Quantitative trait loci mapping of the stigma exertion rate and spikelet number per panicle in rice (*Oryza sativa* L.)


National Center for Rice Improvement, China National Rice Research Institute, Key Laboratory for Zhejiang Super Rice Research, Hangzhou, Zhejiang, China

Corresponding author: S.H. Cheng
E-mail: shcheng@mail.hz.zj.cn

Received January 13, 2016
Accepted March 21, 2016
Published October 17, 2016
DOI http://dx.doi.org/10.4238/gmr15048432

Copyright © 2016 The Authors. This is an open-access article distributed under the terms of the Creative Commons Attribution ShareAlike (CC BY-SA) 4.0 License.

**ABSTRACT.** The stigma exertion rate is a polygenic inherited trait that is important for increased seed yield in hybrid rice breeding. To identify quantitative trait loci (QTL) associated with high stigma exertion rate, we conducted QTL mapping using 134 recombinant inbred lines derived from XieqingzaoB and Zhonghui9308, which have high and low stigma exertion rates, respectively. A total of eight QTLs (*qSES6*, *qSSE11*, *qDSE1a*, *qDSE1b*, *qDSE10*, *qDSE11*, *qTSE1*, and *qTSE11*) for single stigma exertion, double stigma exertion, and total stigma exertion were detected. The locations of *qSSE11* and *qTSE11* have not been previously reported, and the *qDSE11* allele from parent XQZB exhibited a positive additive effect. In addition, three QTLs (*qSNP1*, *qSNP3a*, and *qSNP3b*), for spikelet number per panicle were identified. Of note, one QTL (*qSNP1*) was detected in two different environments (Hainan and Zhejiang). To evaluate the advantage of exerted stigma.
for cross-pollination, single, dual, and total stigma exertion should be considered separately for future genetic improvement in the production of rice hybrid seeds. In addition, this study provides information for fine mapping, gene cloning, and marker assisted selection, with emphasis on the latter.

**Key words:** Rice; Stigma exertion rate; Spikelet number per panicle; QTL mapping