**Title** Factors affecting the incidence of 'Ruset browning' disorder in 'Cox's Orange Pippin' apples

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## Abstract

The ethylene antagonist, 1-methylcyclopropene, is used commercially as SmartFreshSM to retain firmness during shipping and storage of 'Cox's Orange Pippin' apples. However, the application of SmartFresh can result in an unsightly darkening of the russetted area in the stem cavity. The symptoms have been termed 'russet browning' disorder. Several studies have been undertaken in the last five seasons. In initial studies, fruit held in bins or cartons were treated with a full or reduced rate of SmartFresh to determine the effects of maturity at harvest, time after harvest, SmartFresh dose and pack type on the incidence of 'russet browning' after storage. Results indicated that the incidence of 'russet browning' could be reduced by reducing the rate of 1-methylcyclopropene without a significantloss in firmness retention, and that delaying treatment from three days after harvest to 7 days after harvest increased the incidence. Pack type, i.e. treating fruit in bins or cartons, had no consistent effect on 'russet browning'. In subsequent studies, the incidence of 'russet browning' was decreased if fruit were treated with a reduced rate of l-methylcyclopropene after cooling before cooling, and the disorder could be avoided if fruit were treated after cooling and kept cold throughout storage. However, if fruit were given a warming treatment to simulate packing after treatment and short-term storage, the incidence of 'russet browning' increased the earlier and longer the fruit were warmed after SmartFresh treatment. Data from prediction studies indicated that the degree or maturity of the russet at the time of harvest or treatment was a major factor in the potential to develop 'russet browning', and could not be explained by fruit maturity. Data illustrating the findings will be presented alongside guidelines for best practice on the use of SmartFresh on 'Cox's Orange Pippin' apples.