Nutzung der Sortenresistenz zur Kontrolle von Getreiderosten

Kerstin Flath, Philipp Schulz

RUSTWATCH
WHEAT RUST EARLY WARNING

Ziele und Methoden

- Feldtests von >200 europäischen Weizensorten und Zuchtlinien aus 11 Ländern
- 5 Standorte (DK, UK, DE, IT, FR) sowie 3 Züchterstandorte (DE, SW, UK)
- Inokulation neuer Gelb-, Braun- und Schwarzrostrassen oder natürlicher Befall
- Bewertung % Befall und Konvertierung in 1-9 Skala
- Upload und Darstellung der Daten in Wheat Rust Toolbox

Standorte und Methoden

Trait	DK AU	UK NIAB	DE JKI	IT AS.A.R.	FR ARVALIS	DE BREUN	SW Lantm.	UK RAGT
Number of replications	2	2	3	2	2	1	1	2
Artificial inoculations	yes	yes	yes	no	no	no	no	no
Number of scoring dates	3	3	6	10	2	2	2	2
Diseases (YR, LR, SR)	YR	YR	YR, SR	YR, LR, SR	YR, LR	YR, LR	YR	YR
No. of varieties tested	142	205	180	247	206	216	200	223

Boniturmethode

Wheat Rust Toolbox

Home | Wheat Rust samples | Trials | Country overview | Partners

Scale documentation

Simple scale for assessment of foliar disease in wheat, translating to typical assessment scale used in breeding. Midpoint in the scale is 5.
In case more detailed assessments are required, mid-point values can be used, e.g., '3' as midpoint between 1 and 5 and 7,5 as midpoint between 5 and 10.

Disease severity (in %)	Breeder's scale	Interval of OBS	Color gradient	Symptoms on WHEAT crop/plot level (indicative)			
				Leaf Rust	Yellow Rust	Powdery Mildew	Septoria/Tan spot..
0	1	0		No attack			
0,1 (trace)	2	0<x<0,3		Few postules per plant - may be uneven	Few stripes per plant - may be uneven (foci)	Few colonies per plant - may be uneven	Max one spot per plant
0,5	3	0,3<=x<0,75		Few postules per tiller - may be uneven	Few stripes per tiller	Few colonies per tiller - may be uneven	Max one spot per tiller
1	4	0,75<=x<3		Several postules per tiller on lower leaves	Several lesions/stripes per tiller on lower leaves	Several colonies per tiller on lowewr leaves	Few spots per plant on lower leaves
5	5	3<=x<7,5		Lower leaves up to 10-25% coverage	Leaves with overlapping lesions	Lower leaves up to 10-25% coverage	Lower leaves up to 10-25% coverage
10	6	7,5<=x<17,5		Lower leaves typically 25% coverage or more			
25	7	17,5<=x<37,5		Lower leaves 50% coverage or more			
50	8	37,5<=x<75		Half of leaves senescent, lower leaves 75-100% coverage			
>75	9	x>=75		Almost no green leaf area left			

Ergebnisse (für alle zugänglich)

RUSTWATCH WHEAT RUST EARLY WARNING https://agro.au.dk/forskning/projekter/rustwatch/

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Field nurseries

About the Field Nurseries

Approximately 250 winter wheat varieties and breeding lines were tested for susceptibility to novel emerging races of yellow rust (YR), leaf rust (LR) and stem rust (SR) under field conditions in both 2019 and 2020. The nurseries were conducted in DK (AU), UK (NIAB), DE (JKI), IT (AS.A.R), FR (ARVALIS) and at three locations of the breeders' network in DE (BREUN), SW (LANTMÄNNEN) and UK (RAGT). The methodology used for this is described in the milestone report M3.13 'Sharing protocols between partners for evaluating adult plant resistance of varieties and breeding lines to rust diseases under field conditions'.

The results of the 2019 and 2020 field nurseries are published in two separate reports. The 2020 data were analysed using the Field Nursery Data Management System (FNDMS), a collaborative effort between WP3 and WP4. This system, stores the data, do quality control, analyses and visualises the data.

Below you will find output visualisation tools from the Field Nursery Data Management System and finally links to reports and the user guide and documentation report about proper use of the tools.

Summary results as severity scores across cultivars by disease, year, locations and seed provider

Cultivar map with severity scores by disease, year, seed provider and cultivar

Disease pressure by environment

Reports and user guide to tools

- Field Nursery Data Management System, User guide and documentation
- Deliverable report D3.6 covering the analysis of results from 2020

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RUSTWATCH
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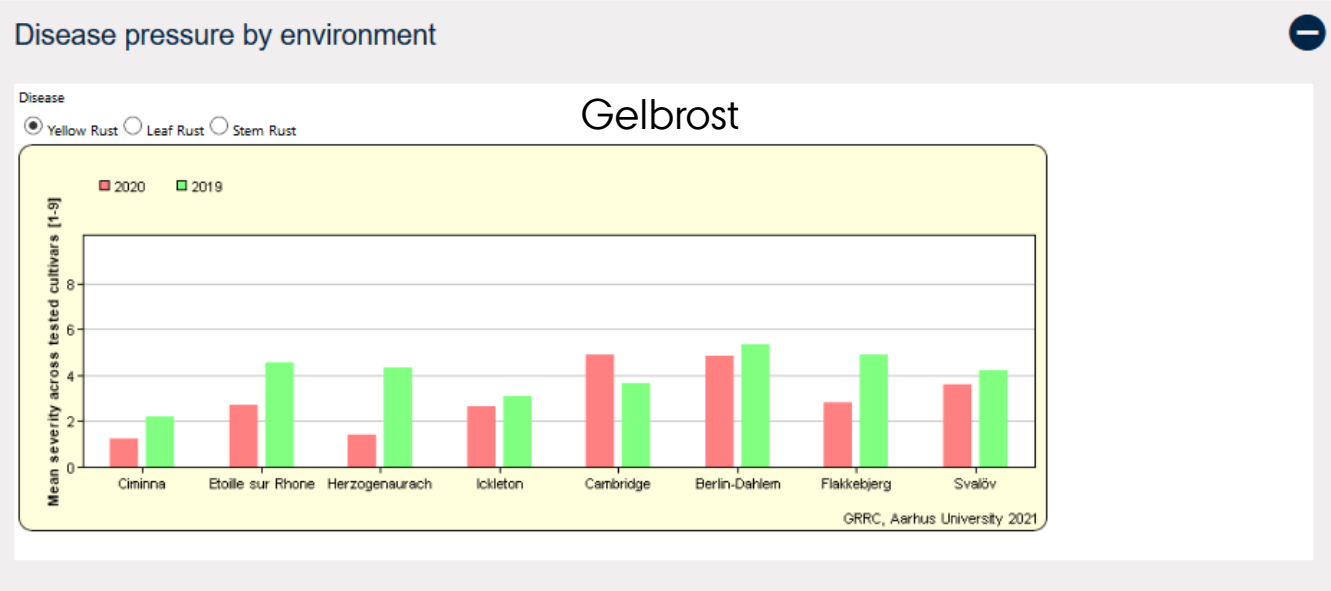

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A European early-warning system for wheat rust

RUSTWATCH

This project has received funding from the European Union's Horizon 2020 research and innovation program *under grant agreement No 773311.*

Grant Agreement: 773311
Call: Research and approaches for emerging diseases and pests in plants and terrestrial livestock
Type of action: Research and Innovation action

Date: 15-01-2021

DELIVERABLE NUMBER	D3.6
DELIVERABLE TITLE	Field assessment of wheat varieties and breeding lines for susceptibility to unusual rust races 2020
RESPONSIBLE AUTHOR	Kerstin Flath, Julius Kühn-Institut (JKI)

Ergebnisse (für alle zugänglich)

Sorten mit geringer Anfälligkeit für Gelbrost (YR), Braunrost (LR) und Schwarzrost (SR)

(Mean=mittlerer Krankheitsbefall 1-9-Skala, SD=Standardabweichung, N=Anzahl Umwelten)

Cultivar	Seed provider	YR Mean	YR SD	YR N	LR Mean	LR SD	LR N	SR Mean	SR SD	SR N	YR+LR+SR Mean
Stigg	NIAB	1,40	0,55	5	1,00	0,00	3	1,75	1,06	2	1,38
Momentum	SEGES	0,87	0,30	5	1,83	1,04	3	1,50		1	1,40
LG Armstrong	ARVALIS	2,10	1,07	8	1,00	0,00	3	1,50	0,71	2	1,53
Aureo	AS.A.R.	2,31	1,62	6	1,00	0,00	2	1,67	0,94	2	1,66
Acorazado	INTIA	1,83	1,18	5	2,17	2,02	3	1,00		1	1,67
Claudio	AS.A.R.	2,24	1,47	7	1,33	0,58	3	1,67	0,94	2	1,75
Forcali	ARVALIS	2,00	1,15	4	2,33	2,31	3	1,00		1	1,78
Iride	AS.A.R.	2,42	2,10	6	1,25	0,35	2	1,67	0,94	2	1,78
RGT Cesario	ARVALIS	1,46	0,56	8	2,33	2,31	3	1,67	0,94	2	1,82

Zusammenfassung und Schlussfolgerungen

- Feldtest von 250 Winterweizensorten gegen neue Rassen des Gelb,- Braun- und Schwarzrostes.
- Datenanalyse mittels „Field Nursery Data Management System“ (FNDMS).
- 88% der Sorten zeigten geringe Anfälligkeit gegen Gelbrost, 97% gegen Braunrost und nur 26% gegen Schwarzrost.
- Ein höherer Infektionsdruck in Prüfungen mit künstlicher Gelb- und Braunrost-Inokulation erlaubt i.d.R. eine zuverlässige Selektion resistenter Sorten.
- Testung der Schwarzrostanfälligkeit erfolgte sowohl mit (JKI Dahlem) als auch ohne (AS.A.R. Sizilien) künstliche Inokulationen und ergab jeweils einen Anteil von 26% resistenter Sorten -> Selektion auch unter optimalen natürlichen Befallsbedingungen möglich.
- Hoher Anteil gelbrostresistenter Sorten verdeutlicht erfolgreiche Züchtung, bisher jedoch wenig über genetische Grundlage dieser Resistenzen bekannt.
- Risiko, dass Sorten mit gleicher Resistenzgrundlage bei Anpassung der Pathogenpopulation zur selben Zeit anfällig werden.
- Dieser Aspekt wird in AP3 (Wirtsresistenz) näher untersucht.