Interaction of Mold and Decay Fungi on Wood in Laboratory Tests

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ABSTRACT

The effect of prior infection of southern pine sapwood by the mold fungus, *Trichoderma viride,* on development of the brown-rot fungus, *Poria monticola,* and prior infection by *P. monticola* on development of *T. viride* was investigated in the laboratory. *Trichoderma viride* did not affect the action of *P. monticola.* The two organisms were mutually antagonistic. Phytopathology 61:124-125.

Additional key words: Pinus sp., antagonism.

Knowledge of the interaction of mold and decay fungi is needed to clarify our understanding of the biodeterioration of wood. Shigo (3) has reviewed the literature on the succession of organisms that invade forest products in general, and Verrall (5) has reviewed the literature pertaining to southern pine.

This study was undertaken to determine the effect of prior infection of southern pine wood by the mold fungus, *Trichoderma viride* Pers., on development of the brown-rot fungus, *Poria monticola* Murr., and prior infection by *P. monticola* on development of *T. viride* under laboratory conditions.

Test specimens were obtained from southern pine (*Pinus* sp.) sapwood, and consisted of 1.9-cm cubes cut serially from 1.9 × 1.9-cm boards. Alternate cubes were inoculated with the test fungus, and adjacent cubes were used as noninoculated controls following standard ASTM soil-block procedures (1). Paired blocks were assigned at random to each treatment. Ten paired blocks were used for each of the following eight treatments: (i) inoculated with *P. monticola* and incubated 2 weeks; (ii) inoculated with *P. monticola* and incubated 4 weeks; (iii) inoculated with *P. monticola,* incubated 2 weeks, and transferred without sterilization to chambers inoculated with *T. viride* and incubated 2 more weeks; (iv) treated as in (iii) above except that blocks were steam sterilized before the *T. viride* inoculation; (v) inoculated with *T. viride* and incubated 2 weeks; (vi) inoculated with *T. viride* and incubated 4 weeks; (vii) inoculated with *T. viride,* incubated 2 weeks, and transferred without sterilization to chambers inoculated with *P. monticola* and incubated 2 more weeks; (viii) treated as in (vii) above except that blocks were steam sterilized before the *P. monticola* inoculation.

At the end of each incubation period, loss in weight was determined by the ASTM Standard method (1), and crushing strength reduction by the method previously described (4).

The 80 observations each for wt loss, loss in stress at modulus of elasticity (MOE), loss in stress at proportional limit (PL), and loss in stress at 5% compression strain, were subjected to analyses of variance. Differences between means were tested for significance with the t test.

The brown-rot fungus, *Poria monticola,* caused significant losses in wt and crushing strength, while the mold, *Trichoderma viride,* caused no significant changes. The average losses in wt and crushing strength are shown in Table 1. *Poria monticola* caused significantly more decay, expressed either by loss in wt or crushing strength, after 4 weeks' than after 2 weeks' incubation. When blocks that had been incubated with *P. monticola* for 2 weeks were placed in cultures of *T. viride* for 2 more weeks, the final losses were not significantly different from those caused by incubation with *P. monticola* for 4 weeks, indicating that *T. viride* was not able to affect the action of *P. monticola.* When *P. monticola* was killed after 2 weeks' incubation before placing the decayed blocks in mold cultures, the blocks were invaded by the mold, but losses in wt or strength were not significantly different from the 2-week losses caused by *P. monticola* alone.

Blocks infected with the actively growing mold fungus, *T. viride,* did not decay when placed in cultures of *P. monticola.* When the mold was killed before placing the blocks in *P. monticola* cultures and incubated for 2 weeks, there was significantly more decay than was caused when *P. monticola* was used alone for 2 weeks (compare treatments 1 and 8, Table 1). These results indicate a definite reduction in decay resistance caused by *T. viride.* This is in agreement with results reported by Findlay (2) with stain fungi and other decay fungi on Scots pine.

The two organisms used in this study appeared to be mutually antagonistic when infected wood blocks of one were exposed to cultures of the other; however,

TABLE 1. Average loss in weight and crushing strength of southern pine blocks inoculated with *Poria monticola* and *Trichoderma viride*[a] in various combinations

Treatment	% Loss			
	Weight	MOE[b]	PL[c]	Stress 5% compression strain
1. *P. monticola,* 2 weeks	12	59	58	61
2. *P. monticola,* 4 weeks	28	72	75	75
3. *P. monticola,* 2 weeks; *T. viride,* 2 weeks	29	75	78	78
4. *P. monticola,* 2 weeks, sterilized; *T. viride,* 2 weeks	15	57	62	61
5. *T. viride,* 2 weeks	0	+4	+5	+3
6. *T. viride,* 4 weeks	0	5	1	3
7. *T. viride,* 2 weeks, *P. monticola,* 2 weeks	0	1	2	1
8. *T. viride,* 2 weeks, sterilized; *P. monticola,* 2 weeks	17	72	78	79

[a] Each loss is an average result for 10 pairs of blocks.
[b] MOE = Stress at modulus of elasticity.
[c] PL = Stress at proportional limit.

killing the first fungus allowed infection by the second. It is possible that with additional time, the decay fungus might replace the mold fungus.

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