81-S6

WEED CONTROL IN ALMONDS

by

A. H. Lange, Extension Weed Specialist,
University of California, Parlier, CA 93648

R. N. Vargas, Farm Advisor,
Madera County, Madera, CA 93637

H. M. Kempen, Farm Advisor,
Kern County, Bakersfield, CA 93303

Submitted to:

Bob Curtis
Almond Board
January 1, 1982

INTRODUCTION

The use of herbicides for the control of weeds in almonds continues to be an efficient and safe method of control. Continuous annual applications of soil-applied preemergence herbicides have caused no longterm detrimental effect to the growth or yield of almonds. No herbicide-varietal interaction has been observed with ten major almond varieties, when the commonly used herbicides have been applied at rates even in excess of the lable. The one partial exception to this generalization is the susceptibility of the Mission variety to simazine (Princep). Even here the phytotoxicity symptoms seem more related to a foliar expression than to total tree damage. Weed competition in two tests, one initiated in 1980 and the other in 1981, showed weed competition to be much more "Phytotoxic" than the preemergence herbicides used to evaluate them. However, postemergecne herbicides used soon after planting showed extreme damage (as has been shown in previous years) but there did not appear to be a varietal herbicide interaction. In other words, postemergence herbicides such and glyphosate (Roundup), dalapon (Dowpon) and MSMA (Bueno 6) were equally phototoxic to all ten varieties when the leaves and lower trunks were sprayed in the first year.

Some of the "phytotoxicity" that occurred in the 1981 trial from the postemergence herbicides was in part due to the competition of the uncontrolled summer grasses in these plots. Even though these grasses were sprayed twice and mowed twice the competition was enough to cause severe stunting particularly when in combination with herbicide phytotoxicity. When these same herbicides were sprayed on one year and two year trees, no injury was observed. With last year's registration of oxyfluorfen (Goal) and this year's registration of oryzalin (Surflan), almond growers now have an excellent program for annual weed control in all soil types. In the light soils of the southern San Joaquin Valley combinations of oxyfluorfen plus oryzalin and oxyfluorfen plus napropamide (Devrinol) will give season long weed control of almost all weeds. In the heavier soils of the northern San Joaquin Valley and the Sacramento Valley combinations of oryzalin plus simazine and simazine plus napropamide have been most effective except where resistant weeds such as cheeseweed are present. In the light soils dinoseb (Dinitro) has also been effective, particularly in combination with oryzalin or napropamide. In some of the heavier soils dichlobenil (Casoron) has given excellent perennial weed control as well as control of some of the more difficult annual broadleaf weeds. In combination with the preemergence grass herbicides, good annual weed control can be obtained where it is economically feasible.

Perennial weed control continues to be a major problem in almonds. A combinations of trifluralin (Treflan) incorporated following a fall application of glyphosate on bermudagrass, johnsongrass and bindweed has given good results. Nutsedge was controlled in heavier soils with combination of dichlobenil plus napropamide. Oryzalin and trifluralin on the other hand are very weak on the nutsedges. Glyphosate has given some degree of control from foliar applications but not as economically as MSMA. Bindweed and white horsenettle were more economically controlled with 2,4-D than glyphosate. White horsenettle was controlled with norflurazon (Solicam). In a few trials glyphosate has been superior to 2,4-D on bindweed on a pound for pound basis, but not on a cost efficient basis. As this weed continues to increase on

Flaxleaved fleabane and marestail in a young orchard. Lange, A. H. and L. J. Nygren. Young trees in their third leaf were treated with 6 pre-emergence herbicides on February 28, 1980 and January 27, 1981. Rainfall was adequate for incorporation with 0.49 inches on January 28 and 0.84 on the 29th. Also 1.49 inches fell during the month of February and 2.93 in March and 1.18 in April. This wet spring may have accounted for the exceptionally poor control of flaxleaved fleabane and marestail with all compounds except simazine (Princep) and fluridone (Brake). It does indicate that these weed species can be expected to cause problems with selective herbicides. All herbicides except simazine gave good grass control thus illustrating the value of tank mixes of herbicides for broad spectrum weed control in young orchards.

The control of annual grasses and flaxleaved fleabane and marestail with 8 herbicides in a long term orchard trial (425-73-501-115-1-80)

		Average[1/]	
Herbicides	lb/A	Grass Control	Flaxleaved Fleabane and Marestail Control
Simazine	2	6.4	8.7
Napropamide	4	8.9	1.8
Napropamide	8	8.2	3.3
Oryzalin	4	10.0	3.7
Oryzalin	8	9.8	4.6
Oxyfluorfen	4	9.7	4.4
Norflurazon	4	10.0	4.6
Norflurazon	8	10.0	5.5
Fluridone	1	9.8	5.3
Fluridone	2	9.9	6.6
Fluridone	4	7.8	7.8
Check	-	5.0	0.8

1/ Average of 9 replications where 0 = no control and 10 = best control of weeds rated. Latest retreatment January 27, 1981. Evaluated July 9, 1981.

A comparison of the relative tolerance of 10 almond varieties to commonly used herbicides. Lange, A. H. Ten varieties of almond on nemaguard (5/16 inch) were planted in a Hanford fine sandy loam (organic matter 0.75%, sand 59%, silt 33%, and clay 8%) on February 24, 1981 in plots about 18 inches apart in 20 foot long plots. A buffer area of 4 feet was left between each set of 10 trees. The pre- and postemergence herbicides were applied April 21, 1981 and immediately irrigated with 1 inch of water. On June 1, 1981 the low rates of 4 of the postemergence herbicides, glyphosate (Roundup), MSMA (Bueno 6), dalapon (Dowpon) and dinoseb (Dinitro) were applied. The phytotoxicity ratings made June 9 showed the relative phytotoxicity of the preemergence herbicides at that time. Simazine (Princep) showed its most effect on Mission. Slight symptoms showed on a few other varieties. Very few symptoms appeared even at the high rates on NePlus and Nonpariel.

All plots were sprayed with 1 lb/A of glyphosate 30 inches on each side of the row on June 26, 1981 to help hold back the grass.

The preemergence application of napropamide (Devrinol), oryzalin (Surflan), dichlobenil (Casoron), EPTC (Eptam), oxyfluorfen (Goal) and dinoseb were safe on young first year planted almond varieties.

The postemergence herbicides exhibited considerable injury from basal sprays which included hitting the bottom foliage. Glyphosate damaged all varieties at the high rate. It appeared hardest on Butte, NePlus, Carmel and Nonpariel at the early ratings.

Based on the diameter determination several herbicides appeared to effect one or two varieties more than others. In most cases there was a significant effect only at the highest rate on one or two varieties.

Simazine was most injurious to Mission and Carmel. Oryzalin may have affected Butte. Dichlobenil appeared to affect Ruby more than other varieties. Glyphosate affected all varieties but was most damaging on Carmel. Oxyfluorfen showed only slight if any effects on Mission and Ruby and showed no effect on Merced.

The best overall weed control was obtained with dichlobenil and simazine.

Table 2. Average almond phytotoxicity [1/]

Herbicides	lb/A	Mission	Butte	Ruby	NePlus	Merced	Thompson	Peerless	Price	Nonpariel	Carmell
Simazine	2	0.0	0.2	1.0	0.5	0.2	0.2	0.8	0.0	0.5	0.0
Simazine	4	1.2	1.0	3.5	0.5	0.5	0.2	1.0	1.0	0.0	0.2
Simazine	8	4.8	2.0	3.5	0.8	2.8	1.2	2.0	2.2	1.0	2.8
Napropamide	4	0.0	0.0	1.5	0.0	0.2	1.0	0.5	0.2	0.0	0.0
Napropamide	8	0.5	0.0	3.2	0.2	2.5	0.5	0.5	0.0	0.0	0.0
Napropamide	16	0.2	0.5	0.5	0.5	0.0	0.2	0.2	0.5	0.2	0.0
Oryzalin	4	0.0	1.2	0.5	0.8	0.0	1.0	0.8	0.8	0.8	0.2
Oryzalin	8	0.8	1.0	0.8	0.2	0.5	0.5	1.8	0.5	0.5	0.0
Oryzalin	16	0.0	3.0	0.5	0.5	0.8	0.0	1.0	0.5	0.8	1.0
Dichlobenil	4	0.5	0.5	2.8	0.8	0.8	0.8	0.5	0.5	0.2	0.5
Dichlobenil	8	0.0	0.0	2.5	0.0	0.2	0.0	0.8	0.0	0.0	0.0
Dichlobenil	16	1.8	0.8	3.8	0.8	1.5	1.5	2.0	1.5	1.5	1.2
Glyphosate	4	1.0	3.2	2.2	1.2	0.2	1.2	2.0	0.8	1.0	2.0
Glyphosate	8	3.2	4.8	4.2	4.2	2.5	3.0	1.8	2.8	3.5	4.8
Glyphosate	16	7.5	5.8	7.5	6.0	4.8	5.2	8.8	7.5	5.5	8.0
EPTC	4	0.2	0.2	1.8	0.2	0.5	0.8	1.8	1.0	0.5	0.2
EPTC	8	0.0	0.0	3.2	0.2	0.0	0.5	0.5	0.5	0.2	0.5
EPTC	16	0.0	0.0	1.0	0.5	0.5	0.2	0.5	0.2	0.2	0.0
Oxyfluorfen	4	0.2	2.5	1.8	0.5	0.0	0.8	1.0	0.2	0.2	0.5
Oxyfluorfen	8	1.0	0.8	3.0	0.8	0.5	1.2	1.2	1.0	1.0	1.0
Oxyfluorfen	16	1.0	3.5	2.5	1.2	1.0	2.0	2.0	1.8	1.2	0.5
Dinoseb	4	0.2	0.0	2.8	0.0	0.0	0.2	2.5	0.0	0.0	0.8
Dinoseb	8	0.5	1.0	0.2	1.0	0.2	0.2	0.8	1.2	0.5	0.2
Dinoseb	16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dalapon	4	0.8	1.2	3.0	1.2	1.0	2.8	1.0	1.2	1.0	0.5
Dalapon	16	1.8	2.8	7.0	3.2	2.8	1.0	3.0	2.7	2.2	2.2
MSMA	4	1.5	0.8	2.2	1.0	1.0	1.0	0.5	1.5	1.0	0.5
MSMA	16	0.2	0.5	0.2	0.2	0.2	0.8	0.2	0.2	0.2	0.2
Weed Free Check [2/]	-	1.8	2.0	2.8	2.0	1.8	2.0	1.8	1.2	0.8	0.5
Weedy Check	-	0.5	2.2	3.0	1.5	2.0	2.0	2.0	1.8	0.8	1.2

1/ Average of 4 replications where 0 = no phytotoxicity symptoms and 10 = plant dead. Treated April 21 and May 26, 1981. Evaluated June 9, 1981.

2/ Sprayed with Paraquat at 1 lb/A.

Table 4. Average almond diameters (425-73-501-146-2-81)

Herbicides	lb/A	Mission	Butte	Ruby	NePlus	Merced	Thompson	Peerless	Price	Nonpariel	Carmel
Simazine	2	1.75	1.94	1.56	1.75	1.88	1.44	1.69	1.75	2.00	1.94
Simazine	4	1.94	1.81	1.31	2.06	2.25	1.88	1.81	1.75	1.81	2.19
Simazine	8	1.44	1.63	1.63	1.56	1.88	1.56	1.44	1.56	1.94	1.94
Napropamide	4	2.00	1.94	1.50	2.13	1.88	1.63	1.56	1.69	1.81	2.19
Napropamide	8	2.19	2.00	1.50	1.56	1.81	1.56	1.63	2.00	2.00	1.75
Napropamide	16	1.75	1.81	1.31	1.69	1.56	1.63	1.56	1.56	1.81	2.13
Oryzalin	4	1.94	1.69	1.56	1.94	1.44	1.38	1.69	1.44	1.56	1.94
Oryzalin	8	2.00	2.13	1.69	1.69	1.69	1.63	1.81	1.88	1.88	2.44
Oryzalin	16	2.00	1.44	1.81	1.75	2.00	1.75	1.38	1.69	2.00	2.00
Dichlobenil	4	2.31	2.25	1.63	2.25	2.19	1.69	1.94	2.13	1.94	2.44
Dichlobenil	8	2.06	2.19	1.44	2.19	2.13	1.81	1.63	1.75	2.00	2.25
Dichlobenil	16	2.00	2.06	1.06	1.88	2.13	1.69	1.63	1.94	1.94	2.06
Glyphosate	4	1.56	1.06	1.25	1.56	1.63	1.45	2.75	1.75	1.56	1.44
Glyphosate	8	1.19	0.81	1.00	1.13	1.25	1.13	1.19	1.31	1.19	0.81
Glyphosate	16	0.25	0.88	0.50	0.88	1.31	0.75	0.38	0.63	0.88	0.38
EPTC	4	1.63	1.50	1.44	1.50	1.63	1.38	1.50	1.38	1.50	1.81
EPTC	8	1.81	1.63	1.19	1.81	1.56	1.38	1.25	1.44	1.63	1.69
EPTC	16	1.63	1.63	1.38	1.31	1.50	1.44	1.44	1.38	1.50	1.81
Oxyfluorfen	4	1.94	1.50	1.19	1.81	1.81	1.56	1.75	1.94	1.81	2.00
Oxyfluorfen	8	2.38	2.25	1.75	2.44	2.06	2.19	1.81	2.00	2.06	2.19
Oxyfluorfen	16	1.88	1.75	1.44	1.88	2.06	1.88	1.81	1.81	2.94	2.06
Dinoseb	4	1.44	1.50	0.69	1.38	1.56	1.44	1.38	1.38	1.56	1.44
Dinoseb	8	1.50	1.31	1.44	1.44	1.38	1.44	1.50	1.38	1.56	1.56
Dinoseb	16	1.50	1.63	1.50	1.63	1.69	1.50	1.38	1.63	1.69	1.75
Dalapon	4	1.38	1.38	1.13	1.38	1.31	1.19	1.31	1.25	1.25	1.25
Dalapon	16	1.25	1.25	0.63	1.38	0.94	1.31	1.25	1.31	1.56	1.50
MSMA	4	1.88	1.38	0.94	1.81	1.81	1.50	1.44	1.50	1.44	2.06
MSMA	16	1.38	1.75	1.06	1.44	1.38	1.19	1.31	1.25	1.31	1.38
Weed Free Check[2/]	-	1.50	1.50	1.44	1.63	1.50	1.38	1.44	1.75	1.50	1.75
Weedy Check	-	1.38	1.31	1.38	1.44	1.13	1.13	1.25	1.31	1.25	1.38

1/ Average of 4 replications. Treated April 21 and May 26, 1981. Evaluated August 4, 1981.
2/ Sprayed with Paraquat at 1 lb/A.

Annual weed control in mature almonds. Lange, A. H. This trial was initiated in a very sandy soil in mature trees on January 21, 1977. The soil was a sandy loam (sand 80%, silt 16%, clay 4%, and 0.43% organic matter). It was sprayed again January 26, 1978, January 12, 1979, January 9, 1980 and January 16, 1981. The evaluation made January 16, 1981 indicated only fair end-of-season weed control. No phytotoxicity was observed from any treatment.

A comparison of 2 preemergence herbicides for annual weed control in almonds (425-10-501-146-6-77)

Herbicides	lb/A	Average[1/] Weed Control	Phyto-toxicity
Simazine	1/4	6.0	0.0
Simazine	1	6.0	0.0
Simazine	2	5.3	0.0
Norflurazon	2	4.0	0.0
Norflurazon	4	4.7	0.0
Norflurazon	8	6.0	0.0
Check	-	1.7	0.0

1/ Average of 3 replications where 0 = no effect and 10 = 100% weed control.

The movement of herbicides in the sandy soils of 3 almond orchards. Lange, A. H. Winter applications of 5 herbicide treatments were made in 3 almond orchards growing in sandy soils. These orchards received rainfall and supplemental sprinkler irrigation. No phytotoxicity was observed on the trees. The pattern of movement and residual activity was observed using 20 cm undisturbed soil cores taken from the plots about one year after spraying. The results on the two different bioassay crops were interesting. In the first test only the oryzalin (Surflan) lasted and appeared to move down to about 3 cm. In the second test oxyfluorfen (Goal) appeared to move to 5 cm with the grass and showed no movement with broccoli. The later crop is slightly tolerant of oxyfluorfen. This may have been true also with oxadiazon (Ronstar) wince the grass suggested a downward movement of 6.8 cm at the 4 lb/A rate. In the third test it appeared that even 2 lb/A of simazine (Princep) did not move into the soil or show any residual activity. Norflurazon (Solicam) both prevailed and maved a short distance into the soil.

Herbicides	lb/A	Average Movement (cm)[1/] Expressed by the bioassay plant Broccoli	Grass
Exp. No. 425-10-501-146-3-77			
Simazine+Oryzalin	1/2+4	0.0	3.2
Simazine+Oryzalin	1/2+4	0.0	3.2
Check	-	0.0	0.0
Exp. No. 425-10-501-146-4-77			
Oxyfluorfen	1	1.2	1.2
Oxyfluorfen	2	1.0	3.2
Oxyfluorfen	4	0.0	5.5
Oxadiazon	2	0.2	0.2
Oxadiazon	4	1.5	6.8
Check	-	0.0	0.5
Exp. No. 425-10-501-146-6-77			
Simazine	1/4	3.0	0.5
Simazine	1	1.0	0.0
Simazine	2	0.5	0.0
Norflurazon	2	1.0	0.5
Norflurazon	6	2.8	2.5
Check	-	0.2	0.0

1/ Average of 4 replications. Soils treated January 21, 1977 and sampled January 20, 1978 and evaluated February 12, 1978.

A comparison of new herbicides for annual weed control in young Mission almond trees. Lange, A. H. On February 24, 1981 young almonds and other species were planted and sprinkled in. On April 1, 1981 herbicides were applied and sprinkler irrigated with 1 acre inch of water. The weed control was best with a combination of oxyfluorfen (Goal) plus oryzalin (Surflan). The only other herbicide giving comparable longterm residual control was R 40244. Another herbicide with excellent contact action with good safety in young almond trees was HO 00661. Another herbicide with excellent activity on bermuda and johnsongrass appeared to be very safe on young trees including Mission almonds was BASF 9052 (Poast).

Weed control in tree and vine variety screening trial
(425-73-501-100-1-81)

Herbicides	lb/A	Average Weed Control[1/] Lovegrass	Milo	Broadleaves
Simazine	2	4.5	7.5	10.0
Oxyfluorfen +Oryzalin	2+4	9.5	10.0	10.0
PPG 844	1/2	0.8	9.8	6.5
PPG 844	2	0.8	10.0	5.8
R 40244	1	8.5	10.0	9.0
R 40244	4	6.8	9.5	9.5
Mon 4600	3	3.2	3.2	7.2
Mon 4600	12	5.8	7.8	6.5
Mon 4601	3	5.2	3.2	5.2
Mon 4601	12	5.5	4.0	7.5
Ortho 28236	3	4.2	3.5	6.0
Ortho 28236	12	3.0	9.8	0.0
EL 500	1	3.8	2.5	4.5
EL 500	4	8.5	1.0	8.8
HO 00661	3/4	4.8	2.5	7.2
HO 00661	3	3.0	9.5	7.5
BASF 9052	1	5.8	9.2	3.2
BASF 9052	4	5.8	7.5	6.5
Dicamba	1/4	1.2	5.0	0.0
Dicamba	1	0.5	9.2	5.0
Mon 097	3	3.5	3.5	5.8
Mon 097	12	4.0	4.2	3.0
MBR 22359	1	0.0	10.0	2.5
MBR 22359	4	2.0	9.2	4.0
Check	-	3.5	6.2	7.0

1/ Average of 4 replications where 0 = no weed control and 10 = best control of weeds present. Treated April 1, 1981 and evaluated September 18, 1981.

The use of preemergence herbicides for control of annual weeds in almonds. Vargas. R. G. A study was established in a 15 year old almond orchard on November 21, 1980 to determine the effects of preemergence herbicides over a prolonged period of time. The trees were divided into two tree plots, replicated four times in a randomized complete block design. Herbicides were applied with a CO_2 plot sprayer. At 8 weeks after application 2.4 inches of rainfall had been received, .40 inch on December 4 and 2 inches on January 23.

The various herbicides used, their rates and effectiveness of controling annual weeds can be seen in Table 1. Because of low weed pressure and a coarser texture soil, all material gave 100% control of weeds present in the trial.

Herbicides	lb/A	Average[1/] Weed Control	Phyto
Simazine	1	10.0	0.0
Napropamide	4	10.0	0.0
Oryzalin	4	10.0	0.0
Oxyfluorfen	2	10.0	0.0
Norflurazon	4	10.0	0.0
Simazine+Napropamide	1+4	10.0	0.0
Simazine+Oryzalin	1+4	10.0	0.0
Simazine+Oxyfluorfen	1+2	10.0	0.0
Simazine+Norflurazon	1+4	10.0	0.0
Oxyfluorfen+Napropamide	2+4	10.0	0.0
Oxyfluorfen+Oryzalin	2+4	10.0	0.0
Oxyfluorfen+Norflurazon	2+4	10.0	0.0
Check	-	0.0	0.0

1/ Average of 4 replications where 0 = no control and 10 = complete control.
Weeds present in check were filaree, shepherds purse, pinappleweed, fiddleneck, common groundsel, marestail, annual bluegrass, and London rocket.

A comparison of the effect of herbicide combinations on 5 common almond varieties irrigated by furrow and drip irrigations. Lange, A. H. Six almond varieties on nemaguard roots were planted in a randomized block design on February 8, 1977. About six weeks later the herbicide combinations were begun (March 29, 1977). Annually thereafter these plots were retreated on January 3, 1978, December 28, 1978, December 28, 1979, and January 28, 1981. The broadleaf herbicide has been changed in order to obtain control of flax-leaved fleabane and marestail. The most recent treatment included simazine (Princep) at 1 lb/A. Some symptoms occurred as a result of the wet spring but the total growth was normal. The herbicides caused no consistant effect on the production.

In earlier years the effect of norflurazon (Solicam) caused severe injury, however this recovery was complete with no detrimental effects on the yield. The yields from the drip irrigation plots appear to be greater than those from the furrow irrigated.

Undisturbed cores taken from these plots after 5 years of treatment show very little downward morement except for norflurazon. Prodiamine (Rydex) may have moved slightly deeper than oryzalin (Surflan) and napropamide (Devrinol).

Table 1. The effect of irrigation methods on the movement of herbicides in the tree row (425-73-501-146-1-77)

Herbicides	lb/A	Average Movement[1/] Drip (cm)	Furrow (cm)
Simazine+Napropamide	1+4	3.2	1.5
Simazine+Oryzalin	1+4	4.0	5.0
Simazine+Prodiamine	1+4	7.0	7.5
Simazine+Norflurazon	1+2	10.0	18.0
Check	-	0.0	0.0

1/ Average of 4 replications on undisturbed core per plot taken November 25, 1981. Treated January 28, 1981. Grass mixture measured December 12, 1981.

Winter annual postemergence weed control. Kempen, H. and J. Graf. On February 24, 1981 4 postemergence herbicides were applied to large cheeseweed, London rocket (14 inches high), broadleaf filaree (12 inches high), pineappleweed (5 inches high), melilotus (5 inches high), and annual bluegrass (6 inches high). There were also some small weeds; cheeseweed (4 to 5 inches high), filaree (4 to 5 inches high), pineappleweed (up to 3 inches high), and annual bluegrass (2 to 5 inches high). The size varied due to fertilizer differences.

The plots were 8.3 feet by 60 feet and each was replicated twice. Forty days after application the plots were evaluated.

It required 2 lb/A of glyphosate (Roundup) to control the large weeds. Oxyfluorfen (Goal) was more effective at 1/4 lb/A than glyphosate at 1 and 2 lb/A with exception of pineappleweed.

Amitrole (Cytrol) was also weak on most of these species when the weed had any size.

Paraquat (Paraquat CL) was effective on everything but cheeseweed at reasonably low rates. At 1 to 2 lb/A paraquat controlled everything but large pineapple weed.

		Average Weed Control[1/]							
		Cheeseweed		Filaree		Pineappleweed		Bluegrass	
Herbicides[2/]	lb/A	Large	Small	Large	Small	Large	Small	Large	Small
Glyphosate	1/4	2.0	1.0	0.0	0.0	3.0	3.0	2.5	4.0
Glyphosate	1/2	4.0	3.0	3.0	3.0	10.0	10.0	3.0	5.5
Glyphosate	1	4.0	4.0	3.0	5.0	10.0	10.0	3.5	10.0
Glyphosate	2	7.0	8.0	10.0	8.5	10.0	10.0	6.0	10.0
Oxyfluorfen	1/4	9.5	10.0	9.0	9.0	2.5	3.5	2.5	3.5
Oxyfluorfen	1/2	9.5	10.0	10.0	10.0	5.0	5.5	5.0	9.0
Oxyfluorfen	1	10.0	10.0	10.0	10.0	4.0	10.0	6.5	6.5
Oxyfluorfen	2	10.0	10.0	10.0	10.0	7.5	10.0	9.0	10.0
Amitrole	1/4	4.5	6.0	3.5	5.5	4.0	10.0	3.5	4.0
Amitrole	1/2	7.0	8.5	5.5	7.5	7.5	10.0	4.0	6.5
Amitrole	1	5.0	6.0	4.0	5.5	7.5	10.0	4.5	9.0
Amitrole	2	6.5	9.0	5.5	5.0	9.5	10.0	5.5	7.5
Paraquat	1/4	3.5	3.0	7.0	8.0	5.5	10.0	9.5	10.0
Paraquat	1/2	5.5	6.0	7.5	10.0	7.5	10.0	10.0	10.0
Paraquat	1	9.0	9.8	9.8	10.0	4.0	10.0	10.0	10.0
Paraquat	2	9.8	10.0	10.0	10.0	5.0	10.0	10.0	10.0
Check	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1/ Rated 0 to 10 where 0 = no effect and 10 = 100% control.
2/ All treatments included X-77 surfactant at 0.25% vol. per vol.
S = soluble formulation. EC = emulsifiable concentrate.

The effect of 4 preemergence herbicides on the growth of 10 almond varieties. Lange, A. H. Ten varieties of almonds were planted out in small plots February 13, 1980. Two weeks later 4 preemergence herbicides were applied to the base of the young trees and the surrounding soil. On March 2, 1980 it rained 0.92 acre inch . The plots were retreated on January 23, 1981 to wet soil and it rained 1.90 acre inch between January 25 and 29, 1981. The soil is a Hanford fine sandy loam with 0.5% organic matter. Because of the severe competition from the weeds during the first year the untreated plots were treated with a combination of simazine (Princep) at 1 lb/A plus oxyfluorfen (Goal) at 1 lb/A plus oryzalin (Surflan) at 4 lb/A. The vigor all plots were rated on July 9, 1981 and the diameters taken December 1, 1981.

From the vigor ratings it would appear that trees treated with napropamide (Devrinol) which had the poorest weed control were slightly less vigorous especially the NePlus, Butte and Nonpariel on Lovell rootstocks. The diameter bore out these observations and added Peerless to this list. An average of all varieties suggested less growth from the napropamide plots.

The better growth in the check plots in the second year overcame the poor growth in the first year. This explains the poorer growth of the napropamide plots as compared to the recovered trees in the check plots.

The growth of these close planted young trees appeared to be closely related to the degree of weed control.

NePlus appeared to be least affected in the oryzalin and oxyfluorfen plots. This appeared to be tree also of the Nonpariel on Lovell.

The Nonpariel on Lovell rootstock was affected much more by poor weed control than Nonpariel on nemaguard which suggests a possible interaction between weeds and nematodes.

PESTICIDE USE WARNING - READ THE LABEL

Pesticides are poisonous and must be used with caution. Read the label carefully before opening a container. Precautions and directions must be followed exactly. Special protective equipment as indicated must be used.

Storage: Keep all pesticides in original containers only. Store separately in a locked shed or area. Keep all pesticides out of the reach of children, unauthorized personnel, pets and livestock. Do not store with foods, feeds or fertilizers. Post warning signs on pesticide storage areas.

Use: The suggestions given in this publication are based upon best current information. Follow directions! Measure accurately to avoid residues exceeding tolerances, use exact amounts as indicated on the label or lesser amounts given in this publication. Use a pesticide only on crops, plants or animals shown on the label.

Container Disposal: Consult your County Agricultural Commissioner for correct procedures for rinsing and disposing of empty containers. Do not transport pesticides in vehicles with foods, feeds, clothing, or other materials, and never in a closed cab with the vehicle driver.

Responsibility: The grower is legally responsible for proper use of pesticides including drift to other crops or properties, and for excessive residues. Pesticides should not be applied over streams, rivers, ponds, lakes, run-off irrigation or other aquatic areas except where specific use for that purpose is intended.

Beneficial Insects: Many pesticides are highly toxic to honey bees and other beneficial insects. The farmer, the beekeeper and the pest control industry should cooperate closely to keep losses of beneficial species to a minimum.

Processed Crops: Some processors will not accept a crop treated with certain chemicals. If your crop is going to a processor, be sure to check with the processor before making a pesticide application.

Posting Treated Fields: When worker safety reentry intervals are established, be sure to keep workers out and post the treated areas with signs when required indicating the safe reentry date.

Permit Requirements: Many pesticides require a permit from the County Agricultural Commissioner before possession or use. Such compounds mentioned in this publication are marked with an asterisk (*).

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.
- at excessive rates.
- with incompatible materials.
- at the wrong formulation.