

Foliar applications of manganese and zinc are effective at any time of year. In order to secure maximum effects, however, applications should be made after a major flush of leaves has expanded to at least two-thirds normal size. After the major spring or bloom flush of leaves is fully expanded, the addition of 7½ pounds of urea to the same spray mixture will give better results. The urea should have less than 0.25 per cent biuret.

In desert areas, citrus trees ordinarily produce a flush of leaves at the end of late summer or early fall. This late flush generally shows manganese and zinc deficiency symptoms even if the major spring flush was sprayed with these nutrients. This indicates that manganese and zinc supplied to the major flush in early spring does not move freely from the old into the new leaves under such conditions. To correct these late deficiency symptoms, fall applications of manganese and zinc are also recommended. Urea should be omitted from fall sprays on orange trees because it may adversely affect fruit quality.

Earlier recommendations suggested that foliar sprays of manganese and zinc should be applied prior to the spring flush of growth. The results obtained recently from many experimental plots on citrus show that, from the standpoint of tree physiology, most effective use of manganese and zinc is obtained when sprays are applied to the young foliage. Leaves of that flush will be adequately supplied with manganese and zinc nutrients during the growing season and as long as these leaves remain on the tree. There is very slight translocation of these nutrients from old sprayed leaves into the new spring flush of leaves, however; and the new flush of leaves may show manganese and zinc deficiency symptoms even if the old flush was adequately supplied with the nutrients. Therefore, manganese and zinc foliar sprays should be applied after a major flush of leaves has expanded to at least two-thirds normal size. Citrus trees showing severe manganese or zinc deficiency symptoms should be sprayed at any time during the year and then repeated annually after a major flush of leaves has expanded to at least two-thirds normal size. In desert areas, however, spring and fall foliar applications of manganese and zinc are recommended.

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## LEGUME TEST PLOTS

This test is one of many set out by Extension Service staff members to find more productive varieties of legumes to improve forage quality and increase total production of California rangelands. This particular plot is 92 x 44 feet and divided into 4 x 4 foot squares with alternate squares seeded. It is located at the Archie S. Porter ranch, between Kelsey and Georgetown, in El Dorado County, and is under the supervision of Farm Advisor D. Barry Leeson. Success of the various annual legumes being tested will depend on their ability to reproduce themselves in future years. The statewide project is being conducted by Farm Advisors and interested ranchers in many counties with coordination and guidance by W. A. Williams of the Department of Agronomy and Victor P. Osterli and James E. Street, Extension Range Improvement Specialists, University of California, Davis.