

**GEOSTATISTICAL MODELING OF SOIL CARBON AND  
HERBACEOUS BIOMASS DISTRIBUTION IN A SILVOPASTORAL  
SYSTEM IN NORTHEASTERN BRAZIL**

Marystella Duarte CORREIA<sup>1</sup>  
Rômulo Simões Cezar MENEZES<sup>2</sup>  
Ricardo Alves de OLINDA<sup>3</sup>

- **ABSTRACT:** *Recent research shows that some regions of the northeastern semiarid have shown the beneficial effect in silvopastoral systems, promote the formation of soil fertility and increase sustainability. For this study we selected three species in the savanna: algaroba, juazeiro and umbuzeiro found in pastures with buffel grass. The experimental the semivariogram is the central part of the geostatistical capable of describing the spatial dependence studies, and is the key point in the interpolation of variables. Hence the importance of fit and selection of models. Soil samples (0-0.15m) and the herbaceous layer were collected for evaluation of conservation and carbon biomass of herbaceous and spatial dependence. The algaroba was inserted along with buffel grass, the juazeiro and umbuzeiro were already more than 50 years when the grass was planted. It aims to explain whether the tree species or buffel grass can conserve carbon in the soil, but also the growth of grass, classifying and mapping the spatial dependence of the data observed with their respective probabilities. It was observed that the Matérn function with kappa 0.5 adapted better to the semivariogram with a range of 3.185 m for the algaroba species already adapted Gaussian semivariogram for the best kind juazeiro with a range of 7.839m , and with Matérn kappa 1.0 to umbuzeiro species with a range of 3.438 m, all with variable carbon . For the herbaceous biomass Spherical models with Matérn kappa 0.5 and Pie were the fit better to the data, with a range of 13.260 m, 6.938m and 6,167m for the species algaroba, juazeiro and umbuzeiro respectively. It was observed that the planting of algaroba, the juazeiro and umbuzeiro in pastures increased levels of organic matter and nutrients in the topsoil.*
- **KEYWORDS:** *Spatial dependence; semivariogram; kriging.*

---

<sup>1</sup> Universidade Federal Rural de Pernambuco – UFRPE, Programa de Pós-Graduação em Biometria e Estatística Aplicada; CEP 52.171-900, Dois Irmãos, Recife, PE, Brasil. E-mail: [marystella.duarte@yahoo.com.br](mailto:marystella.duarte@yahoo.com.br).

<sup>2</sup> Universidade Federal de Pernambuco - UFPE, Departamento de Energia Nuclear, CEP: 50.740-540, Recife, PE, Brasil. E-mail: [rmenezes@ufpe.br](mailto:rmenezes@ufpe.br)

<sup>3</sup> Universidade Estadual da Paraíba - UEPB, Departamento de Estatística, CEP: 58.429-500, Campina Grande, PB, Brasil, E-mail: [prof\\_ricardo@cct.uepb.edu.br](mailto:prof_ricardo@cct.uepb.edu.br).