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Soil available phosphorus in a permanent grassland excessively fertilized

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Phosphorus is an essential element for crop growth and it is necessary to maintain profitable agriculture. In agricultural areas with high cattle manure and/or slurry inputs, available soil P levels are in excess of crop needs, so they had the potential to enrich surface water by runoff, which may trigger eutrophication. This is the case in Galicia, a temperate humid region in north-western of Spain. Soil nutrient testing is a management tool that can help accurately determine the available nutrient status of soils and guide the efficient use of fertilizers. Differences in soil phosphorus (P) contents measured by various techniques may have agronomic and environmental implications. The aim of this study was to analyze the spatial variability of available phosphorus in a permanent grassland field fertilized with organic manure. determined both after exchange resin and Mehlich 3 extraction. The experimental site was located at Castro de Ribeira de Lea, Lugo province, Spain. The studied soil was characterized by a loamy to loam sandy A horizon, rich in organic matter over tertizry-quaternary sediments. Soil was sampled at two successive depths, 0-20 cm and > 20 cm over a 6 ha field. Eighty soil samples were collected. Available P was colorimetrically determined after extraction with Mehlich 3 and exchangeable resin. Mean available P contents extracted using Mehlich 3 and resin were 29.9 and 108.8 mg.kg-1, respectively. Phosphorus extracted by Mehlich 3 ranged from 40.2 to 203.1 mg.kg-1, whereas resin extractable P ranged from 12.4 to 61 mg.kg-1 . These test results indicate excess P all over the studied field. Spatial variability of P over the experimental field was analyzed using geostatistics.