ABSTRACT

Mechanical harvest traffic of sugarcane fields produced significant soil compaction, especially at high soil water content and payload levels. Maximum bulk densities and minimum macro-porosities produced were 1.45 g/cc and 1.42 g/cc and 5.3 % and 4.5 % for Cunupia and Frederick soil series respectively. Vehicles with a high tyre inflation pressure and small tyre dimension produced greater compactive effects than those with a lower inflation pressure and larger tyre dimension.

In both field and laboratory studies filter mud and bagasse were found to produce significant effects on the measured parameters, especially when the two amendments were mixed together at the level of 100 t/ha each. Bagasse alone was found to produce a greater effect than filter mud alone. At the level of 100 t/ha of filter mud and bagasse the optimum soil water content for maximum compaction was increased from 11 % to 28 % and maximum bulk density was reduced from 1.7 g/cc to 1.2 g/cc on Frederick soil series whereas the corresponding values for Cunupia soil series were from 7 % to 26 % and from 1.8 g/cc to 1.35 g/cc. Similarly soil physical properties were improved in the field and cane yield was increased on both soils. On Frederick clay soil bulk density was reduced from 1.37 g/cc to 1.30 g/cc and yield was increased from 65 t/ha to 124 t/ha whereas on Cunupia soil series bulk density was reduced from 1.47 g/cc to 1.35 g/cc and cane yield increased from 60 t/ha to 120 t/ha.

The improvement in soil physical properties and the increase in the optimum soil water content for maximum compaction produced by the additio of filter mud and bagasse, made these soils better able to withstand the effect of harvest traffic, and to modify the compaction effects expected.