WEE
ST
ST

A. H. LANGE

Strawberry weed control test plots, above and cover photo, Monterey County, show weed-free rows of plants resulting from use of DCPA (in bed with the sign) and diphenamid (in bed left of sign).

PRESENT-DAY strawberry culture demands a field clean of weeds. This is particularly true in some areas of California where the practice of covering beds with a clear polyethylene film for several months (beginning usually in January or February) creates a unique problem from the standpoint of weed control. Weeds grow rank under clear polyethylene, and hand labor for weed control underneath the film is costly. The combination of a long harvest period plus the fruit's proximity to the ground places a high value on minimum cultivation.

Fumigation of the soil with methyl bromide or a methyl bromide-chloropicrin mixture before planting is a common practice in most California berry-producing districts. In some areas of the state, weed control is accomplished by chemical or mechanical means. Even with fumigation, some of the more difficult-to-kill weed seeds germinate. Weed species resistant to fumigation—and the fact that there are areas of the state where fumigation is not yet used—create a need for additional information on chemicals for weed control in strawberries.

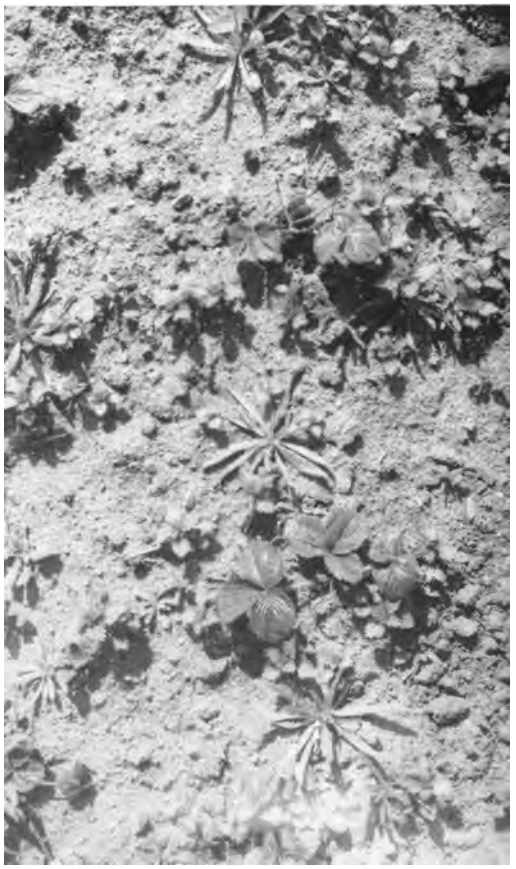
TABLE 1. HERBICIDES REGISTERED* FOR USE ON STRAWBERRIES

Herbicide	Rate/Acre
Sesone	3–6 lbs
Sesone + CIPC	2 + 1 lbs
DNBP amine salt	4–6 lbs
2,4-D	1 lb acid equivalent
2,4-D	½–1½ lbs/10–40 gals. water
Trizone	160–200 lbs A
DCPA	9 lbs
Diphenamid	6 lbs
Falone	4 lbs (1 gal)
Falone + DCPA	4 + 3 lbs

* Registered with USDA. See current summary of registered agricultural pesticide chemical uses for further information. Special note: only sesone is presently recommended by the University of California.

Herbicides

Of the eight herbicides currently registered by USDA for weed control in strawberries (table 1), only diphenamid (Dymid or Enide) and DCPA (Dacthal) have shown promise as pre-emergence herbicides in recent California tests (neither is yet recommended by University of California). Both have limitations since they are weak on certain broadleaf winter annuals. However, in greenhouse and field studies, these herbicides have shown considerable safety on strawberries. Shasta has consistently shown more susceptibility to injury from diphenamid than other varieties, which means more testing will be necessary with all the varieties grown in California before general recommendations can be made. Furthermore, diphenamid is registered for use overall after row establishment, and berries cannot be harvested within one year after treatment



Close-up photo of usual weed control problem, taken in untreated strawberry check plot in Monterey County.

DCPA is registered for use on newly planted or established strawberry beds, at rates up to 9 lbs per acre—and for additional applications to control late-germinating weeds in late summer and early fall. These types of applications

D CONTROL UDIES IN RAWBERRIES

I. AGAMALIAN • W. A. HUMPHREY • V. VOTH

have not been studied extensively in California, but it is quite likely DCPA will not be adequate for many of the winter annuals commonly found where strawberries are grown in California.

While diphenamid and DCPA are potentially useful herbicides for control of some weeds in strawberries, the California industry is in need of new, selective, pre-emergence herbicides that control weed species resistant to diphenamid and DCPA. Evaluation of herbicides used in strawberries has been carried out on a limited scale in several counties. The work reported here is from trials conducted in Monterey County and at the South Coast Field Station in Orange County.

Strawberry test plot in Monterey County showing chemically treated area of bed in the foreground, in contrast to weedy control rows in background.

In early trials in Monterey County both pre- and post-planting treatments with five different herbicides were made during the latter part of 1964 and early 1965. Little or no reduction in yield from either type of treatment was indicated with DCPA at 8 lbs per acre actual ingredient, diphenamid at 4 lbs, trifluralin or benefin at ½ lb per acre. However, IPC at 4 lbs per acre caused 10 to 15% reduction in yield with the Shasta variety. Although there was little indication of differences in strawberry yields, the effectiveness of these materials for weed control at rates mentioned was somewhat different. Weed control of 80% or better was achieved (at three months) by using either DCPA at 8 lbs per acre or diphenamid at 4 lbs per acre in the post-planting treatments. Sixty per cent weed control or less was obtained with the other three materials.

Varietal differences found in greenhouse tests were substantiated by further field trials in Monterey County where Shasta showed greater susceptibility to three herbicides than did Lassen or Solana (table 2) where these herbicides were applied at commercial rates.

In a field test at the South Coast Field Station, herbicides were applied January 27, 1966, as a dormant spray over the plants and soil which were then irrigated (simulated sprinkler irrigation 1/10 inch) before a clear polyethylene-film mulch was laid down. No detrimental effects were found on yield or berry quality except for indications of lower yields from the use of 3 lbs per acre of simazine (table 3). Some marginal chlorosis was also observed during the growing season from the 3 lbs per acre rate of simazine.

A brief summary of strawberry trials from 1962 to 1966 shows diphenamid giving better weed control but with less safety than DCPA. The Shasta variety appeared more susceptible to herbicide injury than other currently used strawberry varieties.

TABLE 2. YIELD RESPONSE OF THREE STRAWBERRY VARIETIES TO DIPHENAMID, DCPA, AND SWEP

Strawberry variety	Herbicide	Lbs/acre	Phytotoxicity rating*	Yield (seven-month harvest)
			average†	mean tons/acre
Shasta	diphenamid	6	5.1	11.9
Lassen	diphenamid	6	0	21.9
Solana	diphenamid	6	0	19.2
Shasta	DCPA	9	5.1	9.5
Lassen	DCPA	9	0	20.6
Solana	DCPA	9	0	18.7
Shasta	SWEP	6	4.3	10.1
Lassen	SWEP	6	0	19.5
Solana	SWEP	6	0	20.3
Shasta	control	0	0	13.9
Lassen	control	0	0	19.8
Solana	control	0	0	19.7

* Phytotoxicity rating: 0 = no effect; 10 = all plants dead.
† Average of three replications.

TABLE 3. COMPARATIVE PHYTOTOXICITY OF FOUR HERBICIDES APPLIED TO DORMANT SOLANA STRAWBERRY PLANTS WHICH WERE LATER MULCHED WITH A POLYETHYLENE FILM (1/27/66)

Herbicide	Amount	Phytotoxicity	Weed control	Average berry yield
	lbs/A	three months	three months	grams per plant
Diphenamid	6	0.2	100	210
Diphenamid	12	0.8	97	201
Benefin	3	0	100	188
Benefin	6	0.2	100	191
DCPA	6	0	100	198
DCPA	12	0.8	100	184
Simazine	3	3.0	100	155
Check	0	0	95	200
LSD (.05%)				58.8

Phytotoxicity rating: 0 = no effect; 10 = all plants dead.

Arthur H. Lange is Extension Weed Control Specialist, Riverside; Harry Agamalian is Farm Advisor, Monterey County, Salinas; Wesley A. Humphrey is Farm Advisor, Orange County; and Victor Voth is Pomologist, South Coast Field Station, Santa Ana. *Dr. R. Bringhurst, L. Fulton and A. Dawson also contributed to this study.*