Stress Combination and their Interaction in Plants (SCIP) Database

Website link: http://www.nipgr.res.in/scipdb.php

Effect on barley genotypes (*Hordeum vulgare* L.)

The interaction between the fungal pathogens under combined stress treatment at plant interphase

Stress 1: *Puccinia hordei, Puccinia antirrhini*
Stress 2: *Blumeria graminis* f. sp. *hordei* isolates Wag 05 and C15
Stage of plant: Seedling

The table shows the effect of *P. hordei* on *B. graminis* induced haustorium formation in various barley cultivars leaves

Cultivar	Treatment	Response under combined stress (Type B Parameter*)
		Haustorium formation by *B. graminis* (%)
Pallas-Mla8	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	34.38
	B. graminis isolate Wag. 04 (100-150 conidia/cm^2)	61.08
	*B. graminis*** isolate Wag. 04 (100-150 conidia/cm^2)	57.01
Pallas-Mla3	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	8.59
	B. graminis isolate Wag. 04 (100-150 conidia/cm^2)	57.91
	*B. graminis*** isolate Wag. 04 (100-150 conidia/cm^2)	49.77
Pallas-MlLa	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	19.45
	B. graminis isolate Wag. 04 (100-150 conidia/cm^2)	57.01
	*B. graminis*** isolate Wag. 04 (100-150 conidia/cm^2)	54.29
Munchurian	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	57.46
	B. graminis isolate Wag. 04 (100-150conidia/cm^2)	76.92
	*B. graminis*** isolate Wag. 04 (100-150 conidia/cm^2)	71.04
Pallas-Mla8	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate C15 (100-150 conidia/cm^2) (Sequential stress)	31.57
	B. graminis isolate C15(100-150conidia/cm^2)	51.01
Pallas-Mla3	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate C15 (100-150 conidia/cm^2) (Sequential stress)	27.12
	B. graminis isolate C15 (100-150conidia/cm^2)	58.70
Pallas-MlLa	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate C15 (100-150 conidia/cm^2) (Sequential stress)	20.24
	B. graminis isolate C15 (100-150 conidia/cm^2)	46.15
Munchurian	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate C15 (100-150 conidia/cm^2) (Sequential stress)	47.36
	B. graminis isolate C15 (100-150conidia/cm^2)	67.61
Rphq2 MlLa	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate C15 (100-150 conidia/cm^2) (Sequential stress)	48.10
	B. graminis isolate C15 (100-150conidia/cm^2)	53.84

rphq2 mlLa	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate C15 (100-150 conidia/cm^2) (Sequential stress)	39.48
	B. graminis isolate C15 (100-150conidia/cm^2)	55.64
rphq2 MlLa	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate C15 (100-150 conidia/cm^2) (Sequential stress)	43.52
	B. graminis isolate C15 (100-150conidia/cm^2)	47.56
Rphq2 mlLa	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate C15 (100-150 conidia/cm^2) (Sequential stress)	35.44
	B. graminis isolate C15 (100-150conidia/cm^2)	56.53
17-5-2016	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate C15 (100-150 conidia/cm^2) (Sequential stress)	13.46
	B. graminis isolate C15 (100-150 conidia/cm^2)	62.82
SusPtrit (165)	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	25.5
	B. graminis isolate Wag. 04 (100-150 conidia/cm^2)	40.5
TrigoBiasa (168)	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	41
	B. graminis isolate Wag. 04 (100-150 conidia/cm^2)	66
EsBgh (176)	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	59.5
	B. graminis isolate Wag. 04 (100-150conidia/cm^2)	78
ErBgh (182)	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	15
	B. graminis isolate Wag. 04 (100-150 conidia/cm^2)	25.5
Zyphyr (186)	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	9.5
	B. graminis isolate Wag. 04 (100-150conidia/cm^2)	45.5
Julia (186)	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04(100-150 conidia/cm^2) (Sequential stress)	17.5
	B. graminis isolate Wag. 04(100-150conidia/cm^2)	63
116-5 (191)	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	13.5
	B. graminis isolate Wag. 04 (100-150conidia/cm^2)	55
Vada (201)	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	38.5
	B. graminis isolate Wag. 04 (100-150 conidia/cm^2)	55.5
Grit (208)	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	46.5
	B. graminis isolate Wag. 04 (100-150 conidia/cm^2)	66.5
17-5-16 (217)	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential stress)	8.5
	B. graminis isolate Wag. 04 (100-150conidia/cm^2)	49.5
Pallas	*P. hordei* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Both pathogen on abaxial leaf surface) (Sequential stress)	16.55
	P. hordei (350 urediospores/cm^2) inoculated on abaxial leaf surface + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) inoculated on adaxial leaf surface (Sequential stress)	24.13
	P. antirrhini (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150 conidia/cm^2) (Sequential	47.24

	stress)	
	B. graminis isolate Wag. 04 (100-150 conidia/cm^2)	47.58
Pallas	*P. recondita* (350 urediospores/cm^2) + *B. graminis* isolate Wag. 04 (100-150conidia/cm^2) (Sequential stress)	45.96
	B. graminis isolate Wag. 04 (100-150 conidia/cm^2)	35.48

For raw data – Click here (.xlsx file)

Reference– Aghnoum R, Niks RE (2012) Compatible *Puccinia hordei* infection in barley induces basal defense to subsequent infection by *Blumeria graminis*. Physiol Mol Plant P **77:**17-22

Note: *Values are presented as it is from the source article without subjecting to the calculation.*

'*'- *For more information on parameters classification, please refer to 'methodology' tab*

"**" *Represents the treatment in 3 cm strips of leaves that were covered during inoculation with the P. hordei and were inoculated only with the B. graminis*

The inference from the study: Aghnoum and Niks, 2012 study focus on effect of *P. hordei* on the infection caused by *B. graminis* (causal agent of powdery mildew) in barley. The author has collected percentage haustorium formation data by *B. graminis* in the presence and absence of *P. hordei* for (a) three barley near-isogenic lines along with one susceptible cultivar (b) three Vada recombinant lines (c) ten barley lines that possess different levels of basal resistance to leaf rust and the powdery mildew. The pre-inoculation of *P. hordei* caused a significant reduction in the haustorium formation by *B. graminis* in all the three barley near-isogenic lines in comparison with single inoculation of *B. graminis* only. Vada recombinant lines did not show a significant difference in percentage haustorium formation in combined treatment and singly inoculated plants with *B. graminis*. The ten barley lines showed a variation in percentage haustorium formation by *B. graminis* when preinoculated with *P. hordei*. **The overall experimental results indicate the *P. hordei* induced the increased penetration resistance to infection by *B. graminis* in near-isogenic lines and ten other barley lines.**

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