

## RESEARCH ARTICLE

## Studies on Seed moulds of Pearl millet (*Pennisetum typhoides*)

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Manuscript Details	ABSTRACT
<p>Received : 31.08.2014            Revised : 21.12.2014            Revised Received : 11.03.2015            Accepted: 02.04.2015            Published: 28.06.2015</p>	<p>Twenty three, fungal species were found associated with seeds of eight cultivars of pearl millet. Maximum fungi were reported from seeds of var. BJ-104 and ICMS -7703. <i>Aspergillus flavus</i>, <i>Fusarium moniliforme</i> and <i>Penicillium oxalicum</i> were found pathogenic causing seed rot, seed discolouration and germination inhibition. Captan and Dithane M-45 proved best for bajra seed dressing.</p>
<p>ISSN: 2322-0015</p>	<p><b>Key Words:</b> Diversity in seedmolds, Pearl millet, Pathogenicity, Control.</p>
<p><b>Editor:</b> Dr. Arvind Chavhan</p>	
<p><b>Cite this article as:</b></p>	
<p>Khairnar DN. Studies on Seed moulds of Pearl millet (<i>Pennisetum typhoides</i>), <i>Int. Res. J. of Science &amp; Engineering</i>, 2015; Vol. 3(3):113-116.</p>	<p><b>INTRODUCTION</b></p> <p>The seed-borne fungi of pearl millet (<i>Pennisetum typhoidis</i> (Burm.) Stapf. and Hutt) were earlier studied by Sharma and Basuchaudhary (1975); Gupta (1976); Konde et al. (1980); Randhawa and Aulakh (1980); Prasad and Narayan (1981); Girisham and Reddy (1985; 1986); Panchal (1984) and Khairnar (1987; 2011).</p> <p>The present investigations were carried out to detect the seed-borne fungi of pearl millet cultivars, viz. African A-1, BJ-104, BK-560, ICMS-7703, Local, MBH-110, X5 and WCC-75 by different seed health testing methods and to study their pathogenic behavior and control by seed dressing fungicides.</p>
<p><b>Acknowledgement:</b>            The author is thankful to Dr. Kashor Pawar, Principal, of this college for continuous encouragement in the work and providing the research facilities</p>	
<p><b>Copyright:</b> © Author(s), This is an open access article under the terms of the Creative Commons Attribution Non-Commercial No Derivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p><b>MATERIALS AND METHODS</b></p> <p>Seed samples of pearl millet varieties African A-1, BJ-104, BK-560, ICMS-7703, Local, MBH-110, WCC-75 and X-5 were collected in three random samples (half kg each) from fields, various store</p>

houses and markets. A composite sample of this was prepared by mixing the individual samples, preserved in cloth bags at laboratory temperature during the studies.

Standard blotter and agar plate method with Wakman's acid agar medium were used as recommended by ISTA (1966) for the isolation of seed-borne fungi of pearl millet (Glucose 10g., KH<sub>2</sub>PO<sub>4</sub> 1g, MgSO<sub>4</sub> 0.5 g, agar agar 20 g and distilled water 1000 ml, pH 5.6 ) Four hundred seeds were used in each case. Seeds used for experiments were untreated and pretreated with 0.1% HgCl<sub>2</sub> solution. In agar plate method, ten seeds were plated in each plate. The plates were incubated at 28+ 20 C under alternate light darkness condition for seven days.

The pathogenicity tests of each fungus on seed during germination were studied by soaking the surface sterilized seeds in spore suspensions of seed borne fungi for 24h. Then seeds were used

for germination studies on moist blotter. Seeds treated similarly but without spore suspension served as control. This type of work was done by Panchal (1984) and Khairnar (1987) on Jowar and Bajra seeds respectively.

The fungicides namely Captan, Dithane M-45, Dithane Z-78, Brassicol, Blitox-50W, Bavistin, Thiram, Zinkop, Ceresan, Zineb 75, Wetttable sulphur each (2g/kg seed) were evaluated for their efficacy in reducing the seed-borne fungi of pearl millet. The treated seeds were tested by standard blotter method after 24 hours of the treatment. Untreated seeds served as control.

## RESULT AND DISCUSSION

It is clear from the results summarized in Table 1 that above twenty three fungal species appeared on the seeds of eight different cultivars tested.

**Table 1: Seed moulds of Pearl millet on agar plate method**

Fungi	% incidence on the seeds		Fungus associated
	Untreated	Pretreated	
<i>Absidia ramosa</i>	10	0	1
<i>Alternaria alternata</i>	10	10	4
<i>Aspergillus flavus</i>	30	10	4
<i>Aspergillus fumigatus</i>	20	0	2
<i>Aspergillus nidulans</i>	20	0	1
<i>Aspergillus niger</i>	30	10	3
<i>Aspergillus ustus</i>	10	0	1
<i>Cladosporium herbarum</i>	10	0	5
<i>Curvularia lunata</i>	40	30	7
<i>Curvularia pallescens</i>	40	10	8
<i>Drechslera longirostrata</i>	10	10	6
<i>Drechslera rostrata</i>	20	10	4
<i>Drechslera spicifer</i>	10	10	3
<i>Drechslera tetramera</i>	50	30	8
<i>Fusarium moniliforme</i>	30	20	5
<i>Fusarium oxysporum</i>	10	30	6
<i>Mortierella exigua</i>	10	0	2
<i>Penicillium oxalicum</i>	10	0	2
<i>Pythium sp.</i>	20	10	5
<i>Rhizoctonia solani</i>	30	10	6
<i>Rhizopus nigricans</i>	20	0	4
<i>Syncephalastrum racemosum</i>	10	0	5
<i>Torula herbarum</i>	10	10	2
Non-sporulating mycelium	30	10	4

**Varieties tested:** African 1-1, BJ-104, BK-560, ICMS-7703, Local, MBH-110, WCC-75, X-5

**Table 2: Effect of artificial infestation on seeds and seedlings of pearl millet**

Fungi	Abnormalities in						
	Seeds			Seedlings			
	% Germination inhibition	Rot	Discolouration	Shoot	Length	Root	Length
<i>Absidia ramosa</i>	40	-	Ash	Normal	5.2	Shortening	3.0
<i>Alternaria alternata</i>	40	-	Blackbrown	Blight	5.0	-	9.8
<i>Alternaria tenuis</i>	60	-	Brown	Yellow	5.2	-	4.1
<i>Aspergillus flavus</i>	10	+	Green	Tip rot	2.6	Shortening	1.9
<i>Aspergillus niger</i>	100	-	Black	Yellow	5.4	Root rot	9.0
<i>Cladosporium herbarum</i>	40	-	Dullgreen	Stunted	1.6	Healthy	3.0
<i>Curvularia lunata</i>	30	-	Black	Chlorosis	4.9	Shortening	10.7
<i>Curvularia pallescens</i>	50	-	Black	Stunted	2.5	-	9.2
<i>Drechslera longirostrata</i>	40	-	Black	Stunted	5.0	Root rot	10.0
<i>Drechslera rostrata</i>	50	-	Black	Blight	5.2	Root rot	10.2
<i>Drechslera tetrametra</i>	20	-	Black	-	5.0	-	9.2
<i>Fusarium moniliforme</i>	0	+	White	Blight	-	Root rot	-
<i>Fusarium oxysporum</i>	0	+	White pink	-	-	Root rot	-
<i>Penicillium oxalicum</i>	10	-	White	-	2.8	-	4.5
<i>Rhizopus nigricans</i>	20	-	White-ash	White	4.5	-	1.5
<i>Rhizoctonia solani</i>	50	-	Black	Tip rot	4.9	Curling	9.7
Control	90	-	Normal	Green (Normal)	5.2	Normal	10.1

In the present investigation three fungi viz. *Mortierella exigua*, *Pythium* sp. and *Torula herbarum* are newly recorded. In untreated seeds, maximum incidence of *Drechslera terramera* followed *Curvularia lunata*, *C. pallescens*, *Aspergillus flavus*, *Fusarium moniliforme*, *Aspergillus niger* and *Rhizoctonia solani* while *Absidia ramosa*, *Alternaria alternata*, *Aspergillus ustus*, *Cladosporium herbarum*, *Drechslera longirostrata*, *D. spicifer*, *Fusarium oxysporum*, *Mortierella exigua*, *Penicillium oxalicum* and *Syncephalastrum racemosum* were reported poorly.

Seeds treated with surface sterilizer showed complete absence of certain fungi like *Absidia ramosa*, *Aspergillus fumigates*, *A. nidulans*, *Mortierella exigua*, *Rhizopus nigricans* and *Syncephalastrum racemosum*. On the other hand counts of *Fusarium oxysporum* were found to be increased. It was interesting to note that one

phycomyceteous non-sporulating fungus appeared consistently both on treated and untreated seeds. Fungal species, *Curvularia pallescens* and *Drechslera tetrametra* were found on all cultivars.

It is evident from the results given in Table 2 that complete inhibition of seed germination was achieved due to *Fusarium moniliforme* and *F. oxysporum*, while seed rotting was effectively found due to *Aspergillus flavus*, *Fusarium moniliforme*, *F. oxysporum* and partial seed rot by *Penicillium oxalicum*. Five days old seedlings, blight and retardation of root length and shoot elongation were the common symptoms caused by most of the seed-borne fungi. Panchal 1984 and Khairnar 1987,2011, showed the fungi like *Fusarium oxysporum*, *Penicillium oxalicum* and *Alternaria alternata* are seed rotting of Jowar seeds, while *Curvularia pallescens* and *Drechslera longirostrata* are root rotting fungi.

Captan, Dithane M-45, Bavistin and Blitox-50W (each 2g/kg seed) showed broad spectrum effect and eliminated all the fungi from seed and improved germination to the extent of 90-98 percent as compared to 50-60 percent obtained in untreated seeds. The remaining fungicides were less effective in checking the pearl millet seed fungi.

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