

RESULTS OF 1978 PISOLITHUS TINCTORIUS ECTOMYCORRHIZAE NATIONAL
EVALUATION IN 33 BARE-ROOT NURSERIES AND 18 CONTAINER
SEEDLING STUDIES IN THE UNITED STATES

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In 1978, the national Pisolithus tinctorius (P.t.) ectomycorrhizae **nurser^y** evaluation was expanded to include 33 bare-root nurseries in 28 states, along with 18 container seedling studies in nine states (**including** Hawaii) and Canada. Seedling **species involved in the** bare-root nurseries included 11 species of pines, along with two varieties of Douglas-fir and Fraser fir. Seedling species involved in **the container nurseries included** nine species of pines, along with Douglas-fir, western hemlock, black spruce, white spruce, bur oak, and eucalyptus. Virginia pine seedbeds were inoculated with Pet. at the Vallonia, Indiana state nursery in both 1978 and 1979.

The objective of both the bare-root and **container** seedling evaluations was to compare the effectiveness of P.t. inoculum produced by the Mycorrhizal Institute - Athens, **Georgia (Ga. P.t.)** and Abbott Laboratories - Chicago, **Illinois, (Abbott P.t .)** for ectomycorrhizal formation, seedling growth and quality in the nursery, and tree survival and growth in subsequent field outplantings. This is a cooperative **project** between the **Institute** for Mycorrhizal Research and Development, Athens, Georgia, Forest **Insect and Disease** Management, Southeastern Area - State and Private Forestry, Atlanta, Georgia and various other U. S. Forest **Service, State,** Industry and University agencies.

The results **obtained** to date from both the bare-root and container **seedling** evaluations are encouraging.

The midseason or first-year sampling results from the 33 nurseries showed 19 percent P.t. ectomycorrhizae formation on seedling feeder roots by the Ga.-100 P.t. treatment and 5 percent by the Abbott-200 P.t. **treatment. An** apparent Abbott P.t. inoculum batch effect is shown in Table 1.

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Table 1.--1978 National Ectomycorrhizae Nursery Evaluation--summary of midseason root evaluations in 33 nurseries

Treatment	Ectomycorrhizae by			Total (%)	Seedlings w/P.t. (%)				
	P.t. (%)	Abbott batch No.							
GA 100	18.6			26.5	70.4				
		Abbott batch No.		Abbott batch No.	Abbott batch No.				
		1	2						
		2	4&5	Avg.	2	4&5	Avg.		
Abbott 200	3.4	5.8	5.2	19.6	17.1	17.8	27.0	34.4	32.5
Abbott 100	2.2	5.8	4.9	19.6	17.1	17.7	24.5	31.6	30.0
Abbott 50	1.4	3.2	2.8	18.6	15.0	16.0	13.0	23.0	20.4
Control	0.1			13.8			1.4		

¹ Poor quality Abbott P.t. inoculum; produced an average of 3 percent P.t. ectomycorrhizae on 4-month-old loblolly pine seedlings in inoculated field microplots at Athens, Ga. in 1978.

² Good to excellent quality Abbott P.t. inoculum; produced an average of 12 and 54 percent P.t. ectomycorrhizae, respectively, on 4-month-old loblolly pine seedlings in inoculated microplots at Athens, Ga. in 1978.

For example, Abbott P.t. batches 4 and 5 produced over 200 percent as much P.t. ectomycorrhizae as batch 2.

The midseason results obtained from the 1978 Virginia pine P.t. **inoculations** at the Vallonia Nursery showed 8 percent P.t. ectomycorrhizae formation on seedling feeder roots by the Ga.-100 P.t. and 5 percent by the Abbott-200 P.t. The P.t. ectomycorrhizae feeder-root development observed on seedlings examined from these two treatments (25 seedlings per treatment) represented over one-half of the total ectomycorrhizae development (less than 15 percent) observed on the Virginia pine seedlings in August 1978. Seedlings examined from the remaining two P.t. treatments, Abbott-100 and Abbott-50, had virtually no P.t. ectomycorrhizae.

Final results obtained from 12, 1-0 southern and central United States bare-root nurseries were also quite variable--particularly with the Abbott P.t. inoculum batches (Table 2.) The Ga. P.t., again, provided the most favorable and consistent results. This inoculum produced 28 percent P.t. ectomycorrhizae on seedling feeder roots, increased seedling fresh weights 26 percent over controls, and decreased seedling cull percentage 26 percent less than controls. The Abbott P.t. batch effect is revealed again in Table 2. The nurseries treated with batches 4 and 5 had over 300 percent increase in P.t. ectomycorrhizae formation and seedlings with P.t. ectomycorrhizae along with a significant reduction in cull seedlings as compared with the nurseries treated with batch 2.

Final results obtained from the 1978 Virginia pine P.t. inoculations at the Vallonia nursery were encouraging and represented, one of the most successful P.t. conifer ectomycorrhizal inoculation studies conducted in 1978. Once again, the Ga.-100 P.t. produced the most favorable and consistent results. This inoculum produced 35 percent P.t. ectomycorrhizae on 1-0 Virginia pine feeder roots, increased seedling fresh weights 15 percent over controls, and decreased seedling cull percentages 20 percent less than controls. The Abbott-200 P.t. batch 4 produced 25 percent P.t. ectomycorrhizae on similar 1-0 Virginia pine feeder roots and decreased seedling cull percentages 29 percent less than controls, but had no positive effect on seedling fresh weights. In addition, 100 percent of all seedlings examined (50 seedlings per treatment) from both treatments had some P.t. ectomycorrhizae on their feeder roots. The remaining two P.t. treatments, Abbott-100 and Abbott-50, had very erratic insignificant P.t. ectomycorrhizae development 5 percent and 11 percent, respectively. Outplantings were established in the spring of 1979 on two sites (good and poor site quality) by the Indiana Division of Forestry using selected Virginia pine seedlings from the Ga.-100, Abbott-200, and control treatment plots. These outplantings will be examined for a minimum of 5 years with annual tree survival and growth measurements, P.t. fruiting body development, and progress reports.

Final results obtained from the container seedling studies with both the Ga. and Abbott P.t. inoculum were also highly encouraging. The Ga. P.t. produced 40 percent P.t. ectomycorrhizae on seedling feeder roots while the Abbott P.t. produced 10 percent P.t. ectomycorrhizae. This resulted in almost a 300 percent increase in total ectomycorrhizae develop-

Table 2.--1978 National Ectomycorrhi^zae Nursery Evaluation--summary of final root evaluations (1-0 seedlings) in 12 nurseries

Treatment	Ectomycorrhi ^z ae by P.t. (%)	Seedlings w/P.t. (%)	Cull seedlings (%)
GA 100	27.8	95.0	18.4
	Abbott batch No.	Abbott batch No.	Abbott batch No.
	1	2	2
	2	4&5	4&5
	Avg.	Avg.	Avg.
Abbott 200	3.2	10.5	5.7
	17.8	61.0	32.2
	29.1	13.8	24.0
Abbott 100	1.5	4.5	2.5
	10.5	42.0	21.0
	25.3	15.0	22.3
Abbott 50	2.4	5.5	3.4
	12.5	33.0	19.3
	28.2	17.4	24.6
Control	0.4	1.8	24.8

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Poor quality Abbott P.t. inoculum; produced an average of 3 percent P.t. ectomycorrhi^zae on 4-month-old loblolly pine seedlings in inoculated field microplots at Athens, Ga. in 1978.

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Good to excellent quality Abbott P.t. inoculum; produced an average of 12 and 54 percent P.t. ectomycorrhi^zae, respectively, on 4-month-old loblolly pine seedlings in inoculated microplots at Athens, Ga. in 1978.

ment on the Ga. P.t. treated seedlings and over a 200 percent increase on the Abbott P.t. treated seedlings, as compared with the untreated seedlings.

As with the Indiana outplantings, field outplantings are being established from all treatments represented in both the bare-root and container seedling nurseries with seedlings showing significant responses in P.t. ectomycorrhizae development.

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Abbott Laboratories plans to market a brand of P.t. "MycorRhiz" in the southern United States in 1980.