

## Evaluation of Lemon Selections for the Desert

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For more than a century, California citrus has been a leader in the worldwide fresh fruit industry. One important component of the industry is the lemon. While many California lemons originate in coastal areas, or in the San Joaquin Valley, the first lemons of any new season, which begins in late August, come from the desert. However, the industry competes against other areas, such as Chile, Mexico and Spain, and must maintain and increase market share by having a year-round volume of good quality fruit.

Thus, one step that the industry must take includes developing or acquiring high quality citrus varieties and then testing them to determine if they are adaptable to the California desert. These varieties must also meet the demands of the marketplace, and produce acceptable returns for the grower before they will become widely adopted. Early season desert lemons are not only important for the desert, but they are also an important source of fruit for packinghouses located in other areas of the state.

This project is designed to evaluate twelve lemon selections under desert conditions. The trial will be maintained for ten years so that yield and quality of production can be evaluated. Information obtained from this trial will help to further define performance of these selected varieties in the California desert. We have planted the following 12 selections, all on *Citrus macrophylla* rootstock, at the Coachella Valley Agriculture Research Station in Mecca, CA:

1. ‘Limoneira 8A Lisbon’ (as a standard)- A vigorous selection originating from the Limoneira Ranch, Ventura County, CA.
2. ‘Allen Eureka’ (as a standard)-The most common and popular ‘Eureka’ selection planted in California.
3. ‘Seedless’ lemon-This variety was imported sometime before 1985 from Lasscock’s Nursery in South Australia as ‘Seedless Lisbon’. The genetic markers of this selection have twice been tested to determine whether it belongs to the ‘Lisbon’ or ‘Eureka’ group, but the current data it is not clear.
4. ‘Femminello Santa Teresa’-A selection of Femminello Ovale that was imported into California from Sicily in 1959.
5. ‘Corona Foothills’- Originates in Corona, CA. This selection purportedly originates from Villa Franca, has fruit that is indistinguishable from ‘Eureka’, but has a winter distribution of the crop, similar to ‘Lisbon’.
6. ‘Limonero Fino’ (Fino 49)- The chief winter lemon of Spain.
7. ‘Limonero Fino Largo’ (Fino 95)- Another promising selection originating from dooryard trees in Murcia, Spain (Planted in April 2007).
8. ‘Walker Lisbon’-A vigorous selection from California that is performing well in Arizona.
9. ‘Messina’- Purportedly early lemon selection from Italy.
10. ‘Interdonato’ – Probably a lemon-citron hybrid, originating in Italy in 1875.
11. ‘Yen Ben’ – A Lisbon-type selection originating in Queensland in 1930.
12. ‘Variegated Pink Fleshed Eureka’ – A Eureka lemon variegated sport that was selected by A.D. Shamel about 1930.



Figure 1: Young lemons planted at the Coachella Valley Agriculture Research Station, Mecca, CA. Picture taken on July 11, 2008.

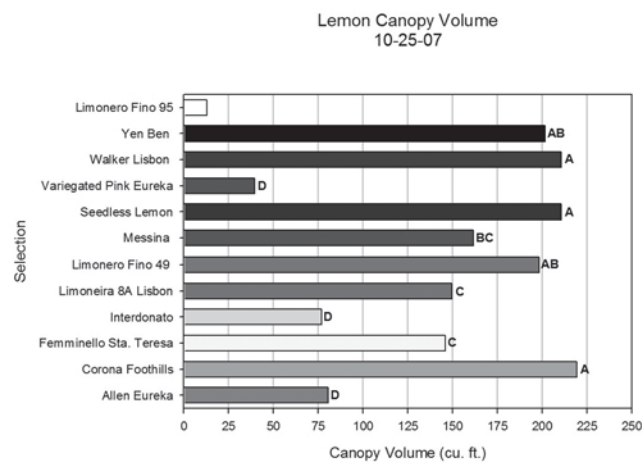


Figure 2. Canopy volume of 12 lemon selections at Mecca, CA. Bars followed by the same letter are not significantly different. Trees of 'Limonero Fino 95' are one year younger than the other selections and were not included in statistical analysis.

Compared with 2006-07, when the project trees were damaged by the freeze of January 13th 2007, the 2007-08 project year was relatively quiet. Only one of the trees that were affected by the freeze died outright. However, a few trees were killed back to a point below the bud union, or were completely defoliated and were forced to regrow shoots that eventually died. Ultimately, just eight of the 240 trees in the experimental plot died by summer 2008 as a result of the freeze. We were surprised to note that six of the trees had a few fruit, despite the freeze, although there was not enough yield to evaluate. There will certainly be enough fruit to evaluate by winter 2008.

As a result of the freeze, we had to reestablish trunks and mains scaffold limbs of some of the trees, beginning in 2007 and continuing into 2008. Since some of the trees lost substantial canopy, and apical dominance was lost, most trees had latent buds that emerged from the trunk and scaffold, and in many cases several of these buds would emerge from the same location. It was necessary to select those new shoots that were strongest and were oriented in the correct direction and remove the rest. Therefore, we spent considerable time pruning some of the trees to regain proper form.

In late October 2007, we evaluated the trees for canopy volume. First, we determined whether the existing canopy of the tree was cylindrical or spherical. If cylindrical, we collected the height and diameter of each tree and calculated the volume using the formula:  $\text{Volume} = \pi r^2 \times \text{height}$ . If spherical, we collected the diameter of each tree, and calculated the volume using the formula:  $\text{Volume} = 4/3 \pi r^3$ . Results from these measurements are found in Figure 2.

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