University of Hertfordshire UH

School of Life and Medical Sciences

Understanding host resistance to improve control of light leaf spot on winter oilseed rape in the UK

Sapelli, L.[1], Karandeni Dewage, C. S.[1], Ritchie, F.[2], Fitt, B. D. L.[1], Huang, Y. J.[1]

[1] School of Life and Medical Sciences, University of Hertfordshire, UK [2] ADAS Boxworth, Cambridge, UK

Introduction

Oilseed rape (*Brassica napus*) is the second most produced oilseed in the world and the third most important arable crop in the UK.

Light leaf spot, caused by the fungal pathogen *Pyrenopeziza brassicae*, is the most economically damaging disease of winter oilseed rape in the UK. Disease control is challenging because it is a polycyclic disease, with epidemics starting in autumn by ascospores. Subsequently, conidia produced through asexual sporulation on infected leaves cause secondary infections on all aerial parts of the plant (Fig. 1).

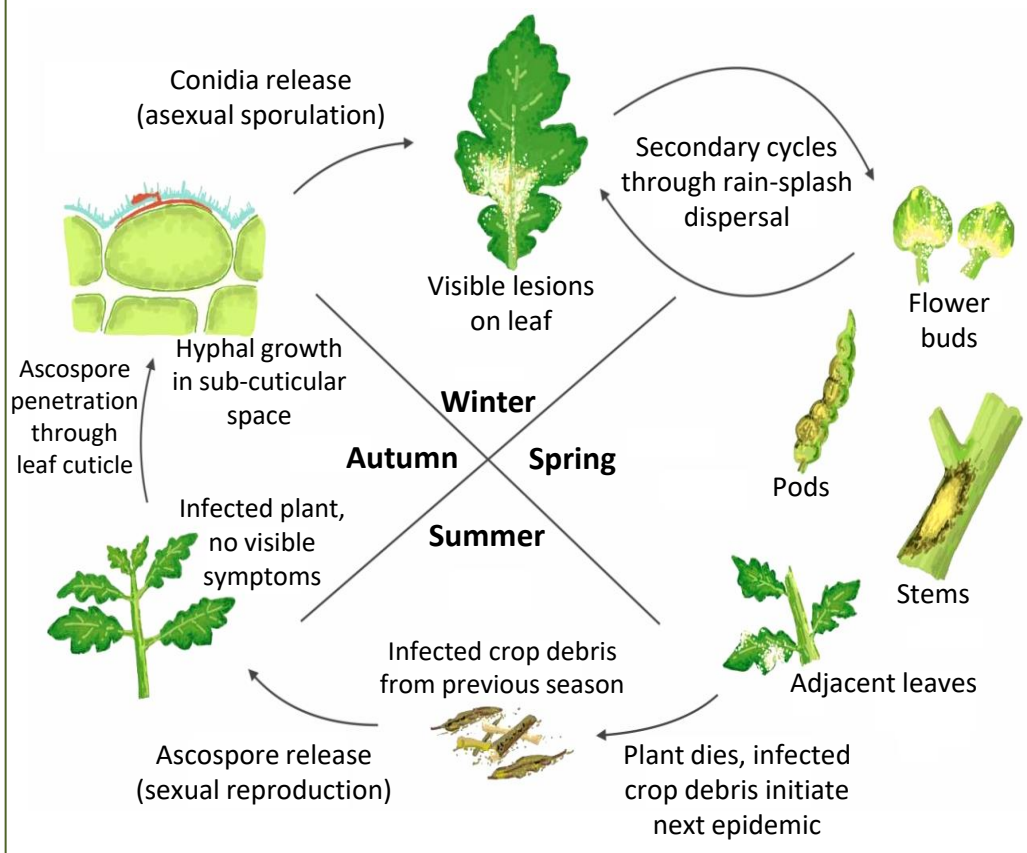

Figure 1: *Pyrenopeziza brassicae* (light leaf spot) life cycle.

Current control relies on fungicides; however, insensitivity development highlights the need for non-chemical controls like host resistance. However, host resistance against *P. brassicae* is poorly understood. The aim of this project is to improve our current knowledge by researching virulent races in pathogen populations, identifying candidate resistance genes and investigating mechanisms of host resistance.

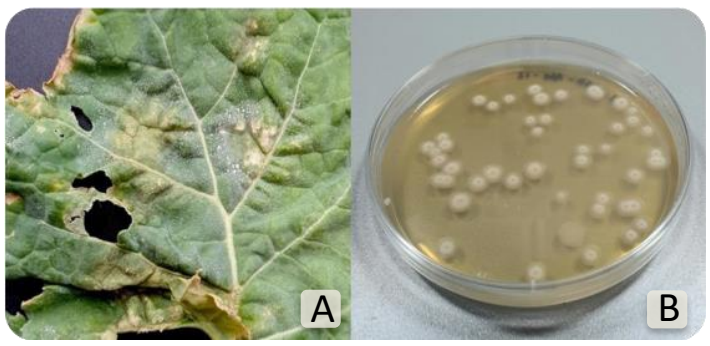

Figure 2: Leaf of oilseed rape cv Charger with light leaf spots (white *P. brassicae* acervuli containing conidia spores) (A). Single conidial colonies derived from the same acervulus grown on a malt extract agar plate (B).

Results

- Plants that received the higher inoculum concentration (10^5 spores/ml) developed more severe disease and were significantly shorter by up to 5 cm than those with the lower inoculum concentration (10^4 spores/ml) (Figs 3 & 4).

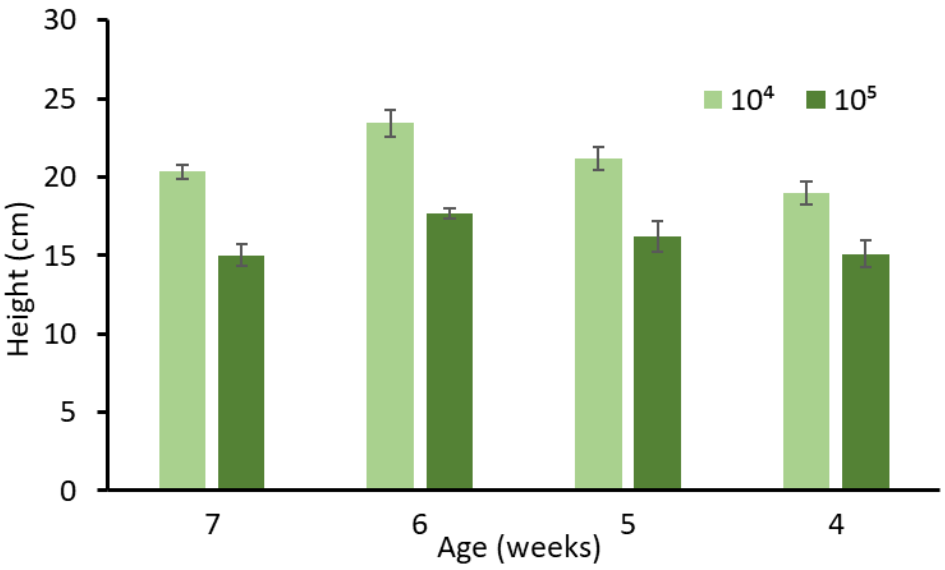

Figure 3: Height of plants inoculated with different conidia concentration at 23 days post-inoculation (dpi). Error bars are standard error of the mean.

Figure 4: Height of plant that received 10^4 spores/ml (1) or 10^5 spores/ml (2) inoculation at 23 dpi.

- A collection of over 20 *P. brassicae* isolates has been established from oilseed rape and kale cultivars across England.

Materials and Methods

- Plants of susceptible cultivar Charger were grown in a controlled environment. Severity of light leaf spot and plant height on plants inoculated at different ages (7, 6, 5, 4 weeks old) with different concentrations (10^4 and 10^5 spores/ml) of *P. brassicae* conidia were assessed at 23 days post-inoculation (dpi).
- Leaves with light leaf spot symptoms were sampled from field and *P. brassicae* isolates were obtained by single-spore isolation (Fig. 2).

Conclusions and Discussion

- Higher fungal inoculum concentration produced higher disease severity and reduced height of plants, suggesting a possible correlation between inoculum concentration and plant growth. These observations have been reported previously in field trials. A follow-up experiment will be done in the future.
- The 20 isolates obtained from different cultivars and different regions in England will be further screened for virulence.

Acknowledgements

This work is part of a four-year HKEP (Hertfordshire Knowledge Exchange Partnership) funded PhD project in collaboration with the Perry Foundation and the industrial partner ADAS.

Email: l.sapelli@herts.ac.uk

ADAS

Perry FOUNDATION

Hertfordshire Local Enterprise Partnership

PERFECTLY PLACED FOR BUSINESS