Assessment of One Year of Growth in the New Jersey Hard Cider Variety Trial

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There is much interest in hard cider in New Jersey. In New Jersey the manufacture of hard cider is covered under the Farm Winery Act, passed in 1981. NJ law treats hard cider as a type of wine as it is fermented from fruits (N.J.A.C. 18:3-1.2)

As such there is much interest from existing sweet cider producers to make and sell hard cider as a value added product. There is also great interest and for the establishment of new, stand alone hard cideries. NJ now has a mix of both established, seen the list at https://www.ciderculture.com/cideries/state/nj/

These hard cider producers all need a supply of the best apples for their cider. Some traditional fresh market apples make good hard cider, but many of the hard cider producers are looking for both the English and French hard cider varieties to source for production of craft hard ciders.

Apple growers and hard cider producers are looking to source these hard cider apple varieties that have specific characteristics for craft hard cider. There is an abundant interest and momentum from these NJ hard cider producers to evaluate and grow or purchase these varieties from other apple growers.

As a result, it is important to establish a demonstra-

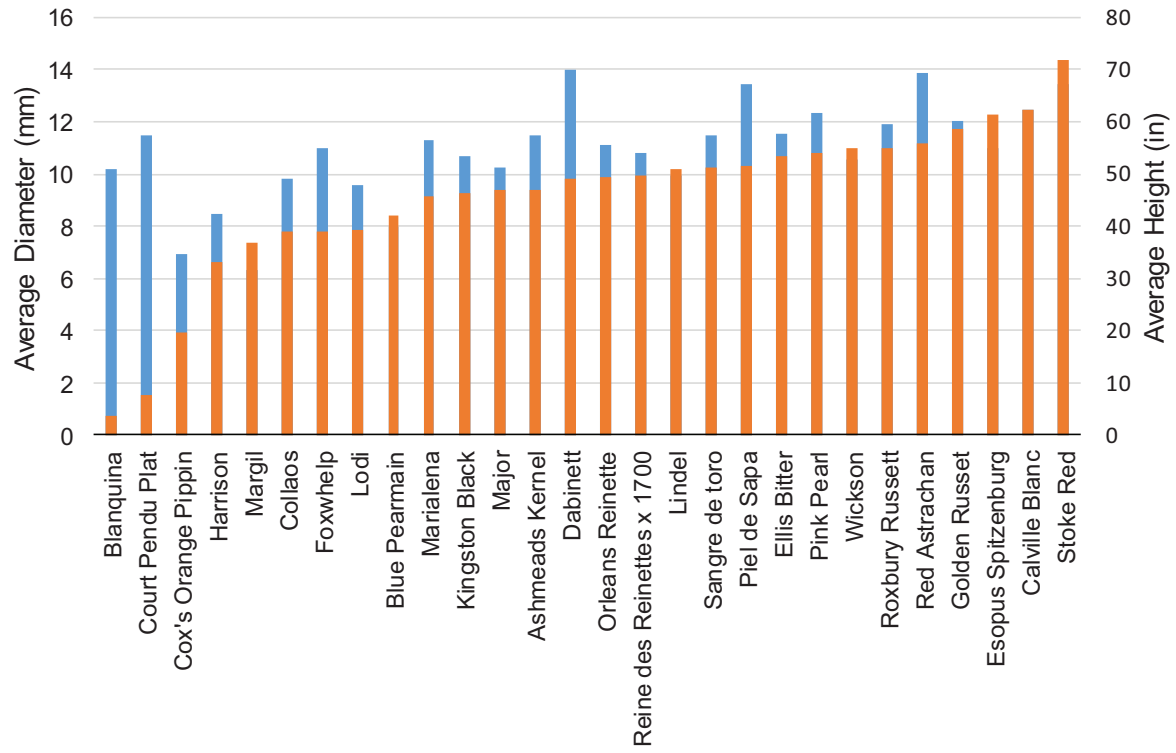


Figure 1. Growth in diameter (mm), and height (in) of 28 hard cider apple cultivar grafts from April 2018 to October 2018 at the Rutgers University, Snyder Research and Extension Farm in Pittstown, New Jersey.

Table 1. Previously characterized traits for varieties included in the hard cider variety trial during 2018 at the Rutgers Snyder Research and Extension Farm. Varieties labeled with TBD indicate information on tannins, sugars and acidity could not be found. Information sourced from the following: The Wittenham Hill Cider Pages. 1996. http://www.cider.org.uk/frameset.htm; Washington State University Extension and Cider. 2018. https://cider.wsu.edu/; Cummins Nursery. 2018. https://shop.cumminsnursery.com/shop/apple-trees/cider; Institut Francais Des Productions Cidricoles 2018. http://www.ifpc.eu/fileadmin/users/ifpc/infos_techniques/Varieties_cidricoles.pef

Variety	Tannin/Bitter	Sweet	Acid/Sharp	Aromatic
Blanquina[1]			X	
Court Pendu Plat			X	X
Cox's Orange Pippin			X	X
Harrison	X	X		
Margil			X	X
Collaos[1]			X	
Foxwhelp	X		X	
Lodi		X	X	
Blue Pearmain		X		
Marialena[1]	TBD	TBD	TBD	TBD
Kingston Black	X		X	
Major	X	X		
Ashmeads Kernel			X	X
Dabinett				X
Orleans Reinette			X	X
Reine des Reinettes x 1700				X
Lindel	X	X		
Sangre de toro[1]	TBD	TBD	TBD	TBD
Piel de Sapa[1]	TBD	TBD	TBD	TBD
Ellis Bitter	X	X		
Pink Pearl			X	
Wickson		X	X	
Roxbury Russett		X	X	X
Red Astrachan		X	X	X
Golden Russet		X	X	X
Esopus Spitzenburg			X	X
Calville Blanc			X	
Stoke Red	X		X	

[1]Varieties originating in Spain that were recently propagated in the United States.

tion variety trial of major hard cider varieties in New Jersey. This will enable us to make recommendations on variety choices and appropriate growing practices for these cultivars. Many of these varieties have had limited cultivation in New Jersey.

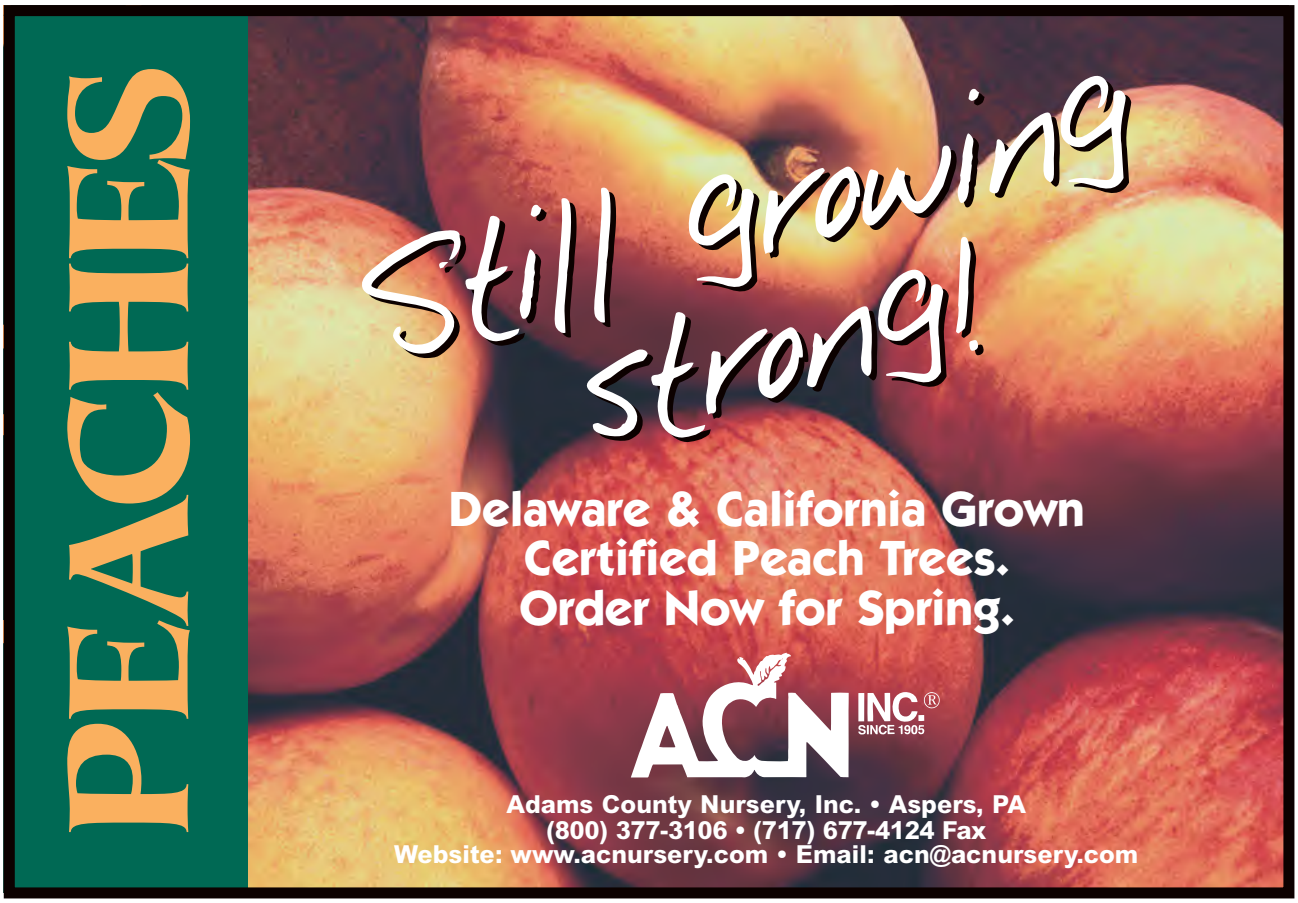
In April 2018, a plot was established at the Rutgers University Snyder Research and Extension Farm to begin our hard cider variety testing. Thirty-one hard cider varieties were top worked onto an existing dwarf research apple block. The hard cider varieties were cleft grafted onto five-year-old apples on M9(NAKBT337) rootstock, planted 3' x 12' growing in a tall spindle

system. Four trees each of the 31 varieties were top worked. Twenty-eight of these varieties saw at least one successful graft. The three varieties that were entirely unsuccessful were Cristalina, Raxao, and Solarina. Unfortunately, all three of these unsuccessful varieties are new Spanish hard cider selections being tested in the United States.

Hard cider apple varieties are categorized primarily by their level of tannins (bitterness), sugars, acidity (sharpness), and aroma. The 28 varieties successfully grafted for this study are listed in Table 1, alongside their cider characteristics. Characteristics listed in Table 1 were referenced from previous studies and were used to determine their inclusion in this study. To date, the three unsuccessful varieties from Spain have yet to be characterized under New Jersey conditions. However, they will be added to this study in the 2019 growing season.

Preliminary results of the study show high grafting success. Just under 50% of all of the trees grafted had a 100% graft take (4 scions), followed by 33% of the trees resulted in 1-3 successful grafts. Of the remaining trees, 18% resulted in zero graft take and will be re-grafted next season.

Blossoms were thinned off of the trees during 2018 to allow for increased vegetative growth. Therefore, fruit data were not collected in 2018.

Graft vigor was assessed by scion length and diameter at the end of the growing season. Tree growth was measured above the original scion wood scar, and scion diameter was measured 12 inches above the top of the original scion wood. Tree vigor varied dramatically across cultivars, as shown in Figure 1. Stoke red was shown to have both the largest diameter (14 mm) and the greatest height (<70 inches) after one growing season. This was followed closely by Calville Blanc, Esopus Spitzenburg, and Golden Russet, all ~ 60 inches tall and 12 mm in diameter. Blanquina, Court Pendu Plat, and Cox's Orange Pippen all grew less than 20 inches in one season; however, diameters on these varieties were some of the largest, ranging from 7 to 12 mm.

Despite only one growing season of data, this study provides a first glimpse as to which varieties show initial vigorous growth in the New Jersey climate. Calville Blanc, Stoke Red, and Esopus Spitzenburg represent an array of flavor profiles, sharp, bittersharp, and sharp respectively, all of which are well suited to hard cider production.