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Transcriptional profiles of emasculated flowers of black locust (*Robinia pseudoacacia*) determined using the cDNA-AFLP technique

J.X. Wang[1]*, P. Sun[2]*, C.Q. Yuan[1], L. Dai[1], Y. Zhang[1], B. Wu[1], C. Long[1], Y.H. Sun[1] and Y. Li[1]

[1]National Engineering Laboratory for Tree Breeding,
Key Laboratory of Genetics and Breeding in Forest Trees and Ornamental Plants,
Ministry of Education, College of Biological Sciences and Technology,
Beijing Forestry University, Beijing, China
[2]Non-Timber Forestry Research and Development Center,
Chinese Academy of Forestry, Zhengzhou, China

*These authors contributed equally to this study.
Corresponding authors: Y.H. Sun / Y. Li
E-mail: sunyuhan@bjfu.edu.cn / yunli@bjfu.edu.cn

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ABSTRACT. Black locust (*Robinia pseudoacacia*) is a tree in the subfamily Faboideae, native to North America, that has been naturalized and widely planted in temperate Europe and Asia. Black locust has important ecological and economic value, but its quality needs improvement. Hybridization programs are important for black locust breeding, but the low rate of fruit set after controlled pollination limits both its breeding and that of other monoclinous plant species that share this problem. In this study, we investigated gene expression in emasculated black locust flowers using the cDNA-amplified fragment length polymorphism technique to determine why the rate of fruit set is low after controlled pollination. Flowers that were emasculated after being frozen in liquid nitrogen were used as controls. Changes in the flower transcriptome were more dramatic at 5 h after emasculation than at 48 h. Injury caused by emasculation decreased the expression levels of genes associated with metabolism, growth regulation, signal transduction, and photosynthesis, and it increased the

expression of genes related to stress-response metabolism, signal transduction, and promotion of senescence. The changes in the expression levels of these genes had negative effects on sugar metabolism, protein metabolism, lipid metabolism, energy metabolism, matter transport, signal transduction, osmotic regulation, pH regulation, and photosynthesis. Thus, emasculation accelerated flower senescence, resulting in low fruit set.

Key words: Black locust; *Robinia pseudoacacia*; cDNA-AFLP; Emasculation

