OXIDATION-REDUCTION POTENTIALS IN ORCHARD SOILS

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Orchard soils studied at the Oregon Agricultural Experiment Station (7) have shown great variation in physical properties, texture, structure, and aeration. Root distribution and variations in tree growth were found to be correlated with soil conditions. The deep soil horizons of some heavy soils appeared to be anaerobic during a greater part of the season. This condition raised the question as to whether such soils would show low oxidation-reduction potentials, which correlate with their lack of suitability for root development and tree growth.

HISTORICAL

A good review of the literature concerning the relation of oxidation-reduction potentials to the properties and conditions of soils has been made by Bradfield and associates (1) and by Sturgis (8). Willis (9), Peech and Batjer (6), Bradfield and others (1), and Brown (2) have given improved methods for the study of oxidation-reduction potentials of soils.

Darnell and Eisenmenger (3) have reported that rapid decomposition of organic matter in the soil brought about a marked fall of potential, and they attributed this to oxygen depletion. They conclude that change in acidity, resulting from biological processes associated with the breaking down of fresh organic matter, and a reduction in the oxygen supply are the chief causes of reduced potentials in soils.

Heintze (4) questions the diagnostic value of oxidation-reduction measurements on soils.

METHODS OF STUDY

Soil samples were collected by 1-foot horizons, except the surface foot which was in two 6-inch sections. Samples of the soil were suspended in N/10 H₂SO₄.

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3Figures in parenthesis refer to "Literature Cited", p. 96.