

Zinc Effect on Citrus, Avocado

large concentrations of zinc added to sand or soil cultures corrected mottle-leaf, increased leaf size and tree growth

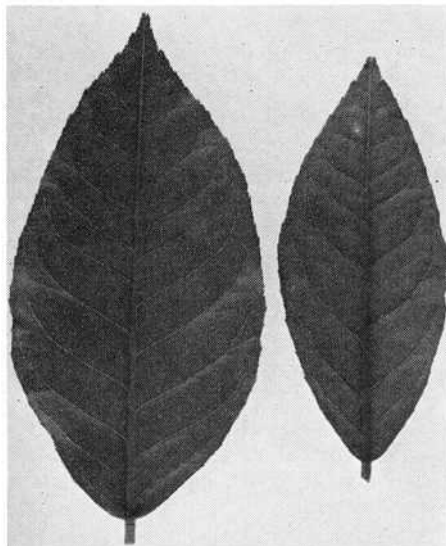
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Zinc can stimulate the growth of citrus and avocado trees. Applied to the roots in nutrient solution at concentrations greater than required in sprays to correct mottled leaf symptoms, zinc will promote vegetative growth.

Soil or sand cultures in crocks of three gallons capacity were used in experiments with lemon and avocado. The young trees were watered with the stock Hoagland's plant nutrient solution—A, B, C—containing: 0.2 ppm—parts per million—each of boron as boric acid, molybdenum as sodium molybdate, manganese as sulfate, and iron as reperfined ferrous sulfate; 0.1 ppm copper as sulfate, 3.0 ppm aluminum as citrate, and 0.05 ppm chromium as potassium chromate. Zinc as sulfate was added to the solution in varying concentrations for the different cultures in the test. Distilled water was used at all times in the experiments.

In all citrus and avocado cultures, at the time of applying the first nutrient solution, the plants were arranged according to descending size, the largest being retained to serve as the control plant.

Rooted Prior Lisbon lemon cuttings were grown for three months in silica sand cultures with zinc concentrations of 0.0, 0.2, 0.4, 0.6, 0.8, and 1.0 ppm. The series suggests that zinc concentrations greater than 0.2 ppm not only pre-



Leaf size of rooted Prior Lisbon lemon cuttings grown in silica sand cultures. Left—zinc added. Right—no added zinc and no mottle.

vented the occurrence of mottle-leaf but also stimulated plant growth.

To determine whether growth would be retarded by greater concentrations of zinc, 0, 2, 4, 6, 10, and 15 ppm zinc were used in another test with rooted Prior Lisbon lemon cuttings in silica sand cultures. After five months the tops measured 20.0, 38.8, 40.0, 39.0, 35.0, and 36.0" in height and 46, 101, 86, 83, 83, and 90 grams fresh weight.

Avocado seedlings of the Guatemalan variety Nabal, germinated from seed of uniform size, were planted in three-gallon capacity soil cultures in the glasshouse and watered with Hoagland's solutions containing zinc concentrations of 0.0, 2.5, 5.0, and 10.0 ppm. When the experiment was terminated after four months, the trunks measured 30, 33, 39, and 35" in height and the fresh weights of the leaves and trunk were 84, 110, 129, and 104 grams. The dry weights of the roots were 12, 14, 19, and 16 grams.

Budded avocado trees in large outdoor soil cultures demonstrated that the use of 5 to 15 ppm of zinc as sulfate in the nutrient solution greatly improved the intensity of the green color in the plant leaves.

The results of these and other similar tests indicated that large concentrations of zinc applied to silica sand or soil cultures not only can correct the mottling of the leaves but in addition can increase the leaf size and the intensity of the green color, and may greatly stimulate plant growth.

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Rooted Prior Lisbon lemon cuttings in silica sand cultures. Left to right: 0.0, 0.2, 0.4, 0.8, and 1.0 ppm zinc. At 0.6 ppm the growth was the same as at 0.4 ppm.

