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E: ISSN NO.: 2455-0817 *Remarking An Analisation*

Fungal Association of Banana Fruits

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Abstract

The different varieties of banana fruits viz. Singapuri, Chinia, Malbhog, Bhoswal, Sakar Chinia, Chaukia, Gopalbhog, Alpan and Champa are cultivated in Gangetic belt of Bihar. Out of these varieties, Chinia, Malbhog & Singapuri occupy an important place in market as table dishes due to better taste and highly nutrients. However, different field, market and storage centre were surveyed to study the fungal diseases in fruits, leaves, pseudostems. Symptom of the diseases were recorded and isolation of pathogens was made by the usual method. The culture of pathogens were purified and identified.

Keywords: Microbial, Association, Banana Fruits.

Introduction

The mere fact that cereals alone cannot fulfil our dietary requirement has forced the farmers and government agencies to pay greater attention on the fruits and vegetables production. In Bihar, banana is extensively cultivated in North-East and North-West region. It covers approximately 20,000 acre of lands. Despite our best efforts, India is producing only 2-2.5 million tons of banana every year out of the total world production of 20 million tons as estimated by Simmonds (1966).

The fungal pathogens damage the fruits by producing soft rot or dry rot symptom. In addition to fruits, leaves as well as pseudostems are also attacked by large number of micro-organisms which indirectly effect the yield by poor fruiting. So, the present investigation deals the fungal association with banana fruits either in field, market and storage.

Reviews of Literature

The unscientifical methods of transportation storage and marketing make them prone to fungal and bacterial attack which reduces the keeping quality as well as nutritive, commercial and medicinal value of the banana fruits. The fungal pathogens damage the fruits by producing soft rot or dry rot symptom which damage the parenchymatous tissue making them inedible (Rose *et al*; 1950 and Ramsey *et al.* 1953). In addition to fruits, leaves and pseudostem are also attacked by various micro-organisms which indirectly affect the yield by poor fruiting (Prasad *et al* 1989). Prakash& Singh (1975), Singh (1992), Singh *et al* (1993) also worked on banana fruits. Singh (2012) also studied the fungal association in concern to banana fruits.

Aim of the Study

An extensive survey for the diseases of several varieties of banana was carried in the study areas viz., Bhagalpur, Naugachia, Narayanpur, Khagaria, Begusari, Sabour, Mokamah and Hajipur. These Banana fruits are damaged by large number of fungi in field, storage as well as market. So the present aim of the study is to find out pathogenic fungal association with different varieties of banana fruits.

Materials & Methods

The survey of different fields and markets of different cities were conducted.Symptom of the diseased samples i.e. fruits, leaves and pseudostems were recorded under natural conditions and samples were brought to the laboratory in separate polyethylene bags for further investigation. Subsequently, proper sterilization with 2% sodium hypo-chloride (Naocl) solution, small pieces of fruit (skin), leaves and pseudostems taken from the junction of infected and apparently healthy regions were transferred to the Potato Dextrose Agar (PDA) & Asthana and Hawker's slant (Prasad *et al*, 1989). Fungal organisms were subsequently purified by usual method and their identification were confirmed.

Results and Discussions

The results reveals that during the survey it was recorded that incidence of fungi varied with the fluctuation, in the environmental condition (Singh, *et al.*, 2012). There was considerable rotting of all the varieties of banana fruits due to *Aspergillus flavus* and *A. niger* in the market. Even the

fruits in field which inflicted mechanical injury got infection of these fungi and caused spoilage of the fruits.

Despite the fruits, the leaves and pseudostems showed severe infection by some of the pathogenic and saprophytic fungi.Some of the organisms isolated from fruits, leaves and pseudostems are listed in (Table – 1).

Like other fruits and vegetables, banana also get spoiled every year by various fungi in field as well as storage and market (Bhargava *et. al*1965; Dhingra *et al*, 1970). Peshney (1984) also reported black heart rot of banana caused by *Fusarium moniliforme*. Similar observation was also made by Singh (1986),who worked on pathological and biochemical studies on banana fruits (Var Green) common in North Bihar. Singh (1992) also worked on different varieties of banana fruits.

Conclusion

A regular survey of different fields and markets for the fungal diseases of fruits, leaves and pseudostems revealed that they are attacked by large number of fungi causing considerable spoilage of the fruits and fruit yield by indirectly affecting the leaves and pseudostem. The field observation exhibited dry and soft rot of the fruits, stunting and wilting of plants, leaf lesion and leaf spots where as the market yard registered heavy spoilage of fruits due to *Fusarium sps., Aspergillus flavus and A. niger.*

Table – 1: An Account of Disease Symptoms in Different Varieties of Banana

Name of the Varieties	Parts Affected	Locality	Symptoms	Fungi Isolated
Alpan& Singapuri	Fruit	Sabour (field)	Symptoms appeared as a small, regular, brown coloured spots which initiated usually from the distal end of the fruits. Within 6-7 days 1/4th of the fruit skin became dark black in colour. Rotting rate was compratively slower.	*Alternaria alternate, Aspergillus flavus, A. niger*
Malbhog& China	Fruit	Sabour (Market & Storage)	A large number of fruits were found to be infected. Lesions were large, brown coloured and irregular in shape ending with reddish margin.At advanced stage of disease development tissuesturned greyish and pulpy.	*Helminthosporium spiciferum, A. flavus*
Chinia	Fruit	Hajipur(Market & Storage	Initially the fruits exhibited longitudinal cracks having white mycelia growth. The skin of the fruits became black and pulpy with pungent odour. The margin of the lesion was irregular.	*Papulospora* sp., *A. flavus, A. niger*
Chinia	Fruit	Naugachia(Market & Storage	The infected fruits showed water soaked, pulpy patches. The fruits brought to the laboratory showed profuse cottony mycelia' growth within 3-4 days.	*Fusarium equiseti Trichothecium roseum, A. flavus*
Singapuri & Malbhog	Fruit	Naugachia (Field)	The diseased fruits were smaller in size. The rotting started from the stigma region. The colour of the entire fruit turned black withthe development of the disease.	*Fusarium solani, A. flavus*
Chinia	Fruit	Bhagalpur (Local Market)	The market fruits showed black shunken round spots on the rind which fused to form large lesion within 5-6 days. The fruits got completely rotten within 10 days.	*Fusarium semitectum, A. niger*
Chinia & Malbhog	Fruit	Hajipur (Field)	During the survey of the field some of the fruits of bunch showed wrinkled black lesion.The longitudinal section of fruit showed reddish brown streaks spreading towards pedicillar region. The diseased portion was quite hard	*Fusarium moniliforme, A. flavus*

			and rough as compared to sorrounding healthy protions. The infection always started at stigmatic end which progressed towards pedicillate end.	
Chinia & Singapuri	Fruit	Bhagalpur (Market) & Naugachia	The fruits exhibited rotting from the pedicillate end. The rotten portion became hard and woody with frequent cracks in the Alpan, infected portion. In many cases the rotting was found to start from the stigma region which progressed backward.	*Deightoniella torulosa, A. flavus*
Chinia & Gopalbhog	Fruit	Hajipur & Bihpur (Field)	The fruit exhibited rotting from the pedicill-ate end. The colour of the skin was changed first to brown and finally to black resulting dropping of the fruits from the bunch. The pulpy tissue emitted pungent odour.	*Acremonius strictus, A. flavus*
Alpan	Fruit	Sabour & Bhagalpur market	The rotting started from either end of the fruit or from both the ends showing rapids spoilage of inner tissue which turned pulpy and brown.	*Cladosporium cladosporioides*
Chinia Malbhog & Bhosawal	Fruit	Bhagalpur market & Sabour	The fruits showed black pin head spots scattered on the skin. In severe cases almost all theareas of skin were marked with fruiting bodies which caused complete spoilage of the fruits with in a week.	*Botryodiplodia theobromae, A. niger, A. flavus*
Chinia	Leaves	Sabour(Field)	The lamina of mature and older leaves showed large number of scattered brown to yellow spots with central necrotic zone.	*Deightoniella torulosa, A. flavus*
Chinia	Leaves	Sabour(Field)	The leaf showed small brown spots parallel to the veins. In mature condition the spots turned brown. The older spots showed yellow, orange colouration in the centre which rapidly developed into necrotic area.	*Alternaria alternate, A. flavus*
Chinia	Pseudostem	Hajipur (Suburbs of Gandhi Setu Bridge) Fields	The first symptom appeared as a yellowing of older leaves. Some of the leaves collapsed from the petiole while they were green. At later stages all leaves collapse at the points where the leaf joins the pseudostem and then died.	*Fusarius oxysporum, F. cubense*
Chinia & Malbhog	Pseudostem (infected)	Hajipur (Suburbsof GandhiSetu Bridge) Fields	Internal section of the pseudostem was also observed which showed discolouration of the vascular bundles. Incubation of cut infected pseudostem in the laboratory condition showed white mycelial growth over the discoloured conducting areas. Finally the tissues turned pulpy & emitted bad smell.	*F. oxysporum*

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