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Sequential Hypothesis Testing for Pest Count Spatial GLMM Models.

It is well known that sequential hypothesis test plans can have appreciable cost savings compared to fixed sample size test plans. The first sequential hypothesis test plan was developed by Wald for one-parameter families of distributions and later extended by Bartlett to handle the case of nuisance parameters. However, Bartlett's hypothesis test plan requires independent and identically distributed observations. In pest management applications, it is common for count data to exhibit spatial correlations. We illustrate the existence of spatial correlations in pest count data by analyzing the spatial structure in a data set for a foliar-feeding mite pest. Spatial correlations should be accounted for when designing a sequential hypothesis test plan to decide if the density of the pest is above an economic threshold. We extend Bartlett's method to contexts where spatial generalized linear mixed models are appropriate for the data and we illustrate its implementation. (Received July 30, 2010)