

# *Sclerotinia* of oilseed crops and recent changes in fungicide resistance

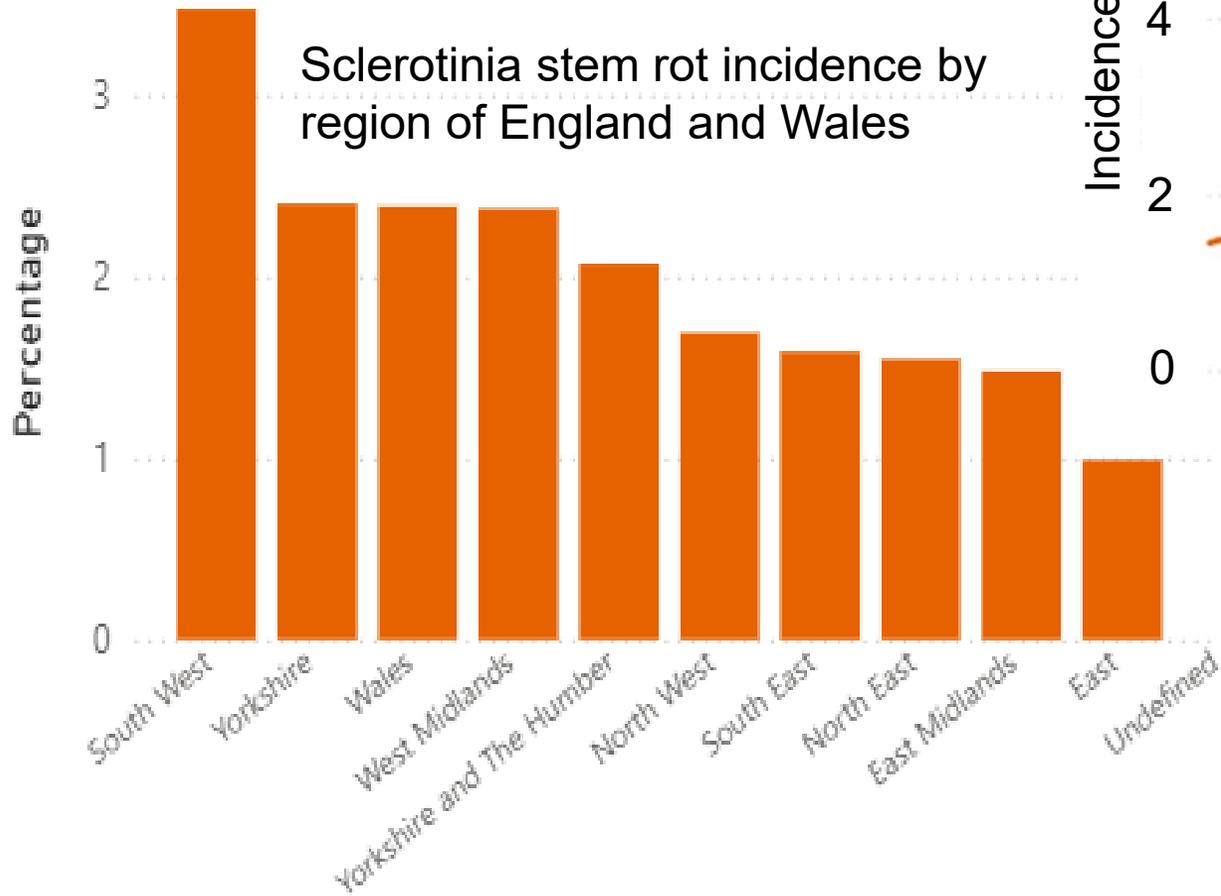
**Jon West, Rothamsted Research**



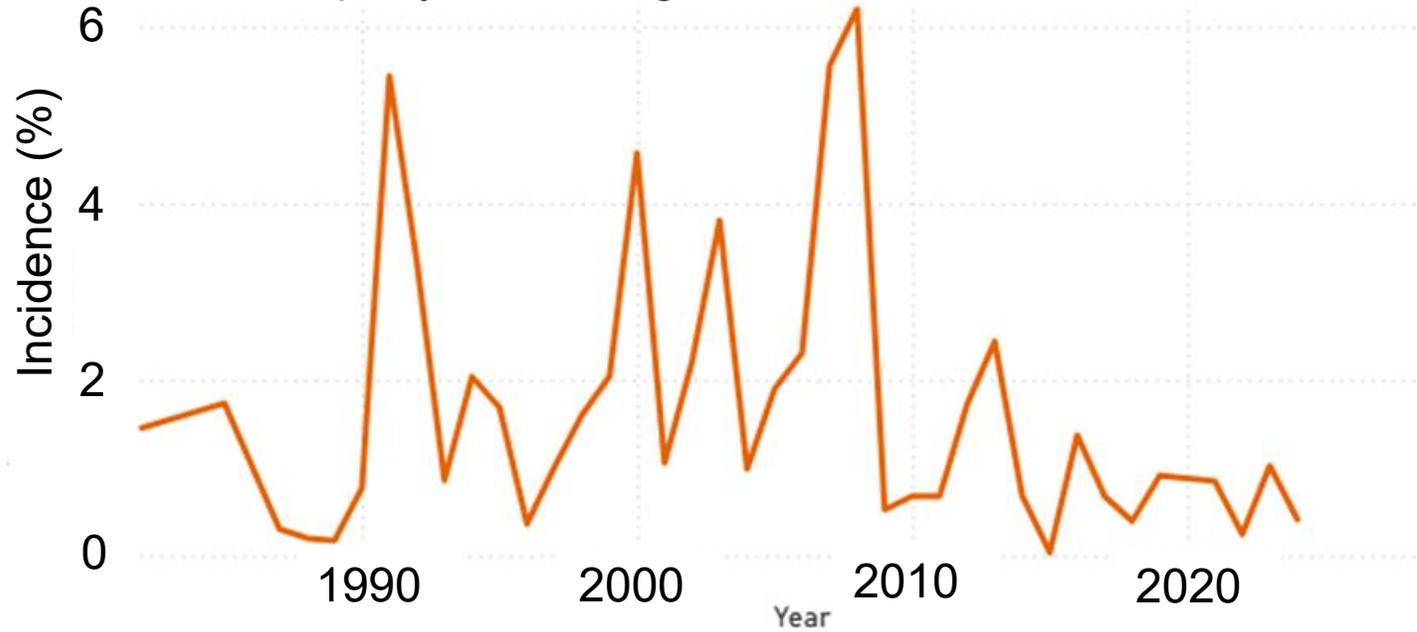
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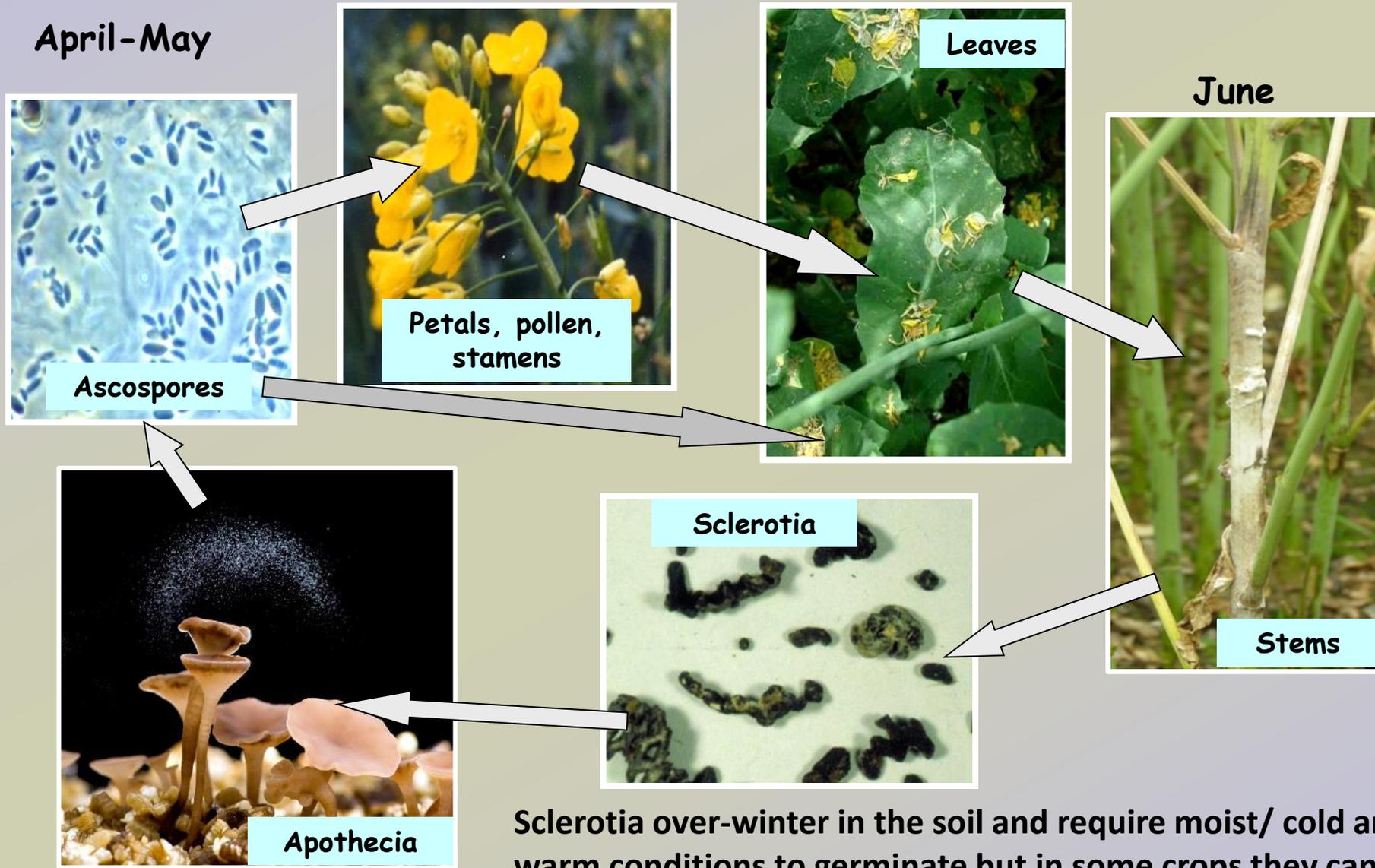
Sclerotinia stem rot incidence by region of England and Wales



Sclerotinia stem rot incidence on OSR per year for England and Wales

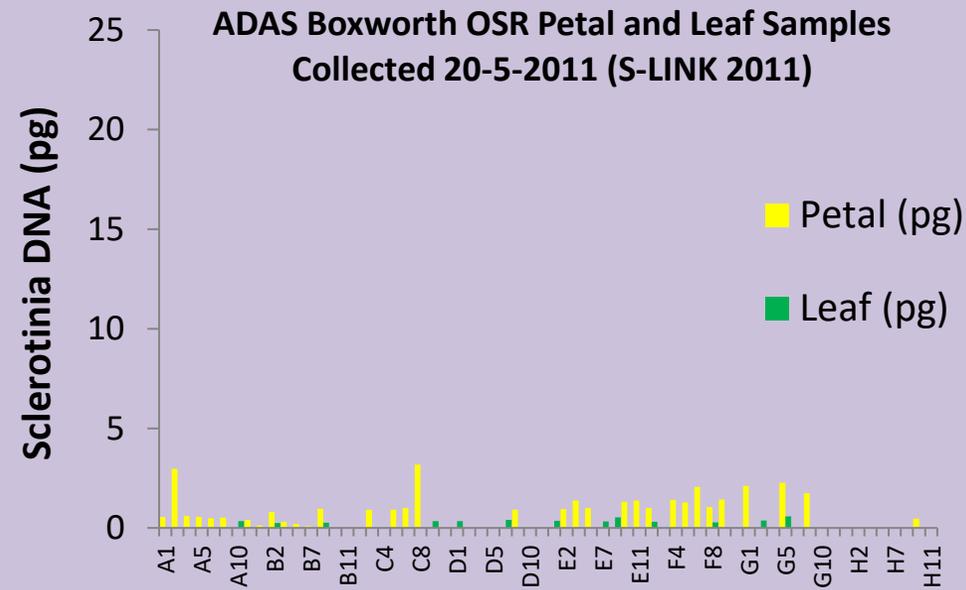
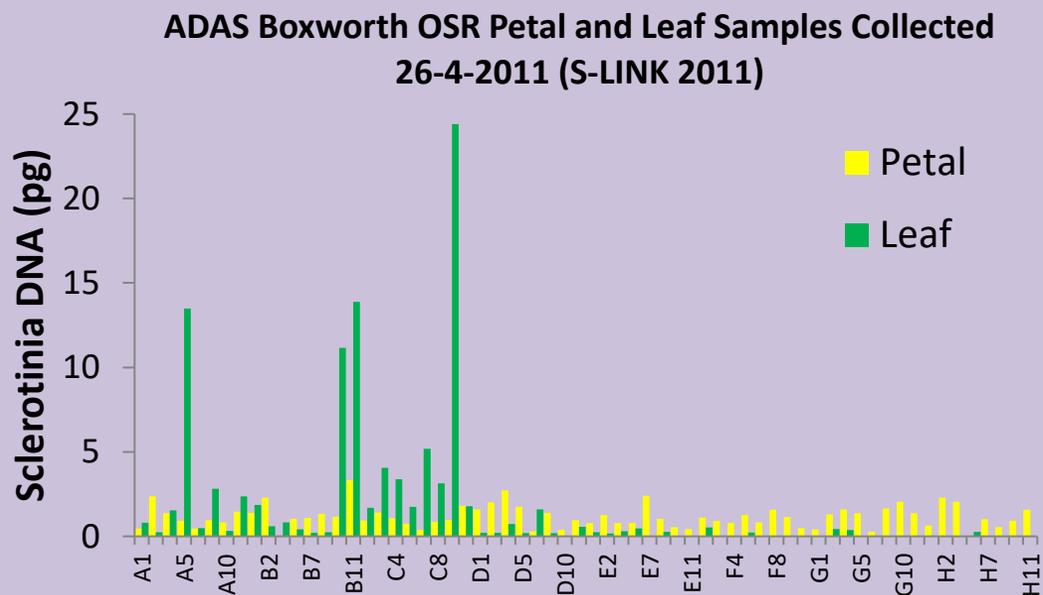
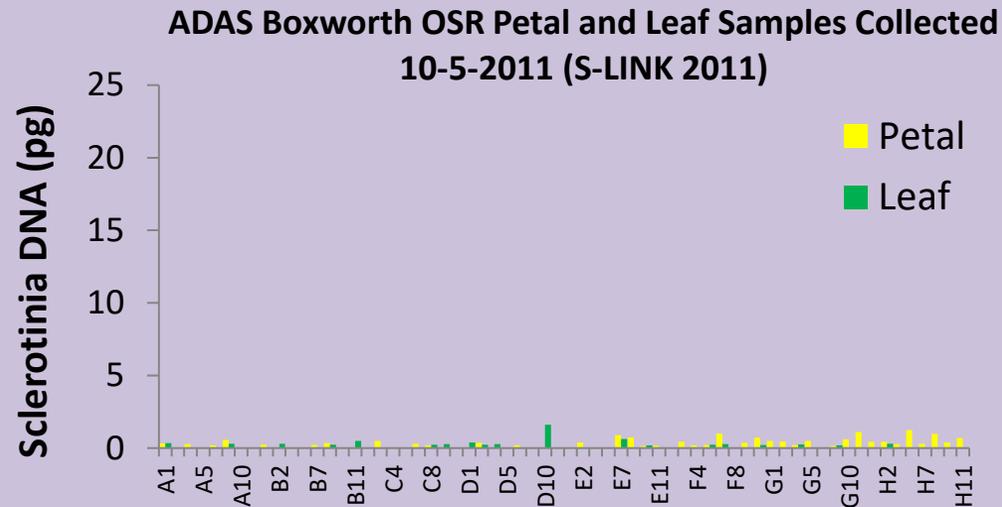
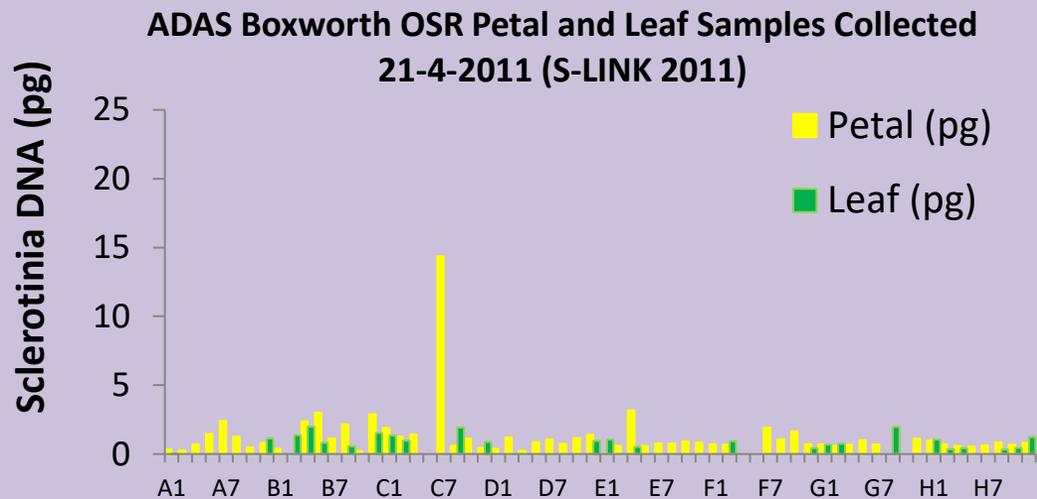


# *Sclerotinia sclerotiorum* life cycle



Sclerotia over-winter in the soil and require moist/ cold and then moist/ warm conditions to germinate but in some crops they can germinate by producing mycelium for root infection rather than apothecia

# Sclerotinia inoculum is found on both petals or leaves in varying amounts during the season and field position – Fungicides applied before flowering can reduce disease significantly



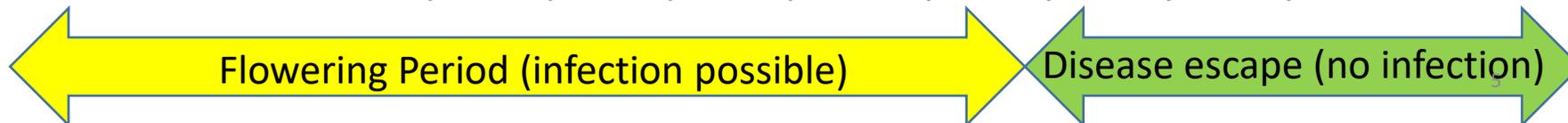
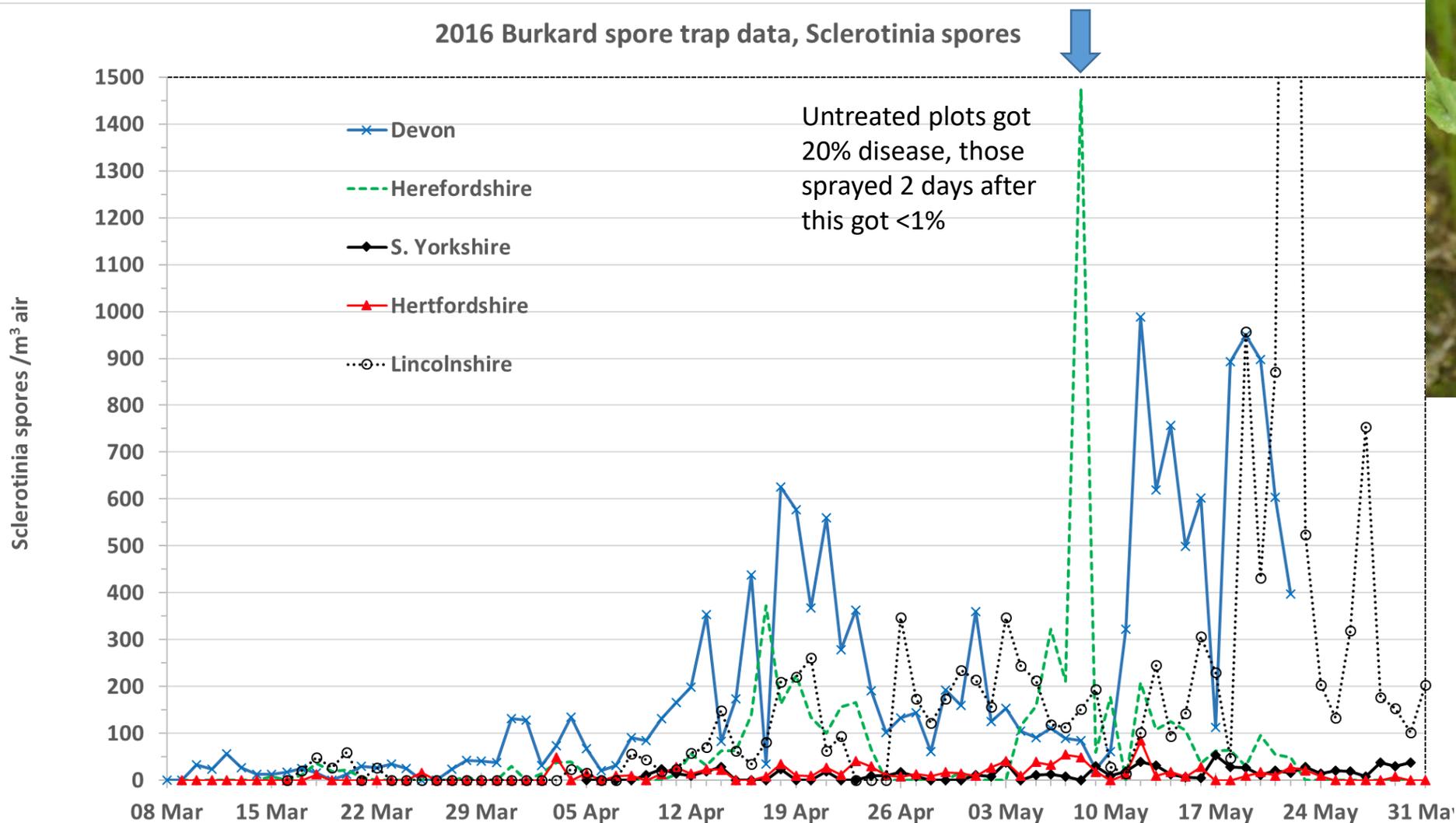
# Sclerotinia Lab-based spore monitoring



First type seven-day spore trap

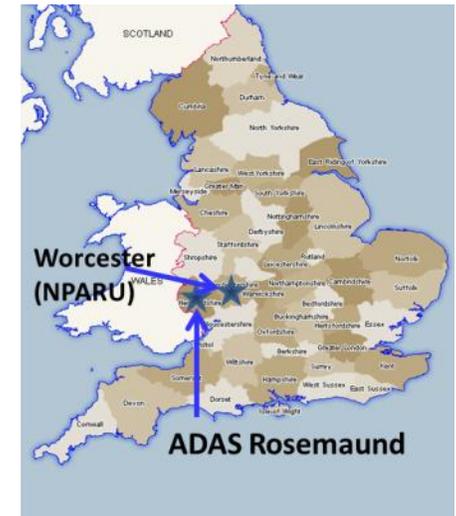
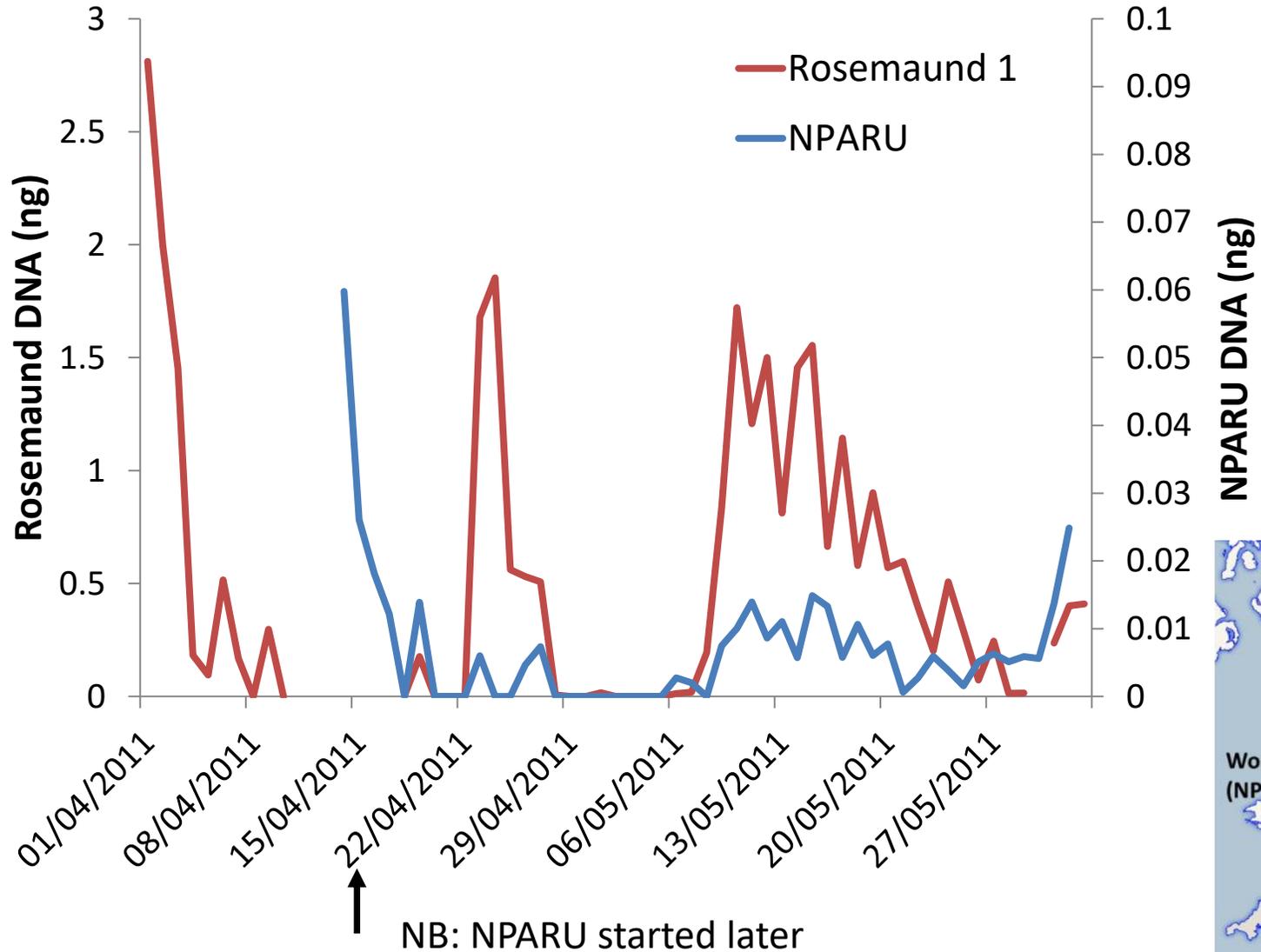


Sclerotinia on Canola

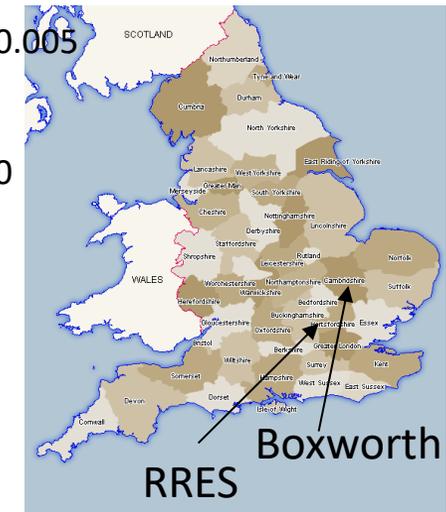
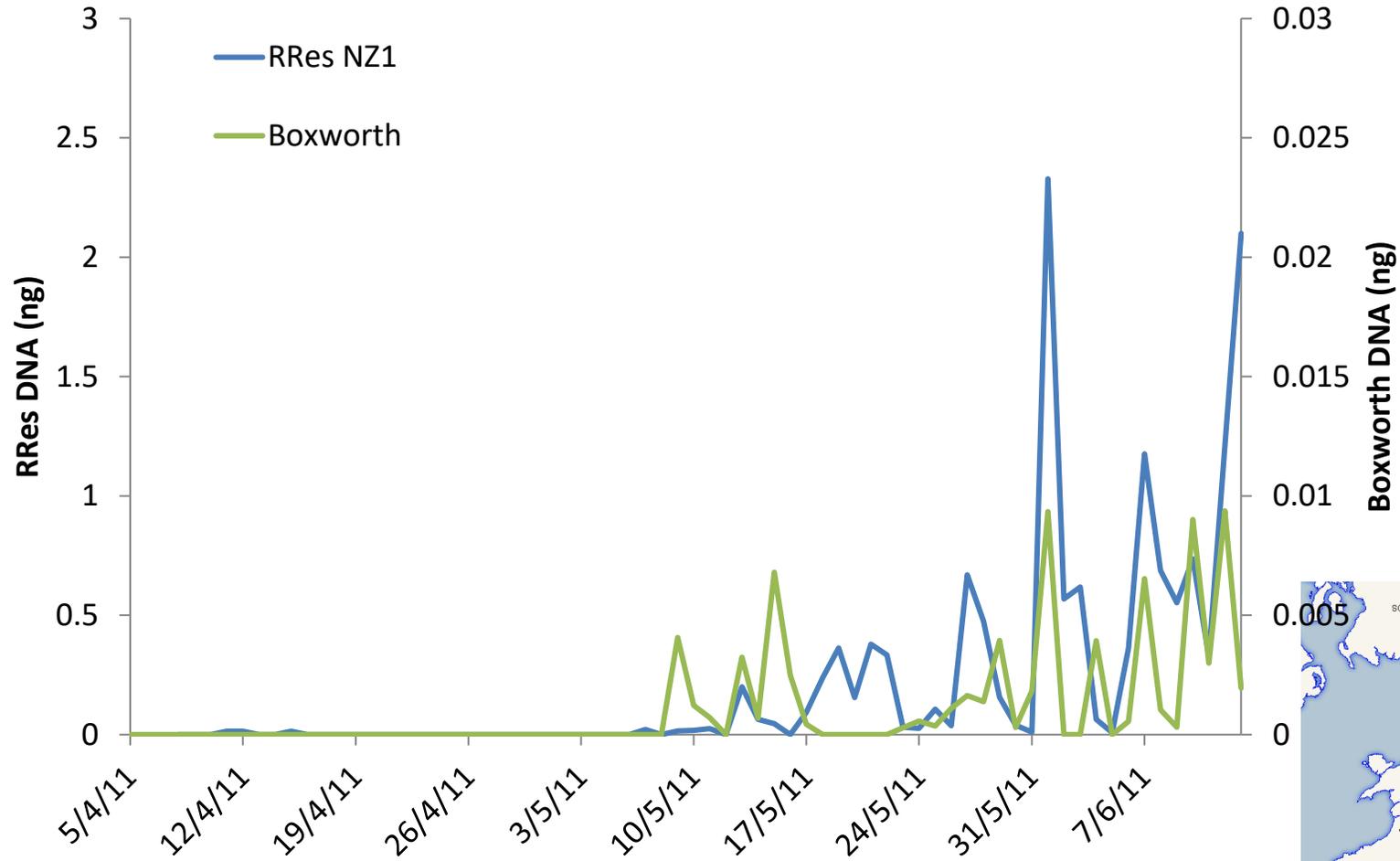


earlier spore release in West than East of England

## Comparison of Sclerotinia DNA at NPARU and ADAS Rosemaund (about 50 km apart in western England)

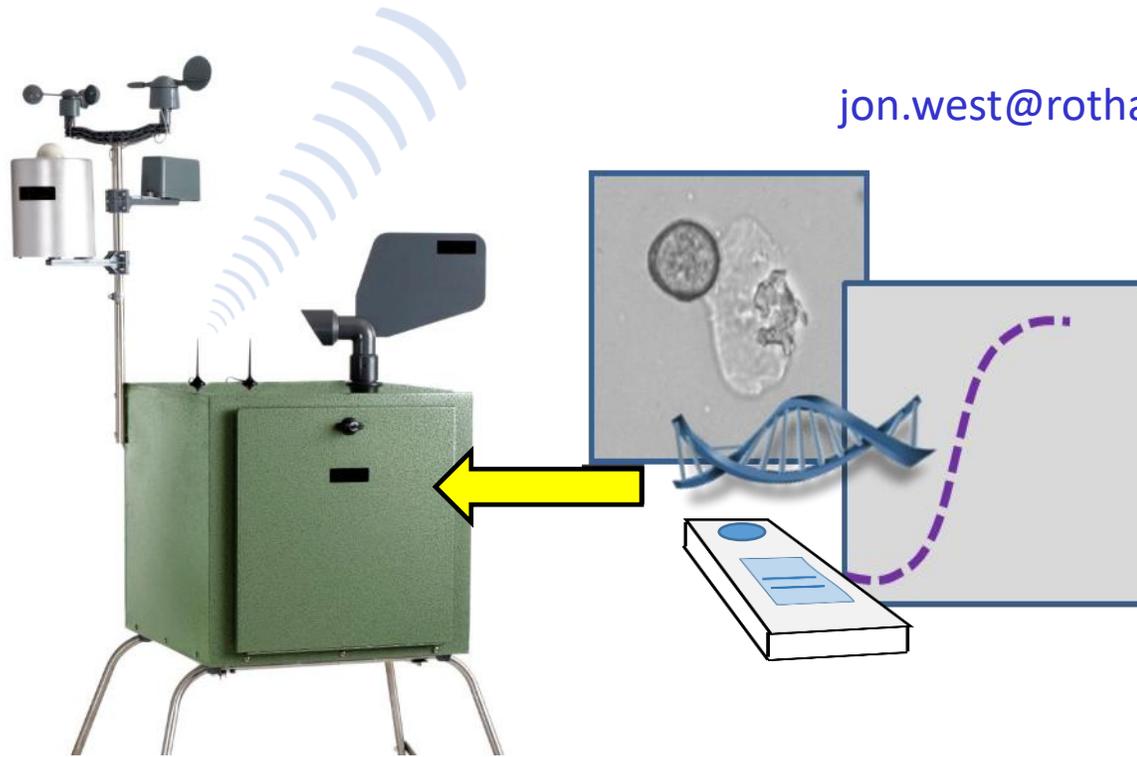


# Comparison of Sclerotinia DNA at RRes and ADAS Boxworth (East of England) S-LINK 2011



# Real-time monitoring of airborne pathogen spores for disease risk alerts

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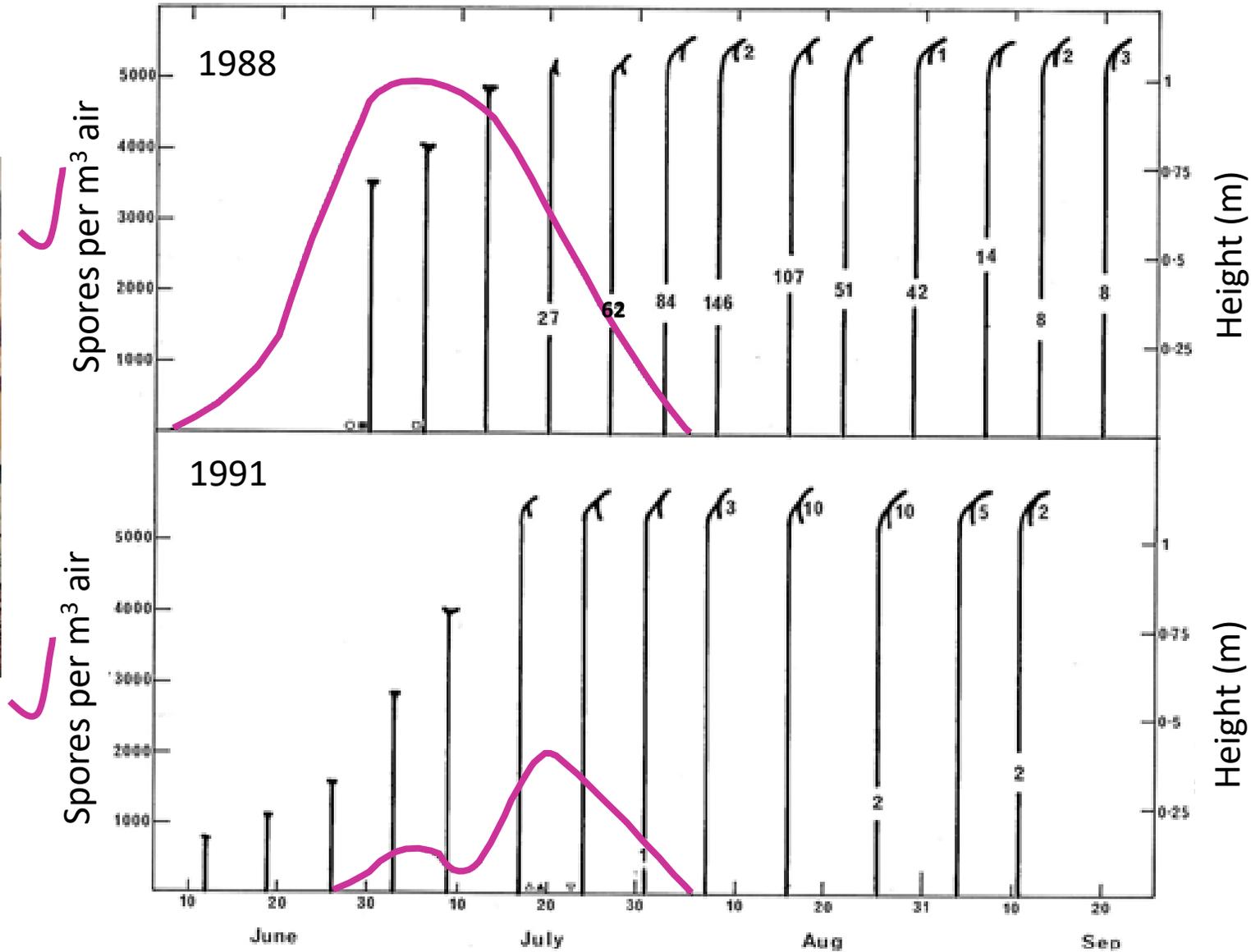
## Pathogens Detected



- Spore sampler, DNA release, same-day LAMP and LFD assay
- 4G wireless reporting
- Result integrated with infection models & prediction sent to end-user
- Assays can be developed for other target diseases
- Mobile (car and aircraft) spore sampling systems in development

Ascospore concentrations and position of disease symptoms in sunflowers in 1988 and 1991. Head lesions and average position of stem lesions are shown by numbers.

McCartney and Lacey, M., 1999



# Changes in Phoma leaf spot and stem canker of OSR

OLD NAME: *Leptosphaeria maculans* =  
NEW NAME: *Plenodomus lingam*



OLD NAME: *Leptosphaeria biglobosa* =  
NEW NAME: *Plenodomus biglobosus*



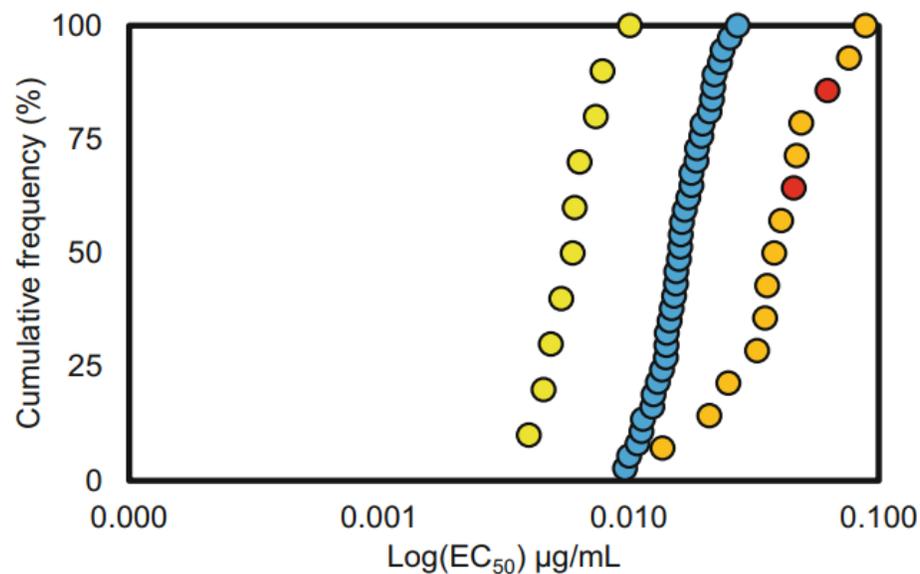
Stem  
symptoms

- Phoma represents a major threat to UK and international OSR production
- Two fungal pathogens that coexist
- Disease management includes application of fungicides – typically two sprays per crop annually



# Current resistance status for DMIs in the Phoma pathogens

Phoma species	<i>CYP51</i> overexpression confirmed	Associated with <i>CYP51</i> site mutations
<i>Plenodomus lingam</i>	✓	X
<i>Plenodomus biglobosus</i>	X	✓ G476S



- *P. biglobosus* G476 (N=10)
- *P. biglobosus* G476S (N=12)
- *P. biglobosus* G476S + 336 bp insert (N=2)
- *P. lingam* + insert (N=37)

- Both species have recently evolved in response to extensive application of DMI fungicides
- These two closely related species have responded differently to DMI use
- Currently each mechanism individually unlikely to result in disease management failures
- Emergence of more complex *CYP51* genotypes (overexpression + target site mutations) might lead to inadequate Phoma disease management
- Fungicide resistance management is important to prolong effective life of fungicides as a component of IPM in conjunction with host resistance

King et al. (2024) Plant Pathology

DOI:10.1111/ppa.13897

King et al. (2025) Pest Management Science

<https://doi.org/10.1002/ps.8926>

# Recently detected new species/lineages/fungicide resistance

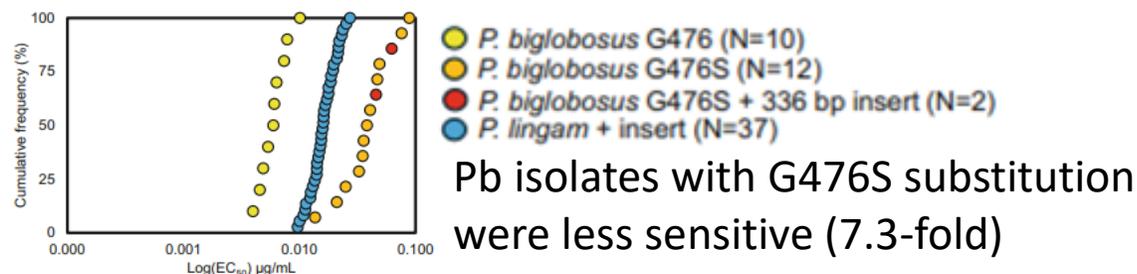


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(2025) DOI 10.1002/ps.8926

## Decreased DMI sensitivity of *Plenodomus biglobosus* (phoma of oilseed rape) associated with CYP51 substitution G476S

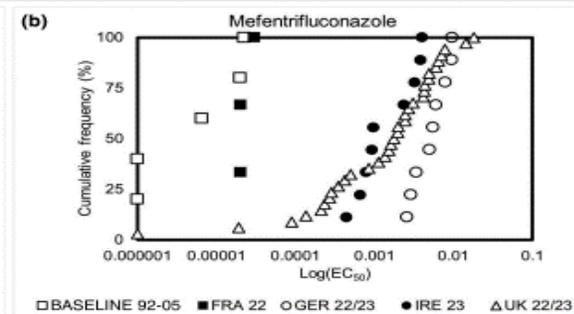
Kevin M King,<sup>a\*</sup> Liza M González-Rodríguez,<sup>a</sup> Joanna Kaczmarek,<sup>b</sup> Małgorzata Jędrzycka<sup>b</sup> and Jonathan S West<sup>a</sup>



(2024) DOI: 10.1111/ppa.13897

## Evolution of decreased sensitivity to azole fungicides in western European populations of *Plenodomus lingam* (Phoma stem canker on oilseed rape)

Kevin M. King<sup>1</sup> | Leo Barr<sup>1</sup> | Louise Bousquet<sup>2</sup> | Anna Glaab<sup>3</sup> | Gail Canning<sup>1</sup> | Faye Ritchie<sup>4</sup> | Steven Kildea<sup>5</sup> | Bart A. Fraaije<sup>6</sup> | Jonathan S. West<sup>1</sup>

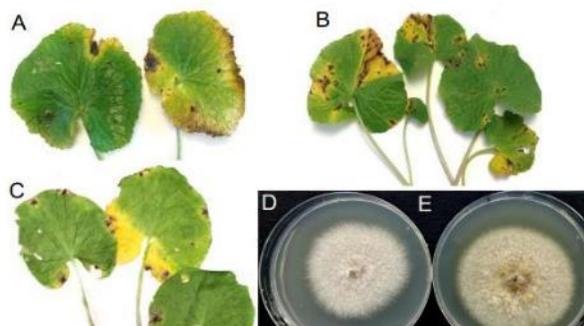


3-10 fold decrease in sensitivity to DMI/azole fungicides caused by a promoter insert. No decrease in sensitivity to QoIs or SDHIs

(2021) <https://doi.org/10.1007/s10658-021-02428-z>

## Detection of the Phoma pathogens *Plenodomus biglobosus* subclades 'brassicae' and 'canadensis' on wasabi, and 'canadensis' in Europe

Kevin M. King | Jonathan S. West



New variant & host

(2020) DOI: 10.1111/ppa.13137

## A phylogenetically distinct lineage of *Pyrenopeziza brassicae* associated with chlorotic leaf spot of Brassicaceae in North America

Shannon M. Carmody<sup>1</sup> | Kevin M. King<sup>2</sup> | Cynthia M. Ocamb<sup>3</sup> | Bart A. Fraaije<sup>2</sup> | Jon S. West<sup>2</sup> | Lindsey J. du Toit<sup>1</sup>



New variant (probably a new species) in NW USA