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Spatial Variability of Soil Chemical Attributes and Corn Yield in two Conservation Tillage Management Systems

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Neglecting spatial heterogeneity pattern in soil properties and nutrient status may result in reduced yield and in environmental damage. The objective of this study was to investigate the differences in spatial variability of some chemical attributes and corn yield under two management systems. The experiment was developed in a soil classified as an Alfisol, according to the Soil Survey Staff and as a Nitossolo Vermelho Distroférrico, in the Brazilian System of Soil Classification. The field was located at the Lageado Experimental Farm, in FCA/UNESP, Botucatu, SP (Brazil). The measurements were made in an area under no tillage system, divided in two of 100 x 120 m. In the first area reduced tillage was implement, whereas in the second area no tillage was performed, having the corn crop been sowed in December of 2006. The attributes analyzed were performed in a grid with 130 sample points in each management system, at depths of 0-0.10 and 0.10-0.20 m. The attributes analyzed were pH, Ca, Mg, H+Al, SB and V% and the corn yield. Classical statistics revealed a characteristic ranking in the variability of soil properties. Geostatistical analysis showed contrasting patterns of spatial dependence for the different soil uses, sampling depths and studied properties. So, all the attributes evaluated presented spatial dependence in both management systems, the majority with moderate dependence. The spherical and exponential models were adjusted to most of the semivariograms. Land use effects may have contributed to differences in variability between the experimental plots. Kriging maps indicated the presence of homogeneous subareas which can be useful for future management decisions.