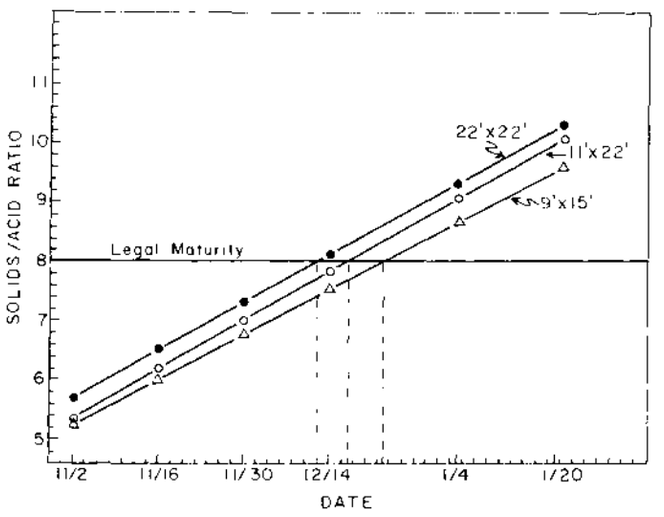
FRUIT MATURITY OF WASHINGTON NAVEL ORANGE TREES AS INFLUENCED BY DENSITY

DEVELOPMENT OF SOLUBLE SOLIDS/ACID RATIO OF FRUIT FROM TREES AT THREE PLANTING DISTANCES (AVERAGE OF 6 REPLICATIONS): 22 × 22 FT (90 TREES/ACRE), 11 × 22 FT (180 TREES/ACRE), AND 9 × 15 FT (324 TREES/ACRE).



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Earliness of fruit maturity is influenced to some extent by tree density. Data on fruit maturity taken during two successive years from close and widely spaced Washington Navel orange trees on Troyer citrange rootstock showed that maturity, as expressed by the solids/acid ratio, was reached earlier by fruit from widely spaced trees, than from trees which were more closely spaced. Rind color also developed sooner and was more intense in fruit from widely spaced trees.

IN A TRIAL established to determine the effect of tree density on production it was noted that fruit on widely spaced trees showed an earlier color break than fruit on close planted trees. Soluble solids/acid tests made late in the season showed little difference between fruit from the two planting distances. However, it was thought that differences might have existed early in the season which would affect maturity development. To determine if such differences existed, samples were taken in advance of maturity and continued at approximately 2-week intervals until harvest during the 1971–72 season, and again during the 1972–73 season until a freeze in January of 1973 destroyed a large portion of the crop.

Fruit samples were picked from six replications each of trees spaced 9 × 15 ft, 11 × 15 ft, and 22 × 22 ft. Measurements were made of the width/length ratio, rind thicknes, percent juice, amount of soluble solids and acid. Firmness of the fruit was determined by rind puncture tests.

Little differences were found between fruit from different spacings as to shape expressed by the width/length ratio, juice content as a percent of total weight, or rind thickness and firmness. Fruit from the 9 × 15 ft spacings were slightly smaller than fruit from the 11 × 22 ft and 22 × 22 ft plantings.

Differences in soluble solids and acid as expressed by the soluble solids/acid ratio are shown in the graph. Fruit from trees spaced 22 × 22 ft reached an 8:1 solids/acid ratio 11 days ahead of fruit from trees spaced 9 × 15 ft and 5 days ahead of fruit from the 11 × 22 ft planting.

The principal reason for the delay in maturity of fruit from closely spaced trees seems to be low light intensity caused by shading. Many years ago, the late Professor Hodgson emphasized the importance of light for the production of citrus fruit. Studies made in Israel have shown a positive correlation between light intensity and higher yield.

Studies in Florida show differences in the soluble solids content of fruit located in different parts of the same tree. This has been correlated with the amount of light to which the fruit was exposed. Highly shaded fruit within the canopy of foliage contained less soluble solids than fruit from outer portions of the tree. Fruit from the top of the tree where high light intensities occurred contained more soluble solids than skirt fruit which received more shade. Increased light intensity was also a factor in the development of a deeper rind color and of greater vitamin C content.

In Florida, development of citric acid was not connected with light intensity and differences in the solids/acid ratio were primarily due to differences in the soluble solids content of the fruit. In the California tests, there was a more rapid increase in solids and a more rapid decrease in acid, as the season progressed, in fruit from widely spaced trees than in fruit from close planted trees.

While the differences in soluble solids/acid content of fruit from trees planted on close and wide spacings would mean little in mid or late season, they might be important to a grower who wished to market his fruit at the earliest possible time.

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