RHIZOCTONIA ROOT ROT CONTROL OF POINSETTIA

D. L. Strider

Department of Plant Pathology
North Carolina State University

The use of trade names in this publication does not imply endorsement by the North Carolina Agricultural Experiment Station of the products named, nor criticism of similar ones not mentioned.

The root rot caused by the fungus, Rhizoctonia solani, is considered the most important disease of poinsettia in North Carolina. Other important root rots are caused by the fungi, Pythium spp. and Thielaviopsis basicola. Control of these diseases involves the use of clean plants in sterilized potting media and drenching with fungicides. Even after soil is sterilized with methyl bromide or steam, most North Carolina growers drench or "water-in" plants at transplanting with fungicides for "added protection." Some growers drench at transplanting and at 3-4 week intervals. The fungicides commonly used are Benlate^{R} (benomyl) or PCNB^{R} (terraclor) for control of R. solani mixed with Truban^{R} (ethazol) or Dexon^{R} (diazoben) for control of Pythium spp. and T. basicola. These materials are usually applied as drenches, but they may also be applied as a dry fungicide mix in the planting medium or as root dips at transplanting. While fungicide drenches are usually applied at transplanting, most growers will drench at any time during the growing season when a root rot problem is found on their poinsettias.

The results presented below concerns the use of benomyl for control of Rhizoctonic root rot of poinsettia as regards: 1) methods of application; 2) concentration needed; and 3) timing of aplications.

MATERIALS AND METHODS

Rooted cuttings of 'Eckespoint C-1' poinsettia growing in Kys Kubes were provided through the courtesy of Hardin Greenhouses, Liberty, N. C. Plants were propagated (8/28) and transplanted (9/25) to a 1:1:1 mixture of soil, sand and peat moss contained in 5-inch standard clay pots. The soil mixture was previously amended with 6.0 oz. of dolomitic lime and 3.0 oz. of super phosphate per cu. ft. of soil. The initial pH of this mixture was 5.7. Plants were fogged for 2 hr. each day for 3 days after transplanting and watered overhead with a sprinkler hose. Weekly applications of KNO_3 and $Ca(NO_3)_2$ were hosed-on to provide 400 ppm N. In addition, Osmocote (18-9-13) at the rate of 1 tsp/pot was used. Plants were pinched (10/2) to induce development of two stems. Growth regulating substances were not used.

Three methods of benomyl application were examined: 1) a 10-minute root dip (up to first leaf); 2) incorporation of dry benomyl in the potting medium; and 3) drench at transplanting (8 oz/5-inch pot).

Concentrations of benomyl 50W used for root dips were: 0.5, 1.0, 2.0, and 4.0 lb/100 gal. After dipping the roots, plants were allowed to drain a few minutes before transplanting. The fungicide was incorporated into the potting mixture at the rate of 3.3 and 6.6 oz/yd^3 and drench concentrations were 0.5, 1.0, 2.0 and 4.0 lb/100 gal. (8 oz/pot). Plants were exposed to the same amount of benomyl at the two lower rates whether applied as a drench or mixed dry with the potting medium. To determine how long after transplanting, fungicides can be applied and still obtain good control, plants were drenched at transplanting and 1/2, 1, 2, 3, 4 and 7 days after transplanting.

Inoculum (R. solani) was grown 6 days at 82°F on sterile oat grains. One teaspoon of oat-grain-inoculum was mixed into the top 3-4 inches of potting media just prior to transplanting.

To determine phytotoxicity of benomyl, whole plants were emersed for 5, 10 and 20 min. in benomyl 50W concentrations of 0.5, 1.0, 2.0 and 4.0 lb/100 gal.

A single potted plant was considered a replicate and there were 10-12 plants used/treatment. Observations on disease development (wilting and death) and phytotoxicity were recorded weekly for 12 weeks.

RESULTS AND DISCUSSION

The 10-minute benomyl dip proved very effective against R. solani. At the 0.5 lb. rate, fewer plants receiving the dip were killed by R. solani than were killed where benomyl was used as a potting medium amendment or as a drench immediately after transplanting (Table 1). Good protection was afforded by the 1 lb. rate incorporated into the soil and by all rates as drenches. It should be noted that these dip treatments involved the very absorbent whole Kys Kube where considerable benomyl remained in the growing block after a dip and drain. This method was most effective and economical at the 0.5 lb. rate of benomyl and would seem to lend yet another advantage to the use of Kys Kube or similar rooting or growing blocks. The amount of the benomyl suspension absorbed in the growing block was estimated to be between 1-2 oz. This means that 75-87% less benomyl was used as a dip than as a drench at any given rate.

Plants emersed into a benomyl suspension for 20 min. at 4.0 lb/100 gal. showed no signs of phytotoxicity.

Generally, root rot control increased with increasing concentrations of benomyl regardless of method, up to 2 lb/100 gal., except in the case of soil incorporation where the increase was slight.

The timing of fungicide drenches to control root rot in R. solani contaminated potting media was very important. Plants wilted or dead 30 days after transplanting were 15, 45, 65 and 85% for plants drenched 0, 1/2, 1, 2 and 4 days after transplanting, respectively (Figure 1). These results indicate that benomyl drenches applied 12 hr. or later after transplanting are unsatisfactory in controlling Rhizoctonia root rot of poinsettia. The factor of timing becomes extremely important for growers who find it difficult to drench large numbers of transplants within 12 hr. after planting. A dip treatment may be more suitable or perhaps the fungicide could be mixed in the potting medium.

During the poinsettia growing season, plant disease clinics such as the one at North Carolina State University receive specimens infected with R. solani. Until now, the recommendation frequently sent out, aside from the use of clean plants and sterilized soil, was to drench with benomyl. Unless the grower is very careless in his production and sanitation practices, it would appear from the results above that such a recommendation would be of very limited value. This should also be true for repeat-drench recommendations as regards the benomyl/R. solani relationship on poinsettia.

In summary, the results presented herein strongly suggest that benomyl drenches for R. solani root rot control of poinsettia after the initial "watering-in" drench are ineffective except as a deterrent against spread of the fungus from diseased to healthy plants.

[R]The symbol R indicates registered trademark.

Table 1. A comparison of methods of application of benomyl for control of poinsettia root rot caused by Rhizoctonia solani.

Benomyl 50W Lbs/100 gal	% Dead plants[a] 3, and 12 weeks after transplanting			
	Root dip	Medium mixed	Drenched	None
Three weeks				
0.0				100
0.5	0	75.0	16.6	
1.0	0	12.0	4.2	
2.0	0	-	0.0	
4.0	0	-	8.3	
Twelve weeks				
0.0				100
0.5	8.3	75.0	16.6	
1.0	8.3	16.6	12.5	
2.0	0	-	0.0	
4.0	0	-	8.3	

[a]A wilted plant was scored as half dead.

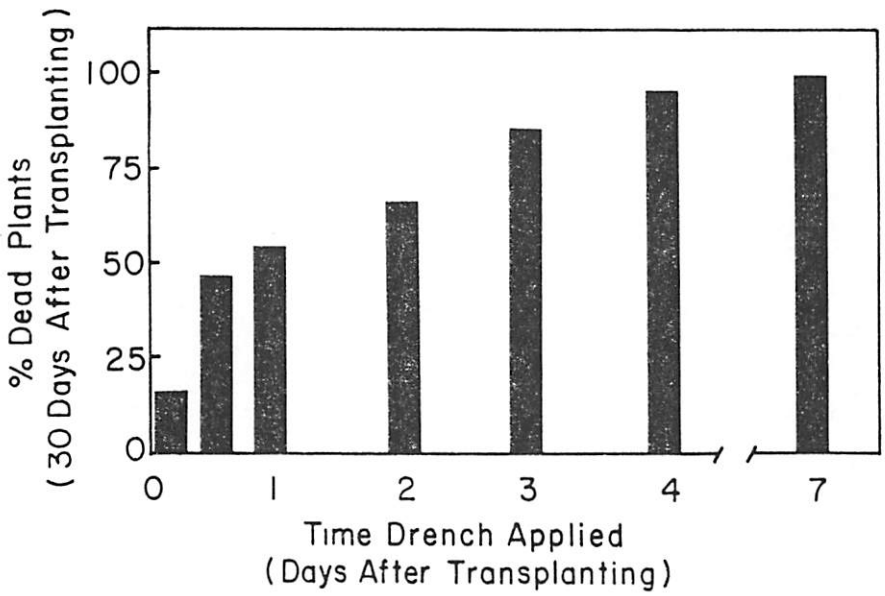

FIGURE 1. Effect of time of drenching of benomyl (50W) at 0.5 lb/100 gal on control of poinsettia root rot caused by Rhizoctonia solani.