DISTRIBUTION OF RESIDUAL SOIL MOISTURE AND
NITRATES IN RELATION TO THE BORDER
EFFECT OF CORN AND SORGO

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THE enhanced growth of plants in rows bordering on uncropped areas is unquestionably caused by one or more of the following reasons: The additional sunlight, the additional soil moisture, or the additional supply of plant nutrients placed at their disposal. The question of "border effect" has been previously studied largely from the point of view of field plat technic. The Committee on Standardization of Field Experiments of the American Society of Agronomy (1) has recommended procedures in the field which will largely obviate errors in yield, etc., which might arise from this source. Various citations in its bibliographies give evidence of the extent and amount of border effect with various crops under a wide range of environmental conditions. In this paper, besides the utilization of additional sunlight as shown by the greater yield from the border plants, data were collected showing the utilization of additional soil moisture and plant nutrients which were at the disposal of the border plants. A survey of the residual soil moisture and nitrate conditions at or near crop maturity was made by taking series of samplings from planes in the soil perpendicular to the crop-fallow boundary lines for the two crops, sorgo and corn.

CULTURE OF THE CROPS

An area previously planted in 1934 to a crop of irrigated tobacco and free from morning glory (Convolvulus arvensis), except for a few small patches, was selected for these experiments. Honey sorgo and King Philip Hybrid corn (Cf. Smith (8) for a description) were planted in blocks interspersed with fallow strips 30 feet wide. Each block containing four rows planted 3.5 feet apart was about 60 feet long. As poor stands resulted from the first planting the blocks were replanted on May 16, 1935, and thinned on June 7 to a stand of approximately 6 inches in the row for the sorgo and 10 to 12 inches for the corn. The area was irrigated on June 8 to resettle the soil about the roots and not irrigated again during the remainder of the growing season. Though this irrigation resupplied the soil to its field capacity, it is believed the amount of moisture which had been used by these seedling plants up to June 8 would be almost insignificant compared with the total amount used during the season. No rain fell during the period of the experiment except 1.03 inches distributed in three storms between Oct. 2 and Oct. 15, 1935. Except for these storms which affected only the surface foot of soil and then not materially, the conditions were very nearly ideal for studies of this kind. At the time of harvest, Oct. 25, 1935, the seeds of the sorgo had just reached maturity.

1Contribution from the Division of Agronomy, University of California, Davis, Calif. Many of the determinations and calculations reported herein were performed by Mr. I. I. Cornet, laboratory technician. Received for publication February 8, 1937.

2Associate Agronomist in the Experiment Station.

3Reference by number is to "Literature Cited", p. 378.