

# CLIMATE CHANGE IN THE VINEYARD: PERSPECTIVES FOR PEST SPECIES IN THE REGION OF NEUCHATEL

Léonard Schneider\*, Valentin Comte, Baptiste Sneiders and Martine Rebetez



Institute of Geography, University of Neuchatel, 2000 Neuchatel, Switzerland

WSL Swiss Federal Institute for Forest, Snow and Landscape Research, 2000 Neuchatel, Switzerland

\*leonard.schneider@unine.ch



## CONTEXT

Global warming is likely to change population dynamics and distribution of insect pests in the vineyards. New species could reach the temperate regions, and some native species could create more damages than previously. In Western Europe, the distribution of the American grapevine leafhopper *Scaphoideus titanus* has been observed to shift northwards during the last decades. Plurivoltin species such as the European grapevine moth *Lobesia botrana* could produce more generations per year, creating potentially more damages on grapes. To help winegrowers to adapt to climate change, it is crucial to lead research at local scale, taking into account microclimatic specificities of the vineyards.



## AIMS

This research aims to determine the potential impacts of temperature trends during the growing season for two important pest species (*Lobesia botrana* and *Scaphoideus titanus*) in vineyards along lake Neuchatel.

## METHODS

- We used daily and hourly temperatures from the period 1981-2020 at the MeteoSwiss station of Neuchatel (485 m a.s.l.).
- We used two climatic scenarios (RCP4.5 & RCP8.5) from the CH2018 dataset to analyse temperature trends over the period 2020-2099 in Neuchatel.
- We used recent bioclimatic models based on temperatures to simulate phenology and development of the species (Sneiders 2019, Castex 2020). We focused on expected number of eggs and 1<sup>st</sup> infection date for *Scaphoideus titanus*, and on number and timing of the generations for *Lobesia botrana*.

## PRELIMINARY RESULTS FOR LOBESIA BOTRANA

Frequency of years with a 3rd generation outbreak				
1990-2020	2035-2064		2070-2099	
	RCP8.5	RCP4.5	RCP8.5	RCP4.5
0%	29%	23%	40%	27%

Mean 1st generation starting date [DOY]				
1990-2020	2035-2064		2070-2099	
	RCP8.5	RCP4.5	RCP8.5	RCP4.5
122	119	125	125	122

Mean 2nd generation starting date [DOY]				
1990-2020	2035-2064		2070-2099	
	RCP8.5	RCP4.5	RCP8.5	RCP4.5
188	180	185	179	182

## PRELIMINARY RESULTS FOR SCAPHOIDEUS TITANUS

Mean 1st infection date [DOY]				
1982-2019	2035-2064		2070-2099	
	RCP8.5	RCP4.5	RCP8.5	RCP4.5
180	165	165	161	161

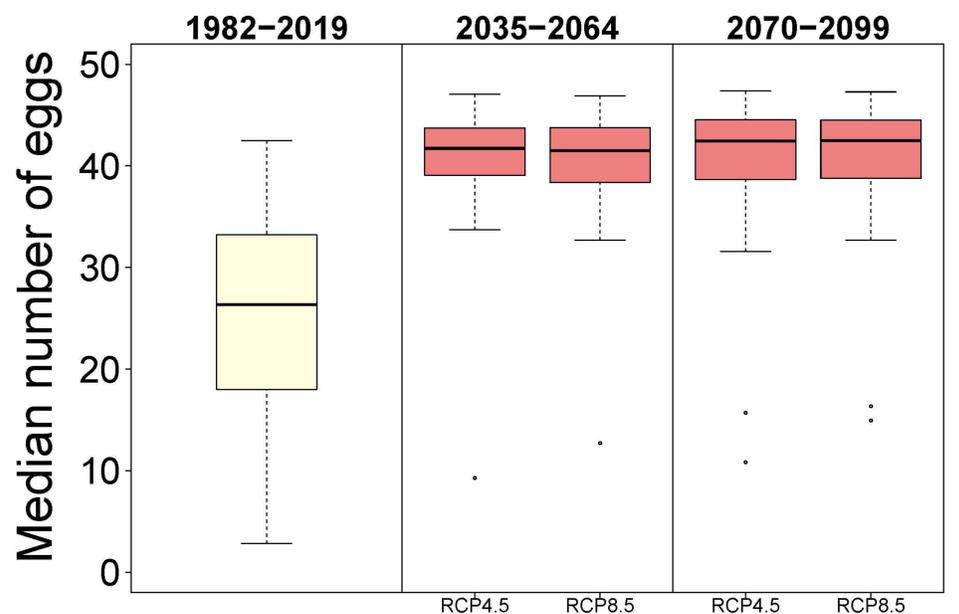


Figure 1: Boxplots with potential annual number of eggs per female for *Scaphoideus titanus* in Neuchatel (485 m a.s.l.). Between 10 and 40 eggs, conditions are adapted for the species. Above 40 eggs, conditions are well adapted for the species.

## PERSPECTIVES

- ✓ Temperature increase may lead to a third generation of *Lobesia botrana* in Neuchatel at least one year out of four during the next decades. The second generation may occur one week earlier than currently by the end of the 21<sup>st</sup> Century.
- ✓ Temperature conditions should become better adapted for *Scaphoideus titanus* in Neuchatel under both scenarios by the middle and the end of the 21<sup>st</sup> Century. The first infection date could occur at least two weeks earlier than currently during the next decades.