Cotton Yields NOT AFFECTED BY IRRIGATION METHOD ON PANOCHE CLAY LOAM

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Methods of irrigating cotton—whether furrow or sprinkler irrigation—apparently have no effect on yields. These tests on Panoche clay loam at the West Side Field Station, Fresno County, also indicate that irrigation methods caused no significant differences in soil conditions, soil moisture content and plant nutrient levels.

THIS PROGRESS REPORT summarizes field studies initiated in 1961 at the West Side Field Station to evaluate the influences of furrow irrigation and sprinkler application rates on soil physical conditions and cotton yields. Water was applied to replicated plots of cotton with furrows and at rates of 0.20 and 0.10 inch per hour with sprinklers. In each case the same depth of water was applied and all plots were irrigated at the same time. A total of about 20 inches of water was applied in three irrigations—following a pre-irrigation of about 15 inches and an application of about four inches on April 15 for emergence. Both of these irrigations were applied to all plots in furrows.

Samples of soil were obtained from the surface of the bed area and the furrow area for all plots before each irrigation and after the last irrigation in August. These samples were used to determine water-stable aggregation, bulk density, modulus of rupture and nitrate content.

Soil conditions

Water-stable aggregation for all three irrigation methods increased until after lay-by, but the next irrigation after cultivation reduced the stable aggregates by 50 per cent. Differences between methods were insignificant, implying that cultural practices were more pronounced in maintaining soil structure than the method of irrigation. This decrease in the water stability of soil aggregates may account for the general decrease in infiltration rates at the latter part of the irrigation season on the West Side.

Soil bulk density increased slightly throughout the year, but with no significant differences between irrigation methods. Modulus of rupture measurements which give an indication of soil crusting showed no differences between either the methods or dates.

Furrow irrigation for pre-irrigation and emergence resulted in high nitrate levels in the bed prior to the first summer irrigation on June 21, as was expected. In all the sprinkler plots the nitrate was leached below the surface soil by the next irrigation. Furrow irrigation subsequent to the April irrigation tended to increase the nitrate concentration of surface soil in the bed area, however. No difference between the two sprinkler applications was apparent, but furrow irrigation re-

PETIOLE ANALYSIS OF COTTON PLANTS

Elements	June 20			July 26			August 23			September 27		
	Furrow	0.20 in/hr	0.10 in/hr	Furrow	0.20 in/hr	0.10 in/hr	Furrow	0.20 in/hr	0.10 in/hr	Furrow	0.20 in/hr	0.10 in/hr
Calcium ppm*	198	174	178	177	168	182	220	222	213	289	305	303
Nitrate	4582	4950	4594	1391	2357	2307	875	752	841	1517	1146	1370
Phosphate	130	100	105	94	93	109	107	115	123	113	103	74
Magnesium	77.7	76.2	77.4	48.6	50.7	52.0	48.3	48.6	49.2	39.0	43.2	42.9
Sodium	17.4	17.4	15.6	15.2	15.8	14.6	17.6	18.6	18.6	25.5	27.6	27.8
Potassium	625	601	605	446	441	460	500	508	484	424	396	342

* All figures shown should be multiplied by 100 to show actual concentration in ppm.

SOIL PROPERTIES AS AFFECTED BY IRRIGATION METHOD AND DATE OF SAMPLING

Date	Location of sample	Water stable aggregation, Percentage retained on 1/60 screen			Bulk density of clods, gm/cc			Nitrate concentration of surface soils, ppm		
		Furrow	0.20 in/hr	0.10 in/hr	Furrow	0.20 in/hr	0.10 in/hr	Furrow	0.20 in/hr	0.10 in/hr
6/20	Bed	35.0	35.8	37.0	...	...	...	157	126	118
	Furrow	32.4	39.4	38.8	...	...	...	20	18	24
7/26	Bed	41.5	46.4	49.8	1.37	1.41	1.39	158	18	18
	Furrow	45.1	46.4	49.5	1.40	1.38	1.39	93	22	23
8/29	Bed	24.8	29.2	31.8	1.46	1.43	1.48	166	14	12
	Furrow	9.2	15.5	12.8	1.38	1.38	1.44	13	14	16
9/27	Bed	13.0	18.8	19.8	1.47	1.52	1.44	268	13	13
	Furrow	11.1	13.2	11.2	1.45	1.46	1.48	18	14	12

sulted in nitrate concentrations in the bed 10 to 20 times greater than that in the furrow or in any of the sprinkled area.

Nutrient Levels

Thirty recently mature cotton leaves were obtained randomly from each plot prior to each irrigation, and were combined into one composite sample for leaf and petiole analyses. At no time did any of the plants exhibit any nutrient deficiency. The only differences evident in the petiole analyses between irrigation methods occurred in the nitrate analysis after the first irrigation. Subsequent irrigations apparently erased this difference. Leaf analyses showed the same results—that the method of irrigation did not affect nutrient uptake at any time during the season. Sprinkler application rate did not appreciably influence nutrient uptake at any time.

Soil Moisture

Soil moisture determinations throughout the growing seasons were made with electrical resistance blocks at 18- and 36-inch soil depths. In no case were there appreciable differences as a result of the irrigation method. Soil moisture tension at the three-foot depth did not exceed one atmosphere until after the last irrigation; however, at the 18-inch depth, soil moisture tension approached 10 atmospheres prior to the second and third irrigation. In all cases soil moisture tensions were never high enough to adversely affect cotton yield.

Cotton Yields

Measurements of seed cotton yields in four replicated plots confirm the conclusion that yields are not affected by irrigation methods. Furrow irrigated plots yielded an average of 1,780 pounds per acre and the sprinkler irrigated plots yielded 1,831 and 1,810 pounds per acre for the 0.20 and 0.10 inch per hour application rates, respectively. These differences are not significant, however, and it may be concluded that the irrigation method resulted in no differences in cotton yields. Additional field studies at the same location are planned to evaluate the continued effects of these irrigation methods on soils and crop yields.

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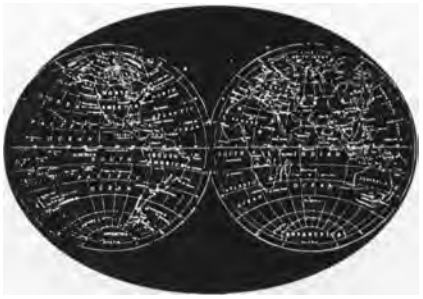

The Proposed Trade Expansion Act of 1962 and California Agriculture

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The proposed Trade Expansion Act of 1962, with its focus on the European Common Market, presents special problems for agriculture in general and California agriculture in particular. The status quo in foreign trade cannot be expected to prevail. The need is to take advantage of prospective changes. If the Trade Expansion Act is considered unsatisfactory, constructive alternatives need to be proposed. If the Act is approved and becomes effective, the State's agricultural industries—particularly fruits, vegetables and tree nuts—will need to pursue closer-than-ever working relationships with those who negotiate for the United States.

THE U. S. CONGRESS is now debating the President's Trade Expansion Act of 1962. It is being discussed along with the development of the European Common Market. The proposed act is intended to improve our position in negotiating tariff adjustments and other features of trade agreements with the Common Market and other countries. Our foreign policy and patterns of international relations are also involved. The proponents believe the act will strengthen our trade position and our foreign policy posture. The opponents believe that segments of our agriculture and industry could be harmed.

A previous article (California Agriculture, May, 1962) summarized the main aspects of the European Economic Community and some problems facing the U. S. The development of the Common Market has reached the point where the member nations have announced the initial outline of a common agricultural policy. If not striving for self-sufficiency in farm products, the Common Market policy is to foster agricultural development—even if that means restriction of agricultural imports. It is with the maintenance of our European markets that California is concerned in the "give and take" of these new trade agreement negotiations.

This involves the additional burden of facing up to increased imports of certain agricultural products which may be competitive with those produced in California. These problems may become more acute as new members join the Common Market, particularly the United Kingdom, an important importer of U. S. agricultural products, or Spain, a major exporter of citrus. Certain California agricultural industries, particularly fruits, vegetables, and tree nuts, are concerned with possible restriction of export markets