

USEFUL LIFE OF AVOCADO TREES IN COMMERCIAL ORCHARDS IN CALIFORNIA

G. E. Goodall, T. M. Little, R. C. Rock, R. G. Platt, and A. D. Reed

The authors are all with the University of California and are respectively: Farm Advisor, Santa Barbara County; Extension Biometrician, Riverside; Extension Economist, Riverside; Extension Subtropical Horticulturist, Riverside; Extension Economist, Davis.

Avocado trees, as with all living organisms, have a life span during which the tree develops into maturity, bears fruit for a period of years, and then declines until it finally dies. Factors which determine the length of the useful productive life of an avocado orchard in California are horticultural, pathological, and economic.

The purposes of this paper are to identify and describe those factors that affect the useful life of avocados and to present available statistical evidence of tree removals and life expectancy of avocado trees grown commercially in California.

Factors Affecting Useful Life

A few individual seedling avocado trees growing in dooryards are estimated to be about 100 years old. The first commercial Fuerte grove was planted in 1913 and is now 57 years old. In spite of the long life of a few avocado trees, there are a number of causes that shorten the useful life of avocado orchards. Care must be taken to distinguish between horticultural life, disease incidence, and the average of actual experience or economic obsolescence.

1. The incidence of *tree diseases* has caused many thousands of acres to die prematurely. The most serious problem and deterrent to the future of the avocado industry is the Avocado Root Rot disease. In a 1968 survey, Platt reported that at least 3,100 acres of the 22,000 in the state were infected, suspected of being infected, or dead (5). Conservative estimates of previously removed acres due to this disease total another 3,000 acres. Thus, nearly one-sixth of California's avocado acreage is being killed by this disease and another one-sixth has been lost in the past. No inexpensive and practical control has been found to date, but an extensive research program continues with several promising developments. An avocado grove can become infected and decline with Root Rot at any age.

Other diseases that adversely affect avocado trees in small but significant ways include Oak Root fungus, Verticillium Wilt fungus and Sun Blotch virus.

2. *High land values*, brought on by urban expansion in southern California, have priced some of the suitable land above what would normally be considered as economically feasible for avocados. When the land is worth more for houses than for avocados, it is often sold and the avocados removed. This is again a factor which can eliminate an

orchard regardless of age.

Estimates of avocado orchard market values in Southern California have been made by the USDA in recent years (2). For the 1958 to 1967 period of this study, these figures rose from \$4,750 to \$7,750 per acre, a rise of 63% in 9 years.

Another facet of this cause for early removal is rising property taxes. Increases of 200-300% in recent years have been common and have pushed some orchards into "red ink" situations.

As suggested by Goodall in his article, "Can You Afford to Grow Avocados?" an investment of \$7,000 per acre instead of \$5,400 would lower the rate of return from 5% to 3% (3). The "too high" land values would vary considerably from district to district, but this is a factor seriously considered by the grower-investor.

3. Other contributing but less serious causes for shortening avocado orchard commercial life expectancy are *large-sized trees* and *changes in varieties*. The very large older trees become expensive to harvest and otherwise care for, reducing their profitability. New improved varieties have been used in topworking poor-producing older groves, but the costs of such work is expensive relative to the potential incomes.

These horticultural causes are usually associated with old age. Without the serious impact of the Root Rot disease and high urban values, which can affect groves at any age, avocado orchards would likely be useful for 40 years or more. Thus useful life would be brought to a close by declining production and lower fruit prices resulting from very large-sized trees and changes in marketable varieties.

Length of Useful Life—Statistical Evidence

As an aid to determining the useful life of commercial avocado plantings in California, acreage data published by the California Crop and livestock Reporting Service of the California Department of Agriculture (1) were analyzed. These annual reports show the acreage planted during previous years and still standing as of the year of the report. It is obvious that the acreage planted in a given year as shown in these reports tend to be underestimated for several years, for they are nearly always revised upward in subsequent reports. These underestimates were not used in the analysis. Only data which showed no subsequent upward revision were accepted as reliable for purposes of analysis.

A total of 332 reliable records involving ages from 2 to 24 years were available. Various models for the relation between tree loss and time were tested on the computer. It turned out that the model which best described the data was the simple one of a constant amount of loss each year.

It should be noted that the removal rate calculated applies to the entire acreage planted in the state and would not be expected to apply to an individual orchard. Also, while the removal rate is based on the initial acreage planted, there are very few reliable estimates available to determine the actual picture for the first 5 or 6 years of the life of orchards in the state.

The average avocado tree removal rate was 3% per year based on the initial acreage

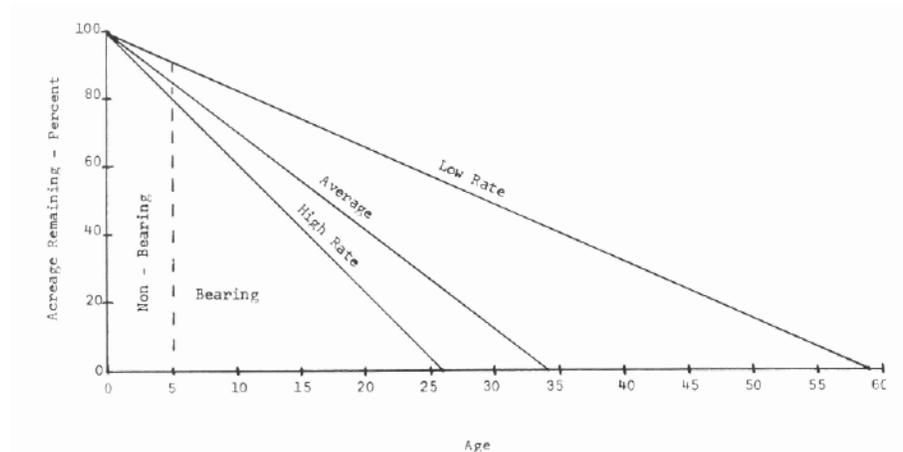
for all avocado acreage in California during the period 1930 to 1968. Stated in another way, on the average, virtually the entire acreage planted in a given year was removed in 34 years. Acreages planted in some years showed a slower rate of loss. For example, the acreage planted in 1956 has so far shown a slower rate of loss which, when projected, would indicate that this acreage will not all be removed until 59 years have passed. On the other hand, the plantings of some years have shown a higher than average rate of loss. For example, the acreage planted in 1953 has a rate of loss which would indicate that, at the present trend, it will last only for 26 years so that by 1979 it should virtually all be removed. These data are illustrated in Figure 1.

Markeson assumed in his economic study of the Florida avocado industry "That an avocado tree comes into commercial production in 5 years and has a life span of 35 years." (4)

In California, on the basis of evidence presented in this paper, we conclude that avocado trees in California do have a limited and determinable economic life expectancy. It seems clear that useful life of avocado orchards will vary widely depending on the impact of horticultural, pathological, and economic factors affecting them.

On the basis of analysis of the reports of state acreages and industry experience, a reasonable estimate of years of useful life can be made. In this we distinguish between total age (as shown in Figure 1), the development or non bearing period (5 years), and the useful life or bearing period. The lower estimate of useful life that might be encountered when risks of loss are high would be 15 years, an average range of productive life would be 20 to 30 years and an upper estimate that might be reached under favorable conditions would be 40 years.

FIGURE 1—CALIFORNIA AVOCADO TREE REMOVAL RATES



BIBLIOGRAPHY

1. "California Fruit and Nut Acreage, Bearing and Non-Bearing, 1958 through 1968," California Crop and Livestock Reporting Service, Sacramento, California, published

annually 1959 through 1969.

2. "Farm Real Estate Market Developments, 1958 through 1969," U. S. Department of Agriculture, Economic Research Service, CD-73 Series, published annually 1958 through 1969.
3. Goodall, G. E. "Can You Afford to Grow Avocados?" CALIFORNIA AVOCADO SOCIETY YEARBOOK, Vol. 53, April 1970.
4. Markeson, C. B., "Economic Aspects of Marketing Florida Avocados," USDA Market Research Report 614, Washington, D.C., August 1963.
5. Platt, R. G, "Survey of Avocado Root Rot," CALIFORNIA AVOCADO SOCIETY YEARBOOK, Vol. 53, April 1970.