Loss of chlorothalonil in disease control programmes

Dr Neil Havis

Challenges and choices 2020

Pesticide withdrawals

Evolving diseases and resistance

New products

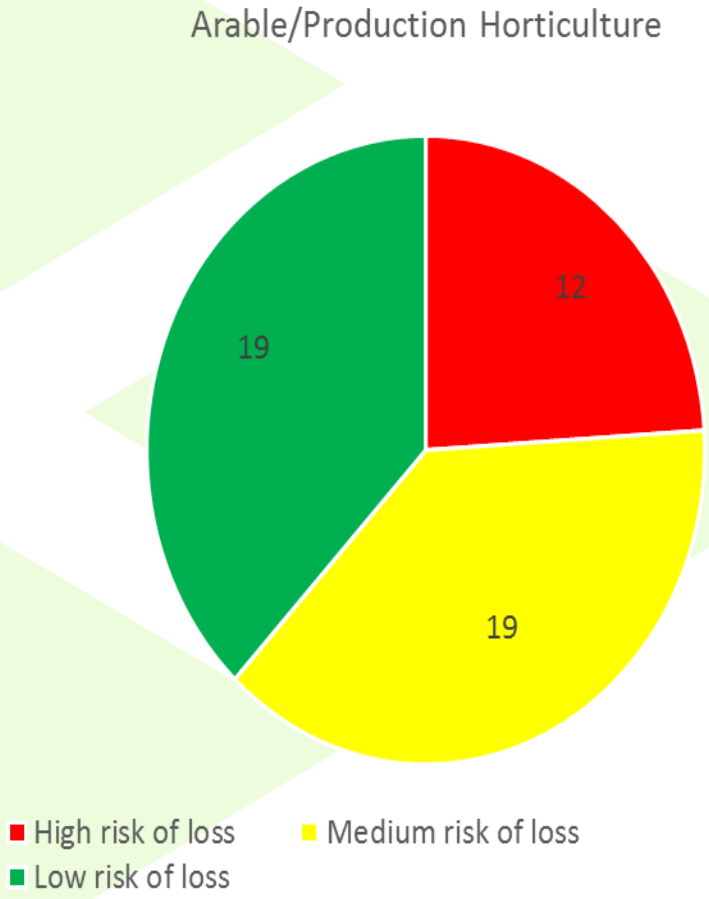
- What are the resistance issues and how can we manage them?
- Where and when to use new and existing products?

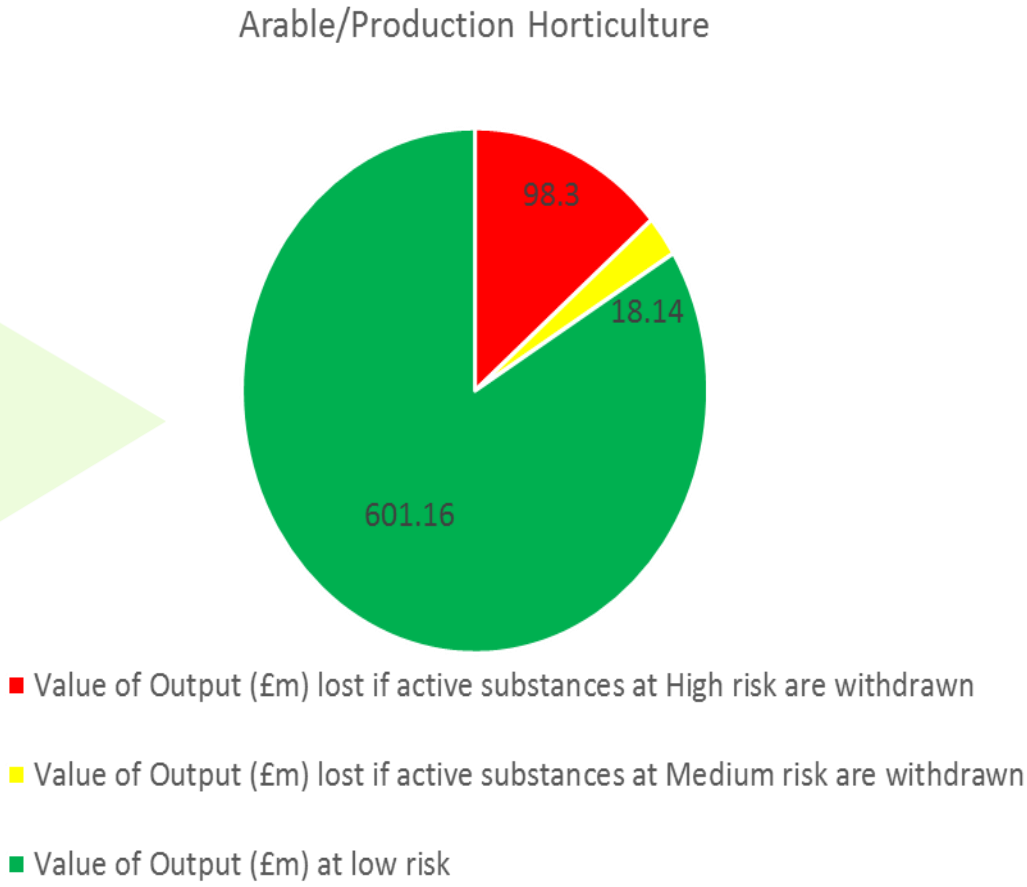
- Chlorothalonil withdrawal

(Authorisation ends: (a) 20 November 2019 for sale and distribution & (b) 20 May 2020 for the disposal, storage and use of existing stocks)

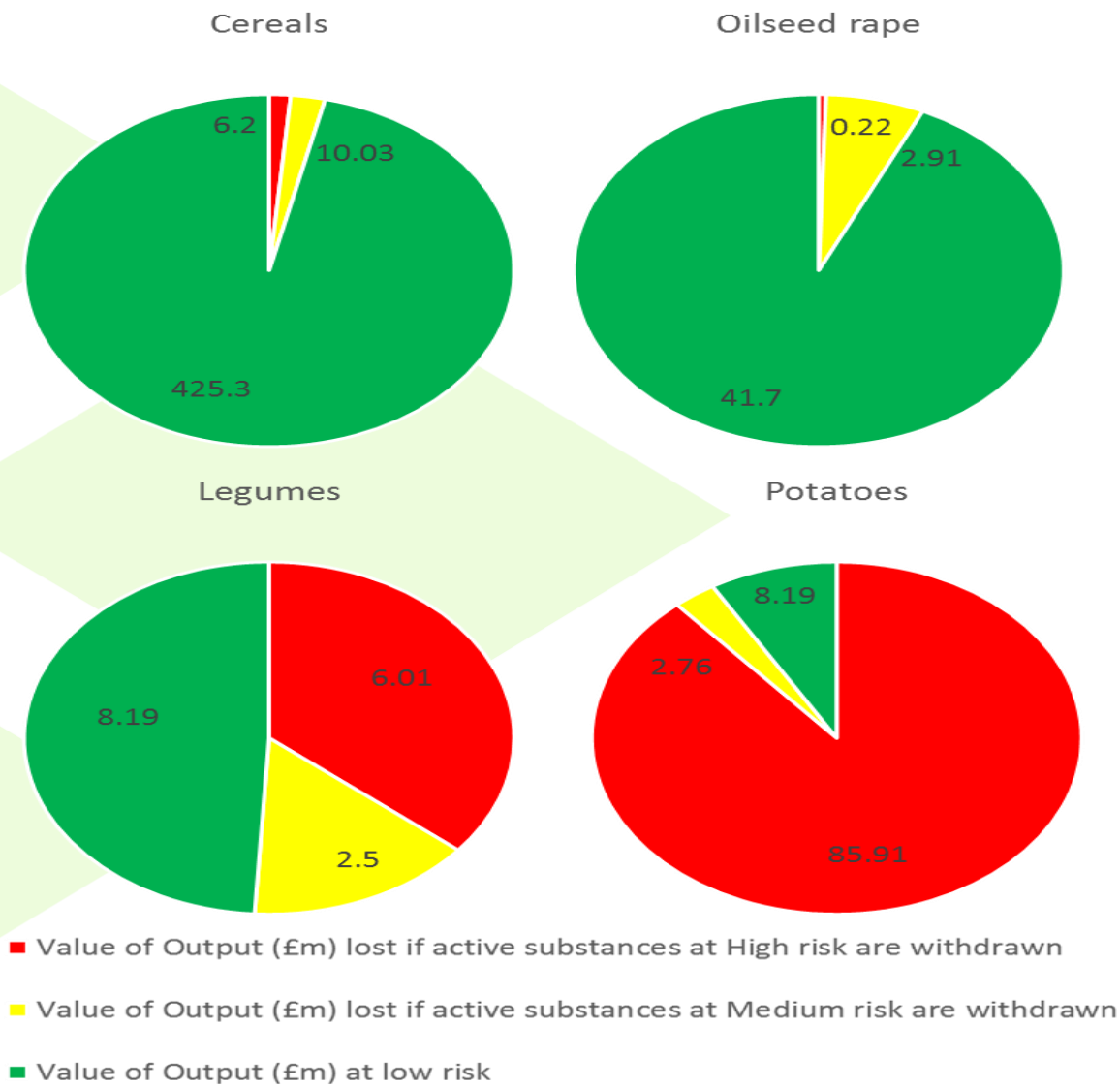
Farm Advisory Service

Threats to existing pesticides





Threat to existing pesticides



Potential loss of pesticides – likely impacts

- Best case scenario
  - Cereals, oilseeds, potatoes – relatively unscathed
  - Edible and ornamental horticulture sector badly hit
- Worst case scenario
  - Cereals, oilseeds, potatoes – significant impact
  - Edible and ornamental horticulture sector severely affected
- 5-8 years until alternative technologies close the gap
- Increased reliance on ‘alternatives’ to pesticides – IPM

SRDP Farm Advisory Service

Revystar XE

30 Jul Assessment following GS32 and 39 applications

New fungicide product for 2020

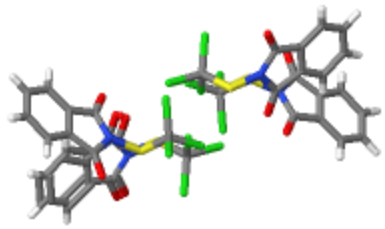
- Contains a new triazole (Revysol) and an SDHI (Xemium)
    - 100 g/L mefentrifluconazole + 47.5 g/L fluxapyroxad
- Maximum individual dose 1.5 L/ha
- Maximum of two applications
- To be applied before GS69 (GS45 for malting barley crops)
- Approved for wheat, barley, oats, rye, triticale, spelt and durum wheat

Inatreq™

- Currently waiting approval and should be launched in 2020
- Contains fenpicoxamid
- Derived from a natural compound produced by fermentation of an Actinomycete (Streptomyces spp.)
- New mode of action - Quinone Inside Inhibitor (Qil) blocking mitochondrial respiration
- No cross-resistance to existing cereal fungicides but single site active so needs careful stewarding against resistance
- To be used once and only in mix with other actives to minimize the risk of resistance development.
- Best used as a protectant treatment or in the earliest stages of disease development.
- Barley product – a coformulation with prothioconazole

Folpet (Adama)

- Phthalimide fungicide (multisite)
- Discovered in 1950's

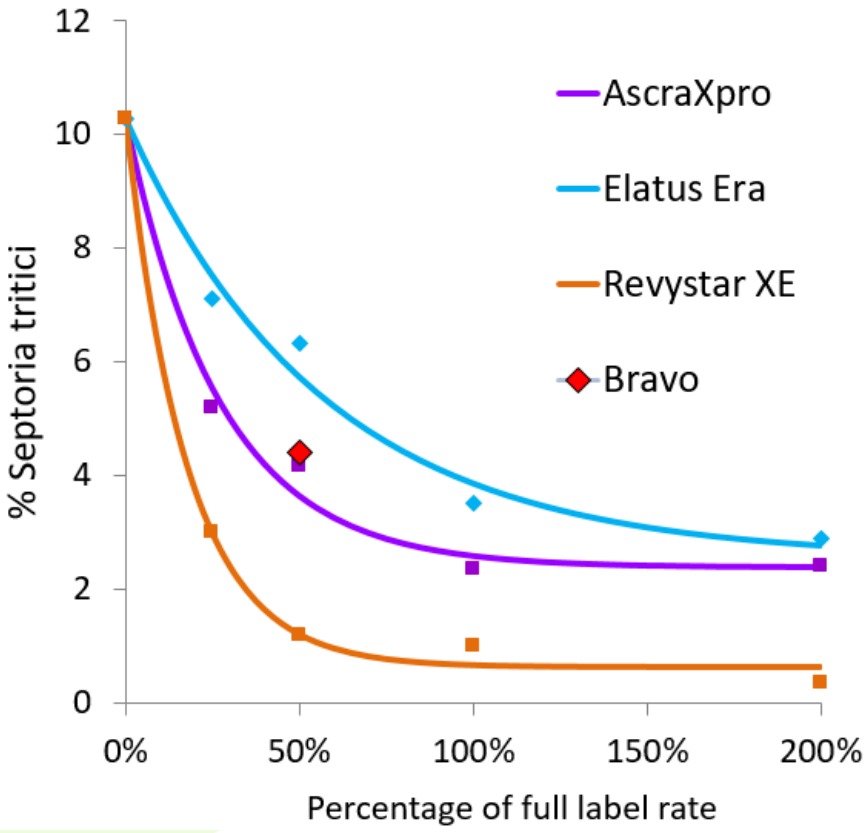


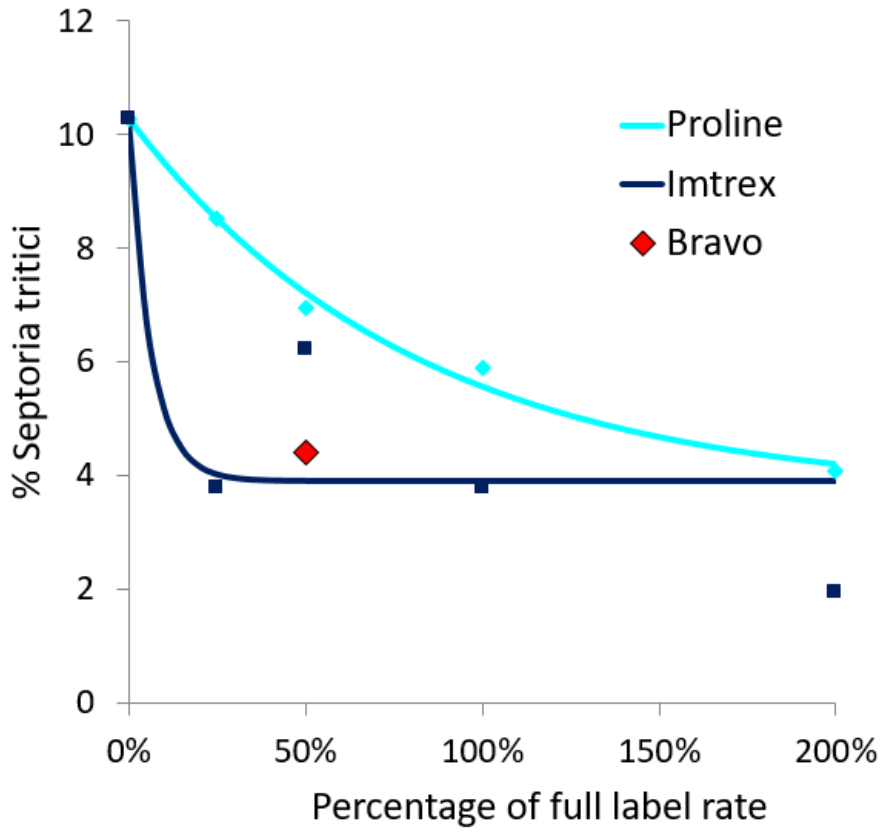
- Arizona ® (500 g/l)
- Manitoba ® (375 g/l folpet + 50 g/l epoxiconazole)

Mancozeb (UPL)

- Discovered in 1960's as an antifungal (dithiocarbamate)
- Used extensively in potato blight control
- Low control of wheat mildew and rust, moderate control of Septoria
- Also contains Manganese and Zinc
- Not approved on barley at the moment

Septoria protectant activity 2019 (5 trials)





Septoria tritici 30-Jul-19 Untreated

S tritici 30-Jul-19 Ascra X Pro 1.5 l/ha

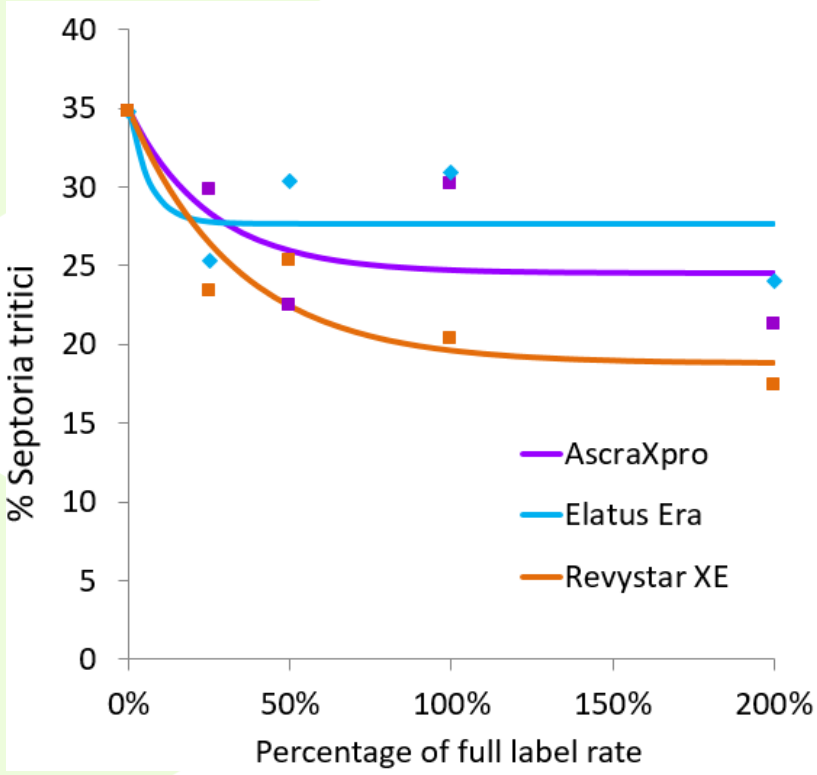
S tritici 30-Jul-19 Bravo 1.0 l/ha

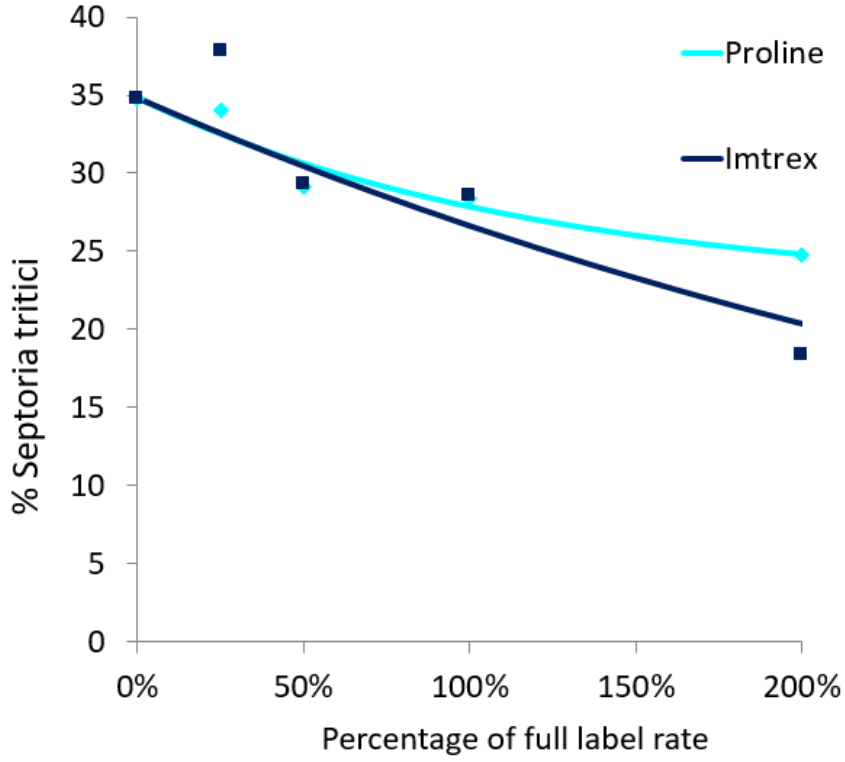
S tritici 30-Jul-19 Elatus Era 1.0l/ha

S tritici 30-Jul-19 Revystar XE 1.5 l/ha

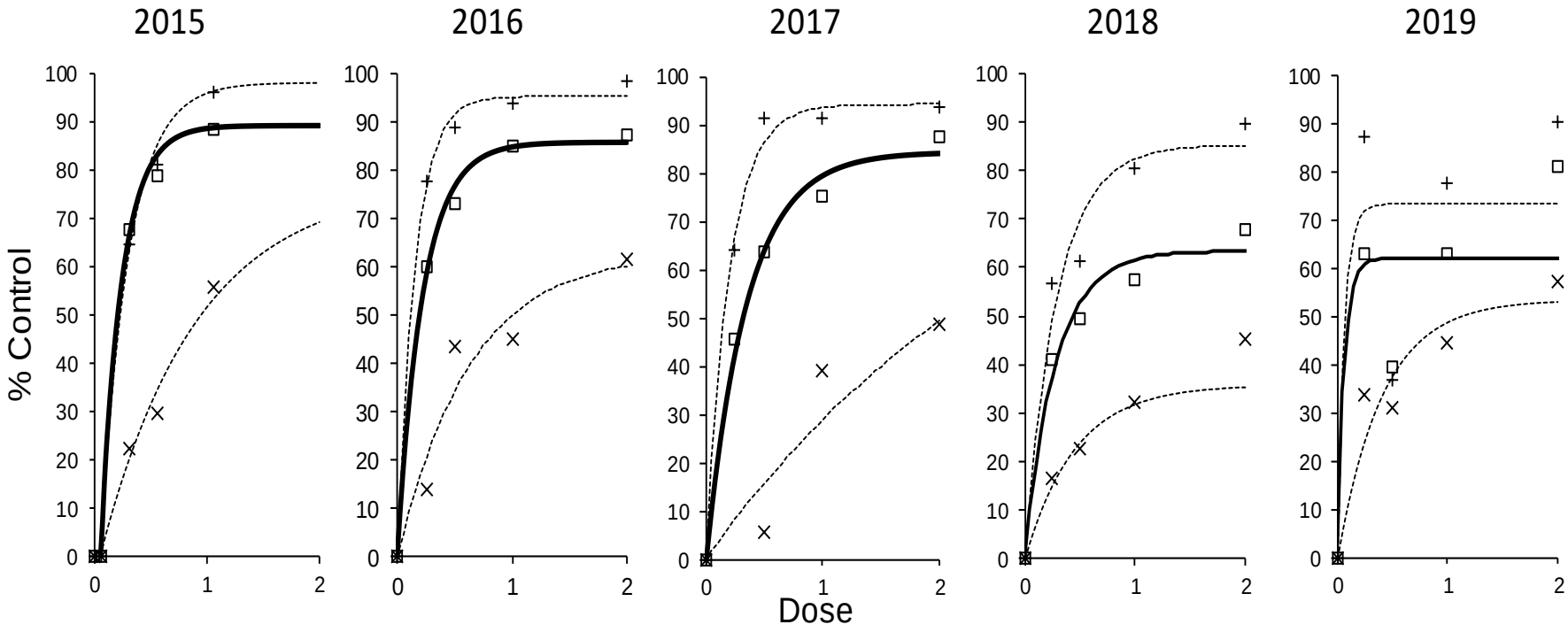
S tritici 30-Jul-19 Inatreq 2.0 l/ha

Septoria curative activity 2019 (2 trials)





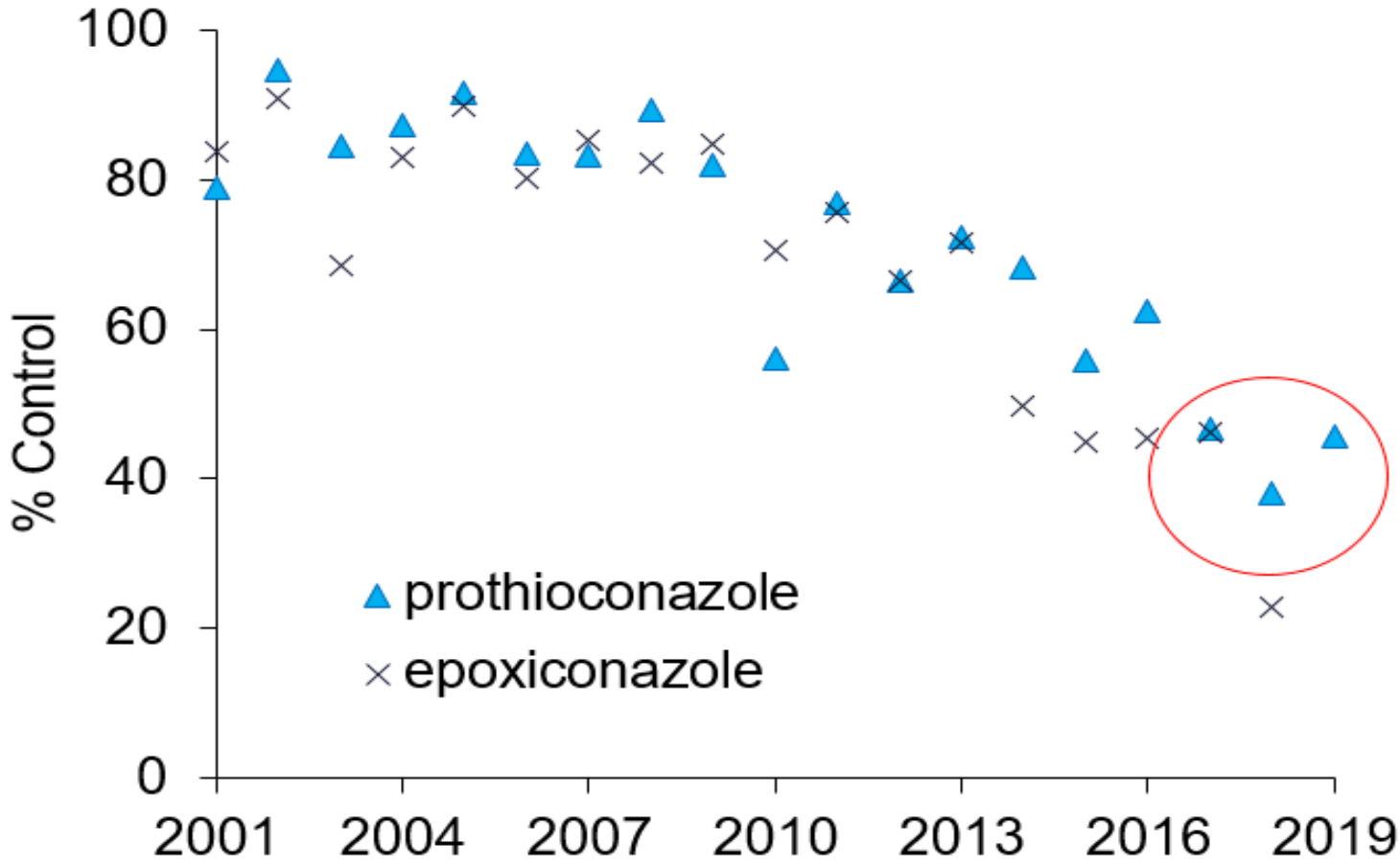
SDHI emerging issues – loss of activity vs S. tritici



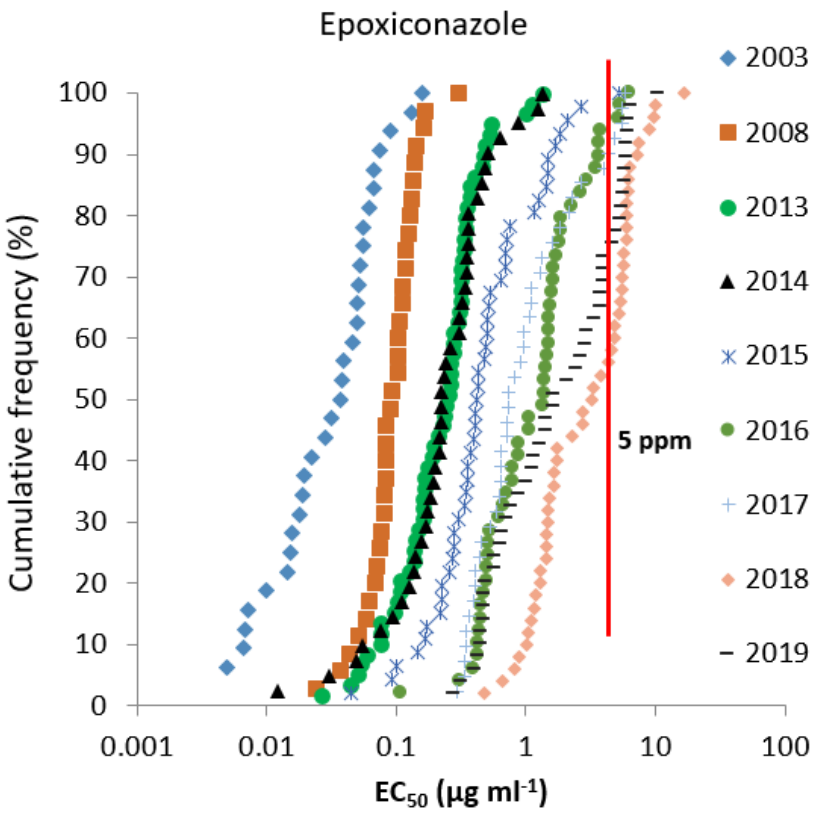
Strains less sensitive to SDHIs (e.g. T79N and N86S) now widely present in populations

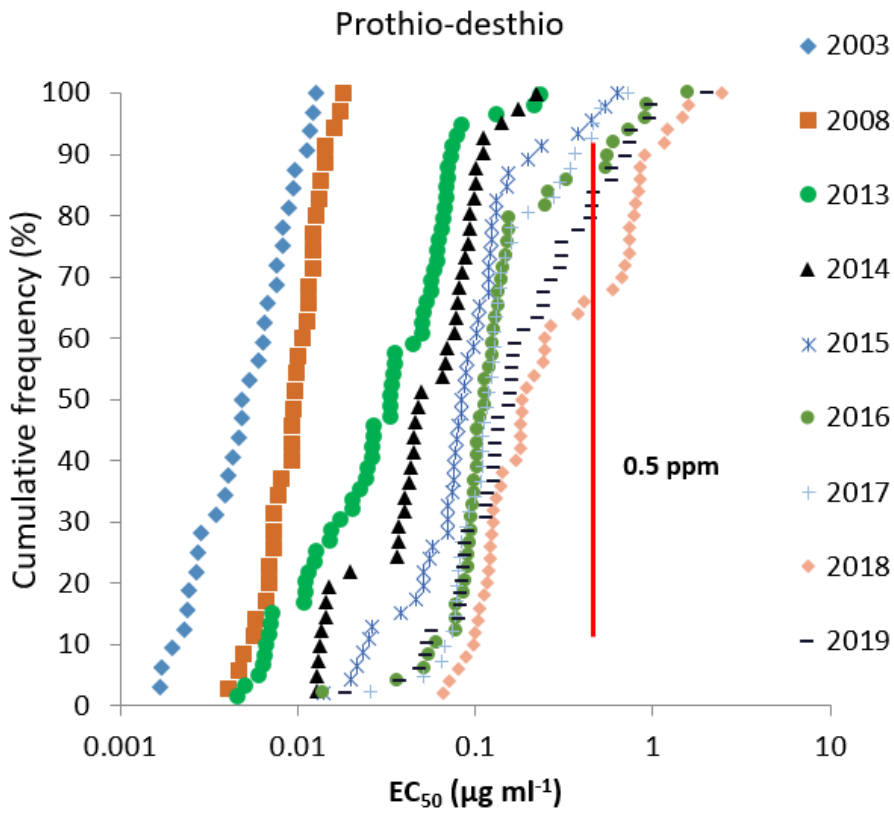
H152R overwintered at Rothamsted site

Azole efficacy on S tritici (2001–19)
Protectant activity at full rate

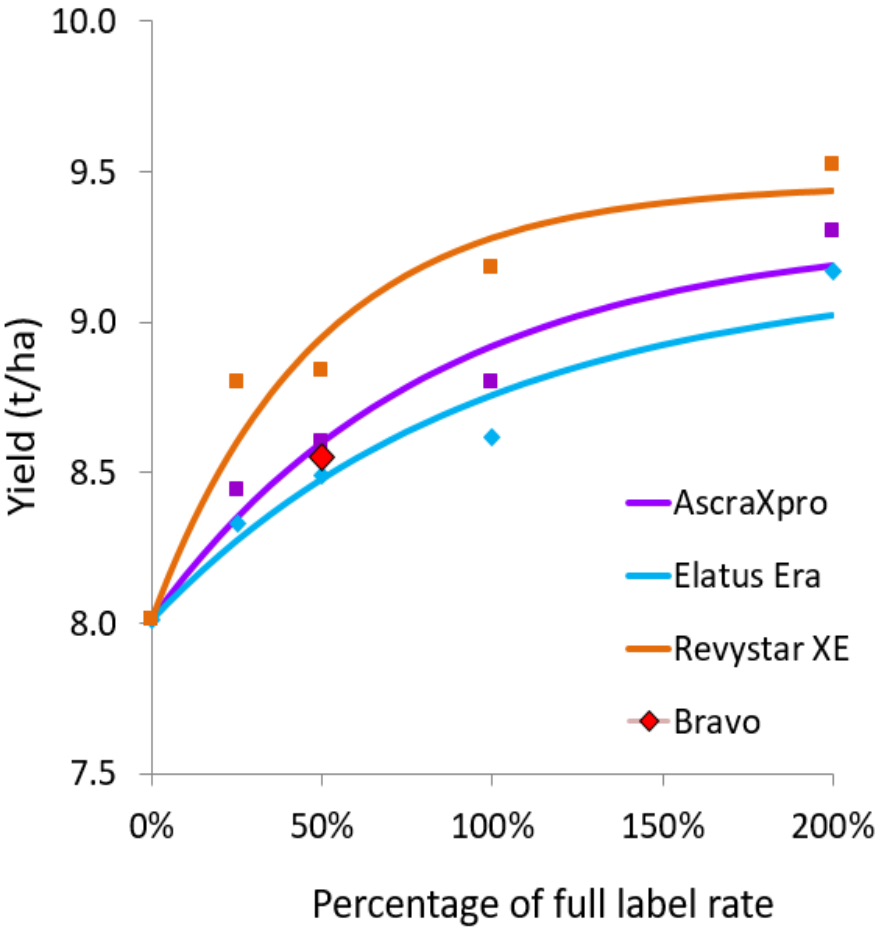


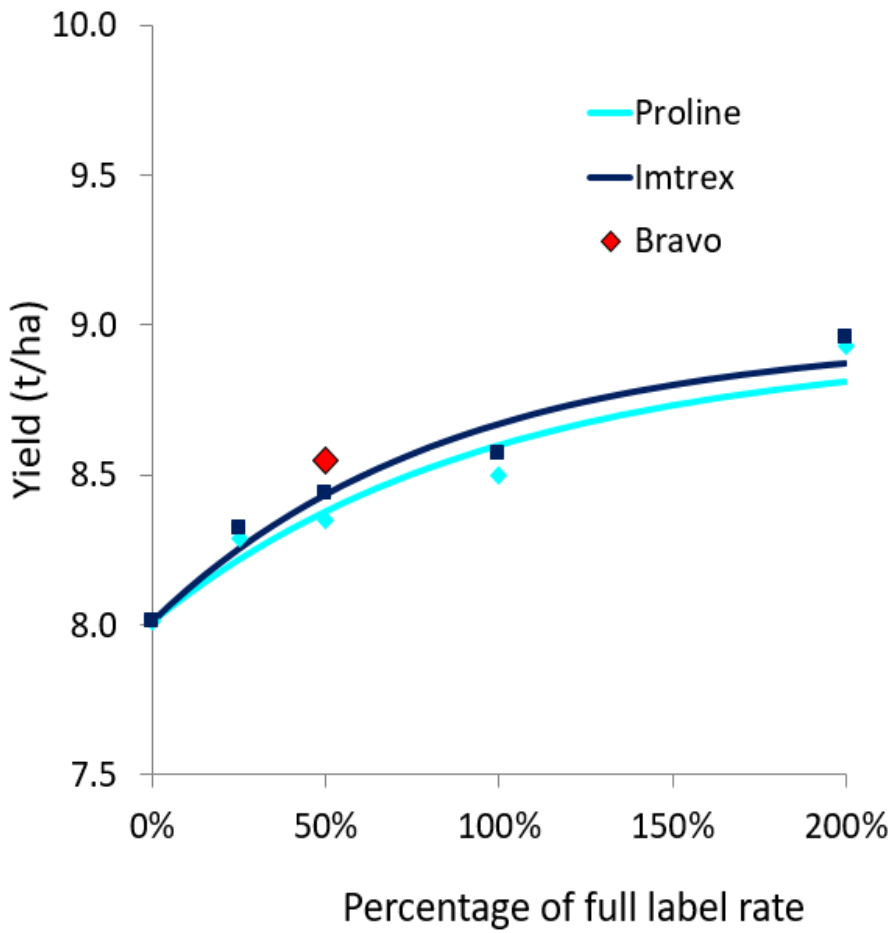
Rothamsted early season monitoring 2019



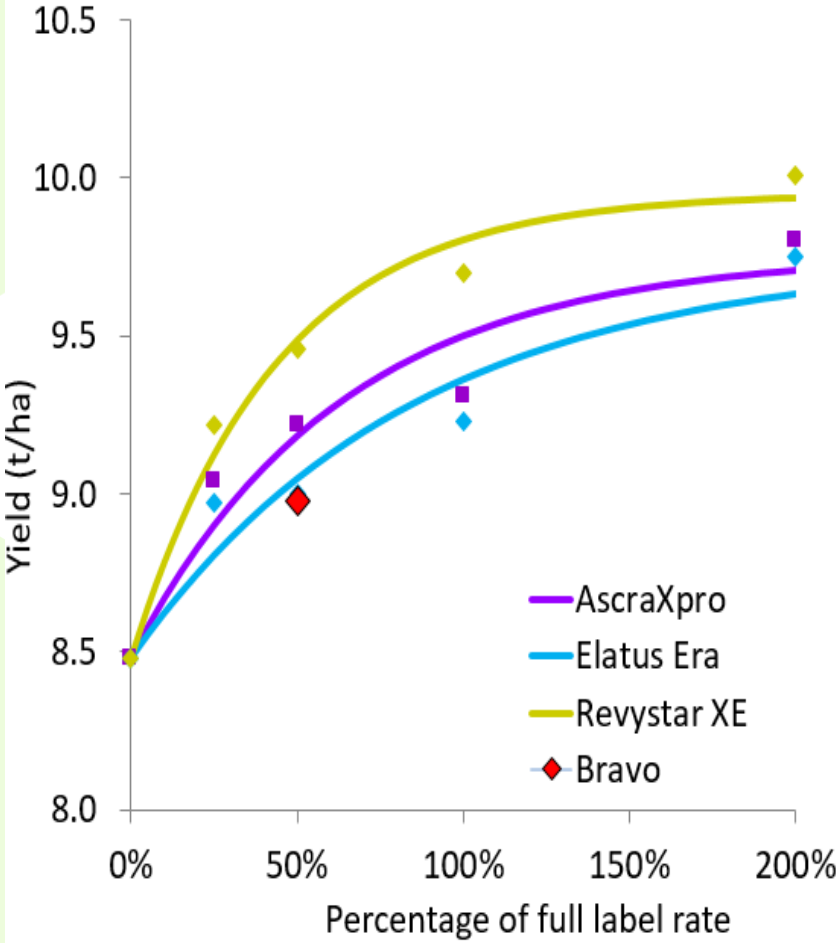


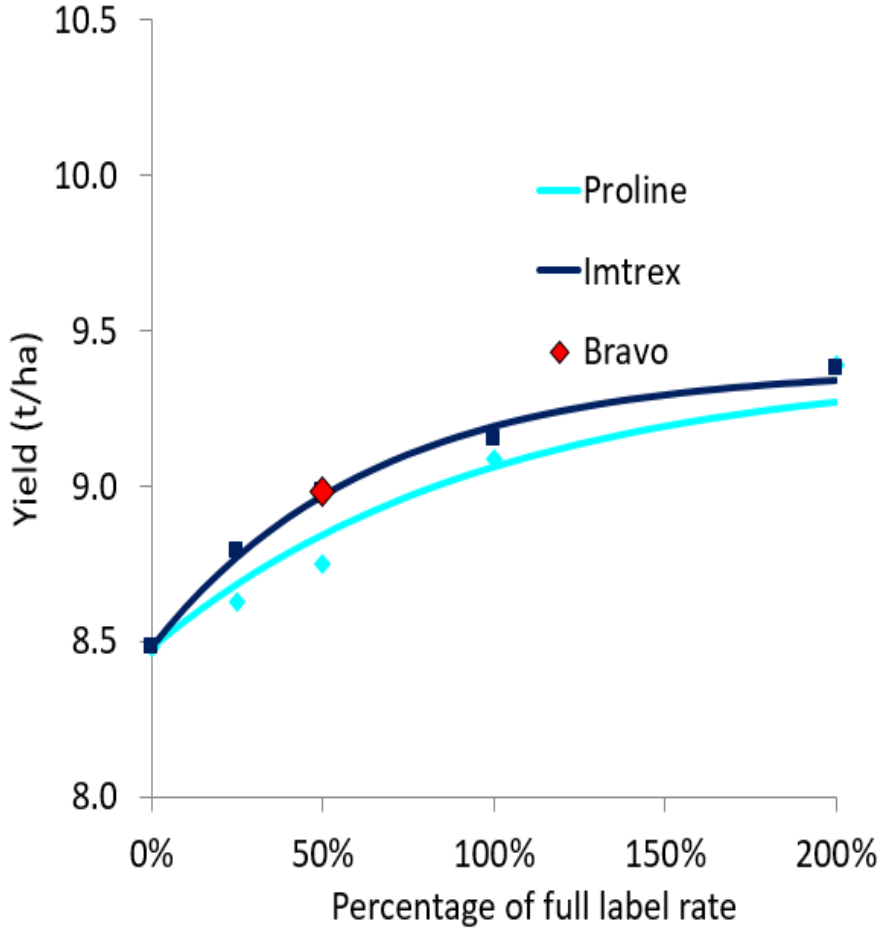
Septoria trial yields 2019 (7 trials)



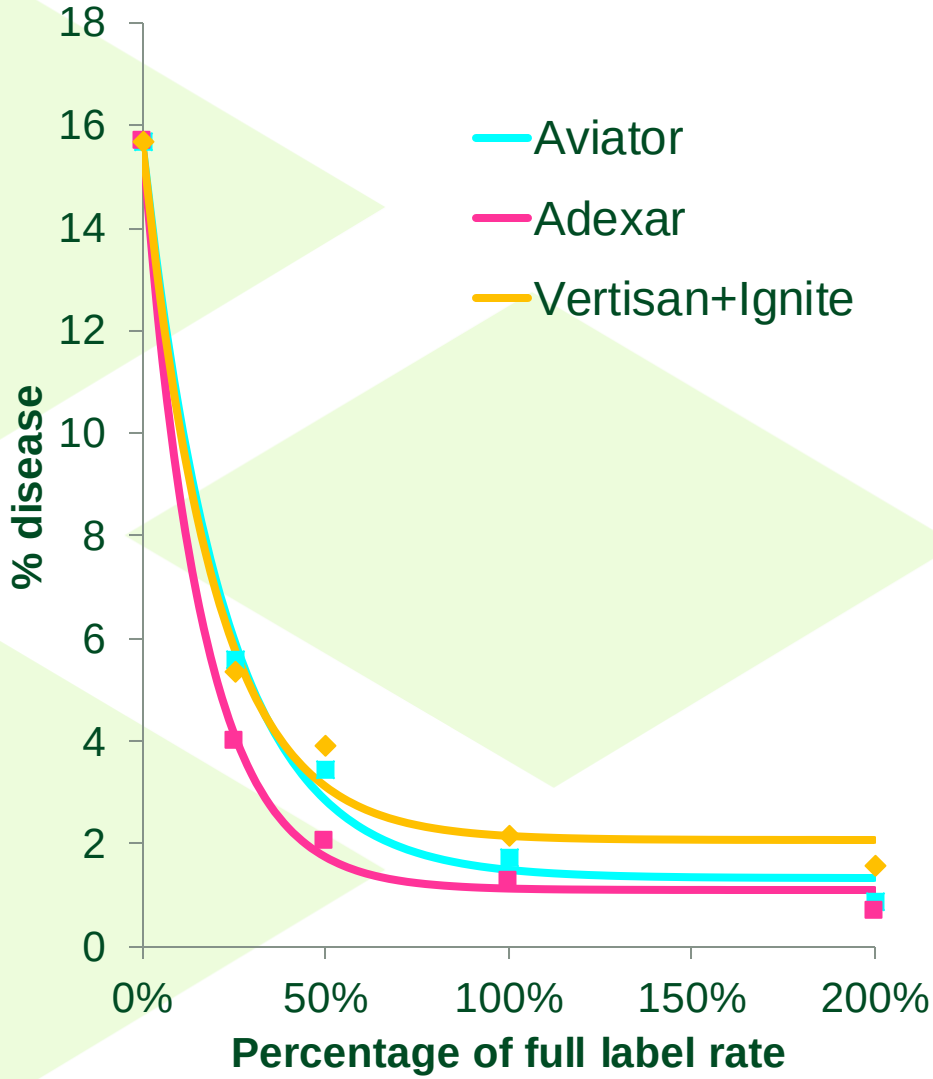


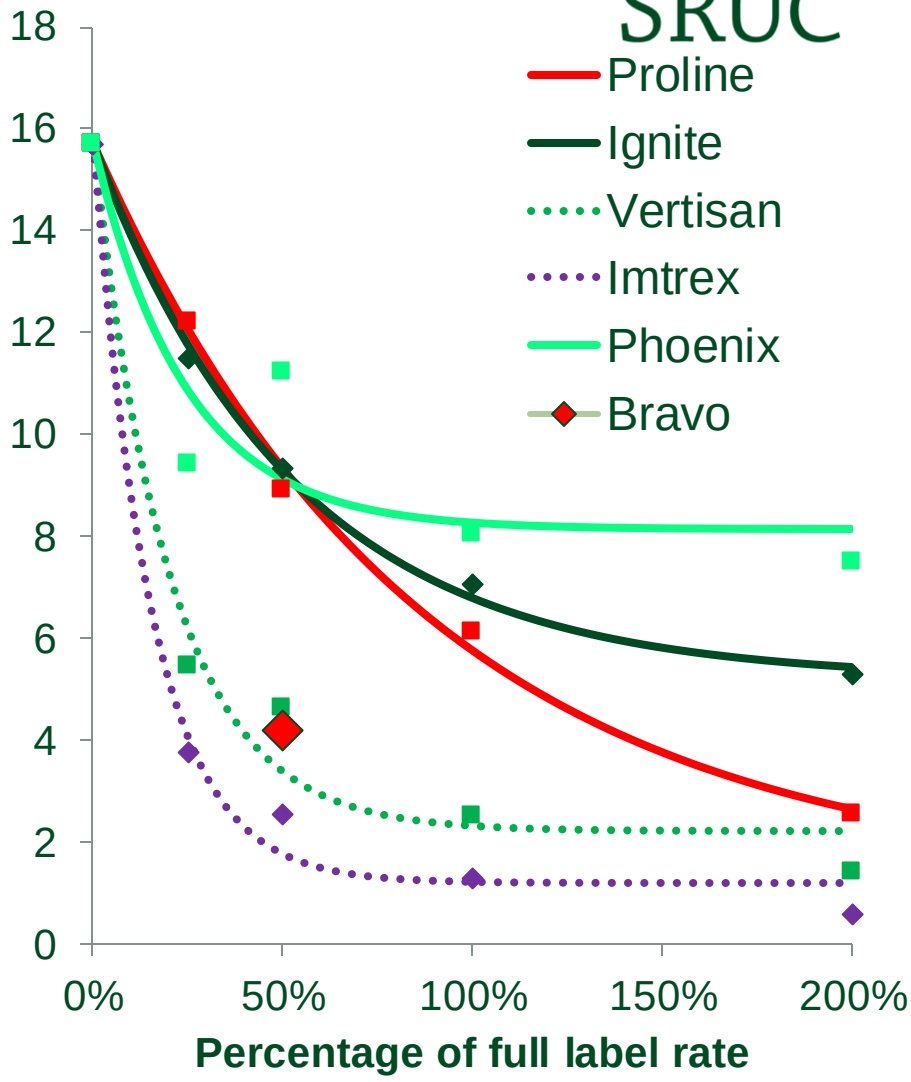
Septoria trial yields 2017–19 (20 trials)



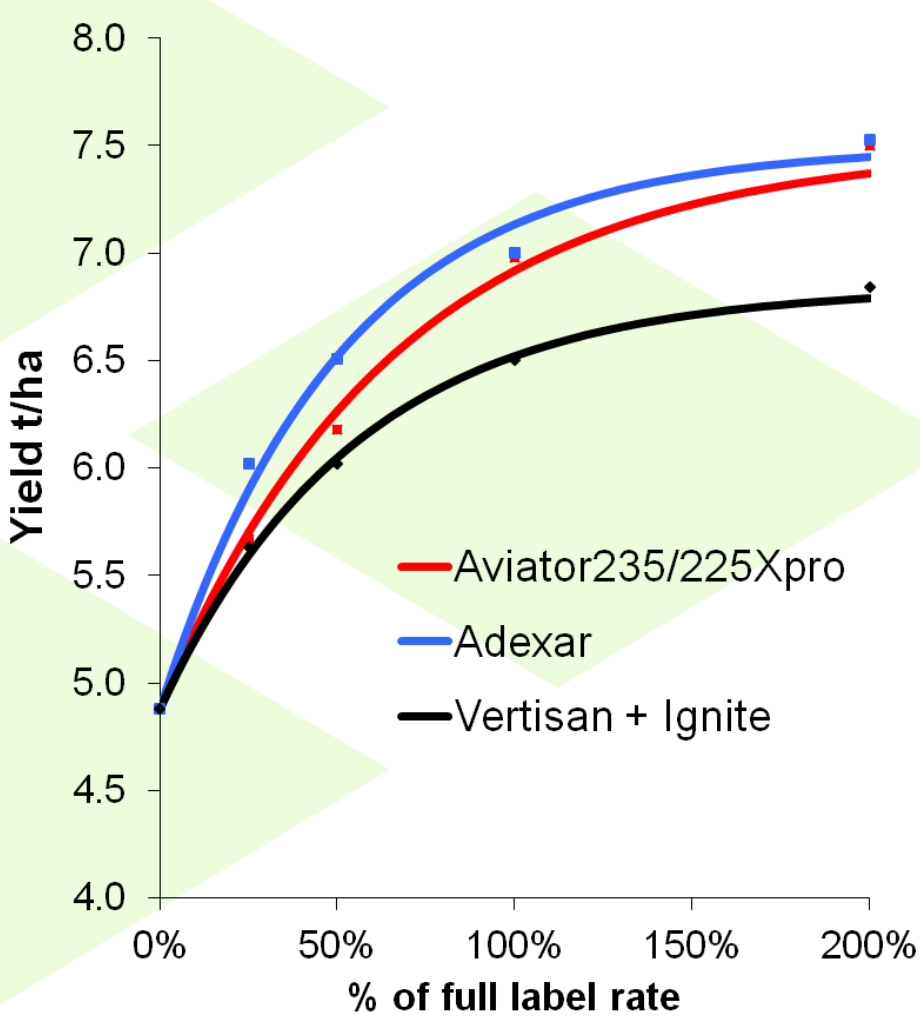


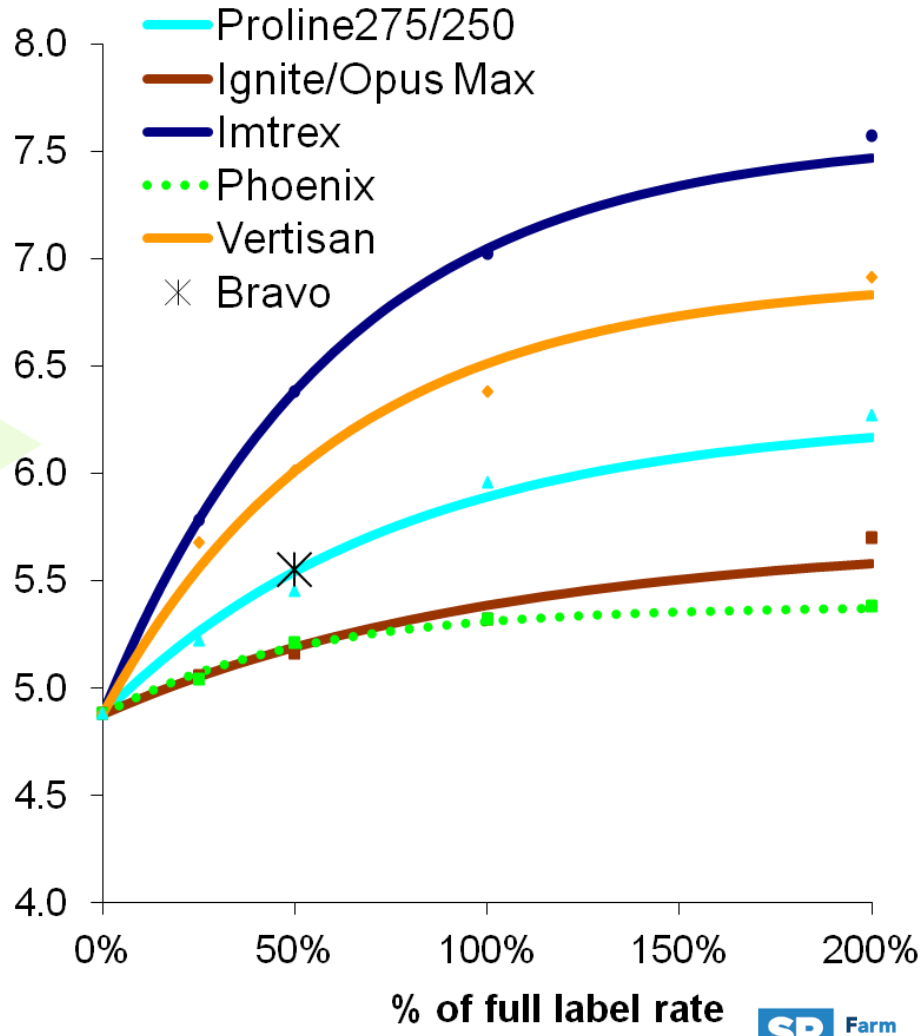
Septoria protectant activity 2013-15



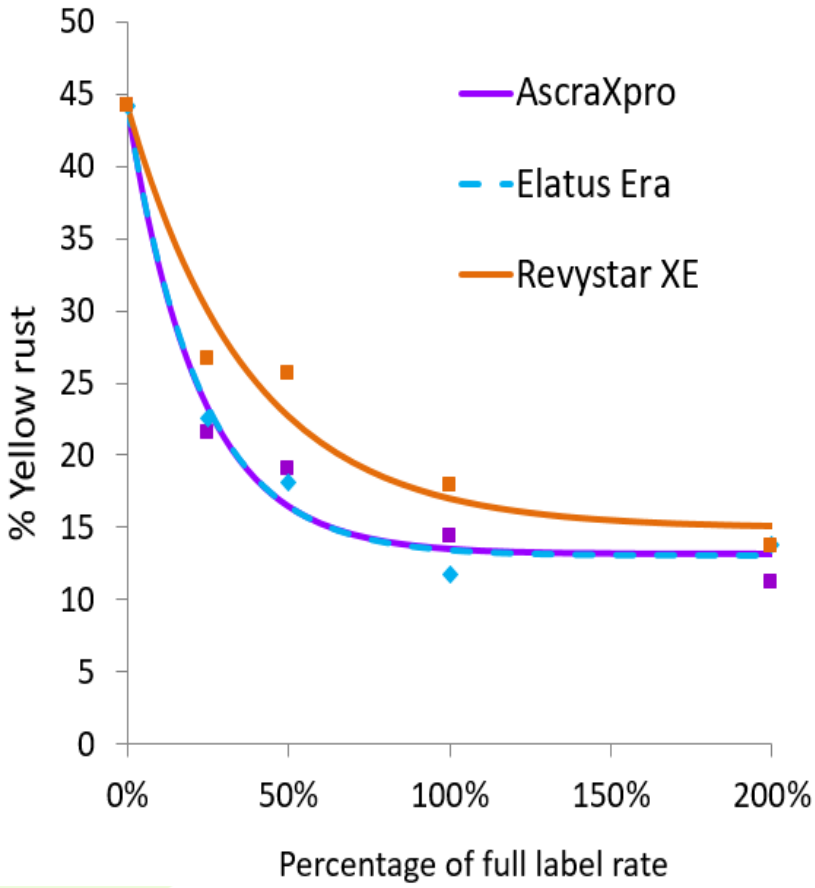


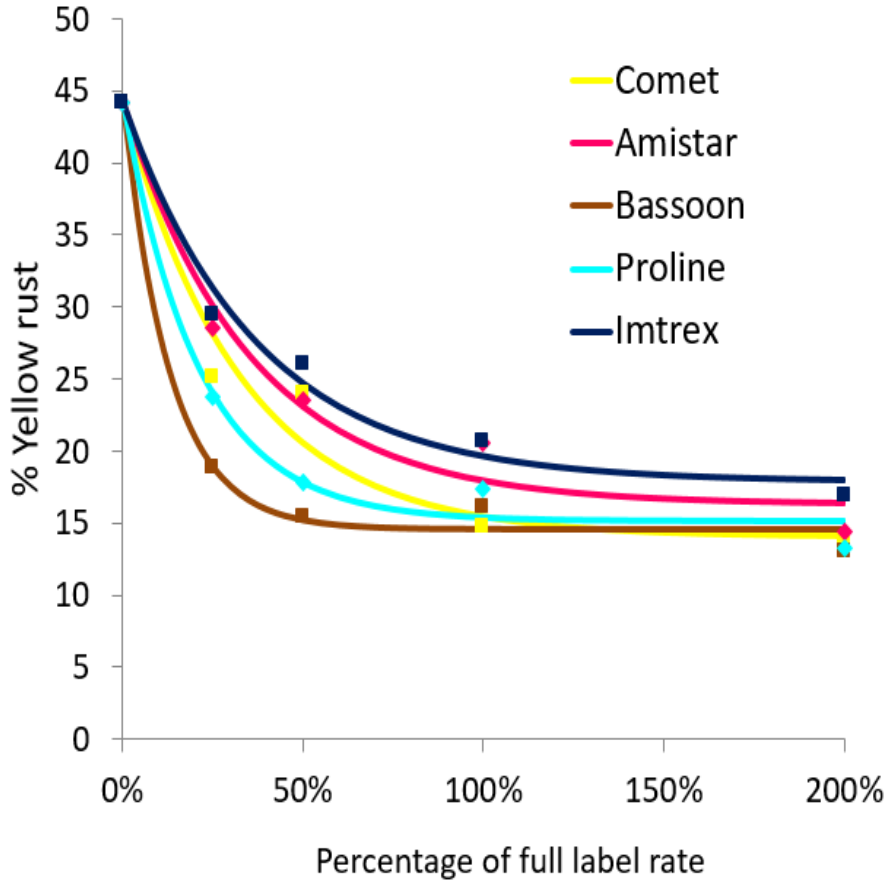
Yield Summary: all 2014 Septoria trials (7)



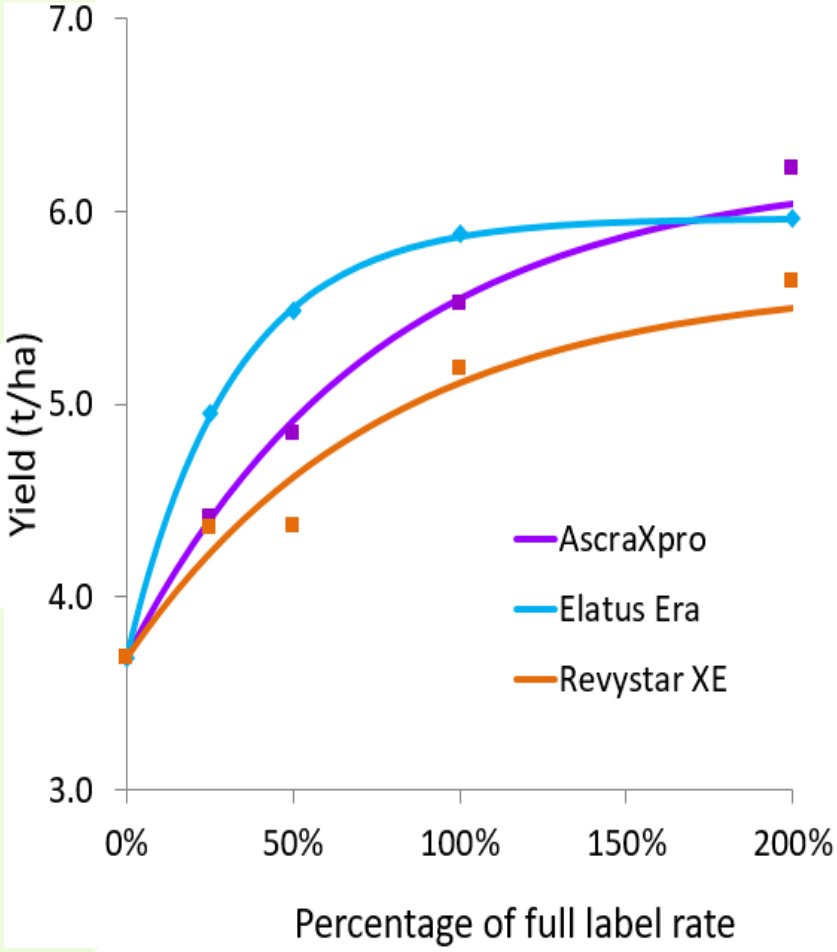


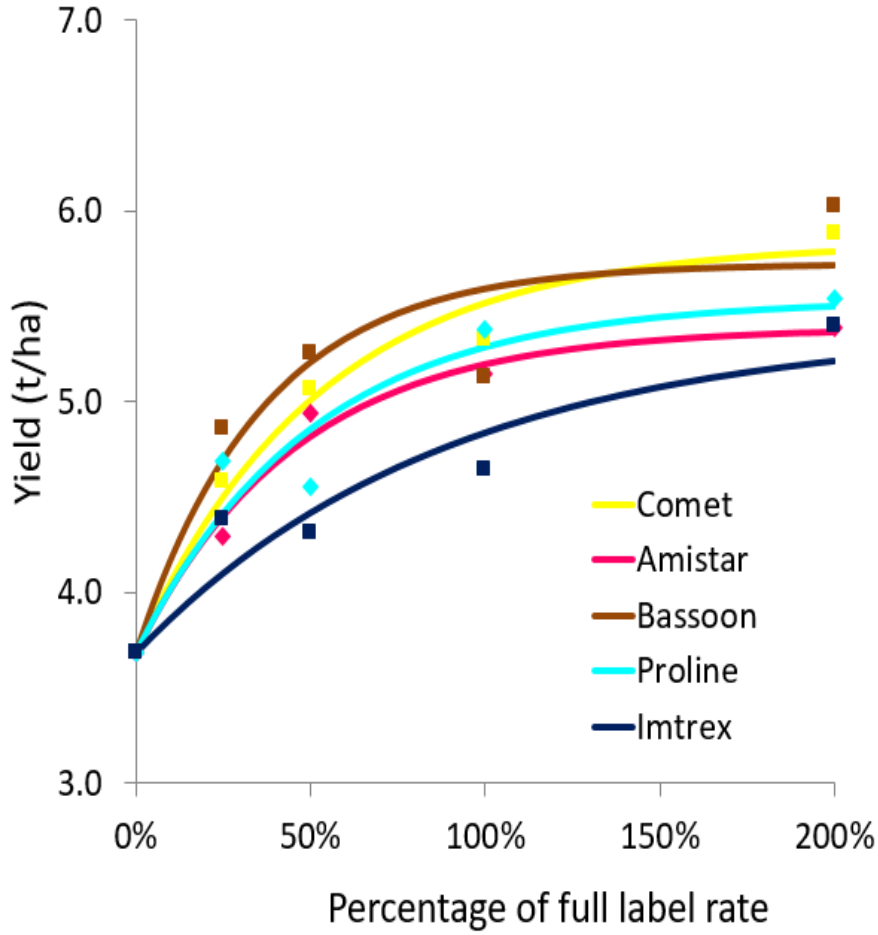
Yellow rust 2019



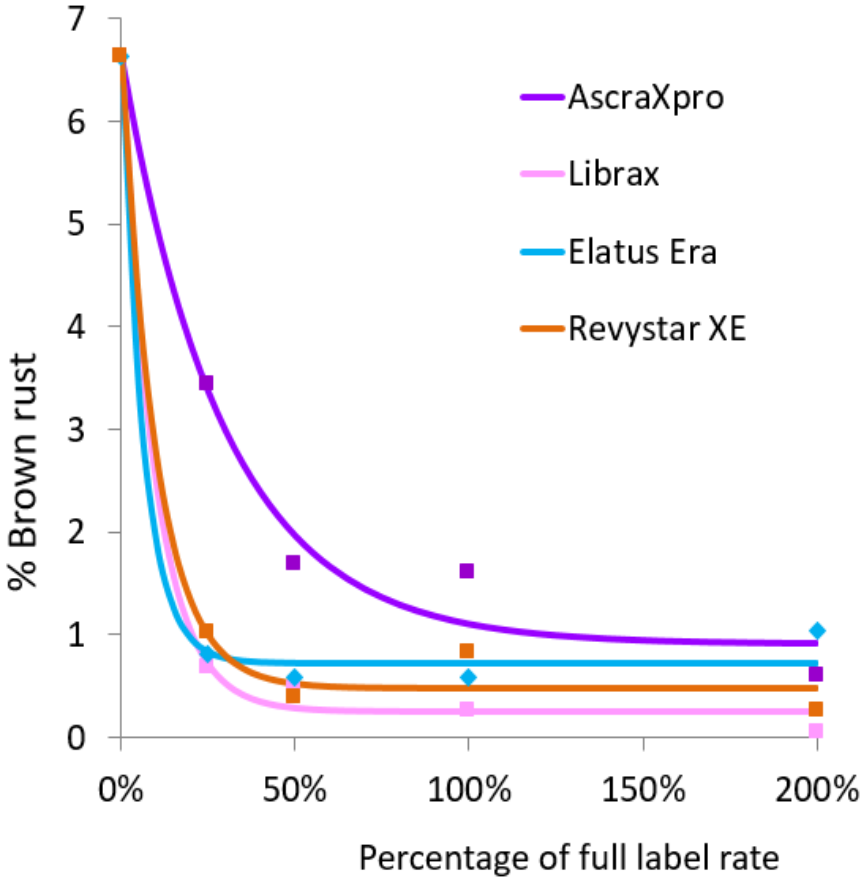


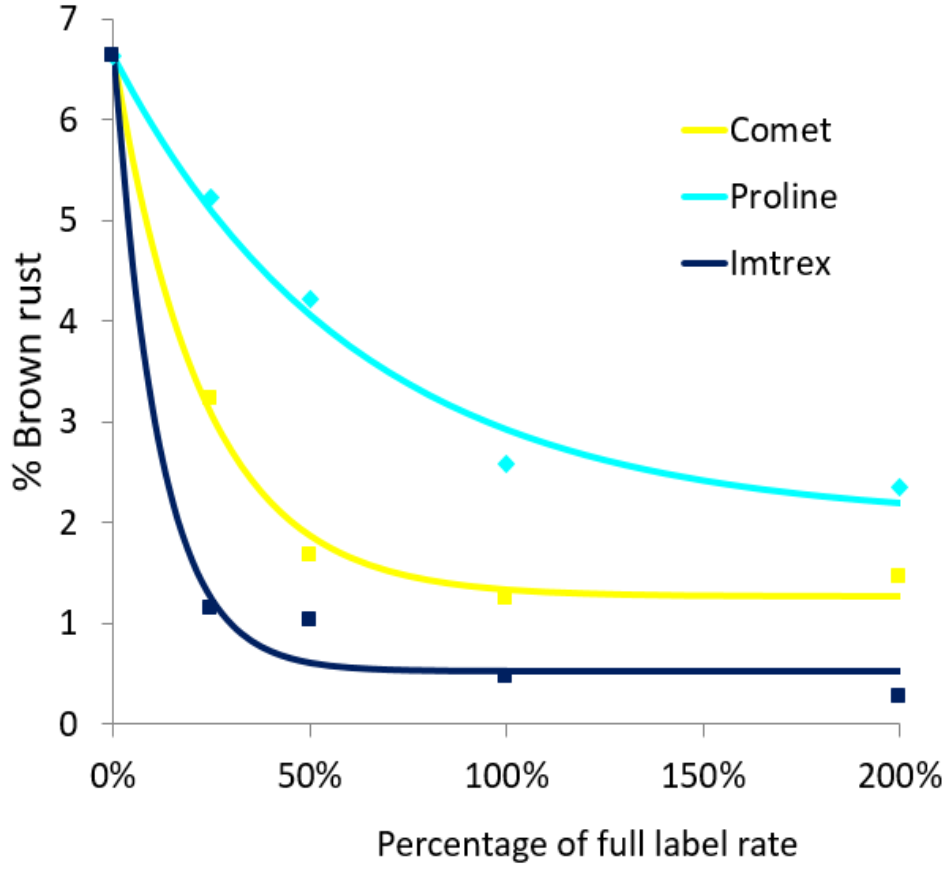
Yellow rust trial yields 2019



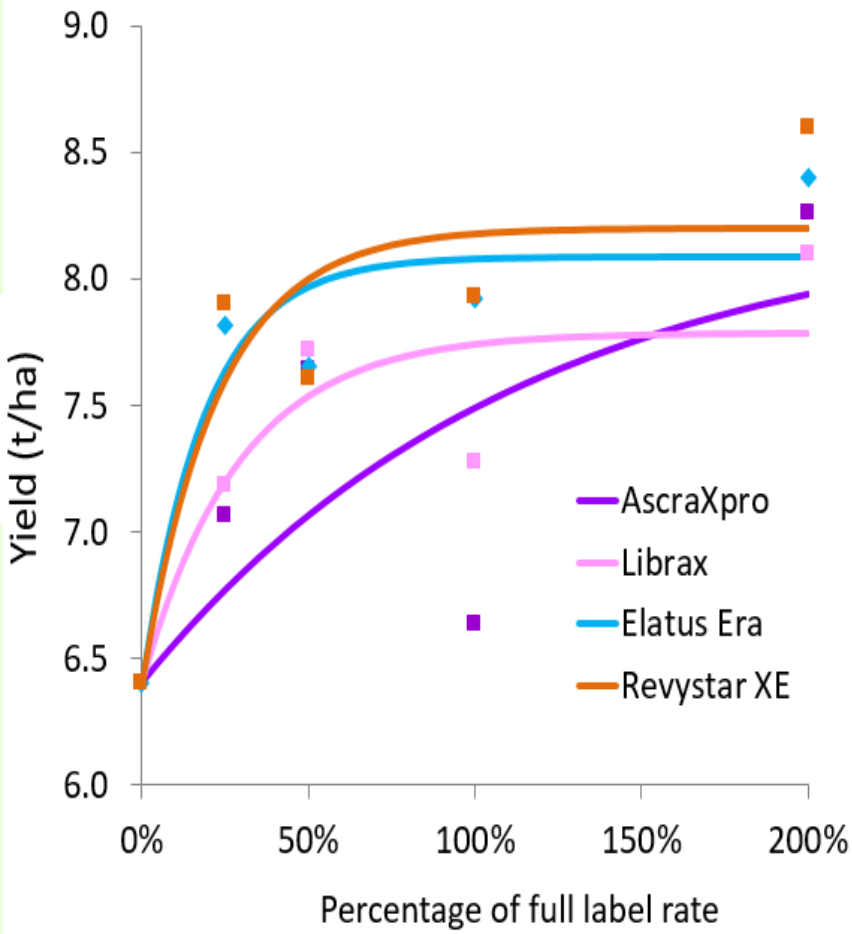


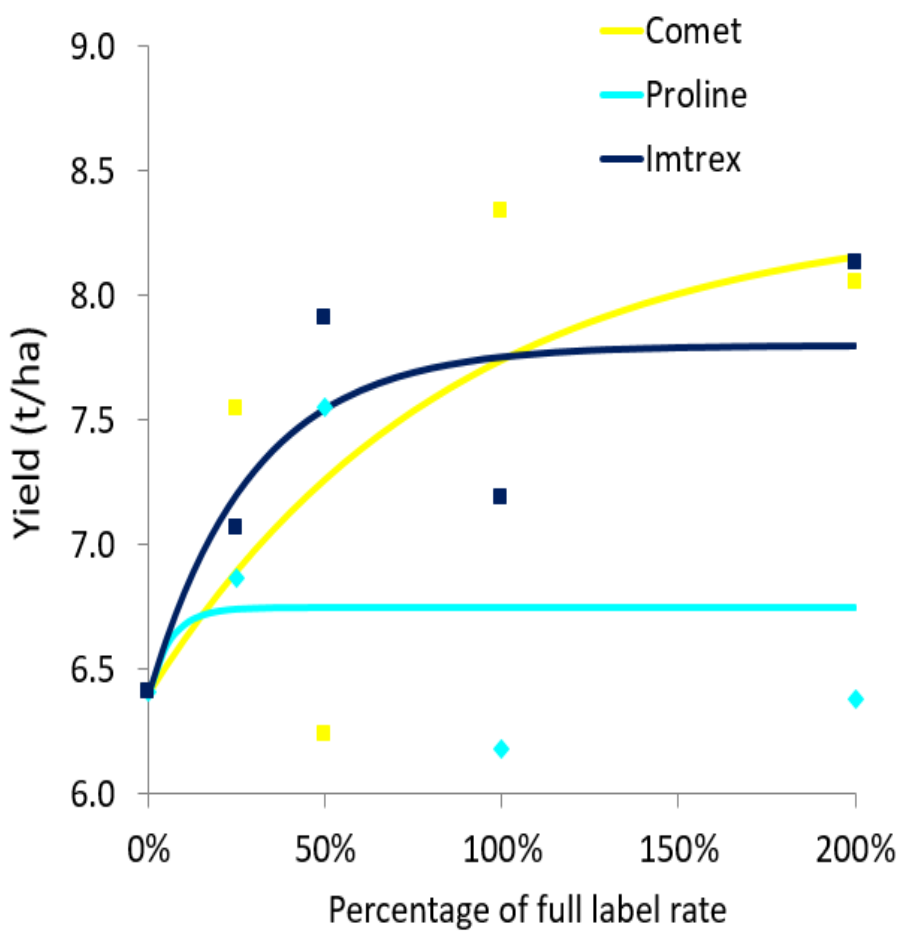
Brown rust 2019





Brown rust yield 2019

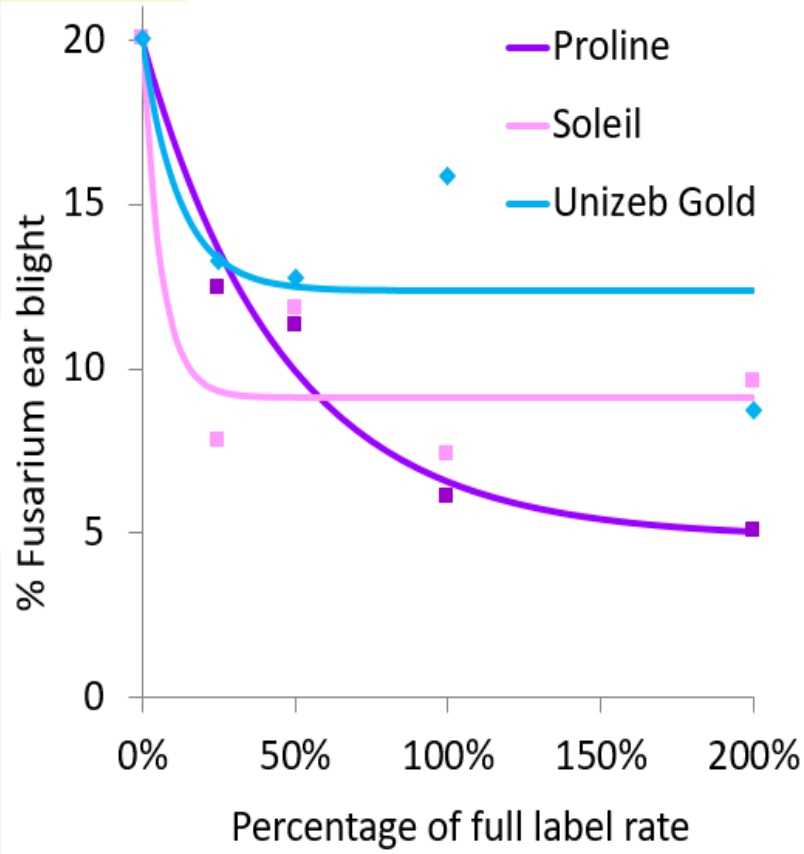




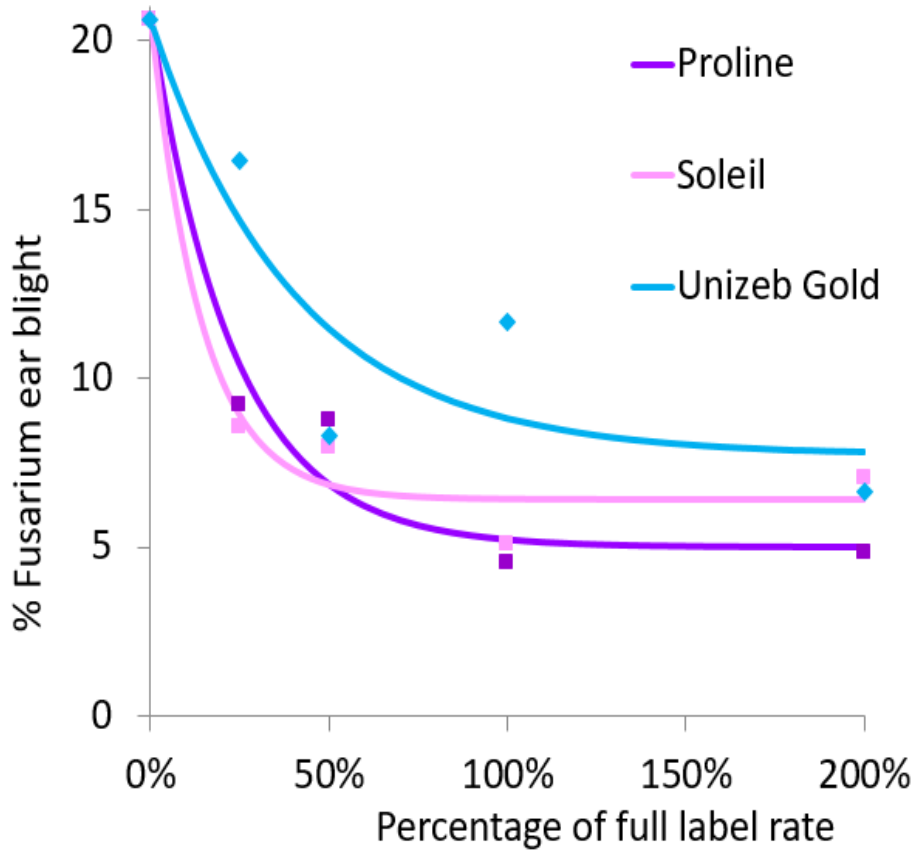
Fusarium trials (inoculated)
Zyatt (near Mansfield, Nottinghamshire)

SRUC

2019



2018-19



Soleil = tebuconazole + bromuconazole, Unizeb Gold = Mancozeb

Note: Mancozeb doesn't seem to control DON mycotoxin levels

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Opportunity in better resistance stewardship

- Stewardship measures based on reduced reliance
- Heavy usage of an a.i. confers a massive advantage to any resistant individuals
- Advice is to use all available methods to reduce pressure on chemistry – mix, alternate, use low-risk multisites

- All of the above give the chance to better tailor programmes, broaden the range of diseases managed and improve margins

Wheat programmes – what do we really need?

- T minus – autumn or winter clean up
- T0 – early rust protection
- **T1 – stem-base disease and protection of yield important leaves**
- T1.5 – protection of leaf 2 is gap between T1 and T2 is stretched
- **T2 – protection of yield important flag**
- T3 – continued green leaf retention and protection from ear diseases
- T4 – continued ear disease protection

- Can we reduce use of more marginal sprays?

Wheat programmes – what do we really need?

- T minus – autumn or winter clean up
- T0 – only for early rust protection
- **T1 – stem-base disease and protection of yield important leaves (risk based – CTL maximised)**
- T1.5 – protection of leaf 2 is gap between T1 and T2 is stretched
- **T2 – protection of yield important flag – deploy new chemistry maximising lowest risk options**
- T3 – continued green leaf retention and protection from ear diseases (azole and alternative multisite?)
- T4 – continued ear disease protection

- Can we reduce use of more marginal sprays?

Untreated Wheat - S tritici trial

3 way S tritici programme
SDHI + azole + Bravo (x2) T1&T2

3 way S tritici programme
SDHI + azole + Folpet (x2) T1&T2

Chlorothalonil authorisation for disposal, storage and use ends 20 May 2020

Reminder of growth stages 20 May 2019 (source adopt-a-crop)

	Average	Maximum	Minimum
Spring barley	17.56	31	10
Spring oats	16.5	22	11
Winter barley	48.2	61	33
Winter oats	32	33	30
Winter wheat	35	41	30

23rd April W Wheat – 31, W barley 31/2, S Barley mostly sown

Wheat programmes - strategic planning for 2020

	T0	T1	T2	T3
Late sown	x	Azole plus CTL	Range of SDHI/azole options plus alternative multisite	Alternate azole plus multisite
Resistant variety	x	Azole plus CTL	Range of SDHI/azole options plus alternative multisite	Alternate azole plus multisite
Early drilled	? Maximise CTL / minimise azole	Azole plus SDHI plus CTL	Try new chemistry plus alternative multisite	Alternate azole plus multisite
Susceptible variety	?Maximise CTL / minimise azole	Azole plus SDHI plus CTL	Try new chemistry plus alternative multisite	Alternate azole plus multisite
2nd wheat / eyespot risk	x	Azole plus SDHI plus CTL	Top rank products plus alternative multisite	Alternate azole plus multisite
Yellow rust scenario	Maximise strob / minimise and alternate azole / use CTL	Azole plus SDHI plus CTL (increase azole or add strob)	Maximise azole / use top rank mixture products plus multisite	Two-way azole mix plus multisite

Wheat fungicide programmes for 2020

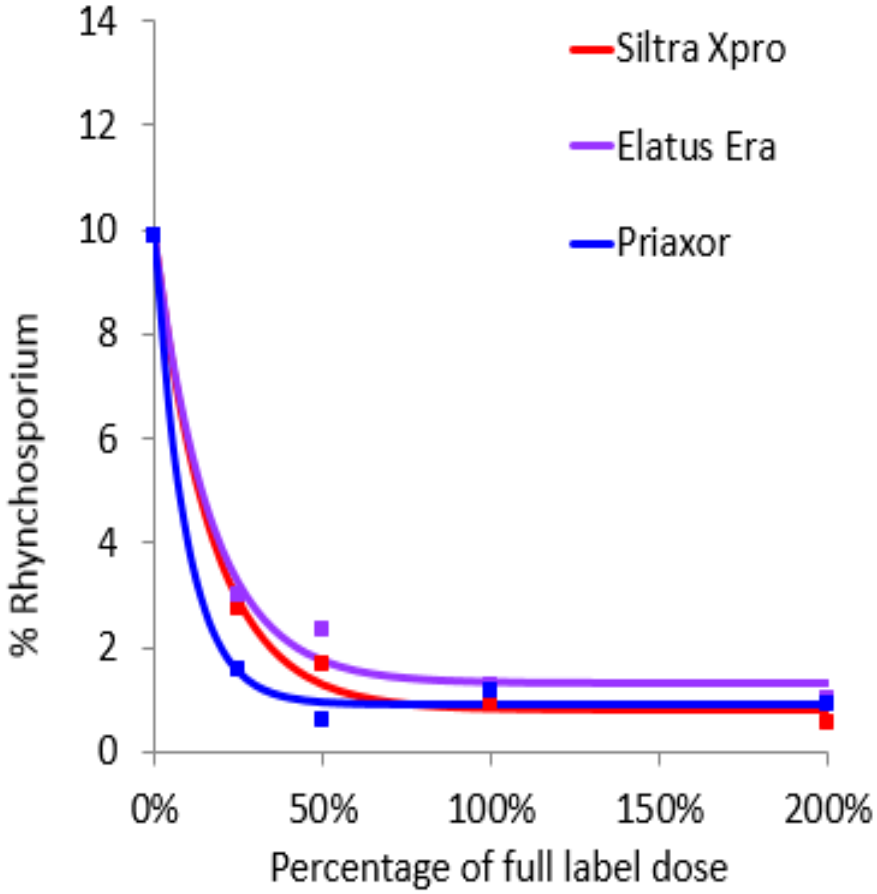
- Maximise use of CTL up to cut off and then switch to alternative multisites
- Use balanced mixtures of systemics
- Limit dose and application number of individual actives where you can
- Tune doses and actives to risk
- Target most effective products at most responsive timings
- Use new chemistry as a chance to alternate azoles
- Inatreq at T2 would give an option to alternate with SDHI at T1
- Folpet likely successor to CTL at T2 but consider mancozeb at T3

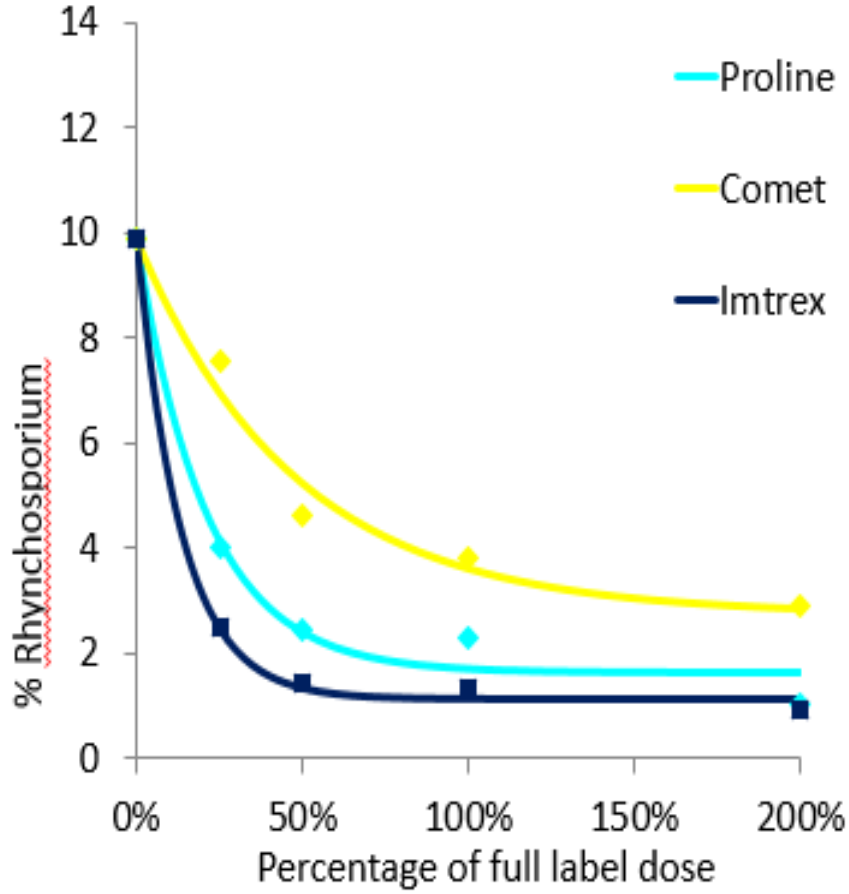
Barley programmes centred on efficient and targeted use

Understanding principles of fungicide use

- Manage crop to maximise grain number and potential grain size
- Early T1 sprays retain healthy tillers hence more ears where disease pressure threatens
- WB higher risk of early disease. SB lower risk at T1 and move to more resistant SB varieties gives scope to reduce T1 input
- A T2 application at GS49 gives sufficient protection of canopy post-anthesis to ensure grains fill to their storage capacity
- Later sprays (post T2) don't yield and could be omitted from recommendations

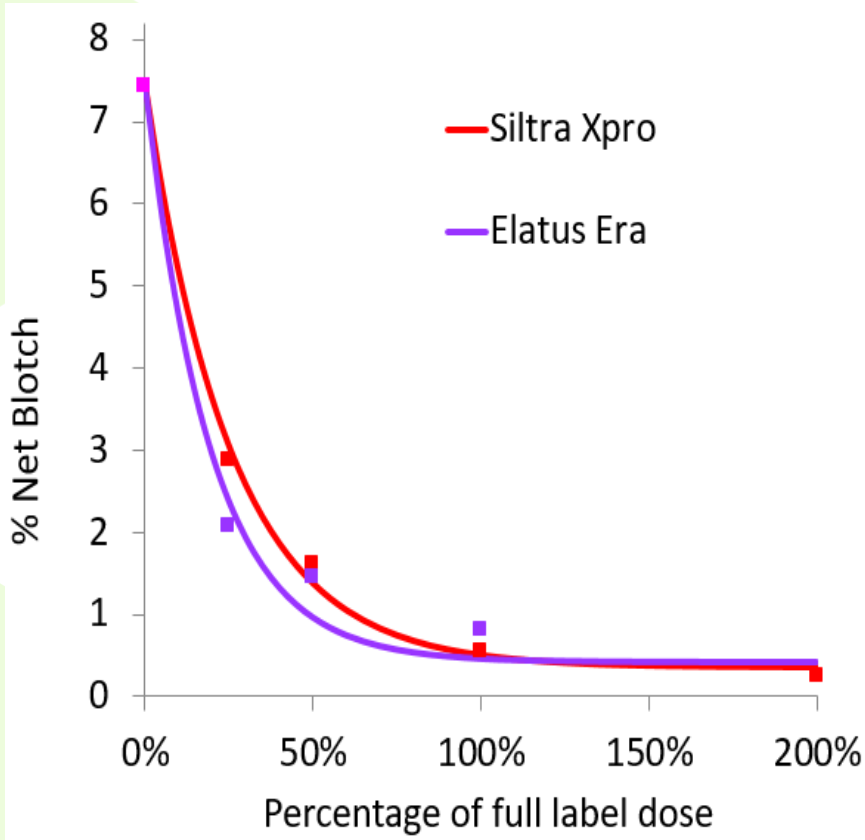
Rhynchosporium 2017–19 (8 trials) (protectant activity)

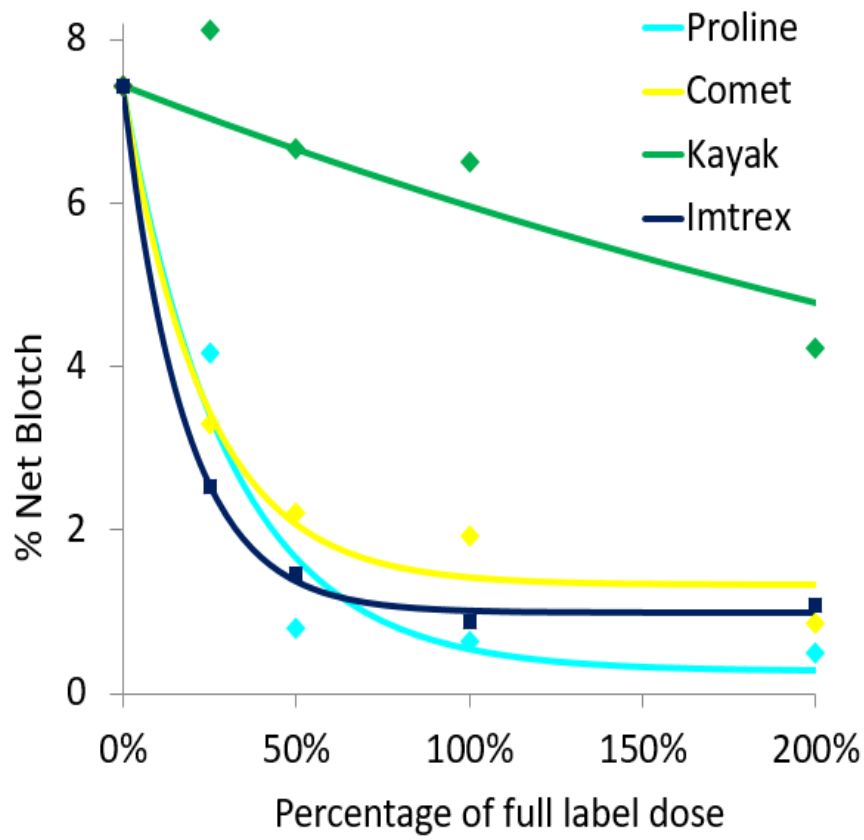




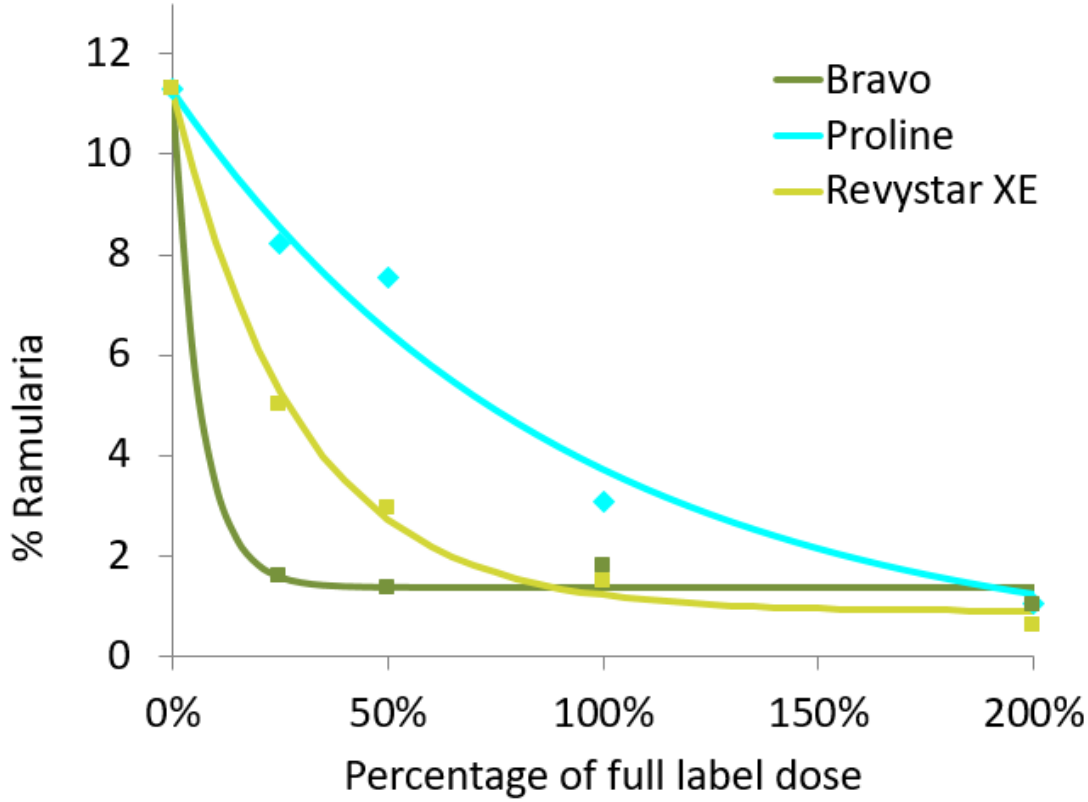
Priaxor = fluxapyroxad + pyraclostrobin

Net blotch protectant 2017–19 (4 trials)

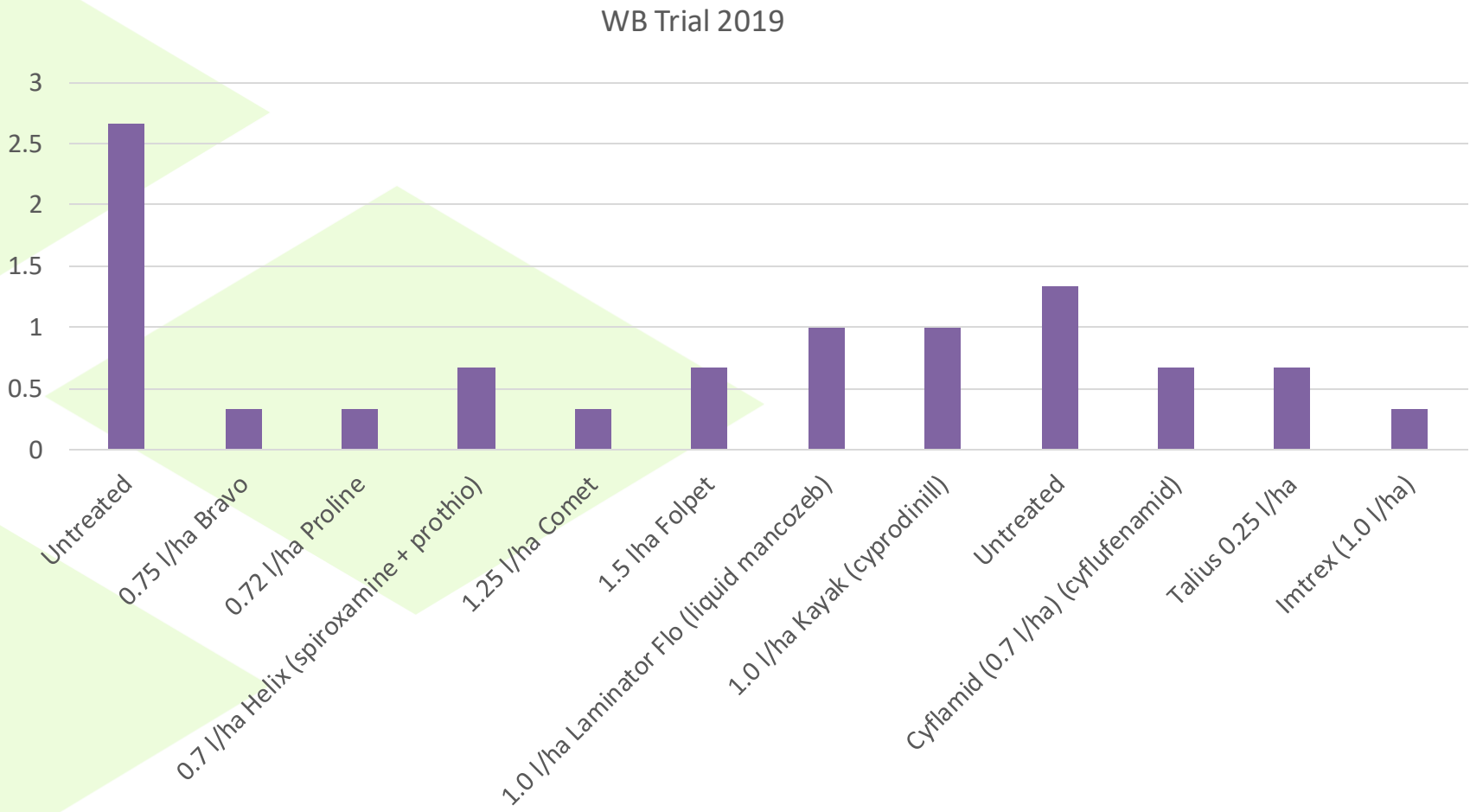




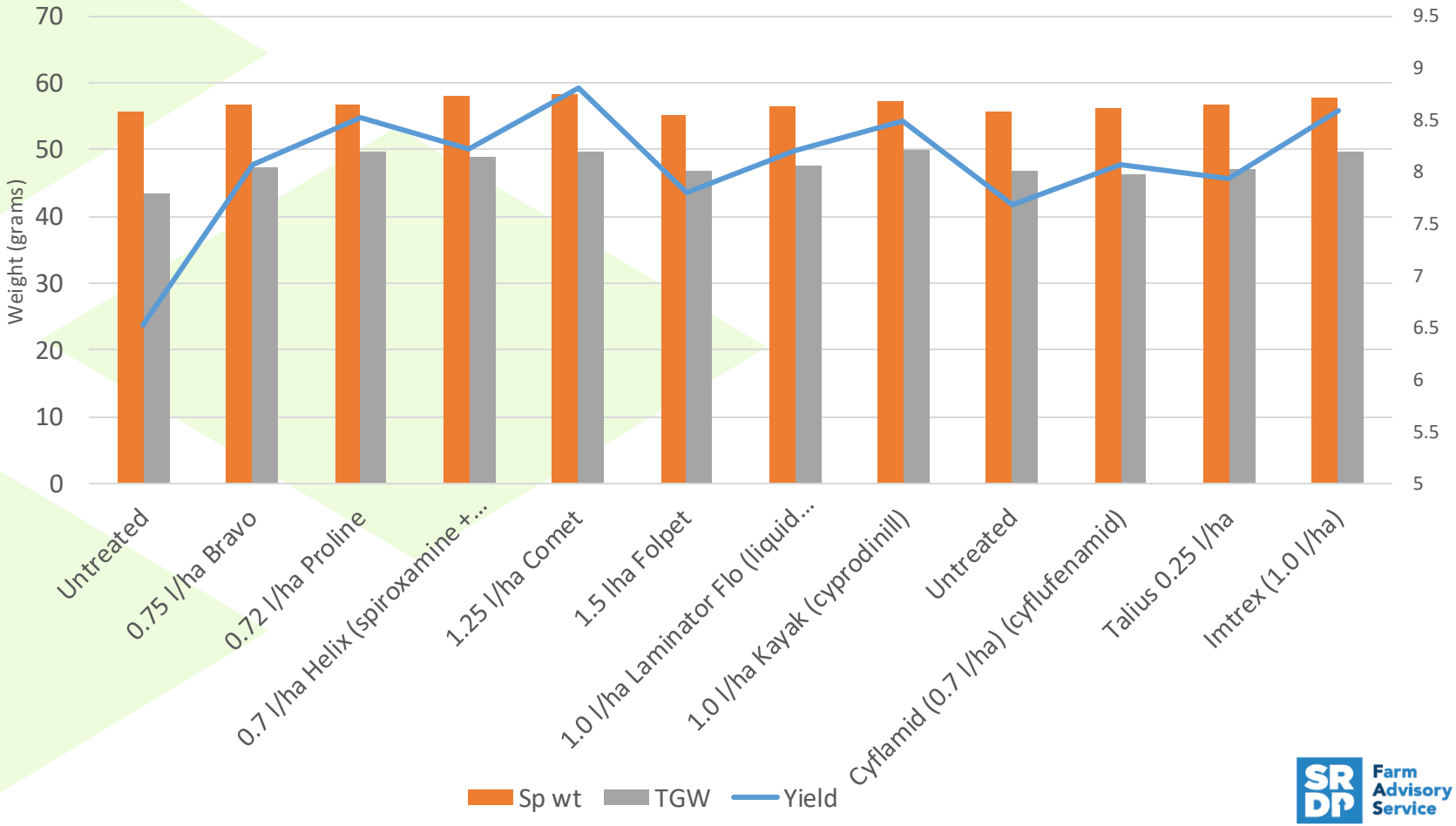
Ramularia 2019 (2 sites)



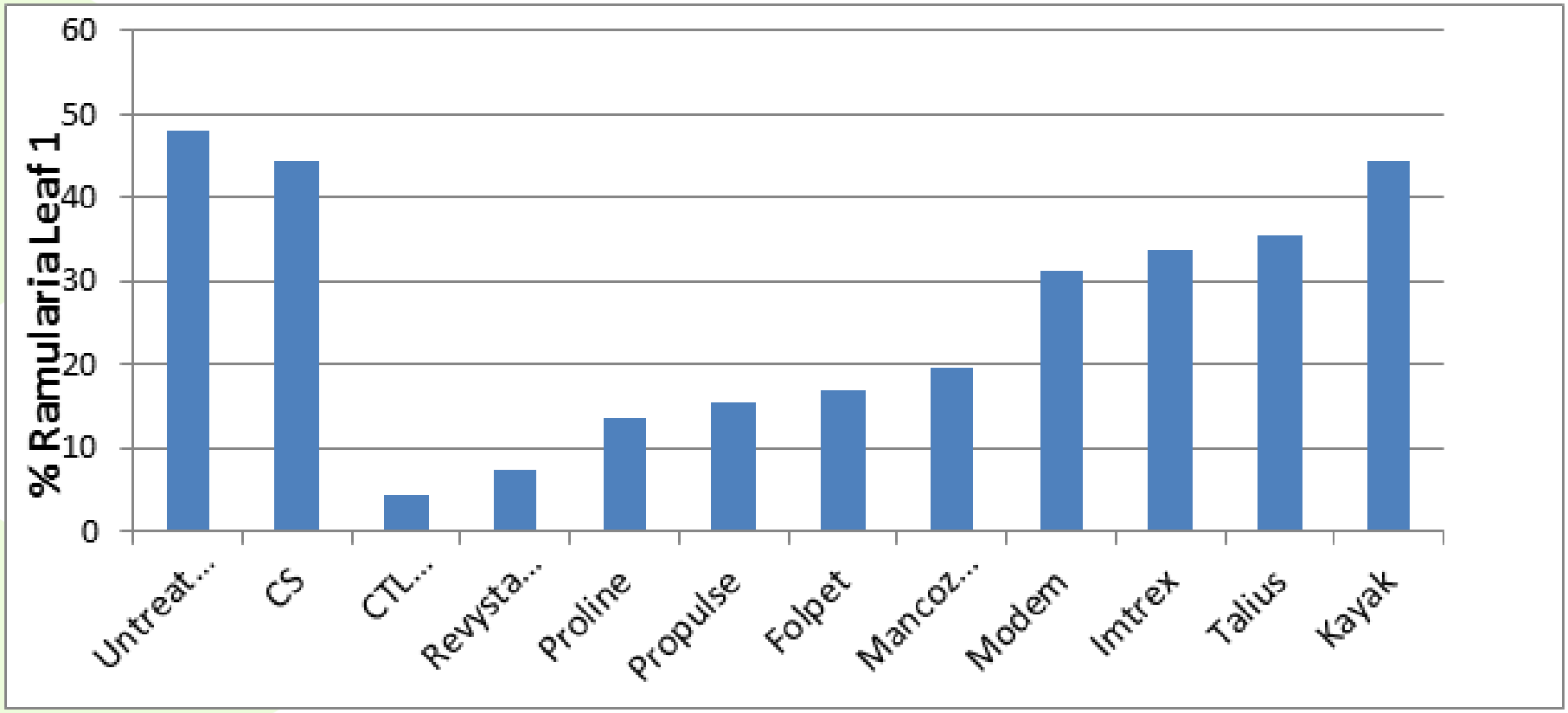
Ramularia control (WB -2019)



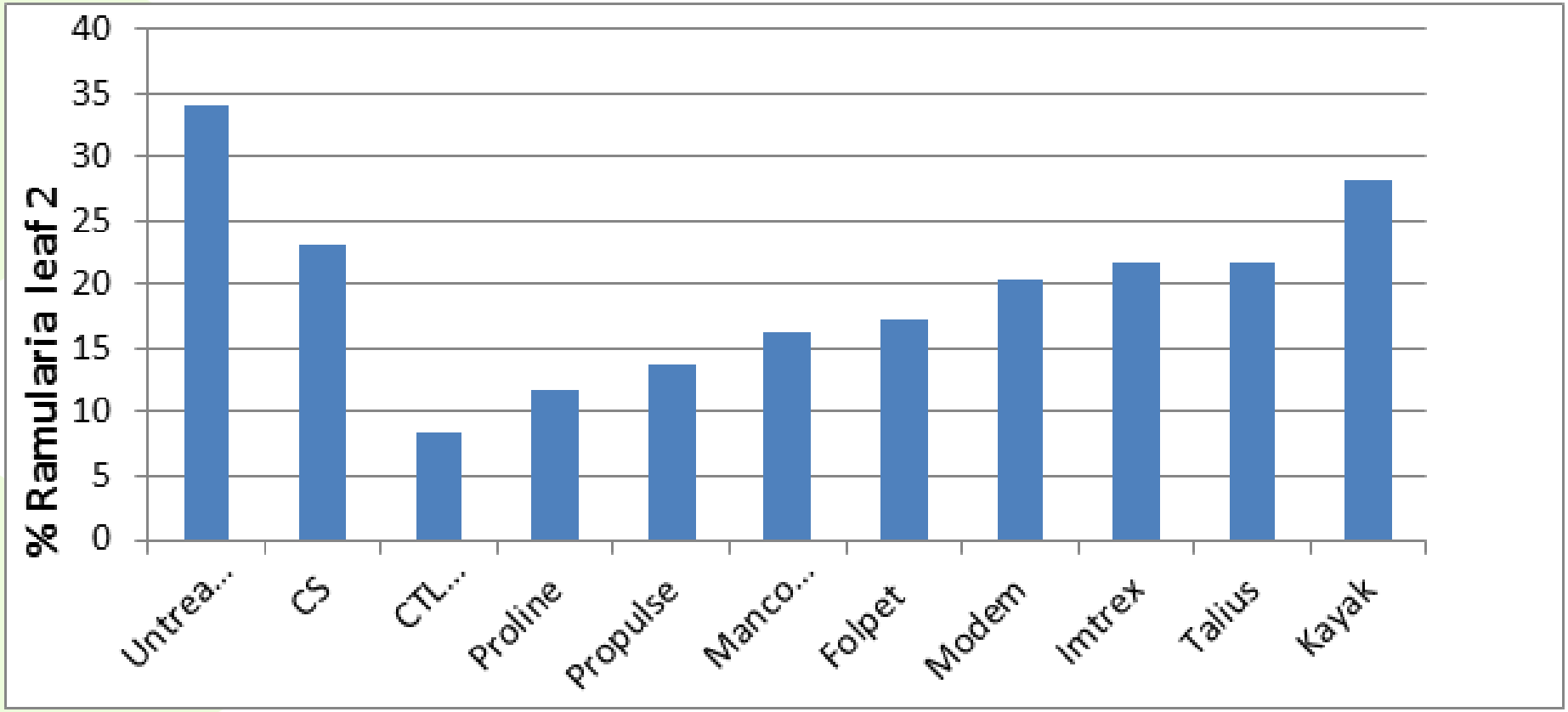
Ramularia control (WB-2019)



Ramularia control - Ireland



Ramularia control - Ireland



Ramularia – current advice

- Varietal ratings for ramularia withdrawn
- Breeding solutions are a longer game
- Use multisite chlorothalonil to manage ramularia risk at T1 and T2 (until 20th May 2020)
- Residual efficacy in prothioconazole
- Revystar XE efficacy sits between CTL and prothioconazole
- Folpet, biostimulants / micronutrients may play greater role
- Minimise crop stresses

Barley programmes - strategic planning

	T0	T1	T2	T3
Winter barley Susceptible	X	CTL + mid dose azole + SDHI mix	Alternate azole / Switch to other multisite	X
Winter barley Resistant variety	X	CTL + low dose azole + strob mix	Switch to other multisite	X
Spring barley Susceptible variety	X	Low dose option in wet year and if disease present	Switch to other multisite PTZ + SDHI	X
Spring barley Resistant	X	CTL* (or nothing if late crop)	Switch to other multisite PTZ + SDHI	X
Spring barley High risk ramularia	X	CTL*	Switch to other multisite Try Revystar XE	X

CTL* - many spring barley crops may not reach mid tillering /T1 by 20th May and stock must be disposed of by then

Take home actions

- CTL loss needs to be factored in to 2020 plans
- Maximise CTL use early and then switch to other multisites
- Build fungicide programmes from key timings
- Minimise use at least responsive timings
- Adjust programmes to variety and to risk
- Get as much diversity into programmes as possible – mix and alternate
- Keep aware on technical developments

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