International Journal of Plant Protection, **Vol. 1 No. 2 : 92-94 (Oct. 2008)**

Survey of the deteriorative effect of fungal pathogens in seeds and grains in and around Burdwan, West Bengal

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Accepted : ***August, 2008***

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ABSTRACT

Different types of cereals, pulses and oily seeds samples were collected from three markets and Crop Research and Seed Multiplication Farm, Burdwan University, Burdwan district, West Bengal to screen the fungal contaminant associated with those seeds under storage condition. Almost all the seeds samples of three markets were found to be contaminated with various fungal pathogens. Growth of maximum fungal colonies was recorded in seeds collected from Durgapur market. Maize and groundnut seeds were appeared to be suitable substrate for the growth of storage fungi. The occurrence of different species of *Aspergillus* especially *Aspergillus niger* and *A. flavus* were found to be more abundant in comparison to the other contaminants.

Key words : Seed, fungal contaminant.

A new paradigm for agriculture in 21st century was proposed (Welch and Graham, 2004) the views that agriculture is an instrument for public health and draws attention to its role in delivering nutrients to humans and animals in balanced amounts that can sustain maximal physical and mental activity of the human beings who are simultaneously the drivers of the food system and its dependents. This is known as the productive, sustainable and nutritious food systems paradigm for agriculture and public health (Graham, 2003).

It is well known that about 90% of all food crops grown in the world are propagated by seeds and grains also constitute the major agricultural commodity for trade (Khetrapal, 2004). Production and distribution of high quality wheat grains have been attributed as an important factor in sustaining the green revolution in India (Nagarajan, 2004). During 1960's spectacular production was witnessed in the seed industry and quality seeds were provided by the National Seed Corporation (NSC) Ltd. (Bhatia, 2004). However, in most developing countries, increased production of grains is not accompanied by a corresponding improvement in post-harvest preservation technology. This problem of food grain storage is still now prevalent and a substantial amount of the storage facilities are unscientific as the grains are kept in open condition.

Several external and internal factors are involved in the deterioration of seeds during storage. Among which seed moisture, temperature, cleanliness of seeds and store- houses, degree of infection already existing in the seeds and insects and mites present in the store houses are important. It has been established that infected or contaminated seed is a primary source of inoculum for a large number of destructive diseases of many important food, fodder and fibre crops (Neegaard, 1977). Fungi play an important role in deterioration of seeds in storage. Although bacteria are also involved in this process but their role is considered to be less important because bacteria damage those seeds which have already undergone considerable deterioration by fungi. Constant uses of the farmer's own seed is an important factor in spreading and repeated occurrence of several fungal diseases.

MATERIALS AND METHODS

The selection of a diagnostic method for evaluating seed health depends on the host to be tested and the type of pathogen that may be carried in the seed (Khetrapal, 2004). Several conventional, serological or molecular techniques are employed for testing seed health (Kumar, 1994; Agarwal and Sinclair, 1997). Salt-malt agar medium was preferably used for growth of a wide range of seed pathogenic fungi and for testing the seed health. In our experiment the seed samples were collected from several markets *viz.*, Burdwan market, Durgapur market, Asansol market, Crop Research and Seed Multiplication Farm (CRSMF, Burdwan University) of Burdwan district. The collected seeds were packed in airtight polypropylene bags and labeled properly for future use. 2% malt agar medium was prepared which was supplemented with 10% sodium chloride salt before solidification and pH of the medium was adjusted to 6. The medium and glasswares were sterilized at 15 lbs for 15 minutes.

15 ml of sterilized salt-malt agar medium was poured in each of the sterilized Petridishes and allowed to solidify. The collected seed samples were surface sterilized by washing thoroughly with sterilized distilled water followed by dipping them in 1% sodium hypochlorite solution and absolute alcohol, respectively for 1 minute in each. Finally