

Exponential growth model of weevil populations: a didactic experiment for undergraduate course of Population Ecology

Maria Eduarda Bomfim¹, Claudiane Braz², Vanderléia Conceição¹, Nayara Dias¹, Francielen Dias¹, Elton Freitas¹, Paloma Regina de Jesus¹, Verônica de Jesus¹, Roberto Junior¹, Vitor Modesto¹, Joanna Karine de Oliveira¹, Tainara Pereira¹, Diana Rocha¹, Stefane Sacramento¹, Roseane Sampaio¹, Ana Caroline Santos¹, Glaucio Silva¹, Joseane da Silva¹, Stheffy Souza¹, and Guilherme de Oliveira²

¹Affiliation not available

²Universidade Federal do Recôncavo da Bahia

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Abstract

Exponential model for population growth (exponential model) is a cornerstone to evaluate population dynamics in Population Ecology field. Here, we used a didactic experiment to teach exponential model for an undergraduate course of Population Ecology. We built nine populations of weevils with three different initial sizes: eight, 16, and 32 individuals with three replicates each. We furnish them equal food resource availability, and count their sizes weekly across 12 weeks. We estimated the intrinsic and population growth rates (i.e., r and dN/dt parameters) by trials and errors with an exponential model build in an Excel spreadsheet. Replicates with eight and 16 individuals reached the highest values of r and dN/dt , while replicates with 32 individuals reached the lowest values. Beyond of exponential model, we observed two density dependency issues acting in populations. First, in the lowest initial population sizes we observed the effect of demographic stochasticity acting in diminishing the number of individuals in one population. Second, we observed the intraspecific competition reducing r values in largest initial populations. Therefore, we highlight the importance of didactic experiment into learning exponential model in Population Ecology course.

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