Russetting and Microcracking of ‘Golden Delicious’ Apple Fruit Concomitantly Decline Due to Gibberellin A$_{4+7}$ Application

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Abstract. The effect of four applications of gibberellin A$_{4+7}$ [GA$_{4+7}$ (10 mg L$^{-1}$ at 10-day intervals beginning with petal fall)] on water-induced russetting, formation of microcracks, and on fruit growth and deposition of the cuticular membrane (CM) was studied in developing ‘Golden Delicious’ fruit (Malus ×domestica Borkh.). Submerging developing apple fruit in deionized water for 48 h induced russetting in untreated control but not in GA$_{4+7}$-treated fruit. Immersing in water during early fruit development, 19 days after full bloom (19 DAFB), resulted in more russetting than immersions occurring later (139 DAFB). Water on the outer surface of epidermal segments increased the frequency of microscopic cracks in untreated controls but to a lesser degree in GA$_{4+7}$-treated fruit. The effect of GA$_{4+7}$ on water-induced russetting and formation of microcracks was larger during early as compared with later stages of fruit development. Fruit treated with GA$_{4+7}$ consistently had fewer microcracks as compared with non-treated control fruit. GA$_{4+7}$ had no effect on amounts or rates of cutin or wax deposition, strain, or mechanical properties of the CM as compared with the non-treated control. Thus, the decrease in russetting and formation of microcracks in the cuticle of GA$_{4+7}$-treated fruit must be accounted for effects on underlying epi- and hypodermal tissues.