

Applications of Fungicides or Antibiotics to Carnation

Cuttings through a Mist Propagative System

by Ross Skiver

Many disease producing organisms require conditions of high humidity for penetration into the host tissue. This study was conducted as an attempt to determine the potential threat of disease under a mist propagative system and also to investigate the possibility of utilizing antibiotics or fungicides as a means of controlling those organisms.

Three pathogens, Alternaria dianthi and Uromyces caryophyllinus which incite

leaf spots and rust of carnations, and Fusarium roseum f. cerealis which causes Fusarium stem rot, were selected for this study. The latter disease is of particular concern in Colorado, where it causes an appreciable loss to carnation growers.

The mist system which was used consisted of 2 completely separate mist lines, each in the shape of a U, suspended around a greenhouse bench (See illustration). One line carried tap water to each of 3 alternate

plots of the bench while the other line contained an antibiotic or fungicide to spray the 3 remaining plots. The chemical to be used in the tests was added to a barrel and pumped into the mist line by means of a shallow well pump.

A number of chemicals were tested in the laboratory and the most promising were later tested in the mist system under actual propagative conditions. The 5 chemicals, which were employed in the system were Captan, Tomatine, Omadine 1456, Omadine 1564, and Omadine 1483. Cuttings of Red Sim and Miller's Yellow varieties were rooted under mist containing a fungicide or an antibiotic, and under tap water. After 21 days all cuttings were rated for severity of disease and degree of rooting.

Cuttings which had been inoculated with rust were transferred to flats of soil and observed for pustule development for an additional 3 to 4 weeks.

The collected data were analyzed and comparative analyses were made on the effects of chemicals on the diseases involved, rooting of cuttings, and differences between the 2 varieties.

Influence of chemicals on Alternaria blight

Each of the 5 chemicals significantly reduced the incidence of Alternaria blight. There were no consistent differences in susceptibility between the 2 varieties.

Influence of chemicals on Fusarium stem rot

Only Omadine 1564 reduced the rot enough to be of significant value. Miller's Yellow appeared to be more resistant than Red Sim at the time disease index readings were made. Though not statistically significant, Omadine 1483 reduced the incidence of Fusarium stem rot of both varieties.

Influence of chemicals on rooting

Reduction in the degree of rooting was noted when treated with all chemicals except for Tomatine applied to Miller's Yellow cuttings. Those cuttings rooted as well as the uninoculated controls under tap water mist.

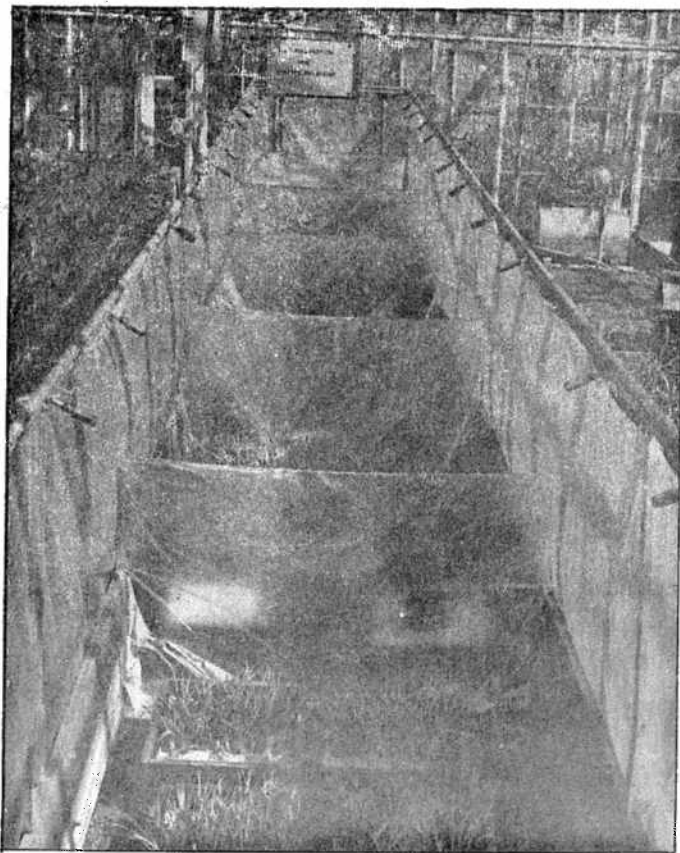
Conclusions

The introduction of antibiotics and fungicides into the water of a mist propagative system shows promise as a means of controlling carnation diseases. In these experiments, incidence of Alternaria blight was greatly reduced by using Captan, Tomatine, Omadine 1456, Omadine 1564, and Omadine 1483. Chemicals applied to cuttings

through the mist system were not effective in the control of Fusarium stem rot. Other materials must be tested in order to recommend an ideal material which provides greatest control. Methods of introducing materials into the mist stream must also be considered. Injection by means of a chemo-feeder may be satisfactory. It is important that such an injector be sensitive so that small amounts of antibiotics are proportioned with comparative accuracy.

Reduced rooting was evident as a result of chemicals sprayed on the cuttings. In view of this, a material which is toxic to pathogens, but which does not impair root growth, should be found or other means of applying fungicidal materials sought.

Rust developed to only a limited extent under mist and would not appear to be a factor under Colorado conditions.



Mist propagative system showing nozzles, plots and flats.