Title Modifications in tomato fruit ripening alter susceptibility to the pathogenic fungus *Botrytis cinerea*

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Abstract

During ripening, fleshy fruit undergo biochemical and physiological changes that result in the organoleptic and nutritional qualities used to market the ripe fruit as consumable post-harvest products. However, some ripening processes, such as textural changes, contribute to the enhanced susceptibility of ripe fruit to pathogens. Ripe tomato fruit are particularly susceptible to fungal pathogens, such as the ascomycete, *Botrytis cinerea*. Before the onset of ripening, tomato fruit are highly tolerant of *Botrytis* infections, whereas ripe fruit are extremely susceptible. Investigating the ripening-associated increased susceptibility of tomato fruit to *B. cinerea* provides novel insights for understanding plant-fungus interactions and eventually may lead to the development of efficient methods to control infections in perishable products. The molecular and genetic basis of plant-*Botrytis* interactions has been described for tomato leaves but our understanding of the role played by fruit ripening in susceptibility to infection has been limited. We have evaluated the susceptibility to *Botrytis* of the tomato fruit ripening mutants, *rin, nor* and *Nr*. The absence or the modification of ripening in these mutant fruit results in differences in susceptibility and altered activation of responses to fungal infection. Our results suggest that only some aspects of ripening make fruit susceptible and that organ-specific developmental processes are important contributors to susceptibility. Characterization of the specific ripening events that promote susceptibility will facilitate the development of commodities that ripen acceptably and yet are less susceptible to fungal infections.