Title Effect of ethylene on the growth and pathogenicity of *Botrytis cinerea*

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Citation Journal of Plant Pathology Volume 90 (2, Supplement) August 2008, Book of Abstract, 9th International Congress of Plant Pathology, August 24-29, 2008 Torino,Italy,. 507 pages.

Keywords grape; ethylene; *Botrytis cinerea*

Abstract

During the storage and transportation of fruit and vegetable crops, ethylene promotes not only their senescence, but also the outbreak of disease in the crops. Many pathogenic fungi can produce ethylene, but its role in expression of pathogenicity has remained obscure. To give some clues to these problems, the present research was conducted using *Botrytis cinerea* isolated from harvested grapes. All isolates produced ethylene on methioninecontaining media (M-media). The highest production was on Mmedium supplemented with grape juice, suggesting that ethylene production by the pathogen is largely promoted by host-derived nutrients. Ethylene production varied among the isolates, and solid medium was best for ethylene production, with an average 9.5 times higher than in liquid M-medium. *B. cinerea* can synthesize ethylene between pH 2 and 5, and the optimum is pH 3.0, corresponding to the physiological pH of grape juice. Exogenous ethylene did not affect spore germination, but significantly promoted *B. cinerea* hyphal growth. Germ tube elongation was promoted to various extents, depending on concentrations of ethylene given. In addition, ethylene treatment enhanced the pathogenicity of *B. cinerea* to post-harvest berries in a bell-shaped curve to concentrations. The disease index reached a maximum when the inoculated berries were exposed to ethylene at 50 μg/ml. No significant effect of ethylene was detected on the activity of cell wall degrading enzymes secreted by *B. cinerea*. Thus, the present study suggested that host nutrients induce ethylene production by *B. cinerea* to promote the hyphal growth and pathogenicity of the pathogen.