

Title Core rot development in red delicious apples is affected by susceptibility of the seed locule to *Alternaria alternata* colonization

Authors J. Niem, I. Miyara, Y. Etedgui, M. Reuveni, M. Flaishman and D. Prusky

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Abstract

Alternaria alternata is the causal organism of core rot decay symptoms in susceptible cv. Red Delicious but not in resistant cv. Golden Delicious. The two cultivars did not differ in natural colonization of the style and ovary during the first week after full bloom; colonization of the ovary in the susceptible cultivar subsequently decreased with increasing distance from the calycine tube. By 30 days after full bloom, *Alternaria* recovery from ovary 1, adjacent to the end of the calycine tube, was 100 and 40% in the susceptible and resistant cultivars, respectively. In the susceptible cultivar, *Alternaria* recovery decreased from 75 to 20% in ovaries 2, 3, and 4, while there was only minor incidence in the resistant cultivar. Inoculation of the mesoderms of the two cultivars induced similar decay symptoms, but inoculated locules of Red Delicious were more susceptible than those of Golden Delicious. Increased inoculum concentration or isolate virulence enhanced the difference in locule susceptibility between the cultivars. Inoculation on isolated seed locules or on media amended with susceptible locule tissue as a carbon source induced greater transcript levels of several genes than the inoculation on resistant tissue. Endo- and exoglucanase activity levels were higher at pH 4.8 than at 4.2, conditions typical of the mesoderm adjacent to the seed locules of the susceptible and resistant cultivars, respectively. Current results suggest that susceptibility of Red Delicious apples to core rot decay is dependent on the sensitivity to locule colonization and on mesoderm pH, a factor that enhances fungal virulence.