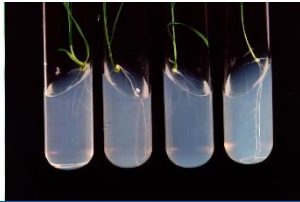




Department
for Environment
Food & Rural Affairs



Integrated Pest Management: Science and Practice

Disease control in cereals

Neil Paveley and Frank van den Bosch

A video series funded by Defra and produced by ADAS

www.adas.co.uk

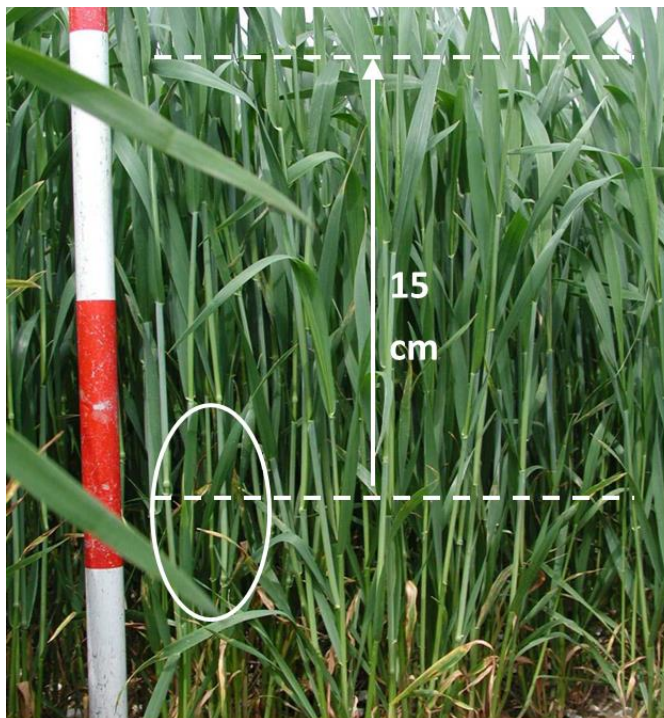
How can variety choice help?

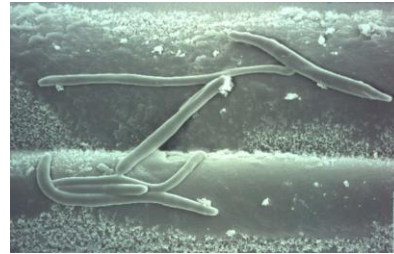
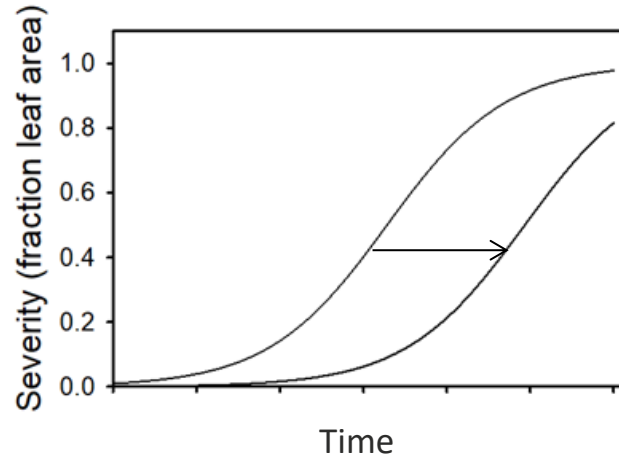


Cereal varieties can reduce disease by:

- **Escape:** reduces spores arriving on the upper canopy (Part A - this video)
- **Resistance:** reduces disease severity per amount of spore arrival on upper canopy (Part B)
- **Tolerance:** reduces yield loss per amount of disease severity (Part C)

Escape

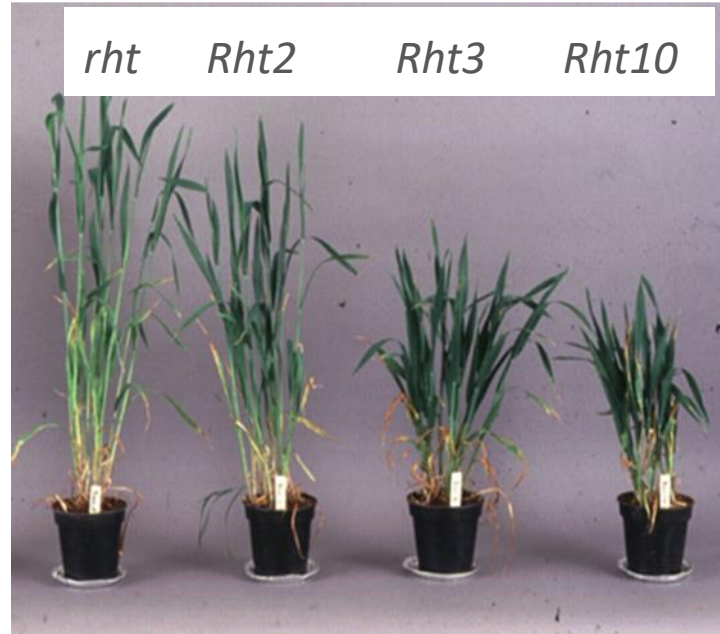




Reducing number of spores arriving on the upper canopy delays the epidemic

Escape





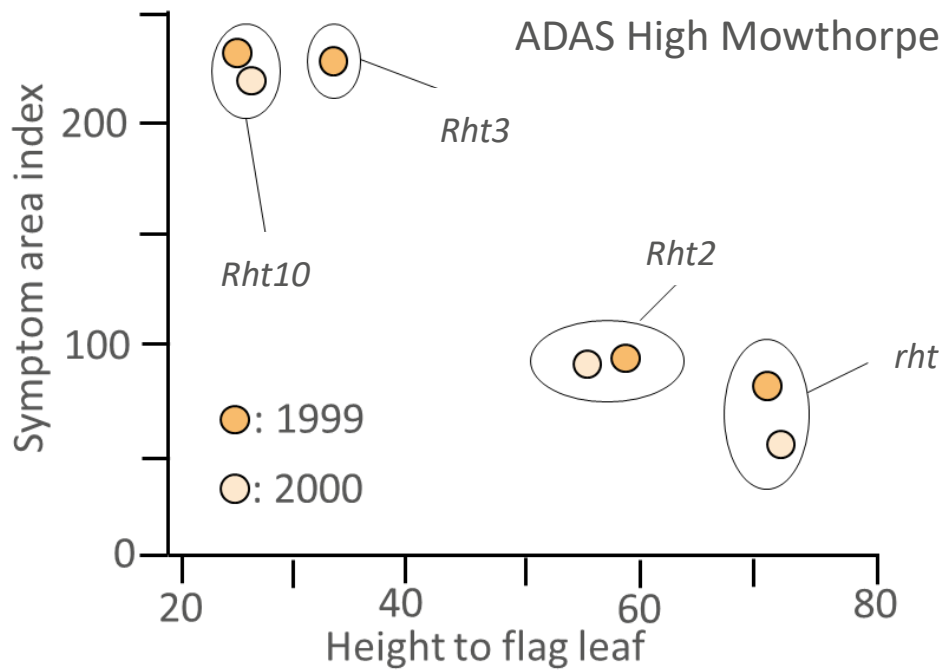
Isogenic lines in cv. Mercia background differing in dwarfing genes



rht



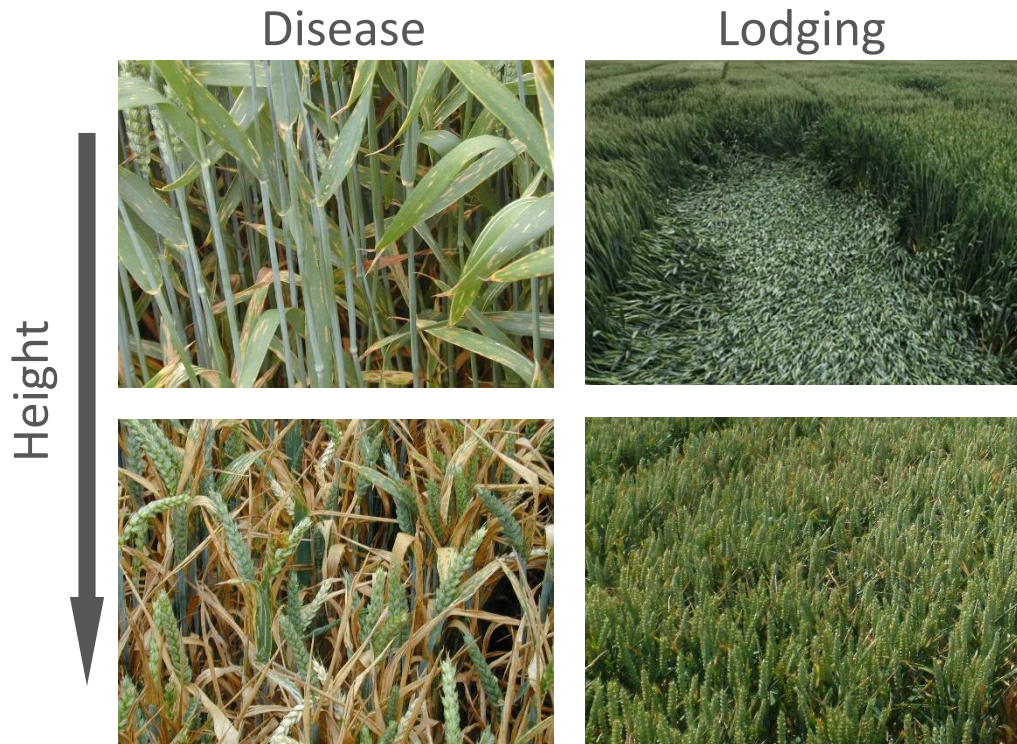
Rht10



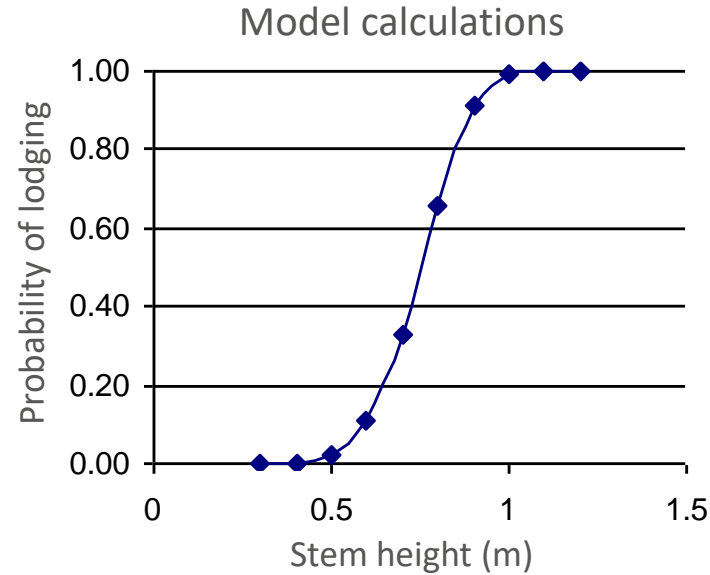
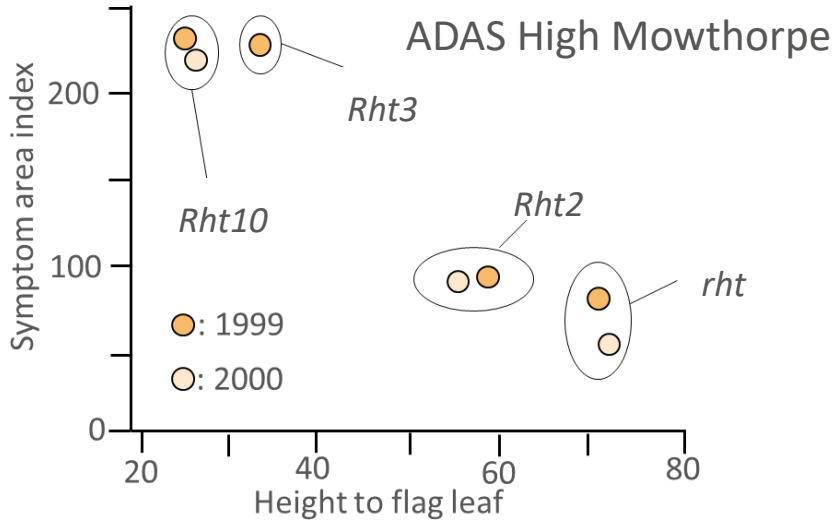
Escape



Trade-off: escape and lodging



Trade-off: escape and lodging



How can variety choice help?

- Disease escape reduces inoculum on the upper canopy, which delays the epidemic
- Taller varieties reduce severity of splash-borne diseases
- But have higher leverage, which increases lodging probability
- Breeding shorter varieties would be very risky
- Distance between inoculum and the emerging flag leaf is a good indicator of risk for splash-borne diseases

Disease resistance and tolerance are considered in subsequent videos

Further reading



Baker CJ, Berry PM, Spink JH, Sylvester-Bradley R, Griffin JM, Scott RK, Clare RW (1998) A method for the assessment of the risk of wheat lodging. *Journal of Theoretical Biology* 194, 587-603.

Paveley ND (2002) A rational basis for design of wheat canopy ideotypes for UK Environments. DEFRA final report AR0906.

Lovell DJ, Parker SR, Hunter T, Welham S, Nichols A (2003) Position of inoculum in the canopy affects the risk of septoria tritici blotch epidemics in winter wheat. *Plant Pathology* 53, 11–21.

Lovell, D J, Parker, S R, Paveley, N D, Worland, A J (2003). Understanding field resistance mechanisms for improved control of *Septoria tritici*. *Plant Protection Science* 38 (Special Issue 1), 165-169.