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## **Leaf Burn of Avocado**

***Sodium or chloride accumulation may cause burning of mature avocado leaves of Fuerte and other varieties***

**A. D. Ayers, D. G. Aldrich, and J. J. Coony**

Leaf burn of avocado is caused by sodium or chloride accumulation in the leaf, or by inadequate water supply.

The severest injury has been observed where irrigation waters are high in chloride. Scorch or burning of mature avocado leaves is particularly noticeable in years of lower than normal rainfall such as in 1947, 1948, 1949, and 1950.

A number of leaves and some soils were sampled to determine their salt status. The injury caused by inadequate water supply resembles chloride injury but involves a smaller portion of the leaf tip. This study deals with injury caused by chloride or sodium accumulation.

### **Chloride or Tip Burn**

The most frequent type of scorch in avocado leaves is commonly described as tip burn. The scorch starts at the tip of the leaf and progresses down the blade and sometimes along the margins. This results in decreased functional leaf area of the individual leaf and an even more pronounced decrease in the leaf area of the tree, because the severely affected leaves drop prematurely.

Analyses of affected leaves selected from a number of plantings in southern California show a close relationship between total chloride and the severity of the tip burn.

Mature leaves free from tip burn seldom contain as much as 0.5% chloride on the dry weight basis. Leaves having up to one tenth of the blade affected may have as much as 0.5% to 0.75% chloride. When one tenth to one third of the leaf is killed by the tip burn, the chloride in the remaining live part of the leaf usually ranges from 0.75% to 1%. Concentrations of 1% or over are found only in the severely burned leaves.

### **Sodium Scorch**

A second leaf-burn pattern, caused by sodium accumulation, does not start at the tip of the leaf but usually as necrotic or scorched spots near the margin or in the interior area of the leaf. This type of leaf burn is sometimes the only one occurring on the leaf; but, more frequently, it is found in conjunction with the tipburn pattern characteristic of chloride injury and for that reason has seldom been differentiated from it.

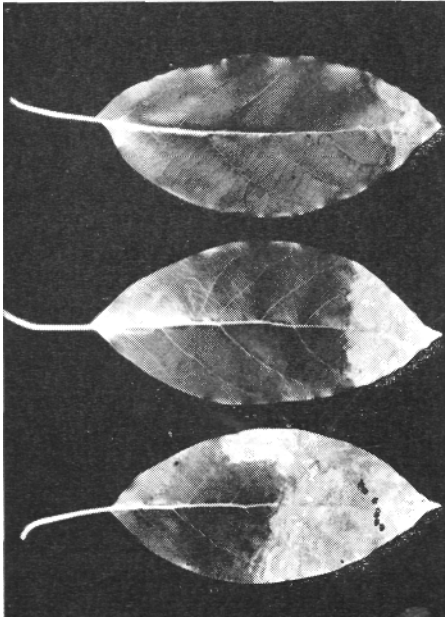
Normal avocado leaves have very low sodium levels, and even though leaves exhibiting the typical symptoms of tip burn may have accumulated as much as 1% chloride, there is frequently no corresponding increase in sodium. It is only when the interveinal or spot

type of scorch is also present that appreciable sodium accumulations are found.

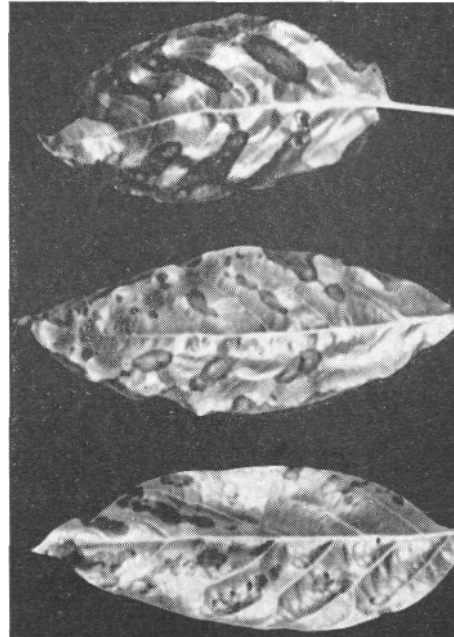
Similar leaf burn can be produced in the greenhouse by growing small trees in culture solutions containing added sodium sulfate.

The greatest accumulation of chloride occurring in any part of the tree is found in the leaf. Sodium accumulation is as high or higher in the small branches or twigs than it is in the leaves. This has been observed in field material as well as in that grown in the greenhouse.

Tip burn of Fuerte avocado leaves typical of chloride injury.



Leaf burn of Fuerte avocado leaves typical of sodium injury.



Avocado trees grown in culture solutions are more sensitive than most other plants to concentrations of either chloride or sodium salts.

The salt content of the soil found under trees suffering from leaf burn is generally low and would seldom place that soil in a saline classification. The conductance of the saturation extracts were usually less than four millimhos per centimeter, although it was not unusual for readings to be two or more in some part of the soil profile. The exchangeable sodium of soil taken from under a limited number of affected trees was not above the normal range, but was slightly higher than that from under normal trees. This suggests that over a period of years the avocado may accumulate toxic levels of chloride and sodium ions from soils not regarded as saline or high in sodium.

This report has been confined to the Fuerte variety, the principal one grown in southern California. However, the chloride type of injury or tip burn has been noted in the field on numerous varieties such as Puebla, Dickinson, Hass, and the sodium-type injury has been observed on Fuerte, Itzamna and Anaheim.

*A. D. Ayers is Agriculturalist, formerly chemist, U. S. Salinity Laboratory, Riverside.*

*D. G. Aldrich is Associate Chemist, University of California College of Agriculture,*

*Riverside.*

*J. J. Coony is Farm Advisor, San Diego County, University of California College of Agriculture.*

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