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MYCOFLORA ASSOCIATED WITH SEEDS OF JATROPHA

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ABSTRACT

Jatropha (*Jatropha curcas*) seeds collected from localities around Hathras and Agra were stored at 30%, 60% and 90% relative humidity and under room conditions were tested by blotter paper and agar plate methods for the occurrence of seed borne fungi. Among 8 fungi were found to pathogenic in soil test and rest were not.

INTRODUCTION

A number of fungal organisms are associated with the seeds. A part from causing disease, a large number of them reduce the germination of the seeds, cause seed rot and some times secrete compounds toxic to man and animals (Forgacs and Carle 1962, Bajerm and Smith 1967). This paper deals with enumeration of seed-borne fungi in the stored samples (for 12 months) of *Jatropha curcas* collected from Hathras and Agra.

MATERIALS AND METHODS

Fungal isolations were made by standard blotter and agar (PDA and Czapek's Dox Agar) plate methods (Anonyomous 1996). Four hundred seeds were tested from each locality. Surface disinfected seeds (with 0.1 percent $HgCl_2$ solution) were used to determine the seed-borne fungi. All the fungi were isolated in pure culture and identified.

The pathogenicity of different seed-borne fungi was tested in plates using blotter as in pots containing sterilized soil. In both the methods, surface disinfected healthy seed were rolled on the sporulating cultures before planting them or sterilized blotterpaper or sowing them in pots containing sterilized soil. Equal number of surface disinfected seeds soaked in sterilized water before sowing served as control. The plates were incubated at room temperature ($27 \pm 2^{\circ}C$) for 7 days. These were kept moist by adding sterilized water, whenever necessary. The observation regarding the pre and post-emergence rot of seeds and symptoms observed on seedlings were recorded from 10^{th} day onwards.

During soil test, the pots were watered with sterilized water as and when found necessary. The observations regarding the germination of the seeds and symptoms observed on the seedlings were recorded for 30 days after sowing. Re-isolations were made to confirm the association of the test fungus.

RESULTS AND DISCUSSION

The observations indicate that *Aspergilus flavus* was the most severe pathogen as it destroyed 92% of the seeds and seedlings (Table 1). *Aspergillus terreus, Fusarium roseum and Verticillum albo-atrum* also exhibited their severe pathogenic nature by rotting the seeds and seedlings to the extent of 78-86 %. The other four isolates displayed lesser pathogenicity ranging between 23 and 30% only. Interestingly, all the fungi exhibited greater adverse influence at pre-emergence stage (seedling mortality). The rot developed on seeds and seedlings were well evident in plates. The pathogenic nature of the isolates was further tested by soil inoculations (Table 1).

Almost parallel results were obtained in both seed and soil infestation test, though fungi affects were of greater sincerity in the latter. In the seed test, out of 8 fungal species, *A flavus, A. terreus, F. roseum and V. albo-atrum* caused secure pathogenicity, being maximum in *A. flavus* causing almost complete rotting (75% seed rot and 25% seedling rot) that did not allow normal seedling growth whereas in the rest 10-40% seedlings were healthy.

The seedlings died as soon as they emerged slightly above the soil levels in *A. flavus* infection. The plumule and cotyledonary parts were minute distorted. In contrast, stem attained normal height in *A. terreus* infection but leaves were less in number and much narrower as compared to the healthy ones. Soon they were blighted and withered resulting death of seedlings.

The seedlings infected by *F. roseum* generally grew to normal height and had only cotyledonary leaves. The stem and its

Table 1. Pathogenicity test by blotter and soil inoculation

	Out of 100 seed Blotter test			Soil test		
	Per-emergence	Post-emergence	Healthy root	Seed mortality	Seedling	Normal seedling
Aspergillus flavus	60	32	8	75	25	00
Aspergillus niger	20	8	72	26	18	56
Aspergillus terreus	58	28	14	56	34	10
Fusarium moniliforme	20	5	75	28	15	57
Fusahum roseum	52	20	28	45	20	35
Penicillium chrysogenum	13	10	77	50	24	26
Rhizopus oryzae	18	12	70	15	18	67
Verticillum-albo-atrum	40	38	22	41	40	14
Control	10	8	82	8	13	79

apex including the embryonic leafves turned brownish and died. But in some cases even after the death of shoot apex, cotyledonary leaves survived for sometime.

The seedlings infected by *V. albo atrum* had more vegetative growth having 2-4 leaves but they remained smaller in size and soon developed brownish patches. Generally, patches increased in perimeter and eventually embraced the entire leaf so blight symptoms were first developed on the youngest leaf.

Similar types of mortalities are reported in a number of leguminous and other crops (Kanjanasoon and Mathur 1961, Aulakh et al. 1976, Jakob 1969, Jagannathan et al. 1976, Neergaard 1977, Singh et al. 1991, Watnabe 2002, Arya et al. 2004, Costa et al. 2005, Begum et al. 2007, Sofi et al. 2007, Nagamani et al. 2008, Kumar 2009, Prasad et al. 2010, Shreekant et al. 2010, Jayaraman et al. 2011).

A. niger, F. moniliforme, P. chrysogenum and *Rhizopus oryzae* displayed severity in soil inoculations than seed infection.

Present study revealed 8 seed borne fungi in Jatropha seeds. Among these only four species namely *A. flavus, A. terrus, F. roseum* and *Verticillum-albo-atrum* showed pathogenicity in seed test. The pathogenecity reached up to embryonic leaves through cotyledons and resulted in the seedling death.

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REFERNCES

Anonyomous. 1996. International rules for seed testing. Proceeding International Seed Testing Association 31: 1-150.

Arya, V. K., K. Vishunavat and H.G. Negi. 2004. Detection, location and transmission of seed borne inoculum of *Macrophomina phaseolina* in charcoal rot in soyabean. Journal of Mycology and Plant Pathology 34(2): 233-237.

Aulakh, K.S., R.K. Grewal and R.K. Goel. 1976. Detection of seed borne fungi of maize and their role in causing seed rot and seedling infection. Indian Phytopathology3: 241-245.

Bajrem, F.K. and H.S. Smith 1967. Dynamics of seed transmission of plant. Annual review of phytopathology.12:15-78.

Begum, M.M., M. Sariah, A.B. Puteh and N.A.Z. Abidin. 2007. Detection of seed born fungi and site of infection by *Colletotrichum truncatam* in naturally infected soyabean seed. International Journal of Agriculture Research 2(9):812-819.

Costa, M.L.N., O.D. Dhingra and J.L. Desilva. 2005. Influence of internal seed borne *Fusarium semitectum* on cotton seedling. Phytopathologia Brasileria 30(2) : 183-186.

Forguces, J. and W.T. Carle. 1962. Mycotoxicoses. Advances of Veterinary Science 273-382.

Jaganathan, T.P., A. P. Narayanswamy and K. Ranganathan. 1976. Studies on damping off disease of black gram (*P. mungo* L.). Madras Agriculture Journal 61(6): 159-169.

Jakob, M. 1969. Fungal disease of cotton seedlings in Egypt (English summary). Pflschutz Nachr. Bayer 22(2):244-286.

Kanjanasoon, P. and R.S. Mathur. 1961. Fungus flora of stored vegetables and pulses seeds in relation to pre-emergence injuries and beneficial effects of fungicides seed treatment. Proceeding of National Academy of Science, India 31: 416-421.

Kumar, A. 2009. Ecofriendly options for the management of white rust in Indian mustard under mild hill conditions of North Western India. Indian Phytopathology 62(1) : 44-48.

Nagmani, A., I., K. Kumar and C. Manoharachary. 2008. Hand Book of Soil Fungi. I.K. International Pvt. Ltd., New Delhi.

Neergaard, P. 1977. Seed Pathology. The Mac Millan Press Ltd. London. 1187.

Prasad, M.S.L., K. Sujatha and S.C. Rao. 2010. Seed transmission of *Alternaria heliathi* infection of leaf blight of sunflower. Journal of Mycology and Plant Pathology 40(1):63-66.

Singh, K., J. Frisvad, C. Thrane and S.B. Mathur. 1991. An Illustrated Manual on Identification of Some Seed Borne *Aspergillus fusariia, Penicillia* and their mycotoxins. The Technical University of Denmark, Denmark. pp. 133.

Shreekant, K., N. Johnson and A.H. Rajasab. 2010. Mycoflora associated with sphacelia and selerotia of *Claviceps sorghi* on sorghum. Journal of Mycology and Plant Pathology 40(1):90-93.

Sofi, T.A., A.K. Tiwari and V.K.Razdan. 2007. Soil solarization reduces damping off caused by soil borne fungal pathogen and improved vigour of cauliflower seedling. Journal of Mycology and Plant Pathology 37(1):68-71.

Watnabe, T. 2002. Pictorial Atlas of Soil and Seed Fungi, Morphologies of Cultured Fungi and Key to Species. Indian Edition, CRC Press, London.