

SOIL SCIENCE (AFFILIATE)

ABSTRACTS

Single Root Fertilization of Corn. A. J. OHLROGGE and W. G. DUNCAN, Purdue University.—Band applications of commercial mixed non-mobile fertilizers results in the fertilization of only a portion of the root system of the crop. It therefore becomes important to determine if a plant can flourish and complete its life cycle with only a part of its root system receiving essential nutrients. Six plants of single cross corn were grown to maturity in the field under conditions where at least 95% or more of the nitrogen and phosphorus was absorbed through one to three roots. Growth rate, vigor, and productivity indicated a high level of nutrition under these experimental conditions.

Effect of Different Systems of Orchard Soil Management on Soil Moisture and Water Penetration. R. B. TUKEY, A. R. BERTRAND and R. G. LANGSTON, Purdue University.—Observations made during 1955 showed that in spite of rainfall which exceeded the thirty year average, apple trees under certain kinds of sod covers suffered from the lack of moisture in August and September to the point of defoliation. More detailed studies were made during 1956 and 1957 to determine what kinds of soil treatments contained the most soil moisture. The effects of various kinds of mulches, grasses, and legumes, mixtures of grasses and legumes, as well as the effects of deep tillage and soil compaction were studied. Moisture measurements and rates of water penetration were recorded.

Results indicate that present cultural practices give poor utilization of rainfall and that under such conditions soil moisture can be depleted very readily even during periods when rainfall should be adequate.

Some Aspects of Soil Compaction. C. W. LOVELL, JR.,¹ Purdue University.—Soils which are to compose an earth structure or which are to support another structure are commonly compacted to a specified unit weight-moisture content condition. The attainment of this condition is intended to provide a soil mass which is sufficiently strong, incompressible and impermeable to perform the desired engineering function.

A number of factors exert an important influence on the condition and properties of the compacted soil mass. Among these factors are: soil texture, amount and type of the applied compactive effort, moisture content at which the compaction is achieved, and the tendency and ability of the soil to change volume in the in-service environment.

This paper outlines and discusses the general nature of influence of these factors.

¹ Joint Highway Research Project, Purdue University.

Influence of Nitrogen and Clipping on the Roots of Two Grasses.
D. L. OSWALT, M. R. TEEL and A. R. BERTRAND, Purdue University.—Orchardgrass and brome-grass under high and low levels of soil nitrogen were grown in glass-sided boxes in the greenhouse and in field plots. P³² was used in the field to detect depth of rooting and the grasses were cut at different physiological stages.

The roots of both grasses grew 10-15 mm. more during a 24-hour period in the greenhouse where the soil nitrogen level was low. The roots reached a depth of six inches 10-15 days sooner in the field where the nitrogen level was low. The number of roots decreased and the diameter increased when the nitrogen level was high. Clipping of the plants caused the old roots to cease extension within 24 hours and a new system of roots was initiated within the top 2 inches of the soil 7-10 days after clipping.

Some Effects of Soil Physical Factors on the Growth of Corn Roots.
W. G. DUNCAN, Purdue University.—Simple tests in a uniform medium show that corn roots grow in a straight line whose slope is determined by the resistance of the medium to root penetration. They are deflected by wet filter paper and other obstructions with a fine textured surface. They are not stopped or turned by poor soil aeration or saturated air.

These observations permit reasonable conjectures about the probable path of corn root growth under various soil conditions.