

SHORT COMMUNICATION

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Seed discolouration of jute and its impact on quality parameters

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Fungal seed discolouration in jute seeds is an important impediment for quality seed production in West Bengal condition. Almost 10-15% seed discolouration was observed in jute seeds grown at research farm of ICAR-CRIJAF, Barrackpore. Seven seed mycoflora namely *Macrophomina phaseolina*, *Colletotrichum gloeosporioides*, *Aspergillus niger*, *Fusarium* sp., *Penicillium* sp., *Curvularia lunata* and *Drechslera* sp. were observed both in healthy as well as in discoloured seeds with maximum incidence in discoloured seeds. The qualitative parameters like germination, abnormal seedling, pre-emergence rotting, post emergence rotting and vigour index were significantly reduced in discoloured jute seeds which are not suitable for sowing. Thus appropriate management practices during seed production at field condition are required to reduce the seed infection as well as seed discolouration. Similarly post-harvest processing of seed is essentially required before storage.

Key words: Seed mycoflora, seed discolouration, jute seed quality

Jute (*Corchorus olitorius* and *C. capsularis*) is one of the important commercial bast fibre crops in India which plays a vital role in the country's economy, particularly in eastern and north-eastern India. The jute sector has the twin qualities of providing a biodegradable environment friendly product as well as furthering socio-economic development of the eastern region of the country. The jute fibre is produced in eastern and north eastern parts of the country including West Bengal which cover about 75% of total area of jute in India with about 80% of total production. But jute seeds are produced in Andhra Pradesh, Maharashtra and Gujarat which are far away from fibre producing states. With changing climatic scenario as well as replacement of jute seed crop with other more remunerative crops, seed production become uncertain in seed producing states which is a great concern for fibre

producing states. Earlier it was thought that it is difficult to produce jute seed in West Bengal because of high rainfall and humidity during flowering stage which increases the seed borne infection by *Macrophomina phaseolina* causing Stem rot and Root rot of jute. With changing scenario, fresh attempt were made at ICAR-CRIJAF, Barrackpore, to explore the possibility of seed production by adopting proper sowing time i.e. August-September. In view of above, investigations on assessment of seed discolouration and its impact on seed quality were studied at ICAR-CRIJAF, Barrackpore during 2010-11. Seeds of four jute variety namely JRO 8432, JRO 524, JRO 128 and S 19 grown with normal agronomic practices (date of sowing: mid-July, seed rate: 4kg/ha, pre-emergence application of butachlor, one hand weeding at 20-25 days after sowing, spacing: 40cm x

10cm, topping at 50 days of sowing, NPK application @60:40:40, irrigation - as and when required) (Singh *et. al*, 1984 Bhattacharjee *et. al*, 2000) at ICAR-CRIJAF research farm (88.43°E and 22.75°N) were collected after harvesting of seed crop. On the basis of visual observation discoloured seed were sorted out. The incidence of seed borne

nation x (root length and shoot length in cm). Meteorological data were collected from the institute observatory (Fig. 1).

Although assessment of seed discolouration and its effect is available in different crops, such information on jute seeds is largely lacking. Dull light

Table1 : Incidence of seed mycoflora (%) in discoloured seeds of jute

Name of fungi	Discoloured seed		Healthy seed	
	Blotter method	Agar plate method	Blotter method	Agar plate method
<i>M. phaseolina</i>	2.6-4.8	5.1-9.7	1.6-2.8	2.1 – 3.0
<i>C. gloeosporioides</i>	1.7-3.9	3.5-9.3	1.2-2.9	2.02 -2.6
<i>Aspergillus niger</i>	4.2-7.2	6.2-11.3	1.2-3.2	5.0-7.37
<i>Fusarium sp.</i>	3.9-7.5	4.9-7.2	2.9-4.5	2.27 – 3.3
<i>Penicillium sp.</i>	4.1-6.5	7.0-10.2	2.1-2.5	5.0-6.67
<i>Curvularia sp.</i>	2.1-3.0	3.0-5.0	1.1-2.0	1.2-2.3
<i>Drechslera sp.</i>	1.2-1.8	3.0-6.0	0.6-1.0	2.0-4.3

*the data are based on 400 seeds

Table 2: Assessment of quality losses due to discoloured seed in jute

Quality parameters*	Discoloured seed		Healthy seed	
	Blotter method	Soil sand method	Blotter method	Soil sand method
Germination (%)	80.6	62.5	92.0	82.5
Abnormal seedling (%)	13.2	5.2	1.2	2.1
Pre-emergence rotting (%)	19.4	36.0	8.0	9.2
Post emergence rotting (%)	10.2	12.2	2.1	2.5
Vigour index	420	425	569	525

*the data are based on 400 seeds

fungi in discoloured seed was determined by agar plate as well as blotter paper method. Identification of fungi was made on the basis of cultural characters, sporulation and conidial character (Ahmed and Reddy, 1993; Subramanian, 1971). Quality parameters of seed were tested in terms of germination, pre-emergence rotting and post-emergence rotting. Germination, emergence rotting, seedling abnormalities were tested both in standard blotting paper method (ISTA, 1996) as well as sterilised



Fig. 2 : Jute seed mycoflora

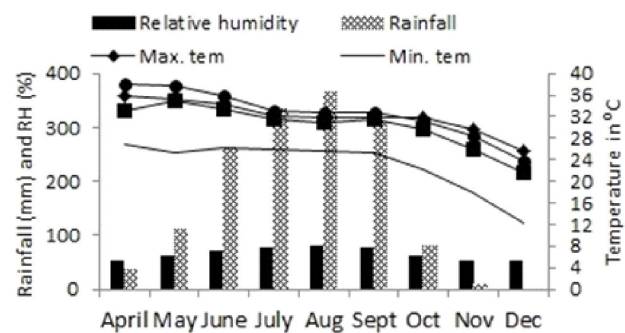


Fig. 1 : Meteriological variables at ICAR-CRIJAF, Barrackpore

sand soil method in earthen plot of 12" size. Vigour index were calculated by using formulae = germi-

brown seeds are normally found in all the varieties. About 5-15% of discoloured seeds are noticed in jute seed of all the jute varieties. Seven seed mycoflora namely *M. phaseolina* (2.1-3.0%), *C. gloeosporioides* (2.0-2.6%), *A. niger* (5.0-7.37%), *Fusarium sp* (2.27-3.3%) and *Penicillium sp.* (5.0-6.67%), *C. lunata* (1.2-2.3) and *Drechslera sp.* (2.0-4.3) were noticed in apparently healthy seeds under Agar plate method (Fig. 2). Whereas in discoloured seed the incidence of *M. phaseolina* (5.1-9.7%), *C. gloeosporioides* (3.5-9.3%), *A. niger* (6.2-11.3%), *Fusarium sp* (4.9-7.2%) and *Penicillium* (7.0-10.2%), *C. lunata* (3.0-5.0) and *Drechslera sp* (3.0-6.0) is quite high (Table 1).

Mandal (2001) reported a number of seed mycoflora in seeds collected from different jute growing areas but no reports are available on the quality of discoloured seeds. Quality parameters like germination (80.6%), abnormal seedling (13.2 %), pre-

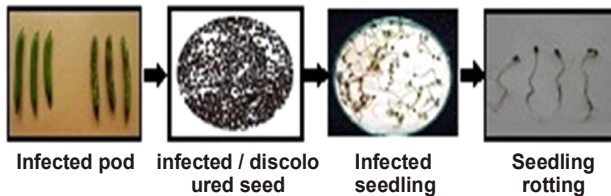


Fig. 3 : Transmission of *M.phoseolina* from pod to seedlings

emergence rotting (19.4%), post emergence rotting (10.2%) and vigour index (420) of discoloured seeds were significantly reduced than the healthy seed in blotter method (Table 2). Similar results were observed in agar plate method also. Seed discolouration due to fungal invasion is a very common phenomenon in pod bearing crops like legumes due to its congenial microclimate inside the pod. Jute seeds are remaining inside the pods and as such are congenial for fungal invasion. Seeds crops are grown during later part of rainy season and seed setting started from last week of September to mid-October, therefore, humid condition prevails during the seed setting stage which aggravates the mycobial seed discolouration. Unlike other crops numbers of dark spots are noticed on

the pod which may infect the seed inside causing seed discolouration/rotting (Fig. 3). The discoloured seeds are very light in colour and gets sorted out during processing and reduce the yield upto 10-15%. Thus appropriate management practices during seed formation stage at field condition are required to reduce the seed infection as well as seed discolouration in West Bengal condition. Similarly post-harvest processing of jute seed is essentially required before storage to avoid quality loss during storage.

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