Abstract

The inclusion of triazole chemicals in orchard spray programmes was investigated as a possible cause of a physiological storage disorder (diffuse browning disorder or DBD) that has seriously affected commercial consignments of 'Cox's Orange Pippin' apples (*Malus domestica* Borkh.) since 2000. In 2006, spray regimes that included or excluded the triazole plant growth regulator paclobutrazol and triazole fungicides myclobutanil and penconazole were compared in each of nine commercial 'Cox' orchards. In 2007 the number of orchards was reduced to eight but the number of treatments was increased in order to compare the effects of paclobutrazol separately from those of the triazole fungicides. Apples were stored in controlled atmosphere (CA) conditions of 1.2 kPa O_2 and <1 kPa CO_2 at 3.5 °C for 5 months and assessed for presence of DBD after a further 7 d at 20 °C. In 2007 additional samples were subjected to a delayed cooling (7 d at 20 °C) or postharvest treatment with diphenylamine (DPA) or 1-methylcyclopropene (1-MCP). In both years DBD did not develop where triazole chemicals were omitted from the spray programmes, whereas the inclusion of triazole chemicals resulted in DBD development in fruit from 67% and 71% of orchards in 2006 and 2007, respectively. Fungicide application was more conducive to DBD development than application of paclobutrazol but, in combination, induced the highest incidence of DBD. Triazole (fungicides + paclobutrazol) application generally increased the respiration rate of CA-stored fruit but ethylene production rates were not affected. The development of DBD was not affected by post harvest application of DPA or 1-MCP or a delayed cooling of the fruit.