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## MISCIBLE OIL SPRAYS.

SUMMARIZED BY

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FROM BULLETIN BY

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\* Riverhead, N. Y.

POPULAR EDITION\*

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### MISCIBLE OIL SPRAYS.

F. H. HALL.

**Oil an excellent insecticide.** Oil is one of the most effective insecticides. It is very penetrating; and a minute quantity of it, coming in contact with a soft-bodied insect, spreads over the entire surface, fills the breathing pores and causes suffocation. For this reason oils in one form or another have been much tested as remedies against the San José scale; but, in whatever form used, difficulties have been met that interfere with perfect success. Pure kerosene is generally regarded as too dangerous to use. However finely divided in spraying or however lightly applied, it is liable to kill the tree as well as the scales. Mechanical emulsions, either of kerosene or of crude oil, are not permanent nor uniform. At times the spray may contain sufficient oil to injure the tree, at other times, even when spraying from the same barrel of emulsion, so little that the scales are not harmed. When oil is emulsified with soap or mixed with limoid or fine lime, uniformity is improved; but to make good, permanent and safe spraying mixtures in this way requires time and careful attention. Soaps made from whale oil (or fish oil) are unreliable as commonly found on the market, and are expensive if used in sufficient strength to be effective.

\*This is a brief review of Bulletin No. 281 of this Station, on Commercial Miscible Oils for Treatment of the San José Scale, by P. J. Parrott, H. E. Hodgkiss and F. A. Sirrine. Anyone interested in the detailed account of the investigations will be furnished, on application, with a copy of the complete bulletin. The names of those who so request will be placed on the mailing list to receive future bulletins of the Station, popular or complete as desired. Bulletins are issued at irregular intervals, as investigations are completed, not monthly.

Recently, however, there have appeared in the **New oil preparations.** insecticide field, under various proprietary names, oil preparations known as a class as Miscible Oils or Water-Soluble Oils. These consist, essentially, of an oil, usually derived from petroleum, which has been so treated that it readily mixes with water, without the use of soap, lime or other emulsifier. The best of these proprietary insecticides form, when properly diluted, uniform white or cream-colored thick liquids that do not separate into layers of oil and water within several hours or days. These permanent emulsions are thus very easily made, they apply nicely, making a fine mist and having no sediment to clog the nozzles, and are not disagreeable to use.

**Safety,  
efficiency  
and cost  
tested.**

These points promised well for the new insecticides; safety, efficiency and expense remained to be tested. To decide whether these preparations were safe to use upon fruit trees, effective as scale-destroyers, and cheap enough to be applicable on a large scale, the Station conducted extensive tests, using three of these proprietary soluble oils,—Scalecide, Kil-o-Scale and Surekill. These were used in seven orchards, but the results in only three of these orchards are discussed, since these show clearly the trend of the evidence. The tests included over 1,300 trees,—apple, pear, peach, plum and cherry—some old, some young, some well cared for, others in poor condition, some showing only a few scattering scales, others badly incrustated. The miscible oils were used according to the manufacturer's directions as given upon cans or other containers. These directions specified the use of one part of oil to twenty or twenty-five parts of water, but stronger emulsions were also used, containing one part of oil to ten or fifteen parts of water. Check trees were left and, as parallel tests, rows adjacent to those treated with the oils were treated with sulphur washes. In one orchard kerosene-lime mixtures containing 15 or 30 per ct. of oil were also tested. Both spring and fall applications were made. The tests were in all respects fair and comprehensive.

**Results.**

Fall applications of Scalecide and Kil-o-Scale in the proportions of one part to either fifteen or twenty parts of water caused no appreciable

injuries to fruit or leaf buds. The effectiveness of these preparations upon the scales was variable. On the moderately infested plum trees the numbers of the scales destroyed by the sprays in these proportions compared favorably with the results obtained by the sulphur washes, while badly infested plum and apple trees received very little benefit by similar applications of the commercial preparations. In the tests conducted in the spring, applications of one part of Scalecide to twenty parts of water usually failed to control the scales, but when this spray was used in stronger mixtures, of one part to either ten or fifteen parts of water, the new growth and fruit of the trees were kept quite clean. One application of a sulphur wash was usually more effective than one application of a miscible oil in either of these proportions. In one test Kil-o Scale at the rate of one part to twenty parts of water proved more effective than a mixture of Scalecide in the same proportions, but on the whole there was very little difference in the relative effectiveness of these sprays when the amount of dilution was the same. Surekill applied as recommended had no appreciable effect upon the scales.

**Conclu-  
sions.**

Applications of proprietary miscible oils at the rate of one part of oil to twenty or twenty-five parts of water, as recommended in the printed directions, did not give uniform results on the scale. Trees sprayed with these strengths in the fall or in the spring usually showed more or less spotting of the fruit and varying infestation of the new growth. Ordinarily not enough scale was destroyed by the miscible oils, in these proportions, to warrant a fruit-grower taking chances on the trees, unless supplementary summer or fall treatments are to be made. The treatments were usually much more effective on trees that were slightly infested than on those showing incrustation of the scale. Surekill was the least efficient of the miscible oils that were tested.

Applications of a miscible oil in the spring at the rate of one part of oil to ten or fifteen parts water, while uniformly more destructive to the scale than the weaker preparations, were usually not quite so effective as the sulphur washes. Preparations of miscible oils in these proportions killed enough of the scale to maintain the vigor of the trees and to secure fairly clean fruit yields.

**Expensive remedies.** At a price of fifty cents a gallon for the stock material, miscible oil in the proportions of one part to ten parts of water will cost about \$2.50 per barrel of fifty gallons, which is about five times the cost of the raw materials for making one barrel of a sulphur wash. Because of the ease with which they may be prepared for use, they are convenient sprays for the treatment of a few trees and of small orchards. The cost of the miscible oils in the proportions of one part to ten or fifteen parts of water makes their use almost prohibitive for commercial orchardists who desire a safe and comparatively cheap oil spray. Compounders of commercial insecticides should endeavor to produce a reliable miscible oil that is cheaper than present brands, as there is demand for an efficient and economical spray that may be prepared for use with greater ease than some of the present remedies.

**Directions for use.** On the basis of these experiments it is evident that the miscible oils tested must be used stronger than is recommended by their compounders to obtain satisfactory results on the scale. Therefore instead of using one part of oil to twenty or twenty-five parts of water the orchardist is advised to use at least one part of the miscible oil to ten or fifteen parts of water. Before measuring out the required quantity from its container, vigorously stir or shake the miscible oil to secure a thorough distribution of its ingredients. The failure to follow the directions in this respect is undoubtedly responsible for some of the poor results with these preparations. Before making applications, the oil and water should be well mixed by the spraying agitator. Spray in the spring as the buds are swelling, during a period of clear weather when the trees are dry. The applications must be thorough so that all parts of the trees are completely wet with the spray. If the base of the new growth should during the summer show quite a little infestation, then spray again in the fall as soon as the majority of the leaves have fallen. Spraying in the fall, especially of peaches and plums, is usually not advisable because of the risks of injury to fruit buds. But rather than run the chances of the continuation of injuries by the late breeding of

the scale or the neglect of the treatment in the spring, fall spraying is advised, as the increased vigor and usefulness of the trees arising from the control of the scale will more than compensate for probable losses in fruit yields.

The miscible oils are commercial insecticides and therefore the orchardist should understand that the reliability of the preparations rests solely with the compounder. These sprays are simple to prepare and they are discharged from the nozzle as an even mist, as there is usually no sediment or clogging of the nozzle apertures.