LS-8-P-1837 Two different methods of fruit cell size measurements

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Cell size is a structural component of fleshy fruit such as tomato berry, contributing to important trait such as fruit size. There are currently a number of methods for measuring cell sizes most rely either on tissue sectioning or digestion of the tissue with cell wall degrading enzymes to release single cells. In this study, we used two tomato plants, cv. Ailsa Craig (wild type) and its ABA deficient mutant flacca. We performed histological analysis and calculate pericarp cell size distribution from slides for light microscopy made according to standard paraffin procedure (Ruzin, 1999). In addition, we measured tomato pericarp mean cell area at ripe fruit stage using the method of cell separation by pectinase solution described in Bertin et al. (2002). At least five measurements per pericarp section were done on five fruits replicates for each genotype. Pericarp sections were observed with a Leica DMLS microscope; images were acquired with a Leica DC300 digital camera and measured by Leica IM1000 software. Cell size of macerated tissue were measured by the public domain Image J software (Rasband, 1997-2009, http://rsbweb.nih.gov/ij), using the “analyze particles” tool, after manually adjusting the segmentation threshold. For both genotypes a minimum of 500 cells were measured and it was found that each of them displayed a distribution of cell size. In ripe fruits, differences between genotypes were clearly visible; cell sizes were larger and more heterogeneous in wild type than in flacca. By both methods the mean size of cells in flacca was about 50% smaller than in wild type. Comparing these two methods for cells measuring we could say that pectinase is less time consuming and could give quantitative trait such as cell number, but histological cross sections provides real view of cell size distribution.

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