Stress Combination and their Interactions in Plants (SCIP) Database
Website link- http://www.nipgr.ac.in/scipdb.php

Effect on ribwort plantain genotypes (*Plantago lanceolata* L.)

A. The net impact of combined stress on the plant

Stress 1: *Phomopsissubordinaria*
Stress 2: Weevil *(Ceutorhynchidius troglodytes)*
Stage of plant: Flowering stage

The table shows the impact of combined stress on the ear weight, ear length, number of viable seed and seed weight of ribwort plantain genotypes

Genotypes	Treatment	Response under combined stress (Type A Parameter*)			
		Reduction over control (%)			
		Ear weight	Ear length	Number of viable seeds/plant	Seed weight of viable seeds
B11 (Moderately susceptible to *P. subordinaria*)	*C. troglodytes* (7 female and 7 male/cage on inflorescences) + *P. subordinaria*on soil surface (Moderately pathogenic isolate) (Simultaneous stress)	9.78 ↓	10 ↓	68.24 ↓	4.54 ↓
	C. troglodytes (7 female and 7 male/cage on inflorescences) + *P. subordinaria*on soil surface (Highly pathogenic isolate) (Simultaneous stress)	29.34 ↓	20 ↓	84.45 ↓	5.45 ↓
B16 (Highly susceptible to *P. subordinaria*)	*C. troglodytes* (7 female and 7 male/cage on inflorescences) + *P. subordinaria*on soil surface (Moderately pathogenic isolate) (Simultaneous stress)	16.48 ↓	15.9 ↓	70.11 ↓	-6.34 ↑
	C. troglodytes (7 female and 7 male/cage on inflorescences) + *P. subordinaria*on soil surface (Highly pathogenic isolate) (Simultaneous stress)	27.47 ↓	22.72 ↓	69.90 ↓	-7.93 ↑

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

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

1) '↓- indicates plant parameter is more affected by stress that leads to high susceptibility (higher the value more the damage).
''- For more information on parameters classification, please refer to 'methodology' tab*

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

The table shows the interaction between the fungus *P. subordinaria* and insect *C. troglodytes* causing an infection on ribwort plantain plants

Genotypes	Treatment	Response under combined stress (Type B Parameter*)							
	Laboratory experiment	Wounded stalks (%)		Number of wounds per wounded stalk		Percentage of all stalks with *Phomopsis* infection		Percentage of wounded stalks with *Phomopsis* infection	
		Young	Old	Young	Old	Young	Old	Young	Old
P35 (susceptible to *P. subordinaria*)	*C. troglodytes* (8 weevils/cabinet on inflorescences)+*P. subordinaria* on soil surface (Simultaneous stress)	64	79	3.9	4	36	39	56	49
	C. troglodytes (8 weevils/cabinet on inflorescences)	36	41	1.2	1.2	0	0	0	0
	P. subordinaria on soil surface	0	0	N/A	N/A	0	0	N/A	N/A

B11 (Moderately susceptible to *P. subordinaria*)	Garden Experiment	Infected plants/cage (%)				Infected stalks/plant (%)				No. of visible oviposition wounds
		Time in weeks				Time in weeks				
		6	8	10	12	6	8	10	12	
	C. troglodytes (7 female and 7 male/cage on inflorescences) + *P. subordinaria*on soil surface (Moderately pathogenic isolate) (Simultaneous stress)	24.71	67.52	93.67	100.28	4.89	10.95	21.61	32.85	0.28
	C. troglodytes (7 female and 7	74.71	92.81	94.25	99.42	16.71	32.27	42.36	49.85	0.11

	male/cage on inflorescences) + *P. subordinaria*on soil surface (Highly pathogenic isolate) (Simultaneous stress)									
B16 (Highly susceptible to *P. subordinaria*)	*C. troglodytes* (7 female and 7 male/cage on inflorescences) + *P. subordinaria*on soil surface (Moderately pathogenic isolate) (Simultaneous stress)	43.96	78.73	93.67	100.28	8.06	13.54	29.68	45.82	1.5
	C. troglodytes (7 female and 7 male/cage on inflorescences) + *P. subordinaria*on soil surface (Highly pathogenic isolate) (Simultaneous stress)	50.28	78.73	93.39	100	9.79	15.27	45.24	58.78	1.17

(*Old - after first phase of male flowering, young - before second phase of male flowering, at the start of the experiment; N/A- not available*)

For raw data – Click here (.xlsx file)

Reference– de Nooij MP (1988) The role of the weevils in the infection process of the fungus *Phomopsis subordinaria* in *Plantagolanceolata*. Oikos **52:** 51–58

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: de Nooji *et al*., studied the interaction between the fungus *P. subordinaria* and weevil *C. troglodytes* on ribwort plantain genotypes P35 (susceptible to *P. subordinaria*), B11 (moderately susceptible to *P. subordinaria*) and B16 (highly susceptible to *P. subordinaria*) in the greenhouse. The simultaneous inoculation of insects with the highly pathogenic strain of fungus caused a more reduction in ear weight and length and seed numbers, in comparison with the combination of insects with moderately pathogenic fungal strain for both the cultivars B11 and B16. However, the combination of both the pathogen did not affect the weight of viable seeds in cv. B16. The combination of both the pathogen caused a high percentage of wounded stalks and wounded stalks with *Phomopsis* infection on cv. P54 in comparison with the single inoculation of either pathogen. The cultivars B11 and B16 treated with the simultaneous inoculation of insects with the highly pathogenic strain of fungus caused a more number of infected plants or stalks, in comparison with the combination of insects with moderately pathogenic fungal strain. The plants showed a higher number of oviposition wounds when treated simultaneously with *C. troglodytes* and moderately pathogenic strain of *P. subordinaria*. However, highly susceptible cv. B16 received a higher number of oviposition wounds in comparison with moderately susceptible cv. B11. **The overall observation recorded on both the genotypes concludes the synergistic interaction among both the pathogens in damaging the weed ribwort plantain.**