



Inheritance of downy mildew (*Plasmopara viticola*) and anthracnose (*Sphaceloma ampelinum*) resistance in grapevines

O. Poolsawat^{1,2}, S. Mahanil^{1,2}, P. Laosuwan¹, S. Wongkaew¹,
A. Tharapreuksapong³, B.I. Reisch⁴ and P.A. Tantasawat^{1,2}

¹School of Crop Production Technology, Institute of Agricultural Technology, Suranaree University of Technology, Nakhon Ratchasima, Thailand

²Center of Excellence on Agricultural Biotechnology (AG-BIO/PERDO-CHE), Bangkok, Thailand

³Center for Scientific and Technological Equipment, Suranaree University of Technology, Nakhon Ratchasima, Thailand

⁴Department of Horticultural Sciences, Cornell University, Geneva, NY, USA

Corresponding author: P.A. Tantasawat

E-mail: piyada@sut.ac.th

Genet. Mol. Res. 12 (4): 6752-6761 (2013)

Received February 19, 2013

Accepted October 18, 2013

Published December 13, 2013

DOI <http://dx.doi.org/10.4238/2013.December.13.8>

ABSTRACT. Downy mildew (*Plasmopara viticola*) and anthracnose (*Sphaceloma ampelinum*) are two of the major diseases of most grapevine (*Vitis vinifera* L.) cultivars grown in Thailand. Therefore, breeding grapevines for improved downy mildew and anthracnose resistance is crucial. Factorial crosses were made between three downy mildew and/or anthracnose resistant lines ('NY88.0517.01', 'NY65.0550.04', and 'NY65.0551.05'; male parents) and two or three susceptible cultivars of *V. vinifera* ('Black Queen', 'Carolina Black Rose', and/or 'Italia'; female parents). F₁ hybrid seedlings were evaluated for downy mildew and anthracnose resistance using a detached/excised leaf assay. For both diseases, the general combining

ability (GCA) variance among male parents was significant, while the variance of GCA among females and the specific combining ability (SCA) variance were not significant, indicating the prevalence of additive over non-additive gene actions. The estimated narrow sense heritabilities of downy mildew and anthracnose resistance were 55.6 and 79.2%, respectively, suggesting that downy mildew/anthracnose resistance gene(s) were highly heritable. The 'Carolina Black Rose x NY65.0550.04' cross combination is recommended for future use.

Key words: Combining ability; *Elsinoe ampelina*; Heritability; Scab; *Vitis* spp