THE TOLERANCE OF FLAX TO SALINE CONDITIONS: EFFECT OF SODIUM CHLORIDE, CALCIUM CHLORIDE, AND SODIUM SULFATE

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The demand for linseed oil and flax fiber under wartime conditions has resulted in a marked increase in acreage of flax in the western states. On the basis of 1941 figures California and Montana harvested over a tenth of the total acreage in the United States, and Arizona, Washington, Oregon, and Idaho reported acreages ranging from 2,000 to 14,000 acres. In the Imperial Valley of California the acreage of flax has increased from about 20,000 acres harvested in 1936, to 106,000 acres in 1942, and the acreage for 1943 was approximately 145,000. This extension of acreage has resulted in planting some flax on saline land. For this reason, it has seemed desirable to obtain more complete information on the effect of saline substrates on the vegetative growth of flax and the yield and oil content of the flax seed.

METHODS AND MATERIALS

The Punjab variety of flax was selected since it is planted almost exclusively in California and Arizona where winter flax is grown and where some districts have a well-developed soil salinity. The plants were grown under greenhouse conditions in sand cultures in 5-gallon jars which were equipped with automatic irrigators controlled by a time clock. Each culture was provided with a main reservoir and a smaller accessory one to control the amount of solution delivered at one irrigation. The combined capacity of the two reservoirs was 20 liters, and 6 liters were held by the sand.

The date of seeding in the Imperial Valley extends from about November 15 to December 15, although some late plantings were made up to January 1 during the 1942-43 season. In order to parallel as far as possible the flax-growing season in the Imperial Valley, plantings in these studies were begun the first week in December. The seeds were germinated between moist blotters and were then planted in the sand cultures on December 8. The seeds were arranged in a 6-inch circle, ¾ inch apart and ½ inch deep, and later were thinned leaving six plants approximately 3 inches apart which gave a spacing of plants in line with the recommendations of Dillman and Brinsmade.

SALT TREATMENTS

Thirteen treatments were used, a control or basal nutrient solution, 0.5 atmosphere osmotic concentration (Table 1), and three series of salt solutions adjusted

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3Agricultural statistics for 1942. U. S. D. A.

4Personal communications from A. C. Dillman and L. G. Goar.

5Figures in parenthesis refer to "Literature Cited", p. 300.