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Leaf Malady of Avocado Trees

Leaves of trees of several varieties on various rootstocks seriously affected when placed under glasshouse conditions

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Leaves of seedling avocado trees grown under glasshouse conditions—in cultures of silica sand or soil—have occasionally shown certain symptoms of nutritional deficiency.

Under glasshouse conditions: *left*—upper side showing translucent spots in top view of Fuerte-Carr-Hybrid leaf; *right*—underside of leaf showing corresponding raised spots that appeared water-soaked.



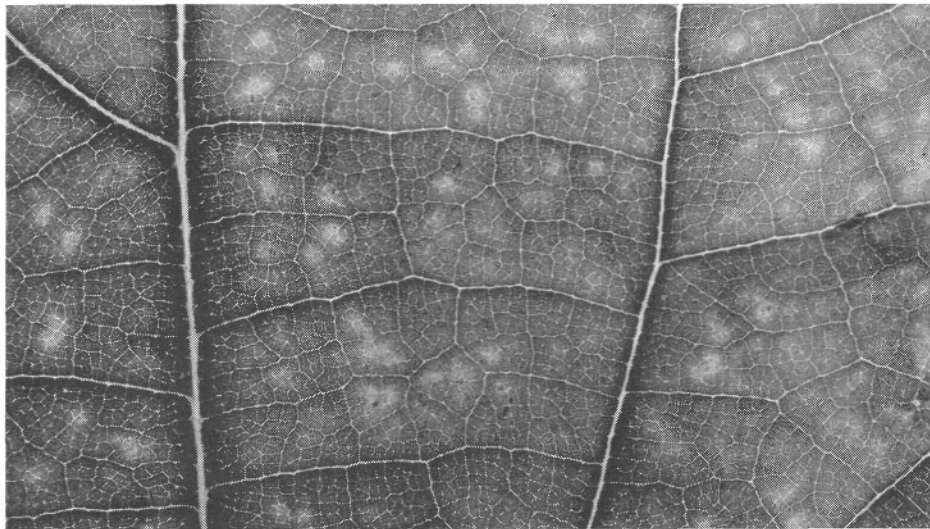
Leaf of Topa Topa-Mex.-avocado seedlings grown in serpentine soil to which was applied Hoagland's nutrient solution with minor elements except molybdenum. Leaf spots are readily seen by using of a reading glass.

Seed of the Mexican variety, Topa Topa—from the same lots of seed used satisfactorily in other tests—were germinated in propagation beds and then planted in serpentine soil in three-gallon-capacity containers. This soil is deficient in many elements—such as

molybdenum, calcium, copper—but contains considerable magnesium. Applications of Hoagland's complete nutrient solution containing as minor elements: boron, manganese, zinc, iron, aluminum, and copper, but no molybdenum, were made to the cultures the leaves of which showed very numerous light colored, translucent circular spots with no raised or burned spots on either side of the leaves.

Leaf spots were also obtained in leaves of budded trees in the glasshouse. Large numbers of silica sand and soil cultures were set up in the glasshouse and outdoors. Seedlings of several varieties of avocado were used as rootstocks, all of which were budded with buds obtained from a healthy Fuerte-Carr-Hybrid avocado tree.

Appearance, when highly magnified, of leaf spots on underside of avocado seedling.



Regardless of the type of nutrient treatment or of the nature of the rootstock variety, it was clear that under glasshouse conditions all Fuerte-Carr-Hybrid-avocado trees possessed leaves which—as they approached maturity— showed translucent spots on the top side and corresponding raised spots on the underside that initially are light green in color and appear water-soaked. The spots on the underside of the leaves appear as clusters of small raised spots. As the leaves increase in maturity the upper leaf surface may show an extremely large number of spots with corresponding raised spots—that turn reddish-brown— on the under surface. Evidently the loss of affected leaves is hastened by the appearance and increased number of the spots. Not until the new leaves are approximately of full size do the spots put in their appearance. This type of leaf spot occurred on leaves of seedlings in various soil cultures—as well as in silica sand—and on leaves of many varieties on various rootstocks. Such a leaf blemish might conceivably affect the health of the tree because of the loss of green color and premature loss of leaves.

Outdoors in full sunlight or under partial shade no such leaf symptoms were found on Fuerte-Carr-Hybrid trees budded on various rootstock varieties in silica sand or soil cultures. Several of these outdoor cultures were brought into the glasshouse. The new leaves when of full size and some of the older leaves showed the symptoms as though the cultures had always been grown in the glasshouse. No recovery of affected leaves

occurred by the transfer of affected cultures from the glasshouse to the outdoors. However, the removal of affected cultures from the glasshouse to the outdoors permitted new leaves to develop to full size without the appearance of any of the symptoms, even though leaves severely affected and in poor condition while in the glasshouse were allowed to be in contact with the new growth produced while outdoors.

From the general occurrence of these avocado leaf symptoms in the glasshouse and in leaves of trees transferred to the glasshouse from outdoors and the failure of symptoms to appear in new leaves produced following the tree removal from the glasshouse to the outdoors, it would appear that possibly the increased humidity in the glasshouse under reduced light may be a factor in the initiation of this leaf malady.

Whether a sprinkler system that contacts tree foliage would be sufficiently continuous as to affect leaves in this manner is not known.

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