

UKCPVS Stakeholder Event 2025

UKCPVS Reports from the 2024 Season

Huw Davis and Kostya Kanyuka (Niab)



CEREALS & OILSEEDS

13th January 2025



UKCPVS Stakeholder Event - January 2025

- Introduction – Huw Davis
- Data from 2024 – Huw Davis
 - Wheat Yellow Rust
 - Wheat Brown Rust
- Sampling in 2025 – Huw Davis
- Changes to the UKCPVS for 2025-27 – Kostya Kanyuka
- Take Home Messages – Kostya Kanyuka
- Questions – Kostya Kanyuka & Huw Davis

About the Survey



- UKCPVS – **UK Cereal Pathogen Virulence Survey**, established in 1967 following an outbreak of yellow rust on the previously resistant wheat variety Rothwell Perdix
 - *Aims to identify changes in pathogen populations and detect new races that may have an adverse effect on cereal production in the UK*
- Farmers, agronomists, trials staff, breeders and researchers send in infected leaf samples
- Funded by AHDB and a contribution from APHA



UKCPVS – Pathogens Surveyed



Puccinia striiformis f.sp. *tritici*
Wheat yellow/stripe rust



Puccinia triticina
Wheat brown/leaf rust



Blumeria graminis f.sp. *hordei*
Barley powdery mildew



UKCPVS changes in 2024 vs 2023

Rusts

- Focus on the seedlings stage, growth room-based YR and BR trials
- A new, reduced differential set is used for pathotyping rust isolates
- Testing **more** isolates on the full set of RL and candidate varieties
- In-season reporting (where possible)

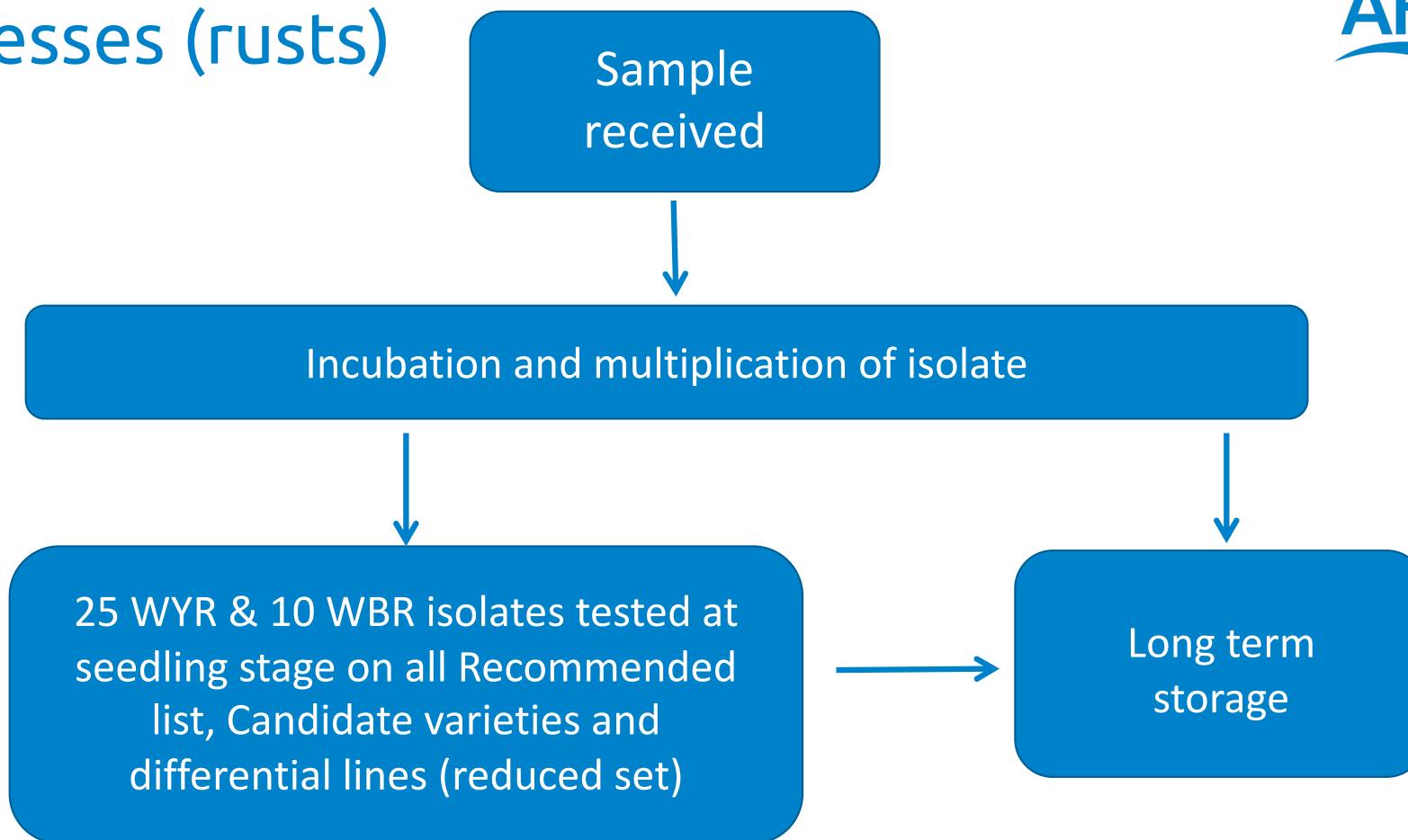


Wheat and barley powdery mildew

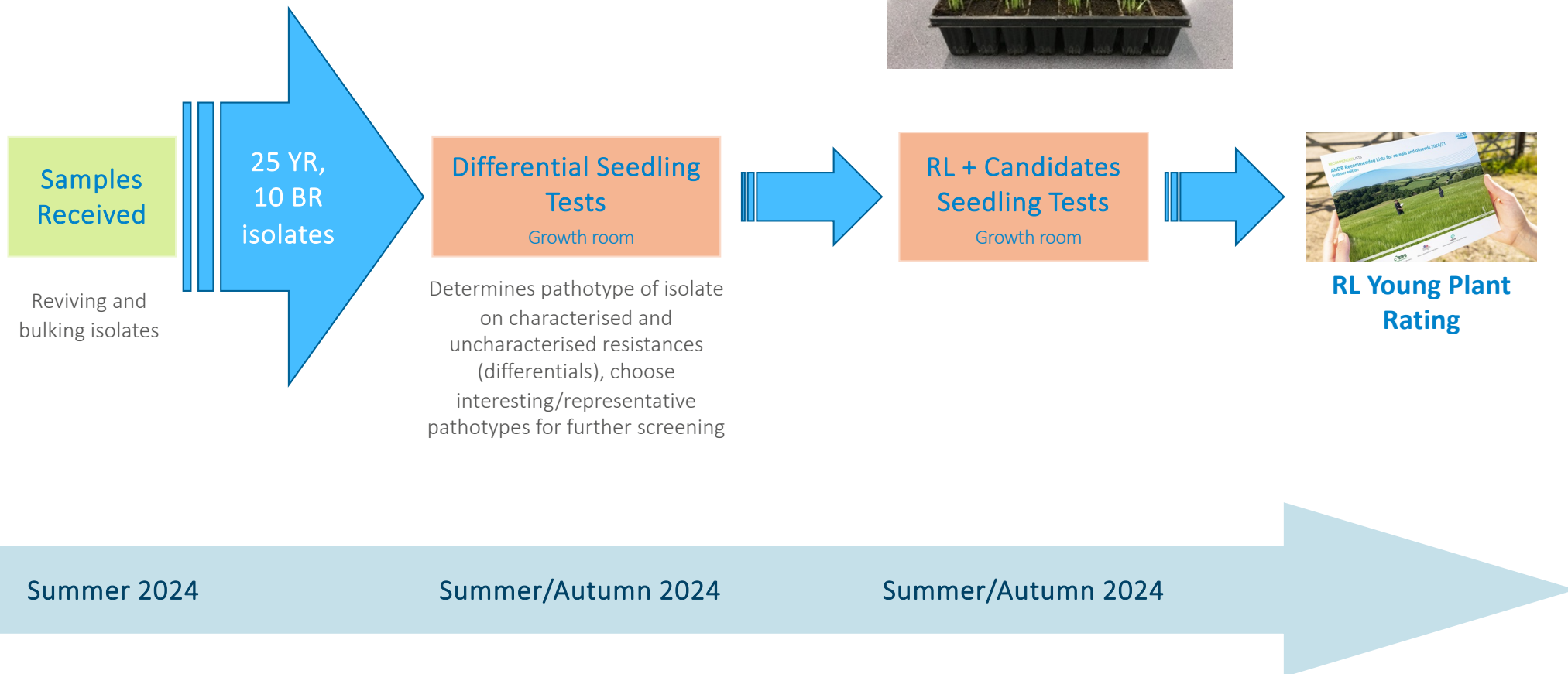
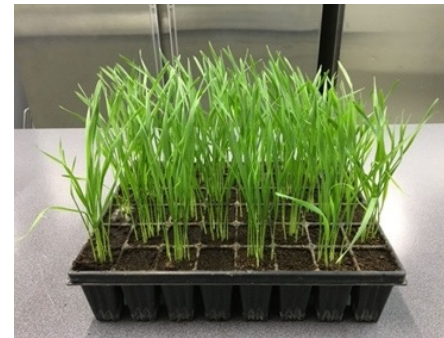
- No reports/unusual sightings to indicate any major changes in wheat mildew population
- Some susceptibility seen in spring barley *m/o* varieties in Scotland in 2023, but no samples were received in 2024



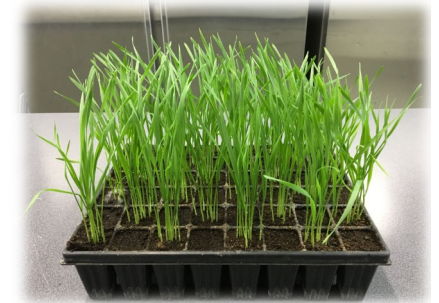
Processes (rusts)



UKCPVS Pipeline - YR & BR



Seedling Differential Tests



WYR Differential Cultivar	Resistance Gene
Avocet 1	<i>Yr1</i>
Vilmorin 23	<i>Yr3+</i>
Hybrid 46	<i>Yr4</i>
Avocet 5	<i>Yr5</i>
Avocet 7	<i>Yr7</i>
Avocet 8	<i>Yr8</i>
Apache	<i>Yr7 & Yr17</i>
Avocet 15	<i>Yr15</i>
Avocet 17	<i>Yr17</i>
Avocet 32	<i>Yr32</i>

Virulence profile = pathotype

Lists the virulence genes the isolate carries and any additional test cultivars infected at seedling stage

1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,Ca,Ap

Resistance (R) genes

Additional cultivars with unnamed R genes

Wheat Yellow Rust

Huw Davis

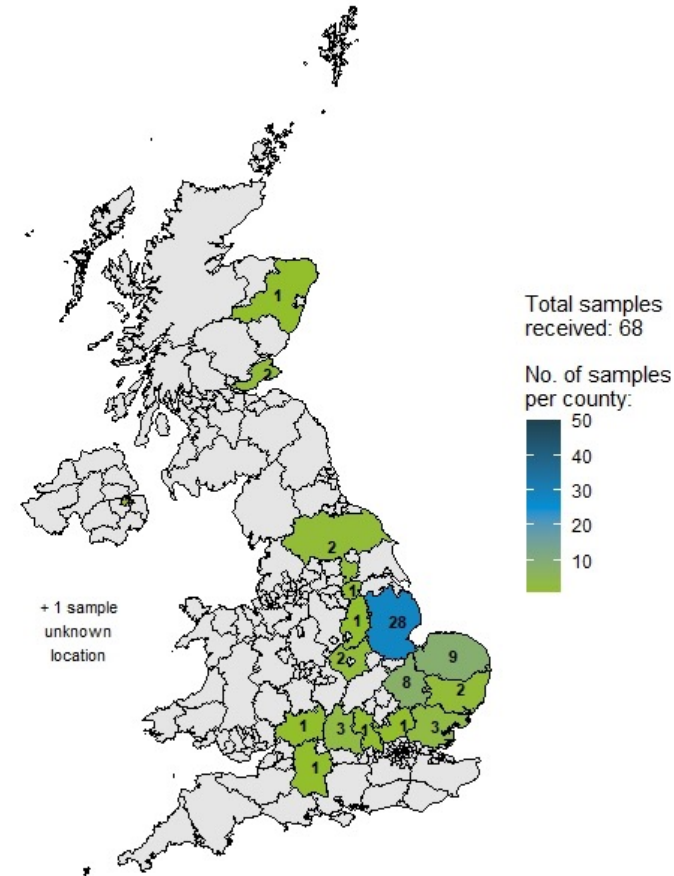
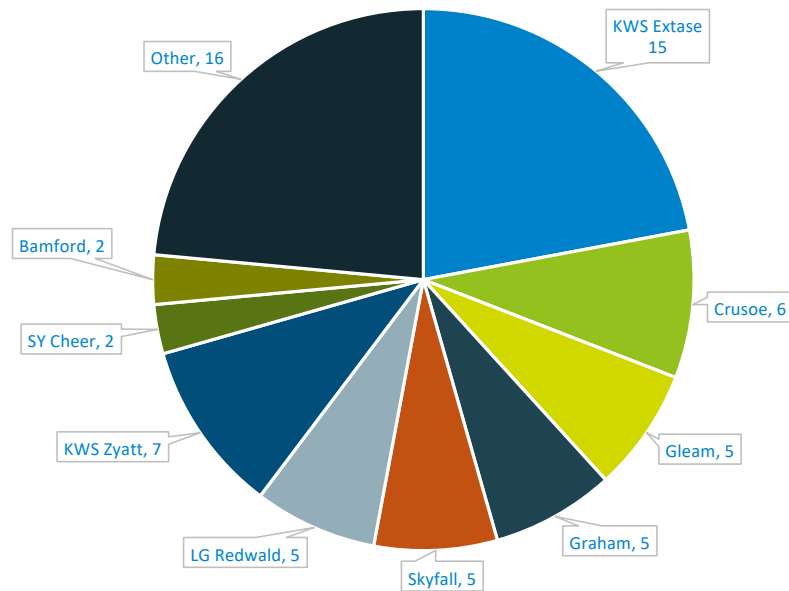


2024 WYR Samples Received

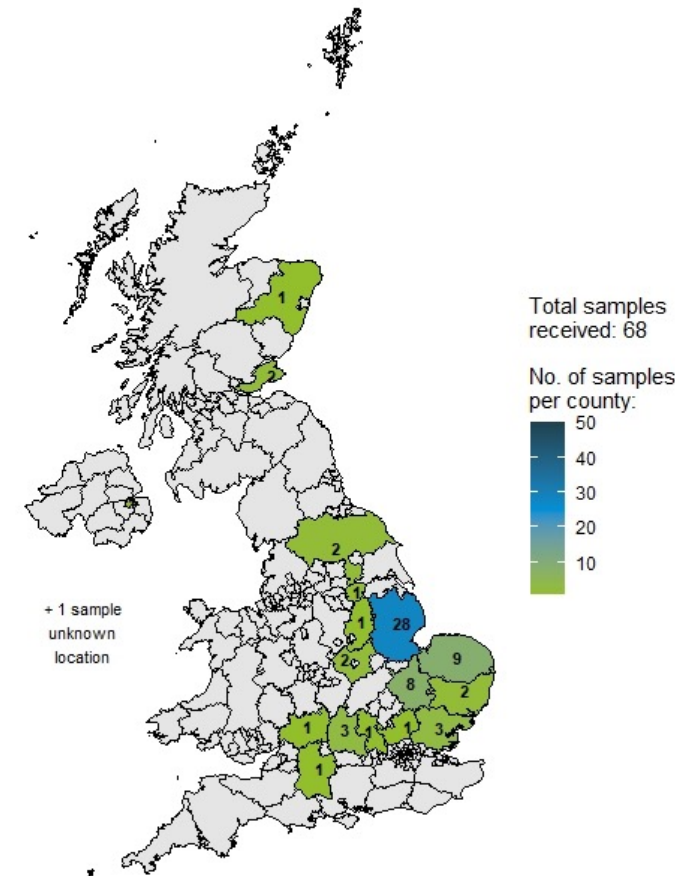
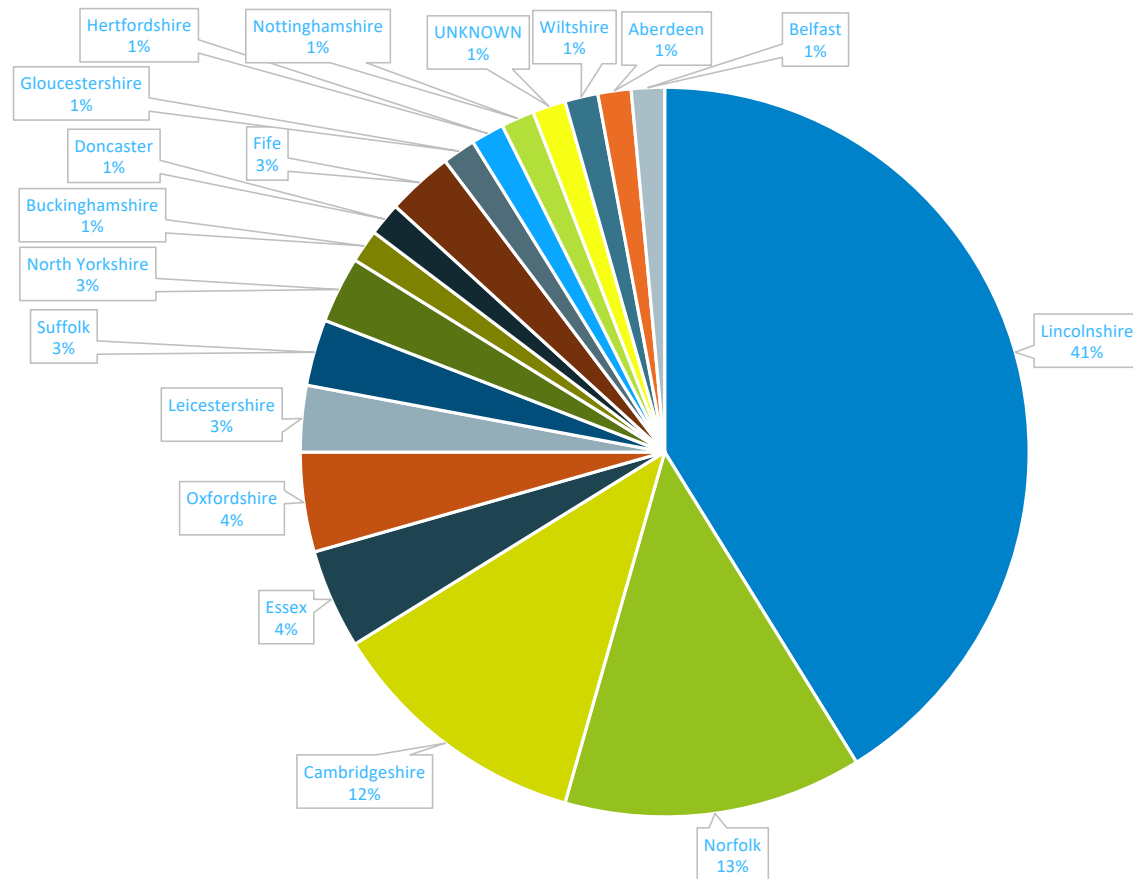


- ✓ 68 samples from 17 counties (+ 1 unknown)
- Weather conducive to rust development in 2024

From 25 varieties



Geographical distribution WYR



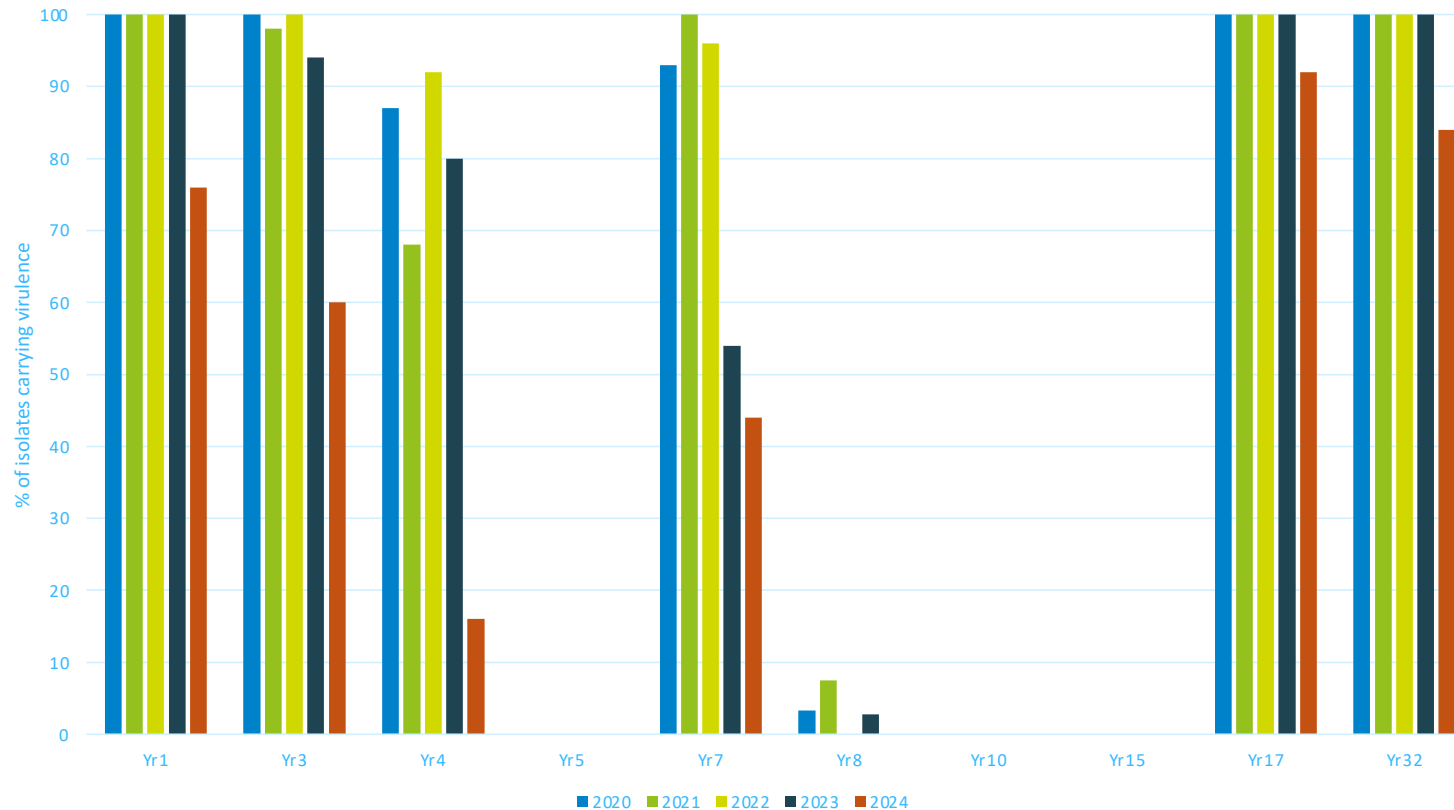
WYR Seedling Differential Tests



- 25 isolates selected based on host variety and location. A mixture of 3 isolates is also tested.

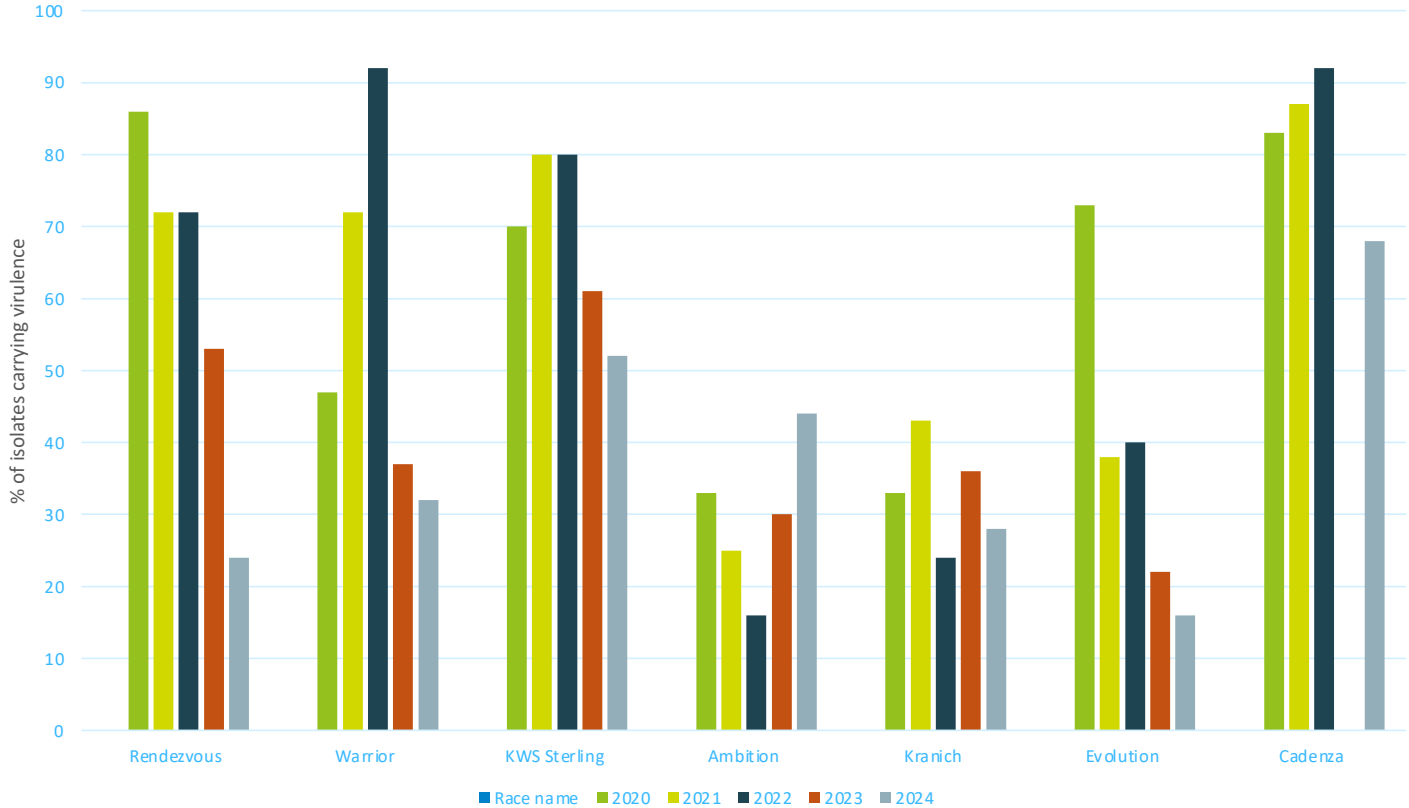
Test Number	Isolate code	Host variety	location	Seedling virulence
1	24-002	KWS Extase	Leicestershire	1,3,7,17,32,Ap,Sp,Amb,Ca
2	24-003	Crusoe	Nottinghamshire	1,3,4,7,17,32,Ap,Sp,Wa,St,Amb,Kr,Ca
3	24-004	Gleam	Lincolnshire	1,4,17,32,Sp
4	24-007	KWS Extase	Oxfordshire	1,3,4,7,17,32,Ap,Re,Sp,Wa,St,Amb,Kr,Ca
5	24-009	Graham	Wiltshire	17,Sp,Amb,Ca
6	24-014	LG Redwald	Lincolnshire	1,17,32,Re,Sp,Kr
7	24-019	Graham	Cambridgeshire	3,17,32,Sp
8	24-020	Crusoe	Oxfordshire	1,3,7,17,Ap,Sp,Wa,Amb,Ca
9	24-023	Gallant	Buckinghamshire	1,3,7,17,32,Ap,Sp,Wa,St,Amb,Kr,Ca
10	24-024	KWS Extase	Leicestershire	1,3,7,17,32,Ap,Sp,St,Amb,Kr
11	24-030	SY Cheer	Lincolnshire	1,3,17,32,Re,Sp,Wa,St,Amb,Ca
12	24-034	Bamford	Cambridgeshire	17,32,Sp,Wa,Ev,Ca
13	24-036	Skyscraper	Gloucestershire	1,17,32,Re,Sp,St,Ev,Ca
14	24-038	Champion	Norfolk	1,3,17,32,Sp,St,Ca
15	24-040	LG Typhoon	Norfolk	1,3,17,32,Sp,Ca
16	24-042	Mayflower	Norfolk	1,17,32,Sp
17	24-044	KWS Ladium	Lincolnshire	1,7,17,Ap,Sp,St
18	24-045	KWS Extase	Norfolk	1,3,7,17,32,Ap,Re,Sp,Wa,St,Amb,Kr,Ca
19	24-046	Crusoe	Yorkshire	Sp,St,Amb
20	24-048	LG Redwald	Fife	1,3,17,32,Sp,Ca
21	24-049	KWS Zyatt	Essex	1,17,32,Sp,St
22	24-058	Frenzy	Lincolnshire	1,4,7,17,32,Ap,Sp,Ca
23	24-062	Gleam	Aberdeen	3,32,Sp
24	24-064	LG Redwald	Cambridgeshire	3,7,17,32,Ap,Re,Sp,Wa,St,Amb,Kr,Ev,Ca
25	24-068	KWS Solitaire	Fife	1,3,7,17,32,Ap,Sp,St,Ev,Ca
26	Mix 3-4-7	Crusoe, KWS Extase, Graham	Nottingham, Lincolnshire, and Cambridgeshire	1,3,4,7,17,32,Ap,Re,Sp,Wa,St,Amb,Kr,Ca

2024 WYR Seedling Differential Tests – *Yr* genes 5-year data comparison



No virulence detected for *Yr5*, *Yr10* and *Yr15* and low/no virulence for *Yr8*

2024 WYR Seedling Differential Tests – additional cultivars (unnamed R genes)



Cadenza not included in 2023

WYR results for recommended and candidate varieties

- ✓ Tested 25 isolates on the full set of RL and candidate varieties
- 14 RL and 15 candidate varieties are susceptible to 1-16 out of 25 (or 4 to 64%) tested isolates
- 32% isolates infected Graham [7]
- 24% infected LG Redward [7] and KWS Extase [7]
- KWS Zyatt was susceptible to 64% of isolates
- All varieties with a rating of [8] or [9] performed well at the seedling stage in growth room-based studies

Recommended list Varieties

Variety	YR reaction
Costello	R
LG Astronomer	R
KWS Cranium	R
Champion	R
LG Typhoon	R
RGT Stokes	R
RGT Bairstow	R
RGT Rashid	R
Mayflower	R
KWS Dawsum	R
KWS Palladium	R
Oxford	R
KWS Ultimatum	R
Blackstone	R
Almara	R
LG Beowulf	R
SY Cheer	R
RGT Illustrious	s1
KWS Zealum	s1
Crusoe	s2
LG Skyscraper	s3
Bamford	s3
RGT Wilkinson	s4
Skyfall	s5
Gleam	s5
LG Redward	s6
KWS Extase	s6
RGT Wolverine	s8
Graham	s8
SY Insitor	s9
KWS Zyatt	s16

Candidate varieties

Variety	YR reaction
Diamond	R
KWS Newbie	R
KWS Vicarage	R
Riley	R
Memphis	R
Rufus	R
LG Henri	R
Roma	R
KWS Beste	s1
KWS Vibe	s2
KWS Mongoose	s2
RGT Goldfinch	s2
Energy	s3
KWS Equipe	s3
SY Monza	s5
KWS Scope	s7
LG Shergar	s7
Frenzy	s7
LG Rebellion	s8
KWS Solitaire	s9
KWS Flute	s9
RGT Hexton	s9
KWS Arnie	s13



How UKCPVS results feed into RL Lists



- Data from UKCPVS now included in "Yellow rust (young plant)" rating – r or s

AHDB RECOMMENDED LISTS

Winter wheat 2025/26



End-use group	UKFM Group 1						UKFM Group 2						UKFM Group 3										
	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK					
Scope of recommendation	NEW	C					NEW	NEW	NEW	NEW	C		NEW				NEW	NEW					
Variety status																							
Fungicide-treated grain yield (% treated control)	100	96	97	96	96	95	106	103	103	102	102	102	102	106	106	98	97	106	105				
Untreated grain yield (% treated control)	70	89	64	82	81	72	87	92	85	87	91	88	89	91	84	88	90	80	85	83	87	80	
Disease resistance																							
Mildew (1-9)	7	[7]	6	7	6	6	[5]	[7]	[5]	[7]	6	7	7	7	[7]		[8]	6	[6]	6	4	5	[6]
Yellow rust (young plant)	3	8	3	6	8	8	7	7	9	7	9	9	9	9	9	9	9	7	6	8	9	7	7
Brown rust (1-9)	7	6	6	6	5	3	6	7	6	6	7	6	6	6	9	5	6	5	7	8	7	5	
Septoria tritici (1-9)	6.3	6.6	5.9	6.0	6.1	6.5	7.0	7.0	6.2	6.7	7.0	6.6	7.2	6.9	6.9	6.7	6.6	6.2	5.8	5.7	6.3	6.8	
Eyespot (1-9)	7(8)	7(8)	6(8)	4	6(8)	6	5	4	5	5	3	6	6	5(8)	5	4	6(8)	5	4	5	4	4	4
Panicle ear blight (1-9)	6	6	7	7	6	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Orange wheat blossom midge	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	R	R	-	R	R	R	R	R
Agronomic features																							
Resistance to lodging without PGR (1-9)	8	8	9	8	8	8	8	7	7	8	7	7	8	6	3	5	7	6	7	7	4	7	7
Resistance to lodging with PGR (1-9)	1	1	0	1	1	1	2	3	4	1	2	4	1	4	6(6)	15	2	8	4	2	20	2	2
Lodging with PGR (%)	1	1	2	2	1	2	2	5	5	1	3	2	2	3	3	9	3	4	2	1	17	3	
Straw length without PGR (cm)	85	88	84	90	90	83	87	94	85	81	91	85	84	88	88	90	89	83	86	88	93	88	
Straw length with PGR (cm)	76	79	78	83	81	77	81	87	77	76	86	77	79	82	80	83	83	77	80	80	88	81	
Ripening (days +/- Skyfall)	0	+1	0	+1	+1	+1	0	-1	0	+1	-1	+2	-1	0	+3	+1	+1	+1	+2	+1	+2	+2	+2
Resistance to sprouting (1-9)	6	-	5	[6]	6	6	-	-	-	-	6	[6]	[6]	[7]	-	-	[6]	-	[6]	7	[6]	-	
Main market options (The specific attributes of varieties are different, so, whenever possible, varieties should not be mixed in store)																							
UK bread-making	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
UK biscuit, cake-making	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UK distilling quality	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UK soft wheat for export	Y	-	-	-	-	Y	-	[Y]	[Y]	-	Y	Y	-	Y	-	-	Y	-	-	-	-	-	-
UK soft wheat for export	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	[Y]
Grain quality																							
Endosperm texture	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Soft	Soft	Soft	Soft	Soft	Soft	Soft	Soft
Protein content (%)	11.4	11.6	11.5	11.5	11.5	12.0	10.9	11.3	11.0	10.9	11.2	11.1	11.1	11.4	11.5	10.6	10.7	10.7	10.8	11.2	10.5	10.4	10.4
Protein content (%) – milling spec	12.3	[13.2]	12.8	12.8	12.4	13.1	[12.1]	[12.2]	[12.5]	[11.9]	12.3	12.3	12.6	[13.1]	[11.8]	11.8	[11.9]	12.2	12.4	11.6	[11.3]	[11.3]	[11.3]
Hagberg Falling Number	259	283	280	299	269	272	287	305	305	289	287	279	309	299	279	179	247	186	193	241	154	236	236
Specific weight (kg/hl)	78.7	79.1	79.4	79.8	78.3	76.5	79.1	79.5	78.4	80.4	79.2	79.9	77.7	79.2	78.2	77.1	78.7	78.4	77.9	78.2	75.7	77.0	77.0
Chopin Alveograph W	-	[312]	287	[281]	-	250	[233]	[219]	[246]	[299]	208	192	[186]	213	[311]	[101]	108	[302]	102	[101]	-	[98]	[98]
							1.7	[0.6]	[0.6]	0.7	0.7	0.7	[0.7]	0.8	[1.6]	[0.4]	0.5	[0.4]	0.3	[0.4]	-	[0.5]	[0.5]
2022 (11.6 t/ha)	101	96	96	98	96	93	105	102	105	102	102	101	101	97	90	107	106	106	99	97	107	105	
2023 (11.1 t/ha)	100	97	98	96	96	96	108	102	102	103	101	101	101	98	88	106	106	105	99	97	106	108	
2024 (10.3 t/ha)	104	102	98	96	97	95	108	104	104	104	104	105	107	105	91	110	109	109	99	97	110	109	
Rotational position																							

<https://ahdb.org.uk/young-plant-resistance-to-wheat-yellow-rust>

Yellow rust young plant resistance ratings

- Young plant ratings are generated from UKCPVS seedlings data (25 isolates)
- This table shows the new 2025/26 RL varieties and their yellow rust resistance
- A variety susceptible to at least one isolate in UKCPVS tests is categorised as ‘s’ – susceptible
- A variety resistant to all tested isolates is categorised as ‘r’ – resistant
- Varieties susceptible to multiple isolates are likely to be liable to problems in the field at the young plant stage and should be a priority for monitoring

	KWS Newbie	KWS Ultimatum	KWS Palladium	Mayflower	RGT Goldfinch	LG Astronomer	KWS Zealium	Blackstone	LG Beewulf	Oxford	KWS Dawson	KWS Granium	LG Typhoon	Costello	KWS Vibet	SY Cheer	RGT Illustrious	Cruise	KWS Solitaire	Almara	RGT Blairstow	Champion	
Yellow rust (1-9)	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8
Yellow rust (young plant)	r	r	r	r	s	s	s	r	r	r	r	r	r	r	s	r	s	s	s	s	s	s	r
Yellow rust (1-9)	7	7	7	7	7	7	7	7	7	7	6	5	5	3	3	3							
Yellow rust (young plant)	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s							

Young Plant Resistance (latest results*)



Susceptible (to one or more isolates)

RGT Illustrious	KWS Vibe
KWS Zealum	KWS Mongoose
Crusoe	RGT Goldfinch
LG Skyscraper	Energy
Bamford	KWS Equipe
RGT Wilkinson	SY Monza
Skyfall	KWS Scope
Gleam	LG Shergar
LG Redwald	Frenzy
KWS Extase	LG Rebellion
RGT Wolverine	KWS Solitaire
Graham	KWS Flute
SY Insitor	RGT Hexton
KWS Zyatt	KWS Arnie
KWS Beste	

Resistant (to all 25 isolates)

Costello	Mayflower	SY Cheer
LG	KWS Dawsum	Diamond
Astronomer	KWS	KWS Newbie
KWS Cranium	Palladium	KWS Vicarage
Champion	Oxford	Riley
LG Typhoon	KWS	Memphis
RGT Stokes	Ultimatum	Rufus
RGT Bairstow	Blackstone	LG Henri
RGT Rashid	Almara	Roma
	LG Beowulf	

*25 isolates from 2024 Survey tested on the full set of RL and candidate varieties



2024 Wheat Yellow Rust Summary



- 68 samples received from 17 counties and 25 different varieties
- No major varietal breakdowns detected
- **No virulence detected** for *Yr5*, *Yr8*, *Yr10*, and *Yr15* amongst 25 tested isolates
- Virulence % for additional cultivars continues to fluctuate
- 17 RL varieties and 8 candidates are **resistant at the seedlings stage**
- **14 RL and 15 candidate varieties are susceptible to 1-16 out of 25 tested isolates**
- Mild and wet winter conducive for yellow rust
- Monitor varieties susceptible to multiple isolates at the young plant stage

Wheat Brown Rust

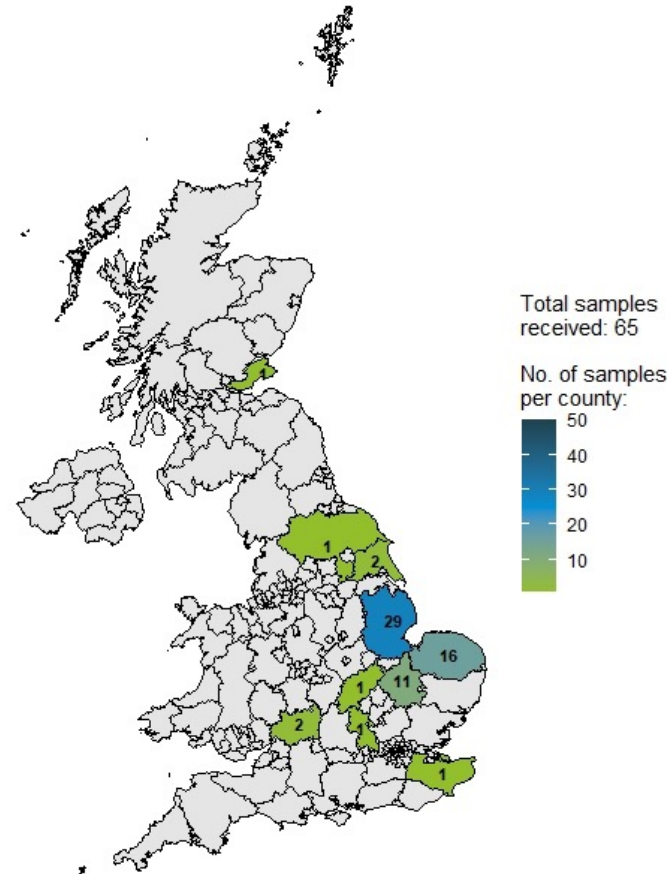
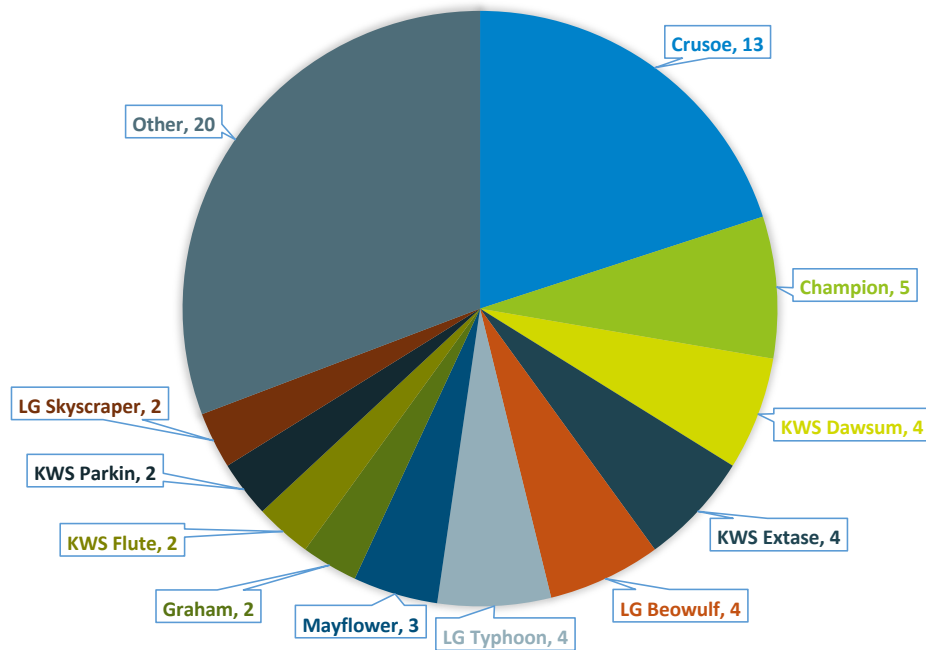
Huw Davis

2024 WBR Samples Received

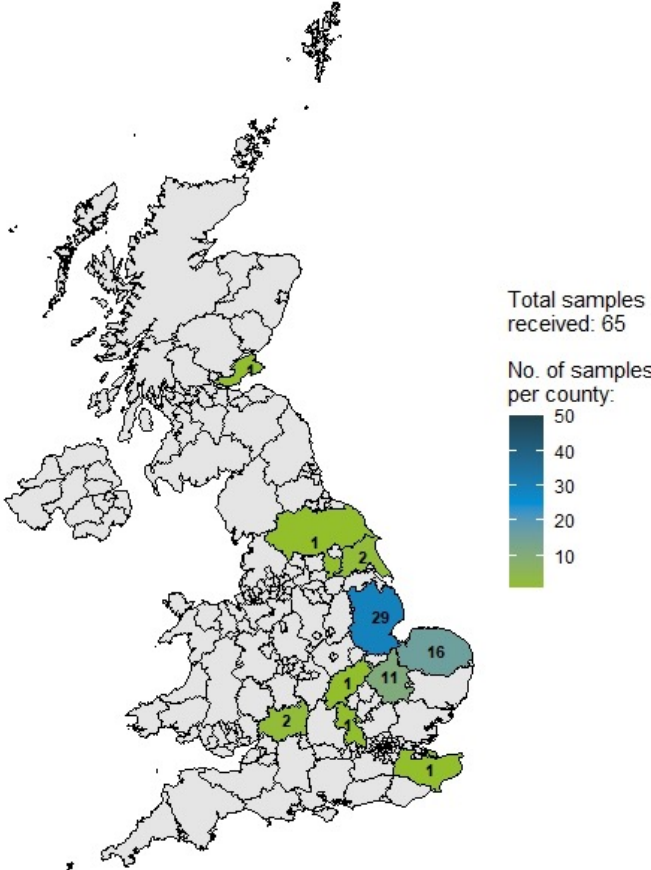
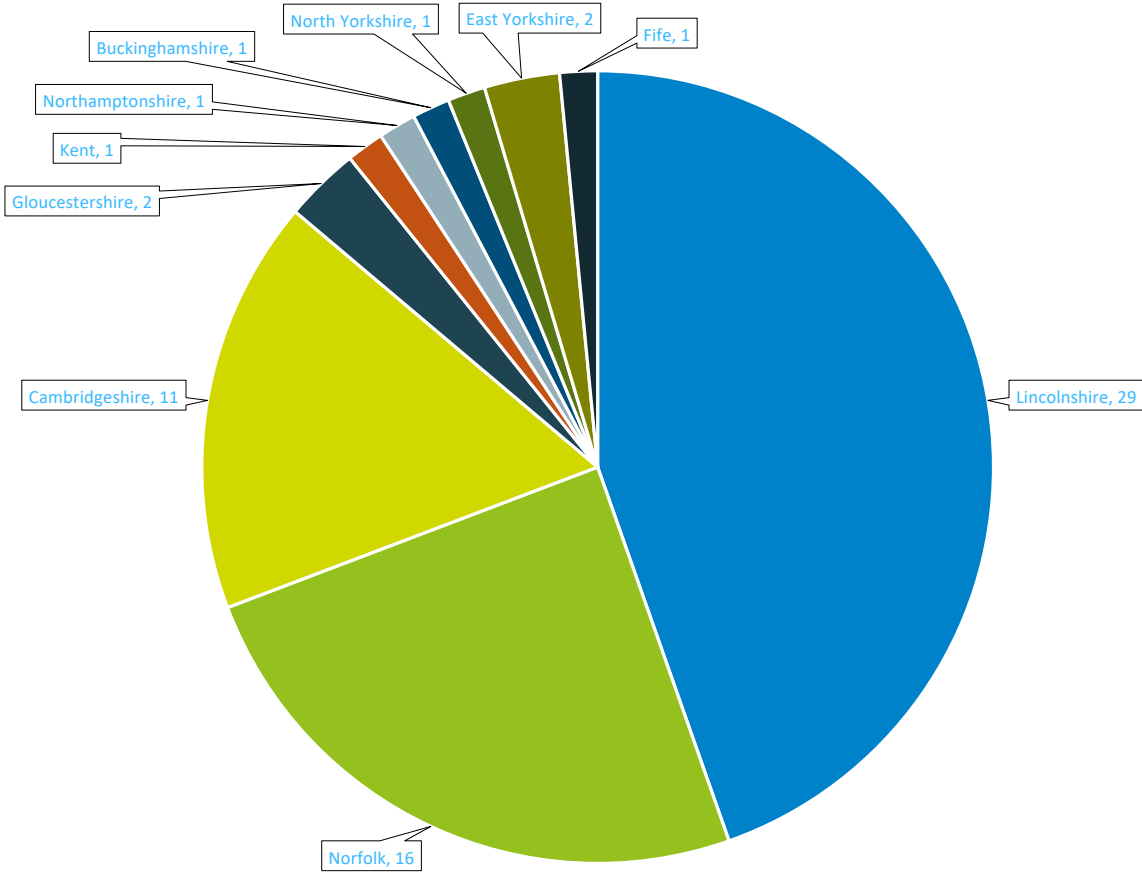


✓ 65 samples from 10 counties and 31 varieties

- Weather conducive to rust development in 2024



Geographical distribution WBR



WBR Seedling Differential Tests

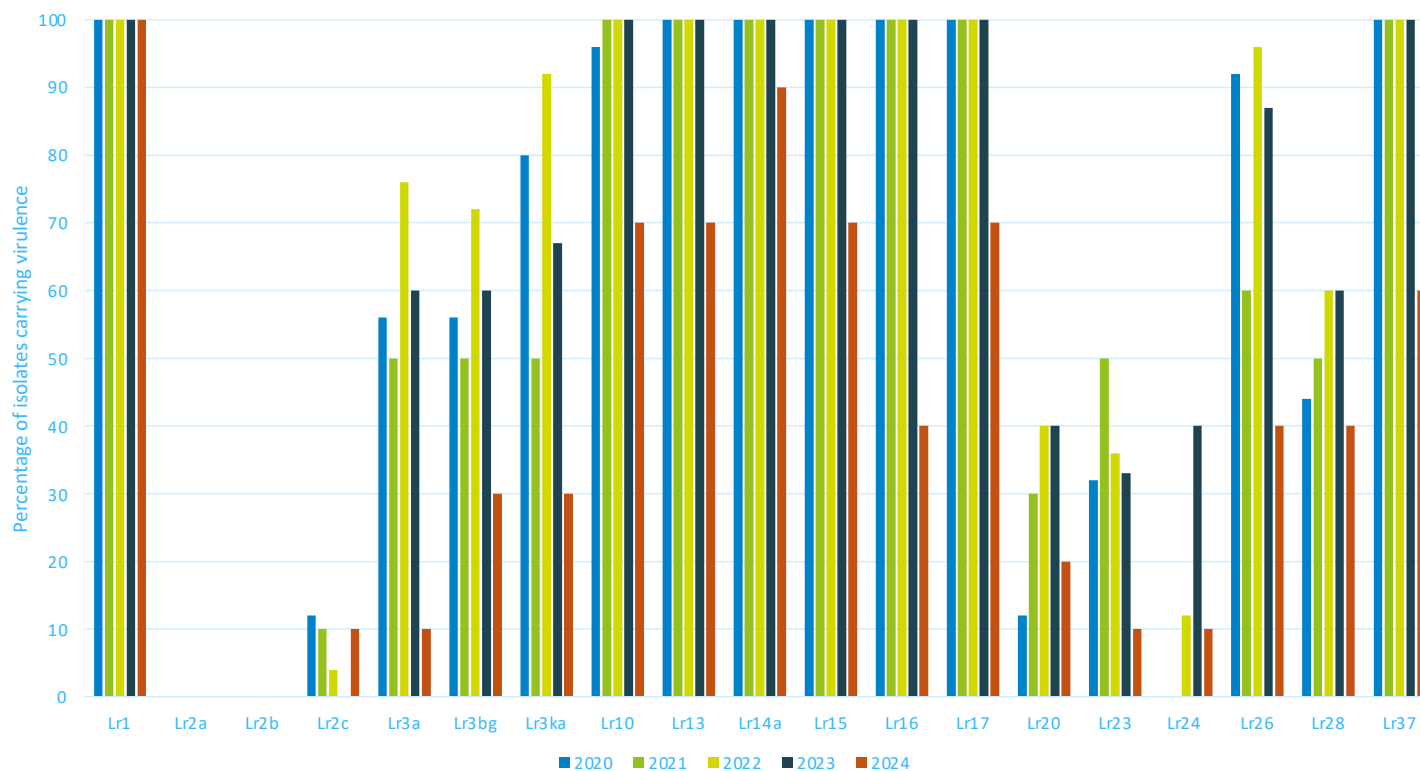


- Funded to test 10 brown rust isolates in total
- All 10 brown rust isolates used for differential tests

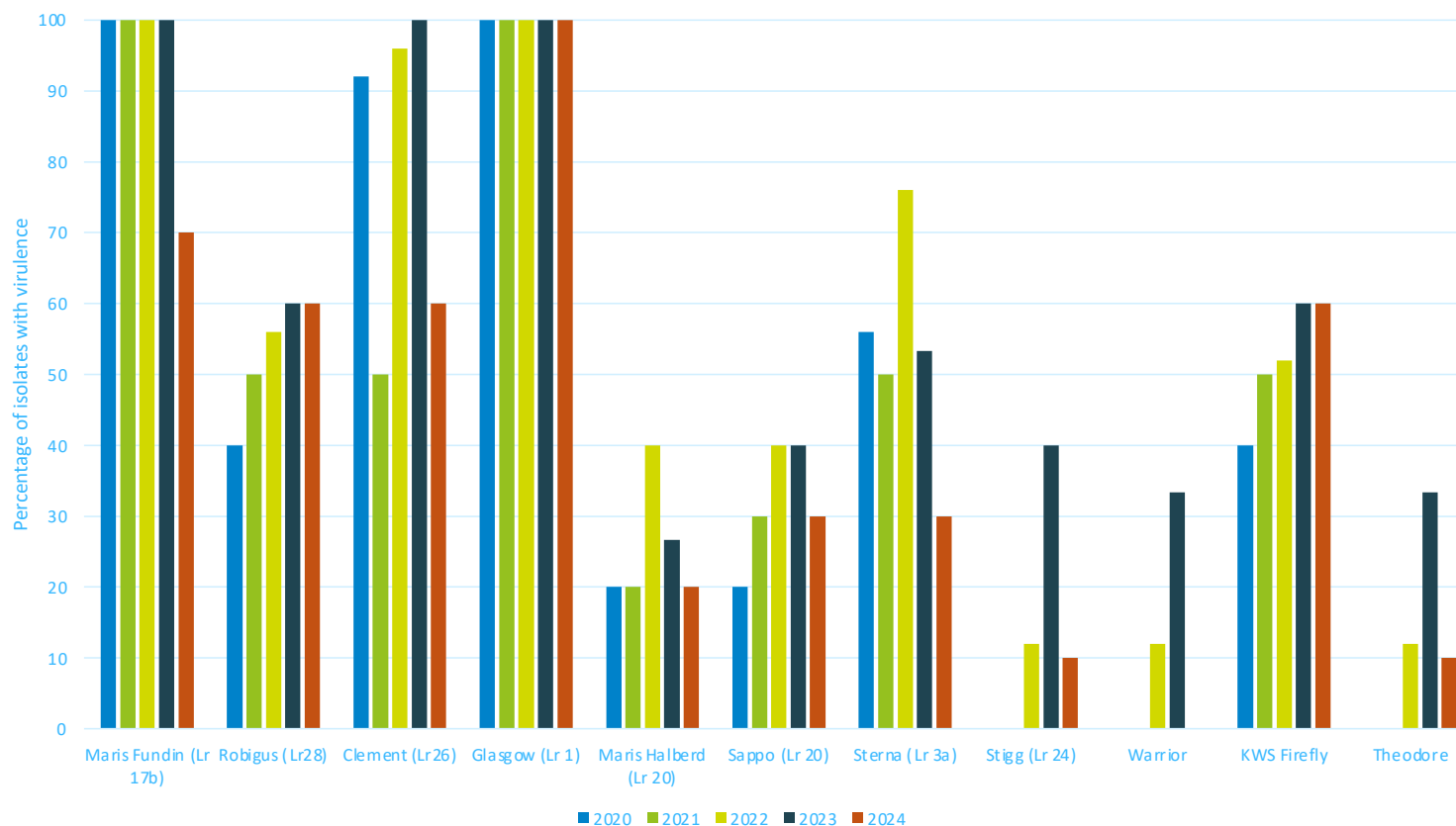


Test count	Isolate code	Host variety	location	Pathotype
1	24/001	Mayflower	Lincolnshire	1,3bg,13,14a,CR,Lr17b,Lr26,Lr1,Lr20,Lr3a
2	24-008	KWS Extase	Norfolk	1,3ka,10,13,14a,15,16,17,26,28,37,AM,CR,Lr17b,Lr28,Lr26,Lr1,LR28
3	24-009	Graham	Cambridgeshire	1,10,13,14a,15,16,17,23,37,AM,CR,Lr147b,Lr28,Lr26,Lr1,LR28
4	24/013	Crusoe	Kent	1,3a,AM,CR,Lr28,Lr1,Lr3a,LR28
5	24-014	LG Skyscraper	Gloucestershire	1,3bg,13,14a,17,20,AM,Lr1,Lr20
6	24/015	KWS Dawsum	Norfolk	1,10,13,14a,15,16,17,26,28,37,AM,CR,Lr17b,Lr28,Lr26,Lr1,LR28
7	24-019	Typhoon	Norfolk	1,2c,3bg,3ka,10,13,14a,15,16,17,26,28,37,AM,CR,Lr17b,Lr28,Lr26,Lr1,LR28
8	24-030	Crusoe	Northamptonshire	1,10,14a,15,17,20,37,AM,CR,Lr1,Lr20
9	24-051	Bamford	Lincolnshire	1,3ka,10,13,14a,15,24,26,AM,Lr17b,Lr1,Lr20,Lr20,Lr3a,Lr24
10	24-061	LG Beowulf	Yorkshire	1,10,14a,15,17,28,37,AM,CR,Lr17b,Lr28,Lr26,Lr1,LR28

2024 WBR Seedling Differential Tests – *Lr* Genes



2024 WBR Seedling Differential Tests – additional cultivars (unnamed R genes)



WBR results for recommended list and candidate varieties

- 10 isolates tested on the full set or RL and candidate varieties
- All RL and most candidate varieties are susceptible to at least 3 out of 10 isolates tested
- RGT Goldfinch resistant to all 10 isolates
- SY Cheer, KWS Zyatt, Graham, KWS Solitaire, KWS Beste and Rufus susceptible to all 10 tested isolates
- Skyfall with RL rating of [9] susceptible to 4 out of 10 isolates



KWS Zealum	s3
Skyfall	s4
RGT Bairstow	s4
Oxford	s4
LG Typhoon	s5
Almara	s5
Costello	s6
LG Astronomer	s6
Champion	s6
RGT Rashid	s6
KWS Ultimatum	s6
LG Redwald	s6
Crusoe	s7
RGT Illustrious	s7
KWS Extase	s7
RGT Wolverine	s7
Mayflower	s7
RGT Wilkinson	s7
Bamford	s7
LG Beowulf	s7
Gleam	s8
LG Skyscraper	s8
SY Inisitor	s8
KWS Cranium	s8
KWS Dawsum	s8
KWS Palladium	s8
RGT Stokes	s9
Blackstone	s9
Graham	s10
KWS Zyatt	s10
SY Cheer	s10
RGT Goldfinch	R
Diamond	s1
LG Rebellion	s5
KWS Vicarage	s6
RGT Hexton	s6
Energy	s8
KWS Vibe	s8
Riley	s8
Memphis	s8
LG Shergar	s8
SY Monza	s8
Roma	s8
KWS Equipe	s9
KWS Scope	s9
KWS Arnie	s9
KWS Newbie	s9
KWS Flute	s9
KWS	
Mongoose	s9
LG Henri	s9
Frenzy	s10
KWS Solitaire	s10
KWS Beste	s10
Rufus	s10

2024 WBR Seedling Tests – RL Varieties



- 10 isolates tested on the full set of RL varieties

Isolate code	Crusoe	Skyfall	RGT Illustrious	Graham	Costello	KWS Zyatt	Gleam	LG Skyscraper	KWS Extase	SY Insitor	LG Astronomer	RGT Wolverine	KWS Cranium	Champion	LG Typhoon	RGT Stokes	RGT Bairstow	RGT Rashid	Mayflower	KWS Dawsum	KWS Palladium	Oxford	RGT Wilkinson	KWS Ultimatum	KWS Zealium	LG Redwald	Barnford	Blackstone	Almara	LG Beowulf	SY Cheer
RL rating '24	3	9	5	5	5	7	6	5	6	6	7	7	4	5	6	5	6	5	6	7	5	6	5	6	5	7	6	6	6	5	6
24-001	s	s	s	r	s	s	r	r	r	r	r	r	r	r	r	s	r	r	r	r	r	r	s	r	r	r	r	s	r	r	s
24-003	s	r	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s
24-009	s	r	s	s	s	s	s	s	r	r	s	s	s	s	s	s	r	s	s	s	s	s	r	s	r	s	s	s	s	s	s
24-013	s	s	s	s	r	s	s	s	s	s	s	s	s	s	s	s	r	s	s	s	s	r	s	s	r	s	s	s	s	s	s
24-014	r	s	s	s	s	s	s	s	s	s	r	s	s	r	r	s	r	r	s	s	s	r	s	s	r	r	s	s	r	r	s
24-015	s	r	s	s	r	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	r	s	s	s	s	s	s
24-019	s	r	s	s	r	s	s	s	s	s	s	r	s	s	r	s	s	s	r	s	s	s	s	s	s	s	s	s	r	r	s
24-030	s	s	s	s	s	s	s	s	s	s	r	s	s	r	r	s	r		s	s	s	r	s	r	s	s	s	s	r	s	s
24-051	r	r	r	s	s	s	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	s	r	s	s
24-061	r	r	r	s	r	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	r	r	r	r	r	r	r	s	s	s

Young Plant Resistance (latest results*)



Susceptible (to one or more isolates)

- RGT Bairstow
- Oxford
- LG Typhoon
- Almara
- Costello
- LG Astronomer
- Champion
- RGT Rashid
- KWS Ultimum
- LG Redwald
- Crusoe
- RGT Illustrious
- KWS Extase
- RGT Wolverine
- Mayflower
- RGT Wilkinson
- Bamford
- LG Beowulf
- Gleam
- LG Skyscraper
- SY Insitor
- KWS Cranium
- KWS Dawsum
- KWS Palladium
- RGT Stokes
- Blackstone
- Graham
- KWS Zyatt
- SY Cheer
- Diamond
- LG Rebellion
- KWS Vicarage
- RGT Hexton
- Energy
- KWS Vibe
- Riley
- Memphis
- LG Shergar
- SY Monza
- Roma
- KWS Equipe
- KWS Scope
- KWS Arnie
- KWS Newbie
- KWS Flute
- KWS Mongoose
- LG Henri
- Frenzy
- KWS Solitaire
- KWS Beste
- Rufus



Resistant to all isolates

RGT Goldfinch

*10 isolates from 2024 Survey tested on the full set of RL and candidate varieties



2023 Wheat Brown Rust Summary



- 65 samples from 11 counties and 31 varieties
 - Most sampled variety was Crusoe
- 10 isolates tested
- Virulence for *Lr1*, *3ka*, *10*, *13*, *14a*, *15*, *16*, *17*, *26*, *28*, and *37*
- No virulence detected for *Lr2a* and *Lr2b*
- A single isolate from Lincolnshire with virulence for *Lr24*
- All RL and most candidate varieties are susceptible
- Only candidate variety RGT Goldfinch was resistant to all 10 isolates
 - Candidate variety Diamond resistant to 9/10 isolates



Any Questions?

✉ | kostya.kanyuka@niab.com

✉ | huw.davis@niab.com



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Sampling in 2025

Huw Davis



CEREALS & OILSEEDS

How are UKCPVS isolates used?

- ✓ Isolates are provided for RL/VL inoculated trials → disease ratings
- ✓ Seedling (young plant) data included in RL lists to give another layer of information
- ✓ Used by breeders to screen breeding lines → future commercial resistant varieties
- ✓ AgChem and biocontrol research → trialling new products
- ✓ Research studies → research projects, PhD studies, and on-going collaboration with other research organisations, investigating the complexities of the pathogen at molecular level
- ✓ Participation in international projects
- ✓ Long-term storage for future research



UKCPVS Sampling Sheet



<https://niab.com/research/agricultural-crop-research/research-projects/uk-cereal-pathogen-virulence-survey>



Please complete this form and send with each sample for virulence analysis to FREEPOST UKCPVS

It is not compulsory to include contact information. However, it would be useful for NIAB to be able to contact you after a sample has been received in case we have any further questions. All personal data supplied will be kept confidential to the UKCPVS project, and will be deleted after two years of the sample submissions. Full details of the NIAB privacy policy can be found on www.niab.com.

Crop: Disease:

Sample no FOR OFFICE USE ONLY	Variety	Date	Location (include county & postcode if known) (AHDB trials operators - include trial ID)	Severity of attack * (% leaf area infection)	Crop GS	Notes (e.g. fungicide treatment)

* If foci present, give assessment for foci and also plot (or field) as a whole.

Name:

Tel:

Address:

Mobile:

.....

Email:

Sampling and P&P (wheat YR and wheat BR)



- Place leaf samples directly in a paper envelope, please do not use polythene bags
- Send sample along with copy of sampling sheet – the more info the better – to:



<https://www.niab.com/research/agricultural-crop-research/research-projects/uk-cereal-pathogen-virulence-survey>
for sampling sheet and more details



Improvements/Plans for 2025

Kostya Kanyuka



CEREALS & OILSEEDS

UKCPVS 2025-2027



Three work packages

- WP1: Support breeding for durable resistance
- WP2: Young plant resistance status of varieties
- WP3: Maintain isolates and differentials

Objectives

- Collect and characterise the virulence profiles of WYR and WBR isolates from diverse geographical regions and wheat varieties
- Determine the resistance status of RL and candidate wheat varieties to WYR isolates at the young plant stage for inclusion in the RL booklet
- Maintain cereal rust isolates and the corresponding differential wheat lines
- Bulk up and provide selected WYR and WBR isolates for use in inoculated VL/RL disease trials

WP1: Support breeding for durable resistance

1.1 Sampling WYR & WBR (aim to sample 50-100+/- season)

- Collect from geographically diverse areas and from different wheat varieties
- Priority to varieties with high resistance ratings at the adult and seedlings stages
- Reach out to AHDB RL trial operators, Defra PDS, and NIAB agronomy members
- Generate informative maps and pie charts (sampled counties and varieties)

1.2 Analysing isolates - isolate from 21 WYR and 10 WBR samples

- A fair representation of the source varieties and their market share
- New differential sets: varieties with resistances of importance to UK agriculture

1.3 Providing isolates for VL/NL trials

- WYR: 21/102 + new isolates overcoming resistances in RL varieties
- WBR: recent isolates jointly covering the widest possible range of virulences

New differential sets for isolate pathotyping

WYR set

- *Yr5*, *Yr10*, *Yr15*, and *Yr24* (no known virulence in the UK)
- *Yr8* (low frequency of virulence)
- Warrior, Kranich, Ambition, Kalmar/Benchmark (help infer common genetic groups)
- A set of 17 RL varieties with high resistance rating
- Screen in mixtures of 3 isolates; rescreen individuals of any 'virulent' mixtures

WBR set

- *Lr3*, *Lr24*, and *Lr28* (present in UK varieties; low frequency of virulence in the UK)
- *Lr20* and *Lr23* (virulence present but not yet fixed)
- *Lr2a*, *Lr2b*, *Lr2c*, and RGT Goldfinch (virulence in the UK has not been detected)
- More recently identified genes *Lr38* – *Lr73* (inform breeders)

WP2: Young plant resistance status of varieties



2.1: Field-based assessment of YR resistance

- Up to 60 RL and candidate varieties will be screened
- Mixture of 3 isolates (the same as for RL/VL trials) will be used to inoculate the trial
- Format: 3 replicated 2-row 1m-long plots
- Spreader variety (KWS Zyatt) will be sown between each 2 experimental plots
- Optional irrigation
- Drill in February-March weather permitting, but no later than April
- Score at several time points post inoculation using at least 2 different methods

2.2: Growth room-based assessment of YR resistance

- Screen all available RL and candidate varieties
- Mixture of 3 isolates (the same as in the field trial above)

WP3: Maintain isolates and wheat differentials



3.1: Maintain cereal rust isolates

- Store a historic collection at 4°C as vacuum-dried urediniospores in sealed glass ampules
- Keep updating and maintain the corresponding Excel database
- Similarly store and record newly purified isolates
- Provide the industry with older isolates of wheat, barley, and oat rusts if/when required

3.2: Maintain wheat differential lines

- Maintain a collection of 'original' differential sets in a long-term seed store
- Multiply 50 differential wheat varieties during the 2025-26 season (1 x 1m field plots)
- Harvest by hand from the central portion of each plot to ensure seed purity
- The differential set could be included in the field-based young plant YR resistance trial in 2026-27



Take Home Messages

Kostya Kanyuka



UKCPVS Take Home Messages (Seedlings stage trials)



Yellow rust

- Fungal populations remain diverse, but no major varietal breakdowns
- ~ ½ of the RL and candidate varieties are resistant
- No virulence is found for *Yr5*, *Yr8*, *Yr10* and *Yr15*
- The highest % of virulence is detected for KWS Zyatt [3]

Brown rust

- All varieties, with one exception, are susceptible
 - RGT Goldfinch [9] is resistant to all 10 tested isolates at seedling stage
 - Virulence for *Lr24*: 12% in 2022, 40% in 2023, and 10% in 2024
- Refer to AHDB RL 2025-26 for resistance ratings, including young plant, and AHDB Watchlist when making your variety choices
- Pathogen populations are dynamic and diverse, keep a close eye on all varieties and spray if needed
- Monitor any unusual sightings and send a sample to UKCPVS



Further Information

- UKCPVS Annual Reports

<https://ahdb.org.uk/ukcpvs>

- Recommended Lists and Press Releases

<https://ahdb.org.uk>

- Sampling and P&P

<https://niab.com/research/agricultural-crop-research/research-projects/uk-cereal-pathogen-virulence-survey>

- Global Rust Reference Centre

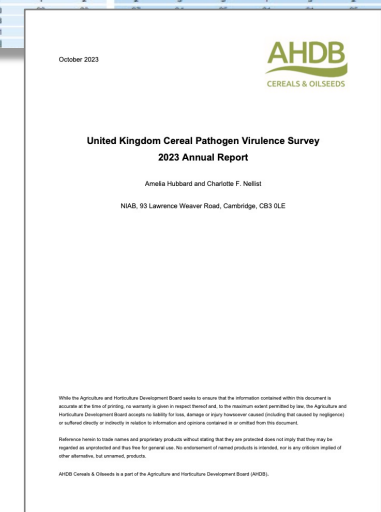
<http://wheatrust.org/yellow-rust-tools-maps-and-charts/>



AHDB RECOMMENDED LISTS
Winter wheat 2025/26

AHDB RECOMMENDED

End-use group	UKCPVS		UKFM Group 1				UKFM Group 2				UKCPVS	
	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK
Scope of recommendation	NEW	C										
Variety status	NEW	C										
Fungicide-treated grain yield (% treated control)												
United Kingdom (10.8 t/ha)	100	98	97	96	96	95	106	103	103	102	102	101
East region (11.7 t/ha)	100	97	97	96	95	94	106	102	103	102	102	103
West region (11.1 t/ha)	102	100	97	97	97	96	108	105	101	103	102	103
North region (10.8 t/ha)	100	99	96	96	96	94	103	100	107	105	103	101
Untreated grain yield (% treated control)												
United Kingdom (10.8 t/ha)	70	89	84	82	81	72	87	92	85	87	91	88
Disease resistance												
Mildew (1-9)	7	[7]	6	7	6	6	[5]	[7]	[5]	[7]	6	7
Yellow rust (1-9)	3	8	3	8	8	8	7	7	9	7	7	9
Yellow rust (young plant)	4	8	8	1	8	8	8	8	1	8	8	1
Brown rust (1-9)	7	6	6	6	5	3	6	7	6	6	7	6
Septoria tritici (1-9)	6.3	6.6	5.9	6.0	6.1	6.5	7.0	7.0	6.2	6.7	7.0	6.6
Eye spot (1-9)	7.6	7.6	6.6	4	6.6	6	5	4	5	5	3	6
Fusarium ear blight (1-9)	6	6	7	7	6	7	6	6	6	6	6	6
Orange wheat blossom midge	-	-	R	-	-	-	-	-	-	-	-	-
Agronomic features												
Resistance to lodging without PGR (1-9)	8	8	9	8	8	8	8	7	7	8	7	7
Resistance to lodging with PGR (1-9)	8	8	8	7	9	8	7	7	7	8	7	8
Lodging without PGR (%)	1	1	0	1	1	1	1	2	3	4	1	2
Lodging with PGR (%)	1	1	2	2	1	2	2	5	5	1	3	2
Straw length without PGR (cm)	85	88	84	80								84
Straw length with PGR (cm)	76	79	78	83								79
Ripening (days to Skyfall)	0	+1	0	+1								-1
Resistance to sprouting (1-9)	6	-	5	[5]								[6]



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Animal &
Plant Health
Agency

Sample
providers



Any Questions?

✉ | kostya.kanyuka@niab.com

✉ | huw.davis@niab.com



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