RELATION OF FERTILITY TO WATER REQUIREMENT OF PLANTS

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In earlier reports (1, 2, 3, 4, 5), the relation between the concentration of the soil solution and the water requirement of plants has been established. The purpose of the present article is to report field studies for determining the value of application of this factor for decreasing the irrigation requirement and increasing profits under irrigation farming.

SULFUR FERTILIZER TRIAL

A field fertilizer experiment was arranged on the University of California Irrigation Experiment Field near Delhi. This trial was designed to test laboratory and greenhouse results as applied to field conditions, to provide a field source of samples for laboratory studies from treated soils, to measure the value of sulfur in increased crop yields, and to determine the effect of fertilizer applied on irrigation requirement and water requirement. Ten one-sixth acre plats in Range 4 and four one-fifth acre plats in Range 3 of the experiment field were used for this trial and treatments were given as indicated in Table 1.

All plats received 36 inches irrigation and nearly 3 inches of rainfall during the growing season. Soil moisture samples were taken in the field to a depth of 6 feet at the beginning of the season and at the time of the last cutting, February 4 and October 21, respectively. The gain or loss in soil moisture during the season, together with rainfall and irrigation water, made a total depth of water used of from 37.73 to 40.87 inches, and made it possible to calculate the units of water consumed per unit dry matter yielded. Moisture determinations were made on all plat crops at each cutting.

The dry weights given in Table 1 would make the increase about 20% less than if yields were expressed as cured hay weights. Sulfur and sulfates increased the yields substantially, the gain running from 1 to 2 tons an acre over the yields from untreated plats. The maximum yield was secured with calcium sulfate. Calcium alone in amounts equivalent to that obtained from calcium sulfate caused...