

Application of generalized linear mixed models to study the surface activity of scorpions

Mónica F. Nime

CONICET- Laboratorio de Biología Reproductiva y Evolución, Instituto de Diversidad y Ecología Animal (IDEA, CONICET), Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba, Córdoba, Argentina
monicanime@yahoo.com.ar

Raúl E. Macchiavelli

College of Agricultural Sciences, University of Puerto Rico, Mayagüez, Puerto Rico
raul.macchiavelli@upr.edu

Camilo I. Mattoni

CONICET - Laboratorio de Biología Reproductiva y Evolución, Instituto de Diversidad y Ecología Animal (IDEA, CONICET), Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba, Córdoba, Argentina
cmattoni@efn.uncor.edu

Fernando Casanoves*

Biostatistics Unit, Tropical Agricultural Research and Higher Education Center, CATIE, Turrialba, Costa Rica casanoves@catie.ac.cr

We evaluate the effect of environmental variables in surface activity of scorpions in two sites of the mature forest and secondary forest within Chancaní Reserve (arid Chaco, Córdoba, Argentina). The nocturnal activity of scorpions was observed during 14 nights. Counts were analyzed with Generalized Linear Mixed Models (GLMM) using environmental covariates (moon percentage, clouds, temperature, relative humidity, atmospheric pressure, and wind velocity) and design effects. Since there were repeated measures we incorporated transect random effects, and hence we were able to model the correlation among observations from the same transect. A Poisson distribution with a log link function was used. Surface activity of the scorpion counts differed significantly between the two areas, and mature and secondary forest share little more than 50% of species. Surface activity of scorpions were negatively related with percentage of visible moon and positively related with air temperature and presence of clouds. The results in this study show the importance of environmental variables on the activity of scorpions.

Key Words: Count data, Poisson distribution, log link function