

Fungicide performance update for wheat, barley and oilseed rape (2021)



**The graphs in this document show
dose-response curves up to 100% label dose.**

The AHDB Agronomists' Conference presentation (7 December 2021) showed dose-response curves up to 200% label dose.

In these trials, most fungicides are tested at double rate to improve the 'fit' of the dose-response curves.

In commercial situations, do not exceed the recommended label dose (i.e. 100%).

ahdb.org.uk/fungicide-performance

Choosing fungicides

- Match fungicides 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 performance of fungicides. It is essential to take resistance management into account when planning fungicide programmes
- For further information, visit the Fungicide Resistance Action Group's (FRAG) web page: ahdb.org.uk/frag

Protectant and eradicant

- ‘Protectant’ curves indicate fungicide activity following application soon after the emergence of a leaf layer, before much infection has occurred
- ‘Eradicant’ curves indicate fungicidal activity following application after infection has occurred
- Product performance on each leaf layer and at each site was classified as protectant or eradicant based on timing of leaf emergence relative to spray application
- Performance of active ingredients can be assessed by comparing dose-response graphs. These show average performance, measured across a range of sites, seasons and leaf layers

Trial methods (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 relatively 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 and barley – registered products

Product	Active(s)	Mode of Action
Arizona*	folpet	Multi-site
Proline	prothioconazole	DMI**
Myresa	mefentrifluconazole (revysol)	DMI**
Imtrex	fluxapyroxad	SDHI
Elatus Plus	benzovindiflupyr (solatenol)	SDHI
Comet	pyraclostrobin	QoI***
Peqtiga	fenpicoxamid	QII
Ascra Xpro	bixafen + fluopyram + prothioconazole	SDHI + SDHI + DMI**
Elatus Era	benzovindiflupyr + prothioconazole	SDHI + DMI**
Revystar XE	mefentrifluconazole + fluxapyroxad	SDHI + DMI**
Univoq	fenpicoxamid + prothioconazole	QII + DMI**

Barley only

Siltra	bixafen + prothioconazole	SDHI + DMI**
Kayak	cyprodinil	Anilinone-pyrimidine

*Arizona tested at full-dose (100%) only

**Azole

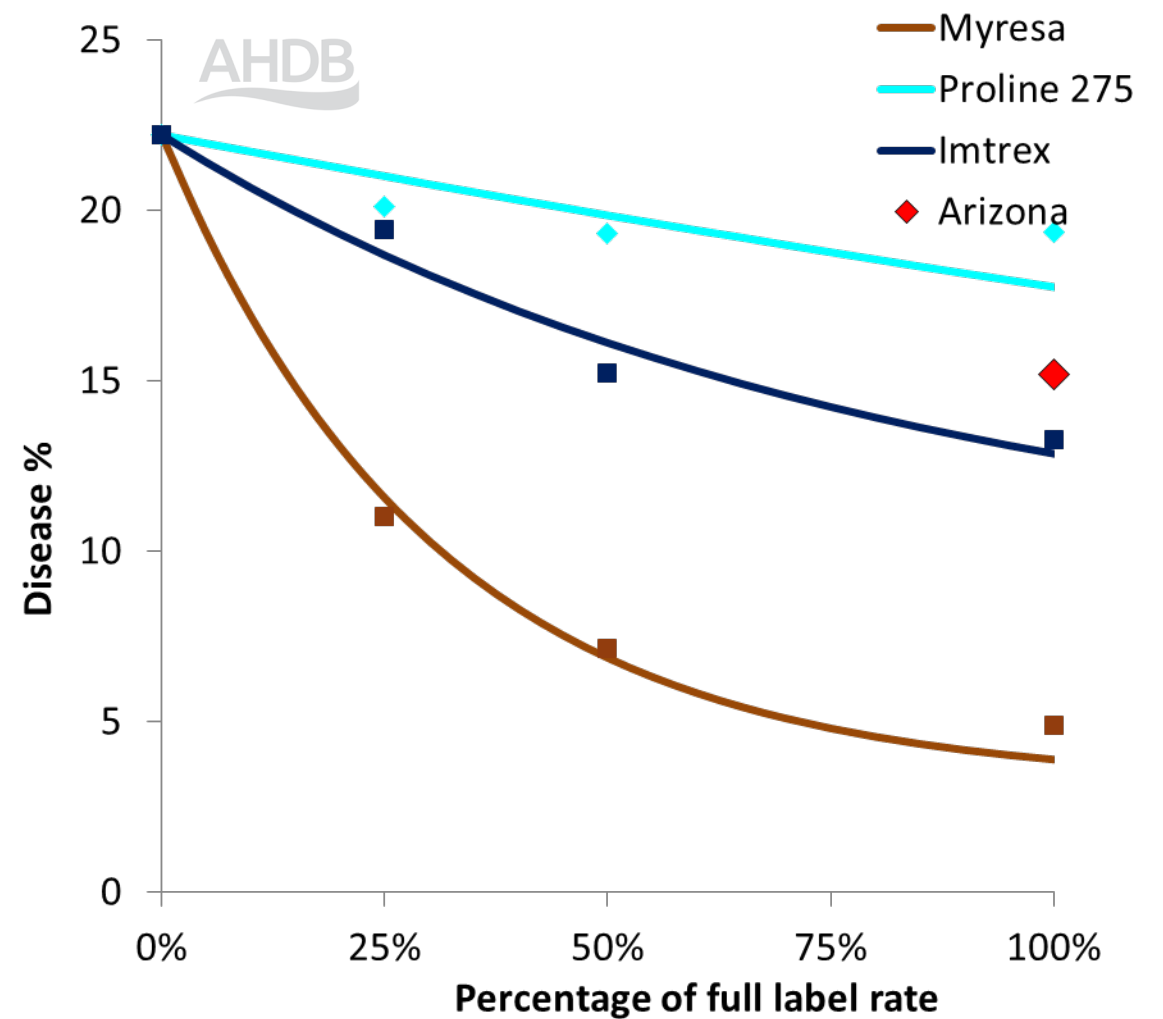
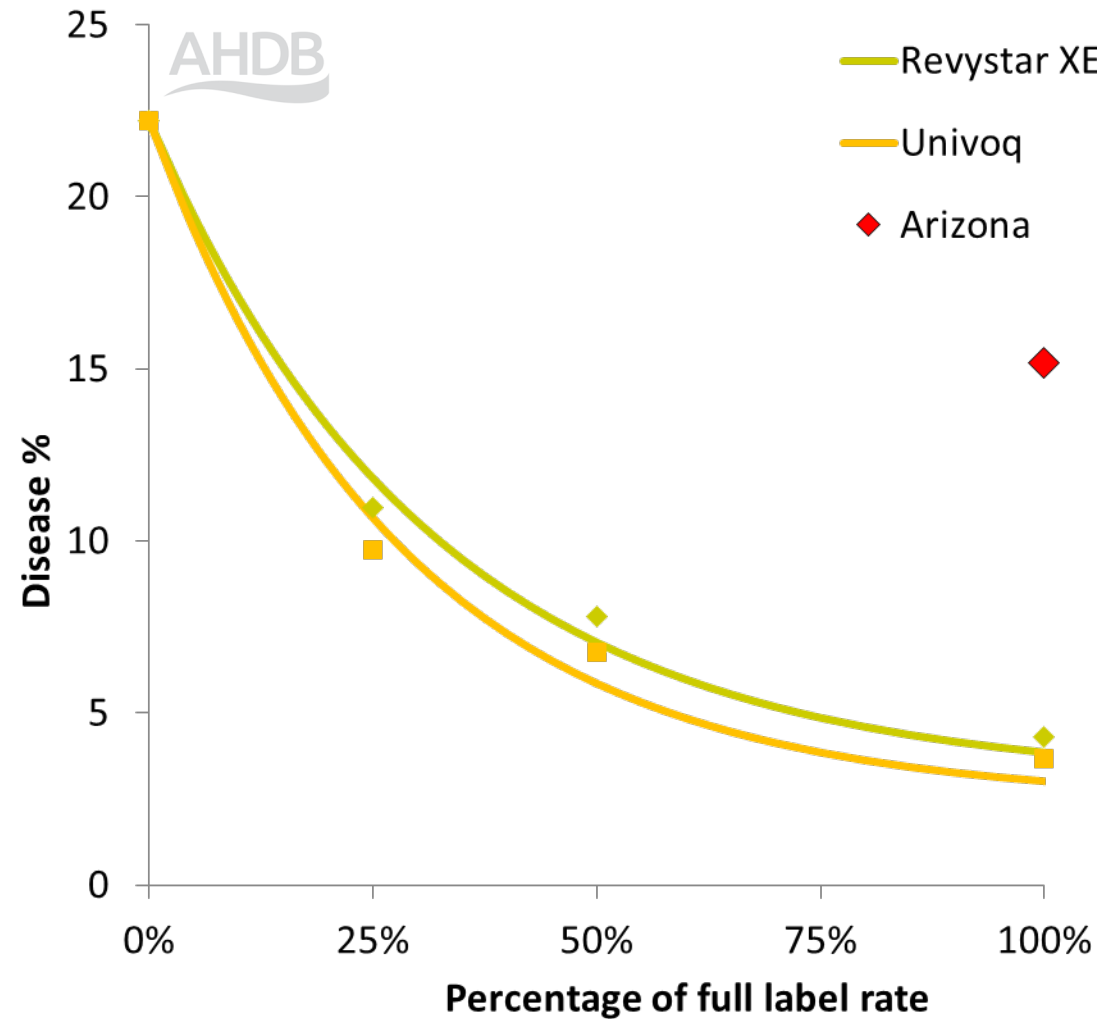
***Strobilurin

Fungicide performance update for wheat (2021)

Wheat septoria tritici efficacy data (2021)

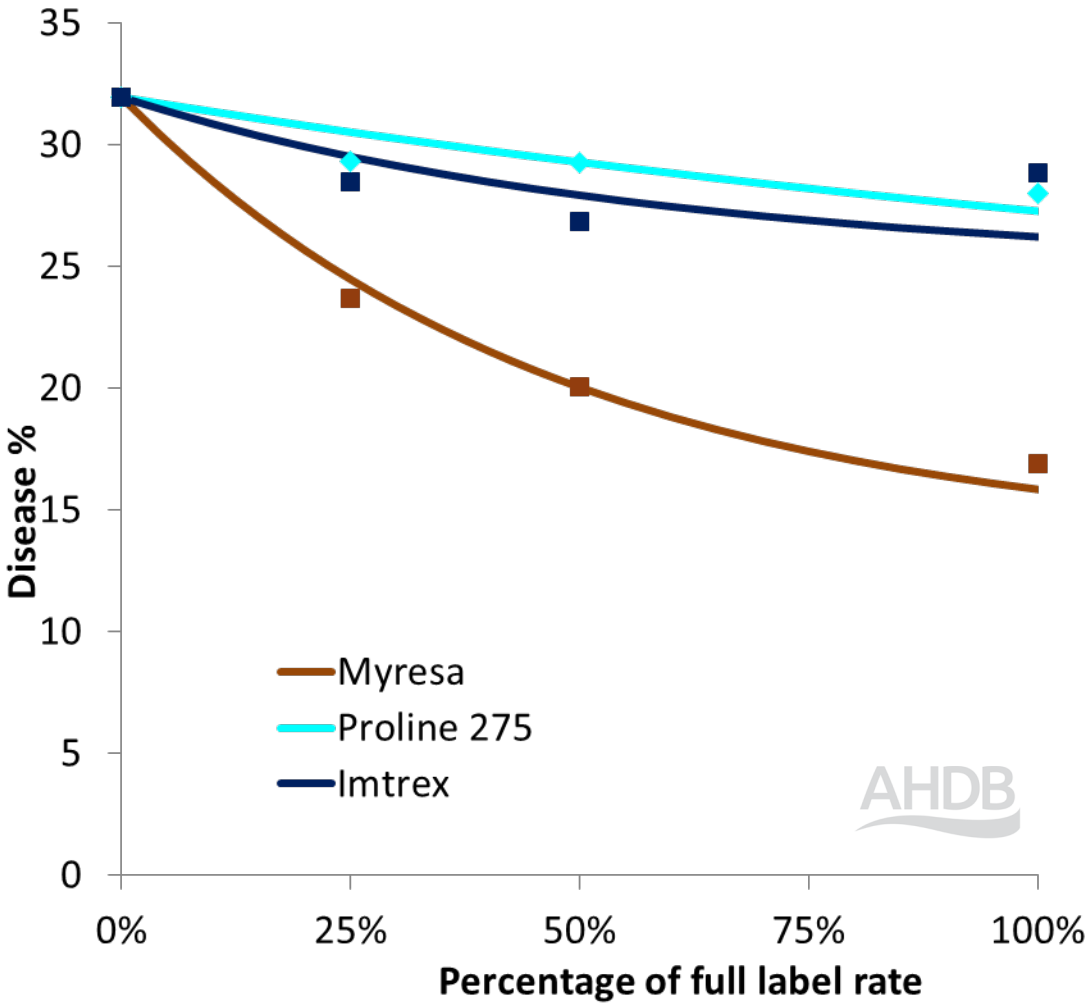
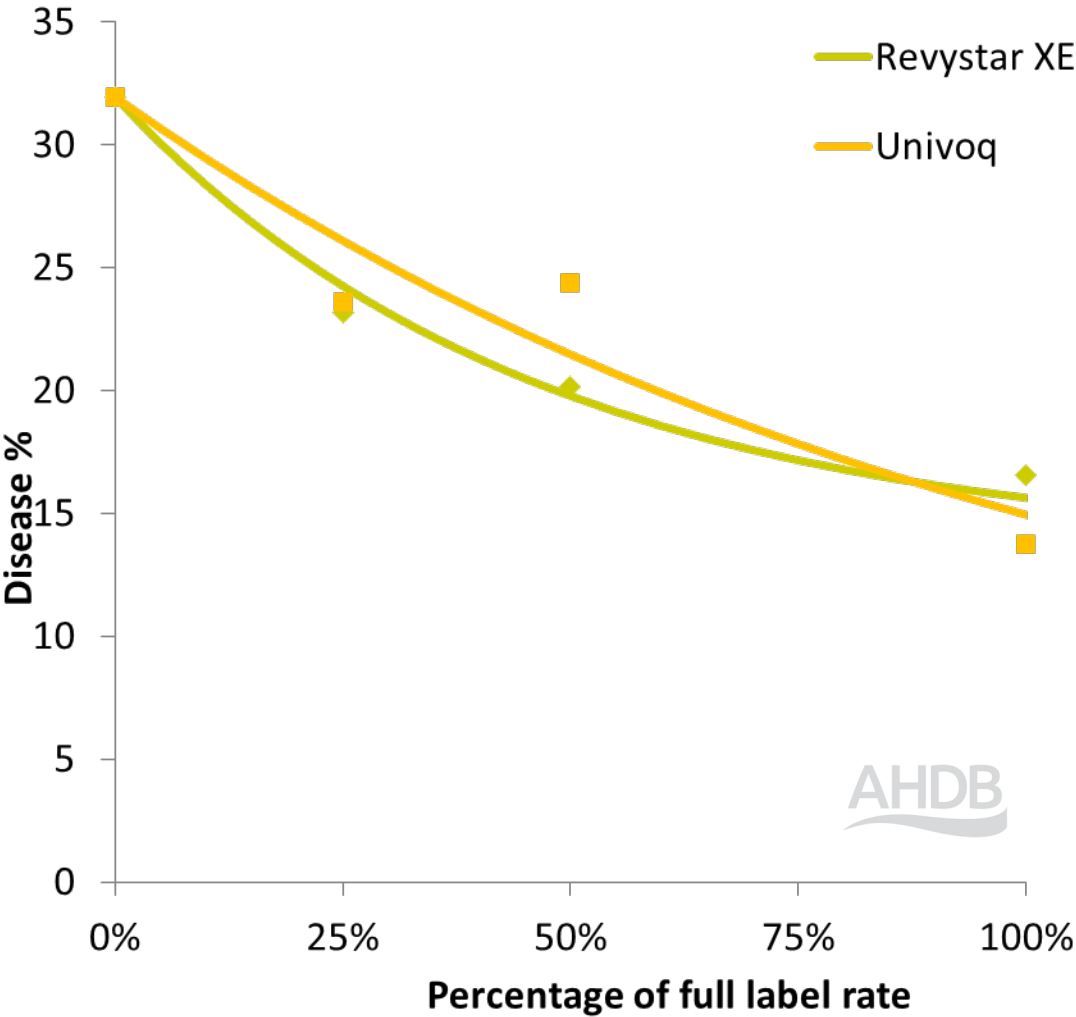
Trial site		Protectant	Curative	Mixed
1	Rosemaund (T1.5)	✓	✓	
2	Sutton Scotney (T1)	✓		
3	East Lothian (T2)	✓	✓	
7	Carlow (T1.5)	✓		
8	Cardigan (T2)	✓		✓
9	Telford (T2)		✓	
10	Dundee (T1)	✓	✓	

Septoria protectant 2021 (6 trials)



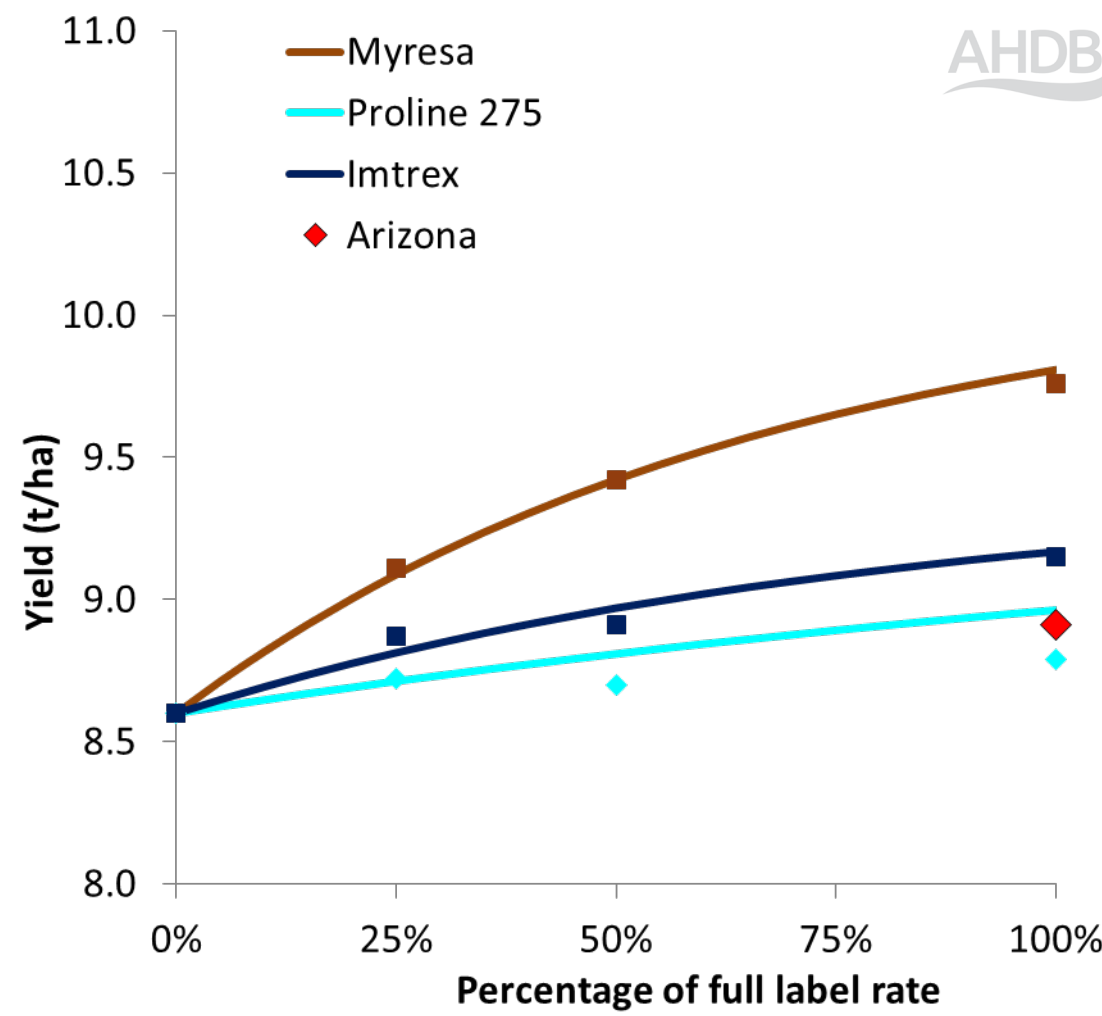
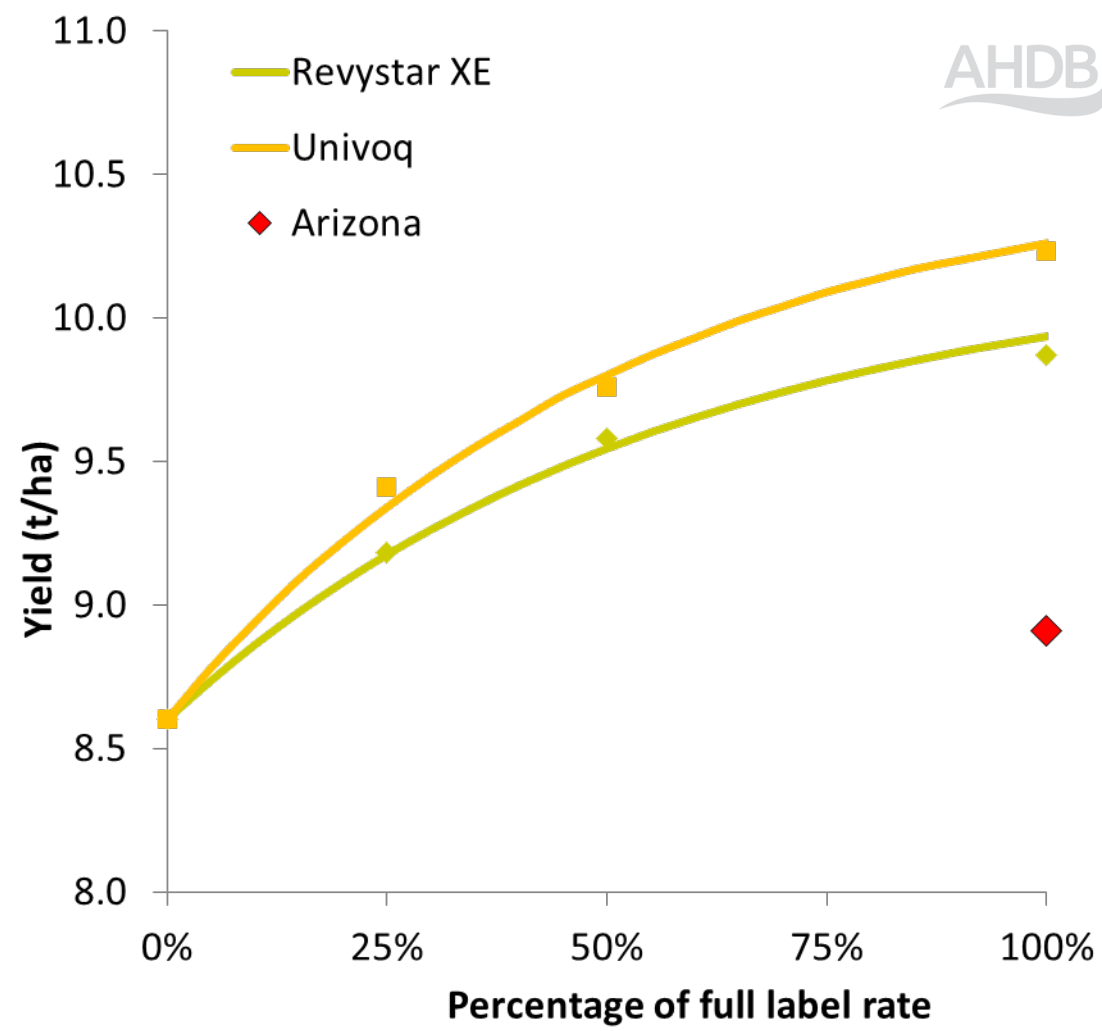
Use Imtrex and Myresa only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Septoria eradicant 2021 (4 trials)



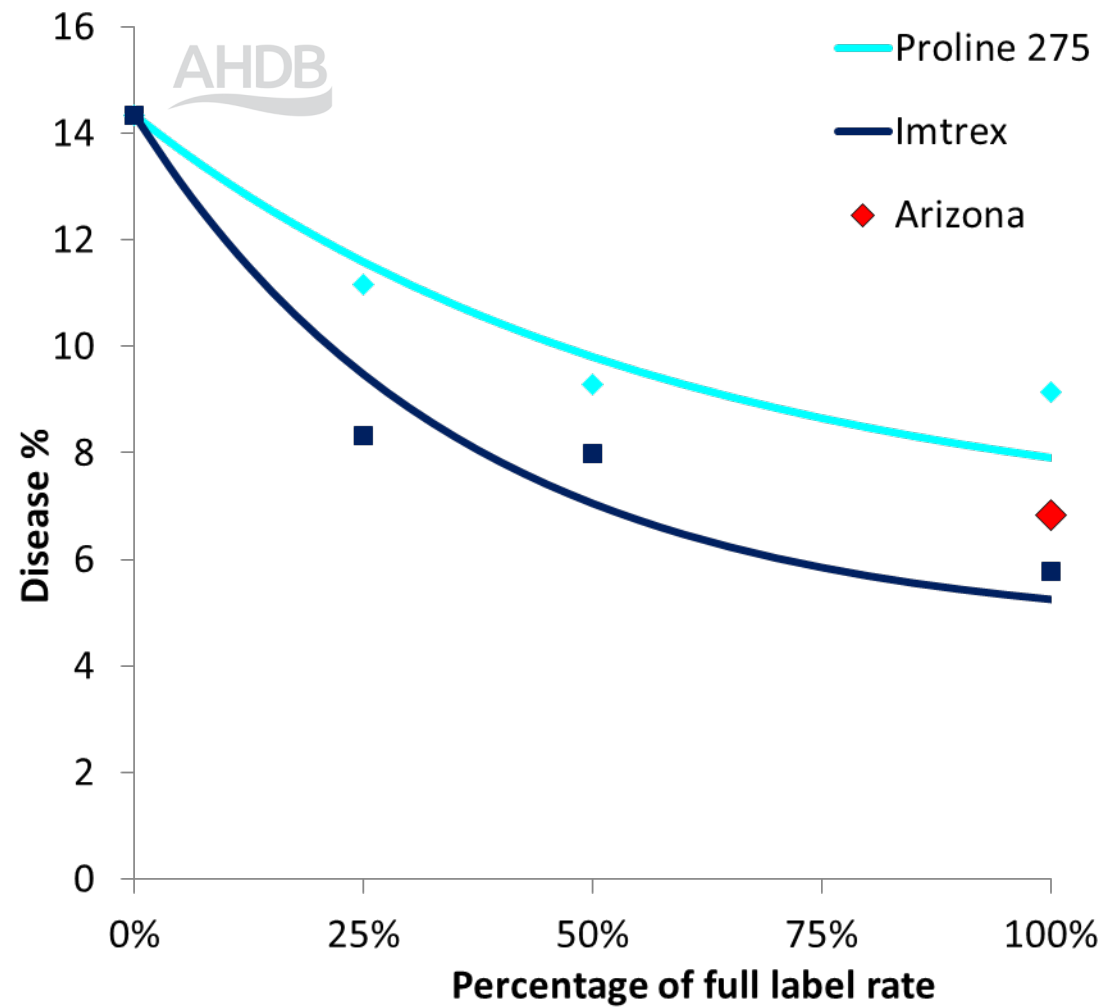
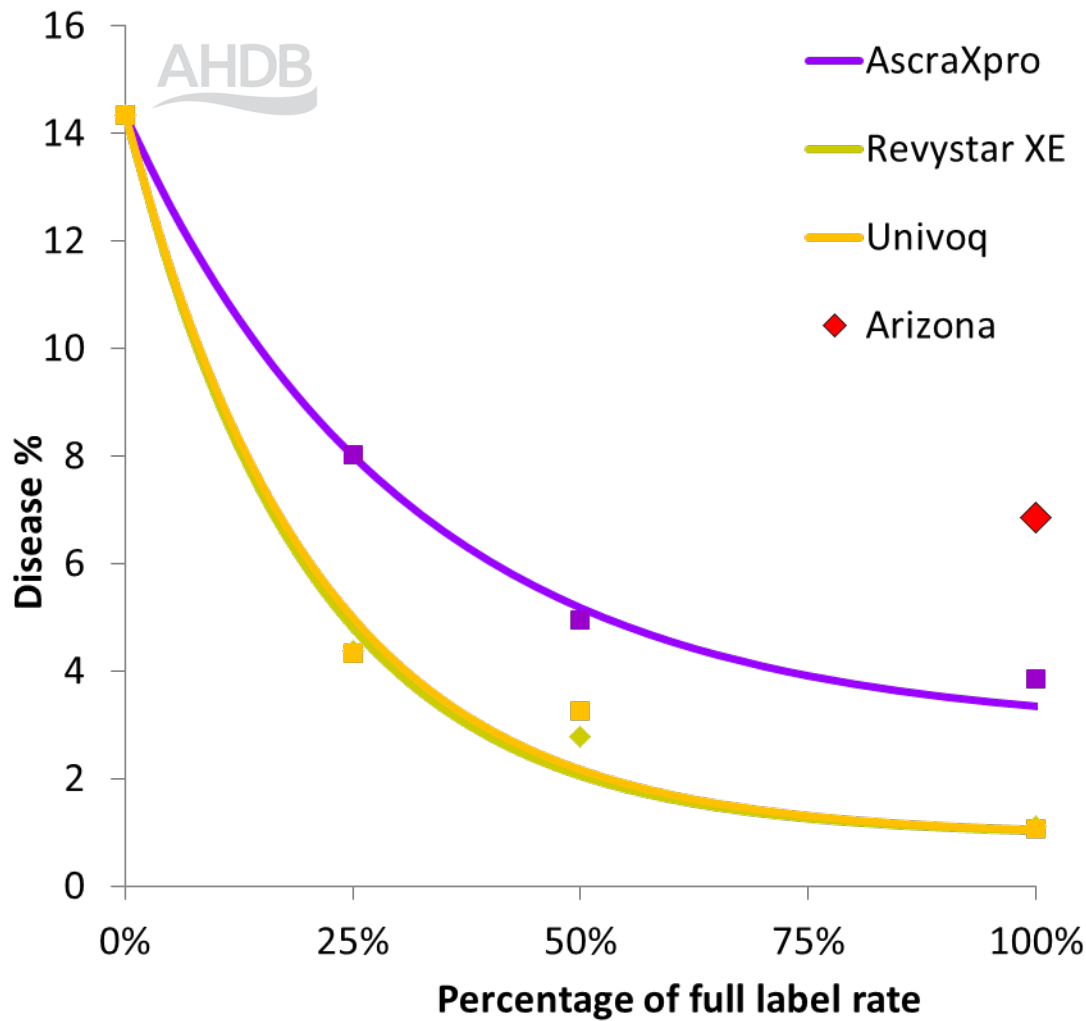
Use Imtrex and Myresa only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Septoria yield 2021 (7 trials)



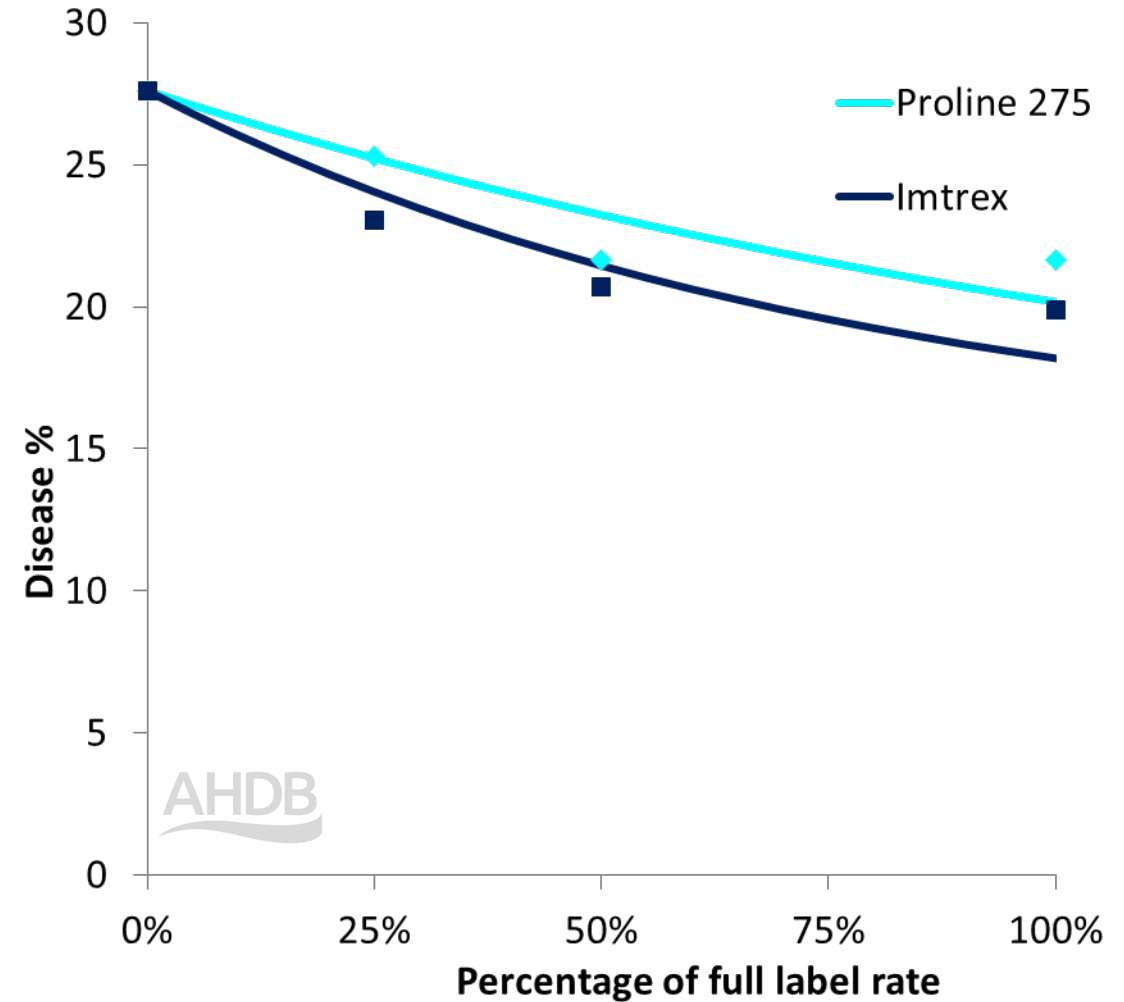
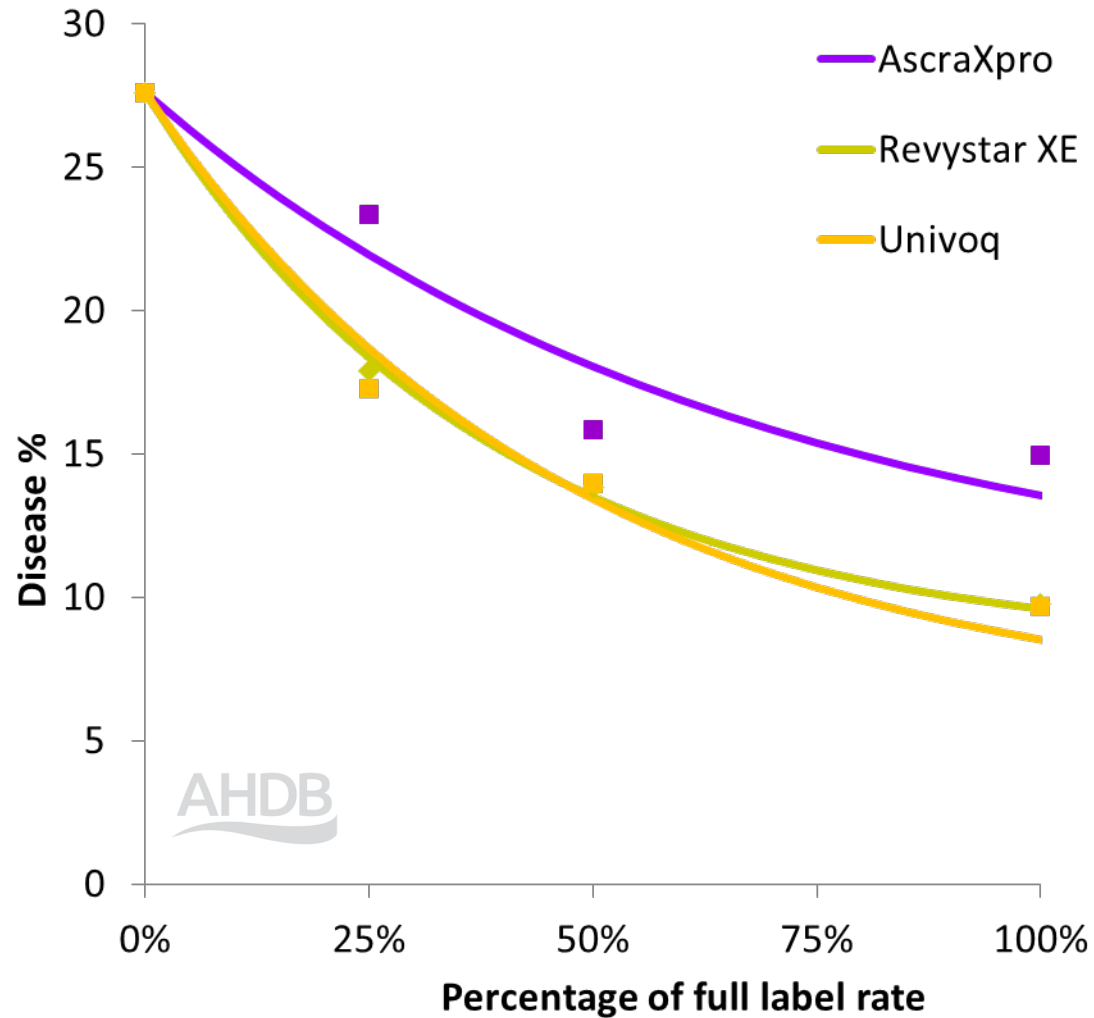
Use Imtrex and Myresa only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Septoria protectant 2019–21 (16 trials)



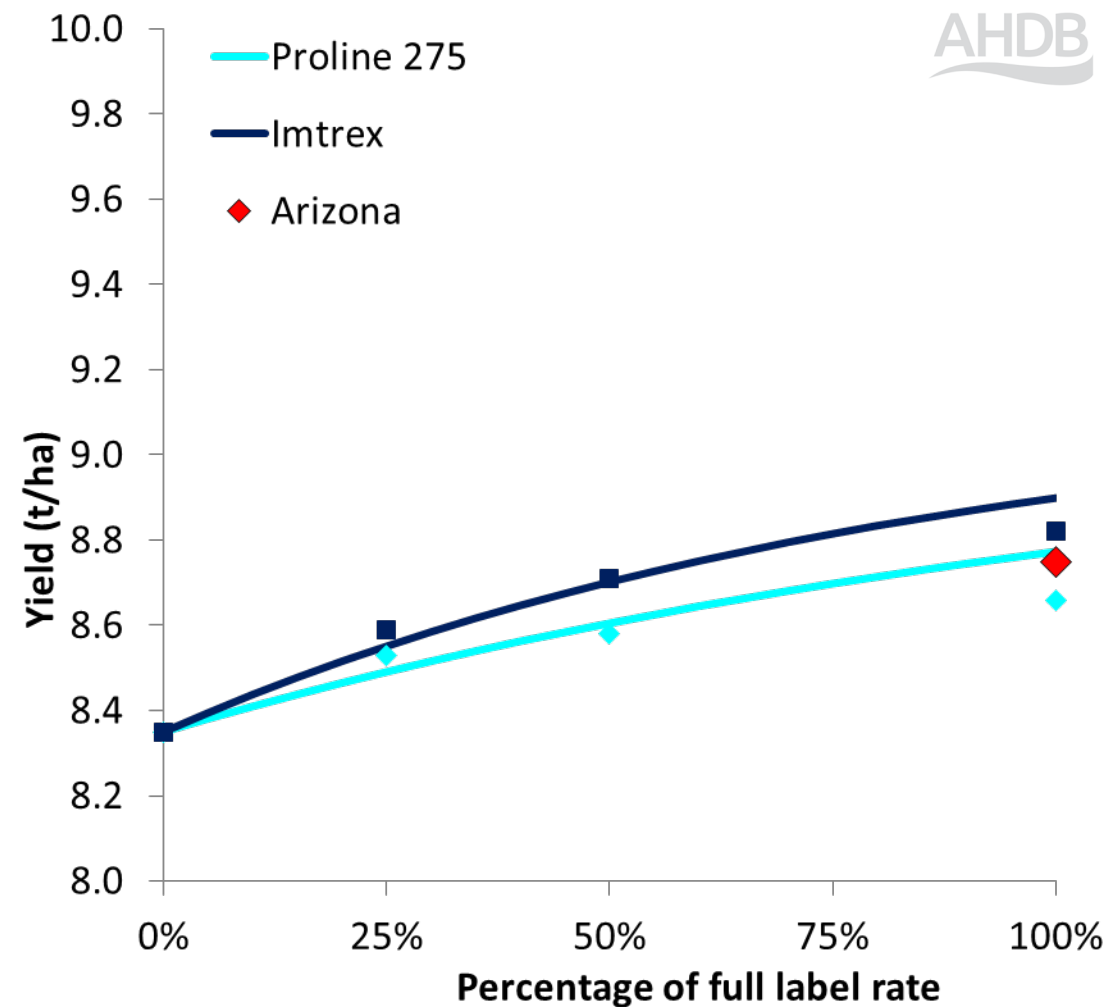
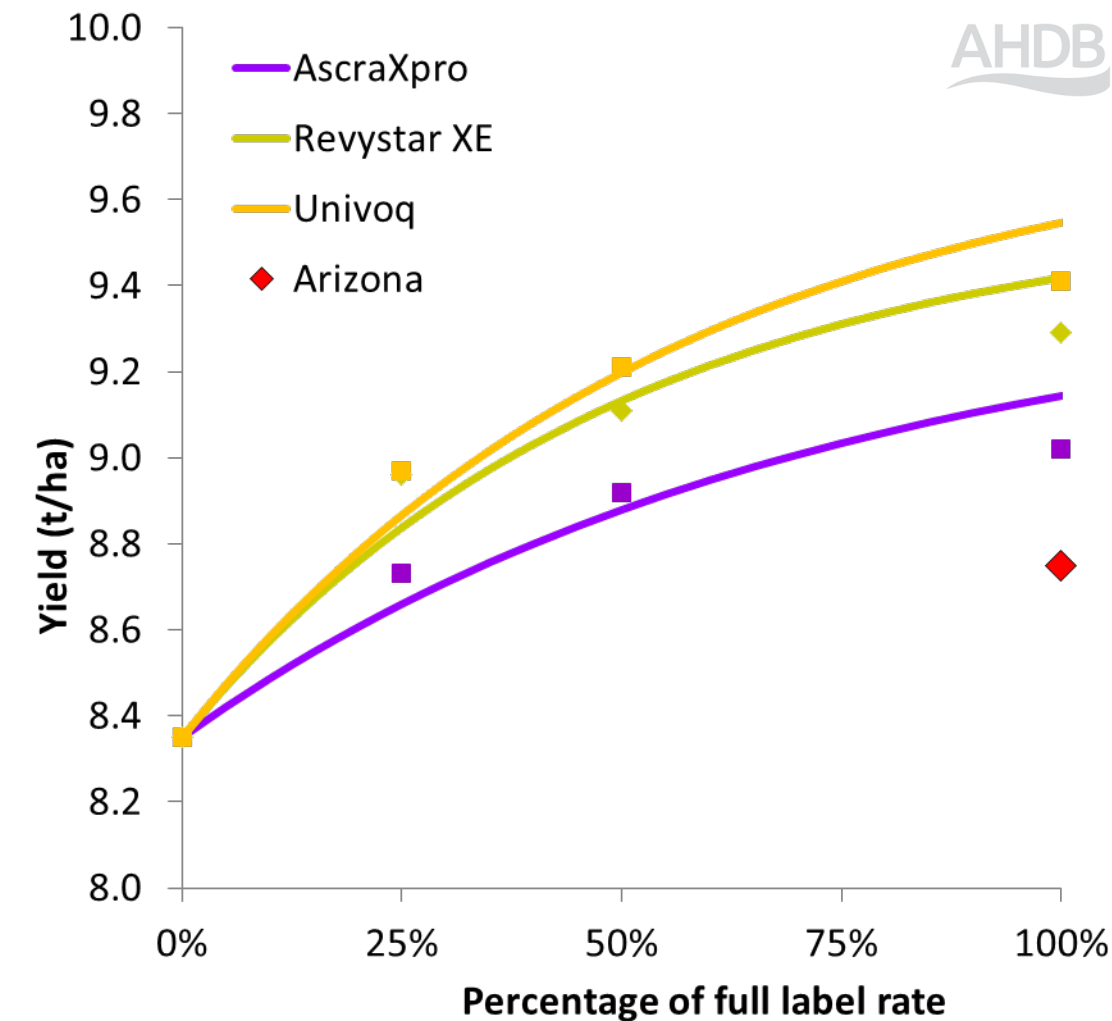
Use Imtrex only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Septoria eradicant 2019–21 (10 trials)



Use Imtrex only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

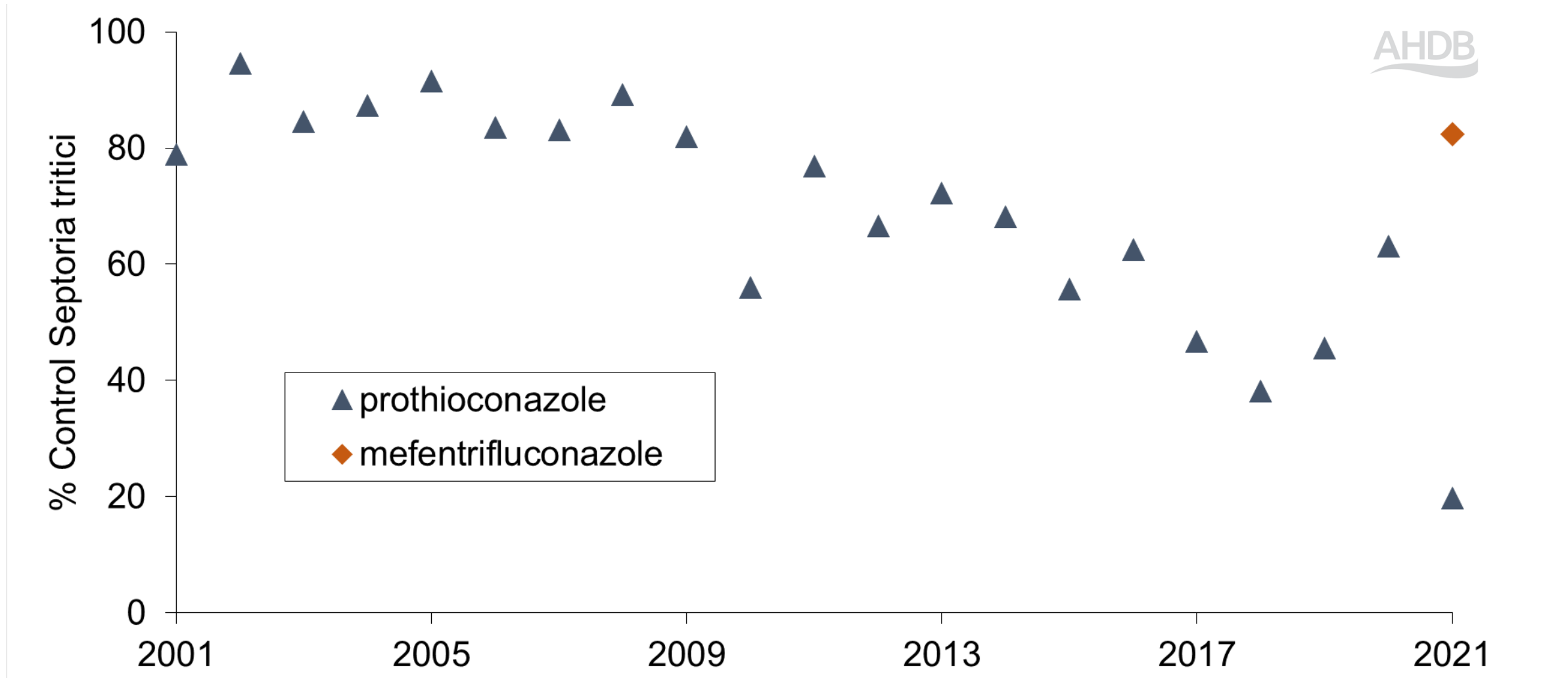
Septoria yield 2019–21 (21 trials)



Use Imtrex only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

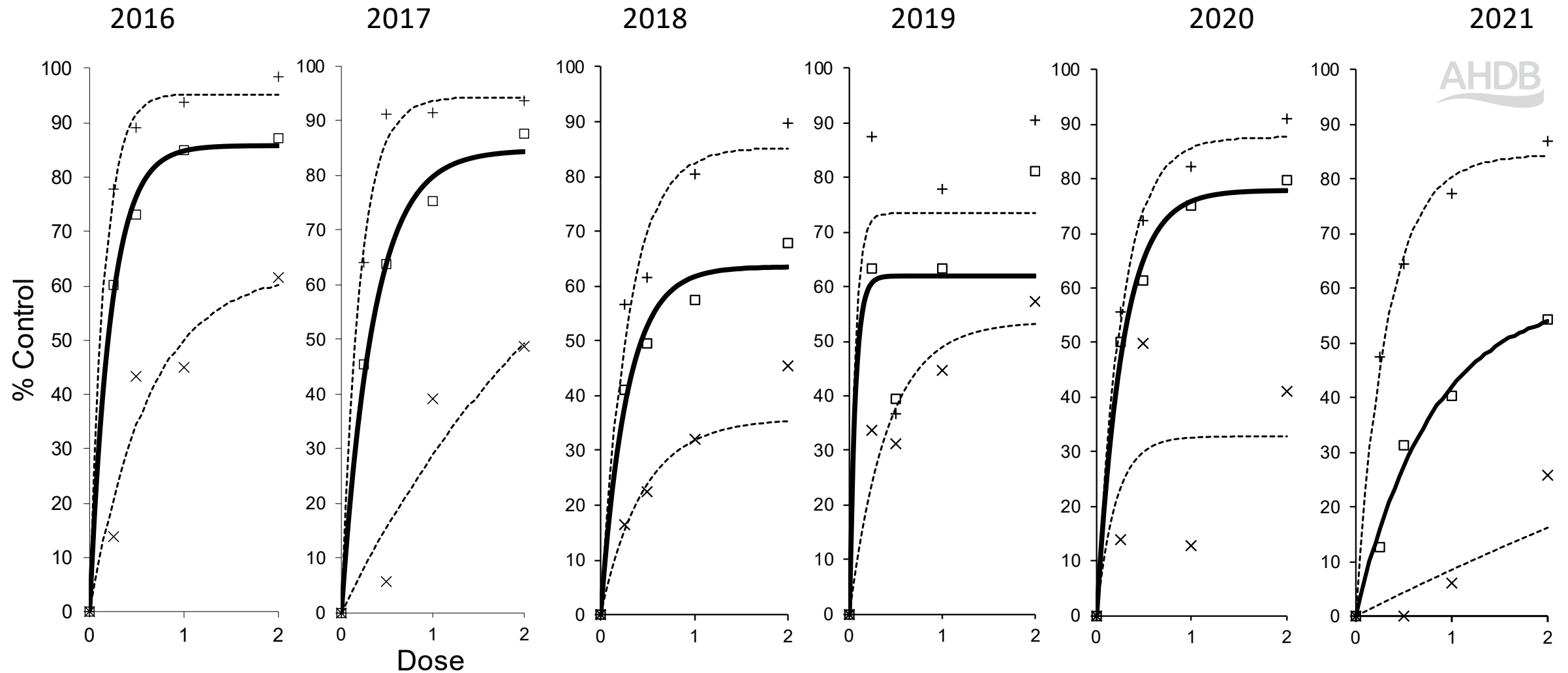
DMI (azole) septoria field activity (2001–21)

Mean control (%) achieved by a full dose in each season

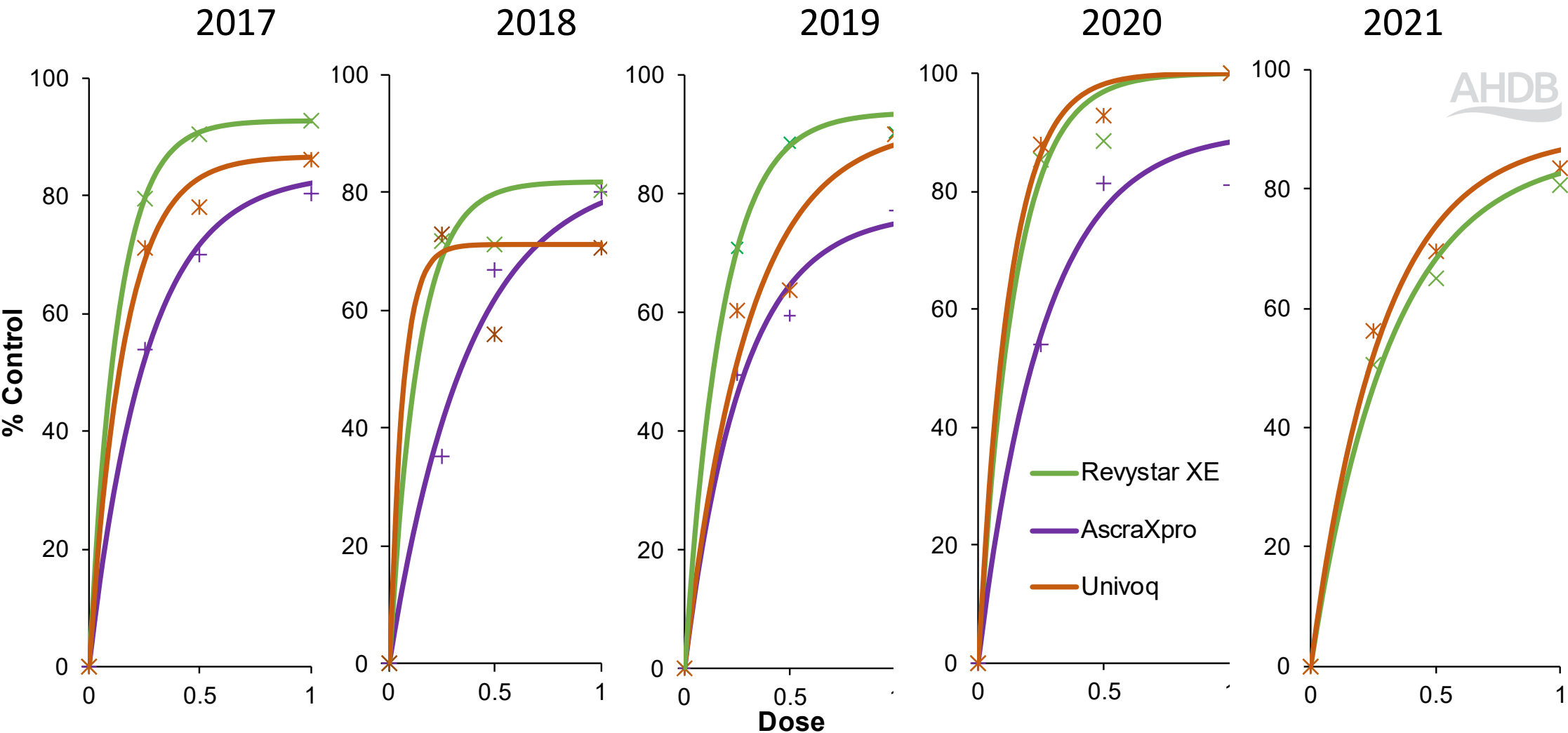


SDHI septoria activity (2016–21)

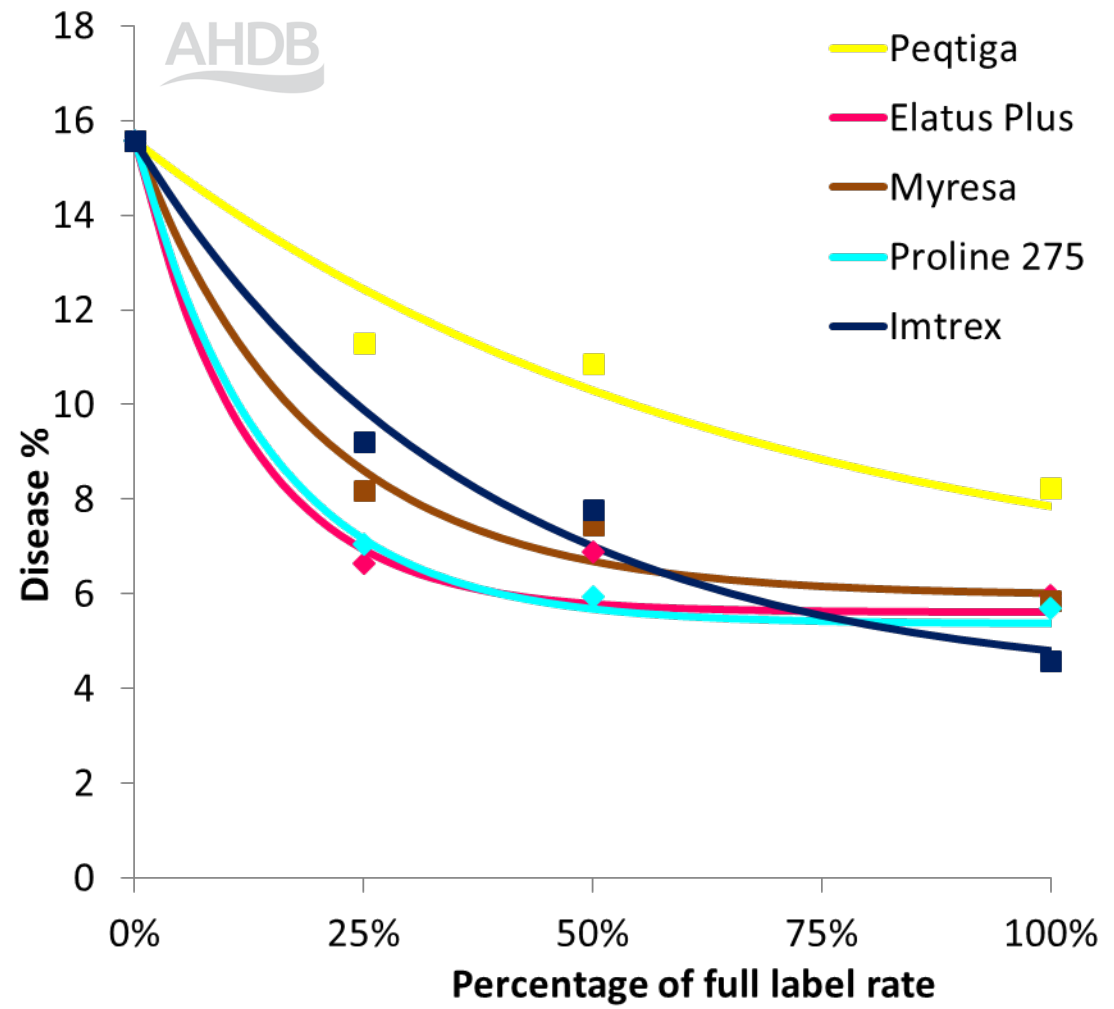
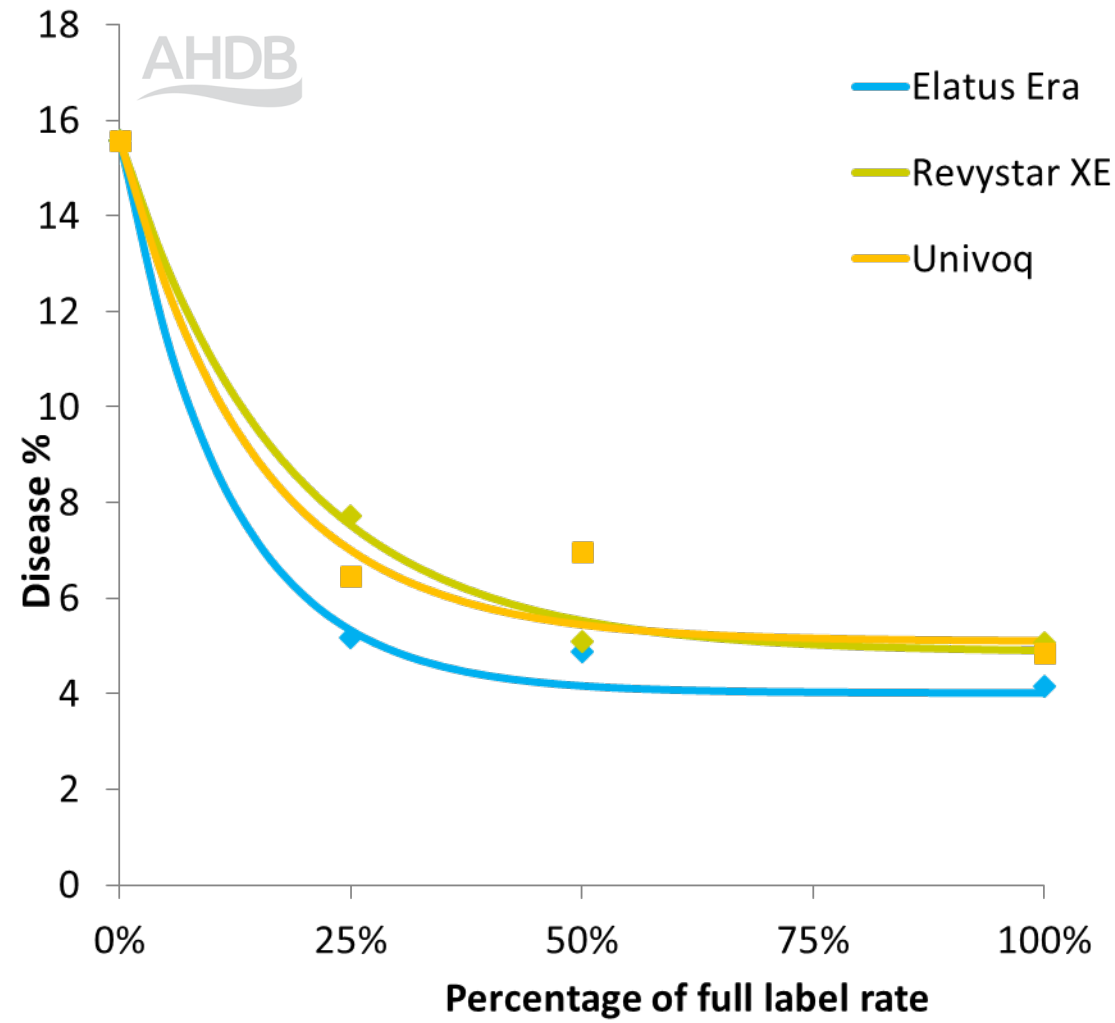
Intrex (fluxapyroxad) control (%)



SDHI/azole and QII/azole efficacy on septoria (2017–21)

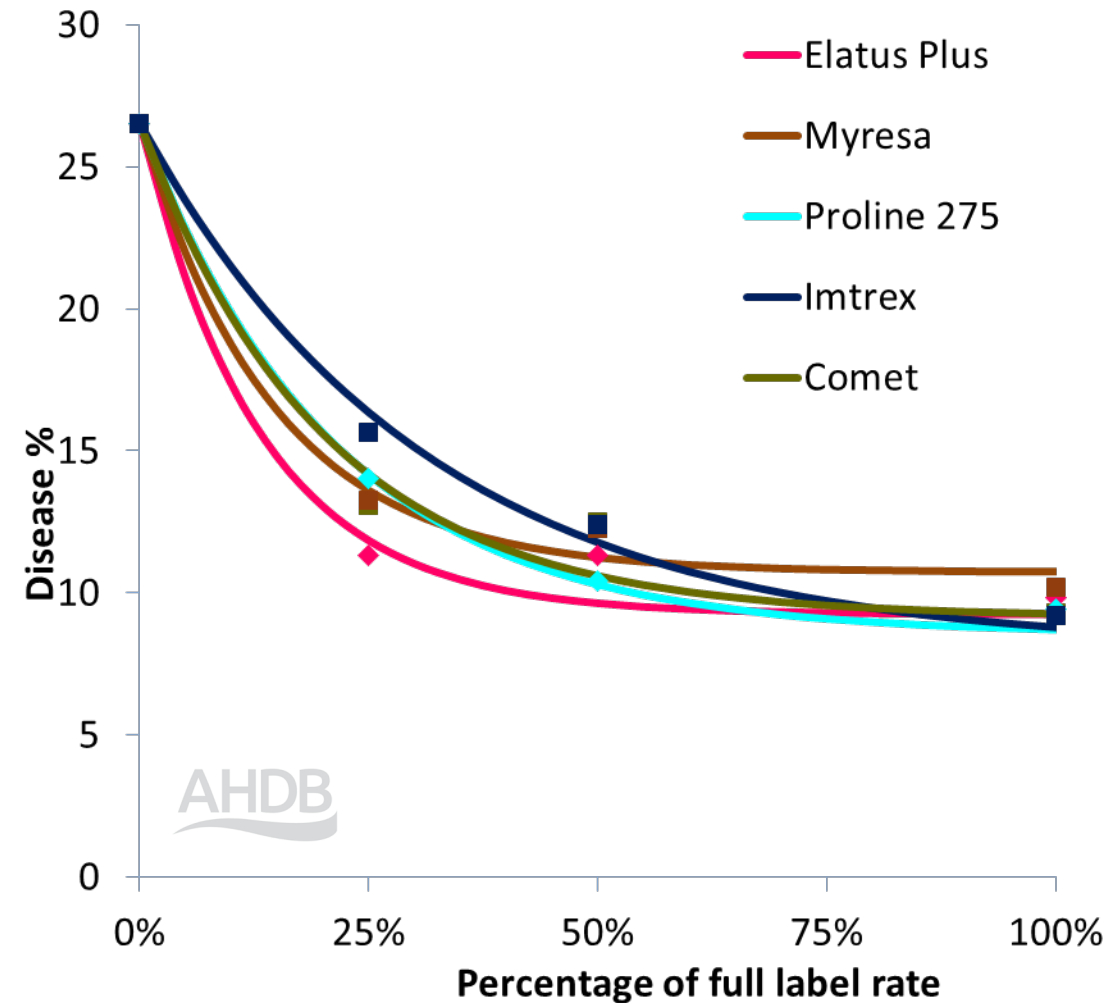
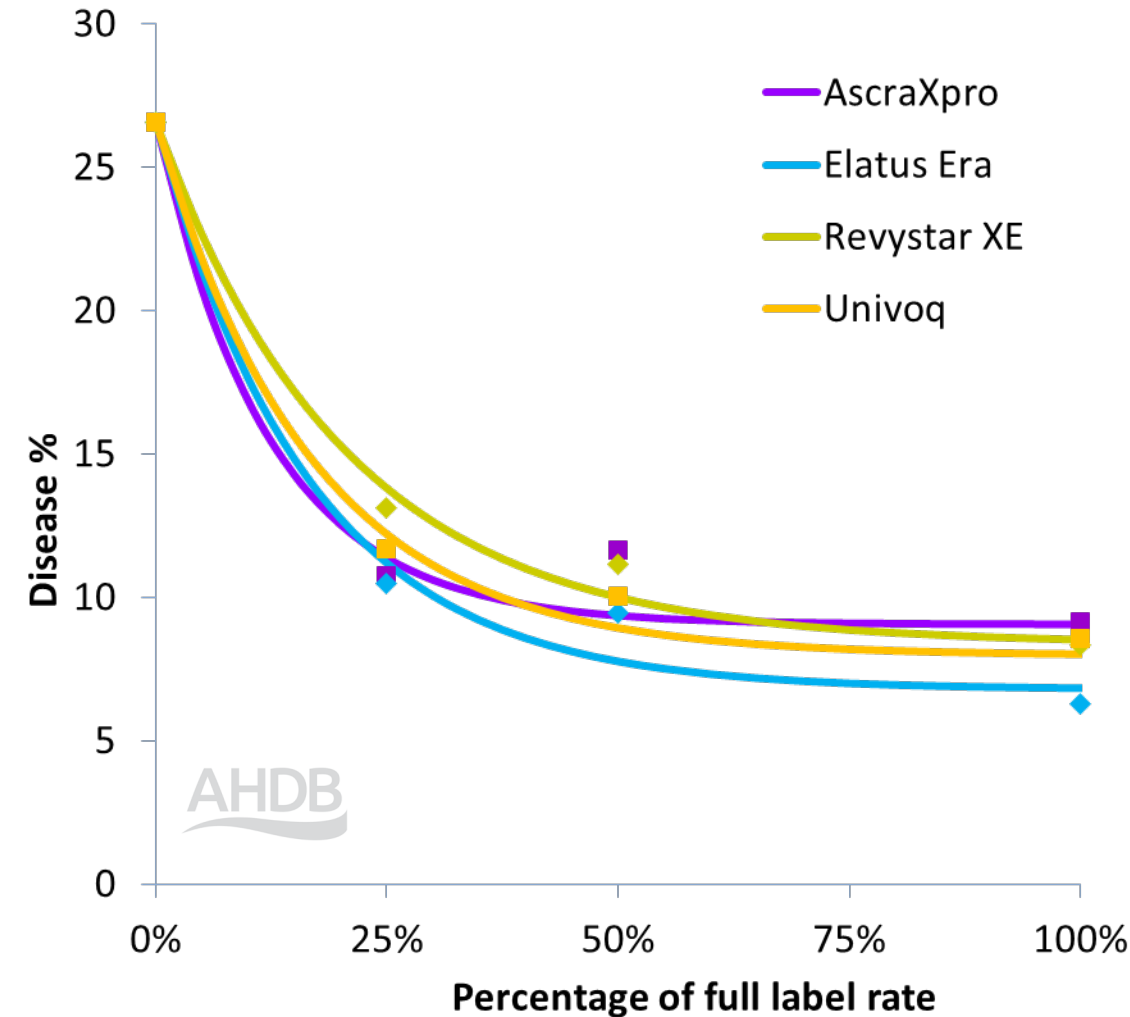


Yellow rust 2021



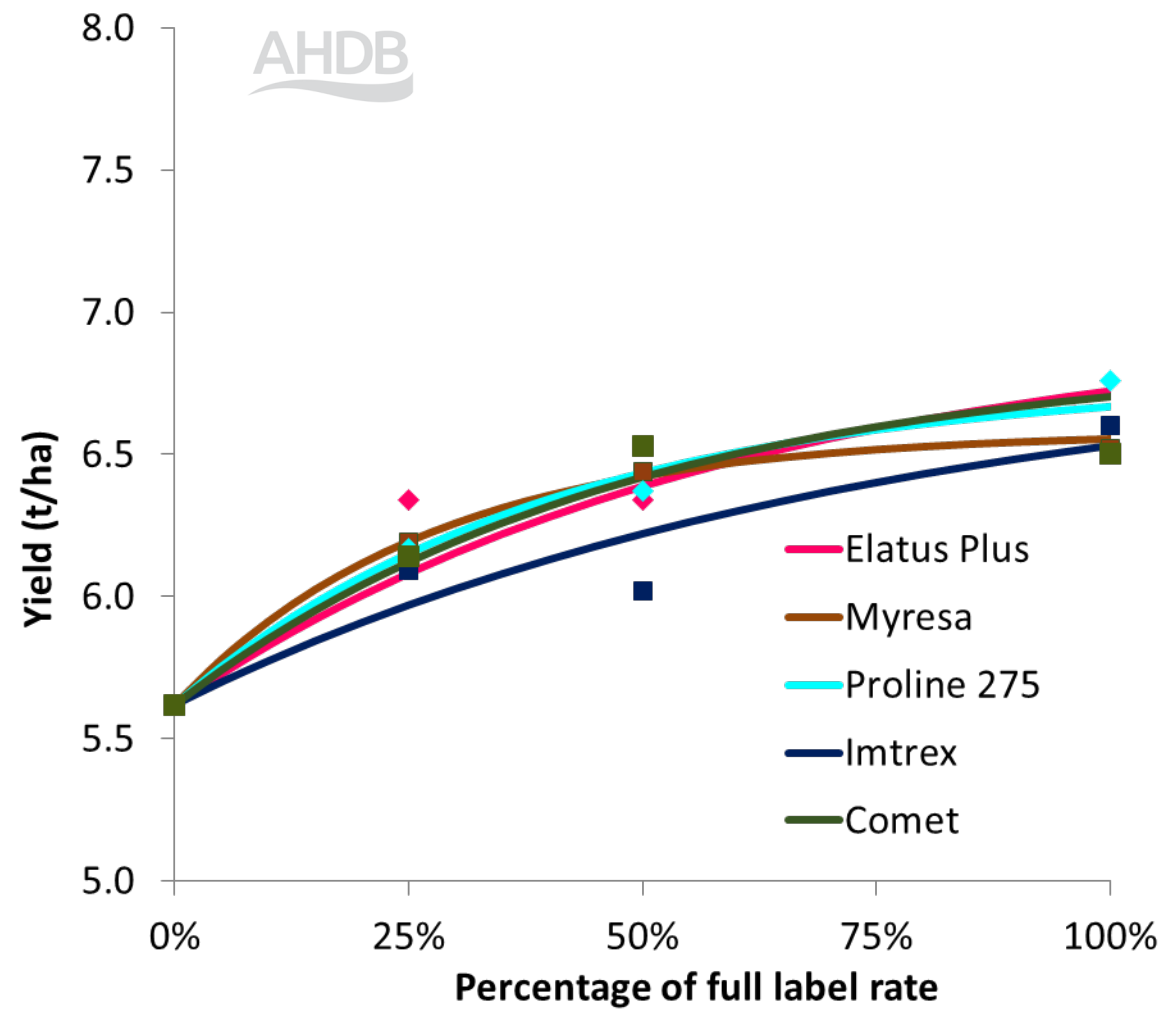
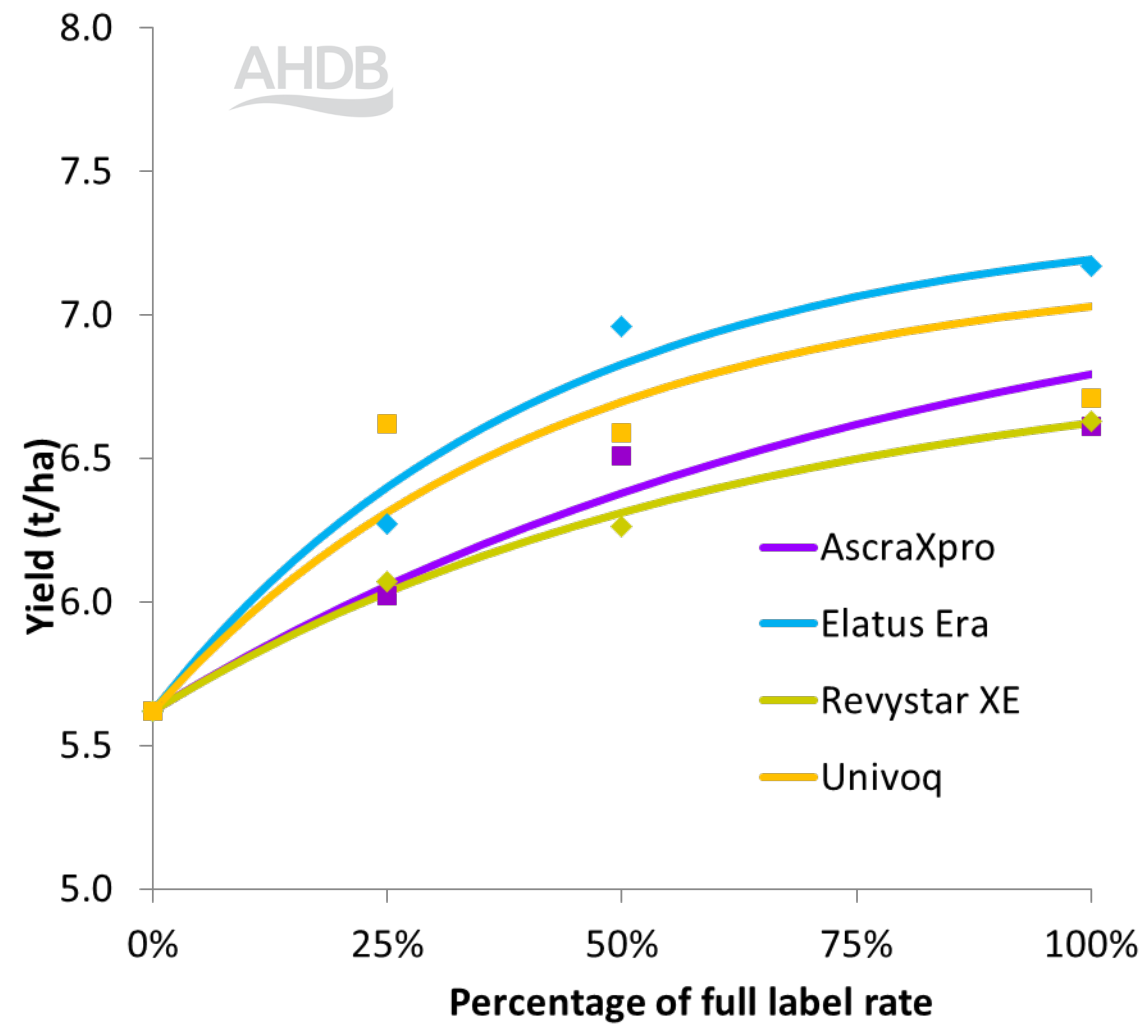
Use Imtrex, Myresa and Peqtiga only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Yellow rust 2019–21 (3 trials)



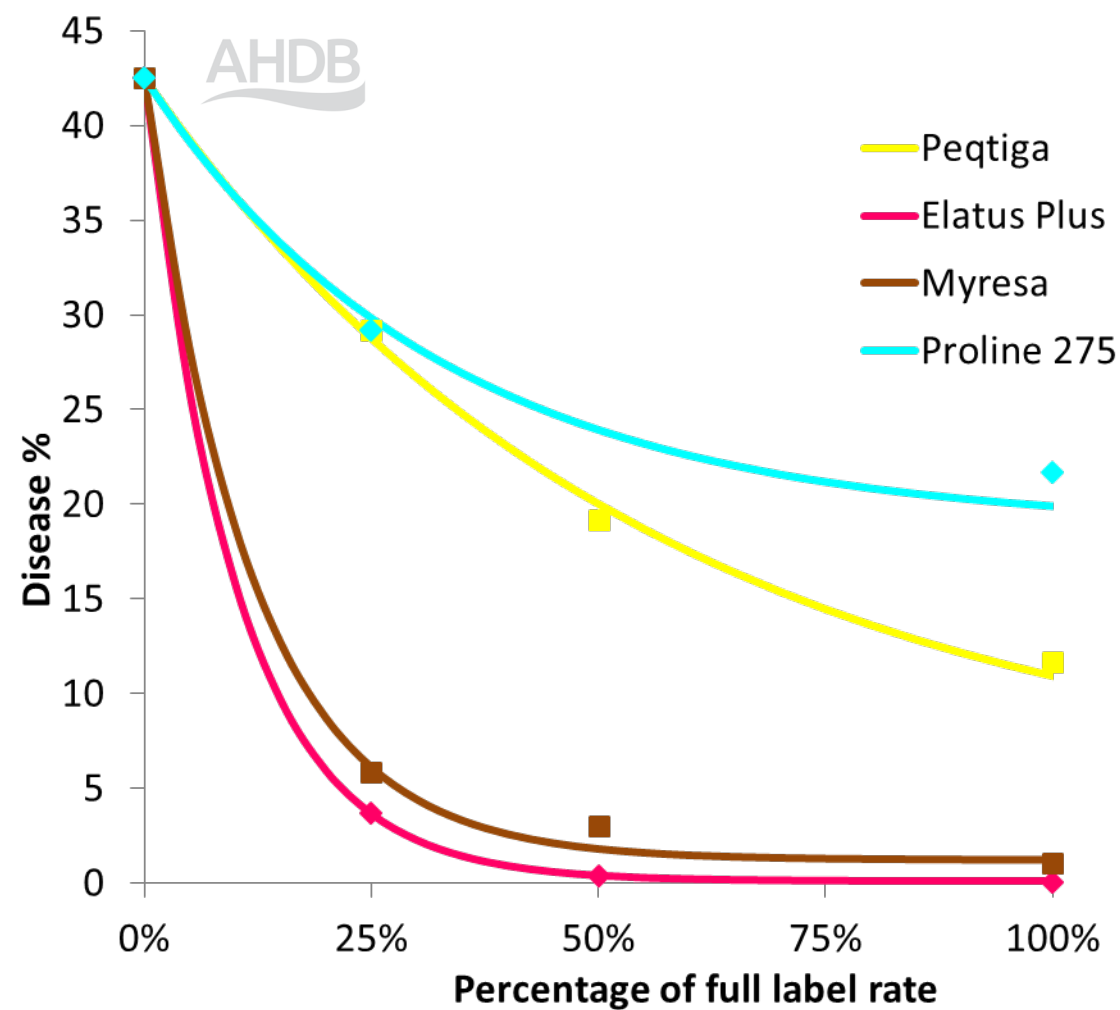
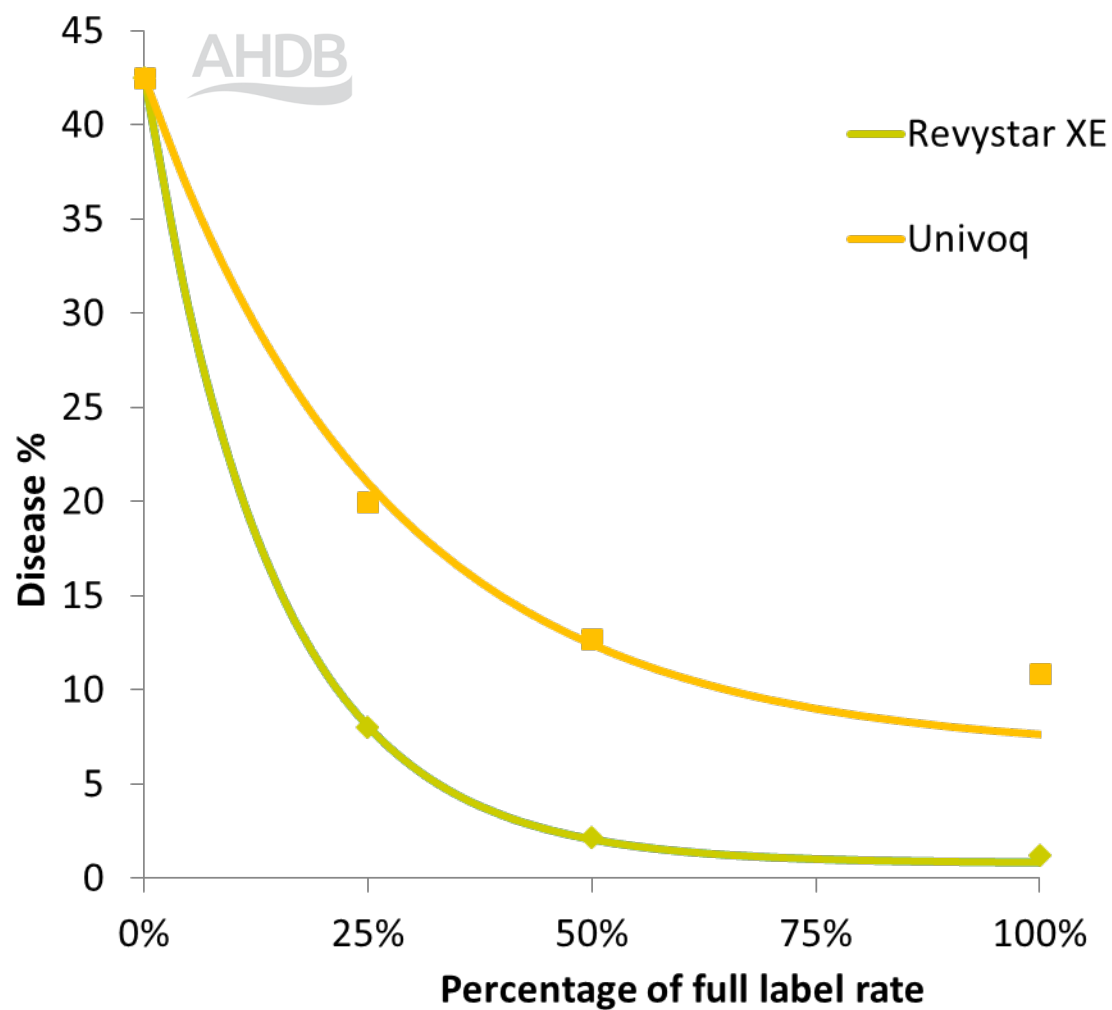
Use Imtrex and Myresa only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Yellow rust yield 2019–21 (3 trials)



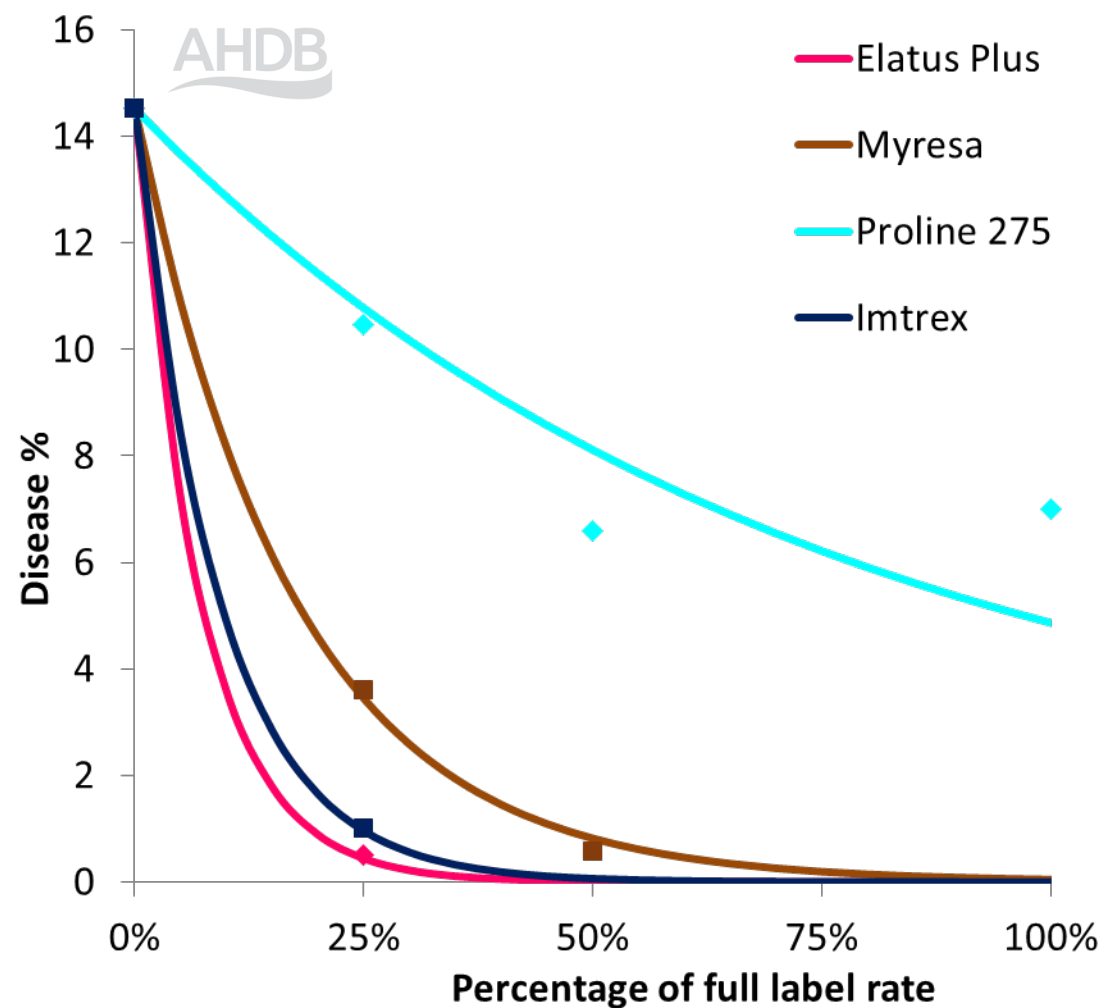
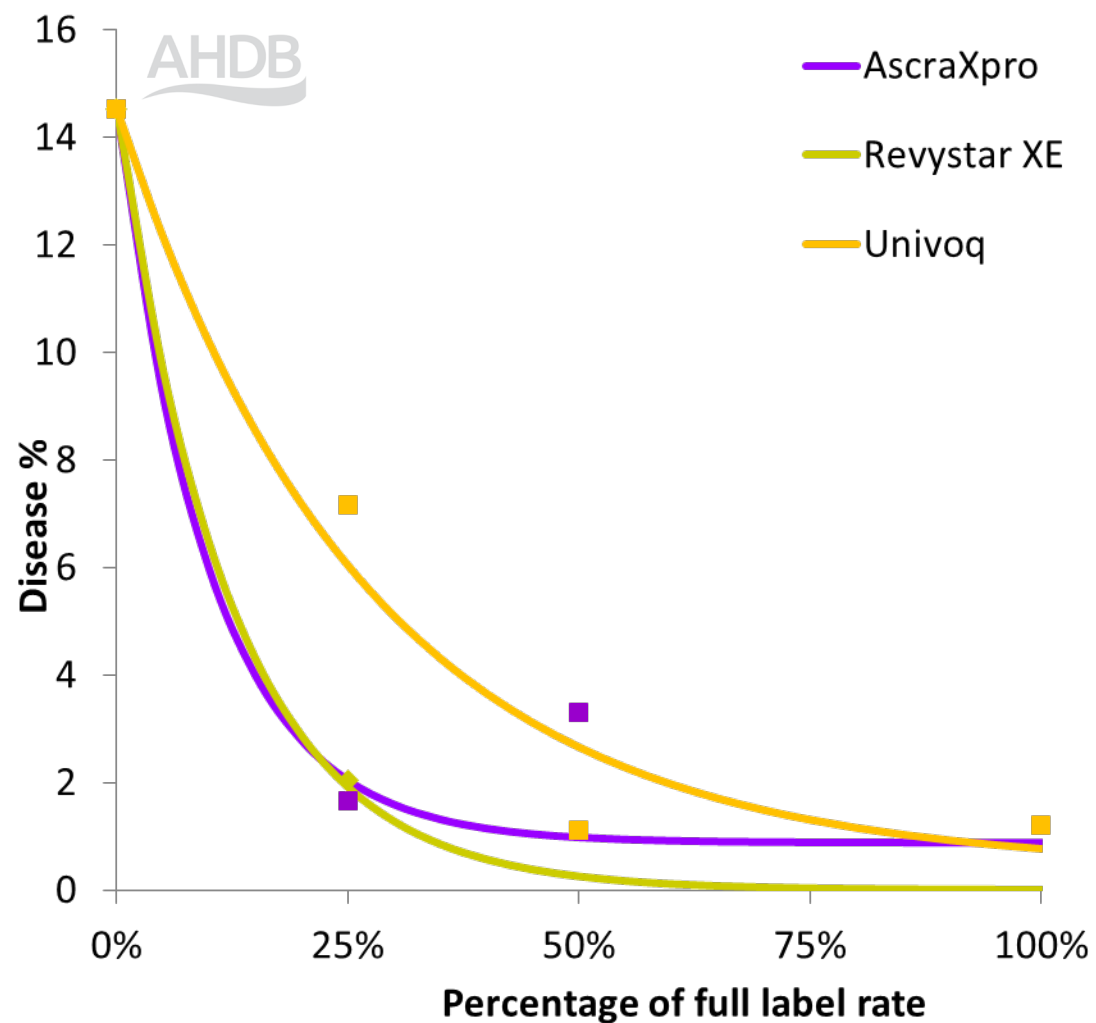
Use Imtrex and Myresa only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Brown rust 2021



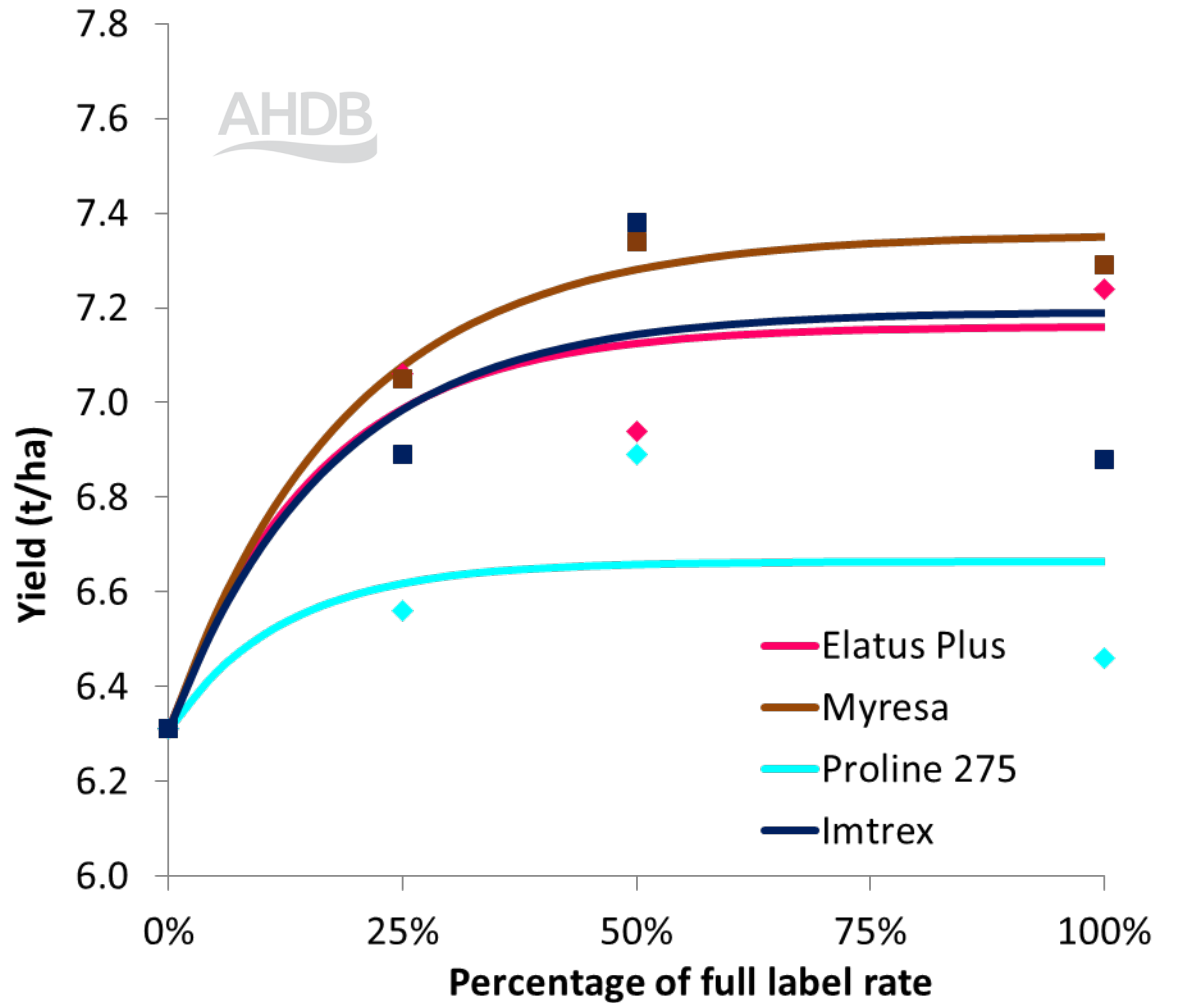
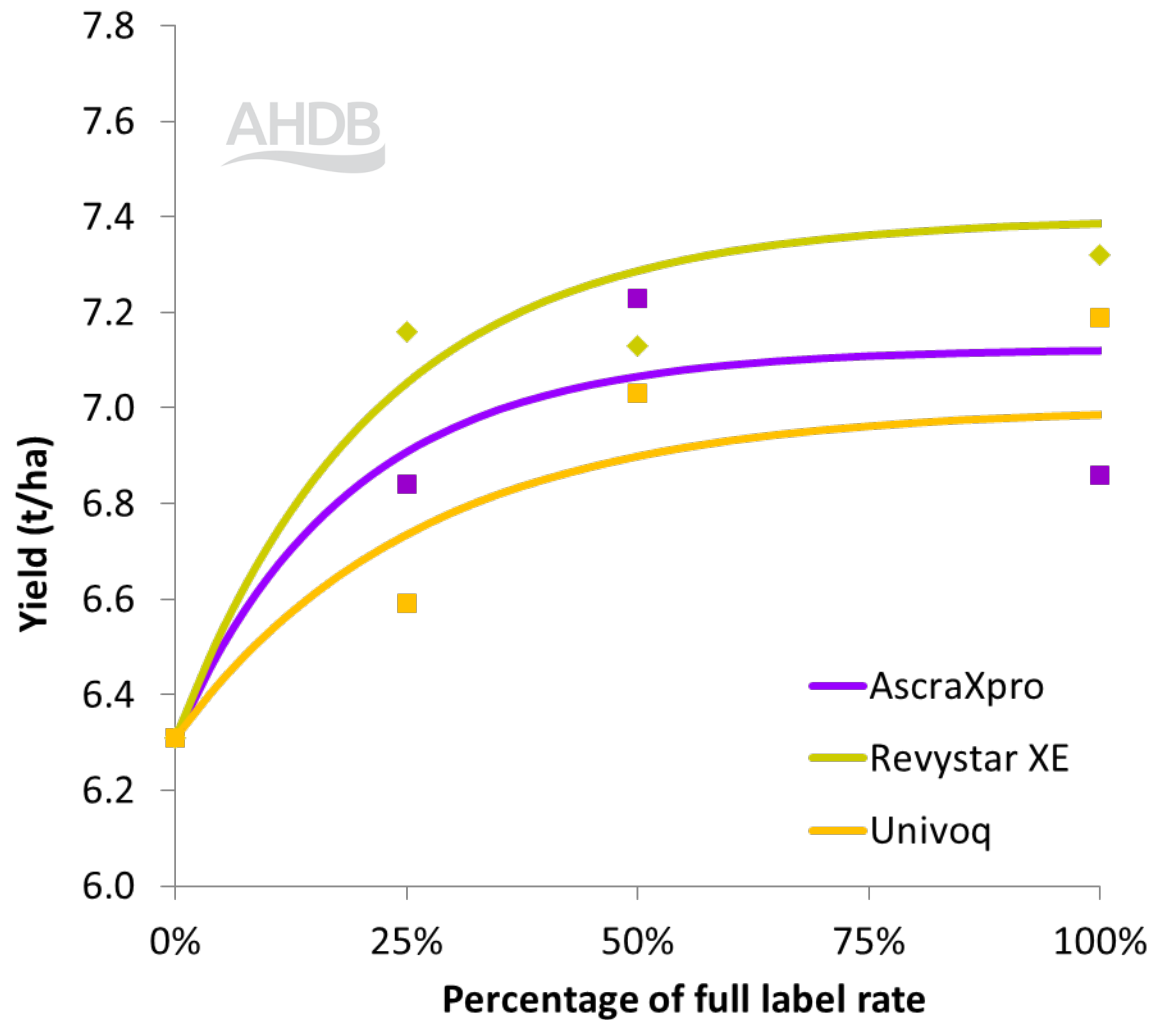
Use Imtrex, Myresa and Peqtiga only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Brown rust 2019–21 (3 trials)



Use Imtrex and Myresa only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Brown rust yield 2019–21 (3 trials)



Use Imtrex and Myresa only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Wheat summary

- On septoria, Univoq and Revystar XE showed the highest level of activity
- Field activity of current SDHIs on septoria has declined since 2017
- On yellow rust, Elatus Era was particularly effective but all mixtures performed well
- Mefentrifluconazole and SDHIs tested were highly active on brown rust, fenpicoxamid and prothioconazole added useful activity

Fungicide performance update for barley (2021)

Barley trial sites (2021)

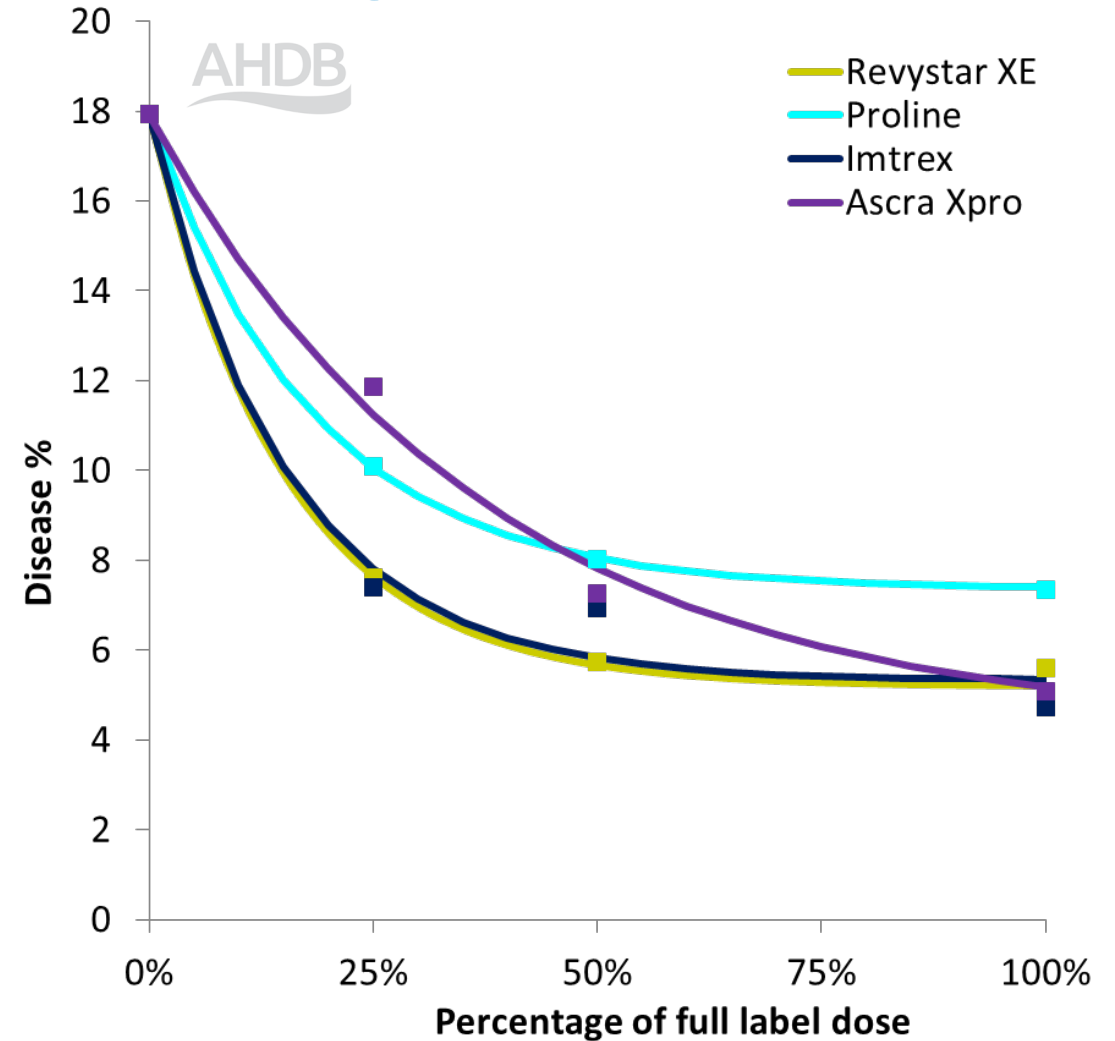
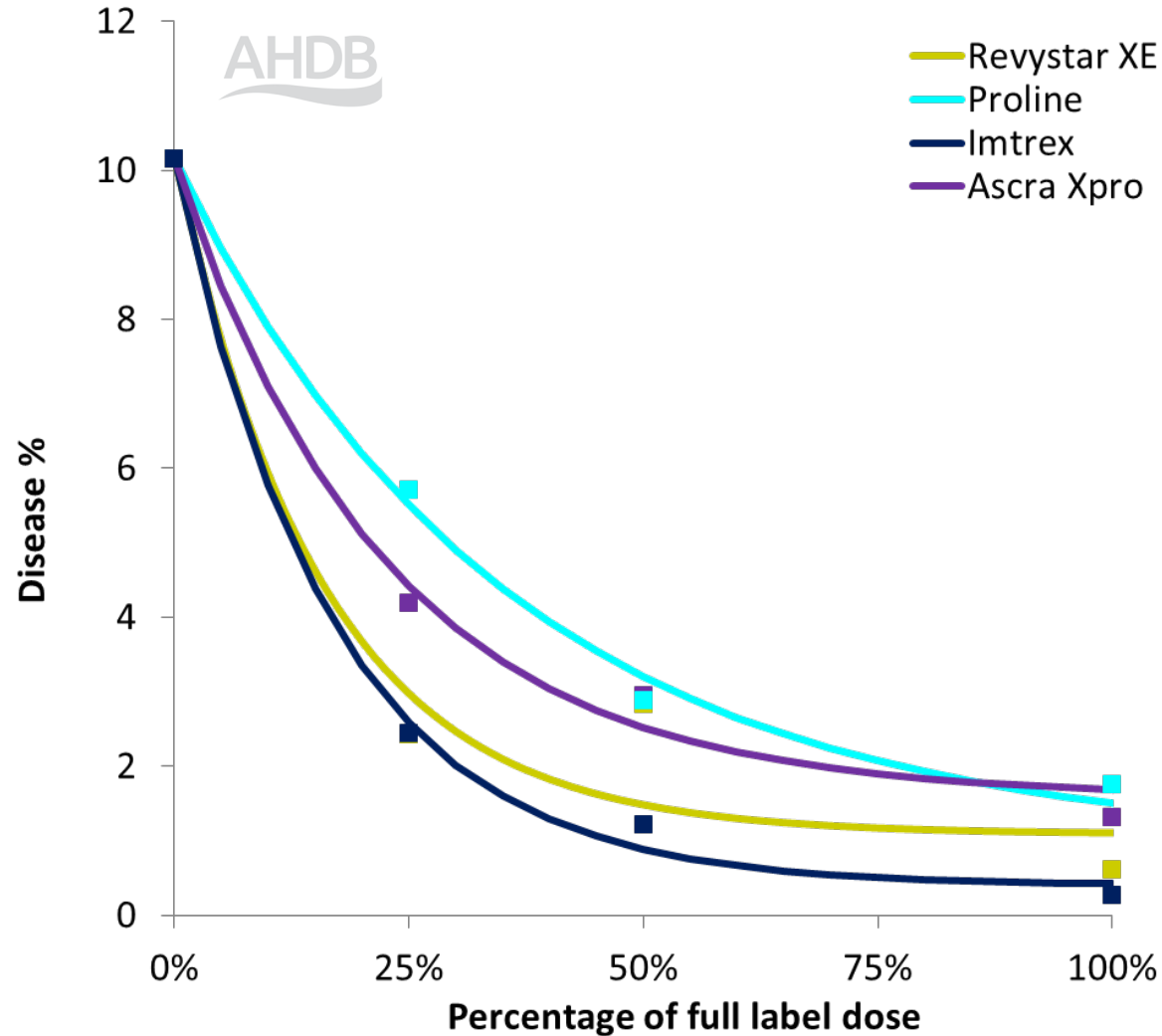
Trial site		Target disease
1	Lanark (T1)	Rhynchosporium
3	Cardigan (T1)	Rhynchosporium
4	High Mowthorpe (T2)	Net blotch
5	Morley (T2)	Net blotch
6a	Midlothian (T2)	Ramularia
6b	Midlothian (T2)	Ramularia
7	Carlow (T1.5)	Rhynchosporium
8	Carlow (T2)	Ramularia

Recently registered products in barley

- Ascra Xpro (Bayer CropScience Limited)
- Full label dose: 1.2 L/ha
- Total dose per crop: 1.2 L/ha
- 65 g/L bixafen, 65 g/L fluopyram and 130 g/L prothioconazole
- Up to the beginning of flowering

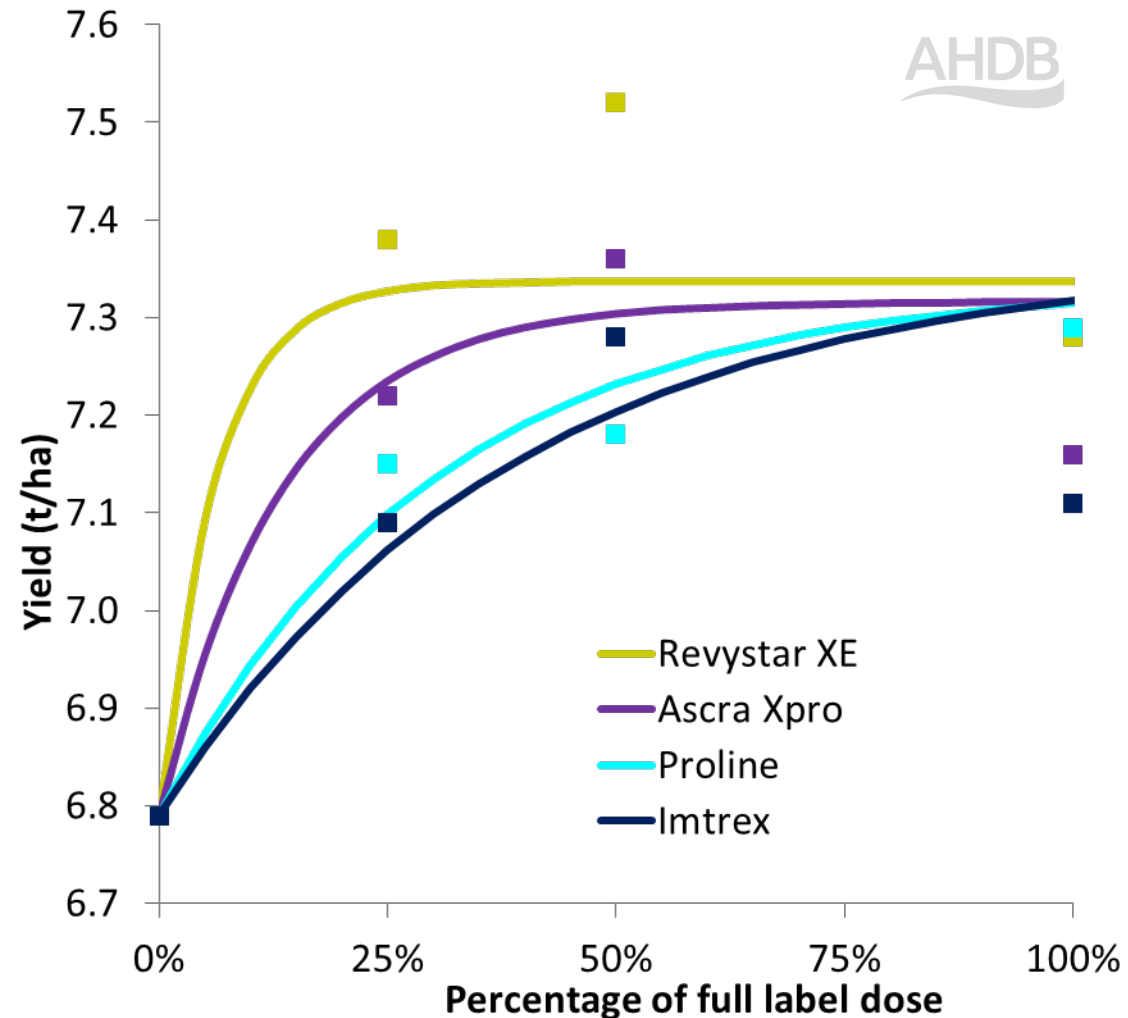
Rhynchosporium (2021)

Protectant (left) and eradicator (right)



Use Imtrex only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

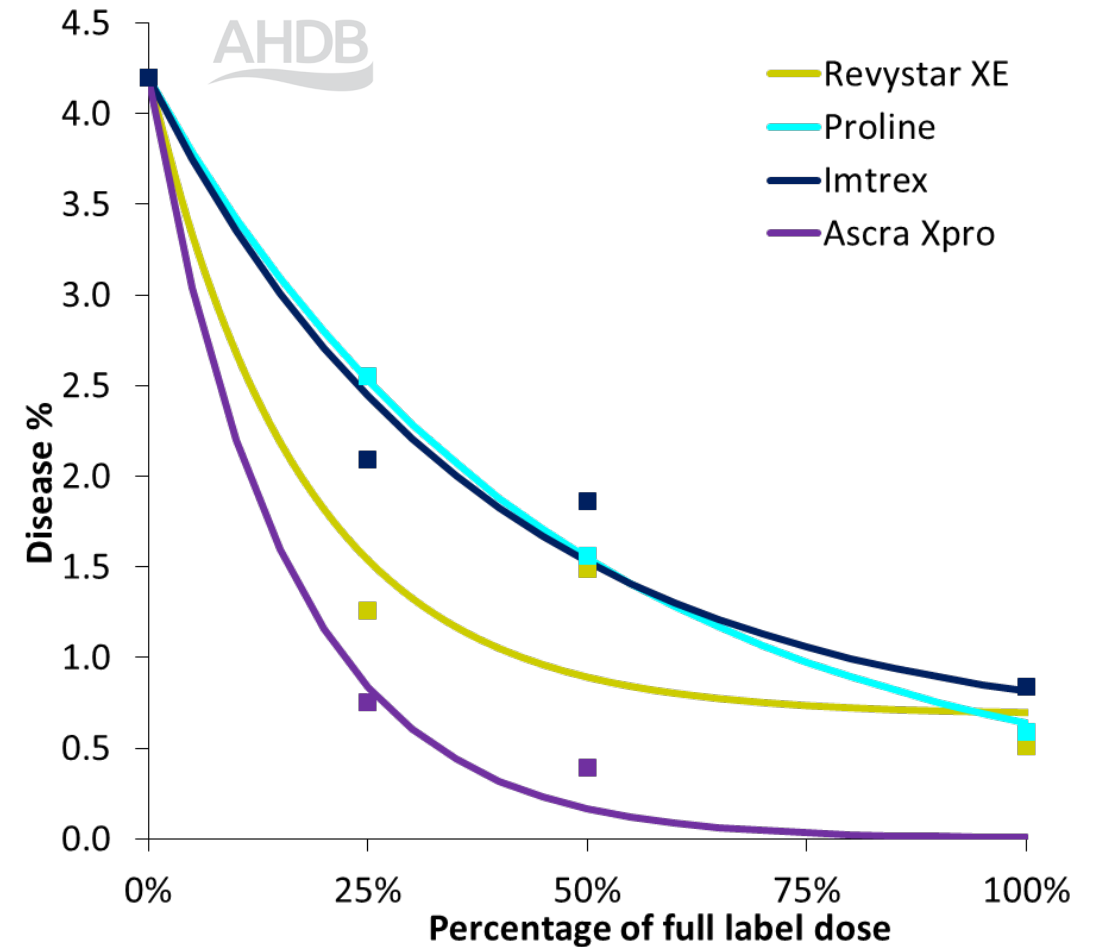
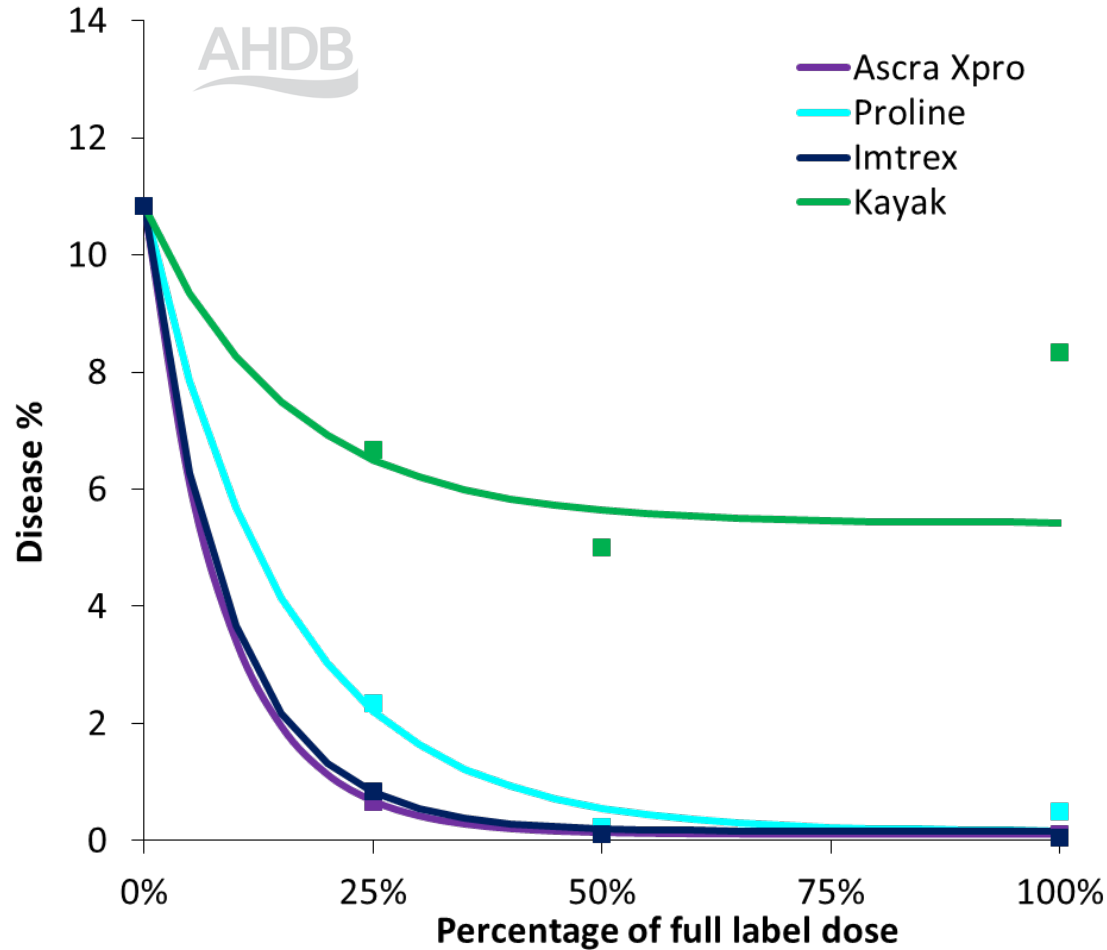
Rhynchosporium yield 2019–21 (8 trials)



Use Imtrex only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

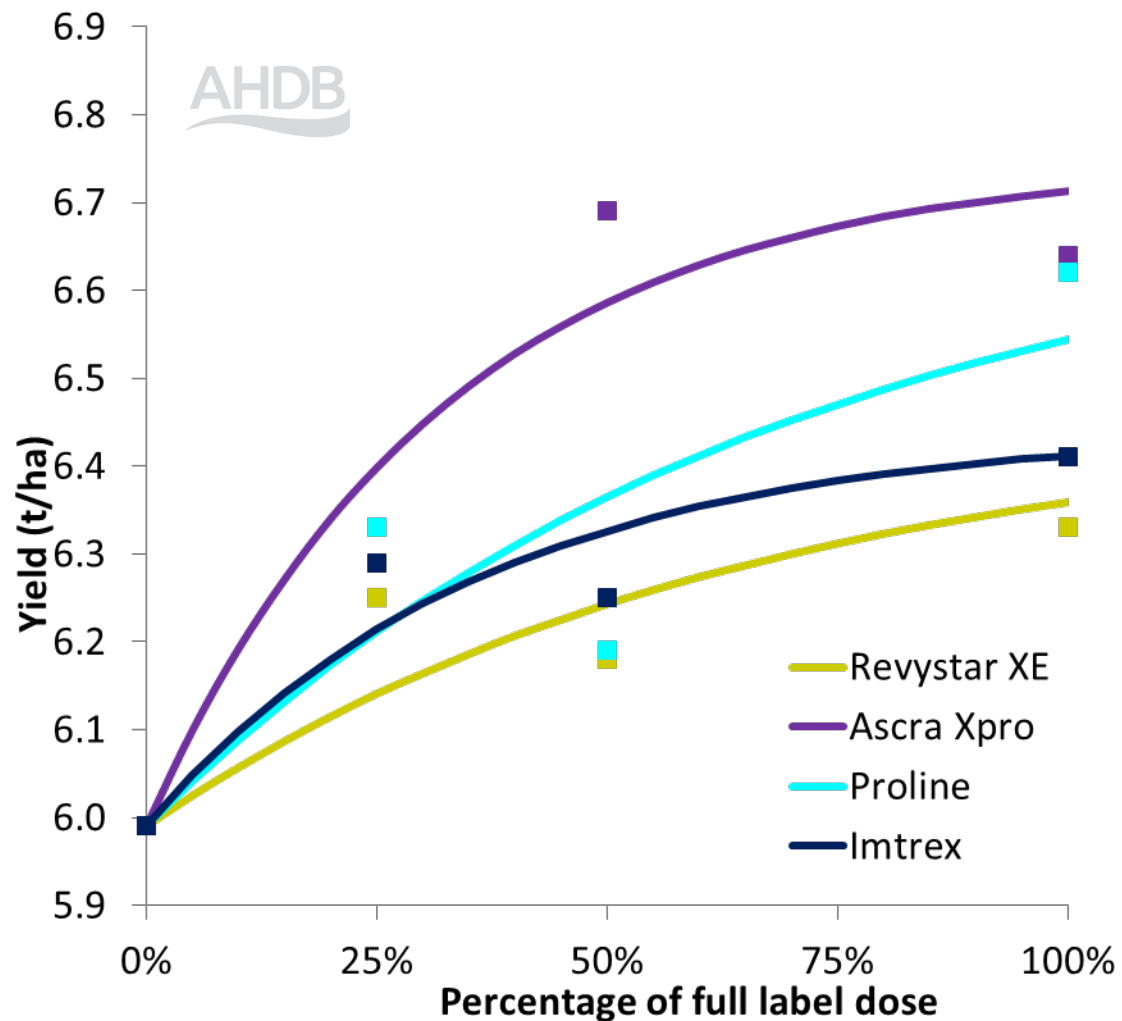
Net blotch (2019–21)

Protectant (left, 1 trial, 2019) and eradicator (right, 3 trials)



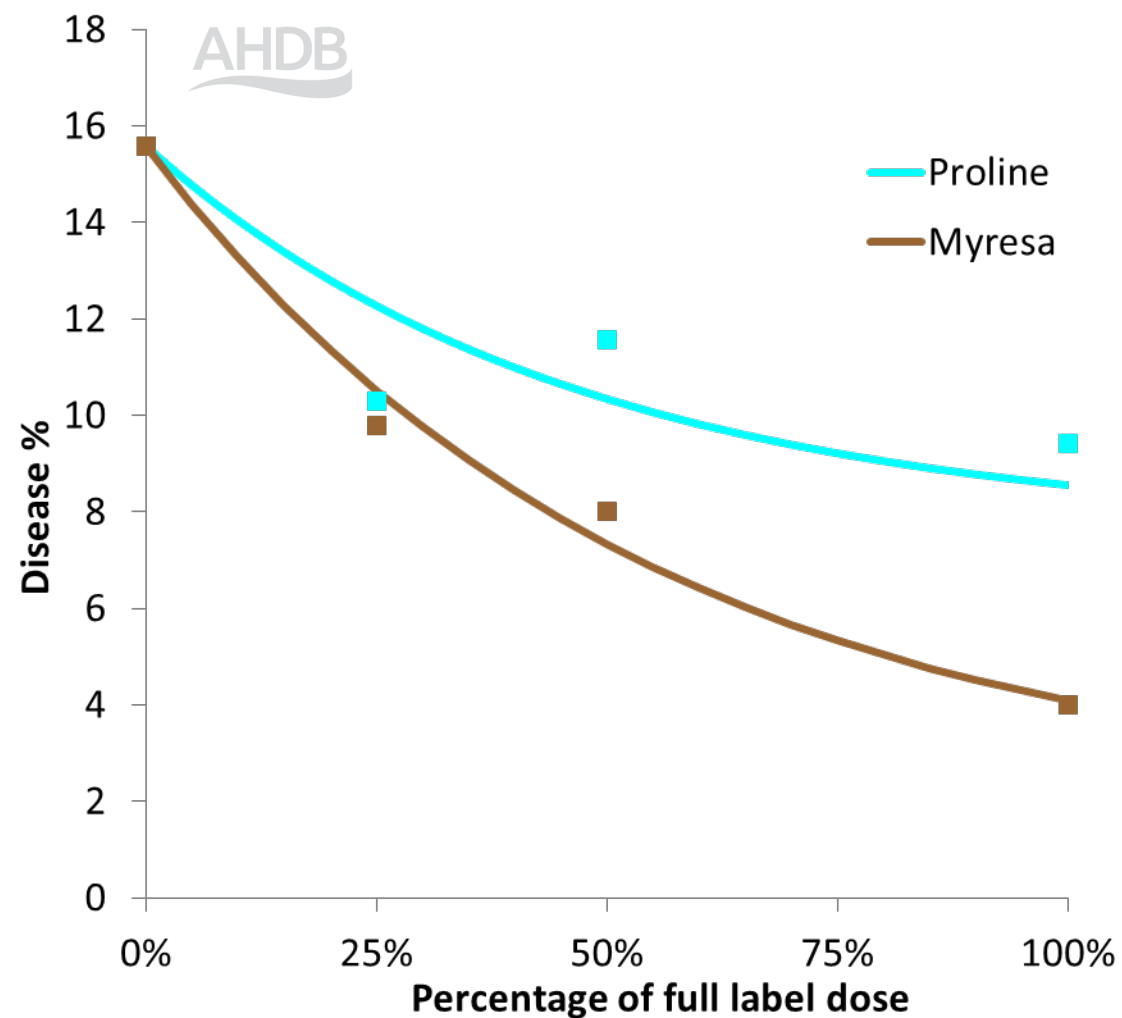
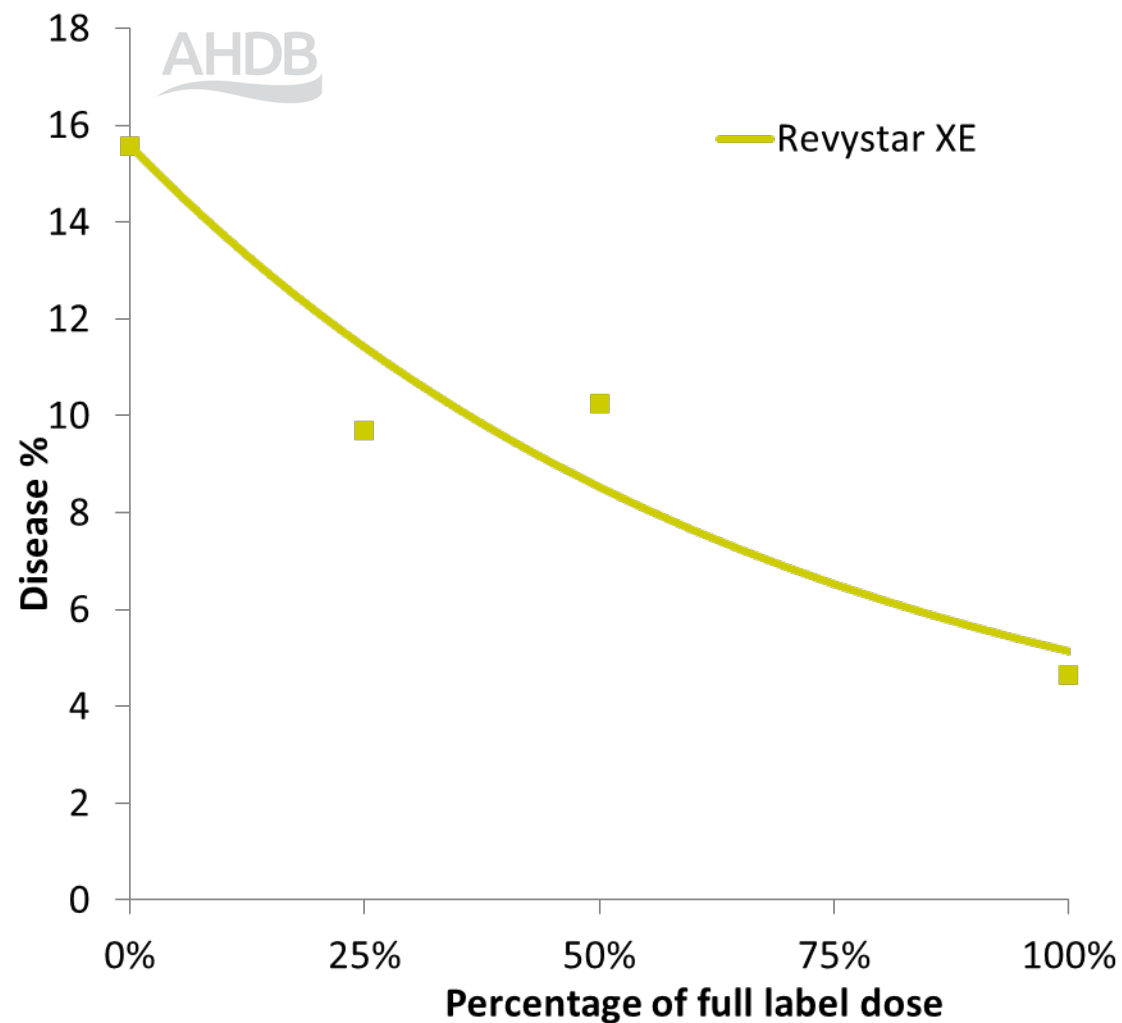
Use Imtrex only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Net blotch yield 2019–21 (6 trials)



Use Imtrex only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Ramularia protectant 2021 (4 trials)



Use Myresa only in mixtures with at least one fungicide with an alternative mode of action that has efficacy against the target disease

Barley summary

- All diseases were better controlled in protectant situations
- Prothioconazole and fluxapyroxad both effective at controlling rhynchosporium and net blotch
- Mefentrifluconazole adds efficacy on ramularia (in Revystar)
- SDHIs fluopyram and bixafen add useful activity on net blotch particularly (in Ascra Xpro)

Fungicide performance update for oilseed rape (2021)

Fungicide performance in oilseed rape

Trial site	Target disease	Variety
Herefordshire (ADAS)	Phoma stem canker	Flamingo
Norfolk (ADAS)	Phoma stem canker	Flamingo
North Yorkshire (ADAS)	Light leaf spot	DK Expedient
Midlothian (SRUC)	Light leaf spot	Campus

Oilseed rape products

Product	Active(s)
Proline	prothioconazole
Priori Gold*	azoxystrobin + difenoconazole
Aviator	bixafen + prothioconazole
Filan*	boscalid
Architect	mepiquat chloride, prohexadione calcium + pyraclostrobin
Shepherd	boscalid + pyraclostrobin
Plover	difenoconazole
Amistar	azoxystrobin
Pictor	dimoxystrobin + boscalid

*Products do not have a label recommendation for light leaf spot control but may be applied at the appropriate time, for the control of other diseases.

Recently registered products in oilseed rape



Shepherd (BASF)

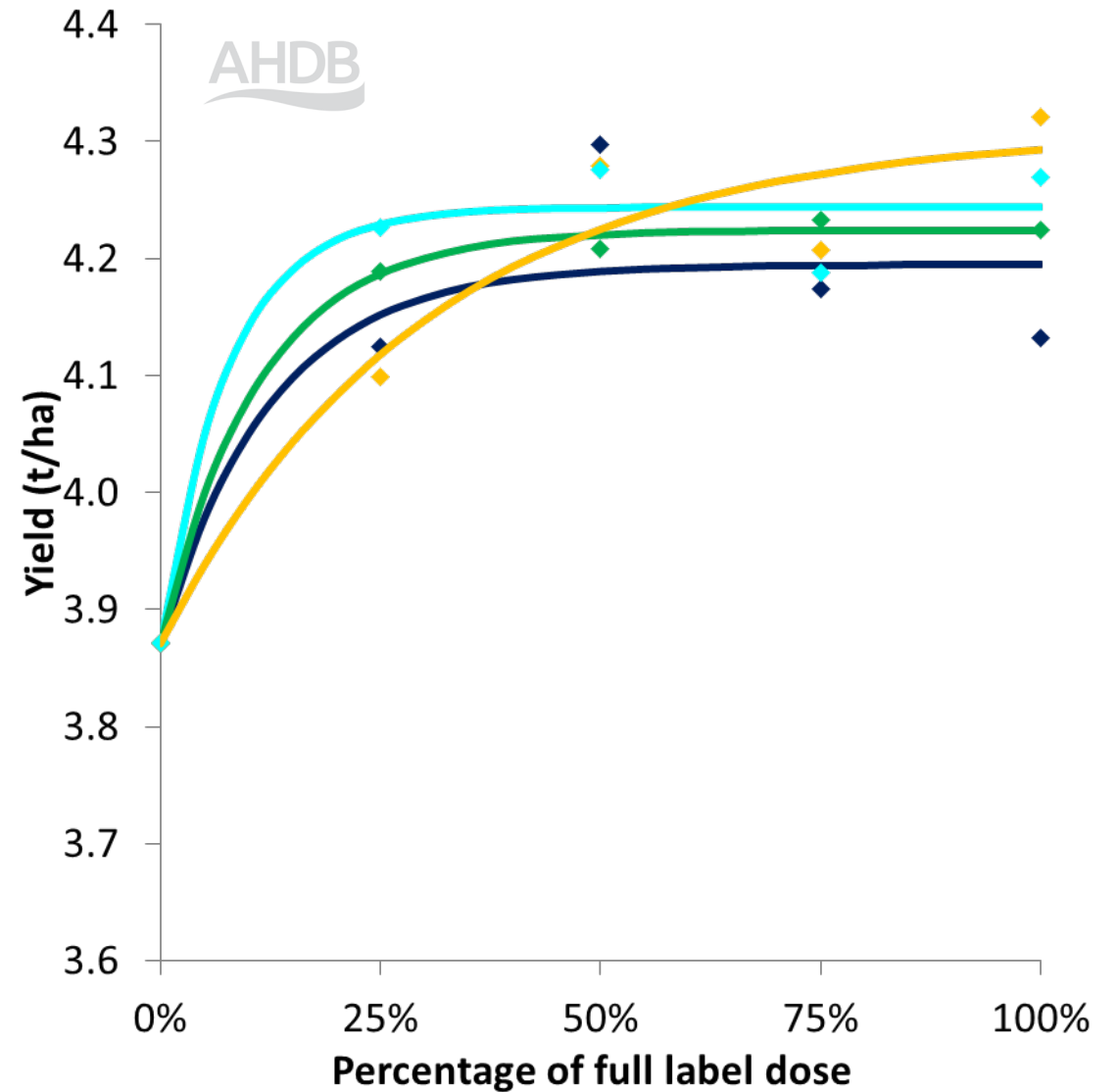
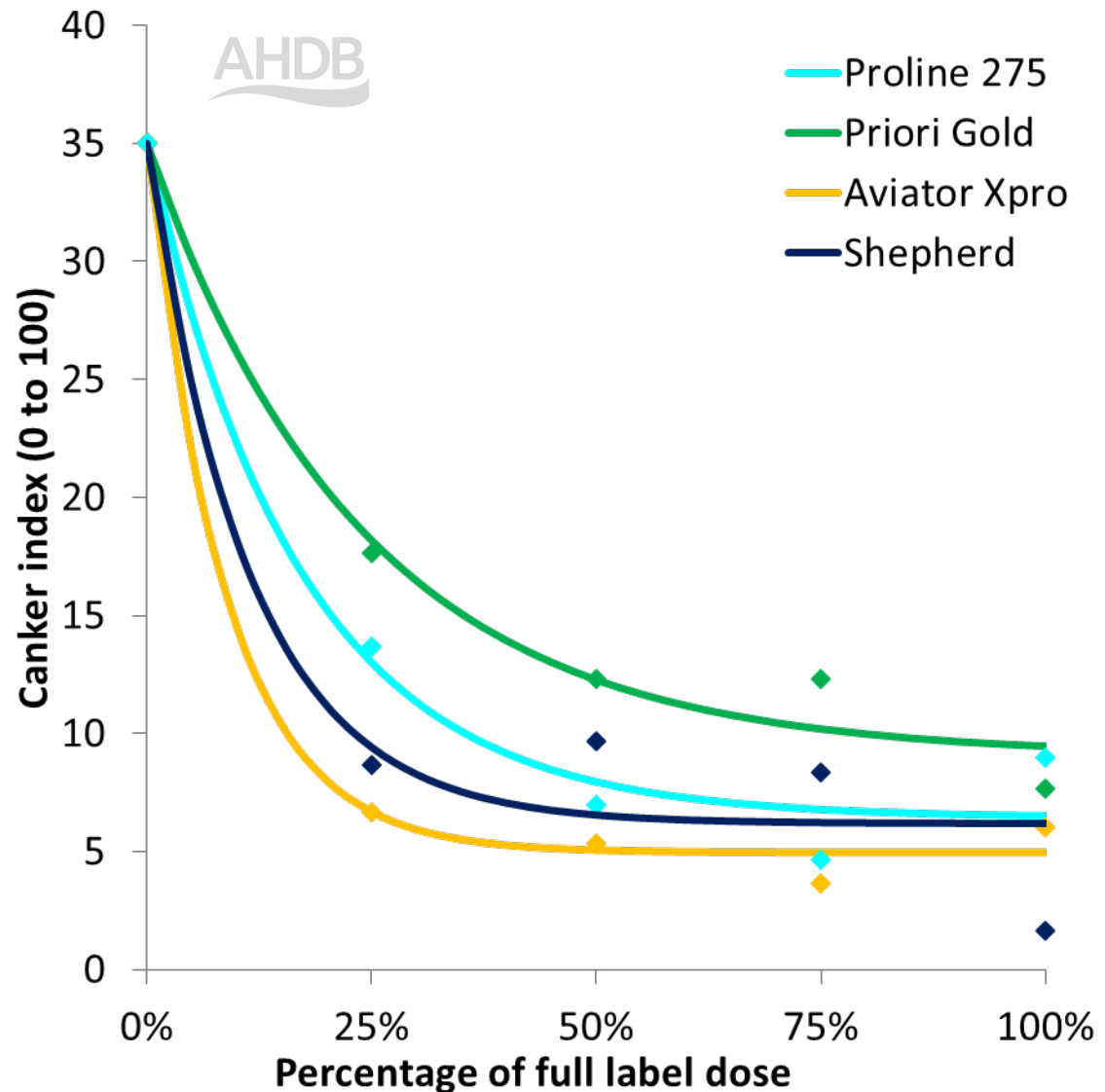
- Full label dose: 0.8 L/ha
- Total dose per crop: 0.8 L/ha
- 150 g/L boscalid + 250 g/L pyraclostrobin
- Autumn and spring use*

Architect (BASF)

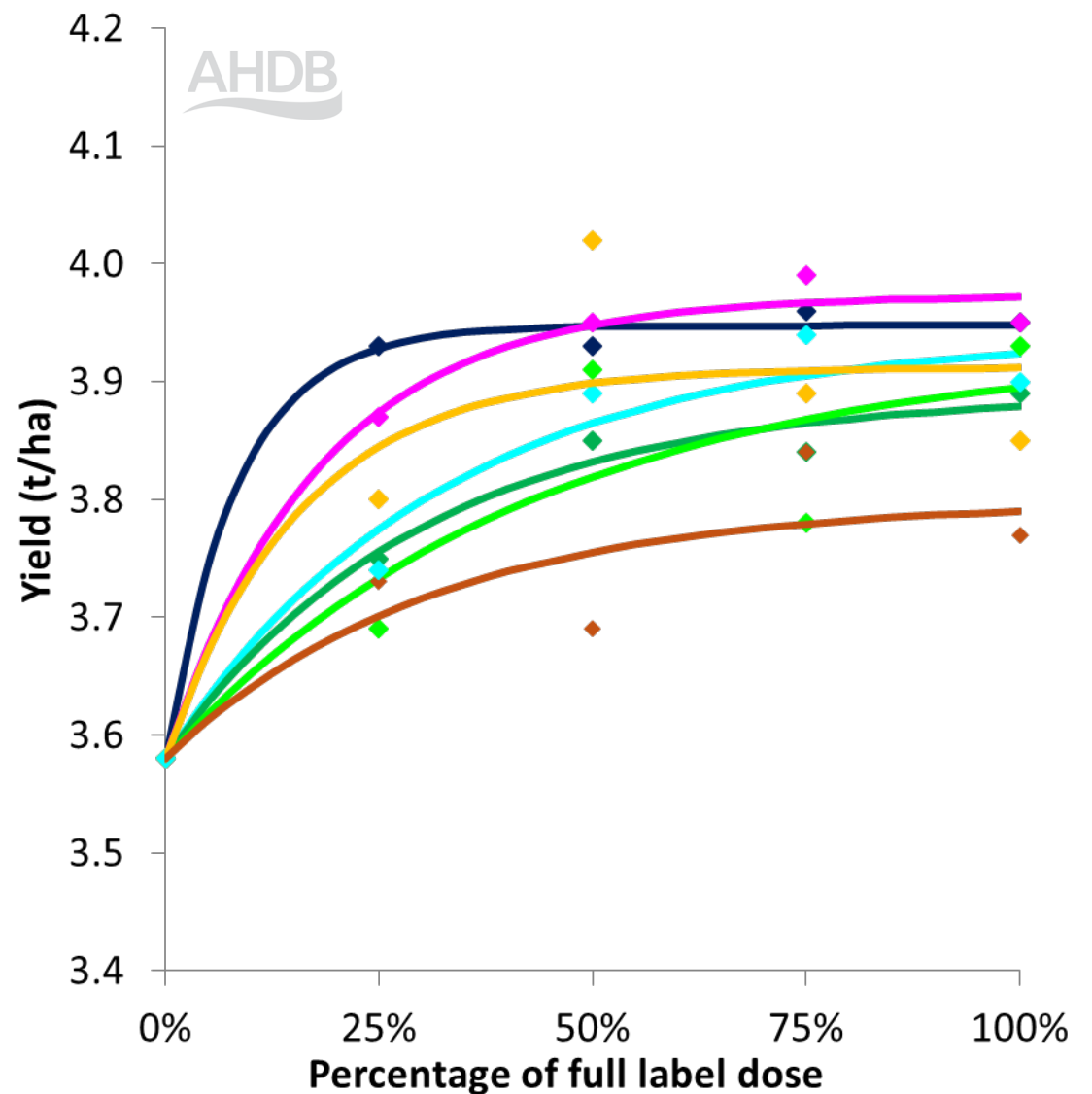
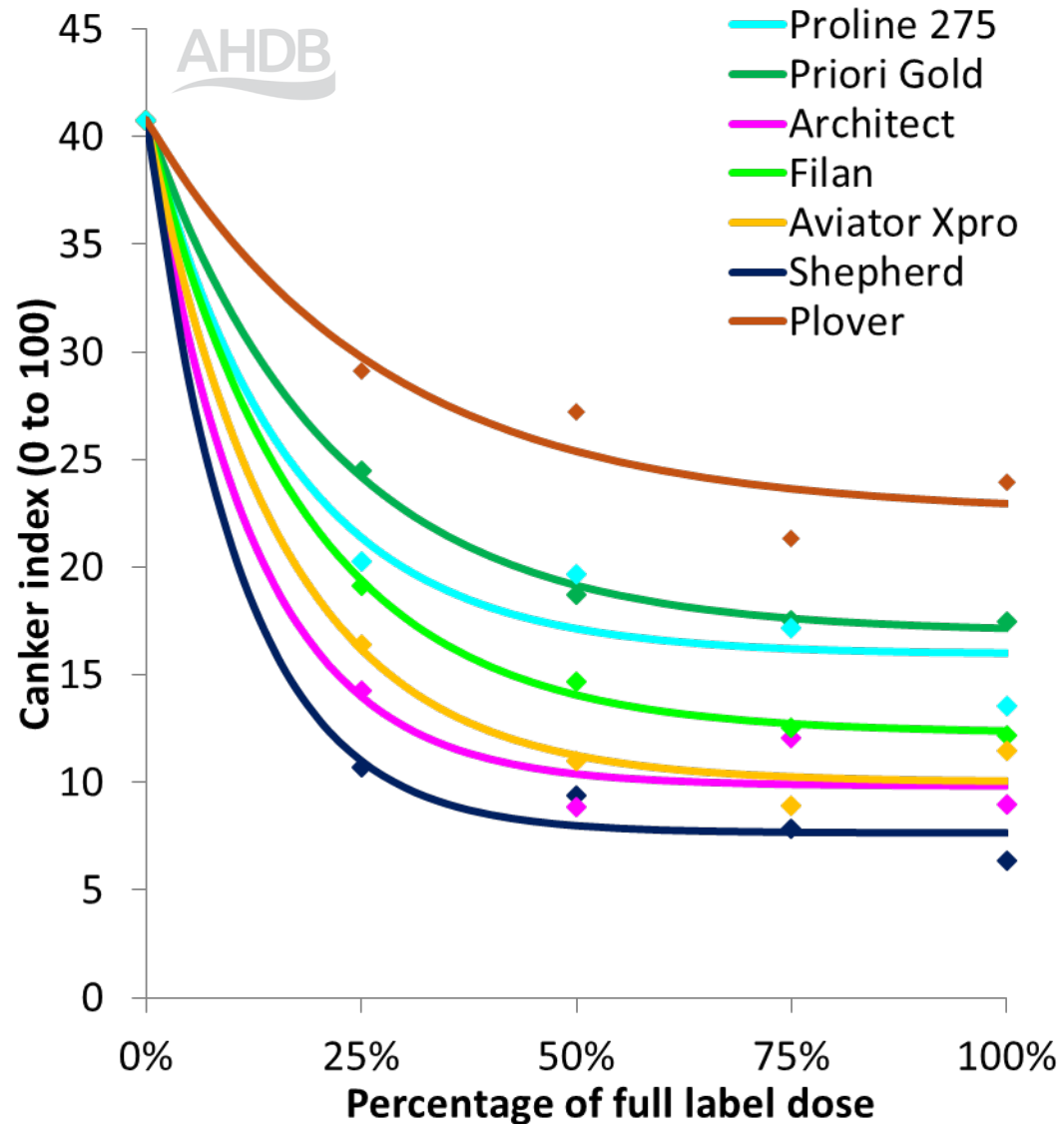
- Full label dose: 2.0 L/ha
- Total dose per crop: 4.0 L/ha
- 150 g/L mepiquat-chloride, 25 g/L prohexadione calcium and 100 g/L pyraclostrobin
- Autumn and spring use*

*see labels for full details

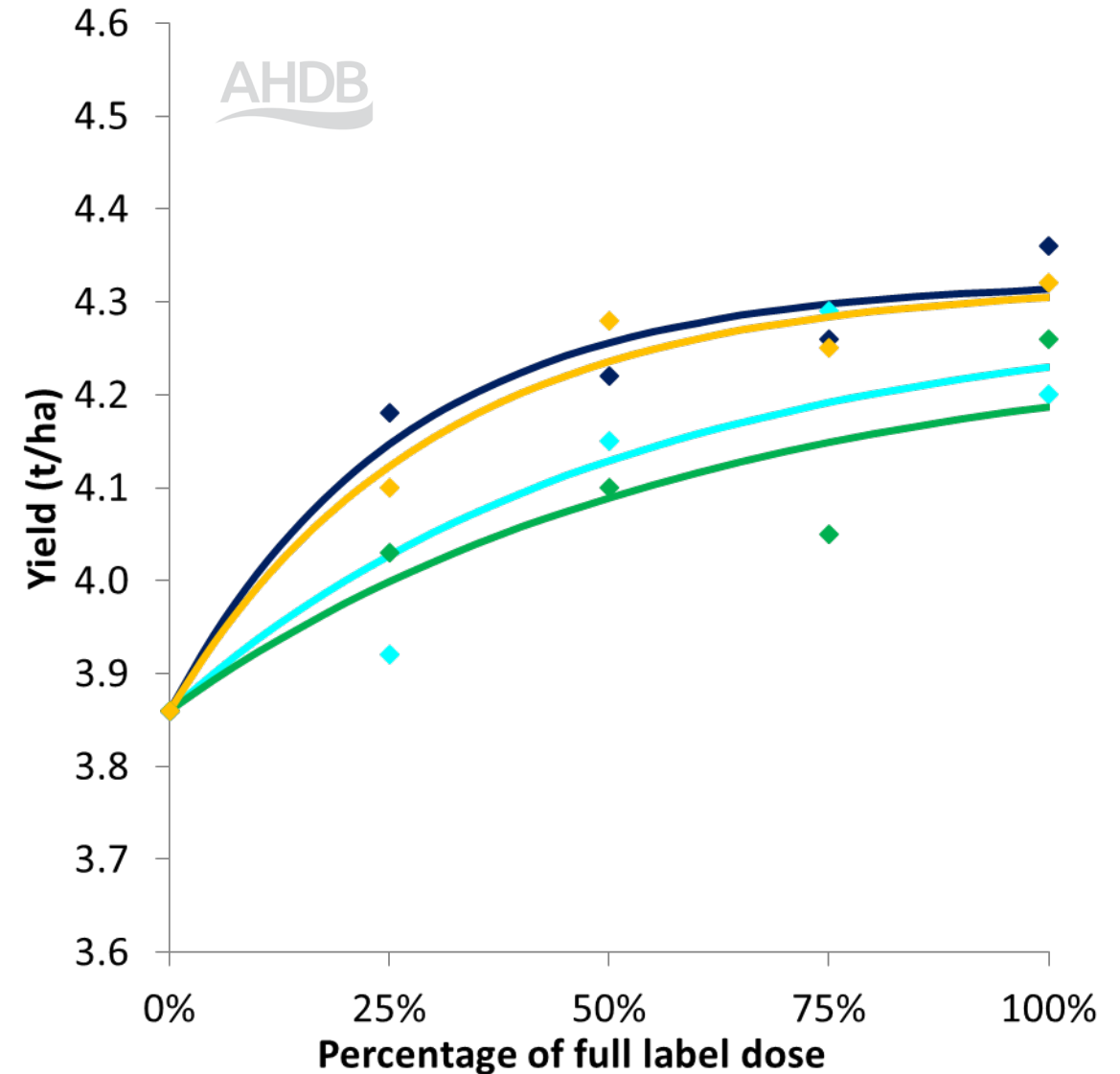
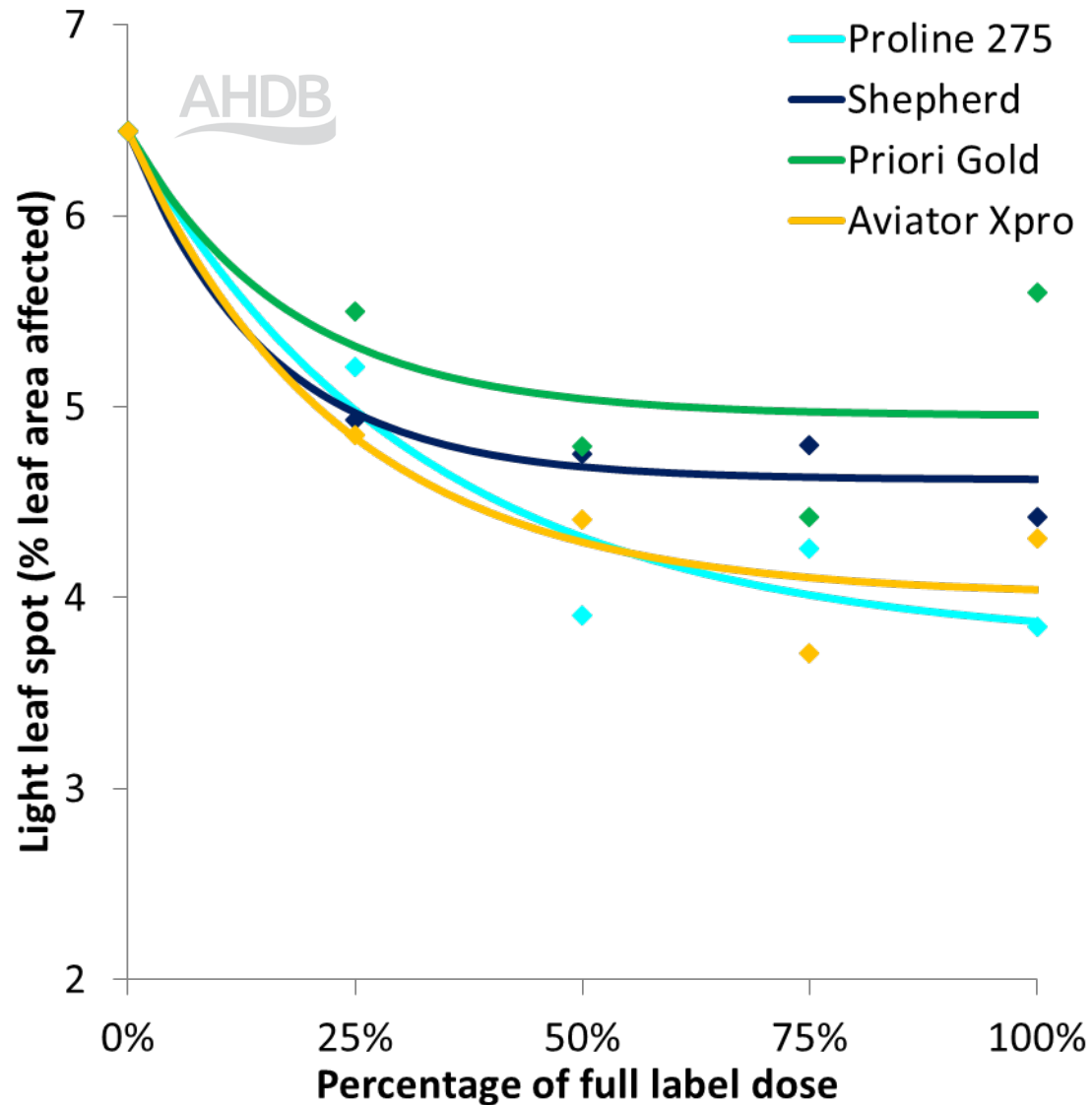
Phoma stem canker and yield (Herefordshire, 2021)



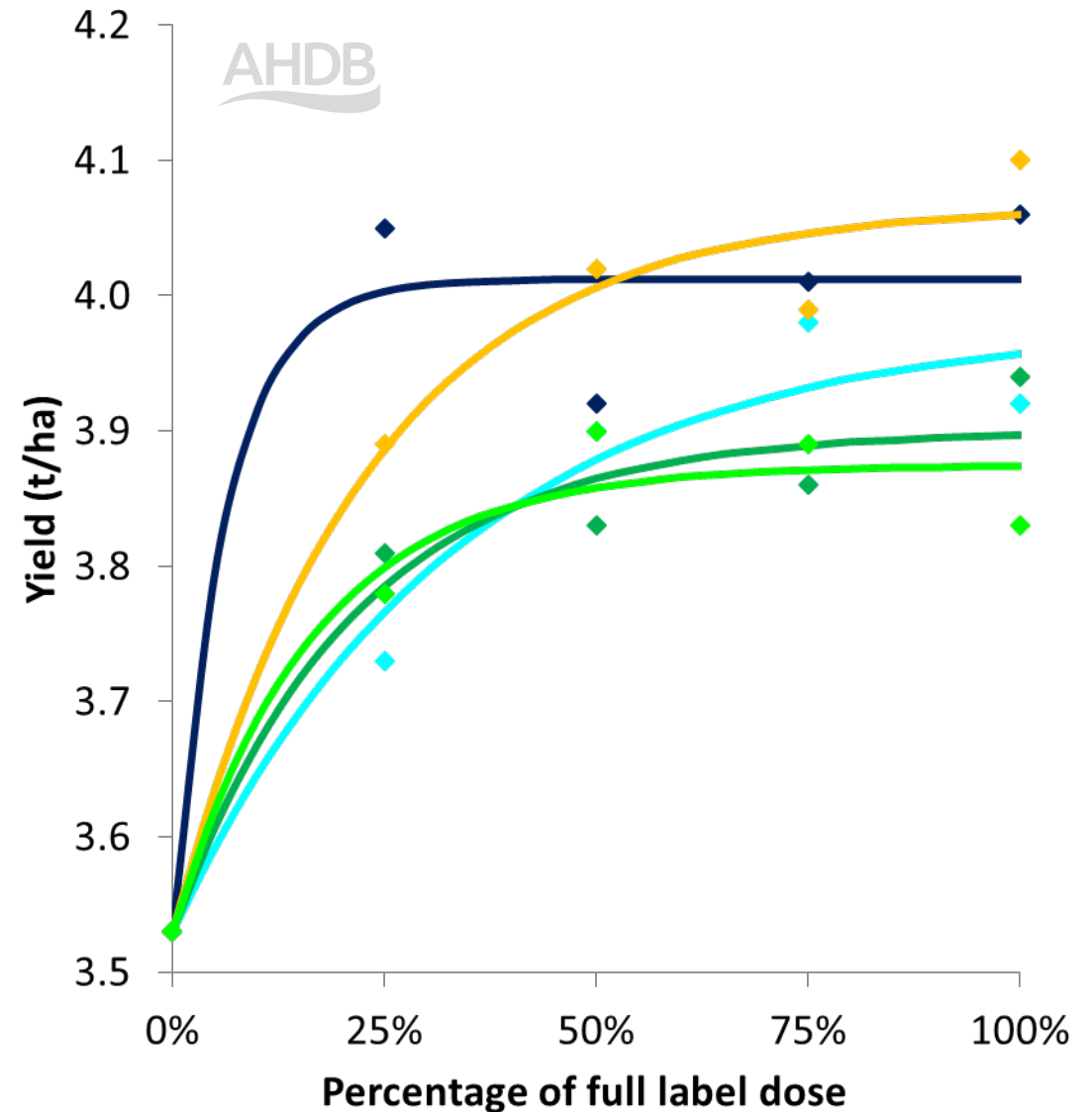
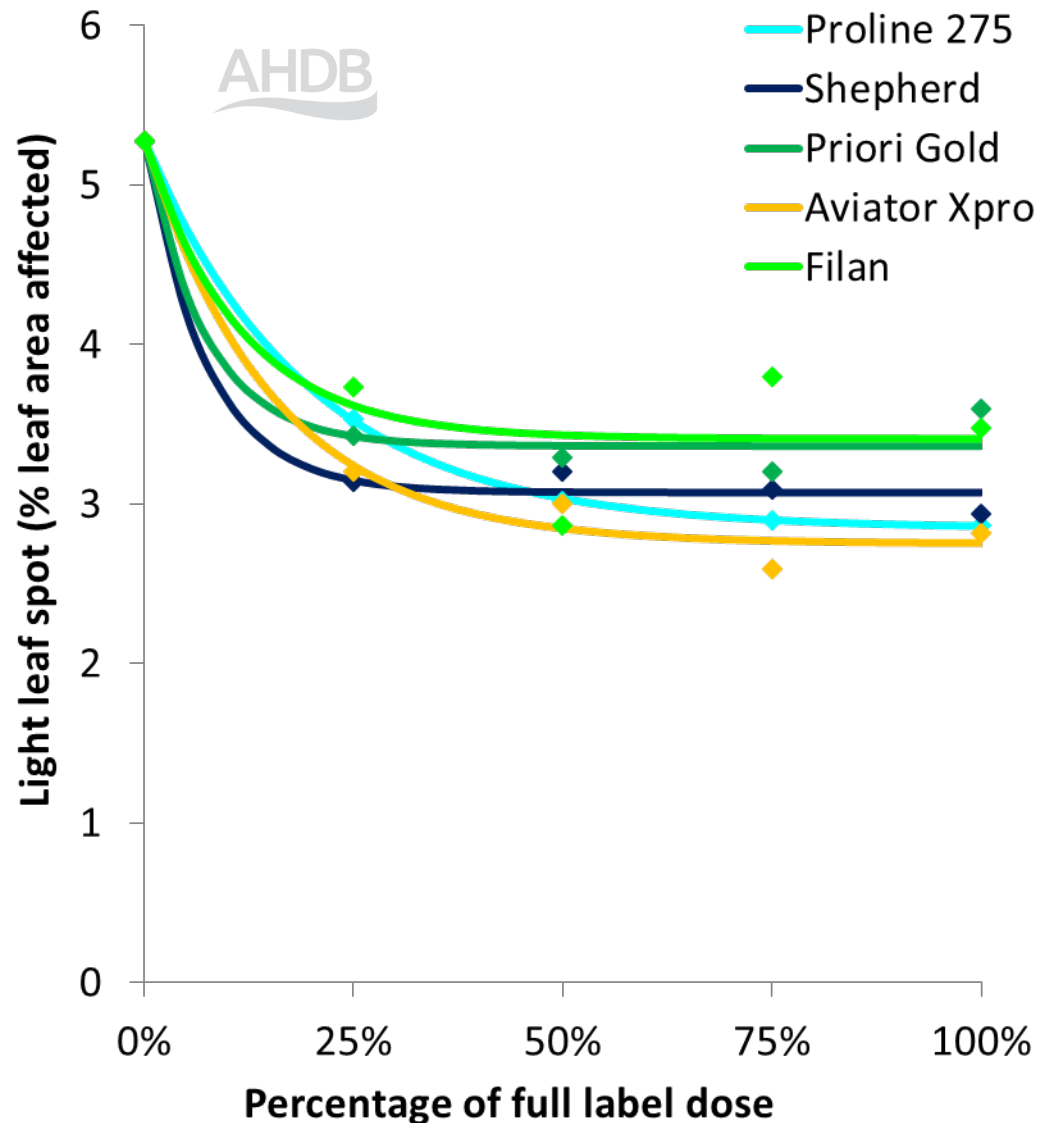
Phoma stem canker and yield 2015–21 (9 trials)



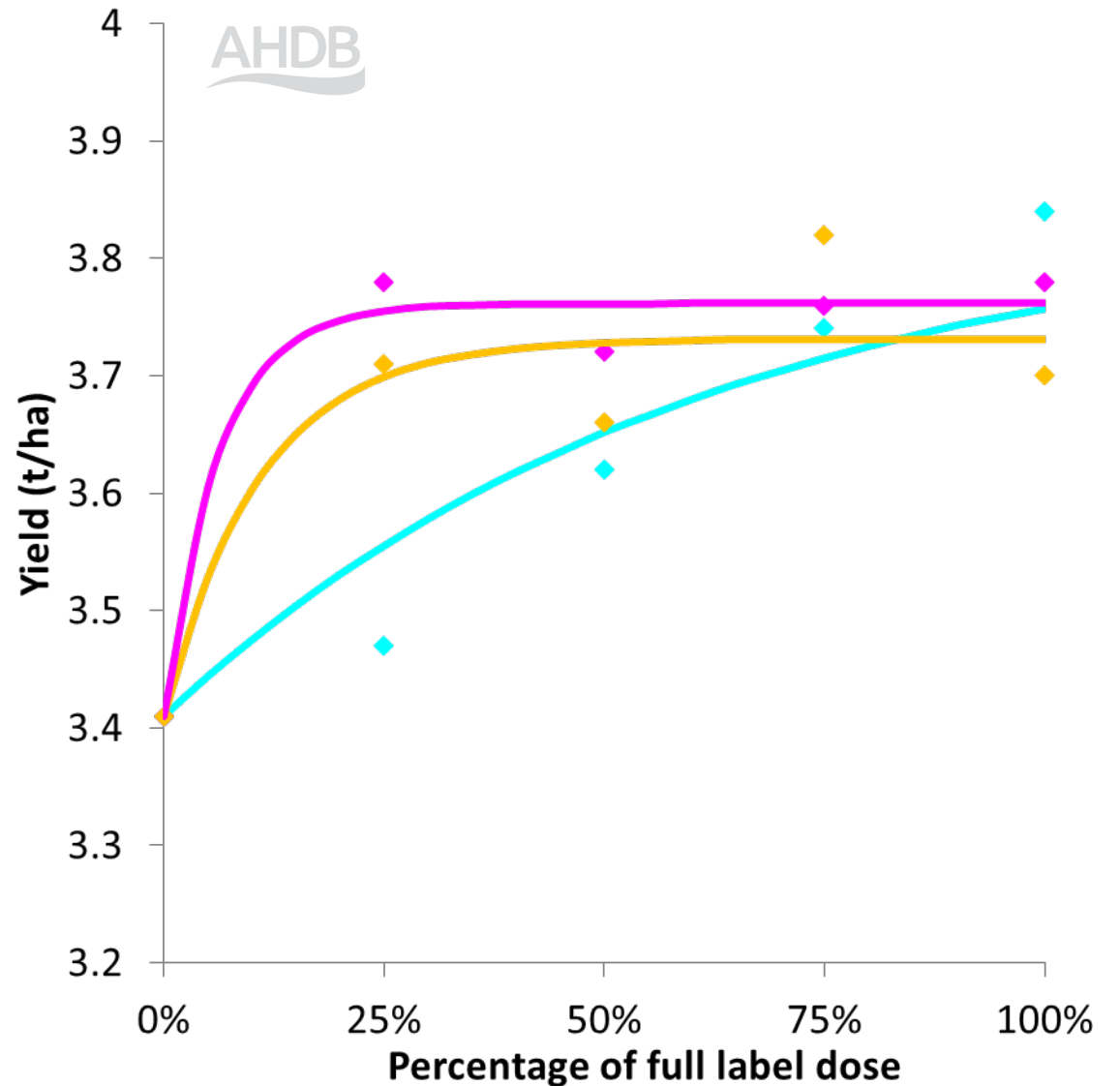
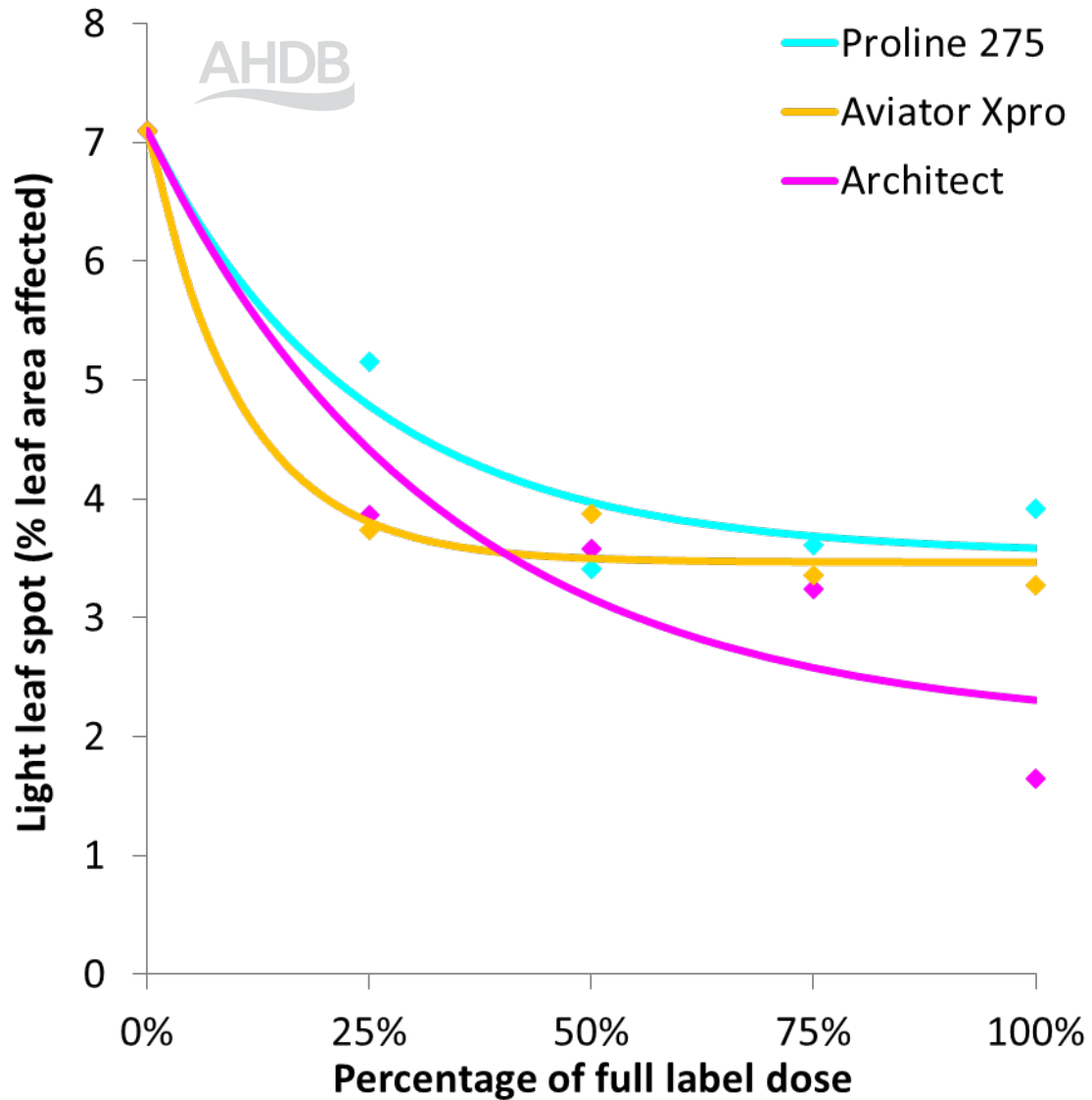
Light leaf spot disease and yield 2021 (2 trials)



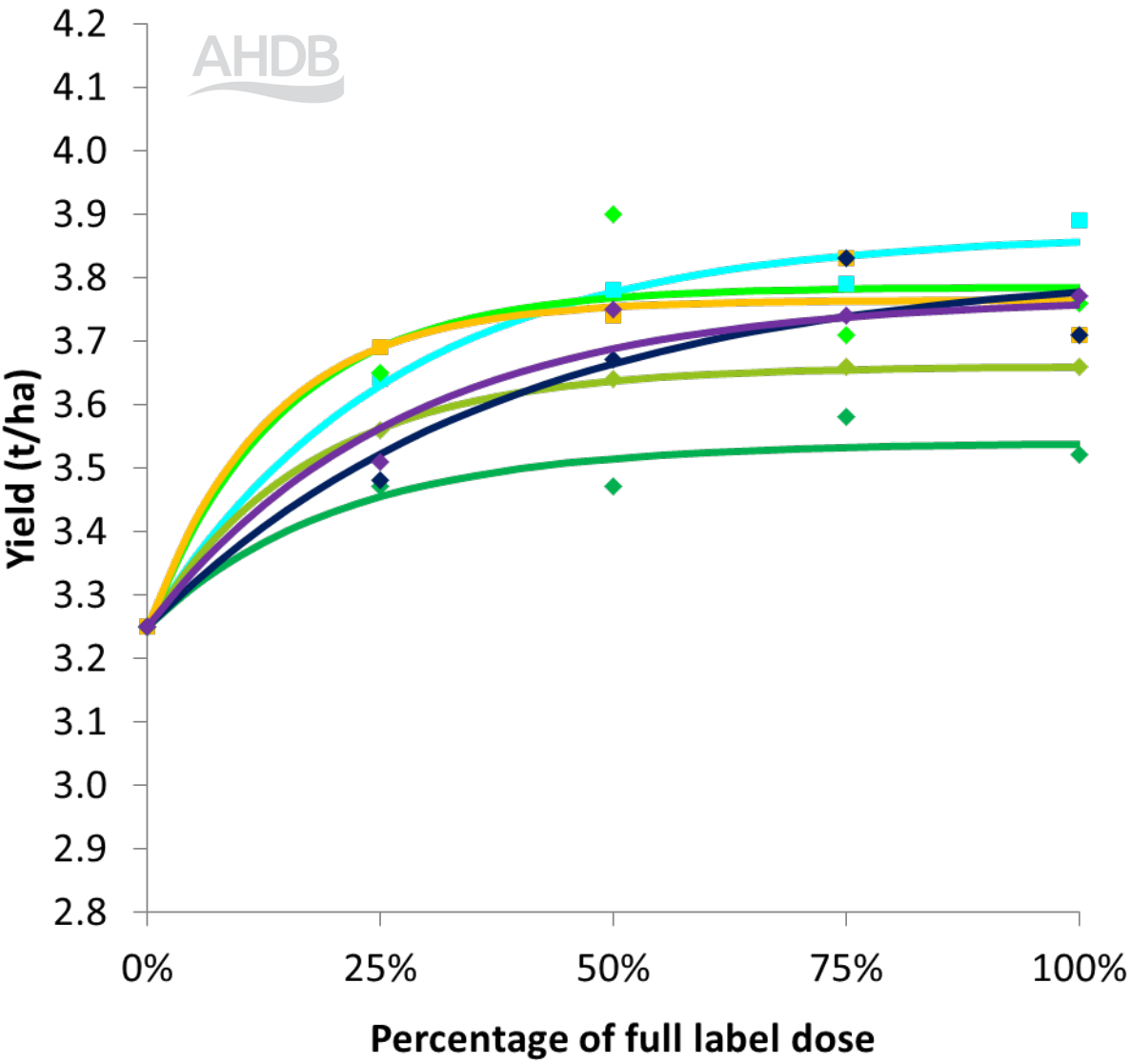
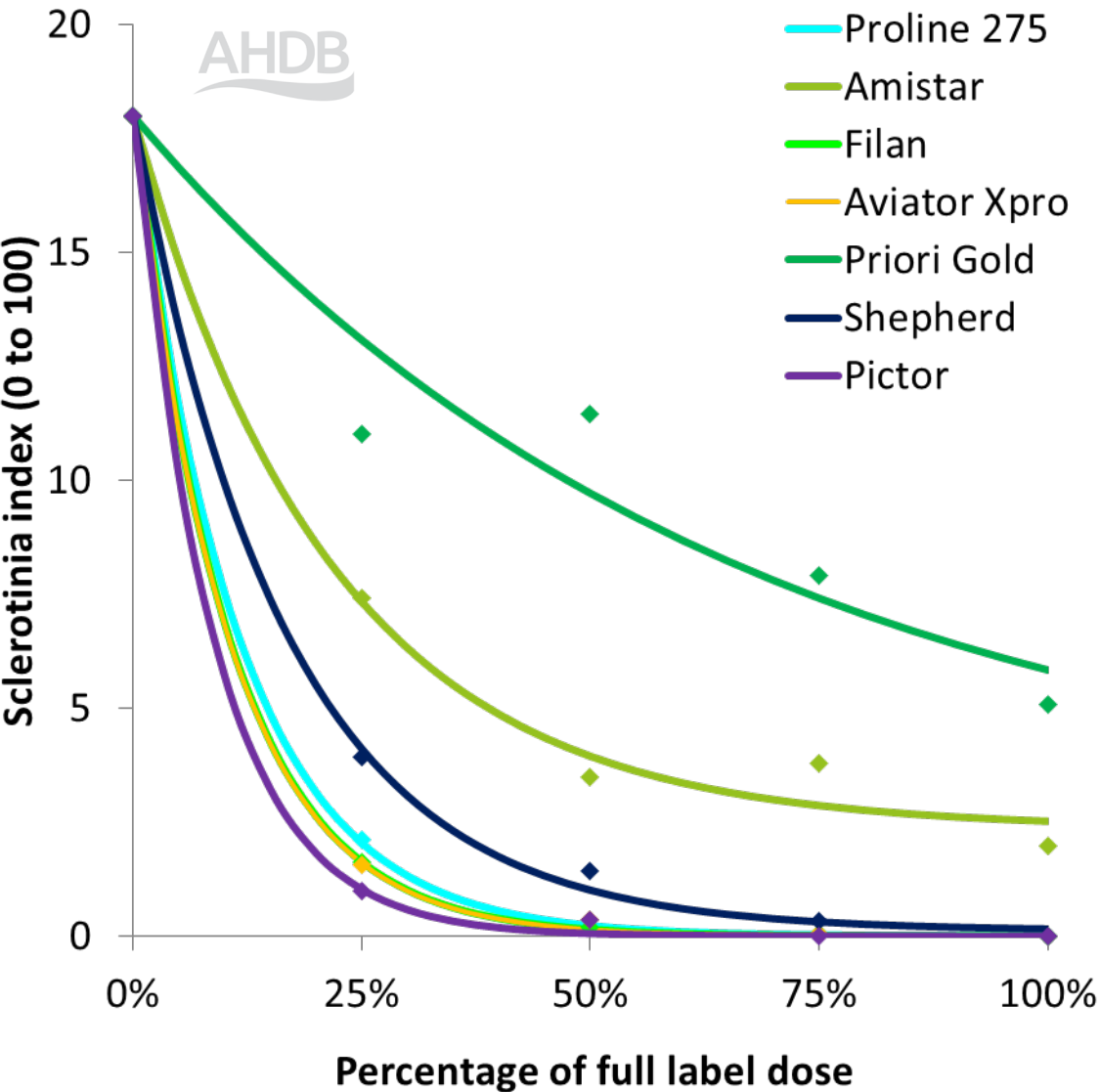
Light leaf spot disease and yield 2019–21 (5 trials)



Light leaf spot disease and yield 2015–16 (5 trials)



Sclerotinia stem rot and yield 2015–17 (5 trials)



Oilseed rape summary

- **Phoma stem canker**

- Phoma controlled by azoles, SDHIs and strobilurins
- Average yield response c. 0.3 t/ha, with little benefit from applying >50% of full label rate (as part of two-spray programme)
- Some differences in canker control between products, but small yield differences (0.1–0.2 t/ha), (especially where index is less than 30)

- **Light leaf spot**

- Azoles and non-azoles providing similar levels of disease control and yield
- Some light leaf spot isolates have a decreased sensitivity to azoles (in laboratory tests), although field performance is not affected
- Make use of different modes of action for resistance management

Acknowledgements

Paul Gosling and Catherine Harries, AHDB

Faye Ritchie, Philip Walker and Rebecca Joynt, ADAS

Stuart Knight, NIAB

Fiona Burnett, SRUC

Simon Edwards, Harper Adams University

Bart Fraaije, Rothamsted Research / NIAB

Stephen Kildea, Teagasc

A vibrant landscape of a green field at sunset. A path leads from the foreground towards the horizon where the sun is setting, casting a warm glow over the scene. The sky is filled with colorful clouds, and the field is lush and green. In the background, there are rolling hills and some distant buildings.

**‘Inspiring our farmers, growers
and industry to succeed in a
rapidly changing world’**