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Dr. Albrecht Melchinger

Editor-in-Chief

Theoretical and Applied Genetics

Date Nov. 20

Dear Dr. Melchinger,

Please reconsider our original research article entitled “The genetic basis for panicle traits variation in switchgrass (*Panicum virgatum*)” for publication in Theoretical and Applied Genetics*.*

Panicle (or inflorescence) architectures play a decisive role in determining seed productivity across wild and domesticated grass species, and are known to be controlled by genes (G), the environment (E), and their interactions (G x E). In this study, we grew a genetic mapping population of switchgrass at 10 field sites covering 17 degrees of latitude from South Texas to South Dakota. In 2016, phenotypic data on panicle traits (panicle length, primary branching number, and secondary branching number) and other traits including flowering time, tiller count and biomass at the end of the growing season were collected. These datasets and multi-environment QTL (quantitative trait loci) modelling were used to help answer four fundamental questions: 1) what is the genetic architecture underlying panicle traits? 2) How sensitive are the QTL identified and what are their effects across environments (QTL x E)? and 3) Are there pleiotropic effects between panicle and other traits?

We identified 18 QTL for panicle traits, with 12 of them exhibiting consistent effects (i.e., no QTL x E) and six exhibiting QTL x E interactions. These QTL x E interactions were mostly conditionally neutral effects. QTL identified for panicle traits co-localized with flowering time QTL, tiller count and biomass QTL at different marker positions, displaying broad pleiotropic effects.

The manuscript is well suited for publication in Theoretical and Applied Geneticsbecause it provides insight into the genetic architecture of important quantitative traits in switchgrass. These results will help better understand the nature and drivers of GxE and its impacts on natural phenotypic variation.

This manuscript has not been published and is not under consideration for publication elsewhere.

Thank you for your time and consideration.

Sincerely,

 

Thomas E. Juenger Li Zhang, PhD

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