Improving the efficiency of augmentative biological control with arthropod natural enemies: a modeling approach

Wouter N. Plouvier, Eric Wajnberg

PII: S1049-9644(18)30346-3
DOI: https://doi.org/10.1016/j.biocontrol.2018.05.010
Reference: YBCON 3773

To appear in: *Biological Control*

Received Date: 23 November 2017
Revised Date: 18 April 2018
Accepted Date: 16 May 2018

Please cite this article as: Plouvier, W.N., Wajnberg, E., Improving the efficiency of augmentative biological control with arthropod natural enemies: a modeling approach, *Biological Control* (2018), doi: https://doi.org/10.1016/j.biocontrol.2018.05.010

Improving the efficiency of augmentative biological control with arthropod natural enemies: a modeling approach

Wouter N. Plouvier[1,2,*] & Eric Wajnberg[1]

[1] *INRA, CNRS, UMR 1355-7254 - 400 Route des Chappes - BP 167 – Sophia Antipolis Cedex, France, and INRIA – Sophia Antipolis – Projet Hephaistos – 2004 Route des Lucioles – BP 93 – 06902 Sophia Antipolis Cedex, France*
[2] *Wageningen University, PO Box 16, 6700 AA Wageningen, The Netherlands*

* Corresponding author.
E-mail address: wouter.plouvier@inra.fr (W. N. Plouvier)

Abstract

A better understanding of the life-history traits of biocontrol agents and their effect on population dynamics is key to obtaining more efficient pest control and generating higher economic returns for biocontrol practitioners. To this end, we constructed an optimality simulation model based on principles of the behavioral ecology of natural enemies. This model allows for the identification of the most important life-history traits of natural enemies (*e.g.*, fecundity, longevity, attack rate, competition and dispersal), taking into account the costs and benefits for biocontrol practitioners. The model was kept general and was designed in such a way that it can be adapted to different target species and their specific ecology (natural enemy-pest-plant combination). Results indicate strong interactions between the optimized life-history traits of the biocontrol agents. Two different optimized life-history strategies for the agents were found with higher potential economic returns. These strategies differ most significantly in the plant-leaving decision and host handling time of the biocontrol