The costs of living in a thermal fluctuating environment for the tropical haematophagous bug, *Rhodnius prolixus*

Carmen Rolandi, Pablo E. Schilman

www.elsevier.com/locate/jtherbio

PII: S0306-4565(17)30510-7
DOI: https://doi.org/10.1016/j.jtherbio.2018.03.022
Reference: TB2087

To appear in: *Journal of Thermal Biology*

Received date: 30 November 2017
Revised date: 21 February 2018
Accepted date: 18 March 2018

Cite this article as: Carmen Rolandi and Pablo E. Schilman, The costs of living in a thermal fluctuating environment for the tropical haematophagous bug, *Rhodnius prolixus*, *Journal of Thermal Biology,* https://doi.org/10.1016/j.jtherbio.2018.03.022

The costs of living in a thermal fluctuating environment for the tropical haematophagous bug, *Rhodnius prolixus*

Carmen Rolandi[1,2], Pablo E. Schilman[1,2]*

[1]Departamento de Biodiversidad y Biología Experimental (DBBE), Facultad de Ciencias Exactas y Naturales (FCEyN), Universidad de Buenos Aires (UBA), Argentina.

[2]Instituto de Biodiversidad y Biología Experimental y Aplicada (IBBEA), CONICET-UBA, Argentina.

***Correspondence author.** Laboratorio de Eco-fisiología de Insectos, Departamento de Biodiversidad y Biología Experimental, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Instituto de Biodiversidad y Biología Experimental y Aplicada –IBBEA, CONICET-UBA, Ciudad Universitaria, Pabellón II, Ciudad Autónoma de Buenos Aires (C1428EHA), ARGENTINA. Tel.: (+54 11) 4576-3300; Fax: (+54 11) 4576-3384. schilman@bg.fcen.uba.ar

Abstract:

Environmental temperature is an abiotic factor with great influence on biological processes of living beings. Jensen's inequality states that for non-lineal processes, such as most biological phenomena, the effects of thermal fluctuations cannot be predicted from mean constant temperatures. We studied the effect of daily temperature fluctuation (DTF) on *Rhodnius prolixus*, a model organism in insect physiology, and an important vector of Chagas disease. We measured development time from egg to adult, fecundity, fertility, body mass reduction rate (indirect measurement of nutrient consumption rates) and survival after a single blood meal. Insects were reared at constant temperature (24°C), or with a DTF (17-32°C; mean = 24°C). Taking into account Jensen's inequality as well as the species tropical distribution, we predict that living in a variable thermal environment will have higher costs than inhabiting a stable one. Development time and fertility were not affected by DTF. However, fecundity was