



Department of

Horticulture

WASHINGTON STATE UNIVERSITY

Department of Horticulture Seminar Series

HORT 509/510

Spring 2018

Thursdays, 2:50-3:40 pm

Presented at the following WSU campuses and Research and Extension Centers: Pullman, Tri-Cities, Mount. Vernon, Prosser, Puyallup, Wenatchee

“Preharvest And Postharvest Management Strategies to Reduce Bitter Pit in ‘Honeycrisp’ Apples”

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Abstract

‘Honeycrisp’ (*Malus x domestica* Borkh.) is a premium apple cultivar that has been widely planted in North America throughout the last two decades. ‘Honeycrisp’ apples are susceptible to bitter pit (BP) which is a physiological disorder related to low calcium in the fruit. BP symptoms include brown, dry depressions in the fruit skin. The disorder typically develops during storage, but it can also appear preharvest. Excessive vegetative vigor in apple trees can reduce fruit calcium concentrations while increasing BP incidence. Plant growth regulators (PGRs) are used in tree fruit to control vegetative growth. The aim of this study was to better understand how preharvest vigor can affect BP risk and to identify postharvest treatments that reduce the onset of BP during storage in fruit from a BP susceptible orchard. The results from this two-year study demonstrated that shoot length can be manipulated with PGRs in the field. However, manipulating vegetative vigor did not change the total leaf area, an important consideration when evaluating whether there is an imbalance between vegetative growth and fruit. Therefore, the tree transpirational balance remained unchanged and changes in leaf and fruit mineral concentrations were not always consistent within year or between years. Accelerating or inhibiting vegetative growth did not significantly affect BP incidence and this work does not support the use of growth inhibition to control BP in ‘Honeycrisp’ apple. Based on the results from postharvest treatments, this study shows that fruit treated with 1-MCP the day after harvest and/or stored in controlled atmosphere (CA) for 1, 2, 3 or 4 weeks followed by storage in air, developed less BP compared to untreated fruit stored in air. 1-MCP delayed loss of soluble solids content, fruit firmness, titratable acidity and reduced internal ethylene content. BP typically developed within 1 month of harvest and slightly changed after 2 months. Results suggest potential for postharvest management of BP development in ‘Honeycrisp’ apples using 1-MCP and/or CA established during conditioning. Preharvest strategies that improve tree transpirational balance may be successful in reducing BP risk and postharvest treatments can be used to manage high-risk lots of ‘Honeycrisp’ for long-term storage.