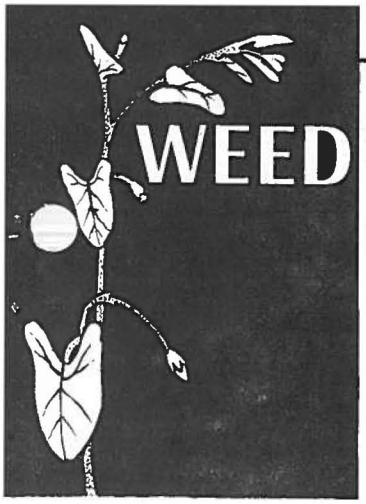

COOPERATIVE EXTENSION UNIVERSITY OF CALIFORNIA

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WEED CONTROL NOTES

PROGRESS REPORT

WEED CONTROL
IN
ALMONDS

Series 77:6

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INTRODUCTION

Two years of drought have served to emphasize the importance of water in California. Everyone knows that weeds waste water. Weeds cannot be tolerated especially in almond orchards with a short supply of expensive water. Some authorities estimate water used by weeds in orchards to be 14 to 18 inches per year. While this is a significant amount in dollars and cents, the water lost is even more important in a drought year. Based on the present water emergency in California this fall, we submitted Section 18 Emergency Exemptions from FIFRA to the State Department of Agriculture for Surflan (oryzalin), Goal (oxyfluorfen), and Roundup (glyphosate) in bearing orchard trees, including almonds. If processed by the state and allowed by the EPA, significant water savings could be made this coming year.

If no legislative action is taken to improve weed control in orchards, we will be left with finding more effective ways to utilize the registered herbicides we now have, i.e., Casoron (dichlobenil), Preemerge (dinoseb), Eptam (EPTC), Devrinol (napropamide), Princep (simazine) and Treflan (trifluralin) for preemergence weed control in bearing almonds. We also have dalapon, dinoseb, paraquat and weed oil for postemergence control of annuals and to some extent, perennial weeds in bearing almonds. While the list is seemingly long, many of these herbicides are not sufficiently safe and effective to be adequate. In some cases, the safety and effectiveness of these older registered herbicides have been improved with this years work, but

the almond grower.

Paraquat continues to be valuable on those weeds which are susceptible, particularly the grasses. Roundup (glyphosate) was also extremely effective on annual grasses, but was slower to kill than paraquat. The combination of Roundup and Goal (oxyfluorfen) gave the best broadleaf and grass control. Although Ronstar (oxadiazon) has looked outstanding alone, and in most combination work, it has just recently been shelved for trees because of economic considerations.

Another important objective in the almond work is the control of perennial weeds. While postemergence herbicides have given the most spectacular control of perennial weeds, a more subtle and perhaps long lasting control has come from the continuous use of preemergence herbicides. Both approaches separately and in combination are being studied. Since both approaches kill in different ways, it is reasonable to assume that their combination would be additive, and perhaps in the long run cheaper. Roundup (glyphosate) in combination with Solicam (norflurazon) or Goal (oxyfluorfen) was better than the preemergence herbicides alone for the control of whitehorse nettle (silver leafed nightshade).

The continuous use of preemergence herbicides such as Surflan (oryzalin), Ronstar (oxadiazon), and Rydex (prodiamine) has helped to control perennial bindweed in several trials. Likewise, the continuous use of Solicam (norflurazon) has reduced nutsedge and bermudagrass.

Of the faster acting postemergence herbicides, Roundup (glyphosate) has been spectacularly good on most perennials being somewhat less effective on broadleaf perennials such as perennial bindweed.

In one broadleaf perennial trial, Roundup was quite effective on whitehorse nettle. When 2,4-D was added to Roundup, even better control was obtained. This was also true in some tests with perennial bindweed. The combination of Roundup and Krenite was also of interest. Krenite alone, although slower acting, was somewhat better than 2,4-D in one experiment when used at a higher rate.

The addition of a growth regulator designed to change the physiological condition of plants such as ethephon (Ethrel) was spectacularly effective with Krenite on bindweed control. Such combinations will be studied further, particularly for early season timed applications on vegetatively growing perennials.

Although numerous phytotoxicity trials have been run on orchard species with translocated herbicides, all conditions for injury have not been evaluated. Young almonds have been generally more resistant to injury than other tree species. This years work suggests that almonds are <u>not</u> susceptible to basal sprays of low rates of Roundup (glyphosate) of fairly high rates from a single spray or from spraying two successive years. There was, however, some slight apparent injury to nectarines and considerable sucker supression. The stunting due to 2,4-D or MSMA was much more apparent than with Roundup. These results also confirm earlier results, but more work on basal sprays is planned because of the important variables that can exist.

The individual reports for this year follow:

<u>Screening new herbicides for preemergence weed control in newly planted rootstock almonds</u>. Lange, A. H., B. Fischer, J. Schlesselman, and L. Nygren. Mission almond on Nemaguard rootstock was planted March 1, 1977. Preemergence herbicides were applied March 24,

weed control evaluation made April 28, 1977 showed some common differences in broadleaf annual weed control. Oryzalin (Surflan) gave good control of all species but filaree. Napropamide (Devrinol) gave good control of all species. Oxadiazon (Ronstar) and oxyfluorfen (Goal) gave excellent control of all species but chickweed. Prodiamine (Rydex) gave good control of all species but yellow radish. Norflurazon (Solicam) gave good control of all species even though applied at only half the rate of the other herbicides. There was no phytotoxicity to almonds from any treatment.

The effect of 6 herbicides on the control of broadleaf annual weeds in almonds. (425-24-501-146-2-77)

Herbicide	lb/A	Average[1/] Chickweed	Cheeseweed	Filaree	Yellow Radish
Oryzalin	4	9.0	9.3	6.7	9.3
Napropamide	4	10.0	10.0	8.0	9.0
Oxyfluorfen	2	4.0	10.0	10.0	9.7
Oxadiazon	4	3.3	10.0	10.0	10.0
Prodiamine	4	10.0	8.3	8.3	5.7
Norflurazon	2	8.3	8.3	10.0	10.0
Check	-	1.3	5.7	4.0	4.0

1/Average of 3 replications where 0 = no effect, 10 = complete control. Treated 12/14/76. Evaluated 4/28/77.

<u>A comparison of 6 preemergence herbicides as measured by the control of annual grasses in a young almond orchard under sprinkler irrigation</u>. Lange, A. H., L. Hendricks, L. Nygren, and J. Schlesselman. A stand of Non-Pareil almonds, at the first leaf stage, was treated with a uniform weed control trial. The orchard was maintained under sprinkler irrigation and growing in a soil with 73.6% sand, 22.7% silt, 3.7% clay, and 0.63% organic matter. Plot size was 6.5 ft. by 75 ft. which included 4 trees. Treatments were applied at 50 GPA and replicated 4 times. Paraquat + X-77 at 0.5 lb ai/A + 0.5% were added to each treatment, including the check, to control the weeds present at the time of application.

An evaluation of grass control was made on April 28, 1977. Oxyfluorfen (Goal) and norflurazon (Solicam) gave only moderate control of the grass while all the other treatments appeared to be effective. None of the treatments gave any indication of phytotoxicity to the almonds. Oryzalin (Surflan) and prodiamine (Rydex) appeared to be most effective.

A comparison of 6 preemergence herbicides as measured by the control of annual grasses in a young almond orchard under sprinkler irrigation. (425-24-501-146-3-77)

Herbicide	lb ai/A	Average[1/] Grass Controlled
Oryzalin	4	9.8
Napropamide	4	8.5
Oxyfluorfen	2	6.5
Oxadiazon	4	7.8
Prodiamine	4	9.5
Norflurazon	2	6.5
Check	-	0.9

1/Average of 8 replications where 0 = no control, 10 = complete control. Treated 12/14/77. Evaluated 4/28/77.

<u>A comparison of 6 preemergence herbicides on the control of several weed species</u>. Schlesselman, J., A. H. Lange, L. Nygren, and E. Stevenson. A stand of Merced and Non-Pareil almonds, growing in a soil with 78.0% sand, 17.8% silt, 4.2% clay, and 1.1% organic matter, were treated with several preemergence herbicides for compraison of annual weed control. The trees were at the second leaf stage when they were treated on Jan. 13, 1977. Herbicides were applied to 5 ft. by 42 ft. at 50 GPA and replicated 4 times. Annual weeds present at the time of application included red maids, filaree, and chickweed. Paraquat at 1 lb ai/A was added to all treatments, including the check, to eliminate these standing weeds. An evaluation on March 6, 1977 showed that all the treatments were free from filaree growth and the best overall treatments

due to competition with heavy weed populations.

Weed control ratings on August 8, 1977 showed that the combination of simazine (Princep) and oryzalin (Surflan) produce the best weed control. Simazine and napropamide (Devrinol) combinations gave excellent broadleaf control but missed the grasses. Oxadiazon (Ronstar) and norflurazon (Solicam) gave good grass control and marginal control of the broadleaves. Oxyfluorfen (Goal) and prodiamine (Rydex) combinations produce good results on both broadleaves and grasses.

This study will continue for a total of 7 years with annual applications. Weed control ratings, and tree growth measurements and yields will be recorded and reported yearly.

The effect of continuous annual application of herbicide combinations on the growth of two orchard varieties. (425-73-501-H14-2-75)

		Almond dia. (cm)[1/]			Nectarine dia. (cm)[1/]		
Herbicide	lb/A	Overall chemical	Strip (5 ft berm)	Tillage	Overall chemical	Strip (5 ft berm)	Tillage
Simazine + Oryzalin	1+4	5.8	7.4	-	4.7	4.6	-
Simazine + Napropamide	1+4	6.6	7.2	-	4.2	4.2	-
Oxadiazon + Norflurazon	4+2	7.9	6.9	-	4.6	5.0	-
Oxyfluorfen + Napropamide	2+4	6.5	7.3	-	4.3	4.9	-
Check	-	5.3*	7.0*	6.8	3.9*	3.4*	4.5

1/ Average of 4 replications. Diameter of trunk measured 15 cm above ground level.
Treated 2/10/75; 1/9/76; 12/17/76. Evaluated 11/22/76.
*Smaller trunk dia. due to weed competition in the check.

The effect of continuous annual application of herbicides combinations on the control of broadleaf and grassy weeds. (425-73-501-H14-2-75)

		Tillage		Average[1/] No tillage		Strip	
Herbicide[2/]	Lb/A	B.L.	Grass	B.L.	Grass	B.L.	Grass
Oxyfluorfen + penoxalin[a/]	2+4	-	-	6.8	5.0	6.2	9.0
Oxadiazon + norflurazon	4+2	-	-	7.5	9.2	7.8	9.0
Simazine + oryzalin	1+4	-	-	9.8	8.8	10.0	9.0
Oxyfluorfen + prodiamine	2+4	-	-	7.0	8.8	8.8	9.5
Simazine + napropamide	1+4	-	-	9.2	0.0	10.0	5.5
Check	-	0.0	0.0				

1/ Average of 4 replications; where 0 = no effect, 10 = complete weed control.

2/ Treated 2/10/75, 1/9/76, 12/17/76; Evaluated 8/8/77.

a/ Not treated 2/10/75 or 1/9/76. Treated 12/17/76 only.

B.L. = Flax leaved fleabane, mare's tail, and some pigweed.
Grass = Watergrass.

Continuous chemical weed control with five preemergence herbicide combinations in young almonds. Lange, A. H., L. Nygren, and J. Schlesselman. Because of the variation of yields from almond trees, very little harvest data has been obtained. The object of this long term study was to determine if any detrimental effects could be observed by the continuous use of herbicides in orchards.

The trees were planted March 1973 and treated with preemergence herbicides April 18, 1974, Nov. 21, 1974, Dec. 24, 1975, Jan. 26, 1977, and April 20, 1977. Because of the low population of weeds, very little if any weed competition has occurred. All treatments have given satisfactory weed control. The few weeds in the untreated checks were hand pulled or sprayed out with paraquat. No tillage has occurred in these plots. The trees bore measurable amounts of almonds during the 1977 season and harvest data was taken. When the data from both treatment dates and varieties were put together allowing 20 replications, no statistical differences were obtained. No other detrimental effects were observed with the exception of a few simazine symptoms on an occasional Mission tree where simazine had been applied.

The effect of continuous preemergence herbicides on the yield of young Non-Pariel and Mission almond trees. (A36-78-501-H14-1-74)

Herbicide	lb/A	Trunk dia. cm	Lb/Tree
Simazine+Prodiamine	1+4	118	3.1
Simazine+Oryzalin	1+4	128	3.5
Simazine+Napropamide	1+4	115	2.8
Oxadiazon+Norflurazon	4+2	120	3.3
Oxadiazon+Napropamide	4+4	115	2.5
Check	-	118	3.1
LSD_{05}		NS	NS

Average of 20 replications, trees planted on 12 x 8 spacing.

Table . Effect of initial irrigation on the activity of 3 preemergence herbicides (425-73-506-6-76)

		Phytotoxicity[1]							
		Alfalfa				Sugar Beets			
Herbicide	lb/A	0"	1/8"	1/2"	2"	0"	1/8"	1/2"	2"
Napropamide	4	4.5	6.5	6.8	8.0	2.5	6.8	7.0	8.1
Norflurazon	4	10.0	9.8	10.0	10.0	10.0	10.0	10.0	10.0
Oryzalin	4	7.0	6.3	9.3	9.3	8.8	9.8	10.0	10.0
Check	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

		Phytotoxicity[1]							
		Milo				Millet			
Herbicide	lb/A	0"	1/8"	1/2"	2"	0"	1/8"	1/2"	2"
Napropamide	4	3.8	8.8	8.8	9.0	7.8	9.6	9.6	9.6
Norflurazon	4	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Oryzalin	4	5.0	7.8	8.3	9.3	9.3	10.0	10.0	10.0
Check	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]/Average of 4 replications where 0 = no effect, 10 = complete kill. Treated 8/3/76. Seeded 9/2/76. Evaluated 10/13/76.

Table . Effect of initial irrigation on the activity of herbicides 8 months after application (425-73-506-6-76)

		Phytotoxicity[1]							
		Sugar Beets				Alfalfa			
Herbicide	lb/A	0"	1/8"	1/2"	2"	0"	1/8"	1/2"	2"
Napropamide	4	5.8	5.8	6.3	5.5	6.3	6.3	7.0	4.0
Norflurazon	4	6.3	7.8	8.3	9.0	5.8	7.0	8.0	8.0
Oryzalin	4	8.3	9.0	10.0	9.3	6.5	7.3	7.7	7.0
Check	-	1.3	3.5	2.3	2.3	3.8	3.5	2.5	3.5

		Phytotoxicity[1]							
		Barley				Ryegrass			
Herbicide	lb/A	0"	1/8"	1/2"	2"	0"	1/8"	1/2"	2"
Napropamide	4	7.3	7.0	7.5	6.0	5.8	5.3	5.7	4.8
Norflurazon	4	9.9	9.9	10.0	10.0	8.0	8.5	9.8	9.5
Oryzalin	4	5.3	8.0	7.7	5.8	7.8	8.8	8.0	8.0
Check	-	1.3	2.0	0.8	0.3	0.3	1.0	1.3	1.3

[1]/ Average of 4 replications where 0 = no effect, 10 = complete kill. Treated 8/3/76. Reseeded 12/10/76. Evaluated 4/4/77.

Table . The effect of initial irrigation on the activity of 3 preemergence herbicides 1 year after application (425-73-506-6-76)

		Phytotoxicity[1]							
		Sugar Beets				Alfalfa			
Herbicides	lb/A	0"	1/8"	1/2"	2"	0"	1/8"	1/2"	2"
Napropamide	4	4.3	6.3	6.7	4.5	5.3	5.3	7.0	5.5
Norflurazon	4	7.5	8.8	9.5	9.3	7.3	7.5	9.3	9.3
Oryzalin	4	7.0	9.5	9.7	9.8	6.0	7.0	7.7	7.8
Check	-	3.8	3.5	6.0	3.8	5.3	5.5	3.3	4.8

		Phytotoxicity[1]							
		Milo				Millet			
Herbicide	lb/A	0"	1/8"	1/2"	2"	0"	1/2"	1/2"	2"
Napropamide	4	0.8	1.8	2.0	1.0	1.0	1.0	3.7	0.0
Norflurazon	4	6.8	8.3	9.5	9.6	9.0	9.3	9.5	10.0
Oryzalin	4	2.3	6.3	5.3	5.5	3.8	8.0	9.5	8.8
Check	-	0.0	0.3	0.5	0.0	1.0	1.0	1.5	1.0

[1]/ Average of 4 replications where 0=no effect, 10=complete kill. Treated 8/3/76. Reseeded 6/20/77. Evaluated 7/14/77.

The effect of thin layering preemergence herbicides on residual activity as measured by groundsel and shepherds purse control. Lange, A., J. Schlesselman, and R. Vargas. In a year of little rainfall, much herbicide activity can be lost after application. It is essential to find a means of herbicide incorporation to act as a substitute for immediate rainfall. A thin layering method of herbicide incorporation is being studied as a method of herbicide incorporation. A field trial was conducted to determine the effect of thin layering on several preemergence herbicides. A uniform stand of almonds growing in a soil containing 72.2% sand, 16.6% silt, 11.2% clay, and 0.78% organic matter were divided into two tree plots and treated on November 15, 1976. All treatments were applied at 50 GPA. Immediately after application, one-half of the plots were covered with a thin layer (1/2 to 1 inch) of soil by using a rotary ditcher. The other half were left uncovered for a direct comparison. The first significant precipitation occurred six weeks after application, i.e., 0.25 inches of rainfall.

Weed control evaluations taken on March 15, 1977 indicate a slight increase in herbicide activity, when covered, for all compounds except oxyfluorfen (Goal) and prodiamine (Rydex). Norflurazon (Solicam) gave the best control whether covered or not.

The effect of thin layering on the residual activity of herbicides as measured by weed control. (425-20-146-1-77)

		Weed control[1]	
Herbicide	Lb. ai/ac	Uncovered	Covered
Napropamide	4	5.1	6.8
Oryzalin	4	8.5	8.1
Oxyfluorfen	4	10.0	0.0
Prodiamine	4	8.3	4.9
Norflurazon	2	7.9	9.8
Norflurazon	4	9.1	9.8
Check	-	0	0

[1]/ Average of 8 replications where 0 = no weed control, 10 = complete weed control.

Applied 11/15/76. Evaluated 3/15/77.

A comparison of 6 herbicides applied through emitters on indicator crops. (425-73-506-8-76)

Herbicide	PPM	Average[1] Herbicide[2] Movement (cm)	Fresh Wt.[3] Milo (gm)	Milo[4] Phyto.
Napropamide	1	2.3	19.8	2.3
Napropamide	10	3.4	19.4	2.3
Napropamide	100	8.9	11.5	1.0
Oryzalin	1	5.5	14.1	2.3
Oryzalin	10	11.4	16.6	5.0
Oryzalin	100	17.4	6.4	3.3
EPTC	1	10.0	14.1	1.3
EPTC	10	9.1	17.0	2.0
EPTC	100	20.1	5.3	1.3
Trifluralin	1	10.8	15.4	2.3
Trifluralin	10	14.2	12.3	5.0
Trifluralin	100	18.6	10.0	10.0
Pebulate	1	9.5	13.3	0.3
Pebulate	10	8.7	18.8	0.7
Pebulate	100	16.3	11.5	0.7
Chloramben	1	4.0	22.8	1.0
Chloramben	10	1.5	21.2	1.3
Chloramben	100	0.0	24.6	0.0
Check	-	0.0	24.8	0.8

1/ Average of 12 replications: 3 replications x 4 emitters/rep.
2/ Total movement (either side of emitter), 9/1/76.
3/ Fresh weight obtained from 15 cm each side of emitter, 9/7/76.
4/ Average rating: 0 = no effect, 10 = complete kill, 10/4/76
Trial established 8/18/76; reseeded 9/18/76.

Effect of chemical movement when applied through drip irrigation on seedling growth surrounding emitters. Nygren, L., A. Lange, J. Schlesselman, and R. Goertzen. The extensive use of drip irrigation in almonds has lead to a new weed control problem -- the wet zone near a drip emitter produces a perfect environment for weed growth. Postemergence weed control is effective, but may require several applications each season to maintain control. The use of preemergence herbicide injection through drip line irrigation is under investigation as one method of control.

This trial was established on a Delhi loamy sand with 87.7% sand, 9.8% silt, 2.5% clay, and 0.34% organic matter. Drip lines were placed on 60 inch prepared beds seeded with tomatoes (VF 134) and milo, parallel and adjacent to the drip line. Plots containing 4 emitters each were established and treated on August 12, 1977. Herbicide injection was simulated by applying the treatments through a short 4 emitter section of drip line connected to a container pressurized at 10 psi with a constant pressure CO_2 bottle. The 4 emitter drip line was layed next to the main drip line (emitter to emitter) as injection took place. Each treatment set up was replicated 3 times, followed by 2 hours of drip irrigation (water only). Subsequent irrigation was with sprinkler and drip to assure a uniform stand of the indicator crops. Evaluations were made by measuring the distance of observable phytotoxicity symptoms from each emitter and by taking fresh weights in a 23 cm radius around each emitter for both indicator crops.

Trifluralin (Treflan) moved readily through a portion of the wet zone produced by continual drip irrigation. Fresh weights obtained from these plots showed a great deal of indicator plant kill and reduction of fresh weight when compared to the check. Napropamide (Devrinol) too, showed good movement, but was less phytotoxic to the indicator crops than trifluralin. EPTC (Eptam) moved farther than the other compounds in this trial; however, there was a zone next to the emitter where the indicator crop grew with no phytotoxic symptoms. This may indicate EPTC activity is reduced near the emitter from excessive movement or degradation, dilution, etc. When EPTC is used through the emitter, it may be desirable to inject it near the end of the run or for a longer period than used in this test. These same observations were also evident in the ametryn plots. Movement and fresh weights of both indicator crops were somewhat erratic in the oxadiazon (Ronstar) and oryzalin (Surflan) plots. In both cases, the middle rate produced the greatest movement and lowest fresh weights. Oxyfluorfen (Goal), at the high rate, moved farther than any other compound in this trial as indicated by tomato growth.

The effect of ten herbicides applied in a water suspension to Mission almond seedlings growing in a Delhi sandy loam. (425-73-501-146-3-77)

Herbicide	lb/A	Fresh wt. gms.[1]	Regrowth Wt.[3]	Vigor of regrowth[2]
Simazine	1/8	6.4	6.8	7.5
Simazine	1/2	9.3	9.1	8.5
Simazine	2	1.5	0.8	1.2
Napropamide	2	6.1	3.2	6.5
Napropamide	8	4.7	9.8	9.0
Napropamide	32	7.0	8.2	9.5
Oryzalin	2	8.7	8.9	8.0
Oryzalin	8	4.9	2.9	5.2
Oryzalin	32	4.9	1.8	4.5
Prodiamine	2	8.8	11.2	9.0
Prodiamine	8	9.1	7.9	7.5
Prodiamine	32	7.4	6.4	7.5
Norflurazon	1/2	6.4	3.9	6.2
Norflurazon	2	2.2	0.9	0.8
Norflurazon	8	1.8	0.0	0.0
Oxadiazon	2	8.3	7.6	8.0
Oxadiazon	8	7.5	4.9	6.5
Oxadiazon	32	8.3	3.4	5.0
Oxyfluorfen	2	10.5	12.1	8.0
Oxyfluorfen	8	8.2	8.4	8.2
Oxyfluorfen	32	8.8	7.1	7.5
Penoxalin	2	9.8	12.1	8.8
Penoxalin	8	8.8	8.0	7.2
Penoxalin	32	6.3	1.3	1.5
Glyphosate	2	8.0	7.1	8.2
Glyphosate	8	9.1	9.1	9.8
Glyphosate	32	6.7	6.7	7.2
Methazole	2	4.2	4.2	6.5
Methazole	8	0.6	0.0	0.0
Methazole	32	1.4	0.0	0.0
Check	-	6.2	7.1	8.5

1/ Average of 4 replications. Evaluated 7/6/77.
2/ 0 = no effect or no live almond seedlings, 10 = perfect control and most vigorous regrowth of almond seedlings. Evaluated 8/10/77.
3/ Evaluated 9/14/77.
Trees 8-12" tall in 46 oz. of Delhi sandy loam (O.M. = 0.1%).

The relative phytotoxicity of 3 herbicides to Mission almond seedlings in sand nutrient culture. Nygren, L. and A. H. Lange. The herbicides in water suspension were prepared and applied July 15, 1977 to young Mission almond seedlings growing in a Delhi sandy loam soil (0.1% organic matter, 72% sand, 6% silt, and 22% clay). The effect on foliage and growth were observed and rated on August 19, 1977. The phytotoxicity to almonds from simazine (Princep) was significant at 0.5 ppm as had been observed in numerous early greenhouse trials. Both norflurazon (Solicam) and fluridone (EL-171) were somewhat more toxic than simazine at equivalent rates. Fluridone was more toxic than norfluazon but gave better spurge control at equivalent rates and better spurge control even at 1/4 ppm. Simazine was weak on spurge.

Limited field trials tend to substantiate the greenhouse findings.

A comparison of 3 soil applied herbicides on young almonds and spurge control. (425-73-501-146-4-77)

Herbicide	ppm	Average[1] Phyto to Almonds	Average[1] Control of Spurge	9/14/77 Fresh Wt. Almonds (gm)
Simazine	1/2	3.8	1.5	8.0
Fluridone	1/4	8.0	10.0	3.5
Fluridone	1/2	8.8	10.0	2.0
Fluridone	1	9.0	10.0	0.0
Norflurazon	1/4	0.5	4.2	14.8
Norflurazon	1/2	4.5	7.2	11.5
Norflurazon	1	8.2	9.5	6.0
Check	-	1.0	0.0	9.3

1/ Average of 4 replications where 0 = no effect, 10 = complete control of spurge or most vigorous almonds. Evaluated 8/19/77.

The effect of the combination of oxyfluorfen and paraquat on the control of large cheeseweed. Lange, A. H., L. Nygren, and J. Schlesselman. Foliar applications of oxyfluorfen (Goal) and paraquat, alone and in combination with each other, were evaluated for effective control of large cheeseweed. All treatments were applied to actively growing cheeseweed (6 to 12 inches high) at 100 GPA on March 18, 1977. The maximum ambiant temperature was 63 F. Each treatment was applied to a 5 ft. by 5 ft. plot, replicated 3 times. Evaluations were taken on 3 dates, over a one month period, March 24, April 4, and April 18, 1977.

Approximately one week after application, oxyfluorfen plus paraquat at 1 plus 1 lb ai/A gave the best control. However, this control appeared to

A comparison of several herbicide treatments on the control of a mixed population of filaree and wild brome-grass. Lange, A. H., L. Nygren, and J. Schlesselman. Five herbicides and several combinations of herbicides at various rates were compared for effective control of filaree. All treatments were applied postemergence to the filaree on Nov. 24, 1976. All treatments were applied at 50 GPA with the exception of two glyphosate (Round-up) treatments at 25 GPA and 100 GPA. The treatments were replicated four times and evaluated on three different dates. The earliest evaluation, on Dec. 5, 1976, showed paraquat at rates of 1/8, 1/4 and 1/2 lb ai/A + X-77 at 0.5% to give the quickest and most complete control of filaree and grass. Glyphosate at 1/8 lb ai/A plus paraquat at 1/8 lb ai/A were comparable to the lowest rate of paraquat alone. All other treatments gave only marginal indications of control when compared to the untreated check. Glyphosate appeared to give better control at 25 GPA than the 100 GPA rate on all three evaluation dates. The addition of a surfactant to glyphosate did not appear to enhance its control at the rates applied. Later evaluations on Jan. 1, 1977 and Feb. 2, 1977 showed increased control in all treatments containing glyphosate.

The effect of combination sprays on the control of filaree and wild barley. (425-73-501-1-77)

		Average[1]				
		12/5/76		1/1/77		2/3/77
Herbicide	lb/A	Filaree	Grass	Filaree	Grass	Control
Glyphosate (50 GPA)	1/8	4.8	3.5	5.0	8.5	6.8
Glyphosate (50 GPA)	1/4	5.2	4.0	8.5	10.0	8.8
Glyphosate (50 GPA)	1/2	4.8	3.5	10.0	10.0	9.3
Glyphosate (25 GPA)	1/4	6.0	5.2	9.5	10.0	9.5
Glyphosate (100 GPA)	1/4	3.2	4.2	7.2	9.5	7.2
Glyphosate+X-77	1/8+.25%	2.2	2.5	5.8	8.5	3.8
Glyphosate+X-77	1/8+.5%	4.8	5.0	5.2	9.5	4.5
Glyphosate+X-77	1/8+1%	6.2	5.5	6.2	8.8	5.8
Paraquat+X-77	1/8+.5%	7.2	10.0	8.0	10.0	6.8
Paraquat+X-77	1/4+.5%	9.0	10.0	8.8	10.0	8.5
Paraquat+X-77	1/2+.5%	9.2	10.0	10.0	10.0	9.8
Glyphosate+Paraquat	1/8+1/8	7.8	9.2	8.2	10.0	7.8
Glyphosate+2,4-D	1/8+1/8	5.2	3.2	9.0	8.8	8.8
Glyphosate+Amitrol	1/8+1/2	4.2	4.8	8.0	9.8	8.8
Glyphosate+Bromoxynil	1/8+1/2	4.8	4.5	8.2	9.8	8.2
2,4-D	1/8	5.5	1.5	4.0	2.5	3.2
Amitrol	1/2	3.2	3.8	6.2	6.5	5.5
Bromoxynil	1/4	2.0	3.8	2.5	3.8	0.5
Bromoxynil	1/2	4.5	5.0	2.0	4.8	1.0
Check	-	0.0	0.0	0.0	3.0	0.0

[1]/Average of 4 replications where 0 = no effect, 10 = complete control. Treated 11/24/76. All treatments = 50 GPA except where designated.

Paraquat at the 1/2 lb ai/A rate gave the next best long term control. Amitrole, 2,4-D, and bromoxynil gave only marginal control. However, when these chemicals were in combination with glyphosate, there appeared to be an additive effect. These combination treatments gave better control than either herbicide applied alone.

Table 1. The effect of surfactant on the activity of glyphosate in comparison to 2,4-D, paraquat, and amitrole. (425-73-501-1-77)

		Average[1]	
Herbicide	lb/A	Filaree	Grass
Glyphosate (50 gpa)	1/8	6.0	8.5
Glyphosate + X-77	1/8+.25%	5.8	8.5
Glyphosate + X-77	1/8+.5%	5.2	9.5
Glyphosate + X-77	1/8+1%	6.2	8.8
Paraquat + X-77	1/8+.5%	8.0	10.0
2,4-D	1/8	4.0	2.5
Amitrole	1/2	6.2	6.5
Check	-	0.0	3.0

[1]/Average of 4 replications based on 0 to 10 scale where 0 = no weed control, 10 = complete weed control. Treated 11/24/76; evaluated 1/1/77. All treatments = 50 pga except where designated.

Table 2. A comparison of glyphosate and combinations on the control of filaree and brome grass. (425-73-501-1-77)

		Average[1]	
Herbicide	lb/A	Filaree	Grass
Glyphosate	1/8	6.0	8.5
Glyphosate	1/4	8.5	10.0
Glyphosate	1/2	10.0	10.0
Glyphosate + Paraquat	1/8+1/8	8.2	10.0
Glyphosate + 2,4-D	1/8+1/8	9.0	8.8
Glyphosate + Amitrole	1/8+1/2	8.0	9.8
Check	-	0.0	3.0

[1]/Average of 4 replications based on 0 to 10 scale where 0 = no weed control, 10 = complete weed control. Treated 11/24/76; evaluated 1/1/77. All treatments = 50 gpa except where designated.

Table 3. The effect of gallonage on the activity of glyphosate. (425-73-501-1-77)

		Average[1]	
Herbicide	lb/A	Filaree	Grass
Glyphosate (25 gpa)	1/4	8.5	10.0
Glyphosate (50 gpa)	1/4	9.5	10.0
Glyphosate (100 gpa)	1/4	7.2	9.5
Check	-	0.0	3.0

[1]/Average of 4 replications based on 0 to 10 scale where 0 = no weed control, 10 = complete weed control. Treated 11/24/76; evaluated 1/1/77. All treatments = 50 gpa except where designated.

Table 2. Second year almonds - drip irrigation
Weed control rating * evaluated January 27, 1977

Main treatments: (A) Oxyfluorfen - 2 lbs A.I./A (B) Untreated
(C) Oxadiazon - 4 lbs A.I./A (D) Glyphosate - 1 lb A.I./A

Subtreatments	A.I./A	Redstem filaree control (A)	(B)	(C)	(D)	Red brome control (A)	(B)	(C)	(D)
(1) Simazine	0.4	10	0	8	9	3	1	1	10
"	0.8	10	0	9	9	5	1	3	10
(2) Oryzalin	2.0	10	2	8	9	4	2	1	10
"	4.0	10	0	8	"	5	0	1	10
(3) Oxadiazon	2.0	10	"	9	10	4	2	3	10
"	4.0	10	"	9	10	4	1	4	10
(4) Norflurazon	1.0	10	0	8	"	6	5	4	10
"	2.0	10	2	9	9	8	6	6	10
(5) Prodiamine	2.0	9	1	9	"	4	1	3	10
(6) Glyphosate + surfactant @ ¼%	0.5	9	4	10	"	10	6	10	10
"	1.0	10	6	10	"	10	9	10	10
(7) Napropamide	2.0	9	3	9	9	4	3	3	10
"	4.0	10	3	8	9	5	4	3	10
(8) Linuron	0.5	10	3	10	9	4	1	3	10
"	1.0	10	3	10	9	5	1	3	10
(9) 2,4-D Amine	1.0	10	4	10	9	5	2	3	10
"	2.0	10	"	10	9	4	2	3	10
(10) Contact weed killer	2 qts **	9	6	10	"	4	2	3	10
"	4 qts **	10	"	10	10	5	2	3	10
(11) Untreated	--	10	"	9	"	4	2	3	10
"	--	9	1	8	"	5	2	3	10

* 0 to 10 rating: 10 = complete kill
** 30% dinoseb by weight

Herbicide combinations for annual broadleaf weed control in nonbearing almonds. Kempen, H. and J. Woods. On December 23, 1976, a trial was established to evaluate the effectiveness of herbicide combinations on annual broadleaf weed control in third year (at time of application) almonds in Kern County, California. The trial was divided into four main treatments and ten sub-treatments. The latter were put over the top of the main treatments. Due to the design of this experiment, there were no replications. Plots were 8 feet wide by 27 feet down the tree row, and were on a Delano sandy loam. A winter storm brought 0.75 inches of rainfall between Dec. 30, 1976 and Jan. 3, 1977. The plots were then without water until March 9, 1977 when the orchard was sprinkled. Sizes of weeds present at time of application were: cheeseweed -- 4 inches, London rocket -- 3 inches, flaxleaved fleabane -- 1 inch, and sowthistle -- 1 inch. Weed control was evaluated by species on February 1, 1977 and on August 10, 1977. During the month of May, the grower applied a dinitro formulation to kill any weeds present at that time. The only weed not fully controlled by this treatment was fleabane.

No almond injury was observed from any of the treatments applied in late December. Weed control appeared to be best in the glyphosate main plot. Cheeseweed was the only emerged species not completely controlled by this compound. Oxyfluorfen was extremely effective on cheeseweed and London rocket, and showed good control of the remaining species. Weed control was also good with oxadiazon, but a few more weeds escaped than with the above materials. All three of these compounds showed good to excellent postemergence activity on seedling weeds. Excellent season-long broadleaf weed control was exhibited by three herbicide combinations: glyphosate X oxadiazon, oxyfluorfen X glyphosate and oxyfluorfen X 2,4-D amine. All the above compounds show both postemergence and residual activity with the exception of glyphosate; although, with glyphosate, there seemed to be some residual control of winter annual weeds. Glyphosate alone was an excellent treatment for emerged broadleaf weeds. Oxyfluorfen showed good residual control of the only summer weed present in this trial, redroot pigweed.

Weed control rating * February 1, 1977

Main treatments: (A) Oxyfluorfen @ 2 lbs A.I/A (B) Untreated (C) Oxadiazon @ 4 lbs A.I/A
(D) Glyphosate @ 1 lb A.I./A

Subtreatments	A.I/A	Flax-leaved Fleabane Control (A)	(B)	(C)	(D)	Pineapple Weed Control (A)	(B)	(C)	(D)	Cheeseweed Control (A)	(B)	(C)	(D)
(1) Simazine	0.4	10	6	5	10	8	4	"	10	10	2	8	4
"	0.8	9	8	9	10	9	4	9	10	10	0	10	5
(2) Oryzalin	2.0	9	6	6	10	9	4	8	10	10	5	9	8
"	4.0	8	4	"	10	9	4	6	10	10	5	8	7
(3) Oxadiazon	2.0	8	8	"	10	8	6	"	10	10	10	10	10
"	4.0	10	8	8	10	9.5	"	8	10	10	10	10	10
(4) Norflurazon	1.0	8	"	"	10	8	6	9	10	10	3	9	8
"	2.0	8	6	9	10	9	6	8	10	10	5	9	7
(5) Prodiamine	2.0	8	4	7	10	9	4	6	10	10	4	10	7
"	4.0	10	4	6	10	9	4	6	10	10	5	9	8
(6) Glyphosate	0.5	10	8	8	10	10	10	10	10	10	6	10	9
"	1.0	10	8	9	10	10	9	10	10	10	8	10	8
(7) Napropamide	2.0	9	5	9	10	9	5	9	10	10	7	10	9
"	4.0	9	5	7	10	9	6	8	10	10	5	10	8
(8) Linuron	0.5	9.5	5	8	--	10	5	9	--	10	8	10	--
"	1.0	9.5	3	6	10	9.5	3	9	10	10	9	10	9
(9) 2,4-D Amine	1.0	9.5	8	4	10	10	7	9	10	10	7	10	10
"	2.0	10	9	8	10	10	8	8	10	10	6	10	9
(10) Untreated	--	7	4	7	10	8	4	8	10	10	8	"	8
"	--	9	5	9	10	9	5	8	10	10	"	10	9

* 0 to 10 ratings: 10 = complete kill

proved with the addition of glyphosate. The best control was obtained with the oxyfluorfen and oxyfluorfen plus glyphosate treatments. As seen in earlier trials, glyphosate does not help with the preemergence control of weeds. No apparent phytotoxicity was observed on the almond trees.

The effect of continuous use of preemergence herbicides for the control of perennial bindweed. Elmore, C. and A. Lange. Continuous annual application of several preemergence herbicides has given control of perennial weeds. In this experiment, sprinkler irrigated bindweed infested soil was treated February 18, 1972, December 26, 1972, April 9, 1974, January 22, 1975, January 9, 1976, and March 17, 1977. Although eradication has not been achieved after 6 years of repeat treatments, commercial control has been obtained.

The effect of 6 selected combination treatments on the control of annual broadleaf and grass and perennial bindweed.

Herbicide	lb/A	Average Control[1/] Annual Broadleaf	Barnyard-grass	Perennial Bindweed
Simazine	2	4.0	0.0	0.8
Simazine+Napropamide	4+8	9.2	10.0	3.0
Simazine+Oryzalin	2+4	8.5	10.0	4.5
Simazine+Oryzalin	4+8	10.0	10.0	8.5
Simazine+Oxadiazon	2+4	8.2	9.8	6.8
Simazine+Oxadiazon	4+8	9.5	10.0	7.5
Oryzalin+Oxadiazon	4+4	4.0*	10.0	5.8
Check	-	0.5	0.0	0.0

[1/] Average of 4 replications where 0 = no effect, 10 = complete control.
*Misses flaxleaved fleabane.

Perennial bindweed control with repeat applications of preemergence herbicides. Lange, A. H., J. Schlesselman, and L. Nygren. A heavy infestation of perennial bindweed was divided up into plots and several herbicide treatments were applied to worked soil May 20, 1976 and retreated again the following spring, February 17, 1977. The trial was sprinkler irrigated immediately after herbicide application.

Evaluation the following spring showed the excellent results with prodiamine (Rydex) and oryzalin (Surflan). The delay and subsequent commercial control with prodiamine was outstandingly better than either oryzalin or oxadiazon (Ronstar) both of which have shown good results in other trials. Fluridone (EL 171) also showed some effects on bindweed.

A comparison of preemergence herbicide treatments for perennial bindweed control in a heavy soil with sprinkler irrigation. (425-40-502-108-2-77)

Herbicide	lb/A	Average[1/] Bindweed Control 5/23/77	9/2/77
Oryzalin	8	8.3	5.0
Oxadiazon	8	5.0	3.7
Fluridone	2	8.0	5.7
Fluridone	1	3.6	3.7
Prodiamine	8	9.3	8.7
Oxadiazon+Oryzalin	4+4	7.3	4.3
Fluridone+Oryzalin	1+4	7.3	6.0
Check	-	1.0	0.3

[1/] Average of 3 replications where 0 = no effect, 3 = prominent symptoms, 10 = perfect bindweed control. Treated 5/20/76 and 2/17/77; evaluated 5/23/77 and 9/2/77.

Effect of two preemergence herbicides on the control of yellow nutsedge in almonds. Lange, A., J. Schlesselman, and L. Nygren. An almond orchard infested with a uniform stand of yellow nutsedge was treated with two preemergence herbicides to evaluate their effectiveness on control of this weed. Two tree plots were established in this sprinkler irrigated field and treatments were applied to the soil 6 ft on either side of the tree row. The soil was a loamy sand with 83.3% sand, 13.6% silt, 3.1% clay and 0.41% O.M. Treatments were applied on January 21, 1977 at 50 gpa. Nutsedge control ratings taken July 27, 1977 indicated excellent nutsedge control from all three rates

weed control. Glyphosate (Roundup), 2,4-D (OSA), and their combinations appeared to give good results. Of the individually applied herbicides, 2,4-D at 3 lb a.i./A was most promising. This was closely matched by the 6 lb a.i./A rate of glyphosate.

The combination of glyphosate at 3 lb a.i./A and 2,4-D at 1 lb a.i./A was better than glyphosate alone. Krenite alone provided only marginal control. However, glyphosate and Krenite appeared more promising than either compound alone. Increasing the Krenite rate in the glyphosate combination did not increase the initial activity. This trial will continue to be evaluated for residual control.

The effect of herbicide combinations on the control of whitehorse nettle. (425-15-502-1-77)

Herbicide	lb/A	Average[1/] Whitehorse nettle
Glyphosate	3	7.7
Glyphosate	6	9.3
2,4-D	3	9.7
Krenite	6	5.3
Glyphosate+2,4-D	3+1	9.7
Glyphosate+Krenite	3+3	8.0
Glyphosate+Krenite	3+6	8.0
Check	-	0.0

[1/] Average of 3 replications where 0 = no effect, 10 = complete (apparent) control. Treated 6/8/77. Evaluated 6/29/77.

The effect of 3 herbicides and two combinations on the initial control of perennial bindweed. Nygren, L. and A. H. Lange. Earlier work has shown somewhat better bindweed control when Krenite or 2,4-D were added to glyphosate (Roundup). The three herbicides were applied June 10, 1977. The results of this summer treated trial appear to substantiate the earlier work. All three materials gave a degree of bindweed control. When combined, some additional control has been observed. Subsequent control ratings will be made in the fall of 1977 and the spring of 1978.

The effect of 3 herbicides and two combinations on the initial control of perennial bindweed. (425-30-502-1-77)

Herbicide	lb/A	Average[1/] Bindweed Control
Glyphosate	3	8.5
Krenite	6	7.5
2,4-D	3	7.8
Glyphosate+Krenite	3+3	9.0
Glyphosate+2,4-D	3+1	9.5
Check	-	3.0

[1/] Average of 4 replications where 0 = no effect, 10 = complete control. Treated 6/10/77. Evaluated 7/30/77.

A comparison of 4 herbicides for perennial bindweed control. Lange, A., R. Keim, and L. Nygren. Choosing the appropriate stage of weed growth for herbicidal application is becoming an increasingly important factor to consider when dealing with tough perennials. This trial was established to compare spring with fall applications of the same 4 postemergence herbicides. A uniform field of perennial bindweed was divided into 30 ft. by 30 ft. plots and 2 timing regimes. The spring treatment was applied on June 30, 1977 at 34 GPA and replicated 8 times. On July 12, 1977, 4 replications for each treatment were disked while the remaining 4 replications were sprayed out with dinitro and oil, July 13, 1977. At the time of rating, the fall treatments had not yet been applied, however, these plots received the same contact spray and cultivation as the spring treatments. On September 24, 1977, the fall applications were made and ratings were taken on the spring applications only. When these plots were evaluated in the fall of 1977, there was no appreciable difference between

and Krenite (3 plus 3 lb ai/A) did not result in the increased control it has in other trials. The addition of ethephon to glyphosate, on the same application date, gave insufficient control of the knapweed and fair control of the bindweed.

The effect of summer postemergence sprays on the control of Russian knapweed and perennial bindweed. (425-50-502-1-77)

Herbicide	lb/A	Russian knapweed	Bind-weed
Glyphosate	3	6.0	8.2
Glyphosate	6	6.6	9.0
Krenite	6	2.8	5.8
Krenite	12	3.2	7.4
Glyphosate+Krenite	1-1/2+1-1/2	2.8	6.4
Glyphosate+Krenite	3+3	5.0	7.6
Glyphosate+Ethephon	1-1/2+10,000ppm	3.2	7.6
Check	-	1.4	1.4

1/ Average of 5 replications where 0 = no control, 10 = complete control. Treated 7/21/77. Evaluated 9/28/77.

The effect of basal sprays of four herbicides on the growth of young trees. Lange, A. H., L. Nygren, and J. Schlesselman. In the control of perennial weeds with translocated herbicides in young trees, it is necessary to know the potential hazard from spray drift onto the trunk and sucker growth, if present. Nectarines and apples usually sucker badly, whereas almonds and pistachio do not. In these tests, only the two year old nectarine trees were heavily suckered. These were sprayed but the basal 8-12 inches of all trees were sprayed May 5, 1977. The effects of the sprays were evaluated May 31, 1977 and August 30, 1977.

From the rating, nectarines appeared most sensitive showing effects from high and medium rates of glyphosate, MSMA, and 2,4-D. The trees were killed when the trunks were sprayed with 16 lb/A of 2,4-D (OSA) and badly damaged with MSMA at that rate. Glyphosate, on the other hand, caused some stunting of the young tree and some bark damage.

Young 2 year old Mutzu apples on M111 rootstock were not affected by these rates. Young second year P. terribentha rootstock were also not significantly affected by these herbicides at the sprayed rates..

First year Mission almond trees on Nemaguard root were severely injured by the 16 lb/A rate of 2,4-D, but no effect was observed from the other herbicides. The 3 year old Mission almond trees on Nemaguard roots showed no apparent phytotoxicity from any of the herbicide treatments.

The effect of May sucker sprays on this seasons top growth, sucker regrowth, and the trunk. (425-73-502-100-1-77)

Herbicide	Act.	lb/A	Nect. Vigor Top	Nect. Vigor Sucker	Average Phyto. Trunk 1/ 2/	Almond 1st yr.	Almond 3 yr.
Glyphosate	4#/gal	4 3/4 3/	8.0	6.5	0.8	7.0	9.3
Glyphosate	4#/gal	8 3/4 3/	6.8	0.8	0.8	8.3	8.7
Glyphosate	4#/gal	16 3/4 3/	5.2	0.0	3.5	3.6	9.5
Paraquat	2#/gal	4	9.2	7.8	0.0	---	9.5
Paraquat	2#/gal	8	9.8	2.0	0.0	7.3	8.7
Paraquat	2#/gal	16	8.0	1.2	0.0	6.3	9.7
MSMA	6#/gal	4	9.0	1.2	0.5	---	8.7
MSMA	6#/gal	8	7.0	0.5	1.0	7.3	10.0
MSMA	6#/gal	16	3.0	0.5	4.0	6.6	9.5
2,4-D (OSA)	3#/gal	16	0.8	0.5	3.8	0.0	7.3
Check	--	-	9.0	9.0	0.0	7.0	9.0

1/ Average of 4 replications where 0 = no growth or dead, 10 = most vigorous. Treated 5/5/77. Evaluated 8/30/77.
2/ SPECIAL NOTE: Trunk damage was a roughening of bark and some gumming. Trunk phyto was rated where 0 = no effect, 10 = severe splitting and dead, 3 = some split and/or gumming.
3/ Pounds calculated on the salt basis.

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Plant Injury: Certain chemicals may cause injury or give less than optimum pest control if:

Used: at the wrong stage of plant development; in certain soil types; when temperatures are too high or too low; the wrong formulation is used; and excessive rates or incompatible materials are used.

Personal Safety: Follow label directions exactly. Avoid splashing, spilling, leaks, spray drift or clothing contamination. Do NOT eat, smoke, dring, or chew while using pesticides. Provide for emergence medical care in advance.

CHEMICAL INDEX

CURRENT HERBICIDE LABEL STATUS FOR DECIDUOUS FRUIT

1976-77

Listed below is a table showing the status of the available herbicides on deciduous fruit and nut crops.

Material	Almonds	Apples	Apricots	Avacados	Citrus	Cherries	Figs	Grapes	Nectarines	Olives	Peaches	Pears	Pistachio	Plums	Prunes	Walnuts
PREEMERGENCE HERBICIDES																
Bromacil (Hyvar X®)	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-
Dichlobenil (Casoron®)	R	R	-	R	R	R	R	R	R	-	R	R	-	R	R	R
Dinoseb (Preemerge®)	R	-	-	-	R	-	-	R	-	-	R	R	-	R	R	-
Diuron (Karmex®)	-	R	-	-	R	-	-	R	-	-	R	R	-	-	-	R
EPTC (Eptam®)	R	-	-	-	R	-	-	-	-	-	-	-	-	-	-	R
Napropamide (Devrinol®)	R	-	R	-	R°	R	N-B	R	R	-	R	-	R	R	R	-
Norflurazon (Solicam®)	-	-	R	-	-	R	-	-	R	-	R	-	-	R	R	R
Oryzalin (Surflan®)	N-B	N-B	-	-	-	N-B	-	N-B	-	-	N-B	N-B	N-B	N-B	N-B	N-B
Simazine (Princep®)	R-S	R	-	R	R	-	-	R	-	R	R-S	R	-	-	-	R
Terbacil (Sinbar®)	-	R	-	-	R	-	-	-	-	-	R	-	-	-	-	-
Trifluralin (Treflan®)	R	-	R	-	R	R	-	R	R	-	R	-	-	R	R	R
POSTEMERGENCE HERBICIDES																
Dalapon (Dowpon®)	R-S*	R	R	-	R	-	-	R	-	-	R	R	-	R	R	-
Glyphosate (Roundup®)	-	N-B	-	-	-	N-B	-	-	-	-	-	-	-	-	-	-
Dinoseb (Dow General®) (Sinox General®)	R	R	R	-	R	R	R	R	R	R	R	R	-	R	R	R
MSMA (Ansar®) (Daconate®)	N-B	N-B	N-B	-	R	N-B	-	N-B	N-B	-	N-B	N-B	-	N-B	N-B	N-B
Paraquat (Paraquat CL®)	R	R	R	R	R	R	R	R	-	-	R	R	-	R	R	R
2,4-D (water or OSA)	R-S*	-	R-S*	-	R-S*	-	-	-	-	-	R-S*	R-S*	R-S*	-	-	R-S*
Weed Oil	R	R	R	-	R	-	-	R	-	-	R	R	-	-	-	R

R = Registered (O = oranges only)
R-S = Registered State Label Only (*some years)
N-B = Registered for use in non-bearing only
- = Not registered

SELECTIVE WEED CONTROL

Herbicide	Shepherds purse	Common groundsel	Mustard	Radish	Burclover	Filaree	Wild oats	Bromus	Annual ryegrass	Chickweed	Fiddleneck	Milk thistle	Pigweed	Goosefoot	Lambsquarter	Russian thistle	Mare's tail	Sowthistle	Prickly lettuce	Star thistle	Puncturevine	Knotweed	Barnyardgrass	Crabgrass	Malva	Chicory	B. Oxtongue	Johnsongrass	Nutsedge	Bermudagrass	F. Bindweed	Smartweed	C. Dock
Devrinol	P	C	P	P	C	C	C	C	C	C	C	P	P	C	C	P	P	C	C	P	N	C	P	C	P	-	C	N	P	N	N	N	N
Surflan	P	P	P	P	P	N	P	C	C	C	C	P	C	C	C	C	P	P	P	P	C	C	C	C	P	-	-	P	N	P	P	-	-
Simazine	C	C	C	C	C	C	C	C	C	C	C	P	P	C	C	C	C	C	C	C	P	C	N	P	P	P	N	N	N	N	N	N	N
Treflan	N	N	N	N	N	N	N	C	C	C	C	N	C	C	C	P	N	N	N	N	C	C	C	C	N	N	N	P	N	P	P	N	N
Karmex	C	N	C	C	P	C	N	C	C	C	C	C	C	C	C	C	C	C	C	C	N	C	C	C	C	-	-	N	N	N	N	N	N
Casoron	P	C	C	P	P	P	P	P	N	C	C	C	C	P	C	P	N	C	C	-	P	C	P	N	C	-	-	N	C	N	sdlg.	N	N
Solicam	C	C	C	C	N	P	C	C	C	C	C	C	P	C	C	C	P	C	C	C	C	N	C	C	P	C	C	P	C	C	N	N	N
Goal	C	C	C	C	C	C	P	P	P	P	C	C	C	C	C	P	P	C	C	C	P	C	P	P	C	-	-	N	N	N	N	-	-
Paraquat	C	C	C	C	C	P	C	C	C	C	C	C	C	P	P	P	C	C	C	C	C	N	C	C	N	N	N	N	N	N	N	N	N
Dinoseb	C	C	C	C	C	C	P	P	P	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	N	P	N	N	N	N	N	N
MSMA	N	N	N	N	N	N	C	C	N	N	N	N	N	N	N	N	N	N	N	N	N	N	P	C	N	N	N	C	P	N	N	N	N
Dalapon	N	N	N	N	N	N	C	C	C	N	N	N	N	N	N	N	N	N	N	N	N	N	C	C	N	N	N	P	N	P	N	N	N
Roundup	C	C	C	C	C	P	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	-
Rydex	P	P	P	P	C	P	C	C	C	C	C	P	C	C	C	P	P	P	P	P	C	C	C	C	P	-	-	P	N	P	C	N	N

Best information currently available, future work may indicate changes.

C = usually controlled
P = partial control - sometimes missed
- = insufficient information
N = usually no control