

Nyt om gulrust i hvede

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www.wheatrust.org



AARHUS UNIVERSITET

Værste angreb af gulrust i 30 år

Ikke siden 1989-1990 har der været så kraftige angreb af gulrust. Svampen kan koste 70 procent udbyttetab.

18. jun 2019 | 10:29 | 

Skrevet af [Lars Kelstrup](#) | 



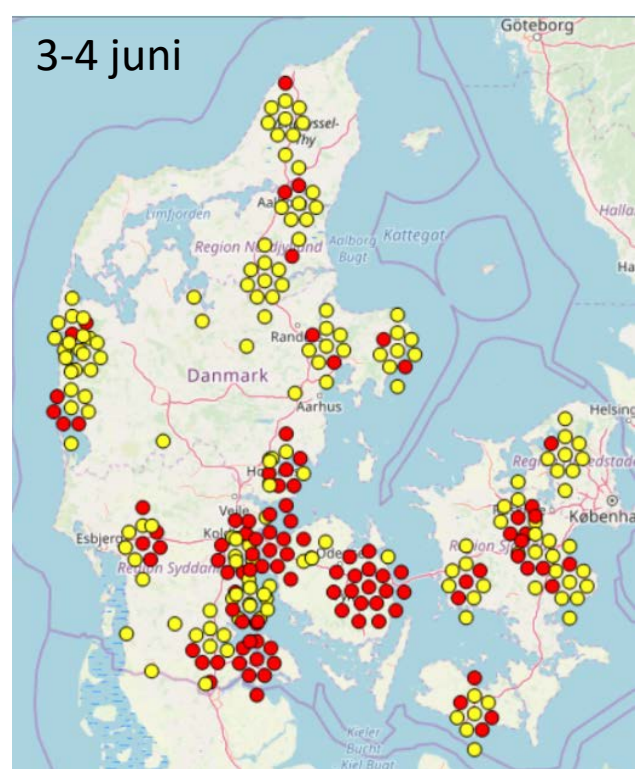
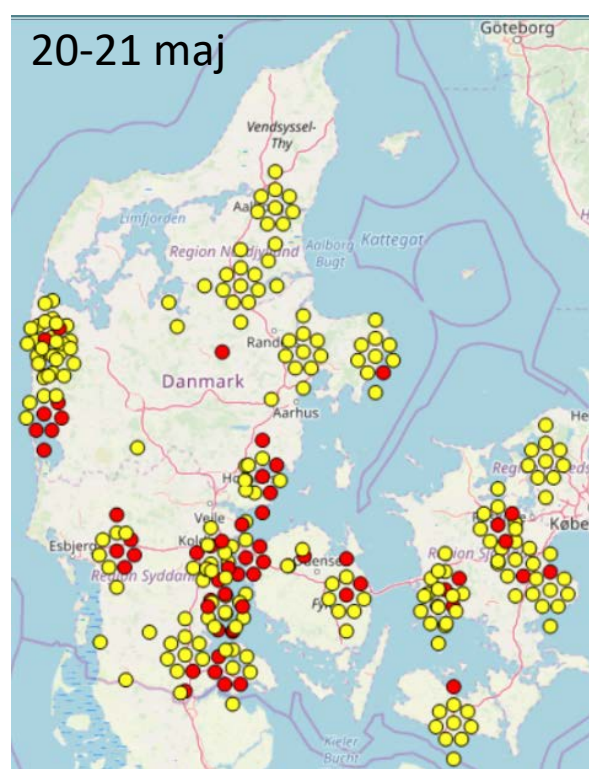
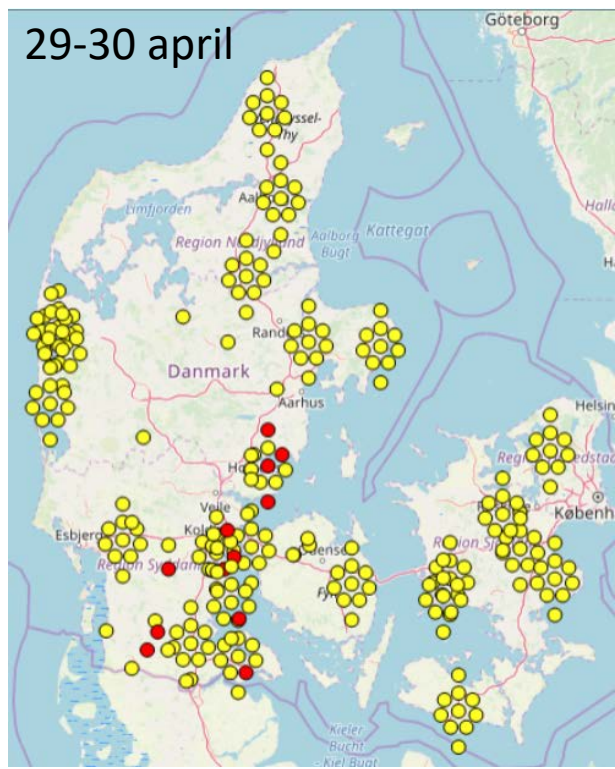
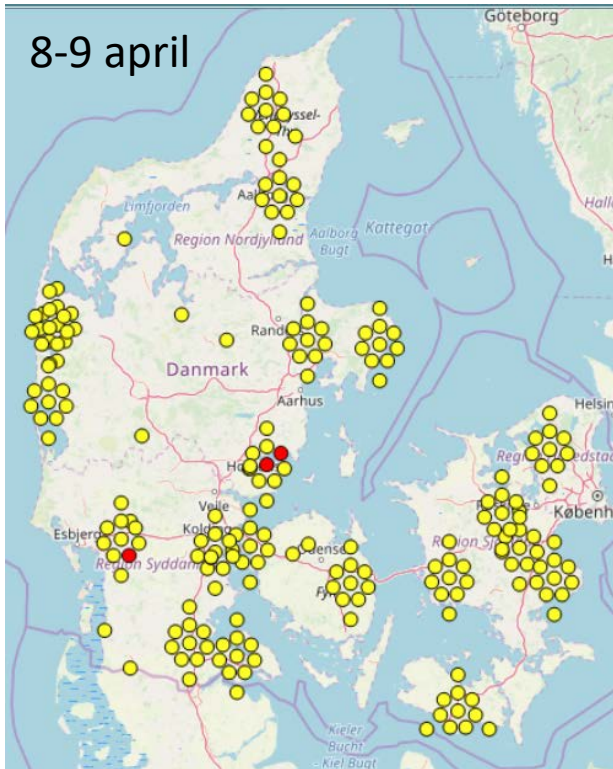
Gulrust kan koste store udbyttetab i modtagelige sorter. På billedet ses en sprøjtemist i en modtagelig sort.

Foto: GCN.

Gulrust var det store samtaleemne blandt planteavlerne i 2019

- Overraskende
- Voldsomt
- Store forskelle ml. sort, lokalitet og ‘behandling’

Bekæmpelsesbehov i vinterhvede jf. Registreringsnet (alle sorter)



Mogens Støvring Hovmøller



Registreringsnet

Velkommen til registreringsnettet

Det er muligt, at se resultater uden login.

DANMARKSKORT, PCT. ANGREBNE PLANTER

- Bekæmpelsesbehov (gul = intet bekæmpelsesbehov, rød = bekæmpelsesbehov)
- Registrerede værdier
- Vækststadie

TABEL 26. Årsvariation i bruttomerudbytte for svampebekæmpelse i vinterhvede¹⁾

Vinterhvede	2016		2017		2018		2019	
	Antal forsøg	Merudb., hkg pr. ha	Antal forsøg	Merudb., hkg pr. ha	Antal forsøg	Merudb., hkg pr. ha	Antal forsøg	Merudb., hkg pr. ha
Benchmark	12	10,7	17	15,3	8	1,9	15	32,5
Elixer	6	7,7	4	8,9	3	1,1	6	11,0
Graham	6	12,7	4	14,4	4	4,0	6	12,2
Informer	6	8,3	4	10,0	5	0	14	9,7
Kalmar	6	12,7	9	17,7	7	4,8	13	21,2
KWS Lili	7	14,7	4	27,2	3	4,6	6	17,7
KWS Zyatt	6	10,4	4	17,2	3	0,7	5	21,1
Sheriff	7	8,1	19	11,4	7	1,8	15	17,0
Torp	18	13,4	23	18,6	13	2,1	13	13,0
Vægtet gennemsnit ²⁾		11,4		15,6		2,3		18,0

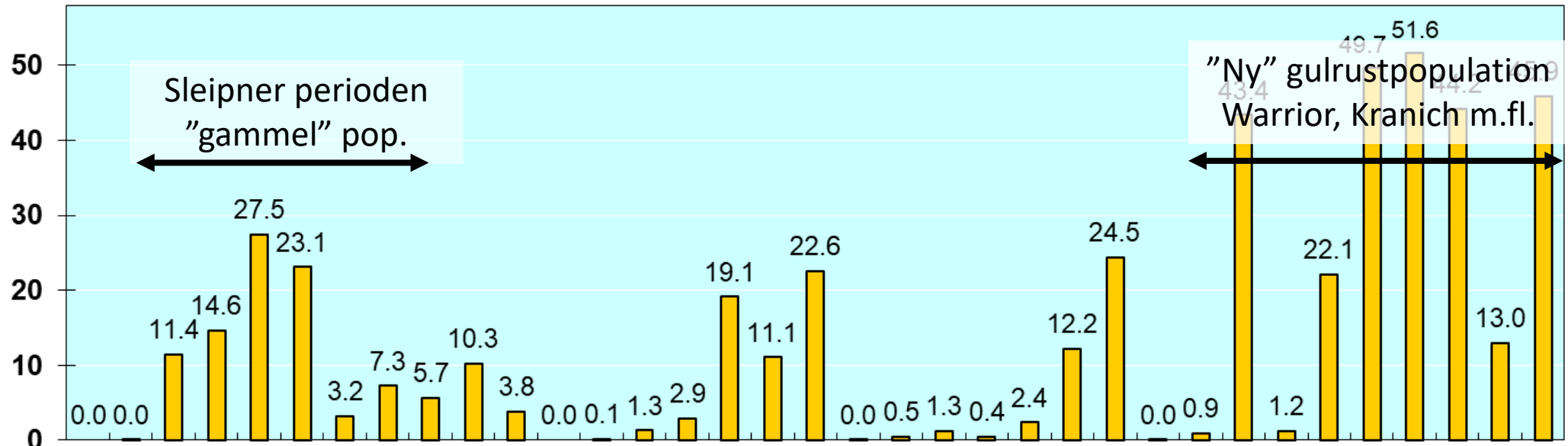
¹⁾ Se tekst.

²⁾ I forhold til antallet af forsøg.

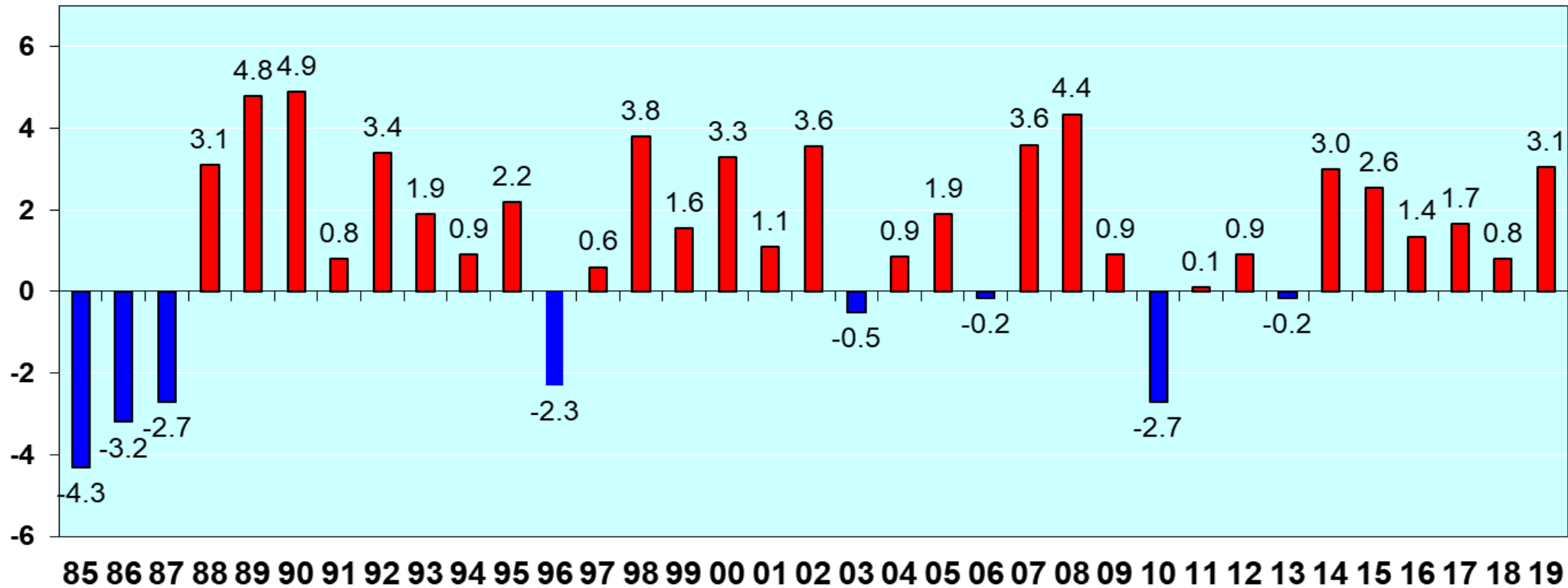
Den farlige "rust" cocktail (vintersæd)

- Tidlig såning
- Mild vinter & vekslende vejr forår (nattedug)
- Sort x race "match"
- Lavt niveau af "voksenplante" resistens
- Stort areal med rustmodtagelige sorter (DK/nabolande)

Rust Anja gns (%)



Gns temp. Jan-Feb (C)



Den farlige ”rust” cocktail (vintersæd)

- Nye racer opstår løbende – typisk 1-2 racer/år i Danmark, en del uden betydning, andre stor betydning
- Forbedrede muligheder for at diagnosticere nye racer
 - DNA-metoder: Hurtig, mange markører, slægtskab og oprindelse af nye racer
 - Virulens-test: Test på panel af sorter med (kendt) resistens, tidskrævende, men info om epidemi-potentiale på relevante sorter
- Omfattende internationalt samarbejde
 - Etablering af Det Globale Rustcenter (2008) v/ AU-Flakkebjerg (www.wheatrust.org)
 - Større geografisk dækning af indsamlede rustprøver
 - Databaser, on-line værktøjer, IT teknologi

Genetic groups on single locations

- › Home
- ›› About GRRC
- ›› Research Projects
- › Submission of isolates
- ›› Yellow Rust Tools - maps and charts
 - › Genetic groups on single locations
 - › Genetic groups frequency map

Genetic groups and races

Genetic group	Race	Pattern
PstS2	PstS2,v27	[-,2,-,-,-,6,7,8,9,-,-,-,25,27,-,-,-]
	PstS2	[-,2,-,-,-,6,7,8,9,-,-,-,25,-,-,-,-]
	PstS2,v1	[1,2,-,-,-,6,7,8,9,-,-,-,25,-,-,-,-]
	PstS2,v1,v27	[1,2,-,-,-,6,7,8,9,-,-,-,25,27,-,-,-]
	PstS2,v10	[-,2,-,-,-,6,7,8,9,10,-,-,25,-,-,-,-]
	PstS2,v10,v27	[-,2,-,-,-,6,7,8,9,10,-,-,25,27,-,-,-]
	PstS2,v3	[-,2,3,-,-,6,7,8,9,-,-,-,25,-,-,-,-]
	PstS2,v3,v27	[-,2,3,-,-,6,7,8,9,-,-,-,25,27,-,-,-]
PstS7	Warrior	[1,2,3,4,-,6,7,-,9,-,-,17,25,-,32,Sp,Amb]
PstS8	Kranich	[1,2,3,-,-,6,7,8,9,-,-,17,25,-,32,-,Amb]
PstS10	Warrior(-)	[1,2,3,4,-,6,7,-,9,-,-,17,25,-,32,Sp,-]
	Kalmar	[1,2,3,4,-,6,7,-,9,-,-,17,25,-,32,Sp,-]
	Benchmark	[1,2,3,4,-,6,7,-,9,-,-,17,25,-,32,Sp,-]
PstS13	Triticale2015	[-,2,-,-,-,6,7,8,9,-,-,-,-,Sp,-]
PstS14	PstS14	[-,2,3,-,-,6,7,8,9,-,-,17,-,25,-,32,Sp,-]
PstS15	PstS15	[1,2,3,-,-,6,7,8,9,-,-,17,25,-,32,-,Amb]

Year: 2019

Continent: Europe

Country: All countries selected

Genetic group: All
 PstS2
 PstS7
 PstS8
 PstS10
 PstS13
 PstS14
 PstS15

Show

Genetic group: 188 samples from 112 locations



Genetic groups on single locations

- > Home
- >> About GRRC
- >> Research Projects
- > Submission of isolates
- >> Yellow Rust Tools - maps and charts
 - > Genetic groups on single locations
 - > Genetic groups frequency map

Genetic group	Race	Pattern
PstS2	PstS2,v27	[-,2,--,6,7,8,9,--,25,27,--,-]
PstS2	PstS2	[-,2,--,6,7,8,9,--,25,--,-,-]
PstS2,v1	PstS2,v1	[1,2,--,6,7,8,9,--,25,--,-,-]
PstS2,v1,v27	PstS2,v1,v27	[1,2,--,6,7,8,9,--,25,27,--,-]
PstS2,v10	PstS2,v10	[-,2,--,6,7,8,9,10,--,25,--,-,-]
PstS2,v10,v27	PstS2,v10,v27	[-,2,--,6,7,8,9,10,--,25,27,--,-]
PstS2,v3	PstS2,v3	[-,2,3,--,6,7,8,9,--,25,--,-,-]
PstS2,v3,v27	PstS2,v3,v27	[-,2,3,--,6,7,8,9,--,25,27,--,-]
PstS7	Warrior	[1,2,3,4,-,6,7,-,9,--,17,25,-,32,Sp,Amb]
PstS8	Kranich	[1,2,3,--,6,7,8,9,--,17,25,-,32,-,Amb]
PstS10	Warrior(-)	[1,2,3,4,-,6,7,-,9,--,17,25,-,32,Sp,-]
PstS10	Kalmar	[1,2,3,4,-,6,7,-,9,--,17,25,-,32,Sp,-]
PstS10	Benchmark	[1,2,3,4,-,6,7,-,9,--,17,25,-,32,Sp,-]
PstS13	Triticale2015	[-,2,--,6,7,8,9,--,--,Sp,-]
PstS14	PstS14	[-,2,3,--,6,7,8,9,--,17,-,25,-,32,Sp,-]
PstS15	PstS15	[1,2,3,--,6,7,8,9,--,17,25,-,32,-,Amb]

> Publications

Year
2019

Continent
Europe

Country
All countries selected

Genetic group  

All

 PstS2

 PstS7

 PstS8

 PstS10

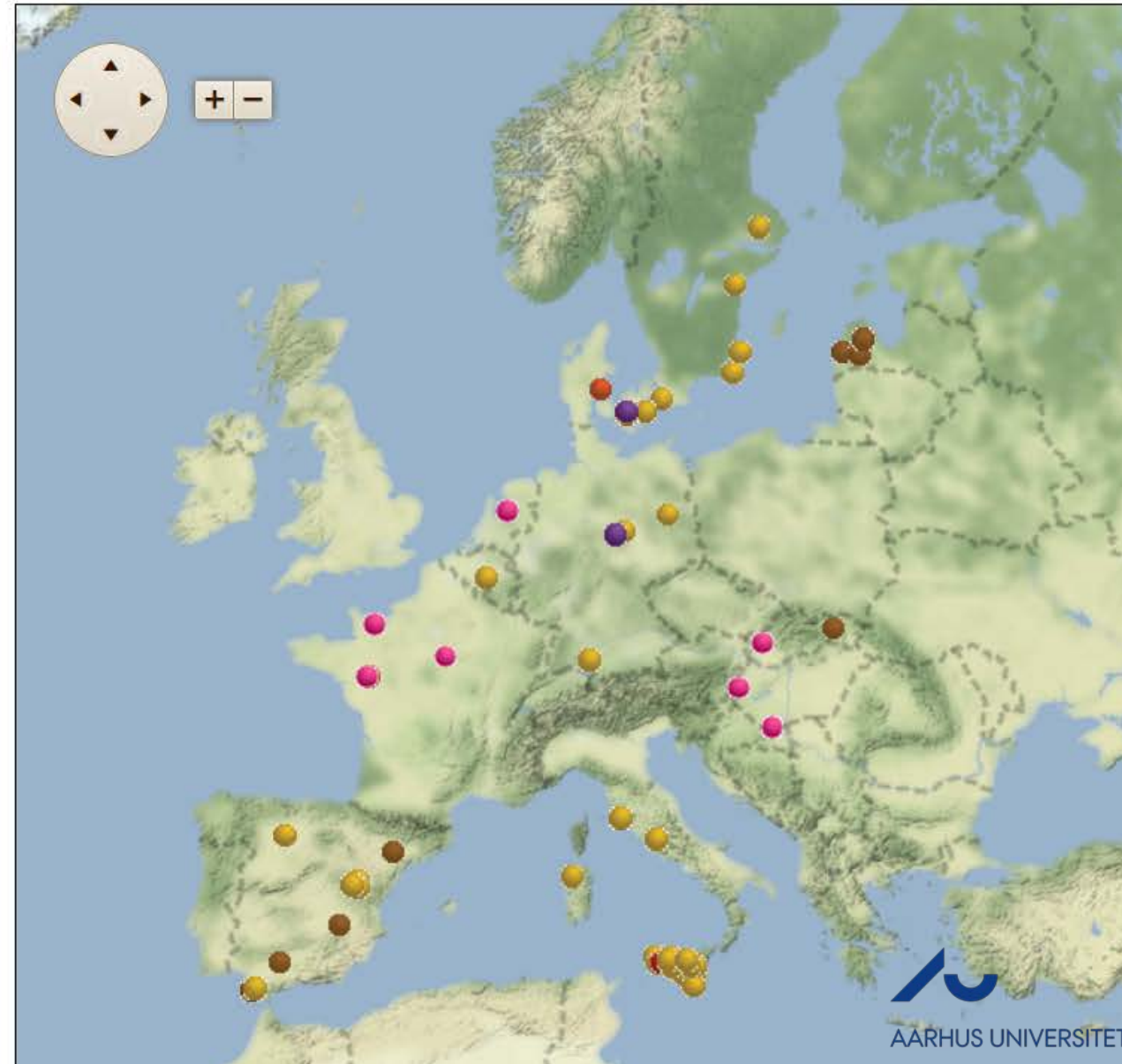
 PstS13

 PstS14

 PstS15

Show

Genetic group: 99 samples from 72 locations



Genetic groups on single locations

- › Home
- ›› About GRRC
- ›› Research Projects
- › Submission of isolates
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 - › Genetic groups on single locations
 - › Genetic groups frequency map

Genetic group	Race	Pattern
PstS2	PstS2,v27	[-,2,---,6,7,8,9,---,25,27,---]
	PstS2	[-,2,---,6,7,8,9,---,25,---]
	PstS2,v1	[1,2,---,6,7,8,9,---,25,---]
	PstS2,v1,v27	[1,2,---,6,7,8,9,---,25,27,---]
	PstS2,v10	[-,2,---,6,7,8,9,10,---,25,---]
	PstS2,v10,v27	[-,2,---,6,7,8,9,10,---,25,27,---]
	PstS2,v3	[-,2,3,---,6,7,8,9,---,25,---]
PstS2,v3,v27	[-,2,3,---,6,7,8,9,---,25,27,---]	
PstS7	Warrior	[1,2,3,4,-,6,7,-,9,---,17,25,-,32,Sp,Amb]
PstS8	Kranich	[1,2,3,---,6,7,8,9,---,17,25,-,32,-,Amb]
PstS10	Warrior(-)	[1,2,3,4,-,6,7,-,9,---,17,25,-,32,Sp,-]
	Kalmar	[1,2,3,4,-,6,7,-,9,---,17,25,-,32,Sp,-]
	Benchmark	[1,2,3,4,-,6,7,-,9,---,17,25,-,32,Sp,-]
PstS13	Triticale2015	[-,2,---,6,7,8,9,---,---,Sp,-]
PstS14	PstS14	[-,2,3,---,6,7,8,9,---,17,-,25,-,32,Sp,-]
PstS15	PstS15	[1,2,3,---,6,7,8,9,---,17,25,-,32,-,Amb]

Year: 2019

Continent: Europe

Country: All countries selected

Genetic group: All
 PstS2
 PstS7
 PstS8
 PstS10
 PstS13
 PstS14
 PstS15

Show

Genetic group: 4 samples from 3 locations



- › Publications

Genetic groups frequency map

Continent
 Africa & West/Central Asia

Year
 Genetic group

- All
- 2019
- 2018
- 2017
- 2016
- 2015
- 2014
- 2013
- 2012
- 2011

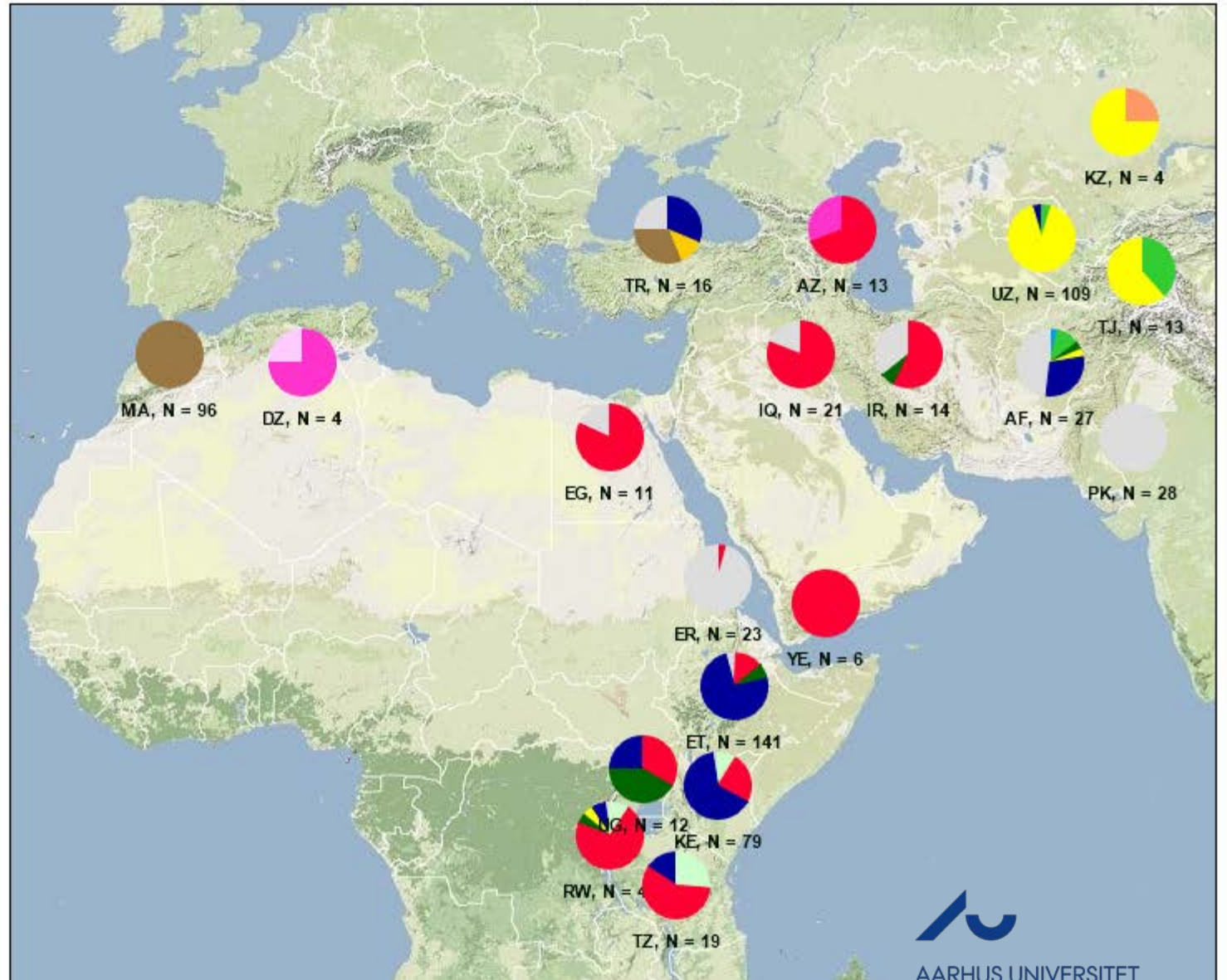
- PstS0
- PstS1
- PstS2
- PstS4
- PstS5
- PstS6
- PstS7
- PstS9
- PstS10
- PstS11
- PstS13
- PstS14
- Other

Show

Genetic group	Race	Pattern
PstS0	Brigadier	[1,2,3,-,-,-,-,-,9,-,-,17,25,-,-,-,-]
	Brigadier,v4	[1,2,3,4,-,-,-,-,9,-,-,17,25,-,-,-,-]
	Madrigal_Lynx	[1,2,3,-,-,6,-,-,9,-,-,17,25,-,-,-,-]
	Madrigal_Lynx,v4	[1,2,3,4,-,6,-,-,9,-,-,17,25,-,-,-,-]
	Robigus	[1,2,3,4,-,-,-,-,9,-,-,17,25,-,-,32,-,-]
	Robigus,v7	[1,2,3,4,-,-,7,-,9,-,-,17,25,-,-,32,-,-]
	Solstice_Oakley	[1,2,3,4,-,6,-,-,9,-,-,17,25,-,-,32,-,-]
	Solstice_Oakley,v7	[1,2,3,4,-,6,7,-,9,-,-,17,25,-,-,32,-,-]
	Tulsa	[-,-,3,4,-,6,-,-,-,-,-,25,-,32,-]
	SAM2010	[-,2,3,4,-,6,7,-,-,-,-,-,25,-,-,-,-]
	CL2010	[1,2,3,4,-,6,7,-,9,-,-,17,25,27,-,-,-]
PstS1	PstS1,v17	[-,2,-,-,-,6,7,8,9,-,-,17,25,-,-,-,-]
PstS2	PstS2	[-,2,-,-,-,6,7,8,9,-,-,-,25,-,-,-,-]
	PstS2,v1	[1,2,-,-,-,6,7,8,9,-,-,-,25,-,-,-,-]
	PstS2,v27	[-,2,-,-,-,6,7,8,9,-,-,-,25,27,-,-,-]
	PstS2,v1,v27	[1,2,-,-,-,6,7,8,9,-,-,-,25,27,-,-,-]
	PstS2,v10	[-,2,-,-,-,6,7,8,9,10,-,-,25,-,-,-,-]
	PstS2,v10,v27	[-,2,-,-,-,6,7,8,9,10,-,-,25,27,-,-,-]
	PstS2,v3	[-,2,3,-,-,6,7,8,9,-,-,-,25,-,-,-,-]
	PstS2,v3,v27	[-,2,3,-,-,6,7,8,9,-,-,-,25,27,-,-,-]
PstS4	Triticale2006	[-,2,-,-,-,6,7,8,-,10,-,-,-,-,-,*]
PstS5	PstS5	[1,2,3,4,-,6,-,-,9,-,-,-,25,-,32,-,Amb]
	PstS5,v17	[1,2,3,4,-,6,-,-,9,-,-,-,17,25,-,32,-,Amb]
PstS6	PstS6	[1,2,-,-,-,6,7,-,9,-,-,-,17,-,27,-,-,-]
PstS7	Warrior	[1,2,3,4,-,6,7,-,9,-,-,17,25,-,32,Sp,Amb]
PstS9	PstS9	[1,2,3,4,-,6,-,-,9,-,-,-,25,27,32,-,Amb]
	PstS9,v17	[1,2,3,4,-,6,-,-,9,-,-,-,17,25,27,32,-,Amb]
PstS10	Kalmar	[1,2,3,4,-,6,7,-,9,-,-,17,25,-,32,Sp,-]
	Warrior(-)	[1,2,3,4,-,6,7,-,9,-,-,17,25,-,32,Sp,-]
	Benchmark	[1,2,3,4,-,6,7,-,9,-,-,17,25,-,32,Sp,-]
PstS11	PstS11	[-,2,-,4,-,6,7,8,-,-,17,-,27,32,-,-]
PstS13	Triticale2015	[-,2,-,-,-,6,7,8,9,-,-,-,-,-,Sp,-]
PstS14	PstS14	[-,2,3,-,-,6,7,8,9,-,-,17,-,25,-,32,Sp,-]
Other	Other	

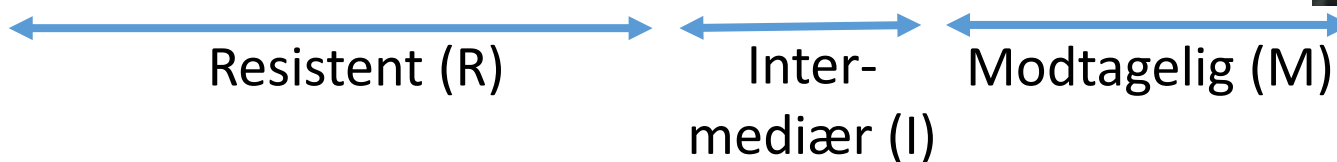
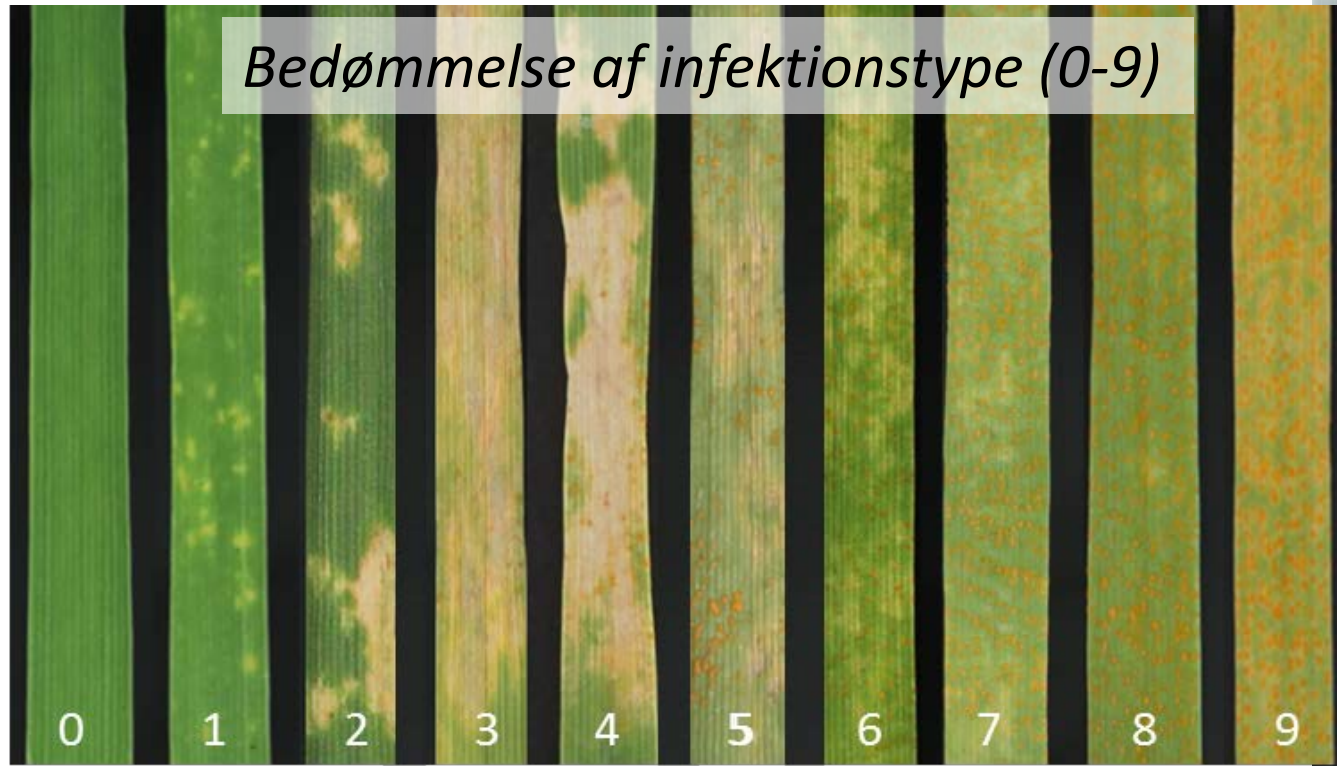
Genetic group frequency distribution

Help



Sorternes rustmodtagelighed

- Smitteforsøg med 'småplanter' (1-2 blade) i væksthus



Sorternes rustmodtagelighed

- Smitteforsøg med 'småplanter' (1-2 blade) i væksthhus
- Smitteforsøg på 'voksne' planter i marken (kun racer indsamlet i Danmark)

Bedømmelse af % angrebet
bladareal 3-4 x maj-juni



Sorternes rustmodtagelighed

Sort	Kalmar race		
	Væksthus	Markforsøg (% dækning)	
		IT	03-06-2019
Anja	M	5.00	25.00
Oakley	M	7.50	37.50
Substance	M	12.50	33.33
Benchmark	I	3.80	12.7*
Elixer	M	0.68	3.00
Graham	I	0.00	0.00
Informer	R	0.00	0.00
Kalmar	M	3.67	6.67
KWS Lili	M	0.00	0.03
Sheriff	M	0.05	2.33
Torp	M	0.00	0.33

Væksthus IT: R: resistent; I: Intermediær; M: modtagelig

* Smitte fra andre racer i forsøget eller "udefra"

Sorternes rustmodtagelighed

Sort	Kalmar race			Kranich race		
	Væksthus	Markforsøg (% dækning)		Væksthus	Markforsøg (% dækning)	
		IT	03-06-2019		13-06-2019	IT
Anja	M	5.00	25.00	M	10.00	29.17
Oakley	M	7.50	37.50	M	12.50	41.67
Substance	M	12.50	33.33	M	9.17	33.33
Benchmark	I	3.80	12.7*	M	3.67	20.0*
Elixer	M	0.68	3.00	M	0.02	3.67
Graham	I	0.00	0.00	M	0.23	10.83
Informer	R	0.00	0.00	I	0.00	0.20
Kalmar	M	3.67	6.67	I	0.53	4.5*
KWS Lili	M	0.00	0.03	M	0.05	5.00
Sheriff	M	0.05	2.33	R	0.05	3.6*
Torp	M	0.00	0.33	R	0.00	0.00

Væksthus IT: R: resistent; I: Intermediær; M: modtagelig

* Smitte fra andre racer i forsøget eller "udefra"

Modtagelighedsgrupper 2020 (SortInfo)

Sort	Certificeret udsæd (t)	Gulrust	Meldug	Septoria	Fusarium
Informer	19,700	0	1	1	2
Kvium	9,882	1	1	2	3
Sheriff	9,859	3	1	2	1
KWS Extase	4,793	1	1	1	2
Graham	4,490	1	2	2	2
Benchmark	4,484	4	2	3	1
Drachmann	3,723	3	0	2	2
Torp	2,894	2	3	3	3

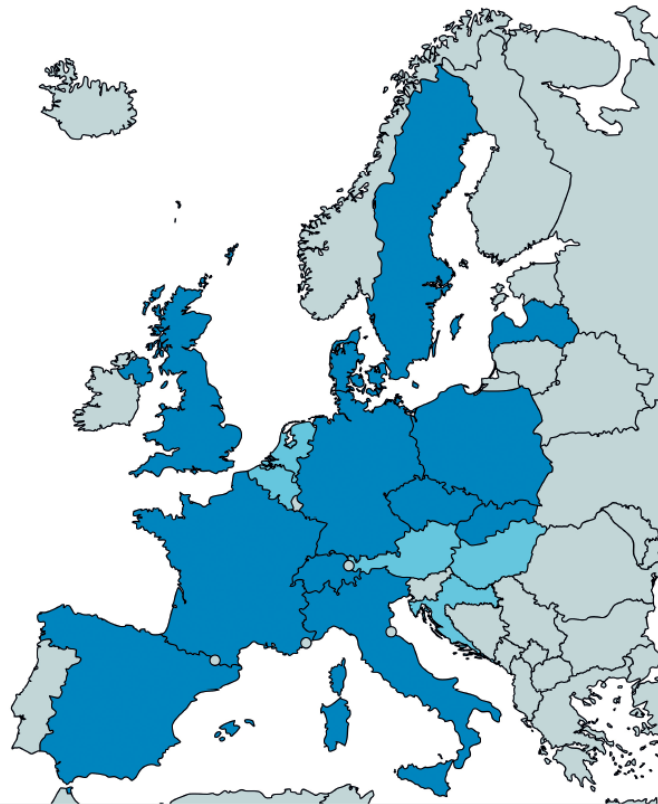
0: ikke modtagelig, 1: svagt modtagelig, 2: modtagelig, 3: stærkt modtagelig, 4: ekstrem modtagelig

Resume gulrust 2019

- Smittetryk: Smitte etableret efterår/vinter – kombineret med mild vinter
- Vekslede vejr april-maj: Gode forhold for sporespredning kombineret med hyppig nattedug
- Sort x race "match": Mest dyrkede sorter stærkt modtagelige
- 2020 sæson: Store ændringer i sortsvalget, fire sorter i top-5 er "svagt" eller "ikke-modtagelige"
- Varsling fremadrettet: "Vi kan gøre det bedre"



- › Home
- ›› About the project
- › Newsletter
- ›› Reports, articles presentations and protocols
- ›› Case Study Regions



Netværk med 24 partnere fra 13 lande

- Forskning
- Planteforædling
- Planteavlslrådgivning
- Sortsafprøvning
- IPM baseret bekæmpelse

<https://agro.au.dk/forskning/projekter/rustwatch/>

Resultater og informationssystemer som præsenteres i dette indlæg er finansieret af forskningsråd og fonde jf. logoer som er vist nederst på siden, herunder EU H2020 programmet RustWatch (grant agreement 773311)

Key collaborators

- R. Singh, CIMMYT MX
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- Y. Jin, L.Szabo, CDL-Minnesota, US
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- Rust diagnostic labs FR (C. Pope), DE (K. Flath), UK (S. Holdgate), PL (P. Czembor), +
- A. Berlin, J. Yuen, Uppsala University (S)
- J.K.M. Brown, C. Uauy, D. Saunders, JIC (UK)
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- H. Thordal-Christensen (DK, KU)
- Sejet Plant Breeding, Nordic Seed A/S
- Agr. Advisory Services, DK, SE, ES, LV
- 24 partners H2020 initiative (2018-2022)
- > 50 people submitting wheat rust samples from Asia, Africa and South America

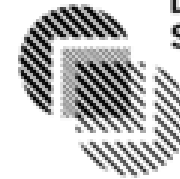
GRRC-team Aarhus University Flakkebjerg



Sejet Planteforædling



Jordbruks
verket



The
Danish Council for
Strategic Research

