Autologistic model with an application to the citrus sudden death disease

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Resumo

Citrus sudden death (MSC) disease is a disease which affects dramatically citrus trees causing the progressive decline and death. It has been identified in the late 90's in the main citrus production area in Brazil and since then there are efforts to understand the etiology as well as the mechanisms of spreading of the disease. One relevant aspect of such studies in to investigate spatial patterns of the occurrence within a field. Methods for determining whether the spatial pattern is aggregated or not are frequently used. However it is possible to further explore and describe the data by means of adopting an explicitly model with which is possible to discriminate and quantify effects by attaching parameters to covariates which represents aspects of interest to be investigated. One of the alternatives is the adoption of autologistic models, which extends a usual logistic model in order to accomodate spatial effects. In order to implement such model it is necessary to take into account the reuse of data to built spatial covariates, which requires extensions in methodology and algorithms to assess the variance of the estimates. This work presents an application of the autologistic model to data collected at 11 time points from citrus fields infected with the MSC. Is is shown how the autologistic model is suitable for investigating diseases of this type, as well as a description of the model and the computational aspects necessary for the model fitting.

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