

Evaluation of new low- and moderate-chill peach cultivars in coastal southern California

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Introduction

A recent study of ten low-chill peach [*Prunus persica* (L.) Batsch] cultivars indicated that at least six were well adapted and suited for home gardens in south coastal California (Hagillih et al, 2000, 2003; Hodel and Hagillih, 2004). Continued interest in such cultivars prompted us to expand our search for promising low-chill peach cultivars for the home garden to include moderate-chill peaches. For this study, we selected 11 cultivars for comparative evaluation with 3 high-yielding cultivars identified from the recent study: ‘August Pride’, ‘Mid-Pride’ and ‘Tropic Snow’ (Table 1.). The selected cultivars are releases from breeding programs at the Universities of Florida, Georgia and Texas A & M and from those developed by Dr. Zaiger or some nurseries in California (Burchell Nursery, 2004). We hope that the results of this study will help us to identify additional promising cultivars to fill the need for backyard planting, U-pick, local road stand and farmers market operations.

The objectives of this research were, therefore, to 1) evaluate the adaptability, fruit yield and quality of the 14 low- and moderate-chill peach cultivars in south coastal California and 2) assess the vulnerability of these cultivars to any pests and diseases.

Materials and Methods

A low- and moderate-chill peach cultivar trial was established at the University of California South Coast Research and Extension Center in Irvine, California, in March 2005. All 14 cultivars tested were grafted on ‘Nemaguard’ rootstock. The peach trees were planted in a complete block design where the experimental unit was a two-tree plot containing trees of the same cultivar. Tree spacing was 6 m between rows and 3 m in-row and trees were trained to the open-vase system. Plots were replicated 5 times. We managed the trial orchard according to recommended cultural practices for peaches (La Rue and Johnson, 1989).

Tree trunk diameters were measured on a painted area 5 cm above the graft union initially in March 2005 and after cessation of growth in December 2005. Tree diameter measurements were converted to and analyzed as trunk cross-sectional area (TCA). In August 2005, we determined the severity of a powdery mildew infection on the trees by a visual rating system. Tree canopies were rated as percent coverage of tree foliage and branches with powdery mildew where 5% coverage was considered to be minimal infection (Fig. 1.) while 100% coverage was considered to be severe infection (Fig. 2.).

Data for tree TCA and powdery mildew rating were recorded on a per tree basis and analyzed by the standard ANOVA procedure of the CoStat Statistical Software. Mean separation was by

Duncan's multiple range test. The bloom date reflected date of first flowering by a tree or trees of a given cultivar.

Results and Discussion

Trunk cross-sectional area is a universal criterion to compare tree size of different treatments or cultivars. It relates directly to the size of the canopy, and therefore allows a rough comparison of relative growth. However, where initial TCAs of treated trees or cultivars are significantly variable or for reporting first-year tree growth, a better criterion would be TCA increase rather than TCA itself. Thus, Schupp (2001) used TCA increase to compare treatment effects on first-year tree growth of apples.

The cultivars were significantly variable in CTA at the start of the trial (Table 1.). Therefore, we reported tree growth as CTA increase for the first year of growth. Results indicated that 4 cultivars ('May Pride', 'Scarlet Robe', 'Desert Gold' and 'August Pride') had the greatest TCA increases, ranging from 24.2 cm² to 23.2 cm². These cultivars had significantly higher TCA increases than the 4 cultivars with the least TCA increases, ranging from 15.3 cm² to 15.0 cm²: 'Donut Stark Saturn', 'June Pride', 'Summerset' and 'Tropic Snow'. The remaining 6 cultivars had intermediate TCA increases and they did not significantly differ from either the cultivars with the greatest TCA increases or those with the least TCA increases. These are preliminary results and we cannot tell if these tree growth trends for the cultivars will carry into the future.

In August 2005 trees began to show symptoms of powdery mildew. We rated the severity of the infection visually and the incidence of the disease on foliage and branches is presented in Table 1. The cultivars 'Santa Barbara', 'Donut Stark Saturn', 'Snow Beauty White', 'Summerset' and 'Fantastic Elberta' were moderately to somewhat severely infected with powdery mildew, the infection ranging from 46% to 71% surface coverage of the tree canopy. The infection of the remaining 9 cultivars ranged from 7% to 36% surface coverage. We were able to adequately control the disease with a single spray application of Rally 40W (Myclobutanil). Although it is still too early in the trial, these results suggest that the 4 'Pride' group of cultivars in this study and 'Tropic Snow' appear to be more resistant to powdery mildew and home gardeners may use this information to select cultivars.

The bloom dates of the early flowering cultivars ranged from February 1 to February 22 while the bloom dates of the late flowering cultivars ranged from April 2 to April 22 (Table 1.). There were 7 cultivars in the former category and 7 in the latter category.

Conclusion

These data are only preliminary. A few more years will be required to evaluate these cultivars adequately, but it is interesting to observe the significant differences that have developed in this first season. First-year results showed that 4 cultivars had significantly higher CTA increases than 4 other cultivars with the least CTA increases. The remaining 6 cultivars had intermediate CTA increases which did not differ significantly from either of the 2 cultivar groupings.

Evaluation of the cultivars for incidence of powdery mildew suggests that the 4 'Pride' group of

cultivars in this study and 'Tropic Snow' may be more resistant to the disease compared to 5 other cultivars. Home gardeners and others may use this information to select cultivars.

Finally, our results suggest that we can also group these cultivars in 2 categories: early flowering and late flowering types. There were 7 early flowering cultivars with bloom dates ranging from February 1 to February 22. There were also 7 late flowering cultivars with bloom dates ranging from April 2 to April 22.

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Fig.1. Peach tree leaves and branches minimally infected (5% surface coverage) with powdery mildew.



Fig. 2. Peach tree leaves and branches severely infected (100% surface coverage) with powdery mildew.

Table 1. Tree trunk cross-sectional area (TCA) growth, Bloom Date and Powdery Mildew Rating of 14 low- and moderate-chill peach cultivars.

| Cultivars | Initial TCA (cm ²) | 2005 TCA Increase, cm ² | Bloom Date | Powdery Mildew Rating ^z |
|----------------------|--------------------------------|------------------------------------|------------|------------------------------------|
| May Pride | 2.7de ^y | 24.2a ^y | 2/06/06 | 11ef ^y |
| Scarlet Robe | 3.9bc | 24.0a | 4/10/06 | 36bcdef |
| Desert Gold | 2.1e | 23.3a | 2/12/06 | 35bcdef |
| August Pride | 4.3b | 23.2a | 2/13/06 | 34bcdef |
| Snow Beauty White | 3.9bc | 22.4ab | 4/10/06 | 60abc |
| Early Amber | 4.5b | 21.0ab | 2/06/06 | 23def |
| Santa Barbara | 3.0d | 20.5ab | 4/16/06 | 71a |
| Elberta | 6.2a | 18.4ab | 2/22/06 | 32cdef |
| Mid-Pride | 3.0d | 17.9ab | 2/12/06 | 12ef |
| Fantastic Elberta | 6.9a | 16.9ab | 4/22/06 | 46abcde |
| Donut 'Stark Saturn' | 4.0bc | 15.3b | 4/02/06 | 69ab |
| June Pride | 2.9d | 15.2b | 4/20/06 | 29cdef |
| Summerset | 4.1bc | 15.0b | 4/18/06 | 58abcd |
| Tropic Snow | 3.3cd | 15.0b | 2/01/06 | 7f |

^zPercent surface coverage of tree foliage and branches with powdery mildew.

^yMean separation in columns by Duncan's multiple range test, 5% level.