

**EFFECT OF SOIL COMPACTION DUE TO MACHINERY
TRAFFIC ON SOIL PHYSICAL PROPERTIES AND YIELD
OF OKRA (*Abelmoschus esculentus*)**



By

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ABSTRACT

Farmers in Batticaloa district use four wheel tractors for the farming practices. Most of the farmers perform farming operations without being aware of the effect of soil compaction on soil physical properties and crop responses. Therefore, a field study was conducted during June to August 2018 on non-calcic brown soil at Karadiyanaru farm Batticaloa to compare the effect of different compaction with different fertilizer application rate on some selected soil physical properties under okra cultivation. The experiment was arranged in a split plot design with three replications where the experimental variables were two levels of compaction (compaction level 1 with two tractor passes resulting in a bulk density of 1.62 g/cm^3 and compaction level 2 with six tractor passes resulting in 1.76 g/cm^3) as main plot factor and the N fertilizer application rates at 250kg/h, 300kg/ha, 350kg/ha as sub plot factors. Effects of soil compaction on soil moisture content, bulk density, porosity, hydraulic conductivity and crop growth and yield were studied. Soil compaction had a highly significant effect on soil physical properties, hydraulic conductivity and crop growth yield at $P < 0.01$. Average soil moisture content ranged from 9.6 – 8.3% at C1 where as it was found to be in the range of 8.6 – 7.5% at C2. Hydraulic conductivity was in the range of 9.0 – 7.9 mm/h at C1 and it was 7.4 – 6.9 mm/h at C2. The average soil bulk density ranged from $1.7 - 1.8 \text{ g/cm}^3$ at C1 where as it ranged from $1.8 - 1.9 \text{ g/cm}^3$ at C2. Induced compaction extended the decrease in soil porosity from 35 – 33% at C1 and from 34 – 32% at C2.

Compared to compaction level 2, compaction level 1 resulted in decreased dry bulk density which caused increased soil moisture content, total porosity, hydraulic conductivity, and crop yield. There was no effect to the selected soil properties by the

fertilizer application. The interaction between soil compaction levels and fertilizer amount affected the final yield of Okra. Therefore under the soil and weather conditions of this experiment, highest yield of 420.62 kg/ha was obtained at low compaction level (C1) with higher fertilizer amount of 350 kg/ha in treatment (C1F3).

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