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Testing granular formulations of picloram for leafy spurge (*Euphorbia esula* L.) control

P. K. FAY and E. S. DAVIS

The Dow Chemical Company has ceased production of Tordon 2K, a dry pellet formulation of picloram. The loss of Tordon 2K will impact Montana since it was especially useful for spot treatment of pioneer patches of leafy spurge. Many ranchers and weed district personnel have used small amounts of Tordon 2K for many years effectively controlling the noxious rangeland weed. These experiments were established in an attempt to find substitute dry formulations of picloram. Complete fertilizer (14-14-14), ammonium sulphate fertilizer, "Tidy Kat," "Hagen," and a locally made organic cat litter were placed on a plastic sheet and sprayed with Tordon 22K using an atomizer. The herbicide was applied in numerous sprays and thoroughly mixed between applications. The final concentration for each material is shown in the table. Oat (*Avena sativa* L.) kernels were autoclaved and soaked in known amounts of Tordon 22K for 24 hours, removed from the solution, and air dried. They imbibed 1% (w/w) picloram as Tordon 22K. The dried materials and Tordon 2K granules were hand applied to 7 by 25 foot plots at Bozeman and Whitehall, MT on May 14, 1986. Tordon 22K was applied using a CO₂-pressurized backpack sprayer in 15 gpa. There were 3 replications arranged in a randomized complete block design at both locations. Leafy spurge control was visually rated in June of 1986 and 1987 at both locations (Table).

Tordon 22K, the liquid formulation of picloram was ineffective at both rates tested at both locations. Tordon 2K, the extruded pellet formulation, provided effective control 13 months after application. The impregnated fertilizer treatments were very effective at the highest rate tested. The impregnated cat litter formulations were also effective at both locations when applied at the rate of 1 lb a.i./A. Dead oat kernels imbibed with Tordon 22K were erratic at Bozeman but provided complete control at Whitehall. It appears that picloram can be impregnated on many types of substrates and maintain good activity on leafy spurge. (Montana Agric. Exp. Sta., Bozeman, MT 59717.)

The effect of picloram impregnated on several substrates for leafy spurge control in Bozeman and Whitehall, MT.

Picloram Formulation Type	Formulation Active Ingredient	Picloram Rate	Leafy Spurge Control			
			Bozeman		Whitehall	
			6-12-86	6-15-87	6-26-86	6-15-87
		lb/A	(%)			
Tordon 22K	2 E.C.	0.5	84	31	0	28
Tordon 2K	2%	0.5	48	73	43	92
14-14-14 fertilizer	0.43%	0.5	35	46	13	59
NH ₄ SO ₄	0.43%	0.5	37	45	35	99
“Tidy Kat” cat litter	2%	0.5	27	40	53	99
“Hagen” cat litter	2%	0.5	40	59	48	100
Organic cat litter	1%	0.5	45	64	32	60
Dead oat kernels	1%	0.5	43	50	30	97
Tordon 22K	2 E.C.	1.0	98	55	13	48
Tordon 2K	2%	1.0	65	87	82	99
14-14-14 fertilizer	0.43%	1.0	58	100	53	100
NH ₄ SO ₄ fertilizer	0.43%	1.0	67	94	92	100
“Tidy Kat” cat litter	2%	1.0	94	99	87	100
“Hagen” cat litter	2%	1.0	71	98	35	100
Organic cat litter	1%	1.0	75	96	43	100
Dead oat kernels	1%	1.0	37	83	62	100
Control	---		0	0	0	0
LSD .05			31	31	21	14

EXPERIMENT NO.: 85015005

TITLE: HERBICIDES FOR LEAFY SPURGE CONTROL.
BRASS LANTERN ESTATES
BOZEMAN, MONTANA

CROP INFORMATION

Crop: RANGE	Seeding Method
Variety:	Seeding Depth:
Planted:	Row Width:
Experimental Design: RCB	Seeding Rate:
Replications: 3	Plot Size: 7 FT X 25 FT

SOIL INFORMATION

Soil Type: GRAVELLY LOAM	Previous Crop: RANGE
Organic Matter: 3% pH: 8.0	Fertilizer Used: NONE

HERBICIDE APPLICATION

TREATMENT 1-24

Date: 6-28-85	Surfactant Used: NONE
Mixed By: FAY	In Trt:
Applied By: DAVIS	Surfactant Rate:
Propellant: CO2	Sprayer: BACKPACK
Pressure: 40 PSI	Volume: 25 GPA
Time: 2:30 P.M.	Nozzles: 8002
Cloud Cover:	Rel. Humidity: 19%
Wind Speed: 0-4 MPH	Air Temperature: 86 F
Wind Direction: NORTH	Soil Temp.: 2"91 F 4"
Note:	

Crop Stage: RANGE

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	EARLY SENESCENCE	HEAVY

RATING INFORMATION number 01 OF 03 TOTAL RATINGS

Rated By: DAVIS Date: 7-29-85
Crop Stage: RANGE
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	SEED-FILL	HEAVY

RATING INFORMATION number 02 OF 03 TOTAL RATINGS

Rated By: FAY Date: 6-12-86
Crop Stage: RANGE
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	EARLY FLOWER	HEAVY

RATING INFORMATION number 03 OF 03 TOTAL RATINGS

Rated By: FAY, MCKONE

Date: 6-15-87

Crop Stage: RANGE

Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	MID BLOOM	HEAVY

SUMMARY

Two years after application only Tordon at a rate of 2 lb/acre provided control of leafy spurge. The rate of control was only 72% illustrating the frustrations being voiced by people trying to control spurge chemically.

EXPT. LOCATION: BRASS LANTERN EST. BOZEMAN, MT

RESEARCH BY: FAY/DAVIS

INITIATED: 06/28/85

COMPLETED: 06/15/87

PESTICIDE				APPLI-1% LEAFY% LEAFY% LEAFY%			PESTICIDE				APPLI-1% LEAFY% LEAFY% LEAFY%			
TRT. -----				CATION:SPURGE			TRT. -----			CATION:SPURGE				
NO. NAME	FORMU.	LBai/A	TYPE: 7/29/85 6/12/86 6/15/87				NO. NAME	FORMU.	LBai/A	TYPE: 7/29/85 6/12/86 6/15/87				
=====														
01	GARLON	EC 4.0	4.0	SPOST	69	10	3	17	XRM 3972 SC 3.0	2.0	SPOST	79	10	3
02	GARLON	EC 4.0	8.0	SPOST	81	0	0		STARANE SC 1.67	2.0	SPOST			
03	GARLON	EC 4.0	2.0	SPOST	46	0	0	18	STARANE SC 1.67	1.0	SPOST	79	0	5
	XRM 3972	SC 3.0	2.0	SPOST				19	STARANE SC 1.67	2.0	SPOST	81	10	13
04	GARLON	EC 4.0	3.0	SPOST	51	3	3	20	STARANE SC 1.67	4.0	SPOST	91	10	7
	XRM 3972	SC 3.0	3.0	SPOST				21	CHECK			0	0	0
05	GARLON	EC 4.0	.5	SPOST	74	3	3	22	KRENITE SC 4.0	2.0	SPOST	48	7	0
	2,4-D AM	SC 4.0	1.0	SPOST				23	KRENITE SC 4.0	4.0	SPOST	25	8	5
06	GARLON	EC 4.0	1.0	SPOST	81	3	5	24	KRENITE SC 4.0	8.0	SPOST	58	63	12
	2,4-D AM	SC 4.0	2.0	SPOST										
07	TORDON	SC 2.0	.5	SPOST	81	36	13							
08	TORDON	SC 2.0	1.0	SPOST	56	57	10							
09	TORDON	SC 2.0	2.0	SPOST	78	96	72							
10	XRM 4703	SC 1.5	.25	SPOST	77	8	3							
11	XRM 4703	SC 1.5	.5	SPOST	66	25	0							
12	XRM 4703	SC 1.5	1.0	SPOST	79	39	8							
13	XRM 3972	SC 3.0	2.0	SPOST	52	5	0							
14	XRM 3972	SC 3.0	4.0	SPOST	50	8	0							
15	XRM 3972	SC 3.0	.5	SPOST	64	18	5							
	STARANE	SC 1.67	.5	SPOST										
16	XRM 3972	SC 3.0	1.0	SPOST	59	3	3							
	STARANE	SC 1.67	1.0	SPOST										

EXPERIMENT NO.: 86020001

TITLE: TESTING DPD FOR CONTROL OF LEAFY SPURGE.
RAY GILLESPIE RANCH, WHITEHALL, MT.

CROP INFORMATION

Crop:	Seeding Method
Variety:	Seeding Depth:
Planted:	Row Width:
Experimental Design: RCB	Seeding Rate:
Replications: 3	Plot Size: 7 FT. X 25 FT.

SOIL INFORMATION

Soil Type: GRAVELLY LOAM	Previous Crop: PASTURE
Organic Matter: 3% pH: 7.0	Fertilizer Used: NONE

HERBICIDE APPLICATION

TREATMENTS 1-5

Date: 6-20-86	Surfactant Used: LI-700
Mixed By: DAVIS	In Trt: 1-5
Applied By: BIGLEN	Surfactant Rate: 2 QT./100 GAL.
Propellant: CO2	Sprayer: BACKPACK
Pressure: 40 PSI	Volume: 34 GPA
Time: 12:00 NOON	Nozzles: 8002
Cloud Cover:	Rel. Humidity: 60%
Wind Speed: 4-6 MPH	Air Temperature: 74 F
Wind Direction: SOUTH	Soil Temp.: 2"92 F 4"73 F
Note:	

Crop Stage:

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	FLOWERING	HEAVY

RATING INFORMATION number 01 OF 03 TOTAL RATINGS

Rated By: FAY, FELLOWS Date: 7-11-86
Crop Stage:
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	SEED FILL	HEAVY

RATING INFORMATION number 02 OF 03 TOTAL RATINGS

Rated By: FAY, MCKONE Date: 8-22-86
Crop Stage:
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	SENESCENCE	MODERATE

EXPERIMENT NO.: 85015005

TITLE: HERBICIDES FOR LEAFY SPURGE CONTROL.
BRASS LANTERN ESTATES
BOZEMAN, MONTANA

CROP INFORMATION

Crop: RANGE	Seeding Method
Variety:	Seeding Depth:
Planted:	Row Width:
Experimental Design: RCB	Seeding Rate:
Replications: 3	Plot Size: 7 FT X 25 FT

SOIL INFORMATION

Soil Type: GRAVELLY LOAM	Previous Crop: RANGE
Organic Matter: 3% pH: 8.0	Fertilizer Used: NONE

HERBICIDE APPLICATION

TREATMENT 1-24

Date: 6-28-85	Surfactant Used: NONE
Mixed By: FAY	In Trt:
Applied By: DAVIS	Surfactant Rate:
Propellant: CO2	Sprayer: BACKPACK
Pressure: 40 PSI	Volume: 25 GPA
Time: 2:30 P.M.	Nozzles: 8002
Cloud Cover:	Rel. Humidity: 19%
Wind Speed: 0-4 MPH	Air Temperature: 86 F
Wind Direction: NORTH	Soil Temp.: 2"91 F 4"
Note:	

Crop Stage: RANGE

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	EARLY SENESCENCE	HEAVY

RATING INFORMATION number 01 OF 03 TOTAL RATINGS

Rated By: DAVIS	Date: 7-29-85
Crop Stage: RANGE	
Rating Method: 0=NO CONTROL 100= COMPLETE KILL	

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	SEED-FILL	HEAVY

RATING INFORMATION number 02 OF 03 TOTAL RATINGS

Rated By: FAY	Date: 6-12-86
Crop Stage: RANGE	
Rating Method: 0=NO CONTROL 100= COMPLETE KILL	

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	EARLY FLOWER	HEAVY

RATING INFORMATION number 03 OF 03 TOTAL RATINGS

Rated By: DAVIS

Date: 6-19-87

Crop Stage:

Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present

Stage of Growth

Population Density

LEAFY SPURGE

MID BLOOM

MODERATE

SUMMARY

DPD ester, sold by Westchem, did not provide effective control one year after application.

FILE NAME:86020001.EXP

INTERIM

PRINTED:01/07/88

MONTANA

STATE

UNIVERSITY

TESTING DPD FOR CONTROL OF LEAFY SPURGE

EXPT. LOCATION:WHITEHALL, MT

RESEARCH BY:FAY/DAVIS

INITIATED:06/20/86

COMPLETED:06/19/87

TRT.	PESTICIDE	APPLI-1X	LEAFY1X	LEAFY1X	LEAFY1X	LEAFY1X	LEAFY1X	LEAFY1X	LEAFY1X	LEAFY1X	LEAFY1X	LEAFY1X
NO. NAME	FORMU. LBai/A	TYPE17/11/86	18/22/86	16/19/87								

01	DPD ESTR EC 4.0 2.0 FLOWR	87	97	62
	LI - 700 2qt/ 100g1 FLOWR			

02	DPD ESTR EC 4.0 4.0 FLOWR	99	99	47
	LI - 700 2qt/ 100g1 FLOWR			

03	DPD ESTR EC 4.0 2.0 FLOWR	63	66	47
	LI - 700 2qt/ 100g1 FLOWR			
	TORDON SC 2.0 .25 FLOWR			

04	DPD ESTR EC 4.0 2.0 FLOWR	94	100	54
	LI - 700 2qt/ 100g1 FLOWR			
	BANVEL SC 4.0 .5 FLOWR			

05	DPD ESTR EC 4.0 4.0 FLOWR	99	100	83
	LI - 700 2qt/ 100g1 FLOWR			
	TORDON SC 2.0 .25 FLOWR			

06	TORDON SC 2.0 1.0 FLOWR	79	89	98
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07	CONTROL	33	33	23
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LSD(0.05) =	58	59	43
STANDARD DEVIATION =	33	33	24
COEFF. OF VARIABILITY =	41	40	41

TITLE: HERBICIDES FOR LEAFY SPURGE CONTROL.
RAY GILLESPIE FARM, WHITEHALL, MT.

Crop: PASTURE	Seeding Method
Variety:	Seeding Depth:
Planted:	Row Width:
Experimental Design: RCB	Seeding Rate:
Replications: 3	Plot Size: 7 FT X 25 FT

Soil Type: GRAVELLY LOAM	Previous Crop: PASTURE
Organic Matter: 3% pH: 7.0	Fertilizer Used: NONE

Date: 6-17-86	Surfactant Used: X-77
Mixed By: DAVIS	In Trt: 1-9,12,13
Applied By: COBLE	Surfactant Rate: 0.25%
Propellant: CO2	Sprayer: BACKPACK
Pressure: 40 PSI	Volume: 14.5 GPA
Time: 9:30 A.M.	Nozzles: 8002
Cloud Cover:	Rel. Humidity: 40%
Wind Speed: 0 MPH	Air Temperature: 83 F
Wind Direction:	Soil Temp.: 2"66 F 4"62 F
Note:	

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	FLOWERING	MODERATE

Rated By: FAY, FELLOWS Date: 7-11-86
Crop Stage:
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	SEED FILL	MODERATE

Rated By: FAY, MCKONE Date: 8-22-86
Crop Stage:
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	SENESCENCE	MODERATE

RATING INFORMATION number 03 OF 03 TOTAL RATINGS

Rated By: DAVIS

Date: 6-19-87

Crop Stage:

Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present

Stage of Growth

Population Density

LEAFY SPURGE

MID BLOOM

MODERATE

SUMMARY

Oust, Escort, and Krenite did not provide effective control one, two or twelve months after application.

EXPT. LOCATION: WHITEHALL. MT

RESEARCH-BY: FAY/DAVIS

INITIATED:06/17/86

COMPLETED: 06/19/87

PESTICIDE		APPLI-1%LEAFY 1% SEED 1% LEAFY 1% LEAFY 1%			
TRT.	CATION:SPURGE 1CONTROL:SPURGE 1SPURGE 1				
NO. NAME	FORMU. LBai/A TYPE:7/11/86:7/11/86:8/22/86:6/19/87:				
01	OUST DF 75% .7 oz FLOWR	10	92	3	0
02	OUST DF 75% 1.5oz FLOWR	17	98	5	2
03	ESCORT DF 60% .3 oz FLOWR	3	74	2	0
04	ESCORT DF 60% .6 oz FLOWR	7	83	5	2
05	OUST DF 75% .75oz FLOWR	7	92	0	0
	ESCORT DF 60% .3 oz FLOWR				
06	OUST DF 75% .75oz FLOWR	10	97	3	3
	ESCORT DF 60% .6 oz FLOWR				
07	OUST DF 75% 1.0oz FLOWR	15	100	10	10
	ESCORT DF 60% .3 oz FLOWR				
08	OUST DF 75% 1.0oz FLOWR	17	93	2	0
	ESCORT DF 60% .6 oz FLOWR				
09	OUST DF 75% 1.0oz FLOWR	32	85	11	7
	ROUNDUP SC 4.0 1.0qt FLOWR				
10	KRENITE SC 4.0 1.0g1 FLOWR	18	78	8	10
11	KRENITE SC 4.0 2.0g1 FLOWR	36	100	21	43
12	OUST DF 75% 1.5oz FLOWR	40	100	18	30
	KRENITE SC 4.0 1.0g1 FLOWR				
13	OUST DF 75% 1.0oz FLOWR	82	95	81	52
	2,4-D AM SC 4.0 4.0oz FLOWR				
14	TORDON EC 2.0 1.01b FLOWR	50	73	84	89
15	CONTROL	0	0	0	0
	LSD(0.05) =	16	20	10	11
	STANDARD DEVIATION =	10	12	6	7
	COEFF. OF VARIABILITY =	42	14	36	39

EXPERIMENT NO.: 86020003

TITLE: BANVEL AND TORDON COMBINATIONS FOR LEAFY SPURGE CONTROL.
RAY GILLESPIE FARM, WHITEHALL, MT.

CROP INFORMATION

Crop: PASTURE	Seeding Method
Variety: `	Seeding Depth:
Planted:	Row Width:
Experimental Design: RCB	Seeding Rate:
Replications: 3	Plot Size: 7 FT X 25 FT

SOIL INFORMATION

Soil Type: GRAVELLY LOAM	Previous Crop: PASTURE
Organic Matter: 3% pH: 7.5	Fertilizer Used: NONE

HERBICIDE APPLICATION

TREATMENT 1-14

Date: 6-17-86	Surfactant Used: NONE
Mixed By: LINDQUIST	In Trt:
Applied By: FELLOWS	Surfactant Rate:
Propellant: CO2	Sprayer: BACKPACK
Pressure: 40 PSI	Volume: 12 GPA
Time: 9:30 A.M.	Nozzles: 8002
Cloud Cover:	Rel. Humidity: 40%
Wind Speed: 0 MPH	Air Temperature: 83 F
Wind Direction:	Soil Temp.: 2"66 F 4"62 F
Note:	

Crop Stage: PASTURE

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	FLOWERING	HEAVY

RATING INFORMATION number 01 OF 03 TOTAL RATINGS

Rated By: FAY, FELLOWS Date: 7-11-86
Crop Stage:
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	SEED-FILL	MODERATE

RATING INFORMATION number 02 OF 03 TOTAL RATINGS

Rated By: FAY, MCKANE Date: 8-22-86
Crop Stage:
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	SENESCENCE	MODERATE

RATING INFORMATION number 03 OF 03 TOTAL RATINGS

Rated By: DAVIS

Date: 6-19-87

Crop Stage:

Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present

Stage of Growth

Population Density

LEAFY SPURGE

MID BLOOM

MODERATE

SUMMARY

Combinations of Banvel and Tordon. Banvel-2,4-D,
Tordon-2,4-D, or EH 680 did not provide effective spurge
control one year after application.

EXPT. LOCATION: GILLESPIE FARM, WHITEHALL, MT

RESEARCH BY: FAY/DAVIS

INITIATED: 07/11/86

COMPLETED: 06/19/87

TRT.	PESTICIDE	APPLI-1%	LEAFY:1%	LEAFY:1%	LEAFY:1%								
NO. NAME	FORMU. LBai/A	TYPE:17/11/86	18/22/86	16/19/87									
01	BANVEL SC 4.0 2.0	FLOWR	20	10	7								
02	BANVEL SC 4.0 4.0	FLOWR	47	35	12								
03	TORDON SC 2.0 .25	FLOWR	15	7	7								
04	TORDON SC 2.0 .50	FLOWR	33	37	33								
05	TORDON SC 2.0 1.0	FLOWR	62	62	78								
06	BANVEL SC 4.0 1.0	FLOWR	57	65	65								
	TORDON SC 2.0 .25	FLOWR											
07	BANVEL SC 4.0 1.0	FLOWR	80	88	65								
	TORDON SC 2.0 .50	FLOWR											
08	BANVEL SC 4.0 .50	FLOWR	34	25	30								
	TORDON SC 2.0 .25	FLOWR											
09	BANVEL SC 4.0 .5	FLOWR	52	57	62								
	TORDON SC 2.0 .5	FLOWR											
10	BANVEL SC 4.0 .5	FLOWR	83	94	50								
	2,4-D AM SC 4.0 1.0	FLOWR											
11	TORDON SC 2.0 .25	FLOWR	72	98	45								
	2,4-D AM SC 4.0 1.0	FLOWR											
12	EH 680 SC 2.0 1.0PT	FLOWR	95	81	28								
13	EH 680 SC 2.0 2.0PT	FLOWR	85	87	33								
14	EH 680 SC 2.0 3.0PT	FLOWR	98	97	35								
15	CONTROL		0	0	0								
	LSD(0.05) =		11	22	13								
	STANDARD DEVIATION =		6	13	8								
	COEFF. OF VARIABILITY =		12	24	21								

EXPERIMENT NO.: 86020004

TITLE: COMBINATIONS WITH OUST FOR LEAFY SPURGE CONTROL.
RAY GILLESPIE FARM
WHITEHALL MONTANA.

CROP INFORMATION

Crop: PASTURE	Seeding Method
Variety:	Seeding Depth:
Planted:	Row Width:
Experimental Design: RCB	Seeding Rate:
Replications: 3	Plot Size: 7 FT. X 25 FT.

SOIL INFORMATION

Soil Type: GRAVELLY LOAM	Previous Crop: PASTURE
Organic Matter: 3% pH: 7.5	Fertilizer Used: NONE

HERBICIDE APPLICATION

TREATMENTS 1-4

Date: 6-17-86	Surfactant Used: X-77
Mixed By: LINDQUIST	In Trt: 1-4
Applied By: FELLOWS	Surfactant Rate: 0.25%
Propellant: CO2	Sprayer: BACKPACK
Pressure: 40 PSI	Volume: 12 GPA
Time: 9:30 AM	Nozzles: 8002
Cloud Cover:	Rel. Humidity: 40%
Wind Speed: 0 MPH	Air Temperature: 83 F
Wind Direction:	Soil Temp.: 2"66 F 4"62 F
Note:	

Crop Stage: PASTURE GRASSES, 12 INCHES TALL

Weeds Present	Stage of Growth	Population Density
-----	-----	-----
LEAFY SPURGE	FLOWERING	HEAVY

RATING INFORMATION number 01 OF 03 TOTAL RATINGS

Rated By: FAY, FELLOWS Date: 7-11-86
Crop Stage:
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
-----	-----	-----
LEAFY SPURGE	SEED FILL	HEAVY

RATING INFORMATION number 02 OF 03 TOTAL RATINGS

Rated By: FAY, MCKONE Date: 8-22-86
Crop Stage:
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
-----	-----	-----
LEAFY SPURGE	RIPE	HEAVY

RATING INFORMATION number 03 OF 03 TOTAL RATINGS

Rated By: FAY, MCKONE Date: 6-15-87
 Crop Stage:
 Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
LEAFY SPURGE	MID BLOOM	MODERATE

SUMMARY

Oust alone and in combination with 2,4-D, Banvel and Tordon did not provide effective spurge control one year after application.

FILE NAME:86020004.EXP INTERIM PRINTED:01/07/88
 MONTANA STATE UNIVERSITY

COMBINATIONS WITH OUST FOR LEAFY SPURGE CONTROL.

EXPT. LOCATION:GILLESPIE FARM, BOZEMAN, MT
 RESEARCH BY:FAY/DAVIS INITIATED:06/17/86 COMPLETED:06/15/87

PESTICIDE		APPLI-1%	LEAFY:1%	CONTROL:1%	LEAFY:1%	LEAFY:1%	INJURY:1%						
TRT.		CATION:1%		SEEDPRO:1%	SPURGE:1%	SPURGE:1%	GRASSES:1%						
NO.	NAME	FORMU.	LBai/A	TYPE	7/11/86	7/11/86	8/22/86	6/15/87	6/15/87				
01	OUST	DF 75%	1.0oz	SPOST	15	100	0	40	5				
02	OUST	DF 75%	1.0oz	SPOST	99	98	97	79	10				
	2,4-D AM	SC 4.0	1.0	SPOST									
03	OUST	DF 75%	1.0oz	SPOST	28	57	28	88	10				
	BANVEL	SC 4.0	2.0	SPOST									
04	OUST	DF 75%	1.0oz	SPOST	30	40	21	85	10				
	TORDON	SC 2.0	.25	SPOST									
05	CHECK				0	0	0	0	0				
		LSB(0.05) =			12	11	11	8	14				
		STANDARD DEVIATION =			6	6	6	4	8				
		COEFF. OF VARIABILITY =			18	10	20	7	110				

EXPERIMENT NO.: 8602006

TITLE: STARANE COMBINATIONS FOR LEAFY SPURGE CONTROL.
GILLESPIE FARM, WHITEHALL, MT.

CROP INFORMATION

Crop: PASTURE	Seeding Method
Variety:	Seeding Depth:
Planted:	Row Width:
Experimental Design: RCB	Seeding Rate:
Replications: 3	Plot Size: 7 FT X 25 FT

SOIL INFORMATION

Soil Type: GRAVELLY LOAM	Previous Crop: PASTURE
Organic Matter: 3% pH: 7.5	Fertilizer Used: NONE

HERBICIDE APPLICATION

TREATMENT 1-10

Date: 6-17-86	Surfactant Used: X-77
Mixed By: DAVIS	In Trt: 9,10
Applied By: COBLE	Surfactant Rate: 0.25%
Propellant: CO2	Sprayer: BACKPACK
Pressure: 40 PSI	Volume: 14.5 GPA
Time: 10:30 A.M.	Nozzles: 8002
Cloud Cover:	Rel. Humidity: 40%
Wind Speed: 0 MPH	Air Temperature: 83 F
Wind Direction:	Soil Temp.: 2"66 F 4"62 F
Note:	

Crop Stage:

Weeds Present	Stage of Growth	Population Density
-----	-----	-----
LEAFY SPURGE	FLOWERING	HEAVY

HERBICIDE APPLICATION

TREATMENT 11-20

Date: 7-29-86	Surfactant Used: X-77
Mixed By: RON WOOD	In Trt: 19,20
Applied By: DAVIS	Surfactant Rate: 0.25%
Propellant: CO2	Sprayer: BACKPACK
Pressure: 40 PSI	Volume: 14 GPA
Time: 10:30 A.M.	Nozzles: 8002
Cloud Cover:	Rel. Humidity: 50%
Wind Speed: 3-5 MPH	Air Temperature: 84 F
Wind Direction: SOUTH	Soil Temp.: 2"70 F 4"65 F
Note:	

Crop Stage:

Weeds Present	Stage of Growth	Population Density
-----	-----	-----
LEAFY SPURGE	L. FLOWER, SEED-FILL	HEAVY

HERBICIDE APPLICATION

Date: 9-17-86
Mixed By: TOWNSEND
Applied By: DAVIS
Propellant: CO2
Pressure: 40 PSI
Time: 12:00 P.M.
Cloud Cover:
Wind Speed: 3-6 MPH
Wind Direction: NORTH
Note:

TREATMENT 21-30

Surfactant Used: LI-700
In Trt: 29.30
Surfactant Rate: 0.25%
Sprayer: BACKPACK
Volume: 15 GPA
Nozzles: 8002
Rel. Humidity: 32%
Air Temperature: 73 F
Soil Temp.: 2"60 F 4"55 F

Crop Stage: PASTURE

Weeds Present	Stage of Growth	Population Density
-----	-----	-----
LEAFY SPURGE	SENESCENCE	HEAVY

RATING INFORMATION number 01 OF 03 TOTAL RATINGS

Rated By: FAY, FELLOWS Date: 7-11-86
Crop Stage:
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
-----	-----	-----
LEAFY SPURGE	SEED-FILL	HEAVY

RATING INFORMATION number 02 OF 03 TOTAL RATINGS

Rated By: FAY, MCKONE Date: 8-22-86
Crop Stage:
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
-----	-----	-----
LEAFY SPURGE	RIPE	HEAVY

RATING INFORMATION number 03 OF 03 TOTAL RATINGS

Rated By: FAY Date: 6-15-87
Crop Stage:
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
-----	-----	-----
LEAFY SPURGE	FLOWERING	HEAVY

SUMMARY

This experiment was established in 1986 to compare applications made on June 17, July 29, and September 17. Oust, and Oust with Tordon was only effective by June 15, 1987 when applied in mid-September. Tordon and Starane were not very effective when applied alone at 0.5 lb/acre at any date of application. The Starane-Tordon combinations were effective when applied in June (treatments 2 and 3), late July at the highest rate (treatment 13) and the two highest treatments (treatments 22 and 23) on September 17. Further work needs to be done with rates and dates. We will continue to monitor in 1988.

FILE NAME:86020006.EXP INTERIM PRINTED:01/07/88
MONTANA STATE UNIVERSITY

STARANE COMBINATIONS FOR LEAFY SPURGE CONTROL

EXPT. LOCATION:GILLESPIE FARM, WHITEHALL, MT
RESEARCH BY:FAY/DAVIS INITIATED:06/17/86 COMPLETED:06/15/87

		PESTICIDE	APPLI-1%	LEAFY1%	LEAFY1%	LEAFY1%	GRASS1									
TRT. -----		CATION:SPURGE !SPURGE !SPURGE !INJURY !														
NO.	NAME	FORMU.	Lb/ai/A	TYPE	7/11/86	8/22/86	6/15/87	6/15/87								
01	STARANE	SC	1.67 .25	FLOWR	70	88	78	2								
	TORDON	EC	2.0 .25	FLOWR												
02	STARANE	SC	1.67 .25	FLOWR	80	97	86	0								
	TORDON	EC	2.0 .5	FLOWR												
03	STARANE	SC	1.67 .25	FLOWR	82	94	93	3								
	TORDON	EC	2.0 1.0	FLOWR												
04	STARANE	SC	1.67 .25	FLOWR	91	92	41	0								
	2,4-D AM	SC	4.0 1.0	FLOWR												
05	STARANE	SC	1.67 .5	FLOWR	98	88	49	0								
	2,4-D AM	SC	4.0 1.0	FLOWR												
06	STARANE	SC	1.67 .5	FLOWR	89	95	58	0								
	2,4-D AM	SC	4.0 2.0	FLOWR												
07	STARANE	SC	1.67 .5	FLOWR	91	91	58	3								
08	TORDON	EC	2.0 .5	FLOWR	23	10	69	0								
09	DUST	DF	75.0 1 oz	FLOWR	10	0	15	0								
10	DUST	DF	75.0 1 oz	FLOWR	16	5	23	7								
	TORDON	EC	2.0 .125	FLOWR												
11	STARANE	SC	1.67 .25	FLOWR	NA	99	64	0								
	TORDON	EC	2.0 .25	FLOWR												
12	STARANE	SC	1.67 .25	FLOWR	NA	100	79	0								
	TORDON	EC	2.0 .5	FLOWR												
13	STARANE	SC	1.67 .25	FLOWR	NA	100	99	2								
	TORDON	EC	2.0 1.0	FLOWR												
14	STARANE	SC	1.67 .25	FLOWR	NA	100	45	0								
	2,4-D AM	SC	4.0 1.0	FLOWR												

STARANE COMBINATIONS FOR LEAFY SPURGE CONTROL

PESTICIDE		APPLI-1%	LEAFY1%	LEAFY1%	LEAFY1%	GRASS1							
TRT. -----		CATION:SPURGE		SPURGE	SPURGE	INJURY							
NO. NAME	FORMU. LBai/A	TYPE:7/11/86	8/22/86	6/15/87	6/15/87								
15	STARANE SC 1.67 .5 2,4-D AM SC 4.0 1.0	FLOWR	NA	100	52	0							
16	STARANE SC 1.67 .5 2,4-D AM SC 4.0 2.0	FLOWR	NA	100	60	0							
17	STARANE SC 1.67 .5	FLOWR	NA	98	43	0							
18	TORDON EC 2.0 .5	FLOWR	NA	86	62	0							
19	OUST DF 75.0 1 oz	FLOWR	NA	7	53	25							
20	OUST DF 75.0 1 oz TORDON EC 2.0 .125	FLOWR	NA	18	93	15							
21	STARANE SC 1.67 .25 TORDON EC 2.0 .25	FLOWR	NA	NA	60	3							
22	STARANE SC 1.67 .25 TORDON EC 2.0 .5	FLOWR	NA	NA	90	2							
23	STARANE SC 1.67 .25 TORDON EC 2.0 1.0	FLOWR	NA	NA	98	15							
24	STARANE SC 1.67 .25 2,4-D AM SC 4.0 1.0	FLOWR	NA	NA	15	0							
25	STARANE SC 1.67 .5 2,4-D AM SC 4.0 1.0	FLOWR	NA	NA	48	0							
26	STARANE SC 1.67 .5 2,4-D AM SC 4.0 2.0	FLOWR	NA	NA	45	15							
27	STARANE SC 1.67 .5	FLOWR	NA	NA	17	0							
28	TORDON EC 2.0 .5	FLOWR	NA	NA	67	2							
29	OUST DF 75.0 1 oz	FLOWR	NA	NA	96	33							
30	OUST DF 75.0 1 oz TORDON EC 2.0 .125	FLOWR	NA	NA	98	43							
31	CONTROL		0	0	0	0							
32	CONTROL		0	0	0	0							
LSD(0.05) =			7	7	33	12							
STANDARD DEVIATION =			4	4	20	7							
COEFF. OF VARIABILITY =			21	9	35	130							

TITLE: TESTING FALL APPLIED DPD ESTER FOR LEAFY SPURGE CONTROL.
GILLESPIE FARM, WHITEHALL, MONTANA.

Crop:	Seeding Method
Variety:	Seeding Depth:
Planted:	Row Width:
Experimental Design: RCB	Seeding Rate:
Replications: 3	Plot Size: 7 FT. X 25 FT.

Soil Type: GRAVELLY LOAM Previous Crop: PASTURE
Organic Matter: 3% pH: 7.0 Fertilizer Used: NONE

Date: 9-17-86	Surfactant Used: LI-700
Mixed By: TOWNSEND	In Trt: 1-5
Applied By: DAVIS	Surfactant Rate: 2 QT./100 GAL
Propellant: CO2	Sprayer: BACKPACK
Pressure: 40 PSI	Volume: 15 GPA
Time: 12:00 NOON	Nozzles: 8002
Cloud Cover:	Rel. Humidity: 32%
Wind Speed: 3-6 MPH	Air Temperature: 73 F
Wind Direction: NORTH	Soil Temp.: 2"60 F 4"55 F
Note:	

Weeds Present	Stage of Growth	Population Density
LEAFY SPURGE	SENESCENCE	MODERATE

Rated By: FAY, MCKONE Date: 6-15-87
Crop Stage: PASTURE
Rating Method: 0=NO CONTROL 100= COMPLETE KILL

Weeds Present	Stage of Growth	Population Density
=====	=====	=====
LEAFY SPURGE	FLOWERING	MODERATE

A phenoxy product sold by Westchem, DPD ester, applied in September, 1986 did not provide effective leafy spurge control the following year.

FILE NAME:86020010.EXP INTERIM PRINTED:01
MONTANA STATE UNIVERSITY

TESTING FALL APPLIED DPD ESTER FOR LEAFY SPURGE CONTROL

EXPT. LOCATION:GILLESPIE FARM, WHITEHALL, MT
RESEARCH BY:FAY/DAVIS INITIATED:06/15/87 COMPLETED:06/15/

NO.	NAME	FORMU.	LBai/A	TYPE:	6/15/87	16/15/87														
01	DPD ESTR EC 4.0	2.0	FALL	45	0															
	LI-700 S UR F 2	QT/10	0 GAL																	
02	DPD ESTR EC 4.0	4.0	FALL	50	0															
	LI-700 S UR F 2	QT/10	0 GAL																	
03	DPD ESTR EC 4.0	2.0	FALL	39	0															
	TORDON EC 2.0	.25	FALL																	
	LI-700 S UR F 2	QT/10	0 GAL																	
04	DPD ESTR EC 4.0	2.0	FALL	47	0															
	BANVEL EC 2.0	.5	FALL																	
	LI-700 S UR F 2	QT/10	0 GAL																	
05	DPD ESTR EC 4.0	2.0	FALL	73	0															
	TORDON EC 2.0	.25	FALL																	
	LI-700 S UR F 2	QT/10	0 GAL																	
06	TORDON EC 2.0	1.0	FALL	98	0															
	LI-700 S UR F 2	QT/10	0 GAL																	
07	CONTROL			0	0															
	LI-700 S UR F 2	QT/10	0 GAL																	

LSD(0.05) = 27 NA
STANDARD DEVIATION = 15 NA
COEFF. OF VARIABILITY = 29 NA