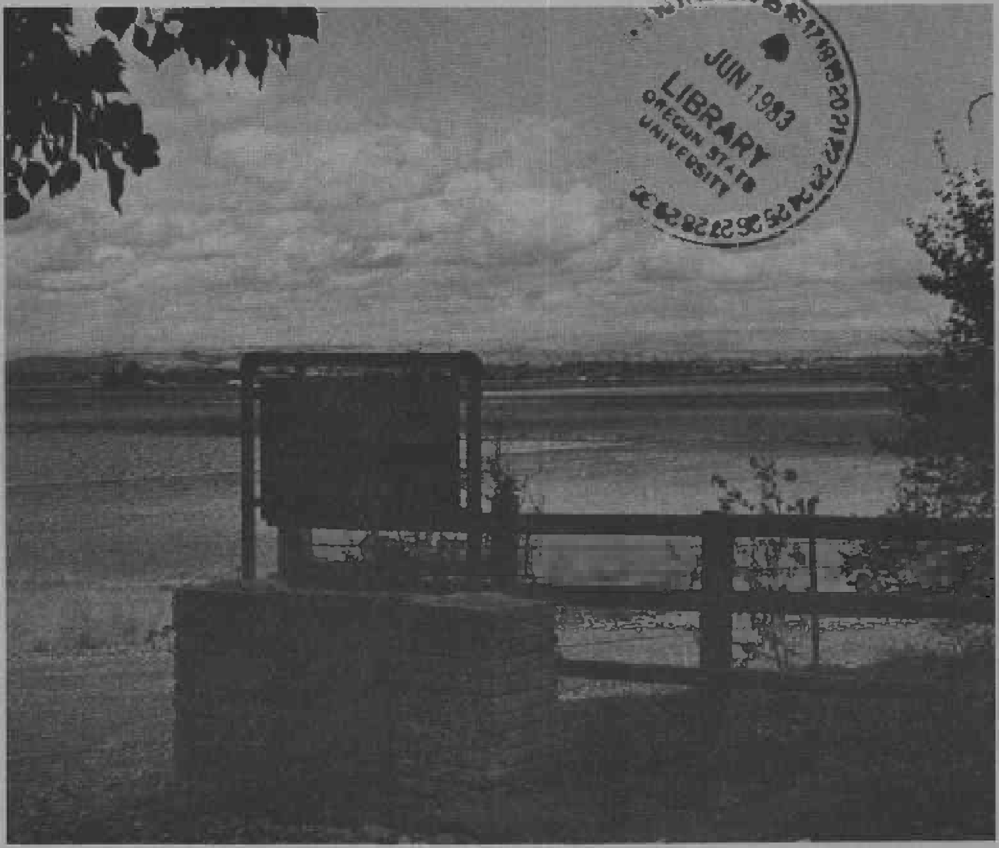
Malheur Agricultural Experiment Station Research



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Agricultual Experiment Station
Oregon State University, Corvallis

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COMMON AND TRADE NAMES OF HERBICIDES EVALUATED IN EXPERIMENTAL PLOTS

Common Names	Trade Names
alachlor	Lasso
sethoxydim	Poast
bensulide	Prefar
bromoxynil	Brominal/Buctril
cycloate	Ro-Neet
DCPA	Dacthal
desmedipham	Betamix
diclofop	Hoelon
diuron	Karmex
EPTC	Eptam
EPTC + safener	Eradicane
ethofumesate	Nortron
fluozifop	Fusilade
hexazinone	Velpar
Hercules 22234	Antor
metham	Vapam
metolachlor	Dual
metribuzin	Sencor/Lexone
napropamide	Devrinol
nitrofen	Tok
oryzalin	Surflan
oxidiazon	Ronstar
oxyfluorfen	Goal
paraquat cl^-	Paraquat
pendimethalin	Prowl
phenmedipham	Betanal
propachlor	Ramrod
pyrazon	Pyramin
terbacil	Sinbar
vernolate	Vernam
vernolate + safener	Surpass

WEATHER REPORTAGE

The Malheur Experiment Station has cooperated with the weather forecasting service of the U.S. Department of Commerce, Environmental Science Service Administration, since the spring of 1962. Participation consists of daily 8 a.m. readings of air temperature, soil temperature, and precipitation. This information is called to radio station KSRV in Ontario and transmitted along with KSRV's readings to the Boise, Idaho Weather Bureau. Evaporation, wind, and water temperature readings are also taken during the irrigation season.

Total precipitation in 1982 was 13.79 inches, more than 3 inches above the 30-year average of 10.26 inches (Table 1). Winter precipitation at 10.78 inches was almost double the 30-year average of 5.61 inches. All winter months received above-average precipitation, with November and December receiving more than double their normal amounts (Table 2). Summer precipitation was near average. Onions damaged by hail in July and August were subjected to poor field drying conditions because of precipitation in late September and early October, and consequently exhibited a high degree of neckrot in storage.

Wind mileage during the 1982 irrigation season was 1,682 miles greater than the previous high recorded in 1980 (Table 3). All months were windier than normal, and evaporation was high throughout the season.

The 1982 growing season lasted 152 days (Table 4). The temperature ranged from -14^{o}F on January 8 to 99^{o}F on August 7, 8, and 23 (Table 5). A hard freeze in late April led to extensive sugar beet replantings. Large temperature variations in June and July reduced potato quality. Soil temperatures at 4 inches remained 2^{o} to 6^{o} F below the 16-year average from April through July (Table 6). A summary of air and soil temperatures and precipitation for 1982, compared with 10-year averages, is presented in Table 7 and Figure 1.

TABLE 1. Daily and monthly precipitation in inches at the Malheur Experiment Station, Ontario, Oregon, 1982

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1	.51			.04			.10					.02
2	.08	.02	T	T			.29					
3	.03	.01	.07	.17			.19					.45
4			.02	.06		T	T			.09		.03
5			T	T		T	.03			T		
6				T		T					T	.56
7		.02		T		T	T			T		
8		T		T		.04	.02					
9		.04	T		.01		.06	T			T	
10		.02			.01			.19	T			
11		T	.01	.26							.11	
12	T		T	T		T	T	.13	T			
13		T		T		.05						.28
14		.60	.13	T					T			.06
15		.17	.12	T	.05							.26
16	T	.43	T	T					T	T		.30
17	.13	.10		T					T		T	.30
18	T	T	.16		.11				T		.26	T
19	.05	.21	.05						T		.07	
20	.02	T	T					T	.29		.01	
21		T						.12			T	.23
22	T	.21				.03						.03
23	.90									T		.52
24	T	T								.06		
25	T					.38			.04	T		
26	T		T		.22	.02	T		.14	.23		.03
27	T			T		T	.07			T		T
28			T			.04			.02		.04	
29	.01		T	T		.16	T		.05	.65	.32	T
30			.12			.11		T		1.03	.10	T
31			T									.01
Total Monthly	1.73	1.83	.68	.53	.40	.83	.76	.44	.54	2.06	.91	3.08
Yearly Total (13.79)												
30 yr.Mo. Avg.	1.41	1.01	.83	.76	.98	.79	.19	.47	.56	.76	1.17	1.39
30 yr. Average (10.26)												

TABLE 2. Fall and winter precipitation - October through February and October through March - at the Malheur Experiment Station, Ontario, Oregon

Month	1972 -73	1973 -74	1974 -75	1975 -76	1976 -77	1977 -78	1978 -79	1979 -80	1980 -81	1981 -82	30 yr Avg
October	.65	.48	.65	1.46	.09	.18	.01	1.21	.17	.93	.70
November	.88	2.48	.71	.65	.19	1.85	.61	1.18	.84	2.76	1.17
December	1.92	2.08	1.37	1.45	.12	1.81	.72	.97	1.73	3.53	1.32
January	1.19	1.10	.86	1.39	.93	2.33	1.93	1.28	1.07	1.73	1.41
February	.27	.55	1.82	.97	.27	1.70	1.82	1.50	1.35	1.83	1.01
Total	4.91	6.69	5.41	5.92	1.60	7.87	5.09	6.14	5.16	10.78	5.61
March	.77	1.20	1.19	.49	.46	.53	.85	1.54	1.85	.68	.83
Total	5.68	7.89	6.60	6.41	2.06	8.40	5.94	7.68	7.01	11.46	6.44

TABLE 3. Evaporation in inches from a free water surface for the 7-month period comprising the irrigation season and total wind mileage immediately above the evaporation pan for 1973-1982, Malheur Experiment Station, Ontario, Oregon

Month		1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
April	W[1]	3021	2744		2867		1856	1806	2808	2634	3164
	E	6.59	6.03		5.71		4.03	6.20	6.90	5.95	6.19
May	W	1909	1999	2399	2020	1342	3444	2826	2693	3523	3632
	E	8.08	7.77	6.99	8.75	5.11	7.61	*	6.56	8.64	9.85
June	W	1624	1510	1455	1571	1256	1173	2180	2153	2250	2275
	E	9.43	11.11	7.35	8.47	9.67	8.90	*	8.40	8.31	9.32
July	W	1453	1527	1187	1150	1110	1909	1934	2130	1976	2092
	E	11.67	10.67	10.89	9.46	11.16	11.51	11.44	10.64	11.76	9.74
August	W	1405	1501	1226	1201	694	1918	1476	2687	1859	2005
	E	9.83	10.48	8.26	6.99	9.07	9.25	9.09	11.45	11.87	10.56
September	W	1337	1163	1217	1024	645	1593	1853	1749	1855	2488
	E	5.90	6.70	6.90	5.18	5.46	5.23	8.82	5.59	7.77	6.68
October	W	1243	1250	1380	1026	796	1601	2468	1998	1907	2244
	E	2.54	2.72	2.58	2.49	2.54	3.94	4.04	3.80	3.31	4.05
Total	W	11992	11694	8864	10859	5843	13494	14543	16218	16004	17900
	E	54.76	55.48	42.97	47.05	43.01	50.47	39.59	53.34	57.61	56.39

*Evaporation pan being repaired

[1] W = wind, E = Evaporation

TABLE 4. Dates of latest frosts in the spring and the earliest frosts in the fall at the Malheur Experiment Station, Ontario, Oregon, 1953-82

	Latest Frost in Spring		First Frost in Fall		
Year	Date	Temp-°F	Date	Temp-°F	Frost-Free Period
1953	Apr 29	29	Oct 3	28	156 days
1954	May 2	29	Sept 30	27	150
1955	Apr 27	26	Sept 27	29	152
1956	Apr 30	31	Sept 23	31	145
1957	Apr 27	32	Oct 18	29	173
1958	Apr 27	31	Oct 21	25	176
1959	May 3	30	Oct 26	28	175
1960	May 22	27	Oct 13	27	143
1961	May 5	31	Sept 22	30	139
1962	Apr 30	26	Oct 18	30	170
1963	Apr 21	28	Oct 26	27	187
1964	May 4	28	Oct 4	32	152
1965	May 5	30	Sept 17	30	134
1966	May 23	31	Oct 10	29	139
1967	May 11	32	Oct 16	31	158
1968	May 6	30	Oct 3	31	149
1969	Apr 30	28	Oct 5	30	157
1970	May 11	27	Sept 25	30	136
1971	Apr 8	28	Sept 18	30	162
1972	May 1	30	Sept 26	30	146
1973	May 11	31	Oct 3	31	144
1974	May 18	30	Oct 6	27	140
1975	May 25	27	Oct 24	23	151
1976	Apr 29*	33	Oct 5	32	158
1977	Apr 20	29	Oct 8	29	170
1978	Apr 23	31	Oct 14	30	173
1979	Apr 19	32	Oct 28	32	191
1980	Apr 13	32	Oct 17	28	186
1981	Apr 14	27	Oct 4	30	172
1982	May 5	30	Oct 5	32	152
30 YR AVG		29		29	158

*In 1976 on June 26, there was a severe killing frost in other areas around the valley giving a growing season of only 100 days.

TABLE 5. Summary of weather recorded at the Malheur Experiment Station, Ontario, Oregon, 1978-1982

Event	1978	1979	1980	1981	1982
Total Precipitation (inches)	11.48	12.06	12.26	15.58	13.79
Total Snowfall (inches)	9.50	31.00	12.50	14.50	32.70
First Snow in Fall	Nov 16	Nov 16	Nov 23	Nov 27	Nov 9
Coldest Day of the Year	Dec 30 -7°F	Jan 31 -24°F	Jan 30 & 31 -5°F	Dec 31 0°F	Jan 8 -14°F
Hottest Day of the Year	Aug 8 & 9 102°F	July 19 104°F	July 23 102°F	Aug 8 & 12 101°F	July 31 Aug 7,8, & 23 99°F
Days 0°F or Below	2	15	4	1	18
Days 32°F or Below	124	147	108	130	161
Days 100°F or Above	7	3	2	5	0
Days 90°F or Above	27	43	29	51	41
Last Killing Frost in Spring	Apr 23 31°F	Apr 19 32°F	Apr 13 32°F	Apr 14 27°F	May 5 30°F
First Killing Frost in Fall	Oct 14 31°F	Oct 28 32°F	Oct 17 28°F	Oct 4 30°F	Oct 5 32°F
Days Frost-Free Growing Season	173	191	186	172	152
Number of Clear Days	114	112	103	125	134
Number of Partly Cloudy Days	192	177	128	168	182
Number of Cloudy Days	59	76	135	71	49
Greatest Amount of Snow on Ground at One Time (date &in.)	3" Feb 15	26" Jan 22	3" Jan 27	8" Dec 30	18" Jan 1 & 3
Dates of Severe Wind Storms	May 11 May 12	Oct 19	Aug 3 Aug 15	None	None

TABLE 6. Maximum, minimum, and mean soil temperature at the 4-inch depth (in degrees F) for 1982, and the 16-year mean soil temperature. Malheur Experiment Station, Ontario, Oregon

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Maximum	34	35	49	58	71	80	85	88	72	61	39	36
Minimum	34	33	39	44	56	66	70	73	63	51	37	35
1982 Mean	34	34	44	51	64	73	77	81	67	56	38	35
16-yr Mean	32	36	45	54	67	75	83	81	70	55	41	34

TABLE 7. Summary of air and soil temperatures and precipitation for 1982, and the average of the last 10 years. Malheur Experiment Station, Ontario, Oregon

	Mean Air Temp.		Mean Soil Temp.		Precipitation	
Months	82	10 yr	82	10 yr	82	10 yr
Jan	21.2	25.2	34.0	32.6	1.78	1.38
Feb	25.7	33.8	33.9	35.5	1.83	1.21
Mar	42.0	42.9	44.1	45.2	0.68	0.96
Apr	46.4	50.5	51.0	54.7	0.53	0.88
May	57.1	58.5	63.7	65.9	0.40	0.74
June	67.0	67.6	72.7	74.7	0.83	0.75
July	71.2	74.5	77.4	82.5	0.76	0.40
Aug	73.7	72.0	80.7	79.9	0.44	0.54
Sept	60.8	63.2	67.4	70.2	0.54	0.65
Oct	49.5	51.3	55.8	55.6	2.06	0.72
Nov	34.6	37.4	38.1	40.5	0.91	1.22
Dec	31.4	30.4	35.4	34.0	3.08	1.67
				TOTAL	13.84	11.12

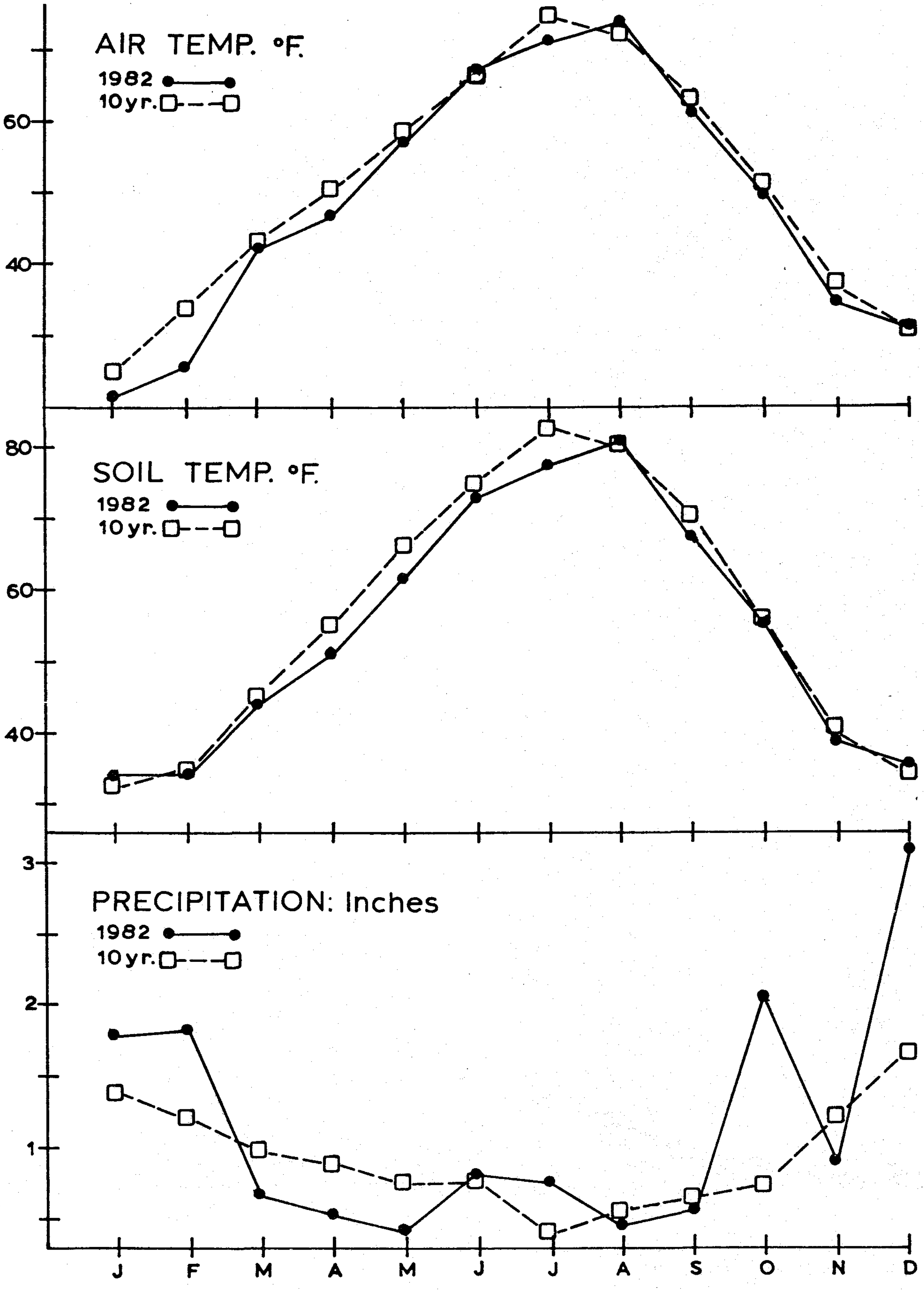

FIGURE 1. Summary of air and soil temperatures and precipitation for 1982 compared with 10-year averages

ALFALFA VARIETY TRIAL

Malheur Experiment Station - Ontario, Oregon - 1982

The alfalfa variety trial which was established at the Malheur Experiment Station in 1981 was terminated after the first cutting in 1982. The small plot size created difficulties in harvesting methods that would insure reliable data. The results of the 1981 cutting are given in Table 1.

A new alfalfa variety trial was established in the fall of 1982. The west end of field C-3 was prepared for the trial. The prior crop was the 1982 spring grain nursery. After irrigation and discing to prevent volunteer grain, 500 units/acre of P_2O_5 and 60 units/acre of nitrogen were broadcast and plowed down. The seedbed was prepared, and the plots were hand-seeded on September 14, 1982.

Twenty-one private and nine public varieties are in the new trial. Plot size is five feet wide and twenty feet long. All varieties are replicated four times in a completely randomized design.

Table 2 lists the varieties in the new alfalfa trial, and, when information is available, their disease and insect resistances are also listed.

TABLE 1. Alfalfa variety trial yield data (harvested on May 24, 1982). Malheur Experiment Station, Ontario, Oregon, 1982

Variety	Tons/Acre at 12 % Moisture	% Dry Matter	Yield as % of Lahontan
Lahontan	2.5	21.3	100
Washoe	2.3	18.8	92
Saranac	2.7	18.3	108
Agate	2.6	20.0	104
Riley	2.8	19.5	112
Oneida	3.0	21.3	120
Multileaf	2.6	21.8	104
Perry	2.8	20.0	112
Baker	2.5	18.5	100
Deseret	2.7	21.0	108
Apollo II	2.5	18.5	100
Armor	2.7	20.8	108
NAPB 107	2.9	19.0	116
Vangard	2.7	18.8	108
Magnum	2.9	19.0	116
NK 80335	2.4	17.5	96
NK 80334	2.8	19.8	112
Trumpetor	2.6	18.8	104
Vancor	2.7	18.0	108
Pioneer 532	2.6	19.0	104
Pioneer 524	2.8	19.8	112
Pioneer 545	2.7	19.3	108
WL 309	2.8	21.3	112
WL 312	2.5	18.3	100
WL 314	2.8	19.3	112
Pacer	2.6	19.0	104
Funks G2815	2.7	18.5	108
Gladiator	2.8	19.8	112
F.M. AS49R	2.5	21.0	100
F.M. AS67	3.1	23.3	124
Futura	2.5	19.3	100
Atra 55	2.9	20.5	116
Blazer	2.6	19.0	104
Farm Seed Res. H117	2.6	18.5	104
Farm Seed Res. H103	2.4	20.3	96
Seagull	2.6	18.5	104
Trout	2.6	20.5	104
Dekalb 120	2.8	18.3	112
Dekalb 130	2.7	19.3	108
Classic	2.3	18.5	80
Hi-phy	2.7	20.5	108
Ramsey RS209	2.5	19.0	100
Average =	2.7	19.6	108
LSD (.05) =	0.4	3.4	16
CV (%) =	12.0%	12.6%	

TABLE 2. Alfalfa variety trial at the Malheur Experiment Station, Ontario, Oregon, 1982

Seed Source	Variety	Release Year	WH	BW	FW	VW	PRR	AN	SBS	CLS	LLS	DM	AW	PA	SAA	LH	RKN	SN
PUBLIC																		
NV/ USDA	Lahontan	54	MH	MR		S	LR					S	S	LR	R	S	S	R
MN/USDA	Agate	72	H	HR	HR		R	LR	LR	R	LR			LR	R			
NE/USDA	Baker	77	H	R	R	S	S	LR		MR		LR	MR	R	R	R		
NE/USDA	Perry		H	R		S		LR				MR		R	R	LR		
KS/USDA	Riley	78	H	HR	R		S	R				MR	S	HR	HR	R		
NE/USDA	*NS 79 P2 Syn2		H			S												
NE/USDA	*NS 82 P2 Syn2		H															
WA/USDA	Vernema		H	MR		MR	LR	LR							MR			R
WA/USDA	W-37		MH			R												
PRIVATE																		
NAPB	Apollo II	82	MH	R	HR	R	R	MR						MR		MR		MR
NAPB	Armor	81	H	R	R	S	R	MR						MR		MR		
Ferry Morse	H 103		H	R	MR		MR	MR						MR	MR			MR[1]
Ferry Morse	IH 101	82	MR	R	MR	MR	R	R		MR		MR		MR	MR	MR	MR	MR
Waterman Loomis	WL 316	81	MH	MR	R	R	LR	R						R	R			LR[2]
Waterman Loomis	WL 314	81	MH	MR	R	LR	LR	LR						HR	R			HR[3]
Waterman Loomis	WL 312	78	MH	HR	MR	LR	MR	MR						HR	HR			MR[4]
Green Thumb	Seagull		MH	R	MR	S	R	MR	LR	MR	MR	MR	LR	R	R	S	S	MR
Pioneer	532	79	H	HR	MR		LR	MR		MR		MR		LR	R		LR	
Pioneer	526	81	VH	R			LR	LR		MR		MR		LR	R	LR		
Pioneer	545	77	H	R	R		R			MR		MR			R	LR	LR	MR
Dekalb/Ramsey	RS 209																	
Dekalb/Ramsey	Dekalb 120		H	R			LR	R										
ID-OR Seed Grw.	IOSG 8010																	
ID-OR Seed Grw.	IOSG 8020																	
Shield Seed Co.	Emeraude	62	MH									MR	S	MR				
FFR Coop.	Classic	76	H	R			LR	LR							S	LR		
FFR Coop.	Hi-phy	76	H	HR	HR		MR	S							LR	LR		
Northrup-King	Vancor	80	H	R	MR	S	R	R				MR	MR	MR	S			R
Northrup-King	Trumpetor	81	MH	MR	R	MR		R		MR	MR	MR		R				MR
Greenway Seed	Greenway 360	81		R	MR	LR	R	R		MR			LR	MR	MR			LR

*Experimental- no information released

[1] 1-2 years from release, [2] Blue alfalfa aphid = MR, [3] Blue alfalfa aphid = MR, [4] Blue alfalfa aphid = LR

WH = Winter Hardiness, BW = Bacterial Wilt, FW = Fusarium Wilt, VW = Verticillium Wilt, PRR = Phytophthora Root Rot, AH = Anthracnose, SBS = Spring Black Stem, CLS = Common Leaf Spot, LLS = Lepto Leaf Spot, DM = Downy Mildew, AW=Alfalfa Weevil, PA = Pea Aphid, SAA = Spotted Alfalfa Aphid, LH = Leaf Hopper, RKN = Root Knot Nematode, Sn = Stem Nematode.

VH = Very Hardy, H = Hardy, MH = Moderately Hardy, MNH = Moderately Non-Hardy

Disease and Insect Resistance: 51% = HR(Highly Resistant), 31-50% = R(Resistant), 15-30% = MR(Moderately Resistant)
6-14% = LR(Low Resistance), 5% = S(Susceptible)

1982 HYBRID CORN PERFORMANCE TRIALS

Malheur Experiment Station - Ontario, Oregon - 1982

Silage and grain corn varietal trials were conducted at the Malheur Experiment Station during the 1982 growing season. Entry in the trials was on a fee basis.

Procedures

The trial was conducted in the north half of field C-1 at the Malheur Experiment Station. The prior year's crop was winter barley, harvested on July 15, 1981. Following harvest, the field was twice irrigated and disced to control volunteer barley. On October 9, 1982, ninety units of P_2O_5 were plowed into the soil. On November 2, the south side (5 acres) of C-1 was planted in winter wheat. This included the area in which the grain corn trial was later planted, and it received an application of 170 units of nitrogen on March 17, 1982. During the week of April 19, the trial area was broadcast sprayed with 5 qts/acre of Eradicane for weed control and incorporated with the seedbed preparation. The trials were planted on April 23 using a John Deere flexi planter with Almaco cone seeders to plant test plots of four 30-inch rows that were 25 feet long. A one-plot border was also planted around the perimeter of both the silage and grain trials. The trial was corrugated at planting and irrigated three days after planting to insure proper germination. After germination, when the corn had 2-3 leaves, the test plots were hand-thinned to the desired plant populations, and a three-foot alleyway, perpendicular to the rows, was made between all plots.

To insure a high level of mite control, something which had been a problem in past years, aldacarb, an insecticide not registered for corn, was sidedressed on the corn at the rate of 3 lbs ai/ac.

255 units of nitrogen per acre were sidedressed on the corn in two applications during cultivation.

The trials were furrow-irrigated throughout the growing season to meet evaporative demand.

Weather Summary

Table 1 is included in this report to provide a brief summary of weather conditions during the corn growing period. The temperature and rainfall data in this table are recorded from an N.O.A.A. weather station at the Malheur Experiment Station. The average monthly temperatures were below the 30-year average except August, and precipitation was almost equal to the 30-year average during the growing season. The column headed "degree days" is a record of accumulated heat units calculated from daily temperatures. The formula is the daily maximum temperature, less than or equal to 86°F, plus the daily minimum temperature, greater than or equal to 50°F, divide by 2, and subtract 50. The daily amounts are accumulated and reported by month in Table 1, and the totals from planting date to grain harvest are also recorded.

Well after silking and fertilization were completed, the corn trials twice sustained damage from hail, and the upper leaves of the plants were shredded.

TABLE 1. Weather summary at the Malheur Experiment Station during the 1982 hybrid corn trials

Month	Average Temp.	Deviation from 30-yr avg	Degree* Days	Precip-tation	Deviation from 30-yr avg
	°F	°F		inches	inches
April 23-	54.4	--	77.5	trace	--
May	57.1	-1.9	323.5	0.40	-0.59
June	67.0	-0.4	515.0	0.83	+0.02
July	71.2	-3.8	602.0	0.76	+0.59
August	73.7	+1.5	651.5	0.44	-0.02
September	60.8	-2.2	380.0	0.54	-0.02
-October 26	50.8	--	196.5	0.38	--
TOTAL			2746.0**	3.35	-0.02

*Degree days equal daily maximum temperature (≤86°F) + daily minimum temperature (≥50°F) ÷ 2 - 50.

**Degree day total for silage corn (4/23 - 9/9) = 2329.5 $AccDD_{50}$.

Silage Trial

Twenty-one hybrid silage corn varieties from nine companies were tested in 1982. The hybrids were replicated six times in a randomized design.

The results of the silage trial are presented in Table 2. The yields were excellent, and individual hybrids should be considered in relation to the performance of other hybrids. The least significant difference between hybrids is 3.5 T/A, with multi-year averages a more reliable indicator of yield potential.

The trial was harvested with a two-row forage chopper which cut the two center rows from each plot into a specialized wagon which weighed each plot for yield. A sample was taken from each plot and oven-dried to determine the percentage of moisture for each plot. The average for each hybrid is reported in Table 2. Silking dates were noted when 50 percent of the plants in a plot had visible silk. Table 2 also reports the number of years each hybrid has been tested at the Malheur Experiment Station,and the multi-year yield average, if any, is also listed.

Grain Trial

The 1982 hybrid grain corn trial included 48 hybrids submitted by twelve companies. Each hybrid was replicated four times in a completely randomized design.

The trial was harvested with a one-row, pull-type corn picker, and the two center rows of each plot were picked and weighed individually. A five-ear sample was taken from each harvested row and used for the determination of percent moisture, test weight, shelling percentage, and average ear weight.

The results of this trial are reported in Tables 3 and 4. The yields are reported in tons per acre (T/A) and bushels per acre (bu/ac) of shelled corn adjusted to 15.5 percent moisture. Hybrid yields should be considered in comparison to each other with a significant difference between yields of 0.6 T/A or 23 bu/ac.

The percentage of moisture at harvest was determined by testing five random samples of shelled grain for each hybrid in a John Deere electronic moisture tester. The average for each hybrid is reported in Table 3.

Hybrid yields are ranked by tons per acre, from highest to lowest, in Table 3. Moisture percentages (lowest to highest) are also ranked.

Table 3 also lists the number of years each hybrid has been tested at the Malheur Experiment Station and the multi-year average yield.

Table 4 continues reporting grain hybrid results. Plant populations are also listed. Test weights are listed as an average of two samples weighed in an Ohaus scale. Shelling percentages were determined by shelling the five-ears-per-row sample taken from the harvested corn. Average ear weight was also computed from these samples. It has been noted that the average ear weight, multiplied by the plant population, does not equal reported yields. This is probably caused in part by five ears' being to small a sample for weight determination, and possibly the amount of moisture in the cob being different than grain moisture. Silking dates were noted when 50 percent of the plants in a plot were showing silks. The black layer maturity (BLM) date was determined by checking ears in the outside plot rows. The date noted was when 50 percent of the ears' center kernels had developed a black layer.

Lodging of plants was only minor in this year's trial. The percentages which are reported are an average of all replications for each variety.

TABLE 2. Summary information for hybrid corn silage trial at the Malheur Experiment Station, Ontario, Oregon, 1982

Company or Brand	Hybrid	Silage* Yield T/A	% Moisture at Harvest %	Plants/ Acre (thousands)	Silking Date	Years Tested	Avg * Yield T/A
Jacques	JX180	38.8	75	26	7/29	1	--
Jacques	JX247	42.2	76	26	8/2	1	--
Pfizer	TXS 115A	43.8	74	32	7/29	2	44.7
Crookham	SS 605	41.0	76	26	7/28	2	41.7
Crookham	SS 70	41.4	74	26	7/31	4	39.0
Crookham	CX 01061	34.1	71	26	7/26	1	--
Crookham	CX 01064	33.9	70	26	7/26	1	--
PAG	SX 333	44.0	74	28	7/31	3	39.1
PAG	SX 351	43.2	73	28	7/30	2	41.0
PAG	SX 379	39.8	76	28	8/1	1	--
Funks	G-4507	41.4	75	26	8/2	4	40.0
Funks	G-4657	41.0	76	26	8/1	2	41.9
Funks	G-4673A	45.7	74	26	8/2	3	39.2
Northrup-King	PX 72	43.4	74	26	8/1	2	43.8
Northrup-King	PX 9573	43.0	74	26	7/31	2	42.0
Northrup-King	PX 74	42.2	74	26	7/29	3	38.1
Dairyland	DX 1017	42.0	72	26	7/30	1	--
Dairyland	DX 1012	37.4	72	26	7/29	1	--
Dekalb	XL 72AA	39.6	74	26	7/30	1	--
Dekalb	XL 74A	39.4	70	26	7/31	1	--
Stauffer	S 7795	42.6	74	26	7/30	3	40.3
	Avg =	40.3	74				
	CV (%) =	7.7	3.3				
	LSD (.05) =	3.5	3				

*Adjusted to 70% moisture

TABLE 3 . Summary information for the hybrid grain corn trial at the Malheur Experiment Station, Ontario, Oregon, 1982

Company or Brand	Hybrid	-- YIELD[1] -- Shelled Corn T/A	Bu/A	% Moisture at Harvest	------ RANK --------- Yield[2]	% Moisture[3]	Years Tested	Avg Yield (Bu/A)
Keltgen	KS 92	5.7	202	17.3	12	1	1	---
Keltgen	KS 93	5.0	178	19.5	19	7	1	---
Keltgen	KS 95	5.3	190	19.4	16	6	1	---
Keltgen	KS 101	5.0	177	19.0	19	4	1	---
Keltgen	KS 1020	5.3	190	22.7	16	15	1	---
Keltgen	KS 103	5.0	179	22.6	19	14	1	---
Jacques	JX 180	6.4	230	26.7	6	29	1	---
Jacques	JX 7780	5.2	185	27.1	17	31	1	---
Pfizer	T 950	6.0	213	18.1	9	2	2	223
Pfizer	T 1000	5.9	211	22.7	10	15	2	223
Pfizer	T 1100	5.6	199	26.3	13	27	2	225
Pfizer	TXS 115A	5.9	211	28.0	10	35	2	243
Crookham	SS 70	5.7	203	29.8	12	41	3	216
Crookham	SS 53	5.1	184	20.8	18	8	1	---
Crookham	SS 305	4.8	171	23.8	20	21	2	186
Crookham	CX 01057	5.2	187	22.1	17	12	1	---
Crookham	CX 01035	4.1	146	22.1	21	12	1	---
PAG	SX 181	5.5	197	20.9	14	9	3	197
PAG	SX 239	6.0	213	23.3	9	17	1	---
PAG	SX 275	5.9	211	24.9	10	25	1	---
PAG	SX 329	5.5	198	28.9	14	40	1	---
PAG	SX 351	6.2	225	27.9	8	34	1	---
Funks	G-4323	5.5	196	23.7	14	20	2	218
Funks	G-4342	5.7	205	23.5	12	18	1	---
Northrup-King	PX 9527	5.4	192	23.0	15	16	1	---
Northrup-King	PX 72	6.6	237	27.8	5	33	2	260
Northrup-King	PX 9573	6.2	221	28.8	8	39	1	---
Northrup-King	PX 74	6.3	224	24.9	7	25	3	231
Dairyland	DX 1008	6.2	222	24.9	8	25	1	---
Dairyland	DX 1007	5.6	201	21.0	13	10	1	---
Dairyland	DX 1096	5.5	197	18.3	14	3	1	---
Dairyland	DX 1094	5.6	199	19.1	13	5	1	---
Dekalb	XL 71	6.8	242	28.3	3	36	1	---
Dekalb	XL 72AA	5.6	200	26.6	13	28	1	---
Dekalb	XL 73	7.2	256	25.8	2	26	1	---
Dekalb	XL 74B	7.4	266	28.6	1	38	1	---
Stauffer	S 5340	6.2	220	21.8	8	11	1	---
Stauffer	S 6389	5.5	198	22.5	14	13	4	204
Stauffer	S 6450	6.4	227	23.6	6	19	1	---
Stauffer	S 6596	5.3	190	26.8	16	30	1	---
Stauffer	S 7767	6.2	220	28.6	8	38	2	248
Ferry Morse	GT 2006	5.6	201	24.7	13	24	3	197
Ferry Morse	GT 2080	5.1	182	24.3	18	22	4	193
Ferry Morse	GT 3006	5.7	202	24.3	12	22	1	---
Ferry Morse	GT 3020	5.8	206	28.4	11	37	1	---
Paymaster	2990	5.8	207	24.9	11	25	2	221
Paymaster	4790	6.0	213	24.5	9	23	1	---
Paymaster	8201	5.9	212	27.4	10	32	1	---
	AVG	5.7	205	24.1				
	LSD (.05)	0.6	23					
	CV (%)	7.9%	7.9%					

[1] Adjusted to 15.5% moisture

[2] Hybrids with yield differences less than or equal to 0.1 T/A were ranked equal

[3] Lowest moisture is ranked 1

TABLE 4. Summary information for the hybrid grain corn trial at the Malheur Experiment Station, Ontario, Oregon, 1982

Company	Hybrid	Popu-lation	Test[1] Weight	Shelling	Avg Ear[1] Weight	Silking Date	BLM[2] Date	Lodging
		1000/ac	lbs/bu	%	lbs			%
Keltgen	KS 92	26	63.9	84	0.53	7/20	9/18	0
Keltgen	KS 93	26	62.2	84	0.48	7/22	9/20	0
Keltgen	KS 95	26	60.4	84	0.48	7/23	9/29	0
Keltgen	KS 101	26	61.5	85	0.49	7/23	9/24	0
Keltgen	KS 1020	26	59.7	84	0.51	7/26	9/29	0
Keltgen	KS 103	26	59.4	84	0.57	7/25	10/02	0
Jacques	JX 180	26	55.2	85	0.63	7/29	10/14	0
Jacques	JX 7780	26	57.1	83	0.61	7/28	10/13	3
Pfizer	T 950	28	61.1	84	0.48	7/25	9/24	1
Pfizer	T 1000	28	59.9	82	0.53	7/26	10/05	0
Pfizer	T 1100	28	57.7	84	0.54	7/28	9/17	0
Pfizer	TXS 115A	28	55.5	83	0.62	7/29	10/16	0
Crookham	SS 70	26	57.3	84	0.60	7/29	9/17	3
Crookham	SS 53	26	61.2	84	0.50	7/26	10/02	3
Crookham	SS 305	26	60.8	87	0.56	7/23	10/02	1
Crookham	CX 01057	26	59.0	82	0.52	7/23	10/05	0
Crookham	CX 01035	26	59.0	82	0.49	7/23	9/27	0
PAG	SX 181	28	64.3	80	0.47	7/25	9/24	0
PAG	SX 239	28	59.2	82	0.53	7/25	10/05	0
PAG	SX 275	28	58.2	85	0.58	7/25	10/13	0
PAG	SX 329	28	61.1	80	0.53	7/30	10/05	0
PAG	SX 351	28	54.6	83	0.64	7/30	10/13	0
Funks	G-4323	26	59.5	84	0.55	7/27	10/09	0
Funks	G-4342	26	60.4	81	0.61	7/25	9/27	1
Northrup-King	PX 9527	26	58.4	83	0.60	7/28	10/20	0
Northrup-King	PX 72	26	55.0	82	0.69	7/29	10/02	1
Northrup-King	PX 9573	26	56.8	83	0.64	7/29	10/18	3
Northrup-King	PX 74	26	57.8	85	0.61	7/29	9/17	0
Dairyland	DX 1008	26	59.1	82	0.55	7/28	10/06	0
Dairyland	DX 1007	26	60.4	84	0.59	7/27	9/30	0
Dairyland	DX 1096	26	60.6	84	0.58	7/22	9/24	1
Dairyland	DX 1094	26	62.4	85	0.52	7/22	9/27	0
Dekalb	XL 71	26	57.1	83	0.63	7/30	10/25	0
Dekalb	XL 72AA	26	55.7	84	0.51	7/30	10/21	0
Dekalb	XL 73	26	59.5	81	0.63	7/31	10/25	0
Dekalb	XL 74B	26	54.3	78	0.71	7/30	10/25	1
Stauffer	S 5340	26	59.9	85	0.57	7/25	9/29	0
Stauffer	S 6389	26	57.3	84	0.54	7/25	10/02	0
Stauffer	S 6450	26	61.7	82	0.63	7/28	10/13	0
Stauffer	S 6596	26	58.1	83	0.55	7/29	10/16	0
Stauffer	S 7767	26	55.0	84	0.62	7/31	10/18	0
Ferry Morse	GT 2006	32	59.8	82	0.50	7/25	9/29	0
Ferry Morse	GT 2080	28	57.5	84	0.58	7/29	10/02	0
Ferry Morse	GT 3006	32	59.0	83	0.55	7/29	10/20	0
Ferry Morse	GT 3020	28	57.0	84	0.59	7/30	10/12	0
Paymaster	2990	26	59.5	82	0.53	7/26	10/05	0
Paymaster	4790	26	58.6	84	0.56	7/26	10/13	1
Paymaster	8201	26	56.6	85	0.56	7/31	10/11	0

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[1] Adjusted to 15.5% moisture

[2] BLM = Black layer maturity

THE TOLERANCE OF GOLDEN JUBILEE VARIETY SWEET CORN TO HERBICIDES APPLIED PREPLANT

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

Eradicane, Surpass, and Ro-Neet were evaluated for weed control and crop safety when applied in combination with chemicals added to extend the active life of these herbicides in the soil. Other herbicides which were evaluated in the trial included Lasso, Dual, and PPG-844.

Procedure

On May 13, 1982, the herbicides were applied as double-overlap broadcast treatments to the surface of a silt loam textured soil. Immediately after the herbicides were applied, the soil was worked with a triple K cultivator to incorporate the herbicides. The straight-shank tilling tools were operated at a depth of approximately six inches; the tractor was run at a speed of approximately five miles per hour. The soil was tilled twice, making the first pass lengthwise in the plots and a second pass in the opposite direction. A spike-tooth harrow was used, trailing the triple K, to level and firm the surface of the soil in preparation for planting.

Golden Jubilee variety of sweet corn was planted and furrow-irrigated on April 14. The distance between rows was 30 inches, and each plot was 4 rows wide and 25 feet long. Each treatment was replicated three times in a randomized block experimental design.

The treatments were evaluated for crop tolerance and weed control on June 22. After the evaluations were taken, the crop was hand-thinned, leaving one plant every ten inches. Weeds were also removed, and the plots were cultivated to accommodate furrow irrigation for the remainder of the growing season.

The ears were harvested on August 16 and 17 to determine yields. Samples of both ears and stalks were taken at harvest time from the check plots and the plots which were treated with Eradicane + SC-7432 (4 lbs ai/ac) for residue analysis. After collection, the samples for residue analysis were frozen and kept until February 3 when Dan Toya picked them up.

Results

High populations of weeds, including redroot pigweed, common lambsquarters, and barnyard grass, existed in the trial area. Most of the herbicides gave good weed control: weed control in the Lasso and Dual treatments was excellent and consistent in each replication, and Surpass gave excellent weed control. Four pounds of Eradicane was needed to give satisfactory weed control, and for some reason, Ro-Neet did not control the weeds as expected. However, weed control was improved when an extender was added with Ro-Neet. This effect has not been noted in other trials. When added with Eradicane, there were no differences noted between the two extenders, R-33865 and SC-7432. There was also no improvement in weed control noted when R-33865 was added with Surpass. Surpass treatments were good with and without R-33865.

Most of the treatments resulted in increased yield of ears compared to the check plots' yield. The corn was hand-weeded several times during the growing season, and the reduced yields in the check and Ro-Neet plots probably were caused by injuries from the weeding hoes when the dense stands of weeds were removed from around the individual corn plants. Herbicide injury symptoms did not appear on the corn which had been treated with Ro-Neet or any of the other herbicides.

TABLE 1. Percent weed control, crop tolerance, and measured yield data from sweet corn herbicide trials. Malheur Experiment Station, Ontario, Oregon, 1982

Herbicides	Rate lbs ai/ac	Crop Injury	Percent Weed Control			
			Pigweed %	Lambs-quarters %	Barnyard Grass %	Yield of Fresh Corn on Ear T/ac
Eradicane	3	0	87	92	97	9.04
Eradicane	4	0	92	97	98	9.80
Eradicane + R-33865	3	0	88	91	96	9.84
Eradicane + R-33865	4	0	94	95	98	9.86
Eradicane + SC-7432	3	0	87	88	96	9.18
Eradicane + SC-7432	4	0	98	97	98	10.33
Surpass	4	0	97	97	98	10.75
Surpass + R-33865	4	0	98	98	99	10.27
Ro-Neet	4	0	87	83	95	8.81
Ro-Neet + Extender	4	0	93	91	97	10.07
Dual	3	0	98	97	99	9.68
Lasso	3	0	99	98	99	9.86
Control	-	0	0	0	0	8.29
LSD (.05)	-	-	-	-	-	1.02
CV (%)	-	-	-	-	-	6.26

Weed control and crop tolerance ratings: 0 = no effect, 100 = plants eliminated

Application information: (1) double-overlap broadcast, (2) 8003 teejet nozzles, (3) 40 psi spray pressure, (4) 42 gallons of water per acre.

PREEMERGENCE AND POSTEMERGENCE APPLICATIONS OF HERBICIDES FOR WEED CONTROL IN SWEET CORN

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

PPG-844 was applied to the surface of the soil for preemergence weed control. Bromoxynil (Buctril) was applied to corn when it was 6-8 inches tall. Both herbicides were evaluated for weed control and crop tolerance.

Procedure

PPG-844 was applied at rates of 0.25 and 0.40. In addition to these treatments, PPG-844 was applied as a tank-mix combination with Lasso. These herbicides were applied to the surface of the soil after the corn was planted, but before weeds and corn emerged, and then incorporated very shallowly with a spring-tine harrow. The plots were furrow-irrigated the same day the herbicides were applied.

Buctril was applied on June 14, 1982. The Golden Jubilee variety of sweet corn was 6-8 inches tall, while broadleaf weeds, including redroot pigweed, common lambsquarters, and hairy nightshade, were 2-4 inches tall. On the day the herbicide treatments were applied, air temperatures ranged from a low of 60^oF to a high of 80^oF. The following were the daily temperatures for seven consecutive days after the treatments were applied: 83, 89, 92, 91, 89, 93, and 93^oF. The skies remained clear during that week.

The PPG-844 treatments were applied with a bicycle-wheel plot sprayer which was equipped with 8003 teejet nozzles spaced on the spray boom to accommodate double-overlap broadcast applications. As the herbicide carrier, water was applied at a volume of 42 gallons per acre.

Buctril was applied with a CO_2 backpack sprayer. A single nozzle boom was used, and the spray nozzle was held over the center of the corn row when being sprayed. The nozzle was a teejet fan (size 8004), spray pressure was 35 psi, and a water volume of 32 gallons per acre was applied as the herbicide carrier. The corn plants and weeds were healthy and growing rapidly before and simultaneously with the application of the herbicide treatments.

Results

The effects of these treatments were evaluated on June 22. The numerical summary of the results is recorded on the following table (Table 1).

Buctril caused some burning to upper portions of the leaves on the corn plants. The degree of injury to the leaves increased with the herbicide rate. In addition to the described leaf burn, Buctril at the highest rate (1/2 lb ai/ac), caused the entire leaf below the burned section to turn yellow. Although these symptoms were severe on the leaves exposed to Buctril, its effects did not persist, and harvest yields were not significantly different from those of the control plot. Corn plants were very tolerant to PPG-844, and no visible or measured effects were noted.

Barnyard grass was not controlled with these treatments. PPG-844 was most effective on pigweed and hairy nightshade, controlling about 96 percent of these species at the 1/4 lb ai/ac rate. The 1/4 lb ai/ac rate was about as effective on these weed species as the .4 lb ai/ac rate. However, the PPG-844 treatments did not show herbicidal activity on lambsquarters. Buctril was effective on each of the broadleaf weed species at rates of 3/8 and 1/2 lb ai/ac. Weed control could have been improved by earlier applications of Buctril to smaller weeds such as redroot pigweed which was too large when Buctril was applied to obtain the highest percentage of weed control.

Although the herbicide symptoms on the leaves were not measured to have had a detrimental effect on the corn by harvest time, it is questionable whether growers would accept these symptoms without concern for their crop. Therefore, it is advisable that Buctril not be used on the Golden Jubilee variety of sweet corn. Further research is needed to establish its degree of tolerance in different varieties of corn.

TABLE 1. Crop tolerance and percent weed control obtained from PPG-844 applied preemergence and Buctril applied postemergence to Golden Jubilee variety sweet corn. Malheur Experiment Station, Ontario, Oregon, 1982

			- - - - - - - - - - Percent Weed Control	- - - - - - - - - -	- - - - - - - - - -	- - - - - - - - - -
Herbicides	Rate lbs ai/ac	Crop Injury	Redroot Pigweed %	Lambs-quarters %	Hairy Nightshade %	Yield of Fresh Corn on Ear T/ac
PPG-844	0.25	0	96	0	90	8.0
PPG-844	0.40	0	99	0	94	8.8
PPG + Lasso	0.25 + 3	0	100	45	92	8.3
Buctril	1/4	5	28	75	84	7.9
Buctril	3/8	12	53	90	93	7.8
Buctril	1/2	23	65	93	96	7.4
Control	--	0	0	0	0	7.1
	LSD (.05)	-	-	-	-	NS
	CV (%)	-	-	-	-	9.8

Weed control ratings: 0 = no effect, 100 = all plants eliminated.

Crop injury ratings: 0-50 indicates increasing injury to foliage, 50-100 indicates severe foliar injury with increasing losses of stand.

FALL-APPLIED HERBICIDES FOR ANNUAL WEED CONTROL IN FURROW-IRRIGATED PEPPERMINT AND SPEARMINT

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

Studies evaluating fall-applied herbicides were initiated to identify herbicides which are superior in weed control, crop selectivity, and less likely to persist in the soil and cause injury to crops following mint in rotation. To be considered most effective as fall-applied materials, herbicides must have the following characteristics: (1) stability on the soil surface until activated by water from rain or snow, (2) persistence in the soil over winter, (3) compatibility with other herbicides as tank mixes to control a wide spectrum of winter and summer species of annual broadleaf and grassy weeds, and (4) soil persistence long enough to control weeds during the growing season without persisting to cause injury to crops following mint in rotation.

Procedure

Herbicides which were evaluated for the first time in mint included Prowl (pendimethalin) and Dual (metolachlor). These are soil-active herbicides which are effective on broadleaf and grassy weeds. Other herbicides which were evaluated singly and as tank-mix combinations included Goal (oxyfluorfen), Devrinol (napropamide), Velpar (hexazinone), Surflan (oryzalin), Hoelon (diclofop), and Sinbar (terbacil). With the exception of Hoelon in peppermint, all the herbicides were applied to the soil surface of Scotch spearmint and Todds Mitchum peppermint plantings which had been plowed, disced, harrowed, and corrugated before herbicide application which was on December 3 and 4. Hoelon was applied to the peppermint trial as a postemergence treatment on June 1. Corrugations accommodated irrigation during the following summer's growing season. The plot area received no tillage after the herbicides were applied.

Individual plots were 9 x 25 feet, and each treatment was replicated three times in a randomized, block-experimental design. Herbicides were sprayed with a single bicycle-wheel plot sprayer which was equipped with an 8.5-foot boom and 8003 teejet nozzles. Nozzles on the boom were spaced 10 inches apart for application of spray materials as double-overlap broadcast treatments. Spraying pressure was 40 psi, and water, as the herbicide carrier, was sprayed at a volume of 42 gallons per acre.

The treatments were evaluated on June 3 and again on July 19 before harvest.

Results

The percent weed control and crop tolerance data demonstrated that Goal treatments were much more effective in spearmint than in peppermint. This was attributable to the earlier growth response of spearmint which allowed it to compete effectively with the weeds and thus control them. Very cool spring temperatures delayed peppermint growth.

Goal was most effective for controlling blue and tansy mustards. These weed species are winter annuals and are susceptible to Goal, especially early in the growing season before herbicide dissipation. Goal was less effective than other herbicides for controlling pigweed, lambsquarters, kochia, and barnyard grass. Goal did not control marestail. Surflan in combination with Goal resulted in good weed control, but the amount of mint injury was considered to be intolerable. In combination with Goal, Hoelon did not persist to give adequate control of barnyard grass when fall-applied. Hoelon applied as a postemergence treatment late in May or early June was a very effective herbicide for controlling foxtail (green and yellow) and barnyard grass.

The Sinbar/Devrinol combination once again gave excellent weed control with good tolerance to both spearmint and peppermint. Devrinol is not stable on the soil surface for an extended period of time when subjected to sunlight. If rain does not occur within a few days after the application of Devrinol, it should be mechanically incorporated to a shallow depth with a rolling harrow or a similar tool. At less than 2 lbs ai/ac, Sinbar did not control kochia or other summer annual weeds effectively. Sinbar does not control groundsel and blue mustard, but it is effective on other weeds, including most other mustards, prickly lettuce, and marestail. Plots treated with 2 lbs of Sinbar in December and followed in early June with Hoelon (1½ lbs) as a postemergence treatment for annual grass control were essentially weed-free at harvest time. Seedling grass in mint is particularly susceptible to Hoelon, probably because of the high temperatures and humidity in an irrigated mint field. A tank-mix combination of Surflan and Sinbar was effective on all weed species except blue mustard. Surflan did delay mint emergence in the spring, but by harvest time, mint growth was normal compared to other plots.

Prowl is a very promising short-residual herbicide for use in both spearmint and peppermint. It persisted through mint harvest to control summer annual weeds. Both spearmint and peppermint showed good tolerance to Prowl without any signs of growth effects at the high rate of 3 lbs ai/ac. Probably certain species of weeds which are problems in mint would escape Prowl. Therefore, Prowl would need to be used in combination with a herbicide effective on winter-germinating weeds not controlled by Prowl.

Dual, applied to the soil surface as a non-mechanically-incorporated treatment, did not persist to effectively control weeds in either spearmint or peppermint.

TABLE 1. Crop tolerance and percent weed control from herbicide treatments applied in December to plowed Scotch Spearmint. Malheur Experiment Station, Ontario, Oregon, 1982

				PERCENT WEED CONTROL[1]											
Herbicide	Rate lbs ai/ac	Crop Injury		Pigweed		Lambs-quarters		Kochia		Barnyard Grass		Blue Mustard		Tansy Mustard	
		6/9	7/19	6/9	7/19	6/9	7/19	6/9	7/19	6/9	7/19	6/9	7/19	6/9	7/19
				%	%	%	%	%	%	%	%	%	%	%	%
Goal[2]	1	10	0	85	82	75	65	70	60	65	40	90	98	88	98
Goal	1.5	15	0	90	90	85	80	78	70	75	60	95	100	92	98
Goal/Hoelon	1 + 1	12	0	88	85	78	65	73	62	85	75	93	95	85	96
Goal/Hoelon	1 + 1.5	10	0	90	85	76	60	75	70	93	80	95	98	85	95
Goal/Hoelon	1 + 2	10	0	86	85	78	63	73	70	98	90	95	95	88	98
Sinbar/Devrinol	2 + 4	0	0	98	93	100	100	99	95	98	98	0	0	96	98
Sinbar/Hoelon	1 + 1.5	0	0	90	75	98	75	80	70	90	80	0	0	90	80
Sinbar/Hoelon	1.5 + 1.5	0	0	95	85	98	88	90	80	93	85	0	0	94	95
Sinbar/Hoelon	2 + 1.5	0	0	99	99	99	95	99	95	95	88	0	0	98	98
Sinbar/Hoelon	1.5 + 1	0	0	93	88	99	90	90	88	85	83	0	0	95	93
Sinbar/Hoelon	2 + 1	0	0	98	96	98	99	99	95	88	85	0	0	98	98
Sinbar/Surflan	1 + 1.5	20	5	96	100	97	100	98	98	99	100	73	70	99	100
Sinbar/Surflan	1.5 + 1.5	20	8	100	100	100	100	100	100	100	100	75	75	100	100
Goal/Surflan	1 + 1.5	45	20	98	96	98	98	88	82	93	88	98	100	92	90
Prowl	1.5	0	0	94	98	93	95	93	90	96	93	85	80	88	92
Prowl	3	0	0	100	100	100	100	100	100	100	100	95	95	93	98
Velpar	1	0	0	20	0	63	45	20	0	0	0	100	98	98	99
Dual	4	0	0	85	80	80	70	80	75	85	80	25	25	20	25
Control	---	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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[1] Ratings: 0 = no herbicide effect, 100 = plants eliminated

[2] Ag98 was added in all Goal treatments at the rate of 0.5% spray volume

TABLE 2. Crop tolerance and percent weed control from herbicide treatments applied in December to plowed Todds Mitchum Peppermint. Malheur Experiment Station, Ontario, Oregon, 1982

				-PERCENT WEED CONTROL[1]-													
Herbicide	Rate lbs ai/ac	Crop Injury		Pigweed		Lambs-quarters		Kochia		Barnyard Grass		Blue Mustard		Tansy Mustard	
		6/9	7/19	6/9	7/19	6/9	7/19	6/9	7/19	6/9	7/19	6/9	7/19	6/9	7/19
				%	%	%	%	%	%	%	%	%	%	%	%
Goal[2]	1	5	0	80	75	60	50	63	60	50	50	93	98	85	80
Goal	1.5	8	3	85	83	65	60	65	60	65	60	98	98	92	90
Goal/Hoelon	1 + 1	5	0	75	75	60	60	60	65	75	65	95	98	82	85
Goal/Hoelon	1 + 1.5	3	0	78	75	62	60	63	60	83	75	93	98	80	85
Goal/Hoelon	1 + 2	5	0	75	70	65	62	60	65	95	70	96	98	83	85
Sinbar/Devrinol	2 + 4	5	0	95	95	98	98	99	96	99	94	20	40	96	95
Sinbar/Hoelon[3]	1 + 1.5	0	0	80	75	75	70	60	65	100	100	0	0	80	75
Sinbar/Hoelon	1.5 + 1.5	0	0	90	85	85	88	72	75	100	100	0	0	90	92
Sinbar/Hoelon	2 + 1.5	0	0	98	98	95	98	93	98	100	100	0	0	98	98
Sinbar/Hoelon	1.5 + 1	0	0	90	88	88	90	83	90	100	100	0	0	90	90
Sinbar/Hoelon	2 + 1	0	0	99	98	98	98	95	98	100	100	0	0	98	98
Sinbar/Surflan	1 + 1.5	30	10	100	100	99	99	98	98	99	96	82	88	95	98
Sinbar/Surflan	1.5 + 1.5	35	20	100	100	100	100	99	98	100	95	85	85	98	98
Goal/Surflan	1 + 1.5	65	40	85	85	93	90	88	90	95	93	98	93	88	82
Prowl	1.5	0	0	93	90	95	98	92	90	96	92	76	78	80	80
Prowl	3	0	0	100	100	100	100	100	100	100	100	85	90	93	95
Velpar	1	95	98	60	65	65	70	20	10	0	0	98	98	98	98
Dual	4	0	0	85	80	75	80	80	80	90	80	15	10	25	20
Control	---	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Ratings: 0 = no herbicide effect, 100 = plants eliminated

[2] AG98 added in all Goal treatments at the rate of 0.5% of spray volume

[3] Hoelon applied on June 1 as a postemergence treatment. Barnyard grass was 4-6 inches tall.

SPRING-APPLIED HERBICIDES ON NEW PLANTINGS OF SPEARMINT AND PEPPERMINT

Rod Frahm Farm - Ontario, Oregon - 1982

Purpose

This study was initiated to evaluate the crop tolerance of newly planted mint to herbicides presently registered for use in other crops but not previously tested in mint. It was also designed to evaluate the effectiveness of these herbicides to control weeds which were tolerant to herbicides presently registered and used in commercial mint fields.

Procedure

The trials were established in commercial fields which were planted to peppermint and spearmint in the fall of 1981. The top one-half of the hilled beds formed by planting were pulled off in the spring. The field was then rotary corrugated in preparation for furrow-irrigation. The herbicide treatments were applied following corrugation and mechanically incorporated with a John Deere rolling harrow. The rolling harrow was operated in two directions: lengthwise and crosswise.

The treatments were applied to spearmint on April 20 and to peppermint on April 27. The soil texture was silt loam, and the soil was dry on the surface when the herbicides were applied. A bicycle-wheel plot sprayer with 8003 teejet nozzles was employed in application at a spray pressure of 40 psi. Water was the herbicide carrier and was sprayed at a volume of 42 gallons per acre as a double-overlap broadcast application. Neither mint nor weedy plants had emerged when the applications were made. The fields were not tilled after the herbicides were incorporated.

Results

The Prowl/Sinbar combination was the best treatment for the control of lambsquarters, pigweed, kochia, barnyard grass, salsify, and marestail. At the rate of 4 lbs ai/ac, Dual controlled pigweed, barnyard grass, and yellow nutsedge. Goal and Devrinol did not give satisfactory control of weeds. Hoelon was effective in controlling barnyard grass. Preemergence applications of Hoelon were less effective than postemergence applications.

Spring-applied and mechanically incorporated treatments are generally less effective than the same herbicides applied in the fall or early winter and activated by winter moisture. Many mint fields are being infected with yellow nutsedge. Preliminary results with Dual indicate it to be a useful material for controlling yellow nutsedge.

The results show that spearmint and peppermint are more tolerant to Prowl and Dual than to either Goal or Surflan.

Populations of salsify and marestail are increasing in mint fields. Marestail is controlled by Sinbar when this herbicide can be used in rotated mint. Sinbar will not control salsify. Goal will not control either marestail or salsify. Prowl, as a herbicide with potential for use in mint, has shown good herbicidal activity on both salsify and marestail in addition to many other weed species.

TABLE 1. Percent weed control and crop tolerance ratings for soil-active herbicides applied in the spring to new plantings of spearmint and peppermint. Rod Frahm Farm, Ontario, Oregon, 1982

Herbicide	Rate	Crop Injury	Percent Weed Control						
	lbs ai/ac		LQ %	PW %	KO %	SA %	MT %	BYG %	YN %
Goal	3/4	8	68	73	62	0	0	65	0
Goal	1.5	15	76	82	70	0	0	75	0
Goal/Sinbar	3/4 + 1/2	8	88	90	75	0	82	80	0
Goal/Sinbar	3/4 + 3/4	5	90	88	70	0	88	85	0
Goal/Sinbar	1 + 1/2	12	83	85	75	0	83	80	0
Goal/Sinbar/Hoelon	3/4 + 1/2 + 3/4	8	84	87	72	0	78	95	0
Goal/Devrinol	3/4 + 2	5	77	70	68	0	0	90	0
Goal/Devrinol	3/4 + 4	8	84	88	76	0	0	95	0
Dual	4	0	79	86	84	65	42	92	82
Dual	6	0	88	92	88	87	65	96	94
Prowl	1-1/2	0	94	96	92	90	84	97	0
Prowl	3	0	98	99	98	93	86	100	0
Prowl/Sinbar	1 + 3/4	0	94	96	92	84	90	98	0
Prowl/Sinbar	1.5 + 3/4	0	98	99	96	85	94	100	0
Devrinol	2	0	45	63	35	0	0	78	0
Devrinol	4	0	68	86	74	0	0	92	0
Goal/Hoelon	3/4 + 1	5	60	70	64	0	0	86	0
Goal/Hoelon	1 + 1	10	68	76	65	0	0	84	0
Control	--	0	0	0	0	0	0	0	0

Evaluated on July 28, 1982.

Ratings: 0 = no effect, 100 = plants eliminated.

LQ = Lambsquarters
SA = Salsify
YN = Yellow Nutsedge
PW = Redroot Pigweed
MT = Marestail
KO = Kochia
BYG = Barnyard Grass

HERBICIDES APPLIED AS POSTEMERGENCE TREATMENTS FOR SELECTIVE WEED CONTROL IN PEPPERMINT AND SPEARMINT

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

Fusilade and Poast are relatively new herbicides with activity on annual and perennial grasses when applied as foliar treatments. They are very selective in broadleaf crops. This trial was established to evaluate their activity on green foxtail, barnyard grass, and quackgrass when applied as tank-mix combinations with Brominal and MCPB.

Procedure

Herbicides were sprayed on June 1 over spearmint which was 4-5 inches tall, and peppermint which was 2-3 inches tall. The trial area had been treated with Paraquat (0.5 lbs ai/ac) on April 5 to control winter and early-germinating summer annual weeds which started growth before the mint. The weeds which were present on June 1 included green and yellow foxtail, barnyard grass, quackgrass, lambsquarters, kochia, and redroot pigweed. The broadleaf weeds varied in height from 2-4 inches, the annual grasses had 2-5 leaves, and quackgrass had 3-6 inches of new growth. All appeared to be growing vigorously when the treatments were applied.

The plots were sprayed with a bicycle-wheel plot sprayer, and the spray nozzles (8003 teejet) were spaced on the boom for double-overlap broadcast applications. The spray pressure was 40 psi , and water, as the herbicide carrier, was applied at a volume of 42 gallons per acre. Crop oil at a rate of 1 qt/ac was added to all Fusilade and Poast treatments.

The treatments were evaluated for crop injury and percent weed control on June 30 and July 18.

Results

Fusilade and Poast were both compatible with Brominal and MCPB. Brominal and MCPB slowed the growth of mint for about two weeks following their application, but the mint resumed growth, and by harvest time, the growth was beautiful. Compared to non-treated plots, mint plants in the Brominal and MCPB plots appeared to have many more stems with more leaves per stem. This would seem desirable for oil production. Fusilade and Poast showed no symptoms on either spearmint or peppermint.

Combination treatments, including Fusilade or Poast with either Brominal or MCPB, gave good control of both summer annual broadleaf and grassy weeds. Fusilade and Poast at 1/4 lbs ai/ac controlled green foxtail and barnyard grass. Fusilade was more active on quackgrass than Poast. At harvest, Fusilade treated plots were relatively free of quackgrass. Brominal gave slightly better broadleaf weed control than MCPB.

Fusilade and Poast did not persist in the soil to control grass that germinated later in open spots not shaded by mint plants. These treatments are only effective in commercial fields where full stands of mint prevent the emergence of weeds germinating after the herbicides were initially applied. Fusilade will be helpful as a treatment to control quackgrass selectively in mint.

TABLE 1. Crop tolerance and percent weed control in spearmint and peppermint treated with herbicides applied postemergence. Malheur Experiment Station, Ontario, Oregon, 1982

				PERCENT WEED CONTROL[1]											
Herbicide	Rate lbs ai/ac	Crop Injury		Pigweed		Lambs-quarters		Kochia		Green Foxtail		Barnyard Grass		Quack-grass	
		6/20	7/18	6/20	7/18	6/20	7/18	6/20	7/18	6/20	7/18	6/20	7/18	6/20	7/18
				%	%	%	%	%	%	%	%	%	%	%	%
Fusilade[2]	1/4	0	0	0	0	0	0	0	0	100	100	100	100	85	95
Fusilade	1/2	0	0	0	0	0	0	0	0	100	100	100	100	95	100
Poast[2]	1/4	0	0	0	0	0	0	0	0	100	100	100	100	20	20
Poast	1/2	0	0	0	0	0	0	0	0	100	100	100	100	35	35
Fusilade/Brominal	1/4 + 1/2	25	5	90	95	98	96	97	95	100	100	100	100	88	96
Fusilade/Brominal	1/2 + 1/2	35	5	85	92	98	99	98	99	100	100	100	100	95	100
Fusilade/MCPB	1/4 + 1/2	40	5	80	88	90	95	85	85	100	100	100	100	85	90
Fusilade/MCPB	1/2 + 1/2	50	5	83	85	88	92	88	90	100	100	100	100	93	97
Poast/Brominal	1/4 + 1/2	20	5	92	96	98	98	98	98	100	100	100	100	30	40
Poast/Brominal	1/2 + 1/2	30	5	90	92	96	98	99	100	100	100	100	100	50	50
Poast/MCPB	1/4 + 1/2	35	5	80	83	88	90	85	88	100	100	100	100	35	40
Poast/MCPB	1/2 + 1/2	45	5	80	85	85	88	86	89	100	100	100	100	50	45
Brominal	1/2	38	5	92	93	96	98	95	97	0	0	0	0	0	0
MCPB	1/2	50	5	78	85	85	85	88	85	0	0	0	0	0	0
Control	---	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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[1] Ratings: 0 = no effect, 100 = plants eliminated

[2] Crop oil added to spray at rate of 1 qt/ac to all Fusilade and Poast treatments.

A COMPARISON OF MECHANICALLY INCORPORATED AND UNINCORPORATED HERBICIDE TREATMENTS FOR WEED CONTROL AND CROP TOLERANCE IN FURROW-IRRIGATED MINT

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

Several herbicides were applied in the spring to the soil surface of spearmint which had been corrugated in the fall for irrigation the next summer. One of each herbicide treatment was mechanically incorporated and another identical herbicide treatment was left on the soil surface. The purpose of the trial was to determine which herbicides needed mechanical incorporation to maintain maximum herbicidal activity resulting in optimal weed control without injuring the emerging crop.

Procedure

Herbicide treatments were applied on March 22 to spearmint which was showing new buds from spring growth at the soil surface. The herbicides were applied with a bicycle-wheel plot sprayer equipped with an 8.5-foot boom and 8003 teejet nozzles spaced 10 inches apart on the boom. The treatments were sprayed as double-overlap broadcast applications using water,as the herbicide carrier, at a volume of 42 gal/ac and a spray pressure of 40 psi. Individual plots were 9 x 25 feet, and each treatment was replicated three times in a randomized block design. The plots had been sprayed previously with paraquat and were free of weeds when the treatments in this study were applied.

The incorporated herbicides were mixed with the top 1-2 inches of soil by raking the soil with a garden rake. The soil was raked twice in each plot, first lengthwise and then crosswise. The herbicides in the unincorporated plots were left on the soil surface to be activated by normal rainfall. The plots were left in this manner with no further tillage. The first irrigation by furrow was made on April 27.

The treatments were evaluated on June 2 for crop tolerance and herbicide activity. Herbicide activity for incorporated and unincorporated treatments was determined by the percent control of lambsquarters and barnyard grass.

Results

The herbicides which were evaluated included Devrinol, Goal, and Hoelon. Weed control was significantly improved for each herbicide which was activated by mechanical incorporation. Weed control was generally poor for both unincorporated Devrinol and Hoelon. Goal maintained some herbicide activity when left on the soil surface, but was better when shallow-incorporated. Although there were traces of rain on several occasions after the herbicides were applied, the plots never received enough at any one time to fully activate the surface treatments. This is the reason why poor results were obtained with the untilled treatments, and this is the chance that growers take when they apply unincorporated treatments in the spring.

The mint was tolerant of all herbicide treatments, but it was most tolerant of incorporated Goal. Goal left on the surface as a concentrated layer burned the mint leaves upon emergence.

Goal and Devrinol, either fall- or winter-applied, or mechanically incorporated in the spring are superior to spring unincorporated treatments. The only time spring untilled treatments are effective is when rain (3/4 to 1 inch) occurs within a few days of application. Hoelon can be activated by rain or tillage to control annual grasses, but grass control is probably more consistent when Hoelon is applied postemergence to grass.

TABLE 1. Herbicide activity from mechanically-incorporated and unincorporated treatments in spearmint. Malheur Experiment Station, Ontario, Oregon, 1982

			- Percent Weed Control[1]-	
Herbicide	Rate lbs ai/ac	Crop Tolerance	Lambs-quarters %	Barnyard Grass %
Incorporated				
1. Goal	1	0	80	70
2. Goal	2	5	95	88
3. Devrinol	2	0	75	83
4. Devrinol	4	0	90	96
5. Goal + Devrinol	1 + 2	0	95	93
6. Goal + Devrinol	1 + 4	0	98	98
7. Goal + Hoelon	1 + 1	0	83	98
Unincorporated				
1. Goal	1	8	60	30
2. Goal	2	15	75	45
3. Devrinol	2	0	35	35
4. Devrinol	4	0	50	65
5. Goal + Devrinol	1 + 2	10	65	45
6. Goal + Devrinol	1 + 4	15	80	70
7. Goal + Hoelon	1 + 1	5	58	70
Check	--	0	0	0

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[1] Ratings: 0 = no effect on plants, 100 = plants eliminated. Evaluations are an average of 3 replications.

SUMMARY OF WEED CONTROL STUDIES IN MINT

Malheur Experiment Station - Ontario, Oregon - 1982

The experimental trials and the results published in this report were under the direction of Dr. Charles E. Stanger who is a research agronomist at the Malheur Experiment Station in Ontario, Oregon. The grants which were used to finance the research were provided by the National Mint Council and chemical companies whose products were evaluated.

Prowl herbicide which was applied in the fall or spring gave excellent control of summer annual broadleaf and grassy weeds. Spearmint and peppermint were tolerant to Prowl at rates exceeding use rates. Prowl can be soil activated by surface moisture or by mechanical tillage. Peppermint and spearmint were tolerant to Dual which was mechanically incorporated. Although Dual gave good control of yellow nutsedge and season-long control of barnyard grass, it did not persist to control late-emerging kochia or lambsquarters. Sinbar, applied in November and December, is an excellent treatment for control of winter and summer annual broadleaf weeds when it is applied at a rate of 2 lbs ai/ac. Lower rates did not control kochia or lambsquarters. Grasses which escape soil-active herbicides were very effectively controlled with Hoelon applied at 1½ lbs ai/ac when the grass was 4-5 inches tall. Surflan was an effective herbicide for control of many species of summer annuals. Although Surflan prevented early mint growth, it did not reduce oil yield when used alone or in combination with Sinbar. Goal used in combination with Surflan is not recommended because of persistent herbicidal injury to both spearmint and peppermint. Goal was very effective for control of prickly lettuce, most species of mustards, including blue mustard, and some species of spring-germinating broadleaf and grassy weeds. It will not control marestail or salsify, and will not persist to control late-emerging weeds in mint fields where stands are not adequate to develop enough plant growth to shade the soil surface by mid-season.

Herbicides applied postemergence to control seedling weeds when spearmint and peppermint were 3-5 inches tall included Thistrol, Brominal, Fusilade, and Poast. Brominal was very effective on seedling broadleaf weeds. Thistrol was less effective on annual broadleaf weeds than Brominal, but it did give excellent suppression of field bindweed until after harvest. Neither of these herbicides controls grassy weeds. Fusilade and Poast are foliar-active herbicides for control of grassy weeds only. Each was compatible with Thistrol and Brominal, and both were very active on barnyard grass and green foxtail. Fusilade, in addition to controlling annual grasses, was also active on quackgrass and gave good control. Poast was less active on quackgrass than Fusilade.

Weed control was better with Devrinol when it was mechanically incorporated. Weed control with 2 lbs ai/ac of Devrinol mechanically incorporated soon after application was superior to 4 lbs ai/ac of Devrinol left on the soil surface for seven days before it was activated by rain or tillage.

New registrations are pending for Surflan, Hoelon, Thistrol, and Brominal. These are special-use herbicides, but if used properly, they can enhance weed control without creating soil residue problems.

Currently, trials are being conducted to further evaluate Prowl and Dual for weed control in spearmint and peppermint. Several new experimental herbicides are also being evaluated as fall-applied, soil-active treatments. Herbicides with activity on salsify and groundsel are being sought after to control weeds in furrow-irrigated spearmint and peppermint.

ONION VARIETY TEST RESULTS

Malheur Experiment Station - Ontario, Oregon - 1982

This experiment was established on April 13, 1982, in silt loam textured soil with 1.3 percent organic matter and a pH of 7.3. The onions were planted in a field which had been planted to wheat in 1980 and 1981. The field was fall-plowed, but not bedded for planting until the spring of 1982. One-hundred units of phophorus and 60 units of nitrogen were plowed down in the fall. An additional 150 units of nitrogen were sidedressed in early June.

A total of 31 entries were included in the trial. Each entry was replicated 10 times. Each plot was a single row, 25 feet long. Onion seed was planted at a rate of 12 seeds per linear foot of row and hand-thinned,when the onions were at the 2- and 3-leaf stage, to an average stand of four plants per foot of row.

Herbicides applied for weed control included a tank-mix of Dacthal and Ramrod, each applied at the rate of 4 lbs ai/ac. The tank-mix combination was incorporated with a spike-tooth harrow before planting the onions. Volunteer wheat was killed with Roundup (1 pt/ac) sprayed before onion emergence. Prowl at .2 lbs ai/ac was applied as a lay-by treatment and incorporated with irrigation water and cultivation.

The onions were watered by furrow irrigation with a water furrow between each row of onions. The onions were watered in alternate rows until mid-June. Thereafter, every furrow received water each irrigation. The last irrigation was applied on September 2.

Maturity ratings were taken on August 10, 18, and 30, and on September 7. The ratings were expressed as percentages based on the number of plants with tops fallen over within each plot. The number of bulbs with seed heads was counted on September 7 and recorded in the data table as the number of plants bolting from a total of 880 plants counted.

The bulbs were lifted on September 9 and left until September 22 before hand-topping. Sixteen feet of each 25-foot row was harvested, and the bulbs were placed in a slotted wooden crate for storage. A total of 10 crates of each variety was stored.

On January 13, 1983, the onions were removed from ventilated storage and graded to determine bulb size, bulb yield, and percent of bulbs with neckrot. The percentage of neckrot is reported as an average and as rot potential. Average neckrot is calculated as an average for the amount of neckrot occurring in ten boxes. Potential neckrot is calculated on the amount of neckrot from a single box with the greatest amount of neckrot of the ten boxes stored for each variety tested. This figure originated because of the variation in the amount of bulbs infected with neckrot between replications.

Samples from each variety were collected for laboratory analysis to determine total solids, ring thickness, and ring number.

A second variety trial was conducted with twelve onion varieties to determine the effects of a delayed harvest on bulb yields and storage quality. Cultural practices in the delayed harvest were the same as those described for the regular harvest, except the late harvest received one extra irrigation and was lifted on October 2 and hand-topped on October 8.

TABLE 1. Results of the 1982 onion variety trial. Malheur Experiment Station, Ontario, Oregon, 1982

			- - - ONION BULB YIELDS (cwt/ac and percentage comparisons)- -																	
Company	Variety	Total	Average Neckrot		Potential Neckrot		+ 4 inch		3-4 inch		2½-3 inch		2's		Maturity Ratings				Bolters
		cwt/ac	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	8/10	8/18	8/30	9/7	No.880 bulbs
Asgrow	Armada	851	110	13	279	33	533	62	293	34	11	1	14	2	2	12	68	83	14
	Vega	816	65	8	139	17	423	52	363	44	22	3	8	1	4	9	50	75	15
	XPH-739	670	40	6	95	14	176	26	457	68	34	5	3	-1	24	65	92	95	0
	Yula	644	34	5	82	12	177	27	411	64	49	7	7	1	68	86	94	95	1
	XPH-691	544	2	-1	9	-2	47	9	416	76	75	14	6	1	24	65	95	98	1
Crookham	Dai Maru	942	99	11	207	22	503	53	417	44	18	2	4	-1	0	3	22	58	29
	W-133	902	93	10	264	29	525	58	325	36	15	2	37	4	0	2	30	72	14
	Ringmaker	798	22	3	46	6	293	37	443	56	36	4	26	3	18	38	75	90	0
	Big Mac	797	70	9	249	31	369	46	383	48	23	3	22	3	2	5	35	68	1
	Early Shipper	779	54	7	175	22	391	50	345	44	26	3	17	2	2	11	65	82	3
	N-42	761	53	7	130	17	340	45	370	49	22	3	29	4	6	13	60	82	3
	Golden Treasure	723	22	3	86	12	252	35	400	55	48	6	23	3	3	8	58	83	1
	Autumn Beauty	671	26	4	59	9	192	29	395	59	51	8	33	5	4	15	63	82	2
	White Delight[1]	627	36	6	71	11	149	24	410	65	56	9	12	2	4	9	60	83	3
	N-61	624	30	5	61	10	192	31	365	58	39	6	28	4	3	20	63	85	1
	White Keeper[1]	553	50	9	94	17	103	19	402	73	8	43	1	5	10	30	70	90	0
Dessert	Monarch	953	131	14	223	23	531	56	372	39	29	3	21	2	0	3	23	48	22
	Durango	885	92	10	160	18	452	51	389	44	26	3	18	2	0	2	15	43	14
	Valdez	881	115	13	162	18	526	60	332	38	9	1	14	2	0	1	15	40	12
	Magnum	788	33	4	49	6	422	54	336	43	20	2	10	1	12	25	75	93	1
	Avalanche[1]	778	143	18	269	34	444	57	310	40	14	2	10	1	0	0	20	57	17
	Golden Cascade	758	38	5	100	13	307	40	414	55	37	5	0	0	62	85	96	98	4
	Bullring	756	58	8	145	19	301	40	409	54	39	5	7	-1	7	20	73	87	7
	Blanco Duro[1]	659	109	16	227	34	276	42	354	54	26	4	3	-1	0	5	40	72	13
	Capable	566	3	-1	9	-2	47	8	402	71	102	18	15	3	78	88	97	99	2
	Carmen[2]	505	29	6	65	13	98	19	338	67	57	11	12	2	0	5	33	83	0
Keystone	Cima	719	21	3	49	7	279	39	378	52	40	6	22	3	6	25	70	85	0
	AV1241	694	28	4	64	9	169	24	479	69	32	5	14	2	20	50	78	88	0
	Early Gold	443	6	1	23	5	12	3	288	65	132	30	11	2	93	97	99	100	0
Moran	MOX1008	721	46	6	121	17	238	33	434	60	28	4	21	3	5	15	68	85	43
	MOX1012	670	14	2	37	6	115	17	472	70	75	11	8	1	3	12	80	90	2
	LSD (.05)	60	18	-	--	--	63	--	57	--	19	--	14	-	-	--	--	--	--
	(.01)	78	31	-	--	--	883	--	75	--	25	--	20	-	-	--	--	--	--
	CV (%)	6.7	18.3	-	--	--	9.4	--	10.2	--	15.3	--	19.3	-	-	--	--	--	--

[1] White bulbs

[2] Red bulbs

Dates: Planted - 4/13/82
Lifted - 9/09/82
Topped - 9/22-23/82
Out of Storage - 1/13-14/83

TABLE 2. Late harvest onion variety trial, Malheur Experiment Station, Ontario, Oregon, 1982

			Onion Bulb Yields											
Company	Variety	Total	Average Neckrot		Potential Neckrot		+ 4 inch		3-4 inch		2¼-3 inch		2's	
		cwt/ac	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%
Asgrow	Vega	942	94	10	145	15	416	45	458	48	30	3	31	3
	Armada	877	175	20	332	38	396	45	424	48	22	2	33	4
Crookham	Dai Maru	1031	142	14	201	20	494	48	466	45	40	4	16	2
	W-133	977	127	13	174	18	587	59	325	33	14	2	47	5
	Golden Treasure	819	33	4	70	8	239	29	492	60	45	5	39	5
	White Delight[1]	668	53	8	94	14	153	24	418	62	58	9	27	4
Dessert	Monarch	1021	204	20	355	35	580	57	383	37	22	2	31	3
	Durango	950	171	18	239	25	566	60	336	34	14	2	30	3
	Valdez	885	257	29	525	59	622	70	225	25	22	3	11	1
	Avalanche[1]	771	262	34	471	61	448	59	271	35	20	2	28	3
	Golden Cascade	765	61	8	187	24	248	32	450	59	45	6	14	2
Keystone	Cima	771	35	5	74	10	215	28	462	60	61	8	28	4
	LSD (.05) =	69	96	-	-	-	112	-	78	-	16	-	NS	-
	(.01) =	93	126	-	-	-	150	-	105	-	22	-	NS	-
	CV (%) =	6	16	-	-	-	11	-	10	-	18	-	19	-

[1] White bulbs

Dates:
Planted - 4/13/82
Lifted - 10/02/82
Topped - 10/02-82
Out of Storage - 1/10/83

TABLE 3. Summary data for the onion variety trials--1980, 1981, and 1982 (regular harvest data). Malheur Experiment Station, Ontario, Oregon

		BULB YIELDS														Maturity Ratings				
Company	Variety	Total	Average Neckrot		Potential Neckrot		+ 4 inch		3-4 inch		2¼-3 inch		2's							
		cwt/ac	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	8/9	8/17	8/28	9/7	No./880
Three-Year Average																				
Asgrow	Armada	810	89	11	170	21	540	67	214	26	7	1	29	4	12	38	72	86	9
	XPH739	704	35	5	77	11	296	42	358	51	23	3	15	2	43	73	94	97	0
Crookham	W-133	878	97	11	202	23	619	71	171	20	3	0	40	5	1	8	28	56	9
	N-42	792	63	8	119	15	487	61	240	30	12	2	37	5	11	24	58	83	3
	Big Mac	767	54	7	130	17	457	60	234	30	12	2	51	7	9	20	55	76	1
	Ringmaker	751	45	6	90	12	385	51	301	40	15	2	34	5	24	42	82	91	0
	Early Shipper	726	44	6	102	14	423	58	251	35	13	2	30	4	12	19	61	81	2
	Golden Treasure	725	29	4	65	9	317	44	340	47	25	3	37	5	5	26	61	84	1
	White Delight	649	52	8	78	12	223	34	341	53	34	5	26	4	14	28	67	84	2
Desert	Valdez	878	114	13	167	19	651	74	172	20	8	1	29	3	0	1	11	28	7
	Monarch	852	102	12	162	19	565	66	211	25	14	2	38	4	3	14	32	61	18
	Durango	846	85	10	144	17	590	70	190	22	13	2	28	3	2	8	30	58	11
	Magnum	800	48	6	56	7	541	68	213	27	12	2	20	3	26	57	85	95	1
	Bullring	753	53	7	113	15	450	60	248	33	22	3	23	3	16	37	75	90	4
	Golden Cascade	741	37	5	74	10	468	63	228	31	18	2	16	2	67	90	97	99	2
	Carmen[2]	578	35	6	64	11	221	38	288	50	31	5	32	5	1	5	25	59	0
Two-Year Average																				
Asgrow	Vega	835	84	10	142	17	559	67	255	31	15	2	6	1	4	15	53	78	10
	XPH691	586	6	1	12	2	66	12	432	74	60	10	27	5	45	81	97	99	1
Crookham	Dai Maru	899	78	9	144	16	580	64	296	33	13	1	11	1	0	4	24	59	18
	Pedro	743	88	12	142	19	463	62	175	24	9	1	60	8	3	13	46	64	3
	Bronze Wonder	715	72	10	114	16	474	66	157	22	11	1	44	6	8	21	62	81	4
	Autumn Beauty	703	35	5	70	10	302	43	332	47	33	5	37	5	10	25	64	82	1
	Early Shipper "75"	689	22	3	55	8	332	55	238	34	21	3	40	6	52	87	96	97	0
	White Keeper[1]	584	64	11	140	24	154	26	381	65	23	4	40	7	11	48	78	92	0
Dessert	Ultimate	770	62	8	126	14	538	70	125	16	6	1	80	11	21	50	77	84	2
	Snow White[1]	753	176	23	316	42	495	66	145	19	8	1	39	5	2	5	10	24	6
	Avalanche[1]	739	170	23	296	40	511	69	205	28	12	2	12	2	0	0	13	34	14
	Capable	634	19	3	38	6	157	25	403	64	65	10	9	1	77	93	99	100	2
Keystone	Cima	755	30	4	53	7	348	46	342	45	28	4	37	5	13	43	78	90	0
Moran	MOX1008	750	53	7	128	17	375	50	339	45	19	3	18	2	18	23	67	85	26

[1] White Sweet Spanish

[2] Red Variety

PREPLANT SHALLOW-INCORPORATED HERBICIDES FOR WEED CONTROL IN ONIONS

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

Soil-active herbicides that persist in the soil when applied in the fall are needed for broadleaf weed control in spring-seeded onions. The purpose of this trial is to identify soil-active herbicides which are known to have persistence in the soil and which have onion tolerance. Herbicides meeting these criteria and included in this study are Prowl, Dual, Pyramin, Antor, and S-734. Herbicides considered as standard treatments for weed control in onions are also included.

Procedure

Herbicides were applied and incorporated on April 15. The field was prepared for applying herbicides by bedding the ground in the spring. As the soil in the preformed beds was dry enough to till properly, the soil forming the tops of the beds was pulled off with a steel spike-tooth harrow mounted on a 3-point hitch. The beds were harrowed twice, leaving them nearly flat, but enough corrugate was left to mark the individual beds so the herbicide could be banded on the bed tops. The soil surface on top of the beds was smooth and firm so the herbicide-treated soil was not dragged from the top of the bed into the corrugates during incorporation of the band-applied treatments.

Individual plots were 4 rows wide and 25 feet long. Each treatment was replicated three times in a randomized block experiment design. The herbicides were sprayed with a bicycle-wheel plot sprayer equipped with a 4-nozzle boom. Teejet nozzles (8006E) were spaced on the boom so a spray nozzle was over the center of each row. Spray pressure was 40 psi, and water, the herbicide carrier, was sprayed at a rate of 42 gallons per acre. The herbicides were incorporated with the same harrow used to level the beds. The harrow teeth were set at an upright angle, and a cultipacker was pulled behind the harrow to re-firm the soil to conserve soil moisture and prepare the seedbed for planting.

The Golden Cascade variety of onion seed was planted on April 17. Amaze insecticide was applied in the seed row during planting for root maggot and early season thrip control. The onions were furrow-irrigated on April 22. Frequent irrigations were required to soften the soil crust while the onions were emerging.

Results

The better herbicides were Prefar, Ramrod, Dacthal, and Hoelon. The degree of crop safety with these herbicides was satisfactory, and control of barnyard grass, lambsquarters, and pigweed was adequate. These herbicides did not control hairy nightshade. Generally, weed control was improved when two of these herbicides were combined and applied as a tank-mix. Combinations included Prefar and Ramrod or Ramrod and Dacthal. Hoelon in combination with Ramrod or Dacthal has improved control of grassy weed species. Hoelon in the soil will persist to give season-long grass control in the onion row. Prefar also will persist in the soil to control grass during the growing season, and will give good control of pigweed and partial control of lambsquarters and kochia until harvest.

Dual and Prowl effectively controlled weeds, but when these materials were incorporated as preplant treatments, the injury to onions was excessive.

Onions were also severely injured by Antor and S-734. Antor gave excellent control of pigweed and barnyard grass, while S-734 was only active on barnyard grass.

Pyramin did not show any herbicidal activity. It was expected to control the broadleaf weeds. Pyramin tolerance to onions is still unknown, so it will be evaluated again for onion tolerance. Because of the lack of herbicidal activity from Pyramin in this trial as compared to prior experience with its ability to control broadleaf weeds, it is suspected that the material was old and had lost its potency.

Nortron caused a slight amount of injury to onions on emergence, but the final yields were comparable to those from the check plots. Nortron in combination with Pyramin and Hoelon will be further evaluated in 1983 because of the potential nightshade control offered by such a combination.

TABLE 1. Percent weed control and onion tolerance to soil-active herbicides applied as preplant incorporated treatments. Malheur Experiment Station, Ontario, Oregon, 1982

		PERCENT WEED CONTROL				
Herbicide	Rate lbs ai/ac	Crop Injury	Pigweed	Lambs-quarters	Hairy Nightshade	Barnyard Grass
			%	%	%	%
Prefar	6	0	98	93	20	99
Ramrod	6	0	88	82	64	95
Ramrod	9	0	98	94	72	99
Dacthal	9	0	92	82	68	94
Prefar + Ramrod	4 + 4	0	99	96	56	99
Prefar + Ramrod	4 + 6	0	98	99	68	100
Prefar + Dacthal + Ramrod	4 + 2 + 2	5	98	98	78	98
Prefar + Dacthal + Ramrod	4 + 4 + 4	0	99	100	82	100
Ramrod + Hoelon	6 + 1.5	0	85	80	65	100
Ramrod + Hoelon	9 + 1.5	0	96	94	72	100
Prowl	1	25	98	90	35	100
Prowl	2	75	99	99	65	100
Pyramin	3	0	40	50	65	0
Pyramin	4	0	60	65	75	0
Pyramin + Hoelon	3 + 1.5	0	45	50	68	100
Pyramin + Hoelon	4 + 1.5	0	45	65	78	99
Dual	2	20	82	45	68	92
Dual	4	75	92	85	86	99
Antor	4	80	99	40	30	99
Nortron + Pyramin + Hoelon	1 + 2 + 1.5	10	92	85	89	96
Antor + Pyramin	2 + 3	40	96	90	68	96
S-734	1.5	60	30	40	20	99
S-734 + Ramrod	1 + 4	40	65	62	60	99
Check	---	0	0	0	0	0

Ratings: 0 = no effect, 100 = plants eliminated

TABLE 2. Harvested bulb yields from yellow sweet spanish onions treated with herbicides applied as preplant incorporated treatments. Malheur Experiment Station, Ontario, Oregon, 1982

		- - - Yield of Onion Bulbs - (3 diameters) No. 1's- - -						
Herbicide	Rate	2¼-3 inch		3-4 inch		+4 inch		Total
	lbs ai/ac	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac
Prefar	6	45	8	406	71	122	21	573
Ramrod	6	53	9	434	72	119	20	605
Ramrod	9	42	7	432	74	112	19	586
Dacthal	9	47	7	439	66	177	27	663
Prefar + Ramrod	4 + 4	30	5	417	68	168	27	616
Prefar + Ramrod	4 + 6	25	4	422	67	186	29	632
Prefar + Dacthal + Ramrod	4 + 2 + 4	33	5	422	63	216	32	670
Prefar + Dacthal + Ramrod	4 + 4 + 4	37	6	393	68	151	26	581
Ramrod + Hoelon	6 + 1.5	41	7	436	72	131	22	607
Ramrod + Hoelon	9 + 1.5	39	6	414	68	158	26	610
Prowl	1	39	8	274	53	203	39	515
Prowl	2	24	6	181	46	188	48	393
Pyramin	3	47	8	397	69	127	22	572
Pyramin	4	62	11	407	70	115	20	584
Pyramin + Hoelon	3 + 1.5	25	4	404	67	175	29	603
Pyramin + Hoelon	4 + 1.5	36	5	421	61	230	33	688
Dual	2	42	7	355	62	180	31	576
Dual	4	37	8	287	59	163	33	487
Antor	4	25	5	279	57	184	38	488
Nortron + Pyramin + Hoelon	1 + 2 + 1.5	48	8	448	73	117	19	614
Antor + Pyramin	2 + 3	30	5	310	52	258	43	599
S-734	1.5	42	9	356	72	157	32	492
S-734 + Ramrod	1 + 4	48	9	361	66	138	25	547
Check	0	42	7	410	71	125	22	576
	LSD (.05) =	NS		86		NS		92
	CV (%) =	40		14		39		9

POSTEMERGENCE-APPLIED HERBICIDES FOR WEED CONTROL IN ONIONS

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

Several herbicides, at different rates and as tank-mix combinations, were applied to onions at the flag-, one-, and two-leaf stages of development. The purpose of this trial was to determine onion tolerance and weed control from herbicides applied at the three different stages of onion growth.

Procedure

The Golden Cascade variety of onions was planted with a four-row Beck planter on April 13 at about one-inch spacings in rows 22 inches apart. Individual plots were four rows wide and 25 feet long; each treatment was replicated three times, and arranged in a complete randomized block experimental design. The onions were not treated with herbicides before applying the postemergence treatments.

The herbicides were applied to onions in the flag-stage on May 16. The flag leaves were fully developed on most of the onions, with the first true leaf starting to develop on about 15 percent of the onion plants. Weeds in the plots included redroot pigweed, lambsquarters, hairy nightshade, and barnyard grass. The broadleaf weeds ranged in size from 2-4 leaves. Barnyard grass plants had 1-3 leaves, and weedy plant populations were high.

The one-leaf treatments were applied on May 25. Both onions and weeds were growing rapidly. Redroot pigweed was 2-4 inches tall, hairy nightshade, 1½-2 inches, lambsquarters, 4-6 inches, and barnyard grass was tillering. The temperature on the date treatments were applied reached a high of 84°F, and thundershowers occurred the evenings of May 25, and 26.

On June 2, the herbicide treatments were applied to onions with two leaves and to the plots receiving repeat applications. The plots previously treated when the onions had flag leaves were relatively free of weeds. The plots not previously treated were all very weedy, and the weedy plants were large: broadleaf weeds were as tall as eight inches, and grass had 2-3 tillers. The onions appeared healthy in all plots. A light application of water by furrow irrigation followed within four hours of herbicide application.

The herbicides were applied through 8006E teejet nozzles, using a spray pressure of 40 psi and 40 gallons of water per acre. A four-nozzle boom was used with a nozzle mounted over the center of each plot row.

The treatments were evaluated on June 21 for weed control and crop injury. After the treatments were evaluated, the onions were weeded and hand-thinned, and the onions were spaced to approximately four plants per foot of row. The onion bulbs were harvested on September 21, and kept in onion storage until January 10, 1983. The onions were then graded on January 10 and 11 to determine bulb yield and quality.

Results

The herbicides which were evaluated included Ronstar, Brominal, Mowdown, Fusilade, Poast, and Hoelon. Ronstar, Brominal, and Mowdown are most active on seedling broadleaf weeds, while Fusilade, Poast, and Hoelon are only active on grasses. Hoelon has both foliar and soil activity. Fusilade and Poast are foliar-active only, but are considerably more active than Hoelon when foliar-applied.

Ronstar applied as repeat treatments at 1.0 lbs ai/ac gave nearly 100 percent control of pigweed, lambsquarters, and hairy nightshade. Ronstar alone did not control barnyard grass. Ronstar in combination with any one of the grass killers gave nearly 100 percent control of all weed species when applied as repeat treatments. Ronstar did not control hairy nightshade as a single application. Onions were very tolerant to Ronstar in this trial.

Brominal also provided excellent control of broadleaf weeds when applied as repeat applications. Brominal was also compatible with each of the grass herbicides when applied as tank-mix combinations. Brominal applied as single applications, even as late as the two-leaf stage of onion growth, effectively controlled lambsquarters and hairy nightshade. It was less active on larger redroot pigweed than Ronstar and did not adequately control pigweed in the plots when applications were delayed until the onions had two true leaves.

Mowdown was applied at 0.5 and 1.0 lbs ai/ac. At these rates, onions were tolerant, but the weeds were not adequately controlled.

The total bulb yields between treatments were compared. The data showed that yields were slightly lower when Brominal was applied at 2/3 lbs ai/ac to onions at the two-leaf stage of growth. Although these yields were less than those of the control plots, the yield difference was not great enough to be considered significant at the 5% level. Bulb yields from all other treatments were equal or better than those from the control plots.

Bulb quality after three months of storage was excellent from all treatments,with less than three percent neckrot even though the onions were stored in burlap bags.

TABLE 1. Percent weed control and crop tolerance rating in onions treated with herbicides applied as post-emergence treatments. Malheur Experiment Station, Ontario, Oregon, 1982

			- - - - - - - - -	PERCENT WEED CONTROL	- - - - - - - - -	
Herbicide	Rate lbs ai/ac	Stage Applied	Crop Injury	Redroot Pigweed %	Lambs-quarters %	Hairy Nightshade %	Barnyard Grass %
Ronstar	3/4	flag & 2 leaf	0	100	100	94	72
Ronstar + Poast	3/4 + 1/4	flag & 2 leaf	0	100	100	95	100
Ronstar + Fusilade	3/4 + 1/4	flag & 2 leaf	0	100	100	93	100
Ronstar + Hoelon	3/4 + 1	flag & 2 leaf	0	100	100	93	100
Brominal	1/3	flag & 2 leaf	4	95	99	98	0
Brominal	1/2	flag & 2 leaf	7	100	100	100	0
Brominal + Poast	1/3 + 1/4	flag & 2 leaf	5	85	96	99	100
Brominal + Poast	1/2 + 1/4	flag & 2 leaf	8	96	100	100	100
Brominal + Fusilade	1/3 + 1/4	flag & 2 leaf	5	96	100	98	100
Brominal + Fusilade	1/2 + 1/4	flag & 2 leaf	7	99	100	100	100
Brominal + Hoelon	1/3 + 1	flag & 2 leaf	5	98	100	98	100
Brominal + Hoelon	1/2 + 1	flag & 2 leaf	8	98	100	100	100
Ronstar + Hoelon	1 + 1-1/2	1 leaf	0	90	93	82	100
Mowdown + Hoelon	1/2 + 1-1/2	1 leaf	0	70	90	75	96
Mowdown + Poast	1 + 1/2	1 leaf	0	80	80	70	100
Mowdown + Fusilade	1/2 + 1/4	1 leaf	0	75	70	65	100
Brominal	1/3	1 leaf	5	85	100	98	0
Brominal	1/2	1 leaf	7	65	90	100	0
Brominal + Poast	1/3 + 1/4	1 leaf	5	60	60	98	100
Brominal + Poast	1/2 + 1/4	1 leaf	8	75	98	100	100
Brominal + Fusilade	1/3 + 1/4	1 leaf	5	80	99	96	100
Brominal + Fusilade	1/2 + 1/4	1 leaf	7	60	90	99	100
Brominal + Hoelon	1/3 + 1-1/2	1 leaf	5	70	95	98	92
Brominal + Hoelon	1/2 + 1-1/2	1 leaf	8	60	95	99	94
Brominal	1/2	2 leaf	5	60	85	92	0
Brominal	2/3	2 leaf	10	70	98	96	0
Brominal + Hoelon	2/3 + 1-1/2	2 leaf	10	65	96	98	85
Control	---	-----	0	0	0	0	0

Ratings: 0 = no effect, 100 = plants eliminated.

TABLE 2. Onion bulb yields from herbicides applied to seedling onions as postemergence treatments. Malheur Experiment Station, Ontario, Oregon, 1982

Herbicide	Rate lbs ai/ac	Stage Applied	- - - - - - - Yield of No. 1 Onion Bulbs - - - - - -						
			2¼-3 inch		3-4 inch		+ 4 inch		Total
			cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac
Ronstar	3/4	flag & 2 leaf	19	3	423	64	219	33	660
Ronstar + Poast	3/4 + 1/4	flag & 2 leaf	29	4	446	66	197	28	672
Ronstar + Fusilade	3/4 + 1/4	flag & 2 leaf	21	3	391	59	250	38	662
Ronstar + Hoelon	3/4 + 1	flag & 2 leaf	39	6	474	78	151	25	607
Brominal	1/3	flag & 2 leaf	40	6	440	67	177	27	656
Brominal	1/2	flag & 2 leaf	50	8	399	66	157	26	607
Brominal + Poast	1/3 + 1/4	flag & 2 leaf	28	4	398	60	236	36	662
Brominal + Poast	1/2 + 1/4	flag & 2 leaf	43	7	438	67	174	27	655
Brominal + Fusilade	1/3 + 1/4	flag & 2 leaf	30	5	411	66	184	29	624
Brominal + Fusilade	1/2 + 1/4	flag & 2 leaf	30	5	385	64	183	31	599
Brominal + Hoelon	1/3 + 1	flag & 2 leaf	33	5	424	65	196	30	652
Brominal + Hoelon	1/2 + 1	flag & 2 leaf	37	6	438	67	175	27	650
Ronstar + Hoelon	1 + 1.5	1 leaf	18	3	411	60	258	38	688
Mowdown + Hoelon	1/2 + 1.5	1 leag	24	4	432	64	218	32	673
Mowdown + Hoelon	1 + 1/4	1 leaf	30	4	474	69	185	27	688
Mowdown + Fusilade	1/2 + 1/4	1 leaf	30	4	455	67	196	29	682
Brominal	1/3	1 leaf	32	5	428	68	166	27	626
Brominal	1/2	1 leaf	43	7	417	70	137	23	596
Brominal + Poast	1/3 + 1/4	1 leaf	33	5	407	61	223	34	662
Brominal + Poast	1/2 + 1/4	1 leaf	44	7	452	71	143	22	639
Brominal + Fusilade	1/3 + 1/4	1 leaf	30	5	414	65	191	30	635
Brominal + Fusilade	1/2 + 1/4	1 leaf	40	6	463	70	163	24	666
Brominal + Hoelon	1/3 + 1/4	1 leaf	35	6	399	64	186	30	619
Brominal + Hoelon	1/2 + 1/4	1 leaf	21	3	435	61	208	31	664
Brominal	1/2	2 leaf	30	5	399	64	191	31	621
Brominal	2/3	2 leaf	44	8	394	69	135	24	573
Brominal + Hoelon	2/3 + 1.5	2 leaf	37	6	385	65	167	28	590
Control	---	------	31	5	420	67	180	29	630
		LSD (.05) =	NS		NS		NS		68
		CV (%) =	24		8		21		6

ONION TOLERANCE AND WEED CONTROL FROM POSTEMERGENCE APPLICATIONS OF GOAL

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

Two experimental trials were conducted with the purpose of evaluating the tolerance of seedling onions to Goal applied as single and repeat postemergence treatments, and to determine if Goal will effectively control broadleaf species of weeds at rates which onions may tolerate.

Procedure

Onion tolerance trial

The Golden Cascade variety of yellow sweet spanish onions was seeded on April 6 in soil previously treated for weed control with a tank-mix combination of Dacthal and Ramrod. Both herbicides were applied at 4 lbs ai/ac and incorporated in the top one inch of soil with a spike-tooth harrow. After planting, the seeded onions were furrow-irrigated to assure the availability of soil moisture for uniform seed germination and seedling emergence.

Herbicide treatments included both the wettable powder and emulsifiable concentrate formulations of Goal. A surfactant (Ag 98) was added to the wettable powder formulation at a rate of 0.25 percent of the spray (H_2O) volume. Herbicide rates were 0.12, 0.25, and 0.50 lbs ai/ac. Herbicides were applied both as single and repeat treatments. Single applications were applied at the flag- and one-leaf stage of onion growth. The first application of repeat treatments was applied when the onions had one true leaf and again 10 days later.

The earliest postemergence treatments were applied on May 16. The flag leaf was fully developed in all the onions, and the first true leaf was present on about 15 percent of the onions when the first treatments were applied. The plots were essentially free of weeds. To evaluate for onion tolerance, plant counts were taken when treatments were applied and again about three weeks later. All plots were 4 rows wide and 25 feet long. Colored flags were used as markers spaced six feet apart in each of the two center rows, and the onion plants between the flags were counted.

The one-leaf treatments and the first application of the repeat treatments were applied on May 25. The temperature was warm, and the seedling onions were growing rapidly. The first true leaf on all the onions had extended to a height above the flag leaf. Frequent rain showers occurred for about two weeks while the onions were growing from the flag to the two true leaf stage of development. It was not raining on the same day the treatments were applied.

The second application of the repeat treatments was applied on June 4, ten days after the first application. Some onions in these plots were chlorotic with small necrotic lesions on the leaves at the time when the second application was applied. About four days following the application of Goal to the onions in the repeat treatments, severe foliar injuries appeared with necrotic lesions over most of the leaves in addition to twisting of the leaves and the stunting of individual plants. Although these injuries were prevalent in plots receiving repeat treatments, plant losses did not occur as demonstrated when plant counts taken three weeks following treatments were compared to counts made at the time the first treatments were applied.

Final plant counts were taken on June 23. The onions were then hand-thinned, leaving a plant population of approximately four plants per foot of row. The onions were fertilized, irrigated, and weeded as necessary during the growing season. Onion harvest began on September 15 when the bulbs were lifted using a rod weeder. They were hand-topped on September 22. The onions were then put into storage on October 12 where they remained until January 10. Then, on January 10 and 11, they were graded to determine bulb yield and bulb size.

Weed control efficacy trial

The weed control trial was established off-station on the Mizuta farms located about one mile north of the Malheur Experiment Station. Herbicides in the trial included Ronstar, Brominal, Goal, Fusilade, Poast, and Hoelon. Fusilade, Poast, and Hoelon, active on grasses as foliar treatments, were evaluated for weed control and compatibility when applied as tank-mixes with Ronstar, Goal, or Brominal. Goal was evaluated in both the wettable powder and emulsifiable concentrate formulation. Each herbicide was applied at various rates to seedling onions in the one- and two-true-leaf stages of growth.

Weed species infesting the trial area included redroot pigweed, kochia, common lambsquarters, volunteer potatoes, and barnyard grass. Treatments were applied to onions in the one-leaf stage on June 8. Broadleaf weeds were 1-4 inches tall, and barnyard grass had 3-4 leaves at the time the treatments were applied.

On June 16, treatments were applied to onions with two leaves not previously treated. Weeds were very large; broadleaf weeds were 4-8 inches tall, and barnyard grass had tillered.

All treatments were evaluated on June 30; after evaluation, the onions were hand-weeded.

Herbicide treatments in both the onion tolerance and weed control efficacy experiments were applied with a bicycle-wheel plot sprayer. All plots were 4 rows wide and 25 feet long, and each treatment was replicated 3 times in a randomized block design. The spray boom was equipped with 4 teejet nozzles, size 8006, the rows were spaced 22 inches apart, and a spray nozzle was centered over each row. The spray pressure was 40 psi, and water was applied at a volume of 42 gallons per acre.

Results

Onion tolerance study

Onion stands were not reduced by any of the Goal treatments. Plant counts taken about three weeks after treatments were applied equalled the number of onion plants before herbicide application. However, Goal caused injury to the onion foliage. Herbicide symptoms appeared as necrotic lessions on the foliage which eventually caused the leaves to grow in a twisted or curled shape. The foliage showing the greatest amount of foliar injury and plant stunting occurred in the plots treated with Goal at 0.5 lbs ai/ac and from Goal applied as repeat treatments using a 0.25 lbs ai/ac rate each application.

Differences in plant injury were not noted between formulations. One formulation appeared as safe as the other.

Harvest data show that bulb yields from single applications of Goal at rates of 0.25 lbs ai/ac or less were comparable to yields from the check plots. Bulb yields from the 0.5 lbs ai/ac rate of Goal and from repeat treatments at 0.25 lbs ai/ac were somewhat lower compared to the yield of the check treatment. Although these yield reductions were not great enough to be significant at the 5 percent level, it suggests that too much Goal might tend to reduce bulb size, thus causing a reduction in total bulb yield.

Weed control efficacy trial

Weed control and crop tolerance results were taken on June 30. The data are recorded in Table 2. Weed control was significantly better in plots which were treated with herbicides when the onions had one leaf. Weeds were too large for effective control when herbicide applications were delayed until the onions had two true leaves. Ronstar at 1.0 lbs ai/ac gave good control of redroot pigweed, lambsquarters, and kochia. It did not control barnyard grass or volunteer potatoes. Goal at 0.25 lbs ai/ac was most effective on redroot, pigweed, and volunteer potatoes. It was only partially active on lambsquarters and kochia, killing only the smaller weeds (1-2 inches tall) of each species. It did not control barnyard grass. Brominal was very effective on lambsquarters and kochia. It was only active on small pigweed plants. Pigweed larger than 1 inch was not controlled by Brominal. Brominal was not expected to control grassy weeds. Fusilade and Poast were very active on barnyard grass, giving complete control when applied at the 0.25 lbs ai/ac rate. Hoelon was less active than Fusilade or Poast. The grass plants were probably too large for effective control with Hoelon. Each of the grass herbicides was compatible with Ronstar, Goal, or Brominal when tank-mixed and sprayed.

Seedling onions were most tolerant of Ronstar. Although some leaf necrosis occurred with Ronstar, there was less than with other herbicides. Brominal caused leaf chlorosis and drugging of leaves for a few days after application. Necrotic areas appeared on the leaves of onions treated with Goal which later caused some leaves to twist as leaf growth proceeded. Although these symptoms were apparent, the onions continued to grow; new leaves formed after the herbicides were applied appeared normal. Bulb formation and growth were generally better in the treated plots compared to the non-treated plots. This was probably caused by the dense weed population in the control plots and the injury to the growing onions caused by the hand-weeding crews when the weeds were removed.

TABLE 1. Plant counts and bulb yields of Golden Cascade variety of yellow sweet spanish onions treated with Goal herbicide applied postemergence. Malheur Experiment Station, Ontario, Oregon, 1982

				- - - - - Bulb Yields	- - - - -	- - - - -
Herbicide Formulation	Rate lbs ai/ac	Stage Applied	Onion Plants	+ 3-inch bulbs cwt/ac	%	Total Bulbs cwt/ac
2 ec	0.12	Flag	101	542	88	617
2 ec	0.25	Flag	101	577	93	622
25 wp	0.12	Flag	102	627	94	663
25 wp	0.25	Flag	101	634	95	666
25 wp	0.50	Flag	100	629	94	671
2 ec	0.12	1 leaf	100	699	97	718
2 ec	0.25	1 leaf	101	672	96	700
25 wp	0.12	1 leaf	104	672	97	695
25 wp	0.25	1 leaf	100	589	93	631
25 wp	0.50	1 leaf	101	509	88	574
25 wp	0.12 + 0.12	1 leaf & 10 days later	102	609	95	639
25 wp	0.25 + 0.25	1 leaf & 10 days later	101	506	93	542
2 ec	0.12 + 0.12	1 leaf & 10 days later	102	626	94	668
2 ec	0.25 + 0.25	1 leaf & 10 days later	101	556	93	598
Control	----	------	105	640	95	672
		LSD (.01) =	NS	115	--	87
		LSD (.05) =	NS	NS	--	NS
		CV (%)	3.4	13.7	--	9.7

*Six feet of row were staked in the two center rows of each 4-row plot. The number of onions in each staked row were counted before and after herbicide applications. Onion plant data are expressed as percent of onions left following herbicide application compared to plants present before treatments were applied.

TABLE 2. Percent weed control and crop injury ratings of seedling onions treated with postemergence herbicides. Mizuta Farms, Ontario, Oregon, 1982

Herbicide	Rate lbs ai/ac	Onion Leaves	Crop Injury	PERCENT WEED CONTROL				
				Redroot Pigweed %	Volunteer Potatoes %	Lambs-quarters %	Kochia %	Barnyard Grass %
Ronstar	1	1	2	98	70	99	98	60
Ronstar	1	2	0	86	40	91	93	45
Ronstar + Fusilade	1 + 1/4	1	3	98	75	98	98	100
Ronstar + Fusilade	1 + 1/4	2	0	95	50	93	90	100
Ronstar + Poast	1 + 1/4	1	3	97	70	99	97	100
Ronstar + Poast	1 + 1/2	2	0	93	45	92	92	100
Goal wp	1/4	1	7	99	96	78	84	60
Goal wp	1/4	2	5	92	90	63	78	45
Goal wp + Fusilade	1/4 + 1/4	1	9	99	95	73	79	100
Goal wp + Fusilade	1/4 + 1/4	2	8	95	85	65	72	100
Goal wp + Fusilade	1/4 + 1/2	1	8	99	93	75	75	100
Goal wp + Fusilade	1/4 + 1/2	2	9	90	90	60	70	100
Goal wp + Poast	1/4 + 1/4	1	10	98	96	80	80	100
Goal wp + Poast	1/4 + 1/2	2	8	92	88	60	68	100
Goal wp + Hoelon	1/4 + 1-1/2	1	7	99	94	77	75	79
Goal wp + Hoelon	1/4 + 1-1/2	2	9	89	86	58	70	60
Goal ec	1/4	1	5	100	96	82	73	63
Goal ec	1/4	2	8	92	88	63	62	48
Goal ec + Fusilade	1/4 + 1/4	1	8	97	95	78	78	100
Goal ec + Fusilade	1/4 + 1/4	2	7	90	85	65	66	100
Goal ec + Fusilade	1/4 + 1/2	1	10	98	97	76	75	100
Goal ec + Fusilade	1/4 + 1/2	2	8	91	88	58	70	100
Goal ec + Poast	1/4 + 1/4	1	8	99	95	78	80	100
Goal ec + Poast	1/4 + 1/4	2	10	93	86	63	72	100
Goal ec + Poast	1/4 + 1/2	1	9	99	96	80	78	100
Goal ec + Poast	1/4 + 1/2	2	8	90	86	60	70	100
Brominal	1/2	1	5	78	60	98	95	0
Brominal	1/2	2	4	45	35	94	89	0
Brominal + Fusilade	1/2 + 1/4	1	7	83	65	96	98	100
Brominal + Fusilade	1/2 + 1/4	2	7	50	40	92	86	98
Brominal + Fusilade	1/2 + 1/2	1	7	75	60	98	96	100
Brominal + Fusilade	1/2 + 1/2	2	8	55	50	91	88	96
Brominal + Poast	1/2 + 1/4	1	9	78	55	95	98	100
Brominal + Poast	1/2 + 1/4	2	9	45	45	90	85	98
Brominal + Poast	1/2 + 1/2	1	6	80	65	99	97	100
Brominal + Poast	1/2 + 1/2	2	5	50	50	92	90	98
Control	---	-	0	0	0	0	0	0

Ratings: 0 = no effect, 100 = plants eliminated

Application information: Treatments were applied between 9 and 11 a.m. Skies were clear; air temperature ranged between 70 and 78°F. The soil surface was moist, and each application followed irrigation. Weeds and crop plants were healthy and growing normally when the herbicides were applied.

WEED CONTROL RESEARCH IN SWEET SPANISH ONIONS GROWN FOR BULBS

Malheur Experiment Station - Ontario, Oregon - 1982

Herbicides presently labeled for use in Oregon and Idaho for weed control in onions include bensulide (Prefar), DCPA (Dacthal), propachlor (Ramrod), glyphosate (Roundup), bromoxynil (Brominal), chloropropham (Chloro IPC), and trifluralin (Treflan). Each is labeled for a specific time of application. Prefar is applied as a band treatment in the fall, Dacthal and Ramrod are applied as postplant preemergence treatments, and Roundup is applied just before onion emergence to control emerged weeds. After the onions have 2-5 true leaves, Brominal is applied for control of seedling broadleaf weeds, and Treflan is labeled as a lay-by treatment applied in the furrows between the planted rows.

Herbicide research studies include herbicide treatments which are applied in the fall during bedding of land for spring planting, spring-applied, postplant, preemergence applications, postemergence, and herbicides applied at lay-by time.

Herbicides evaluated as fall applications include Prefar, Dacthal, Ramrod, diclofop (Hoelon), oxyflurofen (Goal), PPG 844, metalachlor (Dual), pendimethalin (Prowl), and diethatyl ethyl (Antor). Prefar (6 lbs ai/ac) fall applied has given excellent control of barnyard and foxtail grasses and generally good control of pigweed and lambsquarters. It has been unsatisfactory for controlling most other broadleaf weeds, including nightshade. Hoelon (1½ lbs ai/ac) has given excellent control of annual grasses. Dacthal and Ramrod have not overwintered to give consistent weed control. Goal, PPG 844, Dual, Prowl, and Antor have overwintered, but resulted in severe injury to germinating onions.

Ramrod and the combination of Ramrod + Dacthal, at rates of 8 and 4 + 4 lbs ai/ac respectively, have been the most effective spring-applied, postplant, preemergence treatments for control of broadleaf and grassy weeds when activated by shallow, mechanical incorporation followed by one-half inch of rain within one week of application.

Good broadleaf weed control and onion tolerance have been obtained with oxadiazon (Ronstar) and Brominal and Goal applied as postemergence treatments. Repeat treatments at late flag and two-leaf stages of onion growth, at reduced rates, have given better weed control with adequate onion tolerance compared to single applications, at higher rates, applied when the onions have two true leaves. Hoelon, sethoxydim (Poast), and fluozifop-butyl (Fusilade) are very effective for annual grass control when applied postemergence. Each material is compatible with Ronstar, Brominal, and Goal when applied as tank mixes.

In both 1981 and 1982 trials, combination herbicide treatments, including Prefar + Ramrod applied preplant followed by either Ronstar, Brominal, or Goal as repeat postemergence treatments, resulted in higher than 95 percent control of annual broadleaf and grassy weeds. It has been determined that effective use of herbicides can reduce hoeing time, resulting in an estimated labor savings of $162 per acre for the average grower in the Treasure Valley.

Herbicides have been evaluated and shown to consistently control weeds selectively in bulb onions. Most of the effective postemergence herbicides have not been registered for use in onions, and herbicide companies are reluctant to register herbicides in small-acreage, high-value crops like onions because of possible legal suits which would reduce any chance for an economical return for registering a potential herbicide.

HERBICIDE TOLERANCE TO ASGROW SEED COMPANY'S PARENT LINES OF SWEET SPANISH ONIONS

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

The trial was established to evaluate 24 parent lines of sweet spanish onions for herbicide tolerance. These lines are planted in the Treasure Valley by seed growers to produce onion seed for commercial production of bulb onions. In addition to evaluation for crop tolerance, herbicides were rated to obtain weed control efficacy data.

Procedure

Soil active herbicides were applied to the surface of soil which had been prebedded. The tops of the beds were flat and the soil on the surface of the beds was firm. Immediately following the application, the herbicides were shallowly incorporated (1-1½ inches) with a spike-tooth harrow. Furrowing shovels (angle iron corrugators) were operated ahead of the harrow to build up the shoulders of the beds with soil to prevent pulling herbicides from the tops of the beds into the furrow area.

The onions (raw seed) were planted on July 17 using a Beck shoe-type drill. A total of 24 entries were planted in single row plots. Each row was 580 feet long and the rows were spaced 22 inches apart. The seed was drilled 1/2 to 3/4 inches deep. Amaze insecticide was applied in the seed row at a rate of 14 lbs of material per acre while the seed was being planted.

After planting, the furrows were re-corrugated in preparation for irrigation. The corrugates were deep to enough to prevent the water from flooding over the top of the planted row, but not too deep to prevent adequate subbing. Water was left running at frequent intervals to keep the soil moist until the onions were fully emerged.

The postemergence treatments were sprayed on August 5. All the onions had developed the flag leaf, and most had the first true leaf when the first application of the postemergence treatments was applied. Air temperature at the time the treatments were applied was 91°F. The skies were clear, and the sun was bright. Applications were made as soon as the soil surface was dry following irrigation. Subsequent irrigations following herbicide applications were delayed as long as possible without affecting plant growth so as not to increase crop injury from increased herbicidal activity as a result of free moisture at the soil surface adjacent to onion plants.

A tank mix combination of Dyrene, parathion, and toxaphene was sprayed on

September 30 to control disease and insects.

Thirty units of nitrogen were applied in the water on October 10 during the last irrigation.

Lay-by herbicides were sprayed on November 9. A total of five different herbicides were used as lay-by treatments. Each herbicide was sprayed as a broadcast treatment. Lay-by herbicide treatments will be evaluated during March to determine their control of winter weeds, and again in June to determine their control of weeds germinating during spring and early summer.

Results

Table 1 contains onion tolerance ratings for each herbicide treatment. The percent weed control of each weed species is reported in Table 2.

Onion tolerance: Each line of onions was most tolerant to Ramrod and/or Prefar. Dacthal caused more injury to onions than did Ramrod or Prefar. Pyramin showed very little herbicide activity in onions. Sonalan caused severe injury (stand loss) to onions when applied preplant. Preplant treatments, including Ramrod or Ramrod/Prefar, were superior compared to postemergence treatments considering both weed control and onion tolerance. Ronstar/Hoelon was the best of those herbicides applied as postemergence treatments. This combination gave satisfactory weed control with adequate tolerance to most onion lines. Goal/Hoelon was rated next to Ronstar/Hoelon in performance. It was much safer to onions than either Brominal or Basagran. Both Brominal and Basagran caused severe injury to centain lines of onions. Basagran caused severe injury to onions and was also less active on weeds compared to Brominal. Considering both onion tolerance and weed control, preplant treatments were superior to herbicides available as postemergence treatments. Based on the results of this trial and the weed species present, Ramrod alone, at rates of 6 and 9 lbs ai/ac, or a tank-mix combination of Ramrod/Prefar at 4 + 4 and 4 + 6 lbs ai/ac, result in excellent weed control and crop tolerance. The lower rates should be used on sandy loam to loam soils, the higher rates on the finer textured soils, including those of silt and clay loams.

Weed control: Lambsquarters, pigweed, and barnyard grass were controlled effectively with Ramrod, Dacthal, and Prefar. Hairy nightshade was most difficult to control with these herbicides. If hairy nightshade existed at high populations in seed fields, it would be necessary to apply Brominal or Goal as postemergence treatments for control. Growers would probably be wise not to plant onions which are sensitive to Brominal or Goal in a nightshade-infected field. Pyramin did not control weeds. It was expected to be effective on all broadleaf species encountered in this trial. The formula was old and might have been responsible for the results obtained. Goal is less active on lambsquarters, but effective on pigweed and nightshade. Ronstar is active on lambsquarters and pigweed, but will not control hairy nightshade if it has more than two true leaves. Brominal is active on all seedling species of broadleaf weeds. Weed control with Basagran is variable and seems to be most active on susceptible weeds when temperatures exceed 75^0F and humidity is high. Onions are probably less tolerant to Basagran under the conditions for maximum weed control. Hoelon is very active as a foliar treatment on seedling barnyard grass, and it is soil residual, persisting to control annual grass during the spring and summer months after its application at planting time.

The onions were weed-free when the lay-by treatments were applied on November 9. The lay-by treatments will be evaluated for control of winter and summer annual broadleaf and grassy weeds. These evaluations will be reported in a final summary after the study is completed in June 1983.

TABLE 1. Herbicide tolerance ratings to parent lines of onions from Asgrow Seed Company. Malheur Experiment Station, Ontario, Oregon, 1982

			Onion Parent Lines*																							
Herbicide	Rate (lbs ai/ac)	Applied	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Prefar	4	ppi	1.3	1.3	1	1.6	2.3	1.3	1.6	1.6	2.6	1.6	2.6	1.6	2	2.3	1.6	2.3	4.3	2.3	2.3	3	1.6	2.6	2.6	1:6
Prefar	6	ppi	1.3	1	1	1	3.3	1.6	1.3	2	3.3	2	2.3	2.3	2	3	2.3	1.6	3.6	1.6	2.6	4	1.6	3.3	1.3	1.3
Pyramin	4	ppi	1	1.3	1.3	1	1.3	1.3	1	1.3	1.6	1	1.3	1.3	1.3	1	1	1	2	1	1.6	5.6	1	1.3	1	1.3
Dacthal	6	ppi	2.6	1.6	1.6	1	4.3	1	1.6	1.6	3.6	1	2.3	2.3	1	2.6	3.6	2	3.6	2.6	3.3	4.6	2.6	4	1.3	2
Dacthal	9	ppi	2.3	1.6	2.3	2	6	3	3	4	4	2.3	3.6	2	3	3	2	3.3	5.3	4.3	2.6	1.3	2	3	1.3	2.6
Ramrod	6	ppi	2	1.6	1.3	1	2	1	1.3	1.3	2.6	1.3	1	1	1	1	1.3	1.3	3.3	1.6	1.3	1.3	1.3	2.6	1	1.6
Ramrod	9	ppi	1	1	1	1	1	1	2.3	2.3	1.6	1.6	1	1	1.3	2.3	1.6	2.3	2.6	1.3	1.3	2	1.3	1.3	1	1
Prefar/Pyramin	4 + 4	ppi	1	1	1.6	1.6	2.6	1.3	2	3.6	2.3	1.3	1.6	1.3	1	2	1.6	2.3	2	2	2	2	2	2.6	1.3	2.6
Prefar/Dacthal	4 + 4	ppi	2.6	2.3	1.6	1.6	3.3	1.3	1	1.6	2.3	1	3.3	2	1.3	1.3	2.6	3	4.3	2.6	3.6	5.6	2.6	4	1.3	2
Prefar/Dacthal	4 + 6	ppi	2.6	2	3	3	3.3	3.3	4	4	5.6	1.6	3.6	2.3	2	4	4	4.6	2	2.6	3.6	5.3	3	3.6	2.6	3
Prefar/Ramrod	4 + 4	ppi	1.6	1	1.6	1	2.6	1.3	1	2	3	1.3	2	1.6	1.3	1.3	1.6	2	6	2	4.3	2.3	2.3	3.6	2.6	2.6
Prefar/Ramrod	4 + 6	ppi	1.6	1	1	1	2.6	1.3	1	1.6	2.3	1	1	1	1	1	1.6	1.3	4	2	2.3	2.6	2.3	1.6	1	2
Dacthal/Ramrod	4 + 4	ppi	2	1.6	1.3	1.3	6.6	1.6	2.3	3.3	3.3	1.3	4.3	3.6	2.3	2.3	2.6	2	4.3	3	2.6	2	2	3	1.3	1
Dacthal/Ramrod	6 + 6	ppi	3.3	2.1	1.3	1	5	2	1.3	2	6.3	2.3	3.6	3.3	3	3.6	3.6	3	4.6	2.6	3.6	3.3	2	4	1.6	3.6
Sonalan	1.5	ppi	9.6	8.6	7.6	4.3	9.6	8	6.6	5.3	9.6	6.3	8	8	7.3	8.6	8.6	9.3	8.6	7.6	8.6	10	10	10	9.3	7.3
Ronstar/Hoelon	1 + 1½	post	1.6	2	1	1	2.6	1.3	1	4	2.6	1.3	2	2	1	1	1.6	2.6	3.6	2.6	2.3	3	2	2.3	1.6	2.6
Goal/Hoelon	¼ + 1½	post	1.3	1.3	1.3	1.3	3.6	1.3	1.3	2	2.6	1.6	3	1.6	1.3	1.6	2.3	2	6.6	2.3	5	6	3.6	3	2.3	4
Brominal/Hoelon	1/3 + 1½	post	4	3.1	1.6	1.6	3.6	2	2.3	3.3	3	3	4	3	2	2	3.3	2	5.6	3.2	3	3.3	3	4	2	2.3
Brominal/Hoelon	½ + 1½	post	3.3	4.1	1.3	1.3	8	1.6	2.3	3.6	3	2	4.6	2.6	3	3	4.6	2.6	5.3	3.2	5	5.3	2	3.3	2.3	2.3
Brominal/Hoelon	2/3 + 1½	post	7	7	2.3	1.6	5	2.6	4.3	4.6	5.3	3.6	5	3	3	3.6	5.6	3.6	9	5	7	8.6	5.3	6.3	6.6	6.3
Basagran	1	post	5	3	2.6	3	5.3	2.6	3	5.6	10	4	7.3	5	5	6.3	6	6.6	9	4.6	8.6	6.6	3.6	4	3	3.3
Basagran	2	post	7.3	6.3	3	4.6	5	4	6	8	10	4.6	8	3.6	5	6	6.6	10	7	5.3	5.3	5	3.3	2.3	4.6	5
Basagran/Hoelon	1 + 1½	post	5.6	5.6	2	4	3.6	2.6	5	4.3	10	3	9.6	3.3	3.6	3.6	6.6	8	9	5.3	6	7	3.6	2.6	4	4
Prowl	2	lay-by																								
Lorox	1	lay-by																								
Dual	4	lay-by																								
Sonalan	1½	lay-by																								
Surflan	1½	lay-by																								
Control	--	--	1	1	1	1	2.3	1	1	1	2	1	1	1	1	1.6	1	1	3.3	1	1	1.6	1.3	1	1	1

Ratings: 1 = no herbicide effect, 10 = plant elimination, 5 = severe foliar injury and beginning of stand reduction.

Example: 6 = 20% stand reduction, 8 = 60% stand reduction. Ratings from 1-5 indicate different degrees of foliar injury and loss of plant vigor.

* Parent line number 1 represents line planted in first row on east side of plot area.

Evaluated on August 9 and 10, 1982. Lay-by treatments applied on November 10, 1982.

TABLE 2. Percent control of weeds by species in onion herbicide tolerance study (Asgrow Seed Company trial). Malheur Experiment Station, Ontario, Oregon, 1982

Herbicide	Rate lbs ai/ac	Applied	Lambs-quarters %	Redroot Pigweed %	Hairy Nightshade %	Barnyard Grass %
			- - - - - - - - - Percent Weed Control			- - - - - - - - -
Prefar	4	ppi	72	88	0	95
Prefar	6	ppi	86	94	0	99
Pyramin	4	ppi	35	48	20	0
Dacthal	6	ppi	82	89	65	78
Dacthal	9	ppi	90	94	70	89
Ramrod	6	ppi	92	96	60	94
Ramrod	9	ppi	96	99	73	98
Prefar/Pyramin	4 + 4	ppi	78	92	30	96
Prefar/Dacthal	4 + 4	ppi	92	96	65	99
Prefar/Dacthal	4 + 6	ppi	95	98	70	99
Prefar/Ramrod	4 + 4	ppi	96	99	75	99
Prefar/Ramrod	4 + 6	ppi	100	100	75	100
Dacthal/Ramrod	4 + 4	ppi	95	97	65	98
Dacthal/Ramrod	6 + 6	ppi	98	99	75	100
Sonalan	1.5	ppi	98	100	99	100
Ronstar/Hoelon	1 + 1½	post	96	98	82	100
Goal/Hoelon	¼ + 1½	post	80	95	93	98
Brominal/Hoelon	1/3 + 1½	post	90	80	95	99
Brominal/Hoelon	½ + 1½	post	96	90	98	99
Brominal/Hoelon	2/3 + 1½	post	100	100	100	100
Basagran	1	post	60	80	60	0
Basagran	2	post	70	85	70	0
Basagran/Hoelon	1 + 1½	post	65	70	55	0
Prowl	2	lay-by	--	--	--	--
Lorox	1	lay-by	--	--	--	--
Dual	4	lay-by	--	--	--	--
Sonalan	1½	lay-by	--	--	--	--
Surflan	1½	lay-by	--	--	--	--
Control	---	------	0	0	0	0

Evaluated on August 4, 1982. Lay-by treatments will be evaluated in spring and early summer of 1983.
Ratings: 0 = no herbicidal effect, 100 = plants eliminated.

BRAVO FUNGICIDE TREATMENTS FOR NECKROT CONTROL IN ONIONS

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

Bravo fungicide was applied to the leaves and bulb of a neckrot-susceptible white variety of sweet spanish onion to determine if it would improve the storage quality of onions by reducing bulb losses from Botrytis neckrot infection.

Procedure

Avalanche, a white sweet spanish variety of onion which is highly susceptible to Botrytis neckrot was seeded on April 10. The soil was treated with a tank-mix combination of Dacthal and Ramrod for weed control. Each herbicide was applied at a rate of 4 lbs ai/ac and incorporated with a spike-tooth harrow. About 100 units of phosphate and 60 units of nitrogen were plowed under in the fall. An additional 120 units of nitrogen were sidedressed on June 10. Each plot was 4 rows wide and 25 feet long. The distance between rows was 22 inches, and when the onions had 3-4 leaves, the plants within the row were hand-thinned to a spacing of 4 inches between plants.

Bravo treatments were applied at rates of 1½ and 3 pts/ac. Both rates were applied at two different times. The applications were made 10 days before the bulbs were lifted, and right after they were lifted. The post-lifting treatments were applied on the same day the bulbs were lifted. Approximately 40 percent of the onion tops had fallen over when the early Bravo treatments were applied. The bulbs were lifted on September 17, and hand-topped on September 28.

Bravo treatments were applied with a CO_2 backpack sprayer, using 8006 teejet nozzles and a spray pressure of 40 psi. Water, the carrier for the fungicide, was applied at a volume of 61 gallons per acre. The spray boom was equipped with 4 nozzles spaced 22 inches apart; thus, a nozzle was over the center of each row when the treatments were applied.

The onion bulbs were harvested from the two center rows of each plot. Sixteen feet of each row were harvested. This was enough area to fill each storage crate. Two crates were harvested from each plot, with a total of six crates for each treatment. The crated onion bulbs were put in storage on October 9. The storage facility was equipped with electric fans for forced-air circulation to help regulate storage temperature and humidity.

Results

Avalanche is a very late-maturing, white variety of sweet spanish onion. Its bulb is rather soft, its neck large, and it produced a high percentage of bulbs which were larger than 3 inches in diameter. Bulb yields are reported, although Bravo treatments would not have had a direct effect on bulb yield and size because of the late application of the treatments.

Avalanche is very susceptible to infection by Botrytis neckrot. Data show that about half the bulbs (49%) in the control plots were severely infected with Botrytis. Bravo applications at both the 1½ and 3 pt/ac rates, which were applied ten days before lifting, reduced the percentage of neckrot to about 35 percent. This was a reduction great enough to be measured significant at the 5 percent level. The percent neckrot in the onions which were treated with Bravo after lifting was equal to the control.

These data indicate that Bravo applied before lifting might reduce the incidence of neckrot in onion varieties which are highly susceptible to Botrytis infection and where large losses might occur. It is noted, however, that even though Bravo might have saved 15 percent of the onions in storage, there was still a 35 percent loss with the better treatment. Perhaps multiple applications of Bravo are needed to give the degree of Botrytis neckrot control desired.

TABLE 1. The percent neckrot and yield of onion bulbs measured from Avalanche variety of white sweet spanish onions treated with Bravo fungicide and stored about 90 days. Malheur Experiment Station, Ontario, Oregon, 1982

			- - - -Bulb Yields of Marketable Onions[4] - - - - - - - -							
Bravo Rates pts/ac	Applied	Total cwt/ac	+ 4 inch cwt/ac	%	3-4 inch cwt/ac	%	No. 2's cwt/ac	Neckrot cwt/ac	%	Culls[3] %
1.5	10 days[1]	873	386	44	95	11	2	323	37	8
3.0	10 days	861	422	49	101	12	1	293	34	5
1.5	after[2]	891	380	43	83	9	1	383	43	5
3.0	after	873	327	37	93	11	1	384	44	8
Control	----	867	285	33	95	11	2	425	49	7
	LSD (.05)	NS	97	--	NS	--	NS	61	8	-
	CV (%)	2.4	8.7	--	12.3	--	18.0	6.5	7.1	-

[1] Applications 10 days before lifting bulbs.

[2] Applications after bulbs were lifted.

[3] Bulbs less than 3 inches in diameter.

[4] Expressed as cwt/ac and % of total yield.

POTATO VARIETY TRIALS

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

This study was conducted to evaluate tuber yield and quality in experimental lines of early and late harvest potatoes. The experimental lines which were entered in the trials were received from Dr. Joe Pavek, University of Idaho Research and Extension Center in Aberdeen, Idaho. Certain lines were sampled at harvest time and evaluated for processing quality by research personnel from Ore-Ida Foods, Inc., Ontario, Oregon.

Procedure

The potatoes were planted in silt loam soil. The site was prepared for planting by plowing in the fall and bedding in the spring. The previous crop was Stephens wheat, and the residue from the wheat crop was shredded after harvest. The field was then disced, irrigated, and fertilized with 100 lbs of phosphorus and 60 lbs of nitrogen before planting.

Preliminary and advanced experimental lines were planted on April 26 in both the early and late harvest trials. Each plot was a single row, and seed pieces for 25 hills were planted per plot for each entry in the preliminary trial, and 30 hills were planted per plot for entries in the advanced trial. Each entry in the preliminary trial was replicated three times, entries in the advanced trial were replicated four times, and the entries were arranged randomly in a complete block experimental design. There were a total of 35 entries evaluated in the late harvest trial and 30 entries in the early harvest trial.

Lasso was applied and mechanically incorporated as a postplant preemergence treatment for weed control. The potatoes were watered by furrow irrigation, usually in every other row, alternating rows between irrigations. Each row was irrigated for 12 hours every four days during the time when water was in peak demand.

Entries in both the early and late harvest trials were evaluated for vine maturity just before beating-off the vines in preparation for digging the potatoes. The degree of maturity is indicated by a numerical rating of "1-5." A "5" identifies plants with green stems and leaves and "1" indicates the vines which were dry.

The vines were removed from the early harvest trial on August 6, and the tubers were harvested on August 12. Dates for vine removal and tuber harvest for the late varieties were October 4 and October 12.

The data are recorded in the following tables (1-7). Potato tubers from the late harvest plots were large, and many lines had exceptionally high yields.

TABLE 1. 1982 preliminary early harvest potato variety trial. Malheur Experiment Station, Ontario, Oregon

	- - - - - - - - - - U.S. No. 1 Tubers - - - - - -								- - - - - - - - -No. 2 Tubers - - - - - - - -						
Entry	≥ 10 oz		6 - 10 oz		4 - 6 oz		Total No. 1's		≥ 10 oz		≤ 10 oz		≤ 4 oz		Total Yield
	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt
A69827-25	92	25	131	35	80	22	303	82	6	2	4	1	57	2	370
A71991-3	55	18	87	28	82	27	224	73	2	1	15	4	66	21	307
A71991-5	122	29	151	36	64	15	337	81	13	3	12	3	54	13	416
A71997-8	11	3	81	24	77	22	169	49	2	1	40	12	132	38	343
A74452-1	63	18	138	39	73	21	274	78	6	2	5	1	66	19	351
TXA528-5	54	17	66	20	74	23	194	60	35	11	24	7	71	22	324
A7685-1	19	6	82	25	54	16	155	47	22	7	76	23	77	23	330
A76260-16	147	36	134	33	48	12	329	82	25	6	8	2	41	10	403
A7738-2	109	29	126	34	72	19	307	82	5	1	2	1	62	16	376
A7787-3	52	17	79	26	70	23	201	65	19	6	13	4	74	24	307
A77155-4	146	34	117	27	57	13	320	74	27	6	33	8	51	12	431
A77230-2	104	26	120	30	63	16	287	73	26	6	37	9	45	11	395
78-LC1	82	26	86	27	56	18	224	70	36	11	5	2	55	17	320
A77254-9	26	8	81	25	95	30	202	63	3	1	4	1	111	35	320
A77255-4	16	5	44	15	94	32	154	52	0	0	18	6	122	41	294
A77255-2	38	15	83	33	74	29	195	77	2	1	6	2	50	20	253
NDA8694-3	151	36	134	32	58	14	343	81	13	3	12	3	53	12	421
Norgold	53	12	182	41	111	25	346	79	2	1	6	1	86	20	440
Lemhi	80	20	149	38	89	22	318	80	5	1	12	3	62	2	397
Russet Burbank	17	4	69	17	94	23	180	45	14	3	84	21	123	31	401
Mean	72		107		74		253		13		21		73		359
LSD (.05)	39		51		28		89		21		36		38		90
CV (%)	34		30		24		22		41		38		33		15

TABLE 2. 1982 preliminary late harvest potato variety trial. Malheur Experiment Station, Ontario, Oregon

	U.S. No. 1's								No. 2's									
Entry	≥10 oz		6-10 oz		4-6 oz		Total No. 1's		≥10 oz		4-10 oz		Total No. 2's		Culls		Total Yield
	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt
A 68678-9	252	46	210	39	53	10	515	95	0	0	2	0	2	0	26	5	543
A 71997-8	129	19	242	35	164	24	537	79	37	5	12	2	49	7	98	14	683
A 74114-4	94	17	177	32	145	26	415	74	68	12	18	3	86	15	59	11	560
A 74452-1	250	47	157	29	52	10	459	86	22	4	9	2	32	6	45	8	536
A 75459-2	166	25	261	39	127	19	554	83	15	2	5	1	20	3	91	14	664
A 7651-36	258	51	100	20	46	9	403	79	48	9	16	3	64	13	41	8	500
A 7668-2	285	46	110	18	81	13	475	76	65	10	36	6	101	16	49	8	626
A 7735-1	204	38	146	27	81	15	431	81	29	5	30	6	60	11	43	8	533
A 77131-6	208	54	52	14	19	5	278	73	31	8	5	1	36	9	69	18	383
A 77182-1	225	34	191	29	122	19	537	81	49	7	50	8	99	15	23	3	659
A 77230-2	197	33	160	24	55	9	411	69	68	11	59	10	127	21	55	9	594
A 77230-8	184	42	82	19	41	9	307	71	79	18	2	0	81	19	46	11	434
A 77232-3	278	46	125	21	59	10	462	76	64	11	25	4	88	15	57	9	606
A 77250-3	303	51	166	28	56	9	525	88	20	3	9	2	29	5	43	7	598
A 77262-1	177	34	81	16	46	9	304	59	122	24	19	4	141	27	71	14	517
A 77506-10	385	53	164	23	43	6	592	82	83	12	25	3	108	15	21	3	720
A 77725-4	74	16	116	25	64	14	253	54	55	12	76	16	131	28	83	18	466
NDA 848-3	384	59	90	14	40	6	513	78	66	10	23	4	88	13	53	8	655
Lemhi	375	56	178	27	57	9	610	91	19	3	8	1	27	4	31	5	668
Russet Burbank	109	16	176	26	72	11	357	52	147	22	101	15	249	37	76	11	681
AVG =	227		149		71		446		54		26		81		54		582
CV (%) =	15.0%		18.8%		24.7%		9.6%		56.6%		77.0%		49.9%				8.1
LSD (.05)=	54		45		28		69		50		33		64		36		76
LSD (.01)=	71		59		37		91		65		43		85		47		100

TABLE 3. 1982 advanced late harvest potato variety trial. Malheur Experiment Station, Ontario, Oregon

	U.S. No. 1's								No. 2's									
Entry	≥ 10 oz		6-10 oz		4-6 oz		Total No. 1's		≥ 10 oz		4-10 oz		Total No. 2's		Culls		Total Yield
	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt
A 7411-2	329	42	130	16	61	8	521	66	143	18	64	8	207	26	60	8	788
A 74341-4	244	35	172	25	99	14	514	74	30	4	37	5	66	10	109	16	691
A 74595-11	188	39	194	41	71	15	391	72	19	4	23	5	42	9	43	9	476
A 75188-3	474	62	140	18	39	5	656	86	61	8	22	3	83	11	22	3	760
A 7637-8	290	52	112	20	62	11	465	84	24	4	20	4	43	8	48	9	556
A 7637-12	165	32	143	28	77	15	385	75	34	7	28	5	61	12	69	13	514
A 76147-2	418	45	144	15	64	7	625	67	217	23	43	5	260	28	47	5	932
Butte	206	32	141	22	74	11	421	65	104	16	45	7	149	23	77	12	647
Lemhi	265	43	178	29	66	11	509	82	29	5	46	7	75	12	40	6	623
Russet Burbank	123	17	126	17	52	7	300	41	219	30	144	20	363	49	73	10	736
567-1 (Reg.)	128	28	81	18	46	10	256	56	83	18	52	11	135	30	65	14	456
285-18 (Reg.)	63	15	130	31	94	22	288	69	12	3	20	5	32	8	100	24	419
708-6 (Reg.)	198	43	96	21	43	9	338	73	66	14	30	7	96	21	29	6	461
BC 9289-1 (Reg.)	123	24	146	29	84	17	353	70	14	3	17	3	31	6	119	24	503
WC 630-2 (Reg.)	176	35	143	28	63	13	379	75	41	8	32	6	74	15	55	11	509
AVG =	226		134		66		427		73		41		114		64		605
CV (%) =	24.5%		23.6%		25.8%		17.3%		57.0%		43.1%		43.0%		24.7%		12.3
LSD (.05) =	77		44		24		102		57		25		70		22		103
LSD (.01) =	101		57		31		134		76		32		91		28		136

TABLE 4. Internal quality ratings and vine maturity data. Malheur Experiment Station, Ontario, Oregon, 1982

Preliminary Late Harvest

Entry	Internal Necrosis[1]	Hollow Heart[1]	Specific Gravity	Fry Color 45°C	Raw Color	Boil Color	Boil Texture	Maturity
A68678-9	14	0	90	1.4	1.4	2.1	6.5	1.5
A71997-8	0	2	96	1.8	1.8	2.2	6.2	2.5
A74114-4	1	2	98	2.5	1.7	2.8	5.8	2.0
A74452-1	1	2	88	2.3	1.5	1.3	5.7	1.0
A75459-2	3	1	85	1.8	1.5	2.1	7.0	2.7
A7651-36	16	5	96	0.7	1.7	2.5	6.3	3.0
A7668-2	0	4	114	0.8	1.5	1.8	6.3	3.4
A7735-1	2	0	102	1.3	1.7	2.1	6.5	2.3
A77131-6	0	1	109	1.1	1.5	1.8	6.3	2.3
A77182-1	9	5	112	1.0	1.8	1.8	6.7	2.0
A77230-2	0	0	79	2.4	1.4	1.8	6.0	1.6
A77230-8	19	14	91	2.0	1.8	1.7	5.8	2.3
A77232-3	2	0	79	1.2	1.6	1.1	6.7	2.0
A77255-3	2	2	99	1.3	1.6	1.3	6.2	3.5
A77262-1	1	2	78	2.1	1.4	1.3	6.7	2.0
A77586-10	0	5	95	2.9	1.7	1.9	6.3	1.3
A77725-4	0	0	97	1.8	1.5	1.6	6.3	2.3
NDA848-3	1	0	93	1.8	1.5	1.4	6.5	2.0
Lemhi	0	3	103	1.0	1.5	2.3	5.8	2.0
Russet Burbank	0	0	95	1.4	1.5	2.2	6.7	3.5
		Mean	95	1.6	1.6	1.8	6.3	---
		LSD (.05)	5	0.8	0.4	0.7	1.1	---
		LSD (.01)	7	1.1	0.5	0.9	1.5	---
		CV (%)	3	28.9	14.3	22.9	10.8	---

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[1] 30 tubers sampled

TABLE 5. Internal quality ratings and vine maturity data. Malheur Experiment Station, Ontario, Oregon, 1982

Advanced Late Harvest

Entry	Internal Necrosis	Hollow Heart	Specific Gravity	Fry Color 45°C	Raw Color	Boil Color	Boil Texture	Maturity
A7411-2	0	0	102	0.9	1.6	1.8	6.8	3.8
A74341-4	7	3	86	0.5	1.6	1.5	6.5	1.5
A74595-11	2	2	97	0.7	1.5	1.8	6.3	2.3
A75188-3	0	0	91	2.5	1.5	1.3	6.3	4.3
A7637-8	0	0	96	0.7	1.7	2.0	6.4	4.3
A7637-12	1	0	103	1.4	1.6	2.5	6.5	5.0
A76147-2	8	0	91	1.0	1.5	2.1	6.6	3.8
Butte	0	0	101	1.2	1.5	1.7	7.3	1.5
Lemhi	1	5	94	0.8	1.4	2.0	6.4	1.5
Russet Burbank	2	0	89	1.3	1.6	2.1	6.5	1.3
Wn C567-1	0	0	83	2.7	1.7	2.8	5.9	1.5
Wn C285-18	1	0	99	1.5	2.2	2.4	5.8	4.8
Wn C708-6	1	8	86	1.7	1.7	1.1	6.8	2.0
BC 9289-1	6	0	87	2.1	2.1	2.0	6.4	2.3
Wn C630-2	0	0	96	1.1	1.8	1.7	6.6	4.0
		Mean	93	1.3	1.6	1.9	6.5	---
		LSD (.05)	5	0.5	0.3	0.5	0.9	---
		LSD (.01)	7	0.7	0.4	0.7	1.2	---
		CV (%)	4	28.3	12.4	19.6	9.7	---

TABLE 6. Internal quality ratings and vine maturity data. Malheur Experiment Station, Ontario, Oregon, 1982

Preliminary Early Harvest

Entry	Specific Gravity	Fry Color 45°C	Raw Color	Boil Color	Boil Texture	Maturity
A69827-25	1.077	0.6	1.8	2.0	4.8	2.0
A71991-3	79	0.8	2.0	1.8	6.2	3.0
A71991-5	80	1.0	2.0	2.0	4.3	3.5
A71997-8	80	0.8	2.2	2.5	5.7	4.5
A74452-1	77	0.5	1.5	1.3	5.8	4.5
TXA528-5	75	0.8	2.7	3.0	6.7	4.5
A7685-1	78	0.5	2.0	2.5	5.7	3.3
A76260-16	78	0.5	2.0	3.0	4.5	2.7
A7738-2	78	1.1	2.2	2.3	6.0	3.8
A7787-3	75	0.8	1.3	2.0	4.2	4.1
A77155-4	77	0.7	2.0	2.3	5.5	3.0
A77230-2	70	0.8	2.0	3.0	4.3	4.3
78-LC1	71	0.8	2.0	1.8	6.2	3.3
A77254-9	85	1.0	2.5	3.2	6.2	3.7
A77255-4	75	0.5	2.0	3.0	5.0	4.2
A77594-2	74	1.8	2.0	2.7	6.5	5.0
NDA8694-2	77	0.5	1.8	1.3	5.8	3.0
Norgold	82	1.8	2.0	1.8	6.8	2.0
Lemhi	87	0.7	2.0	3.5	5.8	3.3
Russet Burbank	75	0.5	2.0	3.0	5.7	4.2
Mean	78	0.8	2.0	2.4	5.6	---
LSD (.05)	7	0.5	0.5	0.9	1.7	---
LSD (.01)	9	0.7	0.6	1.2	2.3	---
CV (%)	5	36.5	13.9	21.8	18.6	---

TABLE 7. Internal quality ratings and vine maturity data. Malheur Experiment Station, Ontario, Oregon, 1982

Advanced Early Harvest

Entry		Specific Gravity	Fry Color 45°C	Raw Color	Boil Color	Boil Texture	Maturity
A68678-9		1.070	1.2	2.0	2.0	4.1	5.0
A74114-4		81	0.7	2.0	2.5	6.0	3.8
A76147-2		82	0.7	2.0	2.6	4.6	4.2
A76161-4		75	1.0	2.0	2.1	5.1	4.5
NDA8694-3		78	0.5	1.9	1.6	5.5	4.0
Norgold M		76	1.9	2.0	2.0	6.3	4.0
Norgold 35		74	1.8	2.0	1.6	5.8	4.2
Norgold Russet		78	1.5	2.0	2.0	5.0	3.8
Lemhi		84	0.6	2.0	2.8	6.0	4.8
Russet Burbank		76	0.5	1.9	2.3	5.6	4.5
	Mean	77	1.0	2.0	2.2	5.4	---
	LSD (.05)	3	0.5	0.2	0.6	1.7	---
	LSD (.01)	5	0.7	0.2	0.9	2.3	---
	CV (%)	2	35.9	5.8	20.8	21.7	---

EVALUATING WEED CONTROL AND CROP TOLERANCE OF SOIL- AND FOLIAR-ACTIVE HERBICIDES APPLIED IN THE FALL AND SPRING TO FURROW-IRRIGATED POTATOES

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

Potato production in much of Malheur County is characterized by a large amount of acreage which is watered by furrow irrigation. Soil-active herbicides used for weed control in furrow-irrigated potatoes are normally applied as postplant preemergence treatments. To be effective as herbicides, these materials require mechanical tillage for incorporation. In addition to the extra cost for mechanical incorporation of herbicides, the soils in water furrows are compacted, and water penetration is restricted by the extra tractor traffic. Compacted soils also prevent normal root growth by restrictive diffusion of oxygen, and when these conditions occur, both tuber yield and tuber quality are reduced.

It is now a common practice for growers in the Treasure Valley in southwest Idaho and Malheur County in Oregon to till the soil in their perspective potato fields in the fall in preparation for planting in the spring. The final tillage operation in the fall is bedding. Bedding marks the area where each row of potatoes will be planted, and the re-hilled soil conserves winter moisture, eliminating the need for irrigation after planting to insure potato emergence. Winter freezing and thawing improve soil tilth and result in better harvesting conditions by eliminating clods, thus reducing labor costs and increasing the percentage of bruise-free potatoes.

Herbicides applied to the surface of bedded ground can be activated by winter moisture and by tillage as the beds are harrowed in the spring before planting and again as the potato hill is re-established after planting.

Applying herbicides in the fall has been an effective treatment for weed control in spring-seeded onions and sugar beets. New registration of herbicides has now been developed for fall application. Other herbicides are soon to be registered for application in the fall. It is now recognized that fall applications are beneficial, especially in crops watered by furrow irrigation. Potatoes are another crop that can fit in this category, and benefits can also be derived by applying and incorporating herbicides in the fall or spring to bedded land, thus eliminating extra tillage to incorporate postplant preemergence applications which are detrimental to potato production in this area.

The study was conducted with the following objectives: (1) to evaluate the application of herbicides to bedded land and justify their use by showing an improvement in weed control, tuber yield, and tuber quality; (2) to evaluate Fusilade, Poast, and Hoelon as tank-mix combinations with Sencor/Lexone for the control of broadleaf and grassy species of weeds when applied postemergence to potatoes and weeds; (3) to compare the tolerance of new potato cultivars to herbicides used for weed control in potatoes; and (4) to evaluate the tolerance of potatoes to Sonalan and the effectiveness of Sonalan for season-long control of hairy nightshade.

Procedure

Herbicide treatments included fall and spring applications to the surface of soil bedded in the fall of 1981. The beds were shaped to a peak, and the furrows were sufficiently deep to prevent moving the herbicides from the bottom of the water furrows while hilling the potatoes after planting in the spring. Lemhi variety was compared with Russet Burbank for tolerance to Prowl. Prowl was evaluated at several rates when applied alone and as tank-mix combinations with Dual, Lasso, Eptam, and Sencor/Lexone. Postemergence treatments included Sencor/Lexone, Poast, Fusilade, Hoelon, and tank-mix combinations of Sencor/ Lexone with Poast, Fusilade, and Hoelon.

The fall treatments were applied on November 2 to the surface of soil which was bedded on October 28. The beds remained in this condition over winter. Spring applications to fall-bedded soil were made on April 22. Following the spring application, the beds of both the fall and spring treatments were harrowed, pulling the soil from the top of the beds into the furrows. The beds were reduced to about half their original height and left flat on the surface. Russet Burbank potatoes were planted on April 25 and then cultivated to hill the rows on April 26. Large shovels mounted behind the Lilliston were used to hill the potatoes. These plots received no further tillage.

Prowl and Prowl-combinations were applied as postplant preemergence treatments in the Lemhi tolerance study. Lemhi and Russet Burbank potatoes were planted side-by-side in single-row plots. The potatoes were hilled after planting. The herbicides were applied to the soil surface of the hilled potatoes and mechanically incorporated by making two passes with a Lilliston cultivator. The two potato varieties were compared for signs of herbicide injury, including rate of emergence and foliar symptoms.

All herbicides tested as fall- and spring-bedded treatments were also evaluated as postplant preemergence treatments. These treatments were applied and incorporated the same as those in the Lemhi-Prowl interaction study.

Postemergence herbicides were applied on June 7. The weeds were about two inches tall and the potato foliage ranged from 6-8 inches tall. The potatoes in the postemergence trial were not cultivated after they were hilled following planting.

All herbicides were applied as double-overlap broadcast treatments. Spray nozzles (8003 teejet) were spaced 10 inches apart on an 8.5-foot spray boom. Each plot was 9 feet wide, 2-36 rows of potatoes, and 1.5-foot buffer between adjacent plots. The plots were 25 feet long. Water,as the herbicide carrier, was sprayed at a volume of 1 qt/plot (48.4 gal/ac). Spray pressure was 40 psi, and all plots were sprayed with a bicycle-wheel plot sprayer. Seed pieces were planted 9 inches apart in one row of each plot and 18 inches apart in the second row. The wide spacing was used to measure the soil persistence of each herbicide where potato foliage was not dense enough to prevent weed seed germination and growth.

All treatments were evaluated for their effectiveness in controlling various species of weeds and for crop injury. Tubers were harvested during the second week of October to determine tuber yields and tuber quality.

Results

The weed species included pigweed, lambsquarters, kochia, hairy nightshade, and barnyard grass. Sonalan was the single most effective herbicide tested in this trial. Sonalan persisted over winter when applied in the fall to bedded land. It was also effective as a spring-applied, mechanically incorporated treatment. Sonalan was very active on hairy nightshade as well as the other species of weeds in this study. Other herbicides which persisted to control weeds when fall-applied were Prowl, Sencor, and Devrinol. Prowl and Sencor were most effective controlling all weed species when applied in combination as a tank mix. Devrinol did not control hairy nightshade. It was most active on barnyard grass, pigweed, and lambsquarters. Dual, Lasso, and Ro-Neet did not persist over winter, but were very effective as spring-applied treatments to fall-bedded land.

Compared to mechanically incorporated postplant preemergence treatments, weed control and tuber yields were consistently better for all herbicides when they were applied to bedded land and activated by tillage which was necessary to plant and hill the potato rows.

Contrary to results of other tests, Prowl or Prowl combinations did not cause injury to Lemhi or Russet Burbank potatoes. Previous studies by other researchers indicated that possible foliar injury and reduced yields might occur. Neither foliar symptoms from herbicide injury nor yield reductions was noted in this study. Both varieties had high tuber yields. Lemhi was far superior to Russet Burbank in yield of Number 1 tubers.

Sencor, in combination with Hoelon, Fusilade, or Poast, gave excellent control of both broadleaf and grassy weeds when applied as postemergence treatments. Some foliar burn from Sencor was noted, but the symptoms persisted only for a few days after application. Sencor was compatible with Hoelon, Fusilade, and Poast when applied as a tank-mix. Barnyard grass, 6-8 inches tall, was very sensitive to Poast and Fusilade at rates as low as 1/4 lb ai/ac. Hoelon did not control barnyard grass if it exceeded the 3-4 leaf stage. Season-long weed control was obtained for a single postemergence treatment when Sencor/Lexone was applied in combination with Hoelon, Poast, or Fusilade.

TABLE 1. Percent weed control and tolerance of Russet Burbank potatoes to herbicides applied in the fall or spring to the surface of soil bedded in the fall. Malheur Experiment Station, Ontario, Oregon, 1982

				PERCENT WEED CONTROL									
Herbicide	Rate lbs ai/ac	Crop Injury		Pigweed		Lambs-quarters		Kochia		Hairy Nightshade		Barnyard Grass	
		Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Prowl	1	0	0	90	93	94	96	88	92	65	65	94	96
Prowl	2	0	0	100	99	100	100	100	98	75	70	100	100
Prowl/Eptam	1 + 3	0	0	88	93	94	97	94	92	60	88	95	98
Prowl/Sencor	1 + 1/2	0	0	100	99	100	100	100	100	95	90	100	99
Prowl/Lasso	1 + 2 1/2	0	0	95	100	92	98	96	99	80	90	95	99
Prowl/Dual	1 + 2 1/2	0	0	96	100	93	98	95	98	85	91	98	99
Sonalan	1 1/2	0	0	100	98	100	96	100	94	100	98	100	98
Sonalan	3	5	10	100	100	100	100	100	100	100	100	100	100
Dual	3	0	0	90	92	80	88	85	90	70	79	83	94
Dual	4	0	0	94	98	93	96	92	98	83	88	94	98
Eptam/Treflan	3 + 1/2	0	0	88	96	85	93	89	93	35	86	92	96
Ro-Neet	4	0	0	82	98	80	91	40	68	65	92	90	98
Lasso	4	0	0	92	99	85	96	92	97	60	85	90	98
Devrinol	2	0	0	96	93	93	90	92	90	30	20	98	96
Control	-	0	0	0	0	0	0	0	0	0	0	0	0

Ratings: 0 = no herbicide effect, 100 = plants killed

TABLE 2. Potato tuber yields of Russet Burbank potatoes treated with herbicides applied in the fall or spring to the surface of soil bedded in the fall. Malheur Experiment Station, Ontario, Oregon, 1982

		POTATO TUBER YIELDS (cwt/ac)													
						U.S. No. 1's									
Herbicide	Rate lbs ai/ac	No. 2's		Culls		6-10 oz		≥ 10 oz		Percent No. 1's		Total Yield			
		Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring		
Prowl	1	210	218	33	41	69	76	209	199	53	54	521	534		
Prowl	2	245	265	31	30	81	74	201	199	51	48	558	568		
Prowl/Eptam	1 + 3	215	210	29	30	80	76	198	196	53	53	522	512		
Prowl/Sencor	1 + 1/2	208	223	32	30	84	78	219	225	56	54	543	556		
Prowl/Lasso	1 + 2 1/2	198	204	31	30	76	70	195	182	51	52	500	486		
Prowl/Dual	1 + 2 1/2	216	221	30	31	83	80	199	194	53	52	528	526		
Sonalan	1 1/2	214	229	30	28	81	78	199	190	53	51	524	525		
Sonalan	3	183	179	31	32	85	83	229	222	59	59	528	516		
Dual	3	196	207	31	34	97	91	226	220	59	56	550	552		
Dual	4	213	229	30	33	87	79	201	189	54	51	531	530		
Eptam/Treflan	3 + 1/2	219	235	29	30	86	81	248	207	57	52	582	553		
Ro-Neet	4	204	193	31	34	85	74	192	164	54	51	512	465		
Lasso	4	222	259	29	30	89	82	199	185	53	48	539	556		
Devrinol	2	201	213	30	33	87	78	209	197	56	53	527	521		
Control	---	102	93	30	28	72	63	101	92	57	56	305	276		
LSD (.05)	---	58	61	NS	NS	NS	NS	59	62	--	--	98	102		
CV (%)	---	8	9	15	18	13	15	8	10	--	--	9	9		

TABLE 3. Percent weed control and tolerance of Russet Burbank potatoes to herbicides applied postplant preemergence and incorporated after hilling with a Lilliston cultivator. Malheur Experiment Station, Ontario, Oregon, 1982

			PERCENT WEED CONTROL				
Herbicides	Rate lbs ai/ac	Crop Injury	Pigweed	Lambs-quarters	Kochia	Hairy Nightshade	Barnyard Grass
Prowl	1 1/2	0	94	93	90	65	99
Lasso	4	0	95	88	91	85	94
Dual	3	0	92	87	89	88	96
Eptam/Treflan	3 + 1/2	0	98	96	88	85	99
Prowl/Sencor	1 1/2	0	98	98	94	92	100
Prowl/Eptam	1 + 3	0	100	97	93	88	99
Prowl/Dual	1 + 3	0	96	92	90	82	96
Prowl/Lasso	1 + 3	0	99	99	95	90	100
Sonalan	1 1/2	0	99	99	96	98	100
Sonalan	3	0	100	100	100	100	100
Devrinol	2	0	33	38	42	0	62
Eptam	4	0	55	45	40	78	80
Devrinol/Eptam	1 1/2 + 3	0	92	90	86	80	96
PPG 844	1/2	0	15	15	20	30	0
PPG 844	3/4	0	28	0	20	28	8
MBR 20457	1	0	40	30	30	18	93
MBR 20457	2	0	50	48	45	25	98
FOE 2492	2	0	45	32	35	33	98
FOE 2492/Sencor	2 + 1/2	0	85	80	80	60	97
FOE 2602	2	0	55	45	40	40	98
FOE 2602/Sencor	2 + 1/2	0	73	78	65	60	98
Control	---	0	0	0	0	0	0

Ratings: 0 = no herbicide effect, 100 = plants killed

TABLE 4. Potato tuber yields of Russet Burbank potatoes treated with herbicides applied postplant preemergence and incorporated after hilling with a Lilliston cultivator. Malheur Experiment Station, Ontario, Oregon, 1982

		POTATO TUBER YIELDS (cwt/ca)						
				U.S. No. 1's		Total No. 1's		
Herbicides	Rate lbs ai/ac	No. 2's	Culls	6-10 oz.	≥10 oz.	%	cwt/ac	Total Yield
Prowl	1 1/2	172	24	62	151	213	52	408
Lasso	4	141	34	82	170	252	58	429
Dual	3	162	32	70	128	198	51	392
Eptam/Treflan	3 + 1/2	219	30	73	149	222	47	471
Prowl/Sencor	1 + 1/2	219	33	75	134	209	45	461
Prowl/Eptam	1 + 3	259	30	63	164	227	44	515
Prowl/Dual	1 + 3	217	27	54	118	172	41	417
Prowl/Lasso	1 + 3	244	28	60	150	210	43	483
Sonalan	1 1/2	192	35	72	167	239	51	467
Sonalan	3	201	18	55	158	213	49	431
Devrinol	2	115	24	45	65	110	44	249
Eptam	4	148	26	63	85	148	46	323
Devrinol/Eptam	1 1/2 + 3	218	29	70	124	194	44	441
PPG 844	1/2	88	22	43	38	81	42	191
PPG 844	3/4	138	25	49	93	142	47	305
MBR 20457	1	175	23	56	91	147	43	344
MBR 20457	2	146	29	61	69	130	43	305
FOE 2492	2	175	32	56	105	161	44	370
FOE 2492/Sencor	2 + 1/2	183	39	80	150	230	51	452
FOE 2602	2	173	31	60	95	155	43	360
FOE 2602/Sencor	2 + 1/2	132	26	55	111	166	49	339
Control	---	81	21	23	23	46	31	148
LSD (.05)	---	60	7	23	59	66	--	107
CV (%)	---	21	17	19	12	10	--	9

TABLE 5. Tuber yields from Lemhi and Russet Burbank potato varieties treated with Prowl and Prowl combinations of herbicides applied as postplant mechanically-incorporated treatments. Malheur Experiment Station, Ontario, Oregon, 1982

		POTATO TUBER YIELDS (cwt/ac)													
						U.S. No. 1's									
Herbicide	Rate lbs ai/ac	No. 2's		Culls		6-10 oz		≥10 oz		Total		Percent		Total Yield	
		L*	R**	L	R	L	R	L	R	L	R	L	R	L	R
Prowl	3/4	71	202	28	38	102	108	359	265	461	374	82	61	560	613
Prowl	1 1/2	62	251	30	50	114	112	352	277	467	389	84	56	559	690
Prowl	3	40	269	28	42	106	112	353	270	459	382	87	55	527	693
Prowl/Sencor	3/4 + 1/4	40	218	28	43	96	106	372	271	468	377	87	59	536	638
Prowl/Sencor	3/4 + 1/2	45	288	22	39	119	114	353	256	473	370	87	53	541	697
Prowl/Sencor	1 1/2 + 1/4	65	222	29	38	97	105	368	226	465	332	83	56	559	591
Prowl/Sencor	1 1/2 + 1 1/2	64	215	30	24	101	106	301	211	402	317	81	57	496	557
Prowl/Dual	3/4 + 3	73	244	34	36	101	69	371	248	472	317	82	53	579	597
Prowl/Dual	1 1/2 + 3	46	253	24	46	102	98	372	236	474	334	87	53	543	633
Prowl/Lasso	3/4 + 3	67	264	28	36	110	89	334	240	467	329	84	52	559	629
Prowl/Lasso	1 1/2 + 3	63	182	31	50	107	152	315	319	422	471	82	67	516	703
Prowl/Eptam	3/4 + 3	49	279	30	37	139	93	369	231	508	324	87	51	586	640
Prowl/Eptam	1 1/2 + 3	75	236	26	44	103	90	395	234	498	324	83	54	599	604
Control	---	57	203	18	35	108	89	329	219	437	308	85	56	512	546
LSD (.05)	--	NS	82	NS	14	NS	43	NS	78	NS	98	NS	6	NS	138
CV (%)	--	13	20	15	21	10	24	8	18	7	16	12	19	7	13

* Lemhi potato variety

**Russet Burbank potato variety

SUGAR BEET VARIETY TESTING RESULTS

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

The 1982 variety trial included 39 entries. Seed for testing was received from American Crystal Sugar Company, Betaseed Incorporated, Great Western Sugar Company, Holly Sugar Company, Miller Research, and the Amalgamated Sugar Company. Each entry was evaluated for root yield, percent sucrose, percent extractible sugar, and tolerance to curly-top virus. Estimated yields of recoverable sugar were calculated.

Procedure

The trial was conducted at the Malheur Experiment Station. The field was plowed in the fall of 1981. One-hundred pounds of P_2O_5 and 60 pounds of nitrogen per acre were applied broadcast and plowed under. In the spring, 140 pounds of nitrogen per acre (NH_4SO_4) were sidedressed after thinning when the beets had 6-8 leaves. A combination of Nortron and Hoelon (2.0 + 1½ lbs active ingredients per acre) was applied in the spring and incorporated with a spike-tooth harrow before planting.

The sugar beets were planted on April 10 and irrigated for seed germination and seedling emergence. Each variety was replicated 8 times in plots which were 4 rows wide and 25 feet long. The trial was planted with cone seeders which were mounted on John Deere Model 71 flex planting units. Seed for each row was individually packaged with 200 seeds per packet.

The sugar beets were thinned the second week of May to an 8-inch spacing between plants. In mid-July, Bayleton was applied at a rate of 6 ounces ai/ac, broadcast with a ground sprayer for protection against powdery mildew. On September 6, the sugar beets were aerial sprayed with Orthene to control and protect foliage from injury by army worms. Irrigation was by furrow, and water was applied to each corrugate between every row each irrigation.

The plots were harvested on October 18 and 19. Tops were removed with a beater-scalper. The roots from the two center rows of each 4-row plot were dug with a single-row lifter and weighed to determine yields. A sample of 7 beets was taken from each of the two harvested rows to determine percent sucrose and conductivity readings. The coded samples were analyzed at the Amalgamated Sugar Company research laboratory in Nyssa, Oregon.

Soil characteristics were a silt loam texture, pH 7.4, and organic matter 1.1 percent. The previous crop grown on the field was Stephens variety of winter wheat.

EXAMPLES:

Table 1. Yield data from sugar beet variety trial

Variety		Root Yield (lbs/ac)	Sucrose %	Extraction %	Estimated Sugar (lbs/ac)
A		87757	15.61	84.3	11548**
B		85390	15.21	83.9	10897*
C		83470	15.07	83.1	10491
D		82630	14.73	82.9	10041
	LSD (.05)	3433	0.42	0.8	667
	LSD (.01)	4511	0.59	1.1	977
	CV (%)	42	3.4	1.0	6.3

Table 2.

Variety		Estimated Sugar (lbs/ac)	Yield Differences
A		11548	1507**
B		10897	856*
C		10491	450
D		10041	---
	LSD (.05)	667	
	LSD (.01)	997	
	CV (%)	6.3	

**Highly significant difference

* Significant difference

TABLE 1. Summary of data from sugar beet variety trial. Malheur Experiment Station, Ontario, Oregon, 1982

	Company	Variety	Root Yield (lbs/ac)	Sugar Content (%)	Conductivity	Extraction (%)	Estimated Recoverable Sugar (lbs/ac)	Curly Top Ratings USDA
1	American Crystal	ACH-130	87304	15.61	1025	82.2	11202	5.33
2		ACS 81-79	76958	16.19	849	84.7	10553	3.00
3		ACH-31	78469	15.98	921	83.7	10495	4.33
4		ACS 81-272	80096	15.55	905	83.7	10424	2.33
5		ACS 81-80	78236	15.95	936	83.5	10420	3.67
6		ACH-120	73238	16.31	973	83.5	9974	4.67
7	Betaseed	807208(8654)	87013	15.75	922	83.6	11457	3.33
8		9421	85618	15.60	1007	82.4	11005	5.67
9		IC0180	78178	16.68	915	83.8	10928	4.33
10		IC0174	79573	16.25	976	83.1	10745	5.33
11		IC0162	77074	16.10	937	83.5	10361	5.33
12		IC0168	84398	14.85	1018	82.1	10290	4.67
13	Great Western	Mono Hy R_2	84862	15.73	902	83.9	11200	3.33
14		GW 220	85502	15.84	916	83.7	11336	4.00
15		Mono Hy 55	83002	15.76	952	83.2	10883	4.33
16		Mono Hy R_1	80619	15.91	889	84.1	10787	4.00
17		80TMS1255	81317	15.61	871	84.3	10701	2.67
18		Mono Hy CX_2	83060	15.41	946	83.2	10649	2.67
19		*Mono Hy R_1	79921	15.76	871	84.3	10618	4.33
20		*GWH 149	79457	15.45	939	83.4	10238	4.00
21		GW 54	78992	15.54	978	82.8	10164	4.33
22	Holly	HH-35	87716	15.13	1006	82.4	10936	2.67
23		HH-30	84456	15.35	1033	82.0	10631	5.33
24		14210-02	86083	14.94	1026	82.1	10559	4.00
25		HH-7	80794	15.21	887	84.0	10322	3.33
26		HH-28	83119	14.90	954	83.1	10292	2.67
27		14206-02	77306	15.39	936	83.4	9922	3.67
28		HH-36	79515	14.98	940	83.3	9922	3.67
29		HH-22	78527	15.11	962	83.0	9848	2.67
30		14206-05	75155	15.16	968	82.9	9445	3.33
31	Mart	Hyb. 8-529 Large	80038	15.83	841	84.7	10732	1.67
32		IDA-1	80736	15.43	927	83.5	10402	2.00
33	TASCO	9360-02	87246	16.61	852	84.7	12274	4.00
34		0295-02	88466	15.91	906	83.9	11809	3.33
35		9361-02	87943	16.00	906	83.9	11805	3.33
36		0299-02	91721	15.25	968	82.9	11596	3.33
37		*WS-76	81433	16.15	927	83.6	10994	3.67
38		4379-02	82654	15.81	897	84.0	10977	2.67
39		WS-76	82886	15.73	961	83.1	10834	4.00
40		AH-14	80445	14.80	995	82.5	9822	2.67
		LSD (.05)	3433	0.52	48	0.7	667	6.00(2)
		(.01)	4511	0.69	63	0.9	877	3.50(3)
		CV (%)	4.2	3.40	5.2	1.0	6.3	

---

(1) Curly top ratings 1 to 9. 1 = free of curly top symptoms, 9 = plants killed.

(2) Susceptible check variety US/33. (3) Resistant check variety US/41.

Planting date: April 10, 1982. * Commercial seed

Harvesting dates: October 18 and 19, 1982

AN EVALUATION OF PREPLANT INCORPORATED HERBICIDES IN SUGAR BEETS

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

This study was conducted to compare several mechanically incorporated herbicides as preplant treatments for weed control and sugar beet tolerance.

Procedure

On April 14, 1982, herbicides were applied to the surface of pre-worked soil as double overlap broadcast treatments and immediately incorporated to a depth of 2-3 inches by roto-tilling. The bicycle wheel sprayer was equipped with a 7.5 foot boom with 8003 teejet nozzles spaced 10 inches apart. Spraying pressure was 40 psi, and water, as the carrier, was applied at a volume of 42 gallons per acre. When the herbicides were being applied, the skies were cloudy, the wind speed varied from 3-5 mph, and the air temperature was 50^{O}F. The surface of the soil was dry. A soil analysis showed the soil to be a silt loam texture with 1.2 percent organic matter and a pH of 7.8.

Raw sugar beet seed, variety WS-76, was planted on April 16. The plot area was furrow-irrigated to furnish moisture for uniform seed germination, as well as for seedling growth.

The treatments were evaluated for percent weed control and crop tolerance to herbicides on May 24. Following these evaluations, the sugar beets were hand-thinned to a spacing of 8 inches between plants. All weeds were removed during thinning, and the plots were hand-weeded thereafter, as needed, to keep the plots nearly free of weeds during the remainder of the growing season.

The plots were harvested on October 17, 1982. Each plot was 4 rows wide and 25 feet long. Sugar beet roots from the two center rows of each plot were harvested for root weight. One sample containing 7 roots was taken from each row and analyzed for percent sucrose and conductivity. The estimated percent extraction and sugar yield per acre were calculated for each treatment.

Results

Herbicide treatments resulting in superior weed control with adequate crop tolerance included tank mixes of ethofumesate + Pyramin + Hoelon, ethofumesate + Pyramin, and Pyramin + diclofop. These treatments were effective on both broadleaf and grass species of weeds. Grass control was superior when diclofop was applied in combination with Pyramin and ethofumesate.

S-734 was effective for controlling barnyard grass and pigweed, but showed only slight herbicidal activity on kochia, lambsquarters, and prostrate knotweed. S-734 was compatible as a tank mix with Pyramin.

Nortron + S-734 caused a reduction in both sugar beet stands and seedling vigor. However, following hand-thinning, the remaining stands were still sufficient not to have a significant effect in reducing final yields. This might not be the case in commercial fields where less seed is planted and stand reduction would probably be unacceptable.

Some differences did occur between treatments' root yields and percent sucrose, but these differences were not great enough to reduce sugar yields significantly.

TABLE 1. Percent weed control and crop tolerance of sugar beets treated with preplant herbicides. Malheur Experiment Station, Ontario, Oregon, 1982

			- - - - - - - -Percent Weed Control - - - - - - - - -				
Herbicides	lbs ai/ac	Crop Injury	Pig-weed	Lambs-quarters	Kochia	Prostrate	Barnyard Grass
			%	%	%	%	%
Nortron	2	10	100	88	94	92	88
Nortron	3	17	100	92	98	96	92
Pyramin/Hoelon	3 + 1½	0	100	97	92	90	100
Pyramin/Hoelon	4 + 1½	0	100	100	95	94	100
Nortron + Pyramin	1½ + 1½	6	100	97	93	96	98
Nortron + Pyramin	2 + 2	10	100	100	98	98	96
Nortron + Pyramin + Hoelon	1½ + 1½ + 1	5	100	92	93	95	99
Nortron + Pyramin + Hoelon	2 + 2 + 1	12	100	100	97	97	100
S-734	1	17	100	22	10	15	100
S-734	1.5	22	100	18	15	15	100
S-734/Pyramin	1 + 2	18	100	90	88	80	100
S-734/Pyramin	1 + 3	22	100	94	93	85	100
S-734/Pyramin	1½ + 2	18	100	97	86	85	100
S-734/Pyramin	1½ + 3	17	100	100	95	90	100
S-734/Nortron	1 + 2	32	100	100	94	93	100
S-734	1½ + 2	68	100	100	96	93	100
Ro-Neet	4	12	100	80	35	20	100
Nortron/Antor	2 + 2	24	100	100	94	92	100
Antor	4	5	100	40	25	30	100
Control	-	0	0	0	0	0	0

Ratings: 0 = no control, 100 = plant elimination (Ratings are an average of 3 replications for each treatment).

Evaluated on May 24, 1982.

Herbicides were applied before planting and incorporated 2-3 inches with a power roto-tiller.

TABLE 2. Yields from sugar beet trials treated with preplant, applied herbicides. Malheur Experiment Station, Ontario, Oregon, 1982

		YIELDS				
Herbicides	lbs ai/ac	Roots T/A	Sucrose %	Conductivity	Extraction %	Sugar T/A
Nortron	2	38.3	15.6	978	82.8	4.93
Nortron	3	35.8	15.7	970	82.9	4.69
Pyramin/Hoelon	3 + 1½	34.4	15.9	926	83.6	4.59
Pyramin/Hoelon	4 + 1½	36.2	16.1	941	83.4	4.85
Nortron/Pyramin	1½ + 1½	35.1	16.7	898	84.1	4.93
Nortron/Pyramin	2 + 2	38.8	16.2	898	84.0	5.27
Nortron/Pyramin/Hoelon	1½ + 1½ + 1	37.1	15.5	976	82.8	4.78
Nortron/Pyramin/Hoelon	2 + 2 + 1	36.1	15.6	1004	82.5	4.66
S-734	1	37.6	16.2	948	83.3	5.08
S-734	1½	37.1	15.8	968	83.0	4.86
S-734/Pyramin	1 + 2	38.1	16.0	991	82.7	5.06
S-734/Pyramin	1 + 3	37.2	15.8	954	83.2	4.90
S-734/Pyramin	1½ + 2	35.6	16.0	953	83.2	4.77
S-734/Pyramin	1½ + 3	36.5	16.1	929	83.6	4.87
S-734/Nortron	1 + 2	35.2	16.0	942	83.4	4.68
S-734/Nortron	1½ + 2	34.6	15.6	996	82.6	4.46
Ro-Neet	4	37.4	16.2	954	83.2	4.99
Nortron/Antor	2 + 2	36.2	15.9	936	83.4	4.81
Antor	4	38.4	16.3	922	83.7	5.24
Control	-	36.2	15.8	966	83.0	4.77
	LSD (.05) =	2.9	0.6	NS	NS	NS
	CV (%) =	6.9	3.1	6.3	1.0	7.6

HERBICIDES APPLIED AS POSTEMERGENCE TREATMENTS FOR WEED CONTROL IN SUGAR BEETS

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

This trial was conducted to evaluate several foliar-active herbicides for sugar beet selectivity, weed control, and compatibility when applied as tank-mix combinations to sugar beet seedlings.

Procedure

The trials were established at the Malheur Experiment Station and on the Wesley Richmond farm which is located approximately six miles southwest of Ontario, Oregon. The Great Western 149 variety was seeded at the Richmond farm, and the Amalgamated WS-76 variety was planted at the Malheur Experiment Station. Sugar beets in these plots did not receive preplant or preemergence herbicide treatments.

The first application of the repeat treatments was made on May 12. The majority of the sugar beets had two true leaves, and the size of the weeds ranged from 1-2 inches in height and had 2-4 true leaves. The single herbicide treatments were applied on May 19 when the sugar beets had four true leaves, barnyard grass had 3-4 leaves, and broadleaf weeds were 4-5 inches tall and had as many as eight leaves. Volunteer wheat was 8-10 inches tall. The second application of the repeat treatments was made on May 22. When this second application was made, the sugar beet leaves were slightly chlorotic, and a few leaf margins showed signs of necrosis. Nearly all the weeds had been killed by the herbicides after the first application.

Individual plots were four rows wide and 25 feet long, and the sugar beets were planted at 22-inch row spacings. The herbicides were applied as double overlap applications with a bicycle-wheel plot sprayer which was equipped with 8003 teejet nozzles. The spray pressure was 35 psi, and water, which was used as the herbicide carrier, was applied at a volume of 42 gallons per acre.

These applications were made during the morning, from 10 a.m. to noon. The skies were partly cloudy each day, and air temperature reached a high of 68^o, 71^o, and 80^o, respectively, on the dates the treatments were made.

Results

Combination treatments of Betamix and Fusilade, applied as repeat treatments at rates of 1/2, 3/4, or 1 lb ai/ac of Betamix with 1/4 lb ai/ac of

Fusilade, resulted in excellent control (96 percent) of all weed species. The leaves of the sugar beets in the plots which received these treatments were chlorotic, and the leaf margins showed some necrosis. However, these symptoms did not persist to affect production.

Weed control was not as complete from single-application treatments as from repeat-application treatments because of the increased size of the weeds before the single-application treatments were made on May 19.

Ro-Neet and Ro-Neet/Betamix combinations were not effective treatments in this trial. At 0.45 lbs ai/ac, Betamix alone was also ineffective. Ro-Neet in combination with Betamix enhanced broadleaf weed control only slightly more than Betamix alone, but it did increase the control of barnyard grass. This treatment was still inferior to treatments with Poast and Fusilade which were used to control grassy weeds, including both barnyard grass and volunteer wheat. Fusilade and Poast were equally compatible with Betamix as tank-mix combinations.

Betamix mixed with Poast or Fusilade has been found to be an excellent combination to control emerged broadleaf and grassy weeds selectively in sugar beet seedlings.

TABLE 1. Crop tolerance and percent weed control ratings from postemergence herbicides applied to sugar beets. Wesley Richmond Farm, Ontario, Oregon, 1982

Herbicide	Rate lbs ai/ac	Crop Injury	- - - - - - - -Percent Weed Control Lambs-quarters %	- - - Redroot Pigweed %	- - - Hairy Nightshade %	- - - Barnyard Grass %
Ro-Neet	2.06	0	18	12	10	43
Betamix	0.45	0	55	50	18	0
Ro-Neet + Betamix	2.06 + 0.45	0	72	60	20	56
Betamix + Poast	1 + 1/4	6	89	85	60	97
Betamix + Fusilade	1 + 0.375	6	93	88	60	97
SN-561	1 + 0.375	6	91	87	60	98
Betamix + Fusilade	1 + 1/2	6	92	87	62	99
Betamix	1.0	7	91	87	56	43
Betamix + Fusilade	2(1/2 + 1/4)	12	96	97	97	100
Betamix + Fusilade	2(3/4 + 1/4)	14	99	98	99	100
Betamix + Fusilade	2(1 + 1/4)	14	100	100	100	100
Control	---	0	0	0	0	0

Ratings: 0 = no effect, 100 = plants eliminated (ratings are an average of 3 replications).

Evaluated on June 4, 1982.

TABLE 2. Crop tolerance and percent weed control ratings from postemergence herbicides applied to sugar beets. Malheur Experiment Station, Ontario, Oregon, 1982

			- - - - - - - - -Percent Weed Control - - - - - - - - -			
Herbicide	Rate lbs ai/ac	Crop Injury	Lambs-quarters %	Redroot Pigweed %	Volunteer Wheat %	Barnyard Grass %
Ro-Neet	2.06	0	15	10	0	43
Betamix	0.45	0	55	42	0	0
Ro-Neet + Betamix	2.06 + 0.45	0	60	45	0	53
Betamix + Poast	1 + 1/4	5	88	83	98	97
Betamix + Fusilade	1 + 0.375	7	87	85	98	96
SN-561	1 + 0.375	6	85	83	97	97
Betamix + Fusilade	1 + 1/2	7	88	85	97	99
Betamix	1.0	5	83	80	0	40
Betamix + Fusilade	2(1/2 + 1/4)	5	94	91	100	99
Betamix + Fusilade	2(3/4 + 1/4)	10	98	97	100	99
Betamix + Fusilade	2(1 + 1/4)	15	99	99	100	99
Control	---	0	0	0	0	0

Ratings: 0 = no effect, 100 = plants eliminated (Ratings are based on an average of 3 replications).

Evaluated on June 4, 1982.

TABLE 3. Harvested yield data for sugar beets treated with postemergence herbicides for weed control. Malheur Experiment Station, Ontario, Oregon, 1982

Herbicide	Rate lbs ai/ac	Roots T/A	Sucrose %	Conductivity	Extraction %	Sugar T/A
		YIELDS				
Ro-Neet	2.06	39.9	16.5	964	83.2	5.47
Betamix	0.45	39.0	16.2	1008	82.5	5.20
Ro-Neet/Betamix	2.06 + 0.45	37.6	16.2	957	82.5	5.05
Betamix/Poast	1 + 0.250	38.1	16.5	894	84.1	5.30
Betamix/Fusilade	1 + 0.375	37.2	16.0	959	83.1	5.01
SN-561*	1 + 0.375	39.9	16.2	914	83.8	5.42
Betamix/Fusilade	1 + 0.500	39.5	16.6	941	83.5	5.46
Betamix	1.0	41.4	16.8	867	84.5	5.88
Betamix/Fusilade	2(1/2 + 1/4)	40.4	16.2	962	83.2	5.40
Betamix/Fusilade	2(3/4 + 1/4)	40.4	16.6	896	84.1	5.65
Betamix/Fusilade	2(1 + 1/4)	39.9	16.8	871	84.4	5.63
Control	---	41.3	16.8	895	84.4	5.86
	LSD (.05) =	NS	NS	73	1.11	NS
	CV (%) =	7.2	4.3	6.7	1.15	9.10

*Pre-mix formulation of Betamix and Fusilade

SMALL GRAIN INVESTIGATIONS

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

To investigate the performance of small grain varieties under local growing conditions, the staff members established experimental nurseries at the Malheur Experiment Station during the 1981-82 growing season. The investigations were a cooperative effort between Malheur Experiment Station staff and Matt Kolding from the Columbia Basin Agricultural Research Center. The nursery included the Western Regional Wheat and Barley Nurseries, Oregon State University's research plantings of wheat, barley, and triticales, and some private companies' varieties. As this included many hundreds of entries, only the results of the released or soon-to-be-released varieties will be reported.

Procedure

The trial was conducted in field C-3 at the Malheur Experiment Station. The prior crop was winter wheat that yielded 131 bu/ac in the 1981 harvest. After harvest, the straw was burned and the field was irrigated and disced to eliminate volunteer grain. The winter nursery seedbed was prepared, and on October 21, the winter grains were planted. The plots (4 x 15 feet) were planted using Matt Kolding's small-plot grain drill. On March 8, 1982, the winter nursery was broadcast with 150 lbs of nitrogen per acre. On March 26, the spring grain nursery land was prepared, and 160 lbs of nitrogen per acre were applied. The spring grains were planted on March 30 with Matt Kolding's small-plot grain drill. On April 16, the winter nursery was broadcast sprayed with 1 qt/ac of 2,4-D Ester for weed control. On May 14, the spring nursery received the same herbicide treatment. Both nurseries were furrow-irrigated as evaporative demand required. The nurseries were harvested August 3-6 using Matt Kolding's small-plot combine.

Winter Wheat Results

Table 1 summarizes the harvest data for the released varieties of soft, white winter wheat tested.

Stephens is used as the standard (100 percent) in reporting the relative yield of the varieties for 1982 and the average of all the years a variety has been tested at the Malheur Experiment Station.

Stephens, Hyslop, Hill-81, and Crew were all top yielders with four varieties at 91 percent of Stephens, and the remaining five varieties at 85 percent or less.

TABLE 1. Results of the 1982 small grain nursery at the Malheur Experiment Station, Ontario, Oregon

Soft White Winter Wheats

Variety	Head Type	Relative[1] Yield %	Yield bu/ac	Test Weight lbs/bu	Heading Date	Multi-year[2] Relative Yield %
Stephens	common	100	129	59.5	5/30	100 (11)
Hyslop	common	99	128	61.0	6/02	96 (10)
Hill-81	common	97	125	58.5	6/02	100 (2)
Crew	club	97	125	58.0	6/02	97 (2)
Jacmar	club	91	118	58.5	6/02	-- (1)
Daws	common	91	117	58.5	6/03	90 (5)
Faro	club	91	117	57.5	5/30	83 (4)
Nugaines	common	91	117	63.0	5/31	92 (10)
Lewjain	common	85	110	60.0	6/05	-- (1)
Tyee	club	84	109	58.0	6/06	91 (3)
Moro	club	79	102	57.5	5/31	78 (2)
Elgin	club	70	90	61.0	5/30	-- (1)
Kharkoff	common	64	83	61.5	5/29	-- (1)

Avg Yield =113

[1] Based on Stephens = 100%

[2] Based on Stephens = 100% (No. of years tested)

Winter Barley Results

Table 2 summarizes the 1982 winter barley harvest data of the released varieties in the nursery. Yields are reported in pounds per acre and bushels per acre. Yields are also compared to the yield of Boyer on a percentage basis for 1982 and the average of all years that a variety has been tested at the Malheur Experiment Station.

The highest yields came from Robur, a French release. It has only been tested here one year, and a seed source is not known. Second was Scio, released from Oregon State University in 1981, with only one year's data. Wintermalt did well. It has a good six-year average, but it is a malting type with a thick hull that detracts from feed values. Schuyler, Hesk, and Kamiak all yielded above the average while Mal was just one percent lower, and Luther was fourteen percent less.

The multi-year relative yield average should be considered as the best indicator of a variety's yield potential.

TABLE 2. Results of the 1982 small grain nursery at the Malheur Experiment Station, Ontario, Oregon

Winter Barleys

Variety	Relative[1] Yield %	Bushels/ acre	lbs/ acre	Heading Date	Percent Lodging 7/12/82	Multi-year[2] Relative Yield %
Boyer	100	126	6,071	5/24	4	100 (10)
Kamiak	109	138	6,635	5/19	3	98 (11)
Luther	86	109	5,228	5/28	6	100 (15)
Schuyler	117	148	7,097	5/25	5	99 (13)
Wintermalt	125	158	7,579	5/13	1	112 (6)
Mal	101	128	6,142	5/25	2	102 (8)
Hesk	112	142	6,795	5/22	2	101 (8)
Robur	138	175	8,408	----	-	--- (1)
Scio	127	161	7,730	5/23	7	--- (1)
	AVG =	143	6,854			

[1] Based on Boyer = 100%

[2] Based on Boyer = 100% (No. of Years Tested)

Spring Wheat Results

Table 3 summarizes the results of the spring wheat nursery at the Malheur Experiment Station in 1982. The trial included soft white, hard red, and duram wheats.

Of the soft white wheats, Fieldwin and Fielder each yielded at their multi-year average while the Owens and Urquie were both below their averages. It should be noted that the nursery was relatively free of stripe rust infestation which has severely reduced Fieldwin and Fielder yields in the past, while Owens and Urquie are both stripe rust resistant. Again, the multi-year average is the best indicator of yield potential.

The hard red varieties yielded well, but below past averages. Protein content data were not available.

The duram wheats performed well, but all three have been tested at the Malheur Experiment Station only in 1982.

Spring Barley Results

Table 4 summarizes the data from the 1982 spring barley trial at the Malheur Experiment Station. The spring barleys yielded very well in 1982. Bushels and pounds per acre are reported in the table. The yields are also reported as a percentage of Steptoe for 1982 and each variety's average yield for all the years it has been tested at the Malheur Experiment Station.

The highest yielder for 1982 was Summit at 132 bu/ac or 142 percent of Steptoe. However, its three-year average is not that high. Summit is a two-row barley released in 1977 by North American Plant Breeders. Grouped close together in yield were Kombar, Diamant, M1, and M3. Again, the multi-year relative yield average should be the most important indicator of yield potential. Of the spring barleys, only the unreleased M1 and M3 lines have averaged above Steptoe and only for two years.

TABLE 3. Results of the spring wheat trials at the Malheur Experiment Station, Ontario, Oregon, 1982

Entry	Class	Yield bu/ac	Bushel Weight lbs/bu	Plant Height inches	Heading Date	Percent Lodging %	Multi-year Average Yield bu/ac
Owens	SW*	90	62.0	35	6/13	50	106 (3)***
Fieldwin	SW	102	61.5	37	6/18	23	102 (7)
Fielder	SW	101	62.0	35	6/15	3	100 (7)
Urquie	SW	78	60.0	36	6/23	13	104 (3)
McKay	HR**	90	60.0	35	6/15	8	104 (3)
Pro Brand 711	HR	81	61.5	34	6/15	0	93 (3)
Pro Brand 751	HR	87	--	33	6/13	14	92 (2)
Westbred Aim	HR	102	63.0	34	6/12	11	106 (2)
Westbred 906R	HR	87	60.0	34	6/11	26	99 (3)
Aldura	Duram	93	62.0	27	6/15	0	-- (1)
Westbred 803	Duram	86	60.5	31	6/08	0	-- (1)
Westbred 881	Duram	77	61.0	30	6/10	0	-- (1)

*SW = Soft White

**HR = Hard Red

***(No. of Years Tested)

TABLE 4. Results of the 1982 small grain nursery at the Malheur Experiment Station, Ontario, Oregon

Spring Barleys

Variety	Relative[1] Yield %	Bushels/ acre	lbs/ acre	Test Weight lbs/bu	Plant Height inches	Percent Lodging 7/12/82	Multi-year[2] Relative Yield %
Steptoe	100	93	4472	48.5	34	8	100 (13)
Klages	96	89	4278	51.5	36	10	84 (11)
Advance	92	86	4106				81 (2)
Kombar	123	115	5520		27	1	86 (6)
Gus	97	90	4318				88 (3)
M1	126	117	5619				119 (2)
M3	122	114	5462	44.5	30	5	112 (2)
Summit	142	132	6336				92 (3)
Diamant	121	113	5427				-- (1)
Morex	95	89	4269	49.0	35	5	73 (3)
	AVG =	104	4970				

[1] Based on Steptoe = 100%

[2] Based on Steptoe = 100% (No. of Years Tested)

BAYLETON FUNGICIDE TRIALS IN SUGAR BEETS

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

Two separate fungicide trials were initiated, one with the purpose of evaluating the effectiveness of Bayleton in protecting sugar beets from powdery mildew infection, and another to determine if Bayleton acts as a growth stimulant to increase root yield and sugar content.

Procedure

Bayleton treatments were applied on July 17, 1982, as broadcast and band treatments, to sugar beet foliage which was large and covered the water furrows. The band treatments were applied by turning the nozzles so the fan was parallel with the planted row. The fungicide was applied with a CO_2 pressurized plot sprayer. The boom contained four teejet nozzles, size 8004, spaced 22 inches apart so that a nozzle was located over the center of each row. Because of the large leaves which spread from adjacent plants and covered the centers of all the sugar beet plants, it was impossible to get the fungicide into the crown area as desired. The spray pressure was 40 psi, and water, which was used as the herbicide carrier, was applied at a volume of 42 gallons per acre. Individual plots were four rows wide and 25 feet long.

In the trial which evaluated Bayleton for growth-stimulating effects, powdered sulfur, at a rate of 45 lbs ai/ac, was dusted over the sugar beets in all the plots to protect the foliage from mildew infection. The sulfur was applied on July 19, after the Bayleton had already been applied.

Bayleton was applied between 10 a.m. and 1 p.m. The skies were clear; the air temperature ranged from 87° to 92°F, and the humidity was 37 percent. The sugar beet foliage was free from mildew infection when the treatments were applied.

On September 1, powdery mildew had infected about 80 percent of the foliage in the plots treated with Bayleton at rates of 4 oz ai/ac. All beets in the control plots had mildew. Sugar beets in the plots treated at higher rates were free of mildew infection on this date. All foliage in the trial treated with powdered sulfur was healthy and remained free of mildew infection throughout the growing season.

The treatments in the Bayleton mildew protection trial were evaluated for mildew infection on September 30. These results are reported in Table 1.

The plots were harvested on October 18. Sugar beet foliage and crowns were removed with a beater and a scalper. Sugar beet roots from the two center rows of each plot were harvested to determine root yields. Two samples (seven sugar beets per sample) were taken from each plot and analyzed for percent sucrose and conductivity. Sugar yields per acre were calculated from root yield, percent extraction, and percent sucrose results. The harvest yield data are reported in Tables 2 and 3.

Results

Bayleton was effective in reducing the amount of powdery mildew infection in sugar beets. Eight ounces of this product reduced infection by about 50 percent and resulted in a significant increase in root yield and sugar yield per acre. Sixteen ounces of this product worked better and increased root weights and estimated sugar yields significantly more than eight ounces of the product by reducing the percent mildew infection to 16 percent. Although the percent sucrose increased slightly with increased mildew control at both the eight and sixteen ounce rates, this increase was not great enough to be significant.

Bayleton did not act as a growth stimulant to increase root yield and sugar content. Powdered sulfur dusted on the foliage prevented any infection from powdery mildew. In the sulfur plots, the leaves were still bright green at harvest time. It was interesting to note that the highest yields were obtained where powdered sulfur was applied. Both root weight and estimated sugar yields were significantly higher in the sulfur plots compared to Bayleton treatments which controlled up to 84 percent of the mildew. These results indicate that even light mildew infections, occurring four weeks before harvest, can significantly reduce sugar yields.

TABLE 1. Percent of sugar beet foliage infected by powdery mildew. Bayleton mildew protection study. Malheur Experiment Station, Ontario, Oregon, 1982

Application	Rate* oz/ac	Percent of Foliage Infected by Powdery Mildew Rep 1 %	Rep 2 %	Rep 3 %	Rep 4 %	Rep 5 %	Rep 6 %	Rep 7 %	Avg. %
Broadcast	4	100	80	85	85	85	75	85	85
Band	4	100	90	80	85	85	80	80	86
Broadcast	8	50	60	70	60	65	50	50	58
Band	8	60	60	50	50	50	50	40	52
Broadcast	16	20	20	10	15	20	20	5	16
Band	16	15	15	20	20	10	20	10	16
Control	--	100	95	85	95	100	90	100	95

Evaluated 9/30/82

Infection ratings greater than 60% reduced foliage size by 30-40% compared to sugar beets in powdered sulfur treated trials.

TABLE 2. Yields from sugar beets infected with powdery mildew and treated with Bayleton. Malheur Experiment Station, Ontario, Oregon, 1982

Application	Rate* oz/ac	Roots T/A	Sucrose %	Conductivity	Extraction %	Extractible Sugar lbs/ac
Broadcast	4	34.94	15.69	942	83.37	9131
Band	4	35.47	15.79	961	83.11	9310
Broadcast	8	36.07	15.75	961	83.10	9445
Band	8	35.61	16.24	924	83.67	9666
Broadcast	16	37.63	16.04	942	83.40	10061
Band	16	36.97	16.16	942	83.43	9978
Control	--	33.89	15.86	960	83.12	8950
LSD (.05)		1.71	NS	NS	NS	553
LSD (.01)		2.25	--	--	--	727
CV (%)		6.40	3.50	6.4	1.10	7.9

*ounces of material per acre

TABLE 3. Growth regulative effects of Bayleton on sugar beets as measured by root yield, percent sucrose, and extractible sugar. Malheur Experiment Station, Ontario, Oregon, 1982

Application	Rate* oz/ac	Roots T/A	Sucrose %	Conductivity	Extraction %	Extractible Sugar lbs/ac
Broadcast	6	40.16	16.40	925	83.69	11018
Band	6	40.09	16.51	905	83.98	11122
Broadcast	8	39.06	16.34	929	83.62	10690
Band	8	40.22	16.64	934	83.60	11203
Control	-	39.26	16.33	928	83.63	10725
LSD (.05)		NS	NS	NS	NS	NS
LSD (.01)		--	--	--	--	--
CV (%)		7.6	4.1	7.5	1.2	8.7

*ounces of material per acre

POTATO DEFOLIANT STUDY

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

HOE 00661 was applied to potato foliage to evaluate this material as a potato vine dessicant to enhance tuber maturity and improve conditions for mechanical harvesting.

Procedure

Treatments were applied on September 3. The potato leaves and vines were mostly green with very few starting to show signs of maturity. The treatments were applied as spray applications using a CO_2 pressurized backpack sprayer which was equipped with 5 teejet nozzles, size 8004, on a boom 6 feet wide. The spray pressure was 35 psi, and water as a carrier for the herbicide was applied at a rate of 42 gallons per acre. The plots were 6 feet wide (2 rows) and 25 feet long.

The effects of the dessicant were evaluated 3, 7, and 14 days after the treatments were applied. The application rates were 1/2, 3/4, and 1-1/2 lbs ai/ac. The skies were cloudy, the air temperature was 89°F, and the humidity was high when the treatments were made. Temperatures remained warm and dry until September 9. The weather conditions for the 14-day period following the day the treatments were made were as follows:

Date	Air Temp (°F)	Cloud Cover	Rainfall
9/3	86	scattered	0
9/4	83	scattered	0
9/5	85	clear	0
9/6	87	clear	0
9/7	90	clear	0
9/8	92	clear	0
9/9	91	clear	0
9/10	67	overcast	Trace
9/11	66	overcast	0
9/12	69	overcast	Trace
9/13	68	scattered	0
9/14	59	scattered	Trace
9/15	62	scattered	0
9/16	67	scattered	Trace

Results

HOE 00661 was very effective as a dessicant. Within three days after the treatments were applied, the leaves were essentially dry in all treated plots. The data which are reported in Table 1 indicate by numerical ratings the percent vine kill, including leaves and stems. At the end of three days, 65 percent of the vines were killed in the plots treated with HOE 00661 at the lowest rate (1/2 lb.). The percent vine kill increased from 70 to 80 percent, respectively, with each rate increase from 3/4 to 1-1/2 lbs ai/ac. On this same date, about 85 percent of the vines had been killed with 1/2 lb. of paraquat cl⁻.

The maximum amount of vine kill for all treatments had occurred within seven days: about 90 percent at 1/2 lb., 98 percent at 3/4 lb., and complete kill (100 percent) at the 1-1/2 rate of HOE 00661. The percent kill had not increased when the treatments were evaluated after 14 days. This might have been the result of the cool weather which occurred about seven days after the treatments were applied. The percent vine kill in the paraquat cl⁻ at 1/2 lb. plots was similar to the HOE 00661 at 3/4 and 1-1/2 lbs ai/ac rate plots.

The tubers harvested from the HOE 00661 treatment plots did not show increased amounts of stem end necrosis when the tubers were cut and compared to tubers from the control and paraquat cl⁻ plots. About four percent of the tubers from all the plots had light to medium amounts of necrosis at the stem end of the tuber.

Based on these results, HOE 00661 is a potential treatment for vine kill as a harvest aid in the Russet Burbank potato variety.

TABLE 1. Percent dessication of potato vines 3, 7, and 14 days after the application of HOE 00661 and paraquat cl⁻. Malheur Experiment Station, Ontario, Oregon, 1982.

Dessicant	lbs ai/ac	----- Percent of Foliage Dessication -----											
		3 days				7 days				14 days			
		1	2	3	Avg	1	2	3	Avg	1	2	3	Avg
HOE 00661	0.50	60	65	65	63	90	93	90	91	93	95	93	94
HOE 00661	0.75	70	70	70	70	95	98	98	97	98	98	98	98
HOE 00661	1.50	80	75	80	78	98	99	100	99	99	99	100	99
Paraquat cl⁻	0.50	85	80	85	83	98	98	98	98	100	99	99	99
control	----	0	0	0	0	0	0	0	0	0	0	0	0

Evaluated on September 6, 10, and 17.
The vines were beaten off and the tubers harvested on September 20.

DRY BEAN HERBICIDE TRIAL

Malheur Experiment Station - Ontario, Oregon - 1982

Purpose

PPG-844 and PPG-1013 were applied as preemergence and postemergence treatments to dry beans. PPG-844 was also evaluated as a tank-mix combination with Lasso. PPG-844, with and without Poast, was evaluated as postemergence treatments. These treatments were compared for crop tolerance and weed control when Dual was applied as a preplant soil-incorporated treatment.

Procedure

On May 25, 1982, Dual was applied and incorporated as a preplant treatment. Dual was incorporated in the upper three inches of soil with a power roto-tiller equipped with L-shaped teeth. A variety of red mexican beans was planted on May 27. Preemergence surface treatments were applied immediately after planting, and the beans were furrow-irrigated on May 28 to germinate the seeds and activate the herbicides. The postemergence treatments were applied on June 12. The bean plants had two sets of trifoliate leaves and were 4-6 inches tall. Weed species included redroot pigweed, hairy nightshade, lambsquarters, and barnyard grass. The weed species varied in size from cotyledon to 3 inches tall. At the time postemergence treatments were applied, the skies were clear, air temperature was 84^{o}F, the wind was calm, and the soil surface was moist.

The herbicides were applied with a bicycle-wheel plot sprayer which was equipped with 4 teejet nozzles, size 8006, spaced with a nozzle over the center of each row in plots 4 rows wide and 25 feet long. The spray pressure was 40 psi and water, as the herbicide carrier, was applied at a volume of 42 gallons per acre. Each treatment was replicated three times in a randomized block experimental design.

The effects of the treatments were evaluated on June 22 and again on July 22 to determine crop tolerance and weed control.

Results

PPG-844 and PPG-1013 applied postemergence caused severe foliar burn which essentially defoliated the young bean plants. New leaves emerged from the axils of the plants and soon covered the old necrotic tissue. By July 22, the size of the plants in plots treated with PPG-844 and PPG-1013 applied postemergence were comparable in size to plants in the non-treated plots, but the herbicide-treated plants matured later.

The beans showed good tolerance to other treatments. At all rates, PPG-844 and PPG-1013 were effective on pigweed and nightshade when applied post-emergence. However, these treatments did not control lambsquarters and barnyard grass. PPG-844 and PPG-1013 were less active as preemergence surface treatments and only controlled pigweed and hairy nightshade at the higher rate (0.4 lbs/ac). Poast was compatible with PPG-844, and the control of barnyard grass was excellent. Dual and Lasso, incorporated preplant, gave excellent control of pigweed, lambsquarters, and barnyard grass, but demonstrated only good to fair control of hairy nightshade.

TABLE 1. Percent weed control and injury ratings to beans treated with herbicides applied as preplant, preemergence, and postemergence applications. Malheur Experiment Station, Ontario, Oregon, 1982

			Percent Weed Control									
Herbicides	Applied	Rate lbs ai/ac	Crop Injury		Redroot Pigweed		Lambs-quarters		Hairy Nightshade		Barnyard Grass	
			6/22	7/22	6/22	7/22	6/22	7/22	6/22	7/22	6/22	7/22
Lasso + PPG-844	ppi + post	3 + 0.2	38	0	99	98	85	83	80	80	96	96
PPG-844	pre	0.25	0	0	80	75	10	0	75	80	15	15
PPG-1013	pre	0.20	0	0	83	75	40	20	80	78	78	73
PPG-1013	pre	0.30	5	0	94	88	50	45	83	85	88	83
PPG-1013	pre	0.40	6	0	100	100	60	40	85	88	97	96
PPG-844	post	0.15	47	0	100	100	10	0	92	95	22	15
PPG-844	post	0.20	57	0	100	100	15	0	95	98	40	20
PPG-844 + X-77	post	0.15	48	0	100	100	18	5	98	95	50	20
PPG-844 + Poast	post	0.15 + 0.5	58	0	93	93	15	5	93	95	98	95
PPG-1013	post	0.04	42	0	98	98	35	30	95	92	52	40
PPG-1013	post	0.06	45	0	100	100	40	40	98	95	68	60
Dual	ppi	2	0	0	91	90	90	93	84	85	100	100
Dual	ppi	3	0	0	99	96	95	98	88	90	100	100
Check	---	---	0	0	0	0	0	0	0	0	0	0

Ratings for weed control and crop tolerance: 0 = no chemical effect, 100 = all plants eliminated

WEED CONTROL IN ALFALFA GROWN FOR SEED

Dean Sisson Farm - Nyssa, Oregon - 1982

Purpose

Several different soil-active herbicides were applied in the spring to semi-dormant alfalfa being grown for seed. Treatments included mechanically incorporated and soil-surface applications. The purpose of this trial was to evaluate the herbicides for control of weeds and tolerance of alfalfa to each treatment.

Procedure

The treatments were applied on March 22 at the Dean Sisson farm, southwest of Nyssa, where the experiment was being conducted. The alfalfa was starting spring growth, but only a few green shoots were showing. Each herbicide was applied at different rates to the soil surface before and following roto-tilling. The roto-tiller was operated from a PTO. The treatments made before roto-tilling were incorporated in the top three inches of soil. The treatments applied following roto-tilling were left on the soil surface and activated by only a few rain showers which occurred after the treatments were applied.

Each plot was 9 feet wide and 30 feet long, and each treatment was replicated three times. The treatments were applied as double-overlap broadcast applications with a bicycle-wheel plot sprayer, spray pressure was 40 psi, and a volume of water, used as the herbicide carrier, was applied at 42 gallons per acre. The weed species in the trial area included annual sow thistle, common mallow, and green foxtail.

The effectiveness of the treatments was evaluated on July 21. The alfalfa was 18-24 inches tall, and the weeds which escaped the herbicides were flowering and some were beginning to set seed.

Results

Weed populations were rather dense, and the effects of treatments were easy to evaluate for mallow, sow thistle, and green foxtail control. These species of weeds are becoming rather common problems in alfalfa seed production in this area.

The herbicide treatments which were evaluated included Goal, Goal + Surflan, Sonalan, Velpar, and Prowl. Each herbicide was evaluated at the rate of 1 and 2 lbs ai/ac, except Prowl which was evaluated only at the rate of 2 lbs ai/ac.

Weed control was better with all herbicides which were applied before roto-tilling and thus incorporated with the top 3 inches of soil during the roto-tilling process. Velpar was the best herbicide treatment, giving excellent control of mallow and sow thistle and good control of green foxtail. Some plots treated with Goal and Surflan at the 1 + 2 lbs ai/ac rate were free of weeds, but in some cases, each of the weed species escaped elimination. Goal, Sonalan, and Prowl did not effectively control all the weed species. Sonalan was most active on green foxtail and sow thistle, but did not control mallow effectively. Prowl activity was similar to that of Sonalan. Although Goal gave some control of each weed species, it was the least effective of all the treatments in this trial.

Alfalfa tolerance was adequate for all treatments. Although some early season chlorosis occurred from Velpar, the symptoms were only temporary.

TABLE 1. Percent weed control and crop injury ratings from herbicides applied to semi-dormant alfalfa. Dean Sisson Farm, Nyssa, Oregon, 1982.

		- - - - - Percent Weed Control[1] - - - - -							
Herbicides	Rate lbs ai/ac	Crop Injury		Sow Thistle		Common Mallow		Green Foxtail	
		I	NI	I	NI	I	NI	I	NI
Goal	1	0	0	70	47	60	77	55	63
Goal	2	0	0	80	82	75	75	70	68
Goal + Surflan	1 + 1	0	0	96	75	88	73	93	67
Goal + Surflan	1 + 2	0	0	98	94	95	96	98	97
Sonalan	1	0	0	91	55	88	60	98	82
Sonalan	2	0	0	94	65	93	60	98	93
Velpar	1	0	0	98	97	98	96	91	93
Velpar	2	0	0	98	98	98	98	94	94
Prowl	2	0	0	98	82	65	78	98	86
Check	-	0	0	0	0	0	0	0	0

Ratings for crop injury and percent weed control : 0 = no chemical effect, 100 = plants eliminated.

[1] Ratings are for mechanically incorporated (I) and non-incorporated (NI) soil surface applications.