ABSTRACT

Studies into the effects of subsoiling on root distribution of sugar-cane and the physical conditions of the soil were carried out on Talparo clay.

Subsoiling caused an improvement in root distribution in the subsoil (16-24") but this effect disappeared after two cropping cycles.

Soil strength, bulk density and capillary porosity increased while non-capillary porosity decreased as the number of cropping cycles increased. Root growth decreased with depth in accordance with decreases of non-capillary and total porosity and, increases in soil strength, bulk density and capillary porosity. The variations of root distribution with ratooning were not closely related to variations of these physical factors.

The variations of soil physical properties with time were much greater in subsoiled fields.

Bulk density, soil strength and capillary porosity values were greater and, non-capillary porosity lower at all depths and ratoons under subsoiling. This indicated that the subsoiling operation did not ameliorate the soil physically.

Water-stable aggregates were smaller in size in fields that were subsoiled.

Root growth was severely restricted above a bulk density of 1.30 gms/cc. and a soil strength of 0.90 tons/ft^2. Root distribution decreased with increasing bulk density, soil strength and capillary porosity and increased as the non-capillary porosity increased above 10%.

Soil nitrogen, potassium and exch. aluminium were found to be significantly correlated with root distribution.

A moisture range of 25% - 35% was considered to be optimum for minimum compaction of Talparo Clay under mechanisation.

Organic matter application led to a lower bulk density and soil strength and a high non-capillary porosity but the type of organic matter used was thought to affect its long-term effectiveness. The effects of filter-press mud appeared to have worn off within 6 - 8 weeks after application.