



# Fungicide performance update for wheat, barley and oilseed rape

Release date: 6 December 2017 (at the AHDB Agronomists' Conference)



CEREALS & OILSEEDS

**Note: These slides contain curves up to 100 per cent label dose.**

The curves are different to those displayed on the screen at the AHDB Agronomists' Conference, which showed results up to 200 per cent label dose. The data used to produce the curves is the same.

# Fungicide performance update for wheat

# Wheat trial sites in harvest year 2017

Site (organisation)	Target disease	Variety
Rosemaund (ADAS)	Septoria tritici	Santiago
Sutton Scotney (NIAB)	Septoria tritici (double trial)	Dickens
Fife (SRUC)	Septoria tritici (double trial)	Consort
Cardigan (ADAS)	Septoria tritici	KWS Santiago
Carlow (TEAGASC)	Septoria tritici	KWS Lumos
Terrington (ADAS)	Yellow rust	Reflection
Cambridge (NIAB)	Brown rust	Crusoe
Gleadthorpe (ADAS)	Fusarium	Grafton

# Wheat septoria data 2017

Site and timing	Target leaf	Protectant	Eradicant
Rosemaund T2	Flag	✓	✓
Sutton Scotney T1	Leaf 3	(brown rust)	
Sutton Scotney T2	Flag	✓	✓
Fife T1	Leaf 3	✓	
Fife T2	Flag	✓	
Cardigan T2	Flag	✓	✓
Carlow GS33	Leaf 2	✓	

# Wheat septoria products 2017

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

\*Bravo at 50% dose only    \*\*Or 'Bassoon EC'

# Fungicide performance trials

>Since 1994

>Wheat trial locations

- ★ Septoria tritici
- ★ Yellow rust
- ★ Brown rust
- ★ Fusarium

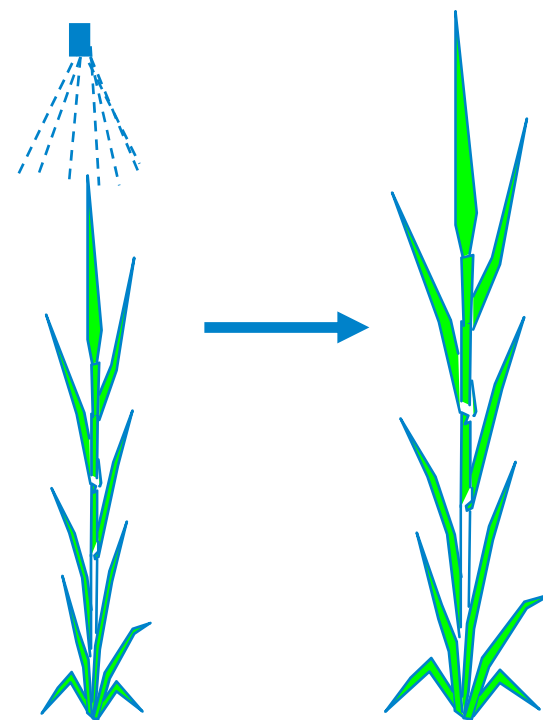


# Trial methods

- Each trial is sprayed just once
- Four rates of application tested
  - 25%, 50%, 100%, and 200% of full label rate per fungicide, plus untreated

Activity observed on each leaf layer and categorised as:

- Eradicant
  - If a leaf emerged before fungicides were applied
- Protectant
  - If a leaf had just emerged or was still emerging when fungicides were applied

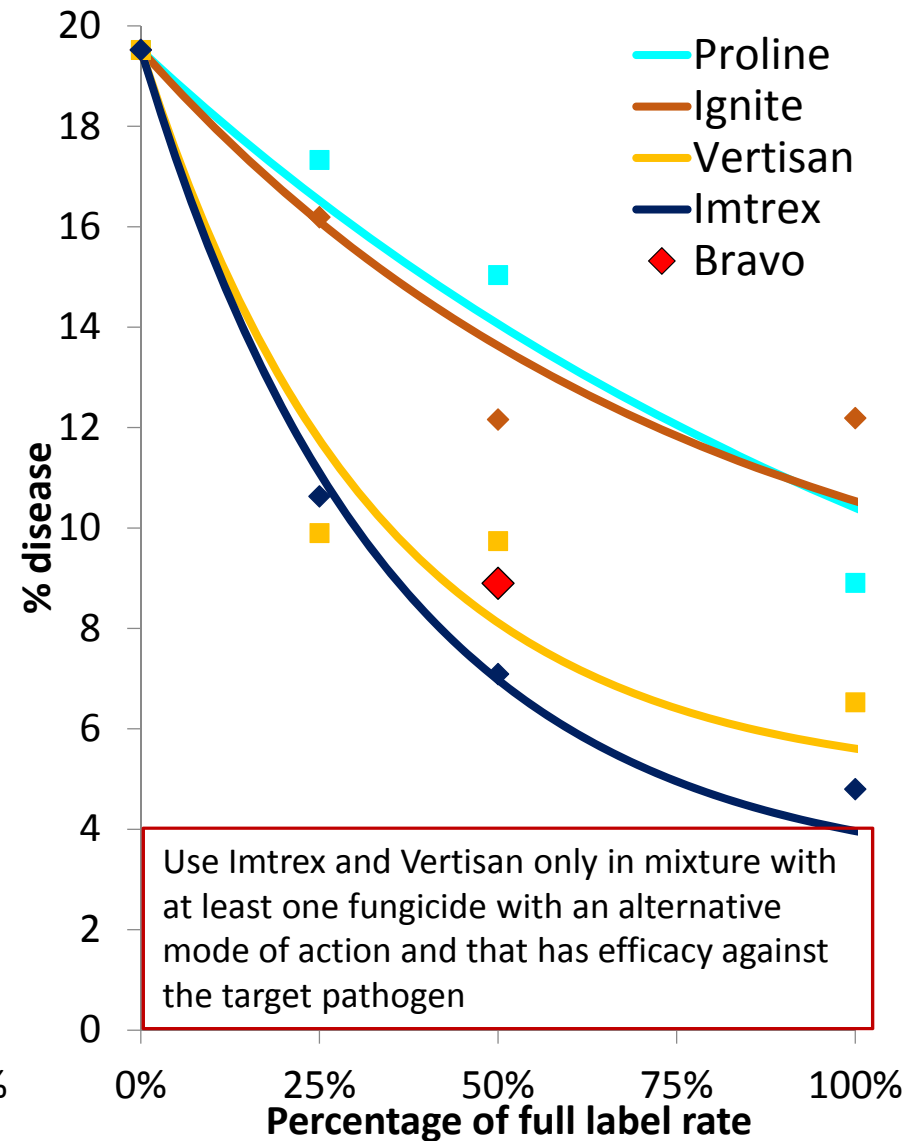
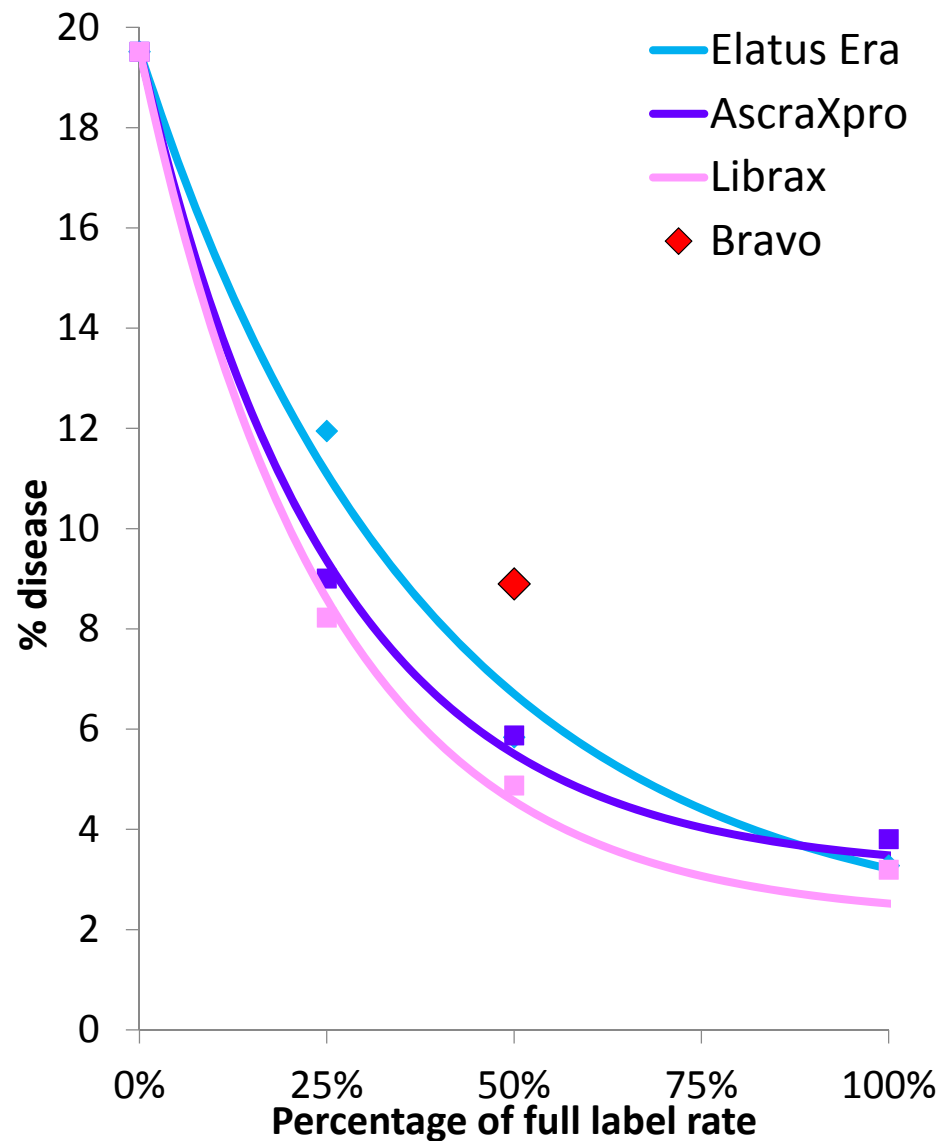




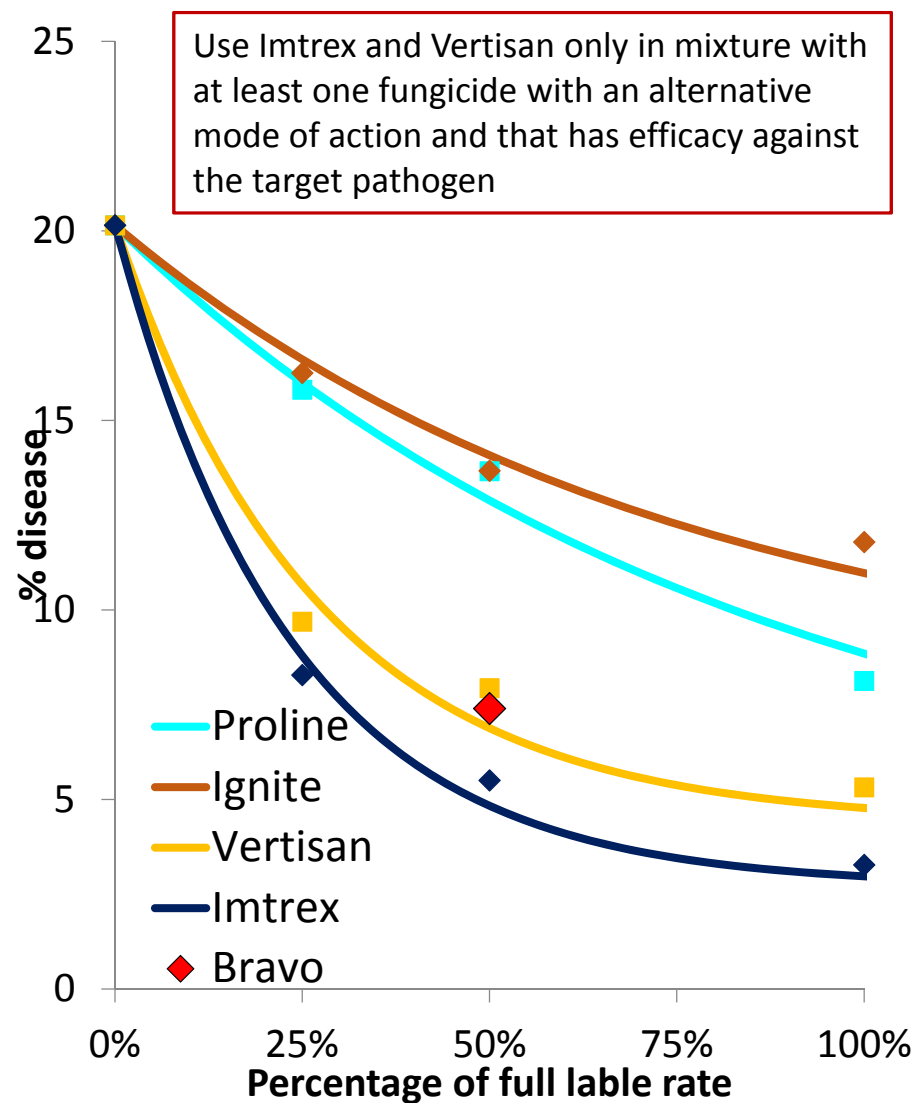
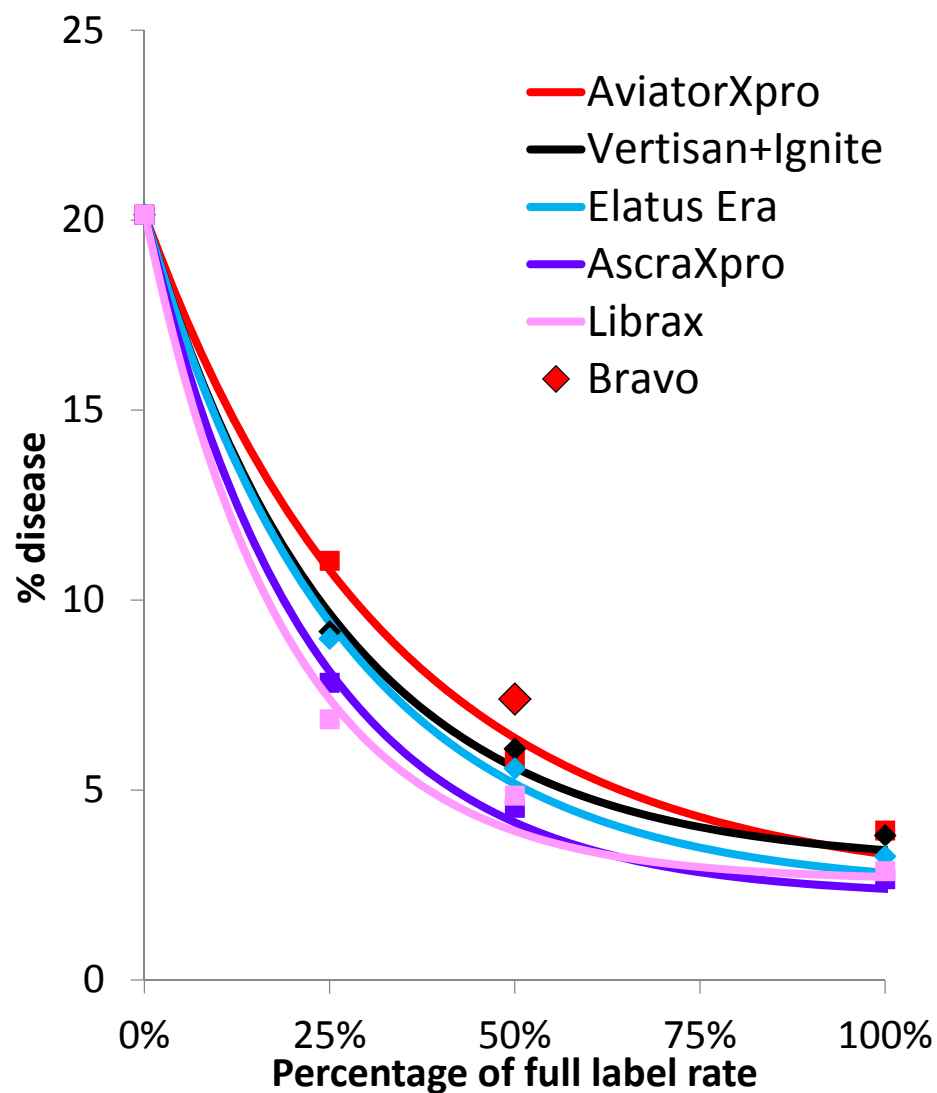
# Elatus Era

- Registered for use in January 2017
- Contains a new SDHI active, plus a triazole
  - 75 g/l benzovindiflupyr (Solatenol), plus 150g/l prothioconazole
- Full label dose 1.0l/ha
- Maximum one application
- Approved for use in wheat and barley
- **In fungicide performance trials since 2016**

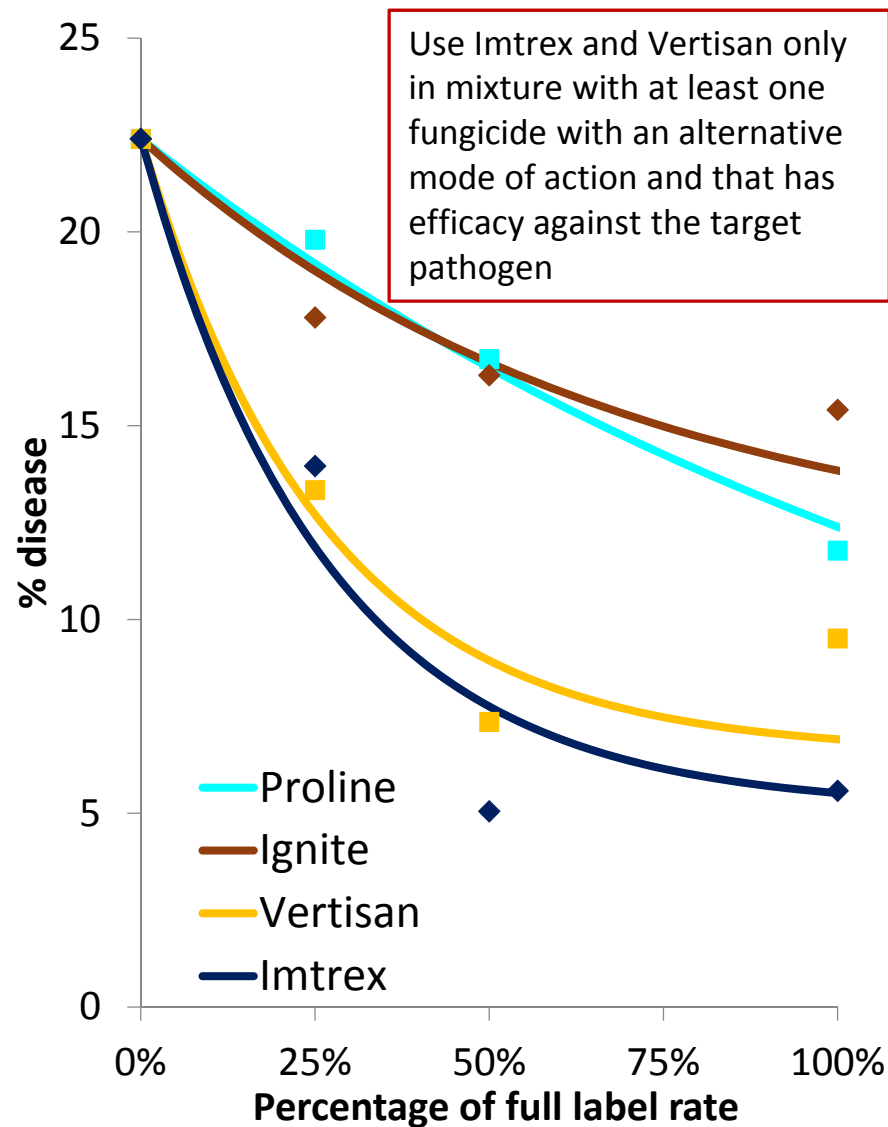
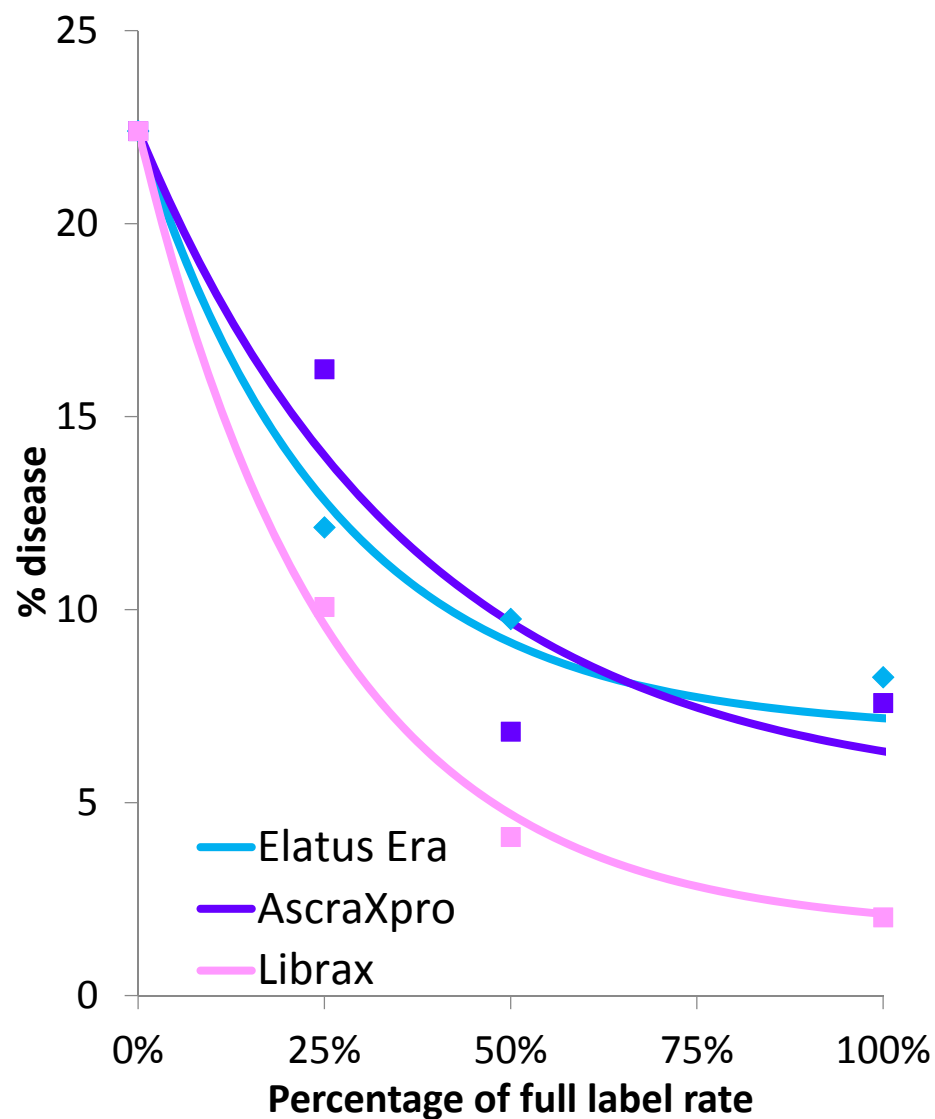
# Septoria protection 2017 (n=6)



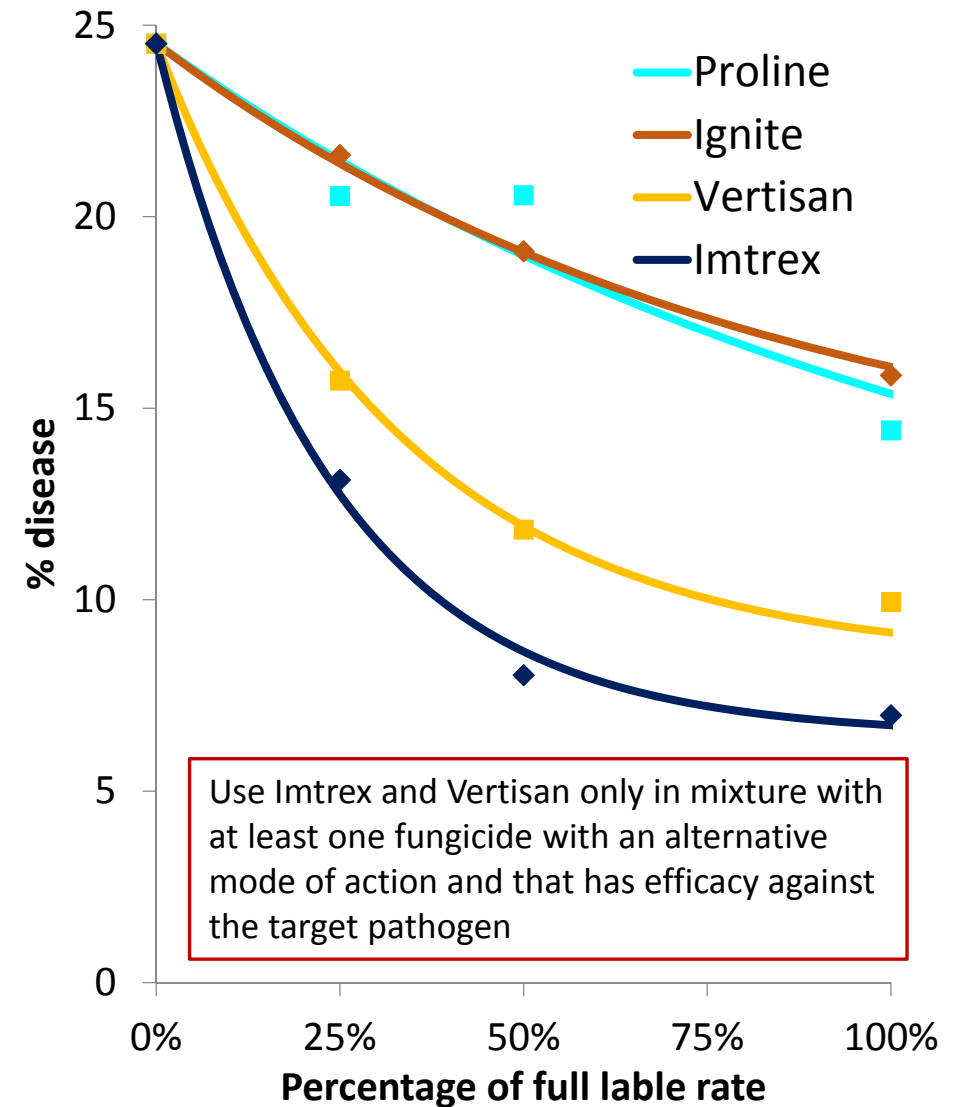
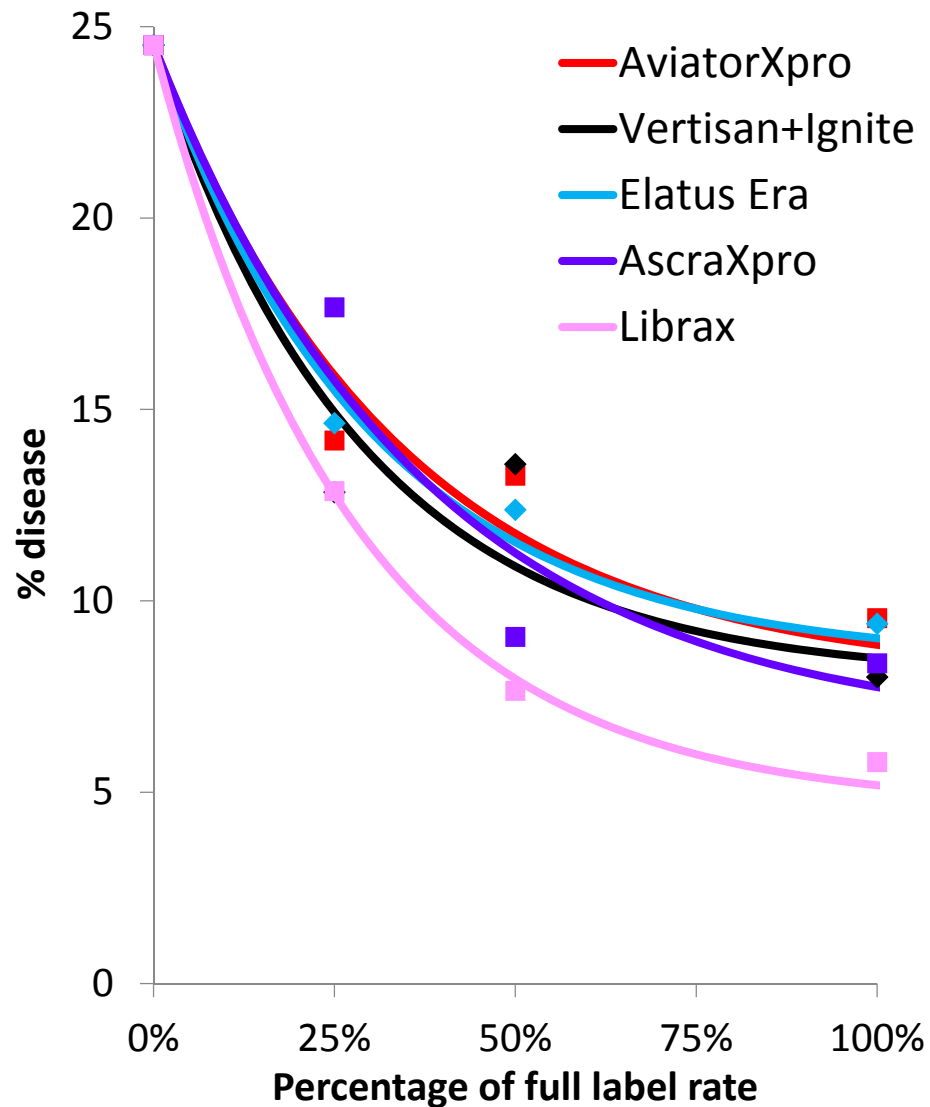
# Septoria protection 2015/16/17 (over trial)



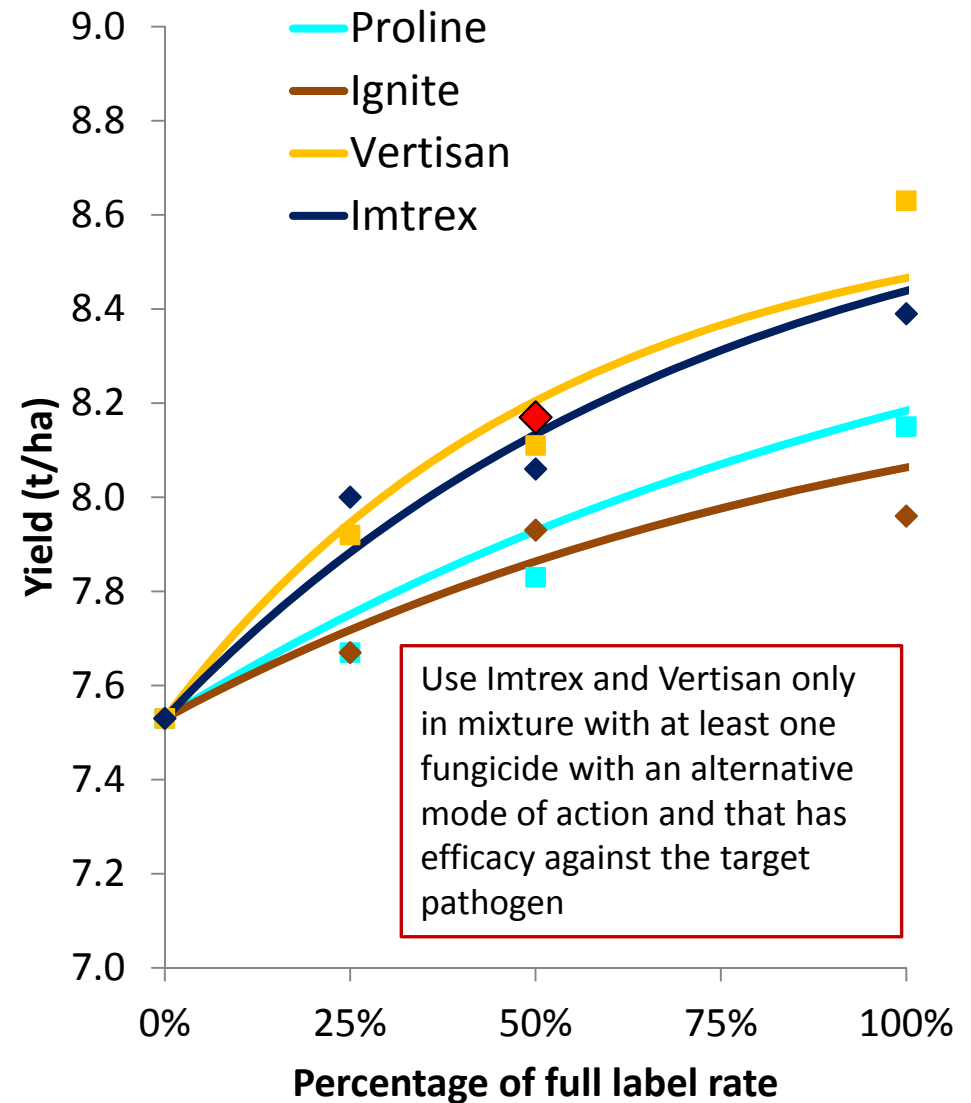
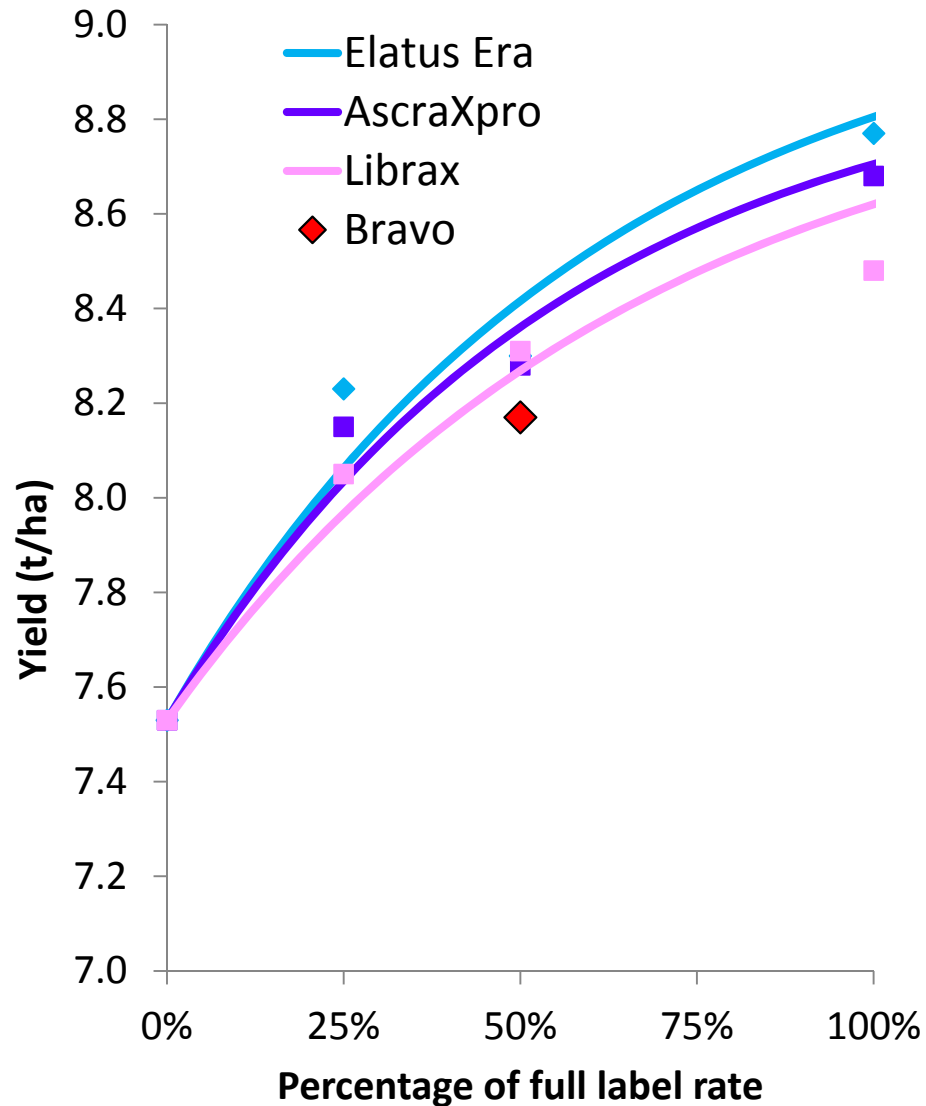
# Septoria curative activity 2017 (n-3)



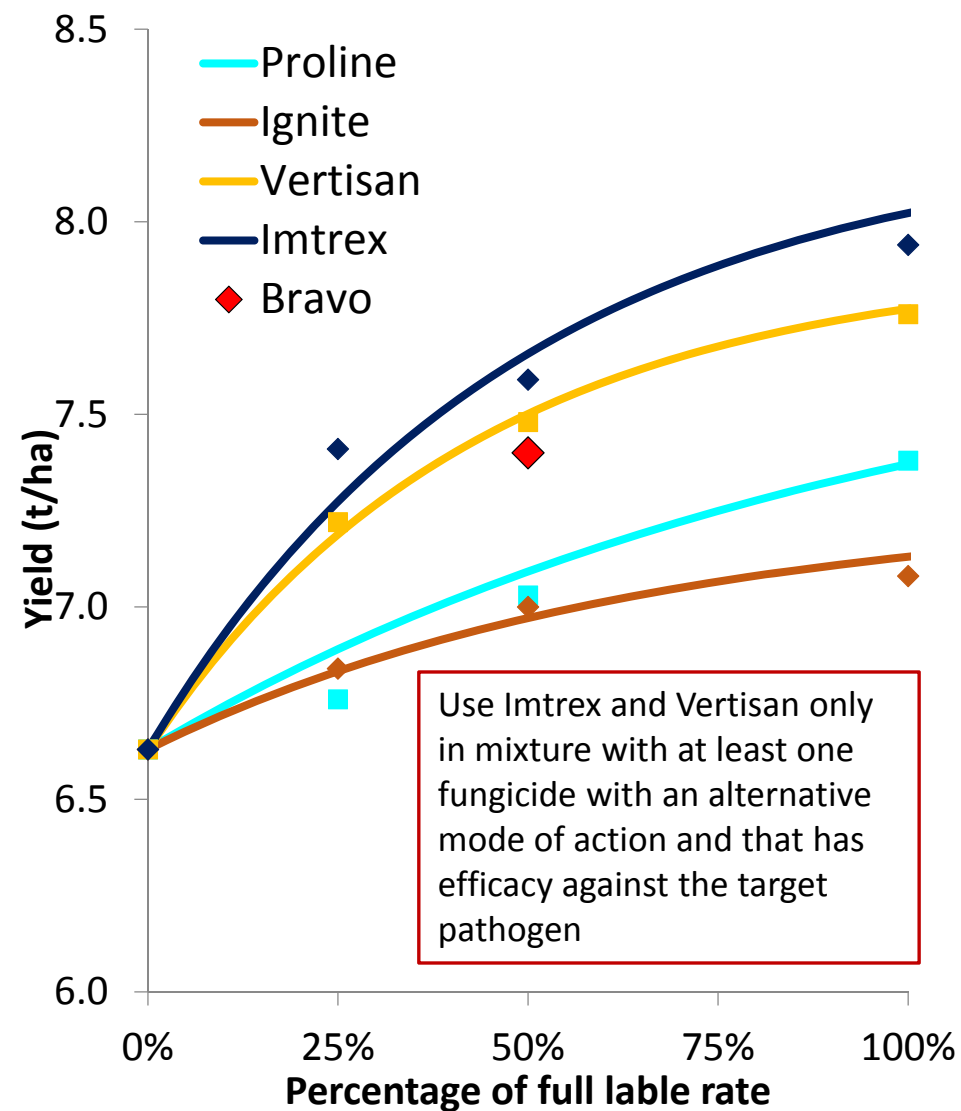
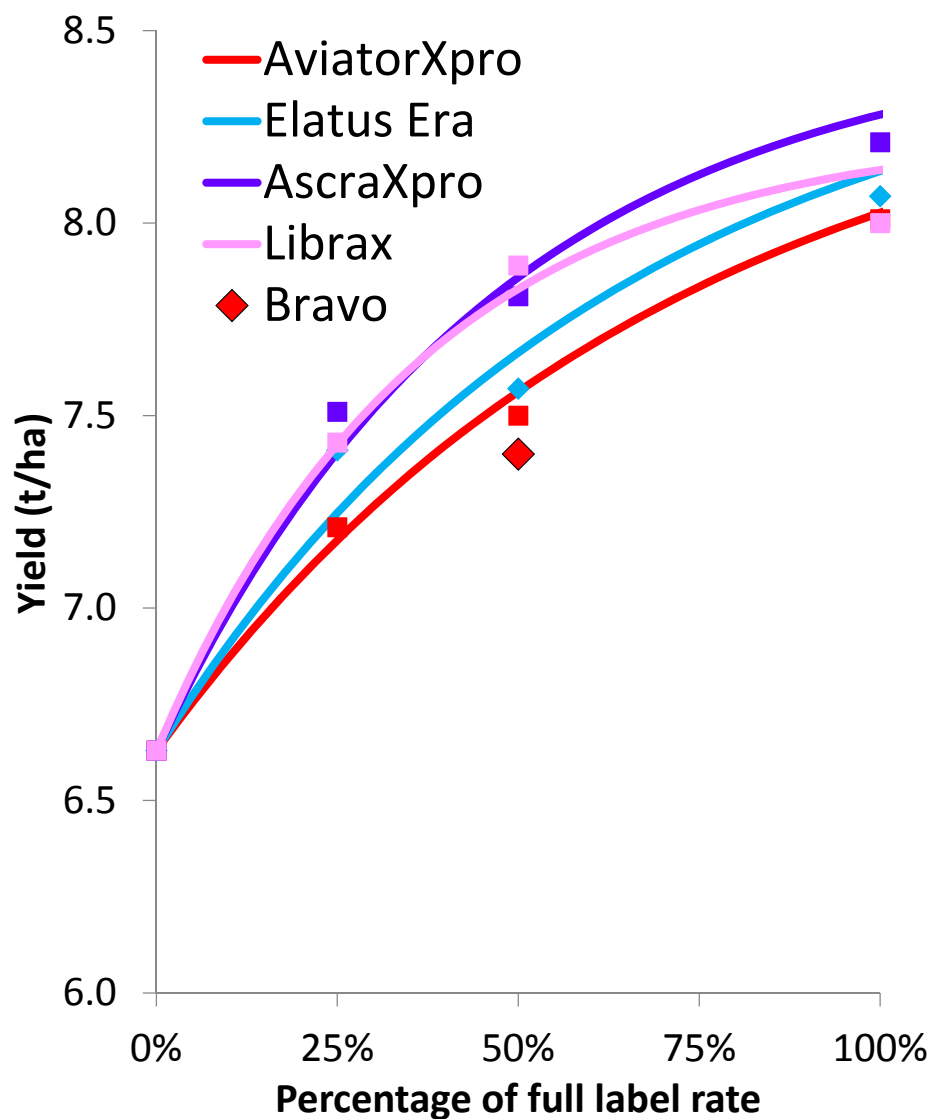
## Septoria curative 2015/16/17 (over trial)



# Septoria yields 2017 (n-5)



# Septoria trial yield 2015/16/17 (over trial)



# Rusts in 2017

## June conditions

- Checked yellow rust development
- Promoted brown rust

75% of varieties have a RL disease rating of 6 or less for yellow or brown rust

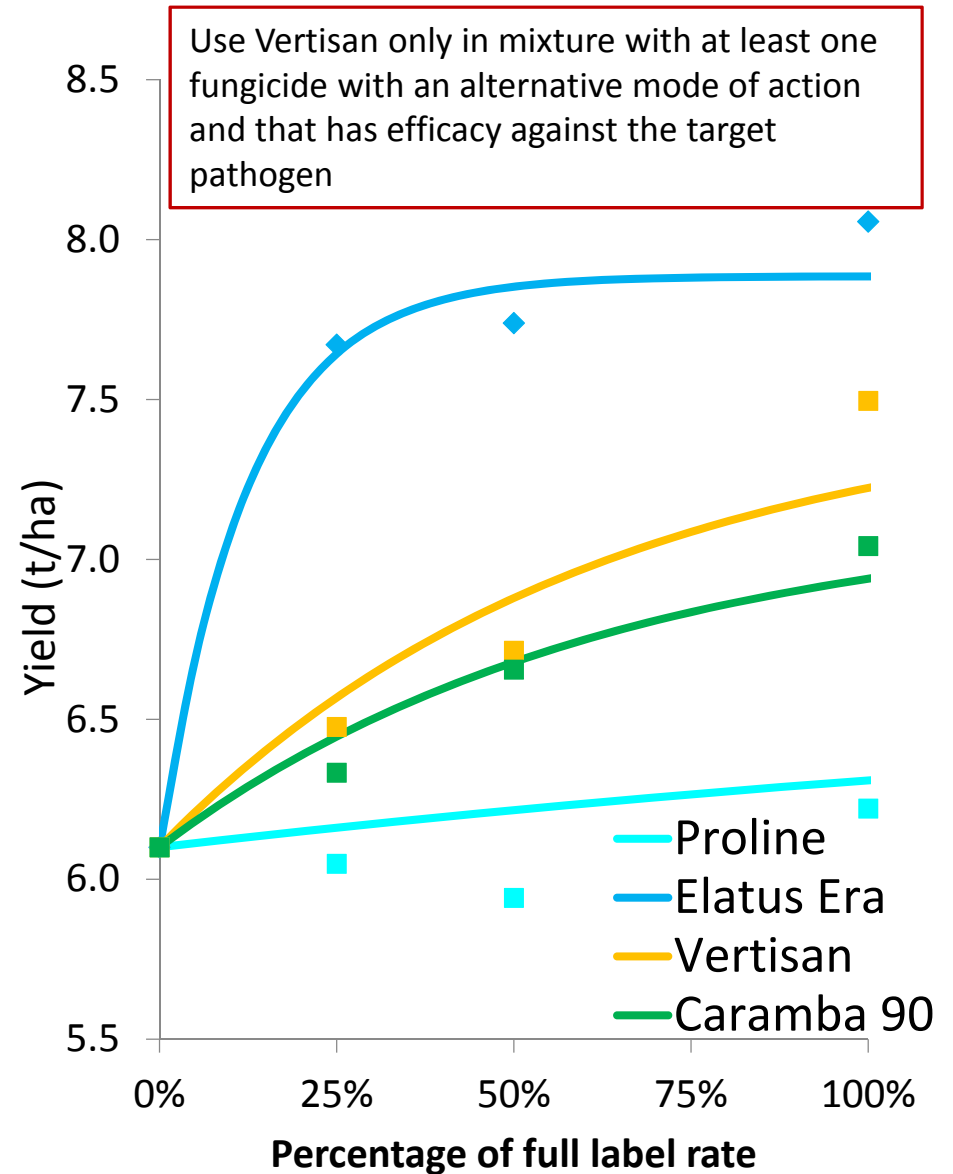
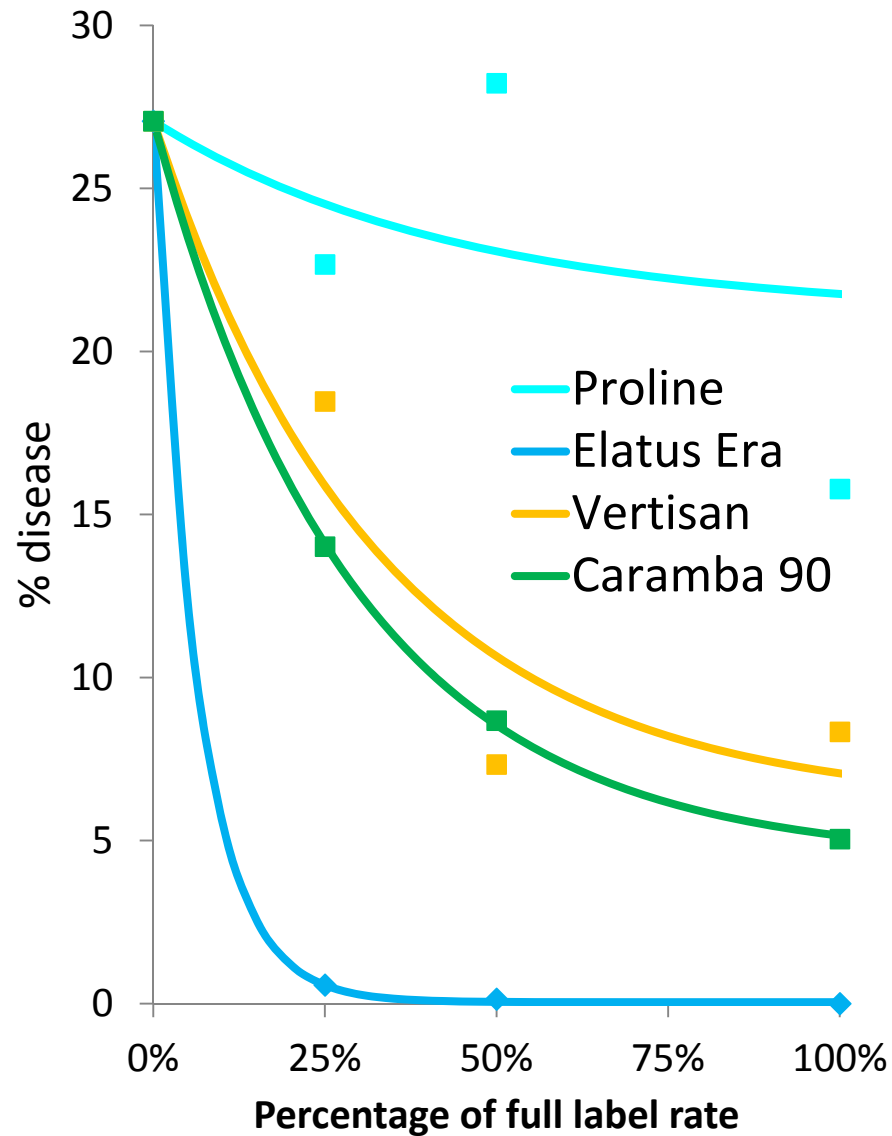
## Most susceptible:

- Yellow rust – Reflection, Cordiale, Gallant, JB Diego, Grafton and Skyfall
- Brown rust – Crusoe, Zulu, Savello and Shabras

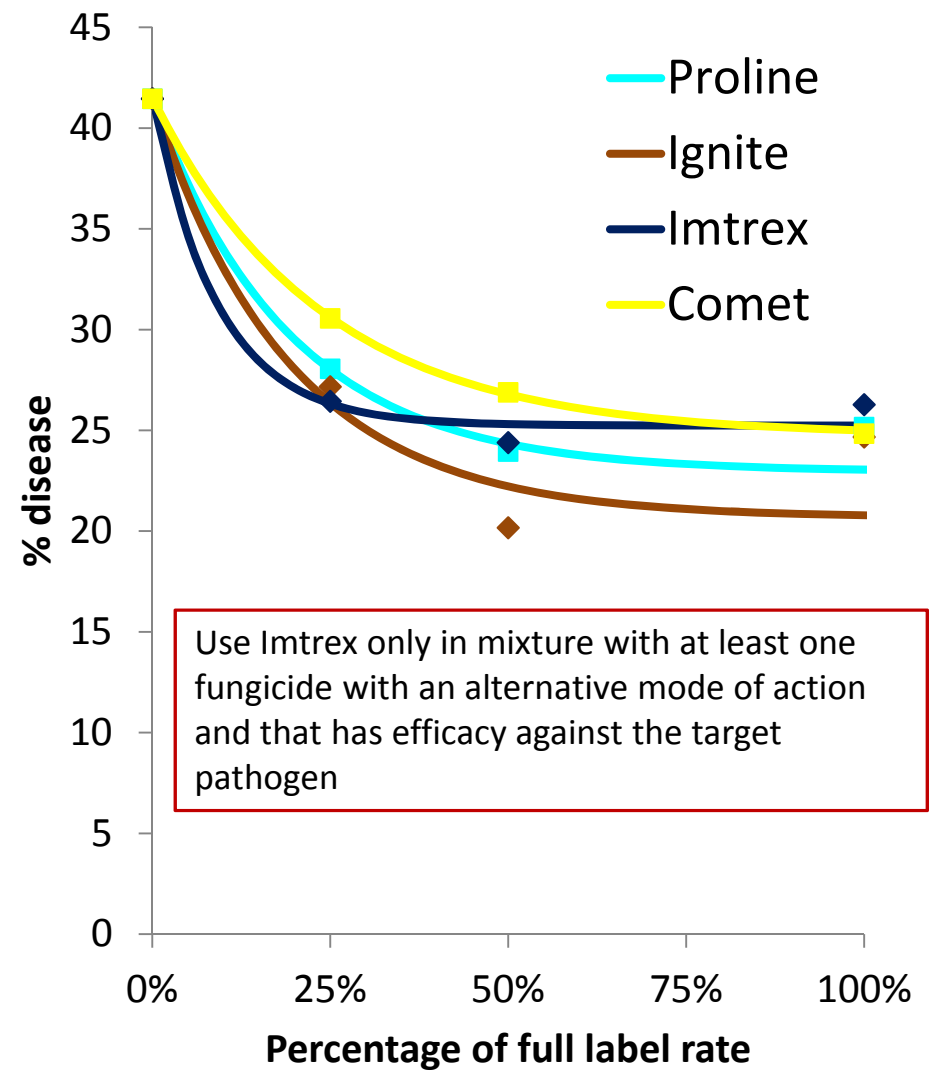
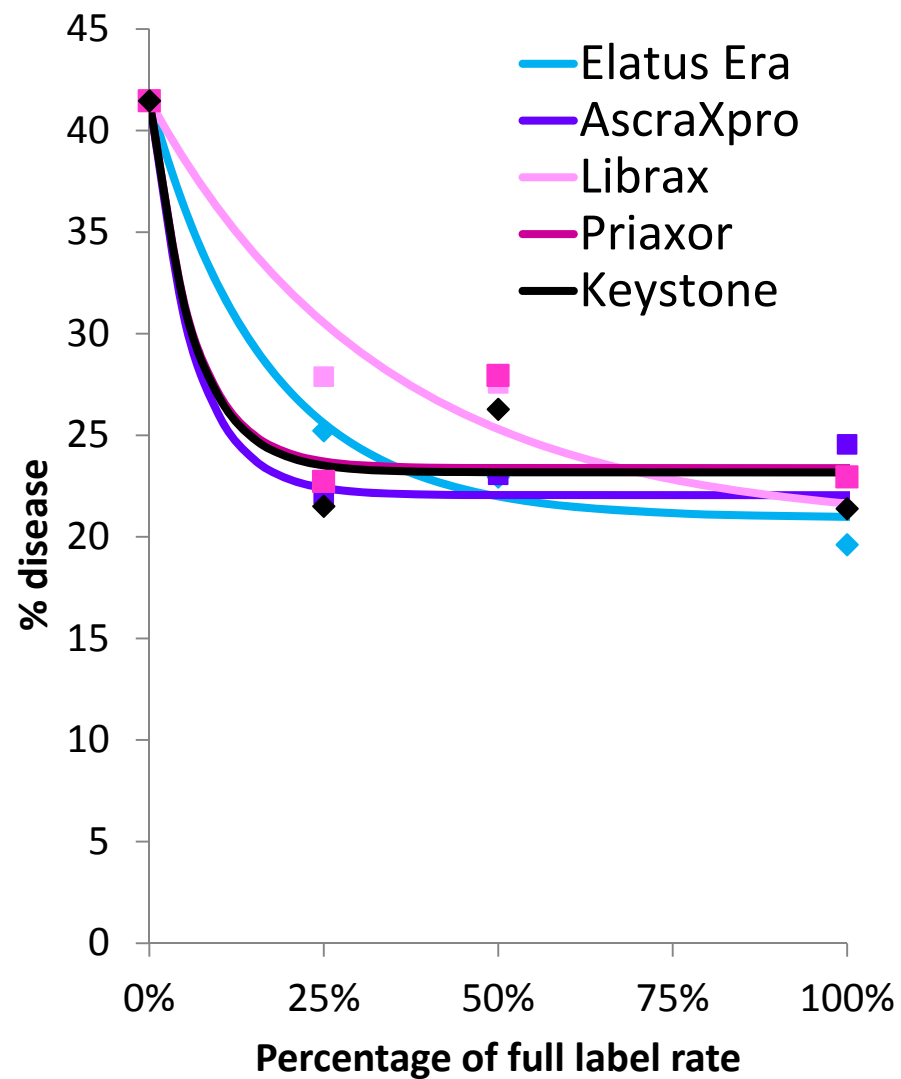




# Brown rust 2017 (inoculated)

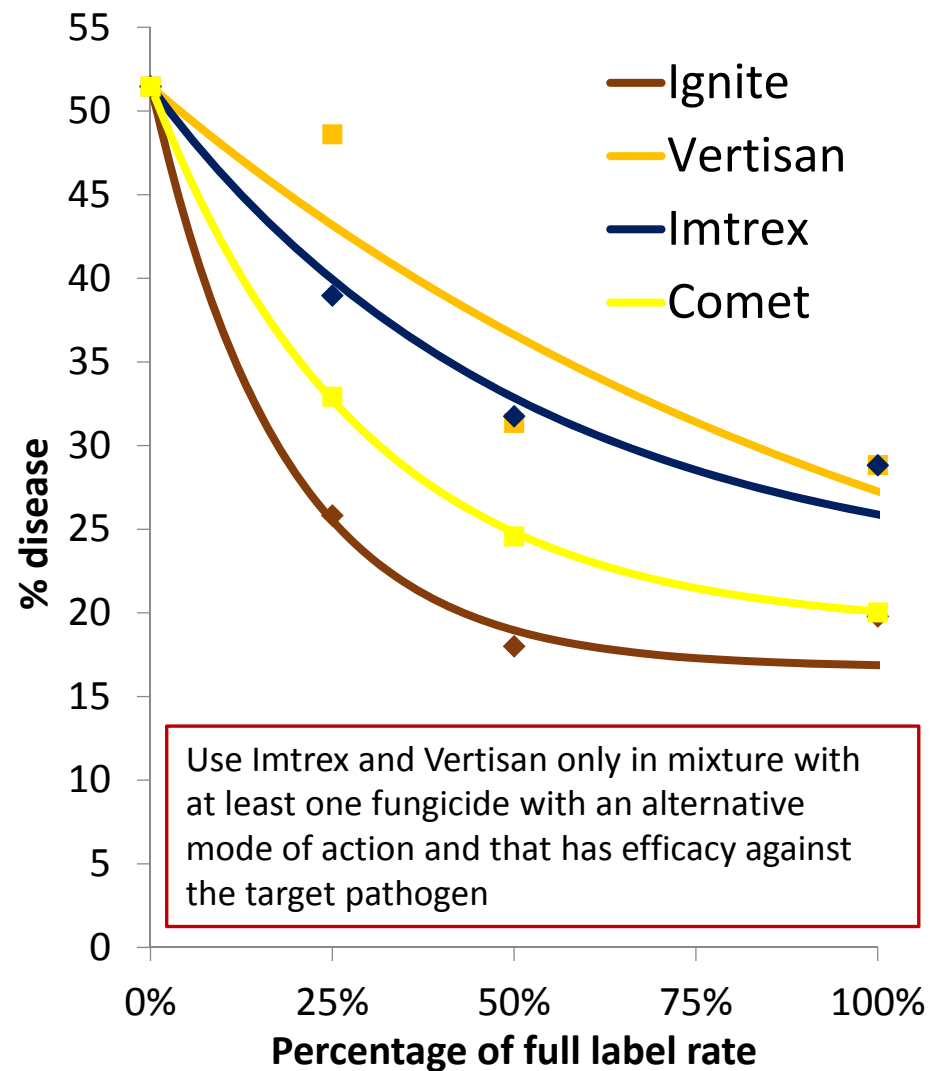
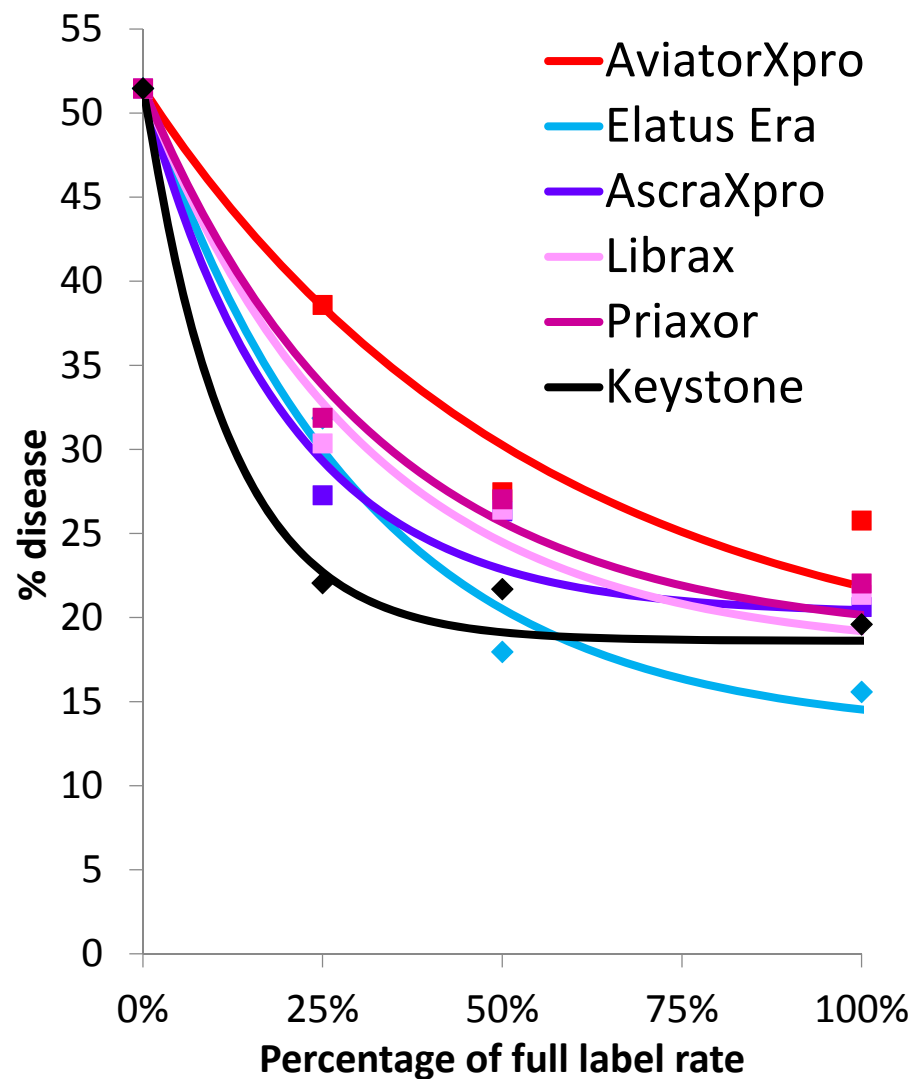


# Yellow rust 2017



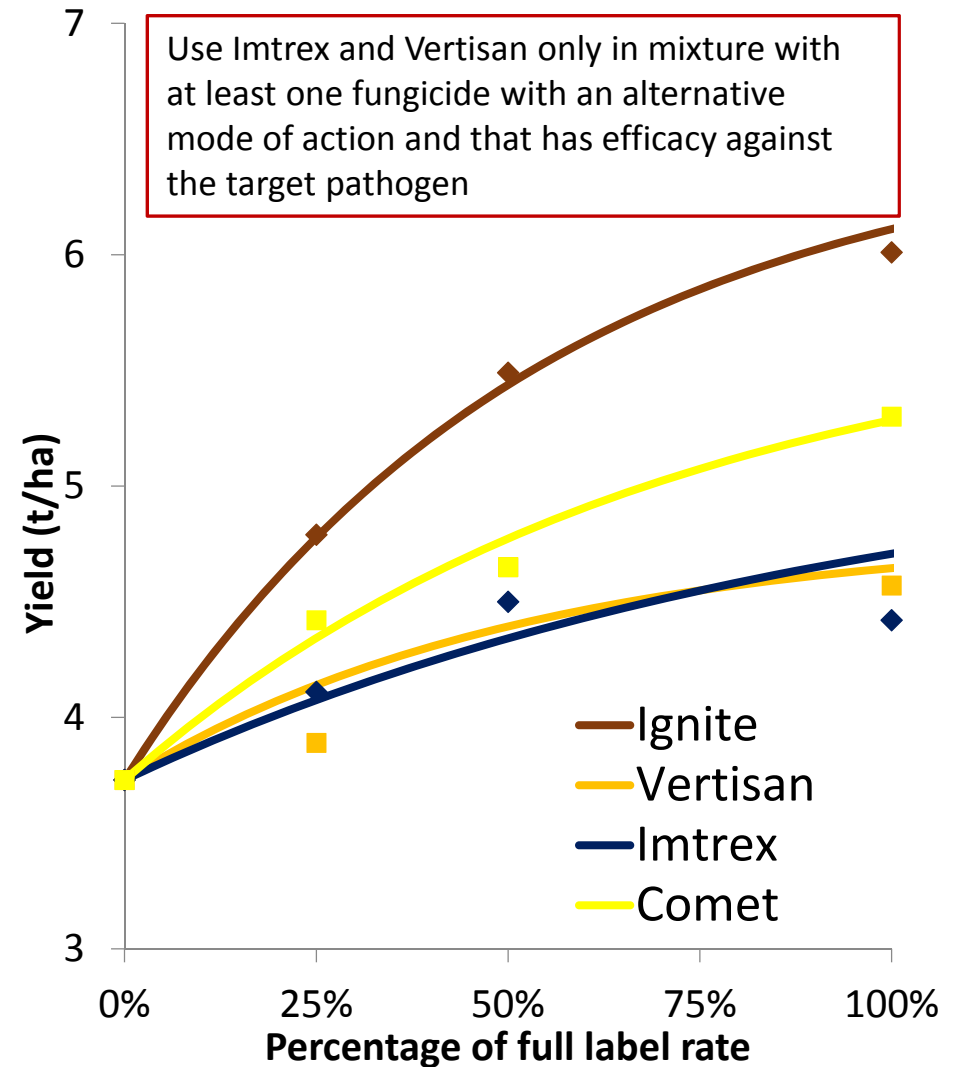
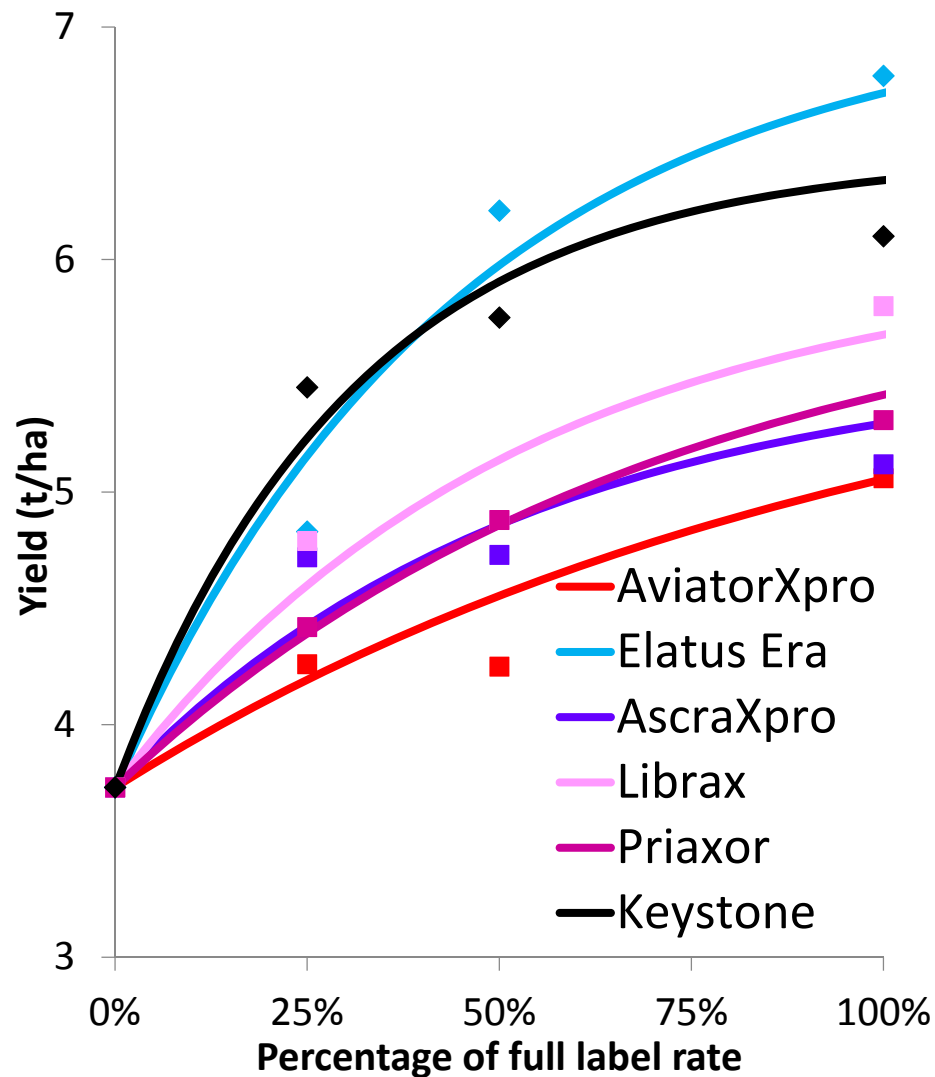
# Yellow rust efficacy

## Three-year mean (2015 to 2017)

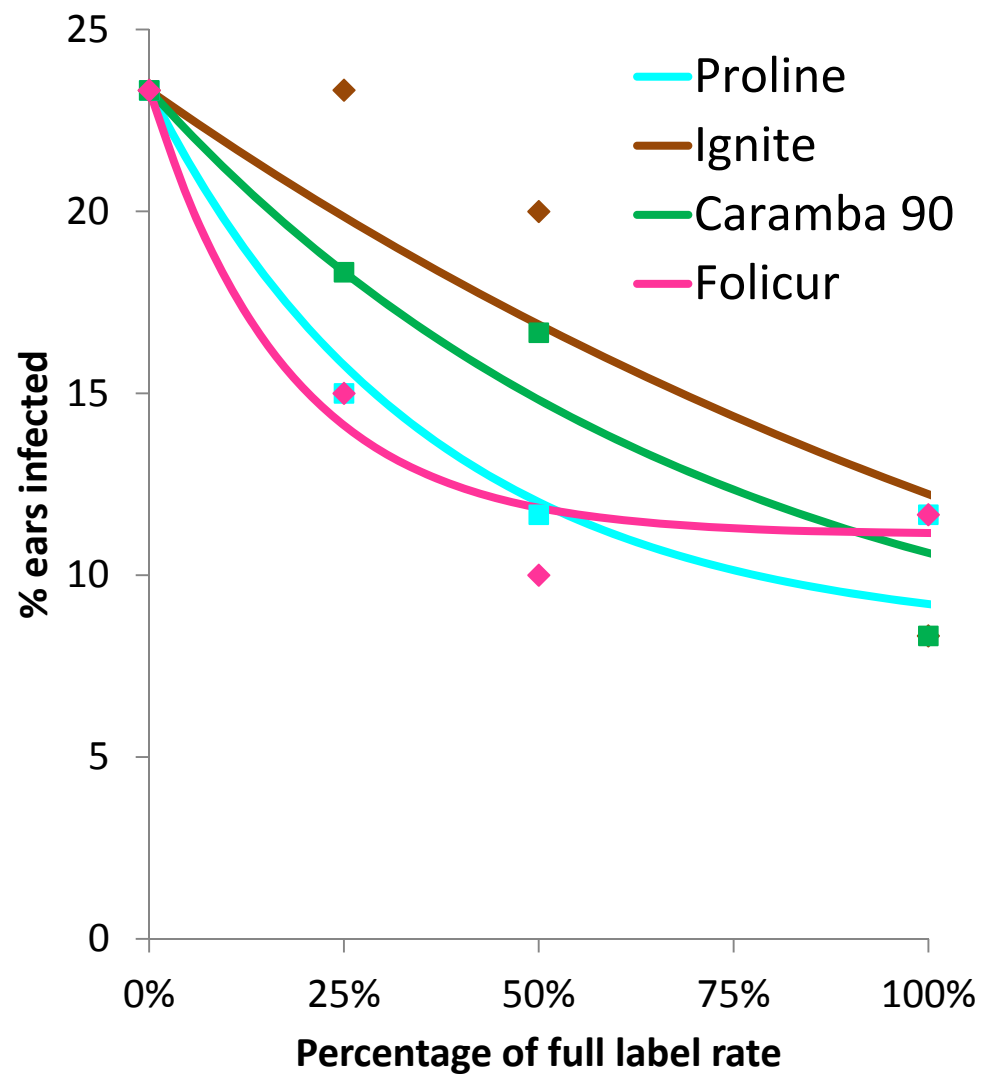


# Yellow rust trial yields

## Three-year mean (2015 to 2017)

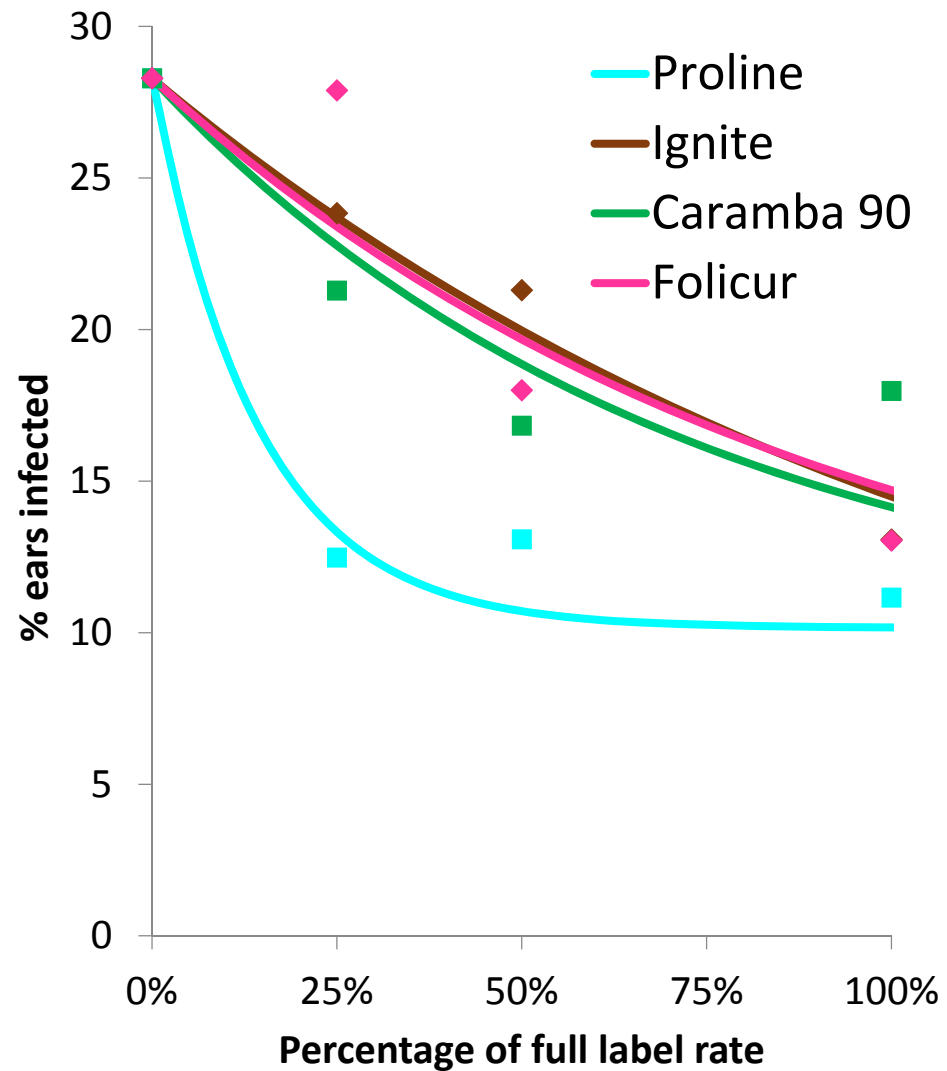


# Fusarium 2017

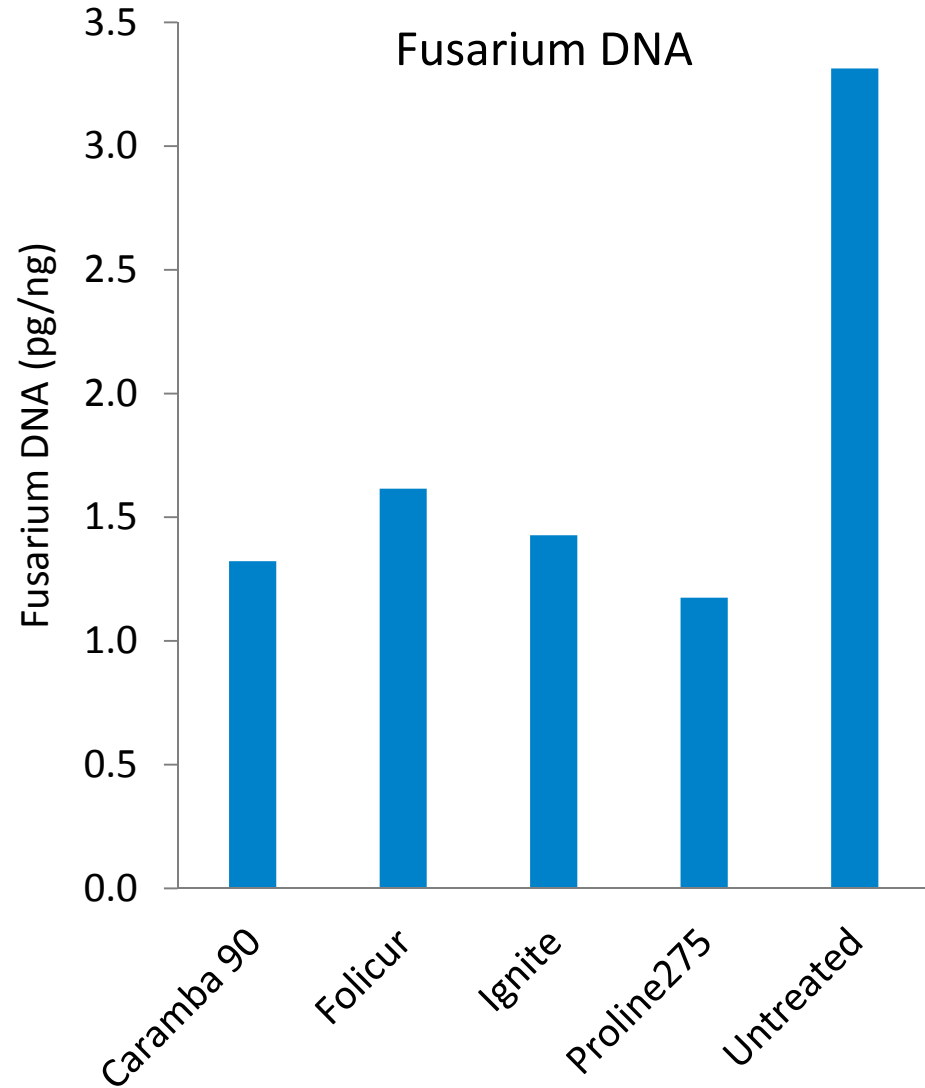
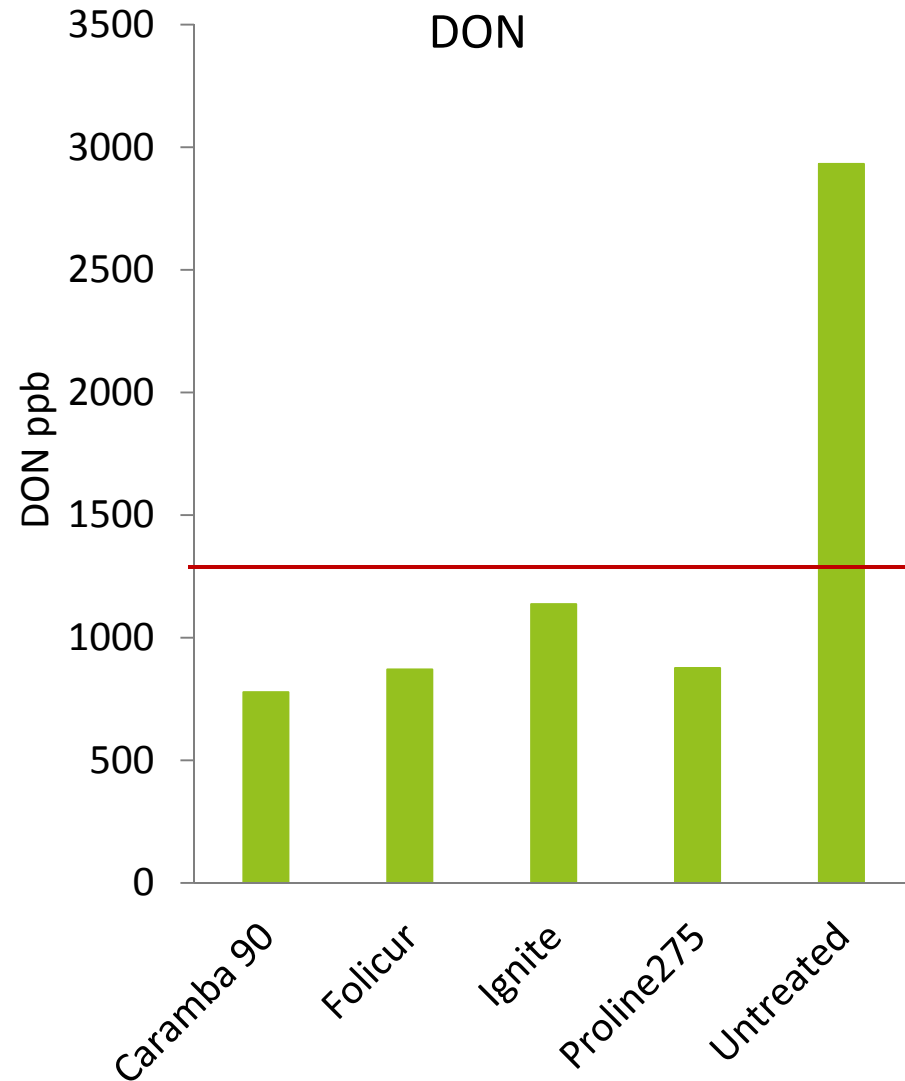


# Fusarium efficacy

Three-year mean (2015 to 2017)

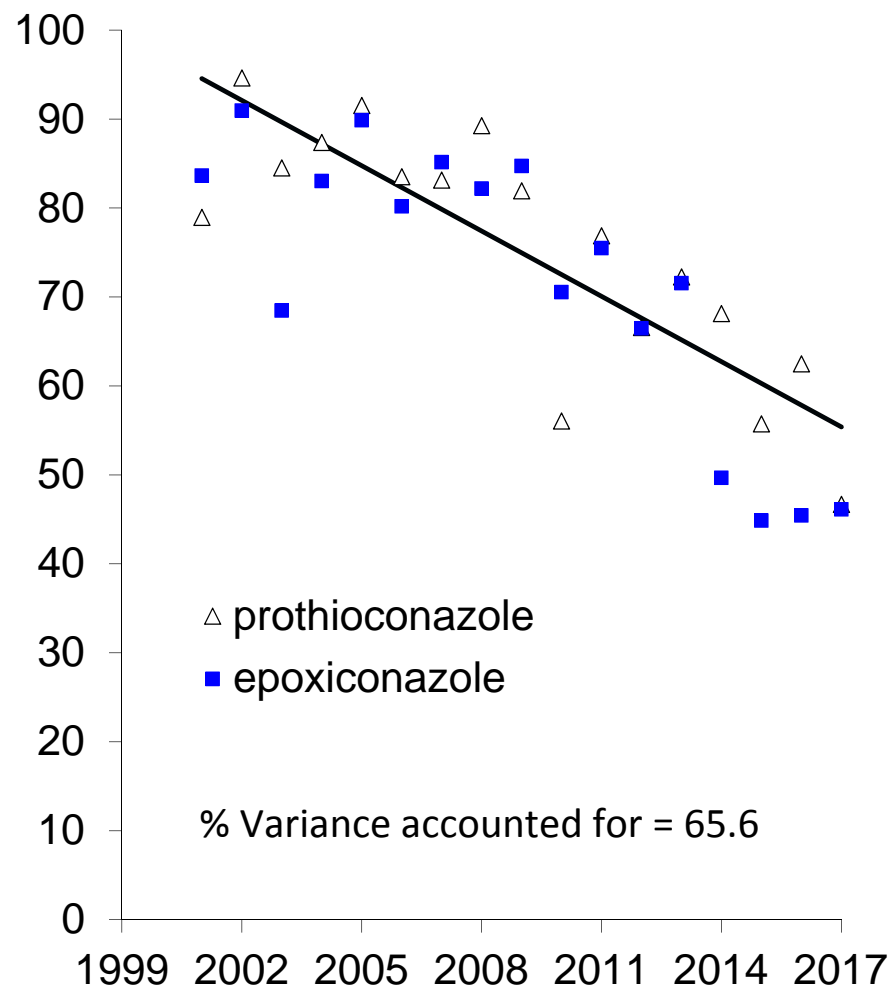


# Fusarium DNA and mycotoxins (2015 to 2017)

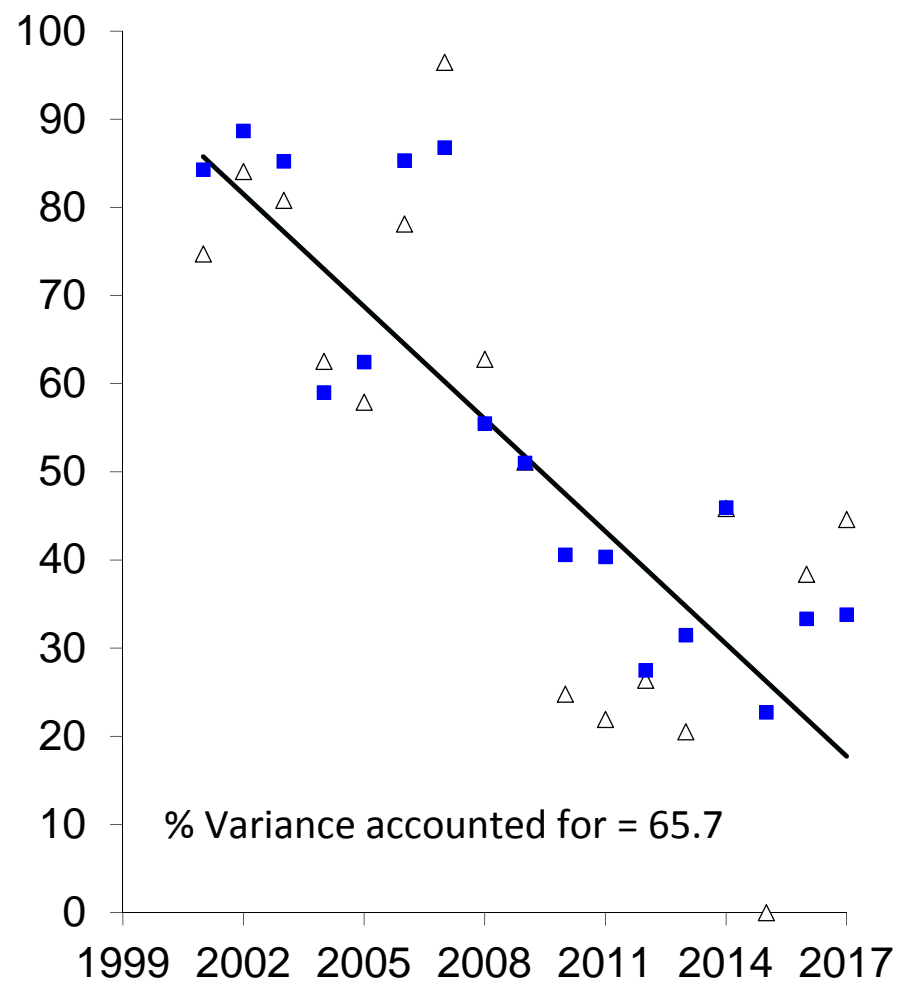


# Azole: septoria activity (full dose)

## Protectant



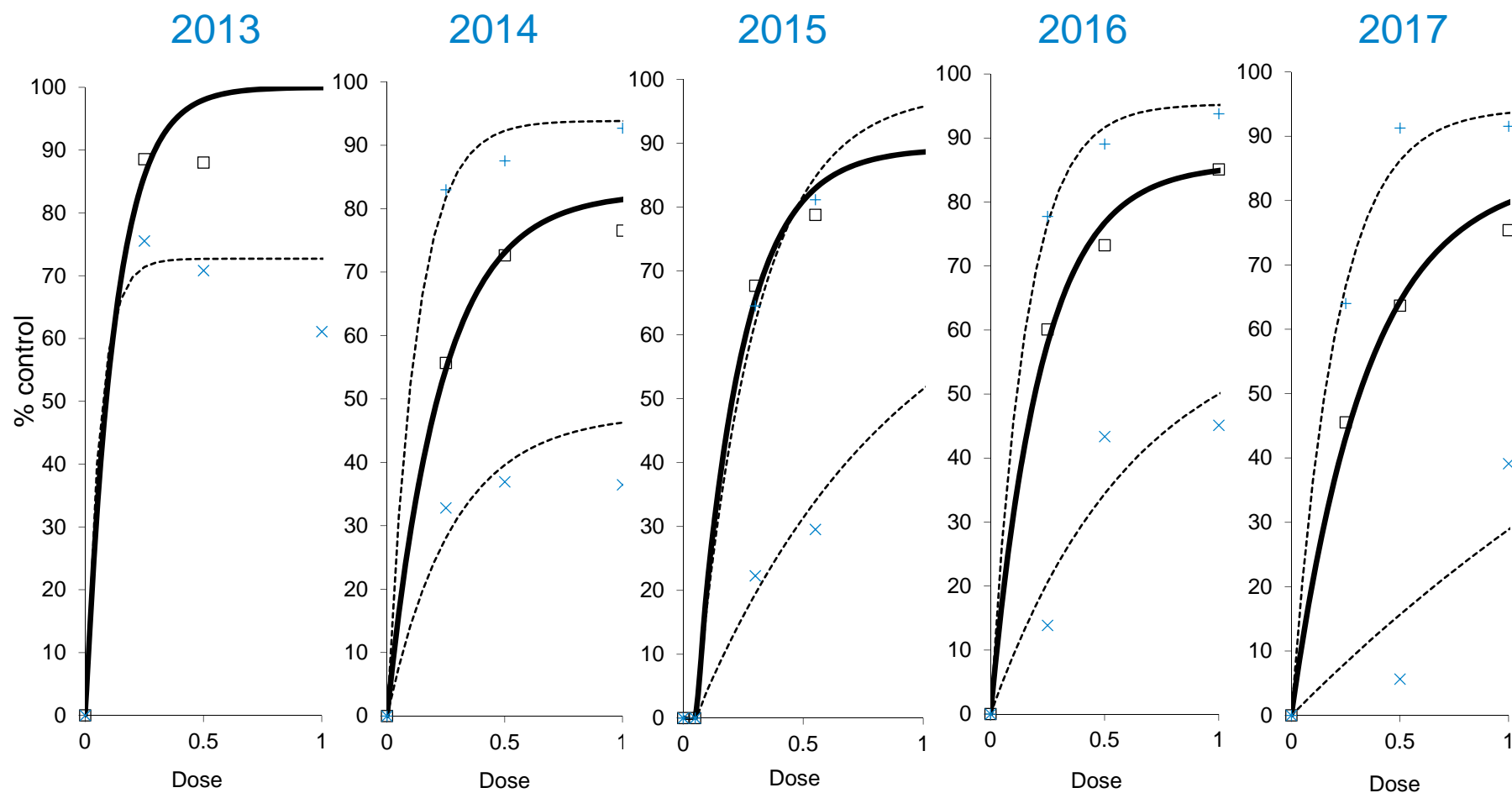
## Curative



Mean value for all sites in fungicide performance trials in each year for percentage control (2001 to 2017)



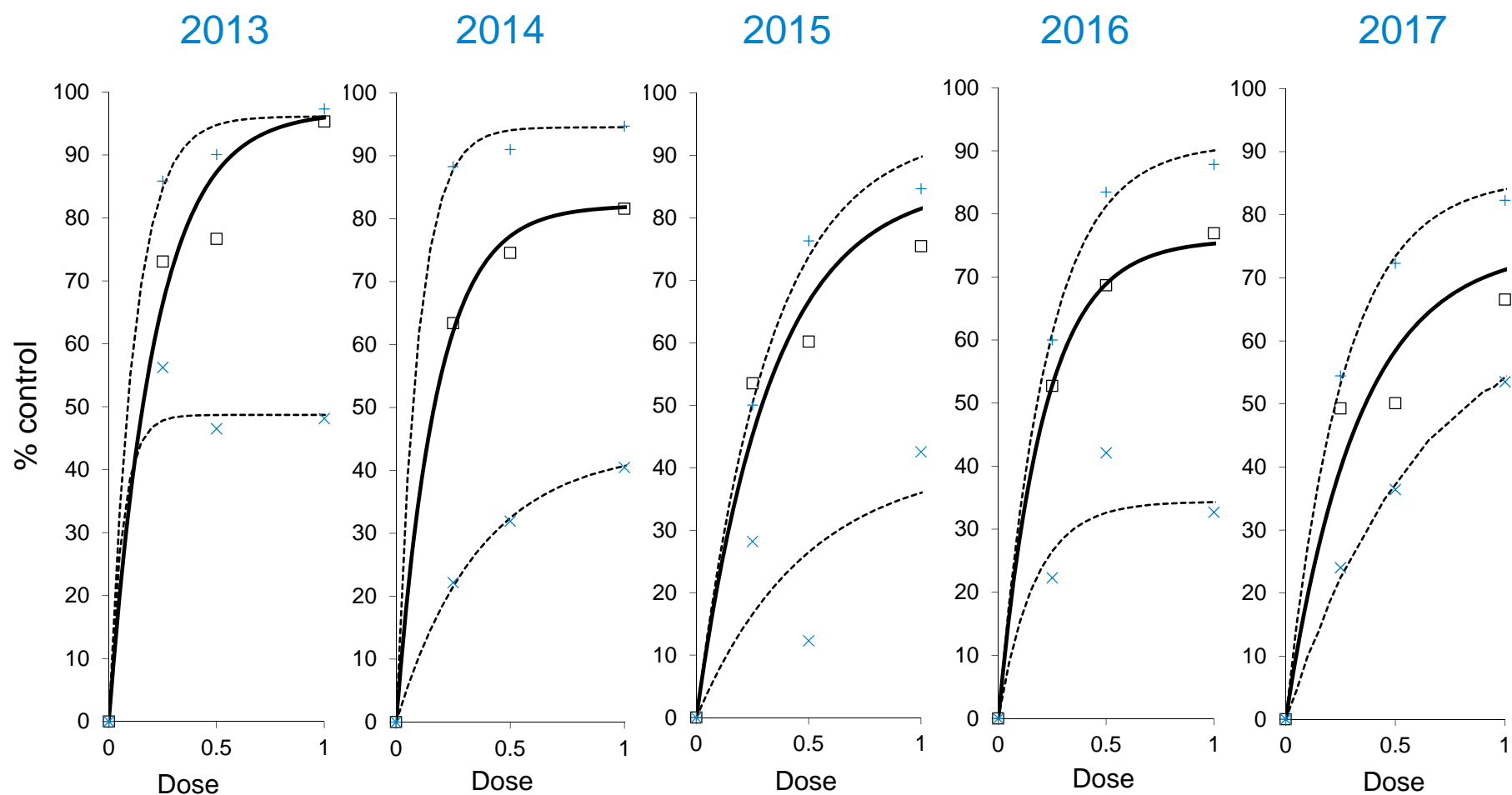
# SDHIs (Imtrex): septoria tritici control (2013 to 2017, protectant situations)



Bold lines show the mean response in each year.

Dotted lines show the highest and lowest percentage control achieved.

# SDHIs (Vertisan): septoria tritici control (2013 to 2017, protectant situations)



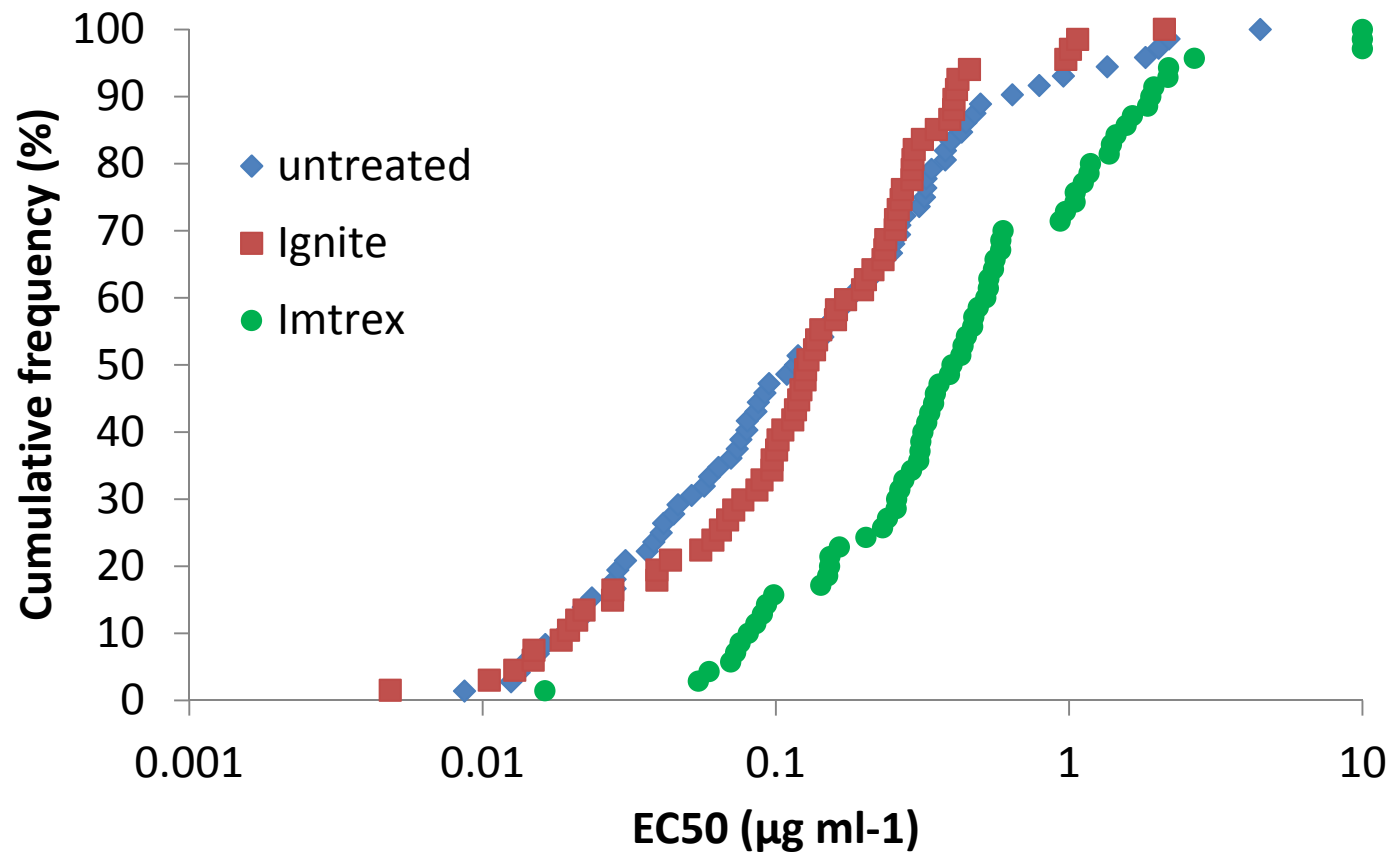
Bold lines show the mean response in each year.

Dotted lines show the highest and lowest percentage control achieved.

# Are we selecting for less sensitivity? (2017 treatments in FP trials)

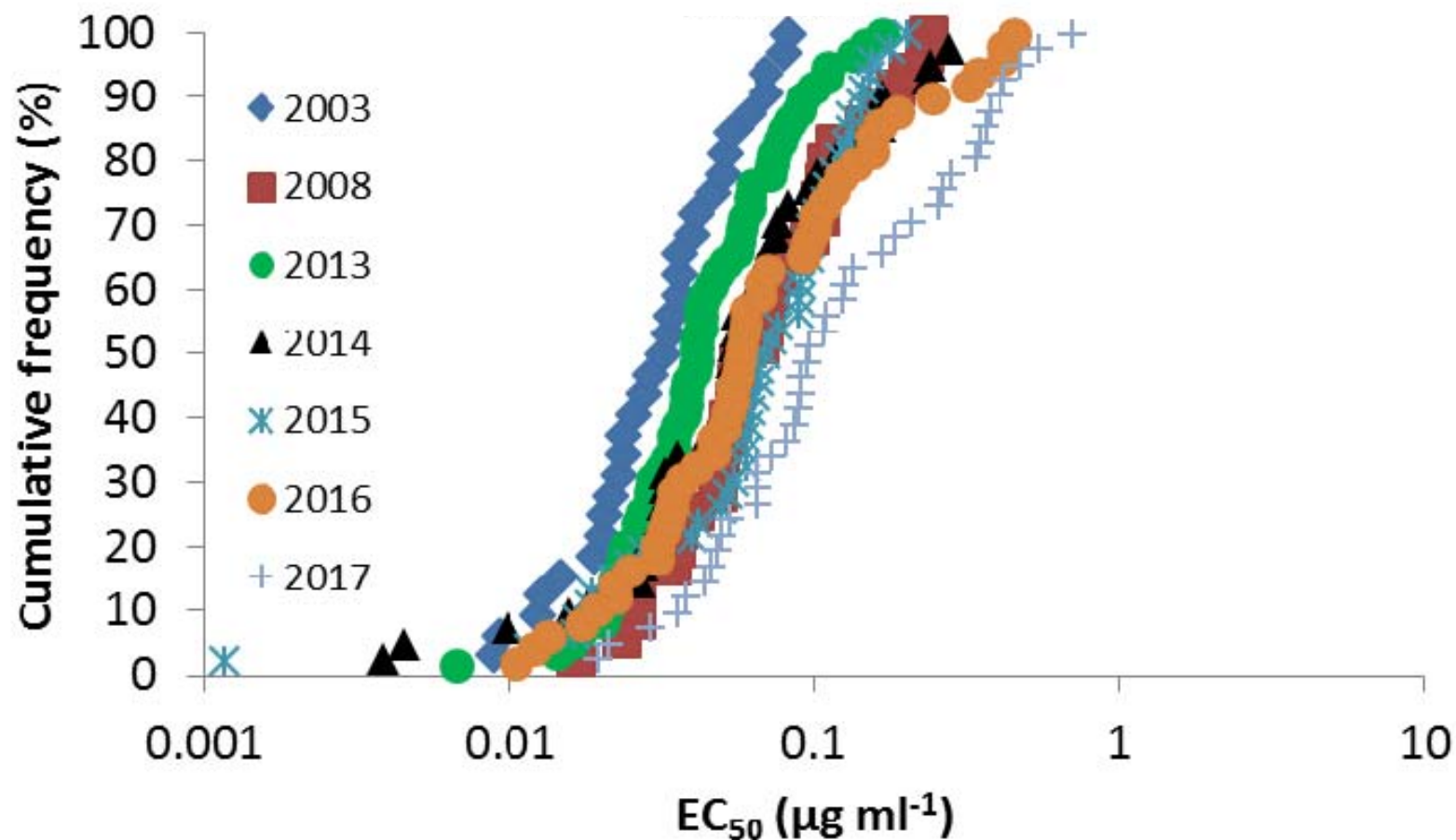


SDHI sensitivity (post treatment application)



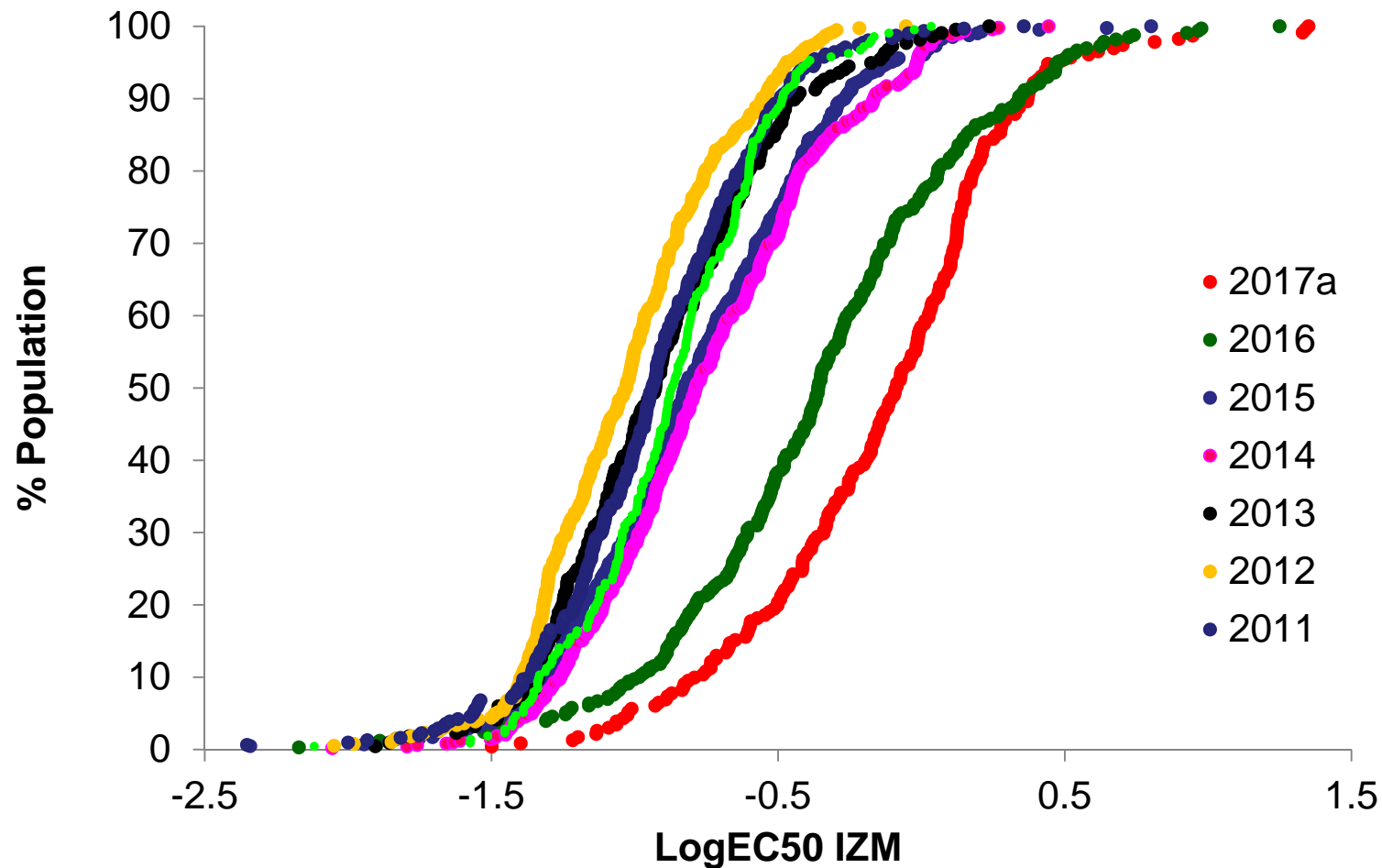
Single AHDB site from 2017 (SDHI = bixafen. Data courtesy of Bart Fraaije, Rothamsted Research)

# Septoria sensitivity to SDHIs (lab tests) (early spring 2017)



Data courtesy of Bart Fraaije, Rothamsted Research. SDHI = bixafen

# SDHI sensitivity (laboratory) Ireland 2011 to 2017



Data courtesy of S. Kildea, Teagasc

# Fungicide performance for wheat summary

- Septoria tritici
  - SDHIs highly active but some evidence of decline in efficacy
  - Elatus Era, Librax and Ascra comparable for protection
  - Use azoles and multisites to slow resistance development
- Rusts
  - Epoxiconazole highly effective in curative situations
  - Pyraclostrobin showed good activity (especially on yellow rust)
  - New SDHI Elatus Era, highly effective on yellow and brown rust
- Fusarium
  - Prothioconazole leads. Metconazole, tebuconazole, and epoxiconazole are all close behind

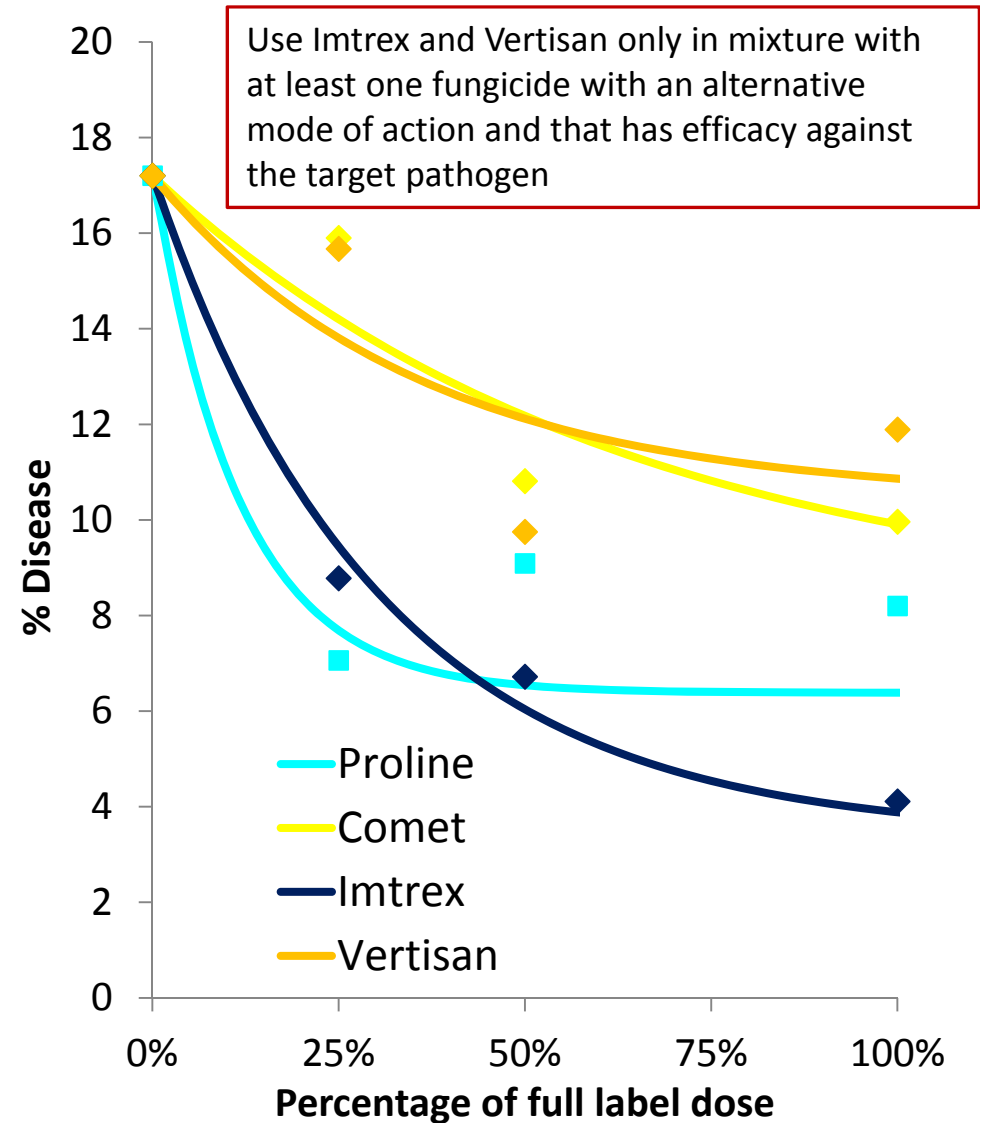
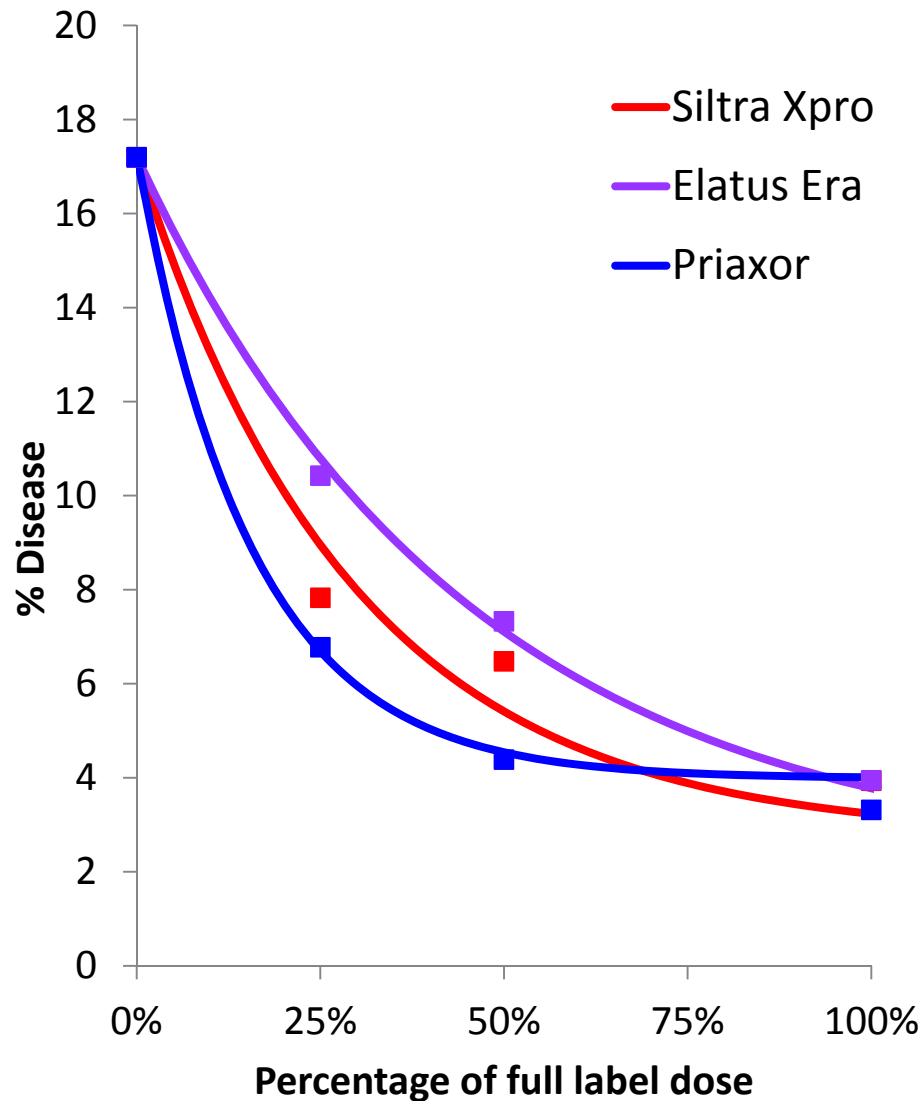
# Fungicide performance update for barley

# Barley targets and sites in harvest year 2017

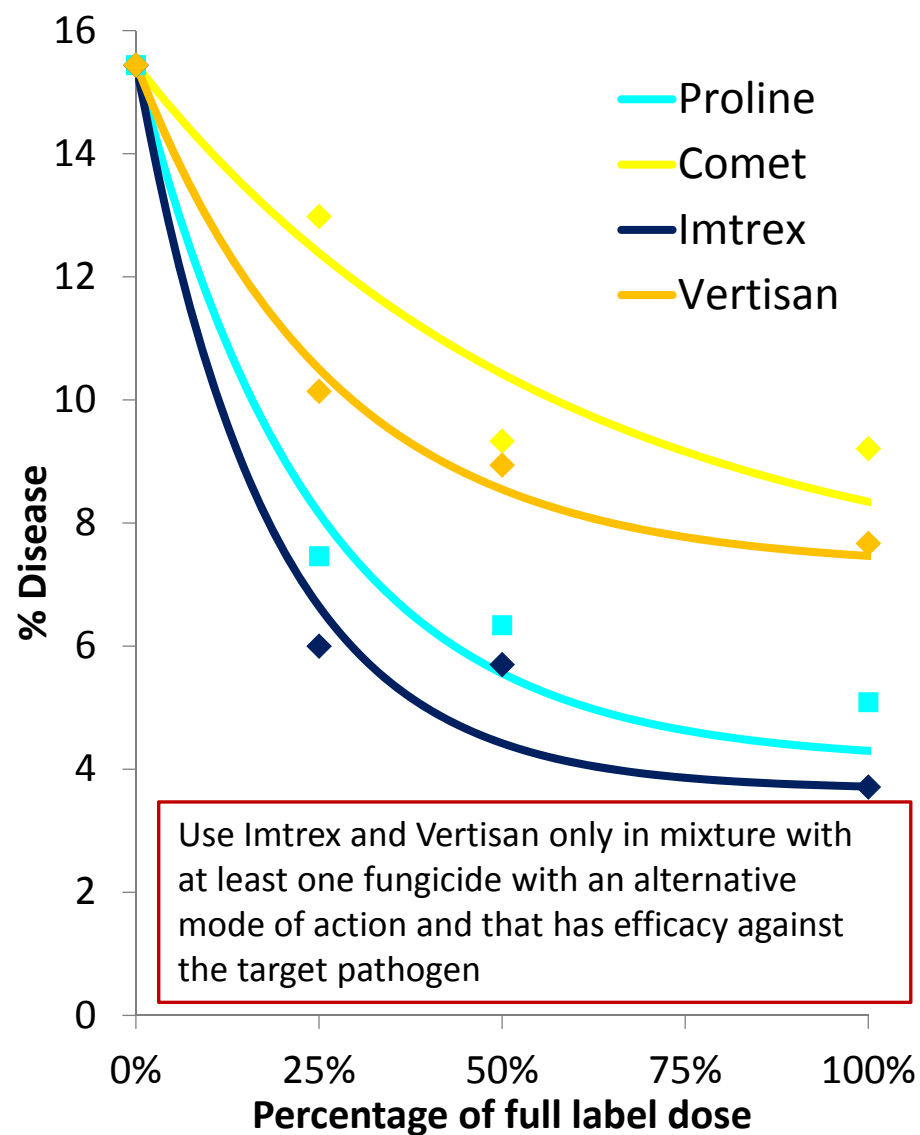
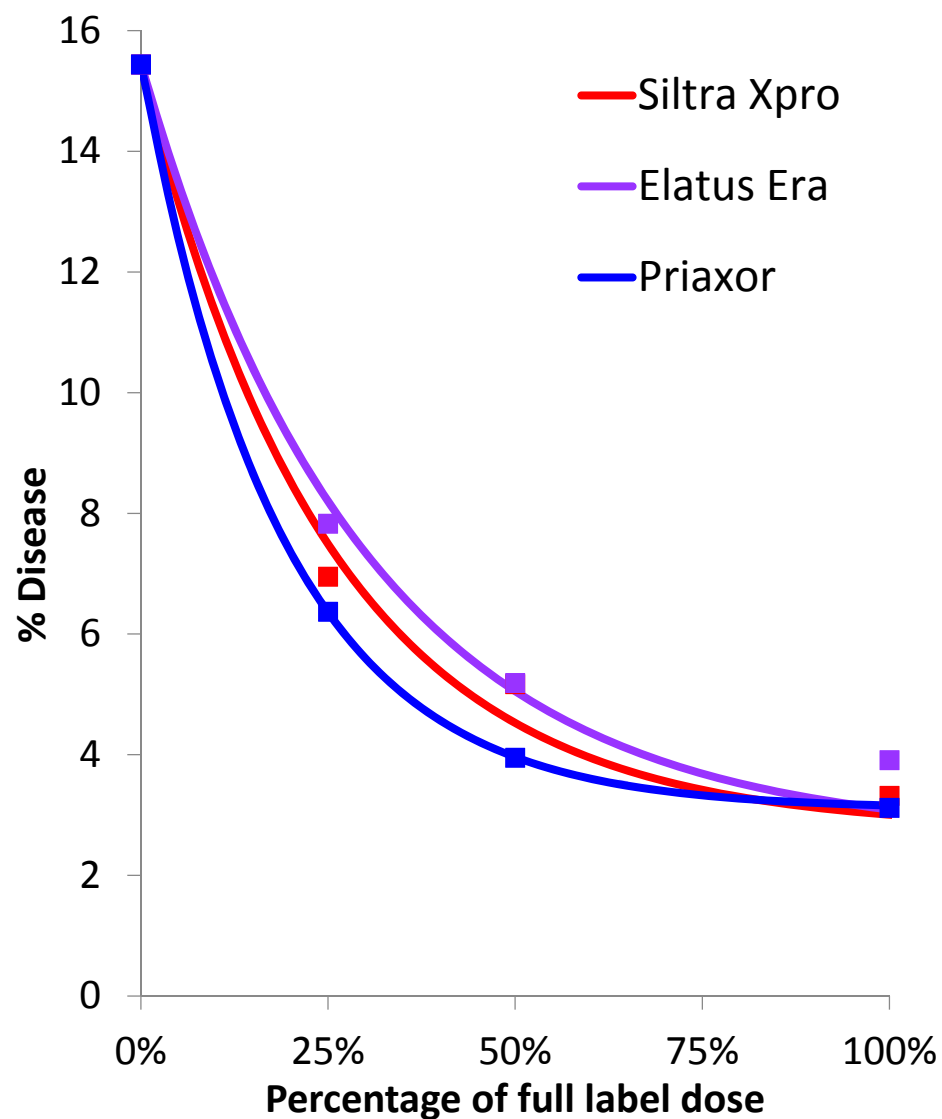
Target disease	Sites	Number of trials
Powdery mildew	Midlothian	1
Rhynchosporium	Lanark, Carlow, and Cardigan	3
Net blotch	Norfolk and East Yorkshire	2
Ramularia	Scotland	1



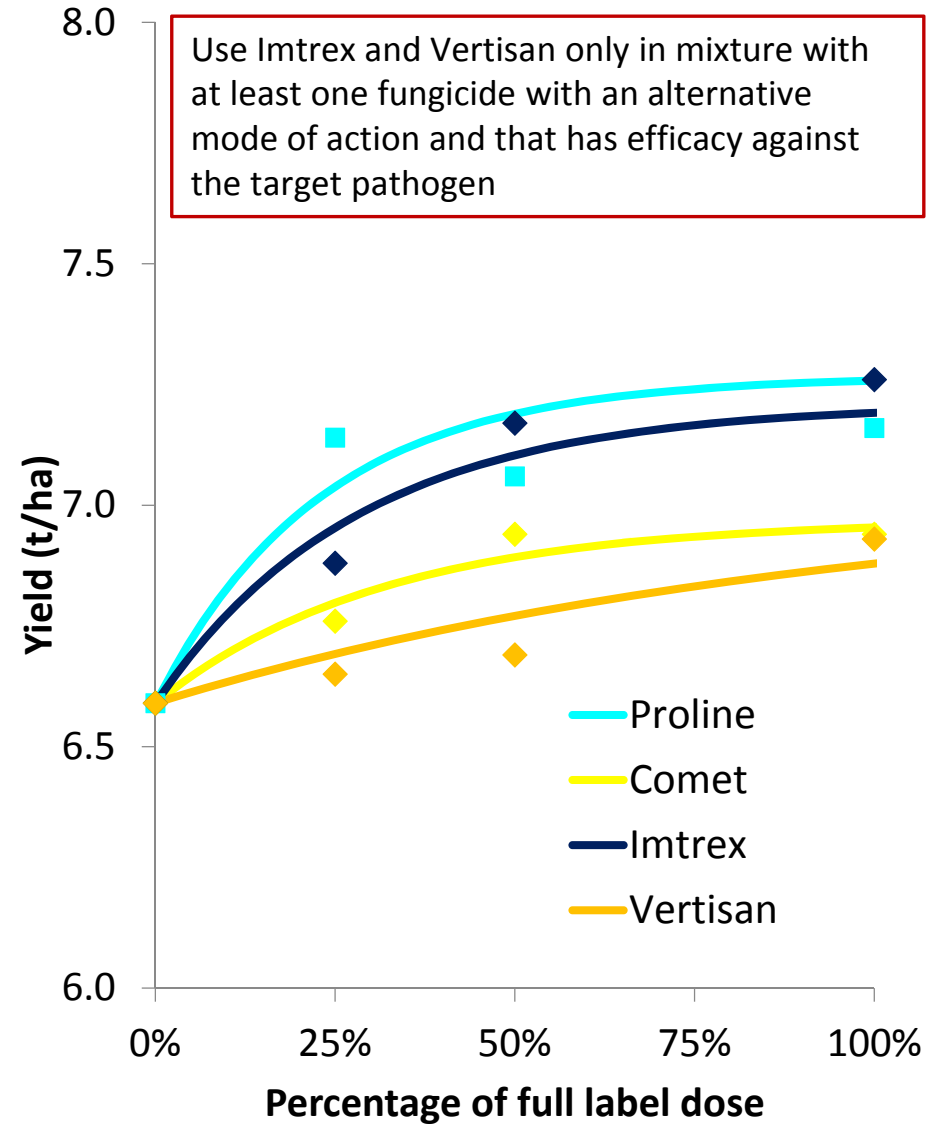
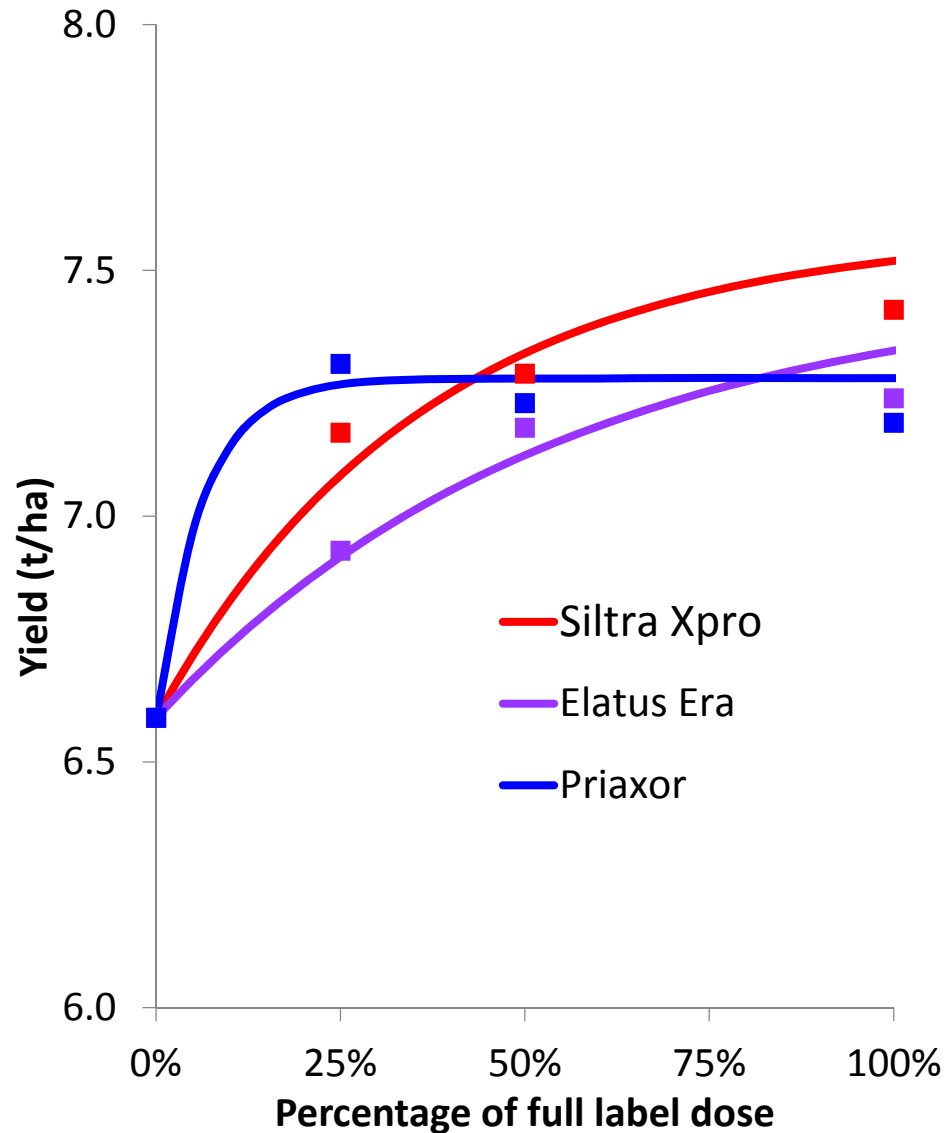
# Rhynchosporium protection 2017 (n=2)



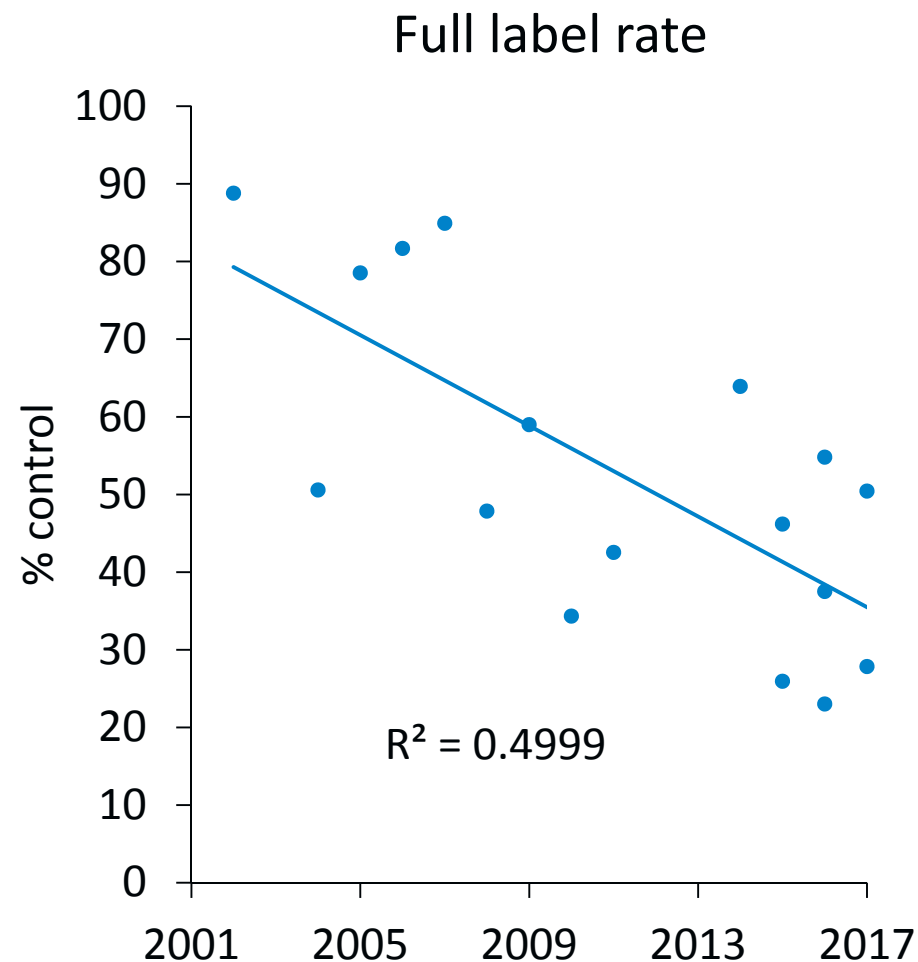
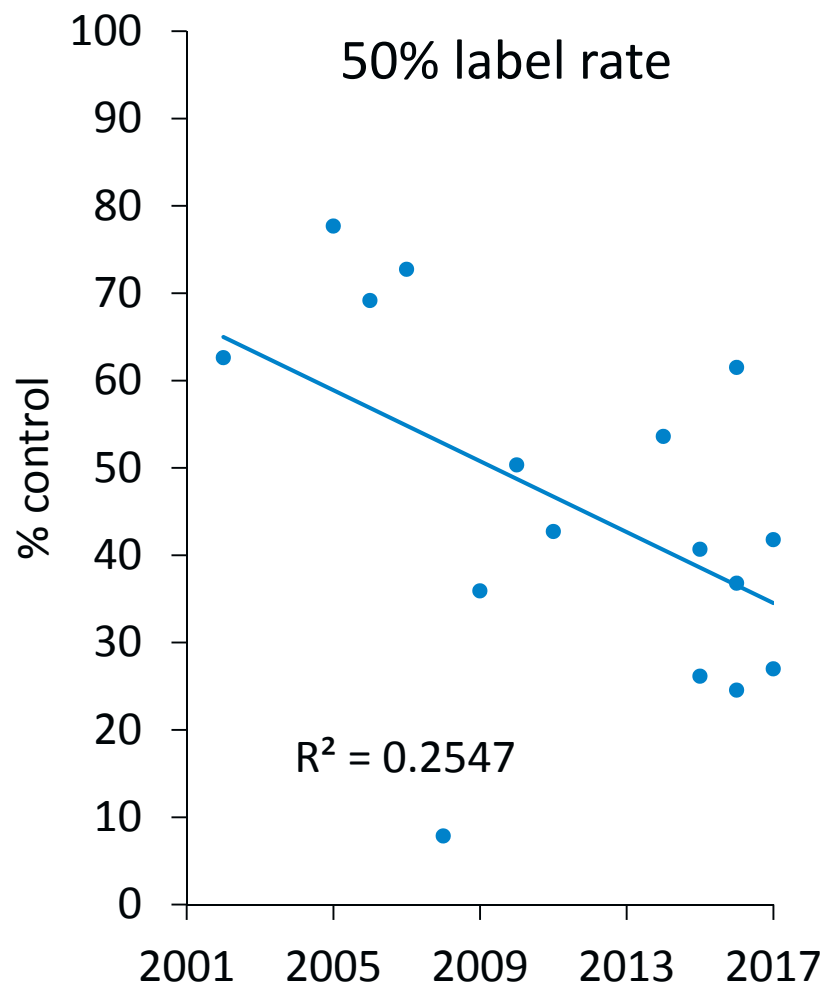
# Rhynchosporium protectant data (2015 to 2017)



# Rhynchosporium trial yields (2015 to 2017)

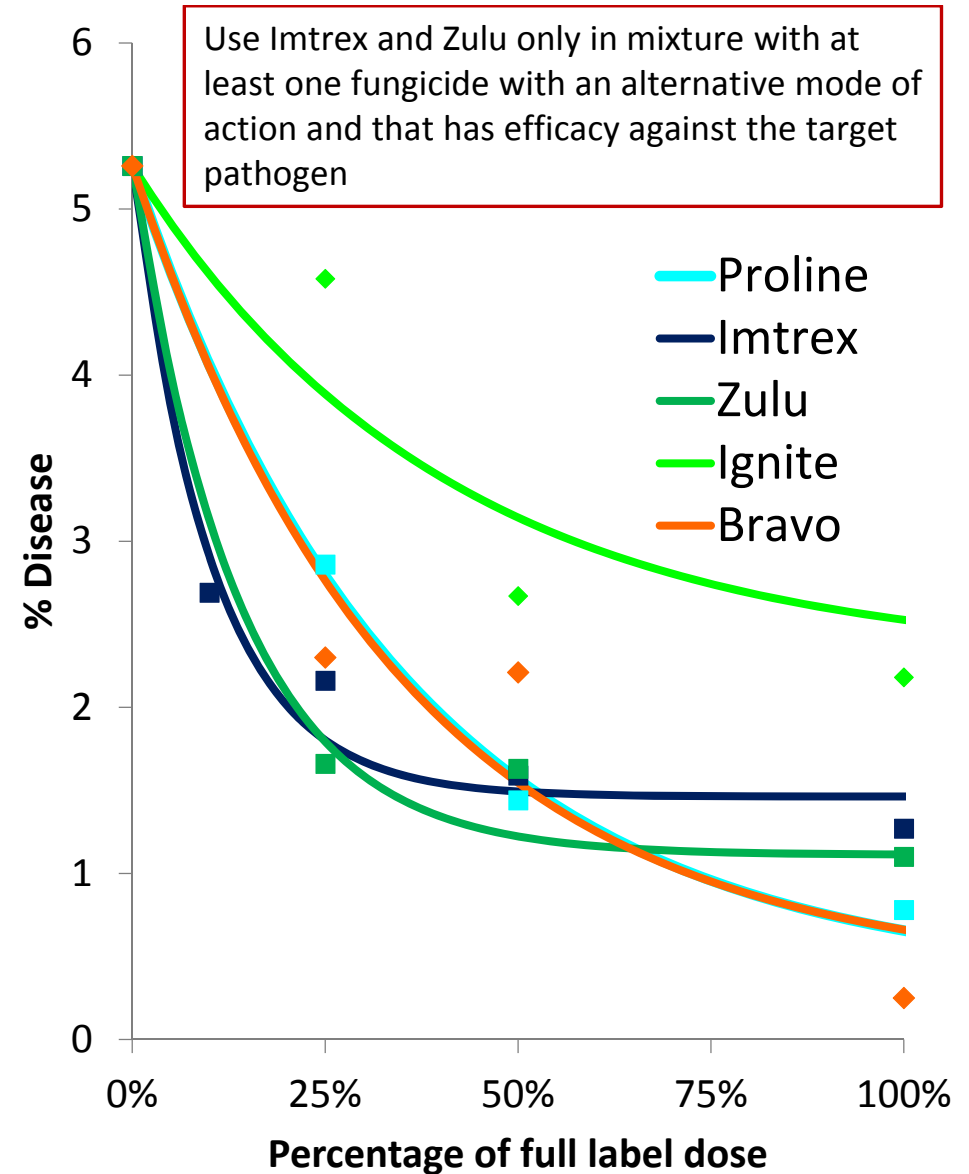
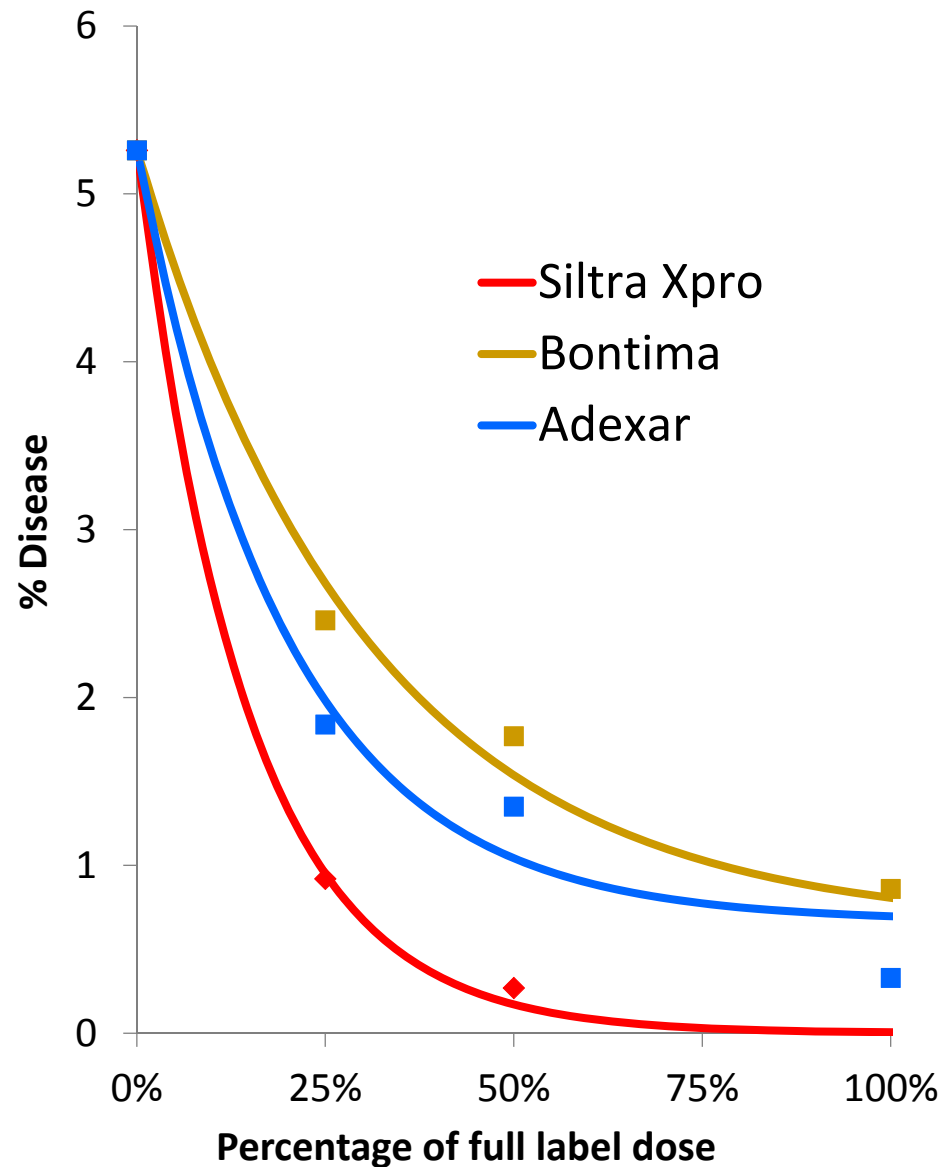


# QoI (strobilurin) efficacy on rhynchosporium (2001 to 2017)

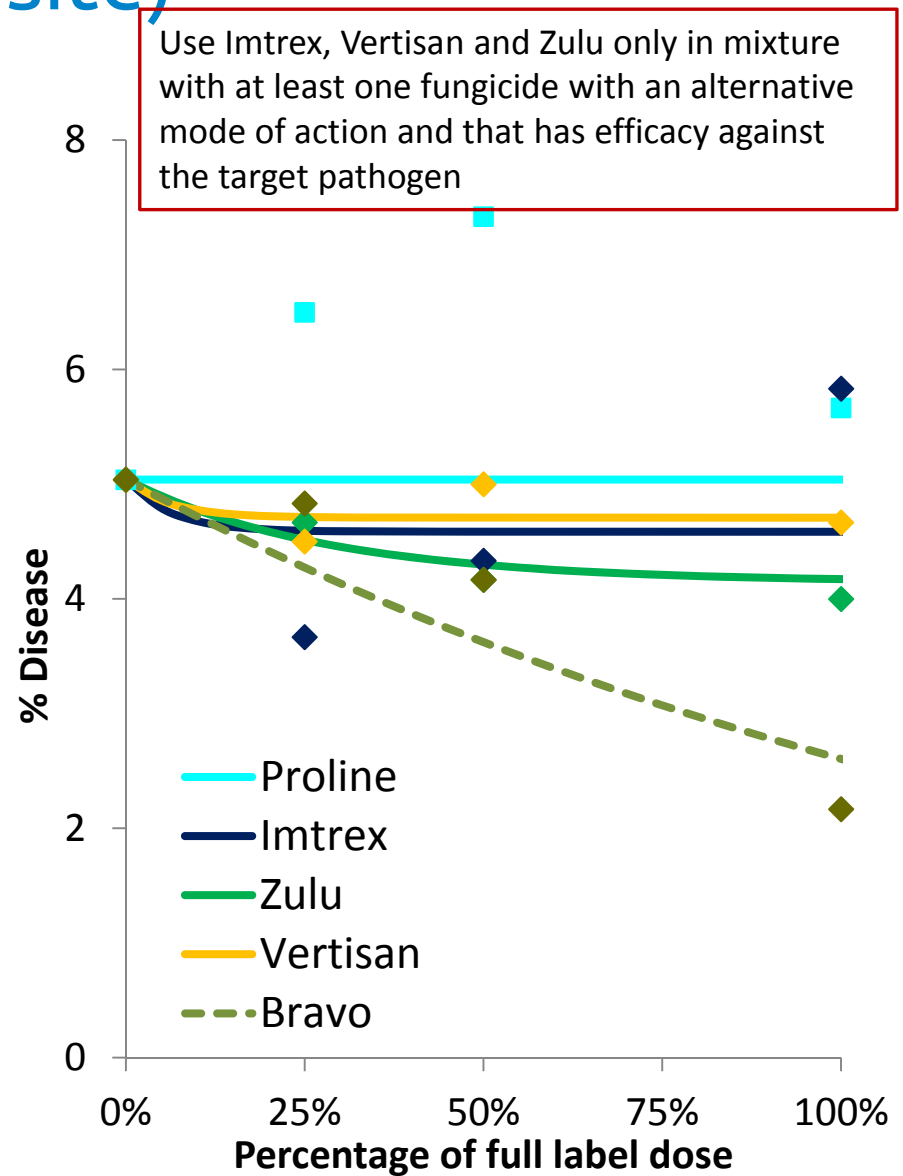
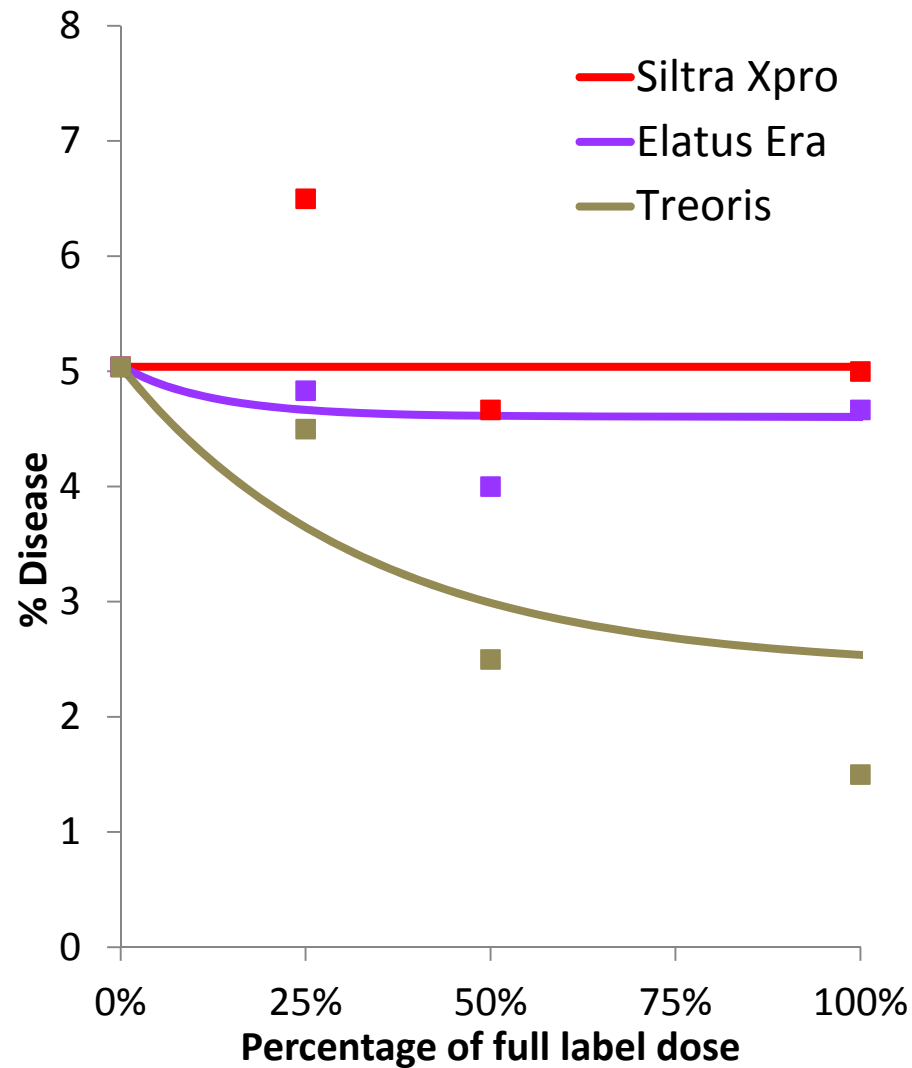


Data based on efficacy of Comet (pyraclostrobin)

## Previously on ramularia: 2011 to 2015 (n=3)

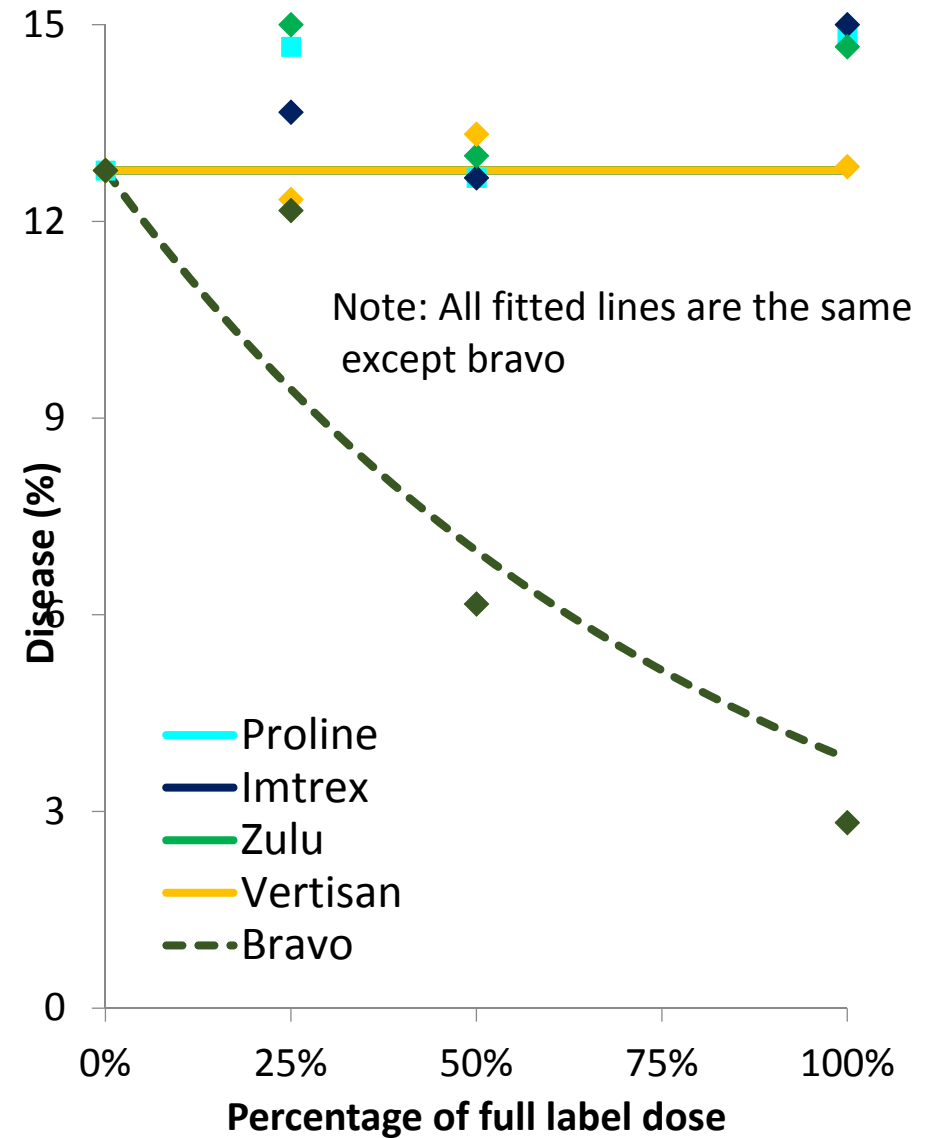
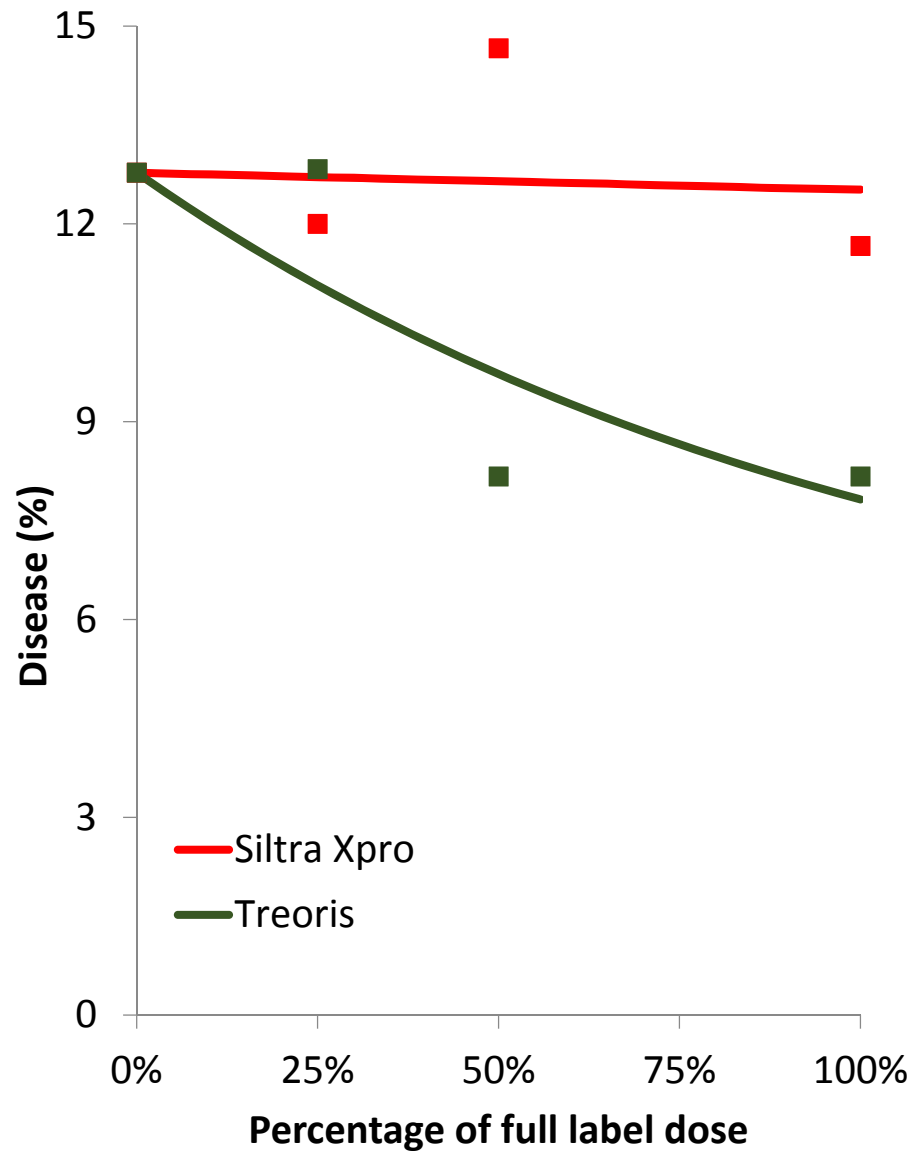


# Ramularia 2017 (single site)

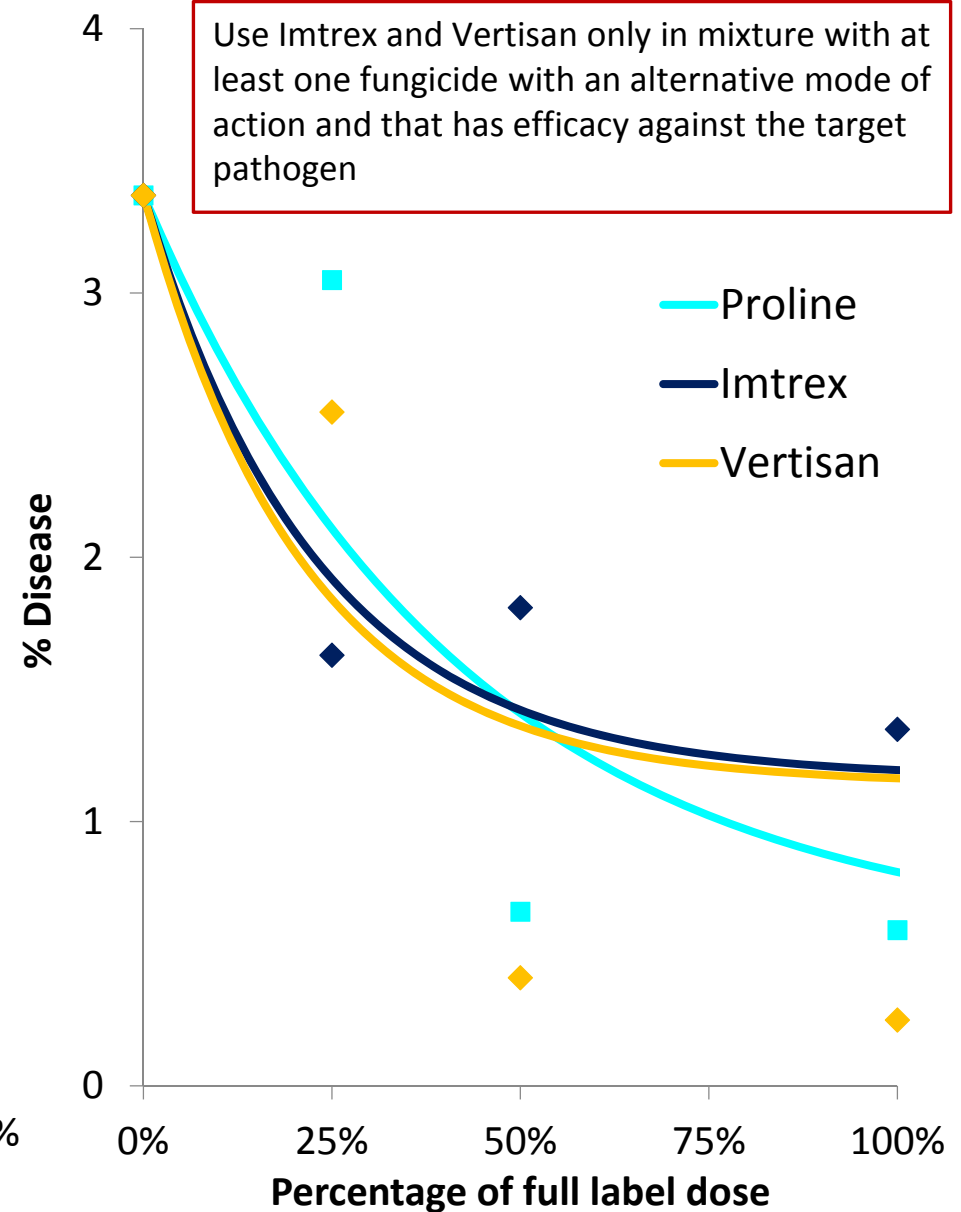
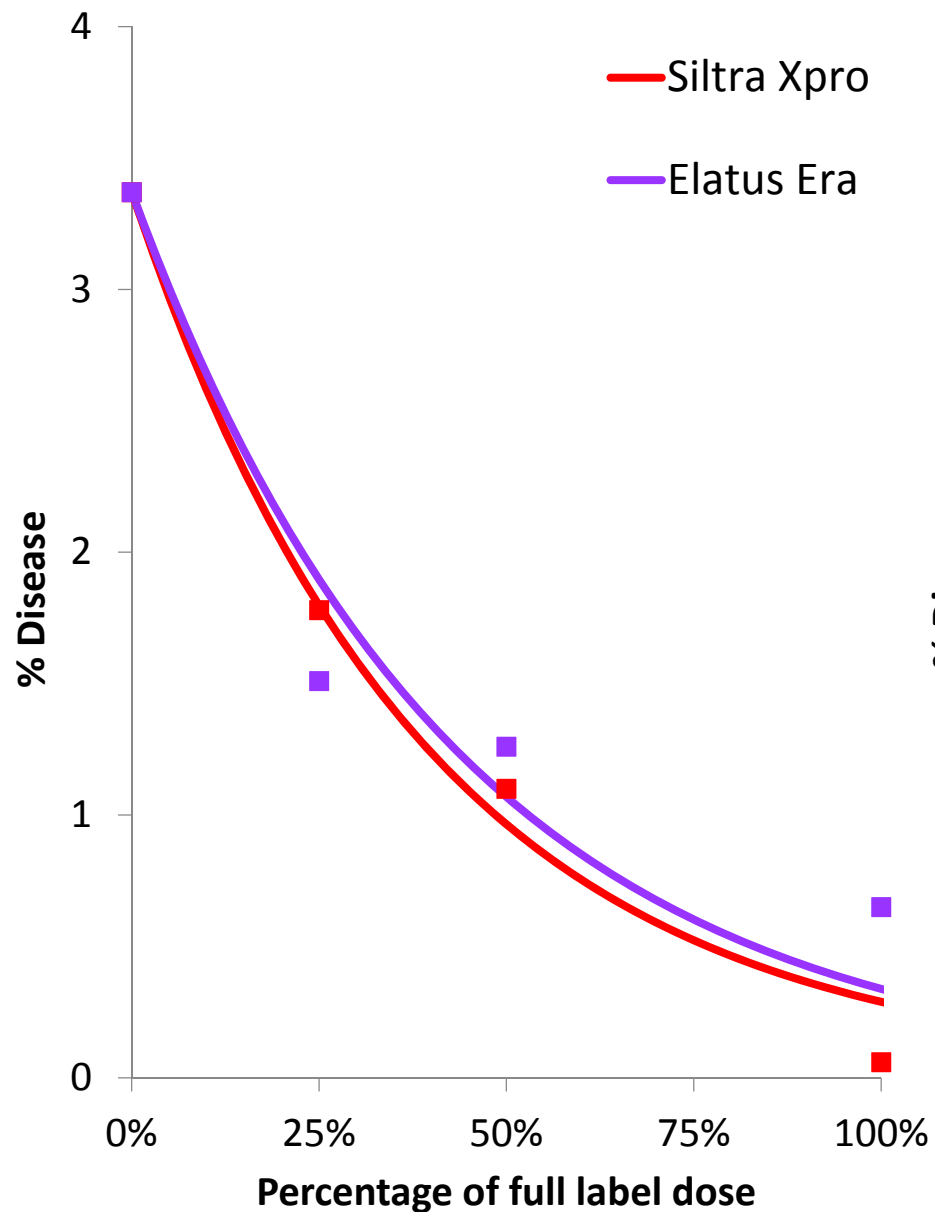


Midlothian 2017 (mean of two leaves)

## SRUC Ramularia - additional trial (Scotland)

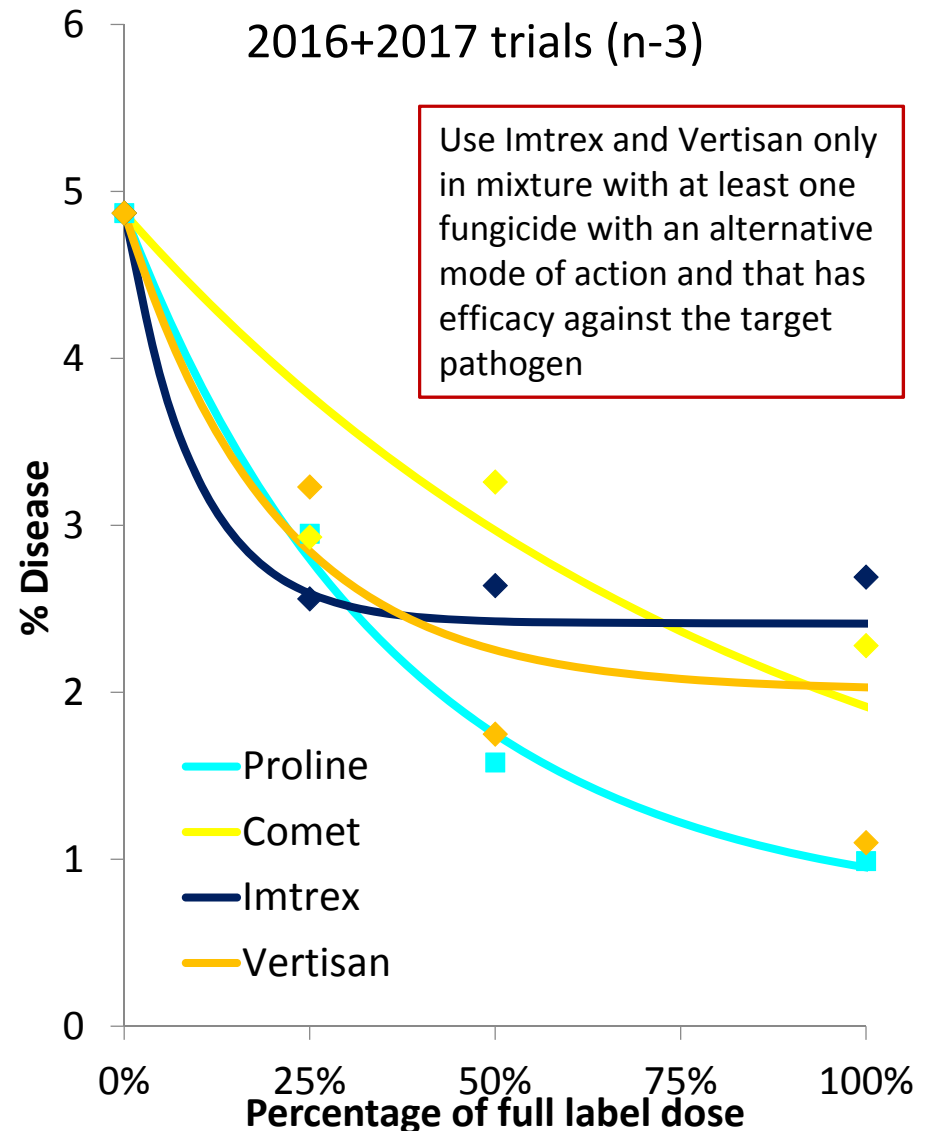
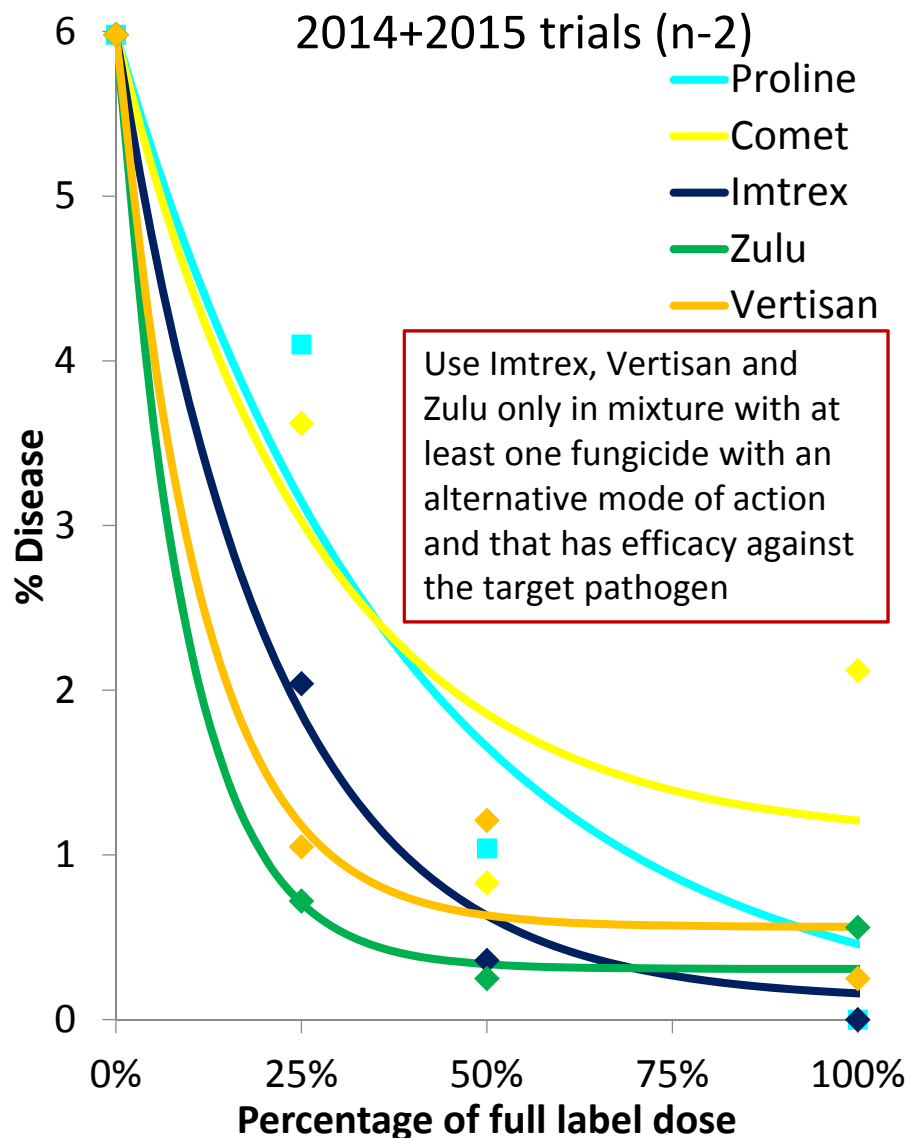


# Net blotch 2017 (two sites)

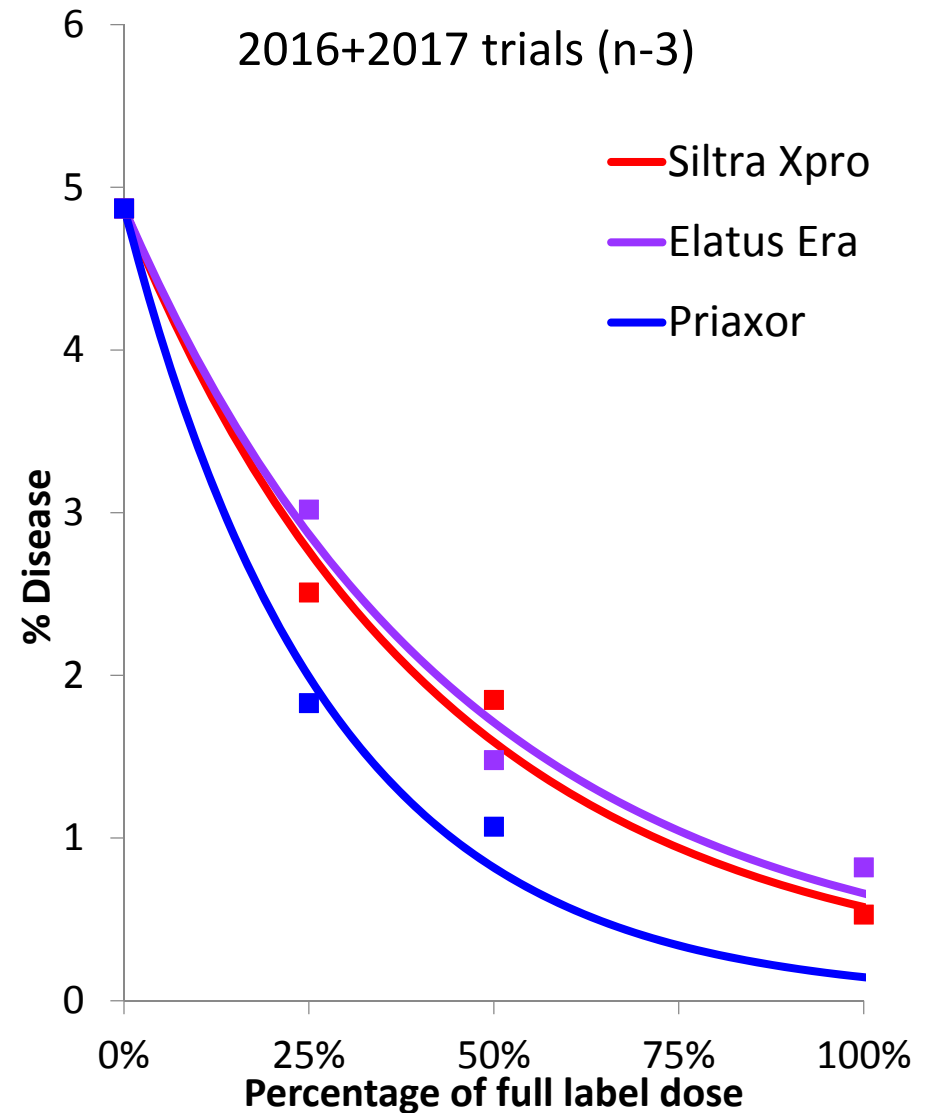
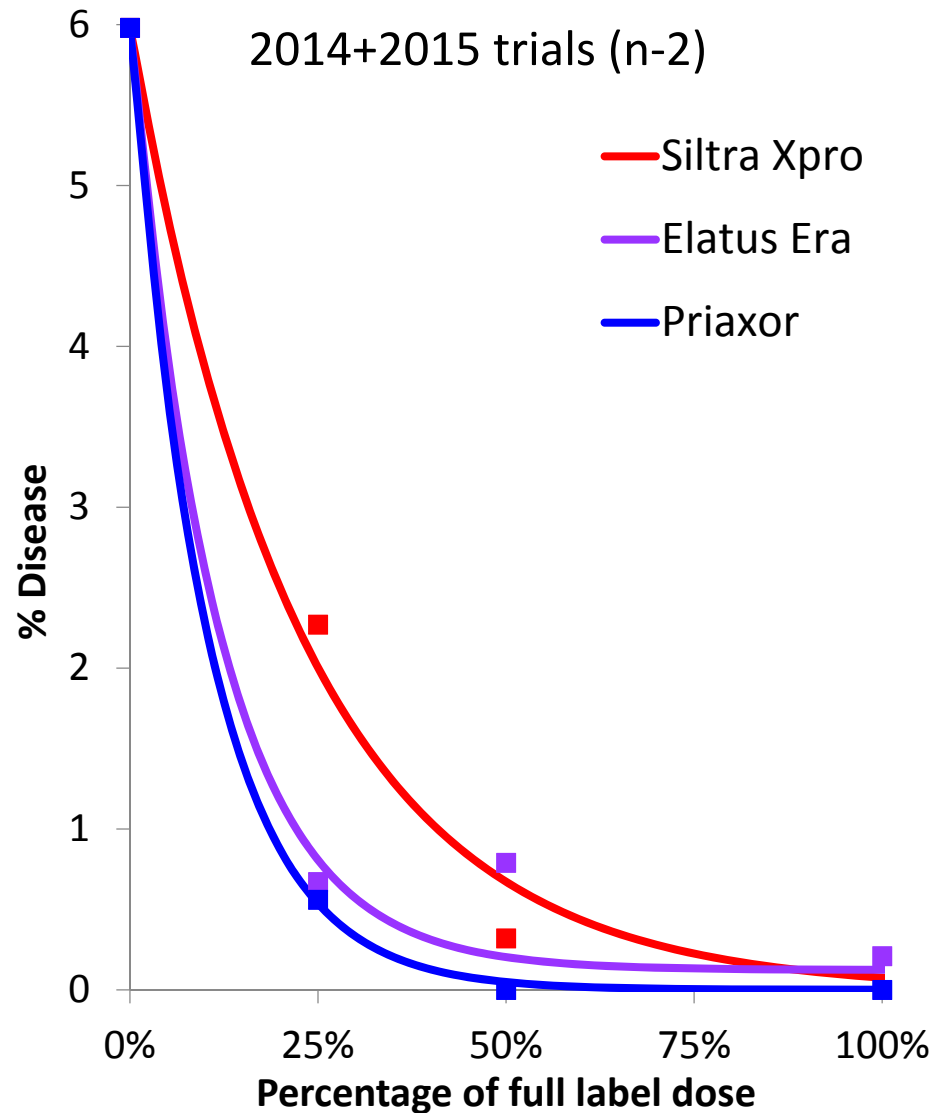




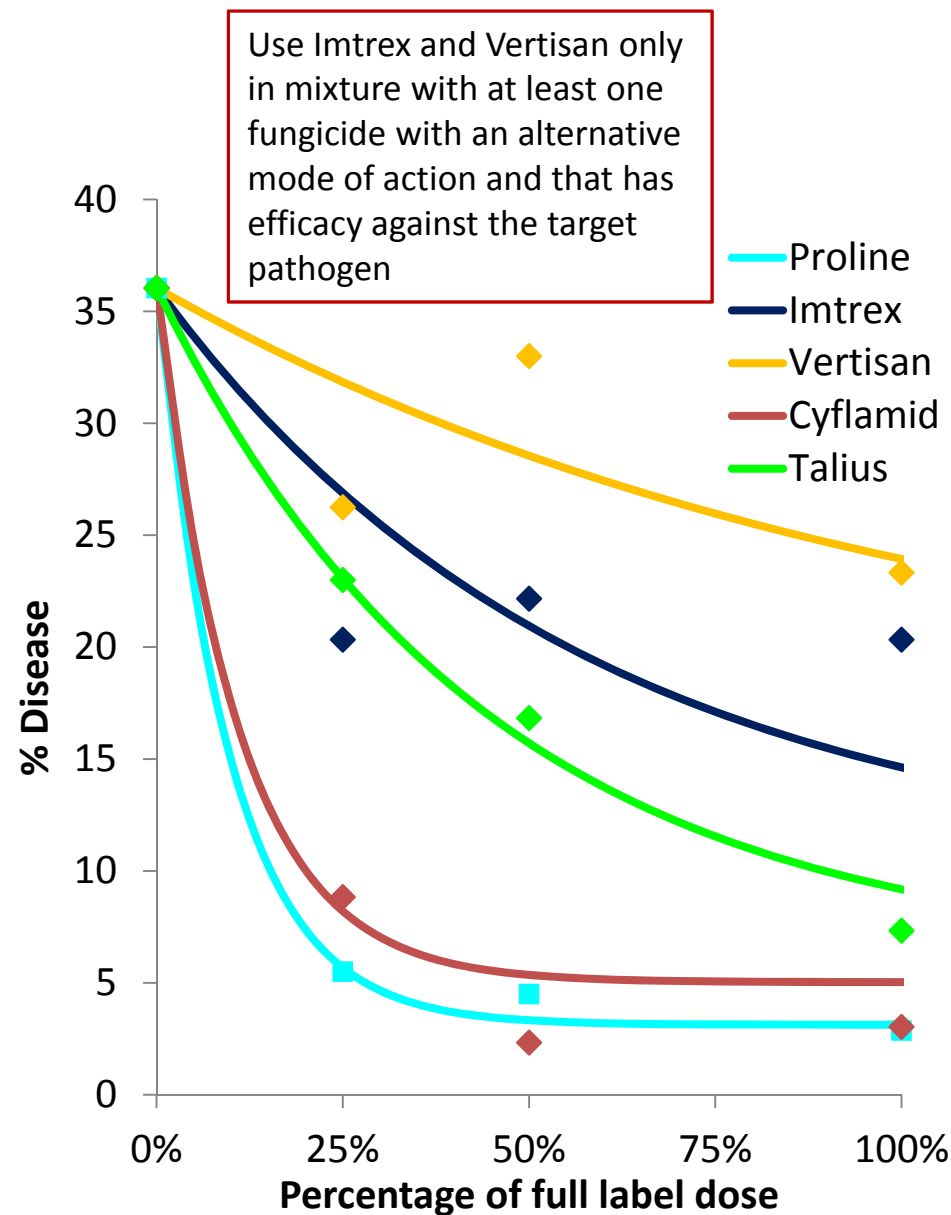
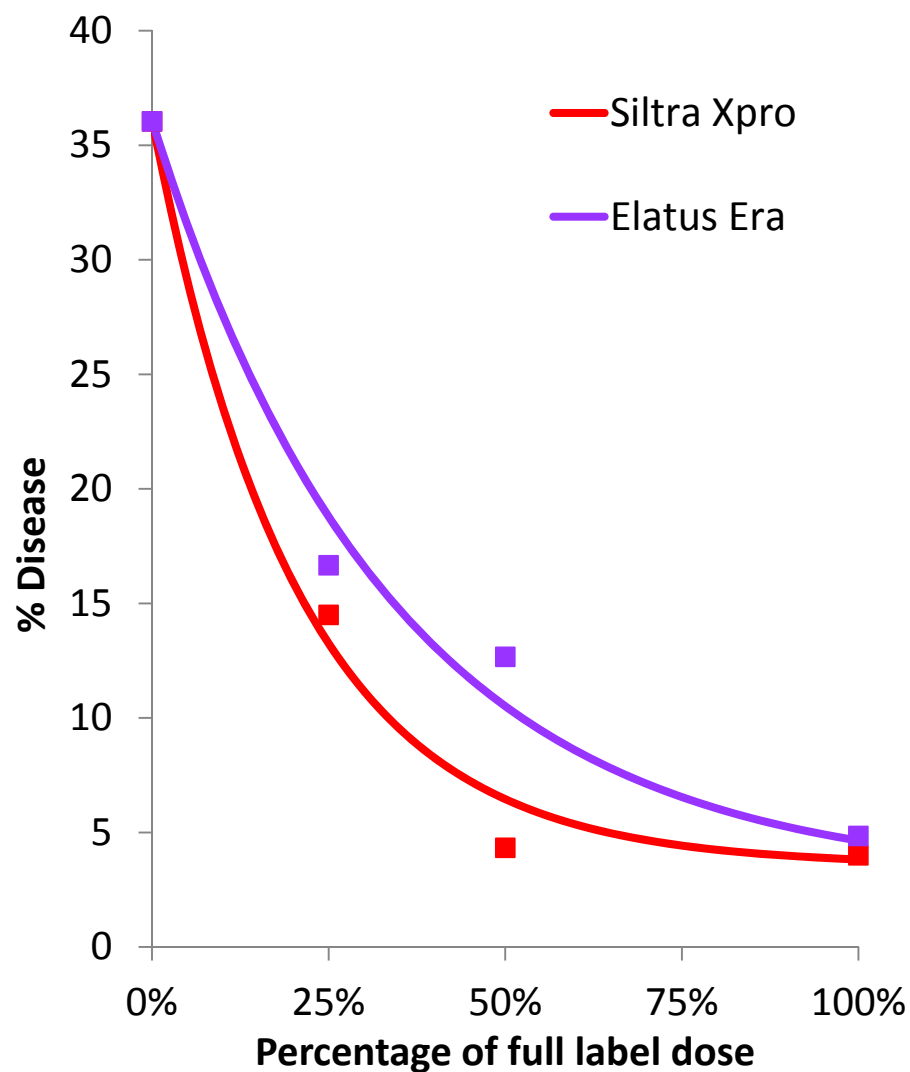
# Net blotch: changes in protectant activity (single active products)



# Net blotch: changes in protectant activity (mixtures)



# Mildew control 2017



# Fungicide performance for barley summary

## Rhynchosporium:

- Excellent control from Proline or Imtrex alone or in mixes (Priaxor, Elatus Era and Siltra)
- Trend for a decline in activity of Comet observed

## Net blotch:

- Reduced sensitivity to SDHIs now confirmed
- Mixture products gave best efficacy
- Comet still adds usefully to efficacy

## Ramularia:

- Chlorothalonil (alone or in mixtures) still effective
- Little field efficacy of SDHI and azoles in 2017 trials

## Mildew:

- Prothioconazole effective (alone or in mixtures), as was Cyflamid. SDHIs add to efficacy

# Modes of action and efficacy

	Rhynchosporium	Net blotch	Ramularia	Powdery mildew
Azoles	✓	✓	Insensitive isolates in UK populations	✓
Strobilurins	Insensitivity?	Partial Insensitivity (F129L)	Insensitivity (G143A)	
SDHIs	✓	Insensitive isolates in UK populations	Insensitive isolates in UK populations	✓
Multisites	✓	-	✓	

# Fungicide performance update for oilseed rape

## Trial sites in harvest year 2017

Target disease	Site	Organisation
Phoma (two sprays*)	Norfolk	ADAS
	Herefordshire	ADAS
Light Leaf Spot (two sprays**)	North Yorkshire	ADAS
	Dorset	NIAB
	Midlothian	SRUC
Sclerotinia Stem Rot (single spray***)	Herefordshire	ADAS
	Ceredigion	ADAS

\*10 to 20 per cent of plants affected, followed by 4 to 10 weeks (when reinfection evident)

\*\* Autumn (November/December) overspray, followed by pre/early stem extension application (February to March)

\*\*\* early to mid-flowering application

## Products included in trials in 2017

Product	Active(s)	Full dose (l/ha)	Phoma	Light leaf spot	Sclerotinia
Untreated	-	-	+	+	+
Proline 275	prothioconazole	0.63	+	+	+
Refinzar <sup>a</sup>	penthiopyrad + picoxystrobin	1.0	+	+	-
Pictor <sup>a</sup>	dimoxystrobin + boscalid	0.5	+	+	-
Filan	boscalid	0.5 (kg/ha)	+	-	+
Amistar	azoxystrobin	1.0	-	-	+

+ = included in trials; - = not included in trials

a = used as autumn or two-spray programme to fit experimental protocol (restrictions on label)

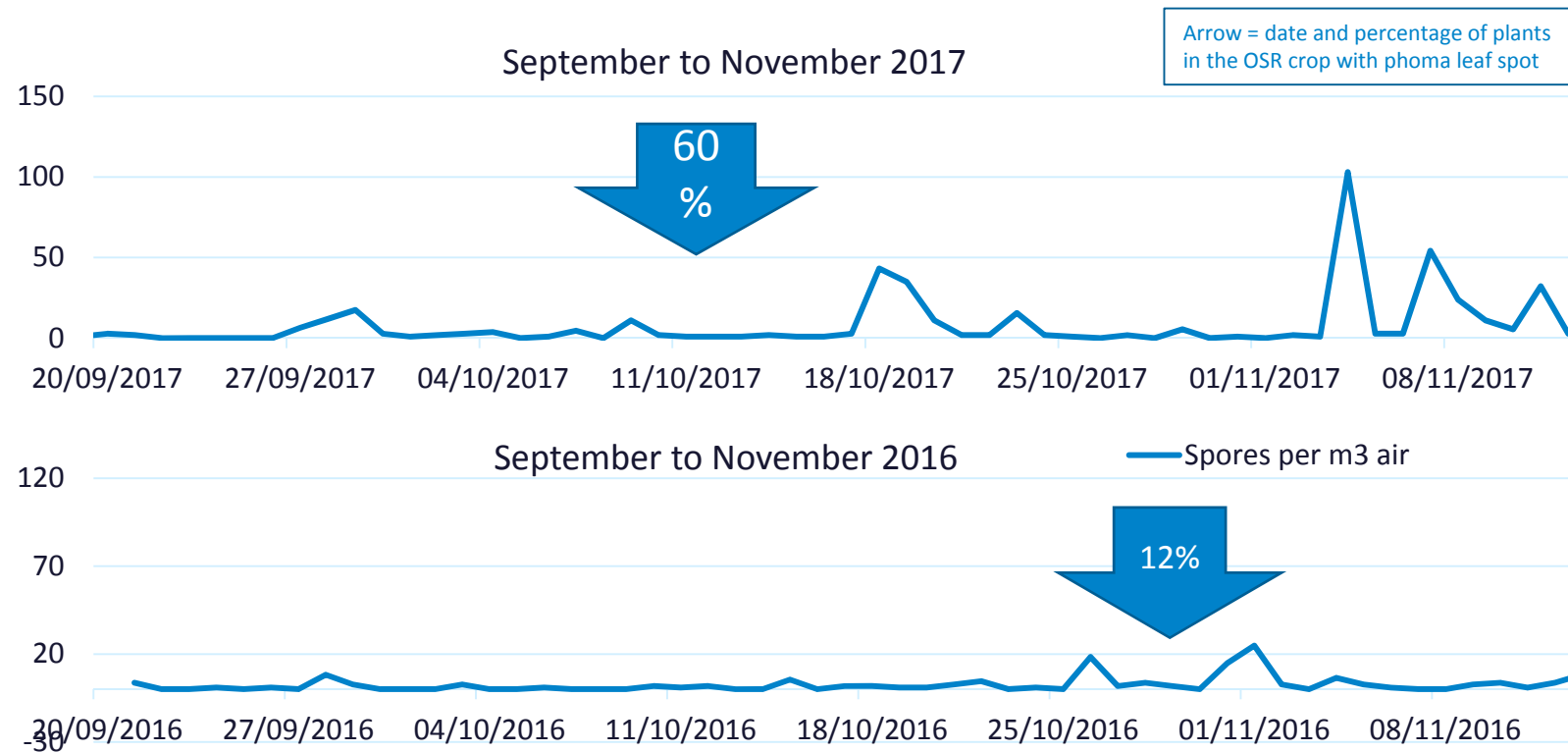
Note: Products near to market are tested but data cannot be released until after registration



## Phoma leaf spot/stem canker

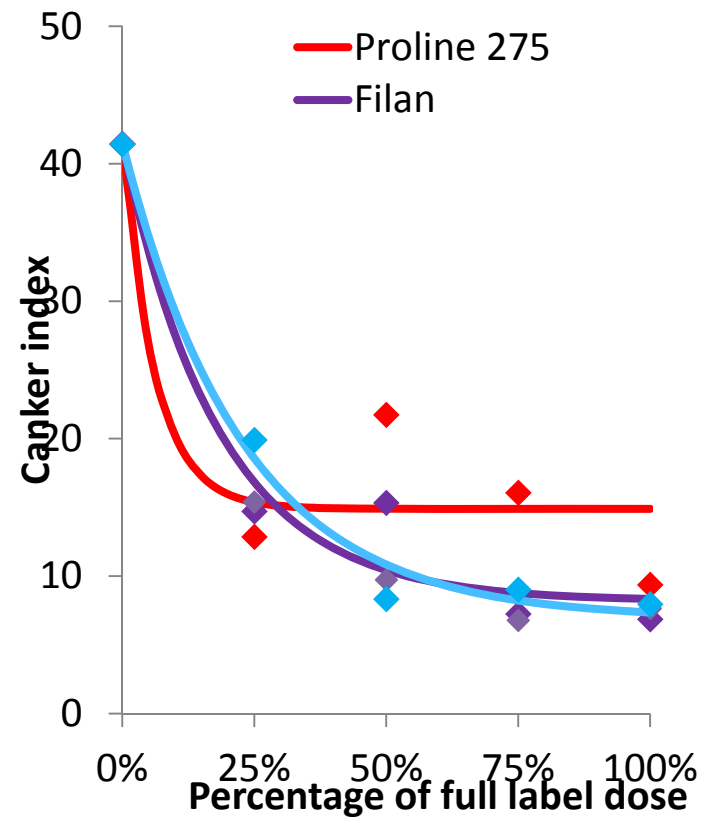


# Phoma leaf spot progress (Norfolk)

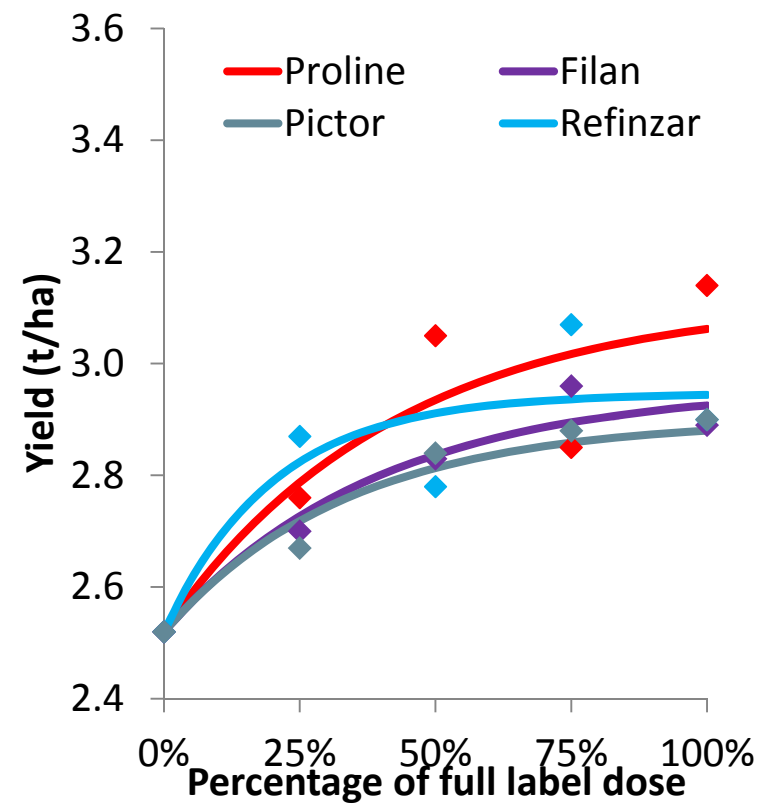
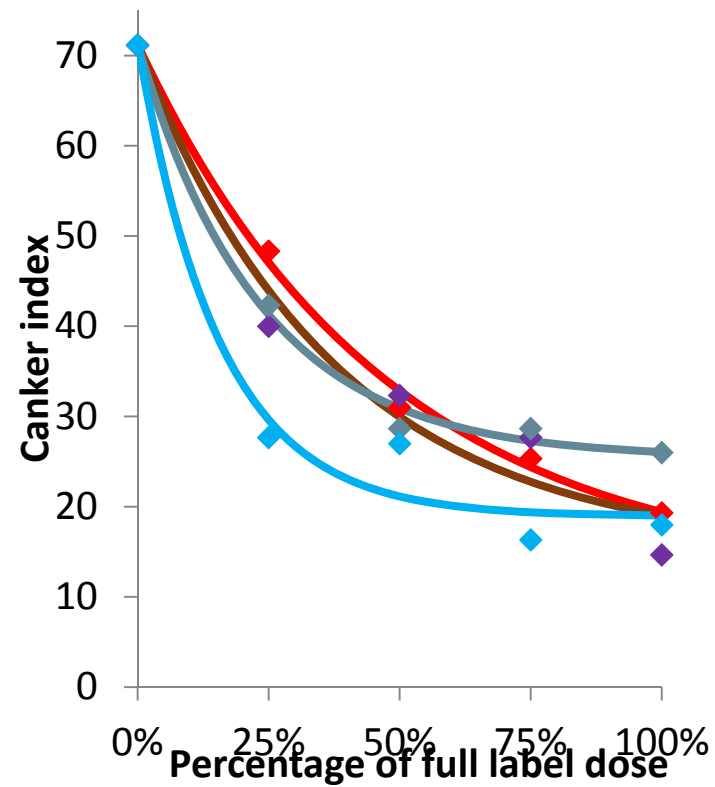


Source: DuPont, University of Hertfordshire, Hutchinsons

## Stem canker 2017 (Norfolk)



## Stem canker and yield 2016 (Norfolk)



## Phoma leaf spot/stem canker (summary)

### Season so far

- Early onset of the epidemic
- Thresholds met in late September/ early October in some areas
- Reinfection occurred 4 to 6 weeks after first sprays

### Fungicide efficacy

- Azole and non-azole products have activity
- Two applications in the autumn providing effective control
- No reports of resistance to fungicides

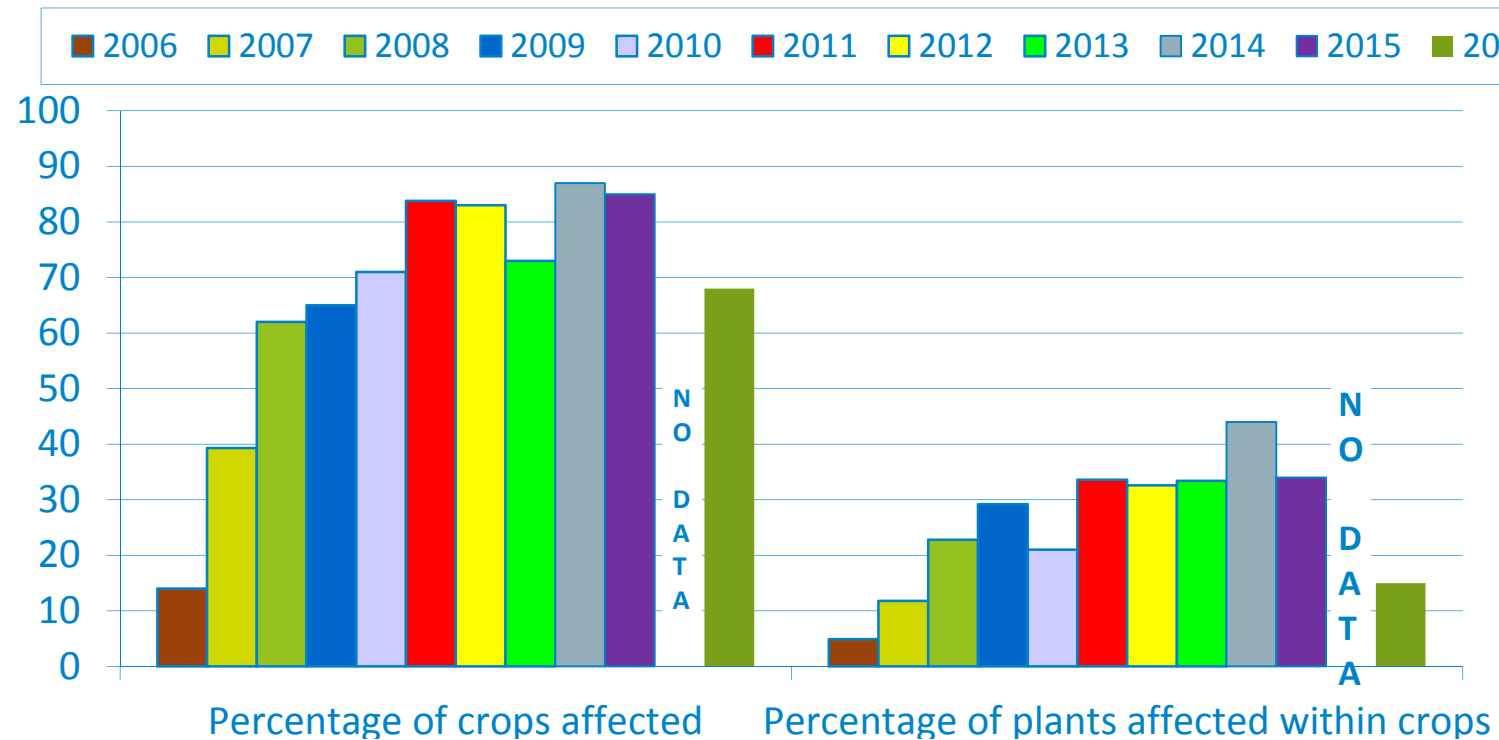
### Outlook: 2017/2018

- Fungicide programmes up to date
- May see more stem canker pre-harvest in some crops

## Light leaf spot



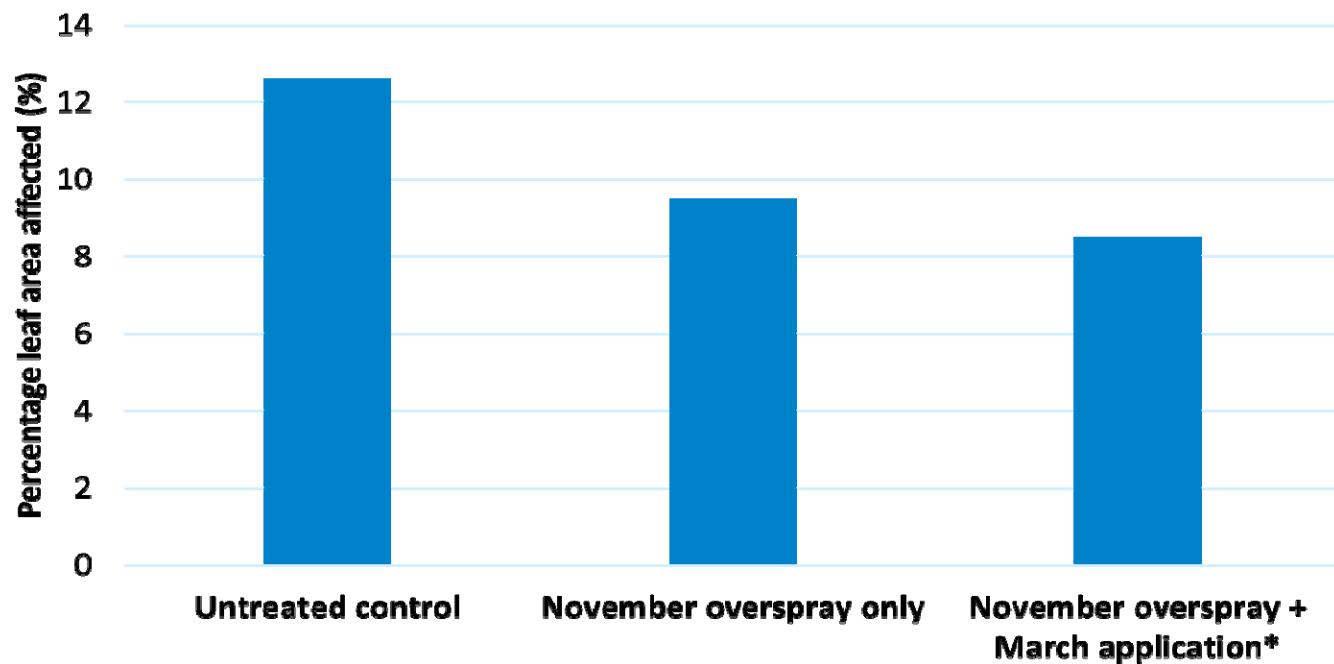
## Light leaf spot: Lowest levels in the spring in England since 2008



cropmonitor.co.uk

Source: Defra winter oilseed rape disease surveys

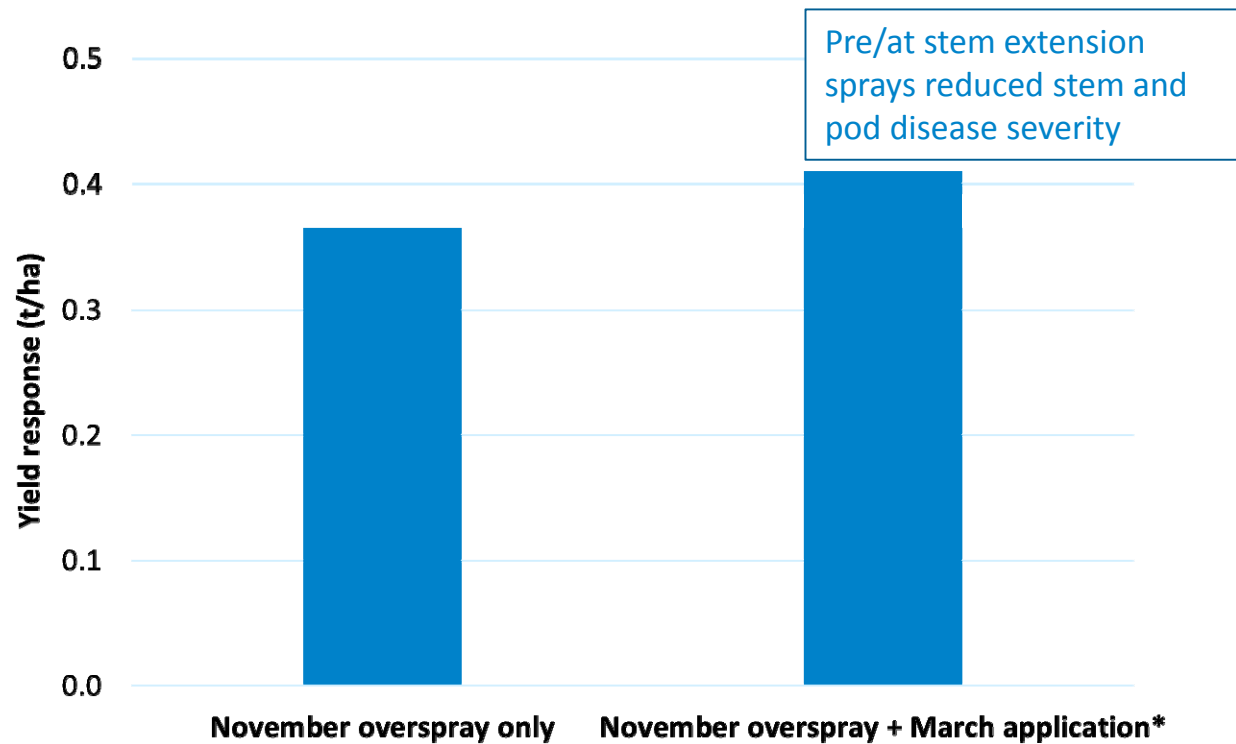
## Light leaf spot trials in 2017: Disease control and fungicide application timing (across 3 sites)\*



\*Overspray applied in November 2016 and stem extension treatments applied in early March 2017, typically at GS30 (rosette stage: beginning of stem extension)



## Significant yield increase with the November fungicide overspray (across 3 sites)

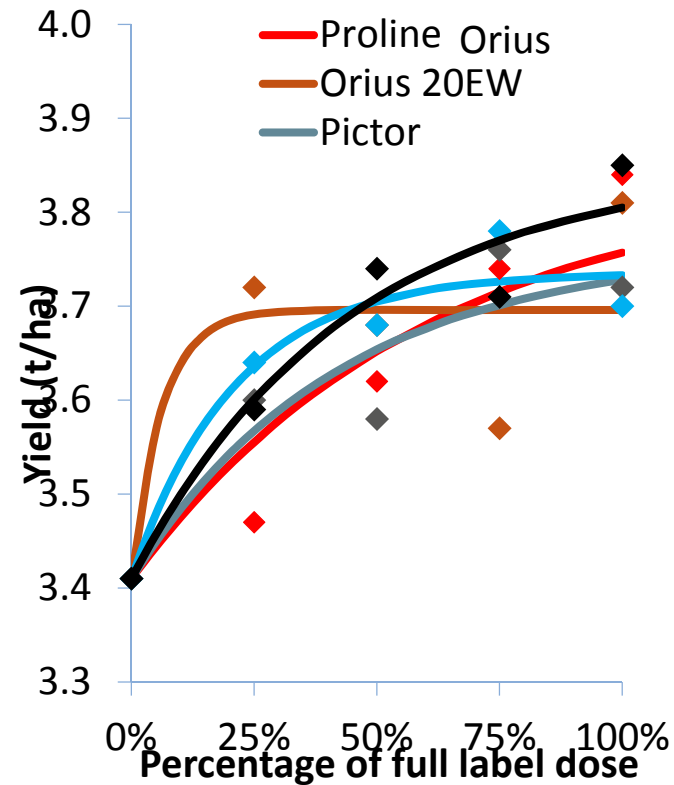
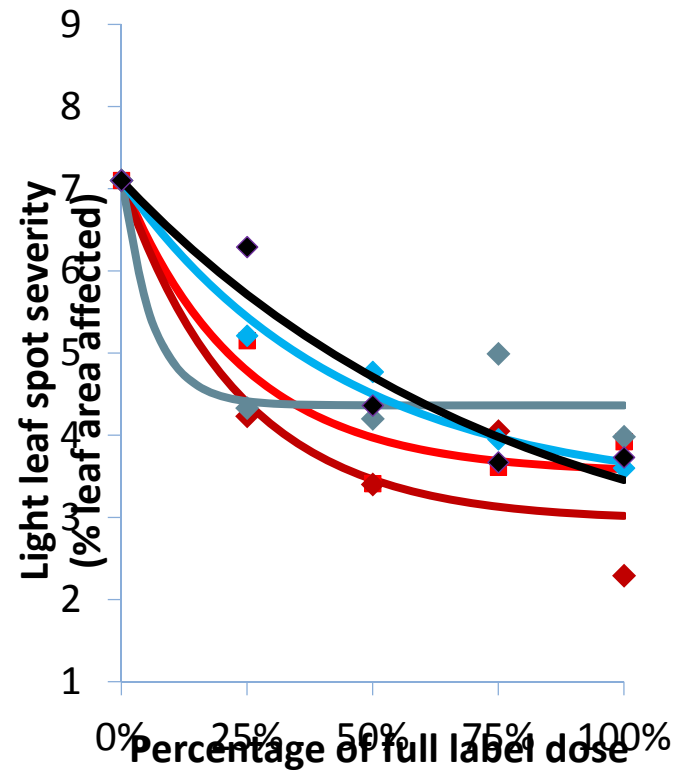


\*Overspray applied in November 2016 and stem extension treatments applied in early March 2017, typically at GS30 (rosette stage: beginning of stem extension)

## Light leaf spot trials: Summary for 2017

- November sprays were important for light leaf spot control at the trial sites
- Spring epidemic was not as severe as previous years, which was unusual
- Both November and later applications (before or at stem extension) are important for good control
- Later applications reduced stem and pod disease severity

## Light leaf spot control across years – 5 trials in 2015 and 2016\*



\*Orius P in harvest year 2015 only, all other products in both years

# Light leaf spot (summary)

## Season so far

- Earlier-sown crops more at risk
- Lesions reported on incubated samples in November

## Fungicide efficacy

- Both azole and non-azole products provide control in the trials
- Anti-resistance management strategies
- Scottish sites – yield benefits with higher doses

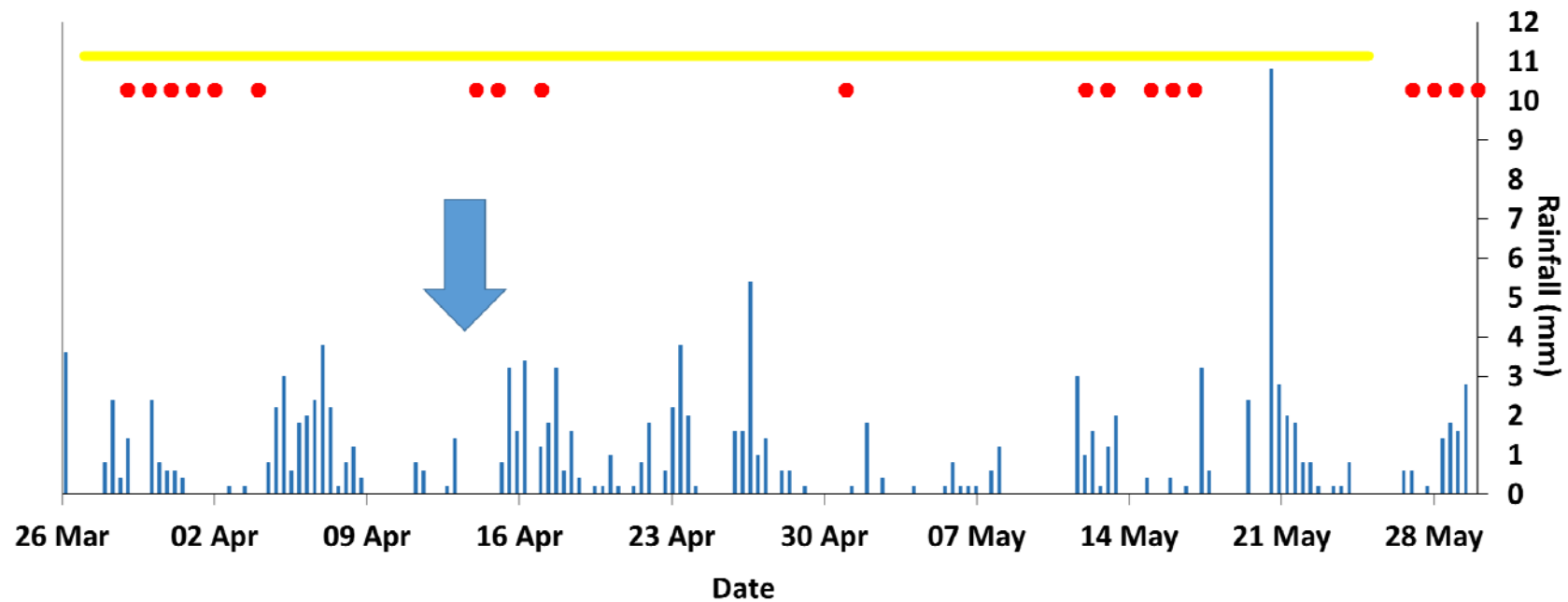
## Outlook: 2017/2018

- Regional and local risk
- Monitor crops in new year and treat promptly, if symptoms seen

## Sclerotinia stem rot



## Sclerotinia risk: Ceredigion in 2017



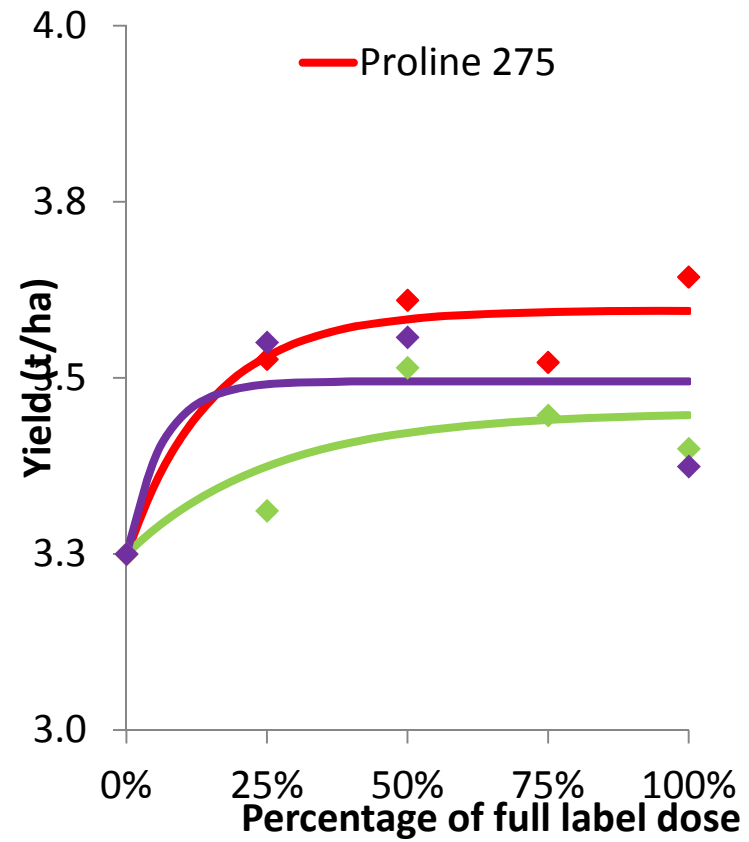
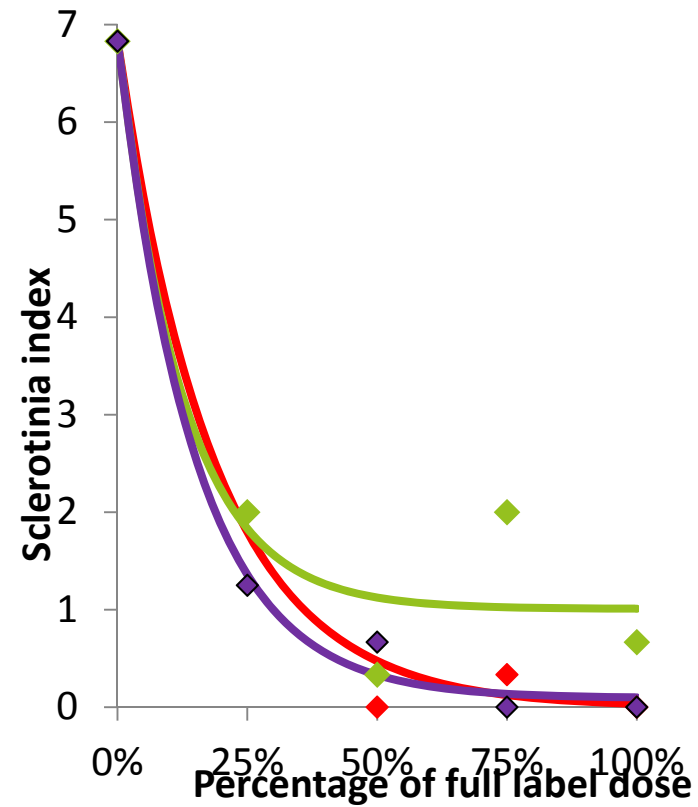
Yellow line = duration of flowering

Red points = Sklero Pro infection events

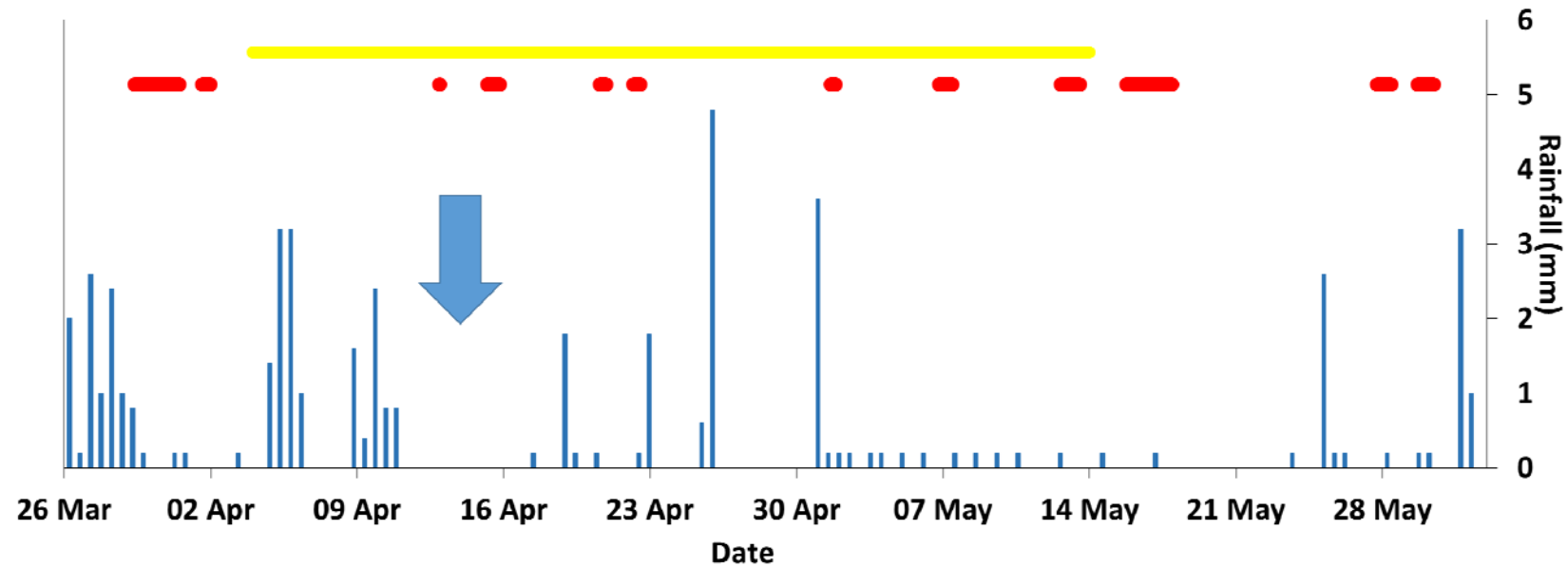
Blue bars = rainfall (mm)

Arrow = fungicide application date (14 April)

## Sclerotinia disease and yield: Ceredigion 2017



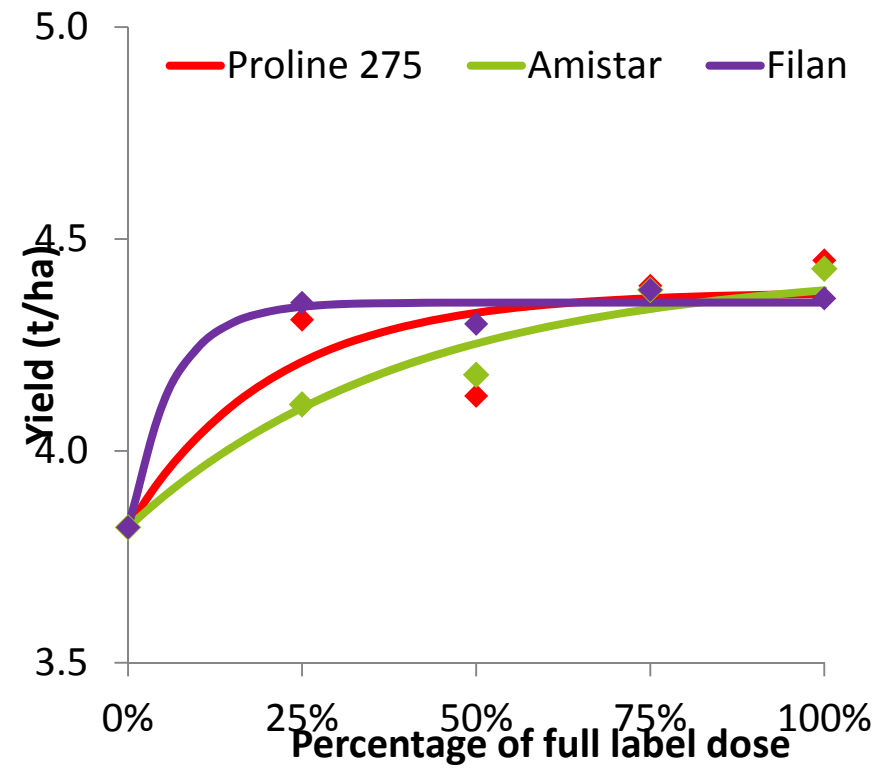
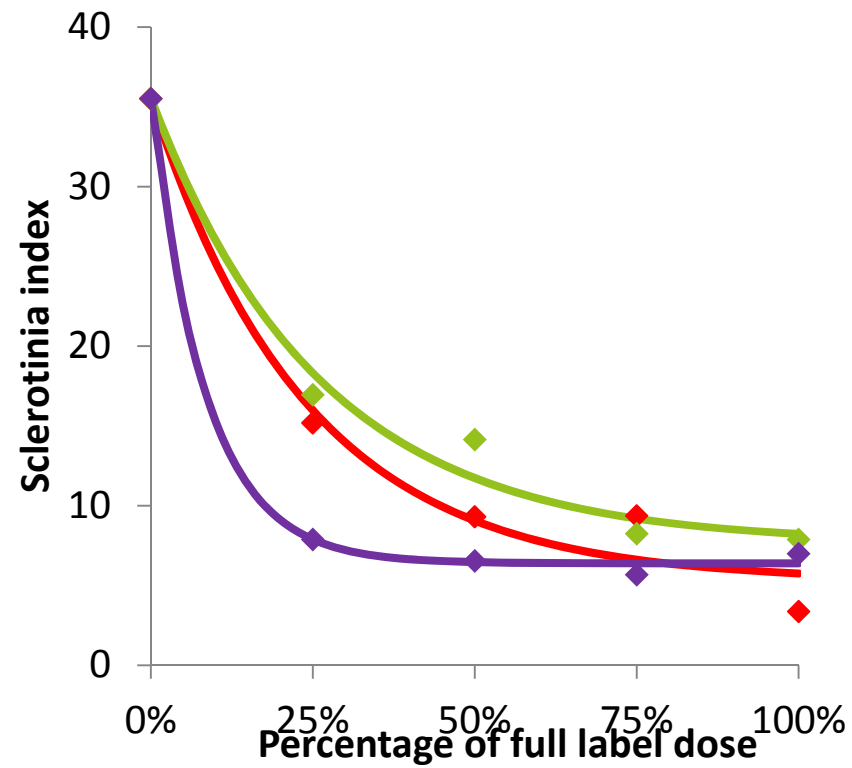
## Sclerotinia risk: Herefordshire in 2017



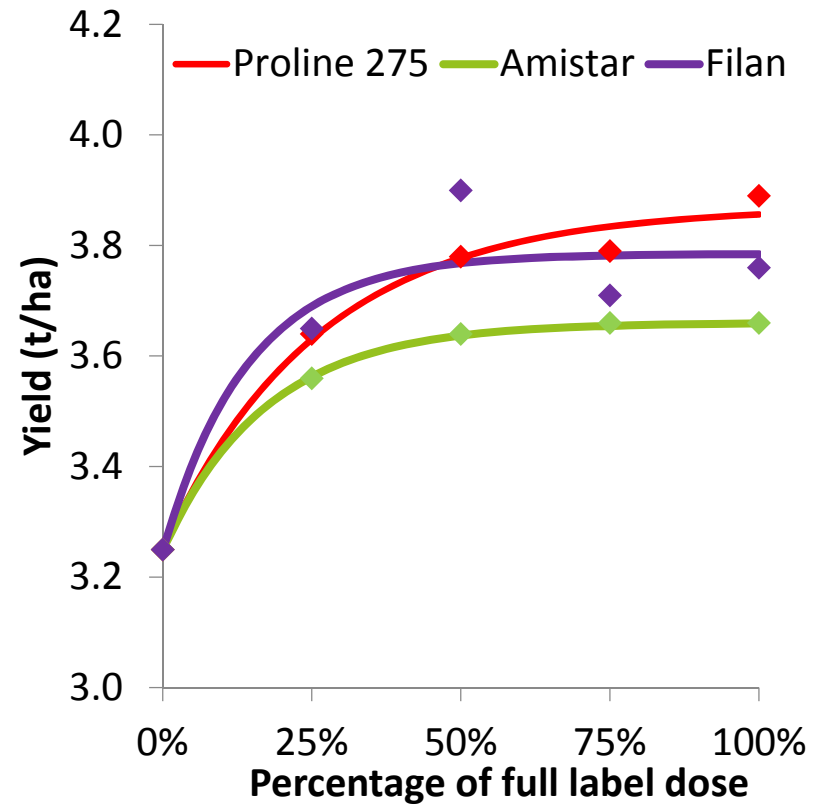
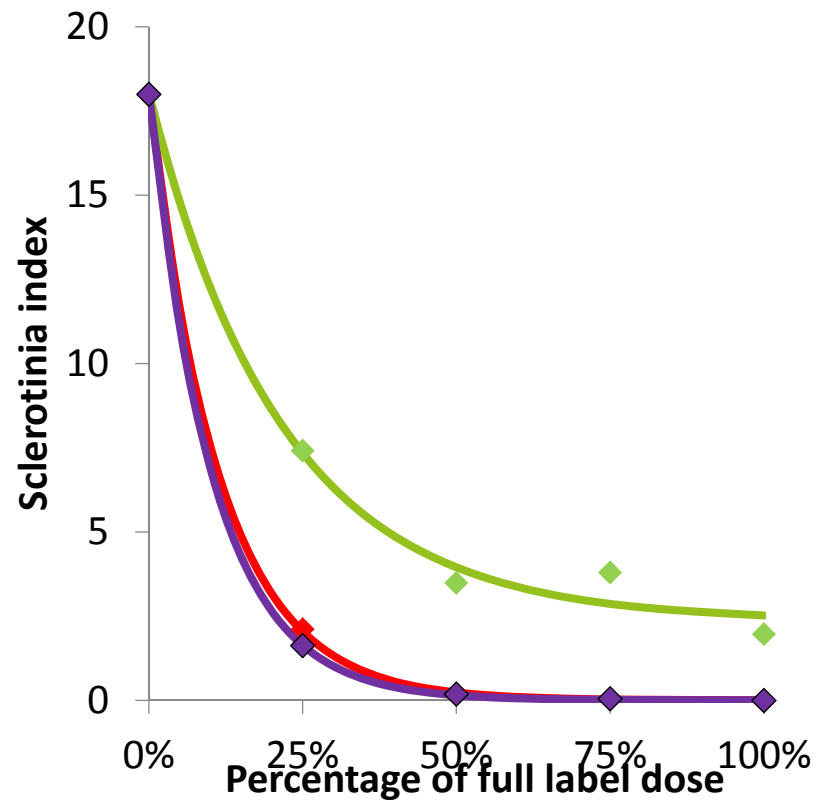
- Yellow line = duration of flowering
- Red points = Sklero Pro infection events
- Blue bars = rainfall (mm)
- Arrow = fungicide application date (14 April)



## Sclerotinia disease and yield: Rosemaund 2017



## Performance of sclerotinia fungicides across 5 sites (2015 to 2017)



Cross site analysis: 5 sites 2015 to 2017

# Sclerotinia stem rot (summary)

## Season so far

- Infection risk dependent on weather during flowering
- On-farm history can increase risk

## Fungicide efficacy

- Higher doses (75% of label dose and above) provide 3 weeks protection
- Range of active ingredients available
- No resistance to sclerotinia fungicides reported in UK

## Outlook: 2017/2018

- Data available on efficacy of other products from previous projects
- Fungicides protectant activity only
- Application timing important for good control

# Efficacy is in your hands...



**Fungicide Futures** combines anti-resistance management information with the power of AHDB's communications channels...

**[cereals.ahdb.org.uk/fungicidefutures](https://cereals.ahdb.org.uk/fungicidefutures)**

Fungicide Futures is a joint initiative between AHDB and the Fungicide Resistance Action Group UK (FRAG)

# Arable Connections: Winter

Bringing farmers, agronomists, processors and researchers together to share better ways of working  
[cereals.ahdb.org.uk/events](http://cereals.ahdb.org.uk/events)

## Agronomy 2018

A series of free indoor events exploring technical developments and ways to improve farming businesses.

Scotland – 9, 11, 16 and 18 January 2018

East Midlands – 23 January 2018

East Anglia – 6 February 2018

Wales – 7 February 2018

West – 8 February 2018

North – 13 February 2018

South East – 15 February 2018

South West – 21 February 2018

## Milling Wheat Conference

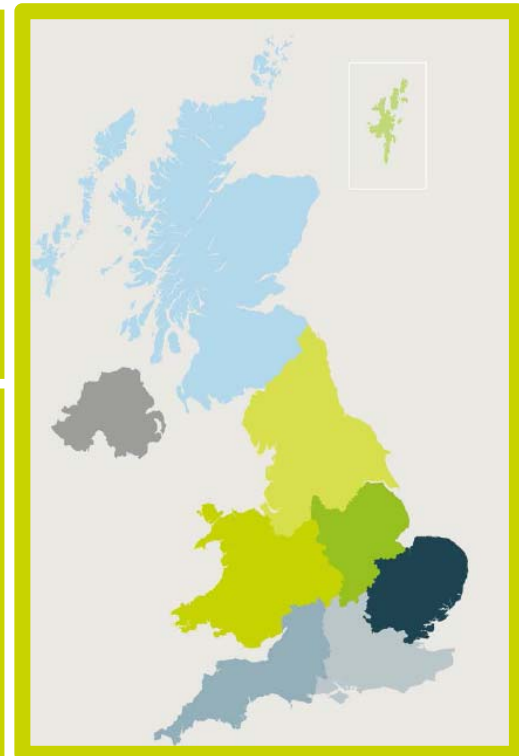
A conference focused on achieving excellence in the milling wheat market  
*In association with nabim. Incorporating the YEN Wheat Quality Award.*

Cambridgeshire – 1 March 2018

## United Oilseeds/AHDB Joint Seminar

An opportunity to talk about the factors affecting establishment, cultivation and profitability of oilseed rape.

Newbury – 8 February 2018





A vibrant landscape photograph of a green field at sunset. A path leads from the foreground towards the horizon where the sun is setting, creating a warm, golden glow. The sky is filled with colorful clouds, and the field is lush and green. The text is overlaid in the center of the image.

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