

Chilling sensitivity of four near-isogenic fruit-color genotypes of summer squash (*Cucurbita pepo*, Cucurbitaceae) and its association with tocopherol content

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Abstract

Accessions of *Cucurbita pepo* vary in the sensitivity of their young fruit (summer squash) to chilling injury (CI). The dominant gene *B* (*Bicolor*), which confers yellow fruit coloration, is known to increase susceptibility of summer squash to CI as compared with green, *b/b*, fruit. Another dominant gene, *D* (*Dark stem*), confers dark plant stems and somewhat enhanced coloration of the young fruit. However, the effect of this gene on chilling sensitivity of summer squash is unknown. Freshly harvested fruit of vegetable marrow-type summer squash from four near-isogenic genotypes, *B/B D/D*, *B/B d/d*, *b/b D/D*, and *b/b d/d*, were stored for 14 d at three temperature regimes, 4–5, 8–9, and 11–12 °C. Storage at 4–5 °C resulted in CI development in the fruit of all four genotypes. The yellow, *B/B* genotypes suffered injury also at 8–9 °C, especially the fruit of the light yellow, *B/B d/d* genotype that showed slight CI symptoms even at 11–12 °C. Chilling tolerance of the genotypes was in accordance with the total tocopherol contents of their exocarp, being highest in the green-skinned *b/b* accessions and lowest in the light yellow *B/B d/d* genotype. Relatively higher tocopherol content and lower CI severity were observed in the fruit of the enhanced-yellow *B/B D/D* genotype. The dominant *D* allele can partially alleviate the CI sensitivity of summer squash that is conferred by the dominant *B* allele.