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FUNGAL INCIDENCE ON GROUNDNUT SEED FROM DIFFERENT LOCALITY OF MARATHAWADA

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ABSTRACT
The seed mycoflora of groundnut seed from different localities were screened by standard blotter paper and agar plate method as recommended by ISTA. The seed mycoflora of five localities of Marathwada region viz. Aurangabad, Jalna, Parbhani, Osmanabad and Beed of groundnut seed samples collected and examined. The 08 genera and 14 species of fungi isolated viz. Alternaria alternata, Aspergillus flavus, Aspergillus fumigatus, Aspergillus niger, Aspergillus ustus, Fusarium oxysporum, Curvularia lunata , Macrophomina phaseolina, Penicillium notatum, Rhizoctonia solani, Rhizopus nigricans. Out of these fungi Aspergillus flavus, Aspergillus niger, Fusarium oxysporum and Rhizopus nigricans were found predominant fungi and shows higher percent of seed mycoflora. Higher number of fungi was isolated by method as agar plate compared to blotter paper method.

Keywords: Seed mycoflora, localities, fungi.

INTRODUCTION
Groundnut (*Arachis hypogaea* L.), also known as peanut, is a legume that ranks 6th among the oilseed crops and 13th among the food crops of the world. India is one of the largest producers of oilseeds in the world and occupies an important position in the Indian agricultural economy. Groundnut (*Arachis hypogea* L.) a valuable legume crop is over in India with production of about 37.19 million tons in 2013. India is second largest producer of groundnut after China. It is estimated that nine oilseeds namely groundnut, rapeseed-mustard, soybean, sunflower, safflower, sesame, castor and linseed, accounted for an area of 23.44 million hectares with the production of 25.14 million tones. Groundnut is called as the 'King' of oilseeds. It is one of the most important food and cash crops of our country.

Groundnuts is a high in calories value food stuff and added to diets to improve dietary proteins and supply vitamins of the 13-complex. Groundnuts foods are simple to prepare and there are a diversity of forms in which they can be prepared. Groundnuts produce vegetable oils, fats. Dry legume seeds are frequently the most practical source of storable and transportable proteins in regions lacking refrigeration facilities. Grain legume proteins are the least expensive protein source for both rural and urban populations of India. While being a valuable source of nutrients and low-priced commodity Groundnut is called as wonder nut and poor men's cashew nut. Groundnut is one of the most important cash crops of our country.

Groundnut is as good source of nutrient therefore storage pathogens were affecting to seed causing loss of seed health. These infected seed were not safe for human health. Storage environment viz., temperature and relative humidity might not be conducive for the survival of field fungi and harvesting and handling practices as well as locality influence seed mycoflora. Ground nut seed is attacked by a number of pathogenic fungi of economic importance. Sullivan (1984), reported that groundnut seeds are highly susceptible to diseases, as they serve as a source of stored nutrients for fungi such as *Rhizopus spp.*, *Penicillium spp.*, *Aspergillus niger*, and *A. flavus*. Rasheed *et al*. (2004) found *Macrophomina phaseolina*, *Rhizoctonia solani*, *Fusarium solani***,** *F. oxysporum*, *Aspergillus flavus***,** *A. niger* were predominant in groundnut and seed coat was greatly infected by fungi followed by cotyledon and axis. Krishnappa *et al*. (2003) reported that groundnut pods stored in gunny bag had recorded maximum infection ranged between 16 and 18% of *Aspergillus flavus***,** *Aspergillus niger***,** *Fusarium* spp. and *Penicillium* spp. and caused reduction in germination and vigour index. Patra *et al*. (2000) reported that increase in storage period of groundnut seeds upto nine months, the viability decreased, while pathogen activity, moisture and sugar content in seeds increased gradually. The storage fungi like *Aspergillus flavus* was responsible for maximum depletion of fat content and reducing sugar in safflower, soybean, sesamum and groundnut due to *Fusarium equiseti* and *Rhizopus stolonifer* and a decrease in crude fat content by *Curvularia lunata*, *F. equiseti* and *penecillium digitatum* Kakde and Chavan (2011).

MATERIAL AND METHODS
Collection of seed samples
The method described by Neergard (1979) has been adopted for the collection of seed samples Of seeds wear collected from different five localities of Marathwada region viz. Aurangabd, Jalna, Parbhani, Osmanabad and Beed of groundnut seed samples fields, store houses, and market places.

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Blotter Paper Method

The seed mycoflora was isolated by using standard moist blotter method and agar plate methods as recommended by International seed testing association (ISTA 1975), The method adopted for isolation of seed mycoflora was standard moist blotter technique as recommended by International Seed Testing Association (ISTA, 1975). Petriplates lined with three circular moist blotting papers were sterilized by autoclaving. One plate was treated as one replication and three replications were kept for each treatment 10 seeds were placed aseptically with uniform spacing. The Petriplates were then incubated at 25±1^{0}C. Observations and identification of seed mycoflora upto species level were made after seven days of incubation. Pure culture isolations were made on Potato Dextrose Agar medium and fungal growth was observed them under microscope.

The fungal population was expressed in terms of per cent occurrence for each fungal species with the following formula:

$$\text{Percent occurrence} = \frac{\text{No. of seeds on which growth of the particular fungal species were detected}}{\text{Total no. of seeds examined}} \text{ X } 100$$

Agar plate Method

In this method pre-sterilized petriplates of 10 cm diameter were poured with 20 ml of autoclaved potato dextrose agar (PDA) medium. On cooling the medium, 10 seeds per petriplates were equal space aseptically. After that incubation conditions and other details were same as described for the blotter plate methods. Seeds without any such pre treatment were placed on agar plates for the study of the total seed mycoflora. These petriplates incubated at 25±2˚C and other details of the study were same as described for blotter test method.

Table No-1: Incidence of groundnut seed mycoflora on Blotter plate method from different Marathwada localities

Name of fungi	Fungi Percent incidence				
	Aurangabad	Jalna	Parbhani	Osmanabad	Beed
Alternaria alternata	3.33	20.00	6.66	-	16.66
Alternaria tenius	6. 66	-	6.66	3.33	-
Aspergillus flavus	23.33	13.33	46.66	20.00	36.66
Aspergillus niger	40.00	30.00	40.00	26.66	50.00
Aspergillus fumigates	16.00	3.33	-	36.66	13.33
Aspergillus ustus	3.33	-	-	6.66	10.00
Curvularia lunata	10.00	6.66	3.33	-	-
Fusarium moniliformae	16.66	3.33	6.66	16.66	3.33
Fusarium oxysporum	6.66	10.00	3.33	30.00	13.33
Macrophomina phaseolina	13.33	3.33	-	13.33	6.66
Penicillum notatum	33.33	10.00	26.66	33.33	10.00
Penicillium chrysogenum	-	3.33	3.33	6.66	23.33
Rhizopus nigricans	6.66	13.33	36.66	26.66	16.66
Rhizoctonia solani	13.33	-	6.66	-	-

Graph-1: Incidence of groundnut seed mycoflora on Blotter plate method from different Marathwada localities

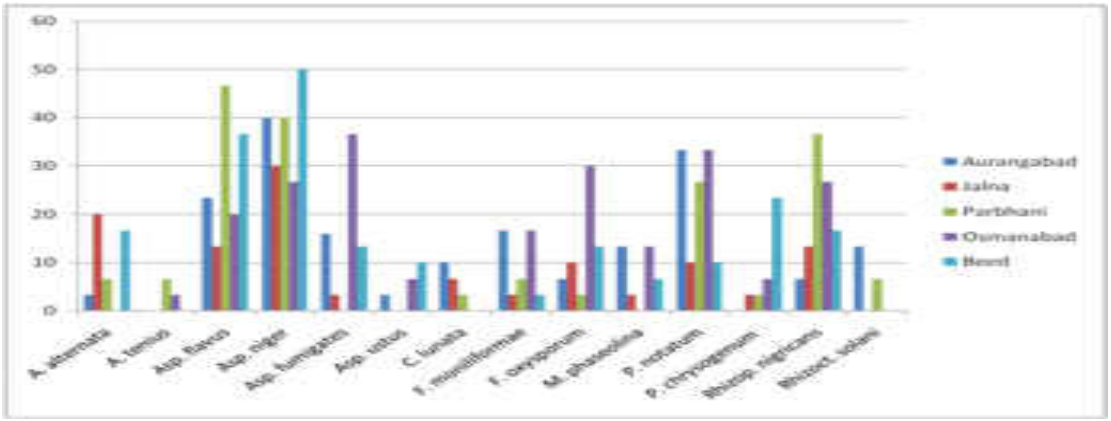

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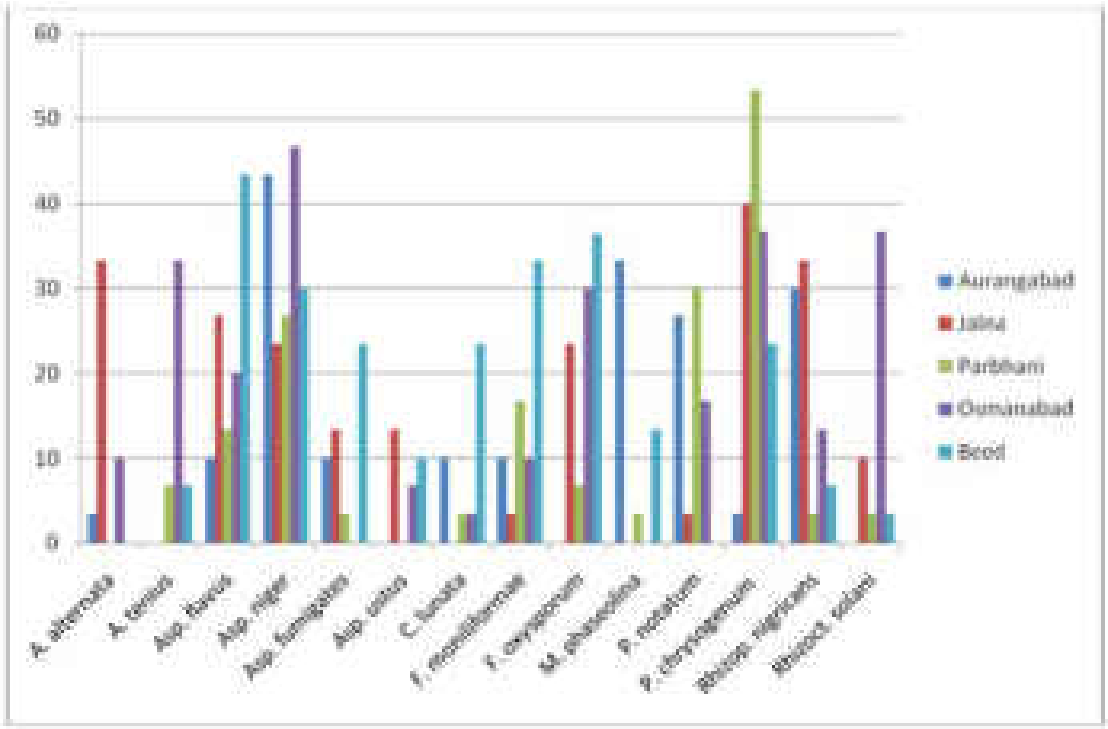
Table No-2: Incidence of groundnut seed mycoflora on Agar plate method from different Marathwada localities

Name of fungi	Fungi Percent incidence				
	Aurangabad	Jalna	Parbhani	Osmanabad	Beed
Alternaria alternata	3.33	33.33	-	10.00	-
Alternaria tenius	-	-	6.66	33.33	6.66
Aspergillus flavus	10.00	26.66	13.33	20.00	43.33
Aspergillus niger	43.33	23.33	26.66	46.66	30.00
Aspergillus fumigates	10.00	13.33	3.33	-	23.33
Aspergillus ustus	-	13.33	-	6.66	10.00
Curvularia lunata	10.00	-	3.33	3.33	23.33
Fusarium moniliformae	10.00	3.33	16.66	10.00	33.33
Fusarium oxysporum	-	23.33	6.66	30.00	36.33
Macrophomina phaseolina	33.33	-	3.33	-	13.33
Penicillum notatum	26.66	3.33	30.00	16.66	-
Penicillium chrysogenum	3.33	40.00	53.33	36.66	23.33
Rhizopus nigricans	30.00	33.33	3.33	13.33	6.66
Rhizoctonia solani	-	10.00	3.33	36.66	3.33

Graph-2: Incidence of groundnut seed mycoflora on Agar plate method from different Marathwada localities



RESULT AND DISCUSSION

The mycological analysis of groundnut seed mycoflora of different localities like Aurangabad, Jalna, Parbhani, Osmanabad and Beed eight dominant genra and 14 different fungal species showed in groundnut seed mycoflora. Six fungal taxa identified in this study included Aspergillus, Rhizophus, Mucor, Curvularia, Fusarium and Penicillium all of which except Curvularia were implicated by Garren (1966) as responsible for rotting of about one-half of rotted groundnut.

In case of standard blotter paper method it was clear from table no. 1 and graph no. 1 the percent incidence of *Aspergillus niger* (50 %) was highest at Beed locality followed by *Aspergillus flavus* (46 %) at Parbhani. *Aspergillus flavus, Aspergillus niger, Fusarium moniliforme, F. oxysporum, Penicillium notatum* and *Rhizopus nigricans* shows 100 % occurrence at 5 localities. Percent incidence of *Alternaria tenius* only 3 localities with

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lower (3.33%, 6.66%) were found to be lest. Jovicevic (1980) also repoted that the filter paper method was most practical method for routine analysis of seed health. In agar plate method paper from table no. 1 and graph no. 1 fungal incidence was seen to be more as compare to Blotter paper method the highest fungal percent incidence were seen of *Penicillium chrysogenum* (53.33 %) at Parbhani locality next to that *Aspergillus niger* (46.66 %) at Osmanabad followed by *Aspergillus flavus* (43.33 %) at Beed locality. Mukherjee et al. (1992) also found *Aspergillus flavus* and *Aspergillus niger* were predominant storage fungi of groundnut. Surface sterilization of seed reduces the incidence of mycoflora. Therefore need for reducing the fungal growth in groundnut seeds by improving the storage condition.

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