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Incidence of fungal diseases of capsicum in relation to seasonal variation

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Abstract

Nashik is one of the most important and leading district in Maharashtra participant in *Capsicum* cultivation. It is proved by various experiments that various pathogenic fungi can attack the plants and cause diseases during favorable environmental conditions, which results yield loss. The aim of this present survey and study was to identify the plant pathogenic fungi from *Capsicum* and to evaluate their fungal pathogenic intensity during variable metrological conditions. A seasonal survey for the incidence of fungal diseases of capsicum was undertaken simultaneously the metrological data of study area recorded. *Capsicum* is economical agricultural crop and is affected by various types of fungal pathogens causing major loss in production and quality. A samples infected with fungal disease were collected from different localities of Nashik District. From these samples pathogenic fungi were isolated and identified through morphological characters. All fungal pathogens were recovered from collected samples. *Fusarium oxysporum*, *Erysiphe cichoracearum* and *Leveillula taurica* were recorded from the samples of collected from irrigated fields, while *Phytophthora*, *Alternaria solani* and *Pythium spp* from early and mature stage of infected plants. All these pathogenic fungi were evaluated to study their pathogenicity on *Capsicum*. The *Alternaria solani* caused the blight and rotting within 10–20 days on plants tested. The fruit rot symptoms were observed on the 6th days after inoculation of *Phytophthora spp.* plants to prove the Koch's postulates.

Keywords: Capsicum, Fungal pathogens, Pathogenicity

1. Introduction

According to Gunashekar and Govindaiah (1993) [6] assessment of the incidence of diseases in Agricultural crop is essential to avoid economic loss. *Capsicum* is attacked by several diseases of biotic and abiotic nature leading to great loss to cultivators. *Capsicum* attacked by a large number of fungal diseases depending upon the locality and agro climatic conditions. Major fungal diseases affecting capsicum are damping off (*Pythium aphanidermatum* and *Phytophthora spp.*), leaf spots (*Cercospora capsici* and *Alternaria solani*), anthracnose and ripe rot (*Colletotrichum capsici*) and fruit rot and leaf blight (*Phytophthora spp.*), powdery mil dew *Erysiphe cichoracearum* and *Leveillula taurica*, Early blight (*Alternaria solani*), wilt (*Fusarium oxysporum*), frog eye rot (*Phaeoramularia capsicicola*), leaf spot (*Septoria lycopersici*), fruit spot (*Phoma destructiva*), stem rot (*Macrophomina phaseoli*), dry rot (*Sclerotium rolfsii*) and fruit rot (*Phomopsis spp.*), respectively. The postharvest rots are caused by *Aspergillus terreus*, *A. candidus*, *A. niger*, *Fusarium moniliforme*, *F. sporotrichioides*, *Paecilomyces variotii* and *Penicillium corylophilum* (Bose *et al.*, 2002; Gupta and Paul, 2002; Chadha, 2003; Gupta and Thind, 2006) [3, 5]

2. Material and Methods

The present investigation carried in *Capsicum* cultivation field of Nashik District. The average rainfall of the district is between 2600 and 3000 mm but there is wide variation in the rainfall received at various blocks. Most of the rainfall is received at various blocks during June to September. In summer the maximum temperature is 42.5 °C and in winter minimum temperature is may be about 5.0 °C. Relative humidity ranges from 43% to 62%. In recent years fluctuation in climatic parameters were observed which results in the initiation, development and spread of diseases on *Capsicum* and other crops in general.

To carry out present research samples were collected from the selected different sites of Nashik District in sterilized bags. At lab these samples were also sorted out, cleaned and labeled after that laboratory analysis is carried out for isolation and identification of fungal pathogens using culture medium to obtain pure culture. Simultaneously meteorological data was collected to co-relate the occurrence of disease and forecasting purposes.

3. Result and Discussion

Colletotrichum causes anthracnose usually during warm, wet weather. This infection occurs at both higher and lower temperatures. Severe losses occur during rainy weather because the spores are washed or splashed to other fruit resulting in more infections. The disease is more likely to develop on mature fruit that is present for a long period on the plant, although it can occur on both immature and mature fruit.

Phytophthora causes root rot disease in capsicum in the late summer and early fall during periods of heavy rainfall and warm nights, and when the foliage is dense and plants become crowded. Initially infected plants show severe wilting and within a few days, infected plants collapse due to root and stem infections and die, turning straw-colored.

Fusarium solani causes infection to fruits and roots of Capsicum. In culture the colonies appeared as brownish, pinkish and white in color. The fungus causes fruit rot and root rot. It was present from October to April, but was dominant in November and February.

Alternaria solani causes infection to leaf and stem. In culture colonies were olive green or brownish black. It causes leaf blight, fruit rot and stem black rot disease in Capsicum. It was found throughout the year in moderate to severe form.

Curvularia lunata mostly infecting leaves. Colonies were found spreading, dark grey coloured in culture. It causes disease mainly on leaves. Infection was recorded from October to May.

4. Conclusion

The present study on Capsicum cultivation in Nashik district revealed that *Fusarium solani* was found throughout the year on fruits and roots in all seasons while *Alternaria alternata* present on leaves, fruits, seeds and stem was confined between summer and winter seasons but was most abundant in early winter seasons and late summer seasons. *Curvularia lunata* on leaves was present in early winter seasons. The reasons for the same may be high humidity and low temperature during these days. The most common fungi causing spoilage were *Alternaria alternata*, *Fusarium solani*.

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