

Studies of seed characteristics of ecotypes of lucerne, *Bromus* and *Agropyron* in response to *Fusarium oxysporum* and *F. solani*

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Introduction Vigorous seeds and seedlings are more resistant to pathogens than non-vigorous seeds and seedlings (Kim, 1994). Therefore, it is necessary to assess seed and seedling performance in response to seed borne fungi.

Material and methods Seed samples were disinfected with detergent and placed in Petri dishes and inoculated with two levels of spores of two species of *Fusarium*. The samples were germinated in a germinator at 20°C with 1000 lux light under laboratory and greenhouse conditions. The percentage and speed of germination were recorded at days 3, 6, 9, 12 and 15 according to Maguire (1962). On day 15 the shoot : root ratios of randomly selected seedlings were measured according to Lekh & Khairwal (1993). Vigour index was measured according to Abdul-baki & Anderson (1973).

Results Vigour index in the greenhouse was reduced by both *Fusarium* spp.. Level of infection gave contradictory results, because the ecotypes responded differently. The root/shoot ratio was not affected in the greenhouse, but in the laboratory *F. oxysporum* infection significantly reduced this ratio. Speed and percentage of germination were reduced by *Fusarium* infection. (Table 1).

Table 1 Mean of the main characteristics of seeds of 13 ecotypes of t *Agropyron*, *Bromus* and lucerne in response to two species of *Fusarium*

Vigour index		Root length /shoot (mm)		Speed of germination.		Germination (%)		
GRH	Lab.	GRH.	Lab.	GRH.	Lab.	GRH.	Lab.	
53.11a	64.7 a	0.42 a	1.02a	13.63a	15.07a	81.33a	95.69a	Control
40.55b	56.01 b	0.45 a	1.06a	10.67b	13.61b	64.33a	84.62b	SO1
42.27b	63.07 a	0.47 a	1.03a	11.79b	14.66a	67.62a	91.28a	SO2
38.48b	58.41 b	0.42 a	0.88b	10.06b	13.89b	58.67a	88.56a	OX1
37.51b	54.54b	0.49a	0.93 b	9.76b	12.51c	58.56a	80.62b	OX2
42.38	59.34	0.45	0.97	11.8	13.95	66.1	88.15	Mean
4.8	3.76	0.044	0.05	1.28	0.77	7.09	4.44	LSD

GRH=greenhouse, Lab=laboratory, SO1, SO2= levels 1 and 2 of spore inoculation for *Fusarium solani*. OX1 and OX2= levels 1 and 2 of spore inoculation for *Fusarium oxysporum*. Data in columns with the same are not significantly different (P≤5%)

Table 2 Compound analysis of variance for seed characteristics of 13 ecotypes of species of *Agropyron*, *Bromus* and lucerne in response to two species of *Fusarium* under laboratory and greenhouse conditions

Vigour index	Root length /shoot (mm)	Speed of germination	Germination %	Df
2801.33**	8465.26**	746.0**	4741.26**	1 Condition
7134.22**	375.07**	121.43**	2680.58**	12 Ecotype
2024.02**	8.6**	121.10**	4118.50**	4 Fungi
6229.86**	354.87**	120.28**	2689.74**	12 Condition x Ecotype
267.20**	8.35**	14.38 ^{ns}	661.55*	4 Condition x Fungi
246.25**	5.29**	13.90**	367.33*	48 Fungi x Ecotype
201.04*	5.30**	15.10**	389.28*	48 Condition x Ecotype x Fungi
22.62	18.61	21.66	20.46	CV

*, ** and ns: Significant at the 5%, 1% levels and non-significant respectively

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