

# What triggers colonization process of agricultural landscapes by wild boar?

Kevin MORELLE<sup>1</sup>, Coralie MENGAL<sup>1</sup> and Philippe LEJEUNE<sup>1</sup>

<sup>1</sup>Unit of Forest and Nature Management / University of Liege (Gembloux Agro-Bio Tech)/ Belgium, [morelle.k@gmail.com](mailto:morelle.k@gmail.com)

## CONTEXT & STUDY OBJECTIVES

Wild boar *Sus scrofa* populations in both native and invasive range have largely increased during these last decades. Though the process is less marked within its native Eurasian range, the species recently expanded within human-shaped environment, e.g. agricultural and peri-urban habitats. Its impact on the environment and the multiplication of conflicts with human stress the need for better understanding of its spatial behaviour. In Wallonia, southern Belgium, the species has progressively expanded northwards into agricultural-dominated landscapes. To better understand this colonization process, we investigated the spatio-temporal change in wild boar distribution in southern Belgium between 1980 and 2010 in relation to various habitat and species variables.



With this research we aimed at answering the following question: *What are the main landscape and species factors that have affected wild boar progression towards northern part of Wallonia?* Hypothesis tested:

Wild boar spread is facilitated along river streams and forest corridors

Development of maize cultivations during last decades has favoured the colonization of wild boar towards north of Wallonia

## METHOD

### Colonization map

Data on the spread of wild boar since 1980 were inferred from a large survey proposed in 2010 to 15 Game Management Unit (GMU) situated northwards to the Ardennes regions.

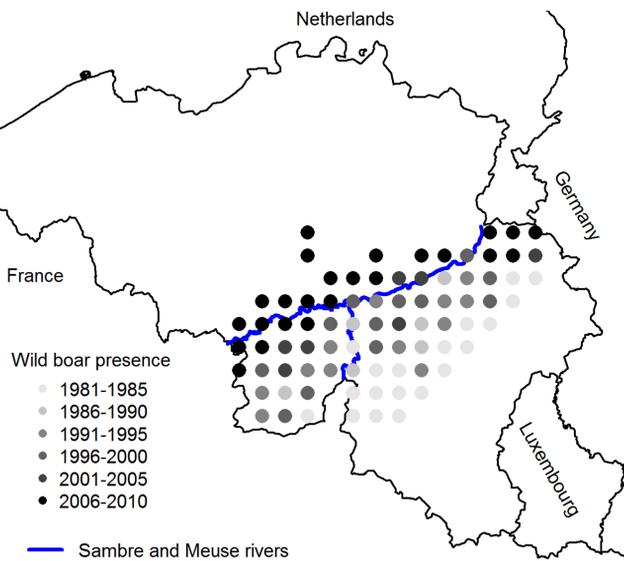
In this survey, we questioned gamekeepers, members of these GMU, about the status of wild boar within their territory: presence or absence, the types of presence (sporadic or regular), the starting period (time step of 5 years) of apparition of the species and the date of first wild boar shooting. The information on historic distribution of wild boar was then transformed into a 5-years temporal and 10x10 km spatial scale grid.

### Range expansion analysis

To calculate the range expansion of wild boar between 1981 and 2010 we calculated the square root of the occupied grid cells over time, which is an indicator of the average radial expansion under the condition of a concentric expansion. By dividing the slope of this curve by the square root of pi, we could estimate the marginal velocity of range expansion through time and space.

### Influence of landscape and species variables on the colonization steps

To understand patterns of wild boar colonization, we modelled the probability of an empty grid to be colonized between every considered period by means of a multivariate logistic regression.

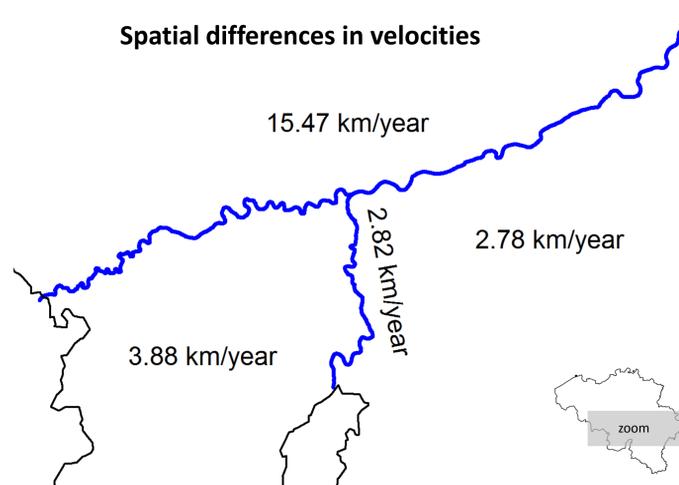


## RESULTS

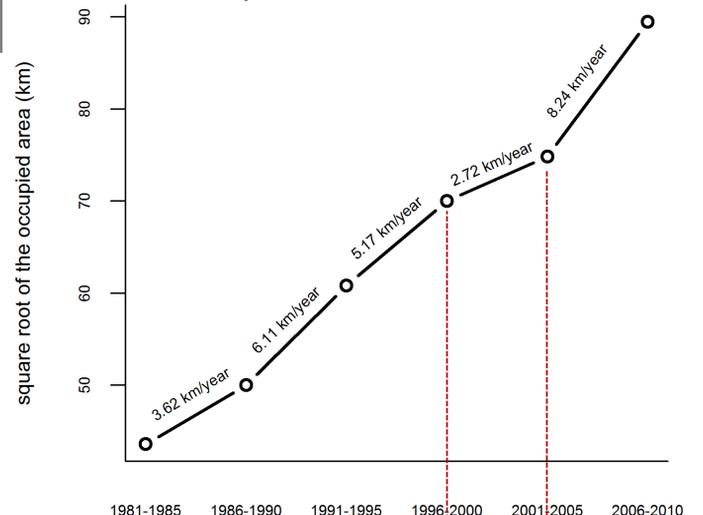
### RANGE EXPANSION

The mean estimated marginal velocity was of 5.04 km/year over the whole study area and studied period. Spatially, differences were observed between the south and the north of the river channel. Temporally, the colonization of wild boar was rather continuous, though differences in velocities between period could be observed. Contrary to our expectation, we found out that **increased area of maize tended to slow down the colonization process.**

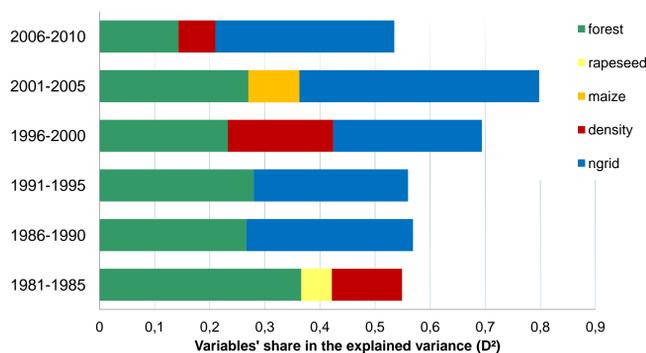
### Spatial differences in velocities



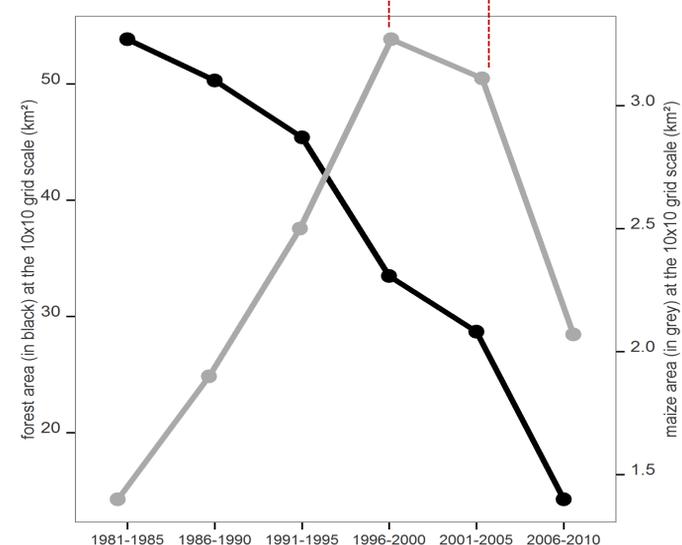
### Temporal differences in velocities



### CONTRIBUTING FACTORS



All along the colonization process, we found out that forest area was the most contributing variables. Also, the presence of wild boar population in the neighbouring grids at the previous period influence largely the likelihood of a grid colonization. Agricultural crops, rapeseed and maize, had a low or absent effect on the colonization process.



## CONCLUSIONS

This research showed that:

- observed range expansion of wild boar in Belgium is a continuous process
- forest remains the major variables in explaining the spread of population over large distances
- agricultural crop providing cover seems to have a relatively low impact on the movement of the wild boar population. We suggest these areas rather act as 'reservoir' where the population find food and quietness to grow rapidly

*Understanding the major factors that contributed to the spatial colonization of new territories by wild boar during these last three decades is of major importance to help developing efficient management strategies of the species in agricultural landscape.*