

Detection of seed mycoflora of chilli and its impact on seed germination and seedling vigour

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SUMMARY

Seed samples of different cultivars of chilli viz., Phule Jyoti, Jwala, Agnirekha and Musalwadi were subjected to standard blotter method for analysis of external seed mycoflora. Observation on seed mycoflora revealed that, *Aspergillus species*, *Fusarium oxysporum* and *Colletotrichum capsici* were predominant fungi in all cultivars. When seeds were artificially inoculated with these fungi capable of reducing seed germination and seedling vigour index significantly.

Key words : Chilli, Seed germination, Seed mycoflora, Seed vigour

Chilli is an important spice and cash crop of India. Chilli crop is infected by number of fungal diseases. However, wilt (*Fusarium* spp.) fruit rot and die-back (*Colletotrichum capsici* Syd.), blight (*Phytophthora capsici* L.) leaf spot (*Cercospora capsici*) are major one. Many of the pathogens of above diseases carried on seed either internally or externally and play a significant role by reducing seed germination and seedling vigour resulted in poor yield (Basak 1994). Keeping in view, the present investigations was made out to study chilli seed mycoflora and its impact on seed germination ability and seedling vigour.

MATERIALS AND METHODS

Seed sample of different varieties of chilli viz., Phule Jyoti, Jwala, Agnirekha and Musalwadi were procured from All India co-ordinated vegetable Improvement project Mahatma Phule Krishi Vidyapeeth, Rahuri and from farmers field. Four hundred seeds from each sample were randomly selected and plated equidistantly on three layers of moistened blotters and incubated under 12/12 hr. alternate cycles of near ultraviolet light and darkness at $22 \pm 2^\circ \text{C}$ for a period of 7 days (ISTA, 1976). On 8th day of incubation, the seeds were evaluated stereoscopically for the occurrence of mycoflora and per cent incidence was recorded.

For recording the effect of important seed borne

fungus, surface sterilized seeds (with 0.1 % mercuric chloride) of variety Phule Jyoti were used. Seeds were smeared with suspension of 10 days old culture of the isolates on PDA and kept in moist chamber for 24 hours for establishment of the isolates and then dried in shade. These seeds were placed (100 seeds each in four replications) on germination paper (TP method of ISTA) and incubated at $25 \pm 2^\circ \text{C}$ for 14 days with alternate dark and light arrangement for 12 hours each. Observation on percentage of seed germination, root length and shoot length was recorded. The seedling vigour index (SVI) was calculated by multiplying the mean germination with mean root length and shoot length. The untreated seeds incubated similarly were considered as corresponding control.

RESULTS AND DISCUSSION

Seed sample of different chilli varieties showed a varied level of incidence of mycoflora. Among the sample screened, variety Musalwadi (119.00) showed a highest mean incidence of seed borne fungi, followed by Agnirekha (110.88) and Jwala (89.40).

Among the various seed borne fungi of chilli, *Aspergillus niger* showed highest incidence (16.18%) followed by other two species of *Aspergillus*. The seed borne fungi, *Colletotrichum capsici*, *Alternaria alternata* and *Fusarium oxysporum* were reported to cause fruit rot of chilli showed the incidence of 6.81, 5.43 and 10.50 per cent, respectively. However, other fungi like, *Curvularia lunata*, *Macrophomina phaseolina*, *Penicillium citrinum*, *Rhizopus nigricans* had incidence (0.43 to 8.68) (Table 1).

Seedborne nature of one or other of these fungi have been earlier reported by many workers. (Rout and Rath, 1972; Dhawale and Kodmelwar, 1978; Pandey, 1976 and

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Table 1 : Seed borne pathogens associated with different varieties of chilli externally

Sr. No.	Seed borne pathogens	Incidence of seed borne pathogen (%)				Mean
		Phule jyoti	Jwala	Agnirekha	Musalwadi	
1.	<i>Alternaria alternata</i>	5.00	4.25	6.25	6.25	5.43
2.	<i>Aspergillus flavus</i>	12.50	16.00	16.25	18.25	15.75
3.	<i>Aspergillus fumigatus</i>	14.25	13.75	15.00	16.25	14.81
4.	<i>Aspergillus niger</i>	13.50	15.25	17.25	18.75	16.18
5.	<i>Bipolaris nodulsa</i>	0.75	0.25	1.50	0.75	0.81
6.	<i>Colletotrichum capsici</i>	6.75	6.25	7.25	7.00	6.81
7.	<i>Curvularia lunata</i>	3.75	4.50	4.00	4.50	4.18
8.	<i>Fusarium oxysporum</i>	10.75	12.75	10.25	8.25	10.50
9.	<i>Fusarium roseum</i>	9.00	13.50	9.50	6.00	9.50
10.	<i>Macrophomina phaseolina</i>	3.50	1.25	4.75	6.50	4.00
11.	<i>Mycelia sterilia</i>	0.75	0.50	1.00	0.00	0.56
12.	<i>Penicillium citrinum</i>	3.50	2.25	6.25	11.00	5.75
13.	<i>Rhizoctenia bataticola</i>	0.50	0.50	0.50	0.25	0.43
14.	<i>Rhizobhus nigricans</i>	6.75	6.75	9.75	11.50	8.68
	Mean	6.46	7.03	7.92	8.50	7.47

Table 2 : Effect of seed borne pathogens on seed germination and seedling vigour index variety – Phule jyoti

Sr. No.	Seed borne pathogens of chilli	Seed germination (%)	Reduction of seed germination over control	Seedling vigour index (SVI)	Reduction of SVI over control
1.	<i>Alternaria alternata</i>	33.25 (36.70)	61.33	339.15	72.23
2.	<i>Colletotrichum capsici</i>	27.25 (31.43)	68.31	325.36	73.35
3.	<i>Fusarium oxysporum</i>	30.00 (43.41)	65.11	490.01	59.87
4.	<i>Fusarium roseum</i>	37.00 (33.18)	49.00	243.36	80.07
5.	<i>Curvularia lunata</i>	47.25 (37.44)	38.75	315.51	74.16
6.	<i>Macrophomina phaseolina</i>	37.50 (37.73)	59.39	397.50	67.43
7.	Control	86.00 (68.11)	-	1221.2	-
	S.E. ±	1.16		5.63	
	C.D. (P=0.05)	3.41		16.58	

Asalmol *et al.*, 2001)

The results on seed germination and seedling vigour (Table 2) revealed that all the pathogens significantly reduced the seed germination. Among them *Colletotrichum capsici* reduced 68.31 per cent seed germination. It was followed by *Fusarium oxysporum* (65.11%) and *Alternaria alternata* (61.33%). The per cent reduction in seed germination in respect of other pathogens was ranged from 38.75 to 59.35 per cent.

Regarding seedling vigour index (Table 2) *Colletotrichum capsici* reduced the maximum seedling vigour followed by *Fusarium oxysporum* and *Alternaria alternata*. The per cent reduction in SVI ranged from 63.05 to 71.89 per cent.

Similar observations regarding seed germination were reported by Dhawale and Kodmelwar (1976). Singh *et al.* (2002) reported poor seedling vigour by various seedborne mycoflora of chilli.

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