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A SURVEY OF SEED-BORNE FUNGI ASSOCIATED WITH SEEDS OF RICE (*ORYZAE SATIVA* L FARO12, 15, AND 29) IN STORAGE AND THE FIELD IN AFIKPO NORTH LOCAL GOVERNMENT AREA OF EBONYI STATE

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ABSTRACT

A survey of seed-borne fungi associated with the seeds of three varieties of rice Faro 12, 15, and 29 both in storage and in the field for three years was undertaken, and their percentage seed germination determined. The result obtained showed that Fusarium moniliforme, Bipolaris oryzae, Fusarium oxysporum, Chaetomium globosum, Curvularia lunata, Aspergillus niger, Aspergillus flavus, Aspergillus terreus , Alternaria tenuis and Penicillium sp were isolated from seeds of three varieties of rice in storage. Fusarium moniliforme, Bipolaris oryzae, Fusarium oxysporum, Chaetomium globosum, Curvularia lunata and Trichoderma harzianum were isolated from the seeds of the three varieties from the field.. Fusarium moniliforme was more prevalent than the other fungi.

Key words: Disease, Incidence, Pathogens, Rice, Seed-borne, Yield.

INTRODUCTION

Rice is an important cereal crop consumed the world over in various forms. However, despite the use to which it is put, its production is affected by disease through reduction in yield caused by attack of fungal pathogens. Some of these fungal pathogens move into the field through the seeds, that is, they are seed-borne. Several fungal pathogens have been isolated from rice seeds, and have been reported to be responsible for a number of diseases right from the nursery to the field by Ibiam *et. al*., 2006).

Marthur and Neergaard (1970) and Neergaard *et al* (1970), reported that a myriad of seed-borne fungi that caused serious diseases of rice in nurseries, fields and storage were seed-borne. Sengupta and Sinha (1987), isolated the following seed-borne fungi of rice: *P. oryzae, Nigrospora spp, Drechslera oryzae, Trichoconis padwikii and Curvularia spp.* Odebunmi – Osikanlu (1989), isolated *Fusarium moniliforme, C. lunata. H. oryzae, Rhynchosporium oryzae* from the six rice seed varieties: IRAT. 110, COL.38, C22, TOX494-SLR, DJII-509, and F.H. 109. Kim and Lee (1989), reported that *Aspergillus terreus, A. ochraceus,* among other *Asperigllus spp* and 6 *Penicillium spp* were isolated from deterioriated rice seed samples in Korea. Esuroso *et al* (1975), reported that wide range of fungi occurred on the seed of rice in Nigeria. Imolehin, (1983),reported that seed-borne fungi affected rice seed germination. Fungal pathogens recorded on twenty-two seed samples of rice cultivars from south-western Nigeria included *Drechslera oryzae, Curvularia lunata, Fusarium moniliforme* and *Rhynchosporium oryzae,* while the

saprophytic fungi were *Aspergillus spp, Penicillium spp, Rhizopus spp, Chaetomium spp,*

*Trichoderma spp and Cladosporum spp (*Imolehin, 1987). He further stated that *Fusarium moniliforme* and *Drechslera oryzae* were the major pathogens that caused devastating seedling disease of rice in the field (*D oryzae* 12%, *F moniliforme* 40%). This work is a survey of the incidence of seed-borne fungi of rice associated with three varieties of rice : Faros 12, 15, and 29 popularly cultivated in Afikpo North local government area of Ebonyi State.

MATERIALS AND METHODS

One thousand seed samples of each of the three varieties of rice: Faros 12, 15, and 29 were collected from the field in three communities; Afikpo, Amasiri , and Akpoha. of Afikpo North local government area.

The Standard Blotter Method of the International Seed Testing Association (I.S.T.A), (1976), was used for this study.Seed samples were pre-treated with 1% sodium hypochlorite solution for five minutes to remove surface contaminants on the surface before plating 25 seeds per Petri-dish, with 15 seeds towards the periphery, followed by nine seeds, then one at the middle. The plated seeds were incubated in complete darkness at 25±2^{o}C, for seven days. These seeds were examined under a stereo binocular microscope (6-50x) for fungal growth, and identification. Percentage germination of the seeds on the blotter was recorded per variety. A total of 400 seeds were tested per seed sample per variety . Identification was made following fungal description manual by Barnett and Hunter (1992).

RESULTS AND DISCUSSION

Fusarium moniliforme, Bipolaris oryzae, Fusarium oxysporum, Chaetomium globosum, Curvularia lunata, Aspergillus niger, Aspergillus flavus, Aspergillus terreus , Alternaria tenuis and *Penicillium sp* were isolated and identified from seeds of the three varieties of rice (Faro 12, Faro 15 and Faro 29) in storage, and *Fusarium moniliforme, Bipolaris oryzae, Fusarium oxysporum, Chaetomium globosum, Curvularia lunata* and *Trichoderma harzianum* from the seeds of the three varieties from the field in Afikpo North L.G.A, of Ebonyi State (Tables 1 and 2). *Fusarium moniliforme* was more prevalent than the other fungi both in the field and storage. Marthur and Neergaard (1970) and Neergaard *et al* (1970), reported that quite a myriad of fungi causing serious devastation in rice nurseries, fields and storage are seed-borne.

Esuroso *et al* (1975), reported that a wide range of fungi occurred on rice seeds in Nigeria. Imolehin (1987), observed that *B oryzae* (*Drechslera oryzae*),*Curvularia lunata*, *Chaetomium spp*, *Trichoderma spp, Aspergillus spp*, and *Penicillium spp* were isolated from twenty-two different rice cultivars from South West Nigeria. Bora and Gogoi (1993), isolated *F moniliforme* and *B oryzae* from discoloured seeds from deep, rice water, in Sialkot district in Pakistan (IIyas and Javaid, (1995). Riaz and Ahmed, (1995), isolated *Helminthosporum spp*, *Curvularia*, *Fusarium* and *Aspergillus* from various seeds from North Southern provinces of Pakistan. Odubunmi–Osikanlu (1989), isolated *Fusarium moniliforme*, *C. lunata*. *H. oryzae*, *Rhynchosporium oryzae* from the six seed varieties (IRAT.110, COL.38, C22, TOX494-SLR, DJII-509, and F.H. 109). The author stated that many parasitic fungi were seed-borne, hence, they grow with the seed to cause disease in subsequent plant. Failure to control such diseases could result in heavy contamination with fungal propagules, including sclerotia, poor germination and low yield

.There was significant difference at $P<0.05$ in the mean percentage incidence of seed-borne fungi associated with the seeds of the three varieties, both in the field and

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Table 1: Mean percentage seed-borne fungi associated with Seeds of the three varieties of rice and the mean percentage seed germination.from the field and storage in Afikpo North Local Government of Ebonyi State

	TABLE 1A								
FIELD	**AFIKPO NORTH**								
FUNGI ISOLATED	**1996**	**1997**	**1998**	**1996**	**1997**	**1998**	**1996**	**1997**	**1998**
	FARO 12			**FARO 15**			**FARO 29**		
F moniliforme	22.3	24.3	27.3	21.8	22.6	25.6	26.3	18.3	21.3
F oxysporum	11.6	1.2	21.2	4.6	2.3	3.8	1.6	7.3	7.8
B oryzae	3.2	12.3	16.9	8.0	16.3	18.3	10.2	3.5	9.2
C globosum	0.2	0.0	9.1	2.6	0.6	0.3	0.9	0.0	0.0
C lunata	0.8	0.0	3.1	0.8	0.6	0.8	0.5	0.0	0.0
T harzianum	1.9	0.6	8.0	2.3	0.6	1.8	4.6	0.0	0.0
L.S.D .05		**7.73**			**4.93**			**5.36**	
Mean%Germ.	88.9	93.2	94.1	89.7	88.1	94.1	24.7	48.3	63.7
L.S.D .05		**7.68**			**1.36**			**8.61**	
STORAGE	**TABLE 1B**								
FUNGI ISOLATED	**1996**	**1997**	**1998**	**1996**	**1997**	**1998**	**1996**	**1997**	**1998**
	FARO 12			**FARO 15**			**FARO 29**		
F moniliforme	18.9	35.5	25.6	13.9	23.4	24.8	25.5	36.7	33.2
F oxysporum	21.3	23.1	5.3	4.3	4.3	5.6	7.1	4.1	3.8
B oryzae	3.6	7.8	8.5	7.3	7.3	6.3	12.3	15.6	12.4
A terreus	4.0	0.1	0.6	2.8	0.3	0.4	0.1	0.7	0.4
A niger	5.3	0.3	0.2	1.8	0.8	0.9	0.0	0.9	0.6
A flavus	0.8	0.6	0.6	5.3	3.9	0.3	0.0	1.0	0.6
C globosum	4.3	5.2	0.6	0.3	0.3	5.1	1.3	1.2	0.6
C lunata	0.8	0.5	0.0	0.3	0.3	1.4	0.0	1.1	0.9
A tenuis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Penicilluim sp	0.7	0.9	0.6	7.3	8.6	0.6	0.4	0.6	0.4
L.S.D 0.05		**4.72**			**3.08**			**2.16**	
Mean%Germ.	84.9	81.4	81.1	77.0	89.1	78.0	69.2	51.2	65.3
L.S.D 0.05		**0.93**			**2.77**			**4.15**	

storage in each year in the local government area; and in the mean percentage incidence of each seed-borne fungi associated with the seeds of F12 in the field survey. and between the three years. However, there was no significant difference in the mean percentage incidence of each seed-borne fungi of varieties F15 and F29 between the three years in the field survey. There was also no significant difference in the mean percentage incidence of each seed-borne fungi in the storage survey for the three varieties in the local government area in the storage survey for the three varieties in the between the three years all at $P>0.05$. The variations in the incidence of the fungi in the three years could be as a result of variations in weather or control measures adopted by the farmers during the period in question.

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Also, the variations in the fungi associated with the seeds of the varieties could be attributed to the amino acid affinity between the particular rice variety and the fungus.

There were significant differences at $P<0.05$ in the percentage incidence of different seed-borne fungi associated with each of the three varieties in storage and field in each year. There was no significant difference at $P<0.05$ in the mean percentage germination of the seeds of the varieties in storage and from the field, within the years and between the years. Variation in percentage seed germination could be attributed to the severity in environmental conditions or the infestation of the seeds by the fungi, or still differences in varietal food storage. Bora and Gogoi (1993), reported that *F moniliforme* and *B oryzae* reduced the germinablility of seeds.

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