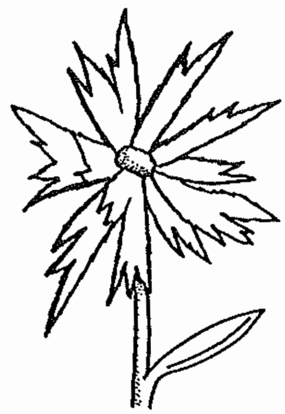
Horticultural Weed Control 1988 Report

Department of Horticulture
Oregon State University
Cordley 2042
Corvallis OR 97331-2911



Compiled by: Ray D. William, Extension Horticultural Weed Specialist

Garvin Crabtree, Professor - Horticultural Weed Science

Secretarial Assistance: Janna Kampen

Table of Contents

Table of Contents cont.

Vegetable Crops—Summary

Vegetable Seed Crops—Summary

The Report

Results from weed management and living mulch trials involving horticultural crops conducted during the past year are compiled and reported by faculty members of the Oregon Agricultural Experiment Station, the Oregon Extension Service, and colleagues who cooperated from adjacent states. This work was conducted throughout Oregon and involved many individuals. The contributors sincerely appreciate the cooperative efforts of the many growers, university employees, and local representatives of the production and agrichemical industries. We also gratefully acknowledge financial assistance from individual growers, grower organizations, and companies which contributed to this work.

Information and Evaluation

Crops were grown at the experimental farms using accepted cultural practices within the limits of experimentation o trials were conducted on growers' fields. Most experiments were designed as randomized complete blocks with two to five replications. Herbicide treatments were applied uniformly with precision plot sprayers or granular formulations were distributed from quart jar shakers. Unless otherwise indicated, preplant herbicide applications were incorporated with a PTO horizontal rotary tiller operated at a depth of approximately three inches. After critical application timings, crops were irrigated with overhead sprinklers at weekly intervals or as needed.

Crop and weed responses are primarily visual evaluations of stand reduction (SR) and growth reduction (GR), ranging from 0-100 with 100 as the maximum response for each rating, or an over-all rating of 0-10 for crop response or control of specific weed species with 10 being complete control of the weed or good crop vigor (no injury). Additional data such as crop yields are reported for certain studies and may be reported in either English or metric systems.

Herbicides Tested

Common Name	Trade Name	Page Number
acifluorfen	Tackle	
alachlor	Lasso	
atrazine	Aatrex	
chloramben	Amiben	
clomazone	Command	
clorpyralid	Stinger	
dichlobenil	Casaron	
dinoseb	Preemerge	
diuron	Karmex	
endothall	Herbicide 273	
--	Enquick	
EPTC	Genep, Eptam, Erradicane Extra	
ethiozin	Tycor	
fluazifop-p-butyl	Fusilade 2000	
fomesafen	Reflex	
hexazinone	Velpar	
imazaquin	Sceptor	
imazethapyr	Pursuit	
lactofen	Cobra	
linuron	Lorox	
metolachlor	Dual	
metribuzin	Sencor	
oryzalin	Surflan	
oxyfluorfen	Goal	
paraquat	Gramoxone	
pendimethalin	Prowl	
pronamide	Kerb	
sethoxydim	Poast	
simazine	Princep	
sulfometuron	Oust	
tridaphane	Tandem	
trifluralin	Treflan	

Weather Data

For complete weather data for 1988 see Appendix.

Living Mulch -- Summary

Similar trials involving two Christmas tree sites, 'Marion' blackberries, and 'Pinot Noir' grapes were initiated in 1986 to evaluate management strategies and soil moisture status when perennial ryegrass living mulches are interplanted between rows of moderately-spaced perennial crops. Treatment included bareground, mowed and chemically suppressed ryegrass sod, and indigenous weedy vegetation. Chemical mowing involved two sublethal applications of fluazifop (0.2 lbs. ai/acre) applied in early spring to suppress grass growth.

Results from the four sites suggested that perennial ryegrass excluded weeds from becoming established, although it depended on density and growth. Chemical mowing, for example, reduced growth and allowed greater weed invasion. Crop yields were similar between vegetative treatments and the bareground control, except for trunk caliper growth the second year at one site only. Leaf nitrogen content in 'Marion' berries were within normal ranges and statistically non-significant. Water status was similar between living mulch treatments, but significantly depleted compared to the bareground control.

Based on these and previous trials, we conclude that perennial ryegrass continues to exhibit potential for substantially reducing yields or depleting soil water in moderately-spaced horticultural crops even when suppressed chemically using sublethal rates of fluazifop. Future directions include examining various annual or potentially less competitive perennials including species with potential allelopathic properties.

EFFECTS OF LIVING MULCH ON CHRISTMAS TREES AND SOIL MOISTURE STATUS

FINAL REPORT

Helene Murray and Siyuan Tan, Graduate Research Assistants

Bill Braunworth, Extension Horticulture Weed Specialist

Introduction

The use of sod strips between crop rows is a common practice of many horticultural farms. Sods or living mulches between horticultural crops may reduce soil erosion, increase soil organic matter, decrease soil compaction, improve trafficability, control weeds, and provide good working conditions for growers. These and other benefits cause living mulches to be widely accepted by growers. However, sod may compete with crops. The potential for competition has limited the realization of the benefits of sod in crop production and is the main barrier to the wider use of living mulch systems. Management of living mulches depends on understanding and controlling the competition between sod and crops. Although competition is important, it is still not well understood. Little is known of water relationships in competition between sod and crops. Several field trials were established to investigate the effect of sod on water availability to horticultural crops and to determine if a living mulch can be grown between horticultural crop rows. The objectives of this study was to investigate the response of Christmas trees to sod and the influence of sod on soil moisture status.

Materials and Methods

Two field experiments were conducted at King's Valley and Cottage Grove in 1987 and 1988. Christmas trees, Douglas fir in King's Valley, were planted in 1985 with row spacing of 6 feet and 2.5 feet between trees. Four ground cover treatments were used with four replications. The four treatments were: 1) bare ground, 2) mowed indigenous vegetation, 3) mechanically mowed Manhattan II perennial ryegrass, and 4) perennial ryegrass chemically suppressed with Fusilade 2000. The experimental design was a randomized complete block design. The plot size was 21 ft. x 6 ft. In sod treatment plots, the 6 ft. between tree rows was divided into sod strips 3 ft. wide with a 3 ft. strip of bare ground in the tree row. Perennial ryegrass 'Manhattan II' was planted in 1985 at 20 lb/acre. The soil is an Abiqua silty clay loam with no slope. Mechanically suppressed perennial ryegrass and indigenous vegetation plots were mowed three times each year, while chemically suppressed perennial ryegrass plots received two applications of Fusilade 2000 at a rate of 0.2 lb ai/acre plus 1% (v/v) crop oil each year (on 15 April and 20 May, 1987; on 27 May and 17 June, 1988). Bare ground plots were treated with glyphosate at 2.5% of spray volume in early spring.

The Cottage Grove trial was similar to the King's Valley trial, with the following differences. Grand fir was planted in 1986 with row spacing 6 feet and 4 feet between trees in the row. The soil is a McAlpin silty clay loam with no slope. The plot size was 16 ft. x 6 ft. with 4 trees in each plot. Fusilade 2000 was spayed on 16 April and 22 May, 1987 and on 26 April and 8 June, 1988.

Ground Cover and Vegetation Composition

Plot ground vegetation cover of treatments was estimated visually on July 9, 1988 for the King's Valley trial and on July 3, 1988 for Cottage Grove. Percentage of vegetation covering the total plot area was recorded, as well as plant species composition of each plot. The proportion of species was determined base on the occupied area by that species relative to the total covered area of the plots.

Christmas Tree Growth

Tree height and trunk diameter were measured after the terminal buds of shoots had formed each year. Cumulative and current year's effects from the treatments on the tree growth were estimated, based on the total height and trunk diameters of trees and net increase of tree height and trunk diameters in current year.

Soil Moisture

Soil water potential was measured using gypsum blocks. The gypsum blocks were installed at 3 positions (between tree rows, between trees within rows, and next to trees within rows) and 4 soil depths (0.5, 1, 2, and 3 ft.) in King's Valley; while the gypsum blocks were installed at 2 positions (between tree rows and between trees within rows) and 3 soil depths (1, 2, and 3 ft.) in Cottage Grove. The readings from the resistance meter were converted to soil matric water potential using the calibration curve provided by the manufacturer. Water potential is expressed in bars and is a negative value. Water potentials of -0.1 to -0.3 bars were approximately field capacity, while potentials of -14.0 to -15.0 bars were at the wilting point for most crops. Gypsum blocks were monitored in intervals of 15 days during the growing season.

Results

Ground Cover

1. King's Valley

The mechanically suppressed, chemically suppressed, and indigenous vegetation treatments had similar total vegetation coverage (Table 1). Chemically suppressing sod may inhibit perennial ryegrass growth and favor invasion of weeds to a greater degree than mechanically suppressing sod. Thus, the chemically suppressed treatment had a similar vegetation composition to the indigenous vegetation treatment.

Table 1. Effect of four floor vegetation management methods on the ground coverage and species composition of the vegetation (%), July 9, 1988 (King's Valley).

Treatment	Bare ground	Mechanically suppressed	Chemically suppressed	Indigenous vegetation
Total ground cover	0	94	97	93
Species composition				
Perennial ryegrass	0	79	47	47
Wild carrot	0	10	18	14
Crepis sp.	0	8	23	23
Trifolium sp.	0	1	6	10
Others	0	2	6	6

2. Cottage Grove

The mechanically suppressed treatment had the highest total vegetation coverage, the indigenous vegetation treatment had the lowest, and the chemically suppressed was between the two (Table 2). As was the case in King's Valley, chemically suppressing sod tended to inhibit perennial ryegrass growth and favor invasion of weeds compared to mechanically suppressing the sod. Only a few weed species, such as wild carrot and spotted catsear, were able to invade the perennial ryegrass sod.

Table 2. Effect of four floor vegetation management methods on the ground cover and species composition of the vegetation (%), July 3, 1988 (Cottage Grove).

Treatment	Bare ground	Mechanically suppressed	Chemically suppressed	Indigenous vegetation
Total ground cover	0	70	68	57
Species composition				
Perennial ryegrass	0	76	70	34
Wild carrot	0	13	22	2
Spotted Catsear	0	5	1	34
Other grass sp.	0	0	0	15
Others	0	6	7	15

Christmas Tree Growth

1. King's Valley

The total trunk diameter and diameter increase in 1988 of Douglas fir grown in bare ground plots were significantly larger than that in sod plots, regardless of sod type and method of suppression (Table 3). Although tree height showed a similar trend to the trunk diameter, the difference was not statistically significant.

Table 3. Effect of four floor cover treatments on Christmas tree growth.

Ground cover treatment	Tree height (in.) 1987 Total growth end of 1987	Tree height (in.) 1987 Total growth in 1987	Tree height (in.) 1988 Total growth end of 1988	Tree height (in.) 1988 Total growth in 1988	Trunk caliper (in.) 1987 Total growth end of 1988	Trunk caliper (in.) 1987 Total growth in 1988	Trunk caliper (in.) 1988 Total growth end of 1988	Trunk caliper (in.) 1988 Total growth in 1988
King's Valley (Douglas fir)								
Bare ground	23.1	11.9	47.6	24.5	0.65	0.36	1.13a*	0.48a
Chemically suppressed	25.2	11.6	45.4	20.2	0.69	0.30	1.07b	0.38b
Mechanically suppressed	22.3	12.4	44.7	22.4	0.58	0.36	0.97b	0.39b
Indigenous vegetation	21.3	10.8	40.6	19.3	0.62	0.30	0.97b	0.35b
Cottage Grove (Grand fir)								
Bare ground	11.7	3.9	19.6	7.9	0.45	0.15	0.76	0.31
Chemically suppressed	12.4	3.9	20.3	7.9	0.47	0.13	0.72	0.25
Mechanically suppressed	12.2	4.0	19.3	7.1	0.41	0.08	0.63	0.22
Indigenous vegetation	11.9	3.7	19.5	7.6	0.43	0.11	0.67	0.24

*Different letters indicate the difference is significant at 5% level.

2. Cottage Grove

Neither the height nor the trunk diameter of Grand fir was affected by ground cover treatments (Table 3). Although the trunk diameter of trees in bare ground plots tended to be larger than that in other plots in 1988, the difference was not statistically significant.

Soil Moisture Status

1. King's Valley

The effect of the ground cover treatments on the average soil moisture potential for the growing season was dependent on the location of measurements (Figure 1). The bare ground treatment had significantly higher soil water potentials than sod treatments between tree rows, regardless of sod type and suppression method. The soil water potential among sod treatments was neither significantly different between tree rows nor within tree rows (between trees and next to trees). The soil water potential was increased (became less negative) as soil depth increased (Figure 2).

2. Cottage Grove

The effect of the ground cover treatments on the average soil moisture potential for the growing season was also dependent on the position of measurements (Table 4). Sod treatment, regardless of sod type or suppression method, used more water than bare ground treatment between tree rows. The soil water potential for chemically suppressed and mechanically suppressed treatments was not significantly different. The soil water potential increased (more water in the soil) as soil depth increased in mechanically suppressed and indigenous vegetation treatment plots in 1988 (Figure 3).

Table 4. Effect of four ground cover treatments on the average soil water potential for the growing season in Cottage Grove.

Ground cover treatment	Seasonal average soil water potential (bar)			
	1987		1988	
	Between rows	In the row	Between rows	In the row
Bare ground	- 0.40	-	-2.40A*	-
Chemically suppressed	-10.35	-	-7.45BC	-
Mechanically suppressed	-10.14	-0.39	-5.31B	-5.17A
Indigenous vegetation	- 7.78	-1.65	-8.20C	-3.87A

*Different letters within column indicate the difference is significant at 1% level.

Summary

Results of these two trials indicate that plots with strips of perennial ryegrass and indigenous vegetation used more water than the bare ground plots regardless of the method of suppression. The suppression methods of perennial ryegrass showed no significant differences in soil water potential, but did influence the sod composition. More weeds invaded the chemically suppressed perennial ryegrass sod. Sod in strips, not under the trees, does not significantly reduce Christmas tree growth before the trees were 3 years old. However, sod significantly reduced the trunk diameter of Douglas fir in the King's Valley trial when the trees were 4 years old.

Acknowledgments

We would like to thank Betty, Pat Malone, and Russ Woolcott for help with data collection and the use of their land for the study in King's Valley and Cottage Grove.

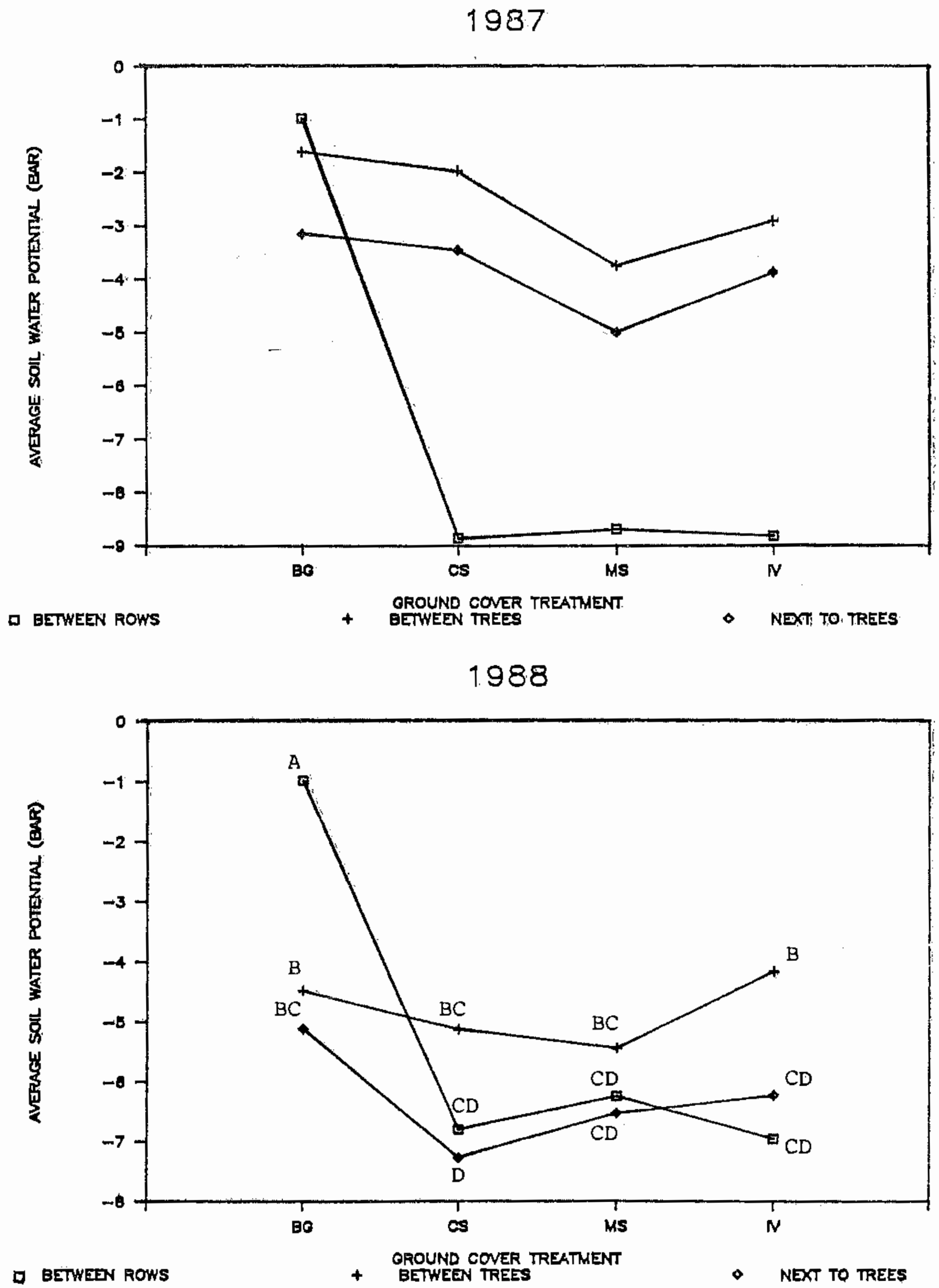


Fig 1. Interaction between ground cover treatments and gypsum block position in affecting average soil water potential for growing season in Kings Valley (BG-bare ground; CS-chemically suppressed; MS-mechanically suppressed; and IV-indigenous vegetation. Mean separation by Duncan's multiple range tests and different letter shows the difference is significant at 1% level)

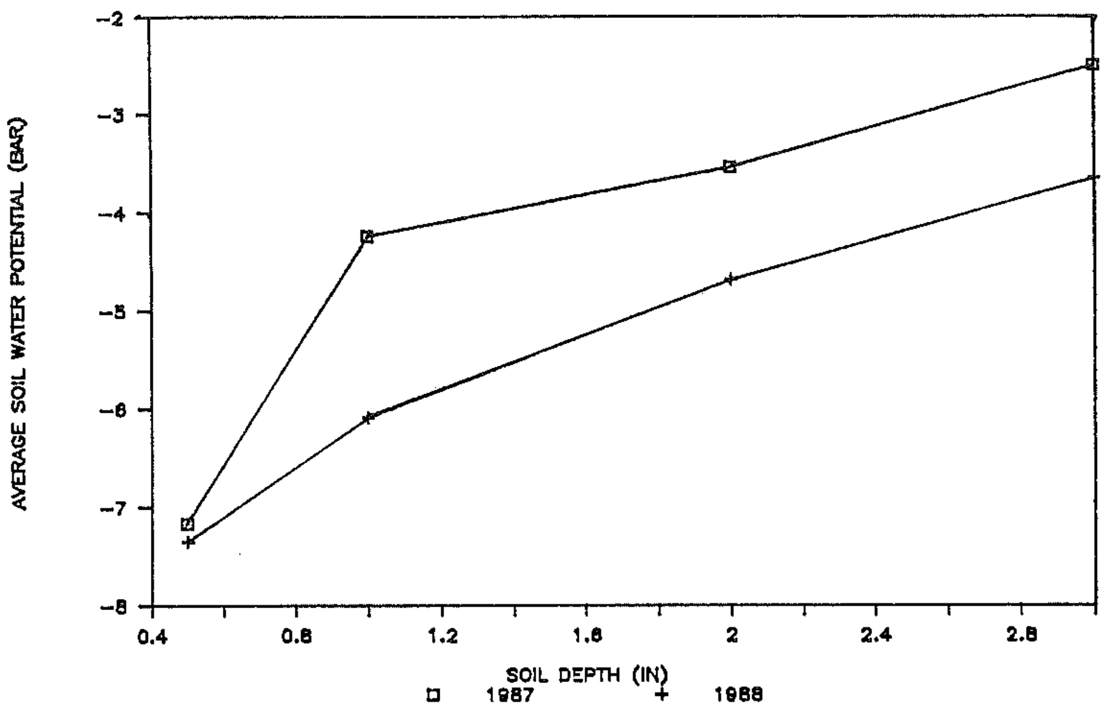


Fig 2. Relationship between soil depth and average soil water potential for growing season in Kings Valley (average all treatments and locations).

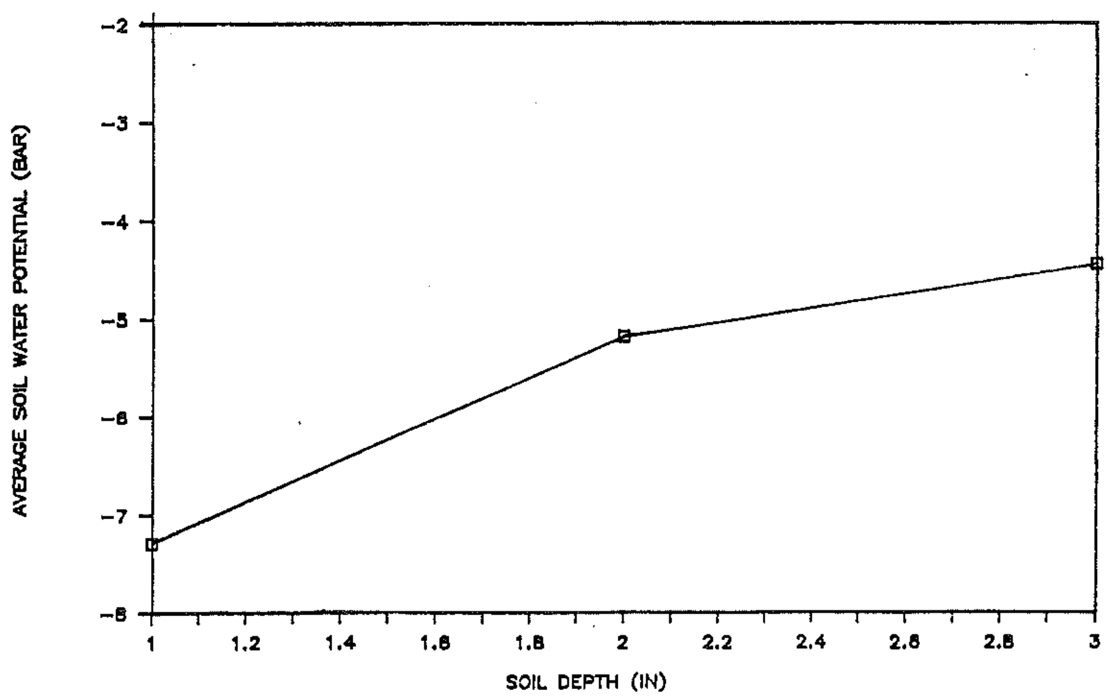


Fig 3. Relationship between soil depth and the average soil water potential for growing season in mechanically suppressed perennial ryegrass and indigenous vegetation

The Effect of a Perennial Ryegrass Living Mulch on Marion Berries

Final Report

Siyuan Tan and Helene Murray, Graduate Research Assistants
Bill Braunworth, Extension Horticulture Weed Specialist
Department of Horticulture
Oregon State University

Introduction

A living mulch system consists of growing a regulated cover crop with an economic crop. Living mulches can be used to decrease soil erosion, increase water infiltration, limit weed invasion and improve trafficability. Detrimental effects of living mulches may include competition for water and nutrients, and the expense of establishment and maintenance. Living mulches may also provide a habitat for pests, both beneficial and harmful. Several field trials have been established throughout the Willamette Valley to determine if a cover crop can be grown between crop rows without excessive competition with the crop.

The objective of this study was: 1) To determine if a perennial ryegrass cover crop can be grown with Marion berries without adversely affecting the: a) nutrient status of the vines, b) water availability to the berries, and c) crop yield.

Methods/Treatments

A field trial was established in 1987 and 1988 at the Blue Herron Farm in Independence in an irrigated field of Marion berries. Manhattan II perennial ryegrass, an intermediate height grass, was chosen as the living mulch for the trial because it is quick to establish, drought tolerant and exhibits good wear tolerance. Because it is a bunch grass, once established, it will not spread. The experimental design was a randomized complete block of three treatments with four replications, for a total of 12 plots. The plot size was 20 ft X 10 ft with 4 plants in each plot. The ground cover treatments were:

1. Bare ground between berry rows.

2. Strips of perennial ryegrass between berry rows, mechanically suppressed (mowed).

3. Strips of perennial ryegrass chemically suppressed with 0.2 lbs ai/acre Fusilade 2000 (fluazifop-p-butyl).

Manhattan II was planted in four, six foot wide strips between five rows of berries in 1986. Mechanically suppressed treatment plots were mowed three times each year, while chemically suppressed plots received two applications of Fusilade 2000, on April 12 and June 5, 1987; on May 4 and June 14, 1988. The chemically suppressed plots were mowed to a height of 2.5 inches before the Fusilade was applied. Bare ground plots were treated with glyphosate at 2.5% of spray volume in early spring.

Ground coverage and vegetation composition

Ground vegetation coverage of treatments was estimated visually on July 4, 1988. Percentage of vegetation covered area over total area of plots was recorded and plant species composition of plots was also investigated. The proportion of species was determined based on the occupied area by that species relative to the total covered area of the plots.

Yield

To determine yield, a ten foot section in the center of each plot was hand harvested three times in 1987. Plots were mechanically harvested after the last hand harvest; data collected does not include tonage from the mechanical harvest. Weight of 100 berries and total hand harvested yield per plot was recorded. The berries were hand harvested five times in 1988 and weight of 100 berries from the tip of clusters was measured.

Leaf Nitrogen Content

Ten leaf blades per plot, from the middle on current season's shoots, were randomly selected for total nitrogen analysis. Leaf samples were collected on August 6, 1987 and August 11, 1988 and sent to the Plant Analysis Laboratory at Oregon State University. Percent nitrogen on a dry weight basis was determined using the micro Kjeldahl technique.

Soil Moisture

Soil water content was measured using gypsum blocks. The readings from the resistance meter were converted to soil water potential or soil matric potential using the calibration curve provide by the manufacturer. Water potential is expressed in bars and is a negative value. Water potentials of -0.1 to -0.3 bars were approximately field capacity, while potentials of -14.0 to -15.0 bars were at the wilting point. Soil moisture status was monitored at 1, 2 and 3 foot depths between berry rows and within the rows. Gypsum blocks were monitored weekly from May through August.

Results

Vegetation coverage

In mechanically suppressed plots, an average of 84% of the area was covered with vegetation, while chemically suppressed plots had 69% covered area (Table 1). Only 5% covered area was field bindweed in the mechanically suppressed plots; the rest covered area was perennial ryegrass. Chemically suppressing perennial ryegrass not only decreased the vegetation coverage but also increased the population of weeds. Twenty four percent of the covered area was occupied by weeds rather than perennial ryegrass in the chemically suppressed plots. Since this has been observed in other similar field trials, it is likely that growers should expect more broadleaf weed invasion from suppression of ryegrass with Fusilade 2000.

Table 1. Effect of three floor vegetation management methods on the ground coverage and species composition of the vegetation (%), July 4, 1988.

Treatment	Bare ground	Mechanically suppressed	Chemically suppressed
Total coverage	0	84	69
Species composition			
Perennial ryegrass	0	95	76
Field bindweed	0	5	10
Annual bluegrass	0	0	10
Others	0	0	4

Yield

There was no significant difference in yield or in 100 berry weights among three ground cover treatments in both 1987 and 1988 (Table 2).

Table 2. Marion berry yield and size in response to three floor cover treatments.

Treatment	Hand harvested yield (tons/acre)		Berry wt. (lbs/100 berries)	
	1987	1988	1987	1988
Bare ground	5.5	3.4	1.07	1.14
Mechanically suppressed	5.7	3.1	1.09	1.14
Chemically suppressed	5.1	3.1	1.11	1.17
Average of all treatments	5.4	3.2	1.09	1.15

Leaf nitrogen status

All leaf samples collected from the twelve plots were well within the recommended range of 2.2-3.0% nitrogen (dry weight basis) in both 1987 and 1988. The average nitrogen content per sample was 2.7% and 2.8% in 1987 and 1988, respectively, with no significant difference between treatments in either year.

Soil moisture status

The precipitation data of Independence area in both years is shown in Table 3. The crop was also irrigated in both years.

Table 4 shows the average soil water potential (bars) for the growing seasons. In 1987, the surface layer moisture readings in all locations are erratic. Soil moisture in the two and three foot layers for all treatments and locations was similar, with no significant difference between the row cover treatments. Figures 1 and 2 show the soil water potential during the growing season for the one foot depth in the berry row and between the rows, respectively, for the three cover treatments. These figures illustrate the variability of moisture readings in the first foot making firm conclusions regarding treatment effects difficult.

Statistical analysis, indicating that the average soil water potential of three ground cover treatments for the growing season in 1988 were not significantly different (Table 3). Figures 3 and 4 shows the soil water potential during the growing season of 1988 for the one foot depth in the berry row and between the rows, respectively, for the three ground cover treatments.

Summary

Both 1987 and 1988 data suggest that perennial ryegrass, grown in a strip between irrigated berry rows may not reduce yield and leaf nitrogen concentration of Marion berries. It was difficult to measure significant differences in the soil water potential between the treatments. Mechanically or chemically suppressed perennial ryegrass did not make significant difference in affecting yield and leaf nitrogen concentration of berries and soil moisture conditions. But chemically suppressing the perennial ryegrass sod will weaken the sod and increase the invasion of weeds in the sod.

Table 3. Monthly total precipitation in inches, Salem.

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
1987	7.67	3.52	3.98	2.36	1.52	0.26	2.51	0.15
1988	6.78	2.37	3.34	3.56	2.39	1.97	0.03	0.00

Table 4. Average soil water potential (bars) for the growing season in response to three cover crop treatments in Marion berries, Independence.

Treatment	Soil depth (ft)		
	1	2	3
1987			
Between rows			
Bare ground	-0.38	-0.44	-0.33
Mechanically suppressed	-3.33	-0.34	-0.32
Chemically suppressed	-3.16	-0.34	-0.38
In berry row			
Bare ground	-8.58	-0.34	-0.35
Mechanically suppressed	-4.91	-0.35	-0.34
Chemically suppressed	-1.78	-0.43	-0.42
1988			
Between rows			
Bare ground	-8.36	-10.86	-10.39
Mechanically suppressed	-8.79	-11.18	- 7.00
Chemically suppressed	-9.89	-10.75	-10.99
In berry row			
Bare ground	-8.95	-8.40	-4.12
Mechanically suppressed	-5.59	-7.75	-7.79
Chemically suppressed	-6.05	-5.65	-4.72

Figure 1.

Soil water potential (bars) in berry row at the one foot depth for three inter-row treatments.

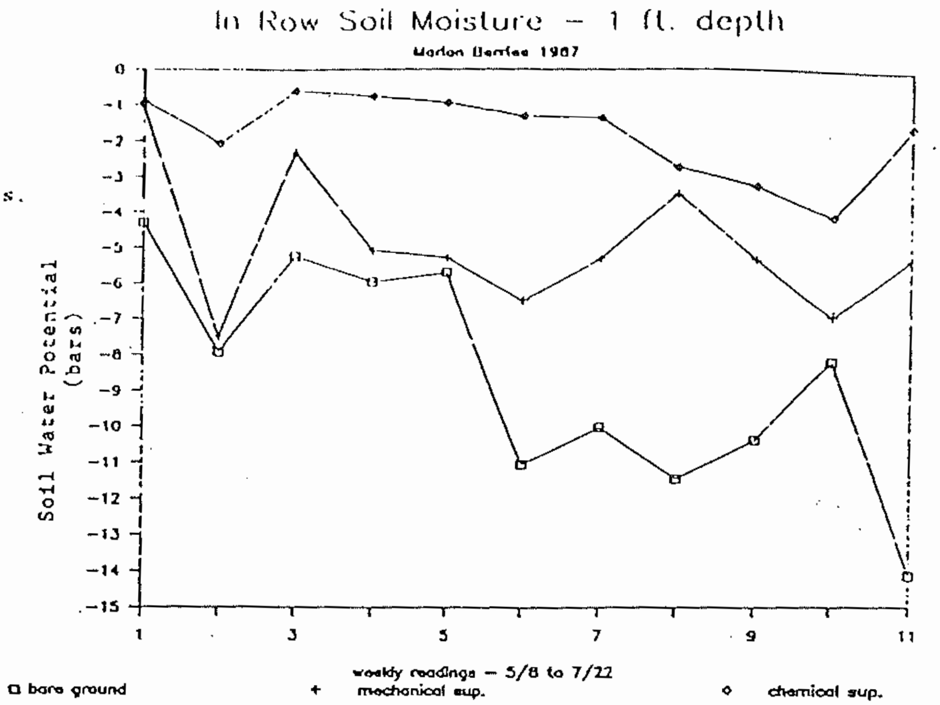


Figure 2.

Soil water potential (bars) between berry rows at the one foot depth for three inter-row treatments.

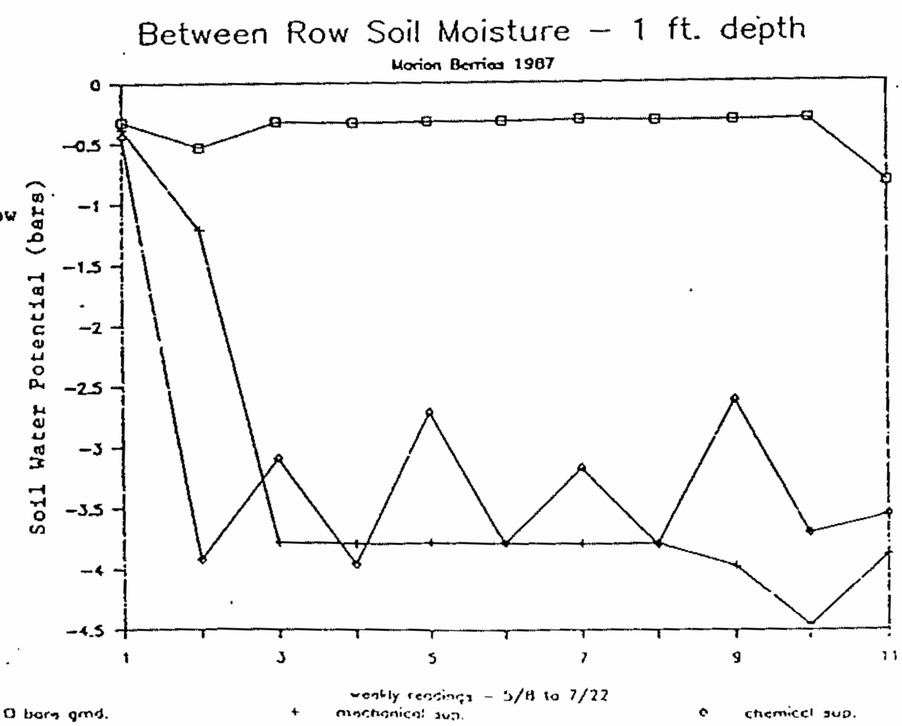


Figure 3.

Soil moisture potential (bars) in berry rows at the one foot depth for three treatments (1988).

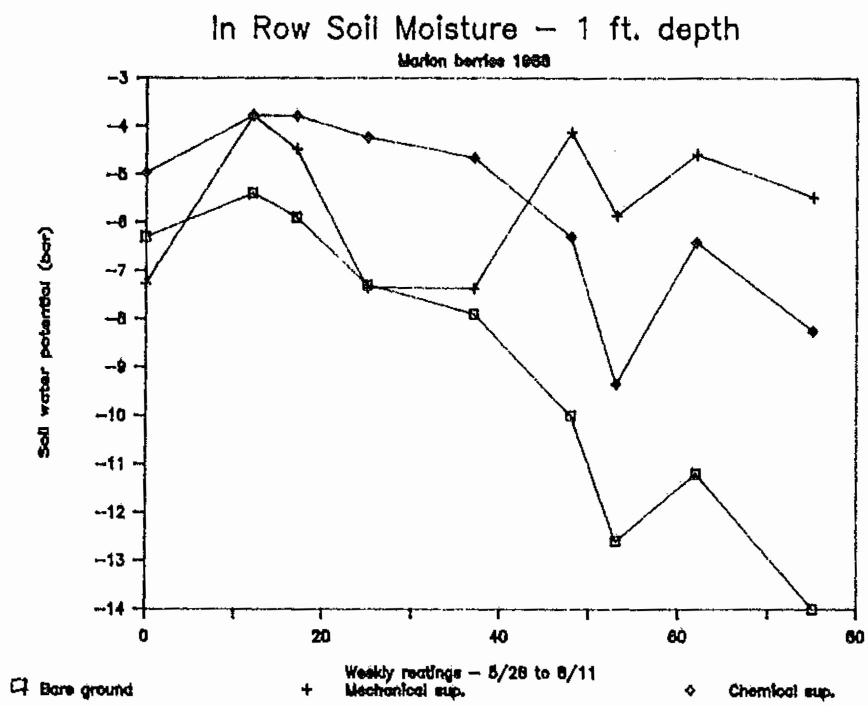
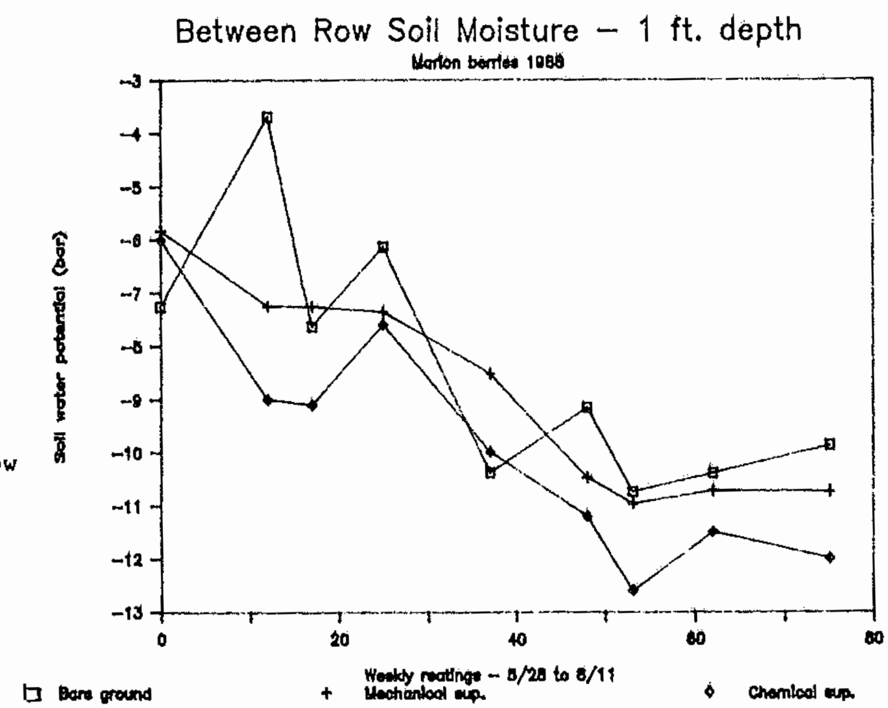


Figure 4.

Soil moisture potential (bars) between berry rows at the one foot depth for three inter-row treatments (1988).



THE EFFECTS OF LIVING MULCH ON GROWTH OF WINE GRAPE 'PINOT NOIR' AND VINEYARD SOIL MOISTURE CONDITIONS.

Siyuan Tan, Bill Braunworth and Garvin Crabtree[1]
Dept. of Horticulture, Oregon State University

Bob Rackham[2]
Extension Service of Benton county

The use of sod strips between rows is a common practice of vineyard and orchard floor management. Sods or living mulches in vineyards and orchards may reduce soil erosion, increase soil organic matter, decrease soil compaction, improve trafficability, control weeds and provide good working conditions for growers. These and other benefits cause living mulches to be widely accepted by fruit growers. However, sod may compete with fruit crops. The potential for competition has limited the realization of the benefits of sod in vineyards and orchards and is the main barrier to the wider use of living mulch systems. Management of living mulches depends on understanding and controlling the competition between sod and crops. Although competition is important, this competition is still not well understood. Little is known of water relationships in competition between crop and sods. A field trial was established to investigate the effect of sod on water availability to grapes and to determine if a cover crop can be grown between grape rows. The objectives of this research was to investigate the performance of grapes grown with sod and the influence of sod on vineyard soil moisture status.

MATERIALS AND METHODS

A field trial was conducted in 1987 at the Cardwell Hill Vineyard in Wren, Oregon. The grape was 3-year-old 'Pinot Noir'. The experimental design was a randomized complete block of four treatments with four replications, for a total of 16 plots. The plot size was 32 ft X 18 ft with 4 vines in each plot. The treatments of vineyard floor vegetation managements were:

1. Bare ground between grape rows.
2. Strips of perennial ryegrass between grape rows, mechanically mowed.
3. Strips of perennial ryegrass between grape rows, chemically suppressed with 0.2 lbs ai/acre Fusilade 2000.
4. Natural vegetation.

Perennial ryegrass 'Manhattan II' was planted in 15 ft wide strips

[1] Graduate Research Assistant, Assistant Professor and Professor, respectively.
[2] Extension Specialist.

between grape rows in 1986. Mechanically suppressed treatment plots were mowed three times during 1987, while chemically suppressed plots received three applications of Fusilade 2000, on May 20, June 29 and Aug. 14. Grape growth (current season vine length) was measured on 1 Nov. 1987. Soil water content was measured using gypsum blocks. The readings from the resistance meter were converted to soil water potential or soil matric potential using the calibration curve provided by the manufacturer. Water potential is expressed in bars and is a negative value. Water potentials of -0.1 to -0.3 bars indicate the soil is approximately at field capacity, while potentials of -14.0 to -15.0 bars were estimated to be the wilting point for most crops. Soil moisture status was monitored at 1, 2, and 3 foot depths between grape rows in all plots, and within grape rows in plots of bare ground and mechanical mowed treatments. Gypsum blocks were monitored at intervals of 10 and 15 days from 10 May through the end of Sept.

RESULTS AND DISCUSSION

Grape vine growth was not significantly different among the vineyard floor vegetation management treatments (Table 1).

Table 1. Effects of vineyard floor vegetation managements on grape vine length.

Vegetation management	Vine length (ft/plant)
Bare ground	35.64
Mechanical mowed	29.47
Chemical suppressed	30.13
Natural vegetation	32.82

The average water potential of soil represented the status of soil moisture during the season. Sod treatments, whether with natural vegetation or perennial ryegrass, mechanically mowed or chemically suppressed, depleted more soil water than the bare ground treatment between grape rows (Fig 1). There were no significant difference in soil water potential among sod treatments. Precipitation in June (60-70 days after May 10) greatly influenced the soil moisture status of treatments (Fig 1 and 2).

Treatments and locations were found to interact each other significantly when evaluated in the seasonal average soil moisture potential (Fig 3). The soil water potentials of bare ground and mechanical mowed treatments were not significantly different within grape rows, while they were significantly different between rows. The analysis of variance indicates that the soil water potentials were significantly affected by ground cover treatments and related to the soil depth (Table 2) between grape rows. All sod treatment had significantly lower water potentials than the bare ground treatment (Table 3). Soil water potentials become less negative, indicating more soil water availability, as soil depth increased (Table 4).

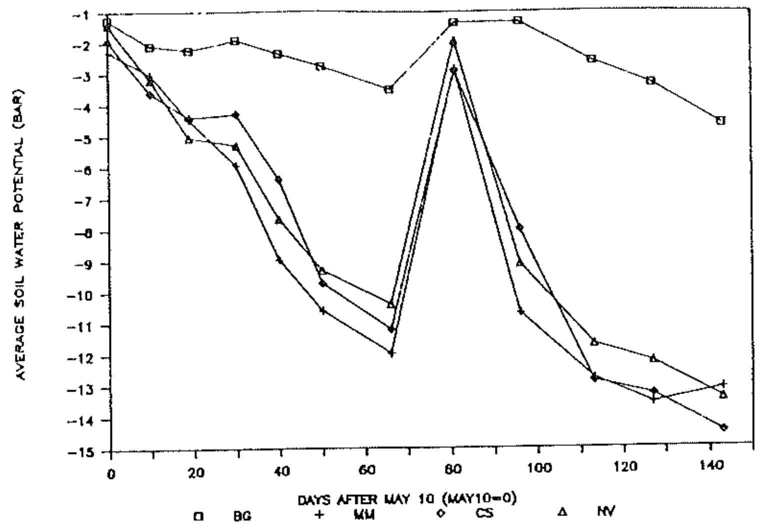


Fig 1. Soil water potential of different types of vineyard floor vegetation managements (BG-Bare ground, MM-Mechanical mowed, CS-Chemical suppressed and NV-Natural vegetation. From May 10 to Sept. 30, 1987)

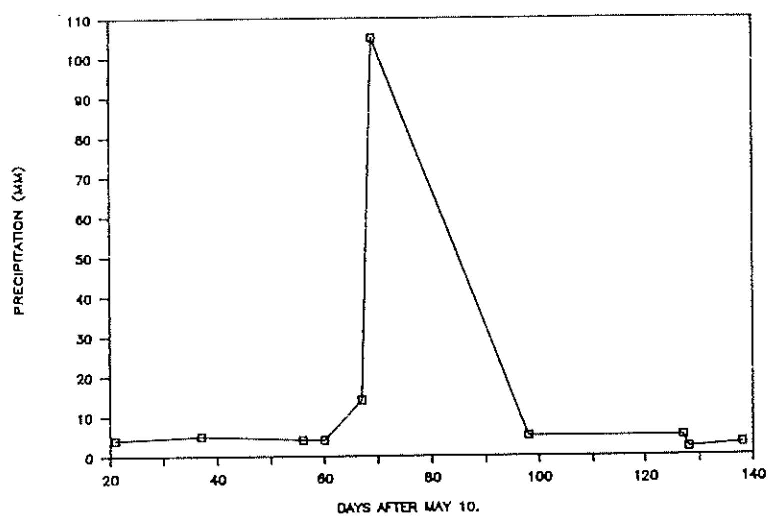


Fig 2. Precipitation of Wren, Oregon from June 1 to Sept. 30, 1987.

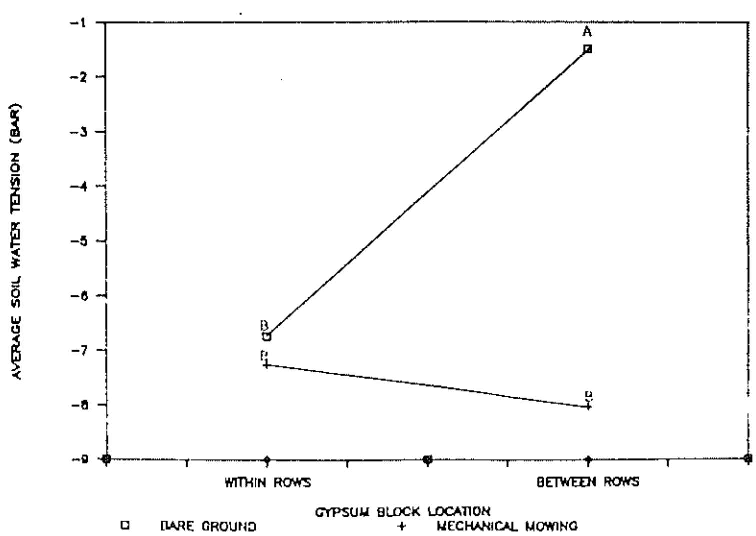


Fig 3. Interaction between vineyard floor vegetation managements and gypsum block locations (Different letter indicates the difference is significant at 1% level).

Table 2. ANOVA of average soil water potential during growing season between grape rows.

Sources	DF	Sum-Squares	Mean-Squares	F-ratio	$F_{0.05}$	$F_{0.01}$
Block	3	57.76	19.25	2.98*	2.89	4.44
Vegetation management	3	262.17	87.39	13.60**	2.89	4.44
Depth	2	226.89	113.31	17.50**	3.29	5.33
Treatment X Depth	6	78.84	13.14	2.03	2.39	
Error	33	212.80	6.45			

*, ** Significant at 5% and 1% levels, respectively.

Table 3. Means of average soil water potentials of treatments between grape rows.

Vegetation management	Water potential (bar)	Contrast tests[1]
Bare ground	-2.46	A
Mechanical mowed	-8.28	B
Chemical suppressed	-7.61	B
Natural vegetation	-7.57	B

[1] Comparing bare ground vs. all sod treatments.

Table 4. Means of average water potentials of different soil depth between grape rows.

Soil depth (ft)	1	2	3
Water potential (bar)	-9.28	-6.19	-3.97

SUMMARY

Sod significantly increased the depletion of soil water and reduced soil water content. Perennial ryegrass depleted similar amount of soil water as natural vegetation. Mowing perennial ryegrass mechanically and suppressing it chemically did not make difference in affecting soil moisture depletion by sod and soil water content. Although it depleted soil water and reduced soil water content, sod did not reduce the grape growth.

ACKNOWLEDGMENTS

We would like to thank Mr. Larry Robinson for help with precipitation data collection and the use of his land for the study.

Small Fruit—Summary

Cane suppression alternatives for red raspberries and blackberries. Since 1987, three trials have been conducted for two consecutive years on exactly the same plants to assess long term effects of several herbicides used as cane suppressants in red raspberries and blackberries. Results suggest that oxyfluorfen (Goal) at 1 lb. ai/acre provided adequate suppression of raspberry and bearing blackberry canes when applied once compared to 2 dinoseb sprays, whereas non-bearing blackberry required a 2 lb. ai/acre rate. Paraquat failed to enhance control when tank-mixed with oxyfluorfen. Lactofen (Cobra) required two applications for similar control as oxyflurofen, but met with company disapproval. Enquik provided less control than all other treatments in red raspberry.

Yearly applications of dicholobenil in blueberries. Repeated annual treatment of blueberries with dicholobenil beginning in 1986 and continued for three years failed to cause any observable injury. We believe injury was prevented by accurately weighing the granules for small areas and applying them during the cold, wet winter months followed by rainfall to prevent volatilization. Acceptable suppression of horsetail rush (Equisetum) infestations were achieved with 4 lbs. ai/acre the first year, 3 lbs./acre the second, and 2 lbs./acre the third. In conclusion, horsetail can be controlled in blueberries using repeated applications at low rates.

POSSIBLE ALTERNATIVES TO DINOSEB
FOR CANE SUPPRESSION IN CANEBERRIES

J.T. DeFrancesco[1], W.S. Braunworth[2], E. Nelson[1]

Primocane suppression is a major cultural practice in caneberry production. Cane suppression increases yield by reducing competition and helps facilitate machine harvesting by keeping the basal area of the plants clear of vegetation. The use of dinoseb [2-(1-methylpropyl)-4-4-dinitrophenol] is critical for the suppression of canes as there are no registered chemical alternatives. Mechanical methods have proved inadequate or prohibitively expensive. The use of dinoseb for cane suppression beyond the 1989 growing season is in serious jeopardy, so the search to find an alternative is paramount. Various chemicals were evaluated for primocane suppression in red raspberries (cv. Willamette) and blackberries (cv. Thornless Evergreen).

RED RASPBERRIES

Sandy, Oregon. In 1987, 19 treatments were applied to 'Willamette' red raspberries in a preliminary screening trial in a commercial field located in Sandy, Oregon. The experimental design was a randomized complete block with three replications. Plot size was 3 by 15 feet with 2.5 feet between plants. Of those 19 treatments, only dinoseb, paraquat (Super Gramoxone) (1,1'-Dimethyl-4,4' bipyridinium ion) plus oxyfluorfen (Goal) [2-chloro-1-(3 ethoxy-4-nitrophenoxy)-4-(trifluoromethyl) benzene], and hand removal provided adequate cane suppression (Table 1). Monocarbamid dihydrogensulfate (Enquik) provided some control of primocanes but was not comparable to dinoseb and paraquat plus oxyfluorfen (Table 1).

In 1988, five of the original 19 treatments were applied to the same plots. Treatments consisted of paraquat (.4 lb a.i./ac) plus oxyfluorfen (.5

[1]Research Assistant, North Willamette Experiment Station, Aurora

[2]Assistant Professor of Horticulture, Oregon State University, Corvallis

lb a.i./ac) with .25% X-77 surfactant, Enquik (20 gal/ac) with .25% X-77 surfactant, dinoseb (2.5 lb a.i./ac) with 1 gal/ac crop oil, hand removal using hand pruners, and an untreated control. All treatments were applied on April 11, 1988, when primocanes were four to six inches tall; Enquik and dinoseb were applied again on April 28, 1988. Volume of water used as a carrier for paraquat plus oxyfluorfen was 30 gal/ac Enquik and dinoseb had 60 gal/ac and 100 gal/ac for the first and second application dates, respectively. A hollow cone nozzle, size D3-25, was directed at the lower 16 inches of the plants. Ratings were based on a visual assessment of the degree of control of the primocanes and lateral buds. These ratings were made five times during the season. On November 3, 1988, the number of canes per plant, cane diameter, and cane length were measured.

Results: Paraquat plus oxyfluorfen treatment resulted in cane suppression comparable to that of dinoseb (Table 2). Hand removal also provided good suppression, but is not economically feasible on a commercial basis. Enquik provided less than commercially acceptable suppression. There were no significant differences in berry size among any of the treatments.

All chemical treatments had similar number of primocanes, but dinoseb had significantly more primocanes than either the control or hand removal (Table 2). All treatments except paraquat plus oxyfluorfen had significantly shorter canes than the control. Dinoseb treatment and hand removal resulted in smaller cane diameter than in the control. Although there were statistically significant differences between treatments in primocane growth, none were considered so great as to affect commercial production adversely.

Salem, Oregon. Seven treatments were applied to 'Willamette' red raspberries in a commercial field located in Salem, Oregon. The experimental design was a randomized complete block with four replications; plot size was 3 by 15 feet with 2.5 feet between plants. The treatments consisted of three rates of oxyfluorfen, .5, 1, and 2 lb a.i./ac, with .25% X-77 surfactant added to each, lactofen (Cobra) {(+)-2-ethoxy-1-methyl-2-oxyethyl 5-[2-chloro-4-(trifluoromethyl) phenoxyl]-2-nitrobenzoate} at a rate of .5 lb a.i./ac with .25% X-77 surfactant, dinoseb (2.5 lb a.i./ac) with 1.0 gal/ac crop oil, hand removal using hand pruners, and an untreated control. All treatments were applied on April 9, 1988; lactofen, dinoseb, and hand removal treatments were repeated on April 27, 1988. Treatments were applied when primocanes were four to six inches tall. Volume of water used as a carrier for oxyfluorfen and lactofen was 30 gal/ac; 100 gal/ac was used for dinoseb. Visual suppression ratings were made six times during the season. Primocane regrowth measurements were taken on August 15, 1988.

Results: All chemical treatments except oxyfluorfen at .5 lb a.i./ac had cane suppression comparable to dinoseb (Table 3). Oxyfluorfen at .5 lb a.i./ac and hand removal had significantly lower cane suppression ratings. The low rating for hand removal may be attributed to the stimulation of regrowth caused by pruning, as is common in young raspberry plants.

There were no significant differences in number of primocanes due to treatment (Table 3). For all treatments, cane diameter was either greater than or equal to that of the control. When compared to the control, lactofen and dinoseb treatments resulted in shorter canes although none were so short as to affect production adversely or indicate reduced plant vigor.

BLACKBERRIES

Brooks, Oregon. In a commercial field near Brooks, Oregon, six treatments were applied to both bearing and non-bearing 'Thornless Evergreen' blackberries grown in an alternate-year (AY) production system. The experimental design was a randomized complete block with four replications. Plot size was 3 by 30 feet with 10 feet between plants. Treatments consisted of three rates of oxyfluorfen, .5, 1, and 2 lb a.i./ac, with .25% X-77 surfactant, lactofen at .5 lb a.i./ac with .25% X-77 surfactant, dinoseb at 2.5 lb a.i./ac with 1 gal/ac crop oil, and an untreated control.

Treatments were applied on an "as needed" basis, usually when the canes were four to fourteen inches long. In the bearing plots, oxyfluorfen and lactofen were applied on April 18, May 17, June 2, June 22, July 1, and July 19, 1988. Dinoseb was applied on April 18, May 10, June 2, June 15, June 24, and July 8, 1988. Visual ratings of cane suppression were made 13 times during the season. Harvest began August 11, 1988, and continued weekly until September 29, 1988. In the non-bearing plots, all treatments were applied on June 17 and September 1, 1988. Cane suppression ratings were made five times during the season.

Results: In the bearing row, all treatments provided acceptable suppression and were rated better than or equal to dinoseb (Table 4). The 2 lb a.i./ac rate of oxyfluorfen did not provide significantly greater control than the 1 lb a.i./ac rate. Berry size was not adversely affected by any of the treatments which all had larger berries than the control (Table 4).

In the non-bearing row, only oxyfluorfen at the 2 lb a.i./ac rate resulted in cane suppression comparable to that of dinoseb; all other treatments provided significantly less control (Table 4). Ratings for oxyfluorfen at .5 and 1 lb a.i./ac were considered marginally acceptable on a commercial basis.

SUMMARY AND CONCLUSION

Raspberries:

Both oxyfluorfen and lactofen are possible replacements for dinoseb for cane suppression in red raspberries. Paraquat plus oxyfluorfen also provided adequate control at the Sandy, Oregon, location but results from Salem, Oregon, indicate that paraquat is not necessary in the mix. Oxyfluorfen at 1 lb a.i./ac would probably be an adequate commercial rate as the 2 lb a.i./ac rate did not provide significantly more control. Oxyfluorfen provided good control throughout the season with just one application, whereas lactofen and dinoseb required two applications for comparable results. Neither lactofen nor oxyfluorfen appeared to have any detrimental effect on cane regrowth. Research conducted by WSU personnel on 'Willamette' red raspberries in Washington also indicates that oxyfluorfen and lactofen are possible alternatives to dinoseb. Washington research also identified glufosinate (Ignite) [ammonium(3-amino-3-carboxypropyl)-methyl phosphinate] at 1 to 2 lb a.i./ac, and acifluorfen (Tackle/Blazer) {5-[2-chloro-4-(trifluoromethyl) phenoxy]-2-nitrobenzoic acid} at .5 to 1 lb a.i./ac as providing adequate cane suppression.

Enquik provided less control than dinoseb or any of the other chemicals tested in raspberries. If registered and used by growers, label directions should be followed carefully to maximize efficacy. The experiments in Salem and Sandy, Oregon, will be repeated in 1989 to identify the long-term effects of the tested chemicals on plant and fruit characteristics.

Blackberries:

Oxyfluorfen and lactofen could prove acceptable replacements for dinoseb for cane suppression in 'Thornless Evergreen' blackberries. Treatments affected the bearing and non-bearing plants differently. In the bearing row, all the chemical treatments had suppression ratings greater than or equal to that of dinoseb. In the non-bearing row only oxyfluorfen at 2 lb a.i./ac provided control comparable to that of dinoseb. Further testing is required to determine if the 1 lb a.i./ac rate of oxyfluorfen will provide adequate cane suppression in non-bearing 'Evergreen' blackberries. This experiment will be repeated in 1989.

Cane suppression and primocane growth are not the only considerations for evaluating treatments as alternatives to dinoseb. Yield, berry size, fruit and soil residue, and delay of harvest are important parameters that will be measured and monitored in 1989 in both the raspberry and blackberry experiments.

Table 1. Effects of treatments for primocane suppression of 'Willamette' red raspberry, Sandy, Oregon, 1987.

Treatment	Cane suppression[z]	Primocane regrowth[w] Canes/plant[y]	Cane length[x] (m)	Cane diameter[x] (cm)
Enquik	5.6 b	24	2.58 c	.92 b
Paraquat + oxyfluorfen	8.5 c	21	2.43 b	.91 b
Dinoseb	8.5 c	22	2.33 ab	.86 ab
Hand removal	9.2 c	26	2.11 a	.79 a
Control (untreated)	0.0 a	25	2.58 c	.86 ab
Significance	**	NS	*	*

[w]Regrowth data collected on 10/27/87
[x]Average of 12 canes/plant from center plant; diameter measured at 61 cm
[y]Average of center 3 plants
[z]Average of 5 dates; 0 = no suppression, 10 = complete suppression
NS, *, ** = Not significant, significant at 5% and 1% levels, respectively

Table 2. Effects of treatments for primocane suppression of 'Willamette' red raspberry, Sandy, Oregon, 1988.

Treatment	Cane suppression[z]	Berry size[y] (g)	Primocane regrowth[v] Canes/plant[x]	Cane length[w] (m)	Cane diameter[w] (cm)
Enquik	5.2 b	4.0	19 ab	2.47 a	.93 b
Paraquat + oxyfluorfen	7.2 c	3.9	19 ab	2.50 ab	.93 b
Dinoseb	7.1 c	3.9	20 b	2.41 a	.86 a
Hand removal	6.4 bc	3.8	16 a	2.37 a	.84 a
Control (untreated)	0.0 a	3.7	15 a	2.59 b	.93 b
Significance	**	NS	*	*	*

[v]Regrowth data collected on 11/3/88
[w]Average of 12 canes/plant from center plant; diameter measured at 46 cm
[x]Average of center 3 plants
[y]Seasonal average (6 harvests)
[z]Average of 5 dates; 0 = no suppression, 10 = complete suppression
NS, *, ** = Not Significant, significant at 5% and 1% levels, respectively

Table 3. Effects of treatments for primocane suppression of 'Willamette' red raspberry, Salem, Oregon, 1988.

Treatment	Cane suppression[z]	Berry size[y] (g)	Primocane regrowth[v] Canes/plant[x]	Cane length[w] (m)	Cane diameter[w] (cm)
Oxyfluorfen (.5 lb a.i.)	7.0 c	2.8	25	1.98 b	.86 ab
Oxyfluorfen (1 lb a.i.)	7.8 d	2.8	25	2.01 b	.90 b
Oxyfluorfen (2 lb a.i.)	8.4 d	2.7	23	1.92 ab	.89 b
Lactofen	8.4 d	2.7	22	1.80 a	.84 a
Dinoseb	8.3 d	2.7	22	1.89 a	.90 b
Hand removal	5.0 b	2.7	24	1.98 b	.91 b
Control (untreated)	0.0 a	2.8	26	2.04 b	.81 a
Significance	**	NS	NS	*	*

[v]Regrowth data collected on 8/15/88
[w]Average of 12 canes/plant from center plant; diameter measured at 46 cm
[x]Average of center 3 plants
[y]Seasonal average (3 harvests).
[z]Average of 6 dates; 0 = no suppression, 10 = complete suppression
NS, *, ** = Nonsignificant, significant at 5% and 1% levels, respectively

Table 4. Effects of treatments for primocane suppression of 'Thornless Evergreen' blackberry, Brooks, Oregon, 1988.

Treatment	Non-Bearing Row Cane suppression[z]	Bearing Row Cane suppression[y]	Bearing Row Berry size[x] (g)
Oxyfluorfen (.5 lb a.i.)	6.4 b	8.3 b	3.2 bc
Oxyfluorfen (1 lb a.i.)	6.3 b	8.8 c	3.1 b
Oxyfluorfen (2 lb a.i.)	8.0 c	8.9 c	3.1 b
Lactofen	7.1 b	8.4 bc	3.2 bc
Dinoseb	8.2 c	7.7 b	3.3 c
Control (untreated)	0.0 a	0.0 a	2.9 a
Significance	**	**	*

[x]Seasonal average (8 harvests)
[y]Average of 13 dates; 0 = no suppression, 10 = complete suppression
[z]Average of 5 dates; 0 = no suppression, 10 = complete suppression
*, ** = Significant at the 5% and 1% level, respectively

Evaluation of Weed Control and Phytotoxicity with Repeated Applications of Dichlobenil on Blueberries, 1988.

William S. Braunworth, Jr., Extension Horticulture Weed Control Specialist, OSU
Arden Sheets, Extension Agent, Washington County, Hillsboro

Introduction:

Cost effective weed control in blueberries is required in order to maintain crop yield, quality and profitability. Dichlobenil is registered for use on blueberries, but growers have indicated concerns of possible crop injury, and the cost can be high.

In this three year study, annual applications of dichlobenil at four rates are being evaluated for possible crop injury and control of horsetail on blueberries. The objectives of this study are as follows:

1) Identification of lowest rate of dichlobenil which will result in adequate weed control.
2) Assess tolerance of blueberries to various levels of dichlobenil.
3) Promote cost effective, safe weed control in blueberries.

Materials and Methods:

The blueberries were established in 1980. Experimental design is a randomized complete block with four replications of the four treatment levels and the control (Table 1). Replications two and four were with Bluecrop, and reps one and three were on Earliblue. Plots were 5 by 20 feet with plants spaced 42 inches in the row and a 10 foot row width. Applications were made 10 March, 1986, 16 February, 1987, and 18 February, 1988. A 4% granular formulation of dichlobenil was applied with shakers. Weed control evaluations were made on 6 June, 1986, 29 April, 1987, 29 June, 1987, and 15 May, 1988. Evaluations in June of both years were at or near the time of harvest.

Results:

Table 1 shows the rates of application of dichlobenil with the corresponding control of horsetail, ryegrass and crop injury ratings. Perennial ryegrass was adequately controlled at 3, 4, and 6/bai/A. The stand of horsetail before application in 1986 was dense and vigorous. After the first application satisfactory control was achieved at the highest rate of application, 6.0 lb ai/A. After the second year, horsetail was adequately controlled with 4.0 lb ai/A. In the second year adequate control was also achieved, but at a latter date, with the 2.0 and 3.0 lb ai/A applications. Early season ratings of the 2.0 and 3.0 lb rates showed 55 to 75% control which improved to 93 to 99% by 29 June, 1987. In 1988 even the lowest application rate of 2 lbai/A applied for three years resulted in excellent control of horsetail. This suggests the lighter rate can be used to insure even more crop safety and over a period of several years adequate control may be achieved. Although a high level of control would take longer, there would be the benefit of reduced chemical costs with the 2 lb rate. In addition, crop injury ratings showed no injury even at the highest rate applied in 3 consecutive years.

Contrary to popular belief, blueberries were not injured by any rate of dichlobenil. A factor contributing to crop safety was weighing the herbicide for each plot and carefully applying it to a measured area. This avoids accidential over applications which could injure blueberries. Additionally, applications were made during the winter while the weather was cool and rainy. These conditions are essential for proper activation of this herbicide.

In summary, these data show the 6.0 lb ai/A rate in the first year, or a 4.0 lb ai/A rate applied for two years, or a lighter rate if delay in control is acceptable, will result in satisfactory weed control with safety to the blueberry crop. The lower rate of 2 lb ai/A applied for three consecutive years provided adequate control of horsetail by late in the second year. If less than complete control is acceptable, the 2 lb rate provides a more cost effective program.

Appendix Table 1 shows individual replication data and treatment averages, while the herbicide application worksheets describe application conditions and methods.

Table 1. Crop injury and horsetail control ratings for applications of dichlobenil on Earliblue and Bluecrop blueberries, Gaston, Oregon.[1/]

Herbicide	Rate	Date of observation							
		Crop injury			Control of horsetail				Control of ryegrass
	(lb ai/A)	6/23/86	4/29/87	6/29/87	6/23/86	4/29/87	6/29/87	5/14/88	5/14/88
Dichlobenil	2.0	0	0	0	43	55	93	100	78
Dichlobenil	3.0	0	0	0	59	75	99	100	97
Dichlobenil	4.0	0	0	0	80	93	98	99	100
Dichlobenil	6.0	0	0	0	92	100	100	100	99
Control		0	0	0	25	0	0	0	0

1/ Ratings are on a scale of 0 to 100% with 0 = no crop injury or weed control and 100 = complete weed control or death of the crop. The four replications are averaged. Dates of application were 10 March, 1986, 16 February, 1987, and 18 February, 1988.

Appendix Table 1. Crop injury and horsetail control ratings for applications of dichlobenil on Earliblue and Bluecrop blueberries, Gaston, Oregon.[1/]

Herbicide	Rate (lb ai/A)	Rep no.	Crop injury 6/23/86	Crop injury 4/29/87 & 6/29/87	Crop injury 5/14/88	Control of horsetail 6/23/86	Control of horsetail 4/29/87	Control of horsetail 6/29/87	Control of horsetail 5/14/88	Control of ryegrass 5/14/88
Dichlobenil	2.0	1	0	0	0	40	60	95	100	95
Dichlobenil	2.0	2	0	0	0	60	20	90	100	65
Dichlobenil	2.0	3	0	0	0	30	80	98	100	80
Dichlobenil	2.0	4	0	0	0	40	60	90	100	70
Dichlobenil	2.0	Avg.	0	0	0	43	55	93	100	78
Dichlobenil	3.0	1	0	0	0	70	100	96	100	100
Dichlobenil	3.0	2	0	0	0	65	70	99	100	95
Dichlobenil	3.0	3	0	0	0	50	80	100	100	95
Dichlobenil	3.0	4	0	0	0	50	50	100	100	98
Dichlobenil	3.0	Avg.	0	0	0	59	75	99	100	97
Dichlobenil	4.0	1	0	0	0	80	90	95	98	100
Dichlobenil	4.0	2	0	0	0	80	90	99	100	98
Dichlobenil	4.0	3	0	0	0	80	100	100	99	100
Dichlobenil	4.0	4	0	0	0	80	90	98	100	100
Dichlobenil	4.0	Avg.	0	0	0	80	93	98	99	100
Dichlobenil	6.0	1	0	0	0	95	100	100	100	100
Dichlobenil	6.0	2	0	0	0	97	100	100	100	100
Dichlobenil	6.0	3	0	0	0	90	100	99	100	98
Dichlobenil	6.0	4	0	0	0	85	100	100	100	98
Dichlobenil	6.0	Avg.	0	0	0	92	100	100	100	99
Control		1	0	0	0	0	0	0	0	0
Control		2	0	0	0	0	0	0	0	0
Control		3	0	0	0	50	0	0	0	0
Control		4	0	0	0	50	0	0	0	0
Control		Avg.	0	0	0	25	0	0	0	0

1/ Ratings are on a scale of 0 to 100% with 0 = no crop injury or weed control and 100 = complete weed control or death of the crop. Dates of application were 10 March, 1986, 16 February, 1987, and 18 February, 1988.

HERBICIDE APPLICATION WORKSHEET

Year: 1987 Exp. No. n/a

Title: Evaluation of weed control and Phytotoxicity with Repeated Applications of Dichlobenil on Blueberries, 1986-87.

Location (farm, town, county): Ivan Hein Farm, Rt. 1 Box 86, Gaston, OR 97119; Washington County

Crop (cultivar): Blueberries, Earliblue and Bluecrop
Planting date: 1980 Final field preparation: none
Plant spacing, 42 inches, by 10 feet
Plot size: 5' x 20'; 100 square feet
Soil series and type: Helvetia silt loam O.M.: 2.0% pH: 5.6
Other pesticides: none Type of irrigation: drip
Experimental design: Randomized complete block Replications: 4
Notes:

	Applic'n #1	Applic'n #2	Applic'n #3
Date of application:	3/10/86	2/16/87	2/18/88
Treatments applied:	all treatments	all treatments	all treatments
Temperatures (F) (approx)	Air 60 Soil	Air 45 Soil 45	Air 46
Relative humidity (%)	75	95	Approx 70%
Cloud cover (%)	15	100	50 to 100%
Wind speed & direction	†5 mph.	5-10 mph, S.	no wind
Dew present?	none	wet foliage	yes-wet foliage
Time of day	2:30-4:30 pm	2:30 pm	10;30 am
Soil moisture	wet	saturated	wet
Soil surface condition	wet, not distr	wet,grass cov	wet,grass cov
Days until moisture received	3 hr post tret	at same time	rain in eary Mar
Quantity of moisture		1/4- 1/2 inch	
Method & depth of incorp.	granular apply to soil surfac	granular apply to soil surfac	granular apply to soil surface
Method of application	shaker	shaker	shaker
Type of sprayer	n/a	n/a	n/a
Ground speed	n/a	n/a	n/a
Type of carrier and volume	granular	granular	granular
Boom length & nozzle spacing	n/a	n/a	n/a
Nozzle size & type	n/a	n/a	n/a
Boom height	n/a	n/a	n/a
Pressure (psi)	n/a	n/a	n/a
Stage of growth: Crop	1 wk pre bloom	Buds begin to to break	fruit buds swollen to breaking
Weeds	0-3" horse- tail, grass, 1-7 inches perennial rye	little horse- tail, grass, 7-10 inches perennial rye	ryegrass 0-5" height no horsetail present yet.
	crepis 0-3" across False dandelion 0-6" across		

Other notes: For application on 2/16/87, there were a few scattered horsetail plants in the treated plots at the time of application. The previous year's application controlled most horsetail. The perennial ryegrass was growing vigorously in all plots.

Tree Fruit—Summary

Ignite on prunes. Glufosinate ammonium provided selective postemergence control of clover, fireweed, fileree, and rattail fescue in prunes, but marginally controlled buckhorn plantain. Symptoms included contact action.

Diuron and simazine tolerance in prunes. Established and fruiting prune trees exhibited no observable symptoms to split applications of diuron and simazine during both the year of treatment and the following year.

Cobra tolerance in prunes. Established and fruiting prunes tolerated a single application of lactofen herbicide applied in March 1987 and evaluated a year later.

TITLE: Weed Control Efficacy and Crop Safety of Ignite on Prunes

PROJECT LEADERS: Dr. Bill Braunworth Jr., Extension Horticulture Weed Specialist
Dr. Garvin Crabtree, Weed Science Professor
Department of Horticulture
Oregon State University
Corvallis, OR 97331

SUMMARY:

Ignite (glufosinate ammonium) is a herbicide being developed by Hoeschst-Roussel Agri-Vet Company. Ignite was evaluated for weed control and safety to prunes in the spring of 1988. Weed control reported here is only preliminary due to a lack of uniform and adequate weed densities. Table 1 shows potentially good control (burndown) of clover, fireweed, filaree and rattail fescue, but only marginal control on buckhorn plantain.

Ignite may be expected to provide burndown of selected species based on contact with foliage. It is not expected to provide control based on translocation of the herbicide into other parts of the plant. Thus, control of well-rooted perennials could be anticipated only at the level of burning-back of existing foliage if the particular species is susceptible to Ignite. Further, we do not expect to observe any preemergence soil activity. Ignite may be useful when used in ways similar to paraquat. It may prove beneficial in burndown of larger weeds.

There was no crop injury observed with this ground application of Ignite which did not drift into the prune tree foliage. With proper direction of the spray and avoiding windy conditions, we do not expect injury to prunes (see Table 1).

FILE NAME:PRUNES88.EXP INTERIM PRINTED:05/05/89

O R E G O N   S T A T E   U N I V E R S I T Y

PRUNE TOLERANCE TO IGNITE AND WEED CONTROL, 1988

PROJECT TYPE (H/I etc): H   PROJECT NO.:   TRIAL ID.:
CITY/COUNTY:CORVALLIS / LINN   ST:OR   ZIP:80331   COUNTRY:USA
RESEARCH BY:BILL BRAUNWORTH   LAST UPDATE:05/05/89   INITIATED: / /
COOPERATOR :S. ROBINS, LB FARM   EXPT. STATUS: COMPLETED: / /
REPORTED BY:BILL BRAUNWORTH   RELATED FILE:**NONE**   SOURCE:

PREVIOUS CROP:N/A   PLOT / Ft:7.5 x24.0   ROW WIDTH/In:15
PREVIOUS TILL:NONE   SOIL TEXTURE:CHEHALIS S.C.L.   OM%:3.3
CEC:31,   %SAND:18   %SILT:53   %CLAY:29   pH:6.2

PREVIOUS TRT.:NONE SINCE 1986   EXPT. DESIGN:RCBD
FERTILIZER :NONE   NUM. OF REPS:4
MISC. INFO. :   REPORT TYPE:INTERIM

CROP:PRUNES   VARIETY:BROOKS
PLANTING DATE: / /   DEPTH/In:N/A   SPACING/In:12 FT IN R   NUM.PLANTS:2/P
HARVEST DATE : / /   SEASONAL RAINFALL DURING EXPERIMENT
RESIDUE TAKEN:N   EARLY:HI   MID: LATE:

PRIMARY RATE UNIT:LBai/A   RATE UNIT [B]:   RATE UNIT [C]:

EXPERIMENT COMMENTS

RATING SCALE:
0=NO CONTROL OR NO DENSITY OF THE WEED SPECIES OR NO INJURY TO PRUNE.
100=COMPLETE CONTROL, VERY DENSE STAND OF WEEDS, OR COMPLETE KILL
OF THE PRUNE TREE

IN GENERAL THE WEEDS WERE SCATTERED IN A NONUNIFORM MANNER ACROSS THE PLOTS. IN MOST CASES THERE WERE ENOUGH WEED PLANTS PRESENT, ALTHOUGH THIS WAS OFTEN ONLY 1 OR 2% COVER, TO GIVE AN INDICATION OF THE ACTIVITY OF IGNITE ON THE PARTICULAR SPECIES.

SUMMARY: IGNITE IS SAFE ON PRUNES WHEN APPLIED TO THE SOIL AND WEED CANOPY NEAR THE GROUND SURFACE.
EXCELLENT BURN DOWN OF FILAREE, RATTAIL FESCUE (RATFESC), CLOVER, AND FIREWEED WAS OBSERVED. POOR CONTROL OF BUCKHORN PLANTAIN WAS MEASURED. IN ADDITION ONLY MARGINAL CONTROL OF A FEW WILD BRACKBERRY PLANTS WAS OBSERVED (POPULATION OF BLACKBERRY WAS NOT ENOUGH FOR A CONCLUSIVE RATING). CONTROL OF A FEW RED SORELL PLANTS WAS IN THE RANGE OF 70-90%. FURTHER TESTS WITH HIGHER WEED DENSITIES IS REQUIRED TO DETERMINE THE SPECIES ON WHICH IGNITE WILL BE MOST ACTIVE.

APPROVED BY: ______________________   SUBMITTED BY: ______________________

DATE: ____________   DATE: ____________

PRUNE TOLERANCE TO IGNITE AND WEED CONTROL, 1988

** SET 1 OF 1 **	APPLIC. 1	APPLIC. 2	APPLIC. 3	APPLIC. 4	APPLIC. 5
GEN. APPLIC. TYPE	POST-SPRING				
APPLICATION DATE	05/13/88	/ /	/ /	/ /	/ /
JULIAN DATE/YEAR	J134/88	J /	J /	J /	J /
START HR / END HR	03:30/04:30	: / :	: / :	: / :	: / :
APPLIC. METHOD	SOIL/FO				
AIR/SOIL TEMP (F)	58 / 58	0 / 0	0 / 0	0 / 0	0 / 0
% REL. HUMIDITY	0	0	0	0	0
WIND DIR. / VELOC	W / <3	/ 0	/ 0	/ 0	/ 0
SKY / SOIL COND.	OVCST/MOIST	/	/	/	/
SOIL/LEAF MOIST.	WET / DRY	/	/	/	/
INCORP. EQUIPMENT	N/A				
INCORP. DEPTH(in)	0	0	0	0	0
SPRAYER TYPE	CO2 BACKPAC				
SPRAYER GPA / PSI	30.25 / 30	0 / 0	0 / 0	0 / 0	0 / 0
MIX SIZE (Gallon)	0.125	0	0	0	0
NOZZLE TYPE /NUM.	8003 3N/45"				
RAINFALL/IRRIG.in					
0-24 HR/1-3 DAYS	/	/	/	/	/
4-7 DAYS/2ND WEEK	/	/	/	/	/
3RD WEEK/4TH WEEK	/	/	/	/	/

	SPECIE CODE	SPECIES	APPLIC. 1 DEN./STG.	APPLIC. 2 DEN./STG.	APPLIC. 3 DEN./STG.	APPLIC. 4 DEN./STG.	APPLIC. 5 DEN./STG.
	*******	****** CROP ******	*********	*********	*********	*********	*********
		PRUNES	/	/	/	/	/
	*******	****** PEST ******	*********	*********	*********	*********	*********
1		CLOVER	VAR/IABLE	/	/	/	/
2		FIREWEED	VAR/IABLE	/	/	/	/
3		BUCKHORN PLANTAIN	VAR/IABLE	/	/	/	/
4		FILAREE	VAR/IABLE	/	/	/	/
5			/	/	/	/	/
6			/	/	/	/	/
7			/	/	/	/	/
8			/	/	/	/	/
9			/	/	/	/	/
UNIFORM STANDARD TREATMENT							
UNIFORM TRT. RATE AND UNIT							

FILE NAME:PRUNES88.EXP INTERIM PRINTED:05/05/89

OREGON STATE UNIVERSITY

PRUNE TOLERANCE TO IGNITE AND WEED CONTROL, 1988

EXPT. LOCATION:CORVALLIS / LINN, OR 80331 USA

RESEARCH BY:BILL BRAUNWORTH INITIATED: / / COMPLETED: / /

TRT. NO.	PESTICIDE NAME	FORMU.	LBai/A	APPLI-CATION TYPE	CLOVER DENSITY 5/13/88	CLOVER CONTROL 5/23/88	FIREWED DENSITY 5/13/88	FIREWED CONTROL 5/23/88	BPLANTN DENSITY 5/13/88	BPLANTN CONTROL 5/23/88
01	IGNITE	SC 1.67	0.50	POST	1	100	7	97	5	50
02	IGNITE	SC 1.67	1.00	POST	5	100	10	96	2	60
03	IGNITE	SC 1.67	2.00	POST	8	100	3	100	6	60
04	CHECK				9	0	12	0	9	0
	LSD(0.05) =				12	NA	10	NA	12	NA
	STANDARD DEVIATION =				8	NA	6	NA	7	NA
	COEFF. OF VARIABILITY =				137	NA	80	NA	142	NA

FILE NAME:PRUNES88.EXP INTERIM PRINTED:05/05/89

OREGON STATE UNIVERSITY

PRUNE TOLERANCE TO IGNITE AND WEED CONTROL, 1988

EXPT. LOCATION:CORVALLIS / LINN, OR 80331 USA

RESEARCH BY:BILL BRAUNWORTH INITIATED: / / COMPLETED: / /

TRT. NO.	PESTICIDE NAME	FORMU.	LBai/A	APPLI-CATION TYPE	FILAREE DENSITY 5/13/88	FILAREE CONTROL 5/23/88	RATFESC DENSITY 5/13/88	RATFESC CONTROL 5/23/88	PRUNE INJURY 5/23/88	PRUNE INJURY 5/26/88
01	IGNITE	SC 1.67	0.50	POST	2	100	1	80	0	0
02	IGNITE	SC 1.67	1.00	POST	3	100	1	95	0	0
03	IGNITE	SC 1.67	2.00	POST	2	100	1	100	0	0
04	CHECK				1	0	1	0	0	0
	LSD(0.05) =				5	NA	2	NA	NA	NA
	STANDARD DEVIATION =				3	NA	1	NA	NA	NA
	COEFF. OF VARIABILITY =				167	NA	126	NA	NA	NA

Table 1. Weed Control and injury to Brooks prunes from application on 13 May, 1988 of Ignite.

Trt. No.	Pesticide Name	Pesticide Formu.	LBai/A	Application Type	Clover Control 5/23/88	Fireweed Control 5/23/88	BPlantn Control 5/23/88	Filaree Control 5/23/88	Ratfesc Control 5/23/88	Prune Injury 5/23/88	Prune Injury 5/26/88
01	Ignite	SC1.67	0.50	Post	100	97	50	100	80	0	0
02	Ignite	SC1.67	1.00	Post	100	96	60	100	95	0	0
03	Ignite	SC1.67	2.00	Post	100	100	60	100	100	0	0
04	Check				0	0	0	0	0	0	0

Ratfesc = rattail fescue (Festuca Myuros L.)
Filaree (Erodium sp.)
Fireweed (Epilobium angustifolium L.)
Clover (Trifolium sp.)
BPlantn = Buckhorn plantin (Plantago lanceolata L.)

Note: Attached are tables of more detailed data from our computer data management program.

PRUNE TOLERANCE TO DIURON & SIMAZINE
1987-88

Bill Braunwoth
Extension Horticulture Weed Specialist

Established prune trees have exhibited tolerance to simazine and diuron herbicides. A trial was conducted to develop data for minor crop registration.

RESULTS:

Based on visual rating of the tree and fruit, there was no injury to prunes from diuron or simazine in 1987 or in the following 1988 growing season. Control of various weed species was not recorded due to a lack of uniform weed populations.

FILE NAME:PRUNEDS.EXP INTERIM PRINTED:05/26/88

O R E G O N   S T A T E   U N I V E R S I T Y

CROP SAFETY OF DIURON AND SIMAZINE ON PRUNES, 1987

PROJECT TYPE (H/I etc): H   PROJECT NO.:   TRIAL ID.:
CITY/COUNTY:CORVALLIS, LINN COUNTY   ST:OR   ZIP:97331   COUNTRY:USA
RESEARCH BY:BILL BRAUNWORTH   LAST UPDATE:05/26/88   INITIATED: / /
COOPERATOR :LEWIS BROWN FARM   EXPT. STATUS:G   COMPLETED:01/17/88
REPORTED BY:BILL BRAUNWORTH   RELATED FILE:**NONE**   SOURCE:

PREVIOUS CROP:WELL ESTABLISHED   PLOT / Ft:7.5 x12.0   ROW WIDTH/In:15.0
PREVIOUS TILL:PRUNE BLOCK   SOIL TEXTURE:SANDY LOAM   OM%:3.3
CEC:0   %SAND:0   %SILT:0   %CLAY:0   pH:6.2

PREVIOUS TRT.:18 APRIL 1986: 3 LBAI/A SOLICAM +   EXPT. DESIGN:RCBD
FERTILIZER :1 QUART ROUNDUP; CONVENTIONAL PRODUCTION   NUM. OF REPS:6
MISC. INFO. :PRACTICES WERE FOLLOWED   REPORT TYPE:INTERIM

CROP:PRUNES   VARIETY:BROOKS; ROWS 4,5,7; ITALIAN; ROWS 1,3,6
PLANTING DATE: / ./   DEPTH/In:N/A   SPACING/In:12.0 FEET   NUM.PLANTS:1/R
HARVEST DATE : / /   SEASONAL RAINFALL DURING EXPERIMENT
RESIDUE TAKEN: EARLY: MID: LATE:

PRIMARY RATE UNIT:LBai/A   RATE UNIT [B]:   RATE UNIT [C]:

EXPERIMENT COMMENTS

Paraquat was applied aprx. 4/10/87, before the second application date
This experiment has a split application of both diuron and simazine.
"PRE2" indicates the second application time which was 4/21/87.
The first application was 1/16/87.
Spray volumes varied for the first application timing. They were as
follows: 1.0 l 6 plots---treatment 1
1.25 l 6 plots---treatment 2, 4
2.50 l 6 plots---treatment 3,6,7,8,9,10
1.15 l 6 plots---treatment 5
Spray volume for the second application (PRE2) was 313 ml/plot or 626
ml/2 plots, which was 40 gal/a.
Rating scale: 0 = no injury; 100 = complete kill.
12 feet between trees in the row; 15 feet is the row spacing.
Bare strip under trees is 7 to 8 feet wide.
At both times of application there were very few weeds present. There
were scattered populations of fireweed and clover.
Soil has some gravelly areas in it.
Plot lay out: 1 tree/plot
Rep 1 Italian Row 1
Rep 2 Italian Row 3
Rep 3 Brooks Row 4
Rep 4 Brooks Row 5
Rep 5 Italian Row 6
Rep 6 Brooks Row 7

NOTE: row numbers are based on row 1 being the row at the west end of the plot, nearest to the germ plasm buildings; plots start at the North end of the row.

APPROVED BY: ________________________   SUBMITTED BY: ________________________

DATE: ____________   DATE: ____________

O R E G O N   S T A T E   U N I V E R S I T Y

CROP SAFETY OF DIURON AND SIMAZINE ON PRUNES, 1987

EXPT. LOCATION:CORVALLIS, LINN COUNTY, OR 97331 USA
RESEARCH BY:BILL BRAUNWORTH INITIATED: / / COMPLETED:01/17/88

TRT. NO.	PESTICIDE NAME	FORMU.	LBai/A	APPLI-CATION TYPE	PRUNE INJURY 4/18/87	PRUNE INJURY 6/11/87	PRUNE INJURY 5/26/88		
01	DIURON	WP 80	1.92	PRE	0	0	0		
02	DIURON	WP 80	3.20	PRE	0	0	0		
03	DIURON	WP 80	5.60	PRE	0	0	0		
04	DIURON	WP 80	1.92	PRE	0	0	0		
	DIURON	WP 80	1.92	PRE2					
05	DIURON	WP 80	2.94	PRE	0	0	0		
	DIURON	WP 80	2.94	PRE2					
06	SIMAZINE	WP 80	1.60	PRE	0	0	0		
07	SIMAZINE	WP 80	4.00	PRE	0	0	0		
08	SIMAZINE	WP 80	8.00	PRE	0	0	0		
09	SIMAZINE	WP 80	1.60	PRE	0	0	0		
	SIMAZINE	WP 80	1.60	PRE2					
10	SIMAZINE	WP 80	4.00	PRE	0	0	0		
	SIMAZINE	WP 80	4.00	PRE2					
11	CHECK				0	0	0		
			LSD(0.05) =		NA	NA	NA		
			STANDARD DEVIATION =		NA	NA	NA		
			COEFF. OF VARIABILITY =		NA	NA	NA		

FILE NAME:PRUNEDS.EXP INTERIM PRINTED:05/26/88

CROP SAFETY OF DIURON AND SIMAZINE ON PRUNES, 1987

** SET 1 OF 1 **	APPLIC. 1	APPLIC. 2	APPLIC. 3	APPLIC. 4	APPLIC. 5
GEN. APPLIC. TYPE	PREEMERG	PREEMERG			
APPLICATION DATE	01/16/87	04/21/87	/ /	/ /	/ /
JULIAN DATE/YEAR	J 16/87	J111/87	J 0/00	J 0/00	J 0/00
START HR / END HR	13:00/17:00	18:00/20:00	: / :	: / :	: / :
APPLIC. METHOD	SURFACE	SURFACE			
AIR/SOIL TEMP (F)	38 / 2	18 / 17	0 / 0	0 / 0	0 / 0
% REL. HUMIDITY	40	40	0	0	0
WIND DIR. / VELOC	/ 0	/ 0	/ 0	/ 0	/ 0
SKY / SOIL COND.	CLEAR/WET	HI CL/DRY	/	/	/
SOIL/LEAF MOIST.	WET / N/A	DRY / N/A	/	/	/
INCORP. EQUIPMENT	NONE	NONE			
INCORP. DEPTH(in)	0	0	0	0	0
SPRAYER TYPE	BACKPACK	BACKPACK			
SPRAYER GPA / PSI	40.0 / 0	40.0 / 0	0 / 0	0 / 0	0 / 0
MIX SIZE (Gallon)	.0826	.0826	0	0	0
NOZZLE TYPE /NUM.	T JET 8002	T JET 8003			
RAINFALL/IRRIG.in					
0-24 HR/1-3 DAYS	/	/	/	/	/
4-7 DAYS/2ND WEEK	/	/	/	/	/
3RD WEEK/4TH WEEK	/	/	/	/	/

	SPECIE CODE	SPECIES	APPLIC. 1 DEN./STG.	APPLIC. 2 DEN./STG.	APPLIC. 3 DEN./STG.	APPLIC. 4 DEN./STG.	APPLIC. 5 DEN./STG.
	*******	****** CROP ******	*********	*********	*********	*********	*********
		PRUNES	/DORMT	/P BLM	/	/	/
	*******	****** PEST ******	*********	*********	*********	*********	*********
1		GRASS + BROADLEAF	0 /N/A	0 /N/A	/	/	/
2			/	/	/	/	/
3			/	/	/	/	/
4			/	/	/	/	/
5			/	/	/	/	/
6			/	/	/	/	/
7			/	/	/	/	/
8			/	/	/	/	/
9			/	/	/	/	/
UNIFORM STANDARD TREATMENT							
UNIFORM TRT. RATE AND UNIT							

PRUNE TOLERANCE TO LACTOFEN (COBRA)
1987-88

Bill Braunworth
Extension Horticulture Weed Specialist

A trial was conducted to assess potential crop injury from lactofen (Cobra) herbicide.

RESULTS

Visual ratings indicated no injury from applications of Cobra or Surflan in 1987 or in 1988.

Populations of weeds were not adequate for weed control efficacy data.

O R E G O N   S T A T E   U N I V E R S I T Y

COBRA ON PRUNES, 1987

PROJECT TYPE (H/I etc): H   PROJECT NO.:004-87   TRIAL ID.:
CITY/COUNTY:CORVALLIS, LINN COUNTY   ST:OR   ZIP:97331   COUNTRY:USA
RESEARCH BY:BILL BRAUNWORTH   LAST UPDATE:05/26/88   INITIATED:03/17/86
COOPERATOR :LEWIS BROWN FARM   EXPT. STATUS:G   COMPLETED:01/17/88
REPORTED BY:BILL BRAUNWORTH   RELATED FILE:**NONE**   SOURCE:

PREVIOUS CROP:PERENNIAL   PLOT / Ft:7.5 x24   ROW WIDTH/In:15
PREVIOUS TILL:WELL ESTABLISHED   SOIL TEXTURE:SANDY-LOAM   OM%:3.3
CEC:0   %SAND:0   %SILT:0   %CLAY:0   pH:6.2

PREVIOUS TRT.:4/18/86: 3LBAI/A SOLICAM + 1 QT. ROUNDUP   EXPT. DESIGN:RCBD
FERTILIZER :COMMERCIAL PRODUCTION PRACTICES   NUM. OF REPS:4
MISC. INFO. :COBRA LOT NO: BC 8700027, 2 TREES/PLOT   REPORT TYPE:FINAL

CROP:PRUNES   VARIETY:ITALIAN (ROWS 8, 10, 11, 13)
PLANTING DATE: / /   DEPTH/In:N/A   SPACING/In:12 FEET   NUM.PLANTS:2/P
HARVEST DATE : / /   SEASONAL RAINFALL DURING EXPERIMENT
RESIDUE TAKEN:N   EARLY: MID: LATE:

PRIMARY RATE UNIT:LBai/A   RATE UNIT [B]:   RATE UNIT [C]:

EXPERIMENT COMMENTS

The row nearest Peoria Road is the row 1 of the prune tests.
Row 8 = rep 1   Tree rows start with first tree at the North end.
Row 10= rep 2   Two trees per plot.
Row 11= rep 3
Row 13= rep 4
A small tree was skipped between plots 305 and 306 in row 11.
April 18, 1986: 3LB AI/A solicam 80WP + 1 QT/A roundup was applied.
Rating scale is 0 to 100% with 0 = no injury; 100 = complete kill.
Not enough weed pressure for weed control efficacy ratings.

SUMMARY OF RESULTS:

Visual ratings indicated no injury from applications of Cobra or Surflan in 1987 or in 1988.

Populations of weeds were not enough for weed control efficacy data to be taken.

APPROVED BY: ______________________   SUBMITTED BY: ______________________

DATE: ___________   DATE: ___________

COBRA ON PRUNES, 1987

** SET 1 OF 1 **	APPLIC. 1	APPLIC. 2	APPLIC. 3	APPLIC. 4	APPLIC. 5
GEN. APPLIC. TYPE	PRE				
APPLICATION DATE	03/20/87	/ /	/ /	/ /	/ /
JULIAN DATE/YEAR	J 79/87	J 0/00	J 0/00	J 0/00	J 0/00
START HR / END HR	: / :	: / :	: / :	: / :	: / :
APPLIC. METHOD					
AIR/SOIL TEMP (F)	60 / 50	0 / 0	0 / 0	0 / 0	0 / 0
% REL. HUMIDITY	60	0	0	0	0
WIND DIR. / VELOC	N / 2.	/ 0	/ 0	/ 0	/ 0
SKY / SOIL COND.	/	/	/	/	/
SOIL/LEAF MOIST.	WET / DRY	/	/	/	/
INCORP. EQUIPMENT	N/A				
INCORP. DEPTH(in)	0	0	0	0	0
SPRAYER TYPE	CO2 BACKPAC				
SPRAYER GPA / PSI	40.0 / 24	0 / 0	0 / 0	0 / 0	0 / 0
MIX SIZE (Gallon)	0	0	0	0	0
NOZZLE TYPE /NUM.	8004,15B,3N				
RAINFALL/IRRIG.in					
0-24 HR/1-3 DAYS	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
4-7 DAYS/2ND WEEK	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
3RD WEEK/4TH WEEK	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0

	SPECIE CODE	SPECIES	APPLIC. 1 DEN./STG.	APPLIC. 2 DEN./STG.	APPLIC. 3 DEN./STG.	APPLIC. 4 DEN./STG.	APPLIC. 5 DEN./STG.
	*******	****** CROP ******	*********	*********	*********	*********	*********
			0 /	0 /	0 /	0 /	0 /
	*******	****** PEST ******	*********	*********	*********	*********	*********
1		FIRE WEED	3 /VEG	0 /	0 /	0 /	0 /
2		CLOVER	2 /VEG	0 /	0 /	0 /	0 /
3			0 /	0 /	0 /	0 /	0 /
4			0 /	0 /	0 /	0 /	0 /
5			0 /	0 /	0 /	0 /	0 /
6			0 /	0 /	0 /	0 /	0 /
7			0 /	0 /	0 /	0 /	0 /
8			0 /	0 /	0 /	0 /	0 /
9			0 /	0 /	0 /	0 /	0 /

UNIFORM STANDARD TREATMENT					
UNIFORM TRT. RATE AND UNIT					

FILE NAME:PRUNESC.EXP FINAL / Originator copy PRINTED:05/26/88

O R E G O N   S T A T E   U N I V E R S I T Y

COBRA ON PRUNES, 1987

EXPT. LOCATION:CORVALLIS, LINN COUNTY, OR 97331 USA
RESEARCH BY:BILL BRAUNWORTH INITIATED:03/17/86 COMPLETED:01/17/88

TRT. NO.	PESTICIDE NAME	FORMU.	LBai/A	APPLI-CATION TYPE	PRUNE INJURY 4/18/87	PRUNE INJURY 6/11/87	PRUNE INJURY 5/26/88		
01	COBRA	EC 2.0	0.5	PRE	0	0	0		
02	COBRA	EC 2.0	1.0	PRE	0	0	0		
03	COBRA	EC 2.0	0.5	PRE	0	0	0		
	SURFLAN	WP 75	4.0	PRE					
04	COBRA	EC 2.0	1.0	PRE	0	0	0		
	SURFLAN	WP 75	4.0	PRE					
05	SURFLAN	WP 75	4.0	PRE	0	0	0		
06	CHECK				0	0	0		
			LSD(0.05) =		NA	NA	NA		
			STANDARD DEVIATION =		NA	NA	NA		
			COEFF. OF VARIABILITY =		NA	NA	NA		

Christmas Tree—Summary

Christmas tree tolerance to clorpyralid. Several species of Christmas trees exhibited adequate tolerance to clorpyralid herbicide applied up to 0.5 lb. ai/acre. Canada thistle infestations were reduced 10 months after treatment at lower rates of 0.125 lbs./acre. Annual re-treatment would be required.

Christmas tree tolerance to sulfometuron. Douglas fir Christmas trees exhibited adequate tolerance to sulfometuron (Oust) herbicide without apparent injury or visible symptoms when applied to six-year-old trees.

CHRISTMAS TREE TOLERANCE TO OUST HERBICIDE

Rick Fletcher, Benton County Forestry Agent
Bill Braunworth, OSU Extension Horticulture Weed Specialist

Sulfometuron (Oust) was applied in March before budbreak and in June following new growth of six-year-old Douglas fir Christmas trees. Sprays were directed from the sides at 2.5 feet with chemical contact on the lower branches.

RESULTS

Douglas fir tolerated the Oust rates applied in this trial with reported injury being attributed to dead needles which were similar within the control treatment. Bud counts were variable and did not coincide with the rate of Oust application. Reduced bud counts also were similar to standard weed control treatments in Christmas trees. Weed control was evaluated, but due to essentially weed-free plots, evaluations were omitted. In conclusion, Oust appears promising for use in Douglas fir Christmas trees.

FILE NAME:DOUGOUST.EXP INTERIM PRINTED:01/01/80

O R E G O N   S T A T E   U N I V E R S I T Y

EXPERIMENTAL HERBICIDES IN CHRISTMAS TREE CULTURE

PROJECT TYPE (H/I etc): H PROJECT NO.: TRIAL ID.:
CITY/COUNTY:PHILOMATH/BENTON ST:OR ZIP:97370 COUNTRY:USA
RESEARCH BY:FLETCHER/BRAUNWORTH LAST UPDATE: 1/09/81 INITIATED: / /
COOPERATOR :MOYLE,HARWOOD EXPT. STATUS: COMPLETED: / /
REPORTED BY:FLETCHER RELATED FILE:**NONE** SOURCE:

PREVIOUS CROP:DOUGLAS FIR X-MAS TR PLOT / Ft:5 x42 ROW WIDTH/In:76
PREVIOUS TILL:--- SOIL TEXTURE:BELLPINE S.C.L OM%:4.5
CEC:32 %SAND:0 %SILT:0 %CLAY:0 pH:5.2

PREVIOUS TRT.:N/A EXPT. DESIGN:RCBD
FERTILIZER :33-0-0-12 50LBS APPLIED ANNUALY NUM. OF REPS:4
MISC. INFO. : REPORT TYPE:INTERIM

CROP:CHRISTMAS TREES VARIETY:DOUGLAS FIR
PLANTING DATE:03/01/85 DEPTH/In:12 SPACING/In:66 NUM.PLANTS:N/A
HARVEST DATE : / / SEASONAL RAINFALL DURING EXPERIMENT
RESIDUE TAKEN: EARLY: MID: LATE:

PRIMARY RATE UNIT:LBai/A RATE UNIT [B]: RATE UNIT [C]:EXPERIMENT

EXPERIMENT COMMENTS

TREES WERE 2/1'S WHEN PLANTED THUS THEY WERE SIX YEARS OLD AT THE TIME OF THE TREATMENT APPL.

APPLICATION HEIGHT WAS AT 2.5 FT. ONLY THE BOTTOM WHORLS OF THE TREES WERE CONTACTED WITH THE SPRAYS.

RATING SCALE AND DESCRIPTION:

Damage Rating:
- 0 = no injury
- 1 = few dead needles
- 2 = 1 or several dead branches
- 3 = dead tree

TERMNLS = number of buds on the central leader formed during the current season (some may break causing 2nd flush growth)
2ND FL #OF LAT = number of 2nd flush laterals formed on the central leader.
2ND FL #OF BDS = number of buds located on the 2nd flush laterals and 2nd flush growth of the central leader.

APPROVED BY: ____________________ SUBMITTED BY: ____________________

EXPERIMENTAL HERBICIDES IN CHRISTMAS TREE CULTURE

** SET 1 OF 1 **	APPLIC. 1	APPLIC. 2	APPLIC. 3	APPLIC. 4	APPLIC. 5
GEN. APPLIC. TYPE	POST	POSTEMERGE			
APPLICATION DATE	03/17/88	06/20/88	/ /	/ /	/ /
JULIAN DATE/YEAR	J 77/88	J172/88	J 0/00	J 0/00	J 0/00
START HR / END HR	09:00/11:45	12:50/02:30	: / :	: / :	: / :
APPLIC. METHOD	SPRAY	SPRAY			
AIR/SOIL TEMP (F)	16 / 13	28 / 28	0 / 0	0 / 0	0 / 0
% REL. HUMIDITY	00	40	0	0	0
WIND DIR. / VELOC	E / <2	E / <1	/ 0	/ 0	/ 0
SKY / SOIL COND.	CLEAR/MOIST	CLEAR/DRY	/	/	/
SOIL/LEAF MOIST.	DRY / DRY	DRY / DRY	/	/	/
INCORP. EQUIPMENT	N/A	N/A			
INCORP. DEPTH(in)	0	0	0	0	0
SPRAYER TYPE	CO2/BACKPAC	CO2/BACKBAC			
SPRAYER GPA / PSI	25.93 / 20	28.72 / 25	0 / 0	0 / 0	0 / 0
MIX SIZE (Gallon)	.125	.138	0	0	0
NOZZLE TYPE /NUM.	8003/2@15"	8003/2@15"			
RAINFALL/IRRIG.in					
0-24 HR/1-3 DAYS	/	/	/	/	/
4-7 DAYS/2ND WEEK	/	/	/	/	/
3RD WEEK/4TH WEEK	/	/	/	/	/

	SPECIE CODE	SPECIES	APPLIC. 1 DEN./STG.	APPLIC. 2 DEN./STG.	APPLIC. 3 DEN./STG.	APPLIC. 4 DEN./STG.	APPLIC. 5 DEN./STG.
	*******	****** CROP ******	*********	*********	*********	*********	*********
		DOUGLAS FIR	/	/1-3"F	/	/	/
	*******	****** PEST ******	*********	*********	*********	*********	*********
1			/	/	/	/	/
2			/	/	/	/	/
3			/	/	/	/	/
4			/	/	/	/	/
5			/	/	/	/	/
6			/	/	/	/	/
7			/	/	/	/	/
8			/	/	/	/	/
9			/	/	/	/	/

UNIFORM STANDARD TREATMENT					
UNIFORM TRT. RATE AND UNIT					

FILE NAME:DOUGOUST.EXP INTERIM PRINTED:01/01/80

O R E G O N   S T A T E   U N I V E R S I T Y

EXPERIMENTAL HERBICIDES IN CHRISTMAS TREE CULTURE

EXPT. LOCATION:PHILOMATH/BENTON, OR 97370 USA
RESEARCH BY:FLETCHER/BRAUNWORTH INITIATED: / / COMPLETED: / /
PRIMARY RATE UNIT:LBai/A RATE UNIT [B]: RATE UNIT [C]:EXPERIMENT

TRT. NO.	PESTICIDE NAME	FORMU.	LBai/A	APPLI-CATION TYPE	TERMNLS AVE # 9/13/88	2ND FL #OF LAT 9/13/88	2ND FL #OF BDS 9/13/88	DAMAGE 0-3 RAT 9/13/88			
01	OUST	DF 75%	.0508	PREB	22.4	5.1	26.1	0			
02	OUST	DF 75%	.1015	PREB	20.7	3.0	20.0	0			
03	OUST	DF 75%	.1523	PREB	21.0	4.6	22.8	0			
04	OUST	DF 75%	.2032	PREB	19.5	6.5	39.5	.1			
05	AATREX	DF 90%	4.334	PREB	21.2	5.0	30.8	0			
06	VELPAR	FL 2.0	2.167	PREB	18.7	5.5	32.8	.1			
07	OUST	DF 75%	.0508	POSTB	21.7	5.2	24.0	0			
08	OUST	DF 75%	.1015	POSTB	17.4	5.3	28.7	.2			
09	OUST	DF 75%	.1523	POSTB	17.3	4.2	23.4	.1			
10	OUST	DF 75%	.2032	POSTB	20.7	4.9	33.9	0			
11	CHECK				18.7	7.4	45.7	.1			
			LSD(0.05) =		5.1	3.5	16.5	.2			
			STANDARD DEVIATION =		3.5	2.4	11.4	.1			
			COEFF. OF VARIABILITY =		17.7	47.1	38.3	296.6			

CLORPYRALID SELECTIVITY INVOLVING FOUR CHRISTMAS TREE SPECIES

Bill Braunworth, OSU Extension Horticulture Weed Specialist
Rich Regan, Marion County Extension Agent

A series of trials involving selectivity of four major species of Christmas trees to clorpyralid were conducted at one site in Clackamas County and a second site in Benton County involving Grand fir only. Canada thistle infested the sites.

RESULTS

All Christmas tree species tolerated clorpyralid without noticeable injury. Clorpyralid provided moderate control of Canada thistle at 0.25 to 0.50 lbs. ai/acre three weeks after application, whereas all rates reduced the stand when evaluated ten months later. Repeat applications during subsequent years would be required.

Reference numbers for Christmas tree/clorpyralid study.

Christmas tree species	Site	IR-4 PR #	IR-4 Trial #
Noble fir	Clackamas	10414A	87-143
Douglas fir	Clackamas	10415	87-142
Scotch pine	Clackamas	--	87-140
Grand fir	Clackamas	10413A	87-141
Grand fir	Benton	10413A	Lontgrud

Christmas tree tolerance to clorpyralid (crop injury ratings)

Site/Species	Clorpyralid rate (lb. ai/acre) 0	0.125	0.25	0.5
Clackamas				
Noble fir	0	0	0	0
Douglas fir	0	0	0	0
Scotch pine	0	0	0	0
Grand fir	0	0	0	0
Benton				
Grand fir	0	0	0	0

FDRF-5

Pr No: 10413A
Trial: 87-141

IR-4 Performance Table - Efficacy - Tabular Data

Treatment	Rate (lb ai/A)	Rep.	Initial weed density of Canada Thistle Date: 6/4/87	Control of Canada Thistle Date: 6/25/87	Density of Canada thistle Date: 4/5/88	% Reduction of Canada thistle 1/ Date: 4/5/88
CONTROL*	--	1	50	0	60	-20 (incr)
CONTROL	--	2	50	0	20	60
CONTROL	--	3	50	0	45	10
CONTROL	--	4	80	0	35	56
CONTROL	--	mean	58	0	40	27
clopyralid	.125	1	40	50	7	83
clopyralid	.125	2	90	35	60	33
clopyralid	.125	3	40	65	2	95
clopyralid	.125	4	40	40	25	38
clopyralid	.125	mean	53	48	24	62
clopyralid	.250	1	30	75	7	77
clopyralid	.250	2	40	90	10	75
clopyralid	.250	3	40	75	5	88
clopyralid	.250	4	70	60	55	21
clopyralid	.250	mean	45	75	19	65
clopyralid	.50	1	40	85	1	98
clopyralid	.50	2	100	75	25	75
clopyralid	.50	3	50	98	25	50
clopyralid	.50	4	30	90	20	33
clopyralid	.50	mean	55	87	18	64

Note: Define measurement of pest population and efficacy scale (e.g. 0-100; with 0 = no control and 100 = complete control). 0-100; 0 = no control or no stand and 100 = complete control or very dense stand of Canada Thistle.

*weedy check

1/ % Reduction in Canada thistle is computed as follows:

$$\text{\% Canada thistle stand reduction} = 100 * \left[\frac{\text{initial weed density on 6/4/87} - \text{weed density on 4/5/88}}{\text{initial weed density on 6/4/87}} \right]$$

IR-4 Performance Table - Efficacy - Tabular Data

Treatment	Rate (lb ai/A)	Rep.	Initial weed density of Canada Thistle Date: 6/4/87	Control of Canada Thistle Date: 6/25/87	Density of Canada thistle Date: 4/5/88	% Reduction of Canada thistle 1/ Date: 4/5/88
CONTROL*	--	1	70	0	40	43
CONTROL	--	2	60	0	20	66
CONTROL	--	3	60	0	75	-25 (incr)
CONTROL	--	4	90	0	50	44
CONTROL	--	mean	70	0	46	32
clopyralid	.125	1	70	60	10	86
clopyralid	.125	2	90	75	10	89
clopyralid	.125	3	40	50	2	95
clopyralid	.125	4	90	50	30	67
clopyralid	.125	mean	73	59	13	84
clopyralid	.250	1	60	65	10	83
clopyralid	.250	2	60	70	15	75
clopyralid	.250	3	50	60	5	90
clopyralid	.250	4	50	50	20	60
clopyralid	.250	mean	55	61	13	77
clopyralid	.50	1	30	65	5	83
clopyralid	.50	2	30	95	1	97
clopyralid	.50	3	50	90	5	90
clopyralid	.50	4	40	95	5	88
clopyralid	.50	mean	38	86	4	90

Note: Define measurement of pest population and efficacy scale (e.g. 0-100; with 0 = no control and 100 = complete control). 0-100; 0 = no control or no stand and 100 = complete control or very dense stand of Canada Thistle.

*weedy check

1/ % Reduction in Canada thistle is computed as follows:

$$\text{\% Canada thistle stand reduction} = 100^* \left[\frac{\text{initial weed density on 6/4/87} - \text{weed density on 4/5/88}}{\text{initial weed density on 6/4/87}} \right]$$

IR-4 Performance Table - Efficacy - Tabular Data

Treatment	Rate (lb ai/A)	Rep.	Initial weed density of Canada Thistle Date: 6/4/87	Control of Canada Thistle Date: 6/25/87	Density of Canada Thistle Date: 4/5/88	% Reduction of Canada Thistle density 1/ Date: 6/4/87 to 4/5/88
CONTROL*	--	1	60	0	50	16
CONTROL	--	2	70	0	7	90
CONTROL	--	3	60	0	40	33
CONTROL	--	4	40	0	7	82
CONTROL	--	mean	58	0	26	55
clopyralid	.125	1	60	35	10	83
clopyralid	.125	2	60	35	5	92
clopyralid	.125	3	50	75	1	98
clopyralid	.125	4	60	40	1	98
clopyralid	.125	mean	58	46	4	93
clopyralid	.250	1	60	70	5	92
clopyralid	.250	2	60	85	0	100
clopyralid	.250	3	60	40	1	98
clopyralid	.250	4	40	82	5	88
clopyralid	.250	mean	55	69	3	95
clopyralid	.50	1	40	99	1	98
clopyralid	.50	2	60	60	10	83
clopyralid	.50	3	50	95	1	98
clopyralid	.50	4	60	60	1	100
clopyralid	.50	mean	53	79	3	95

Note: Define measurement of pest population and efficacy scale (e.g. 0-100; with 0 = no control and 100 = complete control). 0-100 0 = no control or no stand and 100 = complete control or very dense stand of Canada Thistle.

*Weedy check

1/ % reduction in Canada thistle is computed as follows:

$$\text{\% Canada thistle stand reduction} = 100^{*}\left[\frac{\text{initial weed density on 6/4/87} - \text{weed density on 4/5/88}}{\text{initial density on 6/4/87}}\right]$$

FDRF-5

Pr No: 10414A
Trial: 87-143

IR-4 Performance Table - Efficacy - Tabular Data

Treatment	Rate (lb ai/A)	Rep.	Initial weed density of Canada Thistle Date: 6/4/87	Control of Canada Thistle Date: 6/25/87	Density of Canada thistle Date: 4/5/88	% Reduction of Canada thistle 1/ Date: 6/4/88 to 4/5/88
CONTROL*	--	1	50	0	65	-30 (incr)
CONTROL	--	2	40	0	15	63
CONTROL	--	3	50	0	10	80
CONTROL	--	4	40	0	65	-63 (incr)
CONTROL	--	mean	45	0	39	13
clopyralid	.125	1	50	45	25	50
clopyralid	.125	2	30	50	5	83
clopyralid	.125	3	40	60	15	63
clopyralid	.125	4	40	65	15	63
clopyralid	.125	mean	40	55	15	65
clopyralid	.250	1	30	95	20	33
clopyralid	.250	2	60	60	30	50
clopyralid	.250	3	50	60	10	80
clopyralid	.250	4	50	70	3	94
clopyralid	.250	mean	48	71	16	64
clopyralid	.50	1	30	85	20	33
clopyralid	.50	2	40	72	5	88
clopyralid	.50	3	50	60	5	90
clopyralid	.50	4	20	99	15	25
clopyralid	.50	mean	35	79	11	59

Note: Define measurement of pest population and efficacy scale (e.g. 0-100; with 0 = no control and 100 = complete control). 0-100; 0 = no control or no stand and 100 = complete control or very dense stand of Canada thistle.

*Weedy check

1/ % Reduction in Canada thistle is computed as follows:

$$\%\ \text{Canada thistle stand reduction} = 100 * \left[\frac{\text{initial weed density on 6/4/87} - \text{weed density on 4/5/88}}{\text{initial weed density on 6/4/87}} \right]$$

Vegetable Crops—Summary

Snap bean weed control options. Comparisons of snap bean tolerance and weed control efficacy between several herbicides registered for use in snap beans revealed that pendimethalin (Prowl) caused significant crop injury and yield losses. Bean yields and grades from other herbicides were similar. Herbicide combinations generally provided acceptable weed control compared to individual products applied alone.

Trials involving several new products suggested potential for securing registrations in snap beans. Lactofen (Cobra) and fomesafen (Reflex) exhibited adequate crop safety and broad spectrum broadleaf weed control when applied preemergence and early postemergence, respectively. In contrast, imazethapyr (Pursuit) controlled weeds in the crucifer family while exhibiting excellent crop tolerance. Clomazone (Command) resulted in significant crop injury.

Timing and amount of irrigation for soil-applied herbicides in snap beans. A line-source experiment was established to assess a one-day and two-week delay of activating various soil-applied herbicides with differing amounts of water spaced from a series of irrigation nozzles placed in a line. Radish control and bean yields were enhanced by delaying watering 14 days compared to 1 day after treatment with imazethapyr (Pursuit). Early control of radish was improved slightly with greater amounts of water applied within one day following imazethapyr treatment. Control of black nightshade and pigweed were similar except at the lowest irrigation levels (0 to 0.06 inch).

Wild proso millet control in sweet corn. Superior wild proso control was achieved with combinations of Surpass, atrazine, Tandem and crop oil in 'Jubilee' sweet corn. Other herbicides may enhance control.

Tolerance of super sweet corn cultivars to herbicides suggested adequate safety for the soil-applied herbicides tested. However, the super sweet varieties exhibited greater injury from basal-directed sprays of sethoxydim (Poast) than 'Jubilee'. Apparently, sucker development is greater with the super sweets which increases absorption, thereby decreasing tolerance.

Carrot tolerance to linuron alternatives. Although linuron (Lorox) provided maximum broad spectrum weed control, other candidate herbicides with reasonable prospects included clomazone (Command) and ethiozin (Tycor) applied in combination PPI and PRE, respectively. Excessive crop injury was recorded with lactofen (Cobra), acifluorfen (Tackle) and endothall (Herbicide 273).

Weed Control in Snap Beans

W.S. Braunworth, D. Curtis, D. McGrath, and G. Crabtree
Department of Horticulture
Oregon State University

The program started in 1987 in anticipation of the loss of the registration status of dinoseb for use in snapbean production, was continued in 1988 with the same objectives:

1. Obtain data on the weed control efficacy and crop safety of herbicides currently registered for use in snapbeans.

2. Identify other herbicides not currently registered in snapbeans which may serve as a substitute for dinoseb.

3. Obtain data which could be used toward the registration of suitable herbicides.

4. Develop recommendations of weed control options for growers in the Willamette Valley of Oregon.

Six field trials at three sites were established using procedures similar to those reported in 1987. At two grower-cooperator locations, one trial each evaluated registered and unregistered herbicides. At the Oregon State University Vegetable Research Farm one trial included both registered and unregistered herbicides of potential value for selective weed control in beans and one trial was designed to evaluate interactions between herbicides and precipitation (rainfall or sprinkler irrigation). A complex design was used for this last trial to compare irrigation immediately after the preemergence herbicide application with delayed irrigation, to measure relative to the amount of irrigation applied (line-source technique), and to evaluate the interaction between herbicide and water relative to crop response to herbicides and crop response to competition from weeds.

Experimental procedures, treatment lists, recorded data with analyses, and a brief discussion of the results are included in this report for each experiment or set of experiments.

EXPERIMENTAL PROCEDURES
Ray Kauer Farm

The first two 1988 Alternatives to dinoseb field trials were established on 4-26-88, at the Ray Kauer farm located approximately five miles northeast of Amity OR, near the community of Whiteson. Trial A contained 18 herbicide treatments, all with materials and combinations which are currently registered for use in snap beans in the Willamette valley. This treatment list included an EPTC-Treflan-Premerge treatment. Trial B had 20 treatments, which were made up of non-registerd materials alone, and also in combination with registered materials. An EPTC-Treflan-Premerge treatment was included in this trial also.

The soil series at this site was a Woodburn silty clay loam. The previous crop was sweet corn. Site preparation was accomplished by discing, followed by chisel plowing two times, followed by a dixon harrow and cultipacker. Next, the site was rototilled, 275 lbs./acre of 16-0-36 was incorporated before planting, and 300 lbs./acre of 13-39-0 fertilizer was banded at planting.

Prior to planting, preplant incorporated treatments (ppi) were applied to both tests. This opperation was followed by incorporation, 3-4 inches deep with a rototiller. The site was planted with OSU 91-G snap beans, 30 inches between rows, and 0.75 inches deep. Seeding rate was 10 seeds per foot of row, which amounted to 60 to 70 lbs. of seed per acre. Following planting, both test sites were rolled. Preemergence (pre) treatments were then applied to both tests. Test B was irrigated by overhead sprinklers on 4/27/88 and 0.33 to 0.50 inch of water was applied. Frequent rainfall occured for the next two weeks.

A randomized complete block experimental design was used with four replications. The plot size was 8x30 feet with a 1 foot boader between plots. Treatments were applied with a compressed air propelled, uni-cycle, small plot sprayer. Treatments were broadcast with water at 22.68 gallons per acre at 30psi pressure. The sprayer had five 8003 nozzles.

Evaluations for crop injury and weed control were taken on 5/18/88, 6/1/88, and 6/30/88. The predominate weed species present in these trials were; red root pigweed (Amaranthus retroflexus), pineapple weed (Matricaria matricariodes), dog fennel (Anthemis cotula), annual bluegrass (Poa annua), and escaped cabbage.

All plots in the 2 trials were harvested on 7/20/88. Ten feet of the center row within each plot was harvested and weighed for a yield comparison between treatments. The 4 replications of each treatment were then bulked and graded together.

Vegetable Farm

The third 1988 Alternatives to dinoseb snap bean field experiment was established on 5-25-88 at the Oregon State University Vegetable Research Farm in Corvallis. This trial included all the treatments in the two trial at the Kauer farm, including both the registered and the non-registered treatments.

The soil series at the site was a Chehalis silty clay loam with 3.3% organic matter and a pH of 6.5. The site was planted in a variety of crops during the previous season. One half was fallow, one quarter was planted in sweet corn, and the remaining quarter had been used in a vegetable crop-metalochor herbicide trial.

Site preparation included moldboard plowing, followed by 4 passes with a rotera. The soil was then subjected to 2 passes with a gyrospike and 3 passes with a land roller. Two Lbs./acre dyfonate was incorporated for symphlum control and 450 lbs./acre of 12-29-10-8 fertilizer was banded at the time of planting. Preplant incorporated treatments were applied on 5-25-88 and incorporated with a rotera. OSU 91-G snap beans were planted in 36 inches between rows. Seeding depth was 1.5-2.0 inches and the in-row spacing was approximately 1 seed per 1.5 inches of row. Preemergence treatments were then applied on 5-26-88. Spray application methods were identical to those at the Kauer farm trials. The entire site was then irrigated with 0.5 inches of water. The entire trial was then overseeded with diakon sprouting radish and annual ryegrass. Heavy rainfall occurred for the next week.

Evaluations for crop injury and weed control occured on 6-14-88, and 7-6-88. The predominate weed species present were; diakon radish (<u>Raduphanus sativus</u>), annual ryegrass (<u>Lolium multiflorum</u>) and hairy nightshade (<u>Solanum sarachoides</u>). All plots were harvested on 8-2-88. The harvest methods were identical to those used at the Kauer farm trials.

Roger Hildebrandt Farm

The next two alternatives to dinoseb in snap beans field trials for 1988 were established on 6-17-88 at the Roger Hildebrant farm located on Grand Island about 15 miles north of Salem OR near the community of Unionvale. Trial A at this site was identical to trial A at the Ray Kauer farm. Trial B, included all the treatments of trial B at the Kauer farm, but also included 6 additional treatments made up with differing rates and combinations of Reflex, a herbicide from ICI.

The soil series at the site is a Newburg fine sandy loam. The site had been planted in sweet corn the previous growing season. Site preparation was accomplished by; first discing, followed by rip plowing and then passes with a cultipacker. Fertilizer was banded in at the time of planting.

Preplant incorporated treatments were then applied and incorporated to a depth of 3 inches using a rototiller. The site was then planted to OR 91-G snap beans at the rate of 12.5 seeds per foot of row. Between row spacing was 30 inches. The preemergence treatments were then applied. Both trials received irrigation the following day. Post-emergence sprays were applied to trial B on 7-1-88, 2 weeks later. At this timing, the bean's first trifoliate leaves were just emerging. As with the 3 trials, both A and B were randomized complete block designs, with four replications. Spray applicaton details are identical to the 3 previosly mentioned sites.

Crop injury ratings were taken on both sites 7-1-88 and 8-11-88. Crop injury ratings were also taken on 7-11-88 on plots which had recieved post-emergence treatments as well as on the weedy check treatments. A weed control rating was recorded on 8-11-88. The major weed specie present was redroot pigweed. Test B was harvested on 8-31-88 in a similar fashion to the other three trials. Test A was not harvested.

DISCUSSION

Ray Kauer Farm, Test A and Roger Hidebrandt Farm Test A

In these two trials evaluating registered herbicides for selective weed control in beans, significant crop injury occurred only in plots treated with Prowl. This herbicide was used at the high end of the application rate scale which may have been inappropriate for the soils present at the Kauer site where this injury was observed.

Inadequate weed control with treatments 1-9, again mostly at the Kauer site, was associated with single herbicides or combinations that were ineffective in controlling one or more weed species present. Treatment 10 (Genep/Dual) did not control cabbage, the only cruciferous species evaluated, and treatment 13 (Treflan/Genep/Amiben) was only marginally effective in this respect.

Other herbicide combinations in these trials were not significantly different from the standard treatment (Treatment 16 - Treflan/Genep/Premerge) in either weed control or crop response. Outstanding among these were Treatment 17 (Genep/Dual/Amiben) and Treatment 15 (Treflan/Genep/Dual). Treatment 10 (Genep/Dual) performed quite well in these trials and may be useful in situations where cruciferous weeds are not a problem.

From the bean grade data, it appeared that there were no materials that severely influenced bean maturity. This remained constant through the rest of the 1988 trials.

DISCUSSION

Ray Kauer Farm, Test B and Roger Hildebrandt Farm, Test B

Evaluation of herbicides with potential selectivity but not yet registered in green beans, was carried out at two sites with grower cooperators in 1988. Of the candidate herbicides Cobra showed the most promise in these trials with the herbicide used alone at the application rate of 0.5 lbs ai/A or at half that rate in combination with Dual giving selective weed control comparable to the standard treatment of Treflan/Eptam/Premerge. Of interest for possible combination treatments, Pursuit when used alone was somewhat less effective than Cobra in controlling most weeds present in these trials.

Reflex was included in only one trial and results with this herbicide were inconclusive. This material should be tested further to determine if it may have a place in a weed control program for Oregon growers. Command caused severe symptoms (chlorosis) on beans and probably will not be a suitable herbicide as used in these trials. Symptom development was not always associated with significant reductions in crop yield but the potential for yield reduction must be associated with loss in photosynthetic capacity in the chlorotic bean plants.

DISCUSSION

Oregon State University Vegetable Research Farm

Responses in this trial were generally as expected with the standard treatment of Treflan/Eptam/dinoseb among the best for selective control of the weeds present. For other herbicides, combination treatments usually provided superior weed control when all species were considered.

The use of Command resulted in significant injury (visual evaluation and reduced yield) to the bean crop and it should not be included in future bean trials unless it is found that it can be used safely under other conditions, which can be controlled. This trial also showed that Prowl applied as a preplant incorporated material injured beans.

Of the herbicides registered for use on beans and included in this trial, Dual is known to be relatively ineffective in controlling cruciferous weeds and would appear under these circumstances to be a more reasonable alternative to Treflan/Eptam than to dinoseb. The other herbicide in this category is Amiben and was one of the top performers in this trial.
Most promising unregistered herbicides as potential alternatives to dinoseb were Pursuit and Cobra, especially if considered in combination treatments. Of these two Pursuit was lease likely to cause crop injury but was somewhat less effective in controlling composite weed species.

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAP BEANS, 1988

Ray Kauer Farm Amity OR
Test A

TREATMENT LIST

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE LBai/A	APPLIC. TYPE
01A	TREFLAN	EC 4.00	0.75	PPI
02A	PROWL	EC 4.00	1.50	PPI
03A	GENEP	EC 7.00	3.50	PPI
04A	DUAL	EC 8.00	2.00	PRE
05A	DUAL	EC 8.00	2.00	PPI
06A	DUAL	EC 8.00	3.00	PPI
07A	AMIBEN	DF 75%	2.50	PRE
08A	TREFLAN	EC 4.00	0.75	PPI
08B	DUAL	EC 8.00	2.00	PPI
09A	PROWL	EC 4.00	1.50	PPI
09B	DUAL	EC 8.00	2.00	PPI
10A	GENEP	EC 7.00	3.50	PPI
10B	DUAL	EC 8.00	2.00	PRE
11A	GENEP	EC 7.00	3.50	PPI
11B	AMIBEN	DF 75%	2.50	PRE
12A	DUAL	EC 8.00	2.00	PRE
12B	AMIBEN	DF 75%	2.50	PRE
13A	TREFLAN	EC 4.00	0.75	PPI
13B	GENEP	EC 7.00	3.50	PPI
13C	AMIBEN	DF 75%	2.50	PRE
14A	TREFLAN	EC 4.00	0.75	PPI
14B	GENEP	EC 7.00	3.50	PPI
14C	DUAL	EC 8.00	2.00	PPI
15A	TREFLAN	EC 4.00	0.75	PPI
15B	GENEP	EC 7.00	3.50	PPI
15C	DUAL	EC 8.00	2.00	PRE
16A	TREFLAN	EC 4.00	0.75	PPI
16B	GENEP	EC 7.00	3.50	PPI
16C	PREMERGE	EC 3.00	4.50	PRE
17A	GENEP	EC 7.00	3.50	PPI
17B	DUAL	EC 8.00	2.00	PRE
17C	AMIBEN	DF 75%	2.50	PRE
18A	CHECK			

Same for Roger Hildebrandt Farm, Grand Island OR, Table A

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAPBEANS, 1988

Ray Kauer Farm Amity OR
Test B

TREATMENT LIST

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE LBai/A	APPLIC. TYPE
01A	PURSUIT	SC 2.00	.062	PRE
02A	PURSUIT	SC 2.00	.062	PPI
03A	COBRA	EC 2.00	0.25	PRE
04A	COBRA	EC 2.00	0.50	PRE
05A	COMMAND	EC 4.00	0.50	PPI
06A	COMMAND	EC 4.00	1.00	PPI
07A	TREFLAN	EC 4.00	0.75	PPI
07B	PURSUIT	SC 2.00	0.062	PPI
08A	GENEP	EC 7.00	3.50	PPI
08B	PURSUIT	SC 2.00	0.062	PRE
09A	DUAL	EC 8.00	2.00	PRE
09B	PURSUIT	SC 2.00	.062	PRE
10A	TREFLAN	EC 4.00	0.75	PPI
10B	COBRA	EC 2.00	0.25	PRE
11A	GENEP	EC 7.00	3.50	PPI
11B	COBRA	EC 2.00	0.25	PRE
12A	DUAL	EC 8.00	2.00	PRE
12B	COBRA	EC 2.00	0.25	PRE
13A	TREFLAN	EC 4.00	0.75	PPI
13B	COMMAND	EC 4.00	0.50	PPI
14A	GENEP	EC 7.00	3.50	PPI
14B	COMMAND	EC 4.00	0.50	PPI
15A	DUAL	EC 8.00	2.00	PPI
15B	COMMAND	EC 4.00	0.50	PPI
16A	PURSUIT	SC 2.00	0.062	PPI
16B	COMMAND	EC 4.00	0.50	PPI
17A	COBRA	EC 2.00	0.25	PRE
17B	COMMAND	EC 4.00	0.50	PPI
18A	TREFLAN	EC 4.00	0.75	PPI
18B	GENEP	EC 7.00	3.50	PPI
18C	DUAL	EC 8.00	2.00	PRE
19A	TREFLAN	EC 4.00	0.75	PPI
19B	GENEP	EC 7.00	3.50	PPI
19C	PREMERGE	EC 3.00	4.50	PRE
20A	CHECK			

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAP BEANS, 1988

Roger Hildebrandt Farm Grand Island OR
Test B

TREATMENT LIST

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE LBai/A	APPLIC. TYPE
01A	PURSUIT	SC 2.00	.062	PRE
02A	PURSUIT	SC 2.00	.062	PPI
03A	COBRA	EC 2.00	0.25	PRE
04A	COBRA	EC 2.00	0.50	PRE
05A	COMMAND	EC 4.00	0.50	PPI
06A	COMMAND	EC 4.00	1.00	PPI
07A	TREFLAN	EC 4.00	0.75	PPI
07B	PURSUIT	SC 2.00	.062	PPI
08A	EPTAM	EC 7.00	3.50	PPI
08B	PURSUIT	SC 2.00	0.062	PPI
09A	DUAL	EC 8.00	2.00	PRE
09B	PURSUIT	SC 2.00	.062	PRE
10A	TREFLAN	EC 4.00	0.75	PPI
10B	COBRA	EC 2.00	0.25	PRE
11A	EPTAM	EC 7.00	3.50	PPI
11B	COBRA	EC 2.00	0.25	PRE
12A	DUAL	EC 8.00	2.00	PRE
12B	COBRA	EC 2.00	0.25	PRE
13A	TREFLAN	EC 4.00	0.75	PPI
13B	COMMAND	EC 4.00	0.50	PPI
14A	EPTAM	EC 7.00	3.50	PPI
14B	COMMAND	EC 4.00	0.50	PPI
15A	DUAL	EC 8.00	2.00	PPI
15B	COMMAND	EC 4.00	0.50	PPI
16A	PURSUIT	SC 2.00	0.062	PPI
16B	COMMAND	EC 4.00	0.50	PPI
17A	COBRA	EC 2.00	0.25	PRE
17B	COMMAND	EC 4.00	0.50	PPI

O R E G O N   U N I V E R S I T Y

ALTERNATIVES IN SNAP BEANS, 1988

Roger Hildebrandt Farm Grand Island OR
Test B

TREATMENT LIST (Continued)

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE LBai/A	APPLIC. TYPE
18A	TREFLAN	EC 4.00	0.75	PPI
18B	EPTAM	EC 7.00	3.50	PPI
18C	DUAL	EC 8.00	2.00	PRE
19A	TREFLAN	EC 4.00	0.75	PPI
19B	EPTAM	EC 7.00	3.50	PPI
19C	PREMERGE	EC 3.00	4.50	PRE
20A	SURPASS	EC 6.70	6.14	PPI
21A	REFLEX	SC 2.00	0.375	POST
21B	X-77	EC 1.00	.0567	POST
22A	REFLEX	SC 2.00	0.250	POST
22B	X-77	EC 1.00	.0567	POST
22C	EPTAM	EC 7.00	3.50	PPI
23A	REFLEX	SC 2.00	0.375	POST
23B	X-77	EC 1.00	.0567	POST
23C	EPTAM	EC 7.00	3.50	PPI
24A	REFLEX	SC 2.00	0.500	POST
24B	X-77	EC 1.00	.0567	POST
24C	EPTAM	EC 7.00	3.50	PPI
25A	REFLEX	SC 2.00	0.500	PRE
25B	EPTAM	EC 7.00	3.50	PPI
26A	CHECK			

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAP BEANS, 1988

Ray Kauer Farm Amity OR
Test A

CROP INJURY AND HARVEST AVERAGES

TRT. NO.	NAME	%INJURY BEANS 5-18-88	BEANS 6-1-88	BEANS 6-30-88	YIELD TONS/ACRE 7-20-88
01	TREFLAN	8	0	6	7.4
02	PROWL	16	5	44	4.7
03	GENEP	3	3	4	6.5
04	DUAL	0	0	0	7.2
05	DUAL	0	0	1	6.5
06	DUAL	1	0	0	6.4
07	AMIBEN	1	0	9	6.5
08	TREFLAN DUAL	6	0	10	6.6
09	PROWL DUAL	21	15	50	4.1
10	GENEP DUAL	0	0	0	8.0
11	GENEP AMIBEN	1	3	3	7.2
12	DUAL AMIBEN	1	1	5	6.7
13	TREFLAN GENEP AMIBEN	6	1	6	6.6
14	TREFLAN GENEP DUAL	8	1	13	6.4
15	TREFLAN GENEP DUAL	5	0	6	6.5
16	TREFLAN GENEP PREMERGE	9	3	5	7.0
17	GENEP DUAL AMIBEN	4	0	4	7.1
18	CHECK	1	0	0	2.6
	LSD(0.05) =	5	3	9	1.7
	STD DEVIATION =	4	2	6	1.2
	CV =	74	134	70	18.6

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAP BEANS, 1988

Ray Kauer Farm Amity OR
Test A

WEED CONTROL RATING AVERAGES

		%CONTROL					
		PIGWEED	PINAPLE	DOGFENL	BLUEGRS	PIGWEED	CABBAGE
DATE OF RATING:		6-1-88	6-1-88	6-1-88	6-1-88	6-30-88	6-30-88
TRT. NO.	NAME						
01	TREFLAN	86	76	96	73	92	8
02	PROWL	85	91	90	26	79	8
03	GENEP	96	80	93	90	69	58
04	DUAL	100	99	96	28	94	21
05	DUAL	54	68	73	58	63	3
06	DUAL	85	79	81	63	69	40
07	AMIBEN	96	78	76	36	76	46
08	TREFLAN DUAL	94	75	69	70	90	21
09	PROWL DUAL	96	85	81	19	86	19
10	GENEP DUAL	100	100	98	90	97	49
11	GENEP AMIBEN	100	75	85	98	89	69
12	DUAL AMIBEN	100	69	75	80	100	80
13	TREFLAN GENEP AMIBEN	100	86	96	95	99	61
14	TREFLAN GENEP DUAL	100	81	99	92	93	83
15	TREFLAN GENEP DUAL	100	90	98	95	100	95
16	TREFLAN GENEP PREMERGE	100	96	96	98	99	100
17	GENEP DUAL AMIBEN	100	95	98	96	100	98
18	CHECK	0	0	0	0	0	0
	LSD(0.05) =	19	44	25	34	11	31
	STD DEVIATION =	13	30	18	23	8	22
	CV =	15	38	21	35	9	46

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAP BEANS, 1988

Roger Hildebrandt Farm Grand Island OR
Test A

		% INJURY		% CONTROL
		BEANS	BEANS	PIGWEED
DATE OF RATING:		7-1-88	8-11-88	8-11-88
TRT. NO.	NAME			
01	TREFLAN	0	0	100
02	PROWL	0	0	100
03	EPTAM	0	0	100
04	DUAL	0	0	83
05	DUAL	0	0	85
06	DUAL	0	0	99
07	AMIBEN	0	0	100
08	TREFLAN DUAL	0	0	100
09	PROWL DUAL	0	0	96
10	EPTAM DUAL	0	0	100
11	EPTAM AMIBEN	0	0	100
12	DUAL AMIBEN	0	0	96
13	TREFLAN EPTAM AMIBEN	0	0	100
14	TREFLAN EPTAM DUAL	0	0	100
15	TREFLAN EPTAM DUAL	0	0	100
16	TREFLAN EPTAM PREMERGE	0	0	99
17	EPTAM DUAL AMIBEN	0	0	100
18	CHECK	0	0	0
	LSD(0.05) =	NA	NA	11
	STD DEVIATION =	NA	NA	8
	CV =	NA	NA	8

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAPBEANS, 1988

Ray Kauer Farm Amity OR
Test B

CROP INJURY AND HARVEST AVERAGES

		%INJURY		
	BEANS	**BEANS**	**BEANS**	**YIELD TONS/ACRE**
DATE OF RATING:	5-18-88	6-2-88	6-30-88	7-20-88
TRT. NO. NAME				
01 PURSUIT	1	0	4	5.1
02 PURSUIT	1	0	4	5.3
03 COBRA	0	0	0	4.8
04 COBRA	3	3	3	6.2
05 COMMAND	9	0	7	3.4
06 COMMAND	25	11	21	2.7
07 TREFLAN	8	4	15	4.6
PURSUIT				
08 GENEP	1	0	3	5.9
PURSUIT				
09 DUAL	1	1	4	6.1
PURSUIT				
10 TREFLAN	8	1	9	4.8
COBRA				
11 GENEP	6	1	6	5.5
COBRA				
12 DUAL	4	1	10	5.3
COBRA				
13 TREFLAN	14	6	11	4.2
COMMAND				
14 GENEP	8	3	14	4.3
COMMAND				
15 DUAL	5	0	5	5.6
COMMAND				
16 PURSUIT	11	4	33	3.5
COMMAND				
17 COBRA	3	1	3	5.9
COMMAND				
18 TREFLAN	3	0	1	5.8
GENEP				
DUAL				
19 TREFLAN	6	3	10	5.0
GENEP				
PREMERGE				
20 CHECK	1	0	0	2.7
LSD(0.05) =	5	4	13	2.0
STD DEVIATION =	4	3	9	1.4
CV =	63	143	117	28.4

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAPBEANS, 1988

Ray Kauer Farm Amity OR
Test B

WEED CONTROL RATING AVERAGES

		% CONTROL						
		PIGWEED	PINEAPL	DOGFENL	VERONCA	PIGWEED	COMPOSIT	CABBAGE
DATE OF RATING:		6-2-88	6-2-88	6-2-88	6-2-88	6-30-88	6-30-88	6-30-88
TRT. NO.	NAME							
01	PURSUIT	93	63	63	75	100	61	100
02	PURSUIT	100	51	54	79	100	68	99
03	COBRA	98	85	85	59	86	81	94
04	COBRA	100	100	99	95	98	98	100
05	COMMAND	35	75	70	100	35	50	39
06	COMMAND	51	73	73	100	60	66	40
07	TREFLAN PURSUIT	100	69	73	91	100	76	100
08	GENEP PURSUIT	100	71	75	100	100	76	100
09	DUAL PURSUIT	100	90	93	100	100	94	100
10	TREFLAN COBRA	100	95	95	100	100	86	83
11	GENEP COBRA	100	95	95	100	99	91	99
12	DUAL COBRA	100	95	96	100	100	89	96
13	TREFLAN COMMAND	89	70	73	100	88	45	15
14	GENEP COMMAND	94	84	84	100	73	76	68
15	DUAL COMMAND	69	85	85	100	76	81	74
16	PURSUIT COMMAND	99	84	86	100	100	88	100
17	COBRA COMMAND	100	95	95	100	96	84	94
18	TREFLAN GENEP DUAL	100	81	86	100	100	68	63
19	TREFLAN GENEP PREMERGE	100	99	100	100	99	96	100
20	CHECK	0	0	0	0	0	0	0
	LSD(0.05) =	17	18	19	18	13	21	18
	STD DEV =	12	13	13	12	9	14	13
	CV =	14	16	17	14	10	20	16

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAP BEANS, 1988

Roger Hildebrandt Farm Grand Island OR
Test B

CROP INJURY, WEED CONTROL, AND HARVEST AVERAGES

		%INJURY			%CONTROL	YIELD
		BEANS	BEANS	BEANS	PIGWEED	TONS/ACRE
DATE OF RATING:		7-01-88	7-11-88	8-11-88	8-11-88	8-31-88
TRT. NO.	NAME					
01	PURSUIT	0	NA	0	59	3.907
02	PURSUIT	1	NA	0	70	6.970
03	COBRA	0	NA	0	97	5.078
04	COBRA	0	NA	0	100	4.492
05	COMMAND	9	NA	2	51	3.717
06	COMMAND	30	NA	11	74	4.425
07	TREFLAN PURSUIT	0	NA	0	100	4.846
08	EPTAM PURSUIT	0	NA	0	98	4.383
09	DUAL PURSUIT	0	NA	0	78	3.635
10	TREFLAN COBRA	0	NA	0	100	3.825
11	EPTAM COBRA	1	NA	0	100	4.710
12	DUAL COBRA	0	NA	0	100	6.153
13	TREFLAN COMMAND	8	NA	0	100	4.370
14	EPTAM COMMAND	9	NA	0	99	4.806
15	DUAL COMMAND	8	NA	1	94	5.663

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAP BEANS, 1988

Roger Hildebrant Farm Grand Island OR
Test B

CROP INJURY, WEED CONTROL, AND HARVEST
AVERAGES
(CONTINUED)

TRT. NO.	NAME	%INJURY BEANS 7-01-88	%INJURY BEANS 7-11-88	%INJURY BEANS 8-11-88	%CONTROL PIGWEED 8-11-88	YIELD TONS/ACRE 8-31-88
16	PURSUIT COMMAND	8	NA	1	81	4.955
17	COBRA COMMAND	6	NA	0	99	5.840
18	TREFLAN EPTAM DUAL	0	0	1	100	4.642
19	TREFLAN EPTAM PREMERGE	0	0	0	100	6.221
20	SURPASS	5	NA	3	94	6.071
21	REFLEX X-77	0	5	3	100	3.689
22	REFLEX X-77 EPTAM	0	8	4	100	6.262
23	REFLEX X-77 EPTAM	0	9	4	100	4.724
24	REFLEX X-77 EPTAM	1	10	0	100	4.615
25	REFLEX EPTAM	0	NA	1	99	5.405
26	CHECK	0	NA	NA	0	3.403
	LSD(0.05) =	4	2	5	16	1.988
	STD DEVIATION =	3	1	4	11	1.377
	CV =	81	111	316	12	28.237

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAPBEANS, 1988

Oregon State University Vegetable Research Farm

TREATMENT LIST

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE LBai/A	APPLIC. TYPE
01A	TREFLAN	EC 4.00	0.75	PPI
02A	TREFLAN	EC 4.00	0.75	PPI
02B	EPTAM	EC 7.00	3.50	PPI
03A	TREFLAN	EC 4.00	0.75	PPI
03B	DUAL	EC 8.00	2.00	PPI
04A	TREFLAN	EC 4.00	0.75	PPI
04B	PURSUIT	SC 2.00	0.032	PPI
05A	TREFLAN	EC 4.00	0.75	PPI
05B	PURSUIT	SC 2.00	0.047	PPI
06A	TREFLAN	EC 4.00	0.75	PPI
06B	PURSUIT	SC 2.00	0.062	PPI
07A	TREFLAN	EC 4.00	0.75	PPI
07B	COBRA	EC 2.00	0.25	PRE
08A	TREFLAN	EC 4.00	0.75	PPI
08B	COMMAND	EC 4.00	0.50	PPI
09A	AMIBEN	DF 75%	2.50	PRE
10A	PROWL	EC 4.00	1.50	PPI
11A	PROWL	EC 4.00	1.50	PRE
12A	PROWL	EC 4.00	1.50	PPI
12B	EPTAM	EC 7.00	3.50	PPI
13A	PROWL	EC 4.00	1.50	PPI
13B	DUAL	EC 8.00	2.00	PPI
14A	PROWL	EC 4.00	1.50	PPI
14B	COBRA	EC 2.00	0.25	PRE
15A	PROWL	EC 4.00	1.50	PPI
15B	COMMAND	EC 4.00	0.50	PPI
16A	EPTAM	EC 7.00	3.50	PPI
17A	EPTAM	EC 7.00	3.50	PPI
17B	DUAL	EC 8.00	2.00	PPI
18A	EPTAM	EC 7.00	3.50	PPI
18B	AMIBEN	DF 75%	2.50	PRE
19A	EPTAM	EC 7.00	3.50	PPI
19B	PURSUIT	SC 2.00	0.062	PPI
20A	EPTAM	EC 7.00	3.50	PPI
20B	COBRA	EC 2.00	0.25	PRE
21A	DUAL	EC 8.00	2.00	PRE
22A	DUAL	EC 8.00	2.00	PPI
23A	DUAL	EC 8.00	3.00	PPI
24A	DUAL	EC 8.00	2.00	PRE
24B	AMIBEN	DF 75%	2.50	PRE
25A	DUAL	EC 8.00	2.00	PRE
25B	PURSUIT	SC 2.00	0.047	PRE
26A	DUAL	EC 8.00	2.00	PRE
26B	PURSUIT	SC 2.00	0.062	PRE

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAPBEANS, 1988

Oregon State University Vegetable Reseach Farm

TREATMENT LIST (CONTINUED)

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE LBai/A	APPLIC. TYPE
27A	DUAL	EC 8.00	2.00	PRE
27B	COBRA	EC 2.00	0.25	PRE
28A	DUAL	EC 8.00	2.00	PPI
28B	COMMAND	EC 4.00	0.50	PPI
29A	PURSUIT	SC 2.00	0.047	PRE
30A	PURSUIT	SC 2.00	0.047	PPI
31A	PURSUIT	SC 2.00	0.062	PRE
32A	PURSUIT	SC 2.00	0.062	PPI
33A	PURSUIT	SC 2.00	0.125	PPI
34A	PURSUIT	SC 2.00	0.062	PPI
34B	TREFLAN	EC 4.00	0.75	PPI
34C	EPTAM	EC 7.00	3.50	PPI
35A	PURSUIT	SC 2.00	0.062	PPI
35B	COBRA	EC 2.00	0.25	PRE
35C	TREFLAN	EC 4.00	0.75	PPI
36A	COBRA	EC 2.00	0.25	PRE
37A	COBRA	EC 2.00	0.50	PRE
38A	COBRA	EC 2.00	0.25	PRE
38B	COMMAND	EC 4.00	0.50	PPI
39A	COBRA	EC 2.00	0.25	PRE
39B	TREFLAN	EC 4.00	0.75	PPI
39C	EPTAM	EC 7.00	3.50	PPI
40A	COMMAND	EC 4.00	0.50	PPI
41A	COMMAND	EC 4.00	1.00	PPI
42A	COMMAND	EC 4.00	0.50	PPI
42B	TREFLAN	EC 4.00	0.75	PPI
42C	EPTAM	EC 7.00	3.50	PPI
43A	SURPASS	EC 6.70	6.14	PPI
44A	TREFLAN	EC 4.00	0.75	PPI
44B	EPTAM	EC 7.00	3.50	PPI
44C	DUAL	EC 8.00	2.00	PPI
45A	TREFLAN	EC 4.00	0.75	PPI
45B	EPTAM	EC 7.00	3.50	PPI
45C	DUAL	EC 8.00	2.00	PRE
46A	TREFLAN	EC 4.00	0.75	PPI
46B	EPTAM	EC 7.00	3.50	PPI
46C	AMIBEN	DF 75%	2.50	PRE
47A	EPTAM	EC 7.00	3.50	PPI
47B	DUAL	EC 8.00	2.00	PRE
47C	AMIBEN	DF 75%	2.50	PRE
48A	TREFLAN	EC 4.00	0.75	PPI
48B	EPTAM	EC 7.00	3.50	PPI
48C	PREMERGE	EC 3.00	4.50	PRE
49A	HNDWDCHK			POST
50A	CHECK			

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAP BEANS, 1988

Oregon State University Vegetable Research Farm

CROP INJURY, WEED CONTROL AND HARVEST AVERAGES

	%INJURY		%CONTROL				YIELD
	BEANS	BEANS	RADISH	NITESHD	RADISH	ANN RYE	TONS/ACRE
DATE OF RATING:	6-14-88	7-6-88	6-14-88	7-6-88	7-6-88	7-6-88	8-2-88
TRT. NO. NAME							
01 TREFLAN	4	5	0	14	20	86	2.4
02 TREFLAN EPTAM	3	3	18	49	18	97	2.7
03 TREFLAN DUAL	6	8	29	40	49	98	2.5
04 TREFLAN PURSUIT	5	10	33	51	46	79	2.9
05 TREFLAN PURSUIT	6	11	50	86	79	84	2.5
06 TREFLAN PURSUIT	3	5	31	70	78	94	4.0
07 TREFLAN COBRA	15	19	93	98	99	94	3.2
08 TREFLAN COMMAND	34	28	20	86	43	89	3.0
09 AMIBEN	5	5	88	97	92	88	3.7
10 PROWL	19	40	5	56	41	91	1.6
11 PROWL	5	4	30	50	48	100	4.6
12 PROWL EPTAM	15	15	0	71	13	94	2.5
13 PROWL DUAL	9	18	19	59	23	100	2.8
14 PROWL COBRA	11	13	85	99	95	87	3.5
15 PROWL COMMAND	28	29	30	82	46	95	2.9
16 EPTAM	0	1	0	58	29	85	2.3
17 EPTAM DUAL	1	0	15	78	24	100	3.8
18 EPTAM AMIBEN	3	1	83	99	84	100	4.0
19 EPTAM PURSUIT	3	1	43	95	91	94	3.4
20 EPTAM COBRA	5	0	77	95	86	91	4.3
21 DUAL	0	4	4	98	38	100	4.7
22 DUAL	4	6	13	75	33	100	3.0
23 DUAL	0	1	15	58	28	100	3.6
24 DUAL AMIBEN	6	11	91	99	97	100	3.4

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAP BEANS, 1988

Oregon State University Vegetable Research Farm

CROP INJURY, WEED CONTROL AND HARVEST AVERAGES
(CONTINUED)

		%INJURY		%CONTROL				YIELD
		BEANS	BEANS	RADISH	NITESHD	RADISH	ANN RYE	TONS/ACRE
DATE OF RATING:		6-14-88	7-6-88	6-14-88	7-6-88	7-6-88	7-6-88	8-2-88
TRT. NO.	NAME							
25	DUAL PURSUIT	3	1	46	99	97	100	4.4
26	DUAL PURSUIT	1	0	61	97	92	100	4.9
27	DUAL COBRA	11	4	83	100	89	100	4.2
28	DUAL COMMAND	29	23	23	89	45	99	2.6
29	PURSUIT	0	0	30	86	88	31	4.1
30	PURSUIT	0	4	23	59	50	25	3.7
32	PURSUIT	0	0	41	57	86	54	4.5
33	PURSUIT	1	14	43	88	98	79	4.0
34	PURSUIT TREFLAN EPTAM	4	8	53	90	77	100	3.5
35	PURSUIT COBRA TREFLAN	18	11	98	97	99	95	3.6
36	COBRA	1	5	80	96	96	34	4.7
37	COBRA	8	9	76	84	81	31	3.9
38	COBRA COMMAND	29	23	83	100	95	83	3.9
39	COBRA TREFLAN EPTAM	10	13	91	100	96	98	4.5
40	COMMAND	29	28	16	84	43	79	2.3
41	COMMAND	43	46	31	90	55	96	2.0
42	COMMAND TREFLAN EPTAM	19	9	20	94	44	99	3.0
43	SURPASS	4	4	15	71	30	99	3.6
44	TREFLAN EPTAM DUAL	4	3	5	74	35	99	3.3
45	TREFLAN EPTAM DUAL	4	7	14	97	20	100	3.5
46	TREFLAN EPTAM AMIBEN	13	21	88	99	95	100	3.9

O R E G O N   S T A T E   U N I V E R S I T Y

ALTERNATIVES FOR DINOSEB IN SNAP BEANS, 1988

Oregon State University Vegetable Research Farm

CROP INJURY, WEED CONTROL AND HARVEST AVERAGES
(CONTINUED)

		%INJURY		%CONTROL				YIELD
		BEANS	BEANS	RADISH	NITESHD	RADISH	ANN RYE	TONS/ACRE
DATE OF RATING:		6-14-88	7-6-88	6-14-88	7-6-88	7-6-88	7-6-88	8-2-88
TRT. NO.	NAME							
47	EPTAM DUAL AMIBEN	8	13	92	100	96	100	3.7
48	TREFLAN EPTAM PREMERGE	6	10	83	100	80	100	4.1
49	HNDWDCHK	0	0	0	98	100	99	4.7
50	CHECK	1	3	0	0	0	0	1.8
	LSD(0.05) =	9	16	24	25	22	12	1.4
	STD DEVIATION =	6	11	17	17	15	8	1.0
	CV =	70	112	40	22	23	9	28.5

Effects of Timing and Amount of Irrigation on Herbicide Activity in Snapbeans, 1988

W. S. Braunworth, Jr., D. Curtis, and G. Crabtree

Objectives

The objectives of this study were to:

1. determine the effect of irrigation timing on the weed control efficacy of snapbean herbicide programs,
2. determine the effect of water application amounts on the efficacy of these herbicides,
3. identify effective herbicides and application methods for snapbean weed control.

Materials and Methods

Cultural

Snapbeans, var. Oregon 91G, were planted on 8 July 1988 at 91 cm row spacing in a mixed, mesic Cumulic Ultic Hapeoxeroll soil (Chehalis silty clay loam) at the Oregon State University Vegetable Research Farm, Corvallis, Oregon. The facility is at 44.6 degrees N latitude, 123.3 degrees W longitude and 69 m in elevation. Planting density was about 1.5 seeds per inch of row and 450 pounds per acre of 12-29-10-8 fertilizer was band applied at planting. Plots were irrigated before planting in order to assure a high soil water content. Plot size of herbicide applications was 9 by 50 feet, replicated 4 times in a randomized complete block or something like it, for 2 water application dates.

The treatment list is shown in Table 3. Included are a hand weeded check, a weedy check, and 10 herbicide treatments. Herbicides were applied to the soil surface and then incorporated into the top 3 inches of the soil prior to planting (pre-plant incorporated PPI), applied to the soil surface after planting (preemergence PRE) or applied to the soil soil surface and then scratched in with a harrow (PRES). All plots were overseeded with annual ryegrass and diakon radish. Seeds were scratched into the upper inch of soil with a harrow. Each herbicide treatment plot was long enough to include the 5 levels of water applied and was repeated for two irrigation timings.

Irrigation

An irrigation line with 17 sprinkler heads spaced by 20 feet was laid through the plots to establish a gradient of water applied across the 50 foot length of the plots. Every 9 feet along (parallel) the irrigation line the herbicide treatment changed. Two replications (24 herbicide plots) were on each side of the irrigation line. This irrigation line was used to apply a gradient of water (9 July 1988) from 0 to 1.0 inch 1 day after planting and application of herbicides (1 day line). The water application within each herbicide plot was partitioned into 5 levels as follows: 0 to .06, .06 to .2, .2 to .5, .5 to .8, and .8 to 1.0 inch. These water application levels were regulated by the time the sprinkler was operating and by the distance from the irrigation line and were not randomized as discussed by Hanks et al. (1976). The distance out from the irrigation line of these water application plots varied on each side of the line. This was to insure the water applied for each of the the five water levels was equal to the corresponding water level on the opposite side of the irrigation line. The rows of beans were parallel (East - West) to the irrigation line.

A second irrigation line was laid as described above. This line was used to apply the gradient of water 14 days (23 July 1988) after planting and herbicide application (14 day line).

Uniform irrigation of the 1 and 14 day lines began on 4 August 1988 and was the second irrigation of the season for each line. There was no rainfall during this experiment.

Evaluations

For the 1 day line, weed control ratings of diakon radish were on 26 July, 3 and 19 August. Ratings of annual ryegrass, pigweed, and hairy nightshade were made on 26 July 1988. For the 14 day line radish was evaluated on 29 July, 4 and 25 August 1988. Other species were not rated because of inadequate populations. Weed control was evaluated visually considering weed size and number in comparison to the check plot of the respective water level of the 1 day line. The check plots of the 14 day line were also evaluated in comparison to the 1 day line checks for each water level, respectively. Bean yields were determined by harvest of 8 foot of row from the center of each herbicide treatment at the five water levels on the 1 and 14 day lines. In addition, the four reps of each treatment were combined and graded by size.

Results and Discussion

Table 1 shows the effect of irrigation timing on the activity of Pursuit (average of 3 treatments which included Pursuit) for control of diakon radish. At the highest water level (0.8 to 1.0 inch) applied 1 day after herbicide application, control was 88% on 26 July and 43% on 19 August. In contrast, the control in the Pursuit treatments irrigated 14 days after herbicide application was 91% and 48% control on 29 July and 25 August, respectively. This higher level of control does not indicate increased herbicide activity since the control plots of the 14 day line had 92% and 13% control on 29 July and 19 August, respectively. These data show increased herbicide activity with water applications 1 day after planting and also illustrate increased weed pressure because of the favorable germination conditions resulting from the earlier irrigation. Pursuit was better used for radish control by water applications 2 weeks after application which reduced the number of seeds germinated. The long residual of Pursuit favors this strategy. However, large populations of seeds located slightly deeper in the soil where there may be adequate moisture for germination, may germinate at the same time as the beans and may require herbicide activation with water sooner than 2 weeks. Other herbicides or other weed species may not respond in a similar fashion.

During the first evaluation time (26 July and 29 July for the 1 and 14 day lines, respectively) no significant differences were noted in control of radish among the water application levels. However, there was a trend in the 1 day line where reduced control, 64%, was associated with the 0 to 0.06 inch water application level, and greater control, 88% resulted in the water levels in the 14 day line on 29 July was a result of inadequate water for germination.

Later in the season, 19 August, radish control was variable among the water levels in the 1 day line for an unknown reason. In the 14 day line increased herbicide activity was associated with the .8 to 1.0 inch water applied level since the radish control (48%) minus the control of the check plot (13%) was 35% while at the 0 to 0.06 inch water applied level radish control was 79%, but this was only 18% greater than the corresponding control plot.

Yields from the Pursuit treatments at the lowest water applied levels of the 1 day and 14 day lines, 3.4 and 7.3 t/a, respectively, were greater from the 14 day line. The higher yields were associated with greater radish control, which occurred with the most limited water applications. The overall superior weed control and yield in the 0 to .06 inch water level of the 14 day line indicated the benefit from poor weed germination conditions resulting from no water applications from planting, 8 July, to 4 August, when a uniform water application was made to the entire experiment.

The advantage of limited germination of radish from delays in water application was shown by the yield of the check plot of the 1 day line ranging from 0.8 t/a at the .8 to 1.0 inch water level to 2.5 t/a at the lowest water applied level, compared with the yields in the check plots of the 14 day line ranging from 2.5 t/a at the highest water applied level to 5.2 t/a at the least water applied level. The average yield of the check plots of all water levels in the 14 day line was 4.8 t/a which was 80% of the 6 t/a average yield of the pursuit treatments

Pursuit applied pre-plant-incorporated resulted in better radish control than when applied pre-emergence in the 1 day and 14 day lines (Table 2). Poor seasonal control of radish resulted with the Treflan + EPTC + Dual treatment in the 1 day line while control was also poor late in the season of the 14 day line.

Yields of the Pursuit pre-plant-incorporated were higher than other treatments due to improved radish control. However, since control was not complete these yields ranged from 21% to 66% of the respective hand weeded controls. These yield reductions are not acceptable for commercial production thus improved radish controls need to be developed.

Control of hairy nightshade was above 90% for all treatments except Cobra and treflan + EPTC + Dual at the .8 to 1.0 inch water applied level of the 1 day line (Table 3). At the lowest water application level (0 to .06 inch) all treatments with pursuit resulted in poor nightshade control. As water levels were reduced Dual applied pre-plant-incorporated controlled nightshade better than Dual applied pre-emergence or scratched into the soil surface. Only at the highest water applied level did the Dual applied pre-emergence or scratched in result in at least 90% control of hairy nightshade. If Dual is not activated with water, control of hairy nightshade was less than 90%.

Pigweed control in the 1 day line was above 93% in all treatments and water levels greater than .06 inch, except Cobra and Dual scratched in (Table 3). At the 0 to .06 inch water level pigweed control was poor (75% to 83%) with Pursuit applied either pre-emergence or pre-plant-incorporated and Dual applied pre-plant-incorporated. Although pigweed control was less sensitive than hairy nightshade to water application levels the data suggest water applications of .06 to 1.0 inch will improve control.

Annual ryegrass control in the 1 day line was generally above 95% for all water applied levels for the following treatments: Dual applied pre-plant-incorporated, pre-emergence, and scratched in, Treflan + EPTC + Dual, Pursuit + Dual, and Cobra + EPTC (data not shown). The other treatments, not including a grass herbicide did not adequately control annual ryegrass.

Conclusions

Pursuit was better used for radish control by a water application 2 weeks after application because there was no rainfall and the delay in irrigation reduced the number of radish seeds germinated.

There was a trend with water applied 1 day after herbicide application, where reduced control was associated with the 0 to 0.06 inch water application level, and greater control resulted with the 0.80 to 1.00 inch water applied level.

The higher yields were associated with greater radish control, which occurred with the most limited water applications. The overall superior weed control and yield in the 0 to .06 inch water level of the 14 day line indicated the benefit from poor weed germination conditions resulting from no water applications from planting, 8 July, to 4 August.

Pursuit applied pre-plant-incorporated resulted in better radish control than when applied pre-emergence. If Dual is not activated with water, control of hairy nightshade was less than 90%.

Although pigweed control was less sensitive than hairy nightshade to water application levels the data suggest water applications of .06 to 1.0 inch will improve control.

Literature Cited

Hanks, R.J., J Keller, V. P. Rasmussen, and G. D. Wilson. 1976. Line source sprinkler for continuous variable irrigation crop production studies. Soil Sci. Soc. Amer. Proc. 40:426-429.

Table 1. Radish control and yield in response to irrigation timing and amount applied for treatments including pursuit and the untreated check, 1988.

	1 Day Post Application						14 Days Post Application					
	Pursuit[1/]			Check			Pursuit			Check		
Water applied	% Control			% Control			% Control			% Control		
	7/26	8/19	Yld.	7/26	8/19	Yld.	7/29	8/25	Yld.	7/29	8/19	Yld.
(inch)			(T/A)			(T/A)			(T/A)			(T/A)
.80-1.00	88	43	.8	0	0	.8	91	48	3.2	92	13	2.5
.50- .80	73	25	.8	0	0	.8	93	45	6.7	94	30	5.1
.20- .50	71	18	1.2	0	0	.8	95	62	6.5	99	49	5.2
.06- .20	69	34	1.2	0	0	.8	97	80	6.4	97	61	5.9
0.0 - .06	64	52	3.4	0	0	2.5	97	79	7.3	97	61	5.2
Average of all water applied levels	73	34	1.5	0	0	1.2	94	63	6.0	96	43	4.8

[1/] Pursuit treatment includes the average of the following treatments:

Pursuit .062 lb ai/A ppi and pre, and Pursuit .062 lb ai/a + Dual 2.00 lb ai/A

Table 2. Percent radish control and yield for 4 herbicide treatments at 2 irrigation timings averaging the 5 water applied levels, 1988.

Treatment	Application Rate	Application Method	Radish control: 1 Day post 7/26	1 Day post 8/03	1 Day post 8/19	14 Day post 7/29	14 Day post 8/04	14 Day post 8/25	Yield: 2 Day post	Yield: 14 Day post
	(lb ai/a)		(%)						(t/a)	
Pursuit	.062	PRE	70	48	27	93	76	54	1.3	5.4
Pursuit	.062	PPI	78	77	47	95	87	75	1.8	6.4
Pursuit +Dual	.062+ 2.000	PRE PRE	71	56	29	95	78	60	1.3	6.3
Check	---		0	0	0	96	76	43	1.2	4.8
Hand weeded	---		100	75	100	95	83	98	8.4	9.7
Treflan + EPTC + Dual	.75 + 3.50 + 2.00	PPI PPI	51	30	14	95	78	51	1.5	5.2
LSD (.05)				11			6	8		

Table 3. Percent nightshade control on 26 July in response to 5 levels of water applied 1 day after application of treatments, 1988.

Treatment	Application Rate	Application Method	Water Applied (in) .80-1.0	.50-.80	.20-.50	.06-.20	0-.06
	(lb ai/a)		(%)				
Clean Ck			100	100	100	100	100
Cobra	0.25	PRE	60	56	70	94	75
Pursuit	0.062	PRE	91	82	88	91	62
Pursuit	0.062	PPI	97	96	87	84	69
Dual	2.00	PRE	91	88	66	72	62
Dual	2.00	PPI	99	98	98	96	86
Dual	2.00	PRES	90	82	87	77	64
Treflan EPTAM Dual	0.75 3.50 2.00	PPI PPI PPI	84	100	100	97	93
Pursuit Dual	0.062 2.00	PRE PRE	94	90	89	92	75
Cobra EPTAM	0.25 3.50	PRE PPI	99	99	99	99	90
Cobra Dual	0.25 2.00	PRE PRE	92	90	91	84	80
Check			0	0	0	0	0

Table 4. Percent pigweed control on 26 July in response to 5 levels of water applied 1 day after application of treatments, 1988.

Treatment	Application Rate (lb ai/a)	Application Method	Water Applied (in) .80-1.0	.50-.80	.20-.50	.06-.20	0-.06
			(%)				
Clean Ck			100	100	100	100	100
Cobra	0.25	PRE	49	43	73	100	95
Pursuit	0.062	PRE	100	100	97	99	75
Pursuit	0.062	PPI	100	100	99	100	82
Dual	2.00	PRE	99	100	99	100	97
Dual	2.00	PPI	100	100	100	100	83
Dual	2.00	PRES	67	87	94	100	80
Treflan EPTAM Dual	0.75 3.50 2.00	PPI PPI PPI	100	100	100	100	100
Pursuit Dual	0.062 2.00	PRE PRE	100	100	99	100	93
Cobra EPTAM	0.25 3.50	PRE PPI	100	100	100	100	95
Cobra Dual	0.25 2.00	PRE PRE	100	98	94	100	97
Check			0	0	0	0	0

WILD PROSO MILLET CONTROL IN SWEET CORN

W. S. Braunworth, D. Curtis, D. McGrath, and G. Crabtree
Department of Horticulture
Oregon State University

Research initiated in 1984 to find control measures for this serious weed problem were continued in 1988 with the objective of refining application timings and rates of the herbicides found most effective in the previous three years of study with this weed problem. Two trials were established with grower-cooperators in wild proso millet (Panicum miliaceum) infested fields on Grand Island and near Stayton, Oregon. Two trials at the Oregon State University Vegetable Research Farm were used to evaluate herbicide effects on sweet corn cultivars in the absence of wild proso millet. Experimental procedures, treatment lists, the recorded data with analyses, and a brief discussion of the results are included in this report for each experiment or set of experiments.

EXPERIMENTAL METHODS

Richard Spada Farm - Grand Island

The first experiment was established on 5-27-88, at the Richard Spada farm on Grand Island, located approximately 15 miles north of Salem OR, in Yamhill Co. The soil series at the site is a Chehalis silty clay loam, with a pH of approximately 6.6. The site was planted to sweet corn the previous season. Jubilee sweet corn was planted 1.0 inch deep and at a 9 inch in-row spacing. Row width was 30 inches. Sixty-five pounds of N, 150 pounds of P, 90 pounds of K, and 40 pounds of S were banded at planting. Additional N was side dressed later.

A randomized complete block design was utilized with 4 replications. Treatments were applied using a uni-cycle small plot sprayer, which used compressed air as the spray propellant. Preplant incorporated (ppi) treatments were applied and then incorporated to a depth of 2 inches with a rototiller. Preemergence (pre) treatments were then applied. The first post emergence spray was applied on 6-13-88 when the millet in the check treatments was in the 2-3 leaf stage, 1-1.5 inches tall and at a density of 15 plants per square foot. The second postemergence spray was applied 1 week later, on 6-20-88. The millet in the treated plots, on average, was in the 1-3 leafstage, in clumps at 8 plants per square foot. The last postemergence spray was applied on 6-24-88. Millet in the plots treated, on average, were in the 1-6 leaf stage, predominately in the rows and in clumps between rows, at 5 plants per square foot. The corn was in the 2-3 leaf stage on 6-9-88.

Crop injury and weed control ratings were taken on 6-13-88, 7-1-88 and 8-12-88. A crop vigor rating was taken on 8-12-88 in place of a crop injury rating. This rating expressed corn vigor as a percentage increase over the check treatments. The crop was harvested on 9-9-88. 20 feet of row was harvested to quantify yield reductions and to judge treatment effects on corn quality. Corn quality (tip-fill, ear length, and deformities) was evaluated on a 1-5 scale, with a 5 being the highest quality.

Ray Bartosz Farm

The second trial was established on 6-16-88, at the Ray Bartosz farm near Stayton OR. The soil type at the Bartosz site is a Clackamas gravely loam with a pH of about 5.6 and higher organic matter than the Spada site. The site was planted in sweet corn the previous year. Site preparation included plowing, sub-soiling and vibra-shanking followed by a cultipacker. The area was then harrowed.

The treatment list is the same as for the Richard Spada farm. Preplant incorporated treatments were applied and incorporated to a depth of 3 inches. Jubilee sweet corn was then planted 1.5 inches deep in 36 inch rows at a rate of 10 pounds per acre. Preemergence treatments were then applied. Postemergence treatments were applied on 6-24-88. The millet in the check treatments was at the 2-3 leaf stage, with a density of 8 plants per square foot. 40% of the corn had emerged. The second postemergence spray was applied on 7-1-88. The millet in the plots sprayed was at the 3-4 leaf stage and was predominately found only in the rows. The last postemergence spray was applied on 7-7-88. At this time, the millet in the plots treated was at the 2-6 leaf stage, predominately in clumps in and between rows. Some clumps had as many as 20 plants. Not all the corn had emerged at this time. Spray methods were the same as at the Spada site.

Weed control was evaluated on 6-24-88, 7-18-88, 8-12-88 and 8-23-88. Because of erratic stand emergence, crop injury was not rated until 8-23-88, at which time a crop vigor rating was also made. The corn was harvested on 10-4-88 in an identical fashion to the Spada harvest.

Oregon State Vegetable Research Farm

Two trials were established at the Oregon State University farm on 6-27-88. A split block design was used for both trials with 4 treatments and four replications, applied to three sweet corn varieties; Super Sweet Jubilee (Rogers 3376), Crisp-n-Sweet 710 (C&S 710) and Jubilee. To prevent crossing between the super sweet varieties and the Jubilee, the two super sweet varities were planted alongside each other and were separated from the Jubilee by a 30 ft wide strip of fallow ground in addition to 2 guard rows planted on the outsides of each varitey block.

The soil series at the site is a Chehalis silty clay loam. Preplant incorporated herbicides were applied the day of establishment on test A. Test B received <u>Surpass</u>(vernolate) and <u>Aatrex</u>(atrazine) preplant incorporated on 6-28-88. Incorporation was done with a rotera to a depth of three inches. Both tests were then planted at the same time in 36 inch wide rows and at a depth of 1.5 inches. Preemergence herbicides were then applied at Test A. Both sites were then irrigated with 2/3 inches of water. Spray application equipment and methods at Test A were identical to those used at the Richard Spada trial. Preplant incorporated materials at Test B were applied using a standard farm herbicide sprayer at 34 gallons per acre and 30 psi. Postemergence treatments at Test B were applied using a CO_2 back pack sprayer with one 11004 nozzle held 23 inches above the ground. This produced a spray pattern exactly 36 inches wide, 10 inches above the ground. This postemergence spray was applied on 8-10-88, at which time the corn averaged thirty inches in height. Both sides of the center row in each plot was treated.

In test A, a corn stand count (number of plants per 10 ft of row) was recorded on 7-27-88. Corn injury ratings were taken on 8-1-88 and 8-15-88. Harvesting was initiated on 10-7-88. At site B, a stand count was made on 7-27-88. Plant height was measured on 8-16-88 and on 9-6-88. Corn injury was evaluated on 8-22-88. Harvest was initiated on 10-11-88. Harvest methods at both sites were identical to those at The Richard Spada site.

DISCUSSION

Richard Spada Farm and Ray Bartozs

With minor differences responses to the herbicide treatments were similar at the two locations of these trials for wild proso millet control in sweet corn. Slightly reduced levels of control with some herbicide treatments at the Stayton site may be associated with more advanced development of the weed at time of application.

Generally crop response could not be directly attributed to herbicide effects but sweet corn vigor and yield parameters were closely linked to the level of wild proso millet control and the extreme competition potential exerted by this weed.

The first 9 of the 25 treatments in these trials consisted of combinations of AAtrex, Tandem, and crop oil. Although there were variations in level of control obtained with these treatments none provided satisfactory control through the growing season and crop yields were reduced at one or both sites. From these 9 treatments it would appear that there was a definite benefit from adding Tandem although application timing and rate for using this material should be considered further. Increasing application rate of AAtrex in these combinations did not significantly improve the level of control of wild proso millet.

For the second year, herbicide treatment combinations that included Surpass, AAtrex, Tandem, and crop oil provided superior wild proso millet control. Control lasted through the sweet corn growing cycle and the crop produced top yields. As has been pointed out before, these results must be tempered with the possibility of reduced control with repeat applications of this, or similar materials to the same site. Loss of control in time has been reported from other areas in the U.S. Control in plots with Surpass and AAtrex, but not Tandem, was reasonable but not equal to the full combination treatment. Of the timings tried for these combination treatments, only delay to the last timing when the wild proso millet had 4-5 leaves appeared to decrease effectiveness somewhat.

Of the other herbicides tested in combination treatments--Prowl, Lasso, Eradicane, and Eradicane-Extra--none provided control equal to Surpass combinations but may play a role in wild proso millet control programs.

Oregon State University Vegetable Research Farm
Test A and B

Tolerance to herbicides by two supersweet corn cultivars -- CNS710 (designated CNS71 or CN) and Rogers 3376 (designated ROGER or RO) -- was compared to the cultivar Jubilee (designated JUBIL or JU). In the first trial in which Poast(sethoxydim) rates of 0.10, 0.15, or 0.20 lb ai/A were applied as directed sprays at the base of the corn plants, visual evidence of corn injury was much greater on the supersweet cultivars than on Jubilee. This was reflected in a slight reduction in plant height from the high application rate of Poast on CNS710 and a significant reduction in yield in Rogers 3376 plots treated with 0.15 or 0.20 lb ai/A of Poast. These yield reductions corresponded to similar reductions in numbers of harvestable ears per plot.

In the second trial comparing Lasso(alachlor), Eradicane(EPTC + safener), Eradicane-Extra(EPTC + extender + safener), and Surpass (vernolate), there was not plant injury or yield response interactions between the herbicide treatments and cultivars. Of the parameters evaluated only the visual rating of quality of the harvested corn was diminished in the cultivar Jubilee by Eradicane.

O R E G O N   S T A T E   U N I V E R S I T Y
WILD PROSO MILLET CONTROL IN SWEET CORN, 1988
Ray Bartosz Farm, Stayton OR
CROP INJURY AND WEED CONTROL AVERAGES

TRT. NO.	NAME	MILLET %CONTRL 6/24/88	MILLET %CONTRL 7/18/88	MILLET %CONTRL 8/12/88	CORNVIG %INCRSE 8/23/88	MILLET %CONTRL 8/23/88	CORN %INJURY 8/23/88
01	AATREX	20	0	0	13	0	0
02	AATREX CROP OIL	13	8	17	15	0	0
03	AATREX TANDEM AATREX CROP OIL	0	68	50	23	5	0
04	AATREX TANDEM CROP OIL	0	64	39	54	13	0
05	AATREX TANDEM AATREX CROP OIL	10	74	58	33	0	0
06	AATREX TANDEM	18	49	23	20	0	0
07	TANDEM AATREX CROP OIL	8	60	34	48	8	0
08	TANDEM AATREX CROP OIL	0	71	56	30	13	0
09	TANDEM AATREX CROP OIL	8	83	69	54	24	0
10	PROWL AATREX	0	50	50	68	20	0
11	PROWL TANDEM AATREX CROP OIL	0	83	76	56	46	0
12	PROWL TANDEM AATREX CROP OIL	25	93	94	88	80	0
13	LASSO AATREX	0	46	38	45	4	0
14	LASSO TANDEM AATREX CROP OIL	8	86	63	91	45	0
15	SURPASS AATREX	76	86	70	79	44	0

O R E G O N   S T A T E   U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN, 1988

Ray Bartosz Farm, Stayton OR

CROP INJURY AND WEED CONTROL AVERAGES
(CONTINUED)

TRT. NO.	NAME	MILLET %CONTRL 6/24/88	MILLET %CONTRL 7/18/88	MILLET %CONTRL 8/12/88	CORNVIG %INCRSE 8/23/88	MILLET %CONTRL 8/23/88	CORN %INJURY 8/23/88
16	ERAD-EX AATREX	43	54	28	33	5	0
17	ERADCANE AATREX	86	71	43	48	10	0
18	ERADCANE AATREX DUAL	75	83	69	73	34	0
19	SURPASS TANDEM AATREX CROP OIL	63	96	96	95	90	0
20	SURPASS AATREX TANDEM CROP OIL	83	96	95	96	85	0
21	SURPASS TANDEM AATREX CROP OIL	76	98	98	96	91	0
22	SURPASS TANDEM AATREX CROP OIL	81	95	89	90	78	0
23	ERAD-EX TANDEM AATREX CROP OIL	69	94	86	79	51	0
24	ERADCANE TANDEM AATREX CROP OIL	83	94	86	74	50	0
25	CHECK	0	0	0	16	0	0
LSD(0.05) =		24	14	17	38	20	NA
STD DEV =		17	9	12	26	14	NA
CV =		49	14	21	47	43	NA

O R E G O N   S T A T E   U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN, 1988

Ray Bartosz Farm, Stayton OR

HARVEST AVERAGES

TRT. NO.	NAME	CORNYLD TON/ACR 10/4/88	YIELD #EARS/A 10/4/88	CORN QUALITY 10/4/88
01	AATREX	1.0	3630	1.4
02	AATREX CROP OIL	.6	2178	1.4
03	AATREX TANDEM AATREX CROP OIL	3.1	11616	2.9
04	AATREX TANDEM CROP OIL	3.2	12161	3.0
05	AATREX TANDEM AATREX CROP OIL	3.4	11616	3.0
06	AATREX TANDEM	1.6	6353	2.4
07	TANDEM AATREX CROP OIL	3.5	11979	3.3
08	TANDEM AATREX CROP OIL	3.7	12342	2.9
09	TANDEM AATREX CROP OIL	5.2	15065	3.8
10	PROWL AATREX	3.9	12705	3.3
11	PROWL TANDEM AATREX CROP OIL	6.1	17969	3.9
12	PROWL TANDEM AATREX CROP OIL	7.8	25773	4.4
13	LASSO AATREX	2.3	8894	3.0
14	LASSO TANDEM AATREX CROP OIL	6.0	17061	4.4
15	SURPASS	5.8	16154	4.4

O R E G O N   S T A T E   U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN, 1988

Ray Bartosz Farm, Stayton OR

HARVEST AVERAGES (CONTINUED)

TRT. NO.	NAME	CORNYLD TON/ACR 10/4/88	YIELD #EARS/A 10/4/88	CORN QUALITY 10/4/88
16	AATREX ERAD-EX	1.5	5082	3.0
17	AATREX ERADCANE	2.4	9257	3.0
18	AATREX ERADCANE	6.3	17969	3.5
19	AATREX DUAL SURPASS TANDEM	9.6	26136	4.9
20	AATREX CROP OIL SURPASS	9.5	24684	4.9
21	AATREX TANDEM CROP OIL SURPASS	9.1	24503	4.6
22	TANDEM AATREX CROP OIL SURPASS	7.6	19421	4.1
23	TANDEM AATREX CROP OIL ERAD-EX	7.1	19239	3.8
24	TANDEM AATREX CROP OIL ERADCANE	6.7	17424	3.8
25	TANDEM AATREX CROP OIL CHECK	1.3	4356	1.5
LSD(0.05) =		2.5	8325	1.3
STD DEV =		1.7	5766	.9
CV =		36.6	41	26.2

O R E G O N   S T A T E   U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN, 1988

Oregon State University Vegetable Research Farm
Test A

TREATMENT LIST

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE	UNITofRATE	APPLIC TYPE
01A	LASSO	EC 4.00	2.50	LBai/A	CNPRE
01B	AATREX	DF 90%	1.00	LBai/A	CNPPI
02A	ERADICAN	EC 6.70	3.98	LBai/A	CNPPI
02B	AATREX	DF 90%	1.00	LBai/A	CNPPI
03A	ERAD-EXT	EC 6.00	6.00	LBai/A	CNPPI
03B	AATREX	DF 90%	1.00	LBai/A	CNPPI
04A	SURPASS	EC 6.70	6.14	LBai/A	CNPPI
04B	AATREX	DF 90%	1.00	LBai/A	CNPPI
05A	LASSO	EC 4.00	2.50	LBai/A	ROPRE
05B	AATREX	DF 90%	1.00	LBai/A	ROPPI
06A	ERADICAN	EC 6.70	3.98	LBai/A	ROPPI
06B	AATREX	DF 90%	1.00	LBai/A	ROPPI
07A	ERAD-EXT	EC 6.00	6.00	LBai/A	ROPPI
07B	AATREX	DF 90%	1.00	LBai/A	ROPPI
08A	SURPASS	EC 6.70	6.14	LBai/A	ROPPI
08B	AATREX	DF 90%	1.00	LBai/A	ROPPI
09A	LASSO	EC 4.00	2.50	LBai/A	JUPRE
09B	AATREX	DF 90%	1.00	LBai/A	JUPPI
10A	ERADICAN	EC 6.70	3.98	LBai/A	JUPPI
10B	AATREX	DF 90%	1.00	LBai/A	JUPPI
11A	ERAD-EXT	EC 6.00	6.00	LBai/A	JUPPI
11B	AATREX	DF 90%	1.00	LBai/A	JUPPI
12A	SURPASS	EC 6.70	6.14	LBai/A	JUPPI
12B	AATREX	DF 90%	1.00	LBai/A	JUPPI

O R E G O N   S T A T E   U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN, 1988

Oregon State University Vegetable Research Farm
Test A

CROP INJURY AND HARVEST AVERAGES

TRT. NO.	NAME		CORN STNDCNT 7/27/88	CORN %INJURY 8/01/88	PLANT HGHT FT 8/15/88	CORN %INJURY 8/15/88	CORNHRV TON/ACR 10/7/88	CORNHRV QUALRAT 10/7/88
01	LASSO	CNPRE	12	0	3.5	0	7.6	5.0
	AATREX	CNPPI						
02	ERADICAN	CNPPI	13	0	3.7	0	7.8	5.0
	AATREX	CNPPI						
03	ERAD-EXT	CNPPI	13	0	3.7	0	7.6	5.0
	AATREX	CNPPI						
04	SURPASS	CNPPI	13	0	3.6	0	7.2	5.0
	AATREX	CNPPI						
05	LASSO	ROPRE	24	0	3.9	0	6.7	4.0
	AATREX	ROPPI						
06	ERADICAN	ROPPI	21	0	3.8	0	7.3	4.1
	AATREX	ROPPI						
07	ERAD-EXT	ROPPI	23	0	3.8	0	7.5	4.1
	AATREX	ROPPI						
08	SURPASS	ROPPI	25	1	3.8	0	6.7	4.1
	AATREX	ROPPI						
09	LASSO	JUPRE	19	0	4.1	0	9.2	4.3
	AATREX	JUPPI						
10	ERADICAN	JUPPI	20	0	4.1	0	9.4	4.0
	AATREX	JUPPI						
11	ERAD-EXT	JUPPI	17	0	4.0	0	9.4	4.4
	AATREX	JUPPI						
12	SURPASS	JUPPI	19	0	4.0	0	8.7	4.5
	AATREX	JUPPI						
LSD(0.05)		=	4	1	.3	NA	1.1	.4
STD DEV		=	3	1	.2	NA	.8	.3
CV		=	16	693	5.9	NA	10.1	6.3

O R E G O N   S T A T E   U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN, 1988

Oregon State University Vegetable Research Farm
Test B

TREATMENT LIST

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE	UNITofRATE	APPLIC. TYPE
01A	POAST	EC 1.5	0.10	LBai/A	CNS71
01B	CROPOIL	EC 1.00	0.25	LBai/A	CNS71
02A	POAST	EC 1.5	0.15	LBai/A	CNS71
02B	CROPOIL	EC 1.00	0.25	LBai/A	CNS71
03A	POAST	EC 1.5	0.20	LBai/A	CNS71
03B	CROPOIL	EC 1.00	0.25	LBai/A	CNS71
04A	CHECK				CNS71
05A	POAST	EC 1.5	0.10	LBai/A	ROGER
05B	CROPOIL	EC 1.00	0.25	LBai/A	ROGER
06A	POAST	EC 1.5	0.15	LBai/A	ROGER
06B	CROPOIL	EC 1.00	0.25	LBai/A	ROGER
07A	POAST	EC 1.5	0.20	LBai/A	ROGER
07B	CROPOIL	EC 1.00	0.25	LBai/A	ROGER
08A	CHECK				ROGER
09A	POAST	EC 1.5	0.10	LBai/A	JUBIL
09B	CROPOIL	EC 1.00	0.25	LBai/A	JUBIL
10A	POAST	EC 1.5	0.15	LBai/A	JUBIL
10B	CROPOIL	EC 1.00	0.25	LBai/A	JUBIL
11A	POAST	EC 1.5	0.20	LBai/A	JUBIL
11B	CROPOIL	EC 1.00	0.25	LBai/A	JUBIL
12A	CHECK				JUBIL

O R E G O N   S T A T E   U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN, 1988

Oregon State University Vegetable Research Farm
Test B

CROP INJURY AVERAGES

TRT. NO.	PESTICIDE NAME	FORMU.	LBai/A	APPLI-CATION TYPE	CORN STNDCNT 7/27/88	PLANT HGHT FT 8/16/88	CORN %INJURY 8/16/88	CORN %INJURY 8/22/88	CORN HEIGHT 9/06/88
01	POAST	EC 1.5	0.10	CNS71	13	3.5	0	15	7.4
	CROPOIL	EC 1.00	0.25	CNS71					
02	POAST	EC 1.5	0.15	CNS71	14	3.5	0	21	7.3
	CROPOIL	EC 1.00	0.25	CNS71					
03	POAST	EC 1.5	0.20	CNS71	13	3.7	0	26	6.8
	CROPOIL	EC 1.00	0.25	CNS71					
04	CHECK			CNS71	15	3.6	0	0	7.8
05	POAST	EC 1.5	0.10	ROGER	17	3.5	0	5	8.5
	CROPOIL	EC 1.00	0.25	ROGER					
06	POAST	EC 1.5	0.15	ROGER	20	3.5	0	11	7.9
	CROPOIL	EC 1.00	0.25	ROGER					
07	POAST	EC 1.5	0.20	ROGER	18	3.4	0	18	7.8
	CROPOIL	EC 1.00	0.25	ROGER					
08	CHECK			ROGER	19	3.6	0	0	8.8
09	POAST	EC 1.5	0.10	JUBIL	18	4.0	0	0	8.9
	CROPOIL	EC 1.00	0.25	JUBIL					
10	POAST	EC 1.5	0.15	JUBIL	16	3.9	0	1	8.8
	CROPOIL	EC 1.00	0.25	JUBIL					
11	POAST	EC 1.5	0.20	JUBIL	17	3.8	0	2	8.5
	CROPOIL	EC 1.00	0.25	JUBIL					
12	CHECK			JUBIL	18	4.0	0	1	9.0
				LSD(0.05) =	3	.2	NA	9	.7
				STANDARD DEVIATION =	2	.2	NA	6	.5
				COEFF. OF VARIABILITY =	12	4.5	NA	75	6.4

O R E G O N   S T A T E   U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN, 1988

Oregon State University Vegetable Research Farm
Test B

HARVEST AVERAGES

TRT. NO.	PESTICIDE NAME	FORMU.	LBai/A	APPLI-CATION TYPE	CORNHRV TON/ACR 10/11/88	CORNHRV EAR#/AC 10/11/88	CORNHRV QUALRAT 10/11/88
01	POAST	EC 1.5	0.10	CNS71	7.4	17787	4.8
	CROPOIL	EC 1.00	0.25	CNS71			
02	POAST	EC 1.5	0.15	CNS71	7.5	16517	4.8
	CROPOIL	EC 1.00	0.25	CNS71			
03	POAST	EC 1.5	0.20	CNS71	7.1	16335	4.8
	CROPOIL	EC 1.00	0.25	CNS71			
04	CHECK			CNS71	7.9	18150	4.8
05	POAST	EC 1.5	0.10	ROGER	8.9	27225	4.3
	CROPOIL	EC 1.00	0.25	ROGER			
06	POAST	EC 1.5	0.15	ROGER	7.0	20873	3.9
	CROPOIL	EC 1.00	0.25	ROGER			
07	POAST	EC 1.5	0.20	ROGER	5.9	17243	3.8
	CROPOIL	EC 1.00	0.25	ROGER			
08	CHECK			ROGER	9.0	26499	4.0
09	POAST	EC 1.5	0.10	JUBIL	9.5	25047	4.3
	CROPOIL	EC 1.00	0.25	JUBIL			
10	POAST	EC 1.5	0.15	JUBIL	9.8	28314	4.1
	CROPOIL	EC 1.00	0.25	JUBIL			
11	POAST	EC 1.5	0.20	JUBIL	9.4	26318	3.8
	CROPOIL	EC 1.00	0.25	JUBIL			
12	CHECK			JUBIL	10.7	30674	4.4
				LSD(0.05) =	1.9	4782	.5
				STANDARD DEVIATION =	1.3	3312	.3
				COEFF. OF VARIABILITY =	15.6	15	7.4

O R E G O N   S T A T E   U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN, 1988

Richard Spada Farm, Grand Island OR

CROP INJURY AND WEED CONTROL RATINGS

TRT. NO.	NAME	CORN %INJURY 6/13/88	MILLET %CONTRL 6/13/88	CORN %INJURY 7/01/88	MILLET %CONTRL 7/01/88	PIGWEED %CONTRL 7/01/88	CORN VIGOR 8/12/88	MILLET %CONTRL 8/12/88
01	AATREX	0	3	0	5	100	13	0
02	AATREX CROP OIL	0	8	4	43	100	53	6
03	AATREX TANDEM AATREX CROP OIL	0	5	3	59	100	66	20
04	AATREX TANDEM CROP OIL	0	0	0	8	100	30	0
05	AATREX TANDEM AATREX CROP OIL	0	13	5	41	100	68	11
06	AATREX TANDEM	1	78	3	56	100	61	0
07	TANDEM AATREX CROP OIL	0	0	7	25	100	45	8
08	TANDEM AATREX CROP OIL	0	0	3	43	100	51	0
09	TANDEM AATREX CROP OIL	0	0	3	41	100	58	0
10	PROWL AATREX	4	71	0	61	100	70	13
11	PROWL TANDEM AATREX CROP OIL	3	76	8	74	100	65	35
12	PROWL TANDEM AATREX CROP OIL	4	85	6	75	100	70	25
13	LASSO AATREX	4	98	3	95	100	94	86
14	LASSO TANDEM AATREX CROP OIL	3	92	8	95	100	99	90
15	SURPASS AATREX	3	90	3	95	100	95	80

WILD PROSO MILLET CONTROL IN SWEET CORN, 1988

Richard Spada Farm, Grand Island OR

CROP INJURY AND WEED CONTROL RATINGS
(CONTINUED)

TRT. NO.	NAME	CORN %INJURY 6/13/88	MILLET %CONTRL 6/13/88	CORN %INJURY 7/01/88	MILLET %CONTRL 7/01/88	PIGWEED %CONTRL 7/01/88	CORN VIGOR 8/12/88	MILLET %CONTRL 8/12/88
16	ERAD-EX AATREX	0	49	0	80	96	76	30
17	ERADCANE AATREX	3	55	1	64	90	66	34
18	ERADCANE AATREX DUAL	1	96	4	96	100	94	79
19	SURPASS TANDEM AATREX CROP OIL	1	76	8	99	100	100	99
20	SURPASS AATREX TANDEM CROP OIL	0	75	3	98	100	100	92
21	SURPASS TANDEM AATREX CROP OIL	0	87	6	98	100	100	96
22	SURPASS TANDEM AATREX CROP OIL	1	82	3	96	100	98	96
23	ERAD-EX TANDEM AATREX CROP OIL	3	54	9	93	100	95	78
24	ERADCANE TANDEM AATREX CROP OIL	3	69	8	95	100	93	81
25	CHECK	0	0	0	0	0	0	0
	LSD(0.05) =	3	20	5	19	6	22	23
	STD DEV =	2	14	4	13	4	15	16
	CV =	151	26	94	19	4	20	34

O R E G O N   S T A T E   U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN 1988

Richard Spada Farm, Grand Island OR

HARVEST DATA

TRT NO.	NAME	YIELD (T/A) 9/09/88	YIELD EARS/A 9/09/88	CORNQAL VSRATNG 9/09/88
01	AATREX	.9	4138	1.5
02	AATREX CROP OIL	2.7	10019	2.4
03	AATREX TANDEM AATREX CROP OIL	4.2	14593	2.9
04	AATREX TANDEM CROP OIL	.7	4356	1.7
05	AATREX TANDEM AATREX CROP OIL	3.1	12197	3.3
06	AATREX TANDEM	4.9	16989	3.3
07	TANDEM AATREX CROP OIL	2.2	7405	2.2
08	TANDEM AATREX CROP OIL	2.2	10019	2.5
09	TANDEM AATREX CROP OIL	2.2	9148	2.8
10	PROWL AATREX	5.1	14593	3.6
11	PROWL TANDEM AATREX CROP OIL	6.3	17424	3.9
12	PROWL TANDEM AATREX CROP OIL	6.8	19166	4.1
13	LASSO AATREX	8.8	23087	4.5
14	LASSO TANDEM AATREX CROP OIL	8.0	21562	4.4
15	SURPASS AATREX	7.5	20691	3.8

O R E G O N   S T A T E   U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN 1988

Richard Spada Farm, Grand Island OR

HARVEST DATA (CONTINUED)

TRT NO.	NAME	YIELD (T/A) 9/09/88	YIELD EARS/A 9/09/88	CORNQAL VSRATNG 9/09/88
16	ERAD-EX AATREX	6.9	19602	3.8
17	ERADCANE AATREX	5.5	15028	3.4
18	ERADCANE AATREX DUAL	9.8	26136	4.7
19	SURPASS TANDEM AATREX CROP OIL	8.6	24611	4.6
20	SURPASS AATREX TANDEM	9.4	27007	4.6
21	SURPASS TANDEM AATREX CROP OIL	10.1	26354	4.8
22	SURPASS TANDEM AATREX CROP OIL	8.3	22869	4.1
23	ERAD-EX TANDEM AATREX CROP OIL	7.7	21127	4.3
24	ERADCANE TANDEM AATREX CROP OIL	7.6	20909	3.9
25	CHECK	.1	436	0
LSD(0.05) =		2.6	6721	1.1
STD DEV =		1.8	4655	.8
CV =		29.8	26	22.4

O R E G O N S T A T E U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN, 1988

Richard Spada Farm and Ray Bartozs Farm

TREATMENT LIST

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE LBai/A	APPLIC. TYPE
01A	AATREX	DF 90%	1.50	PRE
02A	AATREX	DF 90%	1.50	POST
02B	CROP OIL	EC 1.00	1.00	POST
03A	AATREX	DF 90%	1.50	PRE
03B	TANDEM	EC 4.00	0.75	POST
03C	AATREX	DF 90%	1.50	POST
03D	CROP OIL	EC 1.00	1.00	POST
04A	AATREX	DF 90%	1.50	PRE
04B	TANDEM	EC 4.00	0.75	POST
04C	CROP OIL	EC 1.00	1.00	POST
05A	AATREX	DF 90%	1.00	PRE
05B	TANDEM	EC 4.00	0.75	POST
05C	AATREX	DF 90%	1.00	POST
05D	CROP OIL	EC 1.00	1.00	POST
06A	AATREX	DF 90%	1.50	PRE
06B	TANDEM	EC 4.00	0.75	PRE
07A	TANDEM	EC 4.00	0.38	POST
07B	AATREX	DF 90%	1.50	POST
07C	CROP OIL	EC 1.00	1.00	POST
08A	TANDEM	EC 4.00	0.75	POST
08B	AATREX	DF 90%	1.50	POST
08C	CROP OIL	EC 1.00	1.00	POST
09A	TANDEM	EC 4.00	0.75	POST
09B	AATREX	DF 90%	2.00	POST
09C	CROP OIL	EC 1.00	1.00	POST
10A	PROWL	EC 4.00	1.50	PRE
10B	AATREX	DF 90%	1.50	PRE
11A	PROWL	EC 4.00	2.00	PRE
11B	TANDEM	EC 4.00	0.75	POST
11C	AATREX	DF 90%	1.00	POST
11D	CROP OIL	EC 1.00	1.00	POST
12A	PROWL	EC 4.00	4.00	PRE
12B	TANDEM	EC 4.00	0.75	POST
12C	AATREX	DF 90%	1.00	POST
12D	CROP OIL	EC 1.00	1.00	POST
13A	LASSO	EC 4.00	4.00	PRE
13B	AATREX	DF 90%	1.50	PRE
14A	LASSO	EC 4.00	4.00	PRE
14B	TANDEM	EC 4.00	0.75	POST
14C	AATREX	DF 90%	1.00	POST
14D	CROP OIL	EC 1.00	1.00	POST
15A	SURPASS	EC 6.7	6.14	PPI
15B	AATREX	DF 90%	1.50	PPI

O R E G O N   S T A T E   U N I V E R S I T Y

WILD PROSO MILLET CONTROL IN SWEET CORN, 1988

Richard Spada Farm and Ray Bartozs Farm

TREATMENT LIST (CONTINUED)

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE LBai/A	APPLIC. TYPE
16A	ERAD-EX	EC 6.00	4.00	PPI
16B	AATREX	DF 90%	1.50	PPI
17A	ERADCANE	EC 6.7	4.00	PPI
17B	AATREX	DF 90%	1.50	PPI
18A	ERADCANE	EC 6.7	4.00	PPI
18B	AATREX	DF 90%	1.50	PPI
18C	DUAL	EC 8.00	2.00	PRE
19A	SURPASS	EC 6.7	6.14	PPI
19B	TANDEM	EC 4.00	0.75	POST
19C	AATREX	DF 90%	1.50	POST
19D	CROP OIL	EC 1.00	1.00	POST
20A	SURPASS	EC 6.7	6.14	PPI
20B	AATREX	DF 90%	1.50	PPI
20C	TANDEM	EC 4.00	0.75	POST
20D	CROP OIL	EC 1.00	1.00	POST
21A	SURPASS	EC 6.7	6.14	PPI
21B	TANDEM	EC 4.00	0.75	POST2
21C	AATREX	DF 90%	1.50	POST2
21D	CROP OIL	EC 1.00	1.00	POST2
22A	SURPASS	EC 6.7	6.14	PPI
22B	TANDEM	EC 4.00	0.75	POST3
22C	AATREX	DF 90%	1.50	POST3
22D	CROP OIL	EC 1.00	1.00	POST3
23A	ERAD-EX	EC 6.00	4.00	PPI
23B	TANDEM	EC 4.00	0.75	POST
23C	AATREX	DF 90%	1.50	POST
23D	CROP OIL	EC 1.00	1.00	POST
24A	ERADCANE	EC 6.7	4.00	PPI
24B	TANDEM	EC 4.00	0.75	POST
24C	AATREX	DF 90%	1.50	POST
24D	CROP OIL	EC 1.00	1.00	POST
25A	CHECK			

Alternatives to Lorox in Carrot Production

W.S. Braunworth, D. Curtis, D. McGrath, and G. Crabtree
Department of Horticulture
Oregon State University

In anticipation of the possible loss of the registration status of the herbicide Lorox (linuron) for weed control in carrot production, a program was initiated in 1988 to find alternative weed control measures. The objectives of this study were to:

1. Obtain data on the weed control efficacy and crop safety of herbicides currently registered for use in carrots.

2. Identify other herbicides not currently registered for use in carrots, which might serve as a substitute for Lorox.

3. Obtain data which could be used toward the registration of suitable herbicides.

One field trial was established at the Oregon State University Vegetable Research Farm. This trial was made up of 42 herbicide treatments, one being Lorox, and one being a newly registered material, Sencor (metribuzin). A hand weeded check and a weedy check were also included.

EXPERIMENTAL PROCEDURES

The trial was initiated on 4-28-88 at the Oregon State University Vegetable Research Farm in Corvallis OR. There were 44 treatments total, organized in a randomized complete block design, with 4 replications. Plot size was 8 feet by 30 feet, with 1 foot boarders between plots. The soil series at this site is a Chehalis silty clay loam, with an organic mater content of 3.3% and a pH of 6.2. The previous crop was wheat. 800 pounds per acre of 8-24-8 fertilizer was broadcast on the site. Dyfonate was incorporated into the soil before planting for symphylum control (non-registered treatment). Prior to planting, preplant incorporated treatments (ppi) were applied and then incorporated to a depth of 3 inches using a rotera. Royal Chantenay carrots were then planted 24 inches between rows and .25 inches deep using a Planet Junior hand seeder. The intended stand density was 25 plants per foot of row, although we ended up with about half of that level on average. Due to extremely wet conditions immediately following planting, the preemergence treatments (pre) were not applied until 5-5-88. The first postemergence treatments (post) were applied at the 2-3 leaf stage of the carrots. At this timing, weeds were approximately 3 inches tall. The next postemergence spray (post 1) was applied on 6-8-88 at the 5 leaf stage of the carrots. At this timing, the weeds were approximately 6 inches high and the canopy was 50% closed. The last postemergence spray (post 2) was applied on 6-21-88, at which time the carrots were .5 inches in diameter and the weeds were 10-12 inches tall. The canopy was closed. Treatments were applied using a compressed air propellant, unicycle small plot sprayer. This was equipped with five 8003 flat fan nozzles. The sprays were broadcast at 22.68 gallons per acre at 30 psi. Predominate weed species at the sight included; pineapple weed (Matricaria matricariodes), wild mustard (Brassica arvensis), shepardspurse (Capsella bursa-pastoris), groundsel (Senecio vulgaris), hairy nightshade (Solanum sarrachoides), redroot pigweed (Amaranthus retroflexus) and annual bluegrass (Poa annua). Crop injury ratings (stand counts and crop height) were recorded on 5-23-88 and 6-21-88. Weed control ratings were recorded on 6-21-88. The crop was harvested (10 feet of the center row in each plot) on 10-25-88.

DISCUSSION

Significant crop injury, manifesting itself in the form of severe stand reductions and greatly reduced harvests, was found with treatments containing Cobra, Tackle, and Herbicide 273. No one treatment besides Lorox was able to control all weeds present at the site. Outstanding treatments were Command, which did well in controlling shepardspurse, groundsel, nightshade and annual bluegrass, and Tycor applied preemergence, which controlled pineapple weed, shepards purse, wild mustard and pigweed as well as annual bluegrass. A combination of these 2 materials might be an alternative to Lorox. The Sencor treatments might of performed better if the weeds were not as large at the time of application. The higher rates of Prowl also showed fair control which was apparent at harvest.

In conclusion, this was only the first year of the trial, but some treatments did show promise as possible replacements for Lorox. Further research is needed to examine combinations and timings of materials to find suitable replacement weed control measures for Lorox.

O R E G O N   S T A T E   U N I V E R S I T Y

HERBICIDE ALTERNATIVES TO LOROX IN CARROTS, 1988

Oregon State University Vegetable Research Farm

TREATMENT LIST

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE	UNITofRATE	APPLIC. TYPE
01A	PURSUIT	SC 2.00	.062	LBai/A	PRE
02A	PURSUIT	SC 2.00	.125	LBai/A	PRE
03A	PURSUIT	SC 2.00	.062	LBai/A	POST
04A	PURSUIT	SC 2.00	.125	LBai/A	POST
05A	PURSUIT	SC 2.00	.062	LBai/A	PRE
05B	TREFLAN	EC 4.00	0.75	LBai/A	PPI
06A	PURSUIT	SC 2.00	.062	LBai/A	POST
06B	TREFLAN	EC 4.00	0.75	LBai/A	PPI
07A	COMMAND	EC 4.00	0.50	LBai/A	PPI
08A	COMMAND	EC 4.00	1.00	LBai/A	PPI
09A	COMMAND	EC 4.00	0.50	LBai/A	PPI
09B	TREFLAN	EC 4.00	0.75	LBai/A	PPI
10A	COBRA	EC 2.00	0.125	LBai/A	PRE
11A	COBRA	EC 2.00	0.250	LBai/A	PRE
12A	COBRA	EC 2.00	0.50	LBai/A	PRE
13A	COBRA	EC 2.00	0.125	LBai/A	PRE
13B	TREFLAN	EC 4.00	0.75	LBai/A	PPI
14A	COBRA	EC 2.00	0.125	LBai/A	PRE
14B	PROWL	EC 4.00	1.00	LBai/A	PRE
15A	SCEPTER	SC 1.50	.062	LBai/A	PRE
16A	SCEPTER	SC 1.50	0.125	LBai/A	PRE
17A	SCEPTER	SC 1.50	0.062	LBai/A	POST
18A	SCEPTER	SC 1.50	0.125	LBai/A	POST
19A	TACKLE	SC 2.00	0.25	LBai/A	PRE
20A	TACKLE	SC 2.00	0.50	LBai/A	PRE

O R E G O N   S T A T E   U N I V E R S I T Y

HERBICIDE ALTERNATIVES TO LOROX IN CARROTS, 1988

Oregon State University Vegetable Research Farm

TREATMENT LIST (CONTINUED)

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE	UNITofRATE	APPLIC. TYPE
21A	TACKLE	SC 2.00	0.25	LBai/A	POST
22A	TACKLE	SC 2.00	0.50	LBai/A	POST
23A	TACKLE	SC 2.00	0.25	LBai/A	PRE
23B	TREFLAN	EC 4.00	0.75	LBai/A	PPI
24A	PROWL	EC 4.00	0.50	LBai/A	PRE
25A	PROWL	EC 4.00	1.00	LBai/A	PRE
26A	PROWL	EC 4.00	2.00	LBai/A	PRE
27A	SENCOR	DF 75%	0.25	LBai/A	POST1
27B	PROWL	EC 4.00	1.00	LBai/A	PRE
28A	SENCOR	DF 75%	0.25	LBai/A	POST1
28B	TREFLAN	EC 4.00	0.75	LBai/A	PPI
29A	SENCOR	DF 75%	0.25	LBai/A	POST1
30A	SENCOR	DF 75%	0.50	LBai/A	POST1
31A	SENCOR	DF 75%	0.25	LBai/A	POST1
31B	SENCOR	DF 75%	0.25	LBai/A	POST2
32A	SENCOR	DF 75%	1.00	LBai/A	POST1
33A	TYCOR	DF 50%	1.00	LBai/A	PRE
34A	TYCOR	DF 50%	2.00	LBai/A	PRE
35A	TYCOR	DF 50%	0.75	LBai/A	POST
36A	TYCOR	DF 50%	1.00	LBai/A	POST
37A	TYCOR	DF 50%	2.00	LBai/A	POST
38A	TYCOR	DF 50%	1.00	LBai/A	PRE
38B	TREFLAN	EC 4.00	0.75	LBai/A	PPI
39A	LOROX	WP 50%	0.75	LBai/A	POST
39B	LOROX	WP 50%	0.75	LBai/A	POST1

O R E G O N   S T A T E   U N I V E R S I T Y

HERBICIDE ALTERNATIVES TO LOROX IN CARROTS, 1988

Oregon State University Vegetable Research Farm

TREATMENT LIST (CONTINUED)

TRT. NUM.	COMPOUND TESTED	FORMUL. AI/UNIT	RATE	UNITofRATE	APPLIC. TYPE
40A	HERB273	SC 3.00	1.50	LBai/A	POST
41A	HERB273	SC 3.00	3.00	LBai/A	POST
42A	HERB273	SC 3.00	1.50	LBai/A	POST
42B	TREFLAN	EC 4.00	0.75	LBai/A	PPI
43A	HNDWDCHK				POST
44A	CHECK				

O R E G O N   S T A T E   U N I V E R S I T Y

HERBICIDE ALTERNATIVES TO LOROX IN CARROTS, 1988

Oregon University Vegetable Research Farm

CROP INJURY (STAND COUNTS AND STAND HEIGHT)
AND HARVEST AVERAGES

TRT. NO.	NAME	CARROTS STNDCNT 5/23/88	CARROTS STNDCNT 6/21/88	CARROTS CRPLTHT 6/21/88	CARROTS TONS/AC 10/25/8
01	PURSUIT	28	28	7.5	21.24
02	PURSUIT	31	20	5.5	19.06
03	PURSUIT	29	25	4.0	10.35
04	PURSUIT	36	23	3.1	13.07
05	PURSUIT TREFLAN	40	31	8.1	28.59
06	PURSUIT TREFLAN	34	21	4.1	17.97
07	COMMAND	33	30	9.3	24.50
08	COMMAND	39	48	10.3	48.46
09	COMMAND TREFLAN	34	36	10.9	43.83
10	COBRA	1	4	5.3	7.80
11	COBRA	0	2	3.6	5.99
12	COBRA	0	0	0	NA
13	COBRA TREFLAN	1	7	5.3	9.80
14	COBRA PROWL	0	5	4.6	7.35
15	SCEPTER	32	28	6.3	20.96
16	SCEPTER	36	24	4.1	22.87
17	SCEPTER	33	27	5.4	8.99
18	SCEPTER	29	26	4.5	18.24

HERBICIDE ALTERNATIVES TO LOROX IN CARROTS, 1988

Oregon University Vegetable Research Farm

CROP INJURY (STAND COUNTS AND STAND HEIGHT)
AND HARVEST AVERAGES
(CONTINUED)

TRT. NO.	NAME	CARROTS STNDCNT 5/23/88	CARROTS STNDCNT 6/21/88	CARROTS CRPLTHT 6/21/88	CARROTS TONS/AC 10/25/88
19	TACKLE	3	9	6.0	12.80
20	TACKLE	0	5	5.1	12.16
21	TACKLE	32	30	7.8	13.88
22	TACKLE	27	25	6.0	19.33
23	TACKLE TREFLAN	4	10	6.6	23.69
24	PROWL	41	38	10.5	31.85
25	PROWL	40	39	10.8	35.94
26	PROWL	32	36	10.0	46.01
27	SENCOR PROWL	38	38	10.1	32.67
28	SENCOR TREFLAN	30	29	9.4	30.22
29	SENCOR	37	31	10.8	23.41
30	SENCOR	44	38	10.0	23.14
31	SENCOR SENCOR	36	35	11.3	25.32
32	SENCOR	37	36	10.0	32.13
33	TYCOR	35	39	9.5	29.68
34	TYCOR	31	35	8.5	38.39
35	TYCOR	34	30	9.9	14.70
36	TYCOR	38	33	10.8	22.60
37	TYCOR	35	35	9.0	31.31

HERBICIDE ALTERNATIVES TO LOROX IN CARROTS, 1988

Oregon University Vegetable Research Farm

CROP INJURY (STAND COUNTS AND STAND HEIGHT)
AND HARVEST AVERAGES
(CONTINUED)

TRT. NO.	NAME	CARROTS STNDCNT 5/23/88	CARROTS STNDCNT 6/21/88	CARROTS CRPLTHT 6/21/88	CARROTS TONS/AC 10/25/88
38	TYCOR TREFLAN	36	38	10.4	44.11
39	LOROX LOROX	36	35	9.1	41.11
40	HERB273	31	16	6.4	7.08
41	HERB273	35	10	4.6	2.72
42	HERB273 TREFLAN	36	22	6.5	16.88
43	HNDWDCHK	27	34	9.0	46.01
44	CHECK	32	36	10.1	13.61
LSD(0.05) =		10	12	1.8	12.67
STD DEV =		7	8	1.2	8.78
CV =		23	31	15.9	37.25

O R E G O N   S T A T E   U N I V E R S I T Y

HERBICIDE ALTERNATIVES TO LOROX IN CARROTS, 1988

Oregon State University Vegetable Research Farm

WEED CONTROL RATINGS

TRT. NO.	NAME	PINAPLE %CONTRL 6/21/88	MUSTARD %CONTRL 6/21/88	SH.PURS %CONTRL 6/21/88	GRNDSEL %CONTRL 6/21/88	NIGHTSH %CONTRL 6/21/88	PIGWEED %CONTRL 6/21/88	ANBLGRS %CONTRL 6/21/88
01	PURSUIT	63	63	80	51	63	83	44
02	PURSUIT	73	89	100	75	91	96	70
03	PURSUIT	39	51	46	43	93	97	23
04	PURSUIT	58	76	73	83	98	95	39
05	PURSUIT TREFLAN	60	60	90	44	66	100	95
06	PURSUIT TREFLAN	51	58	60	45	95	100	94
07	COMMAND	85	21	94	100	100	15	95
08	COMMAND	95	40	100	100	100	43	100
09	COMMAND TREFLAN	65	26	95	100	95	66	100
10	COBRA	97	99	100	94	86	100	15
11	COBRA	99	100	100	96	94	85	41
12	COBRA	100	100	100	100	100	100	68
13	COBRA TREFLAN	95	99	100	94	95	97	89
14	COBRA PROWL	96	100	100	100	96	100	65
15	SCEPTER	65	93	96	93	54	100	70
16	SCEPTER	84	100	100	99	58	100	80
17	SCEPTER	45	61	58	44	10	75	25
18	SCEPTER	46	71	65	71	43	90	28
19	TACKLE	93	84	100	89	85	51	34

O R E G O N S T A T E U N I V E R S I T Y

HERBICIDE ALTERNATIVES TO LOROX IN CARROTS, 1988

Oregon State University Vegetable Research Farm

WEED CONTROL RATINGS (CONTINUED)

TRT. NO.	NAME	PINAPLE %CONTRL 6/21/88	MUSTARD %CONTRL 6/21/88	SH.PURS %CONTRL 6/21/88	GRNDSEL %CONTRL 6/21/88	NIGHTSH %CONTRL 6/21/88	PIGWEED %CONTRL 6/21/88	ANBLGRS %CONTRL 6/21/88
20	TACKLE	97	100	100	100	94	100	43
21	TACKLE	53	46	41	45	44	100	13
22	TACKLE	66	79	80	76	66	95	20
23	TACKLE TREFLAN	84	100	100	93	94	100	91
24	PROWL	58	39	33	20	33	5	45
25	PROWL	40	53	69	10	83	68	81
26	PROWL	86	99	98	18	100	99	75
27	SENCOR PROWL	66	88	93	61	80	94	76
28	SENCOR TREFLAN	81	49	45	46	79	96	96
29	SENCOR	44	51	49	29	14	44	70
30	SENCOR	50	60	63	56	21	100	84
31	SENCOR SENCOR	43	53	48	38	19	43	65
32	SENCOR	71	70	75	68	25	93	93
33	TYCOR	100	100	99	53	15	96	100
34	TYCOR	100	100	100	74	34	100	100
35	TYCOR	41	64	68	34	21	100	79
36	TYCOR	41	78	76	38	18	100	79
37	TYCOR	76	96	98	60	28	100	84
38	TYCOR TREFLAN	100	100	100	33	20	100	100

O R E G O N   S T A T E   U N I V E R S I T Y

HERBICIDE ALTERNATIVES TO LOROX IN CARROTS, 1988

Oregon State University Vegetable Research Farm

WEED CONTROL RATINGS (CONTINUED)

TRT. NO.	NAME	PINAPLE %CONTRL 6/21/88	MUSTARD %CONTRL 6/21/88	SH.PURS %CONTRL 6/21/88	GRNDSEL %CONTRL 6/21/88	NIGHTSH %CONTRL 6/21/88	PIGWEED %CONTRL 6/21/88	ANBLGRS %CONTRL 6/21/88
39	LOROX LOROX	79	100	100	88	100	100	94
40	HERB273	94	11	10	50	36	18	35
41	HERB273	100	8	11	65	50	30	44
42	HERB273 TREFLAN	97	20	3	45	75	100	80
43	HNDWDCHK	100	100	100	100	100	100	100
44	CHECK	0	0	0	0	0	0	0
LSD(0.05) =		29	24	17	27	26	25	26
STD DEV =		20	16	12	19	18	18	18
CV =		27	23	15	28	28	21	26

Vegetable Seed Crops—Summary

Brussel sprout, collard and kohlrabi tolerance to simazine and pronamide. Seed yields suggested adequate crop tolerance for normal applications rates of simazine and pronamide applied in winter for each crop except pronamide on brussel sprouts (pronamide was not tested on Kohlrabi).

VEGETABLE SEED CROP TOLERANCE TO PRONAMIDE AND SIMAZINE

Bill Braunworth
and
Ray D. William
OSU Extension Horticultural Weed Specialists

Fall-planted vegetable seed crops require continuous weed control throughout the ten-month production cycle to ensure reasonable yields and a weed-free product. Winter applications of simazine and pronamide (Kerb) may provide similar weed control for collard, brussel sprout and kohlrabi as major seed crops such as cabbage. Crop tolerance is achieved with applications during the winter season when minimal crop growth occurs.

RESULTS

Only pronamide (Kerb) reduced yields of brussel sprouts at 2 and 4 lbs. ai/acre, whereas simazine may have contributed to slight reductions of kohlrabi seed yield at the highest rate applied. Otherwise, crop safety appeared satisfactory. Although not tabulated herein, simazine provided reasonably effective control of shepherdspurse and western bittercress, whereas both products contributed to partial control of annual bluegrass.

Minor crop registration information

Crop	IR-4 PR#	Herbicide	Crop Safety
Brussel sprouts	2117	Pronamide	1 lb. only
	2358	Simazine	okay
Collards	2120	Pronamide	okay
	2361	Simazine	okay
Kohlrabi	2360	Simazine	not over 2 lb.

Table 1. Vegetable seed crop tolerance and seed yield with winter applications of promanide and simazine.

Crop / Herbicide & rate (lb ai/A)		Crop phyto-toxicity (0 to 100)	Plant Stand (no/20 ft.)	Seed Yield (lbs/A)	LSD (5%)
Brussel sprouts					
Simazine	0	0	38	1463	
	1.0	0	28	1554	
	2.0	0	34	1975	
	4.0	7	38	2145	
	HW	0	35	2233	(442)
Pronamide	0	0	38	1464	
	1.0	0	35	1950	
	2.0	0	28	1667	
	4.0	0	34	1200	
	HW	0	35	2233	
Collards					
Simazine	0	0	40	2395	
	1.0	0	33	2332	
	2.0	0	40	2226	
	4.0	0	42	2468	
	HW	0	35	2289	(745)
Pronamide	0	0	40	2395	
	1.0	0	36	2557	
	2.0	0	34	1957	
	4.0	0	34	1935	
	HW	0	35	2289	(745)
Kohlrabi					
Simazine	0	0	57	3116	
	1.0	3	58	2645	
	2.0	6	61	2855	
	4.0	14	60	2394	
	HW	0	56	2839	(---)

HW - hand weeded check

IR-4: NATIONAL PESTICIDE CLEARANCE RESEARCH PROGRAM

Field Data Reporting Form
(please type)

Pr No: 2358 Trial:
Date of Report: 9/20/88

1. Investigator (name, address, phone #): BILL BRAUNWORTH & RAY WILLIAM
DEPT. OF HORTICULTURE, OSU, CORVALLIS, OR 97331 (503) 754-3464

Location of Experimental Trial: OSU VEG. RESEARCH FARM, CORVALLIS, OR

Soil Type: CHEHALIS SILTY CLAY LOAM % OM: 3.3 pH: 6.2

2. Pesticide Nomenclature:

Common Name: SIMAZINE (PRINCEP) Formulation: 80% WP

Cas #: Epa Reg.No: 100-437 Mfg: CIBA-GEIGY

3. Crop Information: (Include plot diagram on Page 8)

Commodity: BRUSSELS SPROUTS (SEED) Variety: LONG ISLAND

Soil Preparation: PLOW, DISK, ROTOTILL

Seeding Date: 9/17/87 Emergence Date: NO RECORD Thinning Date: N/A

Transplant Date: N/A Cultivation Date(s): N/A

Other Cultural Practices: HAND WEEDED, CHECKS WERE WEEDED ON 2/22/88, 3/22/88, 4/14/88

Plant Spacing:7 IN/PLANT Row Spacing: 36 INCHES Rows/Plot: 3

Plot Size: 8 X 30 FEET Experimental Design: RCB Reps: 4

4. Application Parameters:

Sprayer Type: COMP. AIR-UNICYCLE Nozzle Type/Size: FLAT FAN 8003

Nozzle Pressure: 30 PSI Boom Height: 18" Ground Speed:2 MPH

Delivery Rate Per Acre: 22.68 Calibration Date(s): 2/19/88

Application Description (ppi,pre,post,directed,banded,foliar,aerial,etc.)

BROADCAST SPRAY OVER TOP OF CROP, APPLIED TO THE SOIL SURFACE FOR PRE-EMERGENCE WEED CONTROL

5. Treatment Lists: (list pest(s) on pages 3 and 5)

Treatment	Rates lb ai/A	Application Date(s)*	Weight or Volume Used **	Volume of Spray Mixture
SIMAZINE	1.0	2/19/88	3.13 GR	.125 GAL
SIMAZINE	2.0	2/19/88	6.26 GR	.125 GAL
SIMAZINE	4.0	2/19/88	12.51 GR	.125 GAL

*Fill out Spray Record Table (Page 3) for every application date.
**Amount of liquid or dry formulation added to Volume of Spray

6. Rainfall/Irrigation Records:
Include IR-4 Rainfall/Irr. Record Table (Page 4) or other type of records.

7. Other Pesticides, Fertilizers, Lime and Adjuvants applied:

Product: ENDOTHALL	Amount/A: 1.5/BAI/A	Date: 2/12/88
Product: TRIFLURALIN	Amount/A: 0.5/BAI/A	Date: 9/9/87
Product:	Amount/A:	Date:
Product:	Amount/A:	Date:
Product:	Amount/A:	Date:

8. Harvest and Crop sampling information:
   Sampling Date(s): 7/9/88

   Days from last Treatment (phi): 141 DAYS

   Sampling Technique:

   Storage Conditions: N/A

   Preshipment Storage: N/A

   Shipment Conditions (dry ice, freezer truck, etc.):

   Date: N/A Carrier: N/A

   Residue Samples sent to: N/A

9. Narrative Summary of Results: (use Page 8 for additional comments, enter tabular date on Pages 5-7)

SIMAZINE AT THE 2 AND 4 LB AI/A RATES PROVIDED SATISFACTORY CONTROL OF BROADLEAF WEEDS IN THE MUSTARD FAMILY WITH YIELDS SIMILAR TO THE HANDWEEDED CHECKS.

10. Good Laboratory Practice Statement: (for field trials)
    I acknowledge that I have read and followed the IR-4 research protocol and completed this study following good agricultural practice, or reported any deviations*

Principal Investigator Signature William S Braunworth Jr Date 11/7/88
*Note any changes from authorized protocol on page 8

FDRF-3

Pr No: 2358
Trial:

Spray Record Table*
Application Time 1

Date: 2/19/88 Crop Growth Stage: VEGETATIVE (2 FEET IN HEIGHT)

Soil Moisture: WET Air Temp: 57°F Soil Temp: 51°F

Relative Humidity: 65% Wind Speed/Direction: 4 MPH, SW Cloud Cover %:0

1st Rainfall after Trt: 2/29/88, .08 IN Crop Stress: NONE

Pest (type and population): PRE-EMERGENCE WEED CONTROL
Pest (type and population):
Pest (type and population):
Pest (type and population):
Comments:

Application Date 2

Date: Crop Growth Stage:

Soil Moisture: Air Temp: Soil Temp:
Relative Humidity: Wind Speed/Direction: Cloud Cover %:

1st Rainfall after Trt: Crop Stress:

Pest (type and population):
Pest (type and population):
Pest (type and population):
Pest (type and population):
Comments:

Application Date 3

Date: Crop Growth Stage:

Soil Moisture: Air Temp: Soil Temp:

Relative Humidity: Wind Speed/Direction: Cloud Cover %:

1st Rainfall after Trt: Crop Stress:

Pest (type and population):
Pest (type and population):
Pest (type and population):
Pest (type and population):
Comments:

*Use additional sheets, if necessary.

IR-4 Rainfall/Irrigation Record Table

INSTRUCTIONS: Assign each column (A-F) a month. For each day with rain or days when irrigation was applied, note the amount (in cm or inches) and indicate either R for rainfall or I for irrigation. Please record rainfall amounts for two weeks before beginning of study and continue for duration of trial. On bottom of page specify type of irrigation (e.g. overhead, trickle, furrow).

	Month											
	A. FEB		B. MARCH		C. APRIL		D. MAY		E. JUNE		F. JULY	
Day		R,I		R,I		R,I		R,I		R,I		R,I
1	.08		.23				.11		.70			
2					.21		.19		.30		.01	
3			.02		.36		.47		.11			
4			.03		.28		.52					
5	.01		.19		.01				.01		.02	
6			.13				.15				.05	
7					.25		.44		.17			
8	.40		.07		.09		.02		.42			
9	.55		.53				.10		.05			
10	.25		.01						.01			
11	.01								.02			
12	.01											
13	.05						.69				.01	
14	.01				.54		.06					
15	.07				.12							
16	.04				.04		.42					
17							.11					
18	.14						.06		.01			
19							.01					
20					.29							
21			.03		.47							
22			.10									
23			.30									
24			.21		.05							
25			1.51		.03							
26			.02									
27			.46				.10					
28			.01				.22					
29	.08		.05		.17		.09		.03			
30					.42		.08					
31												
TOTAl*	1.70		3.90		3.33		3.84		1.83		.09	

Irrigation Type: NONE

* UNITS ARE IN INCHES

Weather Data

Appendix

Corvallis, 1988 (Oregon State University)

January-September

Day	January Prec.	January Hi	January Low	February Prec.	February Hi	February Low	March Prec.	March Hi	March Low
1	.1	44	32	.08	41	26	.23	55	44
2	0	41	23	0	38	26	T	54	40
3	.12	36	24	0	44	28	.02	51	35
4	.01	34	31	0	49	28	.03	58	37
5	.02	34	30	.01	38	30	.19	55	34
6	.04	39	31	0	40	30	.13	50	36
7	.04	37	32	0	51	38	T	51	31
8	.16	38	32	.40	52	43	.07	54	35
9	.47	47	35	.55	56	47	.53	49	40
10	1.18	53	41	.55	50	46	.01	51	31
11	1.53	45	36	.01	60	39	0	49	31
12	.16	48	36	.01	48	41	0	56	29
13	.17	46	35	.05	53	37	0	59	30
14	.81	54	44	.01	52	35	0	59	30
15	1.06	55	37	.07	52	38	0	61	35
16	.34	45	36	.04	51	34	0	61	33
17	.07	47	31	0	52	32	0	65	31
18	.23	40	32	.14	49	34	0	65	32
19	.01	43	32	0	51	39	0	70	35
20	.05	48	34	0	55	32	0	70	44
21	.01	52	31	T	50	35	.03	58	44
22	T	41	30	T	58	33	.1	56	40
23	.05	44	35	0	53	28	.3	59	39
24	T	45	35	0	60	29	.21	52	41
25	0	43	30	T	59	32	1.51	50	42
26	.01	41	31	0	59	37	.02	60	48
27	T	41	31	0	63	37	.46	53	37
28	.01	50	38	0	63	38	.01	54	31
29	.20	57	40	.08	63	39	.05	54	39
30	.14	53	31				T	51	35
31	.13	46	32				0	56	36
$\bar{x}$		44.7	33.2		52.1	34.9		56.3	36.3
Total	7.12			1.70			3.90		

T = Trace: Amount too small to measure
Prec.: Inches
Temp.: ^oF
Source: Climatological Data Oregon NOAA, 1988

Corvallis, 1988 (Oregon State University)

January-September (cont.)

Day	April Prec.	April Hi	April Low	May Prec.	May Hi	May Low	June Prec.	June Hi	June Low
1	0	63	40	.11	52	37	.70	59	48
2	.21	69	47	.19	52	40	.30	59	50
3	.36	53	44	.47	55	35	.11	65	45
4	.28	51	38	.52	53	38	0	67	47
5	.01	54	39	T	57	40	.01	64	39
6	0	63	47	.15	56	37	T	63	47
7	.25	54	38	.44	51	43	.17	65	49
8	.09	50	31	.02	66	44	.42	63	49
9	0	55	34	.10	56	42	.05	68	49
10	0	70	40	T	61	47	.01	64	47
11	0	76	43	0	78	47	.02	69	46
12	0	74	43	0	82	51	0	73	42
13	0	78	48	.69	74	49	0	73	46
14	.54	58	47	.06	60	49	0	80	52
15	.12	53	46	0	69	47	0	88	50
16	.04	60	49	.42	76	50	0	82	51
17	T	57	48	.11	61	41	0	78	50
18	0	58	37	.06	61	48	.01	75	53
19	0	62	43	.01	64	41	0	75	49
20	.29	60	42	0	67	45	0	80	47
21	.47	58	48	0	74	46	0	78	52
22	T	52	42	0	86	49	0	86	56
23	0	58	36	0	66	38	0	78	50
24	.05	60	40	0	63	41	0	73	50
25	.03	55	31	0	67	41	0	82	53
26	T	64	41	0	69	43	0	72	54
27	0	72	48	.10	65	51	0	71	53
28	0	74	52	.22	65	51	0	68	45
29	.17	63	45	.09	60	44	.03	62	47
30	.42	54	37	.08	61	37	0	69	43
31				T	62	47			
$\bar{x}$		60.9	42.1		64.2	43.8		71.6	48.6
Total	3.33			3.84			1.83		

Corvallis, 1988 (Oregon State University)

January-September (cont.)

Day	July Prec.	July Hi	July Low	August Prec.	August Hi	August Low	September Prec.	September Hi	September Low
1	0	76	45	0	80	42	0	85	52
2	.01	77	56	0	77	51	0	99	53
3	0	72	52	0	85	60	0	103	50
4	0	70	48	0	94	54	0	95	50
5	.02	68	50	0	95	49	0	90	50
6	.05	66	38	0	83	50	0	86	46
7	0	71	49	0	74	48	0	82	48
8	0	85	48	0	79	48	0	76	49
9	0	87	48	0	86	55	0	83	48
10	0	85	49	0	86	55	0	77	37
11	0	79	53	0	77	50	0	71	47
12	T	67	55	0	71	54	0	81	53
13	.01	71	55	0	77	53	0	87	48
14	T	67	55	0	70	52	0	90	43
15	0	74	52	0	75	51	0	87	41
16	0	77	48	T	71	56	0	68	43
17	0	82	51	0	75	49	0	67	40
18	0	82	51	0	74	44	0	70	34
19	0	90	62	0	79	48	.45	72	42
20	0	101	53	0	83	45	.03	68	43
21	0	98	52	0	77	45	0	68	45
22	0	89	52	0	86	54	0	73	42
23	0	85	50	0	96	50	0	70	43
24	0	85	55	0	100	47	0	75	49
25	0	94	55	0	86	43	0	75	54
26	0	101	64	0	88	44	T	66	55
27	0	101	51	0	86	54	.25	60	48
28	0	90	53	0	91	55	0	70	44
29	0	87	55	0	96	50	0	74	45
30	0	88	53	0	80	47	0	83	50
31	0	90	48	0	77	49			
$\bar{x}$		82.4	51.8		82.5	50.1		78.4	46.5
Total	.09			T .00			.73		

Cottage Grove, 1988

March-August

Day	March Prec.	March Hi	March Low	April Prec.	April Hi	April Low	May Prec.	May Hi	May Low
1	.03	59	30	0	69	33	.08	56	30
2	.11	54	40	.54	66	45	.17	54	37
3	.11	54	40	.44	53	43	.27	53	37
4	.42	55	44	.09	54	37	.14	56	33
5	.02	51	35	0	69	37	.14	56	39
6	.43	51	35	.27	69	40	.12	52	36
7	0	56	29	.33	49	33	.59	65	43
8	.26	56	32	0	57	30	.68	58	46
9	.66	51	37	0	72	29	.06	67	38
10	T	50	31	0	78	34	0	78	45
11	0	56	28	0	75	36	0	87	41
12	0	59	27	0	81	39	T	80	43
13	0	60	23	.13	70	48	.69	63	46
14	0	67	25	.56	53	45	.02	69	44
15	0	65	26	.03	57	46	.47	80	39
16	0	67	26	.08	56	48	0	76	48
17	0	67	25	.03	60	44	0	66	33
18	0	74	25	T	63	35	.10	65	45
19	0	72	28	.45	60	38	0	69	37
20	0	65	47	.19	58	40	0	75	34
21	.08	55	40	.91	56	43	0	91	35
22	T	61	34	T	60	34	0	84	45
23	.57	60	40	0	63	32	0	63	35
24	.09	50	35	.05	61	35	0	70	33
25	.05	68	35	.03	66	40	0	69	33
26	.28	64	43	.03	74	46	0	69	41
27	.15	50	34	0	76	47	0	72	51
28	0	59	31	.03	69	48	.41	67	47
29	.12	52	39	.67	58	40	.17	58	38
30	T	55	31	1.20	49	33	0	65	32
31	0	63	28				.37	61	49
$\bar{x}$		58.9	33.0		63.4	39.3		67.6	39.8
Total	3.38			6.06			4.50		

T = Trace: Amount too small to measure
Prec.: Inches
Temp.: ^oF
Source: Climatological Data Oregon NOAA, 1988

Cottage Grove, 1988

March-August (cont.)

Day	June Prec.	June Hi	June Low	July Prec.	July Hi	July Low	August Prec.	August Hi	August Low
1	.64	64	47	0	88	39	0	80	44
2	.08	75	46	.02	80	53	0	84	38
3	.32	67	45	T	72	51	0	93	42
4	.07	64	41	0	69	43	0	96	42
5	T	62	42	.04	67	48	0	94	47
6	T	63	42	0	75	35	0	80	43
7	.23	60	44	0	84	39	0	79	36
8	.05	68	42	0	88	46	0	86	39
9	.06	64	47	0	86	42	0	87	40
10	.06	69	43	0	84	43	0	84	46
11	0	72	38	0	78	53	0	75	50
12	0	73	35	0	80	49	0	77	48
13	0	79	36	0	77	55	0	73	50
14	0	86	44	0	74	54	0	77	48
15	0	85	50	0	76	48	0	78	43
16	0	80	50	0	82	41	0	80	41
17	0	79	50	0	83	42	0	75	47
18	0	78	54	0	87	38	0	80	37
19	0	79	45	0	100	45	0	83	38
20	0	78	44	0	99	48	0	84	32
21	0	86	45	0	95	48	0	83	36
22	0	80	50	0	85	46	0	95	38
23	0	78	52	0	83	42	0	95	43
24	0	76	50	0	92	45	T	89	44
25	0	82	41	0	97	47	0	93	38
26	0	71	42	0	98	51	0	95	43
27	0	69	52	0	97	54	0	90	42
28	T	66	44	0	88	45	0	96	45
29	.02	68	44	0	88	46	0	89	47
30	0	78	35	0	89	47	0	78	40
31				0	88	48	0	82	38
$\bar{x}$		73.3	44.7		84.8	46.2		84.8	42.1
Total	1.53			.06			T .00		

Dallas, 1988

March-August

Day	March Prec.	March Hi	March Low	April Prec.	April Hi	April Low	May Prec.	May Hi	May Low
1	.01	58	40	0	66	34	.25	52	34
2	.10	57	39	.34	64	45	.31	52	42
3	T	51	34	.23	50	40	.18	55	37
4	.25	53	45	.01	55	35	.07	55	35
5	.43	50	37	0	59	43	.18	54	35
6	.05	50	36	.18	58	43	.15	54	35
7	0	58	32	.09	58	33	.58	63	44
8	.17	58	38	0	55	27	.12	60	41
9	.35	53	38	0	68	39	T	60	41
10	0	53	31	0	76	39	0	75	45
11	0	56	26	0	74	38	0	81	45
12	0	60	28	0	77	42	0	82	50
13	0	61	32	.02	77	46	.63	61	48
14	0	60	32	.44	56	46	.19	64	46
15	0	61	28	0	58	46	.01	74	45
16	0	64	35	0	57	49	.02	70	48
17	0	67	32	0	55	46	.03	59	41
18	0	68	32	0	61	38	T	61	46
19	0	69	33	T	61	46	0	66	40
20	T	58	46	.35	60	48	0	73	40
21	.03	57	42	.12	54	47	0	84	47
22	.03	56	33	0	55	41	0	84	48
23	.60	55	42	.01	55	38	0	62	38
24	.89	49	40	0	54	40	0	75	41
25	.28	59	45	0	62	31	0	78	40
26	.48	54	46	0	69	41	0	68	41
27	T	50	35	0	73	41	0	68	41
28	0	52	33	.15	72	49	.09	62	48
29	.08	50	40	.24	57	43	.15	58	40
30	.02	53	34	.11	51	34	.03	58	36
31	0	62	36				.05	60	49
$\bar{x}$		56.8	36.1		61.6	40.9		65.4	42.2
Total	3.77			2.29			3.04		

T = Trace: Amount too small to measure
Prec.: Inches
Temp.: ^{o}F
Source: Climatological Data Oregon NOAA, 1988

Dallas, 1988

March-August (cont.)

Day	June Prec.	June Hi	June Low	July Prec.	July Hi	July Low	August Prec.	August Hi	August Low
1	.68	60	41	0	74	45	0	75	46
2	.31	64	48	0	72	45	0	84	46
3	.27	63	44	0	68	52	0	92	54
4	T	61	41	0	69	47	0	94	53
5	.05	62	40	.04	65	48	0	94	52
6	0	64	42	0	70	39	0	72	43
7	.21	63	48	0	84	44	0	76	44
8	.38	67	47	0	86	44	0	84	47
9	T	64	48	0	86	49	0	85	52
10	.23	66	47	0	83	49	0	85	52
11	.04	70	40	0	75	49	0	75	50
12	0	71	41	0	70	54	0	75	51
13	0	79	44	0	68	55	0	74	52
14	0	87	49	0	71	54	0	72	58
15	0	87	50	0	80	45	0	72	49
16	0	81	50	0	80	45	.02	68	56
17	T	75	49	0	81	48	0	70	44
18	T	72	56	0	88	46	0	76	46
19	0	79	46	0	100	62	0	80	48
20	0	79	45	0	100	56	0	71	44
21	0	83	54	0	94	50	0	85	41
22	0	83	56	0	87	53	0	94	49
23	0	74	51	0	87	46	0	99	49
24	0	80	46	0	93	50	0	96	48
25	0	80	50	0	100	51	0	85	45
26	0	68	54	0	101	59	0	85	46
27	0	64	50	0	96	53	0	92	46
28	.09	64	46	0	86	48	0	96	54
29	.01	67	44	0	86	54	0	96	53
30	0	72	42	0	87	50	0	76	46
31				0	86	53	0	95	43
$\bar{x}$		71.6	47.0		83.0	49.8		83.2	48.6
Total	2.27			.04			.02		

Estacada, 1988

March-August

Day	March Prec.	March Hi	March Low	April Prec.	April Hi	April Low	May Prec.	May Hi	May Low
1	.04	52	44	T	63	39	.08	54	38
2	.21	55	41	1.02	54	47	.32	55	42
3	.07	51	38	.51	48	39	.22	54	38
4	.71	52	39	.28	54	38	.02	57	40
5	.10	52	38	.01	59	41	.04	55	44
6	.19	49	37	1.16	52	37	.13	52	40
7	0	55	31	.36	51	34	.02	62	47
8	.69	50	40	.01	55	34	.04	57	44
9	.36	47	37	0	74	36	0	66	41
10	.02	47	35	0	76	49	0	83	52
11	0	55	29	0	74	41	0	86	51
12	0	55	32	0	79	41	.10	74	49
13	0	58	33	.19	61	48	.72	58	47
14	0	59	35	.03	51	48	.02	67	48
15	0	62	29	0	59	48	.07	76	46
16	0	63	31	.20	54	48	.83	57	44
17	0	66	41	.14	53	46	.11	62	43
18	0	68	40	0	62	45	.10	67	46
19	0	71	42	.29	65	44	0	67	47
20	.15	59	46	1.14	53	48	0	75	42
21	.21	52	40	.90	49	44	T	89	46
22	.27	60	40	.04	53	41	.08	69	48
23	.67	49	40	.02	57	42	0	61	44
24	.85	48	39	.09	57	42	0	69	46
25	.18	60	46	.04	62	36	0	68	45
26	1.03	51	37	0	70	40	0	67	44
27	.27	51	36	0	72	54	.06	68	55
28	.38	52	35	.55	64	48	.82	57	46
29	.35	50	38	1.03	55	39	.14	56	45
30	.05	53	39	.46	51	36	0	61	43
31	.05	60	36				.55	57	49
$\bar{x}$		55.2	37.5		59.6	42.5		64.7	45.2
Total	6.83			8.47			4.47		

T = Trace: Amount too small to measure
Prec.: Inches
Temp.: °F
Source: Climatological Data Oregon NOAA, 1988

Estacada, 1988

March-August (cont.)

Day	June Prec.	June Hi	June Low	July Prec.	July Hi	July Low	August Prec.	August Hi	August Low
1	.66	62	47	0	75	50	0	73	53
2	.64	71	49	.62	70	55	0	84	50
3	.01	61	46	.01	65	49	0	92	52
4	.13	60	46	.01	67	46	0	91	56
5	.12	60	46	.34	61	49	0	91	53
6	.01	63	46	0	69	46	0	69	49
7	.04	62	49	0	83	47	0	74	48
8	.03	67	47	0	85	52	0	82	48
9	.49	63	47	0	82	52	0	81	52
10	.10	68	47	0	78	52	0	76	56
11	T	72	42	.03	63	56	0	64	56
12	0	75	44	.14	64	56	0	73	55
13	0	81	43	.16	63	56	0	68	53
14	0	89	48	.02	72	54	0	70	54
15	0	80	54	0	73	54	0	67	53
16	0	78	52	0	78	49	.06	74	57
17	.11	74	53	0	79	49	0	70	57
18	.05	71	56	0	92	52	0	75	53
19	0	79	49	0	101	52	0	78	49
20	0	76	50	0	95	59	0	70	51
21	0	85	53	0	84	53	0	84	44
22	0	75	58	0	78	51	0	96	45
23	0	69	53	0	88	53	0	100	54
24	0	83	45	0	84	51	0	85	55
25	0	75	57	0	97	55	0	85	50
26	.03	66	54	0	96	58	0	78	49
27	0	64	52	0	83	55	0	87	50
28	.15	63	50	0	83	51	0	92	52
29	.01	67	49	0	83	54	0	92	53
30	0	75	44	0	84	53	0	71	46
31				0	73	50	0	83	47
$\bar{x}$		71.1	49.2		79.0	52.1		79.8	51.6
Total	2.58			1.33			.06		

McMinnville, 1988

January-June

	January			February			March		
Day	Prec.	Hi	Low	Prec.	Hi	Low	Prec.	Hi	Low
1	.01	42	32	0	40	26	0	56	47
2	.01	42	26	0	35	19	0	54	42
3	.30	34	31	0	54	31	0	53	32
4	0	36	31	0	45	27	0	54	32
5	.01	36	30	0	42	25	.45	50	34
6	.12	39	30	0	46	25	.32	49	35
7	.01	40	33	.22	51	41	0	57	29
8	0	39	33	0	53	47	.54	49	42
9	1.03	53	37	0	53	45	.03	51	39
10	.9	52	36	0	61	41	0	49	31
11	.45	49	41	0	53	35	0	58	27
12	.27	45	32	0	50	40	.01	61	27
13	1.08	50	39	.16	51	37	0	61	29
14	1.92	55	47	.01	48	35	0	59	31
15	.71	47	38	0	52	41	0	64	28
16	.55	45	35	0	54	31	0	67	37
17	.06	44	35	0	50	31	0	63	35
18	.45	39	32	.28	51	40	0	69	31
19	.02	44	34	0	56	39	0	69	33
20	.08	54	33	0	52	31	0	58	51
21	0	48	28	0	--	33	.07	58	43
22	0	39	29	0	59	32	0	56	43
23	.06	39	34	0	61	29	.76	53	42
24	0	51	31	0	57	32	1.24	48	41
25	0	43	33	0	63	32	.05	59	46
26	0	43	29	0	68	42	.27	52	43
27	0	44	38	0	69	40	.15	53	36
28	.36	52	38	0	69	50	.05	54	35
29	.04	49	33	0	69	47	0	54	32
30	.21	44	33				0	55	37
31	.21	42	35				0	67	36
$\bar{x}$		44.5	33.7		54.0	35.3		56.8	36.3
Total	8.85			.67			3.94		

T = Trace: Amount too small to measure
Prec.: Inches
Temp.: °F
Source: Climatological Data Oregon NOAA, 1988

McMinnville, 1988

January-June (cont.)

Day	April Prec.	April Hi	April Low	May Prec.	May Hi	May Low	June Prec.	June Hi	June Low
1	0	66	36	.02	55	35	.73	63	48
2	.66	52	47	.39	57	44	.47	64	48
3	.05	53	42	.47	56	38	0	67	47
4	0	57	38	0	58	38	0	63	37
5	0	58	45	.05	57	40	.02	63	37
6	.23	53	47	0	55	41	.08	66	48
7	0	54	35	0	66	46	.64	60	49
8	0	57	29	.25	61	42	.02	69	41
9	0	71	42	0	62	39	.24	68	49
10	0	77	42	0	81	48	0	69	50
11	0	77	41	0	84	48	0	74	42
12	0	79	41	.25	80	53	0	74	43
13	0	60	47	0	61	50	0	83	46
14	.32	58	48	0	67	49	0	91	51
15	0	60	49	0	75	47	0	86	53
16	0	59	51	.55	69	50	0	79	53
17	.02	59	47	0	59	44	0	71	52
18	0	63	45	.05	64	47	0	75	52
19	.15	63	49	0	69	48	0	82	48
20	.21	60	49	0	78	42	0	82	48
21	.05	57	49	0	88	46	0	86	55
22	0	57	42	0	85	50	0	84	61
23	0	57	40	0	64	37	0	77	55
24	T	59	37	0	69	44	0	85	45
25	0	67	36	0	69	42	0	84	45
26	0	71	41	0	65	50	T	80	54
27	0	75	50	0	65	54	0	67	53
28	.21	73	50	.25	63	51	0	67	46
29	.30	58	43	0	61	42	0	69	47
30	.49	57	37	0	62	51	0	73	43
31				.06	61	51			
$\bar{x}$		62.2	43.2		66.6	45.4		74.0	48.0
Total	2.69			2.34			2.20		