

EVALUATION OF GENERALIZED RANDOMIZED COMPLETE BLOCK DESIGN AS A SOLUTION TO OVERDISPERSION IN FIELD EXPERIMENTS

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Overdispersion is a common problem encountered in fitting generalized linear models for disease incidence data. Complicated methods such as compounded models and quasi likelihood methods, which require specific software for implementation, have been suggested to handle the problem. A simple solution is suggested, especially for field experiments, by means of using Generalized Randomized Complete Block Design (GRCBD) as the experimental design for such situation. When the experimental design is GRCBD, there will be an extra term in the model relative to Randomized Complete Block Design (RCBD) and thus the resulting residual deviance will be smaller with GRCBD relative to that with RCBD. The extra term with GRCBD is the block \times treatment interaction and hence the overdispersion is taken into account by means of block \times treatment interaction. The problem with methods suggested earlier is the inflated standard errors and there by large type II error. Hence the advantage of the suggested method is that, overdispersion is taken into account while preserving the higher power of the test. The GRCBD is therefore a useful alternative to the RCBD if the intended analysis is by fitting a generalized model. Implementation of the proposed method is illustrated using the incidence data collected from field experiments on tomato leaf curl complex disease conducted at Maha-Illuppallama sub-campus of University of Peradeniya, Sri Lanka.