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Post harvest fungal decay of turmeric rhizomes in Orissa

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Deacyed post harvest rhizomes of turmeric were collected from different markets and godowns of Orissa. Five fungi, namely *Aspergillus flavus, Aspergillus niger, Fusarium moniliforme, Fusarium solani* and *Rhizopus* spp. were found to be more predominant in causing decay at all places. The occurrence and degree of infection of these fungi were different at different locations. Maximum conidial germination was noticed at a temperature between 25° and 30°C with 100% relative humidity. Fungicides like Sixer 0.3%, copper hydroxide carbendazim and mancozeb were effective against all the fungi reported. Turmeric rhizomes inoculated by incision and pinprick methods indicated that maximum infection occurred on the 10th day after inoculation by *F. moniliforme.*

Key words : Post-harvest fungal decay, turmeric, *Fusarium moniliforme, Aspergillus* spp., conidial germination

INTRODUCTION

Turmeric (*Curcuma longa* L.) is an important spice in the state of Orissa, cultivated next to chilli. It is used not only as a colourant of food stuffs, but also as a blood purifier and has a wide demand in pharmaceutical industries. The rhizome rot of turmeric (Harish *et al.*, 1990) is caused by several pathogens and damages caused by them is still unexplored. To understand the nature of rhizome rot of turmeric under Orissa condition and to study the occurrence, the persent investigation was undertaken and the results are presented herein.

MATERIALS AND METHODS

Rhizome rot affected samples of turmeric were collected from various godowns and markets of four different locations of the state namely, G. Udayagiri, Balliguda Phulbani and Bhubaneswar. The rhizomes were surface sterilized with mercuric chloride solution in the usual way. Surface sterilized infected rhizomes were placed on PDA medium in petriplates and incubated for 5 days at 25±1°C. The growth of the fungi emerging in petriplate were recorded. The emerging fungi were isolated on PDA and maintained in pure culture by single spore isolation.

Symptoms of rotting along with indentification of pathogenic fungi were done for each location. Frequency percentage of each fungi emerging was calculated and relative importance of genera of fungi was assessed on the basis of their frequency of incidence. Pathogenecity test of the isolated fungi were subsequently confirmed. Pattern of appearance of fungi location wise, their conidial gemination trends under different temperature and relative humidity were studied under laboratory condition. Inhibitory effects of fungitoxicants against respective fungi was also studied.

RESULTS AND DISCUSSION

The turmeric rhizome samples with rots collected from Balliguda area had complex association of

fungi with *Fusarium solani, Fusarium moniliforme, Aspergillus niger* and *Aspergillus flavus* exhibiting 25, 35, 20 and 20 per cent rotting symptoms respectively (Fig. 1). *Fusarium solani* and *Rhizopus* spp. were not isolated from rotted rhizomes collected from at G. Udayagiri although rotting by *A. niger, A. flavus* and *F. moniliforme* was to the extent of 40, 20 and 40 per cent respectively. The rotting of rhizomes at Phulbani area could be found to be due to *Fusarium solani* and *Rhizopus* species to an extent of 90 per cent and 10 per cent respectively. The rhizome rot of turmeric at Bhubaneswar was due to *Fusarium moniliforme* only showing hundred percent rotting of healthy rhizomes of turmeric.

Association of *A. niger, A. flavus,* and *F. moniliforme* with rhizome rot of turmeric has earlier been reported by Harish Kumar *et al.* (1990).

Such variation in fungi inciting rot location wise may be due to variation in the agro-climatic conditions and storage conditions. G. Udayagiri, Balliguda and Phulbani belong to same agro-climatic zones with more or less similar trend of temperature and R. H.. Variation in associated fungi and particularly absence of *Aspergillus* spp. may be due to the fact that the storage of rhizome in these areas was made in open-air shed beds. The rhizome samples of Bhubansewar market and godowns showed maximum rotting by *Fasarium moniliforme,* although this area with hot and humid weather is favourable for growth of mould fungi. Such absence of mould fungi could be due to the fact that market samples were kept mostly under clean storage conditions to enhance the market values. Another factor for such post harvest rotting could be the type of humus used and soil-cropping system taken up during cultivation which might be conducive for causing mould fungi.

Studies on effect of different temperature and RH on rate of cinidial germination of three fungi, namely *A. flavus, A. niger* and *Fusarium moniloforme,* isolated from decayed rhizomes of turmeric indicated maximum conidial germination at 35°C accompanied with R. H. between 90—100%. The rate of germination decreased with the decrease in both temperature and RH.

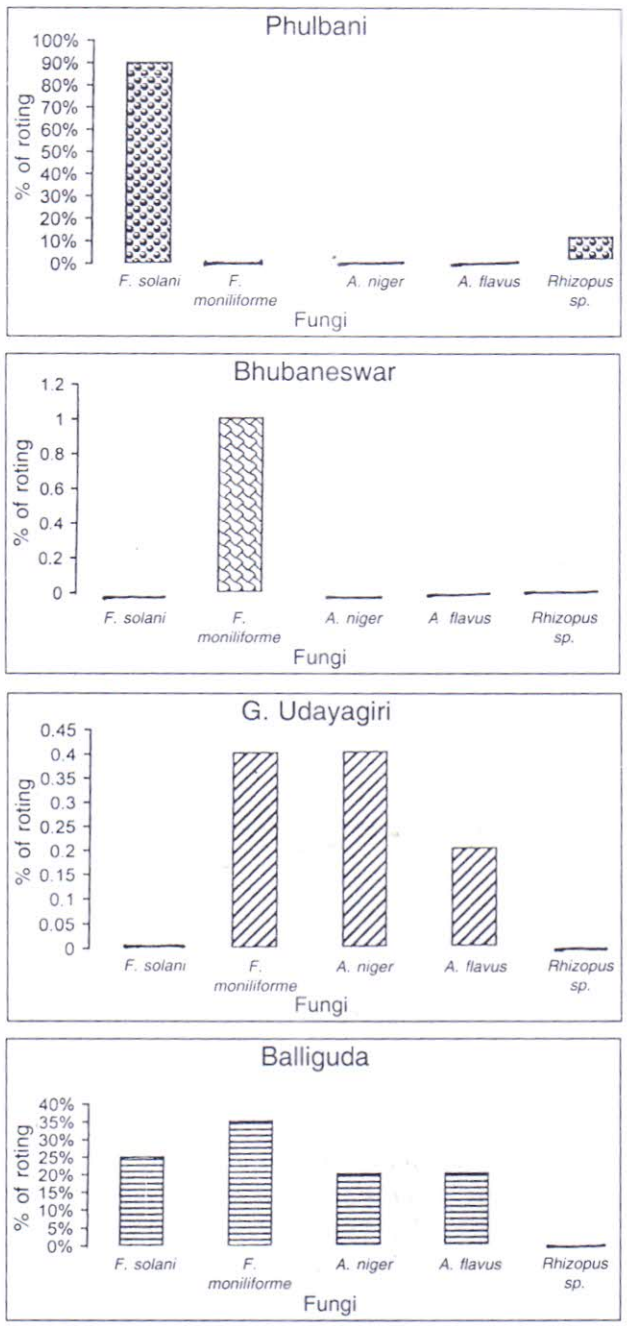

Fig. 1. Relative occurrence of different fungi in rot affected rhizomes of turmeric collected from different areas.

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