

Fruit measurements and tensiometers can tell you

WHEN To Irrigate Citrus Trees

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An irrigation experiment now in its seventh year at the Citrus Experiment Station demonstrated that applying five and one-half acre feet per year produced good tree growth and yields, but gradually induced iron chlorosis (yellow leaves with green veins). When, however, only three acre-feet of water were applied per year, tree growth and yield were reduced. Therefore, the problem is to determine not only how much but also just when to irrigate to promote maximum tree growth and yields without causing iron chlorosis.

Wilting Leaves Are No Index

Wilting of the leaves cannot be used as an index, because citrus trees have a deep root system which supplies sufficient water to the tree to prevent wilting even though the tree and fruit growth is restricted. By measuring the circumference of immature fruit with a steel tape at sunrise at 4- to 7-day intervals during the summer, a record of growth can be obtained. When these results are plotted, changes in growth rates can be observed and irrigations applied at intervals to maintain relatively uniform growth. However, if the grower waits until fruit growth is markedly restricted he has delayed too long.

Tensiometer Provide Easy Correlation

Tensiometers have been tested as a method of easily correlating soil moisture with fruit growth. A tensiometer is a hollow porous cup attached by a water-filled tube to a vacuum gauge. As the soil dries, water exudes from the cup into the soil causing a suction force (tension) to develop within the tensiometer which can be measured up to eight-tenths of an atmosphere by the vacuum gauge. This is the equivalent of a column of water about 800 centimeters high and tensions are reported as centimeters of water. Since soil at the wilting point has a tension of about 15 atmospheres, it is necessary to place the cup where the soil is always moist.

The growth of Valencia oranges in relation to the soil moisture tension at a depth of 30 inches was observed under two irrigation programs. Fruit on trees irrigated on July 23, August 13 and September 9 (Figure 1A, solid line) grew uniformly from July 23 to September 2. Soil moisture tensions during this period (Figure 1B, solid line) ranged from 110 immediately after irrigations to 325 prior to the August 13 irrigation, and on September 2. Between September 2 and 9 fruit growth was retarded and soil moisture tensions rose above 325.

Fruit growth was irregular on trees irrigated on June 2, July 23 and September 9 (Figure 1A, dotted line). The

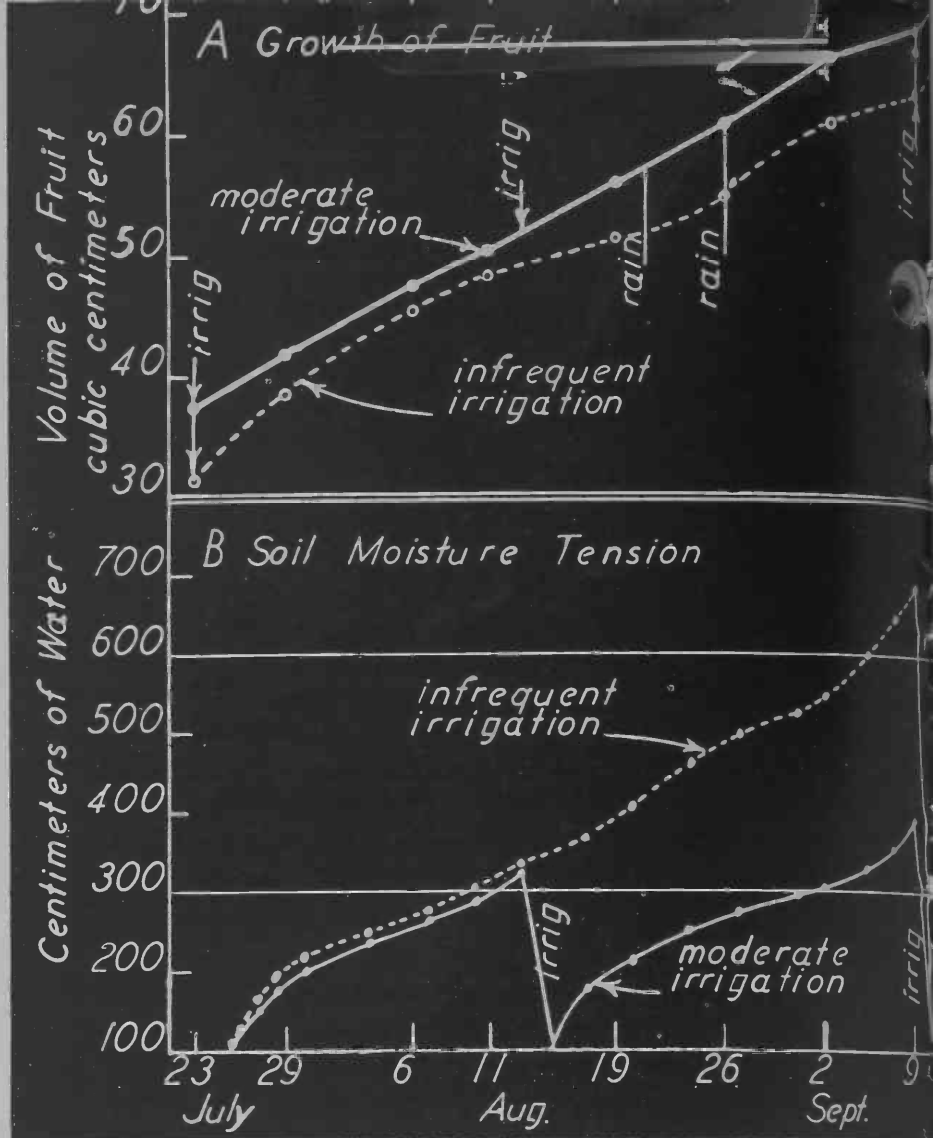


Figure 1.

Relationships between fruit growth and soil moisture tension under two irrigation programs. (Data from University of Arizona Citrus Experiment Station near Tempe, 1954.)

rapid fruit growth between July 23 and 29 indicates the tree was under a moisture stress when irrigated. The reduction in growth between August 11 and 19 reflects the gradual drying of soil below the best level for fruit growth, and is associated with soil moisture tensions above 325. (Figure 1B, dotted line). These stressed fruit responded to the rainfall on August 20 and 26 by a resumption of normal growth, but again grew slowly between September 2 and 9 when the soil moisture tension rose to 700.

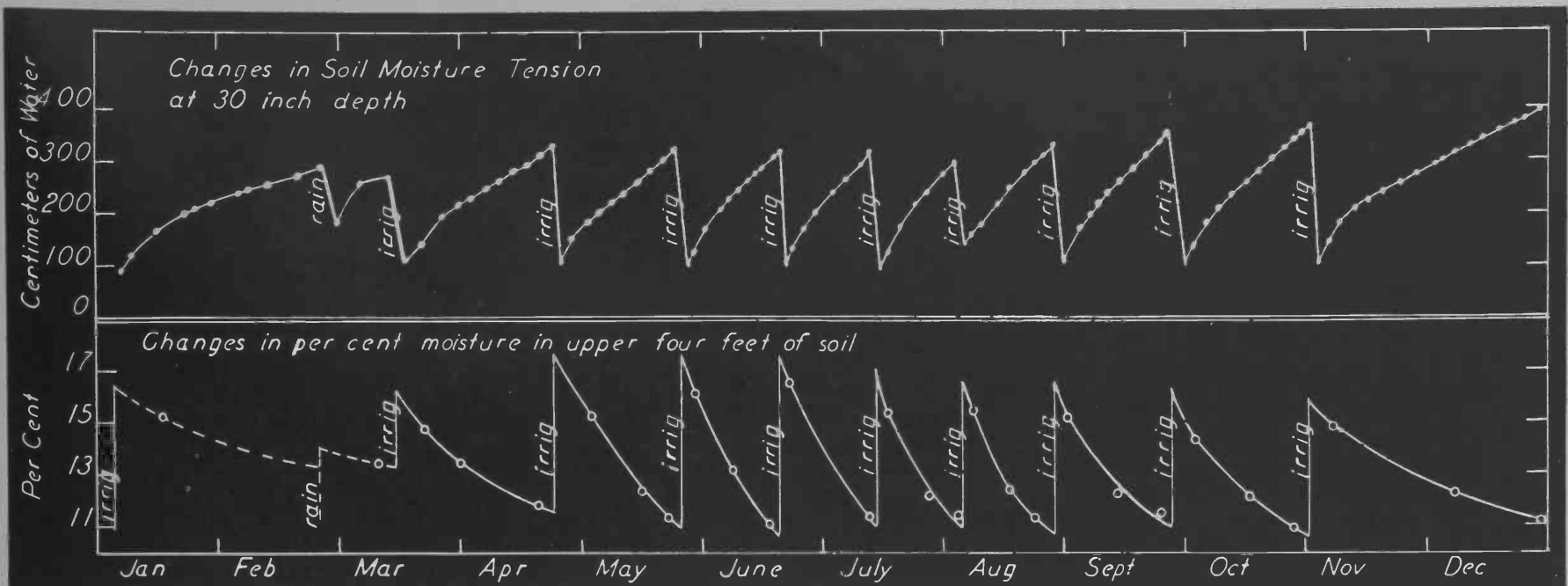
Low Tensions Indicate Wet Soils

Low subsoil moisture tensions of 300 to 350 show that the subsoils are always wet. Such wet caliche subsoils cause iron chlorosis to develop eventually. To overcome this problem in this soil type the subsoil is allowed to dry each year during October.

Correlations of fruit growth with soil moisture tensions vary with soil types and root distribution. In a loam soil in the Mesa district, irrigations applied when tensions at 30 inches deep are between 500 and 600 provide relatively uniform fruit growth. It is probable that such levels are the normal situation which will occur in many groves, but it is necessary to establish a program for each situation.

To establish an irrigation program: first, determine the interval of irrigation from fruit measurements; second, correlate this with tensiometer readings at depths of two and four feet; third, if subsoil tensions are always low in caliche subsoils, provide a drying out period each year.

(See graph on next page)



Seasonal changes in soil moisture tensions in relation to changes in the per cent of soil moisture. Tensions decrease after irrigating when water penetrates to the level of the tensiometer and increase as the soil dries. Tensions of 300-350 are

associated with 11-12% average soil moisture in the upper four feet of soil. The irrigation program indicated above provided good fruit production and tree growth. (Data from University of Arizona Citrus Experiment Station near Tempe, 1950.)



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Saturday, 12:30 p.m.—KCLF

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Sunday, 8:45 a.m.—KOY

Friday, 6:00 p.m.—KTVK, Channel 3, "County Agent Notebook"

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Monday through Friday, 6:50 a.m. to 6:55 a.m. (County Agent); 8:50 to 8:53 a.m. (Home Demonstration Agent — KCKY)

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Tuesday and Thursday, 7:20 a.m. (On the Farm Front)—KYUM

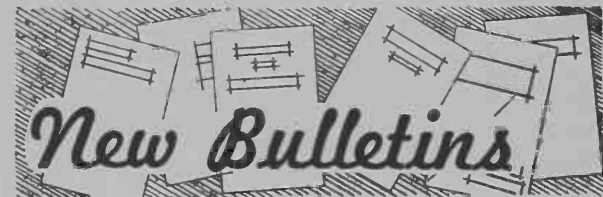
Thursday (TV), 6:15 p.m.—KIVA

Thursday (TV), 7:30 p.m.—KIVA, Channel 11, "Farm Front"

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Saturday, 12:30 to 1:00 p.m. (Arizona Farm and Ranch Hour)—KOY, Phoenix; KTUC, Tucson; KSUN, Bisbee; KYMA, Yuma; KCLS, Flagstaff; KVNC, Winslow; KAWT, Douglas.

Saturday (TV), 5:00 to 5:30 p.m. (Across the Fence) — KVAR, Mesa, Channel 12



Agricultural Extension Service

Growing Arizona Cotton, Circular 222
Insects and Diseases of Cotton, Circular 223

4-H Entomology Project, Folder 67

Agricultural Experiment Station

Arizona Agriculture 1955, Bulletin 261
Agricultural Credit in Arizona, Bulletin 262

Malathion for the Control of Pests in Southern Arizona, Report 115

Annual Report for the 65th Year

THE COVER PICTURE

Fashion designer Betty Johnson, Wickenburg, models a creation of hers called "Desert Magic." The skirt is done in shading: that is, if it is a grey dress, the top tier would be in light grey, the second tier in medium grey, and the bottom tier in dark grey. A similar sequence would follow in any other color.

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Buckeye Cotton Oil Co.	400 lbs. Cottonseed meal
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