



Stress Combination and their Interaction in Plants (SCIP) Database

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

Effect on faba bean cultivars (*Vicia faba* L.)

between the fungus and insect pathogens under combined stress treatment at the plant interface

Stress 1: *Uromyces viciae-fabae*
 Stress 2: Aphid (*Aphis faba*)
 Stage of plant: Two leaf stage

The table shows the impact of individual and combined stress on the dry weight of faba bean cultivars

Cultivar	Treatment	Response under combined stress (Type A Parameter*)								
		Reduction over control (%)								
		Shoot dry weight			Root dry weight			Mean leaf area per plant		
		7DPI	14DPI	21DPI	7DPI	14DPI	21DPI	7DPI	14DPI	21DPI
Diana	<i>U.viciae-fabae</i> (5×10^4 spores/mL) + <i>A. faba</i> (12 apterous virginoparae per plant) (Sequential stress)	12.80↓	28.60↓	41.97↓	-1.79↑	47.21↓	57.77↓	10.47↓	25.64↓	49.02↓
	<i>A. faba</i> (12 apterous virginoparae per plant)	6.06↓	6.12↓	41.77↓	10.77↓	31.22↓	45.47↓	5↓	11.94↓	36.90↓
	<i>U. viciae-fabae</i> (5×10^4 spores/mL)	2.01↓	5.31↓	14.50↓	-13.77↑	30.48↓	27↓	-0.91↑	5.82↓	21.65↓
Bolero	<i>U.viciae-fabae</i> (5×10^4 spores/mL) + <i>A. faba</i> (12 apterous virginoparae per plant) (Sequential stress)	34.15↓	20.20↓	31.45↓	19.96↓	23.63↓	41.96↓	32.55↓	8.79↓	34.27↓
	<i>A. faba</i> (12 apterous virginoparae per plant)	9.03↓	18.98↓	28.85↓	26.25↓	19.37↓	32.88↓	0.77↓	19.23↓	24.99↓
	<i>U. viciae-fabae</i> (5×10^4 spores/mL)	25.76↓	3.62↓	11.11↓	-5.14↑	-10.40↑	23.81↓	16.27↓	-5.49↑	8.06↓

(DPI- days post infection)

Note: Values presented in the table were calculated using the formula described below.

$$\text{Reduction over control (\%)} = \frac{(\text{Value Control} - \text{Value Stress})}{\text{Value Control}} \times 100$$

- 1) ↓'- indicates plant parameter is more affected by stress that leads to high susceptibility (higher the value more the damage).
- 2) ↑'- indicates plant parameters less/not affected by stress leading to improved resistance (higher the value lesser the damage)

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

B. The interaction between the fungus and insect pathogens under the combined stress treatment at the plant interface

The table shows the effect of fungus *U.viciae-fabae* on the number of aphids on faba bean cultivars

Cultivar	Treatment	Response under combined stress (Type B Parameter*)		
		Mean number of aphids		
		7DPI	14DPI	21DPI
Diana	<i>U.viciae-fabae</i> (5×10 ⁴ spores/mL) + <i>A. faba</i> (12 apterous virginoparae per plant) (Sequential stress)	249.95	956.376	1226.27
	<i>A. faba</i> (12 apterous virginoparae per plant)	313.542	1460.42	1349.3
Bolero	<i>U.viciae-fabae</i> (5×10 ⁴ spores/mL) + <i>A. faba</i> (12 apterous virginoparae per plant) (Sequential stress)	168.00	787.67	742.88
	<i>A. faba</i> (12 apterous virginoparae per plant)	215.57	1056.7	905.15

(DPI- days post infection)

For raw data – Click here (.xlsx file)

Reference– Pruter C, Zebitz CPW (1991) Effects of *Aphis fabae* and *Uromyces viciae-fabae* on the growth of a susceptible and an aphid resistant cultivar of *Vicia faba*. Ann. Appl. Biol. **87**: 217–232

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

The inference from the study: Pruter and Zebitz, 2012 study focus on the interaction between the fungus *U. viciae-fabae* and insect *A. faba* on the crop faba bean cv. Diana and bolero. The cv. Diana is susceptible and cv. Bolero is partially resistant to insect *A. faba*. The results showed that the sequential inoculation of both the pathogens caused a more reduction of shoot dry weight in comparison with the inoculation of either pathogen on both the cultivars irrespective of their varied sensitivity to an insect. However cv. Diana is showing increased yield reduction in comparison with cv. Bolero. The pre-inoculation of fungus decreased the number of aphids on the leaves. **The overall observations revealed that the combination of pathogen resulted in additive damage on both the cultivars of faba bean.**