



Breeding new seedless grape by means of *in vitro* embryo rescue

W. Ji^{1,2,3,4}, Z.-Q. Li^{1,2,3}, Q. Zhou^{1,2,3}, W.-K. Yao^{1,2,3} and Y.-J. Wang^{1,2,3}

¹College of Horticulture, Northwest A&F University, Yangling, Shaanxi, P.R. China

²Key Laboratory of Horticultural Plant Biology and Germplasm Innovation in Northwest China, Ministry of Agriculture, Yangling, Shaanxi, P.R. China

³State Key Laboratory of Crop Stress Biology in Arid Areas, Northwest A&F University, Yangling, Shaanxi, P.R. China

⁴College of Horticulture, Shanxi Agricultural University, Taigu, Shanxi, P.R. China

Corresponding author: Y.-J. Wang

E-mail: wangyuejin@263.net / yuejinwanglab1@163.com

Genet. Mol. Res. 12 (1): 859-869 (2013)

Received October 31, 2012

Accepted January 29, 2013

Published March 26, 2013

DOI <http://dx.doi.org/10.4238/2013.March.26.1>

ABSTRACT. This project aimed at breeding new seedless grape cultivars by embryo rescue through three hybridization methods: 1) using cross-breeding between seedless *Vitis vinifera* cultivars and wild Chinese *Vitis* spp; 2) crossing with two seedless cultivars, and 3) hybridization between grapes of different ploidy. Genotype, sampling times, and media were confirmed to play important roles in this system. Among the different genotypes, the productions of hybrid plants were significantly different, ranging from 23.0% (Ruby Seedless x Black Olympia) to only 1.1% (Pink Seedless x Beichun), except for the combinations from which no surviving seedlings were obtained. We got the best sampling times, in days after flowering (DAF), from the following different combinations: 'Flame Seedless x Beichun'

(39 DAF); 'Blush Seedless x Shuangyou' (54 DAF); 'Pink Seedless x Beichun' (54 DAF); 'DA7 x Shuangyou' (44 DAF); 'Blush Seedless x Thompson Seedless' (54 DAF); 'Pink Seedless x Flame Seedless' (54 DAF); 'DA7 x Blush Seedless' (44 DAF); 'Ruby Seedless x Black Olympia' (63 DAF); 'DA7 x Jingyou' (44 DAF); 'Flame Seedless x Fujiminori' (39 DAF), and 'Big Black x Kyoho' (72 DAF). The highest rates of embryo formation (13.2%) and plant development (90.1%) were found when ovules were cultured in MM4 with 500 mg/L mashed banana. Conversely, they were reduced by addition of plant growth regulators. Seven new hybrids were successfully obtained. As a result of early nuclear-free character and ploidy level identification, 11 seedless grape lines, and 3 triploid and 2 haploid grape lines were obtained.

Key words: Grapevine; Embryo rescue; Seedless grapes; Stenospermocarpy; Hybridization