Models predict contrasting effects of future climate conditions on dates of release of ascospores of *Leptosphaeria* spp. causing phoma stem canker on oilseed rape in the UK

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1. Introduction

Weather-dependent models to forecast the first major ascospore discharge during the growing season were developed to guide decisions about timing of fungicide sprays to manage phoma stem canker caused by *Leptosphaeria* species. Assessing impact of climate change on dates of first major spore release can guide breeders/growers to plan control strategies.

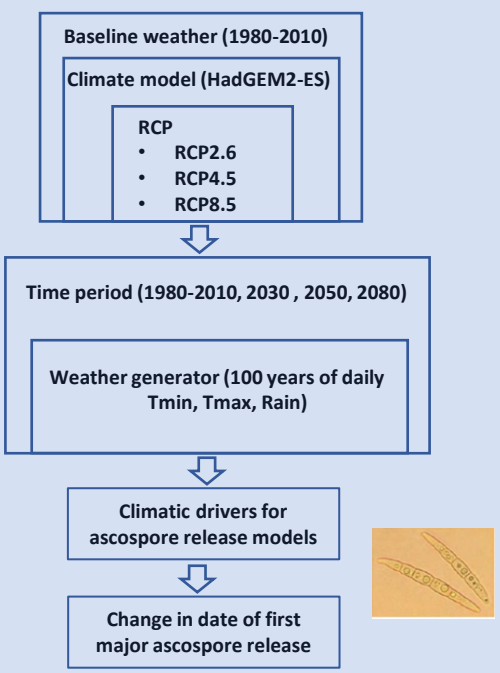
2. Methods

Two weather-based models were developed to predict dates of first major ascospore release during the growing season in the UK. The first model - **P_{50}**, accumulates the rainfall-adjusted rate of development to 1 when 50% of pseudothecia are mature (Huang *et al.*, 2007). The second model – **SporacleEzy**, accumulates of weather favourable for pseudothecial maturation period of 18 days (Salam *et al.*, 2007). A day was regarded as favourable when daily rain≥1mm and mean temperature was 6 - 22°C.

3. Approaches

The change in date of first major ascospore release under climate change was assessed with two weather-based models. Baseline weather for 1980-2010 were obtained from Rothamsted Research.

Three radiative forcing and CO_2 Representative Concentration Pathways (RCP) are projected in 2030, 2050 and 2080.



4. Results

- The model – **P_{50}** predicted dates of first major ascospore discharge later than the model - **SporacleEzy** under baseline weather (Table 1).
- **P_{50}** projects earlier start of first major ascospore release (Table 1, Fig. 1).
- **SporacleEzy** projects delayed start of first major ascospore release (Table 1, Fig. 2).
- Variability in date of first major ascospore release is not affected by climate change scenarios.

Table 1 Mean dates of first major ascospore release in response to climate change scenarios. Figures in brackets are standard deviation.

RCP	Period	P_{50}	SporacleEzy
Baseline	1980-2010	2 Nov(20)	3 Oct(14)
RCP2.6	2030	27 Oct(19)	7 Oct(15)
	2050	31 Oct(20)	8 Oct(13)
	2080	26 Oct(20)	6 Oct(14)
RCP4.5	2030	31 Oct(20)	8 Oct(14)
	2050	29 Oct(20)	12 Oct(15)
	2080	24 Oct(20)	11 Oct(16)
RCP8.5	2030	31 Oct(22)	10 Oct(17)
	2050	29 Oct(19)	15 Oct(15)
	2080	20 Oct(17)	2 Nov(12)

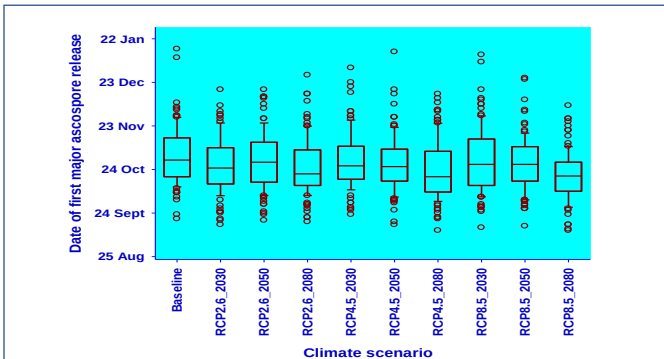


Fig. 1 Distribution of dates of first major ascospore release by P_{50}

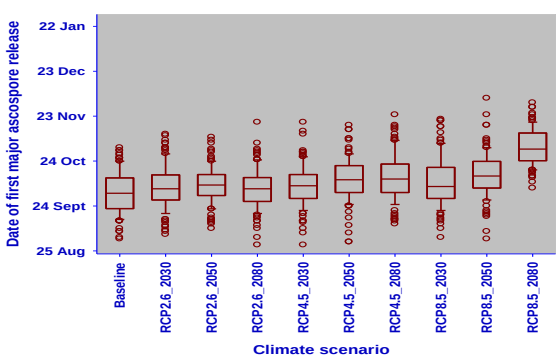


Fig. 2 Distribution of dates of first major ascospore release by SporacleEzy

5. Conclusion

Control strategies and decision-making on fungicide-spray timing against phoma stem canker were made complicated by differences between predicting models under future climate change scenarios.

6. References

Huang *et al.* (2007) *Annals of Applied Biology*, **151**, 99-111; **Salam *et al.* (2007)** *Plant Pathology*, **56**, 412-423.

7. Acknowledgements

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