

Title The effect of boron, calcium, and surface moisture on shoulder check, a quality defect in fresh-market tomato.

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Abstract

The appearance of a fruit quality defect, shoulder check, in fresh-market tomatoes (*Lycopersicon esculentum*) has devastated the Michigan industry, and caused sporadic concern elsewhere. The defect appears as a surface roughness that occurs primarily on the shoulder area of the fruit. The fruit appearance is damaged and storability is severely compromised. Microscopic inspection reveals that the surface roughness consists of many microscopic cracks that occur in parallel lines. Our objectives were to describe this defect and evaluate the role of weather conditions and fruit surface moisture in inducing it. Field experiments were conducted in 2001 and 2002 in Southwest Michigan using the industry standard cultivar Mountain Spring and recommended practices for irrigated, staked fresh market production. The effects of fruit surface wetness and nutrition on quality were evaluated by comparing responses to a plastic rain shelter; Surround WP kaolin spray (to enhance surface wetness); a foliar spray of calcium (Ca at 2 g litre⁻¹), boron (B at 300 mg litre⁻¹), Ca plus B, water alone; and no treatment. A complementary greenhouse experiment investigated the effects of low and high rates of foliar sprays. A very consistent association was found between defect incidence and precipitation events that followed periods of hot, dry weather during rapid fruit expansion. Fruit quality was highest and the incidence of defects was lowest in fruits produced under plastic rain covers, with an average marketable yield of 62 270 vs. 44 340 kg ha⁻¹ for the control. A 28% reduction in defects was consistently associated with Ca + B sprays across harvests and years. In contrast, 18% more fruits had shoulder check defect with kaolin spray, a consistent increase in defect across years compared to control fruit. Greenhouse and field studies gave markedly similar results, except for a water spray control. The incidence of defect was consistently low with the highest rate of B foliar spray.