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Seed Health Status of Farmer Seed Samples vs Certified Samples of Rice Varieties in Andhra Pradesh

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ABSTRACT Experiments were conducted to asses the health status of farmer's vs certified seed samples of rice in Andhra Pradesh. Farmer's samples (271) and certified samples (30) were analysed for seed quality status in laboratory and disease incidence in field conditions during *kharif* 2002-2004. The occurrence of seed borne fungi *Drechslera* spp (2.2%) was maximum in farmer samples over certified samples (0.5%). In addition to *Drechslera oryzae, Fusarium monliforme, Curvularia lunata, Aspergillus flavus, Cheatomium, Alternaria* spp were recorded in both the samples. The germination percentage and seedling vigour decreased in farmer's samples (88 to 90%), (607) over certified samples (89 to 92%) and (698) indicating the poor seed quality status of farmer's samples. The incidence of seed borne disease viz., BLB, brown spot, narrow brown leaf spot and sheath rot were higher in farmer's samples (1-5 scale) than in certified seed samples (1-3 scale).

Keywords: Seed health, seed borne fungi, seed quality, paddy seed samples.

Rice is the staple food for half of the global population. More than 80 per cent of the rice is produced and consumed in Asian countries. Though a lot of information by researchers has been provided on different aspects of seed quality but care taken on maintenance and improvement of quality of seed is quite neglected especially at farmer's level [1]. Out of 120 million hectare area under food crops, a meager 10-12 per cent area is grown with quality/certified seeds. Non-availability of adequate quality seed forces the farmers to use their own saved seed. The impact of good quality seed in agricultural production and economy of our country is well recognized. The production of good quality seed depends on complex condition evoking the most favourable interactions between the genetic make up of seed and the environment under which it is produced, harvested, processed and stored.

For achieving higher productivity, use of quality seed leading to highest germination is essential. The quality of seed is important in achieving higher yields. Farmers often use seed that have impurities and contaminants and are infected with pathogens [2]. In Andhra Pradesh 85 per cent of the seed is being used by the farmers is their own saved seed or the seed that is bartered or exchanged with other farmers. Hence, the present study was aimed for testing the quality of paddy seeds used by the farmers in Andhra Pradesh. The present investigation was carried out to establish whether seed borne fungi are responsible for seedling abnormalities, the possibility of combining germination tests and seed health tests and its influence on quality parameters of the seed used by the farmers.

MATERIALS AND METHODS

Two hundred and seventy one (271) samples of farmers saved seed and 30 certified seed samples comprising of popular paddy varieties *viz.*, IR-64, BPT-5204, Tellahamsa, MTU-1010, MTU-1001, MTU-2077 and PLA-1100 along with other rice varieties were collected from major rice growing areas of Krishna Godavari zone, northern Telangana and southern Telangana, zone of

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Andhra Pradesh. The samples were analysed for seed quality parameters in laboratory. For each seed sample, 400 seeds were drawn and plated @ 25 seeds per plate having three sheets of water soaked blotters. The plates were incubated for 8 days at 22°C under 12/12 h alternate cycles of light and darkness [3]. The incubated seeds were examined under stereo-binocular microscope for identification of fungal colonies on the seeds and expressed in percentage.

Germination and vigour studies

Four hundred seeds of each sample were kept in between paper towels in four replications of 100 seed each for germination. The towels were rolled and kept straight in the germinator and incubated for 14 days at 25°C. The first count of germination was made after 8 days of incubation and final count after 14 days. The length of the seedlings was measured at the time of final count. The vigour index was calculated by multiplying the mean germination with mean root and shoot length of seedlings.

Field studies

Farmer vs certified samples of popularly grown paddy varieties (IR 64, BPT 5204, Tellahamsa, MTU 1001, MTU 1010, MTU 2067, PLA-1100, & MTU 2077), were sown in field conditions in *kharif* 2002, 2003 and 2004 at Seed Research and Technology Centre, Rajendranagar, Hyderabad by adopting randomized block design with 3 replications with spacing of 10x12cm. Observations on disease incidence in field was recorded by adopting 0-9 SES scale.

RESULTS AND DISCUSSION

The results on seed germination and vigour (Table 1) indicated that, irrespective of seed samples, farmer sample recorded germination of 81 to 88 per cent over certified seed samples 82-96 per cent. Seedling vigour index (SVI) in both the type of samples ranged between 459 to 900. The seedling vigour calculated on the basis of root and shoot length showed that farmer's samples recorded less mean seed vigour (607) over certified seed samples (698). This could be due to the use of certified quality seeds. Similar type of results were further confirmed [4] in chilli crop.

Irrespective of farmer and certified samples, the predominant fungal flora associated with both the samples were *Fusarium monliforme, Drechslera oryzae, Curvularia lunata, Aspergillus flavus, Cheatomium*, and *Alternaria* spp. Farmer's samples recorded high incidence of seedborne fungi

Table 1. Seed quality status of farmers vs certified samples of rice

Varieties	Germination (%)		Seedling length (cm)		Seedling vigour index	
	FS	CS	FS	CS	FS	CS
IR 64	81	85	6.9	7.8	559	663
BPT 5204	84	90	8.6	10.1	722	900
Tellahamsa	80	82	6.09	6.2	495	508
MTU 1001	88	96	8.1	8.7	713	835
MTU 1010	80	82	6.8	7.2	544	590
MTU-2067	88	90	7.1	8.9	625	801
PLA-1100	84	89	6.84	7.12	575	634
MTU-2077	88	92	7.1	8.2	625	653
Mean	84.12	88.25	7.19	8.0	607.2	698

(Average of three replications); FS - Farmer's sample; CS - Certified sample

(8.26%) over certified seed samples (2.39%). Among different seedborne fungi, occurrence of field fungi i.e. *Drechslera* spp (2.0%) and saprophytic fungi i.e. *Aspergillus* spp (2.2%) were high in farmer's seed samples. Where as certified samples recorded more occurrence of *Curvularia* spp (0.81%) followed by *Aspergillus* spp (0.65%) and *Drechslera* spp (0.5%). The germination

Table 2. The incidence of seedborne fungi in farmer vs certified samples

Varieties	*Aspergillus* spp		*Curvularia* spp		*Fusarium* spp		*Drechslera* spp		*Cheatomium* spp		*Alternaria* spp		*Bacterium* spp	
	FS	CS	FS	CS	FS	CS	FS	CS	FS	CS	FS	CS	FS	CS
IR 64	2.0	0.5	1.2	1.0	0.25	0.1	0.5	0.2	-	-	3	-	0.1	-
BPT 5204	3.9	0.9	2.1	1.5	4.2	1.5	1.5	0.5	0.5	0.1	2.5	0.1	2.0	-
Tellahamsa	2.0	-	1.0	-	0.9	-	2.0	0.5	-	-	0.5	-	1.0	0.1
MTU 1001	1.5	0.2	3.0	0.5	1.5	0.2	3.5	1.5	-	-	1.5	0.2	-	-
MTU 1010	1.75	0.2	2.5	2.0	1.75	0.2	3.0	1.2	-	-	0.5	0.1	0.1	-
MTU-2067	2.8	1.1	0.5	0.2	1.1	-	3.2	-	0.1	-	0.4	0.3	0.2	0.1
PLA-1100	2.2	1.3	1.5	1.2	0.5	-	1.2	-	0.5	0.3	-	-	0.1	-
MTU-2077	1.5	1.0	0.5	0.1	0.1	-	1.1	0.1	0.7	0.2	0.4	0.2	-	-
MEAN	2.2	0.65	1.53	0.81	1.2	0.25	2.0	0.5	0.23	0.07	1.1	0.11	0.45	0.025

FS - Farmer's seed; *Average of 3 replications (Total number of samples : 271); CS - Certified seed

Table 3. Average disease incidence recorded under field conditions (Farmers vs Certified samples) during *Kharif*, 2002, 2003 & 2004

Varieties	Disease incidence in the field (0-9)							
	Brown spot		Narrow brown leaf spot		Sheath rot		BLB	
	FS	CS	FS	CS	FS	CS	FS	CS
IR 64	3	1	1	0	1	1	3	1
BPT 5204	5	3	1	1	1	0	5	3
Tellahamsa	5	1	3	1	1	1	5	1
MTU 1001	3	3	1	0	3	0	5	1
MTU 1010	5	3	1	1	1	1	3	3
MTU-2067	5	3	3	1	3	1	3	3
PLA-1100	3	1	3	1	5	1	5	3
MTU-2077	5	3	5	3	3	1	3	1

FS - Farmer's seed (1-5); CS - Certified seed (1-3); BLB - Bacterial leaf blight

percentage and seedling vigour decreased in farmer's samples due to proliferation of fungal species on germinating seedling and resulting in seed and seedling death (Table 2). The earlier report also confirms the similar findings in chilli seed samples [4].

The major diseases observed during crop growth stage in three years were Bacterial leaf blight, brown spot, narrow brown leaf spot and sheath rot in both the samples. The disease incidence was significantly higher in farmers samples (1-5 scale) than in certified seed samples (1-3 scale) (Table 3). It has also been reported that farmers saved seed had the maximum percentage of off-type plants as compared to that produced by the certified seed samples of rice, green gram and wheat [5, 6, 7].

Observations made in the study revealed that farmers lack awareness on the use of "Quality Seeds" and source of availability of the quality seeds. The seed must be procured from authentic source. Hence, there is a need to promote the use of high quality certified seed among the farmers.

REFERENCES

1. ISLAM M., JAHAN Q.S.A., K. BUNNARITH, S. VIANGKUM & S.D. MERCA (2000). Evaluation of seed health of some rice varieties under different conditions. *Bangladesh Rice Research Institute*. Gazipur, Bangladesh.

2 FUJISAKA, S.R., A. GUINO, R.T. LUBIGAN & K. MOODY (1993). Farmers' Rice Seed Management Practices and Resulting Weed Seed Contamination in the Philippines, *Seed Sci. & Technol.*, **21**: 149-157.

3 ISTA (1996). International rules for seed testing, *Seed Science & Technol.*, **29**: (Suppl.) 335 + 7 pp.

4. DHARAM SINGH & V.K. MAHEWARI (2002) Health status of chilli seeds in India and its impact on germination and vigour. *Seed Res.*, **30**(1): 128-133.

5 MURALI MOHAN REDDY, B. SARADA & S.H. HUSSAINI (2000). Evaluation of farmer's saved seed of rice. *Seed Res.*, **28**(2): 223-225.

6 TYAGI C.S., R.S. PARODA & M. SINGH (1983). Evaluation of different seed categories in *kharif* legumes. *Seeds & Farms*, **9**: 40-44.

7 SINGH O., C. RAM & R.K. CHOUDHRY (1987). Studies on drill box survey of farmers seed *vis-a-vis* quality seed of wheat. *Seeds & Farms*, **13**: 9-12.