

Effect of Oil Spray on Lemons

juice quality and yield were not affected by pest control sprays in tests made in two southern California orchards

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To determine the effects—if any—on the juice quality and fruit yield of pest control oil spray applied to lemon trees in any of the months from August through January, experimental blocks were established in two widely separated orchards.

One orchard—near Tustin in Orange County—was composed of 5-year-old trees of Rosenberger Lisbon lemon on sweet orange rootstock. The experimental block was 18 trees long by 10 trees wide.

The second orchard—near Somis in Ventura County—was composed of 4-year-old trees of Eureka lemon on sweet orange rootstock. The shape of the experimental block was roughly similar to that of a right-angled triangle with sides eight and thirty-four trees long with the longer dimension in the direction of the irrigation.

The series of treatments and the basic experimental design were the same in each orchard. Each plot consisted of four trees in a square, and each treatment was replicated three times.

Tillage, irrigation, fertilization, pruning, picking dates, and other factors of orchard care and management practiced by the growers were not altered for the experimental blocks. Although these practices varied in the two orchards, the treatments of each experimental block were comparable. Each plot was treated twice annually, once with a proprietary California light-medium-grade emulsive oil spray and once with ovex at the rate of one pound of the 50% wettable-powder formulation per 100 gallons of spray mixture.

Treatments began in August, 1952, and continued through July, 1955, and were applied during the first week of the month. The spray equipment was the conventional type, using a high-pressure reciprocating-type pump operating at 550

pounds pressure and provided with satisfactory agitation in the spray tank. The spray guns were operated manually and a sufficient volume of material for full-coverage was applied to each tree to wet the foliage to the point of drip.

Fourteen sets of samples for juice-quality determinations were taken from the two orchards during the experiment. Analyses of variance were calculated for each of six juice-quality factors for each sampling date for each experimental block. At odds of 19:1, differences between treatments were not significant in 81 of the 84 separate analyses; as exceptions, significant differences occurred once in pounds of acid per ton of fruit and twice in ratio of soluble solids to acid.

Significant differences occurred in pounds of acid per ton of fruit for samples collected at Somis in April, 1955. The differences were significant at odds of 19:1 but not at 99:1. It is likely that the latter odds offer a better interpretation of these data, because at odds of 19:1 the difference between the treatment of oil spray in October and ovex in March and the treatment of oil spray in October and ovex in April would attain significance. There is little reason to believe this conclusion, particularly since no support for this is indicated among the data of any of the other sampling occasions. Moreover, the samples collected at Somis in April, 1955, did not differ significantly in percentage of acid, percentage of juice, or pounds of total soluble solids per ton of fruit.

None of the differences in ratio of soluble solids to acid were significant at odds of 99:1. In samples taken at Somis in January, 1953, the mean value for the treatment with oil spray in August and ovex in February was significantly higher at odds of 19:1 than the means of any other eight treatments, which did not vary significantly among themselves.

At Tustin in April, 1955, the mean values for treatments with oil spray and ovex in November and May and in January and July, were significantly lower at odds of 19:1 than the means of any of the other seven treatments. The seven treatments did not vary significantly among themselves, including particularly the treatment with oil spray in December and ovex in June. On both occasions—at

Somis in January, 1953, and Tustin in April, 1955—percentages of acid, soluble solids, and juice did not differ significantly. No support for a trend is indicated in the data of any of the other sampling occasions.

Records of yield were taken in 1955 during the third successive year of the treatment program. The program of picking dates and the type, color classes, and sizes of fruit picked were determined by the packing house; data on yield were taken each time the orchard was picked during 1955.

For the yield records, each tree was picked as a separate unit. When the pick had been completed for a given tree, the net weight in pounds of fruit per tree was determined. In the course of each pick the mean net weight in pounds of fruit per field box was determined for the type of fruits taken for the given pick; this value could then be used to express the yield of each tree in terms of field boxes. After completion of the last pick in 1955, the data for each tree were pooled to give the total yield per tree for the year.

Analyses of variance of the data of each experimental block for total yield for the year 1955 showed that the differences between treatments occurred by chance.

Both of the orchards used are located in districts in which climatic conditions are generally moderate. Therefore, the results obtained should not be interpreted to mean that established practices related to specific locality climatic conditions of other districts can be disregarded. However, when proper practices for oil spray are followed and the application has been timed to avoid predicted unfavorable weather for several days after treatment, the likelihood is good that oil spray—in itself—will not reduce juice quality or yield of lemons in southern California, and that the month of application for the period of August through January is not critical to the effect.

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Treatment of Plots Selected for Determinations of Juice Quality and Yield

Treatment No.	Month of application	
	Oil spray	Ovex
1.....	Untreated	Untreated
2.....	August	February
3.....	August	March
4.....	September	March
5.....	October	March
6.....	October	April
7.....	November	May
8.....	December	June
9.....	January	July