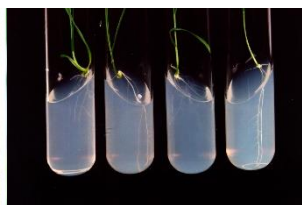




Department  
for Environment  
Food & Rural Affairs



# Integrated Pest Management: Science and Practice

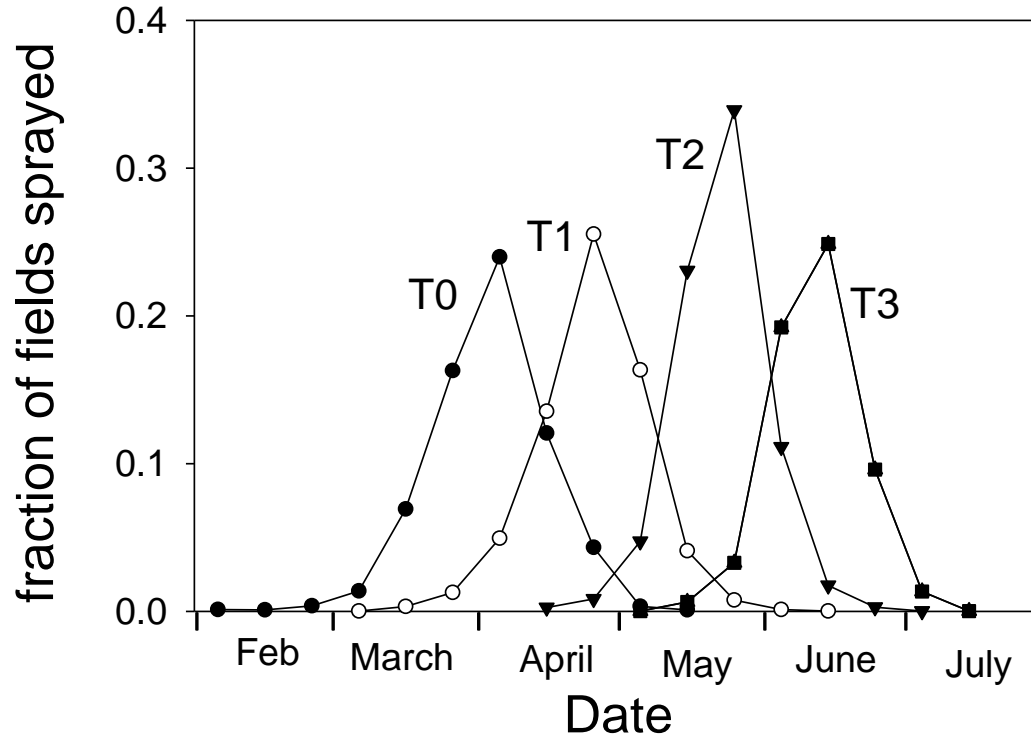
## Disease control in cereals

*Neil Paveley and Frank van den Bosch*

*A video series funded by Defra and produced by ADAS*

[www.adas.co.uk](http://www.adas.co.uk)

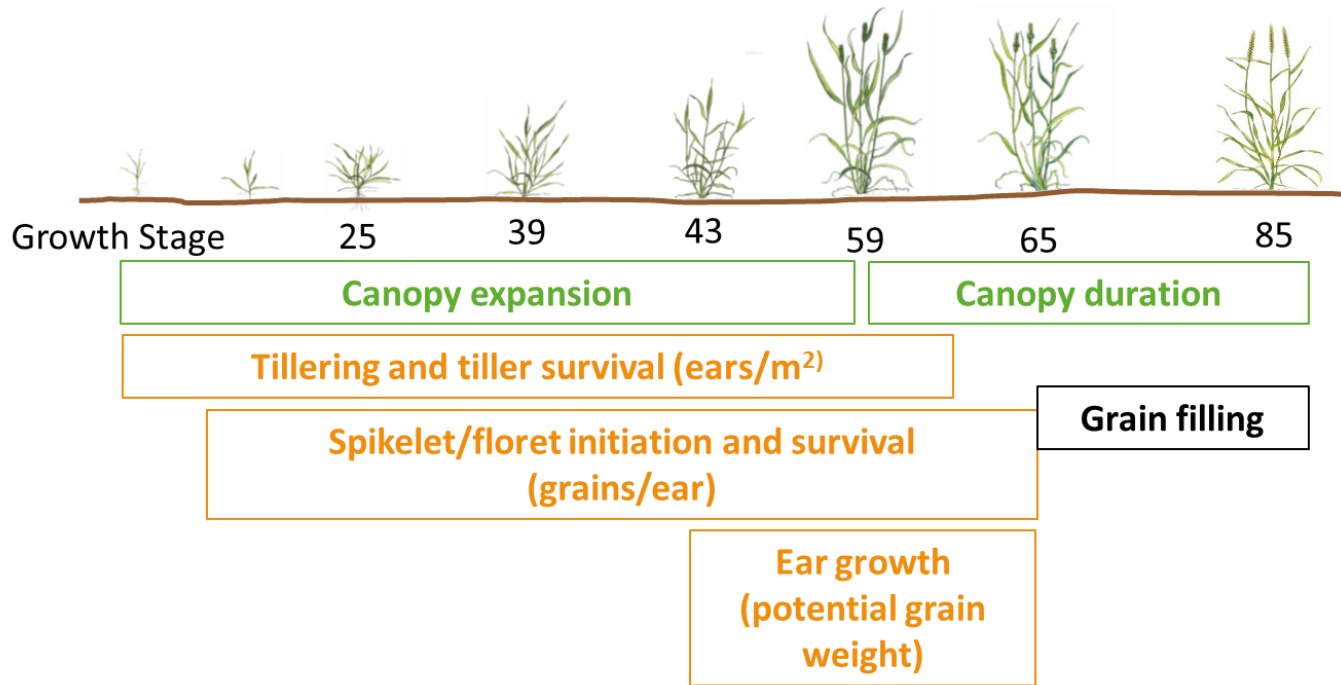
# When is it most efficient to treat with fungicide?



Fungicide timing  
in UK wheat crops

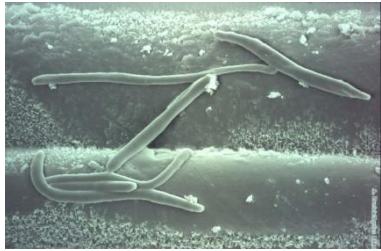
Source: Pest & disease survey 2005 - 2019

# Which parts of the canopy need protecting and when?

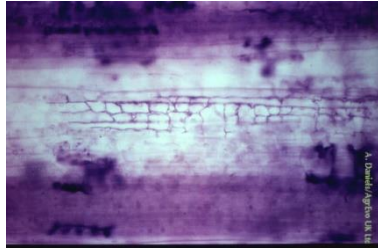


These developmental phases differ somewhat between wheat and barley

# Pathogen life cycle: *Septoria tritici*



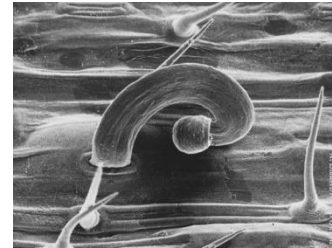
Infection



Symptomless growth  
(latent period)



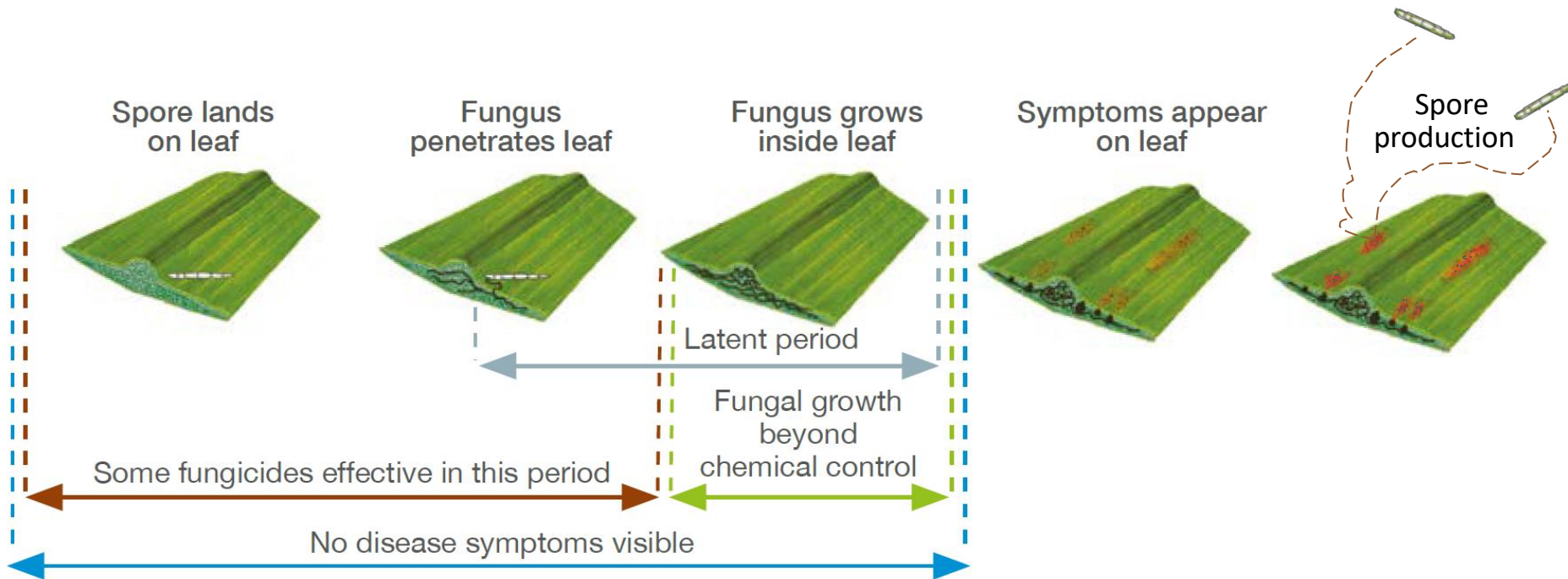
Symptom  
expression



Sporulation

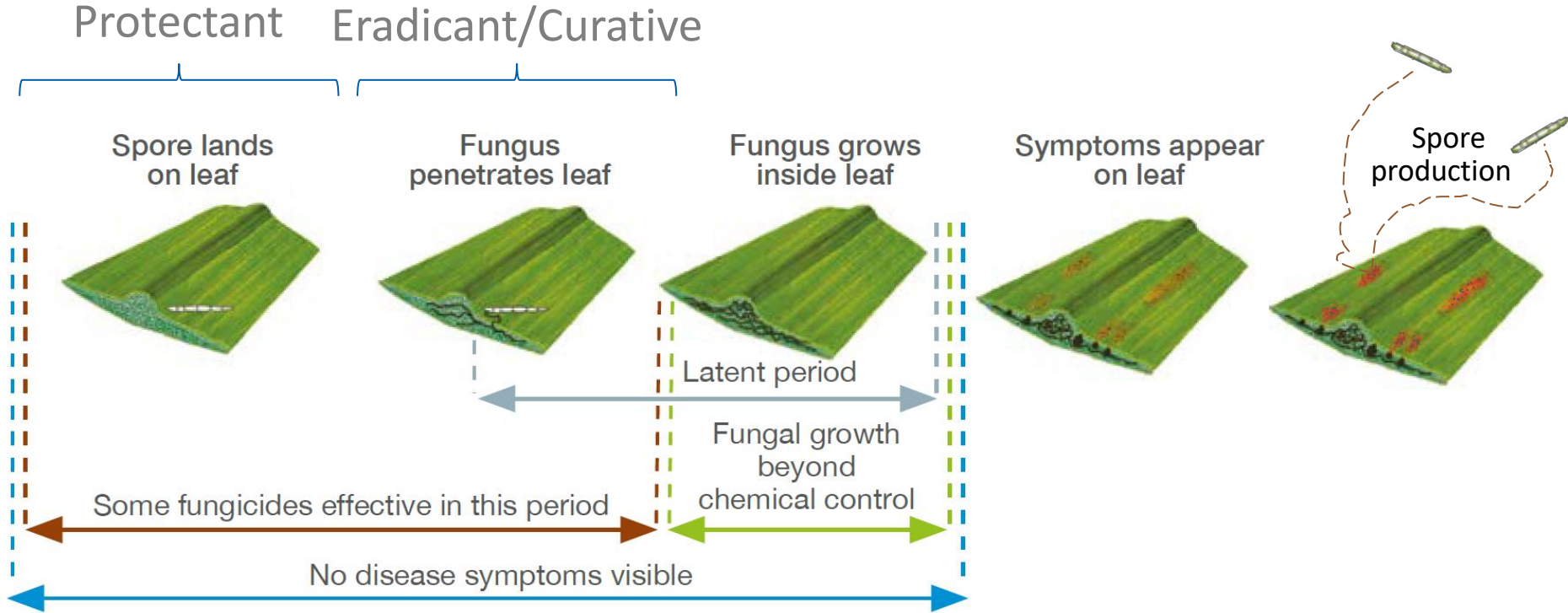


# Pathogen life cycle



Source: AHDB, Wheat and barley disease management guide.

# Protectant and eradicant control



Source: AHDB, Wheat and barley disease management guide.

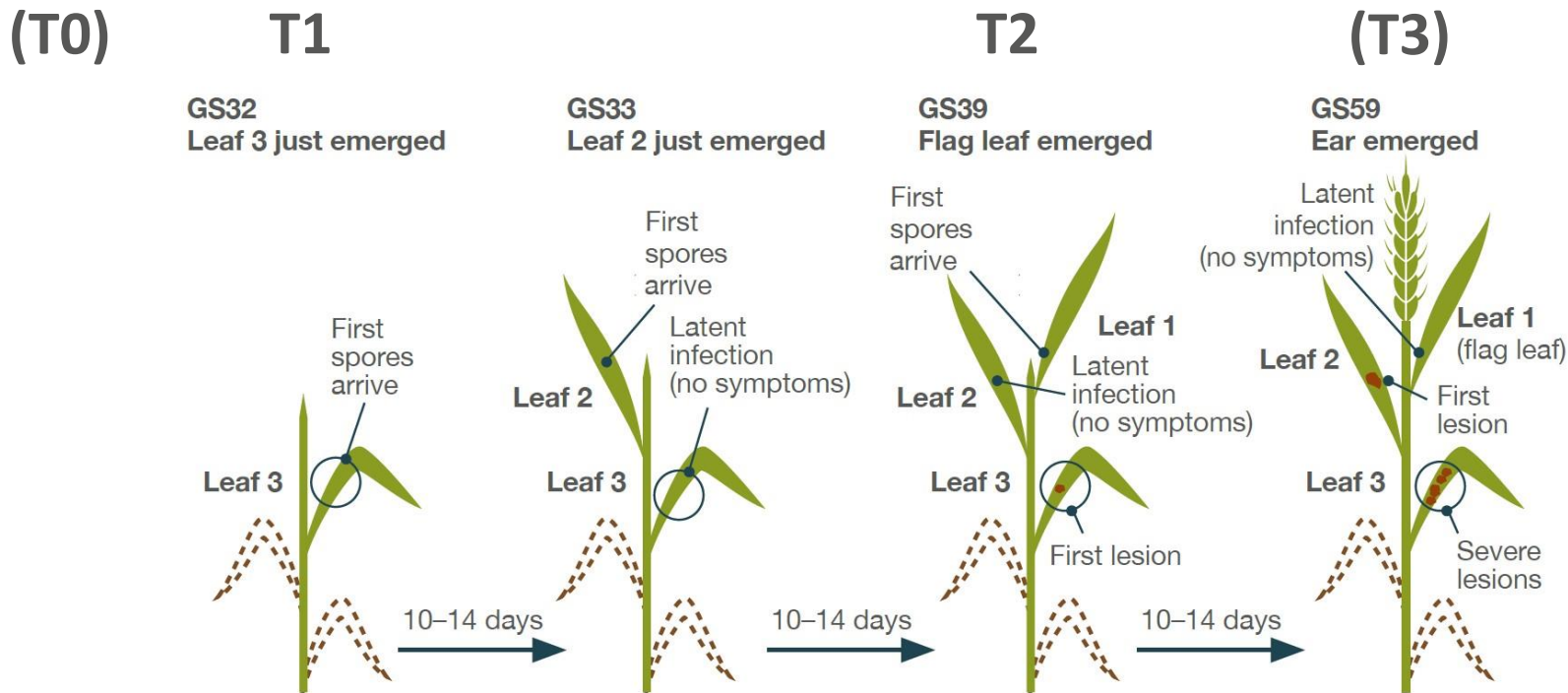
# Protective and eradicant control

Example fungicide products	Protectant (% control)	Eradicant (% control)
<b>Systemic</b>		
Myresa (mefentrifluconazole)	71%	50%
Peqtiga (fenpicoxamid)	79%	53%
Vimoy (isoflucypram)	70%	41%
<b>Protectant</b>		
Arizona (folpet; multi-site)	38%	3%



Single application  
Full label dose

# T0, T1, T2 and T3 spray timings





16 April  
Yorkshire

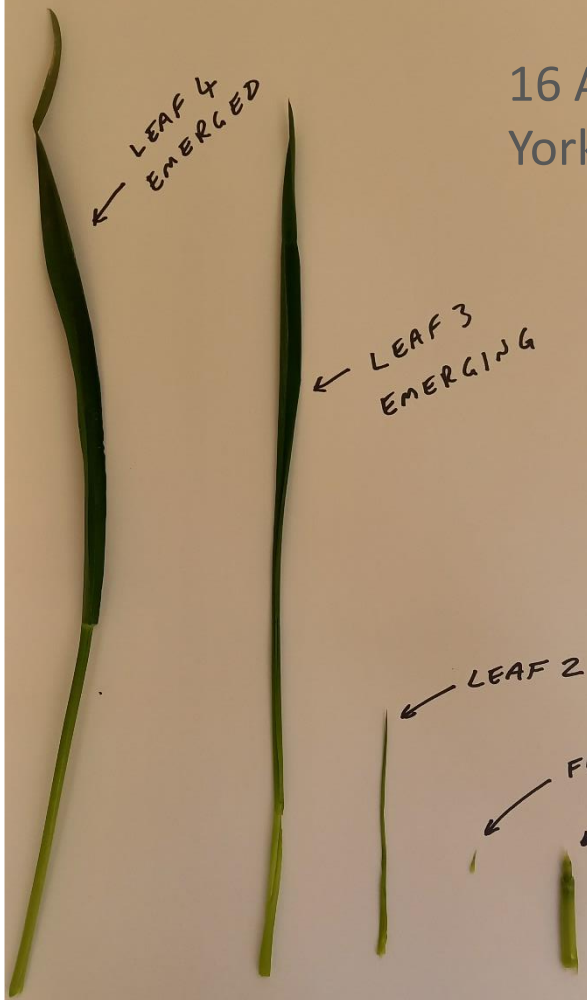
← LEAF 4  
EMERGED

← LEAF 3  
EMERGING

← LEAF 2

← FLAG LEAF

← EAR



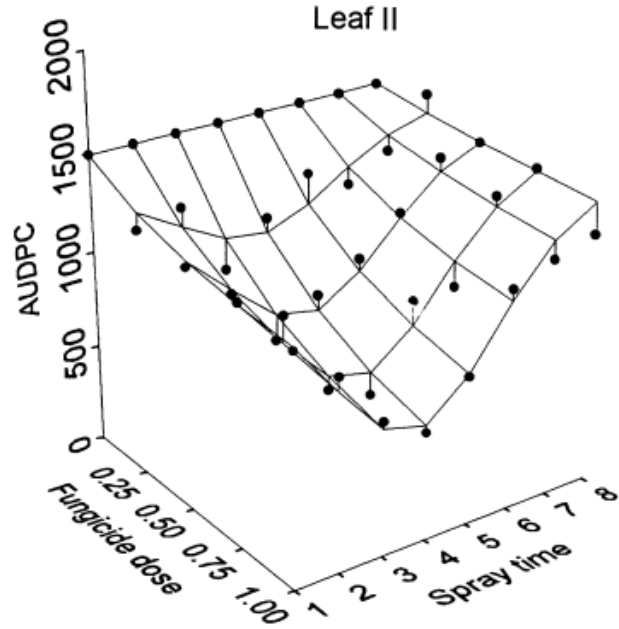
FLAG LEAF

EAR

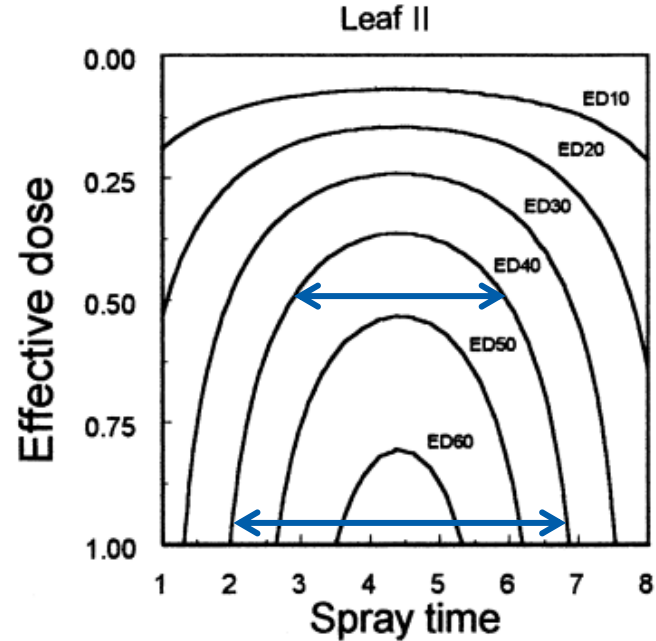
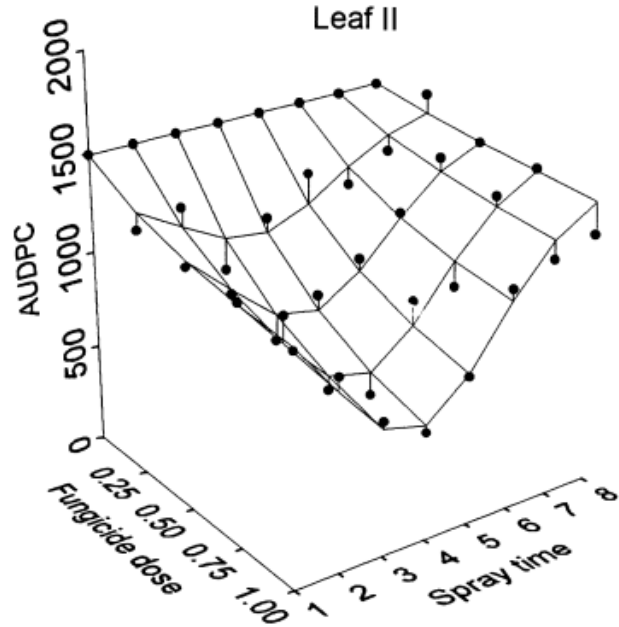


Uppermost node

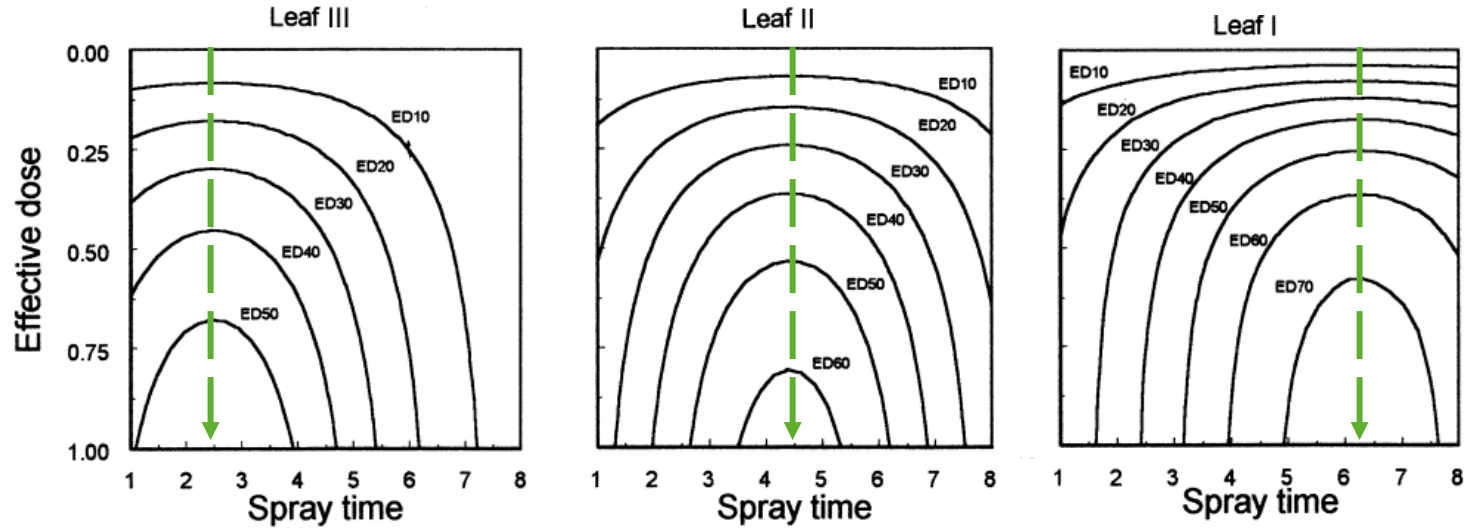
# Spray timing and dose



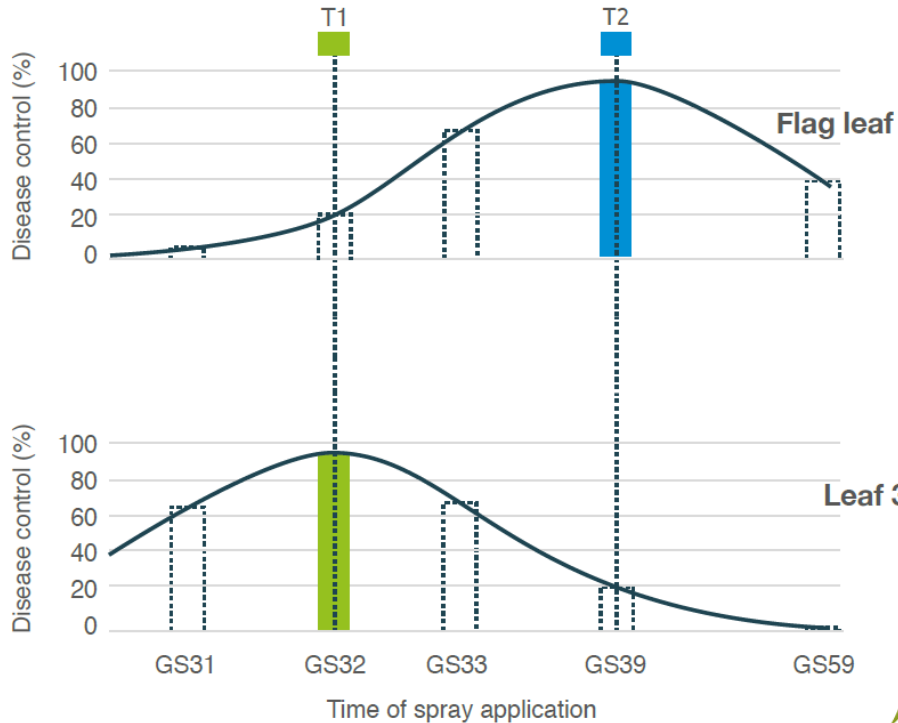
# Effect of dose on the 'spray window'



# Optimum spray timing for dose efficiency



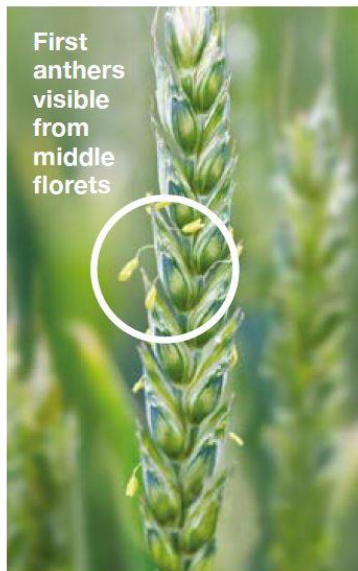
# Optimum spray timings for top three leaves



## T3 Spray timing



**GS59:**  
Not flowering –  
'top up' foliar  
disease control



**GS63–65:**  
Early flowering –  
optimal time to control  
ear diseases



**GS69:**  
Late flowering –  
too late to spray



# When is it most efficient to treat with fungicide?

- Only treat if you need to
- Wheat: fungicide timings are determined by emergence of the top three leaves
  - Leaf emergence cannot be assessed accurately by nodal growth stage – need to ‘dissect’
  - T1 and T2 timings are usually cost effective. T0 and T3 sometimes cost effective
- Barley: fungicide timings are mainly to protect sink formation - T1 timing is critical
- Most cereal fungicides are systemic, giving protectant and eradicator (curative) control
- Protectant treatment at the optimum timing (leaf just fully emerged) is more dose efficient than applying curatively
- Treating too early loses as much efficiency as treating too late
- A higher dose (within max. label dose) only extends the ‘spray window’ by a few days
- Increasing dose to compensate for poor spray timing will help maintain control, but not be cost effective



## Further reading



Defra pest and disease survey. <https://www.pestanddiseasesurvey.co.uk/>

Wheat and barley disease management guide. <https://ahdb.org.uk/knowledge-library/integrated-pest-management-ipm-of-cereal-diseases>

Fungicide performance in cereals. <https://ahdb.org.uk/knowledge-library/a-guide-to-fungicide-performance-in-wheat-barley-and-oilseed-rape>

Fungicide programmes for wheat. <https://ahdb.org.uk/knowledge-library/fungicide-programmes-for-wheat>

Cereal growth stages. <https://ahdb.org.uk/knowledge-library/the-growth-stages-of-cereals>

Paveley ND, Thomas JM, Vaughen TB, Havis ND, Jones DR (2003) Predicting effective doses for the joint action of two fungicide applications. *Plant Pathology* 52: 638-647. <https://doi.org/10.1046/j.1365-3059.2003.00881.x>

Paveley ND, Lockley D, Vaughan TB, Thomas J, Schmidt K (2000) Predicting effective fungicide doses through observation of leaf emergence. *Plant Pathology* 49: 748-766. <https://doi.org/10.1046/j.1365-3059.2000.00518.x>