COMBINATIONS OF NAA AND AVG PROVIDE ENHANCED CONTROL OF FRUIT ABSCISSION IN APPLE

S. McArtney1* and Rongcai Yuan2
1 North Carolina State University, MHCREC, Mills River, NC 28759 USA
2 Virginia Polytechnic Institute and State University, AHS-AREC, Winchester, VA 22602

Fruit abscission before or during the harvest period can reduce economic yield of many important apple cultivars including ‘Golden Delicious’, ‘Red Delicious’, ‘Honeycrisp’, ‘Rome’, ‘Stayman’ and ‘McIntosh’. Growers routinely apply the ethylene biosynthesis inhibitor AVG 14-28 d prior to the anticipated harvest date to delay fruit maturity and abscission. AVG inhibits many of the ethylene mediated changes during fruit ripening including fruit softening, starch degradation, anthocyanin accumulation in the fruit skin and development of an abscission zone in the fruit pedicel. The inhibition of anthocyanin accumulation in response to AVG is most obvious in weak coloring cultivars or strains growing in warmer climates. NAA may also be used to delay fruit drop in apple. NAA is typically applied 10-14 d before the anticipated harvest date, delaying fruit drop by specifically inhibiting expression of genes involved in cell wall degradation in the fruit abscission zone. However, NAA may also occasionally accelerate fruit softening by stimulating ethylene formation in the fruit cortex.

In this presentation we provide data indicating that combinations of AVG and NAA can provide improved control of fruit abscission compared to either material alone. We also report that fruit abscission can be effectively delayed when reduced rates of AVG are combined with NAA.

AVG was applied to mature ‘Red Delicious’/M111 apple trees four weeks prior to the anticipated harvest date at a concentration of 125 mg/L. NAA was applied two weeks prior to the anticipated harvest date at 20 mg/L, either alone or in combination with 125 mg/L or 62.5 mg/L AVG. Silwett L77 was included with all AVG sprays at 0.05% (v/v). Fruit abscission was monitored weekly until 8 weeks after the normal harvest date.

Individual AVG and NAA treatments delayed fruit drop compared to the control, but were not as effective as the combined AVG + NAA treatments. Furthermore, reducing the concentration of AVG to 62.5 mg/L in combination with NAA provided better control of fruit drop than 125 mg/L AVG applied alone (Fig. 1).