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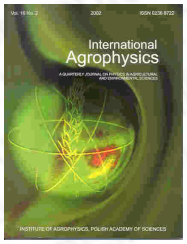

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Influence of vehicular traffic on air permeability and groundnut production in a semi-arid sandy loam soil

(get PDF)

J.O. Ohu, E. Mamman , U.B. Muni

Department of Agricultural and Environmental Resources Engineering, University of Maiduguri, Maiduguri, Nigeria

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abstract The effect of vehicular traffic on the production of groundnut (Arachis hypogea) was investigated in a sandy loam soil. A randomized complete block design with treatments of 0, 5, 10, 15 and 20 passes of a tractor with 31 kPa contact pressure was used. The gravimetric soil moisture content, soil dry bulk density, penetration resistance and air permeability for each applied load were measured from the soil surface up to a depth of 10 cm. Seed moisture content, haulms and seed yield were determined at harvest for each treatment. Soil dry bulk density and penetration resistance increased with increase in the number of tractor passes while air permeability decreased with increase in the number of tractor passes. The haulms yield and seed yield increased with increase in the number of tractor passes up to 5 passes, and thereafter decreased with further increases in tractor passes. The soil physical properties and the product of the number of tractor passes and contact pressure were used to generate a groundnut yield model. The yield model that contained the interactions of the product of the number of tractor passes and contact pressure, penetration resistance and air permeability had the greatest influence on the yield of the crop. It can be concluded that in groundnut production in a sandy loam soil in a semi-arid environment, a moderate amount of soil compaction could improve the yield of groundnut.

keywords semi-arid, tillage, vehicular traffic, compaction, air permeability, groundnut.