Title Characterization of the roles of rin and nor during tomato (*solanum lycopersicum*) fruit ripening

Author Catherine Martel and James J. Giovannoni

Citation Thesis, Doctor of Philosophy (Plant biology), Cornell University.2010.

Keywords Rin, Tomato; *Solanum lycopersicum*; Fruit; Ripening; Nor tomato mutants; Ethylene

Abstract

Fruit ripening is a complex developmental process involving the precise coordination of multiple physiological and chemical changes, and resulting in the transformation of the seed receptacle into a palatable organ. Numerous studies have demonstrated the role of ethylene as a key regulator of ripening in climacteric species. Whereas numerous ripening-associated traits have been shown to be influenced by ethylene, the characterization of the *rin* and *nor* tomato mutants have uncovered another layer of regulation acting upstream of ethylene. The fruits of these mutants are characterized by an absence of a ripening-associated ethylene burst, and an inability to ripen in the presence of exogenous ethylene. This phenotype is described as a failure to reach ripening competency, a developmentally regulated stage in which a fruit becomes responsive to ethylene. The genes underlying the *rin* and *nor* mutations have been cloned and shown to encode transcription factors of the MADS-box and NAC domain families, respectively. This dissertation uses several molecular approaches to gain insight into the role of these transcription factors during ripening. Antibodies specific for both the RIN and NOR proteins were developed and used to examine the dynamics of protein accumulation during ripening. A chromatin immunoprecipitation approach was used to address the transcriptional regulation of known ripening-associated genes by RIN and NOR.