



Available P, Ca and Mg in an Atlantic Small Catchment

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Nutrient maps based on intensive soil sampling are useful to develop site-specific management practices. Catchments represent an important topographic condition to appraise effects of local management practices related to the availability of soil nutrients. Geostatistical methods have been widely used to determine the spatial correlation and the range of spatial dependence at different sampling scales. If spatial dependence is detected, the modelled semivariograms can then be used to map the interested variable by kriging, allowing unbiased estimates with minimal estimation variance. The objective of this work was to examine and to map the spatial distribution of N, Ca, and Mg on an agricultural area in Galicia, Spain, under European Atlantic climatic conditions. The study site was a catchment with a surface area of about 25 ha. Available P, Ca and Mg were extracted by the Mehlich-3 procedure. Mean P, Ca and Mg contents were 54.13, 486.9 and 43.5 mg.kg⁻¹, respectively. All three elements analyzed showed medium to high spatial variability, with coefficients of variation of 37.3%, 29.1% and 28.0% for P, Ca and Mg, respectively. Moreover, the spatial dependence was described by a nugget effect component plus a spherical structure. The strength of spatial dependence was assessed using the values of nugget effect and range of the semivariogram. The spatial dependence decreased in the order Mg > P > K. Different interpolation methods (punctual kriging, block kriging and conditional simulation) render similar results for the spatial distribution of the study elements. Kriging maps showed differences in the spatial distribution of the study nutrients and allowed identification of small regions with distinct availabilities. Microregions with both surpluses and deficits of available P could be identified and related to catchment morphology. Maps also illustrate some similarities in the spatial variation patterns of Ca and Mg.