Abstract

Diffuse browning disorder (DBD) a previously un-described storage condition of Cox's Orange Pippin apples was observed in the early 1990's and has become a significant commercial problem in the UK. In 2002 the disorder was first seen after only 2 months of controlled atmosphere (CA) storage and reached a maximum incidence by February. Transfer of fruit from CA to air storage promoted further development but temperature after transfer had little effect. DBD was aggravated by lower than recommended storage temperatures and appeared earlier in traditional CA (2 kPa O_2 <1 kPa CO_2) than in ULO CA (1.2 kPa <1 kPa CO_2) although final levels were similar. Susceptibility to DBD was related to orchard site and could not be ameliorated by modification of storage conditions. DBD occurred in fruit picked at an optimum stage of maturity for storage and with a favourable mineral composition. Mineral composition in individual affected and unaffected fruits was similar. Although there was circumstantial evidence that DBD was worse in dull summers a link between light intensity and DBD susceptibility was not established in shading trials and there was no marked effect of providing additional light into the trees by the use of reflective mulch. With-holding paclobutrazol prevented DBD development in fruit from a previously established high-risk orchard harvested in 2003 and 2004 and reduced DBD incidence in another high-risk orchard in 2004. Attempts to reduce DBD through the application of gibberellic acid (GA) sprays late in the season were unsuccessful. Post-harvest application of GA and 1-MCP tended to reduce DBD. Further work is required to identify orchard factors that induce susceptibility of apples to DBD.