

## The Setting of Avocado Fruits as Affected by Weather Conditions

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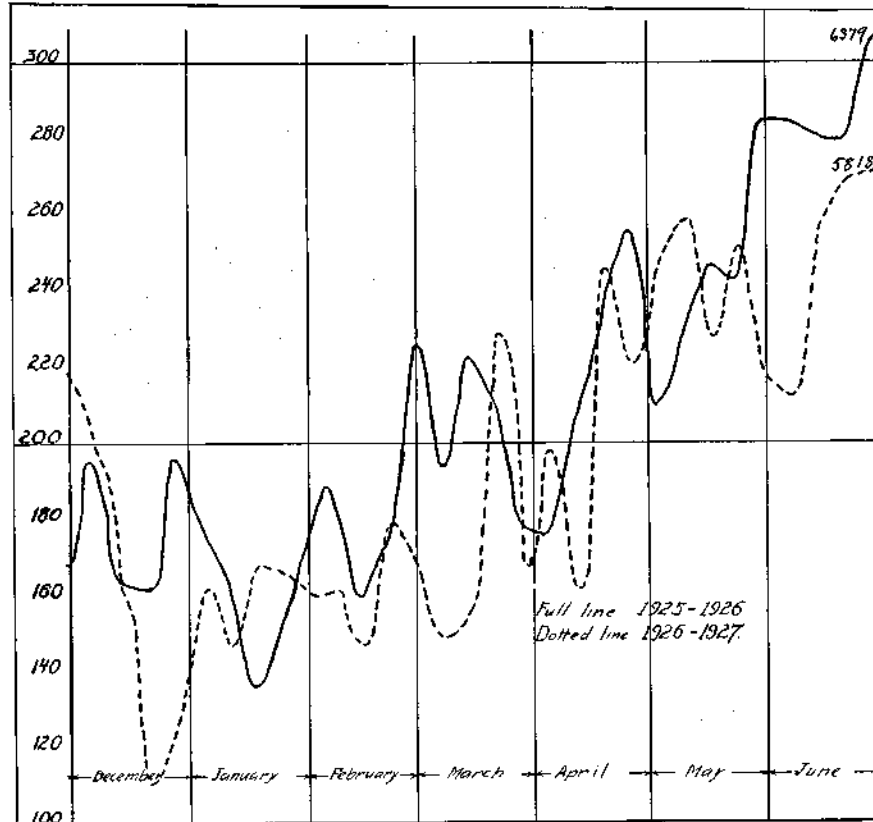
For some years avocado growers have held the opinion generally that the principal weather factors which affected the setting of the crop were late frosts and protracted spring rains.

Observations this year have led some to believe that effective heat units previous to and during bloom might be of even greater importance than either of the other factors mentioned.

The year 1926 and 1927 are peculiarly suitable for comparison. Both were comparatively free from late frosts and both experienced protracted rains during the blooming season. Yet the year 1926 was notable in that throughout Southern California most varieties of avocados set and matured by far the heaviest crop in the history of the industry; while in 1927 the crop set is unusually light and peculiarly spotted. In 1926, widespread propping of branches was resorted to, to prevent serious breakage, while in 1927 no props are to be seen. In 1926, the blooming period was somewhat earlier than normal and occurred in February and March. In 1927, the blooming June, it was observed that in 1927 the young fruits were so late in forming that they were young and delicate and not hardy enough to withstand the high temperatures and rapid evaporation rate during late June and early July. The fruit dropped until very little was left.

For a number of years accurate weather records have been kept in two avocado orchards. One station is on the El Mirador Ranch which is within the city of Pasadena and lies on the eastern slopes of the Protrero foothills at a mean elevation of about 800 feet. The other at Rancho Leucadia is one hundred miles to the south near Encinitas. It is located on a low coastal plain and the instrument shelter in the grove is less than one thousand feet from the ocean shore. In both cases standardized maximum and minimum thermometers, sling psychrometer, rain gauge, etc., are housed in instrument shelters built according to U. S. Weather Bureau specifications. Continuous records have been kept by careful and reliable employees.

These records being available to the writer, it was of interest to make a comparison of the effective heat units received by the trees for each of these years. The period selected was from December 1st, to July 1st, for each year. The method used consisted in making an average for each week of the figures obtained by subtracting thirty-two degrees from the observed daily maximum temperatures. This method is necessarily arbitrary because the base temperature at which avocado growth activity ceases has never been determined. However, it suffices to give a graphic comparison of the effective heat units for these years. The results have been plotted on section paper and the charts appear herewith.



Effective Heat Units at El Mirador Ranch, Pasadena, California

An examination of these charts shows very plainly that the spring of 1927 was in fact much cooler and later than 1926, and that the difference in total heat units for the two years was much greater at Leucadia than at El Mirador.

	El Mirador	Leucadia
1926	6,379	6,055
1927	<u>5,818</u>	<u>5,189</u>
Difference	561	866

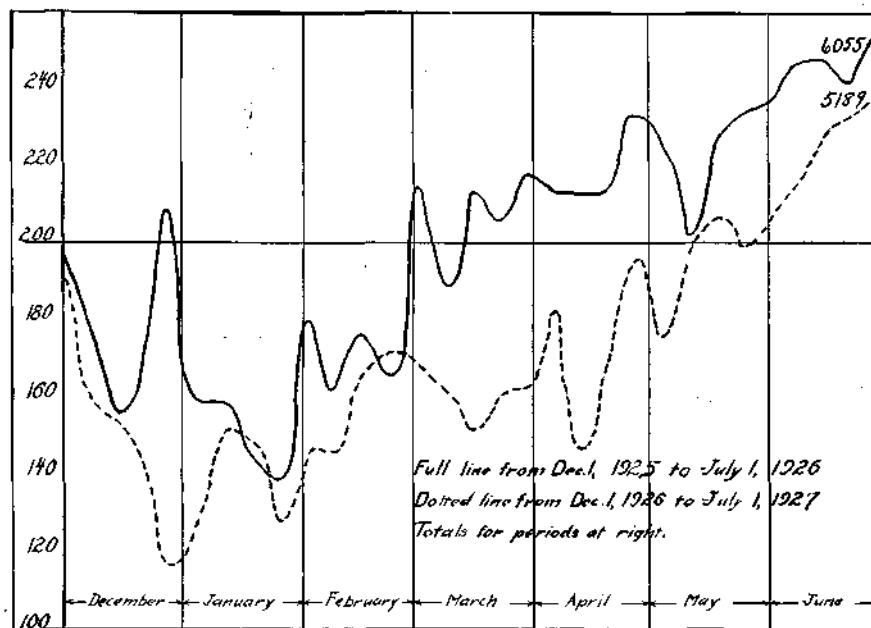
This was no doubt due to the prevalence of foggy weather which occurred at Leucadia during the months of March and April.

Examination of the trees shows that while the trees at both places are healthy and vigorous and all bore well according to their age in 1926; that in 1927 there is no crop at all at Leucadia but a light scattering crop at El Mirador.

Several different interpretations may be given this data. Some growers are inclined to believe that the late cool spring of 1927 prevented or retarded the normal activity of bees and other pollen carrying insects and the the final failure to set was due to lack of effective pollination. If this be true, we should expect to find on the trees an unusually

large proportion of unpollinated seedless fruits, but this is not the case.

Others think that the cool spring retarded the setting and development of the fruit, causing it to enter the hot, dry month of July in a too tender and delicate stage to stand the adverse conditions. I have made constant and critical observations of the progress of fruit setting in these two groves during both years and am familiar with the varieties and soil conditions. My own conclusion is that the last mentioned theory is most likely to be correct. There is no question but that the setting of fruit is affected by several factors such as pollination, soil nitrates, soil moisture, alternate bearing, heat units, etc. Apparently the most important factor having to do with the great difference in crop in the year 1926 and 1927 is one of effective heat units.



Effective Heat Units Rancho Leucadia, San Diego County