

Semesan Drench for Rhizoctonia Control

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The fungus commonly known as *Rhizoctonia solani* is only one of several fungi which may cause the damping-off of seedlings and cuttings. It is, however, the predominant fungus associated with damping-off under eastern greenhouse conditions. It is by far the most common cause of damping-off of snapdragon seedlings, of the rotting of poinsettia and euphorbia cuttings, of the damping-off of begonia leaf cuttings, of the black stem rot or foot-rot of stocks, of the wet stem rot of carnations, and of similar diseases of many other ornamental plants.

Although *Rhizoctonia* may develop to some depth in the soil, it appears to develop best and spread most rapidly very near the soil surface. Furthermore, in the overwhelming majority of the hundreds of cases which have come to our attention the infected plants were initially attacked right at the soil line, although the rot may have eventually spread down into the roots and for a short distance upwards in the stem.

This apparent preference of *Rhizoctonia* for activity near the soil surface should, in theory, render it more vulnerable than the deeper-growing fungi to control by surface drenches with fungicidal chemicals. Studies conducted at Cornell and in several commercial ranges during the past two years have shown that at least one readily available commercial fungicide, when used as a surface drench, will almost completely stop further spread of *Rhizoctonia* and even check its further development in some of the plants in which infection has already been initiated. Two or three other materials were fairly effective, but the majority were valueless for this purpose.

Laboratory tests

The following simple, but highly effective, method was used in making preliminary assays of the effectiveness of different materials. Five-inch pots were filled with well-mixed soil and steam sterilized. After several days seedlings of annual stocks (*Matthiola incana*), which had been started in steamed soil, were planted in the pots, one at the center, four in a ring one inch out from the center, and eight in a ring two inches from the center. A few days were allowed for the seedlings to become established and then the center plant in each pot was inoculated by placing a small disc cut from an agar culture of the fungus against the base of the stem and covering it lightly with sterilized soil. After 60 per cent or more of the inoculated plants had damped-off (about 3 days after inoculation), but before any plants in the first ring out from the center showed any sign of infection, the first treatment was applied, using 75 c.c. per pot (approximately 1 pint per square foot). Five pots were used for each treatment. One week later infection counts were made and a second treatment applied. Final

notes were taken three weeks from the date of inoculation. The results of two such tests, employing a number of different materials, are summarized in tables 1 and 2.

It is evident that in these exploratory tests Semesan at 2 lbs. per 100 gals. (the rate recommended by the manufacturers), and even at 1 lb. per 100 gals., almost perfectly controlled the spread of *Rhizoctonia*. At 1/2 lb. per 100 gals. the effect was not sufficiently persistent. Fermate and Tersan showed up fairly well but were neither as effective nor as consistent as Semesan. Experimental materials CR 305 and SR 406 ranked with Fermate and Tersan. Tag 331 and Phygon XL showed some promise. The remaining materials made a very poor showing.

It was observed in the test summarized in Table 1 that there was some temporary stunting of the small stock seedlings treated with Semesan. These seedlings recovered quickly, however, and grew normally.

Use in commercial ranges

A number of cases of *Rhizoctonia* infection in stocks, carnations, kalanchoes, begonias, and snapdragon seedlings have been treated with Semesan suspension in commercial ranges within the past year. Almost without exception the progress of the disease has been completely checked although some of the plants at the margin of the diseased area, which were already badly infected, died after treatment. This was anticipated, but wholly unanticipated was the fact that many plants which were only lightly infected made new roots above the diseased tissue and recovered completely.

Recommendations

Although no cases of injury have been reported to us in commercial treatments, we are at present recommending Semesan only in cases where infection is established and something must be done. The obviously infected plants should be removed and an area about 2 feet greater in diameter than the infected spot should be drenched with Semesan at the rate of 2 lbs. per 100 gallons of water (1 level tablespoonful per gallon). No spreader is needed. From 1/2 pint to 1 pint should be used per square foot. A second treatment may be made after 7 to 10 days. Because of the extreme sensitivity of roses to mercury we do not recommend using Semesan, a mercury compound, either on roses or on other plants in a house in which roses are growing.

We have not tested Semesan against other damping-off and rot fungi and cannot predict its performance where such organisms are involved. However, where *Rhizoctonia* is involved we are confident of the effectiveness of the treatment.

TABLE 1. Data from test A. Soil drenches for control of Rhizoctonia stem rot of stocks (Matthiola incana)

Material	Concentration of drench solution	% dead 1/ prior to 1st trtmt.	% dead prior to 2nd trtmt.	% dead after 21 days
1. Semesan	2 lbs/100 gals.	1.5	3.1	3.1
2. Tersan	"	7.7	7.7	13.8
3. Fermate	"	7.7	12.3	15.3
4. CR305	1 lb/100 gals.	7.7	9.2	16.9
5. SR406	"	4.6	8.2	16.9
6. Tag 331	1 pint/100 gals.	7.7	12.3	24.8
7. Phygon XL	1 lb/100 gals.	6.1	15.3	26.2
8. Wilson's Anti-Damp <u>2/</u>	2 gals/100 gals.	3.1	4.6	40.0
9. Bioquin 1	2 lbs/100 gals.	6.1	9.2	47.6
Check 1		4.6	16.9	54.0
10. Wilson's Anti-Damp	1 gal/100 gals.	7.7	17.0	57.0
Check 2		7.7	24.6	58.4
11. Crag Fruit Fungicide 341C	1 qt/100 gals.	6.1	18.4	61.5
12. Dithane D14 <u>3/</u>	1 qt/100 gals.	3.1	57.0	63.0
13. Oxyquinoline benzoate	1/5 lb/100 gals.	7.7	15.4	69.2
14. Actidione	10 ppm	0.0	27.5	73.2
15. Actidione	5 ppm	3.1	24.6	77.0
16. Crag Turf Fungicide	2 lbs/100 gals.	4.6	7.7	80.0
17. Crag Potato Spray	2 lbs/100 gals.	4.6	12.3	81.5
18. Fulex Soil Treatment B <u>4/</u>	6 fl. oz/100 gals.	0.0	23.0	83.0

- 1/ These are entirely the center, inoculated plants.
 2/ Contains oxyquinoline benzoate.
 3/ Death of plants due primarily to direct chemical injury.
 4/ Emulsion containing 33% copper - 8 quinolinolate.

TABLE 2. Data from test B. Soil drenches for control of Rhizoctonia stem rot of stocks (Matthiola incana)

Material	Concentration of drench solution	% dead prior to 1st trtmt.	% dead prior to 2nd trtmt.	% dead after 21 days
1. Semesan	2 lbs/100 gals.	7.6	7.6	7.6
2. "	1 lb/100 gals.	7.6	7.6	7.6
3. Fermate	3 lbs/100 gals.	4.6	6.1	15.3
4. Tersan	3 lbs/100 gals.	7.6	10.7	19.9
5. Semesan	1/2 lb/100 gals.	7.6	7.6	22.9
6. Bioquin I	2 lbs/100 gals.	4.6	19.9	26.0
7. Tersan	2 lbs/100 gals.	7.6	12.2	29.1
8. Wilson's Anti-Damp	1 gal/100 gals.	6.1	9.2	30.2
9. Fulex Soil Treatment B	8 6 fl. oz/100 gals.	7.6	9.1	38.3
Check	- - - -	7.6	18.3	81.3

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