AVAILABLE POTASSIUM IN ORCHARD SOILS AS
AFFECTED BY A HEAVY STRAW MULCH

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In a recent brief article (8), the authors pointed out the large amounts of available potassium found beneath old straw mulches as compared with adjacent cultivated land. Since then, additional confirmatory evidence has been obtained in a mulched pear orchard on a Mahoning silty clay loam at Strongsville, Ohio. It is our purpose here to present the data on which these observations were based, together with those obtained on a similar orchard soil to which potassium fertilizers have been applied.

Studies were begun in the orchards of the Ohio Agricultural Station in 1928 to determine the need for other elements than nitrogen, particularly phosphorus and potassium. About that time it was noticed that each year there was a definite scorching of the foliage which suggested potassium deficiency. Each year since, the trees in certain areas of the orchards have shown the same symptoms. One season (1936) a block of trees was left unsprayed to determine whether the trouble was due to injury from sprays or spraying. The leaves again showed "burned" edges, although apple scab was so severe in that year that diagnosis was made difficult. It should be added, however, that there is no evidence that the scorching of the foliage has particularly affected the growth or yield of the trees; neither has there been any significant increase in yield as a result of the fertilizer treatments.

OBSERVATIONS IN ORCHARD J

The orchard in which the fertilizer treatments were begun in 1928 is known as orchard J and consists of the varieties Baldwin and Stayman Winesap. Planted in 1922, it was cultivated for seven years and then put down to blue-grass sod. There has been an occasional light discing along the tree rows. While this orchard is not particularly involved in the present discussion, the treatments are here given together with a record of the downward translocation of available potassium during 10 years of treatment in order to show that potassium is "fixed" in this soil. At first the rate of application was probably too low, but later the rate was increased (Table 1). At all times the rate of nitrogen applications was in accordance with that recommended to orchardists of the state.

From Fig. 1 it will be seen that available potassium is present in any considerable amount only at a very shallow depth in the treated plats of this particular orchard. The characteristic "fixing" of potassium (4) presents a difficult mechanical problem to orchardists who wish to supply it to fruit trees. This tendency for potash to be fixed by the surface soil, above the zone in which the absorbing roots of

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