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# CeLL, an agent based model for exploring the spatial influence of climate change on *Lobesia botrana* population dynamics

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## Context

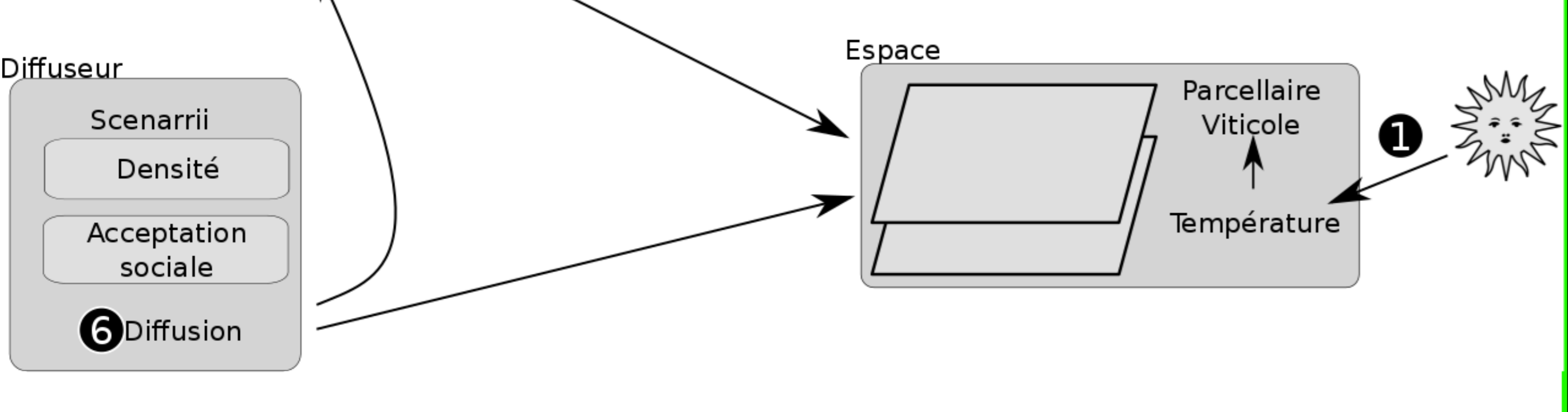
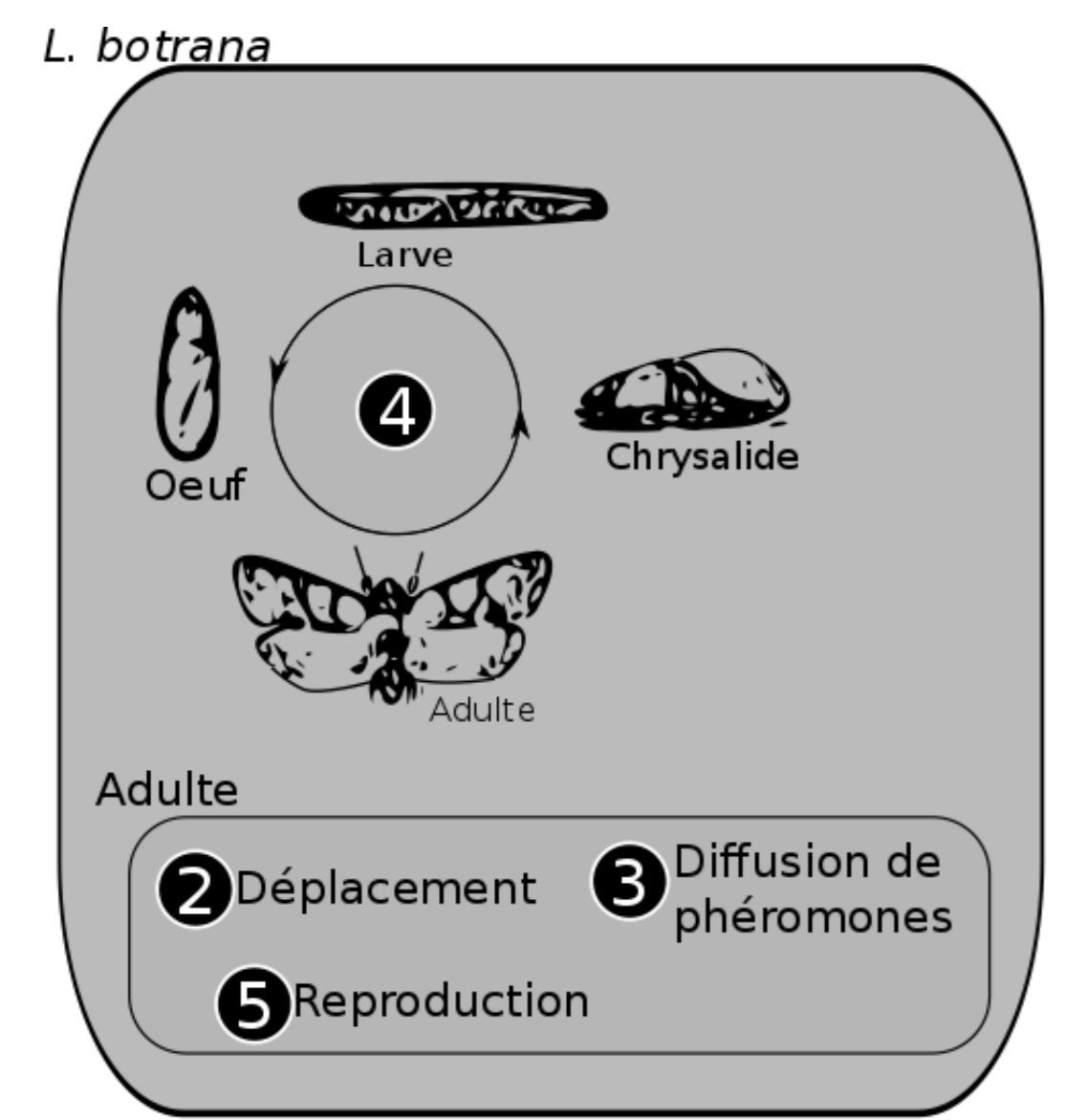
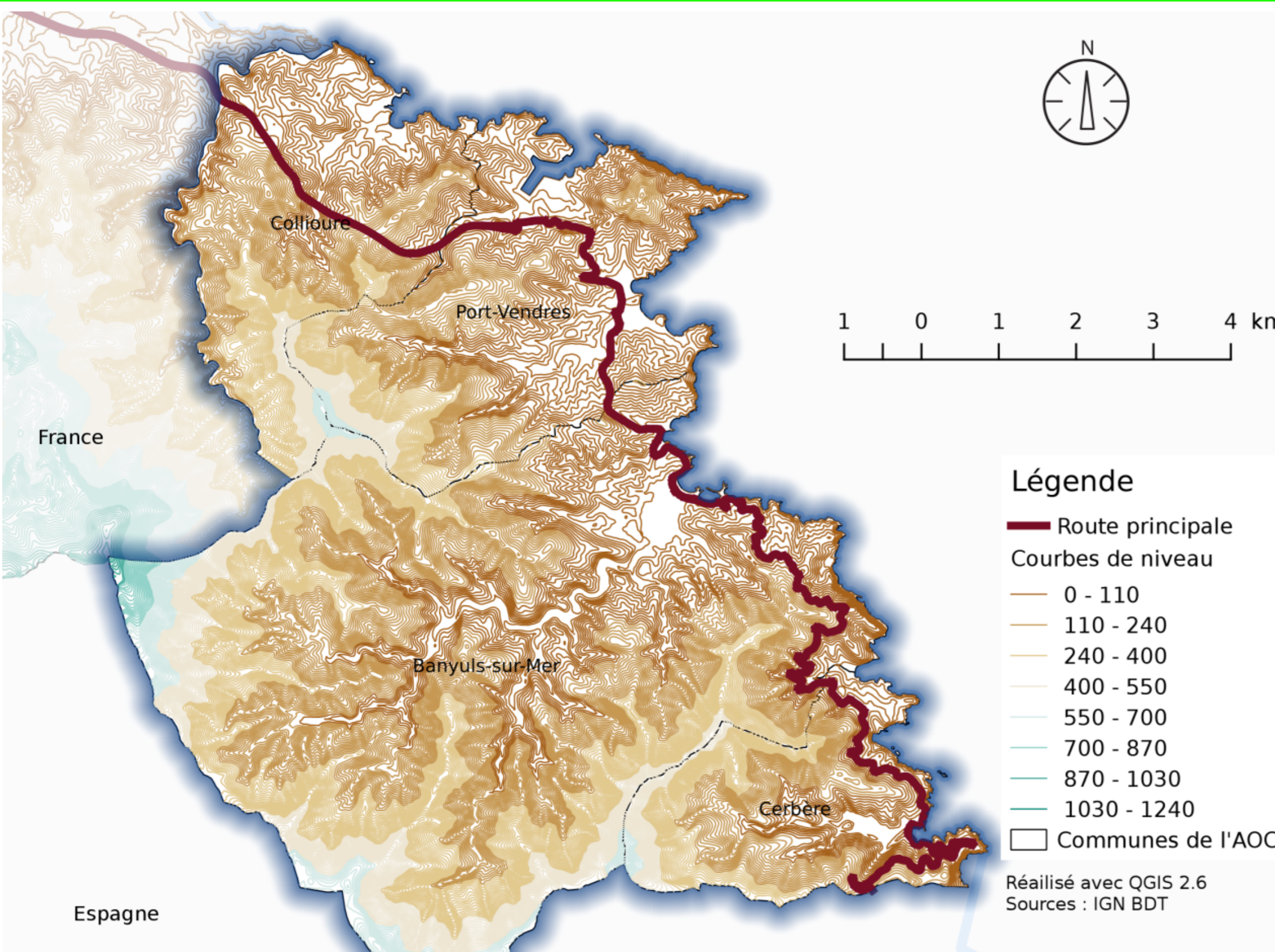
The **European Grapevine moth (*Lobesia botrana*)** is one of the most noxious vineyard-pests in the European and Mediterranean area. Its larvae feed on grapevine flowers and berries, with a facultative diapause and a variable number of generations per year, depending on temperature and photoperiod.

In order to predict its occurrence, different predictive models have been developed and can be found in the literature. However, none of these models is spatially explicit and allows to represent simultaneously the temporal and spatial dynamics of this pest.

Our is to fill this gap, through the development of an **Agent Based Model (ABM CELL model)** representing *L. botrana* movement and mating, and capturing its emerging temporal and spatial patterns and dynamics over a vineyard. In particular, we focus on the modelling of spatial effects elicited by pheromones on the pest, in order to be able to simulate :

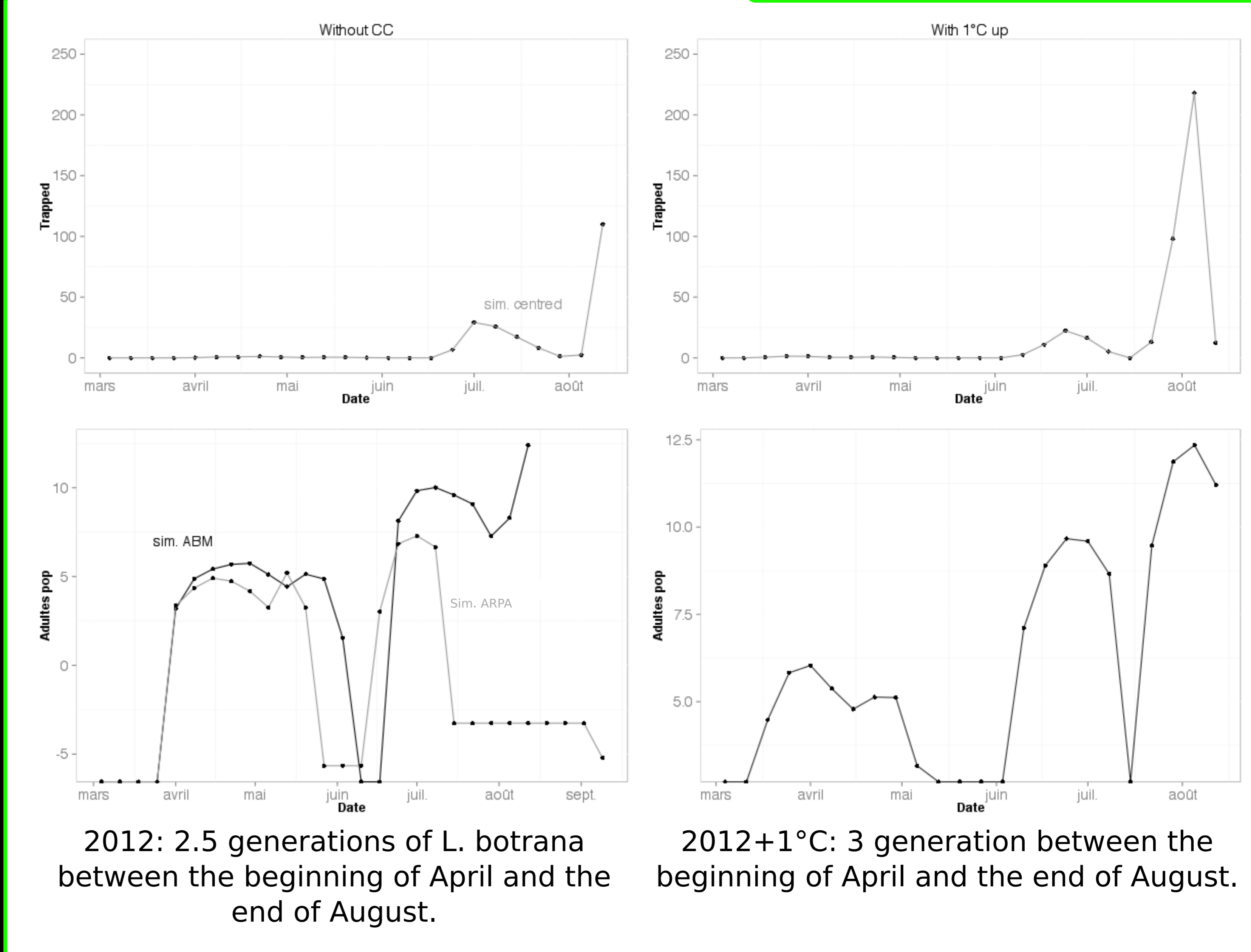
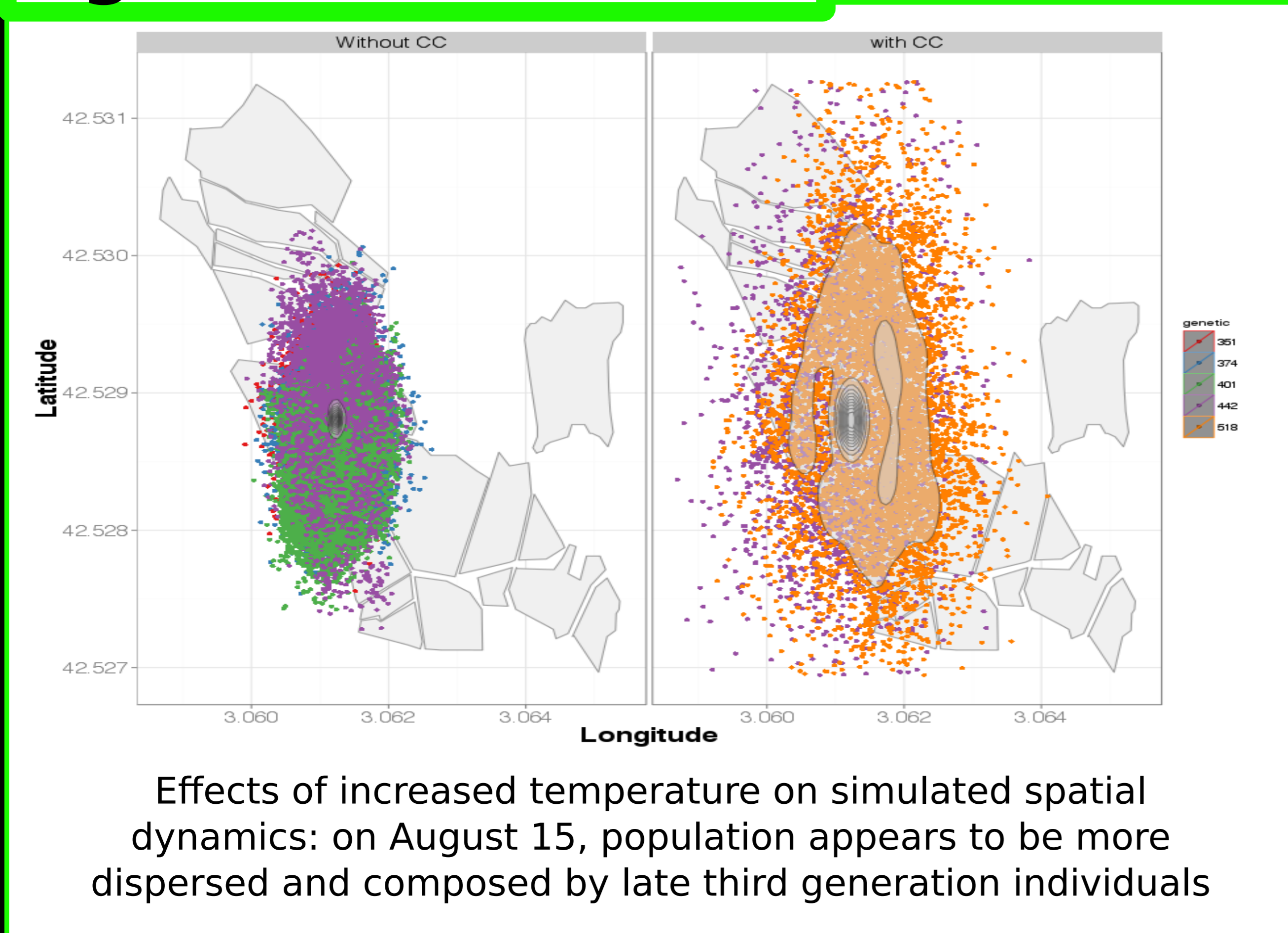
*i.* its reproductive behaviour, *ii.* the effect of spatial positioning of pheromone monitoring traps, *iii.* the effects of temperature and its alterations on population spatio-temporal dynamics

In this poster we present the **simulations of CELL over a 9 hectares viticultural area in the Banyuls AOC** for year 2012, and for a hypothetical temperature increase of +1°C.



## Global Results

## Agent level results



These preliminary results show the potential of ABMs in representing spatio-temporal dynamics under present and altered climate conditions and to raise scientific questions for further study:

- How will climate change impact *L. botrana* abundance and infestation patterns?
- Will climate change act as a selecting pressure on different phenological phenotypes of *L. botrana*?
- Will the impact of climate change on the interaction between host and pest phenology result in an alteration of infestation patterns?