

University of California
WEED
CONTROL
Research Report

TREE FRUITS
VINES
CANEBERRIES
and
STRAWBERRIES
1971 - 72

Division of Agricultural Sciences

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UNIVERSITY OF CALIFORNIA

Fruit and Nut Crops

1971 - 72

This report contains results of weed control experiments conducted in fruit and nut crops during the 1971-72 crop season.

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HERBICIDE LIST

Herbicides Appearing in This Report

<u>Common or Code Name</u>	<u>Trade Name</u>	<u>Manufacturer or Marketing Agent</u>
A-820	-	Amchem
alachlor	Lasso [®]	Monsanto
amitrole	various	Amchem, American Cyanamid
AN-56477	Torpedo [®]	Ansul
asulam	Asulox [®]	Rhodia, Chipman
bromacil	Hyvar-X	DuPont
bromoxynil	Buctril [®] , Brominil [®]	Rhodia, Chipman, Amchem
fluorodifen	Preforan [®] , Soyex [®]	CIBA-Geigy, Nor-Am
C-20546	-	CIBA-Geigy
CGA-10832	-	CIBA-Geigy
chlorpropham	Furloe [®]	Pittsburgh Plate Glass
chloroxuron	Tenoran	CIBA-Geigy
2,4-D amine	various	various
dalapon	Dowpon [®]	Dow
DCPA	Dacthal [®]	Diamond Shamrock
dichlobenil	Casoron [®]	Thompson-Hayward
diethamine	Cobex [®]	U.S. Borax
dinoseb	Premerge [®]	Dow
diphenamid	Dymid [®] , Enide [®]	Elanco, Upjohn
diuron	Karmex [®]	DuPont
diuron + terbacil	Zobar [®]	DuPont
DS-5168	-	Diamond Shamrock
DS-5328	Rotate [®]	Diamond Shamrock
DS-17338	-	Diamond Shamrock
EP 479	-	Schering
EPTC	Eptam [®]	Stauffer
glyphosate	Round-Up [®]	Monsanto
GS-38946	-	CIBA-Geigy
IMC 3950	Bolero [®]	International Minerals & Chemicals
linuron	Lorox [®]	DuPont
MC 3761	-	Mobil
MC 4379	-	Mobil
methazole	Probe [®]	Velsicol
metribuzen	Sencor [®]	Chemagro(Bayer)
MON-097	-	Monsanto
MSMA	various	various
MSMA + Cacodylic acid	Broadside [®]	Ansul
NIA 21800	-	Niagara
NIA 21830	-	Niagara
nitralin	Planavin [®]	Shell
nitrofen	Tok [®]	Rohm & Haas

<u>Common or Code Name</u>	<u>Trade Name</u>	<u>Manufacturer or Marketing Agent</u>
oryzalin	Surflan®	Elanco
oxadiazon	Ronstar®	Rhodia, Chipman
paraquat	Paraquat®	Chevron
phenmedipham	Betanal®	Nor-Am
pronamide	Kerb®	Rohm & Haas
pyrazon	Pyramin®	Amchem
R-7465	Devrinol®	Stauffer
RH-892	-	Rohm & Haas
SAN 6706	-	Sandoz Wander
SAN 9789	Zorail®	Sandoz Wander
simazine	Princep®	CIBA-Geigy
terbacil	Sinbar®	DuPont
terbutryn	Igran®	CIBA-Geigy
trifluralin	Treflan®	Elanco
U-27267	-	Upjohn
USB-3153	-	U.S. Borax

WEED SPECIES PRESENT IN HERBICIDE TESTS

Broadleaved Weeds

<u>Common Name</u>	<u>Latin Name</u>
barley, volunteer	<u>Hordeum vulgare</u>
black nightshade	<u>Solanum nigrum</u>
bursage	<u>Franseria sp.</u>
bristly oxtongue	<u>Picris echioides</u>
burclover	<u>Medicago hispida</u>
California mustard	<u>Thelypodium lasiophyllum</u>
carpetweed	<u>Mollugo verticillata</u>
cheeseweed	<u>Malva parviflora</u>
common groundsel	<u>Senecio vulgaris</u>
corn spurry	<u>Spergula arvensis</u>
cudweed	<u>Gnaphalium sp.</u>
curly dock	<u>Rumex crispus</u>
clover	<u>Trifolium sp.</u>
common chickweed	<u>Stellaria media</u>
dandelion	<u>Taraxacum vulgare</u>
flaxleaf fleabane	<u>Erigeron linifolius</u>
fiddleneck	<u>Amsinckia sp.</u>
filaree	<u>Erodium moschatum</u>
foxtail	<u>Setaria sp.</u>
field bindweed	<u>Convolvulus arvensis</u>
groundcherry	<u>Physalis ixocarpa</u>
hairy nightshade	<u>Solanum sarachoides</u>
henbit	<u>Lamium amplexicaule</u>
hedge mustard	<u>Sisymbrium officinale</u>
jimsonweed	<u>Datura stramonium</u>
knotweed	<u>Polygonum aviculare</u>
lambsquarters	<u>Chenopodium album</u>
London rocket	<u>Sisymbrium irio</u>
marestalk	<u>Erigeron canadensis</u>
mustard	<u>Brassica campestris</u>
nutsedge	<u>Cyperus esculentus</u>
purple nutsedge	<u>Cyperus rotundus</u>
pineappleweed	<u>Matricaria matricarioides</u>
purslane	<u>Portulaca oleracea</u>
prostrate pigweed	<u>Amaranthus blitoides</u>
puncturevine	<u>Tribulus terrestris</u>
redstem filaree	<u>Erodium cicutarium</u>
red maids	<u>Calandrinia caulescens</u>
redroot pigweed	<u>Amaranthus retroflexus</u>

<u>Common Name</u>	<u>Latin Name</u>
Russian thistle	<u>Salsola kali</u>
scarlet pimpernel	<u>Anagallis arvensis</u>
shepherdspurse	<u>Capsella bursa-pastoris</u>
sowthistle	<u>Sonchus oleraceus</u>
sunflower	<u>Helianthus annuus</u>
sweetclover	<u>Melilotus sp.</u>
veronica	<u>Veronica sp.</u>
wild mustard	<u>Brassica arvensis</u>
wild radish	<u>Raphanus sativus</u>

Grasses

annual bluegrass	<u>Poa annua</u>
barnyardgrass (watergrass)	<u>Echinochloa crus-galli</u>
bermudagrass	<u>Cynodon dactylon</u>
bromegrass	<u>Bromus sp.</u>
canarygrass	<u>Phalaris canariensis</u>
crabgrass	<u>Digitaria sanguinalis</u>
johnsongrass	<u>Sorghum halepense</u>
lovegrass	<u>Eragrostis sp.</u>
mediterranean grass	<u>Schismus barbatus</u>
ripgutgrass	<u>Bromus rigidus</u>
ryegrass	<u>Lolium sp.</u>
sprangletop	<u>Leptochloa fascicularis</u>
wild barley	<u>Hordeum sp.</u>
wild oats	<u>Avena fatua</u>

INTRODUCTION

Selective weed control in orchard crops is relatively easy compared to field and vegetable crops. Even first year orchard trees are large, in comparison to small newly germinating weed seeds. The roots of mature orchard trees and vines are relatively deep. The layers of soil between tree roots and the soil surface-applied herbicide act as a semi-effective barrier or buffer.

If soils are high in organic matter and clay and the amount of water applied on top the herbicide is relatively small at any one time, there is little or no hazard to the tree from most herbicides. The coastal fruit growing soils and many of the soils of the Sacramento Valley are relatively higher in organic matter and clay than soils in the southern part of the state.

If the soil to be treated is sandy, low in organic matter and there are large increments of water such as in flood or long-set sprinkler application the hazard to tree health is modest to considerable. Young almond orchards in the sprinkler-irrigated hill soils of the southern San Joaquin Valley can be severely injured by preemergence herbicides.

In California we have a natural outdoor laboratory for evaluating new herbicides because we commonly have the extreme in soils, weed species, and cultural practices. In the coastal and Sacramento Valleys we learn about the resistant and susceptible weed species. In the central and southern San Joaquin Valley we are able to determine the margin of safety to trees.

SUMMARY

The results of the last two years of testing herbicides for weed control in the California orchards have produced several new herbicides with promise for weed control in deciduous orchards.

R-7465 is a moderately volatile herbicide (2.0×10^{-3} mm Hg) which although low in solubility moves downward in soil to some extent under rainfall and sprinkler irrigation. Under warm summer temperatures an appreciable amount of herbicidal activity is lost in as little time as three days. Under cool winter temperatures less is known about the amount of time that can elapse between application and incorporation by rainfall, sprinkler irrigation or mechanical means without significant loss of herbicide activity. The residual nature of R-7465 is long if incorporation is relatively soon after application; however, incorporated R-7465 eventually breaks down under orchard culture. Furthermore, it is selective, being particularly effective on the grasses, several of the composite family of weeds and other weed species. R-7465 is weak on weeds in the potato family, mint family, mustard family and, to some extent, the legume family.

The safety of R-7465 to trees is outstanding even in young newly planted trees under sprinkler and flood irrigation. Rates in excess of 4 times that needed for weed control in sandy soils have shown no detrimental effects to young Prunus species, pear and grape cuttings.

Oxadiazon is another selective persistent herbicide showing promise in young newly planted orchard trees under sprinklers and flood irrigation even in low organic matter soils.

Oxadiazon is very insoluble in water (1 ppm) and is fairly nonvolatile (1×10^{-6} mm Hg). Less is known about breakdown in soil, however, the field work thus far has shown that oxadiazon will remain active for several months when applied to the soil surface and incorporated by sprinklers or flooding. Likewise, when mechanically incorporated, oxadiazon remained several months even when applied at low rates. Under orchard conditions good weed control has been observed 8 months after application in light soils. Oxadiazon is weak on chickweed and related plant species and some grass species.

Nitralin has also shown excellent selectivity in trees being particularly effective on the grass family and showing outstanding tree safety even on young trees growing in light soil under sprinkler and flood irrigation. The volatility of nitralin is intermediate (1.5×10^{-6} mm Hg). Nitralin currently has a state label for use in non-bearing fruit trees.

Oryzalin is chemically similar to nitralin but more soluble (85 ppm), and lower in vapor pressure (1×10^{-7} mm Hg), appeared to have more persistent activity, a broader spectrum of control and similar residual characteristics. It, too, appeared to be very safe on young trees.

SAN 9789, a new herbicide with low volatility was much safer than simazine or terbacil in young trees under sprinkler and flood irrigation. SAN 9789 often gives a very white symptom on weeds and crop plants. SAN 9789 gives good preemergence grass control at low rates but is weak on some broadleaf species.

With this new group of "safe" herbicides we find different selectivities. All are weak on some weed species (figure 1). All are broad spectrum residual herbicides capable of being activated by water, i.e., not requiring mechanical incorporation. In combination with low rates of other herbicides they will give season-long weed control with adequate safety to trees.

Perennial weeds pose another more difficult problem. Some new tools are available to weed workers and still more knowledge about the old materials is needed. Some of the recent work reported here again indicates the need for repeated sprays of herbicides such as dalapon and MSMA. Glyphosate in repeated spray looks very good for perennial weed control.

The application of herbicides able to inhibit the growth of roots or shoots either incorporated or in layers in the soil showed promise. Trifluralin looked outstanding in this work and should be further evaluated.

Figure 1. Relative weed control with various species to 5 new herbicides in orchard trials.

Herbicide lb ai/A	oxadiazon 2	oxadiazon 8	R-7465 4	R-7465 16	oryzalin 2	oryzalin 8	SAN 9789 2	SAN 9789 8	nitralin 2
annual bluegrass	●	●	●	●	●	●	●	●	●
barnyardgrass	●	●	●	●	●	●	●	●	●
burclover	●	●	●	●	●	●	○	●	○
cheeseweed	●	●	●	●	○	●	●	●	○
chickweed	○	○	●	●	●	●	●	●	●
common groundsel	●	●	●	●	●	●	●	●	○
filaree	●	●	●	●	●	●	○	●	●
fleabane	●	●	○	●	●	●	●	●	○
henbit	○	●	○	●	●	●	○	○	●
knotweed	●	●	●	●	●	●	○	●	●
sowthistle	●	●	●	●	●	●	●	●	○
prostrate pigweed	●	●	●	●	●	●	●	●	●
redroot pigweed	●	●	●	●	●	●	●	●	●
pineappleweed	●	●	●	●	●	●	●	●	○
puncturevine	●	●	●	●	●	●	●	●	●
purslane	●	●	●	●	●	●	●	●	●
red maids	●	●	○	●	●	●	●	●	●
ripgutgrass	●	●	●	●	●	●	●	●	●
shepherdspurse	●	●	●	●	●	●	●	●	○
wild barley	●	●	●	●	●	●	●	●	●
wild oats	●	●	●	●	●	●	●	●	●
wild mustard	●	●	●	●	●	●	●	●	○
field bindweed	*	*			*	*			*



Not controlled - tolerant in 1970 and 71 trials



Partial or controlled in some trials and not in others



Controlled



Suppression

NOTE: This information is the best information that is available from current trials. Further research may change or will add to this list.

Weed control and phytotoxicity studies in deciduous fruit trees.

Fischer, B. B. and A. Lange. Nine varieties of deciduous fruit trees were planted February 26, 1970 in individual irrigated plots. On March 12, 1970 the herbicides were applied, each plot was replicated three times.

The first year's results of this experiment can be found in the 1970 Western Society of Weed Science Proceedings. An evaluation made 18 months after herbicide application showed most herbicides had lost weed control. Most of the highly toxic herbicides continued to show toxicity. Some herbicides such as SAN 6706, methazole, U-27267, simazine and terbacil showed considerable recovery from last year's injurious effects. It should be stressed that these trees were not retreated in 1971 and these results represent an evaluation 18 months after application (Table 1).

Table 1. The over-all phytotoxicity and weed control at 18 months after herbicide application.

Herbicide	lb/A	Phyto ^{2/} toxicity	Average ^{1/}		Weed species ^{3/}
			Weed control	Average diameter(cm)	
simazine	2	2.6	3.3	28.9	L, Sth, E, Flf, Cb
C-20546	1	4.3	4.6	28.9	E, Flf, Sth
C-20546	4	10.0	2.6	15.3	Cb, Box, E, Flf
metribuzin	1	7.0	1.3	21.9	E, L, Flf, Sth
metribuzin	4	9.0	2.0	17.4	E, Flf, Cb, Cud
R-7465(inc)	2	4.0	4.3	23.6	Flf, Cud
R-7465(inc)	8	7.3	2.6	20.2	Flf, E
R-7465(sur)	8	0.0	6.3	35.2	E, Flf, Sth
SAN 6706	2	1.3	6.6	30.2	Flf
SAN 6706	4	0.0	5.0	35.5	Flf, Sth
SAN 6706	8	4.0	4.6	-	E, Flf, Cb
SAN 6706	16	6.6	2.0	19.8	E, Flf
SAN 9789	8	5.0	1.0	18.7	Flf, E
NIA 21830	2	7.6	2.6	20.6	Flf, L
NIA 21830	8	10.0	2.0	14.6	L, Pig, Cb
NIA 21800	2	2.3	5.0	28.8	Sth, E, Flf
NIA 21800	8	8.6	2.2	17.8	E, Flf
methazole	2	0.3	6.6	35.0	E, Flf, L
methazole	8	1.3	5.3	32.5	Sth, E, Cb
linuron	1	0.0	6.0	34.8	Sth, Flf
linuron	4	6.6	3.6	21.9	Flf, E, Cud
nitrofen + dinoseb	4 + 2	1.6	4.3	33.5	Cb, E, Flf
nitrofen + dinoseb	16 + 8	6.0	2.3	25.6	E, Flf
U-27267	1.5	0.6	3.6	32.9	Flf, E
U-27267	6.0	2.3	1.3	28.4	Flf
terbacil	2	1.6	6.6	32.7	Sth, E, Flf
untreated	-	4.0	3.6	28.7	E, Flf

1/ Average phytotoxicity of 3 replications per treatment

2/ Phytotoxicity were on 10 varieties of Prunus

3/ Weed species: E-Erigeron, Flf-Flaxleaf fleabane, L-lovegrass, Box-bristly oxtongue, Sth-sowthistle, Cb-crabgrass, Cud-cudweed, Pig-pigweed

Herbicide screening for deciduous fruit trees. Lange, A. H. and B. B. Fischer. Most herbicides showed excellent weed control and several showed a good margin of safety in the 1971 deciduous fruits screening trial. Dormant trees were planted (seven Prunus varieties and one Bartlett pear) in each plot and immediately sprinkle irrigated February 11, 1971. The herbicides were applied March 8, 1971 and immediately sprinkle irrigated with 2 inches of water. Nemaguard rootstock was used in a few special plots designed to evaluate method of incorporation. Prunus varieties included a Nonpareil and Texas (Mission) almond, Santa Rosa plum, Elberta peach, French prune, Bing cherry, and Tilton apricot. The soil was a sandy loam with a poor subsoil drainage (organic matter 0.34%, sand 58%, silt 30% and clay 12%) (Table 1).

Simazine, usually quite toxic in this soil under sprinkler and flood irrigations, was excessively toxic this year at 2 lb/A on seven varieties of Prunus as well as Bartlett pears. Herbicides showing the greatest selectivity were R-7465, oxadiazon, oryzalin, AN-56477 (incorporated), and CGA-10832. Those showing intermediate toxicity included: methazole, alachlor and SAN 9789. Those showing excessive injury included both DS compounds, EP 479, simazine and Zobar®. Most herbicides, even at the low rates, showed season-long weed control under the conditions of this experiment (Tables 2 and 3).

Preplant incorporated R-7465 showed some slight injury, but was considerably less than occurred last year (data not shown here). Where R-7465 was applied to the surface and sprinkle irrigated, or incorporated after planting, there was no injury even at the 8 lb/A rate.

SAN 9789 was noticeably less toxic on pear and apricot than on other varieties. Alachlor was also less toxic on apricot than it was on other varieties.

Table 1. Relative phytotoxicity of thirteen herbicides on seven varieties of Prunus and Bartlett pear at 2 and 5 months after application.

Herbicide	lb/A	Average 1/															
		Nonpareil		Texas		Santa Rosa		Elberta		Tilton		Bing		French		Bartlett	
		almond		almond		plum		peach		apricot		cherry		prune		pear	
		2 mo.	5 mo.	2 mo.	5 mo.	2 mo.	5 mo.	2 mo.	5 mo.	2 mo.	5 mo.	2 mo.	5 mo.	2 mo.	5 mo.	2 mo.	5 mo.
simazine	2	5.0	6.0	7.0	8.5	6.5	8.2	6.5	8.8	8.2	8.2	1.5	7.5	5.5	8.8	1.2	7.7
R-7465	2	0.0	1.2	0.5	1.0	0.5	0.8	1.0	1.5	0.0	0.5	0.8	0.8	0.2	0.8	0.5	0.5
R-7465	8	0.0	2.2	0.0	2.2	0.8	1.5	0.0	2.8	0.0	0.0	0.5	3.0	0.0	2.2	1.2	1.8
oxadiazon	2	0.0	0.8	0.2	0.2	0.0	0.0	0.2	0.5	0.0	0.0	0.5	0.5	0.5	1.2	1.0	1.8
oxadiazon	8	0.0	0.2	0.8	0.5	1.0	0.5	0.0	0.2	0.0	0.2	0.5	0.2	0.5	1.0	1.0	2.2
methazole	2	0.0	3.5	0.0	4.5	0.3	2.5	0.7	2.5	0.3	1.0	0.7	3.5	0.7	3.8	0.0	1.2
methazole	8	3.8	9.2	5.2	9.8	5.5	10.0	4.0	10.0	3.5	8.5	1.2	10.0	4.8	10.0	1.7	8.5
oryzalin	2	1.8	3.2	0.8	2.5	2.0	1.2	0.2	0.8	0.2	0.8	0.0	3.8	0.7	2.8	0.5	1.2
oryzalin	8	0.2	3.0	1.0	3.0	0.2	2.2	0.0	3.0	1.5	3.0	0.2	4.0	0.0	2.8	1.2	4.5
alachlor	2	0.5	3.5	0.5	2.0	0.8	2.0	0.8	3.0	0.5	1.0	0.8	2.5	2.8	1.2	1.5	2.8
alachlor	8	2.5	5.2	2.8	6.0	2.2	4.8	3.2	6.2	2.5	3.0	2.2	4.5	2.5	5.2	4.8	7.2
AN 56477 (inc)	2	0.0	1.2	1.5	2.8	1.0	0.2	0.5	1.0	0.5	1.0	1.0	2.2	2.5	4.0	1.5	2.2
AN 56477 (inc)	8	0.2	2.0	0.2	2.5	1.8	2.5	0.5	0.8	0.5	1.0	0.8	2.5	0.8	4.5	0.5	1.8
EP 479	2	5.0	9.5	6.5	9.8	8.0	10.0	5.8	9.0	6.8	9.2	4.8	9.5	5.8	9.8	1.5	3.5
EP 479	8	6.2	10.0	6.5	10.0	8.0	10.0	4.8	10.0	6.8	10.0	5.0	10.0	8.0	10.0	2.0	9.8
DS-5328	2	9.0	9.5	5.5	5.8	8.2	7.2	6.8	6.8	3.5	3.0	7.5	8.8	8.5	8.0	3.2	7.5
DS-5328	8	9.2	10.0	7.5	9.0	9.0	10.0	8.5	9.8	7.0	7.0	8.8	10.0	8.8	10.0	5.0	10.0
DS-17338	1	9.0	10.0	9.0	9.2	9.0	9.2	9.0	9.0	9.0	9.2	8.7	9.2	8.7	9.2	7.3	8.6
DS-17338	4	9.0	10.0	9.0	10.0	9.0	10.0	9.0	10.0	9.0	10.0	9.0	10.0	9.0	10.0	9.0	10.0
CGA-10832	2	1.8	3.0	0.2	1.8	2.2	2.8	0.2	1.0	0.0	0.0	0.8	1.0	0.8	2.2	0.2	0.0
CGA-10832	8	0.0	0.8	0.0	1.5	0.2	1.2	0.0	0.0	0.0	0.2	0.0	2.2	0.2	1.5	0.5	1.0
SAN 9789	1	3.2	4.2	3.8	4.8	1.8	2.3	2.2	4.2	1.5	1.2	2.2	3.8	2.5	5.2	0.5	0.0
SAN 9789	4	3.8	8.8	3.8	8.2	3.5	8.0	3.5	7.5	3.2	4.8	2.5	7.0	3.5	9.5	1.0	2.0
Zobar®	2	5.2	7.8	6.5	9.8	5.5	9.5	6.8	9.8	6.2	10.0	6.0	10.0	8.0	10.0	3.5	8.8
Zobar®	4	8.2	10.0	8.2	10.0	8.5	10.0	7.5	9.8	9.0	10.0	9.0	10.0	9.0	10.0	5.5	9.5
Check	-	0.0	2.2	0.0	3.2	0.0	3.2	0.0	3.2	0.0	2.8	0.0	2.2	0.0	5.5	0.0	2.8

1/ Average of 4 replications

Table 2. Annual weed control at 2,5 and 12 months following application with several herbicides.

Herbicide	lb/A	Average Weed Control ^{1/}			Weed species ^{2/}
		2 months	5 months	12 months	
simazine	2	10.0	10.0	3.8	
R-7465	2	7.8	9.5	8.5	P
R-7465	8	8.8	9.8	8.8	G
oxadiazon	2	8.5	8.5	8.2	P, St, Cb, Ch
oxadiazon	8	9.2	10.0	9.2	
methazole	2	10.0	7.5	8.8	P, E, Sp, Cp, St
methazole	8	10.0	9.2	4.0	P, N
oryzalin	2	10.0	9.8	8.0	St, N
oryzalin	8	10.0	10.0	7.5	
alachlor	2	8.2	3.0	7.2	P, Sc, St, Cp, Sp, G
alachlor	8	9.0	5.5	4.2	Cb, P, St, Cp, B
AN 56477 (Inc)	2	9.8	8.2	7.0	St, Sc
AN 56477 (Inc)	8	10.0	10.0	8.5	
EP 479	2	10.0	10.0	4.2	
EP 479	8	10.0	10.0	3.5	
DS-5328	2	10.0	3.0	5.0	P, L, G, Cb, Cp, St
DS-5328	8	10.0	5.5	3.2	P, L, Cb, Cp, St, Sp
DS-17338	1	10.0	7.5	4.5	P, L, Cb, Cp, Sp
DS-17338	4	10.0	9.0	7.8	P, L, Sp
CGA-10832	2	8.8	5.8	5.2	P, L, Sc, G, St, Cb, Cp
CGA-10832	8	9.0	8.5	7.0	P, St
SAN 9789	1	10.0	7.8	7.0	P, Cp
SAN 9789	4	10.0	9.8	7.2	E, Cp
Zobar®	2	10.0	10.0	5.2	
Zobar®	4	10.0	10.0	7.8	
Check	-	0.0	1.5	6.0	K, Cb, P, L, St, E, Cp, Cw, Lq

^{1/} Average of 4 replications

^{2/} Weed species: P-pineappleweed, G-annual grasses, St-sowthistle, Cb-crabgrass only, E-Erigeron, Sp-sprangletop, Sc-sour clover, Cp-carpetweed, Lq-lambsquarters, Cw-cudweed, K-knotweed, L-lovegrass, Ch-chickweed, N-nutsedge. (Species present at 5 months).

Table 3. A comparison of the increase in diameter produced by 11 herbicides compared to simazine as measured by the increase in diameter.

Herbicide	lb/A	Average <u>1/</u>							
		Nonpareil almond	Texas almond	Faye Elberta peach	Santa Rosa plum	French prune	Tilton apricot	Bing cherry	Bartlett pear
simazine	2	5.5	1.7	2.4	1.0	0.7	2.2	6.6	- 0.3
R-7465	2	21.8	21.0	17.8	17.8	15.3	8.7	17.5	9.5
R-7465	8	20.0	18.0	11.0	16.3	8.6	10.6	11.3	1.7
oxadiazon	2	18.5	20.0	16.6	18.0	13.7	10.0	14.3	6.7
oxadiazon	8	22.2	20.2	18.5	17.3	17.0	14.3	18.7	7.7
methazole	2	16.8	14.3	14.6	15.5	10.0	11.5	15.0	12.8
methazole	8	2.0	- 0.3	- 0.5	- 0.5	- 0.5	1.7	- 3.3	0.6
oryzalin	2	13.7	15.0	15.0	11.6	11.3	11.0	8.4	5.3
oryzalin	8	14.0	13.0	12.8	9.0	14.8	1.8	11.6	2.7
alachlor	2	15.2	16.0	10.8	11.0	12.0	10.6	3.2	4.0
alachlor	8	4.5	4.0	2.0	3.0	6.7	3.8	7.0	3.0
AN 56477 (inc)	2	18.2	15.3	16.0	12.0	9.3	12.7	12.7	6.5
AN 56477 (inc)	8	16.5	22.0	15.8	10.7	8.2	10.3	9.5	8.2
EP 479	2	2.3	1.4	3.6	- 0.2	- 1.3	0.2	2.3	13.7
EP 479	8	- 2.7	- 1.0	- 0.3	- 3.0	- 1.2	- 2.3	- 0.3	- 1.6
DS-5328	2	- 5.3	7.3	5.8	2.8	- 1.5	11.3	0.7	3.0
DS-5328	8	- 2.0	1.5	- 2.3	- 2.7	0.3	5.7	- 1.5	- 3.7
CGA-10832	2	13.0	15.3	13.3	7.8	12.9	11.2	5.7	8.8
CGA-10832	8	15.0	20.8	16.7	18.5	16.5	8.5	15.8	4.3
SAN 9789	1	15.8	15.7	15.4	13.3	7.2	11.6	12.2	9.7
SAN 9789	4	1.0	1.4	5.0	6.0	0.0	10.8	4.0	9.3
Zobar®	2	5.3	0.3	- 0.5	- 3.2	- 1.5	- 1.3	- 1.6	- 1.0
Zobar®	4	- 4.2	- 1.7	- 0.8	- 1.6	0.0	0.2	- 1.0	- 4.0
check (weedy)	-	7.0	8.3	9.7	8.0	8.0	5.2	9.5	6.7

1/ Average increase in diameter of 4 replications.

Herbicide screening for fruit and nut crops. Lange, A. H. Most of the new herbicides tested in 1972 showed less selectivity with a large number of genera than those previously found safe on the trees of the genus Prunus tested in 1969 through 1971. Most new herbicides were safer than simazine.

Sixteen herbicides were evaluated for annual preemergence weed control in Mission almond, Nemaguard peach, Mahaleb cherry, apple, pear, Black walnut, pistachio, Calimyrna fig, and olive (Table 1). The plants were planted 2-24-72 to 3-22-72 and treated with herbicides as a directed spray to the base on 4-7-72. Immediately after the herbicide application, the plots were sprinkler irrigated with 2 inches of water. Subsequent irrigations were made by individual basin plot irrigation until 7-10-72 when the plots were border flood irrigated.

Herbicides showing consistently more safety than simazine were R-7465, oxadiazon, SAN 9789, oryzalin, methazole, CGA-10832, diethamine, USB 3153, terbutryn and pronamide. Those safe, but with insufficient weed control, were chlorpropham and IMC 3950. One preemergence herbicide, DS-5168, showed fair weed control but gave excessive tree injury. The two postemergence herbicides glyphosate and asulam showed completely different response when applied preemergence. Asulam gave considerable weed control but gave excessive injury to trees and vines. Glyphosate had no preemergence effect on weeds and produced no detrimental effects on tree foliage or growth (Table 2).

Table 1. A comparison of 16 herbicides for preemergence annual and purple nutsedge control in trees.

Herbicide	lb/A	Average $\frac{1}{2}$		Nutsedge
		Annual Weeds		
		1 mo.	2 mo.	
simazine	2	9.7	9.0	9.3
R-7465	2	6.3	5.7	9.3
R-7465	8	6.3	6.3	10.0
oxadiazon	2	8.3	4.3	9.3
oxadiazon	8	9.3	8.0	9.7
SAN 9789	1	5.3	4.7	9.0
SAN 9789	2	8.7	9.3	9.7
SAN 9789	4	8.0	8.3	10.0
oryzalin	2	6.3	6.3	7.7
oryzalin	8	6.0	6.0	9.7
methazole	4	7.0	6.0	9.0
methazole	8	7.0	7.5	5.3
CGA-10832	2	7.0	7.7	6.3
CGA-10832	8	7.0	7.0	6.3
diethamine	2	6.0	6.0	7.7
diethamine	8	7.7	8.0	8.7
chlorpropham	4	7.3	7.3	9.0
chlorpropham	16	7.7	6.3	9.0
terbutryn	2	6.3	5.0	5.3
terbutryn	8	9.3	9.0	10.0
DS-5168	2	5.7	4.3	9.0
DS-5168	8	8.0	7.7	9.7
IMC 3950	2	5.3	3.3	8.0
IMC 3950	4	5.7	4.3	9.7
pronamide	4	5.3	5.0	10.0
pronamide	16	8.0	8.0	9.0
USB-3153	2	5.5	4.0	5.5
USB-3153	8	8.7	9.0	9.3
asulam	4	8.7	8.0	9.0
asulam	16	9.0	7.0	9.7
glyphosate	1	1.3	0.3	3.0
glyphosate	4	1.3	0.0	2.7
check	-	1.7	0.0	7.0

$\frac{1}{2}$ Average of 3 replications where 0 = no effect; 10 = complete control. Herbicides applied 4-7-72. Annual weeds include lovegrass, watergrass, lambsquarters, pigweed, and a small amount of crabgrass, red maids and other broadleaf weeds.

Table 2. Phytotoxicity of several herbicides on 9 young tree species.

Herbicide	lb/A	Average ^{1/} Phytotoxicity								
		Almond	Peach	Pear	Apple	Olive	Walnut	Fig	Pistachio	Cherry
simazine	2	1.3	3.3	0.7	2.3	0.0	0.0	6.0	7.3	4.7
R-7465	2	0.0	0.0	3.0	3.3	0.7	3.3	0.7	1.3	0.0
R-7465	8	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
oxadiazon	2	0.0	0.0	0.0	3.3	0.0	0.0	0.0	3.3	0.0
oxadiazon	8	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0
SAN 9789	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
SAN 9789	2	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.7
SAN 9789	4	0.0	1.0	0.0	0.0	1.0	4.0	0.0	5.3	1.3
oryzalin	2	0.0	0.0	0.0	0.0	0.0	6.3	0.7	2.0	0.0
oryzalin	8	0.7	0.3	1.0	0.3	1.0	1.0	1.0	1.0	1.0
methazole	2	0.0	0.0	0.7	0.7	0.0	0.0	1.3	2.0	0.0
methazole	4	0.0	0.0	0.0	0.0	0.0	1.0	4.0	1.5	0.0
CGA-10832	2	0.0	0.7	0.0	1.0	0.0	0.0	0.7	5.7	0.0
CGA-10832	8	1.3	3.7	0.0	2.3	0.0	3.3	4.0	5.3	0.0
diethamine	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
diethamine	8	0.0	0.0	1.3	0.3	0.0	0.3	1.0	2.3	0.0
chlorpropham	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	1.3
chlorpropham	16	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0
terbutryn	2	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.7
terbutryn	8	1.7	2.3	0.0	0.7	1.0	0.0	6.3	4.3	3.0
DS-5168	2	0.0	1.0	5.3	0.0	0.0	3.3	4.7	0.7	2.7
DS-5168	8	3.0	2.0	2.0	6.7	0.0	5.3	9.3	1.7	7.7
IMC 3950	2	0.7	0.7	0.0	0.0	2.0	1.5	0.0	0.0	0.0
IMC 3950	8	1.3	0.7	0.0	0.7	0.0	0.0	0.0	3.3	1.3
pronamide	4	0.7	0.3	0.7	0.7	0.0	0.0	1.0	2.0	1.3
pronamide	16	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0
USB-3153	2	1.5	2.0	0.0	1.5	0.0	0.0	0.0	1.5	0.0
USB-3153	8	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
asulam	4	1.7	2.0	3.0	1.0	0.3	0.0	1.3	1.3	3.3
asulam	16	9.0	9.3	6.3	8.3	5.0	9.7	9.7	8.0	9.0
glyphosate	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
glyphosate	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
check	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

^{1/} Average of 3 replications where 0 = no effect or no weed control; 5 = chlorosis and stunting on most of the foliage and 10 = complete kill of foliage or bare ground.

Formulation effects on orchard herbicide activity. Lange, A. H.
Granular and non-granular forms of four new orchard herbicides were evaluated under sprinkler irrigation in a low organic matter soil (0.3%). The herbicides were applied in the rain on 12/23/71 to wet soil. (Table 1).

The granular forms of nitralin were more active than the wettable powder early but appeared to reverse with time. The other three new herbicides were equally active on barley, sugar beets and safflower. All herbicides were less active than simazine initially but ultimately 4 lbs/A of nitralin + oxadiazon appeared to outlast 1 lb/A of simazine (Table 2).

Table 1. A comparison of two formulations of each of four herbicides compared to 1 lb/A of simazine applied preemergence under rainfall and sprinkler irrigation.

Herbicide	Formulation	lb/A	Average ^{1/} phytotoxicity to crops & weeds		
			3 mos. ^{2/}	5 mos. ^{3/}	9 mos. ^{4/}
nitralin	WP	4	5.3	6.5	8.5
nitralin	Gr	4	7.3	5.7	5.0
R-7465	WP	4	8.6	8.8	5.2
R-7465	Gr	4	8.1	8.3	7.5
oxadiazon	EC	4	7.7	8.4	3.2
oxadiazon	Gr	4	7.3	8.3	9.3
SAN 9789	WP	1	9.4	9.1	6.5
SAN 9789	Gr	1	8.8	8.8	4.0
simazine	WP	1	9.3	8.6	2.5
check	-	-	1.5	3.7	2.2

- 1/ Average phytotoxicity from 4 replications where 0 = no effect, 10 = all dead
 2/ Average phytotoxicity to barley, sugar beets, and safflower.
 3/ Average phytotoxicity to barley, sugar beets, safflower, and alfalfa.
 4/ Average phytotoxicity to milo and pigweed.

Table 2. The comparative activity of wettable powder vs. granular formulation of four herbicides relative to simazine as measured on barley, sugar beets and safflower.

Herbicide	lb/A	Formulation	Barley	Sugar Beets	Safflower	Average
nitralin	4	WP	3.8	7.0	5.0	5.3
nitralin	4	Gr	4.8	10.0	7.2	7.3
R-7465	4	WP	9.2	8.2	8.5	8.6
R-7465	4	Gr	7.2	7.8	9.2	8.7
oxadiazon	4	EC	8.5	10.0	4.5	7.7
oxadiazon	4	Gr	9.5	10.0	2.5	7.2
SAN 9789	1	WP	9.2	10.0	9.0	9.4
SAN 9789	1	Gr	9.2	10.0	7.2	8.8
simazine	1	WP	7.8	10.0	10.0	9.7
check	-	-	0.8	2.0	1.8	1.5

1/ Average of 4 replications where 0 = no effect and 10 = complete kill of crop.

Weed control in apples. Elmore, C. L. and L. Buschmann. Herbicides were applied December 30, 1970 with backpack sprayers to 10 ft. by 30 ft. plots in 4 year old 'Golden' and Red Delicious apple trees. The herbicides were applied in 100 gpa. All treatments contained paraquat at 1 lb/A plus 0.25% Surfax surfactant. All herbicides were applied to a dry soil surface; however, a light rain fell immediately after application. The orchard was check-flood irrigated. The trial area was disced sometime in June. No injury was observed on the apples; however, terbacil symptoms were observed on the interplanted prune trees.

Table 1. Control of annual weeds by several herbicides and herbicide combinations in flood irrigated apples.

Herbicide	lb/A	Annual weed control and weeds remaining	
		3/5/71	5/26/71
terbacil	2	10.0	9.7
terbacil	4	10.0	10.0
terbacil	8	10.0	10.0
terbacil + diuron	2 + 2	10.0	10.0
terbacil + diuron	4 + 4	10.0	10.0
R-7465	2	7.3 M,H,S	4.3 M,B,E
R-7465	8	6.3 H,M	4.3 M,E
simazine + nitralin	2 + 2	9.3 M	6.0 M,B
terbacil + nitralin	2 + 2	10.0	9.3
SAN 6706	2	7.7 H,M	4.7 M,B,R
SAN 6706	8	9.0 H,M	8.3
check	-	2.0 H,M,C,F,S	0.0 M,B,R,E,C

H - henbit

M - cheeseweed

C - common chickweed

S - shepherd's purse

B - barnyardgrass

E - fleabane

R - wild radish

Annual weed control in young apples. Agamalian, H. and A. Lange.

In a relatively high organic matter coastal soil, herbicides tested performed well under sprinkler irrigation plus natural rainfall. R-7465 was weak on the broadleaf weeds. Oxadiazon was somewhat better. Oryzalin looked very good at these rather high rates. None of the new compounds gave better weed control than simazine and diuron. There were no phytotoxicity symptoms visible.

Weeds included corn spurry, Malva sp., mustard, jimsonweed, filaree, hairy nightshade, pigweed, bluegrass, foxtail and wild radish.

Table 1. Annual weed control in apples

Herbicide	lb/A	Weed control <u>1/</u>		
		Broadleaf	Grass	Phytotoxicity
R-7465	4	6.0	8.5	0
R-7465	8	7.7	9.0	0
oxadiazon	4	10.0	9.3	0
oxadiazon	8	9.7	9.7	0
terbacil	2	9.3	9.7	0
terbacil	4	7.3	6.7	0
oryzalin	4	7.7	9.7	0
oryzalin	8	9.0	9.7	0
simazine	4	10.0	9.3	0
diuron	4	9.7	9.3	0
check	-	1.0	0.0	0

Applied February 24, 1972, evaluated April 15, 1972.

1/ Average of 4 replications.

Weed control in apples. Agamalian, H. and C. Elmore. Whitetop and annual weed control was excellent when terbacil was used at any rate even through May, 1971 from a December, 1970 application.

Control of annual weeds with SAN 6706 was marginal with 2 lbs/A at 4 months and 8 lbs/A only gave about 80% control at six months.

No phytotoxicity was observed on either the Golden Delicious or Red Delicious variety apples with any treatment.

Table 1. Weed control in apples

Herbicide	lb/A	Weed Control ^{1/}				
		Whitetop		Grass	Annuals	
		7/1/71	10/22/71		Pigweed	
		7/1/71	10/22/71	10/22/71	7/1/71	10/22/71
terbacil	2	9.2	7.8	10.0	8.2	0.8
terbacil	4	9.8	9.5	10.0	9.5	6.0
2,4-D + oil	1	4.8	1.5	0.0	0.0	6.2
2,4-D + oil	3	5.2	3.5	1.2	0.0	5.2
SAN 6706	2	3.2	0.0	6.5	6.2	8.5
SAN 6706	4	0.2	0.0	8.5	8.8	9.8
diuron + amitrole	2 + 1	0.0	0.0	9.5	9.2	8.0
diuron + amitrole	4 + 1	1.0	0.8	9.5	8.2	4.8
simazine + amitrole	2 + 1	2.2	0.0	10.0	6.5	3.2
simazine + amitrole	4 + 1	3.2	0.0	7.8	8.2	7.5
amitrole	4	6.5	1.8	8.5	1.8	1.8
check	-	5.5	1.8	0.0	0.0	6.0

^{1/} Average of 4 replications

Weed control in pears. Elmore, C. L., E. Roncoroni, A. H. Lange and J. DeTar. Several herbicides and herbicide combinations were applied as a strip broadcast spray in plots 8' x 25' down the tree row on two year old Bartlett pears in Solano County. All herbicides were applied March 5, 1971, with knapsack sprayers with three 8004 Teejet nozzles in 100 gpa water. The temperature was approximately 70°F. at application. Paraquat at 1 lb/A plus X-77 at 0.25% was added to all treatments except linuron and diuron to control established seedlings. The herbicides were applied to a dry soil surface; first rainfall (.88 in.) occurred March 12. The orchard was sprinkler irrigated.

The entire orchard, including the trial, was sprayed with weed oil approximately May 1 and August 30, 1971.

Table 1. Effect of several herbicides and herbicide combinations on barnyardgrass and field bindweed control.

Herbicide	lb/A	Barnyardgrass control				Field bindweed control	
		5/2/71	5/29/71	6/30/71	8/25/71	5/2/71	5/29/71
simazine	2	7.8	6.0	5.0	3.2	6.8	7.0
methazole	2	3.8	5.0	2.5	2.5	6.0	4.0
methazole	8	6.8	6.0	3.8	2.8	6.2	7.0
oxadiazon	2	7.8	4.2	5.8	4.0	4.2	5.0
oxadiazon	8	9.9	8.5	8.0	6.4	8.2	9.0
SAN 6706	2	3.5	4.2	4.2	3.8	7.0	6.8
SAN 6706	8	9.5	9.5	8.2	7.2	3.8	2.2
oryzalin	2	3.5	4.2	5.5	4.5	8.2	8.8
simazine + oryzalin	2 + 2	10.0	9.2	7.5	7.6	4.0	5.0
simazine + nitralin	2 + 2	8.8	8.2	6.5	4.8	6.2	7.0
R-7465	2	5.0	5.2	4.8	3.0	7.0	7.8
R-7465	8	8.5	8.2	8.4	7.9	5.5	4.2
simazine + R-7465	2 + 2	10.0	9.0	8.0	6.2	5.5	5.0
linuron + diuron	2 + 2	9.0	5.8	5.2	3.5	6.8	6.2
check	-	4.0	5.0	3.5	2.2	3.5	4.2

The herbicides SAN 6706 at 8 lbs/A and R-7465 at 8 lbs/A gave satisfactory long residual control of barnyardgrass. The combination of simazine + oryzalin at 2 lbs/A of each herbicide gave marginal full-season control. Most herbicides with the exception of methazole gave adequate control for about 4 months before needing supplemental postemergence control.

Suppression of field bindweed was observed with oxadiazon at 8 lbs/A and oryzalin at 2 lbs/A. Control was temporary, however, and the area required 2,4-D spraying during the growing season.

No phytotoxicity was observed at this location with any herbicide treatment.

Weed control in pears. Elmore, C. L., G. Morehead, A. H. Lange and E. Roncoroni. Two trials were established in young Bartlett pear orchards to evaluate several herbicides for annual weed control and tree phytotoxicity. One trial was established on Sacramento clay loam soil (sand 26%, silt 38%, clay 36%, organic matter 4.4%); the other on a sandy loam soil (sand 70%, silt 22%, clay 8%, organic matter 0.13%). Both trials were under solid jet sprinkler irrigation.

On December 11, 1970 all treatments were applied as a broadcast spray with Champion backpack sprayers. Amitrole at 1 lb/A plus 0.5% X-77 surfactant was added to all treatments for control of the established weeds. All treatments were four times replicated.

The orchards were evaluated for weed control and tree phytotoxicity at 82 and 153 days after treatment (Tables 1 and 2).

Table 1. The effect of several herbicides on the control of annual weeds and bindweed in a clay loam soil.

Herbicide	lb/A	Weed Control				
		82 days	153 days			
		Annuals	Annuals	Grass	Knotweed	Bindweed
simazine	2	8.5	6.0	9.0	9.8	0.8
methazole	2	6.8	3.5	7.5	2.5	2.8
methazole	8	8.8	4.0	7.0	7.0	4.2
oxadiazon	2	8.5	4.5	9.8	4.8	1.2
oxadiazon	8	9.5	8.5	10.0	9.8	7.2
SAN 6706	2	7.8	6.8	7.8	5.5	3.5
SAN 6706	8	6.5	4.2	7.8	10.0	0.0
oryzalin	2	8.3	6.8	9.0	9.8	7.2
simazine + oryzalin	2 + 2	9.5	8.5	10.0	10.0	6.5
simazine + nitralin	2 + 2	9.7	7.8	9.0	10.0	3.0
R-7465	2	6.5	4.8	4.2	9.8	7.0
R-7465	8	8.9	9.0	9.8	10.0	2.5
simazine + R-7465	2 + 2	9.6	7.5	9.8	9.5	2.5
check	-	5.0	0.0	3.2	1.0	2.2

Table 2. The effect of several herbicides on the control of annual weeds in a sandy loam soil.

Herbicide	lb/A	85 days	Weed Control		Species remaining
			Species remaining	112 days	
simazine	2	9.2	m,f	9.1	
methazole	2	9.0	p,h	6.5	h,c,s
methazole	8	9.6	h	9.5	
oxadiazon	2	6.0	c,h,p	3.5	c,h
oxadiazon	8	6.8	c,h	5.0	c,h
SAN 6706	2	5.8	h,m,f	4.8	h,f,c
SAN 6706	8	7.8	f,m,h	6.2	h,f
oryzalin	2	3.8	p,c,m,f	4.2	p,f
simazine + oryzalin	2 + 2	9.5	m,f	9.2	
simazine + nitralin	2 + 2	9.2	m,f	8.6	m
R-7465	2	3.2	h,m,c,f,r,s	2.5	h,r,f
R-7465	8	5.5	h,m,r,f	4.8	h,r,f
simazine + R-7465	2 + 2	8.6	m,f	8.2	f,m
check	-	1.0	h,m,f,r,s,c	0.2	h,p,m,r,s,c

c - chickweed
p - Poa annua
f - filaree
h - henbit

s - shepherdspurse
m - malva
r - red maids

Trial 1 (clay loam)--When evaluated at 85 days most herbicides or combinations were giving good to excellent weed control. The low rates of methazole and R-7465 were beginning to get growth of tolerant weed species.

Oxadiazon at 8 lbs/A, R-7465 at 8 lbs/A and the combination of simazine plus oryzalin showed approximately 85% control or better at 153 days. Barnyardgrass was developing in R-7465 at 2 lbs/A and knotweed was prevalent in methazole at 2 lbs/A, oxadiazon at 2 lbs/A and SAN 6706 at 2 lbs/A.

There appeared to be field bindweed suppression in the oxadiazon and oryzalin plots at 153 days.

Trial 2 (sandy loam)--There was tremendous weed pressure from several species in this trial. In this trial any treatment containing simazine gave excellent weed control up to 112 days after application. Methazole at 2 lbs/A lasted 85 days, however, 8 lbs/A was required to continue control to 112 days.

Oxadiazon gave excellent control of most weeds except common chickweed which drastically reduced the over-all evaluation. Henbit was also present as a minor weed in the oxadiazon treatments.

Weed control from R-7465 was poor primarily due to the tolerant weeds henbit, red maids and, to a lesser extent, filaree.

Simazine was greatly enhanced when combined with R-7465, oryzalin and nitralin.

Although plants were chlorotic from SAN 6706, henbit and filaree appear to be tolerant and were not controlled in this trial.

No phytotoxicity was observed on the young Bartlett variety pears with any herbicide in either trial.

Annual weed control in young peaches. Lange, A. and N. Ross. Terbacil gave much more effective annual weed control than simazine. The addition of nitralin did not improve the weed control. No phytotoxicity was apparent on these young peach trees. The combination of terbacil plus diuron was not as good as terbacil alone.

Table 1. Annual weed control in young peaches.

Herbicide	lb/A	4/1	Weed control		
			4/28	7/14	9/15
simazine	2	7.3	9.0	0.0	1.0
simazine + nitralin	2 + 2	7.7	8.0	2.7	3.0
terbacil	2	9.7	9.3	9.0	9.0
terbacil + nitralin	2 + 2	10.0	10.0	8.7	7.0
terbacil + diuron	1 + 1	9.3	9.3	7.7	7.0
check	-	5.0	2.0	0.0	3.0

Applied on 11/13/70.

Continuous retreatment of bearing peach trees. Fischer, B. B. and A. Lange. Nine year old Faye Elberta peach trees under furrow irrigation were strip treated annually for four years with no indication of phytotoxicity and excellent annual weed control (Table 1).

The downward movement of herbicides from the soil surface which received only annual rainfall was appreciable only with the two higher rates of terbacil. Although bioassay plants were killed, insufficient amounts were present in the root zone of the tree to cause foliar injury on the tree.

Table 1. Annual weed control in nine year old Faye Elberta treated annually for four years.

Herbicide	lb/A	Annual Weed Control	Average ^{1/} Phytotoxicity	^{4/} cm- Movement
simazine	2	10	0	3.3
simazine	4	10	0	4.7
terbacil	1	9.0 ^{2/}	0	3.3
terbacil	2	10	0	11.0
terbacil	4	10	0	14.0
terbacil + diuron	1 + 1	10	0	7.0
terbacil + nitralin	1 + 2	10	0	6.3
methazole	4	8.3 ^{2/}	0	4.0
R-7465	4	9.0 ^{3/}	0	7.0
check	-	0	0	0.0

Treated 2-13-69, 12-30-69, 12-28-70, 12-23-71 (rained during and after application).

^{1/} Average of 3 replications. 3 trees/plot, data taken from middle tree. Evaluated 8-10-72.

^{2/} Principally barnyardgrass

^{3/} Principally groundcherry

^{4/} Downward movement of herbicide from the soil surface (center of strip, i.e., in the tree line) as determined by bioassaying undisturbed soil cores.

The effect of timing on weed control in a young peach orchard and grape vineyard. Lange, A. Five herbicides at 4 lbs/A in combination with simazine at 1 lb/A were applied at three dates. Each application was followed by 2 inches of sprinkler irrigation except the January 1 set which received 1 inch of rainfall plus 1 inch of sprinkler irrigation.

The entire orchard and vineyard received drip irrigation (one outlet per tree and one outlet per two vines) throughout the growing season. Ditch water was applied three times by sprinkler irrigation in June through early July.

Weed control was generally commercially acceptable from all combinations. No phytotoxicity was observed except from SAN 9789 in the grape planting. Severe chlorosis and some stunting occurred where one plot received extra water. SAN 9789 was observed to severely stunt bermudagrass and to a lesser extent johnsongrass.

Table 1. The effect of herbicide combination with simazine for weed control in young peach trees and grape vines.

Herbicide	lb/A	Applied	Average Annual Weed Control ^{1/}			
			Peaches		Grapes	
			5/7	6/25	5/7	6/25
simazine + nitralin	1 + 4	11/1/71	7.2	7.8	7.6	8.2
simazine + oryzalin	1 + 4	11/1/71	8.8	6.8	7.8	7.5
simazine + R-7465	1 + 4	11/1/71	7.8	7.8	7.2	7.8
simazine + oxadiazon	1 + 4	11/1/71	8.0	7.5	7.2	9.0
simazine + SAN 9789	1 + 4	11/1/71	8.2	8.5	7.0	8.2
simazine + nitralin	1 + 4	1/1/72	7.2	6.5	7.5	8.5
simazine + oryzalin	1 + 4	1/1/72	8.0	8.0	8.5	9.2
simazine + R-7465	1 + 4	1/1/72	8.2	7.2	7.8	7.0
simazine + oxadiazon	1 + 4	1/1/72	7.5	7.8	8.2	8.2
simazine + nitralin	1 + 4	3/1/72	8.0	9.0	7.2	8.5
simazine + oryzalin	1 + 4	3/1/72	8.2	8.0	8.8	8.8
simazine + R-7465	1 + 4	3/1/72	7.8	7.5	5.2	7.0
simazine + oxadiazon	1 + 4	3/1/72	9.2	9.0	9.2	9.8
simazine + SAN 9789	1 + 4	3/1/72	9.0	8.0	8.5	9.0
check	-	-	3.2	3.2	3.0	3.2

^{1/} Average of 4 replications; evaluated 5/7/72 and 6/25/72. 0 = no control; 10 = complete annual weed control.

The effect of irrigation on the activity of three herbicides on peach rootstocks. Lange, A. Dormant Nemaguard peach rootstocks were planted on March 16, 1971 in a sandy loam soil in the Hanford series, 0.5% organic matter, 56% sand, 30% silt and 14% clay. Herbicides were applied and irrigated by a precision irrigation machine. The rate of irrigation was 1/4 inch per irrigation compared to 1 inch per irrigation applied at three day intervals for a total of 1 inch vs. 4 inches.

All herbicides showed some toxicity expressed by chlorosis and/or marginal leaf burn at varying degrees rated on a scale of 0 to 10. Simazine was safer than terbacil, particularly at the high level of irrigation. SAN 9789 was safer than both simazine and terbacil at both levels of irrigation. These results indicated that if simazine and terbacil are irrigated with high increments of water after application, injury to peach trees would vary, according to the level of irrigation. One-quarter inch per irrigation was safer than one inch in all three herbicides (based on symptom), however SAN 9789 was the exception in the fresh weight of top. (Tables 1 and 2).

Table 1. The effect of sprinkler irrigation on the activity of three herbicides as measured by the response of young Nemaguard peach rootstocks.

Herbicide	lb/A	Average ^{1/} Phytotoxicity	
		1/4+1/4+1/4+1/4 in.	1+1+1+1 in.
simazine	2	3.5	6.8
terbacil	2	4.5	9.5
SAN 9789	4	1.2	4.0
check	-	1.0	0.5

^{1/} Average phytotoxicity where 0 = no effect; 10 = complete kill of species.

Table 2. The effect of quantity of first four irrigations on the phytotoxicity of three herbicides to Nemaguard peach rootstocks.

Herbicide	Act	lb/A	Average Fresh Weight Top ^{1/}			
			1/4+1/4+1/4+1/4 in.		1+1+1+1 in.	
			gm	% of untreated	gm	% of untreated
simazine	80	2	405	64	381	56
terbacil	80	2	492	77	220	32
SAN 9789	80	4	462	73	601	86
check	-	-	633		675	

^{1/} Average of 4 replications with six trees per plot.

The effect of layering herbicides on young peach trees. Lange, A.

Young dormant peach trees were planted through a layer of herbicides applied by a spray blade operating at 2-4 inches 9/28/71. The plots were subsequently flood irrigated.

There was no apparent effect on the foliar growth or top weight. Although definite phytotoxicity symptoms were observed from the high rate of dichlobenil, no reduction in top weight was found.

The degree of annual weed control appeared to be related to the higher top weights, however, the variation between replications and within the plots was high and no significant difference was found.

Table 1. The effect of subsurface layering on the top weight of Nemaguard seedlings.

Herbicide	lb/A	Average ^{1/}		lbs.
		Weed Control 4/18/71	Phytotoxicity	
trifluralin	2	8.0	0	10.8
trifluralin	8	9.3	0	17.2
oryzalin	2	6.5	0	11.1
oryzalin	8	4.3	0	9.6
dichlobenil	2	8.5	1.0	16.9
dichlobenil	8	8.8	3.3	13.9
R-7465	2	5.5	0	13.8
R-7465	8	7.8	0	10.6
check	0	3.8	0	12.3
LSD 05				N.S.

^{1/} Average of 4 replications, six trees per plot. Harvested 12/8/71.

Foliar sprays on Prunus. Lange, A. H. Five postemergence herbicides were applied to the lower 2/3 of a mixed planting of one year old top growth plums, peaches, apricots and almonds on three year old roots during 100° weather at the Kearney Field Station.

The foliage was rated at one month after application. Dalapon showed the least injury to the treated foliage of the postemergence herbicides. MSMA and a mixture of MSMA and cacodylic acid caused injury and grass control equivalent to MSMA alone.

Asulam showed injury somewhat greater than dalapon, consisting of primarily chlorosis. There was somewhat better grass kill than with dalapon.

Oxadiazon showed little injury to tree foliage and little damage on mature grass.

Table 1. The effect of five postemergence herbicides on the foliage of eight Prunus and grassy weeds.

Herbicide	lb/A	Average ^{1/}	
		Phytotoxicity	Weed Control
dalapon	4	2.5	5.5
MSMA	4	7.5	8.5
MSMA + cacodylic acid	4	7.5	8.5
asulam	4	3.0	7.0
oxadiazon	4	1.0	4.0
check	-	0.0	1.6

^{1/} Average of 2 replications. Eight varieties including peaches, almonds, plums, prunes and apricots. Tops are one year old; roots are two years old.

Combinations for weed control in young plums. Lange, A. One year old Santa Rosa plum growing with furrow irrigation in a very sandy soil (organic matter 0.1%, sand 76%, silt 18% and clay 6%) were treated 12/20/71.

No phytotoxicity and good weed control resulted from a single winter application. The spraying was followed by several rains apparently adequate for incorporation.

R-7465 at 2 lbs/A with 0.5 lb. of simazine gave excellent weed control five months after application. Nitratin + simazine likewise gave satisfactory weed control. Oxadiazon + simazine gave excellent weed control early but was weak on crabgrass. (Table 1).

Table 1. A comparison of new herbicides in combination for weed control in young plums with a low rate of simazine 5 months after treatment.

Herbicide	lb/A	Average Annual ^{1/} weed control		Phytotoxicity ^{2/} 5 mos.
		3 mos.	5 mos.	
simazine + nitratin	0.5 + 2	10.0	6.5	0
simazine + nitratin	0.5 + 4	10.0	7.5	0
simazine + R-7465	0.5 + 2	10.0	8.0	0
simazine + R-7465	0.5 + 4	9.8	9.0	0
simazine + oxadiazon	0.5 + 2	10.0	4.0	0
simazine + oxadiazon	0.5 + 4	10.0	6.0	0
check	-	0.0	0.5	0

^{1/} Weeds primarily crabgrass and pigweed; where 0 = no effect, 10 = 100% control. Treated 12/20/71. Average of 4 replications.

^{2/} No phytotoxicity was apparent on these 1 year old plums.

Weed control in prunes, plums and nectarines. Schweers, V., S. Sibbett, J. LaRue and A. Lange. Herbicides were applied to the berm down the tree row mostly above the water line. Winter rainfall following treatment was light. These trials were on Chico fine sandy loam, Greenfield sandy loam and San Joaquin loam. The herbicides were applied 2/1/72 in the prunes and 1/13/72 in the plums and the nectarines on 1/31/72.

In general all herbicides gave good to excellent weed control and no leaf symptoms were seen in any trial. In the nectarine trial terbacil gave outstanding weed control of all species. Simazine, R-7465, and oryzalin were weak on broadleaf species. Oxadiazon and SAN 9789 gave good early broadleaf weed control. The combination of simazine plus nitratin was good on all species (Tables 1 and 2).

In the plum trial R-7465 and oryzalin were weak again on broadleaf weeds.

Table 1. Weed control trials in deciduous trees, 1972.

FRIAR PLUMS								GERRAND PRUNES
Herbicide	lbs. ai/A	2/29/72 Annuals	5/16/72 Broadleaf Grasses		9/6/72 Annuals	Weeds*present	Phytotoxicity	5/9/72
simazine	2	10.0	9.5	9.5	9.3	a,e	None	6.0
simazine	4	10.0	10.0	10.0	9.3	a,c,e	None	7.3
R-7465	4	5.5	2.0	10.0	9.0	a,b,c	None	5.8
R-7465	8	5.0	2.0	10.0	8.5	a,b,c,d,f	None	7.0
terbacil	2	10.0	9.8	9.8	10.0	-	None	5.5
terbacil	4	10.0	9.8	10.0	9.5	a,c	None	8.8
oxadiazon	4	10.0	8.8	9.3	8.0	a,b,c	None	6.8
oxadiazon	8	9.0	7.8	10.0	9.3	a,b,c,e	None	7.3
SAN 9789	2	8.8	4.8	10.0	8.5	a,b,c,d,f	None	8.3
SAN 9789	4	9.8	8.7	9.8	9.5	a,b,c	None	8.0
R-7465 + simazine	4 + 2	10.0	9.5	10.0	9.5	a,c	None	6.8
nitralin + simazine	4 + 2	10.0	9.8	10.0	9.5	a,c	None	8.5
oryzalin	2	4.5	2.3	9.8	9.0	a,b,c,d	None	6.8
oryzalin	4	6.0	4.3	9.5	10.0	-	None	7.8

Average of 4 replications. Ratings are 0 = no weed control, 10 = all weeds dead.

* Weeds present were: a - watergrass d - wild lettuce
b - pigweed e - purslane
c - puncturevine f - mare's tail

Berm treated: plums - 1/13/72, prunes - 2/1/72

Table 2. Weed control in nectarines, 1972.

Herbicide	lbs. ai/A	2/3/72*	2/29/72**	5/18/72		9/6/72		
		Broadleaf	Broadleaf	Broadleaf	Grasses	Weed Control	Weeds Present	Phytotoxicity
simazine	2	4.3	8.5	4.5	10.0	8.3	a,b	None
simazine	4	4.5	9.3	6.0	9.8	8.3	a,b	None
R-7465	4	3.8	4.5	2.0	10.0	8.8	a,b	None
R-7465	8	4.5	6.0	1.8	10.0	8.8	b	None
terbacil	2	9.5	9.8	8.3	9.8	8.0	a,b	None
terbacil	4	10.0	10.0	9.3	10.0	10.0	-	None
oxadiazon	4	7.0	4.0	3.0	10.0	9.3	a,b,c	None
oxadiazon	8	7.3	4.5	3.5	10.0	8.8	a,b	None
SAN 9789	2	9.3	8.0	2.5	10.0	7.8	a,b	None
SAN 9789	4	9.3	8.3	4.0	10.0	8.8	a,b,d	None
R-7465 + simazine	4 + 2	7.3	9.3	5.3	10.0	8.5	a,b,e	None
nitralin + simazine	4 + 2	8.0	9.0	7.0	9.8	8.5	a,b,c,e	None
oryzalin	2	0.5	0.0	2.5	10.0	8.3	a,b,c,e	None
oryzalin	4	0.5	1.3	4.0	10.0	8.8	a,b	None

* Indicates contact action 3 days after application on small weeds present at application date.

** Ratings made after .25 inch of rain. Ratings are 0 = no weed control, 10 = all weeds killed.
Herbicides applied 1/31/72.

Weeds present: a - watergrass d - wild lettuce
 b - pigweed e - groundcherry
 c - puncturevine

Average of 4 replications.

Nutsedge (*Cyperus rotundus*) control in citrus. Lange, A.H. and L. Francis.

A three year study of repeat applications of four herbicides in three year old Valencia oranges on Troyer rootstock started in 1968 and continued until 1970. The very sandy soil (organic matter 1.1%, sand 78.5%, silt 16.5% and clay 5%) was irrigated under commercial management by dragline sprinkler.

All the chemicals tested gave some nutsedge control. At the end of three years granular dichlobenil gave the highest rating but also the greatest symptom expression. The degree of symptoms would not be acceptable at 16 lbs/A (Table 1).

Bromacil at 4 lbs/A was as good as 8 lbs/A. The symptoms were pronounced the first year but did not increase with tree age.

The nutsedge control from granular EPTC and foliar applied MSMA was considerably less.

Combinations of MSMA and dichlobenil were not appreciably better than dichlobenil alone.

Table 1. A summary of three years results on the control of nutsedge *Cyperus rotundus*.

Herbicide	Formulation	Active ingredient lb/A	Nutsedge control			Phytotoxicity		
			1968	1969	1970	1968	1969	1970
dichlobenil	4% granular	4	5.7	7.0	7.6	0.8	0.5	0.4
dichlobenil		8	6.8	8.6	8.4	1.2	1.9	0.9
dichlobenil		16	7.0	9.8	9.2	1.8	3.1	3.1
MSMA*	4.5 lbs/gal.	4+4+4+4	5.4	5.1	6.2	1.4	0.0	0.6
dichlobenil + MSMA	4% granular	4	6.9	7.5	8.3	0.9	0.4	0.3
	4.5 lbs/gal	4+4+4						
dichlobenil + MSMA		8	7.8	8.6	9.0	0.7	0.8	0.8
		4+4						
bromacil	80% WP	4	7.4	4.0	8.0	1.7	0.1	0.3
bromacil		8	7.6	3.1	7.6	2.8	0.4	0.3
EPTC	5% granular	4	5.0	1.9	4.4	1.6	0.1	0.4
EPTC	5% granular	16	6.3	3.5	6.0	1.3	0.1	0.3
check			1.4	2.3	2.4	0.0	0.0	0.4

* MSMA was applied at 4 lbs/A four times during the growing season.

Combinations for weed control in young Troyer citrange. Lange, A. Combinations of simazine and five promising preemergence herbicides showed satisfactory weed control with most herbicides without injury to one year old citrus rootstock. The combination of simazine plus oryzalin and simazine plus oxadiazon gave the highest ratings evaluated about 19 weeks after treatment. (Table 1).

Table 1. A comparison of herbicide combinations for annual weed control in Troyer citrange under sprinkler and drip irrigation.

Herbicide	lb/A	Average ^{1/}		Phytotoxicity	
		Weed control 5 weeks	Weed control 19 weeks	5 weeks	19 weeks
simazine + nitralin	1 + 4	8.0	6.5	2.0	0.0
simazine + oryzalin	1 + 4	10.0	9.0	0.0	0.0
simazine + R-7465	1 + 4	10.0	7.2	0.3	0.0
simazine + oxadiazon	1 + 4	8.5	8.5	0.0	0.0
simazine + SAN 9789	1 + 4	10.0	6.2	0.0	0.0
check	-	1.0	0.0	0.0	0.0

^{1/} Average of 3 replications

Annual weed control in young Troyer citrange rootstock and Bacon variety avocado seedlings. Lange, A. Most of the 14 herbicides when applied 4/7/72 and followed by sprinkler and then basin irrigation, gave some broadleaf weed control. Those showing some weakness on broadleaf weeds were USB-3153, chlorpropham, CGA-10832 and R-7465. All of these herbicides gave good grass control but CGA-10832, chlorpropham and USB-3153. This latter compound gave exceptionally better total weed control in a late summer reading.

Those herbicides giving outstanding weed control include simazine, SAN 9789, oryzalin, diethamine, and terbutryn.

Although asulam gave excessive injury on stonefruit, citrus was injured only slightly with this herbicide. (Tables 1, 2 and 3).

Table 1. A comparison of phytotoxicity and annual weed control of 14 herbicides.

Herbicide	lb/A	Citrus	Avocado	Average ^{1/} Broadleaf ^{2/} Weeds	Grass ^{3/} Weeds	Annual ^{4/} Weeds
simazine	2	0.2	0.0	10.0	8.0	10.0
R-7465	2	0.2	2.5	7.5	8.5	6.0
R-7465	8	0.0	0.0	5.0	9.8	9.0
SAN 9789	2	2.5	0.5	10.0	10.0	6.5
SAN 9789	4	0.8	1.0	8.5	9.5	9.5
oryzalin	2	0.0	0.0	10.0	7.0	7.0
oryzalin	8	0.0	0.0	10.0	9.0	4.0
methazole	4	0.0	0.0	8.8	6.5	7.0
CGA-10832	2	2.2	0.0	5.0	4.5	6.0
CGA-10832	8	0.8	0.0	6.5	5.5	6.5
diethamine	2	2.2	0.0	9.0	7.2	7.0
diethamine	8	0.0	0.0	10.0	9.0	9.5
chlorpropham	4	0.0	0.0	5.0	5.5	9.5
chlorpropham	16	1.2	0.0	6.5	4.8	9.5
terbutryn	2	1.8	0.0	9.8	4.0	7.5
terbutryn	8	0.5	0.0	10.0	9.5	10.0
DS-5168	2	1.0	0.0	7.5	0.0	5.0
DS-5168	8	0.0	0.0	10.0	7.0	10.0
USB-3153	2	1.0	0.0	4.5	-	7.0
USB-3153	8	1.8	0.0	7.5	-	9.5
asulam	4	2.2	0.0	4.5	4.5	6.0
glyphosate	1	2.5	0.0	9.0	0.0	1.5
glyphosate	4	1.8	0.0	7.0	0.0	5.0
check	-	1.5 ^{5/}	0.0	6.0	0.0	3.5 ^{5/}
oxadiazon	2	1.5 ^{5/}	-	-	-	6.0 ^{5/}
oxadiazon	8	0.0 ^{5/}	-	-	-	8.0 ^{5/}
SAN 9789	1	0.5 ^{5/}	-	-	-	2.5 ^{5/}
methazole	2	3.5 ^{5/}	-	-	-	6.5 ^{5/}
asulam	16	2.0 ^{5/}	-	-	-	5.0 ^{5/}

Herbicides applied 4/7/72 pre to most weeds.

- 1/ Average phytotoxicity of 2 reps at 2 locations (total 4 reps) where 0 = no effect, 10 = complete kill.
- 2/ Broadleaf weeds included lambsquarters and pigweed.
- 3/ Grass weeds included lovegrass, barnyardgrass and crabgrass.
- 4/ Annual weeds were primarily puncturevine, sunflower, bursage, lambsquarters and pigweed. At a second location under sprinkler irrigation only.
- 5/ Average of only 2 replications.

Table 2. Annual weed control in young citrus and avocados one month after application under sprinkler irrigation.

Herbicide	lb/A	Average ^{1/} Puncturevine	Annual weeds
simazine	4	9.5	10.0
R-7465	8	4.5	7.0
oxadiazon	8	7.5	8.5
SAN 9789	2	5.0	4.5
SAN 9789	4	9.5	9.0
oryzalin	2	6.0	7.5
oryzalin	8	8.0	5.5
methazole	4	10.0	10.0
CGA-10832	2	3.0	5.5
CGA-10832	8	9.0	7.0
diethamine	2	4.5	5.5
diethamine	8	5.0	6.5
chlorpropham	4	4.0	7.0
chlorpropham	16	8.5	9.5
terbutryn	2	10.0	9.0
terbutryn	8	10.0	10.0
DS-5168	2	1.5	7.5
DS-5168	8	9.5	10.0
IMC 3950	4	0.0	1.0
IMC 3950	16	0.0	1.0
USB-3153	2	3.5	4.0
USB-3153	8	9.5	10.0
asulam	4	2.0	4.0
glyphosate	1	0.0	2.5
glyphosate	4	2.5	8.5
oxadiazon	2	8.5	8.5
oxadiazon	8	10.0	10.0
SAN 9789	1	4.0	5.0
methazole	2	6.0	8.5
asulam	16	7.5	7.0
check	-	2.0	3.0

^{1/} Average of 2 replications where 0 = no effect, 10 = complete kill of puncturevine and annual weeds.
Rated 5/8/72

Table 3. Comparison of 13 herbicides compared on 5 weed species and all annual species in citrus and avocados.

Herbicide	lb/A	Weed Control ^{1/}					All Annuals	Nutsedge
		Lovegrass	Lambsquarters	Pigweed	Watergrass			
simazine	2	10.0	10.0	10.0	10.0	10.0	10.0	8.0
R-7465	2	7.5	10.0	4.0	9.5	6.5	6.5	7.5
R-7465	8	9.5	10.0	5.0	10.0	8.0	8.0	10.0
SAN 9789	2	8.5	10.0	10.0	10.0	8.5	8.5	8.0
SAN 9789	4	9.5	10.0	8.0	10.0	9.0	9.0	8.5
oryzalin	2	8.5	10.0	10.0	10.0	7.5	7.5	6.5
oryzalin	8	9.5	10.0	10.0	10.0	9.0	9.0	7.0
methazole	8	10.0	10.0	10.0	7.0	8.5	8.5	8.0
CGA-10832	2	8.5	9.0	9.5	8.0	8.5	8.5	5.0
CGA-10832	8	8.5	9.5	9.0	9.0	7.5	7.5	5.0
diethamine	2	6.0	10.0	10.0	10.0	8.0	8.0	7.0
diethamine	8	8.5	10.0	10.0	9.5	8.5	8.5	8.0
chlorpropham	4	8.5	10.0	9.0	10.0	7.0	7.0	8.5
chlorpropham	16	6.0	10.0	10.0	10.0	8.0	8.0	5.0
terbutryn	2	7.0	10.0	10.0	9.0	8.5	8.5	8.5
terbutryn	8	10.0	10.0	10.0	10.0	10.0	10.0	9.0
DS-5168	2	5.0	10.0	10.0	5.0	4.0	4.0	10.0
DS-5168	8	9.0	10.0	10.0	10.0	9.5	9.5	10.0
USB-3153	2	3.5	5.0	10.0	2.0	1.5	1.5	5.0
USB-3153	8	1.5	7.5	9.0	1.0	1.5	1.5	5.0
asulam	4	9.0	10.0	7.0	7.0	6.5	6.5	9.5
glyphosate	1	4.0	9.0	7.5	1.5	2.5	2.5	4.5
glyphosate	4	6.5	10.0	6.5	1.0	4.0	4.0	5.0
check	-	2.2	8.0	8.0	1.0	1.0	1.0	9.1

^{1/} Average of 2 replications where 0 = no effect and 10 = complete control.

Treated 4/10/72; evaluated 5/26/72. Sprinkler - then flood irrigation.

A study of strip treatment of herbicides on second leaf almonds under sprinklers. Kempen, H. M., R. Russell and L. Jordan. Almond trees planted during the first two months of 1969 were treated while dormant on February 12, 1970. The trial was established 2/12/70. The soil type was a sandy loam with 0.5% organic matter, 53% sand, 36% silt and 11% clay. The first rains were: 2/13/70 - trace, 2/17/70 - .25, 2/28/70 - .3 and 3/5/70 - .5. The irrigation was a Spinner covering 6-8' diameter around tree until March, total coverage thereafter. The plot size was 62' wide x 22' long. The variety was Nonpareil (Replications 1 and 2) and Merced (Replication 3). The rootstock was Nemaguard peach (Table 1).

Table 1. Evaluation of herbicides on second leaf almonds under sprinklers

Herbicide	lb/A active	Weed rating ^{1/}	Tree injury ratings ^{1/} (0 to 10)				Trunk Growth ^{2/} (cm)
			5/15	6/8	6/26	7/28	
terbacil	1	9.7	0.0	0.0	0.0	0.0	14.3
terbacil + nitralin	1 + 2	9.8	0.0	0.0	0.0	0.3	13.8
terbacil	2	9.3	0.0	0.0	0.0	0.0	15.4
terbacil	4	9.8	5.0	6.3	7.7	8.3	3.0
simazine	1	9.8	1.0	4.0	2.3	3.0	12.3
simazine + nitralin	1 + 2	10.0	1.3	2.7	1.3	1.3	14.8
simazine	2	10.0	5.3	5.7	5.3	6.3	8.5
diuron	1	10.0	0.0	1.0	1.0	1.0	14.6
diuron + nitralin	1 + 2	10.0	0.0	1.0	0.3	1.3	15.1
diuron	2	10.0	2.0	5.7	5.0	6.0	10.4
terbacil + diuron	0.5 + 0.5	9.8	0.0	0.0	0.0	0.0	16.4
terbacil + diuron	1 + 1	10.0	0.7	1.7	1.3	1.3	14.3
linuron	2	10.0	0.0	0.0	0.0	0.0	15.7
linuron + nitralin	2 + 2	10.0	0.0	0.0	0.0	0.0	14.9
linuron	4	10.0	1.7	3.3	3.7	2.7	13.7
untreated	-	5.0	0.0		0.0		14.2
R-7465	4	6.3	0.0	0.0	0.0	0.0	15.4
R-7465	8	8.2	0.0	0.0	0.0	0.0	16.0
methazole	2	10.0	0.0	0.0	0.0	0.3	14.5
methazole	4	10.0	0.0	1.3	1.3	2.7	14.5
SAN 6706	2	9.7	0.0	0.0	0.0	0.0	15.1
SAN 6706	4	9.5	0.0	2.0	2.0	0.3	14.5
oxadiazon	2	9.8	0.0	0.0	0.0	0.0	14.5
oxadiazon	4	9.7	0.0	0.0	0.0	0.0	14.5
untreated	-	4.3	0.0	0.0	0.0	0.0	13.5
LSD	- .05	1.08	2.01	1.39	1.56	2.22	4.54
	- .01	1.44	2.68	1.85	2.07	2.96	6.06

- 1/ All ratings 0 to 10: 0 = no effect, 10 = kill, averages of 3 replications.
 2/ Circumference measurements change, of tree trunks before and one year after treatment.

This study of second leaf almonds (recent transplants) on newly developed rangeland showed that young almonds under sprinklers were marginally tolerant to several photosynthetic inhibitor herbicides. Simazine and diuron at 2 lbs/A and terbacil at 4 lbs/A were very toxic to trees, causing severe defoliation. Recovery was good the following year with no symptoms evident.

At half those toxic dosages, only slight chlorosis (or none with terbacil) was evident. All three herbicides probably would provide control of more susceptible weeds at this rate, but if application rigs stopped in the field, injury would be severe.

Addition of nitratin at 2 lbs/A to simazine and diuron definitely reduced the tree phytotoxicity ratings at four different dates. The reduction was sufficient to make the technique a logical management practice should further research prove consistency in this practice. A similar safening of plants from diuron has been shown in cotton research where trifluralin or nitratin are combined with diuron preplant incorporated treatments. Since they both inhibit roots of cotton plants this suggests then, that in this trial nitratin inhibited the almond feeder roots that were near the surface.

Linuron showed promise. At 4 lbs/A active, injury was less than the higher rates of simazine, diuron, or terbacil. Only 1 lb/A would probably be necessary for control of winter annual weeds. Linuron's greater safety may be due to its degradation in 4 months instead of the 6-12 months that the other above compounds require.

Methazole caused some symptoms at 4 lbs/A; inasmuch as 2 lbs/A is probably needed for weed control it seems to offer no advantage over other photosynthetic inhibitor herbicides.

SAN 6706 caused slight veinal chlorosis and terminal whitening of branches. It has been dropped from development by its manufacturer.

Excellent tolerance was exhibited by the trees with R-7465 and oxadiazon at the rates tested.

Insufficient weeds were present in this test to reliably evaluate weed control. Russian thistle, the predominant and most bothersome weed, was most prevalent but outside the sprinkled zone. This verified other studies which showed Russian thistle will not germinate well on firm "sealed-over" soil. From other studies oxadiazon, SAN 6706 and terbacil at 2 lbs/A would usually control Russian thistle. R-7465 did not control Russian thistle or several other winter weed species in the test area in limited number, including filaree, mediterranean grass, California mustard, London rocket and mare's tail.

Response of the two almond varieties in this study, Merced and Nonpareil, to herbicides was similar. Other studies have shown that Mission varieties are the most susceptible variety to simazine, diuron and terbacil; also rootstock will affect scion reaction to these herbicides.

The relatively high degree of toxicity from simazine, diuron, terbacil, and methazole in this study probably is due to two factors; low organic matter and, of course, high transpiration rates. In Kern County most herbicides which are absorbed by the roots of plants with water, then translocated into the foliage, are more toxic than in areas of low transpiration. These herbicides are generally more active in low organic matter soils than in soils of high organic matter.

Annual weed control in young almonds. Lange, A. H. and V. Carlson. After two annual applications of several herbicides excellent annual weed control was obtained under sprinkler irrigation. The combinations of simazine and nitralin or simazine and R-7465 gave excellent broad spectrum control of the annual weeds barnyardgrass, bluegrass, ryegrass, shepherdspurse, pineappleweed, fiddleneck, wild radish, filaree, groundsel, dandelion, chickweed, knotweed, sweetclover and red maids. Simazine was weak on barnyardgrass and Russian thistle. SAN 9789 was weak on clover.

Herbicides were applied 10/29/70 and 10/30/71 to prepared soil the first year and to undisturbed soil the second year. The herbicides were irrigated immediately after application with a solid set sprinkler system.

All herbicides and combinations gave excellent weed control with no injury to young Nonpareil and NePlus almond trees beginning at the end of their first year in the field.

R-7465 was weak on hedge mustard, mare's tail, clover and knotweed. Pronamide was weak on mare's tail and sowthistle. Oryzalin was weak on clover and hedge mustard. Methazole was weak on barnyardgrass.

Table 1. A comparison of preemergence herbicides for annual weed control in almonds.

Herbicide	lb/A	Average ^{1/}		Phytotoxicity 5/25/72
		Weed Control 4/28/71	5/25/72	
simazine	2	7.0	5.0	0.0
simazine + nitralin	2 + 4	9.3	10.0	0.0
R-7465	4	6.3	7.3	0.0
R-7465	8	8.7	9.3	0.0
R-7465 + simazine	4 + 2	10.0	10.0	0.0
oryzalin	4	9.3	8.7	0.0
methazole	4	7.7	7.3	0.0
pronamide	4	6.3	8.7	0.0
SAN 9789	2	9.3	8.0	0.0
check	-	0.0	0.0	0.0

^{1/} Average of 3 replications where 0 = no control; 10 = complete control. Evaluated 5/25/72. Weeds present included barnyardgrass and lambsquarters. (Organic matter 0.4%, sand 54%, silt 28% and clay 18%).

Herbicides and combinations for annual weed control in almonds.
 Elmore, C., D. Holmberg and A. Lange. Fall applied herbicides (11/19/70) under sprinkler irrigation have generally given satisfactory spring weed control. Simazine did not control the grassy weeds. Good annual weed control was achieved with all materials or combinations approximately 4 months after treatment. However after somewhat over 5 months only those treatments containing terbacil or oryzalin gave commercial control of all annuals. When nitralin or R-7465 was added satisfactory grass control was obtained. Broadleaf weeds were better controlled by oxadiazon which also appeared to show slight effects on bindweed, though not commercial. Grass was also controlled in this trial. Oryzalin showed even more effect on bindweed and gave excellent grass control. It was weak on burclover. (Table 1).

Table 1. Annual weed control in almonds

Herbicide	Rate lb a.i./A	3-9-71	species remaining	4 replications 4-29-71			
				annuals	burclover	grass*	bindweed
simazine	2	8.5	D,M,G,C	4.5	6.2	5.2	1.0
simazine + nitralin	2 + 4	9.5*	M	6.5	6.8	8.3	4.0
R-7465	4	8.5	H,P,S,M,C	5.0	2.0	7.0	1.2
R-7465	8	8.9	P,H,S,C,M	4.8	2.0	9.0	3.2
R-7465 + simazine	4 + 2	9.2	M,H,C	6.5	4.2	8.2	3.0
oxadiazon	2	9.1	CH,G,K	5.2	8.8	5.5	4.2
oxadiazon	8	9.5	CH,D	6.2	9.8	9.5	4.8
methazole	2	7.0	G,C,M	1.5	8.5	1.5	3.0
methazole	8	8.9	G,D	5.0	6.8	5.2	4.8
terbacil	2	9.5	G,D	7.0	9.8	7.2	5.0
terbacil + nitralin	2 + 4	9.6*	G,D	7.2	8.2	9.0	4.2
oryzalin	2	8.9	C,S,D,F	6.0	3.0	8.8	4.5
oryzalin	4	9.0*	C,P	7.2	3.8	9.0	6.0
paraquat	1	4.5	M,G,C,K,H	0.0	5.2	0.2	5.8 ✓
control	-	0.0	(all weeds)	-	-	-	-

* bindweed suppression
 ** principal - wild barley
 ✓ annual weed competition

D - curly dock
 C - burclover
 G - wild barley
 M - cheeseweed
 H - henbit

P - scarlet pimpernel
 S - shepherdspurse
 F - filaree
 K - knotweed
 CH - chickweed

Tolerance trials on almonds. Kempen, H. M. The objective of this trial was to evaluate the tolerance of sprinkler irrigated almonds to solid applications of diuron, simazine, and terbacil and/or combination of these herbicides. Three varieties, Mission, Thompson and Nonpareil, all on Nemaguard rootstock, were evaluated. Evaluations for injury were made May 27, June 28 and August 27, 1969 (Table 2).

Application was on February 4, 1969 (Table 1). A rain of 0.04 inches followed that night and was followed by 0.22" the next night. Sprinkler irrigation was begun in late May.

Paraquat was added to all treatments to kill emerged weeds. Additional shepherdspurse emerged along with pigweed in late March and puncturevine in early April. The evaluations on April 14 reflect control of shepherdspurse and pigweed (Table 1). Control of shepherdspurse was virtually 100 percent in all but untreated plots and paraquat treated plots where regrowth occurred. These checks were treated with paraquat again on April 16. Evaluations on May 27 were on pigweed and puncturevine. After these evaluations, the plots were sprayed with a contact herbicide. The area was disced 5 to 7 inches deep on June 24 and later floated before harvest in late August thus no additional weed control evaluations were obtained.

Before one can evaluate the ratings made in Table 1, two points must be considered; (1) the rating needed to be equivalent to acceptable commercial control, and (2) the variability in the plots and therefore the reliability of each rating shown. Ratings of 9.5 or better were considered to be the desired level of control wanted in commercial orchards. Lesser control would result in a need for retreating the total acreage, whereas at 9.5, only spot treating would be required. Variability was not great between replications in all evaluations except on puncturevine where the stand was not uniform in all plots. Therefore, differences of 0.3 in ratings on pigweed of 9 to 10 are probably not different. On puncturevine rating differences of less than 0.5 are probably not different.

Simazine and terbacil were essentially equivalent, pound per pound, against the weed species in this test. At 2 lbs/A, both gave excellent weed control. Diuron was weaker on pigweed but was especially weak on puncturevine. Combinations of terbacil plus simazine at 1 lb/A each were especially good. Terbacil plus diuron and diuron plus simazine at 2 lb. each were also effective. The combination of dinoseb at 6 lbs/A with terbacil at 1 or simazine at 2 looked good. However, there was no indication that the dinoseb enhanced the weed control obtained with diuron, simazine, or terbacil.

Considerable tree injury occurred in these trials. Injury ratings appear in Table 2. Simazine was the most toxic to all varieties with terbacil second. The Mission variety was markedly more susceptible to injury than were the Thompson and Nonpareil varieties. Even at 1 lb/A, simazine caused injury.

The severity of the injury is remarkable in light of the soil type, Delano loam, and the organic matter content (1.3%). Most soil types in Kern County are lower in clay content and organic matter and would therefore be potentially more hazardous soils on which to use these herbicides in almond orchards.

Table 1. Weed control obtained with herbicides under sprinklers in almonds

Herbicide ^{2/}	lb/A active	Weed control ratings ^{1/}		
		4-14-69 (Pigweed and shepherdspurse)	5-27 pigweed	puncturevine
untreated	-	2.0	2.3	4.7
terbacil	0.5 ^{3/}	9.6	9.5	8.8
terbacil	2	9.9	9.9	9.2
terbacil	4	10.0	10.0	10.0
diuron	1	8.6	8.3	6.3
diuron	2	8.1	8.5	6.7
diuron	4	9.9	9.8	8.3
simazine	1	9.1	8.3	8.8
simazine	2	9.8	9.3	9.8
simazine	4	9.9	9.8	10.0
terbacil + diuron	0.5 + 0.5	9.5	9.2	6.7
terbacil + diuron	1 + 1	9.8	9.8	9.4
terbacil + diuron	2 + 2	10.0	10.0	9.9
terbacil + diuron	4 + 4	10.0	9.9	9.9
terbacil + simazine	0.5 + 0.5	9.1	9.4	9.2
terbacil + simazine	1 + 1	10.0	10.0	10.0
diuron + simazine	1 + 1	9.9	9.8	9.5
dinoseb + terbacil	6 + 1	9.3	9.8	9.6
dinoseb + diuron	6 + 1	9.0	8.0	6.3
dinoseb + simazine	6 + 1	9.6	8.8	9.0
dinoseb + simazine	6 + 2	9.9	9.2	10.0
paraquat	0.5	2.3	4.8	5.2
untreated	-	2.0	2.0	3.0

1/ Rated 0 to 10: 0 = no control; 10 = 100% control; average of 3 replications

2/ Paraquat at 1/2 lb/A plus 1/4% Colloidal X-77 added to all treatments.

3/ Not sure of rate.

Table 2. Tolerance of almond varieties under sprinklers to solid treatments of herbicides.

Herbicide	lb/A active	Tree injury ratings ^{2/}						
		Mission		Thompson		Nonpareil		
		5/27/69	6/28	8/27	6/28	8/27	6/28	8/27
untreated	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
terbacil	0.5 ^{3/}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
terbacil	2	0.0	2.0	3.0	0.0	0.0	0.0	0.0
terbacil	4	3.0	4.0	7.0	0.0	2.0	2.0	2.0
diuron	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
diuron	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
diuron	4	0.0	1.0	6.0	0.0	0.0	0.0	0.0
simazine	1	2.0	3.0	4.0	1.0	0.0	0.0	0.0
simazine	2	3.0	5.0	6.0	2.0	2.0	2.0	2.0
simazine	4	5.0	7.0	8.0	5.0	1.0	0.0	1.0
terbacil + diuron	0.5 + 0.5	0.0	0.0	3.0	0.0	0.0	0.0	0.0
terbacil + diuron	1 + 1	0.0	0.0	1.0	0.0	0.0	0.0	0.0
terbacil + diuron	2 + 2	0.0	1.0	3.0	0.0	0.0	0.0	0.0
terbacil + diuron	4 + 4	0.0	2.0	5.0	0.0	0.0	0.0	0.0
terbacil + simazine	0.5 + 0.5	0.0	1.0	3.0	0.0	0.0	0.0	0.0
terbacil + simazine	1 + 1	3.0	3.0	3.0	1.0	1.0	1.0	1.0
diuron + simazine	1 + 1	0.0	1.0	2.0	0.0	0.0	0.0	0.0
dinoseb + terbacil	6 + 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
dinoseb + diuron	6 + 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
dinoseb + simazine	6 + 1	0.0	1.0	2.0	1.0	1.0	0.0	1.0
dinoseb + simazine	6 + 2	0.0	3.0	4.0	1.0	1.0	1.0	1.0
paraquat	0.5	0.0	0.0	1.0	0.0	0.0	0.0	0.0
untreated	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1/ Treated 2/4/69; disced 6" deep 6/24/69.

2/ Evaluated 0 to 10: 0 = no effect; 1 = slight marginal chlorosis; 2 = readily visible chlorosis; 3 = considerable chlorosis; 5 = necrosis plus chlorosis; 7 = 50% of leaves are necrotic; 10 = trees defoliated. Each variety is one replication.

See Table 1 for data on treatments.

3/ Not sure of rate.

Late applications of herbicides in almonds. Lange, A. and N. Ross.
When preemergence herbicides were applied in March less effective broadleaf and more effective grass control were obtained.

The soil was sandy (76%) and the organic matter was relatively high (1.9%).

The herbicides were applied 11/13/70 the first year and the second application was made 3/8/72. The orchard was flood irrigated but received very little rain after application the second year. The annual irrigation amounted to about 4 feet of water.

The evaluation made 6/16/72 showed the usual weakness of simazine on summer grasses. On the other hand, R-7465 was weak on the broadleaf weeds and gave excellent grass control. As has been shown before, the combination of R-7465 and simazine or the combination of nitralin and simazine gave satisfactory weed control.

The phytotoxicity rating indicates essentially no phytotoxicity from any treatment.

Table 1. Annual weed control with a late application of preemergence herbicides in young orchards.

Herbicide	lb/A	Grass	Average ^{1/} Broadleaves	Phytotoxicity
simazine	2	1.7	8.7	1.0
simazine + nitralin	2 + 4	7.3	9.0	1.0
R-7465	4	8.0	5.0	0.0
R-7465	8	10.0	4.7	0.0
simazine + R-7465	2 + 4	8.0	8.0	1.3
check	-	0.0	0.0	0.0

Resistant weed species--6/16/72

simazine--lovegrass, crabgrass, brome grass, pigweed, nutsedge

simazine + nitralin--lovegrass, crabgrass, nutsedge

R-7465 (4)--nutsedge, nightshade, crabgrass, canarygrass

R-7465 (8)--nutsedge, nightshade, crabgrass, canarygrass, pigweed and clover

organic matter--1.9%, sand--76%, silt--17%, and clay--7.0%

New herbicides for almonds. Lange, A. and N. Ross. Several new herbicides showed sufficient safety for annual weed control in young almonds growing in a sandy soil under flood irrigation.

Oryzalin at 4 lbs/A gave outstanding control of such weeds as lovegrass, crabgrass, pigweed and nightshade. Oxadiazon was somewhat weak on the grasses but was quite good on broadleaf weed control.

Table 1. Annual weed control in a young almond orchard under flood irrigation.

Herbicide	lb/A	Average ^{1/} Weed control			Phytotoxicity 9/15
		4/28	7/14	9/15	
oxadiazon	2	5.7	6.7	5.7	0.0
oxadiazon	4	6.7	8.0	7.1	0.0
oryzalin	2	6.3	9.0	9.3	0.0
oryzalin	4	8.7	9.3	9.7	0.0
methazole	2	6.0	8.3	8.7	0.0
methazole	4	8.0	8.3	8.7	0.0
pronamide	4	7.3	7.3	5.7	0.0
pronamide	8	9.3	7.0	5.1	0.0
R-7465	4	8.0	8.0	8.7	0.0
R-7465	8	9.0	9.0	8.7	0.0
SAN 9789	2	6.3	7.3	7.0	0.0
SAN 9789	4	9.0	8.7	8.7	0.6
R-7465 + oryzalin	3 + 1.5	8.0	8.7	9.3	0.0
check	-	0.7	4.3	5.7	0.0

^{1/} Average of 3 replications where 0 = no effect, 10 = 100% annual weed control.

Combinations of herbicides on almonds. Kempen, H. In this experiment combinations of herbicides were applied to evaluate their safety and effectiveness. Nitralin plus low rates of terbacil, simazine or diuron were the primary comparisons (Table 1).

Application was on February 4, 1969. A rain of 0.04 inches followed that night and was followed by 0.22 inches the next night. Sprinkler irrigation was begun in late May.

Weed control was very good with combinations of nitralin plus either terbacil or simazine (Table 1). Terbacil and simazine again were equivalent in effectiveness whereas diuron was less effective. That terbacil and simazine enhanced the effectiveness of nitralin is evident in the comparison with nitralin plus dinoseb. Dinoseb, nitralin plus dinoseb and the combinations of dinoseb plus diphenamid or trifluralin plus simazine were not satisfactory, although all showed some control on the weeds present.

Again, tree injury occurred with terbacil and simazine, making the weed control results somewhat redundant. However, the results apply to citrus where these herbicides are safer. As in the previous test, no injury was evident from diuron at the 1 or 2 lb/A rate.

The ratings on August 27 showed some evidence of marginal chlorosis on the untreated check. This was due to senescence which was partially attributable to droughtiness at harvest time (Table 2).

Table 1. Weed control obtained with herbicide combinations in sprinkler irrigated almonds.

Herbicide ^{2/}	lb/A active	Weed control ratings ^{1/}		
		4/14/69 (Pigweed and shepherdspurse)	5/27/69 pigweed	5/27/69 Puncture vine-
untreated	-	2.6	4.7	5.3
dinoseb	9	4.6	2.7	8.8
dinoseb + diphenamid	3 + 2.2	8.3	9.6	9.2
nitralin + terbacil	2 + 1	9.9	10.0	9.8
nitralin + terbacil	2 + 2	9.9	10.0	10.0
nitralin + diuron	2 + 1	9.4	9.0	6.3
nitralin + diuron	2 + 2	9.9	9.7	9.8
nitralin + simazine	2 + 1	9.9	9.9	9.9
nitralin + simazine	2 + 2	9.9	9.7	9.8
nitralin + dinoseb	2 + 6	9.0	7.0	7.8
trifluralin + simazine	2 + 1	8.6	8.3	9.3

1/ Rated 0 to 10: 0 = no control; 10 = 100% control; average of 3 reps.

2/ Paraquat at 0.5 lb/A and Colloidal X-77 @ 0.25% added to all treatments.

Soil type: Delano loam - 1.3% O.M., 19% clay, 35% silt and 46% sand

Plot size: 20' x 25' Tree spacing: 25' x 25' Rootstock: Nemaguard

Table 2. Tolerance of almond varieties under sprinklers to solid treatments of herbicides.

Herbicide	lb/A active	Tree injury ratings ^{2/}					
		Mission			Nonpareil		
		5/27/69	6/28	8/27	5/27	6/28	8/27
untreated	-	0.0	0.0	1.0	0.0	0.0	0.0
dinoseb	9	0.0	0.0	2.0	0.0	0.0	0.0
dinoseb + diphenamid	3 + 2.2	0.0	1.0	2.0	0.0	0.0	1.0
nitralin + terbacil	2 + 1	0.0	0.0	0.0	0.0	0.0	1.0
nitralin + terbacil	2 + 2	1.0	3.0	4.0	0.0	1.0	1.0
nitralin + diuron	2 + 1	0.0	0.0	0.0	0.0	0.0	0.0
nitralin + diuron	2 + 2	0.0	0.0	0.0	0.0	0.0	0.0
nitralin + simazine	2 + 1	2.0	3.0	4.0	0.0	0.0	1.0
nitralin + simazine	2 + 2	3.0	5.0	6.0	0.0	1.0	2.0
nitralin + dinoseb	2 + 6	0.0	0.0	0.0	0.0	0.0	0.0
trifluralin + simazine	2 + 1	0.0	2.0	2.0	0.0	0.0	1.0
untreated	-	0.0	0.0	1.0	0.0	0.0	0.0

- 1/ Treated February 5, 1969; rainfall occurred the same night; see Table 1 for details.
- 2/ Evaluated 0 to 10: 0 = no effect; 1 = slight marginal chlorosis; 2 = readily visible chlorosis; 3 = considerable chlorosis; 5 = necrosis plus chlorosis; 7 = 50% of leaves are necrotic; 10 = trees defoliated. The Mission variety is one replication. The Nonpareil is an average of two replications.

Control of nutsedge in sprinkled almonds. Kempen, H. Efforts were directed toward control of purple nutsedge in a sprinkled almond orchard, hopefully without tree injury.

Based in part on previous experimental work elsewhere in California, dichlobenil granules and terbacil were combined with other herbicides to control other weed species. No contact herbicides were added to control small emerged winter weeds in the treated strips.

Dichlobenil was the only effective herbicide. It provided excellent nutsedge control for about four months. Terbacil at the rates tested was ineffective although some injury to nutsedge occurred.

On other weeds, treatments including dichlobenil or terbacil provided good control on all species on April 16, one month after application. By June 28, only the dichlobenil plus trifluralin treatments gave fairly good control.

No tree injury was evident from any of the treatments during the 1969 season of growth.

A summer application of herbicides on nutsedge in almonds. Kempen, H. Adjacent to the previous trial, a trial with experimental compounds was applied on June 2, 1969. It was established to evaluate the effect of certain compounds on nutsedge, but also to observe their performance and safety to almonds when applied during the heat of the summer.

The purple nutsedge had been sprayed with MSMA at 2 lbs/A on May 24, 1969 and plants showed partial foliar desiccation on June 2. As a result of that treatment plus the droughtiness and hence the induced dormancy of the nutsedge little information was obtained during 1969 on the effectiveness of the herbicides.

Winter weeds which emerged following the post-harvest irrigation in October were evaluated when very small on November 14. The weeds were subsequently killed in late November by paraquat.

Again dichlobenil provided control of the (emerged) nutsedge. The other herbicides showed no control when used in this manner.

Of the winter species, shepherdspurse, only dichlobenil at 12 lbs/A and methazole gave acceptable control. Terbacil apparently had leached from the surface of soil and EPTC apparently had volatilized or had degraded.

No injury to the three tree varieties was evident during the 1969 season.

Herbicides and combinations for almonds in clay soil. Elmore, C., D. Holmberg and A. Lange. Several herbicides and combinations were applied to Texas and Nonpareil on peach rootstock and almond rootstocks on November 17, 1970 growing in a clay loam soil (1.3% organic matter; 30% clay; 26% silt; and 44% sand). The orchard was sprinkler irrigated.

Oxadiazon gave excellent burclover control but poor chickweed control. It also missed some mustard. Simazine gave broad spectrum weed control as did terbacil. R-7465 was weak on burclover. Methazole missed most of the species in the test.

There was no significant symptoms from any of the herbicides or combinations.

Table 1. Weed control for almonds in clay soil

Herbicide	Rate lb ai/A	3-9-71	Weeds remaining	5-2-71		bur- clover
				annuals	chickweed	
simazine	2	9.6	B	7.5	8.8	8.0
simazine + nitralin	2 + 4	9.6	C	8.8	8.5	8.8
R-7465	4	9.5	m, ch, C	7.0	7.8	6.0
R-7465	8	9.4	m, C	8.5	10.0	7.8
R-7465 + simazine	4 + 2	9.7	m	7.8	8.5	7.2
oxadiazon	2	6.5	ch, m	1.0	0.0	10.0
oxadiazon	8	7.8*	ch, m	0.5	0.0	10.0
methazole	2	7.8	C, ch, g, m	0.0	0.2	1.8
methazole	8	8.9	C, ch	3.2	6.0	1.8
terbacil	2	10.0	-	9.5	10.0	9.5
terbacil + nitralin	2 + 4	10.0*	-	9.8	10.0	10.0
control	-	3.8	ch, A, C, m, p, g, s, sh	0.5	0.2	3.2

* Field bindweed suppression

A - annual bluegrass
B - cheeseweed
C - burclover
ch - chickweed
m - mustard

p - pineappleweed
g - groundsel
s - sowthistle
sh - shepherdspurse

Effects of methods of incorporation on bermuda and field bindweed control in almond orchards. Lange, A.H, and V. Carlson. Three herbicides were incorporated by power tiller and spray blade on October 29, 1970, in a young almond orchard. The organic matter was 0.1%, sand 59%, silt 27% and clay 14%. The orchard was irrigated by dragline sprinklers immediately after application and throughout the season.

Field bindweed and bermudagrass as well as annual weeds were controlled with trifluralin at 4 lbs/A under both methods of incorporation. Nine months after application both R-7465 and pronamide had some effect on annual as well as perennial weed control. Neither gave as good control as trifluralin. When rototilled, R-7465 gave better perennial weed control than when applied by blade, i.e., as a layer.

Table 1. The effect of method of incorporation on weed control with three herbicides down the tree row in an almond orchard.

Herbicide ^{2/}	lb/A	Bladed ^{3/}			Average ^{1/} Rototilled ^{4/}		
		General	Bindweed	Bermuda	General	Bindweed	Bermuda
trifluralin	4	7.3	8.7	7.3	8.7	8.3	9.7
trifluralin	16	9.3	10.0	9.3	9.7	9.7	10.0
R-7465	4	4.7	5.0	5.0	7.7	6.7	9.0
pronamide	4	4.7	4.0	7.3	7.0	6.0	6.7
check	-	4.7	3.7	7.3	3.0	1.3	5.7

^{1/} Average of 3 reps., 9 months after application based on 0-10 control rating; where 0 = no effect, 10 = complete control.

^{2/} Note all plots were treated periodically with paraquat by grower-cooperator.

^{3/} The soil was tilled with power-driven tiller (N.W. tree-hoe) and applied at 4 inches by a hydraulically operated blade.

^{4/} The soil was tilled with power-driven tiller, the herbicides applied and the plots retilled to a depth of 2 to 4 inches with the same power tiller.

Soil: 0.10% organic matter, 59% sand, 27% silt and 14% clay.

SPECIAL NOTE: There were no observable effects on the almond trees.

Annual weed control in walnuts. Elmore, C. L., D. Holmberg, A. Lange and E. Roncoroni. A four year old sprinkler irrigated walnut orchard of Hartley and Ashley varieties was selected for winter applications of several preemergence herbicides. All treatments were applied broadcast to a non-cultivated soil surface on November 27, 1970 with a Champion backpack sprayer. Paraquat was applied at 1 lb/A plus 0.5% X-77 surfactant with all treatments to control the existing seedling weeds. Rainfall (0.5 inches) occurred 10 days after treatment. The soil was a Yolo clay loam with an analysis of 24% sand, 46% silt, 30% clay and 1.5% organic matter. Predominant weed species were cheeseweed, redstem filaree, knotweed and a Bromus specie. The trial was evaluated at 112, 163 and 258 days (Table 1) after treatment for weed control and phytotoxicity.

Initially (112 days) all soil residual treatments gave satisfactory control except methazole at 2 lbs/A and oxadiazon at 2 lbs/A. Common chickweed was growing profusely in the oxadiazon plots which reduced the over-all rating. All other treatments controlled chickweed. When the four principal weed species were evaluated at 163 days several interesting results were evident. Cheeseweed was being controlled with oxadiazon and methazole. Burclover was only well controlled with oxadiazon. Knotweed was being controlled with simazine plus nitralin or R-7465.

At 258 days following treatment, simazine at 2 lbs/A plus nitralin at 4 lbs/A, R-7465 at 8 lbs/A or oxadiazon at 8 lbs/A were all giving satisfactory control of annual weeds in this trial. R-7465 plus simazine did not appear to be appreciably better than an equivalent rate of R-4765 alone.

No injury was observed with any treatment at any evaluation.

Table 1. Annual weed control in a sprinkler irrigated walnut orchard with several herbicides and combinations.^{1/}

Herbicide	lb a.i./A	(112 days)	Species remaining	all annuals	Weed control (days after treatment ^{2/}) <u>163 days</u>					Species remaining
					cheeseweed	burclover	chickweed	knotweed	(258 days)	
simazine	2	7.2	M,K,G,C	6.5	2.0	7.0	9.8	5.5	1.5	K,W,P,M,
simazine + nitralin	2 + 4	3.5	M,C,G	7.5	1.2	7.0	9.8	10.0	8.3	W,B,M,P
R-7465	4	8.5	M,C,K	7.0	3.5	6.8	10.0	9.5	5.5	M,W,B,P
R-7465	8	8.8	M,C	7.5	4.0	6.8	10.0	10.0	8.9	M,B,W,K
simazine + R-7465	2 + 4	8.9	M,C	8.0	4.8	7.2	9.8	10.0	5.5	M,B,W,C
oxadiazon	2	6.2	CH,K,M,C	2.0	7.8	9.5	3.2	0.0	2.8	W,K,M,S,C,D
oxadiazon	8	8.0	CH,K,M	4.5	9.5	10.0	0.2	3.8	7.4	K,W,C,M
methazole	2	5.8	H,C,CH,K,M,G	0.8	6.5	4.8	8.8	1.2	2.8	W,K,M,P
methazole	8	8.5	K,C,G	5.5	9.8	4.8	8.0	6.0	4.0	M,K,W,B
control	-	-	(all weeds)	-	-	-	-	-	1.5	W,K,M, all

^{1/} Average of 4 replications.

^{2/} Weed control 0 = no effect; 10 = complete control

K - knotweed	X - shepherdspurse	C - burclover	W - watergrass
M - malva	V - veronica	G - groundsel	S - curly dock
H - wild barley	B - bindweed	CH - chickweed	P - puncturevine
			D - bermudagrass

Tolerance of pistachios to herbicides. Kempen, H. M. Five herbicides were applied on 11/13/70 around Kerman pistachios on Terebinthus rootstock to evaluate tree tolerance under sprinkler irrigation. The trees had been transplanted into the field during the spring of 1970 and were dormant when treated.

Table 1. The effect of several herbicides on annual weed control and phytotoxicity to young newly planted pistachio trees.

Herbicide	lb/A	Average ^{1/}	
		Weed control	Phytotoxicity
R-7465	4	10.0	0.3
R-7465	16	10.0	0.0
simazine	1	10.0	0.3
simazine	2	10.0	6.0
simazine	4	10.0	8.7
oxadiazon	2	10.0	0.0
oxadiazon	8	10.0	0.0
nitralin	2	9.9	0.0
nitralin	8	9.9	0.0
terbacil	1	10.0	7.0
terbacil	4	10.0	10.0
check	-	9.1	0.0

^{1/} Average of 4 replications. Treated 11/13/70, evaluated 9/17/71.

The effect of four herbicides in relation to timing of first irrigation. Roncoroni, E., T. Aldrich, H. Schulbach, and C. Elmore. Four uniform trials were established in Colusa County to evaluate four herbicides when applied to dry or wet soil and time after application before first irrigation. Herbicide applications were made on October 7 (BI), October 13 (BII), October 21 (BIII), and October 28, 1971 (BIV).

The first three applications were made to dry soil. Immediately after the third application all four trial areas were sprinkled for 28 hours with overhead irrigation in an almond orchard given four inches of water. The October 28 application was made on wet soil and the four treatment areas were sprinkled for 30 minutes.

The herbicides were applied on a Arbuckle Sandy Loam soil (analysis: 0.1% O.M., sand 66%, silt 25%, clay 9%) with a CO₂ pressure sprayer at 30 psi in 100 gpa using three 8004 Teejet nozzles.

Weed control ratings were taken on each trial 48, 91, 172 and 300 days after the first irrigation. Ratings shown in the following tables are an average of four replications.

After the 172 day rating (April 11, 1972) the trial area was chopped to remove uncontrolled weed species. The 300 day rating (August 17, 1972) consists mainly of purslane and annual grasses.

Cooperator: Nickels Estate, Colusa County

Table 1. Weed control evaluations 48 and 91 days after first irrigation

Herbicide	Rate/Acre	BI		BII		BIII		BIV	
		48	91	48	91	48	91	48	91
A R-7465	2 lb.	8.8	7.5	9.9	9.4	9.8	9.6	9.0	7.6
B R-7465	4	8.8	7.6	9.2	9.6	9.7	9.6	8.8	8.9
C R-7465	8	9.5	9.6	10.0	9.9	9.8	9.8	9.5	9.9
D oryzalin	2	8.0	6.3	8.0	7.0	8.0	6.0	8.3	6.0
E oryzalin	4	8.8	7.8	8.3	7.6	9.2	8.1	7.5	5.3
F oryzalin	8	8.5	9.4	9.0	8.5	9.5	8.6	8.5	6.4
G oxadiazon	2	8.3	6.9	9.0	8.6	9.3	7.6	9.0	7.3
H oxadiazon	4	6.8	7.6	X	X	9.3	9.0	9.3	8.3
J oxadiazon	8	9.8	8.8	9.8	9.4	9.4	8.5	8.5	8.5
K nitralin	2	5.8	4.8	7.0	4.0	8.8	6.3	7.0	4.8
L nitralin	8	7.3	6.5	9.5	8.0	8.9	7.3	3.0	5.8
X control	-	4.5	2.5	4.5	3.0	4.5	3.0	5.8	3.0

0 = no control, 10 = 100% control, X = herbicide not applied

Table 2. Weed species remaining 48 and 91 days after first irrigation

Herbicide	Rate/Acre	BI		BII		BIII		BIV	
		48	91	48	91	48	91	48	91
A R-7465	2 lb.	C-S	G-C	-	C	-	C	-	G-C
B R-7465	4	-	G-C	-	S	-	S	-	C
C R-7465	8	C	C	-	C	-	-	-	-
D oryzalin	2	G	G-C-F	C-G-M	C-G	G-F-C	C-G-F	C-G	C-G-S
E oryzalin	4	C-G-F	C-G	G-F	C-G	C-G	C-G-F	C-G	C-G
F oryzalin	8	G-F	C	C-F	C	-	C	-	C-G
G oxadiazon	2	G-S	G-S	G	C-S	S	S	S	G-S
H oxadiazon	4	S	S	-	-	-	S	S	S
J oxadiazon	8	S	S	-	S	S	S	S	S
K nitralin	2	C-G-F	C-F-G	C-F-G	G-C	C-G	C-G-F	C-G	G-C-S
L nitralin	8	C-F	C-F	F-G	G-F-C	C-F	C-F	C-G	G-C
X control	-	G-F-S	G-S-C	C-F-G	C-F	C-S-G	C-G	C-G	C-G
					G-S		S-F		F-S

C = Burclover
G = Annual grasses

S = Chickweed
F = Filaree

M = Malva (cheeseweed)

Table 3. Weed control evaluation 172 days after first irrigation ^{1/}

Herbicide	Rate/Acre	Filaree				Poa annua				Groundsel			
		BI	BII	BIII	BIV	BI	BII	BIII	BIV	BI	BII	BIII	BIV
A R-7465	2 lb.	8.5	9.8	9.8	10.0	3.3	6.5	7.0	7.0	9.3	9.0	8.8	9.5
B R-7465	4	9.8	10.0	10.0	10.0	6.3	9.0	8.5	8.9	8.8	9.4	9.3	10.0
C R-7465	8	10.0	10.0	10.0	10.0	8.3	10.0	10.0	9.5	9.3	10.0	9.6	9.5
D oryzalin	2	8.5	9.5	7.8	8.8	9.8	9.3	9.8	8.3	8.3	7.5	8.5	7.5
E oryzalin	4	8.5	8.0	9.5	9.8	9.8	10.0	10.0	9.5	6.5	8.0	9.0	8.3
F oryzalin	8	9.5	8.5	9.8	10.0	10.0	9.8	10.0	9.5	7.5	6.8	9.3	8.3
G oxadiazon	2	10.0	10.0	10.0	10.0	2.5	4.3	4.0	4.3	9.8	10.0	10.0	10.0
H oxadiazon	4	8.8	-	10.0	10.0	7.3	-	8.5	6.5	7.5	-	10.0	10.0
J oxadiazon	8	10.0	10.0	10.0	10.0	8.3	9.3	9.6	9.8	10.0	10.0	10.0	10.0
K nitralin	2	4.0	4.5	6.8	10.0	6.0	5.3	7.0	7.5	8.8	8.5	9.3	8.5
L nitralin	8	4.3	7.8	8.0	8.8	9.8	10.0	9.8	6.8	8.0	6.8	9.3	7.8
X control	-	6.0	4.3	6.8	7.0	0.3	1.5	1.5	3.0	8.3	9.0	9.0	8.0

^{1/} Mean of 4 replications

Table 3. (continued)

Herbicide	Rate/Acre	Clover				Shepherdspurse				Chickweed			
		BI	BII	BIII	BIV	BI	BII	BIII	BIV	BI	BII	BIII	BIV
A R-7465	2 lb.	6.0	7.8	8.5	6.5	8.5	8.8	8.0	9.3	9.8	10.0	10.0	10.0
B R-7465	4	7.5	9.8	9.8	6.8	6.0	8.9	9.3	9.0	10.0	10.0	10.0	10.0
C R-7465	8	7.8	9.9	9.5	8.4	8.0	9.8	9.8	9.8	10.0	10.0	10.0	10.0
D oryzalin	2	1.3	3.5	1.8	3.5	9.8	10.0	10.0	10.0	10.0	10.0	10.0	10.0
E oryzalin	4	2.3	4.0	3.5	2.8	10.0	10.0	9.9	10.0	10.0	10.0	10.0	10.0
F oryzalin	8	2.3	3.8	5.3	3.0	10.0	9.8	10.0	10.0	10.0	10.0	10.0	10.0
G oxadiazon	2	8.0	8.8	8.3	9.8	10.0	10.0	10.0	10.0	4.3	7.5	3.3	2.3
H oxadiazon	4	7.5	-	10.0	10.0	10.0	-	10.0	10.0	3.0	-	3.5	2.8
J oxadiazon	8	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	1.8	6.3	2.5	1.0
K nitralin	2	0.0	1.8	1.8	3.0	10.0	10.0	9.8	8.5	9.8	10.0	10.0	9.3
L nitralin	8	0.0	2.8	2.5	2.5	10.0	10.0	9.5	9.3	10.0	10.0	10.0	10.0
X control	-	2.0	1.8	2.5	1.0	9.8	9.5	10.0	10.0	5.5	8.3	9.0	9.0

Table 4. Weed control ratings 300 days after first irrigation ^{1/}

Herbicide	Rate/Acre	Purslane				Annual bluegrass				Filaree			
		BI	BII	BIII	BIV	BI	BII	BIII	BIV	BI	BII	BIII	BIV
A R-7465	2 lb.	6.8	6.8	6.5	4.8	5.3	7.3	7.5	7.8	9.0	9.3	9.5	10.0
B R-7465	4	3.0	4.5	4.3	3.0	5.3	9.3	9.5	9.0	7.5	9.0	9.8	9.5
C R-7465	8	2.8	5.3	4.5	3.0	9.0	9.0	9.5	8.3	8.5	9.3	10.0	9.5
D oryzalin	2	7.5	6.3	5.5	6.8	9.8	10.0	9.5	9.5	7.0	8.3	8.8	9.0
E oryzalin	4	9.5	9.5	9.3	7.5	9.8	10.0	10.0	10.0	9.0	7.8	9.3	9.3
F oryzalin	8	10.0	10.0	9.8	9.8	10.0	10.0	10.0	10.0	8.8	9.3	9.3	9.5
G oxadiazon	2	8.8	9.5	9.0	6.3	4.8	5.5	7.0	6.5	9.3	8.8	9.5	9.5
H oxadiazon	4	8.3	-	8.8	6.3	7.3	-	8.5	9.0	9.5	-	9.8	9.5
J oxadiazon	8	9.0	9.8	9.5	7.0	8.8	9.5	9.3	8.5	9.8	9.3	9.5	9.5
K nitralin	2	3.3	4.0	4.0	3.5	7.3	9.5	9.8	9.5	4.3	7.3	8.8	9.5
L nitralin	8	7.8	9.8	9.3	6.8	9.5	10.0	9.8	9.5	4.0	8.8	8.5	8.5
X control	-	6.8	7.8	6.3	1.0	2.5	5.0	5.3	6.8	8.7	8.5	8.8	9.3

^{1/} Mean of 4 replicationsSummary:

R-7465 gave excellent weed control when applied 7 days, just before or after irrigation. When applied 14 days before an irrigation on dry soil, R-7465 was not as effective over-all as the later application especially at the lower rates. Clover was severely stunted with R-7465 in all four trials, even at the 2 lb. rate. Purslane rated 300 days after first irrigation was not controlled.

Oryzalin gave good to excellent control on all weed species, except clover, in all four trials. Oryzalin gave the best grass control at the 300 day evaluation even at the 2 lb/A rate. Purslane was controlled at the 4 and 8 lb. rates 300 days after irrigation.

Oxadiazon is selective on chickweed. Poa annua was not controlled at the 2 lb. rate. Oxadiazon gave good to excellent control on the remaining species even at the 300 day rating.

Nitralin did not control filaree when applied to dry soil 14 days before irrigation. Clover was not controlled with nitralin at any rate or time of application. Purslane at the 300 day evaluation was not controlled at the 2 lb. rate.

No phytotoxicity was observed from any of the treatments.

Methods of controlling annual weeds in grapes. Fischer, B., L. Lider, A. Lange, and L. Christensen. A number of soils in the central San Joaquin Valley have low infiltration rates. Many farmers believe tillage is necessary to prevent "surface sealing", i.e. permit water movement into the soil with flood irrigation. The purpose of this study was to compare five cultural methods in a young Thompson Seedless grape trellised vineyard.

The vines were planted in the spring of 1966. In the spring of 1967 the entire test area was treated with 1 lb/A trifluralin plus 0.5 lb/A simazine and harrowed into the surface 4 inches. Weed control was excellent with no visible effect on the rapidly growing young vines.

The cultural herbicide treatments were established early spring 1968. Treatment A, C, D and E received simazine at 2.4 lbs ai/A plus 0.5 lb ai/A of paraquat down the vine row. In treatment A the middles were treated with trifluralin at 1.0 lb. ai/A plus simazine at 0.5 lb. ai/A.

In the spring of 1969 treatments A, C, D and E were treated with diuron down the vine row at 2.4 lb. ai/A plus paraquat for standing ryegrass at 0.75 lb. ai/A. The middles of treatment A received trifluralin at 1 lb. ai/A plus simazine at 0.5 lb/A.

In the spring of 1970, A, C, D and E were again treated with diuron at 2.4 lb. ai/A plus paraquat at 0.5 lb. ai/A. The middles of treatment A were treated with trifluralin at 1.0 lb/A plus simazine at 0.5 lb/A.

The results of these treatments showed no detrimental effects from herbicide application or non-tillage. The average yield for two years was the highest in the complete chemical treatment (A).

From the statistical analysis it would appear that difference in yield between complete chemical treatment and herbicide down the vine row with the centers being mowed (a 10 lb/vine difference) is real. If water penetration was improved by mowed ground cover the effects were not reflected in the yield. This may have been due to a masking, competitive or nutritional effect of the mowed ground cover.

Summer discing the centers with or without French plowing for four years was not superior in yield to the complete chemical treatment over a two year period.

Table 1. A comparison of 5 methods of controlling weeds in a new Thompson Seedless grape vineyard. A four year study in Hanford sandy loam soil. ^{2/}

Treatment	Weed control in the vine row in Dec. 1970	<u>Average</u> ^{1/}		Two year Average lbs.
		1969 lbs.	1970 lbs.	
A Complete chemical (non-tillage)	8.9	87.93	47.56	67.78
B French plow (disced centers)	6.6	89.19	39.48	64.33
C Herbicides vine row (mowed centers)	6.8	81.12	33.56	57.34
D Herbicides vine row (winter cover crop, summer disced)	7.0	91.28	42.06	66.17
E Herbicides vine row (natural cover, summer disced)	8.8	90.75	40.18	65.46
LSD 0.05		6.41	6.40	
0.01		8.49	8.10	
C.V.		10.5%	20.2%	

^{1/} Average fruit weight in pounds per vine of four vines per plot replicated 8 times.

^{2/} Organic matter 0.6%, sand 67.2%, silt 24.0% and clay 8.8%.

Herbicide screening for grapes. Lange, A., B. Fischer and L. Lider. Several herbicides showed excellent weed control and some safety in the 1971 screening trials at the Kearney Field Station. Dormant Thompson Seedless rootings and cuttings were planted at a depth of 12 to 16 inches on March 26, 1971 and immediately sprinkle irrigated with 1 inch of water. Herbicides were applied on April 16, 1971 when the buds were swollen and some starting to break on the stem. Immediately after herbicide application, 1 inch of water was applied by sprinkler and followed by rain. Subsequent irrigations were applied by flooding.

The unrooted cuttings were erratic and were not evaluated. The rooted cuttings gave good uniform growth. Those herbicides showing lasting injury included: methazole at 8 lbs/A (2 lbs. showed some safety and excellent weed control), EP 479 at 8 lbs/A, DS-5328 at 8 lbs/A; whereas, DS-17338 showed injury at 1 and 4 lbs/A. High rates of dinitro plus oil also showed excessive injury. Those herbicides showing more promise than simazine were: R-7465, oxadiazon, oryzalin and trifluralin.

Table 1. Grape herbicide screening trial

Herbicide	lb/A	Phytotoxicity		Grape vigor		Wt/plant oz.	Average ^{1/} Weed control			Remaining weed species
		3 weeks	6 weeks	6 weeks	4 months		3 weeks	6 weeks	4 mos.	
simazine	2	0.7	5.3	7.6	8.0	11.1	10.0	10.0	10.0	
R-7465	2	1.3	0.3	8.6	10.0	10.4	4.0	6.0	10.0	Sp,H,Rm
R-7465	8	3.3	3.0	8.3	8.6	7.4	7.3	9.5	9.5	Sp
oxadiazon	2	8.7	2.0	7.6	7.3	10.2	10.0	9.7	5.0	Ch
oxadiazon	8	9.7	5.0	8.0	8.0	9.4	10.0	10.0	10.0	
methazole	2	2.3	1.0	8.6	10.0	8.8	10.0	9.7	10.0	Cl
methazole	4	3.3	6.0	0.3	1.0	1.0	10.0	10.0	9.5	
oryzalin	2	0.7	0.3	9.0	9.6	12.0	9.0	9.3	10.0	Sp
oryzalin	8	2.3	1.0	8.6	8.6	8.3	10.0	10.0	6.0	N
alachlor	2	0.3	1.3	8.3	8.0	6.2	9.7	8.3	5.0	F,G,Sp,Rm,N
alachlor	8	4.7	2.7	9.3	8.6	15.4	10.0	9.0	8.5	Sp
EP 479	2	0.7	1.6	8.3	9.6	9.5	10.0	10.0	9.2	
EP 479	8	0.3	9.0	0.3	0.6	3.3	10.0	10.0	10.0	
DS-5328	2	2.0	1.0	10.0	10.0	11.1	10.0	10.0	7.0	N
DS-5328	8	3.7	7.6	3.6	5.3	7.2	10.0	10.0	6.5	
DS-17338	1	3.7	9.0	0.3	0.6	10.5	9.3	10.0	10.0	
DS-17338	4	5.3	9.0	0.6	1.3	1.8	10.0	10.0	9.2	
CGA-10832	2	6.3	1.7	9.0	8.0	8.5	10.0	6.7	6.5	Sp,H,N
CGA-10832	8	4.0	1.7	8.3	7.6	11.1	10.0	10.0	10.0	
SAN 9789	1	2.3	0.0	9.0	9.3	6.7	10.0	9.0	4.8	H,Pig,P,N
SAN 9789	4	3.7	3.0	6.6	7.0	6.7	10.0	10.0	8.0	
AN 56477	2	2.0	0.3	9.0	9.6	8.5	10.0	8.0	7.6	Sp
AN 56477	8	2.3	0.0	9.3	9.0	10.4	10.0	7.3	8.2	Sp
GS-38946	2	0.7	0.0	8.0	7.0	8.4	5.7	2.3	3.1	Sp,Pig,H,Rm,N
GS-38946	8	1.7	0.3	9.0	9.0	7.8	9.7	7.3	8.6	Sp
glyphosate	8	5.0	2.7	8.6	9.0	10.8	10.0	10.0	9.5	
trifluralin	2	4.0	0.0	9.0	8.6	12.2	10.0	7.0	8.0	Sp
dinoseb + NP oil 10 + 4		2.3	3.0	9.3	10.0	7.5	10.0	10.0	5.5	
dinoseb + NP oil 40 + 4		4.7	7.7	2.0	3.3	1.8	10.0	9.7	5.8	Cl,N
check	-	3.7	0.3	7.0	6.3	4.0	0.0	0.0	2.8	Sp,Pig,H

^{1/} Average of 3 replications

^{2/} Weed species: Sp-shepherdspurse, H-henbit, F-Red maids, CH-chickweed, Cl-clover, N-nutsedge, Pig-pigweed, F-fiddleneck, G-groundsel, P-purslane

Screening herbicides for weed control in grapes. Lange, A. and L. Lider. Fourteen preemergence herbicides and two postemergence herbicides were applied over Thompson Seedless cuttings and rootings (planted 2/20/72) showing breaking of buds on 4/7/72. Prior to treatment corn and alfalfa were seeded in each plot.

The weed control, vigor of corn, alfalfa and grape shoot growth was evaluated on 5/24/72 and 7/3/72.

Several herbicides showed safety on corn equivalent to simazine. They were methazole (2 lbs/A), CGA-10832, diethamine, DS-5168, IMC 3950 and USB-3153.

Alfalfa was tolerant to CGA-10832 at 2 lbs/A, USB-3153 at 2 lbs/A.

Grape cuttings and rootings tolerated all preemergence herbicides but was severely injured by asulam.

Those herbicides giving as good weed control as simazine included USB-3153 at 2 lbs/A and R-7465 and oxadiazon at twice the rate of simazine.

Table 1. A comparison of 16 herbicides for preemergence annual weed control, phytotoxicity to grapes, direct seeded alfalfa and corn.

Herbicides	lb/A	Phytotoxicity	Average ^{1/} Annual weeds	Alfalfa	Corn
simazine	2	0.7	10.0	10.0	2.5
R-7465	4	3.3	9.7	6.0	7.0
oxadiazon	4	2.7	10.0	8.3	7.0
SAN 9789	1	1.7	8.7	9.7	9.0
SAN 9789	2	2.7	7.3	8.3	8.5
oryzalin	2	3.0	8.3	4.0	6.0
oryzalin	8	0.0	9.7	6.7	2.0
methazole	2	1.0	10.0	3.3	1.5
methazole	4	2.0	10.0	9.7	6.0
CGA-10832	2	2.0	8.7	1.0	3.5
CGA-10832	8	3.0	10.0	5.3	0.0
diethamine	2	3.0	8.3	7.3	0.5
diethamine	8	3.7	9.7	9.7	1.0
chlorpropham	4	1.3	5.3	5.3	7.0
chlorpropham	16	3.0	9.7	9.7	10.0
terbutryn	2	0.7	8.7	10.0	4.0
terbutryn	8	4.3	10.0	10.0	5.5
DS-5168	2	0.0	4.3	10.0	2.0
DS-5168	8	1.7	5.3	10.0	3.5
IMC 3950	4	1.5	4.0	7.5	2.5
IMC 3950	16	0.3	8.0	3.3	1.5
pronamide	4	3.0	9.3	7.7	10.0
pronamide	16	1.7	10.0	10.0	10.0
USB-3153	2	1.3	10.0	3.3	4.5
USB-3153	8	3.0	9.7	7.3	2.5
asulam	4	0.0	0.3	9.3	6.5
asulam	16	7.3	7.3	9.0	6.5
glyphosate	1	3.5	3.0	0.0	2.0
glyphosate	4	3.0	4.7	1.7	0.5
check	-	0.7	4.3	1.0	2.0

^{1/} Average of 3 replications where 0 = no control or no injury; 10 = complete control or crop kill. Treated 4/7/72, evaluated 5/22/72.

Table 2. A comparison of 16 herbicides for effect on corn, alfalfa, Thompson Seedless grape cuttings and weed control.

Herbicide	lb/A	Vigor ^{1/} Average			Weed Control ^{2/}
		Corn	Alfalfa	Grape	
simazine	2	8.5	0.0	9.3	8.6
R-7465	4	4.5	7.0	8.6	9.3
oxadiazon	4	4.0	2.0	9.0	9.8
SAN 9789	1	1.0	1.3	9.6	7.0
SAN 9789	2	3.5	3.3	10.0	5.8
oryzalin	2	5.5	5.6	9.3	6.0
oryzalin	8	7.5	2.6	10.0	7.6
methazole	2	9.0	6.6	9.6	7.2
methazole	4	5.5	0.3	10.0	10.0
CGA-10832	2	9.5	10.0	9.6	7.3
CGA-10832	8	10.0	4.3	9.3	10.0
diethamine	2	9.5	5.0	9.0	5.0
diethamine	8	9.5	0.3	8.6	8.3
chlorpropham	4	3.5	5.6	8.6	1.6
chlorpropham	16	0.0	2.3	9.6	6.3
terbutryn	2	6.0	0.0	9.3	6.0
terbutryn	8	7.0	0.0	9.3	10.0
DS-5168	2	9.0	0.0	9.6	0.6
DS-5168	8	7.5	0.0	9.6	6.0
IMC 3950	4	8.5	2.5	7.0	2.0
IMC 3950	16	8.5	7.0	10.0	6.3
pronamide	4	0.5	5.3	9.0	5.6
pronamide	16	0.0	0.0	10.0	8.6
USB-3153	2	9.0	8.6	9.3	9.6
USB-3153	8	7.5	5.3	9.3	10.0
asulam	4	4.0	0.0	7.6	0.6
asulam	16	6.5	1.3	1.0	4.0
glyphosate	1	8.5	10.0	8.0	0.3
glyphosate	4	10.0	9.0	8.6	6.3
check	-	8.5	10.0	9.6	2.6

^{1/} Average vigor of 3 reps 8 feet long where 0 = no growth, 10 = best growth.

^{2/} Weed control where 0 = no control, 10 = completely free of weeds

Evaluated 7/3/72

Timing of application on johnsongrass control. Lange, A. Repeated foliage sprays on johnsongrass in vineyards showed that initial applications of MSMA, followed by repeated sprays of dalapon, were comparable on young johnsongrass shoots but poorer when spraying was commenced in May. MSMA sprays showed that applications to intermediate johnsongrass growth was generally more beneficial for MSMA than dalapon. Dalapon applied to early growth (April) was as good as later (May).

Late applications of dalapon or MSMA commencing in June were unsuccessful. Not all the late repeated treatments were completed because of the size of the johnsongrass in relation to the grape plant. Single, and even double, sprays applied to large johnsongrass plants were not satisfactory.

Table 1. The effect of timing and numbers of applications on the control of johnsongrass evaluated at grape harvest (9/5/71).

Herbicide	lb/A	Average ^{1/} control when treatments started at:		
		6-8" ^{2/}	10-18" ^{3/}	16-30" ^{4/}
dalapon	4+4+4+4	7.5	6.8	2.2
MSMA + dalapon	(4+4+4+4)	6.8	7.0	2.5
MSMA + dalapon	(4)+4+4	6.8	4.3	0.0
MSMA + dalapon	(4)+4	6.2	5.2	4.5
MSMA	4	2.3	5.9	2.3
MSMA	4+4+4+4	6.8	8.5	3.0
check	-	0.0	-	-

- ^{1/} Average of 4 replications where 0 = no effect; 10 = complete control, i.e. no live johnsongrass.
^{2/} Applied 4/13/71, 1st treatment.
^{3/} Applied 5/14/71 repeat treatments of dalapon + initial treatment of MSMA (10-18").
^{4/} Applied 6/12/71 repeat treatments of dalapon + initial treatment of MSMA (16-30").

SPECIAL NOTE: 10-18 inch plots did not receive their third spray. The 16-30 inch plots did not receive their third and fourth sprays because of the oversize of the johnsongrass in relation to the grape vines.

Johnsongrass control in an old vineyard with repeated foliar applications. Foliar applications were commenced on 3/23/72 in a moderately heavy growing stand of johnsongrass. The same plots were retreated 5/20/72 and half the plots were again sprayed on 7/17/72.

The best treatment was glyphosate at 3 lbs/A repeated three times applied once every two months. Two applications gave substantial control but three treatments were somewhat better than MSMA. All herbicides gave some control but the others were somewhat less effective under the conditions of this experiment which included minimum irrigations and rainfall.

Table 1. A comparison of five herbicides in repeat applications for the control of johnsongrass in an old vineyard.

Herbicide	lb/A	5/17	6/12	Average control ^{1/}		9/7
				7/17	8/7	
dalapon	3 + 3	3.7	3.3	3.8	3.0	2.5
dalapon	3 + 3 + 3	5.5	4.8	5.5	7.3	7.0
glyphosate	3 + 3	4.7	10.0	8.5	7.0	6.2
glyphosate	3 + 3 + 3	3.7	9.5	8.5	10.0	9.2
asulam	3 + 3	4.0	8.0	6.2	4.0	3.8
asulam	3 + 3 + 3	3.0	7.8	5.3	7.0	6.5
MSMA	3 + 3	4.5	9.3	6.2	4.3	2.5
MSMA	3 + 3 + 3	3.0	8.8	5.2	9.7	8.5
paraquat	3 + 3 + 3	4.5	6.5	1.8	7.5	5.2
check	-	3.7	2.0	0.8	0.0	0.0

^{1/} Average of 4 replications where 0 = no effect, 10 = complete kill.

Layered herbicides for the control of johnsongrass in vineyards.

Lange, A. H. The control of bindweed by layered trifluralin and dichlobenil has been successful in a number of California locations. Johnson-grass has been controlled both in the seedling and "separated" rhizome stages by the incorporation of trifluralin (reported elsewhere). The object of this experiment was to evaluate layered trifluralin for control of johnsongrass.

Results indicate trifluralin and a related compound oryzalin as well as dichlobenil gave partial johnsongrass control. There was considerable effect on the length of roots in the trifluralin plots as well as reduced stand and vigor. Many johnsongrass plants in trifluralin treated plots, although apparently normal, did not produce normal roots or rhizomes. Repeat applications of this technique may prove to be beneficial in reducing the johnsongrass stand in the vine row.

French plowing away the soil, spraying trifluralin and disking back partially treated soil gave results comparable to layering with a spray blade.

Table 1. Control of johnsongrass with spray blade and French plow techniques. Evaluation at harvest (6 and 7 months after treatment just after knifing the plots and disking the centers).

Herbicide	lb/A	Average $\frac{1}{2}$			
		Spray blade		French plow	
		Weed control	Phytotoxicity	Weed control	Phytotoxicity
trifluralin	2	5.0	0.0	4.0	0.0
trifluralin	8	6.5	0.0	6.7	0.0
oryzalin	2	6.8	0.0	5.3	0.0
oryzalin	8	7.2	0.0	5.0	0.0
dichlobenil	2	6.0	1.2	6.0	2.3
dichlobenil	8	8.2	2.2	6.0	3.0
R-7465	2	5.2	0.0	1.7	0.0
R-7465	8	4.2	0.0	5.7	0.0
check	-	2.8	0.0	1.3	0.0

$\frac{1}{2}$ Average of 3 and 4 replications.

Layered herbicides for bindweed control in rooted cuttings of grapes.
 Donaldson, D., A. Lange and C. Elmore. Heavy field bindweed (Convolvulus arvensis) infestations were divided into 7' x 20' plots and treated with several chemicals on April 19, 1971. The herbicides were applied with an 80" spray blade, nozzles spaced at 4" intervals using 11002 noozles delivering 80 gallons per acre. The chemicals were placed at a 2-3 inch depth. One week later an 18" shank slit was made in the center of each plot and rooted cuttings of two grape varieties were planted. The soil was a silty-clay loam with 3.5% organic matter, 8% sand, 48% silt and 44% clay. Plots were irrigated three times at approximately 6 week intervals.

Most herbicides showed very little detrimental effect on the vigor of the young grape vine. Considerable stunting was apparent from lack of bindweed control as can be seen by the later vigor evaluations of the untreated check and low rate of herbicides. Trifluralin and several related compounds gave excellent season-long bindweed control. The herbicides of this group showing the most control were trifluralin, CGA-10832 and diethamine. Dichlobenil also gave excellent control particularly at the 8 lbs/A rate without symptoms and with excellent growth under the conditions of this trial. SAN 9789, R-7465, MON 097, oxadiazon, and MC 3761 produced some effect on the bindweed but considerably less than trifluralin.

Table 1. The effect of 11 herbicides on grape vine vigor and bindweed control.

Herbicide	lb/A	Average ^{1/}			
		2 1/2 months		5 months	
		Bindweed control	Grape vigor	Bindweed control	Grape vigor
trifluralin	2	8.8	7.2	7.0	8.8
trifluralin	8	9.8	6.5	9.6	9.2
CGA-10832	2	7.8	8.8	5.5	7.8
CGA-10832	8	9.5	8.8	9.0	8.5
SAN 9789	2	4.0	8.5	4.2	7.0
SAN 9789	8	3.2	6.5	4.5	5.0
R-7465	2	3.2	8.2	2.8	6.5
R-7465	8	6.0	5.8	5.8	6.2
dichlobenil	2	6.8	8.8	6.0	8.8
dichlobenil	8	8.5	8.0	7.2	10.0
AN 56477	2	5.8	7.8	5.2	7.5
AN 56477	8	4.5	7.8	5.5	7.8
oryzalin	8	4.2	7.0	5.2	7.8
diethamine	8	8.2	8.5	7.2	8.8
MON 097	8	5.8	6.2	4.5	6.8
oxadiazon	8	5.5	8.0	4.2	6.5
MC 3761	8	3.8	7.2	4.5	8.0
check	-	3.0	7.2	1.5	4.5

^{1/} Average of 4 replications where 0 = no effect and no grape growth and 10 = all bindweed dead and the best grape vines.

Layered herbicides for bermudagrass control in vineyards. Lange, A. and F. Swanson. A heavy mat of bermudagrass was French plowed and disced twice. The herbicides were applied the same day, 1/22/72, to the French plow furrow and the interspace between the vine rows. The herbicides were rototilled by a power tiller and the treated soil thrown on top of the layer of the same herbicide.

The French plowing and other tillage greatly reduced the bermudagrass. The addition of root stubbing herbicides appeared to increase the control of bermudagrass. Trifluralin and CGA-10832 were somewhat more effective than diethamine. Additional evaluations will be made next spring (Table 1).

Table 1. Weed control in vineyards.

Herbicide	lb/A	Average ^{1/} weed control			
		Annual		Bermuda	
		5/8/72	8/23/72	5/8/72	8/23/72
trifluralin	2	8.7	10.0	7.0	8.2
trifluralin	4	9.2	10.0	7.5	9.0
trifluralin	8	9.5	10.0	7.7	9.0
CGA-10832	2	8.5	9.7	6.0	8.0
CGA-10832	8	9.5	10.0	8.0	9.0
diethamine	2	9.7	10.0	7.2	6.3
diethamine	8	10.0	10.0	7.5	7.2
check	-	2.7	5.0	4.7	2.3

^{1/} Average of 4 replications where 0 = no control; 10 = complete control

The control of johnsongrass by spray layering with a French plow in an old vineyard. Lange, A. and F. Swanson. Trifluralin and four related compounds were sprayed into a furrowed out area along the vine row and on the interspace soil 1/28/72. The treated interspace soil was then tilled and thrown back to the vine by a offset disc.

Trifluralin and CGA-10832 gave substantial control of johnsongrass. The other herbicides gave slightly poorer control. All appeared to cause some root stubbing of johnsongrass.

Table 1. The effect of spray layered herbicides on the control of johnsongrass and the effect on young bearing vineyard of Thompson seedless grapes.

Herbicide	lb/A	Average ^{1/} Johnsongrass control		Phytotoxicity
		5/17/72	8/7/72	
trifluralin	2	7.2	8.0	0.0
trifluralin	4	7.5	7.0	0.0
trifluralin	8	7.2	7.5	0.0
CGA-10832	2	7.2	7.0	0.0
CGA-10832	8	7.7	7.5	0.0
diethamine	2	6.0	5.2	0.0
diethamine	8	7.2	5.8	0.0
oryzalin	2	5.0	6.2	0.0
oryzalin	8	5.7	7.5	0.0
A-820	2	7.5	5.8	0.0
A-820	8	4.5	6.0	0.0
check	-	3.0	0.0	0.0

^{1/} Average control where 0 = no effect; 5 = half stand and 10 = complete kill.

The effect of layering trifluralin or chlorpropham on the control of johnsongrass. Lange, A. and F. Swanson. Herbicides were sprayed in furrow French plowed away on the interspace between the rows. The herbicide was disced and the treated soil thrown back under the vines on 3/23/72. The crop was furrow irrigated only once during the season.

Both herbicides gave some reduction in stand of johnsongrass. The high rate of trifluralin caused severe root stunting of the johnsongrass.

Table 1. The effect of spray layered herbicides on the control of johnsongrass in an old vineyard.

Herbicide	lb/A	Average ^{1/} control	
		5/17/72	8/7/72
trifluralin	4	7.3	4.0
trifluralin	16	8.3	7.0
chlropropham	4	7.3	6.0
chlorpropham	16	5.7	5.3
check	-	5.0	0.0

^{1/} Average of 3 replications (6 vines each) where 0 = no effect; 5 = half stand and 10 = complete control, i.e., no johnsongrass.

There was no indication of phytotoxicity.

Preemergence weed control in boysenberries. Lange, A. Newly planted rooted cuttings were treated 3/1/72 four days after transplanting. All plants were sprinkle irrigated on 3/2 and 3/22. Subsequently, they were furrow irrigated. Evaluations made at 1 and 5 months after treatment showed the best weed control with granular dichlobenil, however, the injury to the boysenberry plants was excessive. Both nitralin and oxadiazon gave satisfactory early weed control but did not give residual weed control under the conditions of this experiment which included loss of weed control in the furrow.

Table 1. A comparison of annual weed control in boysenberries.

Herbicide	lb/A	Average ^{1/}		Phytotoxicity	
		Weed control 1 month	Weed control 5 months	1 month	5 months
simazine	1	8.7	6.0	2.0	0.0
R-7465	1	6.0	0.8	0.0	0.0
R-7465	4	6.3	1.3	0.0	0.0
nitralin	2	8.0	4.0	0.0	0.0
IMC 3950	4	5.0	1.8	1.0	0.0
CGA-10832	2	7.3	3.7	1.0	0.0
dichlobenil (Gr)	4	9.0	6.0	7.0	8.0
dichlobenil (Gr)	8	9.7	7.7	9.0	10.0
oxadiazon	4	8.0	3.3	1.0	0.0
check	-	0.0	0.7	0.0	0.0

^{1/} Average of 3 replications, where 0 = no effect, 10 = complete control or top kill of boysenberries.

Weeds included: puncturevine, lambsquarters, crabgrass and pigweed.

Postemergence weed control in strawberries. Lange, A. Most commercial strawberry plantings are preplant fumigated with a mixture of methyl bromide and chloropicrin. Weeds such as cheeseweed, sour clover and filaree often escape this treatment, causing high hand weeding costs. Also, some weed seed reinfestation occurs between planting and the application of plastic mulch. Once the clear plastic mulch is in place, hand weeding becomes prohibitive.

In this study six postemergence herbicides were evaluated on Tioga and Shasta varieties planted two weeks prior to treatment. The air temperature was 78° F. during treatment.

The outstanding herbicides in this trial were nitrofen, fluorodifen, and phenmedipham. Excellent broadleaf weed control was obtained at the low rate with sufficient safety at four times this rate. Bromoxynil, pyrazon and dalapon were not selective in strawberries (dalapon data not shown).

All chemicals were weak on volunteer barley and good to excellent on young broadleaf weeds in the 2 to 4-leaf stage.

Table 1. The effect of six herbicides on the foliar condition of newly planted Tioga and Shasta strawberries and the control of annual broadleaves and volunteer barley.

Herbicide	lb/A	Phyto- toxicity 3 days	Average ^{1/}		Volunteer barley control
			Phyto- toxicity 15 days	Annual broadleaf control	
nitrofen	2	1.5	0.0	8.8	5.0
nitrofen	8	2.8	0.0	10.0	7.2
fluorodifen	2	0.5	1.0	8.5	6.0
fluorodifen	8	0.8	0.8	9.8	4.0
pyrazon	2	4.2	6.5	10.0	6.0
pyrazon	8	5.8	9.8	10.0	8.3
bromoxynil	0.5	8.0	8.3	10.0	2.1
bromoxynil	1	8.8	9.3	10.0	6.7
phenmedipham	1	2.0	1.8	7.2	4.3
phenmedipham	4	0.7	1.0	8.8	7.2
chloroxuron + nitrofen	4 + 4	3.0	1.2	10.0	7.0

^{1/} Average of 3 replications

Weed control in strawberries under sprinkler irrigation. Lange, A., V. Schweers and H. Kempen. Five herbicides were applied immediately after transplanting and before sprinkler irrigation in non-fumigated soil 7/14/71. All herbicides except diphenamid and DCPA gave good weed control but showed considerable early phytotoxicity. Later evaluations showed a recovery of vigor and a loss of symptoms (later observations not shown).

Table 1. A comparison of preemergence herbicides for weed control in newly planted Tioga strawberries.

Herbicide	lb/A	Weed control		Weeds left	Phytotoxicity	
		3 weeks	5 weeks		3 weeks	5 weeks
diphenamid	6	5.8	6.5	L,C,V,S,B,A	1.0	1.2
chloroxuron	3	9.9	9.5	C	3.0	2.5
chloroxuron	6	9.9	10.0	C	5.3	4.5
R-7465	3	8.3	8.5	N,C,L	2.3	2.5
R-7465	6	9.3	9.2	N	3.5	4.0
RH-892	3	9.6	9.5	C	2.8	2.5
RH-892	6	9.9	9.5	-	3.3	4.2
DCPA	6	1.3	3.5	L,C,G,A,B	2.0	1.2
DCPA	12	0.8	1.5	L,C,G,S	0.3	0.7
check	-	1.8	2.5	all	0.7	0.7

Weeds included:

N - nightshade	S - sowthistle
L - London rocket	F - foxtail
C - cheeseweed	G - groundsel
V - puncturevine	H - pigweed
	B - bromegrass