

EFFECTS OF SUBSOIL COMPACTION ON NUTRIENT ASSIMILATION AND TRANSLOCATION ABILITY IN THREE GRAIN LEGUME CROPS

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Subsoil compaction affects all aspects of soil quality and persistent than that of surface compaction. An experiment was conducted in a phytotron using a randomized block design to evaluate the effects of different levels of compaction on legume crops viz. soybean, chickpea and lentil in an Andisol. A clay loam Andisol was used to grow the legume crops at different levels of surface and subsoil compaction as no compaction (0 J), medium compaction (500 J) and high compaction (1000 J). In this experiment, the effects of soil compaction on soil physical properties, plant development and nutrient assimilation and translocation ability by soybean, chickpea, and lentil were investigated. The bulk increased substantially with increased compaction. The dry weight of the plants differed in both surface and subsoil compacted soils. Shoot and root weights of the plants were higher at 0 J than the other compaction levels indicating that soil compaction hampered normal plant growth. Furthermore, the yields of plants tended to decrease with increasing of soil compaction from 500 J to 1000 J for both surface and subsoil compaction. However, this tendency was not always statistically significant. The results obtained in the study revealed that apart from Ca uptake by roots, compaction hampered nutrient assimilation in both shoot and root of all the crops. Similarly, the translocation of nutrients in the shoot of the plants were adversely affected by compaction. In general, the effect of compaction on the growth and levels of both macro-and micro- nutrients in soybean was the least pronounced. The severity of the detrimental effect of compaction on dry matter production could be presented as chickpea > lentil > soybean. This study also revealed that for all the measured parameters, the effect of surface soil compaction was severer on the crops than that of subsoil compaction.

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