

Establishing a Semi-freestanding Cider Apple Orchard: Considerations for Tree Support

Cultivars & Rootstock

Two small cider apple research blocks were established at WSU Mount Vernon NWREC in 2016–2017, and we used this opportunity to test two different support stakes for the trees. Our goal was to determine if trees could be established in a medium density orchard (726 trees per acre) with minimal support to be free standing (without a trellis system). Spacing in both blocks is 4 ft. in-row and 15 ft. between rows.

Block 1 consisted of ‘Ashmead’s Kernel’ grafted on Geneva 11 (G.11) rootstock, and included 6 rows planted east and west, with a total of 16 trees per row. Trees were planted in December 2016 – February 2017, and 8 ft. long x 13 gauge rolled edge steel line posts (Linde Vineyard Supply, Monmouth, OR) were set 2 ft. in the ground within 1 ft of the main trunk; trees were secured to these posts with rubber ties. Block 2 consisted of 3 cultivars, ‘Dabinett,’ ‘Golden Russet,’ and ‘Porter’s Perfection’ grafted on Geneva 202 (G.202) rootstock, planted in April 2017. The block includes 6 rows with 48 trees per row, and 6-ft. bamboo stakes 5/8 in. in diameter set 2 ft in the ground were used for support.

Wind Damage

Daily wind speed at the orchard site averaged 3.7 mph from January 1 to October 31 in 2018, but in November 2018 a serious windstorm swept the area. For the first three days of November, wind speed averaged 8.6 mph with sustained winds of 10 mph and above, and wind gusts of 20 mph were recorded for 12 hours with peak wind gusts of 29.6 mph and 27.5 mph, respectively, on 1 and 3 November. On 2 November, winds dropped to 6 – 9 mph with gusts of 18.5 mph. Daily rainfall during these wind events increased to 0.60 inches on average, in contrast to 0.08 inches daily total average precipitation from January 1 to October 31 (data from AgWeatherNet <https://weather.wsu.edu/?p=92950>).

Trees of ‘Dabinett’ on G.202 rootstock were observed to be bending up to 45 degrees (Fig. 1). The damage appeared to be caused by the strong winds in combination with saturated soil conditions. Sustained wind time also appeared to be a factor, because although summer wind gusts can be quite high, they are usually of short duration, whereas winter wind storms tend to produce high wind conditions for several hours. Also a factor is the wind resistance posed by the tree canopy. When the leaves drop in the autumn, wind resistance is reduced, leading to less wind damage of the trees.

The bamboo poles that were installed at planting proved too flexible and shallow to prevent damage to the ‘Dabinett’ trees on G.202 rootstock. ‘Porter’s Perfection’ and ‘Golden Russet’ on G.202 rootstock planted within the same block did not exhibit any damage (Fig. 2). These two cultivars had less vigorous top growth than ‘Dabinett’ and so were less susceptible to the wind. To avoid uprooted or snapped trees, for all trees in this block we installed the same 8 ft. long steel line posts as used in the ‘Ashmead’s Kernel’ block.

Based on this experience, we do not recommend bamboo poles of the height and thickness used at WSU NWREC, as the sole supporting infrastructure in a semi-freestanding orchard in areas where high sustained winds and/or oversaturated soils are a factor.



Figure 1. 'Dabinett' on G.202 supported by bamboo (left) and metal tee-post (right) at WSU Mount Vernon NWREC in November 2018.



Figure 2. 'Porter's Perfection' (left) and 'Golden Russet' (right) on G.202 supported by bamboo at WSU Mount Vernon NWREC in November 2018.