

BULK DENSITY MEASUREMENTS USING HYDRAULIC SAMPLER

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Bulk density measurements often require extensive excavation of a site to allow for collection of undisturbed cores. Using a vehicle mounted hydraulic soil sampler the variations in bulk density were investigated for undisturbed cores compared to 75 mm and 100 mm steel rings sampled adjacent to a soil pit.

The cutting tips used on the sampler tubes were obtained from Department of Primary Industry, Brisbane. Cores of A and B horizons of a grey brown podzolic, a yellow solodic and the A and AB horizons of a black earth were sampled. Core diameters varied from 31.8 to 43.7 mm for 38 to 51 mm tubes respectively. The extracted core sample was broken into 100 mm lengths for analysis.

Using the hydraulic sampler to push a ring of 76 mm stainless steel and 100 mm mild steel into the soil, the rings were dug out by hand. The bulk densities obtained by this method were compared to those obtained from the cores extracted in the tubes. Similarly a 75 mm ring hammered into the soil was removed for comparison.

The results indicated that the variation between sampling methods was not significantly different, given the spatial variability of the soils. The larger cores (43.7 mm) more closely approximated the 75 mm cores, while there was insignificant difference between the 100 mm and 75 mm ring samples. The variations were greatest in the black earth AB horizon, due possibly to the macropores within the soil.

The hydraulic soil sampler provides a rapid sample for calculating bulk density from either the 32 mm or 44 mm core, compared to traditional methods.