

Mandarin Selection Trials in Arizona – 2005-06¹

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Abstract

Second year yield and packout data from a trial containing 'Fina', 'Fina Sodea', 'Sidi Aissa', 'Oroval', 'W. Murcott Afourer', 'Fremont', and 'Gold Nugget'; selections were collected in 2004-05. For the year, 'Fina Sodea' had the greatest yield, and average fruit size, while 'Fremont' had the smallest yield, and the smallest fruit size.

Introduction

Mandarins are becoming increasingly important to the US citrus industry. Mandarins are seen by the consumer as good to eat and convenient, because of their flavor, seedlessness and ease of peeling. All three of these characteristics must be exhibited by a successful mandarin cultivar. The clementine is the cultivar that has been most popular because of these characteristics. Spanish imported Clementines that used to appear on grocery shelves are being replaced by California-grown fruit. The objective of this study is to test the adaptability of Clementines and other mandarins to the Arizona conditions.

Materials and Methods

This trial was established in March 2003 in Block 21 of the Citrus Agricultural Center, near Waddell, Arizona. Trees were planted on a 24-ft x 24-ft spacing. Mandarin selections in the trial include:

- 'Fina' – The original clementine cultivar imported from Algeria into Spain in 1925. Reportedly late, with small fruit
- 'Fina Sodea' – A mutation of Fina clementine discovered in Morocco.
- 'Fremont' – A variety developed at the USDA station at Indio, CA. This variety is a clementine x Ponkan mandarin hybrid and is mid-season and sweet.
- 'Gold Nugget' - A seedless mid- to late-season mandarin developed at the University of California, Riverside. 'Gold Nugget' is a hybrid of 'Wilking' x 'Kincy' parentage.
- 'Oroval' – A spontaneous mutation of Fina, discovered in 1950.
- 'Sidi Aissa' – Another mutation of Fina clementine discovered in Morocco. Valued there because of its large fruit size and durable peel.
- 'W. Murcott Afourer' – An easy peeling mandarin that originated as an open-pollinated seedling in Morocco. Seedless when grown in isolated blocks.

¹ The author wishes to thank Mr. James Truman, Mr. Marco Peña, and Mr. Enrique Madrigal for their assistance in completing this project. The author would also like to thank the Arizona Citrus Research Council for supporting this research. This is a partial final report for project 2005-01 – Citrus rootstock and cultivar breeding and evaluation for the Arizona citrus industry – 2005-06.

The original plan was for there to be 15 trees of each variety. However due to mistakes while the trees were propagated and subsequent tree death, there range between 10 and 21 trees of each variety, except for 'W. Murcott Afourer' with 6 trees, and 'Gold' Nugget' with 4. All trees are on Carrizo citrange rootstock.

Irrigation is border flood, and normal cultural practices are used. Yield data is collected during the winter, and 2004-05 was the first harvest year for this trial. For 2004-05, trees were strip-picked on 12-6-05, except the 'W. Murcott Afourer' which had lost so much yield due to bird predation that we determined that the data for this cultivar for the year was a total loss. There was little yield for 'Gold Nugget' in 2005-06. For each harvest date, the entire quantity of harvested fruit from each tree was passed through an automated electronic eye sorter (Autoline, Inc., Reedley, CA), which provides weight, color, exterior quality and size data for each fruit. Fruit packout data is reported on a percentage basis. Ten fruit per tree were selected for fruit quality analysis. This analysis included % juice, juice pH, total solids, total acids, total solid to total acid ratio, peel thickness, and granulation.

All data was analyzed using SPSS 11.0 for Windows (SPSS Inc., Chicago, Illinois).

Results and Discussion

Second year yield for the trial is shown in Figure 1. There was little difference between the selections, except that 'Fremont' had the least yield, and 'Fina Sodea' had the most. All other selections were intermediate between these two. It is interesting to note that the two 'Clementine' cultivars from Morocco had the greatest yield. This may suggest that these cultivars are more adaptable to the Arizona desert climate. Packout of the cultivars is shown in Figure 2. Trees of 'Oroval' and 'Fina Sodea' had the largest fruit, while those of 'Fremont' had the smallest. 'Fina Sodea' and 'Oroval' fruit appear to be slightly larger than 'Fina' and 'Sidi Aissa' fruit, but 'Oroval' fruit are the largest of the four 'Clementine' selections in the trial. More yield and packout data need to be taken to confirm these trends.

'Fremont' fruit had the greatest juice content, the least granulation, the greatest solids and greatest acids among the cultivars tested (Table 1). This cultivar also had the best exterior fruit color and the least rounded fruit. Among the Clementines, there was little differentiation, other that 'Oroval' had the least exterior coloration. Again, more data needs to be taken to identify differences between these cultivars.

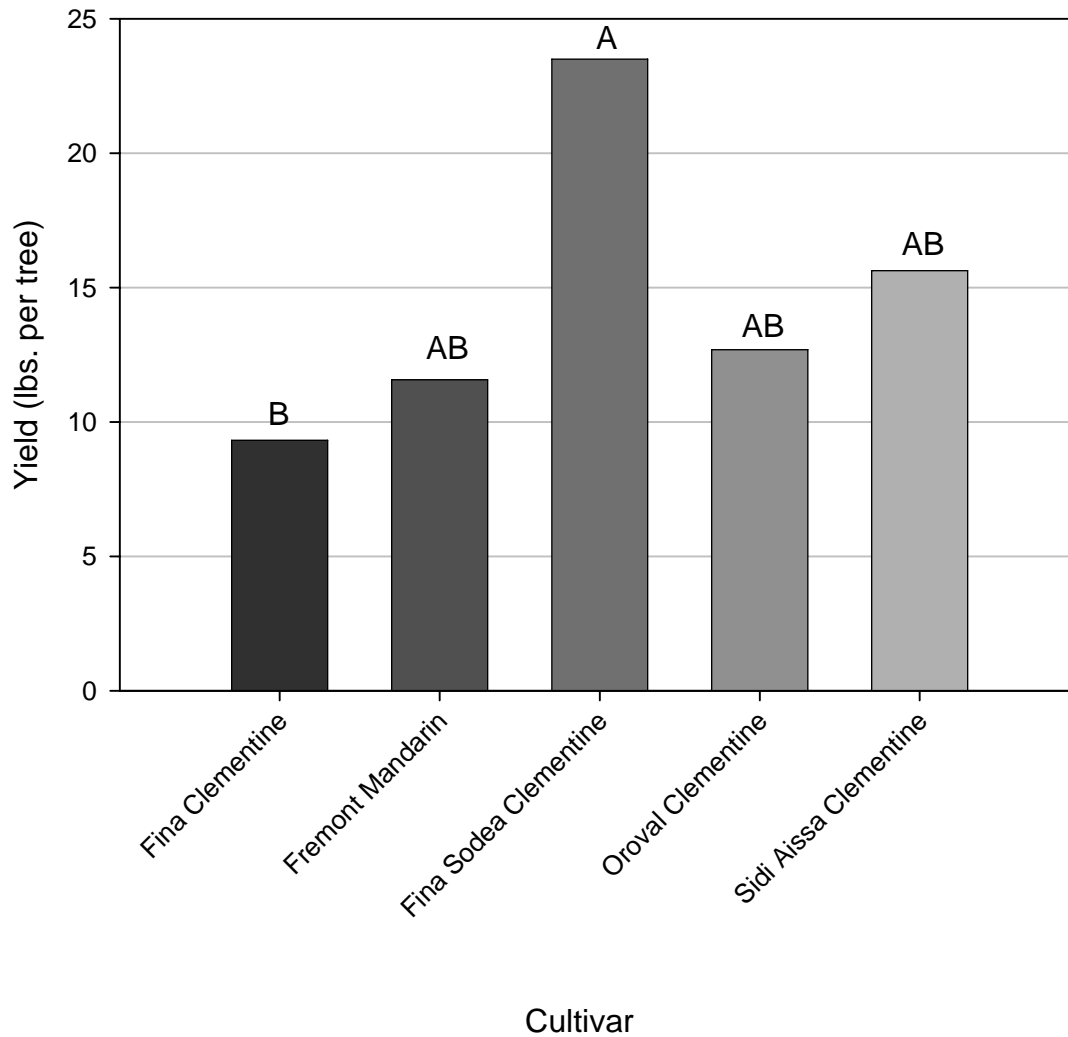


Figure 1. Yields of five mandarin selections on Carrizo citrange rootstock for 2005-06 season. Overall yield for the year can be compared using the uppercase letters above each stacked bar.

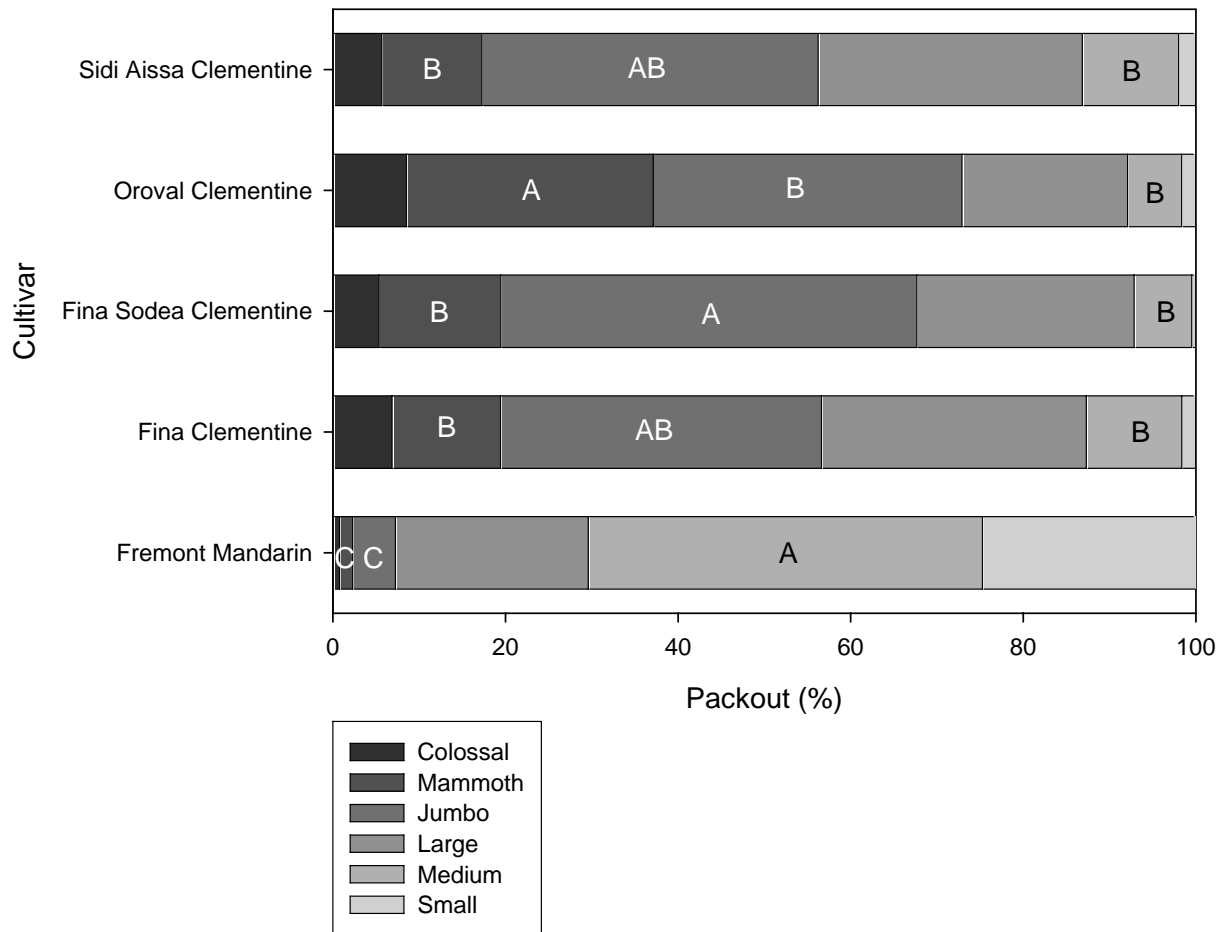


Figure 2. Packout of five mandarin selections on Carrizo citrange rootstock for 2005-06 season. Significant differences are shown by different letters within bars of the same shade. Bars of different shades cannot be statistically compared. Significant differences exist for the small fruit size; although no letters are shown. 'Fremont' has significantly more of the small fruit than do the other cultivars tested.

Table 1. 2005-06 Fruit quality of five mandarin cultivars budded to Carrizo rootstock.

Cultivar	Juice Content (%)	pH	TSS (%)	Total Acids (%)	Peel Thickness (mm)	Granulation (%)	Fruit Shape ^x	R/G ^w
Fremont	49.58 a	2.97 b	14.97 a	1.24 a	1.21 b	0.00 b	0.80 b	2.80 a
Fina	27.66 b	3.34 a	13.44 b	1.05 ab	1.89 a	14.29 ab	0.83 a	2.45 bc
Fina Sodea	24.41b	3.33 a	13.18 b	1.05 ab	1.57 ab	16.25 ab	0.84 a	2.52 b
Oroval	34.68 ab	3.31 a	12.74 b	0.86 b	2.02 b	25.50 a	0.86 a	2.36 c
Sidi Aissa	28.06 b	3.26 a	13.75 ab	1.02 ab	1.67 ab	31.88 a	0.84 a	2.50 b

^z Means separation in columns by Duncan's Multiple Range Test, 5% level.

^y Granulation values are taken from 10 fruit per tree. Values represent the percentage of fruit in the entire fruit sample with more than 20% granulation

^x A value of 1.00 signifies a completely round fruit.

^w Signifies the red to green intensity ratio of the fruit. A greater value signifies more orange or red color.