Rhizoctonia Stem Rot of Carnations

by Arthur H. McCain and R. H. Sciaroni[1/]

Rhizoctonia solani is a common soil inhabiting fungus attacking a wide range of ornamental and crop plants. The fungus is easily killed by steaming and chemical fumigation of the soil. However, it has the facility of rapidly reinvading treated soil. Fungus gnats are known to spread the fungus in the greenhouse. Mycelium, sclerotia and small bits of infected tissue can be carried on tools, shoes, etc., and also carried by wind.

The fungus attacks the tender stems of carnations causing a brown decay and girdling and death of the plants. Roots are not generally attacked. As the stem grows older it becomes resistant. Rhizoctonia can penetrate sound stem tissue, while Fusarium roseum, the cause of Fusarium stem rot, generally requires a wound to cause damage. The disease is favored by warm, moist soil. Since carnations are commonly planted in the summer months, the disease can be very devastating.

There are several effective fungicides on the market that can be used as preplant treatments to prevent Rhizoctonia stem rot and we have yet to observe the disease where the soil has been treated. PCNB (pentachloronitrobenzene) is particularly effective. It is used at 1 lb. (75%)/1000 sq. ft. and worked into the top 1 or 2 inches of soil. If the soil is not treated prior to planting and the disease appears, the PCNB treatment applied at the base of the plants is helpful in preventing further spread.

In the summer of 1967 fungicides active against Rhizoctonia were applied prior to planting at Erica Nursery and Pastorino and Repetto Nursery in Half Moon Bay. The fungicides were used at 1 lb. of formulation per 1,000 sq. ft. (except for DuPont fungicide 1991) and replicated three times. No disease developed in the plantings, but phytotoxicity ratings were obtained (see Table 1, page 4).

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TABLE I.

Fungicide*	Wettable powder formulation	Amount applied per 1000 sq. ft.	Injury observed (Var. Pike's Peak)	Remarks
(1) PCNB	75%	1 lb.	No	Commonly used treatment for carnations.
(2) Dicloran	75%	1 lb.	No	Registered for use on many ornamental plants. Can be sprayed on the foliage without damage.
(3) Chloroneb	65%	1 lb.	Yes	Registered for use as a seed cotton treatment. It is absorbed by the cotton seedling and protects by systemic action.
(4) Oxathiin	75%	1 lb.	Yes	Stunting and yellowing of plants. Stunted plants were still smaller than the rest of the planting three months after treatment. After six months the differences were no longer apparent.
(5) Thiabendazole	60%	1 lb.	Yes	Effect on the plants same as oxathiin. The rates were high for oxathiin and thiabendazole. Lower dosages of 0.033 lb/ 1000 sq. ft. for both fungicides did not affect carnation growth.
(6) DuPont fungicide 1991	50%	1/4 lb.	No	Applied only to a single plot.

*PCNB - pentachloronitrobenzene; sold as Terraclor
Dicloran - 2.6-dichloro-4-nitroaniline; sold as Botran
Chloroneb - 1,4-dichloro-2,5-dimethoxybenzene; sold as Demosan
Oxathiin - 2,3-dihydro-5-carboxanilido-6-methyl-1,4-osathiin-4,4-dioxide; experimental systemic product called Plantvax, Uniroyal Company
Thiabendazole - 2-(4-thiazoyl) benzimidazole; experimental systemic product called TBZ, Merck and Company
DuPont fungicide 1991 - 1-(butylcarbamoyl)-2-benzimidazole carbamic acid, methylester; experimental systemic product of E. I. du Pont de Nemours & Company

Reprinted from U. of Calif. Agric. Ext. Notes, May 1968.

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

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