SULPHUR SPRAYS FOR BLISTER-MITE

SUMMARIZED BY
F. H. HALL
FROM BULLETIN BY
P. J. PARROTT

PUBLISHED BY THE STATION.
BOARD OF CONTROL.

GOVERNOR CHARLES E. HUGHES, Albany.
COMMISSIONER RAYMOND A. PEARSON, Albany.
STEPHEN H. HAMMOND, Geneva.
LYMAN P. HAVILAND, Camden.
EDGAR G. DUSENBURY, Portville.
THOMAS B. WILSON, Halls Corners.
IRVING ROUSE, Rochester.
ALFRED G. LEWIS, Geneva.

OFFICERS OF THE BOARD.

THOMAS B. WILSON, William O'HANLON,
President. Secretary and Treasurer.

EXECUTIVE COMMITTEE.

STEPHEN H. HAMMOND, Lyman P. HAVILAND,
THOMAS B. WILSON.

STATION STAFF.

WHITMAN H. JORDAN, Sc.D., LL.D., Director.

GEORGE W. CHURCHILL, Dairy Expert.
Agriculturist and Superintendent of Labor.

WILLIAM P. WHEELER, Editor and Librarian.
First Assistant (Animal Industry).

FRED C. STEWART, M.S., Entomologist.
Botanist.

G. TALBOT FRENCH, B.S., WILLIAM J. SCHÖNE, B.Agr.,
JOHN G. GROSSENBACHER, Ph.D., A.B., Assistant Entomologists.
Assistant Botanists.

LUCIUS L. VAN SLYKE, Ph.D., Assistant Horticulturist.
Chemist.

ALFRED W. BOSWORTH, B.S., MAXWELL J. DORSEY, B.S.,
ERNEST L. BAKER, B.S., W. H. ALDERMAN, B.S. Agr.,
Associate Chemists.
Assistant Horticulturists.

ARTHUR W. CLARK, B.S., ORRIN M. TAYLOR,
ANTON R. ROSE, B.S., Foreman in Horticulture.
MORGAN P. SWEENEY, A.M., *F. ATWOOD SIRrine, M.S.,
JAMES T. CUSICK, B.S., Special Agent.
OTTO MCCREARY, B.S., †JENNIE TERWILLIGER,
Assistant Chemists. Director's Secretary.

HARRY A. HARDING, M.S., FRANK E. NEWTON,
Bacteriologist. WILLARD F. PATCHIN,
MARTIN J. PRUCHA, M.S., CORA A. WHITAKER,
JAMES K. WILSON, B.S., Clerks and Stenographers.
Assistant Bacteriologists.

Address all correspondence, not to individual members of the staff, but to the
NEW YORK AGRICULTURAL EXPERIMENT STATION, GENEA, N. Y.
The Bulletins published by the Station will be sent free to any farmer applying
for them.

* Riverhead, N. Y.
† Absent on leave.
SULPHUR SPRAYS FOR BLISTER MITE.

F. H HALL.

Five years ago the blister-mite was almost unknown to apple growers of western New York. Today it is second only to San Jose scale as a topic for discussion where orchardists meet. The damage caused by this pest has undoubtedly been overestimated in some cases; the danger from it is not to be compared with that from scale, but the peculiar spotting of the leaves and their unhealthy yellow appearance can not fail to attract attention in any affected orchard. Premature dropping of the leaves must diminish the vigor of the tree and lessen its productiveness the second season, if not the first, and the reduction in size of the fruits and their distortion when directly attacked by the mites are very evident damages. The mite has spread rapidly in the past three years and is now quite common in orchards generally throughout the principal apple-growing counties of western New York. It is impossible to estimate closely the damage done by the mite, since injuries from other causes like poor drainage, insect attacks, unfavorable weather and spraying mixtures are mistaken for work of the mite or combined with it. Many careful fruit men, however, believe that their orchards have been, or are liable to be, so much injured by the pest that they must adopt some repressive measures against

*This is a brief review of Bulletin No. 306 of this Station, on Control of Leaf Blister-Mite in Apple Orchards, by P. J. Parrott. Any one 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.
it. In Bulletin No. 283, the effectiveness of oil emulsions, miscible oils and sulphur washes against the mites was clearly shown. The present bulletin is to emphasize the merits of the sulphur wash, in particular, for this purpose, and to confirm the belief that spraying is desirable, practicable, cheap and effective as a means of control of the mites.

Tests of sprays. In the planned experiments four orchards were treated, one owned by the Station and three by others who cooperated in the tests. Experiments were also made, not under Station direction, by owners of eleven other orchards. These volunteer experiments are especially valuable as showing the practicability of treatment for mites. Each of these orchards was quite seriously infested before treatment and in each case the result was such decided lessening in numbers of the mites that the injury to foliage or fruit was reduced to a minimum.

In the Station orchard comparison was made between sulphur washes (both home-made and commercial preparations), miscible oil and kerosene emulsion. These tests were made both on parallel plats through the orchard and on parts of individual trees treated by thirds, fourths or fifths as necessary to accommodate the mixtures compared, reserving a check section on each tree. Fall and spring spraying were also tested side by side.

In none of the other orchards was the treatment so varied, but in twelve of the fifteen, the lime-sulphur wash was given a good test with excellent results; in the other three, miscible oils or kerosene emulsion were used. In most of these orchards, unsprayed areas or trees were left; and on these or on orchards of neighbors, the work of the mites was much more noticeable than on sprayed sections. On treated trees, as a rule, only scattered leaves showed spotting, the main body of foliage was green and vigorous and in some cases the leaves were apparently larger than those on unsprayed trees. Pimpling and distortion of the fruit were almost wholly prevented. The spraying often so improved the foliage that the contrast between treated and check areas was plain, even at considerable distances from the orchards.
In the cases where comparisons were made, particularly in the Station orchard, little difference in effectiveness was to be detected between the different sprays. Marked differences were found, of course, in the effect in the various orchards; but these variations were usually due to the diverse standards of spraying held by those who made the applications. In one case only about one and one-half gallons of wash was applied to a tree, in others five, while in most cases seven or eight were thought necessary for good treatment, and in one case ten gallons was used. Even with the minimum applications decided reduction of the mites was secured.

A new feature in these tests was the use of concentrated sulphur washes, both commercial and home-made. These compared favorably with the ordinary boiled washes, and they possess some merits which recommend them. The home-made concentrated wash, in particular, should be widely tested by orchardists for the mites. Its advantages are two: It may be prepared in concentrated solutions to be diluted as needed; and it has no coarse sediment to clog the nozzles and to cause the rapid wearing out of the packing, lining and other parts of the pump. This mixture and the commercial preparations now enable many of our fruit-growers to use a sulphur wash, who for the reasons given have refrained from using this spray as prepared by the old method.

**Preparation of Sulphur Sprays.**

**Formula for Boiled-Lime Sulphur Wash.**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lump lime</td>
<td>20 pounds</td>
</tr>
<tr>
<td>Sulphur</td>
<td>15 pounds</td>
</tr>
<tr>
<td>Water</td>
<td>50 gallons</td>
</tr>
</tbody>
</table>

Place the lime and sulphur in the cooking receptacle containing about fifteen to twenty gallons of water. Stir the mixture frequently and boil for one hour. Add water to make the required amount of wash and strain through a fine brass-wire strainer into the spraying tank. Applications should be made while the wash is warm.
FORMULA FOR HOME-MADE CONCENTRATED LIME-SULPHUR WASH.

Lump lime .......................................................... 60 pounds
Sulphur ................................................................. 125 pounds
Water ................................................................. 50 gallons

Slake the lime in the cooking receptacle and stir in the sulphur, which has been made into a thin paste with water. Add enough water to make about 45 gallons of mixture, which should be boiled for one or more hours. After the cooking is completed allow the wash to stand until the sediment has settled to the bottom, when the clear, brownish liquid should be drawn off. To this add water, if needed to make the required 50 gallons of concentrated solution.

For use, dilute the concentrated sulphur solution at the rate of five gallons of the liquid to 45 gallons of water. To every barrel, of 50 gallons capacity, of the diluted spray, add from 10 to 15 pounds of lime, made into a paste. The addition of the lime is not necessary, but by its use the trees are given a whitewashed appearance, which enables farmers to judge better of the thoroughness of their spraying. This mixture may be used immediately after cooking, or may be barreled, to be drawn on as occasion requires. A greater dilution than that recommended may perhaps be employed in spraying for the mite. To avoid the loss of sulphur, the sediment that remains after drawing off the concentrated solution should be boiled over again with fresh lime and water, and the liquid used to start fresh preparations or for purposes of dilution.

Commercial lime-sulphur preparations have appeared on the market. Two of the most widely advertised have been quite extensively tested in various Station experiments with the blister-mite, and at the strength employed, one part to nine parts of water, have proven very efficient remedies. A number of volunteer experimenters have reported equally satisfactory results. Fruit growers who have heretofore refrained from using the lime-sulphur wash for the mite, because of the trouble of making and the expense of a suitable cooking
outfit, may now use one of the commercial brands. Usually some lime paste should be added to these preparations, as, without it, it is difficult to tell how thoroughly the applications have been made.

**Directions for using sulphur washes.** Applications of the lime-sulphur wash may be made in the fall after the majority of leaves have fallen or in the spring until the buds commence to break and to show the tips of the young leaves. Treatment should not be made later than this as the sulphur sprays are very destructive to the tender foliage and the mites may have gained entrance into the leaves, where they would be beyond the reach of the mixtures. If it is desired to treat the trees in the spring, the usual spraying at this time with the bordeaux mixture is unnecessary. By following this plan the work of spraying for the mite is greatly simplified, and for this reason it is generally preferred by orchardists. Liberal quantities of the sulphur wash should be applied and the trees after treatment should have the appearance of being completely whitewashed.