

PHENOTYPIC AND GENETIC STUDIES ON SEED SIZE IN TRADITIONAL TOMATO VARIETIES

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Increase of seed size, as a domestication trait, brought positive consequences in the cultivation of tomato, as a higher uniformity of germination and seedling vigor. Traditional varieties (landraces) have a great importance for farmers and breeders because they contain a great variability of agronomically useful characteristics and preserve a treasure of organoleptic and sensorial traits. Aim of this work was to characterize seed size (seed weight, SW) in a large collection of tomato landraces in the framework of the EU-funded project Traditom (<http://traditom.eu/>). Investigations have been made for correlating SW with fruit weight (FW), ovule size, number of seeds per fruit, soluble-solids content and seedling vigor. In line with previous works, we found a positive correlation between SW and FW and SW and seedling vigor. A negative correlation was found between SW and soluble solid contents. In addition, we observed that the number of seeds per fruit has a positive correlation with both SW and FW. Dimensional comparison of ovary vs fruit and ovule vs seed, indicated that, whereas fruit size is largely determined in the ovary in pre-anthesis, the size of the seed is predominantly determined after fertilization, during fruit development.

Previous evidences associated a single nucleotide mutation in the promoter of *fw3.2* (*SIKLUH*) with increased FW and SW during domestication of tomato. A CAPS molecular marker was developed to investigate the allelic status for this polymorphism in a subgroup of 48 varieties of the Traditom collection, to explore the variability of this trait in European traditional varieties and to shed light on the actual importance of this QTL for seed size. In fact, SW and FW showed an association with the mutation identified in *SIKLUH*, but both are quantitative traits and more genes are related to their control.

A deeper understanding on the genetic control of SW in tomato would be very important for breeders, mainly to improve germination uniformity and seedling vigor selecting for bigger seeds. Alternatively, it could be interesting that fruits produce small seeds in accordance with industry and consumer preferences. Investigating this process and understanding its genetic bases could be finally interesting to transfer useful information in crops where the seed is the primary food product.