Malheur Agricultural Experiment Station Research Reports: 1982

Beet Harvest at Malheur Agricultural Experiment Station, Ontario

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COMMON AND TRADE NAMES OF HERBICIDES EVALUATED IN EXPERIMENTAL PLOTS

Common Names	Trade Names
alachlor	Lasso
BAS 9052	Poast
bensulide	Prefar
bromoxynil	Buctril and Brominal
cycloate	Roneet
DCPA	Dacthal
desmedipham	Betanex
diclofop	Hoelon
diuron	Karmex
EPTC	Eptam
EPTC + safener	Eradicane
ethofumesate	Nortron
hercules 22234	Velpar
hexazinone	Antor
metham	Vapam
metolachlor	Dual
metribuzin	Sencor and Lexone
napropamide	Devrinol
nitrofen	Tok
oryzalin	Surflan
oxadiazon	Ronstar
oxyfluorfen	Goal
paraquat CL	Paraquat
pendimethalin	Prowl
phenmedipham	Betanal
propachlor	Ramrod
pyrazon	Pyramin
terbacil	Sinbar
vernolate	Vernam
vernolate + safener	Surpass

WEATHER REPORTING

The Malheur Experiment Station has participated as a cooperator in 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 temperature, precipitation, and soil temperature. This information is called to station KSRV in Ontario which is transmitted along with KSRV's readings to the Boise, Idaho Weather Bureau.

In 1981, total precipitation was 15.58 inches. This is a new record high, the previous record was 13.90 inches in 1945. The 30-year average is at 10.09 inches (Table 1). Winter precipitation was just slightly above average; however, it was the third lightest snowfall winter on record (Table 2). Precipitation for the remainder of the year was above average for all months except April and August, with November and December setting new record levels.

Wind mileage during the 1981 growing season was only 200 miles lower than the all-time high. No crop damage was reported from wind. Evaporation was the highest on record (Table 3).

The 1981 growing season was 172 days (Table 4). Temperature extremes ranged from 0^{o}F on December 31 to 101^{o}F on August 8 and 12 (Table 5). Soil temperatures at the 4-inch depth are shown in Table 6.

Table 1. Daily and monthly precipitation in inches at the Malheur Experiment Station

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1				.01			T					.08
2				T								.04
3						T				.08		
4	.01			T								
5			.08		T							
6	T	.04		T	T	.04	.26					
7						T	.23			.02		T
8					T	.04				.12		
9				T		.39				T		
10					T					.13		.01
11					T					.24		T
12		T		T	T	.15				T	.17	
13						.39				.11	.21	.15
14	T	.61			T	T		T		T	.01	.21
15	T	.01			.08						.08	.61
16		.08	.05		.02						.71	T
17	T	.25	T			T					.07	
18	.01	.09			T						.01	
19		.13		.19	.17				T			.74
20		.09	.34	.25	.45			.06			.05	.48
21			.53	.05	.20						.13	.31
22			.02		T						.45	.01
23	.14		.17								.18	
24	.53		.01	T	T						.45	.03
25		.05	.06	.03	.02				.19		.04	.04
26			.51	.01	T				.10	.10		.11
27	T		T	.19					.08		.20	.15
28	.30								.27	T	T	
29	T									.13		T
30	.07		.07					T			T	.56
31	.01				.22							
Total	1.07	1.35	1.85	.73	1.16	1.01	.49	.06	.64	.93	2.76	3.53
Year's Total(15.58)												
30 yr. Mo. Avg.	1.40	.96	.83	.77	.99	.81	.17	.46	.56	.70	1.17	1.32
30 yr. Average(10.09)												

Table 2. Fall and winter precipitation - October through February and October through March

Month	1971 -72	1972 -73	1973 -74	1974 -75	1975 -76	1976 -77	1977 -78	1978 -79	1979 -80	1980 -81	30 yr Avg.
October	.38	.65	.48	.65	1.46	.09	.18	.01	1.21	.17	.67
November	1.85	.88	2.48	.71	.65	.19	1.85	.61	1.18	.84	1.12
December	1.09	1.92	2.08	1.37	1.45	.12	1.81	.72	.97	1.73	1.27
January	1.02	1.19	1.10	.86	1.39	.93	2.33	1.93	1.28	1.07	1.41
February	.74	.27	.55	1.82	.97	.27	1.70	1.82	1.50	1.35	.98
Total	5.08	4.91	6.69	5.41	5.92	1.60	7.87	5.09	6.14	5.16	5.45
March	1.04	.77	1.20	1.19	.49	.46	.53	.85	1.54	1.85	.82
Total	6.12	5.68	7.89	6.60	6.41	2.06	8.40	5.94	7.68	7.01	6.27

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 1972-1981, MES

Month		1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
April	W[1]	2241	3021	2744		2867		1856	1806	2808	2634
	E	5.55	6.59	6.03		5.71		4.03	6.20	6.90	5.95
May	W	1805	1909	1999	2399	2020	1342	3444	2826	2693	3523
	E	8.19	8.08	7.77	6.99	8.75	5.11	7.61	*	6.56	8.64
June	W	1583	1624	1510	1455	1571	1256	1173	2180	2153	2250
	E	9.65	9.43	11.11	7.35	8.47	9.67	8.90	*	8.40	8.31
July	W	1929	1453	1527	1187	1150	1110	1909	1934	2130	1976
	E	11.62	11.67	10.67	10.89	9.46	11.16	11.51	11.44	10.64	11.76
August	W	1752	1405	1501	1226	1201	694	1918	1476	2687	1859
	E	10.70	9.83	10.48	8.26	6.99	9.07	9.25	9.09	11.45	11.87
September	W	1431	1337	1163	1217	1024	645	1593	1853	1749	1855
	E	5.34	5.90	6.70	6.90	5.18	5.46	5.23	8.82	5.59	7.77
October	W	1760	1243	1250	1380	1026	796	1601	2468	1998	1907
	E	2.96	2.54	2.72	2.58	2.49	2.54	3.94	4.04	3.80	3.31
Total	W	12501	11992	11694	8864	10859	5843	13494	14543	16218	16004
	E	54.01	54.76	55.48	42.97	47.05	43.01	50.47		53.34	57.61

*Evaporation pan being repaired.

[1] W = Wind, E = Evaporation

Table 4. Dates of latest frosts in the spring and the earliest frost in the fall at the Malheur Experiment Station

Year	Latest Frost in Spring		First Frost in Fall		Frost-Free
	Date	Temp-°F	Date	Temp-°F	Period
1943	May 14	29	Oct 15	32	153 days
1944	May 23	28	Sept 19	32	118
1945	Apr 25	29	Sept 29	30	156
1946	May 1	27	Sept 29	33	150
1947	Apr 16	31	Oct 24	28	191
1948	May 2	28	Oct 17	24	167
1949	Apr 15	30	Oct 4	31	171
1950	May 6	31	Oct 1	23	147
1951	Apr 22	25	Sept 27	32	157
1952	Apr 10	29	Oct 15	26	187
1953	Apr 29	29	Oct 3	28	156
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
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 Malheur Experiment Station

Event	1977	1978	1979	1980	1981
Total Precipitation (in.)	9.55	11.48	12.06	12.26	15.58
Total Snowfall (in.)	21.3	9.5	31.0	12.5	14.5
First Snow in Fall	Nov 18	Nov 16	Nov 16	Nov 23	Nov 27
Coldest Day of the Year	Jan 6 -13 F	Dec 30 -7 F	Jan 31 -24 F	Jan 30&31 -5 F	Dec 31 0 F
Hottest Day of the Year	Aug 16 104 F	Aug 8&9 102 F	July 19 104 F	July 23 102 F	Aug 8&12 101 F
Days 0°F or Below	5	2	15	4	1
Days 32°F or Below	134	124	147	108	130
Days 100°F or Above	11	7	3	2	5
Days 90°F to 99°F	50	27	43	29	51
Last Killing Frost in Spring	Apr 20 29 F	Apr 23 31 F	Apr 19 32 F	Apr 13 32 F	Apr 14 27 F
First Killing Frost in Fall	Oct 8 29 F	Oct 14 31 F	Oct 28 32 F	Oct 17 28 F	Oct 4 30 F
Days Frost Free Growing Season	170	173	191	186	172
Number of Clear Days	95	114	112	103	125
Number of Partly Cloudy Days	180	192	177	128	168
Number of Cloudy Days	90	59	76	135	71
Greatest Amount of Snow on the Ground at one Time (date and in.)	Jan 3 8	Feb 15 3	Jan 22 26	Jan 27 3	Dec 30 8
Dates of Severe Wind Storms	June 2 July 24 July 26	May 11 May 12	Oct 19	Aug 3 Aug 15	None

Table 6. Maximum, minimum, and mean soil temperature at the 4-inch depth (in degrees F) for 1980 at the Malheur Experiment Station

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Mean	36	37	45	54	64	72	81	82	71	54	45	37
Maximum	37	40	51	62	72	79	90	88	76	59	49	38
Minimum	35	35	40	46	56	64	72	75	65	49	41	36

SOIL TESTS OF FIELDS AT THE MALHEUR EXPERIMENT STATION

Table 1. Results of soil testing at the Malheur Experiment Station before the 1981 growing season (Tests by the OSU Soils Laboratory)

Soil depth	pH	P	K	Salts	Zn	No_3-N
		ppm		-mmhos/cm-	ppm	
			Field B-3			
0-1	8.4	32	1533	0.80	0.62	13.7
1-2	8.5	27	1256	0.70	0.56	7.7
			Field B8-W			
0-1	7.8	16	402	1.60	1.20	55.5
1-2	8.1	4	316	0.80	0.36	11.1
			Field B-7A			
0-1	8.0	17	363	1.00	0.74	24.3
1-2	8.3	5	242	1.05	0.36	26.3
			Field B-7B			
0-1	8.2	8	332	1.05	0.78	15.0
1-2	8.4	5	269	0.73	0.44	1.2
			Field C-2			
0-1	7.5	29	421	0.60	0.60	7.1
1-2	8.2	14	335	0.64	0.48	1.8
			Field C3-N			
0-1	7.5	32	429	1.05	1.54	0.5
1-2	8.3	10	203	0.97	0.26	13.4
			Field D-1			
0-1	8.2	21	335	0.80	0.72	7.8
1-2	8.4	7	168	0.94	0.26	54.1

ALFALFA VARIETY TRIAL

An alfalfa variety trial was established at the MES in the spring of 1981 to provide local growers with performance data on some of the many alfalfa varieties available.

The trial consisted of 42 varieties, 5 in the previous alfalfa variety trial at MES.

Procedure

The trial was in the south end of Field C-3. After harvest of the previous year's potato crop, the field was chiseled and 90 units of P_2O_5 were disced into the soil in October 1980.

In March 1981, the plot areas were established 3 feet wide and 22 feet long. The plots were hand planted March 31, with seed broadcast at the equivalent rate of 18 pounds per acre.

The trial was harvested twice in 1981 and the results are reported in the following tables.

Summary

The first year's data are not conclusive of actual yield potential of these alfalfa varieties. As in past trials at the MES, Lahontan is used as a standard by which to compare other varieties. In the extreme right hand column of Table 1, yields (at 12 percent moisture) are expressed as a percent of Lahontan. The highest was 41 percent above Lahontan. The study will be continued in 1982 and beyond. The second year's data are expected to show a reduction in yield differences.

Table 1. 1981 Alfalfa Variety Trial yields at the Malheur Experiment Station adjusted to 12 percent moisture (Planted March 31, 1981)

Variety	Harvest date 7/9	8/28	Total	Yield as % of Lahontan
	tons/acre			
1. Lahontan	2.2	2.2	4.4	100
2. Washoe	2.2	2.3	4.5	102
3. Saranac	2.9	2.8	5.7	130
4. Agate	2.9	2.5	5.4	123
5. Riley	2.5	2.3	4.8	109
6. Oneida	2.9	2.5	5.4	123
7. Muttileaf	2.4	2.3	4.7	107
8. Perry	3.0	2.6	5.6	127
9. Baker	3.0	2.7	5.7	130
10. Deseret	2.8	2.4	5.2	118
11. Apollo II	2.9	2.6	5.5	125
12. Armor	2.8	2.6	5.4	123
13. NAPB 107	2.7	2.5	5.2	118
14. Vangard	2.8	2.7	5.5	125
15. Magnum	2.8	2.6	5.4	123
16. NK 80335	3.3	2.7	6.0	136
17. NK 80334	2.7	2.3	5.0	114
18. Trumpetor	3.1	2.2	5.3	120
19. Vancor	3.0	2.7	5.7	130
20. Pioneer 532	2.9	2.8	5.7	130
21. Pioneer 524	3.2	2.6	5.8	132
22. Pioneer 545	2.9	2.5	5.4	123
23. WL 309	2.7	2.8	5.5	125
24. WL 312	3.1	3.1	6.2	141
25. WL 314	2.7	2.9	5.6	127
26. Pacer	3.0	2.5	5.5	125
27. Funks G2815	3.5	2.7	6.2	141
28. Gladiator	3.2	2.4	5.6	127
29. F.M. AS49R	2.4	2.4	4.8	109
30. F.M. AS67	2.6	2.5	5.1	116
31. Futura	3.0	2.5	5.5	125
32. Atra 55	2.9	2.7	5.6	127
33. Blazer	2.6	2.5	5.1	116
34. Farm Seed Res. H117	2.9	2.6	5.5	125
35. Farm Seed Res. H103	3.0	1.4	5.4	123
36. Seagull	2.7	2.7	5.4	123
37. Trout	3.0	2.3	5.3	120
38. DeKalb 120	3.1	2.4	5.5	125
39. DeKalb 130	2.9	2.6	5.5	125
40. Classic	2.7	2.4	5.1	116
41. Hi-phy	2.9	2.5	5.4	123
42. Ramsey RS-209	3.1	3.0	6.1	139
Average	2.9	2.6		
LSD .10	0.5	0.5		
CV (%)	13.5	15.3		

Table 2. 1981 Alfalfa Variety Trial at the Malheur Experiment Station, Dry matter percentage (Planted March 31, 1981)

Variety	Harvest date 7/9	8/28	Average
	——— % ———		
1. Lahontan	23.8	33.0	28.4
2. Washoe	28.2	29.1	28.7
3. Saranac	25.1	30.5	27.8
4. Agate	25.1	31.6	28.4
5. Riley	23.6	28.7	26.2
6. Oneida	25.5	30.4	28.0
7. Muttileaf	25.3	32.3	28.8
8. Perry	23.7	31.3	27.5
9. Baker	25.6	28.9	27.3
10. Deseret	27.7	33.4	30.6
11. Apollo II	24.1	30.2	27.2
12. Armor	23.2	31.0	27.1
13. NAPB 107	24.9	32.1	28.5
14. Vangard	26.0	30.6	28.3
15. Magnum	25.4	30.2	27.8
16. NK 80335	25.5	29.6	27.6
17. NK 80334	23.4	31.6	27.5
18. Trumpetor	25.7	30.9	28.3
19. Vancor	24.8	29.3	27.1
20. Pioneer 532	22.9	28.8	25.9
21. Pioneer 524	26.1	28.9	27.5
22. Pioneer 545	25.1	31.6	28.4
23. WL 309	24.7	32.2	28.5
24. WL 312	25.0	28.3	26.7
25. WL 314	25.0	30.7	27.9
26. Pacer	25.0	31.6	28.3
27. Funks G2815	26.8	32.3	29.6
28. Gladiator	24.9	31.6	28.3
29. F.M. AS49R	25.4	30.9	28.2
30. F.M. AS67	26.6	33.7	30.2
31. Futura	23.5	29.4	26.5
32. Atra 55	26.0	30.9	28.5
33. Blazer	23.1	32.1	27.6
34. Farm Seed Res. H117	24.2	29.9	27.1
35. Farm Seed Res. H103	24.8	30.1	27.5
36. Seagull	22.9	30.0	26.5
37. Trout	24.9	28.9	26.9
38. DeKalb 120	25.7	29.0	27.4
39. DeKalb 130	25.0	31.4	28.4
40. Classic	23.9	30.6	27.3
41. Hi-phy	26.6	31.3	29.0
42. Ramsey RS-209	26.0	30.8	28.4
Average	25.0	30.7	
LSD .10	3.1	2.9	
CV (%)	10.6	8.0	

CULTURAL MANAGEMENT OF ALFALFA FOR SEED PRODUCTION

Introduction

1981 was the second year of a projected three-year study to investigate cultural management and weed control of alfalfa for maximum seed production. The study had three objectives: First, to determine optimum plant spacing for maximum seed yields. Second, to determine the effects on seed yield of clipping alfalfa to delay the onset of bloom. And third, to identify methods for full season weed control.

Procedure

Field B-3 at the MES was planted with Foundation Vernal alfalfa in August 1979. The test plots were established and managed in 1980.

To determine optimum plant spacing, plots were established with three row spacings: four 38-inch rows, six 30-inch rows, and eight 22-inch rows having within row spacings of 12, 24, and 36 inches between plants. The within row spacings were established by spraying the plants with Roundup (1 percent solution) with a hand sprayer.

To study the effects on seed yield of clipping alfalfa, four treatments were imposed on the plots: 1) check with no clipping, 2) clip to 3 inches tall on May 1, 3) clip to 3 inches tall on May 20, 4) clip to 8 inches tall on May 20.

The treatments were replicated four times in a completely randomized design.

The clipping and spacing studies received the following operations: March 5 - Goal herbicide 1 pound active ingredient per acre; March 11 - spot spray weeds with 1 percent Roundup; May 30 - Supracide 1 pound active ingredient per acre and DiSyston 0.5 pound active ingredient per acre; June 5 - Eptam 2.8 pounds active ingredient per acre in irrigation water; June 29 - spot spray (Roundup 1 percent); July 2 - Dylox 1 pound active ingredient per acre; July 13 - 1/3 pound active ingredient per acre Dibrom, 3/4 pound active ingredient per acre Dylox, and 1 pint Sorbia spray; July 27 - 1/2 pound active ingredient per acre Metasystox R, 1/4 pound active ingredient per acre Dilrom, and 1 pint Sorbia spray; August 10 - 1/4 pound active ingredient per acre Dibrom, 1 quart Thiodan and 1 pint Sorbia spray.

The test plots were harvested September 9 with a commercial combine set to harvest alfalfa seed.

Summary

The 1981 results in both the clipping and spacing studies had unexplained variation in seed yields preventing any significant difference in the data. The trend was for reduced yields at the bottom end of the field that might be the result of distance from the bee house, or water and/or fertility gradients.

In the clipping study (Table 1), the check-no clipping treatment gave the highest yields for the second year which agrees with the original hypothesis. During both years, lowest yields resulted from the 3-inch clipping on May 20 as expected. Clipping at 8-inch height on May 20 and clipping earlier (May 1) resulted in intermediate yields which also agrees with the original hypothesis.

In the spacing study (Table 2), inspection of the data suggests that differences in row spacing were more important than differences in within row spacing. This one year's data do not allow any conclusions but it seems to indicate that 38-inch row spacing is too far apart for optimum seed yields.

We plan to continue this study during 1982 with the same treatments and careful water management to prevent water-related variation. The additional year's data will allow us to determine trends and draw conclusions with an increased level of confidence in the results.

Table 1. Clipping study alfalfa seed yields at the Malheur Experiment Station

Treatment	1980 Seed Yield (lbs/ac)	1981 Seed Yield (lbs/ac)	2 year Avg.
1. Check-no forage clipping	453	869	661
2. Clip to 3-inch height May 1	418	815	617
3. Clip to 3-inch height May 20	415	576	496
4. Clip to 8-inch height May 20	474	644	559
LSD	NS	NS	
CV (%)	12.4	23.4	

Table 2. 1981 Alfalfa Seed Spacing Study results at the Malheur Experiment Station (Seed yields in pounds per acre)

Within Row Spacing (inches)	Row Spacing (inches) 38	30	22	Average
12	828	964	1050	947
24	927	1063	919	969
36	875	1150	967	997
Average	877	1059	979	

WEED CONTROL IN ALFALFA GROWN FOR SEED PRODUCTION

Purpose

The trial was initiated with the purpose of evaluating soil active herbicides for tolerance to established alfalfa and to determine if these herbicides applied in the spring can be activated to control weeds through the growing season.

Procedure

Herbicides included in the trial were DPX-5648, DPX-4189, Velpar (hexazinone), Goal (oxyfluoren), Surflan (oryzalin), Sencor/Lexone (metribuzin), paraquat, Sinbar (terbacil) and Karmex (diuron). All herbicide treatments except Sencor/Lexone + paraquat were applied on March 6, 1981, as the alfalfa was breaking winter dormancy and starting spring growth. The Sencor/Lexone + paraquat treatment was delayed until April 6 to study the effect of this treatment on both weed control and as a means of delaying alfalfa bloom to the time of maximum leaf-cutter bee activity.

Weed species in the trial area included prickly lettuce (Lactura scariola), flixweed (Descurainia sophia), mallow (Malva parviflora), redroot pigweed (Amaranthus retroflexus), and barnyard grass (Echinochloa crusgalli). Weeds emerged on March 6 (2-3 inch rosettes) were prickly lettuce, flixweed and mallow. Dense stands of pigweed and yarnyard grass emerged in the check plots through the summer. Weeds in the plots at time of evaluations were removed after evaluation and allowed to reinfest plots as a means of evaluating the soil persistence of each herbicide treatment.

Each herbicide treatment was applied with a bicycle wheel plot sprayer equipped with an 8.0-foot boom and 8003 teejet nozzles spaced 10 inches apart for broadcast double overlap applications. Spray pressure was 35 psi. Water as the carrier was applied at a volume of 54 gallons per acre. Individual plot size was 25 X 16 feet and each treatment was replicated 3 times in a randomized block design.

The alfalfa variety was Vernal. The alfalfa stand was established during late summer and fall of 1979. The alfalfa was seeded in rows spaced 22 inches apart and the field was irrigated by rill irrigation.

Soil texture is silt loam with 0.9 percent organic matter and a pH of 7.8. The treatments were evaluated for weed control on July 7 and on October 8 before application of dessicants on October 22.

Results

The data are summarized in Tables 1 and 2. One herbicide applied singly was not effective in controlling all weed species. Specific herbicides applied as tank mix combinations were more effective and gave excellent weed control with adequate crop tolerance. Mallow and barnyard grass were weed species most difficult to control. Goal and Sinbar were most active on mallow. Superior combination treatments giving season-long control of all weed species included Goal + Surflan and Sinbar + Paraquat. DPX materials controlled prickly lettuce, flixweed and redroot pigweed, but were not active on barnyard grass. Velpar controlled flixweed, redroot pigweed and barnyard grass but only limited activity on prickly lettuce and mallow. Goal applied singly was much more active on broadleaf weeds than barnyard grass. Sencor/Lexone + Paraquat at 1 pound active ingredient per acre did give good broad spectrum weed control but caused chlorosis to early alfalfa growth. It appears that Goal and Surflan are excellent herbicide candidates for weed control in alfalfa grown for seed. They do not persist longer than one year in the soil and are active on many weed species. Karmex effectively controlled prickly lettuce and pigweed only. It did not adequately control mallow or barnyard grass.

DPX-5648 and DPX-4189 caused severe injury including stand loss to alfalfa. Sencor/Lexone + Paraquat caused severe necrosis, burning the early alfalfa growth back to crown within four days after application. Even though new growth remained chlorotic until the alfalfa was 6 inches tall, it did not cause a delay in time of alfalfa bloom or seed set.

Seed yields from most herbicide treated plots ranged from 75 to 104 pounds per acre more than those received from the check plots. Increased seed yields were considered significant at the 5 percent level of significance. Seed yields from plots treated with DPX materials were greatly reduced because of severe injury to alfalfa which persisted throughout the growing season.

The year 1981 is the first year results have been recorded from this study. The weed control research will be continued for three years. Certain herbicides will be dropped from the study and new herbicides will be added as they become available.

Table 1. Crop tolerance and percent weed control ratings from herbicide treatments applied on March 6 and April 2 to established alfalfa, Malheur Experiment Station, Ontario, Oregon, 1981

		Crop Injury		Percent Weed Control[1]									
				Prickly Lettuce		Flixweed		Mallow		Pigweed		Barnyard Grass	
Herbicide	Rates/ac	7/7	10/8	7/7	10/8	7/7	10/8	7/7	10/8	7/7	10/8	7/7	10/8
DPX-5648	1/8 oz	25	20	93	95	98	100	76	65	100	100	45	40
DPX-5648	1/4 oz	45	45	98	97	100	100	85	70	100	100	50	45
DPX-5648	1/2 oz	60	65	100	100	100	100	90	80	100	100	60	60
DPX-4189	1/8 oz	55	60	98	96	99	100	82	78	100	100	40	45
DPX-4189	1/4 oz	75	80	100	100	100	100	88	85	100	100	50	55
hexazinone	1 lb	0	0	94	90	100	100	92	85	100	100	98	96
oxyfluorfen + X-77	1 lb	0	0	96	95	92	95	90	90	100	100	78	70
oxyfluorfen + X-77	2 lb	0	0	100	100	98	100	100	100	100	100	93	90
oxyfluorfen + oxyzalin + X-77	1 + 1½	0	0	97	100	93	98	93	91	100	100	100	100
oxyfluorfen + oxyzalin + X-77	1½ + 1½	0	0	100	100	96	100	98	96	100	100	100	100
oxyfluorfen + oxyzalin + X-77	2 + 1½	0	0	100	100	99	100	100	100	100	100	100	100
metribuzin + paraquat + X-77	½ + ½[2]	0	0	95	90	85	90	75	70	100	70	82	78
metribuzin + paraquat + X-77	1 + ½[2]	0	0	100	95	93	95	90	85	100	98	93	90
terbacil + paraquat + X-77	2 + ½	0	0	100	100	100	100	98	95	100	100	100	96
diuron + paraquat + X-77	2½ + ½	0	0	94	92	96	98	40	30	100	92	84	80
Check	—	0	0	0	0	0	0	0	0	0	0	0	0

[1] Rating: 0 = no effect, 100 = plants killed.
Weed control evaluated on July 7 and October 8.

[2] Treatments applied on April 2. All other treatments applied on March 6.

Table 2. Alfalfa seed yields from herbicide trials, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate/ac	Alfalfa Seed (lbs/ac) R_1	R_2	R_3	Avg
DPX-5648	1/8 oz	62	78	45	62
DPX-5648	1/4 oz	35	31	27	31
DPX-5648	1/2 oz	0	0	0	0
DPX-4189	1/8 oz	20	35	28	27
DPX-4189	1/4 oz	0	0	0	0
hexazinone	1 lb	814	692	768	758
oxyfluorfen + X-77	1 lb	833	701	752	762
oxyfluorfen + X-77	2 lb	789	675	749	738
oxyfluorfen + oryzalin + X-77	1 + 1½	813	664	727	735
oxyfluorfen + oryzalin + X-77	1½ + 1½	798	692	765	748
oxyfluorfen + oryzalin + X-77	2 + 1½	801	661	741	734
metribuzin + paraquat + X-77	½ + ½[1]	839	679	748	755
metribuzin + paraquat + X-77	1 + ½[1]	796	658	746	733
terbacil + paraquat + X-77	2 + ½	809	682	758	750
diuron + paraquat + X-77	2½ + ½	789	671	742	734
Check	—	692	597	684	658
LSD .05		-	-	-	67
CV (%)		-	-	-	8

[1] Harvested October 8, 1981

1981 HYBRID CORN PERFORMANCE TRIALS

Silage and grain corn performance trials were conducted at the Malheur Experiment Station in 1981. Entry in the trials was on a fee basis for each entry submitted, with a few hybrids entered by the MES to compare with performance of other years.

Procedures

The tests were on an Owyhee silt loam soil in Field C-2. The prior year the field contained small grain trials. In August 1980, the land was disced and plowed with 40 units of N and 90 units of P_2O_5 incorporated. In mid-April 1981, 180 units of N and 10 units of Zn were disced into the soil. Surpass was applied for weed control and disc incorporated. The entries were planted April 23 in four 30-inch row plots and 25 feet long. The two center rows were used for yield data. Each entry was replicated six times in both trials in a completely randomized design.

After the germination, the plots were hand thinned to desired population levels. However, severe pheasant feeding pressure and an error in thinning the silage test caused many plots to be unacceptable for yield data.

To insure a high level of mite control, which had been a problem in past years, an insecticide not registered for corn, aldacarb, was sidedressed on both the silage and grain trials on June 18.

The site was furrow irrigated in alternate rows at weekly intervals while the evaporative demand was high.

Additional nitrogen was applied to the test in the irrigation water, 10 units July 27 and 20 units August 15.

Silking dates (when 50 percent of the ears showed silks) were determined in one replication of both tests. Black layer maturity (50 percent of the kernels showed black layer) was determined in one replication of the grain test by harvesting ears from the outside buffer row. Percentage of lodged plots was recorded in all replications of the grain trial.

The silage trial was harvested September 15 with a two-row forage chopper and specialized wagon for weighing yield. Subsamples were taken to determine moisture percentage. The results are reported in Table 2.

The grain trial was hand harvested October 13-16. Subsamples were taken to determine moisture and shelling percentage. Results are reported in Table 4.

Yields in the grain trial were very high in 1981. An average of three or more years results would be a better indicator of hybrid performance. The 1981 increase can be attributed to several factors: early planting date; improved weed, mite, and aphid control; additional nitrogen between silking and maturity; more degree days in August and September; and less lodging than in past years.

Table 1. Weather summary at the Malheur Experiment Station during the 1981 corn trials

Month	Average Temp.	Deviation from 30yr ave	Degree days[1]	Precipitation	Deviation from 30yr ave
	°F	°F		-in-	-in-
April 20-	56.9	—	97.5	0.72	—
May	56.4	-2.6	327.5	1.16	+0.17
June	62.6	-4.8	432.5	1.01	+0.20
July	72.5	-2.5	629.5	0.49	+0.32
August	76.0	+3.5	673.0	0.06	-0.40
September	63.7	+0.7	443.0	0.64	+0.08
-October 14	47.6	—	66.0	0.70	—
Total			2669.0	4.78	

[1] Degree days equal daily max. ($\leq 86^{\circ}F$) + daily min. ($\geq 50^{\circ}F$) $\div$ 2-50.

Table 2. Summary information for hybrid corn silage test at the Malheur Experiment Station in 1981

Company or Brand	Hybrid	Plants/Acre	Number of Reps	Silking date	% Moisture at harvest	Silage[1] yield T/A
1. Cenex	2108	27,000	4	7/17	65.7	32.6
2. Ferry Morse	2080	27,000	4	7/20	63.7	39.1
3. Ferry Morse	3020	25,000	3	7/21	67.7	40.8
4. Ferry Morse	9770	26,000	2	7/21	64.7	34.7
5. Stauffer	S6389	26,000	4	7/20	64.8	33.4
6. Northrup King	PX71	32,000	2	7/20	67.5	38.3
7. Northrup King	PX72	32,000	4	7/22	66.6	44.1
8. Northrup King	PX74	26,000	2	7/22	69.8	39.1
9. Northrup King	PX9573	32,000	2	7/22	67.8	41.0
10. Pfizer	TXS113	30,000	3	7/18	67.4	38.7
11. Pfizer	TXS115A	32,000	1	7/22	68.6	45.5
12. Keltgen	KS114	26,000	5	7/18	70.9	37.8
13. Keltgen	KS115	30,000	5	7/20	67.4	42.4
14. Crookham	SS70	27,000	2	7/20	68.2	42.4
15. Crookham	SS605	26,000	2	7/24	68.2	42.4
16. Acco	U393	26,000	2	7/23	67.1	42.6
17. PAG	SX351	25,000	3	7/22	70.1	38.8
18. PAG	SX333	28,000	3	7/22	66.6	40.9
19. PAG	B-70	29,000	1	7/23	67.9	31.6
20. Stauffer	S7795	24,000	3	7/24	66.7	42.5
21. Funks	G4507	27,000	3	7/21	68.0	42.1
22. Funks	G4657	26,000	3	7/24	67.6	42.8
23. Funks	G4673	28,000	2	7/22	69.7	41.8
24. Crookham	54-40	22,000	2	7/22	66.8	35.7

[1] Adjusted to 70% moisture.

Table 3. Summary information for hybrid corn silage yields averaged for 1979, 1980, and 1981

Company	Hybrid	Silking date	Moisture at harvest	Yield[1]
			-%-	tons/ac
	79, 80 & 81			
Crookham	SS70	7/25	68.4	38.2
Funks	4507	7/27	66.4	39.5
Ferry Morse	9770	7/26	62.4	34.1
	1980 & 1981			
Northrup King	PX74	7/26	68.6	36.0
Stauffer	7795	7/27	67.9	39.1
Ferry Morse	3020	7/26	69.0	35.7
Funks	4673	7/26	70.5	35.9
PAG	333	7/26	67.7	36.7
Kelgen	KS115	7/24	68.1	38.6

[1] Adjusted to 70% moisture

Table 4. Summary information for hybrid corn grain trial at the Malheur Experiment Station in 1981

Company	Hybrid	Plants/ acre	Silk-ing date	Black layer maturity date	Lodging	Moisture at Harvest	Ear[1] size	Shel-ling	Test[3] weight	Bu/ac[1]
					-%-	-%-	-lb-	-%-	-lb/ac-	
1. Cenex	2108	27,000	7/17	9/22	0	22	.58	88	56	239
2. "	2114	27,000	7/20	9/30	1	30	.62	90	54.5	259
3. Ferry Morse	2006	26,000	7/17	9/22	0	24	.52	88	57.5	212
4. " "	2015	26,000	7/18	9/18	0	24	.66	86	55.5	232
5. " "	2080	26,000	7/20	9/28	1	25	.69	89	55.5	250
6. Northrup King	PX72[2]	26,000	7/25	9/28	17	15	.75	88	55.5	282
7. " "	PX39	29,000	7/18	9/18	3	20	.65	88	56.5	243
8. " "	PX9252	29,000	7/13	9/10	0	18	.56	87	57.5	218
9. " "	PX9288	29,000	7/16	9/15	0	16	.51	87	57.5	208
10. " "	PX9199	29,000	7/15	9/15	0	15	.54	86	56.5	225
11. " "	PX74	28,000	7/22	9/28	13	29	.68	90	57.0	281
12. Pfizer	T950	28,000	7/15	9/15	0	16	.48	88	56.5	232
13. "	T1000	28,000	7/16	9/18	0	23	.53	88	56.0	234
14. "	T1058	27,000	7/17	9/15	0	25	.59	89	58.5	227
15. "	T1100	26,000	7/20	10/05	4	30	.62	90	55.0	251
16. "	TXS115A	28,000	7/21	9/28	4	29	.73	90	56.5	274
17. Keltgen	KS104	26,000	7/16	9/18	0	24	.54	88	56.5	225
18. "	KS106	26,000	7/18	9/28	0	24	.63	88	56.0	243
19. "	KS114	26,000	7/20	9/30	0	28	.67	88	59.0	252
20. "	KS115	26,000	7/23	9/30	4	30	.73	90	56.0	279
21. Crookham	SS70	25,000	7/22	10/02	3	30	.76	90	56.0	263
22. "	SS605	26,000	7/22	10/02	11	28	.68	90	57.0	245
23. "	SS305	26,000	7/13	9/15	0	20	.55	89	56.5	200
24. "	SS304	26,000	7/15	9/10	2	23	.59	88	56.0	221
25. Union Seed	Exp103020	27,000	7/16	9/22	0	20	.55	90	56.0	229
26. " "	Exp181002	26,000	7/17	9/15	0	20	.55	90	58.5	240
27. " "	Exp283159	26,000	7/18	9/22	0	23	.59	89	58.5	230
28. Acco	UC2990	26,000	7/18	9/30	0	25	.53	88	56.0	235
29. "	UC7251	26,000	7/21	10/02	13	28	.78	87	57.0	252
30. "	UC5990	28,000	7/19	10/22	7	26	.60	90	56.5	252

Table 4. (Cont.) Summary information for hybrid corn grain trial at the Malheur Experiment Station in 1981

Company	Hybrid	Plants/ acre	Silk- ing date	Black layer maturity date	Lodging	Moisture at Harvest	Ear size[1]	Shel- ling	Test weight[3]	Bu/ac[1]
					-%-	-%-	-lb-	-%-	-lb/ac-	
31. Payco	SX990	26,000	7/21	10/30	4	29	.77	90	55.5	276
32. "	SX844	26,000	7/19	9/28	1	23	.65	89	55.0	237
33. PAG	SX189	28,000	7/17	9/22	0	21	.54	86	59.0	205
34. "	SX249	27,000	7/19	9/28	1	24	.58	86	57.5	243
35. "	SX333	27,000	7/22	9/30	23	30	.73	90	56.0	284
36. "	SX397	28,000	7/20	9/15	12	24	.62	89	56.5	254
37. Stauffer	S427	26,000	7/18	9/28	1	23	.64	89	55.5	249
38. "	S4402	26,000	7/16	9/22	0	16	.54	89	58.0	227
39. "	S5602	26,000	7/16	9/22	0	22	.59	88	57.0	232
40. "	S6389	26,000	7/20	9/22	0	24	.63	90	56.5	270
41. "	S7759	26,000	7/22	10/02	8	31	.74	90	58.5	283
42. "	S7767	26,000	7/22	10/06	6	30	.70	90	55.5	276
43. "	S7795	26,000	7/23	9/30	3	28	.67	89	55.5	256
44. Funks	G4323	26,000	7/17	9/28	0	21	.61	89	57.5	239
45. "	G4430	26,000	7/19	9/28	6	27	.67	89	57.0	255
46. "	G4507	26,000	7/22	9/30	3	27	.77	90	55.5	301
47. Crookham	54-40[2]	22,000	7/20	9/25	4	31	.86	87	58.0	233
48. PAG	SX181	26,000	7/17	9/15	0	21	.55	88	58.0	218
49. Cenex	2371[2]	26,000	7/25	10/08	0	35	.74	91	57.5	268

CV = 6.5%
LSD(.05) = 18.0
LSD(10) = 15.0

[1] Adjusted to 15.5% moisture - 56 lbs per bushel.

[2] Entered by MES for comparison to past years.

[3] Determined after drying.

Table 5. Summary information for hybrid corn grain yields averaged for 1979, 1980, and 1981

Company	Hybrid	Silking date	BLM date	Lodging	Moisture at harvest	Yield[1]
				-%-	-%-	bu/ac
	79, 80 & 81					
Stauffer	6389	7/24	9/19	5	18.7	206
Ferry Morse	2080	7/24	9/27	26	19.7	196
Idahybrid	54-40	7/24	9/19	22	24.1	177
	1980 & 1981					
Cenex	2108	7/21	9/25	1	22.2	204
Cenex	2114	7/24	10/04	2	27.9	218
Crookham	SS70	7/26	10/01	17	28.3	223
Northrup King	PX74	7/25	10/03	12	27.4	234
Ferry Morse	2006	7/21	9/27	2	24.0	195
Payco	SX844	7/23	9/29	5	21.1	209
PAG	SX181	7/20	9/14	3	20.2	197

[1] Adjusted to 15.5% moisture - 56 lbs to the bushel.

SWEET CORN HERBICIDE TRIAL
MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

Purpose

To evaluate various herbicides for selectivity in sweet corn and for control of certain species of annual broadleaf and grassy weeds.

Procedure

Various herbicides were applied as preplant incorporated and non-incorporated treatments. Depth of incorporation of preplant treatments varied between herbicides. Included in Table 1 are herbicide treatments, herbicide rates, and incorporation depths.

The herbicides were applied on May 7 to a flat soil surface which was prepared with a triple-K and spike tooth harrow. The soil was dry to a depth of 4 inches when the herbicides were applied. Each plot was 12 X 30 feet, wide enough to plant 4 rows of corn 30 feet long. All preplant incorporated treatments were incorporated 2 times with a power roto-tiller equipped with L-shaped teeth. Each plot was incorporated separately and immediately after the herbicide was applied. The soil surface of the tilled (incorporated) plots were releveled and the surface treatments applied just before planting Jubilee variety of sweet corn on May 11. On May 12, the trial was furrow irrigated for seed germination and seedling emergence.

Spray conditions were: Skies were partly cloudy, air temperature 65^{o}F, soil temperature 58^{o}F, and winds were from the north-west at 0 to 2 mph. Herbicides were applied as broadcast treatments, using 8002 teejet nozzles and spray pressure of 35 psi applying the herbicides as an aqueous solution at a total volume of 31 gallons/acre.

Soils in the trial area are in the Owyhee soil series class. Soil texture is a silt loam containing 1.3 percent organic matter and a pH of 7.3.

Data collected included percent weed control, crop tolerance ratings, number of mature and immature ears and ear weights for each plot. Weed control ratings were taken on June 16 and the plots harvested on August 13 and 14.

Results

Jubilee variety of sweet corn showed good tolerance to all treatments at emergence and in seedling stage of growth except in those plots treated with R-40244. R-40244 caused discoloration on the first leaves of most emerging corn plants. In some cases the discolored leaves developed into necrosis. These symptoms only appeared on the first 2 leaves and all later growth was normal. The safener (R-29141) added to R-40244 did not reduce the observed symptoms significantly.

Yield difference between treatments were non-significant for either total weight or number of ears. The corn appeared uniform in tassel and ear height for all treatments.

Control of redroot pigweed and common lambsquarters was satisfactory with most treatments. Pigweed and lambsquarters control in 2 replications of Eradicane + R-33865 was unsatisfactory at only 80 percent control. Barnyard grass control was weak with R-40244 as expected. SC-8149, when compared to SC-7829, resulted in superior barnyard grass control but about equal for control of pigweed and lambsquarter. Volunteer wheat was not expected to be a weed problem, but since it was present, herbicide activity was evaluated. Vernolate and EPTC alone and with additives were most effective for control of volunteer wheat.

The persistence of herbicides with and without extenders could not be evaluated since all plots remained essentially weed free after the initial weeding because of shading of soil from corn plants.

Table 1. Percent weed control and crop tolerance ratings for several herbicides applied as preplant incorporated and non-incorporated treatments to Jubilee variety of sweet corn, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate	Corporation depth	Crop injury	Percent weed control: Volunteer wheat	Pigweed	Lambsquarters	Barnyard grass
	-lbs ai/ac-	-inches-	-%-	-%-	-%-	-%-	-%-
SC-8149	2	1-2	0	62	96	97	91
"	3	1-2	0	73	98	99	96
"	4	1-2	0	81	96	98	97
SC-7829	2	1-2	0	48	96	99	88
"	3	1-2	0	63	96	98	92
"	4	1-2	3	60	94	97	94
alachlor	3	3-4	3	70	100	93	100
metolachlor	3	3-4	0	85	100	95	100
Eradicane	6	3-4	6	98	98	99	99
R-40244	1/2	1-2	45	58	98	98	72
R-40244/R-29148	1/4	1-2	40	36	98	98	67
" "	1/2	1-2	40	73	98	98	73
R-40244	1/2	surface	40	53	100	100	80
R-40244/R-29148	1/4	surface	48	42	98	98	57
" "	1/2	surface	52	58	99	99	73
vernolate	6	3-4	0	98	99	99	99
vernolate/R-33865	3	3-4	10	95	96	96	99
" "	4	3-4	8	99	99	99	99
EPTC+R-29148	6	3-4	0	95	95	96	99
EPTC+R-29148+R-33865	6	3-4	5	99	99	98	99
Eradicane/R-33865	6	3-4	0	95	86	86	96
Control	—	—	0	0	0	0	0

Evaluated June 16, 1981

Rating: 0 = no effect, 100 = plant killed. Average of 3 replications.

Table 2. Harvest data from sweet corn herbicide trials, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate	Total No. Ears	Total weight	Weight and number of ears: Normal		Immature	
	-lbs/ac-		-lbs/plot-	-No.	lbs/plot-	-No.	lbs/plot-
SC-8149	2	106	50.2	84	45.1	22	5.1
"	3	102	51.1	90	48.7	12	2.4
"	4	109	53.5	88	49.3	21	4.2
SC-7829	2	101	51.3	85	47.8	16	3.5
"	3	102	50.1	87	47.1	15	3.0
"	4	103	50.3	88	47.6	13	2.7
Lasso	3	103	50.9	87	47.8	16	3.1
Dual	3	103	49.9	83	45.5	20	4.4
Eradicane	6	99	50.5	86	46.8	13	3.7
R-40244	1/2	107	53.4	92	49.7	15	3.7
R-40244+R-29148	1/4	103	49.8	85	46.4	18	3.4
" "	1/2	103	50.2	87	47.4	16	2.8
R-40244	1/2	106	51.5	89	47.1	17	4.4
R-40244-R-29148	1/4	103	50.6	89	47.4	14	3.2
" "	1/2	97	46.6	79	41.7	18	4.9
Surpass	6	106	51.2	90	47.5	16	3.7
Surpass+R-33865	3	110	52.3	94	48.9	16	3.4
" "	4	112	54.5	94	50.1	18	4.4
EPTC+R-29148	6	104	50.0	85	45.5	19	4.5
EPTC+R-29148+R-33865	6	105	47.8	81	42.6	24	5.2
Eradicane+R-29148+R-33865	6	99	48.8	84	45.4	15	3.4
Control	-	100	50.5	87	47.3	13	3.2
LSD (.05)		NS	NS	NS	NS	NS	NS
CV (%)		6.4	4.6	5.6	4.6	8.3	7.8

Data are average of 3 replications

HERBICIDE TREATMENTS APPLIED IN THE SPRING TO NON-DORMANT PEPPERMINT AND SPEARMINT MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

Purpose

The purpose of this study was to evaluate spring applied soil and foliar active herbicides for control of annual grasses and broadleaf seeds in fall plowed and disced peppermint and spearmint.

Procedure

Three-year-old established peppermint and spearmint were plowed, disced, and corrugated in November so tillage in the spring to accommodate furrow irrigation would not be needed.

On April 21, the early herbicide treatments were applied as broadcast treatments. At this time spearmint shoots were 2 to 3 inches tall and peppermint was much later with buds of shoots beginning to break through the soil surface. Emerged weed species--prostate knotweed, flixweed, prickly lettuce, tumbling mustard, and lambsquarter-- were small, 2 to 3 inches tall and 3 to 4 inch rosettes. Barnyard grass had not yet emerged when these treatments were applied.

Becuase of a second flush of weeds emerging in the plots treated on April 21 with 2,4-DB, and MCPB in combination with either Hoelen or Poast, a second application of these treatments was applied on June 5. At this time spearmint was 6 to 8 inches tall and peppermint 3 to 4 inches tall. Lambsquarter and kochia ranged up to 8 inches tall and barnyard grass was stooling with 3 to 4 tillers. Plots sprayed with bromoxynil and Hoelon on April 21 were resprayed on June 5 with Hoelon but not bromoxynil because these plots were free of broadleaf weeds and injury to mint from the second application of bromoxynil might have been severe.

The herbicide treatments were applied with a bicycle wheel plot sprayer equipped with size 8003 teejet nozzles. Water, carrier for the herbicide, was applied at a volume of 40 gallons per acre. Spray pressure was 35 psi and treatments were applied as double overlap broadcast applications.

Spray conditions on April 21 were: air temperature 55^{o}F, soil temperature 48^{o}F, wind 2 to 4 mph, and partly cloudy skies. On June 5, air temperature was 80^{o}F, soil temperature 76^{o}F, wind 1 to 2 mph, and skies partly cloudy.

Soils were classified as Owyhee silt loam with 1.3 percent organic matter and a pH of 7.3.

Results

Weedy species were summer annuals and included lambsquarters, kochia, prostrate knotweed and barnyard grass. Although both spearmint and peppermint were late emerging because of plowing in the fall, final stands were uniform and growth was normal.

In this trial where summer annuals were the primary weed problem, the outstanding treatment resulting in excellent weed control and crop tolerance was a single application of bromoxynil applied soon after mint and broadleaf weed emergence (April 21) followed with an application of diclofop on June 5 after the barnyard grass had emerged. MCPB + BAS 9052 applied as a repeat treatment also resulted in good weed control. MCPB was much more selective in mint than 2,4-DB although the mint in the 2,4-DB plots was growing rapidly on July 23 and probably would have fully recovered with delayed harvest. Both MCPB and bromoxynil were less active on prostrate knotweed than oxyfluorfen or 2,4-DB. Oxyfluorfen treatments resulted in good broadleaf weed control but oxyfluorfen applied after mint emergence delays mint growth and can cause permanent injury to mint with weak roots. Diclofop applied in late spring before grass emergence without being activated by rainfall is not as effective as applications applied postemergence to grasses. Osyfluorfen + diclofop is a more effective combination treatment applied in fall, winter, or early spring when moisture is available for activation. Oryzalin in combination with oxyfluorfen has been an effective treatment for weed control but has caused more injury to mint than oxyfluorfen and diclofop combinations. BAS 9052 is compatible with MCPB and 2,4-DB and is an effective postemergence treatment for barnyard grass control.

Table 1. Percent weed control and crop injury from herbicides applied in the spring to non-dormant peppermint, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate	Crop Injury 5/29	Crop Injury 7/10	Crop Injury 7/23	Lambsquarter 5/29	Lambsquarter 7/10	Lambsquarter 7/23	Knotweed 5/29	Knotweed 7/10	Knotweed 7/23	Kochia 5/29	Kochia 7/10	Kochia 7/23	Barnyard Grass 5/29	Barnyard Grass 7/10	Barnyard Grass 7/23
	-lbs ai/ac-				Percent Weed Control (visual ratings)[1]											
oxyfluorfen[2] + diclofop	3/4+1½	7	0	0	78	98	77	95	92	85	93	85	83	95	88	70
oxyfluorfen + diclofop	1+1	10	0	0	98	99	78	98	96	88	98	92	90	90	92	80
oxyfluorfen + diclofop	1+1½	15	0	0	93	99	88	96	93	85	96	90	90	94	85	82
oxyfluorfen + BAS 9052	3/4+0.4	14	3	0	95	98	70	96	94	83	96	88	84	93	85	88
oxyfluorfen + BAS 9052[3]	1+0.4	13	0	0	95	96	86	98	96	90	98	92	90	95	80	65
bromoxynil + diclofop	3/4+1	0	3	0	98	96	85	58	45	40	100	98	95	100	98	70
bromoxynil + diclofop	3/4+1½	2	0	0	96	98	97	50	40	35	99	96	93	100	100	99
2,4-DB + BAS 9052	½+0.4	35	34	10	99	96	98	96	90	85	99	88	85	100	100	100
2,4-DB + BAS 9052	1+0.4	52	65	25	100	99	100	99	93	88	100	90	90	100	100	100
MCPB + BAS 9052	½+0.4	12	0	0	82	97	82	78	68	63	95	92	92	100	100	100
MCPB + BAS 9052	1+0.4	22	5	0	96	99	99	65	60	57	96	94	95	99	100	99
oxyfluorfen + oryzalin	3/4+1	27	7	2	99	92	86	96	93	90	99	92	90	97	100	92
oxyfluorfen + oryzalin	1+1	22	7	0	96	98	90	98	95	92	98	90	90	98	95	73
oxyfluorfen + oryzalin	3/4+1½	22	5	0	95	93	87	99	93	88	96	93	90	96	85	88
Control	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Ratings: 0 = no effect, 100 = plant killed.

[2] Adjuvant Ag 98 added to oxyfluorfen treatments at rate of 0.5% of spray volume.

[3] MorAct oil added to BAS 9052 treatments at rate of 1 qt/ac.

Weed control and crop tolerance ratings taken on May 29, July 10 and July 23.

Plot size 9 X 30 feet. Treatments replicated 3 times.

Table 2. Percent weed control and crop injury from herbicides applied in the spring to non-dormant spearmint, Malheur Experiment Station, Ontario, Oregon, 1981

		Crop Injury			Percent Weed Control (visual ratings)[1]											
					Lambsquarter			Knotweed			Kochia			Barnyard Grass		
Herbicides	Rate	5/29	7/10	7/23	5/29	7/10	7/23	5/29	7/10	7/23	5/29	7/10	7/23	5/29	7/10	7/23
	-lbs ai/ac-															
oxyfluorfen[2] + diclofop	3/4+1½	10	5	0	98	99	94	99	95	88	98	95	90	87	73	62
oxyfluorfen + diclofop	1+1	10	5	0	100	99	97	99	95	90	98	95	90	93	87	80
oxyfluorfen + diclofop	1+1½	10	3	0	100	98	98	99	95	90	99	97	90	95	85	78
oxyfluorfen + BAS 9052[3]	3/4+0.4	12	4	0	98	95	94	98	95	93	98	94	90	96	84	75
oxyfluorfen + BAS 9052	1+0.4	7	2	0	96	95	95	97	95	93	98	95	90	92	72	58
bromoxynil + diclofop	3/4+1	0	0	0	95	98	96	68	55	40	100	98	93	100	100	100
bromoxynil + diclofop	3/4+1½	3	0	0	98	96	94	70	60	50	100	98	93	100	100	99
2,4-DB + BAS 9052	½+0.4	27	20	5	100	99	98	99	95	95	100	98	95	100	100	100
2,4-DB + BAS 9052	1+0.4	53	60	40	100	100	100	98	95	95	100	99	95	100	100	98
MCPB + BAS 9052	½+0.4	5	0	0	98	96	92	70	60	50	90	90	90	100	99	98
MCPB + BAS 9052	1+0.4	18	15	6	99	98	97	70	60	50	90	90	90	100	99	98
oxyfluorfen + oryzalin	3/4+1	10	7	5	99	96	93	96	93	93	98	94	92	95	85	82
oxyfluorfen + oryzalin	1+1	15	3	3	99	98	94	99	95	93	95	92	90	94	90	85
oxyfluorfen + oryzalin	3/4+1½	15	5	4	95	93	90	99	95	93	96	92	90	97	95	92
Control	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Ratings: 0 = no effect, 100 = plant killed.

[2] Adjuvants Ag 98 added to oxyfluorfen treatments at rate of 0.5% of spray volume.

[3] Mor Act oil added to BAS 9052 treatments at rate of 1 qt/ac.

Weed control and crop tolerance ratings taken on May 29, July 10 and July 23.

Plot size 9 X 30 feet. Treatments replicated 3 times.

FALL APPLICATION OF HERBICIDES TO NON-PLOWED PEPPERMINT AND SPEARMINT FRAHM RANCH, NYSSA, OREGON, 1980-81

Purpose

The purpose of this study was to determine the effectiveness of herbicides for control of winter and summer annual broadleaf and grassy weeds when applied in the fall to non-plowed spearmint and peppermint.

Procedure

Herbicides were applied as double overlap broadcast treatments on November 19 to non-plowed peppermint and spearmint. The fields had been corrugated and furrow irrigated before the herbicide treatments. The mint was dormant and there was very little regrowth of mint in either field because of the late harvest date. Several species of weeds in the small seedling stage were present when treatments were applied. Weed species included prickly lettuce, flixweed, tansy mustard, shepherds purse, and downy brome. Treatments were applied with a bicycle wheel plot sprayer, 8003 teejet nozzles, using a spray pressure of 35 psi and applying water as the herbicide carrier at a volume of 43 gallons per acre. Each plot was 9 X 25 feet and each treatment was replicated 3 times in a randomized block experimental design. Soil texture is silt loam and the surface of soil was dry but moisture was good under the surface. Skies were clear, wind was calm. Air temperature was 52^{o}F and soil temperature was 48^{o}F.

Results

Oxyfluorfen at 3 pounds active ingredient per acre and oxyfluorfen + oryzalin resulted in permanent injury to both spearmint and peppermint. Both mint crops showed adequate tolerance to other treatments. The combination of terbacil + napropamide consistently gave excellent control of each species of weeds in this trial. Neither terbacil nor napropamide was adequate when applied singly. Oxyfluorfen was effective on all weeds except marestail and annual foxtail and barnyard grass at rates of 1 and 1½ pounds active ingredient per acre. Marestail is totally tolerant to oxyfluorfen. Diclofop applied singly or in combination with oxyfluorfen gave good control of green foxtail and barnyard grass and control persisted until after harvest. Diclofop gave fair control of downy brome if applied before downy brome emergence. Oxyfluorfen + diclofop is a superior treatment compared to oxyfluorfen + oryzalin because of crop tolerance. PPG-844 was effective on most broadleaf weeds but showed very little activity on grasses. In this trial, where emerged weeds were small seedlings at time of herbicide application, there was no advantage from adding paraquat cl to terbacil or napropamide.

Table 1. Percent weed control and crop tolerance ratings from herbicides applied to peppermint in the fall of 1980, Frahm Ranch, Nyssa, Oregon

Herbicide	Rate	Crop Injury	Percent Weed Control (Visual Ratings)[1]							
			P.L.	T.M.	F.W.	D.B.	M.T.	G.F.	Ko	ByG.
	-lbs ai/ac-									
oxyfluorfen[2]	1	0	98	96	85	63	10	72	88	70
oxyfluorfen	1½	3	99	98	88	84	20	80	94	78
oxyfluorfen	3.0	20	100	99	95	95	35	90	99	92
oxyfluorfen + diclofop	1+1½	0	98	95	82	98	19	100	85	99
oxyfluorfen + diclofop	1+2	3	99	95	80	100	10	100	87	100
oxyfluorfen + diclofop	1½+1	5	98	98	88	95	20	100	93	97
oxyfluorfen + diclofop	1½+1½	7	100	98	85	98	20	100	90	100
oxyfluorfen + oryzalin	1+1½	5	99	96	80	90	10	95	90	98
oxyfluorfen + oryzalin	1½+1½	10	96	98	90	95	20	98	95	98
oxyfluorfen + oryzalin	1+3	15	100	99	93	98	10	100	98	100
oxyfluorfen + napropamide	1+2	0	98	97	88	96	10	92	88	92
oxyfluorfen + napropamide	1+4	5	97	97	85	99	10	100	92	98
oxyfluorfen + napropamide	1½+2	5	98	99	90	96	20	95	90	94
oxyfluorfen + napropamide	1½+4	5	99	99	92	100	20	100	93	99
terbacil	2	0	100	100	100	100	100	75	99	70
terbacil + napropamide	2+4	0	100	100	100	100	100	100	100	99
terbacil + napropamide	2+6	0	100	100	100	100	100	100	100	100
PPG-844	½	0	85	80	70	20	30	10	60	15
PPG-844	1	0	92	88	78	30	40	20	65	30
PPG-844	2	5	98	92	83	45	60	40	75	45
diclofop	1½	0	0	0	0	96	0	0	0	99
Control	-	—	0	0	0	0	0	0	0	0

[1] Ratings: 0 = no effect, 100 = plant killed

[2] Ag 98 added with oxyfluorfen at rate of 0.5% by volume

Evaluated June 11, 1981

P.L. = prickly lettuce
T.M. = tansy mustard
F.W. = flixweed
D.B. = downy brome
M.T. = marestail
G.F. = green foxtail
Ko = kochia
ByG. = barnyard grass

Table 2. Percent weed control and crop tolerance ratings from herbicides applied to spearmint in the fall of 1980, Frahm Ranch, Nyssa, Oregon

Herbicide	Rate	Crop Injury	Percent Weed Control (Visual Ratings)[1]				
			Prickly lettuce	Tumbling mustard	Downy brome	kochia	Barnyard grass
	-lbs ai/ac-						
oxyfluorfen[2]	1	0	94	96	88	86	68
oxyfluorfen	1½	0	95	98	94	94	77
oxyfluorfen	3	10	100	100	100	98	94
oxyfluorfen + diclofop	1+1½	0	95	94	98	88	98
oxyfluorfen + diclofop	1+2	0	94	92	100	85	100
oxyfluorfen + diclofop	1½+1	0	98	96	98	93	98
oxyfluorfen + diclofop	1½+1½	0	97	98	100	95	99
oxyfluorfen + oryzalin	1+1½	10	96	95	75	88	92
oxyfluorfen + oryzalin	1+3	20	98	95	96	92	96
oxyfluorfen + oryzalin	1½+1½	15	98	98	98	96	94
oxyfluorfen + napropamide	1+2	0	92	93	92	85	88
oxyfluorfen + napropamide	1+4	0	94	95	96	94	96
oxyfluorfen + napropamide	1½+2	5	98	98	98	96	93
oxyfluorfen + napropamide	1½+4	5	98	98	99	98	96
terbacil	2	0	100	100	100	99	78
terbacil + paraquat cl	2+½	0	100	100	100	100	75
terbacil + napropamide + paraquat cl	2+4+½		100	100	100	100	100
PPG-844	½	0	92	84	10	70	30
PPG-844	1	0	95	88	25	78	35
PPG-844	2	0	99	95	45	86	45
Control	-	-	—	—	—	—	—

[1] Ratings: 0 = no effect, 100 = plant killed

[2] Ag 98 added with oxyfluorfen at rate of 0.5% by volume.

Evaluated July 1, 1981.

EARLY SPRING APPLICATIONS OF HERBICIDES TO NON-PLOWED DORMANT SPEARMINT FRAHM RANCH, NYSSA, OREGON, 1981

Purpose

The purpose of this study was to determine crop tolerance and the effectiveness of herbicides for control of winter and summer annual broadleaf and grassy weeds when applied in the early spring to non-plowed spearmint.

Procedures

Herbicide treatments were applied on March 4 to Scotch spearmint which had been corrugated the previous fall for furrow irrigation during the summer of 1981. Shoots of spearmint were beginning to emerge through the soil on top of the beds. Weeds were plentiful and included species of prickly lettuce, flixweed, downy brome, salisfy, and tumbling mustard. Summer annual weed species not emerged when the treatments were applied but emerging after treatment included green foxtail, barnyard grass, marestail, and kochia.

Treatments were applied with a bicycle-wheel plot sprayer, 8003 teejet nozzles, using a spray pressure of 35 psi and applying water as the herbicide carrier at a volume of 43 gallons per acre. Each plot was 9 X 25 feet and each treatment replicated 3 times in a randomized block experimental design. Soil texture is loam, the soil moist on surface and wet slightly below surface. Skies were partly cloudy, air temperature 48^{o}F, and soil temperature 43^{o}F. Wind was calm.

Results

Oxyfluorfen applied at 1 and 2 pounds active ingredients per acre in March and activated by spring rains resulted in good control of prickly lettuce, flixweed, and kochia but did not effectively control marestail, salisfy, or annual grasses. Diclofop, oryzalin, and napropamide applied in combination with oxyfluorfen were compatible and effective in controlling green foxtail and barnyard grass but did not adequately control established downy brome. Terbacil controlled all broadleaf weeds except salisfy and effectively controlled downy brome but did not control later emerging green foxtail and barnyard grass. Napropamide enhanced control of late season foxtail and barnyard grass and when used in combination with terbacil was an outstanding treatment resulting in excellent control of all weed species except salisfy.

Good crop tolerance to spearmint was obtained with all treatments except oryzalin. Oryzalin delayed crop emergence and stunted the growing crop for most of the growing season until harvest.

Table 1. Percent weed control and crop tolerance ratings form herbicides applied to Scotch spearmint in early spring of 1981, Frahm Ranch, Nyssa, Oregon 1981

Herbicide	Rate	Crop Injury	Percent Weed Control (Visual Ratings)[1]							
			P.L.	M.T.	F.N.	Sa	Ko	D.B.	B.F.	ByG.
	-lbs ai/ac-									
oxyfluorfen	3/4[2]	0	94	0	87	55	93	50	62	55
oxyfluorfen	1	0	96	10	95	70	95	60	70	64
oxyfluorfen	2	0	100	20	97	88	99	70	78	72
oxyfluorfen + diclofop	3/4+1	0	96	0	85	60	88	55	95	92
oxyfluorfen + diclofop	1+1	0	98	5	92	73	93	72	97	94
oxyfluorfen + diclofop	1½+1	0	99	15	97	88	98	78	98	96
oxyfluorfen + diclofop	1½+1½	0	100	20	97	90	98	85	100	100
oxyfluorfen + oryzalin	1+1	10	93	10	100	78	95	60	78	81
oxyfluorfen + oryzalin	1+1½	15	95	15	99	80	98	70	89	86
oxyfluorfen + oryzalin	1+3	25	95	15	100	85	99	80	98	96
oxyfluorfen + oryzalin	1½+1½	15	100	20	100	88	100	75	94	90
oxyfluorfen + napropamide	1+2	0	95	18	97	78	93	72	90	78
oxyfluorfen + napropamide	1+4	0	98	15	98	83	96	76	98	96
terbacil	2	0	100	100	100	20	99	100	78	72
terbacil + paraquat cl	2+½	0	100	100	100	28	100	100	80	75
terbacil + napropamide	2+4	0	100	100	100	20	100	100	100	100
Control	-	0	0	0	0	0	0	0	0	0

[1] Ratings: 0 = no effect, 100 = plant killed. Evaluated on July 1, 1981

[2] Ag 98 was added to oxyfluorfen at rate of 0.5% of water volume.

Weed species key:

P.L. = prickly lettuce	Ko = kochia
M.T. = marestail	D.B. = downy brome
F.W. = flixweed	G.F. = green foxtain
Sa = salisfy	By.G. = barnyard grass

AN EVALUATION OF MCPB AND 2,4-DB FOR SELECTIVE BINDWEED SUPPRESSION IN SPEARMINT AND PEPPERMINT DURING CURRENT YEAR
FRAHM RANCH, ONTARIO, OREGON, 1981

Purpose

The purpose of this study was to determine the effectiveness of MCPB and 2,4-DB to control field bindweed selectively in Scotch spearmint and Mitchum peppermint when applied as single and repeat postemergence treatments.

Procedure

Single application treatments were applied on May 22. Double application treatments were applied on May 22 and June 20. On May 22, spearmint shoots ranged from 6 to 8 inches tall. Peppermint shoots were 2 to 4 inches tall. On June 20, shoots of spearmint in plots not previously treated were 12 to 15 inches tall, peppermint 8 to 10 inches tall. Spearmint and peppermint in plots treated on May 22 with 2,4-DB were severely suppressed especially when treated at the one-pound rate. Spearmint and peppermint previously treated on May 22 with MCPB were suppressed in growth but not severely.

Field bindweed plants on May 22 had runners as long as 12 inches. On June 20, field bindweed in plots not previously treated had runners 2 feet long and foliage was growing over the top of the mint crop. Field bindweed in plots sprayed on May 22 were severely suppressed, lying flat on the soil surface and had made very little if any growth following May 22 application. This effort was noted in all plots regardless of rate of MCPB or 2,4-DB applied.

Plots were 9 X 25 feet and each treatment was replicated 3 times in a completely randomized block experimental design. Treatments were applied as double overlap applications using 8003 teejet nozzles and a spray pressure of 35 psi applying a water volume of 43 gallons per acre. Spearmint and peppermint crops were in the second year of production and well established. Stand of field bindweed was quite dense and uniform throughout the experimental area.

Results

Single applications were as effective in suppressing bindweed growth as double applications and resulted in less injury to mint. Spearmint was more tolerant to MCPB and 2,4-DB than peppermint. Excellent suppression of bind weed was obtained with all treatments. Considering both bindweed suppression and mint tolerance MCPB at 1/3 or 1/2 pound active ingredient per acre was superior. A high percentage of bindweed foliage at the 1/3 pound active ingredient per acre rate had completely dried up.

The plots were observed in October about 1 month after harvest. The plots were striking because of excellent mint growth without any sign of bindweed plants recovering from either MCPB or 2,4-DB treatments.

Table 1. Ratings for percent field bindweed control and crop tolerance of Scotch spearmint and Mitchum peppermint when treated with MCPB and 2,4-DB, Frahm Farm, Ontario, Oregon, 1981

			Crop Tolerance[2]				Field Bindweed Suppression[1]			
			Peppermint		Spearmint		Peppermint		Spearmint	
Herbicide	Rate	Date applied	7/1	8/7	7/1	8/7	7/1	8/7	7/1	8/7
	-lbs ai/ac-									
MCPB	1/3	5/22	12	0	7	0	100	98	100	95
MCPB	1/2	5/22	22	0	12	0	100	96	100	99
MCPB	2/3	5/22	27	0	17	0	100	100	100	100
MCPB	1.0	5/22	25	0	25	0	100	100	100	100
MCPB	2.0	5/22	73	20	50	10	100	100	100	100
MCPB	1/3	5/22 & 6/20	10	0	10	0	100	95	100	98
MCPB	1/2	5/22 & 6/20	17	5	17	0	100	98	100	98
MCPB	1	5/22 & 6/20	22	10	22	5	100	98	100	96
2,4-DB	1/2	5/22	50	10	43	10	100	75	100	80
2,4-DB	1	5/22	83	15	63	15	100	100	100	90
2,4-DB	1/2	5/22 & 6/20	52	25	23	20	100	100	100	90
2,4-DB	1	5/22 & 6/20	63	45	43	40	100	100	100	98
Control	-	—	60[3]	85[3]	45[3]	65[3]	0[4]	0[4]	0[4]	0[4]

[1] Evaluation for treatments were made on July 1 and August 7. Ratings were recorded for crop tolerance and suppression of growth for both mint and field bindweed. One-hundred percent suppression indicates plant foliage is lying on the soil surface and most of the foliage is dry. Ratings less than 100 indicate percent reduction in growth from chemical treatment. Mint plants in control plots were topped by bindweed and mint growth was severely suppressed.

[2] Reduction in mint growth because of herbicide injury.

[3] Reduction in mint growth because of competition from field bindweed.

[4] Reduction in bindweed suppression as result of no chemical applied.

AN EVALUATION OF HERBICIDES FOR CONTROL OF BLUE MUSTARD IN SPEARMINT STEWART BATT FARM, ONTARIO, OREGON, 1981

Purpose

The purpose of this study was to compare herbicides for postemergence activity on blue mustard (Chorispora tenella).

Procedure

Oxyfluorfen, bromoxynil, paraquat cl, and oryzalin were applied as single and combination treatments as postemergence treatments to blue mustard in Scotch spearmint. The treatments were applied on March 9. The spearmint was beginning to emerge. The blue mustard stands were dense and size of rosettes for individual plants ranged from 1 to 6 inches across. Leaves were necrotic on small plants because of frost injury. Larger plants were green and seed stalks had buds developed but no flowers were present. Individual plots were 9 X 25 feet and each treatment was replicated 3 times. The treatments were applied with a bicycle wheel plot sprayer equipped with 8003 teejet nozzles. Water, the herbicide carrier, was applied at a volume of 43 gallons per acre. Spray pressure was 35 psi, soil texture was a clay loam, and soil surface was dry when treatments were applied. Soil and air temperatures were 52°F and 58°F when treatments were applied. Skies were clear and wind calm. Treatments were evaluated on March 30, April 10, and May 15 for control and crop tolerance.

Results

The superior treatment at this location for control of blue mustard included combinations of oxyfluorfen and paraquat. Bromoxynil gave adequate control at both rates of 1.0 and 1.5 pounds active ingredient per acre. The percent control with bromoxynil was slightly increased when X-77 was added. In this trial treatments were applied when the mint was just starting spring growth. Blue mustard plants before stem elongation were more readily killed than plants in the bud and flower stages of growth. This was particularly the case with bromoxynil.

Some leaf burn was noted on the spearmint as it emerged through oxyfluorfen on the soil surface. Bromoxynil at the 1.5 pound rate caused slight leaf chlorosis but did not delay growth. Higher oil yields were obtained from bromoxynil and oxyfluorfen + paraquat treatments. Yields from oxyfluorfen were higher than those from check plots but less than bromoxynil and oxyfluorfen + paraquat treatments.

Oil and hay yields were significantly reduced in the weedy check plots when compared to yields received from all herbicide treated plots.

Table 1. Percent weed control and crop tolerance ratings from herbicide treatments applied postemergence for blue mustard control, Stewart Batt Farm, Ontario, Oregon, 1981

Herbicide	Rate	Crop Injury			Blue Mustard Control			Green Hay Yield	Oil Yields
		3/30	4/10	5/15	3/30	4/10	5/15		
	-lbs ai/ac-							-T/A-	-lbs/A-
oxyfluorfen + X-77	3/4	5	5	0	27	20	18	6.03	53.3 c
oxyfluorfen + X-77	1.5	7	5	0	32	25	18	6.87	54.2 c
oxyfluorfen + paraquat + X-77	3/4+1/2	5	5	0	100	100	100	8.92	67.5 a
oxyfluorfen + paraquat + X-77	1.5+1/2	10	10	0	100	100	100	8.56	65.3 a
bromoxynil + X-77	3/4	0	0	0	87	83	80	7.77	60.4 ab
bromoxynil + X-77	1.0	0	0	0	94	94	95	8.10	61.5 ab
bromoxynil + X-77	1.5	5	5	0	96	98	96	8.81	63.4 a
bromoxynil w/o X-77	3/4	0	0	0	78	75	67	6.89	57.5 b
bromoxynil w/o X-77	1.0	0	0	0	91	90	86	7.29	63.7 ab
bromoxynil w/o X-77	1.5	5	5	0	93	95	94	6.94	59.8 ab
bromoxynil + oryzalin	3/4+1	0	0	0	91	90	89	7.13	62.2 ab
bromoxynil + oryzalin	1+1	0	0	0	96	94	91	7.43	61.1 ab
oxyfluorfen + oryzalin	1+1	10	10	5	96	98	98	6.76	54.3 c
oxyfluorfen + oryzalin	1+1.5	15	20	10	96	98	99	6.24	51.6 c
paraquat + X-77	1/2	0	0	0	74	78	75	7.03	57.3 b
Handweeded Check	—	10	5	0	92	89	93	7.52	63.1 a
Weedy Check	—	20	25	30	0	0	0	4.08	44.7 d

ONION VARIETY TESTING
MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

The trial was planted on April 6, 1981, 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 1979 and 1980. The field was fall plowed and bedded which is a customary cultural practice among commercial onion growers in this area. One-hundred units of phosphorus and 60 units of nitrogen were plowed down in the fall. An additional 150 units of nitrogen were sidedressed on June 5.

A total of 46 entries were included in the trial. Each entry was replicated 5 times. Each plot was 2 rows wide and 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 to 3 leaf stage to an average stand of 4 plants per foot of row.

Herbicides applied for weed control included Dacthal and Tok ec. Dacthal was applied at 9.0 pounds active ingredient per acre as a postplant preemergence incorporated treatment and Tok ec was applied postemergence at 4.0 pounds active ingredient per acre when the onions had 2 true leaves.

The onions were irrigated by furrow irrigation with water furrows between each row.

Maturity ratings based on percent of bulbs in each plot with tops fallen over were taken on August 5, 14, 24, and September 2. Number of bulbs with bolters was counted in each plot on September 2 and recorded as number of bolters per 960 bulbs.

The bulbs were lifted on September 9, handtopped on September 17 and 18 and put in storage on September 23. A total of 10 crates from each variety was stored.

On January 12, the onions were removed from storage and graded to determine bulb size, bulb yield, and percent occurence of neckrot. The percent neckrot is reported as an average and as rot potential. The percent neckrot is based on the average amount for 10 boxes. Potential neckrot is the percent neckrot occurring in a single box of the 10 boxes evaluated for each variety.

Samples from each variety were taken for laboratory analysis to determine total solids, ring thickness, and ring number. These data will be available upon request.

In addition to the regular variety trial data, we have attached an additional table which lists results from varieties which were planted for October harvest date. The cultural management of this trial was the same as that described for the regular variety trial except for the October harvest date.

Table 1. Results of Onion Variety Trial, Malheur Experiment Station, Ontario, Oregon, 1981

Company	Variety	Onion Bulb Yields (cwt/ac and percentage comparison figures) Total	Average Neckrot		Potential Neckrot		+ 4 inch		3-4 inch		2¼-3 inch		2's		Maturity Ratings				Bolters
		cwt/ac	%	cwt/ac -rot	%	cwt/ac -rot	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	8/5	8/14	8/24	9/2	No./960 bulbs
Asgrow	Vega	853	12.4	747	16.2	714	695	81.5	147	17.2	8	0.9	3	0.4	4	20	55	80	5
	XPH 428	829	11.7	732	18.0	679	646	77.9	163	19.6	3	0.3	17	2.0	5	30	70	85	5
	XPH 554	660	3.9	634	12.1	580	291	44.1	263	39.8	22	3.3	84	12.7	15	70	93	97	4
	XPH 739	635	5.4	631	10.7	567	293	46.1	304	47.8	24	3.8	14	2.2	30	70	93	98	0
	XPH 691	628	0.8	623	1.4	619	88	14.0	448	71.3	45	7.2	47	7.5	65	97	99	100	0
Crookham	W 133	861	10.0	775	17.6	709	708	82.2	138	16.0	3	0.3	12	1.4	0	18	28	65	5
	Dai Maru	856	6.3	802	9.2	777	656	76.6	175	20.4	7	0.8	18	2.1	0	5	25	60	7
	N 31	847	12.4	742	21.9	661	606	71.5	222	26.2	8	0.9	11	1.3	0	3	12	35	3
	Big Mac	834	7.2	774	8.8	760	607	72.8	175	20.9	4	0.5	48	5.8	3	20	78	88	0
	N 42	820	11.8	723	19.2	662	582	71.0	208	25.3	8	1.0	22	2.7	2	20	55	86	3
	Early Shipper	803	6.5	751	11.6	709	572	71.2	201	25.0	4	0.5	26	3.2	4	25	60	80	0
	N 39	800	6.2	750	10.2	718	550	68.6	212	26.5	8	1.0	30	3.8	10	60	88	95	0
	Bronze Wonder	792	10.6	708	16.0	665	636	80.3	142	17.9	5	0.6	9	1.1	0	12	60	75	4
	Pedro	774	12.7	676	19.7	621	499	64.5	234	30.2	10	1.3	31	4.0	0	10	50	65	3
	Golden Treasure	768	6.0	722	9.3	696	311	40.4	419	54.5	13	1.7	25	3.2	0	45	70	84	1
	Ringmaker	750	8.3	688	15.3	635	427	56.9	288	38.4	3	0.4	32	4.3	7	35	80	92	1
	Early Shipper "75"	738	3.5	712	8.2	677	457	61.9	240	32.5	19	2.6	22	3.0	35	88	97	99	0
	N 99	735	5.8	692	11.8	648	412	56.0	269	36.5	14	1.9	40	5.4	15	35	65	82	0
	W 636[1]	663	5.3	628	7.8	611	223	33.6	402	60.6	23	3.5	15	2.3	15	40	70	80	1
	N 136[1]	615	11.9	542	19.3	496	205	33.3	359	58.4	37	6.0	14	2.3	12	65	85	93	0
Dessert	Valdez	923	19.1	747	25.5	687	790	85.6	122	13.2	8	0.9	3	0.3	0	0	7	23	2
	Monarch	867	11.2	770	15.9	729	653	75.3	164	18.9	6	0.7	44	5.0	3	20	40	65	16
	Durango	864	10.3	775	14.9	735	739	85.5	104	12.0	8	0.9	13	1.5	0	8	35	60	9
	Magnum	862	7.0	802	9.3	781	683	79.2	162	18.9	7	0.8	10	1.2	18	70	90	95	1
	Ultimate	819	9.9	738	13.0	712	596	72.8	155	18.9	6	0.7	62	7.6	6	37	75	85	2
	Bullring	788	8.6	720	16.1	661	642	81.5	123	15.6	15	1.9	8	1.0	5	20	60	88	2
	Winner	786	10.3	705	15.6	663	683	86.9	92	11.7	4	0.5	7	0.9	4	35	70	85	12
	Golden Cascade	784	7.1	728	12.2	688	600	76.5	169	21.5	9	1.1	6	0.8	60	93	98	99	1
	Snow White[1]	784	27.8	566	57.0	337	602	76.8	162	20.6	6	0.8	14	1.8	0	0	5	20	6
	Capable	701	4.2	671	9.4	635	266	37.9	404	57.6	28	4.0	3	0.4	75	98	100	100	1
	Avalanche[1]	699	28.1	503	45.9	378	577	82.5	99	14.2	9	1.3	14	2.0	0	0	5	20	13
	Carmen[2]	662	7.2	614	10.2	594	294	44.4	311	46.9	15	2.3	42	6.3	0	3	8	50	0
	Bramha	640	4.5	611	11.1	568	318	49.7	266	41.5	45	7.0	11	1.7	20	80	93	97	0
	White Fiesta[1]	628	26.6	461	37.7	391	295	47.0	266	42.3	22	3.5	45	7.2	5	27	45	65	3
Keystone	Cima	791	4.0	759	7.7	730	417	52.7	306	38.6	16	2.0	52	6.6	20	60	85	95	0
Moran	18095	876	7.6	809	13.8	755	771	88.0	74	8.4	3	0.3	28	3.2	0	0	35	60	9
	18093	783	6.2	734	9.7	707	458	58.5	268	34.2	1	0.1	56	7.2	5	15	65	95	2
	NCX 1008	779	5.9	733	8.2	715	511	65.6	243	31.2	10	1.3	15	1.9	0	30	65	85	10
	18094	607	2.8	590	6.2	569	97	16.0	443	72.9	27	4.4	40	6.6	7	40	85	96	0
Petoseed	Colorado 6	823	13.2	714	25.5	613	598	72.7	166	20.1	8	1.0	51	6.2	0	3	20	45	28
	PSR 5775	822	10.0	740	15.3	696	581	70.7	163	19.8	5	0.6	73	8.9	3	17	55	83	0
	PSR 33977	784	6.1	736	8.6	716	549	70.0	161	20.5	13	1.6	61	7.8	10	40	70	92	1
	PS Strain	762	17.6	628	22.9	587	537	70.5	166	21.8	15	2.0	44	5.8	0	0	8	17	0
	Peckham	751	13.0	653	19.4	605	477	63.5	211	28.1	11	1.5	52	6.9	0	8	40	65	8
	PSR 5675	702	11.7	620	21.2	553	390	55.6	179	25.4	11	1.6	122	17.4	0	5	8	35	0
	Fiesta	597	3.0	579	5.8	562	106	17.8	423	70.8	39	6.5	29	4.8	10	60	93	98	0
	LSD .05	64	—	48	—	—	58	—	24	—	—	—	28	—					
	.01	83	—	63	—	—	76	—	36	—	—	—	37	—					
	CV (%)	7.2	—	16	—	—	7.8	—	9.4	—	—	—	22	—					

1 White Sweet Spanish

2 Red bulbs

Dates: Lifted 9/12/81
Topped 9/17-18/81
In Storage 9/23/81
Out of Storage 1/12/82

Table 2. Late Harvest Variety Trial, Malheur Experiment Station, Ontario, Oregon, 1981

Variety	Total Bulbs	Average Neckrot		Potential Neckrot		Bulb Yields: Jumbos		+ 4 inch		3-4 inch		2¼-3 inch		2's	
	cwt/ac	%	cwt/ac -rot	%	cwt/ac -rot	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%
W 133	1039	10	935	17	862	1025	98.6	979	94.2	46	4.4	4	0.4	10	1.0
Valdez	1026	29	728	35	667	1001	97.6	934	91.0	67	6.5	7	0.7	18	1.8
Monarch	976	16	819	19	790	925	94.8	817	83.7	108	11.0	4	0.4	47	4.8
Durango	944	16	793	23	726	937	99.2	814	86.2	123	13.0	5	0.5	2	0.2
Vega	930	17	771	20	744	904	97.2	745	80.1	160	17.2	6	0.6	20	2.2
N-42	905	9	823	11	805	880	97.2	678	74.9	221	24.4	8	0.9	17	1.9
Snow White	857	42	497	60	343	847	98.8	757	84.9	90	10.5	6	0.7	4	0.5
Golden Cascade	857	10	771	13	745	830	96.8	633	73.9	198	23.1	10	1.2	17	2.0
Pedro	837	13	728	21	661	808	96.5	598	71.4	210	25.1	4	0.5	25	3.0
XPH 739	813	9	739	15	691	781	96.1	528	64.9	252	31.0	14	1.7	18	2.2
Golden Treasure	796	7	740	9	724	770	96.7	484	60.8	287	36.0	12	1.5	14	1.8
White Fiesta	765	33	512	47	405	697	91.1	444	58.0	253	33.0	26	3.4	42	5.5
LSD .05	67	—	63	—	—	58	—	96	—	85	—	NS	—	21	—
.01	88	—	82	—	—	76	—	126	—	111	—	NS	—	27	—
CV (%)	4	—	11	—	—	5	—	9	—	12	—	—	—	18	—

Dates: Lifted - Oct. 2, 1981
Topped - Oct. 5 & 6, 1981
In Storage - Oct. 7, 1981
Out of Storage - Jan. 6, 1982

HERBICIDES APPLIED AS BAND TREATMENTS DURING FALL BEDDING FOR WEED CONTROL IN SPRING SEED ONIONS MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1980-81

Purpose

This study was conducted to evaluate herbicides for onion tolerance and weed control when herbicides were applied as band treatments at time of fall bedding and onions were seeded the next spring.

Procedure

The soil was prepared for herbicide applications and bedding by moldboard plowing and leveling the soil surface with a disc and spike tooth harrow. The plot area was marked out so the herbicides could be applied in 12-inch bands in the center of the bud area. Row spacing was 22 inches apart and each plot was 4 rows wide and 25 feet long. The herbicide treatments were applied during mid-November with a bicycle wheel plot sprayer. Four 8006E teejet nozzles were spaced on a boom 22 inches apart so a nozzle would be centered over each row in the 4-row plots. The herbicides were applied with water, using a total volume of 1 quart per plot. Spray pressure was 35 psi. Immediately after the herbicides were applied, the soil in the plots was bedded using hilling shovels mounted on a cultivator bar. The soil adjacent to the banded herbicides was thrown over the top of the herbicide leaving the herbicide as a layer at the base of the peaked shaped bed. The beds were left in this condition over winter.

On April 2, the fall beds were pulled down with a steel bar mounted in front of a spike-tooth harrow as the soil was prepared for planting. The steel bar removes the soil to a depth above the layered herbicide and the harrow's teeth incorporates the layered herbicide in the area where the seed is planted. Monarch Sweet Spanish onions were seeded on April 10 and the plots furrow irrigated on April 12.

After onion emergence, the plots were fertilized, cultivated, and irrigated as needed for normal growth. On June 3, the treatments were evaluated for onion tolerance and weed control. After evaluations, the plots were hand-weeded and the onion plants thinned to an average of 4 per linear foot of row. Weeds emerging after the June 3 evaluation were removed by hand.

On September 10, the onions were lifted with a rod-weeder and hand-topped on September 25. The onions in the 2 center rows of each 4-row plot were harvested then stored until mid-November before grading to determine the effect of the herbicide treatments on bulb size and yield. Onion bulbs were sized into 3 classes depending on the diameter of the bulbs. Sizes were 2¼ to 3 inch, 3 to 4 inch, and more than 4 inches in diameter (Table 1).

Results

Because of mild winter temperatures, DCPA (Dacthal) and propachlor (Ramrod) did not persist overwinter to control grasses and broadleaf weeds emerging with the onions. Bensulide (Prefar) at 4 and 6 pounds active ingredient per acre persisted to give excellent grass control and good broadleaf weed control. When Prefar was used in combination with Dacthal and Ramrod, the weed control obtained was from Prefar activity. Hoelon persisted overwinter and resulted in excellent grass control. Oxyfluorfen (Goal) persisted overwinter and resulted in excellent pigweed control, fair grass control, but poor lambsquarter control. PPG-844 also persisted overwinter at the 1 pound active ingredient per acre rate to give good pigweed and lambsquarter control. It showed very little activity on grasses. Onions showed excellent tolerance to Prefar and Hoelon. Severe onion injury and stand losses occurred with both Goal and PPG-844 (Table 2).

Bulb yields were excellent for all treatments except for Goal and PPG-844. Stand losses associated with Goal and PPG-844 treatments were reflected in yield results. Bulbs were large in all treatments with an average of 95 percent of the harvested bulbs 3 inches and larger in diameter.

Results indicates that Prefar and Hoelon are effective herbicide treatments when applied in the fall for weed control in spring seeded onions. Dacthal and Ramrod did not persist overwinter at high enough concentrations to control weeds. Goal and PPG-844 did persist overwinter at the 1 pound active ingredient per acre rate but onions were not tolerant to either material.

Table 1. Onion bulb yields from herbicides applied as a band treatment during fall bedding, Malheur Experiment Station, Ontario, Oregon, 1980-81

		Diameter of No. 1's								No. 2's		
Herbicides	Rate	2¼-3 in.		3-4 in.		> 4 in.		Total No. 1's		> 2¼ in.		Total
	-lbs ai/ac-	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	-cwt/ac-
DCPA	9	5	1	98	12	677	84	780	97	25	3	805
DCPA	12	8	1	143	17	676	78	827	96	37	4	864
DCPA + propachlor	4+4	6	1	176	21	625	74	807	96	34	4	841
DCPA + propachlor	6+6	6	1	156	19	615	76	778	96	33	4	811
propachlor	8	10	1	168	21	614	78	773	98	16	2	788
propachlor	12	8	1	157	18	665	78	830	98	19	2	849
PPG-844	½	6	1	100	16	478	79	584	96	24	4	608
PPG-844	1	0	0	45	10	356	80	402	90	45	10	447
bensulide + DCPA	4+4	0	0	121	16	678	88	736	96	32	4	768
bensulide + DCPA	4+6	0	0	117	14	640	76	799	95	44	5	843
bensulide + DCPA	6+4	0	0	104	13	651	83	758	96	28	4	786
bensulide + DCPA	6+6	4	1	57	7	673	85	758	96	30	4	788
bensulice + propachlor	4+4	0	0	60	7	737	90	800	98	15	2	815
bensulide + propachlor	6+6	5	1	63	8	678	87	746	96	30	4	776
DCPA + diclofop	9+1½	8	1	146	17	656	78	810	96	35	4	845
DCPA + diclofop	12+1½	4	1	137	17	646	80	788	97	23	3	810
diclofop	1½	10	1	191	25	549	72	749	98	13	2	762
diclofop	2	5	1	169	23	547	74	722	98	14	2	736
oxyfluorfen	½	4	1	18	5	312	85	337	92	29	8	366
oxyfluorfen	1	0	0	0	0	93	91	93	91	9	9	102
Control	-	14	2	167	22	534	72	715	96	29	4	744
LSD .05	-	NS	-	71	—	97	—	108	—	NS	—	104
.01	-	NS	-	95	—	118	—	144	—	NS	—	139
CV (%)	-	—	-	12	—	8	—	7	—	—	—	6

Table 2. Onion tolerance ratings and percent weed control from herbicides applied in the fall as banded applications during fall bedding, Malheur Experiment Station, Ontario, Oregon, 1980-81

Herbicides	Rate	Crop tolerance				Percent weed control: Pigweed				Lambsquarter				Barnyard grass			
		R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg
	-lbs ai/ac-																
DCPA	9	0	0	0	0	10	30	30	23	15	25	25	22	15	30	30	25
DCPA	12	0	0	0	0	20	35	45	33	25	40	50	38	25	35	40	33
DCPA + propachlor	4+4	0	0	0	0	20	20	20	20	30	30	30	30	35	35	35	35
DCPA + propachlor	6+6	0	0	0	0	30	30	30	30	30	30	30	30	40	40	40	40
propachlor	8	0	0	0	0	30	40	30	33	40	45	40	42	40	50	40	43
propachlor	12	5	0	0	2	40	50	80	57	50	45	75	57	50	50	60	53
PPG-844	½	20	15	50	28	60	60	75	65	60	40	50	50	0	0	0	0
PPG-844	1	85	80	75	80	95	95	95	95	90	90	90	90	10	15	25	17
bensulide + DCPA	4+4	0	0	0	0	90	95	95	93	85	93	95	91	98	99	100	99
bensulide + DCPA	4+6	0	0	0	0	95	98	96	97	90	95	95	93	98	100	100	99
bensulide + DCPA	6+4	5	0	5	4	95	95	95	95	88	93	93	91	100	100	100	100
bensulide + DCPA	6+6	0	0	0	0	95	98	98	97	90	95	90	92	100	100	100	100
bensulide + propachlor	4+4	0	0	0	0	96	98	93	95	95	98	95	96	100	100	100	100
bensulide + propachlor	6+6	5	0	0	2	95	98	98	97	92	98	95	95	98	100	100	100
DCPA + diclofop	9+1½	0	0	0	0	30	60	35	42	20	45	30	32	100	100	100	100
DCPA + diclofop	12+1½	0	0	0	0	40	80	80	67	30	70	60	52	100	100	100	100
diclofop	1½	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100
diclofop	2	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100
oxyfluorfen	½	60	70	70	67	95	95	90	93	10	15	10	12	85	80	85	83
oxyfluorfen	1	90	90	95	92	100	100	100	100	80	40	50	57	95	95	95	95
Control	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Rating: 0 = no effect, 100 = plant killed   Evaluated June 3, 1981
Soil characteristics: a) texture silt loam b) pH - 7.3 c) organic matter 1.3%

HERBICIDES APPLIED AS BROADCAST TREATMENTS BEFORE FALL BEDDING FOR WEED CONTROL IN SPRING SEEDED ONIONS
MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1980-81

Purpose

This study was conducted to evaluate herbicides for onion tolerance and weed control where herbicides were applied to the soil surface as broadcast treatments just before bedding in the fall for planting onions in the spring. Onion injury ratings are of significance in this trial because all the soil used to form the beds contains herbicide and winter moisture may leach the herbicide, concentrating it in the area where the corp is planted in the spring.

Procedure

The soil was prepared for herbicide application by moldboard plowing and leveling the soil surface with a disc and spike-tooth harrow. The herbicides were applied as broadcast treatments using 8003 teejet nozzles applying water as the herbicide carrier at a volume of 1 qt/plot. Spray pressure was 35 psi. Each plot was 4 rows wide and 25 feet long. Distance between rows was 22 inches. The herbicides were applied on November 22 and the ground was bedded within an hour after the herbicide was applied. The herbicides were not mechanically incorporated before the ground was bedded. The soil was thrown to a peak in forming the beds. The beds were left in this condition until April 2.

On April 2, the beds were pulled down with a steel bar mounted in front of a spike-tooth harrow in preparation for planting onions. Only about 3/4 of the top part of the beds was removed thus leaving a furrow adjacent to each bed to serve as a mark so the onions could be planted in the center of the beds. Monarch Sweet Spanish onions were seeded on April 10 and the plots furrow irrigated on April 12.

After onion emergence the plots were fertilized, cultivated, and irrigated as needed for normal growth. On June 5, the treatments were evaluated for onion tolerance and weed control. After evaluation, the plots were hand-weeded and the onion plants thinned to an average of 4 per linear foot of row. The plots were kept free of weeds for the remainder of the growing season.

On September 10, the onions were lifted with a rod weeder and hand-topped on September 24. The onions in the two center rows of each 4-row plot were harvested then stored until mid-November before grading to determine the effect of the herbicide treatments on bulb size and yield. Onion bulbs were sized into 3 classes depending on the diameter of the bulbs. Size of each class was 2¼ to 3 inch, 3 to 4 inch, and more than 4 inches in diameter (Table 1).

Results

DCPA (Dacthal) and propachlor (Ramrod) did not persist ovewinter to give adequate weed control. Bensulide (Prefar) persisted overwinter to give good control of pigweed, lambsquarters and barnyard grass. Hoelon also persisted and gave nearly complete control of barnyard grass. PPG-844 also overwintered and resulted in good control of pigweed and lambsquarter but did not adequately control barnyard grass (Table 2).

Onions showed good tolerance to Prefar and Hoelon, but severe onion injury and stand loss which resulted in significant reduction in bulb yield occurred with PPG-844 at both the .5 and 1.0 pound active ingredient per acre rate. Injury ratings could not be recorded for Dacthal and Ramrod because of loss of herbicide activity during the winter and early spring.

Results indicate that onion tolerance is adequate from broadcast applications of Prefar at 6 pounds active ingredient per acre and Hoelon at 1.5 pounds active ingredient per acre applied on the soil surface and followed by bedding in the fall.

Table 1. Onion bulb yields from herbicides applied broadcast to the soil surface and not mechanically incorporated before bedding in the fall, Malheur Experiment Station, Ontario, Oregon, 1980-81

Herbicides	Rate	Diameter of No. 1 bulbs						Total No. 1's		No. 2's		Total
		2¼-3 in.		3-4 in.		> 4 in.				> 2¼ in.		
	lbs ai/ac	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	-cwt/ac-
DCPA	9	5	1	195	23	596	71	797	95	41	5	839
propachlor	6	2	1	160	21	570	75	734	96	28	4	762
propachlor	8	3	1	165	20	632	77	798	97	25	3	823
PPG-844	½	1	1	60	11	417	80	479	92	44	8	523
PPG-844	1	2	1	26	10	209	83	237	94	13	5	251
bensulide	6	2	1	152	19	610	78	764	97	18	2	782
bensulide + DCPA	4+6	1	1	95	13	618	84	714	96	26	4	740
bensulide + propachlor	4+6	6	1	106	14	637	83	748	98	17	2	765
propachlor + DCPA	4+6	2	1	111	15	625	82	737	97	22	3	760
propachlor + DCPA	6+6	2	1	91	12	612	81	705	94	48	6	753
DCPA + diclofop	9+1.5	4	1	166	20	622	74	791	94	46	5	838
Control	—	2	1	133	19	558	78	693	97	22	3	716
LSD .05		NS	-	64	—	98	—	116	—	NS	-	112
.01	—	—	-	86	—	133	—	157	—	—	-	152
CV (%)	—	—	-	13	—	8	—	7	—	—	-	6

Table 2. Onion tolerance ratings and percent weed control from herbicides applied in the fall as broadcast applications before bedding, Malheur Experiment Station, Ontario, Oregon, 1980-81

Herbicides	Rate	Crop Tolerance				Pigweed				Lambsquarter				Barnyard grass			
		R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg
	-lbs ai/ac-																
DCPA	9	0	0	0	0	15	20	30	22	10	25	35	23	30	40	40	37
propachlor	6	0	0	0	0	25	25	40	30	20	25	40	32	30	30	40	33
propachlor	8	0	0	0	0	30	30	30	30	30	35	40	35	40	50	50	47
PPG-844	½	25	60	60	48	90	85	90	88	90	85	90	87	0	10	20	10
PPG-844	1	80	85	90	85	95	98	98	97	95	98	90	94	0	20	30	20
bensulide	6	8	4	0	4	90	95	95	93	90	95	95	93	98	100	100	99
bensulide + DCPA	4+6	5	3	3	4	85	85	90	87	80	80	90	83	92	90	95	92
bensulide + propachlor	4+6	0	0	0	0	98	96	95	96	93	95	95	94	99	99	100	99
propachlor + DCPA	4+6	0	0	0	0	20	25	35	27	15	30	40	32	35	35	50	40
propachlor + DCPA	6+6	0	5	0	0	30	40	60	43	25	35	40	32	50	60	50	63
DCPA + diclofop	9+1.5	0	0	0	0	25	30	30	28	20	35	35	30	100	100	100	100
Control	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Ratings: 0 = no effect, 100 = plant elimination.

HERBICIDE TRIALS COMPARING FALL AND SPRING APPLIED TREATMENTS FOR WEED CONTROL IN SPRING SEEDED ONIONS
MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

Procedure

Prefar (bensulide), Dacthal (DCPA, Ramrod (propachor), Hoelon (diclofop), Goal (oxyflurofen), and PPG-844 were applied in November 1980 as band treatments during fall bedding. The treatments were applied in 11-inch bands between furrows 22 inches wide. To accomplish this, a single nozzle (teejet 8003) was mounted on a rear cultivator bar in front of and between each set of hilling shovels. The herbicide was applied to the flat surface of soil and covered with the soil adjacent to the treated bands leaving the herbicide in a layer at the base of each bed. The beds were left in this condition over winter. On April 2, the fall beds were pulled down with a steel-bar mounted in front of a spike tooth harrow in preparation for planting. The steel-bar removes the soil to a depth just above the layered herbicide and the teeth of the spike-toothed harrow stirs the herbicide with the soil as the seed bed is prepared for planting. This is the same method used by commercial onion growers in working bedded ground in the spring in preparation for planting.

The spring applications of soil active herbicides consisted of Prefar, Dacthal, Hoelon, and Ramrod. When Prefar was used in combination with Dacthal or Ramrod, Prefar was applied preplant followed by either Dacthal or Ramrod as postplant preemergence treatments. Prefar as a preplant treatment was incorporated about 1½ inches deep with a power roto-tiller. Postplant preemergence treatments were applied after planting and incorporated above the planted seed by dragging a nailboard over the soil surface. Monarch variety of seed was planted on April 10 and the plots were furrow irrigated on April 12 for seed germination.

Results

Dacthal and Ramrod did not persist over winter to control grasses or broadleaf weeds emerging with the onions. Prefar at 4 and 6 pounds persisted to give excellent grass control and good broadleaf control. When Prefar was used in combination with Dacthal and Ramrod, the weed control obtained was from the Prefar activity. Hoelon persisted overwinter and gave excellent grass control. PPG-844 and Goal persisted overwinter but both materials severely injured the onions. Prefar and Hoelon showed adequate onion tolerance.

Most treatments in the spring which were applied at optimum rates gave good weed control with selectivity to onions.

Table 1. Percent weed control and crop tolerance of fall applied herbicides in spring seeded sweet spanish onions, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate lbs ai/ac	Visual Rating (% injury)[1] Crop				Pigweed				Lambsquarters				Barnyard Grass			
		R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg
DCPA	9	0	0	0	0	10	30	30	23	15	25	25	22	15	30	30	25
DCPA	12	0	0	0	0	20	35	45	33	25	40	50	38	25	35	40	33
DCPA + propachlor	4+4	0	0	0	0	20	20	20	20	30	30	30	30	35	35	35	35
DCPA + propachlor	6+6	0	0	0	0	30	25	35	30	40	25	30	32	40	30	40	37
propachlor	8	0	0	0	0	30	40	30	33	40	45	40	42	40	50	40	43
propachlor	12	5	0	0	3	40	50	65	52	50	45	75	57	50	50	60	53
PPG-844	½	20	15	50	28	60	60	75	65	60	40	50	50	0	0	0	0
PPG-844	1	85	80	75	80	95	90	95	93	90	85	95	90	10	15	25	17
bensulide + DCPA	4+4	0	0	0	0	90	95	96	93	85	93	95	91	98	99	100	99
bensulide + DCPA	4+6	0	0	0	0	95	98	96	96	90	95	95	93	98	100	100	99
bensulide + DCPA	6+4	5	0	5	4	95	95	95	95	88	93	93	91	100	100	100	100
bensulide + DCPA	6+6	0	0	0	0	95	98	98	97	90	95	90	92	100	100	100	100
bensulide + propachlor	4+4	0	0	0	0	96	98	93	96	95	98	95	96	100	100	100	100
bensulide + propachlor	6+6	5	0	0	4	95	98	98	97	92	98	95	95	98	100	100	99
DCPA + diclofop	9+1.5	0	0	0	0	30	60	35	42	20	45	30	32	100	100	100	100
DCPA + diclofop	12+1.5	0	0	0	0	40	80	80	67	30	70	60	53	100	100	100	100
diclofop	1.5	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100
diclofop	2	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100
oxyflurofen	½	60	70	70	67	95	95	90	93	10	15	10	12	85	80	85	83
oxyflurofen	1	90	90	95	92	100	100	100	100	80	40	50	57	95	95	95	95
bensulide	6	5	0	0	3	90	95	95	93	90	95	95	93	98	100	100	99
non-weeded control		60	70	55	62	0	0	0	0	0	0	0	0	0	0	0	0
weeded control		10	15	10	12	95	98	95	96	95	90	95	93	90	95	88	91

Evaluated June 2, 1981

[1] Rating 0 = no herbicide effect, 100 = plant elimination

Table 2. Percent weed control and crop tolerance of spring applied herbicides to spring seeded sweet spanish onions, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate lbs ai/ac	Applied	Visual Evaluations (% injury)[1] Crop				Pigweed				Lambsquarters				Barnyard Grass			
			R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg
DCPA	9	pei	0	0	0	0	93	88	85	87	90	85	80	85	83	80	83	82
propachlor	9	pei	0	0	0	0	100	100	100	100	95	100	100	98	99	99	100	99
DCPA + propachlor	4+4	pei	0	0	0	0	98	99	98	98	99	99	98	98	99	99	98	98
DCPA + propachlor	6+6	pei	5	3	3	4	100	100	100	100	100	100	100	100	100	100	100	100
bensulide	6	pei	0	0	0	0	96	85	98	93	93	85	90	89	92	90	97	93
bensulide + DCPA	4+6	ppi+pei	0	0	0	0	80	96	93	90	95	95	93	94	93	95	90	93
bensulide + DCPA	4+8	ppi+pei	0	5	3	3	88	96	94	93	85	95	92	91	85	95	92	91
bensulide + propachlor	4+6	ppi+pei	0	3	0	1	100	100	100	100	100	100	99	99	98	98	98	98
bensulide + propachlor	4+8	ppi+pei	15	15	20	17	100	100	100	100	100	100	100	100	100	100	100	100
DCPA + diclofop	6+1.5	pei	0	0	0	0	80	75	75	78	83	80	80	81	85	85	90	87
DCPA + oxadiazon	9+1	pei+post	0	0	0	0	96	99	98	97	99	99	96	97	88	96	93	92
(DCPA + propachlor)+ oxadiazon	4+4 1	pei+post	0	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100
propachlor + oxadiazon	9+1	pei+post	5	0	3	3	100	100	100	100	100	100	100	100	100	100	100	100
bensulide + oxadiazon	6+1	pei+post	0	0	0	0	100	100	100	100	100	100	100	100	85	88	85	86
(bensulide + DCPA)+ oxadiazon	4+4 1	pei+post	0	0	0	0	99	100	100	99	96	100	100	97	96	100	100	98
DCPA + bromoxynil	9+½	pei+post	0	0	0	0	90	92	93	91	88	88	85	86	83	85	90	86
(DCPA + propachlor)+ bromoxynil	4+4 ½	pei+post	5	5	0	3	100	100	100	100	100	100	100	100	100	100	100	100
propachlor + bromoxynil	9+½	pei+post	0	3	5	3	100	100	100	100	100	100	100	100	100	99	100	99
bensulide + bromoxynil	6+½	pei+post	0	5	5	3	90	93	98	94	93	90	90	91	88	80	85	84
(bensulide + DCPA)+ bromoxynil	4+4 ½	pei+post	0	5	5	3	95	100	95	97	95	100	95	96	92	95	90	92
non-weeded control	—	—	45	50	60	52	0	0	0	0	0	0	0	0	0	0	0	0
weeded control	—	—	8	12	15	12	95	92	88	92	98	93	95	95	90	88	93	90

Evaluated June 2, 1981

[1] Rating 0 = no herbicide effect, 100 = plant elimination

OXYFLUORFEN POSTEMERGENCE TREATMENT ON SEEDLING ONIONS
MALHEUR EXPERIMENT STATION, ONTARIO, OREGON 1981

Purpose

The purpose of this study was to evaluate the tolerance of onions to w.p. and e.c. formulations of oxyfluorfen when applied to yellow Sweet Spanish onions in either/or the flag, 1 and 2 leaf stage of growth.

Procedure

Monarch variety of yellow Sweet Spanish onion was seeded on April 10 about 1-inch deep in rows spaced 22 inches apart. Enough area was planted so each herbicide treated plot was 4 rows wide and 25 feet long and each treatment replicated 3 times. The day after planting, DCPA was sprayed broadcast at a rate of 9.0 pounds active ingredient per acre over all plots and incorporated shallowly with the soil above the planted seed. On April 12, the plots were furrow irrigated to furnish moisture for seed germination and seedling emergence. The soil in the plot area is classified as an Owhyee silt loam containing 1.2 percent organic matter with a pH of 7.3.

The flag stage treatments were applied on May 11, the 1 leaf on May 18, and the 2 leaf on May 28. Weeds present on May 11 included redroot pigweed (Amaranthus retroflexus), lambsquarters (Chenopodium album), and barnyard grass (Echinochloa crusgalli). Pigweed had 1-inch rosettes, lambsquarters 2 to 3 inches tall, and barnyard grass beginning to tiller. By May 28 when the 2 leaf treatments were applied, pigweed ranged from 1 to 4 inches tall, lambsquarters up to 6 inches and barnyard grass had advanced to the 1 to 2 tiller stages of growth.

Onion plants, weather and soil conditions during the 3 periods when treatments were applied are as follows: All treatments were applied during the morning hours between 8 and 10. On May 11, skies were overcast, wind was calm (0 to 1 mph), air temperature was 61°F, and soil temperature was 64°F. The soil surface was dry. The onions were growing well and the flag leaf fully developed with the first true leaf starting to show on about 60 percent of the onions. On May 12, rain showers (0.13 inches) occurred. Air temperatures on May 18 (1 leaf applications) were 76°F and soil temperatures 73°F. Skies were clear, soil surface was dry. The first true leaf of onions not previously treated was 3 to 4 inches long and in some cases the second true leaf was starting to show. Onions to receive repeat treatments and previously treated at the flag stage showed some tip burn at the lower rates and some onions were lying on the ground because of burning of the flag leaf at the soil surface from the high rates. Approximately 8 percent of the plants were killed when treated at the flag stages with rates more than 0.25 pounds active ingredient per acre with both formulations. On May 28, (2 leaf treatments applied) skies were cloudy and light rain occurred each day for 3 days previous to time treatments were applied. Air temperatures were 60°F and soil temperatures 65°F. Soil surface was moist and showers again occurred during the evening of May 28. Onions not previously treated had 2 leaves fully developed. Onions previously treated showed stunting with some stand loss again, at rates greater than 0.25 pound active ingredient per acre. Most onions previously injured by leaf burn were growing and rapidly recovering. Lambsquarter and grass plants were large by the time the onions had 2 true leaves and difficult to control with Goal.

Final evaluations for results reported were taken on June 11. Onions in the plots were hand-thinned to an average of 4 plants per foot of row and all weeds removed then kept weed free for the remainder of the growing season.

On September 15, the onions were lifted and left to dry for 7 days before being topped to measure the effects of herbicide treatments on both size of onion bulbs and total yield of bulbs. Twenty feet of row from each of the 2 center rows of each 4-row plot was harvested. On October 24 and 25, the onions were graded and weighed. Onion bulbs were graded according to diameter of bulb. Size categories were 1½ to 2¼, 2¼ to 3, 3 to 4, and larger than 4 inches. Data results are reported in Tables 1 and 2.

Results

Goal effectively controlled pigweed when treatments were applied at the flag and 1-leaf stage of onion growth. Treatments applied when the onions were in the 2-leaf stage were less effective because the pigweed was large and less susceptible to lethal effects from Goal. Lambsquarters and barnyard grass were less susceptible to Goal and control was generally unsatisfactory for these species.

Although no yield difference was measured between Goal treatments and the control plots there was foliar injury and up to 8 percent stand loss with Goal applied in the flag stage at rates of 0.375 and 0.5 pounds active ingredient per acre and at lower rates when Goal was applied as repeat treatments.

The effect of stand loss in this trial was not measured in harvested bulb yield probably because onions were not planted to a stand but instead were planted at about 1 inch spacing and thinned to 3-inch spacing when in the 3-leaf stage. The onions injured by foliar burn fully recovered within 7 to 10 days with good growing weather.

From results of this trial it indicates that onions are more tolerant to the wettable powder formulation of Goal but emulsifiable concentrate was more active as foliar treatments resulting in better weed control. Although lambsquarters and barnyard grass were not effectively controlled with this treatment, other weed species considered problem weeds in onions would have been controlled as was pigweed with this treatment.

Table 1. Percent weed control and onion tolerance ratings from postemergence treatments of w.p. and e.c. formulation of oxyfluorfen, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate	Formulation	Applied	Crop tolerance				Percent weed control: Pigweed				Percent weed control: Lambsquarters				Percent weed control: Barnyard grass			
				R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg
	lbs ai/ac																		
oxyfluorfen	0.125	ec	flag	20	15	20	18	95	100	95	97	75	90	80	82	65	75	80	73
oxyfluorfen	0.125	wp	flag	15	15	8	13	80	85	85	83	65	55	55	58	65	40	55	53
oxyfluorfen	0.25	wp	flag	8	18	15	14	98	100	95	97	50	90	65	68	50	75	35	53
oxyfluorfen	0.50	wp	flag	25	30	35	30	93	100	100	97	65	90	90	82	50	70	75	65
oxyfluorfen	0.125	ec	1 leaf	25	12	8	15	95	100	95	97	65	90	80	78	70	75	60	68
oxyfluorfen	0.25	ec	1 leaf	15	8	20	14	100	100	100	100	80	85	85	83	50	75	70	65
oxyfluorfen	0.25	wp	1 leaf	10	7	10	9	100	95	100	98	80	60	90	77	75	45	80	67
oxyfluorfen	0.375	wp	1 leaf	20	15	8	14	100	98	98	98	70	65	65	67	65	65	70	67
oxyfluorfen	0.50	wp	1 leaf	30	20	30	27	100	100	100	100	80	65	95	80	65	55	85	68
oxyfluorfen	0.25	ec	2 leaf	25	8	8	14	85	70	80	78	50	30	50	43	40	30	45	38
oxyfluorfen	0.50	wp	2 leaf	5	8	5	6	95	80	80	85	70	55	60	62	25	55	60	47
oxyfluorfen + oil	0.25	wp	2 leaf	5	5	5	5	95	80	85	86	65	65	45	58	50	35	45	43
oxyfluorfen + oil	0.50	wp	2 leaf	5	5	5	5	90	90	80	86	65	70	60	65	65	60	60	62
oxyfluorfen	0.125	wp	fl+1-lf+2-lf	10	15	20	15	100	100	100	100	70	100	85	85	40	90	75	68
oxyfluorfen	0.25	wp	fl+1-lf+2-lf	30	30	40	33	100	100	100	100	90	100	90	93	60	92	70	74
nitrofen	2	ec	1 + 2 leaf	12	8	8	9	100	100	100	100	100	85	90	92	95	75	85	85
PPG-844	0.2	ec	1 leaf	8	15	15	13	100	98	100	99	90	65	80	78	30	60	60	50
PPG-844	0.3	ec	1 leaf	20	23	25	23	100	100	100	100	90	90	70	83	60	50	60	57
PPG-844	0.5	ec	1 leaf	35	25	40	33	98	100	100	99	55	90	90	78	35	65	70	57
PPG-844	0.3	ec	2 leaf	40	35	20	32	100	90	90	93	80	70	65	72	70	35	50	52
PPG-844	0.5	ec	2 leaf	60	50	40	50	100	95	85	93	80	75	60	72	35	25	30	30
Control	—	—	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Rating: 0 = no effect, 100 = plant elimination.

Crop tolerance evaluations taken 7 days after herbicide treatments applied.

Table 2. Onion bulb yields from plots treated with oxyfluorfen applied as a postemergence treatment, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate	Formulation	Applied	No. 1 Onion bulbs (diameter) 4 in.		3-4 in.		2¼-3 in.		2's		Total No. 1	Total
	lbs ai/ac			cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	cwt/ac
oxyfluorfen	0.125	ec	flag	530	72	187	25	5	1	20	3	722	742
oxyfluorfen	0.125	wp	flag	537	72	173	23	10	1	25	3	720	745
oxyfluorfen	0.25	wp	flag	543	69	187	24	13	2	40	5	743	783
oxyfluorfen	0.50	wp	flag	577	75	130	17	10	1	55	7	717	772
oxyfluorfen	0.125	ec	1 leaf	587	74	134	17	8	1	59	7	730	789
oxyfluorfen	0.25	ec	1 leaf	526	68	184	24	11	1	48	6	722	770
oxyfluorfen	0.25	wp	1 leaf	552	71	174	22	11	1	40	5	737	777
oxyfluorfen	0.375	wp	1 leaf	538	70	181	23	10	1	44	6	729	773
oxyfluorfen	0.50	wp	1 leaf	580	73	148	18	9	1	59	7	728	796
oxyfluorfen	0.25	ec	2 leaf	550	70	149	19	19	2	64	8	699	782
oxyfluorfen	0.50	wp	2 leaf	546	73	165	22	9	1	31	4	721	752
oxyfluorfen + oil	0.25	wp	2 leaf	566	72	181	23	11	1	33	4	753	786
oxyfluorfen + oil	0.50	wp	2 leaf	589	73	159	20	9	1	46	6	757	803
oxyfluorfen	0.125	wp	fl+1-lf+2-lf	564	73	148	19	10	1	54	7	722	776
oxyfluorfen	0.25	wp	fl+1-lf+2-lf	538	73	156	21	10	1	28	4	704	732
nitrofen	2	ec	1 + 2 lf	584	74	146	19	8	1	47	6	738	785
PPG-844	0.2	ec	1 leaf	528	73	158	22	7	1	35	5	693	728
PPG-844	0.3	ec	1 leaf	518	71	166	23	12	2	30	4	696	726
PPG-844	0.5	ec	1 leaf	467	66	207	29	13	2	24	3	686	710
PPG-844	0.3	ec	2 leaf	539	75	142	20	8	1	31	4	688	719
PPG-844	0.5	ec	2 leaf	497	72	158	23	5	1	30	4	661	691
Control	—	—	—	502	68	184	25	16	2	40	5	703	743
LSD .05				20	—	15	—	3	-	6	-	71	75
.01				26	—	19	—	4	-	8	-	92	97
CV(%)				10.8	—	17.0	—	—	-	—	-	8	7

PROWL FOR WEED CONTROL IN YELLOW SWEET SPANISH ONIONS
MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

Purpose

The purpose of this study is to evaluate Prowl for onion tolerance and weed control when applied as a broadcast spray and activated by cultivation in furrow irrigated onions.

Procedure

Prowl was applied as a broadcast application with a bicycle wheel plot sprayer. Plots were 7.5 feet wide (4 onion rows) and 30 feet long. The sprayer boom was long enough to cover the width of the plot. Spray nozzles were teejet 8003 and spray pressure was 35 psi. Water was the herbicide carrier and applied at a volume of 43 gallons per acre. Prowl was applied at 3/4, 1.5, and 3.0 pounds active ingredient per acre on June 6. When treatments were applied, the onions had 4 to 6 leaves and were 10 to 12 inches tall. All emerged weeds were removed before applying Prowl and the plot area had just been cultivated to clean out the water furrows before applying the herbicide. After Prowl was applied, the trial area was recultivated to incorporate the herbicide. Tools on the cultivator included knives, duckfeet, and angle-iron furrow openers. The plot area was furrow irrigated on June 8, 2 days after Prowl application. Each furrow (22-inch rows) was irrigated and water subbed across each bed.

The onion bulbs were lifted on September 14 and hand-topped on September 22. The harvested bulbs were bagged and stored until November then graded to determine total bulb yield and bulb sizes. Samples were taken for residue testing.

Results

Prowl at 3/4, 1.5, and 3.0 pounds active ingredient per acre had no visible effect on onion foliage or measured effect on bulb size or yield when applied as a broadcast application to Monarch yellow Sweet Spanish onion. Weed control was good at 3/4 pounds but percent control increased from about 90 to 98 percent as rates increased by increment from 3/4 to 3.0 pounds active ingredient per acre. Redroot pigweed and barnyard grass seemed to be more easily controlled with Prowl than lambsquarters. Surflan did not control weeds as effectively as Prowl in this trial.

Bulb yield and size were excellent and differences in yields were not large enough to be significant at the 5 percent level. Late weeds emerging in the check plot did not affect harvested bulb yields but did hinder bulb lifting and hand-topping.

Table 1. Ratings for percent weed control, crop injury, and bulb yields for onions treated with Prowl, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate	Percent							
		Crop Injury		Redroot Pigweed		Lambsquarters		Barnyard Grass	
	-lbs ai/ac-	6/20	8/25	6/20	8/25	6/20	8/25	6/20	8/25
Prowl	3/4	0	0	94	90	90	85	96	94
Prowl	1.5	0	0	98	98	94	92	100	100
Prowl	3.0	0	0	100	100	98	96	100	100
Surflan	1.5	0	0	82	75	79	74	88	83
Check	—	0	0	0	0	0	0	0	0

Rating: 0 = no effect, 100 = plants killed.

Table 2. Onion bulb yields from plots treated with Prowl, Malheur Experiment Station, Ontario, Oregon, 1981

		Bulb Yield No. 1 Onions[1]					
Herbicide	Rate	2¼-3 in.	3-4 in.	≥ 4	Total No. 1	No. 2's	Total
	-lbs ai/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-
Prowl	3/4	19	213	571	803	28	831
Prowl	1.5	13	268	482	763	30	793
Prowl	3.0	18	218	564	800	37	837
Surflan	1.5	12	207	543	762	28	790
Check	—	17	227	491	735	37	772
LSD .05		NS	NS	NS	NS	NS	NS
CV (%)		9	8	10	9	11	8

[1] Onion sized according to diameter of bulbs.

Monarch yellow Sweet Spanish onion.

HERBICIDES APPLIED AS POSTPLANT PREEMERGENCE AND POSTEMERGENCE TREATMENTS FOR ANNUAL WEED CONTROL IN SWEET SPANISH ONIONS MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

Purpose

The purpose of this study is to identify herbicide treatments for onion tolerance and weed control.

Procedure

Monarch yellow Sweet Spanish onions were planted on April 10 in a silt loam textured soil. On April 11, the postplant preemergence treatments were applied as broadcast treatments and shallowly incorporated with the soil above the depth of the planted seed using a nailboard. The trial area was then furrow irrigated to supply soil moisture for seed germination and seedling emergence.

The postemergence treatments were applied on May 22. All onions had at least 1 true leaf and the second leaf was developing on about 30 percent of the onions. Weed species included redroot pigweed, lambsquarters, and barnyard grass. Pigweed was 2 to 3 inches tall, lambsquarters 4 to 5 inches and barnyard grass had 2 to 3 leaves.

Each plot was 4 rows wide and 25 feet long and each treatment was replicated three times in a randomized block experimental design. The herbicide treatments were applied with a bicycle wheel plot sprayer using 8006 teejet nozzles with a nozzle over the center of each row. Spray pressure was 35 psi, applying water as the carrier at the rate of 48 gallons per acre. Soil and air temperatures during application were 62°F and 68°F, respectively. Skies were partly cloudy and wind was calm.

The treatments were evaluated on June 10 for weed control and crop tolerance. After evaluation, the onions were thinned to about 4 plants per linear foot of row, all weeds were removed, and plots were kept free of seeds until harvest.

On September 14, the onion bulbs were lifted and topped on September 20. During mid-October, the bulbs were graded for size, and yields were determined.

Results

Herbicides applied as postplant preemergence treatments included DCPA, diclofop, propachlor, and bensulide. Propachlor was the superior herbicide resulting in 98 to 100 percent control of redroot pigweed, lambsquarters, and barnyard grass. Propachlor was compatible with DCPA and bensulide applied as tank mixes and weed control was good when propachlor was included in the combination tank mix treatments. Diclofop applied in combination with DCPA as a postplant preemergence treatment did not control barnyard grass as well as was expected. Propachlor appears to be a herbicide than can be activated to give good weed control with less incorporation than bensulide and DCPA.

Herbicides applied as postemergence treatments included oxadiazon and bromoxynil. Oxadiazon at 1 pound active ingredient per acre gave better control of redroot pigweed and lambsquarters than bromoxynil at 0.5 pound active ingredient per acre. Onions treated with oxadiazon showed slight symptoms of herbicide injury. Bromoxynil caused onion tops to wilt and droop but tops soon recovered and appeared normal.

Total bulb yields were statistically equal among herbicide treatments although measured yields from several plots treated with herbicides were higher than the untreated check. It was also noted that bulb size was reduced in the untreated check plots. This effect was probably a result of competition from dense stands of weeds left in the plots and not hand-weeded until after all the treatments were evaluated for weed control on June 10.

Table 1. Percent weed control and crop tolerance ratings for herbicides applied to onions as preemergence and postemergence treatments, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate	Applied	Crop Injury	Percent Weed Control[1]											
				Pigweed				Lambsquarters				Barnyard Grass			
				R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg
	-lbs ai/ac-														
DCPA	9	pei	0	93	88	85	89	90	85	80	85	83	80	83	82
propachlor	9	pei	0	100	100	100	100	95	100	100	98	99	99	100	99
DCPA and propachlor	4+4	pei	0	98	99	98	98	99	99	98	98	99	99	98	98
DCPA and propachlor	6+6	pei	4	100	100	100	100	100	100	100	100	100	100	100	100
bensulide	6	pei	0	95	85	98	93	93	85	90	89	92	90	97	93
bensulide and DCPA	4+6	ppi+pei	0	80	96	93	90	95	95	93	94	93	95	90	93
bensulide and DCPA	4+8	ppi+pei	3	88	96	94	93	85	95	92	91	85	95	92	91
bensulide and propachlor	4+6	ppi+pei	3	100	100	100	100	100	100	99	99	98	98	98	98
bensulide and propachlor	4+8	ppi+pei	17	100	100	100	100	100	100	100	100	100	100	100	100
DCPA and diclofop	6+1.5	pei	0	80	75	75	77	83	80	80	81	85	85	90	87
DCPA + oxadiazon	9+1	pei+post	0	96	99	98	97	99	99	96	98	88	96	93	92
(DCPA and propachlor) + oxadiazon	(4+4)+1	pei+post	0	100	100	100	100	100	100	100	100	100	100	100	100
propachlor + oxadiazon	9+1	pei+post	4	100	100	100	100	100	100	100	100	100	100	100	100
bensulide + oxadiazon	6+1	pei+post	0	100	100	100	100	100	100	100	100	85	88	85	86
bensulide and DCPA + oxadiazon	(4+4)+1	pei+post	0	99	100	100	99	96	100	100	98	96	100	100	98
DCPA + bromoxynil	9+½	pei+post	0	90	92	93	92	88	88	85	87	83	85	90	86
DCPA and propachlor + bromoxynil	(4+4)+½	pei+post	5	100	100	100	100	100	100	100	100	100	100	100	100
propachlor + bromoxynil	9+½	pei+post	4	100	100	100	100	100	100	100	100	100	100	99	99
bensulide + bromoxynil	6+½	pei+post	5	90	93	98	94	93	90	90	91	88	80	95	87
bensulide and DCPA + bromoxynil	(4+4)+½	pei+post	5	95	100	95	97	95	100	95	97	92	95	90	92
Control	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0

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

Evaluated June 10.

Table 2. Yield of various sizes of onion bulbs harvested from plots treated with herbicides applied as preemergence and postemergence treatments, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate	Applied	Bulb Yields No. 1's[1] 2¼-3 in.	3-4 in.	4 in.	Total No. 1	No. 2's	Total
	-lbs ai/ac-		-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-
DCPA	9	pei	4	150	596	750	37	787
propachlor	9	pei	2	116	639	757	42	799
DCPA and propachlor	4+4	pei	5	127	635	767	42	809
DCPA and propachlor	6+6	pei	9	157	555	721	48	769
bensulide	6	pei	13	151	511	675	48	723
bensulide and DCPA	4+6	ppi+pei	8	103	573	684	47	731
bensulide and DCPA	4+8	ppi+pei	4	128	615	747	38	785
bensulide and propachlor	4+6	ppi+pei	5	113	629	747	19	766
bensulide and propachlor	4+8	ppi+pei	7	104	562	673	41	714
DCPA and diclofop	6+1½	pei	6	108	630	744	37	781
DCPA + oxadiazon	9+1	pei+post	5	127	617	749	57	806
(DCPA and propachlor) + oxadiazon	(4+4)+1	pei+post	10	133	589	732	37	769
propachlor + oxadiazon	9+1	pei+post	7	109	583	699	30	729
bensulide + oxadiazon	6+1	pei+post	1	122	660	783	20	803
(bensulide and DCPA) + oxadiazon	(4+4)+1	pei+post	4	131	587	722	26	748
DCPA + bromoxynil	9+½	pei+post	7	117	633	757	34	791
(DCPA and propachlor) + bromoxynil	(4+4)+1	pei+post	9	153	598	760	20	780
propachlor + bromoxynil	9+½	pei+post	3	110	580	693	58	751
bensulide + bromoxynil	6+½	pei+post	9	170	529	708	33	741
(bensulide and DCPA) + brominal	(4+4)+1	pei+post	5	124	573	702	40	742
Control	-	-	20	225	452	697	29	726
LSD .05			NS	NS	NS	NS	NS	NS
CV (%)			-	-	-	10.2	-	10.3

[1] diameter of onion bulbs

POSTEMERGENCE APPLIED HERBICIDES FOR WEED CONTROL IN SWEET SPANISH ONIONS MALHEUR EXPERIMENT STATION, ONTARIO, OREGON 1981

Purpose

The purpose of this study was to apply herbicides as postemergence treatments to onions in the flag, and 2 leaf-stages of growth to determine the tolerance of onions to herbicides at these growth stages and also to evaluate the susceptibility of weeds to herbicides at different stages of growth.

Procedure

Monarch, a variety of yellow Sweet Spanish onion, was planted on April 10 at about 1-inch spacing in rows 22 inches apart with a 4-row Beck planter. Individual plots were 4 rows wide and 25 feet long and each treatment replicated 3 times and arranged in a randomized complete block experimental design. Preplant and preemergence type herbicides were not applied to this experiment. The plot area was furrow irrigated after planting to assure that an ample supply of soil moisture was available for seed germination and seedling growth.

The herbicides applied at the flag leaf stage of onion growth were applied on May 11. The flag leaves were fully developed and on about 50 percent of the onions the first true leaf was showing at the base of the flag leaf. Most of the onions appeared in a healthy condition and were growing despite the unusual cool temperature. Weeds present included pigweed (1-inch rosettes), lambsquarters (2 to 3 inches tall), and barnyard grass (2 to 4 leaves). Skies were clear, air temperature was 62^{o}F, soil surface was dry, and wind was 2 to 3 mph.

On May 23, the herbicide treatments were applied to onions in the 2-leaf stage of growth. When the treatments were applied, the second true leaf on most of the plants was at least equal in length to the first true leaf. Onions in the plots previously treated at the flag stage were slightly smaller but essentially free of weeds when the second application of the repeat treatments was applied. During the 12-day interval between the flag and 2 leaf applications, the weeds had made considerable growth. Pigweed was 3 to 4 inches tall, lambsquarters 6 to 8 inches tall, and barnyard grass was tillering with some grass plants having as many as 3 tillers. Skies were partly cloudy, air temperature was 68^{o}F, wind was 1 to 2 mph, and soil surface was moist after frequent rain showers.

After evaluations of treatments for weed control and crop injury, the plots were hand-weeded and the onions hand-thinned to approximately 4 plants per foot of row. All plots were kept free of weeds for the remainder of the growing season.

All herbicide treatments were applied as broadcast applications using 8006 teejet nozzles spaced at 22 inches on a boom long enough for 4 nozzles with a nozzle directly over each row in 4 row plots. Spraying pressure was 35 psi and herbicides applied in an aqueous solution at a volume of 58 gallons per acre.

Soils in the trial area are a silt loam texture, 1.3 percent organic matter with a pH of 7.3.

In late September, the onion bulbs were harvested from the 2 center rows of each 4-row plot. The harvested blubs were stored until mid-November then graded to determine the effect of herbicide treatments on size of bulbs and total bulb yield.

Results

Ronstar (oxadiazon) and Brominal or Buctril (bromoxynil) are most active on annual broad leaf weeds and were used in combination with Hoelon (diclofop) and Poast (BAS 9052) which are foliar active on seedling annual grasses.

All combinations of these materials gave excellent control of pigweed, lambsquarters, and barnyard grass when applied in both the flag and 2-leaf stage of onion growth. These herbicides were less effective even at higher rates when single applications were delayed until the onions had developed 2 true leaves. This occurred because of the large size of weeds by the time onions are in the 2-leaf stage. Foliage of weedy plants this size suffers considerable amount of burning but in many cases recovers from the injury to become problem weeds.

Poast has considerably more foliar activity on grasses than Hoelon and will kill larger grass plants but does not have the residual soul activity of Hoelon which can persist in the soil to control grass as it germinates during the remainder of the growing season.

Foliar symptoms of herbicide effects on onions within a few days after treatments were less apparent with Ronstar than Brominal/Buctril. Although early foliar injury symptoms were observed, none of the injury was signigicant and was only visible for a period of 7 to 10 days after the date when injury was first noted. All repeat herbicide treatments were effective and considered to be treatments that would be readily accepted by commercial growers.

The yield of onion bulbs for each herbicide treatment is reported in Table 2. Yields were determined for bulbs 2¼ to 3, 3 to 4, and larger than 4 inches in diameter. Total bulb yields for all treatments averaged 738 cwt/ac and ranged from a high of 777 to a low of 681. Number 1 jumbo size bulbs for all treatments average 96.35 percent with 68 percent of these bulbs larger than 4 inches in diameter. Yield data analyzed statistically showed that no difference existed between treatments for total bulb yield, yield of bulbs 2¼ to 3 inches and 3 to 4 inches in diameter. Significantly higher yields of bulbs larger than 4 inches in diameter were obtained with all herbicide treatments applied at the flag and 2-leaf stages of onion growth. In summary, the herbicides applied as postemergence treatments did not reduce onion quality or bulb yield. Weeds existing with seedling onions until the 2-leaf stage of growth can reduce size of onion bulbs at harvest time but have little effect on total bulb yield. Results strongly show that Ronstar, Brominal or Buctril, Hoelon, and Poast are safe to use in seedling Sweet Spanish onions as postemergence treatments for weed control.

Table 1. Onion tolerance ratings and percent weed control from herbicides applied as postemergence applications to seedling onion, Malheur Experiment Station, Ontario, Oreogn, 1981

Herbicides	Rate	Applied	Crop tolerance				Percent weed control											
							Pigweed				Lambsquarter				Barnyard grass			
			R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg	R_1	R_2	R_3	Avg
	-lbs ai/ac-																	
oxadiazon + diclofop	3/4+3/4	flag + 2 leaf	0	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100
oxadiazon + diclofop	3/4+1	flag + 2 leaf	0	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100
oxadiazon + BAS 9052	3/4+1/4	flag + 2 leaf	5	0	5	3	100	100	100	100	100	100	100	100	100	100	100	100
oxadiazon + BAS 9052	3/4+1/2	flag + 2 leaf	5	5	5	5	100	100	100	100	100	100	100	100	100	100	100	100
oxadiazon + diclofop	1+1	2 leaf	0	0	0	0	95	92	95	93	98	96	98	97	75	70	85	77
oxadiazon + diclofop	1½+1½	2 leaf	7	10	5	7	95	95	98	96	99	98	99	98	65	70	90	75
oxadiazon + BAS 9052	1½+1/3	2 leaf	0	0	0	0	98	96	98	97	99	98	99	98	98	98	98	98
bromoxynil + diclofop	1/3+1	flag + 2 leaf	5	5	0	4	100	100	95	98	100	100	98	99	100	98	99	99
bromoxynil + diclofop	1/2+1	flag + 2 leaf	10	5	5	7	100	100	100	100	100	100	100	100	100	100	100	100
bromoxynil + BAS 9052	1/3+1/4	flag + 2 leaf	5	5	5	5	100	100	98	99	100	100	100	100	100	100	100	100
bromoxynil + BAS 9052	1/2+1/2	flag + 2 leaf	5	10	10	8	100	100	100	100	100	100	100	100	100	100	100	100
bromoxynil + BAS 9052	2/3+1/3	2 leaf	0	0	5	3	92	80	50	74	94	90	80	88	93	95	95	94
bromoxynil + diclofop	1/2+1½	2 leaf	5	10	10	8	80	90	40	70	90	96	90	92	50	85	80	72
Control	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ratings : 0 = no effect, 100 = plant killed.

Evaluated June 3 & 4.

Table 2. Onion bulb yields from trials conducted to evaluate onion tolerance to herbicides applied to seedling onions as postemergence treatments, Malheur Experiment Station, Ontario, Oregon, 1981

			Diameter of Number 1 Bulbs						No. 2's				
Herbicides	Rate	Applied	2¼-3 in.		3-4 in.		+ 4 in.		+ 2¼ in.		Total No. 1's		Total
	-lbs ai/ac-		cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	-cwt-
oxadiazon + diclofop	3/4+3/4	flag + 2 leaf	17	2	177	23	543	70	40	5	737	95	777
oxadiazon + diclofop	3/4+1	flag + 2 leaf	11	1	132	18	553	75	39	5	696	95	735
oxadiazon + BAS 9052	3/4+1/4	flag + 2 leaf	15	2	192	25	537	70	27	3	744	96	771
oxadiazon + BAS 9052	3/4+1/2	flag + 2 leaf	16	2	159	21	547	73	24	3	722	97	747
oxadiazon + diclofop	1+1	2 leaf	15	2	269	35	475	61	17	2	759	98	776
oxadiazon + diclofop	1½+1½	2 leaf	18	2	215	29	484	66	12	2	717	98	729
oxadiazon + BAS 9052	1½+1/3	2 leaf	25	3	212	28	487	64	34	4	724	96	758
bromoxynil + diclofop	1/3+1	flag + 2 leaf	9	1	177	24	535	72	26	3	722	97	748
bromoxynil + diclofop	1/2+1	flag + 2 leaf	15	2	166	23	513	71	25	3	694	97	719
bromoxynil + BAS 9052	1/3+1/4	flag + 2 leaf	13	2	128	18	537	76	33	5	678	95	711
bromoxynil + BAS 9052	½+½	flag + 2 leaf	19	3	156	22	509	72	24	3	684	97	708
bromoxynil + BAS 9052	2/3+1/3	2 leaf	25	3	235	32	434	60	33	5	695	95	728
bromoxynil + diclofop	2/3+1½	2 leaf	31	4	214	30	435	62	24	3	681	97	705
Control	-	-	49	7	210	29	431	60	26	4	690	96	716
LSD .05			NS	-	NS	-	72	-	NS	-	NS	-	NS
.01			NS	-	NS	-	79	-	NS	-	NS	-	NS
CV (%)			18	-	9	-	7	-	21	-	6	-	5

BRAVO FUNGICIDE TREATMENTS TO SWEET SPANISH ONIONS MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

Purpose

The purpose of this study was to determine the efficacy of Bravo 500 for control of onion disease and the influence of these treatments on maturity and harvest dynamics.

Procedure

Rates of Bravo Applications

a. 1.5 pts/ac
b. 2.0 pts/ac
c. 4.0 pts/ac

Onion Varieties (yellow Sweet Spanish)

a. Golden Cascade (early maturing)
Cima (intermediate maturing)

Two separate blocks of onions were planted on April 6, 1981. Each block consisted of a planting of both Golden Cascade and Cima varieties. Enough onions of each variety was planted so plots of each treatment were 4 rows wide and 25 feet long. Seed was planted at a rate of 12 per foot and after emergence hand-thinned to a final stand of 4 plants/linear foot of row.

Harvest dates were scheduled so the bulbs in Block I were harvested when 20 to 50 percent of the onion tops had fallen over. The onions in Block II were harvested when nearly all the tops had collapsed. Harvest date for Block I was August 18. Block II was harvested on September 14. The lifted onions were left in the field for one week before the bulbs were hand-topped. Twenty-two feet from each of the two center rows of each 4 row plot was harvested for yield and storage data. The harvested bulbs were boxed in celery crates and placed in commercial onion storage. The August 18 harvested bulbs were placed in the storage shed on August 30. September 14 harvested bulbs were put in storage on September 23. All onions remained in storage until January 13. On January 14 and 15, the onions were graded to determine bulb size, bulb yield, and percent neckrot.

Table 1. Bravo Treatments (application dates by variety)

Early (Golden Cascade)	Late (Cima)	Temp. °F Daytime Highs	Rainfall Date	Rainfall Amount (in.)
6/22	—	79	7/6	0.26
6/29	—	89	7/7	0.23
7/7	—	83	8/14	0.05
7.17	—	97	8/20	0.06
7/22	7/22	90	8/30	0.05
8/5	8/5	92	9/25	0.19
8/14	8/14	99		
8/24	8/24	97		
9/3	9/3	78		
9/10	9/10	94		

1 Treatments were applied to early and late harvest blocks until each block was harvested.

Methods used in applying Bravo applications

Bravo treatments were applied using a CO^2 back-pack sprayer equipped with 4 nozzles at 20-inch spacing on a single boom. Teejet fan nozzles (size 8006) were used, applying water at a volume of 54 gallons/acre at a spray pressure of 35 psi. Each application of all treatments was applied between 10 a.m. and noon for each date listed above.

Results

Bulb maturity, bulb size, and bulb yield as affected by multiple applications of Bravo fungicide applied at 1.5, 2.0, and 4.0 pts/ac are in Tables 2 and 3. Results show that Bravo, regardless of rates, had no effect on when tops began to fall over. Golden Cascade was the earlier natural maturing variety with approximately 50 percent of the tops fallen over when the bulbs were lifted on August 18. Cima on the same date had about 22 percent of its tops down. On September 14, 99 percent of the tops were down in Golden Cascade plots with about 90 percent down in Cima plots. In this trial, bulb maturity is correlated to the time when the neck tissue collapses and the tops fall over.

Early harvesting reduced both bulb size and bulb yield regardless of Bravo treatments. Late harvesting increased bulb yields by about 50 cwt/ac. Yield increase probably was caused by a significant increase in the size of the late harvested bulbs compared to those harvested early. Although bulb yields and bulb size varied between Bravo treatments within the same harvest dates, the differences were not great enough to be significant.

The amount of neckrot was considered to be low in all treatments at both harvest dates. Percent neckrot ranged between a low of 1.0 percent to a high of 7.0 percent. Although this would appear to be enough difference to be considered signigicant, it was not measured to be so because of the wide range in percent neckrot between replications within the same treatments.

In conclusion, Bravo fungicides had no effect on bulb yield, bulb size, bulb maturity, or percent incidence of neckrot when applied to the foliage of Golden Cascade or Cima varieties of yellow Sweet Spanish onions as multiple applied treatments. To fully evaluate the effectiveness of this material as a means of reducing storage neckrot, it shoud be tested with onions that have a history for late maturity and a high incidence of neckrot occurence during storage.

Table 2. Bulb yields and percent neckrot from Sweet Spanish Onions treated with Bravo, Malheur Experiment Station, Ontario, Oregon, 1981

Variety	Bravo	Bulb Yields									
		2¼-3 inch		3-4 inch		≥ 4 inch		2's		Rot	Total
	pts/ac	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	%	cwt/ac
Late Harvest											
Cima	1.5	20	3	232	35	384	58	22	3	2.5	658
	2.0	30	5	258	42	314	51	9	1	6.0	611
	4.0	23	4	277	45	298	49	15	2	4.0	613
	check	11	2	260	40	351	54	29	4	3.0	651
	LSD .10	NS	-	NS	--	NS	--	NS	-	NS	NS
	CV (%)	--	-	12	--	13	--	--	-	--	4
Golden Cascade	1.5	17	3	312	48	308	48	5	1	3.0	642
	2.0	16	3	264	42	348	55	8	1	7.0	636
	4.0	16	2	289	47	308	50	6	1	1.0	619
	check	15	2	216	32	456	66	7	1	5.0	694
	LSD .10	NS	-	NS	--	NS	--	NS	-	NS	NS
	CV (%)	--	-	9	--	11	--	--	-	--	5
Early Harvest											
Cima	1.5	40	7	326	55	213	36	17	3	4.0	596
	2.0	22	4	326	54	244	40	9	2	5.0	601
	4.0	43	8	368	66	140	25	9	2	2.0	560
	check	38	6	349	60	176	30	18	3	2.0	581
	LSD .10	NS	-	NS	--	NS	--	NS	-	NS	NS
	CV (%)	--	-	11	--	14	--	--	-	--	3
Golden Cascade	1.5	29	5	364	60	210	35	0	0	2	603
	2.0	31	5	338	57	222	38	1	0	5	592
	4.0	48	9	396	72	103	19	0	0	1	547
	check	36	6	395	64	181	29	2	1	1	614
	LSD .10	NS	-	NS	--	NS	--	NS	-	NS	NS
	CV (%)	--	-	9	--	13	--	--	-	--	4

Table 3. Maturity Rates (percent of bulbs with tops fallen over), Malheur Experiment Station, Ontario, Oregon, 1981

Variety	Bravo	Harvest	Recording by Dates of Percent Onion Bulbs with Collapsed Tops 7/27	8/3	8/10	8/18	8/24	8/31	9/7	9/17
	-pts/ac-		-%-							
Golden Cascade	1.5	early[1]	12	22	37	52	—	—	—	—
Golden Cascade	2.0	early	10	18	33	45	—	—	—	—
Golden Cascade	4.0	early	14	24	35	54	—	—	—	—
Golden Cascade	check	early	12	20	37	52	—	—	—	—
LSD .05			NS	NS	NS	NS				
Cima	1.5	early[1]	0	3	15	21	—	—	—	—
Cima	2.0	early	0	6	12	24	—	—	—	—
Cima	4.0	early	0	4	17	22	—	—	—	—
Cima	check	early	0	5	15	21	—	—	—	—
LSD .05			NS	NS	NS	NS				
Golden Cascade	1.5	late[2]	10	20	35	50	70	90	98	99
Golden Cascade	2.0	late	8	16	30	45	65	85	95	99
Golden Cascade	4.0	late	12	21	37	55	72	90	98	99
Golden Cascade	check	late	10	22	35	52	70	90	98	99
LSD .05			NS	NS	NS	NS	NS	NS	NS	NS
Cima	1.5	late[2]	0	5	13	20	35	55	70	88
Cima	2.0	late	0	3	11	19	33	52	68	85
Cima	4.0	late	0	6	15	25	38	60	80	95
Cima	check	late	0	5	17	25	35	58	75	93
LSD .05			NS	NS	NS	NS	NS	NS	NS	NS

[1] Harvested 8/18/82

[2] Harvested 9/14/82

1981 POTATO VARIETY TRIALS - OREGON SEED

Location: Malheur Experiment Station, Ontario, Oregon

Soils: silt loam texture, pH 7.3, O.M. 1.2 percent

Fertilizer applied: fall 1980 — 100 pounds of P_2O_5 and 60 pounds nitrogen. Mixture was broadcast before moldboard plowing.

spring 1981 — 150 pounds of nitrogen as ammonium nitrate was sidedressed at planting time.

Planting date: April 23

Vines beat-off: October 6

Harvested: October 14 — dug by 2-row digger then hand-picked.

Plot size: 36-inch single row 18.5 feet long or 25 hills with approximately 9-inch spacing between seed pieces.

Replications: 3 times

Table 1. Weather summary at the Malheur Experiment Station during 1981 growing season

Month	Average temperature	Deviation from normal	Precipitation	Deviation from normal
	-F°-	-F°-	-in-	-in-
April	54.0	+3.2	0.73	+0.02
May	56.4	-3.0	1.16	-0.01
June	62.6	-3.8	1.01	+0.09
July	72.5	-2.6	0.49	+0.39
August	76.0	+3.8	0.06	-0.33
September	63.7	+0.9	0.64	+0.22
October	47.5	-3.4	0.93	+0.12
Total	—	—	5.02	—

Weed control: Roneet (cycloate) at 4 pounds active ingredient per acre broadcast applied and disc incorporated before bedding in fall, 1980.

Insecticides: Temik (aldicarb) sidedressed at planting time at rate of 3 pounds active ingredient per acre.

Irrigation: furrow with water applied in each row every 4 days for 12 hours during July and August when crop demands for water were highest. Water run in alternate rows each irrigation.

Table 2. Tuber yields and disease ratings from various experimental lines of potatoes in Oregon variety trials, Malheur Experiment Station, Ontario, Oregon, 1981

Variety	US No. 1's ≥10 oz.		6-10 oz.		4-6 oz.		Total No. 1's		No. 2's >4 oz.		Culls <4 oz. rough		Total yield	Mosiac infected
	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	-cwt-	-%-
Butte	96	18	200	37	164	30	460	85	14	3	70	13	544	0
Pioneer	120	31	146	38	64	17	330	86	34	9	20	5	384	42
Targhee	70	18	126	33	112	29	308	81	0	0	72	19	380	0
Lemhi	78	27	104	35	66	22	248	84	4	1	42	14	294	38
Bison	44	17	126	49	62	24	232	90	8	3	18	7	258	20
Norgold	90	34	90	34	54	21	234	89	0	0	28	11	262	22
Chieftain	84	24	138	40	64	19	286	83	32	9	26	8	344	6
Atlantic	266	49	202	37	48	9	316	95	8	1	22	4	546	0
R. Burbank 78 Gen. 1	98	27	128	36	70	20	296	83	20	6	42	12	358	8
A7474-12	238	34	276	40	136	19	650	93	6	1	42	6	698	0
A74104-8	212	49	138	32	56	13	406	93	2	<½	28	6	432	36
A7403-3	110	26	200	47	90	21	400	93	0	0	30	7	430	20
A74124-3	146	30	154	32	116	24	416	86	6	1	64	13	486	28
A75291-4	110	28	182	46	68	17	360	92	6	2	26	7	392	8
A69870-6	108	22	188	39	172	27	428	88	0	0	56	12	484	0
A7518-8	28	13	82	38	52	24	162	75	12	6	42	19	216	64
A74212-1	208	38	198	36	98	18	504	92	10	2	32	6	546	0
A72619-7	48	26	40	22	52	29	140	77	0	0	42	23	182	40
A74393-1	108	25	172	40	96	22	376	87	12	3	42	20	430	16
A69657-4	150	35	182	42	64	15	396	92	8	2	28	6	432	14
A7487-5	86	23	182	49	78	21	346	94	0	0	24	6	370	0
A7596-1	130	39	112	34	58	17	300	90	4	2	30	9	334	0
A69173-2	60	17	178	50	82	23	320	89	0	0	38	11	358	6
WC612-13	90	39	68	29	42	18	200	86	4	2	28	12	232	8
A72602-2	210	41	190	37	62	12	462	91	20	4	28	5	510	18
A7487-3	26	12	94	45	56	27	176	84	4	2	30	14	210	0
A74404-3	100	20	190	37	142	28	432	85	18	4	60	12	510	4
A74626-1	96	26	136	37	72	19	304	82	42	11	26	7	372	?
A74396-1	158	35	182	80	66	15	406	90	18	4	26	6	450	72
A75291-3	216	44	154	31	78	16	448	91	20	4	24	5	492	4
A69870-3	160	58	264	47	88	16	512	92	16	3	28	5	556	0
WC521-12	100	39	88	35	30	12	218	86	16	6	20	8	254	88
AD7386-1	208	44	134	40	54	28	396	84	54	11	22	5	472	18
AC67560-1	176	33	212	40	106	20	494	93	10	2	30	6	534	6
ND561-1	102	31	124	38	74	22	300	91	0	0	30	9	330	58

Table 2. (Cont'd) Tuber yields and disease ratings from various experimental lines of potatoes in Oregon variety trials, Malheur Experiment Station, Ontario, Oregon, 1981

Variety	US No. 1's ≥10 oz.		US No. 1's 6-10 oz.		US No. 1's 4-6 oz.		Total No. 1's		No. 2's >4 oz.		Culls <4 oz. rough		Total yield	Mosiac infected
	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	-cwt-	-%-
ND451-2	266	52	138	27	74	15	478	94	6	1	24	5	508	10
ND638-1	32	12	122	46	84	31	238	89	6	2	24	9	268	88
ND137-2	24	16	104	24	114	27	242	56	120	28	68	16	430	18
WN630-5	270	58	130	28	52	11	452	97	0	0	16	3	468	8
T226-1	204	42	140	29	60	12	404	83	58	12	26	5	488	2
R. Burbank 79 visc. Gen.	92	17	204	37	164	29	460	83	44	8	52	9	556	2
WD641-10	166	43	138	36	54	14	358	92	8	2	22	6	388	2
WD630-4	74	36	56	27	46	23	176	86	0	0	28	14	204	60
ALR4-1	86	17	224	45	140	28	450	90	0	0	52	10	302	0
AK38-2	132	35	136	36	50	13	318	85	22	12	14	4	376	20
LSD .05	71		61		26		129		13		10		133	
.10	59		51		21		108		11		8		111	

LATE HARVEST POTATO VARIETY TRIAL
MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

Purpose

The purpose of this study was to compare experimental lines for production potential when evaluated for tuber yield and quality when grown by furrow irrigation in the Treasure Valley of southwest Idaho and Malheur County of eastern Oregon.

Procedure

Experimental lines of potatoes were evaluated as entries received as part of a Western Regional testing program and entries designated as preliminary and advanced lines received from Dr. Joe Pavek, Aberdeen, Idaho. Regional entries evaluated included A72545-2, A72685-2, AD7267-1, AD7377-1, AD74135-1, WnC521-12, WnC672-2, Lemhi, Norchip, and Russet Burbank. All other entries listed in the attached information tables were received from Dr. Pavek.

The potatoes were planted in silt loam textured soil partly fertilized, herbicide treated, and bedded in the fall. Fertilizer consisted of 100 pounds of P_2O_5 and 80 pounds of nigrogen plowed under in the fall and another 120 pounds of nitrogen sidedressed at planting time. Roneet (cycloate) at 4 pounds active ingredient per acre was applied and disc incorporated before bedding. Insects were controlled with 3 pounds active ingredient per acre of Temik applied at planting time.

Potatoes were planted on April 23 and 24. The preliminary trial consisted of 19 entries each replicated 3 times in single row plots 25 hills long. Fifteen entries were evaluated in the advanced and regional trial in single row plots 35 hills long and each entry replicated 4 times. After planting, the furrow centers were deep chiseled and the hills established. There were no other cultivations.

The first irrigation was applied on May 24 and subsequent irrigations occurred as needed. During the peak of the irrigation season, water was applied every fourth day in each row for 12 hours.

Vine maturity readings were taken the first week in October before beating the vine off for digging on October 6. The plots were dug on October 12 and hand-picked. The entries were graded on October 13 and 14 to determine tuber yields and quality. Samples of each entry were collected and evaluated at Aberdeen, Idaho, by Dr. Pavek for fry color, boiling scores, and specific gravity.

The data are recorded in attached tables. Yields this year are lower than normal because of exceeding amounts of water rot throughout the trial. The greatest amount of rot occurred in early maturing lines.

Table 1. Potato tuber yields from advanced late harvest potato variety trial, Malheur Experiment Station, Ontario, Oregon, 1981

Variety	US No. 1's ≥10 oz.		US No. 1's 6-10 oz.		US No. 1's 4-6 oz.		Total No. 1's		No. 2's >4 oz.		Culls < 4 oz and misshapen		Total yield
	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	-cwt-
A66102-16	39	13	98	32	77	25	214	71	23	7	66	22	303
A7411-2	63	23	100	37	51	19	214	78	21	7	38	14	273
A7419-2	114	35	94	29	51	16	259	80	10	3	53	16	323
A7578-1	37	14	72	27	65	25	174	67	15	6	71	27	260
A75188-3	34	14	83	35	65	27	182	77	8	3	47	19	237
Lemhi	39	12	94	29	78	24	211	65	26	8	85	26	322
R. Burbank	78	25	100	32	52	16	230	72	38	12	48	15	316
A72545-2	46	14	113	36	77	24	236	74	0	0	81	25	317
A72685-2	47	18	81	31	61	23	189	73	2	1	67	26	258
AD7267-1	58	34	47	28	24	14	129	76	10	6	30	18	169
AD7377-1	21	9	59	26	60	26	140	62	10	4	76	33	226
AD74135-1	17	7	75	27	82	30	176	64	9	3	90	33	275
WnC521-12	148	39	107	28	55	15	310	82	13	3	53	14	376
WnC672-2	63	22	97	33	63	22	223	77	6	2	61	21	290
Norchip	17	6	87	30	85	30	189	66	40	14	56	20	285
LSD .05	32		31		24				23		21		57
.01	43		42		32				30		28		77

Table 2. Potato tuber yields from preliminary late harvest variety trial, Malheur Experiment Station, Ontario, Oregon, 1981

Variety	US No. 1's ≥ 10 oz.		US No. 1's 6-10 oz.		US No. 1's 4-6 oz.		Total No. 1's		No. 2's >4 oz.		Culls < 4 oz and misshapen		Total yield
	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	cwt/ac	%	-cwt-
A69827-15	11	5	63	32	46	23	120	60	5	3	74	37	199
A72240-5	10	3	66	23	79	27	155	53	19	6	118	40	292
A72643-3	4	2	52	24	49	22	105	48	10	4	105	48	220
A72665-22	41	12	69	20	99	29	209	61	12	3	122	36	343
A74341-4	5	2	60	20	88	30	153	51	0	0	145	49	298
A74441-3	4	3	25	19	50	38	79	61	5	4	46	35	130
A7637-8	13	6	72	33	70	32	155	71	2	1	61	28	218
A7637-12	19	6	66	19	133	39	218	64	3	1	120	35	341
A76153-2	81	24	116	34	64	19	261	78	8	2	67	20	336
TxA549-1	13	5	63	22	43	15	119	42	53	18	113	40	285
A74544-1	20	6	53	17	86	28	159	52	9	3	137	45	305
A711076-19	21	12	37	21	50	28	108	61	16	9	53	30	177
A74143-9	17	10	42	24	32	19	91	53	26	15	55	32	172
A74541-1	10	4	40	15	60	22	110	42	1	1	154	58	265
R.B. SM2-50st	26	8	76	24	77	24	179	57	50	16	87	28	316
R.B. SM8-50st	13	8	41	25	39	24	93	56	39	24	33	20	165
R.B. SM122	0	0	9	4	46	19	55	22	33	13	157	64	245
Lemhi	39	20	49	26	42	22	130	68	29	15	32	17	191
R.B. 79 Gen. I	51	17	53	17	54	18	158	52	76	25	69	23	303
LSD .05	21		32		33				22		32		63
.01	28		44		45				31		42		85

Table 3. Fry color, boiling scores, and specific gravity scores from experimental lines of potatoes evaluated in advanced late harvested trials, Malheur Experiment Station, Ontario, Oregon, 1981

Variety	Boiling Scores (average of 3 reps)[1] Cooked color	Cooked yellowness	Change of brightness	Specific gravity	Percent solids
A66102-16	3.2	.09	.13	1.107	+ 25.0
A7411-2	4.2	.10	.10	1.101	24.3
A7419-2	2.4	.06	.11	1.094	22.9
A7478-1	3.8	.02	.16	1.104	24.9
A75188-3	1.9	.03	.08	1.089	21.9
Lemhi	4.0	-.003	.16	1.103	24.7
Russet Burbank	3.9	.04	.13	1.087	21.5
A72545-2	4.0	.06	.11	1.093	22.7
A72685-2	3.5	.13	.09	1.100	24.1
AD7267-1	4.5	.01	.17	1.075	18.90
AD7377-1	1.5	.04	.05	1.081	20.22
AD74135-1	2.4	-.003	.17	1.094	22.9
WnC521-12	2.6	.08	.09	1.108	+ 25.0
WnC672-2	1.8	.10	.03	1.098	23.7
Norchip	4.1	.09	.11	1.088	21.7

[1] Photovolt determination: Boiled color; 1 = white, 6 = dark. Boiled yellowness higher values indicate more yellow. Change of brightness indicates dulling due to cooking, higher values = more dulling.

Table 4. Fry color, boiling scores, and specific gravity scores from experimental lines of potatoes evaluated in preliminary late harvested lines, Malheur Experiment Station, Ontario, Oregon, 1981

	Boiling Scores (average of 3 reps)[1]				
Variety	Cooked color	Cooked yellowness	Change of brightness	Specific gravity	Percent solids
A69827-15	3.7	.09	.15	1.094	22.9
A72240-5	4.2	.08	.14	1.092	22.5
A72643-3	2.5	.15	.09	1.119	+ 25.0
A72665-22	3.0	.02	.06	1.080	20.01
A74341-4	0.8	.02	.04	1.086	21.3
A7444-3	1.6	.11	.10	1.094	22.9
A7637-8	1.1	-.02	.10	1.092	22.5
A7637-12	3.4	-.01	.14	1.098	23.7
A76153-2	2.7	-.01	.12	1.089	21.9
TxA549-1	1.4	-.01	.07	1.098	23.7
A74544-1	2.2	.07	.09	1.099	23.9
A711076-19	3.4	.11	.11	1.097	23.5
A74143-9	2.7	.03	.07	1.080	20.01
A74541-1	4.4	.18	.13	1.103	24.7
RB-SM2-50st	3.1	.04	.08	1.084	20.87
RB-SM8-50st	4.3	.10	.17	1.084	20.87
RB-SM122	4.6	.08	.16	1.091	22.3
Lemhi	4.2	.01	.12	1.092	22.5
Russet Burbank	4.1	.03	.14	1.087	21.5

[1] Photovolt determination: Boiled color; 1 = white, 6 = dark. Boiled yellowness higher values indicates more yellow. Change of brightness indicates dulling due to cooking, higher values = more dulling.

COMPARING FALL AND SPRING APPLICATION OF HERBICIDES FOR WEED ONCTROL IN POTATOES MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1980-81

Purpose

The purpose of this study was to determine if herbicides will persist overwinter to give season-long control in potatoes if applied and incorporated in November and to compare fall to spring applications for weed control and potato tuber yields and quality.

Procedure

Fall application: The herbicides were applied as broadcast treatments to the surface of soil which was leveled after plowing with a double disc and spike tooth harrow. The herbicide treatments were incorporated 5 to 6 inches deep with a large double disc. After incorporation, 2 beds, each 3 feet wide, were hilled in the center of plots 9 feet wide. This left a 3-foot border between adjacent plots to prevent herbicide contamination between plots during incorporation and bedding. Large furrowing shovels were used in shaping the beds so each bed was high enough to form a peak in the center of the bed. The plots were left in this condition overwinter.

On April 22, the tops of the beds were dragged-off with a spike tooth in preparation for planting on April 24. Each plot was 2 rows wide and Russet Burbank variety of potatoes was planted at 9-inch spacing in one row and 18-inch spacing in second row of each plot. The purpose of the wide spacing was to reduce the density of the potato foliage to allow for late season weed emergence as a way of determining the active life from herbicides applied in fall and spring.

Spring treatments: These were applied as postplant preemergence incorporated and postemergence treatments. The potatoes were hilled and the furrow depth established before the herbicides were applied. The plots were 9 X 30 feet with 2 rows per plot. Within row seed spacing in this trial was the same as described for the fall applications. The preemergence herbicides were applied as broadcast treatments and incorporated immediately after application with a lilliston cultivator set to incorporate the herbicide to a soil depth of about 2 inches over the beds and in the furrow area. Hilling shovels were set to operate slightly shallower than furrow depth when herbicides were applied. The lilliston was operated twice with the direction of travel the second time opposite to that of the first. The postemergence treatments were applied as double overlap broadcast treatments on May 28. Potato plants averaged 6 inches tall. Barnyard grass was large, some with 2 tillers. Lambsquarters and pigweed were 3 to 4 inches tall. None of the plots in either trial received cultivations after the initial hills and furrows were shaped after planting. The potatoes were watered by furrow irrigation.

The treatments were evaluated for weed control and crop tolerance to herbicides on June 23 and August 13. On August 13, separate evaluations for percent weed control was made for the 9- and 18-inch seed piece spacings.

All the weeds emerging in the trial were left undisturbed during the growing season.

The vines and weeds were removed from the beds in preparation for digging with a beater on October 2. The plots were harvested on October 14 and graded on November 9 and 10 to determine tuber yield, size, and quality.

Results

Prowl and Dual persisted overwinter to result in excellent weed control and crop tolerance. Treflan gave excellent weed control at the 1 pound rate but delayed potato emergence and caused early foliage injury. Devrinal and PPG-844 also persisted overwinter. Devrinal at 1½ pounds gave fair control of barnyard grass, pigweed, and lambsquarters but control did not compare to Prowl or Dual. PPG-844 at rates tolerant to potatoes gave fair control of pigweed and lambsquarters but showed very little activity on barnyard grass. Roneet and Vernam were superior in weed control to Eptam. Extenders added to Roneet, Eptam, and Vernam did enhance the control of late season pigweed and barnyard grass. This was particularly evident in the row where potato seed pieces were planted 19 inches apart. Vapam had little herbicidal activity by itself but did appear to improve weed control of Eptam and Vernam when applied in combination with these herbicides.

Most herbicide treatments applied preemergence incorporated in the spring resulted in adequate weed control. Superior treatments for lambsquarter, pigweed, and barnyard grass control included Prowl and combinations of Prowl + Sencor/Lexone. Competition by potato vines is important for control of late season weeds. This was evident when weed control was compared between rows planted with seed pieces spaced 9 and 18 inches apart.

Treatments applied postemergence were excellent, giving both initial and season-long residual weed control of pigweed, lambsquarters, and barnyard grass when Sencor/Lexone was applied in combination with either Hoelon or Poast.

Potato tuber yields and tuber size were correlated to percent weed control. The treatments resulting in complete weed control gave the higher yields. Fall herbicide treatments resulting in tuber yields significantly greater than the untreated check included Prowl, Dual, Eptam + Devrinal, and Roneet. Prowl treatments applied in the fall resulted in much higher tuber yields than spring applied Prowl treatments. Since both spring and fall Prowl treatments resulted in excellent weed control, the reduced tuber yields from spring applications may have resulted because of soil compaction from spring tractor traffic. PPG-844 applied in the spring at 2 pounds active ingredient per acre caused a significant reduction in tuber yield. Tuber yields did differ significantly between control plots and herbicide treatments for both No. 1's and total yield in the fall applied treatments but differences were only significant for No. 1's when the herbicides were applied in the spring.

Table 1. Crop tolerance ratings and percent control of weeds from herbicides applied and incorporated before bedding in the fall, Malheur Experiment Station, Ontario, Oregon, 1980-81

		Crop Injury		Percent Weed Control (Visual Ratings)[1]								
				Pigweed			Lambsquarters			Barnyard grass		
					August[2]			August[2]			August[2]	
Herbicide	Rate	June	August	June	9"	18"	June	9"	18"	June	9"	18"
	-lbs ai/ac-											
Eptam	4	0	0	43	81	37	43	80	33	43	92	33
Eptam	6	0	0	40	94	48	43	93	55	58	96	50
Eptam + Extender	4	0	0	26	87	52	35	83	58	50	92	68
Eptam + Extender	6	0	0	60	87	68	55	86	65	73	91	68
Roneet	4	0	0	77	93	85	65	93	83	75	93	83
Roneet	6	0	0	84	98	83	83	95	78	90	99	83
Roneet + Extender	4	0	0	70	98	88	70	96	85	72	97	90
Roneet + Extender	6	3	0	67	99	92	52	94	85	75	99	93
Vernam	4	0	0	43	94	50	50	92	50	68	96	78
Vernam	6	0	0	65	97	81	60	93	82	82	98	91
Vernam + Extender	4	0	0	45	92	50	38	91	65	47	92	83
Vernam + Extender	6	0	0	55	94	67	60	94	65	73	99	95
Vapam	4	0	0	27	83	28	15	83	28	23	83	25
Eptam + Vapam	4+4	0	0	42	96	75	40	92	68	53	97	82
Vernam + Vapam	4+4	0	0	47	97	92	43	95	87	60	98	90
Devrinal	1½	0	0	95	91	84	90	89	84	86	96	90
Eptam + Devrinal	4+1½	0	0	83	89	73	78	92	68	77	94	78
Treflan	1	45	0	100	99	99	100	99	99	98	100	100
Prowl	1½	5	0	100	99	99	100	99	99	100	99	99
Prowl	2	17	0	100	100	100	100	100	100	100	100	100
PPG-844	1	0	0	80	95	83	75	96	85	10	65	28
PPG-844	2	10	0	90	99	91	90	99	92	30	85	48
Dual	4	0	0	99	98	98	97	91	89	99	99	99
Control	-	0	0	0	0	0	0	0	0	0	0	0

[1] Ratings: 0 = no effect, 100 = plant killed
Treatments applied Nov. 26, 1980
Evaluated June 24 and August 13

[2] August evaluations for each row planted at 9 and 18 inch seed piece spacings.

Spraying info:
a. Water/ac - 43 gal.
b. Nozzles - 8003 teejet
c. Spray pressure - 35 psi

Soil info:
a. Silt loam texture
b. 1.3% organic matter
c. pH-7.3

Table 2. Potato tuber yield from herbicides applied and incorporated in the fall before bedding, Malheur Experiment Station, Ontario, Oregon, 1980-81

Herbicide	Rate	U.S. No. 1's				No. 2's	Culls	Total
		+10 oz.	6-10 oz.	4-6 oz.	Total No. 1	+4 oz.	-4 oz.	
	-lbs ai/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-
Eptam	4	78	99	79	256	42	34	333
Eptam	6	82	121	71	305	53	33	360
Eptam + Extender	4	103	108	85	296	63	30	393
Eptam + Extender	6	66	118	76	260	48	36	344
Roneet	4	152	118	82	353	60	26	438
Roneet	6	144	120	80	343	70	31	444
Roneet + Extender	4	104	125	80	309	62	35	407
Roneet + Extender	6	88	108	77	274	64	37	375
Vernam	4	64	120	74	259	44	35	338
Vernam	6	84	141	95	321	52	36	408
Vernam + Extender	4	91	107	88	286	50	32	368
Vernam + Extender	6	97	128	81	306	46	30	383
Vapam	4	68	110	75	253	48	30	330
Eptam + Vapam	4+4	53	121	79	253	41	42	335
Vernam + Vapam	4+4	90	115	69	274	44	38	355
Devrinal	1½	177	117	59	252	44	22	419
Eptam + Devrinal	4+1½	129	130	87	346	53	31	430
Treflan	1	112	119	65	297	71	25	392
Prowl	1½	179	131	88	398	82	29	508
Prowl	2	188	107	74	368	72	28	469
PPG-844	1	86	94	73	253	45	36	333
PPG-844	2	120	87	74	280	57	37	374
Dual	4	166	101	62	329	81	23	433
Control	-	82	110	56	269	56	34	358
LSD .05		42	34	26	52	27	5	64
LSD .01		56	41	34	69	36	7	85
CV (%)		14	—	—	10	—	—	10

Table 3. Crop tolerance ratings and percent control of weeds from herbicides applied to Russet Burbank potatoes as preemergence incorporated and postemergence treatments, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate	Application	Crop Injury June	Crop Injury August	Pigweed June	Pigweed August 9"	Pigweed August 18"	Lambsquarters June	Lambsquarters August 9"	Lambsquarters August 18"	Barnyard grass June	Barnyard grass August 9"	Barnyard grass August 18"
	lbs ai/ac				Percent Weed Control (Visual Ratings)[1]								
Eptam	4	pei	0	0	97	98	73	95	97	65	97	98	72
Eptam + Extender	4	pei	0	0	98	99	90	96	96	88	98	98	92
Roneet	4	pei	0	0	99	97	85	99	91	80	92	95	80
Roneet + Extender	4	pei	0	0	100	99	96	94	96	83	92	92	88
Vernam	4	pei	0	0	99	99	97	94	95	92	98	97	93
Vernam + Extender	4	pei	0	0	100	100	97	99	100	93	98	100	97
Prowl	1.25	pei	0	0	100	100	100	100	100	100	100	100	99
Dual	4	pei	0	0	99	100	98	97	99	93	100	99	98
Lasso	4	pei	0	0	100	98	95	97	98	88	96	98	92
PPG-844	0.5	pei	0	0	98	100	95	80	99	85	35	80	20
PPG-844	1	pei	0	0	100	100	95	98	100	93	55	85	30
PPG-844	2	pei	18	0	100	100	99	93	97	90	72	80	25
Sencor/Lexone	0.75	pei	0	0	100	100	100	100	100	100	94	93	85
RE-28236	3	pei	0	0	88	97	85	85	93	75	94	95	89
Prowl + Sencor/Lexone	1 +0.75	pei	0	0	100	100	100	100	100	100	100	100	99
Sencor/Lexone + Hoelon	0.5+1.5	post	8	0	100	100	99	100	100	100	100	99	99
Sencor/Lexone + Hoelon	0.5+2	post	0	0	100	100	99	97	99	99	100	100	100
Sencor/Lexone + Hoelon	0.75+1	post	0	0	100	100	98	100	100	99	100	100	97
Sencor/Lexone + Poast	0.5+0.25	post	0	0	100	100	100	100	100	100	100	99	99
Sencor/Lexone + Poast	0.5+0.5	post	0	0	100	100	100	100	100	100	100	100	100
Sencor/Lexone + Poast	0.75+0.25	post	0	0	100	100	100	100	100	100	100	100	100
Control	—	—	0	0	0	0	0	0	0	0	0	0	0

[1] Rating: 0 = no effect, 100 = plant killed
Evaluated on June 23 and August 3

Spray info:

preemergence
a. Applied 4/30/81
b. Water volume/ac - 43 gal.
c. Nozzles - 8003 teejet
d. Spray pressure - 35 psi

postemergence
a. Applied 5/28/81
b. Water volume/ac - 43 gal.
c. Nozzles - 8003 teejet
d. Spray pressure - 35 psi
e. Potatoes 6 inches tall
f. Weeds - Barnyard grass - 2 tillers
Lambsquarters - 3-4 inches
Pigweed - 3-4 inches

Table 4. Potato tuber yields from spring applied herbicides, Malheur Experiment Station, Ontario, Oregon, 1980-81

Herbicide	Rate	Application	U.S. No. 1's +10 oz.	U.S. No. 1's 6-10 oz.	U.S. No. 1's 4-6 oz.	U.S. No. 1's Total No. 1	No. 2's +4 oz.	Culls -4 oz.	Total
	lbs ai/ac		-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-	-cwt/ac-
Eptam	4	pei	127	126	84	337	36	26	399
Eptam + Extender	4	pei	115	93	76	284	54	33	371
Roneet	4	pei	155	106	61	322	64	22	408
Roneet + Extender	4	pei	126	146	77	349	43	31	423
Vernam	4	pei	146	125	56	327	40	26	393
Vernam + Extender	4	pei	157	131	84	372	32	33	437
Prowl	1.25	pei	164	124	35	323	46	16	385
Dual	4	pei	147	144	58	349	55	22	426
Lasso	4	pei	154	130	71	355	49	36	440
PPG-844	0.5	pei	109	148	89	346	35	35	416
PPG-844	1	pei	111	140	65	316	20	27	363
PPG-844	2	pei	45	128	86	259	15	30	304
Sencor/Lexone	0.75	pei	153	136	72	362	55	29	445
RE-28236	3	pei	127	113	75	315	49	22	386
Prowl + Sencor/Lexone	1+0.75	pei	164	84	59	307	61	16	384
Hoelon + Sencor/Lexone	0.5+1.5	post	166	131	54	351	38	21	410
Hoelon + Sencor/Lexone	0.5+2	post	158	141	81	380	15	28	423
Hoelon + Sencor/Lexone	0.75+1	post	164	148	74	386	35	26	447
Poast + Sencor/Lexon	0.5+0.25	post	169	137	70	376	37	28	441
Poast + Sencor/Lexone	0.5+0.5	post	140	133	70	363	46	33	442
Poast + Sencor/Lexone	0.75+0.25	post	123	136	63	322	35	30	387
Control	—	—	44	141	101	286	52	44	382
LSD .05			24	28	31	48	18	14	68
LDS .01			33	38	42	65	25	20	92
CV (%)			8	10	20	9	21	25	8

SUGAR BEET VARIETY TESTING RESULTS
MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

Introduction

The 1981 variety trial included 34 entries. Seed for testing was received from Amalgamated Sugar Co., Great Western Sugar Co., Holly Sugar Co., American Crystal Sugar Co., Betaseed Incorporated, and Miller Research. Each entry was evaluated for root yield, percent sucrose, percent extractable sugar, and tolerance to curly-top virus. Estimated yields of recoverable sugar were calculated.

Experimental Procedures

The trial was conducted on the Malheur Experiment Station. The field was plowed and bedded in fall 1980. One-hundred pounds of P_2O_5 and 60 pounds of nitrogen per acre were applied broadcast and plowed under. In the spring 140 lbs/ac of nitrogen (NH_4SO_4) was sidedressed after thinning when the beets had 6 to 8 leaves. A combination of Nortron + Hoelon (2.0 + 1½ lbs. active ingredients per acre) was applied as a band treatment when the field was fall bedded.

The sugar beets were planted on April 7 and irrigated for seed germination and seedling emergence. Each variety was replicated 8 times in plots 4 rows wide and 25 feet long. The trial was planted with cone-seeders mounted on John Deere Model 71 flex planting units. Seed for each row was individually packaged with 200 seeds per packet.

On May 12, 13, and 14, the sugar beets were thinned to approximately 9-inch spacing. In late July, powdered sulfur was broadcast by hand for protection against powdery mildew. On September 4, 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 23, 26, and 27. Tops were removed with a beater-scalper. The roots from the 2 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 samples were analyzed at Amalgamated Sugar Company research laboratory in Nyssa, Oregon.

Soil characteristics were a silt loam texture, pH 7.4, and organic matter 1.3 percent. The previous crop was spring wheat.

Table 1. Summary of Data from Sugar Beet Variety Trial, Malheur Experiment Station, Ontario, Oregon, 1981

	Company	Variety	Root Yield T/A	Root Yield Rank	Sugar Content %	Sugar Content Rank	Conductivity Reading	Conductivity Rank	Extraction %	Extraction Rank	Estimated Recoverable Sugar T/A	Estimated Recoverable Sugar Rank	Curly Top Ratings USDA	Curly Top Ratings TASCO
1.	American Crystal	C79-941	46.3	29	17.58	1	827	23	85.17	20	6.93	10	5.33	5.67
2.		C79-924	49.1	14	16.53	15	858	28	84.60	27	6.86	12	5.33	5.44
3.		C78-836	46.4	27	16.76	9	796	15	85.48	15	6.64	25	5.00	5.00
4.		ACH-155	45.8	32	16.98	4	831	24	85.04	24	6.61	27	5.33	5.22
5.		ACH-120	42.2	34	16.81	8	810	17	85.29	17	6.05	34	5.33	4.89
6.		ACH-130	48.0	23	16.27	26	931	34	83.58	33	6.52	31	4.33	3.67
7.		ACH-31	47.4	26	16.91	5	820	21	85.15	22	6.82	16	3.67	3.11
8.	Betaseed	8072-8	51.0	6	16.65	13	792	14	85.50	13	7.26	3	4.00	3.44
9.		9421	48.8	15	16.37	19	870	29	84.40	29	6.74	19	5.00	6.00
10.		9G5561	53.3	2	16.06	28	890	31	84.11	31	7.19	5	5.00	5.56
11.		9G5506	51.3	4	15.46	34	923	32	83.58	32	6.62	26	5.00	5.00
12.		8G5809	49.7	10	16.09	27	931	33	83.55	34	6.68	23	4.00	3.44
13.		8072-10	47.5	25	16.89	6	740	3	86.25	3	6.92	11	3.67	2.56
14.	Great Western	80TMS1255	48.5	19	16.38	20	764	6	85.87	7	6.82	15	3.00	2.00
15.		XP1350	44.1	33	16.76	10	714	2	86.70	1	6.41	33	3.00	2.22
16.		GWH149	54.8	1	16.68	11	811	18	85.50	14	7.81	1	3.67	3.22
17.		80MSC9	48.4	20	16.28	24	791	13	85.48	16	6.73	21	3.67	3.00
18.		R_1	48.3	21	16.28	25	759	5	85.90	5	6.75	18	4.33	3.44
19.		R_2	46.9	30	16.58	14	750	4	86.07	4	6.69	22	4.00	3.56
20.		D_2	46.4	31	16.48	16	784	9	85.67	9	6.55	30	4.33	4.00
21.		CX_2	52.2	3	15.91	31	845	25	84.71	26	7.03	8	3.67	3.44
22.	Holly	04200-02	49.4	13	16.33	22	816	20	85.16	21	6.86	13	5.00	4.00
23.		HH-7	47.7	24	15.81	33	803	16	85.25	18	6.42	32	3.33	2.33
24.		HH-36	48.7	16	16.30	23	813	19	85.20	19	6.76	17	3.67	3.11
25.		HH-22	48.2	22	15.98	30	787	10	85.50	12	6.58	28	3.33	3.11
26.		HH-30	49.5	12	16.38	18	883	30	84.24	30	6.83	14	4.67	5.00
27.		HH-28	50.0	9	15.90	32	831	25	84.83	25	6.74	20	2.33	1.78
28.	Miller	Hybrid 8	46.3	28	16.65	12	710	1	86.60	2	6.68	24	3.00	1.56
29.	TASCO	0295-02	51.3	5	16.30	21	791	12	85.50	11	7.15	6	3.00	2.33
30.		4378-02	50.7	7	16.45	17	825	22	85.06	23	7.09	7	2.67	2.22
31.		9361-02	48.7	17	16.82	7	781	8	85.69	8	7.02	9	3.00	2.00
32.		AH-14	48.6	18	16.00	29	855	27	84.58	28	6.57	29	3.00	1.78
33.		WS-76	50.0	8	17.01	2	790	11	85.59	10	7.28	2	3.33	2.78
34.		9360-02	49.5	11	16.99	3	769	7	85.87	6	7.22	4	3.33	3.00
		LSD (0.05)	3.2		0.42		48		0.70		0.42		5.70[2]	5.72[2]
		(0.01)	4.1		0.55		61		0.92		0.54		4.46[3]	3.69[3]
		CV (%)	7.4		3.69		7.87		1.19		6.79			

(1) Curly-top ratings 1 to 10. 1 = free of curly-top symptoms, 10 = plants killed.

(2) Susceptible check variety US/33

(3) Resistant check variety US/41

Planting date: April 7

Harvesting dates: October 23, 26, & 27

Plot size: 4 rows x 25 ft. Harvested 2 center rows

Replications: 8

Table 2. Two-year summary of data from sugar beet variety trials, Malheur Experiment Station, Ontario, Oregon, 1980-81

Company	Variety	Root Yield T/A	Root Yield Rank	Sugar Content %	Sugar Content Rank	Conductivity Reading	Conductivity Rank	Extraction %	Extraction Rank	Estimated Recoverable Sugar T/A	Estimated Recoverable Sugar Rank	Curly-Top USDA	Curly-Top TASCO
American Crystal	ACH-120	45.6	13	15.71	5	940	10	83.34	10	5.97	15	4.66	4.16
American Crystal	ACH-130	51.9	6	15.32	10	1037	15	81.96	15	6.52	10	4.33	4.21
American Crystal	ACH-31	49.7	10	15.84	3	924	7	83.54	7	6.58	8	3.67	3.02
Betaseed	9421	52.7	4	15.40	8	962	11	82.98	11	6.73	6	4.84	5.77
Great Western	GWH-149	56.9	1	15.72	4	926	8	83.63	6	7.48	1	3.50	2.74
Great Western	R_1	51.5	7	15.55	7	859	1	84.44	1	6.76	4	3.83	2.93
Great Western	D_2	51.0	8	15.65	6	881	2	84.12	2	6.71	7	4.16	3.87
Great Western	CX_2	53.9	2	15.10	13	964	12	82.94	12	6.75	5	3.50	2.93
Holly	HH-7	48.4	11	15.21	11	887	3	84.02	4	6.18	13	3.16	2.23
Holly	HH-22	48.3	12	15.04	14	907	5	83.72	5	6.08	14	3.50	3.06
Holly	HH-28	49.9	9	15.32	10	931	9	83.50	8	6.38	11	3.00	2.89
Holly	HH-30	51.5	7	15.37	9	986	14	82.66	14	6.54	9	4.67	4.92
Amalgamated	9361-02	52.0	5	16.06	2	901	4	84.08	3	7.02	3	2.84	1.96
Amalgamated	WS-76	53.1	3	16.09	1	922	6	83.46	9	7.13	2	3.16	2.22
Amalgamated	AH-14	49.9	9	15.19	12	967	13	82.84	13	6.28	12	2.34	1.35
LSD .05		2.1		0.38		51		0.74		0.31			—
.01		2.7		0.50		67		0.97		0.40			—
CV (%)		5.8		3.55		7.9		1.27		6.7			—

AN EVALUATION OF PREPLANT INCORPORATED HERBICIDES IN SUGAR BEETS MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

Purpose

The purpose of this study was to compare several herbicides applied and mechanically incorporated as preplant treatments for weed control and sugar beet tolerance.

Procedure

Herbicide treatments were sprayed and incorporated on April 13. Treatments were sprayed as broadcast applications and incorporated 2 to 3 inches deep with a power roto-tiller. Sprayer was equipped with 8003 teejet nozzles applying water as the carrier at a rate of 43 gallons per acre with a spray pressure of 35 psi. While spraying, skies were clear, air temperature was 62°F, soil temperature was 59°F, and wind was calm. Soil texture is a silt loam, percent organic matter was 1.2, and a pH of 7.3.

Great Western R_1 variety of sugar beets was planted on April 15. The plots were furrow irrigated to assure a supply of moisture for seed germination and seedling emergence. Treatments were evaluated on May 29 and thinned on June 3. The trial area was weeded as needed for the remainder of the growing season.

On October 22, the plots were harvested to evaluate the effects of herbicide treatments on root yields. The 2 center rows of each plot were harvested for yield data. Each plot was 4 rows wide and 25 feet long and each treatment was replicated 3 times.

Weed species included pigweed, lambsquarters, tumbling mustard, and barnyard grass.

Results

Superior treatments included ethofumesate + diclofop and ethofumesate + pyrazon + diclofop. Ethofumesate + cycloate was most toxic to emerging seedling with 10-15 percent loss of beet stand. H-22234 has good sugar beet selectivity by itself to sugar beets, good grass control, fair pigweed control, but control was weak for lambsquarters and kochia. In this trial, no differences in weed control were noted between cycloate alone or with the extender or Vapam up until the time the beets were thinned.

Although ethofumesate + cycloate caused injury to sugar beet seedlings resulting in some stand loss, this injury was not noted after the beets were thinned and no root yield differences between treatments were measured.

Table 1. Percent weed control and crop injury ratings from herbicides applied as preplant incorporated treatments for weed control in sugar beets, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicides	Rate	Crop Injury	Percent Weed Control (visual ratings)[1] Pig-weed	Lambs-quarters	Tumbling mustard	Barnyard grass	Total yield
	lbs ai/ac						T/A
cycloate	4	5	98	89	65	98	47.5
ethofumesate	2	8	100	96	92	96	47.5
ethofumesate + cycloate	1½+2	52	100	97	95	100	43.9
ethofumesate + pyrazon	1½+1½	3	97	98	98	96	44.4
ethofumesate + diclofop	2+1	5	100	98	95	98	46.3
ethofumesate + diclofop	2+1½	6	100	97	93	100	46.6
ethofumesate + pyrazon + diclofop	1½+1½+1	5	100	100	98	100	47.4
pyrazon + diclofop	2+1½	3	76	80	94	100	47.9
cycloate + extender	4	8	98	86	76	97	44.0
cycloate + vapam	2½+4	0	87	85	71	92	46.1
ethofumesate + H-22234	2+2	37	100	96	92	100	45.8
ethofumesate	2½	20	96	93	95	98	44.6
H-22234	4	0	92	22	73	80	46.5
H-22234 + pyrazon	2+3	0	94	94	90	96	46.6
Control	-	0	0	0	0	0	45.6

[1] Ratings: 0 = no effect, 100 = plant killed.

LSD .05 = NS
CV (%) = 6.8

Evaluated May 29, 1981

HERBICIDES APPLIED AS POSTEMERGENCE APPLICATIONS FOR WEED CONTROL IN SUGAR BEETS MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

Purpose

The purpose of this study is to evaluate BAS 9052, phenmedipham, desmdeipham and ethofumesate for weed control and sugar beet tolerance when applied as combination treatments with various adjuvants.

Procedure

BAS 9052 treatments were applied at rates of 0.2, 0.3, and 0.4 pounds active ingredient per acre. MorAc crop oil was added with BAS 9052 at the rate of 1 qt/ac. Timing of application varied according to the size of barnyard grass. Application to grass 1 to 2 inches tall was on May 11. Grasses 3 to 4 inches tall were treated on May 19. On May 11, sugar beets were in the 2 to 4 leaf stage. On May 19, sugar beets had 4 to 6 leaves.

BAS 9052 and a 1:1 mixture of phenmedipham and desmedipham were applied on May 19 as both a tank mix and phenmedipham/desmedipham was applied 15 minutes after BAS 9052.

Phenmedipham and desmedipham were applied as single applications and as repeat applications. A factory premixed formulation of phenmedipham and desmedipham was compared to each herbicide mixed at time of application. Also, the combination was evaluated with 3 buffers added. Spray solution was buffered to near a neutral pH. Rates of phenmedipham and desmedipham varied from 1/2 to 1.0 pounds active ingredient per acre of each material as a mixture applied as single and repeat applications.

Other treatments included ethofumesate in combination with phenmedipham and desmedipham. Combination rates were 1.125 pounds active ingredient per acre ethofumesate and 0.75 desmedipham and phenmedipham. Ethofumesate treatments were applied on May 15.

Treatments were applied with a bicycle wheel plot sprayer using 8006 teejet nozzles and a spray pressure of 35 psi. Water as the carrier was applied at 53 gallons per acre. Air temperatures on May 11, 15, and 19 were 58^{o}F, 62^{o}F, and 63^{o}F, respectively. Soil temperatures on these dates were 67^{o}F, 60^{o}F, and 63^{o}F. Soil texture is silt loam, soil organic matter 1.3 percent and pH of 7.3. Soils were dry on the surface but subsurface moisture was high. Skies were partly cloudy when all treatments were applied and rain showers occurred during days between application dates. Weed species were pigweed, lambsquarters, kochia, and barnyard grass.

Sugar beets were thinned on May 30 and June 1 to 12-inch plant spacing. After thinning, they were kept free of weeds by hand-weeding. On October 20 and 21, the 2 center rows of each 4-row plots were harvested to determine root yields. Each plot was 4 rows wide and 25 feet long. Each treatment was replicated 3 times.

Results

Sugar beets were tolerant to BAS 9052 at each rate (0.2, 0.3, and 0.4 pounds active ingredient per acre) applied and each rate effectively controlled barnyard grass. BAS 9052 was compatible with phenmedipham and desmedipham when applied as a tank mix and when phenmedipham/desmedipham followed 15 minutes after BAS 9052 applications. This combination resulted in control of both broadleaf and grassy weeds.

Buffering spray mixture of phenmedipham/ desmedipham from a pH of about 7.9 to 6.0 did not enhance the activity of the herbicides. Phenmedipham and desmedipham formulated as a "premix" at the factory were comparable to field mixtures for weed control and crop selectivity. Repeat applications of phenmedipham and desmedipham improved control of pigweed, kochia, and barnyard grass compared to these materials applied as a single application.

Ethofumesate caused a significant increase in sugar beet injury when mixed with phenmedipham and desmedipham without significantly improving weed control.

Root yields did not significantly differ when yield in the control was compared to herbicide treatments, but yields received from ethofumesate treatments were significantly lower than yields from other treatments in the trial. The higher yields were received from the combination BAS 9052 + desmedipham/ phenmedipham and the repeat application of desmedipham + phenmedipham treatments where consistently good weed control was obtained.

Table 1. Percent weed control and sugar beet tolerance ratings to sugar beets treated with herbicides applied postemergence, Malheur Experiment Station, Ontario, Oregon, 1981

Herbicide	Rate	Time Applied	Crop Injury	Pig-Weed	Lambs-quarters	Kochia	Barn-yard Grass	Total Yield
				Percent Weed Control (Visual ratings)				
	lbs ai/ac							T/A
BAS 9052[1]	0.2	May 11	0	0	0	0	96	41.6
BAS 9052	0.3	"	0	0	0	0	100	42.2
BAS 9052	0.4	"	3	0	0	0	100	42.1
BAS 9052	0.2	May 19	0	0	0	0	97	40.2
BAS 9052	0.3	"	0	0	0	0	98	42.6
BAS 9052	0.4	"	0	0	0	0	100	41.9
BAS 9052	0.2	"	0	0	0	0	96	38.3
BAS 9052 + B and B[2]	0.2+0.5+0.5	"	3	95	99	93	98	43.2
BAS 9052 + B and B[3]	0.2+0.5+0.5	"	5	96	98	92	100	43.8
B and B	0.5+0.5	"	5	95	99	90	80	44.8
B and B + Buffer 1	0.5+0.5	"	5	95	96	90	80	41.6
B and B + Buffer 2	0.5+0.5	"	5	96	99	92	72	40.1
B and B + Buffer 3	0.5+0.5	"	5	94	98	85	70	40.5
B and B	0.6+0.6	"	7	95	99	90	75	40.5
B and B	0.75+0.75	"	10	97	99	93	80	41.2
B and B (premix)[4]	1.0	"	5	92	98	90	68	41.1
B and B (premix)	1.25	"	7	95	98	90	73	43.5
BAS 9052 + B and B	0.5+0.5+0.3	"	5	97	97	90	100	43.9
B and B (premix + BAS 9052	1.0+0.3	"	3	97	99	94	99	41.3
B and B (repeat treatment)	3/4	May 11 & May 19	5	98	99	98	88	44.4
B and B (premix) repeat treatment	1	" "	7	99	100	98	86	41.1
ethofumesate + desmedipham	1.125+0.75	May 15	25	95	95	96	83	36.8
ethofumesate + phenmedipham	1.125+0.75	"	20	35	96	98	78	37.8
ethofumesate + B and B	1.25+0.375+0.375	"	15	97	99	98	80	37.7
Control	-	-	0	0	0	0	0	41.3

Plots evaluated on May 29, 1981

Ratings: 0 = no effect, 100 = plant killed

LSD .05	3.9
.01	4.9
CV (%)	7.2

1 MorAct crop oil applied with all BAS 9052 at rate of 1 qt/ac.

2 B and B is phenmedipham and desmedipham applied as mixture.

3 BAS 9052 applied first followed by application of phenmedipham and desmedipham 15 minutes later.

4 Factory mix of phenmedipham and desmedipham.

FALL APPLIED HERBICIDES FOR WEED CONTROL IN SPRING PLANTED SUGAR BEETS MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

Purpose

The purpose of this study was to evaluate herbicides for weed control and crop tolerance when herbicides are applied in November at the time fields are bedded in preparation for spring planting.

Procedure

Herbicides were applied as band and broadcast applications on October 31 and November 1, 1980. Banded treatments were applied to level soil in bands 11 inches wide before bedding the soil on a 22-inch center. Soil adjacent to the treated band was thrown over the herbicide to form a peak shaped bed. Thus, the herbicide was left in a layer 11 inches wide at the base of each bed. The broadcast treatments were applied as double overlap applications sprayed on the soil surface. After herbicide application, the plots were bedded also on 22-inch row spacing.

The beds remained in this condition overwinter. On April 9, the fall beds were pulled down with a steel bar mounted in front of a spike tooth harrow as the beds were prepared for planting. The steel bar pulls the soil from the bed to a depth just above the layered herbicide. The teeth of the harrow mulches the soil as the seed bed is prepared for planting.

Great Western D_2 variety of sugar beets was seeded on April 10. The trial area was furrow irrigated on April 15 to assure adequate soil moisture for seed germination and uniform seedling emergence.

The treatments were evaluated for weed control and crop tolerance on May 28. The beets were thinned and weeded on June 1 and 2. Weeds were removed by hand during the remainder of the growing season.

The plots were harvested on October 26 and 27 to determine the effects of herbicide treatments on root yield.

Each plot was 4 rows wide and 25 feet long. The two center rows of each plot were harvested for yield data. Each treatment was replicated 3 times in a randomized block experimental design. Soil texture is silt loam with 1.0 percent organic matter and a pH of 7.3. Treatments were applied with a bicycle wheel plot sprayer equipped with 8006 teejet nozzles applying 53 gallons of water per acre at a spray pressure of 35 psi.

Results

Each herbicide persisted overwinter to give effective weed control under rather mild winter temperatures. Cycloate gave good control of pigweed, lambsquarters, and barnyard grass. Ethofumesate was more active on pigweed and lambsquarters. It did not give adequate control of barnyard grass. When diclofop was combined with ethofumesate, excellent control of each weed species was obtained. The most effective treatment resulting in 100 percent control of all weed species was a combination of ethofumesate, pyrazon, and diclofop. Enhancement of cycloate activity was not noted when Vapam and "extender" were added. R-40244 did persist overwinter and prevented growth of sugar beets and weedy species throughout the growing season.

Sugar beets were injured more from broadcast treatments probably because of concentrating the herbicide over the row during fall bedding and leaching the herbicide to the base of the bed by winter moisture.

Root yields varied between treatments. Although root yields were generally higher in the treated plots than the control, they were not great enough to be significant. The combination of ethofumesate + cycloate, however, had lower yields than the control. Because of this effect, several herbicide treatments resulted in yields significantly greater than the root yield from ethofumesate + cycloate treatment. No beets were harvested from the plots treated with R-40244.

Table 1. Percent weed control and crop injury ratings from herbicide applied in the fall as banded treatments, Malheur Experiment Station, Ontario, Oregon, 1980-81

Herbicide	Rate	Crop Injury	Percent Weed Control (Visual ratings)[1]			Root Yield
			Pig-weed	Lambs-quarters	Barn-yard grass	
	lbs ai/ac					
cycloate	3	5	100	92	100	48.6
cycloate	4	8	100	95	100	48.9
ethofumesate	2	5	98	93	75	48.0
ethofumesate	3	28	100	98	86	45.8
ethofumesate + cycloate	1½+2	35	100	100	100	42.0
ethofumesate + pyrazon	1½+1½	4	100	100	83	49.8
ethofumesate + pyrazon	2+2	30	100	100	90	50.8
ethofumesate + diclofop	2+1	6	100	94	100	47.3
ethofumesate + diclofop	2+1½	4	100	93	100	50.6
ethofumesate + diclofop	3+1	16	100	96	100	47.4
ethofumesate + diclofop	3+1½	20	100	98	100	48.6
ethofumesate + pyrazon + diclofop	1½+1½+1	4	100	100	100	48.2
ethofumesate + pyrazon + diclofop	1½+1½+1½	3	100	100	100	49.5
ethofumesate + pyrazon + diclofop	2+2+1	20	100	100	100	45.8
ethofumesate + pyrazon + diclofop	2+2+1½	14	100	100	100	44.8
pyrazon + diclofop	2+1½	0	100	100	100	49.9
pyrazon + diclofop	3+1½	3	100	100	100	46.1
cycloate + Extender	3	6	98	95	100	46.8
cycloate + Extender	4	8	100	97	98	48.6
cycloate + vapam	2½+4	3	90	88	92	46.8
Control	-	0	0	0	0	45.8

[1] Ratings: 0 = no effect, 100 - plant killed.

Evaluated May 28, 1981

LSD .05 - 6.2
.01 8.5
CV (%) 8

Table 2. Percent weed control and crop injury ratings for herbicides applied in the fall as broadcast treatments, Malheur Experiment Station, Ontario, Oregon, 1980-81

Herbicide	Rate	Crop Injury	Percent Weed Control (Visual Ratings)[1] Pig-weed	Lambs quarters	Barn-yard grass	Root Yield
	lbs ai/ac					T/A
cycloate	4	35	100	92	100	36.7
cycloate + R-40244	4+2/3	100	100	100	99	0
ethofumesate	2	14	100	98	93	41.5
ethofumesate	3	30	100	99	97	40.8
ethofumesate + pyrazon	1½+1½	15	100	100	96	41.1
ethofumesate + diclofop	2+1½	12	100	96	100	37.7
cycloate + Vapam	2½+2½	5	100	91	93	41.3
cycloate + R-40244	3+½	100	100	100	97	0
pyrazon + diclofop	2+1½	3	100	100	100	43.6
Control	-	0	0	0	0	43.4

[1] Ratings: 0 = no effect, 100 = plant killed

Evaluated May 28, 1981

LSD .05 - 6.7
.01 - 8.9
CV (%) 8

DELAYED INCORPORATION STUDY OF EPTAM AND VERNAM
MALHEUR EXPERIMENT STATION, ONTARIO, OREGON, 1981

Procedure

The objective of this study was to measure the loss of Surpass and Eradicane by volatilization when applied to the surface of moist and dry soil and incorporated at 0, 12, and 24 hours after application. The amount of herbicide lost was estimated by evaluating the percent control of seeded weed species and by analyzing soil samples when delayed incorporated plots were compared to plots incorporated immediately after herbicide application. Samples of soil were collected from small planter pots placed in each plot before spraying. Each pot contained equal amounts of pre-weighed soil, and each soil sample was taken at time of herbicide incorporation.

The treatment effects were analyzed as a split plot design with intervals between application and incorporation as main plots and herbicides as subplots. The treatments were applied to moist and dry soil at 6:30 a.m. on June 3. Treatments were applied early in the morning so the herbicides in the delayed incorporation treatments could be exposed during daylight hours when conditions are greatest for maximum evaporation. The skies were clear during the 24-hour period after application and incorporation. Air temperatures were 54^{o}F at time of application and reached a maximum of 80^{o}F at mid-day. The moist soil condition was created by spraying water on the soil just before applying the herbicide. The soil on the surface remained moist for approximately 2½ hours after herbicide application.

The soil where the trial was conducted is classified in the Owyhee series, a silt loam texture with 1.3 organic matter and a pH of 7.3.

Incorporation treatments consisted of no incorporation, incorporation immediately after application and incorporation 12 and 24 hours after herbicide application. A power roto-tiller with L-shaped teeth set to incorporate the herbicide with the soil to a depth of 3 inches was used. The roto-tiller was operated twice over each plot with the second time in a direction opposite the direction during the first time. After incorporation, the soil surface was leveled by dragging a lightweight nailboard over the soil surface, then was corrugated for furrow irrigation. The first irrigation was applied on June 5 and subsequent irrigation followed at 7-day intervals. Time interval for each irrigation was approximately 4 hours.

Seed of redroot pigweed (*Amaranthus retroflexus*) and annual ryegrass (*Lolium* sp.) was broadcast on the soil surface after herbicide application but before herbicide incorporation, thus, the seed germinated in the soil containing the herbicide.

Each subplot was 11 X 25 feet and each treatment was replicated 3 times. The herbicides were applied with a bicycle wheel plot sprayer. Teejet nozzles number 8003 were spaced at 10-inch intervals on a boom 8.5 feet long. Herbicides were applied as double overlap broadcast treatments. Spray pressure was 38 psi and herbicides were applied in an aqueous solution using a total volume of 41 gal/acre. Surpass and eradicane were applied at a single rate of 4.0 pounds active ingredient per acre.

The treatments were evaluated 18 and 35 days following original herbicide application. Weed counts were taken in check plots and the number of plants (pigweed and ryegrass) recorded per square foot of area. Six counts (1 square foot each) were taken in each of the moist and dry soil treatments.

Results

Both Surpass and Eradicane gave 96-plus percent control of redroot pigweed and annual ryegrass when applied to the surface of dry soil at the rate of 4 pounds active ingredient per acre and mechanically incorporated at 0, 12, and 24 hours after application. Surpass applied to the surface of moist soil still maintained 98-plus percent weed control when incorporated at 0, 12, and 24 hours after application. Redroot pigweed (86 percent) and annual ryegrass (73 percent) control was significantly reduced when Eradicane was applied to a moist soil surface and incorporated 12 hours after application. Differences in weed control with Eradicane applied to a moist soil surface did not exist between the 12- and 24-hour delay in incorporation time. This effect may be attributed to the fact that the hours between the 12- and 24-hour incorporation treatments were night hours.

Weed control ratings taken 35 days after application were only slightly less than ratings taken 18 days after application. The greatest differences occurred in the Eradicane/moist soil treatments.

Results from this trial strongly show that incorporation can be delayed up to 24 hours after application with Surpass applied to either a dry or moist soil surface and with Eradicane applied to a dry soil surface. Enough eradicane is lost from a moist soil surface within a 1-hour period however, to reduce effective weed control by approximately 15 to 25 percent with variation occurring as a result of weed species.

Table 1. Percent control of redroot pigweed and annual ryegrass as a measure of the activity of Surpass and Eradicane left on the soil surface of both wet and dry soil for 0,12, and 24 hours before incorporation, Malheur Experiment Station, Ontario, Oregon, 1981

Incorporation[1] (hrs after applied)	Soil Surface	Redroot Pigweed[3] Surpass[2]	Redroot Pigweed[3] Eradicane[2]	Annual Ryegrass[3] Surpass	Annual Ryegrass[3] Eradicane
		Percent Weed Control (18 days following herbicide application)			
0	moist	100	96	99	95
	dry	100	96	100	96
12	moist	100	86	98	73
	dry	100	99	99	94
24	moist	100	84	98	68
	dry	100	99	99	96
No Incorporation	moist	80	57	87	65
	dry	85	63	96	72
LSD (.05)		3.9	8.7	5.6	11.9
CV (%)		2.8	5.9	2.6	8.4
		Percent Weed Control (35 days following herbicide application)			
0	moist	100	94	100	96
	dry	100	97	99	96
12	moist	98	81	99	76
	dry	100	98	100	92
24	moist	99	78	99	62
	dry	100	98	100	95
No Incorporation	moist	82	58	81	61
	dry	90	67	88	68
LSD (.05)		2.3	15.23	2.2	3.1
CV (%)		1.12	7.1	1.1	12.1

1 Time lapse between application and incorporation.

2 Herbicides applied at 4 lbs/ac.

3 Weed counts in check plot - pigweed=58/sq. ft., annual ryegrass=31/sq. ft.

WINTER AND SPRING SMALL GRAIN NURSERY

To investigate the adaptation of small grain varieties to local growing conditions, experimental plots were established at the MES in the 1980-81 growing season.

Procedure

Field B-8 of the MES was selected for the nursery. The previous crop was potatoes and after harvest the vines were burned in the field. The field was broadcast with 100 units of P_2O_5 and 40 units of N per acre and plowed. An additional 60 units of N was applied and incorporated with a seed bed tool.

The winter nursery was planted October 10 and 11 and the spring nursery March 18 and 19 both with the assistance of Mathis Kolding. Plot size was 4 feet wide and 15 feet long. When the spring entries had become well established, alley ways (3 feet wide and perpendicular to plot rows) were sprayed with Roundup to clearly define plot boundaries in both the winter and spring grain.

On April 1, 30 units of N were broadcast on the winter wheat entries. April 2, the entire winter nursery was sprayed with 1 pound active ingredient per acre of 2-4D amine for weed control.

On April 30, the spring nursery was sprayed with 3/4 pound active ingredient per acre of Bromoxynil plus 1 pound active ingredient per acre Hoelon.

Irrigation of the winter nursery first occurred on May 8 and the spring nursery on May 16. Subsequent irrigations were applied as needed.

The nurseries were harvested July 27-29 with Mathis Kolding's assistance. Results are in the following tables.

Summary

Overall, small grain yields were excellent in the 1981 nursery. The spring wheats (Table 1) averaged 109 bushels per acre (excluding #39 Stephens and #48 Walladay) with Owens the highest released variety at 117 bushels per acre. Several others were above 110 bu/A and some of the numbered, unreleased varieties exceeded 120 bu/A.

Table 2 summarizes the spring barley yields with the overall average of 113 bu/A. Highest yields were attained by Kombar, M-1, and M-3 unreleased varieties from Oregon State University, Northrup King 1324, Western Plant Breeders WPB-BFP-78-63, and Westbred 501.

Winter wheats and barleys are summarized in Table 3. The winter barleys were led by an OSU unreleased feed barley at 203 bu/A. The average was 136 bu/A with one malting variety, Wintermalt at 160 bu/A.

The winter wheat averaged 134 bu/A with just one low yielder and most varieties at the average or better.

In addition to varietal testing, a seeding rate trial (Table 4) was conducted at the MES with five varieties of spring barley. Three feed barleys were planted at five different pound per acre seeding rates and three malting barleys at four seeding rates. The yields in pounds per acre are listed in Table 4.

Winter and spring small grain varietal testing will be continued at the MES in 1982. When using these data for varietal differences, remember that 2 or 3 years average yields are the better indicator of varietal potential.

Table 1. Summary results from spring wheat nursery at Malheur Experiment Station, 1981

Entry	Stripe Rust[2] rating	Type[3]	Yield	Rank	Test weight	Yield	Plant height	Heading date	Percent lodging
			-lbs/ac-		-lb/bu-	-bu/ac-	-inches-		
1. McKay (ID0167)	5R	HR	6812	16	57.5	114	39	6/4	3
2. UT 541774	3R	HR	5824	50	61.5	97	37	6/3	34
3. UT 541777	33R	HR	6189	41	60.0	103	37	6/4	4
4. ID0134	3R	HR	6539	27	61.0	109	37	6/3	5
5. ID0162	13R	HR	5833	49	61.5	97	37	6/7	0
6. UC 353	10R	HR	6675	21	61.5	111	34	6/5	0
7. UC 355	20R	HR	6541	25	61.0	109	32	6/3	1
8. WA 6823	3R	HR	5794	52	62.0	97	33	6/3	5
9. WA 6824	0	HR	6037	45	63.0	101	33	6/3	39
10. WA 6825	8R	HR	5879	47	62.0	98	35	5/30	8
11. WA 6826	5R	SW	6919	14	61.0	116	38	6/3	10
12. WA 6827	3R	SW	6574	24	61.0	110	35	6/3	36
13. WA 6828	10R	SW	6687	20	62.5	112	33	5/30	1
14. WA 6829	0	SW	6619	23	60.5	111	41	6/6	0
15. WA 6830	5R	SW	6484	31	60.0	108	33	6/3	6
16. WA 6831	8R	SW	7409	4	59.5	123	35	6/3	10
17. WA 6832	3R	SW	6887	15	59.0	115	42	6/7	14
18. WA 6833	0	SW	7197	7	60.5	120	41	6/7	3
19. UT 93	45	HR	6491	29	59.5	108	41	6/3	39
20. UT 125	40R	HR	6623	22	60.0	111	41	6/6	1
21. UT 326	50	HR	6540	26	60.5	109	39	6/3	13
22. UT 1543	40R	HR	5907	46	57.0	98	43	6/9	29
23. ID0170	5R	HR	6206	39	61.0	103	38	6/3	0
24. Federation	28	SW	5056	53	59.5	84	43	6/6	45
25. Owens (ID0185)	18R	SW	7028	10	61.0	117	37	6/3	24
26. ID0183	3R	SW	6974	12	62.5	116	37	6/6	4
27. ID0187	3R	SW	7366	6	58.5	123	39	6/5	9
28. WA 6402	5R	SW	5837	48	60.0	97	39	6/5	6
29. WA 6753	0	SW	6489	30	59.5	108	39	6/7	0
30. ID0172	3R	SW	7057	9	59.0	118	37	6/6	0
31. ID0190	5R	SW	6278	33	57.5	105	39	6/6	13
32. ID0224	5R	SW	6980	11	58.5	116	39	6/6	1
33. ID0226	8R	SW	7666	2	58.5	128	40	6/6	1
34. ID0232	3R	SW	6203	40	58.0	103	35	6/5	59
35. ID0233	5R	SW	7093	8	59.5	118	43	6/6	25
36. ID0234	10R	SW	7376	5	59.5	123	41	6/6	25
37. ID0235	3R	SW	6932	13	60.5	116	40	6/5	1
38. ID0236	0	SW	7572	3	61.0	126	43	6/6	1
39. Stephens	0	SW	3642	54	—	61	37	7/14	0
40. Pro Brand 751	10R	HR	5798	51	63.0	97	33	6/1	3
41. Urique	0	SW	6786	17	55.0	113	41	6/7	0
42. Fielder	55	SW	6257	35	60.5	104	35	6/3	0
43. Borah	8R	HR	6044	44	62.0	101	33	6/1	8
44. Fieldwin	60	SW	6269	34	61.0	105	37	6/4	0
45. Sterling	60	SW	6220	37	60.5	104	36	6/3	8

Table 1. Summary results from spring wheat nursery at Malheur Experiment Station, 1981 (Continued)

Entry	Stripe Rust[2] rating	Type	Yield	Rank	Test weight	Yield	Plant height	Heading date	Percent lodging
			-lbs/ac-		-lb/bu-	-bu/ac-	-inches-		
46. Crestone	0	SW	6747	18	57.0	113	39	6/6	33
47. Sawtell	18	HR	6052	43	61.5	101	39	6/6	5
48. Walladay[1]	3R	SW	7745[1]	1[1]	61.0	129[1]	37	6/7	3
49. Pro Brand 715	8R	HR	6212	38	61.5	104	41	6/6	11
50. Pro Brand 711	0	HR	6100	42	63.0	102	36	6/5	0
51. Prodax	8R	HR	6714	19	61.5	112	35	6/3	3
52. 906-R	15R	HR	6302	32	61.5	105	36	5/30	0
53. 210-E	13R	Durum	6498	28	62.0	108	33	5/28	1
54. 225-RC-A	3R	HR	6246	36	63.0	104	28	6/3	1
CV						91			137
LSD (0.05)						14			19
LSD (0.10)						11			16

[1] Walladay grain was wet at harvest, dry weights were not available except for test weight. In past tests Walladay yields have been about equal to Urique.

[2] Number equals percentage of stripe rust infestation. Number followed by R indicates mature plant resistant reaction.

[3] HR = hard red
SW = soft white

Table 2. 1981 Spring barley yields at the Malheur Experiment Station

Variety	Heading date	Percent lodging	Test weight	Pounds per acre	Bushels per acre
			-lbs/bu-		
Steptoe	6/3	90	49.5	5448	113
Klages	6/5	90	52.0	4941	103
Mores	6/2	90	48.0	4931	103
Trebi	6/7	90	48.0	4525	94
Clark	6/3	70	53.0	5284	110
Lud	6/6	80	52.5	5441	113
Summit	6/6	80	54.5	5476	114
Gus	6/2	60	50.5	4691	98
Advance	5/29	90	48.0	4617	96
Kombar	6/4	27	46.5	6549	136
Karl	6/1	90	51.0	4084	85
M-1	6/6	0	46.5	7223	150
M-3	6/6	0	50.0	6622	138
NK 1324	6/3	90	49.5	5081	106
Westbred 501	5/31	90	50.5	6492	135
WPB BFP -78-63	6/5	90	50.0	5030	105

Table 3. Results of the 1980-81 Winter Small Grain Nursery at the Malheur Experiment Station

Variety	Head type	Height	Straw strength	Maturity	Heading date	Test weight	Yield
						-lbs/bu-	-bu/ac-
BARLEY							
Luther	6 row	Mid-tall	Medium	Late	5/26	45.0	83
Kamiak	6 row	Mid-tall	Weak	Early	5/11	48.0	126
Schuyler	6 row	Mid-tall	Mid-weak	Mid-late	5/16	47.5	126
Boyer	6 row	mid-tall	Mid-stiff	Mid-late	5/18	46.5	127
Wintermalt	6 row	Tall	Medium	Early	5/10	48.5	160
Hesk	6 row	Mid-tall	Medium	Mid-late	5/16	49.0	132
Mal	6 row	Mid-tall	Mid-stiff	Mid-late	5/18	44.0	129
FB74506-06	6 row	Medium	Stiff	Late	5/19	45.0	203
WHEAT							
Nugaines	Common	Medium	Medium	Mid-early	5/29	—	138
Faro	Club	Mid-tall	Mid-weak	Medium	5/26	—	135
Tyee	Club	Mid-tall	Medium	Mid-late	5/29	—	130
Crew	Club	Mid-tall	Medium	Mid-late	5/27	—	134
Moro	Club	Tall	Weak	Mid-late	5/28	—	107
Stephens	Common	Medium	Mid-stiff	Medium	5/25	—	146
Hill	Common	Medium	Mid-stiff	Medium	5/30	—	142
Daws	Common	Medium	Medium	Medium	5/28	—	135
McDermid	Common	Medium	Medium	Medium	5/27	—	136
Luke	Common	Medium	Mid-weak	Late	5/30	—	132
Hyslop	Common	Medium	mid-weak	Medium	5/26	—	143

Table 4. Results of 1981 spring barley seeding rate trial at the Malheur Experiment Station

Variety	Seeding Rate (lbs per acre)				
	40 lbs	60 lbs	80 lbs	100 lbs	120 lbs
	Yield (lbs/ac)				
			FEED BARLEY		
Steptoe	5902	5466	6276	6025	5799
M-1	6535	6514	6667	6926	6668
M-3	6950	7093	6756	6558	6807
			MALT BARLEY		
Lud		6267	6038	6013	5705
Steptoe		5903	6635	5243	6621
Kombar		6401	6631	6133	6041