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MISSISSIPPI AGRICULTURAL EXPERIMENT STATION

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Experiments On the Control of a Narcissus Root-Rot

By H. H. Wedgworth.

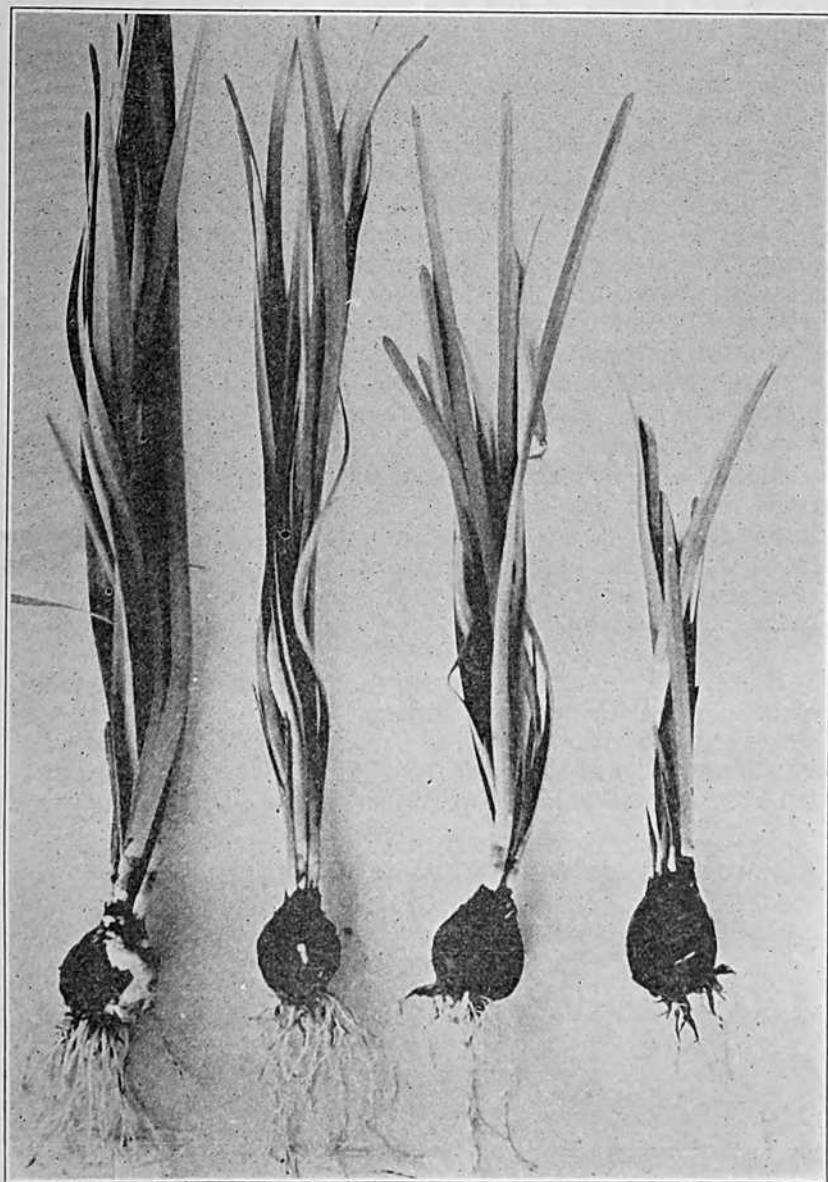


Fig. 1. Narcissus plants showing the effect of root-rot on the development of top-growth. Roots of plant at right almost totally rotted.

Experiments On the Control of a Narcissus Root-Rot

By H. H. Wedgworth,

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A root-rot disease of the narcissus was brought to the attention of the writer in the early part of 1928 by a Mississippi florist who had suffered a heavy loss on bulbs planted in a greenhouse in the fall of 1927. The root-rot was causing many of the plants to be dwarfed as well as a failure of many of the blossoms to develop normally. Upon washing the soil from the roots of some of the plants, the smaller ones were found to have only a few live roots, and in practically every case there was a direct relation between the amount of top-growth and the number of living roots (Fig. 1). A fungus belonging to the genus *Fusarium* which has been isolated quite consistently from such diseased roots probably is responsible for the disease. In addition to the rotting of the roots, the disease causes a decay of the basal plate of the bulb and finally may cause the entire bulb to rot either in the field or in storage. In the later stages of the disease several other fungi, all of which are probably saprophytic, may be found developing in or on the bulb.

Since there was some indication that this root-rot was carried in or on the bulbs, due to the fact that the bulbs referred to above were planted in soil which had never been planted to narcissus before, some experiments were planned to test several disinfectants for the control of the disease.

Experiment I

Bulbs of an unknown variety of *Narcissus barri* which showed a small per cent of the basal plate rot were secured for this experiment. All bulbs showing any signs of decay were discarded, and the apparently healthy ones were divided into lots of 25. These were selected in such a way

TABLE 1
RESULTS FROM TREATING NARCISSUS BULBS WITH
MERCURIC CHLORIDE*

Treatment	Length of time treated	Relative amt. of root-rot	% bulbs recovered at harvest	Av. wt. of bulbs per plat, grams	% increase in wt. over untreated
Untreated		severe	98.7	1138	
Mercuric chloride 1-1000	30 min.	slight	99.3	1454	28.33

*Average of 6 plats.

that each lot of 25 bulbs weighed 442 grams (1 pound=454 grams). Six lots of these bulbs were treated in a 1-1000 solution of mercuric chloride for thirty minutes, and the other six lots were left untreated to be used as checks. The treated and untreated bulbs were planted in alternate plats on January 26. They were planted 3 inches apart in 3½-foot rows in the field on a well-drained, sandy loam soil. The bulbs were harvested on July 4, dried, and weighed on July 17. The results of this test are given in table 1.

Experiment II

Smaller bulbs of the same variety as those used in experiment 1 were divided into 54 lots of 25 each. Each lot of bulbs in this experiment weighed 210 grams. Eighteen lots of the bulbs were left untreated for the checks, and six lots were treated with each disinfectant according to the outline given in table 2. The bulbs were planted, cultivated, harvested, etc., as those in experiment 1 except for the arrangement of plats. With the large number of treatments used in this experiment, it was desirable to arrange the plats in a different manner from those in experiment 1 to overcome any variation that might have occurred in the soil (plats in experiment 2 arranged according to modified magic square method), thereby giving each treatment an equal chance. The results of this experiment are given in table 2.

TABLE 2

RESULTS FROM TREATING NARCISSUS BULBS WITH VARIOUS DISINFECTANTS*

Treatment	Length of time treated	Relative amt. of root-rot	% bulbs recovered at harvest	Av. wt. of bulbs per plat, grams	% increase in wt. over untreated
Untreated		severe	95.6	667.3	
Mercuric chloride 1-1000	30 min.	moderate	98.0	796.3	19.33
Mercuric chloride 1-1000	60 min.	slight	99.3	840.1	25.90
**Chlorophenol mercury soak, 1-400	2 hours	slight	98.7	833.8	24.95
" "	6 hours	slight	99.3	880.6	31.96
" "	12 hours	slight	98.7	876.0	31.28
***Chlorophenol mercury dip, 1-20	1 min.	moderate	98.7	767.1	14.98

*Average of 18 plats for check; average of 6 plats for treated.

**Sold under the trade names of Semesan and Uspulun.

***Sold under the trade names of Dipdust and Semesan Bel.

The results given in tables 1 and 2 show that by thoroughly disinfecting the bulbs of narcissus which were infested with the root-rot organism the resulting crop of bulbs was greatly increased in weight. This increase in weight was no doubt due to the fact that the disinfectants destroyed at least the greater part of the root-rot fungus, which permitted the treated bulbs to develop without a great amount of the disease. This was quite evident when the bulbs were harvested, at which time the difference between the number of live roots of the treated and untreated lots was very noticeable. (Fig. 2.)

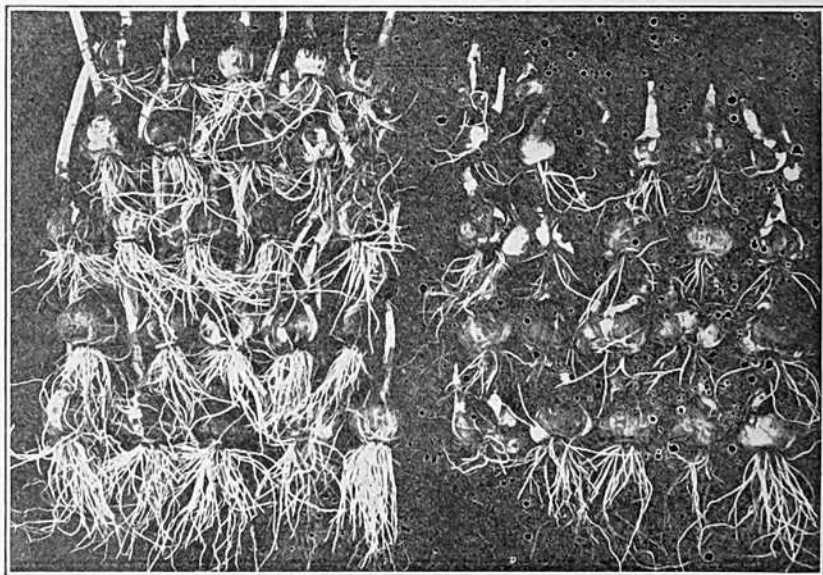


Fig. 2. Effect of disinfecting narcissus bulbs before planting on the control of root-rot. Left, treated for one hour in a 1-1000 solution of mercuric chloride; right, untreated.

The conclusions to be drawn from these experiments are:

1. The organism causing this narcissus root-rot may be carried on the bulbs.
2. The rotting of the roots retards the growth and development of the bulbs.
3. Thoroughly disinfecting the bulbs controlled the disease.
4. Chlorophenol mercury (Uspulun and Semesan) for six hours was the most effective disinfectant for the control of this disease. Bichloride of mercury 1-1000 for one hour was also quite effective.