

Cation exchange capacity (CEC) of the A, B and C horizons

Cation exchange capacity (CEC) represents the maximum quantity of exchangeable cations that a soil can hold at a given pH, i.e. the sum of exchange sites occupied by cations (Ca, Mg, K, Na, H and Al). CEC also expresses the soil's buffering capacity, which is its resistance to change in pH. CEC is strongly related to clay and organic matter content. Five classes are used (Table 1).

Class	CEC (milliequivalent/100g)
Very low	<6
Low	6 - 12
Moderate	12 - 25
High	25 - 40
Very high	≥40

Martin and Nolin 1991

As a rule, the value of CEC remains stable, although it may vary slightly over a long time period if organic matter content declines. CEC is an indicator of soil fertility. It may also serve as a criterion in a model for assessing soil vulnerability to nutrient losses to groundwater.

The distribution of CEC classes in the A horizon follows the distribution of texture and organic content classes. Soils with low CEC (31.0%) are generally sandy soils (e.g. Fleury series). Soils with moderate (44.1%) and high (23.0%) CEC are clays and clay loams (e.g. Providence series). Soils with very high CEC (1.9%) are mainly mineral soils with a peaty surface layer (e.g. Boucherville humic series) or organic soils. CEC declines in the B and C horizons mainly in the case of coarse- and medium-textured soils (e.g. Joseph series). Soils with very low CEC in the B horizon account for 14.9% of the total, and soils with very low CEC in the C horizon account for 17.6% of the total, whereas none of the soils in the study area were characterized by very low CED in the A horizon.