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STUDY OF INCIDENCE OF TWO MAJOR POST HARVEST DISEASES OF STRAWBERRY (*FRAGARIA INDICA* L.) IN MARATHWADA

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ABSTRACT

The fruits of Strawberry (*Fragaria indica* L.) are highly perishable fruits due to their extreme tenderness, vulnerability to mechanical damage, high level of respiration and their susceptibility to fungal spoilage. It has noted that 53.4% strawberries were infected by *Fusarium oxysporum* f.sp. *fragariae.* The percentage of infected strawberries due to growth of *Rhizopus stolonifer* was 34% respectively. This indicates that these two post harvest fungi such as *Fusarium oxysporum f.sp. fragariae* and *Rhizopus stolonifer* were economically important fungi causing major losses of strawberries in Marathwada region.

KEYWORDS: Strawberry (*Fragaria indica* L.), two major post harvest diseases.

INTRODUCTION

The fruit is highly nutritious. It is the best source of minerals such as Phosphorous, Calcium, and Iron. It also consist of vitamin –C, niacin, carotene, thiamine, riboflavin, and crude fiber. It is very commonly cultivated in the tropical and subtropical regions of world. Major loss of harvested fruits is caused due to fungi. The diseases caused before harvest of fruits also responsible for degradation of quality and cost of fruits in market. Post – harvest loss of fruits may be due to susceptibly of fruits to the fungal growth, Bhaskara, et. al, 1998). The physiology and morphology of fruit is also responsible for susceptibility of fruit to diseases. The soft skinned fruits are more susceptible than tough skinned fruits. Sumia Fatima, et. al,

(2006). Soft skinned fruits require careful handling. Injured fruits are highly susceptible than uninjured ones in all types of fruits, (Gadgile, et. al, 2010).

MATERIAL AND METHODS

Collection of strawberry: The infected strawberries were collected from fruit sellers of Marathwada region. The boxes of infected strawberries were collected from fruit sellers and brought to the laboratory in a separate polyethylene bag for each infected strawberries. Total 500 infected fruits were observed.

Isolation of fungus: The fungus grown on infected regions was directly removed by sterile needle in sterile condition and inoculates on PDA amended petriplate (Food poisoning technique) The petiriplates were incubated at room temperature $26+-^{1}\ C^{0}$.

Purification of culture: The externally grown mycoflora of strawberry isolated and purified by using single spore inoculation technique and single hyphal thread inoculation technique, proposed by Mukadam and Chavan, (1998) on freshly prepared PDA medium. The fungus was identified on the basis of external morphology of spores, mycelium.

Pathogenecity test: The pathogenecity of isolated two fungus of strawberry was tested according to Koch s postulates. A four mm disc of 4-5 days old growing colony of respective fungus was removed with sterile borer in sterile condition. The set of 3 healthy strawberries were initially surface satirized with 0.1% $HgCl_2$ and superficially injured with the help of sterile needle and inoculated the 4 mm disc of fungus at artificially injured region of fruits. The inoculated strawberries were incubated at room temperature $25+-^{1}\ C^{0}$.

RESULT AND DISCUSSION

Out of 500 infected strawberries collected from local markets of Marathwada, 267 were shown white cottony growth of fungus such as *Fusarium oxysporum* f.sp. *fragariae* and 170 fruits were shown infection of *Rhizopus stolonifer.* It has noted that 53.4% strawberries were infected by *Fusarium oxysporum* f.sp. *fragariae.* The percentage if infected strawberries due to growth of *Rhizopus stolonifer* was 34% respectively. This indicates that these two post harvest fungi such as *Fusarium oxysporum* f.sp. *fragariae* and *Rhizopus stolonifer* were economically important fungi causing major losses of strawberries in Marathwada region.

The white cottony rot of strawberry starts as a water soaked lesions which are more or less circular, depressed. The skin becomes watery and soft. The infected tissue losses its turgidity.

High humidity is favorable for the advancement of Fusarium rot of strawberry. White mycelial growth develops on the infected fruit. The infected fruits appear cottony, (Abd-El-Kareem, 2001).

The fungus is very common on fully ripen strawberry which causes water soaked lesions, that increase rapidly causing 100 per cent decay within 5-6 days. The fruit lose its shape and the tissue turns soft. Infected fruit get covered with white cottony mass of fungus. Artificial inoculation of *Fusarium oxysporum* develops small circular lesion which increases gradually. In severe cases, an extensive growth of fungal mycelium occurs in on fruit surface. High humidity and temperature at 26°C is most favorable for development of rot.

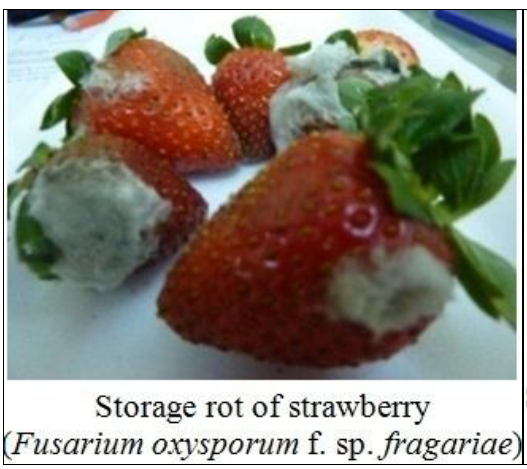
White cottony rot of strawberry

The Fusarium rot of strawberry is one of the major post harvest disease.

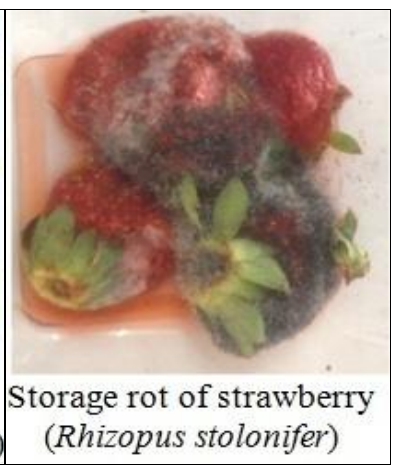
Symptoms

The characteristic symptoms of the disease are yellowing and browning of the fruits. The injured fruits get attracted immediately. Rarely the infected fruit shows white cottony growth of fungus. The infected patches become water soaked. The pulp becomes lucid. Infected fruits emit foul odour. The infected patches become water soaked. It is one of the serious diseases causing hues damage during storage. Similar symptoms are observed by Rathod, (2010).

Causal organism: It caused by *Fusarium oxysporum* f. sp. *fragarae.* The hyphae were septate, hyaline, colony growth white cottony, sexual spores are absent, Macroconidia and microconidia are produced. Macroconidia are falcate, 1-5 septate with tapering ends. Microconidia are thin, hyaline, elliptical, one or two celled structures.



Storage rot of strawberry
(*Fusarium oxysporum* f. sp. *fragariae*)



Storage rot of strawberry
(*Rhizopus stolonifer*)

Rhizopus rot of strawberry

Symptoms: The infected fruit possesses water soaked spots with irregular margin. Later on the colour of spot changes to dark brown.

Infection starts with a light brown coloured circular lesion on the affected fruits. Gradually the circular lesions increase, simultaneously the fruit becomes yellowish and soft. In advanced stages of rot development, watery substance comes out from the centre of spot and patches get covered with fungal growth. The heavily infected fruits become watery. Rhizopus rot emit dirty foul smell. Infection spread quickly to the adjourning fruits. The fruits finally collapse within 5-7 days of infection. Temperature between 20-40°C and 100 per cent humidity is highly favorable for the development of Rhizopus rot (Bhale, 2011).

Causal organism: The fungus *Rhizopus stolonifer* causes soft rot of strawberry. The fungus, produces prostrate sporangiophore, rarely single and measuring 0.5-2 mm in length. All the branches produce sporangia which are spherical, 120-250 mm in diameter. Spores oval or round grayish brown measuring 4.8-7.0 x 4.8-5.6 mm. and easily discriminated by wind.

DISCUSSION

In all India fruit storage system is very poor. Because of this about 10-15 percent food grains get deteriorated due to pests & fungal saprophytic attack. In India 68% population stay at villages. Where fruits are stored by traditional method also showed 6-7 percent loss of fruits. The total estimated loss comes to corers of rupees annually. There are no store houses of fruits in the rural areas in India. After harvest the fruits are brought to the market openly in wooden Laurie. During transportation the fruits get injured and saprophytic fungi grow on all types of injured fruits, (Ceponis, et. al, 1987). The injured fruits are highly susceptible for fungal infection. About 30% fruits get rotted during transportation from fruit orchard to market.

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