# Impact of climate change on the spread of pests and diseases in Scotland

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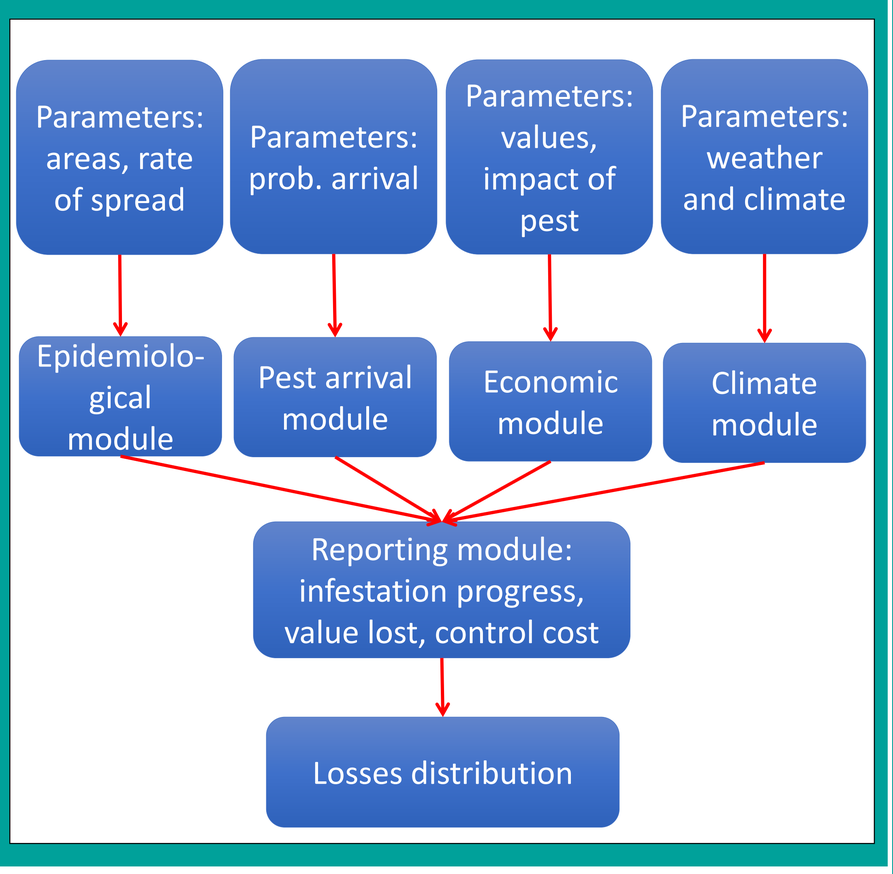
## Introduction

Climate change provides a huge challenge to planning the response of the Scottish Government to plant health threats. New pests and existing threats will become more severe or spread at a higher rate. We constructed a modelling tool that the policy makers can use to assess the potential for pests to invade and spread under climate change scenarios and to estimate future damages.

Web/desktop based app structure

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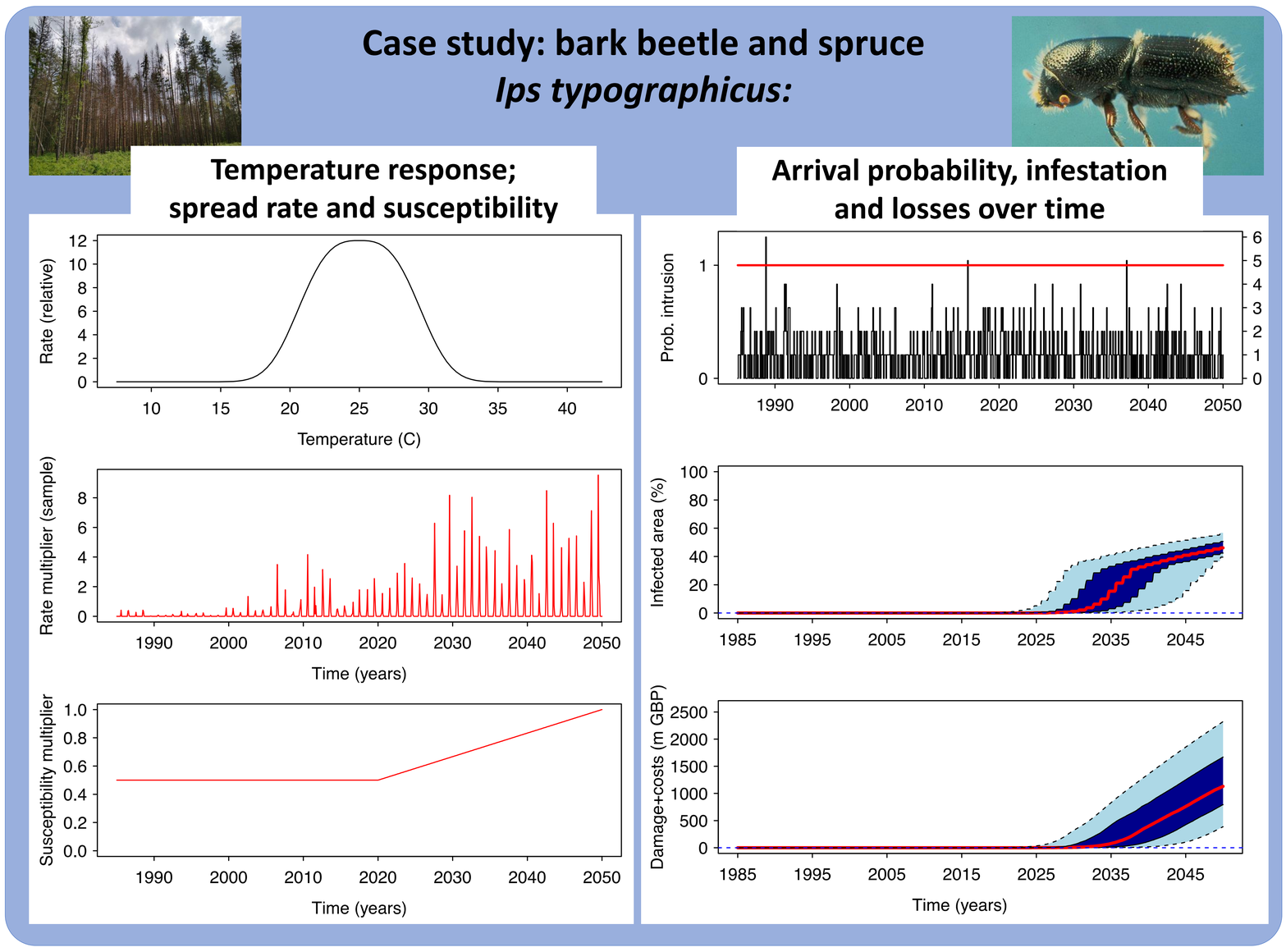
## Objectives

- To illustrate the effects of climate change on spread of pests and pathogens;
- To assess how the key processes and parameters are expected to vary with the climate change;
- To use the model to study epidemiological and economic outcomes for selected pests and pathogens in the period up to 2050.

## Project outcomes

- Web/desktop based app has been developed, combining (i) the RCP8.5 climate model and weather data for temperature in Scotland (1985-2001), (ii) a pest/disease spread model, (iii) a model linking temperature and epidemiological parameters, and (iv) economic valuation of market and non-market values.
- Model development has been complemented by literature review.
- The model whas been as applied for three selected pests (bark beetle, *Ips typographicus*; *Xylella fastidiosa;* Zebra chip).
- All three pests have been shown to have a high probability of invading, spreading and causing large losses in the period 2019-2050, in the range of £40-50m per year average over 32 years.
- Sensitivity analysis has been used to identify uncertainty associated with the predictions.




## Conclusions

- The project demonstrates the feasibility of analysis of future risk and potential economic impact of pests invasions facilitated by climate change.
- As the climate changes and warm weather events becomes more frequent, more pests can invade and cause significant economic damage in the 2020-2050 horizon.
- The model identifies important uncertainties in definition of parameters and processes, and their effect on invasion and impact.
- The model also highlights the gaps, particularly for climate response of pest and host properties.

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