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Investigations on effects of gravel layer of alfisols on sugarcane root distribution

Presence of a shallow gravely layer in Reddish Brown Earth soils (Alfisols) was thought to impede root penetration in sugarcane. This study was conducted on well- drained Atfisols to investigate the effect of gravel layer on root disbribution pattern of three sugarcane varieties under the routine land preparation method and to observe the improvements with sub-soiling under moisture stress conditions.

In the gravely layer, bulk density of 1.75 Mg/ m^3 and soil strength of 1079 kPa were observed before the tillage operations. Sub-soiling decreased bulk density and soil strength to 1.61 Mg/ m^3 and 441 kPa, respectively while macro-porosity was significantly increased. Under ploughing, over 70% of the roots were confined to the top 30 cm of soil in variety SLI 121, while it was about 60% for SL 8306 and Co 775.

Sub-soiling significantly increased the percentage roots below gravely layer in varieties CO 775 and SLI 121. Gravely layer restricted root penetration which was highest in

variety SLI 121 and lowest in SL 8306. Therefore, under normal land preparation method currently used, varieties SLI 121 and Co 775 could become susceptible to moisture stress owing to the shallow root system. Sub-soiling of such soils will improve the root penetration and distribution below the gravely layer and the land preparation method presently used should be modified to include a suitable sub-soiling operation under rain-fed conditions in Alfisol.