



Harper Adams University





Fungicide performance update for wheat, barley and oilseed rape 2018

Stuart Knight, NIAB

ahdb.org.uk/knowledge-library/fungicide-performance



CEREALS & OILSEEDS

****Note****

Graphs show dose-response curves up to 100% label dose.

Graphs presented at the AHDB Agronomists' Conference (5 December 2018) showed dose-response curves up to 200% label dose.

Fungicides are tested at double rate to improve the 'fit' of the dose-response curves.

Choosing fungicides

- Fungicides should be matched to the primary disease risk, which depends mainly on variety, sowing date, location and local weather.
- Mixtures and alternations of fungicides with different modes of action, from different fungicide groups, are often most effective and reduce the likelihood that fungicide resistance will develop in pathogens.
- Resistance poses a significant threat to the ongoing performance of fungicides and resistance management must be taken into account when planning fungicide programmes.
- For information on fungicide resistance, visit the Fungicide Resistance Action Group (FRAG) or Fungicide Futures web pages.

ahdb.org.uk/knowledge-library/frag ahdb.org.uk/knowledge-library/fungicide-futures



Protectant and curative

- 'Protectant' curves show the activity of fungicides when they are applied soon after the emergence of a leaf layer, before much infection has occurred.
- 'Curative' curves indicate fungicidal activity after infection has occurred but before symptoms become visible.
- Performance of products on each leaf layer and at each site was classified as protectant or curative based on timing of leaf emergence relative to spray application.
- Performance of individual active ingredients can be assessed by comparing dose-response graphs. These show average performance measured across a range of sites, seasons and leaf layers.



Weather

Rainfall: 2017/18 season vs 1981–2010 mean



Max Temp: 2017/18 vs 1981–2010 mean



Trial methods

- In order to provide a good test of the fungicides:
 - Trials are located in areas that are at high risk from the target disease in most years
 - Trials are carried out on varieties that are very susceptible to the target disease and not too susceptible to other diseases
- If necessary, over-sprays that are not active against the target disease are used to reduce the effect of other diseases on the trial
- Wheat brown rust trial inoculated in April with spore puffer to maximise the risk of infection, even after a cold spring
- Fusarium trial inoculated with fusarium species and mist-irrigated before and after inoculation to establish infection

Fungicide performance update for wheat

Wheat trial sites in harvest year 2018

	Site (organisation)	Target disease	Variety
1	Rosemaund (ADAS)	Septoria tritici	KWS Santiago
2	Cardigan (ADAS)	Septoria tritici	KWS Barrel
3	Sutton Scotney (NIAB)	Septoria tritici (double trial)	Dickens
4	Fife (SRUC)	Septoria tritici (double trial)	KWS Santiago
5	Carlow (TEAGASC)	Septoria tritici	KWS Lumos
6	Terrington (ADAS)	Yellow rust	Reflection
7	Cambridge (NIAB)	Brown rust	Crusoe
8	Gleadthorpe (ADAS)	Fusarium	Grafton

Wheat septoria data 2018

Site (and timing)	Protectant	Curative	Mixed
Rosemaund		\checkmark	\checkmark
Cardigan	\checkmark		\checkmark
Sutton Scotney (T1)	\checkmark		
Sutton Scotney (T2)	\checkmark		\checkmark
Fife, Scotland (T1)	\checkmark		
Fife, Scotland (T2)			
Carlow, Ireland		\checkmark	

Wheat septoria products

Product	Active(s)	UK sites	Carlow
Bravo	chlorothalonil	√*	✓*
Proline	prothioconazole	\checkmark	\checkmark
Bassoon	epoxiconazole	\checkmark	
Imtrex	fluxapyroxad	\checkmark	\checkmark
Vertisan	penthiopyrad	\checkmark	
Ascra Xpro	bixafen + fluopyram + prothioconazole	\checkmark	\checkmark
Librax	fluxapyroxad + metconazole	\checkmark	\checkmark
Elatus Era	solatenol + prothioconazole	\checkmark	\checkmark

*Bravo at 50% dose only

Septoria protectant 2018 over-trial (n=4)



Septoria protectant over-year 2016–18 (n=17)



Septoria curative over-year 2016–18 (n=9)



Septoria yield over-year 2016–18 (n=17)



Septoria: azole performance over time (protectant, full label dose)





Vertisan (top curve = best control achieved, middle = average control, bottom = worst control)



Septoria: early season sensitivity monitoring









Sdh mutations detected for the first time in 2017

Septoria: monitoring of Sdh mutations

Early season untreated:



Quantitative detection of frequently occurring Sdh mutations in UK field populations of *Zymoseptoria tritici*. No mutations were detected in early 2016 (detection threshold 3–5%)

Wheat rust products

Product	Active(s)	Yellow rust	Brown rust
Comet	pyraclostrobin	\checkmark	
Proline	prothioconazole	\checkmark	\checkmark
Bassoon	epoxiconazole	\checkmark	
Caramba 90	metconazole		\checkmark
Imtrex	fluxapyroxad	\checkmark	
Ascra Xpro	bixafen + fluopyram + prothioconazole	\checkmark	
Librax	fluxapyroxad + metconazole	\checkmark	2018 only
Elatus Era	solatenol + prothioconazole	\checkmark	\checkmark
Priaxor	fluxapyroxad + pyraclostrobin	\checkmark	
Keystone	epoxiconazole + isopyrazam	not 2018	

Yellow rust 2018 (n=1)



Yellow rust over-year 2016–18 (n=3)



Yellow rust yield 2018 (n=1)



Brown rust



Wheat fusarium products

Product	Active(s)	Included
Proline	e prothioconazole	
Folicur	tebuconazole	\checkmark
Soleil	bromuconazole + tebuconazole	2018 only
Unizeb Gold	mancozeb	2018 only
Bassoon	epoxiconazole	not 2018
Caramba 90	metconazole	not 2018

Head blight symptoms



Head blight DNA results 2018

Fusarium



Caution: Data is from 1 trial/year only

Microdochium



Fungicide performance for wheat summary

- Septoria tritici:
 - SDHIs more effective than azoles, with Imtrex ahead of Vertisan and Proline ahead of Bassoon
 - Bravo continues to demonstrate good protectant activity
 - SDHI+azole mixtures achieved the highest levels of control
 - Further sensitivity shifts in azoles and SDHIs reinforce the importance of multi-site protectants in programmes
- Yellow rust azoles and Comet retain good activity against the disease, but Elatus Era gave highest yields
- Brown rust Of the products tested, Elatus Era and Librax very effective, giving increased control compared to the azoles alone
- Head blight Soleil performed similarly to Proline/Folicur against fusarium. Unizeb Gold effective on microdochium

Fungicide performance update for barley

Barley trial sites in harvest year 2018

	Site (organisation)	Target disease	Variety
1	Powys (ADAS)	Rhynchosporium	Cassia
2	Lanark (SRUC)	Rhynchosporium	Cassia
3	Carlow (TEAGASC)	Rhynchosporium	Cassia
4	High Mowthorpe (ADAS)	Net blotch	Tower
5	Norfolk (NIAB)	Net blotch	Flagon
6	Bush Midlothian (SRUC)	Powdery mildew	Cassata
7	Bush Midlothian (SRUC)	Ramularia	Fairing

Barley disease data 2018

	Target	Rhyncho	N Blotch	Mildew	Ramularia
Powys	Rhyncho	\checkmark			
Lanark	Rhyncho	\checkmark			
Carlow	Rhyncho	\checkmark			
Mowthorpe	N blotch		✓ (spot)		
Norfolk	N blotch		Very low dis	ease levels	
Midlothian	Mildew			\checkmark	
Midlothian	Ramularia	Very low I	ramularia levo	els (early ser	nescence)

Barley rhynchosporium products

Product	Active(s)	UK sites	Carlow
Proline	prothioconazole	\checkmark	\checkmark
Comet	pyraclostrobin	\checkmark	\checkmark
Imtrex	fluxapyroxad	\checkmark	
Siltra Xpro	bixafen + prothioconazole	\checkmark	\checkmark
Elatus Era	solatenol + prothioconazole	\checkmark	\checkmark
Vertisan	penthiopyrad	not 2018	
Priaxor	fluxapyroxad + pyraclostrobin	pre 2017	\checkmark

Rhynchosporium over-trial 2018 (n=3)



Rhynchosporium over-year 2016–18 (n=9)



Net blotch and mildew products

Product	Actives	N Blotch	Mildew
Proline	prothioconazole	\checkmark	\checkmark
Comet	pyraclostrobin	\checkmark	
Imtrex	fluxapyroxad	\checkmark	\checkmark
Kayak	cyprodinil	\checkmark	
Cyflamid	cyflufenamid		\checkmark
Talius	proquinazid		\checkmark
Siltra Xpro	bixafen + prothioconazole	\checkmark	
Elatus Era	solatenol + prothioconazole	\checkmark	\checkmark
Vertisan	penthiopyrad	pre 2018	
Priaxor	fluxapyroxad + pyraclostrobin	pre 2018	

Net blotch 2018 (n=1)



Net blotch over-year 2016–18 (n=4)



Mildew 2018 (n=1) Caution: data is from 1 trial/year only



Fungicide performance for barley summary

- Rhynchosporium:
 - Good control from Proline, Imtrex and the SDHI+azole mixtures (Siltra Xpro and Elatus Era)
 - Comet less effective, but still giving reasonable control
- Net blotch:
 - Proline and the SDHI+azole mixtures were most effective, with highest yields from the mixtures
 - Although partial resistance exists, Comet and Imtrex gave reasonable control. Kayak has a different mode of action
- Proline, and mildewicides Talius and Cyflamid, continue to provide good mildew control
- Occurrence of resistance to azoles, Qols and SDHIs means that chlorothalonil is vital for control of ramularia

Fungicide performance update for oilseed rape

Oilseed rape phoma trial sites and products in harvest year 2018

	Site (organisation)	Target disease	Variety
1	Herefordshire (ADAS)	Phoma	Catana
2	Terrington, Norfolk (ADAS)	Phoma	Catana

Product	Actives
Proline	prothioconazole
Plover	difenoconazole
Filan	boscalid

Phoma: stem canker index 2018



Phoma: seed yield 2018



Fungicide performance oilseed rape summary

- Over years, half dose applied twice has generally been an effective strategy for phoma control
- 0.2+ t/ha response with moderate canker index and
 0.4+ t/ha response with high canker index in 2018
- Filan appears to give better disease control but equivalent yield to Proline and Plover
- Filan offers alternative option with a different mode of action to azoles for phoma control

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