UKCPVS
Celebrating 50 Years of Research

AHDB
AGRICULTURE & HORTICULTURE DEVELOPMENT BOARD

12th March 2021

UKCPVS Stakeholders Meeting

Lucy James, Amelia Hubbard, Sarah Wilderspin

CEREALS & OILSEEDS

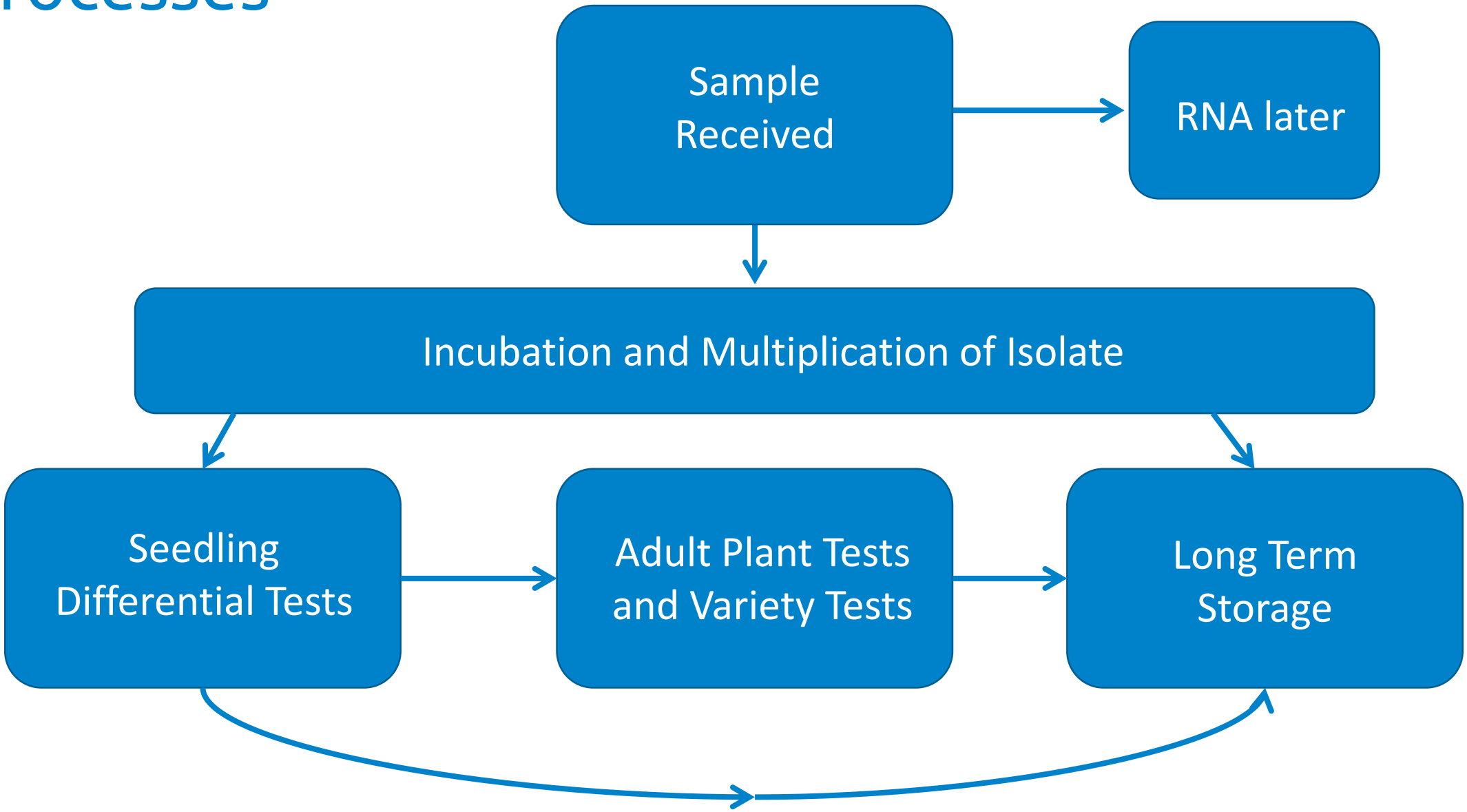
UKCPVS Stakeholders Meeting 2021

- Introduction – *Lucy James*
- Wheat Yellow Rust – *Amelia Hubbard*
- Wheat Brown Rust – *Sarah Wilderspin*
- Barley Powdery Mildew – *Amelia Hubbard*
- Barley Brown Rust – *Amelia Hubbard*

Introduction

- UKCPVS in operation since 1967
- Aims to identify changes in pathogen populations that may have an adverse effect on cereal production in the UK and report them as soon as possible
- Jointly funded by AHDB and APHA

Processes


Sample Received
RNA later
Incubation and Multiplication of Isolate
Seedling Differential Tests
Adult Plant Tests and Variety Tests
Long Term Storage

Identifying Changes in Populations

- Step 1: Identifying any population change

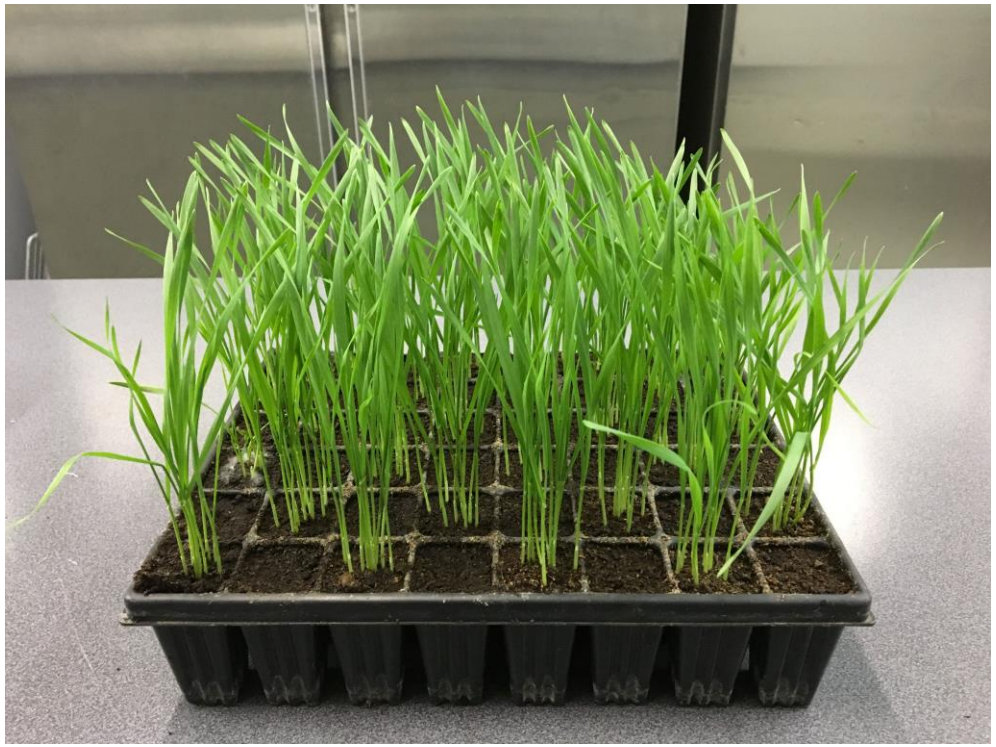
Differential Tests

- Step 2: Identifying risk associated with change

Adult Plant Trials and Variety Seedling Tests

Identifying Population Change: Differential Tests

Differential Cultivar	Resistance Gene
Chinese 166	*Yr1*
Kalyansona	*Yr2*
Vilmorin 23	*Yr3+*
Hybrid 46	*Yr4*
Heines Kolben	*Yr2, Yr6*
Avocet x Yr7	*Yr7*
Avocet x Yr8	*Yr8*
Kavkaz x 4 Fed	*Yr9*
Avocet xYr15	*Yr15*
Avocet x Yr17	*Yr17*
Carstens V	*Yr32*



Identifying Change: Differential Tests

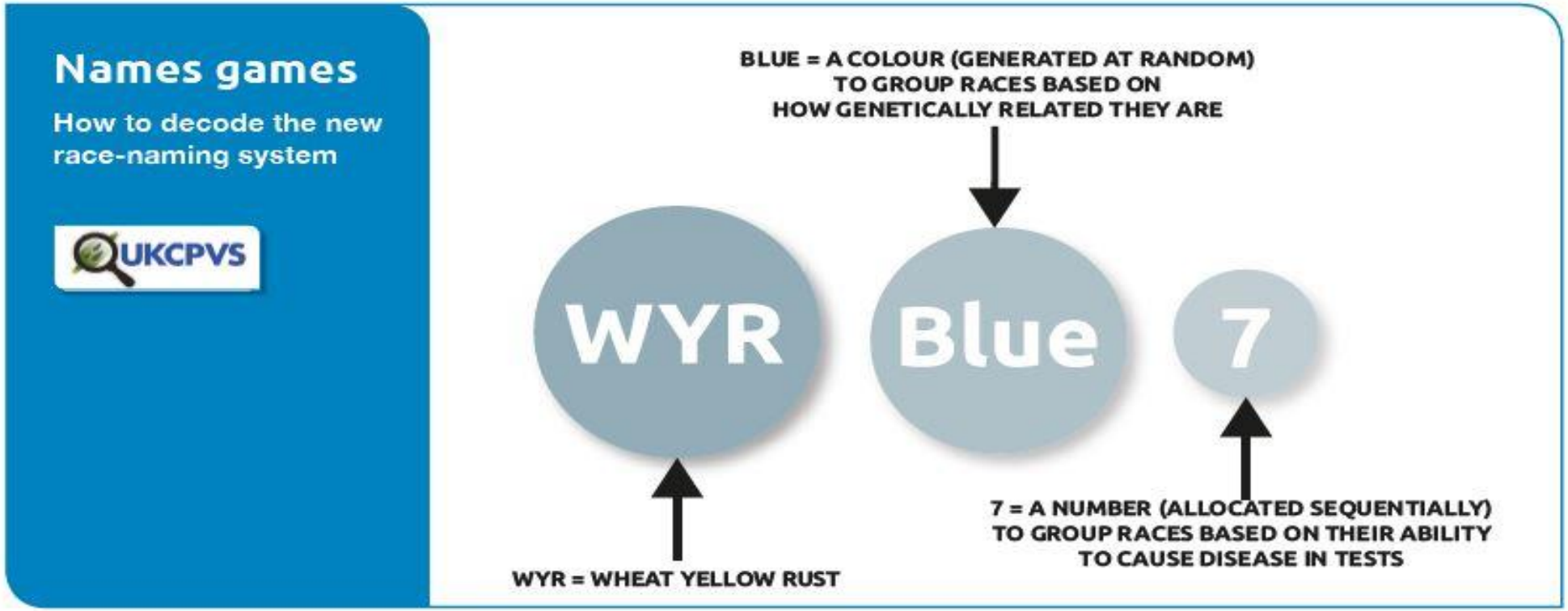
Isolate code	Host	Chinese 166 *1*	Kalyansona *2*	Vilmorin 23 *3a, 4a*	Hybrid 46 *3b,4b*	Avocet Yr5 *5*	Avocet Yr6 *6*	AV x Yr7 NIL *7*	Lee *7,22, 23*	Cadenza *6,7*	Apache *7,17*	Av x Yr8 NIL *8*	Compair *8,19*	Avocet Yr9 *9*	Moro *10*	Av x Yr15 *15*
16/009	Reflection	3.0	3.0	3.0	3.0	0.0	3.0	3.0	2.9	3.0	2.9	0.0	0.0	4.0	0.0	0.0
16/019	KWS Target	3.0	4.0	4.0	3.0	0.0	4.0	4.0	3.0	3.0	2.9	0.0	0.0	3.2	0.0	0.0
16/035	Reflection	4.0	4.0	4.0	3.0	0.0	3.2	3.0	3.0	3.2	3.0	0.0	0.0	3.0	0.0	0.0
16/048	Myriad	3.1	3.1	4.0	3.0	0.0	3.0	3.0	3.0	3.0	2.4	0.0	0.0	3.0	0.0	0.0
16/135	Cordiale	3.0	4.0	3.5	3.0	0.0	3.0	3.0	3.0	3.5	3.0	0.0	0.0	3.0	0.0	0.0
16/144	KWS Gator	3.0	4.0	4.0	3.0	0.0	3.0	3.5	3.5	3.0	2.2	0.0	0.0	3.0	0.0	0.0
16/184	Zulu	3.0	3.5	3.5	3.0	0.0	2.8	2.0	0.3	0.2	0.1	0.0	0.0	3.0	0.0	0.0

Pathotype = Virulence Profile

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

- For example

YRW Race Naming System: Colours and Numbers



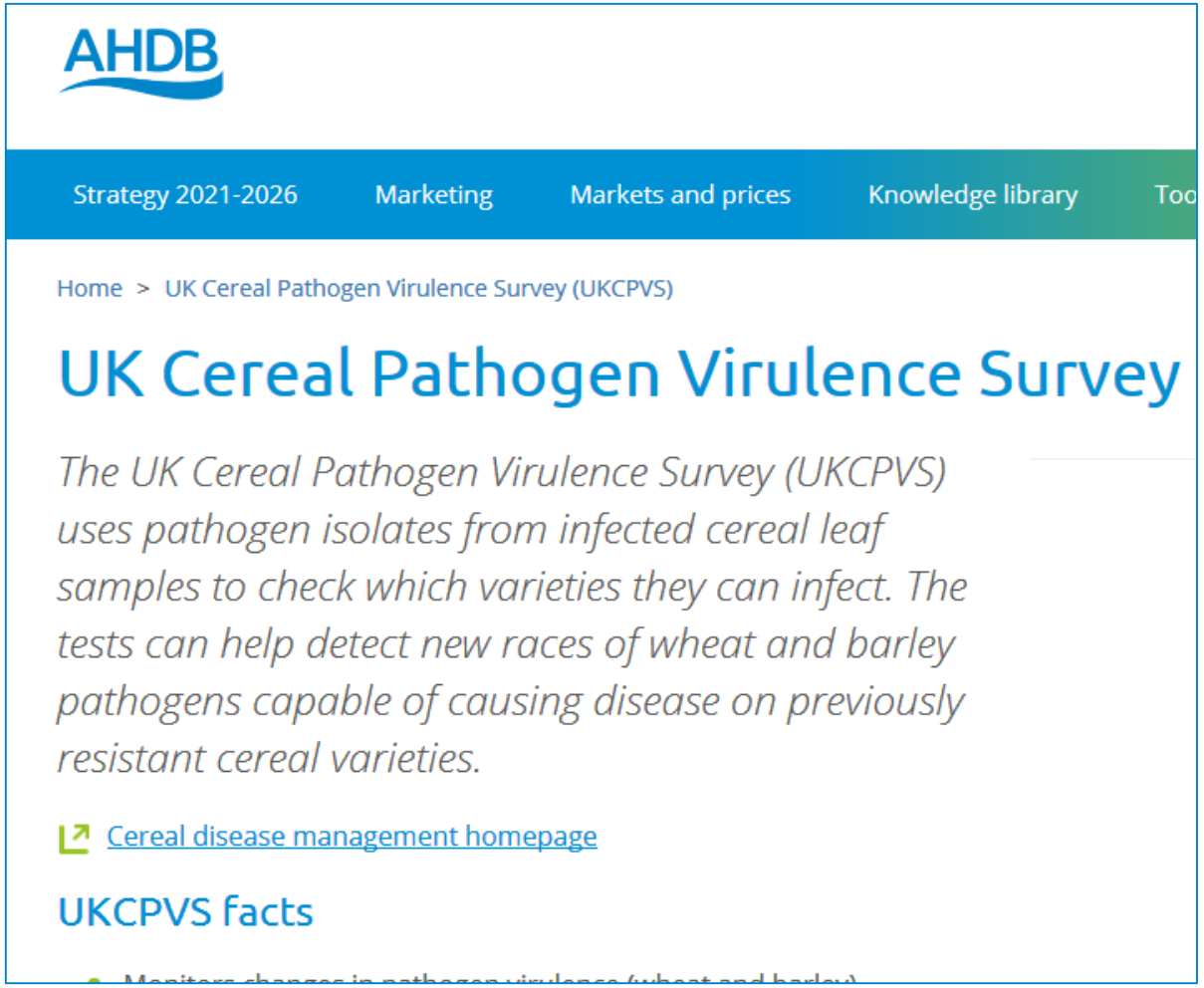
Identifying Risk: Adult Plant Trials

Five representative races trialled on RL varieties and candidates

Changes to Methods

- Field trials – not sprayed prior to inoculation in 2020, inoculated by hand March – June
- Regular repeated inoculations to keep natural infection out and ensure good disease levels
- Increased disease pressure and much improved data from 2020 field trials, especially for WYR

Identifying Risk: Variety Tests



AHDB

Strategy 2021-2026 | Marketing | Markets and prices | Knowledge library | Too

Home > UK Cereal Pathogen Virulence Survey (UKCPVS)

UK Cereal Pathogen Virulence Survey

The UK Cereal Pathogen Virulence Survey (UKCPVS) uses pathogen isolates from infected cereal leaf samples to check which varieties they can infect. The tests can help detect new races of wheat and barley pathogens capable of causing disease on previously resistant cereal varieties.

Cereal disease management homepage

UKCPVS facts

Young and adult plant resistance/susceptibility to yellow rust for winter wheat varieties

RL varieties	Group	RL rating	RL adult plant resistance	Young-plant-stage resistance (2019)	Young-plant-stage resistance (2020)
Crusoe	G1	9	R	S	S
KWS Zyatt	G1	7	MR	S	S
RGT Illustrious	G1	9	R	R	**R**
Skyfall	G1	5	S	S	S
KWS Extase	G2	9	R	S	S
KWS Siskin	G2	9	R	R	**R**
LG Detroit	G2	9	R	S	S
Elicit	G3	9	R	S	S
KWS Barrel	G3	9	R	S	S
KWS Firefly	G3	9	R	R	**R**

Wheat Yellow Rust

Amelia Hubbard

WYR Background

- Incursion of Warrior group in 2011 - highly diverse population
- In 2019 some changes seen in varietal performance e.g. KWS Zyatt
- More isolates identified carrying virulence for *Yr8*, Kranich and Crusoe
- Two isolates – avirulent on *Yr1* and *Yr9* and virulent on *Yr8*

2020 WYR Adult Plant Trial Isolates

Isolate	Host	Pathotype
19/010	KWS Zyatt	2,3,4,6,7,8,17,25,32,Ro,So,Ca
19/038	Shabras	1,2,4,6,7,8,9,17,25,32,Sp,Ro,So,Wa,St,Kr
19/119	KWS Firefly	1,2,3,4,6,7,9,17,25,32,Sp,Ro,So,Wa,St,Ap,Ev
19/165	KWS Zyatt	2,3,4,6,7,8,17,25,32,Sp,Ro,So,Ca,St
19/215	KWS Extase	1,2,4,6,7,9,17,25,32,Re,Sp,Ro,So,Wa,Ca,St,Kr,Ap,Cr

2020 WYR Adult Plant Trial Isolates

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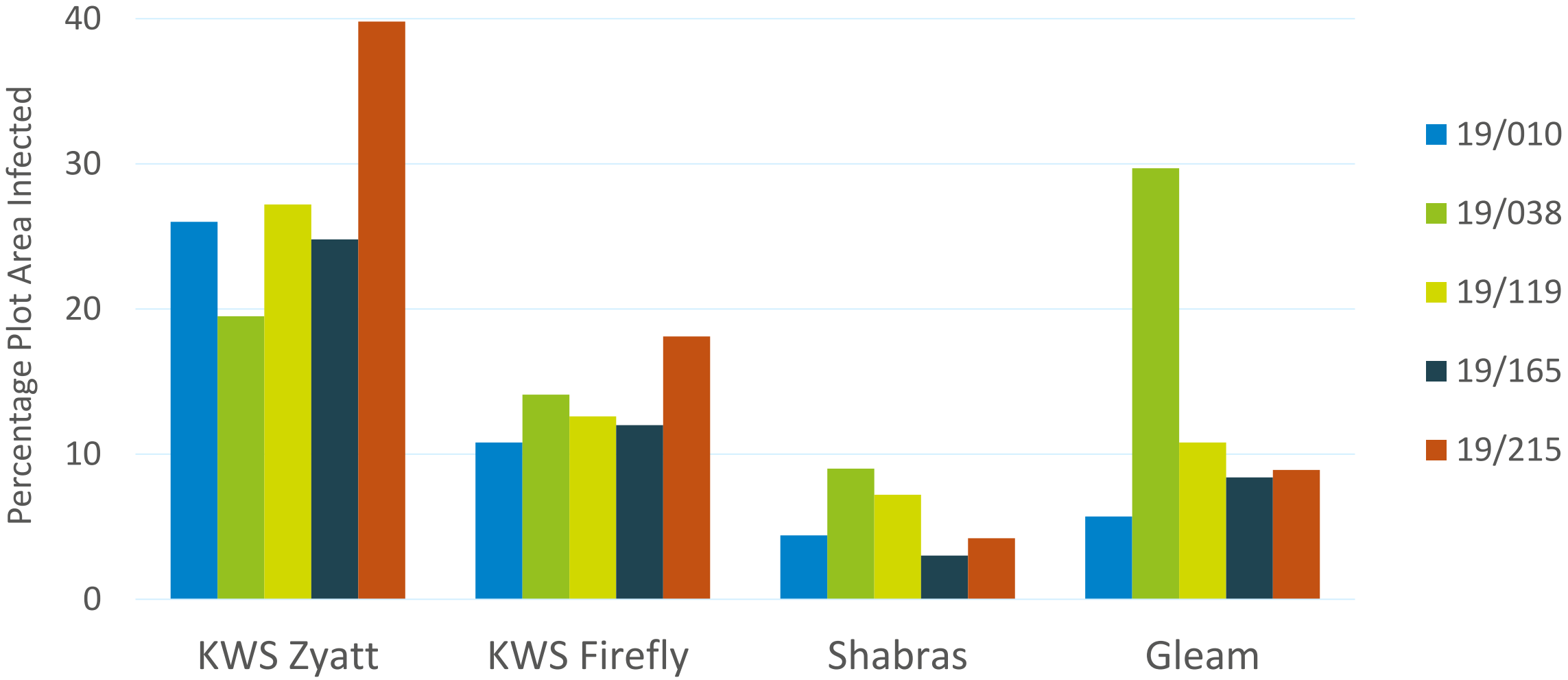
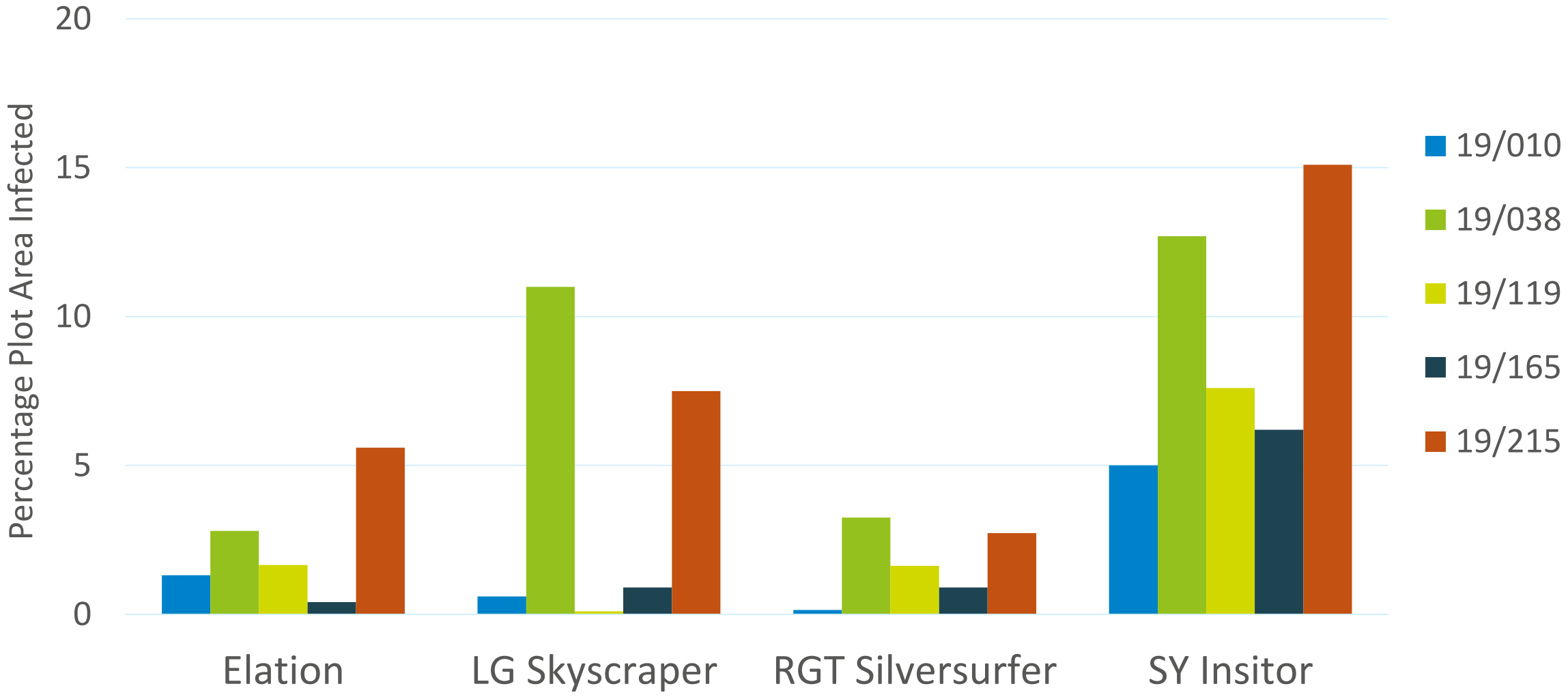
19/038	Shabras	1,2,4,6,7,**8**,9,17,25,32,Sp,Ro,So,Wa,St,**Kr**
19/119	KWS Firefly	1,2,3,4,6,7,9,17,25,32,Sp,Ro,So,Wa,St,Ap,Ev
19/165	KWS Zyatt	2,3,4,6,7,8,17,25,32,Sp,Ro,So,Ca,St
19/215	KWS Extase	1,2,4,6,7,9,17,25,32,Re,Sp,Ro,So,Wa,Ca,St,**Kr**,Ap,**Cr**

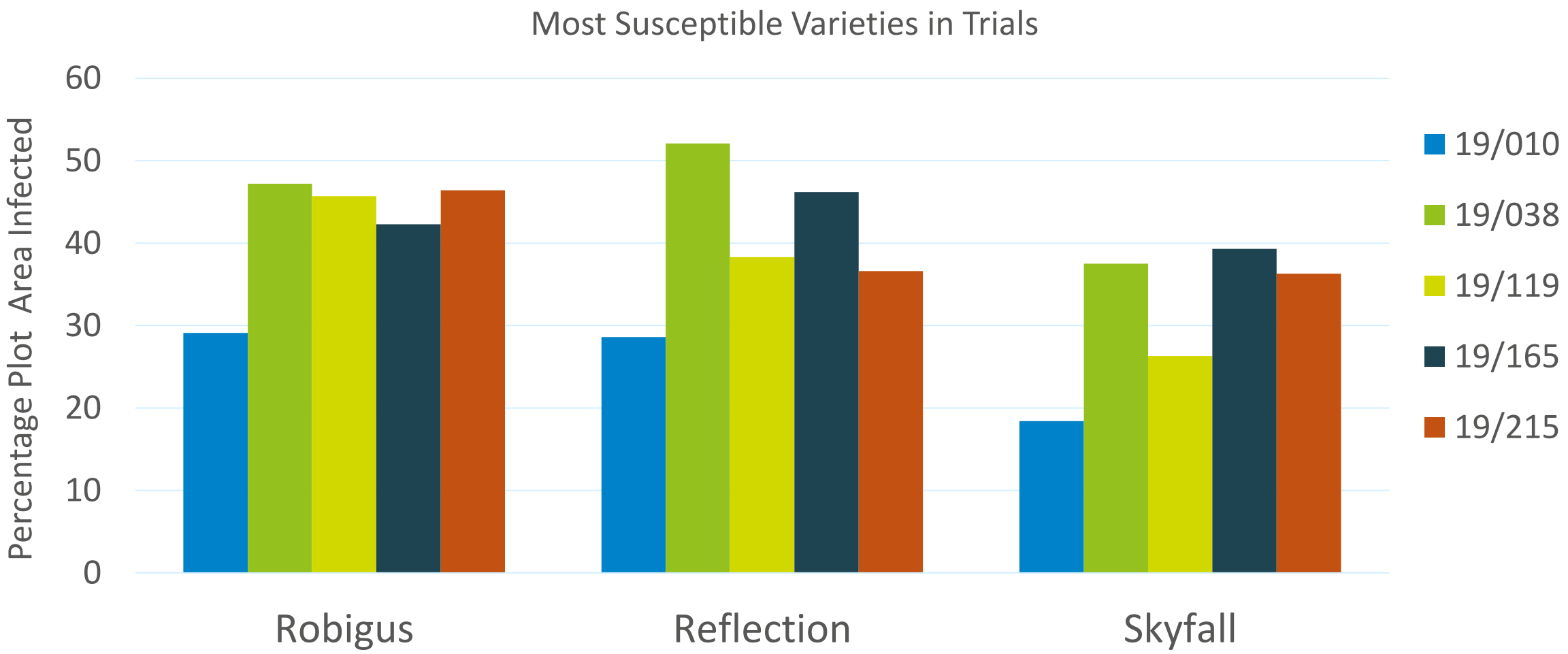
2020 WYR Adult Plant Trials



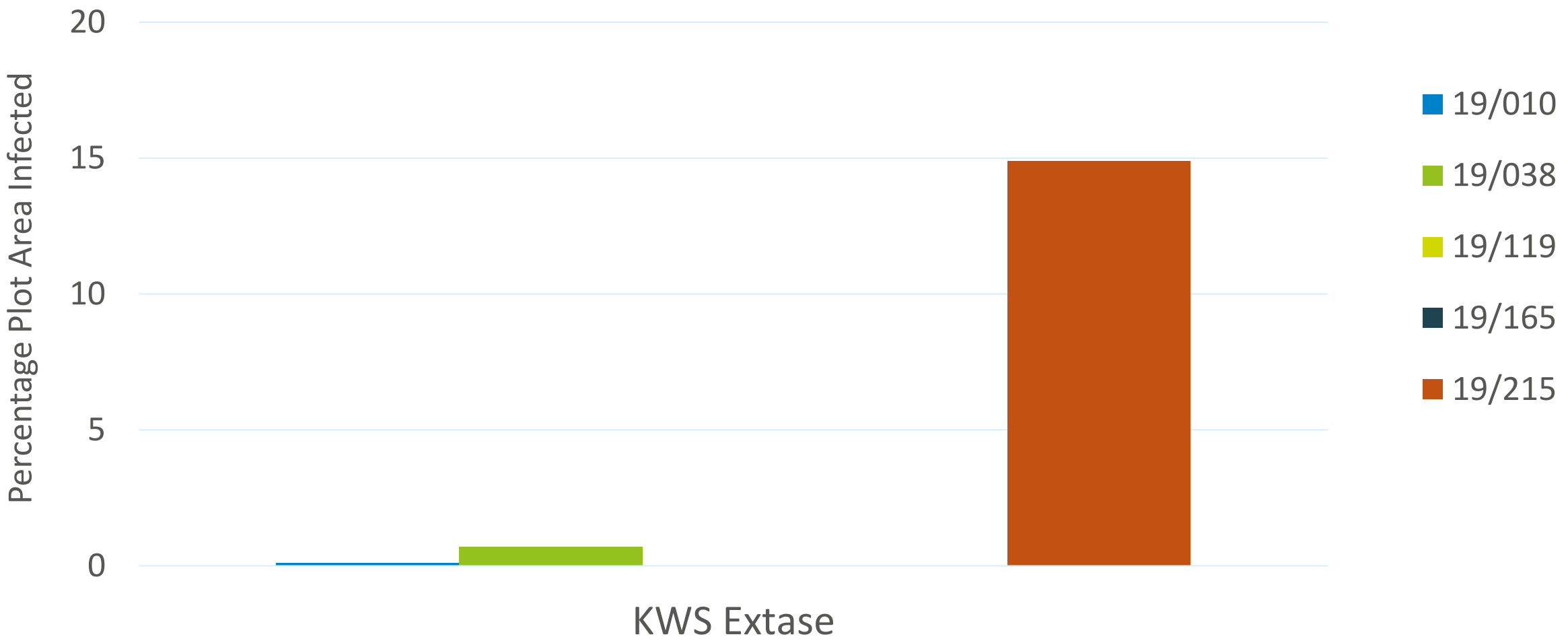
2020 WYR Adult Plant Trials



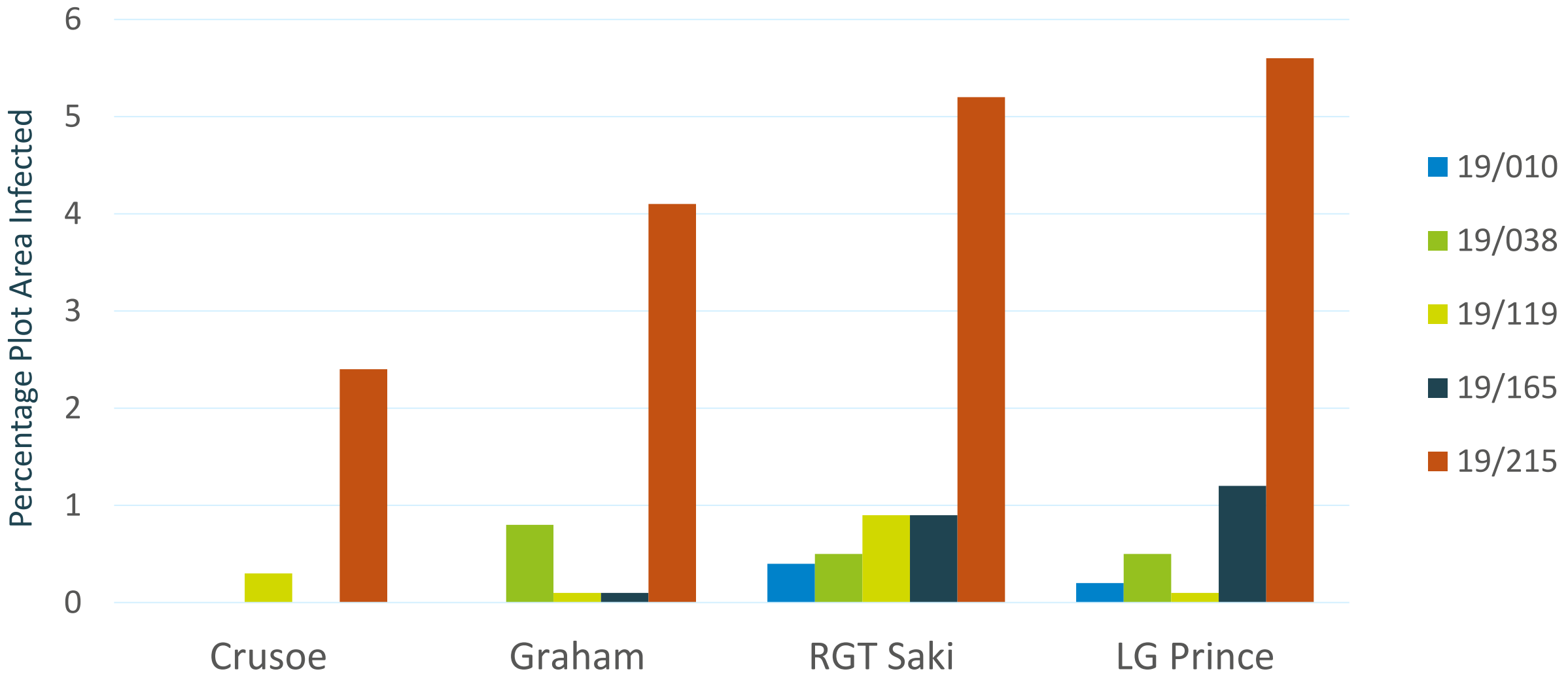
2020 WYR Adult Plant Trials



2020 WYR Adult Plant Trials



2020 WYR Adult Plant Trials



2020 Candidates

ADULT PLANT REACTION

	19/010	19/038	19/119	19/165	19/215
LG Astronomer	0.2	0.3	1.2	0.1	1.1
KWS Cranium	0.9	0.7	1.4	1.4	1.5
Merit	1.9	3.4	5.6	7.5	5.7
LG Quasar	4.8	11.4	8.1	8.3	7.3
LG Illuminate	0.7	7.7	12.2	8.9	10.9
Swallow	10.1	17.7	11.9	10.1	11.4
RGT Wolverine	10.0	24.5	17.6	21.8	20.1

2020 Yellow Rust Adult Plant Trials – key points

- Most susceptible RL variety in trials was Skyfall
- KWS Zyatt recorded the highest plot area infected score of 39.8% with 19/215
- Lots of RL varieties showed very good resistance
- Lower levels of infection with Hereford type isolate 19/010 for majority of varieties
- Some RL varieties reacted to just one of the five isolates tested –
  e.g. KWS Extase and Crusoe, (Graham, RGT Saki, LG Prince) with 19/215

WYR Variety Seedling Tests

Variety	19/010	19/038	19/119	19/165	19/215
Costello	0.0	0.0	0.0	0.0	0.0
KWS Siskin	0.0	0.0	0.0	0.0	0.0
Theodore	0.0	0.0	0.0	0.0	0.0
Crusoe	0.0	1.5	0.0	0.0	3.0
KWS Extase	1.0	1.9	0.9	0.6	3.0
LG Detroit	0.8	2.7	2.1	1.9	3.0
Elicit	0.4	3.0	3.0	0.7	3.0
KWS Jackal	2.9	2.1	2.9	3.0	3.0
KWS Zyatt	3.0	2.9	3.0	4.0	3.0

WYR Variety Seedling Tests

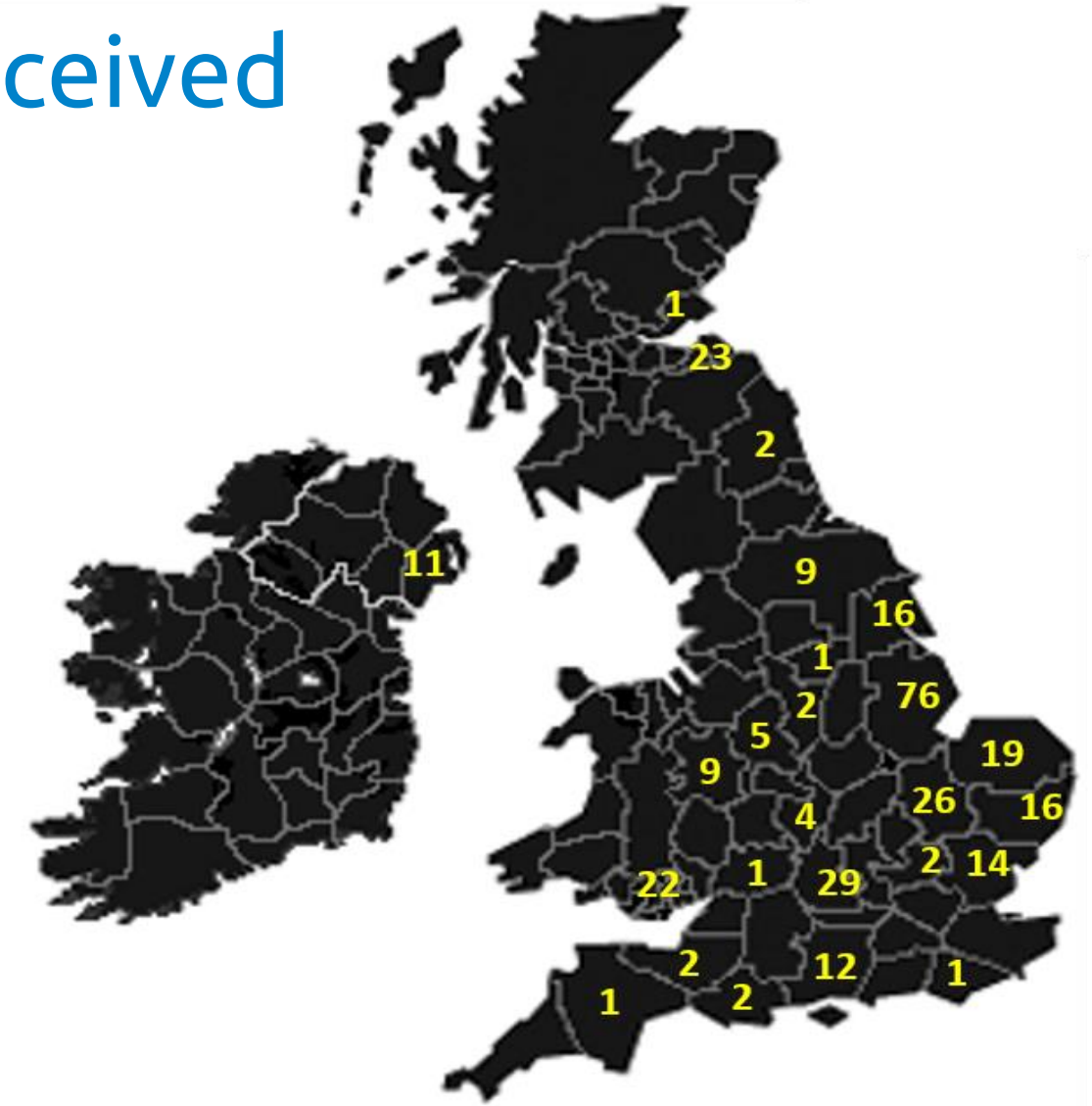
- Variety seedling tests on full set of RL and RL candidates using the five isolates used in Adult Plant trials
- 18 RL and RL candidates were resistant to all five isolates
- 9 RL and RL candidates were susceptible to all five isolates
- Full results in 2020 UKCPVS Annual Report www.ahdb.org.uk/ukcpvs

2020 Samples

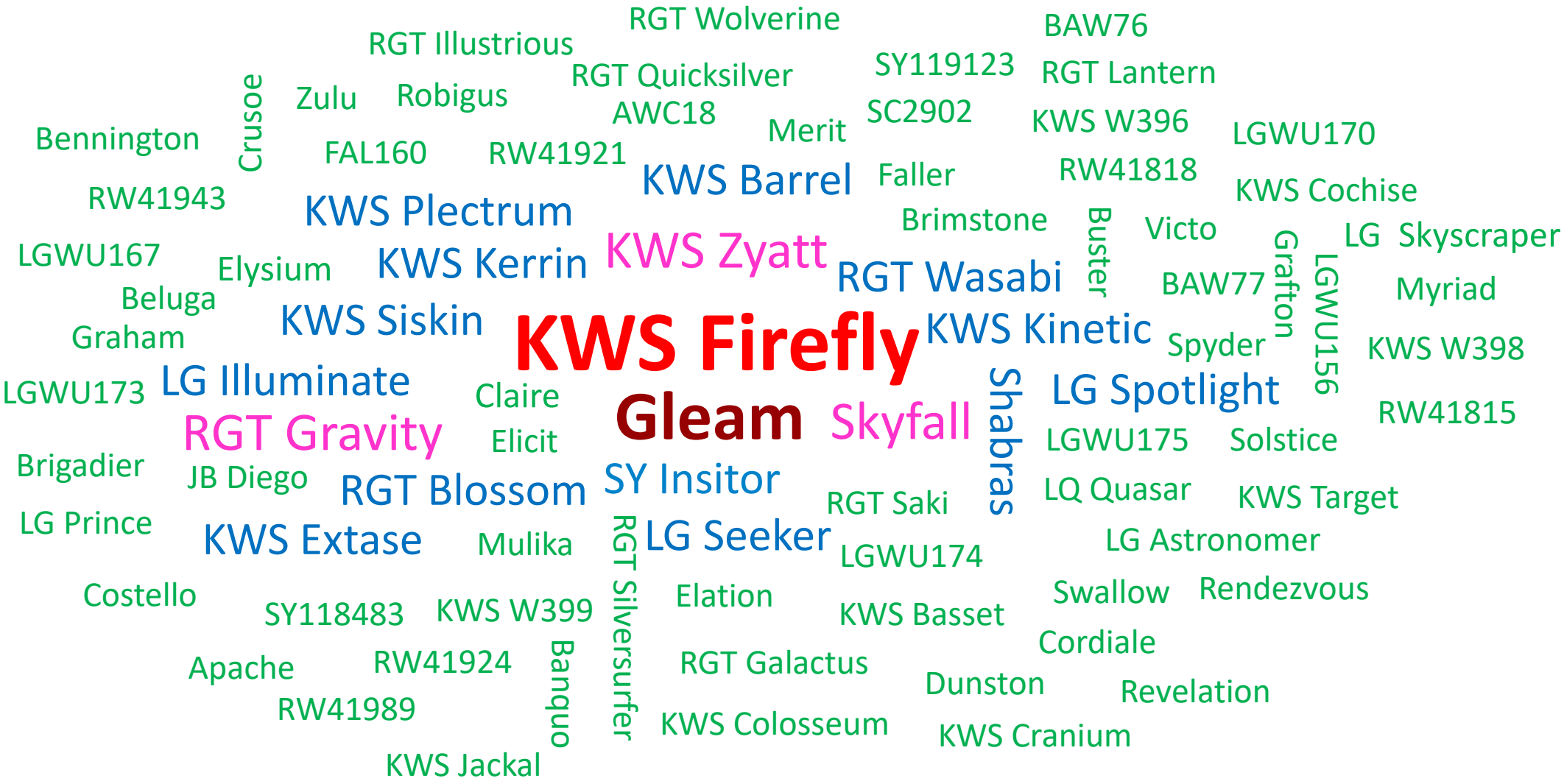
2020 WYR Samples Received

- 306 samples received
- 25 counties
- 88 varieties

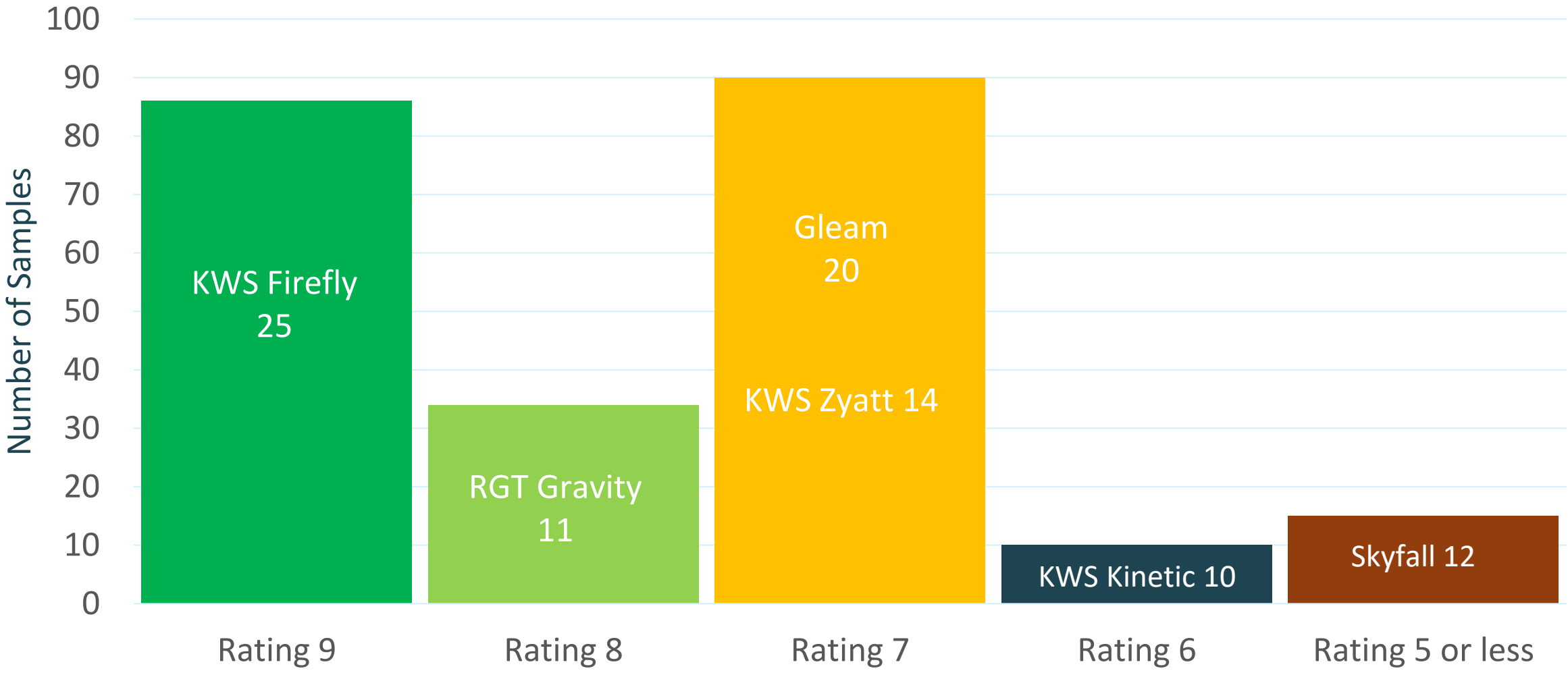
  + two samples from unknown varieties



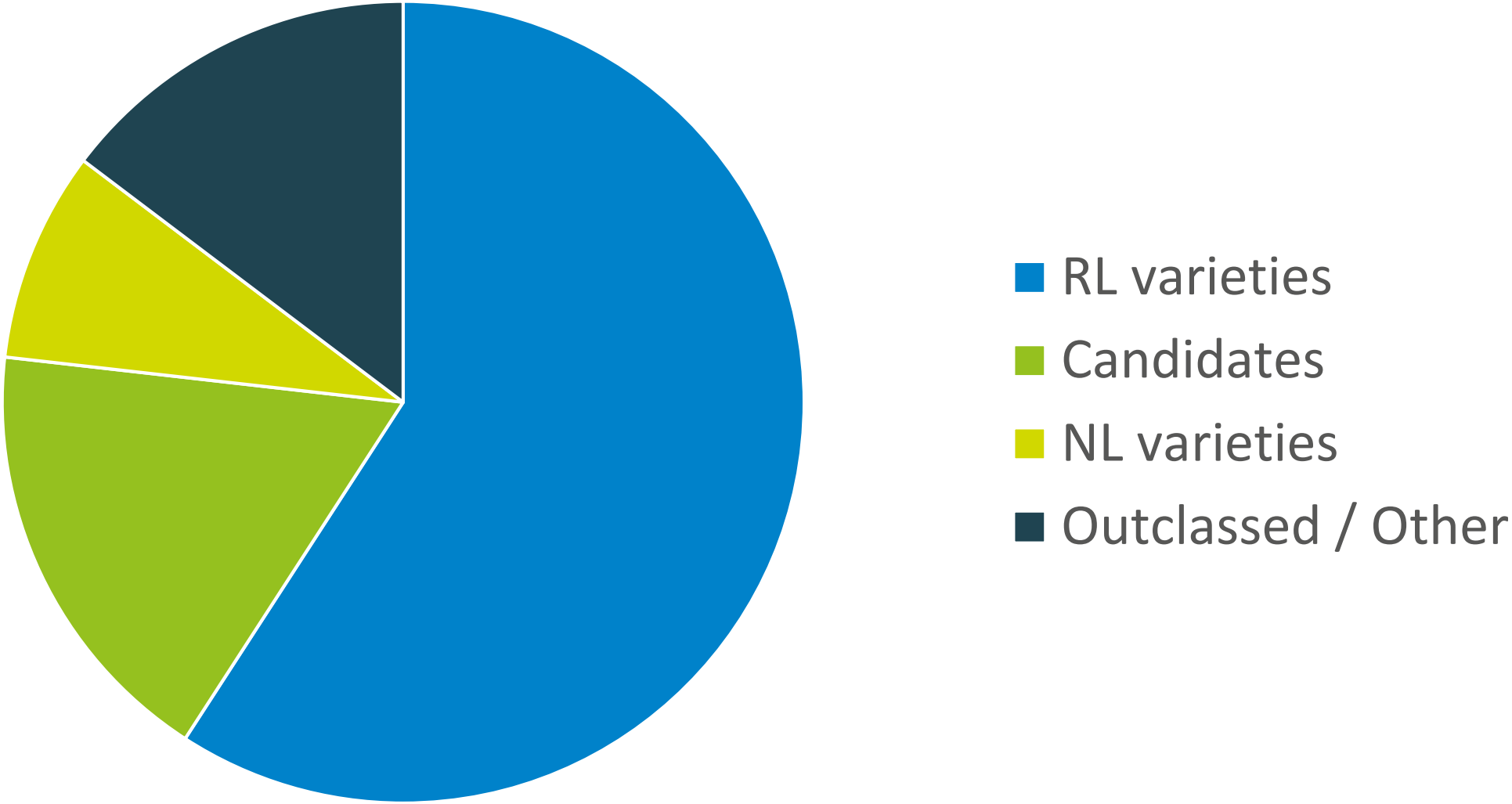
2020 WYR Samples Received



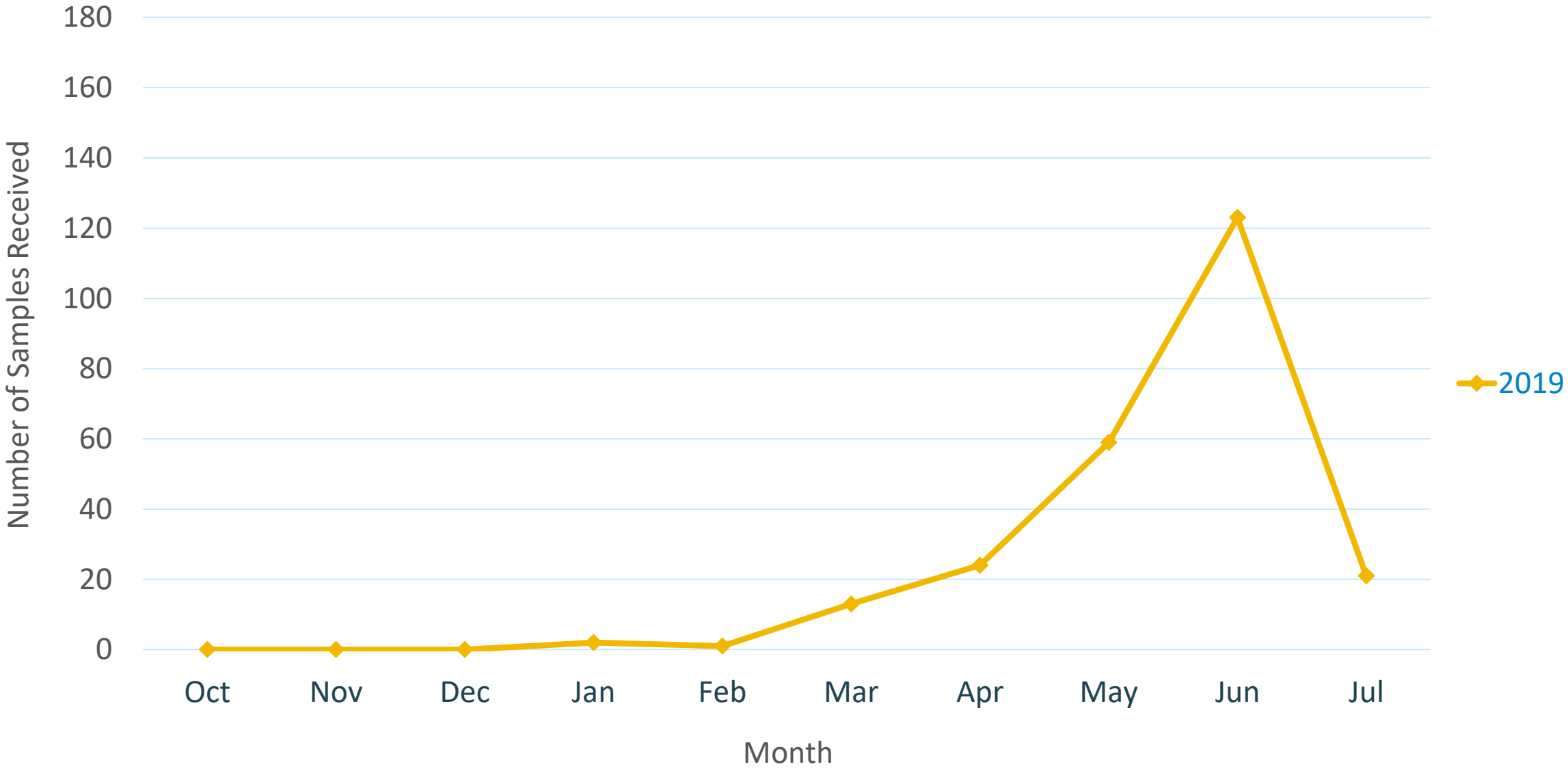
WYR Samples From RL and RL Candidates



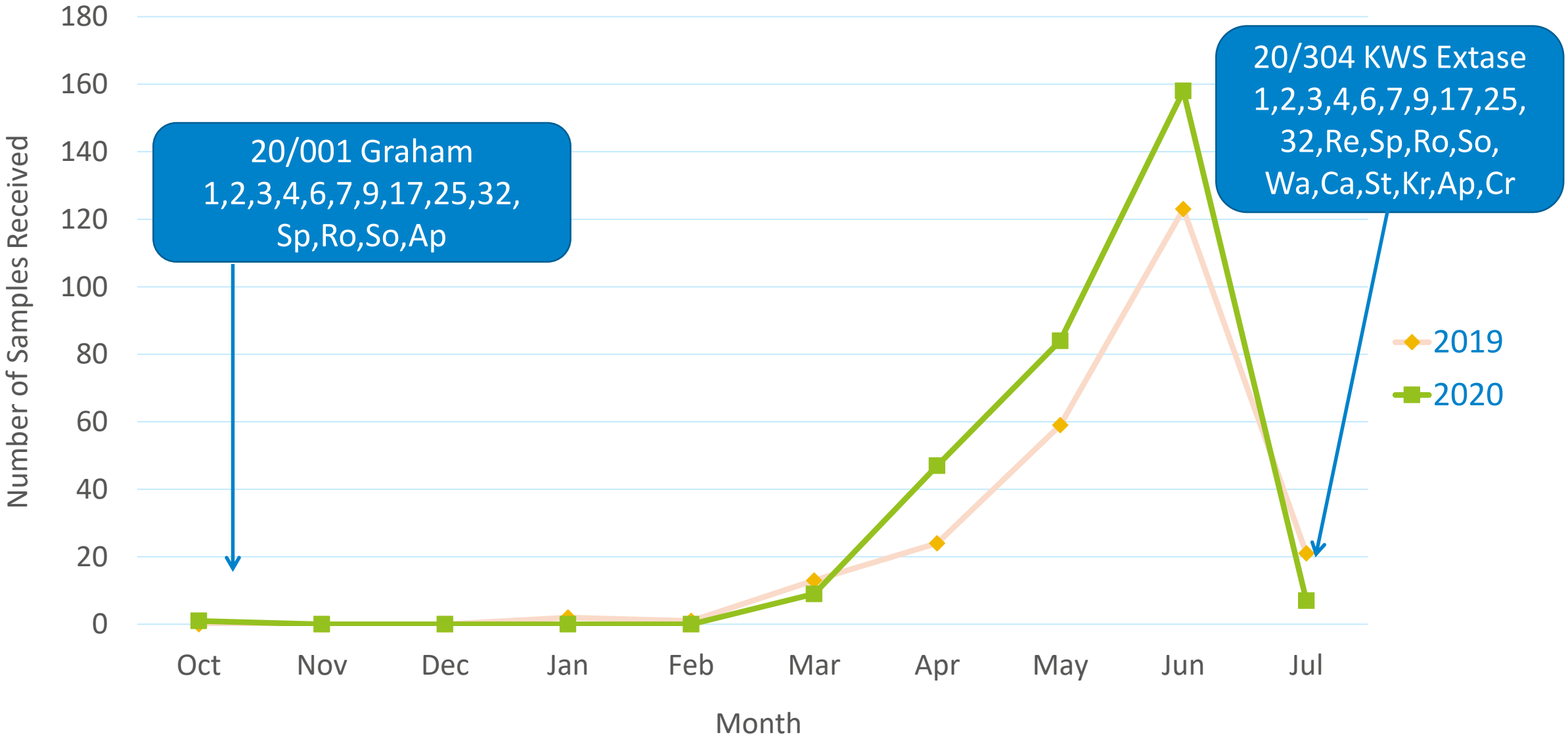
Sampling – Types



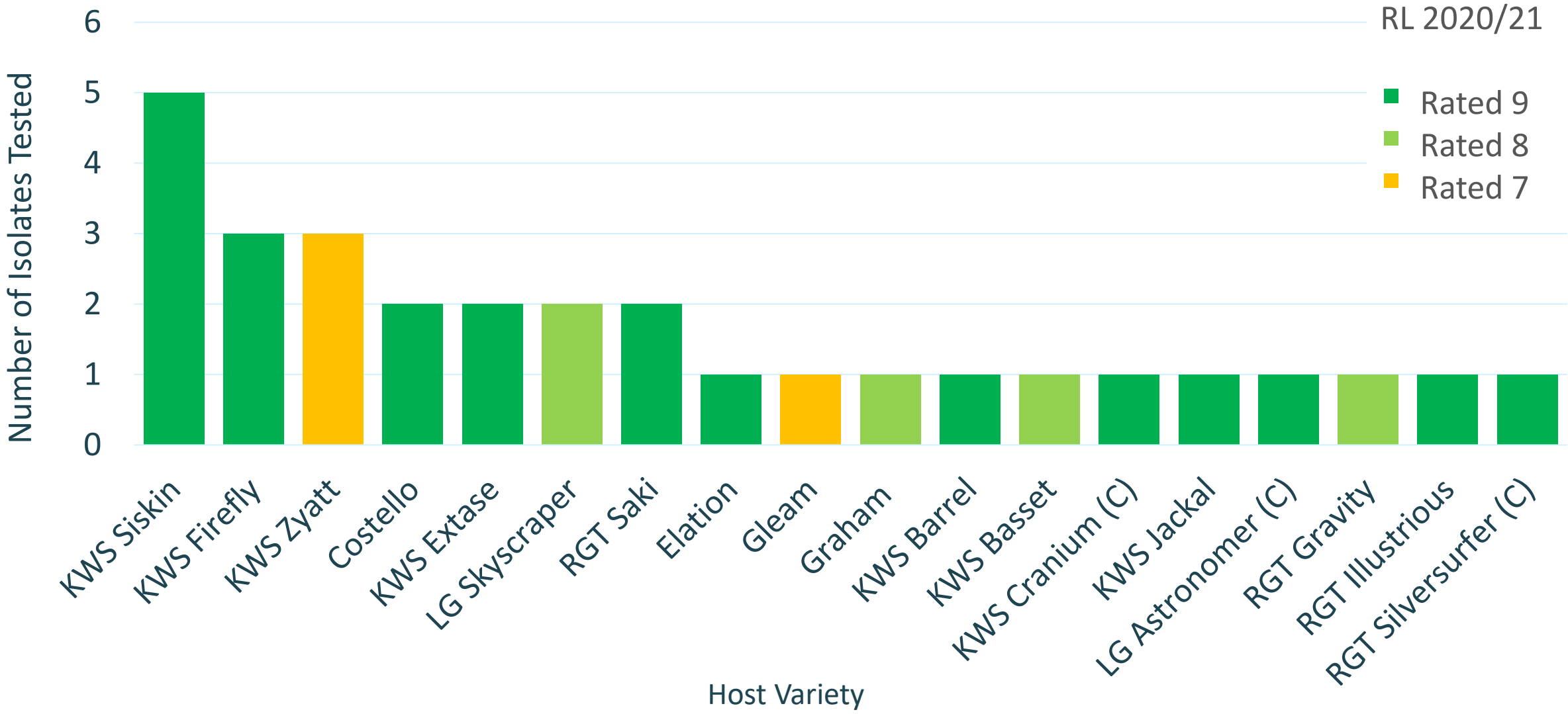
2019 WYR Samples Received



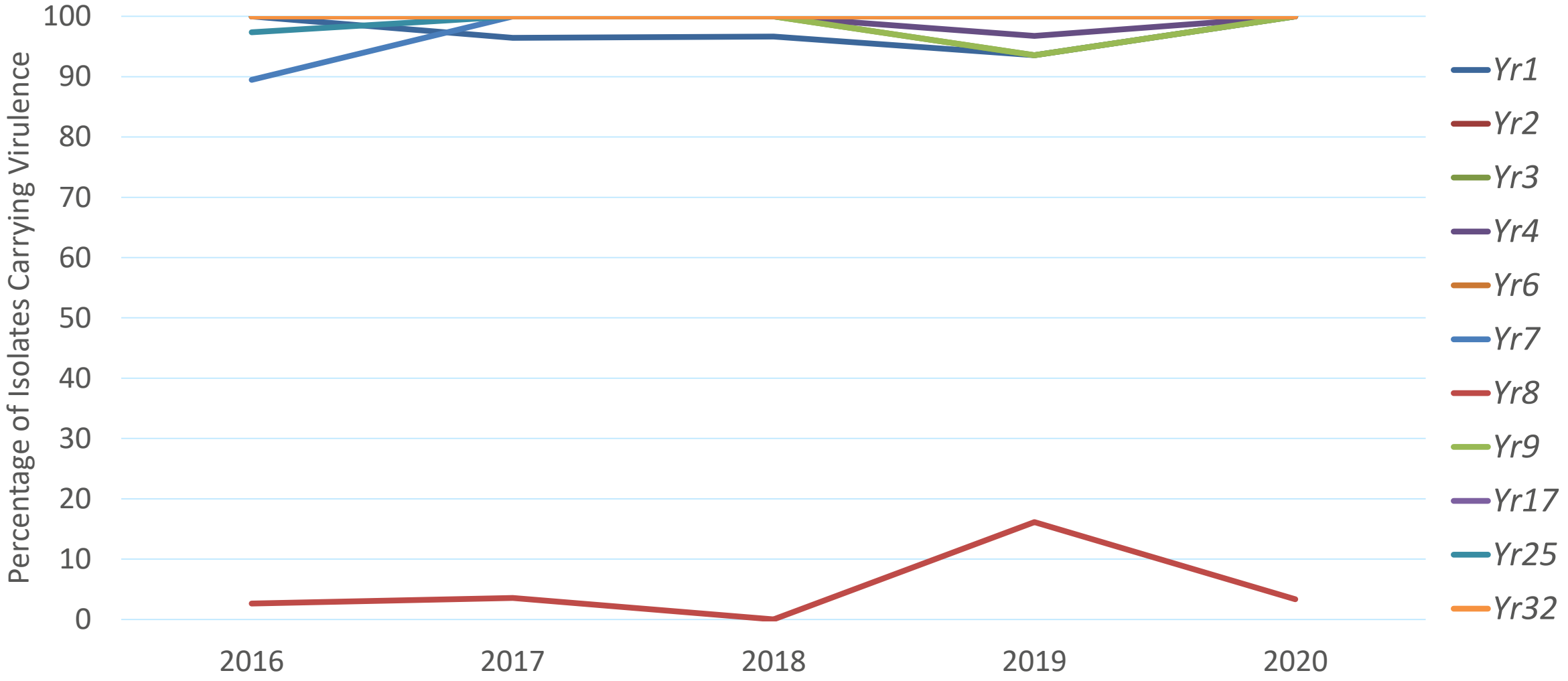
2020 WYR Samples Received



2020 WYR Isolates Tested

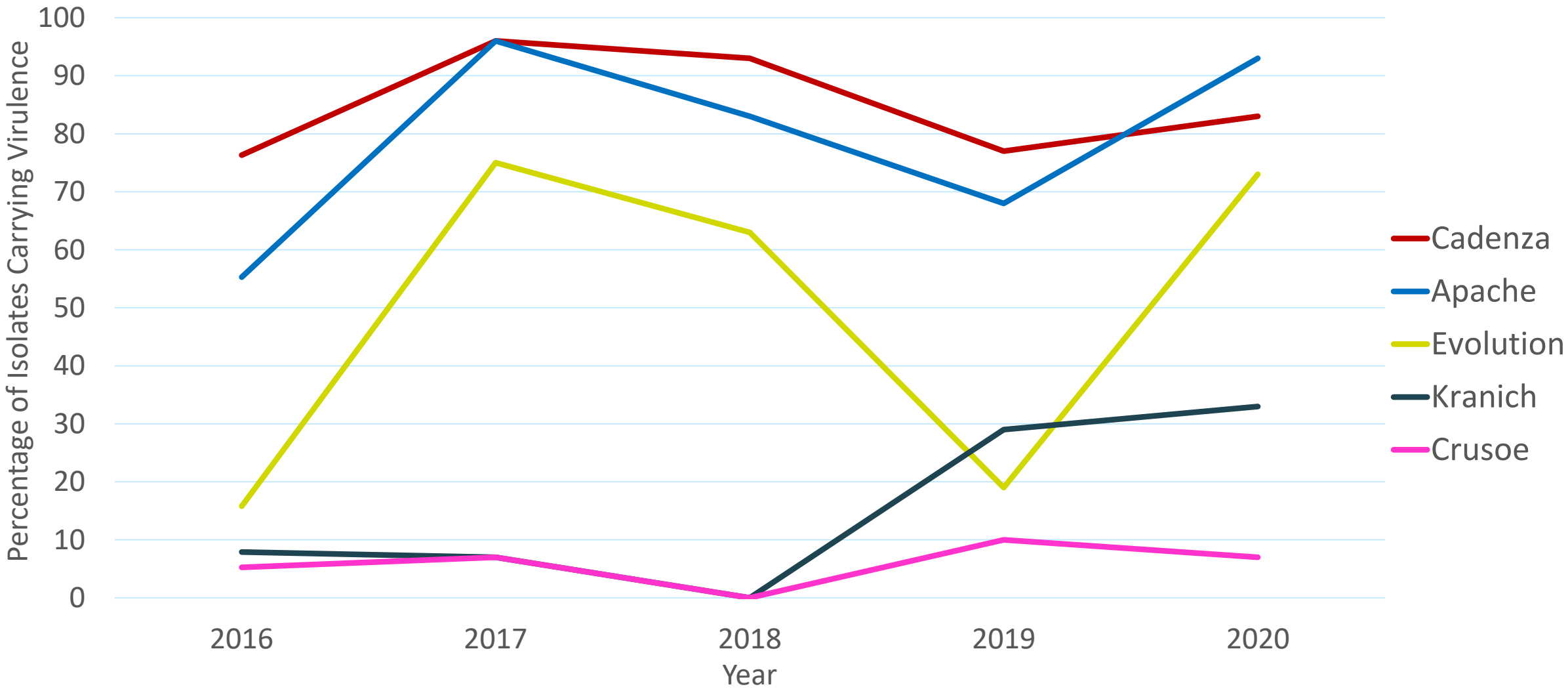


Wheat Yellow Rust Virulence Frequencies



No virulence was detected for *Yr5*, *Yr10* or *Yr15*

Wheat Yellow Rust Virulence Frequencies



Common Pathotypes Found in 2020

"Race" name	Pathotype	% Frequency
Red 37	1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,Wa,Ca,St,Kr,Ap,Ev	17
Red 28	1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,Ca,St,Ap,Ev	17
Red 27	1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,Ca,Ap,Ev	10

New Pathotypes Found in 2020

Pathotype	% Frequency
1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,St,Ev	3
1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,St,Ap,Ev	3
1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,Ca,St,Kr,Ap	3
1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,Wa,St,Kr,Ap,Ev	3
1,2,3,4,6,7,8,9,17,25,32,Sp,Ro,So,St,Kr,Ap,Ev	3

2020 Distribution of New Pathotypes

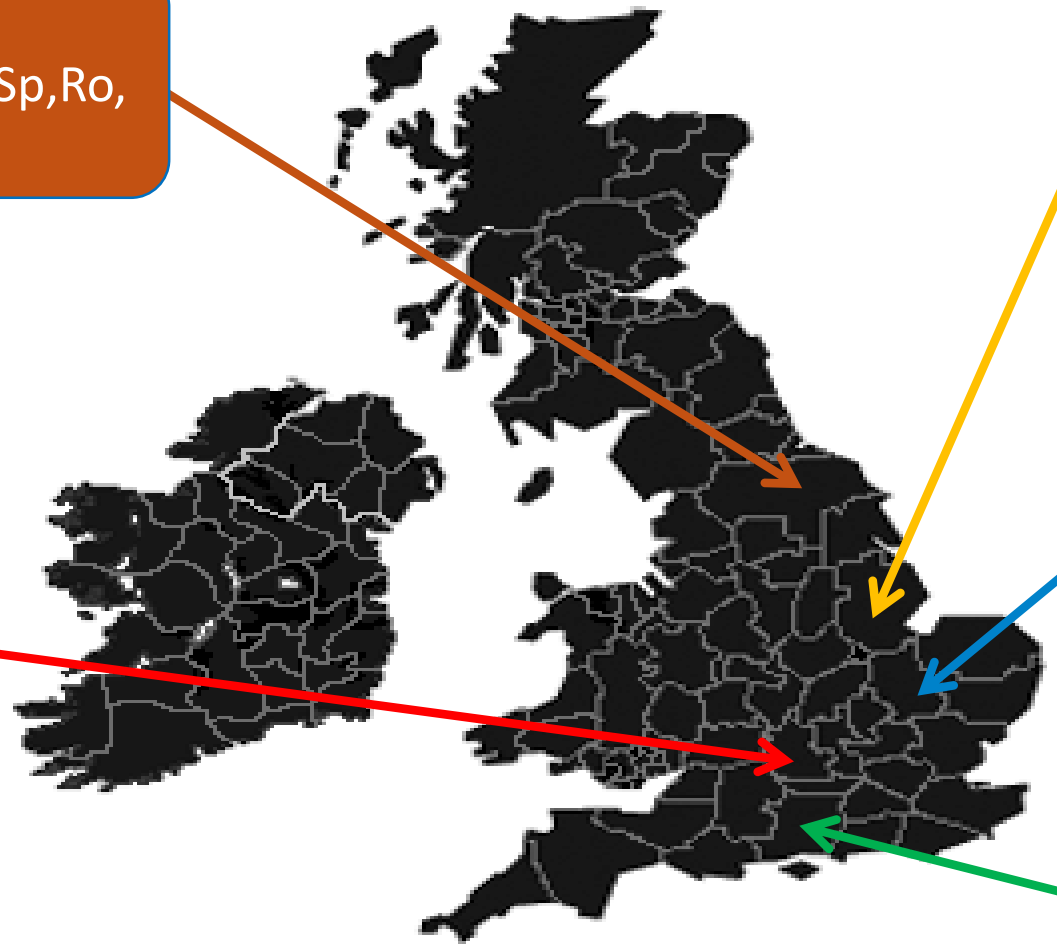
KWS Siskin
1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,
So,Wa,St,Kr,Ap,Ev

KWS Firefly
1,2,3,4,6,7,9,17,25,32,Re,
Sp,Ro,So,St,Ev

KWS Barrel
1,2,3,4,6,7,9,17,25,
32,Re,Sp,Ro,So,St,
Ap,Ev

KWS Siskin
1,2,3,4,6,7,8,9,17,25,32,
Sp,Ro,So,St,Kr,Ap,Ev

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

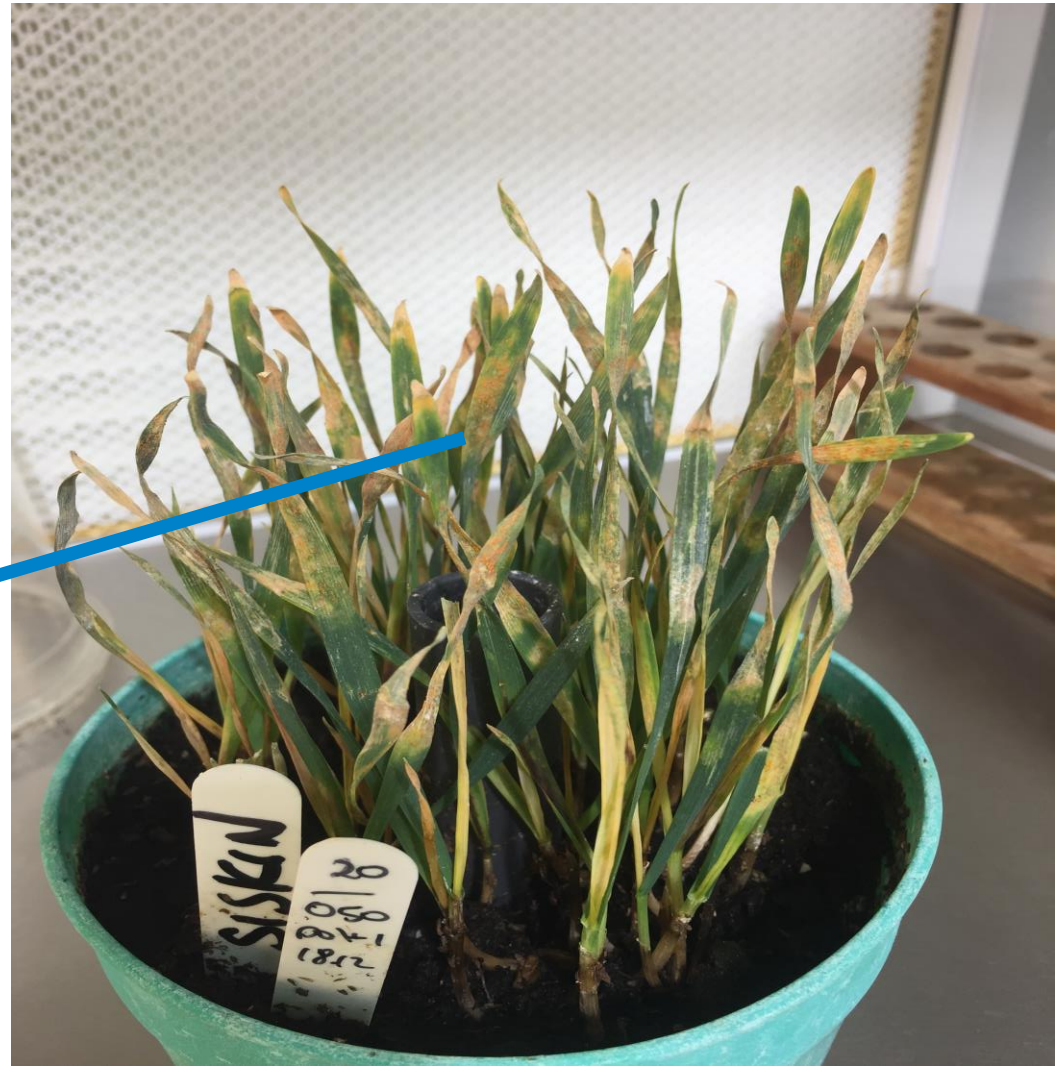


KWS Siskin/Costello Isolates

- 5 samples from KWS Siskin and 2 samples from Costello -both of these varieties are rated 9
- Further tests conducted and after 25 days some sporulation was evident on both KWS Siskin and Costello with a few of the isolates. Sporulation on KWS Siskin was particularly poor with very unhappy pustules and chlorotic/necrotic leaves
- This would not be classed as susceptibility in seedling tests but is something that has been noted and two of the isolates originally sampled from KWS Siskin 20/050 and 20/191 have been selected for 2021 adult plant trials

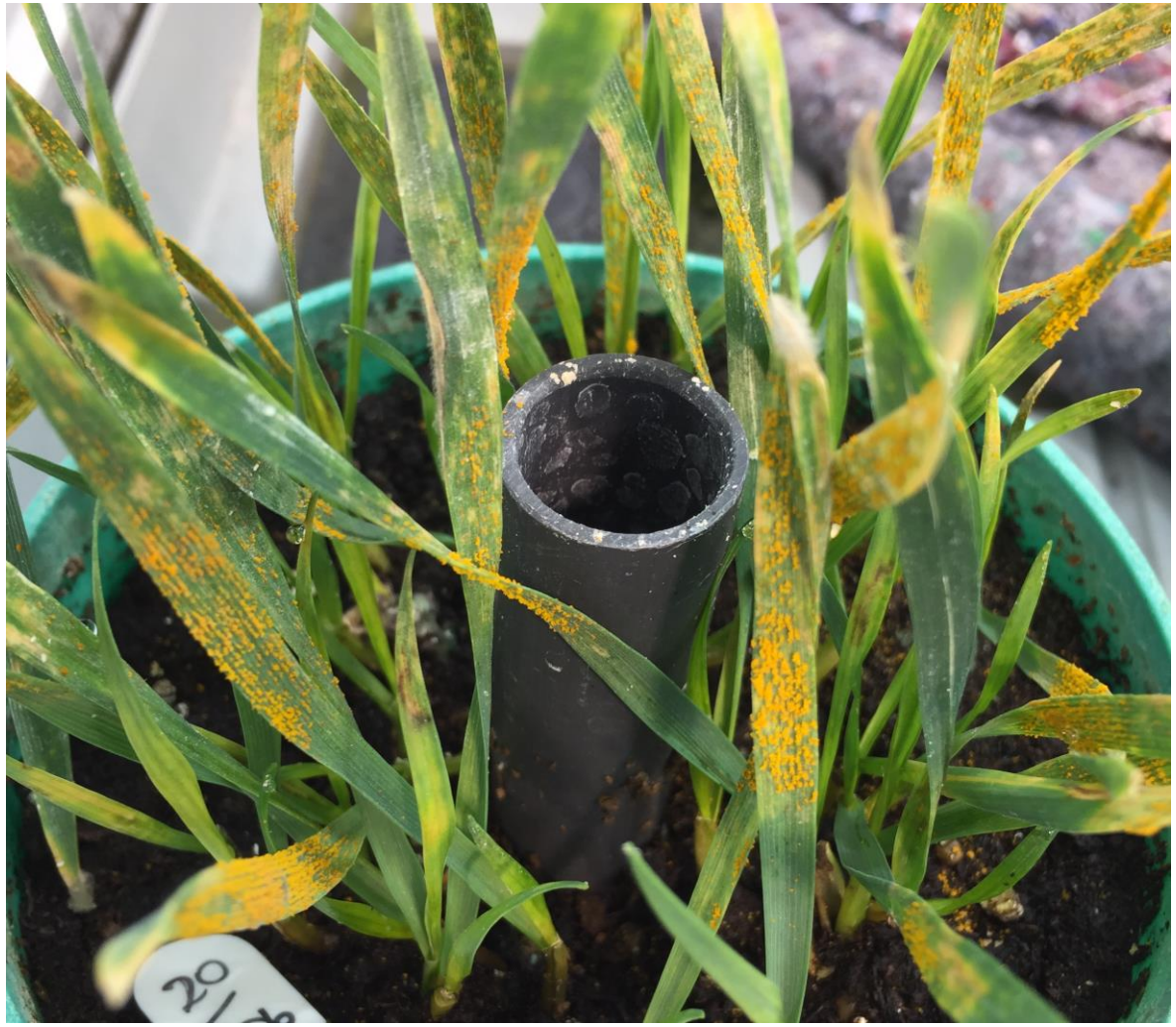
KWS Siskin Isolates

- Necrotic/chlorotic leaves
- Low pustulation
- Low sporulation



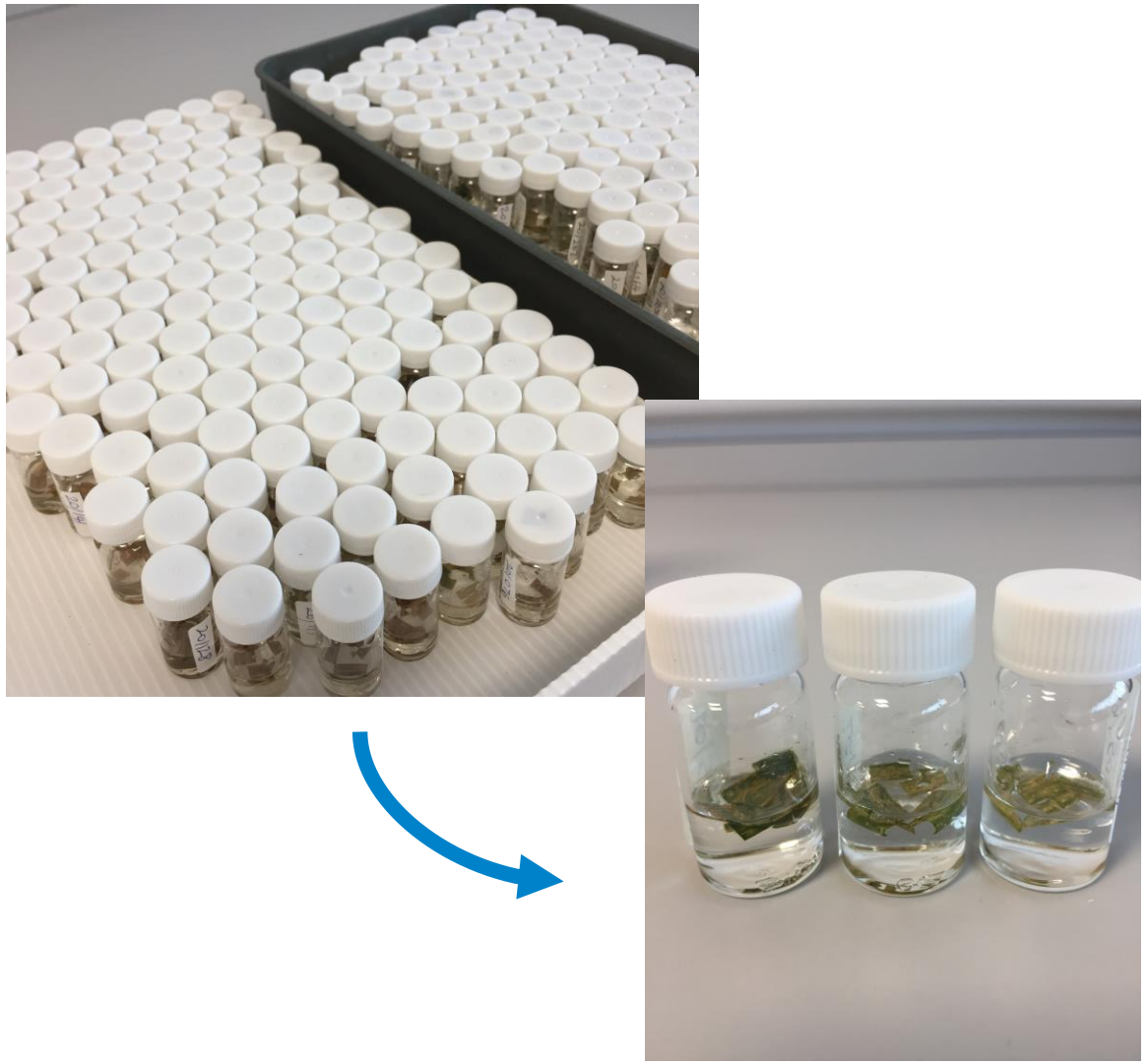
KWS Firefly Samples

- Resistant in seedling virulence tests
- Mini tests conducted using 2020 KWS Firefly isolates
- Good AIT 3 infection levels in separate tests using 19/119 and its re-isolate 20/506 = susceptible
- Environmentally sensitive?
- Further work needed to confirm these results

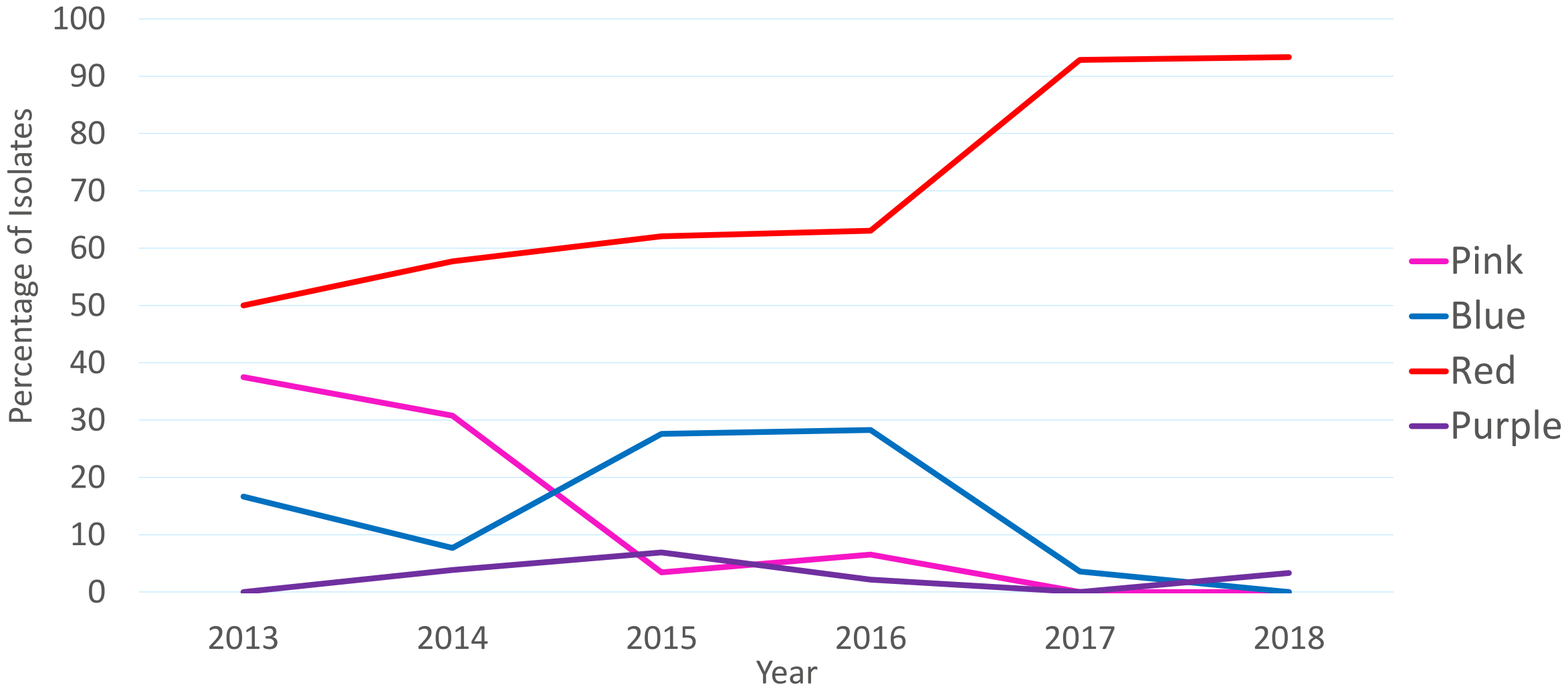


WYR Genetic Groups

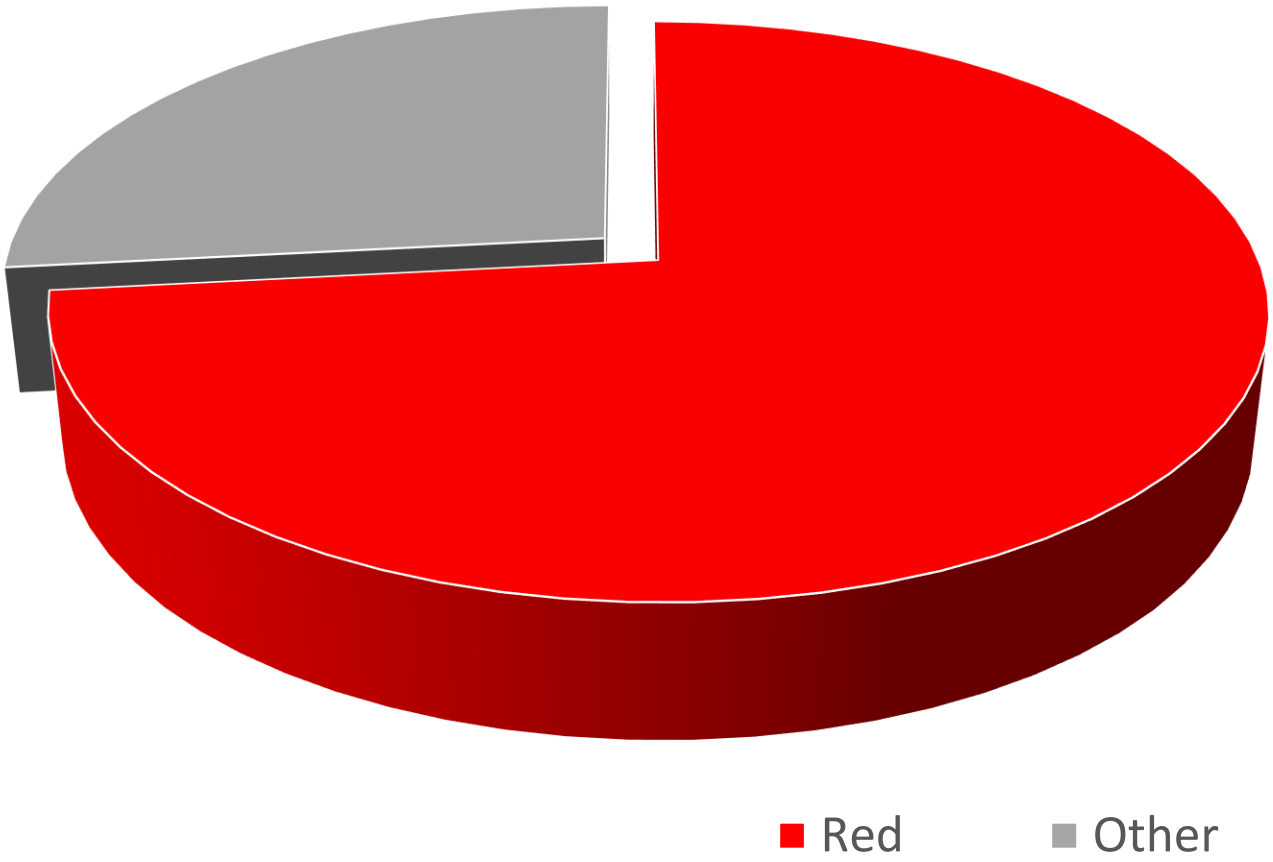
- MARPLE pathogenomics technology is being established at NIAB
- Running final optimisations of PCRs before genotyping outstanding isolates
- Delays due to COVID-19



Wheat Yellow Rust Genetic Groups: Six Year Summary



Wheat Yellow Rust 2020 Pathotypes



Genetic groups have been assigned using phenotyping data

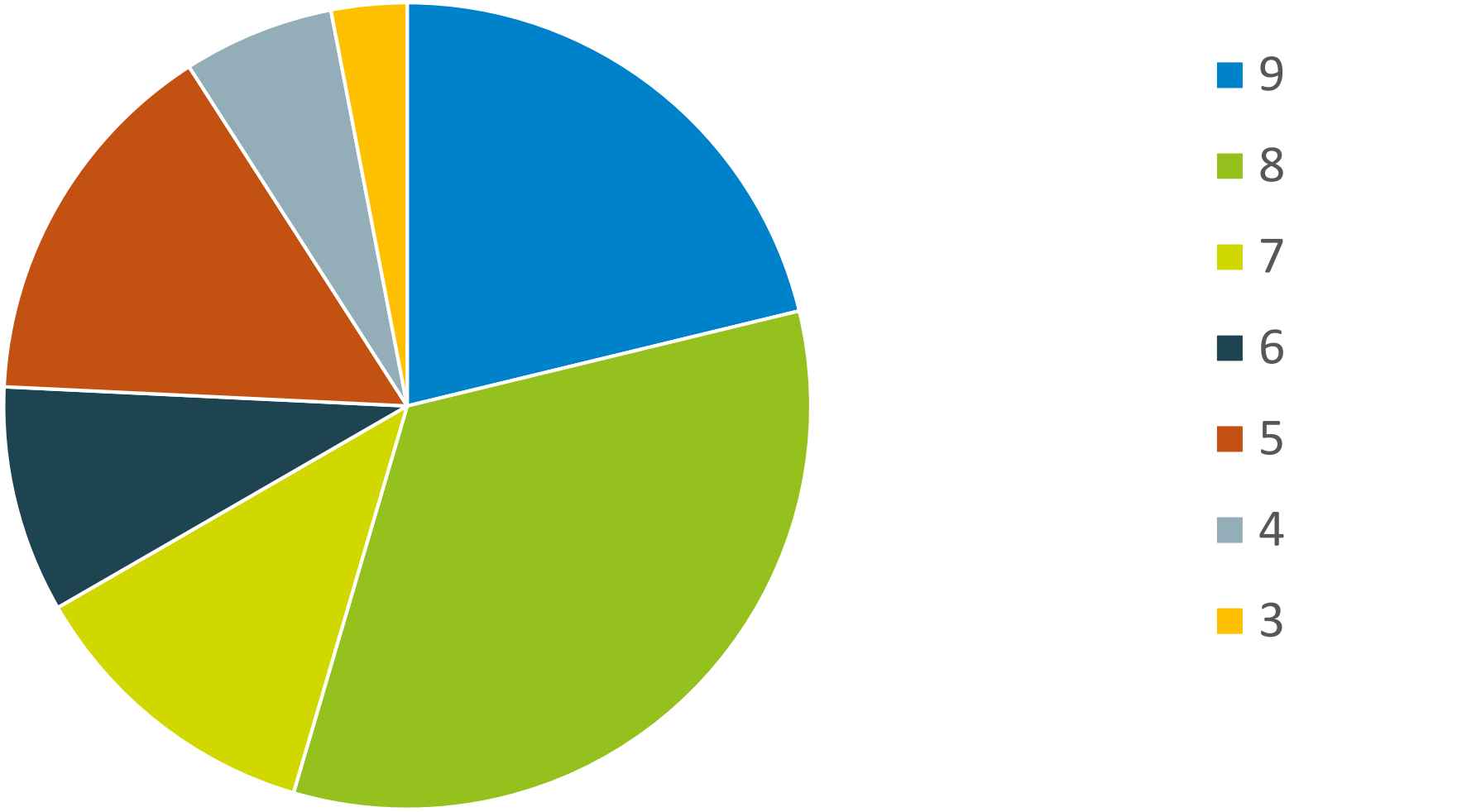
- Novel isolates are currently classified as ‘Other’ until a genetic group can be assigned
- No isolates were detected from blue or purple groups

What Next …

Adult Plant Trials 2021

Isolate	Host Variety	Pathotype
20/050	KWS Siskin	1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,Ca,St,Ap,Ev
20/092	LG Astronomer	1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,Wa,Ca,St,Kr,Ap,Ev
20/191	KWS Siskin	1,2,3,4,6,7,8,9,17,25,32,Sp,Ro,So,St,Kr,Ap,Ev
20/293	KWS Extase	1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,Wa,Ca,St,Kr,Ap,Cr,Ev
20/304	KWS Extase	1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,Wa,Ca,St,Kr,Ap,Cr

RL 2021/22– Wheat Yellow Rust



2021 Samples

- Have we seen any rust?- Reports, samples?
- 6 samples in so far: Oxfordshire, 30/11/20
- 21/003 LG Skyscraper

  1,2,3,4,6,7,9,17,25,32,Re,Sp,Ro,So,Wa,Ca,Ap,Ev
- 21/005 LG Skyscraper

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

Wheat Yellow Rust Summary

- 2020 very busy year - 306 samples and some unusual reports
- Some interesting samples from resistant varieties
- One isolate was identified with virulence for *Yr8*
- Two isolates found with virulence for Crusoe
- Most common pathotypes seen in 2020 samples – Red 37 and Red 28

Wheat Brown Rust

Sarah Wilderspin

UKCPVS Celebrating 50 Years of Research
Animal & Plant Health Agency
NIAB
CEREALS & OILSEEDS

Background

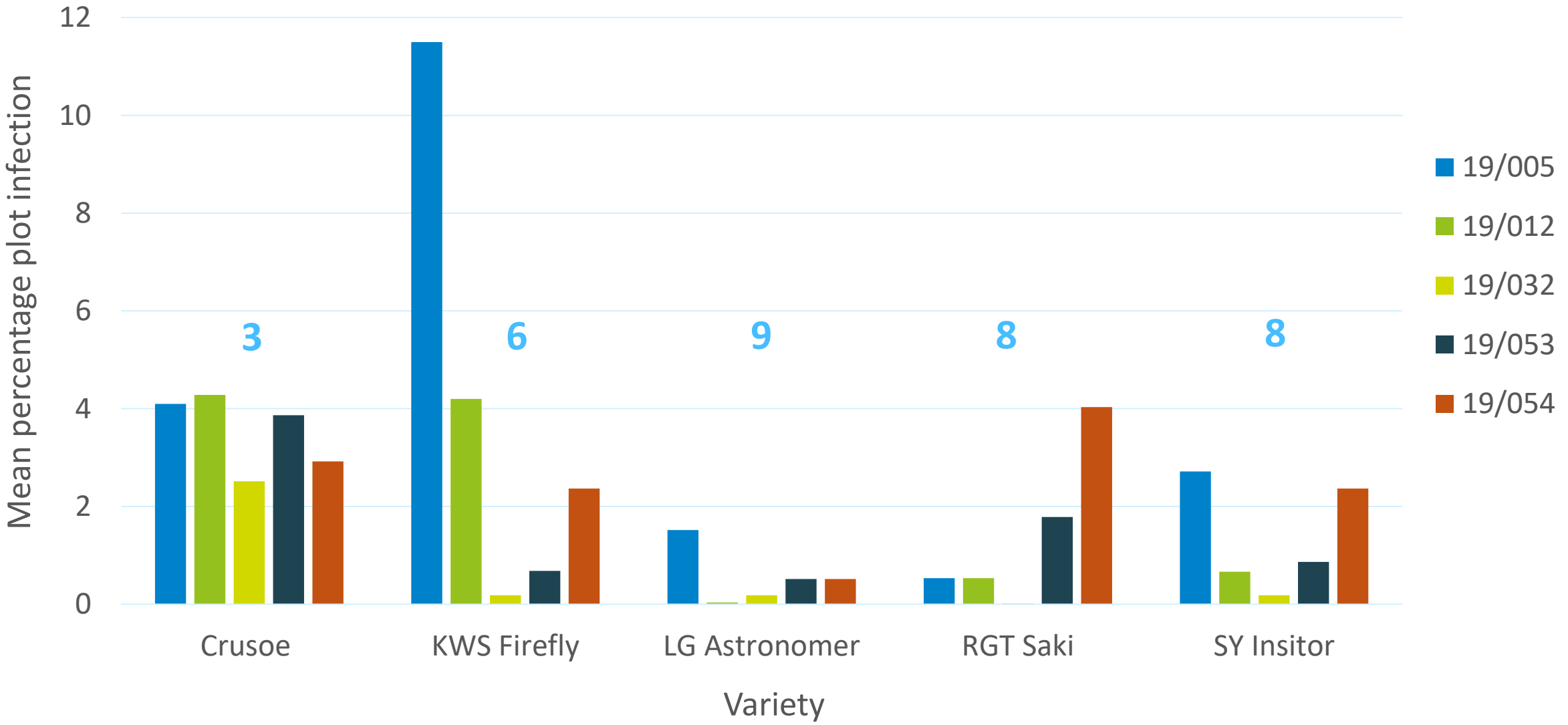
- Surveillance started later than other cereal diseases in 1973
- At the start of the survey there were limited options for resistant varieties to brown rust e.g. Clement
- In 2014 the *Puccinia triticina* population overcame the moderate resistance in Crusoe

2019 samples

Adult Plant Trials

Isolate	Host Variety	Pathotype
19/005	KWS Firefly	1,3a,3bg,3ka,10,13,14a,15,16,17,26,28,37,Cr
19/012	KWS Firefly	1,3a,3bg,3ka,10,13,14a,15,16,17,26,28,37,Cr
19/032	KWS Firefly	1,3a,3bg,3ka,10,13,14a,15,16,17 (24) (26),37,Cr
19/053	RGT Blossom	1,3a,3bg,3ka,10,13,14a,15,16,17 20 26,28,37,Cr
19/054	KWS Firefly	1,3ka,10,13,14a,15,16,17,26,28,37,Cr

Adult Plant Trial Results



Variety Seedling Test Results

Seedling tests inoculated with same 5 isolates as those inoculated in the field

Mostly Resistant

- Stigg
- SY Clipper
- Theodore
- Warrior

Susceptible

- Most of the other varieties were susceptible

Variety Seedling vs Adult Plant Test Results

Variety	RL Rating 2020/21	Variety Seedling	Adult Plant
LG Detroit	5	3.0	3.0
SY Insitor	4	3.0	3.0
LG Prince	8	3.0	0.9
LG Skyscraper	6	3.0	0.4
RGT Quicksilver	8	3.0	1.4
SY Clipper	-	0.4	0.2
Theodore	7	0.2	0.2
Warrior	-	0.4	0.0

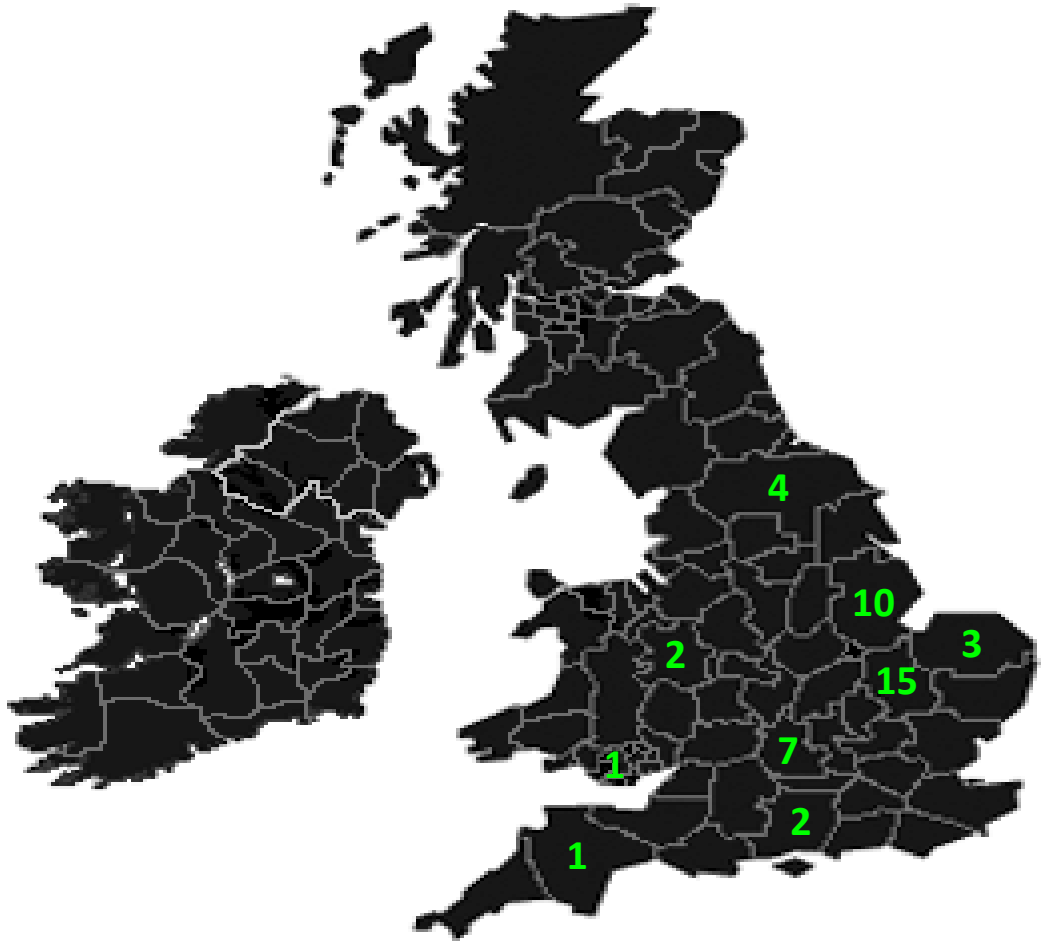
2019 Wheat Brown Rust Summary

- Variety seedling tests
  - SY Clipper and Theodore were the only RL varieties to be resistant to 4 out of the 5 isolates
- Adult plant trials
  - Overall percentage plot infection levels were low which was most probably due to the season
  - There were no major changes in varietal performance

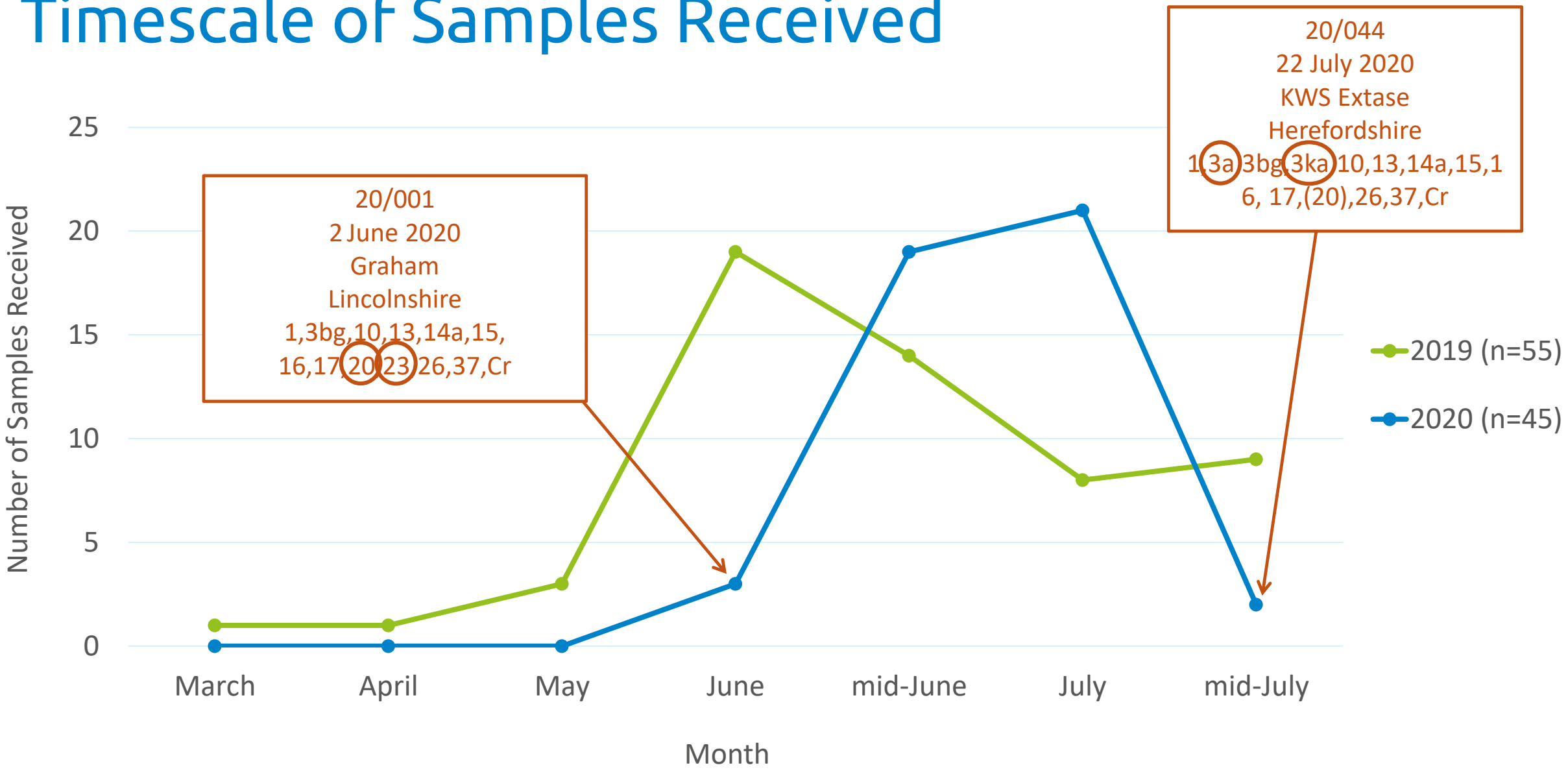
2020 samples

2020 WBR Samples Received

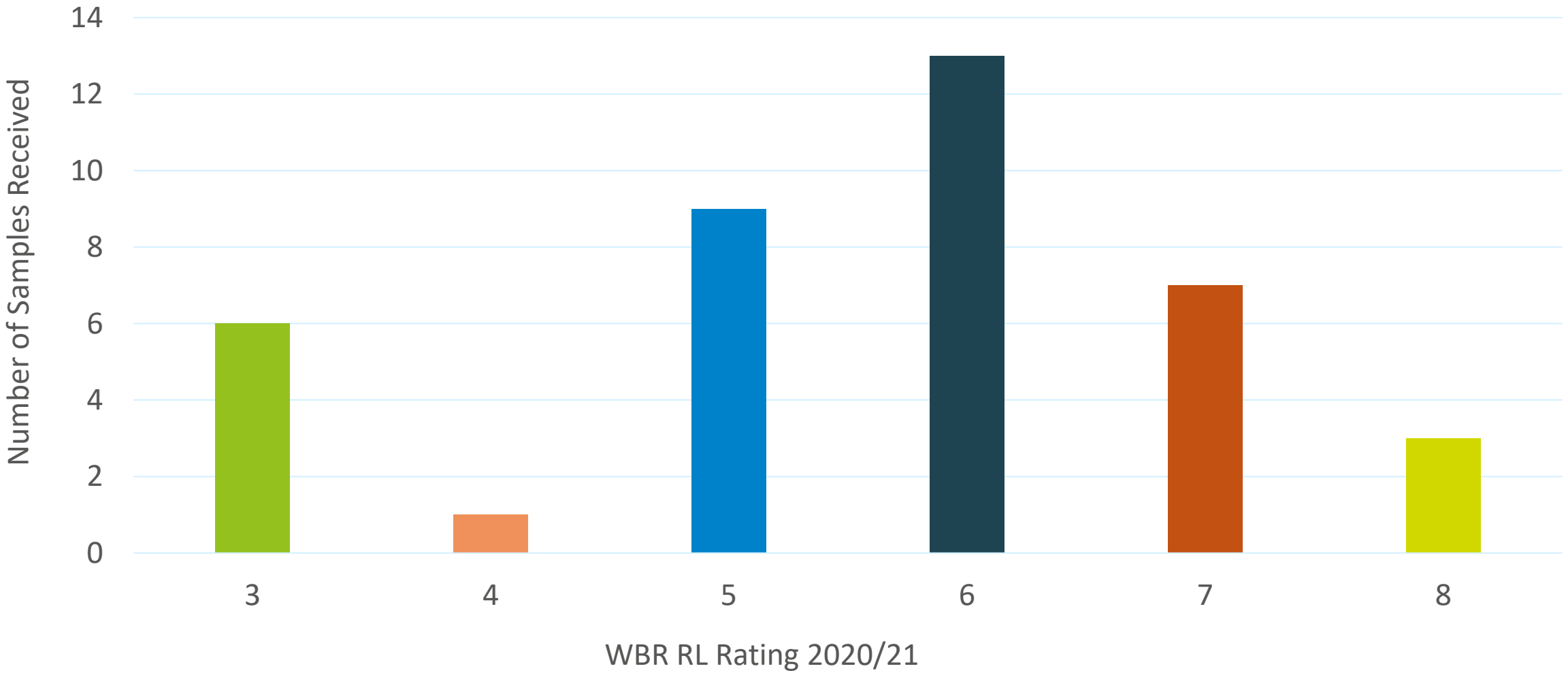
- 45 samples
- 9 counties
- 24 varieties
- 39 samples arrived on RL varieties and candidates



Timescale of Samples Received

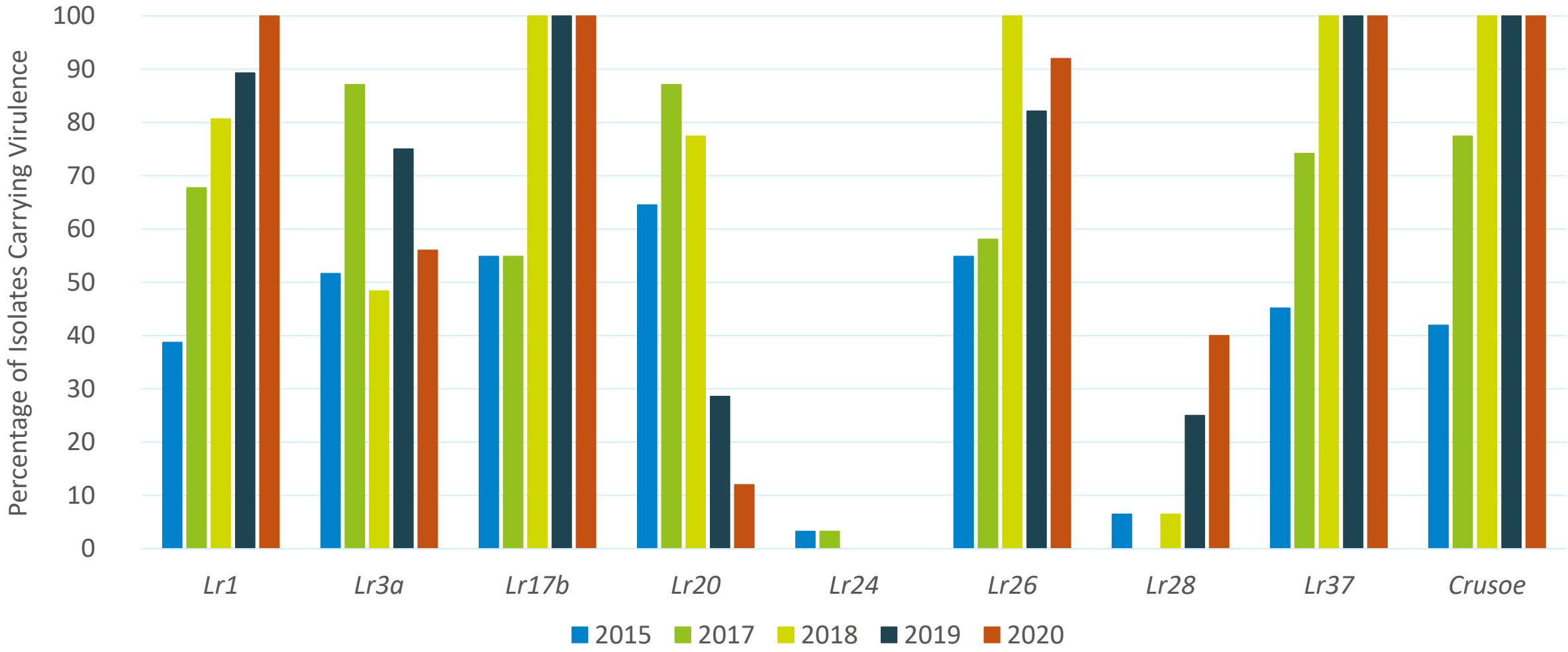


Samples Received RL Ratings



6 samples not on 2020/21 RL list

Virulence Frequencies: 5 Year Summary



25 isolates tested

Why is *Lr28* increasing?

2019			
	Thatcher Lr28	Robigus (Lr28)	KWS Firefly
19-007	3.0	3.0	3.0
19-009	2.0	2.0	2.0
19-010	0.1	0.0	0.0
19-012	3.0	3.0	3.0
19-013	1.2	2.0	0.4
19-014	0.5	0.6	0.6
19-016	0.4	0.0	0.0
19-017	1.0	0.5	0.7
19-025	3.0	3.0	3.0

2020			
	Thatcher Lr28	Robigus (Lr28)	KWS Firefly
20-006	0.0	0.0	0.6
20-015	3.0	3.0	3.0
20-017	3.0	3.0	3.0
20-018	2.0	2.0	2.0
20-019	3.0	3.0	3.0
20-021	3.0	2.0	2.0
20-024	0.4	2.0	0.6
20-026	3.0	3.0	3.0
20-027	3.0	3.0	3.0

Why is *Lr28* increasing?

2019
KWS Firefly

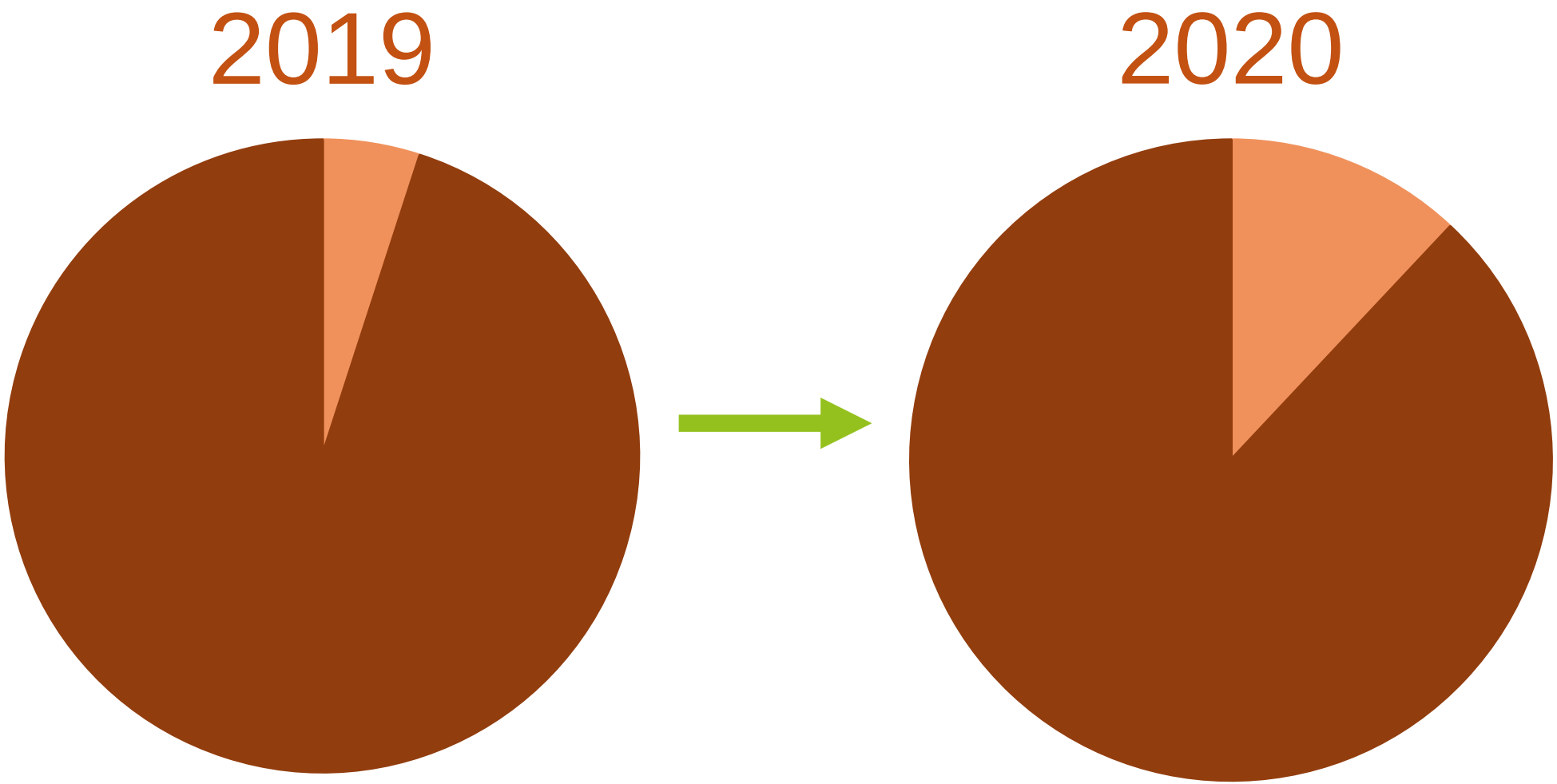
2020
KWS Firefly

Why is *Lr28* increasing?

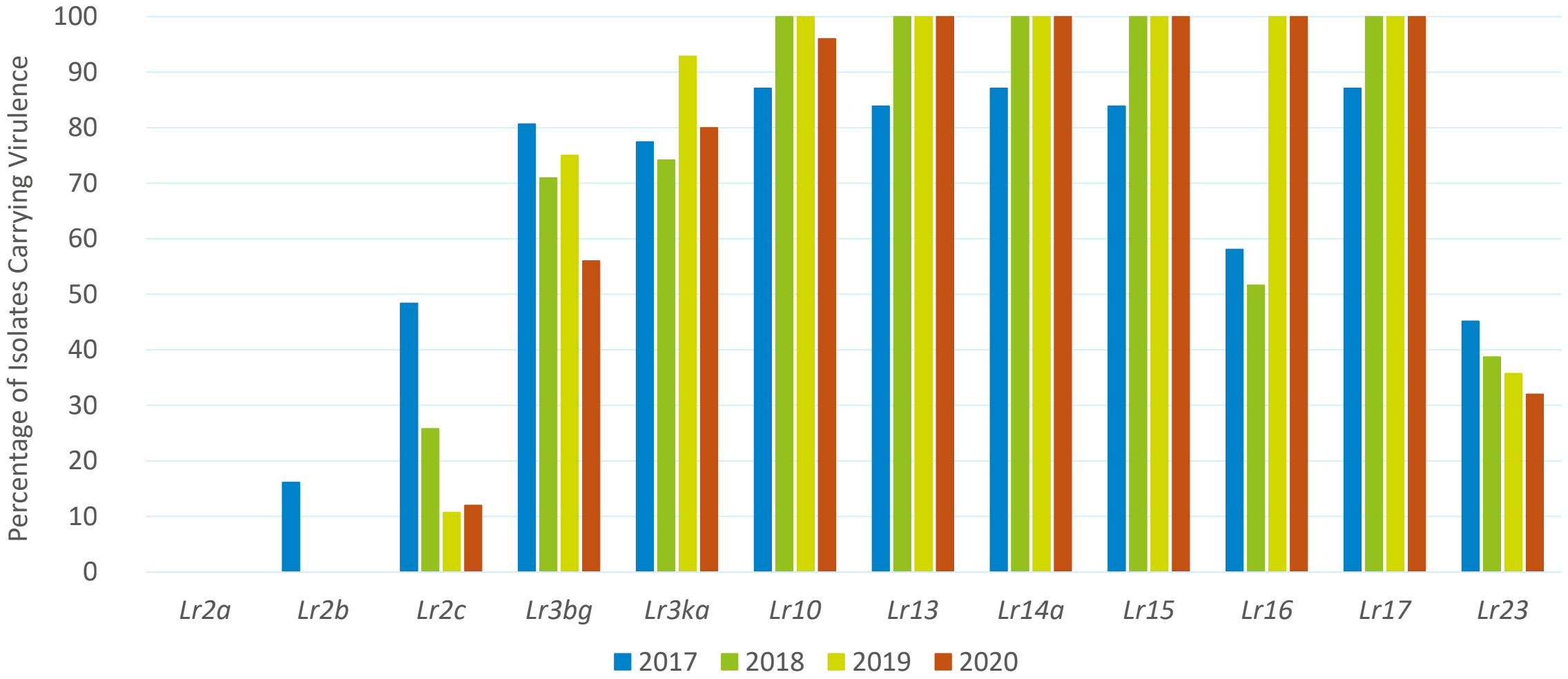
Isolate	Pathotype	Host	County
20-005	1,3a,3bg,3ka,10,13,14a,15,16,17,23,26,**28**,37,Cr	KWS Firefly	Cambridgeshire
20-015	1,13,14a,15,16,17,26,**28**,37,Cr	LG Spotlight	Cambridgeshire
20-017	1,3ka,10,13,14a,15,16,17,26,**28**,37,Cr	RGT Gravity	Hampshire
20-019	1,3ka,10,13,14a,15,16,17,**28**,37,Cr	Crusoe	Oxfordshire
20-026	1,10,13,14a,15,16,17,26,**28**,37,Cr	KWS Firefly	Oxfordshire
20-027	1,3a,3bg,3ka,10,13,14a,15,16,17,26,**28**,37,Cr	LG Prince	Oxfordshire
20-033	1,10,13,14a,15,16,17,**28**,37,Cr	KWS Firefly	Lincolnshire
20-034	1,10,13,14a,15,16,17,26,**28**,37,Cr	RGT Saki	Lincolnshire
20-038	1,3ka,10,13,14a,15,16,17,26,**28**,37,Cr	KWS Extase	Norfolk
20-042	1,3ka,10,13,14a,15,16,17,26,**28**,37,Cr	RGT Illustrious	Yorkshire

Why is *Lr28* increasing?

Why is *Lr28* increasing?



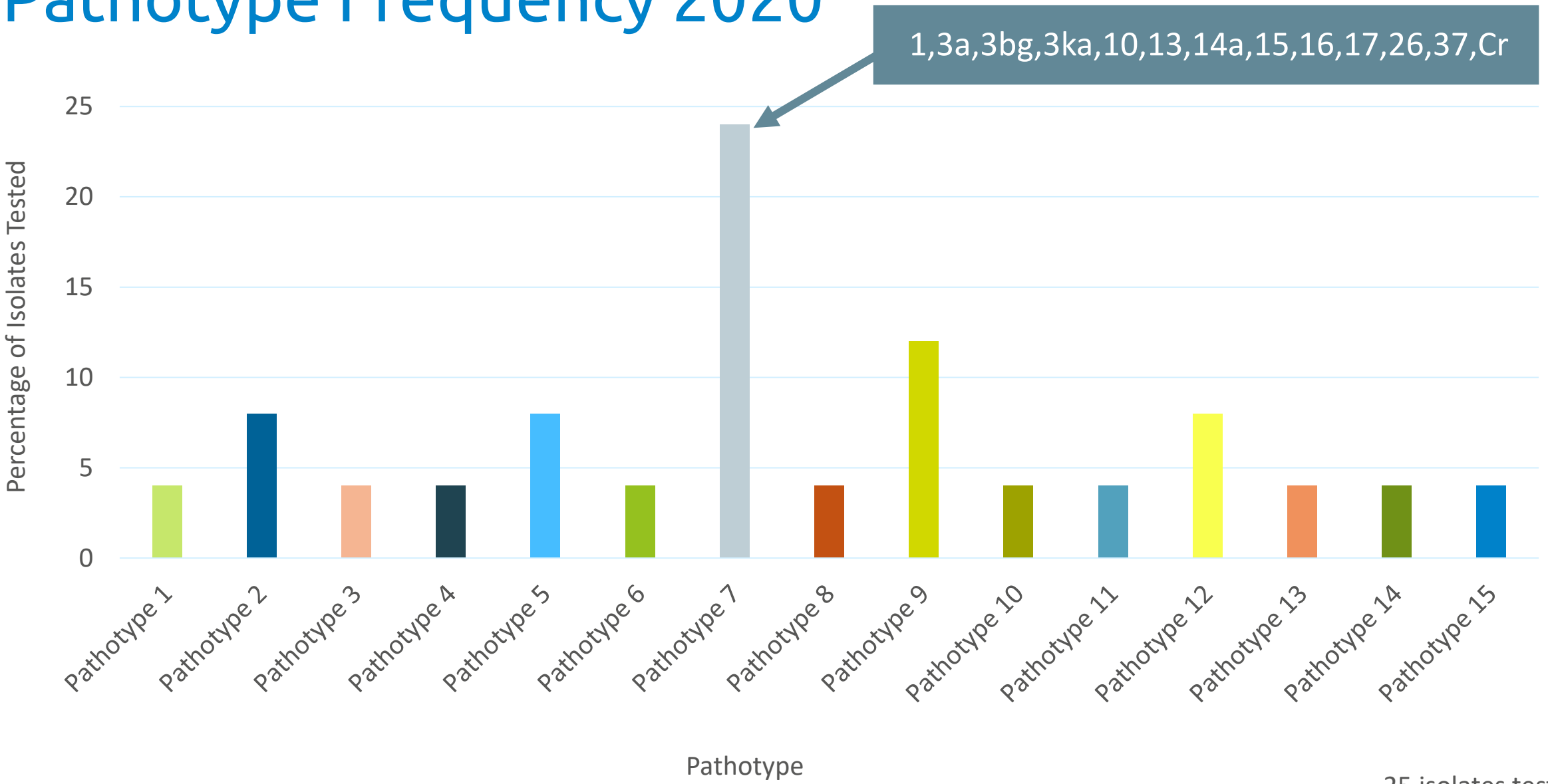
Virulence Frequencies: 4 Year Summary



25 isolates tested

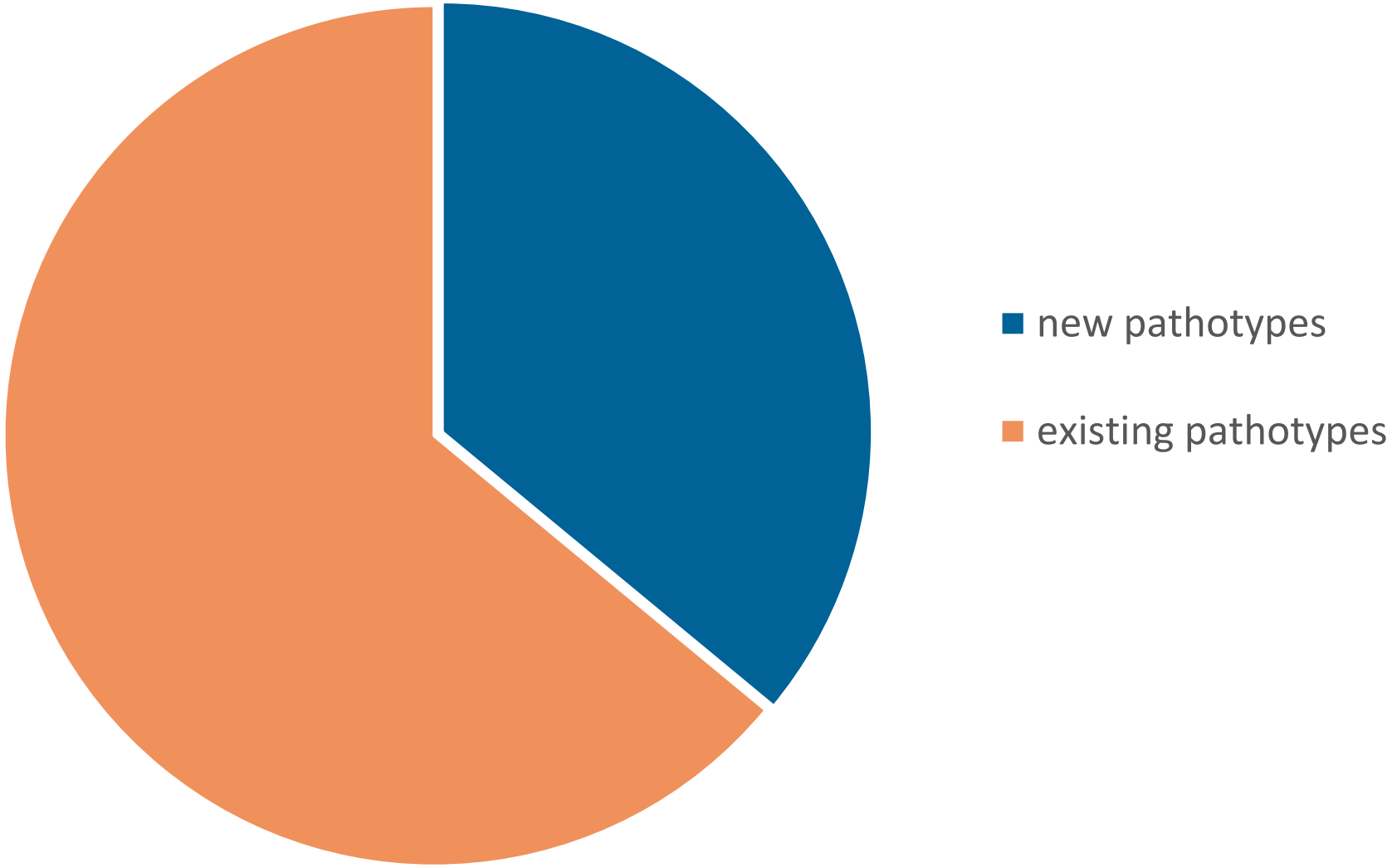
WBR

Pathotype Frequency 2020



25 isolates tested

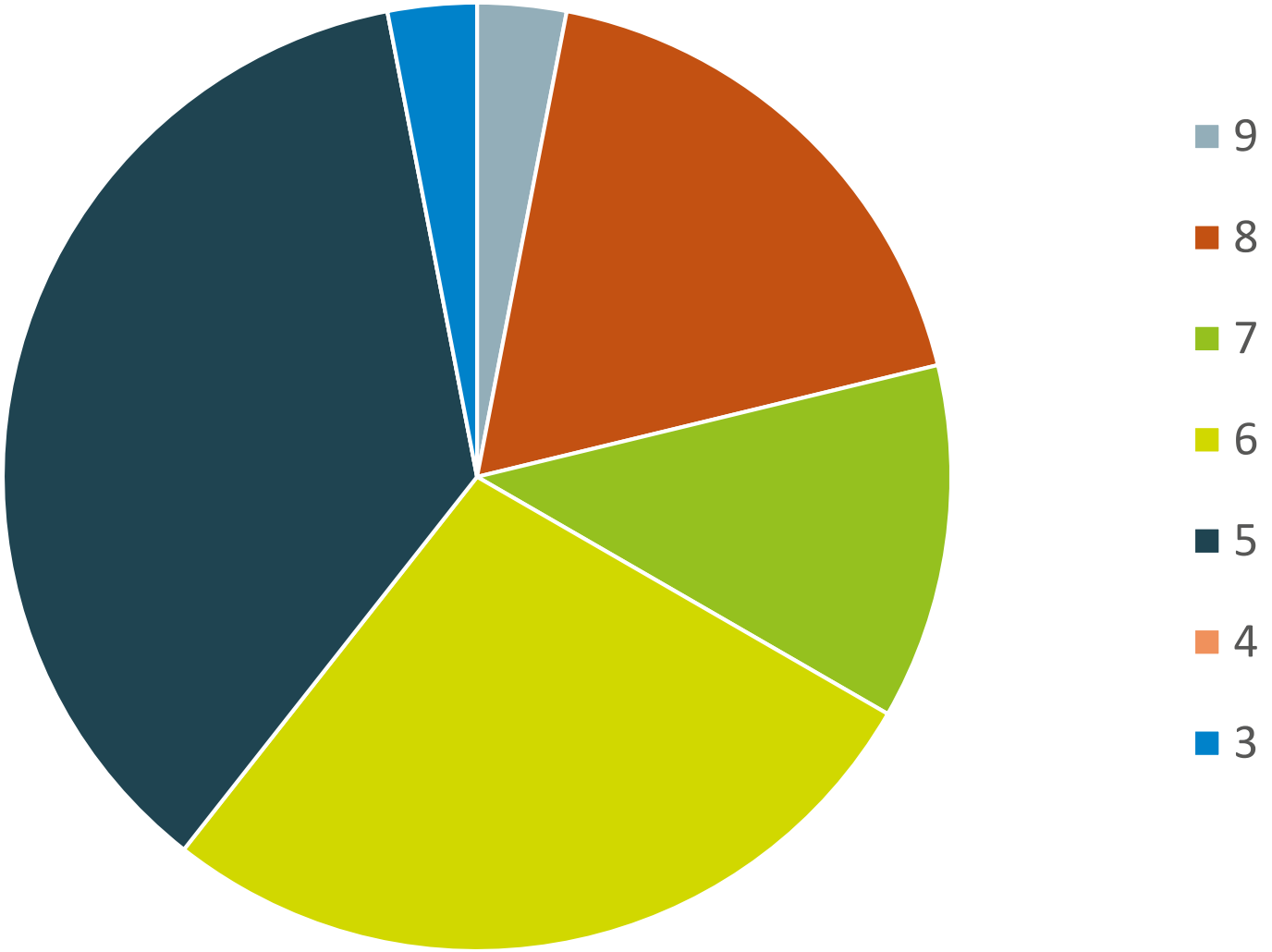
New Pathotypes 2020



Adult Plant Trials 2021

Isolate	Host Variety	Pathotype
20/002	KWS Colosseum	1,2c,3a,3bg,3ka,10,13,14a,15,16,17,23,26,37,Cr
20/005	KWS Firefly	1,3a,3bg,3ka,10,13,14a,15,16,17,23,26,28,37,Cr
20/018	Crusoe	1,2c,3a,3bg,3ka,10,13,14a,15,16,17,20,23,26,37,Cr
20/021	KWS Siskin	1,3a,3bg,3ka,10,13,14a,15,16,17,23,26,(28),37,Cr
20/032	KWS Extase	1,3a,3bg,3ka,10,13,14a,15,16,17,20,23,26,37,Cr

WBR RL Ratings 2021/22



2021 WBR Samples Received

- 5 samples
- 30th November
- Oxfordshire and Berkshire

2020 Wheat Brown Rust Summary

- Moderate to low disease pressure arriving late in the season
- Seedling virulence frequencies continue to increase for *Lr1* and *Lr28* and decrease for *Lr20,* and remain avirulent to *Lr24* for the last three years. A common pathotype was detected for 2020
- Otherwise there were no major changes in varietal performance from seedling virulence frequencies for 2020 isolates

Wheat & Barley Powdery Mildew

Amelia Hubbard

Changes to the Mildew Survey

- Only testing those samples sent in to us
- No longer sampling ourselves from our own field trials
- No longer sending out mobile trap nurseries to collect air borne spores in our home areas

➢Some years we may not have any samples to test

2020 Mildew Update

- Mildew found but not accompanied by reports of varietal problems
- Two wheat mildew samples received but neither survived incubation
- One barley mildew sample received and 6 single pustule isolates tested

Barley Powdery Mildew

Amelia Hubbard

2020 BPM Samples Received

- 1 sample
- 1 county - Buckinghamshire
- 1 variety - Bazooka

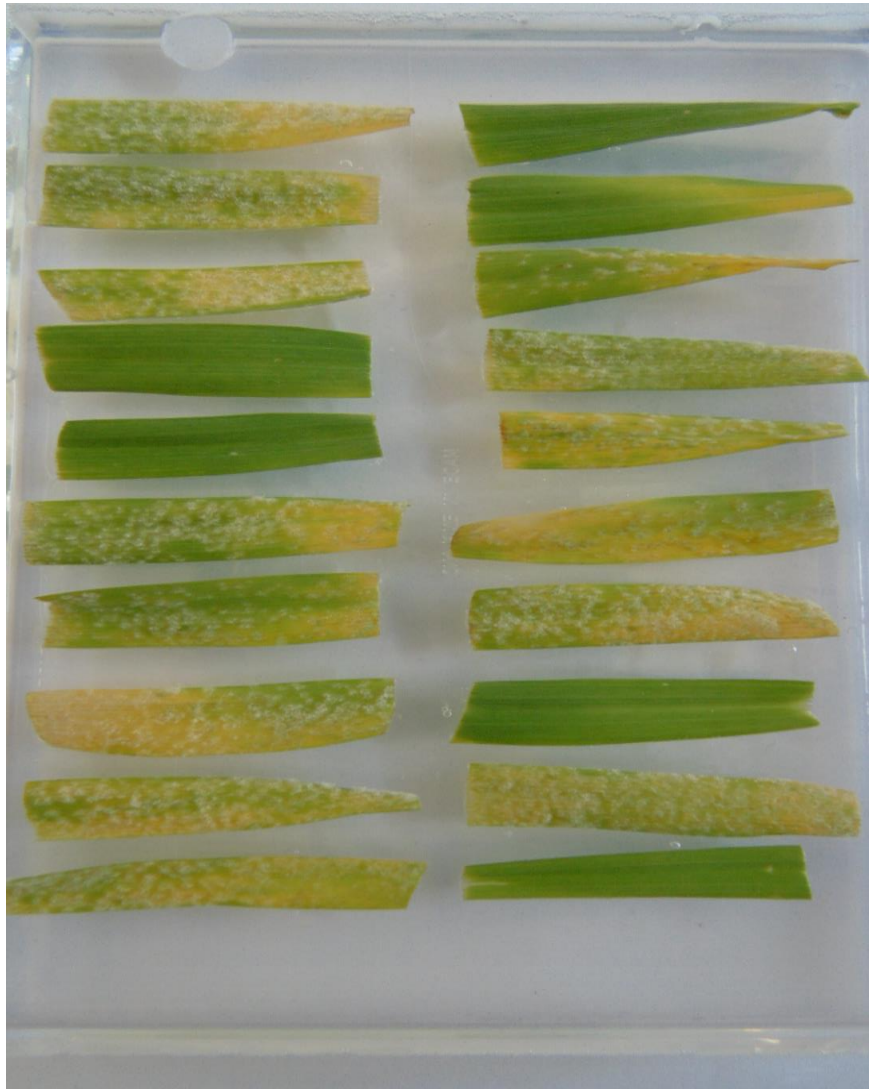
- Low levels of mildew seen in 2020

BPM Differential Set

Differential	Resistance Gene
Golden Promise	0
W.37/136	*Mlh*
W.41/145	*Mlra*
Goldfoil	*Mlg*
Zephyr	*Mlg,Ml(CP)*
Midas	*Mla6*
Lofa	*MlLa*
Hassan	*Mla12*
H.1063	*Mlk1*
Porter	*Mla7*
Lotta	*MlAb*

Differential	Resistance Gene
Triumph	*Mla7,MlAb*
Tyra	*Mla1*
Roland	*Mla9*
Apex	*mlo11*
Riviera	*mlo11*
Digger	*Mla13*
Ricardo	*Mla3*
Vanessa	
Optic	
Propino	
Host Bazooka	

BPM Differential Tests



- Detached leaf segments inoculated with a single isolate
- 4 reps per test
- Scored using 0-4 assessment scale

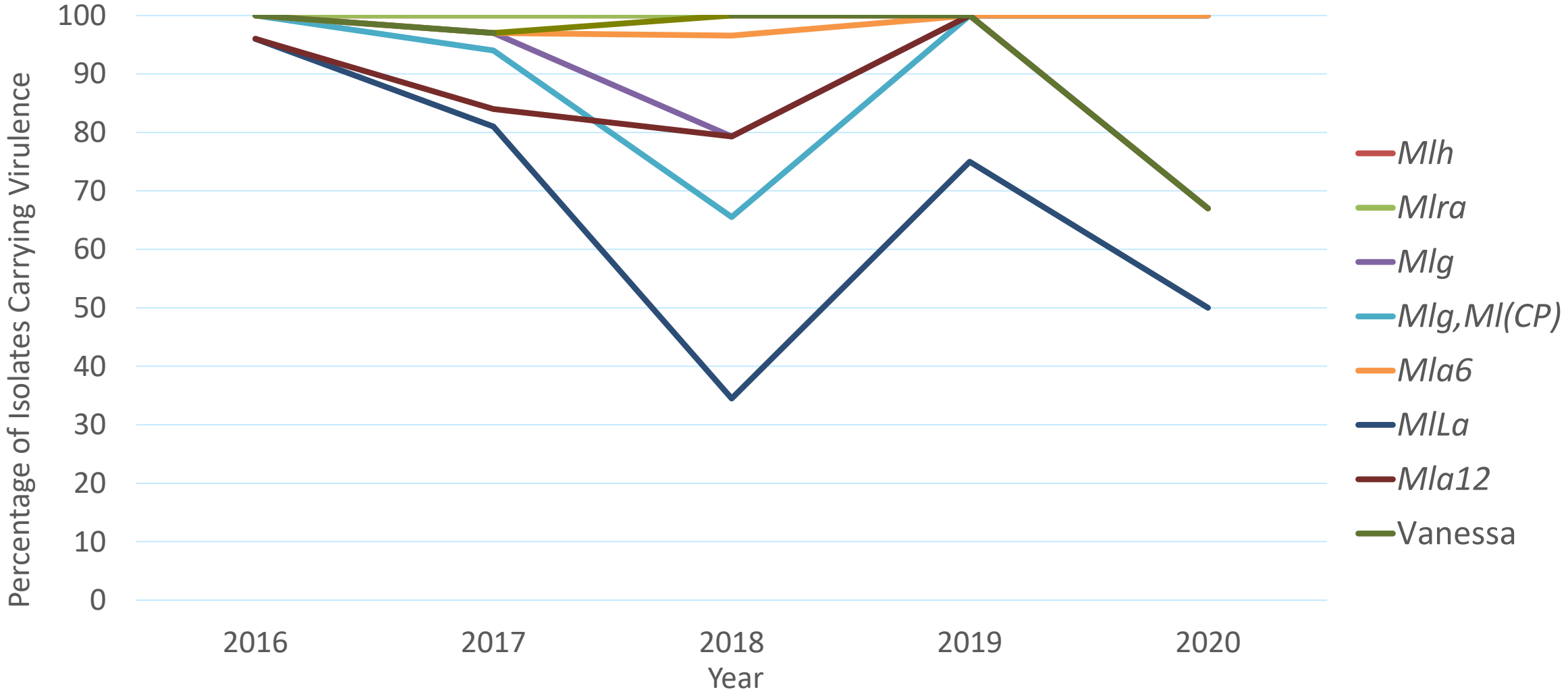
  0 = no sporulation, no mycelium

  4 = abundant sporulation

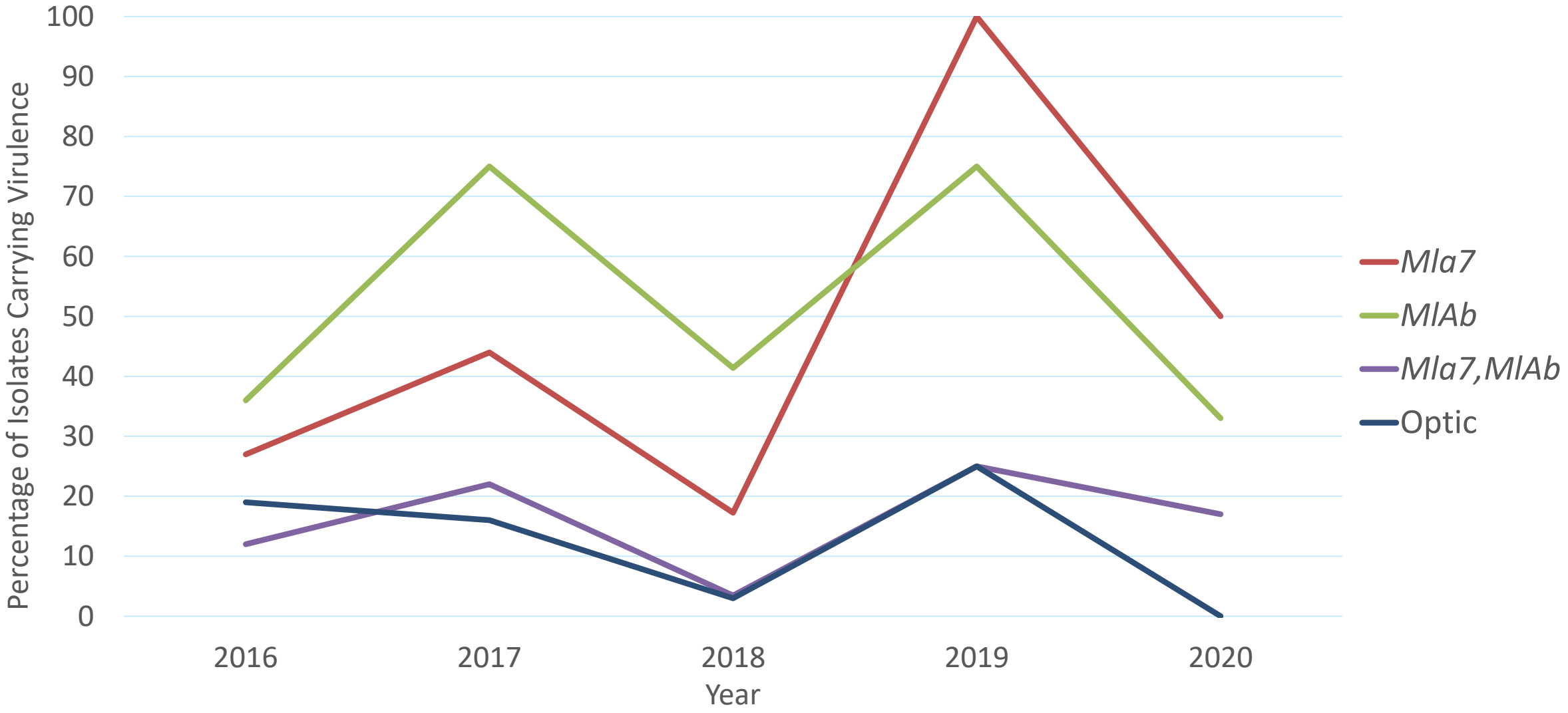
  abundant mycelium

- 2.75 and over is susceptible

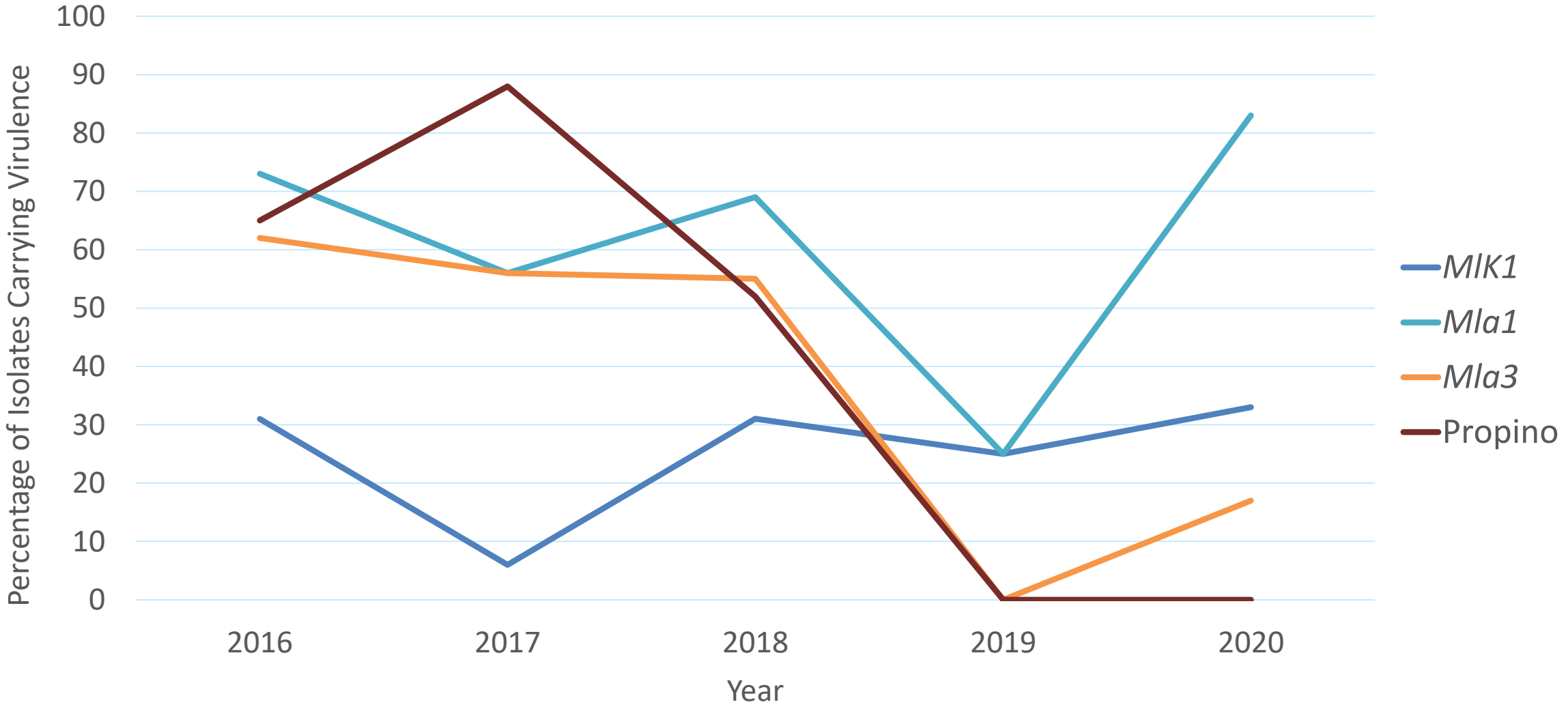
BPM Five Year Summary



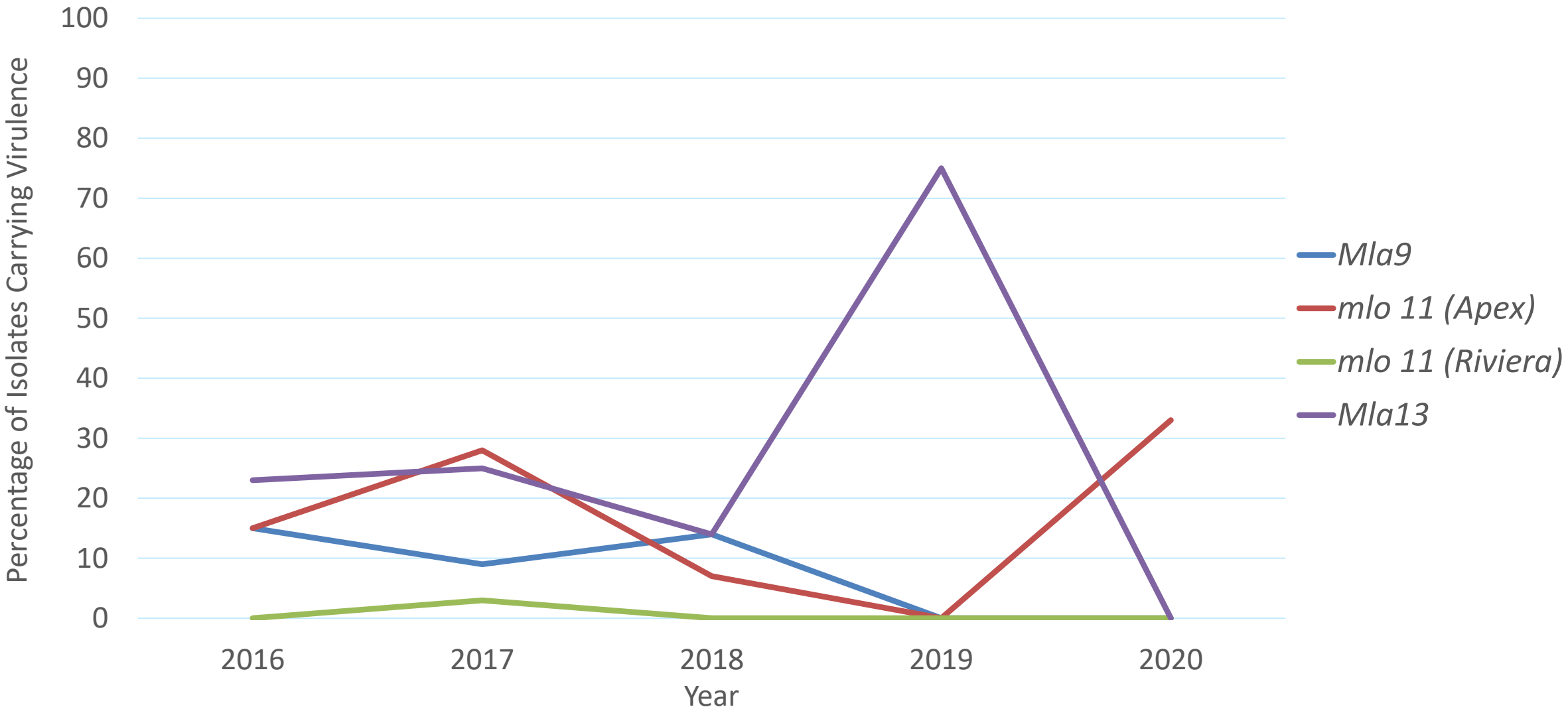
BPM Five Year Summary



BPM Five Year Summary



BPM Five Year Summary



Barley Mildew Differential Tests

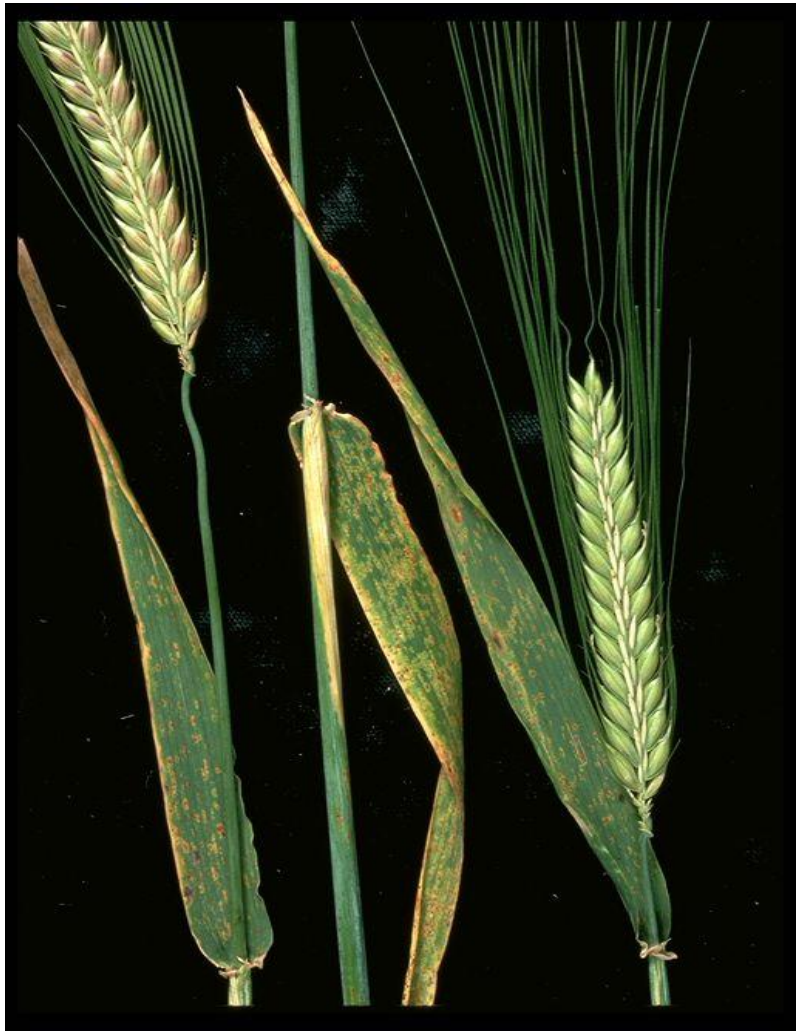
- 6 single pustule isolates tested from one sample
- Virulence for *Mlh, Mlra, Mlg, Ml(CP) and Mla6* was found in 100% of isolates
- Virulence for *Mla1* rose from 25% to 83%, virulence for *Mla3* also rose from 0% to 17%
- No virulence was detected for *Mla9, Mlo11 Riv, Mla13,* Optic and Propino

Barley Brown Rust

Amelia Hubbard

Barley Brown Rust

- Not surveyed in 2020 as part of the UKCPVS
- Included in 2021 RL inoculated trials programme
- Cultured 3 new isolates from spring barley trials in 2020
- Two have been selected for use in RL adult plant inoculated trials



BBR Differential Tests

Variety	BBR Factor	Rph Gene
Sudan	1	1
Peruvian	2	2
Simon	3	3
Gold	4	4
Quinn	5	2+5
Bolivia	6	2+6
Cebada Capa	7	7
Egypt 4	8	8
Hord 2596	9	9
Trumpf	10	12
Optic	10	

BBR Differential Test Results

- BBR 20/002

  1,2,3,4,8,10

- BBR 20/003

  1,2,3,4,6,8,9,10

UKCPVS 2020 Summary

- 2020 did see changes in the pathogen populations
- New/interesting isolates have been identified
- We are looking at these further and await our genotyping results for WYR

➢Send in samples when you see the disease

➢Unusual foci/epidemics could be first indication of something new

➢Please keep us updated on unusual sightings via email/phone

UKCPVS Sampling Instructions

UKCPVS

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

- Place leaf samples directly in a paper envelope, please do not use polythene bags – Wheat yellow and brown rust and wheat and barley mildew

- Send sample along with a copy of the sampling sheet to…

FREEPOST UKCPVS

- If using a stamp please send first class or next day delivery to

  UKCPVS, NIAB Park Farm, Villa Road, Impington, Cambs, CB24 9NZ

Further Information

- Annual report

  https://ahdb.org.uk/ukcpvs

- Recommended Lists

  https://ahdb.org.uk

- Global Rust Reference Centre

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

- Field Pathogenomics

  http://yellowrust.com

- Rustwatch

  http://agro.au.dk/forskning/projekter/rustwatch/

Acknowledgements

- AHDB
- APHA
- Judith Smith
- Trap Nursery providers
- Samplers -trials staff, breeders, farmers and agronomists

AHDB
AGRICULTURE & HORTICULTURE DEVELOPMENT BOARD

Animal & Plant Health Agency

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WHEAT RUST EARLY WARNING


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