



Generalized linear mixed models: an application to fungi data

Christopher Silva de Pádua*

ESALQ-USP, Piracicaba, Brazil - e-mail christopher.silva.padua@gmail.com

Maíra Blumer Fatoretto

ESALQ-USP, Piracicaba, Brazil - e-mail mairafatoretto@gmail.com

Vinícius Menarin

ESALQ-USP, Piracicaba, Brazil - e-mail vinicius.menarin@gmail.com

Rafael de Andrade Moral

ESALQ-USP, Piracicaba, Brazil - e-mail rafael_moral@yahoo.com.br

Clarice Garcia Borges Demétrio

ESALQ-USP, Piracicaba, Brazil - e-mail clarice.demetrio@usp.br

Celeste Paola D'Alessandro

ESALQ-USP, Piracicaba, Brazil - e-mail celed1881@yahoo.com.ar

Victor Arévalo Rojas

ESALQ-USP, Piracicaba, Brazil - e-mail vmar@usp.br

Abstract

The ultraviolet radiation (UV-B) component of sunlight reduces efficacy of entomopathogenic fungi in the field. The proportion of germinated conidia in fourteen isolates on *Isaria fumosorosea* exposed to UV-B was observed aiming to identify possible ones which were superior to *Isaria* 1296. Proportion data from dose-response experiments are often overdispersed, characterized by a larger variance than assumed by the standard binomial model. This paper has the purpose to study several models proposed in the literature that incorporate overdispersion, select the best one to describe the data and ensure the choice of the most efficient isolate in the field. We fitted binomial, quasi-binomial, beta-binomial and binomial-normal models and assessed goodness-of-fit for each of those models using half-normal plots (HNP) with simulation envelopes. A binomial-normal model, which is a generalized linear mixed model (GLMM), was selected to analyze the data. Among the isolates, *Isaria* 1296 was the one with greater efficacy and four main groups with different efficacies were formed.

Keywords: overdispersion; proportion data; logistic-normal model; random effects.