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Specific Difference in Root Penetration into the Compacted Soil Cakes in Crop Plants

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Abstract:

Artificially compacted soil cakes were used to examine the penetration of seminal roots in cereal and tap roots in leguminous crops. Using an oil pressure pump, compacted soil cakes 1 cm in thickness were made from sandy loam soils which had been sieved through a 2.54-mm screen and had about 13% moisture by volume. The penetration of seminal and tap roots of 30 common and forage crops was examined at 25°C. All crops except maize (*Zea mays* L.) could penetrate soil cakes with a hardness of more than 11 kg/cm². Among the crops used, the seminal root of six-row barley (*Hordeum vulgare* L.) could penetrate the hardest soil cake (73 kg/cm²). Of the leguminous crops, the tap root of moth bean (*Phaseolus aconitifolius* Jacq.) could penetrate a soil cake of 59 kg/cm². The seminal roots of 7 crops and tap roots of 4 crops penetrated completely through soil cakes of 11 kg/cm². Among cereal crops except maize, there is a tendency of the larger the diameter of the seminal root, the stronger the penetration force. On the contrary, among leguminous crops except white clover (*Trifolium repens* L.), the smaller the diameter of the main root, the stronger the penetration force.

Keywords:

Main root, Root penetration, Seminal root, Soil cake, Soil hardness, Tap root

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