

## **Regional variation in juice quality characteristics of four cider apple (*Malus × domestica* Borkh.) cultivars in northwest and central Washington**

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### **Summary**

In this study, four cider apple (*Malus × domestica* Borkh.) cvs., Brown Snout, Dabinett, Kingston Black, and Yarlington Mill, were collected from four orchards, two in northwest Washington and two in central Washington, to compare juice quality characteristics. Northwest Washington has a cool, humid summer climate (16.0 °C on average during this study) and is the origin of the state's cider apple industry, while central Washington has a hot, dry summer climate (22.1 °C on average during this study) and is the center of the state's dessert apple industry. Each year from 2012 to 2015, fruit of the four cultivars was harvested and stored at each orchard until it was collected. Fruit were pressed and the juice analyzed for five quality characteristics important to cider making: soluble solids concentration [SSC (percent)], specific gravity (SG), pH, titratable acidity [TA, malic acid equivalent (g.L<sup>-1</sup>)], and tannin [tannic acid equivalent (percent)]. Harvest dates and climate data were recorded annually for each orchard location. There were no significant differences in any of the juice quality characteristics due to region and no significant interaction of region, cultivar, and/or year. Results did show, as expected, a significant difference in all five juice characteristics due to cultivar. 'Brown Snout', 'Dabinett', and 'Kingston Black' were higher in SSC and SG than 'Yarlington Mill'; 'Dabinett' had the highest pH and lowest TA while 'Kingston Black' had the lowest pH and highest TA; and tannin was highest in 'Yarlington Mill' and lowest in 'Kingston Black'. There was also a difference in SG and tannin due to year; SG was lowest in 2013 while tannin was highest in 2012. The difference in SG from year to year may be a result of variable year-to-year storage time at each orchard prior to collection of fruit. The difference in tannin from year to year was likely due to climatic variation over the four years of the current study. On average, growing degree days increased 10% and chilling hours decreased 10% from 2012 to 2015 in both regions. Classification of the four cultivars included in this study differed from historical records at the Long Ashton Research Station (LARS) in England; in this study the four cultivars exhibited tannin levels below 0.20% and would not be classified as bitter, unlike their historical classification at LARS. Results from this study indicate that variations in juice quality characteristics occur between cultivars as expected and occur within a cultivar from year-to-year, but for the four cultivars included in this study variations did not occur due to production region in Washington.