

Agriculture and Climate Change - Adapting Crops to Increased Uncertainty (AGRI 2015)

Comparison of the effect of predicted climate change on two agricultural pest-parasitoid systems.

Lia Hemerik^a, Konstanze Gebauer^b, Rainer Meyhöfer^b *

^aDepartment of Mathematical and Statistical Methods, Wageningen University, Netherlands

^bInstitute of Horticultural Production Systems, Leibniz University Hannover, Germany

Abstract

In insects, developmental and reproductive rates are temperature-dependent and species-specific. Therefore, the effects of climatic changes can be different for host and parasitoid species, thus changing host-parasitoid population dynamics. Within the research co-operation KLIFF (www.kliff-niedersachsen.de) we investigated the impact of climate change on selected vegetable pests and their natural enemies in Lower Saxony, Germany. As model organism we selected two important agricultural pests, *Brevicoryne brassicae* and *Aleyrodes proletella*, and their respective parasitoids, *Diaeretiella rapae* and *Encarsia tricolor*. To model the impact of predicted climatic changes on pest-parasitoid interactions age-structured simulation models were developed in INSIM¹ estimating changes in population size for each species during the course of a year. Based on temperature data simulated by the climate model REMO (MPI, Hamburg, Germany) the parameters were estimated for two future time periods, 2021–2050 and 2071–2100, and compared to parameters estimated for a reference time period (1971–2000). The relative changes in maximum population size and the occurrence of population peaks for each species were analysed for the Lower Saxony area to investigate regional differences. The simulations incorporate the interactions that occur naturally between the species and allow a comparison of the impact of climate change on pest-parasitoid interactions between the time periods.

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* Corresponding author. Tel.: +0-000-000-0000 ; fax: +0-000-000-0000 .
E-mail address: author@institute.xxx

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