

**Abstract:**

**Loss of Function of the Polycomb-group protein SIMS11 produces the parthenocarpic fruit phenotype**

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The Polycomb Repressive complex2 (PRC2) is a transcriptional repressor that catalyzes the trimethylation of the H3 histone on the lysine 27 (H3K27me3). In plants, this complex is involved in the regulation of various developmental processes including vegetative growth, flowering transition, vernalization response, development of the sporophytic stage, female gametophyte, endosperm, and seed. Polycomb-group (PcG) protein MULTICOPY SUPPRESSOR OF IRA1 (MSI1) and MULTICOPY SUPPRESSOR OF IRA2 (MSI2) are evolutionarily conserved proteins that form part of the PRC2 complex. In *Arabidopsis*, heterozygous *msi1/+* mutants have endosperm proliferation in seeds and consequent fruit growth even in the absence of fertilization, while diploid *msi1/msi1* embryos are not obtained. In order to understand the function of PRC2 in tomato, CRISPR mutant tomato plants of *Slmsi1* and *Slmsi2* were generated. The homozygous *msi1* mutant plants are viable, and have a seedless (parthenocarpic) phenotype. The *msi1* mutants have bigger flowers and ovaries, and a greater number of ovules compared to the wild-type M82. The other mutant *msi2* may have a partial parthenocarpic fruit phenotype. To elucidate the origin of these effects in the tomato fruits, we are currently characterizing the *msi* mutant phenotypes in more detail. The production of the parthenocarpic seedless fruits would benefit growers and consumers.