Statistical study of Spatio-temporal evolution of plant infection by SCYLV in a disease free plot.

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In the framework of studying the evolution of infection by SCYLV (Sugar Cane Yellow Leaf Virus) in the caribbean islands, several observations were carried out in Martinique and Guadeloupe in 2004. A sugarcane trial (17 rows of 55m each) was established with 1,745 disease-free plants of cultivar SP71-6163. The number of SCYLV-infected plants was monitored on the whole plot, on weeks 6, 10 14 19 and 23 after transferring plants to the field, by tissue blot immunoassay (TBIA). Colonization of disease-free plants by aphids was monitored in plant cane and aphid population structure was estimated from 40 random identified plants on plant crop. We used a spatio-temporal model based on conditional intensities to investigate the infection evolution with respect to environmental heterogeneity. Since alate aphids may prefer some areas in a culture plot rather than others in relation with the variability in plant growth, wind direction, tree-shaded areas, primary and secondary infections were taken into account as in Gottwald et Gibson(1999). Different Conditional intensities were considered and simulations were carried out with gradient effects (Vaillant et Jacquet, 2005). R packages for spatial dependence were also used to process the observed data.

References :

Gottwald T.R., Gibson G.J., Garnsey S.M., and Irey M. (1999). *Examination of the effect of Aphid vector population composition on the spatial dynamics of Citrus Tristeza Virus spread by stochastic modeling*. Phytopatology, 89, 603-608.

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