0.25 % v/v	A 0
6 simazine		90	SG	1.0 kg ai/ha	B 0
7 metribuzin		75	DF	0.42 kg ai/ha	B 40
oxyfluorfen		240	EC	0.13 kg ai/ha	B 20
8 diuron		80	DF	0.89 kg ai/ha	B 0
LSD (P=.05)					4.7
Standard Deviation					3.2
CV					4.82
Bartlett's X2					2.06
P(Bartlett's X2)					0.956
Treatment F					8.513
Treatment Prob(F)					0.0001
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)					

Trial Comments

Only Princep and Sencor + Goal caused a significant seed yield reduction.

Tolerance of Kentucky Bluegrass to Herbicides Applied in the Fall the Year After Seeding - Brooks 2002-03 (Expt. #KB8)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
 Crop Diversification Division, Alberta Agriculture, Food and Rural Development
 2002-03 Experiment

Experiment ID: KBG E02 Fall BK

CROP: POAPR, Kentucky Bluegrass (ABBEY). Planted: May-9-2001, 2.75 KG/HA, 0.75 CM Deep, 30 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Nov. 7/2002 100 kg/ha N Expt. Location: Brooks, Alberta.

Soil Texture: Silt Loam. %OM: 2 %Sand: 45 %Silt: 35 %Clay: 20 pH: 7.9

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Sep-10-2002 Nov-5-2002	Crop	1 POAPR Kentucky Bluegrass
Time of Day:	9:00 AM 9:00 AM	Height :	12 cm (cutting height)
Method	SPRAY SPRAY		
Timing	POSTHARVEST POSTHARVEST		
Placement	SURFACE SURFACE		
Air Temp.	: 14 C 7 C		
Wind Speed	: 0 KPH 0 KPH		
Equipment	: HANDHELD SPRAYER		
Pressure	: 275 kPa 275 kPa		
Nozzle Type	: TEEJET TEEJET		
Nozzle Size	: 8001 8003		
Noz. Spacing	: 50 CM 50 CM		

Boom Length: 1.5 M 1.5 M
 Boom Height: 45 CM 45 CM
 Carrier : WATER WATER
 Appl. Volume: 100 L/HA 300 L/HA
 Propellant : CO2 CO2

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-5-02, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 6.6 m².

Crop Code	POAPR	POAPR	POAPR	POAPR	POAPR
Part Rated	TOPGROW	TOPGROW	TOPGROW	PLANT	SEED
Rating Data Type	VISINJ	VISINJ	VISINJ	HEIGHT	YIELD
Rating Unit	percent	percent	percent	cm	kg/ha
Rating Date	May-5-2003	May-31-2003	Jun-9-2003	Jul-17-2003	Jul-17-2003
Trt-Eval Interval	181/237 DAA	191/247 DAA	216/272 DAA	254/310 DAA	254/310 DAA
Trt Treatment No.	Form Conc	Form Type	Rate Rate	Appl Unit	Code
1 Check					
2 dicamba	480 SN	0.237 kg	ai/ha	A	0 0 0
2,4-D amine	470 SN	0.523 kg	ai/ha	A	0 0 0
3 clopyralid	50 EC	0.1 kg	ai/ha	A	0 0 0
MCPA ester	280 EC	0.56 kg	ai/ha	A	60 a 997 a
4 metsulfuron-methyl	60 DF	0.0045 kg	ai/ha	A	0 0 0
Agral 90		0.2 %	v/v	A	65 a 939 a
5 primisulfuron-methyl	75 WDG	0.0405 kg	ai/ha	A	0 0 0
Agral 90		0.25 %	v/v	A	63 a 969 a
6 simazine	90 SG	1.0 kg	ai/ha	B	5 5 5
7 metribuzin	75 DF	0.42 kg	ai/ha	B	50 20 5
oxyfluorfen	240 EC	0.13 kg	ai/ha	B	56 a 648 b
8 diuron	80 DF	0.89 kg	ai/ha	B	0 0 5
LSD (P=.05)					61 a 728 b
Standard Deviation					5.9 163.1
CV					4.0 110.9
Bartlett's X2					6.47 12.08
P(Bartlett's X2)					1.984 5.359
Treatment F					0.961 0.616
Treatment Prob(F)					2.119 7.012
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)					0.0866 0.0002

Trial Comments

Sencor + Goal treated plots seem to have stayed dormant longer than the other treatments as they did not green up as fast as the other treatments, in the spring. Only Princep and Sencor + Goal caused a significant seed yield reduction the year after they were applied in the late fall.

Tolerance of Meadow Bromegrass to Herbicides Applied in the Fall of the Year of Seeding - Edmonton 2001-02 (Expt. #MB1)

Dan Cole, Nicole Kimmel

Experiment ID: MBrome S01 Fall Edm

Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

CROP: BROSSM, MEADOW BROMEGRASS (Fleet). Planted: Jun-1-2001, 4.0 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOUBLE DISC PRESS DRILL. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: Oct.31/01 80 kg/ha N Expt. Location: Ellerslie, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 7.0

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	B	Application:
Date	: Oct-1-2001	Nov-4-2001	Crop 1 BROSSM Meadow Bromegrass
Time of Day:	1:00 PM	5:30 PM	Height : 10 CM 10 CM (Mowing Height)
Method	: SPRAY	SPRAY	Stage : Green Veg. Yellow Veg.
Timing	: POSTHARVEST	POSTHARVEST	Weed 1 PLAMA Broadleaf Plantain
Placement	: SURFACE	SURFACE	Stage : 6 lf 6 lf
Air Temp.	: 13 C	8 C	Height : 15 CM 15 CM
Wind Speed	: 10 KPH	0 KPH	Weed 2 CVPTE Narrow-leaf Hawk's-beard
Dew Present:	N	N	Stage : 10 lf 10 lf
Soil Moist.:	N/A	WET	Height : 15 CM 15 CM
Cloud Cover:	100%	0%	
Equipment	HANDHELD SPRAYER		
Pressure	: 138 kPa	276 kPa	
Nozzle Type	TEEJET	TEEJET	
Nozzle Size	XR80015	VS8003	
Noz. Spacing	50 CM	50 CM	
Boom Length	1.5 M	1.5 M	
Boom Height	45 CM	45 CM	
Carrier	: WATER	WATER	
Appl. Volume	: 100 L/HA	300 L/HA	
Propellant	CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-4-01, while normal spray solution volume (100 L/ha) was used in October application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 9 m².

Crop Code			BROSSM	BROSSM	BROSSM
	Part Rated		TOPGROW	TOPGROW	SEED
Rating Data Type			VISINJ	VISINJ	YIELD
Rating Unit			percent	percent	kg/ha
Rating Date			May-31-2002	Aug-1-2002	Aug-1-2002
Trt-Eval Interval			208/242 DAA	270/304 DAA	270/304 DAA
Trt Treatment	Form	Form	Rate	Appl	
No. Name	Conc	Type	Rate	Unit	Code
1 Check					0 0 1179 a
2 dicamba	480	SN	0.237 kg	ai/ha	A 0 0 1159 a
2,4-D amine	470	SN	0.523 kg	ai/ha	A 0 0 1117 a
3 fluroxypyr	180	EC	0.144 kg	ai/ha	A 0 0 1099 a
clopyralid	50	EC	0.1 kg	ai/ha	A 0 0 1063 a
MCPA ester	280	EC	0.560 kg	ai/ha	A 0 0 1063 a
4 metsulfuron methyl	60	DF	0.0045 kg	ai/ha	A 0 0 1063 a
Agral 90			0.2 %	v/v	A 0 0 1063 a
5 simazine	90	SG	1.0 kg	ai/ha	B 0 0 1063 a
2,4-D amine	470	SN	0.523 kg	ai/ha	B 0 0 1063 a
6 sulfosulfuron	75	WDG	0.0203 kg	ai/ha	B 50 38 615 b
2,4-D ester	564	EC	0.395 kg	ai/ha	B 0 0 1063 a
Merge			0.5 %	v/v	B 0 0 1063 a
pH Balancer			0.25 %	v/v	B 0 0 1063 a
7 s-metolachlor	915	EC	1.05 kg	ai/ha	B 0 0 1063 a
8 diuron	80	DF	1.8 kg	ai/ha	B 0 0 1063 a
LSD (P=.05)					121.3
Standard Deviation					82.4
CV					7.85
Bartlett's X2					2.002
P(Bartlett's X2)					0.96
Treatment F					19.105
Treatment Prob(F)					0.0001
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)					

Trial Comments

Only fall applied Sundance + 2,4-D ester stunted and thinned the meadow bromegrass and caused a significant seed yield reduction.

**Tolerance of Meadow Bromegrass to Herbicides Applied in the Fall the Year of Seeding -
Beaverlodge 2002-03 (Expt. #MB2)**

Calvin Yoder, Dan Cole, Jean Beaudoin, Lois Connelly **Experiment ID: MBrome S02 Fall Bldg**
 Alberta Agriculture, Food and Rural Development, Smokey Applied Research and
 Demonstration Association, Agriculture and Agri-Food Canada
 2002-03 Experiment

CROP: BROSM, Meadow Bromegrass (Paddock). Planted: May-31-2002, 4 kg/ha, 1 cm Deep, 30 cm Row Width. Planting Method: Drill. FERTILIZER: Broadcasted May-31-02 N-18 kg/ha P-76.5 kg/ha K-0 kg/ha S-0 kg/ha & Oct-22-02 N-68 kg/ha P-45 kg/ha K-0 kg/ha S-0 kg/ha. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M. Expt. Location: Beaverlodge, Alberta.

APPLICATION DESCRIPTION STAGE AT APPLICATION

Application:	A	Application:	A
Date	Sep-14-2002	Crop	1 BROSM Meadow Bromegrass
Time of Day:	9:00 am	Height	: 20 cm
Method	Sprayer	Stage	: Vegetative
Timing	PostHarvest		
Placement	Surface		
Air Temp.	: 11 C		
% Humidity	: 80		
Cloud Cover	: 95%		
Equipment	: BAC PAC		
Pressure	: 110 kPa		
Nozzle Type	: TEEJET		
Nozzle Size	: XR80015		
Noz. Spacing	: 50 cm		
Boom Length	: 1.5 m		
Boom Height	: 45 cm		
Carrier	: Water		
Appl. Volume	: 100 L/HA		
Propellant	: Propane		

Comments: Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury of the crop. Harvest area 3 m².

Crop Code		BROSM		BROSM		BROSM		
		TOPGROW	VISINJ	TOPGROW	VISINJ	TOPGROW	VISINJ	
Part Rated		percent	percent	percent	percent	percent	percent	
Rating Data Type								
Rating Unit								
Rating Date								
Trt-Eval Interval								
Trt Treatment	No. Name	Form Conc	Form Type	Rate Rate	Unit Unit	Appl Appl	Code Code	
1 Check						0	0	
2 dicamba		480	SN	0.290	kg ai/ha	A	0	
2,4-D amine		470	SN	0.700	kg ai/ha	A	0	
3 fluroxypyr		180	EC	0.144	kg ai/ha	A	0	
clopyralid		50	EC	0.100	kg ai/ha	A	0	
MCPA ester		280	EC	0.56	kg ai/ha	A	0	
4 clopyralid		50	EC	0.10	kg ai/ha	A	0	
MCPA ester		280	EC	0.56	kg ai/ha	A	0	
quinclorac		75	DF	0.125	kg ai/ha	A	0	

Merge			1.0 % v/v	A			
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha	A	0	0	0	0
Agral 90		0.2 % v/v	A				
6 metsulfuron methyl	60 DF	0.0045 kg ai/ha	A	0	0	0	0
2,4-D amine	560 SN	0.70 kg ai/ha	A				
Merge		0.2 % v/v	A				
7 Check			A	0	0	0	0
8 Check			A	0	0	0	0
Crop Code				BROSM	BROSM	BROSM	
Part Rated				TOPGROW	FORAGE	SEED	
Rating Data Type				VISINJ	WEIDRY	YIELD	
Rating Unit				percent	KG/HA	KG/HA	
Rating Date				Jul-29-2003	Aug-1-2003	Aug-1-2003	
Trt-Eval Interval				318 DA-A	321 DA-A	321 DA-A	
Trt Treatment	Form	Form	Rate	Appl			
No. Name	Conc	Type	Rate	Unit	Code		
1 Check					0	6386 a	872 a
2 dicamba	480 SN		0.290 kg ai/ha	A	0	7541 a	853 a
2,4-D amine	470 SN		0.700 kg ai/ha	A			
3 fluroxypyr	180 EC		0.144 kg ai/ha	A	0	6499 a	975 a
clopyralid	50 EC		0.100 kg ai/ha	A			
MCPA ester	280 EC		0.56 kg ai/ha	A			
4 clopyralid	50 EC		0.10 kg ai/ha	A	0	6708 a	868 a
MCPA ester	280 EC		0.56 kg ai/ha	A			
quinchlorac	75 DF		0.125 kg ai/ha	A			
Merge		1 % v/v		A			
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha	A	0	7416 a	951 a	
Agral 90		0.2 % v/v	A				
6 metsulfuron methyl	60 DF	0.0045 kg ai/ha	A	0	5625 a	868 a	
2,4-D amine	560 SN	0.70 kg ai/ha	A				
Merge		0.2 % v/v	A				
7 Check			A	0	6833 a	921 a	
8 Check			A	0	6583 a	815 a	
LSD (P=.05)					2411.00	153.56	
Standard Deviation					1634.55	103.37	
CV					24.4	11.61	
Bartlett's X2					2.76	5.667	
P(Bartlett's X2)					0.906	0.579	
Treatment F					0.544	1.080	
Treatment Prob(F)					0.7908	0.4152	
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)							

Trial Comments

There were no significant differences in forage or seed yield among the treatments. None of the treatments caused visual damage to the meadow bromegrass.

Tolerance of Meadow Bromegrass to Herbicides Applied in the Fall the Year After Seeding - Edmonton 2002-03 (Expt. #MB3)

Dan Cole, Nicole Kimmel

Experiment ID: MBrome E02 Fall Edm

Crop Diversification, Alberta Agriculture, Food and Rural Development
2002-03 Experiment

CROP: BROSM, Meadow Bromegrass (FLEET). Planted: Jun-1-2001, 4.0 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOUBLE DISC PRESS DRILL. Fertilizer: Broadcast Oct.31, 2001 80 kg/ha N & Oct.18, 2002 80 kg/ha N Expt. Design: RANDOMIZED COMPLETE BLOCK.

Reps: 4. Plot Size: 2 M x 6 M.

Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 5.7

APPLICATION DESCRIPTION			STAGE AT APPLICATION		
Application:	A	B	C	Application:	A
C				B &	
Date	Sep-25-2002	Oct-16-2002	Oct-16-2002	Crop 1 BROSM	Meadow Bromegrass
Time of Day:	11:15 AM	10:00 AM		Height:	Cut @ 8 cm
Regrowth 4 cm					
Method	SPRAY	SPRAY	BROADCAST		
Timing	POSTHARVEST	POSTHARVEST	POSTHARVEST		
Placement	SURFACE	SURFACE	SURFACE		
Air Temp.	6 C	6 C			
% Humidity	50	42			
Wind Speed	15 KPH	8 KPH			
Dew Present	Y	N			
Cloud Cover	40%	70%			
Equipment	MOTORIZED	HANDHELD	HAND		
Pressure	207 kPa	276 kPa			
Nozzle Type	TEEJET	TEEJET			
Nozzle Size	80015	8003VS			
Noz. Spacing	50 CM	50 CM			
Boom Length	2 M	2 M			
Boom Height	50 CM	45 CM			
Carrier	WATER	WATER	SAND		
Appl. Volume	100 L/HA	300 L/HA			
Propellant	CO2	CO2			

Comments: Higher spray solution volume (300L/ha) was used in application (B) on Oct-16-02, while normal spray solution volume (100L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 9 m².

Crop Code				BROSSM	BROSSM	BROSSM
	Part Rated	Rating Data Type	Rating Unit	TOPGROW	TOPGROW	SEED
Rating Date				VISINJ	VISINJ	YIELD
Trt-Eval Interval				percent	percent	kg/ha
May-14-2003	Jul-11-2003	Jul-31-2003				
Trt Treatment	Form	Form	Rate	Appl		
No. Name	Conc	Type	Rate	Unit	Code	
1 Check					0	0
2 dicamba	480	SN	0.237 kg	ai/ha	A	1915 a
2,4-D amine	470	SN	0.523 kg	ai/ha	A	1800 a
3 fluroxypyr	180	EC	0.144 kg	ai/ha	A	1731 a
clopyralid	50	EC	0.1 kg	ai/ha	A	
MCPA ester	280	EC	0.56 kg	ai/ha	A	
4 metsulfuron methyl	60	DF	0.0045 kg	ai/ha	A	1742 a
Agral 90			0.2 % v/v		A	
5 simazine	90	SG	1.0 kg	ai/ha	B	1862 a
2,4-D amine	470	SN	0.523 kg	ai/ha	B	
6 triallate	10	GR	1.7 kg	ai/ha	C	1831 a
7 s-metolachlor	915	EC	1.05 kg	ai/ha	B	1825 a
8 diuron	80	DF	1.8 kg	ai/ha	B	1927 a
LSD (P=.05)						202.9
Standard Deviation						137.9
CV						7.54
Bartlett's X2						3.775
P(Bartlett's X2)						0.805
Treatment F						1.083
Treatment Prob(F)						0.4082

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

Trial Comments

None of the fall applied treatments caused a visible or significant seed yield reduction.

Tolerance of Chewings Fescue to Herbicides Applied in the Fall of the Year of Seeding
- Edmonton 2000-01 (Expt. #CF1)

Dan Cole, Nicole Kimmel, James Leskiw
Agronomy Unit, Alberta Agriculture, Food and Rural Development
2000-01 Experiment

Experiment ID: Chewing S00 Fall Edm

CROP: Wilma Chewings Fescue (FESSS) 3 kg/ha Planted: Jun-05-00, 1 cm, 30 cm row width
Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M.
Fertilizer: Apr-30-01 80 kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam, %OM:11, %Sand:19, %Silt:40, %Clay:41 and pH:7.0

APPLICATION DESCRIPTION STAGE AT APPLICATION

Application:	A	B	Application:	A	B
Date	Sep-26-00	Oct-11-00	Crop	1 Chewings Fescue (FESSS)	
Time of Day	8:00 AM	3:45 PM	Height	: 28 CM	28 CM
Method	SPRAY	SPRAY	Stage	: 3 lf	3 lf
Timing	PREBLOOM	PREBLOOM	Weed	1 Dandelion (TAROF)	
Placement	SURFACE	SURFACE	Height	: 13-23 CM	
Air Temp.	6 C	6 C			
% Humidity	High	N			
Wind Speed	0-8 KPH	0-5 KPH			
Dew Present	Little	N			
Equipment	HANDHELD CO2 SPRAYER				
Pressure	138 kPa	138 kPa			
Nozzle Type	TEEJET	TEEJET			
Nozzle Size	80015	80015			
Noz. Spacing	50 CM	50 CM			
Boom Length	1.5 M	1.5 M			
Boom Height	45 CM	45 CM			
Appl. Volume	100 L/ha	300 L/ha			

Comments: Higher spray solution volume (300L/ha) was used in application (B) on Oct-11-00, while normal spray solution volume (100L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops and % control of weeds. Harvest area 9 m².

Crop Code	FESSS		FESSS		FESSS		FESSS
	TOPGROW	VISINJ	TOPGROW	VISINJ	VISINJ	YIELD	SEED
Part Rated	percent	percent	percent	percent	percent	kg/ha	
Rating Data Type							
Rating Unit							
Rating Date	Oct-23-00	May-16-01	Jul-07-01	Jul-23-01			
Trt-Eval Interval	27/12 DA-A		232/217	284/269	300/285		
Trt Treatment	Form	Form	Rate	Appl			
No. Name	Conc	Type	Rate	Unit	Code		
1 Check					0	0	0
2 dicamba	480	SN	0.29	KG A/HA	A	3	4
2,4-D amine	470	SN	0.7	KG A/HA	A		134 bc
3 fluroxypyr	180	EC	0.144	KG A/HA	A	0	0
clopyralid	50	EC	0.1	KG A/HA	A		168 ab
MCPA ester	280	EC	0.56	KG A/HA	A		
4 metsulfuron methyl	60	DF	0.0045	KG A/HA	A	5	0
Agral 90			0.2 %	V/V	A		195 a
5 simazine	90	SG	1.0	KG A/HA	B	1	3
							139 bc

2,4-D amine	470 SN	0.523 KG A/H A B					
6 metribuzin	75 DF	0.56 KG A/H A B	0	0	24	85 d	
7 atrazine	90 WDG	1.51 KG A/H A B	0	0	18	124 c	
8 diuron	80 DF	1.8 KG A/H A B	0	0	18	104 cd	
LSD (P=.05)						31.17	
Standard Deviation						21.20	
CV						14.72	
Bartlett's X2						4.154	
P(Bartlett's X2)						0.762	
Treatment F						15.585	
Treatment Prob(F)						0.0001	

Weed Code		TAROF	TAROF		
Part Rated		TOPGROW	PLANT		
Rating Data Type		VISCON	COUNT		
Rating Unit		percent	#/plot		
Rating Date		Jun-11-01	Jun-15-01		
Trt-Eval Interval		258/270	262/247		
		DA-A	DA-A		
Trt Treatment	Form	Form	Rate	Appl	
No. Name	Conc	Type	Rate	Unit	Code
1 Check					0
2 dicamba	480 SN		0.29 KG A/H A	A	100
2,4-D amine	470 SN		0.7 KG A/H A	A	
3 fluroxypyr	180 EC		0.144 KG A/H A	A	100
clopyralid	50 EC		0.1 KG A/H A	A	
MCPA ester	280 EC		0.56 KG A/H A	A	
4 metsulfuron	60 DF		.0045 KG A/H A	A	100
methyl					0 b
Agral 90			0.2 % V/V	A	
5 simazine	90 SG		1 KG A/H B		61
2,4-D amine	470 SN		0.523 KG A/H B		
6 metribuzin	75 DF		0.56 KG A/H B		3
7 atrazine	90 WDG		1.51 KG A/H B		0
8 diuron	80 DF		1.8 KG A/H B		3
LSD (P=.05)					4.8
Standard Deviation					3.3
CV					73.07
Bartlett's X2					2.065
P(Bartlett's X2)					0.724
Treatment F					7.821
Treatment Prob(F)					0.0001

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

Trial Comments

When applied in the fall, Banvel + 2,4-D amine, Princep + 2,4-D amine, Sencor, Atrazine and Karmex caused a significant chewings fescue seed yield reduction. The Banvel + 2,4-D and Princep + 2,4-D seed yield loss was without noticeable injury to the chewings fescue.

Tolerance of Chewings Fescue to Herbicides Applied in the Fall of the Year of Seeding - Edmonton 2001-02 (Expt. #CF2)

Dan Cole, Nicole Kimmel

Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

Experiment ID: Chew Fes S01 Fall Edm

CROP: FESSS, Chewings Fescue (Wilma). Planted: Jun-5-2001, 3.0 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOUBLE DISC PRESS DRILL. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: Oct.31/01 80 kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 7.0

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Oct-1-2001 Nov-4-2001	Crop 1	FESSS Chewings Fescue
Time of Day:	1:30 PM	Height :	10 CM 10 CM (Mowing Height)
Method	: SPRAY	Stage :	Green Veg. Yellow Veg.
Timing	: POSTHARVEST	POSTHARVEST	Weed 1 CVPTE Narrow-leaved Hawk's-beard
Placement	: SURFACE	SURFACE	Stage : 30 lf 30 lf
Air Temp.	: 13 C	8 C	Height : 8-12 CM 8-12 CM
Wind Speed	: 10 KPH	0 KPH	Weed 2 CIRAR Canada Thistle
Cloud Cover:	100%	0%	Stage : 8 lf 8 lf
Equipment	: HANDHELD SPRAYER		Height : 15 CM 15 CM
Pressure	: 138 kPa	276 kPa	Weed 3 PLAMA Broad-leaved Plantain
Nozzle Type	: TEEJET	TEEJET	Stage : 4 lf 4 lf
Nozzle Size	: XR80015	VS8003	Height : 8-12 CM 8-12 CM
Noz. Spacing:	50 CM	50 CM	
Boom Length:	1.5 M	1.5 M	
Boom Height:	45 CM	45 CM	
Carrier	: WATER	WATER	
Appl. Volume:	100 L/HA	300 L/HA	
Propellant	: CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-4-01, while normal spray solution volume (100 L/ha) was used in October application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 9 m².

Crop Code	FESSS		FESSS		FESSS	
	TOPGROW	VISINJ	TOPGROW	VISINJ	YIELD	percent
Part Rated						kg/ha
Rating Data Type						
Rating Unit						
Rating Date			May-31-2002	Jul-11-2002	Jul-19-2002	
Trt-Eval Interval			208/242 DAA	249/283 DAA	257/291 DAA	
Trt Treatment	Form	Form	Rate	Appl		
No. Name	Conc	Type	Rate	Unit	Code	
1 Check					0	0
2 dicamba	480	SN	0.29 kg	ai/ha	A	468 a
2,4-D amine	470	SN	0.7 kg	ai/ha	A	342 b
3 fluroxypyr	180	EC	0.144 kg	ai/ha	A	0
clopyralid	50	EC	0.1 kg	ai/ha	A	416 ab
MCPA ester	280	EC	0.560 kg	ai/ha	A	
4 metsulfuron methyl	60	DF	0.0045 kg	ai/ha	A	0
Agral 90			0.2 %	v/v	A	384 ab
5 simazine	90	SG	1.0 kg	ai/ha	B	0
2,4-D amine	470	SN	0.523 kg	ai/ha	B	401 ab
6 metribuzin	75	DF	0.56 kg	ai/ha	B	0
7 atrazine	90	WDG	1.51 kg	ai/ha	B	408 ab
8 diuron	80	DF	1.8 kg	ai/ha	B	451 ab
LSD (P=.05)						72.6
Standard Deviation						49.4
CV						11.96
Bartlett's X2						8.165
P(Bartlett's X2)						0.318
Treatment F						2.574
Treatment Prob(F)						0.0440

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

Keuls)

Trial Comments

Although there was not obvious injury to chewings fescue, Banvel + 2,4-D amine applied in the fall caused a significant seed yield reduction.

Tolerance of Chewings Fescue to Herbicides Applied in the Fall the Year After Seeding
- Edmonton 2001-02 (Expt. #CF3)

Dan Cole, Nicole Kimmel
Crop Diversification Div
2001-02 Experiment

Experiment ID: Chew Fes E01 Fall Edm

CROP: FESSS, Chewings Fescue (Wilma). Planted: Jun-5-2000, 3.0 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOUBLE DISC PRESS DRILL. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: April 30/01 80 kg/ha N and Oct.31/01 80 kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta.
Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 7.0

APPLICATION DESCRIPTION		STAGE AT APPLICATION		
Application:	A	Application:	A	B
Date	: Oct-1-2001	Nov-4-2001	Crop 1	FESSS Chewings Fescue
Time of Day:	12:00 PM	4:30 PM	Height	: 10 CM
Height)				10 CM (Mowing
Method	: SPRAY	SPRAY	Stage	: Green Veg.
Timing	: POSTHARVEST	POSTHARVEST		Yellow Veg.
Placement	: SURFACE	SURFACE		
Air Temp.	: 13 C	10 C		
Wind Speed	: 0 KPH	0 KPH		
Cloud Cover:	100%	0%		
Equipment	: HANDHELD SPRAYER			
Pressure	: 138 kPA	276 kPa		
Nozzle Type:	TEEJET	TEEJET		
Nozzle Size:	XR80015	VS8003		
Noz. Spacing:	50 CM	50 CM		
Boom Length:	1.5 M	1.5 M		
Boom Height:	45 CM	45 CM		
Carrier	: WATER	WATER		
Appl. Volume:	100 L/HA	300 L/HA		
Propellant	: CO2	CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-4-01, while normal spray solution volume (100 L/ha) was used in October application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth, WEIDRY- Dry Weight. Visual assessments provide % injury to the crops. Harvest area 9 m².

Crop Code	FESSS	FESSS	FESSS						
Part Rated	TOPGROW	TOPGROW	SEED						
Rating Data Type	VISINJ	VISINJ	YIELD						
Rating Unit	percent	percent	kg/ha						
Rating Date	May-31-2002	Jul-11-2002	Jul-19-2002						
Trt-Eval Interval	208/242 DAA	249/283 DAA	257/291 DAA						
Trt Treatment	Form	Form	Rate	Appl					
No.	Name	Conc	Type	Rate	Unit	Code			
1	Check					0	0	148 ab	
2	dicamba	480	SN	0.29	kg ai/ha	A	0	0	116 b
	2,4-D amine	470	SN	0.7	kg ai/ha	A			
3	fluroxypyr	180	EC	0.144	kg ai/ha	A	0	0	132 ab

clopyralid	50 EC	0.1 kg ai/ha	A			
MCPA ester	280 EC	0.560 kg ai/ha	A			
4 metsulfuron methyl	60 DF	0.0045 kg ai/ha	A	0	0	182 ab
Agral 90		0.2 % v/v	A			
5 simazine	90 SG	1.0 kg ai/ha	B	0	0	156 ab
2,4-D amine	470 SN	0.523 kg ai/ha	B			
6 metribuzin	75 DF	0.56 kg ai/ha	B	0	0	147 ab
7 atrazine	90 WDG	1.51 kg ai/ha	B	0	0	166 ab
8 diuron	80 DF	1.8 kg ai/ha	B	0	0	199 a
LSD (P=.05)						46.0
Standard Deviation						31.3
CV						20.08
Bartlett's X2						4.322
P(Bartlett's X2)						0.742
Treatment F						2.905
Treatment Prob(F)						0.0273

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

Trial Comments

None of the fall applied treatments caused a significant seed yield reduction, although the Banvel + 2,4-D amine treatment had the lowest yield.

Tolerance of Chewings Fescue to Herbicides Applied in the Fall the Year After Seeding - Edmonton 2002-03 (Expt. #CF4)

Dan Cole, Nicole Kimmel

Experiment ID: Chew Fes E02 Fall Edm

Crop Diversification, Alberta Agriculture, Food and Rural Development
2002-03 Experiment

CROP: FESSS, Chewings Fescue (WILMA). Planted: Jun-5-2001, 3.0 KG/HA, 1 CM Deep, 30 CM Row Width.

Planting Method: DOUBLE DISC PRESS DRILL. Fertilizer: Broadcast Oct.31, 2001 80 kg/ha N & Oct.18, 2002 80 kg/ha N Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M.

Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 5.7

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date :	Sep-25-2002 Oct-09-2002	Crop	1 FESSS Chewings Fescue
Time of Day:	10:30 AM	10:20 PM	Height: Cut @ 8 cm Regrowth 2 cm
Method :	SPRAY	SPRAY	
Timing :	POSTHARVEST	POSTHARVEST	
Placement :	SURFACE	SURFACE	
Air Temp. :	5 C	7 C	
% Humidity :	50	62	
Wind Speed :	10 KPH	10 KPH	
Dew Present:	Y	Y	
Cloud Cover:	40 %	70 %	
Equipment :	MOTORIZED	HANDHELD SPRAYER	
Pressure :	207 kPa	276 kPa	
Nozzle Type:	TEEJET	TEEJET	
Nozzle Size:	80015	8003VS	
Noz. Spacing:	50 CM	50 CM	
Boom Length:	2 M	1.5 M	
Boom Height:	50 CM	45 CM	
Carrier :	WATER	WATER	
Appl. Volume:	100 L/HA	300 L/HA	
Propellant :	CO2	CO2	

Comments: Higher spray solution volume (300L/ha) was used in application (B) on Oct-9-02, while normal spray solution volume (100L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 9 m².

Crop Code	FESSS	FESSS	FESSS
Part Rated	TOPGROW	TOPGROW	SEED
Rating Data Type	VISINJ	VISINJ	YIELD
Rating Unit	percent	percent	kg/ha
Rating Date	May-14-2003	Jul-11-2003	Jul-28-2003
Trt-Eval Interval	231/217 DAA	289/275 DAA	306/292 DAA
Trt Treatment	Form	Form	Rate
No. Name	Conc	Type	Rate
1 Check			Unit
2 dicamba	480	SN	0.29 kg ai/ha
2,4-D amine	470	SN	0.7 kg ai/ha
3 fluroxypyr	180	EC	0.144 kg ai/ha
clopyralid	50	EC	0.1 kg ai/ha
MCPA ester	280	EC	0.56 kg ai/ha
4 metsulfuron methyl	60	DF	0.0045 kg ai/ha
Agral 90			0.2 % v/v
5 simazine	90	SG	1.0 kg ai/ha
2,4-D amine	470	SN	0.523 kg ai/ha
6 metribuzin	75	DF	0.56 kg ai/ha
7 atrazine	90	WDG	1.51 kg ai/ha
8 diuron	80	DF	1.8 kg ai/ha
LSD (P=.05)			
Standard Deviation			45.8
CV			31.1
Bartlett's X2			15.51
P(Bartlett's X2)			4.394
Treatment F			0.733
Treatment Prob(F)			5.201
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)			0.0015

Trial Comments

Fall applied Banvel II + 2,4-D amine caused a visible seed stalk reduction and significant seed yield reduction to established chewings fescue while Atrazine caused a significant seed yield reduction.

Canada Thistle and Cleavers Control Following Fall Applications of Herbicides on Established Chewings Fescue - Spirit River 2002-03 (Expt. #CF5)

Calvin Yoder, Dan Cole, Jean Beaudoin, G.Ropchan
Alberta Agriculture, Food and Rural Development, Smokey Applied Research and Demonstration Association
2002-03 Experiment

Experiment ID: Chew Fes E02 Fall SR

CROP: FESSS, Chewings Fescue Planted: May-17-2001, 3 kg/ha Planting Method: Broadcast.
Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M.
Expt. Location: Spirit River, Alberta.

APPLICATION DESCRIPTION	STAGE AT APPLICATION
Application: A	Application: A
Date : Sep-14-2002	Crop 1 FESSS Chewings Fescue
Time of Day: 2:30 pm	Stage : Vegetative
Method : SPRAY	
Timing : PREBLOOM	Weed 1 CIRAR Canada Thistle
Placement : SURFACE	Stage: Rosette-bud
Air Temp. : 21 C	Weed 2 GALAP Cleaver

% Humidity :	75	Stage:	1-30 whorls
Equipment :	BAC PAC		
Pressure :	110 kPa		
Nozzle Type:	TEEJET		
Nozzle Size:	XR80015		
Noz.Spacing:	50 cm		
Boom Length:	1.5 m		
Boom Height:	45 cm		
Carrier :	Water		
Appl.Volume:	100 L/HA		
Propellant :	Propane		

Comments: Crop and weed codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury control of weeds.

Weed Code		CIRAR	GALAP	CIRAR
Part Rated		TOPGROW	TOPGROW	TOPGROW
Rating Data Type		VISCON	VISCON	VISCON
Rating Unit		Percent	Percent	Percent
Rating Date		Oct-5-2002	Oct-5-2002	Jun-25-2003
Trt-Eval Interval		21 DA-A	21 DA-A	265 DA-A
Trt Treatment	Form Form	Rate	Appl	
No. Name	Conc Type Rate	Unit	Code	
1 Check				0 0 0
2 dicamba	480 SN	0.290 kg ai/ha	A	75 68 0
2,4-D amine	560 SN	0.70 kg ai/ha	A	
3 fluroxypyr	180 EC	0.144 kg ai/ha	A	88 86 100
clopyralid	50 EC	0.100 kg ai/ha	A	
MCPA ester	280 EC	0.560 kg ai/ha	A	
4 clopyralid	50 EC	0.100 kg ai/ha	A	90 88 98
MCPA ester	280 EC	0.560 kg ai/ha	A	
quinchlorac	75 DF	0.125 kg ai/ha	A	
Merge		1.0 % v/v	A	
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha	A	43 20 15
Agral 90		0.2 % v/v	A	
6 metsulfuron methyl	60 DF	0.0045 kg ai/ha	A	50 79 9
quinchlorac	75 DF	0.125 kg ai/ha	A	
Merge		1.0 % v/v	A	
7 triasulfuron	75 WDG	0.008 kg ai/ha	A	80 81 0
bromoxynil	280 EC	0.138 kg ai/ha	A	
Agral 90		0.25 % v/v	A	

Weed Code		CIRAR		
Part Rated		TOPGROW		
Rating Data Type		VISCON		
Rating Unit		Percent		
Rating Date		Jul-11-2003		
Trt-Eval Interval		300 DA-A		
Trt Treatment	Form Form	Rate	Appl	
No. Name	Conc Type Rate	Unit	Code	
1 Check			0	
2 dicamba	480 SN	0.290 kg ai/ha	A	10
2,4-D amine	560 SN	0.70 kg ai/ha	A	
3 fluroxypyr	180 EC	0.144 kg ai/ha	A	85
clopyralid	50 EC	0.100 kg ai/ha	A	
MCPA ester	280 EC	0.560 kg ai/ha	A	
4 clopyralid	50 EC	0.100 kg ai/ha	A	88
MCPA ester	280 EC	0.560 kg ai/ha	A	
quinchlorac	75 DF	0.124 kg ai/ha	A	
Merge		1.0 % v/v	A	
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha	A	0

Agral 90		0.2 % v/v	A	
6 metsulfuron methyl	60 DF	0.0045 kg ai/ha	A	0
quinchlorac	75 DF	0.124 kg ai/ha	A	
Merge		1.0 % v/v	A	
7 triasulfuron	75 WDG	0.008 kg ai/ha	A	15
bromoxynil	280 EC	0.138 kg ai/ha	A	
Agral 90		0.25 % v/v	A	

Trial Comments

Fall application of Prestige and Curtail M + Accord provided good control of Canada thistle the following year. Control of thistle the year after spraying was inadequate with all other treatments.

All products, except Banvel + 2,4-D amine and Ally, gave good control of cleavers 21 days after application. There were no cleavers present in any of the plots, including the check, in the year following application to assess long-term tolerance.

Tolerance of Hard Fescue to Herbicides Applied in the Fall of the Year of Seeding - Edmonton 2000-01 (Expt. #HF1)

Dan Cole, Nicole Kimmel, James Leskiw
Agronomy Unit, Alberta Agriculture, Food and Rural Development
2000-01 Experiment

Experiment ID: Hard S00 Fall Edm

CROP: Spartan Hard Fescue (FESSS) 3 kg/ha Planted: Jun-05-00, 1 cm, 30 cm row width
Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M.
Fertilizer: Apr-30-01 80 kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta.
Soil Texture: Silty Clay Loam, %OM:11, %Sand:19, %Silt:40, %Clay:41 and pH:5.7

APPLICATION DESCRIPTION STAGE AT APPLICATION

Application:	A	B	Application:	A	B
Date	Sep-26-00	Oct-11-00	Crop	1 Hard Fescue (FESSS)	
Time of Day	8:45 AM	4:15 PM	Height	: 26 CM	22 CM
Method	SPRAY	SPRAY	Stage	: 3 lf	3 lf
Timing	PREBLOOM	PREBLOOM	Weed	1 Dandelion (TAROF)	
Placement	SURFACE	SURFACE	Height	: 23 CM	
Air Temp.	: 6 C	10 C			
% Humidity	: High	N			
Wind Speed	: 0-8 KPH	0-5 KPH			
Dew Present	: Little	N			
Equipment	: HANDHELD CO2 SPRAYER				
Pressure	: 138 kPa	138 kPa			
Nozzle Type	: TEEJET	TEEJET			
Nozzle Size	: 80015	80015			
Noz. Spacing	: 50 CM	50 CM			
Boom Length	: 1.5 M	1.5 M			
Boom Height	: 45 CM	45 CM			
Appl. Volume	: 100 L/ha	300 L/ha			

Comments: Higher spray solution volume (300L/ha) was used in application (B) on Oct-11-00, while normal spray solution volume (100L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth, WEIDRY- Dry Weight. Visual assessments provide % injury to the crops and % control of weeds. Harvest area 9 m².

Crop Code	FESSS	FESSS	FESSS	FESSS
Part Rated	TOPGROW	TOPGROW	TOPGROW	SEED
Rating Data Type	VISINJ	VISINJ	VISINJ	YIELD

Rating Unit			percent	percent	percent	kg/ha
Rating Date			Oct-23-00	May-16-01	Jul-07-01	Jul-12-01
Trt-Eval Interval			27/12 DAA	232/217 DAA	284/269 DAA	289/274 DAA
Trt Treatment No.	Name	Form Conc	Form Type	Rate Rate	Appl Unit	Code
1	Check				0	0
2	dicamba	480	SN	0.29	KG A/HA	A
	2,4-D amine	470	SN	0.7	KG A/HA	A
3	fluroxypyr	180	EC	0.144	KG A/HA	A
	clopyralid	50	EC	0.1	KG A/HA	A
	MCPA ester	280	EC	0.56	KG A/HA	A
4	metsulfuron methyl	60	DF	0.0045	KG A/HA	A
	Agral 90			0.2 %	V/V	A
5	sulfosulfuron 2,4-D ester	75	WDG	0.02	KG A/HA	B
	Merge	564	EC	0.395	KG A/HA	B
	pH Balancer			0.5 %	V/V	B
6	s-metolachlor	915	EC	1.05	KG A/HA	B
7	oxyflurofen	240	EC	0.13	KG A/HA	B
8	metribuzin oxyflurofen	75	DF	0.56	KG A/HA	B
		240	EC	0.13	KG A/HA	B
LSD (P=.05)						30.6
Standard Deviation						20.8
CV						13.9
Bartlett's X2						1.562
P(Bartlett's X2)						0.98
Treatment F						1.832
Treatment Prob(F)						0.1337

Rating Unit			TAROF	TAROF		
Rating Date			TOPGROW	PLANTS		
Rating Unit			VISCON	COUNT		
Rating Date			percent	#/Plot		
Trt-Eval Interval			Jun-11-01	Jun-05-01		
Trt Treatment No.	Name	Form Conc	Form Type	Rate Rate	Appl Unit	Code
1	Check				0	6 ab
2	dicamba	480	SN	0.29	KG A/HA	A
	2,4-D amine	470	SN	0.7	KG A/HA	A
3	fluroxypyr	180	EC	0.144	KG A/HA	A
	clopyralid	50	EC	0.1	KG A/HA	A
	MCPA ester	280	EC	0.56	KG A/HA	A
4	metsulfuron methyl	60	DF	0.0045	KG A/HA	A
	Agral 90			0.2 %	V/V	A
5	sulfosulfuron 2,4-D ester	75	WDG	0.02	KG A/HA	B
	Merge	564	EC	0.394	KG A/HA	B
	pH Balancer			0.5 %	V/V	B
6	s-metolachlor	915	EC	1.05	KG A/HA	B
7	oxyflurofen	240	EC	0.13	KG A/HA	B
8	metribuzin oxyflurofen	75	DF	0.56	KG A/HA	B
		240	EC	0.13	KG A/HA	B
LSD (P=.05)				4.8		
Standard Deviation				3.3		
CV				78.32		
Bartlett's X2				5.47		
P(Bartlett's X2)				0.242		
Treatment F				7.954		

Treatment Prob(F) 0.0001

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

Trial Comments

Although the fall spraying of Sundance + 2,4-D ester caused some visible injury to hard fescue, none of the treatments caused a significant seed yield reduction.

**Tolerance of Hard Fescue to Herbicides Applied in the Fall of the Year of Seeding -
Beaverlodge 2000-01 (Expt. #HF2)**

Calvin Yoder, Dan Cole, Jean Beaudoin, Nigel Fairey **Experiment ID: Hard Fes S00 Fall Bldg**
Alberta Agriculture, Food and Rural Development, Smokey Applied Research and
Demonstration Association, Agriculture and Agri-Food Canada
2000-01 Experiment

CROP: FESS, Hard Fescue (Spartan). Planted: May-19-2000, 2.8 kg/ha, 1 cm Deep, 30 cm Row Width.

Planting Method: Drill. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M.

Expt. Location: Beaverlodge, Alberta.

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	B	Application:
Date	Sep-14-2000	Oct-27-2000	Crop 1 FESSS Hard Fescue
Time of Day:	1:00 pm	12:00 pm	Height : 6 cm 6 cm
Method	SPRAY	SPRAY	
Timing	POSTHARVEST	POSTHARVEST	
Placement	SURFACE	SURFACE	
Air Temp.	19 C	6 C	
% Humidity	62	90	
Wind Speed	0 KPH	0 KPH	
Equipment	Bicycle	Bicycle	
Pressure	275 kPa	275 kPa	
Nozzle Type	TEEJET	TEEJET	
Nozzle Size	80015	80015	
Noz. Spacing	50 cm	50 cm	
Boom Length	2 m	2 m	
Boom Height	45 cm	45 cm	
Carrier	WATER	WATER	
Appl. Volume	100 L/HA	300 L/HA	
Propellant	CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) in October, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth, WEIDRY-Dry Weight. Visual assessments provide % injury of the crops. Harvest area was 6 m².

Crop Code	FESSS	FESSS	FESSS
Part Rated	TOPGROW	TOPGROW	TOPGROW
Rating Data Type	VISINJ	VISINJ	VISINJ
Rating Unit	percent	percent	percent
Rating Date	Oct-27-2000	May-15-2001	Jun-19-2001
Trt-Eval Interval	43/0 DAA	243/200 DAA	278/235 DAA
Trt Treatment	Form Form	Rate	Appl
No. Name	Conc Type	Rate	Unit
1 Check			A
2 dicamba	480 SN	0.29 kg ai/ha	A
2,4-D amine	470 SN	0.7 kg ai/ha	A

3 fluroxypyrr	180 EC	0.144 kg ai/ha A	0	0	0
clopyralid	50 EC	0.100 kg ai/ha A			
MCPA ester	280 EC	0.56 kg ai/ha A			
4 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	0	4	4
Agral 90		0.2 % v/v A			
5 sulfosulfuron	75 WDG	0.020 kg ai/ha B		65	65
2,4-D ester	564 EC	0.395 kg ai/ha B			
Merge		0.5 % v/v B			
ph Balancer		0.25 % v/v B			
6 s-metolachlor	915 EC	1.05 kg ai/ha B		34	43
7 oxyfluorfen	240 EC	0.13 kg ai/ha B		0	0
8 metribuzin	75 DF	0.56 kg ai/ha B		35	34
oxyfluorfen	240 EC	0.13 kg ai/ha B			
9 clopyralid	50 EC	0.100 kg ai/ha A	0	0	0
MCPA ester	280 EC	0.56 kg ai/ha A			
quinclorac	75 DF	0.125 kg ai/ha A			
Merge		1.0 % v/v A			
10 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	0	0	0
quinclorac	75 DF	0.125 kg ai/ha A			
Merge		1.0 % v/v A			
11 triasulfuron	75 WDG	0.008 kg ai/ha A	0	0	0
bromoxynil	280 EC	0.138 kg ai/ha A			
Agral 90		0.25 % v/v A			
12 simazine	90 SG	1.0 kg ai/ha A	0	0	0

Crop Code			FESSS	FESSS
Part Rated			FORAGE	SEED
Rating Data Type			WEIDRY	YIELD
Rating Unit			KG/HA	KG/HA
Rating Date			Jul-16-2001	Jul-16-2001
Trt-Eval Interval			305/262 DAA	305/262 DAA
Trt Treatment	Form	Form	Rate	Appl
No. Name	Conc	Type	Rate	Unit
1 Check				Appl
2 dicamba	480 SN		0.29 kg ai/ha A	A
2,4-D amine	470 SN		0.7 kg ai/ha A	
3 fluroxypyrr	180 EC		0.144 kg ai/ha A	
clopyralid	50 EC		0.100 kg ai/ha A	
MCPA ester	280 EC		0.56 kg ai/ha A	
4 metsulfuron methyl	60 DF		0.0045 kg ai/ha A	
Agral 90			0.2 % v/v A	
5 sulfosulfuron	75 WDG		0.020 kg ai/ha B	
2,4-D ester	564 EC		0.395 kg ai/ha B	
Merge			0.5 % v/v B	
ph Balancer			0.25 % v/v B	
6 s-metolachlor	915 EC		1.05 kg ai/ha B	
7 oxyfluorfen	240 EC		0.13 kg ai/ha B	
8 metribuzin	75 DF		0.56 kg ai/ha B	
oxyfluorfen	240 EC		0.13 kg ai/ha B	
9 clopyralid	50 EC		0.100 kg ai/ha A	
MCPA ester	280 EC		0.56 kg ai/ha A	
quinclorac	75 DF		0.125 kg ai/ha A	
Merge			1 % v/v A	
10 metsulfuron methyl	60 DF		0.0045 kg ai/ha A	
quinclorac	75 DF		0.125 kg ai/ha A	
Merge			1 % v/v A	
11 triasulfuron	75 WDG		0.008 kg ai/ha A	
bromoxynil	280 EC		0.138 kg ai/ha A	
Agral 90			0.25 % v/v A	
12 simazine	90 SG		1.0 kg ai/ha A	
LSD (P=.05)			2563 a	322 a
Standard Deviation			1153.3	43.5
CV			798.8	30.2
			30.33	10.53

Bartlett's X2		18.977	21.821
P(Bartlett's X2)		0.062	0.026*
Treatment F		7.588	42.570
Treatment Prob(F)		0.0001	0.0001
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)			

Trial Comments

Sundance+ 2,4-D ester and Dual II Magnum caused severe damage and significantly reduced forage and seed yields. Sencor + Goal caused unacceptable damage visually but did not affect hard fescue seed or forage yields. None of the other treatments applied to hard fescue caused injury or reduced seed or forage yields.

Tolerance of Hard Fescue to Herbicides Applied in the Fall of the Year of Seeding - Edmonton 2001-02 (Expt. #HF3)

Dan Cole, Nicole Kimmel

Experiment ID: Hard Fes S01 Fall Edm

Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

CROP: FESSS, Hard Fescue (Spartan). Planted: Jun-5-2001, 3.0 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOUBLE DISC PRESS DRILL. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: Oct.31/01 80 kg/ha N Expt. Location: Ellerslie, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 7.0

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Oct-1-2001	Nov-4-2001	Crop 1 FESSS Hard Fescue
Time of Day:	2:00 PM	6:00 PM	Stage : Green Veg. Yellow Veg.
Method	: SPRAY	SPRAY	Height : 10 CM 10 CM (Mowing Height)
Timing	: POSTHARVEST	POSTHARVEST	Weed 1 MELNO Night-flowering Catchfly
Placement	: SURFACE	SURFACE	Stage : 8 lf 8 lf
Air Temp.	: 12 C	7 C	Height : 12 CM 12 CM
Wind Speed	: 10 KPH	10 KPH	Weed 2 TAROF Dandelion
Cloud Cover:	100%	0%	Stage : 4-8 lf 4-8 lf
Equipment	: HANDHELD SPRAYER		Height : 6-20 CM 6-20 CM
Pressure	: 138 kPa	276 kPa	Weed 3 CIRAR Canada Thistle
Nozzle Type:	TEEJET	TEEJET	Stage : 6 lf 6 lf
Nozzle Size:	XR80015	VS8003	Height : 12 CM 12 CM
Noz. Spacing:	50 CM	50 CM	Weed 4 PLAMA Broad-leaved Plantain
Boom Length:	1.5 M	1.5 M	Stage : 6-20 lf 6-20 lf
Boom Height:	45 CM	45 CM	Height : 6-16 CM 6-16 CM
Carrier	: WATER	WATER	
Appl. Volume:	100 L/HA	300 L/HA	
Propellant	: CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-4-01, while normal spray solution volume (100 L/ha) was used in October application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 9 m².

Crop Code	FESSS	FESSS	FESSS
Part Rated	TOPGROW	TOPGROW	SEED
Rating Data Type	VISINJ	VISINJ	YIELD
Rating Unit	percent	percent	kg/ha
Rating Date	May-31-2002	Jul-11-2002	Jul-16-2002
Trt-Eval Interval	208/242 DAA	249/283 DAA	254/288 DAA

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Unit	Appl Code			
1	Check						0	0	179 a
2	dicamba	480	SN	0.29	kg ai/ha	A	0	0	151 a
	2,4-D amine	470	SN	0.7	kg ai/ha	A			
3	fluroxypyr	180	EC	0.144	kg ai/ha	A	0	0	147 a
	clopyralid	50	EC	0.1	kg ai/ha	A			
	MCPA ester	280	EC	0.56	kg ai/ha	A			
4	metsulfuron methyl	60	DF	0.0045	kg ai/ha	A	0	0	146 a
	Agral 90			0.2	% v/v	A			
5	metsulfuron methyl	60	DF	0.0045	kg ai/ha	A	0	0	159 a
	quinclorac	75	DF	0.125	kg ai/ha	A			
	Merge			1.0	% v/v	A			
6	clopyralid	50	EC	0.1	kg ai/ha	A	0	0	142 a
	MCPA ester	280	EC	0.56	kg ai/ha	A			
	quinclorac	75	DF	0.125	kg ai/ha	A			
	Merge			1.0	% v/v	A			
7	oxyfluorfen	240	EC	0.13	kg ai/ha	B	0	0	123 a
8	simazine	90	SG	1.0	kg ai/ha	B	0	0	164 a
LSD (P=.05)									40.1
Standard Deviation									27.2
CV									18.0
Bartlett's X2									4.86
P(Bartlett's X2)									0.677
Treatment F									1.482
Treatment Prob(F)									0.2273

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

Trial Comments

None of the fall applied treatments caused a significant seed yield reduction, although the Goal 2XL treatment had the lowest yield.

Tolerance of Hard Fescue to Herbicides Applied in the Fall the Year After Seeding - Edmonton 2001-02 (Expt. #HF4)

Dan Cole, Nicole Kimmel

Experiment ID: Hard Fes E01 Fall Edm

Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

CROP: FESSS, Hard Fescue (Spartan). Planted: Jun-2-2000, 3.0 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOBLE DISC PRESS DRILL. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: April 30/01 80 kg/ha N and Oct.31/01 80 kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 7.0

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	B	Application: A B
Date	: Oct-1-2001	Nov-4-2001	Crop 1 FESSS Hard Fescue
Time of Day:	12:00 PM	5:00 PM	Height : 10 CM 10 CM (Mowing Height)
Method	: SPRAY	SPRAY	Stage : Green Veg. Yellow Veg.
Timing	: POSTHARVEST	POSTHARVEST	
Placement	: SURFACE	SURFACE	
Air Temp.	: 13 C	9 C	
Wind Speed	: 0 KPH	0 KPH	
Cloud Cover:	100%	0%	
Equipment	: HANDHELD SPRAYER		
Pressure	: 138 kPa	276 kPa	

Nozzle Type:	TEEJET
Nozzle Size:	XR80015
Noz. Spacing:	50 CM
Boom Length:	1.5 M
Boom Height:	45 CM
Carrier :	WATER
Appl. Volume:	100 L/HA
Propellant :	CO2
	300 L/HA
	CO2

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-4-01, while normal spray solution volume (100 L/ha) was used in October application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 9 m².

Crop Code	FESSS		FESSS		FESSS	
	TOPGROW	VISINJ	TOPGROW	VISINJ	SEED	YIELD
Part Rated	percent	percent	percent	kg/ha		
Rating Data Type						
Rating Unit						
Rating Date	May-31-2002		Jul-11-2002		Jul-16-2002	
Trt-Eval Interval	208/242 DAA		249/283 DAA		254/288 DAA	
Trt Treatment	Form	Form	Rate	Appl		
No.	Conc	Type	Rate	Unit	Code	
1 Check					0	0
2 dicamba	480	SN	0.29	kg ai/ha	A	242 a
2,4-D amine	470	SN	0.7	kg ai/ha	A	268 a
3 fluroxypyr	180	EC	0.144	kg ai/ha	A	278 a
clopyralid	50	EC	0.1	kg ai/ha	A	
MCPA ester	280	EC	0.560	kg ai/ha	A	
4 metsulfuron methyl	60	DF	0.0045	kg ai/ha	A	307 a
Agral 90			0.2	% v/v	A	
5 sulfosulfuron	75	WDG	0.0203	kg ai/ha	B	80
2,4-D ester	564	EC	0.395	kg ai/ha	B	66
Merge			0.5	% v/v	B	4 b
pH Balancer			0.25	% v/v	B	
6 s-metolachlor	915	EC	1.05	kg ai/ha	B	253 a
7 oxyfluorfen	240	EC	0.13	kg ai/ha	B	254 a
8 metribuzin	75	DF	0.56	kg ai/ha	B	238 a
oxyfluorfen	240	EC	0.13	kg ai/ha	B	
LSD (P=.05)						84.1
Standard Deviation						57.2
CV						24.82
Bartlett's X2						21.024
P(Bartlett's X2)						0.004*
Treatment F						10.829
Treatment Prob(F)						0.0001

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

Trial Comments

Only fall applied Sundance + 2,4-D ester caused a significant seed yield reduction.

Tolerance of Hard Fescue to Herbicides Applied in the Fall the Year After Seeding - Beaverlodge 2001-02 (Expt. #HF5)

Experiment ID: Hard Fes E01 Fall Bldg

Calvin Yoder, Dan Cole, Jean Beaudoin, Lois Connelly, Nigel Fairey
 Alberta Agriculture, Food and Rural Development, Smokey Applied Research and
 Demonstration Association, Agriculture and Agri-Food Canada
 2001-02 Experiment

CROP: FESSS, HARD FESCUE (Spartan). Planted: May-19-00, 2.8 KG/HA, 1 CM Deep, 30 CM Row Width. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M. Fertilizer: BROADCAST May-17-00 N-5 kg/ha P-77 kg/ha K-0 kg/ha S-0 kg/ha, Oct-11-00 N-68 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha, Oct-15-01 N-68 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha

Expt. Location: Beaverlodge, Alberta

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date :	Sep-20-01 Oct-30-01	Crop 1	FESSS Hard Fescue
Time of Day:	4:00 PM 3:00 PM	Height :	5 CM 5-8 CM
(Mowing height)			
Method :	SPRAY SPRAY	Stage :	Vegetative Vegetative
Timing :	POSTHARVEST POSTHARVEST		
Placement :	SURFACE SURFACE		
Air Temp. :	16 C 6.5 C		
% Humidity :	46 70		
Wind Speed :	0 KPH 10 KPH		
Equipment :	BICYCLE SPRAYER		
Pressure :	275 kPa 275 kPa		
Carrier :	WATER WATER		
Appl. Volume:	100 L/HA 300 L/HA		
Propellant :	CO2 CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) in October, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury of the crop. Harvest area 6 m².

Crop Code	Part Rated	Rating Data Type	Rating Unit	Rating Date	FESSS		FESSS		FESSS		FESSS	
					TOPGROW	VISINJ	TOPGROW	VISINJ	TOPGROW	VISINJ	TOPGROW	VISINJ
Trt-Eval Interval			percent		Oct-30-01	May-17-02	Jun-10-02	Jul-17-02				
Trt	Chemical	Form	Form	Rate	Appl							
No.	Name	Conc	Type	Rate	Unit	Code						
1	Check						0	0	0	0	0	0
2	dicamba	480	SN	0.29	KG A/HA	A	0	0	0	0	0	4
	2,4-D amine	470	SN	0.7	KG A/HA	A						
3	fluroxypyr	180	EC	0.144	KG A/HA	A	0	0	0	0	0	0
	clopyralid	50	EC	0.100	KG A/HA	A						
	MCPA ester	280	EC	0.56	KG A/HA	A						
4	clopyralid	50	EC	0.100	KG A/HA	A	0	0	0	0	0	0
	MCPA ester	280	EC	0.56	KG A/HA	A						
	quinclorac	75	DF	0.125	KG A/HA	A						
	Merge			1.0	% V/V	A						
5	metsulfuron methyl	60	DF	0.0045	KG A/HA	A	0	0	0	0	0	0
	Agral 90			0.2	% V/V	A						
6	metsulfuron methyl	60	DF	0.0045	KG A/HA	A	0	0	0	0	0	0
	quinclorac	75	DF	0.125	KG A/HA	A						
	Merge			1.0	% V/V	A						
7	triasulfuron bromoxynil	75	WDG	0.008	KG A/HA	A	0	0	0	0	0	0
	Agral 90	280	EC	0.138	KG A/HA	A						
	0.25	% V/V	A									
8	sulfosulfuron 2,4-D ester	75	WDG	0.020	KG A/HA	B		34	60	78		
	Merge	564	EC	0.395	KG A/HA	B						
				0.5	% V/V	B						

pH Balancer		0.25 % V/V	B			
9 s-metolachlor	915 EC	1.05 KG A/H A	B	0	0	0
10 oxyflurofen	240 EC	0.13 KG A/H A	B	6	0	0
11 metribuzin	75 DF	0.56 KG A/H A	B	25	0	0
oxyflurofen	240 EC	0.13 KG A/H A	B			
12 simazine	90 SG	1.00 KG A/H A	B	0	0	1
Crop Code				FESSS		
Part Rated				SEED		
Rating Data Type				YIELD		
Rating Unit				kg/ha		
Rating Date				Jul-18-02		
Trt-Eval Interval				301/261		
				DA-A		
Trt Chemical No.	Name	Form Conc	Form Type	Rate	Appl Unit	Code
1 Check						216 a
2 Dicamba		480 SN		0.29 KG	A/H A	226 a
2,4-D amine		470 SN		0.7 KG	A/H A	
3 fluroxypyr		180 EC		0.144 KG	A/H A	289 a
clopyralid		50 EC		0.100 KG	A/H A	
MCPA ester		280 EC		0.56 KG	A/H A	
4 clopyralid		50 EC		0.100 KG	A/H A	278 a
MCPA ester		280 EC		0.56 KG	A/H A	
quinclorac		75 DF		0.125 KG	A/H A	
Merge				1.0 % V/V	A	
5 metsulfuron methyl		60 DF		0.0045 KG	A/H A	211 a
Agral 90				0.2 % V/V	A	
6 metsulfuron methyl		60 DF		0.0045 KG	A/H A	262 a
quinclorac		75 DF		0.125 KG	A/H A	
Merge				1.0 % V/V	A	
7 triasulfuron bromoxynil		75 WDG		0.008 KG	A/H A	302 a
Agral 90		280 EC		0.138 KG	A/H A	
8 sulfosulfuron 2,4-D ester		75 WDG		0.020 KG	A/H B	0 b
		564 EC		0.395 KG	A/H B	
Merge				0.5 % V/V	B	
pH Balancer				0.25 % V/V	B	
9 s-metolachlor		915 EC		1.05 KG	A/H B	297 a
10 oxyflurofen		240 EC		0.13 KG	A/H B	262 a
11 metribuzin		75 DF		0.56 KG	A/H B	264 a
oxyflurofen		240 EC		0.13 KG	A/H B	
12 simazine		90 SG		1.00 KG	A/H B	292 a
LSD (P=.05)						102.3
Standard Deviation						70.3
CV						29.07
Bartlett's X2						3.924
P(Bartlett's X2)						0.951
Treatment F						5.478
Treatment Prob(F)						0.0002

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

Trial Comments

The fall application of Sundance + 2,4-D ester on established hard fescue resulted in severe visual damage and seed yield loss. Sencor + Goal applied in the fall caused some visual damage to hard fescue but it recovered prior to harvest and did not result in seed yield loss. None of the other fall treatments caused any visual damage or seed yield loss to hard fescue.

**Tolerance of Hard Fescue to Herbicides Applied in the Fall the Year After Seeding -
Edmonton 2002-03 (Expt. #HF6)**

Dan Cole, Nicole Kimmel

Experiment ID: Hard Fes E02 Fall Edm

Crop Diversification, Alberta Agriculture, Food and Rural Development
2002-03 Experiment

CROP: FESSS, Hard Fescue (SPARTAN). Planted: Jun-5-2001, 3.0 KG/HA, 1 CM Deep, 30 CM Row Width.

Planting Method: DOUBLE DISC PRESS DRILL. Fertilizer: Broadcast Oct.31, 2001 80 kg/ha N & Oct.18, 2002 80 kg/ha N Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M.

Expt. Location: Ellerslie, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 5.7

APPLICATION DESCRIPTION			STAGE AT APPLICATION		
Application:	A	B	C	Application:	A
C					B &
Date	: Sep-25-2002	Oct-9-2002	Oct-16-2002	Crop 1 FESSS	Hard Fescue
Time of Day:	10:30 AM	10:00 PM		Height:	Cut @ 8 cm
Regrowth	2 cm				
Method	: SPRAY	SPRAY	BROADCAST		
Timing	: POSTHARVEST	POSTHARVEST	POSTHARVEST		
Placement	: SURFACE	SURFACE	SURFACE		
Air Temp.	: 5 C	5 C			
% Humidity	: 50	70			
Wind Speed	: 10 KPH	6 KPH			
Dew Present	: Y	Y			
Cloud Cover	: 40%	70%			
Equipment	: MOTORIZED	HANDHELD	HAND		
Pressure	: 207 kPa	276 kPa			
Nozzle Type	: TEEJET	TEEJET			
Nozzle Size	: 80015	8003VS			
Noz. Spacing	: 50 CM	50 CM			
Boom Length	: 2 M	2 M			
Boom Height	: 50 CM	45 CM			
Carrier	: WATER	WATER	SAND		
Appl. Volume	: 100 L/HA	300 L/HA			
Propellant	: CO2	CO2			

Comments: Higher spray solution volume (300L/ha) was used in application (B) on Oct-9-02, while normal spray solution volume (100L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 9 m².

Crop Code	FESSS	FESSS	FESSS
Part Rated	TOPGROW	TOPGROW	SEED
Rating Data Type	VISINJ	VISINJ	YIELD
Rating Unit	percent	percent	kg/ha
Rating Date	May-14-2003	Jul-11-2003	Jul-18-2003
Trt-Eval Interval	231/217/201	289/275/268	296/282/275
	DAA	DAA	DAA
Trt Treatment	Form	Form	Rate
No. Name	Conc	Type	Rate
1 Check			0
2 dicamba	480	SN	0.29 kg ai/ha
2,4-D amine	470	SN	0.7 kg ai/ha
3 fluroxypyr	180	EC	0.144 kg ai/ha
clopyralid	50	EC	0.1 kg ai/ha
MCPA ester	280	EC	0.56 kg ai/ha

4 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	0	0	63 a
Agral 90		0.2 % v/v A			
5 trifluralin	5 GR	1.4 kg ai/ha C	0	0	72 a
6 s-metolachlor	915 EC	1.05 kg ai/ha B	0	0	60 a
7 oxyfluorfen	240 EC	0.13 kg ai/ha B	0	0	69 a
8 metribuzin	75 DF	0.56 kg ai/ha B	24	0	66 a
oxyfluorfen	240 EC	0.13 kg ai/ha B			
LSD (P=.05)					35.7
Standard Deviation					24.3
CV					38.77
Bartlett's X2					5.936
Treatment F					0.298
Treatment Prob(F)					0.9470

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

Trial Comments

Although fall applied Sencor + Goal caused noticeable yellowing of hard fescue in spring, none of the treatments caused a significant seed yield reduction.

Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall of the Year of Seeding - Edmonton 2000-01 (Expt. #CR1)

Dan Cole, Nicole Kimmel, James Leskiw
Agronomy Unit, Alberta Agriculture, Food and Rural Development
2000-01 Experiment

Experiment ID: Cr Red S00 Fall Edm

CROP: Boreal Creeping Red Fescue (FESRU) 3.4 kg/ha Planted: Jun-05-00, 1 cm, 30 cm row width
Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M.
Fertilizer: Apr-30-01 80 kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta.
Soil Texture: Silty Clay Loam, %OM:11, %Sand:19, %Silt:40, %Clay:41 and pH:5.7

APPLICATION DESCRIPTION	STAGE AT APPLICATION	APPLICATION:	A	B
Application: A	B	Application:	A	B
Date : Sep-26-00	Oct-11-00	Crop 1 Cr Red Fescue (FESRU)		
Time of Day: 9:00 AM	4:45 PM	Height : 46 CM	42 CM	
Method : SPRAY	SPRAY	Stage : 3 lf	3 lf	
Timing : PREBLOOM	PREBLOOM	Weed 1 Dandelion (TAROF)		
Placement : SURFACE	SURFACE	Height : 33 CM		
Air Temp. : 6 C	10 C			
% Humidity : High	N			
Wind Speed : 0-8 KPH	0-5 KPH			
Dew Present: Little	N			
Equipment : HANDHELD CO2 SPRAYER				
Pressure : 138 kPa	138 kPa			
Nozzle Type: TEEJET	TEEJET			
Nozzle Size: 80015	80015			
Noz. Spacing: 50 CM	50 CM			
Boom Length: 1.5 M	1.5 M			
Boom Height: 45 CM	45 CM			
Appl. Volume: 100 L/ha	300 L/ha			

Comments: Higher spray solution volume (300L/ha) was used in application (B) on Oct-11-00, while normal spray solution volume (100L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth, WEIDRY- Dry Weight. Visual assessments provide % injury to the crops and % control of weeds. Harvest area 9 m².

Crop Code		FESRU	FESRU	FESRU	FESRU
Part Rated		TOPGROW	TOPGROW	TOPGROW	SEED
Rating Data Type		VISINJ	VISINJ	VISINJ	YIELD
Rating Unit		percent	percent	percent	kg/ha
Rating Date		Oct-23-00	May-16-01	Jul-07-01	Aug-01-01
Trt-Eval Interval		27/12 DAA	232/217 DAA	284/269 DAA	309/294 DAA
Trt Treatment No.	Name	Form Conc	Form Type	Rate Rate	Appl Unit Code
1	Check				0
2	dicamba	480	SN	0.29 KG	A/H A
	2,4-D amine	470	SN	0.7 KG	A/H A
3	fluroxypyrr	180	EC	0.144 KG	A/H A
	clopyralid	50	EC	0.1 KG	A/H A
	MCPA ester	280	EC	0.56 KG	A/H A
4	clopyralid	50	EC	0.1 KG	A/H A
	MCPA ester	280	EC	0.56 KG	A/H A
	quinclorac	75	DF	0.125 KG	A/H A
	Merge			1.0 %	V/V A
5	metsulfuron methyl	60	DF	0.0045 KG	A/H A
	Agral 90			0.2 %	V/V A
6	metsulfuron methyl	60	DF	0.0045 KG	A/H A
	quinclorac	75	DF	0.125 KG	A/H A
	Merge			1.0 %	V/V A
7	triasulfuron bromoxynil	75	WDG	0.008 KG	A/H A
		280	EC	0.138 KG	A/H A
	Agral 90			0.25 %	V/V A
8	simazine	90	SG	1.0 KG	A/H B
LSD (P=.05)				0	0
Standard Deviation					93.5
CV					62.4
Bartlett's X2					11.83
P(Bartlett's X2)					2.939
Treatment F					0.891
Treatment Prob(F)					7.374
					0.0005

Weed Code		TAROF	TAROF		
Part Rated		TOPGROW	PLANT		
Rating Data Type		VISCON	COUNT		
Rating Unit		percent	#/plot		
Rating Date		Jun-11-01	Jun-15-01		
Trt-Eval Interval		258/243 DAA	262/247 DAA		
Trt Treatment No.	Name	Form Conc	Form Type	Rate Rate	Appl Unit Code
1	Check				0
2	dicamba	480	SN	0.29 KG	A/H A
	2,4-D amine	470	SN	0.7 KG	A/H A
3	fluroxypyrr	180	EC	0.144 KG	A/H A
	clopyralid	50	EC	0.1 KG	A/H A
	MCPA ester	280	EC	0.56 KG	A/H A
4	clopyralid	50	EC	0.1 KG	A/H A
	MCPA ester	280	EC	0.56 KG	A/H A
	quinclorac	75	DF	0.125 KG	A/H A
	Merge			1.0 %	V/V A
5	metsulfuron methyl	60	DF	0.0045 KG	A/H A
	Agral 90			0.2 %	V/V A
6	metsulfuron methyl	60	DF	0.0045 KG	A/H A

quinclorac	75 DF	0.125 KG A/HA A			
Merge		1.0 % V/V A			
7 triasulfuron	75 WDG	0.008 KG A/HA A	30	1 b	
bromoxynil	280 EC	0.138 KG A/HA A			
Agral 90		0.25 % V/V A			
8 simazine	90 SG	1.0 KG A/HA B	20	2 ab	
LSD (P=.05)				1.7	
Standard Deviation				1.1	
CV				135.39	
Bartlett's X2				1.863	
P(Bartlett's X2)				0.394	
Treatment F				5.525	
Treatment Prob(F)				0.0010	
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)					

Trial Comments

Although there was some visible thinning of creeping red fescue from Banvel + 2,4-D amine and Ally + Accord, none of the treatments caused a significant seed yield reduction.

Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall of the Year of Seeding - Beaverlodge 2000-01 (Expt. #CR2)

Calvin Yoder, Dan Cole, Jean Beaudoin, Nigel Fairey **Experiment ID: Cr Red Fes S00 Fall Bldg**
 Alberta Agriculture, Food and Rural Development, Smokey Applied Research and
 Demonstration Association, Agriculture and Agri-Food Canada
2000-01 Experiment

CROP: FESRU, Creeping Red Fescue (Boreal). Planted: May-5-2000, 2.6 kg/ha, 1 cm Deep,
 30 cm Row Width. Planting Method: Drill. Expt. Design: RANDOMIZED COMPLETE BLOCK.
 Reps: 4. Plot Size: 2 M x 10 M. Expt. Location: Beaverlodge, Alberta.

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Sep-14-2000	Oct-27-2000	Crop 1 FESRU Creeping Red Fescue
Time of Day:	12:00 pm	12:00 pm	Height : 10 cm 10 cm
Method	: SPRAY	SPRAY	
Timing	: POSTHARVEST	POSTHARVEST	
Placement	: SURFACE	SURFACE	
Air Temp.	: 19 C	6 C	
% Humidity	: 62	90	
Equipment	: Bicycle	Bicycle	
Pressure	: 275 kPa	275 kPa	
Nozzle Type	: TEEJET	TEEJET	
Nozzle Size	: 80015	80015	
Noz. Spacing	: 50 CM	50 CM	
Boom Length	: 2 M	2 M	
Boom Height	: 45 CM	45 CM	
Carrier	: Water	Water	
Appl. Volume	: 100 l/ha	300 l/ha	
Propellant	: CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) in October, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth, WEIDRY-Dry Weight. Visual assessments provide % injury of the crops. Harvest area was 6 m².

Crop Code	FESRU	FESRU	FESRU
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Part Rated		TOPGROW	TOPGROW	TOPGROW
Rating Data Type		VISINJ	VISINJ	VISINJ
Rating Unit		percent	percent	percent
Rating Date		Oct-27-2000	May-15-2001	Jun-19-2001
Trt-Eval Interval		43/0 DAA	243/200 DAA	278/235 DAA
Trt Treatment	Form	Form	Rate	Appl
No. Name	Conc	Type	Rate	Unit
1 Check			A	
2 dicamba	480	SN	0.29	kg ai/ha
2,4-D amine	470	SN	0.7	kg ai/ha
3 fluroxypyrr	180	EC	0.144	kg ai/ha
clopyralid	50	EC	0.100	kg ai/ha
MCPA ester	280	EC	0.56	kg ai/ha
4 clopyralid	50	EC	0.100	kg ai/ha
MCPA ester	280	EC	0.56	kg ai/ha
quinclorac	75	DF	0.125	kg ai/ha
Merge			1.0 % v/v	A
5 metsulfuron methyl	60	DF	0.0045	kg ai/ha
Agral 90			0.2 % v/v	A
6 metsulfuron methyl	60	DF	0.0045	kg ai/ha
quinclorac	75	DF	0.125	kg ai/ha
Merge			1.0 % v/v	A
7 triasulfuron	75	WDG	0.008	kg ai/ha
bromoxynil	280	EC	0.138	kg ai/ha
Agral 90			0.25 % v/v	A
8 simazine	90	SG	1.0	kg ai/ha
9 metribuzin	75	DF	0.56	kg ai/ha
10 oxyflurofen	240	EC	0.13	kg ai/ha

Crop Code		FESRU	FESRU
Part Rated		FORAGE	SEED
Rating Data Type		WEIDRY	YIELD
Rating Unit		KG/HA	KG/HA
Rating Date		Jul-23-2001	Jul-23-2001
Trt-Eval Interval		312/269 DAA	312/269 DAA
Trt Treatment	Form	Form	Appl
No. Name	Conc	Type	Rate
1 Check			A
2 dicamba	480	SN	0.29
2,4-D amine	470	SN	0.7
3 fluroxypyrr	180	EC	0.144
clopyralid	50	EC	0.100
MCPA ester	280	EC	0.56
4 clopyralid	50	EC	0.100
MCPA ester	280	EC	0.56
quinclorac	75	DF	0.125
Merge			1 % v/v
5 metsulfuron methyl	60	DF	0.0045
Agral 90			0.2 % v/v
6 metsulfuron methyl	60	DF	0.0045
quinclorac	75	DF	0.125
Merge			1 % v/v
7 triasulfuron	75	WDG	0.008
bromoxynil	280	EC	0.138
Agral 90			0.25 % v/v
8 simazine	90	SG	1.0
9 metribuzin	75	DF	0.56
10 oxyflurofen	240	EC	0.13
LSD (P=.05)			687.7
Standard Deviation			473.0
CV			13.33
Bartlett's X2			9.019
P(Bartlett's X2)			0.436
			109.4
			75.4
			10.3
			12.684
			0.177

Treatment F	1.647	4.729
Treatment Prob(F)	0.1536	0.0008

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

Trial Comments

Sencor caused unacceptable injury to creeping red fescue the year following application and significantly reduced seed yields. There were no differences in seed and forage yields among the other treatments.

Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall of the Year of Seeding - Edmonton 2001-02 (Expt. #CR3)

Dan Cole, Nicole Kimmel Experiment ID: Cr Red Fes S01 Fall Edm
 Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

CROP: FESRU, Creeping Red Fescue (Boreal). Planted: Jun-01-2001, 3.4 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOUBLE DISC PRESS DRILL. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: Oct.31/01 80 kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 7.0

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Oct-1-2001 Nov-4-2001	Crop 1	FESRU Creeping Red Fescue
Time of Day:	2:00 PM 6:00 PM	Height :	10 CM 10 CM (Mowing Height)
Method	: SPRAY SPRAY	Stage :	Green Veg. Yellow Veg.
Timing	: POSTHARVEST POSTHARVEST	Weed 1	PLAMA Broad-leaved Plantain
Placement	: SURFACE SURFACE	Stage :	6-20 lf 6-20 lf
Air Temp.	: 12 C 7 C	Height :	6-16 CM 6-16 CM
% Humidity	: 54	Weed 2	TAROF Dandelion
Wind Speed	: 10 KPH 10 KPH	Stage :	4-8 lf 4-8 lf
Soil Moist.:		Height :	6-20 CM 6-20 CM
Cloud Cover:	100%		
Equipment	: HANDHELD SPRAYER		
Pressure	: 138 kPa 276 kPa		
Nozzle Type	: TEEJET TEEJET		
Nozzle Size	: XR80015 VS8003		
Noz. Spacing	: 50 CM 50 CM		
Boom Length	: 1.5 M 1.5 M		
Boom Height	: 45 CM 45 CM		
Carrier	: WATER WATER		
Appl. Volume	: 100 L/HA 300 L/HA		
Propellant	: CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-4-01, while normal spray solution volume (100 L/ha) was used in October application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops and % control of weeds. Harvest area 9 m².

Crop Code	FESRU	FESRU	FESRU
Part Rated	TOPGROW	TOPGROW	SEED
Rating Data Type	VISINJ	VISINJ	YIELD
Rating Unit	percent	percent	kg/ha
Rating Date	May-31-2002	Jul-11-2002	Jul-23-2002

Trt-Eval Interval					208/242 DAA	249/283 DAA	261/295 DAA
Trt Treatment	Form	Form	Rate	Appl			
No. Name	Conc	Type	Rate	Unit	Code		
1 Check					0	0	790 a
2 dicamba	480	SN	0.29 kg	ai/ha	A	0	0
2,4-D amine	470	SN	0.7 kg	ai/ha	A		717 a
3 fluroxypyr	180	EC	0.144 kg	ai/ha	A	0	0
clopyralid	50	EC	0.1 kg	ai/ha	A		766 a
MCPA ester	280	EC	0.560 kg	ai/ha	A		
4 clopyralid	50	EC	0.1 kg	ai/ha	A	0	0
MCPA ester	280	EC	0.560 kg	ai/ha	A		775 a
quinclorac	75	DF	0.125 kg	ai/ha	A		
Merge			1.0 %	v/v	A		
5 metsulfuron methyl	60	DF	0.0045 kg	ai/ha	A	0	0
Agral 90			0.2 %	v/v	A		839 a
6 metsulfuron methyl	60	DF	0.0045 kg	ai/ha	A	0	0
quinclorac	75	DF	0.125 kg	ai/ha	A		709 a
Merge			1.0 %	v/v	A		
7 triasulfuron	75	WDG	0.008 kg	ai/ha	A	0	0
bromoxynil	280	EC	0.138 kg	ai/ha	A		835 a
Agral 90			0.25 %	v/v	A		
8 simazine	90	SG	1.0 kg	ai/ha	B	0	0
LSD (P=.05)							120.7
Standard Deviation							82.1
CV							10.41
Bartlett's X2							4.335
P(Bartlett's X2)							0.741
Replicate Prob(F)							0.0001
Treatment F							2.039
Treatment Prob(F)							0.0976
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)							

Trial Comments

None of the fall applied treatments caused a significant creeping red fescue seed yield reduction.

Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall of the Year of Seeding - Spirit River 2000-01 (Expt. #CR4)

Experiment ID: Cr Red Fes S01 Fall SR

Calvin Yoder, Dan Cole, Gary Ropchan, Lois Connelly, Nigel Fairey
 Alberta Agriculture, Food and Rural Development, Central Peace Conservation Society,
 Agriculture and Agri-Food Canada
 2001-02 Experiment

CROP: FESRU, CREEPING RED FESCUE (Boreal). Planted: May-15-01, 3.0 KG/HA, 1 CM Deep,
 Broadcast. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M.
 Fertilizer: BROADCAST Oct-18-01 N-70 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha
 Expt. Location: Spirit River, Alberta

APPLICATION DESCRIPTION	STAGE AT APPLICATION
Application: A	Application: A
Date : Aug-16-01	Crop 1 FESRU Creeping Red Fescue
Time of Day: 10:00 PM	Height : 8-10 CM (Mowing height)
Method : SPRAY	Stage : Vegetative
Timing : POSTHARVEST	Weed 1 TRFHY (Alsike Clover)
Placement : SURFACE	Weed 2 GALAP (Cleavers) 25-30 cm with immature seed
Air Temp. : 19 C	Weed 3 TAROF (Dandelion) rosette stage
Wind Speed : 0 KPH	Weed 4 CVPTE (Narrow-leaved Hawk's-beard) bolted &

flowering
 Equipment : HANDHELD SPRAYER
 Pressure : 125 kPa
 Carrier : WATER
 Appl. Volume: 100 L/HA
 Propellant : CO₂

Comments: Crop and weed codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury of the crops and % control of weeds. Harvest area was 6 m².

Weed Code	FESRU	FESRU	FESRU	FESRU	TRFHY
Crop Code	TOPGROW	TOPGROW	TOPGROW	SEED	TOPGROW
Part Rated	VISINJ	VISINJ	VISINJ	YIELD	VISCON
Rating Data Type	percent	percent	percent	kg/ha	percent
Rating Unit	Sep-12-01	May-25-02	Jul-09-02	Jul-26-02	Sep-12-01
Rating Date	27 DA-A	282 DA-A	327 DA-A	344 DA-A	27 DA-A
Trt-Eval Interval					
Trt Chemical No. Name	Form Conc	Form Type	Rate Rate	Appl Unit	Code
1 Check					
2 fluroxypyr	180 EC	0.144 KG	A/H A	A	0
clopyralid	50 EC	0.100 KG	A/H A	A	0
MCPA ester	280 EC	0.56 KG	A/H A	A	0
3 clopyralid	50 EC	0.100 KG	A/H A	A	0
MCPA ester	280 EC	0.56 KG	A/H A	A	0
quinclorac	75 DF	0.125 KG	A/H A	A	0
Merge		1.0 %	V/V	A	
4 triasulfuron	75 WDG	0.008 KG	A/H A	A	0
bromoxynil	280 EC	0.138 KG	A/H A	A	0
Agral 90		0.25 %	V/V	A	
LSD (P=.05)					131.5
Standard Deviation					82.2
CV					9.68
Bartlett's X2					1.464
P(Bartlett's X2)					0.691
Treatment F					5.413
Treatment Prob(F)					0.0210

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

Weed Code	GALAP	CVPTE	TRFHY	TAROF	
Part Rated	TOPGROW	TOPGROW	TOPGROW	TOPGROW	
Rating Data Type	VISCON	VISCON	VISCON	VISCON	
Rating Unit	percent	percent	percent	percent	
Rating Date	Sep-12-01	Sep-12-01	May-25-02	May-25-02	
Trt-Eval Interval	27 DA-A	282 DA-A	282 DA-A	282 DA-A	
Trt Chemical No. Name	Form Conc	Form Type	Rate Rate	Appl Unit	
1 Check					0
2 fluroxypyr	180 EC	0.144 KG	A/H A	A	93
clopyralid	50 EC	0.100 KG	A/H A	A	78
MCPA ester	280 EC	0.56 KG	A/H A	A	100
3 clopyralid	50 EC	0.100 KG	A/H A	A	90
MCPA ester	280 EC	0.56 KG	A/H A	A	100
quinclorac	75 DF	0.125 KG	A/H A	A	83
Merge		1.0 %	V/V	A	69
4 triasulfuron	75 WDG	0.008 KG	A/H A	A	82
bromoxynil	280 EC	0.138 KG	A/H A	A	68
Agral 90		0.25 %	V/V	A	

Weed Code		CVPTE	TRFHY	TAROF	CVPTE
Part Rated		TOPGROW	TOPGROW	TOPGROW	TOPGROW
Rating Data Type		VISCON	VISCON	VISCON	VISCON
Rating Unit		percent	percent	percent	percent
Rating Date		May-25-02	Jul-09-02	Jul-09-02	Jul-09-02
Trt-Eval Interval		282 DA-A	327 DA-A	327 DA-A	327 DA-A
Trt Chemical No.	Form Name	Form Conc	Rate Type	Rate Unit	Appl Code
1 Check					0 0 0 0
2 fluroxypyr	180 EC	0.144	KG A/H A	A	100 100 74 100
clopyralid	50 EC	0.100	KG A/H A	A	
MCPA ester	280 EC	0.56	KG A/H A	A	
3 clopyralid	50 EC	0.100	KG A/H A	A	100 100 76 100
MCPA ester	280 EC	0.56	KG A/H A	A	
quinclorac	75 DF	0.125	KG A/H A	A	
Merge		1.0	% V/V	A	
4 triasulfuron	75 WDG	0.008	KG A/H A	A	100 61 51 100
bromoxynil	280 EC	0.138	KG A/H A	A	
Agral 90		0.25	% V/V	A	

Trial Comments

In the year of herbicide application, all treatments provided satisfactory control of cleavers and alsike clover although the Prestige and Curtail M + Accord provided slightly better control than Unity. In the year following herbicide application, all treatments provided excellent control of narrow-leaved hawk's-beard. Prestige and Curtail M + Accord provided excellent control of alsike clover and dandelions. The application of herbicides in the previous year to control cleavers was of little benefit as no cleavers emerged in any of the treatments the following year.

There was no visual damage to the creeping red fescue from any of the herbicide treatments. The Curtail M + Accord treatment significantly reduced creeping red fescue seed yields. None of the other treatments resulted in a seed yield loss.

Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year After Seeding - Beaverlodge 2002-03 (Expt. #CR5)

Experiment ID: CRF S02 Fall Bldg

Calvin Yoder, Dan Cole, Jean Beaudoin, Lois Connelly, Nigel Fairey
 Alberta Agriculture, Food and Rural Development, Smokey Applied Research and Demonstration Association, Agriculture and Agri-Food Canada
2002-03 Experiment

CROP: FESRU, CREEPING RED FESCUE (Boreal). Planted: May-31-2002, 3 kg/ha, 1 cm Deep, 30 cm Row Width. Planting Method: Drill. Expt. Design: RANDOMIZED COMPLETE BLOCK.
 Reps: 4. Plot Size: 2 M x 10 M. FERTILIZER: Broadcast May-31-02: N-18 kg/ha P-76.5 kg/ha K-0 kg/ha S-0 kg/ha. Broadcast Oct-22-02: N-68 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha

Expt. Location: Beaverlodge, Alberta.

APPLICATION DESCRIPTION	STAGE AT APPLICATION		
Application:	A		
Date	: Sep-14-2002	Application:	A
Time of Day:	9:00 am	Crop	1 FESRU Creeping Red Fescue
Method	: Sprayer	Stage :	Vegetative
Timing	: PostHarvest	Height :	10 cm
Placement	: Surface		
Air Temp.	: 11 C		
% Humidity	: 80		
Cloud Cover	: 95%		
Equipment	: BAC PAC		
Pressure	: 110 kPa		

Nozzle Type: TEEJET
 Nozzle Size: XR80015
 Noz. Spacing: 50 cm
 Boom Length: 1.5 m
 Boom Height: 45 cm
 Carrier : Water
 Appl. Volume: 100 L/HA
 Propellant : PROPANE

Comments: Crop and weed codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury of the crop. Harvest area was 6 m².

Crop Code	Part Rated	Rating Data Type	Rating Unit	Rating Date	Trt-Eval Interval	FESRU	FESRU	FESRU	
						TOPGROW	VISINJ	percent	Oct-30-2002
Trt Treatment	No. Name	Form Conc	Form Type	Rate Rate	Unit Unit	Appl Code	46 DA-A	46 DA-A	46 DA-A
1 Check							0	0	0
2 dicamba		480	SN	0.290	kg ai/ha	A	0	0	0
2,4-D amine		560	SN	0.700	kg ai/ha	A			
3 fluroxypyr		180	EC	0.144	kg ai/ha	A	0	0	0
clopyralid		50	EC	0.100	kg ai/ha	A			
MCPA ester		280	EC	0.560	kg ai/ha	A			
4 clopyralid		50	EC	0.100	kg ai/ha	A	0	0	0
MCPA ester		280	EC	0.560	kg ai/ha	A			
quinclorac		75	DF	0.125	kg ai/ha	A			
Merge				1.0	% v/v	A			
5 metsulfuron methyl		60	DF	0.0045	kg ai/ha	A	0	0	0
Agral 90				0.2	% v/v	A			
6 metsulfuron methyl		60	DF	0.0045	kg ai/ha	A	0	0	0
quinclorac		75	DF	0.125	kg ai/ha	A			
Merge				1.0	% v/v	A			
7 triasulfuron		75	WDG	0.008	kg ai/ha	A	0	0	0
bromoxynil		280	EC	0.138	kg ai/ha	A			
Agral 90				0.25	% v/v	A			
<hr/>									
Crop Code	Part Rated	Rating Data Type	Rating Unit	Rating Date	Trt-Eval Interval	FESRU	FESRU	FESRU	
Trt Treatment	No. Name	Form Conc	Form Type	Rate Rate	Unit Unit	Appl Code	46 DA-A	310 DA-A	
1 Check							0	771 a	
2 dicamba		480	SN	0.290	kg ai/ha	A	0	665 a	
2,4-D amine		560	SN	0.700	kg ai/ha	A			
3 fluroxypyr		180	EC	0.144	kg ai/ha	A	0	649 a	
clopyralid		50	EC	0.100	kg ai/ha	A			
MCPA ester		280	EC	0.560	kg ai/ha	A			
4 clopyralid		50	EC	0.100	kg ai/ha	A	0	686 a	
MCPA ester		280	EC	0.560	kg ai/ha	A			
quinclorac		75	DF	0.125	kg ai/ha	A			
Merge				1.0	% v/v	A			
5 metsulfuron methyl		60	DF	0.0045	kg ai/ha	A	0	657 a	
Agral 90				0.2	% v/v	A			
6 metsulfuron methyl		60	DF	0.0045	kg ai/ha	A	0	591 a	
quinclorac		75	DF	0.125	kg ai/ha	A			
Merge				1.0	% v/v	A			

7 triasulfuron	75 WDG	0.008 kg ai/ha A	0	669 a
bromoxynil	280 EC	0.138 kg ai/ha A		
Agral 90		0.25 % v/v A		
LSD (P=.05)				134.53
Standard Deviation				90.17
CV				13.46
Bartlett's X2				6.507
P(Bartlett's X2)				0.369
Treatment F				1.415
Treatment Prob(F)				0.0.2355
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)				

Trial Comments

There was no visual damage or significant seed yield loss to creeping red fescue from any of the treatments.

Tolerance of Established Creeping Red Fescue to Cleaver Controlling Products Applied in the Fall - Hines Creek 2000-01 (Expt. #CR6)

Calvin Yoder, Dan Cole, Jean Beaudoin, Deven Gerwatoski **Experiment ID: CRF Fall Hines Ck**
 Alberta Agriculture, Food and Rural Development, Three Links Ag Research
2002-03 Experiment

CROP: FESRU, Creeping Red Fescue. Planted: Oct-17-1999, 2 LBS/AC, 1 CM Deep, 30 cm Row Width. Planting Method: SEEDED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M. Expt. Location: Hines Creek, Alberta.

APPLICATION DESCRIPTION	STAGE AT APPLICATION
Application: A	Application: A
Date : Aug-23-2000	Crop 1 FESRU Creeping Red Fescue Vegetative
Time of Day: 8:00AM	Height : 12 cm
Method : SPRAY	
Timing : FALL	Weed 1 GALAP Cleaver
Placement : FOLIAR	Stage: 1-10WHORL
Air Temp. : 8 C	
% Humidity : 70	
Wind Speed : 0	
Dew Present: N	
Soil Moist.: ADEQUATE	
Cloud Cover: 60%	
Equipment : WAND	
Pressure : 25 psi	
Nozzle Type: FAN	
Nozzle Size: 8001VS	
Noz.Spacing: 50 CM	
Boom Length: 2 M	
Boom Height: 50 CM	
Carrier : WATER	
Appl.Volume: 100 L/HA	
Propellant : CO2	

Comments: Crop and weed codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crop and % control of weeds. Cleaver populations were high and were uniform across the trial area.

Crop Code	FESRU	FESRU	FESRU
Rating Data Type	TOPGROW	TOPGROW	TOPGROW
Rating Unit	VISINJ	VISINJ	VISINJ

Rating Date		May-20-2001			Jun-20-2001			Jul-24-2001		
Trt-Eval Interval		270 DA-A			301 DA-A			335 DA-A		
Trt	Treatment	Form	Fm	Rate	Unit	Appl	Code			
No.	Name	Amt	Ds	Rate	Unit					
1	2,4-D ester	564	SN	0.560	kg ai/ha	A		0	0	0
	dicamba	480	SN	0.237	kg ai/ha	A				
2	quinclorac	75	DF	0.01	kg ai/ha	A		0	0	0
	Merge			1.0	% v/v	A				
3	triasulfuron	75	WDG	0.008	kg ai/ha	A		0	0	0
	bromoxynil	280	EC	0.138	kg ai/ha	A				
	Agral 90			0.25	% v/v	A				
4	fluroxypyr	180	EC	0.105	kg ai/ha	A		0	0	0
	2,4-D ester	564	EC	0.560	kg ai/ha	A				
5	fluroxypyr	180	EC	0.144	kg ai/ha	A		0	0	0
	MCPA Ester	280	EC	0.560	kg ai/ha	A				
	clopyralid	50	EC	0.100	kg ai/ha	A				
6	quinclorac	75	DF	0.20	kg ai/ha	A		0	0	0
	Merge			1.0	% v/v	A				
7	triasulfuron	75	WDG	0.016	kg ai/ha	A		0	0	0
	bromoxynil	280	EC	0.28	kg ai/ha	A				
	Agral 90			0.25	% v/v	A				
8	Check					A		0	0	0

Trial Comments

None of the treatments applied caused visual damage to creeping red fescue. Cleavers did not emerge in any of the treatments including the check the year after application.

Weed Control Following Fall Applications of Herbicides on Established Creeping Red Fescue - Falher 2000-01 (Expt. #CR7)

Calvin Yoder, Dan Cole, Jean Beaudoin, Jean Cote

Experiment ID: CRF Fall Falher

Alberta Agriculture, Food and Rural Development, Smokey Applied Research and

Demonstration Association

2002-03 Experiment

CROP: FESRU, Creeping Red Fescue (Boreal). Planted: Oct-15-1999, 3 kg/ha, 2 cm Deep, 30 cm Row Width. Planting Method: Drill. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M. Expt. Location: Falher, Alberta.

APPLICATION DESCRIPTION	STAGE AT APPLICATION		
Application:	A		
Date	: Sep-14-2000	Application:	A
Time of Day:	6:00 pm	Crop 1 FESRU Creeping Red Fescue	Vegetative
Method	: SPRAY	Height	: 15 cm
Timing	: POSTHARVEST	Weed 1 CIRAR	Canada Thistle
Placement	: SURFACE	Stage:	Bud
Air Temp.	: 21 C	Weed 2 GALAP	Cleaver
% Humidity	: 75	Stage:	16-20 cm
Wind Speed	: 4 km/h	Weed 3 CVPTE	Narrow-leaved Hawk's-beard
Equipment	: Bicycle	Stage:	Rosette
Pressure	: 275 kPa	Weed 4 TAROF	Dandelion
Nozzle Type	: TEEJET	Stage:	Rosette
Nozzle Size	: 80015		
Noz. Spacing	: 50 CM		
Boom Length	: 2 M		
Boom Height	: 45 CM		
Carrier	: Water		

Appl. Volume: 100 L/Ha
Propellant : C02

Comments: Crop and weed codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crop and % control of weeds.

Weed Code				TAROF	CVPTE
Crop Code			FESAR	TOPGROW	TOPGROW
Part Rated			VISINJ	VISINJ	VISCON
Rating Data Type			percent	percent	percent
Rating Unit			May-30-	Jun-20-	May-30-
Rating Rate			2001	2001	2001
Trt-Eval Interval					
Trt Treatment	Form	Form	Rate	Appl	
No. Name	Conc	Type	Rate	Unit	Code
1 Check					
2 dicamba	480	SN	0.290 kg	ai/ha	A
2,4-D amine	560	SN	0.70 kg	ai/ha	A
3 fluroxypyrr	180	EC	0.144 kg	ai/ha	A
clopyralid	50	EC	0.100 kg	ai/ha	A
MCPA ester	280	EC	0.560 kg	ai/ha	A
4 clopyralid	50	EC	0.100 kg	ai/ha	A
MCPA ester	280	EC	0.560 kg	ai/ha	A
quinclorac	75	DF	0.124 kg	ai/ha	A
Merge			1.0 % v/v		A
5 metsulfuron methyl	60	DF	0.0045 kg	ai/ha	A
Agral 90			0.2 % v/v		A
6 metsulfuron methyl	60	DF	0.0045 kg	ai/ha	A
quinclorac	75	DF	0.124 kg	ai/ha	A
Merge			1.0 % v/v		A
7 triasulfuron	75	WDG	0.008 kg	ai/ha	A
bromoxynil	280	EC	0.138 kg	ai/ha	A
Agral 90			0.25 % v/v		A
Weed Code				TAROF	CVPTE
Crop Code				TOPGROW	TOPGROW
Part Rated				VISCON	VISCON
Rating Data Type				percent	percent
Rating Unit				Jul-15-	percent
Rating Rate				2001	Jul-15-2001
Trt-Eval Interval					
Trt Treatment	Form	Form	Rate	Appl	
No. Name	Conc	Type	Rate	Unit	Code
1 Check					
2 dicamba	480	SN	0.290 kg	ai/ha	A
2,4-D amine	560	SN	0.70 kg	ai/ha	A
3 fluroxypyrr	180	EC	0.144 kg	ai/ha	A
clopyralid	50	EC	0.100 kg	ai/ha	A
MCPA ester	280	EC	0.560 kg	ai/ha	A
4 clopyralid	50	EC	0.100 kg	ai/ha	A
MCPA ester	280	EC	0.560 kg	ai/ha	A
quinclorac	75	DF	0.124 kg	ai/ha	A
Merge			1.0 % v/v		A
5 metsulfuron methyl	60	DF	0.0045 kg	ai/ha	A
Agral 90			0.2 % v/v		A
6 metsulfuron methyl	60	DF	0.0045 kg	ai/ha	A
quinclorac	75	DF	0.124 kg	ai/ha	A
Merge			1.0 % v/v		A
7 triasulfuron	75	WDG	0.008 kg	ai/ha	A
bromoxynil	280	EC	0.138 kg	ai/ha	A

Agral 90

0.25 % v/v A

Trial Comments

All treatments provided satisfactory control of dandelions and narrow-leaved hawk's beard. Prestige and Curtail M + Accord gave satisfactory control of Canada thistle on July 15, 2001. Ally provided excellent control of dandelions. Cleavers were present throughout the trial area in the fall at the time of herbicide application but did not grow in any of the treatments including the check in 2001. There was no visual damage to creeping red fescue from any of the treatments.

Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year After Seeding - Edmonton 2001-02 (Expt. #CR8)

Dan Cole, Nicole Kimmel

Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

Experiment ID: Cr Red Fes E01 Fall Edm

CROP: FESRU, Creeping Red Fescue (Boreal). Planted: Jun-5-2000, 3.4 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOUBLE DISC PRESS DRILL. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: April 30/01 80 kg/ha N and Oct.31/01 80 kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 7.0

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	B	Application: A B
Date	: Oct-1-2001	Nov-4-2001	Crop 1 FESRU Creeping Red Fescue
Time of Day:	12:00 PM	5:00 PM	Height : 10 CM 10 CM (Mowing Height)
Method	: SPRAY	SPRAY	Stage : Green Veg. Yellow Veg.
Timing	: POSTHARVEST	POSTHARVEST	Weed 1 CIRAR Canada Thistle
Placement	: SURFACE	SURFACE	Stage : 6-8 lf 6-8 lf
Air Temp.	: 13 C	9 C	Height : 15 CM 15 CM
Wind Speed	: 0 KPH	0 KPH	
Dew Present:	N	N	
Soil Moist.:		WET	
Cloud Cover:	100%	0%	
Equipment	: HANDHELD SPRAYER		
Pressure	: 138 kPa	276 kPa	
Nozzle Type	: TEEJET	TEEJET	
Nozzle Size	: XR80015	VS8003	
Noz. Spacing	: 50 CM	50 CM	
Boom Length	: 1.5 M	1.5 M	
Boom Height	: 45 CM	45 CM	
Carrier	: WATER	WATER	
Appl. Volume	: 100 L/HA	300 L/HA	
Propellant	: CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-4-01, while normal spray solution volume (100 L/ha) was used in October application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 9 m².

Crop Code	FESRU	FESRU	FESRU
Part Rated	TOPGROW	TOPGROW	SEED
Rating Data Type	VISINJ	VISINJ	YIELD
Rating Unit	percent	percent	kg/ha
Rating Date	May-31-2002	Jul-11-2002	Jul-23-2002
Trt-Eval Interval	208/242 DAA	249/283 DAA	261/295 DAA
Trt Treatment	Form Form	Rate	Appl

No.	Name	Conc	Type	Rate	Unit	Code			
1	Check						0	0	224 a
2	dicamba	480	SN	0.29	kg ai/ha	A	0	0	151 a
	2,4-D amine	470	SN	0.7	kg ai/ha	A			
3	fluroxypyr	180	EC	0.144	kg ai/ha	A	0	0	194 a
	clopyralid	50	EC	0.1	kg ai/ha	A			
	MCPA ester	280	EC	0.560	kg ai/ha	A			
4	clopyralid	50	EC	0.1	kg ai/ha	A	0	0	164 a
	MCPA ester	280	EC	0.560	kg ai/ha	A			
	quinclorac	75	DF	0.124	kg ai/ha	A			
	Merge			1.0	% v/v	A			
5	metsulfuron methyl	60	DF	0.0042	kg ai/ha	A	0	0	202 a
	Agral 90			0.2	% v/v	A			
6	metsulfuron methyl	60	DF	0.0042	kg ai/ha	A	0	0	228 a
	quinclorac	75	DF	0.124	kg ai/ha	A			
	Merge			1.0	% v/v	A			
7	triasulfuron	75	WDG	0.00825	kg ai/ha	A	0	0	250 a
	bromoxynil	280	EC	0.138	kg ai/ha	A			
	Agral 90			0.25	% v/v	A			
8	simazine	90	SG	1.0	kg ai/ha	B	0	0	202 a
LSD (P=.05)									76.9
Standard Deviation									52.3
CV									25.87
Bartlett's X2									6.21
P(Bartlett's X2)									0.515
Treatment F									1.594
Treatment Prob(F)									0.1919
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)									

Trial Comments

None of the fall applied treatments caused a significant creeping red fescue seed yield reduction, although Banvel + 2,4-D amine had the lowest yield.

Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year After Seeding - Beaverlodge 2001-02 (Expt. #CR9)

Experiment ID: Cr Red Fes E01 Fall Bldg

Calvin Yoder, Dan Cole, Jean Beaudoin, Lois Connelly, Nigel Fairey
 Alberta Agriculture, Food and Rural Development, Smokey Applied Research and Demonstration Association, Agriculture and Agri-Food Canada
2001-02 Experiment

CROP: FESRU, CREEPING RED FESCUE (Boreal). Planted: May-19-00, 2.6 KG/HA, 1 CM Deep, 30 CM Row Width. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M. Fertilizer: BROADCAST May-17-00 N-5 kg/ha P-77 kg/ha K-0 kg/ha S-0 kg/ha, Oct-11-00 N-68 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha, Oct-15-01 N-68 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha

Expt. Location: Beaverlodge, Alberta

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	B	Application: A B
Date	: Sep-20-01	Oct-30-01	Crop 1 FESRU Creeping Red Fescue
Time of Day:	4:00 PM	3:00 PM	Height : 5-10 CM 8-12 CM (Mowing height)
Method	: SPRAY	SPRAY	Stage : Vegetative Vegetative
Timing	: POSTHARVEST	POSTHARVEST	Weed 1 TAROF (Dandelion)
Placement	: SURFACE	SURFACE	Weed 2 TRIHY (Alsike Clover)
Air Temp.	: 16 C	6.5 C	
% Humidity	: 46	70	
Wind Speed	: 0 KPH	13 KPH	

Equipment : BICYCLE SPRAYER
 Pressure : 275 kPa 275 kPa
 Carrier : WATER WATER
 Appl. Volume: 100 L/HA 300 L/HA
 Propellant : CO2 CO2

Comments: Higher spray solution volume (300 L/ha) was used in application (B) in October, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury of the crops and % control of weeds. Harvest area was 6 m².

Crop Code	FESRU	FESRU	FESRU	FESRU
Part Rated	TOPGROW	TOPGROW	TOPGROW	SEED
Rating Data Type	VISINJ	VISINJ	VISINJ	YIELD
Rating Unit	percent	percent	Percent	KG/HA
Rating Date	Oct-30-01	May-17-02	Jun-10-02	Jul-27-02
Trt-Eval Interval	40/0 DA-A	239/199 DA-A	263/223 DA-A	310/270 DA-A
Trt Chemical No. Name	Form Conc	Form Type	Rate Rate	Appl Unit Code
1 Check				
2 dicamba	480 SN	0.29	KG A/H A	A 0
2,4-D Amine	470 SN	0.7	KG A/H A	A 0
3 fluroxypyr	180 EC	0.144	KG A/H A	A 0
clopyralid	50 EC	0.100	KG A/H A	A 0
MCPA ester	280 EC	0.560	KG A/H A	
4 clopyralid	50 EC	0.100	KG A/H A	A 0
MCPA ester	280 EC	0.560	KG A/H A	
quinclorac	75 DF	0.124	KG A/H A	A 0
Merge		1.0	% V/V	A 0
5 metsulfuron methyl	60 DF	0.0045	KG A/H A	A 0
Agral 90		0.2	% V/V	A 0
6 metsulfuron methyl	60 DF	0.0045	KG A/H A	A 0
quinclorac	75 DF	0.124	KG A/H A	A 0
Merge		1.0	% V/V	A 0
7 triasulfuron	75 WDG	0.008	KG A/H A	A 0
bromoxynil	280 EC	0.138	KG A/H A	A 0
Agral 90		0.25	% V/V	A 0
8 simazine	90 SG	1.0	KG A/H B	B 0
9 metribuzin	75 DF	0.56	KG A/H B	B 0
10 oxyflurofen	240 EC	0.13	KG A/H B	B 0
LSD (P=.05)				156.6
Standard Deviation				107.9
CV				21.23
Bartlett's X2				13.864
P(Bartlett's X2)				0.127
Treatment F				2.113
Treatment Prob(F)				0.0643

Weed Code	TAROF	TRIHY		
Part Rated	TOPGROW	TOPGROW		
Rating Data Type	VISCON	VISCON		
Rating Unit	percent	percent		
Rating Date	Jun-10-02	Jun-10-02		
Trt-Eval Interval	263 DA-A	263 DA-A		
Trt Chemical No. Name	Form Conc	Form Type	Rate Rate	Appl Unit Code
1 Check				
2 dicamba	480 SN	0.29	KG A/H A	A 0
2,4-D Amine	470 SN	0.7	KG A/H A	A 85
				100

3 fluroxypyr	180 EC	0.144 KG A/HA A	90	99
clopyralid	50 EC	0.100 KG A/HA A		
MCPA ester	280 EC	0.560 KG A/HA		
4 clopyralid	50 EC	0.100 KG A/HA A	95	100
MCPA ester	280 EC	0.560 KG A/HA		
quinclorac	75 DF	0.124 KG A/HA A		
Merge		1.0 % V/V A		
5 metsulfuron methyl	60 DF	0.0045 KG A/HA A	100	100
Agral 90		0.2 % V/V A		
6 metsulfuron methyl	60 DF	0.0045 KG A/HA A	100	100
quinclorac	75 DF	0.124 KG A/HA A		
Merge		1.0 % V/V A		
7 triasulfuron	75 WDG	0.008 KG A/HA A	13	35
bromoxynil	280 EC	0.138 KG A/HA A		
Agral 90		0.25 % V/V A		
8 simazine	90 SG	1 KG A/HA B	0	0
9 metribuzin	75 DF	0.56 KG A/HA B	0	0
10 oxyflurofen	240 EC	0.13 KG A/HA B	0	0

Trial Comments

There was no visual damage to creeping red fescue from any of the treatments. Fall application of Curtail M + Accord on established creeping red fescue significantly reduced seed yields harvested the following year.

Tolerance of Creeping Red Fescue to Herbicides Applied in the Fall the Year After Seeding - Edmonton 2002-03 (Expt. #CR10)

Dan Cole, Nicole Kimmel

Experiment ID: Cr Red Fes E02 Fall Edm

Crop Diversification, Alberta Agriculture, Food and Rural Development
2002-03 Experiment

CROP: FESRU, Creeping Red Fescue (BOREAL). Planted: Jun-1-2001, 3.4 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOUBLE DISC PRESS DRILL. Fertilizer: Broadcast Oct.31, 2001 80 kg/ha N & Oct.18, 2002 80 kg/ha N Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 5.7

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Sep-25-2002 Oct-16-2002	Crop	1 FESRU Creeping Red Fescue
Time of Day:	11:15 AM 10:00 AM	Height :	Cut @ 8 cm
Method	: SPRAY SPRAY		
Timing	: POSTHARVEST POSTHARVEST		
Placement	: SURFACE SURFACE		
Air Temp.	: 6 C 6 C		
% Humidity	: 50 42		
Wind Speed	: 15 KPH 8 KPH		
Dew Present	: Y N		
Cloud Cover	: 40 % 0 %		
Equipment	: MOTORIZED HANDHELD SPRAYER		
Pressure	: 207 kPa 276 kPa		
Nozzle Type	: TEEJET TEEJET		
Nozzle Size	: 80015 8003VS		
Noz. Spacing	: 50 CM 50 CM		

Boom Length:	2 M	1.5 M
Boom Height:	50 CM	45 CM
Carrier :	WATER	WATER
Appl. Volume:	100 L/HA	300 L/HA
Propellant :	CO2	CO2

Comments: Higher spray solution volume (300L/ha) was used in application (B) on Oct-16-02, while normal spray solution volume (100L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 9 m².

Crop Code			FESRU	FESRU	FESRU
	Part Rated		TOPGROW	TOPGROW	SEED
Rating Data Type			VISINJ	VISINJ	YIELD
Rating Unit			percent	percent	kg/ha
Rating Date			May-14-2003	Jul-11-2003	Jul-28-2003
Trt-Eval Interval			231/210 DAA	289/268 DAA	306/285 DAA
Trt Treatment	Form	Form	Rate	Appl	
No.	Conc	Type	Rate	Unit	Code
1 Check					0 0 669 a
2 dicamba	480	SN	0.29	kg ai/ha	A 0 0 526 a
2,4-D amine	470	SN	0.7	kg ai/ha	A
3 fluroxypyr	180	EC	0.144	kg ai/ha	A 0 0 768 a
clopyralid	50	EC	0.1	kg ai/ha	A
MCPA ester	280	EC	0.56	kg ai/ha	A
4 clopyralid	50	EC	0.1	kg ai/ha	A 3 0 545 a
MCPA ester	280	EC	0.56	kg ai/ha	A
quinclorac	75	DF	0.124	kg ai/ha	A
Merge			1.0	% v/v	A
5 metsulfuron methyl	60	DF	0.0042	kg ai/ha	A 0 0 601 a
Agral 90			0.2	% v/v	A
6 metsulfuron methyl	60	DF	0.0042	kg ai/ha	A 0 0 560 a
quinclorac	75	DF	0.124	kg ai/ha	A
Merge			1.0	% v/v	A
7 triasulfuron	75	WDG	0.00825	kg ai/ha	A 0 0 601 a
bromoxynil	280	EC	0.138	kg ai/ha	A
Agral 90			0.25	% v/v	A
8 simazine	90	SG	1	kg ai/ha	B 0 0 646 a
LSD (P=.05)					157.9
Standard Deviation					107.1
CV					17.42
Bartlett's X2					6.243
P(Bartlett's X2)					0.512
Treatment F					2.177
Treatment Prob(F)					0.0817

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

Trial Comments

None of the fall applied herbicides caused a visible or significant seed yield reduction.

Tolerance of Tall Fescue to Herbicides Applied in the Fall of the Year of Seeding - Brooks 2000-01 (Expt. #TF1)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2000-01 Experiment

Experiment ID: TF S00 Fall BK

CROP: FESAR, Tall Fescue (CROSSFIRE II). Planted: May-16-2000, 4.75 KG/HA, 0.75 CM Deep, 30 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Oct.31/2000 100 kg/ha N Expt. Location: Brooks, Alberta.

Soil Texture: SILT LOAM. %OM: 2 %Sand: 45 %Silt: 35 %Clay: 20 pH: 7.9

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	Sep-11-2000	Oct-23-2000	Crop 1 FESAR Tall Fescue
Time of Day:	9:00 AM	9:00 AM	Height : 12 cm (cutting height)
Method	SPRAY	SPRAY	
Timing	POSTHARVEST	POSTHARVEST	
Placement	SURFACE	SURFACE	
Air Temp.	15 C	10 C	
Wind Speed	0 KPH	5 KPH	
Equipment	HANDHELD SPRAYER		
Pressure	275 kPa	275 kPa	
Nozzle Type	TEEJET	TEEJET	
Nozzle Size	8001	8003	
Noz. Spacing	50 CM	50 CM	
Boom Length	1.5 M	1.5 M	
Boom Height	45 CM	45 CM	
Carrier	WATER	WATER	
Appl. Volume:	100 L/HA	300 L/HA	
Propellant	CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Oct-23-00, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 6.6 m².

Crop Code	FESAR		FESAR		FESAR	
	TOPGROW	PLANT	VISINJ	HEIGHT	YIELD	percent
Part Rated			cm	kg/ha		
Rating Data Type						
Rating Unit						
Rating Date	Spring '01		Jul-19-2001		Jul-19-2001	
Trt-Eval Interval						
Trt Treatment	Form	Form	Rate	Appl		
No. Name	Conc	Type	Rate	Unit	Code	
1 Check					0	778 a
2 dicamba	480	SN	0.237	kg ai/ha	A	89 a
2,4-D amine	470	SN	0.523	kg ai/ha	A	84 a
3 fluroxypyr	180	EC	0.144	kg ai/ha	A	0
clopyralid	50	EC	0.100	kg ai/ha	A	90 a
MCPA ester	280	EC	0.056	kg ai/ha	A	850 a
4 clopyralid	50	EC	0.100	kg ai/ha	A	0
MCPA ester	280	EC	0.56	kg ai/ha	A	91 a
quinclorac	75	DF	0.125	kg ai/ha	A	804 a
Merge			1.0	% v/v	A	
5 metsulfuron methyl	60	DF	0.0045	kg ai/ha	A	0
Agral 90			0.2	% v/v	A	91 a
6 simazine	90	SG	1.00	kg ai/ha	B	809 a
7 metribuzin	75	DF	0.42	kg ai/ha	B	85 a
oxyfluorfen	240	EC	0.13	kg ai/ha	B	680 a
8 diuron	80	DF	0.90	kg ai/ha	B	343 b
LSD (P=.05)					0	770 a
Standard Deviation					9.9	138.9
CV					6.7	94.4
Bartlett's X2					7.67	13.02
P(Bartlett's X2)					5.286	0.282
					0.625	0.507

Treatment F	0.738	11.779
Treatment Prob(F)	0.6424	0.0001
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)		

Trial Comments

Although both Princep and Sencor + Goal caused visible injury to tall fescue, only fall applied Sencor + Goal caused a significant seed yield reduction.

**Tolerance of Tall Fescue to Herbicides Applied in the Fall of the Year of Seeding -
Edmonton 2000-01 (Expt. #TF2)**

Dan Cole, Nicole Kimmel, James Leskiw
Agronomy Unit, Alberta Agriculture, Food and Rural Development
2000-01 Experiment

Experiment ID: Tall S00 Fall Edm

CROP: Crossfire II Tall Fescue (FESAR) 3.5 kg/ha Planted: Jun-05-00, 1 cm, 30 cm row width
Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M.
Fertilizer: Apr-30-01 N-80 kg/ha Expt. Location: Ellerslie, Edmonton, Alberta.
Soil Texture: Silty Clay Loam, %OM:11, %Sand:19, %Silt:40, %Clay:41 and pH:5.7

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	B	Application:
Date	Sep-26-00	Oct-11-00	Crop 1 Tall Fescue (FESAR) 4 lf
Time of Day	8:30 AM	4:00 PM	Height : 35 CM
Method	SPRAY	SPRAY	5% Headed out 10% Headed out
Timing	PREBLOOM	PREBLOOM	Weed 1 Canada Thistle (CIRAR)
Placement	SURFACE	SURFACE	Height : 25-30 CM
Air Temp.	6 C	8 C	Weed 2 Dandelion (TAROF)
% Humidity	High	N	Height : 23 CM
Wind Speed	0-8 KPH	0-5 KPH	Weed 3 Broadleaf Plantain (PLAMA)
Dew Present	Little	N	Weed 4 Shepherd's-purse (CAPBP)
Equipment	HANDHELD CO2 SPRAYER		
Pressure	138 kPa	138 kPa	
Nozzle Type	TEEJET	TEEJET	
Nozzle Size	80015	80015	
Noz. Spacing	50 CM	50 CM	
Boom Length	1.5 M	1.5 M	
Boom Height	45 CM	45 CM	
Appl. Volume	100 L/ha	300 L/ha	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Oct-11-00, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top Growth. Visual assessments provide % injury to the crops and % control of weeds. No harvest due to winter kill.

Crop Code	FESAR	FESAR	FESAR	FESAR
Part Rated	TOPGROW	TOPGROW	TOPGROW	TOPGROW
Rating Data Type	VISINJ	VISINJ	VISINJ	VISINJ
Rating Unit	percent	percent	percent	percent
Rating Date	Oct-23-00	May-16-01	Jun-05-01	Jul-07-01
Trt-Eval Interval	232/217	252/237	284/269	
	27/12 DAA	DAA	DAA	DAA
Trt Treatment	Form Form	Rate	Appl	
No. Name	Conc Type	Rate	Unit	Code
1 Check				0
2 dicamba	480 SN	0.237 KG A/H A		0
2,4-D amine	470 SN	0.523 KG A/H A		20

3 fluroxypyrr	180 EC	0.144 KG A/H A	10	0	0	13
clopyralid	50 EC	0.1 KG A/H A				
MCPA ester	280 EC	0.56 KG A/H A				
4 clopyralid	50 EC	0.1 KG A/H A	0	0	0	0
MCPA ester	280 EC	0.56 KG A/H A				
quinchlorac	75 DF	0.125 KG A/H A				
Merge		1.0 % V/V A				
5 metsulfuron	60 DF	0.0045 KG A/H A	0	0	0	0
methyl		0.2 % V/V A				
Agral 90						
6 simazine	90 SG	1.0 KG A/H B	0	0	0	3
7 metribuzin	75 DF	0.56 KG A/H B	0	0	20	13
oxyfluorfen	240 EC	0.42 KG A/H B				
8 diuron	80 DF	1.8 KG A/H B	0	0	0	5

Weed Code			CIRAR	CIRAR	CIRAR
Crop Code					
Part Rated		FESAR			
Rating Data Type		TOPGROW	TOPGROW	PLANT	TOPGROW
Rating Unit		VISINJ	VISCON	COUNT	VISCON
Rating Date		percent	percent	#/plot	percent
Trt-Eval Interval		Aug-09-01 317/302	Jun-05-01 252/237	Jun-05-01 252/237	Aug-09-01 317/302
Trt Treatment	Form	Form	Rate	Appl	
No. Name	Conc	Type	Rate	Unit	Code
1 Check					
2 dicamba	480 SN	0.237 KG A/H A	14	0	49
2,4-D amine	470 SN	0.523 KG A/H A			
3 fluroxypyrr	180 EC	0.144 KG A/H A	10	56	
clopyralid	50 EC	0.1 KG A/H A			
MCPA ester	280 EC	0.56 KG A/H A			
4 clopyralid	50 EC	0.1 KG A/H A	0	56	
MCPA ester	280 EC	0.56 KG A/H A			
quinchlorac	75 DF	0.125 KG A/H A			
Merge		1.0 % V/V A			
5 metsulfuron	60 DF	0.0045 KG A/H A	0	56	
methyl		0.2 % V/V A			
Agral 90					
6 simazine	90 SG	1.0 KG A/H B	0	23	
7 metribuzin	75 DF	0.56 KG A/H B	15	5	
oxyfluorfen	240 EC	0.42 KG A/H B			
8 diuron	80 DF	1.8 KG A/H B	9	44	
LSD (P=.05)					3.0
Standard Deviation					2.0
CV					67.83
Bartlett's X2					8.008
P(Bartlett's X2)					0.332
Treatment F					5.680
Treatment Prob(F)					0.0009

Weed Code			TAROF	TAROF	PLAMA	CAPBP
Part Rated			TOPGROW	PLANT	TOPGROW	TOPGROW
Rating Data Type			VISCON	COUNT	VISCON	VISCON
Rating Unit			percent	#/plot	percent	percent
Rating Date			Jun-05-01 252/237	Jun-05-01 252/237	Jun-05-01 252/237	Aug-09-01 317/302
Trt-Eval Interval			DAA	DAA	DAA	DAA
Trt Treatment	Form	Form	Rate	Appl		
No. Name	Conc	Type	Rate	Unit	Code	
1 Check						
2 dicamba	480 SN	0.237 KG A/H A	86	0	14 a	0
2,4-D amine	470 SN	0.523 KG A/H A			2 b	100
3 fluroxypyrr	180 EC	0.144 KG A/H A	94	100	2 b	0

clopyralid	50 EC	0.1 KG A/HA A					
MCPA ester	280 EC	0.56 KG A/HA A					
4 clopyralid	50 EC	0.1 KG A/HA A	84	2 b	100		4
MCPA ester	280 EC	0.56 KG A/HA A					
quinclorac	75 DF	0.125 KG A/HA A					
Merge		1.0 % V/V A					
5 metsulfuron methyl	60 DF	0.0045 KG A/HA A	100	0 b	98		0
Agral 90		0.2 % V/V A					
6 simazine	90 SG	1.0 KG A/HA B	0	15 a	5		64
7 metribuzin	75 DF	0.56 KG A/HA B	9	14 a	5		84
oxyfluorfen	240 EC	0.42 KG A/HA B					
8 diuron	80 DF	1.8 KG A/HA B	19	13 a	15		65
LSD (P=.05)				4.0			
Standard Deviation				2.7			
CV				34.93			
Bartlett's X2				12.669			
P(Bartlett's X2)				0.049*			
Treatment F				25.379			
Treatment Prob(F)				0.0001			
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)							

Trial Comments

Unfortunately, most of the tall fescue did not overwinter so that seed yields could not be collected in 2001. There appeared to be some injury to tall fescue from Banvel + 2,4-D amine and Sencor + Goal on June 5, 2001. Most of the treatments provided some initial suppression of Canada thistle. The earlier application treatments controlled dandelion and plantain while the later application treatments suppressed the emergence of shepherd's-purse.

Tolerance of Tall Fescue to Herbicides Applied in the Fall of the Year of Seeding - Beaverlodge 2000-01 (Expt. #TF3)

Calvin Yoder, Dan Cole, Jean Beaudoin, Nigel Fairey **Experiment ID: Tall Fes S00 Fall Bldg**
 Alberta Agriculture, Food and Rural Development, Smokey Applied Research and
 Demonstration Association, Agriculture and Agri-Food Canada
2000-01 Experiment

CROP: FESAR, Tall fescue (Crossfire II). Planted: May-5-2000, 4.5 kg/ha, 1 cm Deep, 30 cm Row Width. Planting Method: Drill. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M. Expt. Location: Beaverlodge, Alberta.

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	Application:	A
Date	Sep-14-2000	Date	B
Time of Day:	11:00 am	Time of Day:	12:00 pm
Method	SPRAY	Method	SPRAY
Timing	POSTHARVEST	Timing	POSTHARVEST
Placement	SURFACE	Placement	SURFACE
Air Temp.	14 C		
% Humidity	78	% Humidity	90
Equipment	Bicycle	Equipment	Bicycle
Pressure	275 kPa	Pressure	275 kPa
Nozzle Type	TEEEJET	Nozzle Type	TEEEJET
Nozzle Size	80015	Nozzle Size	80015
Noz. Spacing	50 cm	Noz. Spacing	50 cm
Boom Length	2 m	Boom Length	2 m
Boom Height	45 cm	Boom Height	45 cm
Carrier	Water	Carrier	Water
Appl. Volume	100 L/HA	Appl. Volume	300 L/HA

Propellant : CO₂CO₂

Comments: Higher spray solution volume (300 L/ha) was used in application (B) in October, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth, WEIDRY-Dry Weight. Visual assessments provide % injury of the crops. Harvest area was 6 m².

Crop Code	FESAR	FESAR	FESAR	
Part Rated	TOPGROW	TOPGROW	TOPGROW	
Rating Data Type	VISINJ	VISINJ	VISINJ	
Rating Unit	percent	percent	percent	
Rating Date	Oct-27-2000	May-15-2001	Jun-19-2001	
Trt-Eval Interval	43/0 DAA	243/200 DAA	278/235 DAA	
Trt Treatment	Form	Form	Rate	
No. Name	Conc	Type	Rate	Appl
1 Check				Code
2 dicamba	480	SN	0.237 kg ai/ha	A
2,4-D amine	470	SN	0.523 kg ai/ha	A
3 fluroxypyrr	180	EC	0.144 kg ai/ha	A
clopyralid	50	EC	0.100 kg ai/ha	A
MCPA ester	280	EC	0.56 kg ai/ha	A
4 clopyralid	50	EC	0.100 kg ai/ha	A
MCPA ester	280	EC	0.56 kg ai/ha	A
quinclorac	75	DF	0.125 kg ai/ha	A
Merge			1 % v/v	A
5 metsulfuron methyl	60	DF	0.0045 kg ai/ha	A
Agral 90			0.2 % v/v	A
6 simazine	90	SG	1.0 kg ai/ha	B
7 metribuzin	75	DF	0.56 kg ai/ha	B
oxyfluorfen	240	EC	0.42 kg ai/ha	B
8 diuron	80	DF	1.8 kg ai/ha	B
9 atrazine	90	WDG	1.5 kg ai/ha	B
10 sulfosulfuron	75	WDG	0.020 kg ai/ha	B
2,4-D ester	564	EC	0.395 kg ai/ha	B
Merge			0.5 % v/v	B
pH Balancer			0.25 % v/v	B
11 metribuzin	75	DF	0.56 kg ai/ha	B

Crop Code	FESAR	FESAR	FESAR	
Part Rated	TOPGROW	FORAGE	SEED	
Rating Data Type	VISINJ	WEIDRY	YIELD	
Rating Unit	percent	KG/HA	KG/HA	
Rating Date	Aug-9-2001	Aug-13-2001	Aug-13-2001	
Trt-Eval Interval	329/286 DAA	333/290 DAA	333/290 DAA	
Trt Treatment	Form	Form	Rate	
No. Name	Conc	Type	Rate	Appl
1 Check				Code
2 dicamba	480	SN	0.237 kg ai/ha	A
2,4-D amine	470	SN	0.523 kg ai/ha	A
3 fluroxypyrr	180	EC	0.144 kg ai/ha	A
clopyralid	50	EC	0.100 kg ai/ha	A
MCPA ester	280	EC	0.56 kg ai/ha	A
4 clopyralid	50	EC	0.100 kg ai/ha	A
MCPA ester	280	EC	0.56 kg ai/ha	A
quinclorac	75	DF	0.125 kg ai/ha	A
Merge			1 % v/v	A
5 metsulfuron methyl	60	DF	0.0045 kg ai/ha	A
Agral 90			0.2 % v/v	A
6 simazine	90	SG	1.0 kg ai/ha	B
7 metribuzin	75	DF	0.56 kg ai/ha	B
oxyfluorfen	240	EC	0.42 kg ai/ha	B
8 diuron	80	DF	1.8 kg ai/ha	B

9 atrazine	90 WDG	1.5 kg ai/ha	B	0	2167 ab	574 a
10 sulfosulfuron	75 WDG	0.020 kg ai/ha	B	38	591 b	98 b
2,4-D ester	564 EC	0.395 kg ai/ha	B			
Merge		0.5 % v/v	B			
pH Balancer		0.25 % v/v	B			
11 metribuzin	75 DF	0.56 kg ai/ha	B	0	2000 ab	533 a
LSD (P=.05)					534.3	164.1
Standard Deviation					368.9	113.7
CV					17.75	20.6
Bartlett's X2					10.728	11.745
P(Bartlett's X2)					0.379	0.302
Treatment F					8.356	8.221
Treatment Prob(F)					0.0001	0.0001

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

Trial Comments

Sundance caused severe damage to tall fescue although it did start to recover by the end of summer. Very few seed heads were produced from the Sundance treatment. Sencor + Goal also caused some visual damage to tall fescue. Ally application resulted in visual damage to tall fescue in the fall but there were no signs of damage in the spring. Sundance was the only treatment to significantly reduce seed and forage yield as compared to the check.

Tolerance of Tall Fescue to Herbicides Applied in the Fall of the Year of Seeding - Brooks 2001-02 (Expt. #TF4)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

Experiment ID: Tall Fes Fall S01 BK

CROP: FESAR, Tall Fescue (CROSSFIRE II). Planted: May-9-2001, 4.75 KG/HA, 0.75 CM Deep, 30 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Nov.8/2001 120 kg/ha N Expt. Location: Brooks, Alberta.

Soil Texture: SILT LOAM. %OM: 2 %Sand: 45 %Silt: 35 %Clay: 20 pH: 7.9

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date :	Sep-11-2001 Oct-30-2001	Crop	1 FESAR Tall Fescue
Time of Day:	9:00 AM 9:00 AM	Height :	12 cm (cutting height)
Method :	SPRAY SPRAY		
Timing :	POSTAHRVEST POSTHARVEST		
Placement :	SURFACE SURFACE		
Air Temp. :	11 C 11.2 C		
Wind Speed :	7 KPH 3 KPH		
Equipment :	HANDHELD SPRAYER		
Pressure :	275 kPa 275 kPa		
Nozzle Type:	TEEJET TEEJET		
Nozzle Size:	8001 8003		
Noz.Spacing:	50 CM 50 CM		
Boom Length:	1.5 M 1.5 M		
Boom Height:	45 CM 45 CM		
Carrier :	WATER WATER		
Appl.Volume:	100 L/HA 300 L/HA		
Propellant :	CO2 CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Oct-

30-01, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Harvest area 6.6 m².

Crop Code	FESAR	FESAR	FESAR
Part Rated	TOPGROW	PLANT	SEED
Rating Data Type	VISINJ	HEIGHT	YIELD
Rating Unit	percent	CM	kg/ha
Rating Date	Jun-04-2002	Jul-26-2002	Jul-26-2002
Trt-Eval Interval	217/266 DAA	269/318 DAA	269/318 DAA
Trt Treatment	Form	Form	Appl
No. Name	Conc	Type	Rate
1 Check			Unit
2 dicamba	480	SN	0.237 kg ai/ha
2,4-D amine	470	SN	0.523 kg ai/ha
3 fluroxyoqr	180	EC	0.144 kg ai/ha
clopyralid	50	EC	0.100 kg ai/ha
MCPA ester	280	EC	0.56 kg ai/ha
4 clopyralid	50	EC	0.100 kg ai/ha
MCPA ester	280	EC	0.56 kg ai/ha
quinclorac	75	DF	0.125 kg ai/ha
Merge			1.0 % v/v
5 metsulfuron methyl	60	DF	0.0045 kg ai/ha
Agral 90			0.2 % v/v
6 simazine	90	SG	1.0 kg ai/ha
7 sulfosulfuron	75	WDG	0.020 kg ai/ha
2,4-D ester	564	EC	0.395 kg ai/ha
Merge			0.5 % v/v
pH Balancer			0.25 % v/v
8 diuron	80	DF	0.90 kg ai/ha
LSD (P=.05)			B
Standard Deviation			0
CV			10
Bartlett's X2			97 a
P(Bartlett's X2)			9.57
Treatment F			6.51
Treatment Prob(F)			191.4
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)			7.08
			13.09
			4.642
			11.144
			0.704
			0.132
			5.700
			6.632
			0.0009
			0.0003

Trial Comments

Sundance + 2,4-D ester caused over 50% loss of the stand in the spring. Ally stunted growth was noted on June 4, 2002. Only Sundance + 2,4-D ester caused a significant seed yield reduction.

Tolerance of Tall Fescue to Herbicides Applied in the Fall of the Year of Seeding - Edmonton 2001-02 (Expt. #TF5)

Dan Cole, Nicole Kimmel

Experiment ID: Tall Fes S01 Fall Edm

Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

CROP: FESAR, Tall Fescue (Crossfire II). Planted: Jun-1-2001, 3.5 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOUBLE DISC PRESS DRILL. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: Oct.31/01 80 kg/ha N and Oct.18/02 80 kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 7.0

APPLICATION DESCRIPTION	STAGE AT APPLICATION
Application: A	B
Date : Oct-1-2001	Nov-4-2001
	Crop 1 FESAR Tall Fescue

Time of Day:	1:30 PM	6:00 PM	Height :	10 CM	10 CM (Mowing Height)
Method :	SPRAY	SPRAY	Stage :	Green Veg.	Yellow Veg.
Timing :	POSTHARVEST	POSTHARVEST	Weed 1 TAROF	Dandelion	
Placement :	SURFACE	SURFACE	Stage :	6 lf	6 lf
Air Temp. :	13 C	7 C	Height :	19 CM	19 CM
Wind Speed :	10 KPH	10 KPH	Weed 2 PLAMA	Broad-leaved Plantain	
Cloud Cover:	100%	0%	Stage :	4 lf	4 lf
Equipment :	HANDHELD SPRAYER		Height :	8-12 CM	8-12 CM
Pressure :	138 kPa	276 kPa	Weed 3 CVPTE	Narrow-leaved Hawk's-beard	
Nozzle Type:	TEEJET	TEEJET	Stage :	30 lf	30 lf
Nozzle Size:	XR80015	VS8003	Height :	8-12 CM	8-12 CM
Noz. Spacing:	50 CM	50 CM	Weed 4 CIRAR	Canada Thistle	
Boom Length:	1.5 M	1.5 M	Stage :	8 lf	8 lf
Boom Height:	45 CM	45 CM	Height :	15 CM	15 CM
Carrier :	WATER	WATER			
Appl. Volume:	100 L/HA	300 L/HA			
Propellant :	CO2	CO2			

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-4-01, while normal spray solution volume (100 L/ha) was used in October application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops and % control of weeds. Harvest area 9 m².

Weed Code	FESAR	FESAR	FESAR
Crop Code	TOPGROW	TOPGROW	SEED
Part Rated	VISINJ	VISINJ	YIELD
Rating Data Type	percent	percent	kg/ha
Rating Unit			
Rating Date	May-31-2002	Aug-1-2002	Aug-21-2002
Trt-Eval Interval	208/242 DAA	270/304 DAA	290/324 DAA
Trt Treatment	Form Conc	Form Type	Rate
No. Name	Rate	Unit	Appl Code
1 Check			0 0
2 dicamba	480 SN	0.237 kg ai/ha	A 0
2,4-D amine	470 SN	0.523 kg ai/ha	A 0
3 fluroxypyr	180 EC	0.144 kg ai/ha	A 0
clopyralid	50 EC	0.1 kg ai/ha	A 0
MCPA ester	280 EC	0.560 kg ai/ha	A 0
4 clopyralid	50 EC	0.1 kg ai/ha	A 0
MCPA ester	280 EC	0.560 kg ai/ha	A 0
quinchlorac	75 DF	0.125 kg ai/ha	A 0
Merge		1.0 % v/v	A 0
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha	A 0
Agral 90		0.2 % v/v	A 0
6 simazine	90 SG	1 kg ai/ha	B 0
7 sulfosulfuron	75 WDG	0.020 kg ai/ha	B 86
2,4-D ester	564 EC	0.395 kg ai/ha	B 78
Merge		0.5 % v/v	B 78
pH Balancer		0.25 % v/v	B 80 b
8 diuron	80 DF	1.8 kg ai/ha	B 0
LSD (P=.05)			311 a 124.3
Standard Deviation			84.3
CV			29.96
Bartlett's X2			6.944
P(Bartlett's X2)			0.435
Treatment F			4.122
Treatment Prob(F)			0.0059

Weed Code	CVPTE
Crop Code	TOPGROW
Part Rated	VISCON
Rating Data Type	

Rating Unit		percent				
Rating Date		Aug-12-2002				
Trt-Eval Interval		281/315 DAA				
Trt Treatment	Form	Form	Rate	Appl		
No. Name	Conc	Type	Rate	Unit	Code	
1 Check					0	
2 dicamba	480	SN	0.237	kg ai/ha	A	100
2,4-D amine	470	SN	0.523	kg ai/ha	A	
3 fluroxypyr	180	EC	0.144	kg ai/ha	A	100
clopyralid	50	EC	0.1	kg ai/ha	A	
MCPCA ester	280	EC	0.560	kg ai/ha	A	
4 clopyralid	50	EC	0.1	kg ai/ha	A	100
MCPCA ester	280	EC	0.560	kg ai/ha	A	
quinclorac	75	DF	0.125	kg ai/ha	A	
Merge			1.0 % v/v		A	
5 metsulfuron methyl	60	DF	0.0045	kg ai/ha	A	100
Agral 90			0.2 % v/v		A	
6 simazine	90	SG	1	kg ai/ha	B	48
7 sulfosulfuron	75	WDG	0.020	kg ai/ha	B	69
2,4-D ester	564	EC	0.395	kg ai/ha	B	
Merge			0.5 % v/v		B	
pH Balancer			0.25 % v/v		B	
8 diuron	80	DF	1.8	kg ai/ha	B	58

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

Trial Comments

Only fall applied Sundance + 2,4-D ester caused a significant seed yield reduction to tall fescue.

Tolerance of Tall Fescue to Herbicides Applied in the Fall of the Year of Seeding - Beaverlodge 2000-01 (Expt. #TF6)

Experiment ID: Tall Fes S01 Fall Bldg

Calvin Yoder, Dan Cole, Jean Beaudoin, Lois Connelly, Nigel Fairey
 Alberta Agriculture, Food and Rural Development, Smokey Applied Research and
 Demonstration Association, Agriculture and Agri-Food Canada
2001-02 Experiment

CROP: FESAR, TALL FESCUE (Crossfire II). Planted: May-22-01, 2.4 KG/HA, 1 CM Deep, 30 CM Row Width. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M. Fertilizer: BROADCAST May-10-01 N-18 kg/ha P-76.5 kg/ha K-0 kg/ha S-0 kg/ha, Oct-16-01 N-102 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha Expt. Location: Beaverlodge, Alberta

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:		Application:	
A	B	A	B
Date	: Sep-20-01	Oct-30-01	Crop 1 FESAR Tall Fescue
Time of Day:	1:00 PM	10:30 AM	Height : 20-25 CM 10-20 CM
(Mowing height)			
Method	: SPRAY	SPRAY	Stage : Vegetative Vegetative
Timing	: POSTHARVEST	POSTHARVEST	
Placement	: SURFACE	SURFACE	
Air Temp.	: 17 C	6.5 C	
% Humidity	: 46	70	
Wind Speed	: 5 KPH	5 KPH	
Equipment	BICYCLE SPRAYER		
Pressure	: 275 kPa	275 kPa	
Carrier	WATER		

Appl. Volume: 100 L/HA 300 L/HA
 Propellant : CO2 CO2

Comments: Higher spray solution volume (300 L/ha) was used in application (B) in October, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury of the crop. Harvest area 3 m².

Crop Code	FESAR		FESAR		FESAR		FESAR	
	TOPGROW	VISINJ	TOPGROW	VISINJ	TOPGROW	VISINJ	TOPGROW	VISINJ
Part Rated								
Rating Data Type								
Rating Unit		percent		percent		percent		percent
Rating Date	Oct-30-01		May-17-02		Jun-10-02		Aug-07-02	
Trt-Eval Interval			239/199		263/223		321/281	
Trt Chemical No.	Form Conc	Form Type	Rate Rate	Appl Unit	Code		DA-A	DA-A
1 Check						0	0	0
2 dicamba	480 SN	SN	0.237	KG A/H A	A	0	0	0
2,4-D amine	470 SN	SN	0.523	KG A/H A	A			
3 fluroxypyrr	180 EC	EC	0.144	KG A/H A	A	0	0	0
clopyralid	50 EC	EC	0.100	KG A/H A	A			
MCPA ester	280 EC	EC	0.56	KG A/H A	A			
4 clopyralid	50 EC	EC	0.1	KG A/H A	A	0	0	0
MCPA ester	280 EC	EC	0.56	KG A/H A	A			
quinclorac	75 DF	DF	0.125	KG A/H A	A			
Merge			1.0	% V/V	A			
5 metsulfuron methyl	60 DF	DF	0.0045	KG A/H A	A	0	0	0
Agral 90			0.2	% V/V	A			
6 simazine	90 SG	SG	1.0	KG A/H B	B	0	0	0
7 diuron	80 DF	DF	1.80	KG A/H B	B	0	0	0
8 atrazine	90 WDG	WDG	1.5	KG A/H B	B	0	0	0
9 metribuzin	75 DF	DF	0.56	KG A/H B	B	0	0	0

Crop Code	FESAR			
	SEED	YIELD		
Part Rated		kg/ha		
Rating Data Type				
Rating Unit				
Rating Date	Aug-09-02			
Trt-Eval Interval	323/283	DA-A		
Trt Chemical No.	Form Conc	Form Type		
1 Check			1865 a	
2 dicamba	480 SN	SN	0.237 KG A/H A	1704 a
2,4-D amine	470 SN	SN	0.523 KG A/H A	
3 fluroxypyrr	180 EC	EC	0.144 KG A/H A	1857 a
clopyralid	50 EC	EC	0.100 KG A/H A	
MCPA ester	280 EC	EC	0.56 KG A/H A	
4 clopyralid	50 EC	EC	0.1 KG A/H A	1672 a
MCPA ester	280 EC	EC	0.56 KG A/H A	
quinclorac	75 DF	DF	0.125 KG A/H A	
Merge			1.0 % V/V A	
5 metsulfuron methyl	60 DF	DF	0.0045 KG A/H A	2012 a
Agral 90			0.2 % V/V A	
6 simazine	90 SG	SG	1.0 KG A/H B	1741 a
7 diuron	80 DF	DF	1.80 KG A/H B	1966 a
8 atrazine	90 WDG	WDG	1.5 KG A/H B	1723 a
9 metribuzin	75 DF	DF	0.56 KG A/H B	1684 a
LSD (P=.05)			383.9	
Standard Deviation			263.0	

CV	14.59
Bartlett's X2	5.165
P(Bartlett's X2)	0.74
Treatment F	0.927
Treatment Prob(F)	0.5125

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

Trial Comments

None of the treatments applied in the fall to tall fescue resulted in visual damage or seed yield loss.

Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year After Seeding - Brooks 2001-02 (Expt. #TF7)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
 Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

Experiment ID: Tall Fes Fall E00 BK

CROP: FESAR, Tall Fescue (CROSSFIRE II). Planted: May-16-2000, 4.75 KG/HA, 0.75 CM Deep, 30 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Nov.8/2001 120 kg/ha N Expt. Location: Brooks, Alberta.

Soil Texture: SILT LOAM. %OM: 2 %Sand: 45 %Silt: 35 %Clay: 20 pH: 7.9

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	B	Application: A B
Date	Sep-11-2001	Oct-30-2001	Crop 1 FESAR Tall Fescue
Time of Day:	9:00 AM	9:00 AM	Height : 12 cm (cutting height)
Method	SPRAY	SPRAY	
Timing	POSTHARVEST	POSTHARVEST	
Placement	SURFACE	SURFACE	
Air Temp.	11 C	11.2 C	
Wind Speed	7 KPH	3 KPH	
Equipment	HANDHELD SPRAYER		
Pressure	275 kPa	275 kPa	
Nozzle Type	TEEJET	TEEJET	
Nozzle Size	8001	8003	
Noz. Spacing	50 CM	3 CM	
Boom Length	1.5 M	1.5 M	
Boom Height	45 CM	45 CM	
Carrier	WATER	WATER	
Appl. Volume	100 L/HA	300 L/HA	
Propellant	CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Oct-30-01, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Harvest area 6.6 m².

Crop Code	FESAR	FESAR
Part Rated	PLANT	SEED
Rating Data Type	HEIGHT	YIELD
Rating Unit	CM	kg/ha
Rating Date	Jul-26-2002	Jul-26-2002
Trt-Eval Interval	269/318 DAA	269/318 DAA
Trt Treatment	Form Form	Appl
No. Name	Conc Type Rate	Unit Code
1 Check		89 a
2 dicamba	480 SN	0.237 kg ai/ha A
		90 a
		1159 a
		1257 a

2,4-D amine	470 SN	0.523 kg ai/ha A		
3 fluroxypyr	180 EC	0.144 kg ai/ha A	87 a	1217 a
clopyralid	50 EC	0.100 kg ai/ha A		
MCPA ester	280 EC	0.056 kg ai/ha A		
4 clopyralid	50 EC	0.100 kg ai/ha A	90 a	1485 a
MCPA ester	280 EC	0.056 kg ai/ha A		
quinclorac	75 DF	0.125 kg ai/ha A		
Merge		1.0 % v/v A		
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	88 a	1257 a
Agral 90		0.2 % v/v A		
6 simazine	90 SG	1.0 kg ai/ha B	85 a	1111 a
7 metribuzin	75 DF	0.42 kg ai/ha B	86 a	1248 a
oxyfluorfen	240 EC	0.13 kg ai/ha B		
8 diuron	80 DF	0.90 kg ai/ha B	82 a	1169 a
LSD (P=.05)			8.41	240.7
Standard Deviation			5.72	163.7
CV			6.58	13.22
Bartlett's X2			8.592	7.128
P(Bartlett's X2)			0.283	0.416
Treatment F			1.064	1.906
Treatment Prob(F)			0.4193	0.1194
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)				

Trial Comments

The trial stand was affected by 2000 winter damage, which may have affected yield results. Ally caused stunting of growth on June 4, 2002. None of the treatments caused a significant seed yield reduction.

Tolerance of Established Tall Fescue to Herbicides Applied in the Fall The Year After Seeding - Edmonton 2001-02 (Expt. #TF8)

Dan Cole, Nicole Kimmel

Experiment ID: Tall Fes E01 Fall Edm

Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

CROP: FESAR, Tall Fescue (Crossfire II). Planted: Jun-05-00, 3.5 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOUBLE DISC PRESS DRILL. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: April 30/01 80 kg/ha N and Oct.31/01 80 kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 7.0

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Oct-01-01 Nov-04-01	Crop 1	FESAR Tall Fescue
Time of Day:	12:00 PM 4:30 PM	Height	: 10 CM 10 CM
Method	: SPRAY SPRAY	Stage	: Green Veg. Yellow Veg.
Timing	: POSTHARVEST POSTHARVEST	Weed 1	TAROF Dandelion
Placement	: SURFACE SURFACE	Stage	: Mature
Air Temp.	: 13 C 10 C		Green Veg. Yellow Veg.
Wind Speed	: 0 KPH 0 KPH	Height	: 14 CM 14 CM
Dew Present:	N N	Weed 2	CIRAR Canada Thistle
Soil Moist.:			WET
Cloud Cover:	100% 0%		
Equipment	: HANDHELD SPRAYER		
Pressure	: 138 kPa 276 kPa		
Nozzle Type	: TEEJET TEEJET		
Nozzle Size	: XR80015 VS8003		
Noz. Spacing	: 50 CM 50 CM		

Boom Length: 1.5 M 1.5 M
 Boom Height: 45 CM 45 CM
 Carrier : WATER WATER
 Appl. Volume: 100 L/HA 300 L/HA
 Propellant : CO2 CO2

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-04-01, while normal spray solution volume (100 L/ha) was used in October application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops and % control of weeds. Harvest area 9 m².

Weed Code	FESAR	FESAR	FESAR	TAROF
Crop Code	TOPGROW	TOPGROW	SEED	TOPGROW
Part Rated	VISINJ	VISINJ	YIELD	VISCON
Rating Data Type	percent	percent	kg/ha	percent
Rating Unit				
Rating Date	May-31-02	Aug-07-02	Aug-23-02	Aug-07-02
Trt-Eval Interval	208/242	277/311	292/326	277/311
	DAA	DAA	DAA	DAA
Trt Treatment	Form	Form	Rate	Appl
No. Name	Conc	Type	Rate	Unit
1 Check				Code
2 dicamba	480	SN	0.237 kg ai/ha	A
2,4-D amine	470	SN	0.523 kg ai/ha	A
3 fluroxypyr	180	EC	0.144 kg ai/ha	A
clopyralid	50	EC	0.1 kg ai/ha	A
MCPA ester	280	EC	0.560 kg ai/ha	A
4 clopyralid	50	EC	0.1 kg ai/ha	A
MCPA ester	280	EC	0.560 kg ai/ha	A
quinclorac	75	DF	0.125 kg ai/ha	A
Merge			1.0 % v/v	A
5 metsulfuron methyl	60	DF	0.0045 kg ai/ha	A
Agral 90			0.2 % v/v	A
6 simazine	90	SG	1 kg ai/ha	B
7 metribuzin	75	DF	0.56 kg ai/ha	B
oxyfluorfen	240	EC	0.42 kg ai/ha	B
8 diuron	80	DF	1.8 kg ai/ha	B
LSD (P=.05)			10	2
Standard Deviation				391 a
CV				100
Bartlett's X2				90.6
P(Bartlett's X2)				61.4
Treatment F				17.09
Treatment Prob(F)				6.32
				0.503
				1.994
				0.1070

Weed Code	CIRAR				
Part Rated	TOPGROW				
Rating Data Type	VISCON				
Rating Unit	percent				
Rating Date	Aug-07-02				
Trt-Eval Interval	277/311 DAA				
Trt Treatment	Form				
No. Name	Form				
	Rate				
	Appl				
1 Check		0			
2 dicamba	480	SN	0.237 kg ai/ha	A	0
2,4-D amine	470	SN	0.523 kg ai/ha	A	
3 fluroxypyr	180	EC	0.144 kg ai/ha	A	25
clopyralid	50	EC	0.1 kg ai/ha	A	
MCPA ester	280	EC	0.560 kg ai/ha	A	
4 clopyralid	50	EC	0.1 kg ai/ha	A	28
MCPA ester	280	EC	0.560 kg ai/ha	A	

quinclorac	75 DF	0.125 kg ai/ha A	
Merge		1.0 % v/v A	
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	0
Agral 90		0.2 % v/v A	
6 simazine	90 SG	1 kg ai/ha B	0
7 metribuzin	75 DF	0.56 kg ai/ha B	0
oxyfluorfen	240 EC	0.42 kg ai/ha B	
8 diuron	80 DF	1.8 kg ai/ha B	0

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

Trial Comments

None of the fall applied treatments caused very much visible damage or a seed yield reduction to tall fescue.

Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year After Seeding - Beaverlodge 2001-02 (Expt. #TF9)

Experiment ID: Tall Fes E01 Fall Bldg

Calvin Yoder, Dan Cole, Jean Beaudoin, Lois Connelly, Nigel Fairey
 Alberta Agriculture, Food and Rural Development, Smokey Applied Research and Demonstration Association, Agriculture and Agri-Food Canada
 2001-02 Experiment

CROP: FESAR, TALL FESCUE (Crossfire II). Planted: May-08-00, 4.5 KG/HA, 1 CM Deep, 30 CM Row Width. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M. Fertilizer: BROADCAST May-07-00 N-5 kg/ha P-77 kg/ha K-0 kg/ha S-0 kg/ha, Oct-13-00 N-102 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha, Oct-15-01 N-102 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha

Expt. Location: Beaverlodge, Alberta

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Sep-20-01 Oct-30-01	Crop	1 FESAR Tall Fescue
Time of Day:	4:00 PM 3:00 PM	Height	: 10 CM 10 CM
(Mowing height)			
Method	: SPRAY SPRAY	Stage	: Vegetative Vegetative
Timing	: POSTHARVEST POSTHARVEST	Weed	1 TAROF (Dandelion)
Placement	: SURFACE SURFACE	Weed	2 TRFY (Alsike Clover)
Air Temp.	: 16 C 6.5 C		
% Humidity	: 46 70		
Wind Speed	: 0 KPH 10 KPH		
Equipment	: BICYCLE SPRAYER		
Pressure	: 275 kPa 275 kPa		
Carrier	: WATER WATER		
Appl. Volume	: 100 L/HA 300 L/HA		
Propellant	: CO2 CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) in October, while normal spray solution volume (100 L/ha) was used in September application (A). Crop and weed codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury of the crops and % control of weeds. Harvest area 6 m².

Crop Code	FESAR	FESAR	FESAR	FESAR
Part Rated	TOPGROW	TOPGROW	TOPGROW	TOPGROW
Rating Data Type	VISINJ	VISINJ	VISINJ	VISINJ
Rating Unit	percent	percent	percent	percent
Rating Date	Oct-30-01	May-17-02	Jun-10-02	Aug-07-02

Trt-Eval Interval					40/0 DA-A	239/199 DA-A	263/223 DA-A	321/281 DA-A
Trt	Chemical	Form	Form	Rate	Appl			
No.	Name	Conc	Type	Rate	Unit	Code		
1	Check					0	0	0
2	dicamba	480	SN	0.237	KG A/H A	A	0	0
	2,4-D amine	470	SN	0.523	KG A/H A	A		0
3	fluroxypyrr	180	EC	0.144	KG A/H A	A	0	0
	clopyralid	50	EC	0.100	KG A/H A	A		0
	MCPA ester	280	EC	0.56	KG A/H A	A		
4	clopyralid	50	EC	0.1	KG A/H A	A	0	0
	MCPA ester	280	EC	0.56	KG A/H A	A		0
	quinchlorac	75	DF	0.125	KG A/H A	A		
	Merge			1.0	% V/V	A		
5	metsulfuron methyl	60	DF	0.0045	KG A/H A	A	0	0
	Agral 90			0.2	% V/V	A		0
6	simazine	90	SG	1.0	KG A/H B		0	0
7	metribuzin	75	DF	0.56	KG A/H B		0	0
	oxyfluorfen	240	EC	0.42	KG A/H B			
8	diuron	80	DF	1.80	KG A/H B		0	0
9	atrazine	90	WDG	1.5	KG A/H B		0	0
10	sulfosulfuron	75	WDG	0.02	KG A/H B		47	77
	2,4-D ester	564	EC	0.395	KG A/H B			65
	Merge			0.5	% V/V	B		
	pH balancer			0.25	% V/V	B		
11	metribuzin	75	DF	0.56	KG A/H B		0	0
Weed Code					TAROF	TRFHY		
Crop Code					FESAR			
Part Rated					SEED	TOPGROW		
Rating Data Type					YIELD	VISCON		
Rating Unit					kg/ha	percent		
Rating Date					Aug-07-02	Jun-10-02	Jun-10-02	
Trt-Eval Interval					321/281	263/223	263/223	
Trt					DA-A	DA-A	DA-A	
Trt	Chemical	Form	Form	Rate	Appl			
No.	Name	Conc	Type	Rate	Unit	Code		
1	Check					607 a	0	0
2	dicamba	480	SN	0.237	KG A/H A	A	676 a	27
	2,4-D amine	470	SN	0.523	KG A/H A	A		100
3	fluroxypyrr	180	EC	0.144	KG A/H A	A	716 a	37
	clopyralid	50	EC	0.100	KG A/H A	A		100
	MCPA ester	280	EC	0.56	KG A/H A	A		
4	clopyralid	50	EC	0.1	KG A/H A	A	671 a	23
	MCPA ester	280	EC	0.56	KG A/H A	A		100
	quinchlorac	75	DF	0.125	KG A/H A	A		
	Merge			1.0	% V/V	A		
5	metsulfuron methyl	60	DF	0.0045	KG A/H A	A	673 a	100
	Agral 90			0.2	% V/V	A		100
6	simazine	90	SG	1.0	KG A/H B		663 a	0
7	metribuzin	75	DF	0.56	KG A/H B		701 a	0
	oxyfluorfen	240	EC	0.42	KG A/H B			
8	diuron	80	DF	1.80	KG A/H B		640 a	0
9	atrazine	90	WDG	1.5	KG A/H B		723 a	0
10	sulfosulfuron	75	WDG	0.02	KG A/H B		443 b	57
	2,4-D ester	564	EC	0.395	KG A/H B			47
	Merge			0.5	% V/V	B		
	pH balancer			0.25	% V/V	B		
11	metribuzin	75	DF	0.56	KG A/H B		648 a	0
LSD (P=.05)						101.2		
Standard Deviation						59.4		
CV						9.13		
Bartlett's X2						9.744		

P(Bartlett's X2)	0.463
Treatment F	5.002
Treatment Prob(F)	0.0011

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

Trial Comments

The fall application of Sundance + 2,4-D ester to established tall fescue resulted in severe visual damage and seed yield loss. None of the other treatments resulted in visual damage or seed yield loss. Ally provided excellent control of alsike clover and dandelions. Prestige provided excellent control of alsike clover.

Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year After Seeding - Brooks 2002-03 (Expt. #TF10)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
 Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2002-03 Experiment

Experiment ID: TF E02 Fall BK

CROP: FESAR, Tall Fescue (CROSSFIRE II). Planted: May-9-2001, 4.75 KG/HA, 0.75 CM Deep, 30 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Nov.7/2002 100 kg/ha N Expt. Location: Brooks, Alberta.

Soil Texture: Silt Loam. %OM: 2 %Sand: 45 %Silt: 35 %Clay: 20 pH: 7.9

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	B	Application: A B
Date	Sep-10-2002	Nov-5-2002	Crop 1 FESAR Tall Fescue
Time of Day:	9:00 AM	9:00 AM	Height : 12 cm (cutting height)
Method	SPRAY	SPRAY	
Timing	POSTHARVEST	POSTHARVEST	
Placement	SURFACE	SURFACE	
Air Temp.	14 C	7 C	
Wind Speed	0 KPH	0 KPH	
Equipment	HANDHELD SPRAYER		
Pressure	275 kPa	275 kPa	
Nozzle Type	TEEJET	TEEJET	
Nozzle Size	8001	8003	
Noz. Spacing	50 CM	50 CM	
Boom Length	1.5 M	1.5 M	
Boom Height	45 CM	45 CM	
Carrier	WATER	WATER	
Appl. Volume	100 L/HA	300 L/HA	
Propellant	CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-5-02, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Harvest area 6.6 m².

Crop Code	FESAR	FESAR				
Part Rated	PLANT	SEED				
Rating Data Type	HEIGHT	YIELD				
Rating Unit	cm	kg/ha				
Rating Date	Jul-17-2003	Jul-17-2003				
Trt-Eval Interval	254/310 DAA	254/310 DAA				
Trt Treatment	Form Form	Rate	Appl			
No. Name	Conc Type	Rate	Unit	Code		
1 Check				94 a	1072 a	
2 dicamba	480 SN	0.237	kg ai/ha	A	90 a	1048 a
2,4-D amine	470 SN	0.523	kg ai/ha	A		

3 fluroxypyr	180 EC	0.144 kg ai/ha A	93 a	1114 a
clopyralid	50 EC	0.1 kg ai/ha A		
MCPA ester	280 EC	0.56 kg ai/ha A		
4 clopyralid	50 EC	0.100 kg ai/ha A	88 a	1084 a
MCPA ester	280 EC	0.56 kg ai/ha A		
quinclorac	75 DF	0.125 kg ai/ha A		
Merge		1.0 % v/v A		
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	94 a	1085 a
Agral 90		0.2 % v/v A		
6 simazine	90 SG	1.0 kg ai/ha B	92 a	1088 a
7 metribuzin	75 DF	0.42 kg ai/ha B	90 a	1028 a
oxyfluorfen	240 EC	0.13 kg ai/ha B		
8 diuron	80 DF	0.90 kg ai/ha B	88 a	1093 a
LSD (P=.05)			6.8	130.1
Standard Deviation			4.6	88.5
CV			5.07	8.22
Bartlett's X2			6.002	1.844
P(Bartlett's X2)			0.539	0.968
Treatment F			1.058	0.373
Treatment Prob(F)			0.4231	0.9077

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

Trial Comments

No visual damage was noted and there were no seed yield reductions caused by any of the treatments.

Tolerance of Tall Fescue to Herbicides Applied in the Fall the Year After Seeding - Edmonton 2002-03 (Expt. #TF11)

Dan Cole, Nicole Kimmel

Experiment ID: Tall Fes E02 Fall Edm

Crop Diversification, Alberta Agriculture, Food and Rural Development
2002-03 Experiment

CROP: FESAR, Tall Fescue (CROSSFIRE II). Planted: Jun-1-2001, 3.5 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOUBLE DISC PRESS DRILL. Fertilizer: Broadcast Oct.31, 2001 80 kg/ha N & Oct.18, 2002 80 kg/ha N Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 5.7

APPLICATION DESCRIPTION		STAGE AT APPLICATION
Application:	A B	Application: A & B
Date :	Sep-25-2002 Oct-16-02	Crop 1 FESAR Tall Fescue
Time of Day:	11:15 AM 10:00 AM	Height : Cut @ 8 cm
Method :	SPRAY SPRAY	
Timing :	POSTHARVEST POSTHARVEST	Weed 1 CVPTE Narrow-leaved Hawk's-beard
Placement :	SURFACE SURFACE	Weed 2 CAPBP Shepherd's-purse
Air Temp. :	6 C 6 C	Weed 3 TAROF Dandelion
% Humidity :	50 42	
Wind Speed :	15 KPH 8 KPH	
Dew Present:	Y N	
Cloud Cover:	40% 0%	
Equipment :	SPIDER HANDHELD	
Pressure :	207 kPa 276 kPa	
Nozzle Type:	TEEJET TEEJET	
Nozzle Size:	80015 8003VS	
Noz. Spacing:	50 CM 50 CM	
Boom Length:	2 M 1.5 M	
Boom Height:	50 CM 45 CM	
Carrier :	WATER WATER	
Appl. Volume:	100 L/HA 300 L/HA	

Propellant : CO₂ CO₂

Comments: Higher spray solution volume (300L/ha) was used in application (B) on Oct-16-02, while normal spray solution volume (100L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops and % control of weeds. Harvest area 9 m².

Weed Code					CVPTE
Crop Code			FESAR	FESAR	
Part Rated			TOPGROW	TOPGROW	TOPGROW
Rating Data Type			VISINJ	VISINJ	VISCON
Rating Unit			percent	percent	percent
Rating Date			May-14-2003	Jul-11-2003	Jul-11-2003
Trt-Eval Interval			231/210 DAA	289/268 DAA	289/268 DAA
Trt Treatment	Form	Form	Rate	Appl	
No. Name	Conc	Type	Rate	Unit	Code
1 Check					0 0 0
2 dicamba	480	SN	0.237 kg	ai/ha	A 0 0 55
2,4-D Amine	470	SN	0.523 kg	ai/ha	A 0 0
3 fluroxypyr	180	EC	0.144 kg	ai/ha	A 0 0 76
clopyralid	50	EC	0.1 kg	ai/ha	A 0 0
MCPA ester	280	EC	0.56 kg	ai/ha	A 0 0
4 clopyralid	50	EC	0.1 kg	ai/ha	A 0 0 83
MCPA ester	280	EC	0.56 kg	ai/ha	A 0 0
quinclorac	75	DF	0.125 kg	ai/ha	A 0 0
Merge			1.0 % v/v		A 0 0
5 metsulfuron methyl	60	DF	0.0045 kg	ai/ha	A 0 0 73
Agral 90			0.2 % v/v		A 0 0
6 simazine	90	SG	1.0 kg	ai/ha	B 0 0 30
7 metribuzin	75	DF	0.56 kg	ai/ha	B 0 0 98
oxyfluorfen	240	EC	0.42 kg	ai/ha	B 0 0
8 diuron	80	DF	1.8 kg	ai/ha	B 0 0 30
Weed Code			CAPBP	TAROF	
Crop Code					FESAR
Part Rated			TOPGROW	TOPGROW	SEED
Rating Data Type			VISCON	VISCON	YIELD
Rating Unit			percent	percent	kg/ha
Rating Date			Jul-11-2003	Jul-11-2003	Aug-6-2003
Trt-Eval Interval			289/268 DAA	289/268 DAA	315/294 DAA
Trt Treatment	Form	Form	Rate	Appl	
No. Name	Conc	Type	Rate	Unit	Code
1 Check					0 0 465 b
2 dicamba	480	SN	0.237 kg	ai/ha	A 3 33 668 a
2,4-D amine	470	SN	0.523 kg	ai/ha	A 11 59 610 a
3 fluroxypyr	180	EC	0.144 kg	ai/ha	A 25 36 655 a
clopyralid	50	EC	0.1 kg	ai/ha	A 14 89 642 a
MCPA ester	280	EC	0.56 kg	ai/ha	A 88 0 470 b
4 clopyralid	50	EC	0.1 kg	ai/ha	A 81 0 468 b
MCPA ester	280	EC	0.56 kg	ai/ha	A 100 0 506 b
quinclorac	75	DF	0.125 kg	ai/ha	A 88 0 88.2
Merge			1.0 % v/v		A 0 0 60.0
5 metsulfuron methyl	60	DF	0.0045 kg	ai/ha	A 0 0 10.7
Agral 90			0.2 % v/v		A 0 0 12.78
6 simazine	90	SG	1.0 kg	ai/ha	B 0 0
7 metribuzin	75	DF	0.56 kg	ai/ha	B 0 0
oxyfluorfen	240	EC	0.42 kg	ai/ha	B 0 0
8 diuron	80	DF	1.8 kg	ai/ha	B 0 0
LSD (P=.05)					
Standard Deviation					
CV					
Bartlett's X2					

P(Bartlett's X2)	0.078
Treatment F	9.284
Treatment Prob(F)	0.0001

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

Trial Comments

None of the fall applied treatments caused a visible or significant seed yield reduction from the untreated check treatment. Treatments 2,3,4 and 5 had significantly higher seed yields than the check due to better weed control with the high weed infestation levels in the trial.

Tolerance of Timothy to Herbicides Applied in the Fall of the Year of Seeding -

Dan Cole, Nicole Kimmel, James Leskiw
Agronomy Unit, Alberta Agriculture, Food and Rural Development
2000-01 Experiment

Experiment ID: Timothy S00 Fall Edm

CROP: Richmond Timothy (PHLPR) 2 kg/ha Planted: Jun-05-00, 1 cm, 30 cm row width
Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M.
Fertilizer: Apr-30-01 N-80 kg/ha Expt. Location: Ellerslie, Edmonton, Alberta.
Soil Texture: Silty Clay Loam, %OM:11, %Sand:19, %Silt:40, %Clay:41 and pH:5.7

APPLICATION DESCRIPTION	STAGE AT APPLICATION	Application:	A	B
Application:	A	Application:	A	B
Date	Sep-26-00	Oct-11-00	Crop 1 Timothy (PHLPR)	
Time of Day:	7:30 AM	3:15 PM	Height	: 19 CM 20 CM
Method	SPRAY	SPRAY	Stage	: 5 lf 5 lf
Timing	PREBLOOM	PREBLOOM		
Placement	SURFACE	SURFACE		
Air Temp.	: 6 C	6 C		
% Humidity	: High	N		
Wind Speed	: 0-8 KPH	0 KPH		
Dew Present	: Little	N		
Equipment	: HANDHELD CO2 SPRAYER			
Pressure	: 138 kPa	138 kPa		
Nozzle Type	: TEEJET	TEEJET		
Nozzle Size	: 80015	80015		
Noz. Spacing	: 50 CM	50 CM		
Boom Length	: 1.5 M	1.5 M		
Boom Height	: 45 CM	45 CM		
Appl. Volume	: 100 L/ha	300 L/ha		

Comments: Higher spray solution volume (300L/ha) was used in application (B) on Oct-11-00, while normal spray solution volume (100L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth, WEIDRY- Dry Weight. Visual assessments provide % injury to the crops and % control of weeds. Harvest area 9 m².

Crop Code	PHLPR	PHLPR	PHLPR	PHLPR
Part Rated	TOPGROW	TOPGROW	TOPGROW	TOPGROW
Rating Data Type	VISINJ	VISINJ	VISINJ	VISINJ
Rating Unit	percent	Percent	percent	percent
Rating Date	Oct-11-00	Oct-23-00	May-09-01	May-16-01
Trt-Eval Interval	15/0 DAA	27/12 DAA	225/210	232/217
Trt Treatment	Form	Form	Appl	DAA

No.	Name	Conc	Type	Rate	Unit	Code				
1	Check						0	0	0	0
2	dicamba	480	SN	0.178	KG A/HA	A	0	0	0	0
	2,4-D amine	470	SN	0.523	KG A/HA	A				
3	fluroxypyrr	180	EC	0.144	KG A/HA	A	0	0	0	0
	clopyralid	50	EC	0.1	KG A/HA	A				
	MCPA ester	280	EC	0.56	KG A/HA	A				
4	clopyralid	50	EC	0.1	KG A/HA	A	0	0	0	0
	MCPA ester	280	EC	0.56	KG A/HA	A				
	quinclorac	75	DF	0.125	KG A/HA	A				
	Merge			1.0	% V/V	A				
5	metsulfuron	60	DF	0.0045	KG A/HA	A	10	10	0	0
	methyl			0.2	% V/V	A				
	Agral 90									
6	metsulfuron	60	DF	0.0045	KG A/HA	A	10	15	0	0
	methyl									
	quinclorac	75	DF	0.125	KG A/HA	A				
	Merge			1.0	% V/V	A				
7	simazine	90	SG	1.0	KG A/HA	B	0	0	0	0
8	sulfosulfuron	75	WDG	0.02	KG A/HA	B	0	1	25	20
	2,4-D ester	564	EC	0.394	KG A/HA	B				
	Merge			0.5	% V/V	B				
	pH Balancer			0.25	% V/V	B				

Crop	Code	PHLPR	PHLPR	PHLPR						
Part	Rated	TOPGROW	TOPGROW	SEED						
Rating	Data Type	VISINJ	VISINJ	YIELD						
Unit		percent	percent	kg/ha						
Rating Date		Jul-07-01	Aug-09-01	Aug-09-01						
Trt-Eval Interval		284/269	317/302	317/302						
DAA	DAA	DAA	DAA	DAA						
Trt	Treatment	Form	Form	Rate	Appl					
No.	Name	Conc	Type	Rate	Unit	Code				
1	Check						0	0	516	a
2	dicamba	480	SN	0.178	KG A/HA	A	9	11	333	a
	2,4-D amine	470	SN	0.523	KG A/HA	A				
3	fluroxypyrr	180	EC	0.144	KG A/HA	A	0	0	495	a
	clopyralid	50	EC	0.1	KG A/HA	A				
	MCPA ester	280	EC	0.56	KG A/HA	A				
4	clopyralid	50	EC	0.1	KG A/HA	A	0	0	496	a
	MCPA ester	280	EC	0.56	KG A/HA	A				
	quinclorac	75	DF	0.125	KG A/HA	A				
	Merge			1.0	% V/V	A				
5	metsulfuron	60	DF	0.0045	KG A/HA	A	0	0	421	a
	methyl			0.2	% V/V	A				
	Agral 90									
6	metsulfuron	60	DF	0.0045	KG A/HA	A	0	0	459	a
	methyl									
	quinclorac	75	DF	0.125	KG A/HA	A				
	Merge			1.0	% V/V	A				
7	simazine	90	SG	1.0	KG A/HA	B	0	5	456	a
8	sulfosulfuron	75	WDG	0.02	KG A/HA	B	23	25	294	a
	2,4-D ester	564	EC	0.394	KG A/HA	B				
	Merge			0.5	% V/V	B				
	pH Balancer			0.25	% V/V	B				
LSD (P=.05)							197.42			
Standard Deviation							134.23			
CV							30.94			
Bartlett's X2							9.249			
P(Bartlett's X2)							0.235			

Treatment F 1.438
Treatment Prob(F) 0.2429
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Trial Comments

Although the fall spraying of Sundance + 2,4-D ester caused some stunting and delay of timothy, none of the treatments caused a significant seed yield reduction. The variability most likely accounted for the lack of a significant seed yield loss from Sundance + 2,4-D ester and Banvel + 2,4-D amine.

Tolerance of Timothy to Herbicides Applied in the Fall of the Year of Seeding -
Beaverlodge 2000-01 (Expt. #T12)

Calvin Yoder, Dan Cole, Jean Beaudoin, Nigel Fairey **Experiment ID:** Tim S00 Fall Bldg
Alberta Agriculture, Food and Rural Development, Smokey Applied Research and
Demonstration Association, Agriculture and Agri-Food Canada
2000-01 Experiment

CROP: PHLPR, Timothy (Richmond). Planted: May-19-2000, 2.4 kg/ha, 1 cm Deep, 30 cm Row Width.

Planting Method: Drill. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M.

Expt. Location: Beaverlodge, Alberta.

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	Application:	A
Date	: Sep-14-2000	B	B
Time of Day:	12:00 pm	Oct-27-2000	Crop 1 PHLPR Timothy
Method	: SPRAY	12:00 pm	Height : 12 cm 8 cm
Timing	: POSTHARVEST	SPRAY	Stage : Vegetative Vegetative
Placement	: SURFACE	POSTHARVEST	(Trial mowed between applications)
Air Temp.	: 19 C	SURFACE	
% Humidity	: 62	6 C	
Equipment	: Bicycle	Bicycle	
Pressure	: 275 kPa	275 kPa	
Nozzle Type	: TEEJET	TEEJET	
Nozzle Size	: 80015	80015	
Noz. Spacing	: 50 cm	50 cm	
Boom Length	: 2 m	2 m	
Boom Height	: 45 cm	45 cm	
Carrier	: Water	Water	
Appl. Volume	: 100 L/Ha	300 L/Ha	
Propellant	: CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) in October, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth, WEIDRY-Dry Weight. Visual assessments provide % injury of the crops. Harvest area was 6 m².

Crop Code	PHLPR	PHLPR	PHLPR						
Part Rated	TOPGROW	TOPGROW	TOPGROW						
Rating Data Type	VISINJ	VISINJ	VISINJ						
Rating Unit	percent	percent	percent						
Rating Date	Oct-27-2000	May-15-2001	Jun-19-2001						
Trt-Eval Interval	43/0 DAA	243/200 DAA	278/235 DAA						
Trt Treatment	Form	Form	Rate	Appl					
No.	Name	Conc	Type	Rate	Unit	Code			
1	Check					0	0	0	
2	dicamba	480	SN	0.178	kg ai/ha	A	0	5	0

2,4-D amine	560 SN	0.523 kg ai/ha A				
3 fluroxypyr	180 EC	0.144 kg ai/ha A	0	3		0
clopyralid	50 EC	0.100 kg ai/ha A				
MCPA ester	280 EC	0.560 kg ai/ha A				
4 clopyralid	50 EC	0.100 kg ai/ha A	0	10		0
MCPA ester	280 EC	0.560 kg ai/ha A				
quinclorac	75 DF	0.125 kg ai/ha A				
Merge		1.0 % v/v A				
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	0	10		6
Agral 90		0.2 % v/v A				
6 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	0	15		0
quinclorac	75 DF	0.125 kg ai/ha A				
Merge		1.0 % v/v A				
7 simazine	90 SG	1.00 kg ai/ha B		29		19
8 sulfosulfuron	75 WDG	0.020 kg ai/ha B		73		35
2,4-D ester	564 EC	0.395 kg ai/ha B				
Merge		0.5 % v/v B				
pH Balancer		0.25 % v/v B				

Crop Code			PHLPR	PHLPR	PHLPR
Part Rated			TOPGROW	FORAGE	SEED
Rating Data Type			VISINJ	WEIDRY	YIELD
Rating Unit			percent	KG/HA	KG/HA
Rating Date			Aug-9-2001	Aug-20-2001	Aug-20-2001
Trt-Eval Interval			329/286 DAA	340/297 DAA	340/297 DAA
Trt Treatment	Form	Form	Rate	Appl	
No. Name	Conc	Type	Rate	Unit	Code
1 Check					0
2 dicamba	480 SN	0.178 kg ai/ha A			3056 a
2,4-D amine	560 SN	0.523 kg ai/ha A	0		2896 a
3 fluroxypyr	180 EC	0.144 kg ai/ha A			
clopyralid	50 EC	0.100 kg ai/ha A			
MCPA ester	280 EC	0.560 kg ai/ha A			
4 clopyralid	50 EC	0.100 kg ai/ha A	0		3083 a
MCPA ester	280 EC	0.560 kg ai/ha A			
quinclorac	75 DF	0.125 kg ai/ha A			
Merge		1.0 % v/v A			
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	0		2583 a
Agral 90		0.2 % v/v A			
6 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	0		3000 a
quinclorac	75 DF	0.125 kg ai/ha A			
Merge		1.0 % v/v A			
7 simazine	90 SG	1.00 kg ai/ha B			
8 sulfosulfuron	75 WDG	0.020 kg ai/ha B			
2,4-D ester	564 EC	0.395 kg ai/ha B			
Merge		0.5 % v/v B			
pH Balancer		0.25 % v/v B			
LSD (P=.05)				598.2	33.0
Standard Deviation				366.8	19.8
CV				12.55	27.15
Bartlett's X2				4.366	8.97
P(Bartlett's X2)				0.359	0.062
Treatment F				1.228	0.960
Treatment Prob(F)				0.3715	0.4848

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

Trial Comments

Princep Nine-T and Sundance treatments resulted in visual damage to timothy. The Princep Nine-T, Sundance and Prestige treatments were not harvested due to flooding damage. None of the treatments harvested reduced seed or forage yields.

**Tolerance of Timothy to Herbicides Applied in the Fall of the Year of Seeding -
Edmonton 2001-02 (Expt. #TI3)**

Dan Cole, Nicole Kimmel

Experiment ID: Tim S01 Fall Edm

Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

CROP: PHLPR, Timothy (Richmond). Planted: Jun-5-2001, 2.0 KG/HA, 1 CM Deep, 30 CM Row Width.

Planting Method: DOUBLE DISC PRESS DRILL. Expt. Design: RANDOMIZED COMPLETE BLOCK.
Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: Oct.31/01 80 kg/ha N Expt. Location:
Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 7.0

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Oct-1-2001 Nov-4-2001	Crop	1 PHLPR Timothy
Time of Day:	1:00 PM 5:30 PM	Height	: 10 CM 10 CM (Mowing Height)
Method	: SPRAY SPRAY	Stage	: Green Veg. Yellow Veg.
Timing	: POSTHARVEST POSTHARVEST		
Placement	: SURFACE SURFACE		
Air Temp.	: 13 C 8 C		
Wind Speed	: 10 KPH 0 KPH		
Dew Present	: N N		
Soil Moist.	: N/A WET		
Cloud Cover	: 100% 0%		
Equipment	: HANDHELD SPRAYER		
Pressure	: 138 kPa 276 kPa		
Nozzle Type	: TEEJET TEEJET		
Nozzle Size	: XR80015 VS8003		
Noz. Spacing	: 50 CM 50 CM		
Boom Length	: 1.5 M 1.5 M		
Boom Height	: 45 CM 45 CM		
Carrier	: WATER WATER		
Appl. Volume	: 100 L/HA 300 L/HA		
Propellant	: CO2 CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-4-01, while normal spray solution volume (100 L/ha) was used in October application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops and % control of weeds. Harvest area 9 m².

Crop Code	Part Rated	Rating Data Type	Rating Unit	Rating Date	Trt-Eval Interval	PHLPR	PHLPR	PHLPR
						TOPGROW	VISINJ	YIELD
			percent			percent	percent	kg/ha
				May-31-2002	Aug-1-2002	Aug-1-2002		
					208/242 DAA	270/304 DAA	270/304 DAA	
Trt Treatment	No. Name	Form Conc	Form Type	Rate Rate	Unit	Appl Unit	Code	
1 Check						0	0	119 a
2 dicamba		480	SN	0.178	kg ai/ha	A	0	14 96 a
2,4-D amine		470	SN	0.523	kg ai/ha	A		
3 fluroxypyr		180	EC	0.144	kg ai/ha	A	0	0 139 a
clopyralid		50	EC	0.100	kg ai/ha	A		
MCPA ester		280	EC	0.560	kg ai/ha	A		
4 clopyralid		50	EC	0.100	kg ai/ha	A	0	0 118 a
MCPA ester		280	EC	0.56	kg ai/ha	A		

quinclorac	75 DF	0.125 kg ai/ha A				
Merge		1.0 % v/v A				
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	0	0	138 a	
Agral 90		0.2 % v/v A				
6 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	0	0	128 a	
quinclorac	75 DF	0.125 kg ai/ha A				
Merge		1.0 % v/v A				
7 simazine	90 SG	1.00 kg ai/ha B	0	0	131 a	
8 metribuzin	75 DF	0.56 kg ai/ha B	0	0	148 a	
LSD (P=.05)					33.3	
Standard Deviation					22.7	
CV					17.84	
Bartlett's X2					0.748	
P(Bartlett's X2)					0.998	
Treatment F					2.008	
Treatment Prob(F)					0.1023	

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

Trial Comments

None of the fall applied treatments caused a significant timothy seed yield reduction, although Banvel II + 2,4-D amine had the lowest yield.

Tolerance of Timothy to Herbicides Applied in the Fall of the Year of Seeding - Beaverlodge 2001-02 (Expt. #TI4)

Experiment ID: Timothy S01 Fall Bldg

Calvin Yoder, Dan Cole, Jean Beaudooin, Lois Connelly, Nigel Fairey
Alberta Agriculture, Food and Rural Development, Smokey Applied Research and Demonstration Association, Agriculture and Agri-Food Canada
2001-02 Experiment

CROP: PHLPR, TIMOTHY (Richmond). Planted: May-17-01, 2.4 KG/HA, 1 CM Deep, 30 CM Row Width. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M. Fertilizer: BROADCAST May-10-01 N-18 kg/ha P-76.5 kg/ha K-0 kg/ha S-0 kg/ha, Oct-16-01 N-68 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha
Expt. Location: Beaverlodge, Alberta

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Sep-20-01 Oct-30-01	Crop	1 PHLPR Timothy
Time of Day:	2:00 PM 11:30 AM	Height	: 15-20 CM 15-20 CM
(Mowing height)			
Method	: SPRAY SPRAY	Stage	: Vegetative Vegetative
Timing	: POSTHARVEST POSTHARVEST		
Placement	: SURFACE SURFACE		
Air Temp.	: 17 C 6.5 C		
% Humidity	: 46 70		
Wind Speed	: 5 KPH 5 KPH		
Equipment	: BICYCLE SPARYER		
Pressure	: 275 kPa 275 kPa		
Carrier	: WATER WATER		
Appl. Volume:	100 L/HA 300 L/HA		
Propellant	: CO2 CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) in October, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury of the crop. Harvest area 6 m².

Crop Code		PHLPR	PHLPR	PHLPR	PHLPR
Part Rated		TOPGROW	TOPGROW	TOPGROW	FORAGE
Rating Data Type		VISINJ	VISINJ	VISINJ	YIELD
Rating Unit		percent	percent	percent	kg/ha
Rating Date		Oct-30-01	May-17-02	Aug-07-02	Aug-12-02
Trt-Eval Interval		40/0	DA-A	239/199	321/281
Trt Chemical	Form	Form	Rate	Appl	
No. Name	Conc	Type	Rate	Unit	Code
1 Check					0
2 dicamba	480	SN	0.178	KG A/H A	0
2,4-D amine	470	SN	0.523	KG A/H A	0
3 fluroxypyrr	180	EC	0.144	KG A/H A	0
clopyralid	50	EC	0.100	KG A/H A	0
MCPA ester	280	EC	0.56	KG A/H A	0
4 clopyralid	50	EC	0.1	KG A/H A	0
MCPA ester	280	EC	0.56	KG A/H A	0
quinclorac	75	DF	0.125	KG A/H A	0
Merge			1.0 % V/V	A	0
5 metsulfuron methyl	60	DF	0.0045	KG A/H A	0
Agral 90			0.2 % V/V	A	0
6 metsulfuron methyl	60	DF	0.0045	KG A/H A	0
quinclorac	75	DF	0.125	KG A/H A	0
Merge			1.0 % V/V	A	0
7 metribuzin	75	DF	0.56	KG A/H B	0
LSD (P=.05)					5376 a 788.9
Standard Deviation					531.0
CV					9.29
Bartlett's X2					7.68
P(Bartlett's X2)					0.262
Treatment F					1.669
Treatment Prob(F)					0.1860

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

Crop Code		PHLPR			
Part Rated		SEED			
Rating Data Type		YIELD			
Rating Unit		kg/ha			
Rating Date		Aug-12-02			
Trt-Eval Interval		326/286			
Trt Chemical	Form	Appl			
No. Name	Conc	Type	Rate	Unit	Code
1 Check					451 a
2 dicamba	480	SN	0.178	KG A/H A	462 a
2,4-D amine	470	SN	0.523	KG A/H A	
3 fluroxypyrr	180	EC	0.144	KG A/H A	537 a
clopyralid	50	EC	0.100	KG A/H A	
MCPA ester	280	EC	0.56	KG A/H A	
4 clopyralid	50	EC	0.1	KG A/H A	424 a
MCPA ester	280	EC	0.56	KG A/H A	
quinclorac	75	DF	0.125	KG A/H A	
Merge			1.0 % V/V	A	
5 metsulfuron methyl	60	DF	0.0045	KG A/H A	455 a
Agral 90			0.2 % V/V	A	
6 metsulfuron methyl	60	DF	0.0045	KG A/H A	444 a
quinclorac	75	DF	0.125	KG A/H A	
Merge			1.0 % V/V	A	
7 metribuzin	75	DF	0.56	KG A/H B	443 a
LSD (P=.05)					88.1

Standard Deviation	59.3
CV	12.91
Bartlett's X2	14.867
P(Bartlett's X2)	0.021*
Treatment F	1.496
Treatment Prob(F)	0.2355
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)	

Trial Comments

None of the herbicide treatments applied in the fall to timothy resulted in visual damage, seed yield loss or forage yield loss.

**Tolerance of Timothy to Herbicides Applied in the Fall the Year After Seeding -
Edmonton 2001-02 (Expt. #T15)**

Dan Cole, Nicole Kimmel

Experiment ID: Tim E01 Fall Edm

Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

CROP: PHLPR, Timothy (Richmond). Planted: Jun-5-2000, 2.0 KG/HA, 1 CM Deep, 30 CM Row Width.

Planting Method: DOUBLE DISC PRESS DRILL. Expt. Design: RANDOMIZED COMPLETE BLOCK.

Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: April 30/01 80 kg/ha N and Oct. 31/01 80 kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 7.0

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Oct-1-2001 Nov-4-2001	Crop	1 PHLPR Timothy
Time of Day	: 11:00 PM 4:00 PM	Height	: 10 CM 10 CM (Mowing Height)
Method	: SPRAY SPRAY	Stage	: Green Veg. Yellow Veg.
Timing	: POSTHARVEST POSTHARVEST	Weed	1 CIRAR Canada Thistle
Placement	: SURFACE SURFACE	Stage	: 6-8 lf 6-8 lf
Air Temp.	: 12 C 11 C	Height	: 23 CM 23 CM
Wind Speed	: 0 KPH 0 KPH		
Dew Present	: N N		
Soil Moist.	: N/A WET		
Cloud Cover	: 100% 0%		
Equipment	: HANDHELD SPRAYER		
Pressure	: 138 kPa 276 kPa		
Nozzle Type	: TEEJET TEEJET		
Nozzle Size	: XR80015 VS8003		
Noz. Spacing	: 50 CM 50 CM		
Boom Length	: 1.5 M 1.5 M		
Boom Height	: 45 CM 45 CM		
Carrier	: WATER WATER		
Appl. Volume	: 100 L/HA 300 L/HA		
Propellant	: CO2 CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-4-01, while normal spray solution volume (100 L/ha) was used in October application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops and % control of weeds. Harvest area 9 m².

Crop Code	PHLPR	PHLPR	PHLPR
Part Rated	TOPGROW	TOPGROW	SEED

Rating Data Type		VISINJ	VISINJ	YIELD
Rating Unit		percent	percent	kg/ha
Rating Date		May-31-2002	Aug-7-2002	Aug-9-2002
Trt-Eval Interval		208/242 DAA	276/310 DAA	278/312 DAA
Trt Treatment No.	Form Conc	Form Type	Rate Rate	Appl Unit Code
1 Check				
2 dicamba	480 SN	0.178 kg	ai/ha	A
2,4-D amine	470 SN	0.523 kg	ai/ha	A
3 fluroxypyr	180 EC	0.144 kg	ai/ha	A
clopyralid	50 EC	0.100 kg	ai/ha	A
MCPA ester	280 EC	0.560 kg	ai/ha	A
4 clopyralid	50 EC	0.100 kg	ai/ha	A
MCPA ester	280 EC	0.56 kg	ai/ha	A
quinclorac	75 DF	0.125 kg	ai/ha	A
Merge		1.0 %	v/v	A
5 metsulfuron methyl	60 DF	0.0045 kg	ai/ha	A
Agral 90		0.2 %	v/v	A
6 metsulfuron methyl	60 DF	0.0045 kg	ai/ha	A
quinclorac	75 DF	0.125 kg	ai/ha	A
Merge		1.0 %	v/v	A
7 simazine	90 SG	1.00 kg	ai/ha	B
8 sulfosulfuron	75 WDG	0.020 kg	ai/ha	B
2,4-D ester	564 EC	0.395 kg	ai/ha	B
Merge		0.5 %	v/v	B
pH balancer		0.25 %	v/v	B
LSD (P=.05)				59.0
Standard Deviation				40.1
CV				13.49
Bartlett's X2				5.107
P(Bartlett's X2)				0.647
Treatment F				0.936
Treatment Prob(F)				0.5003

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

Trial Comments

Although fall applied Sundance + 2,4-D ester caused stunting and delay of timothy, it did not result in a seed yield reduction.

Tolerance of Timothy to Herbicides Applied in the Fall the Year After Seeding - Beaverlodge 2001-02 (Expt. #T16)

Experiment ID: Timothy E01 Fall Bldg

Calvin Yoder, Dan Cole, Jean Beaudooin, Lois Connelly, Nigel Fairey
 Alberta Agriculture, Food and Rural Development, Smokey Applied Research and Demonstration Association, Agriculture and Agri-Food Canada
 2001-02 Experiment

CROP: PHLPR, TIMOTHY (Richmond). Planted: May-19-00, 2.4 KG/HA, 1 CM Deep, 30 CM Row Width. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M. Fertilizer: BROADCAST May-07-00 N-5 kg/ha P-77 kg/ha K-0 kg/ha S-0 kg/ha, Oct-13-00 N-68 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha, Oct-15-01 N-68 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha

Expt. Location: Beaverlodge, Alberta

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	B	Application: A
Date	Sep-20-01	Oct-30-01	Crop 1 PHLPR Timothy
Time of Day:	4:00 PM	3:00 PM	Height : 10 CM
(Mowing height)			10 CM

Method	:	SPRAY	SPRAY	Stage	:	Vegetative	Vegetative
Timing	:	POSTHARVEST	POSTHARVEST	Weed 1	TAROF (Dandelion)		
Placement	:	SURFACE	SURFACE	Weed 2	TRFHY (Alsike Clover)		
Air Temp.	:	16 C	6.5 C				
% Humidity	:	46	70				
Wind Speed	:	0 KPH	5 KPH				
Equipment	:	BICYCLE SPRAYER					
Pressure	:	275 kPa	275 kPa				
Carrier	:	WATER	WATER				
Appl. Volume:	100 L/HA	300 L/HA					
Propellant	C02	CO2					

Comments: Higher spray solution volume (300 L/ha) was used in application (B) in October, while normal spray solution volume (100 L/ha) was used in September application (A). Crop and weed codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury of the crops and control of weeds. Harvest area 6 m².

Crop Code			PHLPR	PHLPR	PHLPR	PHLPR
Part Rated			TOPGROW	TOPGROW	TOPGROW	TOPGROW
Rating Data Type			VISINJ	VISINJ	VISINJ	VISINJ
Rating Unit			percent	percent	percent	percent
Rating Date			Oct-30-01	May-17-02	Jun-10-02	Aug-07-02
Trt-Eval Interval			40/0 DA-A	239/199	263/223	321/281
Trt Chemical	Form	Form	Rate	Appl		
No. Name	Conc	Type	Rate	Unit	Code	
1 Check					0	0
2 dicamba	480	SN	0.178	KG A/HA	A	0
2,4-D amine	470	SN	0.523	KG A/HA	A	0
3 fluroxypyr	180	EC	0.144	KG A/HA	A	0
clopyralid	50	EC	0.100	KG A/HA	A	0
MCPA ester	280	EC	0.56	KG A/HA	A	0
4 clopyralid	50	EC	0.1	KG A/HA	A	0
MCPA ester	280	EC	0.56	KG A/HA	A	0
quinclorac	75	DF	0.125	KG A/HA	A	0
Merge			1.0 %	V/V	A	0
5 metsulfuron methyl	60	DF	0.0045	KG A/HA	A	0
Agral 90			0.2 %	V/V	A	0
6 metsulfuron methyl	60	DF	0.0045	KG A/HA	A	0
quinclorac	75	DF	0.125	KG A/HA	A	0
Merge			1.0 %	V/V	A	0
7 simazine	90	SG	1.0	KG A/HA	B	0
8 sulfosulfuron	75	WDG	0.02	KG A/HA	B	38
2,4-D ester	564	EC	0.395	KG A/HA	B	28
Merge			0.5 %	V/V	B	24
pH Balancer			0.25 %	V/V	B	
Weed Code					TAROF	TRFHY
Crop Code			PHLPR	PHLPR		
Part Rated			FORAGE	SEED	TOPGROW	TOPGROW
Rating Data Type			YIELD	YIELD	VISCON	VISCON
Rating Unit			kg/ha	kg/ha	percent	percent
Rating Date			Aug-16-02	Aug-16-02	May-17-02	May-17-02
Trt-Eval Interval			330 DA-A	330 DA-A	239 DA-A	239 DA-A
Trt Chemical	Form	Form	Rate	Appl		
No. Name	Conc	Type	Rate	Unit	Code	
1 Check					3605 a	0
2 dicamba	480	SN	0.178	KG A/HA	A	3542 a
2,4-D amine	470	SN	0.523	KG A/HA	A	217 a
3 fluroxypyr	180	EC	0.144	KG A/HA	A	3709 a
clopyralid	50	EC	0.100	KG A/HA	A	241 a
MCPA ester	280	EC	0.56	KG A/HA	A	86

4 clopyralid	50 EC	0.1 KG A/HA A	3396 a	195 a	86	100
MCPA ester	280 EC	0.56 KG A/HA A				
quinclorac	75 DF	0.125 KG A/HA A				
Merge		1.0 % V/V A				
5 metsulfuron methyl	60 DF	0.0045 KG A/HA A	3772 a	250 a	89	100
Agral 90		0.2 % V/V A				
6 metsulfuron methyl	60 DF	0.0045 KG A/HA A	3772 a	240 a	91	100
quinclorac	75 DF	0.125 KG A/HA A				
Merge		1.0 % V/V A				
7 simazine	90 SG	1.0 KG A/HA B	3292 a	213 a	0	0
8 sulfosulfuron	75 WDG	0.02 KG A/HA B	3080 a	224 a	93	18
2,4-D ester		0.395 KG A/HA B				
Merge		0.5 % V/V B				
pH Balancer		0.25 % V/V B				
LSD (P=.05)			541.2		73.3	
Standard Deviation			368.0		49.8	
CV			10.45		21.91	
Bartlett's X2			7.334		11.358	
P(Bartlett's X2)			0.395		0.124	
Treatment F			1.819		0.554	
Treatment Prob(F)			0.1363		0.7838	

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

Weed Code			TAROF	TRFHY
Part Rated			TOPGROW	TOPGROW
Rating Data Type			VISCON	VISCON
Rating Unit			percent	percent
Rating Date			Jun-10-02	Jun-10-02
Trt-Eval Interval			263 DA-A	263 DA-A
Trt Chemical	Form	Form	Rate	Appl
No. Name	Conc	Type	Rate	Unit
1 Check				
2 dicamba	480 SN		0.178 KG A/HA A	75
2,4-D amine	470 SN		0.523 KG A/HA A	
3 fluroxypyr	180 EC		0.144 KG A/HA A	75
clopyralid	50 EC		0.100 KG A/HA A	
MCPA ester	280 EC		0.56 KG A/HA A	
4 clopyralid	50 EC		0.1 KG A/HA A	78
MCPA ester	280 EC		0.56 KG A/HA A	
quinclorac	75 DF		0.125 KG A/HA A	
Merge			1.0 % V/V A	
5 metsulfuron methyl	60 DF		0.0045 KG A/HA A	100
Agral 90			0.2 % V/V A	
6 metsulfuron methyl	60 DF		0.0045 KG A/HA A	93
quinclorac	75 DF		0.125 KG A/HA A	
Merge			1.0 % V/V A	
7 simazine	90 SG		1.0 KG A/HA B	0
8 sulfosulfuron	75 WDG		0.02 KG A/HA B	68
2,4-D ester	564 EC		0.395 KG A/HA B	
Merge			0.5 % V/V B	
pH Balancer			0.25 % V/V B	

Trial Comments

Sundance + 2,4-D ester resulted in severe visual damage to established timothy although seed and forage yields were not reduced. None of the other treatments applied resulted in visual damage, seed yield or forage yield losses. All treatments, with the exception of Princep Nine-T and Sundance + 2,4-D ester, provided excellent control of alsike clover. Ally treatments provided excellent control of dandelions. Banvel + 2,4-D amine, Prestige and Sundance + 2,4-D ester provided some suppression of dandelions.

**Tolerance of Timothy to Herbicides Applied in the Fall the Year After Seeding -
Edmonton 2002-03 (Expt. #TI7)**

Dan Cole, Nicole Kimmel

Experiment ID: Tim E02 Fall Edm

Crop Diversification, Alberta Agriculture, Food and Rural Development
2002-03 Experiment

CROP: PHLPR, Timothy (RICHMOND). Planted: Jun-5-2001, 2.0 KG/HA, 1 CM Deep, 30 CM Row Width.

Planting Method: DOUBLE DISC PRESS DRILL. Fertilizer: Broadcast Oct.31, 2001 80 kg/ha N & Oct.18, 2002 80 kg/ha N Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M.

Expt. Location: Ellerslie, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 5.7

APPLICATION DESCRIPTION			STAGE AT APPLICATION			
Application:	A	B	C	Application:	A	B &
C						
Date	: Sep-25-2002	Oct-9-2002	Oct-16-2002	Crop 1	PHLPR Timothy	
Time of Day:	10:30 AM	10:30 PM		Height	:	Cut @ 8 cm
Regrowth 2 cm						
Method	: SPRAY	SPRAY	BROADCAST			
Timing	: POSTHARVEST	POSTHARVEST	POSTHARVEST			
Placement	: SURFACE	SURFACE	SURFACE			
Air Temp.	: 5 C	7 C				
% Humidity	: 50	62				
Wind Speed	: 10 KPH	13 KPH				
Dew Present:	Y	Y				
Cloud Cover:	40%	70%				
Equipment	: MOTORIZED	HANDHELD	HAND			
Pressure	: 207 kPa	276 kPa				
Nozzle Type	: TEEJET	TEEJET				
Nozzle Size	: 80015	8003VS				
Noz. Spacing	: 50 CM	50 CM				
Boom Length	: 2 CM	1.5 M				
Boom Height	: 50 CM	45 CM				
Carrier	: WATER	WATER	SAND			
Appl. Volume	: 100 L/HA	300 L/HA				
Propellant	: CO2	CO2				

Comments: Higher spray solution volume (300L/ha) was used in application (B) on Oct-9-02, while normal spray solution volume (100L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 9 m².

Crop Code	PHLPR	PHLPR	PHLPR
Part Rated	TOPGROW	TOPGROW	SEED
Rating Data Type	VISINJ	VISINJ	YIELD
Rating Unit	percent	percent	kg/ha
Rating Date	May-14-2003	Jul-11-2003	Aug-6-2003
Trt-Eval Interval	231/217/210	289/275/268	315/301/294
	DAA	DAA	DAA
Trt Treatment	Form	Form	Rate
No. Name	Conc	Type	Rate
1 Check			
2 dicamba	480	SN	0.178 kg ai/ha
2,4-D amine	470	SN	0.52 kg ai/ha
3 fluroxypyr	180	EC	0.144 kg ai/ha
clopyralid	50	EC	0.1 kg ai/ha
MCPA ester	280	EC	0.56 kg ai/ha

4 clopyralid	50 EC	0.1 kg ai/ha A	0	0	429 a
MCPA ester	280 EC	0.56 kg ai/ha A			
quinclorac	75 DF	0.125 kg ai/ha A			
Merge		1.0 % v/v A			
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	0	0	407 a
Agral 90		0.2 % v/v A			
6 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	0	0	385 a
quinclorac	75 DF	0.125 kg ai/ha A			
Merge		1.0 % v/v A			
7 simazine	90 SG	1.0 kg ai/ha B	0	0	413 a
8 triallate	10 GR	1.7 kg ai/ha C	0	0	433 a
LSD (P=.05)					39.3
Standard Deviation					26.7
CV					6.51
Bartlett's X2					4.202
P(Bartlett's X2)					0.756
Treatment F					1.630
Treatment Prob(F)					0.1816

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

Trial Comments

None of the fall applied treatments caused a visible or significant seed yield reduction.

Tolerance of Timothy to Herbicides Applied in the Fall the Year After Seeding - Beaverlodge 2002-03 (Expt. #TI8)

Calvin Yoder, Dan Cole, Jean Beaudoin
 Alberta Agriculture, Food and Rural Development, Smokey Applied Research and Demonstration Assc.
 2002-03 Experiment

Experiment ID: Tim E03 Fall Bldg

CROP: PHLPR, TIMOTHY (Richmond). Planted: May-17-2001, 2.4 KG/HA, 1 cm Deep, 30 cm Row Width.
 Planting Method: Drill. Fertilizer: Broadcasted May-10-01 N-18 kg/ha P-76.5 kg/ha K-0 kg/ha S-0 kg/ha, Oct-16-01 N-68 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha & Oct-22-02 N-68 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M.
 Expt. Location: Beaverlodge, Alberta.

APPLICATION DESCRIPTION	STAGE AT APPLICATION
Application: A	Application: A
Date : Sep-14-2002	Crop 1 PHLPR Timothy
Time of Day: 8:30 am	Height : 15 cm
Method : Sprayer	Stage : Vegetative
Timing : POSTHARVEST	
Placement : Surface	
Air Temp. : 11 C	
% Humidity : 80	
Wind Speed : 0 KPH	
Cloud Cover: 95%	
Equipment : BAC PAC	
Pressure : 110 KPA	
Nozzle Type: TEEJET	
Nozzle Size: XR80015	
Noz.Spacing: 50 cm	
Boom Length: 1.5 M	
Boom Height: 45 cm	
Carrier : Water	

Appl. Volume: 100 L/HA
 Propellant : Propane

Comments: Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury of the crop. Harvest area 3 m².

Crop Code	PHLPR	PHLPR	PHLPR					
Part Rated	TOPGROW	TOPGROW	TOPGROW					
Rating Data Type	VISINJ	VISINJ	VISINJ					
Rating Unit	percent	percent	percent					
Rating Date	Oct-30-2002	May-13-2003	Jun-13-2003					
Trt-Eval Interval	46 DA-A	241 DA-A	272 DA-A					
Trt Treatment	Form	Form	Rate					
No. Name	Conc	Type	Rate	Unit	Appl	Code		
1 Check					0	0	0	
2 dicamba	480	SN	0.178	kg ai/ha	A	0	0	
2,4-D amine	470	SN	0.523	kg ai/ha	A			
3 fluroxypyrr	180	EC	0.144	kg ai/ha	A	0	0	
clopyralid	50	EC	0.100	kg ai/ha	A			
MCPA ester	280	EC	0.56	kg ai/ha	A			
4 clopyralid	50	EC	0.10	kg ai/ha	A	0	0	
MCPA ester	280	EC	0.56	kg ai/ha	A			
quinclorac	75	DF	0.125	kg ai/ha	A			
Merge			1.0	% v/v	A			
5 metsulfuron methyl	60	DF	0.0045	kg ai/ha	A	0	0	
Agral 90			0.2	% v/v	A			
6 metsulfuron methyl	60	DF	0.0045	kg ai/ha	A	0	0	
quinclorac	75	DF	0.125	kg ai/ha	A			
Merge			1.0	% v/v	A			
7 Check					0	0	0	
Crop Code	PHLPR	PHLPR	PHLPR					
Part Rated	TOPGROW	FORAGE	SEED					
Rating Data Type	VISINJ	YIELD	YIELD					
Rating Unit	percent	KG/HA	KG/HA					
Rating Date	Jul-29-2003	Aug-5-2003	Aug-5-2003					
Trt-Eval Interval	318 DA-A	325 DA-A	325 DA-A					
Trt Treatment	Form	Form	Rate					
No. Name	Conc	Type	Rate	Unit	Appl	Code		
1 Check					0	3458 a	222 a	
2 dicamba	480	SN	0.178	kg ai/ha	A	0	4191 a	278 a
2,4-D amine	470	SN	0.523	kg ai/ha	A			
3 fluroxypyrr	180	EC	0.144	kg ai/ha	A	0	4375 a	258 a
clopyralid	50	EC	0.100	kg ai/ha	A			
MCPA ester	280	EC	0.56	kg ai/ha	A			
4 clopyralid	50	EC	0.10	kg ai/ha	A	0	3833 a	247 a
MCPA ester	280	EC	0.56	kg ai/ha	A			
quinclorac	75	DF	0.125	kg ai/ha	A			
Merge			1.0	% v/v	A			
5 metsulfuron methyl	60	DF	0.0045	kg ai/ha	A	0	3792 a	267 a
Agral 90			0.2	% v/v	A			
6 metsulfuron methyl	60	DF	0.0045	kg ai/ha	A	0	4025 a	222 a
quinclorac	75	DF	0.125	kg ai/ha	A			
Merge			1.0	% v/v	A			
7 Check					0	3833 a	221 a	
LSD (P=.05)						1255.72	99.47	
Standard Deviation						837.67	66.01	
CV						21.32	26.95	
Bartlett's X2						0.719	1.166	
P(Bartlett's X2)						0.994	0.979	
Treatment F						0.509	0.515	
Treatment Prob(F)						0.7929	0.7880	

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

Trial Comments

There were no differences in visual tolerance, seed yield or forage yield among the treatments.

Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall of the Year of Seeding - Brooks 2000-01 (Expt. #PR1)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2000-01 Experiment

Experiment ID: PR S00 Fall BK

CROP: LOLPE, Perennial Ryegrass (BLAZER II). Planted: May-16-2000, 4.25 KG/HA, 0.75 CM Deep, 20 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Oct. 31/2000 100 kg/ha N Expt. Location: Brooks, Alberta.

Soil Texture: SILT LOAM. %OM: 2 %Sand: 45 %Silt: 35 %Clay: 20 pH: 7.9

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A	B	Application:
Date	Sep-11-2000	Oct-23-2000	Crop 1 LOLPE Perennial Ryegrass
Time of Day:	9:00 AM	9:00 AM	Height : 4 cm
Method	SPRAY	SPRAY	
Timing	POSTHARVEST	POSTHARVEST	
Placement	SURFACE	SURFACE	
Air Temp.	15 C	16 C	
Wind Speed	0 KPH	0 KPH	
Equipment	HANDHELD SPRAYER		
Pressure	275 kPa	275 kPa	
Nozzle Type	TEEJET	TEEJET	
Nozzle Size	8001	8003	
Noz. Spacing	50 CM	50 CM	
Boom Length	1.5 M	1.5 M	
Boom Height	45 CM	45 CM	
Carrier	WATER	WATER	
Appl. Volume	100 L/HA	300 L/HA	
Propellant	CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Oct-23-00, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops. Harvest area 6.6 m².

Crop Code	LOLPE	LOLPE	LOLPE	LOLPE
Part Rated	TOPGROW	STAND	PLANT	SEED
Rating Data Type	VISINJ	DENSITY	HEIGHT	YIELD
Rating Unit	percent	percent	cm	kg/ha
Rating Date	Spring '01	Jul-23-2001	Jul-23-2001	Jul-23-2001
Trt-Eval Interval		273/315 DAA	273/315 DAA	273/315 DAA
Trt Treatment	Form	Form	Rate	Appl
No. Name	Conc	Type	Rate	Unit
1 Check			0	91
2 dicamba	480	SN	0.237 kg ai/ha	A 0
2,4-D amine	470	SN	0.523 kg ai/ha	A 94

3 fluroxypyr	180 EC	0.144 kg ai/ha A	0	95	68 ab	1922 a
clopyralid	50 EC	0.100 kg ai/ha A				
MCPA ester	280 EC	0.056 kg ai/ha A				
4 ethofumesate	480 SC	0.84 kg ai/ha B	0	91	65 ab	1863 ab
5 simazine	90 SG	1.00 kg ai/ha B	0	90	71 a	1504 b
6 metribuzin	75 DF	0.42 kg ai/ha B	95	16	55 b	263 c
oxyfluorfen	240 EC	0.13 kg ai/ha B				
7 atrazine	90 WDG	1.0 kg ai/ha B	65	5	57 ab	89 c
8 diuron	80 DF	0.90 kg ai/ha B	0	94	67 ab	1840 ab
LSD (P=.05)					10.0	289.7
Standard Deviation					6.8	196.9
CV					10.5	13.93
Bartlett's X2					9.335	5.945
P(Bartlett's X2)					0.229	0.546
Treatment F					2.960	62.506
Treatment Prob(F)					0.0253	0.0001

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

Trial Comments

Both Sencor + Goal and Aatrex caused a significant seed yield reduction.

Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall of the Year of Seeding - Edmonton 2000-01 (Expt. #PR2)

Dan Cole, Nicole Kimmel, James Leskiw
Agronomy Unit, Alberta Agriculture, Food and Rural Development
2000-01 Experiment

Experiment ID: PerRyegrass S00 Fall Edm

CROP: LOLPE, Perennial Ryegrass (Blazer) II Planted: Jun-05-00, 1 cm, 30 cm row width
Underseeded: AC Barrie Wheat 90 kg/ha Planted: Jun-05-00, 1 cm, 15 cm row width
Planting Method: DOUBLE DISC PRESS DRILL Seeding Rate: 8.0 kg/ha Expt. Design:
RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: Oct.31/01 80
kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta
Soil Texture: Silty Clay Loam, %OM:11, %Sand:19, %Silt:40, %Clay:41 and pH:7.0

APPLICATION DESCRIPTION		STAGE AT APPLICATION		APPLICATION			
		A	B	A	B		
Application:	A	B		Application:	A	B	
Date	: Sep-26-00	Oct-11-00		Crop	1 Perennial Ryegrass (LOLPE)		
Time of Day:	8:00 AM	3:45 PM		Height	: 26 CM	21 CM	
Method	: SPRAY	SPRAY		Stage	: 3 lf	3 lf	
Timing	: PREBLOOM	PREBLOOM					
Placement	: SURFACE	SURFACE					
Air Temp.	: 6 C	6 C					
% Humidity	: High	N					
Wind Speed	: 0-8 KPH	0-5 KPH					
Dew Present	: Little	N					
Equipment	: HANDHELD CO2 SPRAYER						
Pressure	: 138 kPa	138 kPa					
Nozzle Type	: TEEJET	TEEJET					
Nozzle Size	: 80015	80015					
Noz. Spacing	: 50 CM	50 CM					
Boom Length	: 1.5 M	1.5 M					
Boom Height	: 45 CM	45 CM					
Appl. Volume	: 100 L/ha	300 L/ha					

Comments: Higher spray solution volume (300L/ha) was used in application (B) on Oct-11-00, while normal spray solution volume (100L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the

crops and % control of weeds. No harvest or data collected year after application due to winter kill.

Crop Code	LOLPE		
Part Rated	TOPGROW		
Rating Data Type	VISINJ		
Rating Unit	percent		
Rating Date	Oct-23-00		
Trt-Eval Interval	12/27 DAA		
Trt Treatment No. Name	Form Conc Form Type Rate Rate	Rate Unit Appl Unit	Appl Code
1 Check			0
2 dicamba	480 SN	0.237 KG A/H A	0
2,4-D amine	470 SN	0.523 KG A/H A	
3 fluroxypyr	180 EC	0.144 KG A/H A	0
clopyralid	50 EC	0.1 KG A/H A	
MCPA ester	280 EC	0.560 KG A/H A	
4 ethofumesate	480 EC	0.10 KG A/H B	0
5 simazine	90 SG	1.0 KG A/H B	15
6 metribuzin	75 DF	0.56 KG A/H B	15
oxyflurofen	240 EC	0.13 KG A/H B	
7 atrazine	90 WDG	1.5 KG A/H B	0
8 diuron	80 DF	1.8 KG A/H B	0

Trial Comments

Princep and Sencor + Goal caused initial yellowing of perennial ryegrass. Unfortunately, the perennial ryegrass winter-killed so that visual assessments and yields could not be collected the year following the fall applications.

Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall of the Year of Seeding - Beaverlodge 2000-01 (Expt. #PR3)

Calvin Yoder, Dan Cole, Jean Beaudoin, Nigel Fairey **Experiment ID: PerRye S00 Fall Bldg**
Alberta Agriculture, Food and Rural Development, Smokey Applied Research and Demonstration Association, Agriculture and Agri-Food Canada
2000-01 Experiment

CROP: LOLPE, Perennial Ryegrass (Blazer II). Planted: May-19-2000, 2.6 kg/ha, 1 cm Deep, 30 cm Row Width. Planting Method: Drill. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M. Expt. Location: Beaverlodge, Alberta.

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Sep-14-2000 Oct-27-2000	Crop	1 LOLPE Perennial Ryegrass
Time of Day:	11:00 am	12:00 pm	Height : 10 cm 8 cm
Method	: SPRAY	SPRAY	(Trial mowed between applications)
Timing	: FALL	FALL	
Placement	: SURFACE	SURFACE	
Air Temp.	: 14 C	6 C	
% Humidity	: 78	90	
Equipment	: Bicycle	Bicycle	
Pressure	: 275 kPa	275 kPa	
Nozzle Type	: TEEJET	TEEJET	
Nozzle Size	: 80015	80015	
Noz. Spacing	: 50 cm	50 cm	
Boom Length	: 2 m	2 m	
Boom Height	: 45 cm	45 cm	
Carrier	: Water	Water	
Appl. Volume	: 100 L/HA	300 L/HA	
Propellant	: CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) in October, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth, WEIDRY-Dry Weight. Visual assessments provide % injury of the crops. Harvest area was 6 m².

Crop Code		LOLPE	LOLPE	LOLPE
Part Rated		TOPGROW	TOPGROW	TOPGROW
Rating Data Type		VISINJ	VISINJ	VISINJ
Rating Unit		percent	percent	percent
Rating Date	Oct-27-2000	May-15-2001	Jun-19-2001	
Trt-Eval Interval	43/0 DA-A	243/200 DAA	278/235 DAA	
Trt Treatment	Form	Form	Rate	Appl
No. Name	Conc	Type	Rate	Unit
1 Check			A	
2 dicamba	480	SN	0.237	kg ai/ha
2,4-D amine	470	SN	0.523	kg ai/ha
3 fluroxypyrr	180	EC	0.144	kg ai/ha
clopyralid	50	EC	0.100	kg ai/ha
MCPA ester	280	EC	0.56	kg ai/ha
4 ethofumesate	480	SC	2.13	kg ai/ha
5 simazine	90	SG	1.0	kg ai/ha
6 metribuzin	75	DF	0.56	kg ai/ha
oxyfluorfen	240	EC	0.42	kg ai/ha
7 atrazine	90	WDG	1.5	kg ai/ha
8 diuron	80	DF	1.8	kg ai/ha
9 clopyralid	50	EC	0.100	kg ai/ha
MCPA ester	280	EC	0.56	kg ai/ha
quinclorac	75	DF	0.125	kg ai/ha
Merge			1 % v/v	A
10 metsulfuron methyl	60	DF	0.0045	kg ai/ha
Agral 90			0.2 % v/v	A

Crop Code		LOLPE	LOLPE	LOLPE
Part Rated		TOPGROW	FORAGE	SEED
Rating Data Type		VISINJ	WEIDRY	YIELD
Rating Unit		percent	KG/HA	KG/HA
Rating Date	Aug-9-2001	Aug-13-2001	Aug-13-2001	
Trt-Eval Interval	329/286 DAA	333/290 DAA	333/290 DAA	
Trt Treatment	Form	Form	Rate	Appl
No. Name	Conc	Type	Rate	Unit
1 Check			A	
2 dicamba	480	SN	0.237	kg ai/ha
2,4-D amine	470	SN	0.523	kg ai/ha
3 fluroxypyrr	180	EC	0.144	kg ai/ha
clopyralid	50	EC	0.100	kg ai/ha
MCPA ester	280	EC	0.56	kg ai/ha
4 ethofumesate	480	SC	2.13	kg ai/ha
5 simazine	90	SG	1.0	kg ai/ha
6 metribuzin	75	DF	0.56	kg ai/ha
oxyfluorfen	240	EC	0.42	kg ai/ha
7 atrazine	90	WDG	1.5	kg ai/ha
8 diuron	80	DF	1.8	kg ai/ha
9 clopyralid	50	EC	0.100	kg ai/ha
MCPA ester	280	EC	0.56	kg ai/ha
quinclorac	75	DF	0.125	kg ai/ha
Merge			1 % v/v	A
10 metsulfuron methyl	60	DF	0.0045	kg ai/ha
Agral 90			0.2 % v/v	A
LSD (P=.05)			29	2771 a
Standard Deviation				530.8
CV				365.8
				12.53
				108.4
				74.7
				18.73

Bartlett's X2		13.759	9.339
P(Bartlett's X2)		0.131	0.407
Treatment F		1.017	13.435
Treatment Prob(F)		0.4515	0.0001

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

Trial Comments

Ally and Sencor + Goal applications resulted in visual damage to perennial ryegrass. Ally, Sencor + Goal and Karmex significantly reduced seed yields as compared to the check. None of the treatments reduced perennial ryegrass forage yields.

Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall of the Year of Seeding - Brooks 2001-02 (Expt. #PR4)

Henry Najda, Art Kruger, Dan Cole, Nicole Kimmel
Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

Experiment ID: PR Fall S01 BK

CROP: LOLPE, Perennial Ryegrass (BLAZER II). Planted: May-9-2001, 4.25 KG/HA, 0.75 CM Deep, 20 CM Row Width. Planting Method: DRILLED. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 1.5 M x 7 M. Fertilizer: Nov.8/2001 120 kg/ha N Expt. Location: Brooks, Alberta.

Soil Texture: SILT LOAM. %OM: 2 %Sand: 45 %Silt: 35 %Clay: 20 pH: 7.9

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	Sep-11-2001 Oct-30-2001	Crop	1 LOLPE Perennial Ryegrass
Time of Day:	9:00 AM 9:00 AM	Height	: 4 cm
Method	SPRAY SPRAY		
Timing	POSTHARVEST POSTHARVEST		
Placement	SURFACE SURFACE		
Air Temp.	11 C 11.2 C		
Wind Speed	7 KPH 3 KPH		
Equipment	HANDHELD SPRAYER		
Pressure	275 kPa 275 kPa		
Nozzle Type	TEEJET TEEJET		
Nozzle Size	8001 8003		
Noz. Spacing	50 CM 50 CM		
Boom Length	1.5 M 1.5 M		
Boom Height	45 CM 45 CM		
Carrier	WATER WATER		
Appl. Volume	100 L/HA 300 L/HA		
Propellant	CO2 CO2		

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Oct-30-01, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Harvest area 6.6 m².

Crop Code	LOLPE	LOLPE
Part Rated	PLANT	SEED
Rating Data Type	HEIGHT	YIELD
Rating Unit	CM	kg/ha
Rating Date	Jul-29-2002	Jul-29-2002
Trt-Eval Interval	272/321 DAA	272/321 DAA
Trt Treatment	Form Form	Appl
No. Name	Conc Type Rate	Unit Code
1 Check		74 a 1380 abc
2 dicamba	480 SN	0.237 kg ai/ha A 65 a 1402 ab

2,4-D amine	470 SN	0.523 kg ai/ha A		
3 fluroxypyr	180 EC	0.144 kg ai/ha A	72 a	1453 a
clopyralid	50 EC	0.100 kg ai/ha A		
MCPA ester	280 EC	0.56 kg ai/ha A		
4 clopyralid	50 EC	0.100 kg ai/ha A	69 a	1261 abc
MCPA ester	280 EC	0.56 kg ai/ha A		
quinclorac	75 DF	0.125 kg ai/ha A		
Merge		1.0 % v/v A		
5 metsulfuron methyl	60 DF	0.0045 kg ai/ha A	66 a	1150 bc
Agral 90		0.2 % v/v A		
6 ethofumesate	480 SC	0.84 kg ai/ha B	68 a	1297 abc
7 simazine	90 SG	1.0 kg ai/ha B	70 a	1106 c
8 diuron	80 DF	0.90 kg ai/ha B	70 a	1237 abc
LSD (P=.05)			8.36	184.3
Standard Deviation			5.68	125.3
CV			8.2	9.75
Bartlett's X2			4.166	6.711
P(Bartlett's X2)			0.76	0.46
Treatment F			1.187	3.792
Treatment Prob(F)			0.3521	0.0082
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)				

Trial Comments

Ally caused stunting of growth on June 4, 2002. None of the treatments caused a significant seed yield reduction although Princep had the lowest yield.

Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall of the Year of Seeding - Edmonton 2001-02 (Expt. #PR5)

Dan Cole, Nicole Kimmel

Experiment ID: Per Rye S01 Fall Edm

Crop Diversification Division, Alberta Agriculture, Food and Rural Development
2001-02 Experiment

CROP: LOLPE, Perennial Ryegrass (Blazer) II Planted: Jun-08-01, 1 cm, 30 cm row width
Underseeded: AC Barrie Wheat 90 kg/ha Planted: Jun-07-01, 1 cm, 15 cm row width
Planting Method: DOUBLE DISC PRESS DRILL Seeding Rate: 8.0 kg/ha Expt. Design:
RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Fertilizer: Oct.31/01 80
kg/ha N Expt. Location: Ellerslie, Edmonton, Alberta

Soil Texture: Silty Clay Loam, %OM:11, %Sand:19, %Silt:40, %Clay:41 and pH:7.0

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	: Oct-01-01 Nov-04-01	Crop	1 LOLPE Perennial Ryegrass
Time of Day:	11:00 AM 4:00 PM	Height	: 13 CM 13 CM (Mowing Height)
Method	: SPRAY SPRAY	Stage	: Green Veg. Yellow Veg.
Timing	: POSTHARVEST POSTHARVEST		
Placement	: SURFACE SURFACE		
Air Temp.	: 12 C 11 C		
Wind Speed	: 0 KPH 0 KPH		
Dew Present:	N		
Soil Moist.:		WET	
Cloud Cover:	100% 0%		
Equipment :	HANDHELD SPRAYER		
Pressure	: 138 kPa 276 kPa		
Nozzle Type:	TEEJET TEEJET		
Nozzle Size:	XR80015 VS8003		
Noz. Spacing:	50 CM 50 CM		
Boom Length:	1.5 M 1.5 M		
Boom Height:	45 CM 45 CM		

Carrier : WATER WATER
 Appl. Volume: 100 L/HA 300 L/HA
 Propellant : CO2 CO2

Comments: Higher spray solution volume (300 L/ha) was used in application (B) on Nov-4-01, while normal spray solution volume (100 L/ha) was used in October application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury of the crops. Harvest area 9 m².

Crop Code	LOLPE	LOLPE	LOLPE						
Part Rated	TOPGROW	TOPGROW	SEED						
Rating Data Type	VISINJ	VISINJ	YIELD						
Rating Unit	percent	percent	kg/ha						
Rating Date	May-31-02	Aug-01-02	Aug-26-02						
Trt-Eval Interval	208/242 DAA	270/304 DAA	295/329 DAA						
Trt Treatment No.	Form Conc	Form Type	Rate	Appl Unit	Code				
1 Check						0	0	229 a	
2 dicamba	480	SN	0.237	KG	A/HA	A	0	0	210 a
2,4-D amine	470	SN	0.523	KG	A/HA	A			
3 fluroxypyr	180	EC	0.144	KG	A/HA	A	0	0	206 a
clopyralid	50	EC	0.1	KG	A/HA	A			
MCPA ester	280	EC	0.560	KG	A/HA	A			
4 clopyralid	50	EC	0.10	KG	A/HA	A	0	0	208 a
MCPA ester	280	EC	0.560	KG	A/HA	A			
quinclorac	75	DF	0.125	KG	A/HA	A			
Merge			1.0	%	V/V	A			
5 metsulfuron methyl	60	DF	0.0045	KG	A/HA	A	0	0	92 b
Agral 90			0.2	%	V/V	A			
6 ethofumesate	480	SC	2.13	KG	A/HA	B	0	0	252 a
7 simazine	90	SG	1.0	KG	A/HA	B	0	0	203 a
8 diuron	80	DF	1.8	KG	A/HA	B	0	0	173 a
LSD (P=.05)								76.5	
Standard Deviation								51.9	
CV								26.36	
Bartlett's X2								5.544	
P(Bartlett's X2)								0.594	
Treatment F								3.394	
Treatment Prob(F)								0.0149	

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

Trial Comments

Although none of the fall applied treatments visibly injured perennial ryegrass, Ally caused a significantly lower seed yield.

Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall of the Year of Seeding - Beaverlodge 2000-01 (Expt. #PR6)

Experiment ID: PerRyegrass S01 Fall Bldg

Calvin Yoder, Dan Cole, Jean Beaudoin, Lois Connelly, Nigel Fairey
 Alberta Agriculture, Food and Rural Development, Smokey Applied Research and Demonstration Association, Agriculture and Agri-Food Canada
 2001-02 Experiment

CROP: LOLPE, PERENNIAL RYEGRASS (Blazer II). Planted: May-17-01, 2.6 KG/HA, 1 CM Deep, 30 CM Row Width. Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 10 M. Fertilizer: BROADCAST May-10-01 N-5 kg/ha P-77 kg/ha K-0 kg/ha S-0 kg/ha, Oct-17-01

N-68 kg/ha P-0 kg/ha K-0 kg/ha S-0 kg/ha

APPLICATION DESCRIPTION

Application:	A	B	Expt. Location: Beaverlodge, Alberta
Date :	Sep-20-01	Oct-30-01	STAGE AT APPLICATION
Time of Day:	2:00 PM	11:30 AM	Application: A B
(Mowing Height)			Crop 1 LOLPE Perennial Ryegrass
Method	SPRAY	SPRAY	Height : 5-10 CM 8-10 CM
Timing	POSTHARVEST	POSTHARVEST	
Placement	SURFACE	SURFACE	
Air Temp.	17 C	10 C	
% Humidity	46	70	
Wind Speed	0 KPH	0 KPH	
Equipment	BICYCLE SPRAYER		
Pressure	275 kPa	275 kPa	
Carrier	WATER	WATER	
Appl. Volume:	100 L/HA	300 L/HA	
Propellant	CO2	CO2	

Comments: Higher spray solution volume (300 L/ha) was used in application (B) in October, while normal spray solution volume (100 L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury of the crops. Harvest area 6 m².

Crop Code	LOLPE	LOLPE	LOLPE	LOLPE
Part Rated	TOPGROW	TOPGROW	TOPGROW	SEED
Rating Data Type	VISINJ	VISINJ	VISINJ	YIELD
Rating Unit	percent	percent	percent	kg/ha
Rating Date	Oct-30-01	Jun-10-02	Aug-07-02	Aug-14-02
Trt-Eval Interval	40/0 DA-A	263/223	321/281	328/288
Trt Chemical No. Name	Form Conc	Form Type	Rate Rate	Appl Unit
1 Check				Code
2 dicamba	480 SN	0.237	KG A/H A	A
2,4-D amine	470 SN	0.523	KG A/H A	A
3 fluroxypyr	180 EC	0.144	KG A/H A	A
clopyralid	50 EC	0.100	KG A/H A	A
MCPA ester	280 EC	0.56	KG A/H A	A
4 clopyralid	50 EC	0.100	KG A/H A	A
MCPA ester	280 EC	0.56	KG A/H A	A
quinclorac	75 DF	0.125	KG A/H A	A
Merge		1.0	% V/V	A
5 metsulfuron methyl	60 DF	0.0045	KG A/H A	A
Agral 90		0.2	% V/V	A
6 ethofumesate	480 SC	2.13	KG A/H B	
7 simazine	90 SG	1.0	KG A/H B	
8 atrazine	90 WDG	1.5	KG A/H B	
9 diuron	80 DF	1.8	KG A/H B	
LSD (P=.05)				57.0
Standard Deviation				39.0
CV				23.92
Bartlett's X2				9.844
P(Bartlett's X2)				0.276
Treatment F				1.740
Treatment Prob(F)				0.1401

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

Trial Comments

The fall application of Ally caused severe damage to perennial ryegrass the following year. The seed yields from this application were reduced as compared to the check but the difference was not significant. None of the other treatments applied resulted in visual damage or seed yield loss to perennial ryegrass.

**Tolerance of Perennial Ryegrass to Herbicides Applied in the Fall the Year After
Seeding - Edmonton 2002-03 (Expt. #PR7)**

Dan Cole, Nicole Kimmel

Experiment ID: Per Rye E02 Fall Edm

Crop Diversification, Alberta Agriculture, Food and Rural Development
2002-03 Experiment

CROP: LOLPE, Perennial Ryegrass (BLAZER II). Planted: Jun-8-2001, 8.0 KG/HA, 1 CM Deep, 30 CM Row Width. Planting Method: DOUBLE DISC PRESS DRILL. Fertilizer: Broadcast Oct.31, 2001 80 kg/ha N & Oct.18, 2002 80 kg/ha N Expt. Design: RANDOMIZED COMPLETE BLOCK. Reps: 4. Plot Size: 2 M x 6 M. Expt. Location: Ellerslie, Edmonton, Alberta.

Soil Texture: Silty Clay Loam. %OM: 11 %Sand: 19 %Silt: 40 %Clay: 41 pH: 5.7

APPLICATION DESCRIPTION		STAGE AT APPLICATION	
Application:	A B	Application:	A B
Date	Sep-25-2002 Oct-9-2002	Crop	1 LOLPE Perennial Ryegrass
Time of Day:	11:45 AM 10:40 PM	Height	: Cut @ 8 cm Regrowth 2 cm
Method	SPRAY SPRAY	Weed 1	AVEFA Wild oat
Timing	POSTHARVEST POSTHARVEST	Weed 2	CVPTE Narrow-leaved Hawk's-beard
Placement	SURFACE SURFACE	Weed 3	CAPBP Shepherd's-purse
Air Temp.	7 C 7 C	Weed 4	TAROF Dandelion
% Humidity	72 62		
Wind Speed	15 KPH 13 KPH		
Dew Present:	Y Y		
Cloud Cover:	50% 70%		
Equipment	MOTORIZED HANDHELD		
Pressure	207 kPa 276 kPa		
Nozzle Type	TEEJET TEEJET		
Nozzle Size	80015 8003VS		
Noz. Spacing:	50 CM 50 CM		
Boom Length:	2 M 1.5 M		
Boom Height:	50 CM 45 CM		
Carrier	WATER WATER		
Appl. Volume:	100 L/HA 300 L/HA		
Propellant	CO2 CO2		

Comments: Higher spray solution volume (300L/ha) was used in application (B) on Oct-9-02, while normal spray solution volume (100L/ha) was used in September application (A). Crop codes are mentioned above. Codes used in the following table have the following meaning: TOPGROW-Top growth. Visual assessments provide % injury to the crops and % control of weeds. Harvest area 9 m².

Trt-Eval Interval	Rating Date	Rating Unit	Rating Data Type	Part Rated	Crop Code	Weed Code	AVEFA	CVPTE
						LOLPE	LOLPE	LOLPE
						TOPGROW	TOPGROW	TOPGROW
						VISINJ	STARED	VISCON
						percent	percent	percent
	May-14-2003	Jul-23-2003	Jul-23-2003	May-14-2003	TOPGROW	TOPGROW	VISCON	VISCON
Trt Treatment	Form Conc	Form Type	Rate	Rate	Appl	TOPGROW	TOPGROW	TOPGROW
No. Name			Unit	Unit	Code	VISINJ	STARED	VISCON
1 Check						percent	percent	percent
2 dicamba	480 SN	0.237 kg	ai/ha	A	0	0	0	0
2,4-D amine	470 SN	0.523 kg	ai/ha	A	0	0	0	19
3 fluroxypyr	180 EC	0.144 kg	ai/ha	A	0	0	0	61
clopyralid	50 EC	0.1 kg	ai/ha	A				
MCPA ester	280 EC	0.56 kg	ai/ha	A				
4 ethofumesate	480 SC	2.13 kg	ai/ha	B	0	0	49	3
5 simazine	90 SG	1.0 kg	ai/ha	B	0	6	24	5
6 metribuzin	75 DF	0.56 kg	ai/ha	B	0	76	5	84

oxyfluorfen	240 EC	0.42 kg ai/ha B					
7 atrazine	90 WDG	1.5 kg ai/ha B	0	53	18	40	
8 diuron	80 DF	1.8 kg ai/ha B	0	48	0	58	
Weed Code	CAPBP						TAROF
Crop Code							LOLPE
Part Rated	TOPGROW						SEED
Rating Data Type	VISCON						YIELD
Rating Unit	percent						kg/ha
Rating Date	Jul-23-2003	Jul-23-2003	Aug-21-2003				
Trt-Eval Interval	301/287 DAA	301/287 DAA	330/316 DAA				
Trt Treatment	Form Conc	Form Type	Rate Rate	Appl Unit	Code		
No. Name							
1 Check					0	0	142 b
2 dicamba	480 SN	0.237	kg ai/ha	A	6	38	180 b
2,4-D amine	470 SN	0.523	kg ai/ha	A			
3 fluroxypyr	180 EC	0.144	kg ai/ha	A	0	34	221 a
clopyralid	50 EC	0.1	kg ai/ha	A			
MCPA ester	280 EC	0.56	kg ai/ha	A			
4 ethofumesate	480 SC	2.13	kg ai/ha	B	54	5	170 b
5 simazine	90 SG	1.0	kg ai/ha	B	63	0	149 b
6 metribuzin	75 DF	0.56	kg ai/ha	B	100	0	76 c
oxyfluorfen	240 EC	0.42	kg ai/ha	B			
7 atrazine	90 WDG	1.5	kg ai/ha	B	100	0	80 c
8 diuron	80 DF	1.8	kg ai/ha	B	84	0	148 b
LSD (P=.05)							37.8
Standard Deviation							25.6
CV							17.57
Bartlett's X2							5.094
P(Bartlett's X2)							0.648
Treatment F							14.515
Treatment Prob(F)							0.0001

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

Trial Comments

Both fall applied Sencor + Goal and Aatrex caused visible stand reduction of established perennial ryegrass as well as a significant seed yield reduction. Karmex caused a visible stand reduction but not a significant seed yield reduction from the untreated check. Weed control was variable with these treatments.

BIOGRAPHICAL DATA OF PRIMARY RESEARCHERS

Name: (Last, First) Cole, Dan	
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Past experience relevant to project: (Point form, concise.)	
Integrated control of Canada thistle, common tansy and white cockle in forage crops– 2001-	
Biological control of leafy spurge, bladder campion, toadflax and scentless chamomile – 1988-	
Tolerance of grass seed crops and legumes to herbicides – 1988-	
Herbicide tolerance trials on timothy, creeping red fescue, tall fescue, meadow brome, etc – 1988-	
Integrated control of ox-eye daisy and dandelion in pastures and hayland – 1995-1999	
Integrated control of toadflax, tansy and wild caraway in pastures and hay land– 1995-1997	
Integrated control of Canada thistle and scentless chamomile in pastures and hay land – 1986-1991	
Degrees / Certificates / Diplomas	Institution
M.Sc. in Plant Science	University of Alberta
B.Sc. in Plant Science	University of Alberta
Publications and Patents:	
Cole, D. E., D.R. Clements, S.D. Darbyshire, J.R. King and A. McClay. 2002. The biology of Canadian weeds. <i>Leucanthemum vulgare</i> Lam. Submitted to Can. J. Plant Sci.	
Zhang, W. M., M. Sulz, K.L. Bailey and D.E. Cole. 2002. Effect of epidemiological factors on the impact of the fungus <i>Plectosporium tabacinum</i> on false cleavers (<i>Galium spurium</i>). <i>Biocontrol Sci. Tech.</i> 12: 183-194.	
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Stromme, K., D.E. Cole, J. Tansey, A.S. McClay, C.J. Richardson and J. de Valois. 2000. Long-term monitoring of the impact of <i>Aphthona nigriscutis</i> on leafy spurge: the Beverly Bridge sites. Proceedings of the X International Symposium on Biological Control of Weeds, Bozeman, Montana, July 4-14, 1999. 1030 p.	
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Darwent, A.L., D.E. Cole and N. Malik. 1997. Imazethapyr, alone or with other herbicides for weed control during alfalfa (*Medicago sativa*) establishment. *Weed Technol.* 11:346-353.

Smith, E.G., J.M. Barbieri, J.R. Moyer and D.E. Cole. 1997. The effect of companion crops and herbicides on economic returns of alfalfa-bromegrass establishment. *Can. J. Plant Sci.* 77:231-236.

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McClay, A.S., D.E. Cole, P. Harris, C.J. Richardson. 1995. Biological control of Leafy Spurge in Alberta: Progress and prospects. Alberta Environmental Centre, Vegreville, Alberta, 63 pp.

Moyer, J.R., D.E. Cole, D.C. Maurice and A.L. Darwent. 1994. Companion crop, herbicide and weed effects on establishment and yields of alfalfa-bromegrass mixture. *Can. J. Plant Sci.* 75: 121-127.

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Cole, D.E. 1994. Scentless chamomile: biology and control. Alberta Agriculture, Food and Rural Development Agdex 640-6. 4 p.

Cole, D.E., A.S. McClay and C.J. Richardson. 1991. Control of leafy spurge with spurge beetles. Alberta Agriculture Agdex 643-3. 4 p.

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Lopetinsky, K.J., D.E. Cole, M. Okuda and L. Darwent. 1989. Timothy seed production in Alberta. Alberta Agriculture Agdex 127/15-2. 6 p.

of Refereed papers: 7

Relevant Patents obtained: 0

Refereed conference proceedings: 2

Other relevant citations:

Other evidence of productivity during past 6 years: (Point form, concise)

Submitted over 170 Research Reports to Expert Committee on Weeds, West. Can. Sect., Res. Rep. Thirty-seven Minor Use Registrations.

Conducted over 200 research trials during the past 6 years.

Released biological control agents at over 30 sites.

Produced and extended 3 editions of “Weed Control in Forage Crops”.

Numerous presentations of research results to agronomists and producers.

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Tolerance of established red and alsike clover to herbicides 2000 - present

Fall herbicide application for perennial weed control in grass seed crops 2000 - present

Tolerance of creeping red fescue to cleaver controlling herbicides 1997 - present

Tolerance of timothy to broad-leaved weed herbicides 1998 -present

Degrees / Certificates / Diplomas **Institution**

B.Sc. Agriculture/Forages University of Alberta

Publications and Patents:

Yoder, C. and D. Cole. 2002. Tolerance of Established Creeping Red Fescue to Herbicides.

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Yoder, C., D. Cole and G. Heinz. 1998. Tolerance of Established Hard Fescue to Graminicides - Tangent. Expert Committee on Weeds Research Report, Western Section. p. A18.

of Refereed papers: 1
Relevant Patents obtained:

Refereed conference proceedings: 18
Other relevant citations:

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Degrees / Certificates / Diplomas	Institution
B.A.	University of Alberta
MPM	Simon Fraser University
Publications and Patents: Baron, V.S., Najda, H.G. , McCartney, D.H., Bjorge, M. and Lastiwka, G.W. 2003. Winter weathering effects on corn grown for grazing in a short-season area. <i>Can. J. Plant Sci.</i> 83:333-341. Hwang, S.F., Gaudet, D.A., Turnbull, G.D., Chang, K.F., Howard, R.J. and Najda, H. 2002. Effect of plant age and cottony snow mold on winter survival of forage grasses. <i>Can. J. Plant. Sci.</i> (in press) Gossen, B.D., Soroka, J.J. and Najda, H.G. 2002. Residue management increases seed yield of three turfgrass species on the Canadian prairies. <i>Can. J. Plant Sci.</i> 82:687-692. Najda, H.G. and R.C. McKenzie. 1996. The agronomy and management of grass seed production under irrigation. <i>Farming for the Future Project 92-0049F</i> . 56 pp. Gossen, B.D., Soroka, J.J. and Najda, H.G. 1997. Narrow rows and residue management increase seed yield of three turf grasses. <i>In Proceedings XVIII International Grassland Congress</i> . Winnipeg and Saskatoon, Canada. June. Acharya, S.N., Kozub, G.C., Najda, H. and Aasen, A. 1997. Study of genotypic x environment interaction in alfalfa forage yield. <i>In Proceedings XVIII International Grasslands Congress</i> . Winnipeg and Saskatoon, Canada. June.	
# of Refereed papers: 14 Relevant Patents obtained:	Refereed conference proceedings: 13 Other relevant citations: 116