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Surface Sterilization

Of Hybrid Poplar Cuttings

Fungus diseases of hybrid poplars may be spread by spores that lodge in the resinous coating of buds of dormant cuttings, and in the lenticels. Surface sterilization by dipping the cuttings in fungicides was tested to determine whether such treatment would prevent the germination of spores of the canker-producing fungi Septoria musiva and Dothichiza populea and the leaf-blotch fungus Septotinia populiperda.

Dormant cuttings of selected hybrid poplar clones were sprayed with a water suspension of mixed spores of the three fungi. After a short period of storage at 40° F. the cuttings were dipped in the test fungicides, then wrapped in waxed paper, and stored for periods of 1 to 3 weeks. Buds and lenticels were then selected at random from cuttings of each clone and were cultured on artificial agar medium. Buds and lenticels from untreated cuttings were similarly cultured as controls.

The following fungicides were tested: Chlorox, Bordeaux mixture, Ferbam, Dithane Z78, Captan, CRAG 341, CRAG 531, CRAG 5400, Dowicide G, Dow formation ML37, Dow formation ML38, Ceresan M, Semesan, and corrosive sublimate (mercuric chloride).¹

Effect Of Treatments

On Fungus Spores

Only three of the fungicides--mercuric chloride, Ceresan M, and Semesan--proved effective in decreasing or

¹Mention of these commercial products is not to be construed as endorsement of them by the Forest Service or the Department of Agriculture.

preventing germination of the parasitic fungi spores as well as those of the saprophytic fungi. The treatments with these fungicides were as follows:

1. Mercuric chloride: 5% solution in 70% alcohol. The cuttings were dipped 4 seconds, wrapped in waxed paper, and stored at 40° F. until cultured.
2. Mercuric chloride: 5% solution in 70% alcohol. The cuttings were dipped 4 seconds, wrapped, and stored at 40° F. for 2 weeks. They were then rinsed thoroughly in running water, wrapped, and stored until cultured.
3. Ceresan M: 2% suspension in water. The cuttings were dipped 4 seconds, aired 5 hours at room temperature, wrapped, and stored at 40° F. until cultured.
4. Semesan: 1% suspension in water. The cuttings were dipped 15 to 20 minutes, wrapped, and stored at 40° F. until cultured.

The fungicidal effect of the treatments is given in table 1.² Buds and lenticels were rated as sterile if no fungus, either parasitic or saprophytic, developed from them. From the nonsterile buds a saprophytic fungus that is common on buds of various plants was isolated, but none of the parasitic fungi developed. These fungicides, therefore, are considered excellent for the surface sterilization of the cuttings.

Effect Of Treatment On Growth Of Cuttings In Greenhouse

To test the effect of the fungicides on the growth of the cuttings under greenhouse conditions, dormant cuttings of each clone, not sprayed with fungus spores, were dipped in the fungicides, wrapped, and stored. When the buds and lenticels of the sprayed cuttings were cultured, the unsprayed cuttings were planted in sand in a greenhouse. One-half inch was cut from each end of the cuttings before planting. Untreated cuttings were also planted as checks.

No serious toxic effect occurred on any of the treated cuttings planted in the greenhouse. Those dipped in the

²Waterman, A. M., and Aldrich, K. F. Surface sterilization of poplar cuttings. U. S. Dept. Agr. Plant Dis. Rptr. 36 (5): 203-207. 1952.

Waterman, A. M., and Aldrich, K. F. Additional information on the surface sterilization of poplar cuttings. U. S. Dept. Agr. Plant Dis. Rptr. 38 (2): 96-100. 1954.

mercuric chloride solution developed more slowly than the untreated cuttings used as checks. Since the clones selected for testing represented several combinations of parent species, clonal variations in the production of roots and shoots were evident. However, the growth of the cuttings treated with Ceresan M and Semesan equalled that of untreated cuttings of the corresponding clones. The results from the four treatments indicated that mercuric chloride tended to retard growth and that Ceresan M or Semesan might be preferable for surface-sterilizing poplar cuttings.

Table 1.--Fungicidal effect of treatments on spores on buds and in lenticels of dormant hybrid poplar cuttings

Treatment	Buds		Lenticels	
	Cultured	Sterile	Cultured	Sterile
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Mercuric chloride	44	77	44	100
Mercuric chloride (rinsed)	88	68	88	99
Ceresan M	132	71	132	99
Semesan	88	49	88	97

Treated cuttings were planted in a nursery plot at Beltsville, Md., to test survival and growth. The results of these tests are reported in Forest Research Note No. 33.

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