John R. Langenbach

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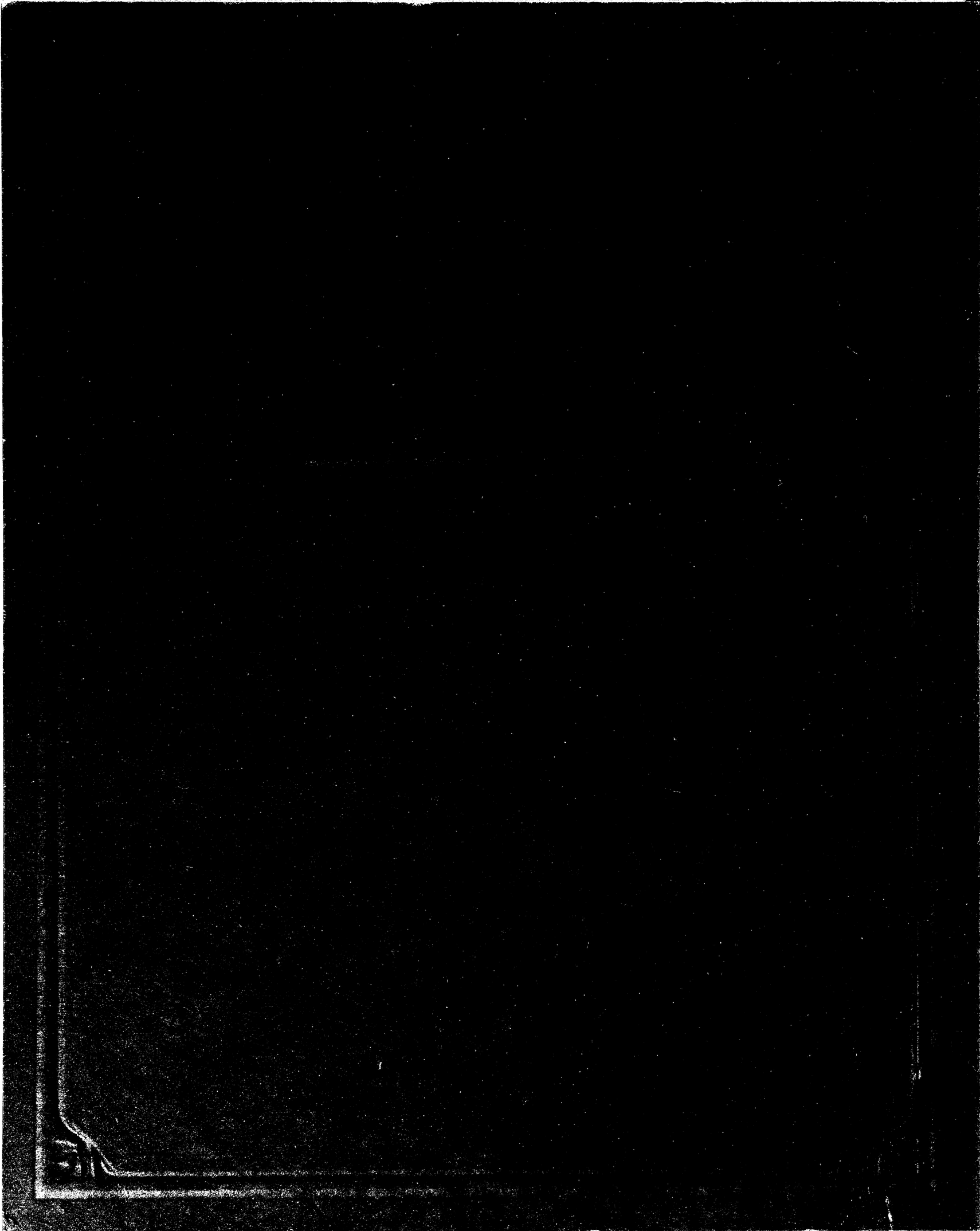

DAMPING OFF OF PINUS RESINOSA IN THE SOIL TAKEN FROM THE STINCHFIELD NURSERY.

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DAMPING OFF OF PINUS RESINOSA IN THE SOIL TAKEN FROM THE STINCHFIELD NURSERY.

The new nursery of the School of Forestry and Conservation, located in the Bell 80 of Stinchfield Woods, has been attacked by damping off fungi. For this reason several experiments were run in an attempt to find a definite treatment which would prevent future losses to seedlings from damping off.

In one of these experiments three chemicals, sulphuric acid, formalin, and aluminum sulphate, were usedin an attempt to check the fungi. The chemicals were applied directly to the soil in various proportions, diluted in 500 cc of water, in order to find what strength of the chemical gave the best results.

Forty, six-inch flower pots were cleaned, numbered and the holes in the bottoms were sealed. The pots were weighed and filled with dirt from the Stinchfield nursery and then reweighed. Following this the moisture content of each pot was calculated in the following manner:

Example: Pot No. 1.

Weight of pot 1657 grams
Weight of soil 1017 grams
Weight of pot and soil 2674 grams

Water Holding Capacity of the Soil 35.4 %

Wght. of Soil X Water. Hold. Cap. = 100% Wat. Hold. Cap.
1017 .354 = 360.018

100% Wat.Cap.	X	% Wat.	+	Wat.hold. capacity	=	Wt. of water added.
360.018	X	.30			=	108.005

Wt. of Water added	+	Wt. of soil	+ pot =	Wt. of water + pot + soil
108.005	+	2674	=	2782.005

The water holding capacity of this soil is the same figure calculated by Lehotsky.

Twelve pots were used for each chemical in three different proportions, and four pots were used for control.

The various amounts of the chemicals were diluted in 500 cc. of water and applied equally over four pots.

FORMALIN

Pots 1 to 4 treated with 10.2 grams of formalin
" 5 to 8 " " 15.4 " " "
" 9 to12 " " 20. " " "

These twelve pots were treated on April 1, 1935, and sown on April 5, 1935, with 100 Norway pine seeds each. Germination in this group started on April 18, 1935.

SULPHURIC ACID.

Pots 13 to 16 treated with 1.6 grams of sulphuric acid.
" 17 to 20 " " 3.8 " " " "
" 21 to 24 " " 4.8 " " " "

These twelve pots were treated and sown on April 5, 1935. Each pot was sown with 100 Norway pine seeds. Germination started April 20, 1935.

ALUMINUM SULPHATE.

Pots 25 to 28 treated with 10 grams of aluminum sulphate.
" 29 to 32 " " 14 " " " "
" 33 to 36 " " 28 " " " "

These twelve pots were treated March 26, 1935 and sown on April 5, 1935, with 100 Norway pine seeds each. Germination started April 18, 1935.

CONTROL.

The four control pots, 37 to 40, were planted on April 10, 1935, with 100 Norway pine seeds each and germination started on April 21, 1935. Damping off started on April 28, 1935.

Mice were noticed to be attacking the pots on April 28, 1935. If any future experiments are run it would be advisable to keep the pots under mouse-proof conditions.

There was a serious error made in the carrying out of this experiment, but this was not realized by the investigator. The error can easily be overcome in future experiments.

In trying to determine the constant weight of the pot the soil was not oven-dried before weighing. This resulted in applying the moisture-holding-capacity figure to the soil which already had quite a bit of moisture in it, so that when the constant weight was finally determined it was too high. Therefore, many of the pots had water standing in them at all times, or were too moist for good germination.

CONCLUSIONS

In view of this error the formalin seemed to be the best chemical in regard to total germination. However, it is interesting to note that the other chemicals did not reduce the damping off as much as the formalin, where any germination showed.

No.	Weight Grams	Wgt. Grms. Soil	Soil + Pot	Chemical Applied	Conc.	Wt. H_2O Added Grams	100% H_2O Capacity Grams	Wt. H_2O + Pot + Soil Grams	H_2O Added % H_2O Capacity	Weight Grams
1	1657	1017	2674	Formalin	10.2 gr.	108.005	360.018	2782.005	30	2782
2	1700	1113	2813	"	in 500	197.001	394.002	3010.001	50	3010
3	1695	987	2682	"	cc water	244.578	349.398	2936.578	70	2937
4	1707	1064	2771	"		338.990	376.656	3109.990	90	3110
5	1676	1096	2771	"	15.4 gr.	116.289	387.630	2887.289	30	2887
6	1666	991	2657	"	in 500	175.407	350.814	2832.407	50	2832
7	1664	1074	2738	"	cc water	266.137	380.196	3004.137	70	3004
8	1664	1064	2728	"		348.990	376.656	3076.990	90	3077
9	1695	1125	2820	"	20 gr.in	119.475	398.250	2939.475	30	2939
10	1669	1096	2765	"	500 cc	193.992	387.984	2958.992	50	2959
11	1704	1065	2769	"	water	263.907	377.010	3032.907	70	3033
12	1702	1135	2837	"		361.611	401.790	3198.611	90	3199
13	1717	1068	2785	H_2SO_4	1.6 gr.	115.333	384.444	2900.333	30	2900
14	1730	1203	2933	"	in 500	212.931	425.862	3145.931	50	3146
15	1702	1185	2887	"	cc water	293.743	419.490	3180.743	70	3181
16	1559	1171	2730	"		373.080	414.534	3103.080	90	3103
17	1698	1168	2866	"	3.8 gr.	124.101	413.672	2990.101	30	2990
18	1708	1093	2801	"	in 500	193.466	386.932	2994.466	50	2994
19	1646	1228	2874	"	cc water	304.298	434.712	3178.298	70	3178
20	1559	1218	2777	"		388.054	431.172	3165.054	90	3165
21	1728	1267	2995	"	4.8 gr.	134.555	448.518	3129.555	30	3130
22	1702	1194	2896	"	in 500	306.338	412.676	3102.338	50	3102
23	1689	1279	2968	"	cc water	316.936	452.766	3284.936	70	3285
24	1682	1237	2919	"		394.108	437.898	3313.108	90	3313
25	1704	1246	2950	$Al_2(SO_4)_3$	10 gr.	132.325	441.084	3082.325	30	3082
26	1663	1206	2869	"	in 500	212.462	426.924	3082.462	50	3082
27	1697	1236	2933	"	cc water	306.280	437.544	3239.280	70	3239
28	1685	1263	2948	"		402.391	447.102	3350.391	90	3350

No.	Weight Grams	Wgt. Grms. Soil	Soil + Pot	Chemical Applied	Conc.	Wt. H_2O Added Grams	100% H_2O Capacity Grams	Wt. H_2O + Pot + Soil Grams	H_2O Added % H_2O Capacity	Weight Grams
29	1667	1204	2871	$Al_2(SO_4)_3$	14 gr.	127.864	426.216	2998.864	30	2999
30	1682	1070	2752	"	in 500	189.390	378.780	2941.390	50	2941
31	1700	1229	2929	"	cc water	303.846	434.066	3232.846	70	3233
32	1690	1257	2947	"		400.480	444.978	3347.480	90	3347
33	1704	1255	2959	"	28 gr.	133.281	444.270	3092.281	30	3092
34	1693	1078	2771	"	in 500	190.806	381.612	2961.806	50	2962
35	1661	1002	2663	"	cc water	248.295	354.708	2911.295	70	2911
36	1690	1043	2733	"		332.299	369.222	3065.299	90	3065
37	1676	1005	2681	Control		106.731	355.770	2787.731	30	2788
38	1637	1024	2661	"		181.248	362.496	284.248	50	2842
39	1725	1016	2741	"		251.764	359.664	2992.764	70	2993
40	1684	1055	2739	"		336.123	373.470	3075.123	90	3075

Count made on 5/15/35

Pot No.	Date Treated	Chemical	Amt.in 500 cc of H_2O	Date Planted	No. Germi-nated	No. Damped Off	No. Seedlings Nipped by Mice	Mouse Attack
1	4/ 1/35	Formalin	10.2 gr.	4/ 5/35	82	10	0	No
2	"	"	"	"	Broken May 1, Germ. 22 - Damped off - 0			
3	"	"	"	"	3	0	0	Yes
4	"	"	"	"	0	0	0	Yes
5	"	"	15.4 gr.	"	73	3	1	No
6	"	"	"	"	63	6	0	No
7	"	"	"	"	1	0	0	Yes
8	"	"	"	"	0	0	0	Yes
9	"	"	20.0 gr.	"	56	38	0	No
10	"	"	"	"	14	4	1	Yes
11	"	"	"	"	0	0	0	No
12	"	"	"	"	0	0	0	Yes
13	4/ 5/35	H_2SO_4	1.6 gr.	"	47	24	1	No
14	"	"	"	"	1	1	1	Yes
15	"	"	"	"	0	0	0	Yes
16	"	"	"	"	0	0	0	No
17	"	"	3.8 gr.	"	1	0	0	No
18	"	"	"	"	1	0	0	Yes
19	"	"	"	"	0	0	0	Yes
20	"	"	"	"	0	0	0	No
21	"	"	4.8 gr.	"	0	0	0	Yes
22	"	"	"	"	2	1	0	Yes
23	"	"	"	"	0	0	0	Yes
24	"	"	"	"	1	1	0	Yes
25	3/26/35	$Al_2(SO_4)_3$	10.0 gr.	"	46	2	3	No
26	"	"	"	"	0	0	0	Yes
27	"	"	"	"	4	2	0	Yes
28	"	"	"	"	0	0	0	Yes

Pot No.	Date Treated	Chemical	Amt. in 500 cc of H_2O	Date Planted	No. Germinated	No. Damped Off	No. Seedlings Nipped by Mice	Mouse Attack
29	3/26/35	$Al_2(SO_4)_3$	14.0 gr.	4/ 5/35	22	19	0	No
30	"	"	"	"	7	2	1	Yes
31	"	"	"	"	8	8	0	Yes
32	"	"	"	"	0	0	0	No
33	"	"	28.0 gr.	"	37	3	11	No
34	"	"	"	"	8	5	0	Yes
35	"	"	"	"	3	0	0	Yes
36	"	"	"	"	1	0	0	Yes
37	-	Control	-	4/10/35	84	84	0	No
38	-	"	-	"	0	0	0	Yes
39	-	"	-	"	1	0	1	Yes
40	-	"	-	"	0	0	0	No