Greenhouse Roses

control of powdery mildew and rust on certain varieties in bay area

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Powdery mildew and rust are common and serious diseases of certain varieties of greenhouse-grown roses in the Bay Area of California during the late spring and summer seasons.

These diseases are less severe during other seasons when temperature and humidity are more closely controlled in the greenhouses. The rust—*Phragmidium mucronatum* (Fr.) Schlecht—can be effectively controlled by manipulation of the temperature and humidity, and the mildew—*Sphaerotheca pannosa* (Wallr.) Lev. and *S. humuli* (DC.) Burr—can be checked by applying sulfur paste to steam pipes in addition to temperature and humidity control. During the late spring and summer seasons heating is discontinued in most greenhouses and these two diseases become commercially important.

To find suitable sprays that would control these diseases, experiments were carried out on several varieties of roses grown under glass in both the cooler, more overcast northern and the warmer, sunnier southern sections of San Mateo County. Four materials were used: Parzate—zinc ethylene bis dithiocarbamate—Dithane Z-78—zinc ethylene bis dithiocarbamate—Dithane D-14—di-sodium ethylene bis dithiocarbamate plus zinc sulfate, and Karathane—dinitro capryl phenyl crotonate. These materials were tried on six varieties of roses—Yellow Talisman, Rome Glory, Better Times, Red Delight, Peter Briarcliff and Elf—to determine if California greenhouse-grown roses showed evidence of spray injury from zinc and other elements as reported in the eastern states. The fungicides were applied at dosages far exceeding those recommended by the manufacturers, as well as at the recommended dosages.

In an initial plant tolerance test Parzate and Dithane D-14 sprays were applied by hand sprayer on the varieties Yellow Talisman and Red Delight. Parzate was used at a concentration of 1½ pounds per 100 gallons of water, and Dithane D-14 at a concentration of two quarts per 100 gallons plus one pound zinc sulfate. In both instances du Pont Spreader Sticker was added at a concentration of six to eight ounces per 100 gallons of water. Readings taken during a three-month period failed to show any evidence of spray burn.

Powdery mildew and rust control experiments were then started in six houses of a commercial range with Dithane D-14 at a concentration of two quarts plus one pound zinc sulfate per 100 gallons of water. Du Pont Spreader Sticker was again incorporated at a concentration of six to eight ounces per 100 gallons.

Results indicated that in all cases there was no evidence of zinc spray injury even when sprays were applied biweekly. Dithane D-14 proved effective in controlling rust and was fairly effective in controlling mildew. Mildew in the varieties Rome Glory and Peter Briarcliff had not been controlled by the use of sulfur paste on the steam pipes, but a combination of spraying with Dithane D-14 and applying sulfur paste on the steam pipes gave almost perfect mildew control.

Trials were made with Karathane, an acaricide as well as a fungicide. Plant tolerance tests were made with both the 25% emulsion at one pint, 1½ pints, and two pints per 100 gallons of water plus four ounces of Triton B1956 per 100 gallons of water and the 25% wettable powder at 1¼ pounds per 100 gallons of water plus four ounces Triton B1956 per 100 gallons of water. These were applied with a hand sprayer on the varieties Rome Glory, Red Delight, and Yellow Talisman. Seven days after treatment there was no apparent injury.

The 25% Karathane emulsion was then applied with a hand sprayer at one pint and two pints per 100 gallons plus four ounces of Triton B1956 in an attempt to control mildew on Rome Glory and Elf, two very susceptible varieties. Seven days after treatment slight to moderate injury was noted on both varieties. The injury showed as light chlorotic circular spots on the young leaflets. Daytime temperatures in excess of 90° F prevailed during the week after treatment and it is believed these high temperatures accentuated the injury. The spray proved very effective; it eradicated the mildew already present and gave good protection for eight days.

Two sprays at a concentration of one pound 25% wettable powder plus four ounces of Triton B1956 were applied at weekly intervals to the variety Elf, growing under lath. The control of mildew was very good and there was no evidence of plant injury. The lack of plant injury was attributed to the lower temperatures prevailing under the lath.

Six benches in a 200-foot house were sprayed with Karathane, three benches with the 25% emulsion at one pint Karathane plus four ounces of Triton B1956 per 100 gallons and three benches with one pound of the 25% wettable powder plus four ounces of Triton B1956 per 100 gallons. Fifty gallons of spray were applied to each set of three benches. Mildew control was excellent with no accompanying plant injury. One week later the entire house was sprayed with 180 gallons of the wettable powder at a concentration of one pound plus four ounces of Triton B1956 per 100 gallons. The emulsion was discontinued at this time because of the possibility of injury due to prevailing high temperatures. Mildew control was again good and there was no injury with the wettable powder spray.

One hundred and fifty gallons of the wettable powder spray were applied to six 150-foot benches of the variety Better Times at a concentration of one pound per 100 gallons plus four ounces of Triton B1956. The control of mildew was excellent but there was a slight burning of the flowers. The temperatures immediately after application exceeded 100° F. The same amount of spray was applied at the same concentration two weeks later. Again temperatures were in excess of 100° F. There was a slight flower burn but mildew control was excellent.

Sprays containing one pound Karathane—25% wettable powder—and 1½ pounds Dithane Z-78 plus five ounces Triton B1956 per 100 gallons of water were applied in an attempt to control both mildew and rust. The materials were compatible and there was no plant injury. A similar spray was applied to the same plants 11 days later. The mildew and rust were controlled but the spray left an objectionable residue on the plants.

Sprays containing two quarts Dithane D-14 plus one pound of zinc sulfate and one half pint of Karathane 25% emulsion plus six ounces Triton B1956 gave good control of rust and mildew and left little residue.

Four glasshouse rose growers in San Mateo County have used the 25% wettable powder of Karathane for powdery mildew control at dosages of one half to one pound per 100 gallons of water plus four to six ounces of Triton B1956. The sprays in all cases were applied by power machine sprayers. Control of powdery mildew was good when thorough coverage was employed.

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