
The southern Nova Scotia wine terroir: a geological and pedological study of the geochemistry of soils from vineyards with a focus on cation exchange capacity

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Terroir is a concept that recognizes five main factors of the natural environment that affect wine grapes during growth (meteorology, geology, pedology, physiography, and viticulture). Among other issues, the study of terroir attempts to explain why different vineyards produce wines of different quality and taste when virtually identical grapes and processing methods are employed. The complex bedrock geology, pedology, and surficial and glacial geology of southern Nova Scotia are believed to influence the local terroir leading to the production of diverse wine in the region. The research focuses on how geology affects some important properties of soils for wine grapes such as cation exchange capacity (CEC), nutrients, and soil pH. CEC (the ability of soils to hold cations and, as a consequence, nutrients) is a relevant soil property as wine grapes tend to grow better in soils with low CEC.

Twenty-five soil samples were taken from 15 vineyards in southern Nova Scotia to investigate the vineyard terroir. The samples were analyzed for pH, organic matter concentration, and grain size distribution, and sent to the ACME Analytical Laboratories in Vancouver, British Columbia for geochemical analysis using hydroxylamine hydrochloride and ICP mass spectrometry. Cation exchange capacities were estimated using Ca, Mg, K, and Na concentrations for each sample. A high variation in CECs was observed. Both the highest and the lowest CECs occur in vineyards from the LaHave River Valley, ranging from 1.68 meq/100 gm (a sample from a vineyard underlain by Bridgewater loam) to 40.92 meq/100 gm (Bridgewater loam - drumlin phase). In the Annapolis Valley, the samples with the lowest CECs are from vineyards underlain by Kentville soil (6.06 to 15.03 meq/100 gm). Samples with the highest CECs are from a vineyard at the base of North Mountain underlain by Pelton soil (up to 37.63 meq/100 gm), and from vineyards underlain by Wolfville soil on the south facing slope of the Wolfville Ridge (up to 34.70 meq/100 gm). Organic matter concentrations exhibit low variation, ranging from 0.63% to 2.93%, whereas soil pH ranges from 4.86 (in Kentville soil) to 7.25 (in Bridgewater loam - drumlin phase). These results illustrate how soil type and soil geochemistry, including CEC, are linked. Future work will attempt to address how soil geochemistry influences wine character.