

PEAR VARIETY EVALUATION IN THE SACRAMENTO RIVER DISTRICT

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ABSTRACT

This trial was planted in Walnut Grove in Feb. 2010 using 10 varieties (Andy, Bartlett, Blake's Pride, Carmen, Cinnamon, Norma, Santa Maria, Sunrise, Tosca, and Turandot) on two rootstocks (OHxF 87 and Winter Nelis). In 2012, most Santa Maria trees were severely damaged or killed by blight and all were removed. In 2014, Carmen trees were similarly damaged by blight and were eliminated from harvest data collection. From 2011 to 2014, Andy, Norma, and Turandot produced the greatest growth, and Blake's Pride and Cinnamon the least. For nearly all varieties, trees on OHxF 87 had greater percent increase in growth from 2011 to 2014 than trees on Winter Nelis. Tosca consistently produced the greatest number of fruit per tree and Norma the least. Cinnamon has consistently produced large fruit and Tosca the smallest. Total yield per tree was greatest for Sunrise and Tosca and lowest for Norma. Trees on OHxF 87 tended to produce more fruit per tree than trees on Winter Nelis, and average fruit size was larger for all trees on OHxF 87. Cinnamon and Sunrise have performed well in this planting, and taste tests in a North Coast variety trial found that they ranked at least as high in taste preference as Bartlett. Five new blight-resistant varieties were planted in the same block in spring 2013. One numbered variety produced red-blushed fruit in 2014, harvested July 14, with 2-7 fruit per tree and an average fruit weight of 0.41 lb.

INTRODUCTION

Below are characteristics of the varieties being compared in this planting.

Blake's Pride combines blight resistance with aromatic, juicy fruit and consistent yield (Ingels, 2007). It was created by a cross in 1965. The fruit is shaped like Bartlett and the skin is golden to light yellow, with some light tan russetting; it was very russetted in a North Coast trial (Elkins, 2006). It requires pollination and it ripens 2 weeks after Bartlett in the Pacific Northwest but closer to Bartlett in California (USA Pears, 2011).

Cinnamon is a russetted pear that was discovered as a limb mutation in a Bartlett tree near Hood River in 1979; however it is a winter pear that ripens with Anjou (Ingels et al., 2007). Cinnamon is a very late-harvested variety that was found to fully russet (similar to Noble Russet) in a North Coast trial (Elkins, 2006). It ranked high in taste tests, scoring as well as Bartlett for overall liking and purchase intent (Elkins, 2007).

Sunrise is a blight-resistant that ripens before Bartlett, close to Starkrimson. It has a yellow skin with a slight pink blush and little russetting. The fruit has a sweet pleasant flavor. Evaluations by USDA-ARS researchers have shown excellent overall consumer acceptance in comparison with existing commercial varieties (Scorza et al., 2008).

Italian Varieties

Carmen is currently the most widely sold new variety in Italy (Fresh Plaza, 2012). It is a consistent bearer and although it flowers with Bartlett, it ripens about 2 weeks earlier. The fruit has a good appearance, as it has attractive yellow and red color that is accentuated during refrigeration. It also has a long shelf life, and is very tolerant of handling and transportation (Mazzoni Group, 2012).

Norma is used for high-density orchards because of its medium-low vigor. Fruits are attractive and have a slight rust on a portion of the surface. Fruit size is large with yellow-green skin and some light red.

Turandot fruit are slightly red-colored, although red color increases during cold storage. Fruit are medium sized with yellow-green skin with some red.

Santa Maria has very large fruit, which mature early, with good quality. The skin is yellow green and sun-exposed areas are pink to red. IT was found to be one of the most sensitive varieties to fire blight (Ristevski and Ristevska, 1996).

Tosca fruit are similar to Bartlett. It is grown extensively in Italy where it is one of the earliest maturing varieties. It has greenish-yellow skin with an occasional red blush.

OBJECTIVE

The objective of this study was to evaluate the characteristics of selected pear varieties and the suitability for potential production.

PROCEDURES

The trial was planted in Feb. 2010 in a new orchard adjacent to Walnut Grove. The soil type is Laugenour loam. Trees were propagated by Fowler Nursery. Ten varieties were planted, including Bartlett. The goal was to plant five trees each of 10 varieties on two rootstocks (Winter Nelis and OHxF 87) (100 trees total). However, 14 of the trees did not survive in the nursery. In 2011-12, 11 additional trees died, mainly due to fire blight. Most of the Santa Maria trees were severely damaged or killed by blight. In 2014, Carmen trees were similarly damaged by blight and were eliminated from harvest data collection. Evaluations include tree growth, measured by trunk cross-sectional area (TCSA), period of flowering, and fruit number, weight, and yield.

RESULTS

The flowering period in 2014 was about 10 days earlier and was more compressed than in 2013 (Fig. 1). In both years, Turandot was the earliest to reach full bloom.

In spring 2014, a severe fire blight epidemic affected many Sacramento Delta orchards, including the orchard in which the variety trees are planted. Carmen trees suffered the

worst, as most trees lost a substantial number of limbs and two trees died; therefore, this variety was removed from further evaluation. The percent of each tree's structure remaining was evaluated and a summary is shown in Fig. 2. OHxF rootstock trees were developed largely for fire blight resistance. In this trial, the portion of each tree still remaining after blight cutting was estimated. OHxF 87 trees had a combined average of 79% remaining after the blight was cut, whereas Winter Nelis trees had 64% left.

Growth of trees from 2013 to 2014, measured by trunk cross-sectional area (TCSA), was greatest for Andy and Turandot, and lowest for Blake's Pride (Fig. 3). Cinnamon and Tosca also had relatively less growth than other varieties, but slightly more than Blake's Pride. Over a three-year period, Andy, Norma, and Turandot produced the greatest growth, and Blake's Pride and Cinnamon the least (Fig. 4). For nearly all varieties, trees on OHxF 87 had a greater percent increase in TCSA (growth) from 2011 to 2014 than trees on Winter Nelis (data not shown); overall, trees on OHxF 87 had a 327% increase and trees on WN had a 299% increase. In 2014, trees on OHxF 87 rootstocks were an average of 24% larger than trees on Winter Nelis, based on TCSA.

As in 2013, Tosca produced by far the greatest number of fruit per tree and Norma produced very few (Fig. 5). Sunrise and Turandot produced more than Bartlett, Blake's Pride, and Cinnamon. Cinnamon and Norma produced slightly larger fruit than Bartlett, Blake's Pride, and Sunrise, and Tosca and Turandot produced the smallest fruit (Fig. 6). Total yield per tree was greatest for Sunrise and Tosca and lowest for Norma (Fig. 7). Harvest data from Andy trees are not available.

Trees on OHxF 87 rootstock tended to produce more fruit per tree than trees on Winter Nelis (especially Tosca), and average fruit size was larger for all trees on OHxF 87 (especially Cinnamon) (data not shown). On average, OHxF 87 trees produced 38% more fruit, 42% larger fruit, and 114% greater total yield per tree than Winter Nelis trees.

In addition to the varieties discussed above, three to four trees each of five new blight-resistant varieties developed by Richard Bell at the Appalachian Fruit Research Laboratory in West Virginia are being evaluated in the same block. Parentage of the trees is dominated by Bartlett, and also includes Seckel, and Comice. The trees were planted in April 2013 and Bartlett trees were included for comparison. The variety XB22 (Gem) produced the greatest growth and XB23 and Bartlett produced the least (Fig. 8). Three of the four trees of one variety produced strongly red-blushed fruit, harvested July 14, with 2-7 fruit per tree and an average fruit weight of 0.41 lb. One tree of another variety produced 6 fruits averaging only 0.28 lb. each. The XB22 (Gem) trees were reported to have pear vein yellows virus from the nursery, so the trees were removed and virus-free trees will be replanted.

DISCUSSION

After 5 years, several varieties are proving to be unacceptable for commercial adoption in the Sacramento Delta. Santa Maria is known for being highly susceptible to fire blight, and all trees were removed in 2013 due to blight. Carmen developed large numbers of rattail

blooms in both 2013 and 2014 and suffered severe blight in 2014. Tosca fruit are consistently small. Norma was one of the most vigorous varieties but it produced very little fruit in year five.

Vegetative growth of Sunrise was similar to that of Bartlett, and growth of Blake's Pride and Cinnamon was considerably less. Of these four varieties, Sunrise produced the most fruit but Cinnamon had the largest fruit; Sunrise had the greatest total yield.

In an earlier variety trial in the North Coast, Cinnamon and Sunrise scored at least as well as Bartlett in taste preference and purchase intent, but Blake's Pride was behind Bartlett (Elkins, 2007). In the 2014 fire blight outbreak, Cinnamon, Sunrise, and Blake's Pride fared relatively well compared to Bartlett, which on average lost 50% of its structure per tree. The skin of Blake's Pride fruit had brown freckles, usually giving a partially russeted appearance. For this reason, it is questionable if Blake's Pride could become a commercially acceptable variety.

LITERATURE CITED

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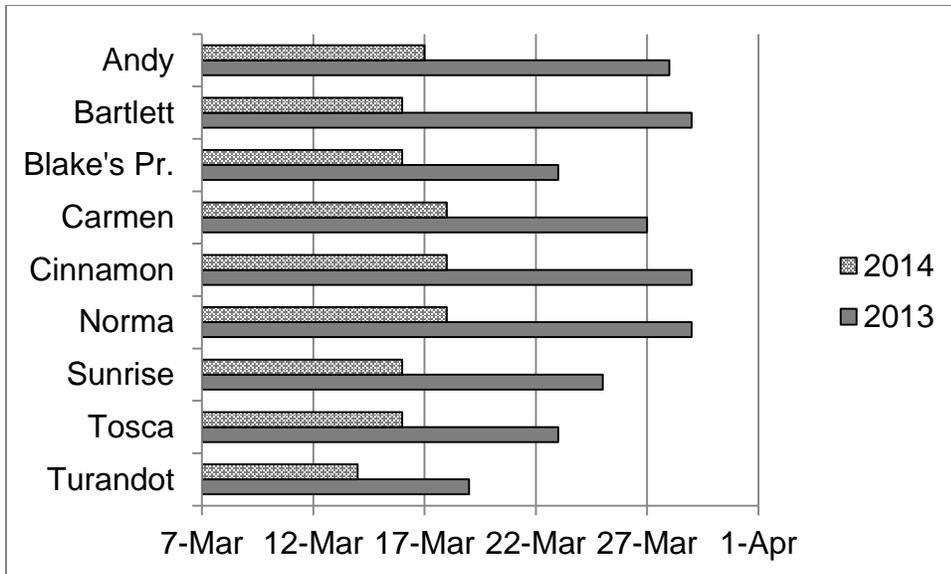


Figure 1. Average dates of full bloom, 2013 and 2014.

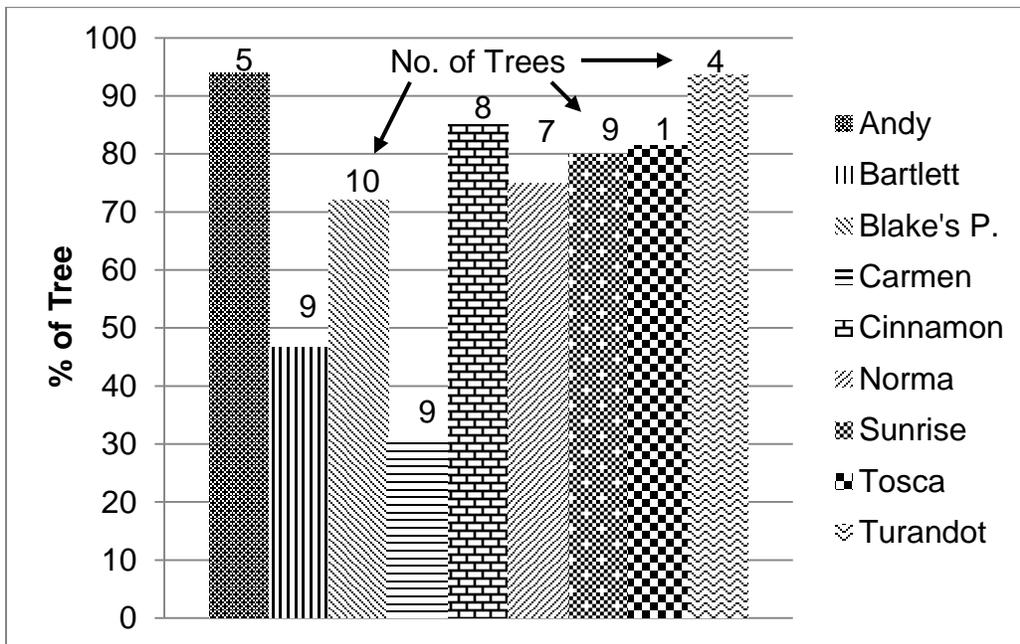


Figure 2. Average percent of trees remaining after blight cuts, evaluated June 2, 2014.

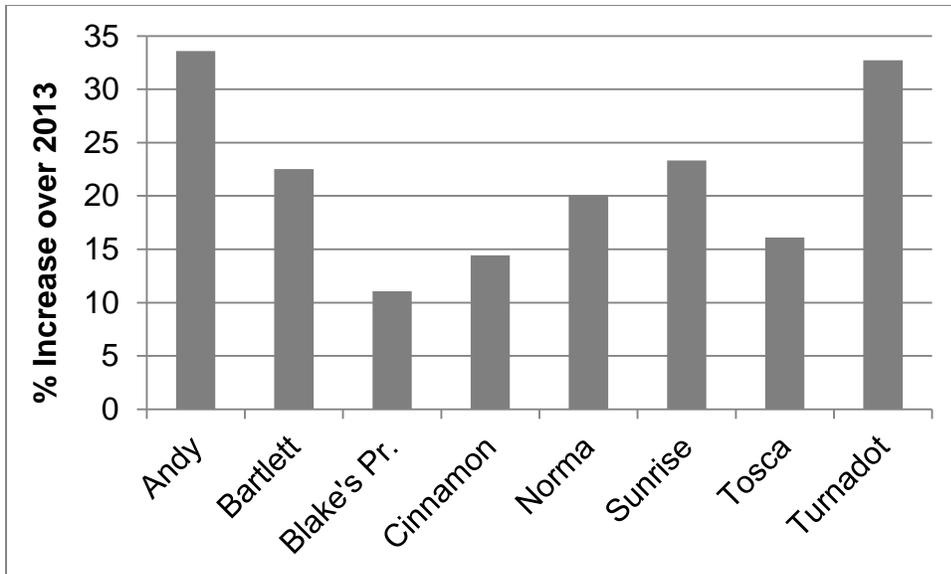


Figure 3. Average increase in trunk cross-sectional from late 2013 to late 2014.

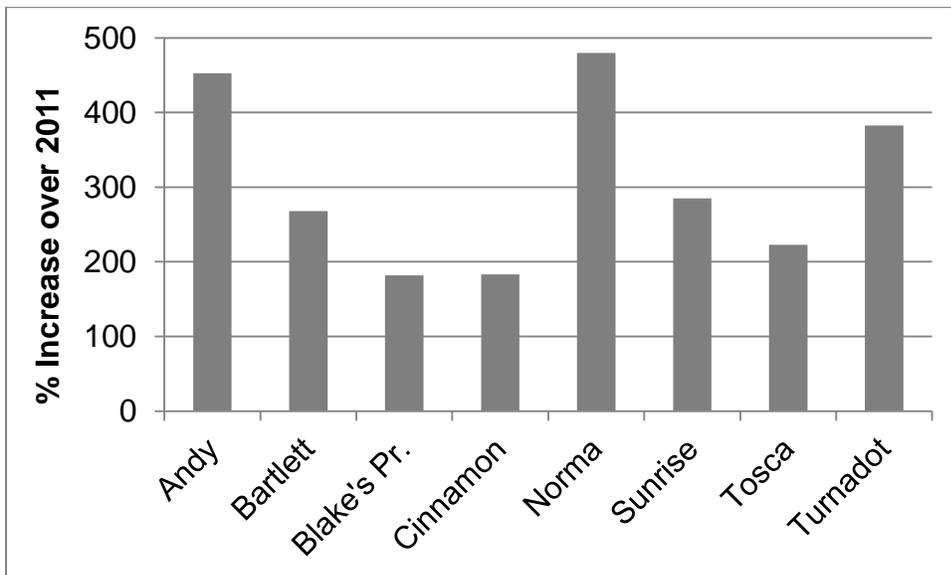


Figure 4. Average increase in trunk cross-sectional from late 2011 to late 2014.

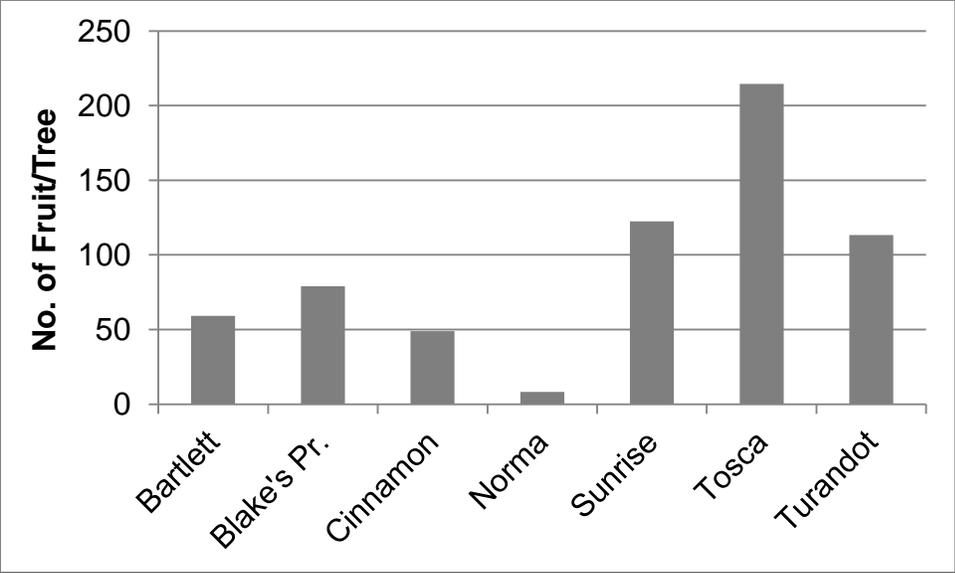


Figure 5. Average number of fruit per tree, 2014.

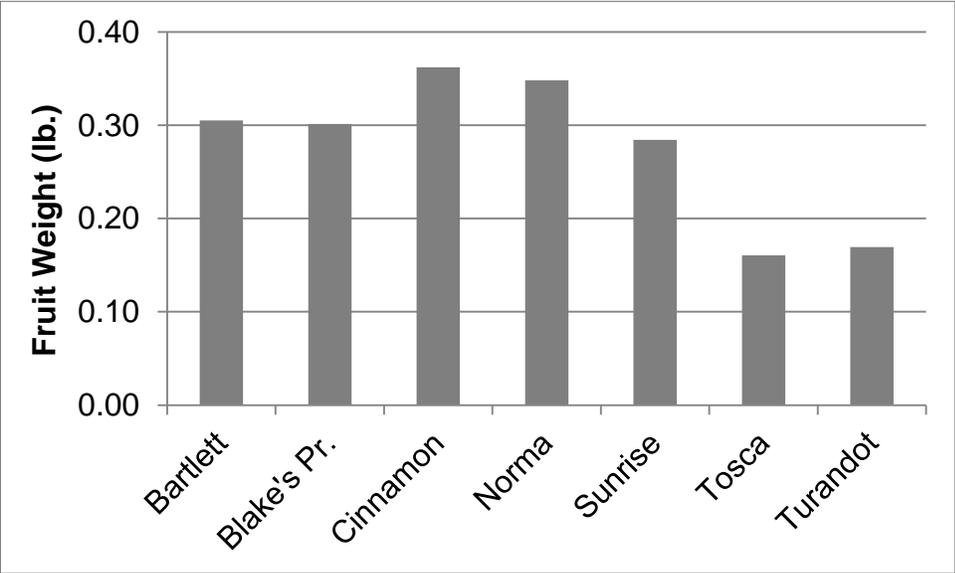


Figure 6. Average fruit weight, 2014.

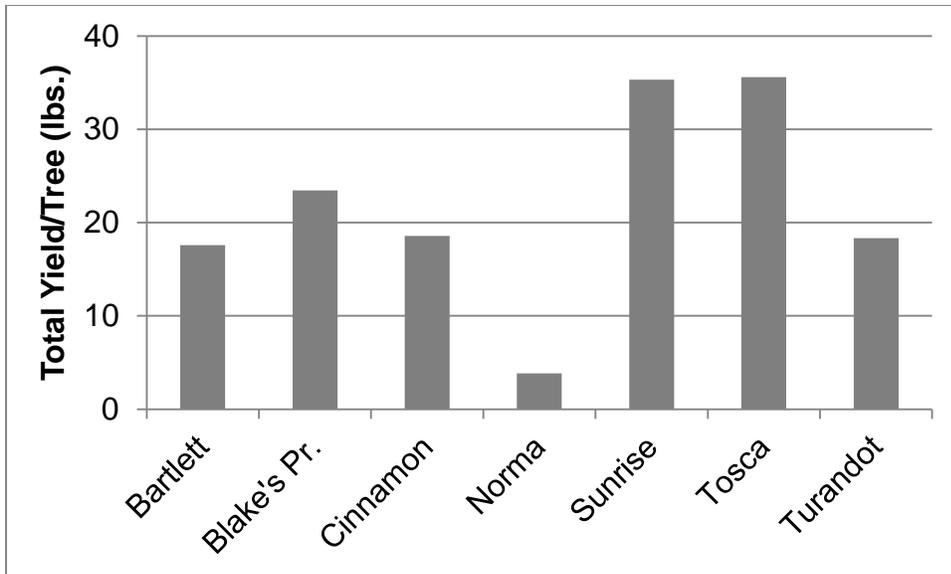


Figure 7. Average yield per tree, 2014.

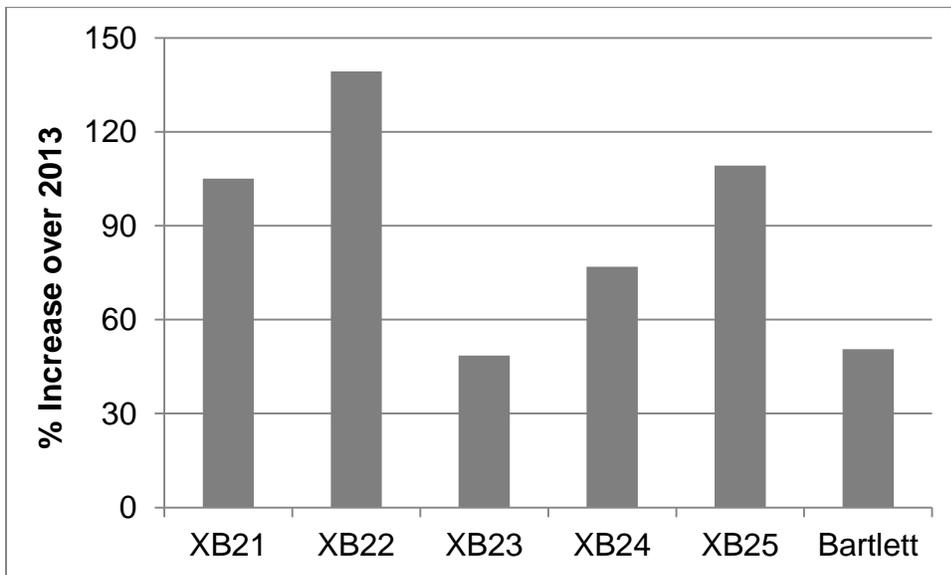


Figure 8. Average increase in trunk cross-sectional of numbered varieties from USDA breeding program, 2014 (planted April 2013).

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