

Systemic Fungicides Control Carnation Rust

Ralph Baker

Rust is becoming a serious problem in carnation ranges in Colorado. Perhaps some increase in incidence is due to more extensive use of plastics in greenhouse construction. Of even more concern, however, is the fact that the most effective fungicides have disadvantages precluding their use. Zineb is very effective in control but is quite injurious to sensitized employees. Maneb induces premature senility

of lower leaves if used in a continuous program. Ferbam leaves an undesirable residue.

Clearly a new approach is warranted for the control of carnation rust. Recently a number of new systemic compounds have been released for experimenters. Three of these have been tested at Colorado State University and at least one appears to have good potential for the control of rust.

The chemicals used were Plantvax and Vitavax (manufactured by United States Rubber Company) and GC 9832 (manufactured by Allied Chemical Company). These were applied as drenches (3 gallons/plot) at ten-day intervals to carnations conventionally grown in plots, each containing 30 plants. Carnations were planted on June 21, 1966. Half of each plot was composed of variety White Sim and the other half Tangerine. Treatments were replicated three times.

Live steam was introduced into the greenhouse in the evening until condensation occurred on the leaves. Plants were then inoculated with a suspension of rust uredospores. Inoculation occurred on October 8 and 10, 1966, and signs were apparent by November 15.

The incidence of rust was noted and compared in the plots on December 22, 1966, by counting the actual number of plants and leaves with signs of rust in each plot. Readings were taken again at the termination of the experiment June 15, 1967. In this case a random sample of 200 leaves in each plot was collected and the percentage of infected leaves determined. Rates of application and results using the best compounds are given in Table 1.

GC 9832 was also used at 5 and 20 ppm. Buds of the carnations in these plots were bullheaded and petals were bleached. Applications of this compound therefore was terminated by November; however, no rust was apparent when data were collected on December 22. Indeed the first rust pustules on these plots were not detected until March 1967. Thus GC 9832 was undoubtedly the best systemic for the control of rust but its phytotoxic properties preclude its usage.

Table 1. Incidence of rust on plants treated at 10-day intervals with solutions of systemic fungicides.

| Treatment ¹ | Incidence of rust | | | |
|------------------------|--------------------------------|--------|----------------------------|--------|
| | December 27, 1966 ² | | June 15, 1967 ³ | |
| | Plants | Leaves | Plants | Leaves |
| Plantvax (5ppm) | No. 3 | No. 10 | % 82 | % 18 |
| Plantvax (20ppm) | 4 | 5 | 65 | 3 |
| Vitavax (20ppm) | 13 | 36 | 93 | 24 |
| Control | 22 | 42 | 100 | 47 |

1 Thirty plants in each plot, treatments replicated three times.

2 Figures represent average numbers of plants or leaves in each plot with rust.

3 Figures represent average percent of all plants or sample of 200 leaves with rust in each plot.

There was no substantial influence on the number and quality of cut flowers resulting from the use of Plantvax or Vitavax (Table 2). There was also no detrimental effect on timing of crops using these compounds (Fig. 1).

These results indicate that fungicides applied to soil may control carnation rust. The implications are exciting since these compounds might be applied routinely with fertilizer solutions through liquid proper-

Table 1. Yields of carnations treated with various systemic fungicides effective in control of rust

| Treatment | Number of cut flowers | | | | Total |
|------------------|-----------------------|----------|-------|--------|-------|
| | Fancy | Standard | Short | Design | |
| Plantvax (5ppm) | 136 | 320 | 20 | 147 | 623 |
| Plantvax (20ppm) | 153 | 369 | 23 | 145 | 683 |
| Vitavax (20ppm) | 160 | 358 | 18 | 163 | 698 |
| Control | 174 | 304 | 33 | 138 | 643 |

¹ Figures represent totals in three replications

tioners now installed in almost every commercial greenhouse. Experiments are now underway to test this possibility.

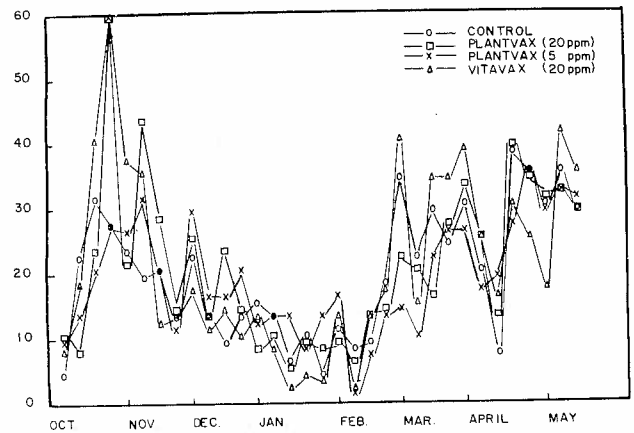


Fig. 1. Cut flower yield of carnations treated with systemic fungicides for control of rust.

Your editor,

W. D. Holley

COLORADO FLOWER GROWERS ASSOCIATION, INC.
 OFFICE OF EDITOR
 W. D. Holley
 Colorado State University
 Fort Collins, Colorado 80521

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