water intake include: less dust for cleaner fruit and working conditions, reduced sun reflection in the vineyard, and possibly fewer spider mites. Flat furrows are most often used by growers, but there is a trend toward increased use of wide, middle-row basins to further assure adequate wetting. This system seems most practical in wine and table grape vineyards where special ground preparation at harvest is not necessary, as in raisin vineyards. Some raisin growers have used a temporary undervine furrow until early-to mid-summer before plowing the soil back to the vines—assuring good water intake for at least this period during the season.

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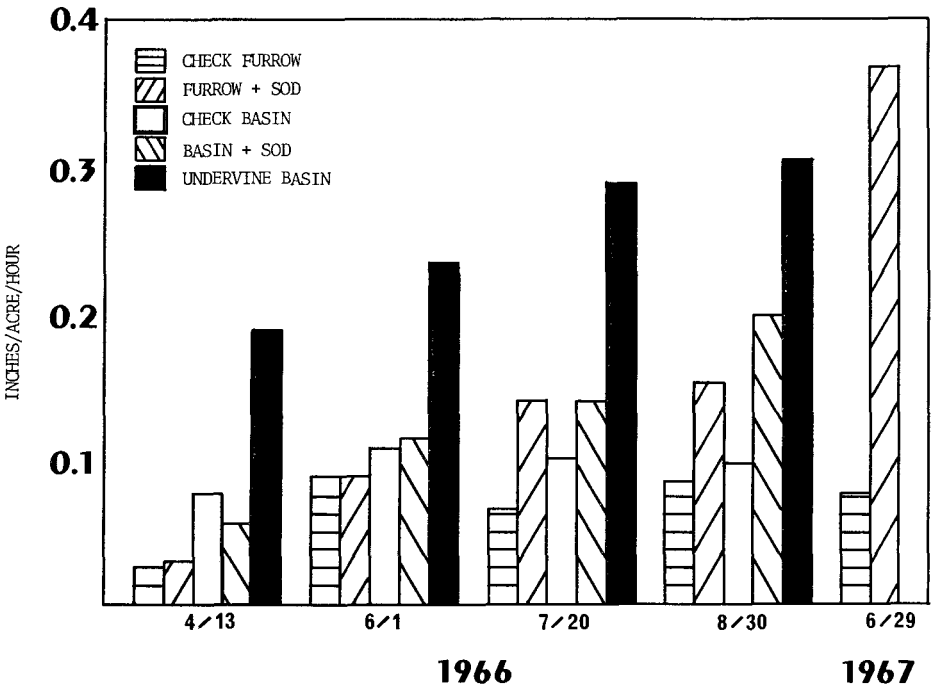
PENETRATION RATE OF IRRIGATION WATER APPLIED TO FRESNO COUNTY (EAST SIDE) VINEYARD SOILS UNDER FOUR DIFFERENT FURROW SYSTEMS—1966 AND 1967



TWO-SPOTTED MITE CONTROL IN WALNUTS

L. C. HENDRICKS, JR. • C. S. DAVIS • W. C. BATISTE

COMPARISON OF THREE OILS, FIVE ACARICIDES AND SIX ACARICIDE-OIL COMBINATIONS FOR THE CONTROL OF TWO-SPOTTED MITE ON ASHLEY WALNUT TREES

Treatments	Mite population counts (pretreatment)					Average observed phytotoxicity†
	9/14	9/21	9/26	10/4	10/12	9/26
Dosage/100 gal water*	Average no. mites per leaflet					Rating*
PGSO-2, 1 gal	64	16	17	36	91	2.0
Orchex 796, 1 gal	40	14	22	61	46	2.0
Volck Supreme, 1 gal	76	13	11	22	43	2.0
Volck Supreme, 1 gal plus 1 lb 25% Ethion WP	5	4	5	10	42	2.0
Ethion 1 lb 25% WP	151	52	92	218	424	1.0
Volck Supreme, 1 gal plus 1 lb 25% Trithion WP	115	3	0	12	42	2.2
Trithion, 1 lb 25% WP (Carbophenothion)	73	3	21	56	134	1.3
Volck Supreme, 1 gal plus 1½ lbs 25% Chlorobenzilate WP	39	14	4	11	40	2.2
Chlorobenzilate, 1½ lbs 25% WP	98	4	5	23	22	1.0
Volck Supreme, 1 gal plus 2 lbs 18½% Kelthane WP	48	0	2	3	8	2.2
Orchex 796, 1 gal plus 2 lbs 18½% Kelthane WP	30	0	1	2	8	2.8
PGSO-2, 1 gal plus 2 lbs 18½% Kelthane WP	37	2	5	6	11	1.8
Kelthane, 2 lbs 25% WP (dicofol)	74	5	6	13	10	1.2
Omite, ½ pt EC (5 lbs per gal)	125	0	1	4	2	1.0
Check (water)	64	85	112	176	333	1.0
Check	41	149	81	106	328	1.0

* Sprayed September 14, 1967, by hand gun.
† Ratings 1 to 10: 1 = no damage, 5 = serious leaf spotting, 10 = dead leaves.

THE TWO-SPOTTED MITE, *Tetranychus urticae*, has been very difficult to control during the past three hot summers. Walnut growers in Merced County, as well as in many other interior valley counties, have experienced early loss of leaves from walnut trees, sunburning of nuts and limbs, and problems with leaves on the ground at harvest.

In recent years, mite-control failures have become quite common with the organic phosphate acaricides such as TEPP, Trithion, and Ethion. Some growers have reported failures with the chlorinated hydrocarbon acaricides such as Tedion, Kelthane, Chlorobenzilate and Aramite. As the standard acaricides have in some cases lost their effectiveness, growers have become more interested in the recently developed plant spray oils. However, little information of a local nature has been available on the effectiveness of these oils, and little was known about the phytotoxicity or plant-damaging qualities of these oils on walnut trees.

With these problems in mind, a field trial was established in western Merced County in 1967, designed to answer the following questions: (1) which of the commonly used acaricides are still controlling two-spotted mite; (2) how well could the recently developed plant spray oils control mites, (3) is phytotoxicity a problem with these oils; and (4) is poor coverage a factor in the poor mite control experienced?

A block of young Ashley walnuts at the Bill Jorgensen orchard, Gustine, was used for experimental purposes. A total of 14 treatments and two checks plots were established. One check, or untreated block was sprayed with water, and one was left dry. Six trees were sprayed in each treatment. All treatments were applied by hand gun to assure good coverage.

Three spray oils were compared: Volck Supreme, PGSO-2, and Orchex 796. Volck Supreme is sold under the Ortho label. Orchex 796 is a base stock oil which is sold under various company labels. PGSO-2 is sold under the PureGro label. All oils and oil combinations were used at the rate of one gallon of oil per 100 gallons of water.

Five acaricides were tested. These chemicals (at rates per 100 gallons of water) were: 1 lb of 25 per cent Ethion WP; 1 lb of 25 per cent Trithion WP; 2 lbs of 18½ per cent Kelthane WP; 1½ lbs of 25 per cent Chlorobenzilate WP; and ½ pt Omite EC at 5 lbs per gallon. Omite has not yet received a registration for use on walnuts.

Oil combination

Each acaricide except Omite was also combined with Volck Supreme to determine whether the mite control could be enhanced by the oil combination. In addition, Kelthane was combined with each of the three oils to learn whether there was a difference in mite control between oils when used in combination with Kelthane.

Pretreatment mite counts were compared with post-treatment counts taken at approximately weekly intervals for four weeks after treatment. The table shows the average mite levels at each weekly rating. Phytotoxicity, or plant-damage ratings, are listed in the right hand column. Pretreatment counts ranged from a low of 5 mites per leaflet to a high of 151 mites on another plot. The average level was 67.5 mites per leaflet.

Omite proved to be the outstanding acaricide in this trial. The mite control remained very acceptable throughout the four weeks of observation. Kelthane alone, or combined with any one of the three oils, gave good mite control for three to four weeks. The addition of oil probably increased the effectiveness of Kelthane. Chlorobenzilate and Trithion with Volck Supreme also gave good control for three to four weeks. However, the total number of mites at four weeks was somewhat higher than in the Kelthane treated plots.

Chlorobenzilate with Volck Supreme resulted in two- to three-week control, and Volck Supreme alone gave control for at least two weeks. Ethion alone, PGSO-2, Orchex 796, and Trithion gave control for only one to two weeks and mite levels then increased. Where oils were used alone, Volck Supreme gave slightly better control than Orchex 796 or PGSO-2.

No comparisons were made between the Ethion + oil treatment and the other treatments because the pretreatment count was extremely low, and the post-treatment counts remained low. The post-treatment level was lower than the pre-treatment level only at one week after treatment.

Phytotoxity

Phytotoxicity ratings showed only minor leaf spotting with any oil or oil combination. This spotting was barely noticeable and was not serious.

With any pest control application good timing and thorough coverage are extremely important. In this test plot work all applications were made with hand gun to small trees. Thorough coverage with air carrier sprayers can only be attained at speeds of 2.5 miles per hour or slower. Excessive travel speed is a common cause of poor coverage and poor control. Mite control should begin early in the season when mite populations are low. After webbing has begun, control is extremely difficult to obtain. Simple test plots in individual orchards can be made by tagging a number of mite-infested shoots, spraying a tank of one acaricide mixture on one block of trees, then spraying other tagged trees with other acaricide mixtures. Such tests allow a determination of which acaricide gives the best results for the money in a particular situation. Some acaricide-oil combinations are not included on the product label. Omite has not yet been registered for walnuts.

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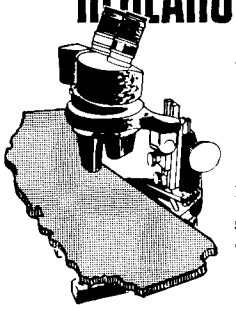
RESEARCH PREVIEWS



A continuing program of research in many aspects of agriculture is carried on at University campuses, field stations, leased areas, and many temporary plots loaned by cooperating landowners throughout the state. Listed below are some of the projects currently under way, but on which no formal progress reports can yet be made.

SOIL FUNGICIDES

Some soil organisms are capable of nullifying the poisonous activity of soil fungicides. Riverside plant pathologists have recently shown that repeated exposure to fungicides overcomes the organisms' ability and allows the fungicides to remain in the soil for longer periods of time—a fact that may have some bearing on the use of fungicides to control plant diseases. Additional studies are planned.

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SMOKING AND TASTE

Carefully controlled comparative studies between cigarette smokers and nonsmokers, conducted by food scientists at Davis, indicated that tobacco usage significantly increases salivary secretion, but has a variable effect on subjects' sensitivity to selected taste and odor compounds. It was consistently noted that smokers were much heavier coffee drinkers than nonsmokers.

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TURFGRASS RESEARCH

Turfgrass research being conducted at Riverside has resulted in development of three improved strains of *Dichondra repens,* one or more of which will be released to seed growers in the near future.

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MULCHING AIDS FORAGE

Agronomists at Riverside have determined that greater success in forage seedling establishment under cold, dry environments (such as deserts) appears possible through the use of petroleum mulches. Further work is being done along this line.

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SALT BUSH

Laboratory studies with saltbush, *Atriplex halimus* at Riverside have shown this plant to have an unexpected tolerance to common salt and suggests the possibility of irrigation of plantings with brackish water.