

Coriolus versicolor Infection of Young Apple Trees in Washington State

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ABSTRACT

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Coriolus versicolor was isolated from young apple trees with papery bark and weak bud unions. Greenhouse inoculations of the clonal rootstocks MM 106 and M 26 and Northwest Common seedlings with *C. versicolor* resulted in heart rot, papery bark, and dieback. *C. versicolor* was reisolated from trees with these symptoms.

Additional key words: *Polyporus versicolor*, *Trametes versicolor*

Wood decay caused by hymenomycetes is generally considered a disease of maturing trees (3) but has been reported in association with dieback of young apple trees in Washington (2). We found wood decay on young (second- to third-leaf stage in the permanent growing site) apple trees in Okanogan County in 1978. The trees, Delicious cultivar on MM 111 rootstock, had weak bud unions and lack of shoot growth. The bud union appeared gnarled when broken and an unhealed pruning wound was present at the bud union. The wood thus exposed was soft, pithy, and decayed. The rootstock bark frequently was thin and papery. About 30% of the trees were affected. Samples of rootstocks and scions were collected for laboratory examination and pathogen isolation.

Laboratory isolations were made from 8-cm lengths of rootstock and scion wood dipped in 70% alcohol. The excess alcohol was burned off, and the bark was peeled away. Chips of the pithy wood were plated on Difco malt agar and potato-dextrose agar as described by Lacy and Bridgmon (4) and modified by Larsen et al (5). Fungal transfers to fresh media were made after about 10 days of incubation.

The only fungus consistently isolated produced white mycelium with occasional clamp connections. With Nobles' key (6), we assigned the fungus to the hymenomycetous group containing *Polyporus*

versicolor L. ex Fr. (syn. *Coriolus versicolor* (L. ex Fr.) Qué.; reported as *Trametes versicolor* (L. ex Fr.) Pilat and as *Trametes versicolor* (L. ex Fr.) Lloyd by other authors [1,3]).

Six affected trees from the Okanogan orchard were transplanted into 46-cm fiber pots and grown in the greenhouse without artificial light at temperatures of 20–35 C. Fructifications of *C. versicolor* were observed on the rootstocks of three trees after approximately 6 mo and on the other three trees after 11 mo. No such fructifications were noted on young affected trees in the orchard.

In another greenhouse study, 45 apple liners were inoculated with *C. versicolor*: 15 liners each of Northwest Common seedling, MM 106, and M 26 were headed back to 15 cm above the soil line, and an agar disk of inoculum 6 mm in diameter was placed on the fresh cut for each tree. The disks were taken from the actively growing margins of *C. versicolor* colonies on malt agar. The isolate used was originally isolated from a *C. versicolor* sporocarp found on an apple tree in central Washington. A sterile surgical gauze pad was taped in position over both the inoculum and pruning cut, kept moist with sterile, distilled water for 7 days, and then removed.

The trees were maintained in the greenhouse for approximately 8 mo. Temperatures reached a maximum of 35 C during the first few months but typically ranged between 15 and 20 C during the colder months. The experiment ended after 8 mo when a greenhouse heat failure caused the temperature to drop to -14 C long enough to kill the roots of the potted plants.

The results of this greenhouse inoculation experiment further documented the association of *C. versicolor* with the orchard problem. *C. versicolor* sporocarps

were noted on three M 26 and two seedlings about 5 mo after inoculation. Eight seedlings had papery bark and one had dieback, both symptoms associated with *C. versicolor* (3). No dieback or sporocarps were noted on MM 106 at this time. After 7 mo, sporocarps were observed on four additional M 26, one seedling, and one MM 106.

Observations of and serial isolations from the trees after the greenhouse heat failure indicated that the fungus had infected all trees and had decayed the stems of each an average 13 cm during the 8 mo. No other fungus was consistently isolated from these trees.

Papery bark, dieback, and wood rot of mature trees have previously been associated with infection by *C. versicolor* (1,3). Dilley and Covey (2) in their report of apple dieback in Washington caused by *C. versicolor* noted an occurrence of the disease associated with young apple trees. This second report of heart rot in young apple trees indicates that the condition is not as anomalous as previously supposed. *C. versicolor* can infect young apple trees on several different rootstocks and can cause both a weakening of the bud union and dieback. Although the disease is seldom observed in orchards, the two reported occurrences resulted from infections that occurred at different times and places—the trees were produced at different nurseries in different years. Because the cut above the bud union normally heals rapidly while those associated with natural infection by *C. versicolor* were unhealed, we postulate that the normally rapid healing of nursery stock is the limiting factor for infection.

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