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CONTROL OF VASCULAR WILT DISEASES OF CARNATION: USE OF ANTITRANSPIRANTS

Ralph Baker and Don Smith[1]

Wilting in the Fusarium wilt diseases is thought to be induced by the impediment of water transpiration in the vascular system of the host (e.g. 1). There is a family of chemicals that reduce transpiration (2) and, hypothetically, could reduce stress on hosts infected with the vascular wilt pathogens. Tests were designed to explore the possibility that reduced stress could lengthen the incubation period for Fusarium wilt of carnation.

Chemicals with antitranspirant properties were applied as a spray to carnations growing in soil infested with *F. oxysporum* f. sp. *dianthi*. In preliminary experiments, atrazine [2-chloro-4(ethylamino)-6-(isopropylamino)-*s*-triazine, Ciba-Geigy Corp., Greensboro, North Carolina] diuron [3-(3,4-dichlorophenyl)-1,1-dimethylurea, E. I. du Pont de Nemours & Co., Wilmington, Delaware], and swep [methyl N-(3,4-diclorophenyl carbamate, Nissan Chemical Industries, Ltd., Japan] had no observable influence on development of Fusarium wilt of carnations. PMA (phenylmercury acetate, Aquacontrols Corp., Delair, New Jersey) exerted some degree of control and was selected for further tests. The PMA formulation was composed of 3.75% phenylmercury acetate. This formulation weighed 100 g/100 m*l* of active material.

Rooted carnation cuttings were planted in soil infested with *F. oxysporum* f. sp. *dianthi* in June. Each treatment contained 30 plants and treatments were replicated three times. Symptoms of Fusarium wilt became apparent early in the spring of the following year. In the first experiment, CSU Pink Sim was lightly sprayed biweekly at 0, 20, and 40 μg active ingredient PMA/m*l* water. Proportions of plants with wilt symptoms in these treatments were 60, 42, and 28%, respectively after 1 yr (Fig. 1).

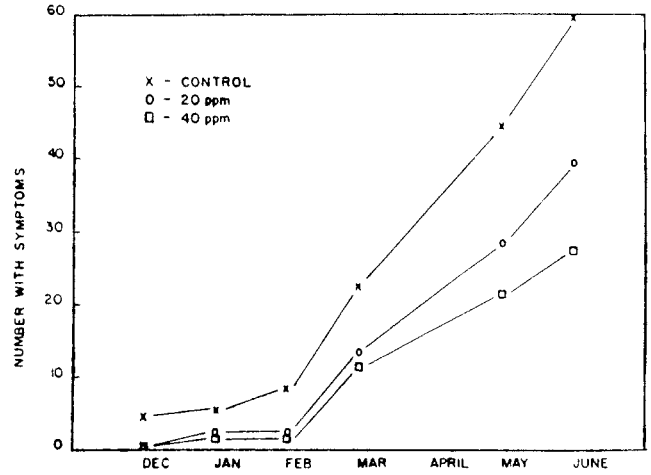

Figure 1: Control of Fusarium wilt of CSU Pink carnations with light sprays of phenylmercury acetate at two conc. Each treatment contained 30 plants and treatments were replicated three times.

The next year in the second experiment, the test was repeated with the addition of plots containing the cultivar CSU Red Sim. Plants were sprayed to run-off and rates of application were reduced to 1 and 5 μg/m*l* with controls sprayed only with water. Significant control was obtained at both rates for CSU Pink Sim (Fig. 2A) but not CSU Red Sim (Fig. 2B).

Carnation tissue from the various treatments was macerated, centrifuged, and the supernatant collected under aseptic conditions. Conidia of *F. oxysporum* f. sp. *dianthi* were incubated in the supernatant and germination observed. The conidia of the pathogen germinated in the same proportions in the supernatant from either treated or nontreated plants. The pathogen also was

[1]*Professor, Dept. of Botany & Plant Pathology, Colorado State University and Assistant Professor of Botany, North Texas State University, respectively.*

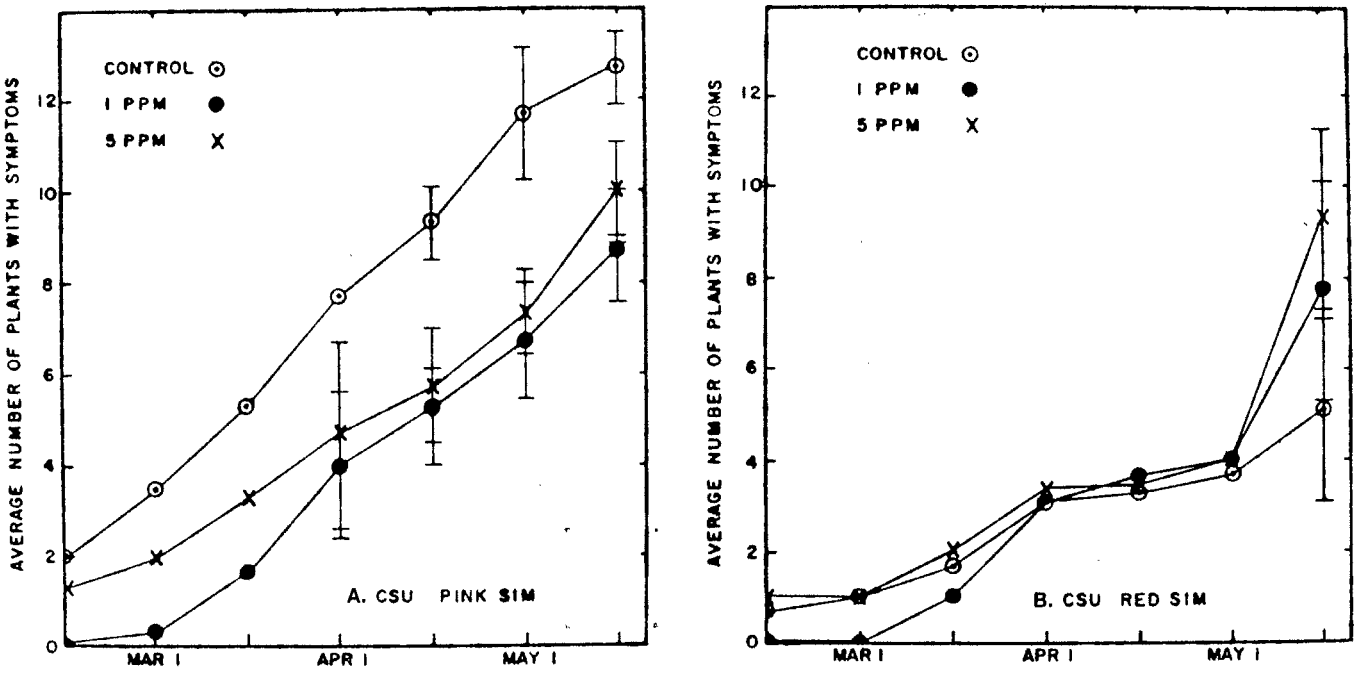

Figure 2: Incidence of Fusarium wilt in two cultivars of carnations sprayed to run-off with phenylmercury acetate at two conc. The standard errors shown as vertical brackets were computed from original data.

isolated in plate cultures in the same proportion from treated and nontreated plants. These results suggest that the effect of the PMA was not directly on the pathogen. Thus, the hypothesis that the antitranspirant reduced stress on the host was not disproven.

These results suggest that the incubation period for development of wilt symptons may be increased when PMA is applied to the foliage of CSU Pink Sim carnations.

Literature Cited

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